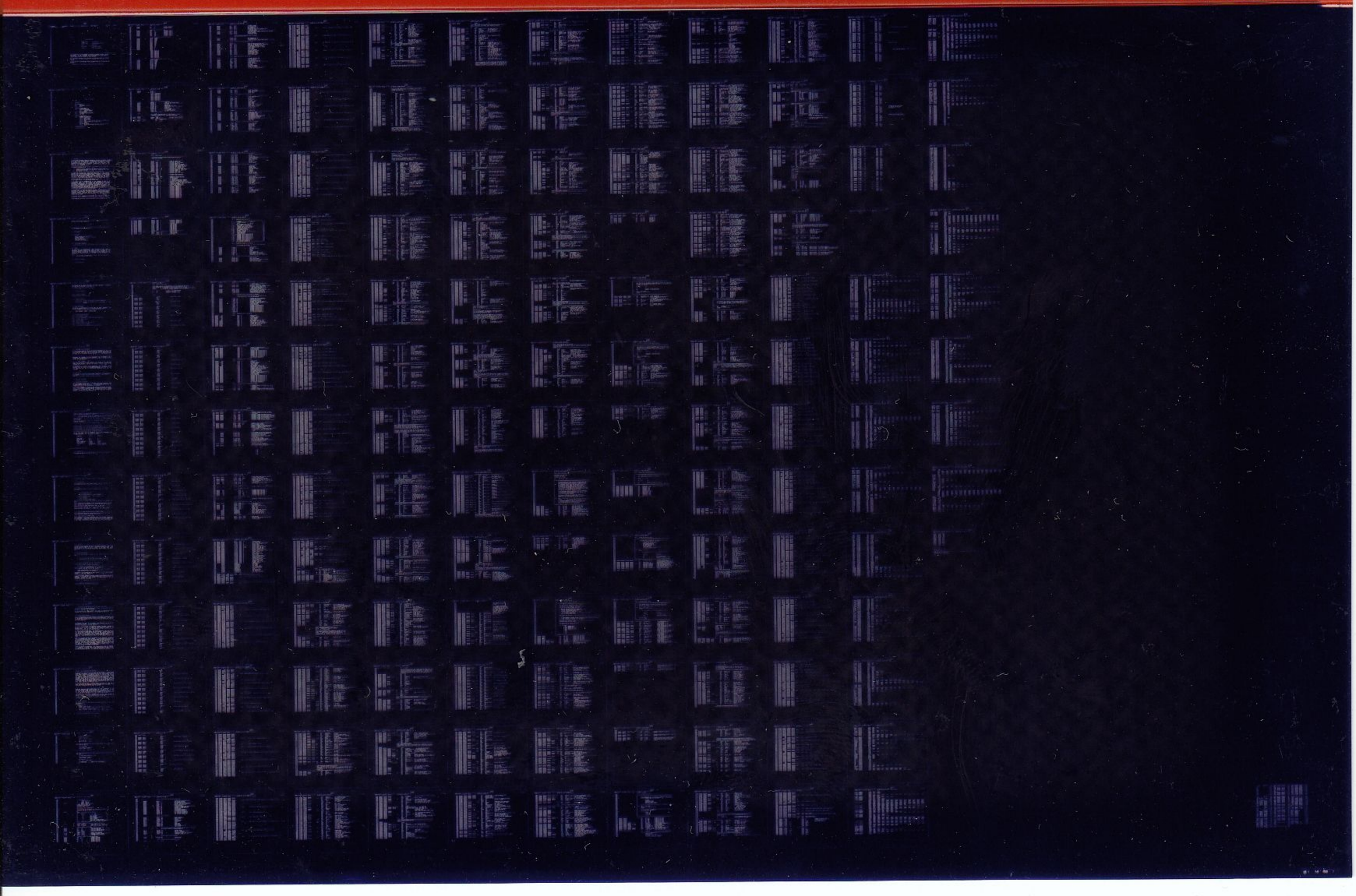
RK06L

CARTRIDGE FORMATTER
CZR6LC0

AH-9133C-MC

FICHE 1 OF 1

MAR 1978
digital
MADE IN USA



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IDENTIFICATION

PRODUCT CODE:	AC-9132C-MC
PRODUCT NAME:	CZR6LCO RK06L CTG FMTR
DATE:	FEB 1978
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	MARV TEGROTENHUIS

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1.0 ABSTRACT

THE RK06-RK07 CARTRIDGE FORMATTER PROGRAM IS DESIGNED TO PROVIDE A MEANS TO WRITE AND VERIFY HEADER AND DATA INFORMATION ON AN RK06K-RK07K DISK PACK AT ALL POSSIBLE DISK PACK ADDRESSES. THE PROGRAM IS DESIGNED TO PROVIDE FLEXIBILITY IN THE TYPES OF OPERATION AND THE DATA USED. (SEE OPERATING PROCEDURE MODES OF OPERATION.) FORMATTING IS DONE ON THE BASIS OF 411 CYLINDERS, 3 TRACKS, AND 20 OR 22 SECTORS PER TRACK (SELECTED WITH A PARAMETER ENTRY).

THE PROGRAM UTILIZES THE BAD SECTOR FILE DESCRIBED IN THE RK06K-RK07K DISK CARTRIDGE SPECIFICATION TO:

A. REPORT THE SERIAL NUMBER OF THE CARTRIDGE BEING FORMATTED.
B. CHECK IF THE CARTRIDGE IS AN ALIGNMENT CARTRIDGE AND ABORT THE PROGRAM IF IT IS.
C. AND IDENTIFY THE SECTORS THAT ARE TO BE MARKED BAD.

AS FORMATTING IS BEING DONE, THE SECTORS IDENTIFIED IN THE "FACTORY DETECTED BAD SECTOR FILE" (FDBSF) ARE UNCONDITIONALLY FLAGGED BAD BY RESETTING BIT 15 IN THE SECOND HEADER WORD. NORMALLY THE "SOFTWARE DETECTED BAD SECTOR FILE" (SDBSF) IS DESTROYED AND ONLY THOSE SECTORS THAT THIS PROGRAM FINDS ARE MARKED BAD AND ENTERED IN THE SDBSF. OPTIONALLY THE PROGRAM WILL PRESERVE THE SDBSF AND MARK THE SECTORS FOUND IN THE SDBSF BAD BY RESETTING BIT 14 OF THE SECOND HEADER WORD.

SECTORS FOUND BAD BY THIS PROGRAM ARE ADDED TO THE SDBSF AND MARKED BAD BY RESETTING BIT 14 OF THE SECOND HEADER WORD.

IF THE SDBSF IS TO BE PRESERVED OR IF THE PROGRAM IS RUN IN A VERIFICATION MODE, THE BAD SECTOR FILES FOR SOFTWARE DETECTED BAD SECTORS MUST EMPLOY THE SAME FORMAT AS DESCRIBED IN THE RK06K-RK07K CARTRIDGE SPECIFICATION FOR FACTORY DETECTED BAD SECTORS. (SEE THE REQUIREMENT IN PARAGRAPH 2.3.) THEREFORE, THE PROGRAM WILL EXPECT ALL EVEN SECTORS 10 THROUGH 20 TO CONTAIN THE ADDRESS OF THE SECTORS FOUND BAD IN 22 SECTOR/TRACK MODE AND ALL ODD SECTORS 11 THROUGH 21 TO CONTAIN THE ADDRESS OF THE SECTORS FOUND BAD IN 20 SECTORS/TRACK MODE. IF FORMATTING IS DONE WITHOUT PRESERVING THE SDBSF THE SDBSF FOR THE SECTOR/TRACK FORMAT IS WRITTEN AS DESCRIBED.

IF THE CARTRIDGE IS FORMATTED (HEADERS WRITTEN) THE DATA USED IS THAT SPECIFIED FOR THE ODD AND EVEN CYLINDERS. THE DATA USED CAN BE SPECIFIED BY THE OPERATOR. WRITING IS DONE UTILIZING THE BUS ADDRESS INCREMENT INHIBIT FUNCTIONS AND A WORD COUNT EQUAL TO ONE TRACK. VERIFICATION AFTER WRITING IS ALSO DONE WITH BUS ADDRESS INCREMENT INHIBIT SET IN A WRITE CHECK OPERATION. AGAIN THE WORD COUNT IS LARGE ENOUGH FOR ONE TRACK.

IF THE PACK IS NOT FORMATTED (VERIFICATION ONLY) THE DATA IS READ ONE SECTOR AT A TIME. HARDWARE ECC IS RELIED UPON TO DETECT ANY ERRORS.

THE PROGRAM HAS THE ABILITY TO DO THE VERIFICATION OPERATION (EITHER AFTER FORMATTING OR AS VERIFICATION ONLY) WITH THE HEADS OFFSET. A

SINGLE OFFSET VALUE IS SPECIFIED IN PROGRAM STARTUP AND THAT OFFSET IS APPLIED TO EVERY READ OPERATION.

C A U T I O N

IF THE PROGRAM IS HALTED WHILE FORMATTING IS IN PROGRESS, THE STATE OF THE CARTRIDGE CANNOT BE PREDICTED.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11 SYSTEM (16K CORE MEMORY)
CONSOLE TERMINAL
DECTAPE, PAPER TAPE READER, OR DECDISK
RK611 CONTROLLER
RK06/RK07 DISK DRIVE
RK06/RK07 DISK CARTRIDGE

2.2 PRELIMINARY PROGRAMS

ALL RK06 DIAGNOSTICS SHOULD HAVE PREVIOUSLY BEEN RUN SUCCESSFULLY.

2.3 MEDIA

THE CARTRIDGE TO BE FORMATTED MUST HAVE CYLINDER 411(10), TRACK 2 FORMATTED IN 22(10) SECTOR/TRACK. EACH SECTOR OF THE FDBSF MUST HAVE THE CARTRIDGE SERIAL NUMBER IN THE FIRST TWO WORDS, FOLLOWED BY TWO WORDS OF ZEROS, FOLLOWED BY THE ADDRESS OF THE BAD SECTOR (IF ANY), FOLLOWED BY A WORD OF ALL ONES. IF THE SDBSF IS TO BE PRESERVED OR IF THE OPERATION IS VERIFICATION ONLY, THE SDBSF MUST ALSO CONFORM TO THE ABOVE.

NOTE: FOR THE RK07K, CYLINDER 815(10),TRACK 2 MUST BE FORMATTED IN 22(10) SECTOR/TRACK FIRST.

3.0 OPERATING PROCEDURE

3.1 LOADING PROCEDURE

THE PROGRAM CAN BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER OR FROM ANY MEDIA SUPPORTED BY XXDP BUT IT IS NOT CHAINABLE. IT CAN ALSO BE LOADED BY APT OR ACT IN DUMP MODE ONLY.

THE PROGRAM DOES NOT DESTROY THE LOADER.

3.2 STARTING PROCEDURE

3.2.1 STARTING ADDRESS

PROGRAM STARTING LOCATION IS 200.

3.2.2 RESTART ADDRESS

LOCATION 200 - RESTART THE PROGRAM TO REQUEST PARAMETERS.

LOCATION 204 - RESTART THE PROGRAM USING THE PARAMETERS AS LAST ENTERED.

3.3 RK611 ADDRESSES

THE PROGRAM IS ASSEMBLED TO USE 177440 AS THE RK611 ADDRESS. THE VECTOR IS ASSUMED TO BE 210. TO ALTER THESE ADDRESS ASSIGNMENTS, THE FOLLOWING MEMORY LOCATIONS MUST BE CHANGED BEFORE STARTING:

RK611 ADDRESS - RKBAS - LOCATION 2570
RK611 VECTOR - RKVEC - LOCATION 2572

3.4 OPTIONAL SWITCH SETTINGS

SW15 - HALT PROGRAM ON ERROR.

SW14 - LOOP ON THE CURRENT CYLINDER AND TRACK OPERATION.

SW13 - INHIBIT ERROR TYPEOUT.

SW10 - BELL ON ERROR

SW07 - REPORT SUMMARY OF ALL BAD SECTORS

SW01 - REPORT ALL DATA IN ERROR

SW00 - LOOP PROGRAM WITH PARAMETERS AS LAST SPECIFIED.

3.5 'SOFTWARE' SWITCH REGISTER

IF THE PROGRAAM IS BEING RUN ON A SWITCHLESS PROCESSOR (I.E AN 11/04 OR 11/34) THE PROGRAM WILL DETERMINE THAT THE HARDWARE SWITCH REGISTER IS NOT PRESENT AND WILL USE A 'SOFTWARE' SWITCH REGISTER. THE SETTINGS OF THE 'SOFTWARE' SWITCHES ARE CONTROLLED THROUGH A KEYBOARD ROUTINE WHICH IS CALLED BY TYPING A 'CONTROL G'. THE PROGRAM WILL

RECOGNIZE THE 'CONTROL G' AT ANY TIME EXCEPT WHEN THE PROGRAM IS AT A HIGHER PRIORITY PROCESSING AN F'C'b INTERRUPT. THE 'SOFTWARE' SWITCH VALUES ARE ENTERED AS AN OCTAL NUMBER IN RESPONSE TO THE PROMPT FROM THE SWITCH ENTRY ROUTINE:

SWR = NNNNNN NEW ='

EACH TIME SWITCH SETTINGS ARE ENTERED. THE ENTIRE SWITCH REGISTER IMAGE MUST BE ENTERED. LEADING ZEROS ARE NOT REQUIRED. 'RUBOUT' AND 'CONTROL U' FUNCTIONS MAY BE USED TO CORRECT TYPING ERRORS DURING SWITCH ENTRY.

ON PROCESSORS WITH HARDWARE SWITCH REGISTERS, THE 'SOFTWARE' SWITCH REGISTER MAY BE USED. IF THE PROGRAM FINDS ALL 16 SWITCHES IN THE 'UP' POSITION, ALL SWITCH REGISTER REFERENCES WILL BE TO THE 'SOFTWARE' REGISTER AND THE PROCEDURES DESCRIBED ABOVE MUST BE FOLLOWED.

3.6 RUN TIME

THE PROGRAM RUN TIME FOR A ENTIRE FORMAT OPERATION IS APPROXIMATELY 2.5 MINUTES. THE RUN TIME FOR VERIFICATION ONLY IS APPROXIMATELY 1.5 MINUTES.
NOTE: TIMES ARE APPROX. DOUBLED FOR RK07 FORMATTING.

4.0 OPERATING PROCEDURE

4.1 SUMMARY OF PARAMETERS

WHEN STARTING AT LOCATION 200, THE PROGRAM IDENTIFIES ITSELF AND ASKS IF THE OPERATOR WANTS HELP. IF "HELP" IS TYPED A SUMMARY OF THE PARAMETERS AND THEIR USES IS TYPED. IF A CARRIAGE RETURN IS TYPED THE PROGRAM CONTINUES IN THE PARAMETERIZATION SEQUENCE.

THE PARAMETER REQUEST IS PRINTED ON THE CONSOLE FOLLOWED BY AN EQUAL SIGN. THE PARAMETER IS THEN ENTERED FOLLOWED BY A CARRIAGE RETURN. AN INVALID OR ILLEGAL PARAMETER REQUEST IS ECHOED BACK TO THE CONSOLE PRECEEDED BY A QUESTION MARK. THAT PARAMETER MAY THEN BE ENTERED WITHOUT RETURNING TO THE BEGINNING OF THE PARAMETER INSERTION SEQUENCE. ALL VALUES ENTERED MUST BE OCTAL.

TYPING A CONTROL Z (Z) (CR) AT ANY TIME DURING PARAMETER ENTRY WILL CAUSE THE REMAINING PARAMETERS TO DEFAULT.

NOTE: DO NOT USE CONTROL Z (CR) AS A RESPONSE FOR THE DRIVE TYPE (FIRST QUESTION). ALL OTHER ENTRIES CAN BE A CONTROL Z (CR).

TYPING A CONTROL C (C) AT ANY TIME WILL RETURN TO FIRST PARAMETER ENTRY REQUEST.

TYPING A CARRIAGE RETURN AFTER THE PARAMETER REQUEST CAUSES THAT PARAMETER TO DEFAULT.

TYPING A RUBOUT CANCELS THE LAST CHARACTER TYPED.

TYPING A CONTROL U (U) CANCELS THE LINE BEING TYPED.

TYPING A CONTROL S (S) WILL STOP THE PROGRAM (LOOPS WAITING FOR Q).

TYPING A CONTROL Q (Q) CONTINUES PROGRAM EXECUTION AFTER A S.

ALL ENTRIES MUST BE TERMINATED BY A CARRIAGE RETURN

THE FOLLOWING TABLE SHOWS THE PARAMETERS THAT WILL BE REQUESTED, THE OPTIONS AVAILABLE, AND THE DEFAULT. EACH OF THE PARAMETERS IS DESCRIBED IN DETAIL IN THE FOLLOWING PARAGRAPHS.

PARAMETER	OPTION	DEFAULT
DRIVE TYPE	6-7	6
DRIVE NUM	0-7	0
SECTORS/TRACK	20,22	22
MODE	0-4	2
EVEN CYLINDER PAT	6 CHAR	135143
ODD CYLINDER PAT	6 CHAR	072307
TRACK LIMITS	0-2,0-2	0,2
CYLINDER LIMITS	0-632,0-632	0,632 FOR RK06
	0-1456,0-1456	0,1456 FOR RK07
OFFSET	060-160	000 (0 OFFSET)

4.2 PARAMETER DESCRIPTION

4.2.1 DRIVE TYPE

THIS PARAMETER DEFINES THE TYPE OF DRIVE AND MEDIA TO BE FORMATTED. A 6 INDICATES AN RK06, 7 INDICATES AN RK07.

4.2.2 DRIVE NUMBER

THIS PARAMETER DEFINES THE DRIVE ADDRESS TO BE FORMATTED.

4.2.3 SECTOR/TRACK

THIS PARAMETER DEFINES THE TRACK FORMAT. A 24 INDICATES 20(10) SECTOR/TRACK AND A 26 INDICATES 22(10) SECTOR/TRACK.

4.2.4 MODE

THIS PARAMETER DEFINES THE MODE OF OPERATION FOR THE PROGRAM. THE MODES ARE:

0 = WRITE HEADERS AND DATA

1 = WRITE HEADERS AND DATA: VERIFY HEADERS

2 = WRITE HEADERS & DATA: VERIFY HEADERS & DATA

3 = VERIFY HEADERS

4 = VERIFY HEADERS & VERIFY DATA.

MODE 0 CONSISTS OF A SINGLE PASS OPERATION, WRITING THE HEADERS AND DATA.

MODE 1 CONSISTS OF TWO PASSES. FIRST THE OPERATION OF MODE 2 IS DONE, THEN A SECOND PASS IS DONE WHERE ALL HEADERS ARE READ AND COMPARED.

MODE 2 PERFORMS THE SAME OPERATION AS MODE 0 AND MODE 1 WITH THE ADDITION OF WRITE CHECKING ALL DATA IN THE SECOND PASS.

MODE 3 AND MODE 4 ARE READ ONLY OPERATIONS. IN MODE 3 ONLY THE HEADERS ARE READ AND COMPARED. IN MODE 4 THE DATA IS ALSO READ.

4.2.5 EVEN CYLINDER PATTERN AND ODD CYLINDER PATTERN

THESE PARAMETERS DEFINE THE DATA WRITTEN IN ALL TRACKS AND SECTORS OF THE EVEN AND ODD NUMBERED CYLINDERS, RESPECTIVELY.

4.2.6 TRACK LIMITS & CYLINDER LIMITS

THESE PARAMETERS DEFINE THE BOUNDARIES WHERE THE DESIRED OPERATIONS ARE PERFORMED. THE TRACK LIMITS DEFINE INCLUSIVELY WHICH TRACKS ARE TO BE USED AND CYLINDER LIMITS DEFINE INCLUSIVELY WHICH CYLINDERS ARE TO BE USED. FOR EXAMPLE, TRACK LIMITS OF 1,1 AND CYLINDER LIMITS OF 0,632 IN MODE 0 WOULD WRITE ALL HEADERS ON TRACK 1 OF ALL CYLINDERS.

4.2.7 OFFSET

THE OFFSET VALUE SUPPLIED MUST BE IN THE RANGE OF 060-160. 060 IS THE MAXIMUM POSITIVE OFFSET AND 160 IS THE MAXIMUM NEGATIVE OFFSET. 000 AND 100 ARE BOTH OFFSET OF ZERO. REFER TO THE RK06 DISK DRIVE SPECIFICATION FOR THE SPECIFIC VALUE-OFFSET RELATIONSHIP. THE OFFSET WILL AFFECT ALL THE VERIFICATION OPERATIONS (VERIFY HEADERS AND VERIFY DATA).

4.3 BAD SECTOR OPTIONS

TWO OPTIONS ARE PROVIDED IN RESPECT TO BAD SECTOR HANDLING. THESE ARE:

A. SPECIFYING SECTORS THAT ARE TO BE FLAGGED AS BAD AND

B. PRESERVING THE ODD SOFTWARE DETECTED BAD SECTOR FILES.

4.3.1 SPECIFYING SECTORS THAT ARE TO BE FLAGGED BAD

THE FOLLOWING LINES IS TYPED ON THE CONSOLE:

"ANY SECTOR TO BE FLAGGED BAD?(TYPE Y OR N)(CR)"

IF "N" IS TYPED THE PROGRAM PROCEEDS TO THE QUESTION. IF "Y" IS TYPED THE FOLLOWING LINES ARE TYPED ON THE CONSOLE:

"ENTER OCTAL ADDRESS TO BE FLAGGED BAD IN FORMAT CCC,T.SS"
"ENTER ADDRESS OF (CR) TO TERMINATE"

THE ADDRESS TO BE FLAGGED BAD IS THEN ENTERED. CCC IS THE CYLINDER ADDRESS, T IS THE TRACK ADDRESS, AND SS IS THE SECTOR NUMBER. SEPARATING COMMAS ARE REQUIRED.

IF AN UNACCEPTABLE ADDRESS IS GIVEN (ILLEGAL IN ANY RESPECT) AN ERROR MESSAGE IS TYPED AND THE LINE "ENTER ADDRESS OR (CR) TO TERMINATE" IS REPEATED. IF THE ADDRESS IS ACCEPTABLE THE "ENTER ADDRESS OR (CR) TO TERMINATE" MESSAGE IS TYPED WITHOUT THE ERROR MESSAGE TO INDICATE ANOTHER ADDRESS MAY BE ENTERED.

TYPING THE (CR) TERMINATES THE BAD SECTOR ENTRY OPERATION.

4.3.2 PRESERVING SOFTWARE BAD SECTOR FILES

THE FOLLOWING LINE IS TYPED ON THE CONSOLE:

"PRESERVE SOFTWARE BAD SECTOR FILES?(TYPE Y OR N)(CR)"

IF "N" IS TYPED THE PROGRAM PROCEEDS TO FORMAT THE CARTRIDGE AND ANY ENTRIES IN THE SDBSF ARE DISREGARDED.

IF "Y" IS TYPED THE SDBSF ENTRIES ARE USED IN DETERMINING WHICH SECTORS ARE TO BE FLAGGED BAD. ANY SECTOR FOUND BAD IN THE FORMAT OPERATION OR SPECIFIED BAD AS IN 5.3.1 ARE ADDED TO THE FILE.

5.0 PROGRAM DESCRIPTION

AFTER THE PARAMETERS HAVE BEEN ENTERED AS DESCRIBED IN PARAGRAPH 4 AND 5, THE PROGRAM PERFORMS VARIOUS CHECKS ON THE PARAMETERS. INCLUDED IN THE CHECKS ARE CYLINDER AND TRACK VALUE CHECKS TO INSURE THE STARTING VALUES ARE LESS THAN OR EQUAL TO THE ENDING VALUES AND THAT ALL VALUES ARE LEGAL ADDRESSES.

THE PROGRAM THEN SETS UP TO FORMAT THE CARTRIDGE IN 20 OR 22 SECTORS/TRACK FORMAT. THIS REMAINS IN EFFECT FOR THE DURATION OF ALL OPERATIONS REQUIRED BY THE MODE SELECTED.

THE TRACK OF BAD SECTORS (CYLINDER 410, TRACK 2) IS READ. SECTOR 0, 2, 4, 6, OR 8 IS READ IF THE REQUESTED FORMAT IS 22 SECTORS/TRACK OR SECTOR 1, 3, 5, 7, OR 9 IS READ IF THE REQUESTED FORMAT IS 20 SECTORS/TRACK. ONE OF THE SECTORS MUST BE READ WITHOUT ERROR OR A MESSAGE IS TYPED OUT AND THE OPERATION STOPS.

ALL PACK WRITING IS DONE NEXT. THE HEADERS AND DATA ARE WRITTEN IN THE FIRST PASS OF HEADS ACROSS THE DISK SURFACE. CYLINDER 410, TRACK 2 IS NOT WRITTEN, PROTECTING THE BLOCKS OF BAD SECTOR INFORMATION. THE HEADER OF ANY SECTOR THAT IS KNOWN TO BE BAD (ENTERED IN THE FDBSF) IS WRITTEN WITH BIT 15 OF THE SECOND HEADER WORD RESET. IF THE SDBSF IS TO BE PRESERVED AND/OR IF ANY SECTORS WERE SPECIFIED TO BE MARKED BAD, THESE ARE WRITTEN WITH BIT 14 OF THE SECOND HEADER WORD RESET.

WHEN DATA IS BEING WRITTEN IT IS POSSIBLE TO GET OPERATION INCOMPLETE (OPI) OR HEADER CHECK (HVRC) ERRORS. IF THIS OCCURS ON A SECTOR THAT HAS NOT BEEN MARKED BAD AND THE SECTOR WHERE THE ERROR OCCURRED CANNOT BE SUCCESSFULLY WRITTEN IN 8 RETRIES, THE SECTOR IS MARKED BAD. ITS ADDRESS IS ENTERED IN THE SOFTWARE TABLE OF BAD SECTORS, BIT 14 IS RESET IN THE HVRC WORD OF THAT SECTOR HEADER, THE HEADERS ARE REWRITTEN, AND DATA WRITING PROCEEDS. HOWEVER, THE HVRC OR OPI ERROR MAY PERSIST. IF IT DOES, THE PROGRAM PRINTS A MESSAGE INDICATING THE PHYSICAL LOCATION OF A HEADER IS DAMAGED AND THE PROGRAM HALTS. THIS CARTRIDGE MUST BE CONSIDERED UNFORMATTABLE.

AFTER ALL WRITING IS COMPLETED, THE VERIFICATION PASS IS STARTED. THIS INVOLVES A SECOND PASS OF THE HEADS ACCROSS THE DISK SURFACE. ALL HEADERS ON A TRACK ARE READ IN AND COMPARED WORD FOR WORD AGAINST SOFTWARE GENERATED HEADERS. THE GENERATED HEADERS TAKE ENTRIES IN THE BAD SECTOR BLOCKS, BOTH FACTORY WRITTEN AND SOFTWARE DETECTED, INTO

ACCOUNT. ANY MISCOMPARES ARE REPORTED.

IF THE DATA ON THIS PACK HAS JUST BEEN WRITTEN (MODE 2), A WRITE CHECK OPERATION IS STARTED. ANY OPI, HVRC, DCK (DATA CHECK), OR WCE (WRITE CHECK ERROR) OCCURRING ON A SECTOR THAT HAS NOT BEEN MARKED BAD IS RETRIED 8 TIMES. IF UNSUCCESSFUL AND IF IT IS AN OPI, HVRC, OR DCK WITH HARD ECC ERROR, THE SECTOR IS MARKED BAD. IF IT IS A WCE ERROR THE SECTOR IN QUESTION IS READ WHICH WILL CAUSE A DCK ERROR. IF THE DCK ERROR IS A HARD ECC ERROR, THE SECTOR IS ALSO MARKED BAD. IF THE ORIGINAL ERROR WAS DCK WITHOUT THE HARD ECC ERROR, THE ERROR IS REPORTED BUT THE SECTOR IS NOT MARKED BAD. IF A SECTOR HAS BEEN MARKED BAD (INSERTED IN THE SOFTWARE SELECTED BAD SECTOR TABLE) BIT 14 OF THE HVRC WORD OF THE HEADER IS RESET, THE HEADERS ARE REWRITTEN FOR THIS TRACK, THE DATA IS REWRITTEN, THE HEADERS ARE VERIFIED, AND THIS WRITE CHECK OPERATION IS PERFORMED AGAIN.

IF THE MODE SELECTED WAS 4, THE DATA VERIFY OPERATION IS DONE AS A READ, RELYING ON THE HARDWARE TO DETECT ERRORS. ANY OPI, HVRC, OR DCK ERROR THAT OCCURS AN A SECTOR THAT IS NOT MARKED BAD IS REPORTED. IF THE SECTOR IS MARKED BAD, NO ERROR IS REPORTED.

AFTER THE WRITE AND VERIFY OPERATIONS IT IS THEN DETERMINED IF THE SOFTWARE DETECTED BAD SECTOR BLOCKS ARE TO BE WRITTEN. IF PACK WRITING WAS DONE, THESE BLOCKS ARE WRITTEN. SECTOR 10, 12, 14, 16, 18, AND 20 ARE WRITTEN IF THE FORMAT IS 22 SECTORS/TRACK AND 11, 13, 15, 17, 19, AND 21 ARE WRITTEN IF THE FORMAT IS 20 SECTORS/TRACK. THIS OPERATION IS BYPASSED IF THE PACK HAS NOT BEEN WRITTEN.

THE PROGRAM WILL THEN PRINT A COMPLETE LIST OF ALL BAD SECTORS IF SWITCH 7 IS SET. THIS LIST INCLUDES BOTH THE BAD SECTORS AS DETECTED IN THE FACTORY AND THE BAD SECTORS DETECTED BY SOFTWARE.

IF SWITCH 2 IS SET, THE PROGRAM WILL REPEAT THE ENTIRE OPERATION WITH THE CURRENT PARAMETER SET.

6.0 ERROR REPORTING

THE GENERAL FORMAT OF ERROR REPORT FOR ERRORS DETECTED BY THE RK06 SUBSYSTEM IS:

```
     ERROR MESSAGE

     (COMMAND START VALUES)
     (DRIVE) (CMND) (CYLNDR) (TRACK) (SECTOR) (WD CNT) (BUFFER)

     (RK611 REGISTERS AND DRIVE STATUS)
     (RKCS1)  (RKCS2)  (RKER)  (RKDS)  (RKWC)  (RKDC)  (RKDA)  (RKBA)

     (A 0)  (B 0)  (A 1)  (B 1)  (A 2)  (B 2)  (A 3)  (B 3)
```

THE FORMAT FOR HEADER VERIFICATION ERRORS IS:

```
600
601                                     HEADER COMPARE ERROR
602
603                                     HEADER SHOULD BE:
604
605                                     WORD 1    WORD 2    WORD 3
606
607                                     BAD HEADER IS:
608                                     WORD 1    WORD 2    WORD 3
609
610
611                             THE FORMAT FOR REPORTING THE DATA IN ERROR DURING A DATA  VERIFICATION
612                             WITH A WRITE CHECK IS:
613
614                                     DATA MISCOMPARE
615
616                                     PACK ADDRESS OF ERROR IS:
617                                     CYLNDR   TRACK   SECTOR
618
619                                     GOOD     BAD     WORD NUM
620
621
622
623                             THE FORMAT FOR REPORTING DATA CHECK DURING A DATA VERFICATION  WITH  A
624                             READ DATA IS:
625
626                                     BAD DATA VERIFICATION WITH READ
627
628                                     PACK ADDRESS OF ERROR IS:
629                                     CYLNDR   TRACK   SECTOR
630
631                                     ECC DATA IS:
632                                     PAT    POS    CORRECTABLE?
633
634                                     IF CORRECTABLE?  = 1, ERROR IS ECC CORRECTABLE.
635                                     IF CORRECTABLE?  = 0, ERROR IS NOT ECC CORRECTABLE.
636                             %
```

```
                                ;*** REV 004 ***
                                        .NLIST  MC,MD,CND
                                        .LIST   ME
                                        .ENABL  ABS,AMA
163000                          $SWR=   163000
                                .TITLE  CZR6LCO RK06L CTG FMTR
                                ;*COPYRIGHT (C) 1976,1977
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY MARV TEGROTENHUIS
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                                ;*
000001                          $TN=1
                                .SBTTL  OPERATIONAL SWITCH SETTINGS
                                ;*
                                ;*      SWITCH                  USE
                                ;*      ------          --------------------
                                ;*        15            HALT ON ERROR
                                ;*        14            LOOP ON TEST
                                ;*        13            INHIBIT ERROR TYPEOUTS
                                ;*        10            BELL ON ERROR
                                ;*         9            LOOP ON ERROR
                                ;*         7            PRINT LIST OF BAD SECTORS
                                ;*         1            LIMIT DATA COMPARE ERROR REPORTS TO 10
                                ;*         0            REPEAT ENTIRE FORMAT OPERATION
                                .SBTTL  BASIC DEFINITIONS

                                ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                          STACK=  1100
                                .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                                .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                                ;*MISCELLANEOUS DEFINITIONS
000011                          HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                          LF=     12              ;;CODE FOR LINE FEED
000015                          CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                          CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                          PS=     177776          ;;PROCESSOR STATUS WORD
                                .EQUIV  PS,PSW
177774                          STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                          PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                          DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                          DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                                ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                          R0=     %0              ;;GENERAL REGISTER
000001                          R1=     %1              ;;GENERAL REGISTER
000002                          R2=     %2              ;;GENERAL REGISTER
000003                          R3=     %3              ;;GENERAL REGISTER
000004                          R4=     %4              ;;GENERAL REGISTER
000005                          R5=     %5              ;;GENERAL REGISTER
000006                          R6=     %6              ;;GENERAL REGISTER
```

```
000007                  R7=     %7              ;;GENERAL REGISTER
000006                  SP=     %6              ;;STACK POINTER
000007                  PC=     %7              ;;PROGRAM COUNTER

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
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
                                                .EQUIV  BIT09,BIT9
                                                .EQUIV  BIT08,BIT8
                                                .EQUIV  BIT07,BIT7
                                                .EQUIV  BIT06,BIT6
                                                .EQUIV  BIT05,BIT5
                                                .EQUIV  BIT04,BIT4
                                                .EQUIV  BIT03,BIT3
                                                .EQUIV  BIT02,BIT2
                                                .EQUIV  BIT01,BIT1
                                                .EQUIV  BIT00,BIT0

                                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
                        000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
                        000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
                        000014                  TBITVEC=14              ;;"T" BIT
                        000014                  TRTVEC= 14              ;;TRACE TRAP
                        000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
                        000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
                        000024                  PWRVEC= 24              ;;POWER FAIL
                        000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
                        000034                  TRAPVEC=34              ;;"TRAP" TRAP
                        000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
                        000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
                        000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
                                                .SBTTL  TRAP CATCHER

                        000000                          .=0
                                                ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                        000174                          .=174
000174  000000         DISPREG: .WORD  0                ;;SOFTWARE DISPLAY REGISTER
000176  000000         SWREG:   .WORD  0                ;;SOFTWARE SWITCH REGISTER
                                                .SBTTL  STARTING ADDRESS(ES)
000200  000137  016202          JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
                        000204          .=204
000204  000137  020154          JMP     @#DRINIT
```

```
                                .SBTTL  COMMON TAGS

                                ;;**********************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                                        .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000          $PASS:  .WORD   0               ;;CONTAINS PASS COUNT
001102  000             $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001103  000             $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
001104  000000          $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000          $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000          $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000          $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001114  000             $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001115  001             $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001116  000000          $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000          $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000          $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000          $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
001126  000000          $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
001130  000000                  .WORD   0               ;;RESERVED--NOT TO BE USED
001132  000000                  .WORD   0
001134  000             $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
001135  000             $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
001136  000000                  .WORD   0
001140  177570          SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001142  177570          DISPLAY:.WORD   DDISP           ;;ADDRESS OF DISPLAY REGISTER
001144  177560          $TKS:   177560                  ;;TTY KBD STATUS
001146  177562          $TKB:   177562                  ;;TTY KBD BUFFER
001150  177564          $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566          $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000             $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002             $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012             $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000             $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000          $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REG0) WAS OBTAINED
001162  000000          $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
001164  000000          $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
001166  000000          $REG2:  .WORD   0               ;;CONTAINS (($REGAD)+4)
001170  000000          $REG3:  .WORD   0               ;;CONTAINS (($REGAD)+6)
001172  000000          $REG4:  .WORD   0               ;;CONTAINS (($REGAD)+10)
001174  000000          $REG5:  .WORD   0               ;;CONTAINS (($REGAD)+12)
001176  000000          $REG6:  .WORD   0               ;;CONTAINS (($REGAD)+14)
001200  000000          $REG7:  .WORD   0               ;;CONTAINS (($REGAD)+16)
001202  000000          $REG10: .WORD   0               ;;CONTAINS (($REGAD)+20)
001204  000000          $REG11: .WORD   0               ;;CONTAINS (($REGAD)+22)
001206  000000          $REG12: .WORD   0               ;;CONTAINS (($REGAD)+24)
001210  000000          $REG13: .WORD   0               ;;CONTAINS (($REGAD)+26)
001212  000000          $REG14: .WORD   0               ;;CONTAINS (($REGAD)+30)
001214  000000          $REG15: .WORD   0               ;;CONTAINS (($REGAD)+32)
001216  000000          $REG16: .WORD   0               ;;CONTAINS (($REGAD)+34)
001220  000000          $REG17: .WORD   0               ;;CONTAINS (($REGAD)+36)
001222  000000          $REG20: .WORD   0               ;;CONTAINS (($REGAD)+40)
```

```
  845  001224  000000                $REG21: .WORD   0               ;;CONTAINS (($REGAD)+42)
  846  001226  000000                $REG22: .WORD   0               ;;CONTAINS (($REGAD)+44)
  847  001230  000000                $REG23: .WORD   0               ;;CONTAINS (($REGAD)+46)
  848  001232  000000                $REG24: .WORD   0               ;;CONTAINS (($REGAD)+50)
  849  001234  000000                $REG25: .WORD   0               ;;CONTAINS (($REGAD)+52)
  850  001236  000000                $TMP0:  .WORD   0               ;;USER DEFINED
  851  001240  000000                $TMP1:  .WORD   0               ;;USER DEFINED
  852  001242  000000                $TMP2:  .WORD   0               ;;USER DEFINED
  853  001244  000000                $TMP3:  .WORD   0               ;;USER DEFINED
  854  001246  000000                $TMP4:  .WORD   0               ;;USER DEFINED
  855  001250  000000                $TMP5:  .WORD   0               ;;USER DEFINED
  856  001252  000000                $TMP6:  .WORD   0               ;;USER DEFINED
  857  001254  000000                $TMP7:  .WORD   0               ;;USER DEFINED
  858  001256  000000                $TMP10: .WORD   0               ;;USER DEFINED
  859  001260  000000                $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
  860  001262  177607  000377        $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
  861  001266     077                $QUES:  .ASCII  /?/             ;;QUESTION MARK
  862  001267     015                $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
  863  001270  000012                $LF:    .ASCIZ  <12>            ;;LINE FEED
  864                                ;;**************************************************************
```

```
                                .SBTTL  ERROR POINTER TABLE

                                ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                ;*      DH              ;;POINTS TO THE DATA HEADER
                                ;*      DT              ;;POINTS TO THE DATA
                                ;*      DF              ;;POINTS TO THE DATA FORMAT

001272                          $ERRTB:

                                        ;ERROR 1                ;UNIBUS PARITY ERROR
001272  042672                         EM1
001274  046413                         DH100
001276  047712                         DT100
001300  050010                         DF01

                                        ;ERROR 2                ;NON-EXISTANT MEMORY
001302  042722                         EM2
001304  046413                         DH100
001306  047712                         DT100
001310  050010                         DF01

                                        ;ERROR 3                ;NON-EXISTANT DRIVE
001312  042760                         EM3
001314  046413                         DH100
001316  047712                         DT100
001320  050010                         DF01

                                        ;ERROR 4                ;UNIT FIELD ERROR
001322  043015                         EM4
001324  046413                         DH100
001326  047712                         DT100
001330  050010                         DF01

                                        ;ERROR 5                ;SUBSYSTEM TIMEOUT
001332  043042                         EM5
001334  046413                         DH100
001336  047712                         DT100
001340  050034                         DF02

                                        ;ERROR 6
001342  043070                         EM6                     ;SERCON PARITY ERROR
001344  046413                         DH100
001346  047712                         DT100
001350  050064                         DF03

                                        ;ERROR 7
001352  043123                         EM7                     ;DRIVE DETECTED PARITY ERROR
001354  046413                         DH100
001356  047712                         DT100
```

```
  921  001360  050064                          DF03
  922
  923                                          ;ERROR 10
  924  001362  043163                          EM10                ;AC LOW
  925  001364  046413                          DH100
  926  001366  047712                          DT100
  927  001370  050034                          DF02
  928
  929                                          ;ERROR 11
  930  001372  043176                          EM11                ;SPEED LOSS
  931  001374  046413                          DH100
  932  001376  047712                          DT100
  933  001400  050034                          DF02
  934
  935                                          ;ERROR 12
  936  001402  043215                          EM12                ;ILLEGAL FUNCTION
  937  001404  046413                          DH100
  938  001406  047712                          DT100
  939  001410  050034                          DF02
  940
  941                                          ;ERROR 13
  942  001412  043250                          EM13                ;PROGRAMMING ERROR
  943  001414  046413                          DH100
  944  001416  047712                          DT100
  945  001420  050010                          DF01
  946
  947                                          ;ERROR 14           ;NON-EXISTANT FUNCTION
  948  001422  043276                          EM14
  949  001424  046413                          DH100
  950  001426  047712                          DT100
  951  001430  050034                          DF02
  952
  953                                          ;ERROR 15
  954  001432  043336                          EM15                ;DRIVE TYPE ERROR
  955  001434  046413                          DH100
  956  001436  047712                          DT100
  957  001440  050034                          DF02
  958
  959                                          ;ERROR 16
  960  001442  043363                          EM16                ;FORMAT ERROR
  961  001444  046413                          DH100
  962  001446  047712                          DT100
  963  001450  050034                          DF02
  964
  965                                          ;ERROR 17
  966  001452  043404                          EM17                ;WRITE LOCK ERROR
  967  001454  046413                          DH100
  968  001456  047712                          DT100
  969  001460  050034                          DF02
  970
  971                                          ;ERROR 20
  972  001462  043431                          EM20                ;DRIVE UNSAFE
  973  001464  046413                          DH100
  974  001466  047712                          DT100
  975  001470  050034                          DF02
  976
```

```
                                        ;ERROR 21
001472  043460                          EM21                    ;SEEK INCOMPLETE
001474  046413                          DH100
001476  047712                          DT100
001500  050034                          DF02

                                        ;ERROR 22
001502  043512                          EM22                    ;CYLINDER OVERFLOW
001504  046413                          DH100
001506  047712                          DT100
001510  050034                          DF02

                                        ;ERROR 23
001512  043546                          EM23                    ;ILLEGAL CYLINDER
001514  046413                          DH100
001516  047712                          DT100
001520  050034                          DF02

                                        ;ERROR 24
001522  043611                          EM24                    ;DRIVE OFF TRACK
001524  046413                          DH100
001526  047712                          DT100
001530  050034                          DF02

                                        ;ERROR 25
001532  043635                          EM25                    ;DRIVE TIMING ERROR
001534  046413                          DH100
001536  047712                          DT100
001540  050034                          DF02

                                        ;ERROR 26
001542  043664                          EM26                    ;DATA LATE
001544  046413                          DH100
001546  047712                          DT100
001550  050034                          DF02

                                        ;ERROR 27
001552  043710                          EM27                    ;CONTROLLER TIMEOUT
001554  046413                          DH100
001556  047712                          DT100
001560  050034                          DF02

                                        ;ERROR 30               ;OPERATION INCOMPLETE
001562  043745                          EM30
001564  046413                          DH100
001566  047712                          DT100
001570  050120                          DF05

                                        ;ERROR 31
001572  044004                          EM31                    ;HEADER CRC ERROR
001574  046413                          DH100
001576  047712                          DT100
001600  050150                          DF06

                                        ;ERROR 32
001602  044031                          EM32                    ;DATA CHECK ERROR
```

```
1033  001604  046413                  DH100
1034  001606  047712                  DT100
1035  001610  050200                  DF07
1036
1037                                  ;ERROR 33
1038  001612  044056                  EM33                ;WRITE CHECK ERROR
1039  001614  046413                  DH100
1040  001616  047712                  DT100
1041  001620  050230                  DF10
1042
1043                                  ;ERROR 34
1044  001622  044104                  EM34                ;DATA MISCOMPARE
1045  001624  047207                  DH604
1046  001626  047774                  DT601
1047  001630  050250                  DF11
1048
1049                                  ;ERROR 35
1050  001632  044130                  EM35                ;NO DRIVE RESPONSE-UFE & NED
1051  001634  046413                  DH100
1052  001636  047712                  DT100
1053  001640  050010                  DF01
1054
1055                                  ;ERROR 36
1056  001642  044170                  EM36                ;DRIVE ERROR WILL NOT CLEAR
1057  001644  000000                  0
1058  001646  000000                  0
1059  001650  000000                  0
1060
1061                                  ;ERROR 37           ;DRIVE STATUS CHANGE WILL NOT CLEAR
1062  001652  044227                  EM37
1063  001654  000000                  0
1064  001656  000000                  0
1065  001660  000000                  0
1066
1067                                  ;ERROR 40
1068  001662  044276                  EM40                ;ATTENTION BUT NO STATUS CHANGE OR FAULT
1069  001664  046413                  DH100
1070  001666  047712                  DT100
1071  001670  050034                  DF02
1072
1073                                  ;ERROR 41
1074  001672  044352                  EM41                ;ATTENTION BUT DRIVE NOT AVAILABLE
1075  001674  046413                  DH100
1076  001676  047712                  DT100
1077  001700  050034                  DF02
1078
1079                                  ;ERROR 42
1080  001702  044420                  EM42                ;ATTENTION WHEN NOT EXPECTED
1081  001704  046413                  DH100
1082  001706  047712                  DT100
1083  001710  050034                  DF02
1084
1085                                  ;ERROR 43           ;ERROR WHILE GATHERING DRIVE STATUS
1086  001712  044460                  EM43
1087  001714  046413                  DH100
1088  001716  047712                  DT100
```

```
1089  001720  050264                          DF12
1090
1091                                          ;ERROR 44
1092  001722  045006                          EM63          ;CLEAR CONTROLLER DID NOT CLEAR ERROR
1093  001724  046413                          DH100
1094  001726  047712                          DT100
1095  001730  050264                          DF12
1096
1097                                          ;ERROR 45
1098  001732  045057                          EM64          ;NO ATTENTION IN ATTENTION SUMMARY REG
1099  001734  046413                          DH100
1100  001736  047712                          DT100
1101  001740  050264                          DF12
1102
1103                                          ;ERROR 46
1104  001742  045136                          EM65          ;UNSOLICITED ATTENTION
1105  001744  046413                          DH100
1106  001746  047712                          DT100
1107  001750  050264                          DF12
1108
1109                                          ;ERROR 47
1110  001752  045170                          EM66          ;UNEXPECTED DATA TYPE ERROR
1111  001754  046413                          DH100
1112  001756  047712                          DT100
1113  001760  050264                          DF12
1114
1115                                          ;ERROR 50
1116  001762  045227                          EM67          ;ATTENTION DID NOT RESET WITH CLEAR
1117  001764  046413                          DH100
1118  001766  047712                          DT100
1119  001770  050264                          DF12
1120
1121                                          ;ERROR 51
1122  001772  045276                          EM70          ;SUBSYSTEM CLEAR DID NOT CLEAR DRIVE ATTENTION
1123  001774  046413                          DH100
1124  001776  047712                          DT100
1125  002000  050264                          DF12
1126
1127                                          ;ERROR 52
1128  002002  044527                          EM52          ;MULTIPLE DRIVE SELECT
1129  002004  046413                          DH100
1130  002006  047712                          DT100
1131  002010  050264                          DF12
1132
1133                                          ;ERROR 53
1134  002012  044561                          EM53          ;ABREVIATED HCE ERROR
1135  002014  046413                          DH100
1136  002016  047712                          DT100
1137  002020  050310                          DF13
1138
1139                                          ;ERROR 54
1140  002022  043745                          EM30          ;OPERATION INCOMPLETE ERROR
1141  002024  046413                          DH100
1142  002026  047712                          DT100
1143  002030  050334                          DF14
1144
```

```
1145
1146  002032  044004                ;ERROR 55
1147  002034  046413  ÉM31          ;ABREVIATED HCRC ERROR
1148  002036  047712  DH100
1149  002040  050310  DT100
1150                  DF13
1151
1152  002042  044612                ;ERROR 56
1153  002044  046413  ÉM56          ;2 TIMEOUT ERROR
1154  002046  047712  DH100
1155  002050  050360  DT100
1156                  DF15
1157
1158  002052  044612                ;ERROR 57          ;2ND LEVEL IN SUBSYSTEM TIMEOUT
1159  002054  046413  ÉM56
1160  002056  047712  DH100
1161  002060  050420  DT100
1162                  DF16
1163
1164  002062  044640                ;ERROR 60
1165  002064  000000  ÉM60          ;ERROR IN RECAL FOR RECOVERY
1166  002066  000000  0
1167  002070  000000  0
1168                  0
1169
1170  002072  044706                ;ERROR 61
1171  002074  000000  ÉM61          ;ABORT MESSAGE
1172  002076  000000  0
1173  002100  000000  0
1174
1175
1176  002102  044760                ;ERROR 62
1177  002104  047072  ÉM62          ;HEADER MISCOMPARE
1178  002106  047774  DH601
1179  002110  050460  DT601
1180                  DF17
1181
1182  002112  000000                ;ERROR 63          ;DATA ERROR WORDS
1183  002114  000000  0
1184  002116  050002  0
1185  002120  050520  DT602
1186                  DF25
1187
1188  002122  045006                ;ERROR 64
1189  002124  046413  ÉM63          ;CLEAR CONTROLLER DID NOT CLEAR ERROR
1190  002126  047712  DH100
1191  002130  050034  DT100
1192                  DF02
1193
1194  002132  045057                ;ERROR 65
1195  002134  046413  ÉM64          ;NO ATTENTION IN ATTENTION SUMMARY REG
1196  002136  047712  DH100
1197  002140  050034  DT100
1198                  DF02
1199
1200  002142  045136                ;ERROR 66
                      ÉM65          ;UNSOLICITED ATTENTION
```

```
1201  002144  046413                  DH100
1202  002146  047712                  DT100
1203  002150  050034                  DF02
1204
1205                                  ;ERROR 67
1206  002152  045170                  EM66          ;UNEXPECTED DATA TYPE ERROR
1207  002154  046413                  DH100
1208  002156  047712                  DT100
1209  002160  050034                  DF02
1210
1211                                  ;ERROR 70
1212  002162  045227                  EM67          ;ATTENTION DID NOT RESET WITH CLEAR
1213  002164  046413                  DH100
1214  002166  047712                  DT100
1215  002170  050034                  DF02
1216
1217                                  ;ERROR 71
1218  002172  045276                  EM70          ;SUBSYSTEM CLEAR DID NOT CLEAR ATT
1219  002174  046413                  DH100
1220  002176  047712                  DT100
1221  002200  050034                  DF02
1222
1223                                  ;ERROR 72
1224  002202  045360                  EM71          ;DATA LATE WHEN UNLOADING HEADER
1225  002204  046413                  DH100
1226  002206  047712                  DT100
1227  002210  050034                  DF02
1228
1229                                  ;ERROR 73
1230  002212  045424                  EM72          ;CONTROLLER ERROR DURING DRIVER SERVICE
1231  002214  046413                  DH100
1232  002216  047712                  DT100
1233  002220  050034                  DF02
1234
1235                                  ;ERROR 74
1236  002222  045477                  EM73          ;DRIVE DETECTED PARITY ERROR
1237  002224  046413                  DH100
1238  002226  047712                  DT100
1239  002230  050034                  DF02
1240
1241                                  ;ERROR 75
1242  002232  045537                  EM74          ;UNDEFINED ERROR
1243  002234  046413                  DH100
1244  002236  047712                  DT100
1245  002240  050034                  DF02
1246
1247                                  ;ERROR 76
1248  002242  045563                  EM75          ;MARKING SECTOR BAD MESSAGE
1249  002244  000000                  0
1250  002246  000000                  0
1251  002250  000000                  0
1252
1253                                  ;ERROR 77
1254  002252  045617                  EM76          ;BAD DATA VERIFICATION WITH READ
1255  002254  047306                  DH605
1256  002256  047774                  DT601
```

```
1257  002260  050500                        DF21
1258
1259                                        ;ERROR 100
1260  002262  045712                        EM77                ;RETRY SUCCESFUL MESSAGE
1261  002264  047641                        DH800
1262  002266  047774                        DT601
1263  002270  050510                        DF23
1264
1265                                        ;ERROR 101
1266  002272  045712                        EM77                ;ANOTHER RETRY SUCCESSFUL MESSAGE
1267  002274  047641                        DH800
1268  002276  047774                        DT601
1269  002300  050510                        DF23
1270
1271                                        ;ERROR 102
1272  002302  045737                        EM100               ;RETRY UNSUCCESSFUL MESSAGE
1273  002304  047641                        DH800
1274  002306  047774                        DT601
1275  002310  050510                        DF23
1276
1277                                        ;ERROR 103
1278  002312  045766                        EM101               ;NO VALID HEADERS IN TRACK JUST READ
1279  002314  047270                        DH6042
1280  002316  047774                        DT601
1281  002320  050514                        DF24
1282
1283                                        ;ERROR 104
1284  002322  046050                        EM102               ;BSE ERROR ON SECTOR NOT LISTED AS BAD
1285  002324  046413                        DH100
1286  002326  047712                        DT100
1287  002330  050034                        DF02
1288
1289                                        ;ERROR 105
1290  002332  046126                        EM103                       ;WORD COUNT NOT CORRECT TO CONTINUE
1291  002334  047664                        DH900
1292  002336  050002                        DT602
1293  002340  050520                        DF25
1294
1295                                        ;ERROR 106
1296  002342  046172                        EM104           ;DRIVE STATUS NOT VALID
1297  002344  000000                        0
1298  002346  000000                        0
1299  002350  000000                        0
1300
1301                                        ;ERROR 107
1302  002352  046257                        EM105                       ;BAD HEADER AREA
1303  002354  047207                        DH604
1304  002356  047774                        DT601
1305  002360  050524                        DF26
```

```
1306
1307                                    .SBTTL  RK06 CONTROLLER REGISTER DEFINITION
1308
1309    000000                          RKCS1=  0                       ;CONTROL AND STATUS REGISTER 1
1310    000002                          RKWC=   2                       ;WORD COUNT REGISTER
1311    000004                          RKBA=   4                       ;BUS ADDRESS REGISTER
1312    000006                          RKDA=   6                       ;DESIRED TRACK SECTOR REGISTER
1313    000010                          RKCS2=  10                      ;CONTROL AND STATUS REGISTER 2
1314    000012                          RKDS=   12                      ;DRIVE STATUS REGISTER
1315    000014                          RKER=   14                      ;ERROR REGISTER
1316    000016                          RKASOF= 16                      ;ATTENTION SUMMARY AND OFFSET REGISTER
1317    000020                          RKDC=   20                      ;DESIRED CYLINDER REGISTER
1318    000020                          RKDCYL= 20                      ;DESIRED CYLINDER REGISTER
1319    000024                          RKDB=   24                      ;DATA BUFFER
1320    000026                          RKMR1=  26                      ;MAINTENANCE REGISTER 1
1321    000034                          RKMR2=  34                      ;MAINTENANCE REGISTER 2
1322    000036                          RKMR3=  36                      ;MAINTENANCE REGISTER 3
1323    000030                          RKPOS=  30                      ;ECC POSITION INFORMATION
1324    000030                          RKECPS= 30                      ;ECC POSITION INFORMATION
1325    000032                          RKPAT=  32                      ;ECC PATTERN INFORMATION
1326    000032                          RKECPT= 32                      ;ECC PATTERN INFORMATION
1327
1328                                    .SBTTL  DRIVE COMMANDS
1329
1330    000101                          SELDRV= 101                     ;SELECT DRIVE
1331    000103                          PACK=   103                     ;PACK ACKNOWLEDGE
1332    000105                          CLEAR=  105                     ;DRIVE CLEAR
1333    000107                          UNLOAD= 107                     ;UNLOAD
1334    000111                          SRTSPL= 111                     ;START SPINDLE
1335    000113                          RECAL=  113                     ;RECALIBRATE
1336    000115                          OFFSET= 115                     ;OFFSET
1337    000117                          SEEK=   117                     ;SEEK
1338    000121                          RDDATA= 121                     ;READ DATA
1339    000123                          WRDATA= 123                     ;WRITE DATA
1340    000125                          RDHEAD= 125                     ;READ HEADER
1341    000127                          WRHEAD= 127                     ;WRITE HEADER AND DATA
1342    000131                          WRTCHK= 131                     ;WRITE CHECK
1343
1344                                    ;       THE FOLLOWING ARE NOT DRIVE COMMANDS BUT ARE USED BY THE DRIVER
1345                                    ;       TO SIMULATE A SPECIFIC DESIRED OPERATION
1346
1347    000140                          RELEAS= 140                     ;RELEASE DRIVE
1348    000141                          RDSTAT= 141                     ;GET ALL STATUS FROM DRIVE
1349    000164                          RDALHD= 164                     ;READ ALL HEADERS
1350    000176                          CONCLR= 176                     ;CONTROLLER CLEAR (BIT 15 OF CS1)
1351    000177                          SUBCLR= 177                     ;SUBSYSTEM CLEAR (BIT 5 OF CS2)
1352    000300                          INTR=   300                     ;GENERATE INTERRUPT TO CPU
1353
1354                                    ;       DRIVER ISSUED SERVICE COMMANDS
1355
1356    000001                          DR.SEL= 001                     ;DRIVE SELECT
1357    000005                          DR.CLR= 005                     ;DRIVE CLEAR
1358
1359                                    .SBTTL  CONTROL AND STATUS REGISTER 1 BITS
1360
1361    000001                          GO=     BIT0                    ;GO BIT
```

```
                        CONTROL AND STATUS REGISTER 1 BITS

000100          IE=     BIT6                    ;INTERRUPT ENABLE
000200          RDY=    BIT7                    ;CONTROLLER READY
000400          BA16=   BIT8                    ;BUS ADDRESS BIT 16
001000          BA17=   BIT9                    ;BUS ADDRESS BIT 17
002000          CDT=    BIT10                   ;CONTROLLER DRIVE TYPE (0=RK06,1=RK07)
004000          CTO=    BIT11                   ;CONTROLLER TIMED OUT WAITING FOR
                                                ;  DRIVE RESPONSE
010000          CFMT=   BIT12                   ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
020000          SPAR=   BIT13                   ;DRIVE BUS PARITY ERROR DETECTED BY CONTROLLER
040000          DI=     BIT14                   ;DRIVE INTERRUPT
100000          CERR=   BIT15                   ;CONTROLLER ERROR
100000          CCLR=   BIT15                   ;CONTROLLER CLEAR

                ;       THESE BIT DEFINITIONS ARE USED FOR ADDRESS
                ;       THE HIGH BYTE OF RKCS1

000001          B.BA16= BIT0                    ;BUS ADDRESS BIT 16
000002          B.BA17= BIT1                    ;BUS ADDRESS BIT 17
000004          B.CDT=  BIT2                    ;CONTROLLER DRIVE TYPE (0=RK06,1=RK07)
000020          B.CFMT= BIT4                    ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)

                .SBTTL  CONTROL AND STATUS REGISTER 2 BITS

000007          DRVMSK= 7                       ;MASK FOR DRIVE SELECTION CODE
000010          DESL=   BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
000010          RLS=    BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
000020          BAI=    BIT4                    ;BUS ADDRESS INCREMENT INHIBIT
000040          CLR=    BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
000040          SCLR=   BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
000100          IR=     BIT6                    ;INPUT READY
000200          OR=     BIT7                    ;OUTPUT READY
000400          UFE=    BIT8                    ;UNIT FIELD ERROR
001000          MDS=    BIT9                    ;MULTIPLE DRIVE SELECT
002000          PGE=    BIT10                   ;PROGRAMMING ERROR
004000          NEM=    BIT11                   ;NON-EXISTENT MEMORY
010000          NED=    BIT12                   ;NON-EXISTENT DRIVE
020000          UPE=    BIT13                   ;UNIBUS PARITY ERROR
040000          WCE=    BIT14                   ;WRITE CHECK ERROR
100000          DLT=    BIT15                   ;DATA LATE ERROR

                .SBTTL  ERROR REGISTER BIT DEFINITION

000001          ILC=    BIT0                    ;ILLEGAL FUNCTION CODE
                ;*ILF=  BIT0                    ;ILLEGAL FUNCTION CODE
000002          SKI=    BIT1                    ;SEEK INCOMPLETE
000004          ILF=    BIT2                    ;ILLEGAL DRIVE FUNCTION
000004          NXF=    BIT2                    ;ILLEGAL DRIVE FUNCTION
000010          DRPAR=  BIT3                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
000020          FMTE=   BIT4                    ;FORMAT ERROR
000040          DTYE=   BIT5                    ;DRIVE TYPE ERROR
000100          ECH=    BIT6                    ;ECC HARD
000200          BSE=    BIT7                    ;BAD SECTOR ERROR
000400          HCRC=   BIT8                    ;HEADER CRC ERRROR
000400          HVRC=   BIT8                    ;HEADER VRC ERRROR
001000          COE=    BIT9                    ;CYLINDER ADDRESS OVERFLOW ERROR
002000          IDAE=   BIT10                   ;INVALID DISK ADDRESS ERROR
```

```
1418            004000                  WLE=    BIT11                   ;WRITE LOCK ERROR
1419            010000                  DTE=    BIT12                   ;DRIVE TIMING ERROR
1420            020000                  OPI=    BIT13                   ;OPERATION (SEARCH) INCOMPLETE
1421            040000                  UNS=    BIT14                   ;DRIVE UNSAFE
1422            100000                  DCK=    BIT15                   ;DATA CHECK
1423
1424                                    .SBTTL  STATUS REGISTER BIT DEFINITION
1425
1426            000001                  DRA=    BIT0                    ;DRIVE AVAILABLE (CONTROLLER IS SET IF
1427                                                                    ;   THIS BIT IS RESET)
1428            000004                  OFST=   BIT2                    ;DRIVE OFFSET
1429            000010                  ACLO=   BIT3                    ;AC LOW
1430            000020                  SPDLSS= BIT4                    ;SPEED LOSS
1431            000020                  DCLO=   BIT4                    ;DC LOW
1432            000040                  DROT=   BIT5                    ;DRIVE OFF TRACK
1433            000100                  VV=     BIT6                    ;VOLUME VALID
1434            000200                  DRY=    BIT7                    ;DRIVE READY
1435            000200                  DRDY=   BIT7                    ;DRIVE READY
1436            000400                  DDT=    BIT8                    ;DRIVE TYPE (0=RK06,1=RK07)
1437            004000                  WRL=    BIT11                   ;WRITE LOCK
1438            020000                  PIP=    BIT13                   ;POSITIONING IN PROGRESS
1439            040000                  DSC=    BIT14                   ;DRIVE STATUS CHANGE
1440            100000                  SVAL=   BIT15                   ;STATUS VALID
1441
1442                                    .SBTTL  MAINTENANCE REGISTER 1 BIT DEFINITION
1443
1444            000017                  MESMSK= 17                      ;MESSAGE MASK
1445
1446            000020                  PAT=    BIT4                    ;FORCE EVEN PARITY ON DRIVE BUS MESSAGE LINES
1447            000040                  DMD=    BIT5                    ;DIAGNOSTIC MODE
1448            000100                  MSP=    BIT6                    ;MAINTENANCE SECTOR PULSE
1449            000200                  MIND=   BIT7                    ;MAINTENANCE INDEX
1450            000400                  MCLK=   BIT8                    ;MAINTENANCE CLOCK
1451            001000                  MERD=   BIT9                    ;MAINTENANCE ENCODED READ DATA
1452            002000                  MEWD=   BIT10                   ;MAINTENACNE ENCODED WRITE DATA
1453            004000                  PCA=    BIT11                   ;PRECOMPENSATION ADVANCE
1454            010000                  PCD=    BIT12                   ;PRECOMPENSATION DELAY
1455            020000                  ECCW=   BIT13                   ;ECC WORD IS BEING READ OR WRITTEN
1456            040000                  WRTGAT= BIT14                   ;WRITE GATE
1457            100000                  RDGATE= BIT15                   ;READ GATE
1458
1459                                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE A
1460
1461            000040                  S.DRA=  BIT5                    ;DRIVE AVAILIABLE
1462            000100                  S.VV=   BIT6                    ;VOLUME VALID
1463            000200                  S.DRY=  BIT7                    ;DRIVE READY
1464            000400                  S.TYPE= BIT8                    ;DRIVE TYPE
1465            001000                  S.FORM= BIT9                    ;DRIVE FORMAT
1466            002000                  S.OFF=  BIT10                   ;OFFSET
1467            004000                  S.WRL=  BIT11                   ;WRITE LOCK
1468            010000                  S.SPIN= BIT12                   ;SPINDLE ON
1469            020000                  S.PIP=  BIT13                   ;POSITIONING IN PROGRESS
1470            040000                  S.DSC=  BIT14                   ;DRIVE STATUS CHANGE
1471
1472                                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE B
1473
```

```
1474    000040          S.ICYL= BIT5            ;ILLEGAL CYLINDER ADDRESS
1475    000100          S.ACLO= BIT6            ;AC LOW
1476    000200          S.FLT=  BIT7            ;DRIVE FAULT
1477    000400          S.ILF=  BIT8            ;ILLEGAL FUNCTION
1478    001000          S.PAR=  BIT9            ;DRIVE DETECTED DRIVE BUS PARITY ERROR
1479    002000          S.SKI=  BIT10           ;SEEK INCOMPLETE
1480    004000          S.WLE=  BIT11           ;WRITE LOCK ERROR
1481    010000          S.SPLS= BIT12           ;SPEED LOSS
1482    010000          S.DCLO= BIT12           ;DC LOW
1483    020000          S.DROT= BIT13           ;DRIVE OFF TRACK
1484    040000          S.UNS=  BIT14           ;DRIVE UNSAFE
1485
1486                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE A
1487
1488    000020          S.XDOK= BIT4            ;TRANSDUCER OK
1489    000040          S.HDHM= BIT5            ;HEADS HOME
1490    000100          S.BRHM= BIT6            ;BRUSHES HOME
1491    000200          S.DOOR= BIT7            ;DOOR INTERLOCKED
1492    000400          S.CART= BIT8            ;CARTRAGE INTERLOCK
1493    001000          S.SPOK= BIT9            ;SPEED OK
1494    002000          S.FWD=  BIT10           ;FORWARD
1495    004000          S.REV=  BIT11           ;REVERSE
1496    010000          S.LOAD= BIT12           ;HEADS LOADING
1497    020000          S.RTZ=  BIT13           ;RETURN TO ZERO
1498    040000          S.UNLD= BIT14           ;HEADS UNLOADING
1499
1500                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE B
1501
1502    000020          S.SECT= BIT4            ;SECTOR ERROR
1503    000040          S.WCLK= BIT5            ;WRITE CLOCK AND NO WRITE GATE
1504    000100          S.WGAT= BIT6            ;WRITE GATE AND NO TRANSISTIONS
1505    000200          S.HDFL= BIT7            ;HEAD FAULT
1506    000400          S.MHD=  BIT8            ;MULTIPLE HEAD SELECT
1507    001000          S.XERR= BIT9            ;INDEX ERROR
1508    002000          S.DIB=  BIT10           ;DIBIT ERROR
1509    004000          S.PLO=  BIT11           ;PLO ERROR
1510    010000          S.NMOV= BIT12           ;SEEK AND NO MOTION
1511    020000          S.LIMD= BIT13           ;LIMIT DETECT ON SEEK
1512    040000          S.BRKE= BIT14           ;SERVO-BRAKE
1513
1514                    .SBTTL  COMMON MASKS
1515
1516    000007          M.DRV=  7               ;DRIVE CODE
1517    100000          M.PAR=  BIT15           ;PARITY
1518    000003          M.ID=   3               ;BYTE ID
1519    017760          M.CDIF= 17760           ;CYLINDER DIFFERENCE/OFFSET
1520    017760          M.CADD= 17760           ;CYLINDER ADDRESS
1521    077770          M.SER=  77770           ;DRIVE SERIAL NUMBER
1522    000760          M.SECT= 760             ;SECTOR COUNT
1523    007000          M.HEAD= 7000            ;HEAD DECODE
```

```
                        .SBTTL  PARAMETER BLOCK ALLOCATION

                        ;*      ************************************************
                        ;*  1   ! COMMAND                 ! DRIVE NO.          !  0
                        ;*  3   ! CYLINDER ADDRESS                             !  2
                        ;*  5   ! TRACK                   ! SECTOR             !  4
                        ;*  7   !BA16-17,FORMAT,DRV TYPE! OFFSET               !  6
                        ;* 11   ! BUS ADDRESS (LOW 16 BITS)                    ! 10
                        ;* 13   ! WORD COUNT (2'S COMPLEMENT)                  ! 12
                        ;* 15   ! PROGRAM DRIVE STATUS INFORMATION             ! 14
                        ;* 17   ! COMMAND AND STATUS REGISTER 1                ! 16
                        ;* 21   ! COMMAND AND STATUS REGISTER 2                ! 20
                        ;* 23   ! WORD COUNT REGISTER                          ! 22
                        ;* 25   ! BUS ADDRESS REGISTER                         ! 24
                        ;* 27   ! DESIRED TRACK AND SECTOR                     ! 26
                        ;* 31   ! DESIRED CYLINDER                             ! 30
                        ;* 33   ! ATTENTION SUMMARY AND DRIVE OFFSET           ! 32
                        ;* 35   ! ERROR REGISTER                               ! 34
                        ;* 37   ! STATUS REGISTER                              ! 36
                        ;* 41   ! MESSAGE LINE A STATUS BYTE CO                ! 40
                        ;* 43   ! MESSAGE LINE B STATUS BYTE 00                ! 42
                        ;* 45   ! MESSAGE LINE A STATUS BYTE 01                ! 44
                        ;* 47   ! MESSAGE LINE B STATUS BYTE 01                ! 46
                        ;* 51   ! MESSAGE LINE A STATUS BYTE 10                ! 50
                        ;* 53   ! MESSAGE LINE B STATUS BYTE 10                ! 52
                        ;* 55   ! MESSAGE LINE A STATUS BYTE 11                ! 54
                        ;* 57   ! MESSAGE LINE B STATUS BYTE 11                ! 56
                        ;* 61   ! ECC POSITION INFORMATION                     ! 60
                        ;* 63   ! ECC PATTERN INFORMATION                      ! 62
                        ;*      ************************************************

                        .SBTTL  PARAMETERS PASSED TO THE DRIVER

                        ;       THE FOLLOWING DEFINITIONS ARE USED TO PASS PARAMETERS
                        ;         TO THE RK06/RK07 DRIVER

000000                  P.DRVN= 0                       ;DRIVE NUMBER
000001                  P.CMND= 1                       ;COMMAND
000002                  P.CYLN= 2                       ;CYLINDER ADDRESS
000004                  P.SECT= 4                       ;SECTOR
000005                  P.TRCK= 5                       ;TRACK
000006                  P.OFST= 6                       ;OFFSET
000007                  P.CS1H= 7                       ;RKCS1 BITS 8-15
000007                  P.BAHI= 7                       ;BUS ADDRESS (BITS 16 AND 17)
000010                  P.BALO= 10                      ;BUS ADDRESS (BITS 0-15)
000012                  P.WC=   12                      ;WORD COUNT (2'S COMPLEMENT)
000014                  P.PRST= 14                      ;PROGRAM DRIVE STATUS INFORMATION

                        .SBTTL  PROGRAM DEVICE STATUS REGISTER DEFINITION

000001                  DRVUSE= BIT0                    ;DRIVE IN USE
000002                  DRVPOS= BIT1                    ;DRIVE POSITIONING
000004                  DRVPDT= BIT2                    ;DRIVE POSITIONED FOR DATA TRANSFER
000010                  UEXATT= BIT3                    ;UNEXPECTED ATTENTION
000020                  DRVHRD= BIT4                    ;DRIVE HAS HARD ERROR
000040                  DRVDSC= BIT5                    ;DRIVE STATUS CHANGE DID NOT CLEAR
```

```
                        PROGRAM DEVICE STATUS REGISTER DEFINITION

1580    000100          CMDTO=  BIT6                    ;NO TERMINATION TO COMMAND FOR AT
1581                                                    ;  LEAST 1 SECOND
1582    000200          W.WCK=  BIT7                    ;WRITE FOR WRITE WRITE CHECK
1583    000400          NOCHK=  BIT8                    ;NO CHECK, DO NOT SET INTERRUPT ENABLE
1584    001000          PBSVAL= BIT9                    ;PARAMETER STATUS WORDS VALID
1585                                                    ;  (SET WHEN ERROR TERMINATION OR
1586                                                    ;  READ STATUS COMMAND)
1587    002000          DRPDRV= BIT10                   ;DROP DRIVE FROM TEST SEQUENCE
1588    004000          NODSC=  BIT11                   ;ATTENTION SET BUT DCS AND FAULT RESET
1589    010000          DRVSZD= BIT12                   ;DRIVE SEIZED BY OTHER PORT
1590    020000          E.UNLD= BIT13                   ;DRIVE UNLOADED DUE TO ERROR
1591    040000          Q.INIT= BIT14                   ;PARAMETER BLOCK ENQUEUED IN INITIATION QUEUE
1592    100000          DTBAII= BIT15                   ;INHIBIT BUS ADDRESS INCREMENT
1593
1594                    .SBTTL  PARAMETERS PASSED FROM DRIVER TO PROGRAM
1595
1596                    ;       THE FOLLOWING DEFINITIONS ARE USED FOR REGISTER RETURNS
1597                    ;         FROM THE DRIVER TO THE CALLING PROGRAM
1598
1599    000016          P.CS1=  16                      ;COMMAND AND STATUS REGISTER 1
1600    000020          P.CS2=  20                      ;COMMAND AND STATUS REGISTER 2
1601    000022          P.WCR=  22                      ;WORD COUNT REGISTER
1602    000024          P.BAR=  24                      ;BUS ADDRESS REGISTER
1603    000026          P.DTS=  26                      ;DESIRED TRACK SECTOR REGISTER
1604    000030          P.DCYL= 30                      ;DESIRED CYLINDER REGISTER
1605    000032          P.ASOF= 32                      ;ATTENTION SUMMARY/OFFSET REGISTER
1606    000034          P.ER=   34                      ;ERROR REGISTER
1607    000036          P.DS=   36                      ;STATUS REGISTER
1608    000040          P.A00=  40                      ;MESSAGE A STATUS BYTE 00
1609    000042          P.B00=  42                      ;MESSAGE B STATUS BYTE 00
1610    000044          P.A01=  44                      ;MESSAGE A STATUS BYTE 01
1611    000046          P.B01=  46                      ;MESSAGE B STATUS BYTE 01
1612    000050          P.A10=  50                      ;MESSGGE A STATUS BYTE 10
1613    000052          P.B10=  52                      ;MESSAGE B STATUS BYTE 10
1614    000054          P.A11=  54                      ;MESSAGE A STATUS BYTE 11
1615    000056          P.B11=  56                      ;MESSAGE B STATUS BYTE 11
1616    000060          P.EPOS= 60                      ;ECC POSITION INFORMATION
1617    000062          P.EPAT= 62                      ;ECC PATTERN INFORMATION
1618
1619                    .SBTTL  PARAMETER BLOCK 0 FOR DRIVE
1620
1621 002362    000     PARM0:  .BYTE   0               ;DRIVE NUMBER
1622 002363    000             .BYTE   0               ;COMMAND
1623 002364 000000              .WORD   0               ;CYLINDER ADDRESS
1624 002366    000             .BYTE   0               ;SECTOR ADDRESS
1625 002367    000             .BYTE   0               ;TRACK ADDRESS
1626 002370    000             .BYTE   0               ;OFFSET VALUE
1627 002371    000             .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1628 002372 000000              .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1629 002374 000000              .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1630 002376 000000              .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1631 002400 000000              .WORD   0               ;COMMAND AND STATUS REGISTER 1
1632 002402 000000              .WORD   0               ;COMMAND AND STATUS REGISTER 2
1633 002404 000000              .WORD   0               ;WORD COUNT REGISTER
1634 002406 000000              .WORD   0               ;BUS ADDRESS REGISTER
1635 002410 000000              .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
```

```
1636  002412  000000                  .WORD   0               ;DESIRED CYLINDER REGISTER
1637  002414  000000                  .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1638  002416  000000                  .WORD   0               ;ERROR REGISTER
1639  002420  000000                  .WORD   0               ;STATUS REGISTER
1640  002422  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1641  002424  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1642  002426  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1643  002430  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1644  002432  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1645  002434  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1646  002436  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1647  002440  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1648  002442  000000                  .WORD   0               ;ECC POSITION INFORMATION
1649  002444  000000                  .WORD   0               ;ECC PATTERN INFORMATION
1650
1651                          .SBTTL  PARAMETER BLOCK 1 FOR DRIVE
1652
1653  002446     000          PARM1:  .BYTE   0               ;DRIVE NUMBER
1654  002447     000                  .BYTE   0               ;COMMAND
1655  002450  000000                  .WORD   0               ;CYLINDER ADDRESS
1656  002452     000                  .BYTE   0               ;SECTOR ADDRESS
1657  002453     000                  .BYTE   0               ;TRACK ADDRESS
1658  002454     000                  .BYTE   0               ;OFFSET VALUE
1659  002455     000                  .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1660  002456  000000                  .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1661  002460  000000                  .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1662  002462  000000                  .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1663  002464  000000                  .WORD   0               ;COMMAND AND STATUS REGISTER 1
1664  002466  000000                  .WORD   0               ;COMMAND AND STATUS REGISTER 2
1665  002470  000000                  .WORD   0               ;WORD COUNT REGISTER
1666  002472  000000                  .WORD   0               ;BUS ADDRESS REGISTER
1667  002474  000000                  .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1668  002476  000000                  .WORD   0               ;DESIRED CYLINDER REGISTER
1669  002500  000000                  .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1670  002502  000000                  .WORD   0               ;ERROR REGISTER
1671  002504  000000                  .WORD   0               ;STATUS REGISTER
1672  002506  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1673  002510  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1674  002512  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1675  002514  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1676  002516  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1677  002520  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1678  002522  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1679  002524  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1680  002526  000000                  .WORD   0               ;ECC POSITION INFORMATION
1681  002530  000000                  .WORD   0               ;ECC PATTERN INFORMATION
1682
1683                          .SBTTL  TEMPORARY CONTROLLER REGISTER STORAGE
1684
1685  002532  000000          T.CS1:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
1686                                                          ;  REGISTER 1
1687  002534  000000          T.CS2:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
1688                                                          ;  REGISTER 2
1689  002536  000000          T.WCR:  .WORD   0               ;TEMPORARY STORAGE FOR WORD COUNT REGISTER
1690  002540  000000          T.BA:   .WORD   0               ;TEMPORARY STORAGE FOR BUS ADDRESS REGISTER
1691  002542  000000          T.DA:   .WORD   0               ;TEMPORARY STORAGE FOR DISK TRACK AND SECTOR
```

```
1692  002544  000000                  T.DC:   .WORD   0               ;TEMPORARY STORAGE FOR DRIVE CYLINDER
1693  002546  000000                  T.ASOF: .WORD   0               ;TEMPORARY STORAGE FOR ATTENTION SUMMARY
1694                                                                  ;  AND OFFSET
1695  002550  000000                  T.ER:   .WORD   0               ;TEMPORARY STORAGE FOR ERROR REGISTER
1696  002552  000000                  T.DS:   .WORD   0               ;TEMPORARY STORAGE FOR DRIVE STATUS REGISTER
1697  002554  000000                  T.MR1:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 1
1698  002556  000000                  T.MR2:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 2
1699  002560  000000                  T.MR3:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 3
1700  002562  000000                  T.POS:  .WORD   0               ;TEMPORARY STORAGE FOR ECC POSITION
1701  002564  000000                  T.PAT:  .WORD   0               ;TEMPORARY STORAGE FOR ECC PATTERN
1702  002566  000000                  T.DB:   .WORD   0               ;TEMPORARY STORAGE FOR DATA BUFFER REGISTER
1703
1704                                  .SBTTL  DRIVER PARAMERTERS
1705
1706  002570  177440                  RKBAS:  .WORD   177440          ;ADDRESS OF RK611 UNIBUS ADDRESS BLOCK
1707  002572  000210                  RKVEC:  .WORD   210             ;ADDRESS OF R611 VECTOR
1708  002574  000240                  RKPRI:  .WORD   PR5             ;RK611 INTERRUPT PRIORITY
1709  002576  025524                  A.NORM: ERRFRE                  ;ADDRESS OF NORMAL RETURN FROM DRIVER
1710  002600  026462                  A.ABNL: ERRHDL                  ;ADDRESS OF ABNORMAL RETURN FROM DRIVER
1711  002602  026040                  A.CONT: CONERR                  ;ADDRESS OF CONTROLLER ERROR RETURN
1712  002604  000000                  E.CONT: .WORD   0               ;CONTROLLER ERROR STATUS
1713                                                                  ;  THIS LOCATION IS CLEARED WHEN EVERY COMMAND
1714                                                                  ;  IS INITIATED.  IF A CONTROLLER ERROR
1715                                                                  ;  OCCURS THE FOLLOWING BIT ASSIGNMENT IS
1716                                                                  ;  USED:
1717
1718          000001                  E.CCLR= BIT0                    ;CLEAR CONTROLLER DID NOT CLEAR ERROR
1719          000002                  E.NOAT= BIT1                    ;NO ATTENTION IN ATTENTION SUMMARY REG
1720          000004                  E.UATT= BIT2                    ;UNSOLICATED ATTENTION (SEQUENTIAL ONLY)
1721          000010                  E.UDAT= BIT3                    ;UNEXPECTED DATA TYPE ERROR
1722          000020                    CLAT= BIT4                    ;ATTENTION DID NOT RESET WITH CLEAR
1723          000040                  E.SCLR= BIT5                    ;SUBSYSTEM CLEAR DID NOT CLEAR DRIVE
1724                                                                  ;  ATTENTION
1725          000100                  E.ILLD= BIT6                    ;ILLEGAL DRIVER COMMAND
1726          000400                  E.DLT=  BIT8                    ;DATA LATE WHEN UNLOADING HEADER
1727          001000                  E.CERR= BIT9                    ;CONTROLLER ERROR DURING DRIVER SERVICING
1728          002000                  E.DPAR= BIT10                   ;DRIVE DETECTED PARITY ERROR
1729          040000                  E.CMTO= BIT14                   ;CONTROLLER COMMAND TIME OUT (QUEUED ONLY)
1730          100000                  E.MDS=  BIT15                   ;MULTIPLE DRIVE SELECT
1731
1732  002606  000000                  O.WAIT: .WORD   0               ;PARAMETER BLOCK OF THE DRIVE
1733                                                                  ;WAITING FOR COMMAND COMPLETION
1734  002610  000400                  W.MTIM: .WORD   400             ;LOOP COUNTER FOR MILISECOND SCAN OF DRIVE
1735  002612  000400                  W.MILI: .WORD   400             ;16 MILISECOND TIME FOR PROGRAM
1736
1737                                                                  ;        CPU      VALUE
1738                                                                  ;        ---      -----
1739
1740                                                                  ;        11/05    100
1741                                                                  ;        11/10
1742                                                                  ;        11/20
1743                                                                  ;        11/34
1744                                                                  ;        11/40
1745                                                                  ;        11/45    400
1746                                                                  ;        11/50
1747                                                                  ;        11/70
```

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1748  002614  000300                  W.SEC:  .WORD   300             ;SECOND COUNT COUNT FOR ALL COMMANDS
1749                                                                  ;   EXCEPT START SPINDLE
1750  002616  003000                  W.BSEC: .WORD   3000            ;8 SECOND FOR DRIVE CYCLE DOWN
1751  002620  030000                  W.MIN:  .WORD   30000           ;MINUTE TIME FOR START SPINDLE
1752  002622  000000                  HDR.AD: .WORD   0               ;ADDRESS USED FOR READ ALL HEADERS
1753  002624  000000                  HDR.CT: .WORD   0               ;NUMBER OF HEADERS LEFT TO READ FOR READ
1754                                                                  ;   ALL HEADERS
1755  002626      000                 I.ISRL: .BYTE   0               ;INTERRUPT OR RELEASED COMMAND ISSUED
1756  002627      002     004     010 H.HEAD: .BYTE   2,4,10          ;HEAD DECODES
1757  002632      000                 W.TIME: .BYTE   0               ;DRIVES BEING WATCH-DOG TIMED
1758
1759                                  .SBTTL  INTERRUPT MASKS
1760
1761  002633      000                 INTMSK: .BYTE   0               ;INTERRUPT MASKS FOR DRIVE IN PARAMETER BLOCK
1762
1763                                  ;       INTERRUPT MASK TABLE
1764
1765  002634      001                 I.DRV:  .BYTE   1               ;INTERRUPT MASK FOR DRIVE 0
1766  002635      002                         .BYTE   2               ;INTERRUPT MASK FOR DRIVE 1
1767  002636      004                         .BYTE   4               ;INTERRUPT MASK FOR DRIVE 2
1768  002637      010                         .BYTE   10              ;INTERRUPT MASK FOR DRIVE 3
1769  002640      020                         .BYTE   20              ;INTERRUPT MASK FOR DRIVE 4
1770  002641      040                         .BYTE   40              ;INTERRUPT MASK FOR DRIVE 5
1771  002642      100                         .BYTE   100             ;INTERRUPT MASK FOR DRIVE 6
1772  002643      200                         .BYTE   200             ;INTERRUPT MASK FOR DRIVE 7
1773
1774                                  .SBTTL  PARAMETER BLOCK TABLE
1775
1776  002644  002362                  PBLKT:  PARM0                   ;ADDRESS OF PARAMETER BLOCK GIVEN WITH
1777                                                                  ;DRIVE CALL.  MUST BE LOADED INTO PBLKT
1778
1779
1780                                  .SBTTL  TIME FOR WATCH-DOG TIMER
1781
1782  002646  000000                  W.DRV:  .WORD   0               ;TIME FOR INSTRUCTION IN PARAMETER BLOCK
1783                                  .SBTTL  PROGRAM SPECIFIC RESERVED LOCATIONS
1784  002650      000                 DERCNT: .BYTE   0               ;DATA ERROR COUNT
1785  002651      000                 OPCOMP. .BYTE   0               ;OPERATION COMPLETE FLAG
1786  002652      000                 DONE:   .BYTE   0               ;DONE SWITCH
1787  002653      000                 TYPFMT: .BYTE   0               ;DRIVE TYPE & FORMAT CONTROL
1788  002654      000                 ERRCNT: .BYTE   0               ;ERROR COUNT
1789  002655      004                 ERRLMT: .BYTE   4               ;ERROR LIMIT
1790  002656      000                 OPCONT: .BYTE   0               ;OPERATION CONTROL SWITCHES
1791              000001              WHDSW=BIT0                      ;WRITE HEADER & DATA SWITCH
1792              000002              VFHDSW=BIT1                     ;VERIFY HEADERS SWITCH
1793              000004              WCDASW=BIT2                     ;WRITE CHECK DATA SWITCH
1794              000010              RCDASW=BIT3                     ;READ CHECK DATA SWITCH
1795              000020              OREQSW=BIT4                     ;OFFSET REQUIRED SWITCH
1796              000040              PSDBSF= BIT5            ;SAVE SOFTWARE DETECTED BAD SECTOR FILES SWITCH
1797  002660                                  .EVEN
1798
1799  002660  000400                  RDBUF:  .BLKW   ↑D256           ;READ BUFFER
1800  003660  000400                  BSSOFT: .BLKW   ↑D256           ;RECORD OF BAD SECTORS FROM SOFTWARE
1801  004660  000400                  BSFACT: .BLKW   ↑D256           ;RECORD OF BAD SECTORS FROM FACTORY
1802  005660  000006                  COMSTR: .BLKW   6               ;COMMAND STORAGE
1803  005674  000102                  BUFFO:  .BLKW   ↑D66            ;OUTPUT BUFFER 1
```

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1804  006100  000102                BUFF1:  .BLKW   ↑D66            ;OUTPUT BUFFER 2
1805  006304  000000                BUFPRT: .WORD   0               ;BUFFER POINTER
1806  006306  000000                TKWDCT: .WORD   0               ;FULL TRACK WORD COUNT STORAGE
1807  006310  000006                INITTP: .WORD   6               ;DEFAULT DRIVE TYPE TO RK06
1808  006312  000000                INITDR: .WORD   0               ;DEFAULT DRIVE
1809  006314  000026                INITSE: .WORD   26              ;DEFAULT SECTOR/TRACK
1810  006316  000002                INITMD: .WORD   2               ;DEFAULT MODE
1811  006320  135143                INITWE: .WORD   135143          ;DEFAULT DATA FOR EVEN CYL
1812  006322  072307                INITWO: .WORD   072307          ;DEFAULT DATA FOR ODD CYL
1813  006324  000000                INITST: .WORD   0               ;DEFAULT STARTING TRACK
1814  006326  000002                INITET: .WORD   2               ;DEFAULT ENDING TRACK
1815  006330  000000                INITSC: .WORD   0               ;DEFAULT STARTING CYLINDER
1816  006332  000000                INITEC: .WORD   0               ;DEFAULT END CYLINDER, LOADED IN PARM2
1817  006334  000000                INITOF: .WORD   0               ;DEFAULT OFFSET (+0)
1818  006336  000000                TPINUS: .WORD   0               ;DRIVE TYPE IN USE
1819  006340  000000                DRINUS: .WORD   0               ;DRIVE IN USE
1820  006342  000000                SEINUS: .WORD   0               ;SECTOR/TRACK IN USE
1821  006344  000000                MDINUS: .WORD   0               ;MODE IN USE
1822  006346  000000                WEINUS: .WORD   0               ;DATA IN USE FOR EVEN CYL
1823  006350  000000                WOINUS: .WORD   0               ;DATA IN USE FOR ODD CYL
1824  006352  000000                STINUS: .WORD   0               ;STARTING TRACK IN USE
1825  006354  000000                ETINUS: .WORD   0               ;ENDING TRACK IN USE
1826  006356  000000                SCINUS: .WORD   0               ;STARTING CYLINDER IN USE
1827  006360  000000                ECINUS: .WORD   0               ;END CYLINDER IN USE
1828  006362  000000                OFINUS: .WORD   0               ;OFFSET VALUE IN USE
1829  006364  000000                RECODE: .WORD   0               ;RECOVERY CODE WORD
1830  006366  000000                CTINUS: .WORD   0               ;CURRENT TRACK IN USE
1831  006370  000000                CCINUS: .WORD   0               ;CURRENT CYLINDER IN USE
1832  006372  000000                ERRCOM: .WORD   0               ;ERROR COMMAND
1833          000002                BSERR=BIT1                      ;BSE ERROR
1834          000004                HVRCER=BIT2                     ;HVRC ERROR
1835          000010                OPIERR=BIT3                     ;OPI ERROR
1836          000020                DCKERR=BIT4                     ;DATA CHECK ERROR
1837          000040                ECCNC=BIT5                      ;ECC NON-CORRECTABLE
1838          000100                WCERR=BIT6                      ;WRITE CHECK ERROR
1839          000200                ABORT=BIT7                      ;ABORT
1840          000400                LEV2ER=BIT8                     ;LEVEL TWO ERROR
1841          001000                BADSEC=BIT9                     ;BAD SECTOR FLAG
1842          002000                TWOTOS=BIT10                    ;TWO TIME OUTS
1843          004000                RCLREQ=BIT11                    ;RECALIBRATE REQUIRED
1844          100000                ANYDER=BIT15                    ;ANY ERROR DETECTED FLAG
1845
1846  006374  037477     000        QUES:   .ASCIZ  /??/
1847  006377     015  044012  046105 HELPFL: .ASCII  <15><12>/HELP FILE/<15><12><12>
1848  006404  020120  044506  042514
1849  006412  005015     012
1850  006415     115  052517  052116         .ASCII  /MOUNT AN RK06K-RK07K DISK CARTRIDGE/<15><12>
1851  006422  040440  020116  045522
1852  006430  033060  026513  045522
1853  006436  033460  020113  044504
1854  006444  045523  041440  051101
1855  006452  051124  042111  042507
1856  006460  005015
1857  006462  042522  042523  020124         .ASCII  /RESET WRITE LOCK IF WRITE HEADERS OR DATA OPERATION/<15><12>
1858  006470  051127  052111  020105
1859  006476  047514  045503  044440
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1860  006504  020106  051127  052111
1861  006512  020105  042510  042101
1862  006520  051105  020123  051117
1863  006526  042040  052101  020101
1864  006534  050117  051105  052101
1865  006542  047511  006516     012
1866  006547     122  051505  047520          .ASCII  /RESPOND TO THE FOLLOWING PARAMETER REQUESTS BY:/
1867  006554  042116  052040  020117
1868  006562  044124  020105  047506
1869  006570  046114  053517  047111
1870  006576  020107  040520  040522
1871  006604  042515  042524  020122
1872  006612  042522  052521  051505
1873  006620  051524  041040  035131
1874  006626  005015  047503  052116          .ASCII  <15><12>/CONTROL Z (↑Z) (CR) TO ALLOW ALL OR /
1875  006634  047522  020114  020132
1876  006642  057050  024532  024040
1877  006650  051103  020051  047524
1878  006656  040440  046114  053517
1879  006664  040440  046114  047440
1880  006672  020122
1881  006674  042522  040515  047111          .ASCII  /REMAINING PARAMETERS TO DEFAULT AFTER DRIVE TYPE/<15><12>
1882  006702  047111  020107  040520
1883  006710  040522  042515  042524
1884  006716  051522  052040  020117
1885  006724  042524  040506  046125
1886  006732  020124  043101  042524
1887  006740  020122  051104  053111
1888  006746  020105  054524  042520
1889  006754  005015
1890  006756  040503  051122  040511          .ASCII  /CARRIAGE RETURN TO DEFAULT THAT SPECIFIC PATAMETER/<15><12>
1891  006764  042507  051040  052105
1892  006772  051125  020116  047524
1893  007000  042040  043105  052501
1894  007006  052114  052040  040510
1895  007014  020124  050123  041505
1896  007022  043111  041511  050040
1897  007030  052101  046501  052105
1898  007036  051105  005015
1899  007042  047503  052116  047522          .ASCII  /CONTROL C (↑C) TO RETURN TO FIRST PARAMETER REQUEST/<15><12>
1900  007050  020114  020103  057050
1901  007056  024503  052040  020117
1902  007064  042522  052524  047122
1903  007072  052040  020117  044506
1904  007100  051522  020124  040520
1905  007106  040522  042515  042524
1906  007114  020122  042522  052521
1907  007122  051505  006524     012
1908  007127     103  047117  051124          .ASCII  /CONTROL C (↑C) ALSO ABORTS THE PROGRAM ONCE /
1909  007134  046117  041440  024040
1910  007142  041536  020051  046101
1911  007150  047523  040440  047502
1912  007156  052122  020123  044124
1913  007164  020105  051120  043517
1914  007172  040522  020115  047117
1915  007200  042503     040
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1916  007203    106  051117  040515          .ASCII  /FORMATTING HAS STARTED/<15><12><12>
1917  007210 052124  047111  020107
1918  007216 040510  020123  052123
1919  007224 051101  042524  006504
1920  007232 005012
1921  007234 051117  005015    012          .ASCII  /OR/<15><12><12>
1922  007241    105  052116  051105          .ASCII  /ENTER THE DESIRED PARAMETER OPTION SELECTED /
1923  007246 052040  042510  042040
1924  007254 051505  051111  042105
1925  007262 050040  051101  046501
1926  007270 052105  051105  047440
1927  007276 052120  047511  020116
1928  007304 042523  042514  052103
1929  007312 042105    040
1930  007315    106  047522  020115          .ASCII  /FROM THE LIST BELOW./<15><12>
1931  007322 044124  020105  044514
1932  007330 052123  041040  046105
1933  007336 053517  006456    012
1934  007343    101  046114  053040          .ASCII  /ALL VALUES TO BE ENTERED ARE OCTAL/<15><12><12>
1935  007350 046101  042525  020123
1936  007356 047524  041040  020105
1937  007364 047105  042524  042522
1938  007372 020104  051101  020105
1939  007400 041517  040524  006514
1940  007406 005012
1941  007410 051104  053111  020105          .ASCII  /DRIVE TYPE= 6 FOR RK06, 7 FOR RK07/<15><12>
1942  007416 054524  042520  020075
1943  007424 020066  047506  020122
1944  007432 045522  033060  020054
1945  007440 020067  047506  020122
1946  007446 045522  033460  005015
1947  007454 051104  053111  020105          .ASCII  /DRIVE NUM=(0-7) DEFAULTS TO 0/<15><12><12>
1948  007462 052516  036515  030050
1949  007470 033455  020051  042504
1950  007476 040506  046125  051524
1951  007504 052040  020117  006460
1952  007512 005012
1953  007514 042523  052103  051117          .ASCII  &SECTORS/TRACK=(24,26) DEFAULTS TO 26&<15><12><12>
1954  007522 027523  051124  041501
1955  007530 036513  031050  026064
1956  007536 033062  020051  042504
1957  007544 040506  046125  051524
1958  007552 052040  020117  033062
1959  007560 005015    012
1960  007563    115  042117  036505          .ASCII  /MODE=(0-4) DEFAULTS TO 2/<15><12>
1961  007570 030050  032055  020051
1962  007576 042504  040506  046125
1963  007604 051524  052040  020117
1964  007612 006462    012
1965  007615    040  020040  030040          .ASCII  /    0=WRITE HEADERS & DATA/<15><12>
1966  007622 053475  044522  042524
1967  007630 044040  040505  042504
1968  007636 051522  023040  042040
1969  007644 052101  006501    012
1970  007651    040  020040  030440          .ASCII  /    1=WRITE HEADERS & DATA; VERIFY HEADERS/<15><12>
1971  007656 053475  044522  042524
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1972  007664  044040  040505  042504
1973  007672  051522  023040  042040
1974  007700  052101  035501  053040
1975  007706  051105  043111  020131
1976  007714  042510  042101  051105
1977  007722  006523     012
1978  007725     040  020040  031040          .ASCII  /    2=WRITE & VERIFY HEADERS & DATA/<15><12>
1979  007732  053475  044522  042524
1980  007740  023040  053040  051105
1981  007746  043111  020131  042510
1982  007754  042101  051105  020123
1983  007762  020046  040504  040524
1984  007770  005015
1985  007772  020040  020040  036463          .ASCII  /    3=VERIFY HEADERS/<15><12>
1986  010000  042526  044522  054506
1987  010006  044040  040505  042504
1988  010014  051522  005015
1989  010020  020040  020040  036464          .ASCII  /    4=VERIFY HEADERS AND VERIFY DATA/<15><12><12>
1990  010026  042526  044522  054506
1991  010034  044040  040505  042504
1992  010042  051522  040440  042116
1993  010050  053040  051105  043111
1994  010056  020131  040504  040524
1995  010064  005015     012
1996  010067     105  042526  020116          .ASCII  /EVEN CYLINDER PATTERN=(DATA WORD) DEFAULTS TO 135143/<15><12>
1997  010074  054503  044514  042116
1998  010102  051105  050040  052101
1999  010110  042524  047122  024075
2000  010116  040504  040524  053440
2001  010124  051117  024504  042040
2002  010132  043105  052501  052114
2003  010140  020123  047524  030440
2004  010146  032463  032061  006463
2005  010154     012
2006  010155     117  042104  041440          .ASCII  /ODD CYLINDER PATTERN=(DATA WORD) DEFAULTS TO 072307/<15><12>
2007  010162  046131  047111  042504
2008  010170  020122  040520  052124
2009  010176  051105  036516  042050
2010  010204  052101  020101  047527
2011  010212  042122  020051  042504
2012  010220  040506  046125  051524
2013  010226  052040  020117  033460
2014  010234  031462  033460  005015
2015  010242  051124  041501  020113          .ASCII  /TRACK LIMITS = (0-2,0-2) DEFAULTS TO 0,2/<15><12>
2016  010250  044514  044515  051524
2017  010256  036440  024040  026460
2018  010264  026062  026460  024462
2019  010272  042040  043105  052501
2020  010300  052114  020123  047524
2021  010306  030040  031054  005015
2022  010314  054503  044514  042116          .ASCII  /CYLINDER LIMITS = (0-632,0-632) DEFAULTS TO 0,632/<15><12><12>
2023  010322  051105  046040  046511
2024  010330  052111  020123  020075
2025  010336  030050  033055  031063
2026  010344  030054  033055  031063
2027  010352  020051  042504  040506
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2028  010360  046125  051524  052040
2029  010366  020117  026060  031466
2030  010374  006462  005012
2031  010400  043117  051506  052105          .ASCII  /OFFSET=(OCTAL OFFSET VALUE) DEFAULTS TO 0 (0 OFFSET)/<15><12>
2032  010406  024075  041517  040524
2033  010414  020114  043117  051506
2034  010422  052105  053040  046101
2035  010430  042525  020051  042504
2036  010436  040506  046125  051524
2037  010444  052040  020117  020060
2038  010452  030050  047440  043106
2039  010460  042523  024524  005015
2040  010466  020040  020040  020040          .ASCII  /      000 AND 200 = BOTH ARE ZERO OFFSET/<15><12>
2041  010474  030060  020060  047101
2042  010502  020104  030062  020060
2043  010510  020075  047502  044124
2044  010516  040440  042522  055040
2045  010524  051105  020117  043117
2046  010532  051506  052105  005015
2047  010540  020040  020040  020040          .ASCII  /      260 = -1200 MICRO INCHES/<15><12>
2048  010546  033062  020060  020075
2049  010554  030455  030062  020060
2050  010562  044515  051103  020117
2051  010570  047111  044103  051505
2052  010576  005015
2053  010600  020040  020040  020040          .ASCII  /      060 = +1200 MICRO INCHES/<15><12>
2054  010606  033060  020060  020075
2055  010614  030453  030062  020060
2056  010622  044515  051103  020117
2057  010630  047111  044103  051505
2058  010636  005015
2059  010640  020040  020040  020040          .ASCII  /      EACH COUNT IS AN OFFSET INCREMENT OF 25 MICRO INCHES/<15><12><12>
2060  010646  040505  044103  041440
2061  010654  052517  052116  044440
2062  010662  020123  047101  047440
2063  010670  043106  042523  020124
2064  010676  047111  051103  046505
2065  010704  047105  020124  043117
2066  010712  031040  020065  044515
2067  010720  051103  020117  047111
2068  010726  044103  051505  005015
2069  010734     012
2070  010735     101  054516  051440          .ASCII  /ANY SECTORS TO BE FLAGGED BAD? (TYPE Y OR N)/<15><12>
2071  010742  041505  047524  051522
2072  010750  052040  020117  042502
2073  010756  043040  040514  043507
2074  010764  042105  041040  042101
2075  010772  020077  052050  050131
2076  011000  020105  020131  051117
2077  011006  047040  006451     012
2078  011013     040  020040  020040          .ASCII  /      IF N IS TYPED, THE FORMAT OPERATION IS INITIALIZED/<15><12>
2079  011020  044440  020106  020116
2080  011026  051511  052040  050131
2081  011034  042105  020054  044124
2082  011042  020105  047506  046522
2083  011050  052101  047440  042520
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2084  011056  040522  044524  047117
2085  011064  044440  020123  047111
2086  011072  052111  040511  044514
2087  011100  042532  006504     012
2088  011105     040  020040  020040          .ASCII  /      AND ONLY THOSE SECTORS FOUND BAD BY THE FORMAT/<15><12>
2089  011112  040440  042116  047440
2090  011120  046116  020131  044124
2091  011126  051517  020105  042523
2092  011134  052103  051117  020123
2093  011142  047506  047125  020104
2094  011150  040502  020104  054502
2095  011156  052040  042510  043040
2096  011164  051117  040515  006524
2097  011172     012
2098  011173     040  020040  020040          .ASCII  /      PROGRAM AND THOSE LISTED IN THE FACTORY TABLE/<15><12>
2099  011200  050040  047522  051107
2100  011206  046501  040440  042116
2101  011214  052040  047510  042523
2102  011222  046040  051511  042524
2103  011230  020104  047111  052040
2104  011236  042510  043040  041501
2105  011244  047524  054522  052040
2106  011252  041101  042514  005015
2107  011260  020040  020040  020040          .ASCII  /      ARE FLAGED BAD. IF Y IS TYPED, THE USER HAS THE/<15><12>
2108  011266  051101  020105  046106
2109  011274  043501  042105  041040
2110  011302  042101  020056  043111
2111  011310  054440  044440  020123
2112  011316  054524  042520  026104
2113  011324  052040  042510  052440
2114  011332  042523  020122  040510
2115  011340  020123  044124  006505
2116  011346     012
2117  011347     040  020040  020040          .ASCII  /      CAPABILITY OF INSTRUCTING THE FORMATTER TO FLAG/<15><12>
2118  011354  041440  050101  041101
2119  011362  046111  052111  020131
2120  011370  043117  044440  051516
2121  011376  051124  041525  044524
2122  011404  043516  052040  042510
2123  011412  043040  051117  040515
2124  011420  052124  051105  052040
2125  011426  020117  046106  043501
2126  011434  005015
2127  011436  020040  020040  020040          .ASCII  /      SPECIFIED SECTORS AS BAD. THE PROGRAM WILL/<15><12>
2128  011444  050123  041505  043111
2129  011452  042511  020104  042523
2130  011460  052103  051117  020123
2131  011466  051501  041040  042101
2132  011474  020056  044124  020105
2133  011502  051120  043517  040522
2134  011510  020115  044527  046114
2135  011516  005015
2136  011520  020040  020040  020040          .ASCII  /      DIRECT THE USER IN HOW THIS IS DONE./<15><12><12>
2137  011526  044504  042522  052103
2138  011534  052040  042510  052440
2139  011542  042523  020122  047111
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2140  011550  044040  053517  052040
2141  011556  044510  020123  051511.
2142  011564  042040  047117  027105
2143  011572  005015     012
2144  011575     120  042522  042523          .ASCII  /PRESERVE SOFTWARE BAD SECTOR FILE?(TYPE Y OR N)(CR)/<15><12>
2145  011602  053122  020105  047523
2146  011610  052106  040527  042522
2147  011616  041040  042101  051440
2148  011624  041505  047524  020122
2149  011632  044506  042514  024077
2150  011640  054524  042520  054440
2151  011646  047440  020122  024516
2152  011654  041450  024522  005015
2153  011662  044411  020106  020131          .ASCII  /       IF Y IS TYPED, THE FORMATTER WILL PRESERVE THE/<15><12>
2154  011670  051511  052040  050131
2155  011676  042105  020054  044124
2156  011704  020105  047506  046522
2157  011712  052101  042524  020122
2158  011720  044527  046114  050040
2159  011726  042522  042523  053122
2160  011734  020105  044124  006505
2161  011742     012
2162  011743     011  050101  046120          .ASCII  /       APPLICABLE BAD SECTOR FILE, MARKING THE SECTORS/<15><12>
2163  011750  041511  041101  042514
2164  011756  041040  042101  051440
2165  011764  041505  047524  020122
2166  011772  044506  042514  020054
2167  012000  040515  045522  047111
2168  012006  020107  044124  020105
2169  012014  042523  052103  051117
2170  012022  006523     012
2171  012025     011  040502  020104          .ASCII  /       BAD THAT ARE LISTED IN THE FILE. ANY ADDITIONAL/<15><12>
2172  012032  044124  052101  040440
2173  012040  042522  046040  051511
2174  012046  042524  020104  047111
2175  012054  052040  042510  043040
2176  012062  046111  027105  040440
2177  012070  054516  040440  042104
2178  012076  042111  047511  040516
2179  012104  006514     012
2180  012107     011  042523  052103          .ASCII  /       SECTORS FOUND BAD BY THE PROGRAM ARE APPENDED/<15><12>
2181  012114  051117  020123  047506
2182  012122  047125  020104  040502
2183  012130  020104  054502  052040
2184  012136  042510  050040  047522
2185  012144  051107  046501  040440
2186  012152  042522  040440  050120
2187  012160  047105  042504  006504
2188  012166     012
2189  012167     011  047524  052040          .ASCII  /       TO THE FILE. IF N IS TYPED THE BAD SECTOR FILE/<15><12>
2190  012174  042510  043040  046111
2191  012202  027105  044440  020106
2192  012210  020116  051511  052040
2193  012216  050131  042105  052040
2194  012224  042510  041040  042101
2195  012232  051440  041505  047524
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2196  012240  020122  044506  042514
2197  012246  005015
2198  012250  044411  020123  046103          .ASCII  /       IS CLEARED BEFORE THE PROGRAM BEGINS./<15><12><12>
2199  012256  040505  042522  020104
2200  012264  042502  047506  042522
2201  012272  052040  042510  050040
2202  012300  047522  051107  046501
2203  012306  041040  043505  047111
2204  012314  027123  005015      012
2205  012321      123  052105  051440          .ASCII  /SET SWITCH 7 TO PRINT A LIST OF ALL BAD SECTORS./<15><12><12>
2206  012326  044527  041524  020110
2207  012334  020067  047524  050040
2208  012342  044522  052116  040440
2209  012350  046040  051511  020124
2210  012356  043117  040440  046114
2211  012364  041040  042101  051440
2212  012372  041505  047524  051522
2213  012400  006456  005012
2214  012404  042523  020124  053523          .ASCII  /SET SWITCH 1 TO FORCE REPORTING OF ALL DATA IN ERROR/<15><12><12>
2215  012412  052111  044103  030440
2216  012420  052040  020117  047506
2217  012426  041522  020105  042522
2218  012434  047520  052122  047111
2219  012442  020107  043117  040440
2220  012450  046114  042040  052101
2221  012456  020101  047111  042440
2222  012464  051122  051117  005015
2223  012472      012
2224  012473      123  052105  051440          .ASCII  /SET SWITCH 0 TO REPEAT THE ENTIRE FORMAT OPERATION/<15><12><12>
2225  012500  044527  041524  020110
2226  012506  020060  047524  051040
2227  012514  050105  040505  020124
2228  012522  044124  020105  047105
2229  012530  044524  042522  043040
2230  012536  051117  040515  020124
2231  012544  050117  051105  052101
2232  012552  047511  006516  005012
2233  012560  043111  052040  042510          .ASCII  /IF THE SOFTWARE SWITCH REGISTER IS IN USE, /<15><12>
2234  012566  051440  043117  053524
2235  012574  051101  020105  053523
2236  012602  052111  044103  051040
2237  012610  043505  051511  042524
2238  012616  020122  051511  044440
2239  012624  020116  051525  026105
2240  012632  006440      012
2241  012635      124  050131  047111          .ASCII  /TYPING CONTROL G (↑G) CAUSES THE PROGRAM/<15><12>
2242  012642  020107  047503  052116
2243  012650  047522  020114  020107
2244  012656  057050  024507  041440
2245  012664  052501  042523  020123
2246  012672  044124  020105  051120
2247  012700  043517  040522  006515
2248  012706      012
2249  012707      124  020117  042522          .ASCII  /TO REQUEST NEW SWR SETTING/<15><12><12>
2250  012714  052521  051505  020124
2251  012722  042516  020127  053523
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2252  012730  020122  042523  052124
2253  012736  047111  006507  005012
2254  012744  047105  020104  042510          .ASCIZ  /END HELP FILE/<15><12><12>
2255  012752  050114  043040  046111
2256  012760  006505  005012     000
2257  012765     040  000040          SPACE2: .ASCIZ  /  /
2258
2259  012770  005015  025052  051040  PROGID: .ASCII  <15><12>/** RK06K-RK07K CARTRIDGE FORMATER **/<15><12>
2260  012776  030113  045466  051055
2261  013004  030113  045467  041440
2262  013012  051101  051124  042111
2263  013020  042507  043040  051117
2264  013026  040515  042524  020122
2265  013034  025052  005015
2266  013040  055103  033122  041514          .ASCIZ  /CZR6LCO/<15><12>
2267  013046  006460  000012
2268  013052  054524  042520  044040  HELPQ:  .ASCIZ  /TYPE HELP FOR OPERATING INFO, ELSE CR/<15><12>
2269  013060  046105  020120  047506
2270  013066  020122  050117  051105
2271  013074  052101  047111  020107
2272  013102  047111  047506  020054
2273  013110  046105  042523  041440
2274  013116  006522  000012
2275  013122  051104  053111  020105  TPQ:    .ASCIZ  /DRIVE TYPE(6 OR 7)/
2276  013130  054524  042520  033050
2277  013136  047440  020122  024467
2278  013144     000
2279  013145     104  044522  042526  DRVQ:   .ASCIZ  /DRIVE NUM=/
2280  013152  047040  046525  000075
2281  013160  042523  052103  051117  SECTQ:  .ASCIZ  &SECTOR/TRACK=&
2282  013166  052057  040522  045503
2283  013174  000075
2284  013176  047515  042504  000075  MODEQ:  .ASCIZ  /MODE=/
2285  013204  053105  047105  041440  WDEQ:   .ASCIZ  /EVEN CYLINDER PATTERN=/
2286  013212  046131  047111  042504
2287  013220  020122  040520  052124
2288  013226  051105  036516     000
2289  013233     117  042104  041440  WDOD:   .ASCIZ  /ODD CYLINDER PATTERN=/
2290  013240  046131  047111  042504
2291  013246  020122  040520  052124
2292  013254  051105  036516     000
2293  013261     124  040522  045503  TRKLIM: .ASCIZ  /TRACK LIMITS=/
2294  013266  046040  046511  052111
2295  013274  036523     000
2296  013277     103  046131  047111  CYLLIM: .ASCIZ  /CYLINDER LIMITS=/
2297  013304  042504  020122  044514
2298  013312  044515  051524  000075
2299  013320  043117  051506  052105  OFSETQ: .ASCIZ  /OFFSET=/
2300  013326  000075
2301  013330  051120  051505  051105  PSDQ:   .ASCIZ  /PRESERVE SOFTWARE BAD SECTOR FILES?(TYPE Y OR N)(CR)/
2302  013336  042526  051440  043117
2303  013344  053524  051101  020105
2304  013352  040502  020104  042523
2305  013360  052103  051117  043040
2306  013366  046111  051505  024077
2307  013374  054524  042520  054440
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2308  013402  047440  020122  024516
2309  013410  041450  024522     000
2310  013415     123  043117  053524  SDBSFP: .ASCIZ  /SOFTWAPE DETECTED BAD SECTOR FILES /
2311  013422  051101  020105  042504
2312  013430  042524  052103  042105
2313  013436  041040  042101  051440
2314  013444  041505  047524  020122
2315  013452  044506  042514  020123
2316  013460     000
2317  013461     120  042522  042523  PRSVD:  .ASCIZ  /PRESERVED/<15><12>
2318  013466  053122  042105  005015
2319  013474     000
2320  013475     116  052117  050040  NPRSVD: .ASCIZ  /NOT PRESERVED/<15><12>
2321  013502  042522  042523  053122
2322  013510  042105  005015     000
2323  013515     101  054516  051440  UBSQ:   .ASCIZ  /ANY SECTORS T^ BE FLAGED BAD? (TYPE Y OR N)(CR)/
2324  013522  041505  047524  051522
2325  013530  052040  020117  042502
2326  013536  043040  040514  042507
2327  013544  020104  040502  037504
2328  013552  024040  054524  042520
2329  013560  054440  047440  020122
2330  013566  024516  041450  024522
2331  013574     000
2332  013575     105  052116  051105  UBSFMT: .ASCIZ  /ENTER OCTAL ADDRESS TO BE FLAGED BAD IN FORMAT CCC,T,SS/<15><12>
2333  013602  047440  052103  046101
2334  013610  040440  042104  042522
2335  013616  051523  052040  020117
2336  013624  042502  043040  040514
2337  013632  042507  020104  040502
2338  013640  020104  047111  043040
2339  013646  051117  040515  020124
2340  013654  041503  026103  026124
2341  013662  051523  005015     000
2342  013667     105  052116  051105  NEXTQ:  .ASCIZ  /ENTER ADDRESS OR (CR) TO TERMINATE/<15><12>
2343  013674  040440  042104  042522
2344  013702  051523  047440  020122
2345  013710  041450  024522  052040
2346  013716  020117  042524  046522
2347  013724  047111  052101  006505
2348  013732  000012
2349  013734  047111  040526  044514  BADENT: .ASCIZ  /INVALID ENTRY/<15><12>
2350  013742  020104  047105  051124
2351  013750  006531  000012
2352  013754  047111  042126  051440  ILLSEC: .ASCIZ  /INVD SECTOR NUMBER/<15><12>
2353  013762  041505  047524  020122
2354  013770  052516  041115  051105
2355  013776  005015     000
2356  014001     111  053116  020104  INVDSE: .ASCIZ  /INVD STARTING OR ENDING PACK ADDRESS/<15><12>
2357  014006  052123  051101  044524
2358  014014  043516  047440  020122
2359  014022  047105  044504  043516
2360  014030  050040  041501  020113
2361  014036  042101  051104  051505
2362  014044  006523  000012
2363  014050  047111  042126  041440  INVDCY: .ASCIZ  /INVD CYLINDER NUMBER /<15><12>
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PROGRAM SPECIFIC RESERVED LOCATIONS

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2364  014056  046131  047111  042504
2365  014064  020122  052516  041115
2366  014072  051105  006440  000012
2367  014100  047111  042126  052040  INVDTK: .ASCIZ  /INVD TRACK NUMBER /<15><12>
2368  014106  040522  045503  047040
2369  014114  046525  042502  020122
2370  014122  005015     000
2371  014125     111  053116  020104  INVDDR: .ASCIZ  /INVD DRIVE NUMBER/<15><12>
2372  014132  051104  053111  020105
2373  014140  052516  041115  051105
2374  014146  005015     000
2375  014151     111  053116  020104  INVDTP: .ASCIZ  /INVD DRIVE TYPE/<15><12>
2376  014156  051104  053111  020105
2377  014164  054524  042520  005015
2378  014172     000
2379  014173     111  053116  020104  INVDMD: .ASCIZ  /INVD MODE SELECTION (MAX OF 4)/<15><12>
2380  014200  047515  042504  051440
2381  014206  046105  041505  044524
2382  014214  047117  024040  040515
2383  014222  020130  043117  032040
2384  014230  006451  000012
2385  014234  047111  042126  047440  INVDOF: .ASCIZ  /INVD OFFSET VALUE/<15><12>
2386  014242  043106  042523  020124
2387  014250  040526  052514  006505
2388  014256  000012
2389  014260  046120  040505  042523  SWLREQ: .ASCIZ  /PLEASE SET WRITE LOCK FOR VERIFY OPERATIONS/<15><12>
2390  014266  051440  052105  053440
2391  014274  044522  042524  046040
2392  014302  041517  020113  047506
2393  014310  020122  042526  044522
2394  014316  054506  047440  042520
2395  014324  040522  044524  047117
2396  014332  006523  000012
2397  014336  046120  040505  042523  RWLREQ: .ASCIZ  /PLEASE RESET WRITE LOCK FOR FORMAT OPERATIONS/<15><12>
2398  014344  051040  051505  052105
2399  014352  053440  044522  042524
2400  014360  046040  041517  020113
2401  014366  047506  020122  047506
2402  014374  046522  052101  047440
2403  014402  042520  040522  044524
2404  014410  047117  006523  000012
2405  014416  051120  051505  020123  CONREQ: .ASCIZ  /PRESS CONTINUE WHEN READY/<15><12>
2406  014424  047503  052116  047111
2407  014432  042525  053440  042510
2408  014440  020116  042522  042101
2409  014446  006531  000012
2410  014452  040503  047116  052117  BAD632: .ASCIZ  /CANNOT READ BAD SECTOR TRACK/<15><12>
2411  014460  051040  040505  020104
2412  014466  040502  020104  042523
2413  014474  052103  051117  052040
2414  014502  040522  045503  005015
2415  014510     000
2416  014511     123  043117  053524  TDMSOF: .ASCIZ  /SOFTWARE BAD SECTOR FILE NOT FORMATTED PROPERLY OR/<15><12>
2417  014516  051101  020105  040502
2418  014524  020104  042523  052103
2419  014532  051117  043040  046111
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2420  014540  020105  047516  020124
2421  014546  047506  046522  052101
2422  014554  042524  020104  051120
2423  014562  050117  051105  054514
2424  014570  047440  006522  000012
2425  014576  044506  042514  044440  TDMSUF: .ASCIZ  /FILE IS TOO LARGE FOR THE PROGRAM ( )100 ENTRIES)/<15><12>
2426  014604  020123  047524  020117
2427  014612  040514  043522  020105
2428  014620  047506  020122  044124
2429  014626  020105  051120  043517
2430  014634  040522  020115  020050
2431  014642  030476  030060  042440
2432  014650  052116  044522  051505
2433  014656  006451  000012
2434  014662  040506  052103  051117  TDMFAC: .ASCIZ  /FACTORY BAD SECTOR FILE NOT FORMATTED PROPERLY OR/<15><12>
2435  014670  020131  040502  020104
2436  014676  042523  052103  051117
2437  014704  043040  046111  020105
2438  014712  047516  020124  047506
2439  014720  046522  052101  042524
2440  014726  020104  051120  050117
2441  014734  051105  054514  047440
2442  014742  006523  000012
2443  014746  040503  052122  044522  SERNUM: .ASCIZ  /CARTRIDGE SERIAL NUMBER *****  /
2444  014754  043504  020105  042523
2445  014762  044522  046101  047040
2446  014770  046525  042502  020122
2447  014776  025052  025052  020052
2448  015004  000040
2449  015006  040503  052122  044522  ALNPAC: .ASCII  /CARTRIDGE MOUNTED IS AN ALIGNMENT CARTRIDGE./<15><12>
2450  015014  043504  020105  047515
2451  015022  047125  042524  020104
2452  015030  051511  040440  020116
2453  015036  046101  043511  046516
2454  015044  047105  020124  040503
2455  015052  052122  044522  043504
2456  015060  027105  005015
2457  015064  047506  046522  052101          .ASCIZ  /FORMAT IS ABORTED/<15><12><12>
2458  015072  044440  020123  041101
2459  015100  051117  042524  006504
2460  015106  005012     000
2461  015111     116  020117  040504  IMPER2: .ASCIZ  /NO DATA CHECK  ON SECTOR THAT WILL NOT PASS WRITE CHECK/<15><12>
2462  015116  040524  041440  042510
2463  015124  045503  020040  047117
2464  015132  051440  041505  047524
2465  015140  020122  044124  052101
2466  015146  053440  046111  020114
2467  015154  047516  020124  040520
2468  015162  051523  053440  044522
2469  015170  042524  041440  042510
2470  015176  045503  005015     000
2471  015203     104  052101  020101  IMPERR: .ASCIZ  /DATA CHECK ERROR IN WRITE. IMPOSSIBLE!!!/< 5><12>
2472  015210  044103  041505  020113
2473  015216  051105  047522  020122
2474  015224  047111  053440  044522
2475  015232  042524  020056  046511
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2476  015240  047520  051523  041111
2477  015246  042514  020441  006441
2478  015254  000012
2479  015256  041505  020103  047503  CORABL: .ASCIZ  /ECC CORRECTABLE/<15><12>
2480  015264  051122  041505  040524
2481  015272  046102  006505  000012
2482  015300  025012  020052  053440  PRGRS1: .ASCIZ  <12>/**  WRITE OPERATION COMPLETE  **/<15><12><12>
2483  015306  044522  042524  047440
2484  015314  042520  040522  044524
2485  015322  047117  041440  046517
2486  015330  046120  052105  020105
2487  015336  025040  006452  005012
2488  015344     000
2489  015345     012  025052  020040  PRGRS2: .ASCIZ  <12>/**  VERIFY OPERATION COMPLETE  **/<15><12><12>
2490  015352  042526  044522  054506
2491  015360  047440  042520  040522
2492  015366  044524  047117  041440
2493  015374  046517  046120  052105
2494  015402  020105  025040  006452
2495  015410  005012     000
2496  015413     040  025040  025052  STARS:  .ASCIZ  /  *****/<15><12>
2497  015420  025052  005015     000
2498  015425     012  051105  047522  BSWERR: .ASCIZ  <12>/ERROR WRITING SOFTWARE DETECTED BAD SECTOR TABLES./<15><12>
2499  015432  020122  051127  052111
2500  015440  047111  020107  047523
2501  015446  052106  040527  042522
2502  015454  042040  052105  041505
2503  015462  042524  020104  040502
2504  015470  020104  042523  052103
2505  015476  051117  052040  041101
2506  015504  042514  027123  005015
2507  015512     000
2508  015513     123  041505  047524  SECINE: .ASCIZ  /SECTOR IN ERROR =/
2509  015520  020122  047111  042440
2510  015526  051122  051117  036440
2511  015534     000
2512  015535     012  040502  020104  BSWTFI: .ASCIZ  <12>/BAD SECTOR TABLE'WRITTEN./<15><12>
2513  015542  042523  052103  051117
2514  015550  052040  041101  042514
2515  015556  053440  044522  052124
2516  015564  047105  006456  000012
2517  015572  052012  042510  041040  BSHEAD: .ASCIZ  <12>/THE BAD SECTORS FOR THIS CARTRIDGE IN /
2518  015600  042101  051440  041505
2519  015606  047524  051522  043040
2520  015614  051117  052040  044510
2521  015622  020123  040503  052122
2522  015630  044522  043504  020105
2523  015636  047111  000040
2524  015642  051440  041505  047524  BSTAIL: .ASCIZ  / SECTOR FORMAT ARE:/<15><12>
2525  015650  020122  047506  046522
2526  015656  052101  040440  042522
2527  015664  006472  000012
2528  015670  041012  042101  051440  FBSLAB: .ASCIZ  <12>/BAD SECTORS IN FACTORY TABLE:/<15><12>
2529  015676  041505  047524  051522
2530  015704  044440  020116  040506
2531  015712  052103  051117  020131
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2532  015720  040524  046102  035105
2533  015726  005015     000
2534  015731     015  041012  042101  SBSLAB: .ASCIZ  <15><12>/BAD SECTORS IN SOFTWARE TABLE:/<15><12>
2535  015736  051440  041505  047524
2536  015744  051522  044440  020116
2537  015752  047523  052106  040527
2538  015760  042522  052040  041101
2539  015766  042514  006472  000012
2540  015774  047516  042516  005015  NONE:   .ASCIZ  /NONE/<15><12>
2541  016002     000
2542  016003     062  000060          TWENTY: .ASCIZ  /20/
2543  016006  031062     000          TWENT2: .ASCIZ  /22/
2544  016011     040  020040  041440  COLHD:  .ASCIZ  /    CYLNDR  TRACK   SECTOR/<15><12>
2545  016016  046131  042116  020122
2546  016024  052040  040522  045503
2547  016032  020040  051440  041505
2548  016040  047524  006522  000012
2549  016046  020040  020040     000  SPACE4: .ASCIZ  /    /
2550  016053     040  020040     000  SPACE3: .ASCIZ  /   /
2551  016057     040  020075  047524  TOTMES: .ASCIZ  / = TOTAL NUMBER OF BAD SECTORS/<15><12>
2552  016064  040524  020114  052516
2553  016072  041115  051105  047440
2554  016100  020106  040502  020104
2555  016106  042523  052103  051117
2556  016114  006523  000012
2557  016120  005015  044103  047101  XXDPMG: .ASCII  <CR><LF>/CHANGE XXDP PACK/
2558  016126  042507  054040  042130
2559  016134  020120  040520  045503          .ASCIZ  <CR><LF>/CLEAR LOC 40,RESTART PROGRAM/
2560  016142  005015  046103  040505
2561  016150  020122  047514  020103
2562  016156  030064  051054  051505
2563  016164  040524  052122  050040
2564  016172  047522  051107  046501
2565  016200     000
2566
2567          016202                          .EVEN
2568  016202                          START:
2569                                  .SBTTL  INITIALIZE THE COMMON TAGS
2570                                  ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
2571  016202  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
2572  016206  005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
2573  016210  022706  001140                  CMP     #SWR,R6 ;;DONE?
2574  016214  001374                          BNE     .-6             ;;LOOP BACK IF NO
2575  016216  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
2576                                  ;;INITIALIZE A FEW VECTORS
2577  016222  012737  040560  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
2578  016230  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
2579  016236  012737  042610  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
2580  016244  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
2581  016252  012737  042240  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
2582  016260  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
2583  016266  005037  001260                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
2584  016272  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
2585                                  ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
2586                                  ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
2587  016300  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
```

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2588  016304  012737  016340  000004          MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
2589  016312  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
2590  016320  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
2591  016326  022777  177777  162604          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
2592  016334  001012                          BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
2593                                                                  ;;AND  THE HARDWARE SWR IS NOT = -1
2594  016336  000403                          BR      65$             ;;BRANCH IF NO TIMEOUT
2595  016340  012716  016346          64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
2596  016344  000002                          RTI
2597  016346  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
2598  016354  012737  000174  001142          MOV     #DISPREG,DISPLAY
2599  016362  012637  000004          66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
2600
2601  016366  004737  040730                  JSR     PC,$TKINT       ;INIT KEYBOARD
2602  016372  013701  002572                  MOV     RKVEC,R1        ;GET ADDRESS OF VECTOR STORAGE
2603  016376  012721  032442                  MOV     #I.INTR,(R1)+   ;SET IT TO INTERRUPT HNDLR
2604  016402  012711  000340                  MOV     #PR7,(R1)       ;SET INTERRUPT HANDLER PR7
2605  016406  013746  000000                  MOV     0,-(SP) ;;PUT NEW PS ON STACK
2606  016412  012746  016420                  MOV     #67$,-(SP)      ;;PUT NEW PC ON  STACK
2607  016416  000002                          RTI                     ;;POP NEW PC AND PS
2608  016420                          67$:
2609  016420  104401  012770                  TYPE    ,PROGID         ;TYPE IDENTIFICATION
2610  016424  104401  013052                  TYPE    ,HELPQ          ;TYPE HELP QUESTION
2611  016430  104410                          RDLIN                   ;GET ANSWER TO HELP Q.
2612  016432  012601                          MOV     (SP)+,R1        ;GET ADDRESS OF ANSWER
2613  016434  105711                          TSTB    (R1)            ;TEST FIRST CHAR
2614  016436  001402                          BEQ     STPARM
2615  016440  104401  006377                  TYPE    ,HELPFL         ;TYPE HELP FILE
2616
2617                                  ;;*****************************************************************
2618                                  ;SBTTL  PARAMETER REQUEST & CHECK ROUTINE
2619                                  ;*ENTRY:  AUTOMATIC AT START OF PROGRAM.
2620                                  ;*EXIT:  GO TO MODE DECODE.
2621                                  ;*
2622                                  ;*THIS ROUTINE REQUESTS EACH PARAMETER IN TURN AND CALLS
2623                                  ;*THE GETANS SUBROUTINE TO HANDLE THE ANSWERS AND STORE
2624                                  ;*THEM.  IT THEN CHECKS THE PARAMETERS FOR LEGALITY AND
2625                                  ;*VALIDITY AND, IF AN ERROR IS FOUND, REQUESTS THE
2626                                  ;*PARAMETERS AGAIN, STARTING WITH THE PARAMETER IN ERROR.
2627                                  ;;*****************************************************************
2628
2629  016444                  STPARM:
2630  016444  122737  000013  000041          CMPB    #13,@#41        ;LOAD FROM XXDP PACK ?
2631  016452  001003                          BNE     1$              ;BRANCH IF NOT
2632  016454  104401  016120                  TYPE    ,XXDPMG
2633  016460  000000                          HALT
2634  016462                          1$:
2635  016462  012702  006310                  MOV     #INITTP,R2      ;STARTING ADDRESS OF DEF. PARAM
2636  016466  012703  006336                  MOV     #TPINUS,R3      ;STARTING ADD OF ACTIVE PARAMS
2637  016472  104401  013122                  TYPE    ,TPQ            ;TYPE DRIVE TYPE QUESTION
2638  016476  004437  017766                  JSR     R4,GETANS
2639  016502  023727  006336  000006  PARM2:  CMP     TPINUS,#6       ;SEE IF RK06
2640  016510  001404                          BEQ     PARM3           ;BR IF YES
2641  016512  012737  001456  006332          MOV     #1456,INITEC    ;ELSE LOAD DEFAULT END CYL FOR RK07
2642  016520  000403                          BR      PARM4
2643  016522  012737  000632  006332  PARM3:  MOV     #632,INITEC     ;LOAD DEFAULT END CYL FOR RK06
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2644  016530  104401  013145          PARM4:  TYPE    ,DRVQ           ;TYPE DRIVE QUESTION
2645  016534  004437  017766                  JSR     R4,GETANS       ;GO GET PARAM
2646  016540  104401  013160                  TYPE    ,SECTQ          ;TYPE SECTOR/TRACK QUESTION
2647  016544  004437  017766                  JSR     R4,GETANS       ;GO GET PARAM
2648  016550  104401  013176          PARAM3: TYPE    ,MODEQ          ;TYPE MODE QUES
2649  016554  004437  017766                  JSR     R4,GETANS       ;GO GET PARAM
2650  016560  104401  013204                  TYPE    ,WDEQ
2651  016564  004437  017766                  JSR     R4,GETANS
2652  016570  104401  013233                  TYPE    ,WDOD
2653  016574  004437  017766                  JSR     R4,GETANS
2654  016600  104401  013261          PARAM5: TYPE    ,TRKLIM         ;TYPE TRACK LIMITS QUESTION
2655  016604  004437  017766                  JSR     R4,GETANS       ;GO GET PARAM
2656  016610  104401  013277                  TYPE    ,CYLLIM         ;TYPE CYLINDER LIMITS QUESTION
2657  016614  004437  017766                  JSR     R4,GETANS       ;GO GET PARAM
2658  016620  104401  013320          PARM6:  TYPE    ,OFSETQ         ;TYPE OFFSET QUESTION
2659  016624  004437  017766                  JSR     R4,GETANS
2660  016630  023727  006336  000007  DONEPR: CMP     TPINUS,#7       ;TEST IF DRIVE TYPE IS
2661  016636  001405                          BEQ     4$              ;6 OR 7
2662  016640  023727  006336  000006          CMP     TPINUS,#6       ;IF NOT TYPE ERROR
2663  016646  001401                          BEQ     4$
2664  016650  000475                          BR      IVDTP
2665  016652  023737  006360  006356  4$:     CMP     ECINUS,SCINUS   ;COMP START & END CYL
2666  016660  002451                          BLT     RSTADD          ;NG-GET PARAM AGAIN
2667  016662  023737  006354  006352          CMP     ETINUS,STINUS   ;COMP START & END TRK
2668  016670  002445                          BLT     RSTADD          ;NG-GET PARAM AGAIN
2669  016672  105037  002653                  CLRB    TYPFMT          ;CLEAR TYPE-FORMAT SWITCH, ASSUME RK06 HERE
2670  016676  023727  006336  000006          CMP     TPINUS,#6       ;TEST IF TRACK PARAMETERS ARE
2671  016704  001407                          BEQ     2$              ;VALID FOR THE DRIVE TYPE
2672  016706  152737  000004  002653          BISB    #B.CDT,TYPFMT
2673  016714  012737  001456  017312          MOV     #1456,LCYL      ;SET LAST CYL FOR RK07
2674  016722  000403                          BR      3$
2675  016724  012737  000632  017312  2$:     MOV     #632,LCYL       ;SET LAST CYL FOR RK06
2676  016732  023727  006354  000002  3$:     CMP     ETINUS,#2       ;TEST FOR VALID TRACK
2677  016740  003027                          BGT     IVDTRK          ;BR IF TOO BIG
2678  016742  023737  006360  017312          CMP     ECINUS,LCYL     ;TEST FOR VALID CYL
2679  016750  003020                          BGT     IVDCYL          ;BR IF TOO BIG
2680  016752  023727  006340  000007          CMP     DRINUS,#7       ;TEST IF VALID DRIVE
2681  016760  003026                          BGT     IVDDRV          ;TOO BIG-BRANCH
2682  016762  023727  006344  000004          CMP     MDINUS,#4       ;TEST IF VALID MODE
2683  016770  003031                          BGT     IVDMOD          ;ERROR IN MODE SELECTION
2684  016772  023727  006362  000260          CMP     OFINUS,#260     ;TEST IF VALID OFFSET
2685  017000  003034                          BGT     IVDOF           ;TO BIG, ERROR
2686  017002  000442                          BR      GETOUT          ;YES-BR TO EXIT
2687  017004  104401  014001          RSTADD: TYPE    ,INVDSE         ;TYPE ERROR MESSAGE
2688  017010  000405                          BR      SETRS
2689  017012  104401  014050          IVDCYL  TYPE    ,INVDCY         ;TYPE ERROR
2690  017016  000402                          BR      SETRS
2691  017020  104401  014100          IVDTRK: TYPE    ,INVDTK         ;TYPE ERROR
2692  017024  012702  006324          SETRS   MOV     #INITST,R2      ;RESET REGISTERS TO REENTER ALL
2693  017030  012703  006352                  MOV     #STINUS,R3      ;START & END ADDRESSES
2694  017034  000661                          BR      PARAM5          ;GO GET NEW START & END ADD
2695  017036  104401  014125          IVDDRV: TYPE    ,INVDDR
2696  017042  000600                          BR      STPARM          ;GO GET ALL PARAM AGAIN
2697  017044  104401  014151          IVDTP:  TYPE    ,INVDTP
2698  017050  000137  016444                  JMP     STPARM
2699  017054  104401  014173          IVDMOD: TYPE    ,INVDMD
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2700  017060  012702  006316                MOV     #INITMD,R2      ;RESET REGISTERS FOR RE-REQUEST
2701  017064  012703  006344                MOV     #MDINUS,R3      ;OF MODE
2702  017070  000627                       BR      PARAM3          ;RETURN TO MODE REQUEST
2703  017072  104401  014234        IVDOF:  TYPE    ,INVDOF         ;TYPE INVALID OFFSET MESSAGE
2704  017076  012702  006334                MOV     #INITOF,R2      ;SET UP R2 AND R3 TO REDO OFFSET
2705  017102  012703  006362                MOV     #OFINUS,R3      ;PARAMETER
2706  017106  000644                       BR      PARM6           ;GO GET OFFSET
2707  017110  105037  002656        GETOUT: CLRB    OPCONT          ;CLEAR OPERATION CONTROL SWITCHES
2708  017114  023727  006342  000026        CMP     SEINUS,#26      ;TEST IF 26 SECTOR FORMAT
2709  017122  001412                       BEQ     3$              ;YES-SKIP
2710  017124  012737  000024  006342        MOV     #24,SEINUS      ;FORCE TO 24 SECTORS/TRACK
2711  017132  152737  000020  002653        BISB    #8,CFMT,TYPFMT  ;SET BIT FOR FORMAT
2712  017140  012737  012000  006306        MOV     #12000,TKWDCT   ;SET WORD COUNT
2713  017146  000403                       BR      4$
2714  017150  012737  013000  006306  3$:   MOV     #13000,TKWDCT   ;ELSE SET FOR 22 SECTOR WORD COUNT
2715  017156  005437  006306        4$:     NEG     TKWDCT          ;MAKE IT NEG FOR RK611
2716  017162  023737  006362  006334        CMP     OFINUS,INITOF   ;TEST IF OFFSET REQUIRED
2717  017170  001403                       BEQ     5$              ;NO-SKIP
2718  017172  152737  000020  002656        BISB    #OREQSW,OPCONT  ;ELSE SET SWITCH
2719  017200  023727  006344  000004  5$:   CMP     MDINUS,#4       ;IF MODE 4,
2720  017206  001004                       BNE     6$              ;NO-SKIP
2721  017210  152737  000012  002656        BISB    #RCDASW!VFHDSW,OPCONT ;ELSE SET READ CHECK & HEADER VERIFY
2722  017216  000433                       BR      10$
2723  017220  023727  006344  000003  6$:   CMP     MDINUS,#3       ;IF MODE 3
2724  017226  001004                       BNE     7$              ;NO-SKIP
2725  017230  152737  000002  002656        BISB    #VFHDSW,OPCONT  ;SET VERIFY HEADER
2726  017236  000423                       BR      10$
2727  017240  023727  006344  000002  7$:   CMP     MDINUS,#2       ;IF MODE 2
2728  017246  001004                       BNE     8$              ;NO-SKIP
2729  017250  152737  000007  002656        BISB    #WHDSW!VFHDSW!WCDASW,OPCONT ;SET WRITE HEADER & DATA VERIFY HEADER,
2730                                                                ;AND WRITE CHECK DATA SWITCHES
2731  017256  000413                       BR      10$
2732  017260  023727  006344  000001  8$:   CMP     MDINUS,#1       ;IF MODE 1
2733  017266  001004                       BNE     9$              ;NO-SKIP
2734  017270  152737  000003  002656        BISB    #WHDSW!VFHDSW,OPCONT ;SET VERIFY HEADER &
2735                                                                ;SET WRITE HEADER & DATA SWITCH
2736  017276  000403                       BR      10$             ;NO-SKIP
2737  017300  152737  000001  002656  9$:   BISB    #WHDSW,OPCONT   ;SET WRITE HDR & DATA SWITCH
2738  017306  000137  017314        10$:    JMP     GETUBS          ;GET USER BAD SECTORS
2739
2740  017312  000000                LCYL:   0                       ;LAST CYL 632 FOR RK06, 1456 FOR RK07
2741
2742                                ;:**************************************************************
2743                                ;SBTTL  USER BAD SECTORS INPUT ROUTINE
2744                                ;*THIS ROUTINE PROVIDES THE CAPABILITY TO INDICATE SPECIFIC PACK
2745                                ;*ADDRESSES THAT ARE TO BE FLAGED AS SOFTWARE BAD SECTORS. THE USER
2746                                ;*IS DIRECTED IN HOW TO ENTER THE ADDRESSES AND HOW TO END THE
2747                                ;*OPERATION.
2748                                ;:**************************************************************
2749  017314  132737  000001  002656  GETUBS: BITB    #WHDSW,OPCONT   ;TEST IF WRITING IS TO BE DONE
2750  017322  001566                       BEQ     14$             ;NO - SKIP OUT
2751  017324  012700  000400                MOV     #400,R0         ;SET UP TO CLEAR BSSOFT FILE
2752  017330  012701  003660                MOV     #BSSOFT,R1      ;TO ALL ONES
2753  017334  012721  177777        1$:     MOV     #177777,(R1)+
2754  017340  005300                       DEC     R0
2755  017342  001374                       BNE     1$
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2756  017344  012701  002660            MOV     #RDBUF,R1       ;GET ADDRESS OF READ BUFFER
2757  017350  012700  000400            MOV     #400,R0         ;SET COUNT FOR CLEAR
2758  017354  012721  177777    21$:    MOV     #177777,(R1)+   ;CLEAR TO ALL ONES
2759  017360  005300                    DEC     R0              ;DECREMENT COUNT
2760  017362  001374                    BNE     21$             ;LOOP UNTIL 0
2761  017364  104401  013515            TYPE    ,UBSQ           ;ASK USER BAD SECTOR QUESTION
2762  017370  104410                    RDLIN                   ;GET ANSWER
2763  017372  012601                    MOV     (SP)+,R1
2764  017374  121127  000032            CMPB    (R1),#032       ;TEST IF ↑Z
2765  017400  001002                    BNE     3$              ;NO - SKIP
2766  017402  000137  020154            JMP     DRINIT          ;ELSE GO START PROGRAM
2767  017406  105711            3$:     TSTB    (R1)            ;TEST IF CR (NULL)
2768  017410  001531                    BEQ     15$             ;YES - EXIT TEST
2769  017412  121127  000116            CMPB    (R1),#'N        ;TEST IF "NO"
2770  017416  001526                    BEQ     15$             ;YES - EXIT TEST
2771  017420  012700  002660            MOV     #RDBUF,R0       ;SET POINTER TO FIRST WORD
2772  017424  104401  013575    4$:     TYPE    ,UBSFMT         ;TYPE USER BAD SECTOR FORMAT
2773  017430  104401  013667            TYPE    ,NEXTQ          ;TYPE NEXT ENTRY REQUEST
2774  017434  104410            12$:    RDLIN                   ;GET BAD SECTOR ENTRY
2775  017436  012601                    MOV     (SP)+,R1
2776  017440  105711                    TSTB    (R1)            ;TEST IF CR (NULL)
2777  017442  001512                    BEQ     13$             ;YES - EXIT TEST
2778  017444  010146                    MOV     R1,-(SP)        ;SET TO CONVERT TO BINARY
2779  017446  004737  037636            JSR     PC,OCTBIN
2780  017452  017652                    30$                     ;ERROR RETURN
2781  017454  021637  006360            CMP     (SP),ECINUS     ;TEST IF CYLINDER VALID
2782  017460  003003                    BGT     16$             ;YES - SKIP
2783  017462  021637  006356            CMP     (SP),SCINUS     ;TEST IF CYLINDER VALID
2784  017466  002004                    BGE     5$              ;YES - SKIP
2785  017470  104401  014050    16$:    TYPE    ,INVDCY         ;INVALID CYLINDER MESSAGE
2786  017474  005726                    TST     (SP)+           ;CLEAN STACK
2787  017476  000752                    BR      4$              ;GO TYPE FORMAT MESSAGE
2788  017500  012620            5$:     MOV     (SP)+,(R0)+     ;STORE CYLINDER
2789  017502  121127  000054    6$:     CMPB    (R1),#',        ;LOOP TO BUMP R1 PAST CYLINDER ENTRY
2790  017506  001406                    BEQ     7$              ;LOOK FOR COMMA BUT RESTART
2791  017510  105721                    TSTB    (R1)+           ;THIS ENTRY IF CR (NULL) IS
2792  017512  001373                    BNE     6$              ;IS FOUND
2793  017514  005740                    TST     -(R0)           ;RESET POINTER
2794  017516  104401  013734            TYPE    ,BADENT         ;TYPE BAD ENTRY MESSAGE
2795  017522  000740                    BR      4$              ;GO TYPE ENTRY FORMAT MESSAGE
2796  017524  105721            7$:     TSTB    (R1)+           ;BUMP PAST COMMA
2797  017526  010146                    MOV     R1,-(SP)        ;GO CONVERT TRACK TO BINARY
2798  017530  004737  037636            JSR     PC,OCTBIN
2799  017534  017652                    30$                     ;ERROR RETURN
2800  017536  012603                    MOV     (SP)+,R3        ;STORE TRACK
2801  017540  121127  000054    8$:     CMPB    (R1),#',        ;LOOP TO BUMP R1 PAST
2802  017544  001406                    BEQ     9$              ;TRACK ENTRY. LOOK FOR COMMA
2803  017546  105721                    TSTB    (R1)+           ;BUT RESTART THIS ENTRY IF CR
2804  017550  001373                    BNE     8$              ;(NULL) IS FOUND
2805  017552  005740                    TST     -(R0)           ;RESET POINTER
2806  017554  104401  013734            TYPE    ,BADENT         ;TYPE BAD ENTRY MESSAGE
2807  017560  000721                    BR      4$              ; AND TYPE FORMAT MESSAGE
2808  017562  105721            9$:     TSTB    (R1)+           ;BUMP PAST COMMA
2809  017564  010146                    MOV     R1,-(SP)        ;GO CONVERT SECTOR TO BINARY
2810  017566  004737  037636            JSR     PC,OCTBIN
2811  017572  017652                    30$                     ;ERROR RETURN
```

```
2812  017574  012604                        MOV     (SP)+,R4        ;STORE SECTOR
2813  017576  020337  006354                CMP     R3,ETINUS               ;TEST IF TRACK VALID
2814  017602  003003                        BGT     17$             ;YES - SKIP
2815  017604  020337  006352                CMP     R3,STINUS       ;TEST IF TRACK VALID
2816  017610  002004                        BGE     10$             ;YES - SKIP
2817  017612  104401  014100        17$:    TYPE    ,INVDTK         ;TYPE INVALID TRACK MESSAGE
2818  017616  005740                        TST     -(R0)           ;RESET POINTER
2819  017620  000701                        BR      4$              ;RESTART ENTRY
2820  017622  020437  006342        10$:    CMP     R4,SEINUS       ;TEST IF SECTOR VALID
2821  017626  002404                        BLT     11$             ;YES - SKIP
2822  017630  104401  013754                TYPE    ,ILLSEC         ;TYPE ILLEGAL SECTOR MESSAGE
2823  017634  005740                        TST     -(R0)           ;RESET POINTER
2824  017636  000672                        BR      4$              ;GO RESTART ENTRY
2825  017640  110420        11$:    MOVB    R4,(R0)+        ;INSERT SECTOR NUMBER
2826  017642  110320                        MOVB    R3,(R0)+        ;INSERT TRACK NUMBER
2827  017644  104401  013667                TYPE    ,NEXTQ          ;TYPE NEXT QUESTION
2828  017650  000671                        BR      12$             ;GO GET NEXT ENTRY
2829  017652  104401  006374        30$:    TYPE    ,QUES           ;TYPE BAD ENTRY LINE
2830  017656  104401  042104                TYPE    ,$TTYIN
2831  017662  104401  001267                TYPE    ,$CRLF
2832  017666  000656                        BR      4$              ;GET LINE AGAIN
2833  017670  012710  177777        13$:    MOV     #177777,(R0)    ;MAKE SURE THE WORD AFTER THE LAST
2834                                                        ;VALID ENTRY IS ALL ONES.
2835  017674  000137  017704        15$:    JMP     CKPRES          ;GO CHECK IF PRESERVE SDBSF
2836  017700  000137  020154        14$:    JMP     DRINIT          ;GO INITIALIZE DRIVE
2837                                ;;*****************************************************************
2838                                .SBTTL  PRESERVE SDBSF QUESTION ROUTINE
2839                                ;*      THIS ROUTINE DETERMINES IF SOFTWARE BAD SECTOR FILES ARE TO
2840                                ;*      BE PRESERVED
2841
2842  017704  104401  013330        CKPRES: TYPE    ,PSDQ           ;TYPE PRESERVE SDBSF QUESTION
2843  017710  104410                        RDLIN                   ;GET ANSWER
2844  017712  012601                        MOV     (SP)+,R1        ;GET POINTER TO ANSWER
2845  017714  104401  013415                TYPE    ,SDBSFP         ;TYPE START OF PRESERVE MESSAGE
2846  017720  121127  000032                CMPB    (R1),#032       ;TEST IF ↑Z
2847  017724  001001                        BNE     2$              ;NO - SKIP
2848  017726  000405                        BR      1$              ;ELSE SET BIT AND GO FORMAT
2849  017730  105711        2$:     TSTB    (R1)            ;TEST IF NULL
2850  017732  001403                        BEQ     1$              ;YES - EXIT
2851  017734  121127  000116                CMPB    (R1),#'N        ;TEST IF "N"
2852  017740  001406                        BEQ     3$              ;YES    EXIT
2853  017742  152737  000040  002656  1$:    BISB    #PSDBSF,OPCONT  ;SET FLAG TO PRESERVE SDBSF
2854  017750  104401  013461                TYPE    ,PRSVD          ;REPORT PRESERVED
2855  017754  000402                        BR      4$              ;SKIP
2856  017756  104401  013475        3$:     TYPE    ,NPRSVD         ;REPORT NOT PRESERVED
2857  017762  000137  020154        4$:     JMP     DRINIT
2858
2859                                ;;*****************************************************************
2860                                ;SBTTL  GET ANSWER (PARAMETER ENTRY) SUBROUTINE
2861                                ;*ENTRY  JSR     R4,GETANS  WITH R2 POINTING TO THE DEFAULT PARAM
2862                                ;*                                  R3 POINTING TO THE ACTIVE PARAM
2863                                ;*RETURN  RTS   R4
2864                                ;*
2865                                ;*THIS ROUTINE RECEIVES THE PARAMETER ENTRY AND ALTERS THE
2866                                ;*APPROPRIATE ACTIVE PARAMETER.  IF THE ENTRY IS NULL THE DEFAULT
2867                                ;*VALUE IS PLACED IN THE ACTIVE ENTRY.  THE CONTROL C & Z
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GET ANSWER (PARAMETER ENTRY) SUBROUTINE

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2868                                    ;*(↑C & ↑Z) ARE DECODED AND THE APPROPRIATE ACTION TAKEN.  SOME
2869                                    ;*PARAMETER CHECKING IS DONE.  ALL NUMERICS ARE TESTED TO
2870                                    ;*INSURE THEY ARE OCTAL.
2871                                    ;;*****************************************************************
2872
2873  017766                            GETANS:
2874  017766  104410                           RDLIN                   ;READ ANSWER
2875  017770  012601                           MOV     (SP)+,R1        ;GET START ADD OF MESSAGE
2876  017772  121127  000032                   CMPB    (R1),#032       ;TEST FOR CONTROL Z
2877  017776  001434                           BEQ     11$             ;YES-BRANCH
2878  020000  105711                           TSTB    (R1)            ;TEST FOR NULL
2879  020002  001002                           BNE     4$
2880  020004  011213                           MOV     (R2),(R3)       ;GET DEFAULT FOR THIS PARAM
2881  020006  000405                           BR      5$
2882  020010  010146                  4$:      MOV     R1,-(SP)        ;PUT ADDRESS OF PARAM IN ON STACK
2883  020012  004737  037636                   JSR     PC,OCTBIN       ;CALL CONVERSION
2884  020016  020106                           30$                     ;ERROR RETURN
2885  020020  012613                           MOV     (SP)+,(R3)      ;STORE RESULTS
2886  020022  022703  006352          5$:      CMP     #STINUS,R3      ;START TRACK PARAM
2887  020026  001403                           BEQ     6$              ;YES-BRANCH
2888  020030  022703  006356                   CMP     #SCINUS,R3      ;STARTING CYL PARAM
2889  020034  001010                           BNE     9$              ;NO-GO TO EXIT
2890  020036  022223                  6$:      CMP     (R2)+,(R3)+     ;BUMP R2 & R3
2891  020040  105711                  7$:      TSTB    (R1)            ;CHECK IF NULL
2892  020042  001404                           BEQ     8$              ;YES-GO STORE DEFAULT & EXIT
2893  020044  122127  000054                   CMPB    (R1)+,#',       ;TEST IF COMMA
2894  020050  001373                           BNE     7$              ;NO-LOOP
2895  020052  000756                           BR      4$              ;YES-GO BACK TO CONVERT PARAM
2896  020054  011213                  8$:      MOV     (R2),(R3)       ;STORE DEFAULT
2897  020056  022223                  9$:      CMP     (R2)+,(R3)+     ;BUMP R2 & R3
2898  020060  000204                           RTS     R4              ;RETURN
2899  020062  012704  016444          10$:     MOV     #STPARM,R4      ;DUMMY R4 TO RESTART PARAM
2900  020066  000204                           RTS     R4              ;RETURN
2901  020070  012223                  11$:     MOV     (R2)+,(R3)+     ;MOV IN DEFAULT
2902  020072  020327  006364                   CMP     R3,#OFINUS+2    ;LAST PARAM SET?
2903  020076  001374                           BNE     11$             ;NO-LOOP
2904  020100  012704  016630                   MOV     #DONEPR,R4      ;DUMMY RETURN FOR PARAM COMPLETE
2905  020104  000204                           RTS     R4              ;RETURN
2906  020106  104401  006374          30$:     TYPE    ,QUES           ;TYPE QUESTION MARK
2907  020112  104401  042104                   TYPE    ,$TTYIN         ;TYPE BAD LINE
2908  020116  104401  001267                   TYPE    ,$CRLF
2909  020122  020327  006354                   CMP     R3,#ETINUS      ;IS THIS ENDING TRACK?
2910  020126  001403                           BEQ     31$             ;YES-BRANCH
2911  020130  020327  006360                   CMP     R3,#ECINUS      ;IS THIS ENDING CYLINDER?
2912  020134  001004                           BNE     32$             ;NO-BRANCH
2913  020136  162702  000002          31$:     SUB     #2,R2           ;BACK UP REGISTERS TO REDO
2914  020142  162703  000002                   SUB     #2,R3           ;PARAM REQUEST
2915  020146  162704  000010          32$:     SUB     #10,R4          ;BACK UP TO REREQUEST PARAM
2916  020152  000204                           RTS     R4              ;RETURN
2917
2918                                    ;;*****************************************************************
2919                                    .SBTTL  DRIVE INITIALIZE ROUTINE
2920                                    ;*BEFORE FORMATTING BEGINS, THIS ROUTINE INITIALIZES
2921                                    ;*THE SUBSYSTEM, RECALIBRATES THE DRIVE, AND SETS VOLUME
2922                                    ;*VALID.  IT THEN CHECKS DRIVE STATUS TO INSURE IT IS
2923                                    ;*AVAILABLE, READY, AND VALID.  WRITE LOCK IS CHECKED TO
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                                        ;#VERIFY IT IS RESET.
                                        ;*
                                        ;#REGISTER 5 IS LOADED WITH THE ADDRESS OF THE
                                        ;#PARAMETER BLOCK.  R5 WILL CONTAIN THIS ADDRESS FOR
                                        ;#THE ENTIRE PROGRAM.
                                        ;*
                                        ;#THE DRIVE NUMBER PARAMETER IN THE PARAMETER
                                        ;#BLOCK IS SET TO THE SELECTED DRIVE.  THIS ALSO REMAINS
                                        ;#VALID FOR THE DURATION OF THE PROGRAM.
                                        ;;*****************************************************************

020154                                  DRINIT:
020154  012706  001100                          MOV     #STACK,SP       ;RESET THE STACK
020160  012737  020154  001110                  MOV     #DRINIT,$LPERR  ;SET UP TO LOOP ON ERROR
020166  012737  026462  002600                  MOV     #ERRHDL,A.ABNL  ;SET UP FOR ERROR HANDLING
020174  012737  025524  002576                  MOV     #ERRFRE,A.NORM  ;SET UP FOR NO ERROR DRIVER RETURNS
020202  105037  002654                          CLRB    ERRCNT          ;CLEAR ERROR COUNT
020206  005037  006364                          CLR     RECODE          ;CLEAR RECOVERY CODE
020212  012703  002446                          MOV     #PARM1,R3       ;SET UP PARAMETER BLOCK 1 FOR
020216  113763  006340  000000                  MOVB    DRINUS,P.DRVN(R3) ;ADDITIONAL INFO RECOVERY IF
020224  105063  000007                          CLRB    P.CS1H(R3)      ;CLEAR PREV.CONTENTS
020230  153763  012653  000007                  BISB    TYPFMT,P.CS1H(R3) ;NEEDED IN ERROR PROCESSING
020236  013702  002570                          MOV     RKBAS,R2        ;SET R2 FOR RKBASE ADDRESS
020242  012705  002362                          MOV     #PARM0,R5       ;GET PARAMETER BLOCK ADDRESS
020246  005065  000014                          CLR     P.PRST(R5)      ;CLEAR PROGRAM STATUS REG
020252  105065  000007                          CLRB    P.CS1H(R5)      ;CLR PREV CONTENTS
020256  153765  002653  000007                  BISB    TYPFMT,P.CS1H(R5)
020264  112765  000177  000001                  MOVB    #SUBCLR,P.CMND(R5) ;DO SUBSYSTEM CLEAR
020272  004737  025442                          JSR     PC,DRVCAL
020276  113765  006340  000000                  MOVB    DRINUS,P.DRVN(R5)       ;LOAD DRIVE NUMBER
020304  112765  000113  000001                  MOVB    #RECAL,P.CMND(R5) ;DO RECALIBRATE
020312  004737  025442                          JSR     PC,DRVCAL
020316  112765  000103  000001                  MOVB    #PACK,P.CMND(R5) ;DO PACK ACK
020324  004737  025442                          JSR     PC,DRVCAL
020330  112765  000141  000001                  MOVB    #RDSTAT,P.CMND(R5) ;DO RD STAT
020336  004737  025442                          JSR     PC,DRVCAL
020342  023727  006344  000003                  CMP     MDINUS,#3               ;TEST IF ANY WRITE TO BE DONE
020350  002415                                  BLT     1$              ;NO-GO TEST WRITE LOCK ON
020352  032765  004000  000040                  BIT     #S.WRL,P.A00(R5) ;ELSE TEST IF WRITE LOCK OFF
020360  001026                                  BNE     2$              ;IF WRONG - TYPE MESSAGE
020362  104401  014260                          TYPE    ,SWLREQ         ;AND WAIT FOR RESPONSE
020366  104401  014416                          TYPE    ,CONREQ
020372  042762  000100  000000                  BIC     #IE,RKCS1(R2)   ;PREVENT INTERRUPT WHEN WRITE LOCK CHANGED
020400  000000                                  HALT                    ;WRITE LOCK IS TESTED AGAIN
020402  000664                                  BR      DRINIT          ;FOR CORRECT SETTING
020404  032765  004000  000040  1$:             BIT     #S.WRL,P.A00(R5)
020412  001411                                  BEQ     2$
020414  104401  014236                          TYPE    ,RWLREQ
020420  104401  014416                          TYPE    ,CONREQ
020424  042762  000100  000000                  BIC     #IE,RKCS1(R2)   ;PREVENT INTERRUPT WHEN WRITE LOCK CHANGE
020432  000000                                  HALT
020434  000647                                  BR      DRINIT
020436  112765  000117  000001  2$:             MOVB    #SEEK,P.CMND(R5) ;DO SEEK
020444  013765  017312  000002                  MOV     LCYL,P.CYLN(R5) ;TO LAST CYL
020452  112765  000002  000005                  MOVB    #2,P.TRCK(R5)   ;TRACK 2
020460  004737  025442                          JSR     PC,DRVCAL
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2980  020464  012765  004660  000010          MOV     #BSFACT,P.BALO(R5) ;SET BUFFER ADDRESS FOR BAD SECTORS
2981  020472  005000                          CLR     R0
2982  020474  012703  000011                  MOV     #11,R3            ;SET UP MAX SECTOR VALUE
2983  020500  112765  000121  000001  8$:     MOVB    #RDDATA,P.CMND(R5) ;DO READ DATA FROM 0 THRU ?
2984  020506  012765  000400  000012          MOV     #400,P.WC(R5)     ;READ ENTIRE SECTOR
2985  020514  005465  000012                  NEG     P.WC(R5)
2986  020520  142765  000020  000007          BICB    #B.CFMT,P.CS1H(R5) ;SET TO 22 SECTOR FORMAT
2987  020526  132737  000020  002653          BITB    #B.CFMT,TYPFMT    ;TEST IF PACK TO BE FORMATTED 20 SECTOR
2988  020534  001401                          BEQ     3$                ;NO-BR. LEAVE R0=0
2989  020536  005200                          INC     R0                ;SET R0=1
2990  020540  110065  000004          3$:     MOVB    R0,P.SECT(R5)     ;PUT IN BLOCK
2991  020544  004737  025442                  JSR     PC,DRVCAL
2992  020550  032737  100000  006364          BIT     #ANYDER,RECODE    ;TEST IF ERROR
2993  020556  001410                          BEQ     4$                ;BR IF NO
2994  020560  062700  000002                  ADD     #2,R0             ;BUMP TO NEXT SECTOR
2995  020564  020003                          CMP     R0,R3             ;CHECK IF STILL IN
2996  020566  003764                          BLE     3$                ;BAD SECTOR. IF YES, DO IT AGAIN
2997  020570  104401  014452                  TYPE    ,BAD632           ;TYPE MESSAGE
2998  020574  000000                          HALT
2999  020576  000776                          BR      .-2
3000  020600  132737  000001  002656  4$:     BITB    #WHDSW,OPCONT     ;WILL THIS PASS WRITE?
3001  020606  001404                          BEQ     17$               ;NO - SKIP
3002  020610  132737  000040  002656          BITB    #PSDBSF,OPCONT    ;TEST IF PRESERVE FILE FLAG SET
3003  020616  001413                          BEQ     7$                ;NO SKIP
3004  020620  020027  000011          17$:    CMP     R0,#11            ;TEST IF R0 GREATER THAN 11
3005  020624  003010                          BGT     7$                ;IF YES, WE ALREADY HAVE A GOOD READ
3006  020626  012765  003660  000010          MOV     #BSSOFT,P.BALO(R5)  ;ELSE SET UP TO READ SOFTWARE FILE
3007  020634  012703  000025                  MOV     #25,R3            ;SET UP MAX SECTOR VALUE
3008  020640  012700  000012                  MOV     #12,R0            ;SET UP STARTING SECTOR
3009  020644  000715                          BR      8$                ;GO READ FILE
3010  020646  104401  014746          7$:     TYPE    ,SERNUM           ;TYPE OUT SERIAL NUMBER
3011  020652  012746  004660                  MOV     #BSFACT,-(SP)     ;OF CARTIDGE TO BE FORMATTED
3012  020656  004737  040212                  JSR     PC,@#$DB2O        ;CONVERT SERIAL NUMBER TO ASCII
3013  020662  012637  020670                  MOV     (SP)+,6$          ;GET RESULT
3014  020666  104401                          TYPE                      ;PRINT IT
3015  020670  000000          6$:     .WORD                             ;ADDRESS OF RESULT GOES HERE
3016  020672  104401  015413                  TYPE    ,STARS
3017  020676  005737  004666                  TST     BSFACT+6          ;TEST IF 3RD WORD ALL ZEROS
3018  020702  001404                          BEQ     10$               ;IF YES - SKIP
3019  020704  104401  015006                  TYPE    ,ALNPAC           ;ELSE TYPE ALIGNMENT PACK MESSAGE
3020                                                                    ;AND ABORT
3021  020710  000137  016202                  JMP     START             ;JUMP TO START IF CONTINUE
3022  020714  153765  002653  00000C  0$:     BISB    TYPFMT,P.CS1H(R5)  ;SET TYPE & FORMAT AGAIN
3023  020722  132737  000001  0026.          BITB    #WHDSW,OPCONT     ;TEST IF WE WILL BE WRITING
3024  020730  001441                          BEQ     19$               ;NO - SKIP BSSOFT INIT
3025  020732  012700  003670                  MOV     #BSSOFT+10,R0     ;ELSE SET POINTER TO BAD SECTOR DATA
3026  020736  012701  000200                  MOV     #200,R1           ;SET A COUNT
3027  020742  132737  000040  002656          BITB    #PSDBSF,OPCONT    ;TEST IF PRESERVE FLAG SET
3028  020750  001413                          BEQ     25$               ;NO - SKIP
3029  020752  005720                  20$:    TST     (R0)+             ;TEST IF ALL ONES
3030  020754  100410                          BMI     21$               ;YES - SKIP
3031  020756  005301                          DEC     R1                ;DECREMENT COUNT TO CHECK IT DOES NOT
3032  020760  001374                          BNE     20$               ;OVERFLOW THE BUFFER
3033  020762  104401  014511                  TYPE    ,TOMSOF           ;MESSAGE CAUSED BY OVERFLOW
3034  020766  104401  014576                  TYPE    ,TOMSUF
3035  020772  000137  016202                  JMP     START             ;RESTART THE PROGRAM
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3036  020776  005740                  21$:    TST     -(R0)           ;REPOSITION POINTER
3037  021000  012703  002660          25$:    MOV     #RDBUF,R3       ;SET POINTER TO SECTORSENTERED AS BAD
3038  021004  012320                  22$:    MOV     (R3)+,(R0)+     ;MOV IN THE ADDRESS
3039  021006  100412                          BMI     19$             ;IF NEGATIVE, MOVE IS DONE
3040  021010  012320                          MOV     (R3)+,(R0)+     ;ELSE GET SECOND WORD
3041  021012  124141                          CMPB    -(R1),-(R1)     ;DEC COUNT BY 2
3042  021014  005701                          TST     R1              ;CHECK IT DIDN'T OVERFLOW
3043  021016  100372                          BPL     22$             ;NOT YET - LOOP
3044  021020  104401  014511                  TYPE    ,TDMSOF         ;ELSE TYPE MESSAGE
3045  021024  104401  014576                  TYPE    ,TDMSUF
3046  021030  000137  016202                  JMP     START           ;RESTART TEST
3047  021034  012700  003660          19$:    MOV     #BSSOFT,R0      ;GET ADDRESS OF BSSOFT
3048  021040  013720  004660                  MOV     BSFACT,(R0)+    ;GET FIRST WORD
3049  021044  013720  004662                  MOV     BSFACT+2,(R0)+  ;GET SECOND WORD
3050  021050  005020                          CLR     (R0)+           ;CLEAR NEXT TWO WORDS
3051  021052  005020                          CLR     (R0)+           ;AS REQUIRED
3052  021054  012701  000200                  MOV     #200,R1         ;SET COUNT
3053  021060  012700  004670                  MOV     #BSFACT+10,R0   ;GET ADDR OF START OF BAD SECTORS
3054  021064  005720                  24$:    TST     (R0)+           ;TEST IF NEGATIVE
3055  021066  100410                          BMI     23$             ;YES - SKIP
3056  021070  005301                          DEC     R1              ;ELSE DEC COUNT
3057  021072  100374                          BPL     24$             ;IF NOT YET ZERO - LOOP
3058  021074  104401  014662                  TYPE    ,TDMFAC         ;MESSAGE REPORT
3059  021100  104401  014576                  TYPE    ,TDMSUF
3060  021104  000137  016202                  JMP     START           ;GO RESTART PROGRAM
3061  021110  000137  021114          23$:    JMP     DSPTCH          ;GO TO DISPATCHER
3062                                  ;;*****************************************************************
3063                                  .SBTTL  DISPATCH ROUTINE
3064                                  ;;*****************************************************************
3065  021114                          DSPTCH:
3066  021114  132737  000001  002656          BITB    #WHDSW,OPCONT   ;TEST IF HDRS & DATA TO BE WRITTEN
3067  021122  001404                          BEQ     1$
3068  021124  004737  022064                  JSR     PC,WRTOP        ;GO TO WRITE HEADERS & DATA
3069  021130  104401  015300                  TYPE    ,PRGRS1         ;TYPE PROGRESS 1 MESSAGE
3070
3071  021134  132737  000016  002656  1$:     BITB    #VFHDSW!WCDASW!RCDASW,OPCONT ;ANY OTHER OPERATION?
3072  021142  001033                          BNE     3$              ;YES-SKIP
3073  021144  104401  015345          4$:     TYPE    ,PRGRS2         ;TYPE DONE MESSAGE
3074  021150  132737  000001  002656          BITB    #WHDSW,OPCONT   ;TEST IF HEADERS AND DATA WERE WRITTEN
3075  021156  001402                          BEQ     5$              ;NO - DON'T WRITE BAD SECTOR FILES
3076  021160  004737  031662                  JSR     PC,BDSTWT       ;GO WRITE BAD SECTOR TABLES
3077  021164  032777  000200  157746  5$:     BIT     #SW7,@SWR       ;TEST IF BAD SECTOR REPORT REQUESTED
3078  021172  001402                          BEQ     2$
3079  021174  004737  032062                  JSR     PC,BSREPT       ;GO REPORT BAD SECTORS
3080  021200  012706  001100          2$:     MOV     #STACK,SP       ;RESET STACK
3081  021204  032777  000001  157726          BIT     #SW0,@SWR       ;TEST IF LOOP ON PROGRAM
3082  021212  001405                          BEQ     6$              ;NO - GO GET NEXT PARAMETERS
3083  021214  012737  177777  002660          MOV     #177777,RDBUF
3084  021222  000137  020154                  JMP     DRINIT          ;ELSE RESTART OPERATION
3085  021226  000137  016444          6$:     JMP     STPARM          ;GO GET NEXT PARAM SET
3086  021232  004737  023064          3$:     JSR     PC,VEROP        ;GO TO VERIFY HEADERS AND/OR DATA
3087  021236  000742                          BR      4$
3088                                  ;;*****************************************************************
3089                                  .SBTTL  TRACK INCREMENT ROUTINE
3090                                  ;;*****************************************************************
3091  021240  032777  040000  157672  TRKINC: BIT     #SW14,@SWR      ;TEST IF LOOP ON OPERATION
```

```
3092  021246  001011                        BNE     2$              ;YES - BYPASS INCREMENT
3093  021250  020037  017312                CMP     R0,LCYL         ;CHECK IF NEXT INCREMENT WOULD
3094  021254  001007                        BNE     1$              ;SELECT LAST TRACK ON THE
3095  021256  020127  000001                CMP     R1,#1           ;PACK. IF SO-DO NOT
3096  021262  001004                        BNE     1$              ;INCREMENT
3097  021264  112737  000377  002651  3$:   MOVB    #377,OPCOMP     ;SET DONE
3098  021272  000207                2$:     RTS     PC              ;& EXIT
3099  021274  005201                1$:     INC     R1              ;ELSE INCREMENT TRACK
3100  021276  020137  006354                CMP     R1,ETINUS       ;IF THIS BUMP DOES NOT
3101  021302  003773                        BLE     2$              ;EXCEED THE SELECTED PACK
3102  021304  013701  006352                MOV     STINUS,R1       ;ADDRESS FORMAT-EXIT
3103  021310  005200                        INC     R0              ;IF IT DOES, SET THE TRACK TO
3104  021312  020037  006360                CMP     R0,ECINUS       ;THE STARTING TRACK VALUES AND
3105  021316  101401                        BLOS    4$
3106  021320  000761                        BR      3$
3107  021322  020037  017312          4$:   CMP     R0,LCYL         ;SEE IF ON LAST CYL
3108  021326  001401                        BEQ     5$              ;BR IF YES
3109  021330  000207                6$:     RTS     PC              ;ELSE RETURN
3110  021332  020127  000002          5$:   CMP     R1,#2           ;SEE IF ON TRACK 2
3111  021336  103774                        BLO     6$
3112  021340  000751                        BR      3$
3113
3114                                  ;;*****************************************************************
3115                                  .SBTTL  BUILD HEADERS ROUTINE
3116                                  ;;*****************************************************************
3117  021342                          BLDHDR:
3118  021342  104411                        SAVREG
3119  021344  012703  000026                MOV     #26,R3          ;PRESET FOR 22 SECTOR FORMAT
3120  021350  012702  005674                MOV     #BUFF0,R2       ;GET BUFFER ADDRESS
3121  021354  006301                        ASL     R1              ;SHIFT TO ALIGN FOR HEADER
3122  021356  006301                        ASL     R1
3123  021360  006301                        ASL     R1
3124  021362  006301                        ASL     R1
3125  021364  006301                        ASL     R1
3126  021366  052701  140000                BIS     #140000,R1      ;SET GOOD SECTOR BITS
3127  021372  132737  000020  002653        BITB    #8.CFMT,TYPFMT  ;TEST IF 20 SET FORMAT
3128  021400  001404                        BEQ     1$              ;NO-SKIP
3129  021402  052701  001000                BIS     #BIT9,R1        ;ELSE SET FORMAT BIT
3130  021406  012703  000024                MOV     #24,R3          ;ADJUST SECTOR COUNT
3131  021412  010022                1$:     MOV     R0,(R2)+        ;INSERT CYLINDER WORD
3132  021414  010122                        MOV     R1,(R2)+        ;INSERT TRK/SECT WORD
3133  021416  010004                        MOV     R0,R4           ;COMPUTE VRC
3134  021420  010105                        MOV     R1,R5
3135  021422  040005                        BIC     R0,R5
3136  021424  040104                        BIC     R1,R4
3137  021426  050504                        BIS     R5,R4
3138  021430  010422                        MOV     R4,(R2)+        ;INSERT VRC
3139  021432  005201                        INC     R1              ;BUMP SECTOR COUNT
3140  021434  005303                        DEC     R3              ;DEC COUNT
3141  021436  001365                        BNE     1$              ;EXIT BUILD IF DONE
3142  021440  104412                        RESREG
3143  021442  012737  100000  001250        MOV     #BIT15,$TMP5    ;SET BIT TO BE BAD SECTOR INDICATOR
3144  021450  012737  004660  021462        MOV     #BSFACT,2$      ;SET TABLE TO BE SEARCHED
3145  021456  004437  021556          3$:   JSR     R4,SRHTBS       ;GO SEARCH TABLE FOR BAD SECTORS
3146  021462  000000                2$:     .WORD
3147  021464  012603                        MOV     (SP)+,R3        ;GET BAD SECTOR COUNT
```

```
3148  021466  001417                        BEQ     4$                      ;IF NO BAD SECTORS GO TEST BSSOFT
3149  021470  011602                6$:     MOV     (SP),R2                 ;GET BAD SECTOR #
3150  021472  006302                        ASL     R2                      ;MULTIPLY BAD SECTOR # BY 6
3151  021474  006302                        ASL     R2                      ;AND ADD 2 TO GET INDEX
3152  021476  061602                        ADD     (SP),R2                 ;TO TRK/SEC WORD OF HEADER OF
3153  021500  062602                        ADD     (SP)+,R2                ;BAD SECTOR
3154  021502  062702  000002                ADD     #2,R2
3155  021506  043762  001250  005674        BIC     $TMP5,BUFF0(R2)         ;CLEAR BIT TO INDICATE BAD SECTOR
3156  021514  043762  001250  005676        BIC     $TMP5,BUFF0+2(R2)       ;CLEAR BIT IN VRC FOR BAD SECTOR
3157  021522  005303                        DEC     R3                      ;DEC # OF BAD SECTOR COUNTER
3158  021524  001361                        BNE     6$                      ;IF 0
3159  021526  023727  021462  003660  4$:   CMP     2$,#BSSOFT              ;TEST IF BAD SECTOR SOFTWARE
3160  021534  001407                        BEQ     5$                      ;HAS BEEN TESTED. IF NOT, GO
3161  021536  012737  040000  001250        MOV     #BIT14,$TMP5
3162  021544  012737  003660  021462        MOV     #BSSOFT,2$              ;SET TAPE .O BE SEARCHED
3163  021552  000741                        BR      3$
3164  021554                        5$:                                     ;ELSE EXIT
3165  021554  000207                        RTS     PC
3166                                ;;*****************************************************************
3167                                ;SBTTL  SEARCH BAD SECTOR TABLES ROUTINE
3168                                ;*THIS ROUTINE RETURNS A LIST OF BAD SECTORS FOUND IN
3169                                ;*THE SPECIFIC TABLE (BAD SECTOR SOFTWARE OR BAD SECTOR FACTORY)
3170                                ;*FOR THE SPECIFIC CYLINDER AND TRACK DESIRED. R0 AND R1 MUST
3171                                ;*CONTAIN THE CYLINDER AND TRACK, RESPECTIVELY.
3172                                ;*
3173                                ;*THE LIST OF BAD SECTORS IS FOUND ON THE STACK WHEN THE ROUTINE
3174                                ;*RETURNS TO THE CALLER. THE FIRST ENTRY ON THE STACK WILL BE THE
3175                                ;*NUMBER OF BAD SECTORS FOUND FOR THIS CYLINDER AND TRACK.
3176                                ;;*****************************************************************
3177  021556  010237  001242        SRHTBS: MOV     R2,$TMP2
3178  021562  010337  001244                MOV     R3,$TMP3
3179  021566  012637  001246                MOV     (SP)+,$TMP4             ;STORE RETURN CONTENTS OF R4
3180  021572  011402                        MOV     (R4),R2 ;GET ADDRESS OF BAD SECTOR TABLE TO SEARCH
3181  021574  012437  001240                MOV     (R4)+,$TMP1             ;SETUP FOR LENGTH OF BAD SECTOR TABLE
3182  021600  062737  001000  001240        ADD     #1000,$TMP1
3183  021606  005003                        CLR     R3                      ;CLEAR R3 FOR COUNT
3184  021610  062702  000010                ADD     #10,R2                  ;SET R2 FOR POINTER TO CYLINDER ENTRY
3185  021614  005712                1$:     TST     (R2)                    ;TEST IF ALL ONES
3186  021616  100430                        BMI     5$                      ;YES-DONE
3187  021620  020012                        CMP     R0,(R2)                 ;TEST IF BAD SECTOR IN PRESENT CYL
3188  021622  001406                        BEQ     3$                      ;YES-GO CHECK TRACK
3189  021624  062702  000004                ADD     #4,R2                   ;ELSE BUMP POINTER
3190  021630  020237  001240                CMP     R2,$TMP1                ;TEST IF OUT OF TABLE
3191  021634  002021                        BGE     5$                      ;YES-EXIT
3192  021636  000766                        BR      1$                      ;LOOP
3193  021640  005722                3$:     TST     (R2)+                   ;TRACK CHECK - PUT POINTER AT TRK/SEC BYTE
3194  021642  011237  001256                MOV     (R2),$TMP10             ;GET TRK/SEC WORD
3195  021646  042737  174377  001256        BIC     #174377,$TMP10          ;CLEAR ALL BUT TRACK
3196  021654  123701  001257                CMPB    $TMP10+1,R1             ;CHECK IF BAD SECTOR IN THIS TRACK
3197  021660  001402                        BEQ     4$                      ;YES - GO PUT SECTOR NUMBER ON STACK
3198  021662  005722                        TST     (R2)+                   ;ELSE BUMP POINTER TO NEXT CYL WORD
3199  021664  000753                        BR      1$                      ;GO TEST NEXT CYL
3200  021666  005203                4$:     INC     R3                      ;BUMP BAD SECTOR COUNT
3201  021670  012246                        MOV     (R2)+,-(SP)             ;PUT TRK/SEC WORD ON STACK
3202  021672  042716  177700                BIC     #177700,(SP)            ;CLEAR ALL BUT SECTOR NUMBER
3203  021676  000746                        BR      1$                      ;GO CHECK REST OF FILE
```

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3204  021700  010346                  5$:     MOV     R3,-(SP)        ;EXIT - PUT NUMBER OF BAD
3205  021702  013702  001242                  MOV     $TMP2,R2        ;SECTORS ON STACK-RESTORE
3206  021706  013703  001244                  MOV     $TMP3,R3        ;REGISTERS
3207  021712  013746  001246                  MOV     $TMP4,-(SP)     ;PUT RETURN ON STACK
3208  021716  000204                          RTS     R4              ;RETURN
3209                                  ;;*****************************************************************
3210                                  .SBTTL  BAD SECTOR CHECK ROUTINE
3211                                  ;*THIS ROUTINE WILL SEARCH BOTH TABLES TO DETERMINE IF A
3212                                  ;*SPECIFIC SECTOR IS LISTED AS BAD. IF THE SECTOR IS LISTED IN THE
3213                                  ;*TABLES THE ROUTINE SETS THE "BADSEC" FLAG AND RETURNS. IF THE SECTOR
3214                                  ;*IS NOT LISTED THE FLAG IS RESET.
3215                                  ;;*****************************************************************
3216  021720  104411                  BDSRCK: SAVREG
3217  021722  012737  004660  021734          MOV     #BSFACT,1$      ;SET TABLE TO SEARCH
3218  021730  004437  021556          2$:     JSR     R4,SRHTBS       ;GO SEARCH IT
3219  021734  000000                  1$:     .WORD                   ;TABLE ADDRESS GOES HERE
3220  021736  012603                          MOV     (SP)+,R3        ;GET NUMBER OF BAD SECTORS, IF ANY
3221  021740  001015                          BNE     6$              ;IF ANY, GO TEST WHICH ONES
3222  021742  023727  021734  003660  7$:     CMP     1$,#BSSOFT      ;ELSE TEST IF OTHER TABLE ALREADY SEARCHED
3223  021750  001404                          BEQ     3$              ;IF YES-EXIT
3224  021752  012737  003660  021734          MOV     #BSSOFT,1$      ;SET OTHER TABLE FOR SEARCH
3225  021760  000763                          BR      2$              ;GO SEARCH IT
3226  021762  042737  001000  006364  3$:     BIC     #BADSEC,RECODE  ;CLEAR BAD SECTOR BIT
3227  021770  104412                  4$:     RESREG
3228  021772  000207                          RTS     PC              ;RETURN
3229  021774  022602                  6$:     CMP     (SP)+,R2        ;THIS SECTOR IN TABLE?
3230  021776  001403                          BEQ     8$              ;YES-GO SET BIT & EXIT
3231  022000  005303                          DEC     R3              ;DECREMENT BAD SECTOR COUNT
3232  022002  001374                          BNE     6$              ;IF NOT ZERO-CHECK NEXT ENTRY
3233  022004  000756                          BR      7$              ;ELSE GO SEARCH OTHER TABLE
3234  022006  052737  001000  006364  8$:     BIS     #BADSEC,RECODE  ;SET BAD SECTOR BIT
3235  022014  005303                  9$:     DEC     R3              ;CLEAR STACK OF OTHER BAD SECTOR
3236  022016  001764                          BEQ     4$              ;NUMBER
3237  022020  005726                          TST     (SP)+
3238  022022  000774                          BR      9$              ;EXIT
3239                                  ;;*****************************************************************
3240                                  .SBTTL  INSERT BAD SECTOR IN BAD SECTOR SOFTWARE TABLE ROUTINE
3241                                  ;;*****************************************************************
3242  022024  104411                  BSSINS: SAVREG
3243  022026  012704  003670                  MOV     #BSSOFT+10,R4   ;GET ADDRESS OF BAD SOFTWARE
3244  022032  005724                  1$:     TST     (R4)+           ;SECTOR TABLE. FIND FIRST
3245  022034  100376                          BPL     1$              ;EMPTY ENTRY
3246  022036  005744                          TST     -(R4)           ;BACK UP POINTER
3247  022040  010024                          MOV     R0,(R4)+        ;INSERT CYLINDER
3248  022042  012703  000010                  MOV     #10,R3          ;SET COUNT FOR SHIFT TO ALIGN
3249  022046  006301                  2$:     ASL     R1              ;SHIFT TRACK TO ALIGN FOR ENTRY
3250  022050  005303                          DEC     R3              ;DEC SHIFT COUNT
3251  022052  001375                          BNE     2$              ;TEST IF SHIFT DONE
3252  022054  060201                          ADD     R2,R1           ;ADD IN SECTOR NUMBER
3253  022056  010114                          MOV     R1,(R4)         ;INSERT TRACK/SECTOR
3254  022060  104412                          RESREG
3255  022062  000207                          RTS     PC
3256                                  ;;*****************************************************************
3257                                  .SBTTL  WRITE OPERATION CONTROL ROUTINE
3258                                  ;;*****************************************************************
3259  022064  105037  002651          WRTOP:  CLRB    OPCOMP          ;CLEAR DONE FLAG
```

```
                        WRITE OPERATION CONTROL ROUTINE

3260  022070  012737  022146  001110          MOV     #WERROR,$LPERR  ;SETUP FOR LOOP ON ERROR
3261  022076  013700  006356                  MOV     SCINUS,R0       ;GET STARTING ADDRESS
3262  022102  013701  006352                  MOV     STINUS,R1
3263  022106  010037  006370          WRTLUP: MOV     R0,CC.NUS       ;STORE CURRENT CYL
3264  022112  010137  006366                  MOV     R1,CTINUS       ;STORE CURRENT TRACK
3265  022116  032777  001000  157014          BIT     #SW9,@SWR       ;TEST IF LOOP ON ERROR
3266  022124  001002                          BNE     1$              ;IF YES - DO NOT CLEAR ERROR FLAG
3267  022126  105037  001103                  CLRB    $ERFLG          ;ELSE CLEAR FLAG
3268  022132  004737  021342          1$:     JSR     PC,BLDHDR       ;GO BUILD HEADERS
3269  022136  004737  022206                  JSR     PC,WRTHDR       ;GO WRITE HEADERS
3270  022142  004737  022312                  JSR     PC,WRTTRK       ;GO WRITE DATA
3271  022146  032777  001000  156764  WERROR: BIT     #SW9,@SWR       ;TEST IF LOOP ON ERROR
3272  022154  001406                          BEQ     2$              ;IF NO - SKIP ERROR FLAG TEST
3273  022156  105737  001103                  TSTB    $ERFLG          ;ELSE TEST ERROR FLAG
3274  022162  001403                          BEQ     2$              ;NO - SKIP
3275  022164  004737  031336                  JSR     PC,PREPLP       ;GO PREPARE FOR LOOP
3276  022170  000746                          BR      WRTLUP          ;GO TO LOOP
3277  022172  004737  021240          2$:     JSR     PC,TRKINC       ;BUMP TO NEXT ADDRESS
3278  022176  105737  002651                  TSTB    OPCOMP          ;WRITE OPERATION DONE?
3279  022202  001741                          BEQ     WRTLUP          ;NO-LOOP
3280  022204  000207                          RTS     PC              ;ELSE RETURN TO DISPATCH
3281                          ;;*****************************************************************
3282                          .SBTTL  WRITE HEADERS ROUTINE
3283                          ;;*****************************************************************
3284  022206                  WRTHDR:
3285  022206  104411                          SAVREG
3286  022210  005065  000014                  CLR     P.PRST(R5)      ;CLEAR PROG STATUS REGISTER
3287  022214  112765  000127  000001          MOVB    #WRHEAD,P.CMND(R5) ;LOAD PARAMETER BLOCK WITH
3288  022222  012765  005674  000010          MOV     #BUFFO,P.BALO(R5) ;VALUES TO DO THE WRITE HEADER.
3289  022230  010065  000002                  MOV     R0,P.CYLN(R5)
3290  022234  012765  000102  000012          MOV     #102,P.WC(R5)   ;LOAD THE WORD COUNT WITH
3291  022242  132737  000020  002653          BITB    #B.CFMT,TYPFMT  ;THE PROPER VALUE FOR THE FORMAT
3292  022250  001403                          BEQ     1$              ;TYPE
3293  022252  012765  000074  000012          MOV     #74,P.WC(R5)
3294  022260  005465  000012          1$:     NEG     P.WC(R5)
3295  022264  110165  000005                  MOVB    R1,P.TRCK(R5)
3296  022270  004737  025442                  JSR     PC,DRVCAL       ;CALL DRIVER
3297  022274  032737  100000  006364          BIT     #ANYDER,RECODE  ;TEST FOR ANY DATA ERRORS
3298  022302  001401                          BEQ     2$
3299                          ;INSERT CODE FOR ANY DATA TYPE ERROR ON WRITE HEADERS
3300  022304  000000                          HALT
3301  022306  104412          2$:     RESREG
3302  022310  000207                          RTS     PC              ;RETURN
3303                          ;;*****************************************************************
3304                          .SBTTL  WRITE ONE TRACK ROUTINE
3305                          ;;*****************************************************************
3306  022312                  WRTTRK:
3307  022312  104411                          SAVREG
3308  022314  105037  002650          8$:     CLRB    DERCNT          ;CLEAR ERROR COUNT
3309  022320  013765  006306  000012          MOV     TKWDCT,P.WC(R5) ;SET WORD COUNT FOR ONE TRACK
3310  022326  105065  000004                  CLRB    P.SECT(R5)      ;SET SECTOR ZERO
3311  022332  012765  006346  000010  4$:     MOV     #WEINUS,P.BALO(R5) ;SET BUFFER ADDRESS TO ODD
3312  022340  032700  000001                  BIT     #BIT0,R0        ;OR EVEN CYLINDER DATA DEPENDING
3313  022344  001403                          BEQ     1$              ;ON THE CYLINDER NUMBER
3314  022346  012765  006350  000010          MOV     #WOINUS,P.BALO(R5)
3315  022354  010065  000002          1$:     MOV     R0,P.CYLN(R5)   ;SET UP THE PARAMETER BLOCK
```

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3316  022360  110165  000005                  MOVB    R1,P.TRCK(R5)    ;TO WRITE THE ENTIRE TRACK
3317  022364  112765  000123  000001          MOVB    #WRDATA,P.CMND(R5)
3318  022372  005065  000014                  CLR     P.PRST(R5)
3319  022376  052765  100000  000014          BIS     #DTBAII,P.PRST(R5)
3320  022404  004737  025442                  JSR     PC,DRVCAL        ;CALL DRIVER
3321  022410  032737  100000  006364          BIT     #ANYDER,RECODE   ;ANY DATA ERROR?
3322  022416  001002                          BNE     12$              ;YES - PROCESS ERROR
3323  022420  000137  023060                  JMP     7$               ;NO-WRITE A-OK, EXIT
3324  022424  032737  000016  006364  12$:    BIT     #HVRCER!OPIERR!BSERR,RECODE ;VRC OR OPI ERROR
3325  022432  001002                          BNE     14$              ;YES-SKIP
3326  022434  000137  023046                  JMP     6$               ;GO PRINT FUNNY MESSAGE
3327  022440  016537  000026  001252  14$:    MOV     P.DTS(R5),$TMP6  ;STORE TRK/SEC
3328  022446  042737  174377  001252          BIC     #174377,$TMP6    ;CLEAR ALL BUT TRACK
3329  022454  113701  001253                  MOVB    $TMP6+1,R1       ;STORE TRACK
3330  022460  016537  000022  001252          MOV     P.WCR(R5),$TMP6  ;STORE WORD COUNT
3331  022466  042737  000377  001252          BIC     #377,$TMP6       ;CLEAR PARTIAL COUNT
3332  022474  062737  000400  001252          ADD     #400,$TMP6       ;BUMP COUNT TO NEXT SECTOR
3333  022502  016502  000026                  MOV     P.DTS(R5),R2     ;& GET BAD SECTOR
3334  022506  042702  177740                  BIC     #177740,R2
3335  022512  032737  000002  006364          BIT     #BSERR,RECODE    ;TEST IF BAD SECTOR
3336  022520  001076                          BNE     3$               ;GO SET UP TO WRITE REMAINDER IF TRACK
3337  022522  105237  002650          2$:     INCB    DERCNT           ;BUMP ERROR COUNT
3338  022526  112765  000123  000001          MOVB    #WRDATA,P.CMND(R5) ;SET UP PARAM BLOCK
3339  022534  012765  177400  000012          MOV     #177400,P.WC(R5) ;TO WRITE ONE SECTOR
3340  022542  010065  000002                  MOV     R0,P.CYLN(R5)    ;THIS IS THE RETRY
3341  022546  110165  000005                  MOVB    R1,P.TRCK(R5)
3342  022552  110265  000004                  MOVB    R2,P.SECT(R5)
3343  022556  052765  100000  000014          BIS     #DTBAII,P.PRST(R5)
3344  022564  004737  025442                  JSR     PC,DRVCAL
3345  022570  032737  100000  006364          BIT     #ANYDER,RECODE   ;ERROR IN RETRY?
3346  022576  001441                          BEQ     5$               ;NO-GO PRINT RETRY SUCCESSFUL
3347  022600  122737  000007  002650          CMPB    #7,DERCNT        ;TEST IF ERROR COUNT TO BIG
3348  022606  002345                          BGE     2$               ;IF NO - GO RETRY AGAIN
3349  022610  005037  001174                  CLR     $REGS
3350  022614  113737  002650  001174          MOVB    DERCNT,$REGS
3351  022622  104102                          ERROR   102
3352  022624  004737  021720                  JSR     PC,BDSRCK        ;GO TEST IF THIS SECTOR ALREADY MARKED BAD
3353  022630  032737  001000  006364          BIT     #BADSEC,RECODE   ;TEST RESULTS OF TEST
3354  022636  001411                          BEQ     11$              ;NOT BAD BEFORE - SKIP
3355  022640  010037  001174                  MOV     R0,$REGS         ;SET UP TO PRINT ERROR
3356  022644  010137  001176                  MOV     R1,$REG6
3357  022650  010237  001200                  MOV     R2,$REG7
3358  022654  104107                          ERROR   107              ;ERROR- BAD HEADER AREA
3359  022656  000137  016202                  JMP     START
3360  022662  104076                  11$:    ERROR   76               ;REPORT MARKING SECTOR BAD
3361  022664  004737  022024                  JSR     PC,BSSINS        ;INSERT BAD SECTOR IN BSSOFT
3362  022670  004737  021342                  JSR     PC,BLDHDR        ;BUILD NEW HEADERS
3363  022674  004737  022206                  JSR     PC,WRTHDR        ;WRITE NEW HEADERS
3364  022700  000605                          BR      8$               ;RESTART WRITE TRACK
3365  022702  005037  001174          5$:     CLR     $REGS            ;CLEAR REG 5 FOR COUNT
3366  022706  113737  002650  001174          MOVB    DERCNT,$REGS     ;INSERT RETRY COUNT
3367  022714  104101                          ERROR   101              ;PRINT RETRY SUCCESFUL
3368  022716  005202                  3$:     INC     R2               ;THIS CODE SETS UP THE
3369  022720  020237  006342                  CMP     R2,SEINUS        ;PARAMETER BLOCK TO PICK
3370  022724  002055                          BGE     7$               ;UP THE TRACK WRITE
3371  022726  010265  000004                  MOV     R2,P.SECT(R5)    ;AFTER THE BAD SECTOR
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3372  022732  012704  000010                  MOV     #10,R4
3373
3374                                          ;THE FOLLOWING BLOCK OF CODE CHECKS THAT THE WORD COUNT IS
3375                                          ;CORRECTLY ADJUSTED TO PICK UP THE OPERATION AFTER THE SECTOR
3376                                          ;THAT IS CAUSING THE ERROR IS PROCESSED. IF THE WORD COUNT
3377                                          ;SOMEHOW GETS SCREWED UP THE PROGRAM HALTS. CONTINUE CAN BE
3378                                          ;DEPRESSED TO CAUSE THE WORD COUNT TO BE CORRECTED AND THE
3379                                          ;PROGRAM ADJUSTS THE COUNT AND CONTINUES THE OPERATION.
3380  022736  006302                  9$:     ASL     R2
3381  022740  005304                          DEC     R4
3382  022742  001375                          BNE     9$
3383  022744  012704  013000                  MOV     #13000,R4
3384  022750  023727  006342  000026          CMP     SEINUS,#26      ;ARE WE IN 26 SECTOR FORMAT?
3385  022756  001402                          BEQ     13$             ;YES - SKIP
3386  022760  012704  012000                  MOV     #12000,R4       ;ELSE CHANGE VALUE FOR 24 SECTOR FORMAT
3387  022764  160204                  13$:    SUB     R2,R4
3388  022766  005404                          NEG     R4
3389  022770  016502  000004                  MOV     P.SECT(R5),R2
3390  022774  020437  001252                  CMP     R4,$TMP6
3391  023000  001413                          BEQ     10$
3392  023002  010437  001204                  MOV     R4,$REG11
3393  023006  013737  001252  001206          MOV     $TMP6,$REG12
3394  023014  010237  001202                  MOV     R2,$REG10
3395  023020  104105                          ERROR   105
3396  023022  000000                          HALT
3397  023024  010437  001252                  MOV     R4,$TMP6
3398
3399                                          ;END OF BLOCK OF CODE TO CHECK WORD COUNT
3400
3401  023030  013765  001252  000012  10$:    MOV     $TMP6,P.WC(R5)
3402  023036  105037  002650                  CLRB    DERCNT
3403  023042  000137  022332                  JMP     4$
3404  023046  104401  015203          6$:     TYPE    ,IMPERR         ;TYPE IMPOSSIBLE ERROR
3405  023052  000000                          HALT                    ;HALT
3406  023054  000137  016202                  JMP     START
3407  023060  104412                  7$:     RESREG
3408  023062  000207                          RTS     PC
3409                                          ;;*****************************************************************
3410                                          .SBTTL  VERIFY OPERATION CONTROL ROUTINE
3411                                          ;;*****************************************************************
3412  023064                          VEROP:
3413  023064  012737  023200  001110          MOV     #VERROR,$LPERR  ;SET UP TO LOOP ON ERROR
3414  023072  013700  006356                  MOV     SCINUS,R0       ;GET STARTING CYLINDER
3415  023076  013701  006352                  MOV     STINUS,R1       ;AND TRACK
3416  023102  105037  002651                  CLRB    OPCOMP
3417  023106  010037  006370          VERLUP: MOV     R0,CCINUS       ;STORE CURRENT CYL
3418  023112  010137  006366                  MOV     R1,CTINUS       ;STORE CURRENT TRACK
3419  023116  032777  001000  156014          BIT     #SW9,@SWR       ;TEST IF LOOP ON ERROR
3420  023124  001002                          BNE     1$              ;IF YES - DON'T CLEAR ERROR FLAG
3421  023126  105037  001103                  CLRB    $ERFLG
3422  023132  004737  023240          1$:     JSR     PC,RDHDRS
3423  023136  004737  021342                  JSR     PC,BLDHDR
3424  023142  004737  023576                  JSR     PC,HDRCMP
3425  023146  132737  000010  002656          BITB    #RCDASW,OPCONT
3426  023154  001403                          BEQ     2$
3427  023156  004737  024740                  JSR     PC,RDOP         ;GO DO READ FOR DATA VERIFICATION
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3428  023162  000406                          BR      VERROR
3429  023164  132737  000004  002656  2$:     BITB    #WCDASW,OPCONT  ;CHECK IF WRITE CHECK DATA
3430  023172  001402                          BEQ     VERROR          ;IF NO - SKIP WRITE CHECK
3431  023174  004737  023714                  JSR     PC,WCOP         ;ELSE GO DO WRITE CHECK FOR DATA VERIF.
3432  023200  032777  001000  155732  VERROR: BIT     #SW9,@SWR       ;TEST IF LOOP ON ERROR
3433  023206  001406                          BEQ     4$              ;IF NO - GO DO NEXT TRACK
3434  023210  105737  001103                  TSTB    $ERFLG          ;ELSE CHECK ERROR FLAG
3435  023214  001403                          BEQ     4$              ;NO SKIP
3436  023216  004737  031336                  JSR     PC,PREPLP       ;GO PREPARE FOR LOOPING
3437  023222  000731                          BR      VERLUP          ;LOOP
3438  023224  004737  021240          4$:     JSR     PC,TRKINC
3439  023230  105737  002651                  TSTB    OPCOMP
3440  023234  001724                          BEQ     VERLUP
3441  023236  000207                          RTS     PC
3442                                  ;;*****************************************************************
3443                                  .SBTTL  READ HEADERS ROUTINE
3444                                  ;*THE HEADERS FOR A GIVEN CYLINDER AND TRACK (SPECIFIED IN R0 AND R1,
3445                                  ;*RESPECTIVELY) ARE READ IN AND SORTED INTO THE REQUIRED SEQUENCE.
3446                                  ;;*****************************************************************
3447  023240                          RDHDRS:
3448  023240  104411                          SAVREG
3449  023242  004737  031262                  JSR     PC,POSOFF               ;GO POSITION AND OFFSET
3450  023246  012765  002660  000010          MOV     #RDBUF,P.BAL0(R5)       ;LOAD ADDRESS FOR HEADERS
3451  023254  005065  000014                  CLR     P.PRST(R5)      ;CLEAR PROGRAM STATUS
3452  023260  010065  000002          2$:     MOV     R0,P.CYLN(R5)   ;SET UP TO READ HEADER
3453  023264  110165  000005                  MOVB    R1,P.TRCK(R5)   ;OF DESIRED TRACK & CYLINDER
3454  023270  005077  155650                  CLR     @$TKS           ;TURN OFF INTERRUPTS FROM KEYBOARD
3455  023274  112765  000164  000001          MOVB    #RDALHD,P.CMND(R5)
3456  023302  004737  025442                  JSR     PC,DRVCAL       ;DO IT
3457  023306  012777  000100  155630          MOV     #100,@$TKS      ;TURN ON KEYBOARD
3458  023314  012737  000204  001236          MOV     #204,$TMP0      ;SET UP TEMP STORE FOR THE NUMBER OF
3459  023322  023727  006342  000026          CMP     SEINUS,#26      ;HEADER WORDS THAT MUST BE STORED FOR
3460  023330  001403                          BEQ     9$              ;THE FORMAT IN USE.
3461  023332  012737  000170  001236          MOV     #170,$TMP0
3462  023340  005003                  9$:     CLR     R3
3463  023342  026300  002660          4$:     CMP     RDBUF(R3),R0    ;TEST IF FIRST HEADER WORD IS RIGHT CYL
3464  023346  001027                          BNE     3$              ;NO - GO BUMP TO NEXT
3465  023350  016304  002662                  MOV     RDBUF+2(R3),R4  ;GET TRACK/SECTOR WORD
3466  023354  042704  177437                  BIC     #177437,R4      ;CLEAR ALL BUT TRACK BITS
3467  023360  006204                          ASR     R4              ;SHIFT TRACK TO ALIGN FOR TESTING
3468  023362  006204                          ASR     R4
3469  023364  006204                          ASR     R4
3470  023366  006204                          ASR     R4
3471  023370  006204                          ASR     R4
3472  023372  020401                          CMP     R4,R1           ;CHECK IF TRACK IS CORRECT
3473  023374  001014                          BNE     3$              ;NO - GO BUMP TO NEXT HEADER
3474  023376  016304  002662                  MOV     RDBUF+2(R3),R4  ;GET SECOND WORD
3475  023402  016302  002660                  MOV     RDBUF(R3),R2    ;GET FIRST WORD
3476  023406  046304  002660                  BIC     RDBUF(R3),R4    ;COMPUTE VRC OF HEADER
3477  023412  046302  002662                  BIC     RDBUF+2(R3),R2
3478  023416  050402                          BIS     R4,R2
3479  023420  026302  002664                  CMP     RDBUF+4(R3),R2  ;CHECK IF VRC IS CORRECT
3480  023424  001414                          BEQ     5$              ;YES - SKIP BUMP TO NEXT HEADER
3481  023426  062703  000006          3$:     ADD     #6,R3           ;BUMP TO NEXT HEADER
3482  023432  020337  001236                  CMP     R3,$TMP0        ;TEST IF END OF HEADERS REACHED
3483  023436  003741                          BLE     4$              ;NO - GO TEST NEXT HEADER
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3484  023440  010037  001202                  MOV     R0,$REG10       ;SET UP CYLINDER AND TRACK FOR REPORT
3485  023444  010137  001204                  MOV     R1,$REG11
3486  023450  104103                          ERROR   103             ;REPORT ERROR
3487  023452  000137  016202                  JMP     START
3488  023456  016304  002662          5$:     MOV     RDBUF+2(R3),R4  ;GET TRACK/SECTOR AGAIN
3489  023462  042704  177740                  BIC     #177740,R4      ;CLEAR ALL BUT SECTOR
3490  023466  020437  006342                  CMP     R4,SEINUS       ;TEST IF A VALID SECTOR NUMBER
3491  023472  002355                          BGE     3$              ;NO - GO BUMP TO NEXT SECTOR
3492  023474  013702  006342                  MOV     SEINUS,R2       ;INITIALIZE COUNTER FOR MOV
3493  023500  010401                          MOV     R4,R1           ;SET THE INDEX VALUE BY MULT SECTOR READ BY 6
3494  023502  006304                          ASL     R4
3495  023504  006304                          ASL     R4
3496  023506  060104                          ADD     R1,R4
3497  023510  060104                          ADD     R1,R4
3498  023512  016364  002660  006100  6$:     MOV     RDBUF(R3),BUFF1(R4)     ;MOV WORD ONE
3499  023520  016364  002662  006102          MOV     RDBUF+2(R3),BUFF1+2(R4) ;MOV WORD TWO
3500  023526  016364  002664  006104          MOV     RDBUF+4(R3),BUFF1+4(R4) ;MOV WORD THREE
3501  023534  005302                          DEC     R2              ;DECREMENT COUNT
3502  023536  001415                          BEQ     8$              ;COUNT ZERO MOVE DONE, EXIT
3503  023540  062704  000006                  ADD     #6,R4           ;BUMP INDEX POINTERS TO NEXT HEADER
3504  023544  062703  000006                  ADD     #6,R3
3505  023550  020337  001236                  CMP     R3,$TMP0        ;TEST IF END OF RDBUF REACHED
3506  023554  002401                          BLT     7$              ;NO - SKIP RESET TO START OF BUFFER
3507  023556  005003                          CLR     R3              ;ELSE RESET R3
3508  023560  020437  001236          7$:     CMP     R4,$TMP0        ;SAME TEST FOR BUFF1
3509  023564  002752                          BLT     6$              ;IF NOT END OF BUFFER, GO DO NEST MOVE
3510  023566  005004                          CLR     R4              ;ELSE RESET R4 TO START OF BUFFER
3511  023570  000750                          BR      6$              ;THEN GO DO NEXT MOVE
3512  023572  104412                  8$:     RESREG
3513  023574  000207                          RTS     PC
3514                                  ;;*****************************************************************
3515                                  .SBTTL  HEADER COMPARE ROUTINE
3516                                  ;;*****************************************************************
3517  023576                          HDRCMP:
3518  023576  104411                          SAVREG
3519  023600  005002                          CLR     R2
3520  023602  013704  006342                  MOV     SEINUS,R4       ;GET NUM OF SECTORS
3521  023606  026262  005674  006100  1$:     CMP     BUFF0(R2),BUFF1(R2) ;COMPARE HDR WORD 1
3522  023614  001015                          BNE     2$
3523  023616  026262  005676  006102          CMP     BUFF0+2(R2),BUFF1+2(R2) ;COMPARE HDR WORD 2
3524  023624  001011                          BNE     2$
3525  023626  026262  005700  006104          CMP     BUFF0+4(R2),BUFF1+4(R2) ;COMPARE HDR WORD 3
3526  023634  001005                          BNE     2$
3527  023636  062702  000006          3$:     ADD     #6,R2           ;BUMP INDEX
3528  023642  005304                          DEC     R4              ;DEC COUNT
3529  023644  001360                          BNE     1$              ;LOOP UNTIL ZERO
3530  023646  000420                          BR      4$              ;EXIT
3531  023650  012703  001174          2$:     MOV     #$REG5,R3       ;SET UP FOR ERROR REPORT
3532  023654  016223  005674                  MOV     BUFF0(R2),(R3)+
3533  023660  016223  005676                  MOV     BUFF0+2(R2),(R3)+
3534  023664  016223  005700                  MOV     BUFF0+4(R2),(R3)+
3535  023670  016223  006100                  MOV     BUFF1(R2),(R3)+
3536  023674  016223  006102                  MOV     BUFF1+2(R2),(R3)+
3537  023700  016223  006104                  MOV     BUFF1+4(R2),(R3)+
3538  023704  104062                          ERROR   62              ;REPORT ERROR
3539  023706  000753                          BR      3$              ;GO TEST NEXT HEADER
```

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3540  023710  104412                  4$:     RESREG                  ;EXIT
3541  023712  000207                          RTS     PC
3542                                  ;;*****************************************************************
3543                                  .SBTTL  DATA VERIFY WITH WRITE CHECK OPERATION ROUTINE
3544                                  ;;*****************************************************************
3545  023714                          WCOP:
3546  023714  104411                          SAVREG
3547  023716  013765  006306  000012  12$:    MOV     TKWDCT,P.WC(R5) ;SET WORD COUNT FOR 1 TRACK
3548  023724  005037  002650                  CLR     DERCNT          ;CLEAR ERROR COUNT
3549  023730  105065  000004                  CLRB    P.SECT(R5)      ;SET TO SECTOR 0
3550  023734  004737  031262          5$:     JSR     PC,POSOFF       ;GO POSITION AND OFFSET
3551  023740  012765  006346  000010          MOV     #WEINUS,P.BALO(R5) ;SET UP FOR EVEN OR ODD
3552  023746  032700  000001                  BIT     #BIT0,R0        ;CYLINDER DATA
3553  023752  001403                          BEQ     1$
3554  023754  012765  006350  000010          MOV     #WOINUS,P.BALO(R5)
3555
3556  023762  010065  000002          1$:     MOV     R0,P.CYLN(R5)   ;SET UP PARAMETER BLOCK
3557  023766  110165  000005                  MOVB    R1,P.TRCK(R5)   ;FOR 1 TRACK WRITE CHECK
3558  023772  005065  000014                  CLR     P.PRST(R5)
3559  023776  052765  100000  000014          BIS     #DTBAII,P.PRST(R5)
3560  024004  112765  000131  000001          MOVB    #WRTCHK,P.CMND(R5)
3561  024012  004737  025442                  JSR     PC,DRVCAL
3562  024016  032737  100000  006364          BIT     #ANYDER,RECODE  ;TEST IF ANY ERROR
3563  024024  001002                          BNE     16$
3564  024026  000137  024566                  JMP     15$             ;GO TO EXIT
3565  024032  016503  000022          16$:    MOV     P.WCR R5),R3    ;STORE WORD COUNT & SECTOR
3566  024036  016502  000026                  MOV     P.DTS(R5),R2    ;NUMBER AT ERROR TIME
3567  024042  042702  177740                  BIC     #177740,R2      ;CLEAR ALL BUT SECTOR NUMBER
3568  024046  042703  000377                  BIC     #377,R3         ; MAKE THE WORD COUNT
3569                                                                  ;MODULO 400
3570  024052  032737  000016  006364          BIT     #OPIERR!HVRCER!BSERR,RECODE ;TEST IF OPI OR HVRC
3571  024060  001013                          BNE     4$              ;IF YES-SKIP
3572  024062  032737  000020  006364          BIT     #DCKERR,RECODE  ;TEST IF DATA CHECK
3573  024070  001402                          BEQ     2$              ;IF NO, WD COUNT IS NOW CORRECT-SKIP
3574  024072  162703  000400                  SUB     #400,R3         ;ELSE INCREASE WORD COUNT
3575  024076  005702                  2$:     TST     R2              ;TEST IF SECTOR NOW ZERO
3576  024100  001002                          BNE     3$              ;IF NO-GO DECREMENT IT
3577  024102  013702  006342                  MOV     SEINUS,R2       ;ELSE GET MAX SECTOR +1 VALUE
3578  024106  005302                  3$:     DEC     R2              ;NOW DECREMENT IT
3579  024110  032737  000002  006364  4$:     BIT     #BSERR,RECODE   ;TEST IF BAD SECTOR
3580  024116  001453                          BEQ     6$              ;IF YES - GO CONTINUE TRACK
3581  024120  005202                  8$:     INC     R2              ;ELSE BUMP TO NEXT SECTOR
3582  024122  020237  006342                  CMP     R2,SEINUS       ;IF NOT AT LAST SECTOR -
3583  024126  002402                          BLT     19$             ;GO TO EXIT IF LAST SECTOR IN ERROR
3584  024130  000137  024566                  JMP     15$
3585  024134  105037  002650          19$:    CLRB    DERCNT          ;CLEAR ERROR COUNT
3586  024140  010265  000004                  MOV     R2,P.SECT(R5)   ;SET UP FOR CONTINUE OF WC
3587  024144  062703  000400                  ADD     #400,R3         ;BUMP COUNT TO NEXT SECTOR
3588  024150  012704  000010                  MOV     #10,R4
3589
3590                                  ;THE FOLLOWING BLOCK OF CODE CHECKS THAT THE WORD COUNT IS
3591                                  ;CORRECTLY ADJUSTED TO PICK UP THE OPERATION AFTER THE SECTOR
3592                                  ;THAT IS CAUSING THE ERROR IS PROCESSED. IF THE WORD COUNT
3593                                  ;SOMEHOW GETS SCREWED UP THE PROGRAM HALTS. CONTINUE CAN BE
3594                                  ;DEPRESSED TO CAUSE THE WORD COUNT TO BE CORRECTED AND THE
3595                                  ;PROGRAM ADJUSTS THE COUNT AND CONTINUES THE OPERATION.
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3596  024154  006302                  17$:    ASL     R2
3597  024156  005304                          DEC     R4
3598  024160  001375                          BNE     17$
3599  024162  012704  013000                  MOV     #13000,R4
3600  024166  023727  006342  000026          CMP     SEINUS,#26      ;TEST IF WE ARE IN 26 SECTOR FORMAT
3601  024174  001402                          BEQ     20$             ;YES - SKIP
3602  024176  012704  012000                  MOV     #12000,R4       ;ELSE SET COUNT FOR 24 SECTOR FORMAT
3603  024202  160204                  20$:    SUB     R2,R4
3604  024204  005404                          NEG     R4
3605  024206  016502  000004                  MOV     P.SECT(R5),R2
3606  024212  020403                          CMP     R4,R3
3607  024214  001411                          BEQ     18$
3608  024216  010437  001204                  MOV     R4,$REG11
3609  024222  010337  001206                  MOV     R3,$REG12
3610  024226  010237  001202                  MOV     R2,$REG10
3611  024232  104105                          ERROR   105
3612  024234  000000                          HALT
3613  024236  010403                          MOV     R4,R3
3614
3615                                          ;END OF CODE TO CHECK WORD COUNT
3616
3617  024240  010365  000012          18$:    MOV     R3,P.WC(R5)     ;AT NEXT SECTOR
3618  024244  000633                          BR      5$              ;GO DO IT
3619  024246  105237  002650          6$:     INCB    DERCNT          ;RETRY SEQUENCE-
3620  024252  004737  031262                  JSR     PC,POSOFF       ;GO POSITION AND OFFSET
3621  024256  112765  000131  000001          MOVB    #WRTCHK,P.CMND(R5) ;COUNT THE ERROR
3622  024264  010065  000002                  MOV     R0,P.CYLN(R5)   ;SET UP PARAM BLOCK
3623  024270  110165  000005                  MOVB    R1,P.TRCK(R5)
3624  024274  110265  000004                  MOVB    R2,P.SECT(R5)
3625  024300  012765  177400  000012          MOV     #177400,P.WC(R5)
3626  024306  052765  100000  000014          BIS     #DTBAII,P.PRST(R5)
3627  024314  004737  025442                  JSR     PC,DRVCAL
3628  024320  032737  100000  006364          BIT     #ANYDER,RECODE  ;TEST IF ANY ERROR
3629  024326  001507                          BEQ     14$             ;GO TYPE RETRY SUCCESSFUL IF NO
3630  024330  022737  000007  002650          CMP     #7,DERCNT       ;ELSE TEST IF ENOUGH RETRIES
3631  024336  002343                          BGE     6$              ;NO-LOOP
3632  024340  032737  000100  006364          BIT     #WCERR,RECODE   ;TEST IF WCE, IF
3633  024346  001446                          BEQ     10$             ;NO GO CHECK FOR DATA CHECK
3634  024350  004737  031262                  JSR     PC,POSOFF       ;GO POSITION AND OFFSET
3635  024354  112765  000121  000001          MOVB    #RDDATA,P.CMND(R5) ;ELSE DO A READ OF SECTOR
3636  024362  012765  177400  000012          MOV     #177400,P.WC(R5) ;IN ERROR
3637  024370  010065  000002                  MOV     R0,P.CYLN(R5)
3638  024374  110165  000005                  MOVB    R1,P.TRCK(R5)
3639  024400  110265  000004                  MOVB    R2,P.SECT(R5)
3640  024404  005065  000014                  CLR     P.PRST(R5)      ;CLEAR PROGRAM STATUS WORD (BAII)
3641  024410  012765  002660  000010          MOV     #RDBUF,P.BALO(R5)
3642  024416  004737  025442                  JSR     PC,DRVCAL
3643  024422  032737  100000  006364          BIT     #ANYDER,RECODE  ;IF NO ERROR ON READ
3644  024430  001442                          BEQ     13$
3645  024432  032737  000020  006364          BIT     #DCKERR,RECODE  ;OR NO DATA CHECK
3646  024440  001436                          BEQ     13$             ;GO PRINT FUNNY MESSAGE
3647  024442  004737  024572                  JSR     PC,DACOMP       ;ELSE COMPARE DATA & PRINT ERRORS
3648  024446  032737  000040  006364  9$:     BIT     #ECCNC,RECODE   ;CHECK IF NON-CORRECTABLE
3649  024454  001007                          BNE     11$             ;IF YES-GO TO BAD SECTOR PROCESSING
3650  024456  104401  015256                  TYPE    ,CORABL         ;ELSE TYPE CORRECTABLE MESSAGE
3651  024462  000616                          BR      8$              ;& GO WC REST OF TRACK
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3652  024464  032737  000020  006364  10$:    BIT     #DCKERR,RECODE  ;THIS IS TEST IF DAK WITH NO WCE
3653  024472  001365                          BNE     9$              ;IF YES-GO TEST FOR CORRECTABLE
3654  024474  005037  001174          11$:    CLR     $REGS
3655  024500  113737  002650  001174          MOVB    DERCNT,$REGS
3656  024506  104102                          ERROR   102
3657  024510  104076                          ERROR   76              ;REPORT MARKING SECTOR BAD
3658  024512  004737  022024                  JSR     PC,BSSINS       ;PUT BAD SECTOR IN BAD SECTOR
3659  024516  004737  021342                  JSR     PC,BLDHDR       ;TABLE, COMPUTE NEW HEADERS,
3660  024522  004737  022206                  JSR     PC,WRTHDR       ;WRITE THEM, REWRITE THE
3661  024526  004737  022312                  JSR     PC,WRTTRK       ;TRACK
3662  024532  000137  023716                  JMP     12$             ;& REDO THE WRITE CHECK
3663  024536  104401  015111          13$:    TYPE    ,IMPER2         ;TYPE FUNNY MESSAGE
3664  024542  000137  023716                  JMP     12$             ;GO RESTART THE WRITE CHECK
3665  024546  005037  001174          14$:    CLR     $REGS
3666  024552  113737  002650  001174          MOVB    DERCNT,$REGS    ;GET RETRY COUNT
3667  024560  104101                          ERROR   101             ;RETRY SUCCESFUL MESSAGE
3668  024562  000137  024120                  JMP     8$
3669  024566  104412          15$:    RESREG                          ;EXIT
3670  024570  000207                  RTS     PC
3671                          ;;*****************************************************************
3672                          .SBTTL  DATA COMPARE ROUTINE
3673                          ;;*****************************************************************
3674  024572                  DACOMP:
3675  024572  104411                  SAVREG
3676  024574  005005                  CLR     R5              ;CLEAR R5 FOR ERROR COUNTING
3677  024576  012703  006346          MOV     #WEINUS,R3      ;GET THE WORD THAT SHOULD BE
3678  024602  032700  000001          BIT     #BIT0,R0        ;WRITTEN THROUGHOUT THE CYLINDER
3679  024606  001402                  BEQ     1$
3680  024610  012703  006350          MOV     #WOINUS,R3
3681  024614  012704  002660  1$:     MOV     #RDBUF,R4       ;SET POINTER TO READ DATA
3682  024620  010037  001174          MOV     R0,$REGS        ;STORE PACK ADDRESS FOR REPORT
3683  024624  010137  001176          MOV     R1,$REG6
3684  024630  010237  001200          MOV     R2,$REG7
3685  024634  012701  000001          MOV     #1,R1           ;PRESET REGISTERS
3686  024640  012702  000001          MOV     #1,R2           ;FOR COUNTING
3687  024644  012700  000400          MOV     #400,R0
3688  024650  021324          2$:     CMP     (R3),(R4)+      ;COMPARE DATA
3689  024652  001005                  BNE     3$              ;GO REPORT IF NOT EQUAL
3690  024654  005202          5$:     INC     R2              ;ELSE BUMP COUNTERS
3691  024656  005300                  DEC     R0
3692  024660  001373                  BNE     2$              ;LOOP UNTIL DONE
3693  024662  104412          6$:     RESREG
3694  024664  000207                  RTS     PC
3695  024666  005205          3$:     INC     R5              ;BUMP ERROR COUNT
3696  024670  005301                  DEC     R1              ;BUMP R1 TO ZERO
3697  024672  011337  001202          MOV     (R3),$REG10     ;STORE GOOD, BAD, & WORD NUM
3698  024676  014437  001204          MOV     -(R4),$REG11
3699  024702  010237  001206          MOV     R2,$REG12
3700  024706  005724                  TST     (R4)+           ;BUMP R4 TO NEXT DATA WORD
3701  024710  005701                  TST     R1              ;TEST R1 SWITCH
3702  024712  001001                  BNE     4$              ;IF NOT ZERO, THIS IS NOT FIRST PASS
3703  024714  104034                  ERROR   34              ;TYPE HEADING
3704  024716  032777  000002  154214  4$:     BIT     #SW1,@SWR       ;TEST IF NO LIMIT ON ERRORS
3705  024724  001003                  BNE     7$              ;SWITCH 1 OFF - LIMIT TO 10
3706  024726  020527  000010          CMP     R5,#10  ;ELSE TEST IF 10 ERRORS REPORTED
3707  024732  001753                  BEQ     6$              ;YES - EXIT
```

```
3708  024734  104063                  7$:     ERROR   63              ;TYPE DATA
3709  024736  000746                          BR      5$              ;GO CONTINUE COMPARE
3710                                  ;;*****************************************************************
3711                                  .SBTTL  DATA VERIFY WITH READ OPERATION ROUTINE
3712                                  ;;*****************************************************************
3713  024740                          RDOP:
3714  024740  104411                          SAVREG
3715  024742  105065  000004                  CLRB    P.SECT(R5)      ;SET UP TO READ A FULL TRACK
3716  024746  105037  002650                  CLRB    DERCNT          ;WITH BUS INCREMENT INHIBIT
3717  024752  013765  006306  000012          MOV     TKWDCT,P.WC(R5)
3718  024760  004737  031262          6$:     JSR     PC,POSOFF       ;GO POSITION AND OFFSET
3719  024764  010065  000002                  MOV     R0,P.CYLN(R5)
3720  024770  110165  000005                  MOVB    R1,P.TRCK(R5)
3721  024774  005065  000014                  CLR     P.PRST(R5)
3722  025000  052765  100000  000014          BIS     #DTBAII,P.PRST(R5)
3723  025006  112765  000121  000001          MOVB    #RDDATA,P.CMND(R5)
3724  025014  004737  025442                  JSR     PC,DRVCAL       ;DO IT
3725  025020  032737  100000  006364          BIT     #ANYDER,RECODE  ;TEST IF ANY DATA ERROR
3726  025026  001002                          BNE     11$             ;READ A-OK, EXIT
3727  025030  000137  025436                  JMP     8$
3728  025034  016537  000022  001254  11$:    MOV     P.WCR(R5),$TMP7 ;STORE WORD COUNT AT ERROR
3729  025042  016502  000026                  MOV     P.DTS(R5),R2    ;STORE SECTOR & TRACK
3730  025046  042702  177400                  BIC     #177400,R2      ;CLEAR ALL BUT SECTOR
3731  025052  062737  000400  001254          ADD     #400,$TMP7      ;BUMP STORED WORD COUNT BY 1 SECTOR
3732  025060  032737  000002  006364          BIT     #BSERR,RECODE   ;CHECK IF BAD SECTOR
3733  025066  001106                          BNE     5$              ;YES - GO CONTINUE READ
3734  025070  032737  000020  006364          BIT     #DCKERR,RECODE  ;CHECK IF DATA CHECK
3735  025076  001410                          BEQ     3$              ;IF YES, DECREMENT SECTOR COUNT BY
3736  025100  005702                          TST     R2              ;1 TO GET SECTOR IN ERROR BUT BE
3737  025102  001002                          BNE     1$              ;SURE SECTOR COUNT IS NOT ZERO
3738  025104  013702  006342                  MOV     SEINUS,R2
3739  025110  005302                  1$:     DEC     R2
3740  025112  162737  000400  001254          SUB     #400,$TMP7      ;IF DCK, ADD WORD COUNT BACK IN
3741  025120  105237  002650          3$:     INCB    DERCNT          ;BUMP ERROR COUNT
3742  025124  004737  031262                  JSR     PC,POSOFF       ;GO POSITION AND OFFSET
3743  025130  112765  000121  000001          MOVB    #RDDATA,P.CMND(R5) ;ELSE SET UP TO RETRY
3744  025136  010065  000002                  MOV     R0,P.CYLN(R5)
3745  025142  110165  000005                  MOVB    R1,P.TRCK(R5)
3746  025146  110265  000004                  MOVB    R2,P.SECT(R5)
3747  025152  012765  177400  000012          MOV     #177400,P.WC(R5)
3748  025160  012765  001240  000010          MOV     #$TMP1,P.BALO(R5)
3749  025166  052765  100000  000014          BIS     #DTBAII,P.PRST(R5)
3750  025174  004737  025442                  JSR     PC,DRVCAL
3751  025200  032737  100000  006364          BIT     #ANYDER,RECODE  ;ANY DATA ERROR IN RETRY?
3752  025206  001504                          BEQ     7$              ;NO-GO TYPE RETRY SUCCESSFUL
3753  025210  122737  000007  002650          CMPB    #7,DERCNT       ;ELSE CHECK IF ERROR COUNT TO BIG
3754  025216  002340                          BGE     3$              ;IF YES-TYPE UNSUCCESSFUL
3755  025220  005037  001174                  CLR     $REG5
3756  025224  113737  002650  001174          MOVB    DERCNT,$REG5
3757  025232  104102                          ERROR   102
3758  025234  032737  000020  006364          BIT     #DCKERR,RECODE  ;TEST IF THIS IS A DATA ERROR
3759  025242  001420                          BEQ     5$              ;IF NO - SKIP ECC PRINTOUT
3760  025244  016537  000060  001174          MOV     P.EPOS(R5),$REG5  ;STORE ECC PATTERN AND POSITION
3761  025252  016537  000062  001176          MOV     P.EPAT(R5),$REG6  ;FOR ERROR REPORT
3762  025260  005037  001200                  CLR     $REG7           ;SET $REG7 FOR ECC UNCORRECTABLE
3763  025264  032737  000040  006364          BIT     #ECCNC,RECODE   ;WAS THAT CORRECT?
```

```
3764  025272  001003                        BNE     4$                      ;YES - GO REPORT
3765  025274  052737  000001  001200        BIS     #1,$REG7                ;NO - SET FOR CORRECTABLE
3766  025302  104077                4$:     ERROR   77                      ;REPORT ERROR
3767  025304  005202                5$:     INC     R2                      ;SET UP TO CONTINUE ON NEXT SECTOR
3768  025306  020237  006342                CMP     R2,SEINUS               ;CHECK IF ERROR SECTOR WAS LAST SECTOR
3769  025312  002051                        BGE     8$                      ;EXIT IF YES
3770  025314  010265  000004                MOV     R2,F.SECT(R5)           ;READ OF REST OF TRACK BY
3771  025320  012704  000010                MOV     #10,R4
3772  025324  006302                9$:     ASL     R2
3773  025326  005304                        DEC     R4
3774  025330  001375                        BNE     9$
3775  025332  012704  013000                MOV     #13000,R4
3776  025336  160204                        SUB     R2,R4
3777  025340  005404                        NEG     R4
3778  025342  016502  000004                MOV     P.SECT(R5),R2
3779  025346  020437  001254                CMP     R4,$TMP7
3780  025352  001413                        BEQ     10$
3781  025354  010437  001204                MOV     R4,$REG11
3782  025360  013737  001254  001206        MOV     $TMP7,$REG12
3783  025366  010237  001202                MOV     R2,$REG10
3784  025372  104105                        ERROR   105
3785  025374  000000                        HALT
3786  025376  010437  001254                MOV     R4,$TMP7
3787  025402  013765  001254  000012  10$:  MOV     $TMP7,P.WC(R5)          ;BUMPING TO THE NEXT SECTOR
3788  025410  105037  002650                CLRB    DERCNT                  ;INSERTING THE WORD COUNT &
3789  025414  000137  024760                JMP     6$                      ;GO START RD DATA
3790  025420  005037  001174          7$:   CLR     $REG5                   ;CLEAR REG 5 FOR RETRY COUNT BYTE
3791  025424  113737  002650  001174        MOVB    DERCNT,$REG5            ;GET RETRY COUNT
3792  025432  104101                        ERROR   101                     ;REPORT RETRY SUCCESSFUL
3793  025434  000723                        BR      5$
3794  025436  104412                8$:     RESREG
3795  025440  000207                        RTS     PC
3796                        ;:*****************************************************************
3797                        ;SBTTL  CALL DRIVER ROUTINE
3798                        ;*ENTRY JSR PC,DRVCAL
3799                        ;*              WITH R5 POINTING TO PARAMETER BLOCK
3800                        ;*RETURN RTS PC
3801                        ;*
3802                        ;*THIS ROUTINE IS USED TO INITIATE A SUBSYSTEM OPERATION BY
3803                        ;*CALLING THE DRIVER. THE PARAMETER BLOCK MUST BE SET UP
3804                        ;*BY THE CALLER AND R5 MUST POINT TO THE PARAMETER
3805                        ;*BLOCK WHEN THE ROUTINE IS CALLED.
3806                        ;*
3807                        ;*THIS ROUTINE WAITS FOR THE OPERATION TO BE COMPLETED.
3808                        ;*WHILE WAITING THE WATCHDOG TIMER IS CALLED TO PREVENT
3809                        ;*SILENT DEATH IN CASE THE SUBSYSTEM DOES NOT PROVIDE AN
3810                        ;*INTERRUPT. THE TERMINATION HANDLER ROUTINES WILL SET THE DONE
3811                        ;*FLAG WHICH KEYS THE ROUTINE TO RETURN TO THE CALLER.
3812                        ;*****************************************************************
3813  025442  105037  002652  DRVCAL: CLRB    DONE                    ;CLEAR DONE FLAG
3814  025446  010146                  MOV     R1,-(SP)                ;STORE REGS
3815  025450  010546                  MOV     R5,-(SP)
3816  025452  012701  005660          MOV     #COMSTR,R1              ;GET ADDRESS OF COMMAND STORAGE
3817  025456  012521                  MOV     (R5)+,(R1)+             ;STORE PARAMETER VALUES
3818  025460  012521                  MOV     (R5)+,(R1)+             ;IN COMMAND STORAGE
3819  025462  012521                  MOV     (R5)+,(R1)+
```

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3820  025464  012521                          MOV     (R5)+,(R1)+
3821  025466  012521                          MOV     (R5)+,(R1)+
3822  025470  012521                          MOV     (R5)+,(P1)+
3823  025472  012605                          MOV     (SP)+,R5
3824  025474  012601                          MOV     (SP)+,R1
3825  025476  010537  026506                  MOV     R5,1$                   ;GET PARAM BLOCK ADDRESS
3826  025502  004737  035742                  JSR     PC,C.INIT               ;CALL DRIVER
3827  025506  000000                  1$:     .WORD                           ;P.B. ADDRESS GOES HERE
3828  025510  004737  032312          2$:     JSR     PC,W.WTCH               ;CALL WATCH DOG
3829  025514  105737  002652                  TSTB    DONE                    ;DONE SET?
3830  025520  001773                          BEQ     2$                      ;NO-LOOP
3831  025522  000207                          RTS     PC                      ;YES-RETURN
3832                                  ;;*****************************************************************
3833                                  .SBTTL  DRIVE ERROR FREE RETURN ROUTINE
3834                                  ;*THIS ROUTINE IS CALLED BY THE DRIVER WHEN NO ERROR
3835                                  ;*HAS BEEN DETECTED IN THE OPERATION. THE ROUTINE SETS THE
3836                                  ;*DONE FLAG THAT IS TESTED IN THE DRIVER CALLING
3837                                  ;*ROUTINE.
3838                                  ;;*****************************************************************
3839  025524  152737  000377  002652  ERRFRE: BISB    #377,DONE               ;SET THE DONE FLAG
3840  025532  032737  100000  006364          BIT     #ANYDER,RECODE          ;TEST IF ANY DATA ERROR
3841  025540  001403                          BEQ     2$                      ;IF NO - DO ERROR RECOVERY PRINT TEST
3842  025542  105037  002654                  CLRB    ERRCNT                  ;CLEAR ERROR COUNT
3843  025546  000413                          BR      1$                      ;EXIT
3844  025550  105737  002654          2$:     TSTB    ERRCNT                  ;CHECK IF ANY ERRORS HAVE OCCURRED
3845  025554  001410                          BEQ     1$                      ;NO - SKIP TO EXIT
3846  025556  005037  001174                  CLR     $REGS
3847  025562  113737  002654  001174          MOVB    ERRCNT,$REGS            ;GET RETRY COUNT
3848  025570  104101                          ERROR   101                     ;PRINT RETRY SUCCESSFUL MESSAGE
3849  025572  105037  002654                  CLRB    ERRCNT                  ;CLEAR ERROR COUNT
3850  025576  005037  006364          1$:     CLR     RECODE                  ;CLEAR RECOVERY FLAGS
3851  025602  000207                          RTS     PC                      ;RETURN
3852                                  ;;*****************************************************************
3853                                  .SBTTL  TYPE ERROR ROUTINE
3854                                  ;*ENTRY JSR PC,TYP ERR
3855                                  ;*RETURN RTS PC
3856                                  ;*
3857                                  ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
3858                                  ;*ERROR IS TO BE REPORTED. IT THEN USES THE "ERROR TABLE" ($ERRTB)
3859                                  ;*ENTRY TO DEFINE WHAT INFORMATION IS TO BE REPORTED CONCERNING
3860                                  ;*THE ERROR.
3861                                  ;;*****************************************************************
3862  025604  104411                  TYPERR: SAVREG
3863  025606  032777  020000  153324          BIT     #SW13,@SWR              ;INHIBIT ERROR TYPEOUTS?
3864  025614  001107                          BNE     20$                     ;YES-BRANCH
3865  025616  113700  001114                  MOVB    $ITEMB,R0               ;ENTER ERROR NUMBER
3866  025622  042700  177400                  BIC     #177400,R0              ;CLEAR UPPER BITS
3867  025626  005300                          DEC     R0                      ;FORM INDEX FOR ERROR TABLE
3868  025630  006300                          ASL     R0
3869  025632  006300                          ASL     R0
3870  025634  006300                          ASL     R0
3871  025636  062700  001272          1$:     ADD     #$ERRTB,R0              ;FORM ADDRESS OF ERROR ENTRY
3872  025642  012037  025656                  MOV     (R0)+,2$                ;GET EM POINTER
3873  025646  001404                          BEQ     3$                      ;BRANCH IF THERE ISN'T ONE
3874  025650  104401  001267                  TYPE    ,$CRLF                  ;TYPE CARRIAGE RETURN LINE FEED
3875  025654  104401                          TYPE                            ;TYPE ERROR MESSAGE (EM)
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3876  025656  000000                  2$:     .WORD   0               ;EM POINTER GOES HERE
3877  025660  012037  025674          3$:     MOV     (R0)+,4$        ;GET DH POINTER
3878  025664  001404                          BEQ     5$              ;BRANCH IF THERE ISN'T ONE
3879  025666  104401  001267                  TYPE    .$CRLF          ;TYPE CR-LF
3880  025672  104401                          TYPE                    ;TYPE DATA HEADER
3881  025674  000000                  4$:     .WORD   0               ;DH POINTER GOES HERE
3882  025676  012001                  5$:     MOV     (R0)+,R1        ;GET DT POINTER
3883  025700  001455                          BEQ     20$             ;BRANCH IF THERE ARE NONE
3884  025702  005004                          CLR     R4              ;SET INDENT SWITCH
3885  025704  012000                          MOV     (R0)+,R0        ;GET DF POINTER
3886  025706  012002                          MOV     (R0)+,R2        ;STORE NUMBER OF DH'S
3887  025710  001446                          BEQ     17$             ;DH NUM IS 0-BRANCH
3888  025712  005104                          COM     R4              ;NO INDENT
3889  025714  104401  001267                  TYPE    .$CRLF
3890  025720  112003                  10$:    MOVB    (R0)+,R3        ;GET & STORE NUMPER OF DATA WORDS
3891  025722  105720                          TSTB    (R0)+           ;BUMP PAST FORMAT WORD
3892  025724  005703                          TST     R3              ;TEST IF ANY DATA FOR THIS HEADER
3893  025726  001407                          BEQ     14$             ;NO - SKIP DATA PRINT
3894  025730  013146                  11$:    MOV     @(R1)+,-(SP)    ;PUT FIRST DATA WORD ON STACK
3895  025732  104402                          TYPOC                   ;TYPE IT
3896  025734  005303                          DEC     R3              ;MORE DATA WORDS
3897  025736  001403                          BEQ     14$             ;NO-BRANCH
3898  025740  104401  012765                  TYPE    .SPACE2         ;TYPE SEPARATORS
3899  025744  000771                          BR      11$             ;LOOP
3900  025746  005302                  14$:    DEC     R2              ;MORE DH'S?
3901  025750  003431                          BLE     20$             ;NO-BRANCH
3902  025752  104401  001267                  TYPE    .$CRLF
3903  025756  005760  000002                  TST     2(R0)           ;ONLY A DH IN THIS REQUEST?
3904  025762  001404                          BEQ     15$             ;YES-BRANCH BYPASS INDENT
3905  025764  005104                          COM     R4              ;INDENT?
3906  025766  001002                          BNE     15$             ;NO-BRANCH
3907  025770  104401  012765                  TYPE    .SPACE2         ;YES-TYPE SPACES
3908  025774  012037  026002          15$:    MOV     (R0)+,16$       ;GET NEXT DH POINTER
3909  026000  104401                          TYPE                    ;TYPE DH
3910  026002  000000                  16$:    .WORD   0               ;DH POINTER GOES HERE
3911  026004  105710                          TSTB    (R0)            ;TYPE A DT?
3912  026006  001003                          BNE     21$             ;YES-BRANCH
3913  026010  062700  000002                  ADD     #2,R0           ;INCREMENT DF POINTER
3914  026014  000754                          BR      14$             ;SEE IF END OF DF BLOCK
3915  026016  104401  001267          21$:    TYPE    .$CRLF
3916  026022  005704                          TST     R4              ;INDENT?
3917  026024  001335                          BNE     10$             ;NO-BRANCH
3918  026026  104401  012765          17$:    TYPE    .SPACE2         ;YES-TYPE SPACES
3919  026032  000732                          BR      10$             ;LOOP
3920  026034  104412                  20$:    RESREG
3921  026036  000207                          RTS     PC
3922                                  ;*********************************************************************
3923                                  .SBTTL  CONTROLLER ERROR REPORTER ROUTINE
3924                                  ;*ENTRY:        JSR PC, CONERR
3925                                  ;*RETURN:       RTS PC
3926                                  ;*
3927                                  ;*THIS ROUTINE DECODES THE CONTROLLER ERROR WORD AND
3928                                  ;*REPORTS THE APPROPRIATE MESSAGE. THE RK611 REGISTERS ARE
3929                                  ;*RETRIEVED FROM THE RK611 AND PLACED IN THE PARAMETER
3930                                  ;*BLOCK. THIS IS DONE BECAUSE PARM 0 MAY NOT BE VALID
3931                                  ;*AT THIS TIME.
```

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3932                                    ;;*****************************************************************
3933  026040  104411                    CONERR: SAVREG
3934  026042  152737  000377  002652            BISB    #377,DONE       ;SET DONE FLAG
3935  026050  105237  002654                    INCB    ERRCNT          ;BUMP ERROR COUNTER
3936  026054  032765  001000  000014            BIT     #PBSVAL,P.PRST(R5) ;TEST IF STATUS VALID
3937  026062  001403                            BEQ     12$             ;YES - SKIP
3938  026064  004737  026302                    JSR     PC,REPSUP       ;CALL FOR GETTING STATUS
3939  026070  000402                            BR      13$
3940  026072  004737  030560          12$:      JSR     PC,TOPROC       ;LOAD RK REGS INTO $REGS
3941  026076  032737  000001  002604  13$:      BIT     #BIT0,E.CONT    ;ERROR 0?
3942  026104  001402                            BEQ     1$              ;NO-BRANCH
3943  026106  104064                            ERROR   64              ;CLEAR CONT DID NOT CLEAR ERROR
3944  026110  000463                            BR      2$
3945  026112  032737  000002  002604  1$:       BIT     #BIT1,E.CONT    ;ERROR 1?
3946  026120  001402                            BEQ     2$              ;NO-BRANCH
3947  026122  104065                            ERROR   65              ;NO ATTENTION IN ATTENTION SUM REG
3948  026124  000455                            BR      3$
3949  026126  032737  000004  002604  2$:       BIT     #BIT2,E.CONT    ;ERROR 2?
3950  026134  001402                            BEQ     3$              ;NO-BRANCH
3951  026136  104066                            ERROR   66              ;UNSOLICITED ATTENTION
3952  026140  000447                            BR      4$
3953  026142  032737  000010  002604  3$:       BIT     #BIT3,E.CONT    ;ERROR 3?
3954  026150  001402                            BEQ     4$              ;NO-BRANCH
3955  026152  104067                            ERROR   67              ;UNEXPECTED DATA TYPE ERROR
3956  026154  000441                            BR      5$
3957  026156  032737  000020  002604  4$:       BIT     #BIT4,E.CONT    ;ERROR 4?
3958  026164  001402                            BEQ     5$              ;NO-BRANCH
3959  026166  104070                            ERROR   70              ;ATTENTION DID NOT RESET WITH CLEAR
3960  026170  000433                            BR      7$
3961  026172  032737  000040  002604  5$:       BIT     #BIT5,E.CONT    ;ERROR 5?
3962  026200  001402                            BEQ     6$              ;NO-BRANCH
3963  026202  104071                            ERROR   71              ;SUBSYS CLEAR DIDN'T CLEAR DRIVE ATTENTION
3964  026204  000425                            BR      7$
3965  026206  032737  000400  002604  6$:       BIT     #BIT8,E.CONT
3966  026214  001401                            BEQ     8$
3967  026216  104072                            ERROR   72              ;DATA LATE WHEN UNLOADING HEADER
3968  026220  032737  001000  002604  8$:       BIT     #BIT9,E.CONT
3969  026226  001401                            BEQ     9$
3970  026230  104073                            ERROR   73              ;CONTROLLER ERROR DURING DRIVER SERVICE
3971  026232  032737  002000  002604  9$:       BIT     #BIT10,E.CONT
3972  026240  001401                            BEQ     10$
3973  026242  104074                            ERROR   74              ;DRIVE DETECTED PARITY ERROR
3974  026244  032737  100000  002604  10$:      BIT     #BIT15,E.CONT
3975  026252  001401                            BEQ     11$
3976  026254  104052                            ERROR   52              ;MULTIPLE DRIVE SELECT
3977  026256  104075                  11$:      ERROR   75              ;UNDEFINED ERROR
3978  026260  032737  000400  006364  7$:       BIT     #LEV2ER,RECODE  ;TEST IF LEVEL 2 ERROR
3979  026266  001401                            BEQ     14$             ;NO - SKIP
3980  026270  104106                            ERROR   106
3981  026272  005037  002604          14$:      CLR     E.CONT          ;CLEAR CONTROLLER ERROR WORD
3982  026276  000137  030416                    JMP     CERTY           ;GO DO RETRY
3983                                    ;;*****************************************************************
3984                                    ;SBTTL  REPORT SUPPORT ROUTINE
3985                                    ;*THIS ROUTINE LOADS ALL THE PARAMETER BLOCK DATA TO BE REPORTED
3986                                    ;*INTO THE PROPER TEMPORARY REGISTERS FOR REPORTING.  ALL THESE MAY
3987                                    ;*NOT BE INCLUDED IN THE REPORT, BUT THEY ARE LOADED ANYWAY.
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 3988  026302                                 REPSUP:
 3989  026302  104411                               SAVREG
 3990  026304  005037  006372                       CLR     ERRCOM          ;CLEAR ERROR COMMAND STORE
 3991  026310  116537  000001  006372               MOVB    P.CMND(R5),ERRCOM ;STORE COMMAND START VALUES
 3992  026316  012700  001162                       MOV     #$REGO,R0       ;FOR REPORTING
 3993  026322  016520  000002                       MOV     P.CYLN(R5),(R0)+
 3994  026326  116520  000005                       MOVB    P.TRCK(R5),(R0)+
 3995  026332  105020                               CLRB    (R0)+
 3996  026334  116520  000004                       MOVB    P.SECT(R5),(R0)+
 3997  026340  105020                               CLRB    (R0)+
 3998  026342  016520  000012                       MOV     P.WC(R5),(R0)+
 3999  026346  016520  000010                       MOV     P.BALO(R5),(R0)+
 4000  026352  016520  000016                       MOV     P.CS1(R5),(R0)+ ;GET ALL THE VALUES FROM THE
 4001  026356  016520  000020                       MOV     P.CS2(R5),(R0)+ ;PARAMETER BLOCK AND LOAD
 4002  026362  016520  000030                       MOV     P.DCYL(R5),(R0)+ ;THE TEMPORARY REGISTERS
 4003  026366  016520  000026                       MOV     P.DTS(R5),(R0)+ ;FOR REPORTING. ALL THIS
 4004  026372  016520  000022                       MOV     P.WCR(R5),(R0)+ ;DATA MAY NOT BE VALID
 4005                                                                       ;FOR ALL REPORTS (TO BE
 4006  026376  016520  000024                       MOV     P.BAR(R5),(R0)+ ;DETERMINED LATER) BUT IT IS
 4007  026402  016520  000032                       MOV     P.ASOF(R5),(R0)+ ;STORED ANY WAY.
 4008  026406  016520  000036                       MOV     P.DS(R5),(R0)+
 4009  026412  016520  000034                       MOV     P.ER(R5),(R0)+
 4010  026416  016520  000040                       MOV     P.AOO(R5),(R0)+
 4011  026422  016520  000042                       MOV     P.BOO(R5),(R0)+
 4012  026426  016520  000044                       MOV     P.AO1(R5),(R0)+
 4013  026432  016520  000046                       MOV     P.BO1(R5),(R0)+
 4014  026436  016520  000050                       MOV     P.A10(R5),(R0)+
 4015  026442  016520  000052                       MOV     P.B10(R5),(R0)+
 4016  026446  016520  000054                       MOV     P.A11(R5),(R0)+
 4017  026452  016520  000056                       MOV     P.B11(R5),(R0)+
 4018  026456  104422                               RESREG
 4019  026460  000207                               RTS     PC
 4020                                 ;*****************************************************************
 4021                                 ;SBTTL  REPORT ERROR ROUTINE
 4022                                 ;* ENTRY         JSR     PC, ERRHDL
 4023                                 ;*RETURN        RTS     PC
 4024                                 ;*
 4025                                 ;*THIS ROUTINE IS CALLED BY THE DRIVER WHEN AN ERROR IS DETECTED
 4026                                 ;*IN THE OPERATION.  THE ROUTINE DETERMINES WHICH COMMAND WAS
 4027                                 ;*BEING EXECUTED AND GENERATES THE PROPER ERROR MESSAGE.
 4028                                 ;*****************************************************************
 4029
 4030  026462  104411                 ERRHDL: SAVREG
 4031  026464  152737  000377  002652         BISB    #377,DONE       ;SET DONE FLAG
 4032  026472  105237  002654                 INCB    ERRCNT          ;INCREMENT ERROR COUNT
 4033  026476  005037  006364                 CLR     RECODE          ;CLEAR RECOVERY CODE WORD
 4034  026502  032737  000400  006364 ER2ENT: BIT     #LEV2ER,RECODE  ;TEST IF 2ND LEVEL ERROR
 4035  026510  001402                         BEQ     52$             ;NO - SKIP PARAM BLOCK CHANGE
 4036  026512  012705  002446                 MOV     #PARM1,R5       ;ELSE SET R5 TO PARAMETER BLOCK 1
 4037  026516  012737  030532  002600 52$:    MOV     #RETANL,A.ABNL  ;SET NOW ABNORMAL AND NORMAL RETURN FOR
 4038  026524  012737  030550  002576         MOV     #RETNML,A.NORM  ;DRIVER OPERATIONS IN ERROR PROCESSING
 4039  026532  004737  026302                 JSR     PC,REPSUP       ;GO SET UP REGISTERS FOR REPORT
 4040                                                                  ;NOW BEGIN TESTING THE ERROR
 4041                                                                  ;BITS. THE SEQUENCE IN
 4042                                                                  ;WHICH THEY ARE TESTED IS
 4043                                                                  ;CONSIDERED SIGNIFICANT IN
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4044                                                                    ;THAT ERRORS OF A MORE
4045                                                                    ;CATASTROPHIC NATURE ARE FIRST
4046                                                                    ;TESTED.
4047                                                                    ;
4048                                                                    ;IF AN ERROR IS FOUND SET,
4049                                                                    ;THAT ERROR IS REPORTED AND
4050                                                                    ;THE REPORTING IS TERMINATED.
4051                                                                    ;IF ADDITIONAL ERRORS ARE SET,
4052                                                                    ;THE RK611 REGISTER PRINTOUTS
4053                                                                    ;WILL SHOW THIS BUT THE
4054                                                                    ;REGISTER CONTENTS MUST BE
4055                                                                    ;MANUALLY DECODED TO LOCATE THE
4056                                                                    ;SECOND ERROR
4057  026536  016504  000034                MOV     P.ER(R5),R4       ;SET R4 TO ERROR REGISTER
4058  026542  032765  020000  000020        BIT     #UPE,P.CS2(R5)    ;TEST UPE. IF UES-SET
4059  026550  001406                        BEQ     1$                ;REPORT ERROR
4060  026552  104001                        ERROR   1
4061  026554  052737  000200  006364        BIS     #ABORT,RECODE
4062  026562  000137  030106                JMP     37$
4063  026566  032765  004000  000020  1$:   BIT     #NEM,P.CS2(R5)    ;TEST NON-EXISTANT MEMORY
4064  026574  001406                        BEQ     2$
4065  026576  104002                        ERROR   2
4066  026600  052737  000200  006364        BIS     #ABORT,RECODE
4067  026606  000137  030106                JMP     37$
4068  026612  032765  010000  000020  2$:   BIT     #NED,P.CS2(R5)    ;TEST NON-EXISTANT DRIVE
4069  026620  001412                        BEQ     3$
4070  026622  032765  000400  000020        BIT     #UFE,P.CS2(R5)    ;TEST IF NED & UFE BOTH SET
4071  026630  001403                        BEQ     38$
4072  026632  104035                        ERROR   35                ;NED & UFE BOTH SET ERROR
4073  026634  000137  030106                JMP     37$
4074  026640  104003                38$:    ERROR   3                 ;NED ONLY
4075  026642  000137  030106                JMP     37$
4076  026646  032765  000400  000020  3$:   BIT     #UFE,P.CS2(R5)    ;TEST UNIT FIELD ERROR
4077  026654  001412                        BEQ     4$
4078  026656  032765  010000  000020        BIT     #NED,P.CS2(R5)    ;TEST IF UFE & NED BOTH SET
4079  026664  001403                        BEQ     39$               ;NO-SKIP
4080  026666  104035                        ERROR   35                ;REPORT NED & UFE BOTH SET
4081  026670  000137  030106                JMP     37$
4082  026674  104004                39$:    ERROR   4                 ;REPORT UFE ONLY
4083  026676  000137  030106                JMP     37$
4084  026702  032765  000100  000014  4$:   BIT     #CMDTO,P.PRST(R5) ;
4085  026710  001414                        BEQ     5$
4086  026712  004737  030560                JSR     PC,TOPROC         ;GO PROCESS TIMEOUT
4087  026716  032737  000400  006364        BIT     #LEV2ER,RECODE    ;TEST IF LEVEL 2 ERROR
4088  026724  001003                        BNE     41$               ;YES - SKIP TO ERROR 57
4089  026726  104005                        ERROR   5                 ;ELSE MAKE FULL TIMEOUT REPORT
4090  026730  000137  030106                JMP     37$
4091  026734  104057                41$:    ERROR   57                ;2ND LEVEL ERROR REPORT
4092  026736  000137  030106                JMP     37$
4093  026742  032765  020000  000016  5$:   BIT     #SPAR,P.CS1(R5)   ;TEST DRIVE BUS PARITY ERROR
4094  026750  001406                        BEQ     6$
4095  026752  104006                        ERROR   6
4096  026754  052737  004000  006364        BIS     #RCLREQ,RECODE
4097  026762  000137  030106                JMP     37$
4098  026766  032704  000010          5$:   BIT     #DRPAR,R4         ;TEST DRIVE DETECTED PARITY ERROR
4099  026772  001406                        BEQ     7$
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4100  026774  104007                          ERROR   7
4101  026776  052737  004000  006364          BIS     #RCLREQ,RECODE
4102  027004  000137  030106                  JMP     37$
4103  027010  032765  000010  000036  7$:     BIT     #ACLO,P.DS(R5)  ;TEST AC LOW
4104  027016  001403                          BEQ     8$
4105  027020  104010                          ERROR   10
4106  027022  000137  030106                  JMP     37$
4107  027026  032765  000020  000036  8$:     BIT     #SPDLSS,P.DS(R5)        ;TEST SPEED LOSS
4108  027034  001403                          BEQ     24$
4109  027036  104011                          ERROR   11
4110  027040  000137  030106                  JMP     37$
4111  027044  032765  004000  000016  24$:    BIT     #CTO,P.CS1(R5)  ;TEST FOR CONTROLLER TIMEOUT
4112  027052  001401                          BEQ     25$
4113  027054  104027                          ERROR   27
4114  027056  032704  000001          25$:    BIT     #ILC,R4         ;TEST ILLEGAL FUNCTION CODE
4115  027062  001403                          BEQ     10$
4116  027064  104012                          ERROR   12
4117  027066  000137  030106                  JMP     37$
4118  027072  032765  002000  000020  10$:    BIT     #PGE,P.CS2(R5)  ,TEST PROGRAMMING ERROR
4119  027100  001403                          BEQ     11$
4120  027102  104013                          ERROR   13
4121  027104  000137  030106                  JMP     37$
4122  027110  032704  000004          11$:    BIT     #NXF,R4         ;TEST ILLEGAL DRIVE FUNCTION
4123  027114  001403                          BEQ     12$
4124  027116  104014                          ERROR   14
4125  027120  000137  030106                  JMP     37$
4126  027124  032704  000040          12$:    BIT     #DTYE,R4        ;TEST DRIVE TYPE ERROR
4127  027130  001403                          BEQ     13$
4128  027132  104015                          ERROR   15
4129  027134  000137  030106                  JMP     37$
4130  027140  032704  000020          13$:    BIT     #FMTE,R4        ;TEST FORMAT ERROR
4131  027144  001403                          BEQ     14$
4132  027146  104016                          ERROR   16
4133  027150  000137  030106                  JMP     37$
4134  027154  032704  004000          14$:    BIT     #WLE,R4         ;TEST WRITE LOCK ERROR
4135  027160  001403                          BEQ     15$
4136  027162  104017                          ERROR   17
4137  027164  000137  030106                  JMP     37$
4138  027170  032704  040000          15$:    BIT     #UNS,R4         ;TEST DRIVE UNSAFE
4139  027174  001406                          BEQ     16$
4140  027176  104020                          ERROR   20
4141  027200  052737  000200  006364          BIS     #ABORT,RECODE
4142  027206  000137  030206                  JMP     ALLTRM
4143  027212  032704  000002          16$:    BIT     #SKI,R4         ;TEST SEEK INCOMPLETE
4144  027216  001406                          BEQ     17$
4145  027220  104021                          ERROR   21
4146  027222  052737  004000  006364          BIS     #RCLREQ,RECODE
4147  027230  000137  030106                  JMP     37$
4148  027234  032704  001000          17$:    BIT     #COE,R4         ;TEST CYLINDER OVERFLOW
4149  027240  001406                          BEQ     18$
4150  027242  104022                          ERROR   22
4151  027244  052737  004000  006364          BIS     #RCLREQ,RECODE
4152  027252  000137  030106                  JMP     37$
4153  027256  032704  002000          18$:    BIT     #IDAE,R4        ;TEST ILLEGAL CYLINDER
4154  027262  001406                          BEQ     19$
4155  027264  104023                          ERROR   23
```

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4156  027266  052737  004000  006364          BIS     #RCLREQ,RECODE
4157  027274  000137  030106                  JMP     37$
4158  027300  032765  000040  000036  19$:    BIT     #DROT,P.DS(R5)  ;TEST DRIVE OFF TRACK
4159  027306  001406                          BEQ     20$
4160  027310  104024                          ERROR   24
4161  027312  052737  004000  006364          BIS     #PCLREQ,RECODE
4162  027320  000137  030106                  JMP     37$
4163  027324  032704  010000          20$:    BIT     #DIE,R4         ;TEST DRIVE TIMING ERROR
4164  027330  001406                          BEQ     21$
4165  027332  104025                          ERROR   25
4166  027334  052737  000200  006364          BIS     #ABORT,RECODE
4167  027342  000137  030106                  JMP     37$
4168  027346  032765  100000  000020  21$:    BIT     #DLT,P.CS2(R5)  ;TEST DATA LATE
4169  027354  001403                          BEQ     22$
4170  027356  104026                          ERROR   26
4171  027360  000137  030106                  JMP     37$
4172  027364  032704  020000          22$:    BIT     #OPI,R4         ;TEST IF OPI ERROR
4173  027370  001457                          BEQ     29$
4174  027372  052737  000010  006364          BIS     #OPIERR,RECODE
4175  027400  105737  002650                  TSTB    DERCNT          ;TEST IF FIRST ERROR
4176  027404  001402                          BEQ     50$
4177  027406  000137  030106                  JMP     37$             ;NO - SKIP REPORT
4178  027412  032737  000400  006364  50$:    BIT     #LEV2ER,RECODE  ;TEST IF A SECOND LEVEL 2 ERROR
4179  027420  001403                          BEQ     26$             ;HAS ALREADY OCCURRED
4180  027422  104054                  27$:    ERROR   54
4181  027424  000137  030106                  JMP     37$             ;GET OUT OF ERROR REPORT
4182  027430  004737  031534          26$:    JSR     PC,BLDEXH       ;GO BUILD EXPECTED HEADER
4183  027434  004737  031122                  JSR     PC,RDHDO        ;GET HEADER OF SECTOR 0
4184  027440  032737  000400  006364          BIT     #LEV2ER,RECODE  ;TEST IF ERROR GETTING HDR
4185  027446  001025                          BNE     28$             ;IF YES-GO MAKE ABREVIATED REPORT
4186  027450  013702  002570                  MOV     RKBAS,R2        ;STORE HEADER 0 INTO REGISTERS
4187  027454  042762  000100  000000          BIC     #IE,RKCS1(R2)   ;RESET INTERRUPT ENABLE
4188  027462  016237  000024  001202          MOV     RKDB(R2),$REG10 ;FOR REPORTING
4189  027470  016237  000024  001204          MOV     RKDB(R2),$REG11
4190  027476  016237  000024  001206          MOV     RKDB(R2),$REG12
4191  027504  032762  100000  000000          BIT     #CERR,RKCS1(R2) ;TEST IF ERROR DURING STORAGE
4192  027512  001343                          BNE     27$
4193  027514  104030                          ERROR   30              ;MAKE OPI REPORT
4194  027516  000137  030106                  JMP     37$
4195  027522  104054                  28$:    ERROR   54
4196  027524  000137  026502                  JMP     ER2ENT          ;GO MAKE 2ND LEVEL REPORT
4197  027530  032704  000400          29$:    BIT     #HVRC,R4        ;TEST IF HVRC ERROR
4198  027534  001457                          BEQ     23$
4199  027536  052737  000004  006364          BIS     #HVRCER,RECODE
4200  027544  105737  002650                  TSTB    DERCNT          ;TEST IF FIRST ERROR
4201  027550  001402                          BEQ     30$             ;YES - REPORT
4202  027552  000137  030106                  JMP     37$             ;JUMP TO RETURN
4203  027556  032737  000400  006364  30$:    BIT     #LEV2ER,RECODE  ;TEST IF A 2ND LEVEL ERROR HAS ALREADY
4204  027564  001403                          BEQ     31$             ;OCCURRED. NO-SKIP EXIT
4205  027566  104055                  51$:    ERROR   55
4206  027570  000137  030106                  JMP     37$             ;GET OUT OF ERROR REPORT
4207  027574  004737  031534          31$:    JSR     PC,BLDEXH       ;GO BUILD EXPECTED HEADER
4208  027600  004737  031122                  JSR     PC,RDHDO        ;GO GET HDR 0
4209  027604  032737  000400  006364          BIT     #LEV2ER,RECODE  ;TEST IF ERROR IN GETTING HDR
4210  027612  001025                          BNE     32$             ;IF YES-GO MAKE ABREVIATED REPORT
4211  027614  013702  002570                  MOV     RKBAS,R2        ;GET RK611 BASE ADDRESS
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4212  027620  042762  000100  000000          BIC     #IE,RKCS1(R2)   ;CLEAR INTERRUPT ENABLE
4213  027626  016237  000024  001202          MOV     RKDB(R2),$REG10 ;STORE OFF HEADER
4214  027634  016237  000024  001204          MOV     RKDB(R2),$REG11
4215  027642  016237  000024  001206          MOV     RKDB(R2),$REG12
4216  027650  032762  100000  000000          BIT     #CERR,RKCS1(R2) ;TEST IN ANY ERROR IN UNLOAD
4217  027656  001343                          BNE     51$             ;IY YES - GO MAKE SHORT REPORT
4218  027660  104031                          ERROR   31              ;MAKE FULL REPORT
4219  027662  000137  030106                  JMP     37$
4220  027666  104055                  32$:    ERROR   55              ;ABREVIATED HVRC ERROR RPORT
4221  027670  000137  026502                  JMP     ER2ENT          ;GO REPORT 2ND LEVEL ERROR
4222  027674  032704  000200          23$:    BIT     #BSE,R4         ;TEST FOR BAD SECTOR ERROR
4223  027700  001422                          BEQ     33$             ;NO - SKIP
4224  027702  052737  000002  006364          BIS     #BSERR,RECODE   ;SET ERROR FLAG
4225  027710  016502  000026                  MOV     P.DTS(R5),R2    ;GET SECTOR IN ERROR
4226  027714  042702  177740                  BIC     #177740,R2      ;CLEAR ALL BITS EXCEPT SECTOR
4227  027720  004737  021720                  JSR     PC,BDSRCK       ;GO SEE IF THIS SECTOR LISTED
4228  027724  032737  001000  006364          BIT     #BADSEC,RECODE  ;TEST RESULT
4229  027732  001065                          BNE     37$             ;YES - EXIT, NO ERROR OR REPORT
4230  027734  104104                          ERROR   104             ;ELSE REPORT BAD BSE
4231  027736  042737  000002  006364          BIC     #BSERR,RECODE   ;RESET BSE ERROR FLAG
4232  027744  000460                          BR      37$             ;GO EXIT
4233  027746  032704  100000          33$:    BIT     #DCK,R4         ;TEST IF DATA CHECK
4234  027752  001435                          BEQ     36$
4235  027754  052737  000020  006364          BIS     #DCKERR,RECODE  ;SET DATA CHECK ERROR IN RECOVERY CODE
4236  027762  032704  000100                  BIT     #ECH,R4         ;TEST IF ECC IS HARD. IF
4237  027766  001406                          BEQ     34$             ;YES SET UNCORRECTABLE IN
4238  027770  052737  000040  006364          BIS     #ECCNC,RECODE   ;RECOVERY FLAG AND A 0 IN
4239  027776  005037  001206                  CLR     $REG12          ;REG12 TO INDICATE UNCORRECTABLE,
4240  030002  000403                          BR      35$             ;A 1 IN REG 12 FOR CORRECTABLE
4241  030004  012737  000001  001206  34$:    MOV     #1,$REG12
4242  030012  105737  002650          35$:    TSTB    DERCNT          ;TEST IF FIRST ERROR
4243  030016  001033                          BNE     37$             ;NO SKIP REPORT
4244  030020  004737  031410                  JSR     PC,GTPKAD       ;GO GET PACK ADDRESS OF ERROR
4245  030024  016537  000060  001202          MOV     P.EPOS(R5),$REG10 ;STORE ECC POSITION &
4246  030032  016537  000062  001204          MOV     P.EPAT(R5),$REG11 ;PATTERN
4247  030040  104032                          ERROR   32              ;REPORT DCK ERROR
4248  030042  000137  030106                  JMP     37$
4249  030046  032765  040000  000020  36$:    BIT     #WCE,P.CS2(R5)  ;TEST WRITE CHECK ERROR
4250  030054  001404                          BEQ     37$
4251  030056  042737  000200  006364          BIC     #ABORT,RECODE   ;CLEAR ABORT & SET WRITE
4252  030064  052737  000100  006364          BIS     #WCERR,RECODE   ;CHECK ERROR IN RECODE
4253  030072  105737  002650                  TSTB    DERCNT          ;TEST IF FIRST ERROR
4254  030076  001003                          BNE     37$             ;NO - SKIP
4255  030100  004737  031410                  JSR     PC,GTPKAD       ;GO GET ADDRESS OF ERROR
4256  030104  104033                          ERROR   33              ;REPORT WCE
4257
4258  030106  032765  000020  000014  37$:    BIT     #DRVHRD,P.PRST(R5) ;TEST HARD ERROR
4259  030114  001404                          BEQ     43$
4260  030116  104036                          ERROR   36
4261  030120  052737  000200  006364          BIS     #ABORT,RECODE
4262
4263  030126  032765  000040  000014  43$:    BIT     #DRVDSC,P.PRST(R5) ;TEST STATUS CHANGE NOT CLEARED
4264  030134  001404                          BEQ     44$
4265  030136  104037                          ERROR   37
4266  030140  052737  000200  006364          BIS     #ABORT,RECODE
4267
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4268  030146  032765  004000  000014  44$:    BIT     #NODSC,P.PRST(R5) ;IFST ATTENTION BUT NO FAULT OR DSC
4269  030154  001404                          BEQ     46$
4270  030156  104040                          ERROR   40
4271  030160  052737  000200  006364          BIS     #ABORT,RECODE
4272  030166  032765  000010  000014  46$:    BIT     #UEXATT,P.PRST(R5) ;TEST UNEXPECTED ATTENTION
4273  030174  001404                          BEQ     ALLTRM
4274  030176  104042                          ERROR   42
4275  030200  052737  000200  006364          BIS     #ABORT,RECODE
4276
4277
4278                                          ;ALL ERRORS MUST EXIT THROUGH THIS POINT
4279
4280  030206  012705  002362          ALLTRM: MOV     #PARM0,R5         ;RESTORE PARAMETER BLOCK SELECTION
4281  030212  012737  026462  002600          MOV     #ERRHDL,A.ABNL    ;RESTORE INTERRUPT VECTORS FOR RETRY
4282  030220  012737  025524  002576          MOV     #ERRFRE,A.NORM    ;DRIVER OPERATIONS, IF ANY
4283  030226  032737  000200  006364          BIT     #ABORT,RECODE     ;IF ABORT IS NOT SET AND
4284  030234  001050                          BNE     48$               ;THE DRIVE IS READY (HAS NOT
4285                                                                    ;CYCLED DOWN)
4286  030236  013702  002570                  MOV     RKBAS,R2          ;GET BASE ADDRESS
4287  030242  032762  000200  000012          BIT     #DRDY,RKDS(R2)    ;TEST IF DRIVE READY SET
4288  030250  001004                          BNE     47$               ;RECALIBRATE REQUIRED BIT IS SET
4289  030252  052737  000200  006364          BIS     #ABORT,RECODE     ;ELSE ABORT WITH ABORT MESSAGE
4290  030260  000436                          BR      48$
4291  030262  032737  004000  006364  47$:    BIT     #RCLREQ,RECODE    ;IF RECALIBRATE IS REQUIRED
4292  030270  001436                          BEQ     BGNRTY            ;FOR RETRY SET UP PARAM
4293  030272  012705  002446                  MOV     #PARM1,R5         ;SET TO PARAMETER BLOCK ONE
4294  030276  112765  000113  000001          MOVB    #RECAL,P.CMND(R5)         ;BLOCK TO DO IT.
4295  030304  012737  030532  002600          MOV     #RETANL,A.ABNL
4296  030312  004737  025442                  JSR     PC,DRVCAL
4297  030316  012737  026462  002600          MOV     #ERRHDL,A.ABNL    ;RESTORE ERROR RETURN
4298  030324  032737  000400  006364          BIT     #LEV2ER,RECODE    ;IF AN ERROR OCCURRED IN THE
4299  030332  001003                          BNE     49$               ;RECAL ATTEMP SET ABORT,
4300  030334  012705  002362                  MOV     #PARM0,R5         ;RESET PARAM TO BLOCK 0
4301  030340  000412                          BR      BGNRTY
4302  030342  052737  000200  006364  49$:    BIS     #ABORT,RECODE     ;PRINT THE RECAL ERROR MESSAGE, AND
4303  030350  104060                          ERROR   60                ;GO REPORT DETAILS
4304  030352  000137  026502                  JMP     ER2ENT
4305  030356  104061                  48$:    ERROR   61                ;REPORT ABORT-RETRY FAILED
4306
4307                                          ;THE PROGRAM WILL HALT HERE IF THE ABORT FLAG HAS BEEN SET OR
4308                                          ;IF THE DRIVE READY BIT IS RESET.
4309
4310  030360  000000                  HLTPRG: HALT
4311  030362  000137  016202                  JMP     START
4312
4313
4314                                          ;THE FOLLOWING CODE WILL DETERMINE IF AND DATA TYPE ERROR
4315                                          ;HAS OCCURRED. IF YES, THE RETRY IS NOT DONE HERE BUT RETURNS TO
4316                                          ; THE INITIATING ROUTINE FOR RETRY.  ANY OTHER ERROR IS TO BE
4317                                          ;RETRIED HERE. IF RETRY IS UNSUCCESSFUL AFTER 4 ATTEMPTS, THE ABORT
4318                                                  ;FLAG IS SET AND PROGRAM HALTS.
4319
4320  030366  032737  000136  006364  BGNRTY: BIT     #BSERR!HVRCER!OPIERR!DCKERR!WCERR,RECODE ;TEST IF ANY DATA ERROR
4321  030374  001404                          BEQ     DOL3
4322  030376  052737  100000  006364          BIS     #ANYDER,RECODE
4323  030404  000450                          BR      DOL2
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                                        REPORT ERROR ROUTINE

 4324  030406                         DOL3:
 4325  030406  032737  001000  006364         BIT     #BADSEC,RECODE  ;TEST IF BAD SECTOR FLAG SET
 4326  030414  001044                         BNE     DOL2            ;IF YES-EXIT TO CALLER
 4327  030416  123737  002654  002655 CERTY:  CMPB    ERRCNT,ERRLMT   ;BEGIN RETRY IF ERROR COUNT HAS
 4328  030424  001012                         BNE     DOL1            ;NOT BEEN EXCEEDED
 4329  030426  005037  001174                 CLR     $REG5
 4330  030432  113737  002654  001174         MOVB    ERRCNT,$REG5    ;GET ERROR RETRY COUNT
 4331  030440  104102                         ERROR   102             ;REPORT RETRY UNSUCCESSFUL
 4332  030442  052737  000200  006364         BIS     #ABORT,RECODE   ;SET ABORT & QUIT
 4333  030450  000743                         BR      HLTPRG
 4334  030452  013702  002570         DOL1:   MOV     RKBAS,R2        ;GET BASE ADDRESS
 4335  030456  012762  000040  000010         MOV     #SCLR,RKCS2(R2) ;CLEAR SUBSYSTEM
 4336  030464  013746  000000                 MOV     0,-(SP) ;;PUT NEW PS ON STACK
 4337  030470  012746  030476                 MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
 4338  030474  000002                         RTI                     ;;POP NEW PC AND PS
 4339  030476                         64$:
 4340  030476  012700  005660                 MOV     #COMSTR,R0      ;GO AND REESTABLISH THE COMMAND
 4341  030502  012025                         MOV     (R0)+,(R5)+     ;AS IT WAS ENTERED INTO THE
 4342  030504  012025                         MOV     (R0)+,(R5)+     ;PARAMETER BLOCK
 4343  030506  012025                         MOV     (R0)+,(R5)+
 4344  030510  012025                         MOV     (R0)+,(R5)+
 4345  030512  012025                         MOV     (R0)+,(R5)+
 4346  030514  012025                         MOV     (R0)+,(R5)+
 4347  030516  012705  002362                 MOV     #PARM0,R5
 4348  030522  004737  025442                 JSR     PC,DRVCAL       ;CALL DRIVER
 4349  030526  104412         DOL2:   RESREG                          ;IF RETURN GETS HERE, NO ERROR
 4350  030530  000207                         RTS     PC              ;OCCURRED, RECOVERY WAS SUCCESSFUL
 4351  030532  152737  000377  002652 RETANL: BISB    #377,DONE       ;SET DONE
 4352  030540  052737  000400  006364         BIS     #LEV2ER,RECODE  ;SET LEVEL TWO ERROR
 4353  030546  000207                         RTS     PC
 4354  030550  152737  000377  002652 RETNML: BISB    #377,DONE       ;SET DONE
 4355  030556  000207                         RTS     PC
 4356                                 ;;*****************************************************************
 4357                                 .SBTTL  TIME OUT PROCESSOR ROUTINE
 4358                                 ;*THIS ROUTINE SUPPORTS THE ERROR HANDLER BY PROCESSING TIME OUT STATUS
 4359                                 ;*GATHERING DUTIES.
 4360                                 ;;*****************************************************************
 4361  030560                         TOPROC:
 4362  030560  104411                         SAVREG
 4363  030562  013702  002570                 MOV     RKBAS,R2
 4364  030566  012701  001162                 MOV     #$REG0,R1       ;SET UP R1 FOR RK REGISTER STORAGE
 4365  030572  005037  006372                 CLR     ERRCOM          ;CLEAR FOR COMMAND
 4366  030576  116537  000001  006372         MOVB    P.CMND(R5),ERRCOM ;STORE COMMAND
 4367  030604  016521  000002                 MOV     P.CYLN(R5),(R1)+ ;STORE CYLINDER
 4368  030610  116521  000005                 MOVB    P.TRCK(R5),(R1)+ ;STORE TRACK
 4369  030614  105021                         CLRB    (R1)+
 4370  030616  116521  000004                 MOVB    P.SECT(R5),(R1)+ ;STORE SECTOR
 4371  030622  105021                         CLRB    (R1)+
 4372  030624  016521  000012                 MOV     P.WC(R5),(R1)+ ;STORE WORD COUNT
 4373  030630  016521  000010                 MOV     P.BALO(R5),(R1)+ ;STORE BUS ADDRESS
 4374  030634  016221  000000                 MOV     RKCS1(R2),(R1)+ ;STORE ALL PARAMERERS AND VALID RK611
 4375  030640  016221  000010                 MOV     RKCS2(R2),(R1)+ ;REGISTERS
 4376  030644  016221  000020                 MOV     RKDC(R2),(R1)+
 4377  030650  016221  000006                 MOV     RKDA(R2),(R1)+
 4378  030654  016221  000002                 MOV     RKWC(R2),(R1)+
 4379  030660  016221  000004                 MOV     RKBA(R2),(R1)+
```

TIME OUT PROCESSOR ROUTINE

```
4380  030664  016221  000016          MOV     RKASOF(R2),(R1)+
4381  030670  016221  000012          MOV     RKDS(R2),(R1)+
4382  030674  016221  000014          MOV     RKER(R2),(R1)+
4383                                                  ;THIS CODE WILL ATTEMPT TO
4384                                                  ;RETRIEVE THE STATUS FROM THE
4385                                                  ;DRIVE.
4386  030700  004737  030710          JSR     PC,GETDRST      ;GO GET DRIVE STATUS
4387  030704  104412                  RESREG
4388  030706  000207                  RTS     PC
4389          ;;*****************************************************************
4390          .SBTTL  RETRIEVE DRIVE STATUS ROUTINE
4391
4392  030710  104411          GETDRST:        SAVREG
4393  030712  005000                  CLR     R0
4394  030714  016762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
4395  030722  010146                  MOV     R1,-(SP)        ;STORE R5
4396  030724  012703  000010          MOV     #10,R3          ;SET COUNT FOR STATUS CLEAR
4397  030730  012721  123456  1$:     MOV     #123456,(R1)+   ;INSERT CLEAR WORD
4398  030734  005303                  DEC     R3              ;BUMP COUNTER
4399  030736  001374                  BNE     1$              ;LOOP UNTIL 0
4400  030740  012601                  MOV     (SP)+,R1        ;RESTORE R5
4401  030742  152737  000377  002632          BISB    #377,W.TIME     ;GIVE WATCH DOG SOMETIHING TO TIME
4402  030750  013746  002600          MOV     A.ABNL,-(SP)    ;STORE ERROR RETURN ADDRESS
4403  030754  012737  030532  002600          MOV     #RETABL,A.ABNL  ;SET UP NEW ERROR RETURN
4404  030762  013762  006340  000010          MOV     DRINUS,RKCS2(R2)        ;LOAD DRIVE NUMBER
4405  030770  032762  100000  000000          BIT     #CERR,RKCS1(R2) ;TEST IF CONT ERROR SET
4406  030776  001037                  BNE     4$              ;YES - GET OUT
4407  031000  010062  000026  3$:     MOV     R0,RKMR1(R2)    ;SET UP STATUS WORD TO READ
4408  031004  012762  000001  000000          MOV     #1,RKCS1(R2)    ;DO DRIVE SELECT
4409  031012  016204  000000          MOV     RKCS1(R2),R4    ;GET CS1
4410  031016  032704  000200          BIT     #RDY,R4         ;TEST IF READY
4411  031022  001007                  BNE     2$              ;YES - SKIP
4412  031024  004737  032312          JSR     PC,W.WTCH       ;CALL WATCH DOG
4413  031030  032765  000100  000014          BIT     #CMDTO,P.PRST(R5)       ;TEST IF TIMEOUT
4414  031036  001360                  BNE     3$              ;NO - LOOP
4415  031040  000416                  BR      4$              ;ELSE GET OUT
4416  031042  016204  000000  2$:     MOV     RKCS1(R2),R4    ;GET CS1
4417  031046  032704  100000          BIT     #CERR,R4        ;TEST IF ERROR
4418  031052  001011                  BNE     4$              ;YES - GET OUT
4419  031054  016221  000034          MOV     RKMR2(R2),(R1)+ ;ELSE STORE STATUS WORDS JUST READ
4420  031060  016221  000036          MOV     RKMR3(R2),(R1)+
4421  031064  005200                  INC     R0              ;BUMP TO NEXT STATUS PAIR
4422  031066  020027  000004          CMP     R0,#4           ;TEST IF ALL HAVE BEEN READ
4423  031072  001342                  BNE     3$              ;YES - GOOD EXIT
4424  031074  000406                  BR      5$
4425  031076  052737  000400  006364  4$:     BIS     #LEV2ER,RECODE  ;SET LEVEL 2 ERROR
4426  031104  012762  000040  000010          MOV     #SCLR,RKCS2(R2) ;CLEAR SUBSYSTEM
4427  031112  012637  002600  5$:     MOV     (SP)+,A.ABNL    ;RESTORE OLD ERROR RETURN
4428  031116  104412                  RESREG
4429  031120  000207                  RTS     PC
4430          ;;*****************************************************************
4431          .SBTTL  READ HEADER 0 ROUTINE
4432          ;;*****************************************************************
4433  031122          RDHD0:
4434  031122  104411          SAVREG
4435  031124  016501  000026          MOV     P.DTS(R5),R1    ;STORE TRACK AND SECTOR
```

```
4436  031130  016500  000052            MOV     P.B10(R5),R0    ;GET THE CYLINDER ADDRESS
4437  031134  042700  160013            BIC     #160013,R0      ;FROM THE DRIVE STATUS. CLEAR
4438  031140  006200                    ASR     R0              ;OFF UNUSED BITS AND POSITION
4439  031142  006200                    ASR     R0              ;FOR USE AS THE DESIRED
4440  031144  006200                    ASR     R0              ;CYLINDER IN THE READ
4441  031146  006200                    ASR     R0              ;HEADER COMMAND
4442  031150  012705  002446            MOV     #PARM1,R5       ;SET UP TO USE PARM 1
4443  031154  010165  000004            MOV     R1,P.SECT(R5)   ;INSERT TRK/SECT FOR READ HEADER
4444  031160  010065  000002            MOV     R0,P.CYLN(R5)
4445  031164  132737  000020  002653    BITB    #B.CFMT,TYPFMT  ;TEST PRESENT FORMAT & CHANGE
4446  031172  001404                    BEQ     1$              ;TO THE OPPOSITE. THIS WILL CAUSE
4447  031174  142765  000020  000007    BICB    #B.CFMT,P.CS1H(R5) ;A READ OFSECTOR 0 HEADER ON
4448  031202  000403                    BR      2$              ;THE READ HEADER COMMAND
4449  031204  152765  000020  000007  1$: BISB   #B.CFMT,P.CS1H(R5)
4450  031212  112765  000125  000001  2$: MOVB   #RDHEAD,P.CMND(R5) ;SET UP TO READ HEADER
4451  031220  013746  000000            MOV     0,-(SP) ;;PUT NEW PS ON STACK
4452  031224  012746  031232            MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
4453  031230  000002                    RTI                     ;;POP NEW PC AND PS
4454  031232                          64$:
4455  031232  004737  025442            JSR     PC,DRVCAL       ;CALL DRIVER
4456  031236  142765  000020  000007    BICB    #B.CFMT,P.CS1H(R5)      ;CLEAR THE FORMAT BIT
4457  031244  153765  002653  000007    BISB    TYPFMT,P.CS1H(R5)       ;RESTORE TYPE AND FORMAT IN USE
4458  031252  012705  002362            MOV     #PARM0,R5       ;RESTORE PARM 0 BLOCK
4459  031256  104412                    RESREG          ;RETURN
4460  031260  000207                    RTS     PC
4461                          ;;*****************************************************************
4462                          .SBTTL  POSITION AND OFFSET ROUTINE
4463                          ;*THIS ROUTINE CHECKS IF OFFSET IS REQUIRED. IF IT IS, THE HEADS
4464                          ;*POSITIONED TO THE CYLINDER SPECIFIED IN R0 AND THE HEADS ARE OFFSET
4465                          ;*TO THE AMOUNT SPECIFIED IN "OFINUS".
4466                          ;;*****************************************************************
4467
4468  031262  104411          POSOFF: SAVREG
4469  031264  132737  000020  002656    BITB    #OREQSW,OPCONT  ;TEST IF OFFSET REQUIRED
4470  031272  001417                    BEQ     1$              ;IF NO - SKIP TO EXIT
4471  031274  112765  000117  000001    MOVB    #SEEK,P.CMND(R5)  ; SET UP TO DO THE SEEK
4472  031302  010065  000002            MOV     R0,P.CYLN(R5)   ;SET CYLINDER
4473  031306  004737  025442            JSR     PC,DRVCAL       ;GO DO IT
4474  031312  112765  000115  000001    MOVB    #OFFSET,P.CMND(R5)  ;SET UP TO OFFSET
4475  031320  113765  006362  000006    MOVB    OFINUS,P.OFST(R5)   ;SET OFFSET VALUE
4476  031326  004737  025442            JSR     PC,DRVCAL       ;GO DO IT
4477  031332  104412          1$:     RESREG
4478  031334  000207                    RTS     PC
4479
4480                          ;;*****************************************************************
4481                          ;;*****************************************************************
4482                          .SBTTL  PREPARE FOR LOOP ON ERROR
4483  031336  105037  002654  PREPLP: CLRB    ERRCNT          ;CLEAR ERROR COUNT
4484  031342  005037  006364            CLR     RECODE          ;CLEAR RECODE
4485  031346  013700  006370            MOV     CCINUS,R0       ;SET CURRENT CYLINDER
4486  031352  013701  006366            MOV     CTINUS,R1       ;SET CURRENT TRACK
4487  031356  012737  026462  002600    MOV     #ERRHDL,A.ABNL  ;SET UP ERROR RETURN
4488  031364  012737  025524  002576    MOV     #ERRFRE,A.NORM  ;SET UP ERROR FREE RETURN
4489  031372  012704  001074            MOV     #STACK-4,R4     ;SET R4 TO STACK BASE -4
4490  031376  011624                    MOV     (SP),(R4)+      ;STORE RETURN ON STACK
4491  031400  005014                    CLR     (R4)            ;CLEAR FOR 0 PRIORITY
```

```
4492  031402  012706  001074                  MOV     #STACK-4,SP     ;SET STACK POINTER FOR RETURN
4493  031406  000002                          RTI                     ;DO RTI TO RETURN TO LOOPING ROUTINE
4494
4495                                  .SBTTL  GET PACK ADDRESS ROUTINE
4496                                  ;*********************************************************************
4497  031410  016537  000030  001174  GTPKAD: MOV     P.DCYL(R5),$REGS ;GET CYLINDER NUMBER
4498  031416  005037  001176          CLR     $REG6           ;CLEAR REGISTERS FOR
4499  031422  005037  001200          CLR     $REG7           ;TRACK & SECTOR STORAGE
4500  031426  116537  000026  001200  MOVB    P.DTS(R5),$REG7 ;STORE THE TRACK AND SECTOR
4501  031434  116537  000027  001176  MOVB    P.DTS+1(R5),$REG6
4502  031442  005737  001200          TST     $REG7                   ;ADJUST THE ADDRESS CONTAINED IN
4503                                                                  ;THE RK REGISTERS FOR THE AUTOMATIC
4504  031446  001403                  BEQ     1$                      ;INCREMENT
4505  031450  005337  001200          DEC     $REG7
4506  031454  000426                  BR      5$
4507  031456  032765  010000  000016  1$:     BIT     #CFMT,P.CS1(R5)
4508  031464  001404                  BEQ     2$
4509  031466  012737  000023  001200          MOV     #19.,$REG7
4510  031474  000403                  BR      3$
4511  031476  012737  000025  001200  2$:     MOV     #21.,$REG7
4512  031504  005737  001176          3$:     TST     $REG6
4513  031510  001403                  BEQ     4$
4514  031512  005337  001176          DEC     $REG6
4515  031516  000405                  BR      5$
4516  031520  012737  000002  001176  4$:     MOV     #2,$REG6
4517  031526  005337  001174          DEC     $REGS
4518  031532  000207                  5$:     RTS     PC
4519                                  ;*********************************************************************
4520                                  .SBTTL  BUILD EXPECTED HEADER
4521                                  ;*USES DESIRED CYLINDER, TRACK AND SECTOR REGISTERS TO DETERMINE
4522                                  ;*WHICH HEADER WAS EXPECTED  LOADS EXPECTED VALUES IN $REG5, 6, AND
4523                                  ;*7 FOR REPORTING.
4524                                  ;*********************************************************************
4525  031534  104411                  BLDEXH: SAVREG
4526  031536  016537  000030  001174          MOV     P.DCYL(R5),$REG5 ;CONSTRUCT EXPECTED HDR
4527  031544  016501  000026                  MOV     P.DTS(R5),R1 ;DESIRED CYLINDER & DESIRED TRACK
4528  031550  042701  174377                  BIC     #174377,R1      ;CLEAR ALL BUT TRACK BITS
4529  031554  006201                          ASR     R1              ;AND SECTOR. SHIFT THE TRACK
4530  031556  006201                          ASR     R1              ;OVER TO CONFORM TO HEADER FORMAT
4531  031560  006201                          ASR     R1              ;CHECK THE FORMAT BIT AND
4532                                                                  ;IF SET, SET THE HEADER FORMAT
4533  031562  016537  000026  001176          MOV     P.DTS(R5),$REG6 ;BIT.
4534  031570  042737  177740  001176          BIC     #177740,$REG6   ;CLEAR ALL BUT SECTOR
4535  031576  060137  001176                  ADD     R1,$REG6        ;ADD TRACK AND SECTOR TOGETHER
4536  031602  052737  140000  001176          BIS     #140000,$REG6   ;INSERT BSE BITS
4537  031610  032765  010000  000016          BIT     #CFMT,P.CS1(R5)
4538  031616  001403                          BEQ     23$
4539  031620  052737  001000  001176          BIS     #1000,$REG6
4540  031626  013737  001174  001200  23$:     MOV     $REG5,$REG7     ;COMPUTE THE HEADER VRC
4541  031634  013701  001176                  MOV     $REG6,R1
4542  031640  043737  001176  001200          BIC     $REG6,$REG7
4543  031646  043701  001174                  BIC     $REG5,R1
4544  031652  050137  001200                  BIS     R1,$REG7
4545  031656  104412                          RESREG
4546  031660  000207                          RTS     PC
4547                                  ;*********************************************************************
```

```
4548                                    .SBTTL  WRITE BAD SECTOR FILE ROUTINE
4549                                    ;*THIS ROUTINE WRITES THE BSSOFT (BAD SECTOR FILE DETECTED BY SOFTWARE)
4550                                    ;*INTO THE APPROPRIATE BAD SECTOR FILE. IT DOES NOT WRITE THE FACTORY
4551                                    ;*DETECTED FILES.
4552                                    ;;*****************************************************************
4553   031662                           BDSTWT:
4554   031662  104411                             SAVREG
4555   031664  105037  002650                     CLRB    DERCNT          ;CLEAR ERROR COUNT
4556   031670  012703  000006                     MOV     #6,R3           ;PRESET FOR 6 SECTORS TO BE WRITTEN
4557   031674  012702  000012                     MOV     #12,R2          ;PRESET TO 22 SECTOR/TRACK
4558   031700  005065  000014                     CLR     P.PRST(R5)      ;CLEAR PROG STAT REG
4559   031704  132737  000020  002653             BITB    #B.CFMT,TYPFMT  ;TEST IF 20 OR 22 SEC/TRACK
4560   031712  001404                             BEQ     1$              ;22 SECTOR - SKIP
4561   031714  005202                             INC     R2              ;20 SECTOR - BUMP TO NEXT SECTOR (13)
4562   031716  142765  000020  000007             BICB    #B.CFMT,P.CS1H(R5)  ;CLEAR FOR 22 SECTOR WRITE
4563   031724  012765  003660  000010  1$:        MOV     #BSSOFT,P.BALO(R5)  ;SET UP PARAMETER BLOCK
4564   031732  112765  000123  000001             MOVB    #WRDATA,P.CMND(R5)  ;TO WRITE THE SECTORS OF BAD
4565   031740  013765  017312  000002             MOV     LCYL,P.CYLN(R5) ;SECTOR TABLE (SOFTWARE DETECTED)
4566   031746  112765  000002  000005             MOVB    #2,P.TRCK(R5)
4567   031754  110265  000004                     MOVB    R2,P.SECT(R5)   ;INSERT SECTOR NUMBER
4568   031760  012765  177400  000012             MOV     #177400,P.WC(R5)
4569   031766  004737  025442                     JSR     PC,DRVCAL
4570   031772  032737  100000  006364             BIT     #ANYDER,RECODE  ;CHECK IF ANY ERROR IN WRITE
4571   032000  001005                             BNE     3$              ;IF YES - SKIP
4572   032002  062702  000002             2$:     ADD     #2,R2           ;ELSE BUMP SECTOR BY TWO
4573   032006  005303                             DEC     R3              ;DECREMENT COUNTER
4574   032010  001345                             BNE     1$              ;EXIT IF DONE
4575   032012  000417                             BR      4$
4576   032014  105237  002650             3$:     INCB    DERCNT          ;COUNT ERROR FOR RETRY
4577   032020  122737  000007  002650             CMPB    #7,DERCNT       ;IF TO MANY TYPE MESSAGE
4578   032026  002736                             BLT     1$              ;ELSE RETRY
4579   032030  104401  015425                     TYPE    ,BSWERR         ;ERROR MESSAGE
4580   032034  104401  015513                     TYPE    ,SECINE
4581   032040  010246                             MOV     R2,-(SP)
4582   032042  104402                             TYPOC
4583   032044  104401  001267                     TYPE    ,$CRLF
4584   032050  000754                             BR      2$
4585   032052  104401  015535             4$:     TYPE    ,BSWTFI         ;TYPE FINISHED MESSAGE
4586   032056  104412                             RESREG
4587   032060  000207                             RTS     PC
4588                                    ;;*****************************************************************
4589                                    ;SBTTL  BAD SECTOR REPORT ROUTINE
4590                                    ;;*****************************************************************
4591   032062                           BSREPT:
4592   032062  104411                             SAVREG
4593   032064  005037  001242                     CLR     $TMP2           ;CLEAR TEMP 2 FOR PASS SWITCH
4594   032070  104401  015572                     TYPE    ,BSHEAD         ;TYPE HEADER LINE
4595   032074  005000                             CLR     R0              ;CLEAR R0 FOR COUNTER
4596   032076  012737  016006  032124             MOV     #TWENT2,2$      ;CHOSE THE MODE TO REPORT
4597   032104  132737  000020  002653             BITB    #B.CFMT,TYPFMT  ;20 OR 22 SECTOR FORMAT
4598   032112  001403                             BEQ     1$              ;QUESSED RIGHT - SKIP
4599   032114  012737  016003  032124             MOV     #TWENTY,2$      ;QUESSED WRONG, SET TO 22 SECTOR
4600   032122  10  01                   1$:     TYPE
4601   032124  000000               2$:     .WORD
4602   032126  104401  015642                     TYPE    ,BSTAIL
4603   032132  104401  015670                     TYPE    ,FBSLAB         ;TYPE FACTORY LABEL
```

```
4604  032136  012704  004670            MOV     #BSFACT+10,R4   ;SET R4 TO POINT TO FACTORY TABLE
4605  032142  104401  016011      6$:   TYPE    .COLHD          ;TYPE COLUMN HEADER
4606  032146  104401  016046      3$:   TYPE    .SPACE4         ;SET FORMAT OF REPORT
4607  032152  012446                    MOV     (R4)+,-(SP)     ;GET FIRST CYLINDER WORD
4608  032154  100417                    BMI     4$              ;IF ALL 1'S EXIT THIS LOOP
4609  032156  104402                    TYPOC                   ;ELSE TYPE VALUE
4610  032160  104401  012765            TYPE    .SPACE2         ;FORMAT
4611  032164  105724                    TSTB    (R4)+           ;BUMP R4 TO THE TRACK IN TRK/SEC WORD
4612  032166  111446                    MOVB    (R4),-(SP)      ;PUT TRACK ON THE STACK
4613  032170  104402                    TYPOC                   ;TYPE TRACK NUMBER
4614  032172  104401  012765            TYPE    .SPACE2         ;FORMAT
4615  032176  114446                    MOVB    -(R4),-(SP)     ;PUT SECTOR ON STACK
4616  032200  104402                    TYPOC                   ;TYPE SECTOR NUMBER
4617  032202  104401  001267            TYPE    .$CRLF          ;RETURN THE CARRIAGE
4618  032206  005724                    TST     (R4)+           ;PUT R4 AT NEXT FILE ENTRY
4619  032210  005200                    INC     R0              ;COUNT BAD SECTORS
4620  032212  000755                    BR      3$              ;LOOP
4621  032214  005726            4$:     TST     (SP)+           ;CLEAN OFF STACK
4622  032216  005737  001242            TST     $TMP2           ;TEST IF 2ND PASS, IF YES
4623  032222  001016                    BNE     5$              ;EXIT
4624  032224  052737  000001  001242    BIS     #1,$TMP2        ;ELSE SET 2ND PASS SWITCH
4625  032232  012704  003670            MOV     #BSSOFT+10,R4   ;SWITCH TO OTHER TABLE
4626  032236  005700                    TST     R0
4627  032240  001004                    BNE     7$
4628  032242  104401  001267            TYPE    .$CRLF
4629  032246  104401  015774            TYPE    .NONE
4630  032252  104401  015731      7$:   TYPE    .SBSLAB         ;TYPE SOFTWARE LABEL
4631  032256  000731                    BR      6$              ;GO BACK TO LOOP
4632  032260  104401  001267      5$:   TYPE    .$CRLF
4633  032264  005700                    TST     R0
4634  032266  001405                    BEQ     9$
4635  032270  010046                    MOV     R0,-(SP)        ;EXIT ROUTINE - TYPE THE
4636  032272  104402                    TYPOC                   ;NUMBER OF BAD SECTORS
4637  032274  104401  016057            TYPE    .TOTMES         ;AND RETURN
4638  032300  000402                    BR      8$
4639  032302  104401  015774      9$:   TYPE    .NONE
4640  032306  104412            8$:   RESREG
4641  032310  000207                    RTS     PC
```

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                                .SBTTL  RK611/RK06-RK07 UNIBUS DRIVER FOR SEQUENTIAL OPERATIONS (REV. 0.10)

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                                ;*MAYNARD, MA. 01754
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                                .SBTTL   *WATCH-DOG TIMER

                                ;;*****************************************************************
                                ;*
                                ;*      THE WATCH-DOG TIMER DOES A PSEUDO-TIMING OF RK06-RK07 UNIBUS
                                ;*      SUBSYSTEM COMMAND. SINCE ONE CAN NOT GUARANTEE THAT A
                                ;*      REAL-TIME CLOCK (KW11-P OR KW11-L) IS ON THE SYSTEM
                                ;*      THE RK06-RK07 DRIVER WILL USE THE LOCATION W.MTIM FOR
                                ;*      MILLI-SECOND TIMING. WHEN W.MTIM REACHES ZERO THE
                                ;*      WATCH-DOG TIMER WILL SCAN THE DRIVES IN USE AS
                                ;*      DETERMINED BY THE LOCATION W.TIME. THE TIMER COUNTS
                                ;*      (ONE FOR EACH DRIVE) ARE KEPT IN THE TABLE W.DRV.
                                ;*      IF ANY COUNT IN THE TABLE W.DRV REACHES ZERO A COMMAND
                                ;*      TIME-OUT WILL BE DESIGNATED IN THE PROGRAM DEVICE STATUS
                                ;*      REGISTER OF THAT DRIVE'S PARAMETER BLOCK.
                                ;*
                                ;*      THE DRIVER WILL USE THE LOCATION W.MIN AS THE NUMBER
                                ;*      OF MILLISECONDS FOR AN UNLOAD OR START SPINDLE COMMAND.
                                ;*      THE DRIVER WILL USE THE LOCATION W.SEC AS THE TIME
                                ;*      LIMIT FOR ALL OTHER COMMANDS.
                                ;*
                                ;*      FOR QUEUED OPERATIONS THE WATCH-DOG TIMER WILL
                                ;*      WATCH UP TO 8 OPERATIONS SIMULATEOUSLY. FOR SEQUENTIAL
                                ;*      OPERATIONS ONLY ONE OPERATION WILL BE WATCHED.
                                ;*
                                ;*CALL   JSR     PC,W.WTCH
                                ;*      RETURN          IF NO DRIVE ORDER EXCEEDED ITS TIME LIMIT
                                ;*
                                ;*      OTHERWISE AN ABNORMAL RETURN TO THE ROUTINE ADDRESS
                                ;*      BY LOCATION A.ABNL WILL OCCUR AND THE CMDTO FLAG
                                ;*      IN THE PROGRAM DEVICE STATUS REGISTER OF THE
                                ;*      APPROPRIATE PARAMETER BLOCK WILL BE SET.
                                ;*
                                ;;*****************************************************************

032312  010546                W.WTCH: MOV     R5,-(SP)        ;SAVE R5 ON THE STACK
032314  010446                        MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
032316  010346                        MOV     R3,-(SP)        ;SAVE R3 ON THE STACK
032320  010246                        MOV     R2,-(SP)        ;SAVE R2 ON STACK
032322  013746  177776              MOV     PS,-(SP)        ;SAVE PROGRAM STATUS WORD ON STACK
032326  005337  002610              DEC     W.MTIM          ;DECREMENT MILLISECOND TIMER
032332  001034                      BNE     20$             ;IF NOT ZERO RETURN
032334  013737  002612  002610      MOV     W.MILI,W.MTIM   ;REINITIALIZE MILLISECOND TIMER
032342  105737  002632              TSTB    W.TIME          ;CHECK IF DRIVE IS BEING TIMED
032346  001426                      BEQ     20$             ;NO, RETURN
032350  013737  002574  177776      MOV     RKPRI,PS        ;LOCK OUT RK06-RK07 INTERRUPTS
032356  013702  002570              MOV     RKBAS,R2        ;LOAD BASE OF RK06-RK07 REGISTERS
032362  005337  002646              DEC     W.DRV           ;DECREMENT COMMAND TIMER
032366  001016                      BNE     20$             ;RETURN IF NO TIME OUT
```

```
4698  032370  105037  002632                  CLRB    W.TIME          ;RESET TIMING INDICATOR
4699  032374  013705  002644                  MOV     PBLKT,R5        ;LOAD ADDRESS OF PARAMETER BLOCK
4700                                                                    ;  TABLE FOR INDEXING
4701  032400  052765  000100  000014          BIS     #CMDTO,P.PRST(R5) ;SET COMMAND TIME OUT
4702  032406  020537  002606                  CMP     R5,O.WAIT       ;CHECK IF DRIVER IS WAITING FOR
4703                                                                    ;  COMMAND COMPLETION
4704  032412  001002                          BNE     5$              ;NO, DO NOT ALTER WAITING FOR
4705                                                                    ;  COMMAND COMPLETION
4706  032414  005037  002606                  CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
4707  032420  004737  035674          5$:     JSR     PC,R.ABNL       ;BRANCH TO ERROR ROUTINE
4708  032424  012637  177776          20$:    MOV     (SP)+,PS        ;RESTORE PSW
4709  032430  012602                          MOV     (SP)+,R2        ;RESTORE R2
4710  032432  012603                          MOV     (SP)+,R3        ;RESTORE R3
4711  032434  012604                          MOV     (SP)+,R4        ;RESTORE R4
4712  032436  012605                          MOV     (SP)+,R5        ;RESTORE R5
4713  032440  000207                          RTS     PC              ;RETURN
```

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                        .SBTTL   *RK06 INTERRUPT SERVICE ROUTINE

                        ;*****************************************************************
                        ;*
                        ;*      THIS ROUTINE WILL SERVICE ALL RK06 INTERRUPTS.
                        ;*
                        ;*      UPON RECEIVING AN INTERRUPT, THIS ROUTINE WILL
                        ;*      PERFORM ONE OF THE FOLLOWING SERVICES:
                        ;*
                        ;*      1.) SERVICE PORT WAS SEIZED BY OTHER PORT
                        ;*      2.) SERVICE DRIVER IS WAIT FOR COMMAND COMPLETION
                        ;*      3.) SERVICE POSITIONING COMPLETION
                        ;*      4 ) REQUEUE COMMAND IF DRIVE WAS RELEASED
                        ;*          FOR THE QUEUED RK06 DRIVER.
                        ;*      5.) IF NO SERVICE IS REQUIRED, THE COMMAND WILL BE ISSUED
                        ;*          FOR THE QUEUED RK06 DRIVER.
                        ;*
                        ;*      THREE LINKS ARE PROVIDED TO THE DRIVING PROGRAM.
                        ;*      THEY ARE:
                        ;*
                        ;*      1.) A.NORM ADDRESS OF NORMAL RETURN (SUCESSFUL COMPLETION OF COMMAND)
                        ;*      2.) A.ABNL ADDRESS OF ABNORMAL RETURN (UNSUCESSFUL COMPLETION OF COMMAND)
                        ;*      3.) A.CONT ADDRESS OF CONTROL ERROR RETURN
                        ;*
                        ;*      FOR NORMAL AND ABNORMAL RETURNS, THE ADDRESS OF THE APPROPRIATE
                        ;*      PARAMETER BLOCK WILL BE IN R5.
                        ;*
                        ;*      FOR THE CONTROLLER ERROR RETURN, THE LOCATION E.CONT CONTAINS
                        ;*      THE REASON FOR THE CONTROLLER ERROR.
                        ;*
                        ;*      ROUTINES USED:
                        ;*              C.OPT   (QUEUED ONLY)
                        ;*              Q.PUSH  (QUEUED ONLY)
                        ;*              Q.RMOV  (QUEUED ONLY)
                        ;*              R.CONT  (SEQUENTIAL ONLY)
                        ;*              R.NORM  (SEQUENTIAL ONLY)
                        ;*              R.ABNL  (SEQUENTIAL ONLY)
                        ;*              I.CSTS
                        ;*              I.STAT
                        ;*              I.ISSU
                        ;*              I.CCLR
                        ;*
                        ;*****************************************************************

032442  010546          I.INTR: MOV     R5,-(SP)        ;STORE R5 ON THE STACK
032444  010446                  MOV     R4,-(SP)        ;STORE R4 ON THE STACK
032446  010346                  MOV     R3,-(SP)        ;STORE R3 ON THE STACK
032450  010246                  MOV     R2,-(SP)        ;STORE R2 ON THE STACK
032452  010146                  MOV     R1,-(SP)        ;STORE R1 ON THE STACK
032454  010046                  MOV     R0,-(SP)        ;STORE R0 ON THE STACK
032456  013702  002570          MOV     RKBAS,R2        ;LOAD R2 TO ADDRESS RK06 REGISTER
032462  016237  000010  002534  MOV     RKCS2(R2),T.CS2 ;STORE CS2
032470  032737  001000  002534  BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
032476  001407                  BEQ     1$              ;NO, CONTINUE PROCESSING
032500  052737  100000  002604  BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT
032506  004737  035720          JSR     PC,R.CONT       ;REPORT ERROR
```

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4770  032512  000137  034672                    JMP     I.RTRN          ;RETURN
4771
4772  032516  105737  002626          1$:       TSTB    I.ISRL          ;CHECK IF INTERRUPT OR RELEASE
4773  032522  001410                            BEQ     6$              ;NO, CHECK IF DRIVE AVAILABLE
4774  032524  100403                            BMI     5$              ;CHECK IF RELEASE COMMAND
4775  032526  105037  002626                    CLRB    I.ISRL          ;YES,CLEAR FLAG
4776  032532  000473                            BR      I.IGO           ;CONTINUE PROCESSING INTERRUPT
4777
4778  032534  105037  002626          5$:       CLRB    I.ISRL          ;CLEAR FLAG
4779  032540  000137  033654                    JMP     I.ATTN          ;GO PROCESS DRIVE ATTENTIONS
4780
4781  032544  032737  010400  002534  6$:       BIT     #NED!UFE,T.CS2  ;CHECK FOR NON-EXISTENT DRIVE OR
4782                                                                    ;  UNIT FIELD ERROR
4783  032552  001413                            BEQ     7$              ;NO, WAIT FOR DUAL ACCESS INTERRUPT
4784  032554  013704  002534                    MOV     T.CS2,R4        ;LOAD R4 FOR DRIVE NUMBER
4785  032560  042704  177770                    BIC     #^C<DRVMSK>,R4  ;KEEP DRIVE BITS
4786  032564  013705  002644                    MOV     PBLKT,R5        ;STORE PARAMETER BLOCK ADDRESS
4787  032570  016237  000000  002532            MOV     RKCS1(R2),T.CS1 ;LOAD TEMPORARY CS1 FOR STATUS REPORT
4788  032576  000137  033064                    JMP     I.ERRC          ;REPORT ERROR
4789
4790  032602  016237  000012  002552  7$:       MOV     RKDS(R2),T.DS   ;STORE STATUS REGISTER FOR COMPARISON
4791  032610  032737  000001  002552            BIT     #DRA,T.DS       ;CHECK IF DRIVE SEIZED BY OTHER
4792                                                                    ;  PORT
4793  032616  001041                            BNE     I.IOO           ;NO, CONTINUE PROCESSING INTERRUPT
4794
4795                                            ;CHECK IF ANY DATA TRANSFER ERROR EXISTS
4796  032620  032737  164000  002534            BIT     #DLT!WCE!UPE!NEM,T.CS2
4797
4798  032626  001007                            BNE     10$             ;INDICATE ERROR
4799  032630  016237  000014  002550            MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER
4800
4801                                  ;         CHECK FOR DATA TRANSFER ERROR TYPE ERROR
4802  032636  032737  125700  002550            BIT     #DCK!OPI!WLE!COE!HVRC!BSE!ECH,T.ER
4803
4804  032644  001407                            BEQ     11$             ;NO, WAIT FOR RELEASE OF RK06 DRIVE
4805
4806  032646  052737  000010  002604  10$:       BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
4807  032654  004737  035720                    JSR     PC,R.CONT       ;REPORT ERROR
4808  032660  000137  034672                    JMP     I.RTRN          ;RESTORE REGISTERS
4809
4810  032664  105037  002632          11$:      CLRB    W.TIME          ;RESET TIMING ON THIS DRIVE
4811  032670  005037  002646                    CLR     W.DRV           ;CLEAR TIMING COUNT FOR THIS DRIVE
4812  032674  013705  002644                    MOV     PBLKT,R5        ;LOAD R5 WITH PARAMETER BLOCK
4813                                                                    ;  ADDRESS
4814  032700  052765  010000  000014            BIS     #DRVSZD,P.PRST(R5) ;SET DRIVE SEIZED IN THE
4815                                                                    ;  PROGRAM DRIVE STATUS REGISTER
4816  032706  005037  002606                    CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
4817  032712  004737  035674                    JSR     PC,R.ABNL       ;INDICATE ABNORMAL TERMINATION
4818  032716  000137  034672                    JMP     I.RTRN          ;GO RESTORE REGISTERS
4819
4820  032722  013705  002606          I.IOO:    MOV     O.WAIT,R5       ;LOAD PARAMETER BLOCK ADDRESS INTO R5
4821  032726  001002                            BNE     2$              ;IS COMMAND WAITING PROCESSING
4822                                                                    ;  YES, DO PROCESSING
4823  032730  000137  033654                    JMP     I.ATTN          ;NO, PROCESS ATTENTION
4824
4825  032734  013704  002534          2$:       MOV     T.CS2,R4        ;STORE RKCS2 FOR DRIVE NUMBER
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4826  032740  042704  177770                BIC     #^C<DRVMSK>,R4  ;MASK OUT UNNECESSARY BITS
4827
4828
4829  032744  126504  000000                CMPB    P.DRVN(R5),R4   ;CHECK IF DRIVE NUMBER IS EXPECTED
4830  032750  001401                        BEQ     3$              ;YES, CONTINUE
4831  032752  000000                        HALT                    ;NO, DRIVER ERROR
4832  032754  122765  000164  000001  3$:   CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
4833  032762  001002                        BNE     10$             ;NO, EXECUTE NORMAL DATA TRANSFER
4834  032764  000137  033322                JMP     I.HDAL          ;GO EXECUTE SPECIAL HEADER SEQUENCE
4835
4836  032770  005037  002606          10$:  CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
4837  032774  005037  002646                CLR     W.DRV           ;CLEAR WATCH-DOG TIME
4838  033000  105037  002632                CLRB    W.TIME          ;RESET TIMING ON THIS DRIVE
4839  033004  016237  000000  002532        MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
4840  033012  032737  100000  002532        BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
4841  033020  001021                        BNE     I.ERRC          ;YES, PROCESS ERROR
4842  033022  016237  000016  002546        MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
4843  033030  133737  002633  002547        BITB    INTMSK,T.ASOF+1 ;CHECK IF DRIVE ATTENTION SET
4844  033036  001004                        BNE     15$             ;YES, REPORT ERROR
4845  033040  004737  035706                JSR     PC,R.NORM       ;INDICATE NORMAL RETURN
4846  033044  000137  034672                JMP     I.RTRN          ;RESTORE REGISTERS
4847
4848  033050  052765  000010  000014  15$:   BIS     #UEXATT,P.PRST(R5) ;SET UNEXPECTED ATTENTION
4849
4850  033056  004737  035342          I.ERRA: JSR     PC,I.CSTS       ;STORE CONTROLLER STATUS
4851  033062  000405                        BR      I.ERR           ;STORE PATTERN AND POSITION INFORMATION
4852
4853  033064  013765  002532  000016  I.ERRC: MOV     T.CS1,P.CS1(R5) ;GET ERROR RKCS1
4854  033072  004737  035364                JSR     PC,I.CSTI       ;GET REST OF CONTROLLER STATUS
4855  033076  016265  000032  000062  I.ERR:  MOV     RKECPT(R2),P.EPAT(R5) ;STORE ECC PATTERN
4856  033104  016265  000030  000060        MOV     RKECPS(R2),P.EPOS(R5) ;STORE ECC POSITION
4857  033112  004037  034710                JSR     R0,I.CCLR       ;CLEAR CONTROLLER
4858  033116  034672                        I.RTRN                  ;ERROR RETURN
4859  033120  032765  010400  000020        BIT     #NED!UFE,P.CS2(R5) ;CHECK IF IT WAS NON-EXISTENT DRIVE OR
4860                                                                ;  UNIT FIELD ERROR
4861  033126  001046                        BNE     5$              ;YES, REPORT ERROR
4862  033130  004037  035446                JSR     R0,I.STAT       ;GATHER DRIVE STATUS
4863  033134  034672                        I.RTRN                  ;ERROR RETURN
4864  033136  112737  000005  002532        MOVB    #DR.CLR,T.CS1   ;LOAD COMMAND
4865  033144  004037  034772                JSR     R0,I.ISSU       ;ISSUE DRIVE CLEAR
4866  033150  034672                        I.RTRN                  ;ERROR RETURN
4867  033152  133737  002633  002547        BITB    INTMSK,T.ASOF+1 ;CHECK IF ATTENTION RESET
4868  033160  001407                        BEQ     2$              ;NO, INDICATE DRIVE ERROR
4869  033162  052737  000020  002604        BIS     #E.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
4870                                                                ;  WITH CLEAR
4871  033170  004737  035720                JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
4872  033174  000137  034672                JMP     I.RTRN          ;GO RESTORE REGISTERS
4873
4874  033200  032737  040000  002556  2$:   BIT     #S.DSC,T.MR2    ;CHECK IF DRIVE STATUS CHANGE CLEARED
4875  033206  001403                        BEQ     3$              ;YES, CHECK FAULT
4876  033210  052765  000040  000014        BIS     #DRVDSC,P.PRST(R5) ;SET DSC DID NOT CLEAR
4877  033216  032737  001000  002560  3$:   BIT     #S.PAR,T.MR3    ;CHECK IF DRIVE PARITY ERROR
4878  033224  001407                        BEQ     5$              ;NO, INDICATE ABNORMAL TERMINATION
4879  033226  052737  002000  002604        BIS     #E.DPAR,E.CONT  ;SET DRIVE PARITY ERROR
4880  033234  004737  035720                JSR     PC,R.CONT       ;INDICATE CONTROLLER ERROR
4881  033240  000137  034672                JMP     I.RTRN          ;RETURN
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4882
4883  033244  032765  000020  000014  5$:     BIT     #DRVHRD,P.PRST(R5) ;CHECK IF HARD DRIVE ERROR
4884  033252  001017                          BNE     10$             ;YES, GO REPORT ERROR
4885  033254  032737  020000  002556          BIT     #S.PIP,T.MR2    ;CHECK IF DRIVE IS CYCLING DOWN
4886  033262  001413                          BEQ     10$             ;NO, REPORT ERROR
4887  033264  052765  020000  000014          BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING
4888  033272  113737  002633  002632          MOVB    INTMSK,W.TIME   ;SET UP 8 SECONDS FOR DRIVE TO CYCLE UP
4889  033300  013737  002616  002646          MOV     W.8SEC,W.DRV
4890  033306  000137  034672                  JMP     I.RTRN          ;GO RESTORE REGISTERS
4891
4892  033312  004737  035674          10$:    JSR     PC,R.ABNL       ;GO REPORT ERROR
4893  033316  000137  034672                  JMP     I.RTRN          ;GO RESTORE REGISTERS
4894
4895                                  .SBTTL  *READ ALL HEADERS INTERRUPT SEQUENCE
4896
4897  033322  016237  000000  002532  I.HDAL: MOV     RKCS1(R2),T.CS1 ;STORE CS1 TO CHECK CONTROLLER
4898                                                                  ;  ERROR
4899  033330  032737  100000  002532          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
4900  033336  001422                          BEQ     5$              ;NO, CHECK FOR ATTENTION
4901
4902  033340  005037  002606                  CLR     0.WAIT          ;CLEAR WAITING FOR COMMAND COMPLETE
4903  033344  105037  002632                  CLRB    W.TIME          ;RESET TIMING ON DRIVE
4904  033350  005037  002646                  CLR     W.DRV           ;CLEAR TIME OUT COUNT
4905  033354  013765  002532  000016          MOV     T.CS1,P.CS1(R5) ;STORE ERROR RKCS1
4906  033362  004737  035364                  JSR     PC,I.CST1       ;STORE CONTROLLER REGISTERS
4907  033366  004037  034710                  JSR     R0,I.CCLR       ;CLEAR CONTROLLER
4908  033372  034672                          I.RTRN                  ;ERROR RETURN
4909  033374  004737  035674                  JSR     PC,R.ABNL       ;INDICATE ERROR RETURN
4910  033400  000137  034672                  JMP     I.RTRN          ;RESTORE REGISTERS
4911
4912  033404  016237  000016  002546  5$:     MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
4913  033412  133737  002633  002547          BITB    INTMSK,T.ASOF+1 ;CHECK IF DRIVE ATTENTION IS SET
4914  033420  001410                          BEQ     7$              ;NO, CHECK IF READ ALL HEADERS
4915  033422  005037  002606                  CLR     0.WAIT          ;CLEAR WAITING FOR COMMAND COMPLETION
4916  033426  105037  002632                  CLRB    W.TIME          ;RESET TIMING ON DRIVE
4917  033432  005037  002646                  CLR     W.DRV           ;CLEAR TIME OUT COUNT
4918  033436  000137  033056                  JMP     I.ERRA          ;GO REPORT ERROR
4919
4920  033442  013701  002622          7$:     MOV     HDR.AD,R1       ;GET MAIN MEMORY ADDRESS
4921  033446  016221  000024                  MOV     RKDB(R2),(R1)+  ;GET FIRST WORD OF HEADER
4922  033452  016221  000024                  MOV     RKDB(R2),(R1)+  ;GET SECOND WORD OF HEADER
4923  033456  016221  000024                  MOV     RKDB(R2),(R1)+  ;GET THIRD WORD OF HEADER
4924  033462  010137  002622                  MOV     R1,HDR.AD       ;STORE ADDRESS FOR NEXT HEADER
4925  033466  016237  000010  002534          MOV     RKCS2(R2),T.CS2 ;STORE CS2 TO CHECK FOR DATA LATE
4926  033474  032737  100000  002534          BIT     #DLT,T.CS2      ;CHECK FOR DATA LATE
4927  033502  001055                          BNE     35$             ;YES, REPORT ERROR
4928  033504  005337  002624                  DEC     HDR.CT          ;DECREMENT NUMBER OF HEADER YET TO READ
4929  033510  001026                          BNE     25$             ;IF NON-ZERO, GO ISSUE NEXT READ HEADER
4930  033512  005037  002606                  CLR     0.WAIT          ;CLEAR DRIVER WAITING FOR COMMAND COMPLETION
4931  033516  005037  002646                  CLR     W.DRV           ;CLEAR TIME OUT COUNT FOR THIS DRIVE
4932  033522  105037  002632                  CLRB    W.TIME          ;CLE   WATCH DOG TIME ON THIS DRIVE
4933  033526  012762  000003  000026          MOV     #3,RKMR1(R2)    ;LOAD MAINTENANCE REGISTER FOR SECTOR COUNT
4934  033534  112737  000001  002532          MOVB    #DR.SEL,T.CS1   ;LOAD SELECT COMMAND
4935  033542  004037  034772                  JSR     R0,I.ISSU       ;GET SECTOR COUNT
4936  033546  034672                          I.RTRN                  ;ERROR RETURN
4937  033550  013765  002560  000056          MOV     T.MR3,P.B11(R5) ;LOAD SECTOR COUNT
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4938  033556  004737  035706                      JSR     PC,R.NORM       ;INDICATE NORMAL TERMINATION
4939  033562  000137  034672                      JMP     I.RTRN          ;RESTORE REGISTERS
4940
4941  033566  016562  000002  000020  25$:        MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
4942  033574  016562  000004  000006              MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
4943  033602  116565  000007  000017              MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
4944  033610  042765  165777  000016              BIC     #^C<CDT!CFMT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT AND
4945                                                      ;  DRIVE TYPE
4946  033616  112765  000125  000016              MOVB    #RDHEAD,P.CS1(R5)  ;STORE COMMAND ISSUED
4947  033624  016562  000016  000000              MOV     P.CS1(R5),RKCS1(R2)  ;ISSUE READ HEADER
4948  033632  000137  034672                      JMP     I.RTRN          ;RESTORE REGISTERS
4949
4950  033636  052737  000400  002604  35$:        BIS     #E.DLT,E.CONT   ;SET DATA LATE WHILE UNLOADING HEADER
4951  033644  004737  035720                      JSR     PC,R.CONT       ;REPORT ERROR
4952  033650  000137  034672                      JMP     I.RTRN          ;RESTORE REGISTERS
4953
4954                                      .SBTTL   *DRIVE ATTENTION SCANNER
4955
4956  033654  016237  000000  002532  I.ATTN: MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS
4957                                                  ;  REGISTER 1 FOR COMPARISON
4958  033662  032737  100000  002532              BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCURRED
4959  033670  001441                              BEQ     5$              ;NO, CHECK IF ATTENTION
4960
4961                                              ;CHECK IF ANY DATA TRANSFER TYPE ERROR EXISTS
4962  033672  032737  164000  002534              BIT     #DLT!WCE!UPE!NEM,T.CS2
4963
4964  033700  001007                              BNE     1$              ;INDICATE ERROR
4965  033702  016237  000014  002550              MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER
4966
4967                                      ;       CHECK FOR DATA TRANSFER ERROR TYPE
4968  033710  032737  125700  002550              BIT     #DCK!OPI!WLE!COE!HVRC!BSE!ECH,T.ER
4969
4970  033716  001407                              BEQ     2$              ;NO DATA TRANSFER ERROR
4971
4972  033720  052737  000010  002604  1$:         BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
4973  033726  004737  035720                      JSR     PC,R.CONT       ;REPORT ERROR
4974  033732  000137  034672                      JMP     I.RTRN          ;RESTORE REGISTERS
4975
4976  033736  013704  002534          2$:         MOV     T.CS2,R4        ;SAVE CS2 FOR REGISTER NUMBER
4977  033742  042704  177770                      BIC     #^C<DRVMSK>,R4  ;STRIP OFF JUNK
4978  033746  105037  002632                      CLRB    W.TIME          ;CLEAR WATCH DOG TIMER
4979  033752  005037  002646                      CLR     W.DRV           ;RESET TIMER VALUE
4980  033756  013705  002644                      MOV     PBLKT,R5        ;STORE PARAMETER BLOCK ADDRESS IN R5
4981
4982                                      ;       CLEAR DRIVE POSITIONING AND DRIVE POSITIONED FOR DATA TRANSFER
4983                                      ;         IN PROGRAM DEVICE STATUS REGISTER
4984  033762  042765  000006  000014              BIC     #DRVPOS!DRVPDT,P.PRST(R5)
4985
4986  033770  000137  033064                      JMP     I.ERRC          ;GO REPORT ERROR
4987
4988  033774  032737  040000  002532  5$:         BIT     #DI,T.CS1       ;CHECK IF ANY DRIVE ATTENTION
4989  034002  001002                              BNE     6$              ;YES, PROCESS INTERRUPT
4990  034004  000137  034672                      JMP     I.RTRN          ;RESTORE REGISTERS
4991
4992  034010  016237  000016  002546  6$:         MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
4993  034016  105737  002547                      TSTB    T.ASOF+1        ;CHECK IF ANY ATTENTIONS SET
```

```
4994  034022  001007                          BNE     7$                      ;YES GO PROCESS INTERRUPT
4995  034024  052737  000002  002604          BIS     #E.NOAT,E.CONT          ;SET NO ATTENTION IN ATTENTION SUMMARY
4996  034032  004737  035720                  JSR     PC,R.CONT               ;GO REPORT ERROR
4997  034036  000137  034672                  JMP     I.RTRN                  ;GO RESTORE REGISTERS
4998
4999  034042  133737  002633  002547  7$:     BITB    INTMSK,T.ASOF+1         ;CHECK IF DESIRED INTERRUPT
5000  034050  001007                          BNE     8$                      ;YES, GO PROCESS IT
5001  034052  052737  000004  002604          BIS     #E.UATT,E.CONT          ;SET UNSOLICATED ATTENTION
5002  034060  004737  035720                  JSR     PC,R.CONT               ;GO REPORT ERROR
5003  034064  000137  034672                  JMP     I.RTRN                  ;GO RESTORE REGISTERS
5004
5005  034070  013705  002644          8$:     MOV     PBLKT,R5                ;STORE PARAMETER BLOCK TABLE
5006  034074  116504  000000                  MOVB    P.DRVN(R5),R4           ;STORE DRIVE NUMBER
5007  034100  032765  020000  000014          BIT     #E.UNLD,P.PRST(R5)      ;CHECK IF DRIVE UNLOADING
5008  034106  001402                          BEQ     11$                     ;NO, CONTINUE
5009  034110  000137  034572                  JMP     I.UNLD                  ;SERVICE DRIVE IN POSITION AFTER ERROR
5010
5011  034114  042765  000002  000014  11$:     BIC     #DRVPOS,P.PRST(R5)      ;RESET DRIVE POSITIONING
5012  034122  005062  000026                  CLR     RKMR1(R2)               ;CLEAR MAINTENANCE REGISTER 1
5013  034126  112737  000001  002532          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
5014  034134  004037  034772                  JSR     R0,I.ISSU               ;SELECT DRIVE WITH ATTENTION HIGH
5015  034140  034672                          I.RTRN                          ;ERROR RETURN
5016  034142  013765  002560  000042          MOV     T.MR3,P.B00(R5)         ;STORE STATUS BYTE 00 MESS B
5017  034150  032765  000200  000042          BIT     #S.FLT,P.B00(R5)        ;CHECK IF DRIVE FAULT
5018  034156  001401                          BEQ     12$                     ;NO, CHECK FOR DRIVE STATUS CHANGE
5019  034160  000461                          BR      I.AERR                  ;PROCESS ERROR
5020
5021  034162  013765  002556  000040  12$:     MOV     T.MR2,P.A00(R5)         ;STORE MAINTENANCE REGISTER 2
5022  034170  032765  040000  000040          BIT     #S.DSC,P.A00(R5)        ;CHECK FOR DRIVE STATUS CHANGE
5023  034176  001004                          BNE     13$                     ;YES, PROCESS DRIVE STATUS CHANGE
5024  034200  052765  004000  000014          BIS     #NODSC,P.PRST(R5)       ;SET NO DRIVE STATUS CHANGE
5025  034206  000446                          BR      I.AERR                  ;PROCESS ERROR
5026
5027  034210  112737  000005  002532  13$:     MOVB    #DR.CLR,T.CS1           ;LOAD COMMAND
5028  034216  004037  034772                  JSR     R0,I.ISSU               ;CLEAR DRIVE STATUS CHANGE
5029  034222  034672                          I.RTRN                          ;ERROR RETUN
5030  034224  013765  002546  000032          MOV     T.ASOF,P.ASOF(R5)       ;STORE ATTENTION SUMMARY
5031  034232  133765  002633  000033          BITB    INTMSK,P.ASOF+1(R5)     ;CHECK IF ATTENTION RESET
5032  034240  001407                          BEQ     15$                     ;YES, CONTINUE INTERRUPT PROCESSING
5033  034242  052737  000020  002604          BIS     #E.CLAT,E.CONT          ;SET ATTENTION DID NOT RESET
5034                                                                          ;  WITH DRIVE CLEAR
5035  034250  004737  035720                  JSR     PC,R.CONT               ;FLAG ERROR
5036  034254  000137  034672                  JMP     I.RTRN                  ;RESTORE REGISTERS
5037
5038  034260  013765  002556  000040  15$:     MOV     T.MR2,P.A00(R5)         ;STORE MAINTENANCE REGISTER 2
5039  034266  032765  040000  000040          BIT     #S.DSC,P.A00(R5)        ;CHECK IF DRIVE STATUS CHANGE
5040                                                                          ;  RESET
5041  034274  001404                          BEQ     16$                     ;YES, CONTINUE INTERRUPT PROCESSING
5042  034276  052765  000040  000014          BIS     #DRVDSC,P.PRST(R5)      ;SET DRIVE STATUS CHANGE DID NOT CLEAR
5043  034304  000407                          BR      I.AERR                  ;GO PROCESS ERROR
5044
5045  034306  105037  002632          16$:     CLRB    W.TIME                  ;RESET TIMING ON THIS DRIVE
5046  034312  005037  002646                  CLR     W.DRV                   ;CLEAR DRIVE TIMING COUNT
5047  034316  004737  035706                  JSR     PC,R.NORM               ;REPORT SUCCESSFUL COMMAND COMPLETETION
5048  034322  000563                          BR      I.RTRN                  ;RESTORE REGISTERS
5049
```

```
                                        .SBTTL   *ATTENTION ERROR HANDLER
                                
034324  042765  000004  000014  I.AERR: BIC     #DRVPDT,P.PRST(R5) ;RESET POSITIONING IN PROGRESS BECAUSE
                                                                   ;   OF DATA TRANSFER
034332  105037  002632                  CLRB    W.TIME             ;CLEAR TIMING FOR THIS DRIVE
034336  005037  002646                  CLR     W.DRV              ;RESET WATCH-DOG TIME
034342  042765  177741  000016          BIC     #177741,P.CS1(R5)  ;KEEP COMMAND ISSUED
034350  042737  000036  002532          BIC     #36,T.CS1          ;KEEP CURRENT CONTROLLER STATUS
034356  052765  002532  000016          BIS     T.CS1,P.CS1(R5)    ;MAKE GOOD MESSAGE
034364  013765  002534  000020          MOV     T.CS2,P.CS2(R5)    ;STORE CONTROLLER REGISTERS
034372  013765  002536  000022          MOV     T.WCR,P.WCR(R5)
034400  013765  002540  000024          MOV     T.BA,P.BAR(R5)
034406  013765  002542  000026          MOV     T.DA,P.DTS(R5)
034414  013765  002544  000030          MOV     T.DC,P.DCYL(R5)
034422  013765  002546  000032          MOV     T.ASOF,P.ASOF(R5)
034430  013765  002550  000034          MOV     T.ER,P.ER(R5)
034436  013765  002552  000036          MOV     T.DS,P.DS(R5)
034444  004037  035446                  JSR     R0,I.STAT          ;GATHER DRIVE STATUS
034450  034672                          I.RTRN                     ;ERROR RETURN
034452  112737  000005  002532          MOVB    #DR.CLR,T.CS1      ;LOAD COMMAND
034460  004037  034772                  JSR     R0,I.ISSU          ;CLEAR DRIVE ERRORS
034464  034672                          I.RTRN                     ;ERROR RETURN
034466  133737  002633  002547          BITB    INTMSK,T.ASOF+1    ;CHECK IF ATTENTION RESET
034474  001407                          BEQ     2$                 ;YES, FLAG DRIVE ERROR
034476  052737  000020  002604          BIS     #E.CLAT,E.CONT     ;SET ATTENTION DID NOT RESET
034504  004737  035720                  JSR     PC,R.CONT          ;REPORT EPROR
034510  000137  034672                  JMP     I.RTRN             ;RESTORE REGISTERS

034514  032765  000020  000014  2$:     BIT     #DRVHRD,P.PRST(R5) ;CHECK IF AHARD DRIVE ERROR
034522  001017                          BNE     10$                ;YES, REPORT ERROR
034524  032737  020000  002556          BIT     #S.PIP,T.MR2       ;CHECK IF DRIVE IS UNLOADING
034532  001413                          BEQ     10$                ;NO, REPORT ERROR
034534  052765  020000  000014          BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING DUE TO ERROR
034542  113737  002633  002632          MOVB    INTMSK,W.TIME      ;SET TIMING ON THIS DRIVE
034550  013737  002616  002646          MOV     W.BSEC,W.DRV       ;LOAD 8 SECONDS FOR CYCLE UP TIME
034556  000137  034672                  JMP     I.RTRN             ;RESTORE REGISTERS

034562  004737  035674          10$:    JSR     PC,R.ABNL          ;REPORT ERROR
034566  000137  034672                  JMP     I.RTRN             ;RESTORE REGISTERS

                                        .SBTTL   *ERROR CAUSING DRIVE TO UNLOAD

034572  052765  020000  000014  I.UNLD: BIS     #E.UNLD,P.PRST(R5) ;CLEAR DRIVE UNLOADING BECAUSE OF ERROR
034600  112737  000005  002532          MOVB    #DR.CLR,T.CS1      ;LOAD IN DRIVE CLEAR
034606  004037  034772                  JSR     R0,I.ISSU          ;GO ISSUE DRIVE CLEAR
034612  034672                          I.RTRN                     ;ERROR RETURN
034614  136437  002633  002547          BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF ATTENTION CLEARED
034622  001406                          BEQ     15$                ;YES, CONTINUE
034624  012737  000020  002604          MOV     #E.CLAT,E.CONT     ;SET ATTENTION DID NOT RESET
034632  004737  035720                  JSR     PC,R.CONT          ;REPORT ERROR
034636  000415                          BR      I.RTRN             ;RESTORE REGISTERS

034640  032737  040000  002556  15$:    BIT     #S.DSC,T.MR2       ;CHECK IF DRIVE STAUS CHANGE RESET
034646  001403                          BEQ     20$                ;YES, CONTINUE
034650  052765  000040  000014          BIS     #DRVDSC,P.PRST(R5) ;SET DRIVE STAUS CHANGE DID NCT CLEAR
034656  105037  002632          20$:    CLRB    W.TIME             ;RESET TIMING ON THIS DRIVE
```

```
 5106  034662  005037  002646                CLR     W.DRV           ;CLEAR TIME COUN
 5107  034666  004737  035674                JSR     PC,R.ABNL       ;REPORT ERROR
 5108
 5109  034672  012600            I.RTRN:     MOV     (SP)+,R0        ;RESTORE R0
 5110  034674  012601                        MOV     (SP)+,R1        ;RESTORE R1
 5111  034676  012602                        MOV     (SP)+,R2        ;RESTORE R2
 5112  034700  012603                        MOV     (SP)+,R3        ;RESTORE R3
 5113  034702  012604                        MOV     (SP)+,R4        ;RESTORE R4
 5114  034704  012605                        MOV     (SP)+,R5        ;RESTORE R5
 5115  034706  000002                        RTI                     ;RETURN
 5116
```

```
                                .SBTTL   *CONTROLLER CLEAR ROUTINE

                                ;;*****************************************************************
                                ;*
                                ;*      THIS ROUTINE WILL BE USED BY THE DRIVER TO CLEAR THE CONTROLLER
                                ;*      AND CHECK IF THE CONTROLLER ERRORS ARE RESET.  IF THE ERROR IS NOT
                                ;*      CLEARED, THE ROUTINE AS SPECIFIED IN A.CONT WILL BE CALLED WITH
                                ;*      E.CCLR SET IN E.CONT.
                                ;*
                                ;*      REGISTER        USE
                                ;*      --------        ---
                                ;*
                                ;*      R2              ADDRESS OF RK06 REGISTERS
                                ;*      R5              ADDRESS OF PARAMETER BLOCK
                                ;*
                                ;*CALL  JSR     R0,I.CCLR
                                ;*      (ADDRESS OF ERROR RETURN)
                                ;*      RETURN
                                ;*
                                ;;*****************************************************************

034710  012762  100000  000000  I.CCLR: MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
034716  016237  000000  002532          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
034724  032737  100000  002532          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER CLEAR DID
                                                                ;  CLEAR ERROR
034732  001407                          BEQ     5$              ;YES, RETURN TO DRIVER PROCESSING
034734  052737  000001  002604          BIS     #E.CCLR,E.CONT  ;SET CLEAR CONTROLLER DID NOT CLEAR ERROR
034742  004737  035720                  JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
034746  011000                          MOV     (R0),R0         ;SET UP ERROR RETURN
034750  000200                          RTS     R0              ;RETURN

034752  012762  000100  000000  5$:     MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
034760  112737  177777  002626          MOVB    #-1,I.ISRL      ;SET INTERRUPT ENABLE ISSUED
034766  005720                          TST     (R0)+           ;ADJUST FOR NORMAL RETURN
034770  000200                          RTS     R0              ;RETURN
```

```
5152                                    .SBTTL   *COMMAND ISSUED BY DRIVER SERVICE ROUTINE
5153
5154                                    ;*****************************************************************
5155                                    ;*
5156                                    ;*      THIS ROUTINE WILL ISSUE THE COMMAND AS SPECIFIED IN T.CS1
5157                                    ;*      AND CHECK IF A CONTROLLER ERROR OCCURRED.  IF A CONTROLLER
5158                                    ;*      ERROR OCCURRED, E.CERR WILL BE SET IN E.CONT AND
5159                                    ;*      CONTROL WILL BE TURN OVER TO THE ROUTINE SPECIFIED BY THE
5160                                    ;*      ADDRESS IN A.CONT.
5161                                    ;*
5162                                    ;*      REGISTER        USE
5163                                    ;*      --------        ---
5164                                    ;*
5165                                    ;*      R2              ADDDRESS OF RK06 REGISTERS
5166                                    ;*      R5              ADDRESS OF PARAMETER BLOCK
5167                                    ;*
5168                                    ;*CALL  JSR     R0,I.ISSU
5169                                    ;*      <ADDRESS OF ERROR RETURN>
5170                                    ;*      RETURN
5171                                    ;*
5172                                    ;*      ROUTINES USED:
5173                                    ;*      --------------
5174                                    ;*
5175                                    ;*              I.CCLR
5176                                    ;*              I.STOR
5177                                    ;*
5178                                    ;*****************************************************************
5179
5180  034772  013746  002532           I.ISSU: MOV     T.CS1,-(SP)     ;STORE COMMAND ISSUED
5181  034776  005037  002534                   CLR     T.CS2           ;CLEAR TEMPORARY CS2
5182  035002  116537  000000  002534           MOVB    P.DRVN(R5),T.CS2 ;LOAD IN DRIVE NUMBER
5183  035010  013762  002534  000010           MOV     T.CS2,RKCS2(R2) ;LOAD DRIVE NUMBER FOR COMMAND
5184  035016  116537  000007  002533           MOVB    P.CS1H(R5),T.CS1+1 ;STORE BITS 8-15 OF CS1
5185  035024  142737  177753  002533           BICB    #^C<B.CDT!B.CFMT>,T.CS1+1 ;CLEAR ALL BITS EXCEPT
5186                                                                    ;  FORMAT AND DRIVE TYPE
5187  035032  013762  002532  000000           MOV     T.CS1,RKCS1(R2) ;ISSUE COMMAND
5188  035040  105762  000000           1$:     TSTB    RKCS1(R2)       ;WAIT FOR READY
5189  035044  100375                           BPL     1$
5190  035046  004737  035214                   JSR     PC,I.STOR       ;GO STORE REGISTERS
5191  035052  032737  100000  002532           BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCUERED
5192  035060  001437                           BEQ     5$              ;NO, RETURN
5193  035062  032737  001000  002534           BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
5194  035070  001406                           BEQ     2$              ;NO, CHECK FOR OTHER CONTROLLER ERRORS
5195  035072  052737  100000  002604           BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT FLAG
5196  035100  004737  035720                   JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
5197  035104  000440                           BR      10$             ;RETURN
5198
5199                                    ;CHECK IF ANY CONTROLLER ERROR IS SET
5200  035106  032737  024000  002532   2$:     BIT     #CTO!SPAR,T.CS1
5201  035114  001027                           BNE     7$
5202  035116  032737  176400  002534           BIT     #UFE!PGE!NEM!NED!UPE!WCE!DLT,T.CS2
5203  035124  001023                           BNE     7$
5204  035126  032737  131761  002550           BIT     #ILC!DTYE!FMTE!ECH!BSE!HVRC!COE!DTE!OPI!DCK,T.ER
5205  035134  001017                           BNE     7$
5206
5207  035136  122716  000005                   CMPB    #DR.CLR,(SP)    ;CHECK IF CLEAR DRIVE
```

```
 5208  035142  001003                        BNE     3$                  ;NO, DO NOT SET DRIVE HARD ERROR
 5209  035144  052765  000020  000014        BIS     #DRVHRD,P.PRST(R5)  ;SET HARD DRIVE ERROR
 5210  035152  004037  034710          3$:   JSR     R0,I.CCLR           ;GO ISSUE A CONTROLLER CLEAR
 5211  035156  035206                        .10$                        ;ERROR RETURN
 5212  035160  012762  000100  000000  5$:   MOV     #IE,RKCS1(R2)       ;SET INTERRUPT ENABLE
 5213  035166  005726                        TST     (SP)+               ;ADJUST STACK
 5214  035170  005720                        TST     (R0)+               ;ADJUST R0 FOR NORMAL RETURN
 5215  035172  000200                        RTS     R0                  ;RETURN
 5216
 5217  035174  052737  001000  002604  7$:   BIS     #E.CERR,E.CONT      ;SET CONTROLLER ERROR DURING
 5218                                                                    ;  DRIVER SERVICING
 5219  035202  004737  035720                JSR     PC,R.CONT           ;REPORT ERROR
 5220  035206  005726                  10$:  TST     (SP)+               ;ADJUST STACK
 5221  035210  011000                        MOV     (R0),R0             ;ADJUST R0 FOR ERROR RETURN
 5222  035212  000200                        RTS     R0                  ;RETURN
```

```
                                .SBTTL   *STORE RK611 UNIBUS REGISTERS

                                ;;*****************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS CALLED BY THE RK06 DRIVER TO STORE ALL
                                ;*      RK611 REGISTER IN TEMPORARY LOCATIONS.
                                ;*
                                ;*CALL  JSR     PC,I.STOR
                                ;*      RETURN
                                ;*
                                ;*      REGISTER        USE
                                ;*      --------        ---
                                ;*
                                ;*      R2              ADDRESS OF RK611 REGISTERS
                                ;*
                                ;;*****************************************************************

 035214  016237  000000  002532 I.STOR: MOV     RKCS1(R2),T.CS1 ;STORE ALL CONTROLLER REGISTERS
 035222  016237  000010  002534         MOV     RKCS2(R2),T.CS2 ;  EXCEPT DATA BUFFER
 035230  016237  000002  002536         MOV     RKWC(R2),T.WCR
 035236  016237  000004  002540         MOV     RKBA(R2),T.BA
 035244  016237  000006  002542         MOV     RKDA(R2),T.DA
 035252  016237  000012  002552         MOV     RKDS(R2),T.DS
 035260  016237  000014  002550         MOV     RKER(R2),T.ER
 035266  016237  000016  002546         MOV     RKASOF(R2),T.ASOF
 035274  016237  000020  002544         MOV     RKDCYL(R2),T.DC
 035302  016237  000026  002554         MOV     RKMR1(R2),T.MR1
 035310  016237  000034  002556         MOV     RKMR2(R2),T.MR2
 035316  016237  000036  002560         MOV     RKMR3(R2),T.MR3
 035324  016237  000030  002562         MOV     RKECPS(R2),T.POS
 035332  016237  000032  002564         MOV     RKECPT(R2),T.PAT
 035340  000207                         RTS     PC              ;RETURN
```

```
                        SBTTL   *STORE CONTROLLER STATUS

                        ;*****************************************************************
                        ;*
                        ;*      THIS SUBROUTINE IS CALLED BY THE RK06 DRIVER AT PRIORITY 7.
                        ;*      THE FOLLOWING REGISTERS WILL BE STORED:
                        ;*
                        ;*              COMMAND AND STATUS REGISTER 2
                        ;*              WORD COUNT REGISTER
                        ;*              BUS ADDRESS REGISTER
                        ;*              DESIRED TRACK AND SECTOR
                        ;*              STATUS REGISTER
                        ;*              ERROR REGISTER
                        ;*              ATTENTION SUMMARY/OFFSET REGISTER
                        ;*              CYLINDER ADDRESS REGISTER
                        ;*
                        ;*CALL  JSR     PC,I.CSTS
                        ;*      RETURN
                        ;*
                        ;*      THIS ROUTINE ASSUMES THE FOLLOWING REGISTERS CONTAIN:
                        ;*
                        ;*
                        ;*              REGISTER                CONTENTS
                        ;*              --------                --------
                        ;*
                        ;*              R2                      RK06 BASE ADDRESS
                        ;*              R5                      ADDRESS OF PARAMETER BLOCK
                        ;*
                        ;*****************************************************************

035342  042765  177741  000016  I.CSTS: BIC     #177741,P.CS1(R5)       ;CLEAR ALL BITS EXCEPT FUNCTION
                                                                        ;OF LAST COMMAND ISSUED
035350  042737  000036  002532          BIC     #36,T.CS1               ;CLEAR FUNCTION OF CS1 STATUS
035356  053765  002532  000016          BIS     T.CS1,P.CS1(R5)         ;GENERATE CS1 STATUS INFORMATION
035364  016265  000010  000020  I.CST1: MOV     RKCS2(R2),P.CS2(R5)     ;STORE COMMAND AND STATUS REGISTER 2
035372  016265  000002  000022          MOV     RKWC(R2),P.WCR(R5)      ;STORE WORD COUNT REGISTER
035400  016265  000004  000024          MOV     RKBA(R2),P.BAR(R5)      ;STORE BUS ADDRESS REGISTER
035406  016265  000006  000026          MOV     RKDA(R2),P.DTS(R5)      ;STORE DESIRED TRACK AND SECTOR
035414  016265  000012  000036          MOV     RKDS(R2),P.DS(R5)       ;STORE DRIVE STATUS REGISTER
035422  016265  000014  000034          MOV     RKER(R2),P.ER(R5)       ;STORE ERROR REGISTER
035430  016265  000016  000032          MOV     RKASOF(R2),P.ASOF(R5)   ;STORE ATTENTION SUMMARY AND
                                                                        ;   OFFSET
035436  016265  000020  000030          M.      RKDCYL(R2),P.DCYL(R5)   ;STORE CYLINDER ADDRESS
035444  000207                          RTS     PC                      ;RETURN
```

```
                                .SBTTL   *GATHER DRIVE STATUS

                                ;*****************************************************************
                                ;*
                                ;*      THIS SUBROUTINE WILL BE USED TO GATHER DRIVE STATUS
                                ;*      BYTE 01, 10, AND 11. IT IS ASSUMED THAT THE DRIVE
                                ;*      HAS PREVIOUSLY BEEN SEIZED.  IT RUNS AT PRIORITY 7.
                                ;*
                                ;*CALL  JSR     R0,I.STAT
                                ;*      <ADDRESS OF ERROR RETURN>
                                ;*      RETURN
                                ;*
                                ;*      THIS ROUTINE ASSUMES THE FOLLOWING REGISTERS CONTAIN:
                                ;*
                                ;*              REGISTER                CONTENTS
                                ;*              --------                --------
                                ;*
                                ;*              R2                      RK06 BASE ADDRESS
                                ;*              R5                      ADDRESS OF PARAMETER BLOCK
                                ;*
                                ;*      ROUTINES USED:
                                ;*              I.ISSU
                                ;*
                                ;*****************************************************************

035446  012762  000001  000026  I.STAT: MOV     #1,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
                                                                        ;  FOR STATUS BYTE 01
035454  112737  000001  002532          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
035462  004037  034772                  JSR     R0,I.ISSU               ;GET STATUS BYTES 01
035466  035656                          3$                              ;ERROR RETURN
035470  013765  002556  000044          MOV     T.MR2,P.A01(R5)         ;STORE STATUS BYTE 01 MESS A
035476  013765  002560  000046          MOV     T.MR3,P.B01(R5)         ;STORE STATUS BYTE 01 MESS B
035504  012762  000002  000026          MOV     #2,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
                                                                        ;  FOR STATUS BYTE 10
035512  112737  000001  002532          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
035520  004037  034772                  JSR     R0,I.ISSU               ;GET STATUS BYTES 10
035524  035656                          3$                              ;ERROR RETURN
035526  013765  002556  000050          MOV     T.MR2,P.A10(R5)         ;STORE STATUS BYTE 10 MESS A
035534  013765  002560  000052          MOV     T.MR3,P.B10(R5)         ;STORE STATUS BYTE 10 MESS B
035542  012762  000003  000026          MOV     #3,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER
                                                                        ;  FOR STATUS BYTE 11
035550  112737  000001  002532          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
035556  004037  034772                  JSR     R0,I.ISSU               ;GET STATUS BYTES 11
035562  035656                          3$                              ;ERROR RETURN
035564  013765  002556  000054          MOV     T.MR2,P.A11(R5)         ;STORE STATUS BYTE 11 MESS A
035572  013765  002560  000056          MOV     T.MR3,P.B11(R5)         ;STORE STATUS BYTE 11 MESS B
035600  005062  000026                  CLR     RKMR1(R2)               ;LOAD MAINTENANCE REGISTER 1
                                                                        ;  FOR STATUS BYTE 00
035604  112737  000001  002532          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
035612  004037  034772                  JSR     R0,I.ISSU               ;GET STATUS BYTES 00
035616  035656                          3$                              ;ERROR RETURN
035620  013765  002556  000040          MOV     T.MR2,P.A00(R5)         ;STORE STATUS BYTE 00 MESS A
035626  013765  002560  000042          MOV     T.MR3,P.B00(R5)         ;STORE STATUS BYTE 00 MESS B
035634  032737  001000  002560          BIT     #S.PAR,T.MR3            ;CHECK IF BAD PARITY DETECTED BY DRIVE
035642  001407                          BEQ     5$                      ;10. RETURN NORMALLY
```

```
5356   035644   052737   002000   002604          BIS     #E.DPAR,E.CONT          ;INDICATE BAD PARITY DETECTED BY DRIVE
5357   035652   004737   035720                   JSR     PC,R.CONT               ;REPORT ERROR
5358   035656   011000                    3$:     MOV     (R0),R0                 ;LOAD R0 FOR ERROR RETURN
5359   035660   000200                            RTS     R0                      ;RETURN
5360
5361   035662   052765   001000   000014   5$:     BIS     #PBSVAL,P.PRST(R5)      ;SET PARAMETER BLOCK STATUS VALID
5362   035670   005720                            TST     (R0)+                   ;ADJUST R0 FOR NORMAL RETURN
5363   035672   000200                            RTS     R0                      ;RETURN
5364
```

```
5365                                    .SBTTL   *COMMON DRIVER RETURNS
5366
5367  035674  105037  002633  R.ABNL: CLRB    INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
5368  035700  004777  144674          JSR     PC,@A.ABNL      ;INDICATE ABNORMAL RETURN
5369  035704  000207                  RTS     PC              ;RETURN
5370
5371  035706  105037  002633  R.NORM: CLRB    INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
5372  035712  004777  144660          JSR     PC,@A.NORM      ;INDICATE NORMAL RETURN
5373  035716  000207                  RTS     PC              ;RETURN
5374
5375  035720  105037  002633  R.CONT: CLRB    INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
5376  035724  105037  002632          CLRB    W.TIME          ;RESET WATCH DOG TIMING ON THIS DRIVE
5377  035730  005037  002646          CLR     W.DRV           ;CLEAR TIMING COUNT FOR THIS DRIVE
5378  035734  004777  144642          JSR     PC,@A.CONT      ;INDICATE CONTROLLER ERROR RETURN
5379  035740  000207                  RTS     PC              ;RETURN
```

```
                                .SBTTL   *COMMAND INITATOR

                                ;;*****************************************************************
                                ;*
                                ;*      THIS SUBROUTINE WILL INITIATE ALL COMMANDS AS SPECIFIED
                                ;*      BY THE COMMAND FIELD OF THE PARAMETER BLOCK. THE FOLLOWING
                                ;*      SPECIAL COMMAND ARE ALSO EXECUTED:
                                ;*
                                ;*              RELEASE
                                ;*              CONROLLER CLEAR
                                ;*              SUBSYSTEM CLEAR
                                ;*              READ ALL DRIVE STATUS
                                ;*              READ SPECIFIED HEADER
                                ;*
                                ;*      THE ABOVE COMMANDS ARE TRANSLATED INTO A SEQUENCE OF COMMANDS
                                ;*
                                ;*CALL  JSR     PC,C.INIT
                                ;*      <ADDRESS OF PARAMETER BLOCK>
                                ;*      RETURN
                                ;*
                                ;*      FOR THE SEQUENTIAL OPERATIONS, THE DRIVER WILL LOAD THE
                                ;*      LOCATIONS, PBLKT AND INTMSK.
                                ;*
                                ;*      ROUTINES USED:
                                ;*              W.WTCH
                                ;*              I.CSTS
                                ;*              I.STAT
                                ;*              I.CCLR
                                ;*
                                ;;*****************************************************************

035742  010546          C.INIT: MOV     R5,-(SP)        ;STORE R5 ON STACK
035744  010446                  MOV     R4,-(SP)        ;STORE R4 ON STACK
035746  010346                  MOV     R3,-(SP)        ;STORE R3 ON STACK
035750  010246                  MOV     R2,-(SP)        ;STORE R2 ON STACK
035752  010146                  MOV     R1,-(SP)        ;STORE R1 ON STACK
035754  010046                  MOV     R0,-(SP)        ;STORE R0 ON STACK
035756  013746  177776          MOV     PS,-(SP)        ;STORE PSW ON STACK
035762  013737  002574  177776  MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
035770  017605  000016          MOV     @16(SP),R5      ;STORE PARAMETER BLOCK ADDRESS
035774  062766  000002  000016  ADD     #2,16(SP)       ;ADJUST RETURN
036002  016504  000000          MOV     P.DRVN(R5),R4   ;STORE DRIVE NUMBER
036006  042704  177770          BIC     #^C<DRVMSK>,R4  ;MASK OUT JUNK
036012  010537  002644          MOV     R5,PBLKT        ;LOAD PARAMETER BLOCK TABLE
036016  116437  002634  002633  MOVB    I.DRV(R4),INTMSK ;LOAD INTERRUPT MASK
036024  116437  002634  002632  MOVB    I.DRV(R4),W.TIME ;SET WATCH-DOG TIMER FLAG
036032  013737  002614  002646  MOV     W.SEC,W.DRV     ;LOAD WATCH-DOG TIME

036040  013702  002570          MOV     RKBAS,R2        ;LOAD R2 WITH RK06 ADDRESS BASE

                                RESET ALL BITS IN PROGRAM DEVICE STATUS REGISTER EXCEPT
                                        DRIVE IN USE
                                        WRITE FOR WRITE CHECK
                                        NO CHECK
                                        DROP DRIVE FROM TEST SEQUENCE
                                        INHIBIT BUS ADDRESS INCREMENT
```

```
5436  036044  042765  075176  000014          BIC     #↑C<DRVUSE!W.WCK!NOCHK!DRPDRV!DTBAII>,P.PRST(R5)
5437
5438  036052  010500                          MOV     R5,R0           ;STORE PARAMETER BLOCK ADDRESS
5439  036054  062700  000016                  ADD     #P.CS1,R0       ;CALCULATE FIRST LOCATION TO BE CLEARED
5440  036060  010501                          MOV     R5,R1           ;STORE PARAMETER BLOCK ADDRESS
5441  036062  062701  000062                  ADD     #P.EPAT,R1      ;CALCULATE LAST LOCATION TO BE CLEARED
5442
5443  036066  005020                  1$:     CLR     (R0)+           ;CLEAR RETURN PARAMETER
5444  036070  020001                          CMP     R0,R1           ;CHECK IF FINISHED
5445  036072  101775                          BLOS    1$              ;NO, CLEAR NEXT RETURN PARAMETER
5446  036074  105037  002626                  CLRB    I.ISRL          ;CLEAR RELEASE OR INTERRUPT ISSUED
5447  036100  010465  000020                  MOV     R4,P.CS2(R5)    ;STORE DRIVE NUMBER
5448  036104  005062  000026                  CLR     RKMR1(R2)       ;CLEAR RK06 MAINTENANCE REGISTER 1
5449  036110  132765  000040  000001          BITB    #BIT5,P.CMND(R5) ;CHECK IF SPECIAL COMMAND
5450  036116  001402                          BEQ     3$              ;NO, PROCESS
5451  036120  000137  036634                  JMP     C.SPEC          ;JUMP TO SPECIAL COMMAND PROCESSOR
5452
5453  036124  122765  000107  000001  3$:     CMPB    #UNLOAD,P.CMND(R5) ;CHECK IF POSITIONING COMMAND
5454                                                                  ;  START SPINDLE
5455                                                                  ;  RECALIBRATE
5456                                                                  ;  OFFSET
5457                                                                  ;  SEEK
5458                                                                  ;  UNLOAD
5459
5460  036132  101174                          BHI     25$             ;NO, DRIVE COMMAND
5461                                                                  ;  SELECT DRIVE
5462                                                                  ;  PACK ACKNOWLEDGE
5463                                                                  ;  CLEAR
5464
5465  036134  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF DATA TRANSFER
5466  036142  103540                          BLO     20$             ;YES, DATA TRANSFER COMMAND
5467                                                                  ;  READ DATA
5468                                                                  ;  WRITE DATA
5469                                                                  ;  READ HEADER
5470                                                                  ;  WRITE HEADER
5471                                                                  ;  WRITE CHECK
5472  036144  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
5473  036152  052765  000002  000014          BIS     #DRVPOS,P.PRST(R5) ;SET DRIVE POSITIONING
5474  036160  005037  002606                  CLR     0.WAIT          ;CLEAR WAIT FOR COMMAND
5475  036164  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF SEEK
5476  036172  001007                          BNE     5$              ;NO, CHECK FOR OFFSET
5477  036174  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
5478  036202  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
5479  036210  000431                          BR      8$              ;GO ISSUE COMMAND
5480
5481  036212  122765  000115  000001  5$:     CMPB    #OFFSET,P.CMND(R5) ;CHECK IF OFFSET
5482  036220  001007                          BNE     6$              ;NO, CHECK FOR UNLOAD
5483  036222  116565  000006  000032          MOVB    P.OFST(R5),P.ASOF(R5) ;STORE OFFSET
5484  036230  016562  000032  000016          MOV     P.ASOF(R5),RKASOF(R2) ;LOAD OFFSET REGISTER
5485  036236  000416                          BR      8$              ;GO ISSUE COMMAND
5486
5487  036240  122765  000111  000001  6$:     CMPB    #SRTSPL,P.CMND(R5) ;CHECK IF START SPINDLE
5488  036246  001003                          BNE     7$              ;NO, CHECK IF RECAL
5489  036250  013737  002620  002646          MOV     W.MIN,W.DRV     ;LOAD WATCH DOG TIME FOR 1 MINUTE
5490  036256  122765  000113  000001  7$:     CMPB    #RECAL,P.CMND(R5) ;CHECK IF RECAL
5491  036264  001003                          BNE     8$              ;NO, CONTINUE
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5492  036266  013737  002616  002646          MOV     W.BSEC,W.DRV     ;LOAD RECAL TIME FOR 8 SECONDS
5493  036274  116565  000007  000017  8$:     MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
5494  036302  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
5495                                                                  ;  AND DRIVE TYPE
5496  036310  116565  000001  000016          MOVB    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
5497  036316  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
5498  036324  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IN NO CHECK MODE
5499  036332  001533                          BEQ     30$              ;NO, SKIP CLEAR OF INTERRUPT ENABLE
5500  036334  042765  000100  000016          BIC     #IE,P.CS1(R5)    ;CLEAR INTERRUPT ENABLE
5501  036342  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
5502  036350  004737  032312          10$:    JSR     PC,W.WTCH        ;CALL WATCH DOG TIMER
5503  036354  016237  000000  002532          MOV     RKCS1(R2),T.CS1  ;STORE COMMAND AND STATUS REGISTER 1
5504  036362  032737  000200  002532          BIT     #RDY,T.CS1       ;WAIT FOR READY
5505  036370  001767                          BEQ     10$
5506  036372  032737  100000  002532          BIT     #CERR,T.CS1      ;CHECK FOR ERROR
5507  036400  001011                          BNE     15$              ;YES, GIVE NORMAL RETURN
5508  036402  004737  032312          11$:    JSR     PC,W.WTCH        ;CALL WATCH DOG TIMER
5509  036406  016237  000016  002546          MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
5510  036414  133737  002633  002547          BITB    INTMSK,T.ASOF+1  ;CHECK IF INTERRUPT HAS OCCURRED
5511  036422  001767                          BEQ     11$              ;WAIT FOR DRIVE INTERRUPT
5512  036424  105037  002632          15$:    CLRB    W.TIME           ;RESET TIMING ON THIS DRIVE
5513  036430  005037  002646                  CLR     W.DRV            ;CLEAR DRIVE TIMING COUNT
5514  036434  004737  035706                  JSR     PC,R.NORM        ;INDICATE COMMAND IS FINISHED
5515  036440  000137  037614                  JMP     C.RTRN           ;RESTORE REGISTERS
5516
5517  036444  016562  000010  000004  20$:    MOV     P.BALO(R5),RKBA(R2) ;LOAD BUS ADDRESS REGISTER
5518  036452  016562  000012  000002          MOV     P.WC(R5),RKWC(R2) ;LOAD WORD COUNT REGISTER
5519  036460  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
5520  036466  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK NUMBER
5521  036474  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK COMMAND
5522  036502  001010                          BNE     25$              ;NO, GO ISSUE THE COMMAND
5523  036504  032765  000200  000014          BIT     #W.WCK,P.PRST(R5) ;CHECK IF WRITE COMMAND SHOULD BE ISSUED
5524  036512  001404                          BEQ     25$              ;NO, GO ISSUE THE COMMAND
5525  036514  012765  000123  000016          MOV     #WRDATA,P.CS1(R5) ;ISSUE WRITE COMMAND
5526  036522  000406                          BR      26$              ;GO ISSUE COMMAND
5527
5528  036524  116565  000001  000016  25$:    MOVB    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
5529  036532  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
5530  036540  116565  000007  000017  26$:    MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
5531  036546  142765  177750  000017          BICB    #^C<B.CFMT!B.CDT!B.BA16!B.BA17>,P.CS1+1(R5) ;CLEAR ALL BITS EXCEPT
5532                                                                  ;  FORMAT, DRIVE TYPE, AND BUS ADDRESS
5533                                                                  ;  BITS 16-17
5534  036554  010537  002606                  MOV     R5,@.WAIT        ;LOAD WAITING FOR COMMAND
5535  036560  032765  100000  000014          BIT     #D^BAII,P.PRST(R5) ;CHECK IF INHIBIT BUS ADDRESS INCREMENT
5536  036566  001403                          BEQ     27$              ;NO, LOAD CS2
5537  036570  052765  000020  000020          BIS     #BAI,P.CS2(R5)   ;SET INHIBIT BUS ADDRESS INCREMENT
5538  036576  016562  000020  000010  27$:    MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2
5539  036604  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IN NO CHECK MODE
5540  036612  001403                          BEQ     30$              ;NO, SKIP CLEAR OF INTERRUPT ENABLE
5541  036614  042765  000100  000016          BIC     #IE,P.CS1(R5)    ;CLEAR INTERRUPT ENABLE
5542  036622  016562  000016  000000  30$:    MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
5543  036630  000137  037614                  JMP     C.RTRN           ;RESTORE REGISTERS
5544
5545                                  .SBTTL   *SPECIAL COMMAND PROCESSING
5546
5547  036634  122765  000141  000001  C.SPEC: CMPB    #RDSTAT,P.CMND(R5) ;CHECK IF READ DRIVE STATUS
```

```
5548  036642  001132                        BNE     10$             ;NO, PROCESS OTHER COMMANDS
5549  036644  016562  000020  000010        MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR COMMAND
5550  036652  116565  000007  000017        MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
5551  036660  042765  165777  000016        BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
5552                                                                ;  AND DRIVE TYPE
5553  036666  112765  000001  000016        MOVB    #DR.SEL,P.CS1(R5) ;STORE COMMAND
5554  036674  016562  000016  000000        MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
5555  036702  004737  032312        2$:     JSR     PC,W.WTCH       ;CALL WATCH-DOG TIMER
5556  036706  016265  000000  000016        MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REG. 1
5557  036714  032765  000200  000016        BIT     #RDY,P.CS1(R5)  ;WAIT FOR READY
5558  036722  001767                        BEQ     2$
5559  036724  004737  035364                JSR     PC,I.CST1       ;STORE CONTROLLER REGISTERS
5560  036730  016265  000034  000040        MOV     RKMR2(R2),P.A00(R5) ;STORE STATUS BYTE 00 MESSAGE A
5561  036736  016265  000036  000042        MOV     RKMR3(R2),P.B00(R5) ;STORE STATUS BYTE 00 MESSAGE B
5562  036744  032765  100000  000016        BIT     #CERR,P.CS1(R5) ;CHECK IF CONTROLLER ERROR
5563  036752  001436                        BEQ     6$              ;NO, GATHER DRIVE STATUS
5564  036754  105037  002632                CLRB    W.TIME          ;RESET WATCH DOG TIMING ON THIS DRIVE
5565  036760  005037  002646                CLR     W.DRV           ;CLEAR WATCH DOG COUNT
5566  036764  032765  000400  000014        BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
5567  036772  001043                        BNE     8$              ;YES, INDICATE NORMAL RETURN
5568  036774  032765  001000  000020        BIT     #MDS,P.CS2(R5)  ;CHECK IF MULTIPLE DRIVE SELECT
5569  037002  001043                        BNE     9$              ;YES, INDICATE CONTROLLER ERROR
5570  037004  004037  034710                JSR     R0,I.CCLR       ;CLEAR ERROR
5571  037010  037614                        C.RTRN                  ;ERROR RETURN
5572  037012  032765  010400  000020        BIT     #NED!UFE,P.CS2(R5) ;CHECK IF NON-EXISTENT DRIVE OR UNIT FIELD ERROR
5573  037020  001007                        BNE     5$              ;REPORT ERROR
5574  037022  032765  000001  000036        BIT     #DRA,P.DS(R5)   ;CHECK IF DRIVE AVAILIABLE
5575  037030  001003                        BNE     5$              ;YES, REPORT ERROR
5576  037032  052765  010000  000014        BIS     #DRVSZD,P.PRST(R5) ;INDICATE DRIVE IS SEIZED BY OTHER PORT
5577  037040  004737  035674        5$:     JSR     PC,R.ABNL       ;INDICATE ABNORMAL RETURN
5578  037044  000137  037614                JMP     C.RTRN          ;RESTORE REGISTERS
5579
5580  037050  004037  035446        6$:     JSR     R0,I.STAT       ;GATHER DRIVE STATUS
5581  037054  037614                        C.RTRN                  ;ERROR RETURN
5582  037056  105037  002632                CLRB    W.TIME          ;STOP WATCH-DOG TIMING ON DRIVE
5583  037062  005037  002646                CLR     W.DRV           ;RESET WATCH-DOG TIME
5584  037066  032765  000400  000014        BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
5585  037074  001402                        BEQ     8$              ;NO, REPORT ERROR
5586  037076  005062  000000                CLR     RKCS1(R2)       ;CLEAR INTERRUPT ENABLE
5587  037102  004737  035706        8$:     JSR     PC,R.NORM       ;REPORT COMMAND COMPLETE
5588  037106  000137  037614                JMP     C.RTRN          ;RESTORE REGISTERS
5589
5590  037112  052737  100000  002604  9$:     BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT
5591  037120  004737  035720                JSR     PC,R.CONT       ;INDICATE CONTROLLER ERROR
5592  037124  000137  037614                JMP     C.RTRN
5593
5594  037130  122765  000140  000001  10$:     CMPB    #RELEAS,P.CMND(R5) ;CHECK IF RELEASE COMMAND
5595  037136  001040                        BNE     13$             ;NO, CHECK IF READ ALL HEADERS
5596  037140  010537  002606                MOV     R5,O.WAIT       ;STORE PARAMETER BLOCK ADDRESS IN
5597                                                                ;  WAIT FOR COMMAND
5598  037144  052765  000010  000020        BIS     #RLS,P.CS2(R5)  ;SET RELEASE BIT
5599  037152  016562  000020  000010        MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR DESELECT
5600  037160  112737  000001  002626        MOVB    #1,I.ISRL       ;SET FLAG FOR RELEASE COMMAND
5601  037166  116565  000007  000017        MOVB    P.CS1H(R5),P.CS1+1(R5);STORE BITS 8-15 OF CS1
5602  037174  042765  165777  000016        BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
5603                                                                ;  AND DRIVE TYPE
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```
5604  037202  112765  000101  000016          MOVB    #SELDRV,P.CS1(R5) ;STORE COMMAND
5605  037210  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
5606  037216  001403                          BEQ     11$               ;NO, DO NOT RESET INTERRUPT ENABLE
5607  037220  042765  000100  000016          BIC     #IE,P.CS1(R5)     ;RESET INTERRUPT ENABLE
5608  037226  016562  000016  000000  11$:    MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
5609  037234  000137  037614                  JMP     C.RTRN            ;RESTORE REGISTERS
5610
5611  037240  122765  000164  000001  13$:    CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
5612  037246  001053                          BNE     30$               ;NO, CHECK IF CONTROLLER CLEAR
5613  037250  010537  002606                  MOV     R5,O.WAIT         ;SET WAITING FOR COMMAND COMMPLETION
5614  037254  016537  000010  002622          MOV     P.BALO(R5),HDR.AD ;LOAD HEADER ADDRESS
5615  037262  132765  000020  000007          BITB    #8.CFMT,P.CS1H(R5) ;CHECK IF 22 SECTOR FORMANT
5616  037270  001404                          BEQ     14$               ;YES, LOAD 22 IN HEADER COUNT
5617  037272  012737  000024  002624          MOV     #20.,HDR.CT       ;LOAD 20 IN SECTOR COUNT
5618  037300  000403                          BR      22$               ;GO ISSUE READ HEADER COMMAND
5619
5620  037302  012737  000026  002624  14$:    MOV     #22.,HDR.CT       ;LOAD 22 IN SECTOR COUNT
5621  037310  016562  000002  000020  22$:    MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
5622  037316  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD TRACK NUMBER
5623  037324  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
5624  037332  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
5625  037340  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT DRIVE TYPE
5626                                                  ;  AND FORMAT
5627  037346  112765  000125  000016          MOVB    #RDHEAD,P.CS1(R5) ;STORE READ HEADER COMMAND
5628  037354  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
5629  037362  001027                          BNE     34$               ;YES, INDICATE ILLEGAL DRIVER COMMAND
5630  037364  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE READ HEADER
5631  037372  000137  037614                  JMP     C.RTRN            ;RESTORE REGISTERS
5632
5633  037376  122765  000176  000001  30$:    CMPB    #CONCLR,P.CMND(R5) ;CHECK IF CONTROLLER CLEAR
5634  037404  001012                          BNE     32$               ;NO, CHECK IF SUBSYSTEM CLEAR
5635  037406  004037  034710                  JSR     R0,I.CCLR         ;CLEAR CONTROLLER
5636  037412  037614                          C.RTRN                    ;ERROR RETURN
5637  037414  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
5638  037422  001472                          BEQ     40$               ;NO, INDICATE NORMAL RETURN
5639  037424  005062  000000                  CLR     RKCS1(R2)         ;RESET INTERRUPT ENABLE
5640  037430  000467                          BR      40$               ;INDICATE NORMAL RETURN
5641
5642  037432  122765  000177  000001  32$:    CMPB    #SUBCLR,P.CMND(R5) ;CHECK IF SUBSYSTEM CLEAR
5643  037440  001406                          BEQ     36$               ;YES, CLEAR SUBSYSTEM
5644  037442  052737  000100  002604  34$:    BIS     #E.ILLD,E.CONT    ;SET ILLEGAL DRIVER COMMAND
5645  037450  004737  035720                  JSR     PC,R.CONT         ;REPORT ERROR
5646  037454  000457                          BR      C.RTRN            ;RESTORE REGISTERS
5647
5648  037456  012762  000040  000010  36$:    MOV     #SCLR,RKCS2(R2)   ;ISSUE SUBSYSTEM CLEAR
5649  037464  016265  000000  000016          MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REGISTER 1
5650  037472  032765  100000  000016          BIT     #CERR,P.CS1(R5)   ;CLEAR IF CONTROLLER ERROR RESET
5651  037500  001406                          BEQ     37$               ;NO, FINISH COMMAND
5652  037502  052737  000001  002604          BIS     #BIT0,E.CONT      ;SET CLEAR SUBSYSTEM DID NOT CLEAR
5653                                                  ;  CONTROLLER ERROR
5654  037510  004737  035720                  JSR     PC,R.CONT         ;REPORT ERROR
5655  037514  000437                          BR      C.RTRN            ;RESTORE REGISTERS
5656
5657  037516  013746  002612          37$:    MOV     W.MILI,-(SP)      ;LOAD 16 MILI-SECOND COUNT FOR ATTENTION
5658                                                  ;  TO DISAPPEAR
5659  037522  016265  000000  000016  38$:    MOV     RKCS1(R2),P.CS1(R5) ;STORE CS1
```

```
5660  037530  032765  040000  000016          BIT     #DI,P.CS1(R5)   ;CHECK IF ATTENTIONS CLEARED
5661  037536  001411                          BEQ     39$             ;YES, FINISH COMMAND
5662  037540  005316                          DEC     (SP)            ;DECREMENT 16 MILISECOND COUNT
5663  037542  001367                          BNE     38$             ;CHECK DRIVE INTERRUPT AGAIN
5664  037544  005726                          TST     (SP)+           ;ADJUST STACK
5665  037546  052737  000040  002604          BIS     #E.SCLR,E.CONT  ;SET SUBSYSTEM CLEAR DID NOT CLEAR
5666                                                                  ;  DRIVE ATTENTIONS
5667  037554  004737  035720                  JSR     PC,R.CONT       ;REPORT ERROR
5668  037560  000415                          BR      C.RTRN          ;RESTORE REGISTER
5669
5670  037562  005726                  39$:    TST     (SP)+           ;ADJUST STACK
5671  037564  032765  000400  000014          BIT     #NOCHK,P.PRST(R5)  ;CHECK IF NO CHECK MODE
5672  037572  001010                          BNE     C.RTRN          ;YES, RESTORE REGISTERS
5673  037574  112737  177777  002626          MOVB    #-1,I.ISRL      ;SET INTERRUPT ENABLE SET
5674  037602  012762  000100  000000          MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
5675  037610  004737  035706                  JSR     PC,R.NORM       ;INDICATE NORMAL TERMINATION
5676
5677  0376 4  012637  177776          C.RTRN: MOV     (SP)+,PS        ;RESTORE PSW
5678  037620  012600                          MOV     (SP)+,R0        ;RESTORE R0
5679  037622  012601                          MOV     (SP)+,R1        ;RESTORE R1
5680  037624  012602                          MOV     (SP)+,R2        ;RESTORE R2
5681  037626  012603                          MOV     (SP)+,R3        ;RESTORE R3
5682  037630  012604                          MOV     (SP)+,R4        ;RESTORE R4
5683  037632  012605                          MOV     (SP)+,R5        ;RESTORE R5
5684  037634  000207                          RTS     PC              ;RETURN
5685                                  .SBTTL  OCTAL TO BINARY CONVERSION ROUTINE
5686
5687                                  ;;**************************************************************
5688                                  ;*
5689                                  ;*      THIS ROUTINE WILL CHECK A STRING OF ASCII CHARACTERS TERMINATED
5690                                  ;*      WITH A NULL <000> OR COMMA.  IF THE CHARACTERS ARE LEGAL
5691                                  ;*      IT  WILL GENERATE TWO BINARY WORDS PLACING THE LOW 16 BITS
5692                                  ;*      ON THE STACK AND THE HIGH 16 BITS IN LOCATION $HIOCT.
5693                                  ;*
5694                                  ;*CALL
5695                                  ;*      MOV     <ADDRESS OF ASCII STRING>,-(SP)
5696                                  ;*      JSR     PC,OCTBIN
5697                                  ;*      <ADDRESS OF ERROR RETURN>
5698                                  ;*      RETURN
5699                                  ;*
5700                                  ;;**************************************************************
5701
5702  037636  010046                  OCTBIN: MOV     R0,-(SP)        ;SAVE R0
5703  037640  010146                          MOV     R1,-(SP)        ;SAVE R1
5704  037642  010246                          MOV     R2,-(SP)        ;SAVE R2
5705  037644  016600  000010                  MOV     10(SP),R0       ;GET ADDRESS OF ASCII STRING
5706  037650  005001                          CLR     R1              ;CLEAR DATA WORDS
5707  037652  005002                          CLR     R2
5708  037654  112046                  2$:     MOVB    (R0)+,-(SP)     ;PICK THIS CHARACTER
5709  037656  001423                          BEQ     3$              ;IF ZERO GET OUT
5710  037660  121627  000054                  CMPB    (SP),#',        ;CHECK IF COMMA
5711  037664  001420                          BEQ     3$              ;IF COMMA GET OUT
5712  037666  122716  000060                  CMPB    #'0,(SP)        ;MAKE SURE THIS CHARACTER IS
5713  037672  003030                          BGT     4$              ;  AN OCTAL DIGIT
5714  037674  122716  000067                  CMPB    #'7,(SP)
5715  037700  002425                          BLT     4$
```

```
037702  006301                           ASL     R1                      ; *2
037704  006102                           ROL     R2
037706  006301                           ASL     R1                      ; *4
037710  006102                           ROL     R2
037712  006301                           ASL     R1                      ; *8
037714  006102                           ROL     R2
037716  042716  177770                   BIC     #^C7,(SP)               ;STRIP THE ASCII JUNK
037722  062601                           ADD     (SP)+,R1                ;ADD THIS DIGIT
037724  000753                           BR      2$                      ;LOOP
037726  005726                   3$:     TST     (SP)+                   ;CLEAN PARTIAL FROM STACK
037730  010166  000010                   MOV     R1,10(SP)               ;SAVE RESULT
037734  010237  037770                   MOV     R2,$HIOCT
037740  012602                           MOV     (SP)+,R2                ;RESTORE R2
037742  012601                           MOV     (SP)+,R1                ;RESTORE R1
037744  012600                           MOV     (SP)+,R0                ;RESTORE R0
037746  062716  000002                   ADD     #2,(SP)                 ;ADJUST RETURN
037752  000207                           RTS     PC                      ;RETURN

037754  005726                   4$:     TST     (SP)+                   ;CLEAN UP PARTIAL FROM STACK
037756  012602                           MOV     (SP)+,R2                ;RESTORE R2
037760  012601                           MOV     (SP)+,R1                ;RESTORE R1
037762  012600                           MOV     (SP)+,R0                ;RESTORE R0
037764  013616                           MOV     @(SP)+,(SP)             ;PUT ADDRESS OF ERROR ROUTINE ON STACK
037766  000207                           RTS     PC                      ;GO PROCESS ERROR
037770  000000                   $HIOCT: .WORD   0                       ;HIGH ORDER BITS GO HERE
                                 .SBTTL  TYPE ROUTINE

                                 ;;************************************************************
                                 ;;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                 ;;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                 ;;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                 ;;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                 ;;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                 ;;*
                                 ;;*CALL:
                                 ;;*1) USING A TRAP INSTRUCTION
                                 ;;*       TYPE    ,MESADR                 ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                 ;;*OR
                                 ;;*       TYPE
                                 ;;*       MESADR
                                 ;;*
037772  105737  001157           $TYPE:  TSTB    $TPFLG                  ;;IS THERE A TERMINAL?
037776  100002                           BPL     1$                      ;;BR IF YES
040000  000000                           HALT                            ;;HALT HERE IF NO TERMINAL
040002  000407                           BR      3$                      ;;LEAVE
040004  010046                   1$:     MOV     R0,-(SP)                ;;SAVE R0
040006  017600  000002                   MOV     @2(SP),R0               ;;GET ADDRESS OF ASCIZ STRING
040012  112046                   2$:     MOVB    (R0)+,-(SP)             ;;PUSH CHARACTER TO BE TYPED ONTO STACK
040014  001005                           BNE     4$                      ;;BR IF IT ISN'T THE TERMINATOR
040016  005726                           TST     (SP)+                   ;;IF TERMINATOR POP IT OFF THE STACK
040020  012600                   60$:    MOV     (SP)+,R0                ;;RESTORE R0
040022  062716  000002           3$:     ADD     #2,(SP)                 ;;ADJUST RETURN PC
040026  000002                           RTI                             ;;RETURN
040030  122716  000011           4$:     CMPB    #HT,(SP)                ;;BRANCH IF <HT>
040034  001430                           BEQ     8$
```

```
5772  040036  122716  000200          CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
5773  040042  001006                  BNE     5$
5774  040044  005726                  TST     (SP)+           ;;POP  <CR><LF> EQUIV
5775  040046  104401                  TYPE                    ;;TYPE A CR AND LF
5776  040050  001267                  $CRLF
5777  040052  105037  040206          CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
5778  040056  000755                  BR      2$              ;;GET NEXT CHARACTER
5779  040060  004737  040142  5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
5780  040064  123726  001156  6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
5781  040070  001350                  BNE     2$              ;;IF NO GO GET NEXT CHAR.
5782  040072  013746  001154          MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
5783                                                          ;;AND THE NULL CHAR.
5784  040076  105366  000001  7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
5785  040102  002770                  BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
5786  040104  004737  040142          JSR     PC,$TYPEC       ;;GO TYPE A NULL
5787  040110  105337  040206          DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
5788  040114  000770                  BR      7$              ;;LOOP
5789
5790                                  ;HORIZONTAL TAB PROCESSOR
5791
5792  040116  112716  000040  8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
5793  040122  004737  040142  9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
5794  040126  132737  000007  040206  BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
5795  040134  001372                  BNE     9$              ;;TAB STOP
5796  040136  005726                  TST     (SP)+           ;;POP SPACE OFF STACK
5797  040140  000724                  BR      2$              ;;GET NEXT CHARACTER
5798  040142  105777  141002  $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
5799  040146  100375                  BPL     $TYPEC
5800  040150  116677  000002  140774  MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
5801  040156  122766  000015  000002  CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
5802  040164  001003                  BNE     1$              ;;BRANCH IF NO
5803  040166  105037  040206          CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
5804  040172  000406                  BR      $TYPEX          ;;EXIT
5805  040174  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
5806  040202  001402                  BEQ     $TYPEX          ;;BRANCH IF YES
5807  040204  105227                  INCB    (PC)+           ;;COUNT THE CHARACTER
5808  040206  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
5809  040210  000207          $TYPEX: RTS     PC
5810
5811                                  .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
5812
5813                                  ;;******************************************************************
5814                                  ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
5815                                  ;*UNSIGNED OCTAL ASCIZ NUMBER.
5816                                  ;*CALL
5817                                  ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
5818                                  ;*      JSR     PC,@#$DB2O      ;;CALL THE ROUTINE
5819                                  ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
5820
5821
5822  040212  104411          $DB2O:  SAVREG                  ;;SAVE ALL REGISTERS
5823  040214  016601  000002          MOV     2(SP),R1        ;;PICKUP THE POINTER TO LOW WORD
5824  040220  012705  040331          MOV     #$OCTVL+13.,R5  ;;POINTER TO DATA TABLE
5825  040224  012704  000014          MOV     #12.,R4         ;;DO ELEVEN CHARACTERS
5826  040230  012703  177770          MOV     #^C7,R3         ;;MASK
5827  040234  012100                  MOV     (R1)+,R0        ;;LOWER WORD
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5828  040236  012101                        MOV     (R1)+,R1        ;;HIGH WORD
5829  040240  005002                        CLR     R2              ;;TERMINATOR
5830  040242  110245                1$:     MOVB    R2,-(R5)        ;;PUT CHARACTER IN DATA TABLE
5831  040244  010002                        MOV     R0,R2           ;;GET THIS DIGIT
5832  040246  005304                        DEC     R4              ;;COUNT THIS CHARACTER
5833  040250  003007                        BGT     3$              ;;BR IF NOT THE LAST DIGIT
5834  040252  001405                        BEQ     2$              ;;BR IF IT IS THE LAST DIGIT
5835  040254  005205                        INC     R5              ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
5836  040256  010566  000002                MOV     R5,2(SP)        ;;ASCIZ CHAR. & PUT IT ON THE STACK
5837  040262  104412                        RESRE                   ;;RESTORE ALL REGISTERS
5838  040264  000207                        RTS     PC              ;;RETURN TO USER
5839  040266  006203                2$:     ASR     R3              ;;POSITION THE MASK FOR THE LAST DIGIT
5840  040270  006001                3$:     ROR     R1              ;;POSITION THE BINARY NUMBER FOR
5841  040272  006000                        ROR     R0              ;;      THE NEXT OCTAL DIGIT
5842  040274  006001                        ROR     R1
5843  040276  006000                        ROR     R0
5844  040300  006001                        ROR     R1
5845  040302  006000                        ROR     R0
5846  040304  040302                        BIC     R3,R2           ;;MASK OUT ALL JUNK
5847  040306  062702  000060                ADD     #'0,R2          ;;MAKE THIS CHAR. ASCII
5848  040312  000753                        BR      1$              ;;GO PUT IT IN THE DATA TABLE
5849  040314  000016                $OCTVL: .BLKB   14.             ;;RESERVE DATA TABLE
5850                                .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
5851
5852                                ;;*****************************************************************
5853                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
5854                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
5855                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
5856                                ;*CALL:
5857                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
5858                                ;*      TYPOS                   ;;CALL FOR TYPEOUT
5859                                ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
5860                                ;*      .BYTE   M               ;;M=1 OR 0
5861                                ;*                                      ;;1=TYPE LEADING ZEROS
5862                                ;*                                      ;;0=SUPPRESS LEADING ZEROS
5863                                ;*
5864                                ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
5865                                ;*$TYPOS OR $TYPOC
5866                                ;*CALL:
5867                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
5868                                ;*      TYPON                   ;;CALL FOR TYPEOUT
5869                                ;*
5870                                ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
5871                                ;*CALL:
5872                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
5873                                ;*      TYPOC                   ;;CALL FOR TYPEOUT
5874
5875  040332  017646  000000        $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
5876  040336  116637  000001  040555        MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
5877  040344  112637  040557                MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
5878  040350  062716  000002                ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
5879  040354  000406                        BR      $TYPON
5880  040356  112737  000001  040555 $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
5881  040364  112737  000006  040557        MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
5882  040372  112737  000005  040554 $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
5883  040400  010346                        MOV     R3,-(SP)        ;;SAVE R3
```

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5884  040402  010446                        MOV     R4,-(SP)        ;;SAVE R4
5885  040404  010546                        MOV     R5,-(SP)        ;;SAVE R5
5886  040406  113704  040557                MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
5887  040412  005404                        NEG     R4
5888  040414  062704  000006                ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
5889  040420  110437  040556                MOVB    R4,$OMODE       ;;SAVE IT FOR USE
5890  040424  113704  040555                MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
5891  040430  016605  000012                MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
5892  040434  005003                        CLR     R3              ;;CLEAR THE OUTPUT WORD
5893  040436  006105                1$:     ROL     R5              ;;ROTATE MSB INTO "C"
5894  040440  000404                        BR      3$              ;;GO DO MSB
5895  040442  006105                2$:     ROL     R5              ;;FORM THIS DIGIT
5896  040444  006105                        ROL     R5
5897  040446  006105                        ROL     R5
5898  040450  010503                        MOV     R5,R3
5899  040452  006103                3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
5900  040454  105337  040556                DECB    $OMODE          ;;TYPE THIS DIGIT?
5901  040460  100016                        BPL     7$              ;;BR IF NO
5902  040462  042703  177770                BIC     #177770,R3      ;;GET RID OF JUNK
5903  040466  001002                        BNE     4$              ;;TEST FOR 0
5904  040470  005704                        TST     R4              ;;SUPPRESS THIS 0?
5905  040472  001403                        BEQ     5$              ;;BR IF YES
5906  040474  005204                4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
5907  040476  052703  000060                BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
5908  040502  052703  000040        5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
5909  040506  110337  040552                MOVB    R3,8$           ;;SAVE FOR TYPING
5910  040512  104401  040552                TYPE    ,8$             ;;GO TYPE THIS DIGIT
5911  040516  105337  040554        7$:     DECB    $OCNT           ;;COUNT BY 1
5912  040522  003347                        BGT     2$              ;;BR IF MORE TO DO
5913  040524  002402                        BLT     6$              ;;BR IF DONE
5914  040526  005204                        INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
5915  040530  000744                        BR      2$              ;;GO DO THE LAST DIGIT
5916  040532  012605                6$:     MOV     (SP)+,R5        ;;RESTORE R5
5917  040534  012604                        MOV     (SP)+,R4        ;;RESTORE R4
5918  040536  012603                        MOV     (SP)+,R3        ;;RESTORE R3
5919  040540  016666  000002  000004        MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
5920  040546  012616                        MOV     (SP)+,(SP)
5921  040550  000002                        RTI                     ;;RETURN
5922  040552     000                8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
5923  040553     000                        .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
5924  040554     000                $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
5925  040555     000                $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
5926  040556  000000                $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
5927                                .SBTTL  ERROR HANDLER ROUTINE
5928
5929                                ;;*****************************************************************
5930                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
5931                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
5932                                ;*AND GO TO TYPERR ON ERROR
5933                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
5934                                ;*SW15=1         HALT ON ERROR
5935                                ;*SW13=1         INHIBIT ERROR TYPEOUTS
5936                                ;*SW10=1         BELL ON ERROR
5937                                ;*SW09=1         LOOP ON ERROR
5938                                ;*CALL
5939                                ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
```

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                                        $ERROR:
040560                                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
040560  104406                          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
040562  105237  001103                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
040566  001775                                  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
040570  013777  001102  140344                  BIT     #BIT10,@SWR     ;;BELL ON ERROR?
040576  032777  002000  140334                  BEQ     1$              ;;NO - SKIP
040604  001402                                  TYPE    ,$BELL          ;;RING BELL
040606  104401  001262                  1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
040612  005237  001112                          MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
040616  011637  001116                          SUB     #2,$ERRPC
040622  162737  000002  001116                  MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
040630  117737  140262  001114                  BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
040636  032777  020000  140274                  BNE     20$             ;;SKIP TYPEOUTS
040644  001004                                  JSR     PC,TYPERR       ;;GO TO USER ERROR ROUTINE
040646  004737  025604                          TYPE    ,$CRLF
040652  104401  001267                  20$:
040656                                  2$:     TST     @SWR            ;;HALT ON ERROR
040656  005777  140256                          BPL     3$              ;;SKIP IF CONTINUE
040662  100002                                  HALT                    ;;HALT ON ERROR!
040664  000000                                  CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
040666  104406                          3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
040670  032777  001000  140242                  BEQ     4$              ;;BR IF NO
040676  001402                                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
040700  013716  001110                  4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
040704  005737  001260                          BEQ     5$              ;;BR IF NONE
040710  001402                                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
040712  013716  001260                  5$:
040716                                          RTI                     ;;RETURN
040716  000002                          .SBTTL  TTY INPUT ROUTINE
                                        ;;*****************************************************************
                                        .ENABL  LSB
040720  000000                          $TKCNT: .WORD   0               ;;NUMBER OF ITEMS IN QUEUE
040722  000000                          $TKQIN: .WORD   0               ;;INPUT POINTER
040724  000000                          $TKQOUT:.WORD   0               ;;OUTPUT POINTER
040726  000001                          $TKQSRT:.BLKB   1               ;;TTY KEYBOARD QUEUE
040727                                  $TKQEND=.
040730                                  .EVEN
                                        ;*TK INITIALIZE ROUTINE
                                        ;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
                                        ;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
                                        ;
                                        ;*CALL:
                                        ;*      JSR     PC,$TKINT
                                        ;*      RETURN
                                        ;
040730  005037  040720          $TKINT: CLR     $TKCNT                  ;;CLEAR COUNT OF ITEMS IN QUEUE
040734  012737  040726  040722          MOV     #$TKQSRT,$TKQIN         ;;MOVE THE STARTING ADDRESS OF THE
040742  013737  040722  040724          MOV     $TKQIN,$TKQOUT          ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
040750  012737  041000  000060          MOV     #$TKSRV,@#TKVEC         ;;INITIALIZE THE KEYBOARD VECTOR
040756  012737  000200  000062          MOV     #200,@#TKVEC+2          ;;"BR" LEVEL 4
040764  005777  140156                  TST     @$TKB                   ;;CLEAR DONE FLAG
040770  012777  000100  140146          MOV     #100,@$TKS              ;;ENABLE TTY KEYBOARD INTERRUPT
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 5996  040*76  00020*                        RTS     PC              ;;RETURN TO CALLER
 599*
 5998                                  .*TK SERVICE ROUTINE
 5999                                  .*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
 6000                                  .*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
 6001                                  .*I* IN THE QUEUE.
 6002                                  ;*IF THE CHARACTER IS A "CONTROL-C" (↑C) $TKINT IS CALLED AND
 6003                                  ;*UPON RETURN EXIT IS MADE TO THE "CONTROL-C" RESTART ADDRESS (START)
 6004
 6005  041000  117746  140142         $TKSRV: MOVB    @$TKB,-(SP)     ;;PICKUP THE CHARACTER
 6006  041004  042716  177600                 BIC     #↑C177,(SP)     ;;STRIP THE JUNK
 6007  041010  021627  000003                 CMP     (SP),#3         ;;IS IT A CONTROL C?
 6008  041014  001007                         BNE     1$              ;;BRANCH IF NO
 6009  041016  104401  042176                 TYPE    ,$CNTLC         ;;TYPE A CONTROL-C (↑C)
 6010  041022  004737  040730                 JSR     PC,$TKINT       ;;INIT THE KEYBOARD
 6011  041026  005726                         TST     (SP)+           ;;CLEAN UP STACK
 6012  041030  000137  016202                 JMP     START           ;;CONTROL C RESTART
 6013  041034  021627  000007         1$:     CMP     (SP),#7         ;;IS IT A CONTROL G?
 6014  041040  001004                         BNE     2$              ;;BRANCH IF NO
 6015  041042  022737  000176  001140         CMP     #SWREG,SWR      ;;IS SOFT-SWR SELECTED?
 6016  041050  001500                         BEQ     6$              ;;GO TO SWR CHANGE
 6017
 6018  041052                         2$:
 6019  041052  022737  000001  040720         CMP     #1,$TKCNT       ;;IS THE QUEUE FULL?
 6020  041060  001004                         BNE     3$              ;;BRANCH IF NO
 6021  041062  104401  001262                 TYPE    ,$BELL          ;;RING THE TTY BELL
 6022  041066  005726                         TST     (SP)+           ;;CLEAN CHARACTER OFF OF STACK
 6023  041070  000451                         BR      5$              ;;EXIT
 6024  041072  021627  000023         3$:     CMP     (SP),#23        ;;IS IT A CONTROL-S?
 6025  041076  001021                         BNE     32$             ;;BRANCH IF NO
 6026  041100  005077  140040                 CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
 6027  041104  005726                         TST     (SP)+           ;;CLEAN CHAR OFF STACK
 6028  041106  105777  140032         31$:    TSTB    @$TKS           ;;WAIT FOR A CHAR
 6029  041112  100375                         BPL     31$             ;;LOOP UNTIL ITS THERE
 6030  041114  117746  140026                 MOVB    @$TKB,-(SP)     ;;GET THE CHARACTER
 6031  041120  042716  177600                 BIC     #↑C177,(SP)     ;;MAKE IT 7-BIT ASCII
 6032  041124  022627  000021                 CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
 6033  041130  001366                         BNE     31$             ;;BRANCH IF NO
 6034  041132  012777  000100  140004         MOV     #100,@$TKS      ;;REENABLE TTY KEYBOARD INTERRUPTS
 6035  041140  000002                         RTI                     ;;RETURN
 6036  041142  005237  040720         32$:    INC     $TKCNT          ;;COUNT THIS CHARACTER
 6037  041146  021627  000140                 CMP     (SP),#140       ;;IS IT UPPER CASE?
 6038  041152  002405                         BLT     4$              ;;BRANCH IF YES
 6039  041154  021627  000175                 CMP     (SP),#175       ;;IS IT A SPECIAL CHAR?
 6040  041160  003002                         BGT     4$              ;;BRANCH IF YES
 6041  041162  042716  000040                 BIC     #40,(SP)        ;;MAKE IT UPPER CASE
 6042  041166  112677  177530         4$:     MOVB    (SP)+,@$TKQIN   ;;AND PUT IT IN QUEUE
 6043  041172  005237  040722                 INC     $TKQIN          ;;UPDATE THE POINTER
 6044  041176  023727  040722  040727         CMP     $TKQIN,#$TKQEND ;;GO OFF THE END?
 6045  041204  001003                         BNE     5$              ;;BRANCH IF NO
 6046  041206  012737  040726  040722         MOV     #$TKQSRT,$TKQIN ;;RESET THE POINTER
 6047  041214  000002                 5$:     RTI                     ;;RETURN
 6048
 6049                                  ;;*****************************************************************
 6050                                  ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
 6051                                  ;*ROUTINE IS ENTERED  FROM THE TRAP HANDLER, AND WILL
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6052                                    ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
6053                                    ;*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
6054  041216  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED
6055  041224  001124                          BNE     15$             ;;EXIT IF NOT
6056  041226  105777  137712                  TSTB    @$TKS           ;;IS A CHAR WAITING?
6057  041232  100121                          BPL     15$             ;;IF NOT, EXIT
6058  041234  117746  137706                  MOVB    @$TKB,-(SP)     ;;YES
6059  041240  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT  7-BIT ASCII
6060  041244  021627  000007                  CMP     (SP),#7         ;;IS IT A CONTROL-G?
6061  041250  001300                          BNE     2$              ;;IF NOT, PUT IT IN THE TTY QUEUE
6062                                                                  ;;AND EXIT
6063
6064                                    ;;*****************************************************************
6065                                    ;*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
6066                                    ;*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
6067                                    ;*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
6068  041252  123727  001134  000001  6$:      CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
6069  041260  001674                          BEQ     2$              ;;BRANCH IF YES
6070  041262  005726                          TST     (SP)+           ;;CLEAR CONTROL-G OFF STACK
6071  041264  004737  040730                  JSR     PC,$TKINT       ;;FLUSH THE TTY INPUT QUEUE
6072  041270  005077  137650                  CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
6073  041274  112737  000001  001135          MOVB    #1,$INTAG       ;;SET INTERRUPT MODE INDICATOR
6074
6075  041302  104401  042210                  TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
6076  041306  104401  042215  $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
6077  041312  013746  000176                  MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
6078  041316  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
6079  041320  104401  042226                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
6080  041324  005046                  19$:     CLR     -(SP)           ;;CLEAR COUNTER
6081  041326  005046                          CLR     -(SP)           ;;THE NEW SWR
6082  041330  105777  137610          7$:      TSTB    @$TKS           ;;CHAR THERE?
6083  041334  100375                          BPL     7$              ;;IF NOT TRY AGAIN
6084
6085  041336  117746  137604                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
6086  041342  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
6087
6088  041346  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL-C?
6089  041352  001015                          BNE     9$              ;;BRANCH IF NOT
6090  041354  104401  042176                  TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (^C)
6091  041360  062706  000006                  ADD     #6,SP           ;;CLEAN UP STACK
6092  041364  123727  001135  000001          CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
6093  041372  001003                          BNE     8$              ;;BRANCH IF NO
6094  041374  012777  000100  137542          MOV     #100,@$TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
6095  041402  000137  016202          8$:     JMP     START           ;;CONTROL-C RESTART
6096
6097
6098  041406  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
6099  041412  001005                          BNE     10$             ;;BRANCH IF NOT
6100  041414  104401  042203                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
6101  041420  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
6102  041424  000737                          BR      19$             ;;LET'S TRY IT AGAIN
6103
6104
6105  041426  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
6106  041432  001022                          BNE     16$             ;;BRANCH IF NO
6107  041434  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
```

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6108  041440  001403                          BEQ     11$             ;;BRANCH IF YES
6109  041442  016677  000002  137470          MOV     2(SP),@SWR      ;;SAVE NEW SWR
6110  041450  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
6111  041454  104401  001267          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
6112  041460  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
6113  041466  001003                          BNE     15$             ;;BRANCH IF NOT
6114  041470  012777  000100  137446          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
6115  041476  000002          15$:    RTI                             ;;RETURN
6116  041500  004737  040142          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
6117  041504  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
6118  041510  002420                          BLT     18$             ;;BRANCH IF YES
6119  041514  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
6120  041520  003015                          BGT     18$             ;;BRANCH IF YES
6121  041524  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
6122  041530  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
6123  041534  001403                          BEQ     17$             ;;BRANCH IF YES
6124  041536  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
6125  041540  006316                          ASL     (SP)            ;;   CHAR OVER TO MAKE
6126  041542  006316                          ASL     (SP)            ;;   ROOM FOR NEW ONE.
6127  041546  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
6128  041552  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
6129  041556  000667                          BR      7$              ;;GET THE NEXT ONE
6130  041560  104401  001266          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
6131  041564  000720                          BR      20$             ;;SIMULATE CONTROL-U
6132                                .DSABL  LSB
6133
6134
6135                                ;;*****************************************************************
6136                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
6137                                ;*CALL:
6138                                ;*      RDCHR                   ;;GET A CHARACTER FROM THE QUEUE
6139                                ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
6140                                ;*                              ;;WITH PARITY BIT STRIPPED OFF
6141                                ;
6142
6143  041566  011646                $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC AND
6144  041570  016666  000004  000002          MOV     4(SP),2(SP)     ;;THE PS
6145  041576  005066  000004                  CLR     4(SP)           ;;GET READY FOR A CHARACTER
6146  041602  005046                          CLR     -(SP)           ;;PUT NEW PS ON STACK
6147  041604  012746  041612                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
6148  041610  000002                          RTI                     ;;POP NEW PC AND PS
6149  041612                        64$:
6150  041612  005737  040720          1$:     TST     $TKCNT          ;;WAIT ON A CHARACTER
6151  041616  001775                          BEQ     1$
6152  041620  005337  040720                  DEC     $TKCNT          ;;DECREMENT THE COUNTER
6153  041624  117766  177102  000004          MOVB    @$TKQOUT,4(SP)  ;;GET ONE CHARACTER
6154  041632  005237  040724                  INC     $TKQOUT         ;;UPDATE THE POINTER
6155  041636  023727  040724  040727          CMP     $TKQOUT,#$TKQEND ;;DID IT GO OFF OF THE END?
6156  041644  001003                          BNE     2$              ;;BRANCH IF NO
6157  041646  012737  040726  040724          MOV     #$TKQSRT,$TKQOUT ;;RESET THE POINTER
6158  041654  000002          2$:     RTI                             ;;RETURN
6159                                ;;*****************************************************************
6160                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
6161                                ;*CALL:
6162                                ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
6163                                ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
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6164                                    ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
6165
6166  041650  010346                    $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
6167  041652  005046                            CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
6168  041654  012703  042104            1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
6169  041660  022703  042176            2$:     CMP     #$TTYIN+72,R3   ;;BUFFER FULL?
6170  041664  101456                            BLOS    4$              ;;BR IF YES
6171  041666  104407                            RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
6172  041670  112613                            MOVB    (SP)+,(R3)      ;;GET CHARACTER
6173  041672  122713  000177            10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
6174  041676  001022                            BNE     5$              ;;BR IF NO
6175  041700  005716                            TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
6176  041702  001007                            BNE     6$              ;;BR IF NO
6177  041704  112737  000134  042102          MOVB    #'\,9$          ;;TYPE A BACK SLASH
6178  041712  104401  042102                    TYPE    ,9$
6179  041716  012716  177777                    MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
6180  041722  005303                    6$:     DEC     R3              ;;BACKUP BY ONE
6181  041724  020327  042104                    CMP     R3,#$TTYIN      ;;STACK EMPTY?
6182  041730  103434                            BLO     4$              ;;BR IF YES
6183  041732  111337  042102                    MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
6184  041736  104401  042102                    TYPE    ,9$             ;;GO TYPE
6185  041742  000746                            BR      2$              ;;GO READ ANOTHER CHAR.
6186  041744  005716                    5$:     TST     (SP)            ;;RUBOUT KEY SET?
6187  041746  001406                            BEQ     7$              ;;BR IF NO
6188  041750  112737  000134  042102          MOVB    #'\,9$          ;;TYPE A BACK SLASH
6189  041756  104401  042102                    TYPE    ,9$
6190  041762  005016                            CLR     (SP)            ;;CLEAR THE RUBOUT KEY
6191  041764  122713  000025            7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
6192  041770  001003                            BNE     8$              ;;BR IF NO
6193  041772  104401  042203                    TYPE    ,$CNTLU         ;;TYPE A CONTROL "U"
6194  041776  000726                            BR      1$              ;;GO START OVER
6195  042000  122713  000022            8$:     CMPB    #22,(R3)        ;;IS CHARACTER A "^R"?
6196  042004  001011                            BNE     3$              ;;BRANCH IF NO
6197  042006  105013                            CLRB    (R3)            ;;CLEAR THE CHARACTER
6198  042010  104401  001267                    TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
6199  042014  104401  042104                    TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
6200  042020  000717                            BR      2$              ;;GO PICKUP ANOTHER CHACTER
6201  042022  104401  001266            4$:     TYPE    ,$QUES          ;;TYPE A '?'
6202  042026  000712                            BR      1$              ;;CLEAR THE BUFFER AND LOOP
6203  042030  111337  042102            3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
6204  042034  104401  042102                    TYPE    ,9$
6205  042040  122723  000015                    CMPB    #15,(R3)+       ;;CHECK FOR RETURN
6206  042044  001305                            BNE     2$              ;;LOOP IF NOT RETURN
6207  042046  105063  177777                    CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
6208  042052  104401  001270                    TYPE    ,$LF            ;;TYPE A LINE FEED
6209  042056  005726                            TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
6210  042060  012603                            MOV     (SP)+,R3        ;;RESTORE R3
6211  042062  011646                            MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
6212  042064  016666  000004  000002            MOV     4(SP),2(SP)     ;;       FIRST ASCII CHARACTER ON IT
6213  042072  012766  042104  000004            MOV     #$TTYIN,4(SP)
6214  042100  000002                            RTI                     ;;RETURN
6215  042102     000                    9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
6216  042103     000                            .BYTE   0               ;;TERMINATOR
6217  042104  000072                    $TTYIN: .BLKB   72              ;;RESERVE 72 BYTES FOR TTY INPUT
6218  042176  041536  005015     000    $CNTLC: .ASCIZ  /^C/<15><12>    ;;CONTROL "C"
6219  042203     136  006525  000012    $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
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6220  042210  043536  005015     000  $CNTLG: .ASCIZ  /↑G/<15><12>     ;;CONTROL "G"
6221  042215     015  051412  051127  $MSWR:  .ASCIZ  <15><12>/SWR = /
6222  042222  036440  000040
6223  042226  020040  042516  020127  $MNEW:  .ASCIZ  /  NEW = /
6224  042234  020075     000
6225          042240                  .EVEN
6226                                  .SBTTL  POWER DOWN AND UP ROUTINES
6227
6228                                  ;;*****************************************************************
6229                                  ;POWER DOWN ROUTINE
6230  042240  012737  042400  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
6231  042246  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
6232  042254  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
6233  042256  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
6234  042260  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
6235  042262  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
6236  042264  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
6237  042266  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
6238  042270  017746  136644                MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
6239  042274  010637  042404                MOV     SP,$SAVR6       ;;SAVE SP
6240  042300  012737  042312  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
6241  042306  000000                        HALT
6242  042310  000776                        BR      .-2             ;;HANG UP
6243
6244                                  ;;*****************************************************************
6245                                  ;POWER UP ROUTINE
6246  042312  012737  042400  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
6247  042320  013706  042404                MOV     $SAVR6,SP       ;;GET SP
6248  042324  005037  042404                CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
6249  042330  005237  042404          1$:   INC     $SAVR6          ;;WAIT FOR THE INC
6250  042334  001375                        BNE     1$              ;;OF  WORD
6251  042336  012677  136576                MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
6252  042342  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
6253  042344  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
6254  042346  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
6255  042350  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
6256  042352  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
6257  042354  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
6258  042356  012737  042240  000024        MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
6259  042364  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
6260  042372  104401                        TYPE                    ;REPORT THE POWER FAILURE
6261  042374  042406          $PWRMG: .WORD   $POWER                  ;;POWER FAIL MESSAGE POINTER
6262  042376  000002                  RTI
6263  042400  000000          $ILLUP: HALT                            ;;THE POWER UP SEQUENCE WAS STARTED
6264  042402  000776                  BR      .-2                     ;; BEFORE THE POWER DOWN WAS COMPLETE
6265  042404  000000          $SAVR6: 0                               ;;PUT THE SP HERE
6266  042406  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
6267  042414  000122
6268                                  .EVEN
6269                                  .SBTTL  ROUTINE TO SIZE MEMORY
6270
6271                                  ;;*****************************************************************
6272                                  ;*CALL:
6273                                  ;*      JSR     PC,$SIZE
6274                                  ;*      RETURN
6275                                  ;*$LSTAD WILL CONTAIN THE LAST AVAILABLE MEMORY LOCATION
```

```
6276
6277  042416  010046                  $SIZE:  MOV     R0,-(SP)        ;;SAVE R0 ON THE STACK
6278  042420  010146                          MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
6279  042422  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE PRESENT ERROR VECTOR PS & PC
6280  042426  013746  000006                  MOV     @#ERRVEC+2,-(SP)
6281  042432  010600                          MOV     SP,R0           ;;SAVE THE STACK POINTER
6282                                  ;;SET THE ERRVEC PS TO THE PRESENT PS
6283  042434  104400                          TRAP                    ;;PUSH OLD PSW AND PC ON STACK
6284  042436  012637  000006                  MOV     (SP)+,@#ERRVEC+2        ;;SAVE THE PSW IN @#ERRVEC+2
6285  042442  012737  042462  000004          MOV     #2$,@#ERRVEC    ;;SET FOR TIMEOUT
6286  042450  012701  020000                  MOV     #20000,R1       ;;FIRST ADDRESS
6287  042454  005711                  1$:     TST     (R1)            ;;TEST THIS ADDRESS
6288  042456  005721                          TST     (R1)+           ;;STEP TO NEXT ADDRESS
6289  042460  000775                          BR      1$              ;;TRY ANOTHER
6290  042462  162701  000002          2$:     SUB     #2,R1           ;;BACK UP
6291  042466  010006                          MOV     R0,SP           ;;RESTORE THE STACK
6292  042470  012637  000006                  MOV     (SP)+,@#ERRVEC+2 ;;RESTORE ERROR VECTOR
6293  042474  012637  000004                  MOV     (SP)+,@#ERRVEC
6294  042500  010137  042512                  MOV     R1,$LSTAD       ;;LAST ADDRESS
6295  042504  012601                          MOV     (SP)+,R1        ;;RESTORE R1
6296  042506  012600                          MOV     (SP)+,R0        ;;RESTORE R0
6297  042510  000207                          RTS     PC
6298  042512  000000                  $LSTAD: .WORD   0               ;;CONTAINS THE LAST ADDRESS
6299                                  .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
6300
6301                                  ;;******************************************************************
6302                                  ;*SAVE R0-R5
6303                                  ;*CALL:
6304                                  ;*      SAVREG
6305                                  ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
6306                                  ;*
6307                                  ;*TOP---(+16)
6308                                  ;* +2---(+18)
6309                                  ;* +4---R5
6310                                  ;* +6---R4
6311                                  ;* +8---R3
6312                                  ;*+10---R2
6313                                  ;*+12---R1
6314                                  ;*+14---R0
6315
6316  042514                  $SAVREG:
6317  042514  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
6318  042516  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
6319  042520  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
6320  042522  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
6321  042524  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
6322  042526  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
6323  042530  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
6324  042534  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
6325  042540  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
6326  042544  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
6327  042550  000002                          RTI
6328
6329                                  ;*RESTORE R0-R5
6330                                  ;*CALL:
6331                                  ;*      RESREG
```

```
042552                          $RESREG:
042552  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
042556  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
042562  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
042566  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
042572  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
042574  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
042576  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
042600  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
042602  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
042604  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
042606  000002                          RTI
                                .SBTTL  TRAP DECODER

                                ;;**********************************************************************
                                ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                ;*GO TO THAT ROUTINE.

042610  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
042612  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
042616  005740                          TST     -(R0)           ;;BACKUP BY 2
042620  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
042622  006300                          ASL     R0              ;;POSITION FOR INDEXING
042624  016000  042644                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
042630  000200                          RTS     R0              ;;GO TO ROUTINE

                                ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO

042632  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
042634  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
042642  000002                          RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

                                ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                ;*BY THE "TRAP" INSTRUCTION.

                                ;       ROUTINE
                                ;       -------
042644  042632                  $TRPAD: .WORD   $TRAP2
042646  037772                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
042650  040356                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
042652  040332                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
042654  040372                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)

042656  041306                          $GTSWR  ;;CALL=GTSWR    TRAP+5(104405)  GET SOFT-SWR SETTING

042660  041216                          $CKSWR  ;;CALL=CKSWR    TRAP+6(104406)  TEST FOR CHANGE IN SOFT-SWR
042662  041560                          $RDCHR  ;;CALL=RDCHR    TRAP+7(104407)  TTY TYPEIN CHARACTER ROUTINE
042664  041650                          $RDLIN  ;;CALL=RDLIN    TRAP+10(104410) TTY TYPEIN STRING ROUTINE
042666  042514                          $SAVREG ;;CALL=SAVREG   TRAP+11(104411) SAVE R0-R5 ROUTINE
042670  042552                          $RESREG ;;CALL=RESREG   TRAP+12(104412) RESTORE R0-R5 ROUTINE
```

```
6388  042672  025052  020040  047125  EM1:    .ASCIZ  /**  UNIBUS PARITY ERROR/
6389  042700  041111  051525  050040
6390  042706  051101  052111  020131
6391  042714  051105  047522  000122
6392  042722  025052  020040  047516  EM2:    .ASCIZ  /**  NON-EXISTANT MEMORY ERROR/
6393  042730  026516  054105  051511
6394  042736  040524  052116  046440
6395  042744  046505  051117  020131
6396  042752  051105  047522  000122
6397  042760  025052  020040  047516  EM3:    .ASCIZ  /**  NON-EXISTANT DRIVE ERROR/
6398  042766  026516  054105  051511
6399  042774  040524  052116  042040
6400  043002  044522  042526  042440
6401  043010  051122  051117      000
6402  043015      052  020052  052440  EM4:    .ASCIZ  /**  UNIT FIELD ERROR/
6403  043022  044516  020124  044506
6404  043030  046105  020104  051105
6405  043036  047522  000122
6406  043042  025052  020040  052523  EM5:    .ASCIZ  /**  SUBSYSTEM TIMEOUT/
6407  043050  051502  051531  042524
6408  043056  020115  044524  042515
6409  043064  052517  000124
6410  043070  025052  020040  051104  EM6:    .ASCIZ  /**  DRIVE BUS PARITY ERROR/
6411  043076  053111  020105  052502
6412  043104  020123  040520  044522
6413  043112  054524  042440  051122
6414  043120  051117      000
6415  043123      052  020052  042040  EM7:    .ASCIZ  /**  DRIVE DETECTED PARITY ERROR/
6416  043130  044522  042526  042040
6417  043136  052105  041505  042524
6418  043144  020104  040520  044522
6419  043152  054524  042440  051122
6420  043160  051117      000
6421  043163      052  020052  040440  EM10:   .ASCIZ  /**  AC LOW/
6422  043170  020103  047514  000127
6423  043176  025052  020040  050123  EM11:   .ASCIZ  /**  SPEED LOSS/
6424  043204  042505  020104  047514
6425  043212  051523      000
6426  043215      052  020052  044440  EM12:   .ASCIZ  /**  ILLEGAL FUNCTION ERROR/
6427  043222  046114  043505  046101
6428  043230  043040  047125  052103
6429  043236  047511  020116  051105
6430  043244  047522  000122
6431  043250  025052  020040  051120  EM13:   .ASCIZ  /**  PROGRAMMING ERROR/
6432  043256  043517  040522  046515
6433  043264  047111  020107  051105
6434  043272  047522  000122
6435  043276  025052  020040  047516  EM14:   .ASCIZ  /**  NON-EXISTANT FUNCTION ERROR/
6436  043304  026516  054105  051511
6437  043312  040524  052116  043040
6438  043320  047125  052103  047511
6439  043326  020116  051105  047522
6440  043334  000122
6441  043336  025052  020040  051104  EM15:   .ASCIZ  /**  DRIVE TYPE ERROR/
6442  043344  053111  020105  054524
6443  043352  042520  042440  051122
```

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6444  043360  051117     000
6445  043363     052  020052  043040  EM16:   .ASCIZ  /**  FORMAT ERROR/
6446  043370  051117  040515  020124
6447  043376  051105  047522  000122
6448  043404  025052  020040  051127  EM17:   .ASCIZ  /**  WRITE LOCK ERROR/
6449  043412  052111  020105  047514
6450  043420  045503  042440  051122
6451  043426  051117     000
6452  043431     052  020052  042040  EM20:   .ASCIZ  /**  DRIVE UNSAFE ERROR/
6453  043436  044522  042526  052440
6454  043444  051516  043101  020105
6455  043452  051105  047522  000122
6456  043460  025052  020040  042523  EM21:   .ASCIZ  /**  SEEK INCOMPLETE ERROR/
6457  043466  045505  044440  041516
6458  043474  046517  046120  052105
6459  043502  020105  051105  047522
6460  043510  000122
6461  043512  025052  020040  054503  EM22:   .ASCIZ  /**  CYLINDER OVERFLOW EPROR/
6462  043520  044514  042116  051105
6463  043526  047440  042526  043122
6464  043534  047514  020127  051105
6465  043542  047522  000122
6466  043546  025052  020040  046111  EM23:   .ASCIZ  /**  ILLEGAL CYLINDER ADDRESS ERROR/
6467  043554  042514  040507  020114
6468  043562  054503  044514  042116
6469  043570  051105  040440  042104
6470  043576  042522  051523  042440
6471  043604  051122  051117     000
6472  043611     052  020052  042040  EM24:   .ASCIZ  /**  DRIVE OFF TRACK/
6473  043616  044522  042526  047440
6474  043624  043106  052040  040522
6475  043632  045503     000
6476  043635     052  020052  042040  EM25:   .ASCIZ  /**  DRIVE TIMING ERROR/
6477  043642  044522  042526  052040
6478  043650  046511  047111  020107
6479  043656  051105  047522  000122
6480  043664  025052  020040  040504  EM26:   .ASCIZ  /**  DATA LATE ERROR/
6481  043672  040524  046040  052101
6482  043700  020105  051105  047522
6483  043706  000122
6484  043710  025052  020040  047503  EM27:   .ASCIZ  /**  CONTROLLER TIMEOUT ERROR/
6485  043716  052116  047522  046114
6486  043724  051105  052040  046511
6487  043732  047505  052125  042440
6488  043740  051122  051117     000
6489  043745     052  020052  047440  EM30:   .ASCIZ  /**  OPERATION INCOMPLETE ERROR/
6490  043752  042520  040522  044524
6491  043760  047117  044440  041516
6492  043766  046517  046120  052105
6493  043774  020105  051105  047522
6494  044002  000122
6495  044004  025052  020040  042510  EM31:   .ASCIZ  /**  HEADER VRC ERROR/
6496  044012  042101  051105  053040
6497  044020  041522  042440  051122
6498  044026  051117     000
6499  044031     052  020052  042040  EM32:   .ASCIZ   **  DATA CHECk ERROR/
```

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6500  044036  052101  020101  044103
6501  044044  041505  020113  051105
6502  044052  047523  000122
6503  044056  025052  020040  051127  EM33:   .ASCIZ  /** WRITE CHECK ERROR/
6504  044064  052111  020105  044103
6505  044072  041505  020113  051105
6506  044100  047522  000122
6507  044104  025052  020040  040504  EM34:   .ASCIZ  /** DATA MISCOMPARE/
6508  044112  040524  046440  051511
6509  044120  047503  050115  051101
6510  044126  000105
6511  044130  025052  020040  047516  EM35:   .ASCIZ  /** NO DRIVE RESPONSE-UFE & NED/
6512  044136  042040  044522  042526
6513  044144  051040  051505  047520
6514  044152  051516  026505  043125
6515  044160  020105  020046  042516
6516  044166  000104
6517  044170  025052  020040  051104  EM36:   .ASCIZ  /** DRIVE ERROR WILL NOT CLEAR/
6518  044176  053111  020105  051105
6519  044204  047522  020122  044527
6520  044212  046114  047040  052117
6521  044220  041440  042514  051101
6522  044226     000
6523  044227     052  020052  042040  EM37:   .ASCIZ  /** DRIVE STATUS CHANGE WILL NOT CLEAR/
6524  044234  044522  042526  051440
6525  044242  040524  052524  020123
6526  044250  044103  047101  042507
6527  044256  053440  046111  020114
6528  044264  047516  020124  046103
6529  044272  040505  000122
6530  044276  025052  020040  052101  EM40:   .ASCIZ  /** ATTENTION BUT NO STATUS CHANGE OR FAULT/
6531  044304  042524  052116  047511
6532  044312  020116  052502  020124
6533  044320  047516  051440  040524
6534  044326  052524  020123  044103
6535  044334  047101  042507  047440
6536  044342  020122  040506  046125
6537  044350  000124
6538  044352  025052  020040  052101  EM41:   .ASCIZ  /** ATTENTION BUT DRIVE NOT AVAILABLE/
6539  044360  042524  052116  047511
6540  044366  020116  052502  020124
6541  044374  051104  053111  020105
6542  044402  047516  020124  053101
6543  044410  044501  040514  046102
6544  044416  000105
6545  044420  025052  020040  052101  EM42:   .ASCIZ  /** ATTENTION WHEN NOT EXPECTED/
6546  044426  042524  052116  047511
6547  044434  020116  044127  047105
6548  044442  047040  052117  042440
6549  044450  050130  041505  042524
6550  044456  000104
6551  044460  025052  020040  051105  EM43:   .ASCIZ  /** ERROR WHILE GATHERING DRIVE STATUS/
6552  044466  047522  020122  044127
6553  044474  046111  020105  040507
6554  044502  044124  051105  047111
6555  044510  020107  051104  053111
```

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  6556  044516  020105  052123  052101
  6557  044524  051525     000
  6558  044527     052  020052  046440  EM52:   .ASCIZ  /** MULTIPLE DRIVE SELECT/
  6559  044534  046125  044524  046120
  6560  044542  020105  051104  053111
  6561  044550  020105  042523  042514
  6562  044556  052103     000
  6563  044561     052  020052  044040  EM53:   .ASCIZ  /** HEADER COMPARE ERROR/
  6564  044566  040505  042504  020122
  6565  044574  047503  050115  051101
  6566  044602  020105  051105  047522
  6567  044610  000122
  6568  044612  025052  020040  052523  EM56:   .ASCIZ  /** SUBSYSTEM TIMEOUT/
  6569  044620  051502  051531  042524
  6570  044626  020115  044524  042515
  6571  044634     2517 000124
  6572  044640  025052  020040  051105  EM60:   .ASCIZ  /** ERROR IN RECALIBRATE FOR RECOVERY/
  6573  044646  047522  020122  047111
  6574  044654  051040  041505  046101
  6575  044662  041111  040522  042524
  6576  044670  043040  051117  051040
  6577  044676  041505  053117  051105
  6578  044704  000131
  6579  044706  025052  020040  051120  EM61:   .ASCIZ  /** PROGRAM ABORTING FATAL ERROR IN RETRY/
  6580  044714  043517  040522  020115
  6581  044722  041101  051117  044524
  6582  044730  043516  043040  052101
  6583  044736  046101  042440  051122
  6584  044744  051117  044440  020116
  6585  044752  042522  051124  000131
  6586  044760  025052  020040  042510  EM62:   .ASCIZ  /** HEADER MISCOMPARE/
  6587  044766  042101  051105  046440
  6588  044774  051511  047503  050115
  6589  045002  051101  000105
  6590  045006  025052  020040  046103  EM63:   .ASCIZ  /** CLEAR CONTROLLER DID NOT CLEAR ERROR/
  6591  045014  040505  020122  047503
  6592  045022  052116  047522  046114
  6593  045030  051105  042040  042111
  6594  045036  047040  052117  041440
  6595  045044  042514  051101  042440
  6596  045052  051122  051117     000
  6597  045057     052  020052  047040  EM64:   .ASCIZ  /** NO ATTENTION IN ATTENTION SUMMARY REGISTER/
  6598  045064  020117  052101  042524
  6599  045072  052116  047511  020116
  6600  045100  047111  040440  052124
  6601  045106  047105  044524  047117
  6602  045114  051440  046525  040515
  6603  045122  054522  051040  043505
  6604  045130  051511  042524  000122
  6605  045136  025052  020040  047125  EM65:    ASCIZ  /** UNSOLICITED ATTENTION/
  6606  045144  047523  044514  044503
  6607  045152  042524  020104  052101
  6608  045160  042524  052116  047511
  6609  045166  000116
  6610  045170  025052  020040  047125  EM66:   .ASCIZ  /** UNEXPECTED DATA TYPE ERROR/
  6611  045176  054105  042520  052103
```

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6612  045204  042105  042040  052101
6613  045212  020101  054524  042520
6614  045220  042440  051122  051117
6615  045226     000
6616  045227     052  020052  040440  EM67:   .ASCIZ  /** ATTENTION DID NOT RESET WITH CLEAR/
6617  045234  052124  047105  044524
6618  045242  047117  042040  042111
6619  045250  047040  052117  051040
6620  045256  051505  052105  053440
6621  045264  052111  020110  046103
6622  045272  040505  000122
6623  045276  025052  020040  052523  EM70:   .ASCIZ  /** SUBSYSTEM CLEAR DID NOT CLEAR DRIVE ATTENTION/
6624  045304  051502  051531  042524
6625  045312  020115  046103  040505
6626  045320  020122  044504  020104
6627  045326  047516  020124  046103
      045334  040505  020122  051104
      045342  053111  020105  052101
      045350  042524  052116  047511
      045356  000116
6632  045360  025052  020040  040504  EM71:   .ASCIZ  /** DATA LATE WHEN UNLOADING HEADER/
6633  045366  040524  046040  052101
6634  045374  020105  044127  047105
6635  045402  052440  046116  040517
6636  045410  044504  043516  044040
6637  045416  040505  042504  000122
6638  045424  025052  020040  047503  EM72:   .ASCIZ  /** CONTROLLER ERROR WHEN DRIVER SERVICING/
6639  045432  052116  047522  046114
6640  045440  051105  042440  051122
6641  045446  051117  053440  042510
6642  045454  020116  051104  053111
6643  045462  051105  051440  051105
6644  045470  044526  044503  043516
6645  045476     000
6646  045477     052  020052  042040  EM73:   .ASCIZ  /** DRIVE DETECTED PARITY ERROR/
6647  045504  044522  042526  042040
6648  045512  052105  041505  042524
6649  045520  020104  040520  044522
6650  045526  054524  042440  051122
6651  045534  051117     000
6652  045537     052  020052  052440  EM74:   .ASCIZ  /** UNDEFINED ERROR/
6653  045544  042116  043105  047111
6654  045552  042105  042440  051122
6655  045560  051117     000
6656  045563     052  020052  046440  EM75:   .ASCIZ  /** MARKING THIS SECTOR BAD/
6657  045570  051101  044513  043516
6658  045576  052040  044510  020123
6659  045604  042523  052103  051117
6660  045612  041040  042101     000
6661  045617     052  020052  041040  EM76:   .ASCIZ  /** BAD DATA VERIFICATION WITH READ. ECC OF LAST RETRY IS:
6662  045624  042101  042040  052101
6663  045632  020101  042526  044522
6664  045640  044506  040503  044524
6665  045646  047117  053440  052111
6666  045654  020110  042522  042101
6667  045662  020056  041505  020103
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6668  045670  043117  046040  051501
6669  045676  020124  042522  051124
6670  045704  020131  051511  000072
6671  045712  025052  020040  042522  EM77:   .ASCIZ  /**  RETRY SUCCESSFUL/
6672  045720  051124  020131  052523
6673  045726  041503  051505  043123
6674  045734  046125      000
6675  045737      052  020052  051040  EM100:  .ASCIZ  /**  RETRY UNSUCCESSFUL/
6676  045744  052105  054522  052440
6677  045752  051516  041525  042503
6678  045760  051523  052506  000114
6679  045766  025052  020040  040503  EM101:  .ASCIZ  /**  CANNOT FIND A VALID HEADER IN TRACK JUST READ/
6680  045774  047116  052117  043040
6681  046002  047111  020104  020101
6682  046010  040526  044514  020104
6683  046016  042510  042101  051105
6684  046024  044440  020116  051124
6685  046032  041501  020113  052512
6686  046040  052123  051040  040505
6687  046046  000104
6688  046050  025052  020040  040502  EM102:  .ASCIZ  /**  BAD SECTOR ERROR ON SECTOR NOT LISTED BAD/
6689  046056  020104  042523  052103
6690  046064  051117  042440  051122
6691  046072  051117  047440  020116
6692  046100  042523  052103  051117
6693  046106  047040  052117  046040
6694  046114  051511  042524  020104
6695  046122  040502  000104
6696  046126  025052  053440  051117  EM103:  .ASCIZ  /** WORD COUNT INCORRECT TO CONTINUE/
6697  046134  020104  047503  047125
6698  046142  020124  047111  047503
6699  046150  051122  041505  020124
6700  046156  047524  041440  047117
6701  046164  044524  052516  000105
6702  046172  025052  040503  052125  EM104:  .ASCIZ  /**CAUTION** DRIVE STATUS REPORTED MAY NOT BE CORRECT/
6703  046200  047511  025116  020052
6704  046206  051104  053111  020105
6705  046214  052123  052101  051525
6706  046222  051040  050105  051117
6707  046230  042524  020104  040515
6708  046236  020131  047516  020124
6709  046244  042502  041440  051117
6710  046252  042522  052103      000
6711  046257      105  051122  051117  EM105:  .ASCII  /ERROR IN SECTOR ALREADY MARKED BAD/<15><12>
6712  046264  044440  020116  042523
6713  046272  052103  051117  040440
6714  046300  051114  040505  054504
6715  046306  046440  051101  042513
6716  046314  020104  040502  006504
6717  046322      012
6718  046323      123  051525  042520          .ASCII   SUSPECT PHYSICAL DAMAGE IN HEADER AREA/<15><12>
6719  046330  052103  050040  054510
6720  046336  044523  040503  020114
6721  046344  040504  040515  042507
6722  046352  044440  020116  042510
6723  046360  042101  051105  040440
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6724  046366  042522  006501     012
6725  046373     106  051117  040515          .ASCIZ  /FORMAT ABORTING/
6726  046400  020124  041101  051117
6727  046406  044524  043516     000
6728  046413     103  046517  040515  DH100:  .ASCIZ  /COMMAND START VALUES/
6729  046420  042116  051440  040524
6730  046426  052122  053040  046101
6731  046434  042525  000123
6732  046440  045522  030466  020061  DH200:  .ASCIZ  /RK611 REGISTERS/
6733  046446  042522  044507  052123
6734  046454  051105  000123
6735  046460  042522  040515  047111  DH500:  .ASCIZ  /REMAINING REGISTERS NOT VALID/
6736  046466  047111  020107  042522
6737  046474  044507  052123  051105
6738  046502  020123  047516  020124
6739  046510  040526  044514  000104
6740  046516  044124  020105  047506  DH501:  .ASCIZ  /THE FOLLOWING REGISTER DATA MAY BE INCORRECT/
6741  046524  046114  053517  047111
6742  046532  020107  042522  044507
6743  046540  052123  051105  042040
6744  046546  052101  020101  040515
6745  046554  020131  042502  044440
6746  046562  041516  051117  042522
6747  046570  052103     000
6748  046573     105  051122  050040  DH101:  .ASCIZ  /ERR PC  DRIVE   CMND    CYLNDR  TRACK   SECTOR   WD CNT  BUFFER/
6749  046600  020103  042040  044522
6750  046606  042526  020040  041440
6751  046614  047115  020104  020040
6752  046622  041440  046131  042116
6753  046630  020122  052040  040522
6754  046636  045503  020040  051440
6755  046644  041505  047524  020122
6756  046652  020040  042127  041440
6757  046660  052116  020040  052502
6758  046666  043106  051105     000
6759  046673     122  041513  030523  DH201:   ASCIZ  /RKCS1   RKCS2   RKDC    RKDA    RKWCR  RKBA    RkASOF/
6760  046700  020040  051040  041513
6761  046706  031123  020040  051040
6762  046714  042113  020103  020040
6763  046722  051040  042113  020101
6764  046730  020040  051040  053513
6765  046736  051103  020040  045522
6766  046744  040502  020040  020040
6767  046752  045522  051501  043117
6768  046760     000
6769  046761     122  042113  020123  DH202.  .ASCIZ  /RKDS    RKER
6770  046766  020040  051040  042513
6771  046774  000122
6772  046776  030101  020060  020040  DH203:  ASCIZ  /A00     B00     A01     B01     A02     B02     A03     B03/
6773  047004  020040  030102  020060
6774  047012  020040  020040  030101
6775  047020  020061  020040  020040
6776  047026  030102  020061  020040
6777  047034  020040  030101  020062
6778  047042  020040  020040  030102
6779  047050  020062  020040  020040
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6780  047056  030101  020063  020040
6781  047064  020040  030102  000063
6782  047072  042510  042101  051105  DH601:  .ASCIZ  /HEADER SHOULD BE:/
6783  047100  051440  047510  046125
6784  047106  020104  042502  000072
6785  047114  042510  042101  051105  DH602:  .ASCIZ  /HEADER OF SECTOR 0 THIS CYLINDER IS:/
6786  047122  047440  020106  042523
6787  047130  052103  051117  030040
6788  047136  052040  044510  020123
6789  047144  054503  044514  042116
6790  047152  051105  044440  035123
6791  047160     000
6792  047161     123  040505  041522  DH603:  .ASCIZ  /SEARCHING FOR HEADER:/
6793  047166  044510  043516  043040
6794  047174  051117  044040  040505
6795  047202  042504  035122     000
6796  047207     120  041501  020113  DH604:  .ASCIZ  /PACK ADDRESS OF ERROR IS:/
6797  047214  042101  051104  051505
6798  047222  020123  043117  042440
6799  047230  051122  051117  044440
6800  047236  035123     000
6801  047241     103  046131  042116  DH6041: .ASCIZ  /CYLNDR  TRACK   SECTOR/
6802  047246  020122  052040  040522
6803  047254  045503  020040  051440
6804  047262  041505  047524  000122
6805  047270  054503  047114  051104  DH6042: .ASCIZ  /CYLNDR  TRACK/
6806  047276  020040  051124  041501
6807  047304  000113
6808  047306  041505  020103  040504  DH605:  .ASCIZ  /ECC DATA IS:/
6809  047314  040524  044440  035123
6810  047322     000
6811  047323     120  051517  020040  DH6051: .ASCIZ  /POS     PAT     CORRECTABLE?/
6812  047330  020040  050040  052101
6813  047336  020040  020040  041440
6814  047344  051117  042522  052103
6815  047352  041101  042514  000077
6816  047360  047527  042122  020061  DH606:  .ASCIZ  /WORD1   WORD2   WORD3/
6817  047366  020040  047527  042122
6818  047374  020062  020040  047527
6819  047402  042122  000063
6820  047406  047507  042117  020040  DH701:  .ASCIZ  /GOOD    BAD     WORD NUM
6821  047414  020040  040502  020104
6822  047422  020040  020040  047527
6823  047430  042122  047040  046525
6824  047436     000
6825  047437     102  042101  044040  DH607:  .ASCIZ  /BAD HEADER IS:/
6826  047444  040505  042504  020122
6827  047452  051511  000072
6828  047456  045522  051504  020040  DH204:  .ASCIZ  /RKDS    RKER    RKMR2   RKMR3/
6829  047464  020040  045522  051105
6830  047472  020040  020040  045522
6831  047500  051115  020062  020040
6832  047506  045522  051115  000063
6833  047514  051105  047522  020122  DH502:  .ASCIZ  /ERROR TRYING TO GET FAILURE INFORMATION/
6834  047522  051124  044531  043516
6835  047530  052040  020117  042507
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6836  047536  020124  040506  046111
6837  047544  051125  020105  047111
6838  047552  047506  046522  052101
6839  047560  047511  000116
6840  047564  042523  047503  042116  DH503:  .ASCIZ  /SECOND TIMEOUT OCCURRED GETTING DRIVE STATUS/
6841  047572  052040  046511  047505
6842  047600  052125  047440  041503
6843  047606  051125  042522  020104
6844  047614  042507  052124  047111
6845  047622  020107  051104  053111
6846  047630  020105  052123  052101
6847  047636  051525     000
6848  047641     116  046525  042502  DH800:  .ASCIZ  /NUMBER OF RETRIES:/
6849  047646  020122  043117  051040
6850  047654  052105  044522  051505
6851  047662  000072
6852                                  .EVEN
6853  047664  042523  052103  051117  DH900:  .ASCIZ  /SECTOR  WC SB   WC IS/
6854  047672  020040  041527  051440
6855  047700  020102  020040  041527
6856  047706  044440  000123
6857  047712  001116  006340  006372  DT100:  .WORD   $ERRPC,DRINUS,ERRCOM,$REG0,$REG1,$REG2,$REG3,$REG4
6858  047720  001162  001164  001166
6859  047726  001170  001172
6860  047732  001174  001176  001200  DT201:  .WORD   $REG5,$REG6,$REG7,$REG10,$REG11,$REG12,$REG13
6861  047740  001202  001204  001206
6862  047746  001210
6863  047750  001212  001214          DT202:  .WORD   $REG14,$REG15
6864  047754  001216  001220  001222  DT203:  .WORD   $REG16,$REG17,$REG20,$REG21,$REG22,$REG23,$REG24,$REG25
6865  047762  001224  001226  001230
6866  047770  001232  001234
6867  047774  001174  001176  001200  DT601:  .WORD   $REG5,$REG6,$REG7
6868  050002  001202  001204  001206  DT602:  .WORD   $REG10,$REG11,$REG12
6869
6870  050010  000005          DF01:   .WORD   5               ;NUMBER OF HEADER LINES
6871  050012     000          .BYTE   0       ;NUMBER OF COL FOR FIRST HDR
6872  050013     000          .BYTE   0       ;ALL CHARACTERS OCTAL
6873  050014  046573          .WORD   DH101   ;SECOND HDR LINE
6874  050016     010     000  .BYTE   10,0    ;NUM OF COL-ALL OCTAL
6875  050020  046440          .WORD   DH200
6876  050022     000     000  .BYTE   0,0
6877  050024  046673          .WORD   DH201
6878  050026     007     000  .BYTE   7,0
6879  050030  046460          .WORD   DH500
6880  050032     000     000  .BYTE   0,0
6881
6882  050034  000006          DF02:   .WORD   6
6883  050036     000     000  .BYTE   0,0
6884  050040  046573          .WORD   DH101
6885  050042     010     000  .BYTE   10,0
6886  050044  046440          .WORD   DH200
6887  050046     000     000  .BYTE   0,0
6888  050050  046673          .WORD   DH201
6889  050052     007     000  .BYTE   7,0
6890  050054  046761          .WORD   DH202
6891  050056     002     000  .BYTE   2,0
```

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 6892  050060  046776                          .WORD   DH203
 6893  050062     010      000                 .BYTE   10,0
 6894
 6895  050064  000007                  DF03:   .WORD   7
 6896  050066     000      000                 .BYTE   0,0
 6897  050070  046573                          .WORD   DH101
 6898  050072     010      000                 .BYTE   10,0
 6899  050074  046440                          .WORD   DH200
 6900  050076     000      000                 .BYTE   0,0
 6901  050100  046673                          WORD    DH201
 6902  050102     007      000                 .BYTE   7,0
 6903  050104  046516                          .WORD   DH501          ;"THE FOLLOWING REG DATA MB INCORRECT"
 6904  050106     000      000                 BYTE    0,0
 6905  050110  046761                          .WORD   DH202
 6906  050112     002      000                 .BYTE   2,0
 6907  050114  046776                          .WORD   DH203
 6908  050116     010      000                 .BYTE   10,0
 6909
 6910  050120  000006                  DF05:   .WORD   6              ;OPERATION INCOMPLETE
 6911  050122     000      000                 .BYTE   0,0
 6912  050124  046573                          .WORD   DH101
 6913  050126     010      000                 .BYTE   10,0
 6914  050130  047161                          .WORD   DH603
 6915  050132     000      000                 .BYTE   0,0
 6916  050134  047360                          .WORD   DH606
 6917  050136     003      000                 .BYTE   3,0
 6918  050140  047114                          .WORD   DH602
 6919  050142     000      000                 .BYTE   0,0
 6920  050144  047360                          .WORD   DH606
 6921  050146     003      000                 .BYTE   3,0
 6922
 6923  050150  000006                  DF06:   .WORD   6              ;HEADER VRC ERROR
 6924  050152     000      000                 .BYTE   0,0
 6925  050154  046573                          .WORD   DH101
 6926  050156     010      000                 .BYTE   10,0
 6927  050160  047072                          .WORD   DH601
 6928  050162     000      000                 .BYTE   0,0
 6929  050164  047360                          .WORD   DH606
 6930  050166     003      000                 .BYTE   3,0
 6931                             ;            .WORD   DH607          ;THIS LINE WHEN SPECIFIC HEADER CAN BE READ
 6932  050170  047114                          .WORD   DH602          ;THIS LINE THEN DELETES
 6933  050172     000      000                 .BYTE   0,0
 6934  050174  047360                          .WORD   DH606
 6935  050176     003      000                 .BYTE   3,0
 6936
 6937  050200  000006                  DF07:   .WORD   6
 6938  050202     000      000                 .BYTE   0,0
 6939  050204  046573                          .WORD   DH101
 6940  050206     010      000                 .BYTE   10,0
 6941  050210  047207                          .WORD   DH604
 6942  050212     000      000                 .BYTE   0,0
 6943  050214  047241                          .WORD   DH6041
 6944  050216     003      000                 .BYTE   3,0
 6945  050220  047306                          .WORD   DH605
 6946  050222     000      000                 .BYTE   0,0
 6947  050224  047323                          .WORD   DH6051
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6948  050226  003  000                    .BYTE   3,0
6949
6950  050230  000004                 DF10:  .WORD   4
6951  050232  000  000                    .BYTE   0,0
6952  050234  046573                      .WORD   DH101
6953  050236  010  000                    .BYTE   10,0
6954  050240  047207                      .WORD   DH604
6955  050242  000  000                    .BYTE   0,0
6956  050244  047241                      .WORD   DH6041
6957  050246  003  000                    .BYTE   3,0
6958
6959  050250  000003                 DF11:  .WORD   3
6960  050252  000  000                    .BYTE   0,0
6961  050254  047241                      .WORD   DH6041
6962  050256  003  000                    .BYTE   3,0
6963  050260  047406                      .WORD   DH701
6964  050262  000  000                    .BYTE   0,0
6965
6966  050264  000005                 DF12:  .WORD   5
6967  050266  000  000                    .BYTE   0,0
6968  050270  046573                      .WORD   DH101
6969  050272  010  000                    .BYTE   10,0
6970  050274  046440                      .WORD   DH200
6971  050276  000  000                    .BYTE   0,0
6972  050300  046673                      .WORD   DH201
6973  050302  007  000                    .BYTE   7,0
6974  050304  047456                      .WORD   DH204
6975  050306  004  000                    .BYTE   4,0
6976
6977  050310  000005                 DF13:  .WORD   5          ;FORMAT FOR 2ND LEVEL ERROR
6978  050312  000  000                    .BYTE   0,0          ;IN HEADER COMPARE ERROR
6979  050314  046573                      .WORD   DH101        ;AND 2ND LEVEL HEADER
6980  050316  010  000                    .BYTE   10,0         ;VRC ERROR
6981  050320  047072                      .WORD   DH601
6982  050322  000  000                    .BYTE   0,0
6983  050324  047360                      .WORD   DH606
6984  050326  003  000                    .BYTE   3,0
6985  050330  047514                      .WORD   DH502
6986  050332  000  000                    .BYTE   0,0
6987
6988  050334  000005                 DF14:  .WORD   5          ;FORMAT FOR 2ND LEVEL ERROR
6989  050336  000  000                    .BYTE   0,0          ;IN OPERATION INCOMPLETE ERROR
6990  050340  046573                      .WORD   DH101
6991  050342  010  000                    .BYTE   10,0
6992  050344  047161                      .WORD   DH603
6993  050346  000  000                    .BYTE   0,0
6994  050350  047360                      .WORD   DH606
6995  050352  003  000                    .BYTE   3,0
6996  050354  047514                      .WORD   DH502
6997  050356  000  000                    .BYTE   0,0
6998
6999  050360  000010                 DF15:  .WORD   10
7000  050362  000  000                    .BYTE   0,0
7001  050364  046573                      .WORD   DH101
7002  050366  010  000                    .BYTE   10,0
7003  050370  046440                      .WORD   DH200
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7004  050372  000      000                    .BYTE   0,0
7005  050374  046673                          .WORD   DH201
7006  050376  007      000                    .BYTE   7,0
7007  050400  046761                          .WORD   DH202
7008  050402  002      000                    .BYTE   2,0
7009  050404  047564                          .WORD   DH503
7010  050406  000      000                    .BYTE   0,0
7011  050410  046516                          .WORD   DH501
7012  050412  000      000                    .BYTE   0,0
7013  050414  046776                          .WORD   DH203
7014  050416  010      000                    .BYTE   10,0
7015
7016  050420  000010                 DF16:    .WORD   10
7017  050422  000      000                    .BYTE   0,0
7018  050424  046573                          .WORD   DH101
7019  050426  010      000                    .BYTE   10,0
7020  050430  046440                          .WORD   DH200
7021  050432  000      000                    .BYTE   0,0
7022  050434  046673                          .WORD   DH201
7023  050436  007      000                    .BYTE   7,0
7024  050440  046761                          .WORD   DH202
7025  050442  002      000                    .BYTE   2,0
7026  050444  047514                          .WORD   DH502
7027  050446  000      000                    .BYTE   0,0
7028  050450  046516                          .WORD   DH501
7029  050452  000      000                    .BYTE   0,0
7030  050454  046776                          .WORD   DH203
7031  050456  010      000                    .BYTE   10,0
7032
7033  050460  000004                 DF17:    .WORD   4
7034  050462  000      000                    .BYTE   0,0
7035  050464  047360                          .WORD   DH606
7036  050466  003      000                    .BYTE   3,0
7037  050470  047437                          .WORD   DH607
7038  050472  000      000                    .BYTE   0,0
7039  050474  047360                          .WORD   DH606
7040  050476  003      000                    .BYTE   3,0
7041
7042  050500  000002                 DF21:    .WORD   2
7043  050502  000      000                    .BYTE   0,0
7044  050504  047323                          .WORD   DH6051
7045  050506  003      000                    .BYTE   3,0
7046
7047  050510  000001                 DF23:    .WORD   1
7048  050512  001      000                    .BYTE   1,0
7049
7050  050514  000001                 DF24:    .WORD   1
7051  050516  002      000                    .BYTE   2,0
7052
7053  050520  000001                 DF25:    .WORD   1
7054  050522  003      000                    .BYTE   3,0
7055
7056  050524  000002                 DF26:    .WORD   2
7057  050526  000      000                    .BYTE   0,0
7058  050530  047241                          .WORD   DH6041
7059  050532  003      000                    .BYTE   3,0
```

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  7060          000001                  .END
```

```
ABORT = 000200          1839#  4061  4066  4141  4165  4251  4261  4266  4271  4275  4283  4289  4302
                        4332
ACLO  = 000010          1429#  4103
ALLTRM  030206          4142   4273  4280#
ALMPAC  015006          2449#  3019
ANYDER= 100000          1844#  2992  3297  3321  3345  3562  3628  3643  3725  3751  3840  4322  4570
A.ABNL  002600          1710#  2938# 4037# 4281# 4295# 4297# 4402  4403# 4427# 4487# 5368
A.CONT  002602          1711#  5378
A.NORM  002576          1709#  2939# 4038# 4282# 4488# 5372
BADENT  013734          2349#  2794  2806
BADSEC= 001000          1841#  3226  3234  3353  4228  4325
BA0632  014452          2410#  2997
BAI   = 000020          1388#  5537
BA16  = 000400          1364#
BA17  = 001000          1365#
BDSRCK  021720          3216#  3352  4227
BDSTWT  031662          3076   4553#
BGNRTY  030366          4292   4301  4320#
BIT0  = 000001           761#  1361  1378  1404  1426  1574  1718  1791  3312  3552  3678  3941  5652
BIT00 = 000001           751#   761
BIT01 = 000002           750#   760
BIT02 = 000004           749#   759
BIT03 = 000010           748#   758
BIT04 = 000020           747#   757
BIT05 = 000040           746#   756
BIT06 = 000100           745#   755
BIT07 = 000200           744#   754
BIT08 = 000400           743#   753
BIT09 = 001000           742#   752  5962
BIT1  = 000002           760#  1379  1406  1575  1719  1792  1833  3945
BIT10 = 002000           741#  1366  1395  1417  1452  1466  1479  1494  1508  1587  1728  1842  3971
                        5946
BIT11 = 004000           740#  1367  1396  1418  1437  1453  1467  1480  1495  1509  1588  1843
BIT12 = 010000           739#  1369  1397  1419  1454  1468  1481  1482  1496  1510  1589
BIT13 = 020000           738#  1370  1398  1420  1438  1455  1469  1483  1497  1511  1590  5953
BIT14 = 040000           737#  1371  1399  1421  1439  1456  1470  1484  1498  1512  1591  1729  3161
BIT15 = 100000           736#  1372  1373  1400  1422  1440  1457  1517  1592  1730  1844  3143  3974
BIT2  = 000004           759#  1380  1407  1408  1428  1576  1720  1793  1834  3949
BIT3  = 000010           758#  1386  1387  1409  1429  1577  1721  1794  1835  3953
BIT4  = 000020           757#  1381  1388  1410  1430  1431  1446  1488  1502  1578  1722  1795  1836
                        3957
BIT5  = 000040           756#  1389  1390  1411  1432  1447  1461  1474  1489  1503  1579  1723  1796
                        1837   3961  5449
BIT6  = 000100           755#  1362  1391  1412  1433  1448  1462  1475  1490  1504  1580  1725  1838
BIT7  = 000200           754#  1363  1392  1413  1434  1435  1449  1463  1476  1491  1505  1582  1839
BIT8  = 000400           753#  1364  1393  1414  1415  1436  1450  1464  1477  1492  1506  1583  1726
                        1840   3965
BIT9  = 001000           752#  1365  1394  1416  1451  1465  1478  1493  1507  1584  1727  1841  3129
                        3968
BLDEXH  031534          4182   4207  4525#
BLDHDR  021342          3117#  3268  3362  3423  3659
BPTVEC= 000014           768#
BSE   = 000200          1413#  4222  4802  4968  5204
BSERR = 000002          1833#  3324  3335  3570  3579  3732  4224  4231  4320
BSFACT  004660          1801#  2980  3011  3017  3048  3049  3053  3144  3217  4604
BSHEAD  015572          2517#  4594
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
BSREPT  032062            3079    4591#
BSSINS  022024            3242#   3361    3658
BSSOFT  003660            1800#   2752    3006    3025    3047    3159    3162    3222    3224    3243    4563    4625
BSTAIL  015642            2524#   4602
BSWERR  015425            2498#   4579
BSWTFI  015535            2512#   4585
BUFFO   005674            1803#   3120    3155*   3156*   3268    3521    3523    3525    3532    3533    3534
BUFFI   006100            1804#   3498*   3499*   3500*   3521    3523    3525    3535    3536    3537
BUFPRT  006304            1805#
B.BA16= 000001            1378#   5531
B.BA17= 000002            1379#   5531
B.CDT = 000004            1380#   2672    5185    5531
B.CFMT= 000020            1381#   2711    2986    2987    3127    3291    4445    4447    4449    4456    4559    4562    4597
                          5185    5531    5615
CCINUS  006370            1831#   3263*   3417*   4485
CCLR  = 100000            1373#   4394    5138
CDT   = 002000            1366#   4944    5494    5551    5602    5625
CERR  = 100000            1372#   4191    4216    4405    4417    4840    4899    4958    5140    5191    5506    5562    5650
CERTY   030416            3982    4327#
CFMT  = 010000            1369#   4507    4537    4944    5494    5551    5602    5625
CKPRES  017704            2835    2842#
CKSWR = 104406            5942    5961    6382#
CLEAR = 000105            1332#
CLR   = 000040            1389#
CMDTO = 000100            1580#   4084    4413    4701
COE   = 001000            1416#   4148    4802    4968    5204
COLHD   016011            2544#   4605
COMSTR  005660            1802#   3816    4340
CONCLR= 000176            1350#   5633
CONERR  026040            1711    3933#
CONREQ  014416            2405#   2965    2972
CORABL  015256            2479#   3650
CR    = 000015             676#   2557    2560    5801    5811
CRLF  = 000200             677#   5772    5811
CTINUS  006366            1800#   3264*   3418*   4486
CTO   = 004000            1367#   4111    5200
CYLLIM  013277            2296#   2656
C.INIT  035742            3826    5411#
C.RTRN  037614            5515    5543    5571    5578    5581    5588    5592    5609    5631    5636    5646    5655    5668
                          5672    5677#
C.SPEC  036634            5451    5547#
DACOMP  024572            3647    3674#
DCK   = 100000            1422#   4233    4802    4968    5204
DCKERR= 000020            1836#   3572    3645    3652    3734    3758    4235    4320
DCLO  = 000020            1431#
DDISP = 177570             683#    817    2590
DDT   = 000400            1436#
DERCNT  002650            1784#   3308*   3337*   3347    3350    3366    3402*   3548*   3585*   3619*   3630    3655    3666
                          3716*   3741*   3753    3756    3788*   3791    4175    4200    4242    4253    4555*   4576*   4577
DESL  = 000010            1386#
DF01    050010             885     891     897     903     945    1053    6870#
DF02    050034             909     927     933     939     951     957     963     969     975     981     987     993     999
                          1005    1011    1017    1071    1077    1083    1191    1197    1203    1209    1215    1221    1227
                          1233    1239    1245    1287    6882#
DF03    050064             915     921    6895#
DF05    050120            1023    6910#
```

DF06	050150	1029	6923#									
DF07	050200	1035	6937#									
DF10	050230	1041	6950#									
DF11	050250	1047	6959#									
DF12	050264	1089	1095	1101	1107	1113	1119	1125	1131	6966#		
DF13	050310	1137	1143	6977#								
DF14	050334	1143	6988#									
DF15	050360	1155	6999#									
DF16	050420	1161	7016#									
DF17	050460	1179	7033#									
DF21	050500	1257	7042#									
DF23	050510	1263	1269	1275	7047#							
DF24	050514	1281	7050#									
DF25	050520	1185	1293	7053#								
DF26	050524	1305	7056#									
DH100	046413	883	889	895	901	907	913	919	925	931	937	943	949	955
		961	967	973	979	985	991	997	1003	1009	1015	1021	1027	1033
		1039	1051	1069	1075	1081	1087	1093	1099	1105	1111	1117	1123	1129
		1135	1141	1147	1153	1159	1189	1195	1201	1207	1213	1219	1225	1231
		1237	1243	1285	6728#									
DH101	046573	6748#	6873	6884	6897	6912	6925	6939	6952	6968	6979	6990	7001	7018
DH200	046440	6732#	6875	6886	6899	6970	7003	7020						
DH201	046673	6759#	6977	6888	6901	6972	7005	7022						
DH202	046761	6769#	6890	6905	7007	7024								
DH203	046776	6772#	6892	6907	7013	7030								
DH204	047456	6828#	6974											
DH500	046460	6735#	6879											
DH501	046516	6740#	6903	7011	7028									
DH502	047514	6833#	6985	6996	7026									
DH503	047564	6840#	7009											
DH601	047072	1177	6782#	6927	6981									
DH602	047114	6785#	6918	6932										
DH603	047161	6792#	6914	6992										
DH604	047207	1045	1303	6796#	6941	6954								
DH6041	047241	6801#	6945	6956	6961	7058								
DH6042	047270	1279	6805#											
DH605	047306	1255	6808#	6945										
DH6051	047323	6811#	6947	7044										
DH606	047360	6816#	6916	6920	6929	6934	6983	6994	7035	7039				
DH607	047437	6825#	7037											
DH701	047406	6820#	6963											
DH800	047641	1261	1267	1273	6848#									
DH900	047664	1291	6853#											
DI =	040000	1371#	4988	5660										
DISPLA	001142	817#	2590#	2598#	5945#									
DISPRE	000174	783#	2598											
DLT =	100000	1400#	4168	4796	4926	4962	5202							
DMD =	000040	1447#												
DOL1	030452	4328	4334#											
DOL2	030526	4323	4326	4349#										
DOL3	030406	4321	4324#											
DONE	002652	1786#	3813#	3829	3839#	3934#	4031#	4351#	4354#					
DONEPR	016630	2660#	2904											
DRA =	000001	1426#	4791	5574										
DRDY =	000200	1435#	4287											
DRINIT	020154	788	2766	2836	2857	2935#	2937	2968	2975	3084				

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DRINUS  006340          1819#   2680    2943    2953    4404    6857
DROT   = 000040          1432#   4158
DRPAR  = 000010          1409#   4098
DRPDRV= 002000           1587#   5436
DRVCAL  025442           2952    2955    2957    2959    2979    2991    3296    3320    3344    3456    3561    3627    3642
                         3724    3750    3813#   4296    4348    4455    4473    4476    4569
DRVDSC= 000040           1579#   4263    4876    5042    5104
DRVHRD= 000020           1578#   4258    4883    5078    5209
DRVMSK= 000007           1385#   4785    4826    4977    5422
DRVPDT= 000004           1576#   4984    5052
DRVPOS= 000002           1575#   4984    5011    5473
DRVQ    013145           2279#   2644
DRVSZD= 010000           1589#   4814    5576
DRVUSE= 000001           1574#   5436
DRV    = 000200          1434#
DR CLR= 000005           1357#   4864    5027    5069    5093    5207
DR.SEL= 000001           1356#   4934    5013    5328    5335    5342    5349    5553
DSC    = 040000          1439#
DSPTCH  021114           3061    3065#
DSWR   = 177570           682#    816    2589
DTBAII= 100000           1592#   3319    3343    3559    3626    3722    3749    5436    5535
DTE    = 010000          1419#   4163    5204
DTYE   = 000040          1411#   4126    5204
DT100   047712            884     890     896     902     908     914     920     926     932     938     944     950     956
                          962     968     974     980     986     992     998    1004    1010    1016    1022    1028    1034
                         1040    1052    1070    1076    1082    1088    1094    1100    1106    1112    1118    1124    1130
                         1136    1142    1148    1154    1160    1190    1196    1202    1208    1214    1220    1226    1232
                         1238    1244    1286    6857#
DT201   047732          6860#
DT202   047750          6863#
DT203   047754          6864#
DT601   047774          1046    1178    1256    1262    1268    1274    1280    1304    6867#
DT602   050002          1184    1292    6868#
ECCNC  = 000040          1837#   3648    3763    4238
ECCW   = 020000          1455#
ECH    = 000100          1412#   4236    4802    4968    5204
ECINUS  006360          1827#   2665    2678    2781    2911    3104
EMTVEC= 000030            771#   2577*   2578*
EM1     042672            882    6388#
EM10    043163            924    6421#
EM100   045737           1272    6675#
EM101   045766           1278    6679#
EM102   046050           1284    6688#
EM103   046126           1290    6696#
EM104   046172           1296    6702#
EM105   046257           1302    6711#
EM11    043176            930    6423#
EM12    043215            936    6426#
EM13    043250            942    6431#
EM14    043276            948    6435#
EM15    043336            954    6441#
EM16    043363            960    6445#
EM17    043404            966    6448#
EM2     042722            888    6392#
EM20    043431            972    6452#
EM21    043460            978    6456#
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EM22	043512	984	6461#										
EM23	043546	990	6466#										
EM24	043611	996	6472#										
EM25	043635	1002	6476#										
EM26	043664	1008	6480#										
EM27	043710	1014	6484#										
EM3	042760	894	6397#										
EM30	043745	1020	1140	6489#									
EM31	044004	1026	1146	6495#									
EM32	044031	1032	6499#										
EM33	044056	1038	6503#										
EM34	044104	1044	6507#										
EM35	044130	1050	6511#										
EM36	044170	1056	6517#										
EM37	044227	1062	6523#										
EM4	043015	900	6402#										
EM40	044276	1068	6530#										
EM41	044352	1074	6538#										
EM42	044420	1080	6545#										
EM43	044460	1086	6551#										
EM5	043042	906	6406#										
EM52	044527	1128	6558#										
EM53	044561	1134	6563#										
EM56	044612	1152	1158	6568#									
EM6	043070	912	6410#										
EM60	044640	1164	6572#										
EM61	044706	1170	6579#										
EM62	044760	1176	6586#										
EM63	045006	1092	1188	6590#									
EM64	045057	1098	1194	6597#									
EM65	045136	1104	1200	6605#									
EM66	045170	1110	1206	6610#									
EM67	045227	1116	1212	6616#									
EM7	043123	918	6415#										
EM70	045276	1122	1218	6623#									
EM71	045360	1224	6632#										
EM72	045424	1230	6638#										
EM73	045477	1236	6646#										
EM74	045537	1242	6652#										
EM75	045563	1248	6656#										
EM76	045617	1254	6661#										
EM77	045722	1260	1266	6671#									
ERRCNT	002654	1788#	2940#	3842#	3844	3847	3849#	3935#	4032#	4327	4330	4483#	
ERRCOM	006372	1832#	3990#	3991#	4365#	4366#	6857						
ERRFRE	025524	1709	2939	3839#	4282	4488							
ERRHDL	026462	1710	2938	4030#	4281	4297	4487						
ERRLMT	002655	1789#	4327										
ERRVEC=	000004	764#	2587	2588#	2599#	6279	6280	6284#	6285#	6292#	6293#		
ER2ENT	026502	4034#	4196	4221	4304								
ETINUS	006354	1825#	2667	2676	2813	2909	3100						
E.CCLR=	000001	1718#	5143										
E.CERR=	001000	1727#	5217										
E.CLAT=	000020	1722#	4869	5033	5074	5098							
E.CMTO=	040000	1729#											
E.CONT	002604	1712#	3941	3945	3949	3953	3957	3961	3965	3968	3971	3974	3981#	4768#
		4806#	4869#	4879#	4950#	4972#	4995#	5001#	5033#	5074#	5098#	5143#	5195#	5217#

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                    5356*   5590*   5644*   5652*   5665*
E DLT = 000400      1726*   4950
E DPAR= 002000      1728*   4879    5356
E ILLD= 000100      1725*   5644
E MDS = 100000      1730*   4768    5195    5590
E.NOAT= 000002      1719*   4995
E.SCLR= 000040      1723*   5665
E UATT= 000004      1720*   5001
E UDAT= 000010      1721*   4806    4972
E UNLD= 020000      1590*   4887    5007    5082    5092
EBSLAB  015670      2528*   4603
FMTE  = 000020      1410*   4130    5204
GETANS  017766      2638    2645    2647    2649    2651    2653    2655    2657    2659    2873*
GETDRS  030710      4386    4392*
GETOUT  017110      2686    2707*
GETUBS  017314      2738    2749*
GNS   = ****** U     782    6375    6376    6377    6378    6380    6382    6383    6384    6385    6386
GO    = 000001      1361*
GTPKAD  031410      4244    4255    4497*
GTSWR = 104405      6380*
HCRC  = 000400      1414*
HDRCMP  023576      3424    3517*
HDR.AD  002622      1752*   4920    4924*   5614*
HDR.CT  002624      1753*   4928*   5617*   5620*
HELPFL  006377      1847*   2615
HELPQ   013052      2268*   2610
HLTPRG  030360      4310*   4333
HT    = 000011       674*   5770    5811
HVRC  = 000400      1415*   4197    4802    4968    5204
HVRCER= 000004      1834*   3324    3570    4199    4320
H.HEAD  002627      1756*
IDAE  = 002000      1417*   4153
IE    = 000100      1362*   2966    2973    4187    4212    5148    5212    5500    5541    5607    5674
ILC   = 000001      1404*   4114    5204
ILF   = 000004      1407*
ILLSEC  013754      2352*   2822
IMPERR  015203      2471*   3404
IMPER2  015111      2461*   3663
INITDR  006312      1808*
INITEC  006332      1816*   2641*   2643*
INITET  006326      1814*
INITMD  006316      1810*   2700
INITOF  006334      1817*   2704    2716
INITSC  006330      1815*
INITSE  006314      1809*
INITST  006324      1813*   2692
INITTP  006310      1807*   2635
INITWE  006320      1811*
INITWO  006322      1812*
INTMSK  002633      1761*   4843    4867    4888    4913    4999    5031    5072    5083    5096    5367*   5371*   5375*
                    5424*   5510
INTR  = 000300      1352*
INVDCY  014050      2363*   2689    2785
INVDDR  014125      2371*   2695
INVDMD  014173      2379*   2699
INVDOF  014234      2385*   2703
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INVCSE  014001          2356#   2687
INVDTK  014100          2367#   2691    2817
INVDTP  014151          2375#   2697
ICTVEC= 000020           769#
IR      = 000100          1391#
IVDCYL  017012          2679    2689#
IVDDRV  017036          2681    2695#
IVDMOD  017054          2683    2699#
IVDOF   017072          2685    2703#
IVDTP   017044          2664    2697#
IVDTRK  017020          2677    2691#
I.AERR  034324          5019    5025    5043    5052#
I.ATTN  033654          4779    4823    4956#
I.CCLR  034710          4857    4907    5138#   5210    5570    5635
I.CSTS  035342          4E50    5285#
I.CST1  035364          4854    4906    5289#   5559
I.DRV   002634          1765#   5424    5425
I.ERR   033076          4851    4855#
I.ERRA  033056          4850#   4918
I.ERRC  033064          4788    4841    4853#   4986
I.HDAL  033322          4834    4897#
I.INTR  032442          2603    4758#
I.ISRL  002626          1755#   4772    4775#   4778#   5149#   5446#   5600#   5673#
I.ISSU  034772          4865    4935    5014    5028    5070    5094    5180#   5329    5336    5343    5350
I.IOD   032722          4776    4793    4820#
I.RTRN  034672          4770    4808    4818    4846    4858    4863    4866    4872    4881    4890    4893    4908    4910
                        4926    4939    4948    4952    4974    4990    4997    5003    5015    5029    5036    5048    5068
                        5071    5076    5085    5089    5095    5100    5109#
I.STAT  035446          4862    5067    5326#   5580
I.STOR  035214          5190    5240#
I.UNLD  034572          5009    5092#
KIPARO= ****** U        6275
LCYL    017312          2673#   2675#   2678    2740#   2977    3093    3107    4565
LEV2ER= 000400          1840#   3978    4034    4087    4178    4184    4203    4209    4298    4352    4425
LF      = 000012           6?5#  2557    2560    5805    5811
MCLK    = 000400          1450#
MDINUS  006344          1821#   2682    2701    2719    2723    2727    2732    2960
MDS     = 001000          1394#   4766    5193    5568
MERD    = 001000          1451#
MESMSK= 000017          1444#
MEWD    = 002000          1452#
MIMD    = 000200          1449#
MODEQ   013176          2284#   2648
MSP     = 000100          1448#
M.CADD= 017760          1520#
M.CDIF= 017760          1519#
M.DRV = 000007          1516#
M.MERD= 007000          1523#
M.ID  = 000003          1518#
M.PAR = 100000          1517#
M.SECT= 000760          1522#
M.SER = 077770          1521#
NED     = 010000          1397#   4068    4078    4781    4859    5202    5572
NEM     = 004000          1396#   4063    4796    4962    5202
NEAMQ   013667          2342#   2773    282?
NOCHK = 000400          1583#   5436    5498    5539    5566    5584    5605    5628    5637    5671
```

```
NODSC = 004000          1588#   4268    5024
NONE    015774          2540#   4629    4639
NPRSVD  013475          2320#   2856
NXF   = 000004          1408#   4122
OCTBIN  037636          2779    2798    2810    2883    5702#
OFFSET= 000115          1336#   4474    5481
OFINLS  006362          1828#   2684    2705    2716    2902    4475
OFSETQ  013320          2299#   2658
OFST  = 000004          1428#
OPCOMP  002651          1785#   3097#   3259#   3278    3416#   3439
OPCONT  002656          1790#   2707#   2718#   2721#   2725#   2729#   2734#   2737#   2749    2853#   3000    3002    3023
                        3027    3066    3071    3074    3425    3429    4469
OPI   = 020000          1420#   4172    4802    4968    5204
OPIERR= 000010          1835#   3324    3570    4174    4320
OR    = 000200          1392#
OREQSW= 000020          1795#   2718    4469
O.WAIT  002606          1732#   4702    4706#   4816#   4820    4836#   4902#   4915#   4930#   5474#   5534#   5596#   5613#
PACK  = 000103          1331#   2956
PARAM3  016550          2648#   2702
PARAMS  016600          2654#   2694
PARM0   002362          1621#   1776    2947    4280    4300    4347    4458
PARM1   002446          1653#   2942    4036    4293    4442
PARM2   016502          2639#
PARM3   016522          2640    2643#
PARM4   016530          2642    2644#
PARM6   016620          2658#   2706
PAT   = 000020          1446#
PBLKT   002644          1776#   4699    4786    4812    4980    5005    5423#
PBSVAL= 001000          1584#   3936    5361
PCA   = 004000          1453#
PCD   = 010000          1454#
PGE   = 002000          1395#   4118    5202
PIP   = 020000          1438#
PIRQ  = 177772           681#
PIRQVE= 000240           775#
POSOFF  031262          3449    3550    3620    3634    3718    3742    4468#
PREPLP  031336          3275    3436    4483#
PRGRS1  015300          2482#   3069
PRGRS2  015345          2489#   3073
PROGID  012770          2259#   2609
PRSVD   013461          2317#   2854
PR0   = 000000           698#
PR1   = 000040           699#
PR2   = 000100           700#
PR3   = 000140           701#
PR4   = 000200           702#
PR5   = 000240           703#   1708
PR6   = 000300           704#
PR7   = 000340           705#   2604
PS    = 177776           678#    679    4688    4694#   4708#   5417    5418#   5677#
PSDBSF= 000040          1796#   2853    3002    3027
PSDQ    013330          2301#   2842
PSW   = 177776           679#
PWRVEC= 000024           770#   2581#   2582#   6230#   6231#   6240#   6246#   6258#   6259#
P.ASOF= 000032          1605#   4007    5030#   5031    5064#   5295#   5483#   5484
P.AOO = 000040          1608#   2962    2969    4010    5021#   5022    5038#   5039    5352#   5560#
```

```
P.A01 = 000044   1610#  4012   5331*
P.A10 = 000050   1612#  4014   5338*
P.A11 = 000054   1614#  4016   5345*
P.BAHI= 000007   1567#
P.BALO= 000010   1568#  2980*  3006*  3288*  3311*  3314*  3450*  3551*  3554*  3641*  3748*  3999   4373
                 4563*  5517   5614
P.BAR = 000024   1602#  4006   5061*  5291*
P.B00 = 000042   1609#  4011   5016*  5017   5353*  5561*
P.B01 = 000046   1611#  4013   5332*
P.B10 = 000052   1613#  4015   4436   5339*
P.B11 = 000056   1615#  4017   4937*  5346*
P.CMND= 000001   1561#  2951*  2954*  2956*  2958*  2976*  2983*  3287*  3317*  3338*  3455*  3560*  3621*
                 3635*  3723*  3743*  3991   4294*  4366   4450*  4471*  4474*  4564*  4832   5449   5453
                 5465   5475   5481   5487   5490   5496   5521   5528   5547   5594   5611   5633   5642
P.CS1 = 000016   1599#  4000   4093   4111   4507   4537   4853*  4905*  4943*  4944*  4946*  4947   5056*
                 5058*  5285*  5288*  5439   5493*  5494*  5496*  5500*  5501   5525*  5528*  5530*  5531*
                 5541*  5542   5550*  5551*  5553*  5554   5556*  5557   5562   5601*  5602*  5604*  5607*
                 5608   5624*  5625*  5627*  5630   5649*  5650   5659*  5660
P.CS1H= 000007   1566#  2944*  2945*  2949*  2950*  2986*  3022*  4447*  4449*  4456*  4457*  4562*  4943
                 5184   5493   5530   5550   5601   5615   5624
P.CS2 = 000020   1600#  4001   4058   4063   4068   4070   4076   4078   4118   4168   4249   4859   5059*
                 5289*  5447*  5472   5537*  5538   5549   5568   5572   5598*  5599   5623
P.CYLN= 000002   1562#  2977*  3289*  3315*  3340*  3452*  3556*  3622*  3637*  3719*  3744*  3993   4367
                 4444*  4472*  4565*  4941   5477   5519   5621
P.DCYL= 000030   1604#  4002   4497   4526   5063*  5297*
P.DRVN= 000000   1560#  2943*  2953*  4829   5006   5182   5421
P.DS  = 000036   1607#  4008   4103   4107   4158   5066*  5293*  5574
P.DTS = 000026   1603#  3327   3333   3566   3729   4003   4225   4435   4500   4501   4527   4533   5062*
                 5292*
P.EPAT= 000062   1617#  3761   4246   4855*  5441
P.EPOS= 000060   1616#  3760   4245   4856*
P.ER  = 000034   1606#  4009   4057   5065*  5294*
P.OFST= 000006   1565#  4475*  5483
P.PRST= 000014   1570#  2948*  3286*  3318*  3319*  3343*  3451*  3558*  3559*  3626*  3640*  3721*  3722*
                 3749*  3936   4084   4258   4263   4268   4272   4413   4558*  4701*  4814*  4848*  4876*
                 4883   4887*  4984*  5007   5011*  5024*  5042*  5052*  5078   5082*  5092*  5104*  5209*
                 5361*  5436*  5473*  5497*  5498   5523   5529*  5535   5539   5566   5576*  5584   5605
                 5628   5637   5671
P.SECT= 000004   1563#  2990*  3310*  3342*  3371*  3389   3549*  3586*  3605   3624*  3639*  3715*  3746*
                 3770*  3778   3996   4370   4443*  4567*  4942   5478   5520   5622
P.TRCK= 000005   1564#  2978*  3295*  3316*  3341*  3453*  3557*  3623*  3638*  3720*  3745*  3994   4368
                 4566*
P.WC  = 000012   1569#  2984*  2985*  3290*  3293*  3294*  3309*  3339*  3401*  3547*  3617*  3625*  3636*
                 3717*  3747*  3787*  3998   4372   4568*  5518
P.WCR = 000022   1601#  3330   3565   3728   4004   5060*  5290*
QNEWSW= 000000   1320   4476
QUES    006374   1846#  2829   2906
Q.INIT= 040000   1591#
RCDASW= 000010   1794#  2721   3071   3425
RCLREQ= 004000   1843#  4096   4101   4146   4151   4156   4161   4291
RDALHD= 000164   1349#  3455   4832   5611
RDBUF   002660   1799#  2756   2771   3037   3083*  3450   3463   3465   3474   3475   3476   3477   3479
                 3488   3498   3499   3500   3641   3681
RDCHR = 104407   6171   6383#
RDDATA= 000121   1338#  2983   3635   3723   3743
RDGATE= 100000   1457#
```

```
RDHDRS  023240          3422    3447*
RDHDO   031122          4183    4208    4433*
RDHEAD= 000125          1340*   4450    4946    5627
RDLIN = 104410          2611    2762    2774    2843    2874    6384*
RDOP    024740          3427    3713*
RDSTAT= 000141          1348*   2958    5547
RDY   = 000200          1363*   4410    5504    5557
RECAL = 000113          1335*   2954    4294    5490
RECODE  006364          1829*   2941*   2992    3226*   3234*   3297    3321    3324    3335    3345    3353    3562    3570
                        3572    3579    3628    3632    3643    3645    3648    3652    3725    3732    3734    3751    3758
                        3763    3840    3850*   3978    4033*   4034    4061*   4066*   4087    4096*   4101*   4141*   4146*
                        4151*   4156*   4161*   4166*   4174*   4178    4184    4199*   4203    4209    4224*   4228    4231*
                        4235*   4238*   4251*   4252*   4261*   4266*   4271*   4275*   4283    4289*   4291    4298    4302*
                        4320    4322*   4325    4332*   4352*   4425*   4484*   4570
RELEAS= 000140          1347*   5594
REPSUP  026302          3938    3988*   4039
RESREG= 104412          3142    3227    3254    3301    3407    3512    3540    3669    3693    3794    3920    4018    4349
                        4387    4428    4459    4477    4545    4586    4640    5837    6386*
RESVEC= 000010           765*
RETANL  030532          4037    4295    4351*   4403
RETNML  030550          4038    4354*
RKASOF= 000016          1316*   4380    4842    4912    4992    5247    5295    5484*   5509
RKBA  = 000004          1311*   4379    5243    5291    5517*
RKBAS   002570          1706*   2946    4186    4211    4286    4334    4363    4695    4764    5428
RKCS1 = 000000          1309*   2966*   2973*   4187*   4191    4212*   4216    4374    4394*   4405    4408*   4409    4416
                        4787    4839    4897    4947*   4956    5138*   5139    5148*   5187*   5188    5212*   5240    5501*
                        5503    5542*   5554*   5556    5586*   5608*   5630*   5639*   5649    5659    5674*
RKCS2 = 000010          1313*   4335*   4375    4404*   4426*   4765    4925    5183*   5241    5289    5472*   5538*   5549*
                        5599*   5623*   5648*
RKDA  = 000006          1312*   4377    4942*   5244    5292    5478*   5520*   5622*
RKDB  = 000024          1319*   4188    4189    4190    4213    4214    4215    4921    4922    4923
RKDC  = 000020          1317*   4376
RKDCYL= 000020          1318*   4941*   5248    5297    5477*   5519*   5621*
RKDS  = 000012          1314*   4287    4381    4790    5245    5293
RKECPS= 000030          1324*   4856    5252
RKECPT= 000032          1326*   4855    5253
RKER  = 000014          1315*   4382    4799    4965    5246    5294
RKMR1 = 000026          1320*   4407*   4933*   5012*   5249    5326*   5333*   5340*   5347*   5448*
RKMR2 = 000034          1321*   4419    5250    5560
RKMR3 = 000036          1322*   4420    5251    5561
RKPAT = 000032          1325*
RKPOS = 000030          1323*
RKPRI   002574          1708*   4694    5418
RKVEC   002572          1707*   2602
RKWC  = 000002          1310*   4378    5242    5290    5518*
RLS   = 000010          1387*   5598
RSTADD  017004          2666    2668    2687*
RWLREQ  014336          2397*   2971
R.ABNL  035674          4707    4817    4892    4909    5087    5107    5367*   5577
R.CONT  035720          4769    4807    4871    4880    4951    4973    4996    5002    5035    5075    5099    5144    5196
                        5219    5357    5375*   5591    5645    5654    5667
R.NORM  035706          4845    4938    5047    5371*   5514    5587    5675
SAVREG= 104411          3118    3216    3242    3285    3307    3448    3518    3546    3675    3714    3862    3933    3989
                        4030    4362    4392    4434    4468    4525    4554    4592    5822    6385*
SBSLAB  015731          2534*   4630
SCINUS  006356          1826*   2665    2783    2888    3261    3414
```

```
SCLR   = 000040          1390#   4335    4426    5648
SDBSFP   013415          2310#   2845
SECINE   015513          2508#   4580
SECTO    013160          2281#   2646
SEEK   = 000117          1337#   2976    4471    5465    5475
SEINUS   006342          1820#   2708    2710*   2820    3369    3384    3459    3490    3492    3520    3577    3582    3600
                         3738    3768
SELDRV= 000101           1330#   5604
SERNUM   014746          2443#   3010
SETRS    017024          2688    2690    2692#
SKI    = 000002          1406#   4143
SPACE2   012765          2257#   3898    3907    3918    4610    4614
SPACE3   016053          2550#
SPACE4   016046          2549#   4606
SPAR   = 020000          1370#   4093    5200
SPDLSS= 000020           1430#   4107
SRHTBS   021556          3145    3177#   3218
SRTSPL= 000111           1334#   5487
STACK  = 001100           669#   2575    2936    3080    4489    4492
STARS    015413          2496#   3016
START    016202           786    2568#   3021    3035    3046    3060    3359    3406    3487    4311    6012    6095
STINUS   006352          1824#   2667    2693    2815    2886    3102    3262    34.5
STKLMT= 177774            680#
STPARM   016444          2614    2629#   2696    2698    2899    3085
SUBCLR= 000177           1351#   2951    5642
SVAL   = 100000          1440#
SWLREQ   014260          2389#   2964
SWR      001140           816#   2573    2589*   2591    2597*   3077    3081    3091    3265    3271    3419    3432    3704
                         3863    5946    5953    5958    5962    6015    6054    6109#   6238    6251#
SWREG    000176           784#   2597    6015    6054    6077
SWO    = 000001           733#   3081
SW00   = 000001           723#    733
SW01   = 000002           722#    732
SW02   = 000004           721#    731
SW03   = 000010           720#    730
SW04   = 000020           719#    729
SW05   = 000040           718#    728
SW06   = 000100           717#    727
SW07   = 000200           716#    726
SW08   = 000400           715#    725
SW09   = 001000           714#    724
SW1    = 000002           732#   3704
SW10   = 002000           713#
SW11   = 004000           712#
SW12   = 010000           711#
SW13   = 020000           710#   3863
SW14   = 040000           709#   3091
SW15   = 100000           708#
SW2    = 000004           731#
SW3    = 000010           730#
SW4    = 000020           729#
SW5    = 000040           728#
SW6    = 000100           727#
SW7    = 000200           726#   3077
SW8    = 000400           725#
SW9    = 001000           724#   3265    3271    3419    3432
```

```
S.ACLO= 000100          1475#
S.BRHM= 000100          1490#
S.BRKE= 040000          1512#
S.CART= 000400          1492#
S.DCLO= 010000          1482#
S.DIB = 002000          1508#
S.DOOR= 000200          1491#
S.DRA = 000040          1461#
S.DROT= 020000          1483#
S.DRY = 000200          1463#
S.DSC = 040000          1470#   4874    5022    5039    5102
S.FLT = 000200          1476#   5017
S.FORM= 001000          1465#
S.FWD = 002000          1494#
S.HDFL= 000200          1505#
S.HDHM= 000040          1489#
S.ICYL= 000040          1474#
S.ILF = 000400          1477#
S.LIMO= 020000          1511#
S.LOAD= 010000          1496#
S.MHD = 000400          1506#
S.NMOV= 010000          1510#
S.OFF = 002000          1466#
S.PAR = 001000          1478#   4877    5334
S.PIP = 020000          1469#   4885    5080
S.PLO = 004000          1509#
S.REV = 004000          1495#
S.RTZ = 020000          1497#
S.SECT= 000020          1502#
S.SKI = 002000          1479#
S.SPIN= 010000          1468#
S.SPLS= 010000          1481#
S.SPOK= 001000          1493#
S.TYPE= 000400          1464#
S.UNLD= 040000          1498#
S.UNS = 040000          1484#
S.VV  = 000100          1462#
S.WCLK= 000040          1503#
S.WGAT= 000100          1504#
S.WLE = 004000          1480#
S.WRL = 004000          1467#   2962    2969
S.XDOK= 000020          1488#
S.XERR= 001000          1507#
TBITVE= 000014           766#
TDMFAC  014662          2434#   3058
TDMSOF  014511          2416#   3033    3044
TDMSUF  014576          2425#   3034    3045    3059
TKVEC = 000060           773#   5992*   5993*
TKWDCT  006306          1806#   2712*   2714*   2715*   3309    3547    3717
TOPROC  030560          3940    4086    4361#
TOTMES  016057          2551#   4637
TPINUS  006336          1818#   2636    2639    2660    2662    2670
TPQ     013122          2275#   2637
TPVEC = 000064           774#
TRAPVE= 000034           772#   2579*   2580*
TRKINC  021240          3091#   3277    3438
```

```
TRKLIM  013261          2293#   2654
TRTVEC= 000014           767#
TWENTY  016003          2542#   4599
TWENT2  016006          2543#   4596
TWOTOS= 002000          1842#
TYPE   = 104401         2609    2610    2615    2632    2637    2644    2646    2648    2650    2652    2654    2656    2658
                        2687    2689    2691    2695    2697    2699    2703    2761    2772    2773    2785    2794    2806
                        2817    2822    2827    2829    2830    2831    2842    2845    2854    2856    2906    2907    2908
                        2964    2965    2971    2972    2997    3010    3014    3016    3019    3033    3034    3044    3045
                        3058    3059    3069    3073    3404    3650    3663    3874    3875    3879    3880    3889    3898
                        3902    3907    3909    3915    3918    4579    4580    4583    4585    4594    4600    4602    4603
                        4605    4606    4610    4614    4617    4628    4629    4630    4632    4637    4639    5775    5910
                        5948    5956    6009    6021    6075    6076    6079    6090    6100    6111    6130    6178    6184
                        6189    6193    6198    6199    6201    6204    6208    6260    6375#
TYPERR  025604          3862#   5955
TYPFMT  002653          1787#   2669*   2672*   2711*   2945    2950    2987    3022    3127    3291    4445    4457    4559
                        4597
TYPOC  = 104402         3895    4582    4609    4613    4616    4636    6078    6376#
TYPON  = 104404         6378#
TYPOS  = 104403         6377#
T.ASOF  002546          1693#   4842*   4843    4867    4912*   4913    4992*   4993    4999    5030    5064    5072    5096
                        5247*   5509*   5510
T.BA    002540          1690#   5061    5243*
T.CS1   002532          1685#   4787*   4839*   4840    4853    4864*   4897*   4899    4905    4934*   4956*   4958    4988
                        5013*   5027*   5057*   5058    5069*   5093*   5139*   5140    5180    5184*   5185*   5187    5191
                        5200    5240*   5287*   5288    5328*   5335*   5342*   5349*   5503*   5504    5506
T.CS2   002534          1687#   4765*   4766    4781    4784    4796    4825    4925*   4926    4962    4976    5059    5181*
                        5182*   5183    5193    5202    5241*
T.DA    002542          1691#   5062    5244*
T.DB    002566          1702#
T.DC    002544          1692#   5063    5248*
T.DS    002552          1696#   4790*   4791    5066    5245*
T.ER    002550          1695#   4799*   4802    4965*   4968    5065    5204    5246*
T.MR1   002554          1697#   5249*
T.MR2   002556          1698#   4874    4885    5021    5038    5080    5102    5250*   5331    5338    5345    5352
T.MR3   002560          1699#   4877    4937    5016    5251*   5332    5339    5346    5353    5354
T.PAT   002564          1701#   5253*
T.POS   002562          1700#   5252*
T.WCR   002536          1689#   5060    5242*
UBSFMT  013575          2332#   2772
UBSQ    013515          2323#   2761
UEXATT= 000010          1577#   4272    4848
UFE    = 000400         1393#   4070    4076    4781    4859    5202    5572
UNLOAD= 000107          1333#   5453
UNS    = 040000         1421#   4138
UPE    = 020000         1398#   4058    4796    4962    5202
VERLUP  023106          3417#   3437    3440
VEROP   023064          3086    3412#
VERROR  023200          3413    3428    3430    3432#
VFHDSW= 000002          1792#   2721    2725    2729    2734    3071
VV     = 000100         1433#
WCDASW= 000004          1793#   2729    3071    3429
WCE    = 040000         1399#   4249    4796    4962    5202
WCERR  = 000100         1838#   3632    4252    4320
WCOP    023714          3431    3545#
WDCQ    013204          2285#   2650
```

F12


```
WOOD    013233          2289#   2652
WEINUS  006346          1822#   3311    3551    3677
WERROR  022146          3260    3271#
WHDSW = 000001          1791#   2729    2734    2737    2749    3000    3023    3066    3074
WLE   = 004000          1418#   4134    4802    4968
WOINUS  006350          1823#   3314    3554    3680
WRDATA= 000123          1339#   3317    3338    4564    5525
WRHEAD= 000127          1341#   3287
WRL   = 004000          1437#
WRTCHK= 000131          1342#   3560    3621    5521
WRTGAT= 040000          1456#
WRTHDR  022206          3269    3284#   3363    3660
WRTLUP  022106          3263#   3276    3279
WRTOP   022064          3068    3259#
WRTTRK  022312          3270    3306#   3661
W.DRV   002646          1782#   4696*   4811*   4837*   4889*   4904*   4917*   4931*   4979*   5046*   5055*   5084*   5106*
                        5377*   5426*   5489*   5492*   5513*   5565*   5583*
W.MILI  002612          1735#   4691    5657
W.MIN   002620          1751#   5489
W.MTIM  002610          1734#   4689*   4691*
W.SEC   002614          1748#   5426
W.TIME  002632          1757#   4401*   4692    4698*   4810*   4838*   4888*   4903*   4916*   4932*   4978*   5045*   5054*
                        5083*   5105*   5376*   5425*   5512*   5564*   5582*
W.WCK = 000200          1582#   5436    5497    5523    5529
W.WTCH  032312          3828    4412    4684*   5502    5508    5555
W.8SEC  002616          1750#   4889    5084    5492
XXDPMG  016120          2557#   2632
$AUTO8  001134           8'3#   6068    6225
$BDADR  001122           808#
$BDDAT  001126           810#
$BELL   0012'3           860#   5948    5970    6021    6218
$CHARC  040206          5777*   5787*   5794    5803*   5808#
$CKSWR  041216          6054#   6382
$CMTAG  001100           796#   2570    2571    2583
$CM1  = 000026           828#    829#    830#    831#    832#    833#    834#    835#    836#    837#    838#    839#    840#
                         841#    842#    843#    844#    845#    846#    847#    848#    849#    850#
$CM2  = 000054           828#    829#    830#    831#    832#    833#    834#    835#    836#    837#    838#    839#    840#
                         841#    842#    843#    844#    845#    846#    847#    848#    849#    850#
$CM3  = 000026           826#    828
$CM4  = 000011           850#    851#    852#    853#    854#    855#    856#    857#    858#    859#
$CNTLC  042176          6009    6090    6218#
$CNTLG  042210          6075    6220#
$CNTLU  042203          6100    6193    6219#
$CRLF   001267           862#   2831    2908    3874    3879    3889    3902    3915    4583    4617    4628    4632    5776
                        5811    5956    5970    6111    6198    6218
$DB20   040212          3012    5822#
$ERFLG  001103           799#   3267*   3273    3421*   3434    5943*   5970
$ERMAX  001115           805#   2584*
$ERROR  040560          2577    5941#
$ERRPC  001116           806#   5950*   5951*   5952    5970    6857
$ERRTB  001272           879#   3871
$ERTTL  001112           803#   5949*   5970
$ESCAP  001260           859#   2583*   5965    5967    5970
$FILLC  001156           824#   5780    581'
$FILLS  001155           823#   5811
$GDADR  001120           807#
```

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$GDDAT  001124            809#
$GTSWR  041306           6076#   6380
$HD   = 000001            653     654
$HIOCT  037770           5727*   5740#
$ICNT   001104            800#
$ILLUP  042400           6230    6246    6263#
$INTAG  001135            814#   6073*   6092    6112    6225
$ITEMB  001114            804#   3865    5952*   5970
$LF     001270            863#   5811    5970    6208    6218
$LPADR  001106            801#
$LPERR  001110            802#   2937*   3260*   3413*   5964
$LSTAD  042512           6294*   6298#
$MAIL = ****** U         2601    5764    5958
$MNEW   042226           6079    6223#
$MSWR   042215           6076    6221#
$NULL   001154            822#   5782    5811
$OCNT   040554           5882*   5911*   5924#
$OCTVL  040314           5924    5849#
$OMODE  040556           5877*   5881*   5886    5889*   5900*   5926#
$PASS   001100            797#
$POWER  042406           6261    6266#
$PWRDN  042240           2581    6230#   6258
$PWRMG  042374           6261#
$PWRUP  042312           6240    6246#
$QUES   001266            861#   5811    5970    6130    6201    6218
$RDCHR  041560           6143#   6383
$RDDEC= ****** U         6385
$RDLIN  041650           6166#   6384
$RDOCT= ****** U         6385
$RDSZ = 000072           6159#
$REGAD  001160            826#
$REG0   001162            828#   3992    4364    6857
$REG1   001164            829#   6857
$REG10  001202            836#   3394*   3484*   3610*   3697*   3783*   4188*   4213*   4245*   6860    6868
$REG11  001204            837#   3392*   3485*   3608*   3698*   3781*   4189*   4214*   4246*   6860    6868
$REG12  001206            838#   3393*   3609*   3699*   3782*   4190*   4215*   4239*   4241*   6860    6868
$REG13  001210            839#   6860
$REG14  001212            840#   6863
$REG15  001214            841#   6863
$REG16  001216            842#   6864
$REG17  001220            843#   6864
$REG2   001166            830#   6857
$REG20  001222            844#   6864
$REG21  001224            845#   6864
$REG22  001226            846#   6864
$REG23  001230            847#   6864
$REG24  001232            848#   6864
$REG25  001234            849#   6864
$REG3   001170            831#   6857
$REG4   001172            832#   6857
$REG5   001174            833#   3349*   3350*   3355*   3365*   3366*   3531    3654*   3655*   3665*   3666*   3682*   3755*
                         3756*   3760*   3790*   3791*   3846*   3847*   4329*   4330*   4497*   4517*   4526*   4540    4543
                         6860    6867
$REG6   001176            834#   3356*   3683*   3761*   4498*   4501*   4512    4514*   4516*   4533*   4534*   4535*   4536*
                         4539*   4541    4542    6860    6867
$REG7   001200            835#   3357*   3684*   3762*   3765*   4499*   4500*   4502    4505*   4509*   4511*   4540*   4542*
```

```
                    4544*   6860    6867
$RESRE  042552      6332*   6386
$R2A    = ****** U  6387
$SAVRE  042514      6316*   6385
$SAVR6  042404      6239*   6247    6248*   6249*   6265*
$SETUP= 000116      2568*   2576    2577    2579    2581    2583    2585    5942    5961    5969    6013    6018    6019
                    6049    6225
$SIZE   042416      6277*
$STUP   = 177777    2568*
$SWR    = 163000     642*    653     658     659     660     661     662     663     859     860    2583    5933    5934
                    5935    5936    5937    5946    5953    5958    5962    5970    6262

$TKB    001146       819*   5973    5994    6005    6030    6058    6085
$TKCNT  040720      5974*   5989*   6019    6036*   6150    6152*
$TKINT  040730      2601    5989*   6010    6071
$TKQEN= 040727      5978*   6044    6155
$TKQIN  040722      5975*   5990*   5991    6042*   6043*   6044    6046*
$TKQOU  040724      5976*   5991*   6153    6154*   6155    6157*
$TKQSR  040726      5977*   5990    6046    6157
$TKS    001144       818*   3454*   3457*   5973    5995*   6026*   6028    6034*   6056    6072*   6082    6094*   6114*
$TKSRV  041000      5992    6005*
$TMP0   001236       850*   3458*   3461*   3482    3505    3508
$TMP1   001240       851*   3181*   3182*   3190    3748
$TMP10  001256       858*   3194*   3195*   3196
$TMP2   001242       852*   3177*   3205    4593*   4622    4624*
$TMP3   001244       853*   3178*   3206
$TMP4   001246       854*   3179*   3207
$TMP5   001250       855*   3143*   3155    3156    3161*
$TMP6   001252       856*   3327*   3328*   3329    3330*   3331*   3332*   3390    3393    3397*   3401
$TMP7   001254       857*   3728*   3731*   3740*   3779    3782    3786*   3787
$TN     = 000001     653*
$TPB    001152       821*   5800*   5811
$TPFLG  001157       825*   5758    5811
$TPS    001150       820*   5798    5811
$TRAP   042610      2579    6352*
$TRAP2  042632      6363*   6374
$TRP    = 000013    6367*   6376*   6377*   6378*   6379*   6380    6381*   6382    6383*   6384*   6385*   6386*   6387*
$TRPAD  042644      6357    6374*
$TSTNM  001102       798*   5945    5970
$TTYIN  042104      2830    2907    6168    6169    6181    6199    6213    6217*
$TYPBN= ****** U    6379
$TYPDS= ****** U    6379
$TYPE   037772      5758*   6367    6375
$TYPEC  040142      5779    5786    5793    5798*   5799    6116
$TYPEX  040210      5804    5806    5809*
$TYPOC  040356      5880*   6376
$TYPON  040372      5879    5882*   6378
$TYPOS  040332      5875*   6377
$.$.SM= ****** U    1734    4713    4948    5139    5150    5188    5502    5543    5555    5609    5631    5649    5676
                    5685
$OFILL  040555      5876*   5880*   5890    5925*
$40CAT= ****** U    5955
.       = 050534     778*    782*    787*    795*    864    1797*   1799*   1800*   1801*   1802*   1803*   1804*   2567*
                    2574    2999    5811    5849*   5970    5973    5977*   5978    5979*   6217*   6218    6225*   6242
                    6264
```

```
COMMEN    776#
ENDCOM    776#
ERROR     670#  3351  3358  3360  3367  3395  3486  3538  3611  3656  3657  3667  3703  3708  3757
           3766  3784  3792  3848  3943  3947  3951  3955  3959  3963  3967  3970  3973  3976  3977
           3980  4060  4065  4072  4074  4080  4082  4089  4091  4095  4100  4105  4109  4113  4116
           4120  4124  4128  4132  4136  4140  4145  4150  4155  4160  4165  4170  4180  4193  4195
           4205  4218  4220  4230  4247  4256  4260  4265  4270  4274  4303  4305  4331
ESCAPE    776#
GETPRI    642#   776#  6283
GETSWR    776#
MULT      776#
NEWTST    776#
PARMBK      1#  1618  1650
PARMDF      1#  1524
POP       776#  6251  6252  6337
PUSH      776#  6232  6238  6317
P.DRVR      1#  1682
REGDEF      1#  1306
REPORT    776#
R.DRIV      1#  4642
R.QDRV      1#
SCOPE     671#
SETPRI    642#   776#  2605  4336  4451  6146
SETTRA   6367#  6376  6377  6378  6380  6382  6383  6384  6385  6386
SETUP     776#  2568
SKIP      776#
SLASH     776#
SPACE     776#
STARS     776#   791   864  2617  2627  2742  2748  2837  2859  2871  2918  2933  3062  3064  3088
           3090  3114  3116  3166  3176  3209  3215  3239  3241  3256  3258  3281  3283  3303  3305
           3409  3411  3442  3446  3514  3516  3542  3544  3671  3673  3710  3712  3796  3812  3832
           3838  3852  3861  3922  3932  3983  4020  4028  4356  4360  4389  4430  4432  4461  4466
           4480  4481  4496  4519  4524  4547  4552  4588  4590  4651  4682  4716  4756  5119  5136
           5154  5178  5225  5238  5257  5283  5302  5324  5382  5409  5687  5700  5743  5813  5852
           5929  5972  6049  6064  6135  6159  6228  6244  6271  6301  6346
SWRSU     776#  2585#
S.DRVE      1#  1458
TRMTRP   6367#
TYPBIN    776#
TYPDEC    776#
TYPNAM    776#
TYPNUM    776#
TYPOCS    776#
TYPOCT    776#  6077
TYPTXT    776#
$DECBN      1#
$OCTBN      1#  5685
$$CMRE    789#   828   829   830   831   832   833   834   835   836   837   838   839   840   841
           842   843   844   845   846   847   848   849
$$CMTM    789#   850   851   852   853   854   855   856   857   858
$$ESCA    776#
$$NEWT    776#
$$SET    6367#  6376  6377  6378  6380  6382  6383  6384  6385  6386
$$SKIP    776#
.EQUAT    642#   666
.MFADE    642#   643
```

```
.SETUP    642#   2568
.SWRHI    642#    654
 SWRLO    663#    664     665
.$CATC    642#    776
.$CMTA    642#    789
.$DB2O    642#   5811
.$ERRO    642#   5927
.$POWE    642#   6226
.$RAND    642#
.$READ    642#   5970
.$SAVE    642#   6299
.$SIZE    642#   6269
.$TRAP    642#   6344
.$TYPD    642#
 $TYPE    642#   5741
.$TYPO    642#   5850

. ABS.   050534     000

 ERRORS DETECTED:  0

 RM03:CZR6LC,RM03:CZR6LC.SEQ/SOL/CRF/NL:TOC/DOC/EQ:GNEWSW=RM03:DRIV10.P11,RM03:CZR6LC.P11
 RUN-TIME:  25 20 2 SECONDS
 RUN-TIME RATIO: 1224/47=25.6
 CORE USED:  42K  (83 PAGES)

 DOCUMENT PAGES:  152
```