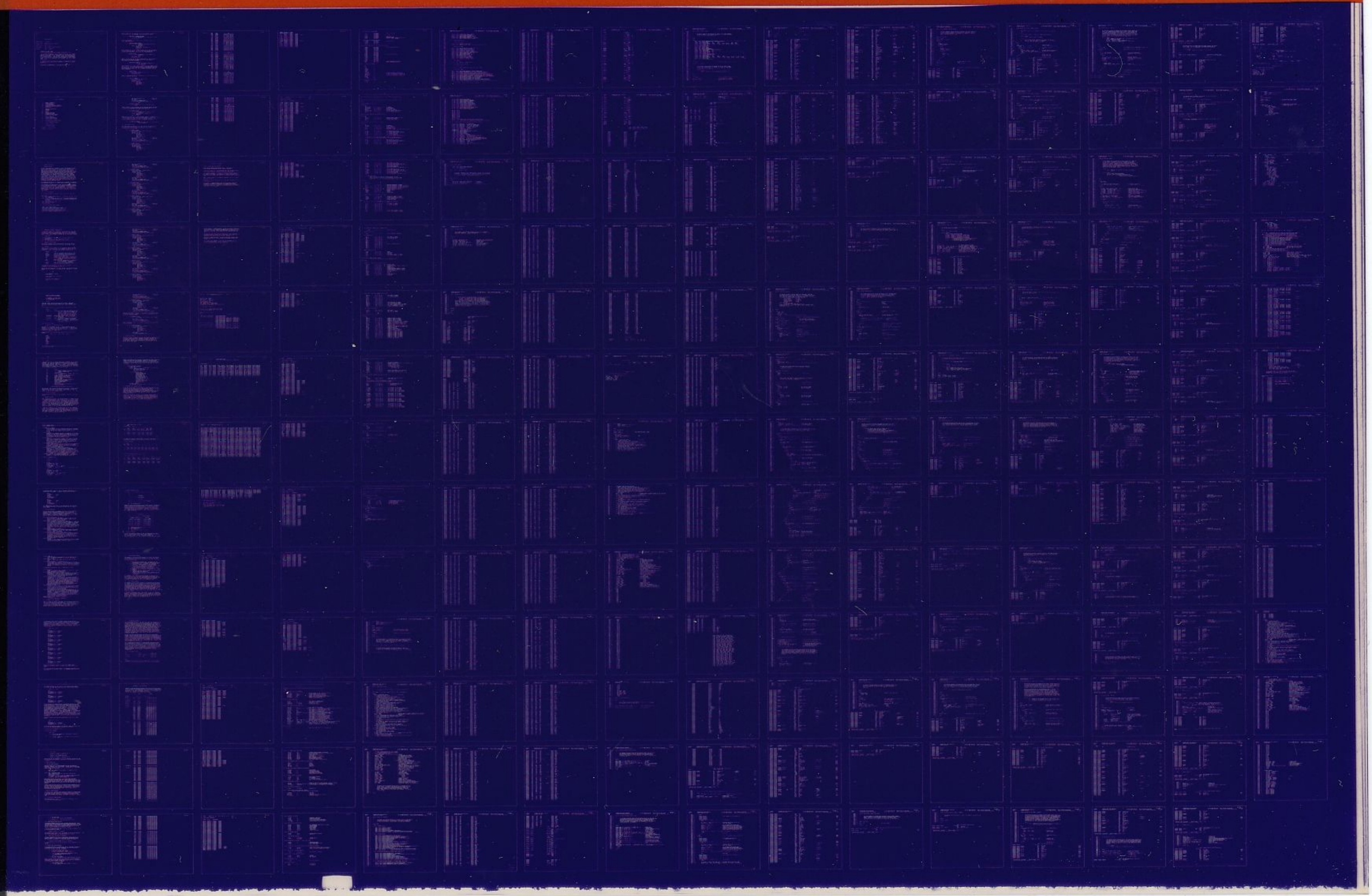
RC25

RC25 EXERCISER
CZRCDB0

AH-T267B-MC
1 OF 2 OCT 1985

digital
MADE IN USA



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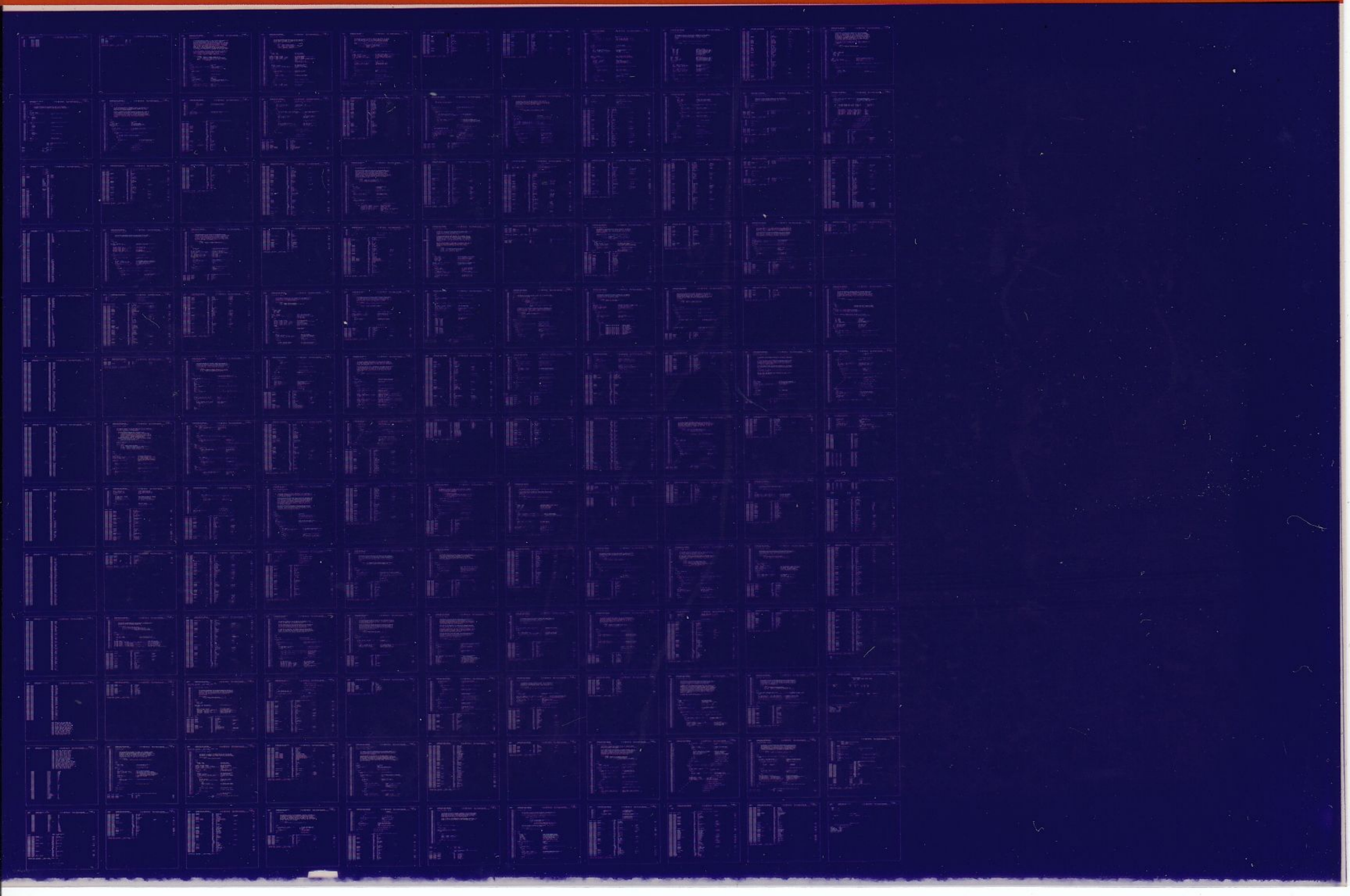

IDENTIFICATION

PRODUCT CODE: AC-T266B-MC

PRODUCT NAME: CZRCDB0 RC25 DISK EXERCISER

PRODUCT DATE: JUNE 17, 1985

MAINTAINER: SMALL STORAGE SYSTEMS DIAGNOSTICS

AUTHOR: JAMES S. DOUCETTE

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE RC25 DISK EXERCISER IS DESIGNED TO VERIFY THE INTEGRITY OF THE DRIVE(S) UNDER TEST, AND TO DETECT FAULTS AT THE FUNCTIONAL LEVEL ONLY. UNDER THE MULTI-DRIVE SUBTEST, THE PROGRAM SHOULD GIVE A CLEAR INDICATION AS TO HOW AN RC25 DRIVE WILL FUNCTION EITHER ALONE OR WITH OTHER RC25 DRIVES UNDER STRESSFUL OPERATING SYSTEM CONDITIONS. THESE CONDITIONS ARE CREATED BY ISSUING A HEAVY LOAD OF MSCP I/O COMMANDS TO ALL ONLINE UNITS. THE USER CAN CONTROL MANY OF THE I/O COMMAND PARAMETERS THROUGH THE HARDWARE AND SOFTWARE QUESTIONS, INCLUDING FUNCTION (WRITE-ONLY, READ-ONLY, WRITES AND READS, WRITE-COMPARES, READ COMPARES), DISK BLOCK SELECTION (RANDOM VS. SEQUENTIAL), TRACK NUMBER LIMITS, AND THE SELECTION OF DATA PATTERNS. IN ADDITION, THE USER CAN CHOOSE INSTEAD TO RUN THE DM EXERCISER SUBTEST. THIS SUBTEST CONSISTS OF THE ROM-RESIDENT FRONT PANEL EXERCISER RUNNING IN THE DM (DIAGNOSTIC MACHINE) UNDER HOST CONTROL. SEE SECTION 6.0 FOR MORE INFORMATION ON EACH EXERCISER SUBTEST.

THIS EXERCISER CAN TEST UP TO 4 CONTROLLERS (4 DIFFERENT IP ADDRESSES), EACH CONTROLLER HAVING UP TO 2 DRIVES, AND EACH DRIVE WITH 2 PLATTERS.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE RC25 DISK EXERCISER:

- PDP-11 CPU
- 28K WORDS OF MEMORY (MEMORY ABOVE 28K, IF AVAILABLE, WILL BE USED FOR DATA TRANSFERS)
- FROM 1 TO 4 RC25 CONTROLLERS WITH UP TO 2 DRIVES PER CONTROLLER AND EXACTLY 2 PLATTERS PER DRIVE (I.E., A REMOVABLE CARTRIDGE MUST BE PRESENT IN EACH DRIVE, ALTHOUGH IT NEED NOT PARTICIPATE IN THE TEST)
- XXDP+ MEDIA DEVICE (I.E., RK05, RL02)
- KW11-L OR KW11 P CLOCK
- CONSOLE TERMINAL

1.3 RELATED DOCUMENTS AND STANDARDS

- CHQUS XXDP+ USER'S MANUAL
- UNIBUS/Q-BUS STORAGE SYSTEMS PORT (UQSSP), V1.5
- MASS STORAGE COMMUNICATION PROTOCOL (MSCP), V1.2
- DIAGNOSTIC AND UTILITIES PROTOCOL (DUP), V0.5
- FRONT PANEL EXERCISER DIAGNOSTIC SPECIFICATION, REV 1.2
- RC25 AZTEC ENGINEERING SPECIFICATION, REV 5

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

ALL RC25 DRIVE-UNITS TO BE EXERCISED BY THIS PROGRAM MUST HAVE BEEN SUCCESSFULLY VERIFIED BY THE RC25 AZTEC FRONT-END / HOST DIAGNOSTIC. THE FRONT-END / HOST DIAGNOSTIC REQUIRES THAT THE BUS, HOST PROCESSOR, MEMORY, SYSTEM CLOCK AND CONSOLE TERMINAL ARE ALL FUNCTIONING PROPERLY.

1.5 ASSUMPTIONS

* REMOVABLE CARTRIDGE IS PRESENT IN ALL RC25 DRIVE-UNITS TO BE EXERCISED
* ALL RC25 DRIVE-UNITS HAVE BEEN SUCCESSFULLY SPUN-UP
* ALL RC25 CONTROLLERS WILL INTERRUPT THE HOST AT BR LEVEL 5 OR LESS.

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (BY ↑C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME)
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

FOR THE RC25 DISK EXERCISER, THE START, RESTART, AND CONTINUE COMMANDS PERFORM SIMILAR FUNCTIONS. THE DIFFERENCES ARE SUMMARIZED IN THE TABLE BELOW:

	START	RESTART	CONTINUE
ALLOW CHANGES TO HARDWARE CONFIGURATION	X		
CLEAR ELAPSED TIME OF EXERCISER TO 00:00:00	X		
SAVE STATISTICS ACCUMULATED DURING THE LAST INCOMPLETE PASS			X

RESET THE COMMAND REFERENCE NUMBER USED IN MSCP COMMANDS	X	X
IF SEQUENTIAL LBN MODE, RESET THE STARTING BLOCK NUMBER USED IN I/O OPERATIONS	X	X

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH.

IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDDD	REPORT END-OF-PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDDD = 1 TO 64000)
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED IN THE LIST. LIST EXAMPLE - /UNITS:0:5:10-12 USE UNITS 0,5,10,11,12.

EXAMPLE OF SWITCH USAGE:

```
START/TESTS:1-5/PASS:1000/EOP:100
```

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END-OF-PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	X	X	X	X
CONTINUE		X	X	X	
PROCEED			X		
DROP					X
ADD					X
PRINT					
DISPLAY					X
FLAGS					
ZFLAGS					
EXIT					

FOR THE RC25 DISK EXERCISER, THE /TESTS SWITCH IS MEANINGLESS SINCE THERE IS ONLY ONE TEST.

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH A LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS (GENERAL, BASIC, AND EXTENDED)
IBR*	INHIBIT BASIC AND EXTENDED ERROR REPORTS
IXR*	INHIBIT EXTENDED ERROR REPORTS
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

* ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

```
/FLAGS:LOE:IER:BOE
```

FOR THE RC25 DISK EXERCISER, THE FOLLOWING FLAGS HAVE NO EFFECT: ADR AND EVL.

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?". YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS (A) THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+ USER'S MANUAL), OR (B) YOU WISH TO USE THE DEFAULT HARDWARE CONFIGURATION THAT IS SUPPLIED WITH THE PROGRAM (SEE BELOW). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE HARDWARE QUESTIONS FOR EACH UNIT. UNDER THIS PROGRAM, A UNIT IS DEFINED TO BE ONE DISK PLATTER.

A WORD ABOUT SEMANTICS: IN ALL MESSAGES OUTPUT BY THE RC25 EXERCISER, AS WELL AS IN THE DOCUMENTATION, THE PHRASES "UNIT X" AND "UNIT NUMBER" REFER TO THE SEQUENTIALLY-ASSIGNED UNIT NUMBER GIVEN BY THE DIAGNOSTIC SUPERVISOR. THE PHRASES "PLATTER X" AND "PLATTER ADDRESS" REFER TO THE UNIT NUMBER ASSIGNED TO THE DISK THROUGH THE UNIT PLUG ON THE FRONT OF THE DRIVE. THESE TWO NUMBERS ARE NOT RELATED.

```
DEFAULT ANSWERS APPEAR WITH QUESTIONS FOR WHICH THE USER MAY SIMPLY
TYPE A CARRIAGE RETURN.

IP ADDRESS (O)  172150 ?
        ENTER THE ADDRESS OF THE IP REGISTER OF ONE RC25 AS ADDRESSED
        BY THE PROCESSOR WITH MEMORY MANAGEMENT TURNED OFF. THE PROGRAM
        EXPECTS AN EVEN 16-BIT ADDRESS IN THE RANGE OF 160000 TO
        177774.
VECTOR (O)  154 ?
        ANSWER WITH THE INTERRUPT VECTOR OF THE SAME RC25 IN THE ABOVE
        QUESTION. AN EVEN VECTOR ADDRESS IN THE RANGE OF 4 TO 774 WILL
        BE ACCEPTED. SINCE RC25 VECTOR ADDRESSES ARE PROGRAMMABLE AND
        NOT HARDWIRED, CARE MUST BE TAKEN NOT TO SPECIFIY A VECTOR
        WHICH IS USED FOR ANOTHER PERIPHERAL DEVICE.
BR LEVEL (O)  5 ?
        ANSWER WITH THE BUS REQUEST INTERRUPT LEVEL USED BY THE ABOVE
        RC25. LEVELS 4 THORUGH 7 ARE ACCEPTABLE. (NOTE: THE PROGRAM
        EXPECTS THAT ALL RC25'S WILL BE AT BR LEVEL 5 OR LESS. IF
        THIS IS NOT THE CASE, THEN ONLY ONE RC25 CONTROLLER WITH UP
        TO FOUR UNITS MAY BE EXERCISED AT A TIME).
PLATTER ADDRESS (UNIT PLUG) (D)  0 ?
        ENTER A NUMBER BETWEEN 0 AND 253 FOR ONE DISK WHICH CORRESPONDS
        TO THE UNIT PLUG ON THE FRONT OF THE DEVICE. EVEN NUMBERS
        DESIGNATE THE REMOVABLE PLATTER (UPPER DISK), ODD NUMBERS REFER
        TO THE FIXED PLATTER (LOWER DISK).
ALLOW WRITES TO CUSTOMER DATA AREA ON THIS PLATTER (L)  ?
        NO DEFAULT. IF THE MULTI-DRIVE SUBTEST IS BEING RUN, A "NO"
        ANSWER HERE WILL FORCE THE EXERCISER TO PERFORM READ-ONLY
        OPERATIONS TO THE CUSTOMER DATA AREA OF THIS UNIT. IF THE DM
        EXERCISER IS BEING RUN, THIS QUESTION HAS NO EFFECT, SINCE THE
        DM EXERCISER WRITES ON THE DIAGNOSTIC TRACKS ONLY. IN ANY CASE,
        IF YOU ANSWER "YES", THE FOLLOWING QUESTION WILL APPEAR.
** WARNING - CUSTOMER DATA AREA MAY BE OVERWRITTEN! ... CONFIRM (L)  ?
        NO DEFAULT. A "YES" ANSWER IS EXPECTED, BUT A "NO" ANSWER WILL
        PREVENT THE CUSTOMER DATA AREA FROM BEING OVERWRITTEN.

EXAMPLE OF HARDWARE DIALOG:

        CHANGE HW (L)  ? Y<CR>

        # UNITS (D)  ? 2<CR>

        UNIT 0
        IP ADDRESS (O)  172150 ? <CR>
        VECTOR (O)  154 ? <CR>
        BR LEVEL (O)  5 ? <CR>
        PLATTER ADDRESS ... (D)  0 ? 252<CR>
        ALLOW WRITES ... (L)  ? Y<CR>
        ** WARNING - ... CONFIRM (L)  ? N<CR>    ! USER REVERSES ANSWER

        UNIT 1
        IP ADDRESS (O)  172150 ? <CR>
        VECTOR (O)  154 ? <CR>
        BR LEVEL (O)  5 ? <CR>
        PLATTER ADDRESS ... (D)  252 ? 253<CR>
        ALLOW WRITES ... (L) ? Y<CR>
        ** WARNING - ... CONFIRM (L)  ? Y<CR>
```

AS MENTIONED ABOVE, THERE IS A DEFAULT HARDWARE CONFIGURATION THAT IS SUPPLIED WITH THE PROGRAM. IT CONSISTS OF TWO UNITS AS FOLLOWS:

```
UNIT 0
IP ADDRESS:       172150
VECTOR:           154
BR LEVEL:         5
PLATTER ADDRESS:  0
ALLOW WRITES?     N

UNIT 1
IP ADDRESS:       172150
VECTOR:           154
BR LEVEL:         5
PLATTER ADDRESS:  1
ALLOW WRITES?     N
```

THIS CONFIGURATION TAKES EFFECT IF THE USER DOES NOT USE THE SETUP UTILITY AND HAS BYPASSED THE HARDWARE QUESTIONS WHEN THE PROGRAM IS FIRST STARTED.

2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS OR AFTER A RESTART OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC OPERATION MODES. YOU WILL BE PROMPTED BY "CHANGE SW (L) ?". IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING "Y". THE SOFTWARE QUESTIONS AND THE DEFAULT VALUES ARE DESCRIBED BELOW:

ERROR LIMIT (0 FOR NO LIMIT) (D) 32 ?
ENTER THE NUMBER OF HARD ERRORS ALLOWED PER UNIT PER PASS BEFORE THE UNIT IS DROPPED FROM TESTING. A NUMBER IN THE RANGE OF 0 TO 65535 WILL BE ACCEPTED.

TRANSFER LIMIT IN MEGABYTES (0 FOR NO LIMIT) (D) 2 ?
ENTER THE NUMBER OF MEGABYTES TO BE TRANSFERRED TO / FROM EACH UNIT BEFORE AN END-OF-PASS IS DECLARED. A NUMBER IN THE RANGE OF 0 TO 65535 WILL BE ACCEPTED. AS A REFERENCE, ON A SYSTEM CONFIGURED WITH ONE DRIVE (TWO UNITS) AND 128K OF MEMORY, THE MULTI-DRIVE SUBTEST WILL REACH A 10 MEGABYTE TRANSFER LIMIT IN APPROXIMATELY 8 MINUTES. FOR THE SAME SYSTEM, THE DM EXERCISER SUBTEST WILL REACH A 2 MEGABYTE LIMIT IN APPROXIMATELY 20 MINUTES.

SUPPRESS PRINTING ERROR LOG MESSAGES (L) Y ?
ERROR LOG MESSAGES USUALLY DESCRIBE MINOR ERRORS ENCOUNTERED DURING I/O OPERATIONS, SUCH AS ECC SYMBOL ERRORS. ANSWER "N" TO SEE ALL ERROR LOG MESSAGES.

RUN DM EXERCISER INSTEAD OF MULTI-DRIVE SUBTEST (L) N ?
THIS QUESTION DETERMINES WHICH OF THE TWO EXERCISER SUBTESTS WILL BE RUN. THE MULTI-DRIVE SUBTEST IS HOST-DRIVEN WHILE THE DM EXERCISER IS THE FRONT PANEL TEST EXECUTING IN THE DIAGNOSTIC MACHINE AT THE DEVICE. SEE SECTION 6.0 FOR MORE INFORMATION. THE REMAINING QUESTIONS WILL ONLY BE ASKED IF THE MULTI-DRIVE SUBTEST IS BEING RUN.

RANDOM SEEK MODE (L) Y ?
ANSWERING "Y" WILL CAUSE EACH I/O OPERATION TO SELECT A RANDOM STARTING DISK BLOCK NUMBER. ANSWER "N" TO HAVE STARTING BLOCK NUMBERS SELECTED SEQUENTIALLY ON EACH PLATTER.

STARTING TRACK (D) 0 ?
        ENTER THE STARTING TRACK NUMBER OF THE DISK AREA YOU WISH TO
        TEST. A NUMBER IN THE RANGE 0 TO 1641 WILL BE ACCEPTED.
ENDING TRACK (D) 1641 ?
        ENTER THE ENDING TRACK NUMBER OF THE DISK AREA YOU WISH TO
        TEST.
READ-COMPARES PERFORMED AT THE CONTROLLER (L) Y ?
        A "YES" ANSWER WILL CAUSE ALL READ OPERATIONS TO BE CHANGED TO
        READ-COMPARE. THIS ESSENTIALLY FORCES THE CONTROLLER TO PERFORM
        TWO READ OPERATIONS ON THE SAME DISK SECTORS AND TO COMPARE THE
        RESULTS. AFTER ANSWERING THIS QUESTION, THE FOLLOWING MESSAGE
        APPEARS:

THE REMAINING QUESTIONS ONLY APPLY TO UNPROTECTED PLATTERS.

WRITE ONLY (L) N ?
        ANSWER "Y" FOR WRITES ONLY; OTHERWISE THE PROGRAM WILL CHOOSE
        WRITES AND READS ON A RANDOM BASIS.
WRITE COMPARES PERFORMED AT THE CONTROLLER (L) Y ?
        ANSWERING "YES" CAUSES ALL WRITE I/O REQUESTS TO BE CHANGED TO
        WRITE-COMPARE. IN THIS SITUATION, AFTER EACH WRITE, THE
        CONTROLLER WILL READ BACK THE DATA FROM THE MEDIA AND COMPARE
        IT TO THE ORIGINAL DATA RE-OBTAINED FROM THE HOST.
CHECK ALL WRITES AT HOST BY READING (L) N ?
        THIS QUESTION WILL ONLY BE ASKED IF THE PREVIOUS QUESTION WAS
        ANSWERED "NO". A "YES" ANSWER HERE CAUSES EACH HOST WRITE
        REQUEST TO BE FOLLOWED BY A READ REQUEST. WHEN BOTH OPERATIONS
        HAVE COMPLETED, THE HOST WILL COMPARE THE DATA STORED IN THE
        TWO I/O BUFFERS. THERE ARE SOME UNDESIRABLE IMPLICATIONS IN
        CHOOSING THIS OPTION, INCLUDING THE CONSUMPTION OF EXTRA CPU
        TIME, AND THE OVERRIDING OF THE CONTROLLER'S NORMAL
        OPTIMIZATION POLICIES (DUE TO THE "EXPRESS REQUEST" COMMAND
        MODIFIER WHICH MUST BE SET FOR EACH WRITE-READ PAIR).
USER-DEFINED DATA PATTERN (L) N ?
        AN ANSWER OF "YES" ALLOWS YOU TO DEFINE YOUR OWN DATA PATTERN
        (UP TO 16 WORDS) TO BE USED IN ALL WRITE OPERATIONS. A "NO"
        ANSWER ALLOWS THE USE OF OTHER PRE-DEFINED DATA PATTERNS WHICH
        MAY BE SELECTED IN THE NEXT QUESTION.
SELECT PRE-DEFINED DATA PATTERN (0 FOR SEQUENTIAL SELECTION) (D) 0 ?
        THIS QUESTION WILL ONLY BE ASKED IF THE PREVIOUS QUESTION WAS
        ANSWERED "NO'. THE 21 PRE-DEFINED DATA PATTERNS ARE SHOWN IN
        APPENDIX A. AN ANSWER OF "0" CAUSES EACH OF THE 21 PATTERNS TO
        BE SELECTED SEQUENTIALLY ON EACH UNIT. NOTE THAT PATTERN 1
        CONSISTS ENTIRELY OF RANDOM NUMBERS. THIS COMPLETES THE SOFT-
        WARE QUESTIONING; THE FOLLOWING QUESTIONS ARE ASKED ONLY IF YOU
        CHOSE TO DEFINE YOUR OWN DATA PATTERN.
NUMBER OF WORDS IN DATA PATTERN (16 MAXIMUM) (D) 16 ?
PATTERN VALUE (0) ?
        THIS QUESTION REPEATED AS APPROPRIATE.

2.6 EXTENDED P-TABLE DIALOGUE

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. IF YOU HAVE A MULTIPLEXED DEVICE SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

TO ILLUSTRATE A MORE EFFICIENT METHOD, SUPPOSE YOU ARE TESTING A FICTIONAL DEVICE, THE XY11. SUPPOSE THIS DEVICE CONSISTS OF A CONTROL MODULE WITH EIGHT UNITS (SUB-DEVICES) ATTACHED TO IT. THESE UNITS ARE DESCRIBED BY THE OCTAL NUMBERS 0 THROUGH 7. THERE IS ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS CALLED THE Q-FACTOR. THIS Q-FACTOR MAY BE 0 OR 1. BELOW IS A SIMPLE WAY TO BUILD A TABLE FOR ONE XY11 WITH EIGHT UNITS.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  1<CR>
Q-FACTOR (O) 1 ?  0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 4
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  3<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 5
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  4<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  5<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 7
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 8
CSR ADDRESS (O)  160000<CR>
SUB DEVICE # (O) ?  7<CR>
Q-FACTOR (O) 1 ?  <CR>
```

NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A NON DEFAULT RESPONSE IS GIVEN. BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

THE RUNTIME SERVICES CAN TAKE MULTIPLE UNIT SPECIFICATIONS HOWEVER.
LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION FEATURE.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB DEVICE # (O) ?  0,1<CR>
Q-FACTOR (O) O ?  1,0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2-5<CR>
Q-FACTOR (O) O ?  0<CR>

UNIT 7
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6,7<CR>
Q-FACTOR (O) O ?  1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE "-" CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY). THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS SHOWN BELOW.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0-7<CR>
Q-FACTOR (O) O ?  0,1,0,,,,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

2.7 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE "R NAME", WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM

4. TYPE "START"

5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"

6. ANSWER ALL THE HARDWARE QUESTIONS

7. ANSWER THE "CHANGE SW" QUESTION WITH "N"

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME  TYPE  NUMBER  ON UNIT NUMBER  TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

,WHERE; NAME = DIAGNOSTIC NAME
TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
NUMBER = ERROR NUMBER
UNIT NUMBER = 0 - (N-1) (N IS THE NUMBER OF UNITS CONFIGURED)
TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE. FOR THE RC25 DISK EXERCISER, ALL BASIC ERROR MESSAGES CONTAIN THE ELAPSED TIME (THE TIME SINCE THE LAST START COMMAND).

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

THIS LIST OF RC25 EXERCISER ERROR MESSAGES IS ARRANGED BY ERROR NUMBER. THE LETTERS G, B, AND X REFER TO THE GENERAL, BASIC, AND EXTENDED TEXT OF THE ERROR MESSAGE, RESPECTIVELY. ALL NUMERIC VALUES ARE IN OCTAL EXCEPT FOR THE ELAPSED TIME OR WHEN THE NUMBER IS FOLLOWED BY A DECIMAL POINT.

3.2.1 SYSTEM-FATAL ERROR MESSAGES

THESE CONDITIONS WILL CAUSE THE DIAGNOSTIC TO BE ABORTED. THEY WILL APPEAR AFTER THE SOFTWARE DIALOG.

```
        1  G  TOO MANY UNITS
           B  XX:XX:XX  MORE THAN 16. UNITS SPECIFIED

        2  G  NEITHER P NOR L CLOCK WAS FOUND ON THE SYSTEM
```

3.2.2 CONFIGURATION ERROR MESSAGES

CONFIGURATION ERRORS INDICATE ILLEGAL HARDWARE CONFIGURATIONS. THESE SITUATIONS ARE DETECTED BEFORE ANY ACTUAL TESTING TAKES PLACE. AS SUCH, THEY ARE SPECIAL IN THAT THERE IS NO ERROR NUMBER ASSOCIATED WITH THEM, AND THEY ARE NOT INCLUDED IN THE SUMMARY REPORT NOR THE END-OF-PASS MESSAGE. ANY UNITS INVOLVED ARE IMMEDIATELY DROPPED.

IF YOU TRY TO CONFIGURE MORE THAN 4 UNITS AT THE SAME IP ADDRESS, THE FOLLOWING MESSAGE WILL APPEAR:

```
        ALREADY 4 UNITS AT IP XXXXXX(O)
```

THE REMAINING UNITS (OVER 4) WILL BE DROPPED. IF YOU TRY TO CONFIGURE MORE THAN 4 CONTROLLERS, THE FOLLOWING MESSAGE WILL APPEAR:

```
        MORE THAN 4 DIFFERENT IP ADDRESSES
```

ALL UNITS ASSOCIATED WITH THE 5TH (AND HIGHER) CONTROLLERS WILL BE DROPPED. FINALLY, IF YOU SPECIFY IDENTICAL PLATTER ADDRESSES UNDER ONE CONTROLLER (IP ADDRESS), THE FOLLOWING MESSAGE WILL APPEAR:

```
        DUPLICATE PLATTER ADDRESS XXX. AT IP XXXXXX(O)
```

ALL UNITS (BEYOND THE FIRST) WITH IDENTICAL PLATTER ADDRESSES WILL BE DROPPED.

3.2.3 DEVICE-FATAL ERROR MESSAGES

IF THE ERROR PERTAINS TO A CONTROLLER, THEN ALL THE UNITS ATTACHED TO THE CONTROLLER WILL BE DROPPED. OTHERWISE, THE ERROR PERTAINS TO A SINGLE UNIT, AND ONLY THAT UNIT IS DROPPED.

```
        10  G  REGISTER EXISTENCE TEST FAILED
            B  XX:XX:XX  NO RESPONSE AT ADDRESS XXXXXX(O)

        11     ABOUT TO VERIFY VECTOR XXX(O) FOR DEVICE XXXXXX(O) ...
                   (FOLLOWED BY EITHER NOTHING OR)
            G  VECTOR TEST FAILED

        12  G  BR LEVEL TEST FAILED
            B  XX:XX:XX  INCORRECT BR LEVEL GIVEN FOR DEVICE XXXXXX(O)
```

ERROR 13 REFERS TO THE FOUR STEP HARD INITIALIZE SEQUENCE DESCRIBED IN THE UNIBUS / Q-BUS STORAGE SYSTEMS PORT (UQSSP) SPEC. THE SA REGISTER CODE IS PROVIDED TO ASSIST IN DIAGNOSIS.

```
        13  G  INIT SEQUENCE FAILED
            B  XX:XX:XX  STEP X READ ERROR ON DEVICE XXXXXX(O)
            X       SA: XXXXXX(O)
```

ERROR 14 MEANS THAT THE ERROR BIT (BIT 15) OF A DEVICE'S SA REGISTER WAS FOUND SET TO 1. THE LOW-ORDER 11 BITS DESCRIBE THE ERROR.

```
14  G  FATAL PORT / CONTROLLER ERROR
    B  XX:XX:XX  ERROR CODE RECEIVED IN SA REGISTER OF DEVICE
                          XXXXXX(O)
    X       SA: XXXXXX(O)
```

ERROR 15 IS REPORTED WHEN THE RC25 FAILS TO RESPOND TO ONE OF THE LISTED MSCP COMMANDS.

```
15  G  MESSAGE RESPONSE TIMEOUT
    B  XX:XX:XX  FAILED TO RECEIVE END MESSAGE FROM DEVICE
                          XXXXXX(O)
    X       COMMAND: SET CTLR CHAR (OR)
                     ONLINE (OR)
                     EXECUTE SUPPLIED PROGRAM (OR)
                     SEND DATA
```

ERROR 16 REFERS TO THE MSCP "ONLINE' MESSAGE SENT TO EACH UNIT DURING THE INITIALIZATION SUBTEST. THE STATUS CODE AND SUB CODE ARE TAKEN FROM THE MSCP END MESSAGE (AS THEY ARE IN ALL ERROR MESSAGES).

```
16  G  ONLINE FAILED
    B  XX:XX:XX  ERROR IN RESPONSE TO ONLINE COMMAND FOR
                          PLATTER XXX.
    X       STATUS CODE: XX(O)
    X       SUB-CODE: XXXX(O)
```

ERROR 17 IMPLIES THAT (A) YOU HAVE ALLOWED WRITES TO THE CUSTOMER DATA AREA THROUGH THE HARDWARE QUESTION, AND (B) THE WRITE-PROTECT PUSHBUTTON FOR THE UNIT IS ENGAGED.

```
17  G  WRITE-PROTECT CONFLICT
    B  XX:XX:XX  PLATTER XXX. IS SW WRITE-ENABLED BUT HW
                          WRITE-PROTECTED
```

ERROR 18 REFERS TO THE MSCP "ACCESS" COMMANDS WHICH ARE ISSUED TO EACH UNIT AS PART OF THE INITIALIZATION SUBTEST. IF EXTENDED ERROR MESSAGES ARE ENABLED AND THE STATUS CODE AND SUB-CODE DO NOT APPEAR, THEN THE ACCESS COMMAND HAS TIMED OUT (I.E., NO RESPONSE RECEIVED WITHIN THE REQUIRED INTERVAL).

```
18  G  ACCESS FAILED
    B  XX:XX:XX  ACCESS FAILED ON PLATTER XXX.
    X       STATUS CODE: XX(O)
    X       SUB-CODE: XXXX(O)
```

ERROR 19 OCCURS WHEN AN MSCP I/O COMMAND RESULTS IN AN END MESSAGE WITH THE "UNIT OFFLINE' STATUS CODE.

```
19  G  FATAL I/O ERROR
    B  XX:XX:XX  PLATTER XXX. WENT OFFLINE
    X       CMD REF NUM: XXXXXX(O)
    X       SUB-CODE: XXXX(O)
    X       COMMAND: READ (OR)
                     READ-COMPARE (OR)
                     WRITE (OR)
                     WRITE COMPARE (OR)
                     XXX(O)
```

```
            X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
            X       LBN: XXXXX.                             !   OR THIS
            X       BYTE COUNT IN COMMAND: XXXXX.
            X       ACTUAL # BYTES TRANSFERRED: XXXXX.
            X       I/O BUFFER DESCRIPTOR: XXXXXX(O) XXXXXX(O)

        20  G   CONTROLLER TIMEOUT
            B   XX:XX:XX  DEVICE XXXXXX(O) NOT PROCESSING COMMAND
                          PACKETS
```

ERROR 21 ARISES IF YOU ARE RUNNING THE DM EXERCISER SUBTEST, AND ONE OF THE INITIAL DUP COMMANDS WAS REJECTED WITH A STATUS CODE OTHER THAN 'SUCCESS'. NOTE THAT THE STATUS CODE IS NOT FROM MSCP.

```
        21  G   DUP COMMAND FAILED
            B   XX:XX:XX  MESSAGE REJECTED BY DUP SERVER ON DEVICE
                                XXXXXX(O)
            X       COMMAND: EXECUTE SUPPLIED PROGRAM (OR)
            X                SEND DATA
            X       DUP STATUS CODE: X.
```

ERROR 22 IS ALSO RELATED TO THE DM EXERCISER SUBTEST. IT INDICATES THAT THE FRONT PANEL TEST (EXECUTING UNDER HOST CONTROL IN THE DM) HAS FAILED TO PROVIDE THE HOST WITH A SET OF OPERATING STATISTICS WITHIN A PRE-DETERMINED TIME INTERVAL. THE FPT IS ASSUMED TO BE DEAD.

```
        22  G   DM EXERCISER TIMEOUT
            B   XX:XX:XX  NO RESPONSE FROM FRONT PANEL TEST EXECUTING IN
                                DEVICE XXXXXX(O)
```

3.2.4 HARD ERROR MESSAGES

MOST HARD ERRORS ARE REPORTED TO THE HOST THROUGH THE END MESSAGES ASSOCIATED WITH MSCP READ AND WRITE COMMANDS. ERROR NUMBERS 31 - 41 ARE BASED ON MSCP STATUS CODES 1 - 11.

```
        30  G   I/O REQUEST FAILED
            B   XX:XX:XX  PLATTER XXX. - STATUS CODE: XX(O)
            X       CMD REF NUM: XXXXXX(O)
            X       SUB-CODE: XXXX(O)
            X       COMMAND: READ (OR)
                             READ-COMPARE (OR)
                             WRITE (OR)
                             WRITE-COMPARE (OR)
                             XXX(O)
            X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
            X       LBN: XXXXX.                             !   OR THIS
            X       BYTE COUNT IN COMMAND: XXXXX.
            X       ACTUAL # BYTES TRANSFERRED: XXXXX.
            X       I/O BUFFER DESCRIPTOR: XXXXXX(O) XXXXXX(O)

        31  G   I/O REQUEST FAILED
            B   XX:XX:XX  PLATTER XXX.   INVALID COMMAND
            X       CMD REF NUM: XXXXXX(O)
            X       SUB-CODE: XXXX(O)
            X       COMMAND: READ (OR)
                             READ-COMPARE (OR)
                             WRITE (OR)
                             WRITE-COMPARE (OR)
                             XXX(O)
```

```
      X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X       LBN: XXXXX.                             !   OR THIS
      X       BYTE COUNT IN COMMAND: XXXXX.
      X       ACTUAL # BYTES TRANSFERRED: XXXXX.
      X       I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)

   32 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX. - COMMAND ABORTED
      X       CMD REF NUM: XXXXXX(0)
      X       SUB CODE: XXXX(0)
      X       COMMAND: READ (OR)
                       READ-COMPARE (OR)
                       WRITE (OR)
                       WRITE-COMPARE (OR)
                       XXX(0)
      X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X       LBN: XXXXX.                             !   OR THIS
      X       BYTE COUNT IN COMMAND: XXXXX.
      X       ACTUAL # BYTES TRANSFERRED: XXXXX.
      X       I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)

   34 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX.   UNIT-AVAILABLE
      X       CMD REF NUM: XXXXXX(0)
      X       SUB-CODE: XXXX(0)
      X       COMMAND: READ (OR)
                       READ-COMPARE (OR)
                       WRITE (OR)
                       WRITE-COMPARE (OR)
                       XXX(0)
      X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X       LBN: XXXXX.                             !   OR THIS
      X       BYTE COUNT IN COMMAND: XXXXX.
      X       ACTUAL # BYTES TRANSFERRED: XXXXX.
      X       I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)

   35 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX. - MEDIA FORMAT ERROR
      X       CMD REF NUM: XXXXXX(0)
      X       SUB-CODE: XXXX(0)
      X       COMMAND: READ (OR)
                       READ-COMPARE (OR)
                       WRITE (OR)
                       WRITE-COMPARE (OR)
                       XXX(0)
      X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X       LBN: XXXXX.                             !   OR THIS
      X       BYTE COUNT IN COMMAND: XXXXX.
      X       ACTUAL # BYTES TRANSFERRED: XXXXX.
      X       I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)

   36 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX. - WRITE PROTECTED
      X       CMD REF NUM: XXXXXX(0)
      X       SUB-CODE: XXXX(0)
      X       COMMAND: READ (OR)
                       READ-COMPARE (OR)
                       WRITE (OR)
                       WRITE COMPARE (OR)
                       XXX(0)
```

```
      X      BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X      LBN: XXXXX.                             !   OR THIS
      X      BYTE COUNT IN COMMAND: XXXXX.
      X      ACTUAL # BYTES TRANSFERRED: XXXXX.
      X      I/O BUFFER DESCRIPTOR: XXXXXX(O) XXXXXX(O)

   37 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX. - DEVICE COMPARE ERROR
      X      CMD REF NUM: XXXXXX(O)
      X      SUB-CODE: XXXX(O)
      X      COMMAND: READ (OR)
                      READ-COMPARE (OR)
                      WRITE (OR)
                      WRITE-COMPARE (OR)
                      XXX(O)
      X      BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X      LBN: XXXXX.                             !   OR THIS
      X      BYTE COUNT IN COMMAND: XXXXX.
      X      ACTUAL # BYTES TRANSFERRED: XXXXX.
      X      I/O BUFFER DESCRIPTOR: XXXXXX(O) XXXXXX(O)

   38 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX. - DATA ERROR
      X      CMD REF NUM: XXXXXX(O)
      X      SUB-CODE: XXXX(O)
      X      COMMAND: READ (OR)
                      READ-COMPARE (OR)
                      WRITE (OR)
                      WRITE-COMPARE (OR)
                      XXX(O)
      X      BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X      LBN: XXXXX.                             !   OR THIS
      X      BYTE COUNT IN COMMAND: XXXXX.
      X      ACTUAL # BYTES TRANSFERRED: XXXXX.
      X      I/O BUFFER DESCRIPTOR: XXXXXX(O) XXXXXX(O)

   39 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX. - HOST BUFFER ACCESS ERROR
      X      CMD REF NUM: XXXXXX(O)
      X      SUB-CODE: XXXX(O)
      X      COMMAND: READ (OR)
                      READ-COMPARE (OR)
                      WRITE (OR)
                      WRITE-COMPARE (OR)
                      XXX(O)
      X      BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
      X      LBN: XXXXX.                             !   OR THIS
      X      BYTE COUNT IN COMMAND: XXXXX.
      X      ACTUAL # BYTES TRANSFERRED: XXXXX.
      X      I/O BUFFER DESCRIPTOR: XXXXXX(O) XXXXXX(O)

   40 G  I/O REQUEST FAILED
      B  XX:XX:XX  PLATTER XXX. - CONTROLLER ERROR
      X      CMD REF NUM: XXXXXX(O)
      X      SUB-CODE: XXXX(O)
      X      COMMAND: READ (OR)
                      READ-COMPARE (OR)
                      WRITE (OR)
                      WRITE-COMPARE (OR)
                      XXX(O)
```

```
            X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
            X       LBN: XXXXX.                             !   OR THIS
            X       BYTE COUNT IN COMMAND: XXXXX.
            X       ACTUAL # BYTES TRANSFERRED: XXXXX.
            X       I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)

        41  G   I/O REQUEST FAILED
            B   XX:XX:XX  PLATTER XXX. - DRIVE ERROR
            X       CMD REF NUM: XXXXXX(0)
            X       SUB-CODE: XXXX(0)
            X       COMMAND: READ (OR)
                             READ-COMPARE (OR)
                             WRITE (OR)
                             WRITE-COMPARE (OR)
                             XXX(0)
            X       BAD BLOCK REPORTED: XXXXX.              ! EITHER THIS
            X       LBN: XXXXX.                             !   OR THIS
            X       BYTE COUNT IN COMMAND: XXXXX.
            X       ACTUAL # BYTES TRANSFERRED: XXXXX.
            X       I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)
```

ERROR 42 IS DETECTED AT THE HOST. IT CAN ARISE IF THE USER HAS CHOSEN THE OPTION TO CHECK ALL WRITES AT THE HOST BY FOLLOWING EACH WITH A READ TO THE SAME DISK ADDRESS.

```
        42  G   I/O REQUEST FAILED
            B   XX:XX:XX  PLATTER XXX. - HOST-DETECTED WRITE-COMPARE
                                         ERROR
            X       LBN: XXXXX.
            X       BYTE COUNT IN COMMAND: XXXXX.
            X       ACTUAL # BYTES TRANSFERRED: XXXXX.
```

ERROR 43 DESCRIBES A SINGLE I/O COMMAND FOR WHICH NO MSCP END MESSAGE WAS EVER RECEIVED.

```
        43  G   I/O REQUEST FAILED
            B   XX:XX:XX  PLATTER XXX. - COMMAND TIMEOUT
            X       CMD REF NUM: XXXXXX(0)
            X       COMMAND: READ (OR)
                             READ-COMPARE (OR)
                             WRITE (OR)
                             WRITE-COMPARE (OR)
                             XXX(0)
            X       LBN: XXXXX.
            X       BYTE COUNT IN COMMAND: XXXXX.
            X       I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)
```

3.2.5 ERROR LOG MESSAGES

ERROR LOG MESSAGES (DATAGRAMS) DESCRIBE MINOR ERRORS ENCOUNTERED BY THE CONTROLLER. THEIR OCCAISIONAL OCCURRENCE IS NORMAL. RELEVANT FIELDS OF A DATAGRAM ARE PRINTED (A) IF THE USER IS RUNNING THE PROGRAM IN ATTENDED MODE, AND (B) IF NOT SUPPRESSED BY THE USER DURING THE SW DIALOG. ONE OF THESE FIELDS, THE COMMAND REFERENCE NUMBER, CAN LINK THE DATAGRAM WITH A HARD ERROR.

ERROR LOG MESSAGES ARE NOT INCLUDED IN THE CUMULATIVE ERROR COUNT WHICH APPEARS WITH THE END-OF-PASS MESSAGE. HOWEVER, IF THE MULTI-DRIVE SUBTEST IS BEING RUN, THEN DATAGRAMS WHICH APPLY TO A PARTICULAR UNIT (AS OPPOSED TO THE CONTROLLER) ARE TALLIED FOR THE STATISTICAL REPORT REGARDLESS OF WHETHER THEIR PRINTING HAS BEEN SUPPRESSED. THE FORMAT IS AS FOLLOWS:

```
        ERROR LOG MESSAGE RECEIVED:
            CMD REF NUM: XXXXXX(O)
            PLATTER: XXX.              ! FOR SMALL DISK ERRORS ONLY
            FORMAT: CONTROLLER ERROR (OR)
                    HOST MEMORY ACCESS ERROR (OR)
                    SMALL DISK ERROR (OR)
                    XXX(O)
            EVENT CODE: SUCCESS (OR)
                        INVALID COMMAND (OR)
                        COMMAND ABORTED (OR)
                        UNIT-OFFLINE (OR)
                        UNIT-AVAILABLE (OR)
                        MEDIA FORMAT ERROR (OR)
                        WRITE-PROTECTED (OR)
                        DEVICE COMPARE ERROR (OR)
                        DATA ERROR (OR)
                        HOST BUFFER ACCESS ERROR (OR)
                        CONTROLLER ERROR (OR)
                        DRIVE ERROR (OR)
                        XXX(O)
            SUB-CODE: XXXX(O)
            HOST MEM ADDR: XXXXXX(O) XXXXXX(O) ! HOST MEM ACC ERR ONLY
```

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THIS ERROR COUNT DOES NOT INCLUDE ERROR LOG MESSAGES (SECTION 3.2.5), CONFIGURATION ERRORS (SECTION 3.2.2), NOR ERRORS DETECTED BY THE FRONT PANEL TEST UNDER THE DM EXERCISER. THE "EOP" SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END-OF-PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

PRIOR TO THE END-OF-PASS MESSAGE, THE STATISTICAL SUMMARY REPORT IS AUTOMATICALLY PRINTED BY THE EXERCISER. ITS FORMAT DEPENDS ON WHICH SUBTEST (MULTI-DRIVE OR DM EXERCISER) IS BEING RUN. AN ASTERISK (*) APPEARING NEXT TO A NUMBER IN THE FORMAT BELOW REPRESENTS EITHER A SPACE OR THE LETTER "K". THE "K" FORMAT WILL BE USED IF THE STATISTIC IS GREATER THAN 65,000. ALL VALUES ARE IN DECIMAL RADIX.

4.1 MULTI-DRIVE SUBTEST REPORTS

ELAPSED TIME: XX:XX:XX

UNIT NO.	NO. READS (K=1000)	NO. WRITES (K=1000)	MBYTES READ	MBYTES WRITTEN	NO. HARD ERRORS	NO. ERROR LOGS
XX	XXXXX*	XXXXX*	XXXXX	XXXXX	XXXXX	XXXXX
XX	XXXXX*	XXXXX*	XXXXX	XXXXX	XXXXX	XXXXX
XX	XXXXX*	XXXXX*	XXXXX	XXXXX	XXXXX	XXXXX
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

ECC ERRORS ARE REPORTED THROUGH ERROR LOG MESSAGES. THEY ARE TALLIED REGARDLESS OF WHETHER THE MESSAGE PRINTING HAS BEEN SUPPRESSED.

N SYMBOL ECC ERRORS:

UNIT NO.	ECC FIELD ONLY	N = 1	N = 2	N = 3	N = 4	N = 5	N = 6	N = 7	N = 8
XX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
XX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
XX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.

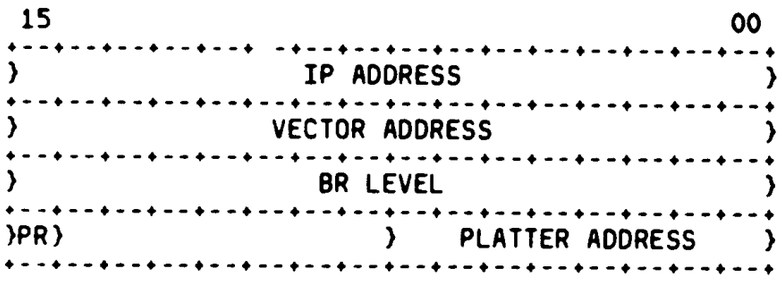
4.2 DM EXERCISER SUBTEST REPORT

ELAPSED TIME: XX:XX:XX

UNIT NO.	NO. READS (K=1000)	NO. WRITES (K=1000)	NO. SEEKS (K=1000)	MBYTES READ	MBYTES WRITTEN	NO. HARD ERRORS	NO. SOFT ERRORS
XX	XXXXX*	XXXXX*	XXXXX*	XXXXX	XXXXX	XXXXX	XXXXX
XX	XXXXX*	XXXXX*	XXXXX*	XXXXX	XXXXX	XXXXX	XXXXX
XX	XXXXX*	XXXXX*	XXXXX*	XXXXX	XXXXX	XXXXX	XXXXX
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

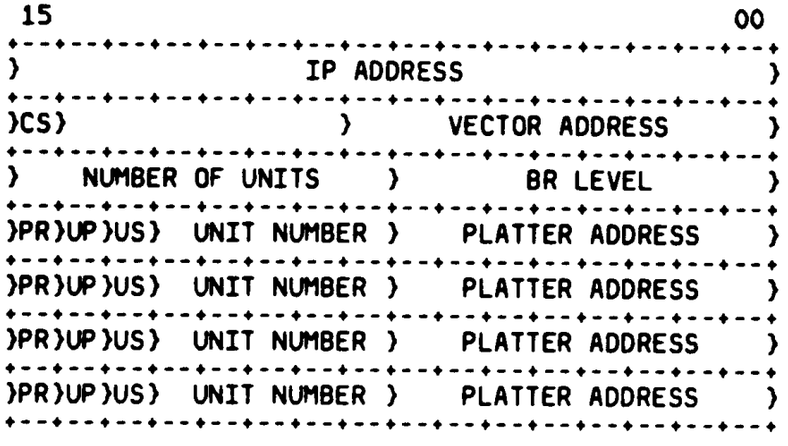
5.0 DEVICE INFORMATION TABLES

THE HARDWARE P-TABLE APPEARS AS FOLLOWS FOR EACH UNIT:



PR - UNIT PROTECTION BIT

DURING THE INITIALIZATION PROCESS AFTER A START, RESTART, OR CONTINUE COMMAND, THE RC25 DISK EXERCISER CREATES UP TO FOUR RUN-TIME TABLES (CALLED CONTROLLER STATUS TABLES, OR CST'S), AND FILLS THEM WITH INFORMATION DERIVED FROM THE HARDWARE P-TABLES OF ALL ACTIVE UNITS. THESE TABLES ARE NOT USER-ACCESSIBLE; THEIR FORMAT IS PRESENTED HERE ONLY TO SHOW THE VIEW OF THE WORLD AS SEEN BY THE EXERCISER. EACH CST IS A DYNAMIC 7-WORD BLOCK:



CS - CONTROLLER STATUS BIT (ONLINE / OFFLINE)
PR - UNIT PROTECTION BIT
UP - UNIT PRESENT BIT
US - UNIT STATUS BIT (ONLINE / OFFLINE)

6.0 SUBTEST SUMMARIES

THE RC25 DISK EXERCISER CONSISTS OF ONE TEST SUBDIVIDED INTO THREE SUBTESTS: INITIALIZATION, MULTI-DRIVE, AND DM EXERCISER. IN THE FIRST PASS FOLLOWING A START, RESTART, OR CONTINUE COMMAND, THE INITIALIZATION SUBTEST WILL ALWAYS PRECEDE THE EXECUTION OF ANY OTHER SUBTEST. SUBSEQUENT PASSES WILL NOT INCLUDE THE INITIALIZATION SUBTEST.

6.1 INITIALIZATION SUBTEST

THE PURPOSE OF THE INITIALIZATION SUBTEST IS TO VERIFY THE HARDWARE CONFIGURATION AS SPECIFIED BY THE OPERATOR, AND TO BRING EACH UNIT ONLINE. SPECIFICALLY, THE SUBTEST PERFORMS THE FOLLOWING ACTIONS FOR EACH CONTROLLER IN TURN:

1. A DEVICE REGISTER EXISTENCE TEST - TO VERIFY THAT THE CONTROLLER'S IP AND SA REGISTERS APPEAR ON THE UNIBUS,
2. A VECTOR INTERRUPT TEST - TO INSURE THAT THE DEVICE CAN INITIATE VECTORED INTERRUPTS TO THE PROCESSOR,
3. A BR LEVEL TEST - TO VERIFY THAT THE DEVICE INTERRUPT OCCURS AT THE BR LEVEL SPECIFIED BY THE OPERATOR,
4. A FOUR-STEP HARD INIT SEQUENCE, AS DEFINED IN THE UNIBUS / Q-BUS STORAGE SYSTEMS PORT SPECIFICATION,
5. THE SENDING OF THE "SET CONTROLLER CHARACTERISTICS" COMMAND (MSCP),
6. THE SENDING OF THE MSCP "ONLINE" COMMAND FOR EACH PLATTER SPINNING UNDER THE CONTROLLER,
7. THE SENDING OF ONE OR TWO MSCP "ACCESS" COMMANDS FOR EACH PLATTER UNDER THE CONTROLLER TO VERIFIY THAT EACH DISK CAN BE READ.

ANY CONTROLLER-FATAL ERRORS ENCOUNTERED DURING THE INITIALIZATION SUBTEST WILL CAUSE ALL ITS UNITS TO BE DROPPED FROM TESTING. ANY UNIT-FATAL ERRORS WILL CAUSE ONLY THE APPROPRIATE UNIT TO BE DROPPED. FOR ALL SURVIVING CONTROLLERS AND UNITS, THE PROGRAM WILL THEN BEGIN EXECUTION OF EITHER THE MULTI-DRIVE OR DM EXERCISER SUBTEST.

6.2 MULTI-DRIVE SUBTEST

THE PURPOSE OF THE MULTI-DRIVE SUBTEST IS TO EXERCISE THE DISK DRIVES IN A MANNER SIMILAR TO HEAVY USAGE IN AN OPERATING SYSTEM ENVIRONMENT. THE SUBTEST ISSUES MSCP I/O COMMANDS TO ALL UNITS FAST ENOUGH SO THAT EACH CONTROLLER HAS SEVERAL COMMANDS QUEUED AT ANY GIVEN TIME. THE I/O COMMAND PARAMETERS ARE GOVERNED BY USER RESPONSES DURING THE SOFTWARE QUESTIONING, EXCEPT THAT BYTE COUNTS ARE DETERMINED AT RANDOM. AS EACH I/O OPERATION COMPLETES, THE PROGRAM UPDATES THE STATISTICAL TALLY UNTIL THE SPECIFIED NUMBER OF MEGABYTES HAS BEEN TRANSFERRED TO / FROM EACH UNIT. WHEN THIS HAPPENS, END-OF-PASS IS DECLARED, AND THE SUMMARY REPORT IS PRINTED.

IF THE RC25 EXPERIENCES A READ / WRITE ERROR, IT WILL TRY A VARIABLE NUMBER OF TIMES TO CORRECT THE ERROR. IF ALL RETRIES FAIL, THEN A HARD ERROR WILL BE REPORTED TO THE HOST, AN ERROR MESSAGE WILL BE DISPLAYED ON THE CONSOLE TERMINAL, AND THE ERROR WILL BE TALLIED FOR THE SUMMARY REPORT. THE UNIT INVOLVED WILL BE DROPPED FROM TESTING IF ITS HARD ERROR COUNT HAS EXCEEDED THE USER-SPECIFIED LIMIT.

6.3 DM EXERCISER SUBTEST

THE DM EXERCISER CONSISTS OF THE FRONT PANEL TEST (ROM RESIDENT ON THE CONTROLLER BOARD) RUN IN A CONTINUOUS LOOP UNDER HOST SUPERVISION. IT IS USED TO EXERCISER A DISK BY (A) PERFORMING READS ON ALL TRACKS OF THE PLATTER, AND (B) FORCING WRITES TO THE DIAGNOSTIC TRACKS ONLY. ALL ERRORS DETECTED IN THE DIAGNOSTIC MACHINE, BOTH HARD AND SOFT, WILL BE REPORTED TO THE HOST IN STATISTICAL FORM FOR THE SUMMARY REPORT, BUT THEY WILL NOT APPEAR IN THE CUMULATIVE ERROR COUNT WITH THE END-OF-PASS MESSAGE. THE NUMBER OF SEEKS, READS, AND WRITES WILL ALSO BE REPORTED AND TALLIED. AS IN THE MULTI-DRIVE SUBTEST, END-OF-PASS WILL BE DECLARED WHEN ALL UNITS HAVE REACHED THE MEGABYTE TRANSFER LIMIT SPECIFIED BY THE USER. (NOTE THAT THIS SUBTEST TAKES MUCH LONGER TO ACCOMPLISH THE SAME FEAT; IT TAKES ABOUT 10 MINUTES PER UNIT TO REACH A 2 MEGABYTE TRANSFER LIMIT).

THE HOST INITIATES THE FRONT PANEL TEST (FPT) WITH A CROM PRIMER PROGRAM, WHICH IS DOWNLINE LOADED FROM THE HOST TO THE RC25 VIA THE DUP COMMAND "EXECUTE SUPPLIED PROGRAM". THE CROM PRIMER IS RESPONSIBLE FOR LOADING THE FRONT PANEL TEST INTO RC25 RAM SPACE, THEN PASSING CONTROL TO IT. IF THE "EXECUTE SUPPLIED PROGRAM" SUCCEEDS, THE HOST RESPONDS BY ISSUING THE DUP COMMAND "SEND DATA". THIS COMMAND TELLS THE FRONT PANEL TEST THE LOCATION OF THE HOST / FPT COMMUNICATION AREA, A BLOCK OF HOST MEMORY RESERVED FOR MUTUAL ACCESS.

THE FPT EXERCISES ONE PLATTER AT A TIME PER PASS, AND EACH FPT PASS TAKES APPROXIMATELY 5 MINUTES. AT THE COMPLETION OF EACH FPT PASS, A NEW SET OF STATISTICS IS LOADED INTO THE HOST COMMUNICATION AREA, AND THE FPT GOES ON TO EXERCISE THE NEXT UNIT. IF THE HOST FAILS TO DETECT A NEW SET OF STATS WITHIN A TIMED INTERVAL, THEN A DEVICE-FATAL ERROR WILL BE DECLARED, AND ALL UNITS ASSOCIATED WITH THE CONTROLLER WILL BE DROPPED. OTHERWISE, THE UNIT NUMBER AND THE NUMBER OF BLOCKS TRANSFERRED DURING THE FPT PASS WILL BE DISPLAYED TO THE USER (IF IN ATTENDED MODE).

7.0 MAINTENANCE HISTORY

DATE:	AUTHOR:	PRODUCT NAME:
13-JUL-83	JAMES S. DOUCETTE	CZRCDA0.BIN
17 JUN 85	GARY Y. CHIN	CZRCDB0.BIN

NOTE:

CZRCDB0.BIN was mod'fied to run on the PDP 11/84. The four steps of In'tialization routines now measure t'me off of the real-time clock.

APPENDIX A - DATA PATTERNS

THERE ARE 21 PRE-DEFINED DATA PATTERNS SUPPLIED WITH THE MULTI-DRIVE SUBTEST. THROUGH THE SOFTWARE QUESTIONS, YOU MAY CHOSE ANY ONE PATTERN TO BE USED FOR ALL WRITE OPERATIONS, OR YOU MAY HAVE ALL PATTERNS USED SEQUENTIALLY. THE "LBN" APPEARING IN PATTERNS 17 - 21 REPRESENTS THE STARTING BLOCK NUMBER OF THE CURRENT WRITE REQUEST.

	HEX	OCTAL	BINARY
PATTERN 1	R A N D O M	N U M B E R S	
PATTERN 2	0000	000000	0 000 000 000 000 000
PATTERN 3	FFFF	177777	1 111 111 111 111 111
PATTERN 4	8B8B	105613	1 000 101 110 001 011
PATTERN 5	3333	031463	0 011 001 100 110 011
PATTERN 6	3091	030221	0 011 000 010 010 001
PATTERN 7	0001	000001	0 000 000 000 000 001
	0003	000003	0 000 000 000 000 011
	0007	000007	0 000 000 000 000 111
	000F	000017	0 000 000 000 001 111
	001F	000037	0 000 000 000 011 111
	003F	000077	0 000 000 000 111 111
	007F	000177	0 000 000 001 111 111
	00FF	000377	0 000 000 011 111 111
	01FF	000777	0 000 000 111 111 111
	03FF	001777	0 000 001 111 111 111
	07FF	003777	0 000 011 111 111 111
	0FFF	007777	0 000 111 111 111 111
	1FFF	017777	0 001 111 111 111 111
	3FFF	037777	0 011 111 111 111 111
	7FFF	077777	0 111 111 111 111 111
	FFFF	177777	1 111 111 111 111 111
PATTERN 8	FFFE	177776	1 111 111 111 111 110
	FFFC	177774	1 111 111 111 111 100
	FFF8	177770	1 111 111 111 111 000
	FFF0	177760	1 111 111 111 110 000
	FFE0	177740	1 111 111 111 100 000
	FFC0	177700	1 111 111 111 000 000
	FF80	177600	1 111 111 110 000 000
	FF00	177400	1 111 111 100 000 000
	FE00	177000	1 111 111 000 000 000
	FC00	176000	1 111 110 000 000 000
	F800	174000	1 111 100 000 000 000
	F000	170000	1 111 000 000 000 000
	E000	160000	1 110 000 000 000 000
	C000	140000	1 100 000 000 000 000
	8000	100000	1 000 000 000 000 000
	0000	000000	0 000 000 000 000 000

PATTERN 9	0000	000000	0 000 000 000 000 000
	0000	000000	0 000 000 000 000 000
	0000	000000	0 000 000 000 000 000
	FFFF	177777	1 111 111 111 111 111
	FFFF	177777	1 111 111 111 111 111
	FFFF	177777	1 111 111 111 111 111
	0000	000000	0 000 000 000 000 000
	0000	000000	0 000 000 000 000 000
	FFFF	177777	1 111 111 111 111 111
	FFFF	177777	1 111 111 111 111 111
	0000	000000	0 000 000 000 000 000
	FFFF	177777	1 111 111 111 111 111
	0000	000000	0 000 000 000 000 000
	FFFF	177777	1 111 111 111 111 111
	0000	000000	0 000 000 000 000 000
	FFFF	177777	1 111 111 111 111 111
PATTERN 10	B6D9	133331	1 011 011 011 011 001
PATTERN 11	5555	052525	0 101 010 101 010 101
	5555	052525	0 101 010 101 010 101
	5555	052525	0 101 010 101 010 101
	AAAA	125252	1 010 101 010 101 010
	AAAA	125252	1 010 101 010 101 010
	AAAA	125252	1 010 101 010 101 010
	5555	052525	0 101 010 101 010 101
	5555	052525	0 101 010 101 010 101
	AAAA	125252	1 010 101 010 101 010
	AAAA	125252	1 010 101 010 101 010
	5555	052525	0 101 010 101 010 101
	AAAA	125252	1 010 101 010 101 010
	5555	052525	0 101 010 101 010 101
	AAAA	125252	1 010 101 010 101 010
	5555	052525	0 101 010 101 010 101
	AAAA	125252	1 010 101 010 101 010
PATTERN 12	2D2D	026455	0 010 110 100 101 101
	2D2D	026455	0 010 110 100 101 101
	2D2D	026455	0 010 110 100 101 101
	D2D2	151322	1 101 001 011 010 010
	D2D2	151322	1 101 001 011 010 010
	D2D2	151322	1 101 001 011 010 010
	2D2D	026455	0 010 110 100 101 101
	2D2D	026455	0 010 110 100 101 101
	D2D2	151322	1 101 001 011 010 010
	D2D2	151322	1 101 001 011 010 010
	2D2D	026455	0 010 110 100 101 101
	2D2D	026455	0 010 110 100 101 101
	D2D2	151322	1 101 001 011 010 010
	2D2D	026455	0 010 110 100 101 101
	D2D2	151322	1 101 001 011 010 010
	2D2D	026455	0 010 110 100 101 101
	D2D2	151322	1 101 001 011 010 010
	2D2D	026455	0 010 110 100 101 101
	D2D2	151322	1 101 001 011 010 010
	2D2D	026455	0 010 110 100 101 101
PATTERN 13	6DB6	066666	0 110 110 110 110 110

PATTERN 14	0001	000001	0 000 000 000 000 001
	0002	000002	0 000 000 000 000 010
	0004	000004	0 000 000 000 000 100
	0008	000010	0 000 000 000 001 000
	0010	000020	0 000 000 000 010 000
	0020	000040	0 000 000 000 100 000
	0040	000100	0 000 000 001 000 000
	0080	000200	0 000 000 010 000 000
	0100	000400	0 000 000 100 000 000
	0200	001000	0 000 001 000 000 000
	0400	002000	0 000 010 000 000 000
	0800	004000	0 000 100 000 000 000
	1000	010000	0 001 000 000 000 000
	2000	020000	0 010 000 000 000 000
	4000	040000	0 100 000 000 000 000
	8000	100000	1 000 000 000 000 000
PATTERN 15	FFFE	177776	1 111 111 111 111 110
	FFFD	177775	1 111 111 111 111 101
	FFFB	177773	1 111 111 111 111 011
	FFF7	177767	1 111 111 111 110 111
	FFEF	177757	1 111 111 111 101 111
	FFDF	177737	1 111 111 111 011 111
	FFBF	177677	1 111 111 110 111 111
	FF7F	177577	1 111 111 101 111 111
	FEFF	177377	1 111 111 011 111 111
	FDFF	176777	1 111 110 111 111 111
	FBFF	175777	1 111 101 111 111 111
	F7FF	173777	1 111 011 111 111 111
	EFFF	167777	1 110 111 111 111 111
	DFFF	157777	1 101 111 111 111 111
	BFFF	137777	1 011 111 111 111 111
	7FFF	077777	0 111 111 111 111 111
PATTERN 16	B6D9	133331	1 011 011 011 011 001
	B6D9	133331	1 011 011 011 011 001
	B6D9	133331	1 011 011 011 011 001
	DB6C	155554	1 101 101 101 101 100
	DB6C	155554	1 101 101 101 101 100
	DB6C	155554	1 101 101 101 101 100
	B6D9	133331	1 011 011 011 011 001
	B6D9	133331	1 011 011 011 011 001
	DB6C	155554	1 101 101 101 101 100
	DB6C	155554	1 101 101 101 101 100
	B6D9	133331	1 011 011 011 011 001
	DB6C	155554	1 101 101 101 101 100
	B6D9	133331	1 011 011 011 011 001
	DB6C	155554	1 101 101 101 101 100
	B6D9	133331	1 011 011 011 011 001
	DB6C	155554	1 101 101 101 101 100

PATTERN 17	LBN	LBN	LBN
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
PATTERN 18	8D36	106466	1 000 110 100 110 110
	LBN	LBN	LBN
	72C9	071311	0 111 001 011 001 001
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	8D36	106466	1 000 110 100 110 110
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
	72C9	071311	0 111 001 011 001 001
PATTERN 19	LBN	LBN	LBN
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110

	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
PATTERN 20	B999	134631	1 011 100 110 011 001
	LBN	LBN	LBN
	4666	043146	0 100 011 001 100 110
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	B999	134631	1 011 100 110 011 001
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
	4666	043146	0 100 011 001 100 110
PATTERN 21	LBN	LBN	LBN

APPENDIX B - GLOSSARY

AZTEC - PROJECT NAME FOR THE RC25

MASS STORAGE COMMUNICATION PROTOCOL (MSCP) - THE METHOD OF COMMUNICATION USED BETWEEN THE HOST AND RC25 CONTROLLER.

DIAGNOSTIC MACHINE (DM) - AN INTERPRETER BUILT INTO THE RC25 FIRMWARE THAT IS USED TO EXECUTE RESIDENT OR DOWNLINE LOADED PROGRAMS.

INITIALIZATION SEQUENCE - THE SERIES OF COMMANDS EXECUTED TO BRING AN RC25 ONLINE TO THE HOST. THIS SEQUENCE IS A STRICTLY-DEFINED SET OF FOUR STEPS WHICH INFORMS THE DEVICE OF SUCH THINGS AS RING LOCATION AND SIZE.

UNIT - A UNIT AS SEEN BY THE DIAGNOSTIC SUPERVISOR; THAT IS, A SINGLE RC25 DISK PLATTER.

DRIVE UNIT - A SINGLE RC25 DRIVE WITH A FIXED AND A REMOVABLE PLATTER ON ONE SPINDLE.

UNIT NUMBER - A NUMBER BETWEEN 0 AND 15 INCLUSIVE WHICH IDENTIFIES A PLATTER TO THE DIAGNOSTIC SUPERVISOR. UNIT NUMBERS ARE ASSIGNED SEQUENTIALLY FROM 0 BY THE DIAGNOSTIC SUPERVISOR DURING THE HARDWARE CONFIGURATION QUESTIONS. THERE IS NO RELATIONSHIP BETWEEN A DISK'S UNIT NUMBER AND ITS PLATTER ADDRESS.

PLATTER ADDRESS - A NUMBER BETWEEN 0 AND 253 THAT UNIQUELY IDENTIFIES ONE RC25 PLATTER. THIS NUMBER IS ASSIGNED THROUGH THE UNIT PLUG ON THE FRONT PANEL OF AN RC25. EVEN PLATTER ADDRESSES ALWAYS DESIGNATE THE REMOVABLE DISK AND ODD PLATTER ADDRESSES ALWAYS DESIGNATE THE FIXED DISK.

CUSTOMER DATA AREA (ALSO HOST APPLICATION AREA) - BLOCKS RESERVED ON AN RC25 PLATTER FOR FREE USE BY THE CUSTOMER. THIS AREA EXCLUDES THE DIAGNOSTIC TRACKS (DBN), THE FCT, THE RCT, AND RBN'S.

PROTECTED CUSTOMER DATA AREA AN RC25 PLATTER WHOSE CUSTOMER TRACKS ARE WRITE-PROTECTED BY THE USER THROUGH THE HARDWARE CONFIGURATION SECTION.

LBN (LOGICAL BLOCK NUMBER) - GIVEN THAT N IS THE NUMBER OF BLOCKS IN THE HOST APPLICATION AREA, LBN IS A NUMBER BETWEEN 0 AND (N - 1) INCLUSIVE WHICH IDENTIFIES A SINGLE SUCH BLOCK.

)≪

CZRCD.EXE Memory allocation map TKB M40.02 Page 1
14 JUN-85 09:50

Partition name : DUMMY
Identification : V02.0
Task UIC : [200,250]
Task attributes: -HD
Total address windows: 1.
Task image size : 14720. words
Task address limits: 002000 073307
R-W disk blk limits: 000002 000073 000072 00058.

*** Root segment: CZRCD1

R/W mem limits: 002000 073307 071310 29384.
Disk blk limits: 000002 000073 000072 00058.

Memory allocation synopsis:

Section		Title	Ident	File
. BLK.:(RW,I,LCL,REL,CON)	002000 000000 00000.			
$CODE$:(RC,I,LCL,REL,CON)	002000 040426 16662.			
	002000 006550 03432.	CZRCD1	V02.0	CZRCD1.OBJ;4
	010550 011544 04964.	CZRCD2	V02.0	CZRCD2.OBJ;3
	022314 017432 07962.	CZRCD3	V02.0	CZRCD3.OBJ;11
	041746 000034 00028.	B16ABS	V3.0	AZLIB.OLB;1
	042002 000316 00206.	B16MUL	V3.0	AZLIB.OLB;1
	042320 000106 00070.	B16SAV	V3.0	AZLIB.OLB;1
FFF :(RO,I,LCL,REL,CON)	042426 023714 10188.			
	042426 023714 10188.	CZRCD1	V02.0	CZRCD1.OBJ;4
GGG :(RO,I,LCL,REL,CON)	066342 002616 01422.			
	066342 002616 01422.	CZRCD3	V02.0	CZRCD3.OBJ;11
$PLIT$:(RO,D,LCL,REL,CON)	071160 002066 01078.			
	071160 001716 00974.	CZRCD2	V02.0	CZRCD2.OBJ;3
	073076 000150 00104.	CZRCD3	V02.0	CZRCD3.OBJ;11

```
$XYZ$ :(RO,I,LCL,REL,CON)     073246 000040 00032.
                              073246 000040 00032. CZRCD4 V02.0  CZRCD4.OBJ;3


Global symbols:

ADR     000020    BIT10   002000    BIT9    001000    CER.01 004140 R  CST     042756-R  DUM.IE 004450-R  EBD.18 006160-R
BIT0    000001    BIT11   004000    BL$ABS  041770 R  CER.02 004224-R  CST.AD  043046-R  DUM.UC 004376-R  EBD.19 006224-R
BIT00   000001    BIT12   010000    BL$DIV  042226-R  CER.03 004270-R  CTLR.C  066246-R  DUM.UE 004526-R  EBD.20 006264-R
BIT01   000002    BIT13   020000    BL$LAS  073246-R  CLK.CS 066310-R  CUOFF   066244-R  DUM.00 004344-R  EBD.21 006350-R
BIT02   000004    BIT14   040000    BL$MOD  042240-R  CLK.HE 066306-R  DCT     043050-R  DUR    066250-R  EBD.22 006436-R
BIT03   000010    BIT15   100000    BL$MUL  042002-R  CLK.IN 014756-R  DCT.AD  043160-R  D$PCNT 002122-R  EBH.31 006556-R
BIT04   000020    BIT2    000004    BL$SGN  041746-R  CLK.TY 066304-R  DFPTBL  010450-R  EBD.10 005400-R  EBH.32 006602-R
BIT05   000040    BIT3    000010    BL$SHF  042252-R  CLK.VE 066312-R  DMC.AD  043506-R  EBD.12 005444-R  EBH.34 006650-R
BIT06   000100    BIT4    000020    BOE     000400    COPY.B 015060-R  DM.COM  043166-R  EBD.13 005526-R  EBH.35 006674-R
BIT07   000200    BIT5    000040    BUFF.D  065466-R  CPLAT  066242 R  DROP.C  016262-R  EBD.14 005604-R  EBH.36 006724-R
BIT08   000400    BIT6    000100    BUFF.O  066066-R  CPT    042736-R  DRV.CT  016366-R  EBD.15 005676-R  EBH.37 006750-R
BIT09   001000    BIT7    000200    BUFF.S  066300-R  CRLF   010442-R  DUM.CE  004420-R  EBD.16 005766-R  EBH.38 007002-R
BIT1    000002    BIT8    000400    CCTLR   066240-R  CRN    066340-R  DUM.HE  004470 R  EBD.17 006062-R  EBH.39 007022 R
```

```
EBH.40 007060 R  EOP.FL 066234-R  GP$17  011044-R  L$CCP  002106-R  L$REV  002010-R  PRI04  000200    SWP.DP 010475-R
EBH.41 007106-R  ERRBLK 002134-R  GP$18  011054-R  L$CLEA 014254-R  L$RPT  012236-R  PRI05  000240    SWP.ER 010464-R
EBH.42 007126-R  ERRMSG 002132-R  GP$19  011064-R  L$CO   002032-R  L$SFTL 010714-R  PRI06  000300    SWP.ET 010472-R
EBH.43 007174-R  ERRNBR 002130-R  GP$2   010636-R  L$DEPO 002011-R  L$SOFT 010716-R  PRI07  000340    SWP.FL 010474-R
EBS.01 005332-R  ERRTYP 002126-R  GP$20  011102-R  L$DESC 010576-R  L$SPC  002056-R  PUTA.B 016074-R  SWP.ST 010470-R
EF.CON 000036    ETIME  010372-R  GP$21  011114-R  L$DESP 002076-R  L$SPCP 002020-R  PUTA.E 015536-R  SWP.UC 010476-R
EF.NEW 000035    EVL    000004    GP$3   010646-R  L$DEVP 002060-R  L$SPTP 002024-R  PUT.EN 015522-R  SWP.UD 010500-R
EF.PWR 000034    EX.BB  007654-R  GP$4   010660-R  L$DISP 002124-R  L$STA  002030-R  PUT.IO 016010-R  SWP.XF 010466-R
EF.RES 000037    EX.BC  010012-R  GP$5   010672-R  L$DLY  002116-R  L$SW   010464-R  PUT.RE 015704-R  SWQ1   002414-R
EF.STA 000040    EX.BD  010070-R  GP$6   010702-R  L$DTP  002040-R  L$SWLE 010462-R  QIO    066270-R  SWQ10  003024-R
EGD.10 004654-R  EX.CBC 007744-R  GP$7   010716-R  L$DTYP 002034-R  L$TEST 002114-R  RCINT0 037326-R  SWQ11  003100-R
EGD.11 004714-R  EX.CMD 007474-R  GP$8   010730-R  L$DU   014646-R  L$TIML 002014-R  RCINT1 037344-R  SWQ12  003144-R
EGD.12 004740-R  EX.CMP 007636-R  GP$9   010742-R  L$DUT  002072-R  L$UNIT 002012-R  RCINT2 037364-R  SWQ13  003176-R
EGD.13 004766-R  EX.CRN 007304-R  HARD.E 016502-R  L$DVTY 010550-R  MEM.MG 066235-R  RCINT3 037404-R  SWQ14  003274-R
EGD.14 005014-R  EX.DSC 007400-R  HOE    100000    L$EF   002052-R  MEM.SI 066274-R  RC25.A 043162-R  SWQ15  003352-R
EGD.15 005052-R  EX.EL  010150-R  HOURS  066314-R  L$ENVI 002044-R  MINUTE 066316-R  RETPKT 062422-R  SWQ2   002452-R
EGD.16 005104-R  EX.ESP 007546-R  HWPT.B 010454-R  L$ERRT 002126-R  MSCP.E 045462-R  RPS.X1 043550-R  SWQ3   002530-R
EGD.17 005122-R  EX.EVC 010262-R  HWPT.I 010450-R  L$ETP  002102-R  MSG.01 003466-R  RPS.X2 043552-R  SWQ4   002576-R
EGD.18 005152-R  EX.FMT 010242-R  HWPT.P 010456-R  L$EXP1 002046-R  MSG.02 003520-R  RP.ADD 065464-R  SWQ5   002656-R
EGD.19 005170-R  EX.HMA 010306-R  HWPT.V 010452-R  L$EXP4 002064-R  MSG.03 003616-R  RP.IND 065462-R  SWQ6   002700-R
EGD.20 005210-R  EX.LBN 007720-R  HWQ1   002136-R  L$EXP5 002066-R  MSG.04 003636-R  RP.SAV 043510-R  SWQ7   002720-R
EGD.21 005234-R  EX.ONL 007534-R  HWQ2   002152-R  L$HARD 010626-R  MSG.05 003670-R  RP.USE 065422-R  SWQ8   002736-R
EGD.22 005260-R  EX.O3  010356-R  HWQ3   002162-R  L$HIME 002120-R  MSG.06 003730-R  SA.REG 066334-R  SWQ9   003010-R
EGH.30 005306-R  EX.PA  010212-R  HWQ4   002174-R  L$HPCP 002016-R  MSG.07 003772-R  SB.COD 066326-R  TALLY  044060-R
EGS.01 004556-R  EX.RD  007616-R  HWQ5   002230-R  L$HPTP 002022-R  MSG.08 004044-R  SECOND 066320-R  TICKS  066322-R
EGS.02 004576-R  EX.SA  007256-R  HWQ6   002314-R  L$HRDL 010624-R  NEX    066336-R  SEND   017126-R  T$FREE 073302-R
EMS.01 020706-R  EX.SB  007440-R  IBE    010000    L$HW   010450-R  NEX.TR 014746-R  SET.CP 015120-R  T$PTHV 000002
EMS.10 020750-R  EX.SC  007342-R  IDU    000040    L$HWLE 010446-R  NULL   003464-R  SET.UP 015314-R  T.ADDR 045460-R
EMS.12 021016-R  EX.SCC 007514-R  IER    020000    L$ICP  002104-R  NUM.BU 066302-R  SFPTBL 010464-R  T.FLAG 066233-R
EMS.13 021060-R  EX.SND 007602-R  IIP.FL 066236-R  L$INIT 014032-R  OCL.X1 044054-R  STC.00 006542-R  T1     022420-R
EMS.14 021132-R  EX.WRT 007626-R  IN.IOD 016174-R  L$LADP 002026-R  OCL.X2 044056-R  STC.01 006556-R  UAM    000200
EMS.15 021200-R  FREE.M 066276-R  IODQ   066166-R  L$LAST 073252-R  OF.RC  066332-R  STC.02 006602-R  UPD.IO 016572-R
EMS.16 021246-R  GET.EN 015412-R  IODQ.I 066226-R  L$LOAD 002100-R  OUTC.L 043554-R  STC.03 006626-R  WAIT   017372-R
EMS.17 021320-R  GET.IO 015720-R  IODQ.O 066230-R  L$LUN  002074-R  OUTC.T 043654-R  STC.04 006650-R  XFR.CH 016734-R
```

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EMS.18 021362-R  GET.RE 015576-R  IRC25. 043164-R  L$MREV 002050-R  OUT.IO 016136 R  STC.05 006674-R  $END.L 073304-R
EMS.19 021434-R  GP$DIS 011022-R  ISR     000100    L$NAME 002000-R  OVF.CH 016660-R  STC.06 006724-R  $SAVE2 042320-R
EMS.20 021502-R  GP$1   010626-R  IXE     004000    L$NDHR 010712-R  PATCH  042426 R  STC.07 006750-R  $SAVE3 042334-R
EMS.21 021544-R  GP$10  010750-R  LOE     040000    L$NDHW 010460-R  PLATT  010416-R  STC.08 007002-R  $SAVE4 042352-R
EMS.22 021632-R  GP$11  010760-R  LOT     000010    L$NDSF 011134-R  PNT    001000    STC.09 007022-R  $SAVE5 042372-R
EMS.30 021674-R  GP$12  010766-R  L$ACP   002110-R  L$NDSW 010540-R  PRI    002000    STC.10 007060-R
EMS.42 022044-R  GP$13  011000-R  L$APT   002036-R  L$PRIO 002042-R  PRIO0  000000    STC.11 007106-R
EMS.43 022132-R  GP$14  011014-R  L$AU    014736-R  L$PROT 010542-R  PRIO1  000040    STEP   066330-R
ENTRY. 066232-R  GP$15  011026-R  L$AUT   002070-R  L$PRT  002112-R  PRIO2  000100    ST.COD 066324-R
ENV.US 062262-R  GP$16  011034-R  L$AUTO  014044-R  L$REPP 002062-R  PRIO3  000140    SWM1   003370-R


*** Task builder statistics:

    Total work file references: 73188.
    Work  file  reads: 0.
    Work  file writes: 0.
    Size of core pool: 4816. words (18. pages)
    Size of work file: 3840. words (15. pages)
    Elapsed time:00:00:57
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CZRCD CREATED BY TKB ON 14-JUN-85 AT 09:50 PAGE 1

GLOBAL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES...		
ADR	000020	# CZRCD1	# CZRCD2	# CZRCD3
BIT0	000001	# CZRCD1	# CZRCD2	# CZRCD3
BIT00	000001	# CZRCD1	# CZRCD2	# CZRCD3
BIT01	000002	# CZRCD1	# CZRCD2	# CZRCD3
BIT02	000004	# CZRCD1	# CZRCD2	# CZRCD3
BIT03	000010	# CZRCD1	# CZRCD2	# CZRCD3
BIT04	000020	# CZRCD1	# CZRCD2	# CZRCD3
BIT05	000040	# CZRCD1	# CZRCD2	# CZRCD3
BIT06	000100	# CZRCD1	# CZRCD2	# CZRCD3
BIT07	000200	# CZRCD1	# CZRCD2	# CZRCD3
BIT08	000400	# CZRCD1	# CZRCD2	# CZRCD3
BIT09	001000	# CZRCD1	# CZRCD2	# CZRCD3
BIT1	000002	# CZRCD1	# CZRCD2	# CZRCD3
BIT10	002000	# CZRCD1	# CZRCD2	# CZRCD3
BIT11	004000	# CZRCD1	# CZRCD2	# CZRCD3
BIT12	010000	# CZRCD1	# CZRCD2	# CZRCD3
BIT13	020000	# CZRCD1	# CZRCD2	# CZRCD3
BIT14	040000	# CZRCD1	# CZRCD2	# CZRCD3
BIT15	100000	# CZRCD1	# CZRCD2	# CZRCD3
BIT2	000004	# CZRCD1	# CZRCD2	# CZRCD3
BIT3	000010	# CZRCD1	# CZRCD2	# CZRCD3
BIT4	000020	# CZRCD1	# CZRCD2	# CZRCD3
BIT5	000040	# CZRCD1	# CZRCD2	# CZRCD3
BIT6	000100	# CZRCD1	# CZRCD2	# CZRCD3
BIT7	000200	# CZRCD1	# CZRCD2	# CZRCD3
BIT8	000400	# CZRCD1	# CZRCD2	# CZRCD3
BIT9	001000	# CZRCD1	# CZRCD2	# CZRCD3
BL$ABS	041770-R	# B16ABS	CZRCD3	
BL$DIV	042226-R	# B16MUL	CZRCD3	
BL$LAS	073246-R	# CZRCD4		
BL$MOD	042240-R	# B16MUL	CZRCD3	
BL$MUL	042002-R	# B16MUL	CZRCD2	CZRCD3

BL$SGN	041746-R	#	B16ABS				
BL$SHF	042252-R	#	B16MUL		CZRCD3		
BOE	000400	#	CZRCD1	#	CZRCD2	#	CZRCD3
BUFF.D	065466-R	#	CZRCD1		CZRCD2		CZRCD3
BUFF.O	056066-R	#	CZRCD1		CZRCD2		CZRCD3
BUFF.S	066300-R	#	CZRCD1		CZRCD2		CZRCD3
CCTLR	066240-R	#	CZRCD1		CZRCD2		CZRCD3
CER.01	004140-R	#	CZRCD1		CZRCD2		
CER.02	004224-R	#	CZRCD1		CZRCD2		
CER.03	004270-R	#	CZRCD1		CZRCD2		
CLK.CS	066310-R	#	CZRCD1		CZRCD2		CZRCD3
CLK.HE	066306-R	#	CZRCD1		CZRCD2		CZRCD3
CLK.IN	014756-R	#	CZRCD2				
CLK.TY	066304-R	#	CZRCD1		CZRCD2		CZRCD3
CLK.VE	066312-R	#	CZRCD1		CZRCD2		CZRCD3
COPY.B	015060-R	#	CZRCD2		CZRCD3		
CPLAT	066242-R	#	CZRCD1		CZRCD2		CZRCD3
CPT	042736-R	#	CZRCD1		CZRCD2		CZRCD3
CRLF	010442-R	#	CZRCD1		CZRCD2		
CRN	066340-R	#	CZRCD1		CZRCD2		CZRCD3

GLOBAL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES...		
CST	042756-R	# CZRCD1	CZRCD2	CZRCD3
CST.AD	043046-R	# CZRCD1	CZRCD2	CZRCD3
CTLR.C	066246 R	# CZRCD1	CZRCD2	CZRCD3
CUOFF	066244-R	# CZRCD1	CZRCD2	CZRCD3
DCT	043050-R	# CZRCD1	CZRCD2	CZRCD3
DCT.AD	043160-R	# CZRCD1	CZRCD2	CZRCD3
DFPTBL	010450-R	# CZRCD1		
DMC.AD	043506-R	# CZRCD1	CZRCD2	CZRCD3
DM.COM	043166-R	# CZRCD1	CZRCD2	CZRCD3
DROP.C	016262-R	# CZRCD2	CZRCD3	
DRV.CT	016366-R	# CZRCD2	CZRCD3	
DUM.CE	004420-R	# CZRCD1	CZRCD2	
DUM.HE	004470-R	# CZRCD1	CZRCD2	
DUM.IE	004450-R	# CZRCD1	CZRCD2	
DUM.UC	004376-R	# CZRCD1	CZRCD2	
DUM.UE	004526-R	# CZRCD1	CZRCD2	
DUM.00	004344-R	# CZRCD1	CZRCD2	
DUR	066250-R	# CZRCD1	CZRCD2	CZRCD3
D$PCNT	002122-R	# CZRCD1		
EBD.10	005400-R	# CZRCD1	CZRCD2	
EBD.12	005444-R	# CZRCD1	CZRCD2	
EBD.13	005526-R	# CZRCD1	CZRCD2	
EBD.14	005604-R	# CZRCD1	CZRCD2	
EBD.15	005676-R	# CZRCD1	CZRCD2	
EBD.16	005766-R	# CZRCD1	CZRCD2	
EBD.17	006062-R	# CZRCD1	CZRCD2	
EBD.18	006160-R	# CZRCD1	CZRCD2	
EBD.19	006224-R	# CZRCD1	CZRCD2	
EBD.20	006264-R	# CZRCD1	CZRCD2	
EBD.21	006350-R	# CZRCD1	CZRCD2	
EBD.22	006436 R	# CZRCD1	CZRCD2	
EBH.31	006556-R	# CZRCD1	CZRCD2	
EBH.32	006602-R	# CZRCD1	CZRCD2	

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EBH.34  006650-R  # CZRCD1    CZRCD2
EBH.35  006674-R  # CZRCD1    CZRCD2
EBH.36  006724-R  # CZRCD1    CZRCD2
EBH.37  006750-R  # CZRCD1    CZRCD2
EBH.38  007002-R  # CZRCD1    CZRCD2
EBH.39  007022-R  # CZRCD1    CZRCD2
EBH.40  007060-R  # CZRCD1    CZRCD2
EBH.41  007106-R  # CZRCD1    CZRCD2
EBH.42  007126-R  # CZRCD1    CZRCD2
EBH.43  007174-R  # CZRCD1    CZRCD2
EBS.01  005332-R  # CZRCD1    CZRCD2
EF.CON  000036    # CZRCD1  # CZRCD2  # CZRCD3
EF.NEW  000035    # CZRCD1  # CZRCD2  # CZRCD3
EF.PWR  000034    # CZRCD1  # CZRCD2  # CZRCD3
EF.RES  000037    # CZRCD1  # CZRCD2  # CZRCD3
EF.STA  000040    # CZRCD1  # CZRCD2  # CZRCD3
EGD.10  004654-R  # CZRCD1    CZRCD3
EGD.11  004714-R  # CZRCD1    CZRCD3
EGD.12  004740-R  # CZRCD1    CZRCD3
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GLOBAL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES...		
EGD.13	004766-R	# CZRCD1	CZRCD3	
EGD.14	005014-R	# CZRCD1	CZRCD3	
EGD.15	005052-R	# CZRCD1	CZRCD3	
EGD.16	005104-R	# CZRCD1	CZRCD3	
EGD.17	005122-R	# CZRCD1	CZRCD3	
EGD.18	005152-R	# CZRCD1	CZRCD3	
EGD.19	005170-R	# CZRCD1	CZRCD3	
EGD.20	005210-R	# CZRCD1	CZRCD3	
EGD.21	005234-R	# CZRCD1	CZRCD3	
EGD.22	005260-R	# CZRCD1	CZRCD3	
EGH.30	005306-R	# CZRCD1	CZRCD3	
EGS.01	004556-R	# CZRCD1	CZRCD2	
EGS.02	004576-R	# CZRCD1	CZRCD2	
EMS.01	020706-R	# CZRCD2		
EMS.10	020750-R	# CZRCD2	CZRCD3	
EMS.12	021016-R	# CZRCD2	CZRCD3	
EMS.13	021060-R	# CZRCD2	CZRCD3	
EMS.14	021132-R	# CZRCD2	CZRCD3	
EMS.15	021200-R	# CZRCD2	CZRCD3	
EMS.16	021246-R	# CZRCD2	CZRCD3	
EMS.17	021320-R	# CZRCD2	CZRCD3	
EMS.18	021362-R	# CZRCD2	CZRCD3	
EMS.19	021434-R	# CZRCD2	CZRCD3	
EMS.20	021502-R	# CZRCD2	CZRCD3	
EMS.21	021544-R	# CZRCD2	CZRCD3	
EMS.22	021632-R	# CZRCD2	CZRCD3	
EMS.30	021674-R	# CZRCD2	CZRCD3	
EMS.42	022044-R	# CZRCD2	CZRCD3	
EMS.43	022132-R	# CZRCD2	CZRCD3	
ENTRY.	066232-R	# CZRCD1	CZRCD2	CZRCD3
ENV.US	062262-R	# CZRCD1	CZRCD2	CZRCD3
EOP.FL	066234-R	# CZRCD1	CZRCD2	CZRCD3
ERRBLK	002134-R	# CZRCD1		
ERRMSG	002132-R	# CZRCD1		

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ERRNBR   002130-R  * CZRCD1
ERRTYP   002126-R  * CZRCD1
ETIME    010372-R  * CZRCD1    CZRCD2
EVL      000004    * CZRCD1  * CZRCD2   * CZRCD3
EX.BB    007654 R  * CZRCD1    CZRCD2
EX.BC    010012-R  * CZRCD1    CZRCD2
EX.BD    010070-R  * CZRCD1    CZRCD2
EX.CBC   007744-R  * CZRCD1    CZRCD2
EX.CMD   007474 R  * CZRCD1    CZRCD2
EX.CMP   007636-R  * CZRCD1    CZRCD2
EX.CRN   007304-R  * CZRCD1    CZRCD2     CZRCD3
EX.DSC   007400-R  * CZRCD1    CZRCD2
EX.EL    010150-R  * CZRCD1    CZRCD3
EX.ESP   007546-R  * CZRCD1    CZRCD2
EX.EVC   010262-R  * CZRCD1    CZRCD3
EX.FMT   010242-R  * CZRCD1    CZRCD3
EX.HMA   010306-R  * CZRCD1    CZRCD3
EX.LBN   007720-R  * CZRCD1    CZRCD2
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SYMBOL	VALUE	REFERENCES...		
EX.ONL	007534-R	# CZRCD1	CZRCD2	
EX.OS	010356-R	# CZRCD1	CZRCD2	CZRCD3
EX.PA	010212-R	# CZRCD1	CZRCD3	
EX.RD	007616-R	# CZRCD1	CZRCD2	
EX.SA	007256-R	# CZRCD1	CZRCD2	
EX.SB	007440-R	# CZRCD1	CZRCD2	CZRCD3
EX.SC	007342-R	# CZRCD1	CZRCD2	
EX.SCC	007514-R	# CZRCD1	CZRCD2	
EX.SND	007602-R	# CZRCD1	CZRCD2	
EX.WRT	007626-R	# CZRCD1	CZRCD2	
FREE.M	066276-R	# CZRCD1	CZRCD2	CZRCD3
GET.EN	015412-R	# CZRCD2	CZRCD3	
GET.IO	015720-R	# CZRCD2	CZRCD3	
GET.RE	015576-R	# CZRCD2	CZRCD3	
GP$DIS	011022-R	# CZRCD2		
GP$1	010626-R	# CZRCD2		
GP$10	010750-R	# CZRCD2		
GP$11	010760-R	# CZRCD2		
GP$12	010766-R	# CZRCD2		
GP$13	011000-R	# CZRCD2		
GP$14	011014-R	# CZRCD2		
GP$15	011026-R	# CZRCD2		
GP$16	011034-R	# CZRCD2		
GP$17	011044-R	# CZRCD2		
GP$18	011054-R	# CZRCD2		
GP$19	011064-R	# CZRCD2		
GP$2	010636-R	# CZRCD2		
GP$20	011102-R	# CZRCD2		
GP$21	011114-R	# CZRCD2		
GP$3	010646-R	# CZRCD2		
GP$4	010660-R	# CZRCD2		
GP$5	010672-R	# CZRCD2		
GP$6	010702-R	# CZRCD2		
GP$7	010716-R	# CZRCD2		

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GP$8     010730 R  # CZRCD2
GP$9     010742-R  # CZRCD2
HARD.E   016502-R  # CZRCD2    CZRCD3
HOE      100000    # CZRCD1  # CZRCD2  # CZRCD3
HOURS    056314-R  # CZRCD1    CZRCD2    CZRCD3
HWPT.B   010454-R  # CZRCD1
HWPT.I   010450-R  # CZRCD1
HWPT.P   010456-R  # CZRCD1
HWPT.V   010452 R  # CZRCD1
HWQ1     002136-R  # CZRCD1    CZRCD2
HWQ2     002152-R  # CZRCD1    CZRCD2
HWQ3     002162-R  # CZRCD1    CZRCD2
HWQ4     002174 R  # CZRCD1    CZRCD2
HWQ5     002230-R  # CZRCD1    CZRCD2
HWQ6     002314-R  # CZRCD1    CZRCD2
IBE      010000    # CZRCD1  # CZRCD2  # CZRCD3
IDU      000040    # CZRCD1  # CZRCD2  # CZRCD3
IER      020000    # CZRCD1  # CZRCD2  # CZRCD3
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GLOBAL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES...		
IIP.FL	066236-R	# CZRCD1	CZRCD2	CZRCD3
IN.IOD	016174-R	# CZRCD2	CZRCD3	
IODQ	066166-R	# CZRCD1	CZRCD2	CZRCD3
IODQ.I	066226-R	# CZRCD1	CZRCD2	CZRCD3
IODQ.O	066230-R	# CZRCD1	CZRCD2	CZRCD3
IRC25.	043164-R	# CZRCD1	CZRCD2	CZRCD3
ISR	000100	# CZRCD1	# CZRCD2	# CZRCD3
IXE	004000	# CZRCD1	# CZRCD2	# CZRCD3
LOE	040000	# CZRCD1	# CZRCD2	# CZRCD3
LOT	000010	# CZRCD1	# CZRCD2	# CZRCD3
L$ACP	002110-R	# CZRCD1		
L$APT	002036-R	# CZRCD1		
L$AU	014736-R	CZRCD1	# CZRCD2	
L$AUT	002070-R	# CZRCD1		
L$AUTO	014044-R	CZRCD1	# CZRCD2	
L$CCP	002106-R	# CZRCD1		
L$CLEA	014254-R	CZRCD1	# CZRCD2	
L$CO	002032-R	# CZRCD1		
L$DEPO	002011-R	# CZRCD1		
L$DESC	010576-R	CZRCD1	# CZRCD2	
L$DESP	002076-R	# CZRCD1		
L$DEVP	002060-R	# CZRCD1		
L$DISP	002124-R	# CZRCD1		
L$DLY	002116-R	# CZRCD1	CZRCD2	CZRCD3
L$DTP	002040-R	# CZRCD1		
L$DTYP	002034-R	# CZRCD1		
L$DU	014646-R	CZRCD1	# CZRCD2	
L$DUT	002072-R	# CZRCD1		
L$DVTY	010550-R	CZRCD1	# CZRCD2	
L$EF	002052-R	# CZRCD1		
L$ENVI	002044-R	# CZRCD1		
L$ERRT	002126-R	# CZRCD1		
L$ETP	002102 R	# CZRCD1		
L$EXP1	002046-R	# CZRCD1		
L$EXP4	002064-R	# CZRCD1		

```
L$EXP5   002066 R   # CZRCD1
L$HARD   010626-R     CZRCD1   # CZRCD2
L$HIME   002120-R   # CZRCD1     CZRCD3
L$HPCP   002016-R   # CZRCD1
L$HPTP   002022-R   # CZRCD1
L$HRDL   010624-R   # CZRCD2
L$HW     010450-R   # CZRCD1
L$HWLE   010446-R   # CZRCD1
L$ICP    002104 R   # CZRCD1
L$INIT   014032-R     CZRCD1   # CZRCD2
L$LADP   002026-R   # CZRCD1
L$LAST   073252-R     CZRCD1   # CZRCD4
L$LOAD   002100-R   # CZRCD1
L$LUN    002074-R   # CZRCD1     CZRCD2     CZRCD3
L$MREV   002050-R   # CZRCD1
L$NAME   002000-R   # CZRCD1
L$NDHR   010712-R   # CZRCD2
```

GLOBAL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES...		
L$NDHW	010460-R	# CZRCD1		
L$NDSF	011134-R	# CZRCD2		
L$NDSW	010540-R	# CZRCD1		
L$PRIO	002042-R	# CZRCD1		
L$PROT	010542-R	# CZRCD1		
L$PRT	002112-R	# CZRCD1		
L$REPP	002062-R	# CZRCD1		
L$REV	002010-R	# CZRCD1		
L$RPT	012236-R	CZRCD1	# CZRCD2	
L$SFTL	010714-R	# CZRCD2		
L$SOFT	010716-R	CZRCD1	# CZRCD2	
L$SPC	002056-R	# CZRCD1		
L$SPCP	002020-R	# CZRCD1		
L$SPTP	002024-R	# CZRCD1		
L$STA	002030-R	# CZRCD1		
L$SW	010464-R	# CZRCD1		
L$SWLE	010462-R	# CZRCD1		
L$TEST	002114-R	# CZRCD1		
L$TIML	002014-R	# CZRCD1		
L$UNIT	002012-R	# CZRCD1	CZRCD2	CZRCD3
MEM.MG	066235-R	# CZRCD1	CZRCD2	CZRCD3
MEM.SI	066274-R	# CZRCD1	CZRCD2	CZRCD3
MINUTE	066316-R	# CZRCD1	CZRCD2	CZRCD3
MSCP.E	045462-R	# CZRCD1	CZRCD2	CZRCD3
MSG.01	003466-R	# CZRCD1	CZRCD2	
MSG.02	003520-R	# CZRCD1	CZRCD3	
MSG.03	003616-R	# CZRCD1	CZRCD3	
MSG.04	003636-R	# CZRCD1	CZRCD3	
MSG.05	003670-R	# CZRCD1	CZRCD3	
MSG.06	003730-R	# CZRCD1	CZRCD3	
MSG.07	003772-R	# CZRCD1	CZRCD2	
MSG.08	004044-R	# CZRCD1	CZRCD3	
NEX	066336-R	# CZRCD1	CZRCD2	CZRCD3
NEX.TR	014746-R	# CZRCD2	CZRCD3	
NULL	003464-R	# CZRCD1		
NUM.BU	066302 R	# CZRCD1	CZRCD2	CZRCD3

```
OCL.X1   044054-R  # CZRCD1    CZRCD2    CZRCD3
OCL.X2   044056-R  # CZRCD1    CZRCD2    CZRCD3
OF.RC    066332-R  # CZRCD1    CZRCD2    CZRCD3
OUTC.L   043554-R  # CZRCD1    CZRCD2    CZRCD3
OUTC.T   043654-R  # CZRCD1    CZRCD2    CZRCD3
OUT.IO   016136-R  # CZRCD2    CZRCD3
OVF.CH   016660-R  # CZRCD2    CZRCD3
PATCH    042426-R  # CZRCD1    CZRCD2    CZRCD3
PLATT    010416-R  # CZRCD1    CZRCD2
PNT      001000    # CZRCD1  # CZRCD2  # CZRCD3
PRI      002000    # CZRCD1  # CZRCD2  # CZRCD3
PRI00    000000    # CZRCD1  # CZRCD2  # CZRCD3
PRI01    000040    # CZRCD1  # CZRCD2  # CZRCD3
PRI02    000100    # CZRCD1  # CZRCD2  # CZRCD3
PRI03    000140    # CZRCD1  # CZRCD2  # CZRCD3
PRI04    000200    # CZRCD1  # CZRCD2  # CZRCD3
```

GLOBAL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES...		
PRIO5	000240	# CZRCD1	# CZRCD2	# CZRCD3
PRIO6	000300	# CZRCD1	# CZRCD2	# CZRCD3
PRIO7	000340	# CZRCD1	# CZRCD2	# CZRCD3
PUTA.B	016074-R	# CZRCD2	CZRCD3	
PUTA.E	015536-R	# CZRCD2		
PUT.EN	015522-R	# CZRCD2	CZRCD3	
PUT.IO	016010-R	# CZRCD2	CZRCD3	
PUT.RE	015704-R	# CZRCD2	CZRCD3	
QIO	066270-R	# CZRCD1	CZRCD2	CZRCD3
RCINT0	037326-R	# CZRCD3		
RCINT1	037344-R	# CZRCD3		
RCINT2	037364-R	# CZRCD3		
RCINT3	037404-R	# CZRCD3		
RC25.A	043162-R	# CZRCD1	CZRCD2	CZRCD3
RETPKT	062422-R	# CZRCD1	CZRCD2	CZRCD3
RPS.X1	043550-R	# CZRCD1	CZRCD2	CZRCD3
RPS.X2	043552-R	# CZRCD1	CZRCD2	CZRCD3
RP.ADD	065464-R	# CZRCD1	CZRCD2	CZRCD3
RP.IND	065462-R	# CZRCD1	CZRCD2	CZRCD3
RP.SAV	043510-R	# CZRCD1	CZRCD2	CZRCD3
RP.USE	065422-R	# CZRCD1	CZRCD2	CZRCD3
SA.REG	066334-R	# CZRCD1	CZRCD2	CZRCD3
SB.COD	066326-R	# CZRCD1	CZRCD2	CZRCD3
SECOND	066320-R	# CZRCD1	CZRCD2	CZRCD3
SEND	017126-R	# CZRCD2	CZRCD3	
SET.CP	015120-R	# CZRCD2	CZRCD3	
SET.UP	015314-R	# CZRCD2	CZRCD3	
SFPTBL	010464-R	# CZRCD1		
STC.00	006542-R	# CZRCD1	CZRCD3	
STC.01	006556-R	# CZRCD1	CZRCD3	
STC.02	006602-R	# CZRCD1	CZRCD3	
STC.03	006626 R	# CZRCD1	CZRCD3	
STC.04	006650-R	# CZRCD1	CZRCD3	
STC.05	006674-R	# CZRCD1	CZRCD3	
STC.06	006724-R	# CZRCD1	CZRCD3	
STC.07	006750-R	# CZRCD1	CZRCD3	
STC.08	007002-R	# CZRCD1	CZRCD3	

STC.09	007022-R	@	CZRCD1	CZRCD3	
STC.10	007060-R	@	CZRCD1	CZRCD3	
STC.11	007106-R	@	CZRCD1	CZRCD3	
STEP	066330-R	@	CZRCD1	CZRCD2	CZRCD3
ST.COD	056324-R	@	CZRCD1	CZRCD2	CZRCD3
SWM1	003370-R	@	CZRCD1	CZRCD2	
SWP.DP	010475-R	@	CZRCD1	CZRCD3	
SWP.ER	010464-R	@	CZRCD1	CZRCD2	
SWP.ET	010472-R	@	CZRCD1	CZRCD2	CZRCD3
SWP.FL	010474-R	@	CZRCD1	CZRCD2	CZRCD3
SWP.ST	010470-R	@	CZRCD1	CZRCD2	CZRCD3
SWP.UC	010476-R	@	CZRCD1	CZRCD3	
SWP.UD	010500-R	@	CZRCD1	CZRCD3	
SWP.XF	010466-R	@	CZRCD1	CZRCD2	
SWQ1	002414-R	@	CZRCD1	CZRCD2	

SYMBOL	VALUE	REFERENCES...				
SWQ10	003024-R	# CZRCD1	CZRCD2			
SWQ11	003100-R	# CZRCD1	CZRCD2			
SWQ12	003144-R	# CZRCD1	CZRCD2			
SWQ13	003176-R	# CZRCD1	CZRCD2			
SWQ14	003274-R	# CZRCD1	CZRCD2			
SWQ15	003352-R	# CZRCD1	CZRCD2			
SWQ2	002452-R	# CZRCD1	CZRCD2			
SWQ3	002530-R	# CZRCD1	CZRCD2			
SWQ4	002576-R	# CZRCD1	CZRCD2			
SWQ5	002656-R	# CZRCD1	CZRCD2			
SWQ6	002700-R	# CZRCD1	CZRCD2			
SWQ7	002720-R	# CZRCD1	CZRCD2			
SWQ8	002736-R	# CZRCD1	CZRCD2			
SWQ9	003010-R	# CZRCD1	CZRCD2			
TALLY	044060-R	# CZRCD1	CZRCD2	CZRCD3		
TICKS	066322-R	# CZRCD1	CZRCD2	CZRCD3		
T$FREE	073302-R	# CZRCD4				
T$PTHV	000002	CZRCD1	# CZRCD4			
T.ADDR	045460-R	# CZRCD1	CZRCD2	CZRCD3		
T.FLAG	066233-R	# CZRCD1	CZRCD2	CZRCD3		
T1	022420-R	CZRCD1	# CZRCD3			
UAM	000200	# CZRCD1	# CZRCD2	# CZRCD3		
UPD.IO	016572-R	# CZRCD2	CZRCD3			
WAIT	017372-R	# CZRCD2	CZRCD3			
XFR.CH	016734-R	# CZRCD2	CZRCD3			
$END.L	073304-R	# CZRCD4				
$SAVE2	042320-R	B16MUL	# B16SAV	CZRCD2	CZRCD3	
$SAVE3	042334-R	# B16SAV	CZRCD2	CZRCD3		
$SAVE4	042352-R	# B16SAV	CZRCD2	CZRCD3		
$SAVE5	042372-R	B16MUL	# B16SAV	CZRCD2	CZRCD3	

```
!*****************************************************************************
!                                                                             *
!                       L I T E R A L S                                       *
!                                                                             *
!*****************************************************************************
!
LITERAL
!
!****** HARDWARE LIMITS AND PARAMETERS
!
        MAX_CTLR        = 4,                    ! MAXIMUM NUMBER OF RC25 CONTROLLERS ALLOWED
        MAX_UNITS       = MAX_CTLR * 4,         ! MAXIMUM NUMBER OF UNITS TO TEST
        MAX_TRACK       = 1641,                 ! LARGEST TRACK NUMBER IN HOST AREA
        MAX_SECT        = 30,                   ! LARGEST HOST SECTOR NUMBER IN EACH TRACK
        SEC_PER_TRK     = 31,                   ! NUMBER OF HOST SECTORS PER TRACK
        BLK_SIZE        = 512,                  ! NUMBER OF BYTES PER SECTOR
!
!****** U/Q PORT RING SIZES
!
        CR_LOG          = 3,                    ! LOG2 LENGTH OF COMMAND RING
        RR_LOG          = 3,                    ! LOG2 LENGTH OF RESPONSE RING
        CRING_LEN       = 1 ^ CR_LOG,           ! COMMAND RING LENGTH
        RRING_LEN       = 1 ^ RR_LOG,           ! RESPONSE RING LENGTH
!
!****** TABLE AND OTHER STRUCTURE SIZES
!
        HWPT_LEN        = 4,                    ! SIZE (WORDS) OF HW P-TABLE
        COMM_LEN        = (RRING_LEN * 2) + (CRING_LEN * 2) + 4, ! SIZE (WORDS) OF U/Q PORT COMM AREA FOR ONE CTLR
        CST_LEN         = 7,                    ! SIZE (WORDS) OF A CONTROLLER STATUS TABLE
        TALLY_LEN       = 24,                   ! SIZE (WORDS) OF A UNIT'S STATISTICS TABLE
        RP_LEN          = 24,                   ! SIZE (WORDS) OF A RETURN PACKET
        RPS_LEN         = CRING_LEN,            ! SIZE (BYTES) OF A CONTROLLER'S RETPKT SAVE AREA
        IODQ_LEN        = MAX_CTLR * RRING_LEN, ! NUMBER OF ENTRIES IN I/O DONE QUEUE (IODQ)
        MSG_LEN         = 30,                   ! SIZE (WORDS) OF AN MSCP MESSAGE (TEXT PORTION)
        ENV_LEN         = MSG_LEN + 4,          ! SIZE (WORDS) OF AN MSCP ENVELOPE
        DCT_LEN         = 9,                    ! SIZE (WORDS) OF A DRIVER CONTROLLER TABLE
        BST_LEN         = 2,                    ! SIZE (WORDS) OF A UNIT'S BLOCK SEQ TABLE ENTRY
        RDM_LEN         = 16,                   ! SIZE (WORDS) OF THE RANDOM NUMBER TABLE
        DESC_LEN        = 2,                    ! SIZE (WORDS) OF AN I/O BUFFER DESCRIPTOR
        DMC_LEN         = 26,                   ! SIZE (WORDS) OF DM_COMM AREA FOR ONE CONTROLLER
        RP_CNT          = MAX_CTLR * RRING_LEN, ! NUMBER OF RETURN PACKETS IN POOL
        MAX_UDP_CNT     = 16,                   ! MAX SIZE (WORDS) OF USER DATA PATTERN
        MAX_BUF_CNT     = (CRING_LEN * 2) * MAX_CTLR, ! MAX NO. OF I/O BUFFERS (SIZE OF BUFF_DESC AND BUFF_OWN)
        ENV_CNT         = ((CRING_LEN * 2) + RRING_LEN) * MAX_CTLR, ! NO. OF MSCP ENVELOPES IN POOL
        OUTC_CNT        = CRING_LEN * 2,        ! NUMBER OF ENTRIES IN A CONTROLLER'S OUTSTANDING CMD LIST
        DP_CNT          = 21,                   ! NUMBER OF PRE-DEFINED DATA PATTERNS
!
!****** OFFSETS
!
        OF_UN           = 3,                    ! WORD OFFSET FROM START OF CST TO FIRST UNIT
```

```
!
!****** SW P-TABLE FLAGS (SWP_FLAGS)
!
        SWF_SEL         = %O'1',                ! SUPPRESS PRINTING ERROR LOG MESSAGES
        SWF_DM          = %O'2',                ! RUN DM EXERCISER INSTEAD OF MULTI-DRIVE SUBTEST
        SWF_RDM         = %O'4',                ! RANDOM SEEK MODE
        SWF_CRC         = %O'10',               ! READ-COMPARES AT CONTROLLER
        SWF_WO          = %O'20',               ! WRITE ONLY
        SWF_CWC         = %O'40',               ! WRITE-COMPARES AT CONTROLLER
        SWF_HWC         = %O'100',              ! WRITE-COMPARES AT HOST
        SWF_UDP         = %O'200',              ! USER-DEFINED DATA PATTERN
        SWF_PHWC        = %O'6',                ! HOST WRITE COMPARES (BIT POSITION)
!
!****** ENTRY_REASON VALUES (HOW CURRENT PASS WAS INVOKED)
!
        START           = 1,                    ! START
        RESTART         = 2,                    ! RESTART
        CONT            = 3,                    ! CONTINUE
        PWR_FAIL        = 4,                    ! POWER FAIL
        NEW_PASS        = 5,                    ! NEW PASS
!
!****** DROP UNIT REASONS (LOADED INTO DUR VECTOR)
!
        DU_USER         = 0,                    ! USER COMMAND
        DU_CONF         = 1,                    ! CONFIGURATION ERROR
        DU_INIT         = 2,                    ! INITIALIZATION ERROR
        DU_HERR         = 3,                    ! HARD ERROR LIMIT REACHED
        DU_FATAL        = 4,                    ! UNRECOVERABLE DEVICE ERROR
!
!****** TIMEOUT VALUES (IN SECONDS)
!
        TO_INIT         = 120,                  ! INIT SUBTEST COMMANDS
        TO_DUP          = 30,                   ! DUP COMMANDS
        TO_IO           = 300,                  ! I/O TRANSFER COMMANDS
        TO_DM           = 360,                  ! ONE FPT PASS (DM EXERCISER SUBTEST)
!
!****** MISCELLANEOUS LITERALS
!
        INI_ATT         = 2,                    ! NUMBER OF HARD INIT ATTEMPTS BEFORE FAILURE IS ASSUMED
        WR_RING         = ((%O'200') OR (CR_LOG + 3) OR (RR_LOG)), ! USED IN HARD INIT SEQUENCE
        QIO_PER_CTLR    = CRING_LEN * 2,        ! MAXIMUM NUMBER OF OUTSTANDING QIOS PER CONTROLLER
!
!****** MSCP ENVELOPE DESCRIPTOR
!
        ED_OWN          = %O'100000',           ! OWNERSHIP BIT
!
!****** CONNECTION ID VALUES (MSCP_ENV, RETPKT)
!               (SERVE AS SOURCES AND DESTINATIONS OF MSCP MESSAGES)
!
        CID_DISK        = 0,                    ! DISK MSCP
!       CID_TAPE        = 1,                    ! TAPE MSCP
        CID_DUP         = 2,                    ! DIAGNOSTIC AND UTILITIES PROTOCOL
        CID_DRIVER      = 3,                    ! EXERCISER "DRIVER"
```

```
!
!****** MESSAGE TYPE VALUES
!
        MT_SEQ          = 0,                    ! SEQUENTIAL (FROM PORT)
        MT_DG           = 1,                    ! DATAGRAM (FROM PORT)
!       MT_CRD          = 2,                    ! CREDIT NOTIFICATION (FROM PORT)
        MT_FATAL        = 3,                    ! FATAL DEVICE ERROR (FROM "DRIVER")
        MT_TIMEOUT      = 4,                    ! COMMAND TIMEOUT (FROM "DRIVER")
!
!****** MSCP COMMAND PACKET OPCODES
!
        OP_SCC          = %O'4',                ! SET CONTROLLER CHARACTERISTICS COMMAND
        OP_ONL          = %O'11',               ! ONLINE COMMAND
        OP_ACC          = %O'20',               ! ACCESS COMMAND
        OP_RD           = %O'41',               ! READ COMMAND
        OP_WRT          = %O'42',               ! WRITE COMMAND
        OP_MSK          = %O'177',              ! OPCODE MASK
        OP_END          = %O'200',              ! ENDCODE DESIGNATOR
!
!****** DUP COMMAND OPCODES
!
        OP_ESP          = %O'2',                ! EXECUTE SUPPLIED PROGRAM
        OP_SND          = %O'4',                ! SEND DATA
!
!****** MSCP COMMAND MODIFIERS
!
        MD_EXP          = %O'100000',           ! EXPRESS REQUEST
        MD_CMP          = %O'40000',            ! COMPARE
!
!****** MSCP ERROR LOG MESSAGES - FORMAT FIELD CODES
!
        FM_CNT          = 0,                    ! CONTROLLER ERROR
        FM_BAD          = 1,                    ! HOST MEMORY ACCESS ERROR
        FM_SDE          = 4,                    ! SMALL DISK ERROR
!
!****** CONTROLLER FLAGS (IN SET CONTROLLER CHARACTERISTICS COMMAND)
!
        CF_MSC          = %O'100',              ! ENABLE MISCELLANEOUS ERROR LOG MESSAGES
        CF_THS          = %O'20',               ! ENABLE THIS HOST'S ERROR LOG MESSAGES
!
!****** UNIT FLAGS (IN ONLINE RESPONSE)
!
        UF_WPH          = %O'20000',            ! WRITE PROTECT (HARDWARE)
!
!****** STATUS / EVENT CODE DEFINITIONS
!
        ST_SUC          = %O'0',                ! SUCCESS
        ST_OFL          = %O'3',                ! UNIT OFFLINE
        ST_DAT          = %O'10',               ! DATA ERROR
!
!****** END MESSAGE FLAGS
!
        EF_BBR          = %O'200',              ! BAD BLOCK REPORTED
!
!****** RC25 LITERALS
!
        RCIP            = 0,                    ! IP REGISTER
        RCSA            = 1,                    ! SA REGISTER
```

```
!    SA REGISTER BIT DEFINITIONS
!
        SA_S1           = %O'004000',       ! STEP 1 STATUS BIT
        SA_S2           = %O'010000',       !   :  2
        SA_S3           = %O'020000',       !   :  3
        SA_S4           = %O'040000',       !   V  4
        SA_ERR          = %O'100000',       ! ERROR INDICATOR
        SA_INT          = %O'000200',       ! INTERRUPT ENABLE DURING INITIALIZATION
        SA_GO           = %O 000001',       ! GO BIT TO START FIRMWARE
!
!    INITIALIZATION SEQUENCE READ MASKS
        S1_MASK         = %O'176000',       ! STEP 1 READ BITS
        S2_MASK         = %O'174377',       !   :  2
        S3_MASK         = %O'174377',       !   :  3
        S4_MASK         = %O'174000',       !   V  4
!
!****** MEMORY MANAGEMENT (KT-11) REGISTER LOCATIONS
!
        KTPDR0          = %O'172300',       ! PAGE DESCRIPTOR REGISTERS
        KTPDR1          = %O'172302',
        KTPDR2          = %O'172304',
        KTPDR3          = %O'172306',
        KTPDR4          = %O 172310 ,
        KTPDR5          = %O'172312',
        KTPDR6          = %O 172314',
        KTPDR7          = %O'172316 ,
        KTPAR0          = %O'172340',       ! PAGE ADDRESS REGISTERS
        KTPAR1          = %O'172342',
        KTPAR2          = %O'172344 ,
        KTPAR3          = %O 172346 ,
        KTPAR4          = %O 172350 ,
        KTPAR5          = %O 172352 ,
        KTPAR6          = %O'172354',
        KTPAR7          = %O'172356 ,
        MMR0            = %O 177572 ,       ! MEMORY MANAGEMENT REGISTER 0
        MMR3            = %O 172516',       ! MEMORY MANAGEMENT REGISTER 3
!
!****** LITERALS FOR READABILITY
!
        YES             = 1,
        NO              = 0,
        TRUE            = 1,
        FALSE           = 0,
        SUCCESS         = 1,
        FAILURE         = 0,
        FOUND           = 1,
        NOT_FOUND       = 0,
        PRESENT         = 1,                ! PLATTER IS PRESENT IN CONTROLLER
        NOT_PRESENT     = 0,                ! PLATTER IS NOT PRESENT IN CONTROLLER
        UNPROTECTED     = 1,                ! PLATTER HAS UNPROTECTED CUSTOMER LBN'S
        PROTECTED       = 0,                ! PLATTER HAS PROTECTED CUSTOMER LBN'S
        ONLINE          = 1,
        OFFLINE         = 0,
        ALL_ONES        = %O'177777',
!
!****** CLOCK FLAGS FOR CLK TYPE
        NO_CLOCK        = 0,
        L_CLOCK         = -1,
        P_CLOCK         = 1;
```

```
!****************************************************************************
!                                                                           *
!                       F I E L D S                                         *
!                                                                           *
!****************************************************************************
!
FIELD
!
!******* HARDWARE P-TABLE FIELDS
!
HWP_FIELDS =
        SET
        HWP_IP_ADDR     = [0, 0, 16, 0],        ! IP ADDRESS
        HWP_VECTOR      = [1, 0, 16, 0],        ! VECTOR ADDRESS
        HWP_BR_LEVEL    = [2, 0, 16, 0],        ! BUS REQUEST LEVEL
        HWP_PLAT        = [3, 0, 16, 0],        ! PLATTER (ALL FIELDS)
        HWP_PLAT_ADDR   = [3, 0, 8, 0],         ! PLATTER ADDRESS (MSCP UNIT NO.)
        HWP_PLAT_CP     = [3, 15, 1, 0]         ! PROTECT CUSTOMER DATA BIT
        TES;
!
!******* U/Q PORT COMMUNICATION AREA HEADER FIELDS
!
COM_FIELDS =
        SET
        ADAP_CH         = [1, 8, 8, 0],         ! ADAPTER CHANNEL NUMBER FOR PURGES
        CMD_INT         = [2, 0, 16, 0],        ! COMMAND RING INTERRUPT
        RSP_INT         = [3, 0, 16, 0]         ! RESPONSE RING INTERRUPT
        TES;
!
!******* CONTROLLER STATUS TABLE (CST) FIELDS
!
C_FIELDS =
        SET
        IP_ADDR         = [0, 0, 16, 0],        ! IP ADDRESS
        VEC_ADDR        = [1, 0, 9, 0],         ! VECTOR ADDRESS
        STATE           = [1, 15, 1, 0],        ! CONTROLLER STATUS
        BR_LEV          = [2, 0, 8, 0],         ! BUS REQUEST LEVEL
        U_CNT           = [2, 8, 8, 0],         ! NUMBER OF TESTABLE UNITS UNDER THIS CONTROLLER
!
        P1_ALL          = [3, 0, 16, 0],        ! 1ST PLATTER (ALL FIELDS)
        P1_ADDR         = [3, 0, 8, 0],         ! 1ST PLATTER ADDRESS (MSCP UNIT NO.)
        P1_UNIT         = [3, 8, 5, 0],         ! 1ST PLATTER UNIT NUMBER (DRS UNIT NO.)
        P1_STAT         = [3, 13, 1, 0],        ! 1ST PLATTER STATUS BIT
        P1_PRES         = [3, 14, 1, 0],        ! 1ST PLATTER PPESENT BIT
        P1_PROT         = [3, 15, 1, 0]         ! 1ST PLATTER PROTECT CUSTOMER DATA BIT
!
!       THE REMAINING C_FIELDS ARE NOT REFERENCED DIRECTLY, BUT RATHER WITH OFFSETS
!       AND MACROS. THE FIELDS ARE DEFINED HERE ONLY FOR DOCUMENTATION PURPOSES.
!
!       P2_ALL          = [4, 0, 16, 0],        ! 2ND PLATTER (ALL FIELDS)
!       P2_ADDR         = [4, 0, 8, 0],         ! 2ND PLATTER ADDRESS (MSCP UNIT NO.)
!       P2_UNIT         = [4, 8, 5, 0],         ! 2ND PLATTER UNIT NUMBER (DRS UNIT NO.)
!       P2_STAT         = [4, 13, 1, 0],        ! 2ND PLATTER STATUS BIT
!       P2_PRES         = [4, 14, 1, 0],        ! 2ND PLATTER PRESENT BIT
!       P2_PROT         = [4, 15, 1, 0],        ! 2ND PLATTER PROTECT CUSTOMER DATA BIT
```

```
!
!       P3_ALL          = [5, 0, 16, 0],        ! 3RD PLATTER (ALL FIELDS)
!       P3_ADDR         = [5, 0, 8, 0],         ! 3RD PLATTER ADDRESS (MSCP UNIT NO.)
!       P3_UNIT         = [5, 8, 5, 0],         ! 3RD PLATTER UNIT NUMBER (DRS UNIT NO.)
!       P3_STAT         = [5, 13, 1, 0],        ! 3RD PLATTER STATUS BIT
!       P3_PRES         = [5, 14, 1, 0],        ! 3RD PLATTER PRESENT BIT
!       P3_PROT         = [5, 15, 1, 0],        ! 3RD PLATTER PROTECT CUSTOMER DATA BIT
!
!       P4_ALL          = [6, 0, 16, 0],        ! 4TH PLATTER (ALL FIELDS)
!       P4_ADDR         = [6, 0, 8, 0],         ! 4TH PLATTER ADDRESS (MSCP UNIT NO.)
!       P4_UNIT         = [6, 8, 5, 0],         ! 4TH PLATTER UNIT NUMBER (DRS UNIT NO.)
!       P4_STAT         = [6, 13, 1, 0],        ! 4TH PLATTER STATUS BIT
!       P4_PRES         = [6, 14, 1, 0],        ! 4TH PLATTER PRESENT BIT
!       P4_PROT         = [6, 15, 1, 0]         ! 4TH PLATTER PROTECT CUSTOMER DATA BIT
        TES.
!
!****** MSCP ENVELOPE FIELDS
!               (NOTE: THE FIRST TWO WORDS OF AN MSCP ENVELOPE (ITS BASE
!               ADDRESS) CONTAIN THE ENVELOPE'S OWN DESCRIPTOR, RATHER THAN THE
!               MESSAGE BODY (TEXT + 0). THE MESSAGE BODY BEGINS AT WORD 4.
!
E_FIELDS =
        SET
!
!   HEADER FIELDS
!
        ENV_LO          = [0, 0, 16, 0],        ! ENVELOPE DESCRIPTOR (LO ORDER)
        ENV_HI          = [1, 0, 16, 0],        ! ENVELOPE DESCRIPTOR (HI ORDER - ALL FIELDS)
        ENV_U           = [1, 0, 2, 0],         ! ENVELOPE DESCRIPTOR (HI ORDER UNIBUS BITS)
        ENV_Q           = [1, 2, 4, 0],         ! ENVELOPE DESCRIPTOR (HI ORDER Q-BUS BITS)
        ENV_F           = [1, 14, 1, 0],        ! ENVELOPE DESCRIPTOR FLAG BIT
        ENV_O           = [1, 15, 1, 0],        ! ENVELOPE DESCRIPTOR OWNERSHIP BIT
        MSGLEN          = [2, 0, 16, 0],        ! MESSAGE LENGTH
        CREDITS         = [3, 0, 4, 0],         ! CREDITS
        MSGTYP          = [3, 4, 4, 0],         ! MESSAGE TYPE
        CONNID          = [3, 8, 8, 0],         ! CONNECTION ID
!
!   GENERIC COMMAND PACKET AND END PACKET FILEDS
!
        CRN_LO          = [4, 0, 16, 0],        ! COMMAND REF NUMBER (LO ORDER)
        CRN_HI          = [5, 0, 16, 0],        ! COMMAND REF NUMBER (HI ORDER)
        PL_ADDR         = [6, 0, 16, 0],        ! PLATTER ADDRESS (MSCP UNIT NUMBER)
        OPCODE          = [8, 0, 8, 0],         ! OPCODE AND ENDCODE
        MODIFY          = [9, 0, 16, 0],        ! COMMAND MODIFIERS
!
!   READ, WRITE, AND ACCESS COMMAND FIELDS (FOR COMMAND AND END PACKETS)
!
        BC_LO           = [10, 0, 16, 0],       ! BYTE COUNT (LO ORDER,
        BC_HI           = [11, 0, 16, 0],       ! BYTE COUNT (HI ORDER)
        BUF_0           = [12, 0, 16, 0],       ! I/O BUFFER DESCRIPTOR
        BUF_1           = [13, 0, 16, 0],       !
!       BUF_2           = [14, 0, 16, 0],       !
!       BUF_3           = [15, 0, 16, 0],       !
!       BUF_4           = [16, 0, 16, 0],       !
!       BUF_5           = [17, 0, 16, 0],       !
        LBN_L           = [18, 0, 16, 0],       ! LOGICAL BLOCK NUMBER (LO ORDER)
        LBN_H           = [19, 0, 16, 0],       ! LOGICAL BLOCK NUMBER (HI ORDER)
```

```
!
!   SET CONTROLLER CHARACTERISTICS COMMAND FIELDS
!
        C_FLAGS         = [11, 0, 16, 0],       ! CONTROLLER FLAGS
!
!   ONLINE COMMAND FIELDS
!
        DDPAR           = [18, 0, 16, 0],       ! DEVICE-DEPENDENT PARAMETERS
!
!   DUP COMMAND FIELDS
!
        DBC_LO          = [10, 0, 16, 0],       ! BYTE COUNT (LO ORDER)
        DBC_HI          = [11, 0, 16, 0],       ! BYTE COUNT (HI ORDER)
        DBUF_0          = [12, 0, 16, 0],       ! BUFFER DESCRIPTOR
!       DBUF_1          = [13, 0, 16, 0],       !
!       DBUF_2          = [14, 0, 16, 0],       !
!       DBUF_3          = [15, 0, 16, 0],       !
!       DBUF_4          = [16, 0, 16, 0],       !
!       DBUF_5          = [17, 0, 16, 0],       !
        OBUF_0          = [18, 0, 16, 0],       ! OVERLAY BUFFER DESCRIPTOR
!       OBUF_1          = [19, 0, 16, 0],       !
!       OBUF_2          = [20, 0, 16, 0],       !
!       OBUF_3          = [21, 0, 16, 0],       !
!       OBUF_4          = [22, 0, 16, 0],       !
!       OBUF_5          = [23, 0, 16, 0],       !
!
!   ERROR LOG MESSAGE FIELDS
!
        FORMAT          = [8, 0, 8, 0],         ! FORMAT
        EVENT           = [9, 0, 5, 0],         ! EVENT CODE
        SUBC            = [9, 5, 11, 0],        ! SUB-CODE
        MA_LO           = [16, 0, 16, 0],       ! HOST MEMORY ADDRESS (LO ORDER)
        MA_HI           = [17, 0, 16, 0]        ! HOST MEMORY ADDRESS (HI ORDER)
        TES,
!
!****** RETURN PACKET (RETPKT) FIELDS
!               (SIMILAR, BUT NOT IDENTICAL, TO MSCP ENVELOPE FIELDS)
!
RP_FIELDS =
        SET
!
!   COMMON TO ALL RETURN PACKETS FROM DISK MSCP
!
        MESLEN          = [0, 0, 16, 0],        ! MESSAGE LENGTH
        CTLR            = [1, 0, 4, 0],         ! CONTROLLER NUMBER (CREDITS OVERWRITTEN)
        MESTYP          = [1, 4, 4, 0],         ! MESSAGE TYPE
        CONID           = [1, 8, 8, 0],         ! CONNECTION ID
        CRF_LO          = [2, 0, 16, 0],        ! COMMAND REFERENCE NUMBER (LO ORDER)
        CRF_HI          = [3, 0, 16, 0],        ! COMMAND REFERENCE NUMBER (HI ORDER)
        PLAT            = [4, 0, 16, 0],        ! PLATTER ADDRESS (MSCP UNIT NUMBER)
        CMDMOD          = [5, 0, 16, 0],        ! COMMAND MODIFIERS
        ENDCOD          = [6, 0, 8, 0],         ! END CODE
        FLAGS           = [6, 8, 8, 0],         ! FLAGS
        STATUS          = [7, 0, 16, 0],        ! STATUS AND SUB-CODE
        STSCOD          = [7, 0, 5, 0],         ! STATUS CODE
        SUBCOD          = [7, 5, 11, 0],        ! SUB CODE
```

```
!
!    READ, WRITE, AND ACCESS COMMAND RETURN PACKETS
!
        BCNT_LO         = [8, 0, 16, 0],        ! BYTE COUNT (LO ORDER)
        BCNT_HI         = [9, 0, 16, 0],        ! BYTE COUNT (HI ORDER)
        BUFF_0          = [10, 0, 16, 0],       ! I/O BUFFER DESCRIPTOR
        BUFF_1          = [11, 0, 16, 0],       !
!       BUFF_2          = [12, 0, 16, 0],       !
!       BUFF_3          = [13, 0, 16, 0],       !
!       BUFF_4          = [14, 0, 16, 0],       !
!       BUFF_5          = [15, 0, 16, 0],       !
        BBLK_LO         = [16, 0, 16, 0],       ! FIRST BAD BLOCK (LO ORDER)
        BBLK_HI         = [17, 0, 16, 0],       ! FIRST BAD BLOCK (HI ORDER)
        CBCNT_LO        = [18, 0, 16, 0],       ! BYTE COUNT FROM CMD PACKET (LO ORDER)
        CBCNT_HI        = [19, 0, 16, 0],       ! BYTE COUNT FROM CMD PACKET (HI ORDER)
        LBN_LO          = [20, 0, 16, 0],       ! LOGICAL BLOCK NUMBER (LO ORDER)
        LBN_HI          = [21, 0, 16, 0],       ! LOGICAL BLOCK NUMBER (HI ORDER)
!
!    UNIT ONLINE RETURN PACKET
!
        U_FLGS          = [9, 0, 16, 0],        ! UNIT FLAGS
        USIZ_LO         = [20, 0, 16, 0],       ! UNIT SIZE (LO ORDER)
        USIZ_HI         = [21, 0, 16, 0]        ! UNIT SIZE (HI ORDER)
        TES,
!
!****** STATISTICS TABLE (TALLY) FIELDS
!
T_FIELDS =
        SET
        READ_LO         - [0, 0, 16, 0],        ! NUMBER OF READS (LO ORDER)
        READ_HI         = [1, 0, 16, 0],        ! NUMBER OF READS (HI ORDER)
        WRIT_LO         = [2, 0, 16, 0],        ! NUMBER OF WRITES (LO ORDER)
        WRIT_HI         = [3, 0, 16, 0],        ! NUMBER OF WRITES (HI ORDER)
        SEEK_LO         = [4, 0, 16, 0],        ! NUMBER OF DM EXERCISER SEEKS (LO ORDER)
        SEEK_HI         = [5, 0, 16, 0],        ! NUMBER OF DM EXERCISER SEEKS (HI ORDER)
        BR_LO           = [6, 0, 16, 0],        ! NUMBER OF BYTES READ (LO ORDER 1000)
        BR_HI           = [ , 0, 16, 0],        ! NUMBER OF BYTES READ (HI ORDER 1000)
        MB_READ         = [8, 0, 16, 0],        ! MEGABYTES READ
        BW_LO           = ,9, 0, 16, 0],        ! NUMBER OF BYTES WRITTEN (LO ORDER 1000)
        BW HI             [10, 0, 16, 0],       ! NUMBER OF BYTES WRITTEN (HI ORDER 1000)
        MB_WRIT         = [11, 0, 16, 0],       ! MEGABYTES WRITTEN
        ER_HRD          = [12, 0, 16, 0],       ! NUMBER OF HARD ERRORS
        ER_LOG          = [13, 0, 16, 0],       ! NUMBER OF ERROR LOG MESSAGES
        ER_SFT          = [14, 0, 16, 0],       ! NUMBER OF DM SOFT ERRORS
        ECC_1           = [15, 0, 16, 0],       ! NUMBER OF 1-SYMBOL ECC ERRORS
        ECC_2           = [16, 0, 16, 0],       ! NUMBER OF 2-SYMBOL ECC ERRORS
        ECC_3           = [17, 0, 16, 0],       ! NUMBER OF 3-SYMBOL ECC ERRORS
        ECC_4           - [18, 0, 16, 0],       ! NUMBER OF 4-SYMBOL ECC ERRORS
        ECC_5           = [19, 0, 16, 0],       ! NUMBER OF 5-SYMBOL ECC ERRORS
        ECC_6           = [20, 0, 16, 0],       ! NUMBER OF 6 SYMBOL ECC ERRORS
        ECC_7           = [21, 0, 16, 0],       ! NUMBER OF 7-SYMBOL ECC ERRORS
        ECC_8           = [22, 0, 16, 0],       ! NUMBER OF 8 SYMBOL ECC ERRORS
        ECC_ONLY        = [23, 0, 16, 0]        ! ECC FIELD-ONLY ERRORS
        TES,
```

```
!
!****** DRIVER CONTROLLER TABLE (DCT) FIELDS
!
DC_FIELDS =
        SET
        WORD0           = [0, 0, 16, 0],        ! ALL FIELDS IN WORD 0
        CRING_CNT       = [0, 0, 8, 0],         ! NUMBER OF SLOTS IN CRING NOT YET RETURNED TO HOST
        IG_INT          = [0, 14, 1, 0],        ! IGNORE INTERRUPT BIT
        STAT            = [0, 15, 1, 0],        ! ONLINE / OFFLINE STATUS
        SA_SAVE         = [1, 0, 16, 0],        ! SA REGISTER SAVE WORD
        RR_BEG          = [2, 0, 16, 0],        ! FIXED ADDRESSES OF START AND
        RR_END          = [3, 0, 16, 0],        !       END OF EACH RING
        CR_BEG          = [4, 0, 16, 0],        !               :
        CR_END          = [5, 0, 16, 0],        !               V
        RR_POLL         = [6, 0, 16, 0],        ! ADDR OF NEXT RRING SLOT TO BE POLLED
        CR_POLL         = [7, 0, 16, 0],        ! ADDR OF NEXT CRING SLOT TO BE POLLED
        CR_NEXT         = [8, 0, 16, 0]         ! ADDR OF NEXT AVAIL CRING SLOT
        TES,
!
!****** DM EXERCISER COMMUNICATION AREA (DM_COMM) FIELDS
!
DMC_FIELDS =
        SET
        FPT_ACC         = [24, 0, 16, 0],       ! FRONT PANEL TEST ACCESS WORD
        HOST_ACC        = [25, 0, 16, 0]        ! HOST ACCESS WORD
!
!       THE REMAINING DMC_FIELDS ARE REFERENCED BY ADDRESS POINTERS. THE FIELDS
!       ARE DEFINED HERE ONLY FOR DOCUMENTATION PURPOSES.
!
!       DM_P1           = [0, 0, 16, 0],        ! PLATTER ADDRESSES (UNIT PLUG
!       DM_P2           = [1, 0, 16, 0],        !     NUMBERS) OF DISKS TO BE
!       DM_P3           = [2, 0, 16, 0],        !     DM-EXERCISED
!       DM_P4           = [3, 0, 16, 0],        !
!
!       P1_SEEKS        = [4, 0, 16, 0],        ! 1ST PLATTER - NO. OF SEEKS
!       P1_READS        = [5, 0, 16, 0],        ! 1ST PLATTER - NO. OF READS
!       P1_WRITES       = [6, 0, 16, 0],        ! 1ST PLATTER - NO. OF WRITES
!       P1_SOFT         = [7, 0, 16, 0],        ! 1ST PLATTER - NO. OF SOFT ERRORS
!       P1_HARD         = [8, 0, 16, 0],        ! 1ST PLATTER - NO. OF HARD ERRORS
!
!       P2_SEEKS        = [9, 0, 16, 0],        ! 2ND PLATTER - NO. OF SEEKS
!       P2_READS        = [10, 0, 16, 0],       ! 2ND PLATTER - NO. OF READS
!       P2_WRITES       = [11, 0, 16, 0],       ! 2ND PLATTER - NO. OF WRITES
!       P2_SOFT         = [12, 0, 16, 0],       ! 2ND PLATTER - NO. OF SOFT ERRORS
!       P2_HARD         = [13, 0, 16, 0],       ! 2ND PLATTER - NO. OF HARD ERRORS
!
!       P3_SEEKS        = [14, 0, 16, 0],       ! 3RD PLATTER - NO. OF SEEKS
!       P3_READS        = [15, 0, 16, 0],       ! 3RD PLATTER - NO. OF READS
!       P3_WRITES       = [16, 0, 16, 0],       ! 3RD PLATTER - NO. OF WRITES
!       P3_SOFT         = [17, 0, 16, 0],       ! 3RD PLATTER - NO. OF SOFT ERRORS
!       P3_HARD         = [18, 0, 16, 0],       ! 3RD PLATTER - NO. OF HARD ERRORS
!
!       P4_SEEKS        = [19, 0, 16, 0],       ! 4TH PLATTER - NO. OF SEEKS
!       P4_READS        = [20, 0, 16, 0],       ! 4TH PLATTER   NO. OF READS
!       P4_WRITES       = [21, 0, 16, 0],       ! 4TH PLATTER - NO. OF WRITES
!       P4_SOFT         = [22, 0, 16, 0],       ! 4TH PLATTER - NO. OF SOFT ERRORS
!       P4_HARD         = [23, 0, 16, 0]        ! 4TH PLATTER - NO. OF HARD ERRORS
        TES,
```

```
!
!****** BLOCK SEQUENCE TABLE (BST) FIELDS
!
B FIELDS =
        SET
        SECTOR          = [0, 0, 16, 0],        ! SECTOR
        TRACK           = [1, 0, 16, 0]         ! TRACK
        TES,
!
!****** I/O BUFFER DESCRIPTOR FIELDS (BUFF_DESC)
!
BD_FIELDS =
        SET
        BD_LO           = [0, 0, 16, 0],        ! LOW-ORDER 16 BITS
        BD_HI           = [1, 0, 16, 0]         ! HIGH-ORDER U/Q BITS
        TES,
!
!****** RC25 REGISTER FIELDS
!
RC REG =
        SET
        RC_ALL          = [0, 16, 0]            ! DEFINE ALL BITS
        TES;
```

```
!*****************************************************************************
!                                                                             *
!                       M A C R O S                                           *
!                                                                             *
!*****************************************************************************
!
MACRO
!
!******* ALL FIELDS OF A WORD
!
        ALLBIT          = 0, 16, 0%,            ! ALL FIELDS
!
!******* CST FIELDS (WORDS 3 - 6)
!
        P_ADDR          = 0, 8, 0%,             ! PLATTER ADDRESS (MSCP UNIT NO.)
        P_UNIT          = 8, 5, 0%,             ! PLATTER UNIT NUMBER (DRS UNIT NO.)
        P_STAT          = 13, 1, 0%,            ! PLATTER STATUS BIT
        P_PRES          = 14, 1, 0%,            ! PLATTER PRESENT BIT
        P_PROT          = 15, 1, 0%,            ! PLATTER PROTECTION BIT
!
!******* BIT TEST
!
BIT_TST (ADDR, EXPECTED) =
    (IF (.ADDR AND EXPECTED) EQLU EXPECTED
    THEN
        TRUE
    ELSE
        FALSE )%,
!
!******* RC25 WRITE
!
WRT_RC25 (0, FIELDNAM, IMAGE) =
    BEGIN
    LOCAL
        RC_REG;
    RC_REG <%FIELDEXPAND (FIELDNAM)> = IMAGE;
    (.RC25_ADDR + (%UPVAL * 0)) = .RC_REG;
    END%;
```

```
!*****************************************************************************
!                                                                             *
!                     S T R U C T U R E S                                     *
!                                                                             *
!*****************************************************************************
!
!
!****** RC25 ACCESS ALGORITHM
!
STRUCTURE
    RC25 [O, P, S, E] =
        BEGIN
        LOCAL
            RC_REG;
        RC_REG = .(RC25 + %UPVAL * O) <O, %BPVAL, O>;
        RC_REG
        END
        <P, S, E>;
```

```
;  0001  0     MODULE CZRCD1 (
;  0002  0             %TITLE 'CZRCDB0 RC25 DISK EXERCISER'
;  0003  0             IDENT = 'V02.0',
;  0004  0             ADDRESSING_MODE (ABSOLUTE)
;  0005  0             ) =
;  0006  1     BEGIN
;  0007  1
;  0043  1     %SBTTL 'PROGRAM HEADER'
;  0044  1
;  0045  1     LIBRARY 'CZRCDL';                       ! RC25 EXERCISER GLOBAL LIBRARY
;  0046  1     REQUIRE 'BLSMAC.REQ';                   ! DIAGNOSTIC SUPERVISOR LIBRARY
;  1535  1
;  1536  1     LITERAL
;  1537  1         DS$NBR_OF_TESTS = 1;                ! NUMBER OF TESTS IN THIS DIAGNOSTIC
;  1538  1
;  1539  1     EQUALS;
;  1540  1
;  1541  1     POINTER (ALL);
;  1542  1
;  1543  1     !+
;  1544  1     !       THE PROGRAM HEADER IS THE INTERFACE BETWEEN THE DIAGNOSTIC PROGRAM
;  1545  1     !       AND THE SUPERVISOR. THE ARGUMENTS FOR THE "HEADER" MACRO ARE: PROGRAM
;  1546  1     !       NAME, REV, PATCH, LONGEST TEST TIME, TYPE (WHERE 0 = SEQUENTIAL
;  1547  1     !       DIAGNOSTIC, 1 = EXERCISER), AND, OPTIONALLY, THE PROCESSOR PRIORITY TO
;  1548  1     !       BE SET WHEN STARTING THE DIAGNOSTIC.
;  1549  1     !-
;  1550  1
;  1551  1     HEADER (%ASCII' CZRCD', %ASCII'B', %ASCII'0', 65535, 1, PRI00);
;  1552  1
;  1553  1     !+
;  1554  1     !       THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST. IT
;  1555  1     !       IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST. THE LITERAL
;  1556  1     !       "DS$NBR_OF_TESTS" REPRESENTS THE NUMBER OF TESTS (1) IN THIS PROGRAM.
;  1557  1     !-
;  1558  1
;  1559  1     DISPATCH (DS$NBR_OF_TESTS);
```

```
;    1560  1     %SBTTL 'GLOBAL DATA SECTION'
;    1561  1
;    1562  1     !+
;    1563  1     !       THE GLOBAL DATA SECTION CONTAINS ALL DYNAMICALLY-MODIFIED DATA.
;    1564  1     !-
;    1565  1
;    1566  1     PSECT GLOBAL = $FFF$ (READ, NOWRITE, EXECUTE, LOCAL, CONCATENATE);
;    1567  1
;    1568  1     GLOBAL
;    1569  1         PATCH : VECTOR [100, WORD],                     ! PATCH AREA
;    1570  1         CPT : VECTOR [MAX_UNITS, BYTE],
;    1571  1     !       CURRENT PASS TESTING (YES / NO) PER UNIT
;    1572  1         CST : BLOCKVECTOR [MAX_CTLR, CST_LEN, WORD] FIELD (C_FIELDS),
;    1573  1     !       RUN-TIME CONTROLLER STATUS TABLES
;    1574  1         CST_ADDR : REF BLOCK [CST_LEN, WORD] FIELD (C_FIELDS),
;    1575  1     !       CONTROLLER STATUS TABLE ADDRESS OF "CURRENT" CONTROLLER
;    1576  1         DCT : BLOCKVECTOR [MAX_CTLR, DCT_LEN, WORD] FIELD (DC_FIELDS),
;    1577  1     !       DRIVER CONTROLLER TABLES
;    1578  1         DCT_ADDR : REF BLOCK [DCT_LEN, WORD] FIELD (DC_FIELDS),
;    1579  1     !       ADDRESS OF "CURRENT" DRIVER CONTROLLER TABLE
;    1580  1         RC25_ADDR : REF RC25 FIELD (RC_REG),
;    1581  1     !       DEVICE ADDRESS OF "CURRENT" CONTROLLER
;    1582  1         IRC25_ADDR : REF RC25 FIELD (RC_REG),
;    1583  1     !       DEVICE ADDRESS OF INTERRUPTING CONTROLLER
;    1584  1         DM_COMM : BLOCKVECTOR [MAX_CTLR, DMC_LEN, WORD] FIELD (DMC_FIELDS),
;    1585  1     !       DM EXERCISER COMMUNICATION AREA (LINK TO FRONT PANEL TEST)
;    1586  1         DMC_ADDR : REF BLOCK [DMC_LEN, WORD] FIELD (DMC_FIELDS),
;    1587  1     !       ADDRESS OF CURRENT CONTROLLER'S DM EXERCISER COMMUNICATION AREA
;    1588  1         RP_SAVE : VECTOR [MAX_CTLR * RPS_LEN, BYTE, SIGNED],
;    1589  1     !       RETURN PACKET SAVE AREA
;    1590  1         RPS_X1 : WORD,                                  ! STARTING INDEX OF CURRENT CONTROLLER'S RP_SAVE AREA
;    1591  1         RPS_X2 : WORD,                                  ! ENDING INDEX OF CURRENT CONTROLLER'S RP_SAVE AREA
;    1592  1         OUTC_LIST : VECTOR [MAX_CTLR * OUTC_CNT, BYTE, SIGNED],
;    1593  1     !       OUTSTANDING COMMAND LIST (CONTAINS MSCP ENVELOPE INDECES)
;    1594  1         OUTC_TIMR : VECTOR [MAX_CTLR * OUTC_CNT, WORD],
;    1595  1     !       OUTSTANDING COMMAND TIMERS
;    1596  1         OCL_X1 : WORD,
;    1597  1     !       STARTING INDEX OF CURRENT CONTROLLER'S OUTSTANDING COMMAND AREA
;    1598  1         OCL_X2 : WORD,
;    1599  1     !       ENDING INDEX OF CURRENT CONTROLLER'S OUTSTANDING COMMAND AREA
;    1600  1         TALLY : VECTOR [MAX_UNITS * TALLY_LEN, WORD] FIELD (T_FIELDS),
;    1601  1     !       STATISTICS TABLES
;    1602  1         T_ADDR : REF BLOCK [TALLY_LEN, WORD] FIELD (T_FIELDS),
;    1603  1     !       ADDRESS OF STATISTICS TABLE (TALLY) FOR CURRENT UNIT
;    1604  1         MSCP_ENV : BLOCKVECTOR [ENV_CNT, ENV_LEN, WORD] FIELD (E_FIELDS),
;    1605  1     !       MSCP ENVELOPE POOL
;    1606  1         ENV_USE : VECTOR [ENV_CNT, BYTE, SIGNED],
;    1607  1     !       MSCP ENVELOPE POOL ALLOCATION TABLE
;    1608  1         RETPKT : BLOCKVECTOR [RP_CNT, RP_LEN, WORD] FIELD (RP_FIELDS),
;    1609  1     !       RETURN PACKET POOL
;    1610  1         RP_USE : VECTOR [RP_CNT, BYTE, SIGNED],
;    1611  1     !       RETURN PACKET POOL ALLOCATION TABLE
;    1612  1         RP_INDX : WORD,                                 ! CURRENT RETURN PACKET INDEX
;    1613  1         RP_ADDR : REF BLOCK [RP_LEN, WORD] FIELD (RP_FIELDS),
;    1614  1     !       CURRENT RETURN PACKET ADDRESS
;    1615  1         BUFF_DESC : BLOCKVECTOR [MAX_BUF_CNT, DESC_LEN, WORD] FIELD (BD_FIELDS),
;    1616  1     !       TABLE OF I/O BUFFER DESCRIPTORS
```

```
;    1617  1          BUFF_OWN : VECTOR [MAX_BUF_CNT, BYTE, SIGNED],
;    1618  1      !       I/O BUFFER OWNERSHIP (CONTROLLER NUMBER)
;    1619  1          IODQ : VECTOR [IODQ_LEN, BYTE],
;    1620  1      !       I/O DONE QUEUE - CIRCULAR QUEUE OF RETPKT INDECES
;    1621  1          IODQ_IN : WORD,                         ! I/O DONE QUEUE IN POINTER
;    1622  1          IODQ_OUT : WORD,                        ! I/O DONE QUEUE OUT POINTER
;    1623  1          ENTRY_REASON : BYTE,                    ! HOW CURRENT PASS WAS INVOKED
;    1624  1          T_FLAG : BYTE,                          ! ONE SECOND TIMING FLAG
;    1625  1          EOP_FLAG : BYTE,                        ! END-OF-PASS FLAG
;    1626  1          MEM_MGMT : BYTE,                        ! MEMORY MANAGEMENT FLAG
;    1627  1          IIP_FLAG : BYTE,                        ! INITIALIZATION-IN-PROGRESS FLAG
;    1628  1          CCTLR : WORD,                           ! NUMBER OF "CURRENT" CONTROLLER
;    1629  1          CPLAT : WORD,                           ! CURRENT PLATTER ADDRESS (MSCP UNIT NUMBER)
;    1630  1          CUOFF : WORD,                           ! CST OFFSET FOR CURRENT UNIT
;    1631  1          CTLR_CNT : WORD,                        ! TOTAL NUMBER OF CONFIGURED CONTROLLERS
;    1632  1          DUR : VECTOR [MAX_UNITS, BYTE],         ! DROP UNIT REASON
;    1633  1          QIO : VECTOR [MAX_CTLR, BYTE],          ! NUMBER OF OUTSTANDING QIOS PER CONTROLLER
;    1634  1          MEM_SIZE : WORD,                        ! AVAILABLE MEMORY (IN WORDS) UP TO 28K
;    1635  1          FREE_MEM_ADDR,                          ! START OF FREE MEMORY BELOW 28K
;    1636  1          BUFF_SIZE : WORD,                       ! SIZE (BYTES) OF AN I/O BUFFER
;    1637  1          NUM_BUFF : WORD,                        ! NUMBER OF I/O BUFFERS
;    1638  1          CLK_TYPE : WORD,                        ! TYPE OF CLOCK ON SYSTEM
;    1639  1                                                  !   (0 = NONE,  1 = L-CLOCK, 1 = P_CLOCK)
;    1640  1          CLK_HERTZ : WORD,                       ! CLOCK HERTZ RATE
;    1641  1          CLK_CSR,                                ! CLOCK CSR ADDRESS
;    1642  1          CLK_VECTOR,                             ! CLOCK VECTOR ADDRESS
;    1643  1          HOURS : WORD,                           ! ELAPSED TIME - HOURS,
;    1644  1          MINUTES : WORD,                         !       MINUTES,
;    1645  1          SECONDS : WORD,                         !       SECONDS,
;    1646  1          TICKS : WORD,                           !       TICKS
;    1647  1          ST_CODE : WORD,                         ! CURRENT STATUS CODE
;    1648  1          SB_CODE : WORD,                         ! CURRENT SUB-CODE
;    1649  1          STEP : WORD,                            ! CURRENT STEP IN HARD_INIT
;    1650  1          OF_RC : SIGNED WORD,                    ! OFFSET (0 OR 2) TO READ IP OR SA
;    1651  1          SA_REG : WORD,                          ! STORAGE FOR SA REGISTER READS AND WRITES
;    1652  1          NEX : WORD,                             ! NON-EXISTENT MEMORY TRAP INDICATOR
;    1653  1          CRN : WORD;                             ! COMMAND REF NUMBER OF LAST COMMAND SENT
;    1654  1
;    1655  1      !+
;    1656  1      !       THE ERRTBL MACRO IS REQUIRED WHETHER OR NOT THE PROGRAM USES THE
;    1657  1      !       "ERROR" MACRO.  THE ERRTBL MACRO EXPANDS INTO FOUR WORDS THAT ARE
;    1658  1      !       USED BY THE RUNTIME SERVICES DURING AN ERROR CALL: ERROR TYPE,
;    1659  1      !       ERROR NUMBER, ADDRESS OF ERROR MESSAGE AND ADDRESS OF MESSAGE
;    1660  1      !       BLOCK.  THERE MUST BE ONLY ONE ERRTBL IN ANY PROGRAM.  THIS SECTION
;    1661  1      !       IS NOT OPTIONAL.
;    1662  1      !-
;    1663  1
;    1664  1      ERRTBL;
```

```
;    1665  1      %SBTTL 'GLOBAL TEXT SECTION'
;    1666  1
;    1667  1      !+
;    1668  1      !       THE GLOBAL TEXT SECTION CONTAINS ALL MESSAGES OUTPUT TO THE OPERATOR
;    1669  1      !       DUPING THE OPERATION OF THE EXERCISER. THIS INCLUDES HARDWARE AND
;    1670  1      !       SOFTWARE DIALOG PROMPTS, ERROR MESSAGES, AND DROP UNIT MESSAGES.
;    1671  1      !-
;    1672  1
;    1673  1      GLOBAL BIND
;    1674  1      !
;    1675  1      !****** HARDWARE DIALOG
;    1676  1      !
;    1677  1          HWQ1 = UPLIT (%ASCIZ'IP ADDRESS'),
;    1678  1          HWQ2 = UPLIT (%ASCIZ'VECTOR'),
;    1679  1          HWQ3 = UPLIT (%ASCIZ'BR LEVEL'),
;    1680  1          HWQ4 = UPLIT (%ASCIZ'PLATTER ADDRESS (UNIT PLUG)'),
;    1681  1          HWQ5 = UPLIT (%ASCIZ'ALLOW WRITES TO CUSTOMER DATA AREA ON THIS PLATTER'),
;    1682  1          HWQ6 = UPLIT (%ASCIZ'** WARNING - CUSTOMER DATA AREA MAY BE OVERWRITTEN! ... CONFIRM'),
;    1683  1      !
;    1684  1      !****** SOFTWARE DIALOG
;    1685  1      !
;    1686  1          SWQ1 = UPLIT (%ASCIZ'ERROR LIMIT (0 FOR NO LIMIT)'),
;    1687  1          SWQ2 = UPLIT (%ASCIZ'TRANSFER LIMIT IN MEGABYTES (0 FOR NO LIMIT)'),
;    1688  1          SWQ3 = UPLIT (%ASCIZ'SUPPRESS PRINTING ERROR LOG MESSAGES'),
;    1689  1          SWQ4 = UPLIT (%ASCIZ'RUN DM EXERCISER INSTEAD OF MULTI-DRIVE SUBTEST'),
;    1690  1          SWQ5 = UPLIT (%ASCIZ'RANDOM SEEK MODE'),
;    1691  1          SWQ6 = UPLIT (%ASCIZ'STARTING TRACK'),
;    1692  1          SWQ7 = UPLIT (%ASCIZ'ENDING TRACK'),
;    1693  1          SWQ8 = UPLIT (%ASCIZ'READ-COMPARES PERFORMED AT THE CONTROLLER'),
;    1694  1          SWQ9 = UPLIT (%ASCIZ'WRITE ONLY'),
;    1695  1          SWQ10 = UPLIT (%ASCIZ'WRITE-COMPARES PERFORMED AT THE CONTROLLER'),
;    1696  1          SWQ11 = UPLIT (%ASCIZ'CHECK ALL WRITES AT HOST BY READING'),
;    1697  1          SWQ12 = UPLIT (%ASCIZ'USER-DEFINED DATA PATTERN'),
;    1698  1          SWQ13 = UPLIT (%ASCIZ'SELECT PRE-DEFINED DATA PATTERN (0 FOR SEQUENTIAL SELECTION)'),
;    1699  1          SWQ14 = UPLIT (%ASCIZ'NUMBER OF WORDS IN DATA PATTERN (16 MAXIMUM)'),
;    1700  1          SWQ15 = UPLIT (%ASCIZ'PATTERN VALUE'),
;    1701  1          SWM1 = UPLIT (%ASCIZ'THE REMAINING QUESTIONS ONLY APPLY TO UNPROTECTED PLATTERS.'),
;    1702  1          NULL = UPLIT (%ASCIZ''),    ! ADDED TO COVER DRS BUG (NEXT MESSAGE ALSO PRINTED)
;    1703  1      !
;    1704  1      !****** INFORMATION MESSAGES (IF ATTENDED MODE, THEN PRINTF)
;    1705  1      !
;    1706  1          MSG_01 = UPLIT (%ASCIZ'%APOWER DELAY - WAITING%N'),
;    1707  1          MSG_02 = UPLIT (%ASCIZ'%N%AABOUT TO VERIFY VECTOR %O3%A(0) FOR DEVICE %O6%A(0) ... '),
;    1708  1          MSG_03 = UPLIT (%ASCIZ'%ACOMPLETED.%N'),
;    1709  1          MSG_04 = UPLIT (%ASCIZ'%N%AINIT SUBTEST START%N'),
;    1710  1          MSG_05 = UPLIT (%ASCIZ'%N%AMULTI-DRIVE SUBTEST START%N'),
;    1711  1          MSG_06 = UPLIT (%ASCIZ'%N%ADM EXERCISER SUBTEST START%N'),
;    1712  1          MSG_07 = UPLIT (%ASCIZ'%AUNIT %D2%A. - TRANSFER LIMIT REACHED%N'),
;    1713  1          MSG_08 = UPLIT (%ASCIZ'%D5%A. BLOCKS TRANSFERRED ON UNIT %D2%A. (PLATTER %D3%A.)%N'),
;    1714  1      !
;    1715  1      !****** CONFIGURATION ERROR MESSAGES (IF ATTENDED MODE, THEN PRINTF)
;    1716  1      !
;    1717  1          CER_01 = UPLIT (%ASCIZ'%N%ADUPLICATE PLATTER ADDRESS %D3%A. AT IP %O6%A(0)'),
;    1718  1          CER_02 = UPLIT (%ASCIZ'%N%AALREADY 4 UNITS AT IP %O6%A(0)'),
;    1719  1          CER_03 = UPLIT (%ASCIZ'%N%AMORE THAN %D1%A DIFFERENT IP ADDRESSSES'),
;    1720  1      !
;    1721  1      !****** DROP UNIT MESSAGES
```

```
;  1722  1      !
;  1723  1          DUM_00 = UPLIT (%ASCIZ'%AUNIT %D2%A, DROPPED    '),
;  1724  1          DUM_UC = UPLIT (%ASCIZ'%AUSER COMMAND%N'),
;  1725  1          DUM_CE = UPLIT (%ASCIZ'%ACONFIGURATION ERROR%N'),
;  1726  1          DUM_IE = UPLIT (%ASCIZ'%AINIT ERROR%N'),
;  1727  1          DUM_HE = UPLIT (%ASCIZ'%AHARD ERROR LIMIT REACHED%N'),
;  1728  1          DUM_UE = UPLIT (%ASCIZ'%AUNRECOVERABLE ERROR%N'),
;  1729  1      !
;  1730  1      !****** GENERAL ERROR MESSAGES
;  1731  1      !
;  1732  1      !       SYSTEM FATAL (ERRSF)
;  1733  1      !
;  1734  1          EGS_01 = UPLIT (%ASCIZ'TOO MANY UNITS'),
;  1735  1          EGS_02 = UPLIT (%ASCIZ NEITHER P NOR L CLOCK WAS FOUND ON THE SYSTEM'),
;  1736  1      !
;  1737  1      !       DEVICE FATAL (ERRDF)
;  1738  1      !
;  1739  1          EGD_10 = UPLIT (%ASCIZ'REGISTER EXISTENCE TEST FAILED'),
;  1740  1          EGD_11 = UPLIT (%ASCIZ'VECTOR TEST FAILED '),
;  1741  1          EGD_12 = UPLIT (%ASCIZ'BR LEVEL TEST FAILED'),
;  1742  1          EGD_13 = UPLIT (%ASCIZ'INIT SEQUENCE FAILED'),
;  1743  1          EGD_14 = UPLIT (%ASCIZ'FATAL PORT / CONTROLLER ERROR'),
;  1744  1          EGD_15 = UPLIT (%ASCIZ'MESSAGE RESPONSE TIMEOUT'),
;  1745  1          EGD_16 = UPLIT (%ASCIZ'ONLINE FAILED '),
;  1746  1          EGD_17 = UPLIT (%ASCIZ'WRITE-PROTECT CONFLICT'),
;  1747  1          EGD_18 = UPLIT (%ASCIZ'ACCESS FAILED'),
;  1748  1          EGD_19 = UPLIT (%ASCIZ'FATAL I/O ERROR'),
;  1749  1          EGD_20 = UPLIT (%ASCIZ'CONTROLLER TIMEOUT'),
;  1750  1          EGD_21 = UPLIT (%ASCIZ'DUP COMMAND FAILED'),
;  1751  1          EGD_22 = UPLIT (%ASCIZ'DM EXERCISER TIMEOUT'),
;  1752  1      !
;  1753  1      !       HARD (ERRHRD)
;  1754  1      !
;  1755  1          EGH_30 = UPLIT (%ASCIZ'I/O REQUEST FAILED'),
;  1756  1      !
;  1757  1      !****** BASIC ERROR MESSAGES (PRINTB)
;  1758  1      !
;  1759  1      !       SYSTEM FATAL (ERRSF)
;  1760  1      !
;  1761  1          EBS_01 = UPLIT (%ASCIZ'%AMORE THAN %D2%A. UNITS SPECIFIED%N'),
;  1762  1      !
;  1763  1      !       DEVICE FATAL (ERRDF)
;  1764  1      !
;  1765  1          EBD_10 = UPLIT (%ASCIZ'%ANO RESPONSE AT ADDRESS %O6%A(0)%N'),
;  1766  1          EBD_12 = UPLIT (%ASCIZ'%AINCORRECT BR LEVEL GIVEN FOR DEVICE %O6%A(0)%N'),
;  1767  1          EBD_13 = UPLIT (%ASCIZ'%ASTEP %D1%A READ ERROR ON DEVICE %O6%A(0)%N'),
;  1768  1          EBD_14 = UPLIT (%ASCIZ'%AERROR CODE RECEIVED IN SA REGISTER OF DEVICE %O6%A(0)%N'),
;  1769  1          EBD_15 = UPLIT (%ASCIZ'%AFAILED TO RECEIVE END MESSAGE FROM DEVICE %O6%A(0)%N'),
;  1770  1          EBD_16 = UPLIT (%ASCIZ'%AERROR IN RESPONSE TO ONLINE COMMAND FOR PLATTER %D3%A.%N'),
;  1771  1          EBD_17 = UPLIT (%ASCIZ'%APLATTER %D3%A. IS SW WRITE-ENABLED BUT HW WRITE-PROTECTED%N'),
;  1772  1          EBD_18 = UPLIT (%ASCIZ'%AACCESS FAILED ON PLATTER %D3%A.%N'),
;  1773  1          EBD_19 = UPLIT (%ASCIZ'%APLATTER %D3%A. WENT OFFLINE%N'),
;  1774  1          EBD_20 = UPLIT (%ASCIZ'%ADEVICE %O6%A(0) NOT PROCESSING COMMAND PACKETS%N'),
;  1775  1          EBD_21 = UPLIT (%ASCIZ'%AMESSAGE REJECTED BY DUP SERVER ON DEVICE %O6%A(0)%N'),
;  1776  1          EBD_22 = UPLIT (%ASCIZ'%ANO RESPONSE FROM FRONT PANEL TEST EXECUTING IN DEVICE %O6%A(0)%N'),
;  1777  1      !
;  1778  1      !       HARD (ERRHRD)   MAINLY BASED ON MSCP STATUS CODES
```

```
;  1779  1      !
;  1780  1          STC_00 = UPLIT (%ASCIZ'%ASUCCESS%N'),
;  1781  1          STC_01 = UPLIT (%ASCIZ'%AINVALID COMMAND%N'),
;  1782  1          STC_02 = UPLIT (%ASCIZ'%ACOMMAND ABORTED%N'),
;  1783  1          STC_03 = UPLIT (%ASCIZ'%AUNIT OFFLINE%N'),
;  1784  1          STC_04 = UPLIT (%ASCIZ'%AUNIT-AVAILABLE%N'),
;  1785  1          STC_05 = UPLIT (%ASCIZ'%AMEDIA FORMAT ERROR%N'),
;  1786  1          STC_06 = UPLIT (%ASCIZ'%AWRITE-PROTECTED%N'),
;  1787  1          STC_07 = UPLIT (%ASCIZ %ADEVICE COMPARE ERROR%N'),
;  1788  1          STC_08 = UPLIT (%ASCIZ'%ADATA ERROR%N'),
;  1789  1          STC_09 = UPLIT (%ASCIZ %AHOST BUFFER ACCESS ERROR%N ),
;  1790  1          STC_10 = UPLIT (%ASCIZ'%ACONTROLLER ERROR%N ),
;  1791  1          STC_11 = UPLIT (%ASCIZ'%ADRIVE ERROR%N'),
;  1792  1      !
;  1793  1          EBH_31 = STC_01,
;  1794  1          EBH_32 = STC_02,
;  1795  1          EBH_34 = STC_04,
;  1796  1          EBH_35 = STC_05,
;  1797  1          EBH_36 = STC_06,
;  1798  1          EBH_37 = STC_07,
;  1799  1          EBH_38 = STC_08,
;  1800  1          EBH_39 = STC_09,
;  1801  1          EBH_40 = STC_10,
;  1802  1          EBH_41 = STC_11,
;  1803  1          EBH_42 = UPLIT (%ASCIZ'%AHOST-DETECTED WRITE-COMPARE ERROR%N'),
;  1804  1          EBH_43 = UPLIT (%ASCIZ'%AFAILED TO RECEIVE END MESSAGE FOR I/O COMMAND%N'),
;  1805  1      !
;  1806  1      !****** EXTENDED ERROR (PRINTX) AND ERROR LOG (PRINTF) MESSAGES
;  1807  1      !
;  1808  1          EX_SA = UPLIT (%ASCIZ %A    SA: %O6%A(0)%N'),
;  1809  1          EX_CRN = UPLIT (%ASCIZ %A    CMD REF NUM: %O6%A(0)%N'),
;  1810  1          EX_SC = UPLIT (%ASCIZ'%A    STATUS CODE: %O2%A(0)%N'),
;  1811  1          EX_DSC = UPLIT (%ASCIZ'%A    DUP STATUS CODE: %D1%A.%N'),
;  1812  1          EX_SB = UPLIT (%ASCIZ'%A    SUB-CODE: %O4%A(0)%N'),
;  1813  1          EX_CMD = UPLIT (%ASCIZ'%A    COMMAND: '),
;  1814  1          EX_SCC = UPLIT (%ASCIZ'%ASET CTLR CHAR'),
;  1815  1          EX_ONL = UPLIT (%ASCIZ'%AONLINE'),
;  1816  1          EX_ESP = UPLIT (%ASCIZ'%AEXECUTE SUPPLIED PROGRAM'),
;  1817  1          EX_SND = UPLIT (%ASCIZ'%ASEND DATA'),
;  1818  1          EX_RD = UPLIT (%ASCIZ'%AREAD'),
;  1819  1          EX_WRT = UPLIT (%ASCIZ'%AWRITE'),
;  1820  1          EX_CMP = UPLIT (%ASCIZ'%A-COMPARE%N'),
;  1821  1          EX_BB = UPLIT (%ASCIZ'%A    BAD BLOCK REPORTED: %D5%A.%N'),
;  1822  1          EX_LBN = UPLIT (%ASCIZ'%A    LBN: %D5%A.%N'),
;  1823  1          EX_CBC = UPLIT (%ASCIZ'%A    BYTE COUNT IN COMMAND: %D5%A.%N'),
;  1824  1          EX_BC = UPLIT (%ASCIZ'%A    ACTUAL # OF BYTES TRANSFERRED: %D5%A.%N'),
;  1825  1          EX_BD = UPLIT (%ASCIZ'%A    I/O BUFFER DESCRIPTOR:%O7%A(0)%O7%A(0)%N'),
;  1826  1          EX_EL = UPLIT (%ASCIZ'%N%AERROR LOG MESSAGE RECEIVED:%N'),
;  1827  1          EX_PA = UPLIT (%ASCIZ'%A    PLATTER: %D3%A.%N'),
;  1828  1          EX_FMT = UPLIT (%ASCIZ'%A    FORMAT: '),
;  1829  1          EX_EVC = UPLIT (%ASCIZ'%A    EVENT CODE: '),
;  1830  1          EX_HMA = UPLIT (%ASCIZ'%A    HOST MEM ADDR:%O7%A(0)%O7%A(0)%N'),
;  1831  1          EX_03 = UPLIT (%ASCIZ'%O3%A(0)%N'),
```

```
;    1832  1      !
;    1833  1      !****** MISCELLANEOUS
;    1834  1      !
;    1835  1          ETIME = UPLIT (%ASCIZ'%D2%A:%D2%A:%D2%A  '),
;    1836  1          PLATT = UPLIT (%ASCIZ'%APLATTER %D3%A. - '),
;    1837  1          CRLF = UPLIT (%ASCIZ'%N');
;    1838  1
;    1839  1      %SBTTL  DEFAULT HARDWARE P TABLE
;    1840  1
;    1841  1      !+
;    1842  1      !       THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF THE TEST-DEVICE
;    1843  1      !       PARAMETERS.  THE STRUCTURE OF THIS TABLE IS IDENTICAL TO THE STRUCTURE
;    1844  1      !       OF THE ACTUAL HARDWARE P-TABLES, WHICH RESIDE IN SUPERVISOR SPACE, AND
;    1845  1      !       IS USED AS A "TEMPLATE' FOR BUILDING THE P TABLES.
;    1846  1      !-
;    1847  1
;    1848  1      BGNHW (DFPTBL);
;    1849  1
;    1850  1      GLOBAL
;    1851  1
;    1852  1          HWPT_IP_ADDR : WORD INITIAL (%O 172150'),    ! IP ADDRESS
;    1853  1          HWPT_VECTOR : WORD INITIAL (%O'154'),        ! VECTOR ADDRESS
;    1854  1          HWPT_BR_LEVEL : WORD INITIAL (5),            ! BR LEVEL
;    1855  1          HWPT_PLAT : WORD INITIAL (0);                ! PLATTER ADDR, PROTECTON BIT
;    1856  1
;    1857  1      ENDHW;
```

```
;   1858  1     %SBTTL  'SOFTWARE P-TABLE'
;   1859  1
;   1860  1     !+
;   1861  1     !       THE SOFTWARE P-TABLE CONTAINS VARIOUS DATA USED BY THE PROGRAM AS
;   1862  1     !       OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE SET UP AT ASSEMBLY TIME
;   1863  1     !       AND MAY BE VARIED BY THE OPERATOR AT RUN TIME.
;   1864  1     !-
;   1865  1
;   1866  1     BGNSW (SFPTBL);
;   1867  1
;   1868  1     GLOBAL
;   1869  1
;   1870  1         SWP_ERROR : WORD INITIAL (32),              ! HARD ERROR LIMIT FOR DROPPING UNIT
;   1871  1         SWP_XFER : WORD INITIAL (2),                ! TRANSFER LIMIT PER UNIT PER PASS
;   1872  1         SWP_STRACK : WORD INITIAL (0),              ! STARTING TRACK
;   1873  1         SWP_ETRACK : WORD INITIAL (MAX_TRACK),      ! ENDING TRACK
;   1874  1         SWP_FLAGS : BYTE INITIAL (%O'55'),          ! FLAGS (SEE DOCUMENTATION)
;   1875  1         SWP_DPAT : BYTE INITIAL (0),                ! DATA PATTERN NUMBER
;   1876  1         SWP_UCNT : WORD INITIAL (MAX_UDP_CNT),      ! USER DATA PATTERN COUNT
;   1877  1         SWP_UDPAT : VECTOR [MAX_UDP_CNT, WORD];     ! USER DATA PATTERN
;   1878  1
;   1879  1     ENDSW;
```

```
;   1880  1     %SBTTL 'PROTECTION TABLE'
;   1881  1
;   1882  1     !+
;   1883  1     !       THIS TABLE IS USED BY THE RUNTIME SERVICES TO PROTECT THE LOAD MEDIA.
;   1884  1     !               1ST ARG = BYTE OFFSET INTO P-TABLE FOR CSR ADDRESS
;   1885  1     !               2ND ARG = BYTE OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
;   1886  1     !               3RD ARG = BYTE OFFSET INTO P-TABLE FOR DRIVE NUMBER
;   1887  1     !       BYTE OFFSET REFERS TO THE NUMBER OF BYTES FROM THE BEGINNING OF A
;   1888  1     !       PTABLE ENTRY TO THE ITEM IN QUESTION. IF THE PARTICULAR ITEM DOES NOT
;   1889  1     !       APPLY, THEN ENTRY IS SET TO -1.  WHEN THE RUNTIME SERVICES EXECUTES A
;   1890  1     !       GPHARD, IT USES THESE OFFSETS (IF NOT SET TO -1) TO GET THE ITEMS AND
;   1891  1     !       COMPARE WITH THOSE SAVED IN THE XXDP+ MONITOR.  IF THE UNIT BEING
;   1892  1     !       REQUESTED MATCHES THE LOAD DEVICE, THEN THE RUNTIME SERVICES RETURN AN
;   1893  1     !       INCOMPLETE FLAG ON THE GPHARD.
;   1894  1     !-
;   1895  1
;   1896  1     BGNPROT (-1, -1, -1);
;   1897  1
;   1898  1     ENDPROT;
;   1899  1
;   1900  1     END
;   1901  1
;   1902  0     ELUDOM


                                        .TITLE  CZRCD1 CZRCDB0 RC25 DISK EXERCISER
                                        .IDENT  /V02.0/
                                        .ENABL  AMA


000000                                          .PSECT  $CODE$,  RO
000000     040     103     132          L$NAME::.ASCII  / CZ/
000003     122     103     104                  .ASCII  /RCD/
000006     000                                  .BYTE   0
000007     000                                  .BYTE   0
000010                                  L$REV::
000010     102                                  .ASCII  /B/
000011     060                                  .ASCII  /0/
000012  000000G                         L$UNIT::.WORD   T$PTHV
000014  177777                         L$TIML::.WORD   -1
000016  000000G                         L$HPCP::.WORD   L$HARD
000020  000000G                         L$SPCP::.WORD   L$SOFT
000022  006450'                         L$HPTP::.WORD   L$HW
000024  006464'                         L$SPTP::.WORD   L$SW
000026  000000G                         L$LADP::.WORD   L$LAST
000030  000000                          L$STA:: .WORD   0
000032  000000                          L$CO::  .WORD   0
000034  000001                          L$DTYP::.WORD   1
000036  000000                          L$APT:: .WORD   0
000040  000124'                         L$DTP:: .WORD   L$DISPATCH
000042  000000                          L$PRIO::.WORD   0
000044  000000                          L$ENVI::.WORD   0
000046  000000                          L$EXP1::.WORD   0
000050                                  L$MREV::
000050     003                                  .BYTE   3
000051     003                                  .BYTE   3
000052  000000                          L$EF::  .WORD   0
```

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000056  000000                  L$SPC:: .WORD   0
000060  000000G                 L$DEVP::.WORD   L$DVTYP
000062  000000G                 L$REPP::.WORD   L$RPT
000064  000000                  L$EXP4::.WORD   0
000066  000000                  L$EXP5::.WORD   0
000070  000000G                 L$AUT:: .WORD   L$AU
000072  000000G                 L$DUT:: .WORD   L$DU
000074  000000                  L$LUN:: .WORD   0
000076  000000G                 L$DESP::.WORD   L$DESC
000100  104035                  L$LOAD::.WORD   -73743
000102  000126'                 L$ETP:: .WORD   L$ERRTBL
000104  000000G                 L$ICP:: .WORD   L$INIT
000106  000000G                 L$CCP:: .WORD   L$CLEAN
000110  000000G                 L$ACP:: .WORD   L$AUTO
000112  006542'                 L$PRT:: .WORD   L$PROT
000114  000000                  L$TEST::.WORD   0
000116  000000                  L$DLY:: .WORD   0
000120  000000                  L$HIME::.WORD   0
000122  000001                  D$PCNT::.WORD   1
000124  000000G                 L$DISPATCH::
                                        .WORD   T1
000126                          ERRTYP::.BLKW   1
000130                          ERRNBR::.BLKW   1
000132                          ERRMSG::.BLKW   1
000134                          ERRBLK::.BLKW   1
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004631  116  111  124                .ASCII  /NIT/
004634  055  117  106                .ASCII  /-OF/
004637  106  114  111                .ASCII  /FLI/
004642  116  105  045                .ASCII  /NE%/
004645  116  000  000                .ASCII  /N/<00><00>
004650  045  101  125          P.ACV: .ASCII  /%AU/
004653  116  111  124                .ASCII  /NIT/
004656  055  101  126                .ASCII  /-AV/
004661  101  111  114                .ASCII  /AIL/
004664  101  102  114                .ASCII  /ABL/
004667  105  045  116                .ASCII  /E%N/
004672  000  000                     .ASCII  <00><00>
004674  045  101  115          P.ACW: .ASCII  /%AM/
004677  105  104  111                .ASCII  /EDI/
004702  101  040  106                .ASCII  /A F/
004705  117  122  115                .ASCII  /ORM/
004710  101  124  040                .ASCII  /AT /
004713  105  122  122                .ASCII  /ERR/
```

```
004716  117  122  045                .ASCII  /OR%/
004721  116  000  000                .ASCII  /N/<00><00>
004724  045  101  127        P.ACX:  .ASCII  /%AW/
004727  122  111  124                .ASCII  /RIT/
004732  105  055  120                .ASCII  /E-P/
004735  122  117  124                .ASCII  /ROT/
004740  105  103  124                .ASCII  /ECT/
004743  105  104  045                .ASCII  /ED%/
004746  116  000                    .ASCII  /N/<00>
004750  045  101  104        P.ACY:  .ASCII  /%AD/
004753  105  126  111                .ASCII  /EVI/
004756  103  105  040                .ASCII  /CE /
004761  103  117  115                .ASCII  /COM/
004764  120  101  122                .ASCII  /PAR/
004767  105  040  105                .ASCII  /E E/
004772  122  122  117                .ASCII  /RRO/
004775  122  045  116                .ASCII  /R%N/
005000  000  000                    .ASCII  <00><00>
005002  045  101  104        P.ACZ:  .ASCII  /%AD/
005005  101  124  101                .ASCII  /ATA/
005010  040  105  122                .ASCII  / ER/
005013  122  117  122                .ASCII  /ROR/
005016  045  116  000                .ASCII  /%N/<00>
005021  000                         .ASCII  <00>
005022  045  101  110        P.ADA:  .ASCII  /%AH/
005025  117  123  124                .ASCII  /OST/
005030  040  102  125                .ASCII  / BU/
005033  106  106  105                .ASCII  /FFE/
005036  122  040  101                .ASCII  /R A/
005041  103  103  105                .ASCII  /CCE/
005044  123  123  040                .ASCII  /SS /
005047  105  122  122                .ASCII  /ERR/
005052  117  122  045                .ASCII  /OR%/
005055  116  000  000                .ASCII  /N/<00><00>
005060  045  101  103        P.ADB:  .ASCII  /%AC/
005063  117  116  124                .ASCII  /ONT/
005066  122  117  114                .ASCII  /ROL/
005071  114  105  122                .ASCII  /LER/
005074  040  105  122                .ASCII  / ER/
005077  122  117  122                .ASCII  /ROR/
005102  045  116  000                .ASCII  /%N/<00>
005105  000                         .ASCII  <00>
005106  045  101  104        P.ADC:  .ASCII  /%AD/
005111  122  111  126                .ASCII  /RIV/
005114  105  040  105                .ASCII  /E E/
005117  122  122  117                .ASCII  /RRO/
005122  122  045  116                .ASCII  /R%N/
005125  000                         .ASCII  <00>
005126  045  101  110        P.ADD:  .ASCII  /%AH/
005131  117  123  124                .ASCII  /OST/
005134  055  104  105                .ASCII  /-DE/
005137  124  105  103                .ASCII  /TEC/
005142  124  105  104                .ASCII  /TED/
005145  040  127  122                .ASCII  / WR/
005150  111  124  105                .ASCII  /ITE/
005153  055  103  117                .ASCII  /-CO/
005156  115  120  101                .ASCII  /MPA/
```

```
005161  122  105  040              .ASCII  /RE /
005164  105  122  122              .ASCII  /ERR/
005167  117  122  045              .ASCII  /OR%/
005172  116  000                   .ASCII  /N/<00>
005174  045  101  106  P.ADE:      .ASCII  /%AF/
005177  101  111  114              .ASCII  /AIL/
005202  105  104  040              .ASCII  /ED /
005205  124  117  040              .ASCII  /TO /
005210  122  105  103              .ASCII  /REC/
005213  105  111  126              .ASCII  /EIV/
005216  105  040  105              .ASCII  /E E/
005221  116  104  040              .ASCII  /ND /
005224  115  105  123              .ASCII  /MES/
005227  123  101  107              .ASCII  /SAG/
005232  105  040  106              .ASCII  /E F/
005235  117  122  040              .ASCII  /OR /
005240  111  057  117              .ASCII  /I/<57>/O/
005243  040  103  117              .ASCII  / CO/
005246  115  115  101              .ASCII  /MMA/
005251  116  104  045              .ASCII  /ND%/
005254  116  000                   .ASCII  /N/<00>
005256  045  101  040  P.ADF:      .ASCII  /%A /
005261  040  040  040              .ASCII  /   /
005264  123  101  072              .ASCII  /SA:/
005267  040  045  117              .ASCII  / %O/
005272  066  045  101              .ASCII  /6%A/
005275  050  117  051              .ASCII  /(O)/
005300  045  116  000              .ASCII  /%N/<00>
005303  000                       .ASCII  <00>
005304  045  101  040  P.ADG:      .ASCII  /%A /
005307  040  040  040              .ASCII  /   /
005312  103  115  104              .ASCII  /CMD/
005315  040  122  105              .ASCII  / RE/
005320  106  040  116              .ASCII  /F N/
005323  125  115  072              .ASCII  /UM:/
005326  040  045  117              .ASCII  / %O/
005331  066  045  101              .ASCII  /6%A/
005334  050  117  051              .ASCII  /(O)/
005337  045  116  000              .ASCII  /%N/<00>
005342  045  101  040  P.ADH:      .ASCII  /%A /
005345  040  040  040              .ASCII  /   /
005350  123  124  101              .ASCII  /STA/
005353  124  125  123              .ASCII  /TUS/
005356  040  103  117              .ASCII  / CO/
005361  104  105  072              .ASCII  /DE:/
005364  040  045  117              .ASCII  / %O/
005367  062  045  101              .ASCII  /2%A/
005372  050  117  051              .ASCII  /(O)/
005375  045  116  000              .ASCII  /%N/<00>
005400  045  101  040  P.ADI:      .ASCII  /%A /
005403  040  040  040              .ASCII  /   /
005406  104  125  120              .ASCII  /DUP/
005411  040  123  124              .ASCII  / ST/
005414  101  124  125              .ASCII  /ATU/
005417  123  040  103              .ASCII  /S C/
005422  117  104  105              .ASCII  /ODE/
005425  072  040  045              .ASCII  /: %/
```

```
005430  104  061  045            .ASCII  /D1%/
005433  101  056  045            .ASCII  /A.%/
005436  116  000                 .ASCII  /N/<00>
005440  045  101  040  P.ADJ:    .ASCII  /%A /
005443  040  040  040            .ASCII  /   /
005446  123  125  102            .ASCII  /SUB/
005451  055  103  117            .ASCII  /-CO/
005454  104  105  072            .ASCII  /DE:/
005457  040  045  117            .ASCII  / %O/
005462  064  045  101            .ASCII  /4%A/
005465  050  117  051            .ASCII  /(O)/
005470  045  116  000            .ASCII  /%N/<00>
005473  000                      .ASCII  <00>
005474  045  101  040  P.ADK:    .ASCII  /%A /
005477  040  040  040            .ASCII  /   /
005502  103  117  115            .ASCII  /COM/
005505  115  101  116            .ASCII  /MAN/
005510  104  072  040            .ASCII  /D: /
005513  000                      .ASCII  <00>
005514  045  101  123  P.ADL:    .ASCII  /%AS/
005517  105  124  040            .ASCII  /ET /
005522  103  124  114            .ASCII  /CTL/
005525  122  040  103            .ASCII  /R C/
005530  110  101  122            .ASCII  /HAR/
005533  000                      .ASCII  <00>
005534  045  101  117  P.ADM:    .ASCII  /%AO/
005537  116  114  111            .ASCII  /NLI/
005542  116  105  000            .ASCII  /NE/<00>
005545  000                      .ASCII  <00>
005546  045  101  105  P.ADN:    .ASCII  /%AE/
005551  130  105  103            .ASCII  /XEC/
005554  125  124  105            .ASCII  /UTE/
005557  040  123  125            .ASCII  / SU/
005562  120  120  114            .ASCII  /PPL/
005565  111  105  104            .ASCII  /IED/
005570  040  120  122            .ASCII  / PR/
005573  117  107  122            .ASCII  /OGR/
005576  101  115  000            .ASCII  /AM/<00>
005601  000                      .ASCII  <00>
005602  045  101  123  P.ADO:    .ASCII  /%AS/
005605  105  116  104            .ASCII  /END/
005610  040  104  101            .ASCII  / DA/
005613  124  101  000            .ASCII  /TA/<00>
005616  045  101  122  P.ADP:    .ASCII  /%AR/
005621  105  101  104            .ASCII  /EAD/
005624  000  000                 .ASCII  <00><00>
005626  045  101  127  P.ADQ:    .ASCII  /%AW/
005631  122  111  124            .ASCII  /RIT/
005634  105  000                 .ASCII  /E/<00>
005636  045  101  055  P.ADR:    .ASCII  /%A-/
005641  103  117  115            .ASCII  /COM/
005644  120  101  122            .ASCII  /PAR/
005647  105  045  116            .ASCII  /E%N/
005652  000  000                 .ASCII  <00><00>
005654  045  101  040  P.ADS:    .ASCII  /%A /
005657  040  040  040            .ASCII  /   /
005662  102  101  104            .ASCII  /BAD/
```

```
005665  040     102     114             .ASCII  / BL/
005670  117     103     113             .ASCII  /OCK/
005673  040     122     105             .ASCII  / RE/
005676  120     117     122             .ASCII  /POR/
005701  124     105     104             .ASCII  /TED/
005704  072     040     045             .ASCII  /: %/
005707  104     065     045             .ASCII  /D5%/
005712  101     056     045             .ASCII  /A.%/
005715  116     000     000             .ASCII  /N/<00><00>
005720  045     101     040     P.ADT:  .ASCII  /%A /
005723  040     040     040             .ASCII  /   /
005726  114     102     116             .ASCII  /LBN/
005731  072     040     045             .ASCII  /: %/
005734  104     065     045             .ASCII  /D5%/
005737  101     056     045             .ASCII  /A.%/
005742  116     000                     .ASCII  /N/<00>
005744  045     101     040     P.ADU:  .ASCII  /%A /
005747  040     040     040             .ASCII  /   /
005752  102     131     124             .ASCII  /BYT/
005755  105     040     103             .ASCII  /E C/
005760  117     125     116             .ASCII  /OUN/
005763  124     040     111             .ASCII  /T I/
005766  116     040     103             .ASCII  /N C/
005771  117     115     115             .ASCII  /OMM/
005774  101     116     104             .ASCII  /AND/
005777  072     040     045             .ASCII  /: %/
006002  104     065     045             .ASCII  /D5%/
006005  101     056     045             .ASCII  /A.%/
006010  116     000                     .ASCII  /N/<00>
006012  045     101     040     P.ADV:  .ASCII  /%A /
006015  040     040     040             .ASCII  /   /
006020  101     103     124             .ASCII  /ACT/
006023  125     101     114             .ASCII  /UAL/
006026  040     043     040             .ASCII  / # /
006031  117     106     040             .ASCII  /OF /
006034  102     131     124             .ASCII  /BYT/
006037  105     123     040             .ASCII  /ES /
006042  124     122     101             .ASCII  /TRA/
006045  116     123     106             .ASCII  /NSF/
006050  105     122     122             .ASCII  /ERR/
006053  105     104     072             .ASCII  /ED:/
006056  040     045     104             .ASCII  / %D/
006061  065     045     101             .ASCII  /5%A/
006064  056     045     116             .ASCII  /.%N/
006067  000                             .ASCII  <00>
006070  045     101     040     P.ADW:  .ASCII  /%A /
006073  040     040     040             .ASCII  /   /
006076  111     057     117             .ASCII  /I/<57>/O/
006101  040     102     125             .ASCII  / BU/
006104  106     106     105             .ASCII  /FFE/
006107  122     040     104             .ASCII  /R D/
006112  105     123     103             .ASCII  /ESC/
006115  122     111     120             .ASCII  /RIP/
006120  124     117     122             .ASCII  /TOR/
006123  072     045     117             .ASCII  /:%O/
006126  067     045     101             .ASCII  /7%A/
006131  050     117     051             .ASCII  /(O)/
```

```
006134  045  117  067              .ASCII  /%07/
006137  045  101  050              .ASCII  /%A(/
006142  117  051  045              .ASCII  /O)%/
006145  116  000  000              .ASCII  /N/<00><00>
006150  045  116  045  P.ADX:      .ASCII  /%N%/
006153  101  105  122              .ASCII  /AER/
006156  122  117  122              .ASCII  /ROR/
006161  040  114  117              .ASCII  / LO/
006164  107  040  115              .ASCII  /G M/
006167  105  123  123              .ASCII  /ESS/
006172  101  107  105              .ASCII  /AGE/
006175  040  122  105              .ASCII  / RE/
006200  103  105  111              .ASCII  /CEI/
006203  126  105  104              .ASCII  /VED/
006206  072  045  11               .ASCII  /:%N/
006211  000                       .ASCII  <00>
006212  045  101  040  P.ADY:      .ASCII  /%A /
006215  040  040  040              .ASCII  /   /
006220  120  114  101              .ASCII  /PLA/
006223  124  124  105              .ASCII  /TTE/
006226  122  072  040              .ASCII  /R: /
006231  045  104  063              .ASCII  /%D3/
006234  045  101  056              .ASCII  /%A./
006237  045  116  000              .ASCII  /%N/<00>
006242  045  101  040  P.ADZ:      .ASCII  /%A /
006245  040  040  040              .ASCII  /   /
006250  106  117  122              .ASCII  /FOR/
006253  115  101  124              .ASCII  /MAT/
006256  072  040  000              .ASCII  /: /<00>
006261  000                       .ASCII  <00>
006262  045  101  040  P.AEA:      .ASCII  /%A /
006265  040  040  040              .ASCII  /   /
006270  105  126  105              .ASCII  /EVE/
006273  116  124  040              .ASCII  /NT /
006276  103  117  104              .ASCII  /COD/
006301  105  072  040              .ASCII  /E: /
006304  000  000                   .ASCII  <00><00>
006306  045  101  040  P.AEB:      .ASCII  /%A /
006311  040  040  040              .ASCII  /   /
006314  110  117  123              .ASCII  /HOS/
006317  124  040  115              .ASCII  /T M/
006322  105  115  040              .ASCII  /EM /
006325  101  104  104              .ASCII  /ADD/
006330  122  072  045              .ASCII  /R:%/
006333  117  067  045              .ASCII  /07%/
006336  101  050  117              .ASCII  /A(O/
006341  051  045  117              .ASCII  /)%O/
006344  067  045  101              .ASCII  /7%A/
006347  050  117  051              .ASCII  /(O)/
006352  045  116  000              .ASCII  /%N/<00>
006355  000                       .ASCII  <00>
006356  045  117  063  P.AEC:      .ASCII  /%03/
006361  045  101  050              .ASCII  /%A(/
006364  117  051  045              .ASCII  /O)%/
006367  116  000  000              .ASCII  /N/<00><00>
006372  045  104  062  P.AED:      .ASCII  /%D2/
006375  045  101  072              .ASCII  /%A:/
```

```
006400     045     104     062                  .ASCII  /%D2/
006403     045     101     072                  .ASCII  /%A:/
006406     045     104     062                  .ASCII  /%D2/
006411     045     101     040                  .ASCII  /%A /
006414     040     000                          .ASCII  / /<00>
006416     045     101     120          P.AEE:  .ASCII  /%AP/
006421     114     101     124                  .ASCII  /LAT/
006424     124     105     122                  .ASCII  /TER/
006427     040     045     104                  .ASCII  / %D/
006432     063     045     101                  .ASCII  /3%A/
006435     056     040     055                  .ASCII  /. -/
006440     040     000                          .ASCII  / /<00>
006442     045     116     000          P.AEF:  .ASCII  /%N/<00>
006445     000                                  .ASCII  <00>
006446  000000C                         L$HWLEN::
                                                .WORD   <<L$NDHW-L$HWLEN>/2>
006450  172150                          HWPT.IP.ADDR::
                                                .WORD   -5630
006452  000154                          HWPT.VECTOR::
                                                .WORD   154
006454  000005                          HWPT.BR.LEVEL::
                                                .WORD   5
006456  000000                          HWPT.PLAT::
                                                .WORD   0
006460                                  L$NDHW::.BLKW   1
006462  000000C                         L$SWLEN::
                                                .WORD   <<L$NDSW-L$SWLEN>/2>
006464  000040                          SWP.ERROR::
                                                .WORD   40
006466  000002                          SWP.XFER::
                                                .WORD   2
006470  000000                          SWP.STRACK::
                                                .WORD   0
006472  003151                          SWP.ETRACK::
                                                .WORD   3151
006474     055                          SWP.FLAGS::
                                                .BYTE   55
006475     000                          SWP.DPAT::
                                                .BYTE   0
006476  000020                          SWP.UCNT::
                                                .WORD   20
006500                                  SWP.UDPAT::
                                                .BLKW   20
006540                                  L$NDSW::.BLKW   1
006542  177777                          L$PROT::.WORD   -1
006544  177777                                  .WORD   -1
006546  177777                                  .WORD   -1


000000                                          .PSECT  $FFF$,  RO
000000                                  PATCH:: .BLKW   144
000310                                  CPT::   .BLKW   10
000330                                  CST::   .BLKW   34
000420                                  CST.ADDR::
                                                .BLKW   1
000422                                  DCT::   .BLKW   44
```

```
000532                          DCT.ADDR::
                                        .BLKW   1
000534                          RC25.ADDR::
                                        .BLKW   1
000536                          IRC25.ADDR::
                                        .BLKW   1
000540                          DM.COMM::
                                        .BLKW   150
001060                          DMC.ADDR::
                                        .BLKW   1
001062                          RP.SAVE::
                                        .BLKW   20
001122                          RPS.X1::.BLKW   1
001124                          RPS.X2::.BLKW   1
001126                          OUTC.LIST::
                                        .BLKW   40
001226                          OUTC.TIMR::
                                        .BLKW   100
001426                          OCL.X1::.BLKW   1
001430                          OCL.X2::.BLKW   1
001432                          TALLY:: .BLKW   600
003032                          T.ADDR::.BLKW   1
003034                          MSCP.ENV::
                                        .BLKW   6300
017634                          ENV.USE::
                                        .BLKW   60
017774                          RETPKT::.BLKW   1400
022774                          RP.USE::.BLKW   20
023034                          RP.INDX::
                                        .BLKW   1
023036                          RP.ADDR::
                                        .BLKW   1
023040                          BUFF.DESC::
                                        .BLKW   200
023440                          BUFF.OWN::
                                        .BLKW   40
023540                          IODQ::  .BLKW   20
023600                          IODQ.IN::
                                        .BLKW   1
023602                          IODQ.OUT::
                                        .BLKW   1
023604                          ENTRY.REASON::
                                        .BLKB   1
023605                          T.FLAG::.BLKB   1
023606                          EOP.FLAG::
                                        .BLKB   1
023607                          MEM.MGMT::
                                        .BLKB   1
023610                          IIP.FLAG::
                                        .BLKB   1
                                        .EVEN
023612                          CCTLR:: .BLKW   1
023614                          CPLAT:: .BLKW   1
023616                          CUOFF:: .BLKW   1
023620                          CTLR.CNT::
                                        .BLKW   1
023622                          DUR::   .BLKW   10
```

```
023642                          QIO :    .BLKW   2
023646                          MEM.SIZE::
                                         .BLKW   1
023650                          FREE.MEM.ADDR::
                                         .BLKW   1
023652                          BUFF.SIZE::
                                         .BLKW   1
023654                          NUM.BUFF::
                                         .BLKW   1
023656                          CLK.TYPE::
                                         .BLKW   1
023660                          CLK.HERTZ::
                                         .BLKW   1
023662                          CLK.CSR::
                                         .BLKW   1
023664                          CLK.VECTOR::
                                         .BLKW   1
023666                          HOURS:: .BLKW   1
023670                          MINUTES::
                                         .BLKW   1
023672                          SECONDS::
                                         .BLKW   1
023674                          TICKS:: .BLKW   1
023676                          ST.CODE::
                                         .BLKW   1
023700                          SB.CODE::
                                         .BLKW   1
023702                          STEP::   .BLKW   1
023704                          OF.RC::  .BLKW   1
023706                          SA.REG::.BLKW   1
023710                          NEX::    .BLKW   1
023712                          CRN::    .BLKW   1

                                .GLOBL  L$SOFT, T$PTHV, L$RPT, L$INIT
                                .GLOBL  L$CLEAN, L$LAST, L$HARD, L$DVTYP
                                .GLOBL  L$DESC, L$DU, L$AU, L$AUTO, T1

100000                          BIT15=:          -100000
040000                          BIT14=:          40000
020000                          BIT13=:          20000
010000                          BIT12=:          10000
004000                          BIT11=:          4000
002000                          BIT10=:          2000
001000                          BIT09=:          1000
000400                          BIT08=:          400
000200                          BIT07=:          200
000100                          BIT06=:          100
000040                          BIT05=:          40
000020                          BIT04=:          20
000010                          BIT03=:          10
000004                          BIT02=:          4
000002                          BIT01=:          2
000001                          BIT00=:          1
001000                          BIT9=:           1000
000400                          BIT8=:           400
```

```
000200          BIT7==          200
000100          BIT6==          100
000040          BIT5==          40
000020          BIT4==          20
000010          BIT3==          10
000004          BIT2==          4
000002          BIT1==          2
000001          BIT0==          1
000040          EF.START==      40
000037          EF.RESTART==    37
000036          EF.CONTINUE==   36
000035          EF.NEW==        35
000034          EF.PWR==        34
000340          PRI07==         340
000300          PRI06==         300
000240          PRI05==         240
000200          PRI04==         200
000140          PRI03==         140
000100          PRI02==         100
000040          PRI01==         40
000000          PRI00==         0
000004          EVL==           4
000010          LOT==           10
000020          ADR==           20
000040          IDU==           40
000100          ISR==           100
000200          UAM==           200
000400          BOE==           400
001000          PNT==           1000
002000          PRI==           2000
004000          IXE==           4000
010000          IBE==           10000
020000          IER==           20000
040000          LOE==           40000
100000          HOE==            100000
000126          L$ERRTBL==      ERRTYP
006464'         L$SW==          L$SWLEN*2
006450'         L$HW==          L$HWLEN*2
000011          L$DEPO==        L$REV*1
000136          HWQ1==          P.AAA
000152          HWQ2==          P.AAB
000162'         HWQ3==          P.AAC
000174'         HWQ4==          P.AAD
000230          HWQ5==          P.AAE
000314          HWQ6==          P.AAF
000414          SWQ1==          P.AAG
000452          SWQ2==          P.AAH
000530          SWQ3==          P.AAI
000576          SWQ4==          P.AAJ
000656'         SWQ5==          P.AAK
000700'         SWQ6==          P.AAL
000720          SWQ7==          P.AAM
000736          SWQ8==          P.AAN
001010          SWQ9==          P.AAO
001024'         SWQ10==         P.AAP
001100          SWQ11==         P.AAQ
001144          SWQ12==         P.AAR
```

```
001176'                 SWQ13==         P.AAS
001274'                 SWQ14==         P.AAT
001352'                 SWQ15==         P.AAU
001370'                 SWM1==          P.AAV
001464'                 NULL==          P.AAW
001466'                 MSG.01==        P.AAX
001520                  MSG.02==        P.AAY
001616                  MSG.03==        P.AAZ
001636'                 MSG.04==        P.ABA
001670                  MSG.05==        P.ABB
001730'                 MSG.06==        P.ABC
001772'                 MSG.07==        P.ABD
002044'                 MSG.08==        P.ABE
002140'                 CER.01==        P.ABF
002224'                 CER.02==        P.ABG
002270'                 CER.03==        P.ABH
002344'                 DUM.00==        P.ABI
002376'                 DUM.UC==        P.ABJ
002420'                 DUM.CE==        P.ABK
002450'                 DUM.IE==        P.ABL
002470'                 DUM.HE==        P.ABM
002526'                 DUM.UE==        P.ABN
002556'                 EGS.01==        P.ABO
002576'                 EGS.02==        P.ABP
002654'                 EGD.10==        P.ABQ
002714'                 EGD.11==        P.ABR
002740'                 EGD.12==        P.ABS
002766'                 EGD.13==        P.ABT
003014'                 EGD.14==        P.ABU
003052                  EGD.15==        P.ABV
003104'                 EGD.16==        P.ABW
003122'                 EGD.17==        P.ABX
003152                  EGD.18==        P.ABY
003170'                 EGD.19==        P.ABZ
003210'                 EGD.20==        P.ACA
003234'                 EGD.21==        P.ACB
003260'                 EGD.22==        P.ACC
003306'                 EGH.30==        P.ACD
003332'                 EBS.01==        P.ACE
003400'                 EBD.10==        P.ACF
003444'                 EBD.12==        P.ACG
003526'                 EBD.13==        P.ACH
003604'                 EBD.14==        P.ACI
003676'                 EBD.15==        P.ACJ
003766'                 EBD.16==        P.ACK
004062'                 EBD.17==        P.ACL
004160'                 EBD.18==        P.ACM
004224'                 EBD.19==        P.ACN
004264'                 EBD.20==        P.ACO
004350'                 EBD.21==        P.ACP
004436'                 EBD.22==        P.ACQ
004542'                 STC.00==        P.ACR
004556'                 STC.01==        P.ACS
004602'                 STC.02==        P.ACT
004626'                 STC.03==        P.ACU
004650'                 STC.04==        P.ACV
004674'                 STC.05==        P.ACW
```

```
004724'                 STC.06==        P.ACX
004750'                 STC.07==        P.ACY
005002'                 STC.08==        P.ACZ
005022'                 STC.09==        P.ADA
005060'                 STC.10==        P.ADB
005106'                 STC.11==        P.ADC
004556'                 EBH.31==        P.ACS
004602'                 EBH.32==        P.ACT
004650'                 EBH.34==        P.ACV
004674'                 EBH.35==        P.ACW
004724'                 EBH.36==        P.ACX
004750'                 EBH.37==        P.ACY
005002'                 EBH.38==        P.ACZ
005022'                 EBH.39==        P.ADA
005060'                 EBH.40==        P.ADB
005106'                 EBH.41==        P.ADC
005126'                 EBH.42==        P.ADD
005174'                 EBH.43==        P.ADE
005256'                 EX.SA==         P.ADF
005304'                 EX.CRN==        P.ADG
005342'                 EX.SC==         P.ADH
005400'                 EX.DSC==        P.ADI
005440'                 EX.SB==         P.ADJ
005474'                 EX.CMD==        P.ADK
005514'                 EX.SCC==        P.ADL
005534'                 EX.ONL==        P.ADM
005546'                 EX.ESP==        P.ADN
005602'                 EX.SND==        P.ADO
005616'                 EX.RD==         P.ADP
005626'                 EX.WRT==        P.ADQ
005636'                 EX.CMP==        P.ADR
005654'                 EX.BB==         P.ADS
005720'                 EX.LBN==        P.ADT
005744'                 EX.CBC==        P.ADU
006012'                 EX.BC==         P.ADV
006070'                 EX.BD==         P.ADW
006150'                 EX.EL==         P.ADX
006212'                 EX.PA==         P.ADY
006242'                 EX.FMT==        P.ADZ
006262'                 EX.EVC==        P.AEA
006306'                 EX.HMA==        P.AEB
006356'                 EX.03==         P.AEC
006372'                 ETIME==         P.AED
006416'                 PLATT==         P.AEE
006442'                 CRLF==          P.AEF
006450'                 DFPTBL==        L$HWLEN+2
006464'                 SFPTBL==        L$SWLEN+2


;                       PSECT SUMMARY
;
;       Psect Name      Words     Attributes
;        $CODE$          1716       RO ,  I  ,  LCL,  REL,  CON
;        $FFF$           5094       RO ,  I  ,  LCL,  REL,  CON
```

```
;                              Library Statistics
;
;                                          ----  -- Symbols -- -----      Pages       Processing
;       File                               Total    Loaded    Percent     Mapped      Time
;
;  USER$1:[AZTEC.CZRCDB]CZRCDL.L16;6         276       138         50       16         00:00.2




;                                      COMMAND QUALIFIERS

;       BLISS/PDP11 CZRCD1.SRC/LIST/EN:NOEIS

; Size:         0 code + 6810 data words
; Run Time:        00:58.9
; Elapsed Time:    00:59.9
; Lines/CPU Min:    1938
; Lexemes/CPU-Min: 13067
; Memory Used:  258 pages
; Compilation Complete
```

```
;  0001  0     MODULE CZRCD2 (
;  0002  0             %TITLE 'CZRCDB0 RC25 DISK EXERCISER'
;  0003  0             IDENT = 'V02.0',
;  0004  0             ADDRESSING_MODE (ABSOLUTE)
;  0005  0             ) =
;  0006  1     BEGIN
;  0007  1
;  0043  1     %SBTTL 'DECLARATIONS'
;  0044  1
;  0045  1     LIBRARY 'CZRCDL';                       ! RC25 EXERCISER GLOBAL LIBRARY
;  0046  1     REQUIRE 'BLSMAC.REQ';                   ! DIAGNOSTIC SUPERVISOR LIBRARY
;  1535  1
;  1536  1     FORWARD ROUTINE
;  1537  1         NEX_TRAP : L$ISR NOVALUE,
;  1538  1         CLK INT_SERV : L$ISR NOVALUE,
;  1539  1         EMS_01 : NOVALUE;
;  1540  1
;  1541  1     EXTERNAL
;  1542  1         PATCH : VECTOR [100, WORD],             ! PATCH AREA
;  1543  1         CPT : VECTOR [MAX_UNITS, BYTE],
;  1544  1     !       CURRENT PASS TESTING (YES / NO) PER UNIT
;  1545  1         CST : BLOCKVECTOR [MAX_CTLR, CST_LEN, WORD] FIELD (C_FIELDS),
;  1546  1     !       RUN-TIME CONTROLLER STATUS TABLES
;  1547  1         CST_ADDR : REF BLOCK [CST_LEN, WORD] FIELD (C_FIELDS),
;  1548  1     !       CONTROLLER STATUS TABLE ADDRESS OF "CURRENT" CONTROLLER
;  1549  1         DCT : BLOCKVECTOR [MAX_CTLR, DCT_LEN, WORD] FIELD (DC_FIELDS),
;  1550  1     !       DRIVER CONTROLLER TABLES
;  1551  1         DCT_ADDR : REF BLOCK [DCT_LEN, WORD] FIELD (DC_FIELDS),
;  1552  1     !       ADDRESS OF "CURRENT" DRIVER CONTROLLER TABLE
;  1553  1         RC25_ADDR : REF RC25 FIELD (RC_REG),
;  1554  1     !       DEVICE ADDRESS OF "CURRENT" CONTROLLER
```

```
;   1555  1          IRC25_ADDR : REF RC25 FIELD (RC_REG),
;   1556  1     !        DEVICE ADDRESS OF INTERRUPTING CONTROLLER
;   1557  1          DM_COMM : BLOCKVECTOR [MAX_CTLR, DMC_LEN, WORD] FIELD (DMC_FIELDS),
;   1558  1     !        DM EXERCISER COMMUNICATION AREA (LINK TO FRONT PANEL TEST)
;   1559  1          DMC_ADDR : REF BLOCK [DMC_LEN, WORD] FIELD (DMC_FIELDS),
;   1560  1     !        ADDRESS OF CURRENT CONTROLLER'S DM EXERCISER COMMUNICATION AREA
;   1561  1          RP_SAVE : VECTOR [MAX_CTLR * RPS_LEN, BYTE, SIGNED],
;   1562  1     !        RETURN PACKET SAVE AREA
;   1563  1          RPS_X1 : WORD,                              ! STARTING INDEX OF CURRENT CONTROLLER'S RP_SAVE AREA
;   1564  1          RPS_X2 : WORD,                              ! ENDING INDEX OF CURRENT CONTROLLER'S RP_SAVE AREA
;   1565  1          OUTC_LIST : VECTOR [MAX_CTLR * OUTC_CNT, BYTE, SIGNED],
;   1566  1     !        OUTSTANDING COMMAND LIST (CONTAINS MSCP ENVELOPE INDECES)
;   1567  1          OUTC_TIMR : VECTOR [MAX_CTLR * OUTC_CNT, WORD],
;   1568  1     !        OUTSTANDING COMMAND TIMERS
;   1569  1          OCL_X1 : WORD,
;   1570  1     !        STARTING INDEX OF CURRENT CONTROLLER'S OUTSTANDING COMMAND AREA
;   1571  1          OCL_X2 : WORD,
;   1572  1     !        ENDING INDEX OF CURRENT CONTROLLER'S OUTSTANDING COMMAND AREA
;   1573  1          TALLY : VECTOR [MAX_UNITS * TALLY_LEN, WORD] FIELD (T_FIELDS),
;   1574  1     !        STATISTICS TABLES
;   1575  1          T_ADDR : REF BLOCK [TALLY_LEN, WORD] FIELD (T_FIELDS),
;   1576  1     !        ADDRESS OF STATISTICS TABLE (TALLY) FOR CURRENT UNIT
;   1577  1          MSCP_ENV : BLOCKVECTOR [ENV_CNT, ENV_LEN, WORD] FIELD (E_FIELDS),
;   1578  1     !        MSCP ENVELOPE POOL
;   1579  1          ENV_USE : VECTOR [ENV_CNT, BYTE, SIGNED],
;   1580  1     !        MSCP ENVELOPE POOL ALLOCATION TABLE
;   1581  1          RETPKT : BLOCKVECTOR [RP_CNT, RP_LEN, WORD] FIELD (RP_FIELDS),
;   1582  1     !        RETURN PACKET POOL
;   1583  1          RP_USE : VECTOR [RP_CNT, BYTE, SIGNED],
;   1584  1     !        RETURN PACKET POOL ALLOCATION TABLE
;   1585  1          RP_INDX : WORD,                             ! CURRENT RETURN PACKET INDEX
;   1586  1          RP_ADDR : REF BLOCK [RP_LEN, WORD] FIELD (RP_FIELDS),
;   1587  1     !        CURRENT RETURN PACKET ADDRESS
```

```
;  1588  1          BUFF_DESC : BLOCKVECTOR [MAX_BUF_CNT, DESC_LEN, WORD] FIELD (BD_FIELDS),
;  1589  1      !       TABLE OF I/O BUFFER DESCRIPTORS
;  1590  1          BUFF_OWN : VECTOR [MAX_BUF_CNT, BYTE, SIGNED],
;  1591  1      !       I/O BUFFER OWNERSHIP (CONTROLLER NUMBER)
;  1592  1          IODQ : VECTOR [IODQ_LEN, BYTE],
;  1593  1      !       I/O DONE QUEUE - CIRCULAR QUEUE OF RETPKT INDECES
;  1594  1          IODQ_IN : WORD,                             ! I/O DONE QUEUE IN POINTER
;  1595  1          IODQ_OUT : WORD,                            ! I/O DONE QUEUE OUT POINTER
;  1596  1          ENTRY_REASON : BYTE,                        ! HOW CURRENT PASS WAS INVOKED
;  1597  1          T_FLAG : BYTE,                              ! ONE SECOND TIMING FLAG
;  1598  1          EOP_FLAG : BYTE,                            ! END-OF-PASS FLAG
;  1599  1          MEM_MGMT : BYTE,                            ! MEMORY MANAGEMENT FLAG
;  1600  1          IIP_FLAG : BYTE,                            ! INITIALIZATION IN-PROGRESS FLAG
;  1601  1          CCTLR : WORD,                               ! NUMBER OF "CURRENT" CONTROLLER
;  1602  1          CPLAT : WORD,                               ! CURRENT PLATTER ADDRESS (MSCP UNIT NUMBER)
;  1603  1          CUOFF : WORD,                               ! CST OFFSET FOR CURRENT UNIT
;  1604  1          CTLR_CNT : WORD,                            ! TOTAL NUMBER OF CONFIGURED CONTROLLERS
;  1605  1          DUR : VECTOR [MAX_UNITS, BYTE],             ! DROP UNIT REASON
;  1606  1          QIO : VECTOR [MAX_CTLR, BYTE],              ! NUMBER OF OUTSTANDING QIOS PER CONTROLLER
;  1607  1          MEM_SIZE : WORD,                            ! AVAILABLE MEMORY (IN WORDS) UP TO 28K
;  1608  1          FREE_MEM_ADDR,                              ! START OF FREE MEMORY BELOW 28K
;  1609  1          BUFF_SIZE : WORD,                           ! SIZE (BYTES) OF AN I/O BUFFER
;  1610  1          NUM_BUFF : WORD,                            ! NUMBER OF I/O BUFFERS
;  1611  1          CLK_TYPE : WORD,                            ! TYPE OF CLOCK ON SYSTEM
;  1612  1                                                      !   (0 = NONE, -1 = L CLOCK, 1 = P CLOCK)
;  1613  1          CLK_HERTZ : WORD,                           ! CLOCK HERTZ RATE
;  1614  1          CLK_CSR,                                    ! CLOCK CSR ADDRESS
;  1615  1          CLK_VECTOR,                                 ! CLOCK VECTOR ADDRESS
;  1616  1          HOURS : WORD,                               ! ELAPSED TIME - HOURS,
;  1617  1          MINUTES : WORD,                             !       MINUTES,
;  1618  1          SECONDS : WORD,                             !       SECONDS,
;  1619  1          TICKS : WORD,                               !       TICKS
;  1620  1          ST_CODE : WORD,                             ! CURRENT STATUS CODE
;  1621  1          SB_CODE : WORD,                             ! CURRENT SUB-CODE
;  1622  1          STEP : WORD,                                ! CURRENT STEP IN HARD_INIT
;  1623  1          OF_RC : SIGNED WORD,                        ! OFFSET (0 OR 2) TO READ IP OR SA
;  1624  1          SA_REG : WORD,                              ! STORAGE FOR SA REGISTER READS AND WRITES
;  1625  1          NEX : WORD,                                 ! NON EXISTENT MEMORY TRAP INDICATOR
;  1626  1          CRN : WORD,                                 ! COMMAND REF NUMBER OF LAST COMMAND SENT
;  1627  1          HWQ1,
;  1628  1          HWQ2,
;  1629  1          HWQ3,
;  1630  1          HWQ4,
;  1631  1          HWQ5,
;  1632  1          HWQ6,
;  1633  1          SWQ1,
;  1634  1          SWQ2,
;  1635  1          SWQ3,
;  1636  1          SWQ4,
;  1637  1          SWQ5,
;  1638  1          SWQ6,
;  1639  1          SWQ7,
;  1640  1          SWQ8,
;  1641  1          SWQ9,
;  1642  1          SWQ10,
;  1643  1          SWQ11,
;  1644  1          SWQ12,
```

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;    1645  1          SWQ13,
;    1646  1          SWQ14,
;    1647  1          SWQ15,
;    1648  1          SWM1,
;    1649  1          MSG_01,
;    1650  1          MSG_07,
;    1651  1          CER_01,
;    1652  1          CER_02,
;    1653  1          CER_03,
;    1654  1          DUM_00,
;    1655  1          DUM_UC,
;    1656  1          DUM_CE,
;    1657  1          DUM_IE,
;    1658  1          DUM_HE,
;    1659  1          DUM_UE,
;    1660  1          EGS_01,
;    1661  1          EGS_02,
;    1662  1          EBS_01,
;    1663  1          EBD_10,
;    1664  1          EBD_12,
;    1665  1          EBD_13,
;    1666  1          EBD_14,
;    1667  1          EBD_15,
;    1668  1          EBD_16,
;    1669  1          EBD_17,
;    1670  1          EBD_18,
;    1671  1          EBD_19,
;    1672  1          EBD_20,
;    1673  1          EBD_21,
;    1674  1          EBD_22,
;    1675  1          EBH_31,
;    1676  1          EBH_32,
;    1677  1          EBH_34,
;    1678  1          EBH_35,
;    1679  1          EBH_36,
;    1680  1          EBH_37,
;    1681  1          EBH_38,
;    1682  1          EBH_39,
;    1683  1          EBH_40,
;    1684  1          EBH_41,
;    1685  1          EBH_42,
;    1686  1          EBH_43,
;    1687  1          EX_SA,
;    1688  1          EX_CRN,
;    1689  1          EX_SC,
;    1690  1          EX_DSC,
;    1691  1          EX_SB,
;    1692  1          EX_CMD,
;    1693  1          EX_SCC,
;    1694  1          EX_ONL,
;    1695  1          EX_ESP,
;    1696  1          EX_SND,
;    1697  1          EX_RD,
;    1698  1          EX_WRT,
;    1699  1          EX_CMP,
;    1700  1          EX_BB,
;    1701  1          EX_LBN,
```

```
;   1702  1          EX_CBC,
;   1703  1          EX_BC,
;   1704  1          EX_BD,
;   1705  1          EX_03,
;   1706  1          ETIME,
;   1707  1          PLATT,
;   1708  1          CRLF,
;   1709  1          SWP_ERROR : WORD,
;   1710  1          SWP_XFER : WORD,
;   1711  1          SWP_STRACK : WORD,
;   1712  1          SWP_ETRACK : WORD,
;   1713  1          SWP_FLAGS : BYTE,
;   1714  1          L$LUN,
;   1715  1          L$UNIT;

;   1716  1      %SBTTL 'TYPE AND DESCRIPTION'
;   1717  1
;   1718  1      EQUALS;
;   1719  1
;   1720  1      !+
;   1721  1      !       THE TEXT WHICH APPEARS IN THESE MACROS IS DISPLAYED TO THE USER WHEN
;   1722  1      !       THE DIAGNOSTIC IS FIRST LOADED AND RUN.
;   1723  1      !-
;   1724  1
;   1725  1      DEVTYP (%ASCIZ'SINGLE RC25 PLATTER');          ! "UNIT IS SINGLE RC25 PLATTER"
;   1726  1
;   1727  1      DESCRIPT (%ASCIZ'RC25 DISK EXERCISER');        ! TEST DESCRIPTION
```

```
;   1728  1     %SBTTL 'HARDWARE PARAMETER CODING SECTION'
;   1729  1
;   1730  1     !+
;   1731  1     !       THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS THAT ARE USED BY
;   1732  1     !       THE SUPERVISOR TO BUILD  'ABLES. THE MACROS ARE NOT EXECUTED AS
;   1733  1     !       MACHINE INSTRUCTIONS BU  ,RE INTERPRETED BY THE SUPERVISOR AS DATA
;   1734  1     !       STRUCTURES. THE MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
;   1735  1     !       WITH THE OPERATOR.
;   1736  1     !-
;   1737  1
;   1738  1     BGNHRD;
;   1739  1
;   1740  1     GPRMA (HWQ1, 0, 0, %O'160000', %O'177777', YES, 1);     ! IP ADDRESS
;   1741  1     GPRMA (HWQ2, 2, 0, %O'4', %O'774', YES, 1);             ! VECTOR
;   1742  1     GPRMD (HWQ3, 4, 0, %O'177777', %O'4', %O'7', YES, 1);   ! BR LEVEL
;   1743  1     GPRMD (HWQ4, 6, 0, %O'377', %DECIMAL'0', %DECIMAL'253', YES, 1); ! PLATTER ADDRESS
;   1744  1     GPRML (HWQ5, 6, %O'100000', NO, 1);                     ! WRITE ON CUST DATA AREA
;   1745  1     XFERF (HWDONE);                                         ! NO - DONE
;   1746  1     GPRML (HWQ6, 6, %O'100000', NO, 1);                     ! ** WARNING / CONFIRM
;   1747  1     $L (HWDONE);
;   1748  1
;   1749  1     ENDHRD;
```

```
;    1750  1     %SBTTL 'SOFTWARE PARAMETER CODING SECTION'
;    1751  1
;    1752  1     !+
;    1753  1     !       THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS THAT ARE USED BY
;    1754  1     !       THE SUPERVISOR TO INTERROGATE THE OPERATOR FOR SOFTWARE INFORMATION
;    1755  1     !       WHICH WILL BE PLACED IN THE SOFTWARE P-TABLE. THE MACROS ARE NOT
;    1756  1     !       EXECUTED AS MACHINE INSTRUCTIONS BUT ARE INTERPRETED BY THE SUPERVISOR
;    1757  1     !       AS DATA STRUCTURES. THE MACROS ALLOW THE SUPERVISOR TO ESTABLISH
;    1758  1     !       COMMUNICATIONS WITH THE OPERATOR.
;    1759  1     !-
;    1760  1
;    1761  1     BGNSFT;
;    1762  1
;    1763  1     GPRMD (SWQ1, 0, D, %O'177777', 0, 65535, YES, 1);       ! ERROR LIMIT
;    1764  1     GPRMD (SWQ2, 2, D, %O'177777', 0, 65535, YES, 1);       ! TRANSFER LIMIT
;    1765  1     GPRML (SWQ3, 8, SWF_SEL, YES, 1);                       ! SUPPRESS ERROR LOG PRINTING
;    1766  1     GPRML (SWQ4, 8, SWF_DM, YES, 1);                        ! RUN DM EXERCISER
;    1767  1     XFERT (SW3);                                            ! IF YES - DONE
;    1768  1     GPRML (SWQ5, 8, SWF_RDM, YES, 1);                       ! RANDOM SEEK MODE
;    1769  1     GPRMD (SWQ6, 4, D, %O'177777', 0, MAX_TRACK, YES, 1);   ! STARTING TRACK
;    1770  1     GPRMD (SWQ7, 6, D, %O'177777', GP$ATLO(4), MAX_TRACK, YES, 1); ! ENDING TRACK
;    1771  1     GPRML (SWQ8, 8, SWF_CRC, YES, 1);                       ! READ-COMPARES AT CONTROLLER
;    1772  1     DISPLAY (SWM1);                                         ! REMAINING QUESTIONS ONLY APPLY ...
;    1773  1     GPRML (SWQ9, 8, SWF_WO, YES, 1);                        ! WRITE ONLY
;    1774  1     GPRML (SWQ10, 8, SWF_CWC, YES, 1);                      ! WRITE-COMPARES AT CONTROLLER
;    1775  1     XFERT (SW1);                                            ! IF YES, SKIP NEXT QUESTION
;    1776  1     GPRML (SWQ11, 8, SWF_HWC, YES, 1);                      ! CHECK WRITES AT HOST BY READING
;    1777  1     $L (SW1);
;    1778  1     GPRML (SWQ12, 8, SWF_UDP, YES, 1);                      ! USER-DEFINED DATA PATTERN
;    1779  1     XFERT (SW2);                                            ! IF YES, SKIP NEXT QUESTION
;    1780  1     GPRMD (SWQ13, 8, D, %O'177400', 0, DP_CNT, YES, 1);     ! SELECT PRE-DEFINED DATA PATTERN
;    1781  1     XFER (SW4);                                             ! DONE
;    1782  1     $L (SW2);
;    1783  1     GPRMD (SWQ14, 10, D, %O'177777', 1, MAX_UDP_CNT, YES, 1); ! NO. OF WORDS IN USER DATA PATTERN
;    1784  1     GPRMD (SWQ15, 12, O, %O'177777', 0, %O'177777', NO, 10); ! PATTERN VALUES
;    1785  1     $L (SW3);
;    1786  1     $L (SW4);
;    1787  1
;    1788  1     ENDSFT;
```

```
;   1789  1     %SBTTL  REPORT CODING SECTION'
;   1790  1
;   1791  1     !+
;   1792  1     !       THE REPORT CODING SECTION CONTAINS THE 'PRINTS" CALLS THAT GENERATE
;   1793  1     !       STATISTICAL REPORTS. THIS SECTION IS EXECUTED BY THE OPERATOR COMMAND
;   1794  1     !       'PRINT" OR BY THE PROGRAM MACRO "DORPT".
;   1795  1     !-
;   1796  1
;   1797  2     BGNRPT;
;   1798  2
;   1799  2     BIND
;   1800  2         SR_HD = UPLIT (%ASCIZ'%N%A********************** S U M M A R Y   R E P O R T **********************%N'),
;   1801  2         SR_ET = UPLIT (%ASCIZ'%AELAPSED TIME:  %D2%A:%D2%A:%D2%N'),
;   1802  2         SR_MH1 = UPLIT (%ASCIZ'%N%A         NO.        NO.                          NO.     NO.'),
;   1803  2         SR_MH2 = UPLIT (%ASCIZ'%N%AUNIT    READS     WRITES    MBYTES   MBYTES     HARD    ERROR'),
;   1804  2         SR_MH3 = UPLIT (%ASCIZ'%N%A NO.  (K=1000)  (K=1000)   READ    WRITTEN   ERRORS  LOGS'),
;   1805  2         SR_MH4 = UPLIT (%ASCIZ'%N%A----  --------  --------  ------  -------  ------  -----%N'),
;   1806  2         SR_UN = UPLIT (%ASCIZ'%N%D3'),
;   1807  2         SR_LO = UPLIT (%ASCIZ'%D9%A '),
;   1808  2         SR_HI = UPLIT (%ASCIZ'%D9%AK'),
;   1809  2         SR_ML = UPLIT (%ASCIZ'%D9%D8%D9%D7'),
;   1810  2         SR_EH1 = UPLIT (%ASCIZ'%N%N%AN SYMBOL ECC ERRORS:%N'),
;   1811  2         SR_EH2 = UPLIT (%ASCIZ'%N%A         ECC'),
;   1812  2         SR_EH3 = UPLIT (%ASCIZ'%N%AUNIT  FIELD   N =    N =    N =    N =    N =    N =    N =    N ='),
;   1813  2         SR_EH4 = UPLIT (%ASCIZ'%N%A NO.   ONLY    1      2      3      4      5      6      7      8'),
;   1814  2         SR_EH5 = UPLIT (%ASCIZ'%N%A----  -----  -----  -----  -----  -----  -----  -----  -----  -----%N'),
;   1815  2         SR_EL1 = UPLIT (%ASCIZ'%N%D3%D8%D7%D7%D7'),
;   1816  2         SR_EL2 = UPLIT (%ASCIZ'%D7%D7%D7%D7%D7'),
;   1817  2         SR_DH1 = UPLIT (%ASCIZ'%N%A         NO.        NO.        NO.'),
;   1818  2         SR_DH2 = UPLIT (%ASCIZ'%N%AUNIT    READS     WRITES    SEEKS     MBYTES  MBYTES   NO. HARD  NO. SOFT'),
;   1819  2         SR_DH3 = UPLIT (%ASCIZ'%N%A NO.  (K=1000)  (K=1000)  (K=1000)   READ   WRITTEN   ERRORS    ERRORS'),
;   1820  2         SR_DH4 = UPLIT (%ASCIZ'%N%A----  --------  --------  --------  ------  -------   ---- --  --------%N'),
;   1821  2         SR_DL = UPLIT (%ASCIZ %D9%D8%D10%D10');
;   1822  2
;   1823  2     OWN
;   1824  2         ADDR_LO;                                    ! ADDR OF LOW-ORDER FIELD OF I/O COUNT
;   1825  2
;   1826  2     ROUTINE HI_LO : NOVALUE =
;   1827  2
;   1828  2     !+
;   1829  2     !       THIS ROUTINE IS CALLED FROM THE MAINLINE CODE OF THE REPORT CODING
;   1830  2     !       SECTION WHICH APPEARS BELOW. ITS PURPOSE IS TO PRINT THE HIGH ORDER
;   1831  2     !       FIELD OF ONE OF THE I/O COUNTS IF THE FIELD IS NON ZERO. OTHERWISE, THE
;   1832  2     !       LOW-ORDER FIELD IS PRINTED.
;   1833  2     !
;   1834  2     !       IMPLICIT INPUTS:
;   1835  2     !               ADDR LO   ADDRESS OF THE LOW ORDER FIELD OF AN I/O COUNT
;   1836  2     !-
;   1837  2
;   1838  3     BEGIN
;   1839  3
;   1840  3     LOCAL
;   1841  3         ADDR_HI;                                    ! ADDR OF HIGH-ORDER FIELD OF I/O COUNT
;   1842  3
;   1843  3     ADDR_HI = .ADDR_LO + 2;                         ! GET HIGH-ORDER FIELD ADDRESS
;   1844  3     IF ..ADDR_HI EQLU 0                             ! IF HIGH-ORDER FIELD IS ZERO
;   1845  3     THEN                                            ! THEN
```

```
;   1846  4          PRINTS (SR_LO, ..ADDR_LO)                  ! PRINT LOW-ORDER FIELD
;   1847  3      ELSE                                           ! OTHERWISE
;   1848  3          PRINTS (SR_HI, ..ADDR_HI);                 ! PRINT HIGH ORDER FIELD (THOUSANDS)
;   1849  3
;   1850  2      END;                                           ! ROUTINE HI_LO


                                                .TITLE  CZRCD2 CZRCDB0 RC25 DISK EXERCISER
                                                .IDENT  /V02.0/
                                                .ENABL  AMA


000000                                          .PSECT  $CODE$,  RO
000000      123     111     116         L$DVTYP::
                                                .ASCII  /SIN/
000003      107     114     105                 .ASCII  /GLE/
000006      040     122     103                 .ASCII  / RC/
000011      062     065     040                 .ASCII  /25 /
000014      120     114     101                 .ASCII  /PLA/
000017      124     124     105                 .ASCII  /TTE/
000022      122     000                         .ASCII  /R/<00>
000024                                          .BLKB   2
000026      122     103     062         L$DESC::.ASCII  /RC2/
000031      065     040     104                 .ASCII  /5 D/
000034      111     123     113                 .ASCII  /ISK/
000037      040     105     130                 .ASCII  / EX/
000042      105     122     103                 .ASCII  /ERC/
000045      111     123     105                 .ASCII  /ISE/
000050      122     000                         .ASCII  /R/<00>
000052                                          .BLKB   2
000054  000000C                   L$HRDLN::
                                                .WORD   <<<L$NDHRD-L$HRDLN>/2>-1>
000056  000031                  GP$1::  .WORD   31
000060  000000G                         .WORD   HWQ1
000062  160000                          .WORD   -20000
000064  177777                          .WORD    1
000066  001031                  GP$2::  .WORD   1031
000070  000000G                         .WORD   HWQ2
000072  000004                          .WORD   4
000074  000774                          .WORD   774
000076  002032                  GP$3::  .WORD   2032
000100  000000G                         .WORD   HWQ3
000102  177777                          .WORD   -1
000104  000004                          .WORD   4
000106  000007                          .WORD   7
000110  003052                  GP$4::  .WORD   3052
000112  000000G                         .WORD   HWQ4
000114  000377                          .WORD   377
000116  000000                          .WORD   0
000120  000375                          .WORD   375
000122  003120                  GP$5::  .WORD   3120
000124  000000G                         .WORD   HWQ5
000126  100000                          .WORD   -100000
000130  000000C             $HWDONE:.WORD   <<<<$LHWDONE-$HWDONE>*400>*4>*40>
000132  003120                  GP$6::  .WORD   3120
000134  000000G                         .WORD   HWQ6
000136  100000                          .WORD    100000
```

```
000140  001004                          $LHWDONE:
                                                .WORD   1004
000142                                  L$NDHRD::
                                                .BLKW   1
000144  000000C                         L$SFTLN::
                                                .WORD   <<<L$NDSFT-L$SFTLN>/2> 1>
000146  000052                          GP$7::  .WORD   52
000150  000000G                                 .WORD   SWQ1
000152  177777                                  .WORD   -1
000154  000000                                  .WORD   0
000156  177777                                  .WORD   -1
000160  001052                          GP$8::  .WORD   1052
000162  000000G                                 .WORD   SWQ2
000164  177777                                  .WORD    1
000166  000000                                  .WORD   0
000170  177777                                  .WORD   -1
000172  004130                          GP$9::  .WORD   4130
000174  000000G                                 .WORD   SWQ3
000176  000001                                  .WORD   1
000200  004130                          GP$10:: .WORD   4130
000202  000000G                                 .WORD   SWQ4
000204  000002                                  .WORD   2
000206  000000C                         $SW3:   .WORD   <<<<$LSW3-$SW3>*400>+4>+20>
000210  004130                          GP$11:: .WORD   4130
000212  000000G                                 .WORD   SWQ5
000214  000004                                  .WORD   4
000216  002052                          GP$12:: .WORD   2052
000220  000000G                                 .WORD   SWQ6
000222  177777                                  .WORD   -1
000224  000000                                  .WORD   0
000226  003151                                  .WORD   3151
000230  003452                          GP$13:: .WORD   3452
000232  000000G                                 .WORD   SWQ7
000234  177777                                  .WORD   -1
000236  000002                                  .WORD   2
000240  003151                                  .WORD   3151
000242  000001                                  .WORD   1
000244  004130                          GP$14:: .WORD   4130
000246  000000G                                 .WORD   SWQ8
000250  000010                                  .WORD   10
000252  000003                          GP$DISP::
                                                .WORD   3
000254  000000G                                 .WORD   SWM1
000256  004130                          GP$15:: .WORD   4130
000260  000000G                                 .WORD   SWQ9
000262  000020                                  .WORD   20
000264  004130                          GP$16:: .WORD   4130
000266  000000G                                 .WORD   SWQ10
000270  000040                                  .WORD   40
000272  000000C                         $SW1:   .WORD   <<<<$LSW1-$SW1>*400>+4>+20>
000274  004130                          GP$17:: .WORD   4130
000276  000000G                                 .WORD   SWQ11
000300  000100                                  .WORD   100
000302  001004                          $LSW1:  .WORD   1004
000304  004130                          GP$18:: .WORD   4130
000306  000000G                                 .WORD   SWQ12
000310  000200                                  .WORD   200
```

```
000312  000000C                         $SW2:    .WORD   <<<<$LSW2-$SW2>*400>+4>+20>
000314  004052                          GP$19::  .WORD   4052
000316  000000G                                  .WORD   SWQ13
000320  177400                                   .WORD   -400
000322  000000                                   .WORD   0
000324  000025                                   .WORD   25
000326  000000C                         $SW4:    .WORD   <<<$LSW4-$SW4>*400>+4>
000330  001004                          $LSW2:   .WORD   1004
000332  005052                          GP$20::  .WORD   5052
000334  000000G                                  .WORD   SWQ14
000336  177777                                   .WORD   -1
000340  000001                                   .WORD   1
000342  000020                                   .WORD   20
000344  006222                          GP$21::  .WORD   6222
000346  000000G                                  .WORD   SWQ15
000350  177777                                   .WORD   -1
000352  000000                                   .WORD   0
000354  177777                                   .WORD   -1
000356  000005                                   .WORD   5
000360  001004                          $LSW3:   .WORD   1004
000362  001004                          $LSW4:   .WORD   1004
000364                                  L$NDSFT::
                                                 .BLKW   1
000366                                  ADDR.LO::.BLKW   1



000000                                           .PSECT  $PLIT$,  RO ,  D
000000      045     116     045         P.AAA:   .ASCII  /%N%/
000003      101     052     052                  .ASCII  /A**/
000006      052     052     052                  .ASCII  /***/
000011      052     052     052                  .ASCII  /***/
000014      052     052     052                  .ASCII  /***/
000017      052     052     052                  .ASCII  /***/
000022      052     052     052                  .ASCII  /***/
000025      052     052     052                  .ASCII  /***/
000030      052     040     123                  .ASCII  /* S/
000033      040     125     040                  .ASCII  / U /
000036      115     040     115                  .ASCII  /M M/
000041      040     101     040                  .ASCII  / A /
000044      122     040     131                  .ASCII  /R Y/
000047      040     040     040                  .ASCII  /   /
000052      122     040     105                  .ASCII  /R E/
000055      040     120     040                  .ASCII  / P /
000060      117     040     122                  .ASCII  /O R/
000063      040     124     040                  .ASCII  / T /
000066      052     052     052                  .ASCII  /***/
000071      052     052     052                  .ASCII  /***/
000074      052     052     052                  .ASCII  /***/
000077      052     052     052                  .ASCII  /***/
000102      052     052     052                  .ASCII  /***/
000105      052     052     052                  .ASCII  /***/
000110      052     052     052                  .ASCII  /***/
000113      045     116     000                  .ASCII  /%N/<00>
000116      045     101     105         P.AAB:   .ASCII  /%AE/
000121      114     101     120                  .ASCII  /LAP/
000124      123     105     104                  .ASCII  /SED/
```

```
000127  040  124  111                    .ASCII  / TI/
000132  115  105  072                    .ASCII  /ME:/
000135  040  040  045                    .ASCII  /  %/
000140  104  062  045                    .ASCII  /D2%/
000143  101  072  045                    .ASCII  /A:%/
000146  104  062  045                    .ASCII  /D2%/
000151  101  072  045                    .ASCII  /A:%/
000154  104  062  045                    .ASCII  /D2%/
000157  116  000  000                    .ASCII  /N/<00><00>
000162  045  116  045          P.AAC:    .ASCII  /%N%/
000165  101  040  040                    .ASCII  /A  /
000170  040  040  040                    .ASCII  /   /
000173  040  040  040                    .ASCII  /   /
000176  116  117  056                    .ASCII  /NO./
000201  040  040  040                    .ASCII  /   /
000204  040  040  040                    .ASCII  /   /
000207  040  116  117                    .ASCII  / NO/
000212  056  040  040                    .ASCII  /.  /
000215  040  040  040                    .ASCII  /   /
000220  040  040  040                    .ASCII  /   /
000223  040  040  040                    .ASCII  /   /
000226  040  040  040                    .ASCII  /   /
000231  040  040  040                    .ASCII  /   /
000234  040  040  040                    .ASCII  /   /
000237  040  040  040                    .ASCII  /   /
000242  040  116  117                    .ASCII  / NO/
000245  056  040  040                    .ASCII  /.  /
000250  040  040  116                    .ASCII  /  N/
000253  117  056  000                    .ASCII  /O./<00>
000256  045  116  045          P.AAD:    .ASCII  /%N%/
000261  101  125  116                    .ASCII  /AUN/
000264  111  124  040                    .ASCII  /IT /
000267  040  040  122                    .ASCII  /  R/
000272  105  101  104                    .ASCII  /EAD/
000275  123  040  040                    .ASCII  /S  /
000300  040  040  040                    .ASCII  /   /
000303  127  122  111                    .ASCII  /WRI/
000306  124  105  123                    .ASCII  /TES/
000311  040  040  040                    .ASCII  /   /
000314  115  102  131                    .ASCII  /MBY/
000317  124  105  123                    .ASCII  /TES/
000322  040  040  115                    .ASCII  /  M/
000325  102  131  124                    .ASCII  /BYT/
000330  105  123  040                    .ASCII  /ES /
000333  040  040  040                    .ASCII  /   /
000336  110  101  122                    .ASCII  /HAR/
000341  104  040  040                    .ASCII  /D  /
000344  040  105  122                    .ASCII  / ER/
000347  122  117  122                    .ASCII  /ROR/
000352  000  000                         .ASCII  <00><00>
000354  045  116  045          P.AAE:    .ASCII  /%N%/
000357  101  040  116                    .ASCII  /A N/
000362  117  056  040                    .ASCII  /O. /
000365  040  050  113                    .ASCII  / (K/
000370  075  061  060                    .ASCII  /=10/
000373  060  060  051                    .ASCII  /00)/
000376  040  040  050                    .ASCII  /  (/
```

```
000401  113  075  061                .ASCII  /K=1/
000404  060  060  060                .ASCII  /000/
000407  051  040  040                .ASCII  /)  /
000412  040  122  105                .ASCII  / RE/
000415  101  104  040                .ASCII  /AD /
000420  040  040  127                .ASCII  /  W/
000423  122  111  124                .ASCII  /RIT/
000426  124  105  116                .ASCII  /TEN/
000431  040  040  105                .ASCII  /  E/
000434  122  122  117                .ASCII  /RRO/
000437  122  123  040                .ASCII  /RS /
000442  040  114  117                .ASCII  / LO/
000445  107  123  000                .ASCII  /GS/<00>
000450  045  116  045       P.AAF:   .ASCII  /%N%/
000453  101  055  055                .ASCII  /A--/
000456  055  055  040                .ASCII  /-- /
000461  040  055  055                .ASCII  / --/
000464  055  055  055                .ASCII  /---/
000467  055  055  055                .ASCII  /---/
000472  040  040  055                .ASCII  /  -/
000475  055  055  055                .ASCII  /---/
000500  055  055  055                .ASCII  /---/
000503  055  040  040                .ASCII  /-  /
000506  055  055  055                .ASCII  /---/
000511  055  055  055                .ASCII  /---/
000514  040  040  055                .ASCII  /  -/
000517  055  055  055                .ASCII  /---/
000522  055  055  055                .ASCII  /---/
000525  040  040  055                .ASCII  /  -/
000530  055  055  055                .ASCII  /---/
000533  055  055  040                .ASCII  /-- /
000536  040  055  055                .ASCII  / --/
000541  055  055  055                .ASCII  /---/
000544  045  116  000                .ASCII  /%N/<00>
000547  000                         .ASCII  <00>
000550  045  116  045       P.AAG:   .ASCII  /%N%/
000553  104  063  000                .ASCII  /D3/<00>
000556  045  104  071       P.AAH:   .ASCII  /%D9/
000561  045  101  040                .ASCII  /%A /
000564  000  000                     .ASCII  <00><00>
000566  045  104  071       P.AAI:   .ASCII  /%D9/
000571  045  101  113                .ASCII  /%AK/
000574  000  000                     .ASCII  <00><00>
000576  045  104  071       P.AAJ:   .ASCII  /%D9/
000601  045  104  070                .ASCII  /%D8/
000604  045  104  071                .ASCII  /%D9/
000607  045  104  067                .ASCII  /%D7/
000612  000  000                     .ASCII  <00><00>
000614  045  116  045       P.AAK:   .ASCII  /%N%/
000617  116  045  101                .ASCII  /N%A/
000622  116  040  123                .ASCII  /N S/
000625  131  115  102                .ASCII  /YMB/
000630  117  114  040                .ASCII  /OL /
000633  105  103  103                .ASCII  /ECC/
000636  040  105  122                .ASCII  / ER/
000641  122  117  122                .ASCII  /ROR/
000644  123  072  045                .ASCII  /S:%/
```

```
000647  116  000  000                .ASCII  /N/<00><00>
000652  045  116  045        P.AAL:  .ASCII  /%N%/
000655  101  040  040                .ASCII  /A  /
000660  040  040  040                .ASCII  /   /
000663  040  040  105                .ASCII  /  E/
000666  103  103  000                .ASCII  /CC/<00>
000671  000                         .ASCII  <00>
000672  045  116  045        P.AAM:  .ASCII  /%N%/
000675  101  125  116                .ASCII  /AUN/
000700  111  124  040                .ASCII  /IT /
000703  040  106  111                .ASCII  / FI/
000706  105  114  104                .ASCII  /ELD/
000711  040  040  040                .ASCII  /   /
000714  116  040  075                .ASCII  /N =/
000717  040  040  040                .ASCII  /   /
000722  040  116  040                .ASCII  / N /
000725  075  040  040                .ASCII  /=  /
000730  040  040  116                .ASCII  /  N/
000733  040  075  040                .ASCII  / = /
000736  040  040  040                .ASCII  /   /
000741  116  040  075                .ASCII  /N =/
000744  040  040  040                .ASCII  /   /
000747  040  116  040                .ASCII  / N /
000752  075  040  040                .ASCII  /=  /
000755  040  040  116                .ASCII  /  N/
000760  040  075  040                .ASCII  / = /
000763  040  040  040                .ASCII  /   /
000766  116  040  075                .ASCII  /N =/
000771  040  040  040                .ASCII  /   /
000774  040  116  040                .ASCII  / N /
000777  075  000  000                .ASCII  /=/<00><00>
001002  045  116  045        P.AAN:  .ASCII  /%N%/
001005  101  040  116                .ASCII  /A N/
001010  117  056  040                .ASCII  /0. /
001013  040  040  117                .ASCII  /  0/
001016  116  114  131                .ASCII  /NLY/
001021  040  040  040                .ASCII  /   /
001024  040  061  040                .ASCII  / 1 /
001027  040  040  040                .ASCII  /   /
001032  040  040  062                .ASCII  /  2/
001035  040  040  040                .ASCII  /   /
001040  040  040  040                .ASCII  /   /
001043  063  040  040                .ASCII  /3  /
001046  040  040  040                .ASCII  /   /
001051  040  064  040                .ASCII  / 4 /
001054  040  040  040                .ASCII  /   /
001057  040  040  065                .ASCII  /  5/
001062  040  040  040                .ASCII  /   /
001065  040  040  040                .ASCII  /   /
001070  066  040  040                .ASCII  /6  /
001073  040  040  040                .ASCII  /   /
001076  040  067  040                .ASCII  / 7 /
001101  040  040  040                .ASCII  /   /
001104  040  040  070                .ASCII  /  8/
001107  000                         .ASCII  <00>
001110  045  116  045        P.AA0:  .ASCII  /%N%/
001113  101  055  055                .ASCII  /A--/
```

```
001116  055  055  040                .ASCII  /-- /
001121  040  055  055                .ASCII  / --/
001124  055  055  055                .ASCII  /---/
001127  040  040  055                .ASCII  /  -/
001132  055  055  055                .ASCII  /---/
001135  055  040  040                .ASCII  /-  /
001140  055  055  055                .ASCII  /---/
001143  055  055  040                .ASCII  /-- /
001146  040  055  055                .ASCII  / --/
001151  055  055  055                .ASCII  /---/
001154  040  040  055                .ASCII  /  -/
001157  055  055  055                .ASCII  /---/
001162  055  040  040                .ASCII  /-  /
001165  055  055  055                .ASCII  /---/
001170  055  055  040                .ASCII  /-- /
001173  040  055  055                .ASCII  / --/
001176  055  055  055                .ASCII  /---/
001201  040  040  055                .ASCII  /  -/
001204  055  055  055                .ASCII  /---/
001207  055  040  040                .ASCII  /-  /
001212  055  055  055                .ASCII  /---/
001215  055  055  045                .ASCII  /--%/
001220  116  000                    .ASCII  /N/<00>
001222  045  116  045          P.AAP:  .ASCII  /%N%/
001225  104  063  045                .ASCII  /D3%/
001230  104  070  045                .ASCII  /D8%/
001233  104  067  045                .ASCII  /D7%/
001236  104  067  045                .ASCII  /D7%/
001241  104  067  000                .ASCII  /D7/<00>
001244  045  104  067          P.AAQ:  .ASCII  /%D7/
001247  045  104  067                .ASCII  /%D7/
001252  045  104  067                .ASCII  /%D7/
001255  045  104  067                .ASCII  /%D7/
001260  045  104  067                .ASCII  /%D7/
001263  000                         .ASCII  <00>
001264  045  116  045          P.AAR:  .ASCII  /%N%/
001267  101  040  040                .ASCII  /A  /
001272  040  040  040                .ASCII  /   /
001275  040  040  040                .ASCII  /   /
001300  116  117  056                .ASCII  /NO./
001303  040  040  040                .ASCII  /   /
001306  040  040  040                .ASCII  /   /
001311  040  116  117                .ASCII  / NO/
001314  056  040  040                .ASCII  /.  /
001317  040  040  040                .ASCII  /   /
001322  040  040  116                .ASCII  /  N/
001325  117  056  000                .ASCII  /O./<00>
001330  045  116  045          P.AAS:  .ASCII  /%N%/
001333  101  125  116                .ASCII  /AUN/
001336  111  124  040                .ASCII  /IT /
001341  040  040  122                .ASCII  /  R/
001344  105  101  104                .ASCII  /EAD/
001347  123  040  040                .ASCII  /S  /
001352  040  040  040                .ASCII  /   /
001355  127  122  111                .ASCII  /WRI/
001360  124  105  123                .ASCII  /TES/
001363  040  040  040                .ASCII  /   /
```

```
001366  040  123  105                .ASCII  / SE/
001371  105  113  123                .ASCII  /EKS/
001374  040  040  040                .ASCII  /   /
001377  040  115  102                .ASCII  / MB/
001402  131  124  105                .ASCII  /YTE/
001405  123  040  040                .ASCII  /S  /
001410  115  102  131                .ASCII  /MBY/
001413  124  105  123                .ASCII  /TES/
001416  040  040  040                .ASCII  /   /
001421  116  117  056                .ASCII  /NO./
001424  040  110  101                .ASCII  / HA/
001427  122  104  040                .ASCII  /RD /
001432  040  116  117                .ASCII  / NO/
001435  056  040  123                .ASCII  /. S/
001440  117  106  124                .ASCII  /OFT/
001443  000                        .ASCII  <00>
001444  045  116  045          P.AAT:  .ASCII  /%N%/
001447  101  040  116                .ASCII  /A N/
001452  117  056  040                .ASCII  /O. /
001455  040  050  113                .ASCII  / (K/
001460  075  061  060                .ASCII  /=10/
001463  060  060  051                .ASCII  /00)/
001466  040  040  050                .ASCII  /  (/
001471  113  075  061                .ASCII  /K=1/
001474  060  060  060                .ASCII  /000/
001477  051  040  040                .ASCII  /)  /
001502  050  113  075                .ASCII  /(K=/
001505  061  060  060                .ASCII  /100/
001510  060  051  040                .ASCII  /0) /
001513  040  040  122                .ASCII  /  R/
001516  105  101  104                .ASCII  /EAD/
001521  040  040  040                .ASCII  /   /
001524  127  122  111                .ASCII  /WRI/
001527  124  124  105                .ASCII  /TTE/
001532  116  040  040                .ASCII  /N  /
001535  040  105  122                .ASCII  / ER/
001540  122  117  122                .ASCII  /ROR/
001543  123  040  040                .ASCII  /S  /
001546  040  040  105                .ASCII  /  E/
001551  122  122  117                .ASCII  /RRO/
001554  122  123  000                .ASCII  /RS/<00>
001557  000                        .ASCII  <00>
001560  045  116  045          P.AAU:  .ASCII  /%N%/
001563  101  055  055                .ASCII  /A--/
001566  055  055  040                .ASCII  /-- /
001571  040  055  055                .ASCII  / --/
001574  055  055  055                .ASCII  /---/
001577  055  055  055                .ASCII  /---/
001602  040  040  055                .ASCII  /  -/
001605  055  055  055                .ASCII  /---/
001610  055  055  055                .ASCII  /---/
001613  055  040  040                .ASCII  /-  /
001616  055  055  055                .ASCII  /---/
001621  055  055  055                .ASCII  /---/
001624  055  055  040                .ASCII  /-- /
001627  040  055  055                .ASCII  / --/
001632  055  055  055                .ASCII  /---/
```

```
001635  055  040  040                .ASCII  /-  /
001640  055  055  055                .ASCII  /---/
001643  055  055  055                .ASCII  /---/
001646  055  040  040                .ASCII  /-  /
001651  055  055  055                .ASCII  /---/
001654  055  055  055                .ASCII  /---/
001657  055  055  040                .ASCII  /-- /
001662  040  055  055                .ASCII  / --/
001665  055  055  055                .ASCII  /---/
001670  055  055  055                .ASCII  /---/
001673  045  116  000                .ASCII  /%N/<00>
001676  045  104  071      P.AAV:    .ASCII  /%D9/
001701  045  104  070                .ASCII  /%D8/
001704  045  104  061                .ASCII  /%D1/
001707  060  045  104                .ASCII  /0%D/
001712  061  060  000                .ASCII  /10/<00>
001715  000                         .ASCII  <00>


                                    .GLOBL  PATCH, CPT, CST, CST.ADDR, DCT
                                    .GLOBL  DCT.ADDR, RC25.ADDR, IRC25.ADDR
                                    .GLOBL  DM.COMM, DMC.ADDR, RP.SAVE, RPS.X1
                                    .GLOBL  RPS.X2, OUTC.LIST, OUTC.TIMR, OCL.X1
                                    .GLOBL  OCL.X2, TALLY, T.ADDR, MSCP.ENV
                                    .GLOBL  ENV.USE, RETPKT, RP.USE, RP.INDX
                                    .GLOBL  RP.ADDR, BUFF.DESC, BUFF.OWN, IODQ
                                    .GLOBL  IODQ.IN, IODQ.OUT, ENTRY.REASON
                                    .GLOBL  T.FLAG, EOP.FLAG, MEM.MGMT, IIP.FLAG
                                    .GLOBL  CCTLR, CPLAT, CUOFF, CTLR.CNT
                                    .GLOBL  DUR, QIO, MEM.SIZE, FREE.MEM.ADDR
                                    .GLOBL  BUFF.SIZE, NUM.BUFF, CLK.TYPE
                                    .GLOBL  CLK.HERTZ, CLK.CSR, CLK.VECTOR
                                    .GLOBL  HOURS, MINUTES, SECONDS, TICKS
                                    .GLOBL  ST.CODE, SB.CODE, STEP, OF.RC
                                    .GLOBL  SA.REG, NEX, CRN, HWQ1, HWQ2, HWQ3
                                    .GLOBL  HWQ4, HWQ5, HWQ6, SWQ1, SWQ2, SWQ3
                                    .GLOBL  SWQ4, SWQ5, SWQ6, SWQ7, SWQ8, SWQ9
                                    .GLOBL  SWQ10, SWQ11, SWQ12, SWQ13, SWQ14
                                    .GLOBL  SWQ15, SWM1, MSG.01, MSG.07, CER.01
                                    .GLOBL  CER.02, CER.03, DUM.00, DUM.UC
                                    .GLOBL  DUM.CE, DUM.IE, DUM.HE, DUM.UE
                                    .GLOBL  EGS.01, EGS.02, EBS.01, EBD.10
                                    .GLOBL  EBD.12, EBD.13, EBD.14, EBD.15
                                    .GLOBL  EBD.16, EBD.17, EBD.18, EBD.19
                                    .GLOBL  EBD.20, EBD.21, EBD.22, EBH.31
                                    .GLOBL  EBH.32, EBH.34, EBH.35, EBH.36
                                    .GLOBL  EBH.37, EBH.38, EBH.39, EBH.40
                                    .GLOBL  EBH.41, EBH.42, EBH.43, EX.SA
                                    .GLOBL  EX.CRN, EX.SC, EX.DSC, EX.SB, EX.CMD
                                    .GLOBL  EX.SCC, EX.ONL, EX.ESP, EX.SND
                                    .GLOBL  EX.RD, EX.WRT, EX.CMP, EX.BB, EX.LBN
                                    .GLOBL  EX.CBC, EX.BC, EX.BD, EX.03, ETIME
                                    .GLOBL  PLATT, CRLF, SWP.ERROR, SWP.XFER
                                    .GLOBL  SWP.STRACK, SWP.ETRACK, SWP.FLAGS
                                    .GLOBL  L$LUN, L$UNIT
```

```
100000          BIT15==         -100000
040000          BIT14==         40000
020000          BIT13==         20000
010000          BIT12==         10000
004000          BIT11==         4000
002000          BIT10==         2000
001000          BIT09==         1000
000400          BIT08==         400
000200          BIT07==         200
000100          BIT06==         100
000040          BIT05==         40
000020          BIT04==         20
000010          BIT03==         10
000004          BIT02==         4
000002          BIT01==         2
000001          BIT00==         1
001000          BIT9==          1000
000400          BIT8==          400
000200          BIT7==          200
000100          BIT6==          100
000040          BIT5==          40
000020          BIT4==          20
000010          BIT3==          10
000004          BIT2==          4
000002          BIT1==          2
000001          BIT0==          1
000040          EF.START==      40
000037          EF.RESTART==    37
000036          EF.CONTINUE==   36
000035          EF.NEW==        35
000034          EF.PWR==        34
000340          PRI07==         340
000300          PRI06==         300
000240          PRI05==         240
000200          PRI04==         200
000140          PRI03==         140
000100          PRI02==         100
000040          PRI01==         40
000000          PRI00==         0
000004          EVL==           4
000010          LOT==           10
000020          ADR==           20
000040          IDU==           40
000100          ISR==           100
000200          UAM==           200
000400          BOE==           400
001000          PNT==           1000
002000          PRI==           2000
004000          IXE==           4000
010000          IBE==           10000
020000          IER==           20000
040000          LOE==           40000
100000          HOE==           -100000
000056'         L$HARD==        L$HRDLN+2
000146          L$SOFT==        L$SFTLN+2
000000'         SR.HD=          P.AAA
000116'         SR.ET=          P.AAB
```

```
000162'                         SR.MH1=         P.AAC
000256'                         SR.MH2=         P.AAD
000354'                         SR.MH3=         P.AAE
000450'                         SR.MH4=         P.AAF
000550'                         SR.UN=          P.AAG
000556'                         SR.LO=          P.AAH
000566'                         SR.HI=          P.AAI
000576'                         SR.ML=          P.AAJ
000614'                         SR.EH1=         P.AAK
000652'                         SR.EH2=         P.AAL
000672'                         SR.EH3=         P.AAM
001002'                         SR.EH4=         P.AAN
001110'                         SR.EH5=         P.AAO
001222'                         SR.EL1=         P.AAP
001244'                         SR.EL2=         P.AAQ
001264'                         SR.DH1=         P.AAR
001330'                         SR.DH2=         P.AAS
001444'                         SR.DH3=         P.AAT
001560'                         SR.DH4=         P.AAU
001676'                         SR.DL=          P.AAV


                                .SBTTL  HI.LO REPORT CODING SECTION
000370                          .PSECT  $CODE$,  RO

000000  013700  000366'  HI.LO:  MOV     ADDR.LO,R0                      ; *,ADDR.HI                     1843
000004  062700  000002          ADD     #2,R0                           ; *,ADDR.HI
000010  005710                  TST     (R0)                            ; ADDR.HI                       1844
000012  001011                  BNE     1$
000014  017746  177756          MOV     @ADDR.LO,-(SP)                  ;                               1846
000020  012746  000556'          MOV     #SR.LO,-(SP)
000024  012746  000002          MOV     #2,-(SP)
000030  010600                  MOV     SP,R0                           ; SP,*
000032  104416                  TRAP    16
000034  000407                  BR      2$                              ;                               1844
000036  011046          1$:     MOV     (R0),-(SP)                      ; ADDR.HI,*                     1848
000040  012746  000566'          MOV     #SR.HI,-(SP)
000044  012746  000002          MOV     #2,-(SP)
000050  010600                  MOV     SP,R0                           ; SP,*
000052  104416                  TRAP    16
000054  062706  000006          ADD     #6,SP                           ;                               1838
000060  000207          2$:     RTS     PC                              ;                               1826

; Routine Size:  25 words,      Routine Base:  $CODE$ + 0370
; Maximum stack depth per invocation:  5 words


;   1851  2
;   1852  2     !!!!!!!!!!!!!!! REPORT CODING SECTION - MAINLINE CODE !!!!!!!!!!!!!!!!!!!!!!!!
;   1853  2
;   1854  2     LOCAL
;   1855  2         TA : REF BLOCK [TALLY_LEN] FIELD (T_FIELDS);        ! ADDRESS OF A UNIT'S TALLY BLOCK
;   1856  2
;   1857  2     PRINTS (SR_HD);                                         ! SUMMARY REPORT HEADER
;   1858  2     PRINTS (SR_ET, .HOURS, .MINUTES, .SECONDS);             ! ELAPSED TIME
;   1859  3     IF BIT_TST (SWP_FLAGS, SWF_DM)                          ! IF DM EXERCISER IS BEING RUN
;   1860  2     THEN                                                    ! THEN
```

```
;    1861  3          BEGIN
;    1862  3
;    1863  3          PRINTS (SR_DH1);                          ! PRINT HEADER FOR DM EXERCISER STATS
;    1864  3          PRINTS (SR_DH2);
;    1865  3          PRINTS (SR_DH3);
;    1866  3          PRINTS (SR_DH4);
;    1867  3          INCR UNIT FROM 0 TO (.L$UNIT - 1) DO      ! FOR EACH UNIT
;    1868  4              BEGIN
;    1869  4
;    1870  4              TA = TALLY + (.UNIT * TALLY_LEN * 2);  ! CALCULATE UNIT'S TALLY BLOCK ADDR
;    1871  4              PRINTS (SR_UN, .UNIT);                 ! PRINT UNIT NUMBER
;    1872  4
;    1873  4              ADDR_LO = TA [READ_LO];                ! SET LOW-ORDER ADDR OF READ COUNT
;    1874  4              HI_LO ();                              ! PRINT EITHER LOW- OR HIGH-ORDER FIELD
;    1875  4              ADDR_LO = .ADDR_LO + 4;                ! ADVANCE TO LOW-ORDER ADDR OF WRITE COUNT
;    1876  4              HI_LO ();                              ! PRINT EITHER LOW- OR HIGH-ORDER FIELD
;    1877  4              ADDR_LO = .ADDR_LO + 4;                ! ADVANCE TO LOW-ORDER ADDR OF SEEK COUNT
;    1878  4              HI_LO ();                              ! PRINT EITHER LOW- OR HIGH-ORDER FIELD
;    1879  4
;    1880  4              PRINTS (SR_DL, .TA [MB_READ], .TA [MB_WRIT], .TA [ER_HRD], .TA [ER_SFT]);
;    1881  4
;    1882  3              END;                                   ! UNIT LOOP
;    1883  3
;    1884  3          END
;    1885  2      ELSE                                           ! ELSE - MULTI-DRIVE SUBTEST IS BEING RUN
;    1886  3          BEGIN
;    1887  3
;    1888  3          PRINTS (SR_MH1);                           ! PRINT HEADER FOR MULTI-DRIVE
;    1889  3          PRINTS (SR_MH2);                           !     SUBTEST BASIC STATS
;    1890  3          PRINTS (SR_MH3);
;    1891  3          PRINTS (SR_MH4);
;    1892  3          INCR UNIT FROM 0 TO (.L$UNIT - 1) DO       ! FOR EACH UNIT
;    1893  4              BEGIN
;    1894  4
;    1895  4              TA = TALLY + (.UNIT * TALLY_LEN * 2);  ! CALCULATE UNIT'S TALLY BLOCK ADDR
;    1896  4              PRINTS (SR_UN, .UNIT);                 ! PRINT UNIT NUMBER
;    1897  4
;    1898  4              ADDR_LO = TA [READ_LO];                ! SET LOW-ORDER ADDR OF READ COUNT
;    1899  4              HI_LO ();                              ! PRINT EITHER LOW- OR HIGH-ORDER FIELD
;    1900  4              ADDR_LO = .ADDR_LO + 4;                ! ADVANCE TO LOW-ORDER ADDR OF WRITE COUNT
;    1901  4              HI_LO ();                              ! PRINT EITHER LOW- OR HIGH-ORDER FIELD
;    1902  4
;    1903  4              PRINTS (SR_ML, .TA [MB_READ], .TA [MB_WRIT], .TA [ER_HRD], .TA [ER_LOG]);
;    1904  4
;    1905  3              END;                                   ! UNIT LOOP
;    1906  3
;    1907  3          PRINTS (SR_EH1);                           ! PRINT HEADER FOR ECC ERROR STATS
;    1908  3          PRINTS (SR_EH2);
;    1909  3          PRINTS (SR_EH3);
;    1910  3          PRINTS (SR_EH4);
;    1911  3          PRINTS (SR_EH5);
;    1912  3          INCR UNIT FROM 0 TO (.L$UNIT - 1) DO       ! FOR EACH UNIT
;    1913  4              BEGIN
;    1914  4
;    1915  4              TA = TALLY + (.UNIT * TALLY_LEN * 2);  ! CALCULATE UNIT'S TALLY BLOCK ADDR
;    1916  4              PRINTS (SR_EL1, .UNIT, .TA [ECC_ONLY], .TA [ECC_1], .TA [ECC_2], .TA [ECC_3]);
;    1917  4              PRINTS (SR_EL2, .TA [ECC_4], .TA [ECC_5], .TA [ECC_6], .TA [ECC_7], .TA [ECC_8]);
```

```
;   1918  4
;   1919  3          END;                          ! UNIT LOOP
;   1920  3
;   1921  2      END;
;   1922  2
;   1923  2  PRINTS (CRLF);                              ! PRINT <CR><LF>
;   1924  2
;   1925  1  ENDRPT;


                                        .SBTTL  LRPT REPORT CODING SECTION
000000  004137  000000G          LRPT:  JSR     R1,$SAVE3                    ;                    1788
000004  012746  000000'                 MOV     #SR.HD, (SP)                 ;                    1857
000010  012746  000001                  MOV     #1,-(SP)
000014  010600                          MOV     SP,R0                        ; SP,*
000016  104416                          TRAP    16
000020  013716  000000G                 MOV     SECONDS,(SP)                 ;                    1858
000024  013746  000000G                 MOV     MINUTES,-(SP)
000030  013746  000000G                 MOV     HOURS,-(SP)
000034  012746  000116                  MOV     #SR.ET, (SP)
000040  012746  000004                  MOV     #4,-(SP)
000044  010600                          MOV     SP,R0                        ; SP,*
000046  104416                          TRAP    16
000050  132737  000002  000000G        BITB    #2,SWP.FLAGS                 ;                    1859
000056  001516                          BEQ     3$
000060  012716  001264'                 MOV     #SR.DH1,(SP)                 ;                    1863
000064  012746  000001                  MOV     #1,-(SP)
000070  010600                          MOV     SP,R0                        ; SP,*
000072  104416                          TRAP    16
000074  012716  001330'                 MOV     #SR.DH2,(SP)                 ;                    1864
000100  012746  000001                  MOV     #1,-(SP)
000104  010600                          MOV     SP,R0                        ; SP,*
000106  104416                          TRAP    16
000110  012716  001444'                 MOV     #SR.DH3,(SP)                 ;                    1865
000114  012746  000001                  MOV     #1,-(SP)
000120  010600                          MOV     SP,R0                        ; SP,*
000122  104416                          TRAP    16
000124  012716  001560'                 MOV     #SR.DH4,(SP)                 ;                    1866
000130  012746  000001                  MOV     #1,-(SP)
000134  010600                          MOV     SP,R0                        ; SP,*
000136  104416                          TRAP    16
000140  013703  000000G                 MOV     L$UNIT,R3                    ;                    1867
000144  005002                          CLR     R2                           ; UNIT
000146  000456                          BR      2$
000150  010216                  1$:     MOV     R2,(SP)                      ; UNIT,*             1870
000152  012746  000060                  MOV     #60, (SP)
000156  004737  000000G                 JSR     PC,BL$MUL
000162  062700  000000G                 ADD     #TALLY,R0
000166  010001                          MOV     R0,R1                        ; *,-A
000170  010216                          MOV     R2,(SP)                      ; UNIT,*             1871
000172  012746  000550'                 MOV     #SR.UN, (SP)
000176  012746  000002                  MOV     #2,-(SP)
000202  010600                          MOV     SP,R0                        ; SP,*
000204  104416                          TRAP    16
000206  010137  000366'                 MOV     R1,ADDR.LO                   ; TA,*               1873
000212  004737  000370'                 JSR     PC,HI.LO                     ;                    1874
000216  062737  000004  000366'        ADD     #4,ADDR.LO                   ;                    1875
```

```
000224  004737  000370'                        JSR     PC,HI.LO                        ;                               1876
000230  062737  000004  000366                  ADD     #4,ADDR.LO                      ;                               1877
000236  004737  000370                          JSR     PC,HI.LO                        ;                               1878
000242  016116  000034                          MOV     34(R1),(SP)                     ; *(TA),*                       1880
000246  016146  000030                          MOV     30(R1),-(SP)                    ; *(TA),*
000252  016146  000026                          MOV     26(R1),-(SP)                    ; *(TA),*
000256  016146  000020                          MOV     20(R1),-(SP)                    ; *(TA),*
000262  012746  001676                          MOV     #SR.DL,-(SP)
000266  012746  000005                          MOV     #5,-(SP)
000272  010600                                  MOV     SP,R0                           ; SP,*
000274  104416                                  TRAP    16
000276  062706  000020                          ADD     #20,SP                          ;                               1868
000302  005202                                  INC     R2                              ; UNIT                          1867
000304  020203                          2$:     CMP     R2,R3                           ; UNIT,*
000306  002720                                  BLT     1$
000310  000137  001444                          JMP     8$                              ;                               1859
000314  012716  000162                  3$:     MOV     #SR.MH1,(SP)                    ;                               1888
000320  012746  000001                          MOV     #1, (SP)
000324  010600                                  MOV     SP,R0                           ; SP,*
000326  104416                                  TRAP    16
000330  012716  000256                          MOV     #SR.MH2,(SP)                    ;                               1889
000334  012746  000001                          MOV     #1,-(SP)
000340  010600                                  MOV     SP,R0                           ; SP,*
000342  104416                                  TRAP    16
000344  012716  000354'                         MOV     #SR.MH3,(SP)                    ;                               1890
000350  012746  000001                          MOV     #1,-(SP)
000354  010600                                  MOV     SP,R0                           ; SP,*
000356  104416                                  TRAP    16
000360  012716  000450                          MOV     #SR.MH4,(SP)                    ;                               1891
000364  012746  000001                          MOV     #1,-(SP)
000370  010600                                  MOV     SP,R0                           ; SP,*
000372  104416                                  TRAP    16
000374  013703  000000G                         MOV     L$UNIT,R3                       ;                               1892
000400  005002                                  CLR     R2                              ; UNIT
000402  000451                                  BR      5$
000404  010216                          4$:     MOV     R2,(SP)                         ; UNIT,*                        1895
000406  012746  000060                          MOV     #60, (SP)
000412  004737  000000G                         JSR     PC,BL$MUL
000416  062700  000000G                         ADD     #TALLY,R0
000422  010001                                  MOV     R0,R1                           ; *,TA
000424  010216                                  MOV     R2,(SP)                         ; UNIT,*                        1896
000426  012746  000550'                         MOV     #SR.UN,-(SP)
000432  012746  000002                          MOV     #2,-(SP)
000436  010600                                  MOV     SP,R0                           ; SP,*
000440  104416                                  TRAP    16
000442  010137  000366'                         MOV     R1,ADDR.LO                      ; TA,*                          1898
000446  004737  000370'                         JSR     PC,HI.LO                        ;                               1899
000452  062737  000004  000366'                 ADD     #4,ADDR.LO                      ;                               1900
000460  004737  000370'                         JSR     PC,HI.LO                        ;                               1901
000464  016116  000032                          MOV     32(R1),(SP)                     ; *(TA),*                       1903
000470  016146  000030                          MOV     30(R1), (SP)                    ; *(TA),*
000474  016146  000026                          MOV     26(R1),-(SP)                    ; *(TA),*
000500  016146  000020                          MOV     20(R1), (SP)                    ; *(TA),*
000504  012746  000576'                         MOV     #SR.ML, (SP)
000510  012746  000005                          MOV     #5,-(SP)
000514  010600                                  MOV     SP,R0                           ; SP,*
000515  104416                                  TRAP    16
```

```
000520  062706  000020                  ADD     #20,SP                  ;                               1893
000524  005202                          INC     R2                      ; UNIT                          1892
000526  020203                  5$:     CMP     R2,R3                   ; UNIT,*
000530  002725                          BLT     4$
000532  012716  000614                  MOV     #SR.EH1,(SP)            ;                               1907
000536  012746  000001                  MOV     #1,(SP)
000542  010600                          MOV     SP,R0                   ; SP,*
000544  104416                          TRAP    16
000546  012716  000652'                 MOV     #SR.EH2,(SP)            ;                               1908
000552  012746  000001                  MOV     #1,-(SP)
000556  010600                          MOV     SP,R0                   ; SP,*
000560  104416                          TRAP    16
000562  012716  000672'                 MOV     #SR.EH3,(SP)            ;                               1909
000566  012746  000001                  MOV     #1,-(SP)
000572  010600                          MOV     SP,R0                   ; SP,*
000574  104416                          TRAP    16
000576  012716  001002'                 MOV     #SR.EH4,(SP)            ;                               1910
000602  012746  000001                  MOV     #1,-(SP)
000606  010600                          MOV     SP,R0                   ; SP,*
000610  104416                          TRAP    16
000612  012716  001110'                 MOV     #SR.EH5,(SP)            ;                               1911
000616  012746  000001                  MOV     #1,-(SP)
000622  010600                          MOV     SP,R0                   ; SP,*
000624  104416                          TRAP    16
000626  013703  000000G                 MOV     L$UNIT,R3               ;                               1912
000632  005002                          CLR     R2                      ; UNIT
000634  000452                          BR      7$
000636  010216                  6$:     MOV     R2,(SP)                 ; UNIT,*                        1915
000640  012746  000060                  MOV     #60,-(SP)
000644  004737  000000G                 JSR     PC,BL$MUL
000650  062700  000000G                 ADD     #TALLY,R0
000654  010001                          MOV     R0,R1                   ; *,TA
000656  016116  000042                  MOV     42(R1),(SP)             ; *(TA),*                       1916
000662  016146  000040                  MOV     40(R1),(SP)             ; *(TA),*
000666  016146  000036                  MOV     36(R1),-(SP)            ; *(TA),*
000672  016146  000056                  MOV     56(R1),-(SP)            ; *(TA),*
000676  010246                          MOV     R2,-(SP)                ; UNIT,*
000700  012746  001222'                 MOV     #SR.EL1,-(SP)
000704  012746  000006                  MOV     #6,-(SP)
000710  010600                          MOV     SP,R0                   ; SP,*
000712  104416                          TRAP    16
000714  016116  000054                  MOV     54(R1),(SP)             ; *(TA),*                       1917
000720  016146  000052                  MOV     52(R1),-(SP)            ; *(TA),*
000724  016146  000050                  MOV     50(R1),(SP)             ; *(TA),*
000730  016146  000046                  MOV     46(R1),-(SP)            ; *(TA),*
000734  016146  000044                  MOV     44(R1),-(SP)            ; *(TA),*
000740  012746  001244'                 MOV     #SR.EL2,-(SP)
000744  012746  000006                  MOV     #6,-(SP)
000750  010600                          MOV     SP,R0                   ; SP,*
000752  104416                          TRAP    16
000754  062706  000032                  ADD     #32,SP                  ;                               1913
000760  005202                          INC     R2                      ; UNIT                          1912
000762  020203                  7$:     CMP     R2,R3                   ; UNIT,*
000764  002724                          BLT     6$
000766  062706  000012                  ADD     #12,SP                  ;                               1886
000772  012716  000000G         8$:     MOV     #CRLF,(SP)              ;                               1923
000776  012746  000001                  MOV     #1,-(SP)
```

```
001002  010600                          MOV     SP,R0                           ; SP,R0
001004  104416                          TRAP    16
001006  062706  000026                  ADD     #26,SP                          ;                       1788
001012  000207                          RTS     PC

; Routine Size:  262 words,     Routine Base:  $CODE$ + 0452
; Maximum stack depth per invocation:  34 words



                                        .SBTTL  L$RPT REPORT CODING SECTION
000000  004737  000452'          L$RPT:: JSR     PC,LRPT                         ;                       1923
000004  104425                          TRAP    25
000006  000207                          RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 1466
; Maximum stack depth per invocation:  2 words
```

```
;    1926  1     %SBTTL 'INITIALIZE SECTION'
;    1927  1
;    1928  1     !+
;    1929  1     !       THE INITIALIZE CODE IS EXECUTED UNDER FIVE CONDITIONS. THERE ARE
;    1930  1     !       SUPERVISOR EVENT FLAGS THAT ARE USED TO LET THE DIAGNOSTIC KNOW UNDER
;    1931  1     !       WHICH CONDITION THE EXECUTION IS TAKING PLACE. THE EVENT FLAGS ARE
;    1932  1     !       READ USING THE "READEF" MACRO. THE CONDITIONS UNDER WHICH THE INIT CODE
;    1933  1     !       IS EXECUTED AND THE CORRRESPONDING EVENT FLAGS ARE:
;    1934  1     !               START COMMAND           EF.START
;    1935  1     !               RESTART COMMAND         EF.RESTART
;    1936  1     !               CONTINUE COMMAND        EF.CONTINUE
;    1937  1     !               POWERDOWN/POWERUP       EF.PWR
;    1938  1     !               NEW PASS                EF.NEW
;    1939  1     !       EXAMPLE OF EVENT FLAG USE:
;    1940  1     !               IF READEF(EF.START) THEN START_FLAG = 1;
;    1941  1     !       DURING THE INIT CODE, THE "GPHARD" MACRO IS USED TO OBTAIN P-TABLE
;    1942  1     !       INFORMATION FOR ALL DEVICES. THE NUMBER OF UNITS AVAILABLE IS IN THE
;    1943  1     !       HEADER WORD "L$UNIT".
;    1944  1     !-
;    1945  1
;    1946  2     BGNINIT;
;    1947  2
;    1948  2     LOCAL
;    1949  2         FLAG1 : BYTE,
;    1950  2         FLAG2 : BYTE,
;    1951  2         DELAY_MULT : WORD,
;    1952  2         CLK_ADR,
;    1953  2         HWPT_REF : REF BLOCK [HWPT_LEN, WORD] FIELD (HWP_FIELDS);
;    1954  2
;    1955  2     SETPRI (PRIO7);                         ! PRIORITY 7 - NO INTERRUPTS ALLOWED DURING INIT
;    1956  2
;    1957  2     IF READEF (EF_NEW)                      ! IS THIS A NEW PASS? (AS  NEW_PASS
;    1958  2     THEN                                    !       FIRST IN CASE MULTI, E FLAGS ARE
;    1959  2         ENTRY_REASON = NEW_PASS;            !       SET, E.G., START AND NEW_PASS)
;    1960  2
;    1961  2     IF READEF (EF_CONTINUE)                 ! IS THIS A CONTINUE?
;    1962  2     THEN
;    1963  2         ENTRY_REASON = CONT;
;    1964  2
;    1965  2     IF READEF (EF_PWR)                      ! IS THIS A POWER FAIL?
;    1966  2     THEN
;    1967  3         BEGIN
;    1968  3         ENTRY_REASON = PWR_FAIL;
;    1969  4         IF MANUAL                           ! IF ATTENDED
;    1970  3         THEN                                ! THEN
;    1971  3             PRINTF (MSG_01);                ! "POWER DELAY - WAITING"
;    1972  3
;    1973  3         INCR COUNT FROM 0 TO 60 DO          ! WAIT APPROX. 60 SECONDS
;    1974  4             BEGIN
;    1975  4             DELAY_MULT = 400;               ! Changed from 333 to 400 for 11/84 cache
;    1976  4             DELAY (.DELAY_MULT);
;    1977  4             BREAK;                          ! BREAK FOR ACT
;    1978  3             END;
;    1979  3
;    1980  2         END;
;    1981  2
;    1982  2     IF READEF (EF_RESTART)                  ! IS THIS A RESTART?
```

```
;   1983  2     THEN
;   1984  2         ENTRY_REASON = RESTART;
;   1985  2
;   1986  2     IF READEF (EF_START)                    ! IS THIS A START?
;   1987  2     THEN
;   1988  3         BEGIN
;   1989  3         ENTRY_REASON = START;
;   1990  3         HOURS = MINUTES = SECONDS = TICKS = 0;      ! INIT ELAPSED TIME TO 00:00:00:00
;   1991  2         END;
;   1992  2
;   1993  2     !+
;   1994  2     !       MAKE SURE THAT NOT MORE THAN MAX_UNITS HAVE BEEN SPECIFIED.
;   1995  2     !       IF THERE ARE TOO MANY, NOTIFY USER AND RETURN TO SUPERVISOR.
;   1996  2     !       (DIAGNOSTIC IS ABORTED).
;   1997  2     !-
;   1998  2
;   1999  2     IF .L$UNIT GTRU MAX_UNITS
;   2000  2     THEN
;   2001  3         BEGIN
;   2002  3         ERRSF (1, EGS_01, EMS_01);              ! "TOO MANY UNITS"
;   2003  3         DOCLN;
;   2004  2         END;
;   2005  2
;   2006  2     !+
;   2007  2     !       CHECK TO MAKE SURE THERE IS A CLOCK ON THE SYSTEM.  IF NO_CLOCK,
;   2008  2     !       THEN ABORT TO SUPERVISOR. OTHERWISE, DETERMINE WHETHER CLOCK IS
;   2009  2     !       AN L OR P CLOCK, AND SET UP PARAMETERS.
;   2010  2     !-
;   2011  2
;   2012  2     CLK_TYPE = NO_CLOCK;                    ! SET FLAG FOR NO CLOCK
;   2013  2
;   2014  3     IF CLOCK (P, CLK_ADR)                   ! IS THERE A P_CLOCK?
;   2015  2     THEN
;   2016  3         BEGIN
;   2017  3         CLK_TYPE = P_CLOCK;                 ! SET TYPE TO P_CLOCK
;   2018  3         CLK_CSR = ..CLK_ADR;                ! SAVE THE CSR ADDRESS
;   2019  3         .CLK_CSR = %O'105';                 ! ENABLE INTERRUPTS
;   2020  3         END
;   2021  2     ELSE
;   2022  3         BEGIN
;   2023  3
;   2024  4         IF CLOCK (L, CLK_ADR)               ! IS THERE AN L_CLOCK?
;   2025  3         THEN
;   2026  4             BEGIN
;   2027  4             CLK_TYPE = L_CLOCK;             ! SET TYPE TO L CLOCK
;   2028  4             CLK_CSR = ..CLK_ADR;            ! SAVE THE CSR ADDRESS
;   2029  4             .CLK_CSR = %O'100';             ! ENABLE INTERRUPTS
;   2030  3             END;
;   2031  3
;   2032  2         END;
;   2033  2
;   2034  2     IF .CLK_TYPE EQLU NO_CLOCK              ! IF NO CLOCK WAS FOUND
;   2035  2     THEN
;   2036  3         BEGIN
;   2037  3         ERRSF (2, EGS_02, 0);               ! "NEITHER P NOR L CLOCK WAS FOUND"
;   2038  3         DOCLN;                              ! ABORT THE PROGRAM
;   2039  3         END
```

```
;   2040  2     ELSE
;   2041  3         BEGIN
;   2042  3         CLK_VECTOR = .(.CLK_ADR + 4);               ! CLOCK VECTOR ADDRESS
;   2043  3         CLK_HERTZ = .(.CLK_ADR + 6);                ! CLOCK HERTZ RATE
;   2044  3         SETVEC (.CLK_VECTOR, CLK_INT_SERV, PRI06);  ! SET CLOCK VECTOR ADDR
;   2045  2         END;
;   2046  2
;   2047  2     !+
;   2048  2     !       THE FOLLOWING CODE IS EXECUTED FOR ALL ENTRY REASONS EXCEPT NEW_PASS.
;   2049  2     !       ALL RUN-TIME CONTROLLER STATUS TABLES (CST'S) ARE CLEARED TO 0, THEN
;   2050  2     !       LOADED WITH CONFIGURATION DATA FROM THE HARDWARE P-TABLES.
;   2051  2     !-
;   2052  2
;   2053  2     IF .ENTRY_REASON NEQU NEW_PASS
;   2054  2     THEN
;   2055  3         BEGIN
;   2056  3
;   2057  3         INCR COUNT FROM 0 TO ((MAX_CTLR * CST_LEN * 2) - 2) BY 2 DO
;   2058  3             (CST + .COUNT) = 0;
;   2059  3
;   2060  3         INCR UNIT FROM 0 TO (.L$UNIT - 1) DO        ! LOOP THROUGH ALL UNITS
;   2061  4             BEGIN
;   2062  4
;   2063  4             CPT [.UNIT] = NO;                       ! INIT CURRENT PASS TESTING VECTOR
;   2064  4             IF GPHARD (.UNIT, HWPT_REF) NEQA 0      ! IF HWP TABLE FOUND
;   2065  4             THEN
;. 2066  5                 BEGIN
;   2067  5
;   2068  5                 FLAG1 = NOT_FOUND;                  ! NO EXISTING IP ADDRESS MATCH YET
;   2069  5                 INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO ! LOOP THROUGH ALL CST'S
;   2070  6                     BEGIN
;   2071  6
;   2072  6                     IF .CST [.CTLR, IP_ADDR] EQLA .HWPT_REF [HWP_IP_ADDR]
;   2073  6                     THEN                            ! IF IP ADDR ALREADY EXISTS
;   2074  7                         BEGIN
;   2075  7
;   2076  7                         FLAG1 = FOUND;
;   2077  7                         FLAG2 = NOT_FOUND;          ! FLAG INDICATING PLATTER SLOT AVAILABILITY
;   2078  7                         INCR OFFSET FROM (0 + OF_UN) TO (3 + OF_UN) DO ! LOOP THROUGH EACH PLATTER SLOT
;   2079  8                             BEGIN
;   2080  8
;   2081  8                             IF .CST [.CTLR, .OFFSET, P_PRES] EQLU NOT_PRESENT
;   2082  8                             THEN                    ! IF EMPTY SLOT FOUND
;   2083  9                                 BEGIN
;   2084  9
;   2085  9                                 FLAG2 = FOUND;
;   2086  9                                 CST [.CTLR, .OFFSET, ALLBIT] = .HWPT_REF [HWP_PLAT];
;   2087  9                                                     ! COPY PLATTER ADDR AND PROT BIT
;   2088  9                                 CST [.CTLR, .OFFSET, P_UNIT] = .UNIT;
;   2089  9                                 CST [.CTLR, .OFFSET, P_PRES] = PRESENT;
;   2090  9                                 EXITLOOP;
;   2091  9
;   2092  9                                 END                ! END - IF PLATTER SLOT FOUND
;   2093  8                             ELSE                   ! OTHERWISE - SLOT IS OCCUPIED
;   2094  9                                 BEGIN
;   2095  9
;   2096  9                                 IF .CST [.CTLR, .OFFSET, P_ADDR] EQLU .HWPT_REF [HWP_PLAT_ADDR]
```

```
;   2097  9                                THEN
;   2098 10                                    BEGIN
;   2099 10
;   2100 10                                    FLAG2 = FOUND;                          ! PLATTER ADDR SLOT ALREADY EXISTS
;   2101 11                                    IF MANUAL                               ! IF ATTENDED
;   2102 10                                    THEN                                    ! THEN
; P 2103 10                                        PRINTF (CER_01, .HWPT_REF [HWP_PLAT_ADDR],
;   2104 10                                            .HWPT_REF [HWP_IP_ADDR]);       ! "DUPLICATE PLATTER ADDRESS XXX. AT IP XXXX
XX(0)"
;   2105 10                                    DUR [.UNIT] = DU_CONF;                  ! LOAD REASON FOR DROPPING UNIT
;   2106 10                                    DODU (.UNIT);                           ! DROP UNIT
;   2107 10                                    EXITLOOP;                               ! DON'T LOOK AT ANY MORE SLOTS
;   2108 10
;   2109  9                                    END;                            ! IF PLATTER ADDR ALREADY EXISTS
;   2110  9
;   2111  8                                END;                            ! IF SLOT IS OCCUPIED
;   2112  8
;   2113  7                            END;                            ! PLATTER SLOT SEARCH LOOP
;   2114  7
;   2115  7                        IF .FLAG2 EQLU NOT_FOUND    ! IF PLATTER SLOT NOT AVAILABLE
;   2116  7                        THEN
;   2117  8                            BEGIN
;   2118  8
;   2119  9                            IF MANUAL                                   ! IF ATTENDED
;   2120  8                            THEN                                        ! THEN
;   2121  8                                PRINTF (CER_02, .HWPT_REF [HWP_IP_ADDR]); ! "ALREADY 4 UNITS AT IP XXXXXX(0)"
;   2122  8                            DUR [.UNIT] = DU_CONF;                      ! CONFIGURATION ERROR
;   2123  8                            DODU (.UNIT);                               ! DROP UNIT
;   2124  8
;   2125  7                            END;
;   2126  7
;   2127  7                        EXITLOOP;
;   2128  7
;   2129  6                            END;                            ! IF EXISTING CST TABLE FOUND
;   2130  6
;   2131  5                        END;                                ! CST TABLE SEARCH LOOP
;   2132  5
;   2133  5                    IF .FLAG1 EQLU NOT_FOUND                ! IF NO IP ADDR MATCH TO EXISTING CST
;   2134  5                    THEN
;   2135  6                        BEGIN
;   2136  6
;   2137  6                        FLAG2 = NOT_FOUND;                  ! FLAG INDICATING EMPTY CST AVAILABILITY
;   2138  6                        INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO ! LOOP THROUGH EACH CST
;   2139  7                            BEGIN
;   2140  7
;   2141  7                            IF .CST [.CTLR, IP_ADDR] EQLA 0 ! IF EMPTY CST FOUND
;   2142  7                            THEN
;   2143  8                                BEGIN
;   2144  8
;   2145  8                                FLAG2 = FOUND;
;   2146  8                                CST [.CTLR, IP_ADDR] = .HWPT_REF [HWP_IP_ADDR];
;   2147  8                                CST [.CTLR, VEC_ADDR] = .HWPT_REF [HWP_VECTOR];
;   2148  8                                CST [.CTLR, BR_LEV] = .HWPT_REF [HWP_BR_LEVEL];
;   2149  8
;   2150  8                                CST [.CTLR, P1_ALL] = .HWPT_REF [HWP_PLAT]; !PLAT ADDR, PROT BIT
;   2151  8                                CST [.CTLR, P1_UNIT] = .UNIT;
;   2152  8                                CST [.CTLR, P1_PRES] = PRESENT;
;   2153  8                                EXITLOOP;
```

```
;  2154  8
;  2155  7                          END;                        ! IF EMPTY CST FOUND
;  2156  7
;  2157  6                      END;                            ! EMPTY CST SEARCH LOOP
;  2158  6
;  2159  6                  IF .FLAG2 EQLU NOT_FOUND            ! IF NO EMPTY CST FOUND
;  2160  6                  THEN
;  2161  7                      BEGIN
;  2162  7
;  2163  8                      IF MANUAL                       ! IF ATTENDED
;  2164  7                      THEN                            ! THEN
;  2165  7                          PRINTF (CER_03, MAX_CTLR); ! "MORE THAN X DIFFERENT IP ADDRESSES."
;  2166  7                      DUR [.UNIT] = DU_CONF;          ! CONFIGURATION ERROR
;  2167  7                      DODU (.UNIT);                   ! DROP UNIT
;  2168  7
;  2169  6                      END;
;  2170  6
;  2171  5                  END;                                ! IF NO IP ADDR MATCH IN CST
;  2172  5
;  2173  4              END;                                    ! IF GPHARD RETURNED A HWP TABLE
;  2174  4
;  2175  3          END;                                        ! UNIT LOOP
;  2176  3
;  2177  3      END
;  2178  2  ELSE                                               ! OTHERWISE, FOR EACH NEW PASS
;  2179  3      BEGIN
;  2180  3
;  2181  3      INCR UNIT FROM 0 TO (.L$UNIT - 1) DO           ! FOR EACH UNIT
;  2182  4          BEGIN
;  2183  4
;  2184  4          IF GPHARD (.UNIT, HWPT_REF) NEQA 0         ! IF UNIT HAS NOT BEEN DROPPED
;  2185  4          THEN                                       ! THEN
;  2186  5              BEGIN
;  2187  5
;  2188  5              CPT [.UNIT] = YES;                                  ! O.K. TO TEST UNIT
;  2189  5              INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO               ! FIND UNIT'S CONTROLLER
;  2190  6                  BEGIN
;  2191  6
;  2192  6                  IF .CST [.CTLR, IP_ADDR] EQLA .HWPT_REF [HWP_IP_ADDR]
;  2193  6                  THEN
;  2194  7                      BEGIN                                       ! FOUND IT
;  2195  7
;  2196  7                      CST [.CTLR, U_CNT] = .CST [.CTLR, U_CNT] + 1;       ! INCREMENT NO. OF TESTABLE UNITS
;  2197  7                      EXITLOOP;                                           ! DONE
;  2198  7
;  2199  6                      END;
;  2200  6
;  2201  5                  END;                                            ! CONTROLLER LOOP
;  2202  5
;  2203  4              END;                                    ! IF UNIT NOT DROPPED
;  2204  4
;  2205  3          END;                                        ! UNIT LOOP
;  2206  3
;  2207  2      END;                                            ! END - IF NEW PASS
;  2208  2
;  2209  2  IF .ENTRY_REASON LEQU RESTART                       ! IF START OR RESTART
;  2210  2  THEN                                                ! THEN
```

```
;    2211  3          BEGIN
;    2212  3
;    2213  3          CRN = 0;                                    ! COMMAND REFERENCE NUMBER
;    2214  3          CTLR_CNT = 0;                               ! NUMBER OF CONFIGURED CONTROLLERS
;    2215  3          INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO
;    2216  4              BEGIN
;    2217  4
;    2218  4              IF .CST [.CTLR, IP_ADDR] NEQA 0         ! IF CONTROLLER IS PRESENT
;    2219  4              THEN                                    ! THEN
;    2220  4                  CTLR_CNT = .CTLR_CNT + 1;           ! INCREMENT CONTROLLER COUNT
;    2221  4
;    2222  3              END;
;    2223  3
;    2224  3          MEMORY (FREE_MEM_ADDR);                     ! GET START OF FREE MEMORY
;    2225  3          MEM_SIZE = ..FREE_MEM_ADDR;                 ! GET FREE MEMORY SIZE
;    2226  3
;    2227  3          INCR COUNT FROM 0 TO ((MAX_UNITS * TALLY_LEN) - 1) DO       ! INITIALIZE
;    2228  3              TALLY [.COUNT] = 0;                                     ! STATISTICS
;    2229  3
;    2230  2          END;                                        ! END OF START/RESTART INITIALIZATION
;    2231  2
;    2232  2      !+
;    2233  2      !       MISCELLANEOUS INITIALIZATON
;    2234  2      !-
;    2235  2
;    2236  2      INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO           ! INITIALIZE NO. OF OUTSTANDING QIOS
;    2237  2          QIO [.CTLR] = 0;
;    2238  2      INCR COUNT FROM 0 TO (RP_CNT - 1) DO            ! INITIALIZE RETURN PACKET POOL
;    2239  2          RP_USE [.COUNT] = -1;
;    2240  2      IODQ_IN = IODQ_OUT = 0;                         ! INITIALIZE I/O DONE QUEUE POINTERS
;    2241  3      IF ((BIT_TST (SWP_FLAGS, SWF_HWC)) AND          ! IF USER CHANGED FROM HOST WRITE-CHECKS TO
;    2242  3          (BIT_TST (SWP_FLAGS, SWF_CWC)))             !     CONTROLLER WRITE-CHECKS
;    2243  2      THEN                                            ! THEN (BOTH BITS WOULD BE SET)
;    2244  2          SWP_FLAGS <SWF_PHWC,1> = 0;                 ! CLEAR HOST WRITE-CHECKS
;    2245  2
;    2246  2      !+
;    2247  2      !       THE FOLLOWING SITUATION (STARTING TRACK NUMBER GREATER THAN ENDING
;    2248  2      !       TRACK NUMBER) CAN OCCUR DUE TO ANOTHER DRS BUG. IF THE USER ENTERS LOW
;    2249  2      !       TRACK LIMITS FOR ONE PASS, THEN ENTERS A HIGH STARTING TRACK NUMBER
;    2250  2      !       AFTER A RESTART OR CONTINUE COMMAND, DRS WILL NOT GIVE AN ERROR IF THE
;    2251  2      !       ENDING TRACK NUMBER IS DEFAULTED TO THE PREVIOUS LOW TRACK NUMBER. AN
;    2252  2      !       ERRONEOUS LBN WOULD BE GENERATED IN QIO_LBN IF THIS SITUATION WERE
;    2253  2      !       ALLOWED.
;    2254  2      !-
;    2255  2
;    2256  2      IF .SWP_STRACK GEQU .SWP_ETRACK
;    2257  2      THEN
;    2258  3          BEGIN
;    2259  3
;    2260  3          LOCAL
;    2261  3              TEMP : WORD;
;    2262  3
;    2263  3          TEMP = .SWP_STRACK;                         ! REVERSE STARTING AND ENDING
;    2264  3          SWP_STRACK = .SWP_ETRACK;                   !    TRACK NUMBERS
;    2265  3          SWP_ETRACK = .TEMP;
;    2266  3
;    2267  2          END;
```

```
;   2268  2
;   2269  2     SETPRI (PRI00);                         ! SET PROGRAM PRIORITY TO 0
;   2270  2
;   2271  1     ENDINIT;

                                        .GLOBL  L$DLY

                                        .SBTTL  LINIT INITIALIZE SECTION
000000  004137  000000G                 LINIT:  JSR     R1,$SAVE5                       ;                       1925
000004  162706  000010                          SUB     #10,SP
000010  012700  000340                          MOV     #340,R0                         ;                       1955
000014  104441                                  TRAP    41
000016  012700  000035                          MOV     #35,R0                          ;                       1957
000022  104447                                  TRAP    47
000024  103003                                  BHIS    1$
000026  112737  000005  000000G                 MOVB    #5,ENTRY.REASON                 ;                       1959
000034  012700  000036                  1$:     MOV     #36,R0                          ;                       1961
000040  104447                                  TRAP    47
000042  103003                                  BHIS    2$
000044  112737  000003  000000G                 MOVB    #3,ENTRY.REASON                 ;                       1963
000052  012700  000034                  2$:     MOV     #34,R0                          ;                       1965
000056  104447                                  TRAP    47
000060  103036                                  BHIS    9$
000062  112737  000004  000000G                 MOVB    #4,ENTRY.REASON                 ;                       1968
000070  104450                                  TRAP    50                              ;                       1969
000072  103007                                  BHIS    3$
000074  012746  000000G                         MOV     #MSG.01,-(SP)                   ;                       1971
000100  012746  000001                          MOV     #1,-(SP)
000104  010600                                  MOV     SP,R0                           ; SP,*
000106  104417                                  TRAP    17
000110  022626                                  CMP     (SP)+,(SP)+
000112  012702  000075                  3$:     MOV     #75,R2                          ; *,COUNT               1973
000116  012703  000620                  4$:     MOV     #620,R3                         ; *,DELAY.MULT          1975
000122  010301                                  MOV     R3,R1                           ; DELAY.MULT,$$TMP2     1976
000124  001411                          5$:     BEQ     8$
000126  013700  000000G                         MOV     L$DLY,R0                        ; *,$$TMP1
000132  001404                                  BEQ     7$
000134  005066  000006                  6$:     CLR     6(SP)                           ; $$TMP
000140  005300                                  DEC     R0                              ; $$TMP1
000142  001374                                  BNE     6$
000144  005301                          7$:     DEC     R1                              ; $$TMP2
000146  000766                                  BR      5$
000150  104422                          8$:     TRAP    22
000152  005302                                  DEC     R2                              ; COUNT                 1973
000154  001360                                  BNE     4$
000156  012700  000037                  9$:     MOV     #37,R0                          ;                       1982
000162  104447                                  TRAP    47
000164  103003                                  BHIS    10$
000166  112737  000002  000000G                 MOVB    #2,ENTRY.REASON                 ;                       1984
000174  012700  000040                  10$:    MOV     #40,R0                          ;                       1986
000200  104447                                  TRAP    47
000202  103013                                  BHIS    11$
000204  112737  000001  000000G                 MOVB    #1,ENTRY.REASON                 ;                       1989
000212  005037  000000G                         CLR     TICKS                           ;                       1990
000216  005037  000000G                         CLR     SECONDS
```

```
000222  005037  000000G                        CLR     MINUTES
000226  005037  000000G                        CLR     HOURS
000232  023727  000000G 000020        11$:    CMP     L$UNIT,#20                      ;                               1999
000240  101405                                BLOS    12$
000242  104454                                TRAP    54                              ;                               2002
000244  000001                                .WORD   1
000246  000000G                               .WORD   EGS.01
000250  000000V                               .WORD   EMS.01
000252  104444                                TRAP    44
000254  005037  000000G               12$:    CLR     CLK.TYPE                        ;                               2012
000260  012700  000120                        MOV     #120,R0                         ;                               2014
000264  104462                                TRAP    62
000266  103012                                BHIS    13$
000270  010001                                MOV     R0,R1                           ; R0,CLK.ADR
000272  012737  000001  000000G               MOV     #1,CLK.TYPE                     ;                               2017
000300  011137  000000G                       MOV     (R1),CLK.CSR                    ; CLK.ADR,*                     2018
000304  012777  000105  000000G               MOV     #105,@CLK.CSR                   ;                               2019
000312  000415                                BR      14$                             ;                               2014
000314  012700  000114               13$:    MOV     #114,R0                         ;                               2024
000320  104462                                TRAP    62
000322  103011                                BHIS    14$
000324  010001                                MOV     R0,R1                           ; R0,CLK.ADR
000326  012737  177777  000000G               MOV     #-1,CLK.TYPE                    ;                               2027
000334  011137  000000G                       MOV     (R1),CLK.CSR                    ; CLK.ADR,*                     2028
000340  012777  000100  000000G               MOV     #100,@CLK.CSR                   ;                               2029
000346  005737  000000G               14$:    TST     CLK.TYPE                        ;                               2034
000352  001006                                BNE     15$
000354  104454                                TRAP    54                              ;                               2037
000356  000002                                .WORD   2
000360  000000G                               .WORD   EGS.02
000362  000000                                .WORD   0
000364  104444                                TRAP    44
000366  000421                                BR      16$                             ;                               2034
000370  016137  000004  000000G       15$:    MOV     4(R1),CLK.VECTOR                ; *(CLK.ADR),*                  2042
000376  016137  000006  000000G               MOV     6(R1),CLK.HERTZ                 ; *(CLK.ADR),*                  2043
000404  012746  000300                        MOV     #300,-(SP)                      ;                               2044
000410  012746  000000V                       MOV     #CLK.INT.SERV,-(SP)
000414  013746  000000G                       MOV     CLK.VECTOR,-(SP)
000420  012746  000003                        MOV     #3,-(SP)
000424  104437                                TRAP    37
000426  062706  000010                        ADD     #10,SP                          ;                               2041
000432  013766  000000G 000002       16$:    MOV     L$UNIT,2(SP)                    ;                               2060
000440  005366  000002                        DEC     2(SP)
000444  123727  000000G 000005               CMPB    ENTRY.REASON,#5                 ;                               2053
000452  001002                                BNE     17$
000454  000137  002744'                       JMP     37$
000460  005000                       17$:    CLR     R0                              ; COUNT                         2057
000462  005060  000000G              18$:    CLR     CST(R0)                         ; *(COUNT)                      2058
000466  062700  000002                        ADD     #2,R0                           ; *,COUNT                       2057
000472  020027  000066                        CMP     R0,#66                          ; COUNT,*
000476  003771                                BLE     18$
000500  005002                                CLR     R2                              ; UNIT                          2060
000502  000137  002730'                       JMP     35$
000506  105062  000000G              19$:    CLRB    CPT(R2)                         ; *(UNIT)                       2063
000512  010200                                MOV     R2,R0                           ; UNIT,*                        2064
000514  104442                                TRAP    42
000516  010001                                MOV     R0,R1                           ; *,HWPT.REF
```

```
000520  001002                          BNE     20$
000522  000137  002726'                JMP     34$
000526  105016                  20$:    CLRB    (SP)                    ; FLAG1                 2068
000530  005004                          CLR     R4                      ; CTLR                  2069
000532  010446                  21$:    MOV     R4,-(SP)                ; CTLR,*                2072
000534  012746  000016                  MOV     #16,-(SP)
000540  004737  000000G                 JSR     PC,BL$MUL
000544  022626                          CMP     (SP)+,(SP)+
000546  026011  000000G                 CMP     CST(R0),(R1)            ; *,HWPT.REF
000552  001124                          BNE     28$
000554  112716  000001                  MOVB    #1,(SP)                 ; *,FLAG1               2076
000560  105005                          CLRB    R5                      ; FLAG2                 2077
000562  010446                          MOV     R4,-(SP)                ; CTLR,*                2081
000564  012746  000007                  MOV     #7,-(SP)
000570  004737  000000G                 JSR     PC,BL$MUL
000574  010066  000010                  MOV     R0,10(SP)
000600  022626                          CMP     (SP)+,(SP)+
000602  012703  000003                  MOV     #3,R3                   ; *,OFFSET              2078
000606  010300                  22$:    MOV     R3,R0                   ; OFFSET,*              2081
000610  066600  000004                  ADD     4(SP),R0
000614  006300                          ASL     R0
000616  062700  000000G                 ADD     #CST,R0
000622  032710  040000                  BIT     #40000,(R0)
000626  001016                          BNE     23$
000630  112705  000001                  MOVB    #1,R5                   ; *,FLAG2               2085
000634  016110  000006                  MOV     6(R1),(R0)              ; *(HWPT.REF),*         2086
000640  010246                          MOV     R2,-(SP)                ; UNIT,*                2088
000642  000316                          SWAB    (SP)
000644  042716  160377                  BIC     #160377,(SP)
000650  042710  017400                  BIC     #17400,(R0)
000654  052610                          BIS     (SP)+,(R0)
000656  052710  040000                  BIS     #40000,(R0)             ;                       2089
000662  000435                          BR      26$                     ;                       2083
000664  121061  000006          23$:    CMPB    (R0),6(R1)              ; *,*(HWPT.REF)         2096
000670  001026                          BNE     25$
000672  112705  000001                  MOVB    #1,R5                   ; *,FLAG2               2100
000676  104450                          TRAP    50                      ;                       2101
000700  103014                          BHIS    24$
000702  011146                          MOV     (R1),-(SP)              ; HWPT.REF,*            2104
000704  005046                          CLR     -(SP)
000706  116116  000006                  MOVB    6(R1),(SP)              ; *(HWPT.REF),*
000712  012746  000000G                 MOV     #CER.01,-(SP)
000716  012746  000003                  MOV     #3,-(SP)
000722  010600                          MOV     SP,R0                   ; SP,*
000724  104417                          TRAP    17
000726  062706  000010                  ADD     #10,SP
000732  112762  000001  000000G  24$:    MOVB    #1,DUR(R2)              ; *,*(UNIT)             2105
000740  010200                          MOV     R2,R0                   ; UNIT,*                2106
000742  104451                          TRAP    51
000744  000404                          BR      26$                     ;                       2098
000746  005203                  25$:    INC     R3                      ; OFFSET                2078
000750  020327  000006                  CMP     R3,#6                   ; OFFSET,*
000754  003714                          BLE     22$
000756  105705                  26$:    TSTB    R5                      ; FLAG2                 2115
000760  001025                          BNE     29$
000762  104450                          TRAP    50                      ;                       2119
000764  103011                          BHIS    27$
```

```
000766  011146                          MOV     (R1),-(SP)
000770  012746  000000G                 MOV     #CER.02,-(SP)                   ; HWPT.REF,*                    2121
000774  012746  000002                  MOV     #2,-(SP)
001000  010600                          MOV     SP,R0                           ; SP,*
001002  104417                          TRAP    17
001004  062706  000006                  ADD     #6,SP
001010  112762  000001  000000G  27$:   MOVB    #1,DUR(R2)                      ; *,*(UNIT)                     2122
001016  010200                          MOV     R2,R0                           ; UNIT,*                        2123
001020  104451                          TRAP    51
001022  000404                          BR      29$                             ;                               2074
001024  005204                  28$:    INC     R4                              ; CTLR                          2069
001026  020427  000003                  CMP     R4,#3                           ; CTLR,*
001032  003637                          BLE     21$
001034  105716                  29$:    TSTB    (SP)                            ; FLAG1                         2133
001036  001074                          BNE     34$
001040  105005                          CLRB    R5                              ; FLAG2                         2137
001042  005000                          CLR     R0                              ; CTLR                          2138
001044  005760  000000G         30$:    TST     CST(R0)                         ; *(CTLR)                       2141
001050  001037                          BNE     31$
001052  112705  000001                  MOVB    #1,R5                           ; *,FLAG2                       2145
001056  011160  000000G                 MOV     (R1),CST(R0)                    ; HWPT.REF,*(CTLR)              2146
001062  016103  000002                  MOV     2(R1),R3                        ; *(HWPT.REF),*                 2147
001066  042703  177000                  BIC     #177000,R3
001072  042760  000777  000002G         BIC     #777,CST+2(R0)                  ; *,*(CTLR)
001100  050360  000002G                 BIS     R3,CST+2(R0)                    ; *,*(CTLR)
001104  116160  000004  000004G         MOVB    4(R1),CST+4(R0)                 ; *(HWPT.REF),*(CTLR)           2148
001112  012703  000006G                 MOV     #CST+6,R3                       ;                               2150
001116  060003                          ADD     R0,R3                           ; CTLR,*
001120  016113  000006                  MOV     6(R1),(R3)                      ; *(HWPT.REF),*
001124  010204                          MOV     R2,R4                           ; UNIT,*                        2151
001126  000304                          SWAB    R4
001130  042704  160377                  BIC     #160377,R4
001134  042713  017400                  BIC     #17400,(R3)
001140  050413                          BIS     R4,(R3)
001142  052713  040000                  BIS     #40000,(R3)                     ;                               2152
001146  000405                          BR      32$                             ;                               2143
001150  062700  000016          31$:    ADD     #16,R0                          ; *,CTLR                        2138
001154  020027  000052                  CMP     R0,#52                          ; CTLR,*
001160  003731                          BLE     30$
001162  105705                  32$:    TSTB    R5                              ; FLAG2                         2159
001164  001021                          BNE     34$
001166  104450                          TRAP    50                              ;                               2163
001170  103012                          BHIS    33$
001172  012746  000004                  MOV     #4,-(SP)                        ;                               2165
001176  012746  000000G                 MOV     #CER.03,-(SP)
001202  012746  000002                  MOV     #2,-(SP)
001206  010600                          MOV     SP,R0                           ; SP,*
001210  104417                          TRAP    17
001212  062706  000006                  ADD     #6,SP
001216  112762  000001  000000G  33$:   MOVB    #1,DUR(R2)                      ; *,*(UNIT)                     2166
001224  010200                          MOV     R2,R0                           ; UNIT,*                        2167
001226  104451                          TRAP    51
001230  005202                  34$:    INC     R2                              ; UNIT                          2060
001232  020266  000002          35$:    CMP     R2,2(SP)                        ; UNIT,*
001236  003002                          BGT     36$
001240  000137  002204                  JMP     19$
001244  000431                  36$:    BR      43$                             ;                               2053
```

```
001246  005002                          37$:    CLR     R2                      ; UNIT                          2181
001250  000424                                  BR      42$
001252  010200                          38$:    MOV     R2,R0                   ; UNIT,*                        2184
001254  104442                                  TRAP    42
001256  010001                                  MOV     R0,R1                   ; *,HWPT.REF
001260  001417                                  BEQ     41$
001262  112762  000001  000000G                 MOVB    #1,CPT(R2)              ; *,*(UNIT)                     2188
001270  005000                                  CLR     R0                      ; CTLR                          2189
001272  026011  000000G                 39$:    CMP     CST(R0),(R1)            ; *(CTLR),HWPT.REF              2192
001276  001003                                  BNE     40$
001300  105260  000005G                         INCB    CST+5(R0)               ; *(CTLR)                       2196
001304  000405                                  BR      41$                     ;                               2194
001306  062700  000016                 40$:    ADD     #16,R0                  ; *,CTLR                        2189
001312  020027  000052                          CMP     R0,#52                  ; CTLR,*
001316  003765                                  BLE     39$
001320  005202                          41$:    INC     R2                      ; UNIT                          2181
001322  020266  000002                 42$:    CMP     R2,2(SP)                ; UNIT,*
001326  003751                                  BLE     38$
001330  123727  000000G 000002         43$:    CMPB    ENTRY.REASON,#2         ;                               2209
001336  101034                                  BHI     47$
001340  005037  000000G                         CLR     CRN                     ;                               2213
001344  005037  000000G                         CLR     CTLR.CNT                ;                               2214
001350  005000                                  CLR     R0                      ; CTLR                          2215
001352  005760  000000G                 44$:    TST     CST(R0)                 ; *(CTLR)                       2218
001356  001402                                  BEQ     45$
001360  005237  000000G                         INC     CTLR.CNT                ;                               2220
001364  062700  000016                 45$:    ADD     #16,R0                  ; *,CTLR                        2215
001370  020027  000052                          CMP     R0,#52                  ; CTLR,*
001374  003766                                  BLE     44$
001376  104431                                  TRAP    31                      ;                               2224
001400  010037  000000G                         MOV     R0,FREE.MEM.ADDR
001404  011037  000000G                         MOV     (R0),MEM.SIZE           ; FREE.MEM.ADDR,*               2225
001410  005000                                  CLR     R0                      ; COUNT                         2227
001412  005060  000000G                 46$:    CLR     TALLY(R0)               ; *(COUNT)                      2228
001416  062700  000002                          ADD     #2,R0                   ; *,COUNT                       2227
001422  020027  001376                          CMP     R0,#1376                ; COUNT,*
001426  003771                                  BLE     46$
001430  005000                          47$:    CLR     R0                      ; CTLR                          2236
001432  105060  000000G                 48$:    CLRB    QIO(R0)                 ; *(CTLR)                       2237
001436  005200                                  INC     R0                      ; CTLR                          2236
001440  020027  000003                          CMP     R0,#3                   ; CTLR,*
001444  003772                                  BLE     48$
001446  005000                                  CLR     R0                      ; COUNT                         2238
001450  112760  000377  000000G         49$:    MOVB    #377,RP.USE(R0)         ; *,*(COUNT)                    2239
001456  005200                                  INC     R0                      ; COUNT                         2238
001460  020027  000037                          CMP     R0,#37                  ; COUNT,*
001464  003771                                  BLE     49$
001466  005037  000000G                         CLR     IODQ.OUT                ;                               2240
001472  005037  000000G                         CLR     IODQ.IN
001476  132737  000100  000000G                 BITB    #100,SWP.FLAGS          ;                               2241
001504  001407                                  BEQ     50$
001506  132737  000040  000000G                 BITB    #40,SWP.FLAGS           ;                               2242
001514  001403                                  BEQ     50$
001516  142737  000100  000000G                 BICB    #100,SWP.FLAGS          ;                               2244
001524  023737  000000G 000000G         50$:    CMP     SWP.STRACK,SWP.ETRACK   ;                               2256
001532  103407                                  BLO     51$
001534  013700  000000G                         MOV     SWP.STRACK,R0           ; *,TEMP                        2263
```

```
001540  013737  000000G 000000G                MOV     SWP.ETRACK,SWP.STRACK           ;                       2264
001546  010037  000000G                        MOV     R0,SWP.ETRACK                   ; TEMP,*                2265
001552  005000                          51$:    CLR     R0                              ;                       2269
001554  104441                                  TRAP    41
001556  062706  000010                          ADD     #10,SP                          ;                       1925
001562  000207                                  RTS     PC

; Routine Size:  442 words,     Routine Base:  $CODE$ + 1476
; Maximum stack depth per invocation:  16 words




                                                .SBTTL  L$INIT INITIALIZE SECTION
000000  004737  001476'                L$INIT::JSR     PC,LINIT                        ;                       2269
000004  104411                                  TRAP    11
000006  000207                                  RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 3262
; Maximum stack depth per invocation:  2 words
```

```
;   2272  1     %SBTTL 'AUTODROP SECTION'
;   2273  1
;   2274  1     !+
;   2275  1     !       THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF THE
;   2276  1     !       "ADR" FLAG WAS SET. THE UNIT(S) UNDER TEST ARE CHECKED TO SEE IF THEY
;   2277  1     !       WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY DROPPED FROM TESTING.
;   2278  1     !-
;   2279  1
;   2280  2     BGNAUTO;
;   2281  2
;   2282  2     RETURN;
;   2283  2
;   2284  1     ENDAUTO;


                                        .SBTTL  LAUTO AUTODROP SECTION
000000  000207                  LAUTO:  RTS     PC                              ;                               2271

; Routine Size:  1 word,        Routine Base:  $CODE$ + 3272
; Maximum stack depth per invocation:  0 words


                                        .SBTTL  L$AUTO AUTODROP SECTION
000000  004737  003272'          L$AUTO::JSR    PC,LAUTO                        ;                               2282
000004  104461                          TRAP    61
000006  000207                          RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 3274
; Maximum stack depth per invocation:  2 words
```

```
;    2285  1     %SBTTL 'CLEANUP CODING SECTION'
;    2286  1
;    2287  1     !+
;    2288  1     !       THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED UNDER
;    2289  1     !       ONE OF THREE CONDITIONS: (A) AFTER EACH COMPLETE PASS, (B) WHENEVER
;    2290  1     !       THE 'DOCLN' MACRO IS ENCOUNTERED, AND (C) WHEN THE OPERATOR TYPES
;    2291  1     !       "<CTRL-C>'. SOME OF THE CODE IN THIS SECTION IS NOT PERFORMED IF THE
;    2292  1     !       REASON FOR ENTRY IS END OF-PASS ((A) ABOVE).
;    2293  1     !-
;    2294  1
;    2295  2     BGNCLN;
;    2296  2
;    2297  2     IF .CLK_TYPE EQLU NO_CLOCK                          ! IF THERE IS NO CLOCK
;    2298  2     THEN                                                ! THEN
;    2299  2         RETURN                                          ! RETURN
;    2300  2     ELSE                                                ! OTHERWISE
;    2301  3         BEGIN
;    2302  3
;    2303  3         .CLK_CSR = 0;                                   ! TURN OFF CLOCK
;    2304  3         CLRVEC (.CLK_VECTOR);                           ! CLEAR CLOCK VECTOR
;    2305  3
;    2306  2         END;
;    2307  2
;    2308  2     IF NOT .EOP_FLAG                                    ! IF INVOKED BY ^C OR DOCLN
;    2309  2     THEN                                                ! THEN
;    2310  3         BEGIN
;    2311  3
;    2312  3         SETVEC (4, NEX_TRAP, PRI07);                    ! IN CASE USER GAVE BAD IP ADDRESS
;    2313  3         INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO           ! FOR EACH CONTROLLER
;    2314  4             BEGIN
;    2315  4
;    2316  4             IF (RC25_ADDR = .CST [.CTLR, IP_ADDR]) NEQA 0   ! IF CONTROLLER EXISTS
;    2317  4             THEN                                            ! THEN
;    2318  4                 WRT_RC25 (RCIP, RC_ALL, ALL_ONES);          ! WRITE IP TO STOP DEVICE
;    2319  4
;    2320  3             END;
;    2321  3
;    2322  3         CLRVEC (4);                                     ! RETURN TRAP 4 TO DIAGNOSTIC SUPERVISOR
;    2323  3
;    2324  2         END;                                            ! IF NOT END OF PASS
;    2325  2
;    2326  2     INCR UNIT FROM 0 TO (MAX_UNITS - 1) DO              ! INITIALIZE DROP UNIT REASON VECTOR
;    2327  2         DUR [.UNIT] = 0;
;    2328  2
;    2329  2     IF .MEM_MGMT                                        ! IF SYSTEM HAS MEMORY MANAGEMENT
;    2330  2     THEN                                                ! THEN
;    2331  3         BEGIN
;    2332  3
;    2333  3         KTPAR4 = %O'1000';                              ! RESTORE PAR'S
;    2334  3         KTPAR5 = %O'1200';
;    2335  3         MMR0 = 0;                                       ! TURN OFF MEMORY MANAGEMENT
;    2336  3
;    2337  2         END;
;    2338  2
;    2339  2     EOP_FLAG = FALSE;                                   ! CLEAR END-OF-PASS FLAG
;    2340  2
;    2341  1     ENDCLN;
```

```
                                        .SBTTL  LCLEAN CLEANUP CODING SECTION
000000  010146                  LCLEAN: MOV     R1,-(SP)                ;                       2284
000002  005737  000000G                 TST     CLK.TYPE                ;                       2297
000006  001472                          BEQ     6$                      ;                       2299
000010  005077  000000G                 CLR     @CLK.CSR                ;                       2303
000014  013700  000000G                 MOV     CLK.VECTOR,R0           ;                       2304
000020  104436                          TRAP    36
000022  132737  000001  000000G         BITB    #1,EOP.FLAG             ;                       2308
000030  001034                          BNE     3$
000032  012746  000340                  MOV     #340,-(SP)              ;                       2312
000036  012746  000000V                 MOV     #NEX.TRAP,-(SP)
000042  012746  000004                  MOV     #4,-(SP)
000046  012746  000003                  MOV     #3,-(SP)
000052  104437                          TRAP    37
000054  005000                          CLR     R0                      ; CTLR                  2313
000056  016037  000000G 000000G  1$:     MOV     CST(R0),RC25.ADDR       ; *(CTLR),*             2316
000064  001404                          BEQ     2$
000066  012701  177777                  MOV     #-1,R1                  ; *,RC.REG              2318
000072  010170  000000G                 MOV     R1,@CST(R0)             ; RC.REG,*
000076  062700  000016          2$:     ADD     #16,R0                  ; *,CTLR                2313
000102  020027  000052                  CMP     R0,#52                  ; CTLR,*
000106  0C3763                          BLE     1$
000110  012700  000004                  MOV     #4,R0                   ;                       2322
000114  104436                          TRAP    36
000116  062706  000010                  ADD     #10,SP                  ;                       2310
000122  005000                  3$:     CLR     R0                      ; UNIT                  2326
000124  105060  000000G         4$:     CLRB    DUR(R0)                 ; *(UNIT)               2327
000130  005200                          INC     R0                      ; UNIT                  2326
000132  020027  000017                  CMP     R0,#17                  ; UNIT,*
000136  003772                          BLE     4$
000140  132737  000001  000000G         BITB    #1,MEM.MGMT             ;                       2329
000146  001410                          BEQ     5$
000150  012737  001000  172350          MOV     #1000,@#172350          ;                       2333
000156  012737  001200  172352          MOV     #1200,@#172352          ;                       2334
000164  005037  177572                  CLR     @#177572                ;                       2335
000170  105037  000000G          5$:     CLRB    EOP.FLAG                ;                       2339
000174  012601                   6$:     MOV     (SP)+,R1                ;                       2284
000176  000207                          RTS     PC

; Routine Size:  64 words,      Routine Base:  $CODE$ + 3304
; Maximum stack depth per invocation:  7 words



000000  004737  003304'         L$CLEAN::
                                        JSR     PC,LCLEAN               ;                       2339
000004  104412                          TRAP    12
000006  000207                          RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 3504
; Maximum stack depth per invocation:  2 words
```

```
;    2342  1     %SBTTL 'DROP UNIT SECTION'
;    2343  1
;    2344  1     !+
;    2345  1     !       THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A PLATTER TO NO
;    2346  1     !       LONGER BE TESTED. IT IS EXECUTED WHENEVER THE MACRO "DODU" IS
;    2347  1     !       ENCOUNTERED IN THE PROGRAM, OR WHEN THE OPERATOR TYPES THE COMMAND
;    2348  1     !       "DROP/UNIT:X"
;    2349  1     !
;    2350  1     !       THE PROGRAM WILL DROP A UNIT FOR ONE OF SEVERAL REASONS:
;    2351  1     !               1. A CONTROLLER CANNOT BE BROUGHT ONLINE,
;    2352  1     !               2. A PLATTER CANNOT BE BROUGHT ONLINE TO ITS CONTROLLER,
;    2353  1     !               3. AN UNRECOVERABLE PORT OR CONTROLLER ERROR HAS BEEN DETECTED,
;    2354  1     !               4. A PLATTER HAS REACHED THE HARD ERROR LIMIT, OR
;    2355  1     !               5. AN MSCP END MESSAGE CONTAINS A "UNIT-OFFLINE" STATUS CODE.
;    2356  1     !-
;    2357  1
;    2358  2     BGNDU;
;    2359  2
;    2360  2     OWN
;    2361  2         DUM_TBL : VECTOR [5] INITIAL (DUM_UC, DUM_CE,       ! ADDRESS TABLE FOR DROP UNIT MESSAGES
;    2362  2                 DUM_IE, DUM HE, DUM_UE);
;    2363  2
;    2364  2     LOCAL
;    2365  2         UNIT : WORD                                         ! NUMBER OF UNIT BEING DROPPED
;    2366  2         PRINT : WORD;                                       ! O.K TO PRINT DROP UNIT MESSAGE
;    2367  2
;    2368  2     LABEL
;    2369  2         SEARCH;
;    2370  2
;    2371  3     BEGIN
;    2372  3
;    2373  3     REGISTER
;    2374  3         INPUT = 0;                                          ! UNIT NUMBER APPEARS IN R0 UPON ENTRY
;    2375  3     UNIT = .INPUT;                                          ! GET UNIT NUMBER
;    2376  3
;    2377  2     END;                                                    ! UNDECLARE PEGISTER
;    2378  2
;    2379  2     PRINT = FALSE;                                          ! ASSUME NO PRINTING OF MESSAGE
;    2380  2
;    2381  2     SEARCH:                                                 ! BEGIN SEARCH BLOCK
;    2382  3         BEGIN
;    2383  3
;    2384  3         INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO               ! FOR EACH CST
;    2385  4             BEGIN
;    2386  4
;    2387  4             INCR OFFSET FROM (0 + OF_UN) TO (3 + OF UN) DO  ! FOR EACH UNIT ENTRY IN CST
;    2388  5                 BEGIN
;    2389  5
;    2390  6                 IF ((.CST [.C~ R, .OFFSET, P_PRES] EQLU PRESENT) AND ! IF UNIT EXISTS AND
;    2391  6                     (.CST [.C.LR, .OFFSET, P_UNIT] EQLU .UNIT))      !    UNIT MATCHES CST ENTRY
;    2392  5                 THEN                                                 ! THEN
;    2393  6                     BEGIN
;    2394  6
;    2395  6                     IF .CST [.CTLR, .OFFSET, P_STAT] EQLU ONLINE     ! IF UNIT IS ONLINE
;    2396  6                     THEN                                             ! THEN
;    2397  7                         BEGIN
;    2398  7
```

```
;   2399  7                       PRINT = TRUE;                                   ! O.K. TO PRINT MESSAGE
;   2400  7                       CST [.CTLR, .OFFSET, P_STAT] = OFFLINE;         ! MARK UNIT OFFLINE
;   2401  7                       IF .CPT [.UNIT] EQLU YES                        ! IF UNIT IS UNDER TEST
;   2402  7                       THEN                                            ! THEN
;   2403  8                           BEGIN
;   2404  8
;   2405  8                           CPT [.UNIT] = NO;                                   ! NO FURTHER TESTING
;   2406  8                           CST [.CTLR, U_CNT] = .CST [.CTLR, U_CNT] - 1;       ! DECREMENT UNIT COUNT
;   2407  8                           DM_COMM [.CTLR, .OFFSET - OF_UN, ALLBIT] = -1;      ! IF DM EXER, TELL FPT
;   2408  8
;   2409  7                           END;
;   2410  7
;   2411  6                       END;                                            ! IF UNIT WAS ONLINE
;   2412  6
;   2413  6                   LEAVE SEARCH;                   ! EXIT SEARCH BLOCK
;   2414  6
;   2415  5                   END;                            ! IF UNIT EXISTS AND MATCHES
;   2416  5
;   2417  4               END;                                ! CST UNIT LOOP
;   2418  4
;   2419  3           END;                                    ! CONTROLLER LOOP
;   2420  3
;   2421  2       END;                                        ! SEARCH BLOCK
;   2422  2
;   2423  3   IF MANUAL AND (.PRINT OR (.DUR [.UNIT] LEQU DU_INIT))   ! IF O.K. TO PRINT MESSAGE
;   2424  2   THEN                                                     ! THEN
;   2425  3       BEGIN
;   2426  3
;   2427  3       PRINTF (CRLF);                              ! <CR><LF>
;   2428  3       PRINTF (ETIME, .HOURS, .MINUTES, .SECONDS); ! ELAPSED TIME
;   2429  3       PRINTF (DUM_00, .UNIT);                     ! "UNIT XX. DROPPED - "
;   2430  3       PRINTF (.DUM_TBL [.DUR [.UNIT]]);           ! REASON
;   2431  3
;   2432  2       END;
;   2433  2
;   2434  1   ENDDU;


003514  000000G                   DUM.TBL:.WORD   DUM.UC
003516  000000G                           .WORD   DUM.CE
003520  000000G                           .WORD   DUM.IE
003522  000000G                           .WORD   DUM.HE
003524  000000G                           .WORD   DUM.UE


                                        .SBTTL  LDU DROP UNIT SECTION
000000  004137  000000G         LDU:    JSR     R1,$SAVE5                       ;                       2341
000004  010001                          MOV     R0,R1                           ; INPUT,UNIT            2375
000006  005004                          CLR     R4                              ; PRINT                 2379
000010  005003                          CLR     R3                              ; CTLR                  2384
000012  010346                  1$:     MOV     R3,-(SP)                        ; CTLR,*                2390
000014  012746  000007                  MOV     #7,-(SP)
000020  004737  000000G                 JSR     PC,BL$MUL
000024  010005                          MOV     R0,R5
000026  012702  000003                  MOV     #3,R2                           ; *,OFFSET              2387
000032  010500                  2$:     MOV     R5,R0                           ;                       2390
000034  060200                          ADD     R2,R0                           ; OFFSET,*
```

```
000036  006300                          ASL     R0
000040  062700  000000G                 ADD     #CST,R0
000044  032710  040000                  BIT     #40000,(R0)
000050  001450                          BEQ     4$
000052  010146                          MOV     R1,-(SP)        ; UNIT,*                2391
000054  011046                          MOV     (R0),-(SP)
000056  000316                          SWAB    (SP)
000060  042716  177740                  BIC     #177740,(SP)
000064  022626                          CMP     (SP)+,(SP)+
000066  001041                          BNE     4$
000070  032710  020000                  BIT     #20000,(R0)     ;                       2395
000074  001434                          BEQ     3$
000076  012704  000001                  MOV     #1,R4           ; *,PRINT               2399
000102  042710  020000                  BIC     #20000,(R0)     ;                       2400
000106  126104  000000G                 CMPB    CPT(R1),R4      ; *(UNIT),*             2401
000112  001025                          BNE     3$
000114  105061  000000G                 CLRB    CPT(R1)         ; *(UNIT)               2405
000120  010316                          MOV     R3,(SP)         ; CTLR,*                2406
000122  012746  000016                  MOV     #16,-(SP)
000126  004737  000000G                 JSR     PC,BL$MUL
000132  005726                          TST     (SP)+
000134  105360  000005G                 DECB    CST+5(R0)
000140  010316                          MOV     R3,(SP)         ; CTLR,*                2407
000142  012746  000032                  MOV     #32,-(SP)
000146  004737  000000G                 JSR     PC,BL$MUL
000152  005726                          TST     (SP)+
000154  060200                          ADD     R2,R0           ; OFFSET,*
000156  006300                          ASL     R0
000160  012760  177777  177772G        MOV     #-1,DM.COMM-6(R0)
000166  022626                  3$:     CMP     (SP)+,(SP)+     ;                       2393
000170  000411                          BR      5$
000172  005202                  4$:     INC     R2              ; OFFSET                2387
000174  020227  000006                  CMP     R2,#6           ; OFFSET,*
000200  003714                          BLE     2$
000202  022626                          CMP     (SP)+,(SP)+     ;                       2385
000204  005203                          INC     R3              ; CTLR                  2384
000206  020327  000003                  CMP     R3,#3           ; CTLR,*
000212  003677                          BLE     1$
000214  104450                  5$:     TRAP    50              ;                       2423
000216  103053                          BHIS    7$
000220  006004                          ROR     R4              ; PRINT
000222  103404                          BLO     6$
000224  126127  000000G 000002          CMPB    DUR(R1),#2      ; *(UNIT),*
000232  101045                          BHI     7$
000234  012746  000000G         6$:     MOV     #CRLF,-(SP)     ;                       2427
000240  012746  000001                  MOV     #1,-(SP)
000244  010600                          MOV     SP,R0           ; SP,*
000246  104417                          TRAP    17
000250  013716  000000G                 MOV     SECONDS,(SP)    ;                       2428
000254  013746  000000G                 MOV     MINUTES,-(SP)
000260  013746  000000G                 MOV     HOURS,-(SP)
000264  012746  000000G                 MOV     #ETIME,-(SP)
000270  012746  000004                  MOV     #4,-(SP)
000274  010600                          MOV     SP,R0           ; SP,*
000276  104417                          TRAP    17
000300  010116                          MOV     R1,(SP)         ; UNIT,*                2429
000302  012746  000000G                 MOV     #DUM.00,-(SP)
```

```
000306  012746  000002                        MOV     #2,-(SP)
000312  010600                                MOV     SP,R0           ; SP,*
000314  104417                                TRAP    17
000316  005000                                CLR     R0              ;                       2430
000320  156100  000000G                       BISB    DUR(R1),R0      ; *(UNIT),*
000324  006300                                ASL     R0
000326  016016  003514'                       MOV     DUM.TBL(R0),(SP)
000332  012746  000001                        MOV     #1,-(SP)
000336  010600                                MOV     SP,R0           ; SP,*
000340  104417                                TRAP    17
000342  062706  000022                        ADD     #22,SP          ;                       2425
000346  000207                        7$:     RTS     PC              ;                       2341

; Routine Size:  116 words,     Routine Base:  $CODE$ + 3526
; Maximum stack depth per invocation:  17 words



                                              .SBTTL  L$DU DROP UNIT SECTION
000000  004737  003526'                L$DU::  JSR     PC,LDU          ;                       2432
000004  104453                                TRAP    53
000006  000207                                RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 4076
; Maximum stack depth per invocation:  2 words
```

```
;   2435  1     %SBTTL 'ADD UNIT SECTION'
;   2436  1
;   2437  1     !+
;   2438  1     !       THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES TO BE
;   2439  1     !       EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK TO THE TEST
;   2440  1     !       CYCLE. THIS CODE WILL BE EXECUTED AFTER THE OPERATOR COMMAND
;   2441  1     !       "ADD/UNIT:X".
;   2442  1     !-
;   2443  1
;   2444  2     BGNAU;
;   2445  2
;   2446  2     LOCAL
;   2447  2         UNIT : WORD,                        ! NUMBER OF UNIT BEING ADDED
;   2448  2         STINDX : WORD,
;   2449  2         ENDIDX : WORD;
;   2450  2
;   2451  3     BEGIN
;   2452  3
;   2453  3     REGISTER
;   2454  3         INPUT = 0;                          ! UNIT NUMBER APPEARS IN R0 UPON ENTRY
;   2455  3     UNIT = .INPUT;                          ! GET UNIT NUMBER
;   2456  3
;   2457  2     END;                                    ! UNDECLARE REGISTER
;   2458  2
;   2459  2     DUR [.UNIT] = 0;                        ! ZERO OUT DROP UNIT REASON
;   2460  2     STINDX = .UNIT * TALLY_LEN;             ! ZERO OUT
;   2461  2     ENDIDX = .STINDX + TALLY_LEN - 1;       !    ADDED
;   2462  2     INCR COUNT FROM .STINDX TO .ENDIDX DO   !    UNIT'S
;   2463  2         TALLY [.COUNT] = 0;                 !    STATISTICS
;   2464  2
;   2465  1     ENDAU;


                                    .SBTTL  LAU ADD UNIT SECTION
000000  004137  000000G        LAU:   JSR     R1,$SAVE2                ;                          2434
000004  105060  000000G               CLRB    DUR(R0)                  ; *(UNIT)                  2459
000010  010046                       MOV     R0,-(SP)                 ; UNIT,*                   2460
000012  012746  000030               MOV     #30,-(SP)
000016  004737  000000G               JSR     PC,BL$MUL
000022  010002                       MOV     R0,R2                    ; STINDX,ENDIDX            2461
000024  062702  000027               ADD     #27,R2                   ; *,ENDIDX
000030  010001                       MOV     R0,R1                    ; STINDX,COUNT             2462
000032  005301                       DEC     R1                       ; COUNT
000034  000404                       BR      2$
000036  010100                1$:    MOV     R1,R0                    ; COUNT,*                  2463
000040  006300                       ASL     R0
000042  005060  000000G               CLR     TALLY(R0)
000046  005201                2$:    INC     R1                       ; COUNT                    2462
000050  020102                       CMP     R1,R2                    ; COUNT,ENDIDX
000052  003771                       BLE     1$
000054  022626                       CMP     (SP)+,(SP)+              ;                          2434
000056  000207                       RTS     PC

; Routine Size:  24 words,      Routine Base:  $CODE$ + 4106
; Maximum stack depth per invocation:  6 words
```

```
                                        .SBTTL  L$AU ADD UNIT SECTION
000000  004737  004106'            L$AU::  JSR     PC,LAU                  ;                       2463
000004  104452                            TRAP    52
000006  000207                            RTS     PC

; Routine Size:  4 words,      Routine Base:  $CODE$ + 4166
; Maximum stack depth per invocation:  2 words
```

```
;    2466  1     %SBTTL 'NON-EXISTENT MEMORY TRAP HANDLER'
;    2467  1
;    2468  1     !+
;    2469  1     !       THIS TRAP HANDLER IS VECTORED FROM LOCATION 4 FOR ALL UNIBUS TIMEOUT
;    2470  1     !       ERRORS, INDICATING THAT AN ATTEMPT WAS MADE TO REFERENCE A NON-EXISTENT
;    2471  1     !       MEMORY LOCATION. ITS MAIN PURPOSE IS TO SET . FLAG FOR THE RC11
;    2472  1     !       REGISTER EXISTENCE TEST, INDICATING THE ABSENCE OF A DEVICE REGISTER.
;    2473  1     !-
;    2474  1
;    2475  2     BGNSRV (NEX_TRAP);
;    2476  2
;    2477  2     NEX = TRUE;                             ! NEX TRAP OCCURRED
;    2478  2
;    2479  1     ENDSRV;


                                        .SBTTL  NEX.TRAP NON-EXISTENT MEMORY TRAP HANDLER
000000  012737  000001  000000G    NEX.TRAP::
                                        MOV     #1,NEX                          ;                       2477
000006  000002                          RTI                                     ;                       2475

; Routine Size:  4 words,       Routine Base:  $CODE$ + 4176
; Maximum stack depth per invocation:  0 words
```

```
;    2480  1     %SBTTL 'CLOCK INTERRUPT SERVICE ROUTINE'
;    2481  1
;    2482  1     !+
;    2483  1     !       THE CLOCK INTERRUPT SERVICE ROUTINE IS ENTERED AT THE CLOCK HERTZ RATE
;    2484  1     !       (50 OR 60 TIMES PER SECOND). ITS PURPOSE IS TO MAINTAIN THE ELAPSED
;    2485  1     !       TIME OF THE EXERCISER, AND, IF ONE SECOND HAS ELAPSED, TO FLAG THE
;    2486  1     !       EVENT BY SETTING T_FLAG TO "TRUE".
;    2487  1     !-
;    2488  1
;    2489  2     BGNSRV (CLK_INT_SERV);
;    2490  2
;    2491  2     TICKS = .TICKS + 1;
;    2492  2     IF .TICKS EQLU .CLK_HERTZ
;    2493  2     THEN
;    2494  3         BEGIN
;    2495  3
;    2496  3         TICKS = 0;
;    2497  3         SECONDS = .SECONDS + 1;
;    2498  3         IF .SECONDS EQLU 60
;    2499  3         THEN
;    2500  4             BEGIN
;    2501  4
;    2502  4             SECONDS = 0;
;    2503  4             MINUTES = .MINUTES + 1;
;    2504  4             IF .MINUTES EQLU 60
;    2505  4             THEN
;    2506  5                 BEGIN
;    2507  5
;    2508  5                 MINUTES = 0;
;    2509  5                 HOURS = .HOURS + 1;
;    2510  5
;    2511  4                 END;
;    2512  4
;    2513  3             END;
;    2514  3
;    2515  2         END;
;    2516  2
;    2517  2     IF .TICKS EQLU 0                    ! IF ONE SECOND HAS ELAPSED
;    2518  2     THEN                                ! THEN
;    2519  2         T_FLAG = TRUE;                  ! FLAG THE EVENT
;    2520  2
;    2521  1     ENDSRV;


                                        .SBTTL  CLK.INT.SERV CLOCK INTERRUPT SERVICE ROUTINE
000000  005237  000000G           CLK.INT.SERV::
                                    INC     TICKS                   ;                   2491
000004  023737  000000G 000000G        CMP     TICKS,CLK.HERTZ         ;                   2492
000012  001024                      BNE     1$
000014  005037  000000G             CLR     TICKS                   ;                   2496
000020  005237  000000G             INC     SECONDS                 ;                   2497
000024  023727  000000G 000074        CMP     SECONDS,#74             ;                   2498
000032  001014                      BNE     1$
000034  005037  000000G             CLR     SECONDS                 ;                   2502
000040  005237  000000G             INC     MINUTES                 ;                   2503
000044  023727  000000G 000074        CMP     MINUTES,#74             ;                   2504
000052  001004                      BNE     1$
```

```
000054  005037  000000G                        CLR     MINUTES                         ;                       2508
000060  005237  000000G                        INC     HOURS                           ;                       2509
000064  005737  000000G                1$:     TST     TICKS                           ;                       2517
000070  001003                                BNE     2$
000072  112737  000001  000000G               MOVB    #1,T.FLAG                       ;                       2519
000100  000002                        2$:     RTI                                     ;                       2489

; Routine Size:  33 words,      Routine Base:  $CODE$ + 4206
; Maximum stack depth per invocation:  0 words
```

```
;   2522  1     %SBTTL  GLOBAL ROUTINES'
;   2523  1
;   2524  1     GLOBAL ROUTINE COPY_BLK (SRC, DST, NWRDS) : NOVALUE =
;   2525  1
;   2526  1     !+
;   2527  1     !       THE PURPOSE OF THIS ROUTINE IS TO TRANSFER A BLOCK OF MEMORY OF LENGTH
;   2528  1     !       "NWRDS' FROM 'SRC" TO "DST'.
;   2529  1     !-
;   2530  1
;   2531  1     INCR I FROM 1 TO .NWRDS DO                      ! FOR EACH WORD IN BLOCK
;   2532  2         BEGIN
;   2533  2
;   2534  2         .DST = ..SRC;                               ! TRANSFER WORD FROM SOURCE TO DESTINATION
;   2535  2         DST = .DST + 2;                             ! ADVANCE DESTINATION ADDRESS
;   2536  2         SRC = .SRC + 2;                             ! ADVANCE SOURCE ADDRESS
;   2537  2
;   2538  1         END;


                                        .SBTTL  COPY.BLK GLOBAL ROUTINES
000000  005000                    COPY.BLK::
                                        CLR     R0                      ; I                     2531
000002  000411                          BR      2$
000004  017676  000006  000004    1$:   MOV     @6(SP),@4(SP)           ; SRC,DST               2534
000012  062766  000002  000004          ADD     #2,4(SP)                ; *,DST                 2535
000020  062766  000002  000006          ADD     #2,6(SP)                ; *,SRC                 2536
000026  005200                    2$:   INC     R0                      ; I                     2531
000030  020066  000002                  CMP     R0,2(SP)                ; I,NWRDS
000034  003763                          BLE     1$
000036  000207                          RTS     PC                      ;                       2524

; Routine Size:  16 words,      Routine Base:  $CODE$ + 4310
; Maximum stack depth per invocation:  0 words
```

```
;   2539  1     GLOBAL ROUTINE SET_CPAR (CTLR) : NOVALUE =
;   2540  1
;   2541  1     !+
;   2542  1     !       THIS ROUTINE SETS UP THE COMMONLY-USED CONTROLLER-RELATED DATA ITEMS
;   2543  1     !       FOR THE GIVEN CONTROLLER NUMBER.
;   2544  1     !
;   2545  1     !       INPUTS:
;   2546  1     !               CTLR - CONTROLLER NUMBER
;   2547  1     !
;   2548  1     !       IMPLICIT OUTPUTS:
;   2549  1     !               CCTLR   CURRENT CONTROLLER NUMBER
;   2550  1     !               CST_ADDR - ADDRESS OF CONTROLLER'S STATUS TABLE
;   2551  1     !               DCT_ADDR - ADDRESS OF CONTROLLER'S DRIVER TABLE
;   2552  1     !               RC25_ADDR - ADDRESS OF CONTROLLER'S IP REGISTER
;   2553  1     !               DMC_ADDR - ADDRESS OF CONTROLLER'S DM_COMM AREA
;   2554  1     !               OCL_X1,2 - STARTING/ENDING INDECES OF CONTROLLER'S OUTSTANDING
;   2555  1     !                       COMMAND AREA (OUTC_LIST, OUTC_TIMR)
;   2556  1     !               RPS_X1,2 - STARTING/ENDING INDECES OF CONTROLLER'S RETURN
;   2557  1     !                       PACKET SAVE AREA (RP_SAVE)
;   2558  1     !-
;   2559  1
;   2560  2     BEGIN
;   2561  2
;   2562  2     CCTLR = .CTLR;                              ! SET CURRENT CONTROLLER NUMBER
;   2563  2     CST_ADDR = CST + (.CTLR * CST_LEN * 2); ! CALCULATE ADDRESS OF CONTROLLER'S CST
;   2564  2     DCT_ADDR = DCT + (.CTLR * DCT_LEN * 2); ! CALCULATE ADDRESS OF CONTROLLER'S DCT
;   2565  2     RC25_ADDR = .CST_ADDR [IP_ADDR];        ! GET CONTROLLER'S DEVICE ADDRESS
;   2566  2     DMC_ADDR = DM_COMM + (.CTLR * DMC_LEN * 2); ! CALCULATE ADDRESS OF CONTROLLER'S DM_COMM AREA
;   2567  2     OCL_X1 = .CTLR * OUTC_CNT;              ! STARTING INDEX OF CTLR'S OUTC AREA
;   2568  2     OCL_X2 = .OCL_X1 + OUTC_CNT - 1;        ! ENDING INDEX OF CTLR'S OUTC AREA
;   2569  2     RPS_X1 = .CTLR * RPS_LEN;               ! STARTING INDEX OF CTLR'S RETPKT SAVE AREA
;   2570  2     RPS_X2 = .RPS_X1 + RPS_LEN - 1;         ! ENDING INDEX OF CTLR'S RETPKT SAVE AREA
;   2571  2
;   2572  1     END;


                                                .SBTTL  SET.CPAR GLOBAL ROUTINES
000000  010146                            SET.CPAR::
                                                MOV     R1,-(SP)                        ;                               2539
000002  016601  000004                          MOV     4(SP),R1                        ; CTLR,*                        2562
000006  010137  000000G                         MOV     R1,CCTLR
000012  010146                                  MOV     R1,-(SP)                        ;                               2563
000014  012746  000016                          MOV     #16,-(SP)
000020  004737  000000G                         JSR     PC,BL$MUL
000024  062700  000000G                         ADD     #CST,R0
000030  010037  000000G                         MOV     R0,CST.ADDR
000034  010116                                  MOV     R1,(SP)                         ;                               2564
000036  012746  000022                          MOV     #22,-(SP)
000042  004737  000000G                         JSR     PC,BL$MUL
000046  062700  000000G                         ADD     #DCT,R0
000052  010037  000000G                         MOV     R0,DCT.ADDR
000056  017737  000000G 000000G                 MOV     @CST.ADDR,RC25.ADDR             ;                               2565
000064  010116                                  MOV     R1,(SP)                         ;                               2566
000066  012746  000064                          MOV     #64,-(SP)
000072  004737  000000G                         JSR     PC,BL$MUL
000076  062700  000000G                         ADD     #DM.COMM,R0
0001C2  010037  000000G                         MOV     R0,DMC.ADDR
```

```
000106  010100                          MOV     R1,R0                           ;                               2567
000110  006300                          ASL     R0
000112  006300                          ASL     R0
000114  006300                          ASL     R0
000116  006300                          ASL     R0
000120  010037  000000G                 MOV     R0,OCL.X1
000124  010037  000000G                 MOV     R0,OCL.X2                       ; OCL.X1,*                      2568
000130  062737  000017  000000G         ADD     #17,OCL.X2
000136  010100                          MOV     R1,R0                           ;                               2569
000140  006300                          ASL     R0
000142  006300                          ASL     R0
000144  006300                          ASL     R0
000146  010037  000000G                 MOV     R0,RPS.X1
000152  010037  000000G                 MOV     R0,RPS.X2                       ; RPS.X1,*                      2570
000156  062737  000007  000000G         ADD     #7,RPS.X2
000164  062706  000010                  ADD     #10,SP                          ;                               2560
000170  012601                          MOV     (SP)+,R1                        ;                               2539
000172  000207                          RTS     PC

; Routine Size:  62 words,      Routine Base:  $CODE$ + 4350
; Maximum stack depth per invocation:  6 words
```

```
;   2573  1     GLOBAL ROUTINE SET_UPAR (OFFSET) : NOVALUE =
;   2574  1
;   2575  1     !+
;   2576  1     !       THIS ROUTINE SETS UP THE COMMONLY-USED UNIT-RELATED DATA ITEMS FOR
;   2577  1     !       THE CURRENT CONTROLLER AND GIVEN CST OFFSET.
;   2578  1     !
;   2579  1     !       INPUTS:
;   2580  1     !               OFFSET - WORD OFFSET INTO CURRENT CONTROLLER'S CST WHICH
;   2581  1     !                        DESCRIBES A UNIT
;   2582  1     !
;   2583  1     !       IMPLICIT INPUTS:
;   2584  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;   2585  1     !
;   2586  1     !       IMPLICIT OUTPUTS:
;   2587  1     !               CUOFF - CURRENT UNIT'S CST OFFSET
;   2588  1     !               CPLAT - CURRENT PLATTER ADDRESS (MSCP UNIT NUMBER)
;   2589  1     !               L$LUN - CURRENT UNIT NUMBER (DS UNIT NUMBER)
;   2590  1     !               T_ADDR - ADDRESS OF CURRENT UNIT'S STATISTICS BLOCK (TALLY)
;   2591  1     !-
;   2592  1
;   2593  2     BEGIN
;   2594  2
;   2595  2     CUOFF = .OFFSET;
;   2596  2     CPLAT = .CST_ADDR [.OFFSET, P_ADDR];
;   2597  2     L$LUN = .CST_ADDR [.OFFSET, P_UNIT];
;   2598  2     T_ADDR = TALLY + (.L$LUN * TALLY_LEN * 2);
;   2599  2
;   2600  1     END;


                                        .SBTTL  SET.UPAR GLOBAL ROUTINES
000000  010146                 SET.UPAR::
                                        MOV     R1,-(SP)                ;                               2573
000002  016637  000004  000000G        MOV     4(SP),CUOFF             ; OFFSET,*                      2595
000010  016600  000004                 MOV     4(SP),R0                ; CUOFF,*                       2596
000014  006300                         ASL     R0
000016  063700  000000G                ADD     CST.ADDR,R0
000022  111037  000000G                MOVB    (R0),CPLAT
000026  105037  000001G                CLRB    CPLAT+1
000032  011001                         MOV     (R0),R1                 ;                               2597
000034  000301                         SWAB    R1
000036  042701  177740                 BIC     #177740,R1
000042  010137  000000G                MOV     R1,L$LUN
000046  0  46                         MOV     R1,-(SP)                ; L$LUN,*                       2598
000050  0  46  000060                 MOV     #60,-(SP)
000054  0  737  000000G               JSR     PC,BL$MUL
000060  062700  000000G               ADD     #TALLY,R0
000064  010037  000000G               MOV     R0,T.ADDR
000070  022626                         CMP     (SP)+,(SP)+             ;                               2593
000072  012601                         MOV     (SP)+,R1                ;                               2573
000074  000207                         RTS     PC

; Routine Size:  31 words,      Routine Base:  $CODE$ + 4544
; Maximum stack depth per invocation:  4 words
```

```
;   2601  1     GLOBAL ROUTINE GET_ENV (CTLR) =
;   2602  1
;   2603  1     !+
;   2604  1     !       THIS ROUTINE SEARCHES THE MSCP ENVELOPE POOL ALLOCATION TABLE (ENV_USE)
;   2605  1     !       FOR A FREE MSCP ENVELOPE TO ALLOCATE TO THE GIVEN CONTROLLER. IF ONE IS
;   2606  1     !       FOUND, THE ENVELOPE IS ZEROED OUT, AND THE ENVELOPE INDEX IS RETURNED
;   2607  1     !       TO THE CALLER. OTHERWISE, A -1 IS RETURNED INDICATING NONE AVAILABLE.
;   2608  1     !
;   2609  1     !       INPUTS:
;   2610  1     !               CTLR - CONTROLLER NUMBER REQUESTING ALLOCATION
;   2611  1     !-
;   2612  1
;   2613  2     BEGIN
;   2614  2
;   2615  2     LOCAL
;   2616  2         INDEX : WORD;
;   2617  2
;   2618  2     INDEX = -1;
;   2619  2
;   2620  2     INCR COUNT FROM 0 TO (ENV_CNT   1) DO          ! FOR EACH ENTRY IN ALLOCATION TABLE
;   2621  3         BEGIN
;   2622  3
;   2623  3         IF .ENV_USE [.COUNT] LSS 0                 ! IF ENTRY INDICATES FREE ENVELOPE
;   2624  3         THEN                                       ! THEN
;   2625  4             BEGIN
;   2626  4
;   2627  4             ENV_USE [.COUNT] = .CTLR;              ! ALLOCATE ENVELOPE TO CONTROLLER
;   2628  4             INDEX = .COUNT;
;   2629  4             INCR J FROM 2 TO (ENV_LEN - 1) DO      ! ZERO OUT ENVELOPE
;   2630  4                 MSCP_ENV [.COUNT, .J, ALLBIT] = 0;
;   2631  4             EXITLOOP;                              ! DONE
;   2632  4
;   2633  3             END;
;   2634  3
;   2635  2         END;
;   2636  2
;   2637  2     RETURN .INDEX;
;   2638  2
;   2639  1     END;


                                        .SBTTL  GET.ENV GLOBAL ROUTINES
000000  004137  000000G           GET.ENV::
                                        JSR     R1,$SAVE4                       ;                               2601
000004  012703  177777                  MOV     #-1,R3                          ; *,INDEX                       2618
000010  005001                          CLR     R1                              ; COUNT                         2620
000012  105761  000000G           1$:   TSTB    ENV.USE(R1)                     ; *(COUNT)                      2623
000016  002026                          BGE     3$
000020  116661  000014  000000G         MOVB    14(SP),ENV.USE(R1)              ; CTLR,*(COUNT)                 2627
000026  010103                          MOV     R1,R3                           ; COUNT,INDEX                   2628
000030  010146                          MOV     R1,-(SP)                        ; COUNT,*                       2630
000032  012746  000042                  MOV     #42,-(SP)
000036  004737  000000G                 JSR     PC,BL$MUL
000042  022626                          CMP     (SP)+,(SP)+
000044  012702  000002                  MOV     #2,R2                           ; *,J                           2629
000050  010004                2$:       MOV     R0,R4                           ;                               2630
000052  060204                          ADD     R2,R4                           ; J,*
```

```
000054  006304                          ASL     R4
000056  005064  000000G                 CLR     MSCP.ENV(R4)
000062  005202                          INC     R2                      ; J                     2629
000064  020227  000041                  CMP     R2,#41                  ; J,*
000070  003767                          BLE     2$
000072  000404                          BR      4$                      ;                       2625
000074  005201                  3$:     INC     R1                      ; COUNT                 2620
000076  020127  000137                  CMP     R1,#137                 ; COUNT,*
000102  003743                          BLE     1$
000104  010300                  4$:     MOV     R3,R0                   ; INDEX,*               2613
000106  000207                          RTS     PC                      ;                       2601

; Routine Size:  36 words,      Routine Base:  $CODE$ + 4642
; Maximum stack depth per invocation:  8 words
```

```
;   2640  1     GLOBAL ROUTINE PUT_ENV (INDEX) : NOVALUE =
;   2641  1
;   2642  1     !+
;   2643  1     !       THE MSCP ENVELOPE DESIGNATED BY "INDEX" IS RETURNED TO THE POOL BY THIS
;   2644  1     !       ROUTINE.
;   2645  1     !-
;   2646  1
;   2647  2     BEGIN
;   2648  2
;   2649  2     ENV_USE [.INDEX] = -1;
;   2650  2
;   2651  1     END;


                                        .SBTTL  PUT.ENV GLOBAL ROUTINES
000000  016600  000002            PUT.ENV::
                                        MOV     2(SP),R0                        ; INDEX,*                               2649
000004  112760  000377  000000G         MOVB    #377,ENV.USE(R0)
000012  000207                          RTS     PC                              ;                                       2640

; Routine Size:  6 words,       Routine Base:  $CODE$ + 4752
; Maximum stack depth per invocation:  0 words
```

```
;    2652  1     GLOBAL ROUTINE PUTA_ENV (CTLR) : NOVALUE =
;    2653  1
;    2654  1     !+
;    2655  1     !       THIS ROUTINE DEALLOCATES ALL MSCP ENVELOPES WHICH HAVE BEEN ALLOCATED
;    2656  1     !       TO A PARTICULAR CONTROLLER.
;    2657  1     !
;    2658  1     !       INPUTS:
;    2659  1     !               CTLR - CONTROLLER NUMBER
;    2660  1     !-
;    2661  1
;    2662  2     BEGIN
;    2663  2
;    2664  2     INCR COUNT FROM 0 TO (ENV_CNT - 1) DO          ! FOR EACH ENTRY IN ALLOCATION TABLE
;    2665  3         BEGIN
;    2666  3
;    2667  3         IF .ENV_USE [.COUNT] EQLU .CTLR            ! IF ENVELOPE IS ALLOCATED TO GIVEN CONTROLLER
;    2668  3         THEN                                       ! THEN
;    2669  3             ENV_USE [.COUNT] = -1;                 ! DEALLOCATE IT
;    2670  3
;    2671  2         END;
;    2672  2
;    2673  1     END;                                           ! ROUTINE PUTA_ENV


                                        .SBTTL  PUTA.ENV GLOBAL ROUTINES
000000  010146                  PUTA.ENV::
                                        MOV     R1,-(SP)                ;                                       2652
000002  005000                          CLR     R0                      ; COUNT                                 2664
000004  116001  000000G         1$:     MOVB    ENV.USE(R0),R1          ; *(COUNT),*                            2667
000010  020166  000004                  CMP     R1,4(SP)                ; *,CTLR
000014  001003                          BNE     2$
000016  112760  000377  000000G         MOVB    #377,ENV.USE(R0)        ; *,*(COUNT)                            2669
000024  005200                  2$:     INC     R0                      ; COUNT                                 2664
000026  020027  000137                  CMP     R0,#137                 ; COUNT,*
000032  003764                          BLE     1$
000034  012601                          MOV     (SP)+,R1                ;                                       2652
000036  000207                          RTS     PC

; Routine Size:  16 words,      Routine Base:  $CODE$ + 4766
; Maximum stack depth per invocation:  2 words
```

```
;    2674  1     GLOBAL ROUTINE GET_RETPKT (CTLR) =
;    2675  1
;    2676  1     !+
;    2677  1     !       THIS ROUTINE SEARCHES THE RETURN PACKET POOL ALLOCATION TABLE (RP_USE)
;    2678  1     !       FOR A FREE RETURN PACKET TO ALLOCATE TO THE GIVEN CONTROLLER. IF ONE IS
;    2679  1     !       FOUND, THE PACKET IS ZEROED OUT, AND THE PACKET INDEX IS RETURNED TO
;    2680  1     !       THE CALLER. OTHERWISE, A -1 IS RETURNED INDICATING NONE AVAILABLE.
;    2681  1     !
;    2682  1     !       INPUTS:
;    2683  1     !               CTLR   CONTROLLER NUMBER REQUESTING ALLOCATION
;    2684  1     !-
;    2685  1
;    2686  2     BEGIN
;    2687  2
;    2688  2     LOCAL
;    2689  2         INDEX : WORD;
;    2690  2
;    2691  2     INDEX = -1;                                 ! ASSUME NONE AVAILABLE
;    2692  2
;    2693  2     INCR COUNT FROM 0 TO (RP_CNT - 1) DO        ! FOR EACH ENTRY IN TABLE
;    2694  3         BEGIN
;    2695  3
;    2696  3         IF .RP_USE [.COUNT] LSS 0               ! IF FREE RETPKT IS FOUND
;    2697  3         THEN
;    2698  4             BEGIN
;    2699  4
;    2700  4             RP_USE [.COUNT] = .CTLR;            ! ALLOCATE RETURN PACKET TO CONTROLLER
;    2701  4             INDEX = .COUNT;
;    2702  4             INCR J FROM 0 TO (RP_LEN - 1) DO    ! ZERO OUT RETPKT
;    2703  4                 RETPKT [.COUNT, .J, ALLBIT] = 0;
;    2704  4             EXITLOOP;                           ! DONE
;    2705  4
;    2706  3             END;
;    2707  3
;    2708  2         END;
;    2709  2
;    2710  2     RETURN .INDEX;                              ! RETURN PACKET INDEX (OR  1) TO CALLER
;    2711  2
;    2712  1     END;


                                        .SBTTL  GET.RETPKT GLOBAL ROUTINES
000000  004137  000000G          GET.RETPKT::
                                        JSR     R1,$SAVE4                       ;                       2674
000004  012703  177777                  MOV     #-1,R3                          ; *,INDEX               2691
000010  005001                          CLR     R1                              ; COUNT                 2693
000012  105761  000000G          1$:    TSTB    RP.USE(R1)                      ; *(COUNT)              2696
000016  002025                          BGE     3$
000020  116661  000014  000000G        MOVB    14(SP),RP.USE(R1)               ; CTLR,*(COUNT)         2700
000026  010103                          MOV     R1,R3                           ; COUNT,INDEX           2701
000030  010146                          MOV     R1,-(SP)                        ; COUNT,*               2703
000032  012746  000030                  MOV     #30,-(SP)
000036  004737  000000G                JSR     PC,BL$MUL
000042  022626                          CMP     (SP)+,(SP)+
000044  005002                          CLR     R2                              ; J                     2702
000046  010004          2$:    MOV     R0,R4                           ;                       2703
000050  060204                  ADD     R2,R4                           ; J,*
```

```
000052  006304                          ASL     R4
000054  005064  000000G                 CLR     RETPKT(R4)
000060  005202                          INC     R2                      ; J                     2702
000062  020227  000027                  CMP     R2,#27                  ; J,*
000066  003767                          BLE     2$
000070  000404                          BR      4$                      ;                       2698
000072  005201                  3$:     INC     R1                      ; COUNT                 2693
000074  020127  000037                  CMP     R1,#37                  ; COUNT,*
000100  003744                          BLE     1$
000102  010300                  4$:     MOV     R3,R0                   ; INDEX,*               2686
000104  000207                          RTS     PC                      ;                       2674

; Routine Size:  35 words,      Routine Base:  $CODE$ + 5026
; Maximum stack depth per invocation:  8 words
```

```
;   2713  1     GLOBAL ROUTINE PUT_RETPKT (INDEX) : NOVALUE =
;   2714  1
;   2715  1     !+
;   2716  1     !       THE RETURN PACKET DESIGNATED BY "INDEX" IS RETURNED TO THE POOL BY THIS
;   2717  1     !       ROUTINE.
;   2718  1     !-
;   2719  1
;   2720  2     BEGIN
;   2721  2
;   2722  2     RP_USE [.INDEX] = -1;
;   2723  2
;   2724  1     END;


                                        .SBTTL  PUT.RETPKT GLOBAL ROUTINES
000000  016600  000002            PUT.RETPKT::
                                        MOV     2(SP),R0                        ; INDEX,*       2722
000004  112760  000377  000000G         MOVB    #377,RP.USE(R0)
000012  000207                          RTS     PC                              ;               2713

; Routine Size:  6 words,       Routine Base:  $CODE$ + 5134
; Maximum stack depth per invocation:  0 words
```

```
;   2725  1     GLOBAL ROUTINE GET_IO_BUFF (ADDR) : NOVALUE =
;   2726  1
;   2727  1     !+
;   2728  1     !       THIS ROUTINE HANDLES THE ALLOCATION OF AN I/O BUFFER FROM THE BUFFER
;   2729  1     !       POOL.
;   2730  1     !
;   2731  1     !       INPUTS:
;   2732  1     !               ADDR   ADDRESS TO STORE THE 2 WORD BUFFER DESCRIPTOR
;   2733  1     !
;   2734  1     !       IMPLICIT INPUTS:
;   2735  1     !               CCTLR   CURRENT CONTROLLER NUMBER
;   2736  1     !
;   2737  1     !       OUTPUTS:
;   2738  1     !               THE ALLOCATED BUFFER'S DESCRIPTOR IS LOADED INTO THE TWO
;   2739  1     !               WORDS AT "ADDR" AND 'ADDR + 2". OTHERWISE, A "-1" IS RETURNED
;   2740  1     !               AT "ADDR" IF NO BUFFERS ARE AVAILABLE.
;   2741  1     !-
;   2743  2     BEGIN
;   2744  2
;   2745  2     .ADDR = -1;                                     ! ASSUME FAILURE
;   2746  2     INCR COUNT FROM 0 TO (.NUM_BUFF - 1) DO         ! FOR EACH ENTRY IN BUFFER TABLE
;   2747  3         BEGIN
;   2749  3         IF .BUFF_OWN [.COUNT] LSS 0                 ! IF BUFFER IS FREE
;   2750  3         THEN                                        ! THEN
;   2751  4             BEGIN
;   2753  4             BUFF_OWN [.COUNT] = .CCTLR;             ! ALLOCATE BUFFER TO CONTROLLER
;   2754  4             .ADDR = .BUFF_DESC [.COUNT, BD_LO];     ! RETURN BUFFER DESCRIPTOR
;   2755  4             (.ADDR + 2) = .BUFF_DESC [.COUNT, BD_HI];
;   2756  4             EXITLOOP;                               ! DONE
;   2758  3             END;
;   2760  2         END;                                        ! BUFFER TABLE LOOP
;   2762  1     END;                                            ! ROUTINE GET_IO_BUFF

                                        .SBTTL  GET.IO.BUFF GLOBAL ROUTINES
000000  004137  000000G           GET.IO.BUFF::
                                        JSR     R1,$SAVE2                       ;                               2725
000004  016602  000010                  MOV     10(SP),R2                       ; ADDR,*                *       2745
000010  012712  177777                  MOV     #-1,(R2)
000014  005001                          CLR     R1                              ; COUNT                         2746
000016  000420                          BR      3$
000020  105761  000000G           1$:   TSTB    BUFF.OWN(R1)                    ; *(COUNT)                      2749
000024  002014                          BGE     2$
000026  113761  000000G 000000G         MOVB    CCTLR,BUFF.OWN(R1)              ; *,*(COUNT)                    2753
000034  010100                          MOV     R1,R0                           ; COUNT,*                       2754
000036  006300                          ASL     R0
000040  006300                          ASL     R0
000042  016012  000000G                 MOV     BUFF.DESC(R0),(R2)
000046  016062  000002G 000002          MOV     BUFF.DESC+2(R0),2(R2)           ;                               2755
000054  000207                          RTS     PC                              ;                               2751
000056  005201                  2$:     INC     R1                              ; COUNT                         2746
000060  020137  000000G           3$:   CMP     R1,NUM.BUFF                     ; COUNT,*
000064  002755                          BLT     1$
000066  000207                          RTS     PC                              ;                               2725

; Routine Size:  28 words,      Routine Base:  $CODE$ + 5150
; Maximum stack depth per invocation:  4 words
```

```
;  2763  1     GLOBAL ROUTINE PUT_IO BUFF (ADDR) : NOVALUE =
;  2764  1
;  2765  1     !+
;  2766  1     !       THIS ROUTINE HANDLES THE DEALLOCATION OF AN I/O BUFFER, RETURNING IT
;  2767  1     !       TO THE BUFFER POOL.
;  2768  1     !
;  2769  1     !       INPUTS:
;  2770  1     !               ADDR - ADDRESS OF THE 2 WORD BUFFER DESCRIPTOR TO BE
;  2771  1     !                       DEALLOCATED
;  2772  1     !-
;  2773  1
;  2774  2     BEGIN
;  2775  2
;  2776  2     INCR COUNT FROM 0 TO (.NUM_BUFF - 1) DO         ! FOR EACH ENTRY IN BUFFER TABLE
;  2777  3         BEGIN
;  2778  3
;  2779  4         IF ((.BUFF_DESC [.COUNT, BD_LO] EQLA ..ADDR) AND    ! IF THIS IS THE BUFFER'S ENTRY
;  2780  4             (.BUFF_DESC [.COUNT, BD_HI] EQLU .(.ADDR + 2)))
;  2781  3         THEN                                            ! THEN
;  2782  4             BEGIN
;  2783  4
;  2784  4             BUFF_OWN [.COUNT] = -1;                     ! DEALLOCATE BUFFER
;  2785  4             EXITLOOP;                                   ! DONE
;  2786  4
;  2787  3             END;
;  2788  3
;  2789  2         END;                                            ! BUFFER TABLE SEARCH LOOP
;  2790  2
;  2791  1     END;                                                ! ROUTINE PUT_IO BUFF


                                        .SBTTL  PUT.IO.BUFF GLOBAL ROUTINES
000000  004137  000000G                 PUT.IO.BUFF::
                                        JSR     R1,$SAVE2                       ;                       2763
000004  005002                          CLR     R2                              ; COUNT                 2776
000006  000422                          BR      3$
000010  010201                  1$:     MOV     R2,R1                           ; COUNT,*               2779
000012  006301                          ASL     R1
000014  006301                          ASL     R1
000016  026176  000000G 000010          CMP     BUFF.DESC(R1),@10(SP)           ; *,ADDR
000024  001012                          BNE     2$
000026  016600  000010                  MOV     10(SP),R0                       ; ADDR,*                2780
000032  026160  000002G 000002          CMP     BUFF.DESC+2(R1),2(R0)
000040  001004                          BNE     2$
000042  112762  000377  000000G         MOVB    #377,BUFF.OWN(R2)               ; *,*(COUNT)            2784
000050  000207                          RTS     PC                              ;                       2782
000052  005202                  2$:     INC     R2                              ; COUNT                 2776
000054  020237  000000G         3$:     CMP     R2,NUM.BUFF                     ; COUNT,*
000060  002753                          BLT     1$
000062  000207                          RTS     PC                              ;                       2763

; Routine Size:  26 words,      Routine Base:  $CODE$ + 5240
; Maximum stack depth per invocation:  4 words
```

```
;   2792  1     GLOBAL ROUTINE PUTA_BUFF : NOVALUE =
;   2793  1
;   2794  1     !+
;   2795  1     !       THIS ROUTINE DEALLOCATES ALL I/O BUFFERS WHICH HAVE BEEN ALLOCATED TO
;   2796  1     !       THE CURRENT CONTROLLER (CCTLR).
;   2797  1     !-
;   2798  1
;   2799  2     BEGIN
;   2800  2
;   2801  2     INCR COUNT FROM 0 TO (.NUM_BUFF - 1) DO         ! FOR EACH ENTRY IN BUFFER TABLE
;   2802  3         BEGIN
;   2803  3
;   2804  3         IF .BUFF_OWN [.COUNT] EQLU .CCTLR           ! IF THIS BUFFER IS ALLOCATED TO THE CURRENT CONTROLLER
;   2805  3         THEN                                        ! THEN
;   2806  3             BUFF_OWN [.COUNT] = -1;                 ! DEALLOCATE IT
;   2807  3
;   2808  2         END;                                        ! BUFFER TABLE ENTRY LOOP
;   2809  2
;   2810  1     END;                                            ! ROUTINE PUTA_BUFF


                                        .SBTTL  PUTA.BUFF GLOBAL ROUTINES
000000  010146                  PUTA.BUFF::
                                        MOV     R1, (SP)                        ;                                       2792
000002  005000                          CLR     R0                              ; COUNT                                 2801
000004  000411                          BR      3$
000006  116001  000000G         1$:     MOVB    BUFF.OWN(R0),R1                 ; *(COUNT),*                            2804
000012  020137  000000G                 CMP     R1,CCTLR
000016  001003                          BNE     2$
000020  112760  000377  000000G        MOVB    #377,BUFF.OWN(R0)               ; *,*(COUNT)                            2806
000026  005200                  2$:     INC     R0                              ; COUNT                                 2801
000030  020037  000000G         3$:     CMP     R0,NUM.BUFF                     ; COUNT,*
000034  002764                          BLT     1$
000036  012601                          MOV     (SP)+,R1                        ;                                       2792
000040  000207                          RTS     PC

; Routine Size:  17 words,      Routine Base:  $CODE$ + 5324
; Maximum stack depth per invocation:  2 words
```

```
;   2811  1     GLOBAL ROUTINE OUT_IODQ =
;   2812  1
;   2813  1     !+
;   2814  1     !       THIS ROUTINE RETURNS TO THE CALLER THE NEXT RETPKT INDEX TO BE
;   2815  1     !       PROCESSED FROM THE I/O DONE QUEUE (IODQ). THE "OUT" POINTER TO THE
;   2816  1     !       QUEUE IS ALSO UPDATED.
;   2817  1     !
;   2818  1     !       INPUTS:
;   2819  1     !               NONE
;   2820  1     !
;   2821  1     !       OUTPUTS:
;   2822  1     !               THE INDEX OF THE NEXT RETPKT TO BE PROCESSED.
;   2823  1     !-
;   2824  1
;   2825  2     BEGIN
;   2826  2
;   2827  2     LOCAL
;   2828  2         INDEX : WORD;
;   2829  2
;   2830  2     INDEX = .IODQ [.IODQ_OUT];                  ! GET NEXT RETPKT INDEX
;   2831  2     IODQ_OUT = .IODQ_OUT + 1;                   ! ADVANCE "OUT" POINTER
;   2832  2     IF .IODQ_OUT GEQU IODQ_LEN                  ! IF BEYOND END OF QUEUE
;   2833  2     THEN                                        ! THEN
;   2834  2         IODQ_OUT = 0;                           ! SET POINTER TO BEGINNING OF QUEUE
;   2835  2     RETURN .INDEX;                              ! RETURN INDEX TO CALLER
;   2836  2
;   2837  1     END;


                                .SBTTL  OUT.IODQ GLOBAL ROUTINES
000000  013700  000000G      OUT.IODQ::
                                MOV     IODQ.OUT,R0                 ;                   2830
000004  116000  000000G              MOVB    IODQ(R0),R0             ; *,INDEX
000010  042700  177400               BIC     #177400,R0              ; *,INDEX
000014  005237  000000G              INC     IODQ.OUT                ;                   2831
000020  023727  000000G 000040       CMP     IODQ.OUT,#40            ;                   2832
000026  103402                      BLO     1$
000030  005037  000000G              CLR     IODQ.OUT                ;                   2834
000034  000207               1$:    RTS     PC                      ;                   2811

; Routine Size:  15 words,      Routine Base:  $CODE$ + 5366
; Maximum stack depth per invocation:  0 words
```

```
;    2838  1     GLOBAL ROUTINE IN_IODQ (INDEX) : NOVALUE =
;    2839  1
;    2840  1     !+
;    2841  1     !       THIS ROUTINE INSERTS A RETURN PACKET INDEX INTO THE I/O DONE QUEUE, AND
;    2842  1     !       UPDATES THE IODQ_IN POINTER.
;    2843  1     !-
;    2844  1
;    2845  2     BEGIN
;    2846  2
;    2847  3     IF (((.IODQ_IN + 1) NEQU .IODQ_OUT) AND          ! IF I/O DONE QUEUE IS NOT FULL
;    2848  3         (.IODQ_IN - (IODQ_LEN - 1) NEQU .IODQ_OUT))
;    2849  2     THEN                                             ! THEN
;    2850  3         BEGIN
;    2851  3
;    2852  3         IODQ [.IODQ_IN] = .INDEX;                    ! LOAD INDEX INTO QUEUE
;    2853  3         IODQ_IN = .IODQ_IN + 1;                      ! ADVANCE "IN" POINTER
;    2854  3         IF .IODQ_IN GEQU IODQ_LEN                    ! IF BEYOND END OF QUEUE
;    2855  3         THEN                                         ! THEN
;    2856  3             IODQ_IN = 0;                             ! CYCLE BACK TO BEGINNING OF QUEUE
;    2857  3
;    2858  2         END;                                         ! IF IODQ IS NOT FULL
;    2859  2
;    2860  1     END;


                                .SBTTL  IN.IODQ GLOBAL ROUTINES
000000  010146            IN.IODQ::
                                MOV     R1,-(SP)                        ;                       2838
000002  013701  000000G        MOV     IODQ.IN,R1                      ;                       2847
000006  010100                  MOV     R1,R0
000010  005200                  INC     R0
000012  020037  000000G        CMP     R0,IODQ.OUT
000016  001421                  BEQ     1$
000020  010100                  MOV     R1,R0                           ;                       2848
000022  162700  000037          SUB     #37,R0
000026  020037  000000G        CMP     R0,IODQ.OUT
000032  001413                  BEQ     1$
000034  116661  000004  000000G  MOVB    4(SP),IODQ(R1)                  ; INDEX,*               2852
000042  005237  000000G        INC     IODQ.IN                         ;                       2853
000046  023727  000000G 000040  CMP     IODQ.IN,#40                     ;                       2854
000054  103402                  BLO     1$
000056  005037  000000G        CLR     IODQ.IN                         ;                       2856
000062  012601            1$:   MOV     (SP)+,R1                        ;                       2838
000064  000207                  RTS     PC

; Routine Size:  27 words,      Routine Base:  $CODE$ + 5424
; Maximum stack depth per invocation:  2 words
```

```
;   2861  1     GLOBAL ROUTINE DROP_CTLR (CTLR, REASON) : NOVALUE =
;   2862  1
;   2863  1     !+
;   2864  1     !       THIS ROUTINE DROPS ALL UNITS ASSOCIATED WITH THE CONTROLLER DESIGNATED
;   2865  1     !       BY "CTLR". THE REASON FOR DROPPING THE DEVICE IS LOADED INTO THE DUR
;   2866  1     !       VECTOR FOR EACH ATTACHED UNIT. THIS DATA IS THEN USED BY THE DROP UNIT
;   2867  1     !       SECTION.
;   2868  1     !-
;   2869  1
;   2870  2     BEGIN
;   2871  2
;   2872  2     LOCAL
;   2873  2         UNIT;
;   2874  2
;   2875  2     INCR OFFSET FROM (0 + OF_UN) TO (3 + OF_UN) DO  ! FOR EACH UNIT IN CST
;   2876  3         BEGIN
;   2877  3
;   2878  3         IF .CST [.CTLR, .OFFSET, P_PRES] EQLU PRESENT       ! IF UNIT IS CONFIGURED
;   2879  3         THEN
;   2880  4             BEGIN
;   2881  4
;   2882  4             UNIT = .CST [.CTLR, .OFFSET, P UNIT];           ! GET DS UNIT NUMBER
;   2883  4             DUR [.UNIT] = .REASON;                          ! SET REASON FOR DROPPING UNIT
;   2884  4             DODU (.UNIT);                                   ! DROP UNIT
;   2885  4
;   2886  3             END;
;   2888  2         END;
;   2890  1     END;

                                    .SBTTL  DROP.CTLR GLOBAL ROUTINES
000000  004137  000000G          DROP.CTLR::
                                    JSR     R1,$SAVE3                   ;                       2861
000004  016646  000014              MOV     14(SP),-(SP)                ; CTLR,*                2878
000010  012746  000007              MOV     #7,-(SP)
000014  004737  000000G              JSR     PC,BL$MUL
000020  010003                      MOV     R0,R3
000022  012702  000003              MOV     #3,R2                       ; *,OFFSET              2875
000026  010300              1$:     MOV     R3,R0                       ;                       2878
000030  060200                      ADD     R2,R0                       ; OFFSET,*
000032  006300                      ASL     R0
000034  032760  040000  000000G      BIT     #40000,CST(R0)
000042  001412                      BEQ     2$
000044  016001  000000G              MOV     CST(R0),R1                  ; *,UNIT                2882
000050  000301                      SWAB    R1                          ; UNIT
000052  042701  177740              BIC     #177740,R1                  ; *,UNIT
000056  116661  000016  000000G      MOVB    16(SP),DUR(R1)              ; REASON,*(UNIT)        2883
000064  010100                      MOV     R1,R0                       ; UNIT,*                2884
000066  104451                      TRAP    51
000070  005202              2$:     INC     R2                          ; OFFSET                2875
000072  020227  000006              CMP     R2,#6                       ; OFFSET,*
000076  003753                      BLE     1$
000100  022626                      CMP     (SP)+,(SP)+                 ;                       2870
000102  000207                      RTS     PC                          ;                       2861

; Routine Size:  34 words,      Routine Base:  $CODE$ + 5512
; Maximum stack depth per invocation:  8 words
```

```
;    2891  1     GLOBAL ROUTINE DRV_CTLERR (CTLR) : NOVALUE =
;    2892  1
;    2893  1     !+
;    2894  1     !       THIS ROUTINE IS CALLED BY DRV_TIMCHK AND FATAL_ERROR WHENEVER AN
;    2895  1     !       UNRECOVERABLE CONTROLLER ERROR HAS BEEN DETECTED. ITS PURPOSE IS TO
;    2896  1     !       CLEAN UP ALL CONTROLLER-RELATED DATA IN THE "DRIVER" PORTION OF THE
;    2897  1     !       PROGRAM. THIS INCLUDES MARKING THE CONTROLLER OFFLINE, CLEARING THE
;    2898  1     !       C-RING COUNT, AND DEALLOCATING MSCP ENVELOPES DESCRIBED IN THE RESPONSE
;    2899  1     !       RING AND OUTSTANDING COMMAND AREA (OUTC_LIST).
;    2900  1     !
;    2901  1     !       INPUTS:
;    2902  1     !               CTLR - DYING CONTROLLER NUMBER
;    2903  1     !-
;    2904  1
;    2905  2     BEGIN
;    2906  2
;    2907  2     LOCAL
;    2908  2         D_ADDR : REF BLOCK [DCT_LEN, WORD] FIELD (DC_FIELDS),       ! CONTROLLER S DCT ADDRESS
;    2909  2         INDEX : WORD,
;    2910  2         STIDX : WORD,                                               ! STARTING OUTC INDEX
;    2911  2         ENDIDX : WORD;                                              ! ENDING OUTC INDEX
;    2912  2
;    2913  2     D_ADDR = DCT + (.CTLR * DCT_LEN * 2);           ! GET CONTROLLER'S DCT ADDR
;    2914  2     D_ADDR [WORD0] = 0;                             ! MARK DCT OFFLINE AND CLEAR CRING_CNT
;    2915  2     PUTA_ENV (.CTLR);                               ! RELEASE ALL ENVELOPES ALLOCATED TO CONTROLLER
;    2916  2     STIDX = .CTLR * OUTC_CNT;                       ! START OF CTLR'S OUTC_LIST AND  TIMR
;    2917  2     ENDIDX = .STIDX + OUTC_CNT - 1;                 ! END OF OUTC
;    2918  2     INCR COUNT FROM .STIDX TO .ENDIDX DO            ! FOR EACH OUTC ENTRY
;    2919  3         BEGIN
;    2920  3
;    2921  3         OUTC_TTMR [.COUNT] = 0;                     ! TURN OF COMMAND TIMER
;    2922  3         OUTC_LIST [.COUNT] = -1;                    ! INIT SLOT
;    2923  3
;    2924  2         END;                                        ! OUTC SLOT LOOP
;    2925  2
;    2926  1     END;                                            ! ROUTINE DRV_CTLERR


                                        .SBTTL  DRV.CTLERR GLOBAL ROUTINES
000000  004137  000000G          DRV.CTLERR::
                                        JSR     R1,$SAVE2                       ;                                       2891
000004  016601  000010                  MOV     10(SP),R1                       ; CTLR,*                                2913
000010  010146                          MOV     R1,-(SP)
000012  012746  000022                  MOV     #22,-(SP)
000016  004737  000000G                 JSR     PC,BL$MUL
000022  062700  000000G                 ADD     #DCT,R0
000026  005010                          CLR     (R0)                            ; D.ADDR                                2914
000030  010116                          MOV     R1,(SP)                         ;                                       2915
000032  004737  004766'                 JSR     PC,PUTA.ENV
000036  010100                          MOV     R1,R0                           ;                                       2916
000040  006300                          ASL     R0
000042  006300                          ASL     R0
000044  006300                          ASL     R0
000046  006300                          ASL     R0
000050  010002                          MOV     R0,R2                           ; STIDX,ENDIDX                          2917
000052  062702  000017                  ADD     #17,R2                          ; *,ENDIDX
000056  010001                          MOV     R0,R1                           ; STIDX,COUNT                           2918
```

```
000060  005301                          DEC     R1                      ; COUNT
000062  000407                          BR      2$
000064  010100                  1$:     MOV     R1,R0                   ; COUNT,*                       2921
000066  006300                          ASL     R0
000070  005060  000000G                 CLR     OUTC.TIMR(R0)
000074  112761  000377  000000G         MOVB    #377,OUTC.LIST(R1)      ; *,*(COUNT)                    2922
000102  005201                  2$:     INC     R1                      ; COUNT                         2918
000104  020102                          CMP     R1,R2                   ; COUNT,ENDIDX
000106  003766                          BLE     1$
000110  022626                          CMP     (SP)+,(SP)+             ;                               2905
000112  000207                          RTS     PC                      ;                               2891

; Routine Size:  38 words,      Routine Base:  $CODE$ + 5616
; Maximum stack depth per invocation:  6 words
```

```
;    2927  1     GLOBAL ROUTINE HARD_ERR (ERRCNT) : NOVALUE =
;    2928  1
;    2929  1     !+
;    2930  1     !       THIS ROUTINE IS CALLED BY IO_RETPKT, DM_TALLY, AND OTHERS TO UPDATE THE
;    2931  1     !       HARD ERROR STATISTIC FIELD FOR THE CURRENT UNIT. IF THE HARD ERROR
;    2932  1     !       COUNT HAS EXCEEDED THE OPERATOR-SPECIFIED LIMIT, THEN THE UNIT IS
;    2933  1     !       DROPPED FROM TESTING.
;    2934  1     !
;    2935  1     !       INPUTS:
;    2936  1     !               ERRCNT - NUMBER OF HARD ERRORS TO ADD TO CURRENT TOTAL
;    2937  1     !
;    2938  1     !       IMPLICIT INPUTS:
;    2939  1     !               L$LUN - CURRENT UNIT NUMBER
;    2940  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;    2941  1     !               CUOFF - CST OFFSET FOR CURRENT UNIT
;    2942  1     !               T_ADDR - ADDRESS OF CURRENT UNIT'S STATISTICS BLOCK (TALLY)
;    2943  1     !-
;    2944  1
;    2945  2     BEGIN
;    2946  2
;    2947  2     T_ADDR [ER_HRD] = .T_ADDR [ER_HRD] + .ERRCNT;   ! UPDATE UNIT'S HARD ERROR COUNT
;    2948  2     IF .SWP_ERROR NEQU 0                            ! IF THE USER SPECIFIED A HARD ERROR LIMIT
;    2949  2     THEN                                            ! THEN
;    2950  3         BEGIN
;    2951  3
;    2952  3         IF .T_ADDR [ER_HRD] GEQU .SWP_ERROR         ! IF HARD ERROR LIMIT REACHED
;    2953  3         THEN                                        ! THEN
;    2954  4             BEGIN
;    2955  4
;    2956  4             IF .CST_ADDR [.CUOFF, P_STAT] EQLU ONLINE       ! IF UNIT IS STILL ONLINE
;    2957  4             THEN                                            ! THEN
;    2958  5                 BEGIN
;    2959  5
;    2960  5                 DUR [.L$LUN] = DU_HERR;                     ! LOAD REASON TO DROP UNIT
;    2961  5                 DODU (.L$LUN);                              ! DROP UNIT
;    2962  5
;    2963  4                 END;
;    2964  4
;    2965  3             END;                                    ! IF HARD ERROR LIMIT REACHED
;    2966  3
;    2967  2         END;                                        ! IF THE USER SPECIFIED A HARD ERROR LIMIT
;    2968  2
;    2969  1     END;                                            ! ROUTINE HARD_ERR


                                .SBTTL  HARD.ERR GLOBAL ROUTINES
000000  010146            HARD.ERR::
                                MOV     R1,-(SP)                ;                       2927
000002  013700  000000G            MOV     T.ADDR,R0               ;                       2947
000006  066660  000004  000030     ADD     4(SP),30(R0)            ; ERRCNT,*
000014  013701  000000G            MOV     SWP.ERROR,R1            ;                       2948
000020  001421                     BEQ     1$
000022  026001  000030             CMP     30(R0),R1               ;                       2952
000026  103416                     BLO     1$
000030  013700  000000G            MOV     CUOFF,R0                ;                       2956
000034  006300                     ASL     R0
000036  063700  000000G            ADD     CST.ADDR,R0
```

```
000042  032710  020000                          BIT     #20000,(R0)
000046  001406                                  BEQ     1$
000050  013700  000000G                         MOV     L$LUN,R0                        ;                       2960
000054  112760  000003  000000G                 MOVB    #3,DUR(R0)
000062  104451                                  TRAP    5I                              ;                       2961
000064  012601                          1$:     MOV     (SP)+,R1                        ;                       2927
000066  000207                                  RTS     PC

; Routine Size:  28 words,      Routine Base:  $CODE$ + 5732
; Maximum stack depth per invocation:  3 words
```

```
;    2970  1     GLOBAL ROUTINE UPD_IOC (ADDR, COUNT) : NOVALUE =
;    2971  1
;    2972  1     !+
;    2973  1     !       THIS ROUTINE IS CALLED (A) DURING THE MULTI-DRIVE SUBTEST FROM MD_TALLY
;    2974  1     !       FOR ALL I/O TRANSFER RETURN PACKETS WITH "SUCCESS" STATUS CODES, AND
;    2975  1     !       (B) DURING THE DM EXERCISER SUBTEST FROM DM_TALLY WHEN EXAMINING THE
;    2976  1     !       COMMUNICATION AREA (DM_COMM). ITS PURPOSE IS TO UPDATE THE I/O COUNT
;    2977  1     !       (NUMBER OF READS, WRITES, OR SEEKS) FOR THE CURRENT UNIT.
;    2978  1     !
;    2979  1     !       AFTER THE LOW-ORDER FIELD OF THE APPROPRIATE COUNT IS UPDATED, THIS
;    2980  1     !       ROUTINE CHECKS FOR ONE OF TWO OVERFLOW CONDITIONS: (A) IF THE
;    2981  1     !       HIGH ORDER FIELD OF THE COUNT IS ZERO, THEN THE LOW-ORDER FIELD IS
;    2982  1     !       CHECKED FOR EXCEEDING 65,000. IF TRUE, THEN THE HIGH-ORDER FIELD IS
;    2983  1     !       LOADED WITH 65 (FOR 65,000) AND THE LOW-ORDER FIELD IS REDUCED BY
;    2984  1     !       65,000. (B) IF THE HIGH-ORDER FIELD OF THE UPDATED COUNT IS NON ZERO,
;    2985  1     !       THEN THE LOW-ORDER FIELD IS CHECKED FOR EXCEEDING 1000. IF TRUE, THEN
;    2986  1     !       THE HIGH-ORDER FIELD IS INCREMENTED BY 1 FOR EACH 1000 SUBTRACTED FROM
;    2987  1     !       THE LOW-ORDER FIELD.
;    2988  1     !
;    2989  1     !       INPUTS:
;    2990  1     !               ADDR - ADDRESS OF THE LOW-ORDER FIELD OF THE I/O COUNT TO BE
;    2991  1     !                      UPDATED (IN THE CURRENT UNIT'S STATISTICS TABLE (TALLY))
;    2992  1     !               COUNT - AMOUNT TO BE ADDED TO THE I/O COUNT
;    2993  1     !-
;    2994  1
;    2995  2     BEGIN
;    2996  2
;    2997  2     .ADDR = ..ADDR + .COUNT;                    ! UPDATE THE COUNT (LOW-ORDER FIELD)
;    2998  2     IF .(.ADDR + 2) EQLU 0                      ! IF HIGH-ORDER FIELD IS ZERO
;    2999  2     THEN                                        ! THEN
;    3000  3         BEGIN
;    3001  3
;    3002  3         IF ..ADDR GEQU 65000                    ! IF LOW-ORDER FIELD EXCEEDS 65,000
;    3003  3         THEN                                    ! THEN
;    3004  4             BEGIN
;    3005  4
;    3006  4             .ADDR = ..ADDR - 65000;             ! BECOMES LOW-ORDER 1000
;    3007  4             (.ADDR + 2) = 65;                   ! HIGH-ORDER (TIMES 1000)
;    3008  4
;    3009  3             END;
;    3010  3
;    3011  3         END
;    3012  2     ELSE                                        ! ELSE - HIGH-ORDER FIELD IS X1000
;    3013  3         BEGIN
;    3014  3
;    3015  3         WHILE ..ADDR GEQU 1000 DO               ! WHILE LOW-ORDER FIELD EXCEEDS 1000
;    3016  4             BEGIN
;    3017  4
;    3018  4             .ADDR = ..ADDR - 1000;              ! SUBTRACT 1000 FROM LOW-ORDER FIELD
;    3019  4             (.ADDR + 2) = .(.ADDR + 2) + 1;     ! INCREMENT HIGH-ORDER FIELD
;    3020  4
;    3021  3             END;
;    3022  3
;    3023  2         END;
;    3024  2
;    3025  1     END;                                        ! ROUTINE UPD_IOC
```

```
                                .SBTTL  UPD.IOC GLOBAL ROUTINES
000000  010146                  UPD.IOC::
                                        MOV     R1,-(SP)                ;                               2970
000002  016600  000006                  MOV     6(SP),R0                ; ADDR,*                        2997
000006  066610  000004                  ADD     4(SP),(R0)              ; COUNT,*
000012  012701  000002                  MOV     #2,R1                   ;                               2998
000016  060001                          ADD     R0,R1
000020  005711                          TST     (R1)
000022  001010                          BNE     1$
000024  021027  176750                  CMP     (R0),#176750            ;                               3002
000030  103414                          BLO     2$
000032  062710  001030                  ADD     #1030,(R0)              ;                               3006
000036  012711  000101                  MOV     #101,(R1)               ;                               3007
000042  000407                          BR      2$                      ;                               2998
000044  021027  001750          1$:     CMP     (R0),#1750              ;                               3015
000050  103404                          BLO     2$
000052  162710  001750                  SUB     #1750,(R0)              ;                               3018
000056  005211                          INC     (R1)                    ;                               3019
000060  000771                          BR      1$                      ;                               3015
000062  012601                  2$:     MOV     (SP)+,R1                ;                               2970
000064  000207                          RTS     PC

; Routine Size:  27 words,      Routine Base:  $CODE$ + 6022
; Maximum stack depth per invocation:  2 words
```

```
;    3026  1     GLOBAL ROUTINE OVF_CHK (ADDR) : NOVALUE =
;    3027  1
;    3028  1     !+
;    3029  1     !       THIS ROUTINE IS CALLED (A) DURING THE MULTI-DRIVE SUBTEST FROM MD_TALLY
;    3030  1     !       FOR ALL I/O TRANSFER RETURN PACKETS WITH "SUCCESS" STATUS CODES, AND
;    3031  1     !       (B) DURING THE DM EXERCISER SUBTEST FROM DM_TALLY WHEN EXAMINING THE
;    3032  1     !       COMMUNICATION AREA (DM_COMM). ITS PURPOSE IS TO CHECK FOR OVERFLOW IN
;    3033  1     !       CERTAIN STATISTICAL FIELDS OF THE CURRENT UNIT. SPECIFICALLY, THE
;    3034  1     !       LOW-ORDER FIELD OF THE NUMBER OF BYTES READ OR WRITTEN IS CHECKED FOR
;    3035  1     !       EXCEEDING 1000. IF TRUE  THEN THE HIGH-ORDER COUNT IS INCREMENTED. IF
;    3036  1     !       THAT EXCEEDS 1000, THEN THE MEGABYTE COUNT IS INCREMENTED.
;    3037  1     !
;    3038  1     !       INPUTS:
;    3039  1     !               ADDR - ADDRESS OF THE BR_LO OR BW_LO FIELD FOR THE CURRENT UNIT
;    3040  1     !                       (SEE STATISTIC TABLE (TALLY) LAYOUT)
;    3041  1     !-
;    3043  2     BEGIN
;    3044  2
;    3045  2     WHILE ..ADDR GEQU 1000 DO                       ! IF LO-ORDER OVERFLOW
;    3046  3         BEGIN
;    3047  3
;    3048  3         .ADDR = ..ADDR - 1000;                      ! SUBTRACT 1000
;    3049  3         (.ADDR + 2) = .(.ADDR + 2) + 1;             ! INCR HI-ORDER
;    3050  3
;    3051  2         END;
;    3052  2
;    3053  2     IF .(.ADDR + 2) GEQU 1000                       ! IF HI-ORDER OVERFLOW
;    3054  2     THEN                                            ! THEN
;    3055  3         BEGIN
;    3056  3
;    3057  3         (.ADDR + 2) = .(.ADDR + 2) - 1000;          ! SUBTRACT 1000
;    3058  3         (.ADDR + 4) = .(.ADDR + 4) + 1;             ! INCREMENT MBYTES
;    3059  3
;    3060  2         END;
;    3062  1     END;                                            ! ROUTINE OVF_CHK

                                        .SBTTL  OVF.CHK GLOBAL ROUTINES
000000  010146                  OVF.CHK::
                                        MOV     R1,-(SP)                ;                       3026
000002  016600  000004                  MOV     4(SP),R0                ; ADDR,*                3045
000006  012701  000002                  MOV     #2,R1                   ;                       3049
000012  060001                          ADD     R0,R1
000014  021027  001750          1$:     CMP     (R0),#1750              ;                       3045
000020  103404                          BLO     2$
000022  162710  001750                  SUB     #1750,(R0)              ;                       3043
000026  005211                          INC     (R1)                    ;                       3049
000030  000771                          BR      1$                      ;                       3045
000032  021127  001750          2$:     CMP     (R1),#1750              ;                       3053
000036  103404                          BLO     3$
000040  162711  001750                  SUB     #1750,(R1)              ;                       3057
000044  005260  000004                  INC     4(R0)                   ;                       3058
000050  012601                  3$:     MOV     (SP)+,R1                ;                       3026
000052  000207                          RTS     PC

; Routine Size:  22 words,      Routine Base:  $CODE$ + 6110
; Maximum stack depth per invocation:  2 words
```

```
;    3063  1     GLOBAL ROUTINE XFR_CHK : NOVALUE =
;    3064  1
;    3065  1     !+
;    3066  1     !       THIS ROUTINE IS CALLED (A) DURING THE MULTI-DRIVE SUBTEST FROM MD_TALLY
;    3067  1     !       FOR ALL I/O TRANSFER RETURN PACKETS WITH "SUCCESS" STATUS CODES, AND
;    3068  1     !       (B) DURING THE DM EXERCISER SUBTEST FROM DM_TALLY WHEN EXAMINING THE
;    3069  1     !       COMMUNICATION AREA (DM_COMM). ITS PURPOSE IS TO CALCULATE THE TOTAL
;    3070  1     !       NUMBER OF BYTES TRANSFERRED THUS FAR ON THE CURRENT UNIT, AND TO CHECK
;    3071  1     !       THIS SUM AGAINST THE OPERATOR-SPECIFIED LIMIT. IF THE LIMIT HAS BEEN
;    3072  1     !       REACHED, THEN THE UNIT IS REMOVED FROM THE CURRENT PASS.
;    3073  1     !
;    3074  1     !       IMPLICIT INPUTS:
;    3075  1     !               T_ADDR - ADDRESS OF THE CURRENT UNIT'S STATISTICS BLOCK (TALLY)
;    3076  1     !               L$LUN - CURRENT UNIT NUMBER
;    3077  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;    3078  1     !               DMC_ADDR - ADDRESS OF CURRENT CONTROLLER'S DM_COMM AREA
;    3079  1     !               CUOFF - CST OFFSET FOR CURRENT UNIT
;    3080  1     !-
;    3081  1
;    3082  2     BEGIN
;    3083  2
;    3084  2     LOCAL
;    3085  2         SUM : WORD;                                     ! TOTAL NUMBER OF BYTES TRANSFERRED TO/FROM A UNIT
;    3086  2
;    3087  2     IF .SWP_XFER NEQU 0                                 ! IF A TRANSFER LIMIT WAS SPECIFIED
;    3088  2     THEN                                                ! THEN
;    3089  3         BEGIN
;    3090  3
;    3091  3         SUM = .T_ADDR [MB_READ] + .T_ADDR [MB WRIT];        ! TOTAL BYTES TRANSFERRED
;    3092  3         IF .SUM GEQU .SWP_XFER                              ! IF TRANSFER LIMIT IS REACHED
;    3093  3         THEN                                                ! THEN
;    3094  4             BEGIN
;    3095  4
;    3096  4             CPT [.L$LUN] = NO;                              ! MARK UNIT INACTIVE
;    3097  4             CST_ADDR [U_CNT] = .CST_ADDR [U_CN ] - 1;       ! DECREMENT ACTIVE UNIT COUNT
;    3098  4             DMC_ADDR [.CUOFF - OF_UN, ALLBIT] = -1;         ! IF DM EXER, STOP FPT ON UNIT
;    3099  5             IF MANUAL                                       ! IF ATTENDED
;    3100  4             THEN                                            ! THEN
;    3101  5                 BEGIN
;    3102  5
;    3103  5                 PRINTF (CRLF);
;    3104  5                 PRINTF (ETIME, .HOURS, .MINUTES, .SECONDS); ! ELAPSED TIME
;    3105  5                 PRINTF (MSG_07, .L$LUN);                    ! 'UNIT XX. - TRANSFER LIMIT REACHED"
;    3106  5
;    3107  4                 END;
;    3108  4
;    3109  3             END;
;    3110  3
;    3111  2         END;                                            ! IF A TRANSFER LIMIT WAS SPECIFIED
;    3112  2
;    3113  1     END;                                                ! ROUTINE XFR CHK


                                        .SBTTL  XFR.CHK GLOBAL ROUTINES
000000  004137  000000G          XFR.CHK::
                                        JSR     R1,$SAVE2                       ;                       3063
000004  013702  000000G                 MOV     SWP.XFER,R2                     ;                       3087
```

```
000010  001467                          BEQ     1$
000012  013701  000000G                 MOV     T.ADDR,R1               ;                               3091
000016  010100                          MOV     R1,R0                   ; T.ADDR,*
000020  016101  000020                  MOV     20(R1),R1               ; *,SUM
000024  066001  000026                  ADD     26(R0),R1               ; *,SUM
000030  020102                          CMP     R1,R2                   ; SUM,*                         3092
000032  103456                          BLO     1$
000034  013700  000000G                 MOV     L$LUN,R0                ;                               3096
000040  105060  000000G                 CLRB    CPT(R0)
000044  013700  000000G                 MOV     CST.ADDR,R0             ;                               3097
000050  105360  000005                  DECB    5(R0)
000054  013700  000000G                 MOV     CUOFF,R0                ;                               3098
000060  006300                          ASL     R0
000062  063700  000000G                 ADD     DMC.ADDR,R0
000066  012760  177777  177772         MOV     #1,-6(R0)
000074  104450                          TRAP    50                      ;                               3099
000076  103034                          BHIS    1$
000100  012746  000000G                 MOV     #CRLF,-(SP)             ;                               3103
000104  012746  000001                  MOV     #1,-(SP)
000110  010600                          MOV     SP,R0                   ; SP,*
000112  104417                          TRAP    17
000114  013716  000000G                 MOV     SECONDS,(SP)            ;                               3104
000120  013746  000000G                 MOV     MINUTES,-(SP)
000124  013746  000000G                 MOV     HOURS,-(SP)
000130  012746  000000G                 MOV     #ETIME,-(SP)
000134  012746  000004                  MOV     #4,-(SP)
000140  010600                          MOV     SP,R0                   ; SP,*
000142  104417                          TRAP    17
000144  013716  000000G                 MOV     L$LUN,(SP)              ;                               3105
000150  012746  000000G                 MOV     #MSG.07,-(SP)
000154  012746  000002                  MOV     #2,-(SP)
000160  010600                          MOV     SP,R0                   ; SP,*
000162  104417                          TRAP    17
000164  062706  000020                  ADD     #20,SP                  ;                               3101
000170  000207                  1$:     RTS     PC                      ;                               3063

; Routine Size:  61 words,      Routine Base:  $CODE$ + 6164
; Maximum stack depth per invocation:  13 words
```

```
;  3114  1     GLOBAL ROUTINE SEND (INDEX) =
;  3115  1
;  3116  1     !+
;  3117  1     !       IF THE CURRENT RC25 IS ONLINE AND ITS CRING IS NOT FULL, THEN THIS
;  3118  1     !       ROUTINE "SENDS' A COMMAND TO THE RC25 BY LOADING THE ENVELOPE
;  3119  1     !       DESCRIPTOR OF AN MSCP ENVELOPE INTO THE COMMAND RING AND READING THE
;  3120  1     !       DEVICE S IP REGISTER. A RECORD OF THE SENT COMMAND IS MADE IN THE
;  3121  1     !       CONTROLLER'S OWN OUTSTANDING COMMAND LIST (OUTC_LIST), AND A COMMAND
;  3122  1     !       TIMER IS STARTED IN THE OUTSTANDING COMMAND TIMER (OUTC_TIMR). IF THE
;  3123  1     !       CURRENT RC25 IN NOT ONLINE, THEN A FAILURE INDICATION IS RETURNED TO
;  3124  1     !       THE CALLER, AND NO ACTION IS TAKEN.
;  3125  1     !
;  3126  1     !       INPUTS:
;  3127  1     !               INDEX - INDEX OF MSCP ENVELOPE CONTAINING THE COMMAND TO
;  3128  1     !                       BE SENT
;  3129  1     !
;  3130  1     !       IMPLICIT INPUTS:
;  3131  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;  3132  1     !               DCT_ADDR - ADDRESS OF CURRENT CONTROLLER'S DCT
;  3133  1     !               OCL_X1, OCL_X2 - STARTING/ENDING INDECES OF CURRENT
;  3134  1     !                                       CONTROLLER'S OUTSTANDING COMMAND AREA
;  3135  1     !-
;  3136  1
;  3137  2     BEGIN
;  3138  2
;  3139  2     LOCAL
;  3140  2         SLOT_ADDR,
;  3141  2         TEMP : WORD;
;  3142  2
;  3143  3     IF ((.DCT ADDR [STAT] EQLU ONLINE) AND                  ! IF DEVICE IS ONLINE AND
;  3144  3         (.DCT_ADDR [CRING CNT] LSSU CRING_LEN))             ! ITS CRING IS NOT FULL
;  3145  2     THEN
;  3146  3         BEGIN
;  3147  3
;  3148  3         MSCP_ENV [.INDEX, CRN_LO] = (CRN = .CRN + 1);       ! ASSIGN CMD REF NUM
;  3149  3         SLOT_ADDR = .DCT ADDR [CR_NEXT];                    ! ADDR OF NEXT COMMAND SLOT
;  3150  3         .SLOT_ADDR = .MSCP_ENV [.INDEX, ENV_LO];            ! LOAD ENV DESC (LO) INTO COMMAND SLOT
;  3151  3         SLOT_ADDR = .SLOT ADDR + 2;                         ! ADVANCE TO NEXT WORD
;  3152  3         .SLOT_ADDR = .MSCP_ENV [.INDEX, ENV_HI];            ! LOAD ENV DESC (HI) INTO COMMAND SLOT
;  3153  3         SLOT_ADDR = .SLOT_ADDR + 2;                         ! ADVANCE TO NEXT COMMAND SLOT
;  3154  3         IF .SLOT_ADDR GTRA .DCT ADDR [CR_END]               ! IF BEYOND END OF CRING
;  3155  3         THEN                                                ! THEN
;  3156  3             SLOT_ADDR = .DCT_ADDR [CR_BEG];                 ! CYCLE BACK TO BEGINNING
;  3157  3         DCT_ADDR [CR NEXT] = .SLOT_ADDR;                    ! RESTORE CR_NEXT POINTER IN DCT
;  3158  3         DCT_ADDR [CRING_CNT] = .DCT_ADDR [CRING_CNT] + 1;   ! INCR # OF COMMANDS IN CRING
;  3159  3
;  3160  3         INCR COUNT FROM .OCL_X1 TO .OCL_X2 DO               ! FOR EACH OUTC ENTRY
;  3161  4             BEGIN
;  3162  4
;  3163  4             IF .OUTC_LIST [.COUNT] LSS 0                    ! IF A SPARE SLOT IS FOUND
;  3164  4             THEN
;  3165  5                 BEGIN
;  3166  5
;  3167  5                 OUTC_LIST [.COUNT] = .INDEX;                ! LOAD MSCP_ENV INDEX
;  3168  5                 IF .IIP_FLAG                                ! IF INIT SUBTEST IN PROGRESS
;  3169  5                 THEN                                        ! THEN
;  3170  5                     OUTC_TIMR [.COUNT] = TO_INIT            ! SET INIT SUBTEST COMMAND TIMER
```

```
;   3171  5                 ELSE                                        ! OTHERWISE
;   3172  6                     BEGIN
;   3173  6
;   3174  7                     IF BIT_TST (SWP_FLAGS, SWF_DM)          ! IF DM EXERCISER IS BEING RUN
;   3175  6                     THEN                                    ! THEN
;   3176  6                         OUTC_TIMR [.COUNT] = TO_DUP         ! SET DUP COMMAND TIMER
;   3177  6                     ELSE                                    ! OTHERWISE
;   3178  6                         OUTC_TIMR [.COUNT] = TO_IO;         ! SET I/O TRANSFER COMMAND TIMER
;   3179  6
;   3180  5                     END;
;   3181  5
;   3182  5                 EXITLOOP;
;   3183  5
;   3184  4                 END;                                        ! IF A SPARE SLOT IS FOUND
;   3185  4
;   3186  3             END;                                            ! OUTC_LIST SEARCH LOOP
;   3187  3
;   3188  3         TEMP = .RC25_ADDR [RCIP, RC_ALL];                   ! READ IP TO FORCE PORT TO POLL
;   3189  3         RETURN SUCCESS;
;   3190  3
;   3191  3         END
;   3192  2     ELSE                                                    ! IF DEVICE IS NOT ONLINE
;   3193  2         RETURN FAILURE;
;   3194  2
;   3195  1     END;                                                    ! ROUTINE SEND


                                        .SBTTL  SEND GLOBAL ROUTINES
000000  004137  000000G           SEND::  JSR     R1,$SAVE2                   ;                       3114
000004  005746                          TST     -(SP)
000006  013701  000000G                   MOV     DCT.ADDR,R1                 ;                       3143
000012  005711                          TST     (R1)
000014  100110                          BPL     7$
000016  121127  000010                  CMPB    (R1),#10                    ;                       3144
000022  103105                          BHIS    7$
000024  016646  000012                  MOV     12(SP),-(SP)                ; INDEX,*               3148
000030  012746  000104                  MOV     #104,-(SP)
000034  004737  000000G                 JSR     PC,BL$MUL
000040  013702  000000G                 MOV     CRN,R2
000044  005202                          INC     R2
000046  010237  000000G                 MOV     R2,CRN
000052  010260  000010G                 MOV     R2,MSCP.ENV+10(R0)
000056  016102  000020                  MOV     20(R1),R2                   ; *,SLOT.ADDR           3149
000062  016022  000000G                 MOV     MSCP.ENV(R0),(R2)+          ; *,SLOT.ADDR           3150
000066  016022  000002G                 MOV     MSCP.ENV+2(R0),(R2)+        ; *,SLOT.ADDR           3152
000072  020261  000012                  CMP     R2,12(R1)                   ; SLOT.ADDR,*           3154
000076  101402                          BLOS    1$
000100  016102  000010                  MOV     10(R1),R2                   ; *,SLOT.ADDR           3156
000104  010261  000020          1$:     MOV     R2,20(R1)                   ; SLOT.ADDR,*           3157
000110  105211                          INCB    (R1)                        ;                       3158
000112  013701  000000G                 MOV     OCL.X1,R1                   ; *,COUNT               3160
000116  005301                          DEC     R1                          ; COUNT
000120  000433                          BR      5$
000122  105761  000000G          2$:     TSTB    OUTC.LIST(R1)               ; *(COUNT)              3163
000126  002030                          BGE     5$
000130  116661  000016  000000G         MOVB    16(SP),OUTC.LIST(R1)        ; INDEX,*(COUNT)        3167
000136  010100                          MOV     R1,R0                       ; COUNT,*               3170
```

```
000140  006300                          ASL     R0
000142  062700  000000G                 ADD     #OUTC.TIMR,R0
000146  132737  000001  000000G         BITB    #1,IIP.FLAG                     ;                       3168
000154  001403                          BEQ     3$
000156  012710  000170                  MOV     #170,(R0)                       ;                       3170
000162  000416                          BR      6$                              ;                       3168
000164  132737  000002  000000G  3$:     BITB    #2,SWP.FLAGS                    ;                       3174
000172  001403                          BEQ     4$
000174  012710  000036                  MOV     #36,(R0)                        ;                       3176
000200  000407                          BR      6$                              ;                       3174
000202  012710  000454          4$:     MOV     #454,(R0)                       ;                       3178
000206  000404                          BR      6$                              ;                       3165
000210  005201                  5$:     INC     R1                              ; COUNT                 3160
000212  020137  000000G                 CMP     R1,OCL.X2                       ; COUNT,*
000216  003741                          BLE     2$
000220  017766  000000G 000004  6$:     MOV     @RC25.ADDR,4(SP)                ; *,RC.REG              3188
000226  022626                          CMP     (SP)+,(SP)+                     ;                       3146
000230  012700  000001                  MOV     #1,R0                           ;                       3193
000234  000401                          BR      8$
000236  005000                  7$:     CLR     R0
000240  005726                  8$:     TST     (SP)+                           ;                       3114
000242  000207                          RTS     PC

; Routine Size:  82 words,      Routine Base:  $CODE$ + 6356
; Maximum stack depth per invocation:  7 words
```

```
;  3196  1     GLOBAL ROUTINE WAIT : NOVALUE =
;  3197  1
;  3198  1     !+
;  3199  1     !       THIS ROUTINE IS CALLED DURING THE INITIALIZATION SUBTEST AFTER EACH
;  3200  1     !       MSCP MESSAGE IS SENT TO A DEVICE. ITS PURPOSE IS TO LOCATE THE LONE
;  3201  1     !       OUTSTANDING COMMAND AND TO MAINTAIN ITS TIMER UNITL EITHER 'A) THE
;  3202  1     !       DEVICE RESPONDS TO THE COMMAND THROUGH AN RC25 INTERRUPT, RESULTING IN
;  3203  1     !       A RETURN PACKET BEING DEPOSITED INTO THE I/O DONE QUEUE (IODQ), OR (B)
;  3204  1     !       THE COMMAND MESSAGE TIMER EXPIRES.
;  3205  1     !
;  3206  1     !       IMPLICIT INPUTS:
;  3207  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;  3208  1     !               OCL_X1, OCL_X2 - STARTING/ENDING INDECES OF CURRENT
;  3209  1     !                                       CONTROLLER'S OUTSTANDING COMMAND AREA
;  3210  1     !-
;  3211  1
;  3212  2     BEGIN
;  3213  2
;  3214  2     LOCAL
;  3215  2         CX : SIGNED WORD,                                   ! OUTSTANDING COMMAND'S OUTC_LIST INDEX
;  3216  2         MX : WORD,                                          ! INDEX OF MSCP COMMAND ENVELOPE
;  3217  2         RX : WORD,                                          ! RETURN PACKET INDEX
;  3218  2         M_ADDR,                                             ! MSCP ENV ADDRESS
;  3219  2         R_ADDR : REF BLOCK [RP_LEN, WORD] FIELD (RP_FIELDS); ! RETURN PACKET ADDRESS
;  3220  2
;  3221  2     CX =  1;                                                ! ASSUME COMMAND NOT FOUND
;  3222  2     INCR COUNT FROM .OCL_X1 TO .OCL_X2 DO                   ! SEARCH OUTC_LIST FOR THE
;  3223  3         BEGIN                                               !     OUTSTANDING COMMAND
;  3224  3
;  3225  3         IF .OUTC_LIST [.COUNT] GEQ 0                        ! IF THIS IS IT
;  3226  3         THEN                                                ! THEN
;  3227  4             BEGIN
;  3228  4
;  3229  4             CX = .COUNT;                                    ! SAVE OUTC INDEX OF COMMAND
;  3230  4             EXITLOOP;                                       ! DONE HERE
;  3231  4
;  3232  3             END;
;  3233  3
;  3234  2         END;
;  3235  2
;  3236  2     T_FLAG = FALSE;                                         ! CLEAR ONE SECOND TIMING FLAG
;  3237  2     DO                                                      ! REPEAT UNITL RC25 INTERRUPT
;  3238  3         BEGIN                                               !     OR TIMEOUT
;  3239  3
;  3240  3         IF .T_FLAG                                          ! IF ONE SECOND HAS ELAPSED
;  3241  3         THEN                                                ! THEN
;  3242  4             BEGIN
;  3243  4
;  3244  4             IF .CX GEQ 0                                    ! IF OUTSTANDING COMMAND WAS FOUND
;  3245  4             THEN                                            ! THEN
;  3246  5                 BEGIN
;  3247  5
;  3248  5                 SETPRI (PRI05);                             ! LOCK OUT RC25 INTERRUPTS
;  3249  5                 IF .OUTC_TIMR [.CX] GTRU 0                  ! IF TIMER STILL ACTIVE
;  3250  5                 THEN                                        ! THEN
;  3251  6                     BEGIN
;  3252  6
```

```
;  3253  6                    OUTC_TIMR [.CX] = .OUTC_TIMR [.CX] - 1; ! DECREMENT TIMER
;  3254  6                    IF .OUTC_TIMR [.CX] EQLU 0              ! IF MESSAGE HAS TIMED OUT
;  3255  6                    THEN                                    ! THEN
;  3256  7                        BEGIN
;  3257  7
;  3258  7                        RX = GET_RETPKT (.CCTLR);                   ! GET A RETURN PACKET
;  3259  7                        MX = .OUTC_LIST [.CX];                      ! GET COMMAND ENV INDEX
;  3260  7                        R_ADDR = RETPKT + (.RX * RP_LEN * 2);       ! CALCULATE RETPKT ADDRESS
;  3261  7                        M_ADDR = MSCP_ENV + (.MX * ENV_LEN * 2);    ! CALCULATE ENV ADDR
;  3262  7                        COPY_BLK (.M_ADDR + 4, .R_ADDR, RP_LEN);    ! COPY COMMAND TO RETPKT
;  3263  7                        R_ADDR [CONID] = CID_DRIVER;                ! SET PACKET SOURCE AS "DRIVER"
;  3264  7                        R_ADDR [MESTYP] = MT_TIMEOUT;               ! COMMAND TIMEOUT
;  3265  7                        R_ADDR [CTLR] = .CCTLR;                     ! CONTROLLER NUMBER
;  3266  7                        IN_IODQ (.RX);                              ! "SEND" THE PACKET
;  3267  7                        PUT_ENV (.MX);                              ! RETURN COMMAND ENV TO POOL
;  3268  7                        OUTC_LIST [.CX] = -1;                       ! INIT OUTC_LIST ENTRY
;  3269  7
;  3270  6                        END;                                    ! IF MESSAGE TIMER EXPIRED
;  3271  6
;  3272  5                    END;                                ! IF TIMER STILL ACTIVE
;  3273  5
;  3274  5                SETPRI (PRI00);                         ! RESTORE INIT SUBTEST PRIORITY
;  3275  5
;  3276  4                END;                                    ! IF OUTSTANDING COMMAND WAS FOUND
;  3277  4
;  3278  4            T_FLAG = FALSE;                             ! CLEAR ONE SECOND TIMING FLAG
;  3279  4
;  3280  3            END;                                        ! IF ONE SECOND HAS ELAPSED
;  3281  3
;  3282  3        END                                             ! UNTIL A PACKET IS "SENT" FROM HERE
;  3283  2    UNTIL .IODQ_IN NEQU .IODQ_OUT;                      !     OR RC25 INTERRUPT PROCESSING
;  3284  2
;  3285  1    END;                                                ! ROUTINE WAIT


                                        .SBTTL  WAIT GLOBAL ROUTINES
000000  004137  000000G           WAIT::  JSR     R1,$SAVE5               ;                       3196
000004  012701  177777                   MOV     #-1,R1                  ; *,CX                  3221
000010  013700  000000G                   MOV     OCL.X1,R0               ; *,COUNT               3222
000014  060100                           ADD     R1,R0                   ; *,COUNT
000016  000405                           BR      2$
000020  105760  000000G           1$:     TSTB    OUTC.LIST(R0)           ; *(COUNT)              3225
000024  002402                           BLT     2$
000026  010001                           MOV     R0,R1                   ; COUNT,CX              3229
000030  000404                           BR      3$                      ;                       3227
000032  005200                   2$:     INC     R0                      ; COUNT                 3222
000034  020037  000000G                   CMP     R0,OCL.X2               ; COUNT,*
000040  003767                           BLE     1$
000042  105037  000000G           3$:     CLRB    T.FLAG                  ;                       3236
000046  132737  000001  000000G 4$:     BITB    #1,T.FLAG               ;                       3240
000054  001510                           BEQ     7$
000056  005701                           TST     R1                      ; CX                    3244
000060  002504                           BLT     6$
000062  012700  000240                   MOV     #240,R0                 ;                       3248
000066  104441                           TRAP    41
000070  010100                           MOV     R1,R0                   ; CX,*                  3249
000072  006300                           ASL     R0
```

```
000074  062700  000000G                 ADD     #OUTC.TIMR,R0
000100  005710                          TST     (R0)
000102  001471                          BEQ     5$
000104  005310                          DEC     (R0)                    ;                       3253
000106  001067                          BNE     5$                      ;                       3254
000110  013746  000000G                 MOV     CCTLR,-(SP)             ;                       3258
000114  004737  005026'                 JSR     PC,GET.RETPKT
000120  010004                          MOV     R0,R4                   ; *,RX
000122  116103  000000G                 MOVB    OUTC.LIST(R1),R3        ; *(CX),MX              3259
000126  010416                          MOV     R4,(SP)                 ; RX,*                  3260
000130  012746  000060                  MOV     #60,-(SP)
000134  004737  000000G                 JSR     PC,BL$MUL
000140  062700  000000G                 ADD     #RETPKT,R0
000144  010002                          MOV     R0,R2                   ; *,R.ADDR
000146  010316                          MOV     R3,(SP)                 ; MX,*                  3261
000150  012746  000104                  MOV     #104,-(SP)
000154  004737  000000G                 JSR     PC,BL$MUL
000160  062700  000000G                 ADD     #MSCP.ENV,R0
000164  010005                          MOV     R0,R5                   ; *,M.ADDR
000166  010516                          MOV     R5,(SP)                 ; M.ADDR,*              3262
000170  062716  000004                  ADD     #4,(SP)
000174  010246                          MOV     R2,-(SP)                ; R.ADDR,*
000176  012746  000030                  MOV     #30,-(SP)
000202  0C4737  004310'                 JSR     PC,COPY.BLK
000206  012700  000002                  MOV     #2,R0                   ;                       3263
000212  060200                          ADD     R2,R0                   ; R.ADDR,*
000214  112760  000003  000001          MOVB    #3,1(R0)
000222  013746  000000G                 MOV     CCTLR,-(SP)             ;                       3265
000226  042716  177760                  BIC     #177760,(SP)
000232  112710  000100                  MOVB    #100,(R0)
000236  152610                          BISB    (SP)+,(R0)
000240  010416                          MOV     R4,(SP)                 ; RX,*                  3266
000242  004737  005424'                 JSR     PC,IN.IODQ
000246  010316                          MOV     R3,(SP)                 ; MX,*                  3267
000250  004737  004752'                 JSR     PC,PUT.ENV
000254  112761  000377  000000G         MOVB    #377,OUTC.LIST(R1)      ; *,*(CX)               3268
000262  062706  000012                  ADD     #12,SP                  ;                       3256
000266  005000                  5$:     CLR     R0                      ;                       3274
000270  104441                          TRAP    41
000272  105037  000000G         6$:     CLRB    T.FLAG                  ;                       3278
000276  023737  000000G 000000G 7$:     CMP     IODQ.IN,IODQ.OUT        ;                       3283
000304  001660                          BEQ     4$
000306  000207                          RTS     PC                      ;                       3196

; Routine Size:  100 words,     Routine Base:  $CODE$ + 6622
; Maximum stack depth per invocation:  12 words
```

```
;   3286  1     %SBTTL 'ERROR MESSAGE SUBROUTINES'
;   3287  1
;   3288  1     ROUTINE EMS_ET : NOVALUE =
;   3289  1
;   3290  1     !+
;   3291  1     !       THIS ROUTINE PRINTS THE ELAPSED TIME THAT PRECEDES ALL BASIC ERROR
;   3292  1     !       MESSAGES.
;   3293  1     !-
;   3294  1
;   3295  1     PRINTB (ETIME, .HOURS, .MINUTES, .SECONDS);


                                        .SBTTL  EMS.ET ERROR MESSAGE SUBROUTINES
000000  013746  000000G           EMS.ET: MOV     SECONDS,-(SP)                   ;                       3295
000004  013746  000000G                   MOV     MINUTES,-(SP)
000010  013746  000000G                   MOV     HOURS,-(SP)
000014  012746  000000G                   MOV     #ETIME,-(SP)
000020  012746  000004                    MOV     #4,-(SP)
000024  010600                            MOV     SP,R0                           ; SP,*
000026  104414                            TRAP    14
000030  062706  000012                    ADD     #12,SP
000034  000207                            RTS     PC                              ;                       3288

; Routine Size:  15 words,      Routine Base:  $CODE$ + 7132
; Maximum stack depth per invocation:  7 words


;   3296  1     ROUTINE EMS_SA : NOVALUE =
;   3297  1
;   3298  1     !+
;   3299  1     !       THIS ROUTINE PRINTS (EXTENDED) THE GLOBAL DATUM "SA_REG" WHICH CONTAINS
;   3300  1     !       THE CONTENTS OF THE SA REGISTER.
;   3301  1     !-
;   3302  1
;   3303  1     PRINTX (EX_SA, .SA_REG);                        ! "    SA: XXXXXX(O)"


                                        .SBTTL  EMS.SA ERROR MESSAGE SUBROUTINES
000000  013746  000000G           EMS.SA: MOV     SA.REG,-(SP)                    ;                       3303
000004  012746  000000G                   MOV     #EX.SA,-(SP)
000010  012746  000002                    MOV     #2,-(SP)
000014  010600                            MOV     SP,R0                           ; SP,*
000016  104415                            TRAP    15
000020  062706  000006                    ADD     #6,SP
000024  000207                            RTS     PC                              ;                       3296

; Routine Size:  11 words,      Routine Base:  $CODE$ + 7170
; Maximum stack depth per invocation:  5 words


;   3304  1     ROUTINE EMS_CRN : NOVALUE =
;   3305  1
;   3306  1     !+
;   3307  1     !       THIS ROUTINE PRINTS (EXTENDED) THE COMMAND REFERENCE NUMBER OF THE
;   3308  1     !       CURRENT RETURN PACKET. ONLY THE LOW-ORDER WORD IS SIGNIFICANT.
;   3309  1     !-
;   3310  1
```

```
;   3311  1     PRINTX (EX_CRN, .RP_ADDR [CRF_LO]);              ! "    CMD REF NUM: XXXXXX(O)"


                                          .SBTTL  EMS.CRN ERROR MESSAGE SUBROUTINES
000000  013700  000000G            EMS.CRN:MOV     RP.ADDR,R0                        ;                    3311
000004  016046  000004                    MOV     4(R0),-(SP)
000010  012746  000000G                    MOV     #EX.CRN,-(SP)
000014  012746  000002                    MOV     #2,-(SP)
000020  010600                            MOV     SP,R0                             ; SP,*
000022  104415                            TRAP    15
000024  062706  000006                    ADD     #6,SP
000030  000207                            RTS     PC                                ;                    3304

; Routine Size:  13 words,      Routine Base:  $CODE$ + 7216
; Maximum stack depth per invocation:  5 words


;   3312  1     ROUTINE EMS_STC : NOVALUE =
;   3313  1
;   3314  1     !+
;   3315  1     !       THIS ROUTINE PRINTS (EXTENDED) THE GLOBAL DATUM "ST_CODE" (STATUS CODE)
;   3316  1     !       IF IT IS NON-ZERO.
;   3317  1     !-
;   3318  1
;   3319  1     IF .ST_CODE NEQU 0
;   3320  1     THEN
;   3321  1         PRINTX (EX_SC, .ST_CODE);                    ! "    STATUS CODE: XX(O)"


                                          .SBTTL  EMS.STC ERROR MESSAGE SUBROUTINES
000000  013700  000000G            EMS.STC:MOV     ST.CODE,R0                        ;                    3319
000004  001411                            BEQ     1$
000006  010046                            MOV     R0,-(SP)                          ;                    3321
000010  012746  000000G                    MOV     #EX.SC,-(SP)
000014  012746  000002                    MOV     #2,-(SP)
000020  010600                            MOV     SP,R0                             ; SP,*
000022  104415                            TRAP    15
000024  062706  000006                    ADD     #6,SP
000030  000207                    1$:     RTS     PC                                ;                    3312

; Routine Size:  13 words,      Routine Base:  $CODE$ + 7250
; Maximum stack depth per invocation:  5 words


;   3322  1     ROUTINE EMS_SBC : NOVALUE =
;   3323  1
;   3324  1     !+
;   3325  1     !       THIS ROUTINE PRINTS (EXTENDED) THE GLOBAL DATUM 'SB CODE" (SUB-CODE) IF
;   3326  1     !       EITHER THE STATUS CODE (ST_CODE) OR THE SUB-CODE IS NON ZERO. (A
;   3327  1     !       NON-ZERO SUB CODE ALWAYS HAS SIGNIFICANCE, WHEREAS A ZERO SUB CODE ONLY
;   3328  1     !       HAS MEANING WITH A NON-ZERO STATUS CODE).
;   3329  1     !-
;   3330  1
;   3331  1     IF (.ST_CODE OR .SB_CODE) NEQU 0
;   3332  1     THEN
;   3333  1         PRINTX (EX_SB, .SB_CODE);                    ! "    SUB CODE: XXXX(O)'
```

```
                                        .SBTTL  EMS.SBC ERROR MESSAGE SUBROUTINES
000000  013700  000000G          EMS.SBC:MOV     ST.CODE,R0                      ;                       3331
000004  053700  000000G                  BIS     SB.CODE,R0
000010  001412                          BEQ     1$
000012  013746  000000G                  MOV     SB.CODE, (SP)                   ;                       3333
000016  012746  000000G                  MOV     #EX.SB,-(SP)
000022  012746  000002                  MOV     #2,-(SP)
000026  010600                          MOV     SP,R0                           ; SP,▲
000030  104415                          TRAP    15
000032  062706  000006                  ADD     #6,S
000036  000207                  1$:     RTS     PC                              ;                       3322

; Routine Size:  16 words,      Routine Base:  $CODE$ + 7302
; Maximum stack depth per invocation:  5 words


;   3334  1     ROUTINE EMS_CMD : NOVALUE =
;   3335  1
;   3336  1     !+
;   3337  1     !       THIS ROUTINE PRINTS (EXTENDED) THE OPCODE AND COMMAND MODIFIER (IF
;   3338  1     !       PRESENT) OF THE CURRENT RETURN PACKET. THESE FIELDS ARE "TRANSLATED"
;   3339  1     !       INTO ENGLISH TEXT RATHER THAN PRINTED AS RAW NUMBERS.
;   3340  1     !
;   3341  1     !       IMPLICIT INPUTS:
;   3342  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;   3343  1     !-
;   3344  1
;   3345  2     BEGIN
;   3346  2
;   3347  2     LOCAL
;   3348  2         COMMAND : WORD;                             ! COMMAND OPCODE
;   3349  2
;   3350  2     PRINTX (EX_CMD);                                ! "    COMMAND: '
;   3351  2     COMMAND = .RP_ADDR [ENDCOD] AND OP_MSK;         ! GET OPCODE ALONE
;   3352  2     SELECTONEU .COMMAND OF
;   3353  2         SET
;   3354  2
;   3355  2         [OP_ESP]    : PRINTX (EX_ESP);              ! "EXECUTE SUPPLIED PROGRAM"
;   3356  2         [OP_SCC]    : IF .IIP_FLAG                  ! IF INIT SUBTEST IN PROGRESS
;   3357  2                       THEN                          ! THEN (THESE 2 OPCODES ARE THE SAME)
;   3358  3                           PRINTX (EX_SCC)           ! "SET CTLR CHAR'
;   3359  2                       ELSE                          ! OTHERWISE
;   3360  2                           PRINTX (EX_SND);          ! "SEND DATA'
;   3361  2         [OP_ONL]    : PRINTX (EX_ONL);              ! "ONLINE"
;   3362  2         [OP_RD]     : PRINTX (EX_RD);               ! 'READ'
;   3363  2         [OP_WRT]    : PRINTX (EX_WRT);              ! "WRITE"
;   3364  2         [OTHERWISE] : PRINTX (EX_03, .RP_ADDR [ENDCOD]); ! "XXX(0)'
;   3365  2
;   3366  2         TES;
;   3367  2
;   3368  3     IF (((.COMMAND EQLU OP_RD) OR (.COMMAND EQLU OP_WRT)) AND
;   3369  3          (BIT_TST (RP_ADDR [CMDMOD], MD_CMP)))      ! IF COMPARE MODIFIER IS PRESENT
;   3370  2     THEN                                            ! THEN
;   3371  3         PRINTX (EX_CMP)                             ! '-COMPARE<CR><LF>'
;   3372  2     ELSE                                            ! OTHERWISE
;   3373  2         PRINTX (CRLF);                              ! <CR><LF>
```

```
;   3374  2
;   3375  1     END;                                    ! ROUTINE EMS_CMD


                                        .SBTTL  EMS.CMD ERROR MESSAGE SUBROUTINES
000000  004137  000000G           EMS.CMD:JSR     R1,$SAVE2                       ;                       3334
000004  012746  000000G                   MOV     #EX.CMD,-(SP)                   ;                       3350
000010  012746  000001                    MOV     #1,-(SP)
000014  010600                           MOV     SP,R0                           ; SP,*
000016  104415                           TRAP    15
000020  013701  000000G                   MOV     RP.ADDR,R1                      ;                       3351
000024  116102  000014                    MOVB    14(R1),R2                       ; *,COMMAND
000030  042702  177600                    BIC     #177600,R2                      ; *,COMMAND
000034  020227  000002                    CMP     R2,#2                           ; COMMAND,*             3355
000040  001007                           BNE     1$
000042  012716  000000G                   MOV     #EX.ESP,(SP)
000046  012746  000001                    MOV     #1,-(SP)
000052  010600                           MOV     SP,R0                           ; SP,*
000054  104415                           TRAP    15
000056  000462                           BR      6$
000060  020227  000004           1$:     CMP     R2,#4                           ; COMMAND,*             3356
000064  001022                           BNE     3$
000066  132737  000001  000000G          BITB    #1,IIP.FLAG
000074  001407                           BEQ     2$
000076  012716  000000G                   MOV     #EX.SCC,(SP)                    ;                       3358
000102  012746  000001                    MOV     #1,-(SP)
000106  010600                           MOV     SP,R0                           ; SP,*
000110  104415                           TRAP    15
000112  000444                           BR      6$                              ;                       3356
000114  012716  000000G           2$:     MOV     #EX.SND,(SP)                    ;                       3360
000120  012746  000001                    MOV     #1,-(SP)
000124  010600                           MOV     SP,R0                           ; SP,*
000126  104415                           TRAP    15
000130  000435                           BR      6$                              ;                       3356
000132  020227  000011           3$:     CMP     R2,#11                          ; COMMAND,*             3361
000136  001007                           BNE     4$
000140  012716  000000G                   MOV     #EX.ONL,(SP)
000144  012746  000001                    MOV     #1,-(SP)
000150  010600                           MOV     SP,R0                           ; SP,*
000152  104415                           TRAP    15
000154  000423                           BR      6$
000156  020227  000041           4$:     CMP     R2,#41                          ; COMMAND,*             3362
000162  001007                           BNE     5$
000164  012716  000000G                   MOV     #EX.RD,(SP)
000170  012746  000001                    MOV     #1, (SP)
000174  010600                           MOV     SP,R0                           ; SP,*
000176  104415                           TRAP    15
000200  000411                           BR      6$
000202  020227  000042           5$:     CMP     R2,#42                          ; COMMAND,*             3363
000206  001010                           BNE     7$
000210  012716  000000G                   MOV     #EX.WRT,(SP)
000214  012746  000001                    MOV     #1,-(SP)
000220  010600                           MOV     SP,R0                           ; SP,*
000222  104415                           TRAP    15
000224  005726                   6$:     TST     (SP)+
000226  000412                           BR      8$                              ;                       3352
000230  005016                   7$:     CLR     (SP)                            ;                       3364
```

```
000232  116116  000014                          MOVB    14(R1),(SP)
000236  012746  000000G                         MOV     #EX.03,-(SP)
000242  012746  000002                          MOV     #2,-(SP)
000246  010600                                  MOV     SP,R0           ; SP,*
000250  104415                                  TRAP    15
000252  022626                                  CMP     (SP)+,(SP)+
000254  020227  000041              8$:         CMP     R2,#41          ; COMMAND,*                     3368
000260  001403                                  BEQ     9$
000262  020227  000042                          CMP     R2,#42          ; COMMAND,*
000266  001015                                  BNE     10$
000270  013700  000000G             9$:         MOV     RP.ADDR,R0      ;                               3369
000274  032760  040000  000012                  BIT     #40000,12(R0)
000302  001407                                  BEQ     10$
000304  012716  000000G                         MOV     #EX.CMP,(SP)    ;                               3371
000310  012746  000001                          MOV     #1, (SP)
000314  010600                                  MOV     SP,R0           ; SP,*
000316  104415                                  TRAP    15
000320  000406                                  BR      11$             ;                               3368
000322  012716  000000G             10$:        MOV     #CRLF,(SP)      ;                               3373
000326  012746  000001                          MOV     #1,-(SP)
000332  010600                                  MOV     SP,R0           ; SP,*
000334  104415                                  TRAP    15
000336  062706  000006              11$:        ADD     #6,SP           ;                               3345
000342  000207                                  RTS     PC              ;                               3334

; Routine Size:  114 words,     Routine Base:  $CODE$ + 7342
; Maximum stack depth per invocation:  9 words


;   3376  1     ROUTINE EMS_LBN : NOVALUE =
;   3377  1
;   3378  1     !+
;   3379  1     !       THIS ROUTINE PRINTS (EXTENDED) ONE OF TWO BLOCK NUMBERS APPEARING IN
;   3380  1     !       THE CURRENT RETURN PACKET. NORMALLY, THE LBN FIELD IS PRINTED; THIS
;   3381  1     !       FIELD WAS COPIED INTO THE RETURN PACKET FROM THE ASSOCIATED COMMAND
;   3382  1     !       ENVELOPE. HOWEVER, IF THE "FLAGS" FIELD OF THE CURRENT RETURN PACKET
;   3383  1     !       INDICATES "BAD BLOCK REPORTED", THEN THE "FIRST BAD BLOCK" FIELD IS
;   3384  1     !       PRINTED.
;   3385  1     !
;   3386  1     !       IMPLICIT INPUTS:
;   3387  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;   3388  1     !-
;   3389  1
;   3390  2     BEGIN
;   3391  2
;   3392  3     IF BIT_TST (RP_ADDR [FLAGS], EF_BBR)            ! IF BAD BLOCK REPORTED
;   3393  2     THEN                                            ! THEN
;   3394  3         PRINTX (EX_BB, .RP_ADDR [BBLK_LO])          ! "    BAD BLOCK REPORTED: XXXXX."
;   3395  2     ELSE                                            ! OTHERWISE
;   3396  2         PRINTX (EX_LBN, .RP ADDR [LBN_LO]);         ! "    LBN: XXXXX."
;   3397  2
;   3398  1     END;                                            ! ROUTINE EMS_LBN


                                    .SBTTL  EMS.LBN ERROR MESSAGE SUBROUTINES
000000  013700  000000G     EMS.LBN:MOV     RP.ADDR,R0                      ;                       3392
000004  105760  000015              TSTB    15(R0)
```

```
000010  100011                                  BPL     1$
000012  016046  000040                          MOV     40(R0),-(SP)                    ;                               3394
000016  012746  000000G                         MOV     #EX.BB,-(SP)
000022  012746  000002                          MOV     #2,-(SP)
000026  010600                                  MOV     SP,R0                           ; SP,*
000030  104415                                  TRAP    15
000032  000410                                  BR      2$                              ;                               3392
000034  016046  000050                  1$:     MOV     50(R0),-(SP)                    ;                               3396
000040  012746  000000G                         MOV     #EX.LBN,-(SP)
000044  012746  000002                          MOV     #2,-(SP)
000050  010600                                  MOV     SP,R0                           ; SP,*
000052  104415                                  TRAP    15
000054  062706  000006                  2$:     ADD     #6,SP                           ;                               3390
000060  000207                                  RTS     PC                              ;                               3376

; Routine Size:  25 words,      Routine Base:  $CODE$ + 7706
; Maximum stack depth per invocation:  5 words

;   3399  1     ROUTINE EMS_BC : NOVALUE =
;   3400  1
;   3401  1     !+
;   3402  1     !       THIS ROUTINE PRINTS (EXTENDED) BOTH BYTE COUNT FIELDS OF THE CURRENT
;   3403  1     !       RETURN PACKET: THE BYTE COUNT FROM THE COMMAND ENVELOPE AND THE
;   3404  1     !       ACTUAL NUMBER OF BYTES TRANSFERRED (FROM THE RESPONSE ENVELOPE).
;   3405  1     !
;   3406  1     !       IMPLICIT INPUTS:
;   3407  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;   3408  1     !-
;   3409  1
;   3410  2     BEGIN
;   3411  2
;   3412  2     PRINTX (EX_CBC, .RP_ADDR [CBCNT_LO]);           ! "    BYTE COUNT IN COMMAND: XXXXX."
;   3413  2     PRINTX (EX_BC, .RP_ADDR [BCNT_LO]);             ! "    ACTUAL # OF BYTES TRANSFERRED: XXXXX."
;   3414  2
;   3415  1     END;                                            ! ROUTINE EMS_BC


                                            .SBTTL  EMS.BC ERROR MESSAGE SUBROUTINES
000000  013700  000000G                 EMS.BC: MOV     RP.ADDR,R0                      ;                               3412
000004  016046  000044                          MOV     44(R0),-(SP)
000010  012746  000000G                         MOV     #EX.CBC,-(SP)
000014  012746  000002                          MOV     #2,-(SP)
000020  010600                                  MOV     SP,R0                           ; SP,*
000022  104415                                  TRAP    15
000024  013700  000000G                         MOV     RP.ADDR,R0                      ;                               3413
000030  016016  000020                          MOV     20(R0),(SP)
000034  012746  000000G                         MOV     #EX.BC,-(SP)
000040  012746  000002                          MOV     #2,-(SP)
000044  010600                                  MOV     SP,R0                           ; SP,*
000046  104415                                  TRAP    15
000050  062706  000012                          ADD     #12,SP                          ;                               3410
000054  000207                                  RTS     PC                              ;                               3399

; Routine Size:  23 words,      Routine Base:  $CODE$ + 7770
; Maximum stack depth per invocation:  7 words
```

```
;   3416  1     ROUTINE EMS_BD : NOVALUE =
;   3417  1
;   3418  1     !+
;   3419  1     !       THIS ROUTINE PRINTS (EXTENDED) THE TWO-WORD I/O BUFFER DESCRIPTOR
;   3420  1     !       APPEARING IN THE CURRENT RETURN PACKET.
;   3421  1     !
;   3422  1     !       IMPLICIT INPUTS:
;   3423  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;   3424  1     !-
;   3425  1
;   3426  1     PRINTX (EX_BD, .RP_ADDR [BUFF_0], .RP_ADDR [BUFF_1]);   ! "    I/O BUFFER DESCRIPTOR: XXXXXX(0) XXXXXX(0)"

                                        .SBTTL  EMS.BD ERROR MESSAGE SUBROUTINES
000000  013700  000000G          EMS.BD: MOV     RP.ADDR,R0                      ;                               3426
000004  016046  000026                  MOV     26(R0),-(SP)
000010  016046  000024                  MOV     24(R0),-(SP)
000014  012746  000000G                  MOV     #EX.BD,-(SP)
000020  012746  000003                  MOV     #3, (SP)
000024  010600                          MOV     SP,R0                           ; SP,*
000026  104415                          TRAP    15
000030  062706  000010                  ADD     #10,SP
000034  000207                          RTS     PC                              ;                               3416

; Routine Size:  15 words,      Routine Base:  $CODE$ + 10046
; Maximum stack depth per invocation:  6 words

;   3427  1     ROUTINE EMS_RP : NOVALUE =
;   3428  1
;   3429  1     !+
;   3430  1     !       THIS ROUTINE IS RESPONSIBLE FOR PRINTING (EXTENDED) THE RELEVANT FIELDS
;   3431  1     !       OF THE CURRENT RETURN PACKET.
;   3432  1     !-
;   3433  1
;   3434  2     BEGIN
;   3435  2
;   3436  2     EMS_CRN ();                                     ! COMMAND REFERENCE NUMBER
;   3437  2     EMS_SBC ();                                     ! SUB-CODE
;   3438  2     EMS_CMD ();                                     ! COMMAND (AND MODIFIER)
;   3439  2     EMS_LBN ();                                     ! LBN OR BAD BLOCK NUMBER
;   3440  2     EMS_BC ();                                      ! BYTE COUNTS
;   3441  2     EMS_BD ();                                      ! I/O BUFFER DESCRIPTOR
;   3442  2
;   3443  1     END;                                            ! ROUTINE EMS_RP

                                        .SBTTL  EMS.RP ERROR MESSAGE SUBROUTINES
000000  004737  007216'          EMS.RP: JSR     PC,EMS.CRN                      ;                               3436
000004  004737  007302'                  JSR     PC,EMS.SBC                      ;                               3437
000010  004737  007342'                  JSR     PC,EMS.CMD                      ;                               3438
000014  004737  007706'                  JSR     PC,EMS.LBN                      ;                               3439
000020  004737  007770'                  JSR     PC,EMS.BC                       ;                               3440
000024  004737  010046'                  JSR     PC,EMS.BD                       ;                               3441
000030  000207                          RTS     PC                              ;                               3427

; Routine Size:  13 words,      Routine Base:  $CODE$ + 10104
; Maximum stack depth per invocation:  1 word
```

```
;   3444  1     BGNMSG (EMS_01);


                                        .SBTTL  EMS.01 ERROR MESSAGE SUBROUTINES
000000  004737  000000V           EMS.01::JSR     PC,M$EMS.01                     ;                       3444
000004  104423                            TRAP    23
000006  000207                            RTS     PC

; Routine Size:  4 words,      Routine Base:  $CODE$ + 10136
; Maximum stack depth per invocation:  2 words


;   3445  2
;   3446  2     EMS_ET ();                                      ! ELAPSED TIME
;   3447  2     PRINTB (EBS_01, MAX_UNITS);                     ! "MORE THAN XX. UNITS SPECIFIED"
;   3448  2
;   3449  1     ENDMSG;


                                        .SBTTL  M$EMS.01 ERROR MESSAGE SUBROUTINES
000000  004737  007132'          M$EMS.01:
                                        JSR     PC,EMS.ET                       ;                       3446
000004  012746  000020                  MOV     #20,-(SP)                       ;                       3447
000010  012746  000000G                 MOV     #EBS.01,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  062706  000006                  ADD     #6,SP                           ;                       3444
000030  000207                          RTS     PC

; Routine Size:  13 words,      Routine Base:  $CODE$ + 10146
; Maximum stack depth per invocation:  5 words


;   3450  1     BGNMSG (EMS_10);


                                        .SBTTL  EMS.10 ERROR MESSAGE SUBROUTINES
000000  004737  000000V           EMS.10::JSR     PC,M$EMS.10                     ;                       3450
000004  104423                            TRAP    23
000006  000207                            RTS     PC

; Routine Size:  4 words,      Routine Base:  $CODE$ + 10200
; Maximum stack depth per invocation:  2 words


;   3451  2
;   3452  2     EMS_ET ();                                      ! ELAPSED TIME
;   3453  2     PRINTB (EBD_10, .RC25_ADDR + .OF RC);           ! "NO RESPONSE AT ADDRESS XXXXXX(0)"
;   3454  2
;   3455  1     ENDMSG;


                                        .SBTTL  M$EMS.10 ERROR MESSAGE SUBROUTINES
000000  004737  007132'          M$EMS.10:
                                        JSR     PC,EMS.ET                       ;                       3452
0000C4  013746  000000G                 MOV     RC25.ADDR,-(SP)                 ;                       3453
```

```
000010  063716  000000G                        ADD     OF.RC,(SP)
000014  012746  000000G                        MOV     #EBD.10,-(SP)
000020  012746  000002                         MOV     #2,-(SP)
000024  010600                                 MOV     SP,R0                           ; SP,*
000026  104414                                 TRAP    14
000030  062706  000006                         ADD     #6,SP                           ;                                       3450
000034  000207                                 RTS     PC

; Routine Size:  15 words,      Routine Base:  $CODE$ + 10210
; Maximum stack depth per invocation:  5 words


;   3456  1     BGNMSG (EMS_12);


                                               .SBTTL  EMS.12 ERROR MESSAGE SUBROUTINES
000000  004737  000000V                EMS.12::JSR     PC,M$EMS.12                     ;                                       3456
000004  104423                                 TRAP    23
000006  000207                                 RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10246
; Maximum stack depth per invocation:  2 words


;   3457  2
;   3458  2     EMS_ET ();                                      ! ELAPSED TIME
;   3459  2     PRINTB (EBD_12, .RC25_ADDR);                    ! "INCORRECT BR LEVEL GIVEN FOR DEVICE XXXXXX(0)"
;   3460  2
;   3461  1     ENDMSG;


                                               .SBTTL  M$EMS.12 ERROR MESSAGE SUBROUTINES
000000  004737  007132'               M$EMS.12:
                                               JSR     PC,EMS.ET                       ;                                       3458
000004  013746  000000G                        MOV     RC25.ADDR,-(SP)                 ;                                       3459
000010  012746  000000G                        MOV     #EBD.12,-(SP)
000014  012746  000002                         MOV     #2,-(SP)
000020  010600                                 MOV     SP,R0                           ; SP,*
000022  104414                                 TRAP    14
000024  062706  000006                         ADD     #6,SP                           ;                                       3456
000030  000207                                 RTS     PC

; Routine Size:  13 words,      Routine Base:  $CODE$ + 10256
; Maximum stack depth per invocation:  5 words


;   3462  1     BGNMSG (EMS_13);


                                               .SBTTL  EMS.13 ERROR MESSAGE SUBROUTINES
000000  004737  000000V                EMS.13::JSR     PC,M$EMS.13                     ;                                       3462
000004  104423                                 TRAP    23
000006  000207                                 RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10310
; Maximum stack depth per invocation:  2 words
```

```
;   3463  2
;   3464  2     EMS_ET ();                                      ! ELAPSED TIME
;   3465  2     PRINTB (EBD_13, .STEP, .RC25 ADDR);             ! "STEP X READ ERROR ON DEVICE XXXXXX(0)"
;   3466  2     EMS_SA ();                                      ! PRINTX SA CONTENTS
;   3467  2
;   3468  1     ENDMSG;


                                        .SBTTL  M$EMS.13 ERROR MESSAGE SUBROUTINES
000000  004737  007132'           M$EMS.13:
                                        JSR     PC,EMS.ET                       ;                       3464
000004  013746  000000G                 MOV     RC25.ADDR,-(SP)                 ;                       3465
000010  013746  000000G                 MOV     STEP,-(SP)
000014  012746  000000G                 MOV     #EBD.13,-(SP)
000020  012746  000003                  MOV     #3,-(SP)
000024  010600                          MOV     SP,R0                           ; SP,*
000026  104414                          TRAP    14
000030  004737  007170'                 JSR     PC,EMS.SA                       ;                       3466
000034  062706  000010                  ADD     #10,SP                          ;                       3462
000040  000207                          RTS     PC

; Routine Size:  17 words,      Routine Base:  $CODE$ + 10320
; Maximum stack depth per invocation:  6 words


;   3469  1     BGNMSG (EMS_14);


                                        .SBTTL  EMS.14 ERROR MESSAGE SUBROUTINES
000000  004737  000000V         EMS.14::JSR     PC,M$EMS.14                     ;                       3469
000004  104423                          TRAP    23
000006  000207                          RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10362
; Maximum stack depth per invocation:  2 words


;   3470  2
;   3471  2     EMS_ET ();                                          ! ELAPSED TIME
;   3472  2     PRINTB (EBD_14, .IRC25_ADDR);                       ! "ERROR CODE RECEIVED IN SA REGISTER OF DEVICE XXXXXX(0)"
;   3473  2     EMS_SA ();                                          ! PRINTX SA REGISTER CONTENTS
;   3474  2
;   3475  1     ENDMSG;


                                        .SBTTL  M$EMS.14 ERROR MESSAGE SUBROUTINES
000000  004737  007132'           M$EMS.14:
                                        JSR     PC,EMS.ET                       ;                       3471
000004  013746  000000G                 MOV     IRC25.ADDR,-(SP)                ;                       3472
000010  012746  000000G                 MOV     #EBD.14,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  004737  007170'                 JSR     PC,EMS.SA                       ;                       3473
000030  062706  000006                  ADD     #6,SP                           ;                       3469
000034  000207                          RTS     PC
```

```
; Routine Size:  15 words,      Routine Base:  $CODE$ + 10372
; Maximum stack depth per invocation:  5 words


;   3476  1     BGNMSG (EMS_15);


                                        .SBTTL  EMS.15 ERROR MESSAGE SUBROUTINES
000000  004737  000000V             EMS.15::JSR     PC,M$EMS.15                     ;                                       3476
000004  104423                             TRAP    23
000006  000207                             RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10430
; Maximum stack depth per invocation:  2 words


;   3477  2
;   3478  2     EMS_ET ();                                      ! ELAPSED TIME
;   3479  2     PRINTB (EBD_15, .RC25_ADDR);                    ! "FAILED TO RECEIVE END MESSAGE FROM DEVICE XXXXXX(0)"
;   3480  2     EMS_CMD ();                                     ! PRINTX COMMAND
;   3481  2
;   3482  1     ENDMSG;


                                        .SBTTL  M$EMS.15 ERROR MESSAGE SUBROUTINES
000000  004737  007132'            M$EMS.15:
                                        JSR     PC,EMS.ET                       ;                                       3478
000004  013746  000000G                 MOV     RC25.ADDR,-(SP)                 ;                                       3479
000010  012746  000000G                 MOV     #EBD.15,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    1^
000024  004737  007342'                 JSR     PC,EMS.CMD                      ;                                       3480
000030  062706  000006                  ADD     #6,SP                           ;                                       3476
000034  000207                          RTS     PC

; Routine Size:  15 words,      Routine Base:  $CODE$ + 10440
; Maximum stack depth per invocation:  5 words


;   3483  1     BGNMSG (EMS_16);


                                        .SBTTL  EMS.16 ERROR MESSAGE SUBROUTINES
000000  004737  000000V             EMS.16::JSR     PC,M$EMS.16                     ;                                       3483
000004  104423                             TRAP    23
000006  000207                             RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10476
; Maximum stack depth per invocation:  2 words


;   3484  2
;   3485  2     EMS_ET ();                                      ! ELAPSED TIME
;   3486  2     PRINTB (EBD_16, .CPLAT);                        ! "ERROR IN RESPONSE TO ONLINE COMMAND FOR PLATTER XXX."
;   3487  2     EMS STC ();                                     ! PRINTX STATUS CODE IF NOT ZERO
```

```
;   3488  2     EMS_SBC ();                                   ! PRINTX SUB-CODE
;   3489  2
;   3490  1     ENDMSG;


                                        .SBTTL  M$EMS.16 ERROR MESSAGE SUBROUTINES
000000  004737  007132'            M$EMS.16:
                                        JSR     PC,EMS.ET                       ;                       3485
000004  013746  000000G                 MOV     CPLAT,-(SP)                     ;                       3486
000010  012746  000000G                 MOV     #EBD.16,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  004737  007250'                 JSR     PC,EMS.STC                      ;                       3487
000030  004737  007302'                 JSR     PC,EMS.SBC                      ;                       3488
000034  062706  000006                  ADD     #6,SP                           ;                       3483
000040  000207                          RTS     PC

; Routine Size:  17 words,      Routine Base:  $CODE$ + 10506
; Maximum stack depth per invocation:  5 words


;   3491  1     BGNMSG (EMS_17);


                                        .SBTTL  EMS.17 ERROR MESSAGE SUBROUTINES
000000  004737  000000V            EMS.17::JSR     PC,M$EMS.17                     ;                       3491
000004  104423                          TRAP    23
000006  000207                          RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10550
; Maximum stack depth per invocation:  2 words


;   3492  2
;   3493  2     EMS_ET ();                                    ! ELAPSED TIME
;   3494  2     PRINTB (EBD_17, .CPLAT);                      ! "PLATTER XXX. IS SW WRITE-ENABLED BUT HW WRITE-PROTECTED"
;   3495  2
;   3496  1     ENDMSG;


                                        .SBTTL  M$EMS.17 ERROR MESSAGE SUBROUTINES
000000  004737  007132'            M$EMS.17:
                                        JSR     PC,EMS.ET                       ;                       3493
000004  013746  000000G                 MOV     CPLAT,-(SP)                     ;                       3494
000010  012746  000000G                 MOV     #EBD.17,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  062706  000006                  ADD     #6,SP                           ;                       3491
000030  000207                          RTS     PC

; Routine Size:  13 words,      Routine Base:  $CODE$ + 10560
; Maximum stack depth per invocation:  5 words


;   3497  1     BGNMSG (EMS 18);
```

```
                                        .SBTTL  EMS.18 ERROR MESSAGE SUBROUTINES
000000  004737  000000V            EMS.18::JSR     PC,M$EMS.18                     ;                       3497
000004  104423                            TRAP    23
000006  000207                            RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10612
; Maximum stack depth per invocation:  2 words


;   3498  2
;   3499  2     EMS_ET ();                                      ! ELAPSED TIME
;   3500  2     PRINTB (EBD_18, .CPLAT);                        ! "ACCESS FAILED ON PLATTER XXX."
;   3501  2     EMS_STC ();                                     ! PRINTX STATUS CODE IF NOT ZERO
;   3502  2     EMS_SBC ();                                     ! PRINTX SUB-CODE
;   3503  2
;   3504  1     ENDMSG;


                                        .SBTTL  M$EMS.18 ERROR MESSAGE SUBROUTINES
000000  004737  007132'           M$EMS.18:
                                        JSR     PC,EMS.ET                       ;                       3499
000004  013746  000000G                 MOV     CPLAT,-(SP)                     ;                       3500
000010  012746  000000G                 MOV     #EBD.18,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  004737  007250'                 JSR     PC,EMS.STC                      ;                       3501
000030  004737  007302'                 JSR     PC,EMS.SBC                      ;                       3502
000034  062706  000006                  ADD     #6,SP                           ;                       3497
000040  000207                          RTS     PC

; Routine Size:  17 words,      Routine Base:  $CODE$ + 10622
; Maximum stack depth per invocation:  5 words


;   3505  1     BGNMSG (EMS_19);


                                        .SBTTL  EMS.19 ERROR MESSAGE SUBROUTINES
000000  004737  000000V            EMS.19::JSR     PC,M$EMS.19                     ;                       3505
000004  104423                            TRAP    23
000006  000207                            RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10664
; Maximum stack depth per invocat'on:  2 words


;   3506  2
;   3507  2     EMS_ET ();                                      ! ELAPSED TIME
;   3508  2     PRINTB (EBD_19, .CPLAT);                        ! "PLATTER XXX. WENT OFFLINE"
;   3509  2     EMS_RP ();                                      ! PRINTX RELEVANT RETPKT FIELDS
;   3510  2
;   3511  1     ENDMSG;
```

```
                                        .SBTTL  M$EMS.19 ERROR MESSAGE SUBROUTINES
000000  004737  007132'           M$EMS.19:
                                        JSR     PC,EMS.ET                       ;                       3507
000004  013746  000000G                 MOV     CPLAT,-(SP)                     ;                       3508
000010  012746  000000G                 MOV     #EBD.19,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  004737  010104'                JSR     PC,EMS.RP                       ;                       3509
000030  062706  000006                  ADD     #6,SP                           ;                       3505
000034  000207                          RTS     PC

; Routine Size:  15 words,      Routine Base:  $CODE$ + 10674
; Maximum stack depth per invocation:  5 words


;   3512  1     BGNMSG (EMS_20);


                                        .SBTTL  EMS.20 ERROR MESSAGE SUBROUTINES
000000  004737  000000V           EMS.20::JSR     PC,M$EMS.20                     ;                       3512
000004  104423                          TRAP    23
000006  000207                          RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 10732
; Maximum stack depth per invocation:  2 words


;   3513  2
;   3514  2     EMS_ET ();                                  ! ELAPSED TIME
;   3515  2     PRINTB (EBD_20, .RC25_ADDR);                ! "DEVICE XXXXXX(O) NOT PROCESSING COMMAND PACKETS"
;   3516  2
;   3517  1     ENDMSG;


                                        .SBTTL  M$EMS.20 ERROR MESSAGE SUBROUTINES
000000  004737  007132'           M$EMS.20:
                                        JSR     PC,EMS.ET                       ;                       3514
000004  013746  000000G                 MOV     RC25.ADDR,-(SP)                 ;                       3515
000010  012746  000000G                 MOV     #EBD.20,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  062706  000006                  ADD     #6,SP                           ;                       3512
000030  000207                          RTS     PC

; Routine Size:  13 words,      Routine Base:  $CODE$ + 10742
; Maximum stack depth per invocation:  5 words


;   3518  1     BGNMSG (EMS_21);


                                        .SBTTL  EMS.21 ERROR MESSAGE SUBROUTINES
000000  004737  000000V           EMS.21::JSR     PC,M$EMS.21                     ;                       3518
000004  104423                          TRAP    23
000006  000207                          RTS     PC
```

```
; Routine Size:  4 words,      Routine Base:  $CODE$ + 10774
; Maximum stack depth per invocation:  2 words


;   3519  2
;   3520  2     EMS_ET ();                                  ! ELAPSED TIME
;   3521  2     PRINTB (EBD_21, .RC25_ADDR);                ! "MESSAGE REJECTED BY DUP SERVER ON DEVICE XXXXXX(0)"
;   3522  2     EMS_CMD ();                                 ! PRINTX COMMAND
;   3523  2     PRINTX (EX_DSC, .ST_CODE);                  ! "    DUP STATUS CODE: X."
;   3524  2
;   3525  1     ENDMSG;


                                        .SBTTL  M$EMS.21 ERROR MESSAGE SUBROUTINES
000000  004737  007132'           M$EMS.21:
                                        JSR     PC,EMS.ET                       ;                       3520
000004  013746  000000G                 MOV     RC25.ADDR,-(SP)                 ;                       3521
000010  012746  000000G                 MOV     #EBD.21,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  004737  007342'                 JSR     PC,EMS.CMD                      ;                       3522
000030  013716  000000G                 MOV     ST.CODE,(SP)                    ;                       3523
000034  012746  000000G                 MOV     #EX.DSC,-(SP)
000040  012746  000002                  MOV     #2,-(SP)
000044  010600                          MOV     SP,R0                           ; SP,*
000046  104415                          TRAP    15
000050  062706  000012                  ADD     #12,SP                          ;                       3518
000054  000207                          RTS     PC

; Routine Size:  23 words,      Routine Base:  $CODE$ + 11004
; Maximum stack depth per invocation:  7 words


;   3526  1     BGNMSG (EMS_22);


                                        .SBTTL  EMS.22 ERROR MESSAGE SUBROUTINES
000000  004737  000000V         EMS.22::JSR     PC,M$EMS.22                     ;                       3526
000004  104423                          TRAP    23
000006  000207                          RTS     PC

; Routine Size:  4 words,      Routine Base:  $CODE$ + 11062
; Maximum stack depth per invocation:  2 words


;   3527  2
;   3528  2     EMS_ET ();                                  ! ELAPSED TIME
;   3529  2     PRINTB (EBD_22, .RC25_ADDR);                ! "NO RESPONSE FROM FRONT PANEL TEST EXECUTING IN DEVICE XXXXXX(0 "
;   3530  2
;   3531  1     ENDMSG;


                                        .SBTTL  M$EMS.22 ERROR MESSAGE SUBROUTINES
0000C0  004737  007132'           M$EMS.22:
                                        JSR     PC,EMS.ET                       ;                       3528
```

```
000004  013746  000000G                    MOV     RC25.ADDR,-(SP)                 ;                               3529
000010  012746  000000G                    MOV     #EBD.22,-(SP)
000014  012746  000002                     MOV     #2,-(SP)
000020  010600                             MOV     SP,R0                           ; SP,*
000022  104414                             TRAP    14
000024  062706  000006                     ADD     #6,SP                           ;                               3526
000030  000207                             RTS     PC

; Routine Size:  13 words,      Routine Base:  $CODE$ + 11072
; Maximum stack depth per invocation:  5 words


;   3532  1     BGNMSG (EMS_30);


                                           .SBTTL  EMS.30 ERROR MESSAGE SUBROUTINES
000000  004737  000000V                EMS.30::JSR     PC,M$EMS.30                     ;                               3532
000004  104423                             TRAP    23
000006  000207                             RTS     PC

; Routine Size:  4 words,      Routine Base:  $CODE$ + 11124
; Maximum stack depth per invocation:  2 words


;   3533  2
;   3534  2     OWN
;   3535  2         EBH_TB : VECTOR [11] INITIAL (EBH_31, EBH_32, 0, EBH_34, EBH_35, EBH_36,
;   3536  2                                       EBH_37, EBH_38, EBH_39, EBH_40, EBH_41);
;   3537  2             ! TABLE OF BASIC, HARD ERROR MESSAGE ADDRESSES, INDEXED BY STATUS CODE
;   3538  2
;   3539  2     EMS_ET ();                                                  ! ELAPSED TIME
;   3540  2     PRINTB (PLATT, .CPLAT);                                     ! "PLATTER XXX. - "
;   3541  3     IF ((.ST_CODE GEQU 1) AND (.ST_CODE LEQU 11))               ! IF STATUS CODE IS WITHIN RANGE
;   3542  2     THEN                                                        ! THEN
;   3543  3         PRINTB (.EBH_TB [.ST_CODE - 1])                         ! PRINTB APPROPRIATE MESSAGE
;   3544  2     ELSE                                                        ! ELSE STATUS CODE OUT OF RANGE
;   3545  2         PRINTB (EX_SC, .ST_CODE);                               ! JUST PRINT STATUS CODE
;   3546  2     EMS_RP ();                                                  ! PRINTX OTHER RETPKT FIELDS
;   3547  2
;   3548  1     ENDMSG;


011134  000000G                        EBH.TB: .WORD   EBH.31
011136  000000G                                .WORD   EBH.32
011140  000000                                .WORD   0
011142  000000G                                .WORD   EBH.34
011144  000000G                                .WORD   EBH.35
011146  000000G                                .WORD   EBH.36
011150  000000G                                .WORD   EBH.37
011152  000000G                                .WORD   EBH.38
011154  000000G                                .WORD   EBH.39
011156  000000G                                .WORD   EBH.40
011160  000000G                                .WORD   EBH.41


                                           .SBTTL  M$EMS.30 ERROR MESSAGE SUBROUTINES
000000  004737  007132'                M$EMS.30:
```

```
                                        JSR     PC,EMS.ET                       ;                               3539
000004  013746  000000G                 MOV     CPLAT,-(SP)                     ;                               3540
000010  012746  000000G                 MOV     @PLATT,-(SP)
000014  012746  000002                  MOV     #2,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104414                          TRAP    14
000024  013700  000000G                 MOV     ST.CODE,R0                      ;                               3541
000030  001413                          BEQ     1$
000032  020027  000013                  CMP     R0,#13
000036  101010                          BHI     1$
000040  006300                          ASL     R0                              ;                               3543
000042  016016  011132'                 MOV     EBH.TB 2(R0),(SP)
000046  012746  000001                  MOV     #1,-(SP)
000052  010600                          MOV     SP,R0                           ; SP,*
000054  104414                          TRAP    14
000056  000410                          BR      2$                              ;                               3541
000060  010016                  1$:     MOV     R0,(SP)                         ;                               3545
000062  012746  000000G                 MOV     @EX.SC,-(SP)
000066  012746  000002                  MOV     #2,-(SP)
000072  010600                          MOV     SP,R0                           ; SP,*
000074  104414                          TRAP    14
000076  005726                          TST     (SP)+
000100  004737  010104'          2$:     JSR     PC,EMS.RP                       ;                               3546
000104  062706  000010                  ADD     #10,SP                          ;                               3532
000110  000207                          RTS     PC

; Routine Size:  37 words,      Routine Base:  $CODE$ + 11162
; Maximum stack depth per invocation:  7 words


;   3549  1     BGNMSG (EMS_42);


                                        .SBTTL  EMS.42 ERROR MESSAGE SUBROUTINES
000000  004737  000000V         EMS.42::JSR     PC,M$EMS.42                     ;                               3549
000004  104423                          TRAP    23
000006  000207                          RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 11274
; Maximum stack depth per invocation:  2 words


;   3550  2
;   3551  2     EMS_ET ();                                  ! ELAPSED TIME
;   3552  2     PRINTB (PLATT, .CPLAT);                     ! "PLATTER XXX. - "
;   3553  2     PRINTB (EBH_42);                            ! "HOST-DETECTED WRITE COMPARE ERROR"
;   3554  2     EMS_LBN ();                                 ! PRINTX LBN
;   3555  2     EMS_BC ();                                  ! PRINTX BYTE COUNTS
;   3556  2
;   3557  1     ENDMSG;


                                        .SBTTL  M$EMS.42 ERROR MESSAGE SUBROUTINES
000000  004737  007132'          M$EMS.42:
                                        JSR     PC,EMS.ET                       ;                               3551
000004  013746  000000G                 MOV     CPLAT,-(SP)                     ;                               3552
000010  012746  000000G                 MOV     @PLATT,-(SP)
```

```
000014  012746  000002                    MOV     #2,-(SP)
000020  010600                            MOV     SP,R0                   ; SP,*
000022  104414                            TRAP    14
000024  012716  000000G                   MOV     #EBH.42,(SP)            ;                       3553
000030  012746  000001                    MOV     #1,-(SP)
000034  010600                            MOV     SP,R0                   ; SP,*
000036  104414                            TRAP    14
000040  004737  007706'                   JSR     PC,EMS.LBN              ;                       3554
000044  004737  007770'                   JSR     PC,EMS.BC               ;                       3555
000050  062706  000010                    ADD     #10,SP                  ;                       3549
000054  000207                            RTS     PC

; Routine Size:  23 words,      Routine Base:  $CODE$ + 11304
; Maximum stack depth per invocation:  6 words


;   3558  1     BGNMSG (EMS_43);


                                          .SBTTL  EMS.43 ERROR MESSAGE SUBROUTINES
000000  004737  000000V         EMS.43::  JSR     PC,M$EMS.43             ;                       3558
000004  104423                            TRAP    23
000006  000207                            RTS     PC

; Routine Size:  4 words,       Routine Base:  $CODE$ + 11362
; Maximum stack depth per invocation:  2 words


;   3559  2
;   3560  2     EMS_ET ();                                  ! ELAPSED TIME
;   3561  2     PRINTB (PLATT, .CPLAT);                     ! "PLATTER XXX. - "
;   3562  2     PRINTB (EBH_43);                            ! "FAILED TO RECEIVE END MESSAGE FOR I/O COMMAND"
;   3563  2     EMS_CRN ();                                 ! PRINTX COMMAND REFERENCE NUMBER
;   3564  2     RP_ADDR [CMDMOD] = .RP_ADDR [STATUS];       ! STATUS FIELD HOLDS MODIFIER (IF ANY)
;   3565  2     EMS_CMD ();                                 ! PRINTX COMMAND (AND MODIFIER)
;   3566  2     PRINTX (EX_LBN, .RP_ADDR [BBLK_LO]);        ! PRINTX LBN
;   3567  2     PRINTX (EX_CBC, .RP_ADDR [BCNT_LO]);        ! PRINTX BYTE COUNT
;   3568  2     EMS_BD ();                                  ! PRINTX I/O BUFFER DESCRIPTOR
;   3569  2
;   3570  1     ENDMSG;


                                          .SBTTL  M$EMS.43 ERROR MESSAGE SUBROUTINES
000000  010146                  M$EMS.43:
                                          MOV     R1,-(SP)                ;                       3558
000002  004737  007132'                   JSR     PC,EMS.ET               ;                       3560
000006  013746  000000G                   MOV     CPLAT,-(SP)             ;                       3561
000012  012746  000000G                   MOV     #PLATT,-(SP)
000016  012746  000002                    MOV     #2,-(SP)
000022  010600                            MOV     SP,R0                   ; SP,*
000024  104414                            TRAP    14
000026  012716  000000G                   MOV     #EBH.43,(SP)            ;                       3562
000032  012746  000001                    MOV     #1,-(SP)
000036  010600                            MOV     SP,R0                   ; SP,*
000040  104414                            TRAP    14
000042  004737  007216'                   JSR     PC,EMS.CRN              ;                       3563
000046  013701  000000G                   MOV     RP.ADDR,R1              ;                       3564
```

```
000052  010100                          MOV     R1,R0                           ; RP.ADDR,*
000054  016061  000016  000012          MOV     16(R0),12(R1)
000062  004737  007342'                 JSR     PC,EMS.CMD                      ;                       3565
000066  013700  000000G                 MOV     RP.ADDR,R0                      ;                       3566
000072  016016  000040                  MOV     40(R0),(SP)
000076  012746  000000G                 MOV     #EX.LBN,-(SP)
000102  012746  000002                  MOV     #2,-(SP)
000106  010600                          MOV     SP,R0                           ; SP,*
000110  104415                          TRAP    15
000112  013700  000000G                 MOV     RP.ADDR,R0                      ;                       3567
000116  016016  000020                  MOV     20(R0),(SP)
000122  012746  000000G                 MOV     #EX.CBC,-(SP)
000126  012746  000002                  MOV     #2,-(SP)
000132  010600                          MOV     SP,R0                           ; SP,*
000134  104415                          TRAP    15
000136  004737  010046'                 JSR     PC,EMS.BD                       ;                       3568
000142  062706  000020                  ADD     #20,SP                          ;                       3558
000146  012601                          MOV     (SP)+,R1
000150  000207                          RTS     PC

; Routine Size:  53 words,      Routine Base:  $CODE$ + 11372
; Maximum stack depth per invocation:  11 words

;   3571  1
;   3572  1     END
;   3573  1
;   3574  0     ELUDOM
;                                   OTS external references
                                            .GLOBL  $SAVE5, $SAVE4, $SAVE3, $SAVE2
                                            .GLOBL  BL$MUL

;                                   PSECT SUMMARY
;
;       Psect Name                  Words   Attributes
;        $CODE$                      2482      RO  ,  I  ,  LCL,  REL,  CON
;        $PLIT$                       487      RO  ,  D  ,  LCL,  REL,  CON

;                               Library Statistics
;
;                                       -------- Symbols - ------      Pages       Processing
;       File                            Total    Loaded   Percent      Mapped      Time
;
;  JSEP$1:[AZTEC.CZRCDB]CZRCDL.L16;6      276       204        73        16          00:00.2


;                                   COMMAND QUALIFIERS

;       BLISS/PDP11 CZRCD2.SRC/LIST/EN:NOEIS

; Size:         2342 code + 627 data words
; Run Time:        04:34.1
; Elapsed Time:    04:35.7
; Lines/CPU Min:     782
; Lexemes/CPU-Min:  8635
; Memory Used:  441 pages
; Compilation Complete
```

```
;  0001  0     MODULE CZRCD3 (
;  0002  0             %TITLE 'CZRCDB0 RC25 DISK EXERCISER'
;  0003  0             IDENT = 'V02.0',
;  0004  0             ADDRESSING_MODE (ABSOLUTE)
;  0005  0             ) =
;  0006  1     BEGIN
;  0007  1
;  0043  1     %SBTTL  DECLARATIONS'
;  0044  1
;  0045  1     LIBRARY 'CZRCDL';                       ! RC25 EXERCISER GLOBAL LIBRARY
;  0046  1     REQUIRE 'BISMAC.REQ';                   ! DIAGNOSTIC SUPERVISOR LIBRARY
;  1535  1
;  1536  1     EQUALS;
;  1537  1
;  1538  1                                             ! ROUTINES APPEAR IN THIS ORDER
;  1539  1     FORWARD ROUTINE                         !    INDENTATION IMPLIES CALLED SUBROUTINE
;  1540  1         INIT_TEST : NOVALUE,                ! INITIALIZATION SUBTEST
;  1541  1             DRIVER_INIT : NOVALUE,
;  1542  1                 CTLR_INIT : NOVALUE,
;  1543  1                     INI_CTLR_DAT : NOVALUE,
;  1544  1                     REG_EXIST,
;  1545  1                     VEC_BR_TEST,
;  1546  1                     INT_GEN,
;  1547  1                     HARD_INIT,
;  1548  1                     INI_RRING : NOVALUE,
;  1549  1                     SET_CTLR_CHAR : NOVALUE,
;  1550  1                 UNIT_INIT : NOVALUE,
;  1551  1             ACCESS : NOVALUE,
```

```
;    1552  1          DM_EXER : NOVALUE,                  ! DM EXERCISER SUBTEST
;    1553  1              DM_INIT : NOVALUE,
;    1554  1              DM_QUIT,
;    1555  1              DM_RETPKT : NOVALUE,
;    1556  1                  DM_MSG : NOVALUE,
;    1557  1              DM_ACC,
;    1558  1              DM_TALLY : NOVALUE,
;    1559  1                  UPD_DMBC : NOVALUE,
;    1560  1              DM_TIME : NOVALUE,
;    1561  1          MULTI_DRIVE : NOVALUE,              ! MULTI-DRIVE SUBTEST
;    1562  1              MD_INIT : NOVALUE,
;    1563  1                  INIT_IO_BUFF : NOVALUE,
;    1564  1              QIO_OK,
;    1565  1              MD_QUIT,
;    1566  1              QIO_GEN : NOVALUE,
;    1567  1                  GET_RANDOM : NOVALUE,
;    1568  1                  QIO_UNIT : NOVALUE,
;    1569  1                  QIO_FUNC : NOVALUE,
;    1570  1                  QIO_LBN : NOVALUE,
;    1571  1                      ADV_BST : NOVALUE,
;    1572  1                  QIO_SIZE : NOVALUE,
;    1573  1                  FILL_BUFF : NOVALUE,
;    1574  1              PROC_RETPKT : NOVALUE,
;    1575  1                  IO_RETPKT : NOVALUE,
;    1576  1                      FSET_UPAR : NOVALUE,
;    1577  1                      MD_TALLY : NOVALUE,
;    1578  1                      HOST_WRT CHK : NOVALUE,
;    1579  1                          CMP DATA,
;    1580  1                      SWEEP : NOVALUE,
;    1581  1                          RPS_REM,
;    1582  1                  DR RETPKT : NOVALUE,
;    1583  1              DRV_TIMCHK : NOVALUE,
;    1584  1          RCINT0 : L$ISR NOVALUE,             ! RC25 INTERRUPT SERVICE ROUTINES
;    1585  1          RCINT1 : L$ISR NOVALUE,
;    1586  1          RCINT2 : L$ISR NOVALUE,
;    1587  1          RCINT3 : L$ISR NOVALUE,
```

```
;    1588  1              RCINT : NOVALUE,
;    1589  1              INT_PROC : NOVALUE,
;    1590  1                  ISET_CPAR : NOVALUE,
;    1591  1                  FATAL_ERROR : NOVALUE,
;    1592  1                  POLL_CRING : NOVALUE,
;    1593  1                  POLL_RRING : NOVALUE,
;    1594  1                      ENV_TO_RP : NOVALUE,
;    1595  1                      DATAGM : NOVALUE;
;    1596  1
;    1597  1      PSECT OWN = $GGG$ (READ, NOWRITE, EXECUTE, LOCAL, CONCATENATE);
;    1598  1
;    1599  1      OWN
;    1600  1          COMM_AREA : BLOCKVECTOR [MAX_CTLR, COMM_LEN, WORD] FIELD (COM_FIELDS),
;    1601  1      !       U/Q PORT COMMUNICATIONS AREA BETWEEN HOST AND RC25 CONTROLLERS
;    1602  1          BST : BLOCKVECTOR [MAX_UNITS, BST_LEN, WORD] FIELD (B_FIELDS),
;    1603  1      !       BLOCK SEQUENCE TABLE FOR SEQUENTIAL LBN (VS. RANDOM SEEK) MODE
;    1604  1          DPST : VECTOR [MAX_UNITS, BYTE],              ! DATA PATTERN SEQUENCE TABLE
;    1605  1          ICOM_ADDR : REF BLOCK [COMM_LEN, WORD] FIELD (COM_FIELDS),
;    1606  1      !       ADDRESS OF INTERRUPTING CONTROLLER'S U/Q PORT COMMUNICATION AREA
;    1607  1          IENV_ADDR : REF BLOCK [ENV_LEN, WORD] FIELD (E_FIELDS),
;    1608  1      !       ADDRESS OF AN MSCP ENVELOPE (INTERRUPT PROCESSING)
;    1609  1          ICST_ADDR : REF BLOCK [CST_LEN, WORD] FIELD (C_FIELDS),
;    1610  1      !       ADDRESS OF INTERRUPTING CONTROLLER'S CST
;    1611  1          IDCT_ADDR : REF BLOCK [DCT_LEN, WORD] FIELD (DC_FIELDS),
;    1612  1      !       ADDRESS OF INTERRUPTING CONTROLLER'S DCT
;    1613  1          INT_ADDR : VECTOR [MAX_CTLR] INITIAL (RCINT0, RCINT1, RCINT2, RCINT3),
;    1614  1      !       INTERRUPT SERVICE ROUTINE ADDRESS TABLE
;    1615  1          ICTLR : WORD,                                 ! INTERRUPTING CONTROLLER NUMBER
;    1616  1          MX1 : SIGNED WORD,                            ! MSCP ENV INDEX FOR FIRST QIO
;    1617  1          MX2 : SIGNED WORD,                            ! MSCP ENV INDEX FOR SECOND QIO
;    1618  1          MAD1 : REF BLOCK [ENV_LEN, WORD] FIELD (E_FIELDS),
;    1619  1      !       ADDRESS OF MSCP ENVELOPE FOR FIRST QIO
;    1620  1          MAD2 : REF BLOCK [ENV_LEN, WORD] FIELD (E_FIELDS),
;    1621  1      !       ADDRESS OF MSCP ENVELOPE FOR SECOND QIO
;    1622  1          VEC_AD : WORD,                                ! CURRENT DEVICE'S VECTOR ADDRESS
;    1623  1          BRLEVEL : WORD,                               ! CURRENT DEVICE'S BR LEVEL
;    1624  1          USIZE : WORD,                                 ! UNIT SIZE (NO. OF LBN'S)
;    1625  1          DM_TIMR : VECTOR [MAX_CTLR],                  ! TIMERS FOR ONE PASS OF FRONT PANEL TEST (DM EXER)
;    1626  1          SWEEP_FLAG : BYTE,                            ! CALL / DON'T CALL SWEEP () (MULTI-DRIVE SUBTEST)
;    1627  1          RDM_CNT : WORD INITIAL (RDM_LEN),             ! NUMBER OF RANDOM NUMBERS        \ KEEP
;    1628  1          RANDOM : VECTOR [RDM_LEN, WORD],              ! RANDOM NUMBER TABLE (PATTERN 1) / TOGETHER
;    1629  1          PAT02 : VECTOR [2] INITIAL (1,                                ! PATTERN 2
;    1630  1                  %O'000000'),
;    1631  1          PAT03 : VECTOR [2] INITIAL (1,                                ! PATTERN 3
;    1632  1                  %O'177777'),
;    1633  1          PAT04 : VECTOR [2] INITIAL (1,                                ! PATTERN 4
;    1634  1                  %O'105613'),
;    1635  1          PAT05 : VECTOR [2] INITIAL (1,                                ! PATTERN 5
;    1636  1                  %O'031463'),
;    1637  1          PAT06 : VECTOR [2] INITIAL (1,                                ! PATTERN 6
;    1638  1                  %O'030221'),
;    1639  1          PAT07 : VECTOR [17] INITIAL (16,                              ! PATTERN 7
;    1640  1                  %O'000001', %O'000003', %O'000007', %O'000017',
;    1641  1                  %O'000037', %O'000077', %O'000177', %O'000377',
;    1642  1                  %O'000777', %O'001777', %O'003777', %O'007777',
;    1643  1                  %O'017777', %O'037777', %O'077777', %O'177777'),
;    1644  1          PAT08 : VECTOR [17] INITIAL (16,                              ! PATTERN 8
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;   1645  1                 %O'177776', %O'177774', %O'177770', %O'177760',
;   1646  1                 %O'177740', %O'177700', %O'177600', %O'177400',
;   1647  1                 %O'177000', %O'176000', %O'174000', %O'170000',
;   1648  1                 %O'160000', %O'140000', %O'100000', %O'000000'),
;   1649  1           PAT09 : VECTOR [17] INITIAL (16,                          ! PATTERN 9
;   1650  1                 %O'000000', %O'000000', %O'000000', %O'177777',
;   1651  1                 %O'177777', %O'177777', %O'000000', %O'000000',
;   1652  1                 %O'177777', %O'177777',
;   1653  1                 %O'000000', %O'177777', %O'000000', %O'177777',
;   1654  1                 %O'000000', %O'177777'),
;   1655  1           PAT10 : VECTOR [2] INITIAL (1,                            ! PATTERN 10
;   1656  1                 %O'133331'),
;   1657  1           PAT11 : VECTOR [17] INITIAL (16,                          ! PATTERN 11
;   1658  1                 %O'052525', %O'052525', %O'052525', %O'125252',
;   1659  1                 %O'125252', %O'125252', %O'052525', %O'052525',
;   1660  1                 %O'125252', %O'125252',
;   1661  1                 %O'052525', %O'125252', %O'052525', %O'125252',
;   1662  1                 %O'052525', %O'125252'),
;   1663  1           PAT12 : VECTOR [21] INITIAL (20,                          ! PATTERN 12
;   1664  1                 %O'026455', %O'026455', %O'026455', %O'151322',
;   1665  1                 %O'151322', %O'151322', %O'026455', %O'026455',
;   1666  1                 %O'151322', %O'151322', %O'026455', %O'026455',
;   1667  1                 %O'151322', %O'026455', %O'151322', %O'026455',
;   1668  1                 %O'151322', %O'026455', %O'151322', %O'026455'),
;   1669  1           PAT13 : VECTOR [2] INITIAL (1,                            ! PATTERN 13
;   1670  1                 %O'066666'),
;   1671  1           PAT14 : VECTOR [17] INITIAL (16,                          ! PATTERN 14
;   1672  1                 %O'000001', %O'C00002', %O'000004', %O'000010',
;   1673  1                 %O'000020', %O'000040', %O'000100', %O'000200',
;   1674  1                 %O'000400', %O'001000', %O'002000', %O'004000',
;   1675  1                 %O'010000', %O'020000', %O'040000', %O'100000'),
;   1676  1           PAT15 : VECTOR [17] INITIAL (16,                          ! PATTERN 15
;   1677  1                 %O'177776', %O'177775', %O'177773', %O'177767',
;   1678  1                 %O'177757', %O'177737', %O'177677', %O'177577',
;   1679  1                 %O'177377', %O'176777', %O'175777', %O'173777',
;   1680  1                 %O'167777', %O'157777', %O'137777', %O'077777'),
;   1681  1           PAT16 : VECTOR [17] INITIAL (16,                          ! PATTERN 16
;   1682  1                 %O'133331', %O'133331', %O'133331', %O'155554',
;   1683  1                 %O'155554', %O'155554', %O'133331', %O'133331',
;   1684  1                 %O'155554', %O'155554',
;   1685  1                 %O'133331', %O'155554', %O'133331', %O'155554',
;   1686  1                 %O'133331', %O'155554'),
;   1687  1           PAT17 : VECTOR [22] INITIAL (21,                          ! PATTERN 17
;   1688  1                 %O'000000', %O'106466', %O'106466', %O'071311',
;   1689  1                 %O'071311', %O'071311', %O'106466', %O'106466',
;   1690  1                 %O'106466', %O'106466', %O'071311', %O'071311',
;   1691  1                 %O'071311', %O'071311', %O'071311', %O'106466',
;   1692  1                 %O'106466', %O'106466', %O'106466', %O'106466',
;   1693  1                 %O'106466'),
;   1694  1           PAT18 : VECTOR [22] INITIAL (21,                          ! PATTERN 18
;   1695  1                 %O'106466', %O'000000', %O'071311',
;   1696  1                 %O'106466', %O'106466', %O'106466', %O'071311',
;   1697  1                 %O'071311', %O'071311', %O'071311', %O'106466',
;   1698  1                 %O'106466', %O'106466', %O'106466', %O'106466',
;   1699  1                 %O'071311', %O'071311', %O'071311', %O'071311',
;   1700  1                 %O'071311', %O'071311'),
;   1701  1           PAT19 : VECTOR [22] INITIAL (21,                          ! PATTERN 19
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;   1702  1                 %O'000000', %O'134631', %O'134631', %O'043146',
;   1703  1                 %O'043146', %O'043146', %O'134631', %O'134631',
;   1704  1                 %O'134631', %O'134631', %O'043146', %O'043146',
;   1705  1                 %O'043146', %O'043146', %O'043146', %O'134631',
;   1706  1                 %O'134631', %O'134631', %O'134631', %O'134631',
;   1707  1                 %O'134631'),
;   1708  1          PAT20 : VECTOR [22] INITIAL (21,                          ! PATTERN 20
;   1709  1                 %O'134631', %O'000000', %O'043146',
;   1710  1                 %O'134631', %O'134631', %O'134631', %O'043146',
;   1711  1                 %O'043146', %O'043146', %O'043146', %O'134631',
;   1712  1                 %O'134631', %O'134631', %O'134631', %O'134631',
;   1713  1                 %O'043146', %O'043146', %O'043146', %O'043146',
;   1714  1                 %O'043146', %O'043146'),
;   1715  1          PAT21 : VECTOR [2] INITIAL (1,                            ! PATTERN 21
;   1716  1                 %O'000000'),                                       !    (LBN)
;   1717  1          DPA_TBL : VECTOR [DP_CNT] INITIAL                 ! DATA PATTERN ADDRESS TABLE
;   1718  1                   (RDM_CNT, PAT02, PAT03, PAT04, PAT05,
;   1719  1                   PAT06, PAT07, PAT08, PAT09, PAT10, PAT11,
;   1720  1                   PAT12, PAT13, PAT14, PAT15, PAT16, PAT17,
;   1721  1                   PAT18, PAT19, PAT20, PAT21),
;   1722  1      !+
;   1723  1      !       THE FOLLOWING CODE IS THE CROM PRIMER WHICH WAS DEVELOPED
;   1724  1      !       INDEPENDENTLY. ITS BINARY .SAV FILE WAS RUN THROUGH THE PROGRAM
;   1725  1      !       "DMCONV", PRODUCING THIS COMPILABLE VECTOR.
;   1726  1      !-
;   1727  1
;   1728  1      CROMP:VECTOR[206,WORD]
;   1729  1      PRESET (
;   1730  1      [0]     =  %O'000140',  ! THIS IS THE DM PROGRAM BYTE COUNT.
;   1731  1      [1]     =  %O'000000',
;   1732  1      [2]     =  %O'000472',  ! THIS IS THE DM OVERLAY BYTE COUNT.
;   1733  1      [3]     =  %O'000000',
;   1734  1      [4]     =  %O'051103',  ! NEXT 3 WORDS = PROGRAM NAME (ASCII)
;   1735  1      [5]     =  %O'046517',  ! PROGRAM NAME IS 'CROMP '
;   1736  1      [6]     =  %O'020120',
;   1737  1      [7]     =  %O'000001',  ! THIS IS THE PROGRAM VERSION
;   1738  1      [8]     =  %O'000013',  ! UPPER BYTE=TIME OUT VAL. LOWER = FLAGS
;   1739  1      [9]     =  %O'000000',
;   1740  1      [10]    =  %O'000000',
;   1741  1      [11]    =  %O'000000',
;   1742  1      [12]    =  %O'000000',
;   1743  1      [13]    =  %O'000000',
;   1744  1      [14]    =  %O'000000',
;   1745  1      [15]    =  %O'000000',
;   1746  1      [16]    =  %O'104206',  ! DM CODE STARTS HERE
;   1747  1      [17]    =  %O'007760',
;   1748  1      [18]    =  %O'002754',
;   1749  1      [19]    =  %O'000000',
;   1750  1      [20]    =  %O'000000',
;   1751  1      [21]    =  %O'000000',
;   1752  1      [22]    =  %O'000000',
;   1753  1      [23]    =  %O'000000',
;   1754  1      [24]    =  %O'000000',
;   1755  1      [25]    =  %O'000235',
;   1756  1      [26]    =  %O'000000',
;   1757  1      [27]    =  %O'000000',
;   1758  1      [28]    =  %O'104204',
```

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;    1759  1      [29]     =  %O'007774',
;    1760  1      [30]     =  %O'104140',
;    1761  1      [31]     =  %O'002752',
;    1762  1      [32]     =  %O'104204',
;    1763  1      [33]     =  %O'002751',
;    1764  1      [34]     =  %O'104203',
;    1765  1      [35]     =  %O'007000',
;    1766  1      [36]     =  %O'104647',
;    1767  1      [37]     =  %O'000001',
;    1768  1      [38]     =  %O'104641',
;    1769  1      [39]     =  %O'000002',
;    1770  1      [40]     =  %O'104142',
;    1771  1      [41]     =  %O'060020',
;    1772  1      [42]     =  %O'102207',
;    1773  1      [43]     =  %O'000037',
;    1774  1      [44]     =  %O'052754',
;    1775  1      [45]     =  %O'104077',
;    1776  1      [46]     =  %O'007006',
;    1777  1      [47]     =  %O'032305',
;    1778  1      [48]     =  %O'000000',  ! DM OVERLAY CODE STARTS HERE
;    1779  1      [49]     =  %O'000000',
;    1780  1      [50]     =  %O'000000',
;    1781  1      [51]     =  %O'000000',
;    1782  1      [52]     =  %O'000000',
;    1783  1      [53]     =  %O'000000',
;    1784  1      [54]     =  %O'104207',
;    1785  1      [55]     =  %O'007000',
;    1786  1      [56]     =  %O'104201',
;    1787  1      [57]     =  %O'000002',
;    1788  1      [58]     =  %O'104202',
;    1789  1      [59]     =  %O'002740',
;    1790  1      [60]     =  %O'107027',
;    1791  1      [61]     =  %O'107017',
;    1792  1      [62]     =  %O'105012',
;    1793  1      [63]     =  %O'060011',
;    1794  1      [64]     =  %O'027107',
;    1795  1      [65]     =  %O'027203',
;    1796  1      [66]     =  %O'027146',
;    1797  1      [67]     =  %O'114000',
;    1798  1      [68]     =  %O'007005',
;    1799  1      [69]     =  %O'114000',
;    1800  1      [70]     =  %O'007776',
;    1801  1      [71]     =  %O'114000',
;    1802  1      [72]     =  %O'007776',
;    1803  1      [73]     =  %O'104077',
;    1804  1      [74]     =  %O'104206',
;    1805  1      [75]     =  %O'007760',
;    1806  1      [76]     =  %O'104301',
;    1807  1      [77]     =  %O'007005',
;    1808  1      [78]     =  %O'104610',
;    1809  1      [79]     =  %O'007234',
;    1810  1      [80]     =  %O'007767',
;    1811  1      [81]     =  %O'115000',
;    1812  1      [82]     =  %O'007767',
;    1813  1      [83]     =  %O'077076',
;    1814  1      [84]     =  %O'027120',
;    1815  1      [85]     =  %O'104200',
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;  1816  1     [86]    =  %O'007051',
;  1817  1     [87]    =  %O'002750',
;  1818  1     [88]    =  %O'002740',
;  1819  1     [89]    =  %O'027146',
;  1820  1     [90]    =  %O'115000',
;  1821  1     [91]    =  %O'007265',
;  1822  1     [92]    =  %O'057051',
;  1823  1     [93]    =  %O'104200',
;  1824  1     [94]    =  %O'177777',
;  1825  1     [95]    =  %O'007004',
;  1826  1     [96]    =  %O'027130',
;  1827  1     [97]    =  %O'027146',
;  1828  1     [98]    =  %O'115000',
;  1829  1     [99]    =  %O'007265',
;  1830  1     [100]   =  %O'017071',
;  1831  1     [101]   =  %O'114000',
;  1832  1     [102]   =  %O'007004',
;  1833  1     [103]   =  %O'027130',
;  1834  1     [104]   =  %O'007051',
;  1835  1     [105]   =  %O'027162',
;  1836  1     [106]   =  %O'027203',
;  1837  1     [107]   =  %O'114000',
;  1838  1     [108]   =  %O'007264',
;  1839  1     [109]   =  %O'027216',
;  1840  1     [110]   =  %O'115400',
;  1841  1     [111]   =  %O'007005',
;  1842  1     [112]   =  %O'106200',
;  1843  1     [113]   =  %O'000003',
;  1844  1     [114]   =  %O'007005',
;  1845  1     [115]   =  %O'037031',
;  1846  1     [116]   =  %O'114000',
;  1847  1     [117]   =  %O'007005',
;  1848  1     [118]   =  %O'007031',
;  1849  1     [119]   =  %O'104207',
;  1850  1     [120]   =  %O'007002',
;  1851  1     [121]   =  %O'104201',
;  1852  1     [122]   =  %O'000002',
;  1853  1     [123]   =  %O'060023',
;  1854  1     [124]   =  %O'102207',
;  1855  1     [125]   =  %O'000037',
;  1856  1     [126]   =  %O'057107',
;  1857  1     [127]   =  %O'000000',
;  1858  1     [128]   =  %O'104307',
;  1859  1     [129]   =  %O'007005',
;  1860  1     [130]   =  %O'104201',
;  1861  1     [131]   =  %O'000005',
;  1862  1     [132]   =  %O'060031',
;  1863  1     [133]   =  %O'104010',
;  1864  1     [134]   =  %O'007001',
;  1865  1     [135]   =  %O'000000',
;  1866  1     [136]   =  %O'104307',
;  1867  1     [137]   =  %O'007002',
;  1868  1     [138]   =  %O'105207',
;  1869  1     [139]   =  %O'000060',
;  1870  1     [140]   =  %O'114001',
;  1871  1     [141]   =  %O'104202',
;  1872  1     [142]   =  %O'000001',
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;    1873  1      [143]   =  %O'104203',
;    1874  1      [144]   =  %O'007004',
;    1875  1      [145]   =  %O'060021',
;    1876  1      [146]   =  %O'102207',
;    1877  1      [147]   =  %O'000037',
;    1878  1      [148]   =  %O'057130',
;    1879  1      [149]   =  %O'000000',
;    1880  1      [150]   =  %O'104307',
;    1881  1      [151]   =  %O'007002',
;    1882  1      [152]   =  %O'114001',
;    1883  1      [153]   =  %O'104202',
;    1884  1      [154]   =  %O'000032',
;    1885  1      [155]   =  %O'104203',
;    1886  1      [156]   =  %O'007234',
;    1887  1      [157]   =  %O'060020',
;    1888  1      [158]   =  %O'102207',
;    1889  1      [159]   =  %O'000037',
;    1890  1      [160]   =  %O'057146',
;    1891  1      [161]   =  %O'000000',
;    1892  1      [162]   =  %O'104200',
;    1893  1      [163]   =  %O'000004',
;    1894  1      [164]   =  %O'007000',
;    1895  1      [165]   =  %O'104207',
;    1896  1      [166]   =  %O'002743',
;    1897  1      [167]   =  %O'104301',
;    1898  1      [168]   =  %O'007001',
;    1899  1      [169]   =  %O'104272',
;    1900  1      [170]   =  %O'105612',
;    1901  1      [171]   =  %O'007240',
;    1902  1      [172]   =  %O'100612',
;    1903  1      [173]   =  %O'007240',
;    1904  1      [174]   =  %O'115401',
;    1905  1      [175]   =  %O'117400',
;    1906  1      [176]   =  %O'007000',
;    1907  1      [177]   =  %O'037171',
;    1908  1      [178]   =  %O'000000',
;    1909  1      [179]   =  %O'114000',
;    1910  1      [180]   =  %O'002743',
;    1911  1      [181]   =  %O'114000',
;    1912  1      [182]   =  %O'002744',
;    1913  1      [183]   =  %O'114000',
;    1914  1      [184]   =  %O'002745',
;    1915  1      [185]   =  %O'114000',
;    1916  1      [186]   =  %O'002746',
;    1917  1      [187]   =  %O'114000',
;    1918  1      [188]   =  %O'002747',
;    1919  1      [189]   =  %O'000000',
;    1920  1      [190]   =  %O'104307',
;    1921  1      [191]   =  %O'007002',
;    1922  1      [192]   =  %O'105207',
;    1923  1      [193]   =  %O'000010',
;    1924  1      [194]   =  %O'114001',
;    1925  1      [195]   =  %O'104202',
;    1926  1      [196]   =  %O'000025',
;    1927  1      [197]   =  %O'104203',
;    1928  1      [198]   =  %O'007240',
;    1929  1      [199]   =  %O'060021',
```

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;    1930  1      [200]   =  %O'102207',
;    1931  1      [201]   =  %O'000037',
;    1932  1      [202]   =  %O'057216',
;    1933  1      [203]   =  %O'000000',
;    1934  1      [204]   =  %O'143367',
;    1935  1      [205]   =  %O'000000');
;    1936  1
;    1937  1      EXTERNAL
;    1938  1          PATCH : VECTOR [100, WORD],                    ! PATCH AREA
;    1939  1          CPT : VECTOR [MAX_UNITS, BYTE],
;    1940  1      !       CURRENT PASS TESTING (YES / NO) PER UNIT
;    1941  1          CST : BLOCKVECTOR [MAX_CTLR, CST_LEN, WORD] FIELD (C_FIELDS),
;    1942  1      !       RUN-TIME CONTROLLER STATUS TABLES
;    1943  1          CST_ADDR : REF BLOCK [CST_LEN, WORD] FIELD (C_FIELDS),
;    1944  1      !       CONTROLLER STATUS TABLE ADDRESS OF 'CURRENT" CONTROLLER
;    1945  1          DCT : BLOCKVECTOR [MAX_CTLR, DCT_LEN, WORD] FIELD (DC_FIELDS),
;    1946  1      !       DRIVER CONTROLLER TABLES
;    1947  1          DCT_ADDR : REF BLOCK [DCT_LEN, WORD] FIELD (DC_FIELDS),
;    1948  1      !       ADDRESS OF "CURRENT" DRIVER CONTROLLER TABLE
;    1949  1          RC25_ADDR : REF RC25 FIELD (RC_REG),
;    1950  1      !       DEVICE ADDRESS OF "CURRENT" CONTROLLER
;    1951  1          IRC25_ADDR : REF RC25 FIELD (RC_REG),
;    1952  1      !       DEVICE ADDRESS OF INTERRUPTING CONTROLLER
;    1953  1          DM_COMM : BLOCKVECTOR [MAX_CTLR, DMC_LEN, WORD] FIELD (DMC_FIELDS),
;    1954  1      !       DM EXERCISER COMMUNICATION AREA (LINK TO FRONT PANEL TEST)
;    1955  1          DMC_ADDR : REF BLOCK [DMC LEN, WORD] FIELD (DMC_FIELDS),
;    1956  1      !       ADDRESS OF CURRENT CONTROLLER'S DM EXERCISER COMMUNICATION AREA
;    1957  1          RP_SAVE : VECTOR [MAX_CTLR * RPS_LEN, BYTE, SIGNED],
;    1958  1      !       RETURN PACKET SAVE AREA
;    1959  1          RPS_X1 : WORD,                                 ! STARTING INDEX OF CURRENT CONTROLLER'S RP_SAVE AREA
;    1960  1          RPS_X2 : WORD,                                 ! ENDING INDEX OF CURRENT CONTROLLER'S RP_SAVE AREA
;    1961  1          OUTC_LIST : VECTOR [MAX_CTLR * OUTC_CNT, BYTE, SIGNED],
;    1962  1      !       OUTSTANDING COMMAND LIST (CONTAINS MSCP ENVELOPE INDECES)
;    1963  1          OUTC_TIMR : VECTOR [MAX_CTLR * OUTC_CNT, WORD],
;    1964  1      !       OUTSTANDING COMMAND TIMERS
;    1965  1          OCL_X1 : WORD,
;    1966  1      !       STARTING INDEX OF CURRENT CONTROLLER'S OUTSTANDING COMMAND AREA
;    1967  1          OCL_X2 : WORD,
;    1968  1      !       ENDING INDEX OF CURRENT CONTROLLER'S OUTSTANDING COMMAND AREA
;    1969  1          TALLY : VECTOR [MAX UNITS * TALLY_LEN, WORD] FIELD (T_FIELDS),
;    1970  1      !       STATISTICS TABLES
;    1971  1          T_ADDR : REF BLOCK [TALLY_LEN, WORD] FIELD (T_FIELDS),
;    1972  1      !       ADDRESS OF STATISTICS TABLE (TALLY) FOR CURRENT UNIT
;    1973  1          MSCP_ENV : BLOCKVECTOR [ENV_CNT, ENV_LEN, WORD] FIELD (E_FIELDS),
;    1974  1      !       MSCP ENVELOPE POOL
;    1975  1          ENV_USE : VECTOR [ENV_CNT, BYTE, SIGNED],
;    1976  1      !       MSCP ENVELOPE POOL ALLOCATION TABLE
;    1977  1          RETPKT : BLOCKVECTOR [RP_CNT, RP_LEN, WORD] FIELD (RP_FIELDS),
;    1978  1      !       RETURN PACKET POOL
;    1979  1          RP_USE : VECTOR [RP CNT, BYTE, SIGNED],
;    1980  1      !       RETURN PACKET POOL ALLOCATION TABLE
;    1981  1          RP INDX : WORD,                                ! CURRENT RETURN PACKET INDEX
;    1982  1          RP_ADDR : REF BLOCK [RP_LEN, WORD] FIELD (RP_FIELDS),
;    1983  1      !       CURRENT RETURN PACKET ADDRESS
;    1984  1          BUFF_DESC : BLOCKVECTOR [MAX_BUF_CNT, DESC_LEN, WORD] FIELD (BD_FIELDS),
;    1985  1      !       TABLE OF I/O BUFFER DESCRIPTORS
;    1986  1          BUFF OWN : VECTOR [MAX_BUF_CNT, BYTE, SIGNED],
```

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;    1987  1      !       I/O BUFFER OWNERSHIP (CONTROLLER NUMBER)
;    1988  1          IODQ : VECTOR [IODQ_LEN, BYTE],
;    1989  1      !       I/O DONE QUEUE - CIRCULAR QUEUE OF RETPKT INDECES
;    1990  1          IODQ_IN : WORD,                         ! I/O DONE QUEUE IN POINTER
;    1991  1          IODQ_OUT : WORD,                        ! I/O DONE QUEUE OUT POINTER
;    1992  1          ENTRY_REASON : BYTE,                    ! HOW CURRENT PASS WAS INVOKED
;    1993  1          T_FLAG : BYTE,                          ! ONE SECOND TIMING FLAG
;    1994  1          EOP_FLAG : BYTE,                        ! END-OF-PASS FLAG
;    1995  1          MEM_MGMT : BYTE,                        ! MEMORY MANAGEMENT FLAG
;    1996  1          IIP_FLAG : BYTE,                        ! INITIALIZATION IN-PROGRESS FLAG
;    1997  1          CCTLR : WORD,                           ! NUMBER OF "CURRENT" CONTROLLER
;    1998  1          CPLAT : WORD,                           ! CURRENT PLATTER ADDRESS (MSCP UNIT NUMBER)
;    1999  1          CUOFF : WORD,                           ! CST OFFSET FOR CURRENT UNIT
;    2000  1          CTLR_CNT : WORD,                        ! TOTAL NUMBER OF CONFIGURE  CONTROLLERS
;    2001  1          DUR : VECTOR [MAX_UNITS, BYTE],         ! DROP UNIT REASON
;    2002  1          QIO : VECTOR [MAX_CTLR, BYTE],          ! NUMBER OF OUTSTANDING QIOS PER CONTROLLER
;    2003  1          MEM_SIZE : WORD,                        ! AVAILABLE MEMORY (IN WORDS) UP TO 28K
;    2004  1          FREE_MEM_ADDR,                          ! START OF FREE MEMORY BELOW 28K
;    2005  1          BUFF_SIZE : WORD,                       ! SIZE (BYTES) OF AN I/O BUFFER
;    2006  1          NUM_BUFF : WORD,                        ! NUMBER OF I/O BUFFERS
;    2007  1          CLK_TYPE : WORD,                        ! TYPE OF CLOCK ON SYSTEM
;    2008  1                                                  !   (0 = NONE, -1 = L_CLOCK, 1 = P_CLOCK)
;    2009  1          CLK_HERTZ : WORD,                       ! CLOCK HERTZ RATE
;    2010  1          CLK_CSR,                                ! CLOCK CSR ADDRESS
;    2011  1          CLK_VECTOR,                             ! CLOCK VECTOR ADDRESS
;    2012  1          HOURS : WORD,                           ! ELAPSED TIME - HOURS,
;    2013  1          MINUTES : WORD,                         !       MINUTES,
;    2014  1          SECONDS : WORD,                         !       SECONDS,
;    2015  1          TICKS : WORD,                           !       TICKS
;    2016  1          ST_CODE : WORD,                         ! CURRENT STATUS CODE
;    2017  1          SB_CODE : WORD,                         ! CURRENT SUB-CODE
;    2018  1          STEP : WORD,                            ! CURRENT STEP IN HARD_INIT
;    2019  1          OF_RC : SIGNED WORD,                    ! OFFSET (0 OR 2) TO READ IP OR SA
;    2020  1          SA_REG : WORD,                          ! STORAGE FOR SA REGISTER READS AND WRITES
;    2021  1          NEX : WORD,                             ! NON-EXISTENT MEMORY TRAP INDICATOR
;    2022  1          CRN : WORD,                             ! COMMAND REF NUMBER OF LAST COMMAND SENT
;    2023  1          MSG_02,
;    2024  1          MSG_03,
;    2025  1          MSG_04,
;    2026  1          MSG_05,
;    2027  1          MSG_06,
;    2028  1          MSG_08,
;    2029  1          EGD_10,
;    2030  1          EGD_11,
;    2031  1          EGD_12,
;    2032  1          EGD_13,
;    2033  1          EGD_14,
;    2034  1          EGD_15,
;    2035  1          EGD_16,
;    2036  1          EGD_17,
;    2037  1          EGD_18,
;    2038  1          EGD_19,
;    2039  1          EGD_20,
;    2040  1          EGD_21,
;    2041  1          EGD_22,
;    2042  1          EGH_30,
;    2043  1          STC_00,
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;    2044  1          STC_01,
;    2045  1          STC_02,
;    2046  1          STC_03,
;    2047  1          STC_04,
;    2048  1          STC_05,
;    2049  1          STC_06,
;    2050  1          STC_07,
;    2051  1          STC_08,
;    2052  1          STC_09,
;    2053  1          STC_10,
;    2054  1          STC_11,
;    2055  1          EX_CRN,
;    2056  1          EX_SB,
;    2057  1          EX_EL,
;    2058  1          EX_PA,
;    2059  1          EX_FMT,
;    2060  1          EX_EVC,
;    2061  1          EX_HMA,
;    2062  1          EX_03,
;    2063  1          SWP_STRACK : WORD,                          ! STARTING TRACK
;    2064  1          SWP_ETRACK : WORD,                          ! ENDING TRACK
;    2065  1          SWP_FLAGS : BYTE,                           ! FLAGS (SEE DOCUMENTATION)
;    2066  1          SWP_DPAT : BYTE,                            ! DATA PATTERN NUMBER
;    2067  1          SWP_UCNT : WORD,                            ! USER DATA PATTERN COUNT
;    2068  1          SWP_UDPAT : VECTOR [MAX_UDP_CNT, WORD],     ! USER DATA PATTERN
;    2069  1          L$HIMEM,
;    2070  1          L$UNIT,
;    2071  1          L$LUN;
;    2072  1
;    2073  1      EXTERNAL ROUTINE
;    2074  1          NEX_TRAP : L$ISR NOVALUE,
;    2075  1          COPY_BLK : NOVALUE,
;    2076  1          SET_CPAR : NOVALUE,
;    2077  1          SET_UPAR : NOVALUE,
;    2078  1          GET_ENV,
;    2079  1          PUT_ENV : NOVALUE,
;    2080  1          GET_RETPKT,
;    2081  1          PUT_RETPKT : NOVALUE,
;    2082  1          GET_IO_BUFF : NOVALUE,
;    2083  1          PUT_IO_BUFF : NOVALUE,
;    2084  1          PUTA_BUFF : NOVALUE,
;    2085  1          OUT_IODQ,
;    2086  1          IN_IODQ : NOVALUE,
;    2087  1          DROP_CTLR : NOVALUE,
;    2088  1          DRV_CTLERR : NOVALUE,
;    2089  1          HARD_ERR : NOVALUE,
;    2090  1          UPD_IOC : NOVALUE,
;    2091  1          OVF_CHK : NOVALUE,
;    2092  1          XFR_CHK : NOVALUE,
;    2093  1          SEND,
;    2094  1          WAIT : NOVALUE,
;    2095  1          EMS_10 : NOVALUE,
;    2096  1          EMS_12 : NOVALUE,
;    2097  1          EMS_13 : NOVALUE,
;    2098  1          EMS_14 : NOVALUE,
;    2099  1          EMS_15 : NOVALUE,
;    2100  1          EMS_16 : NOVALUE,
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;    2101  1          EMS_17 : NOVALUE,
;    2102  1          EMS_18 : NOVALUE,
;    2103  1          EMS_19 : NOVALUE,
;    2104  1          EMS_20 : NOVALUE,
;    2105  1          EMS_21 : NOVALUE,
;    2106  1          EMS_22 : NOVALUE,
;    2107  1          EMS_30 : NOVALUE,
;    2108  1          EMS_42 : NOVALUE,
;    2109  1          EMS_43 : NOVALUE;
```

```
;    2110  1     %SBTTL 'TEST SECTION'
;    2111  1
;    2112  1     !+
;    2113  1     !       THIS SECTION CONTAINS THE TOP-LEVEL TEST CODE FOR THE RC25 DISK
;    2114  1     !       EXERCISER. THE EXERCISER CONSISTS OF ONE TEST WHICH IS SUBDIVIDED INTO
;    2115  1     !       A NUMBER OF SUBTESTS. ALL SUBTESTS ARE DECLARED WITHIN THIS BLOCK.
;    2116  1     !-
;    2117  1
;    2118  3     BGNTST;
;    2119  3
;    2120  3     EOP_FLAG = FALSE;
;    2121  3     IF .ENTRY_REASON NEQU NEW PASS          ! IF START, RESTART, CONT, OR PWR FAIL
;    2122  3     THEN                                    ! THEN
;    2123  4         BEGIN
;    2124  4
;    2125  6         BGNSUB;
;    2126  6         INIT_TEST ();                       ! INITIALIZATION SUBTEST
;    2127  4         ENDSUB;
;    2128  4
;    2129  3         END;
;          3
;          4     IF BIT_TST (SWP_FLAGS, SWF_DM)          ! IF OPERATOR SELECTED DM EXERCISER
;    2132  3     THEN                                    ! THEN
;    2133  4         BEGIN
;    2134  4
;    2135  6         BGNSUB;
;    2136  6         DM_EXER ();                         ! RUN DM EXERCISER SUBTEST
;    2137  4         ENDSUB;
;    2138  4
;    2139  4         END
;    2140  3     ELSE                                    ! OTHERWISE
;    2141  4         BEGIN
;    2142  4
;    2143  6         BGNSUB;
;    2144  6         MULTI_DRIVE ();                     ! RUN MULTI-DRIVE SUBTEST
;    2145  4         ENDSUB;
;    2146  4
;    2147  3         END;
;    2148  3
;    2149  3     DORPT;                                  ! PRINT STATISTICS
;    2150  3     EOP_FLAG = TRUE;                        ! SET END-OF PASS FLAG
;    2151  3
;    2152  1     ENDTST;


                                        .TITLE  CZRCD3 CZRCD80 RC25 DISK EXERCISER
                                        .IDENT  /V02.0/
                                        .ENABL  AMA

000000                                  .PSECT  $GGG$,  RO
000000                          COMM.AREA:
                                        .BLKW   220
000440                          BST:    .BLKW   40
000540                          DPST:   .BLKW   10
000560                          ICOM.ADDR:
                                        .BLKW   1
```

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000562                          IENV.ADDR:
                                        .BLKW   1
000564                          ICST.ADDR:
                                        .BLKW   1
000566                          IDCT.ADDR:
                                        .BLKW   1
000570  000000V                 INT.ADDR:
                                        .WORD   RCINT0
000572  000000V                         .WORD   RCINT1
000574  000000V                         .WORD   RCINT2
000576  000000V                         .WORD   RCINT3
000600                          ICTLR:  .BLKW   1
000602                          MX1:    .BLKW   1
000604                          MX2:    .BLKW   1
000606                          MAD1:   .BLKW   1
000610                          MAD2:   .BLKW   1
000612                          VEC.AD: .BLKW   1
000614                          BRLEVEL:.BLKW   1
000616                          USIZE:  .BLKW   1
000620                          DM.TIMR:.BLKW   4
000630                          SWEEP.FLAG:
                                        .BLKB   1
                                        .EVEN
000632  0C0020                  RDM.CNT:.WORD   20
000634                          RANDOM: .BLKW   20
000674  000001                  PAT02:  .WORD   1
000676  000000                          .WORD   0
000700  000001                  PAT03:  .WORD   1
000702  177777                          .WORD    1
000704  000001                  PAT04:  .WORD   1
000706  105613                          .WORD   -72165
000710  000001                  PAT05:  .WORD   1
000712  031463                          .WORD   31463
000714  000001                  PAT06:  .WORD   1
000716  030221                          .WORD   30221
000720  000020                  PAT07:  .WORD   20
000722  000001                          .WORD   1
000724  000003                          .WORD   3
000726  000007                          .WORD   7
000730  000017                          .WORD   17
000732  000037                          .WORD   37
000734  000077                          .WORD   77
000736  000177                          .WORD   177
000740  000377                          .WORD   377
000742  000777                          .WORD   777
000744  001777                          .WORD   1777
000746  003777                          .WORD   3777
000750  007777                          .WORD   7777
000752  017777                          .WORD   17777
000754  037777                          .WORD   37777
000756  077777                          .WORD   77777
000760  177777                          .WORD   -1
000762  000020                  PAT08:  .WORD   20
000764  177776                          .WORD   -2
000766  177774                          .WORD   -4
000770  177770                          .WORD   -10
000772  177760                          .WORD   -20
```

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000774  177740                          .WORD   -40
000776  177700                          .WORD   -100
001000  177600                          .WORD   -200
001002  177400                          .WORD   -400
001004  177000                          .WORD   -1000
001006  176000                          .WORD   -2000
001010  174000                          .WORD   -4000
001012  170000                          .WORD   -10000
001014  160000                          .WORD   -20000
001016  140000                          .WORD   -40000
001020  100000                          .WORD   -100000
001022  000000                          .WORD   0
001024  000020                  PAT09:  .WORD   20
001026  000000                          .WORD   0
001030  000000                          .WORD   0
001032  000000                          .WORD   0
001034  177777                          .WORD   -1
001036  177777                          .WORD   -1
001040  177777                          .WORD   -1
001042  000000                          .WORD   0
001044  000000                          .WORD   0
001046  177777                          .WORD   -1
001050  177777                          .WORD   -1
001052  0C0000                          .WORD   0
001054  177777                          .WORD   -1
001056  000000                          .WORD   0
001060  177777                          .WORD   -1
001062  000000                          .WORD   0
001064  177777                          .WORD   -1
001066  000001                  PAT10:  .WORD   1
001070  133331                          .WORD   -44447
001072  000020                  PAT11:  .WORD   20
001074  052525                          .WORD   52525
001076  052525                          .WORD   52525
001100  052525                          .WORD   52525
001102  125252                          .WORD   -52526
001104  125252                          .WORD   -52526
001106  125252                          .WORD   -52526
001110  052525                          .WORD   52525
001112  052525                          .WORD   52525
001114  125252                          .WORD   -52526
001116  125252                          .WORD   -52526
001120  052525                          .WORD   52525
001122  125252                          .WORD   -52526
001124  052525                          .WORD   52525
001126  125252                          .WORD   -52526
001130  052525                          .WORD   52525
001132  125252                          .WORD   -52526
001134  000024                  PAT12:  .WORD   24
001136  026455                          .WORD   26455
001140  026455                          .WORD   26455
001142  026455                          .WORD   26455
001144  151322                          .WORD   -26456
001146  151322                          .WORD   -26456
001150  151322                          .WORD   -26456
001152  026455                          .WORD   26455
001154  026455                          .WORD   26455
```

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001156  151322                          .WORD   -26456
001160  151322                          .WORD   -26456
001162  026455                          .WORD   26455
001164  026455                          .WORD   26455
001166  151322                          .WORD   -26456
001170  026455                          .WORD   26455
001172  151322                          .WORD   -26456
001174  026455                          .WORD   26455
001176  151322                          .WORD   -26456
001200  026455                          .WORD   26455
001202  151322                          .WORD   -26456
001204  026455                          .WORD   26455
001206  000001                  PAT13:  .WORD   1
001210  066666                          .WORD   66666
001212  000020                  PAT14:  .WORD   20
001214  000001                          .WORD   1
001216  000002                          .WORD   2
001220  000004                          .WORD   4
001222  000010                          .WORD   10
001224  000020                          .WORD   20
001226  000040                          .WORD   40
001230  000100                          .WORD   100
001232  000200                          .WORD   200
001234  000400                          .WORD   400
001236  001000                          .WORD   1000
001240  002000                          .WORD   2000
001242  004000                          .WORD   4000
001244  010000                          .WORD   10000
001246  020000                          .WORD   20000
001250  040000                          .WORD   40000
001252  100000                          .WORD   -100000
001254  000020                  PAT15:  .WORD   20
001256  177776                          .WORD   -2
001260  177775                          .WORD   -3
001262  177773                          .WORD   -5
001264  177767                          .WORD   -11
001266  177757                          .WORD   -21
001270  177737                          .WORD   -41
001272  177677                          .WORD   -101
001274  177577                          .WORD   -201
001276  177377                          .WORD   -401
001300  176777                          .WORD   -1001
001302  175777                          .WORD   -2001
001304  173777                          .WORD   -4001
001306  167777                          .WORD   -10001
001310  157777                          .WORD   -20001
001312  137777                          .WORD   -40001
001314  077777                          .WORD   77777
001316  000020                  PAT16:  .WORD   20
001320  133331                          .WORD   -44447
001322  133331                          .WORD   -44447
001324  133331                          .WORD   -44447
001326  155554                          .WORD   -22224
001330  155554                          .WORD   -22224
001332  155554                          .WORD   -22224
001334  133331                          .WORD   -44447
001336  133331                          .WORD   -44447
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001340  155554                          .WORD   -22224
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001344  133331                          .WORD   -44447
001346  155554                          .WORD   -22224
001350  133331                          .WORD   -44447
001352  155554                          .WORD   -22224
001354  133331                          .WORD   -44447
001356  155554                          .WORD   -22224
001360  000025                  PAT17:  .WORD   25
001362  000000                          .WORD   0
001364  106466                          .WORD   -71312
001366  106466                          .WORD   -71312
001370  071311                          .WORD   71311
001372  071311                          .WORD   71311
001374  071311                          .WORD   71311
001376  106466                          .WORD   -71312
001400  106466                          .WORD   -71312
001402  106466                          .WORD   -71312
001404  106466                          .WORD   -71312
001406  071311                          .WORD   71311
001410  071311                          .WORD   71311
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001414  071311                          .WORD   71311
001416  071311                          .WORD   71311
001420  106466                          .WORD   -71312
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001426  106466                          .WORD   -71312
001430  106466                          .WORD   -71312
001432  106466                          .WORD   -71312
001434  000025                  PAT18:  .WORD   25
001436  106466                          .WORD   -71312
001440  000000                          .WORD   0
001442  071311                          .WORD   71311
001444  106466                          .WORD   -71312
001446  106466                          .WORD   -71312
001450  106466                          .WORD   -71312
001452  071311                          .WORD   71311
001454  071311                          .WORD   71311
001456  071311                          .WORD   71311
001460  071311                          .WORD   71311
001462  106466                          .WORD   -71312
001464  106466                          .WORD   -71312
001466  106466                          .WORD   -71312
001470  106466                          .WORD   -71312
001472  106466                          .WORD   -71312
001474  071311                          .WORD   71311
001476  071311                          .WORD   71311
001500  071311                          .WORD   71311
001502  071311                          .WORD   71311
001504  071311                          .WORD   71311
001506  071311                          .WORD   71311
001510  000025                  PAT19:  .WORD   25
001512  000000                          .WORD   0
001514  134631                          .WORD   -43147
001516  134631                          .WORD   -43147
001520  043146                          .WORD   43146
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001522  043146                          .WORD   43146
001524  043146                          .WORD   43146
001526  134631                          .WORD   -43147
001530  134631                          .WORD   -43147
001532  134631                          .WORD   -43147
001534  134631                          .WORD   -43147
001536  043146                          .WORD   43146
001540  043146                          .WORD   43146
001542  043146                          .WORD   43146
001544  043146                          .WORD   43146
001546  043146                          .WORD   43146
001550  134631                          .WORD   -43147
001552  134631                          .WORD   -43147
001554  134631                          .WORD   -43147
001556  134631                          .WORD   -43147
001560  134631                          .WORD   -43147
001562  134631                          .WORD   -43147
001564  000025                  PAT20:  .WORD   25
001566  134631                          .WORD   -43147
001570  000000                          .WORD   0
001572  043146                          .WORD   43146
001574  134631                          .WORD   -43147
001576  134631                          .WORD   -43147
001600  134631                          .WORD   -43147
001602  043146                          .WORD   43146
001604  043146                          .WORD   43146
001606  043146                          .WORD   43146
001610  043146                          .WORD   43146
001612  134631                          .WORD   -43147
001614  134631                          .WORD   -43147
001616  134631                          .WORD   -43147
001620  134631                          .WORD   -43147
001622  134631                          .WORD   -43147
001624  043146                          .WORD   43146
001626  043146                          .WORD   43146
001630  043146                          .WORD   43146
001632  043146                          .WORD   43146
001634  043146                          .WORD   43146
001636  043146                          .WORD   43146
001640  000001                  PAT21:  .WORD   1
001642  000000                          .WORD   0
001644  000632'                 DPA.TBL:.WORD   RDM.CNT
001646  000674'                         .WORD   PAT02
001650  000700'                         .WORD   PAT03
001652  000704'                         .WORD   PAT04
001654  000710'                         .WORD   PAT05
001656  000714'                         .WORD   PAT06
001660  000720'                         .WORD   PAT07
001662  000762'                         .WORD   PAT08
001664  001024'                         .WORD   PAT09
001666  001066'                         .WORD   PAT10
001670  001072'                         .WORD   PAT11
001672  001134'                         .WORD   PAT12
001674  001206'                         .WORD   PAT13
001676  001212'                         .WORD   PAT14
001700  001254'                         .WORD   PAT15
001702  001316'                         .WORD   PAT16
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001704  001360'                         .WORD   PAT17
001706  001434'                         .WORD   PAT18
001710  001510'                         .WORD   PAT19
001712  001564'                         .WORD   PAT20
001714  001640'                         .WORD   PAT21
001716  000140                  CROMP:  .WORD   140
001720  000000                          .WORD   0
001722  000472                          .WORD   472
001724  000000                          .WORD   0
001726  051103                          .WORD   51103
001730  046517                          .WORD   46517
001732  020120                          .WORD   20120
001734  000001                          .WORD   1
001736  000013                          .WORD   13
001740  000000                          .WORD   0
001742  000000                          .WORD   0
001744  000000                          .WORD   0
001746  000000                          .WORD   0
001750  000000                          .WORD   0
001752  000000                          .WORD   0
001754  000000                          .WORD   0
001756  104206                          .WORD   -73572
001760  007760                          .WORD   7760
001762  002754                          .WORD   2754
001764  000000                          .WORD   0
001766  000000                          .WORD   0
001770  000000                          .WORD   0
001772  000000                          .WORD   0
001774  000000                          .WORD   0
001776  000000                          .WORD   0
002000  000235                          .WORD   235
002002  000000                          .WORD   0
002004  000000                          .WORD   0
002006  104204                          .WORD   -73574
002010  007774                          .WORD   7774
002012  104140                          .WORD   -73640
002014  002752                          .WORD   2752
002016  104204                          .WORD   -73574
002020  002751                          .WORD   2751
002022  104203                          .WORD   -73575
002024  007000                          .WORD   7000
002026  104647                          .WORD   -73131
002030  000001                          .WORD   1
002032  104641                          .WORD   -73137
002034  000002                          .WORD   2
002036  104142                          .WORD   -73636
002040  060020                          .WORD   60020
002042  102207                          .WORD   -75571
002044  000037                          .WORD   37
002046  052754                          .WORD   52754
002050  104077                          .WORD   -73701
002052  007006                          .WORD   7006
002054  032305                          .WORD   32305
002056  000000                          .WORD   0
002060  000000                          .WORD   0
002062  000000                          .WORD   0
002064  000000                          .WORD   0
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002066  000000                  .WORD   0
002070  000000                  .WORD   0
002072  104207                  .WORD   -73571
002074  007000                  .WORD   7000
002076  104201                  .WORD   -73577
002100  000002                  .WORD   2
002102  104202                  .WORD   -73576
002104  002740                  .WORD   2740
002106  107027                  .WORD   -70751
002110  107017                  .WORD   -70761
002112  105012                  .WORD   -72766
002114  060011                  .WORD   60011
002116  027107                  .WORD   27107
002120  027203                  .WORD   27203
002122  027146                  .WORD   27146
002124  114000                  .WORD   -64000
002126  007005                  .WORD   7005
002130  114000                  .WORD   -64000
002132  007776                  .WORD   7776
002134  114000                  .WORD   -64000
002136  007776                  .WORD   7776
002140  104077                  .WORD   -73701
002142  104206                  .WORD   -73572
002144  007760                  .WORD   7760
002146  104301                  .WORD   -73477
002150  007005                  .WORD   7005
002152  104610                  .WORD   -73170
002154  007234                  .WORD   7234
002156  007767                  .WORD   7767
002160  115000                  .WORD   -63000
002162  007767                  .WORD   7767
002164  077076                  .WORD   77076
002166  027120                  .WORD   27120
002170  104200                  .WORD   -73600
002172  007051                  .WORD   7051
002174  002750                  .WORD   2750
002176  002740                  .WORD   2740
002200  027146                  .WORD   27146
002202  115000                  .WORD   -63000
002204  007265                  .WORD   7265
002206  057051                  .WORD   57051
002210  104200                  .WORD   -73600
002212  177777                  .WORD   -1
002214  007004                  .WORD   7004
002216  027130                  .WORD   27130
002220  027146                  .WORD   27146
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002224  007265                  .WORD   7265
002226  017071                  .WORD   17071
002230  114000                  .WORD   -64000
002232  007004                  .WORD   7004
002234  027130                  .WORD   27130
002236  007051                  .WORD   7051
002240  027162                  .WORD   27162
002242  027203                  .WORD   27203
002244  114000                  .WORD   -64000
002246  007264                  .WORD   7264
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002252  115400                  .WORD   -62400
002254  007005                  .WORD   7005
002256  106200                  .WORD   -71600
002260  000003                  .WORD   3
002262  007005                  .WORD   7005
002264  037031                  .WORD   37031
002266  114000                  .WORD   -64000
002270  007005                  .WORD   7005
002272  007031                  .WORD   7031
002274  104207                  .WORD   -73571
002276  007002                  .WORD   7002
002300  104201                  .WORD   -73577
002302  000002                  .WORD   2
002304  060023                  .WORD   60023
002306  102207                  .WORD   -75571
002310  000037                  .WORD   37
002312  057107                  .WORD   57107
002314  000000                  .WORD   0
002316  104307                  .WORD   -73471
002320  007005                  .WORD   7005
002322  104201                  .WORD   -73577
002324  000005                  .WORD   5
002326  060031                  .WORD   60031
002330  104010                  .WORD   -73770
002332  007001                  .WORD   7001
002334  000000                  .WORD   0
002336  104307                  .WORD   -73471
002340  007002                  .WORD   7002
002342  105207                  .WORD   -72571
002344  000060                  .WORD   60
002346  114001                  .WORD   -63777
002350  104202                  .WORD   -73576
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002354  104203                  .WORD   -73575
002356  007004                  .WORD   7004
002360  060021                  .WORD   60021
002362  102207                  .WORD   -75571
002364  000037                  .WORD   37
002366  057130                  .WORD   57130
002370  000000                  .WORD   0
002372  104307                  .WORD   -73471
002374  007002                  .WORD   7002
002376  114001                  .WORD   -63777
002400  104202                  .WORD   -73576
002402  000032                  .WORD   32
002404  104203                  .WORD   -73575
002406  007234                  .WORD   7234
002410  060020                  .WORD   60020
002412  102207                  .WORD   -75571
002414  000037                  .WORD   37
002416  057146                  .WORD   57146
002420  000000                  .WORD   0
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002424  000004                  .WORD   4
002426  007000                  .WORD   7000
002430  104207                  .WORD   -73571
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002432  002743                          .WORD   2743
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002436  007001                          .WORD   7001
002440  104272                          .WORD   -73506
002442  105612                          .WORD   -72166
002444  007240                          .WORD   7240
002446  100612                          .WORD   -77166
002450  007240                          .WORD   7240
002452  115401                          .WORD   -62377
002454  117400                          .WORD   -60400
002456  007000                          .WORD   7000
002460  037171                          .WORD   37171
002462  000000                          .WORD   0
002464  114000                          .WORD   -64000
002466  002743                          .WORD   2743
002470  114000                          .WORD   -64000
002472  002744                          .WORD   2744
002474  114000                          .WORD   -64000
002476  002745                          .WORD   2745
002500  114000                          .WORD   -64000
002502  002746                          .WORD   2746
002504  114000                          .WORD   -64000
002506  002747                          .WORD   2747
002510  000000                          .WORD   0
002512  104307                          .WORD   -73471
002514  007002                          .WORD   7002
002516  105207                          .WORD   -72571
002520  000010                          .WORD   10
002522  114001                          .WORD   -63777
002524  104202                          .WORD   -73576
002526  000025                          .WORD   25
002530  104203                          .WORD   -73575
002532  007240                          .WORD   7240
002534  060021                          .WORD   60021
002536  102207                          .WORD   -75571
002540  000037                          .WORD   37
002542  057216                          .WORD   57216
002544  000000                          .WORD   0
002546  143367                          .WORD   -34411
002550  000000                          .WORD   0


                                .GLOBL  PATCH, CPT, CST, CST.ADDR, DCT
                                .GLOBL  DCT.ADDR, RC25.ADDR, IRC25.ADDR
                                .GLOBL  DM.COMM, DMC.ADDR, RP.SAVE, RPS.X1
                                .GLOBL  RPS.X2, OUTC.LIST, OUTC.TIMR, OCL.X1
                                .GLOBL  OCL.X2, TALLY, T.ADDR, MSCP.ENV
                                .GLOBL  ENV.USE, RETPKT, RP.USE, RP.INDX
                                .GLOBL  RP.ADDR, BUFF.DESC, BUFF.OWN, IODQ
                                .GLOBL  IODQ.IN, IODQ.OUT, ENTRY.REASON
                                .GLOBL  T.FLAG, EOP.FLAG, MEM.MGMT, IIP.FLAG
                                .GLOBL  CCTLR, CPLAT, CUOFF, CTLR.CNT
                                .GLOBL  DUR, QIO, MEM.SIZE, FREE.MEM.ADDR
                                .GLOBL  BUFF.SIZE, NUM.BUFF, CLK.TYPE
                                .GLOBL  CLK.HERTZ, CLK.CSR, CLK.VECTOR
                                .GLOBL  HOURS, MINUTES, SECONDS, TICKS
                                .GLOBL  ST.CODE, SB.CODE, STEP, OF.RC
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                        .GLOBL  SA.REG, NEX, CRN, MSG.02, MSG.03
                        .GLOBL  MSG.04, MSG.05, MSG.06, MSG.08
                        .GLOBL  EGD.10, EGD.11, EGD.12, EGD.13
                        .GLOBL  EGD.14, EGD.15, EGD.16, EGD.17
                        .GLOBL  EGD.18, EGD.19, EGD.20, EGD.21
                        .GLOBL  EGD.22, EGH.30, STC.00, STC.01
                        .GLOBL  STC.02, STC.03, STC.04, STC.05
                        .GLOBL  STC.06, STC.07, STC.08, STC.09
                        .GLOBL  STC.10, STC.11, EX.CRN, EX.SB
                        .GLOBL  EX.EL, EX.PA, EX.FMT, EX.EVC, EX.HMA
                        .GLOBL  EX.03, SWP.STRACK, SWP.ETRACK
                        .GLOBL  SWP.FLAGS, SWP.DPAT, SWP.UCNT
                        .GLOBL  SWP.UDPAT, L$HIMEM, L$UNIT, L$LUN
                        .GLOBL  NEX.TRAP, COPY.BLK, SET.CPAR, SET.UPAR
                        .GLOBL  GET.ENV, PUT.ENV, GET.RETPKT, PUT.RETPKT
                        .GLOBL  GET.IO.BUFF, PUT.IO.BUFF, PUTA.BUFF
                        .GLOBL  OUT.IODQ, IN.IODQ, DROP.CTLR, DRV.CTLERR
                        .GLOBL  HARD.ERR, UPD.IOC, OVF.CHK, XFR.CHK
                        .GLOBL  SEND, WAIT, EMS.10, EMS.12, EMS.13
                        .GLOBL  EMS.14, EMS.15, EMS.16, EMS.17
                        .GLOBL  EMS.18, EMS.19, EMS.20, EMS.21
                        .GLOBL  EMS.22, EMS.30, EMS.42, EMS.43


100000                  BIT15==         -100000
040000                  BIT14==         40000
020000                  BIT13==         20000
010000                  BIT12==         10000
004000                  BIT11==         4000
002000                  BIT10==         2000
001000                  BIT09==         1000
000400                  BIT08==         400
000200                  BIT07==         200
000100                  BIT06==         100
000040                  BIT05==         40
000020                  BIT04==         20
000010                  BIT03==         10
000004                  BIT02==         4
000002                  BIT01==         2
000001                  BIT00==         1
001000                  BIT9==          1000
000400                  BIT8==          400
000200                  BIT7==          200
000100                  BIT6==          100
000040                  BIT5==          40
000020                  BIT4==          20
000010                  BIT3==          10
000004                  BIT2==          4
000002                  BIT1==          2
000001                  BIT0==          1
000040                  EF.START==      40
000037                  EF.RESTART==    37
000036                  EF.CONTINUE==   36
000035                  EF.NEW==        35
000034                  EF.PWR==        34
000340                  PRI07==         340
000300                  PRI06==         300
```

```
        000240                          PRI05==         240
        000200                          PRI04==         200
        000140                          PRI03==         140
        000100                          PRI02==         100
        000040                          PRI01==         40
        000000                          PRI00==         0
        000004                          EVL==           4
        000010                          LOT==           10
        000020                          ADR==           20
        000040                          IDU==           40
        000100                          ISR==           100
        000200                          UAM==           200
        000400                          BOE==           400
        001000                          PNT==           1000
        002000                          PRI==           2000
        004000                          IXE==           4000
        010000                          IBE==           10000
        020000                          IER==           20000
        040000                          LOE==           40000
        100000                          HOE==           -100000


000000                                          .SBTTL  $T1 TEST SECTION
                                                .PSECT  $CODE$,  RO

000000  105037  000000G               $T1:     CLRB    EOP.FLAG                ;                       2120
000004  123727  000000G 000005                 CMPB    ENTRY.REASON,#5         ;                       2121
000012  001406                                  BEQ     2$
000014  104402                          1$:     TRAP    2
000016  004737  000000V                         JSR     PC,INIT.TEST            ;                       2123
000022  104467                                  TRAP    67                      ;                       2126
000024  006000                                  ROR     R0
000026  103772                                  BLO     1$
000030  132737  000002  000000G       2$:     BITB    #2,SWP.FLAGS            ;                       2131
000036  001407                                  BEQ     4$
000040  104402                          3$:     TRAP    2                       ;                       2133
000042  004737  000000V                         JSR     PC,DM.EXER              ;                       2136
000046  104467                                  TRAP    67
000050  006000                                  ROR     R0
000052  103007                                  BCC     5$
000054  000771                                  BR      3$
000056  104402                          4$:     TRAP    2                       ;                       2141
000060  004737  000000V                         JSR     PC,MULTI.DRIVE          ;                       2144
000064  104467                                  TRAP    67
000066  006000                                  ROR     R0
000070  103772                                  BLO     4$
000072  104424                          5$:     TRAP    24                      ;                       2147
000074  112737  000001  000000G               MOVB    #1,EOP.FLAG             ;                       2150
000102  000207                                  RTS     PC                      ;                       2109

; Routine Size:  34 words,      Routine Base:  $CODE$ + 0000
; Maximum stack depth per invocation:  2 words


                                                .SBTTL  T1 TEST SECTION
```

```
000000  004737  000000'                T1::
000000                                  1$:     JSR     PC,$T1                  ;                       2150
000004  104466                                  TRAP    66
000006  006000                                  ROR     R0
000010  103773                                  BLO     1$
000012  000207                                  RTS     PC

; Routine Size:  6 words,      Routine Base:  $CODE$ + 0104
; Maximum stack depth per invocation:  2 words
```

```
;    2153  1     %SBTTL 'INITIALIZATION SUB.EST ROUTINES'
;    2154  1
;    2155  1     ROUTINE INIT_TEST : NOVALUE =
;    2156  1
;    2157  1     !+
;    2158  1     !       THE INITIALIZATION SUBTEST IS DESIGNED TO VERIFY THE EXISTENCE OF THE
;    2159  1     !       DEVICES AS CONFIGURED BY THE OPERATOR DURING THE HW DIALOG, AND TO
;    2160  1     !       BRING EACH DEVICE ONLINE IN PREPARATION FOR EITHER THE MULTI-DRIVE
;    2161  1     !       SUBTEST OR THE DM EXERCISER SUBTEST.
;    2162  1     !
;    2163  1     !       BASICALLY, THE DEVICES ARE BROUGHT ONLINE VIA "DRIVER_INIT", WHICH IS
;    2164  1     !       INVOKED IMMEDIATELY. ANY DEVICES WHICH FAIL DURING THIS PHASE WILL BE
;    2165  1     !       MARKED OFFLINE IN THEIR DCT AND CST. FOR THOSE DEVICES WHICH SURVIVE
;    2166  1     !       THE INITIALIZATION, THIS ROUTINE WILL ATTEMPT 1 OR 2 ACCESS COMMANDS TO
;    2167  1     !       EACH PLATTER VIA ROUTINE "ACCESS". THE INITIALIZATION SUBTEST IS DEEMED
;    2168  1     !       A SUCCESS IF A BLOCK ON THE INNER TRACK OF EACH PLATTER CAN BE
;    2169  1     !       ACCESSED.
;    2170  1     !-
;    2171  1
;    2172  2     BEGIN
;    2173  2
;    2174  3     IF MANUAL                                   ! IF ATTENDED
;    2175  2     THEN                                        ! THEN
;    2176  2         PRINTF (MSG_04);                        ! "INIT SUBTEST START"
;    2177  2     IIP_FLAG = TRUE;                            ! SET INIT-IN-PROGRESS FLAG
;    2178  2     DRIVER_INIT ();                             ! INIT DRIVER DATA AND DEVICES
;    2179  2     INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO       ! FOR EACH CONTROLLER
;    2180  3         BEGIN
;    2181  3
;    2182  3         SET_CPAR (.CTLR);                       ! SET UP COMMONLY-USED CONTROLLER-RELATED DATA ITEMS
;    2183  3         IF .CST_ADDR [STATE] EQLU ONLINE        ! IF CONTROLLER IS STILL ALIVE
;    2184  3         THEN                                    ! THEN
;    2185  4             BEGIN
;    2186  4
;    2187  4             INCR OFFSET FROM (0 + OF_UN) TO (3 + OF_UN) DO  ! FOR EACH PLATTER
;    2188  5                 BEGIN
;    2189  5
;    2190  6                 IF ((.CST_ADDR [.OFFSET, P_PRES] EQLU PRESENT) AND
;    2191  6                     (.CST_ADDR [.OFFSET, P_STAT] EQLU ONLINE))
;    2192  5                 THEN
;    2193  6                     BEGIN
;    2194  6
;    2195  6                     SET_UPAR (.OFFSET);                 ! SET UP UNIT-RELATED DATA ITEMS
;    2196  6                     ACCESS ();                          ! TRY ACCESS TO INNER TRACK
;    2197  5
;    2198  5                     END;                                ! IF UNIT IS PRESENT AND ONLINE
;    2199  5
;    2200  4                 END;                                ! UNIT LOOP
;    2201  4
;    2202  3             END;                                ! IF CONTROLLER IS ONLINE
;    2203  3
;    2204  2         END;                                    ! CONTROLLER LOOP
;    2205  2
;    2206  2     IIP_FLAG = FALSE;                           ! CLEAR INIT-IN-PROGRESS FLAG
;    2207  2
;    2208  1     END;                                        ! ROUTINE INIT_TEST
```

```
                                        .SBTTL  INIT.TEST INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G           INIT.TEST:
                                        JSR     R1,$SAVE2                       ;                               2155
000004  104450                          TRAP    50                              ;                               2174
000006  103007                          BHIS    1$
000010  012746  000000G                 MOV     #MSG.04,-(SP)                   ;                               2176
000014  012746  000001                  MOV     #1,-(SP)
000020  010600                          MOV     SP,R0                           ; SP,*
000022  104417                          TRAP    17
000024  022626                          CMP     (SP)+,(SP)+
000026  112737  000001  000000G  1$:     MOVB    #1,IIP.FLAG                     ;                               2177
000034  004737  000000V                 JSR     PC,DRIVER.INIT                  ;                               2178
000040  005002                          CLR     R2                              ; CTLR                          2179
000042  010246                  2$:     MOV     R2,-(SP)                        ; CTLR,*                        2182
000044  004737  000000G                 JSR     PC,SET.CPAR
000050  013700  000000G                 MOV     CST.ADDR,R0                     ;                               2183
000054  005760  000002                  TST     2(R0)
000060  100025                          BPL     5$
000062  012701  000003                  MOV     #3,R1                           ; *,OFFSET                      2187
000066  010100                  3$:     MOV     R1,R0                           ; OFFSET,*                      2190
000070  006300                          ASL     R0
000072  063700  000000G                 ADD     CST.ADDR,R0
000076  032710  040000                  BIT     #40000,(R0)
000102  001410                          BEQ     4$
000104  032710  020000                  BIT     #20000,(R0)                     ;                               2191
000110  001405                          BEQ     4$
000112  010116                          MOV     R1,(SP)                         ; OFFSET,*                      2195
000114  004737  000000G                 JSR     PC,SET.UPAR
000120  004737  000000V                 JSR     PC,ACCESS                       ;                               2196
000124  005201                  4$:     INC     R1                              ; OFFSET                        2187
000126  020127  000006                  CMP     R1,#6                           ; OFFSET,*
000132  003755                          BLE     3$
000134  005726                  5$:     TST     (SP)+                           ;                               2180
000136  005202                          INC     R2                              ; CTLR                          2179
000140  020227  000003                  CMP     R2,#3                           ; CTLR,*
000144  003736                          BLE     2$
000146  105037  000000G                 CLRB    IIP.FLAG                        ;                               2206
000152  000207                          RTS     PC                              ;                               2155

; Routine Size:  54 words,      Routine Base:  $CODE$ + 0120
; Maximum stack depth per invocation:  7 words
```

```
;    2209  1     ROUTINE DRIVER_INIT : NOVALUE =
;    2210  1
;    2211  1     !+
;    2212  1     !       THIS ROUTINE IS EQUIVALENT IN FUNCTION TO THE INITIALIZATION ENTRY
;    2213  1     !       POINT OF A STANDARD DEVICE DRIVER. ITS RESPONSIBILITY IS TO INITIALIZE
;    2214  1     !       DRIVER DATA, AND TO BRING EACH RC25 CONTROLLER AND UNIT ONLINE.
;    2215  1     !-
;    2216  1
;    2217  2     BEGIN
;    2218  2
;    2219  2     LOCAL
;    2220  2         ENV_ADDR;
;    2221  2
;    2222  2     ENV_ADDR = MSCP_ENV + 8;                        ! ADDR (TEXT + 0) OF FIRST MSCP ENVELOPE
;    2223  2     INCR COUNT FROM 0 TO (ENV_CNT - 1) DO           ! FOR EACH MSCP ENVELOPE
;    2224  3         BEGIN
;    2225  3
;    2226  3         ENV_USE [.COUNT] = -1;                      ! MARK ENVELOPE FREE
;    2227  3         MSCP_ENV [.COUNT, ENV_LO] = .ENV_ADDR;      ! LOAD ENVELOPE ADDR INTO ENV DESCRIPTOR
;    2228  3         MSCP_ENV [.COUNT, ENV_HI] = 0;
;    2229  3         MSCP_ENV [.COUNT, ENV_F] = 1;               ! SET FLAG BIT
;    2230  3         MSCP_ENV [.COUNT, ENV_O] = 1;               ! SET OWNERSHIP BIT
;    2231  3         ENV_ADDR = .ENV_ADDR + (ENV_LEN * 2);       ! ADVANCE ADDR TO NEXT ENVELOPE
;    2232  3
;    2233  2         END;
;    2234  2
;    2235  2     INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO           ! FOR EACH CONTROLLER
;    2236  3         BEGIN
;    2237  3
;    2238  3         IF .CST [.CTLR, IP_ADDR] NEQA 0             ! IF CONTROLLER IS PRESENT
;    2239  3         THEN                                        ! THEN
;    2240  4             BEGIN
;    2241  4
;    2242  4             SET_CPAR (.CTLR);                       ! SET UP CURRENT CONTROLLER PARAMETERS
;    2243  4             VEC_AD = .CST_ADDR [VEC_ADDR];          ! SET CURRENT CONTROLLER'S VECTOR ADDRESS
;    2244  4             BRLEVEL = .CST_ADDR [BR_LEV] + 5;       ! SET CURRENT CONTROLLER'S BR LEVEL
;    2245  4             CTLR_INIT ();                           ! INIT DEVICE AND CTLR DATA
;    2246  4             IF .DCT_ADDR [STAT] EQLU ONLINE         ! IF CONTROLLER IS STILL ALIVE
;    2247  4             THEN                                    ! THEN
;    2248  5                 BEGIN
;    2249  5
;    2250  5                 INCR OFFSET FROM (0 + OF_UN) TO (3 + OF_UN) DO      ! FOR EACH UNIT (PLATTER)
;    2251  6                     BEGIN
;    2252  6
;    2253  6                     IF .CST_ADDR [.OFFSET, P_PRES] EQLU PRESENT     ! IF UNIT EXISTS
;    2254  6                     THEN                                            ! THEN
;    2255  7                         BEGIN
;    2256  7
;    2257  7                         SET_UPAR (.OFFSET);                         ! SET UP UNIT-RELATED DATA ITEMS
;    2258  7                         UNIT_INIT ();                               ! BRING UNIT ONLINE
;    2259  7
;    2260  6                         END;                                        ! IF UNIT EXISTS
;    2261  6
;    2262  5                     END;                                    ! UNIT LOOP
;    2263  5
;    2264  4                 END;                                ! IF CONTROLLER IS STILL ALIVE
;    2265  4
```

```
;   2266  3          END;                                ! IF CONTROLLER IS PRESENT
;   2267  3
;   2268  2      END;                                    ! CONTROLLER LOOP
;   2269  2
;   2270  1  END;                                        ! ROUTINE DRIVER_INIT


                                        .SBTTL  DRIVER.INIT INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G          DRIVER.INIT:
                                        JSR     R1,$SAVE2                       ;                                       2209
000004  012702  000010G                 MOV     #MSCP.ENV+10,R2                 ; *,ENV.ADDR                            2222
000010  005001                          CLR     R1                              ; COUNT                                 2223
000012  112761  000377  000000G  1$:    MOVB    #377,ENV.USE(R1)                ; *,*(COUNT)                            2226
000020  010146                          MOV     R1,-(SP)                        ; COUNT,*                               2227
000022  012746  000104                 MOV     #104,-(SP)
000026  004737  000000G                 JSR     PC,BL$MUL
000032  010260  000000G                 MOV     R2,MSCP.ENV(R0)                 ; ENV.ADDR,*
000036  062700  000002G                 ADD     #MSCP.ENV+2,R0                  ;                                       2228
000042  005010                          CLR     (R0)
000044  052710  140000                 BIS     #140000,(R0)                    ;                                       2230
000050  062702  000104                 ADD     #104,R2                         ; *,ENV.ADDR                            2231
000054  022626                          CMP     (SP)+,(SP)+                     ;                                       2224
000056  005201                          INC     R1                              ; COUNT                                 2223
000060  020127  000137                 CMP     R1,#137                         ; COUNT,*
000064  003752                          BLE     1$
000066  005002                          CLR     R2                              ; CTLR                                  2235
000070  010246                  2$:     MOV     R2,-(SP)                        ; CTLR,*                                2238
000072  012746  000016                 MOV     #16,-(SP)
000076  004737  000000G                 JSR     PC,BL$MUL
000102  022626                          CMP     (SP)+,(SP)+
000104  005760  000000G                 TST     CST(R0)
000110  001454                          BEQ     6$
000112  010246                          MOV     R2,-(SP)                        ; CTLR,*                                2242
000114  004737  000000G                 JSR     PC,SET.CPAR
000120  013700  000000G                 MOV     CST.ADDR,R0                     ;                                       2243
000124  016037  000002  000612'        MOV     2(R0),VEC.AD
000132  042737  177000  000612'        BIC     #177000,VEC.AD
000140  005016                          CLR     (SP)                            ;                                       2244
000142  116016  000004                 MOVB    4(R0),(SP)
000146  012746  000005                 MOV     #5,-(SP)
000152  004737  000000G                 JSR     PC,BL$SHF
000156  010037  000614'                 MOV     R0,BRLEVEL
000162  004737  000000V                 JSR     PC,CTLR.INIT
000166  005777  000000G                 TST     @DCT.ADDR                       ;                                       2245
000172  100022                          BPL     5$                              ;                                       2246
000174  012701  000003                 MOV     #3,R1                           ; *,OFFSET                              2250
000200  010100                  3$:     MOV     R1,R0                           ; OFFSET,*                              2253
000202  006300                          ASL     R0
000204  063700  000000G                 ADD     CST.ADDR,R0
000210  032710  040000                 BIT     #40000,(R0)
000214  001405                          BEQ     4$
000216  010116                          MOV     R1,(SP)                         ; OFFSET,*                              2257
000220  004737  000000G                 JSR     PC,SET.UPAR
000224  004737  000000V                 JSR     PC,UNIT.INIT                    ;                                       2258
000230  005201                  4$:     INC     R1                              ; OFFSET                                2250
000232  020127  000006                 CMP     R1,#6                           ; OFFSET,*
000236  003760                          BLE     3$
```

```
000240  022626                          5$:     CMP     (SP)+,(SP)+                             ;                                       2240
000242  005202                          6$:     INC     R2                                      ; CTLR                                  2235
000244  020227  000003                          CMP     R2,#3                                   ; CTLR,*
000250  003707                                  BLE     2$
000252  000207                                  RTS     PC                                      ;                                       2209

; Routine Size:  86 words,      Routine Base:  $CODE$ + 0274
; Maximum stack depth per invocation:  6 words
```

```
;    2271  1     ROUTINE CTLR_INIT : NOVALUE =
;    2272  1
;    2273  1     !+
;    2274  1     !       THIS "DRIVER" ROUTINE IS CALLED FROM DRIVER_INIT FOR EACH CONTROLLER
;    2275  1     !       CONFIGURED FOR TESTING. ITS GENERAL PURPOSE IS TO BRING THE RC25 ONLINE
;    2276  1     !       TO THE HOST. SPECIFICALLY, IT IS WRITTEN TO:
;    2277  1     !
;    2278  1     !       1. INITIALIZE DRIVER CONTROLLER DATA, INCLUDING THE DCT,
;    2279  1     !       2. SET UP THE DEVICE'S INTERRUPT VECTOR ADDRESS, (NOTE THAT RC25
;    2280  1     !               INTERRUPT PROCESSING RUNS AT LEVEL 5 FOR ALL RC25'S. THIS IS
;    2281  1     !               BASED ON THE ASSUMPTION THAT ALL RC25'S WILL HAVE A FIXED BR
;    2282  1     !               LEVEL OF 5 OR LESS. INTERRUPT PROCESSING CANNOT BE BROKEN WITH
;    2283  1     !               A HIGHER PRIORITY INTERRUPT FROM ANOTHER RC25.)
;    2284  1     !       3. PERFORM A REGISTER EXISTENCE TEST TO VERIFY THE DEVICE'S PRESENCE,
;    2285  1     !       4. PERFORM A VECTOR AND BR LEVEL TEST TO VERIFY THE DEVICE'S VECTOR
;    2286  1     !               ADDRESS AND INTERRUPT REQUEST LEVEL,
;    2287  1     !       5. DO A HARD INITIALIZATION (FOUR STEPS) ON THE DEVICE.
;    2288  1     !
;    2289  1     !       IF ANY OF THESE INITIAL TESTS FAIL, THEN ALL UNITS ASSOCIATED WITH THE
;    2290  1     !       DEVICE ARE DROPPED.
;    2291  1     !
;    2292  1     !       IMPLICIT INPUTS:
;    2293  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;    2294  1     !               VEC_AD - ASSUMED VECTOR ADDRESS OF THE CURRENT CONTROLLER
;    2295  1     !               DCT_ADDR - ADDRESS OF CURRENT CONTROLLER'S DCT
;    2296  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;    2297  1     !               RC25_ADDR - ADDRESS OF CURRENT CONTROLLER'S IP REGISTER
;    2298  1     !-
;    2299  1
;    2300  2     BEGIN
;    2301  2
;    2302  2     LOCAL
;    2303  2         RESULT : WORD;
;    2304  2
;    2305  2     INI_CTLR_DAT ();                                    ! INITIALIZE CONTROLLER DATA
;    2306  2     SETVEC (.VEC_AD, .INT_ADDR [.CCTLR], PRIO5);        ! SET DEVICE'S ASSUMED VECTOR ADDRESS
;    2307  2     DCT_ADDR [IG_INT] = YES;                            ! SET "IGNORE INTERRUPT" BIT
;    2308  2     L$LUN = .CST_ADDR [OF_UN, P_UNIT];                  ! GET FIRST UNIT NUMBER OF CONTROLLER
;    2309  2                                                         ! (USED BY DRS FOR ERROR REPORTING)
;    2310  2     IF REG_EXIST () EQLU FAILURE                        ! REGISTER EXISTENCE TEST. IF FAILURE
;    2311  2     THEN                                                ! THEN
;    2312  3         BEGIN
;    2313  3
;    2314  3         DROP_CTLR (.CCTLR, DU_INIT);                    ! DROP ALL CONTROLLER'S UNITS
;    2315  3         RETURN;
;    2316  3
;    2317  2         END;
;    2318  2
;    2319  2     IF VEC_BR_TEST () EQLU FAILURE                      ! VECTOR ADDR AND BR LEVEL TEST. IF FAILURE
;    2320  2     THEN                                                ! THEN
;    2321  3         BEGIN
;    2322  3
;    2323  3         DROP_CTLR (.CCTLR, DU_INIT);                    ! DROP ALL CONTROLLER'S UNITS
;    2324  3         RETURN;
;    2325  3
;    2326  2         END;
;    2327  2
```

```
;   2328  2     RESULT = HARD_INIT ();                  ! ATTEMPT HARD DEVICE INIT
;   2329  2     DCT_ADDR [IG_INT] = NO;                 ! CLEAR "IGNORE INTERRUPT" BIT
;   2330  2     IF .RESULT EQLU SUCCESS                 ! IF HARD INIT WAS SUCCESSFUL
;   2331  2     THEN                                    ! THEN
;   2332  3         BEGIN
;   2333  3
;   2334  3         DCT_ADDR [STAT] = ONLINE;           ! MARK CONTROLLER ONLINE IN "DRIVER"
;   2335  3         CST_ADDR [STATE] = ONLINE;          ! MARK CONTROLLER ONLINE IN "PROGRAM"
;   2336  3         INI_RRING ();                       ! INITIALIZE RESPONSE RING
;   2337  3         WRT_RC25 (RCSA, RC_ALL, SA_GO);     ! SET "GO" BIT (START CTLR POLLING)
;   2338  3         SET_CTLR_CHAR ();                   ! SET CONTROLLER CHARACTERISTICS
;   2339  3
;   2340  3         END
;   2341  3
;   2342  2     ELSE                                    ! HARD INIT FAILED
;   2343  2         DROP_CTLR (.CCTLR, DU_INIT);        ! DROP ALL CONTROLLER'S UNITS
;   2344  2
;   2345  1     END;                                    ! ROUTINE CTLR_INIT


                                        .SBTTL  CTLR.INIT INITIALIZATION SUBTEST ROUTINES
000000  010146                    CTLR.INIT:
                                        MOV     R1,-(SP)                        ;                       2271
000002  0C4737  000000V                 JSR     PC,INI.CTLR.DAT                 ;                       2305
000006  012746  000240                  MOV     #240,-(SP)                      ;                       2306
000012  013700  000000G                 MOV     CCTLR,R0
000016  006300                          ASL     R0
000020  016046  000570'                 MOV     INT.ADDR(R0),-(SP)
000024  013746  000612'                 MOV     VEC.AD,-(SP)
000030  012746  000003                  MOV     #3,-(SP)
000034  104437                          TRAP    37
000036  052777  040000  000000G        BIS     #40000,@DCT.ADDR                ;                       2307
000044  013700  000000G                 MOV     CST.ADDR,R0                     ;                       2308
000050  016001  000006                  MOV     6(R0),R1
000054  000301                          SWAB    R1
000056  042701  177740                  BIC     #177740,R1
000062  010137  000000G                 MOV     R1,L$LUN
000066  004737  000000V                 JSR     PC,REG.EXIST                    ;                       2310
000072  005700                          TST     R0
000074  001404                          BEQ     1$                              ;                       2314
000076  004737  000000V                 JSR     PC,VEC.BR.TEST                  ;                       2319
000102  005700                          TST     R0
000104  001011                          BNE     2$
000106  013716  000000G         1$:     MOV     CCTLR,(SP)                      ;                       2323
000112  012746  000002                  MOV     #2,-(SP)
000116  004737  000000G                 JSR     PC,DROP.CTLR
000122  062706  000012                  ADD     #12,SP                          ;                       2324
000126  000444                          BR      5$                              ;                       2321
000130  004737  000000V         2$:     JSR     PC,HARD.INIT                    ;                       2328
000134  042777  040000  000000G        BIC     #40000,@DCT.ADDR                ;                       2329
000142  020027  000001                  CMP     R0,#1                           ; RESULT,*              2330
000146  001023                          BNE     3$
000150  052777  100000  000000G        BIS     #100000,@DCT.ADDR               ;                       2334
000156  013700  000000G                 MOV     CST.ADDR,R0                     ;                       2335
000162  052760  100000  000002         BIS     #100000,2(R0)
000170  004737  000000V                 JSR     PC,INI.RRING                    ;                       2336
000174  012701  000001                  MOV     #1,R1                           ; *,RC.REG              2337
```

```
000200  013700  000000G                       MOV     RC25.ADDR,R0
000204  010160  000002                        MOV     R1,2(R0)                ; RC.REG,*
000210  004737  000000V                       JSR     PC,SET.CTLR.CHAR        ;                       2338
000214  000407                               BR      4$                      ;                       2330
000216  013716  000000G             3$:       MOV     CCTLR,(SP)              ;                       2343
000222  012746  000002                        MOV     #2,-(SP)
000226  004737  000000G                       JSR     PC,DROP.CTLR
000232  005726                               TST     (SP)+
000234  062706  000010              4$:       ADD     #10,SP                  ;                       2300
000240  012601                      5$:       MOV     (SP)+,R1                ;                       2271
000242  000207                               RTS     PC

; Routine Size:  82 words,      Routine Base:  $CODE$ + 0550
; Maximum stack depth per invocation:  7 words
```

```
;    2346  1     ROUTINE INI_CTLR_DAT : NOVALUE =
;    2347  1
;    2348  1     !+
;    2349  1     !       THIS ROUTINE IS RESPONSIBLE FOR INITIALIZING ALL CONTROLLER-RELATED
;    2350  1     !       DATA IN THE "DRIVER" PORTION OF THE EXERCISER. THIS INCLUDES THE
;    2351  1     !       CONTROLLER'S DCT AND OUTSTANDING COMMAND LIST.
;    2352  1     !
;    2353  1     !       IMPLICIT INPUTS:
;    2354  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;    2355  1     !               DCT_ADDR - ADDRESS OF CURRENT CONTROLLER'S DCT
;    2356  1     !               OCL_X1, OCL_X2 - STARTING AND ENDING INDECES OF CURRENT
;    2357  1     !                                       CONTROLLER'S OUTSTANDING COMMAND AREA
;    2358  1     !-
;    2359  1
;    2360  2     BEGIN
;    2361  2
;    2362  2     INCR INDEX FROM .OCL_X1 TO .OCL_X2 DO
;    2363  3         BEGIN
;    2364  3
;    2365  3         OUTC_LIST [.INDEX] = -1;                    ! INIT OUTSTANDING CMD LIST
;    2366  3         OUTC_TIMR [.INDEX] = 0;                     ! ZERO OUT OUTSTANDING CMD TIMERS
;    2367  3
;    2368  2         END;
;    2369  2
;    2370  2     DCT_ADDR [WORD0] = 0;                                       ! CLEAR FIRST DCT WORD
;    2371  2     DCT_ADDR [RR_BEG] = COMM_AREA + 8 + (.CCTLR * COMM_LEN * 2);    ! START OF RESPONSE RING
;    2372  2     DCT_ADDR [RR_END] = .DCT_ADDR [RR_BEG] + ((RRING_LEN - 1) * 4); ! LAST SLOT IN RESPONSE RING
;    2373  2     DCT_ADDR [CR_BEG] = .DCT_ADDR [RR_END] + 4;                 ! START OF COMMAND RING
;    2374  2     DCT_ADDR [CR_END] = .DCT_ADDR [CR_BEG] + ((CRING_LEN - 1) * 4); ! LAST SLOT IN COMMAND RING
;    2375  2     DCT_ADDR [RR_POLL] = .DCT_ADDR [RR_BEG];                    ! FIRST RRING SLOT TO POLL
;    2376  2     DCT_ADDR [CR_POLL] = DCT_ADDR [CR_NEXT] = .DCT_ADDR [CR_BEG];   ! CRING POLL AND NEXT COMMAND POINTERS
;    2377  2
;    2378  1     END;


                                        .SBTTL  INI.CTLR.DAT INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G          INI.CTLR.DAT:
                                        JSR     R1,$SAVE2                       ;                               2346
000004  013701  000000G                 MOV     OCL.X1,R1                       ; *,INDEX                       2362
000010  005301                          DEC     R1                              ; INDEX
000012  000407                          BR      2$
000014  112761  000377  000000G  1$:     MOVB    #377,OUTC.LIST(R1)              ; *,*(INDEX)                    2365
000022  010100                          MOV     R1,R0                           ; INDEX,*                       2366
000024  006300                          ASL     R0
000026  005060  000000G                 CLR     OUTC.TIMR(R0)
000032  005201                  2$:     INC     R1                              ; INDEX                         2362
000034  020137  000000G                 CMP     R1,OCL.X2                       ; INDEX,*
000040  003765                          BLE     1$
000042  013701  000000G                 MOV     DCT.ADDR,R1                     ;                               2370
000046  005011                          CLR     (R1)
000050  012702  000004                  MOV     #4,R2                           ;                               2371
000054  060102                          ADD     R1,R2
000056  013746  000000G                 MOV     CCTLR,-(SP)
000062  012746  000110                  MOV     #110,-(SP)
000066  004737  000000G                 JSR     PC,BL$MUL
000072  062700  000010'                 ADD     #COMM.AREA+10,R0
000076  010012                          MOV     R0,(R2)
```

```
000100  010061  000006                    MOV     R0,6(R1)                        ;                               2372
000104  062761  000034  000006            ADD     #34,6(R1)
000112  012700  000010                    MOV     #10,R0                          ;                               2373
000116  060100                            ADD     R1,R0
000120  016110  000006                    MOV     6(R1),(R0)
000124  062710  000004                    ADD     #4,(R0)
000130  011061  000012                    MOV     (R0),12(R1)                     ;                               2374
000134  062761  000034  000012            ADD     #34,12(R1)
000142  011261  000014                    MOV     (R2),14(R1)                     ;                               2375
000146  011061  000020                    MOV     (R0),20(R1)                     ;                               2376
000152  011061  000016                    MOV     (R0),16(R1)
000156  022626                            CMP     (SP)+,(SP)+                     ;                               2360
000160  000207                            RTS     PC                              ;                               2346

; Routine Size:  57 words,      Routine Base:  $CODE$ + 1014
; Maximum stack depth per invocation:  6 words
```

```
;    2379  1     ROUTINE REG_EXIST =
;    2380  1
;    2381  1     !+
;    2382  1     !       THIS IS THE REGISTER EXISTENCE (OR "PROBE") TEST DESIGNED TO VERIFY
;    2383  1     !       THE PRESENCE OF AN RC25 DEVICE. THIS OBJECTIVE IS ACCOMPLISHED BY
;    2384  1     !       SETTING UP THE NON-EXISTENT MEMORY (NEX) TRAP VECTOR (LOCATION 4) AND
;    2385  1     !       ATTEMPTING TO READ WHAT IS ASSUMED TO BE THE DEVICE'S SA AND IP
;    2386  1     !       REGISTERS. IF THE NEX TRAP HANDLER IS INVOKED DUE TO AN ABSENT DEVICE,
;    2387  1     !       THEN THE GLOBAL DATUM "NEX" WILL BE SET TO "TRUE". THIS DATUM
;    2388  1     !       DETERMINES THE SUCCESS / FAILURE VALUE OF THIS ROUTINE.
;    2389  1     !
;    2390  1     !       IMPLICIT INPUTS:
;    2391  1     !               RC25_ADDR - ADDRESS OF CURRENT CONTROLLER'S IP REGISTER
;    2392  1     !-
;    2393  1
;    2394  2     BEGIN
;    2395  2
;    2396  2     LOCAL
;    2397  2         TEMP : WORD,                        ! TEMP FOR READING SA AND IP
;    2398  2         DUMMY : WORD;                       ! AS THE NAME IMPLIES
;    2399  2
;    2400  2     OF_RC = 2;                              ! SET UP TO READ SA FIRST
;    2401  2     DO
;    2402  3         BEGIN
;    2403  3
;    2404  3         NEX = FALSE;                        ! SET TO "TRAP NOT RECEIVED"
;    2405  3         SETVEC (4, NEX_TRAP, PRI07);        ! SET LOCATION 4 TRAP VECTOR ADDRESS
;    2406  3         TEMP = .(.RC25_ADDR + .OF_RC);      ! READ REGISTER (THEN TRAP OR CONTINUE)
;    2407  3         DUMMY = 0;                          ! DUMMY INSTRUCTION TO COVER TRAP RETURN BUG
;    2408  3                                             !       (TRAP RETURNS TO NEXT INSTRUCTION)
;    2409  3         CLRVEC (4);                         ! CLEAR LOCATION 4 TRAP VECTOR ADDRESS
;    2410  3         IF .NEX EQLU TRUE                   ! IF NEX TRAP OCCURRED
;    2411  3         THEN                                ! THEN
;    2412  4             BEGIN
;    2413  4
;    2414  4             ERRDF (10, EGD_10, EMS_10);     ! "REGISTER EXISTENCE TEST FAILED"
;    2415  4             RETURN FAILURE;
;    2416  4
;    2417  4             END
;    2418  3         ELSE
;    2419  3             OF_RC = .OF_RC - 2;             ! SET UP FOR IP REG OR QUIT
;    2420  3
;    2421  3         END
;    2422  3
;    2423  2     UNTIL .OF_RC LSS 0;
;    2424  2
;    2425  2     RETURN SUCCESS;
;    2426  2
;    2427  1     END;


                                        .SBTTL  REG.EXIST INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G           REG.EXIST:
                                        JSR     R1,$SAVE2                       ;                       2379
000004  012737  000002  000000G         MOV     #2,OF.RC                        ;                       2400
000012  005037  000000G         1$:     CLR     NEX                             ;                       2404
000016  012746  000340                  MOV     #340,-(SP)                      ;                       2405
```

```
000022  012746  000000G                          MOV     @NEX.TRAP,-(SP)
000026  012746  000004                          MOV     #4,-(SP)
000032  012746  000003                          MOV     #3,-(SP)
000036  104437                                  TRAP    37
000040  013700  000000G                          MOV     RC25.ADDR,R0            ;                       2406
000044  063700  000000G                          ADD     OF.RC,R0
000050  011001                                  MOV     (R0),R1                 ; *,TEMP
000052  005002                                  CLR     R2                      ; DUMMY                 2407
000054  012700  000004                          MOV     #4,R0                   ;                       2409
000060  104436                                  TRAP    36
000062  023727  000000G 000001                  CMP     NEX,#1                  ;                       2410
000070  001007                                  BNE     2$
000072  104455                                  TRAP    55                      ;                       2414
000074  000012                                  .WORD   12
000076  000000G                                 .WORD   EGD.10
000100  000000G                                 .WORD   EMS.10
000102  062706  000010                          ADD     #10,SP                  ;                       2415
000106  000413                                  BR      3$                      ;                       2412
000110  162737  000002  000000G         2$:     SUB     #2,OF.RC                ;                       2419
000116  062706  000010                          ADD     #10,SP                  ;                       2402
000122  005737  000000G                          TST     OF.RC                   ;                       2423
000126  002331                                  BGE     1$
000130  012700  000001                          MOV     #1,R0                   ;                       2394
000134  000207                                  RTS     PC
000136  005000                         3$:     CLR     R0                      ;                       2379
000140  000207                                  RTS     PC

; Routine Size:  49 words,      Routine Base:  $CODE$ + 1176
; Maximum stack depth per invocation:  9 words
```

```
;  2428  1     ROUTINE VEC_BR_TEST =
;  2429  1
;  2430  1     !+
;  2431  1     !       THIS ROUTINE ATTEMPTS TO VERIFY (A) THAT THE RC25 VECTOR ADDRESS GIVEN
;  2432  1     !       BY THE USER DURING THE HW DIALOG IS VALID, AND (B) THAT THE
;  2433  1     !       USER-SPECIFIED BUS REQUEST LEVEL FOR THE DEVICE IS CORRECT. THE FIRST
;  2434  1     !       OBJECTIVE IS ACCOMPLISHED BY SETTING THE CPU PRIORITY TO 0 AND FORCING
;  2435  1     !       AN RC25 INTERRUPT. IF THE USER SPECIFIED AN INCORRECT VECTOR ADDRESS,
;  2436  1     !       THEN THE RESULT MAY BE UNPREDICTABLE. FOR THIS REASON, THE MESSAGE
;  2437  1     !       "ABOUT TO VERIFY VECTOR XXX(O) FOR DEVICE XXXXXX(O) ..." IS PRINTED
;  2438  1     !       BEFORE THE TEST, AND "COMPLETED" IS PRINTED AT ITS SUCCESSFUL
;  2439  1     !       CONCLUSION. IF THE WORD "COMPLETED" DOES NOT APPEAR, AND AN ERROR IS
;  2440  1     !       NOT REPORTED, THEN PROGRAM CONTROL IS ASSUMED LOST AND A FATAL TRAP HAS
;  2441  1     !       LIKELY OCCURRED. AT THIS POINT, THE EXERCISER MUST BE STARTED AGAIN.
;  2442  1     !
;  2443  1     !       IF THIS TEST SUCCEEDS, THEN THE BR LEVEL TEST IS RUN BY SETTING THE
;  2444  1     !       PROCESSOR PRIORITY TO THE ASSUMED INTERRUPT PRIORITY GIVEN BY THE
;  2445  1     !       USER. A FORCED INTERRUPT SHOULD NOT OCCUR. THEN, BY LOWERING THE
;  2446  1     !       PRIORITY BY ONE, THE DELAYED INTERRUPT SHOULD OCCUR.
;  2447  1     !               RC25_ADDR - ADDRESS OF CURRENT CONTROLLER'S IP REGISTER
;  2448  1     !
;  2449  1     !       IMPLICIT INPUTS:
;  2450  1     !               DCT_ADDR - ADDRESS OF CURRENT CONTROLLER'S DCT
;  2451  1     !               RC25_ADDR - ADDRESS OF CURRENT CONTROLLER'S IP REGISTER
;  2452  1     !               VEC_AD - ASSUMED VECTOR ADDRESS OF THE CURRENT CONTROLLER
;  2453  1     !               BRLEVEL - ASSUMED BUS REQUEST INTERRUPT LEVEL OF THE CURRENT
;  2454  1     !                       CONTROLLER
;  2455  1     !-
;  2456  1
;  2457  2     BEGIN
;  2458  2
;  2459  3     IF MANUAL                                       ! IF ATTENDED
;  2460  2     THEN                                            ! THEN
;  2461  2         PRINTF (MSG_02, .VEC_AD, .RC25_ADDR);       ! "ABOUT TO VERIFY VECTOR..."
;  2462  2     IF INT_GEN () EQLU FALSE                        ! FORCE AN INTERRUPT
;  2463  2     THEN                                            ! IF INTERRUPT DID NOT OCCUR
;  2464  3         BEGIN
;  2465  3
;  2466  3         ERRDF (11, EGD_11, 0);                      ! "VECTOR TEST FAILED'
;  2467  3         RETURN FAILURE;
;  2468  3
;  2469  3         END
;  2470  2     ELSE                                            ! INTERRUPT DID OCCUR
;  2471  3         BEGIN
;  2472  3
;  2473  4         IF MANUAL                                   ! IF ATTENDED
;  2474  3         THEN                                        ! THEN
;  2475  3             PRINTF (MSG_03);                        ! "COMPLETED.'
;  2476  3         SETPRI (.BRLEVEL);                          ! SET PRIORITY TO ASSUMED BR LEVEL
;  2477  3         IF INT_GEN () EQLU FALSE                    ! FORCE AN INTERRUPT (SHOULD NOT OCCUR)
;  2478  3         THEN                                        ! IF INTERRUPT DID NOT OCCUR
;  2479  4             BEGIN
;  2480  4
;  2481  4             SETPRI (.BRLEVEL - %O'40');             ! LOWER PRIORITY BY 1
;  2482  4             DELAY (1);                              ! WAIT
;  2483  4             IF .DCT_ADDR [SA_SAVE] NEQU 0           ! IF INTERRUPT DID OCCUR (SA_SAVE WOULD BE NON ZERO)
;  2484  4             THEN                                    ! THEN
```

```
;  2485  5                 BEGIN
;  2486  5
;  2487  5                 SETPRI (PRI00);             ! RESTORE PROCESSOR PPIORITY TO 0
;  2488  5                 RETURN SUCCESS;             ! ONLY SUCCESSFUL EXIT POINT
;  2489  5
;  2490  4                 END;
;  2491  4
;  2492  3             END;
;  2493  3
;  2494  2         END;
;  2495  2
;  2496  2     SETPRI (PRI00);                         ! COME HERE ONLY FOR BR TEST FAILURE
;  2497  2     ERRDF (12, EGD_12, EMS_12);             ! "BR LEVEL TEST FAILED"
;  2498  2     RETURN FAILURE;
;  2499  2
;  2500  1     END;


                                        .GLOBL  L$DLY


                                        .SBTTL  VEC.BR.TEST INITIALIZATION SUBTEST ROUTINES
000000  010146                  VEC.BR.TEST:
                                        MOV     R1,-(SP)                        ;                       2428
000002  005746                          TST     -(SP)
000004  104450                          TRAP    50                              ;                       2459
000006  103014                          BHIS    1$
000010  013746  000000G                 MOV     RC25.ADDR,-(SP)                 ;                       2461
000014  013746  000612'                 MOV     VEC.AD,-(SP)
000020  012746  000000G                 MOV     #MSG.02,-(SP)
000024  012746  000003                  MOV     #3,-(SP)
000030  010600                          MOV     SP,R0                           ; SP,*
000032  104417                          TRAP    17
000034  062706  000010                  ADD     #10,SP
000040  004737  000000V          1$:     JSR     PC,INT.GEN                      ;                       2462
000044  005700                          TST     R0
000046  001005                          BNE     2$
000050  104455                          TRAP    55                              ;                       2466
000052  000013                          .WORD   13
000054  000000G                         .WORD   EGD.11
000056  000000                          .WORD   0
000060  000460                          BR      9$                              ;                       2464
000062  104450                  2$:     TRAP    50                              ;                       2473
000064  103007                          BHIS    3$
000066  012746  000000G                 MOV     #MSG.03,-(SP)                   ;                       2475
000072  012746  000001                  MOV     #1,-(SP)
000076  010600                          MOV     SP,R0                           ; SP,*
000100  104417                          TRAP    17
000102  022626                          CMP     (SP)+,(SP)+
000104  013700  000614'          3$:     MOV     BRLEVEL,R0                      ;                       2476
000110  104441                          TRAP    41
000112  004737  000000V                 JSR     PC,INT.GEN                      ;                       2477
000116  005700                          TST     R0
000120  001032                          BNE     8$
000122  013700  000614'                 MOV     BRLEVEL,R0                      ;                       2481
000126  162700  000040                  SUB     #40,R0
000132  104441                          TRAP    41
```

```
000134  012701  000001                    MOV     #1,R1           ; *,$$TMP2                      2482
000140  001410                      4$:   BEQ     7$
000142  013700  000000G                   MOV     L$DLY,R0        ; *,$$TMP1
000146  001403                            BEQ     6$
000150  005016                      5$:   CLR     (SP)            ; $$TMP
000152  005300                            DEC     R0              ; $$TMP1
000154  001375                            BNE     5$
000156  005301                      6$:   DEC     R1              ; $$TMP2
000160  000767                            BR      4$
000162  013700  000000G               7$:  MOV     DCT.ADDR,R0     ;                               2483
000166  005760  000002                    TST     2(R0)
000172  001405                            BEQ     8$
000174  005000                            CLR     R0              ;                               2487
000176  104441                            TRAP    41
000200  012700  000001                    MOV     #1,R0           ;                               2485
000204  000407                            BR      10$
000206  005000                      8$:   CLR     R0              ;                               2496
000210  104441                            TRAP    41
000212  104455                            TRAP    55              ;                               2497
000214  000014                            .WORD   14
000216  000000G                           .WORD   EGD.12
000220  000000G                           .WORD   EMS.12
000222  005000                      9$:   CLR     R0              ;                               2428
000224  005726                      10$:  TST     (SP)+
000226  012601                            MOV     (SP)+,R1
000230  000207                            RTS     PC

; Routine Size:  77 words,      Routine Base:  $CODE$ + 1340
; Maximum stack depth per invocation:  8 words
```

```
;   2501  1     ROUTINE INT_GEN =
;   2502  1
;   2503  1     !+
;   2504  1     !       THIS ROUTINE BEGINS AN RC25 INITIALIZATION SEQUENCE, BUT ONLY
;   2505  1     !       COMPLETES THROUGH THE STEP 1 WRITE. ITS PURPOSE IS TO CREATE AN RC25
;   2506  1     !       INTERRUPT (AT THE COMPLETION OF STEP 1) IN ORDER TO HELP VERIFY THE
;   2507  1     !       THE USER-SPECIFIED VECTOR ADDRESS AND BUS REQUEST INTERRUPT LEVEL.
;   2508  1     !       A VALUE OF "TRUE" IS RETURNED TO THE CALLER IF AN INTERRUPT OCCURS,
;   2509  1     !       AND "FALSE" OTHERWISE. THE INTERRUPT IS VERIFIED BY A NON-ZERO VALUE
;   2510  1     !       IN THE "SA SAVE" WORD IN THE DEVICE'S DCT.
;   2511  1     !
;   2512  1     !       IMPLICIT INPUTS:
;   2513  1     !               DCT_ADDR - ADDRESS OF CURRENT CONTROLLER'S DCT
;   2514  1     !               RC25_ADDR - ADDRESS OF CURRENT CONTROLLER'S IP REGISTER
;   2515  1     !-
;   2516  1
;   2517  2     BEGIN
;   2518  2
;   2519  2     LOCAL
;   2520  2         IE_VEC : WORD,                      ! IE-BIT-AND-VECTOR-ADDRESS/4 BYTE
;   2521  2         SA : WORD;                          ! STORAGE FOR STEP 1 READ AND WRITE
;   2522  2
;   2523  2     DCT_ADDR [SA_SAVE] = 0;                 ! ZERO OUT SA SAVE WORD IN DCT
;   2524  2     IE_VEC = (.VEC_AD ^ -2) OR SA_INT;      ! VEC ADDR / 4 WITH IE = 1
;   2525  2     WRT_RC25 (RCIP, RC_ALL, ALL_ONES);      ! WRITE IP TO START INIT SEQUENCE
;   2526  2     DELAY (625);                            ! WAIT Changed from 500 to 625 for 84 cache
;   2527  2     SA = .RC25_ADDR [RCSA, RC_ALL];         ! STEP 1 READ
;   2528  2     SA = (WR_RING ^ 8) OR .IE_VEC;          ! STEP 1 WRITE VALUE
;   2529  2     WRT_RC25 (RCSA, RC_ALL, .SA);           ! STEP 1 WRITE
;   2530  2     INCR COUNT FROM 1 TO 10 DO              ! TEN SECOND LIMIT
;   2531  3         BEGIN
;   2532  3
;   2533  3         DELAY (400);                        ! ABOUT 1 SECOND Changed 333 to 400 for 84
;   2534  3         SA = .RC25_ADDR [RCSA, RC_ALL];     ! READ SA REGISTER
;   2535  4         IF BIT_TST (SA, SA_S2)              ! IF STEP 2 HAS BEGUN
;   2536  3         THEN                                ! THEN
;   2537  3             EXITLOOP;                       ! BREAK OUT
;   2538  3
;   2539  2         END;
;   2540  2
;   2541  2     IF .DCT_ADDR [SA_SAVE] EQLU 0           ! IF SA SAVE WORD WAS NOT TOUCHED
;   2542  2     THEN                                    ! THEN
;   2543  2         RETURN FALSE                        ! INTERRUPT DID NOT OCCUR
;   2544  2     ELSE                                    ! OTHERWISE
;   2545  2         RETURN TRUE;                        ! INTERRUPT DID OCCUR
;   2546  2
;   2547  1     END;


                                        .SBTTL  INT.GEN INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G       INT.GEN:  JSR     R1,$SAVE5                         ;  2501
000004  162706  000006                  SUB     #6,SP
000010  013704  000000G                 MOV     DCT.ADDR,R4                       ;  2523
000014  005064  000002                  CLR     2(R4)
000020  013700  000612'                 MOV     VEC.AD,R0                         ;  2524
000024  006200                          ASR     R0
000026  006200                          ASR     R0
```

```
000030  010003                          MOV     R0,R3                   ; *,IE.VEC
000032  052703  000200                  BIS     #200,R3                 ; *,IE.VEC
000036  012700  177777                  MOV     #-1,R0                  ; *,RC.REG              2525
000042  010077  000000G                 MOV     R0,@RC25.ADDR           ; RC.REG,*
000046  012701  001161                  MOV     #1161,R1                ; *,$$TMP2              2526
000052  001411                  1$:     BEQ     4$
000054  013700  000000G                 MOV     L$DLY,R0                ; *,$$TMP1
000060  001404                          BEQ     3$
000062  005066  000004          2$:     CLR     4(SP)                   ; $$TMP
000066  005300                          DEC     R0                      ; $$TMP1
000070  001374                          BNE     2$
000072  005301                  3$:     DEC     R1                      ; $$TMP2
000074  000766                          BR      1$
000076  013700  000000G         4$:     MOV     RC25.ADDR,R0            ;                       2527
000102  012705  000002                  MOV     #2,R5
000106  060005                          ADD     R0,R5
000110  011516                          MOV     (R5),(SP)               ; *,RC.REG
000112  010302                          MOV     R3,R2                   ; IE.VEC,SA             2528
000114  052702  115400                  BIS     #115400,R2              ; *,SA
000120  010200                          MOV     R2,R0                   ; SA,RC.REG             2529
000122  010015                          MOV     R0,(R5)                 ; RC.REG,*
000124  012703  000012                  MOV     #12,R3                  ; *,COUNT               2530
000130  012701  000620          5$:     MOV     #620,R1                 ; *,$$TMP2              2533
000134  0C1411          6$:     BEQ     9$
000136  013700  000000G                 MOV     L$DLY,R0                ; *,$$TMP1
000142  001404                          BEQ     8$
000144  005066  000004          7$:     CLR     4(SP)                   ; $$TMP
000150  005300                          DEC     R0                      ; $$TMP1
000152  001374                          BNE     7$
000154  005301                  8$:     DEC     R1                      ; $$TMP2
000156  000766                          BR      6$
000160  011566  000002          9$:     MOV     (R5),2(SP)              ; *,RC.REG              2534
000164  011502                          MOV     (R5),R2                 ; RC.REG,SA
000166  032702  010000                  BIT     #10000,R2               ; *,SA                  2535
000172  001002                          BNE     10$
000174  005303                          DEC     R3                      ; COUNT                 2530
000176  001354                          BNE     5$
000200  005764  000002          10$:    TST     2(R4)                   ;                       2541
000204  001002                          BNE     11$
000206  005000                          CLR     R0                      ;                       2545
000210  000402                          BR      12$
000212  012700  000001          11$:    MOV     #1,R0
000216  062706  000006          12$:    ADD     #6,SP                   ;                       2501
000222  000207                          RTS     PC

; Routine Size:  74 words,      Routine Base:  $CODE$ + 1572
; Maximum stack depth per invocation:  10 words
```

```
;  2548  1     ROUTINE HARD_INIT =
;  2549  1
;  2550  1     !+
;  2551  1     !       THIS ROUTINE PERFORMS THE FOUR READ / WRITE STEPS REQUIRED TO
;  2552  1     !       INITIALIZE AN RC25 DEVICE. IF NO READ ERRORS ARE DETECTED IN ANY OF
;  2553  1     !       THE FOUR STEPS, THEN A SUCCESS VALUE IS RETURNED TO THE CALLER.
;  2554  1     !       OTHERWISE, ADDITIONAL ATTEMPTS MAY BE MADE TO INITIALIZE THE DEVICE.
;  2555  1     !       IF ALL ATTEMPTS FAIL, A FAILURE INDICATION IS RETURNED.
;  2556  1     !
;  2557  1     !       IMPLICIT INPUTS:
;  2558  1     !               RC25_ADDR - ADDRESS OF CURRENT CONTROLLER'S IP REGISTER
;  2559  1     !               VEC_AD - ASSUMED VECTOR ADDRESS OF THE CURRENT CONTROLLER
;  2560  1     !               DCT_ADDR - ADDRESS OF CURRENT CONTROLLER'S DCT
;  2561  1     !-
;  2562  2     BEGIN
;  2563  2
;  2564  2     LOCAL
;  2565  2         IE_VEC : WORD;                          ! IE-BIT-AND-VECTOR-ADDRESS/4 BYTE
;  2566  2                                                 !   (USED IN STEP 1 WRITE AND STEP 3 READ)
;  2567  2
;  2568  2     IE_VEC = .VEC_AD + -2;                      ! GET VECTOR ADDR/4 (IE = 0)
;  2569  2     INCR ATTEMPTS FROM 1 TO INI_ATT DO
;  2570  3         BEGIN
;  2571  3
;  2572  3         WRT_RC25 (RCIP, RC_ALL, ALL_ONES);      ! WRITE IP TO START INIT SEQUENCE
;  2573  3         DO
;  2574  4         BEGIN
;  2575  4         DELAY (100);
;  2576  4         END
;  2577  3         UNTIL .T_FLAG EQLU TRUE;                ! IF ONE SECOND HAS ELAPSED THEN CONTINUE
;  2578  3         T_FLAG = FALSE;
;  2579  3         DO
;  2580  4         BEGIN
;  2581  4         DELAY (100);
;  2582  4         END
;  2583  3         UNTIL .T_FLAG EQLU TRUE;                ! IF ONE SECOND HAS ELAPSED THEN CONTINUE
;  2584  3         T_FLAG = FALSE;
;  2585  3
;  2586  3     !
;  2587  3     !       STEP 1
;  2588  3     !
;  2589  3         STEP = 1;
;  2590  3         SA_REG = .RC25_ADDR [RCSA, RC_ALL];     ! READ SA
;  2591  3         IF (.SA_REG AND S1_MASK) EQLU SA_S1     ! IF STEP 1 READ IS O.K.
;  2592  3         THEN                                    ! THEN
;  2593  4             BEGIN
;  2594  4
;  2595  4             SA_REG = (WR_RING + 8) OR .IE_VEC;  ! STEP 1 WRITE VALUE
;  2596  4             WRT_RC25 (RCSA, RC_ALL, .SA_REG);   ! STEP 1 WRITE
;  2597  4             INCR COUNT FROM 1 TO 10 DO          ! TEN SECOND LIMIT
;  2598  5                 BEGIN
;  2599  5
;  2600  5     !               DELAY (400);                ! ABOUT 1 SECOND   333 old 400 new
;  2601  5             DO
;  2602  6             BEGIN
;  2603  6             DELAY (100);
;  2604  6             END
```

```
;   2605  5          UNTIL .T_FLAG EQLU TRUE;                    ! IF ONE SECOND HAS ELAPSED THEN CONTINUE
;   2606  5          T_FLAG = FALSE;
;   2607  5                  SA_REG = .RC25_ADDR [RCSA, RC_ALL]; ! READ SA REGISTER
;   2608  6                  IF BIT_TST (SA_REG, SA_S2)          ! IF STEP 2 HAS BEGUN
;   2609  5                  THEN                                ! THEN
;   2610  5                      EXITLOOP;                       ! BREAK OUT
;   2611  5
;   2612  4                  END;
;   2613  4      !
;   2614  4      !       STEP 2
;   2615  4      !
;   2616  4                  STEP = .STEP + 1;
;   2617  5                  IF (.SA_REG AND S2_MASK) EQLU (SA_S2 OR WR_RING) ! IF STEP 2 READ IS O.K.
;   2618  4                  THEN                                             ! THEN
;   2619  5                      BEGIN
;   2620  5
;   2621  5                      WRT_RC25 (RCSA, RC_ALL, .DCT_ADDR [RR_BEG]);        ! RINGBASE-LO, PI = 0
;   2622  5                      INCR COUNT FROM 1 TO 10 DO                          ! TEN SECOND LIMIT
;   2623  6                          BEGIN
;   2624  6
;   2625  6      !                    DELAY (400);                                   ! ABOUT 1 SECOND  changed 333 to 400 for 11/84 cache
;   2626  6          DO
;   2627  7          BEGIN
;   2628  7          DELAY (100);
;   2629  7          END
;   2630  6          UNTIL .T_FLAG EQLU TRUE;                    ! IF ONE SECOND HAS ELAPSED THEN CONTINUE
;   2631  6          T_FLAG = FALSE;
;   2632  6                      SA_REG = .RC25_ADDR [RCSA, RC_ALL];             ! READ SA REGISTER
;   2633  7                      IF BIT_TST (SA_REG, SA_S3)                      ! IF STEP 3 HAS BEGUN
;   2634  6                      THEN                                            ! THEN
;   2635  6                          EXITLOOP;                                   ! BREAK OUT
;   2636  6
;   2637  5                      END;
;   2638  5      !
;   2639  5      !       STEP 3
;   2640  5      !
;   2641  5                      STEP = .STEP + 1;
;   2642  6                      IF (.SA_REG AND S3_MASK) EQLU (SA_S3 OR .IE_VEC)    ! IF STEP 3 READ IS O.K.
;   2643  5                      THEN                                                ! THEN
;   2644  6                          BEGIN
;   2645  6
;   2646  6                          WRT_RC25 (RCSA, RC_ALL, 0);                     ! PP, RINGBASE-HI = 0
;   2647  6                          INCR COUNT FROM 1 TO 10 DO                      ! TEN SECOND LIMIT
;   2648  7                              BEGIN
;   2649  7
;   2650  7      !                        DELAY (400);                               ! ABOUT 1 SECOND  changed 333 to 400 for 11/84 cache
;   2651  7          DO
;   2652  8          BEGIN
;   2653  8          DELAY (100);
;   2654  8          END
;   2655  7          UNTIL .T_FLAG EQLU TRUE;                ! IF ONE SECOND HAS ELAPSED THEN CONTINE
;   2656  7          T_FLAG = FALSE;
;   2657  7
;   2658  7                          SA_REG = .RC25_ADDR [RCSA, RC_ALL];         ! READ SA REGISTER
;   2659  8                          IF BIT_TST (SA_REG, SA_S4)                  ! IF STEP 4 HAS BEGUN
;   2660  7                          THEN                                        ! THEN
;   2661  7                              EXITLOOP;                               ! BREAK OUT
```

```
;   2662  7
;   2663  6                        END;
;   2664  6      !
;   2665  6      !       STEP 4
;   2666  6      !
;   2667  6                    STEP = .STEP + 1;
;   2668  6                    IF (.SA_REG AND S4_MASK) EQLU SA_S4      ! IF STEP 4 READ IS O.K.
;   2669  6                    THEN                                     ! THEN
;   2670  7                        BEGIN
;   2671  7
;   2672  7                        WRT_RC25 (RCSA, RC_ALL, 0);          ! BURST, LF, GO = 0
;   2673  7                        RETURN SUCCESS;                      ! SUCCESS EXIT POINT
;   2674  7
;   2675  6                        END;
;   2676  6
;   2677  5                    END;
;   2678  5
;   2679  4                END;
;   2680  4
;   2681  3            END;
;   2682  3
;   2683  2        END;                                                 ! TRY AGAIN OR GIVE UP
;   2684  2
;   2685  2    ERRDF (13, EGD_13, EMS_13);                              ! "INIT SEQUENCE FAILED"
;   2686  2    RETURN FAILURE;
;   2687  2
;   2688  1    END;                                                     ! ROUTINE HARD_INIT
```

```
                                        .SBTTL  HARD.INIT INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G          HARD.INIT:
                                        JSR     R1,$SAVE5                       ;                       2548
000004  162706  000012                  SUB     #12,SP
000010  013746  000612'                 MOV     VEC.AD,-(SP)                    ; *,IE.VEC              2568
000014  006216                          ASR     (SP)                            ; IE.VEC
000016  006216                          ASR     (SP)                            ; IE.VEC
000020  013704  000000G                 MOV     L$DLY,R4                        ;
000024  013700  000000G                 MOV     RC25.ADDR,R0                    ;                       2575
000030  012702  000002                  MOV     #2,R2                           ;                       2590
000034  060002                          ADD     R0,R2
000036  012705  000002                  MOV     #2,R5                           ; *,ATTEMPTS            2569
000042  012700  177777          1$:     MOV     #-1,R0                          ; *,RC.REG              2572
000046  010077  000000G                 MOV     R0,@RC25.ADDR                   ; RC.REG,*
000052  012701  000144          2$:     MOV     #144,R1                         ; *,$$TMP2              2575
000056  001410                  3$:     BEQ     6$
000060  010400                          MOV     R4,R0                           ; *,$$TMP1
000062  001404                          BEQ     5$
000064  005066  000012          4$:     CLR     12(SP)                          ; $$TMP
000070  005300                          DEC     R0                              ; $$TMP1
000072  001374                          BNE     4$
000074  005301                  5$:     DEC     R1                              ; $$TMP2
000076  000767                          BR      3$
000100  123727  000000G 000001  6$:     CMPB    T.FLAG,#1                       ;                       2577
000106  001361                          BNE     2$
000110  105037  000000G                 CLRB    T.FLAG                          ;                       2578
000114  012701  000144          7$:     MOV     #144,R1                         ; *,$$TMP2              2581
000120  001410                  8$:     BEQ     11$
```

```
000122  010400                          MOV     R4,R0           ; *,$$TMP1
000124  001404                          BEQ     10$
000126  005066  000012          9$:     CLR     12(SP)          ; $$TMP
000132  005300                          DEC     R0              ; $$TMP1
000134  001374                          BNE     9$
000136  005301                  10$:    DEC     R1              ; $$TMP2
000140  000767                          BR      8$
000142  123727  000000G 000001  11$:    CMPB    T.FLAG,#1       ;                       2583
000150  001361                          BNE     7$
000152  105037  000000G                 CLRB    T.FLAG          ;                       2584
000156  012737  000001  000000G         MOV     #1,STEP         ;                       2589
000164  011266  000002                  MOV     (R2),2(SP)      ; *,RC.REG              2590
000170  011237  000000G                 MOV     (R2),SA.REG     ; RC.REG,*
000174  011200                          MOV     (R2),R0         ; SA.REG,*              2591
000176  042700  001777                  BIC     #1777,R0
000202  020027  004000                  CMP     R0,#4000
000206  001177                          BNE     30$
000210  011637  000000G                 MOV     (SP),SA.REG     ; IE.VEC,*              2595
000214  052737  115400  000000G         BIS     #115400,SA.REG
000222  013700  000000G                 MOV     SA.REG,R0       ; *,RC.REG              2596
000226  010012                          MOV     R0,(R2)         ; RC.REG,*
000230  012703  000012                  MOV     #12,R3          ; *,COUNT               2597
000234  012701  000144          12$:    MOV     #144,R1         ; *,$$TMP2              2603
000240  001410                  13$:    BEQ     16$
000242  010400                          MOV     R4,R0           ; *,$$TMP1
000244  001404                          BEQ     15$
000246  005066  000012          14$:    CLR     12(SP)          ; $$TMP
000252  005300                          DEC     R0              ; $$TMP1
000254  001374                          BNE     14$
000256  005301                  15$:    DEC     R1              ; $$TMP2
000260  000767                          BR      13$
000262  123727  000000G 000001  16$:    CMPB    T.FLAG,#1       ;                       2605
000270  001361                          BNE     12$
000272  105037  000000G                 CLRB    T.FLAG          ;                       2606
000276  011266  000004                  MOV     (R2),4(SP)      ; *,RC.REG              2607
000302  011237  000000G                 MOV     (R2),SA.REG     ; RC.REG,*
000306  032712  010000                  BIT     #10000,(R2)     ; *,SA.REG              2608
000312  001002                          BNE     17$
000314  005303                          DEC     R3              ; COUNT                 2597
000316  001346                          BNE     12$
000320  005237  000000G         17$:    INC     STEP            ;                       2616
000324  013700  000000G                 MOV     SA.REG,R0       ;                       2617
000330  042700  003400                  BIC     #3400,R0
000334  020027  010233                  CMP     R0,#10233
000340  001127                          BNE     31$
000342  013700  000000G                 MOV     DCT.ADDR,R0     ;                       2621
000346  016000  000004                  MOV     4(R0),R0        ; *,RC.REG
000352  010012                          MOV     R0,(R2)         ; RC.REG,*
000354  012703  000012                  MOV     #12,R3          ; *,COUNT               2622
000360  012701  000144          18$:    MOV     #144,R1         ; *,$$TMP2              2628
000364  001410                  19$:    BEQ     22$
000366  010400                          MOV     R4,R0           ; *,$$TMP1
000370  001404                          BEQ     21$
000372  005066  000012          20$:    CLR     12(SP)          ; $$TMP
000376  005300                          DEC     R0              ; $$TMP1
000400  001374                          BNE     20$
000402  005301                  21$:    DEC     R1              ; $$TMP2
```

```
000404  000767                          BR      19$
000406  123727  000000G 000001  22$:     CMPB    T.FLAG,#1       ;                       2630
000414  001361                          BNE     18$
000416  105037  000000G                 CLRB    T.FLAG          ;                       2631
000422  011266  000006                  MOV     (R2),6(SP)      ; *,RC.REG              2632
000426  011237  000000G                 MOV     (R2),SA.REG     ; RC.REG,*
000432  032712  020000                  BIT     #20000,(R2)     ; *,SA.REG              2633
000436  001002                          BNE     23$
000440  005303                          DEC     R3              ; COUNT                 2622
000442  001346                          BNE     18$
000444  005237  000000G         23$:    INC     STEP            ;                       2641
000450  013701  000000G                 MOV     SA.REG,R1       ;                       2642
000454  042701  003400                  BIC     #3400,R1
000460  011600                          MOV     (SP),R0         ; IE.VEC,*
000462  052700  020000                  BIS     #20000,R0
000466  020100                          CMP     R1,R0
000470  001053                          BNE     31$
000472  005000                          CLR     R0              ; RC.REG                2646
000474  005012                          CLR     (R2)
000476  012703  000012                  MOV     #12,R3          ; *,COUNT               2647
000502  012701  000144          24$:    MOV     #144,R1         ; *,$$TMP2              2653
000506  001410          25$:    BEQ     28$
000510  010400                          MOV     R4,R0           ; *,$$TMP1
000512  001404                          BEQ     27$
000514  005066  000012          26$:    CLR     12(SP)          ; $$TMP
000520  005300                          DEC     R0              ; $$TMP1
000522  001374                          BNE     26$
000524  005301                  27$:    DEC     R1              ; $$TMP2
000526  000767                          BR      25$
000530  123727  000000G 000001  28$:     CMPB    T.FLAG,#1       ;                       2655
000536  001361                          BNE     24$
000540  105037  000000G                 CLRB    T.FLAG          ;                       2656
000544  011266  000010                  MOV     (R2),10(SP)     ; *,RC.REG              2658
000550  011237  000000G                 MOV     (R2),SA.REG     ; RC.REG,*
000554  032712  040000                  BIT     #40000,(R2)     ; *,SA.REG              2659
000560  001002                          BNE     29$
000562  005303                          DEC     R3              ; COUNT                 2647
000564  001346                          BNE     24$
000566  005237  000000G         29$:    INC     STEP            ;                       2667
000572  013700  000000G                 MOV     SA.REG,R0       ;                       2668
000576  042700  003777                  BIC     #3777,R0
000602  020027  040000                  CMP     R0,#40000
000606  001004                  30$:    BNE     31$
000610  005012                          CLR     (R2)            ;                       2672
000612  012700  000001                  MOV     #1,R0           ;                       2670
000616  000411                          BR      33$
000620  005305                  31$:    DEC     R5              ; ATTEMPTS              2569
000622  001402                          BEQ     32$
000624  000137  002060'                 JMP     1$
000630  104455                  32$:    TRAP    55              ;                       2685
000632  000015                          .WORD   15
000634  000000G                         .WORD   EGD.13
000636  000000G                         .WORD   EMS.13
000640  005000                          CLR     R0              ;                       2562
000642  062706  000014          33$:    ADD     #14,SP          ;                       2548
000646  000207                          RTS     PC
```

```
; Routine Size:  212 words,    Routine Base:  $CODE$ + 2016
; Maximum stack depth per invocation:  14 words


;   2689  1     ROUTINE INI_RRING : NOVALUE =
;   2690  1
;   2691  1     !+
;   2692  1     !       THIS ROUTINE IS RESPONSIBLE FOR ALLOCATING ENOUGH MSCP ENVELOPES TO
;   2693  1     !       FILL AN RC25 RESPONSE RING. THE ENVELOPE DESCRIPTOR OF EACH ENVELOPE
;   2694  1     !       (LOCATED IN FRONT OF THE ENVELOPE ITSELF) IS LOADED INTO SUCCESSIVE
;   2695  1     !       RRING SLOTS. NOTE THAT THE ENVELOPE DESCRIPTORS HAVE BEEN INITIALIZED
;   2696  1     !       WITH THE FLAG AND OWNERSHIP BITS SET TO "1", MAKING EACH SLOT
;   2697  1     !       CONTROLLER-OWNED.
;   2698  1     !
;   2699  1     !       IMPLICIT INPUTS:
;   2700  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;   2701  1     !               DCT_ADDR - ADDRESS OF CURRENT CONTROLLER'S DCT
;   2702  1     !-
;   2704  2     BEGIN
;   2705  2
;   2706  2     LOCAL
;   2707  2         INDEX : WORD,
;   2708  2         RRING_ADDR;
;   2709  2
;   2710  2     RRING_ADDR = .DCT_ADDR [RR_BEG];            ! FIRST RESPONSE RING SLOT
;   2711  2     INCR COUNT FROM 1 TO RRING_LEN DO
;   2712  3         BEGIN
;   2713  3
;   2714  3         INDEX = GET_ENV (.CCTLR);               ! GET AN MSCP ENVELOPE
;   2715  3         MSCP_ENV [.INDEX, MSGLEN] = MSG_LEN + 2;    ! SET MESSAGE LENGTH FIELD
;   2716  3         .RRING_ADDR = .MSCP_ENV [.INDEX, ENV_LO];   ! LOAD LO-ORDER ENV DESC INTO SLOT
;   2717  3         RRING_ADDR = .RRING_ADDR + 2;           ! ADVANCE TO SECOND WORD
;   2718  3         .RRING_ADDR = .MSCP_ENV [.INDEX, ENV_HI];   ! LOAD HI-ORDER ENV DESC INTO SLOT
;   2719  3         RRING_ADDR = .RRING_ADDR + 2;           ! ADVANCE TO NEXT SLOT
;   2720  3
;   2721  2         END;
;   2723  1     END;

                                .SBTTL  INI.RRING INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G    INI.RRING:
                            JSR     R1,$SAVE3                   ;                       2689
000004  013700  000000G            MOV     DCT.ADDR,R0         ;                       2710
000010  016001  000004            MOV     4(R0),R1            ; *,RRING.ADDR
000014  012702  000010            MOV     #10,R2              ; *,COUNT               2711
000020  013746  000000G    1$:     MOV     CCTLR,-(SP)         ;                       2714
000024  004737  000000G            JSR     PC,GET.ENV
000030  010003                    MOV     R0,R3               ; *,INDEX
000032  010316                    MOV     R3,(SP)             ; INDEX,*               2715
000034  012746  000104            MOV     #104,-(SP)
000040  004737  000000G            JSR     PC,BL$MUL
000044  012760  000074  000004G   MOV     #74,MSCP.ENV+4(R0)
000052  016021  000000G            MOV     MSCP.ENV(R0),(R1)+  ; *,RRING.ADDR          2716
000056  016021  000002G            MOV     MSCP.ENV+2(R0),(R1)+ ; *,RRING.ADDR         2718
000062  022626                    CMP     (SP)+,(SP)+         ;                       2712
000064  005302                    DEC     R2                  ; COUNT                 2711
000066  001354                    BNE     1$
000070  000207                    RTS     PC                  ;                       2689
```

```
; Routine Size:  29 words,      Routine Base:  $CODE$ + 2666
; Maximum stack depth per invocation:  7 words

;   2724  1     ROUTINE SET_CTLR_CHAR : NOVALUE =
;   2725  1
;   2726  1     !+
;   2727  1     !       THIS ROUTINE IS CALLED BY CTLR_INIT AFTER THE RC25 HAS BEEN HARD-
;   2728  1     !       INITIALIZED. ITS PURPOSE IS TO FORMAT AND SEND THE "SET CONTROLLER
;   2729  1     !       CHARACTERISTICS" COMMAND, AND TO VERIFY THAT THE MESSAGE WAS ACCEPTED.
;   2730  1     !
;   2731  1     !       IMPLICIT INPUTS:
;   2732  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;   2733  1     !-
;   2735  2     BEGIN
;   2736  2
;   2737  2     LOCAL
;   2738  2         REASON : WORD,                              ! DROP UNIT REASON
;   2739  2         M_INDEX : WORD;                             ! MSCP ENVELOPE INDEX
;   2740  2
;   2741  2     M_INDEX = GET_ENV (.CCTLR);                     ! GET AN MSCP ENVELOPE
;   2742  2     MSCP_ENV [.M_INDEX, OPCODE] = OP_SCC;           ! OPCODE = SET CTLR CHAR
;   2743  2     MSCP_ENV [.M_INDEX, C_FLAGS] = CF_MSC + CF_THS; ! CONTROLLER FLAGS
;   2744  2     IF SEND (.M_INDEX) EQLU FAILURE                 ! ATTEMPT SEND; IF CTLR IS OFFLINE
;   2745  2     THEN                                            ! THEN
;   2746  2         PUT_ENV (.M_INDEX)                          ! RETURN ENVELOPE TO POOL
;   2747  2     ELSE                                            ! IF SEND WAS SUCCESSFUL
;   2748  3         BEGIN
;   2749  3
;   2750  3         WAIT ();                                    ! WAIT FOR RETPKT RESPONSE
;   2751  3         RP_INDX = OUT_IODQ ();                      ! GET INDEX OF RETPKT
;   2752  3         RP_ADDR = RETPKT + (.RP_INDX * RP_LEN * 2); ! CALCULATE RETPKT ADDRESS
;   2753  3         IF .RP_ADDR [CONID] EQLU CID_DRIVER         ! IF RETPKT IS FROM "DRIVER"
;   2754  3         THEN                                        ! THEN
;   2755  4             BEGIN
;   2756  4
;   2757  4             REASON = DU_FATAL;                      ! ASSUME FATAL SA ERROR
;   2758  4             IF .RP_ADDR [MESTYP] EQLU MT_TIMEOUT    ! IF COMMAND TIMED OUT
;   2759  4             THEN                                    ! THEN
;   2760  5                 BEGIN
;   2761  5
;   2762  5                 REASON = DU_INIT;                   ! SET REASON TO INIT ERROR
;   2763  5                 ERRDF (15, EGD_15, EMS_15);         ! "MESSAGE RESPONSE TIMEOUT"
;   2764  5
;   2765  4                 END;
;   2766  4
;   2767  4             DROP_CTLR (.CCTLR, .REASON);            ! DROP CONTROLLER'S UNITS
;   2768  4
;   2769  3             END;                                    ! IF RETPKT IS FROM "DRIVER"
;   2770  3
;   2771  3         PUT_RETPKT (.RP_INDX);
;   2772  3
;   2773  2         END;                                        ! IF SEND WAS SUCCESSFUL
;   2775  1     END;                                    ! ROUTINE SET_CTLR_CHAR

                                    .SBTTL  SET.CTLR.CHAR INITIALIZATION SUBTEST ROUTINES
000000  010146                  SET.CTLR.CHAR:
                                    MOV     R1,-(SP)                                    ;  2724
```

```
000002  013746  000000G                    MOV     CCTLR,-(SP)             ;                               2741
000006  004737  000000G                    JSR     PC,GET.ENV
000012  010001                             MOV     R0,R1                   ; *,M.INDEX
000014  010116                             MOV     R1,(SP)                 ; M.INDEX,*                     2742
000016  012746  000104                     MOV     #104,-(SP)
000022  004737  000000G                    JSR     PC,BL$MUL
000026  112760  000004  000020G           MOVB    #4,MSCP.ENV+20(R0)
000034  012760  000120  000026G           MOV     #120,MSCP.ENV+26(R0)    ;                               2743
000042  010116                             MOV     R1,(SP)                 ; M.INDEX,*                     2744
000044  004737  000000G                    JSR     PC,SEND
000050  005700                             TST     R0
000052  001004                             BNE     1$
000054  010116                             MOV     R1,(SP)                 ; M.INDEX,*                     2746
000056  004737  000000G                    JSR     PC,PUT.ENV
000062  000455                             BR      4$
000064  004737  000000G           1$:     JSR     PC,WAIT                 ;                               2744
000070  004737  000000G                    JSR     PC,OUT.IODQ             ;                               2750
000074  010037  000000G                    MOV     R0,RP.INDX              ;                               2751
000100  010016                             MOV     R0,(SP)                 ; RP.INDX,*                     2752
000102  012746  000060                     MOV     #60,-(SP)
000106  004737  000000G                    JSR     PC,BL$MUL
000112  062700  000000G                    ADD     #RETPK  ,R0
000116  010037  000000G                    MOV     R0,RP.ADDR
000122  126027  000003  000003            CMPB    3(R0),#3                                                2753
000130  001025                             BNE     3$
000132  012701  000004                     MOV     #4,R1                   ; *,REASON                      2757
000136  116000  000002                     MOVB    2(R0),R0                ;                               2758
000142  042700  177417                     BIC     #177417,R0
000146  020027  000100                     CMP     R0,#100
000152  001006                             BNE     2$
000154  012701  000002                     MOV     #2,R1                   ; *,REASON                      2762
000160  104455                             TRAP    55                      ;                               2763
000162  000017                             .WORD   17
000164  000000G                            .WORD   EGD.15
000166  000000G                            .WORD   EMS.15
000170  013716  000000G           2$:     MOV     CCTLR,(SP)              ;                               2767
000174  010146                             MOV     R1,-(SP)                ; REASON,*
000176  004737  000000G                    JSR     PC,DROP.CTLR
000202  005726                             TST     (SP)+
000204  013716  000000G           3$:     MOV     RP.INDX,(SP)            ;                               2755
000210  004737  000000G                    JSR     PC,PUT.RETPKT           ;                               2771
000214  005726                             TST     (SP)+
000216  022626                     4$:     CMP     (SP)+,(SP)+             ;                               2748
000220  012601                             MOV     (SP)+,R1                ;                               2735
000222  000207                             RTS     PC                      ;                               2724

; Routine Size:  74 words,      Routine Base:  $CODE$ + 2760
; Maximum stack depth per invocation:  6 words
```

```
;  2776  1     ROUTINE UNIT_INIT : NOVALUE =
;  2777  1
;  2778  1     !+
;  2779  1     !       THIS ROUTINE IS CALLED FROM DRIVER INIT FOR EACH CONFIGURED UNIT
;  2780  1     !       (PLATTER) WHICH IS ATTACHED TO A CONTROLLER THAT SURVIVED
;  2781  1     !       INITIALIZATION. ITS PURPOSE IS TO FORMAT AND SEND AN "ONLINE"
;  2782  1     !       MESSAGE, AND TO VERIFY THE RESPONSE.
;  2783  1     !
;  2784  1     !       IMPLICIT INPUTS:
;  2785  1     !               CCTLR   CURRENT CONTROLLER NUMBER
;  2786  1     !               CPLAT   CURRENT PLATTER ADDRESS (MSCP UNIT NUMBER)
;  2787  1     !               L$LUN - CURRENT (DRS) UNIT NUMBER
;  2788  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;  2789  1     !               CUOFF - CURRENT UNIT CST OFFSET
;  2790  1     !-
;  2791  1
;  2792  2     BEGIN
;  2793  2
;  2794  2     LOCAL
;  2795  2         REASON : WORD,                              ! DROP UNIT REASON
;  2796  2         M_INDEX : WORD;                             ! MSCP ENVELOPE INDEX
;  2797  2
;  2798  2     M_INDEX = GET_ENV (.CCTLR);                     ! GET AN MSCP ENVELOPE
;  2799  2     MSCP_ENV [.M_INDEX, PL_ADDR] = .CPLAT;          ! SET PLATTER ADDRESS (MSCP UNIT NUMBER)
;  2800  2     MSCP_ENV [.M_INDEX, OPCODE] = OP_ONL;           ! OPCODE FOR "ONLINE"
;  2801  2     MSCP_ENV [.M_INDEX, DDPAR] = BIT00;             ! SHOW ALL ECC ERRORS IN ERROR LOG MESSAGES
;  2802  2     IF SEND (.M_INDEX) EQLU FAILURE                 ! ATTEMPT TO SEND; IF CTLR IS OFFLINE
;  2803  2     THEN                                            ! THEN
;  2804  2         PUT_ENV (.M_INDEX)                          ! RETURN ENVELOPE TO POOL
;  2805  2     ELSE                                            ! OTHERWISE (SEND WAS SUCCESSFUL)
;  2806  3         BEGIN
;  2807  3
;  2808  3         WAIT ();                                    ! WAIT FOR RETPKT RESPONSE
;  2809  3         RP_INDX = OUT_IODQ ();                      ! GET INDEX OF RETPKT
;  2810  3         RP_ADDR = RETPKT + (.RP_INDX * RP_LEN * 2); ! CALCULATE RETPKT ADDRESS
;  2811  3         IF .RP_ADDR [CONID] EQLU CID_DRIVER         ! IF RETPKT IS FROM "DRIVER"
;  2812  3         THEN                                        ! THEN
;  2813  4             BEGIN
;  2814  4
;  2815  4             REASON = DU_FATAL;                      ! ASSUME FATAL SA ERROR
;  2816  4             IF .RP_ADDR [MESTYP] EQLU MT_TIMEOUT    ! IF COMMAND TIMED OUT
;  2817  4             THEN                                    ! THEN
;  2818  5                 BEGIN
;  2819  5
;  2820  5                 REASON = DU_INIT;                   ! SET REASON TO INIT ERROR
;  2821  5                 ERRDF (15, EGD_15, EMS_15);         ! "MESSAGE RESPONSE TIMEOUT"
;  2822  5
;  2823  4                 END;
;  2824  4
;  2825  4             DROP_CTLR (CCTLR, .REASON);             ! DROP ALL CONTROLLER'S UNITS
;  2826  4
;  2827  4             END
;  2828  3         ELSE                                        ! OTHERWISE, IF RETPKT IS FROM DISK MSCP
;  2829  4             BEGIN
;  2830  4
;  2831  4             ST_CODE = .RP_ADDR [STSCOD];            ! GET STATUS CODE
;  2832  4             SB_CODE = .RP_ADDR [SUBCOD];            ! GET SUB-CODE
```

```
;  2833  4            IF .ST_CODE NEQU ST SUC                  ! IF STATUS CODE IS NOT SUCCESSFUL
;  2834  4            THEN                                     ! THEN
;  2835  5                BEGIN
;  2836  5
;  2837  5                ERRDF (16, EGD_16, EMS 16);          ! "ONLINE FAILED"
;  2838  5                DUR [.L$LUN] = DU_INIT;              ! SET UP REASON FOR DROPPING UNIT
;  2839  5                DODU (.L$LUN);                       ! DROP UNIT
;  2840  5
;  2841  5                END
;  2842  4            ELSE                                     ! STATUS CODE IS O.K.
;  2843  5                BEGIN
;  2844  5
;  2845  6                IF ((BIT_TST (RP_ADDR [U_FLGS], UF_WPH)) AND        ! IF UNIT IS WRITE-PROTECTED AND
;  2846  6                    (.CST_ADDR [.CUOFF, P_PROT] EQLU UNPROTECTED))  !    USER ALLOWED WRITES
;  2847  5                THEN                                                ! THEN
;  2848  6                    BEGIN
;  2849  6
;  2850  6                    ERRDF (17, EGD_17, EMS_17);                     ! "WRITE-PROTECT CONFLICT"
;  2851  6                    DUR [.L$LUN] = DU_INIT;                         ! SET REASON TO DROP UNIT
;  2852  6                    DODU (.L$LUN);                                  ! DROP UNIT
;  2853  6
;  2854  6                    END
;  2855  5                ELSE                                                ! WRITE PROTECT SWITCH IS O.K.
;  2856  6                    BEGIN
;  2857  6
;  2858  6                    USIZE = .RP_ADDR [USIZ_LO];                     ! UNIT SIZE (NO. OF LBN'S)
;  2859  6                    CST_ADDR [.CUOFF, P_STAT] = ONLINE;             ! MARK UNIT ONLINE
;  2860  6                    CPT [.L$LUN] = YES;                             ! O.K. TO TEST
;  2861  6                    CST_ADDR [U_CNT] = .CST_ADDR [U_CNT] + 1;       ! INCR NO. OF TESTABLE UNITS
;  2862  6
;  2863  5                    END;
;  2864  5
;  2865  4                END;                                     ! IF STATUS CODE = SUCCESS
;  2866  4
;  2867  3            END;                                         ! IF RETPKT ORIGINATED AT CONTROLLER
;  2868  3
;  2869  3        PUT_RETPKT (.RP_INDX);
;  2870  3
;  2871  2        END;                                             ! IF SEND WAS SUCCESSFUL
;  2872  2
;  2873  1    END;                                                 ! ROUTINE UNIT_INIT


                                        .SBTTL  UNIT.INIT INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G           UNIT.INIT:
                                        JSR     R1,$SAVE2                       ;                       2776
000004  013746  000000G                   MOV     CCTLR,-(SP)                     ;                       2798
000010  004737  000000G                   JSR     PC,GET.ENV
000014  010001                            MOV     R0,R1                           ; *,M.INDEX
000016  010116                            MOV     R1,(SP)                         ; M.INDEX,*             2799
000020  012746  000104                    MOV     #104,-(SP)
000024  004737  000000G                   JSR     PC,BL$MUL
000030  013760  000000G 000014G           MOV     CPLAT,MSCP.ENV+14(R0)
000036  112760  000011  000020G           MOVB    #11,MSCP.ENV+20(R0)             ;                       2800
000044  012760  000001  000044G           MOV     #1,MSCP.ENV+44(R0)              ;                       2801
000052  010116                            MOV     R1,(SP)                         ; M.INDEX,*             2802
000054  004737  000000G                   JSR     PC,SEND
```

```
000060  005700                          TST     R0
000062  001004                          BNE     1$
000064  010116                          MOV     R1,(SP)                 ; M.INDEX,*                     2804
000066  004737  000000G                 JSR     PC,PUT.ENV
000072  000565                          BR      7$                      ;                               2802
000074  004737  000000G          1$:    JSR     PC,WAIT                 ;                               2808
000100  004737  000000G                 JSR     PC,OUT.IODQ             ;                               2809
000104  010037  000000G                 MOV     R0,RP.INDX
000110  010016                          MOV     R0,(SP)                 ; RP.INDX,*                     2810
000112  012746  000060                  MOV     #60,-(SP)
000116  004737  000000G                 JSR     PC,BL$MUL
000122  062700  000000G                 ADD     #RETPKT,R0
000126  010037  000000G                 MOV     R0,RP.ADDR
000132  010001                          MOV     R0,R1                   ; RP.ADDR,*                     2811
000134  126127  000003  000003         CMPB    3(R1),#3
000142  001026                          BNE     3$
000144  012700  000004                  MOV     #4,R0                   ; *,REASON                      2815
000150  116102  000002                  MOVB    2(R1),R2                ;                               2816
000154  042702  177417                  BIC     #177417,R2
000160  020227  000100                  CMP     R2,#100
000164  001006                          BNE     2$
000166  012700  000002                  MOV     #2,R0                   ; *,REASON                      2820
000172  104455                          TRAP    55                      ;                               2821
000174  000017                          .WORD   17
000176  000000G                         .WORD   EGD.15
000200  000000G                         .WORD   EMS.15
000202  012716  000000G          2$:    MOV     #CCTLR,(SP)             ;                               2825
000206  010046                          MOV     R0,-(SP)                ; REASON,*
000210  004737  000000G                 JSR     PC,DROP.CTLR
000214  005726                          TST     (SP)+                   ;                               2813
000216  000506                          BR      6$                      ;                               2811
000220  116137  000016  000000G  3$:    MOVB    16(R1),ST.CODE          ;                               2831
000226  042737  177740  000000G         BIC     #177740,ST.CODE
000234  016100  000016                  MOV     16(R1),R0               ;                               2832
000240  006200                          ASR     R0
000242  006200                          ASR     R0
000244  006200                          ASR     R0
000246  006200                          ASR     R0
000250  006200                          ASR     R0
000252  042700  174000                  BIC     #174000,R0
000256  010037  000000G                 MOV     R0,SB.CODE
000262  013702  000000G                 MOV     L$LUN,R2                ;                               2838
000266  005737  000000G                 TST     ST.CODE                 ;                               2833
000272  001412                          BEQ     4$
000274  104455                          TRAP    55                      ;                               2837
000276  000020                          .WORD   20
000300  000000G                         .WORD   EGD.16
000302  000000G                         .WORD   EMS.16
000304  112762  000002  000000G         MOVB    #2,DUR(R2)              ;                               2838
000312  010200                          MOV     R2,R0                   ;                               2839
000314  104451                          TRAP    51
000316  000446                          BR      6$                      ;                               2833
000320  032761  020000  000022  4$:    BIT     #20000,22(R1)           ;                               2845
000326  001421                          BEQ     5$
000330  013700  000000G                 MOV     CUOFF,R0                ;                               2846
000334  006300                          ASL     R0
000336  063700  000000G                 ADD     CST.ADDR,R0
```

```
000342  005710                                  TST     (R0)
000344  100012                                  BPL     5$
000346  104455                                  TRAP    55                                      ;                       2850
000350  000021                                  .WORD   21
000352  000000G                                 .WORD   EGD.17
000354  000000G                                 .WORD   EMS.17
000356  112762  000002  000000G                 MOVB    #2,DUR(R2)                              ;                       2851
000364  010200                                  MOV     R2,R0                                   ;                       2852
000366  104451                                  TRAP    51
000370  000421                                  BR      6$                                      ;                       2845
000372  016137  000050  000616'          5$:     MOV     50(R1),USIZE                            ;                       2858
000400  013700  000000G                         MOV     CUOFF,R0                                ;                       2859
000404  006300                                  ASL     R0
000406  063700  000000G                         ADD     CST.ADDR,R0
000412  052710  020000                          BIS     #20000,(R0)
000416  112762  000001  000000G                 MOVB    #1,CPT(R2)                              ;                       2860
000424  013700  000000G                         MOV     CST.ADDR,R0                             ;                       2861
000430  105260  000005                          INCB    5(R0)
000434  013716  000000G                 6$:     MOV     RP.INDX,(SP)                            ;                       2869
000440  004737  000000G                         JSR     PC,PUT.RETPKT
000444  005726                                  TST     (SP)+                                   ;                       2806
000446  022626                          7$:     CMP     (SP)+,(SP)+                             ;                       2792
000450  000207                                  RTS     PC                                      ;                       2776

; Routine Size:  149 words,     Routine Base:  $CODE$ + 3204
; Maximum stack depth per invocation:  8 words
```

```
;  2874  1     ROUTINE ACCESS : NOVALUE =
;  2875  1
;  2876  1     !+
;  2877  1     !       THIS ROUTINE IS CALLED BY INIT_TEST TO VERIFY THAT THE CURRENT PLATTER
;  2878  1     !       CAN BE ACCESSED. THIS OBJECTIVE IS ACCOMPLISHED BY FORMATTING AND
;  2879  1     !       SENDING ONE OR TWO MSCP ACCESS COMMANDS TO THE PLATTER, AND CHECKING
;  2880  1     !       THE STATUS FIELD OF THE RESPONSE MESSAGE(S).
;  2881  1     !
;  2882  1     !       IMPLICIT INPUTS:
;  2883  1     !               CCTLR   CURRENT CONTROLLER NUMBER
;  2884  1     !               CPLAT   CURRENT PLATTER ADDRESS (MSCP UNIT NUMBER)
;  2885  1     !               L$LUN - CURRENT (DRS) UNIT NUMBER
;  2886  1     !-
;  2887  1
;  2888  2     BEGIN
;  2889  2
;  2890  2     LOCAL
;  2891  2         M_INDEX : WORD,
;  2892  2         RESULT : WORD,
;  2893  2         LBN : WORD,
;  2894  2         PASS : WORD;
;  2895  2
;  2896  2     RESULT = FAILURE;                          ! GUILTY UNTIL PROVEN INNOCENT
;  2897  2     ST_CODE = SB_CODE = 0;                     ! STATUS CODE AND SUB CODE
;  2898  2     LBN = ((.USIZE + -1) AND %O'77777') - 1;   ! START WITH LAST LBN ON TOP SURFACE
;  2899  2     PASS = 1;                                  ! LOOP PASS COUNT
;  2900  2     DO                                         ! LOOP STARTS HERE
;  2901  3         BEGIN
;  2902  3
;  2903  3         M_INDEX = GET_ENV (.CCTLR);            ! GET AN MSCP ENVELOPE
;  2904  3         MSCP_ENV [.M_INDEX, PL_ADDR] = .CPLAT; ! SET PLATTER ADDR (MSCP UNIT NUMBER)
;  2905  3         MSCP_ENV [.M_INDEX, OPCODE] = OP_ACC;  ! ACCESS OPCODE
;  2906  3         MSCP_ENV [.M_INDEX, BC_LO] = BLK_SIZE; ! BYTE COUNT (1 BLOCK)
;  2907  3         MSCP_ENV [.M_INDEX, LBN_L] = .LBN;     ! LOGICAL BLOCK NUMBER
;  2908  3         IF SEND (.M_INDEX) EQLU FAILURE        ! ATTEMPT TO SEND; IF CTLR NOT ONLINE
;  2909  3         THEN                                   ! THEN
;  2910  4             BEGIN
;  2911  4
;  2912  4             PUT_ENV (.M_INDEX);                ! RETURN ENVELOPE TO POOL
;  2913  4             PASS = 2;                          ! NO MORE TRIES
;  2914  4
;  2915  4             END
;  2916  3         ELSE                                   ! IF SEND WAS SUCCESSFUL
;  2917  4             BEGIN
;  2918  4
;  2919  4             WAIT ();                                        ! WAIT FOR RESPONSE
;  2920  4             RP_INDX = OUT_IODQ ();                          ! GET RETPKT (RESPONSE) INDEX
;  2921  4             RP_ADDR = RETPKT + (.RP_INDX * RP_LEN * 2);     ! CALCULATE RETPKT ADDRESS
;  2922  4             IF .RP_ADDR [CONID] EQLU CID_DRIVER             ! IF RETPKT CAME FROM "DRIVER"
;  2923  4             THEN                                            ! THEN
;  2924  4                 PASS = 2                                    ! NO MORE TRIES
;  2925  4             ELSE                                            ! OTHERWISE - CHECK OUT RESPONSE
;  2926  5                 BEGIN
;  2927  5
;  2928  5                 ST_CODE = .RP_ADDR [STSCOD];                ! GET STATUS CODE FROM PACKET
;  2929  5                 SB_CODE = .RP_ADDR [SUBCOD];                ! GET SUB-CODE FROM PACKET
;  2930  5                 IF .ST_CODE EQLU ST_SUC                     ! IF STATUS CODE INDICATES SUCCESS
```

```
;   2931  5                 THEN                                    ! THEN
;   2932  6                     BEGIN
;   2933  6
;   2934  6                     RESULT = SUCCESS;
;   2935  6                     PASS = 2;                           ! NO NEED TO TRY AGAIN
;   2936  6
;   2937  5                     END;
;   2938  5
;   2939  4                 END;                                    ! IF RETPKT ORIGINATED AT CONTROLLER
;   2940  4
;   2941  4             PUT_RETPKT (.RP_INDX);
;   2942  4
;   2943  3             END;                                        ! IF SEND WAS SUCCESSFUL
;   2944  3
;   2945  3         LBN = .LBN + 1;                                 ! ADVANCE TO FIRST LBN OF BOTTOM SURFACE
;   2946  3         PASS = .PASS + 1;                               ! SECOND PASS
;   2947  3
;   2948  3         END                                             ! END OF PASS LOOP
;   2949  3
;   2950  2     UNTIL .PASS GEQU 3;
;   2951  2
;   2952  2     IF .RESULT EQLU FAILURE
;   2953  2     THEN
;   2954  3         BEGIN
;   2955  3
;   2956  3         SETPRI (PRIO5);                                 ! DELAY POSSIBLE ERROR LOG MESSAGE
;   2957  3         ERRDF (18, EGD_18, EMS_18);                     ! "ACCESS FAILED"
;   2958  3         SETPRI (PRIOO);                                 ! RESTORE PROCESSOR PRIORITY
;   2959  3         DUR [.L$LUN] = DU_INIT;                         ! SET REASON TO DROP UNIT
;   2960  3         DODU (.L$LUN);                                  ! DROP UNIT
;   2961  3
;   2962  2         END;                                            ! IF ACCESS FAILED
;   2963  2
;   2964  1     END;                                                ! ROUTINE ACCESS


                            .SBTTL  ACCESS INITIALIZATION SUBTEST ROUTINES
000000  004137  000000G   ACCESS: JSR     R1,$SAVE5                ;                                   2874
000004  005003                    CLR     R3                       ; RESULT                            2896
000006  005037  000000G           CLR     SB.CODE                  ;                                   2897
000012  005037  000000G           CLR     ST.CODE
000016  013700  000616'            MOV     USIZE,R0                 ;                                   2898
000022  006200                    ASR     R0
000024  010004                    MOV     R0,R4                    ; *,LBN
000026  042704  100000            BIC     #100000,R4               ; *,LBN
000032  005304                    DEC     R4                       ; LBN
000034  012701  000001            MOV     #1,R1                    ; *,PASS                            2899
000040  013746  000000G     1$:   MOV     CCTLR,-(SP)              ;                                   2903
000044  004737  000000G           JSR     PC,GET.ENV
000050  010002                    MOV     R0,R2                    ; *,M.INDEX
000052  010216                    MOV     R2,(SP)                  ; M.INDEX,*                         2904
000054  012746  000104            MOV     #104,-(SP)
000060  004737  000000G           JSR     PC,BL$MUL
000064  013760  000000G 000014G   MOV     CPLAT,MSCP.ENV+14(R0)
000072  112760  000020  000020G   MOVB    #20,MSCP.ENV+20(R0)      ;                                   2905
000100  012760  001000  000024G   MOV     #1000,MSCP.ENV+24(R0)    ;                                   2906
000106  010460  000044G           MOV     R4,MSCP.ENV+44(R0)       ; LBN,*                             2907
```

```
000112  010216                          MOV     R2,(SP)                 ; M.INDEX,*                             2908
000114  004737  000000G                 JSR     PC,SEND
000120  005700                          TST     R0
000122  001006                          BNE     2$
000124  010216                          MOV     R2,(SP)                 ; M.INDEX,*                             2912
000126  004737  000000G                 JSR     PC,PUT.ENV
000132  012701  000002                  MOV     #2,R1                   ; *,PASS                                2913
000136  000460                          BR      5$                      ;                                       2908
000140  004737  000000G          2$:    JSR     PC,WAIT                 ;                                       2919
000144  004737  000000G                 JSR     PC,OUT.IODQ             ;                                       2920
000150  010037  000000G                 MOV     R0,RP.INDX
000154  010016                          MOV     R0,(SP)                 ; RP.INDX,*                             2921
000156  012746  000060                  MOV     #60,-(SP)
000162  004737  000000G                 JSR     PC,BL$MUL
000166  062700  000000G                 ADD     #RETPKT,R0
000172  010037  000000G                 MOV     R0,RP.ADDR
000176  126027  000003  000003          CMPB    3(R0),#3                ;                                       2922
000204  001426                          BEQ     3$                      ;                                       2924
000206  116037  000016  000000G         MOVB    16(R0),ST.CODE          ;                                       2928
000214  042737  177740  000000G         BIC     #177740,ST.CODE
000222  016005  000016                  MOV     16(R0),R5               ;                                       2929
000226  006205                          ASR     R5
000230  006205                          ASR     R5
000232  006205                          ASR     R5
000234  006205                          ASR     R5
000236  006205                          ASR     R5
000240  042705  174000                  BIC     #174000,R5
000244  010537  000000G                 MOV     R5,SB.CODE
000250  005737  000000G                 TST     ST.CODE                 ;                                       2930
000254  001004                          BNE     4$
000256  012703  000001                  MOV     #1,R3                   ; *,RESULT                              2934
000262  012701  000002          3$:     MOV     #2,R1                   ; *,PASS                                2935
000266  013716  000000G          4$:     MOV     RP.INDX,(SP)            ;                                       2941
000272  004737  000000G                 JSR     PC,PUT.RETPKT
000276  005726                          TST     (SP)+                   ;                                       2917
000300  005204                  5$:     INC     R4                      ; LBN                                   2945
000302  005201                          INC     R1                      ; PASS                                  2946
000304  022626                          CMP     (SP)+,(SP)+             ;                                       2901
000306  020127  000003                  CMP     R1,#3                   ; PASS,*                                2950
000312  103652                          BLO     1$
000314  005703                          TST     R3                      ; RESULT                                2952
000316  001017                          BNE     6$
000320  012700  000240                  MOV     #240,R0                 ;                                       2956
000324  104441                          TRAP    41
000326  104455                          TRAP    55                      ;                                       2957
000330  000022                          .WORD   22
000332  000000G                         .WORD   EGD.18
000334  000000G                         .WORD   EMS.18
000336  005000                          CLR     R0                      ;                                       2958
000340  104441                          TRAP    41
000342  013700  000000G                 MOV     L$LUN,R0                ;                                       2959
000346  112760  000002  000000G         MOVB    #2,DUR(R0)
000354  104451                          TRAP    51                      ;                                       2960
000356  000207                  6$:     RTS     PC                      ;                                       2874

; Routine Size:  120 words,     Routine Base:  $CODE$ + 3656
; Maximum stack depth per invocation:  10 words
```

```
;  2965  1     %SBTTL 'DM EXERCISER ROUTINES'
;  2966  1
;  2967  1     ROUTINE DM_EXER : NOVALUE =
;  2968  1
;  2969  1     !+
;  2970  1     !       THIS ROUTINE CONTROLS THE OVERALL OPERATION OF THE DM EXERCISER. THE
;  2971  1     !       DM EXERCISER IS A SUBTEST OF THE HOST EXERCISER. ITS BASIC PURPOSE IS
;  2972  1     !       TO SUPERVISE THE OPERATION OF THE FRONT PANEL TEST WHICH EXECUTES IN
;  2973  1     !       THE DM (DIAGNOSTIC MACHINE).
;  2974  1     !
;  2975  1     !       THE HOST INITIATES THE FRONT PANEL TEST BY DOWN-LINE LOADING THE CROM
;  2976  1     !       PRIMER PROGRAM FROM DM_INIT. THIS PROGRAM HAS THE JOB OF LOADING THE
;  2977  1     !       FRONT PANEL TEST INTO CONTROLLER MEMORY AND PASSING EXECUTION CONTROL
;  2978  1     !       TO IT. WHEN AND IF THIS SUCCEEDS, THE HOST SENDS DOWN THE ADDRESS OF
;  2979  1     !       THE DM EXERCSER / FRONT PANEL TEST COMMUNICATION AREA (DM_COMM). THIS
;  2980  1     !       BLOCK OF MEMORY HOLDS THE UNIT NUMBERS OF DISKS WHICH ARE TO BE
;  2981  1     !       DM-EXERCISED, AS WELL AS UNIT STATISTICS (LOADED BY THE FRONT PANEL
;  2982  1     !       TEST AND READ BY THE HOST).
;  2983  1     !
;  2984  1     !       THIS ROUTINE DISPATCHES PROCESSING TO OTHER ROUTINES ON A REGULAR
;  2985  1     !       BASIS UNTIL ALL UNITS HAVE COMPLETED THE REQUIRED NUMBER OF BYTES
;  2986  1     !       TRANSFERRED. THESE OTHER ROUTINES INCLUDE THE PROCESSING OF DUP END
;  2987  1     !       MESSAGES (DM_RETPKT), UPDATING HOST STATISTICS FROM DM_COMM (DM_TALLY),
;  2988  1     !       AND MAINTAINING COMMAND TIMERS (DRV_TIMCHK).
;  2989  1     !-
;  2990  1
;  2991  2     BEGIN
;  2992  2
;  2993  3     IF MANUAL                                       ! IF ATTENDED
;  2994  2     THEN                                            ! THEN
;  2995  2         PRINTF (MSG_06);                            ! "DM EXERCISER SUBTEST START"
;  2996  2     DM_INIT ();                                     ! INIT DM_EXER DATA, SEND CROM PRIMER
;  2997  2
;  2998  2     DO                                              ! "EXECUTIVE" PROCESSING LOOP
;  2999  3         BEGIN
;  3000  3
;  3001  3         BREAK;                                      ! BREAK IN CASE USER TYPED <CTRL-C>
;  3002  3         DM_RETPKT ();                               ! PROCESS ANY DUP END MESSAGES OR "DRIVER" ERRORS
;  3003  3         IF .T_FLAG EQLU TRUE                        ! IF ONE SECOND HAS ELAPSED
;  3004  3         THEN                                        ! THEN
;  3005  4             BEGIN
;  3006  4
;  3007  4             INCR CTLR FROM 0 TO (.CTLR_CNT - 1) DO  ! FOR EACH CONFIGURED CONTROLLER
;  3008  5                 BEGIN
;  3009  5
;  3010  5                 SET_CPAR (.CTLR);                           ! SET UP CONTROLLER-RELATED DATA ITEMS
;  3011  6                 IF ((.CST_ADDR [STATE] EQLU ONLINE) AND     ! IF CONTROLLER IS ONLINE AND
;  3012  6                     (.CST_ADDR [U_CNT] NEQU 0))             !    THERE IS AT LEAST 1 UNIT UNDER TEST
;  3013  5                 THEN                                        ! THEN
;  3014  6                     BEGIN
;  3015  6
;  3016  6                     IF DM_ACC ()                            ! IF ACCESS GAINED TO DM_COMM AREA
;  3017  6                     THEN                                    ! THEN
;  3018  6                         DM_TALLY ();                        ! ADD DM_COMM STATS TO HOST TOTALS
;  3019  6                     DM_TIME ();                             ! CHECK FPT SANITY TIMER FOR CONTROLLER
;  3020  6
;  3021  5                     END;                                ! IF CTLR IS ONLINE AND AT LEAST ONE UNIT
```

```
;   3022  5
;   3023  4                 END;                        ! CONTROLLER LOOP
;   3024  4
;   3025  4             DRV_TIMCHK ();                  ! CHECK FOR COMMAND TIMEOUTS
;   3026  4
;   3027  3             END;                            ! IF ONE SECOND HAS ELAPSED
;   3028  3
;   3029  3         END                                 ! END OF "EXECUTIVE" LOOP
;   3030  2     UNTIL DM_QUIT ();                       ! UNTIL ALL UNITS DONE
;   3031  2
;   3032  1     END;                                    ! ROUTINE DM_EXER


                                    .SBTTL  DM.EXER DM EXERCISER ROUTINES
000000  004137  000000G     DM.EXER:JSR     R1,$SAVE2                   ;                   2967
000004  104450                      TRAP    50                          ;                   2993
000006  103007                      BHIS    1$
000010  012746  000000G             MOV     #MSG.06,-(SP)               ;                   2995
000014  012746  000001              MOV     #1,-(SP)
000020  010600                      MOV     SP,R0                       ; SP,*
000022  104417                      TRAP    17
000024  022626                      CMP     (SP)+,(SP)+
000026  004737  000000V     1$:     JSR     PC,DM.INIT                  ;                   2996
000032  104422              2$:     TRAP    22                          ;                   2999
000034  004737  000000V             JSR     PC,DM.RETPKT                ;                   3002
000040  123727  000000G 000001      CMPB    T.FLAG,#1                   ;                   3003
000046  001035                      BNE     7$
000050  013702  000000G             MOV     CTLR.CNT,R2                 ;                   3007
000054  005001                      CLR     R1                          ; CTLR
000056  000425                      BR      6$
000060  010146              3$:     MOV     R1,-(SP)                    ; CTLR,*            3010
000062  004737  000000G             JSR     PC,SET.CPAR
000066  013700  000000G             MOV     CST.ADDR,R0                 ;                   3011
000072  005760  000002              TST     2(R0)
000076  100013                      BPL     5$
000100  105760  000005              TSTB    5(R0)                       ;                   3012
000104  001410                      BEQ     5$
000106  004737  000000V             JSR     PC,DM.ACC                   ;                   3016
000112  006000                      ROR     R0
000114  103002                      BCC     4$
000116  004737  000000V             JSR     PC,DM.TALLY                 ;                   3018
000122  004737  000000V     4$:     JSR     PC,DM.TIME                  ;                   3019
000126  005726              5$:     TST     (SP)+                       ;                   3008
000130  005201                      INC     R1                          ; CTLR              3007
000132  020102              6$:     CMP     R1,R2                       ; CTLR,*
000134  002751                      BLT     3$
000136  004737  000000V             JSR     PC,DRV.TIMCHK               ;                   3025
000142  004737  000000V     7$:     JSR     PC,DM.QUIT                  ;                   3030
000146  006000                      ROR     R0
000150  103330                      BCC     2$
000152  000207                      RTS     PC                          ;                   2967

; Routine Size:  54 words,      Routine Base:  $CODE$ + 4236
; Maximum stack depth per invocation:  7 words
```

```
;    3033  1     ROUTINE DM_INIT : NOVALUE =
;    3034  1
;    3035  1     !+
;    3036  1     !       THIS ROUTINE IS CALLED BY DM_EXER WHEN THE DM EXERCISER IS FIRST
;    3037  1     !       STARTED. ITS PURPOSE IS (A) TO INITIALIZE DM EXERCISER DATA, AND (B)
;    3038  1     !       TO START THE FRONT PANEL TEST EXECUTING IN THE DM.
;    3039  1     !
;    3040  1     !       THE MOST SIGNIFICANT DATA INITIALIZATION OCCURS IN THE COMMUNICATION
;    3041  1     !       AREA (DM_COMM) BETWEEN THE HOST AND THE FRONT PANEL TEST. PLATTER
;    3042  1     !       ADDRESSES TO BE EXERCISED UNDER THE FPT ARE LOADED INTO THIS AREA,
;    3043  1     !       AND ALL STATISTICS AND ACCESS WORDS ARE CLEARED TO ZERO.
;    3044  1     !
;    3045  1     !       TO START THE FPT EXECUTING, THIS PROGRAM CAUSES THE CROM PRIMER TO
;    3046  1     !       BE DOWN-LINE LOADED INTO THE DM VIA DUP'S "EXECUTE SUPPLIED PROGRAM"
;    3047  1     !       MESSAGE. THE CROM PRIMER THEN LOADS THE FRONT PANEL TEST INTO RAM AND
;    3048  1     !       STARTS ITS EXECUTION. THE SUCCESS / FAILURE OF THIS OPERATION IS
;    3049  1     !       COMMUNICATED BACK TO THE HOST THROUGH AN END MESSAGE.
;    3050  1     !-
;    3051  1
;    3052  2     BEGIN
;    3053  2
;    3054  2     LOCAL
;    3055  2         MX : WORD;                                  ! MSCP ENVELOPE INDEX
;    3056  2
;    3057  2     INCR CTLR FROM 0 TO (.CTLR_CNT - 1) DO          ! FOR EACH CONFIGURED CONTROLLER
;    3058  3         BEGIN
;    3059  3
;    3060  3         SET_CPAR (.CTLR);                               ! SET UP CONTROLLER-RELATED PARAMETERS
;    3061  3         IF .CST_ADDR [STATE] EQLU ONLINE                ! IF CONTROLLER IS ONLINE
;    3062  3         THEN                                            ! THEN
;    3063  4             BEGIN
;    3064  4
;    3065  4             INCR COUNT FROM 8 TO ((DMC_LEN * 2) - 2) BY 2 DO        ! CLEAR CTLR'S DM_COMM STATS
;    3066  4                 (.DMC_ADDR + .COUNT) = 0;
;    3067  4             INCR OFFSET FROM 0 TO 3 DO                              ! FOR EACH UNIT UNDER CTLR
;    3068  5                 BEGIN
;    3069  5
;    3070  5                 IF .CST_ADDR [.OFFSET + OF_UN, P_STAT] EQLU ONLINE  ! IF UNIT IS ONLINE
;    3071  5                 THEN                                                ! THEN LOAD PLATTER ADDRESS
;    3072  5                     DMC_ADDR [.OFFSET, ALLBIT] = .CST_ADDR [.OFFSET + OF_UN, P_ADDR]
;    3073  5                 ELSE                                                ! OTHERWISE
;    3074  5                     DMC_ADDR [.OFFSET, ALLBIT] = -1;                ! DO NOT EXERCISE
;    3075  5
;    3076  4                 END;                                                ! END UNIT LOOP
;    3077  4
;    3078  4             IF .ENTRY_REASON NEQU NEW_PASS                  ! IF START, RESTART, CONT, OR PWR FAIL
;    3079  4             THEN                                            ! THEN
;    3080  5                 BEGIN
;    3081  5
;    3082  5                 DM_TIMR [.CTLR] = 0;                        ! INIT FPT SANITY TIMER
;    3083  5                 MX = GET_ENV (.CTLR);                       ! GET AN MSCP ENVELOPE
;    3084  5                 MSCP_ENV [.MX, CONNID] = CID_DUP;           ! CONNECTION ID (DUP)
;    3085  5                 MSCP_ENV [.MX, OPCODE] = OP_ESP;            ! OPCODE = EXECUTE SUPPLIED PROGRAM
;    3086  5                 MSCP_ENV [.MX, DBC_LO] = .CROMP [0];        ! BYTE COUNT
;    3087  5                 MSCP_ENV [.MX, DBUF_0] = CROMP;             ! BUFF DESC OF CROM PRIMER
;    3088  5                 MSCP_ENV [.MX, OBUF_0] = CROMP + .CROMP [0]; ! OVERLAY BUFF DESC
;    3089  5                 IF SEND (.MX) EQLU FAILURE                  ! ATTEMPT TO SEND. IF FAILURE
```

```
;   3090  5                 THEN                                        ! THEN
;   3091  5                     PUT_ENV (.MX);                          ! RETURN ENVELOPE TO POOL
;   3092  5
;   3093  4                 END;                                        ! IF START, RESTART, CONT, OR PWR FAIL
;   3094  4
;   3095  3             END;                                            ! END - IF CTLR IS ONLINE
;   3096  3
;   3097  2         END;                                                ! END CONTROLLER LOOP
;   3098  2
;   3099  3     IF ((.ENTRY_REASON NEQU CONT) AND                       ! IF START, RESTART, OR NEW PASS
;   3100  3         (.ENTRY_REASON NEQU PWR_FAIL))
;   3101  2     THEN                                                            ! THEN
;   3102  2         INCR COUNT FROM 0 TO ((MAX_UNITS * TALLY_LEN) - 1) DO       ! CLEAR ALL STATS
;   3103  2             TALLY [.COUNT] = 0;
;   3104  2
;   3105  2     T_FLAG = FALSE;                                         ! CLEAR ONE SECOND TIMING FLAG
;   3106  2
;   3107  1     END;                                                    ! ROUTINE DM_INIT


                                        .SBTTL  DM.INIT DM EXERCISER ROUTINES
000000  004137  000000G           DM.INIT:JSR     R1,$SAVE5                       ;                       3033
000004  013705  000000G                   MOV     CTLR.CNT,R5                     ;                       3057
000010  005003                           CLR     R3                              ; CTLR
000012  000531                           BR      8$
000014  010346                   1$:     MOV     R3,-(SP)                        ; CTLR,*                3060
000016  004737  000000G                   JSR     PC,SET.CPAR
000022  013700  000000G                   MOV     CST.ADDR,R0                     ;                       3061
000026  005760  000002                   TST     2(R0)
000032  100117                           BPL     7$
000034  012700  000010                   MOV     #10,R0                          ; *,COUNT               3065
000040  010001                   2$:     MOV     R0,R1                           ; COUNT,*               3066
000042  063701  000000G                   ADD     DMC.ADDR,R1
000046  005011                           CLR     (R1)
000050  062700  000002                   ADD     #2,R0                           ; *,COUNT               3065
000054  020027  000062                   CMP     R0,#62                          ; COUNT,*
000060  003767                           BLE     2$
000062  005002                           CLR     R2                              ; OFFSET                3067
000064  010201                   3$:     MOV     R2,R1                           ; OFFSET,*              3072
000066  006301                           ASL     R1
000070  063701  000000G                   ADD     DMC.ADDR,R1
000074  010200                           MOV     R2,R0                           ; OFFSET,*              3070
000076  006300                           ASL     R0
000100  063700  000000G                   ADD     CST.ADDR,R0
000104  032760  020000  000006           BIT     #20000,6(R0)
000112  001405                           BEQ     4$
000114  116011  000006                   MOVB    6(R0),(R1)                      ;                       3072
000120  105061  000001                   CLRB    1(R1)
000124  000402                           BR      5$                              ;                       3070
000126  012711  177777           4$:     MOV     #-1,(R1)                        ;                       3074
000132  005202                   5$:     INC     R2                              ; OFFSET                3067
000134  020227  000003                   CMP     R2,#3                           ; OFFSET,*
000140  003751                           BLE     3$
000142  123727  000000G 000005           CMPB    ENTRY.REASON,#5                 ;                       3078
000150  001450                           BEQ     7$
000152  010300                           MOV     R3,R0                           ; CTLR,*                3082
000154  006300                           ASL     R0
```

```
000156  005060  000620'                        CLR     DM.TIMR(R0)
000162  010316                                 MOV     R3,(SP)                 ; CTLR,*                        3083
000164  004737  000000G                       JSR     PC,GET.ENV
000170  010004                                 MOV     R0,R4                   ; *,MX
000172  010416                                 MOV     R4,(SP)                 ; MX,*                          3084
000174  012746  000104                        MOV     #104,-(SP)
000200  004737  000000G                       JSR     PC,BL$MUL
000204  112760  000002  000007G               MOVB    #2,MSCP.ENV+7(R0)
000212  112760  000002  000020G               MOVB    #2,MSCP.ENV+20(R0)      ;                               3085
000220  013760  001716' 000024G               MOV     CROMP,MSCP.ENV+24(R0)   ;                               3086
000226  012760  001716' 000030G               MOV     #CROMP,MSCP.ENV+30(R0)  ;                               3087
000234  016060  000024G 000044G               MOV     MSCP.ENV+24(R0),MSCP.ENV+44(R0) ;                       3088
000242  062760  001716' 000044G               ADD     #CROMP,MSCP.ENV+44(R0)
000250  010416                                 MOV     R4,(SP)                 ; MX,*                          3089
000252  004737  000000G                       JSR     PC,SEND
000256  005700                                 TST     R0
000260  001003                                 BNE     6$
000262  010416                                 MOV     R4,(SP)                 ; MX,*                          3091
000264  004737  000000G                       JSR     PC,PUT.ENV
000270  005726                         6$:     TST     (SP)+                   ;                               3080
000272  005726                         7$:     TST     (SP)+                   ;                               3058
000274  005203                                 INC     R3                      ; CTLR                          3057
000276  020305                         8$:     CMP     R3,R5                   ; CTLR,*
000300  002645                                 BLT     1$
000302  123727  000000G 000003                CMPB    ENTRY.REASON,#3         ;                               3096
000310  001414                                 BEQ     10$
000312  123727  000000G 000004                CMPB    ENTRY.REASON,#4         ;                               3100
000320  001410                                 BEQ     10$
000322  005000                                 CLR     R0                      ; COUNT                         3102
000324  005060  000000G                 9$:     CLR     TALLY(R0)               ; *(COUNT)                      3103
000330  062700  000002                        ADD     #2,R0                   ; *,COUNT                       3102
000334  020027  001376                        CMP     R0,#1376                ; COUNT,*
000340  003771                                 BLE     9$
000342  105037  000000G                 10$:    CLRB    T.FLAG                  ;                               3105
000346  000207                                 RTS     PC                      ;                               3033

; Routine Size:  116 words,     Routine Base:  $CODE$ + 4412
; Maximum stack depth per invocation:  9 words
```

```
;   3108  1     ROUTINE DM_QUIT =
;   3109  1
;   3110  1     !+
;   3111  1     !       THIS ROUTINE IS CALLED BY THE DM_EXERCISER "EXECUTIVE" (DM_EXER) TO
;   3112  1     !       DETERMINE WHETHER OR NOT THE DM EXERCISER SUBTEST SHOULD BE TERMINATED.
;   3113  1     !       ITS PURPOSE IS TO EXAMINE THE STATUS OF THE CURRENT PASS TESTING
;   3114  1     !       VECTOR (CPT). IF EACH UNIT'S VALUE IN THIS TABLE IS "NO" (INDICATING
;   3115  1     !       THAT CURRENT PASS TESTING ON THE UNIT IS COMPLETE), THEN THIS ROUTINE
;   3116  1     !       RETURNS A VALUE OF "TRUE" TO ITS CALLER. IF ANY ONE UNIT HAS A VALUE
;   3117  1     !       OF "YES", THEN "FALSE" IS RETURNED.
;   3118  1     !
;   3119  1     !       IMPLICIT INPUTS:
;   3120  1     !               L$UNIT - NUMBER OF UNITS CONFIGURED FOR TEST
;   3121  1     !-
;   3122  1
;   3123  2     BEGIN
;   3124  2
;   3125  2     INCR UNIT FROM 0 TO (.L$UNIT - 1) DO            ! FOR EACH CONFIGURED UNIT
;   3126  2         IF .CPT [.UNIT] EQLU YES                    ! IF UNIT STILL UNDER TEST
;   3127  2         THEN                                        ! THEN
;   3128  2             RETURN FALSE;                           ! TEST NOT FINISHED
;   3129  2     RETURN TRUE;                                    ! ALL UNITS DONE
;   3130  2
;   3131  1     END;                                            ! ROUTINE DM_QUIT


                                    .SBTTL  DM.QUIT DM EXERCISER ROUTINES
000000  005000                DM.QUIT:CLR     R0                      ; UNIT                          3125
000002  000405                        BR      2$
000004  126027  000000G 000001 1$:     CMPB    CPT(R0),#1              ; *(UNIT),*                     3126
000012  001407                        BEQ     3$                      ;                               3128
000014  005200                        INC     R0                      ; UNIT                          3125
000016  020037  000000G         2$:     CMP     R0,L$UNIT               ; UNIT,*
000022  002770                        BLT     1$
000024  012700  000001                MOV     #1,R0                   ;                               3123
000030  000207                        RTS     PC
000032  005000                3$:     CLR     R0                      ;                               3108
000034  000207                        RTS     PC

; Routine Size:  15 words,      Routine Base:  $CODE$ + 4762
; Maximum stack depth per invocation:  0 words
```

```
;   3134  1     ROUTINE DM_RETPKT : NOVALUE =
;   3135  1
;   3136  1     !+
;   3137  1     !       THIS ROUTINE IS CALLED BY DM_EXER TO CHECK FOR AND PROCESS ANY RETURN
;   3138  1     !       PACKETS THAT HAVE BEEN "SENT" BY THE 'DRIVER" PORTION OF THE PROGRAM.
;   3139  1     !       THE I/O DONE QUEUE (IODQ) ACTS AS THE LINK BETWEEN THE TWO PROGRAM
;   3140  1     !       PARTS; IT HOLDS INDECES OF RETURN PACKETS WHICH REQUIRE PROCESSING.
;   3141  1     !
;   3142  1     !       UNDER THE DM EXERCISER SUBTEST, RETURN PACKETS ORIGINATE FROM TWO
;   3143  1     !       SOURCES:
;   3144  1     !               1. DUP - DESCRIBING AN END MESSAGE RECEIVED FROM THE RC25 IN
;   3145  1     !                       RESPONSE TO A HOST COMMAND
;   3146  1     !               2. THE PROGRAM "DRIVER"   DESCRIBING A CONTROLLER ERROR OR
;   3147  1     !                       COMMAND TIMEOUT.
;   3148  1     !-
;   3149  1
;   3150  2     BEGIN
;   3151  2
;   3152  2     WHILE .IODQ_IN NEQU .IODQ_OUT DO                ! DO UNTIL I/O DONE QUEUE IS EMPTY
;   3153  3         BEGIN
;   3154  3
;   3155  3         RP_INDX = OUT_IODQ ();                      ! GET INDEX OF NEXT RETPKT AND ADVANCE OUT POINTER
;   3156  3         RP_ADDR = RETPKT + (.RP_INDX * RP_LEN * 2); ! CALCULATE RETPKT ADDRESS
;   3157  3         SET_CPAR (.RP_ADDR [CTLR]);                 ! SET UP CURRENT CONTROLLER PARAMETERS
;   3158  3         L$LUN = .CST_ADDR [OF_UN, P_UNIT];          ! GET UNIT NUMBER OF FIRST UNIT
;   3159  3         IF .RP_ADDR [CONID] EQLU CID_DRIVER         ! IF RETPKT IS FROM PROGRAM 'DRIVER"
;   3160  3         THEN                                        ! THEN
;   3161  4             BEGIN
;   3162  4
;   3163  4             IF .RP_ADDR [MESTYP] EQLU MT_TIMEOUT    ! IF COMMAND TIMEOUT
;   3164  4             THEN                                    ! THEN
;   3165  4                 ERRDF (15, EGD 15, EMS_15);         ! "MESSAGE RESPONSE TIMEOUT"
;   3166  4             DROP_CTLR (.CCTLR, DU_FATAL);           ! DROP CONTROLLER'S UNITS
;   3167  4             CST_ADDR [STATE] = OFFLINE;             ! MARK CONTROLLER OFFLINE
;   3168  4
;   3169  4             END
;   3170  3         ELSE                                        ! OTHERWISE (RETPKT NOT FROM "DRIVER")
;   3171  4             BEGIN
;   3172  4
;   3173  4             IF .RP_ADDR [CONID] EQLU CID_DUP        ! IF RETPKT IS FROM DUP
;   3174  4             THEN                                    ! THEN
;   3175  4                 DM_MSG ();                          ! PROCESS THE END MESSAGE
;   3176  4
;   3177  3             END;
;   3178  3
;   3179  3         PUT_RETPKT (.RP_INDX);                      ! RETURN PACKET TO POOL
;   3180  3
;   3181  2         END;                                        ! END   UNTIL I/O DONE QUEUE IS EMPTY
;   3182  2
;   3183  1     END;                                            ! ROUTINE DM_RETPKT


                                        .SBTTL  DM.RETPKT DM EXERCISER ROUTINES
000000  010146                    DM.RETPKT:
                                        MOV     R1,-(SP)                        ;                       3134
000002  023737  000000G 000000G   1$:     CMP     IODQ.IN,IODQ.OUT                ;                       3150
000010  001506                            BEQ     5$
```

```
000012  004737  000000G                        JSR     PC,OUT.IODQ             ;                       3153
000016  010037  000000G                        MOV     R0,RP.INDX
000022  010046                                 MOV     R0, (SP)                ; RP.INDX,*             3154
000024  012746  000060                        MOV     #60,-(SP)
000030  004737  000000G                        JSR     PC,BL$MUL
000034  062700  000000G                        ADD     #RETPKT,R0
000040  010037  000000G                        MOV     R0,RP.ADDR
000044  116016  000002                        MOVB    2(R0),(SP)              ;                       3155
000050  042716  177760                        BIC     #177760,(SP)
000054  004737  000000G                        JSR     PC,SET.CPAR
000060  013700  000000G                        MOV     CST.ADDR,R0             ;                       3156
000064  016001  000006                        MOV     6(R0),R1
000070  000301                                SWAB    R1
000072  042701  177740                        BIC     #177740,R1
000076  010137  000000G                        MOV     R1,L$LUN
000102  013700  000000G                        MOV     RP.ADDR,R0              ;                       3157
000106  126027  000003  000003                CMPB    3(R0),#3
000114  001030                                BNE     3$
000116  116000  000002                        MOVB    2(R0),R0                ;                       3161
000122  042700  177417                        BIC     #177417,R0
000126  020027  000100                        CMP     R0,#100
000132  001004                                BNE     2$
000134  104455                                TRAP    55                      ;                       3163
000136  000017                                .WORD   17
000140  000000G                               .WORD   EGD.15
000142  000000G                               .WORD   EMS.15
000144  013716  000000G             2$:        MOV     CCTLR,(SP)              ;                       3164
000150  012746  000004                        MOV     #4,-(SP)
000154  004737  000000G                        JSR     PC,DROP.CTLR
000160  013700  000000G                        MOV     CST.ADDR,R0             ;                       3165
000164  042760  100000  000002                BIC     #100000,2(R0)
000172  005726                                TST     (SP)+                   ;                       3159
000174  000406                                BR      4$                      ;                       3157
000176  126027  000003  000002      3$:        CMPB    3(R0),#2                ;                       3171
000204  001002                                BNE     4$
000206  004737  000000V                        JSR     PC,DM.MSG               ;                       3173
000212  013716  000000G             4$:        MOV     RP.INDX,(SP)            ;                       3177
000216  004737  000000G                        JSR     PC,PUT.RETPKT
000222  022626                                CMP     (SP)+,(SP)+             ;                       3151
000224  000666                                BR      1$                      ;                       3150
000226  012601                      5$:        MOV     (SP)+,R1                ;                       3132
000230  000207                                RTS     PC

; Routine Size:  77 words,      Routine Base:  $CODE$ + 5020
; Maximum stack depth per invocation:  5 words
```

```
;  3182  1     ROUTINE DM_MSG : NOVALUE =
;  3183  1
;  3184  1     !+
;  3185  1     !       THIS ROUTINE IS CALLED BY DM_RETPKT FOR ALL DUP END MESSAGES RECEIVED
;  3186  1     !       BY THE DM EXERCISER.
;  3187  1     !
;  3188  1     !       THIS ROUTINE FIRST CHECKS THE STATUS CODE OF THE END MESSAGE; IF IT
;  3189  1     !       INDICATES ANYTHING OTHER THAN SUCCESSFUL COMPLETION OF THE COMMAND,
;  3190  1     !       THEN A DEVICE FATAL ERROR IS DECLARED FOR THE CONTROLLER, AND ALL ITS
;  3191  1     !       UNITS ARE DROPPED. IF THE STATUS CODE INDICATES SUCCESS, THEN
;  3192  1     !       PROCESSING IS DEPENDENT ON THE ENDCODE (OPCODE OF THE ASSOCIATED
;  3193  1     !       COMMAND). FOR THE "EXECUTE SUPPLIED PROGRAM" END MESSAGE, THIS ROUTINE
;  3194  1     !       FORMATS AND SENDS A 'SEND DATA" MESSAGE, PROVIDING THE FRONT PANEL TEST
;  3195  1     !       WITH THE HOST ADDRESS OF THE CURRENT CONTROLLER'S DM EXERCISER
;  3196  1     !       COMMUNICATION BLOCK (DM_COMM).
;  3197  1     !
;  3198  1     !       IMPLICIT INPUTS:
;  3199  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;  3200  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;  3201  1     !               DMC_ADDR - ADDRESS OF CURRENT CONTROLLER'S DM_COMM AREA
;  3202  1     !-
;  3203  1
;  3204  2     BEGIN
;  3205  2
;  3206  2     LOCAL
;  3207  2         MX : WORD,                                      ! MSCP ENVELOPE INDEX
;  3208  2         DUP_OP : WORD,                                  ! DUP OPCODE
;  3209  2         UNIT : WORD;                                    ! UNIT NUMBER
;  3210  2
;  3211  2     IF (ST_CODE = .RP_ADDR [STATUS]) NEQU ST_SUC        ! IF STATUS CODE NOT SUCCESS
;  3212  2     THEN                                                ! THEN
;  3213  3         BEGIN
;  3214  3
;  3215  3         ERRDF (21, EGD_21, EMS_21);                     ! "DUP COMMAND FAILED"
;  3216  3         DROP_CTLR (.CCTLR, DU_FATAL);                   ! DROP CONTROLLER'S UNITS
;  3217  3
;  3218  3         END
;  3219  2     ELSE                                                ! OTHERWISE - SUCCESS
;  3220  3         BEGIN
;  3221  3
;  3222  3         DUP_OP = .RP_ADDR [ENDCOD] AND OP_MSK;          ! GET OPCODE
;  3223  3         SELECTONEU .DUP_OP OF
;  3224  3             SET
;  3225  3
;  3226  4             [OP_ESP] : BEGIN                                ! IF "EXECUTE SUPPLIED PROGRAM"
;  3227  4
;  3228  4                        MX = GET_ENV (.CCTLR);               ! GET AN MSCP ENVELOPE
;  3229  4                        MSCP_ENV [.MX, CONNID] = CID_DUP;    ! CONNECTION ID (DUP)
;  3230  4                        MSCP_ENV [.MX, OPCODE] = OP_SND;     ! OPCODE = SEND DATA
;  3231  4                        MSCP_ENV [.MX, DBC_LO] = 2;          ! BYTE COUNT
;  3232  4                        MSCP_ENV [.MX, DBUF_0] = DMC_ADDR;   ! ADDR OF ADDR OF CTLR'S DM_COMM AREA
;  3233  4                        IF SEND (.MX) EQLU FAILURE           ! ATTEMPT TO SEND. IF FAILURE
;  3234  4                        THEN                                 ! THEN
;  3235  4                            PUT_ENV (.MX);                   ! RETURN ENVELOPE TO POOL
;  3236  4
;  3237  3                        END;                                 ! END - IF "EXECUTE SUPPLIED PROGRAM'
;  3238  3
```

```
;   3239  3          [OP_SND] : DM TIMR [.CCTLR] = TO_DM;          ! IF "SEND DATA", START FPT SANITY TIMER
;   3240  3
;   3241  3          TES;
;   3242  3
;   3243  2      END;                                             ! END - IF STATUS CODE = SUCCESS
;   3244  2
;   3245  1  END;                                                 ! ROUTINE DM_MSG


                                        .SBTTL  DM.MSG DM EXERCISER ROUTINES
000000  010146                  DM.MSG: MOV     R1,-(SP)                        ;                       3182
000002  013700  000000G                 MOV     RP.ADDR,R0                      ;                       3211
000006  016037  000016  000000G         MOV     16(R0),ST.CODE
000014  001413                          BEQ     1$
000016  104455                          TRAP    55                              ;                       3215
000020  000025                          .WORD   25
000022  000000G                         .WORD   EGD.21
000024  000000G                         .WORD   EMS.21
000026  013746  000000G                 MOV     CCTLR,-(SP)                     ;                       3216
000032  012746  000004                  MOV     #4,-(SP)
000036  004737  000000G                 JSR     PC,DROP.CTLR
000042  000447                          BR      2$                              ;                       3213
000044  013700  000000G          1$:    MOV     RP.ADDR,R0                      ;                       3222
000050  116000  000014                  MOVB    14(R0),R0                       ; *,DUP.OP
000054  042700  177600                  BIC     #177600,R0                      ; *,DUP.OP
000060  020027  000002                  CMP     R0,#2                           ; DUP.OP,*              3226
000064  001040                          BNE     3$
000066  013746  000000G                 MOV     CCTLR,-(SP)                     ;                       3228
000072  004737  000000G                 JSR     PC,GET.ENV
000076  010001                          MOV     R0,R1                           ; *,MX
000100  010116                          MOV     R1,(SP)                         ; MX,*                  3229
000102  012746  000104                  MOV     #104,-(SP)
000106  004737  000000G                 JSR     PC,BL$MUL
000112  112760  000002  000007G         MOVB    #2,MSCP.ENV+7(R0)
000120  112760  000004  000020G         MOVB    #4,MSCP.ENV+20(R0)              ;                       3230
000126  012760  000002  000024G         MOV     #2,MSCP.ENV+24(R0)              ;                       3231
000134  012760  000000G 000030G         MOV     #DMC.ADDR,MSCP.ENV+30(R0)       ;                       3232
000142  010116                          MOV     R1,(SP)                         ; MX,*                  3233
000144  004737  000000G                 JSR     PC,SEND
000150  005700                          TST     R0
000152  001003                          BNE     2$
000154  010116                          MOV     R1,(SP)                         ; MX,*                  3235
000156  004737  000000G                 JSR     PC,PUT.ENV
000162  022626                  2$:     CMP     (SP)+,(SP)+                     ;                       3226
000164  000411                          BR      4$                              ;                       3223
000166  020027  000004          3$:     CMP     R0,#4                           ; DUP.OP,*              3239
000172  001006                          BNE     4$
000174  013700  000000G                 MOV     CCTLR,R0
000200  006300                          ASL     R0
000202  012760  000550  000620'         MOV     #550,DM.TIMR(R0)
000210  012601                  4$:     MOV     (SP)+,R1                        ;                       3182
000212  000207                          RTS     PC

; Routine Size:  70 words,      Routine Base:  $CODE$ + 5252
; Maximum stack depth per invocation:  4 words
```

```
;    3246  1     ROUTINE DM_ACC =
;    3247  1
;    3248  1     !+
;    3249  1     !       THIS ROUTINE IS CALLED BY DM_EXER IN ORDER TO ATTEMPT TO GAIN ACCESS
;    3250  1     !       TO THE CURRENT CONTROLLER'S DM_COMM AREA. IF ACCESS IS PERMITTED (I.E.,
;    3251  1     !       IF THE FRONT PANEL TEST (FPT) IS NOT CURRENTLY UPDATING DM_COMM
;    3252  1     !       STATISTICS), THEN THIS ROUTINE RETURNS A VALUE OF "SUCCESS". OTHERWISE,
;    3253  1     !       ACCESS IS DENIED AT THIS TIME, AND "FAILURE" IS RETURNED.
;    3254  1     !
;    3255  1     !       IMPLICIT INPUTS:
;    3256  1     !               DMC_ADDR - ADDRESS OF CURRENT CONTROLLER'S DM_COMM AREA
;    3257  1     !
;    3258  1     !       OUTPUTS:
;    3259  1     !               'SUCCESS" - ACCESS TO DM_COMM IS PERMITTED
;    3260  1     !               "FAILURE" - ACCESS TO DM_COMM IS DENIED
;    3261  1     !-
;    3262  1
;    3263  2     BEGIN
;    3264  2
;    3265  2     LOCAL
;    3266  2         RESULT : WORD;                          ! RESULT OF ACCESS REQUEST
;    3267  2
;    3268  2     RESULT = SUCCESS;                           ! ASSUME ACCESS WILL BE GAINED
;    3269  2     DMC_ADDR [HOST_ACC] = ALL_ONES;             ! SET HOST ACCESS WORD
;    3270  2     IF .DMC_ADDR [FPT_ACC] NEQU 0               ! IF FPT HAS ACCESS NOW
;    3271  2     THEN                                        ! THEN
;    3272  3         BEGIN
;    3273  3
;    3274  3         DMC_ADDR [HOST_ACC] = 0;                ! WITHDRAW ACCESS REQUEST
;    3275  3         RESULT = FAILURE;                       ! CHANGE RESULT TO FAILURE
;    3276  3
;    3277  2         END;
;    3278  2
;    3279  2     RETURN .RESULT;
;    3280  2
;    3281  1     END;                                        ! ROUTINE DM_ACC


                                        .SBTTL  DM.ACC DM EXERCISER ROUTINES
000000  004137  000000G           DM.ACC: JSR     R1,$SAVE2                       ;                       3246
000004  012702  000001                   MOV     #1,R2                           ; *,RESULT              3268
000010  013700  000000G                  MOV     DMC.ADDR,R0                     ;                       3269
000014  012760  177777  000062           MOV     #-1,62(R0)
000022  010001                           MOV     R0,R1                           ; DMC.ADDR,*            3270
000024  005761  000060                   TST     60(R1)
000030  001403                           BEQ     1$
000032  005060  000062                   CLR     62(R0)                          ;                       3274
000036  005002                           CLR     R2                              ; RESULT                3275
000040  010200                   1$:     MOV     R2,R0                           ; RESULT,*              3263
000042  000207                           RTS     PC                              ;                       3246

; Routine Size:  18 words,      Routine Base:  $CODE$ + 5466
; Maximum stack depth per invocation:  4 words
```

```
;  3282  1     ROUTINE DM_TALLY : NOVALUE =
;  3283  1
;  3284  1     !+
;  3285  1     !       THIS ROUTINE IS CALLED FROM DM_EXER AFTER ACCESS HAS BEEN GAINED TO
;  3286  1     !       THE CURRENT CONTROLLER'S DM_COMM AREA. ITS PURPOSE IS TO EXTRACT THE
;  3287  1     !       STATISTICAL VALUES STORED THERE BY THE FRONT PANEL TEST (EXECUTING IN
;  3288  1     !       THE DM), AND TO ADD THESE VALUES TO THE HOST-KEPT STATS. THE STATS IN
;  3289  1     !       DM_COMM ARE THEN RESET TO 0.
;  3290  1     !
;  3291  1     !       AFTER UPDATING THE HOST STATS, THE NUMBER OF HARD ERRORS AND THE NUMBER
;  3292  1     !       OF MBYTES TRANSFERRED THUS FAR FOR EACH UNIT IS CHECKED AGAINST THE
;  3293  1     !       LIMITS SPECIFIED IN THE SW P-TABLE. IF THE HARD ERROR LIMIT HAS BEEN
;  3294  1     !       REACHED, THEN THE UNIT IS DROPPED FROM ALL TESTING. IF THE TRANSFER
;  3295  1     !       LIMIT HAS BEEN REACHED, THEN THE UNIT IS SIMPLY REMOVED FROM THE
;  3296  1     !       CURRENT PASS.
;  3297  1     !
;  3298  1     !       IMPLICIT INPUTS:
;  3299  1     !               DMC_ADDR - ADDRESS OF THE CURRENT CONTROLLER'S DM_COMM AREA
;  3300  1     !-
;  3301  1
;  3302  2     BEGIN
;  3303  2
;  3304  2     LOCAL
;  3305  2         ST_PTR,                                     ! STATISTICS POINTER IN DM_COMM
;  3306  2         NBXFR : WORD;                               ! NUMBER OF BLOCKS TRANSFERRED
;  3307  2
;  3308  2     ST_PTR = .DMC_ADDR + 8;                         ! POINTS TO STATS FOR FIRST UNIT
;  3309  2     INCR OFFSET FROM 0 TO 3 DO                      ! FOR EACH UNIT
;  3310  3         BEGIN
;  3311  3
;  3312  3         IF .DMC_ADDR [.OFFSET, 0, 16, 1] GEQ 0      ! IF UNIT IS BEING DM-EXERCISED
;  3313  3         THEN                                        ! THEN
;  3314  4             BEGIN
;  3315  4
;  3316  4             SET_UPAR (.OFFSET + OF_UN);             ! SET UP UNIT-RELATED PARAMETERS
;  3317  4
;  3318  4             UPD_IOC (T_ADDR [SEEK_LO], ..ST_PTR);   ! UPDATE NO. OF SEEKS
;  3319  4             .ST_PTR = 0;                            ! RESET STAT TO 0
;  3320  4             ST_PTR = .ST_PTR + 2;                   ! ADVANCE DM_COMM POINTER
;  3321  4
;  3322  4             NBXFR = ..ST_PTR;                       ! NUMBER OF BLOCKS READ (1 BLOCK PER READ)
;  3323  4             UPD_IOC (T_ADDR [READ_LO], ..ST_PTR);   ! UPDATE NO. OF READS
;  3324  4             UPD_DMBC (T_ADDR [BR_LO], ..ST_PTR);    ! UPDATE NO. OF BYTES READ, CHECK FOR OVERFLOW
;  3325  4             .ST_PTR = 0;                            ! RESET STAT TO 0
;  3326  4             ST_PTR = .ST_PTR + 2;                   ! ADVANCE DM_COMM POINTER
;  3327  4
;  3328  4             NBXFR = .NBXFR + ..ST_PTR;              ! ADD NUMBER OF BLOCKS WRITTEN (1 BLOCK PER WRITE)
;  3329  4             UPD_IOC (T_ADDR [WRIT_LO], ..ST_PTR);   ! UPDATE NO. OF WRITES
;  3330  4             UPD_DMBC (T_ADDR [BW_LO], ..ST_PTR);    ! UPDATE NO. OF BYTES WRITTEN, CHECK FOR OVERFLOW
;  3331  4             .ST_PTR = 0;                            ! RESET STAT TO 0
;  3332  4             ST_PTR = .ST_PTR + 2;                   ! ADVANCE DM_COMM POINTER
;  3333  4
;  3334  4             T_ADDR [ER_SFT] = .T_ADDR [ER_SFT] + ..ST_PTR;  ! UPDATE NO. OF DM SOFT ERRORS
;  3335  4             .ST_PTR = 0;                            ! RESET STAT TO 0
;  3336  4             ST_PTR = .ST_PTR + 2;                   ! ADVANCE DM_COMM POINTER
;  3337  4
;  3338  4             HARD_ERR (..ST_PTR);                    ! UPDATE HRD ERR CNT + CHK FOR LIMIT
```

```
;    3339  4            .ST_PTR = 0;                          ! RESET STAT TO 0
;    3340  4            ST_PTR = .ST_PTR + 2;                 ! ADVANCE DM_COMM POINTER
;    3341  4
;    3342  4            IF .NBXFR NEQU 0                      ! IF A COMPLETE PASS HAS BEEN MADE
;    3343  4            THEN                                  ! THEN
;    3344  5                BEGIN
;    3345  5
;    3346  6                IF MANUAL                                 ! IF ATTENDED
;    3347  5                THEN                                      ! THEN
;    3348  5                    PRINTF (MSG_08, .NBXFR, .L$LUN, .CPLAT);      ! "XXXXX. BLOCKS TRANSFERRED ON UNIT XX. (PLATTER XX
X.)"
;    3349  5                DM_TIMR [.CCTLR] = TO_DM;             ! RESET FPT SANITY TIMER
;    3350  5
;    3351  4                END;
;    3352  4
;    3353  4            XFR_CHK ();                           ! CHECK IF TRANSFER LIMIT REACHED
;    3354  4
;    3355  4            END                                   ! END - IF UNIT IS BEING DM-EXERCISED
;    3356  3        ELSE                                      ! OTHERWISE
;    3357  3            ST_PTR = .ST_PTR + 10;                ! ADVANCE DM_COMM POINTER TO NEXT BLOCK
;    3358  3
;    3359  2        END;                                      ! UNIT LOOP
;    3360  2
;    3361  2    DMC_ADDR [HOST_ACC] = 0;                      ! TELL FPT THAT WE ARE LEAVING
;    3362  2
;    3363  1    END;                                          ! ROUTINE DM_TALLY


                                .SBTTL  DM.TALLY DM EXERCISER ROUTINES
000000  004137  000000G    DM.TALLY:
                            JSR     R1,$SAVE3                 ;                                   3282
000004  013701  000000G            MOV     DMC.ADDR,R1       ; *,ST.PTR                          3308
000010  062701  000010             ADD     #10,R1            ; *,ST.PTR
000014  005002                    CLR     R2                ; OFFSET                            3309
000016  010200             1$:     MOV     R2,R0             ; OFFSET,*                          3312
000020  006300                     ASL     R0
000022  063700  000000G            ADD     DMC.ADDR,R0
000026  005710                     TST     (R0)
000030  002520                     BLT     4$
000032  010246                     MOV     R2,-(SP)          ; OFFSET,*                          3316
000034  062716  000003             ADD     #3,(SP)
000040  004737  000000G            JSR     PC,SET.UPAR
000044  013716  000000G            MOV     T.ADDR,(SP)       ;                                   3318
000050  062716  000010             ADD     #10,(SP)
000054  011146                     MOV     (R1),-(SP)        ; ST.PTR,*
000056  004737  000000G            JSR     PC,UPD.IOC
000062  005021                     CLR     (R1)+             ; ST.PTR                            3319
000064  011103                     MOV     (R1),R3           ; ST.PTR,NBXFR                      3322
000066  013716  000000G            MOV     T.ADDR,(SP)       ;                                   3323
000072  010346                     MOV     R3,-(SP)
000074  004737  000000G            JSR     PC,UPD.IOC
000100  013716  000000G            MOV     T.ADDR,(SP)       ;                                   3324
000104  062716  000014             ADD     #14,(SP)
000110  011146                     MOV     (R1),-(SP)        ; ST.PTR,*
000112  004737  000000V            JSR     PC,UPD.DMBC
000116  005021                     CLR     (R1)+             ; ST.PTR                            3325
000120  061103                     ADD     (R1),R3           ; ST.PTR,NBXFR                      3328
000122  013716  000000G            MOV     T.ADDR,(SP)       ;                                   3329
```

```
000126  062716  000004                          ADD     #4,(SP)
000132  011146                                   MOV     (R1),-(SP)          ; ST.PTR,*
000134  004737  000000G                         JSR     PC,UPD.IOC
000140  013716  000000G                         MOV     T.ADDR,(SP)         ;                                   3330
000144  062716  000022                          ADD     #22,(SP)
000150  011146                                   MOV     (R1),-(SP)          ; ST.PTR,*
000152  004737  000000V                         JSR     PC,UPD.DMBC
000156  005021                                   CLR     (R1)+               ; ST.PTR                            3331
000160  013700  000000G                         MOV     T.ADDR,R0           ;                                   3334
000164  061160  000034                          ADD     (R1),34(R0)         ; ST.PTR,*
000170  005021                                   CLR     (R1)+               ; ST.PTR                            3335
000172  011116                                   MOV     (R1),(SP)           ; ST.PTR,*                          3338
000174  004737  000000G                         JSR     PC,HARD.ERR
000200  005021                                   CLR     (R1)+               ; ST.PTR                            3339
000202  005703                                   TST     R3                  ; NBXFR                             3342
000204  001425                                   BEQ     3$
000206  104450                                   TRAP    50                  ;                                   3346
000210  103015                                   BHIS    2$
000212  013716  000000G                         MOV     CPLAT,(SP)          ;                                   3348
000216  013746  000000G                         MOV     L$LUN,-(SP)
000222  010346                                   MOV     R3,-(SP)            ; NBXFR,*
000224  012746  000000G                         MOV     #MSG.08,-(SP)
000230  012746  000004                          MOV     #4,-(SP)
000234  010600                                   MOV     SP,R0               ; SP,*
000236  104417                                   TRAP    17
000240  062706  000010                          ADD     #10,SP
000244  013700  000000G             2$:         MOV     CCTLR,R0            ;                                   3349
000250  006300                                   ASL     R0
000252  012760  000550  000620'                 MOV     #550,DM.TIMR(R0)
000260  004737  000000G             3$:         JSR     PC,XFR.CHK          ;                                   3353
000264  062706  000014                          ADD     #14,SP              ;                                   3314
000270  000402                                   BR      5$                  ;                                   3312
000272  062701  000012             4$:         ADD     #12,R1              ; *,ST.PTR                          3357
000276  005202                     5$:         INC     R2                  ; OFFSET                            3309
000300  020227  000003                          CMP     R2,#3               ; OFFSET,*
000304  003644                                   BLE     1$
000306  013700  000000G                         MOV     DMC.ADDR,R0         ;                                   3361
000312  005060  000062                          CLR     62(R0)
000316  000207                                   RTS     PC                  ;                                   3282

; Routine Size:  104 words,     Routine Base:  $CODE$ + 5532
; Maximum stack depth per invocation:  16 words
```

```
;    3364  1     ROUTINE UPD_DMBC (ADDR, COUNT) : NOVALUE =
;    3365  1
;    3366  1     !+
;    3367  1     !       THIS ROUTINE IS CALLED FROM DM_TALLY TO UPDATE THE TOTAL NUMBER OF
;    3368  1     !       BYTES READ OR WRITTEN BY THE FRONT PANEL TEST (FPT) FOR THE CURRENT
;    3369  1     !       UNIT. IT IS ASSUMED THAT EACH READ OR WRITE OPERATION PERFORMED BY THE
;    3370  1     !       FPT IS EXACTLY ONE BLOCK (512 BYTES) LONG. (A SIMPLE MULTIPLICATION
;    3371  1     !       (.COUNT * BLK_SIZE) IS NOT FEASIBLE BECAUSE A 16 BIT OVERFLOW WOULD
;    3372  1     !       OCCUR).
;    3373  1     !
;    3374  1     !       INPUTS:
;    3375  1     !               ADDR - TALLY ADDRESS OF THE LOW-ORDER FIELD OF THE NUMBER OF
;    3376  1     !                      BYTES READ OR WRITTEN FOR THE CURRENT UNIT
;    3377  1     !               COUNT - THE NUMBER OF READ OR WRITE OPERATIONS PERFORMED BY THE
;    3378  1     !                       FPT
;    3379  1     !-
;    3380  1
;    3381  2     BEGIN
;    3382  2
;    3383  2     INCR I FROM 1 TO .COUNT DO                      ! FOR EACH FPT I/O OPERATION
;    3384  3         BEGIN
;    3385  3
;    3386  3         .ADDR = ..ADDR + BLK_SIZE;                  ! UPDATE TOTAL NO. OF BYTES (LOW ORDER)
;    3387  3         IF ..ADDR GEQU 50000                        ! IF LOW ORDER VALUE IS APPROACHING OVERFLOW
;    3388  3         THEN                                        ! THEN
;    3389  3             OVF_CHK (.ADDR);                        ! REDUCE LOW ORDER WORD, UPDATE HIGH ORDER WORDS
;    3390  3
;    3391  2         END;                                        ! END   I/O OPERATION COUNT LOOP
;    3392  2
;    3393  2     OVF_CHK (.ADDR);                                ! ONE MORE TIME
;    3394  2
;    3395  1     END;                                            ! ROUTINE UPD_DMBC

                                        .SBTTL  UPD.DMBC DM EXERCISER ROUTINES
000000  004137  000000G          UPD.DMBC:
                                        JSR     R1,$SAVE2                       ;                       3364
000004  016601  000012                  MOV     12(SP),R1                       ; ADDR,*                3386
000010  005002                          CLR     R2                              ; I                     3383
000012  000411                          BR      2$
000014  062711  001000          1$:     ADD     #1000,(R1)                      ;                       3386
000020  021127  141520                  CMP     (R1),#141520                    ;                       3387
000024  103404                          BLO     2$
000026  010146                          MOV     R1,-(SP)                        ;                       3389
000030  004737  000000G                 JSR     PC,OVF.CHK
000034  005726                          TST     (SP)+
000036  005202                  2$:     INC     R2                              ; I                     3383
000040  020266  000010                  CMP     R2,10(SP)                       ; I,COUNT
000044  003763                          BLE     1$
000046  010146                          MOV     R1,-(SP)                        ;                       3393
000050  004737  000000G                 JSR     PC,OVF.CHK
000054  005726                          TST     (SP)+
000056  000207                          RTS     PC                              ;                       3381
                                                                                ;                       3364

; Routine Size:  24 words,      Routine Base:  $CODE$ + 6052
; Maximum stack depth per invocation:  5 words
```

```
;    3396  1     ROUTINE DM_TIME : NOVALUE =
;    3397  1
;    3398  1     !+
;    3399  1     !       THIS ROUTINE IS CALLED ONCE PER SECOND FOR EACH CONFIGURED CONTROLLER
;    3400  1     !       BY THE DM EXERCISER "EXECUTIVE" (DM_EXER). ITS PURPOSE IS TO MAINTAIN
;    3401  1     !       THE SANITY TIMER ON THE FRONT PANEL TEST (FPT) WHICH IS EXECUTING IN
;    3402  1     !       THE DIAGNOSTIC MACHINE (DM).
;    3403  1     !
;    3404  1     !       THE FPT IS EXPECTED TO PROVIDE THE HOST WITH A NEW SET OF OPERATING
;    3405  1     !       STATISTICS IN DM_COMM AT REGULAR INTERVALS. EACH CONTROLLER HAS AN
;    3406  1     !       ENTRY IN DM_TIMR WHICH CONTAINS THE REMAINING TIME (IN SECONDS) TO
;    3407  1     !       RECEIVE A NEW SET OF STATS. IF THE TIMER FOR THE CURRENT CONTROLLER
;    3408  1     !       IS ACTIVE, THEN THIS ROUTINE DECREMENTS THE TIMER, AND DECLARES AN
;    3409  1     !       ERROR IF THE TIMER REACHES ZERO.
;    3410  1     !
;    3411  1     !       INPLICIT INPUTS:
;    3412  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;    3413  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;    3414  1     !-
;    3415  1
;    3416  2     BEGIN
;    3417  2
;    3418  2     IF .DM_TIMR [.CCTLR] NEQU 0                     ! IF TIMER IS ACTIVE
;    3419  2     THEN                                            ! THEN
;    3420  3         BEGIN
;    3421  3
;    3422  3         DM_TIMR [.CCTLR] = .DM_TIMR [.CCTLR] - 1;   ! DECREMENT
;    3423  3         IF .DM_TIMR [.CCTLR] EQLU 0                 ! IF TIME HAS EXPIRED
;    3424  3         THEN                                        ! THEN
;    3425  4             BEGIN
;    3426  4
;    3427  4             L$UNIT = .CST_ADDR [OF_UN, P_UNIT];     ! GET DS UNIT NUMBER OF FIRST PLATTER UNDER CONTROLLER
;    3428  4             ERRDF (22, EGD_22, EMS_22);             ! 'DM EXERCISER TIMEOUT"
;    3429  4             DROP_CTLR (.CCTLR, DU_FATAL);           ! DROP ALL CONTROLLER'S UNITS
;    3430  4             CST_ADDR [STATE] = OFFLINE;             ! MARK CONTROLLER OFFLINE
;    3431  4
;    3432  3             END;
;    3433  3
;    3434  2         END;
;    3435  2
;    3436  1     END;                                            ! ROUTINE DM_TIME


                                .SBTTL  DM.TIME DM EXERCISER ROUTINES
000000  010146          DM.TIME:MOV     R1,-(SP)                ;                       3396
000002  013700  000000G          MOV     CCTLR,R0                ;                       3418
000006  006300                  ASL     R0
000010  062700  000620'          ADD     #DM.TIMR,R0
000014  005710                  TST     (R0)
000016  001433                  BEQ     1$
000020  005310                  DEC     (R0)                    ;                       3422
000022  001031                  BNE     1$                      ;                       3423
000024  013700  000000G          MOV     CST.ADDR,R0             ;                       3427
000030  016001  000006          MOV     6(R0),R1
000034  000301                  SWAB    R1
000036  042701  177740          BIC     #177740,R1
000042  010137  000000G          MOV     R1,L$UNIT
```

```
000046  104455                          TRAP    55                              ;                               3428
000050  000026                          .WORD   26
000052  000000G                         .WORD   EGD.22
000054  000000G                         .WORD   EMS.22
000056  013746  000000G                 MOV     CCTLR,-(SP)                     ;                               3429
000062  012746  000004                  MOV     #4,-(SP)
000066  004737  000000G                 JSR     PC,DROP.CTLR
000072  013700  000000G                 MOV     CST.ADDR,R0                     ;                               3430
000076  042760  100000  000002          BIC     #100000,2(R0)
000104  022626                          CMP     (SP)+,(SP)+                     ;                               3425
000106  012601                  1$:     MOV     (SP)+,R1                        ;                               3396
000110  000207                          RTS     PC

; Routine Size:  37 words,      Routine Base:  $CODE$ + 6132
; Maximum stack depth per invocation:  4 words
```

```
;  3437  1     %SBTTL 'MULTI-DRIVE SUBTEST ROUTINES'
;  3438  1
;  3439  1     ROUTINE MULTI_DRIVE : NOVALUE =
;  3440  1
;  3441  1     !+
;  3442  1     !       THIS SUBTEST IS THE MOST SIGNIFICANT PART OF THE ENTIRE PROGRAM. THE
;  3443  1     !       MULTI-DRIVE SUBTEST IS A HOST-CONTROLLED EXERCISER DESIGNED TO GIVE THE
;  3444  1     !       USER AN INDICATION OF HOW ONE OR SEVERAL RC25 DRIVES WOULD PERFORM IN
;  3445  1     !       AN OPERATING SYSTEM ENVIRONMENT.
;  3446  1     !
;  3447  1     !       THIS ROUTINE ACTS AS AN "EXECUTIVE" TO THE WHOLE PROCESS. AFTER
;  3448  1     !       INVOKING MD_INIT TO INITIALIZE MULTI-DRIVE SUBTEST DATA, THIS ROUTINE
;  3449  1     !       ENTERS A LOOP WHICH ISSUES QIOS TO ALL ACTIVE CONTROLLERS AND PROCESSES
;  3450  1     !       ANY RESPONSES. IN ADDITION, ALL OUTSTANDING COMMANDS ARE TIMED IN
;  3451  1     !       DRV_TIMCHK WHICH IS INVOKED EVERY SECOND. NORMAL TERMINATION OF THIS
;  3452  1     !       LOOP OCCURS WHEN QIOS ARE NO LONGER BEING ISSUED, AND ALL OUTSTANDING
;  3453  1     !       QIOS HAVE COMPLETED.
;  3454  1     !-
;  3455  1
;  3456  2     BEGIN
;  3457  2
;  3458  3     IF MANUAL                                   ! IF ATTENDED
;  3459  2     THEN                                        ! THEN
;  3460  2         PRINTF (MSG_05);                        ! "MULTI-DRIVE SUBTEST START"
;  3461  2     MD_INIT ();                                 ! INIT MULTI-DRIVE SUBTEST DATA
;  3462  2
;  3463  2     DO                                          ! START OF EXECUTIVE LOOP
;  3464  3         BEGIN
;  3465  3
;  3466  3         INCR CTLR FROM 0 TO (.CTLR_CNT - 1) DO      ! FOR EACH CONTROLLER
;  3467  4             BEGIN
;  3468  4
;  3469  4             SET_CPAR (.CTLR);                   ! SET UP CURRENT CONTROLLER PARAMETERS
;  3470  4             IF QIO_OK () EQLU TRUE              ! IF O.K. TO ISSUE QIO(S) TO THIS CONTROLLER
;  3471  4             THEN                                ! THEN
;  3472  5                 BEGIN
;  3473  5
;  3474  5                 QIO_GEN ();                     ! GENERATE 1 OR 2 QIOS
;  3475  5                 IF .MX1 GEQ 0                   ! IF SUCCESS ON FIRST QIO
;  3476  5                 THEN                            ! THEN
;  3477  6                     BEGIN
;  3478  6
;  3479  6                     IF SEND (.MX1) EQLU SUCCESS         ! ATTEMPT TO SEND IT. IF SUCCESS
;  3480  6                     THEN                                ! THEN
;  3481  6                         QIO [.CTLR] = .QIO [.CTLR] + 1  ! INCR OUTSTANDING QIO COUNT
;  3482  6                     ELSE                                ! OTHERWISE
;  3483  6                         PUT_ENV (.MX1);                 ! RETURN ENVELOPE TO POOL
;  3484  6
;  3485  5                     END;
;  3486  5
;  3487  5                 IF .MX2 GEQ 0                   ! IF SUCCESS ON SECOND QIO
;  3488  5                 THEN                            ! THEN
;  3489  6                     BEGIN
;  3490  6
;  3491  6                     IF SEND (.MX2) EQLU SUCCESS         ! ATTEMPT TO SEND IT. IF SUCCESS
;  3492  6                     THEN                                ! THEN
;  3493  6                         QIO [.CTLR] = .QIO [.CTLR] + 1  ! INCR OUTSTANDING QIO COUNT
```

```
;    3494  6                    ELSE                                    ! OTHERWISE
;    3495  6                        PUT_ENV (.MX2);                     ! RETURN ENVELOPE TO POOL
;    3496  6
;    3497  5                    END;
;    3498  5
;    3499  4                END;                                        ! O.K. TO ISSUE QIO(S)
;    3500  4
;    3501  4            IF .DCT_ADDR [STAT] EQLU ONLINE                 ! IF CONTROLLER IS ONLINE
;    3502  4            THEN                                            ! THEN
;    3503  4                INT_PROC ();                                ! PROCESS ANY INTERRUPTS
;    3504  4
;    3505  3            END;                                            ! CONTROLLER LOOP
;    3506  3
;    3507  3        PROC_RETPKT ();                     ! PROCESS ANY RETURN PACKETS
;    3508  3        IF .T_FLAG EQLU TRUE                ! IF ONE SECOND HAS ELAPSED
;    3509  3        THEN                                ! THEN
;    3510  3            DRV_TIMCHK ();                  ! CHECK OUTSTANDING COMMAND TIMERS
;    3511  3
;    3512  3        END                                 ! EXECUTIVE PROCESSING LOOP
;    3513  3
;    3514  2    UNTIL MD_QUIT ();               ! UNTIL ALL UNITS ARE FINISHED
;    3515  2
;    3516  1    END;                            ! ROUTINE MULTI_DRIVE


                                   .SBTTL  MULTI.DRIVE MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G     MULTI.DRIVE:
                                   JSR     R1,$SAVE2                       ;                       3439
000004  104450                     TRAP    50                              ;                       3458
000006  103007                     BHIS    1$
000010  012746  000000G            MOV     #MSG.05,-(SP)                   ;                       3460
000014  012746  000001             MOV     #1,-(SP)
000020  010600                     MOV     SP,R0                           ; SP,*
000022  104417                     TRAP    17
000024  022626                     CMP     (SP)+,(SP)+
000026  004737  000000V     1$:     JSR     PC,MD.INIT                      ;                       3461
000032  013702  000000G     2$:     MOV     CTLR.CNT,R2                     ;                       3466
000036  005001                     CLR     R1                              ; CTLR
000040  000461                     BR      9$
000042  010146             3$:     MOV     R1,-(SP)                        ; CTLR,*                3469
000044  004737  000000G            JSR     PC,SET.CPAR
000050  004737  000000V            JSR     PC,QIO.OK                       ;                       3470
000054  020027  000001             CMP     R0,#1
000060  001042                     BNE     7$
000062  004737  000000V            JSR     PC,QIO.GEN                      ;                       3474
000066  013700  000602'            MOV     MX1,R0                          ;                       3475
000072  002415                     BLT     5$
000074  010016                     MOV     R0,(SP)                         ;                       3479
000076  004737  000000G            JSR     PC,SEND
000102  020027  000001             CMP     R0,#1
000106  001003                     BNE     4$
000110  105261  000000G            INCB    QIO(R1)                         ; *(CTLR)               3481
000114  000404                     BR      5$                              ;                       3479
000116  013716  000602'     4$:     MOV     MX1,(SP)                        ;                       3483
000122  004737  000000G            JSR     PC,PUT.ENV
000126  013700  000604'     5$:     MOV     MX2,R0                          ;                       3487
000132  002415                     BLT     7$
```

```
000134  010016                          MOV     R0,(SP)                 ;                               3491
000136  004737  000000G                 JSR     PC,SEND
000142  020027  000001                  CMP     R0,#1
000146  001003                          BNE     6$
000150  105261  000000G                 INCB    QIO(R1)                 ; *(CTLR)                       3497
000154  000404                          BR      7$                      ;                               3491
000156  013716  000604'          6$:     MOV     MX?,(SP)                ;                               3495
000162  004737  000000G                 JSR     PC,PUT.ENV
000166  005777  000000G          7$:     TST     @DCT.ADDR               ;                               3501
000172  100002                          BPL     8$
000174  004737  000000V                 JSR     PC,INT.PROC             ;                               3503
000200  005726                  8$:     TST     (SP)+                   ;                               3467
000202  005201                          INC     R1                      ; CTLR                          3466
000204  020102                  9$:     CMP     R1,R2                   ; CTLR,*
000206  002715                          BLT     3$
000210  004737  000000V                 JSR     PC,PROC.RETPKT          ;                               3507
000214  123727  000000G 000001          CMPB    T.FLAG,#1               ;                               3508
000222  001002                          BNE     10$
000224  004737  000000V                 JSR     PC,DRV.TIMCHK           ;                               3510
000230  004737  000000V          10$:    JSR     PC,MD.QUIT              ;                               3514
000234  006000                          ROR     R0
000236  103275                          BCC     2$
000240  000207                          RTS     PC                      ;                               3439

; Routine Size:  81 words,      Routine Base:  $CODE$ + 6244
; Maximum stack depth per invocation:  7 words
```

```
;    3517  1     ROUTINE MD_INIT : NOVALUE =
;    3518  1
;    3519  1     !+
;    3520  1     !       THIS ROUTINE IS CALLED BY ROUTINE MULTI_DRIVE TO INITIALIZE DATA ITEMS
;    3521  1     !       USED BY THE MULTI DRIVE SUBTEST.
;    3522  1     !-
;    3523  1
;    3524  2     BEGIN
;    3525  2
;    3526  2     INIT_IO_BUFF ();                                ! PARTITION FREE MEMORY INTO I/O BUFFERS
;    3527  2     IF .ENTRY_REASON NEQU NEW_PASS                  ! IF START, RESTART, CONT, PWR FAIL
;    3528  2     THEN                                            ! THEN
;    3529  3         BEGIN
;    3530  3
;    3531  3         INCR UNIT FROM 0 TO (MAX_UNITS   1) DO      ! FOR EACH UNIT
;    3532  4             BEGIN
;    3533  4
;    3534  5             IF ((.ENTRY_REASON LEQU RESTART) OR             ! IF START OR RESTART OR
;    3535  5                 (.BST [.UNIT, TRACK] LSSU .SWP_STRACK) OR   ! IF USER CHANGED TRACK LIMITS
;    3536  5                 (.BST [.UNIT, TRACK] GTRU .SWP_ETRACK))
;    3537  4             THEN                                        ! THEN
;    3538  5                 BEGIN
;    3539  5
;    3540  5                 BST [.UNIT, TRACK] = .SWP_STRACK;       ! INITIALIZE BLOCK SEQUENCE TABLE
;    3541  5                 BST [.UNIT, SECTOR] = 0;                !     (USED ONLY FOR SEQUENTIAL LBN MODE)
;    3542  5                 DPST [.UNIT] = DP_CNT;                  ! INITIALIZE DATA PATTERN SEQUENCE TABLE
;    3543  5                                                         !     (USED ONLY IF "PATTERN 0" WAS SELECTED)
;    3544  4                 END;
;    3545  4
;    3546  3             END;                                    ! END UNIT LOOP
;    3547  3
;    3548  2         END;                                        ! END   IF START, RESTART, CONT, PWR FAIL
;    3549  2
;    3550  3     IF ((.ENTRY_REASON NEQU CONT) AND               ! IF START, RESTART, OR NEW PASS
;    3551  3         (.ENTRY_REASON NEQU PWR_FAIL))
;    3552  2     THEN                                                    ! THEN
;    3553  2         INCR COUNT FROM 0 TO ((MAX_UNITS * TALLY_LEN) - 1) DO   ! CLEAR ALL STATS
;    3554  2             TALLY [.COUNT] = 0;
;    3555  2     INCR COUNT FROM 0 TO ((MAX_CTLR * RPS_LEN) - 1) DO ! INITIALIZE RETPKT
;    3556  2         RP_SAVE [.COUNT] = -1;                      !       SAVE AREA
;    3557  2     INCR COUNT FROM 0 TO (.NUM_BUFF - 1) DO         ! INITIALIZE I/O BUFFER ALLOCATION
;    3558  2         BUFF_OWN [.COUNT] = -1;                     !     TABLE
;    3559  2     IF .MEM_MGMT                                    ! IF SYSTEM HAS MEMORY MANAGEMENT
;    3560  2     THEN                                            ! THEN
;    3561  2         MMR0 = 1;                                   ! ENABLE RELOCATION
;    3562  2     T_FLAG = FALSE;                                 ! FLAG TO CALL DRV_TIMCHK EVERY SECOND
;    3563  2
;    3564  1     END;                                            ! ROUTINE MD_INIT


                                    .SBTTL  MD.INIT MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G     MD.INIT:JSR     R1,$SAVE2                       ;                       3517
000004  004737  000000V             JSR     PC,INIT.IO.BUFF                 ;                       3526
000010  005002                      CLR     R2                              ;                       3527
000012  153702  000000G             BISB    ENTRY.REASON,R2
000016  020227  000005              CMP     R2,#5
000022  001441                      BEQ     4$
```

```
000024  005001                          CLR     R1                      ; UNIT                          3531
000026  020227  000002                1$: CMP     R2,#2                   ;                               3534
000032  101416                          BLOS    2$
000034  010100                          MOV     R1,R0                   ; UNIT,*                        3535
000036  006300                          ASL     R0
000040  006300                          ASL     R0
000042  026037  000442' 000000G         CMP     BST+2(R0),SWP.STRACK
000050  103407                          BLO     2$
000052  010100                          MOV     R1,R0                   ; UNIT,*                        3536
000054  006300                          ASL     R0
000056  006300                          ASL     R0
000060  026037  000442' 000000G         CMP     BST+2(R0),SWP.ETRACK
000066  101413                          BLOS    3$
000070  010100                      2$: MOV     R1,R0                   ; UNIT,*                        3540
000072  006300                          ASL     R0
000074  006300                          ASL     R0
000076  013760  000000G 000442'         MOV     SWP.STRACK,BST+2(R0)
000104  005060  000440'                 CLR     BST(R0)                 ;                               3541
000110  112761  000025  000540'         MOVB    #25,DPST(R1)            ; *,*(UNIT)                     3542
000116  005201                      3$: INC     R1                      ; UNIT                          3531
000120  020127  000017                  CMP     R1,#17                  ; UNIT,*
000124  003740                          BLE     1$
000126  020227  000003                4$: CMP     R2,#3                   ;                               3550
000132  001413                          BEQ     6$
000134  020227  000004                  CMP     R2,#4                   ;                               3551
000140  001410                          BEQ     6$
000142  005000                          CLR     R0                      ; COUNT                         3553
000144  005060  000000G               5$: CLR     TALLY(R0)               ; *(COUNT)                      3554
000150  062700  000002                  ADD     #2,R0                   ; *,COUNT                       3553
000154  020027  001376                  CMP     R0,#1376                ; COUNT,*
000160  003771                          BLE     5$
000162  005000                      6$: CLR     R0                      ; COUNT                         3555
000164  112760  000377  000000G     7$: MOVB    #377,RP.SAVE(R0)        ; *,*(COUNT)                    3556
000172  005200                          INC     R0                      ; COUNT                         3555
000174  020027  000037                  CMP     R0,#37                  ; COUNT,*
000200  003771                          BLE     7$
000202  005000                          CLR     R0                      ; COUNT                         3557
000204  000404                          BR      9$
000206  112760  000377  000000G     8$: MOVB    #377,BUFF.OWN(R0)       ; *,*(COUNT)                    3558
000214  005200                          INC     R0                      ; COUNT                         3557
000216  020037  000000G               9$: CMP     R0,NUM.BUFF             ; COUNT,*
000222  002771                          BLT     8$
000224  132737  000001  000000G         BITB    #1,MEM.MGMT             ;                               3559
000232  001403                          BEQ     10$
000234  012737  000001  177572          MOV     #1,@#177572             ;                               3561
000242  105037  000000G              10$: CLRB    T.FLAG                  ;                               3562
000246  000207                          RTS     PC                      ;                               3517

; Routine Size:  84 words,      Routine Base:  $CODE$ + 6506
; Maximum stack depth per invocation:  4 words
```

```
;    3565  1     ROUTINE INIT_IO_BUFF : NOVALUE =
;    3566  1
;    3567  1     !+
;    3568  1     !       THIS ROUTINE IS CALLED BY MD_INIT WHEN THE MULTI-DRIVE SUBTEST IS FIRST
;    3569  1     !       STARTED. IT IS RESPONSIBLE FOR PARTITIONING FREE MEMORY INTO A
;    3570  1     !       COLLECTION OF I/O BUFFERS. THE NUMBER OF I/O BUFFERS IS BASED ON THE
;    3571  1     !       NUMBER OF CONTROLLERS CONFIGURED FOR TESTING.
;    3572  1     !
;    3573  1     !       IF THIS HOST PROCESSOR HAS MORE THAN 28K (32K) OF MEMORY, THEN ALL
;    3574  1     !       AVAILABLE MEMORY OVER 32K (BUT UNDER 124K) IS DIVIDED EQUALLY AMONG
;    3575  1     !       THE NUMBER OF I/O BUFFERS (4K PER BUFFER MAXIMUM). MEMORY MANAGEMENT
;    3576  1     !       REGISTERS ARE SET UP TO MAP ALL VIRTUAL ADDRESSES TO THE SAME PHYSICAL
;    3577  1     !       ADDRESSES (FOR NOW). IF THE HOST PROCESSOR HAS ONLY 28K, THEN THE
;    3578  1     !       AMOUNT OF FREE MEMORY UNDER 28K IS SIMILARLY DIVIDED (WITHOUT MEMORY
;    3579  1     !       MANAGEMENT).
;    3580  1     !
;    3581  1     !       ONCE THE STARTING ADDRESS OF FREE MEMORY IS DETERMINED ALONG WITH THE
;    3582  1     !       BUFFER SIZE, THE BUFFER DESCRIPTOR TABLE (BUFF_DESC) IS INITIALIZED.
;    3583  1     !       THIS TABLE REMAINS FIXED THROUGHOUT THE MULTI-DRIVE SUBTEST. IT
;    3584  1     !       PROVIDES THE TWO-WORD BUFFER DESCRIPTORS USED IN MSCP COMMAND
;    3585  1     !       ENVELOPES.
;    3586  1     !
;    3587  1     !       IMPLICIT INPUTS:
;    3588  1     !               CTLR_CNT - THE NUMBER OF CONTROLLERS CONFIGURED
;    3589  1     !               L$HIMEM - TOP OF FREE MEMORY (IN PAR FORMAT)
;    3590  1     !               MEM_SIZE - SIZE (IN WORDS) OF FREE MEMORY
;    3591  1     !               FREE_MEM_ADDR - START OF FREE MEMORY
;    3592  1     !
;    3593  1
;    3594  2     BEGIN
;    3595  2
;    3596  2     LOCAL
;    3597  2         HIMEM : WORD,                                   ! TOP OF FREE MEMORY (IN PAR FORMAT)
;    3598  2         BLKS_PER_BUFF : WORD,                           ! NO. OF 32-WORD BLOCKS PER BUFFER
;    3599  2         BD_LOW : WORD,                                  ! BUFFER DESCRIPTOR (LO-ORDER)
;    3600  2         BD_HIGH : WORD,                                 ! BUFFER DESCRIPTOR (HI-ORDER)
;    3601  2         TEMP : WORD,
;    3602  2         KTPDR : WORD;                                   ! PDR INITIALIZATION WORD
;    3603  2
;    3604  2     NUM_BUFF = .CTLR_CNT * QIO_PER_CTLR;                ! CALCULATE NO. OF I/O BUFFERS NEEDED
;    3605  2     MEM_MGMT = NO;                                      ! ASSUME NO MEMORY MANAGEMENT
;    3606  2     IF .L$HIMEM GTRU %O'2000'                           ! IF MORE THAN 32K OF MEMORY
;    3607  2     THEN                                                ! THEN
;    3608  3         BEGIN
;    3609  3
;    3610  3         MEM_MGMT = YES;                                     ! SET MEMORY MANAGEMENT FLAG
;    3611  3         HIMEM = .L$HIMEM;                                   ! GET TOP OF FREE MEMORY
;    3612  3         IF .HIMEM GTRU %O'7577'                             ! IF GREATER THAN 124K
;    3613  3         THEN                                                ! THEN
;    3614  3             HIMEM = %O'7577';                               ! SET LIMIT AT 124K
;    3615  3         BLKS_PER_BUFF = (.HIMEM   %O'1777') / .NUM_BUFF;    ! NO. OF 32 WORD BLOCKS PER BUFFER
;    3616  3         IF .BLKS_PER_BUFF GTRU %O'200'
;    3617  3         THEN
;    3618  3             BLKS_PER_BUFF = %O'200';                        ! MAX BUFFER SIZE = 4K
;    3619  3         BUFF_SIZE = .BLKS_PER_BUFF * 64;                    ! BUFFER SIZE IN BYTES
;    3620  3         BD_LOW = 0;                                         ! BUFFERS START AT 32K
;    3621  3         BD_HIGH = 1;
```

```
;    3622  3
;    3623  3          END
;    3624  2      ELSE                                        ! OTHERWISE - ONLY 28K OF MEMORY
;    3625  3          BEGIN
;    3626  3
;    3627  3          BUFF_SIZE = ((.MEM_SIZE * 2) / .NUM_BUFF) AND %O'177776';
;    3628  3          BD_LOW = .FREE_MEM_ADDR;                          ! START OF BUFFER SPACE
;    3629  3          BD_HIGH = 0;
;    3630  3
;    3631  2          END;
;    3632  2
;    3633  2      INCR J FROM 0 TO (.NUM_BUFF - 1) DO             ! FOR EACH BUFF_DESC ENTRY
;    3634  3          BEGIN
;    3635  3
;    3636  3          BUFF_DESC [.J, BD_LO] = .BD_LOW;            ! LOAD LOW-ORDER WORD
;    3637  3          BUFF_DESC [.J, BD_HI] = .BD_HIGH;           ! LOAD HIGH-ORDER WORD
;    3638  3          TEMP = .BD_LOW;
;    3639  3          BD_LOW = .BD_LOW + .BUFF_SIZE;              ! ADVANCE TO NEXT BUFFER ADDRESS
;    3640  3          IF .TEMP GEQU .BD_LOW                       ! IF 16-BIT CARRY
;    3641  3          THEN                                        ! THEN
;    3642  3              BD_HIGH = .BD_HIGH + 1;                 ! ADVANCE HIGH-ORDER WORD
;    3643  3
;    3644  2          END;
;    3645  2
;    3646  2      IF .MEM_MGMT                                    ! IF SYSTEM HAS MEMORY MANAGEMENT
;    3647  2      THEN                                            ! THEN
;    3648  3          BEGIN
;    3649  3
;    3650  3          MMR0 = 0;                                   ! MAKE SURE MEM MGMT IS OFF
;    3651  3          KTPDR = %O'77406';                          ! PDR LOAD VALUE
;    3652  3          KTPDR0 = .KTPDR;                            ! LOAD PDR'S
;    3653  3          KTPDR1 = .KTPDR;
;    3654  3          KTPDR2 = .KTPDR;
;    3655  3          KTPDR3 = .KTPDR;
;    3656  3          KTPDR4 = .KTPDR;
;    3657  3          KTPDR5 = .KTPDR;
;    3658  3          KTPDR6 = .KTPDR;
;    3659  3          KTPDR7 = .KTPDR;
;    3660  3
;    3661  3          KTPAR0 = 0;                                 ! LOAD PAR'S
;    3662  3          KTPAR1 = %O'200';
;    3663  3          KTPAR2 = %O'400';
;    3664  3          KTPAR3 = %O'600';
;    3665  3          KTPAR4 = %O'1000';
;    3666  3          KTPAR5 = %O'1200';
;    3667  3          KTPAR6 = %O'1400';
;    3668  3          KTPAR7 = %O'7600';
;    3669  3
;    3670  2          END;
;    3671  2
;    3672  1      END;                                            ! ROUTINE INIT_IO BUFF


                                 .SBTTL  INIT.IO.BUFF MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G  INIT.IO.BUFF:
                         JSR     R1,$SAVE5                       ;                    3565
000004  013700  000000G  MOV     CTLR.CNT,R0                     ;                    3604
```

```
000010  006300                          ASL     R0
000012  006300                          ASL     R0
000014  006300                          ASL     R0
000016  006300                          ASL     R0
000020  010037  000000G                 MOV     R0,NUM.BUFF
000024  105037  000000G                 CLRB    MEM.MGMT                ;                               3605
000030  010005                          MOV     R0,R5                   ; NUM.BUFF,*                    3615
000032  023727  000000G 002000          CMP     L$HIMEM,#2000           ;                               3606
000040  101441                          BLOS    3$
000042  112737  000001  000000G         MOVB    #1,MEM.MGMT             ;                               3610
000050  013700  000000G                 MOV     L$HIMEM,R0              ; *,HIMEM                       3611
000054  020027  007577                  CMP     R0,#7577                ; HIMEM,*                       3612
000060  101402                          BLOS    1$
000062  012700  007577                  MOV     #7577,R0                ; *,HIMEM                       3614
000066  010046                  1$:     MOV     R0,-(SP)                ; HIMEM,*                       3615
000070  162716  001777                  SUB     #1777,(SP)
000074  010546                          MOV     R5,-(SP)
000076  004737  000000G                 JSR     PC,BL$DIV
000102  020027  000200                  CMP     R0,#200                 ; BLKS.PER.BUFF,*               3616
000106  101402                          BLOS    2$
000110  012700  000200                  MOV     #200,R0                 ; *,BLKS.PER.BUFF               3618
000114  000300                  2$:     SWAB    R0                      ;                               3619
000116  106000                          RORB    R0
000120  006000                          ROR     R0
000122  006000                          ROR     R0
000124  142700  000077                  BICB    #77,R0
000130  010037  000000G                 MOV     R0,BUFF.SIZE
000134  005002                          CLR     R2                      ; BD.LOW                        3620
000136  012703  000001                  MOV     #1,R3                   ; *,BD.HIGH                     3621
000142  000416                          BR      4$                      ;                               3606
000144  013746  000000G          3$:    MOV     MEM.SIZE,-(SP)          ;                               3627
000150  006316                          ASL     (SP)
000152  010546                          MOV     R5,-(SP)
000154  004737  000000G                 JSR     PC,BL$DIV
000160  010037  000000G                 MOV     R0,BUFF.SIZE
000164  042737  000001  000000G         BIC     #1,BUFF.SIZE
000172  013702  000000G                 MOV     FREE.MEM.ADDR,R2        ; *,BD.LOW                      3628
000176  005003                          CLR     R3                      ; BD.HIGH                       3629
000200  005001                  4$:     CLR     R1                      ; J                             3633
000202  000416                          BR      7$
000204  010100                  5$:     MOV     R1,R0                   ; J,*                           3636
000206  006300                          ASL     R0
000210  006300                          ASL     R0
000212  010260  000000G                 MOV     R2,BUFF.DESC(R0)        ; BD.LOW,*
000216  010360  000002G                 MOV     R3,BUFF.DESC+2(R0)      ; BD.HIGH,*                     3637
000222  010204                          MOV     R2,R4                   ; BD.LOW,TEMP                   3638
000224  063702  000000G                 ADD     BUFF.SIZE,R2            ; *,BD.LOW                      3639
000230  020402                          CMP     R4,R2                   ; TEMP,BD.LOW                   3640
000232  103401                          BLO     6$
000234  005203                          INC     R3                      ; BD.HIGH                       3642
000236  005201                  6$:     INC     R1                      ; J                             3633
000240  020105                  7$:     CMP     R1,R5                   ; J,*
000242  002760                          BLT     5$
000244  132737  000001  000000G         BITB    #1,MEM.MGMT             ;                               3646
000252  001453                          BEQ     8$
000254  005037  177572                  CLR     @#177572                ;                               3650
000260  012700  077406                  MOV     #77406,R0               ; *,KTPDR                       3651
```

```
000264  010037  172300                          MOV     R0,@#172300                     ; KTPDR,*                       3652
000270  010037  172302                          MOV     R0,@#172302                     ; KTPDR,*                       3653
000274  010037  172304                          MOV     R0,@#172304                     ; KTPDR,*                       3654
000300  010037  172306                          MOV     R0,@#172306                     ; KTPDR,*                       3655
000304  010037  172310                          MOV     R0,@#172310                     ; KTPDR,*                       3656
000310  010037  172312                          MOV     R0,@#172312                     ; KTPDR,*                       3657
000314  010037  172314                          MOV     R0,@#172314                     ; KTPDR,*                       3658
000320  010037  172316                          MOV     R0,@#172316                     ; KTPDR,*                       3659
000324  005037  172340                          CLR     @#172340                        ;                               3661
000330  012737  000200  172342                  MOV     #200,@#172342                   ;                               3662
000336  012737  000400  172344                  MOV     #400,@#172344                   ;                               3663
000344  012737  000600  172346                  MOV     #600,@#172346                   ;                               3664
000352  012737  001000  172350                  MOV     #1000,@#172350                  ;                               3665
000360  012737  001200  172352                  MOV     #1200,@#172352                  ;                               3666
000366  012737  001400  172354                  MOV     #1400,@#172354                  ;                               3667
000374  012737  007600  172356                  MOV     #7600,@#172356                  ;                               3668
000402  022626                          8$:     CMP     (SP)+,(SP)+                     ;                               3594
000404  000207                                  RTS     PC                              ;                               3565

; Routine Size:  131 words,     Routine Base:  $CODE$ + 6756
; Maximum stack depth per invocation:  9 words
```

```
;    3673  1     ROUTINE QIO_OK =
;    3675  1     !+
;    3676  1     !       THIS ROUTINE IS CALLED BY THE MULTI_DRIVE "EXECUTIVE" IN ORDER TO
;    3677  1     !       DETERMINE WHETHER OR NOT A QIO REQUEST (OR QIO PAIR) SHOULD BE
;    3678  1     !       GENERATED TO THE CURRENT CONTROLLER. A VALUE OF "TRUE" IS RETURNED IF
;    3679  1     !       THE CONTROLLER MEETS 3 REQUIREMENTS:
;    3680  1     !
;    3681  1     !               A. THE CONTROLLER IS ONLINE;
;    3682  1     !               B. THE NUMBER OF OUTSTANDING QIOS IS AT LEAST 2 LESS THAN THE
;    3683  1     !                       MAXIMUM ALLOWED FOR ANY ONE CONTROLLER;
;    3684  1     !               C. THERE IS AT LEAST ONE UNIT UNDER THE CONTROLLER WHICH IS
;    3685  1     !                       STILL UNDER TEST.
;    3686  1     !
;    3687  1     !       IF ANY OF THESE TESTS FAIL, THEN A VALUE OF "FALSE" IS RETURNED.
;    3688  1     !
;    3689  1     !       IMPLICIT INPUTS:
;    3690  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;    3691  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;    3692  1     !-
;    3694  2     BEGIN
;    3695  2
;    3696  2     IF .CST_ADDR [STATE] EQLU ONLINE                ! IF CONTROLLER IS ONLINE
;    3697  2     THEN
;    3698  3         BEGIN
;    3699  3
;    3700  3         IF (.QIO [.CCTLR] + 2) LEQU QIO_PER_CTLR    ! IF OUTSTANDING QIO COUNT IS O.K.
;    3701  3         THEN
;    3702  4             BEGIN
;    3703  4
;    3704  4             IF .CST_ADDR [U_CNT] NEQU 0             ! IF THERE IS VALID UNIT
;    3705  4             THEN
;    3706  4                 RETURN TRUE;                        ! "TRUE" EXIT POINT
;    3708  3             END;
;    3710  2         END;
;    3711  2
;    3712  2     RETURN FALSE;                                   ! "FALSE" EXIT POINT
;    3714  1     END;

                                        .SBTTL  QIO.OK MULTI-DRIVE SUBTEST ROUTINES
000000  013700  000000G          QIO.OK: MOV     CST.ADDR,R0                     ;    3696
000004  005760  000002                  TST     2(R0)
000010  100023                          BPL     1$
000012  013700  000000G                  MOV     CCTLR,R0                        ;    3700
000016  116000  000000G                  MOVB    QIO(R0),R0
000022  042700  177400                  BIC     #177400,R0
000026  062700  000002                  ADD     #2,R0
000032  020027  000020                  CMP     R0,#20
000036  101010                          BHI     1$
000040  013700  000000G                  MOV     CST.ADDR,R0                     ;    3704
000044  105760  000005                  TSTB    5(R0)
000050  001403                          BEQ     1$
000052  012700  000001                  MOV     #1,R0                           ;    3706
000056  000207                          RTS     PC
000060  005000                  1$:     CLR     R0                              ;    3694
000062  000207                          RTS     PC                              ;    3673

; Routine Size:  26 words,      Routine Base:  $CODE$ + 7364
; Maximum stack depth per invocation:  0 words
```

```
;    3715  1     ROUTINE MD_QUIT =
;    3716  1
;    3717  1     !+
;    3718  1     !       THIS ROUTINE IS CALLED BY THE MULTI_DRIVE EXECUTIVE FOR DETERMINING THE
;    3719  1     !       END OF THE MULTI-DRIVE SUBTEST. ITS PURPOSE IS TO EXAMINE THE NUMBER OF
;    3720  1     !       TESTABLE UNITS REMAINING ON EACH CONTROLLER, AND THE NUMBER OF
;    3721  1     !       OUTSTANDING QIOS. IF BOTH OF THESE PARAMETERS ARE ZERO FOR ALL
;    3722  1     !       CONTROLLERS, THEN THIS ROUTINE RETURNS A VALUE OF "TRUE". OTHERWISE,
;    3723  1     !       THE MULTI-DRIVE SUBTEST EXECUTIVE LOOP MUST CONTINUE, AND A VALUE OF
;    3724  1     !       "FALSE" IS RETURNED.
;    3725  1     !-
;    3726  1
;    3727  2     BEGIN
;    3728  2
;    3729  2     INCR CTLR FROM 0 TO (MAX_CTLR - 1) DO
;    3730  3         BEGIN
;    3731  3
;    3732  3         IF .CST [.CTLR, U_CNT] NEQU 0               ! IF AT LEAST ONE VALID UNIT REMAINS
;    3733  3         THEN                                        ! THEN
;    3734  3             RETURN FALSE                            ! DON'T TERMINATE MULTI-DRIVE SUBTEST
;    3735  3         ELSE                                        ! OTHERWISE (NO UNITS REMAIN)
;    3736  3             IF .QIO [.CTLR] NEQU 0                  ! IF AT LEAST ONE QIO OUTSTANDING
;    3737  3             THEN                                    ! THEN
;    3738  3                 RETURN FALSE;                       ! DON'T TERMINATE SUBTEST
;    3739  3
;    3740  2         END;
;    3741  2
;    3742  2     RETURN TRUE;                                    ! ALL PARAMETERS ARE ZERO - END OF SUBTEST
;    3743  2
;    3744  1     END;                                            ! ROUTINE MD_QUIT


                                        .SBTTL  MD.QUIT MULTI-DRIVE SUBTEST ROUTINES
000000  010146                  MD.QUIT:MOV     R1,-(SP)                ;                               3715
000002  005001                          CLR     R1                      ; CTLR                          3724
000004  010146                  1$:     MOV     R1,-(SP)                ; CTLR,*                        3732
000006  012746  000016                  MOV     #16,-(SP)
000012  004737  000000G                 JSR     PC,BL$MUL
000016  022626                          CMP     (SP)+,(SP)+
000020  105760  000005G                 TSTB    CST+5(R0)
000024  001012                          BNE     2$                      ;                               3734
000026  105761  000000G                 TSTB    QIO(R1)                 ; *(CTLR)                       3736
000032  001007                          BNE     2$                      ;                               3738
000034  005201                          INC     R1                      ; CTLR                          3729
000036  020127  000003                  CMP     R1,#3                   ; CTLR,*
000042  003760                          BLE     1$
000044  012700  000001                  MOV     #1,R0                   ;                               3727
000050  000401                          BR      3$
000052  005000                  2$:     CLR     R0                      ;                               3715
000054  012601                  3$:     MOV     (SP)+,R1
000056  000207                          RTS     PC

; Routine Size:  24 words,      Routine Base:  $CODE$ + 7450
; Maximum stack depth per invocation:  4 words
```

```
;    3745  1     ROUTINE QIO_GEN : NOVALUE =
;    3746  1
;    3747  1     !+
;    3748  1     !       THIS ROUTINE IS CALLED BY THE MULTI_DRIVE EXECUTIVE FOR AN ONLINE
;    3749  1     !       CONTROLLER ELIGIBLE TO RECEIVE I/O TRANSFER REQUESTS. IT IS
;    3750  1     !       RESPONSIBLE FOR SECURING ONE OR TWO MSCP ENVELOPES AND LOADING THEM
;    3751  1     !       WITH VARIOUS PARAMETERS COMPRISING THE I/O REQUEST. THE I/O REQUEST
;    3752  1     !       GENERATED HERE IS DESTINED TO A PARTICULAR UNIT SELECTED AT RANDOM FROM
;    3753  1     !       THOSE CONFIGURED UNDER THE CURRENT CONTROLLER.
;    3754  1     !
;    3755  1     !       EACH FIELD OF THE ENVELOPE(S) IS LOADED WITHIN INDIVIDUAL ROUTINES
;    3756  1     !       (QIO_FUNC, QIO_LBN, QIO_SIZE, ETC.). MOST OF THE VALUES SELECTED FOR
;    3757  1     !       EACH FIELD ARE BASED ON A SET OF RANDOM NUMBER GENERATED AT THE START.
;    3758  1     !
;    3759  1     !       UNDER NORMAL CIRCUMSTANCES, ONLY ONE I/O REQUEST IS GENERATED. HOWEVER,
;    3760  1     !       IF THIS I/O REQUEST IS A "WRITE", AND IF THE OPERATOR SELECTED THE
;    3761  1     !       OPTION FOR HOST WRITE-COMPARES, THEN A SECOND "READ" REQUEST WILL BE
;    3762  1     !       GENERATED WITH THE SAME LBN AND BYTE COUNT.
;    3763  1     !
;    3764  1     !       AFTER THE ENVELOPE(S) HAVE BEEN LOADED, THIS ROUTINE REGAINS CONTROL
;    3765  1     !       AND ATTEMPTS TO GET ONE OR TWO I/O BUFFERS FOR THE ACTUAL DATA
;    3766  1     !       TRANSFERS. THE SUCCESS / FAIL STATUS OF THIS ENTIRE OPERATION IS
;    3767  1     !       PASSED BACK TO THE CALLER THROUGH THE GLOBALS "MX1" AND "MX2"; THEY
;    3768  1     !       CONTAIN VALID MSCP ENVELOPE INDECES, OR -1.
;    3769  1     !
;    3770  1     !       IMPLICIT INPUTS:
;    3771  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;    3772  1     !-
;    3773  1
;    3774  2     BEGIN
;    3775  2
;    3776  2     MX2 = -1;                                       ! ASSUME FAILURE IN SECURING 2ND ENVELOPE
;    3777  2     IF (MX1 = GET_ENV (.CCTLR)) LSS 0               ! TRY TO GET 1ST ENVELOPE. IF FAILURE
;    3778  2     THEN                                            ! THEN
;    3779  2         RETURN;                                     ! NO POINT IN CONTINUING
;    3780  2     IF (MX2 = GET_ENV (.CCTLR)) LSS 0               ! TRY TO GET 2ND ENVELOPE. IF FAILURE
;    3781  2     THEN                                            ! THEN
;    3782  3         BEGIN
;    3783  3
;    3784  3         PUT_ENV (.MX1);                             ! RETURN 1ST ENVELOPE TO POOL
;    3785  3         MX1 = -1;                                   ! INDICATE FAILURE
;    3786  3         RETURN;                                     ! DONE
;    3787  3
;    3788  2         END;
;    3789  2
;    3790  2     MAD1 = MSCP_ENV + (.MX1 * ENV_LEN * 2);         ! CALCULATE STARTING ADDRESSES
;    3791  2     MAD2 = MSCP_ENV + (.MX2 * ENV_LEN * 2);         !     OF BOTH ENVELOPES
;    3792  2     GET_RANDOM ();                                  ! GENERATE A SET OF RANDOM NUMBERS
;    3793  2     QIO_UNIT ();                                    ! LOAD RANDOM UNIT NUMBER INTO ENVELOPES
;    3794  2     QIO_FUNC ();                                    ! LOAD RANDOM FUNCTION CODE (OPCODE)
;    3795  2     QIO_LBN ();                                     ! LOAD LBN (RANDOM OR SEQUENTIAL)
;    3796  2     QIO_SIZE ();                                    ! LOAD RANDOM BYTE COUNT
;    3797  2     GET_IO_BUFF (MAD1 [BUF_0]);                     ! TRY TO GET AN I/O BUFFER
;    3798  2     IF .MX2 GEQ 0                                   ! IF TWO QIOS ARE TO BE ISSUED
;    3799  2     THEN                                            ! THEN
;    3800  3         BEGIN
;    3801  3
```

```
;    3802  3          GET_IO_BUFF (MAD2 [BUF_0]);                ! TRY TO GET 2ND I/O BUFFER
;    3803  3          IF .MAD2 [BUF_0]                           ! IF 2ND BUFFER ALLOCATION FAILED
;    3804  3          THEN                                       ! THEN
;    3805  4              BEGIN
;    3806  4
;    3807  4              IF NOT .MAD1 [BUF_0]                   ! IF 1ST I/O BUFFER WAS ALLOCATED
;    3808  4              THEN                                   ! THEN
;    3809  5                  BEGIN
;    3810  5
;    3811  5                  PUT_IO_BUFF (MAD1 [BUF_0]);        ! RETURN 1ST I/O BUFFER TO POOL
;    3812  5                  MAD1 [BUF_0] = -1;                 ! MARK IT AS FAILED
;    3813  5
;    3814  4                  END;
;    3815  4
;    3816  4              PUT_ENV (.MX2);                        ! RETURN 2ND ENVELOPE TO POOL
;    3817  4              MX2 = -1;                              ! INDICATE FAILURE
;    3818  4
;    3819  3              END;                                   ! IF 2ND I/O BUFFER ALLOCATION FAILED
;    3820  3
;    3821  2          END;                                       ! IF TWO QIOS ARE TO BE ISSUED
;    3822  2
;    3823  2      IF .MAD1 [BUF_0]                               ! IF 1ST I/O BUFFER ALLOCATION FAILED
;    3824  2      THEN                                           ! THEN
;    3825  3          BEGIN
;    3826  3
;    3827  3          PUT_ENV (.MX1);                            ! RETURN 1ST ENVELOPE TO POOL
;    3828  3          MX1 = -1;                                  ! INDICATE FAILURE
;    3829  3
;    3830  3          END
;    3831  2      ELSE                                           ! OTHERWISE (ALL IS O.K.)
;    3832  2          IF .MAD1 [OPCODE] EQLU OP_WRT              ! IF 1ST OPCODE IS A WRITE
;    3833  2          THEN                                       ! THEN
;    3834  2              FILL_BUFF ();                          ! FILL 1ST I/O BUFFER WITH APPROPRIATE DATA PATTERN
;    3835  2
;    3836  1      END;                                           ! ROUTINE QIO_GEN


                                        .SBTTL  QIO.GEN MULTI DRIVE SUBTEST ROUTINES
000000  012737  177777  000604'  QIO.GEN:MOV     #-1,MX2                         ;                       3776
000006  013746  000000G                 MOV     CCTLR,-(SP)                     ;                       3777
000012  004737  000000G                 JSR     PC,GET.ENV
000016  010037  000602'                 MOV     R0,MX1
000022  005726                          TST     (SP)+
000024  005700                          TST     R0                              ; MX1
000026  002564                          BLT     6$                              ;                       3779
000030  013746  000000G                 MOV     CCTLR,-(SP)                     ;                       3780
000034  004737  000000G                 JSR     PC,GET.ENV
000040  010037  000604'                 MOV     R0,MX2
000044  005726                          TST     (SP)+
000046  005700                          TST     R0                              ; MX2
000050  002011                          BGE     1$
000052  013746  000602'                 MOV     MX1,-(SP)                       ;                       3784
000056  004737  000000G                 JSR     PC,PUT.ENV
000062  012737  177777  000602'         MOV     #-1,MX1                         ;                       3785
000070  005726                          TST     (SP)+                           ;                       3786
000072  000207                          RTS     PC                              ;                       3782
000074  013746  000602'          1$:    MOV     MX1,-(SP)                       ;                       3790
```

```
000100  012746  000104                          MOV     #104,-(SP)
000104  004737  000000G                         JSR     PC,BL$MUL
000110  062700  000000G                         ADD     #MSCP.ENV,R0
000114  010037  000606'                         MOV     R0,MAD1
000120  013716  000604'                         MOV     MX2,(SP)                ;                       3791
000124  012746  000104                          MOV     #104,-(SP)
000130  004737  000000G                         JSR     PC,BL$MUL
000134  062700  000000G                         ADD     #MSCP.ENV,R0
000140  010037  000610'                         MOV     R0,MAD2
000144  004737  000000V                         JSR     PC,GET.RANDOM           ;                       3792
000150  004737  000000V                         JSR     PC,QIO.UNIT             ;                       3793
000154  004737  000000V                         JSR     PC,QIO.FUNC             ;                       3794
000160  004737  000000V                         JSR     PC,QIO.LBN              ;                       3795
000164  004737  000000V                         JSR     PC,QIO.SIZE             ;                       3796
000170  013716  000606'                         MOV     MAD1,(SP)               ;                       3797
000174  062716  000030                          ADD     #30,(SP)
000200  004737  000000G                         JSR     PC,GET.IO.BUFF
000204  005737  000604'                         TST     MX2                     ;                       3798
000210  002443                                  BLT     3$
000212  013716  000610'                         MOV     MAD2,(SP)               ;                       3802
000216  062716  000030                          ADD     #30,(SP)
000222  004737  000000G                         JSR     PC,GET.IO.BUFF
000226  013700  000610'                         MOV     MAD2,R0                 ;                       3803
000232  032760  000001  000030                  BIT     #1,30(R0)
000240  001427                                  BEQ     3$
000242  013700  000606'                         MOV     MAD1,R0                 ;                       3807
000246  032760  000001  000030                  BIT     #1,30(R0)
000254  001012                                  BNE     2$
000256  012716  000030                          MOV     #30,(SP)                ;                       3811
000262  060016                                  ADD     R0,(SP)
000264  004737  000000G                         JSR     PC,PUT.IO.BUFF
000270  013700  000606'                         MOV     MAD1,R0                 ;                       3812
000274  012760  177777  000030                  MOV     #-1,30(R0)
000302  013716  000604'              2$:        MOV     MX2,(SP)                ;                       3816
000306  004737  000000G                         JSR     PC,PUT.ENV
000312  012737  177777  000604'                 MOV     #-1,MX2                 ;                       3817
000320  013700  000606'              3$:        MOV     MAD1,R0                 ;                       3823
000324  032760  000001  000030                  BIT     #1,30(R0)
000332  001410                                  BEQ     4$
000334  013716  000602'                         MOV     MX1,(SP)                ;                       3827
000340  004737  000000G                         JSR     PC,PUT.ENV
000344  012737  177777  000602'                 MOV     #-1,MX1                 ;                       3828
000352  000410                                  BR      5$                      ;                       3823
000354  013700  000606'              4$:        MOV     MAD1,R0                 ;                       3832
000360  126027  000020  000042                  CMPB    20(R0),#42
000366  001002                                  BNE     5$
000370  004737  000000V                         JSR     PC,FILL.BUFF            ;                       3834
000374  062706  000006              5$:        ADD     #6,SP                   ;                       3774
000400  000207                      6$:        RTS     PC                      ;                       3745

; Routine Size:  129 words,     Routine Base:  $CODE$ + 7530
; Maximum stack depth per invocation:  4 words
```

```
;    3837  1     ROUTINE GET_RANDOM : NOVALUE =
;    3838  1
;    3839  1     !+
;    3840  1     !       THIS ROUTINE IS CALLED BY QIO_GEN TO GENERATE A SET OF RANDOM NUMBERS,
;    3841  1     !       AND TO STORE THEM INTO THE RANDOM NUMBER TABLE (RANDOM). THE RANDOM
;    3842  1     !       NUMBERS ARE USED TO SELECT I/O REQUEST PARAMETERS FOR THE CURRENT QIO
;    3843  1     !       OR QIO PAIR. IN ADDITION, IF DATA PATTERN #1 IS BEING USED, THESE
;    3844  1     !       RANDOM NUMBERS WILL BE USED IN THE WRITE OPERATION.
;    3845  1     !
;    3846  1     !       A TEST IS MADE TO AVOID GENERATING THE RANDOM NUMBER 100000-OCTAL. THIS
;    3847  1     !       NUMBER, IF USED AS THE DIVIDEND IN A "MOD" OPERATION (E.G., QIO_LBN),
;    3848  1     !       REGARDLESS OF THE DIVISOR, RESULTS IN AN OUT-OF-RANGE REMAINDER.
;    3849  1     !-
;    3850  1
;    3851  2     BEGIN
;    3852  2
;    3853  2     OWN
;    3854  2         SEED1 : WORD INITIAL (%O'123456');
;    3855  2
;    3856  2     LOCAL
;    3857  2         SEED2 : WORD;
;    3858  2
;    3859  2     SEED2 = ((.MINUTES + 5) OR .SECONDS) + 5 OR .TICKS;
;    3860  2     DECR COUNT FROM (RDM_LEN - 1) TO 0 DO
;    3861  3         BEGIN
;    3862  3
;    3863  3         DO
;    3864  4             BEGIN
;    3865  4
;    3866  4             SEED1 = (.SEED1 + .SEED2 + 1) * 4;
;    3867  4             SEED2 = (.SEED2 / 4) + .SEED1;
;    3868  4             RANDOM [.COUNT] = .SEED2;
;    3869  4
;    3870  4             END
;    3871  3         UNTIL .RANDOM [.COUNT] NEQU %O'100000';
;    3872  3
;    3873  2         END;
;    3874  2
;    3875  1     END;


002552                                  .PSECT  $GGG$,  RO
002552  123456                  SEED1:  .WORD   -54322


                                        .SBTTL  GET.RANDOM MULTI-DRIVE SUBTEST ROUTINES
010132                                  .PSECT  $CODE$,  RO

000000  004137  000000G         GET.RANDOM:
                                        JSR     R1,$SAVE3                       ;                       3837
000004  013746  000000G                 MOV     MINUTES,-(SP)                   ;                       3859
000010  012746  000005                  MOV     #5,-(SP)
000014  004737  000000G                 JSR     PC,BL$SHF
000020  010016                          MOV     R0,(SP)
000022  053716  000000G                 BIS     SECONDS,(SP)
000026  012746  000005                  MOV     #5,-(SP)
```

```
000032  004737  000000G                        JSR     PC,BL$SHF
000036  010002                                  MOV     R0,R2                   ; *,SEED2
000040  053702  000000G                        BIS     TICKS,R2                ; *,SEED2
000044  012701  000036                          MOV     #36,R1                  ; *,COUNT               3860
000050  013703  002552'              1$:       MOV     SEED1,R3                ;                       3866
000054  010200                      2$:       MOV     R2,R0                   ; SEED2,*
000056  060300                                ADD     R3,R0
000060  006300                                ASL     R0
000062  006300                                ASL     R0
000064  010037  002552'                        MOV     R0,SEED1
000070  062737  000004  002552'               ADD     #4,SEED1
000076  010216                                MOV     R2,(SP)                 ; SEED2,*               3867
000100  012746  000004                        MOV     #4,-(SP)
000104  004737  000000G                        JSR     PC,BL$DIV
000110  013703  002552'                        MOV     SEED1,R3
000114  060300                                ADD     R3,R0
000116  010002                                MOV     R0,R2                   ; *,SEED2
000120  010261  000634'                        MOV     R2,RANDOM(R1)           ; SEED2,*(COUNT)        3868
000124  005726                                TST     (SP)+                   ;                       3864
000126  020227  100000                        CMP     R2,#-100000             ;                       3871
000132  001750                                BEQ     2$
000134  162701  000002                        SUB     #2,R1                   ; *,COUNT               3860
000140  100343                                BPL     1$
000142  062706  000006                        ADD     #6,SP                   ;                       3851
000146  000207                                RTS     PC                      ;                       3837

; Routine Size:  52 words,      Routine Base:  $CODE$ + 10132
; Maximum stack depth per invocation:  9 words
```

```
;    3876  1     ROUTINE QIO_UNIT : NOVALUE =
;    3877  1
;    3878  1     !+
;    3879  1     !       THIS ROUTINE IS CALLED BY QIO_GEN TO RANDOMLY SELECT ONE UNIT
;    3880  1     !       CONFIGURED UNDER THE CURRENT CONTROLLER (CCTLR) TO BE USED FOR THE
;    3881  1     !       CURRENT QIO OR QIO PAIR. THE UNIT SELECTED IS BASED ON THE NUMBER OF
;    3882  1     !       UNITS ELIGIBLE TO RECEIVE AN I/O REQUEST (FROM 1 TO 4) AND THE FIRST
;    3883  1     !       RANDOM NUMBER IN THE RANDOM NUMBER TABLE (RANDOM).
;    3884  1     !
;    3885  1     !       IMPLICIT INPUTS:
;    3886  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;    3887  1     !
;    3888  1     !       IMPLICIT OUTPUTS:
;    3889  1     !               THE MSCP UNIT NUMBER (PLATTER ADDRESS) IS LOADED INTO THE
;    3890  1     !                       APPROPRIATE FIELD OF BOTH MSCP ENVELOPES.
;    3891  1     !-
;    3892  1
;    3893  2     BEGIN
;    3894  2
;    3895  2     LOCAL
;    3896  2         UNIT : WORD,                                    ! UNIT NUMBER
;    3897  2         NTH_UNIT : WORD;                                ! ORDINAL NUMBER OF CHOSEN UNIT
;    3898  2
;    3899  2     CASE .CST_ADDR [U_CNT]                              ! DETERMINE ORDINAL UNIT NUMBER
;    3900  2         FROM 1 TO 4 OF
;    3901  2         SET
;    3902  2         [1] : NTH_UNIT = 1;                             ! 1
;    3903  2         [2] : NTH_UNIT = (.RANDOM [0] AND 1) + 1;       ! 1 OR 2
;    3904  2         [3] : NTH_UNIT = ABS (.RANDOM [0] MOD 3) + 1;   ! 1, 2, OR 3
;    3905  2         [4] : NTH_UNIT = (.RANDOM [0] AND 3) + 1;       ! 1, 2, 3, OR 4
;    3906  2         [OUTRANGE] : NTH_UNIT = 1;                      ! IN CASE CONTROLLER JUST WENT DOWN
;    3907  2         TES;
;    3908  2
;    3909  2     INCR OFFSET FROM (0 + OF_UN) TO (3 + OF UN) DO  ! LOOP THROUGH EACH CST UNIT
;    3910  3         BEGIN
;    3911  3
;    3912  3         IF .CST_ADDR [.OFFSET, P_PRES] EQLU PRESENT         ! IF UNIT IS PRESENT
;    3913  3         THEN                                                ! THEN
;    3914  4             BEGIN
;    3915  4
;    3916  4             UNIT = .CST_ADDR [.OFFSET, P_UNIT];             ! GET (DRS) UNIT NUMBER
;    3917  4             IF .CPT [.UNIT]                                 ! IF THIS UNIT IS ACTIVE
;    3918  4             THEN                                            ! THEN
;    3919  5                 BEGIN                                       ! THIS IS AN ELIGIBLE UNIT
;    3920  5
;    3921  5                 NTH_UNIT = .NTH_UNIT - 1;                   ! DECREMENT ORDINAL COUNT
;    3922  5                 IF .NTH_UNIT EQLU 0                         ! IF DOWN TO 0
;    3923  5                 THEN                                        ! THEN
;    3924  6                     BEGIN                                   ! THIS IS THE CHOSEN UNIT
;    3925  6
;    3926  6                     SET_UPAR (.OFFSET);                     ! SET UP UNIT-RELATED DATA
;    3927  6                     EXITLOOP;                               ! DONE
;    3928  6
;    3929  5                     END;
;    3930  5
;    3931  4                 END;                                        ! UNIT IS ACTIVE
;    3932  4
```

```
;    3933  3              END;                                    ! UNIT IS PRESENT
;    3934  3
;    3935  2          END;                                        ! CST UNIT LOOP
;    3936  2
;    3937  2      MAD1 [PL_ADDR] = .CPLAT;                        ! LOAD PLATTER ADDRESS (MSCP UNIT NUMBER)
;    3938  2      MAD2 [PL_ADDR] = .CPLAT;                        !     BOTH MSCP ENVELOPES
;    3939  2
;    3940  1      END;                                            ! ROUTINE QIO_UNIT


                                        .SBTTL  QIO.UNIT MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G          QIO.UNIT:
                                        JSR     R1,$SAVE3                       ;                       3876
000004  013700  000000G                 MOV     CST.ADDR,R0                     ;                       3899
000010  116000  000005                  MOVB    5(R0),R0
000014  042700  177400                  BIC     #177400,R0
000020  005300                          DEC     R0
000022  020027  000003                  CMP     R0,#3
000026  101003                          BHI     2$
000030  006300                          ASL     R0
000032  066007  000000'                 ADD     P.AAA(R0),PC                    ; Case dispatch
000036  012703  000001          2$:     MOV     #1,R3                           ; *,NTH.UNIT            3902
000042  000427                          BR      7$                              ;                       3899
000044  013703  000634'          3$:     MOV     RANDOM,R3                       ; *,NTH.UNIT            3903
000050  042703  177776                  BIC     #177776,R3                      ; *,NTH.UNIT
000054  000421                          BR      6$
000056  013746  000634'          4$:     MOV     RANDOM,-(SP)                    ;                       3904
000062  012746  000003                  MOV     #3,-(SP)
000066  004737  000000G                 JSR     PC,BL$MOD
000072  010016                          MOV     R0,(SP)
000074  004737  000000G                 JSR     PC,BL$ABS
000100  010003                          MOV     R0,R3                           ; *,NTH.UNIT
000102  005203                          INC     R3                              ; NTH.UNIT
000104  022626                          CMP     (SP)+,(SP)+
000106  000405                          BR      7$                              ;                       3899
000110  013703  000634'          5$:     MOV     RANDOM,R3                       ; *,NTH.UNIT            3905
000114  042703  177774                  BIC     #177774,R3                      ; *,NTH.UNIT
000120  005203                  6$:     INC     R3                              ; NTH.UNIT
000122  012702  000003          7$:     MOV     #3,R2                           ; *,OFFSET              3909
000126  010200                  8$:     MOV     R2,R0                           ; OFFSET,*              3912
000130  006300                          ASL     R0
000132  063700  000000G                 ADD     CST.ADDR,R0
000136  032710  040000                  BIT     #40000,(R0)
000142  001417                          BEQ     9$
000144  011001                          MOV     (R0),R1                         ; *,UNIT                3916
000146  000301                          SWAB    R1                              ; UNIT
000150  042701  177740                  BIC     #177740,R1                      ; *,UNIT
000154  132761  000001  000000G         BITB    #1,CPT(R1)                      ; *,*(UNIT)             3917
000162  001407                          BEQ     9$
000164  005303                          DEC     R3                              ; NTH.UNIT              3921
000166  001005                          BNE     9$                              ;                       3922
000170  010246                          MOV     R2,-(SP)                        ; OFFSET,*              3926
000172  004737  000000G                 JSR     PC,SET.UPAR
000176  005726                          TST     (SP)+
000200  000404                          BR      10$                             ;                       3924
000202  005202          9$:     INC     R2                              ; OFFSET                3909
000204  020227  000006                  CMP     R2,#6                           ; OFFSET,*
```

```
000210  003746                          BLE     8$
000212  013700  000606'          10$:    MOV     MAD1,R0                         ;                       3937
000216  013760  000000G 000014          MOV     CPLAT,14(R0)
000224  013700  000610'                  MOV     MAD2,R0                         ;                       3938
000230  013760  000000G 000014          MOV     CPLAT,14(R0)
000236  000207                          RTS     PC                              ;                       3876

; Routine Size:  80 words,      Routine Base:  $CODE$ + 10302
; Maximum stack depth per invocation:  7 words


000000                                  .PSECT  $PLIT$,  RO ,  D

                                P.AAA:
000000  000000                  1$:     .WORD   0                               ; CASE Table for QIO.UNIT+0032  3899
000002  000006                          .WORD   6                               ; [2$]
000004  000020                          .WORD   20                              ; [3$]
000006  000052                          .WORD   52                              ; [4$]
                                                                                ; [5$]
```

```
;  3941  1     ROUTINE QIO_FUNC : NOVALUE =
;  3942  1
;  3943  1     !+
;  3944  1     !       THIS ROUTINE IS CALLED BY QIO_GEN TO SELECT THE I/O FUNCTION (OPCODE)
;  3945  1     !       TO BE USED FOR THE CURRENT QIO OR QIO PAIR. THE FUNCTION IS DETERMINED
;  3946  1     !       BY THE FOLLWING ALGORITHM:
;  3947  1     !
;  3948  1     !               IF THE CHOSEN UNIT IS PROTECTED
;  3949  1     !               THEN
;  3950  1     !                       FUNCTION = READ
;  3951  1     !               ELSE (UNPROTECTED)
;  3952  1     !                       IF OPERATOR SELECTED 'WRITE-ONLY" OPTION
;  3953  1     !                       THEN
;  3954  1     !                               FUNCTION = WRITE
;  3955  1     !                       ELSE
;  3956  1     !                               FUNCTION (WRITE OR READ) IS BASED ON A RANDOM
;  3957  1     !                               NUMBER
;  3958  1     !
;  3959  1     !       IN ADDITION, IF THE OPERATOR SELECTED THE OPTION OF PERFORMING WRITE-
;  3960  1     !       COMPARES AT THE HOST, AND IF A "WRITE" FUNCTION WAS CHOSEN ABOVE FOR
;  3961  1     !       THE FIRST QIO, THEN A "READ" OPCODE IS LOADED INTO THE SECOND MSCP
;  3962  1     !       ENVELOPE. OTHERWISE, THE SECOND MSCP ENVELOPE IS RETURNED TO THE POOL.
;  3963  1     !
;  3964  1     !       IMPLICIT INPUTS:
;  3965  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;  3966  1     !               CUOFF - CURRENT UNIT CST OFFSET
;  3967  1     !
;  3968  1     !       IMPLICIT OUTPUTS:
;  3969  1     !               THE OPCODE FIELD OF ONE OR BOTH MSCP ENVELOPES IS LOADED.
;  3970  1     !-
;  3971  1
;  3972  2     BEGIN
;  3973  2
;  3974  2     LOCAL
;  3975  2         FUNC : WORD;                                    ! OPCODE (READ OR WRITE)
;  3976  2
;  3977  2     IF .CST_ADDR [.CUOFF, P_PROT] EQLU PROTECTED        ! IF UNIT IS PROTECTED
;  3978  2     THEN                                                ! THEN
;  3979  2         FUNC = OP_RD                                    ! SET FUNCTION TO READ
;  3980  2     ELSE                                                ! OTHERWISE (UNIT IS UNPROTECTED)
;  3981  3         BEGIN
;  3982  3
;  3983  4         IF BIT_TST (SWP_FLAGS, SWF_WO)                  ! IF OPERATOR CHOSE WRITE-ONLY OPTION
;  3984  3         THEN                                            ! THEN
;  3985  3             FUNC = OP_WRT                               ! SET FUNCTION TO WRITE
;  3986  3         ELSE                                            ! OTHERWISE
;  3987  4             BEGIN
;  3988  4
;  3989  5             IF (.RANDOM [1] AND 1)                      ! USE 2ND RANDOM NUMBER TO SELECT
;  3990  4             THEN                                        !     EITHER
;  3991  4                 FUNC = OP_RD                            !     READ
;  3992  4             ELSE                                        !     OR
;  3993  4                 FUNC = OP_WRT;                          !     WRITE
;  3994  4
;  3995  3             END;
;  3996  3
;  3997  2         END;
```

```
;  3998  2
;  3999  2     IF (MAD1 [OPCODE] = .FUNC) EQLU OP_WRT          ! LOAD CHOSEN OPCODE. IF WRITE
;  4000  2     THEN                                            ! THEN
;  4001  3         BEGIN
;  4002  3
;  4003  4         IF BIT_TST (SWP_FLAGS, SWF_CWC)             ! IF CONTROLLER DOES WRITE-COMPARES
;  4004  3         THEN                                        ! THEN
;  4005  3             MAD1 [MODIFY] = MD_CMP;                 ! ADD COMPARE MODIFIER
;  4006  3
;  4007  4         IF BIT_TST (SWP_FLAGS, SWF_HWC)             ! IF HOST DOES WRITE-COMPARES
;  4008  3         THEN                                        ! THEN
;  4009  4             BEGIN
;  4010  4
;  4011  4             MAD1 [MODIFY] = MD_EXP;                 ! SET EXPRESS REQUEST MODIFIER
;  4012  4             MAD2 [OPCODE] = OP_RD;                  ! SET READ OPCODE INTO 2ND MSCP ENVELOPE
;  4013  4             MAD2 [MODIFY] = MD_EXP;                 ! SET EXPRESS REQUEST MODIFIER
;  4014  4
;  4015  3             END;
;  4016  3
;  4017  3         END
;  4018  2     ELSE                                            ! OTHERWISE - FUNCTION IS READ
;  4019  3         BEGIN
;  4020  3
;  4021  4         IF BIT_TST (SWP_FLAGS, SWF_CRC)             ! IF CONTROLLER DOES READ-COMPARES
;  4022  3         THEN                                        ! THEN
;  4023  3             MAD1 [MODIFY] = MD_CMP;                 ! ADD COMPARE MODIFIER
;  4024  3
;  4025  2         END;
;  4026  2
;  4027  2     IF .MAD2 [OPCODE] EQLU 0                        ! IF NO OPCODE IN 2ND ENVELOPE
;  4028  2     THEN                                            ! THEN
;  4029  3         BEGIN
;  4030  3
;  4031  3         PUT_ENV (.MX2);                             ! RETURN 2ND ENVELOPE TO POOL
;  4032  3         MX2 = -1;                                   ! MARK IT UNUSED
;  4033  3
;  4034  2         END;
;  4035  2
;  4036  1     END;                                            ! ROUTINE QIO_FUNC


                                .SBTTL  QIO.FUNC MULTI-DRIVE SUBTEST ROUTINES
010542                          .PSECT  $CODE$,  RO

000000  004137  000000G      QIO.FUNC:
                                JSR     R1,$SAVE2                       ;                       3941
000004  013700  000000G              MOV     CUOFF,RO                        ;                       3977
000010  006300                       ASL     RO
000012  063700  000000G              ADD     CST.ADDR,RO
000016  032710  100000               BIT     #100000,(RO)
000022  001410                       BEQ     1$                              ;                       3979
000024  132737  000020  000000G      BITB    #20,SWP.FLAGS                   ;                       3983
000032  001007                       BNE     2$                              ;                       3985
000034  032737  000001  000636'      BIT     #1,RANDOM+2                     ;                       3989
000042  001403                       BEQ     2$
000044  012702  000041           1$: MOV     #41,R2                          ; *,FUNC                3991
000050  000402                       BR      3$                              ;                       3989
```

```
000052  012702  000042                2$:     MOV     #42,R2                  ; *,FUNC                        3993
000056  005001                        3$:     CLR     R1                      ;                               4003
000060  153701  000000G                       BISB    SWP.FLAGS,R1
000064  013700  000606'                       MOV     MAD1,R0                 ;                               3999
000070  110260  000020                        MOVB    R2,20(R0)               ; FUNC,*
000074  020227  000042                        CMP     R2,#42                  ; FUNC,*
000100  001025                              BNE     5$
000102  032701  000040                      BIT     #40,R1                  ;                               4003
000106  001403                              BEQ     4$
000110  012760  040000  000022              MOV     #40000,22(R0)           ;                               4005
000116  032701  000100                4$:     BIT     #100,R1                 ;                               4007
000122  001422                              BEQ     6$
000124  012760  100000  000022              MOV     #-100000,22(R0)         ;                               4011
000132  013700  000610'                       MOV     MAD2,R0                 ;                               4012
000136  112760  000041  000020              MOVB    #41,20(R0)
000144  012760  100000  000022              MOV     #-100000,22(R0)         ;                               4013
000152  000406                              BR      6$                      ;                               3999
000154  032701  000010                5$:     BIT     #10,R1                  ;                               4021
000160  001403                              BEQ     6$
000162  012760  040000  000022              MOV     #40000,22(R0)           ;                               4023
000170  013700  000610'                6$:     MOV     MAD2,R0                 ;                               4027
000174  105760  000020                        TSTB    20(R0)
000200  001010                              BNE     7$
000202  013746  000604'                       MOV     MX2,-(SP)               ;                               4031
000206  004737  000000G                       JSR     PC,PUT.ENV
000212  012737  177777  000604'              MOV     #-1,MX2                 ;                               4032
000220  005726                              TST     (SP)+                   ;                               4029
000222  000207                        7$:     RTS     PC                      ;                               3941

; Routine Size:  74 words,      Routine Base:  $CODE$ + 10542
; Maximum stack depth per invocation:  5 words
```

```
;  4037  1     ROUTINE QIO_LBN : NOVALUE =
;  4038  1
;  4039  1     !+
;  4040  1     !       THIS ROUTINE IS CALLED BY QIO_GEN TO SELECT THE LOGICAL BLOCK NUMBER TO
;  4041  1     !       BE USED FOR THE CURRENT QIO OR QIO PAIR.
;  4042  1     !
;  4043  1     !       IF THE OPERATOR CHOSE THE RANDOM SEEK MODE OPTION, THEN THE LBN IS
;  4044  1     !       RANDOMLY CHOSEN WITHIN THE SPECIFIED LIMITS FOR TRACK AND SECTOR.
;  4045  1     !       OTHERWISE, THE NEXT SEQUENTIAL LBN IS DERIVED FROM THE BLOCK SEQUENCE
;  4046  1     !       TABLE (BST).
;  4047  1     !
;  4048  1     !       IMPLICIT INPUTS:
;  4049  1     !               L$LUN - CURRENT (DIAGNOSTIC SUPERVIOR) UNIT NUMBER
;  4050  1     !
;  4051  1     !       IMPLICIT OUTPUTS:
;  4052  1     !               THE LBN IS LOADED INTO ONE OR BOTH MSCP ENVELOPES.
;  4053  1     !-
;  4054  1
;  4055  2     BEGIN
;  4056  2
;  4057  2     LOCAL
;  4058  2         T_RANGE : WORD,                         ! PERMISSIBLE RANGE OF TRACK NUMBERS
;  4059  2         S_RANGE : WORD,                         ! PERMISSIBLE RANGE OF SECTOR NUMBERS
;  4060  2         NTRACK : WORD,                          ! SELECTED TRACK NUMBER
;  4061  2         NSECT : WORD,                           ! SELECTED SECTOR NUMBER
;  4062  2         LBN : WORD;                             ! LOGICAL BLOCK NUMBER
;  4063  2
;  4064  3     IF BIT_TST (SWP_FLAGS, SWF_RDM)             ! IF RANDOM SEEK MODE
;  4065  2     THEN                                        ! THEN
;  4066  3         BEGIN
;  4067  3
;  4068  3         T_RANGE = (.SWP_ETRACK - .SWP_STRACK) + 1;          ! RANGE OF TRACK NUMBERS
;  4069  3         S_RANGE = MAX_SECT + 1;                             ! RANGE OF SECTOR NUMBERS
;  4070  3         NTRACK = .SWP_STRACK + ABS (.RANDOM [2] MOD .T_RANGE); ! RANDOM TRACK NUMBER WITHIN RANGE
;  4071  3         NSECT = ABS (.RANDOM [3] MOD .S_RANGE);             ! RANDOM SECTOR NUMBER WITHIN RANGE
;  4072  3
;  4073  3         END
;  4074  2     ELSE                                        ! ELSE - SEQUENTIAL LBN MODE
;  4075  3         BEGIN
;  4076  3
;  4077  3         NTRACK = .BST [.L$LUN, TRACK];          ! GET TRACK FROM BST
;  4078  3         NSECT = .BST [.L$LUN, SECTOR];          ! GET SECTOR FROM BST
;  4079  3         ADV_BST ();                             ! ADVANCE TO NEXT LBN
;  4080  3
;  4081  2         END;
;  4082  2
;  4083  2     LBN = (.NTRACK * SEC_PER_TRK) + .NSECT;     ! CALCULATE LBN
;  4084  2     MAD1 [LBN_L] = .LBN;                        ! LOAD LBN INTO 1ST ENVELOPE
;  4085  2     IF .MX2 GEQ 0                               ! IF 2 QIOS
;  4086  2     THEN                                        ! THEN
;  4087  2         MAD2 [LBN_L] = .LBN;                    ! LOAD LBN INTO 2ND ENVELOPE
;  4088  2
;  4089  1     END;                                        ! ROUTINE QIO_LBN


                                        .SBTTL  QIO.LBN MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G          QIO.LBN:JSR     R1,$SAVE2                       ;                                4037
```

```
000004  132737  000004  000000G          BITB    #4,SWP.FLAGS                    ;                                       4064
000012  001436                           BEQ     1$
000014  013700  000000G                  MOV     SWP.ETRACK,R0                   ;                                       4068
000020  163700  000000G                  SUB     SWP.STRACK,R0
000024  005200                           INC     R0
000026  012702  000037                   MOV     #37,R2                          ; *,S.RANGE                             4069
000032  013746  000640'                  MOV     RANDOM+4,-(SP)                  ;                                       4070
000036  010046                           MOV     R0,-(SP)                        ; T.RANGE,*
000040  004737  000000G                  JSR     PC,BL$MOD
000044  010016                           MOV     R0,(SP)
000046  004737  000000G                  JSR     PC,BL$ABS
000052  063700  000000G                  ADD     SWP.STRACK,R0
000056  010001                           MOV     R0,R1                           ; *,NTRACK
000060  013716  000642'                  MOV     RANDOM+6,(SP)                   ;                                       4071
000064  010246                           MOV     R2,-(SP)                        ; S.RANGE,*
000066  004737  000000G                  JSR     PC,BL$MOD
000072  010016                           MOV     R0,(SP)
000074  004737  000000G                  JSR     PC,BL$ABS
000100  010002                           MOV     R0,R2                           ; *,NSECT
000102  062706  000006                   ADD     #6,SP                           ;                                       4066
000106  000412                           BR      2$                              ;                                       4064
000110  013700  000000G          1$:     MOV     L$LUN,R0                        ;                                       4077
000114  006300                           ASL     R0
000116  006300                           ASL     R0
000120  016001  000442'                  MOV     BST+2(R0),R1                    ; *,NTRACK
000124  016002  000440'                  MOV     BST(R0),R2                      ; *,NSECT                               4078
000130  004737  000000V                  JSR     PC,ADV.BST                      ;                                       4079
000134  010146                  2$:     MOV     R1,-(SP)                        ; NTRACK,*                              4083
000136  012746  000037                   MOV     #37,-(SP)
000142  004737  000000G                  JSR     PC,BL$MUL
000146  060200                           ADD     R2,R0                           ; NSECT,*
000150  010001                           MOV     R0,R1                           ; *,LBN
000152  013700  000606'                  MOV     MAD1,R0                         ;                                       4084
000156  010160  000044                   MOV     R1,44(R0)                       ; LBN,*
000162  005737  000604'                  TST     MX2                             ;                                       4085
000166  002404                           BLT     3$
000170  013700  000610'                  MOV     MAD2,R0                         ;                                       4087
000174  010160  000044                   MOV     R1,44(R0)                       ; LBN,*
000200  022626                  3$:     CMP     (SP)+,(SP)+                     ;                                       4055
000202  000207                           RTS     PC                              ;                                       4037

; Routine Size:  66 words,      Routine Base:  $CODE$ + 10766
; Maximum stack depth per invocation:  7 words
```

```
;  4090  1     ROUTINE ADV_BST : NOVALUE =
;  4091  1
;  4092  1     !+
;  4093  1     !       THIS ROUTINE IS CALLED BY QIO_LBN TO ADVANCE THE CURRNET UNIT'S LBN
;  4094  1     !       IN THE BLOCK SEQUENCE TABLE (BST). THIS IS DONE BY INCREMENTING THE
;  4095  1     !       SECTOR NUMBER (AND TRACK NUMBER, IF NECESSARY), WHILE ENSURING THAT
;  4096  1     !       BOTH VALUES REMAIN WITHIN THE PROPER LIMITS.
;  4097  1     !
;  4098  1     !       IMPLICIT INPUTS:
;  4099  1     !               L$LUN - CURRENT (DRS) UNIT NUMBER
;  4100  1     !-
;  4101  1
;  4102  2     BEGIN
;  4103  2
;  4104  2     BST [.L$LUN, SECTOR] = .BST [.L$LUN, SECTOR] + 1;       ! INCREMENT SECTOR NUMBER
;  4105  2     IF .BST [.L$LUN, SECTOR] GTRU MAX_SECT                  ! IF SECTOR IS BEYOND HIGH LIMIT
;  4106  2     THEN                                                    ! THEN
;  4107  3         BEGIN
;  4108  3
;  4109  3         BST [.L$LUN, SECTOR] = 0;                           ! SET SECTOR TO LOW LIMIT
;  4110  3         BST [.L$LUN, TRACK] = .BST [.L$LUN, TRACK] + 1;     ! INCREMENT TRACK NUMBER
;  4111  3         IF .BST [.L$LUN, TRACK] GTRU .SWP_ETRACK            ! IF TRACK IS BEYOND HIGH LIMIT
;  4112  3         THEN                                                ! THEN
;  4113  3             BST [.L$LUN, TRACK] = .SWP_STRACK;              ! SET TRACK TO LOW LIMIT
;  4114  3
;  4115  2         END;
;  4116  2
;  4117  1     END;                                                    ! ROUTINE ADV_BST


                                        .SBTTL  ADV.BST MULTI-DRIVE SUBTEST ROUTINES
000000  010146                  ADV.BST:MOV     R1,-(SP)                ;                       4090
000002  013701  000000G                 MOV     L$LUN,R1                ;                       4104
000006  006301                          ASL     R1
000010  006301                          ASL     R1
000012  012700  000440'                 MOV     #BST,R0
000016  060100                          ADD     R1,R0
000020  005210                          INC     (R0)
000022  021027  000036                  CMP     (R0),#36                ;                       4105
000026  101412                          BLOS    1$
000030  005010                          CLR     (R0)                    ;                       4109
000032  012700  000442'                 MOV     #BST+2,R0               ;                       4110
000036  060100                          ADD     R1,R0
000040  005210                          INC     (R0)
000042  021037  000000G                 CMP     (R0),SWP.ETRACK         ;                       4111
000046  101402                          BLOS    1$
000050  013710  000000G                 MOV     SWP.STRACK,(R0)         ;                       4113
000054  012601                  1$:     MOV     (SP)+,R1                ;                       4090
000056  000207                          RTS     PC

; Routine Size:  24 words,      Routine Base:  $CODE$ + 11172
; Maximum stack depth per invocation:  2 words
```

```
;   4118  1     ROUTINE QIO_SIZE : NOVALUE =
;   4119  1
;   4120  1     !+
;   4121  1     !       THIS ROUTINE IS CALLED BY QIO_GEN TO SELECT THE I/O TRANSFER BYTE COUNT
;   4122  1     !       TO BE USED FOR THE CURRENT QIO OR QIO PAIR. THE BYTE COUNT IS
;   4123  1     !       DETERMINED BY A RANDOM NUMBER, AND WILL ALWAYS BE AN EVEN NUMBER
;   4124  1     !       BETWEEN 0 AND THE I/O BUFFER SIZE (BUFF_SIZE), INCLUSIVE.
;   4125  1     !
;   4126  1     !       IMPLICIT OUTPUTS:
;   4127  1     !               THE BYTE COUNT IS LOADED INTO ONE OR BOTH MSCP ENVELOPES.
;   4128  1     !-
;   4129  1
;   4130  2     BEGIN
;   4131  2
;   4132  2     LOCAL
;   4133  2         END_BLK : WORD,                             ! ENDING BLOCK NUMBER FOR CURRENT I/O
;   4134  2         SIZE : WORD;                                ! BYTE COUNT
;   4135  2
;   4136  2     SIZE = ABS (.RANDOM [4] MOD (.BUFF_SIZE + 1)) AND %O'177776';   ! GET BYTE COUNT FROM RANDOM NUMBER
;   4137  2     END_BLK = .MAD1 [LBN_L] + ((.SIZE - 1) / BLK_SIZE);             ! CALCULATE ENDING BLOCK NUMBER
;   4138  3     IF .END_BLK GTRU (.USIZE - 1)                   ! IF ENDING BLOCK IS LARGER THAN UNIT SIZE
;   4139  2     THEN                                            ! THEN
;   4140  2         SIZE = (.USIZE - .MAD1 [LBN_L]) * BLK_SIZE; ! SCALE DOWN BYTE COUNT
;   4141  2     MAD1 [BC_LO] = .SIZE;                           ! LOAD SIZE INTO 1ST MSCP ENVELOPE
;   4142  2     IF .MX2 GEQ 0                                   ! IF 2 QIOS
;   4143  2     THEN                                            ! THEN
;   4144  2         MAD2 [BC_LO] = .SIZE;                       ! LOAD SIZE INTO 2ND MSCP ENVELOPE
;   4145  2
;   4146  1     END;                                            ! ROUTINE QIO_SIZE


                                .SBTTL  QIO.SIZE MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G    QIO.SIZE:
                                JSR     R1,$SAVE3                       ;                               4118
000004  013746  000644'             MOV     RANDOM+10,-(SP)             ;                               4136
000010  013746  000000G             MOV     BUFF.SIZE,-(SP)
000014  005216                      INC     (SP)
000016  004737  000000G             JSR     PC,BL$MOD
000022  010016                      MOV     R0,(SP)
000024  004737  000000G             JSR     PC,BL$ABS
000030  010003                      MOV     R0,R3                       ; *,SIZE
000032  042703  000001              BIC     #1,R3                       ; *,SIZE
000036  013701  000606'             MOV     MAD1,R1                     ;                               4137
000042  010316                      MOV     R3,(SP)                     ; SIZE,*
000044  005316                      DEC     (SP)
000046  012746  001000              MOV     #1000,-(SP)
000052  004737  000000G             JSR     PC,BL$DIV
000056  066100  000044              ADD     44(R1),R0
000062  010002                      MOV     R0,R2                       ; *,END.BLK
000064  013700  000616'             MOV     USIZE,R0                    ;                               4138
000070  005300                      DEC     R0
000072  020200                      CMP     R2,R0                       ; END.BLK,*
000074  101410                      BLOS    1$
000076  013700  000616'             MOV     USIZE,R0                    ;                               4140
000102  166100  000044              SUB     44(R1),R0
000106  000300                      SWAB    R0
000110  105000                      CLRB    R0
```

```
000112  006300                          ASL     R0
000114  010003                          MOV     R0,R3                   ; *,SIZE
000116  013700  000606'          1$:     MOV     MAD1,R0                 ;                       4141
000122  010360  000024                    MOV     R3,24(R0)               ; SIZE,*
000126  005737  000604'                    TST     MX2                     ;                       4142
000132  002404                          BLT     2$
000134  013700  000610'                    MOV     MAD2,R0                 ;                       4144
000140  010360  000024                    MOV     R3,24(R0)               ; SIZE,*
000144  062706  000006          2$:     ADD     #6,SP                   ;                       4130
000150  000207                          RTS     PC                      ;                       4118

; Routine Size:  53 words,      Routine Base:  $CODE$ + 11252
; Maximum stack depth per invocation:  8 words
```

```
;  4147  1     ROUTINE FILL_BUFF : NOVALUE =
;  4148  1
;  4149  1     !+
;  4150  1     !       THIS ROUTINE IS CALLED BY QIO_GEN TO LOAD THE I/O BUFFER DESCRIBED IN
;  4151  1     !       THE FIRST MSCP ENVELOPE WITH THE APPROPRIATE DATA PATTERN.
;  4152  1     !
;  4153  1     !       THE DATA PATTERN TO BE SELECTED IS BASED ON THE FOLLOWING ALGORITHM:
;  4154  1     !
;  4155  1     !               IF THE OPERATOR DEFINED A DATA PATTERN
;  4156  1     !               THEN
;  4157  1     !                       SELECT IT
;  4158  1     !               ELSE
;  4159  1     !                       GET DATA PATTERN NUMBER FROM SW P-TABLE
;  4160  1     !                       IF DATA PATTERN NUMBER = 0
;  4161  1     !                       THEN
;  4162  1     !                               GET DATA PATTERN NUMBER FROM THE UNIT'S ENTRY
;  4163  1     !                               IN THE DATA PATTERN SEQUENCE TABLE (DPST)
;  4164  1     !
;  4165  1     !       NOTE THAT PATTERN # 1 CONSISTS OF RANDOM NUMBERS, AND PATTERNS # 17 -
;  4166  1     !       21 USE THE ACTUAL LBN OF THE WRITE REQUEST.
;  4167  1     !
;  4168  1     !       IMPLICIT INPUTS:
;  4169  1     !               L$LUN - CURRENT (DRS) UNIT NUMBER
;  4170  1     !-
;  4171  1
;  4172  2     BEGIN
;  4173  2
;  4174  2     LOCAL
;  4175  2         DP_NUM : WORD,                          ! DATA PATTERN NUMBER SELECTED
;  4176  2         DP_ADDR,                                ! ADDR OF DATA PATTERN (LENGTH)
;  4177  2         IOB_ADDR,                               ! I/O BUFFER ADDRESS (DESTINATION)
;  4178  2         SRC_ADDR,                               ! WORKING SOURCE ADDRESS
;  4179  2         DISP : WORD,                            ! MEM. MGMT. ADDRESS DISPLACEMENT
;  4180  2         PAF : WORD,                             ! PAGE ADDRESS FIELD
;  4181  2         COUNT : WORD;                           ! NO. OF WORDS IN DATA PATTERN
;  4182  2
;  4183  3     IF BIT_TST (SWP_FLAGS, SWF_UDP)             ! IF USER DEFINED A DATA PATTERN
;  4184  2     THEN                                        ! THEN
;  4185  2         DP_ADDR = SWP_UCNT                      ! SELECT IT
;  4186  2     ELSE                                        ! OTHERWISE
;  4187  3         BEGIN
;  4188  3
;  4189  3         IF .SWP_DPAT NEQU 0                     ! IF USER SELECTED A PRE-DEFINED DATA PATTERN
;  4190  3         THEN                                    ! THEN
;  4191  3             DP_NUM = .SWP_DPAT                  ! SELECT IT
;  4192  3         ELSE                                    ! OTHERWISE
;  4193  4             BEGIN
;  4194  4
;  4195  4             DP_NUM = .DPST [.L$LUN];            ! GET PATTERN NUMBER FROM SEQUENCE TABLE
;  4196  4             DPST [.L$LUN] = .DPST [.L$LUN] + 1; ! ADVANCE TO NEXT PATTERN NUMBER
;  4197  4             IF .DPST [.L$LUN] GTRU DP_CNT       ! CHECK FOR HIGH LIMIT
;  4198  4             THEN
;  4199  4                 DPST [.L$LUN] = 1;
;  4200  4
;  4201  3             END;
;  4202  3
;  4203  3         DP_ADDR = .DPA_TBL [.DP_NUM - 1];       ! ADDRESS OF DATA PATTERN (COUNT)
```

```
;  4204  3          IF .DP_NUM GEQU 17
;  4205  3          THEN
;  4206  4              BEGIN
;  4207  4
;  4208  4              IF .DP_NUM                                  ! IF PATTERN 17, 19, OR 21
;  4209  4              THEN                                        ! THEN
;  4210  4                  (.DP_ADDR + 2) = .MAD1 [LBN_L]          ! LOAD LBN INTO FIRST WORD OF PATTERN
;  4211  4              ELSE                                        ! ELSE - PATTERN 18 OR 20
;  4212  4                  (.DP_ADDR + 4) = .MAD1 [LBN_L];         ! LOAD LBN INTO SECOND WORD OF PATTERN
;  4213  4
;  4214  3              END;
;  4215  3
;  4216  2          END;
;  4217  2
;  4218  2      IOB_ADDR = .MAD1 [BUF_0];                           ! I/O BUFFER ADDRESS
;  4219  2      IF .MEM_MGMT                                        ! IF SYSTEM HAS MEMORY MANAGEMENT
;  4220  2      THEN                                                ! THEN
;  4221  3          BEGIN
;  4222  3
;  4223  3          DISP = .IOB_ADDR AND %O'17777';                 ! I/O BUFFER DISPLACEMENT ADDRESS
;  4224  3          PAF = (.IOB_ADDR ^ -6) AND %O'1600';            ! PAGE ADDRESS FIELD
;  4225  3          KTPAR4 = (.MAD1 [BUF_1] ^ 10) OR .PAF;          ! LOAD PAR4
;  4226  3          IOB_ADDR = %O'100000' OR .DISP;                 ! I/O BUFFER VIRTUAL ADDRESS
;  4227  3
;  4228  2          END;
;  4229  2
;  4230  2      COUNT = ..DP_ADDR;                                  ! NO. OF WORDS IN DATA PATTERN
;  4231  2      SRC_ADDR = .DP_ADDR + 2;                            ! START OF THE ACTUAL DATA PATTERN
;  4232  2      INCR N FROM 1 TO (.MAD1 [BC_LO] / 2) DO             ! FOR EACH WORD IN THIS WRITE REQUEST
;  4233  3          BEGIN
;  4234  3
;  4235  3          .IOB_ADDR = ..SRC_ADDR;                         ! MOVE 1 WORD
;  4236  3          IOB_ADDR = .IOB_ADDR + 2;                       ! ADVANCE DESTINATION ADDRESS
;  4237  3          SRC_ADDR = .SRC_ADDR + 2;                       ! ADVANCE SOURCE ADDRESS
;  4238  3          IF .MEM_MGMT                                    ! IF SYSTEM HAS MEMORY MANAGEMENT
;  4239  3          THEN                                            ! THEN
;  4240  4              BEGIN
;  4241  4
;  4242  4              IF (.IOB_ADDR AND %O'17777') EQLU 0         ! IF I/O BUFFER CROSSES A 4K PAGE BOUNDARY
;  4243  4              THEN                                        ! THEN
;  4244  5                  BEGIN
;  4245  5
;  4246  5                  IOB_ADDR = %O'100000';                  ! RESET VIRTUAL ADDRESS
;  4247  5                  KTPAR4 = .KTPAR4 + %O'200';             ! ADVANCE PAR TO NEXT 4K PAGE
;  4248  5
;  4249  4                  END;
;  4250  4
;  4251  3              END;                                        ! END   IF MEMORY MANAGEMENT
;  4252  3
;  4253  3          COUNT = .COUNT - 1;                             ! DECREMENT COUNT
;  4254  3          IF .COUNT EQLU 0                                ! IF END OF DATA PATTERN
;  4255  3          THEN                                            ! THEN
;  4256  4              BEGIN
;  4257  4
;  4258  4              COUNT = ..DP_ADDR;                          ! REPEAT DATA PATTERN
;  4259  4              SRC_ADDR = .DP_ADDR + 2;
;  4260  4
```

```
;  4261  3          END;
;  4262  3
;  4263  2      END;                                ! WORD TRANSFER LOOP
;  4264  2
;  4265  2      IF .MEM_MGMT                        ! IF SYSTEM HAS MEMORY MANAGEMENT
;  4266  2      THEN                                ! THEN
;  4267  2          KTPAR4 = %O'1000';              ! RESTORE PAR4
;  4268  2
;  4269  1      END;                                ! ROUTINE FILL_BUFF


                                        .SBTTL  FILL.BUFF MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G           FILL.BUFF:
                                        JSR     R1,$SAVE5                       ;                       4147
000004  024646                          CMP     -(SP), (SP)
000006  105737  000000G                 TSTB    SWP.FLAGS                       ;                       4183
000012  100003                          BPL     1$
000014  012702  000000G                 MOV     #SWP.UCNT,R2                    ; *,DP.ADDR             4185
000020  000445                          BR      5$                              ;                       4183
000022  005000           1$:            CLR     R0                              ;                       4189
000024  153700  000000G                 BISB    SWP.DPAT,R0
000030  005700                          TST     R0
000032  001402                          BEQ     2$
000034  010001                          MOV     R0,R1                           ; *,DP.NUM              4191
000036  000414                          BR      3$                              ;                       4189
000040  013700  000000G       2$:       MOV     L$LUN,R0                        ;                       4195
000044  062700  000540                  ADD     #DPST,R0
000050  005001                          CLR     R1                              ; DP.NUM
000052  151001                          BISB    (R0),R1                         ; *,DP.NUM
000054  105210                          INCB    (R0)                            ;                       4196
000056  121027  000025                  CMPB    (R0),#25                        ;                       4197
000062  101402                          BLOS    3$
000064  112710  000001                  MOVB    #1,(R0)                         ;                       4199
000070  010100           3$:            MOV     R1,R0                           ; DP.NUM,*              4203
000072  006300                          ASL     R0
000074  016002  001642'                 MOV     DPA.TBL-2(R0),R2                ; *,DP.ADDR
000100  020127  000021                  CMP     R1,#21                          ; DP.NUM,*              4204
000104  103413                          BLO     5$
000106  013700  000606'                 MOV     MAD1,R0                         ;                       4210
000112  006001                          ROR     R1                              ; DP.NUM                4208
000114  103004                          BCC     4$
000116  016062  000044  000002          MOV     44(R0),2(R2)                    ; *,*(DP.ADDR)          4210
000124  000403                          BR      5$                              ;                       4208
000126  016062  000044  000004  4$:     MOV     44(R0),4(R2)                    ; *,*(DP.ADDR)          4212
000134  013701  000606'        5$:     MOV     MAD1,R1                         ;                       4218
000140  016104  000030                  MOV     30(R1),R4                       ; *,IOB.ADDR
000144  005066  000002                  CLR     2(SP)                           ;                       4219
000150  113766  000000G 000002          MOVB    MEM.MGMT,2(SP)
000156  032766  000001  000002          BIT     #1,2(SP)
000164  001431                          BEQ     6$
000166  010405                          MOV     R4,R5                           ; IOB.ADDR,DISP         4223
000170  042705  160000                  BIC     #160000,R5                      ; *,DISP
000174  010446                          MOV     R4,-(SP)                        ; IOB.ADDR,*            4224
000176  012746  177772                  MOV     #-6,-(SP)
000202  004737  000000G                 JSR     PC,BL$SHF
000206  010003                          MOV     R0,R3                           ; *,PAF
000210  042703  176177                  BIC     #176177,R3                      ; *,PAF
```

```
000214  016100  000032                        MOV     32(R1),R0               ;                                       4225
000220  000300                                SWAB    R0
000222  105000                                CLRB    R0
000224  006300                                ASL     R0
000226  006300                                ASL     R0
000230  010337  172350                        MOV     R3,@#172350             ; PAF,*
000234  050037  172350                        BIS     R0,@#172350
000240  010504                                MOV     R5,R4                   ; DISP,IOB.ADDR                         4226
000242  052704  100000                        BIS     #100000,R4              ; *,IOB.ADDR
000246  022626                                CMP     (SP)+,(SP)+             ;                                       4221
000250  011205                        6$:     MOV     (R2),R5                 ; DP.ADDR,COUNT                         4230
000252  012716  000002                        MOV     #2,(SP)                 ;                                       4231
000256  060216                                ADD     R2,(SP)                 ; DP.ADDR,*
000260  011603                                MOV     (SP),R3                 ; *,SRC.ADDR
000262  016146  000024                        MOV     24(R1),-(SP)            ;                                       4232
000266  012746  000002                        MOV     #2,-(SP)
000272  004737  000000G                       JSR     PC,BL$DIV
000276  005001                                CLR     R1                      ; N
000300  000422                                BR      9$
000302  012324                        7$:     MOV     (R3)+,(R4)+             ; SRC.ADDR,IOB.ADDR                     4235
000304  032766  000001  000006                BIT     #1,6(SP)                ;                                       4238
000312  001410                                BEQ     8$
000314  032704  017777                        BIT     #17777,R4               ; *,IOB.ADDR                            4242
000320  001005                                BNE     8$
000322  012704  100000                        MOV     #-100000,R4             ; *,IOB.ADDR                            4246
000326  062737  000200  172350                ADD     #200,@#172350           ;                                       4247
000334  005305                        8$:     DEC     R5                      ; COUNT                                 4253
000336  001003                                BNE     9$                      ;                                       4254
000340  011205                                MOV     (R2),R5                 ; DP.ADDR,COUNT                         4258
000342  016603  000004                        MOV     4(SP),R3                ; *,SRC.ADDR                            4259
000346  005201                        9$:     INC     R1                      ; N                                     4232
000350  020100                                CMP     R1,R0                   ; N,*
000352  003753                                BLE     7$
000354  032766  000001  000006                BIT     #1,6(SP)                ;                                       4265
000362  001403                                BEQ     10$
000364  012737  001000  172350                MOV     #1000,@#172350          ;                                       4267
000372  062706  000010                10$:    ADD     #10,SP                  ;                                       4147
000376  000207                                RTS     PC

; Routine Size:  128 words,     Routine Base:  $CODE$ + 11424
; Maximum stack depth per invocation:  11 words
```

```
;    4270  1     ROUTINE PROC_RETPKT : NOVALUE =
;    4272  1     !+
;    4273  1     !       THIS ROUTINE IS CALLED FROM THE MULTI_DRIVE "EXECUTIVE" TO CHECK FOR
;    4274  1     !       AND PROCESS ANY RETURN PACKETS THAT HAVE BEEN "SENT" BY THE "DRIVER"
;    4275  1     !       PORTION OF THE PROGRAM. THE I/O DONE QUEUE (IODQ) ACTS AS THE LINK
;    4276  1     !       BETWEEN THE TWO PROGRAM PARTS; IT HOLDS INDECES OF RETURN PACKETS WHICH
;    4277  1     !       REQUIRE PROCESSING.
;    4278  1     !
;    4279  1     !       UNDER THE MULTI-DRIVE SUBTEST, RETURN PACKETS ORIGINATE FROM TWO
;    4280  1     !       SOURCES:
;    4281  1     !               1. DISK MSCP - THE MORE COMMON, DESCRIBING A COMPLETED I/O
;    4282  1     !                  OPERATION
;    4283  1     !               2. THE PROGRAM "DRIVER" - DESCRIBING A CONTROLLER ERROR OR
;    4284  1     !                  COMMAND TIMEOUT.
;    4285  1     !-
;    4287  2     BEGIN
;    4289  2     WHILE .IODQ_IN NEQU .IODQ_OUT DO                ! DO UNTIL I/O DONE QUEUE IS EMPTY
;    4290  3         BEGIN
;    4292  3         RP_INDX = OUT_IODQ ();                      ! GET INDEX OF NEXT RETPKT AND ADVANCE OUT POINTER
;    4293  3         RP_ADDR = RETPKT + (.RP_INDX * RP_LEN * 2); ! CALCULATE RETPKT ADDRESS
;    4294  3         SET_CPAR (.RP_ADDR [CTLR]);                 ! SET UP CURRENT CONTROLLER PARAMETERS
;    4295  3         SELECTONEU .RP_ADDR [CONID] OF              ! CONNECTION ID INDICATES PACKET SOURCE
;    4296  3             SET
;    4297  3             [CID_DISK]   : IO_RETPKT ();                    ! DISK MSCP (I/O TRANSFER DONE)
;    4298  3             [CID_DRIVER] : DR_RETPKT ();                    ! MESSAGE FROM "DRIVER"
;    4299  3             TES;
;    4301  2         END;                                        ! UNITL I/O DONE QUEUE IS EMPTY
;    4303  1     END;                                            ! ROUTINE PROC_RETPKT

                                        .SBTTL  PROC.RETPKT MULTI-DRIVE SUBTEST ROUTINES
000000  023737  000000G 000000G  PROC.RETPKT:
000000                          1$:     CMP     IODQ.IN,IODQ.OUT                ;                       4289
000006  001444                          BEQ     4$
000010  004737  000000G                 JSR     PC,OUT.IODQ                     ;                       4292
000014  010037  000000G                 MOV     R0,RP.INDX
000020  010046                          MOV     R0,-(SP)                        ; RP.INDX,*             4293
000022  012746  000060                  MOV     #60,-(SP)
000026  004737  000000G                 JSR     PC,BL$MUL
000032  062700  000000G                 ADD     #RETPKT,R0
000036  010037  000000G                 MOV     R0,RP.ADDR
000042  116016  000002                  MOVB    2(R0),(SP)                      ;                       4294
000046  042716  177760                  BIC     #177760,(SP)
000052  004737  000000G                 JSR     PC,SET.CPAR
000056  013700  000000G                 MOV     RP.ADDR,R0                      ;                       4295
000062  116000  000003                  MOVB    3(R0),R0
000066  042700  177400                  BIC     #177400,R0
000072  001003                          BNE     2$                              ;                       4297
000074  004737  000000V                 JSR     PC,IO.RETPKT
000100  000405                          BR      3$                              ;                       4295
000102  020027  000003          2$:     CMP     R0,#3                           ;                       4298
000106  001002                          BNE     3$
000110  004737  000000V                 JSR     PC,DR.RETPKT
000114  022626                  3$:     CMP     (SP)+,(SP)+                     ;                       4290
000116  000730                          BR      1$                              ;                       4289
000120  000207                  4$:     RTS     PC                              ;                       4270

; Routine Size:  41 words,      Routine Base:  $CODE$ + 12024
; Maximum stack depth per invocation:  3 words
```

```
;  4304  1     ROUTINE IO_RETPKT : NOVALUE =
;  4305  1
;  4306  1     !+
;  4307  1     !       THIS ROUTINE IS CALLED BY PROC_RETPKT TO HANDLE ALL I/O TRANSFER
;  4308  1     !       RETURN PACKETS. PROCESSING OF THESE PACKETS INCLUDES DECLARING ANY
;  4309  1     !       HARD ERRORS THAT MAY HAVE OCCURRED, UPDATING THE STATISTICS, AND
;  4310  1     !       PERFORMING HOST WRITE-COMPARES IF REQUIRED.
;  4311  1     !
;  4312  1     !       IMPLICIT INPUTS:
;  4313  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;  4314  1     !               CCTLR   CURRENT CONTROLLER NUMBER
;  4315  1     !-
;  4316  1
;  4317  2     BEGIN
;  4318  2
;  4319  2     SWEEP_FLAG = TRUE;                              ! INDICATES THAT SWEEP () WILL BE CALLED
;  4320  2     FSET_UPAR ();                                   ! FIND UNIT'S ENTRY IN CST AND SET UP UNIT-RELATED DATA
;  4321  2     ST_CODE = .RP_ADDR [STSCOD];                    . GET STATUS CODE FROM RETPKT
;  4322  2     SB_CODE = .RP_ADDR [SUBCOD];                    ! GET SUB-CODE, IF ANY
;  4323  2     IF .ST_CODE NEQU ST_SUC                         ! IF STATUS CODE INDICATES ERROR
;  4324  2     THEN                                            ! THEN
;  4325  3         BEGIN
;  4326  3
;  4327  3         IF .ST_CODE EQLU ST_OFL                     ! IF UNIT OFFLINE
;  4328  3         THEN                                        ! THEN
;  4329  4             BEGIN
;  4330  4
;  4331  4             ERRDF (19, EGD_19, EMS_19);             ! "FATAL I/O ERROR"
;  4332  4             DUR [.L$LUN] = DU_FATAL;                ! LOAD REASON FOR DROPPING UNIT
;  4333  4             DODU (.L$LUN);                          ! DROP UNIT
;  4334  4
;  4335  4             END
;  4336  3         ELSE                                        ! ELSE   ERROR IS NOT UNIT-OFFLINE
;  4337  4             BEGIN
;  4338  4
;  4339  4             CASE .ST_CODE
;  4340  4                 FROM 1 TO 11 OF
;  4341  4                 SET
;  4342  4                 [1]         : ERRHRD (31, EGH_30, EMS_30);    ! INVALID COMMAND
;  4343  4                 [2]         : ERRHRD (32, EGH_30, EMS_30);    ! COMMAND ABORTED
;  4344  4                 [3]         : ;                               ! UNIT OFFLINE (DEVICE-FATAL)
;  4345  4                 [4]         : ERRHRD (34, EGH_30, EMS_30);    ! UNIT AVAILABLE
;  4346  4                 [5]         : ERRHRD (35, EGH 30, EMS_30);    ! MEDIA FORMAT ERROR
;  4347  4                 [6]         : ERRHRD (36, EGH_30, EMS_30);    ! WRITE-PROTECTED
;  4348  4                 [7]         : ERRHRD (37, EGH_30, EMS_30);    ! DEVICE COMPARE ERROR
;  4349  4                 [8]         : ERRHRD (38, EGH_30, EMS_30);    ! DATA ERROR
;  4350  4                 [9]         : ERRHRD (39, EGH_30, EMS_30);    ! HOST BUFFER ACCESS ERROR
;  4351  4                 [10]        : ERRHRD (40, EGH_30, EMS_30);    ! CONTROLLER ERROR
;  4352  4                 [11]        : ERRHRD (41, EGH_30, EMS_30);    ! DRIVE ERROR
;  4353  4                 [OUTRANGE]  : ERRHRD (30, EGH_30, EMS_30);    ! UNKNOWN
;  4354  4                 TES;
;  4355  4
;  4356  4             HARD_ERR (1);                           ! INCREMENT HARD ERROR COUNT FOR CURRENT UNIT
;  4357  4
;  4358  3             END;
;  4359  3
;  4360  3     END
```

```
;    4361  2     ELSE                                    ! ELSE - I/O WAS SUCCESSFUL
;    4362  3         BEGIN
;    4363  3
;    4364  3         MD_TALLY ();                        ! UPDATE I/O STATISTICS
;    4365  4         IF BIT_TST (SWP_FLAGS, SWF HWC)     ! IF HOST IS DOING WRITE-COMPARES
;    4366  3         THEN                                ! THEN
;    4367  3             HOST_WRT_CHK ();                ! SAVE I/O PACKET OR DO WRITE-CHECK
;    4368  3
;    4369  2         END;
;    4370  2
;    4371  2     IF .SWEEP_FLAG EQLU TRUE                ! IF SWEEP_FLAG IS STILL TRUE
;    4372  2     THEN                                    ! THEN
;    4373  2         SWEEP ();                           ! DEALLOCATE BUFFER(S) AND RETPKT(S)
;    4374  2     QIO [.CCTLR] = .QIO [.CCTLR]   1;       ! DECREMENT NO. OF OUTSTANDING QIOS
;    4375  2
;    4376  1     END;                                    ! ROUTINE IO_RETPKT


                                        .SBTTL  IO.RETPKT MULTI-DRIVE SUBTEST ROUTINES
000000  010146                  IO.RETPKT:
                                        MOV     R1,-(SP)                        ;                       4304
000002  112737  000001  000630'         MOVB    #1,SWEEP.FLAG                   ;                       4319
000010  004737  000000V                 JSR     PC,FSET.UPAR                    ;                       4320
000014  013700  000000G                 MOV     RP.ADDR,R0                      ;                       4321
000020  116037  000016  000000G         MOVB    16(R0),ST.CODE
000026  042737  177740  000000G         BIC     #177740,ST.CODE
000034  016001  000016                  MOV     16(R0),R1                       ;                       4322
000040  006201                          ASR     R1
000042  006201                          ASR     R1
000044  006201                          ASR     R1
000046  006201                          ASR     R1
000050  006201                          ASR     R1
000052  042701  174000                  BIC     #174000,R1
000056  010137  000000G                 MOV     R1,SB.CODE
000062  013700  000000G                 MOV     ST.CODE,R0                      ;                       4323
000066  001521                          BEQ     15$
000070  020027  000003                  CMP     R0,#3                           ;                       4327
000074  001013                          BNE     1$
000076  104455                          TRAP    55                              ;                       4331
000100  000023                          .WORD   23
000102  000000G                         .WORD   EGD.19
000104  000000G                         .WORD   EMS.19
000106  013700  000000G                 MOV     L$LUN,R0                        ;                       4332
000112  112760  000004  000000G         MOVB    #4,DUR(R0)
000120  104451                          TRAP    51                              ;                       4333
000122  000513                          BR      16$                             ;                       4327
000124  005300                  1$:     DEC     R0                              ;                       4339
000126  020027  000012                  CMP     R0,#12
000132  101003                          BHI     3$
000134  006300                          ASL     R0
000136  066007  000010'                 ADD     P.AAB(R0),PC                    ; Case dispatch
000142  104456                  3$:     TRAP    56                              ;                       4353
000144  000036                          .WORD   36
000146  000000G                         .WORD   EGH.30
000150  000000G                         .WORD   EMS.30
000152  000461                          BR      14$                             ;                       4339
000154  104456                  4$:     TRAP    56                              ;                       4342
```

```
000156  000037                          .WORD   37
000160  000000G                         .WORD   EGH.30
000162  000000G                         .WORD   EMS.30
000164  000454                          BR      14$                             ;
000166  104456                  5$:     TRAP    56                              ;  4339
000170  000040                          .WORD   40                              ;  4343
000172  000000G                         .WORD   EGH.30
000174  000000G                         .WORD   EMS.30
000176  000447                          BR      14$                             ;
000200  104456                  6$:     TRAP    56                              ;  4339
000202  000042                          .WORD   42                              ;  4345
000204  000000G                         .WORD   EGH.30
000206  000000G                         .WORD   EMS.30
000210  000442                          BR      14$                             ;
000212  104456                  7$:     TRAP    56                              ;  4339
000214  000043                          .WORD   43                              ;  4346
000216  000000G                         .WORD   EGH.30
000220  000000G                         .WORD   EMS.30
000222  000435                          BR      14$                             ;
000224  104456                  8$:     TRAP    56                              ;  4339
000226  000044                          .WORD   44                              ;  4347
000230  000000G                         .WORD   EGH.30
000232  000000G                         .WORD   EMS.30
000234  000430                          BR      14$                             ;
000236  104456                  9$:     TRAP    56                              ;  4339
000240  000045                          .WORD   45                              ;  4348
000242  000000G                         .WORD   EGH.30
000244  000000G                         .WORD   EMS.30
000246  000423                          BR      14$                             ;
000250  104456                  10$:    TRAP    56                              ;  4339
000252  000046                          .WORD   46                              ;  4349
000254  000000G                         .WORD   EGH.30
000256  000000G                         .WORD   EMS.30
000260  000416                          BR      14$                             ;
000262  104456                  11$:    TRAP    56                              ;  4339
000264  000047                          .WORD   47                              ;  4350
000266  000000G                         .WORD   EGH.30
000270  000000G                         .WORD   EMS.30
000272  000411                          BR      14$                             ;
000274  104456                  12$:    TRAP    56                              ;  4339
000276  000050                          .WORD   50                              ;  4351
000300  000000G                         .WORD   EGH.30
000302  000000G                         .WORD   EMS.30
000304  000404                          BR      14$                             ;
000306  104456                  13$:    TRAP    56                              ;  4339
000310  000051                          .WORD   51                              ;  4352
000312  000000G                         .WORD   EGH.30
000314  000000G                         .WORD   EMS.30
000316  012746  000001          14$:    MOV     #1,-(SP)                        ;  4356
000322  004737  000000G                 JSR     PC,HARD.ERR
000326  005726                          TST     (SP)+                           ;  4337
000330  000410                          BR      16$                             ;  4323
000332  004737  000000V          15$:    JSR     PC,MD.TALLY                     ;  4364
000336  132737  000100  000000G         BITB    #100,SWP.FLAGS                  ;  4365
000344  001402                          BEQ     16$
000346  004737  000000V                 JSR     PC,HOST.WRT.CHK                 ;  4367
000352  123727  000630'  000001  16$:    CMPB    SWEEP.FLAG,#1                   ;  4371
```

```
000360  001002                          BNE     17$
000362  004737  000000V                 JSR     PC,SWEEP                        ;                       4373
000366  013700  000000G         17$:    MOV     CCTLR,R0                        ;                       4374
000372  105360  000000G                 DECB    QIO(R0)
000376  012601                          MOV     (SP)+,R1                        ;                       4304
000400  000207                          RTS     PC

; Routine Size:  129 words,     Routine Base:  $CODE$ + 12146
; Maximum stack depth per invocation:  3 words


000010                                  .PSECT  $PLIT$,  RO ,  D

                                P.AAB:                                          ; CASE Table for IO.RETPKT+0136 4339
000010  000012                  2$:     .WORD   12                              ; [4$]
000012  000024                          .WORD   24                              ; [5$]
000014  000154                          .WORD   154                             ; [14$]
000016  000036                          .WORD   36                              ; [6$]
000020  000050                          .WORD   50                              ; [7$]
000022  000062                          .WORD   62                              ; [8$]
000024  000074                          .WORD   74                              ; [9$]
000026  000106                          .WORD   106                             ; [10$]
000030  000120                          .WORD   120                             ; [11$]
000032  000132                          .WORD   132                             ; [12$]
000034  000144                          .WORD   144                             ; [13$]
```

```
;  4377  1     ROUTINE FSET_UPAR : NOVALUE =
;  4378  1
;  4379  1     !+
;  4380  1     !       THIS ROUTINE IS CALLED BY IO_RETPKT AND OTHERS TO SEARCH THE CURRENT
;  4381  1     !       CONTROLLER STATUS TABLE (CST) FOR THE PLATTER ADDRESS WHICH IS
;  4382  1     !       CONTAINED IN THE CURRENT RETURN PACKET. WHEN FOUND, THE OFFSET INTO THE
;  4383  1     !       CST IS USED AS INPUT TO SET_UPAR, WHICH SETS UP CURRENT UNIT-RELATED
;  4384  1     !       DATA PARAMETERS.
;  4385  1     !
;  4386  1     !       IMPLICIT INPUTS:
;  4387  1     !               RP_ADDR - ADDRESS OF CURRENT RETURN PACKET
;  4388  1     !               CST_ADDR - ADDRESS OF CURRENT CONTROLLER'S CST
;  4389  1     !-
;  4390  1
;  4391  2     BEGIN
;  4392  2
;  4393  2     INCR OFFSET FROM (0 + OF_UN) TO (3 + OF_UN) DO  ! FOR EACH UNIT IN CST
;  4394  3         BEGIN
;  4395  3
;  4396  3         IF .CST_ADDR [.OFFSET, P_ADDR] EQLU .RP_ADDR [PLAT] ! IF RETPKT UNIT NUMBER MATCHES CST ENTRY
;  4397  3         THEN                                                ! THEN
;  4398  4             BEGIN
;  4399  4
;  4400  4             SET_UPAR (.OFFSET);                             ! SET UP UNIT RELATED DATA
;  4401  4             RETURN;                                         ! DONE
;  4402  4
;  4403  3             END;
;  4404  3
;  4405  2         END;                                            ! CST UNIT SEARCH LOOP
;  4406  2
;  4407  1     END;                                                ! ROUTINE FSET_UPAR

                                        .SBTTL  FSET.UPAR MULTI-DRIVE SUBTEST ROUTINES
012550                                  .PSECT  $CODE$,  RO

000000  004137  000000G          FSET.UPAR:
                                        JSR     R1,$SAVE3                       ;                       4377
000004  012702  000003                  MOV     #3,R2                           ; *,OFFSET              4393
000010  010201                  1$:     MOV     R2,R1                           ; OFFSET,*              4396
000012  006301                          ASL     R1
000014  063701  000000G                 ADD     CST.ADDR,R1
000020  013700  000000G                 MOV     RP.ADDR,R0
000024  005003                          CLR     R3
000026  151103                          BISB    (R1),R3
000030  020360  000010                  CMP     R3,10(R0)
000034  001005                          BNE     2$
000036  010246                          MOV     R2,-(SP)                        ; OFFSET,*              4400
000040  004737  000000G                 JSR     PC,SET.UPAR
000044  005726                          TST     (SP)+                           ;                       4401
000046  000207                          RTS     PC                              ;                       4398
000050  005202                  2$:     INC     R2                              ; OFFSET                4393
000052  020227  000006                  CMP     R2,#6                           ; OFFSET,*
000056  003754                          BLE     1$
000060  000207                          RTS     PC                              ;                       4377

; Routine Size:  25 words,      Routine Base:  $CODE$ + 12550
; Maximum stack depth per invocation:  6 words
```

```
;    4408  1     ROUTINE MD_TALLY : NOVALUE =
;    4409  1
;    4410  1     !+
;    4411  1     !       THIS ROUTINE IS CALLED FROM IO_RETPKT FOR ALL I/O TRANSFER RETURN
;    4412  1     !       PACKETS WITH "SUCCESS" STATUS CODES. ITS PURPOSE IS TO UPDATE ALL THE
;    4413  1     !       APPROPRIATE STATISTICAL FIELDS FOR THE CURRENT UNIT. A CHECK IS ALSO
;    4414  1     !       MADE ON THE TOTAL NUMBER OF BYTES TRANSFERRED THUS FAR; IF THE
;    4415  1     !       OPERATOR-SPECIFIED LIMIT HAS BEEN REACHED, THEN THE UNIT IS REMOVED
;    4416  1     !       FROM CURRENT PASS TESTING.
;    4417  1     !
;    4418  1     !       IMPLICIT INPUTS:
;    4419  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;    4420  1     !               T_ADDR - ADDRESS OF THE CURRENT UNIT'S STATISTICS BLOCK (TALLY)
;    4421  1     !               L$LUN - CURRENT (DRS) UNIT NUMBER
;    4422  1     !-
;    4423  1
;    4424  2     BEGIN
;    4425  2
;    4426  3     IF .RP_ADDR [ENDCOD] EQLU (OP_RD + OP_END)      ! IF ENDCODE IS READ
;    4427  2     THEN                                            ! THEN
;    4428  3         BEGIN
;    4429  3
;    4430  3         UPD_IOC (T_ADDR [READ_LO], 1);                      ! INCREMENT NO. OF READS
;    4431  3         T_ADDR [BR_LO] = .T_ADDR [BR_LO] + .RP_ADDR [BCNT_LO]; ! UPDATE BYTE COUNT
;    4432  3         OVF_CHK (T_ADDR [BR_LO]);                           ! CHECK FOR FIELD OVERFLOW
;    4433  3
;    4434  3         END
;    4435  2     ELSE                                            ! ELSE ENDCODE IS WRITE
;    4436  3         BEGIN
;    4437  3
;    4438  3         UPD_IOC (T_ADDR [WRIT_LO], 1);                      ! INCREMENT NO. OF WRITES
;    4439  3         T_ADDR [BW_LO] = .T_ADDR [BW_LO] + .RP_ADDR [BCNT_LO]; ! UPDATE BYTE COUNT
;    4440  3         OVF_CHK (T_ADDR [BW_LO]);                           ! CHECK FOR FIELD OVERFLOW
;    4441  3
;    4442  2         END;
;    4443  2
;    4444  2     IF .CPT [.L$LUN]                                ! IF UNIT IS STILL UNDER TEST
;    4445  2     THEN                                            ! THEN
;    4446  2         XFR_CHK ();                                 ! CHECK MBYTES XFR'D AGAINST LIMIT
;    4447  2
;    4448  1     END;                                            ! ROUTINE MD_TALLY


                                        .SBTTL  MD.TALLY MULTI-DRIVE SUBTEST ROUTINES
000000  010146                    MD.TALLY:
                                        MOV     R1,-(SP)                ;                       4408
000002  013700  000000G                 MOV     RP.ADDR,R0              ;                       4426
000006  126027  000014  000241          CMPB    14(R0),#241
000014  001020                          BNE     1$
000016  013746  000000G                 MOV     T.ADDR,-(SP)            ;                       4430
000022  012746  000001                  MOV     #1,-(SP)
000026  004737  000000G                 JSR     PC,UPD.IOC
000032  013700  000000G                 MOV     T.ADDR,R0               ;                       4431
000036  013701  000000G                 MOV     RP.ADDR,R1
000042  066160  000020  000014          ADD     20(R1),14(R0)
000050  012716  000014                  MOV     #14,(SP)                ;                       4432
000054  000421                          BR      2$
```

```
000056  013746  000000G                   1$:     MOV     T.ADDR,-(SP)                    ;                       4438
000062  062716  000004                              ADD     #4,(SP)
000066  012746  000001                              MOV     #1,-(SP)
000072  004737  000000G                             JSR     PC,UPD.IOC
000076  013700  000000G                             MOV     T.ADDR,R0                       ;                       4439
000102  013701  000000G                             MOV     RP.ADDR,R1
000106  066160  000020  000022                      ADD     20(R1),22(R0)
000114  012716  000022                              MOV     #22,(SP)                        ;                       4440
000120  060016                             2$:     ADD     R0,(SP)
000122  004737  000000G                             JSR     PC,OVF.CHK
000126  013700  000000G                             MOV     L$LUN,R0                        ;                       4444
000132  132760  000001  000000G                     BITB    #1,CPT(R0)
000140  001402                                      BEQ     3$
000142  004737  000000G                             JSR     PC,XFR.CHK                      ;                       4446
000146  022626                             3$:     CMP     (SP)+,(SP)+                     ;                       4424
000150  012601                                      MOV     (SP)+,R1                        ;                       4408
000152  000207                                      RTS     PC

; Routine Size:  54 words,      Routine Base:  $CODE$ + 12632
; Maximum stack depth per invocation:  4 words
```

```
;  4449  1     ROUTINE HOST_WRT_CHK : NOVALUE =
;  4451  1     !+
;  4452  1     !       THIS ROUTINE IS CALLED FROM IO_RETPKT FOR ALL I/O TRANSFER RETURN
;  4453  1     !       PACKETS WITH "SUCCESS" STATUS CODES, BUT ONLY IF THE HOST WRITE-COMPARE
;  4454  1     !       OPTION WAS SELECTED BY THE OPERATOR.
;  4455  1     !
;  4456  1     !       IF THE CURRENT RETPKT BEING PROCESSED IS A WRITE FUNCTION, THEN THE
;  4457  1     !       PACKET INDEX (RP_INDX) IS SAVED IN THE CONTROLLER'S RETURN PACKET SAVE
;  4458  1     !       AREA (RP_SAVE). OTHERWISE, THE PACKET IS A READ, SO ITS ASSOCIATED
;  4459  1     !       WRITE PACKET IS REMOVED FROM THE SAVE AREA, AND A WORD-FOR-WORD
;  4460  1     !       COMPARISON IS PERFORMED ON THE TWO I/O BUFFERS. ANY DIFFERENCES
;  4461  1     !       ENCOUNTERED RESULTS IN THE DECLARATION OF A HARD ERROR.
;  4462  1     !
;  4463  1     !       IMPLICIT INPUTS:
;  4464  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;  4465  1     !               RP_INDX - INDEX OF THE CURRENT RETURN PACKET
;  4466  1     !               RPS_X1, RPS_X2 - STARTING / ENDING INDECES OF THE CURRENT
;  4467  1     !                                       CONTROLLER'S RETPKT SAVE AREA (RP_SAVE)
;  4468  1     !-
;  4469  1
;  4470  2     BEGIN
;  4471  2
;  4472  2     LOCAL
;  4473  2         BUFFW,                                          ! ADDR OF I/O BUFFER DESCRIPTOR
;  4474  2         INDEX : SIGNED WORD;
;  4475  2
;  4476  3     IF .RP_ADDR [ENDCOD] EQLU (OP_WRT + OP_END)         ! IF WRITE OPERATION
;  4477  2     THEN                                                ! THEN
;  4478  3         BEGIN
;  4479  3
;  4480  3         INCR INDEX FROM .RPS_X1 TO .RPS_X2 DO           ! LOOK FOR SPARE ENTRY IN
;  4481  4             BEGIN                                       !     CONTROLLER'S RP_SAVE
;  4482  4
;  4483  4             IF .RP_SAVE [.INDEX] LSS 0                  ! IF SPARE SLOT FOUND
;  4484  4             THEN                                        ! THEN
;  4485  5                 BEGIN
;  4486  5
;  4487  5                 RP_SAVE [.INDEX] = .RP_INDX;            ! SAVE INDEX OF WRITE RETPKT
;  4488  5                 EXITLOOP;                               ! DONE
;  4489  5
;  4490  4                 END;
;  4492  3             END;
;  4493  3
;  4494  3         SWEEP_FLAG = FALSE;                             ! DON'T CALL SWEEP FROM IO_RETPKT
;  4495  3
;  4496  3         END
;  4497  2     ELSE                                                ! ELSE ENDCODE IS READ
;  4498  3         BEGIN
;  4499  3
;  4500  3         IF (INDEX = RPS_REM ()) GEQ 0                   ! IF ASSOCIATED WRITE PACKET IS FOUND
;  4501  3         THEN                                            ! THEN
;  4502  4             BEGIN
;  4503  4
;  4504  4             BUFFW = RETPKT [.INDEX,.BUFF_0];            ! ADDR OF ADDR OF WRITE I/O BUFFER
;  4505  4             IF CMP_DATA (.BUFFW) EQLU FAILURE           ! COMPARE DATA IN BOTH BUFFERS. IF FAILURE
;  4506  4             THEN                                        ! THEN
;  4507  5                 BEGIN
```

```
;   4508  5
;   4509  5                 ERRHRD (42, EGH_30, EMS_42);        ! "I/O REQUEST FAILED"
;   4510  5                 HARD_ERR (1);                       ! INCR HARD ERROR STATISTIC
;   4512  4                 END;                                ! IF COMPARE ERROR
;   4513  4
;   4514  4             PUT_IO_BUFF (.BUFFW);                   ! RETURN WRITE I/O BUFFER TO POOL
;   4515  4             PUT_RETPKT (.INDEX);                    ! PUT BACK WRITE RETPKT
;   4516  4
;   4517  3             END;                                    ! IF ASSOCIATED WRITE RETPKT WAS FOUND
;   4519  2         END;                                        ! IF ENDCODE WAS READ
;   4521  1     END;                                            ! ROUTINE HOST_WRT_CHK

                                    .SBTTL  HOST.WRT.CHK MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G          HOST.WRT.CHK:
                                    JSR     R1,$SAVE2                   ;                       4449
000004  013700  000000G             MOV     RP.ADDR,R0                  ;                       4476
000010  126027  000014  000242      CMPB    14(R0),#242
000016  001022                      BNE     4$
000020  013700  000000G             MOV     RPS.X1,R0                   ; *,INDEX               4480
000024  005300                      DEC     R0                          ; INDEX
000026  000407                      BR      2$
000030  105760  000000G          1$: TSTB    RP.SAVE(R0)                 ; *(INDEX)              4483
000034  002004                      BGE     2$
000036  113760  000000G 000000G      MOVB    RP.INDX,RP.SAVE(R0)         ; *,*(INDEX)            4487
000044  000404                      BR      3$                          ;                       4485
000046  005200                  2$: INC     R0                          ; INDEX                 4480
000050  020037  000000G             CMP     R0,RPS.X2                   ; INDEX,*
000054  003765                      BLE     1$
000056  105037  000630'          3$: CLRB    SWEEP.FLAG                  ;                       4494
000062  000207                      RTS     PC                          ;                       4476
000064  004737  000000V          4$: JSR     PC,RPS.REM                  ;                       4500
000070  010002                      MOV     R0,R2                       ; *,INDEX
000072  002434                      BLT     6$
000074  010246                      MOV     R2,-(SP)                    ; INDEX,*               4504
000076  012746  000060              MOV     #60,-(SP)
000102  004737  000000G             JSR     PC,BL$MUL
000106  062700  000024G             ADD     #RETPKT+24,R0
000112  010001                      MOV     R0,R1                       ; *,BUFFW
000114  010116                      MOV     R1,(SP)                     ; BUFFW,*               4505
000116  004737  000000V             JSR     PC,CMP.DATA
000122  005700                      TST     R0
000124  001010                      BNE     5$
000126  104456                      TRAP    56                          ;                       4509
000130  000052                      .WORD   52
000132  000000G                     .WORD   EGH.30
000134  000000G                     .WORD   EMS.42
000136  012716  000001              MOV     #1,(SP)                     ;                       4510
000142  004737  000000G             JSR     PC,HARD.ERR
000146  010116                  5$: MOV     R1,(SP)                     ; BUFFW,*               4514
000150  004737  000000G             JSR     PC,PUT.IO.BUFF
000154  010216                      MOV     R2,(SP)                     ; INDEX,*               4515
000156  004737  000000G             JSR     PC,PUT.RETPKT
000162  022626                      CMP     (SP)+,(SP)+                 ;                       4502
000164  000207                  6$: RTS     PC                          ;                       4449

; Routine Size:  59 words,      Routine Base:  $CODE$ + 13006
; Maximum stack depth per invocation:  7 words
```

```
;    4522  1     ROUTINE CMP_DATA (BUFFW) =
;    4523  1
;    4524  1     !+
;    4525  1     !       THIS ROUTINE IS CALLED BY HOST_WRT_CHK TO PERFORM THE ACTUAL WORD-BY
;    4526  1     !       WORD COMPARISON BETWEEN THE READ BUFFER DESCRIBED IN THE CURRENT RETURN
;    4527  1     !       PACKET AND ITS ASSOCIATED WRITE BUFFER. A VALUE OF "SUCCESS" IS
;    4528  1     !       RETURNED IF THE TWO BUFFERS ARE IDENTICAL. OTHERWISE, "FAILURE" IS
;    4529  1     !       RETURNED.
;    4530  1     !
;    4531  1     !       INPUTS:
;    4532  1     !               BUFFW - ADDRESS OF THE WRITE BUFFER DESCRIPTOR
;    4533  1     !
;    4534  1     !       IMPLICIT INPUTS:
;    4535  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET (READ OPERATION)
;    4536  1     !-
;    4537  1
;    4538  2     BEGIN
;    4539  2
;    4540  2     LOCAL
;    4541  2         RESULT : WORD,                          ! SUCCESS / FAILURE
;    4542  2         WBD0 : WORD,                            ! WRITE BUFFER DESCRIPTOR (WORD 0)
;    4543  2         WBD1 : WORD,                            ! WRITE BUFFER DESCRIPTOR (WORD 1)
;    4544  2         RBD0 : WORD,                            ! READ BUFFER DESCRIPTOR (WORD 0)
;    4545  2         RBD1 : WORD,                            ! READ BUFFER DESCRIPTOR (WORD 1)
;    4546  2         DISP : WORD,                            ! 4K PAGE DISPLACEMENT ADDR
;    4547  2         PAF : WORD,                             ! PAGE ADDRESS FIELD
;    4548  2         COUNT : WORD;                           ! BUFFER WORD COUNT
;    4549  2
;    4550  2     RESULT = SUCCESS;                           ! ASSUME BLUE SKY
;    4551  2     WBD0 = ..BUFFW;                             ! WRITE BUFFER DESCRIPTOR (WORD 0)
;    4552  2     WBD1 = .(.BUFFW + 2);                       ! WRITE BUFFER DESCRIPTOR (WORD 1)
;    4553  2     RBD0 = .RP_ADDR [BUFF_0];                   ! READ BUFFER DESCRIPTOR (WORD 0)
;    4554  2     RBD1 = .RP_ADDR [BUFF_1];                   ! READ BUFFER DESCRIPTOR (WORD 1)
;    4555  2     IF .MEM_MGMT                                ! IF SYSTEM HAS MEMORY MANAGEMENT
;    4556  2     THEN                                        ! THEN
;    4557  3         BEGIN
;    4558  3
;    4559  3         DISP = .WBD0 AND %O'17777';             ! WRITE BUFFER DISPLACEMENT
;    4560  3         PAF = (.WBD0 ^ -6) AND %O'1600';        ! PAGE ADDRESS FIELD
;    4561  3         KTPAR4 = (.WBD1 ^ 10) OR .PAF;          ! LOAD PAR4
;    4562  3         WBD0 = %O'100000' OR .DISP;             ! WRITE BUFFER VIRTUAL ADDRESS
;    4563  3
;    4564  3         DISP = .RBD0 AND %O'17777';             ! READ BUFFER DISPLACEMENT
;    4565  3         PAF = (.RBD0 ^ -6) AND %O'1600';        ! PAGE ADDRESS FIELD
;    4566  3         KTPAR5 = (.RBD1 ^ 10) OR .PAF;          ! LOAD PAR5
;    4567  3         RBD0 = %O'120000' OR .DISP;             ! READ BUFFER VIRTUAL ADDRESS
;    4568  3
;    4569  2         END;
;    4570  2
;    4571  2     IF (COUNT = .RP_ADDR [BCNT_LO] / 2) NEQU 0  ! IF WORD COUNT IS NON-ZERO
;    4572  2     THEN                                        ! THEN
;    4573  3         BEGIN
;    4574  3
;    4575  3         INCR I FROM 1 TO .COUNT DO              ! FOR EACH WORD IN BUFFERS
;    4576  4             BEGIN
;    4577  4
;    4578  4             IF ..WBD0 EQLU ..RBD0               ! IF WORDS COMPARE O.K.
```

```
;    4579  4              THEN                                    ! THEN
;    4580  5                  BEGIN
;    4581  5
;    4582  5                  WBDO = .WBDO + 2;                   ! ADVANCE WRITE BUFFER ADDRESS
;    4583  5                  RBDO = .RBDO + 2;                   ! ADVANCE READ BUFFER ADDRESS
;    4584  5                  IF .MEM_MGMT                        ! IF SYSTEM HAS MEMORY MANAGEMENT
;    4585  5                  THEN                                ! THEN
;    4586  6                      BEGIN
;    4587  6
;    4588  6                      IF (.WBDO AND %O'17777') EQLU 0 ! IF WRITE BUFFER CROSSES 4K PAGE BOUNDARY
;    4589  6                      THEN                            ! THEN
;    4590  7                          BEGIN
;    4591  7
;    4592  7                          WBDO = %O'100000';          ! RESET VIRTUAL ADDRESS
;    4593  7                          KTPAR4 = .KTPAR4 + %O'200'; ! ADVANCE PAR TO NEXT 4K PAGE
;    4594  7
;    4595  6                          END;
;    4596  6
;    4597  6                      IF (.RBDO AND %O'17777') EQLU 0 ! IF READ BUFFER CROSSES 4K PAGE BOUNDARY
;    4598  6                      THEN                            ! THEN
;    4599  7                          BEGIN
;    4600  7
;    4601  7                          RBDO = %O'120000';          ! RESET VIRTUAL ADDRESS
;    4602  7                          KTPAR5 = .KTPAR5 + %O'200'; ! ADVANCE PAR TO NEXT 4K PAGE
;    4603  7
;    4604  6                          END;
;    4605  6
;    4606  5                      END;                            ! END   IF MEMORY MANAGEMENT
;    4607  5
;    4608  5                  END
;    4609  4              ELSE                                    ! OTHERWISE - COMPARE ERROR
;    4610  5                  BEGIN
;    4611  5
;    4612  5                      RESULT = FAILURE;               ! FAILED
;    4613  5                      EXITLOOP;                       ! NO NEED TO CONTINUE
;    4614  5
;    4615  4                      END;
;    4616  4
;    4617  3                  END;                                ! WORD COMPARE LOOP
;    4618  3
;    4619  2              END;                                    ! IF WORD COUNT IS NON-ZERO
;    4620  2
;    4621  2          IF .MEM_MGMT                                ! IF SYSTEM HAS MEMORY MANAGEMENT
;    4622  2          THEN                                        ! THEN
;    4623  3              BEGIN
;    4624  3
;    4625  3              KTPAR4 = %O'1000';                      ! RESTORE PAR'S
;    4626  3              KTPAR5 = %O'1200';
;    4627  3
;    4628  2              END;
;    4629  2
;    4630  2          RETURN .RESULT;
;    4631  2
;    4632  1          END;                                        ! ROUTINE CMP_DATA

                                                .SBTTL  CMP.DATA MULTI-DRIVE SUBTEST ROUTINES
```

```
000000  004137  000000G                CMP.DATA:
                                                JSR     R1,$SAVE5                       ;                                       4522
000004  012746  000001                          MOV     #1,-(SP)                        ; *,RESULT                              4550
000010  017604  000020                          MOV     @20(SP),R4                      ; BUFFW,WBDO                            4551
000014  016600  000020                          MOV     20(SP),R0                       ; BUFFW,*                               4552
000020  016046  000002                          MOV     2(R0),-(SP)                     ; *,WBD1
000024  013701  000000G                         MOV     RP.ADDR,R1                      ;                                       4553
000030  016105  000024                          MOV     24(R1),R5                       ; *,RBDO
000034  016146  000026                          MOV     26(R1),-(SP)                    ; *,RBD1                                4554
000040  005046                                  CLR     -(SP)                           ;                                       4555
000042  113716  000000G                         MOVB    MEM.MGMT,(SP)
000046  032716  000001                          BIT     #1,(SP)
000052  001462                                  BEQ     1$
000054  010402                                  MOV     R4,R2                           ; WBDO,DISP                             4559
000056  042702  160000                          BIC     #160000,R2                      ; *,DISP
000062  010446                                  MOV     R4,-(SP)                        ; WBDO,*                                4560
000064  012746  177772                          MOV     #-6,-(SP)
000070  004737  000000G                         JSR     PC,BL$SHF
000074  010003                                  MOV     R0,R3                           ; *,PAF
000076  042703  176177                          BIC     #176177,R3                      ; *,PAF
000102  016600  000010                          MOV     10(SP),R0                       ; WBD1,*                                4561
000106  000300                                  SWAB    R0
000110  105000                                  CLRB    R0
000112  006300                                  ASL     R0
000114  006300                                  ASL     R0
000116  010337  172350                          MOV     R3,@#172350                     ; PAF,*
000122  050037  172350                          BIS     R0,@#172350
000126  010204                                  MOV     R2,R4                           ; DISP,WBDO                             4562
000130  052704  100000                          BIS     #100000,R4                      ; *,WBDO
000134  010502                                  MOV     R5,R2                           ; RBDO,DISP                             4564
000136  042702  160000                          BIC     #160000,R2                      ; *,DISP
000142  010516                                  MOV     R5,(SP)                         ; RBDO,*                                4565
000144  012746  177772                          MOV     #-6,-(SP)
000150  004737  000000G                         JSR     PC,BL$SHF
000154  010003                                  MOV     R0,R3                           ; *,PAF
000156  042703  176177                          BIC     #176177,R3                      ; *,PAF
000162  016600  000010                          MOV     10(SP),R0                       ; RBD1,*                                4566
000166  000300                                  SWAB    R0
000170  105000                                  CLRB    R0
000172  006300                                  ASL     R0
000174  006300                                  ASL     R0
000176  010337  172352                          MOV     R3,@#172352                     ; PAF,*
000202  050037  172352                          BIS     R0,@#172352
000206  010205                                  MOV     R2,R5                           ; DISP,RBDO                             4567
000210  052705  120000                          BIS     #120000,R5                      ; *,RBDO
000214  062706  000006                          ADD     #6,SP                           ;                                       4557
000220  016146  000020          1$:             MOV     20(R1),-(SP)                    ;                                       4571
000224  012746  000002                          MOV     #2,-(SP)
000230  004737  000000G                         JSR     PC,BL$DIV
000234  022626                                  CMP     (SP)+,(SP)+
000236  005700                                  TST     R0                              ; COUNT
000240  001442                                  BEQ     6$
000242  005001                                  CLR     R1                              ; I                                     4575
000244  000435                                  BR      5$
000246  021415          2$:             CMP     (R4),(R5)                       ; WBDO,RBDO                             4578
000250  001030                                  BNE     4$
000252  062704  000002                          ADD     #2,R4                           ; *,WBDO                                4582
```

```
000256  062705  000002                      ADD     #2,R5                   ; *,RBDC                        4583
000262  032716  000001                      BIT     #1,(SP)                 ;                               4584
000266  001424                              BEQ     5$
000270  032704  017777                      BIT     #17777,R4               ; *,WBDO                        4588
000274  001005                              BNE     3$
000276  012704  100000                      MOV     #-100000,R4             ; *,WBDO                        4592
000302  062737  000200  172350              ADD     #200,@#172350           ;                               4593
000310  032705  017777              3$:     BIT     #17777,R5               ; *,RBDO                        4597
000314  001011                              BNE     5$
000316  012705  120000                      MOV     #-60000,R5              ; *,RBDO                        4601
000322  062737  000200  172352              ADD     #200,@#172352           ;                               4602
000330  000403                              BR      5$                      ;                               4578
000332  005066  000006              4$:     CLR     6(SP)                   ; RESULT                        4612
000336  000403                              BR      6$                      ;                               4610
000340  005201                      5$:     INC     R1                      ; I                             4575
000342  020100                              CMP     R1,R0                   ; I,COUNT
000344  003740                              BLE     2$
000346  032716  000001              6$:     BIT     #1,(SP)                 ;                               4621
000352  001406                              BEQ     7$
000354  012737  001000  172350              MOV     #1000,@#172350          ;                               4625
000362  012737  001200  172352              MOV     #1200,@#172352          ;                               4626
000370  016600  000006              7$:     MOV     6(SP),R0                ; RESULT,*                      4538
000374  062706  000010                      ADD     #10,SP                  ;                               4522
000400  000207                              RTS     PC

; Routine Size:  129 words,     Routine Base:  $CODE$ + 13174
; Maximum stack depth per invocation:  14 words
```

```
;    4633  1     ROUTINE SWEEP : NOVALUE =
;    4634  1
;    4635  1     !+
;    4636  1     !       THIS ROUTINE IS CALLED FROM IO_RETPKT AND OTHERS TO DEALLOCATE THE
;    4637  1     !       RESOURCES ASSOCIATED WITH THE CURRENT RETURN PACKET. THIS INCLUDES THE
;    4638  1     !       PACKET ITSELF AND THE I/O BUFFER. IN ADDITION, IF THE HOST IS
;    4639  1     !       PERFORMING WRITE-COMPARES, AND IF THE CURRENT RETURN PACKET IS A READ
;    4640  1     !       FUNCTION, THEN THE CURRENT CONTROLLER'S RP_SAVE AREA IS SEARCHED FOR
;    4641  1     !       THE ASSOCIATED WRITE RETPKT SO THAT ITS RESOURCES CAN ALSO BE
;    4642  1     !       DEALLOCATED.
;    4643  1     !
;    4644  1     !       IMPLICIT INPUTS:
;    4645  1     !               RP_ADDR - ADDRESS OF CURRENT RETURN PACKET
;    4646  1     !               RP_INDX - INDEX OF CURRENT RETURN PACKET
;    4647  1     !-
;    4648  1
;    4649  2     BEGIN
;    4650  2
;    4651  2     LOCAL
;    4652  2         INDEX : SIGNED WORD;
;    4653  2
;    4654  2     IF (.RP_ADDR [ENDCOD] AND OP_MSK) EQLU OP_RD    ! IF READ OPCODE OR ENDCODE
;    4655  2     THEN                                            ! THEN
;    4656  3         BEGIN
;    4657  3
;    4658  4         IF BIT_TST (SWP_FLAGS, SWF_HWC)             ! IF HOST IS DOING WRITE-COMPARES
;    4659  3         THEN                                        ! THEN
;    4660  4             BEGIN
;    4661  4
;    4662  4             IF (INDEX = RPS_REM ()) GEQ 0           ! IF ASSOCIATED WRITE RETPKT IS FOUND
;    4663  4             THEN                                    ! THEN
;    4664  5                 BEGIN
;    4665  5
;    4666  5                 PUT_IO_BUFF (RETPKT [.INDEX, BUFF_O]);      ! RETURN WRITE I/O BUFFER TO POOL
;    4667  5                 PUT_RETPKT (.INDEX);                        ! RETURN WRITE PACKET TO POOL
;    4668  5
;    4669  4                 END;
;    4670  4
;    4671  3             END;
;    4672  3
;    4673  2         END;
;    4674  2
;    4675  2     PUT_IO_BUFF (RP_ADDR [BUFF_O]);                 ! RETURN CURRENT I/O BUFFER TO POOL
;    4676  2     PUT_RETPKT (.RP_INDX);                          ! RETURN CURRENT RETPKT TO POOL
;    4677  2
;    4678  1     END;                                            ! ROUTINE SWEEP

                                            .SBTTL  SWEEP MULTI-DRIVE SUBTEST ROUTINES
000000  010146                        SWEEP:  MOV     R1,-(SP)                        ;                       4633
000002  013700  000000G                        MOV     RP.ADDR,R0                      ;                       4654
000006  116000  000014                         MOVB    14(R0),R0
000012  042700  177600                         BIC     #177600,R0
000016  020027  000041                         CMP     R0,#41
000022  001026                               BNE     1$
000024  132737  000100  000000G               BITB    #100,SWP.FLAGS                  ;                       4658
000032  001422                               BEQ     1$
```

```
000034  004737  000000V                        JSR     PC,RPS.REM              ;                               4662
000040  010001                                  MOV     R0,R1                   ; *,INDEX
000042  002416                                  BLT     1$
000044  010146                                  MOV     R1,-(SP)                ; INDEX,*                       4666
000046  012746  000060                          MOV     #60,-(SP)
000052  004737  000000G                        JSR     PC,BL$MUL
000056  062700  000024G                        ADD     #RETPKT+24,R0
000062  010016                                  MOV     R0,(SP)
000064  004737  000000G                        JSR     PC,PUT.IO.BUFF
000070  010116                                  MOV     R1,(SP)                 ; INDEX,*                       4667
000072  004737  000000G                        JSR     PC,PUT.RETPKT
000076  022626                                  CMP     (SP)+,(SP)+             ;                               4664
000100  013746  000000G             1$:        MOV     RP.ADDR,-(SP)           ;                               4675
000104  062716  000024                        ADD     #24,(SP)
000110  004737  000000G                        JSR     PC,PUT.IO.BUFF
000114  013716  000000G                        MOV     RP.INDX,(SP)            ;                               4676
000120  004737  000000G                        JSR     PC,PUT.RETPKT
000124  005726                                  TST     (SP)+                   ;                               4649
000126  012601                                  MOV     (SP)+,R1                ;                               4633
000130  000207                                  RTS     PC

; Routine Size:  45 words,      Routine Base:  $CODE$ + 13576
; Maximum stack depth per invocation:  4 words
```

```
;  4679  1     ROUTINE RPS_REM =
;  4680  1
;  4681  1     !+
;  4682  1     !       THIS ROUTINE SEARCHES THE CURRENT CONTROLLER'S RP_SAVE AREA FOR A
;  4683  1     !       RETURN PACKET WHOSE COMMAND REFERENCE NUMBER (CRN) IS ONE LESS THAN THE
;  4684  1     !       CRN OF THE CURRENT RETURN PACKET (I.E., SEARCHING FOR THE SAVED WRITE
;  4685  1     !       OPERATION ASSOCIATED WITH THE CURRENT READ OPERATION). IF FOUND, THE
;  4686  1     !       RP_SAVE ENTRY IS CLEARED (TO -1) AND THE RETPKT INDEX OF THE WRITE
;  4687  1     !       OPERATION IS RETURNED TO THE CALLER.
;  4688  1     !
;  4689  1     !       IMPLICIT INPUTS:
;  4690  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;  4691  1     !               RPS_X1, RPS_X2 - STARTING / ENDING INDECES OF THE CURRENT
;  4692  1     !                               CONTROLLER'S RP_SAVE AREA
;  4693  1     !
;  4694  1     !       OUTPUTS:
;  4695  1     !               INDEX (VALUE OF THIS ROUTINE) - INDEX OF THE RETPKT CONTAINING
;  4696  1     !                               A CRN WHICH IS ONE LESS THAN THE CURRENT
;  4697  1     !-
;  4698  1
;  4699  2     BEGIN
;  4700  2
;  4701  2     LOCAL
;  4702  2         INDEX : SIGNED WORD,
;  4703  2         TEMP : SIGNED WORD;
;  4704  2
;  4705  2     INDEX = -1;                                     ! ASSUME NOT FOUND
;  4706  2     INCR COUNT FROM .RPS_X1 TO .RPS_X2 DO           ! FOR EACH ENTRY IN RP_SAVE
;  4707  3         BEGIN
;  4708  3
;  4709  3         IF (TEMP = .RP_SAVE [.COUNT]) GEQ 0         ! IF THIS IS A VALID RETPKT INDEX
;  4710  3         THEN                                        ! THEN
;  4711  4             BEGIN
;  4712  4
;  4713  5             IF .RETPKT [.TEMP, CRF_LO] EQLU (.RP_ADDR [CRF_LO] - 1) ! IF CORRECT CRN
;  4714  4             THEN                                                    ! THEN
;  4715  5                 BEGIN
;  4716  5
;  4717  5                 INDEX = .TEMP;                                      ! INDEX TO BE RETURNED
;  4718  5                 RP_SAVE [.COUNT] = -1;                              ! INIT ENTRY
;  4719  5                 EXITLOOP;                                           ! DONE
;  4720  5
;  4721  4                 END;
;  4722  4
;  4723  3             END;                                    ! IF VALID RETPKT INDEX
;  4724  3
;  4725  2         END;                                        ! RP_SAVE ENTRY LOOP
;  4726  2
;  4727  2     RETURN .INDEX;
;  4728  2
;  4729  1     END;                                            ! ROUTINE RPS_REM


                                .SBTTL  RPS.REM MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G    RPS.REM:JSR     R1,$SAVE4                       ;                       4679
000004  012704  177777            MOV     #-1,R4                          ; *,INDEX               4705
000010  013701  000000G            MOV     RPS.X1,R1                       ; *,COUNT               4706
```

```
000014  060401                          ADD     R4,R1                   ; *,COUNT
000016  000426                          BR      2$
000020  116103  000000G          1$:     MOVB    RP.SAVE(R1),R3          ; *(COUNT),TEMP                 4709
000024  002423                          BLT     2$
000026  010346                          MOV     R3,-(SP)                ; TEMP,*                        4713
000030  012746  000060                  MOV     #60,-(SP)
000034  004737  000000G                 JSR     PC,BL$MUL
000040  022626                          CMP     (SP)+,(SP)+
000042  013702  000000G                 MOV     RP.ADDR,R2
000046  016202  000004                  MOV     4(R2),R2
000052  005302                          DEC     R2
000054  026002  000004G                 CMP     RETPKT+4(R0),R2
000060  001005                          BNE     2$
000062  010304                          MOV     R3,R4                   ; TEMP,INDEX                    4717
000064  112761  000377  000000G        MOVB    #377,RP.SAVE(R1)        ; *,*(COUNT)                    4718
000072  000404                          BR      3$                      ;                               4715
000074  005201                  2$:     INC     R1                      ; COUNT                         4706
000076  020137  000000G                 CMP     R1,RPS.X2               ; COUNT,*
000102  003746                          BLE     1$
000104  010400                  3$:     MOV     R4,R0                   ; INDEX,*                       4699
000106  000207                          RTS     PC                      ;                               4679

; Routine Size:  36 words,      Routine Base:  $CODE$ + 13730
; Maximum stack depth per invocation:  8 words
```

```
;  4730  1     ROUTINE DR_RETPKT : NOVALUE =
;  4731  1
;  4732  1     !+
;  4733  1     !       THIS ROUTINE IS CALLED BY PROC_RETPKT FOR ALL PACKETS ORIGINATING AT
;  4734  1     !       THE "DRIVER" PORTION OF THE PROGRAM. THIS INCLUDES PACKETS DESCRIBING
;  4735  1     !       FATAL DEVICE ERRORS AND INDIVIDUAL COMMAND TIMEOUTS.
;  4736  1     !
;  4737  1     !       FOR FATAL DEVICE ERRORS, THIS ROUTINE RELEASES ALL RESOURCES HELD BY
;  4738  1     !       THE CONTROLLER. THE CONTROLLER IS MARKED OFFLINE IN ITS CST, AND ALL
;  4739  1     !       UNITS ATTACHED TO THE CONTROLLER ARE DROPPED. IF THE RETURN PACKET
;  4740  1     !       DESCRIBES A COMMAND TIMEOUT, THEN A HARD ERROR IS DECLARED FOR THE
;  4741  1     !       APPROPRIATE UNIT.
;  4742  1     !
;  4743  1     !       IMPLICIT INPUTS:
;  4744  1     !               RP_INDX - INDEX OF THE CURRENT RETURN PACKET
;  4745  1     !               RP_ADDR - ADDRESS OF THE CURRENT RETURN PACKET
;  4746  1     !               RPS_X1 - STARTING / ENDING INDECES OF THE CURRENT CONTROLLER'S
;  4747  1     !                       RETPKT SAVE (RP_SAVE) AREA
;  4748  1     !               CST_ADDR - ADDRESS OF THE CURRENT CONTROLLER'S CST
;  4749  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;  4750  1     !-
;  4751  1
;  4752  2     BEGIN
;  4753  2
;  4754  2     LOCAL
;  4755  2         INDEX : SIGNED WORD;
;  4756  2
;  4757  2     IF .RP_ADDR [MESTYP] EQLU MT_FATAL                  ! IF FATAL CONTROLLER ERROR
;  4758  2     THEN                                                ! THEN
;  4759  3         BEGIN
;  4760  3
;  4761  3         PUTA_BUFF ();                                   ! RELEASE ALL I/O BUFFERS HELD BY CONTROLLER
;  4762  3         INCR COUNT FROM .RPS_X1 TO .RPS_X2 DO           ! FOR EACH ENTRY IN CONTROLLER'S RP_SAVE
;  4763  4             BEGIN
;  4764  4
;  4765  4             IF (INDEX = .RP_SAVE [.COUNT]) GEQ 0        ! IF VALID RETPKT INDEX
;  4766  4             THEN                                        ! THEN
;  4767  5                 BEGIN
;  4768  5
;  4769  5                 PUT_RETPKT (.INDEX);                    ! RETURN RETPKT TO POOL
;  4770  5                 RP_SAVE [.COUNT] = -1;                  ! INIT ENTRY
;  4771  5
;  4772  4                 END;
;  4773  4
;  4774  3             END;                                        ! RP_SAVE ENTRY LOOP
;  4775  3
;  4776  3         QIO [.CCTLR] = 0;                               ! CLEAR NO. OF OUTSTANDING QIOS
;  4777  3         CST_ADDR [STATE] = OFFLINE;                     ! MARK CST OFFLINE
;  4778  3         DROP_CTLR (.CCTLR, DU_FATAL);                   ! DROP CONTROLLER'S UNITS
;  4779  3         PUT_RETPKT (.RP_INDX);                          ! PUT BACK RETPKT
;  4780  3
;  4781  3         END
;  4782  2     ELSE                                                ! ELSE - COMMAND TIMEOUT
;  4783  3         BEGIN
;  4784  3
;  4785  3         FSET_UPAR ();                                   ! SET UP UNIT-RELATED PARAMETERS
;  4786  3         ERRHRD (43, EGH_30, EMS_43);                    ! "I/O REQUEST FAILED"
```

```
;   4787  3          HARD_ERR (1);                    ! INCREMENT HARD ERROR STAT FOR UNIT
;   4788  3          SWEEP ();                        ! RETURN RESOURCES
;   4789  3          QIO [.CCTLR] = .QIO [.CCTLR] - 1;  ! DECREMENT NO. OF OUTSTANDING QIOS
;   4790  3
;   4791  2          END;
;   4792  2
;   4793  1      END;                                 ! ROUTINE DR_RETPKT

                                        .SBTTL  DR.RETPKT MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G          DR.RETPKT:
                                        JSR     R1,$SAVE3                       ;                       4730
000004  013700  000000G                  MOV     RP.ADDR,R0                      ;                       4757
000010  116000  000002                   MOVB    2(R0),R0
000014  042700  177417                   BIC     #177417,R0
000020  020027  000060                   CMP     R0,#60
000024  001051                          BNE     3$
000026  004737  000000G                  JSR     PC,PUTA.BUFF                    ;                       4761
000032  013703  000000G                  MOV     RPS.X2,R3                       ;                       4762
000036  013701  000000G                  MOV     RPS.X1,R1                       ; *,COUNT
000042  005301                          DEC     R1                              ; COUNT
000044  000412                          BR      2$
000046  116102  000000G          1$:     MOVB    RP.SAVE(R1),R2                  ; *(COUNT),INDEX        4765
000052  002407                          BLT     2$
000054  010246                          MOV     R2,-(SP)                        ; INDEX,*               4769
000056  004737  000000G                  JSR     PC,PUT.RETPKT
000062  112761  000377  000000G        MOVB    #377,RP.SAVE(R1)                ; *,*(COUNT)            4770
000070  005726                          TST     (SP)+                           ;                       4767
000072  005201                  2$:     INC     R1                              ; COUNT                 4762
000074  020103                          CMP     R1,R3                           ; COUNT,*
000076  003763                          BLE     1$
000100  013701  000000G                  MOV     CCTLR,R1                        ;                       4776
000104  105061  000000G                  CLRB    QIO(R1)
000110  013700  000000G                  MOV     CST.ADDR,R0                     ;                       4777
000114  042760  100000  000002         BIC     #100000,2(R0)
000122  010146                          MOV     R1,-(SP)                        ;                       4778
000124  012746  000004                   MOV     #4,-(SP)
000130  004737  000000G                  JSR     PC,DROP.CTLR
000134  013716  000000G                  MOV     RP.INDX,(SP)                    ;                       4779
000140  004737  000000G                  JSR     PC,PUT.RETPKT
000144  005726                          TST     (SP)+                           ;                       4759
000146  000420                          BR      4$                              ;                       4757
000150  004737  012550'          3$:     JSR     PC,FSET.UPAR                    ;                       4785
000154  104456                          TRAP    56                              ;                       4786
000156  000053                          .WORD   53
000160  000000G                         .WORD   EGH.30
000162  000000G                         .WORD   EMS.43
000164  012746  000001                   MOV     #1,-(SP)                        ;                       4787
000170  004737  000000G                  JSR     PC,HARD.ERR
000174  004737  013576'                  JSR     PC,SWEEP                        ;                       4788
000200  013700  000000G                  MOV     CCTLR,R0                        ;                       4789
000204  105360  000000G                  DECB    QIO(R0)
000210  005726                  4$:     TST     (SP)+                           ;                       4752
000212  000207                          RTS     PC                              ;                       4730

; Routine Size:  70 words,      Routine Base:  $CODE$ + 14040
; Maximum stack depth per invocation:  7 words
```

```
;  4794  1     ROUTINE DRV_TIMCHK : NOVALUE =
;  4795  1
;  4796  1     !+
;  4797  1     !       THIS ROUTINE IS CALLED ONCE PER SECOND FROM EITHER THE MULTI-DRIVE
;  4798  1     !       SUBTEST EXECUTIVE (MULTI_DRIVE) OR THE DM EXERCISER SUBTEST EXECUTIVE
;  4799  1     !       (DM_EXER). ITS PURPOSE IS TO DECREMENT THE TIMING COUNTS FOR ALL
;  4800  1     !       OUTSTANDING COMMANDS, AND TO PROCESS ANY THAT REACH ZERO.
;  4801  1     !
;  4802  1     !       A COMMAND TIMER THAT REACHES ZERO CAN MEAN ONE OF TWO THINGS. IF THE
;  4803  1     !       OWNERSHIP BIT OF THE ENVELOPE DESCRIPTOR OF THE TIMED OUT COMMAND
;  4804  1     !       INDICATES THAT THE SLOT IS STILL CONTROLLER-OWNED, THEN THE CONTROLLER
;  4805  1     !       IS ASSUMED DEAD. A DEVICE-FATAL ERROR IS DECLARED AND ALL CONTROLLER-
;  4806  1     !       RELATED DATA IN THE "DRIVER" ARE INITIALIZED. IF THE AFOREMENTIONED
;  4807  1     !       OWNERSHIP BIT INDICATES THAT THE SLOT HAS BEEN RETURNED TO THE HOST, OR
;  4808  1     !       IF THE ENVELOPE DESCRIPTOR SLOT FOR THE TIMED OUT COMMAND CANNOT BE
;  4809  1     !       FOUND (I.E., OVERWRITTEN WITH ANOTHER DESCRIPTOR), THEN ONLY THE
;  4810  1     !       COMMAND IS ASSUMED LOST.
;  4811  1     !
;  4812  1     !       IN EITHER CASE, A RETURN PACKET IS SET UP WHICH DESCRIBES THE
;  4813  1     !       CONDITION, AND "SENT" TO THE "EXERCISER".
;  4814  1     !-
;  4815  1
;  4816  2     BEGIN
;  4817  2
;  4818  2     LOCAL
;  4819  2         M_INDEX : SIGNED WORD,                          ! MSCP ENVELOPE INDEX
;  4820  2         M_ADDR,                                         ! MSCP ENVELOPE ADDRESS
;  4821  2         CR_ADDR,                                        ! COMMAND RING (C-RING) ADDRESS
;  4822  2         TYPE : WORD;                                    ! TYPE OF ERROR
;  4823  2
;  4824  2     INCR CNTLR FROM 0 TO (MAX_CTLR - 1) DO              ! FOR EACH CONTROLLER
;  4825  3         BEGIN
;  4826  3
;  4827  3         SET_CPAR (.CNTLR);                              ! SET UP CONTROLLER-RELATED DATA
;  4828  3         IF .CST_ADDR [STATE] EQLU ONLINE                ! IF CONTROLLER IS ONLINE
;  4829  3         THEN                                            ! THEN
;  4830  4             BEGIN
;  4831  4
;  4832  4             INCR COUNT FROM .OCL_X1 TO .OCL_X2 DO       ! FOR EACH OUTSTANDING COMMAND ENTRY
;  4833  5             BEGIN
;  4834  5
;  4835  5                 IF (M_INDEX = .OUTC_LIST [.COUNT]) GEQ 0    ! IF ENTRY HOLDS VALID MSCP INDEX
;  4836  5                 THEN                                        ! THEN
;  4837  6                     BEGIN
;  4838  6
;  4839  6                     OUTC_TIMR [.COUNT] = .OUTC_TIMR [.COUNT] - 1;   ! DECREMENT COMMAND TIMER
;  4840  6                     IF .OUTC_TIMR [.COUNT] EQLU 0                   ! IF COMMAND TIMED OUT
;  4841  6                     THEN                                            ! THEN
;  4842  7                         BEGIN
;  4843  7
;  4844  7                         OUTC_LIST [.COUNT] = -1;                        ! KILL OUTC ENTRY
;  4845  7                         M_ADDR = MSCP_ENV + (.M_INDEX * ENV_LEN * 2);   ! CALCULATE MSCP ENV ADDRESS
;  4846  7                         CR_ADDR = .DCT_ADDR [CR_BEG];                   ! GET START OF C-RING
;  4847  7                         TYPE = MT_TIMEOUT;                              ! ASSUME COMMAND TIMED OUT
;  4848  7                         INCR SLOT FROM 1 TO CRING_LEN DO                ! FOR EACH CRING SLOT
;  4849  8                             BEGIN
;  4850  8
```

```
;  4851  9                          IF ..CR_ADDR EQLA (.M_ADDR + 8)                 ! IF THIS SLOT HOLDS TIMED OUT COMMAND
;  4852  8                          THEN                                            ! THEN
;  4853  9                              BEGIN
;  4854  9
;  4855  9                              CR_ADDR = .CR_ADDR + 2;                     ! ADVANCE TO HI ORDER WORD
;  4856 10                              IF BIT_TST (.CR_ADDR, ED_OWN)               ! IF SLOT IS STILL CTLR-OWNED
;  4857  9                              THEN                                        ! THEN
;  4858 10                                  BEGIN
;  4859 10
;  4860 10                                  WRT_RC25 (RCIP, RC_ALL, ALL_ONES);      ! WRITE IP TO STOP DEVICE
;  4861 10                                  L$LUN = .CST_ADDR [OF_UN, P_UNIT];      ! 1ST UNIT # IN CTLR
;  4862 10                                  ERRDF (20, EGD_20, EMS_20);             ! "CONTROLLER TIMEOUT"
;  4863 10                                  DRV_CTLERR (.CNTLR);                    ! CLEAN UP CTLR DATA IN DRIVER
;  4864 10                                  TYPE = MT_FATAL;                        ! CHANGE TYPE TO FATAL ERROR
;  4865 10
;  4866  9                                  END;                                    ! IF SLOT STILL CTLR-OWNED
;  4867  9
;  4868  9                              EXITLOOP;                                   ! EXIT C-RING SLOT SEARCH LOOP
;  4869  9
;  4870  8                              END;                                        ! IF COMMAND SLOT IS FOUND
;  4871  8
;  4872  8                          CR_ADDR = .CR_ADDR + 4;                         ! ADVANCE TO NEXT C-RING SLOT
;  4873  8
;  4874  7                          END;                                ! C-RING SLOT SEARCH LOOP
;  4875  7
;  4876  7                  IF (RP_INDX = GET_RETPKT (.CNTLR)) GEQ 0    ! IF RETPKT IS AVAILABLE
;  4877  7                  THEN                                        ! THEN
;  4878  8                      BEGIN
;  4879  8
;  4880  8                      RP_ADDR = RETPKT + (.RP_INDX * RP_LEN * 2);
;  4881  8                      IF .TYPE EQLU MT_TIMEOUT                ! IF COMMAND TIMEOUT
;  4882  8                      THEN                                    ! THEN
;  4883  9                          BEGIN
;  4884  9
;  4885  9                          COPY_BLK (.M_ADDR + 4, .RP_ADDR, RP_LEN);   ! COPY COMMAND TO RETPKT
;  4886  9                          PUT_ENV (.M_INDEX);                         ! RETURN COMMAND ENVELOPE TO POOL
;  4887  9
;  4888  8                          END;                                ! IF TYPE = COMMAND TIMEOUT
;  4889  8
;  4890  8                      RP_ADDR [CTLR] = .CNTLR;                ! LOAD CTLR # INTO RETPKT
;  4891  8                      RP_ADDR [MESTYP] = .TYPE;       ! LOAD TYPE
;  4892  8                      RP_ADDR [CONID] = CID_DRIVER;   ! LOAD PACKET ORIGINATOR
;  4893  8                      IN_IODQ (.RP_INDX);             ! PASS RETPKT TO EXERCISER VIA IODQ
;  4894  8
;  4895  7                      END;                                ! IF RETPKT IS AVAILABLE
;  4896  7
;  4897  6                  END;                                    ! IF COMMAND TIMER REACHED ZERO
;  4898  6
;  4899  5              END;                                ! IF OUTC ENTRY HOLDS A COMMAND ENVELOPE INDEX
;  4900  5
;  4901  4          END;                                    ! OUTSTANDING COMMAND ENTRY LOOP
;  4902  4
;  4903  3      END;                                        ! IF CONTROLLER IS ONLINE
;  4904  3
;  4905  2  END;                                            ! CONTROLLER LOOP
;  4906  2
;  4907  2  T_FLAG = FALSE;                                 ! CLEAR ENTRY FLAG
```

```
;   4908  2
;   4909  1     END;                                    ! ROUTINE DRV_TIMCHK


                                        .SBTTL  DRV.TIMCHK MULTI-DRIVE SUBTEST ROUTINES
000000  004137  000000G           DRV.TIMCHK:
                                        JSR     R1,$SAVE5                       ;                               4794
000004  162706  000006                  SUB     #6,SP
000010  005003                          CLR     R3                              ; CNTLR                         4824
000012  010346                  1$:     MOV     R3,-(SP)                        ; CNTLR,*                       4827
000014  004737  000000G                 JSR     PC,SET.CPAR
000020  013700  000000G                 MOV     CST.ADDR,R0                     ;                               4828
000024  005760  000002                  TST     2(R0)
000030  100402                          BMI     2$
000032  000137  014762'                 JMP     11$
000036  013701  000000G           2$:     MOV     OCL.X1,R1                       ; *,COUNT                       4832
000042  005301                          DEC     R1                              ; COUNT
000044  000137  014746'           3$:     JMP     10$
000050  116100  000000G           4$:     MOVB    OUTC.LIST(R1),R0                ; *(COUNT),*                    4835
000054  010066  000006                  MOV     R0,6(SP)                        ; *,M.INDEX
000060  002771                          BLT     3$
000062  010100                          MOV     R1,R0                           ; COUNT,*                       4839
000064  006300                          ASL     R0
000066  005360  000000G                 DEC     OUTC.TIMR(R0)
000072  001177                          BNE     10$                             ;                               4840
000074  112761  000377  000000G        MOVB    #377,OUTC.LIST(R1)              ; *,*(COUNT)                    4844
000102  016616  000006                  MOV     6(SP),(SP)                      ; M.INDEX,*                     4845
000106  012746  000104                  MOV     #104,-(SP)
000112  004737  000000G                 JSR     PC,BL$MUL
000116  062700  000000G                 ADD     #MSCP.ENV,R0
000122  010066  000004                  MOV     R0,4(SP)                        ; *,M.ADDR
000126  013700  000000G                 MOV     DCT.ADDR,R0                     ;                               4846
000132  016005  000010                  MOV     10(R0),R5                       ; *,CR.ADDR
000136  012766  000004  000006          MOV     #4,6(SP)                        ; *,TYPE                        4847
000144  016604  000004                  MOV     4(SP),R4                        ; M.ADDR,*                      4851
000150  062704  000010                  ADD     #10,R4
000154  012702  000010                  MOV     #10,R2                          ; *,SLOT                        4848
000160  021504                  5$:     CMP     (R5),R4                         ; CR.ADDR,*                     4851
000162  001040                          BNE     6$
000164  062705  000002                  ADD     #2,R5                           ; *,CR.ADDR                     4855
000170  011500                          MOV     (R5),R0                         ; CR.ADDR,*                     4856
000172  042700  077777                  BIC     #77777,R0
000176  020027  100000                  CMP     R0,#-100000
000202  001034                          BNE     7$
000204  012700  177777                  MOV     #-1,R0                          ; *,RC.REG                      4860
000210  010077  000000G                 MOV     R0,@RC25.ADDR                   ; RC.REG,*
000214  013700  000000G                 MOV     CST.ADDR,RC                     ;                               4861
000220  016046  000006                  MOV     6(R0),-(SP)
000224  000316                          SWAB    (SP)
000226  042716  177740                  BIC     #177740,(SP)
000232  012637  000000G                 MOV     (SP)+,L$LUN
000236  104455                          TRAP    55                              ;                               4862
000240  000024                          .WORD   24
000242  000000G                         .WORD   EGD.20
000244  000000G                         .WORD   EMS.20
000246  010316                          MOV     R3,(SP)                         ; CNTLR,*                       4663
000250  004737  000000G                 JSR     PC,DRV.CTLERR
```

```
000254  012766  000003  000006                    MOV     #3,6(SP)                ; *,TYPE                        4864
000262  000404                                    BR      7$                      ;                               4853
000264  062705  000004                6$:         ADD     #4,R5                   ; *,CR.ADDR                     4872
000270  005302                                    DEC     R2                      ; SLOT                          4848
000272  001332                                    BNE     5$
000274  010316                        7$:         MOV     R3,(SP)                 ; CNTLR,*                       4876
000276  004737  000000G                           JSR     PC,GET.RETPKT
000302  010037  000000G                           MOV     R0,RP.INDX
000306  002470                                    BLT     9$
000310  010016                                    MOV     R0,(SP)                 ; RP.INDX,*                     4880
000312  012746  000060                           MOV     #60,-(SP)
000316  004737  000000G                           JSR     PC,BL$MUL
000322  062700  000000G                           ADD     #RETPKT,R0
000326  010037  000000G                           MOV     R0,RP.ADDR
000332  026627  000010  000004                    CMP     10(SP),#4               ; TYPE,*                        4881
000340  001016                                    BNE     8$
000342  016616  000006                           MOV     6(SP),(SP)              ; M.ADDR,*                      4885
000346  062716  000004                           ADD     #4,(SP)
000352  010046                                    MOV     R0,-(SP)                ; RP.ADDR,*
000354  012746  000030                           MOV     #30,-(SP)
000360  004737  000000G                           JSR     PC,COPY.BLK
000364  016616  000016                           MOV     16(SP),(SP)             ; M.INDEX,*                     4886
000370  004737  000000G                           JSR     PC,PUT.ENV
000374  022626                                    CMP     (SP)+,(SP)+             ;                               4883
000376  013700  000000G                8$:         MOV     RP.ADDR,R0              ;                               4890
000402  062700  000002                           ADD     #2,R0
000406  010302                                    MOV     R3,R2                   ; CNTLR,*
000410  042702  177760                           BIC     #177760,R2
000414  142710  000017                           BICB    #17,(R0)
000420  150210                                    BISB    R2,(R0)
000422  016602  000010                           MOV     10(SP),R2               ; TYPE,*                        4891
000426  006302                                    ASL     R2
000430  006302                                    ASL     R2
000432  006302                                    ASL     R2
000434  006302                                    ASL     R2
000436  042702  177417                           BIC     #177417,R2
000442  142710  000360                           BICB    #360,(R0)
000446  150210                                    BISB    R2,(R0)
000450  112760  000003  000001                    MOVB    #3,1(R0)                ;                               4892
000456  013716  000000G                           MOV     RP.INDX,(SP)            ;                               4893
000462  004737  000000G                           JSR     PC,IN.IODQ
000466  005726                                    TST     (SP)+                   ;                               4878
000470  005726                        9$:         TST     (SP)+                   ;                               4842
000472  005201                        10$:        INC     R1                      ; COUNT                         4832
000474  020137  000000G                           CMP     R1,OCL.X2               ; COUNT,*
000500  003002                                    BGT     11$
000502  000137  014324'                           JMP     4$
000506  005726                        11$:        TST     (SP)+                   ;                               4825
000510  005203                                    INC     R3                      ; CNTLR                         4824
000512  020327  000003                           CMP     R3,#3                   ; CNTLR,*
000516  003002                                    BGT     12$
000520  000137  014266'                           JMP     1$
000524  105037  000000G                12$:        CLRB    T.FLAG                  ;                               4907
000530  062706  000006                           ADD     #6,SP                   ;                               4794
000534  000207                                    RTS     PC
; Routine Size:  175 words,    Routine Base:  $CODE$ + 14254
; Maximum stack depth per invocation:  15 words
```

```
;   4910  1     ;SBTTL 'RC25 INTERRUPT SERVICE ROUTINES'
;   4911  1
;   4912  1     !+
;   4913  1     !       THERE EXISTS AN RC25 INTERRUPT SERVICE ROUTINE FOR EACH DEVICE
;   4914  1     !       CONTROLLER. EACH SERVICE ROUTINE BEGINS BY SIMPLY SETTING THE
;   4915  1     !       APPROPRIATE CONTROLLER NUMBER INTO "ICTLR . ALL SERVICE ROUTINES THEN
;   4916  1     !       BRANCH TO A COMMON INTERRUPT PROCESSING ROUTINE.
;   4917  1     !-
;   4918  1
;   4919  2     BGNSRV (RCINT0);
;   4920  2
;   4921  2     ICTLR = 0;
;   4922  2     RCINT ();
;   4923  2
;   4924  1     ENDSRV;


                                        .SBTTL  RCINT0 RC25 INTERRUPT SERVICE ROUTINES
000000  010046                 RCINT0::MOV     R0,-(SP)                        ;                       4919
000002  005037  000600'                 CLR     ICTLR                           ;                       4921
000006  004737  000000V                 JSR     PC,RCINT                        ;                       4922
000012  012600                          MOV     (SP)+,R0                        ;                       4919
000014  000002                          RTI

; Routine Size:  7 words,       Routine Base:  $CODE$ + 15012
; Maximum stack depth per invocation:  2 words


;   4925  1
;   4926  2     BGNSRV (RCINT1);
;   4927  2
;   4928  2     ICTLR = 1;
;   4929  2     RCINT ();
;   4930  2
;   4931  1     ENDSRV;


                                        .SBTTL  RCINT1 RC25 INTERRUPT SERVICE ROUTINES
000000  010046                 RCINT1::MOV     R0,-(SP)                        ;                       4926
000002  012737  000001  000600'         MOV     #1,ICTLR                        ;                       4928
000010  004737  000000V                 JSR     PC,RCINT                        ;                       4929
000014  012600                          MOV     (SP)+,R0                        ;                       4926
000016  000002                          RTI

; Routine Size:  8 words,       Routine Base:  $CODE$ + 15030
; Maximum stack depth per invocation:  2 words


;   4932  1
;   4933  2     BGNSRV (RCINT2);
;   4934  2
;   4935  2     ICTLR = 2;
;   4936  2     RCINT ();
;   4937  2
;   4938  1     ENDSRV;
```

```
                                        .SBTTL  RCINT2 RC25 INTERRUPT SERVICE ROUTINES
000000  010046                  RCINT2::MOV     R0,-(SP)                        ;                       4933
000002  012737  000002  000600'          MOV     #2,ICTLR                        ;                       4935
000010  004737  000000V                 JSR     PC,RCINT                        ;                       4936
000014  012600                          MOV     (SP)+,R0                        ;                       4933
000016  000002                          RTI

; Routine Size:  8 words,       Routine Base:  $CODE$ + 15050
; Maximum stack depth per invocation:  2 words


;   4939  1
;   4940  2     BGNSRV (RCINT3);
;   4941  2
;   4942  2     ICTLR = 3;
;   4943  2     RCINT ();
;   4944  2
;   4945  1     ENDSRV;


                                        .SBTTL  RCINT3 RC25 INTERRUPT SERVICE ROUTINES
000000  010046                  RCINT3::MOV     R0,-(SP)                        ;                       4940
000002  012737  000003  000600'          MOV     #3,ICTLR                        ;                       4942
000010  0C4737  000000V                 JSR     PC,RCINT                        ;                       4943
000014  012600                          MOV     (SP)+,R0                        ;                       4940
000016  000002                          RTI

; Routine Size:  8 words,       Routine Base:  $CODE$ + 15070
; Maximum stack depth per invocation:  2 words
```

```
;    4946  1     ROUTINE RCINT : NOVALUE =
;    4947  1
;    4948  1     !+
;    4949  1     !       THIS IS THE COMMON INTERRUPT SERVICE ROUTINE FOR ALL RC25 CONTROLLERS.
;    4950  1     !       AFTER SETTING UP THE COMMONLY-USED CONTROLLER-RELATED DATA ITEMS, THIS
;    4951  1     !       ROUTINE WILL SAVE THE CURRENT CONTENTS OF THE SA REGISTER IN THE DCT.
;    4952  1     !       THEN, IF THE "IGNORE INTERRUPT" BIT IS SET, NO FURTHER ACTION IS TAKEN.
;    4953  1     !
;    4954  1     !       IF THE INITIALIZATION SUBTEST IS IN PROGRESS OR IF THE DM EXERCISER
;    4955  1     !       SUBTEST BEING RUN, THEN INTERRUPT PROCESSING CONTINUES BY CHECKING THE
;    4956  1     !       ERROR BIT OF THE SA REGISTER, AND POLLING THE COMMAND AND RESPONSE
;    4957  1     !       RINGS. OTHERWISE, THE INTERRUPT IS PROCESSED LATER WHEN INT_PROC IS
;    4958  1     !       CALLED FROM THE MULTI-DRIVE SUBTEST "EXECUTIVE" (MULTI_DRIVE).
;    4959  1     !-
;    4960  1
;    4961  2     BEGIN
;    4962  2
;    4963  2     ISET_CPAR ();                                   ! SET UP CONTROLLER-RELATED PARAMETERS
;    4964  2     IDCT_ADDR [SA_SAVE] = .IRC25_ADDR [RCSA, RC_ALL]; ! SAVE SA REGISTER
;    4965  2     IF .IDCT_ADDR [IG_INT] EQLU YES                 ! IGNORE INTERRUPT?
;    4966  2     THEN
;    4967  2         RETURN;                                     ! YES - RETURN
;    4968  3     IF ((.IIP_FLAG) OR (BIT_TST (SWP_FLAGS, SWF_DM))) ! IF INIT SUBTEST OR DM EXERCISER
;    4969  2     THEN                                            ! THEN
;    4970  3         BEGIN
;    4971  3
;    4972  4         IF BIT_TST (IDCT_ADDR [SA_SAVE], SA_ERR)    ! IF FATAL ERROR
;    4973  3         THEN                                        ! THEN
;    4974  3             FATAL_ERROR ()                          ! DECLARE ERROR AND CLEAN UP
;    4975  3         ELSE                                        ! OTHERWISE
;    4976  4             BEGIN
;    4977  4
;    4978  4             POLL_CRING ();                          ! POLL COMMAND RING
;    4979  4             POLL_RRING ();                          ! POLL RESPONSE RING
;    4980  4
;    4981  3             END;
;    4982  3
;    4983  2         END;                                        ! IF INIT SUBTEST OR DM EXERCISER
;    4984  2
;    4985  1     END;                                            ! ROUTINE RCINT


                                        .SBTTL  RCINT RC25 INTERRUPT SERVICE ROUTINES
000000  010146                  RCINT:  MOV     R1,-(SP)                ;                       4946
000002  005746                          TST     -(SP)
000004  004737  000000V                 JSR     PC,ISET.CPAR            ;                       4963
000010  013700  000566'                 MOV     IDCT.ADDR,R0            ;                       4964
000014  013701  000000G                 MOV     IRC25.ADDR,R1
000020  016116  000002                  MOV     2(R1),(SP)              ; *,RC.REG
000024  011660  000002                  MOV     (SP),2(R0)              ; RC.REG,*
000030  032710  040000                  BIT     #40000,(R0)             ; *,IDCT.ADDR           4965
000034  001026                          BNE     3$                      ;                       4967
000036  132737  000001  000000G         BITB    #1,IIP.FLAG             ;                       4968
000044  001004                          BNE     1$
000046  132737  000002  000000G         BITB    #2,SWP.FLAGS
000054  001416                          BEQ     3$
000056  016000  000002          1$:     MOV     2(R0),R0                ;                       4972
```

```
000062  042700  077777                        BIC     #77777,R0
000066  020027  100000                        CMP     R0,#-100000
000072  001003                                BNE     2$
000074  004737  000000V                       JSR     PC,FATAL.ERROR          ;                4974
000100  000404                                BR      3$                      ;                4972
000102  004737  000000V             2$:       JSR     PC,POLL.CRING           ;                4978
000106  004737  000000V                       JSR     PC,POLL.RRING           ;                4979
000112  005726                      3$:       TST     (SP)+                   ;                4946
000114  012601                                MOV     (SP)+,R1
000116  000207                                RTS     PC

; Routine Size:  40 words,      Routine Base:  $CODE$ + 15110
; Maximum stack depth per invocation:  3 words
```

```
;    4986  1     ROUTINE INT_PROC : NOVALUE =
;    4987  1
;    4988  1     !+
;    4989  1     !       THIS ROUTINE IS CALLED FROM THE "EXECUTIVE" OF THE MULTI-DRIVE SUBTEST
;    4990  1     !       TO PROCESS ANY RC25 INTERRUPTS WHICH MAY HAVE OCCURRED IN THE RECENT
;    4991  1     !       PAST.
;    4992  1     !
;    4993  1     !       IF EITHER THE INITIALIZATION SUBTEST OR DM EXERCISER SUBTEST IS BEING
;    4994  1     !       RUN, THEN INTERRUPTS ARE FULLY PROCESSED AS THEY OCCUR (SEE RCINT).
;    4995  1     !       OTHERWISE, FOR THE MULTI-DRIVE SUBTEST, INTERRUPTS ARE PROCESSED ON A
;    4996  1     !       DELAYED BASIS TO PREVENT PROGRAM PRINTOUTS FROM BEING BROKEN UP BY,
;    4997  1     !       SAY, ERROR LOG MESSAGE PRINTOUTS.
;    4998  1     !
;    4999  1     !       AFTER SOME INITIALIZATION, THIS ROUTINE CONTINUES AS IF AN INTERRUPT
;    5000  1     !       HAS JUST OCCURRED: IF THE ERROR BIT OF THE SA REGISTER IS SET, THEN A
;    5001  1     !       FATAL ERROR IS DECLARED. OTHERWISE, THE COMMAND AND RESPONSE RINGS ARE
;    5002  1     !       POLLED.
;    5003  1     !
;    5004  1     !       IF NO INTERRUPT HAS OCCURRED IN THE RECENT PAST, THEN THE POLLING
;    5005  1     !       ROUTINES TAKE NO ACTION.
;    5006  1     !
;    5007  1     !       NOTE: ALL RC25'S ARE ASSUMMED TO BE HARDWIRED AT BR LEVEL 5 OR LESS.
;    5008  1     !       INTERRUPT PROCESSING RUNS AT LEVEL 5, AND CANNOT BE BROKEN BY AN
;    5009  1     !       INTERRUPT FROM A SECOND RC25.
;    5010  1     !
;    5011  1     !       IMPLICIT INPUTS:
;    5012  1     !               CCTLR - CURRENT CONTROLLER NUMBER
;    5013  1     !-
;    5014  1
;    5015  2     BEGIN
;    5016  2
;    5017  2     SETPRI (PRI05);                                 ! LOCK OUT ALL RC25 INTERRUPTS
;    5018  2     ICTLR = .CCTLR;                                 ! FAKE INTERRUPTING CONTROLLER NUMBER
;    5019  2     ISET_CPAR ();                                   ! SET UP CONTROLLER-RELATED DATA
;    5020  2     IDCT_ADDR [SA_SAVE] = .IRC25_ADDR [RCSA, RC_ALL]; ! SAVE SA REGISTER
;    5021  3     IF BIT_TST (IDCT_ADDR [SA_SAVE], SA_ERR)        ! IF FATAL ERROR
;    5022  2     THEN
;    5023  2         FATAL_ERROR ()
;    5024  2     ELSE                                            ! OTHERWISE
;    5025  3         BEGIN
;    5026  3
;    5027  3         POLL_CRING ();                              ! POLL COMMAND RING
;    5028  3         POLL_RRING ();                              ! POLL RESPONSE RING
;    5029  3
;    5030  2         END;
;    5031  2
;    5032  2     SETPRI (PRI00);                                 ! RESTORE PROCESSOR PRIORITY
;    5033  2
;    5034  1     END;                                            ! ROUTINE INT_PROC


                                    .SBTTL  INT.PROC RC25 INTERRUPT SERVICE ROUTINES
000000  010146                 INT.PROC:
                                    MOV     R1,-(SP)                        ;                       4986
000002  005746                         TST     -(SP)
000004  012700  000240                 MOV     #240,R0                         ;                       5017
000010  104441                         TRAP    41
```

```
000012  013737  000000G 000600'          MOV     CCTLR,ICTLR                     ;                               5018
000020  004737  000000V                  JSR     PC,ISET.CPAR                    ;                               5019
000024  013701  000566'                  MOV     IDCT.ADDR,R1                    ;                               5020
000030  013700  000000G                  MOV     IRC25.ADDR,R0
000034  016016  000002                   MOV     2(R0),(SP)                      ; *,RC.REG
000040  011661  000002                   MOV     (SP),2(R1)                      ; RC.REG,*
000044  011601                           MOV     (SP),R1                         ;                               5021
000046  042701  077777                   BIC     #77777,R1
000052  020127  100000                   CMP     R1,#-100000
000056  001003                           BNE     1$
000060  004737  000000V                  JSR     PC,FATAL.ERROR                  ;                               5023
000064  000404                           BR      2$                              ;                               5021
000066  004737  000000V          1$:     JSR     PC,POLL.CRING                   ;                               5027
000072  004737  000000V                  JSR     PC,POLL.RRING                   ;                               5028
000076  005000                  2$:     CLR     R0                              ;                               5032
000100  104441                           TRAP    41
000102  005726                           TST     (SP)+                           ;                               4986
000104  012601                           MOV     (SP)+,R1
000106  000207                           RTS     PC

; Routine Size:  36 words,      Routine Base:  $CODE$ + 15230
; Maximum stack depth per invocation:  4 words
```

```
;    5035  1     ROUTINE ISET_CPAR : NOVALUE =
;    5036  1
;    5037  1     !+
;    5038  1     !       THIS ROUTINE IS CALLED BY RCINT AND INT_PROC TO SET UP THE COMMONLY-
;    5039  1     !       USED DATA ITEMS FOR THE INTERRUPTING CONTROLLER.
;    5040  1     !
;    5041  1     !       IMPLICIT INPUTS:
;    5042  1     !               ICTLR - INTERRUPTING CONTROLLER NUMBER
;    5043  1     !-
;    5044  1
;    5045  2     BEGIN
;    5046  2
;    5047  2     IDCT_ADDR = DCT + (.ICTLR * DCT_LEN * 2);       ! CALCULATE DCT ADDRESS
;    5048  2     ICST_ADDR = CST + (.ICTLR * CST_LEN * 2);       ! CALCULATE CST ADDRESS
;    5049  2     IRC25_ADDR = .ICST_ADDR [IP_ADDR];              ! GET RC25 ADDRESS
;    5050  2     ICOM_ADDR = COMM_AREA + (.ICTLR * COMM_LEN * 2); ! CALCULATE COMM_AREA ADDR
;    5051  2
;    5052  1     END;                                            ! ROUTINE ISET_CPAR


                                        .SBTTL  ISET.CPAR RC25 INTERRUPT SERVICE ROUTINES
000000  010146                    ISET.CPAR:
                                        MOV     R1,-(SP)                        ;                       5035
000002  013701  000600'                 MOV     ICTLR,R1                        ;                       5047
000006  010146                          MOV     R1,-(SP)
000010  012746  000022                  MOV     #22,-(SP)
000014  004737  000000G                 JSR     PC,BL$MUL
000020  062700  000000G                 ADD     #DCT,R0
000024  010037  000566'                 MOV     R0,IDCT.ADDR
000030  010116                          MOV     R1,(SP)                         ;                       5048
000032  012746  000016                  MOV     #16,-(SP)
000036  004737  000000G                 JSR     PC,BL$MUL
000042  062700  000000G                 ADD     #CST,R0
000046  010037  000564'                 MOV     R0,ICST.ADDR
000052  011037  000000G                 MOV     (R0),IRC25.ADDR                 ; ICST.ADDR,*           5049
000056  010116                          MOV     R1,(SP)                         ;                       5050
000060  012746  000110                  MOV     #110,-(SP)
000064  004737  000000G                 JSR     PC,BL$MUL
000070  062700  000000'                 ADD     #COMM.AREA,R0
000074  010037  000560'                 MOV     R0,ICOM.ADDR
000100  062706  000010                  ADD     #10,SP                          ;                       5045
000104  012601                          MOV     (SP)+,R1                        ;                       5035
000106  000207                          RTS     PC

; Routine Size:  36 words,      Routine Base:  $CODE$ + 15340
; Maximum stack depth per invocation:  6 words
```

```
;    5053  1     ROUTINE FATAL_ERROR : NOVALUE =
;    5054  1
;    5055  1     !+
;    5056  1     !       THIS ROUTINE IS CALLED BY BOTH RCINT AND INT_PROC UPON DETECTING AN
;    5057  1     !       UNRECOVERABLE ERROR THROUGH THE DEVICE'S SA REGISTER. ITS PURPOSE IS TO
;    5058  1     !       CLEAN UP DEVICE DATA IN THE "DRIVER" PORTION OF THE EXERCISER, AND TO
;    5059  1     !       INFORM THE "PROGRAM" PORTION OF THE EVENT VIA RETURN PACKET.
;    5060  1     !
;    5061  1     !       IMPLICIT INPUTS:
;    5062  1     !               ICTLR - INTERRUPTING CONTROLLER NUMBER
;    5063  1     !               IDCT_ADDR - ADDRESS OF INTERRUPTING CONTROLLER'S DCT
;    5064  1     !               ICST_ADDR - ADDRESS OF INTERRUPTING CONTROLLER'S CST
;    5065  1     !-
;    5066  1
;    5067  2     BEGIN
;    5068  2
;    5069  2     LOCAL
;    5070  2         INDEX : SIGNED WORD,
;    5071  2         U_SAVE : WORD;
;    5072  2
;    5073  2     SA_REG = .IDCT_ADDR [SA_SAVE];
;    5074  2     U_SAVE = .L$LUN;                        ! SAVE PRE-INTERRUPT CURRENT UNIT NUMBER
;    5075  2     L$LUN = .ICST_ADDR [OF_UN, P_UNIT];     ! SET CURRENT UNIT TO FIRST IN CONTROLLER
;    5076  2     ERRDF (14, EGD_14, EMS_14);             ! "FATAL PORT / CONTROLLER ERROR"
;    5077  2     L$LUN = .U_SAVE;                        ! RESTORE PRE-INTERRUPT CURRENT UNIT
;    5078  2     DRV_CTLERR (.ICTLR);                    ! CLEAN UP DRIVER DATA FOR CONTROLLER
;    5079  2     IF (INDEX = GET_RETPKT (.ICTLR)) GEQ 0  ! TRY TO GET A RETPKT; IF SUCCESS
;    5080  2     THEN
;    5081  3         BEGIN
;    5082  3
;    5083  3         RETPKT [.INDEX, CONID] = CID_DRIVER;    ! SET CONNECTION ID TO "DRIVER"
;    5084  3         RETPKT [.INDEX, MESTYP] = MT_FATAL;     ! FATAL ERROR
;    5085  3         RETPKT [.INDEX, CTLR] = .ICTLR;         ! CONTROLLER NUMBER
;    5086  3         IN_IODQ (.INDEX);                       ! LOAD RETPKT INDEX INTO IODQ
;    5087  3
;    5088  2         END;                                    ! IF RETPKT WAS ALLOCATED
;    5089  2
;    5090  1     END;                                        ! ROUTINE FATAL_ERR


                                        .SBTTL  FATAL.ERROR RC25 INTERRUPT SERVICE ROUTINES
000000  004137  000000G           FATAL.ERROR:
                                        JSR     R1,$SAVE2                       ;                       5053
000004  013700  000566'                 MOV     IDCT.ADDR,R0                    ;                       5073
000010  016037  000002  000000G         MOV     2(R0),SA.REG
000016  013701  000000G                 MOV     L$LUN,R1                        ; *,U.SAVE              5074
000022  013700  000564'                 MOV     ICST.ADDR,R0                    ;                       5075
000026  016002  000006                  MOV     6(R0),R2
000032  000302                          SWAB    R2
000034  042702  177740                  BIC     #177740,R2
000040  010237  000000G                 MOV     R2,L$LUN
000044  104455                          TRAP    55                              ;                       5076
000046  000016                          .WORD   16
000050  000000G                         .WORD   EGD.14
000052  000000G                         .WORD   EMS.14
000054  010137  000000G                 MOV     R1,L$LUN                        ; U.SAVE,*              5077
000060  013746  000600'                 MOV     ICTLR,-(SP)                     ;                       5078
```

```
000064  004737  000000G                        JSR     PC,DRV.CTLERR
000070  013716  000600'                        MOV     ICTLR,(SP)              ;                               5079
000074  004737  000000G                        JSR     PC,GET.RETPKT
000100  010001                                 MOV     R0,R1                   ; *,INDEX
000102  002425                                 BLT     1$
000104  010116                                 MOV     R1,(SP)                 ; INDEX,*                       5083
000106  012746  000060                        MOV     #60,-(SP)
000112  004737  000000G                        JSR     PC,BL$MUL
000116  062700  000002G                        ADD     #RETPKT+2,R0
000122  112760  000003  000001                 MOVB    #3,1(R0)
000130  013702  000600'                        MOV     ICTLR,R2                ;                               5085
000134  042702  177760                        BIC     #177760,R2
000140  112710  000060                        MOVB    #60,(R0)
000144  150210                                 BISB    R2,(R0)
000146  010116                                 MOV     R1,(SP)                 ; INDEX,*                       5086
000150  004737  000000G                        JSR     PC,IN.IODQ
000154  005726                                 TST     (SP)+                   ;                               5081
000156  005726                         1$:     TST     (SP)+                   ;                               5067
000160  000207                                 RTS     PC                      ;                               5053

; Routine Size:  57 words,      Routine Base:  $CODE$ + 15450
; Maximum stack depth per invocation:  6 words
```

```
;    5091  1     ROUTINE POLL_CRING : NOVALUE =
;    5092  1
;    5093  1     !+
;    5094  1     !       THIS ROUTINE IS CALLED BY BOTH RCINT AND INT_PROC TO SCAN THE DEVICE'S
;    5095  1     !       COMMAND RING AND CHECK FOR ANY COMMAND SLOTS THAT HAVE BEEN "TAKEN" BY
;    5096  1     !       THE CONTROLLER. SUCH SLOTS HAVE BEEN RETURNED TO THE HOST, INDICATED BY
;    5097  1     !       A ZERO OWNERSHIP BIT. FOR EACH SLOT THAT HAS BEEN RETURNED TO THE HOST,
;    5098  1     !       THE CRING COUNT IS DECREMENTED, AND THE CR_POLL ADDRESS IS ADVANCED TO
;    5099  1     !       THE NEXT SLOT IN THE COMMAND RING.
;    5100  1     !
;    5101  1     !       IMPLICIT INPUTS:
;    5102  1     !               ICTLR - INTERRUPTING CONTROLLER NUMBER
;    5103  1     !               IDCT_ADDR - ADDRESS OF INTERRUPTING CONTROLLER'S DCT
;    5104  1     !               ICOM_ADDR - ADDRESS OF INTERRUPTING CONTROLLER'S COMM_AREA
;    5105  1     !-
;    5107  2     BEGIN
;    5108  2
;    5109  3     WHILE ((.IDCT_ADDR [CRING_CNT] GTRU 0) AND                  ! WHILE # OF COMMANDS IN CRING > 0 AND
;    5110  2        NOT (BIT_TST ((.IDCT_ADDR [CR_POLL] + 2), ED_OWN))) DO   ! CURRENT SLOT IS HOST-OWNED
;    5111  3         BEGIN
;    5112  3
;    5113  3         IDCT_ADDR [CRING_CNT] = .IDCT_ADDR [CRING_CNT] - 1; ! DECREMENT # CMDS IN CRING
;    5114  3         IDCT_ADDR [CR_POLL] = .IDCT_ADDR [CR_POLL] + 4;     ! ADVANCE TO NEXT SLOT TO POLL
;    5115  3         IF .IDCT_ADDR [CR_POLL] GTRA .IDCT_ADDR [CR_END]    ! IF BEYOND END OF RING
;    5116  3         THEN                                                ! THEN
;    5117  3             IDCT_ADDR [CR_POLL] = .IDCT_ADDR [CR_BEG];      ! SET POINTER TO TOP OF CRING
;    5118  3
;    5119  2         END;
;    5120  2
;    5121  2     ICOM_ADDR [CMD_INT] = 0;                                ! CLEAR COMMAND INTERRUPT WORD IN RING HEADER
;    5122  2
;    5123  1     END;

                                        .SBTTL  POLL.CRING RC25 INTERRUPT SERVICE ROUTINES
000000  004137  000000G          POLL.CRING:
                                        JSR     R1,$SAVE2                       ;                       5091
000004  013701  000566'                 MOV     IDCT.ADDR,R1                    ;                       5109
000010  012702  000016                  MOV     #16,R2                          ;                       5114
000014  060102                          ADD     R1,R2
000016  105711                  1$:     TSTB    (R1)                            ;                       5109
000020  001422                          BEQ     2$
000022  016100  000016                  MOV     16(R1),R0                       ;                       5110
000026  016000  000002                  MOV     2(R0),R0
000032  042700  077777                  BIC     #77777,R0
000036  020027  100000                  CMP     R0,#-100000
000042  001411                          BEQ     2$
000044  105311                          DECB    (R1)                            ;                       5113
000046  062712  000004                  ADD     #4,(R2)                         ;                       5114
000052  021261  000012                  CMP     (R2),12(R1)                     ;                       5115
000056  101757                          BLOS    1$
000060  016112  000010                  MOV     10(R1),(R2)                     ;                       5117
000064  000754                          BR      1$                              ;                       5109
000066  013700  000560'          2$:     MOV     ICOM.ADDR,R0                    ;                       5121
000072  005060  000004                  CLR     4(R0)
000076  000207                          RTS     PC                              ;                       5091

; Routine Size:  32 words,      Routine Base:  $CODE$ + 15632
; Maximum stack depth per invocation:  4 words
```

```
;    5124  1     ROUTINE POLL_RRING : NOVALUE =
;    5125  1
;    5126  1     !+
;    5127  1     !       THIS ROUTINE IS CALLED BY BOTH RCINT AND INT_PROC TO SCAN THE DEVICE'S
;    5128  1     !       RESPONSE RING AND CHECK FOR ANY SLOTS WHICH HAVE BEEN RETURNED TO THE
;    5129  1     !       HOST (OWNERSHIP BIT = 0). FOR EACH SUCH SLOT, THE ASSOCIATED MESSAGE IS
;    5130  1     !       PROCESSED BASED ON ITS CONNECTION ID (DISK OR DUP) AND MESSAGE TYPE
;    5131  1     !       (SEQUENTIAL OR DATAGRAM). AFTER PROCESSING, THE MESSAGE ENVELOPE IS
;    5132  1     !       RE-INITIALIZED AND RETURNED TO THE CONTROLLER (OWNERSHIP BIT SET TO 1).
;    5133  1     !
;    5134  1     !       IMPLICIT INPUTS:
;    5135  1     !               IDCT_ADDR - ADDRESS OF INTERRUPTING CONTROLLER'S DCT
;    5136  1     !-
;    5137  1
;    5138  2     BEGIN
;    5139  2
;    5140  2     WHILE NOT (BIT_TST ((.IDCT_ADDR [RR_POLL] + 2), ED_OWN)) DO     ! WHILE O = 0
;    5141  3         BEGIN
;    5142  3
;    5143  3         IENV_ADDR = ..IDCT_ADDR [RR_POLL] - 8;              ! ADDRESS OF RESPONSE ENVELOPE
;    5144  3         IF .IENV_ADDR [CONNID] EQLU CID_DISK                ! IF MESSAGE IS FROM DISK MSCP
;    5145  3         THEN                                                ! THEN
;    5146  3             SELECTONEU .IENV_ADDR [MSGTYP] OF               ! PROCESS ON MESSAGE TYPE
;    5147  3                 SET
;    5148  3
;    5149  3                 [MT_SEQ]    : ENV_TO_RP ();                         ! SEQUENTIAL
;    5150  3                 [MT_DG]     : DATAGM ();                            ! DATAGRAM
;    5151  3
;    5152  3                 TES
;    5153  3             ELSE                                            ! ELSE (MESSAGE NOT FROM DISK MSCP)
;    5154  4                 BEGIN
;    5155  4
;    5156  4                 IF .IENV_ADDR [CONNID] EQLU CID_DUP         ! IF MESSAGE IS FROM DUP
;    5157  4                 THEN                                        ! THEN
;    5158  4                     ENV_TO_RP ();                           ! COPY ENV TO RETPKT
;    5159  4
;    5160  3                 END;
;    5161  3
;    5162  3             IENV_ADDR [MSGLEN] = MSG_LEN * 2;               ! RE-INIT MESSAGE LENGTH
;    5163  3             IDCT_ADDR [RR_POLL] = .IDCT_ADDR [RR_POLL] + 2; ! ADVANCE TO HI ORDER WORD OF RING SLOT
;    5164  3             .IDCT_ADDR [RR_POLL] = .IENV_ADDR [ENV_HI];     ! RETURN SLOT TO CONTROLLER
;    5165  3             IDCT_ADDR [RR_POLL] = .IDCT_ADDR [RR_POLL] + 2; ! ADVANCE TO NEXT RRING SLOT
;    5166  3             IF .IDCT_ADDR [RR_POLL] GTRA .IDCT_ADDR [RR_END]    ! IF BEYOND END OF RING
;    5167  3             THEN                                            ! THEN
;    5168  3                 IDCT_ADDR [RR_POLL] = .IDCT_ADDR [RR_BEG];  ! CYCLE TO TOP OF RING
;    5169  3
;    5170  2             END;                                        ! WHILE LOOP
;    5171  2
;    5172  2     ICOM_ADDR [RSP_INT] = 0;                            ! CLEAR RESPONSE INTERRUPT WORD IN RING HEADER
;    5173  2
;    5174  1     END;


                                        .SBTTL  POLL.RRING RC25 INTERRUPT SERVICE ROUTINES
000000  004137  000000G           POLL.RRING:
                                        JSR     R1,$SAVE2                   ;                       5124
000004  013702  000566'                 MOV     IDCT.ADDR,R2                ;                       5140
```

```
000010  062702  000014                        ADD     #14,R2
000014  011200                          1$:     MOV     (R2),R0
000016  016000  000002                        MOV     2(R0),R0
000022  042700  077777                        BIC     #77777,R0
000026  020027  100000                        CMP     R0,#-100000
000032  001470                                BEQ     5$
000034  017237  000000  000562'               MOV     @0(R2),IENV.ADDR        ;                5143
000042  162737  000010  000562'               SUB     #10,IENV.ADDR
000050  013700  000562'                       MOV     IENV.ADDR,R0            ;                5144
000054  062700  000006                        ADD     #6,R0
000060  105760  000001                        TSTB    1(R0)
000064  001016                                BNE     2$
000066  111000                                MOVB    (R0),R0                 ;                5146
000070  006200                                ASR     R0
000072  006200                                ASR     R0
000074  006200                                ASR     R0
000076  006200                                ASR     R0
000100  042700  177760                        BIC     #177760,R0
000104  001412                                BEQ     3$
000106  020027  000001                        CMP     R0,#1                   ;                5149
000112  001011                                BNE     4$                      ;                5150
000114  004737  000000V                       JSR     PC,DATAGM
000120  000406                                BR      4$
000122  126027  000001  000002        2$:     CMPB    1(R0),#2                ;                5144
000130  001002                                BNE     4$                      ;                5156
000132  004737  000000V               3$:     JSR     PC,ENV.TO.RP            ;                5158
000136  013700  000562'               4$:     MOV     IENV.ADDR,R0            ;                5162
000142  012760  000074  000004                MOV     #74,4(R0)
000150  013701  000566'                       MOV     IDCT.ADDR,R1            ;                5163
000154  010102                                MOV     R1,R2
000156  062702  000014                        ADD     #14,R2
000162  062712  000002                        ADD     #2,(R2)
000166  016072  000002  000000                MOV     2(R0),@0(R2)            ;                5164
000174  062712  000002                        ADD     #2,(R2)                 ;                5165
000200  021261  000006                        CMP     (R2),6(R1)              ;                5166
000204  101703                                BLOS    1$
000206  016112  000004                        MOV     4(R1),(R2)              ;                5168
000212  000700                                BR      1$                      ;                5140
000214  013700  000560'               5$:     MOV     ICOM.ADDR,R0            ;                5172
000220  005060  000006                        CLR     6(R0)
000224  000207                                RTS     PC                      ;                5124

; Routine Size:  75 words,      Routine Base:  $CODE$ + 15732
; Maximum stack depth per invocation:  4 words
```

```
;  5175  1     ROUTINE ENV_TO_RP : NOVALUE =
;  5176  1
;  5177  1     !+
;  5178  1     !       THIS ROUTINE IS CALLED BY POLL_RRING FOR (A) DISK MSCP RESPONSE
;  5179  1     !       MESSAGES WITH THE 'SEQUENTIAL" MESSAGE TYPE, AND (B) DUP RESPONSE
;  5180  1     !       MESSAGES. ITS GENERAL PURPOSE IS TO COPY THE CONTENTS OF THE MESSAGE
;  5181  1     !       ENVELOPE INTO A RETURN PACKET SO THAT THE ENVELOPE CAN BE RETURNED TO
;  5182  1     !       THE CONTROLLER. IF THE RESPONSE MESSAGE HAS AN ASSOCIATED COMMAND IN
;  5183  1     !       THE CONTROLLER'S OUTSTANDING COMMAND LIST (OUTC_LIST), THEN TIMING FOR
;  5184  1     !       THAT COMMAND IS TERMINATED. IN ADDITION, IF THE COMMAND WAS AN I/O
;  5185  1     !       TRANSFER (READ, WRITE, OR ACCESS), THEN SOME FIELDS OF THE COMMAND
;  5186  1     !       ENVELOPE ARE COPIED INTO THE RETURN PACKET.
;  5187  1     !
;  5188  1     !       AFTER THE RETURN PACKET HAS BEEN LOADED, ITS INDEX IS LOADED INTO THE
;  5189  1     !       I/O DONE QUEUE (IODQ) FOR PROCESSING BY THE "PROGRAM" PORTION OF THE
;  5190  1     !       DIAGNOSTIC.
;  5191  1     !
;  5192  1     !       IMPLICIT INPUTS:
;  5193  1     !               ICTLR   INTERRUPTING CONTROLLER NUMBER
;  5194  1     !               IENV_ADDR   ADDRESS OF MSCP ENVELOPE CONTAINING RESPONSE
;  5195  1     !-
;  5196  1
;  5197  2     BEGIN
;  5198  2
;  5199  2     LOCAL
;  5200  2         M_INDEX : SIGNED WORD,
;  5201  2         R_INDEX : SIGNED WORD,
;  5202  2         STIDX : WORD,
;  5203  2         ENDIDX : WORD,
;  5204  2         R_ADDR : REF BLOCK [RP_LEN, WORD] FIELD (RP_FIELDS),
;  5205  2         TEMP : WORD;
;  5206  2
;  5207  2     M_INDEX = -1;                                   ! ASSUME NO ASSOCIATED COMMAND PACKET
;  5208  2     STIDX = .ICTLR + OUTC_CNT;                      ! START OF CONTROLLER'S OUTC_LIST AND _TIMR
;  5209  2     ENDIDX = .STIDX + OUTC_CNT - 1;                 ! END OF OUTC
;  5210  2     INCR COUNT FROM .STIDX TO .ENDIDX DO            ! SEARCH THROUGH EACH OUTC ENTRY
;  5211  3         BEGIN
;  5212  3
;  5213  3         IF (TEMP = .OUTC_LIST [.COUNT]) GEQ 0       ! IF ENTRY CONTAINS AN OUTSTANDING COMMAND INDEX
;  5214  3         THEN                                        ! THEN
;  5215  4             BEGIN
;  5216  4
;  5217  4             IF .MSCP_ENV [.TEMP, CRN_LO] EQLU .IENV_ADDR [CRN_LO]   ! IF THIS IS THE ASSOC CMD
;  5218  4             THEN                                                    ! THEN
;  5219  5                 BEGIN
;  5220  5
;  5221  5                 M_INDEX = .TEMP;
;  5222  5                 OUTC_LIST [.COUNT] =  1;                            ! INIT ENTRY
;  5223  5                 OUTC_TIMR [.COUNT] = 0;                             ! TURN OFF COMMAND TIMER
;  5224  5                 EXITLOOP;
;  5225  5
;  5226  4                 END;
;  5227  4
;  5228  3             END;
;  5229  3
;  5230  2         END;
;  5231  2
```

```
;    5232  2     IF (R_INDEX = GET_RETPKT (.ICTLR)) GEQ 0        ! IF RETPKT IS AVAILABLE
;    5233  2     THEN
;    5234  3         BEGIN
;    5235  3
;    5236  3         R_ADDR = RETPKT + (.R_INDEX * RP_LEN * 2);  ! START OF ALLOCATED RETPKT
;    5237  3         COPY_BLK (.IENV_ADDR + 4, .R_ADDR, RP_LEN); ! COPY RESPONSE ENVELOPE INTO RETURN PACKET
;    5238  3         R_ADDR [CTLR] = .ICTLR;                     ! LOAD CONTROLLER NUMBER INTO PACKET
;    5239  3         IF .M_INDEX GEQ 0                           ! IF ASSOC. CMD ENV WAS FOUND
;    5240  3         THEN                                        ! THEN
;    5241  4             BEGIN
;    5242  4
;    5243  5             IF ((.IENV_ADDR [OPCODE] EQLU (OP_RD + OP_END)) OR      ! IF END MESSAGE IS
;    5244  5                 (.IENV_ADDR [OPCODE] EQLU (OP_WRT + OP_END)) OR     !      READ, WRITE, OR
;    5245  5                 (.IENV_ADDR [OPCODE] EQLU (OP_ACC + OP_END)))       !      ACCESS
;    5246  4             THEN                                                    ! THEN
;    5247  5                 BEGIN
;    5248  5
;    5249  5                 R_ADDR [CMDMOD] = .MSCP_ENV [.M_INDEX, MODIFY];     ! COPY
;    5250  5                 R_ADDR [CBCNT_LO] = .MSCP_ENV [.M_INDEX, BC_LO];    ! RELEVANT
;    5251  5                 R_ADDR [CBCNT_HI] = .MSCP_ENV [.M_INDEX, BC_HI];    ! FIELDS
;    5252  5                 R_ADDR [LBN_LO] = .MSCP_ENV [.M_INDEX, LBN_L];      ! FROM
;    5253  5                 R_ADDR [LBN_HI] = .MSCP_ENV [.M_INDEX, LBN_H];      ! COMMAND
;    5254  5                 R_ADDR [BUFF_0] = .MSCP_ENV [.M_INDEX, BUF_0];      ! PACKET
;    5255  5                 R_ADDR [BUFF_1] = .MSCP_ENV [.M_INDEX, BUF_1];      ! TO RETPKT
;    5256  5
;    5257  4                 END;                                        ! IF ENDCODE WAS READ, WRITE, OR ACCESS
;    5258  4
;    5259  3             END;                                    ! IF ASSOC CMD ENV WAS FOUND
;    5260  3
;    5261  3         IN_IODQ (.R_INDEX);                         ! PUT RETPKT INDEX INTO IODQ
;    5262  3
;    5263  2         END;                                        ! IF RETPKT WAS ALLOCATED
;    5264  2
;    5265  2     IF .M_INDEX GEQ 0                               ! IF ASSOC CMD ENV WAS FOUND
;    5266  2     THEN
;    5267  2        PUT_ENV (.M_INDEX);                          ! RETURN COMMAND ENVELOPE TO POOL
;    5268  2
;    5269  1     END;                                            ! ROUTINE DISK_RSP


                                    .SBTTL  ENV.TO.RP RC25 INTERRUPT SERVICE ROUTINES
000000  004137  000000G       ENV.TO.RP:
                                    JSR     R1,$SAVE5                       ;                       5175
000004  012704  177777              MOV     #-1,R4                          ; *,M.INDEX             5207
000010  013700  000600'              MOV     ICTLR,R0                        ;                       5208
000014  006300                       ASL     R0
000016  006300                       ASL     R0
000020  006300                       ASL     R0
000022  006300                       ASL     R0
000024  010005                       MOV     R0,R5                           ; STIDX,ENDIDX          5209
000026  062705  000017               ADD     #17,R5                          ; *,ENDIDX
000032  010001                       MOV     R0,R1                           ; STIDX,COUNT           5  0
000034  060401                       ADD     R4,R1                           ; *,COUNT
000036  000430                       BR      2$
000040  116103  000000G       1$:     MOVB    OUTC.LIST(R1),R3                ; *(COUNT),TEMP         5213
000044  002425                       BLT     2$
000046  010346                       MOV     R3,-(SP)                        ; TEMP,*                5217
```

```
000050  012746  000104                          MOV     #104,-(SP)
000054  004737  000000G                         JSR     PC,BL$MUL
000060  022626                                  CMP     (SP)+,(SP)+
000062  013702  000562'                         MOV     IENV.ADDR,R2
000066  026062  000010G 000010                  CMP     MSCP.ENV+10(R0),10(R2)
000074  001011                                  BNE     2$
000076  010304                                  MOV     R3,R4                   ; TEMP,M.INDEX                  5221
000100  112761  000377  000000G                MOVB    #377,OUTC.LIST(R1)      ; *,*(COUNT)                    5222
000106  010100                                  MOV     R1,R0                   ; COUNT,*                       5223
000110  006300                                  ASL     R0
000112  005060  000000G                         CLR     OUTC.TIMR(R0)
000116  000403                                  BR      3$                      ;                               5219
000120  005201                          2$:     INC     R1                      ; COUNT                         5210
000122  020105                                  CMP     R1,R5                   ; COUNT,ENDIDX
000124  003745                                  BLE     1$
000126  013746  000600'                 3$:     MOV     ICTLR,-(SP)             ;                               5232
000132  004737  000000G                         JSR     PC,GET.RETPKT
000136  010001                                  MOV     R0,R1                   ; *,R.INDEX
000140  005726                                  TST     (SP)+
000142  005701                                  TST     R1                      ; R.INDEX
000144  002513                                  BLT     6$
000146  010146                                  MOV     R1,-(SP)                ; R.INDEX,*                     5236
000150  012746  000060                          MOV     #60,-(SP)
000154  004737  000000G                         JSR     PC,BL$MUL
000160  062700  000000G                         ADD     #RETPKT,R0
000164  010002                                  MOV     R0,R2                   ; *,R.ADDR
000166  013716  000562'                         MOV     IENV.ADDR,(SP)          ;                               5237
000172  062716  000004                          ADD     #4,(SP)
000176  010246                                  MOV     R2,-(SP)                ; R.ADDR,*
000200  012746  000030                          MOV     #30,-(SP)
000204  004737  000000G                         JSR     PC,COPY.BLK
000210  013700  000600'                         MOV     ICTLR,R0                ;                               5238
000214  042700  177760                          BIC     #177760,R0
000220  142762  000017  000002                  BICB    #17,2(R2)               ; *,*(R.ADDR)
000226  150062  000002                          BISB    R0,2(R2)                ; *,*(R.ADDR)
000232  005704                                  TST     R4                      ; M.INDEX                       5239
000234  002452                                  BLT     5$
000236  013700  000562'                         MOV     IENV.ADDR,R0            ;                               5243
000242  116000  000020                          MOVB    20(R0),R0
000246  042700  177400                          BIC     #177400,R0
000252  020027  000241                          CMP     R0,#241
000256  001406                                  BEQ     4$
000260  020027  000242                          CMP     R0,#242                 ;                               5244
000264  001403                                  BEQ     4$
000266  020027  000220                          CMP     R0,#220                 ;                               5245
000272  001033                                  BNE     5$
000274  010416                          4$:     MOV     R4,(SP)                 ; M.INDEX,*                     5249
000276  012746  000104                          MOV     #104,-(SP)
000302  004737  000000G                         JSR     PC,BL$MUL
000306  016062  000022G 000012                  MOV     MSCP.ENV+22(R0),12(R2)  ; *,*(R.ADDR)
000314  016062  000024G 000044                  MOV     MSCP.ENV+24(R0),44(R2)  ; *,*(R.ADDR)                   5250
000322  016062  000026G 000046                  MOV     MSCP.ENV+26(R0),46(R2)  ; *,*(R.ADDR)                   5251
000330  016062  000044G 000050                  MOV     MSCP.ENV+44(R0),50(R2)  ; *,*(R.ADDR)                   5252
000336  016062  000046G 000052                  MOV     MSCP.ENV+46(R0),52(R2)  ; *,*(R.ADDR)                   5253
000344  016062  000030G 000024                  MOV     MSCP.ENV+30(R0),24(R2)  ; *,*(R.ADDR)                   5254
000352  016062  000032G 000026                  MOV     MSCP.ENV+32(R0),26(R2)  ; *,*(R.ADDR)                   5255
000360  005726                                  TST     (SP)+                   ;                               5247
```

```
000362  010116                          5$:     MOV     R1,(SP)                         ; R.INDEX,*                     5261
000364  004737  000000G                         JSR     PC,IN.IODQ
000370  062706  000010                          ADD     #10,SP                          ;                               5234
000374  005704                          6$:     TST     R4                              ; M.INDEX                       5265
000376  002404                                  BLT     7$
000400  010446                                  MOV     R4,-(SP)                        ; M.INDEX,*                     5267
000402  004737  000000G                         JSR     PC,PUT.ENV
000406  005726                                  TST     (SP)+
000410  000207                          7$:     RTS     PC                              ;                               5175

; Routine Size:  133 words,     Routine Base:  $CODE$ + 16160
; Maximum stack depth per invocation:  12 words
```

```
;  5270  1     ROUTINE DATAGM : NOVALUE =
;  5271  1
;  5272  1     !+
;  5273  1     !       THIS ROUTINE HANDLES ALL DATAGRAM (ERROR LOG) MESSAGES RECEIVED FROM
;  5274  1     !       THE RC25. IF THE DATAGRAM REFERENCES A PARTICULAR UNIT (AND IS NOT
;  5275  1     !       CONTROLLER-RELATED), THEN ITS OCCURRENCE IS TALLIED FOR THAT UNIT. IF
;  5276  1     !       THE USER DID NOT SUPPRESS THE PRINTING OF ERROR LOG MESSAGES DURING THE
;  5277  1     !       SW DIALOG, THEN EACH RELEVANT FIELD IS IDENTIFIED AND PRINTED. IF THE
;  5278  1     !       DATAGRAM INDICATES AN ECC ERROR, THEN IT IS TALLIED FOR THE APPROPRIATE
;  5279  1     !       UNIT.
;  5280  1     !
;  5281  1     !       IMPLICIT INPUTS:
;  5282  1     !               IENV_ADDR - ADDRESS OF MSCP ENVELOPE CONTAINING ERROR LOG
;  5283  1     !                           MESSAGE
;  5284  1     !-
;  5285  1
;  5286  2     BEGIN
;  5287  2
;  5288  2     LITERAL
;  5289  2         EC1 = 8,                                ! SUB-CODE VALUE FOR 1-SYMBOL ECC ERROR
;  5290  2         EC8 = 15,                               ! SUB-CODE VALUE FOR 8-SYMBOL ECC ERROR
;  5291  2         EC0 = 4;                                ! SUB-CODE VALUE FOR ECC-FIELD-ONLY ERROR
;  5292  2
;  5293  2     BIND
;  5294  2         FMT_CE = UPLIT (%ASCIZ'%ACONTROLLER ERROR%N'),
;  5295  2         FMT_HMA = UPLIT (%ASCIZ'%AHOST MEMORY ACCESS ERROR%N'),
;  5296  2         FMT_SDE = UPLIT (%ASCIZ'%ASMALL DISK ERROR%N');
;  5297  2
;  5298  2     OWN
;  5299  2         FMT_TB : VECTOR [5] INITIAL (FMT_CE, FMT_HMA, 0, 0, FMT_SDE),
;  5300  2         STC_TB : VECTOR [12] INITIAL (STC_00, STC_01, STC_02, STC_03, STC_04,
;  5301  2                         STC_05, STC_06, STC_07, STC_08, STC_09, STC_10, STC_11);
;  5302  2
;  5303  2     LOCAL
;  5304  2         FMT : WORD,                                     ! FORMAT CODE
;  5305  2         EVC : WORD,                                     ! EVENT CODE
;  5306  2         SBC : WORD,                                     ! SUB-CODE
;  5307  2         PLAD : WORD,                                    ! PLATTER ADDRESS (MSCP UNIT NO.)
;  5308  2         UNIT : SIGNED WORD,                             ! DRS UNIT NUMBER
;  5309  2         TAD : REF BLOCK [TALLY_LEN, WORD] FIELD (T_FIELDS); !TALLY ADDRESS
;  5310  2
;  5311  2     FMT = .IENV_ADDR [FORMAT];                          ! GET FORMAT CODE
;  5312  2     EVC = .IENV_ADDR [EVENT];                           ! GET EVENT CODE
;  5313  2     SBC = .IENV_ADDR [SUBC];                            ! GET SUB-CODE
;  5314  2     I~ .FMT EQLU FM_SDE                                 ! IF SMALL DISK ERROR
;  5315  2     THEN                                                ! THEN
;  5316  3         BEGIN
;  5317  3
;  5318  3         PLAD = .IENV_ADDR [PL_ADDR];                            ! GET PLATTER ADDRESS (MSCP UNIT NO.)
;  5319  3         UNIT = -1;
;  5320  3         INCR OFFSET FROM (0 + OF_UN) TO (3 + OF_UN) DO          ! FOR EACH CST UNIT
;  5321  4             BEGIN
;  5322  4
;  5323  4             IF .PLAD EQLU .ICST_ADDR [.OFFSET, P_ADDR]          ! IF PLAT ADDR MATCHES CST ENTRY
;  5324  4             THEN                                                ! THEN
;  5325  5                 BEGIN
;  5326  5
```

```
;  5327  5                UNIT = .ICST_ADDR [.OFFSET, P_UNIT];        ! GET DRS UNIT NUMBER
;  5328  5                EXITLOOP;                                   ! DONE SEARCH
;  5329  5
;  5330  4                END;
;  5331  4
;  5332  3            END;                                            ! PLATTER ADDRESS SEARCH LOOP
;  5333  3
;  5334  3        IF .UNIT GEQ 0                                      ! IF UNIT NUMBER WAS FOUND
;  5335  3        THEN                                                ! THEN
;  5336  4            BEGIN
;  5337  4
;  5338  4            TAD = TALLY + (.UNIT * TALLY_LEN * 2);          ! CALCULATE UNIT'S TALLY ADDRESS
;  5339  4            TAD [ER_LOG] = .TAD [ER_LOG] + 1;               ! INCR ERROR LOG COUNT
;  5340  4            IF .EVC EQLU ST_DAT                             ! IF EVENT CODE = DATA ERROR
;  5341  4            THEN                                            ! THEN
;  5342  5                BEGIN
;  5343  5
;  5344  5                IF .SBC EQLU ECO                                ! IF ECC-FIELD-ONLY
;  5345  5                THEN                                            ! THEN
;  5346  5                    TAD [ECC_ONLY] = .TAD [ECC_ONLY] + 1        ! INCREMENT STAT
;  5347  5                ELSE                                            ! OTHERWISE
;  5348  6                    BEGIN
;  5349  6
;  5350  7                    IF ((.SBC GEQ EC1) AND (.SBC LEQ EC8))      ! IF SUB-CODE INDICATES ECC SYMBOL ERROR
;  5351  6                    THEN                                        ! THEN
;  5352  7                        BEGIN
;  5353  7
;  5354  7                        TAD = TAD [ECC_1] + ((.SBC - 8) * 2); ! CALCULATE EXACT ADDR OF ECC STAT
;  5355  7                        .TAD = ..TAD + 1;                     ! INCREMENT STATISTIC
;  5356  7
;  5357  6                        END;                                  ! IF SUB-CODE IS ECC ERROR
;  5358  6
;  5359  5                    END;                                      ! IF NOT ECC-FIELD-ONLY ERROR
;  5360  5
;  5361  4                END;                                        ! IF EVENT CODE = DATA ERROR
;  5362  4
;  5363  3            END;                                            ! IF UNIT NUMBER WAS FOUND
;  5364  3
;  5365  2        END;                                                ! IF FORMAT = SMALL DISK ERROR
;  5366  2
;  5367  3    IF MANUAL AND (NOT (BIT_TST (SWP_FLAGS, SWF_SEL)))      ! IF ATTENDED AND ERROR LOG PRINTING WAS NOT SUPPRESSED
;  5368  2    THEN                                                    ! THEN
;  5369  3        BEGIN
;  5370  3
;  5371  3        PRINTF (EX_EL);                                     ! "ERROR LOG MESSAGE RECEIVED:"
;  5372  3        PRINTF (EX_CRN, .IENV_ADDR [CRN_LO]);               ! "    CMD REF NUM: XXXXXX(O)"
;  5373  3        IF .FMT EQLU FM_SDE                                 ! IF FORMAT CODE = SMALL DISK ERROR
;  5374  3        THEN                                                ! THEN
;  5375  3            PRINTF (EX_PA, .PLAD);                          ! "    PLATTER: XXX."
;  5376  3        PRINTF (EX_FMT);                                    ! "    FORMAT: "
;  5377  3        SELECTONE .FMT OF
;  5378  3            SET
;  5379  3
;  5380  3            [FM_CNT, FM_BAD, FM_SDE] : PRINTF (FMT_TB [.FMT]);      ! PRINT TEXT
;  5381  3            [OTHERWISE]              : PRINTF (EX_03, .FMT);        ! "XXX(O)"
;  5382  3
;  5383  3            TES;
```

```
;   5384  3
;   5385  3          PRINTF (EX_EVC);                                    ! "    EVENT CODE: "
;   5386  3          IF .EVC LEQU 11                                     ! IF EVENT CODE IS KNOWN
;   5387  3          THEN                                                ! THEN
;   5388  4              PRINTF (.STC_TB [.EVC])                         ! PRINT EVENT CODE TEXT
;   5389  3          ELSE                                                ! OTHERWISE
;   5390  3              PRINTF (EX_03, .EVC);                           ! "XXX(0)"
;   5391  3          PRINTF (EX_SB, .SBC);                               ! "    SUB-CODE: XXXX(0)"
;   5392  3          IF .FMT EQLU FM_BAD                                 ! IF HOST MEMORY ACCESS ERROR
;   5393  3          THEN                                                ! THEN
;   5394  3              PRINTF (EX_HMA, .IENV_ADDR [MA_LO], .IENV_ADDR [MA_HI]);        ! PRINT HOST ADDRESS
;   5395  3
;   5396  2          END;                                                ! IF PRINTING WAS NOT SUPPRESSED
;   5397  2
;   5398  1      END;                                                    ! ROUTINE DATAGM


002554                                          .PSECT  $GGG$,  RO
002554  000036'                        FMT.TB: .WORD   FMT.CE
002556  000064'                                .WORD   FMT.HMA
002560  000000                                .WORD   0
002562  000000                                .WORD
002564  000122'                                .WORD    .T.SDE
002566  000000G                        STC.TB: .WORD   STC.00
002570  000000G                                .WORD   STC.01
002572  000000G                                .WORD   STC.02
002574  000000G                                .WORD   STC.03
002576  000000G                                .WORD   STC.04
002600  000000G                                .WORD   STC.05
002602  000000G                                .WORD   STC.06
002604  000000G                                .WORD   STC.07
002606  000000G                                .WORD   STC.08
002610  000000G                                .WORD   STC.09
002612  000000G                                .WORD   STC.10
002614  000000G                                .WORD   STC.11


000036                                          .PSECT  $PLIT$,  RO ,  D
000036      045     101     103         P.AAC:  .ASCII  /%AC/
000041      117     116     124                 .ASCII  /ONT/
000044      122     117     114                 .ASCII  /ROL/
000047      114     105     122                 .ASCII  /LER/
000052      040     105     122                 .ASCII  / ER/
000055      122     117     122                 .ASCII  /ROR/
000060      045     116     000                 .ASCII  /%N/<00>
000063      000                                 .ASCII  <00>
000064      045     101     110         P.AAD:  .ASCII  /%AH/
000067      117     123     124                 .ASCII  /OST/
000072      040     115     105                 .ASCII  / ME/
000075      115     117     122                 .ASCII  /MOR/
000100      131     040     101                 .ASCII  /` A/
000103      103     103     105                 .ASCII  /CCE/
000106      123     123     040                 .ASCII  /SS /
000111      105     122     122                 .ASCII  /ERR/
000114      117     122     045                 .ASCII  /OR%/
```

```
000117  116  000  000                    .ASCII  /N/<00><00>
000122  045  101  123          P.AAE:    .ASCII  /%AS/
000125  115  101  114                    .ASCII  /MAL/
000130  114  040  104                    .ASCII  /L D/
000133  111  123  113                    .ASCII  /ISK/
000136  040  105  122                    .ASCII  / ER/
000141  122  117  122                    .ASCII  /ROR/
000144  045  116  000                    .ASCII  /%N/<00>
000147  000                             .ASCII  <00>


        000036'                 FMT.CE=         P.AAC
        000064'                 FMT.HMA=        P.AAD
        000122'                 FMT.SDE=        P.AAE


                                .SBTTL  DATAGM RC25 INTERRUPT SERVICE ROUTINES
016572                          .PSECT  $CODE$,  RO

000000  004137  000000G  DATAGM: JSR     R1,$SAVE5                       ;                               5270
000004  024646                   CMP     -(SP),-(SP)
000006  013700  000562'           MOV     IENV.ADDR,R0                    ;                               5311
000012  005004                   CLR     R4                              ; FMT
000014  156004  000020           BISB    20(R0),R4                       ; *,FMT
000020  116003  000022           MOVB    22(R0),R3                       ; *,EVC                         5312
000024  042703  177740           BIC     #177740,R3                      ; *,EVC
000030  016005  000022           MOV     22(R0),R5                       ; *,SBC                         5313
000034  006205                   ASR     R5                              ; SBC
000036  006205                   ASR     R5                              ; SBC
000040  006205                   ASR     R5                              ; SBC
000042  006205                   ASR     R5                              ; SBC
000044  006205                   ASR     R5                              ; SBC
000046  042705  174000           BIC     #174000,R5                      ; *,SBC
000052  005066  000002           CLR     2(SP)                           ;                               5314
000056  020427  000004           CMP     R4,#4                           ; FMT,*
000062  001075                   BNE     6$
000064  005266  000002           INC     2(SP)
000070  016016  000014           MOV     14(R0),(SP)                     ; *,PLAD                        5318
000074  012702  177777           MOV     #-1,R2                          ; *,UNIT                        5319
000100  012700  000006           MOV     #6,R0                           ; *,OFFSET                      5320
000104  010001           1$:     MOV     R0,R1                           ; OFFSET,*                      5323
000106  063701  000564'           ADD     ICST.ADDR,R1
000112  111146                   MOVB    (R1),-(SP)
000114  105066  000001           CLRB    1(SP)
000120  026626  000002           CMP     2(SP),(SP)+                     ; PLAD,*
000124  001005                   BNE     2$
000126  011102                   MOV     (R1),R2                         ; *,UNIT                        5327
000130  000302                   SWAB    R2                              ; UNIT
000132  042702  177740           BIC     #177740,R2                      ; *,UNIT
000136  000406                   BR      3$                              ;                               5325
000140  062700  000002  2$:      ADD     #2,R0                           ; *,OFFSET                      5320
000144  020027  000014           CMP     R0,#14                          ; OFFSET,*
000150  003755                   BLE     1$
000152  005702                   TST     R2                              ; UNIT                          5334
000154  002440           3$:     BLT     6$
000156  010246                   MOV     R2,-(SP)                        ; UNIT,*                        5338
000160  012746  000060           MOV     #60,-(SP)
```

```
000164  004737  000000G                       JSR     PC,BL$MUL
000170  062700  000000G                       ADD     #TALLY,R0
000174  005260  000032                        INC     32(R0)          ; *(TAD)                5339
000200  020327  000010                        CMP     R3,#10          ; EVC,*                 5340
000204  001023                                BNE     5$
000206  020527  000004                        CMP     R5,#4           ; SBC,*                 5344
000212  001003                                BNE     4$
000214  005260  000056                        INC     56(R0)          ; *(TAD)                5346
000220  000415                                BR      5$              ;                       5344
000222  020527  000010              4$:       CMP     R5,#10          ; SBC,*                 5350
000226  002412                                BLT     5$
000230  020527  000017                        CMP     R5,#17          ; SBC,*
000234  003007                                BGT     5$
000236  010502                                MOV     R5,R2           ; SBC,*                 5354
000240  006302                                ASL     R2
000242  060002                                ADD     R0,R2           ; TAD,*
000244  010200                                MOV     R2,R0           ; *,TAD
000246  062700  000016                        ADD     #16,R0          ; *,TAD
000252  005210                                INC     (R0)            ; TAD                   5355
000254  022626                    5$:         CMP     (SP)+,(SP)+     ;                       5336
000256  104450                    6$:         TRAP    50              ;                       5367
000260  103165                                BHIS    15$
000262  132737  000001  000000G               BITB    #1,SWP.FLAGS
000270  001161                                BNE     15$
000272  012746  000000G                       MOV     #EX.EL,-(SP)    ;                       5371
000276  012746  000001                        MOV     #1,-(SP)
000302  010600                                MOV     SP,R0           ; SP,*
000304  104417                                TRAP    17
000306  013700  000562'                       MOV     IENV.ADDR,R0    ;                       5372
000312  016016  000010                        MOV     10(R0),(SP)
000316  012746  000000G                       MOV     #EX.CRN,-(SP)
000322  012746  000002                        MOV     #2,-(SP)
000326  010600                                MOV     SP,R0           ; SP,*
000330  104417                                TRAP    17
000332  032766  000001  000012               BIT     #1,12(SP)       ;                       5373
000340  001411                                BEQ     7$
000342  016616  000010                        MOV     10(SP),(SP)     ; PLAD,*                5375
000346  012746  000000G                       MOV     #EX.PA,-(SP)
000352  012746  000002                        MOV     #2,-(SP)
000356  010600                                MOV     SP,R0           ; SP,*
000360  104417                                TRAP    17
000362  022626                                CMP     (SP)+,(SP)+
000364  012716  000000G              7$:       MOV     #EX.FMT,(SP)    ;                       5376
000370  012746  000001                        MOV     #1,-(SP)
000374  010600                                MOV     SP,R0           ; SP,*
000376  104417                                TRAP    17
000400  005704                                TST     R4              ; FMT                   5380
000402  002403                                BLT     8$
000404  020427  000001                        CMP     R4,#1           ; FMT,*
000410  003403                                BLE     9$
000412  020427  000004              8$:       CMP     R4,#4           ; FMT,*
000416  001012                                BNE     10$
000420  010400                    9$:         MOV     R4,R0           ; FMT,*
000422  006300                                ASL     R0
000424  016016  002554'                       MOV     FMT.TB(R0),(SP)
000430  012746  000001                        MOV     #1,-(SP)
000434  010600                                MOV     SP,R0           ; SP,*
```

```
000436  104417                          TRAP    17
000440  005726                          TST     (SP)+
000442  000410                          BR      11$                             ;                               5377
000444  010416                  10$:    MOV     R4,(SP)                         ; FMT,*                         5381
000446  012746  C00000G                 MOV     #EX.03,-(SP)
000452  012746  000002                  MOV     #2,-(SP)
000456  010600                          MOV     SP,R0                           ; SP,*
000460  104417                          TRAP    17
000462  022626                          CMP     (SP)+,(SP)+
000464  012716  000000G           11$:   MOV     #EX.EVC,(SP)                    ;                               5385
000470  012746  000001                  MOV     #1,-(SP)
000474  010600                          MOV     SP,R0                           ; SP,*
000476  104417                          TRAP    17
000500  020327  000013                  CMP     R3,#13                          ; EVC,*                         5386
000504  101011                          BHI     12$
000506  010300                          MOV     R3,R0                           ; EVC,*                         5388
000510  006300                          ASL     R0
000512  016016  002566'                 MOV     STC.TB(R0),(SP)
000516  012746  000001                  MOV     #1,-(SP)
000522  010600                          MOV     SP,R0                           ; SP,*
000524  104417                          TRAP    17
000526  000410                          BR      13$                             ;                               5386
000530  010316                  12$:    MOV     R3,(SP)                         ; EVC,*                         5390
000532  012746  000000G                 MOV     #EX.03,-(SP)
000536  012746  000002                  MOV     #2,-(SP)
000542  010600                          MOV     SP,R0                           ; SP,*
000544  104417                          TRAP    17
000546  005726                          TST     (SP)+
000550  010516                  13$:    MOV     R5,(SP)                         ; SBC,*                         5391
000552  012746  000000G                 MOV     #EX.SB,-(SP)
000556  012746  000002                  MOV     #2,-(SP)
000562  010600                          MOV     SP,R0                           ; SP,*
000564  104417                          TRAP    17
000566  020427  000001                  CMP     R4,#1                           ; FMT,*                         5392
000572  001016                          BNE     14$
000574  013700  000562'                 MOV     IENV.ADDR,R0                    ;                               5394
000600  016016  000042                  MOV     42(R0),(SP)
000604  016046  000040                  MOV     40(R0),-(SP)
000610  012746  000000G                 MOV     #EX.HMA,-(SP)
000614  012746  000003                  MOV     #3,-(SP)
000620  010600                          MOV     SP,R0                           ; SP,*
000622  104417                          TRAP    17
000624  062706  000006                  ADD     #6,SP
000630  062706  000022          14$:    ADD     #22,SP                          ;                               5369
000634  022626                  15$:    CMP     (SP)+,(SP)+                     ;                               5270
000636  000207                          RTS     PC

; Routine Size:  208 words,     Routine Base:  $CODE$ + 16572
; Maximum stack depth per invocation:  22 words


;   5399  1
;   5400  1     END
;   5401  1
;   5402  0     ELUDOM
```

```
;                                       OTS external references
                                                .GLOBL  $SAVE5, $SAVE4, $SAVE3, $SAVE2
                                                .GLOBL  BL$ABS, BL$SHF, BL$DIV, BL$MOD
                                                .GLOBL  BL$MUL


;                                       PSECT SUMMARY
;
;       Psect Name                      Words     Attributes
;        $GGG$                            711       RO  .  I  .  LCL,  REL,  CON
;        $CODE$                          3981       RO  .  I  .  LCL,  REL,  CON
;        $PLIT$                            52       RO  .  D  .  LCL,  REL,  CON



;                                  Library Statistics
;
;                                            -------- Symbols -------        Pages       Processing
;       File                                  Total    Loaded   Percent       Mapped      Time
;
;  USER$1:[AZTEC.CZRCDB]CZRCDL.L16;6            276       249        90         16          00:00.2



;                                       COMMAND QUALIFIERS

;       BLISS/PDP11 CZRCD3.SRC/LIST/EN:NOEIS

; Size:         3981 code + 763 data words
; Run Time:        06:47.6
; Elapsed Time:    07:16.0
; Lines/CPU Min:      795
; Lexemes/CPU-Min:  6489
; Memory Used:  396 pages
; Compilation Complete
```

```
;    0001  0     MODULE CZRCD4 (
;    0002  0             %TITLE 'CZRCDB0 RC25 DISK EXERCISER'
;    0003  0             IDENT = 'V02.0',
;    0004  0             ADDRESSING_MODE (ABSOLUTE)
;    0005  0             ) =
;    0006  1     BEGIN
;    0043  1     %SBTTL 'LASTAD AND SETUP'
;    0044  1
;    0045  1     REQUIRE 'BLSMAC.REQ';                   ! DIAGNOSTIC SUPERVISOR LIBRARY
;    1534  1
;    1535  2     LASTAD
;    1536  2
;    1537  2     BGNSETUP (2);
;    1538  2
; P  1539  2     BGNPTAB
; P  1540  2         %O'172150', %O'154', 5, 0           ! IP, VECTOR, BR, PLAT ADDR
;    1541  2     ENDPTAB
;    1542  2
; P  1543  2     BGNPTAB
; P  1544  2         %O'172150', %O'154', 5, 1           ! IP, VECTOR, BR, PLAT ADDR
;    1545  2     ENDPTAB
;    1546  2
;    1547  1     ENDSETUP
                                        .TITLE  CZRCD4 CZRCDB0 RC25 DISK EXERCISER
                                        .IDENT  /V02.0/
                                        .ENABL  AMA
000000                                  .PSECT  $XYZ$,  RO
000000  000034'                 BL$LAS::.WORD   T$FREE
000002  000000C                         .WORD   <<T$FREE-<BL$LAS+4>>/2>
000004  000024'                 P.AAA:  .WORD   L$LAST+20
000006  000004                         .WORD   4                              ; Plit count word
000010  172150                 P.AAB:  .WORD   -5630
000012  000154                         .WORD   154
000014  000005                         .WORD   5
000016  000000                         .WORD   0
000020  000000                 P.AAC:  .WORD   0
000022  000004                         .WORD   4                              ; Plit count word
000024  172150                 P.AAD:  .WORD   -5630
000026  000154                         .WORD   154
000030  000005                         .WORD   5
000032  000001                         .WORD   1
000034  000000                 T$FREE::.WORD   0

        000004'                 L$LAST= :       BL$LAS+4
        000002                  T$PTHV= :       2
        000004'                 $LAS3=  :       P.AAA
        000010'                 $REM3=  :       P.AAB
        000020'                 $$LAS1= :       P.AAC
        000024'                 $REM2=  :       P.AAD
                                        .SBTTL  $END.LINK LASTAD AND SETUP
000000  000207                  $END.LINK::
                                        RTS     PC                             ;                                       1533

; Routine Size:  1 word,        Routine Base:  $XYZ$ + 0036
; Maximum stack depth per invocation:  0 words
```

```
;   1548  1
;   1549  1     END
;   1550  1
;   1551  0     ELUDOM


;                                       PSECT SUMMARY
;
;       Psect Name                      Words     Attributes
;        $XYZ$                            16       RO ,  I  ,  LCL,  REL,  CON




;                                       COMMAND QUALIFIERS

;       BLISS/PDP11 CZRCD4.SRC/LIST/EN:NOEIS

; Size:          1 code + 15 data words
; Run Time:        00:22.1
; Elapsed Time:    00:22.7
; Lines/CPU Min:    4207
; Lexemes/CPU-Min: 22155
; Memory Used:  103 pages
; Compilation Complete
```