VT61

EXERCISER

MD-11-DZVTJ-A

EP-DZVTJ-A-DL-A

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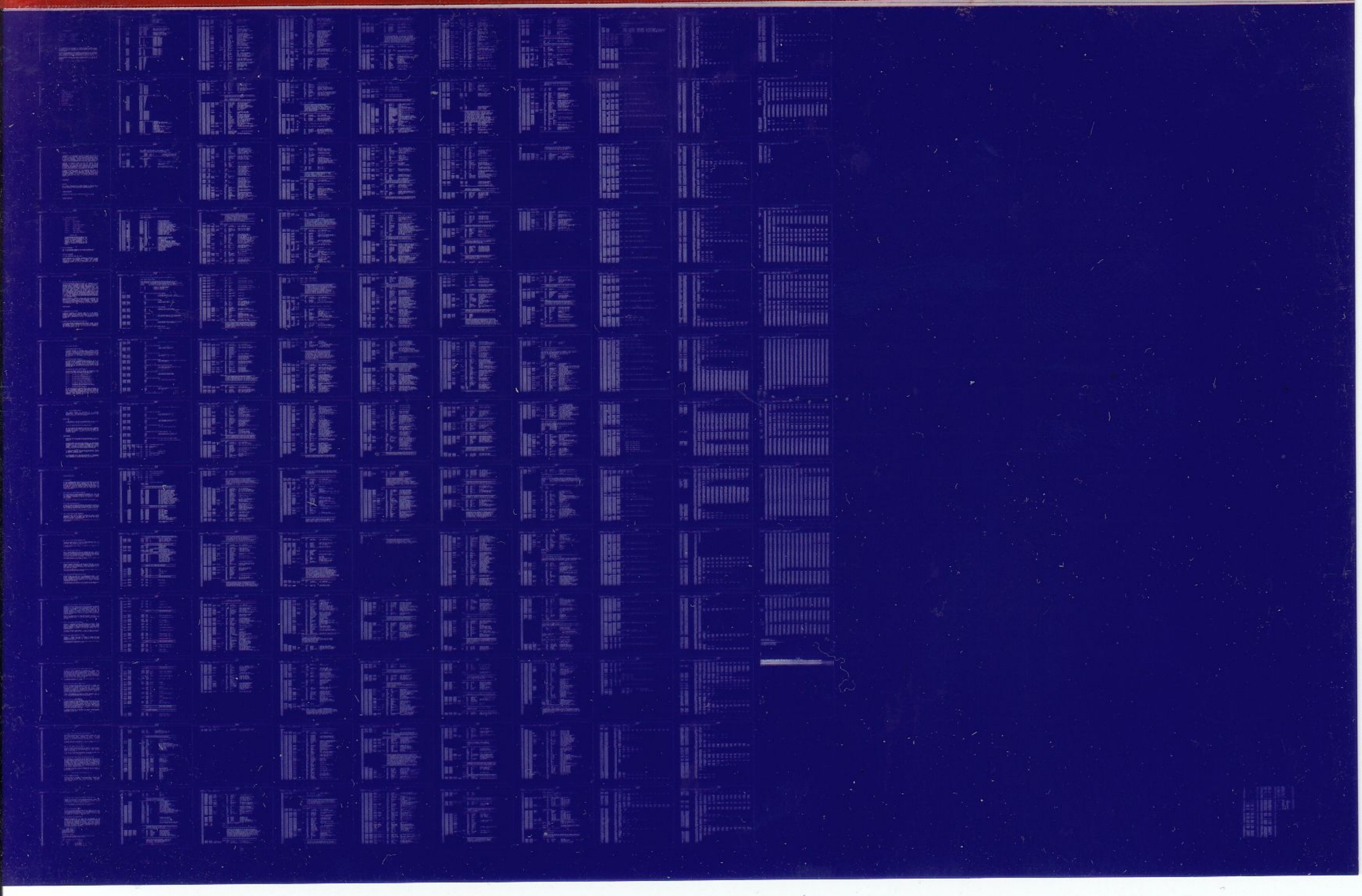
digital

MADE IN USA



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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZVTJ-A
PRODUCT NAME:	VT61 EXERCISOR
DATE:	30-JAN-76
MAINTENANCE:	DIAGNOSTIC GROUP
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TABLE OF CONTENTS

1. ABSTRACT

THIS PROGRAM IS AN ACCEPTANCE TEST FOR THE ENTIRE VT61 FAMILY OF TERMINALS. THE FUNCTIONAL TESTING IS BASED UPON A SET OF TERMINAL FUNCTIONS WHICH ARE COMMON THROUGHOUT THE ENTIRE FAMILY OF VT61 TYPE TERMINALS. THE FUNCTIONS AND THEIR DERIVED TESTING IS DESIGNED TO COMPLETELY CHECK(AT THE FUNCTIONAL LEVEL) THE TERMINAL MICRO-PROCESSOR AND ASSOCIATED RAMS. ALL TRANSMISSIONS TO THE VT61 WILL BE PRECEEDED BY A SOM AND TERMINATED BY AEOM//.

THERE ARE TWO DISTINCT MODES IN WHICH THE PROGRAM CAN BE OPERATED. IN "AUTO" MODE UP TO 2 DJ11'S WITH UP TO 32 OPERATIONAL VT61'S WILL BE MAPPED AND ALL WILL BE TESTED SEQUENTIALLY. ALL TESTS WHICH DO NOT REQUIRE MANUAL INTERVENTION OR VISUAL SCREEN OBSERVATION (TESTS 1 THRU 20) WILL BE EXECUTED FOR EACH VT61 REPETITIVELY. ALL ERRORS WILL BE REPORTED ON THE SYSTEM CONSOLE (WHICH IS NOT TESTED EVEN IF IT IS A VT61).

IN MANUAL MODE CONSOLE ENTRY OF THE ADDRESSES AND TESTS IS REQUIRED. THE ADDRESSES AND TESTS CAN BE ENTERED IN A NON-SEQUENTIAL MANNER AND THE SUBSEQUENT EXECUTION WILL FOLLOW THE ENTRY SEQUENCE. THIS MODE MUST BE UTILIZED TO ENTER THE KEYBOARD TESTS, DATA LOOP TEST, AND PRINTER CONTROLLER TEST. SEQUENCE COMPLETION WILL EXIT TO THE RE-START POINT FOR THE MANUAL TEST.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP 11 FAMILY COMPUTER WITH 8K WORDS OF MEMORY, A CONSOLE, AND UP TO 32 VT61'S CONNECTED TO THE HOST COMPUTER VIA DJ11(S). VT61 MUST BE IN REMOTE; FULL DUPLEX AND AT LEAST 300 BAUD.

3. LOADING PROCEDURE

PROCEDURE FOR NORMAL BINARY PAPERTAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

STANDARD PDP 11 FORMAT

SW15 = 1	HALT ON ERROR.
SW14 = 1	LOOP ON TEST
SW13 = 1	INHIBIT ERROR TYPEOUTS
SW11 = 1	INHIBIT ITERATIONS
SW10 = 1	BELL ON ERROR
SW9 = 1	LOOP ON ERROR
SW8 = 1	LOOP ON TEST IN SWR<7:0>

SPECIAL NOTE

IF THE COMPUTER UTILIZED IS A LSI 11 OR A COMPUTER WITHOUT A SWITCH REGISTER. THE PROGRAM WILL UTILIZE LOCATIONS 174 AND 176 AS A "DISPLAY" REGISTER AND A "SWITCH" REGISTER RESPECTIVELY. THE OPERATOR WILL BE RESPONSIBLE FOR THE LOADING OF THE "SWITCH" REGISTER LOCATION PRIOR TO STARTING OR RESTARTING THE PROGRAM.

4.2 STARTING ADDRESSES

200 IS THE STARTING ADDRESS OF THE "AUTO" ACCEPTANCE TEST
204 IS THE STARTING ADDRESS ON THE "MANUAL" SELECT TEST.

5. OPERATING PROCEDURE

5.1 AUTO ACCEPTANCE MODE (SA = 200).

IN THIS MODE THE ONLY OPERATOR INTERVENTION REQUIRED IS SWR OPTION SELECTIONS SUCH AS LOOP ON TEST (SWR 11), BELL ON ERROR (SWR 0), ECT.. THE PROGRAM WILL, WITHOUT ANY EXTERNAL INTERVENTION, LOCATE THE DJ11(S)/LINES WITH VT61 TYPE UNITS ATTACHED AND SEQUENTIALLY TEST ALL UNITS REPETITIVELY WITH TESTS 1 THRU 20.

5.2 MANUAL UNIT/TEST SELECTION MODE (SA = 204)

THIS MODE REQUIRES THE OPERATOR TO ENTER THE ADDRESSES OF THE DJ11'S TO BE TESTED (FORMAT IS 17XXXX, ECT, -UP TO 2 ENTRIES). THE ENTRIES MUST BE SEPARATED BY COMMAS AND TERMINATED WITH A CARRIAGE RETURN. ENTERING AN ILLEGAL ADDRESS WILL RESULT IN A "?" BEING TYPED AND THE ADDRESS IGNORED! THE PROGRAM WILL THEN REQUEST THE LINES TO BE TESTED ,IN BINARY FORMAT. TO TEST LINES ON TWO DJ11S, INSERT A -1(177777) A. THE END OF THE LINE LIST FOR EACH DJ11 AND TERMINATE THE ENTIRE LIST WITH A 0 WORD(000000).EXAMPLE- TEST LINE 1 OF 1ST DJ11 AND LINE 4 OF 2ND DJ11; ENTERED LIST WOULD BE 000002,177777 ,000020,177777,000000 C/R. THE OPERATOR MUST THEN, UPON PROGRAM REQUEST, ENTER A LIST OF TESTS TO BE EXECUTED IN THE SAME FORMAT AS THE ADDRESS ENTRY (I.E.YY,ZZ,C/R). PRECEEDING THE TERMINATING CARRIAGE RETURN WITH A 377 OCTAL WILL RESULT IN THE TESTS BEING REPETITIVELY EXECUTED FOR ALL ADDRESSES ENTERED.

SIMPLY DEPRESSING A CARRIAGE RETURN WHEN UNIT ADDRESSES ARE REQUESTED WILL RESULT IN THE MAPPING AND TESTING OF ALL GOOD DJ11(S)/LINES WITH OPERATIONAL VT61'S ATTACHED. HOWEVER, THE TEST LIST MUST STILL BE ENTERED VIA THE CONSOLE!! WHEN RUNNING THE EXERCISOR IN MANUAL MODE A CONTROL C (03 OCTAL) WILL RESULT IN THE TERMINATION OF TESTING AT THE END OF THE CURRENT SUBTEST.

6. ERRORS-GENERAL

6.1 NO OPERATIONAL VT61 ATTACHED

IF THE UNIT SELECTED (IN "MANUAL" MODE) OR IN THE MAPPING OPERATION ("AUTO" MODE) DOES NOT RESULT IN A UNIT WHICH IS CAPABLE OF RESPONDING TO THE TEST THE MESSAGE "NO VT61 RESPONDED TO ESCZ SEQ. AUTO RETRY IN 30 SEC". WILL BE DISPLAYED ON THE CONSOLE EVERY 30 SECONDS UNTIL THE TEST IS STOPPED OR A UNIT RESPONDS.

6.2 EXCESSIVE "FATAL" ERRORS FROM UNIT UNDER TEST

IF TEN FATAL ERRORS (INCOMPLETE TRANSMIT/RECIEVE CYCLES) OCCURS THE MESSAGE "TESTING ABORTED-TOO MANY FATAL XMITS" WILL BE DISPLAYED AND THE TEST WILL EXIT TO THE INITIAL SETUP SEQUENCE OF THE REQUESTED MODE. IF THE TEST THEN LOCATES AN OPERATIONAL UNIT, IT WILL BEGIN TESTING IT.

6.3 COMMON ERROR MESSAGES

A. ESCAPE SEQUENCE ERROR (ERROR 1)

THIS ERROR MESSAGE IS RETURNED WHEN A SPECIFIC ESCAPE SEQUENCE DID NOT ELICIT THE EXPECTED RESPONSE FROM THE UNIT UNDER TEST. MESSAGE RETURNS TEST #, ERROR PROGRAM COUNT AND TWO WORDS WHICH CONTAIN UP TO 4 BYTES OF THE FAILING ESCAPE SEQUENCE (I.E. IF "TRANSMIT ALL" FAILED;THE ESC,O, V WOULD BE DISPLAYED IN THE FORMAT BYTE 1+2=015517,BYTE 3+4= 000126).

B. RECEIVE STATUS ERROR (ERROR 2)

THIS ERROR MESSAGE IS RETURNED IF ANY OF BITS 12, 13, OR 14 ARE SET IN THE INTERFACE RECEIVE BUFFER REGISTER. DATA DISPLAYED IS THE ADDRESS OF THE CSR (CONTROL AND STATUS REGISTER) OF THE FAILING UNIT, THE CONTENTS OF THE FOREMENTIONED CSR , THE ERROR BITS FROM THE RECEIVE BUFFER REGISTER, AND THE CHARACTER WHICH WAS STORED WHEN THE ERRORS WERE DETECTED.

C. SOFTWARE STATUS (VSTAT) ERROR (ERROR 3)

THE LOCATION TAGGED "VSTAT" IS USED BY THE PROGRAM TO STORE DYNAMIC CONDITIONS RELATING TO THE UNIT UNDER TEST. THE BITS WHICH MAY CAUSE A SOFTWARE STATUS ERROR ARE:

BIT 15	SET FOR XOFF, CLEARED FOR XON
BIT 14	SET WHEN START OF MESSAGE RECEIVED
BIT 13	SET WHEN END OF MESSAGE RECEIVED
BIT 12	SET FOR A PERIPHERAL ABORT MESSAGE
BIT 10	SET WHEN AN INTERFACE ERROR DETECTED
BIT 7	SET WHEN AN XOFF WAS DETECTED AND THE TRANSMITTER WAS SHUT DOWN BY THE SOFTWARE.
BIT 1	SET WHEN TRANSMIT COMPLETE

THE ONLY BIT WHICH WILL UNCONDITIONALLY CAUSE THIS ERROR IS BIT 12 (PERIPHERAL ABORT) ALL OTHER BITS WILL BE SET AND RESET AND AN ERROR IS DEPENDENT UPON EXPECTED CONDITIONS (I.E. AFTER A COMPLETE TRANSMISSION BITS 1, 13 AND 14 MUST BE SET AND OTHERS MENTIONED RESET OR AN ERROR WILL BE REPORTED). DATA DISPLAYED IS THE PASS #, THE TEST #, EXPECTED STATUS AND ACTUAL STATUS.

D. VT61 HUNG ERROR (ERROR 11)

THIS ERROR MESSAGE IS DISPLAYED IF A COMPLETE TRANSMISSION(S) DOES NOT RESULT IN A SOM(S), AN EOM(S) AND TRANSMIT DONE. THIS ERROR IS A FATAL ERROR AND TEN OF THESE ERRORS WILL RESULT IN THE TEST ABORTING.

7. RESTRICTIONS

A. IT IS IMPERATIVE THAT BOTH THE INTERFACE AND THE VT61 SHOULD BE PLACED IN FULL DUPLEX AND REMOTE (NOT LOCAL) MODE.

B. UNIT TO BE TESTED CANNOT BE THE CONSOLE DEVICE.

C. FOR THE AUTOMATIC TEST MAPPING OF THE DJ11'S, ALL ADDRESSES FOR THE UNITS TO BE TESTED MUST BE WITHIN THE STANDARD DEC ADDRESSES AND VECTORS. IF THIS IS NOT THE CASE, THE PROCEDURE OUTLINED IN SECTION 8-B MUST BE FOLLOWED BEFORE TESTING IS BEGUN.

8. MISCELLANEOUS

A. EXECUTION TIME FOR THE AUTO SELECTION TESTS (TEST 1-20) WITH UNITS SET TO A BAUD RATE OF 9600 BAUD IS APPROXIMATELY 90 SECONDS.

B. TO TEST A DEVICE (DJ11 WITH VT61 ATTACHED) AT NON-STANDARD ADDRESSES THE LOCATION "STRTAB" CAN BE MODIFIED TO CONTAIN THE LOWEST OF THE NON-STANDARD ADDRESSES AND LOCATON "ENDTAB" MODIFIED TO CONTAIN THE HIGHEST NON-STANDARD ADDRESS. ALL INTERFACES WITHIN THE NEW ADDRESSES WILL BE MAPPED AND TESTED IF THE PROPER RESPONSES ARE OBTAINED.

C. TO CHANGE THE NUMBER OF FATAL ERRORS ALLOWED BEFORE TESTING IS ABORTED, LOCATION "ALWCNT" (LOADED WITH 10) CAN BE MODIFIED TO THE DESIRED COUNT.

D. ALL TESTS EXCEPT TEST 1 AND TEST 23 ARE RUN IN MAINTENANCE MODE, THEREFORE ALL TRANSMISSIONS FROM THE VT61 ARE EXPECTED TO BE PRECEEDED BY A SOM AND TERMINATED WITH A EOM.

9. PROGRAM DESCRIPTION

9.0 INITIALIZATION

IN "AUTO" SEQUENCE MODE THIS SECTION OF THE TEST MAPS ALL DEVICES IN THE PRE-DETERMINED AREAS. DEVICES ARE THEN TESTED FOR INTERRUPT CAPABILITY VIA THE "MAINTENANCE" BIT AND ALL UNITS WHICH DO NOT OR CANNOT RESPOND ARE PURGED FROM THE TABLE. ALL UNITS ARE THEN ISSUED THE "ESCAPE Z" SEQUENCE AND THOSE WHICH DO NOT RESPOND, OR DO NOT RESPOND WITH THE PROPER "IDENT" ARE PURGED. ALL OPERATIONAL UNITS ARE STORED IN A TABLE(DLTBL) AND TESTED SEQUENTIALLY.

9.1 TEST 1 CHECK ALL COMMON ESCAPE SEQUENCES.

THIS TEST ISSUES ALL ESCAPE SEQUENCES AND INSURES THE VT61 HAS NOT FAILED DURING AN ESC SEQUENCE BY ISSUING A ESC Z TO FORCE A VT61 RESPONSE. THE PURPOSE OF THE TEST IS TO ATTEMPT TO INSURE THAT SUBSEQUENT TESTS WILL NOT RESULT IN A "HUNG" UNIT. DATA IS NOT EVALUATED.

ALL ERRORS ARE REPORTEDED AS ESCAPE SEQUENCE FAILURES(ERROR 1).

9.2 TEST 2 CHECK MAINTENANCE MODE.

ROUTINE TO INSURE ENTERING MAINTENANCE MODE CAUSES SOM AND EOM TO BE APPENDED TO ALL TRANSMITS FROM VT61 UNDER TEST. MAINTENANCE MODE IS ENTERED, THEN AN ESCAPE Z SEQUENCE IS ISSUED TO THE UNIT AND THE RESULTING RESPONSE FROM THE VT61 IS CHECKED FOR SOM/EOM.

ERROR 22 WILL BE ISSUED IF EITHER COMPONENT(SOM/EOM) IS MISSING.

9.3 TEST 3 CHECK DIRECT CURSOR ADDRESSING

THIS TEST INSURES THAT THE CURSOR WILL RESPOND TO DIRECT CURSOR ADDRESSING. THE UNIT IS RESET AND THE CURSOR POSITION IS VERIFIED TO BE HOME. THE CURSOR IS THEN MOVED TO ROW 23 COLUMN 80 AND THE POSITION IS AGAIN VERIFIED.

CURSOR POSITIONING ERRORS(ERROR 7) ARE REPORTED IF THE POSITIONS ARE INCORRECT.

9.4 TEST 4 CHECK LINEAR ADDRESSING MODE.

ROUTINE TO INSURE THE UNIT CAN ENTER LINEAR ADDRESSING MODE. 81 CHARACTERS ARE ISSUED TO THE UNIT UNDER TEST THEN THE CURSOR POSITION IS READ AND MUST BE ROW1, COL.0.

AN ESCAPE SEQUENCE ERROR (ERROR 1)IS ISSUED IF THE CURSOR IS NOT AT ROW1,COL.0

9.5 TEST 5 CHECK XON/XOFF FROM VT61

TEST TO INSURE OPERATION OF XON/XOFF COMMANDS FROM VT61. XOFF IS FORCED BY TRANSMITTING THE DATA ON LINE 23 WHILE SIMULTANEOUSLY FILLING THE SILO WITH NEW DATA. AFTER SENSING THE XOFF, THE TEST WAITS FOR THE TRANSMIT TO FINISH AND INSURES XON OCCURS BEFORE THE MAXIMUM TRANSFER TIME HAS ELAPSED. (30 SECONDS)

ERRORS ARE REPORTED IF THE FORMAT OF ERROR 3(VSTAT ERRORS) AND WILL REFLECT EITHER LACK OR EXCESS OF BIT 15.

9.6 TEST 6 CHECK XON/XOFF TO VT61

ROUTINE TO VERIFY OPERATION OF XOFF AND XON TO THE VT61. A FULL SCREEN TRANSMIT IS INITIATED AND A SERIES OF XOFFS AND XONS ARE ISSUED TO THE TERMINAL SEQUENTIALLY. ERRORS ARE REPORTED IF A XOFF DOES NOT STOP, OR A XON RESTART THE TRANSMISSION. TEST IS ENDED WHEN EOM IS SENSED.

ERRORS ARE REPORTED(ERROR 15 FOR XOFF FAILURE AND ERROR 15 FOR A XON FAILURE)AS SPECIFIC ERROR MESSAGES.

9.7 TEST 7 CHECK RAM AND COMMUNICATIONS PATHS

ROUTINE TO TEST VT61 RAM AND THE COMMUNICATION PATHS. THIS ROUTINE ISSUES A SERIES OF FULL SCREEN PATTERNS (77/100, 100/77, 52/125, INCREMENTING, AND REV VIDEO INCREMENTING) TO THE VT61. THE FULL SCREEN IS THEN TRANSMITTED TO THE HOST AND AFTER EACH ITERATION RECEIVED DATA IS CHECKED AND ALL ERRORS (INCLUDING TRANSMISSION) ARE REPORTED.

ERRORS REPORTED COULD BE ERROR 2 FOR A RECEIVE STATUS ERROR,ERROR 4 FOR DATA ERRORS AND ERROR 5 FOR A RECEIVE BYTE COUNT ERROR.

9.10 TEST 10 CHECK TRANSMIT AND RECEIVE CHECKSUMS.

ROUTINE TO TEST THE ABILITY OF THE VT61 TO CALCULATE AND TRANSMIT CHECKSUMS OF BOTH TRANSMITTED AND RECEIVED DATA. SUBTEST "A" TRANSMITS A FULL BUFFER UPDATING A CALCULATED CHECKSUM ON EACH CHARACTER TRANSMITTED. AN ESCAPE SEQUENCE REQUESTING THE RECEIVER CHECKSUM IS EMBEDDED AT THE END OF XMIT BUFFER AND THE RECEIVED CHECKSUM IS COMPARED TO THE CALCULATED. SUBTEST "B" PERFORMS THE SAME TYPE OF CHECK ON THE VT61 TRANSMIT CHECKSUM, UTILIZING THE DATA SENT TO THE VT61 IN SUBTEST "A", DURING A FULL SCREEN TRANSMIT.

ERROR 13 IS ISSUED(WITH CALCULATED AND RECEIVED CHECKSUM) IF A RECEIVE CHECKSUM ERROR IS DETECTED. ERROR 14 IS ISSUED (WITH SAME DATA AS ERROR 13) IF A VT61 TRANSMIT CHECKSUM ERROR IS DETECTED.

9.11 TEST 11 CHECK BASIC CURSOR COMMANDS

ROUTINE TO INSURE BASIC CURSOR COMMANDS RESULT IN CORRECT CURSOR MOVEMENT. COMMANDS ARE ISSUED IN THE SEQUENCE: RESET, CURSOR RIGHT, CURSOR DOWN, CURSOR LEFT, AND CURSOR UP. THE READ CURSOR POSITION COMMAND IS ISSUED AFTER EVERY MOVE CURSOR COMMAND AND RECEIVED POSITION IS COMPARED TO THE EXPECTED POSITION AND ANY ERRORS REPORTED.

AN ESCAPE SEQUENCE ERROR(ERROR 1) AND A CURSOR POSITIONING ERROR(ERROR 6) ARE ISSUED IF ANY FUNCTIONS ARE DETECTED TO FAIL.

9.12 TEST 12 CHECK READ CHARACTER AT CURSOR

ROUTINE TO INSURE THAT READ CHARACTER AT CURSOR FUNCTIONS CORRECTLY. COMMAND SEQUENCE IS: RESET, A, CURSOR LEFT, READ CHARACTER AT CURSOR. AN ERROR IS REPORTED IF THE CHARACTER RECEIVED IS NOT AN "A".

AN ESCAPE SEQUENCE ERROR(ERROR 1) AND A DATA COMPARE ERROR(ERROR 4) ARE ISSUED IF A FAILURE IS DETECTED.

9.13 TEST 13 CHECK REPLACE AND INSERT CHARACTER MODES

ROUTINE TO VERIFY OPERATION OF REPLACE AND INSERT MODE. INITIALLY ROW 0 IS WRITTEN TO 80 INCREMENTING CHARACTERS; ON THE FIRST PASS (REPLACE MODE) A CHARACTER(172) IS REPLACED AT THE HOME POSITION AND THE CHARACTERS AT ROW0, COL.0 AND ROW1, COL.0 ARE READ AND VERIFIED TO BE A "172" AND A "NULL" RESPECTIVELY. ON THE SECOND PASS, INSERT MODE IS ENTERED AND THE RESULTING INSERTION (AT THE HOME POSITION) IS VERIFIED. ROW0, COL.0 SHOULD BE "172" AND ROW1, COL.0 SHOULD BE "161".

IF AN ERROR IS DETECTED IN EITHER MODE,THE APPROPRIATE ESCAPE SEQUENCE ERROR(ERROR 1) IS ISSUED.

9.14 TEST 14 CHECK VT61 SCROLL CAPABILITIES.

ROUTINE TO INSURE VT61 WILL SCROLL IF A LINE FEED IS ISSUED FROM ROW 23 OR A DATA INSERT FROM ROW 23 COL. 79. IN SUBTEST "A", ROW 0 IS INITIALLY WRITTEN TO A 0 AND ROW 1 A 1. AFTER COMPLETION OF A LINE FEED (AND RESULTING SCROLL) ROW 00, COL.00 IS EXPECTED TO CONTAIN A 1. IN SUBTEST "B", THE CURSOR IS PLACED AT ROW23, COL.79 AND A DATA CHARACTER "A" IS ENTERED. THE CURSOR POSITION IS THEN READ AND SHOULD BE ROW23, COL.00. THE CHAR. AT HOME IS VERIFIED TO BE A NULL.

A SCROLL ERROR(ERROR 23) IS ISSUED IF EITHER FUNCTIONS FAIL TO ELICIT THE PROPER RESPONSE FROM THE UNIT UNDER TEST. THE ERROR PC WILL DISTINGUISH BETWEEN THE FAILING FUNCTIONS.

9.15 TEST 15 CHECK ALL SCREEN ADDRESSES.

THIS TEST INSURES THAT THE VT61 CURSOR CAN BE POSITIONED TO EVERY POSSIBLE ROW/COLUMN POSITION ON THE SCREEN. THIS IS TESTED BY FILLING THE COMPLETE SCREEN (EXCEPT ROW 23,COL.79 WHICH WILL CONTAIN A "NULL") WITH THE CHARACTER "A" AND THEN POSITIONING THE CURSOR (VIA DCA) TO EVERY POSITION AND THE "A" AT THAT POSITION IS REPLACED WITH A SPACE(OCTAL 40). THE SCREEN IS THEN READ TO VERIFY THAT ONLY SPACES EXIST ON THE SCREEN. ALL POSITIONS CONTAINING NON-SPACES ARE REPORTED.

ALL ERRORS DETECTED WILL BE REPORTED AS DIRECT CURSOR ADDRESS ERROS(ERROR 7),AND WILL CONTAIN THE POSITION THE BAD DATA(NON -SPACE) WAS DETECTED AT.

9.16 TEST 16 CHECK LINE FEED AND CARRIAGE RETURN

ROUTINE TO INSURE PROPER OPERATION OF CARRIAGE RETURN AND LINE FEED DURING NORMAL MODE. INITIALLY THE CURSOR IS SET (VIA D.C.A.) TO ROW0, COL 20 AND A LINE FEED IS ISSUED. THE CURSOR POSITION IS THEN READ AND MUST BE ROW1, COL.20. A CARRIAGE RETURN IS THEN ISSUED AND CURSOR POSITION VERIFIED TO BE ROW1, COL0.

AN ESCAPE SEQUENCE ERROR(ERROR 1) AND A CURSOR POSITIONING ERROR(ERROR 6) WILL BE ISSUED IF AN ERROR IS DETECTED.

9.17 TEST 17 CHECK ERASE TO END OF SCREEN

ROUTINE TO VERIFY PROPER OPERATION OF ERASE TO END-OF-SCREEN. SCREEN IS WRITTEN TO 1920 INCREMENTING CHAR. ERASE TO END OF SCREEN IS THEN ISSUED AND THE ENTIRE SCREEN IS READ VERIFYING THAT IT IS ALL NULLS.

IF ANY NON-NULL POSITIONS ARE DETECTED, AND ESCAPE SEQUENCE ERROR (ERROR 1) AND A DATA ERROR(ERROR 4) WILL BE ISSUED.

9.20 TEST 20 CHECK SELF TEST, COPIER, AND ISSUE END OF PASS.

SELF TEST (ESC T) IS ISSUED TO THE UNIT UNDER TEST AND AN SELF TEST ERROR(ERROR 10) IS ISSUED IF THE UNIT CANNOT RESPOND TO AN "ESCAPE Z" SEQUENCE AFTER SELF TEST IS COMPLETE. IF SELF TEST IS SUCCESSFUL THE SCREEN IS WRITTEN TO 23 LINES OF INCREMENTING CHARACTERS AND 23 LINES OF INCREMENTING CHAR. IN REVERSE VIDEO. THE "IDENT" IS THEN CHECKED AND IF A COPIER IS PRESENT A COPY SCREEN COMMAND IS ISSUED (NOTE: THIS COMMAND WILL CAUSE THE UNIT TO BE "BUSY" AND NOT RESPOND TO ANY FURTHER COMMANDS UNTIL THE SCREEN HAS BEEN COMPLETELY COPIED.)

IF THE IDENT INDICATES A COPIER IS PRESENT AND THE COPY SCREEN IS INITIATED,BUT NOT COMPLETED, A "PERIPHERAL ABORT" (ERROR 20) ERROR IS ISSUED.

END OF AUTO-ACCEPTANCE TESTS

9.21 TEST 21 KEYBOARD ECHO TEST

ROUTINE TO ECHO THE KEYBOARD. KEYS FOR TAB, BELL, CARRIAGE AND LINE FEED ECHO A MNEMONIC, NON-DISPLAY CHAR. ECHO OCTAL EQUIVALENTS AND DISPLAY CHAR. ECHO THEMSELVES. (EXAMPLES- CHAR., SPACE, ESC, SPACE OR 037, SPACE.) A CONTROL C (003) WILL CAUSE A TEST EXIT.

9.22 TEST 22 TEST A LINE PRINTER(PRINTER CONTROLLER MODE)

ROUTINE TO UTILIZE THE VT61 AS A PRINTER CONTROLLER. AFTER TEST MESSAGE IS DISPLAYED, THE TEST WAITS FOR A C/R BEFORE ACTUALLY ENTERING TEST. A PATTERN OF INCREMENTING, ROLLING CHAR. WILL BE OUTPUTTED UNTIL A CONTROL C (003) IS RECEIVED.

IF THE LINE PRINTER IS DISABLED AFTER THE INITIALIZATION OF THE TEST, A "PERIPHERAL ABORT" (ERROR 20) IS ISSUED.

9.23 TEST 23 UNIT SIMULATOR TEST

ROUTINE TO LOOP DATA/COMMANDS FROM THE VT61 BACK TO THE VT61. DATA TRANSMISSIONS RESULTING FROM A ESC SEQUENCE WILL ALSO BE LOOPED AND WILL ENTER THE SCREEN AT THE CURSOR POSITION. THIS TEST CAN BE USED TO SIMULATE, OR CREATE, SPECIFIC SCREEN PATTERNS AND OPERATIONS. A CONTROL C (003) EXITS TEST.

9.24 TEST 24 PRODUCTION KEYBOARD TEST

PRODUCTION KEYBOARD TEST. ALL KEYS MUST BE DEPRESSED IN THE SEQUENCE INDICATED ON THE SCREEN. ALL ERRORS OR MISTAKES ARE DISPLAYED IN OCTAL POSITIONAL FORMAT AND THE CORRECT KEY POSITION IN THE ROW IS DISPLAYED IN DECIMAL. THIS TEST IS RUN IN MAINTENANCE MODE, THEREFORE THE KEYS WILL ECHO THEIR POSITION, NOT THEIR INDICATED MNEMONIC. THE EXCEPTIONS ARE THE INDIVIDUAL TESTS FOR THE SHIFT AND CONTROL FUNCTIONS.THESE TESTS ARE EXPLICITELY DEFINED BY MESSAGES TO THE OPERATOR. 10 ERRORS WILL CAUSE AN AUTOMATIC EXIT FROM TEST.

```
        %
        .NLIST  MD,MC,CND
        .LIST   ME
.TITLE  MAINDEC-11-DZVTJ-A
;*COPYRIGHT (C) 1975
;*DIGITAL EQUIPMENT CORP.
;*MAYNARD, MASS. 01754
;*
;*PROGRAM BY P. NELSON
;*
;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
;*PACKAGE (MAINDEC-11-DZQAC-81),AUG 29,1975.
;*

.SBTTL  OPERATIONAL SWITCH SETTINGS
;*
;*      SWITCH                  USE
;*      ------          --------------------
;*        15            HALT ON ERROR
;*        14            LOOP ON TEST
;*        13            INHIBIT ERROR TYPEOUTS
```

```
                        ;*        12        INHIBIT TRACE TRAP
                        ;*        11        INHIBIT ITERATIONS
                        ;*        10        BELL ON ERROR
                        ;*         9        LOOP ON ERROR
                        ;*         8        LOOP ON TEST IN SWR<7:0>

                        .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
        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
                        .EQUIV  R6,SP           ;;STACK POINTER
                        .EQUIV  R7,PC           ;;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
```

```
                        SW01=   2
                        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)
                        BIT15=  100000
                        BIT14=  40000
                        BIT13=  20000
                        BIT12=  10000
                        BIT11=  4000
                        BIT10=  2000
                        BIT09=  1000
                        BIT08=  400
                        BIT07=  200
                        BIT06=  100
                        BIT05=  40
                        BIT04=  20
                        BIT03=  10
                        BIT02=  4
                        BIT01=  2
                        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
```

```
                                ;*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  ACT11 HOOKS
                                ;HOOKS REQUIRED BY ACT11
                        000200          $SVPC=.                 ;SAVE PC
                        000046          .=46
000046  011052                  $ENDAD                          ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                        000052          .=52
000052  000000                  .WORD   0                       ;;2)SET LOC.52 TO ZERO
                        000200          .=$SVPC                 ;; RESTORE PC
                        000200          .=200
000200  000137  002266  START:  JMP     AUTO                    ;USE AUTO SELECTION OF UNITS
000204  000137  002320  MSTRT:  JMP     MANS                    ;ALLOW OPERATOR SELECTIONOF UNITS/TESTS
```

```
                                ;*****************************************************************

                                .SBTTL  COMMON TAGS

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

001100                                  .=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  000000                          .WORD   0
001136  177570                  SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001140  177570                  DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
001142  177560                  $TKS:   177560                  ;;TTY KBD STATUS
001144  177562                  $TKB:   177562                  ;;TTY KBD BUFFER
001146  177564                  $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001150  177566                  $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001152     000                  $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001153     002                  $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001154     012                  $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001155     000                  $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001156  000000                  $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
001160  000000                  $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
001162  177607  000377          $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001166     077                  $QUES:  .ASCII  /?/             ;;QUESTION MARK
001167     015                  $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
001170  000012                  $LF:    .ASCIZ  <12>            ;;LINE FEED
```

```
                                ;*****************************************************************

                                .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


001172                          $ERRTB:
                                        ;GENERAL ESCAPE SEQUENCE ERROR MESSAGE

001172  024460                          EM1                     ;AN ESCAPE SEQUENCE TO VT61   FAILED.
001174  024545                          DH1                     ;TEST#,ERROR PC,2 SEQUENCE BYTES,2 SEQUENCE BYTES.
001176  001422                          DT0
001200  001442                          DF0

                                        ;RECEIVE STATUS ERROR MESSAGE

001202  024610                          EM2                     ;RECEIVE STATUS ERROR
001204  024640                          DH2                     ;ADDRESS,STATUS ,ERR. BITS,CHAR.
001206  001452                          DT2
001210  001442                          DF0

                                ;RECIEVE SOFTWARE STATUS ERROR MESSAGE.

001212  024677                  EM3                             ;SOFTWARE (VSTAT) STATUS ERROR
001214  024740                  DH3                             ;PASS#,TEST#,GOOD STATUS,RECEIVED STATUS
001216  001500                  DT4
001220  001543                  DF6

                                ;DATA ERROR

001222  025007                  EM4                             ;DATA EXPECTED DOES NOT MATCH RECEIVE DATA.
001224  025053                  DH4                             ;TEST#,REC.CNT.,EXPECTED DATA, RECEIVE DATA
001226  001512                  DT5
001230  001442                  DF0

                                ;RECEIVE BYTE COUNT ERROR

001232  025122                  EM5                             ;BYTES EXPECTED DOES NOT EQUAL BYTES RECEIVED.
001234  025201                  DH5                             ;BYTES EXPECTED, BYTES RECEIVED
001236  001434                  DT1
001240  001450                  DF2

                                ;GENERAL DIRECT CURSOR ADDRESS FAILURE

001242  025232                  EM6                             ;CURSOR POSITION ERROR
```

```
001244  025265                  DH6                     ;GD LINE, GD COL., BD LINE, BAD COL.
001246  001452                  DT2
001250  001474                  DF3

                                ;DIRECT CURSOR ADDRESS ERROR

001252  025332                  EM7                     ;DIRECT CURSOR ADDRESS ERROR
001254  025432                  DH10                    ;PASS#,TEST#,BD. ROW,BD. COL.
001256  001500                  DT4
001260  001543                  DF6


                                ;LAST TEST-SELF TEST FAILED

001262  025634                  EM10                    ;VT61 FAILED SELF-TEST FUNCTION
001264  026211                  DH11                    ;CSR, VECTOR
001266  001434                  DT1
001270  001446                  DF1

                                ;VT61 FAIL/HUNG ERROR MESSAGE
001272  025471                  EM11                    ;LAST TRANSMISSION TO VT61 CAUSED VT61 TO FAIL/HANG
001274  025375                  DH7                     ;PASS#,TEST#,ERROR PC
001276  001464                  DT3
001300  001524                  DF4

                                ;GENERAL TEST FAILURE-PRECEEDS DATA/POSITION ERROR

001302  025557                  EM12                    ;VT61 UNDERR TEST FAILED-ERROR DATA FOLLOWS
001304  025375                  DH7                     ;PASS#,TEST#,ERROR PC.
001306  001464                  DT3
001310  001534                  DF4

                                ;RECEIVE CHECKSUM ERROR

001312  026010                  EM13                    ;VT61 RECEIVER CHECKSUM ERROR
001314  025675                  DH12                    ;PASS#,TEST#,GD.CKSUM,BD CKSUM
001316  001500                  DT4
001320  001543                  DF6

                                ;TRANSMITTER CHECKSUM ERRROR

001322  026057                  EM14                    ;VT61 TRANSMITTER CHECKSUM ERROR
001324  025675                  DH12
001326  001500                  DT4
001330  001543                  DF6


                                ;XOFF FAILED TO HALT BLOCK XMIT

001332  026304                  EM15                    ;XOFF TO VT61 FAILED TO HALT BLOCK XMIT
001334  027021                  DH13                    ;PASS,TEST,VSTAT
001336  001524                  DT6
001340  001534                  DF4

                                ;XON FAILED TO RESTART BLOCK XMIT
```

```
                                        EM16                    ;XON TO VT61 FAILED TO RESTART BLOCK XMIT
001342  026365                        DH13
001344  027021                        DT6
001346  001524                        DF4
001350  001534

                                        ;NO XON AFTER UNIT WAS RESET

001352  026430                        EM17                    ;NO XON AFTER UNIT WAS RESET.
001354  025375                        DH7                     ;PASS#,TEST#,ERROR PC
001356  001524                        DT6
001360  001534                        DF4

                                        ;PERIPHERAL ABORT ERROR

001362  026506                        EM20                    ;LAST PERIPHERAL OPERATION ABORTED.
001364  027053                        DH14                    ;PASS,TEST,ERROR PC, VSTAT
001366  001500                        DT4
001370  001543                        DF6

                                        ;CANT CLEAR PERIPHERAL ABORT FLAG.

001372  026552                        EM21                    ;COULD NOT CLEAR LAST ABORT FLAG.
001374  027053                        DH14
001376  001500                        DT4
001400  001543                        DF6

                                        ;MAINTENANCE MODE DID NOT FORCE A SOM/EOM.

001402  026615                        EM22                    ;SOM OR EOM NOT REC. IN MAINT. MODE.
001404  024740                        DH3                     ;PASS#,TEST#,EXP.STAT, ACT.STAT
001406  001500                        DT4
001410  001543                        DF6

                                        ;LINE FEED OR CURSOR RIGHT AT ROW 23 DID NOT CAUSE A SCROLL.

001412  026703                        EM23                    ;NO SCROLL FROM LINE FEED OR CURSOR RIGHT.
001414  025375                        DH7
001416  001524                        DT6
001420  001534                        DF4

001422  002264  001116  001124  DT0:  .WORD   TSTNM,$ERRPC,$GDDAT,$BDDAT,0
001430  001126  000000
001434  001124  001126  000000  DT1:  .WORD   $GDDAT,$BDDAT,0
001442     000     000     000  DF0:  .BYTE   0,0,0,0
001445     000
001446     000     000          DF1:  .BYTE   0,0

001450     001     001          DF2:  .BYTE   1,1               ;DECIMAL TYPE

001452  001120  001124  001122  DT2:  .WORD   $GDADR,$GDDAT,$BDADR,$BDDAT,0
001460  001126  000000
001464  001100  002264  001116  DT3:  .WORD   $PASS,TSTNM,$ERRPC,0
001472  000000
001474     001     001     001  DF3:  .BYTE   1,1,1,1
001477     001
```

```
001500  001100  002264  001124  DT4:    .WORD   $PASS,TSTNM,$GDDAT,$BDDAT,0
001506  001126  000000
001512  002264  001120  001124  DT5:    .WORD   TSTNM,$GDADR,$GDDAT,$BDDAT,0
001520  001126  000000
001524  001100  002264  001120  DT6:    .WORD   $PASS,TSTNM,$GDADR,0
001532  000000
001534     001     000     000  DF4:    .BYTE   1,0,0
001537     000     000     001  DF5:    .BYTE   0,0,1,1
001542     001
001543     001     000     000  DF6:    .BYTE   1,0,0,0
001546     000
          001550                          .EVEN
                                          ;INSTRUCTION DEFINITIONS
          022626                POP2SP  =22626
          024646                PUSH2SP =24646

                                ;*****************************************************************
                                        ;DEFINITION SOFTWARE STATUS(VSTAT) REGISTER BITS
                                ;*****************************************************************

          100000                RXOFF   =100000                 ;SET FOR XOFF, CLEARED FOR XON
          040000                RSOM    =040000                 ;SET FOR SOM (START OF MESSAGE).
          020000                REOM    =020000                 ;SET FOR EOM (END OF MESSAGE).
          010000                PABRT   =010000                 ;SET FOR A PERIPHERAL ABORT.
          004000                RSTT    =004000                 ;SET FOR RECEIVE STATUS ERROR.
          002000                CKSUM   =002000                 ;SET TO CALCULATE 61 REC.  CHECKSUM
          001000                EPL     =001000                 ;SET WHEN END OF LINE DETECTED
          000400                ESC     =000400                 ;SET WHEN OCTAL 33 RECEIVED.
          000200                XMKIL   =000200                 ;SET WHEN TRANSMIT KILLLED.
          000100                TXSUM   =000100                 ;SET TO CALCULATE 61 XMIT CHECKSUM
          000040                REVID   =000040                 ;SET WHEN REVERSE VIDEO MODE RECEIVED.
          000020                COMGP   =000020                 ;SET TO CONVERT REC. CHAR. BY -137.
          000010                ILLNE   =000010                 ;SET FOR REC. INT. ON NON-SELECTED LINE.
          000004                CURPOS  =000004                 ;SET WHEN CURSOP POS. RECEIVED
          000002                TRMID   =000002                 ;SET WHEN TERMINAL I.D. RECEVED.
          000001                XMDNE   =000001                 ;SET UPON TRANSMIT COMPLETE

                                ;*****************************************************************
                                        ;DEFINITION OF DJ11 CONTROL BITS
                                ;*****************************************************************

          100000                TRDY    =100000                 ;XMIT READY
          040000                XENA    =040000                 ;XMIT INT. ENABLE
          000400                XSCN    =000400                 ;XMIT SCAN ENABLE.
          000200                RECDN   =000200                 ;RECEIVER DONE.
          000100                RENA    =000100                 ;REC. INT. ENABLE.
          000020                BCLR    =000020                 ;MOS CLEAR BUSY.
          000010                MCLR    =000010                 ;MOS CLEAR.
          000004                MAINT   =000004                 ;MAINTENANCE MODE.
          000001                RSCN    =000001                 ;REC. SCAN ENABLE.
          040004                TCOMB   =040004                 ;MAINT. MODE AND XMIT INT  ENABLE.
          000401                SCAN    =000401                 ;REC. AND XMIT SCAN ENABLES.
          100000                RRDY    =100000                 ;REG. 2, REC. BUFFER READY FLAG.

          003600                TOTCH   =1920.                  ;TOTAL CHARACTERS ON SCREEN
          003601                TOTC1   =1921.                  ;TOTAL SCREEN +1
```

```
                                ;*****************************************************************
                                ;FOLLOWING ARE DJ11 ADDRESS, VECTOR AND LINE STORAGE TABLES
                                ;*****************************************************************
001550  000004                VVECT:  .BLKW   4               ;GOOD DJ11 VECTOR TABLE
001560  000004                DJTBL:  .BLKW   4               ;GOOD DJ11 ADDRESS TABLE
001570  000020                INTAB:  .BLKW   20              ;TABLE OF POSSIBLE DJ11 ADDRESSES
001630  000050                DJLNE:  .BLKW   40.             ;TABLE OF DJ11 LINESL

                                ;*****************************************************************
                                ;CURRENT POINTERS FOR ADDRESSES, VECTORS AND LINES
                                ;*****************************************************************
001750  000000                VECPT:  .WORD                   ;VECTOR INDEX
001752  000000                DJAPT:  .WORD                   ;ADDRESS INDEX
001754  000000                LNEPT:  .WORD           ;DJ11 LINE POINTER.
                                ;ADDRESS TABLES FOR DJ11 INTERFACES
001756  160010                STRTAB: .WORD   160010          ;BEGININNING OF FLOATING ADD.
001760  164000                ENDTAB: .WORD   164000          ;END OF FLOATING ADD.
                                ;*****************************************************************
                                ;V*61 ADDRESSES IN TABLE REFLECT UNIT UNDER TEST
                                ;*****************************************************************
001762  000000                VJCSR:  .WORD   0               ;DJ11 CONTROL AND STATUS.
001764  000000                VRBUF:  .WORD   0               ;RECEIVE DATA BUFFER
001766  000000                VXTCR:  .WORD   0               ;XMIT LINE CONTROL.
001770  000000                VXBUF:  .WORD   0               ;XMITTER DATA BUFFER
001772  000000                VECT:   .WORD   0               ;VECTOR FOR UNIT UNDER TEST
001774  000000                TSTLNE: .WORD   0               ;DJ11 LINE UNDER TEST.
001776  000000                OCTLNE: .WORD   0               ;OCT. EQUIV. OF TSTLNE (BIT8-11)
002000  000000                CRCSR:  .WORD   0               ;CONSOLE RECEIVE CSR
002002  000000                CRBUF:  .WORD   0               ;CONSOLE DATA BUFFER


                                ;*****************************************************************
                                ;TABLE OF VT61 COMMAND AND SEQUENCES
                                ;*****************************************************************

        000007                  .BEL    =007
002004  000007                BEL:    .WORD   007             ;BELL
        000015                  .CARRT  =015
002006  000015                CARRT:  .WORD   015             ;CARRIAGE RETURN
        000012                  .LNFED  =012
002010  000012                LNFED:  .WORD   012             ;LINE FEED
        000011                  .TAB    =011
002012  000011                TAB:    .WORD   011             ;TAB
                                ;*****************************************************************
002014  000001                        .WORD   01              ;TABLE DELIMITER (ESCN)
                                ;*****************************************************************

        000110                  .CHOM   =110
002016  000110                CHOM:   .WORD   110             ;HOME CURSOR  H

        000103                  .CRT    =103
002020  000103                CRT:    .WORD   103             ;CURSOR RIGHT  C

        000102                  .CDWN   =102
002022  000102                CDWN:   .WORD   102             ;CURSOR DOWN  B
```

```
                    000104                  .CLFT   =104
002024  000104      CLFT:   .WORD   104              ;CURSOR LEFT  D

                    000101                  .CUP    =101
002026  000101      CUP:    .WORD   101              ;CURSOR UP  A

                    000112                  .EOS    =112
002030  000112      EOS:    .WORD   112              ;ERASE TO END OF SCREEN  J

                                            ;*****************************************************************
002032  000002              .WORD   2                ;TABLE DELIMITER (ESC0)
                                            ;*****************************************************************

                    000101                  .EMAIN  =101
002034  000101      EMAIN:  .WORD   101              ;ENTER MAINTENANCE MODE  A
                    000141                  .DMAIN  =141
002036  000141      DMAIN:  .WORD   141              ;EXIT MAINTENANCE MODE  SA

                    000105                  .LKKB   =105
002040  000105      LKKB:   .WORD   105              ;LOCK KEYBOARD  E
                    000145                  .UNLKKB =145
002042  000145      UNLKKB: .WORD   145              ;UNLOCK KEYBOARD  SE

                    000103                  .DRECT  =103
002044  000103      DRECT:  .WORD   103              ;ENABLE LINEAR MODE  C

                    000133                  .CLRCK  =133
002046  000133      CLRCK:  .WORD   133              ;CLEAR RECEIVER CHECKSUM I

                    000134                  .CLTCK  =134
002050  000134      CLTCK:  .WORD   134              ;CLEAR TRANSMITTER CHECKSUM


                    000112                  .EEMP   =112
002052  000112      EEMP:   .WORD   112              ;ENABLE REVERSE  VIDEO  J
                    000152                  .DEMP   =152
002054  000152      DEMP:   .WORD   152              ;DISABLE REVERSE VIDEO  SJ

                    000137                  .IABT   =137
002056  000137      IABT:   .WORD   137              ;INITIALIZE ABORT FLAG  -

                                            ;*****************************************************************
002060  000003              .WORD   3                ;TABLE DELIMITER (ESCAPE P)
                                            ;*****************************************************************

                    000131                  .EAPNT  =131
002062  000131      EAPNT:  .WORD   131              ;ENABLE AUTO PRINT MODE  Y
                    000171                  .DAPNT  =171
002064  000171      DAPNT:  .WORD   171              ;DISABLE AUTO PRINT MODE  SY

                    000111                  .EINST  =111
002066  000111      EINST:  .WORD   111              ;ENABLE INSERT  I
                    000151                  .ERPL   =151
002070  000151      ERPL:   .WORD   151              ;ENABLE REPLACE  SI
```

```
1173
1174
1175                                    ;*****************************************************************
1176  002072  000004                            .WORD   4                       ;TABLE DELIMITER (I/O)
1177                                    ;*****************************************************************
1178
1179          054433                    .DCRAD  =054433
1180  002074  054433                    DCRAD:  .WORD   054433          ;DIRECT CURSOR ADDRESSING
1181          067467                    .R23C79 =067467
1182  002076  067467                    R23C79: .WORD   067467          ;CURSOR TO LOWER RIGHT
1183  002100  000000                            .WORD   0
1184
1185  002102  047433                    RCUR:   .WORD   047433          ;DIRECT CURSOR ADDRESSING
1186          000131                    .Y      =131
1187          000131                    .RDCUR  =00131
1188  002104  000131                    RDCUR:  .WORD   00131           ;READ CURSOR POSITION  Y
1189  002106  000000                            .WORD   0
1190
1191          000117                    .O      =117
1192  002110  047433                    ESCO:   .WORD   047433          ;ESCAPE O
1193          000126                    .XMTAL  =000126
1194  002112  000126                    XMTAL:  .WORD   000126          ;TRANSMIT ALL  V
1195  002114  000000                            .WORD   0
1196
1197  002116  047433                            .WORD   047433          ;ESCAPE O
1198          000127                    .TCUCH  =127
1199  002120  000127                    TCUCH:  .WORD   127             ;XMIT CHARACTER AT CURSOR.  W
1200  002122  000000                            .WORD   0
1201
1202  002124  047433                            .WORD   047433          ;ESCAPE O
1203          000135                    .TXRCK  =135
1204  002126  000135                    TXRCK:  .WORD   135             ;XMIT RECIEVER CHECKSUM ]
1205  002130  000000                            .WORD   0
1206
1207  002132  047433                            .WORD   047433          ;ESCAPE O
1208          000136                    .TXTCK  =136
1209  002134  000136                    TXTCK:  .WORD   136             ;XMIT TRANSMITTER CHECKSUM
1210  002136  000000                            .WORD   0
1211
1212  002140  147433                            .WORD   147433          ;ESCAPE O
1213          000140                    .RABT   =140
1214  002142  000140                    RABT:   .WORD   140             ;READ THE ABORT FLAG.  \
1215  002144  000000                            .WORD   0
1216
1217                                    ;*****************************************************************
1218  002146  177777                            .WORD   -1                      ;END OF TABLE TERMINATOR
1219                                    ;*****************************************************************
1220
1221                                    ;*****************************************************************
1222                                            ;PERIPHERAL COMMANDS
1223                                    ;*****************************************************************
1224
1225          000127                    .EPNT   =127
1226  002150  000127                    EPNT:   .WORD   127             ;ENABLE PRINT MODE.  W
1227          000130                    .DPNT   =130
1228  002152  000130                    DPNT:   .WORD   130             ;DISABLE PRINT MODE  X
```

```
1229
1230            000135                  .CPYSC  =135            ;COPY SCREEN  ]
1231            000136                  .ENAC   =136            ;ENABLE AUTO COPY MODE  ESC ↑
1232            000137                  .DISAC  =137            ;DISABLE AUTO COPY MODE  ESC -
1233            000150                  .PSCRN  =000150         ;PRINT THE SCREEN  H/SH
1234
1235
1236                                    ;*****************************************************************
1237                                            ;ESCAPE CODE EQUIVALENCES AND IDENTIFIERS
1238                                    ;*****************************************************************
1239
1240            000033                  .ESC    =033                    ;PRIMARY ESCAPE CODE.
1241            000120                  .P      =120
1242  002154    050033                  ESCP:   .WORD   050033          ;ESCAPE P
1243            000124                  .TSTER  =124
1244  002156    000124                  TSTER:  .WORD   124             ;TEST TERMINAL(ESC 0 T)
1245            002074                  ESCYI   =DCRAD                  ;ESCYI EQUALS DCRAD/DCRADI
1246            000057                  SLSH    =000057                 ;SLASH CODE FOR TERMINAL  IDENT ESC.
1247            000106                  CKGP    =106                    ;ENABLE REC.TO SUB 137 FROM ALL REC DATA
1248            000107                  NCKGP   =107                    ;ENABLE NORMAL RECEIVED DATA.
1249            000171                  CPABRT  =171                    ;COPIER ABORT
1250            000172                  PRABRT  =172                    ;PRINTER ABORT
1251            000170                  NABRT   =170                    ;NO ABORT  SX
1252  002160    000000                  IDENT:  .WORD   0               ;VT61 IDENT CODE
1253            002110                  ESCOI   =ESCO
1254            002154                  ESCPI   =ESCP
1255            002162                  ESCZI   =ESCZ
1256            055033                  .ESCZ   =055033
1257  002162    055033                  ESCZ:   .WORD   055033          ;OCTAL EQUIV. OF ESZ SEQUENCE
1258            000122                  .RESET  =122
1259  002164    000122                  RESET:  .WORD   122             ;VT61 INITIALIZE R
1260
1261  002166    000033                  ESCN:   .WORD   000033          ;ESCAPE N-FLAG
1262  002170    020041                  R01C00: .WORD   020041          ;ROW1,COL. 0
1263  002172    032041                  R01C20: .WORD   032041          ;ROW01,COLUMN 20
1264  002174    020066                  R22C00: .WORD   020066          ;ROW22,COL.00
1265  002176    020054                  R12C00: .WORD   020054          ;ROW 12,COLUMN 00
1266            020067                  .R23C00 =020067
1267  002200    020067                  R23C00: .WORD   020067          ;ROW23,COL.00
1268            025440                  .R00C11 =025440
1269  002202    025440                  R00C11: .WORD   025440          ;ROW,COL.11
1270            032040                  .R00C20 =032040
1271  002204    032040                  R00C20: .WORD   032040          ;ROW 0,COLUMN 20
1272  002206    024040                  R00C08: .WORD   024040          ;ROW 00,COLUMN 8
1273  002210    020040                  CUHME:  .WORD   020040          ;OCTAL EQUIV. OF CURSOR HOME.
1274  002212    067440                  R00C80: .WORD   067440          ;ROW 0, COLUMN 80.
1275  002214    067067                  R23C78: .WORD   067067          ;ROW 23,COL. 78.
1276            000040                  .R00    =40                     ;ROW 0
1277            000041                  .R01    =41                     ;ROW 1
1278            000054                  .R12    =54                     ;ROW 12
1279            000066                  .R22    =66                     ;ROW 22
1280            000067                  .R23    =67                     ;ROW 23
1281            000040                  .C00    =40                     ;COLUMN 0
1282            000043                  .C03    =43                     ;COL. 3
1283            000050                  .C08    =50                     ;COL. 8
1284            000053                  .C11    =53                     ;COL. 11
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                    000064                  .C20    =64                     ;COL. 20
                    000065                  .C21    =65                     ;COL. 21
                    000110                  .C40    =110                    ;COL. 40
                    000157                  .C79    =157                    ;COL. 79

                                            ;*****************************************************************
                                                    ;TEMPORARY STORAGE LOCATIONS AND
                                                    ;SPECIAL RECEIVE CODE EQUIVALENCES.
                                            ;*****************************************************************
                    000002                  SOM     =02                     ;START OF MESSAGE
                    000004                  EOM     =04                     ;END OF MESSAGE
                    000023                  XOFF    =23                     ;TURN OFF TRANSMISSION
                    000021                  XON     =21                     ;TURN ON TRANSMISSION
002216  000000      CHRD:   .WORD   0       ;STORAGE FOR SINGLE CH. READ
002220  000000      SVER1:  .WORD           ;TEMP. STORAGE R1.
002222  000000      SVER2:  .WORD           ;TEMP. STORAGE R2.
002224  000000      ZERO:   .WORD   0       ;MUST BE LEFT AS ZERO.
002226  003000      TYP6:   .WORD   3000    ;TYPE 6 OCTAL CHAR-NO ZEROS
002230  000000      TSTPTR: .WORD   0       ;TEST POINTER IN MANUAL SELECT MODE
002232  000000      MODE:   .WORD   0       ;BYTE0=TESTING MODE,BYTE1=INTERFACE TYPE
002234  000000      FTLCNT: .WORD   0       ;COUNT OF INCOMPLETE XMITS.
002236  000012      ALWCNT: .WORD   10.     ;# OF ALLOWABLE INCOMPLETE XMITS.
002240  000001      ONE:    .WORD   1
002242  000000      TOADD:  .WORD
002244  000000      BUBCT:  .WORD
002246  000000      TPREG:  0
002250  000000      PRESC:  .WORD           ;PRIMARY ESC COMMAND
002252  000000      ESSEQ:  .WORD           ;SEQUENCE ASSEMBLY AREA
002254  000000      DLAY:   .WORD
002256  000000      ROSVE:  .WORD           ;TEMP STORAGE FOR R0 ONLY.
002260  000000      VSTAT:  .WORD   0
002262  000000      BLKM:   .WORD   0       ;FLAG LOCATION FOR BLOCK MODE XMITS.
002264  000000      TSTNM:  .WORD   0       ;DISPLAY STORAGE FOR TEST NUMBER.


                                            ;*****************************************************************
                                                    ;AUTOMATIC SELECTION OF UNITS. TESTS 1 THROUGH 33 WILL BE
                                                    ;REPITIVELY EXECUTED FOR ALL UNITS.
                                            ;*****************************************************************

002266  005037  002232  AUTO:   CLR     MODE            ;ZERO THE MODE SWITCH
002272  000137  012154          JMP     SETA            ;;DO VECTOR SETUP
002276  004037  012670  AUTOA:  JSR     R0,TRPVEC       ;GO FIND GOOD DJ11S
002302  004037  012776          JSR     R0,CDEV         ;CHECK DJ11S FOUND
002306  004037  013536          JSR     R0,INITA        ;INSURE VT61S ON DJ11
002312  000137  002626          JMP     MONCK           ;VT61 PRESENT -BEGIN TESTING
002316  000767                  BR      AUTOA           ;NO VT61 FOUND LOOP IN CHECKING


                                            ;*****************************************************************

                                                    ;MANUAL UNIT AND TEST SELECTION.  UNITS CAN BE
                                                    ;SELECTED VIA CONSOLE OR AUTO SELECTION CAN
                                                    ;BE UTILIZED.  TESTS ENTERED VIA CONSOLE WILL
                                                    ;BE EXECUTED IN THE ORDER ENTERED.

                                            ;*********************'*******************************************
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1341
1342  002320  012737  000001  002232  MANS:   MOV     #1,MODE         ;SET MODE TO MANUAL SELECT.
1343  002326  000137  012154          MANSA:  JMP     SETA            ;GO SET UP CONSTANTS
1344  002332  104400  024233                  TYPE    ,DMANA
1345  002336  004037  012670                  JSR     R0,TRPVEC       ;FIND GOOD DJ11'S
1346  002342  012703  001570                  MOV     #INTAB,R3
1347  002346  005002                  BLDADD: CLR     R2
1348
1349  002350  004037  020570          BLDADA: JSR     R0,GTNUM        ;GET A KEYBOARD INPUT
1350  002354  120127  000054                  CMPB    R1,#54          ;CHAR. = COMMA?
1351  002360  001004                          BNE     1$              ;NO
1352  002362  004037  012624                  JSR     R0,TMNAD        ;YES-VERIFY THIS ADDRESS.
1353  002366  010223                          MOV     R2,(R3)+        ;STORE THIS ADDRESS
1354  002370  000766                          BR      BLDADD          ;AND LOOK FOR ANOTHER ADDRESS.
1355  002372  120137  002010          1$:     CMPB    R1,LNFED        ;CHAR. = LINE FEED?
1356  002376  001025                          BNE     3$              ;NO
1357  002400  005702                          TST     R2              ;ANY ENTRIES CREATED?
1358  002402  001414                          BEQ     2$              ;NO USE AUTO SELECTION OF UNITS
1359  002404  004037  012624                  JSR     R0,TMNAD        ;YES-VERIFY THIS ADDRESS,
1360  002410  010223                          MOV     R2,(R3)+        ;STORE LAST ADDRESS,
1361  002412  013723  002224                  MOV     ZERO,(R3)+      ;AND SET A TERMINATOR IN TABLE.
1362  002416  004037  012776                  JSR     R0,CDEV         ;CHECK DJ11 ON VT 61 SELECTED
1363  002422  005737  001560                  TST     DJTBL           ;ANY DJ11S GOOD?
1364  002426  001741                          BEQ     MANSA           ;NO-BACK TO SQUARE ONE
1365  002430  000137  002460                  JMP     BLDLNE          ;YES- GO GET TESTS
1366  002434  004037  012776          2$:     JSR     R0,CDEV         ;CHECK DJ11'S
1367  002440  004037  013536                  JSR     R0,INITA        ;VERIFY DJ11 HAVE VT61 ATTACHED
1368  002444  000137  002460                  JMP     BLDLNE          ;BEGIN LINE SELECTION
1369  002450  000730                          BR      MANSA           ;NO UNIT FOUND-LOOP
1370  002452  004037  020466          3$:     JSR     R0,OCTBIN       ;KEEP BUILDING ADDRESS
1371  002456  000734                          BR      BLDADA
1372  002460  104400  024363          BLDLNE: TYPE    ,DMANL          ;TYPE ENTER LINES MESSAGE.
1373  002464  012703  001630                  MOV     #DJLNE,R3       ;SET FIRST LINE ADDRESS.
1374  002470  005002                  BLDLNA: CLR     R2
1375  002472  004037  020570          10$:    JSR     R0,GTNUM        ;GET A KEYBOARD INPUT
1376  002476  120127  000054                  CMPB    R1,#54          ;CHAR. = COMMA?
1377  002502  001002                          BNE     1$              ;NO
1378  002504  010223                          MOV     R2,(R3)+        ;YES - STORE THIS ADDRESS
1379  002506  000770                          BR      BLDLNA          ;AND LOOK FOR ANOTHER LINE ENTRY.
1380  002510  120137  002010          1$:     CMPB    R1,LNFED        ;CHAR. = LINE FEED?
1381  002514  001403                          BEQ     2$              ;YES-SET TERMINATIORS AND EXIT.
1382  002516  004037  020466                  JSR     R0,OCTBIN       ;NO-KEEP BUILDING ADDRESS
1383  002522  000763                          BR      10$
1384  002524  010223                  2$:     MOV     R2,(R3)+        ;STORE LAST ADDRESS.
1385  002526  012723  177777                  MOV     #-1,(R3)+       ;STORE END OF ADD. TERMINATOR.
1386  002532  005013                          CLR     (R3)            ;STORE LAST LINE TERMINATOR
1387
1388  002534  104400  024333          BLDTST: TYPE    ,DMANB          ;TYPE 2ND PART OF MANUAL MESSAGE
1389  002540  012703  001570                  MOV     #INTAB,R3       ;USE INTAB AS TEST # STORAGE.
1390  002544  005004                          CLR     R4              ;CLEAR TEST COUNTER
1391  002546  005002                  11$:    CLR     R2              ;CLEAR ASSEMBL WORD
1392  002550  004037  020570          10$:    JSR     R0,GTNUM        ;GET A NUMERIC CHAR.
1393  002554  120127  000054                  CMPB    R1,#54          ;CHAR.=COMMA?
1394  002560  001006                          BNE     1$              ;NO
1395  002562  110223                          MOVB    R2,(R3)+        ;YES STORE A TEST #
1396  002564  005204                          INC     R4              ;AND INCREMENT TEST COUNT.
```

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1397  002566  020437  000040          CMP     R4,32.          ;COUNT =32?
1398  002572  001415                  BEQ     MODCK           ;YES ACCEPT NO MORE ENTRIES.
1399  002574  000764                  BR      11$             ;NO KEEP LOCKING
1400  002576  120137  002030  1$:     CMPB    R1,LNFED        ;CHAR. = LINE FEED?
1401  002602  001006                  BNE     2$              ;NO
1402  002604  110223                  MOVB    R2,(R3)+        ;LOAD THE LAST TEST
1403  002606  105013                  CLRB    (R3)            ;AND INSERT TEST TABLE TEPMINATOR
1404  002610  112737  000001  002232  MOVB    #1,MODE         ;SET MODE SWITCH TO MANUAL
1405  002616  000403                  BR      MODCK           ;AND BEGIN TESTING.
1406
1407  002620  004037  020466  2$:     JSR     R0,OCTBIN       ;CONVERT CHAR.
1408  002624  000751                  BR      10$
1409
1410                          ;*****************************************************************
1411                          ;THIS ROUTINE LOOKS FOR THE OPERATIONAL MODE REQUESTED AND
1412                          ;SELECTS THE NEXT UNIT TO BE TESTED.
1413
1414                          ;MODE 0 = ACCEPTANCE TYPE TEST
1415                          ;MODE 1 = OPERATOR SELECTION OF UNITS AND SEQUENCE OF TESTS.
1416                          ;*****************************************************************
1417
1418  002626  012737  001560  001752  MODCK:  MOV     #DJTBL,DJAPT    ;INITIAL SETUP OF ADDRESS
1419  002634  012737  001550  001750          MOV     #VVECT,VECPT    ;AND VECTOR POINTERS.
1420  002642  012737  001630  001754          MOV     #DJLNE,LNEPT    ;LOAD LINE POINTER.
1421  002650  012701  001762          MODCO:  MOV     #VJCSR,R1       ;LOAD ADDRESS DESTINATION
1422  002654  013702  001752                  MOV     DJAPT,R2        ;LOAD CURRENT ADDRESS POINTER
1423  002660  017703  177064                  MOV     @VECPT,R3       ;LOAD CURRENT VECTOR POINTER
1424  002664  005712                  TST     (R2)            ;ALL UNITS CHECKED?
1425  002666  001013                  BNE     1$              ;NO - CONTINUE
1426  002670  005737  002232                  TST     MODE            ;CHECK MODE
1427  002674  001002                  BNE     10$
1428  002676  000137  002276                  JMP     AUTOA           ;GO RESTART AUTO MODE
1429  002702  105777  177322          10$:    TSTB    @TSTPTR         ;MANUAL LOOP REQUESTED?
1430  002706  100001                  BPL     2$              ;NO
1431  002710  000746                  BR      MODCK           ;YES-RESTART COMPLETE TEST.
1432  002712  000137  002332          2$:     JMP     MANSA           ;GO RESTART MANUAL MODE
1433  002716  004037  014076          1$:     JSR     R0,LDADD        ;NO-LOAD NEXT ADDRESSES
1434  002722  010237  001752                  MOV     R2,DJAPT        ;SAVE ADDRESS POINTER.
1435  002726  010337  001772                  MOV     R3,VECT         ;STORE VECT. OF UNIT UNDER TEST
1436  002732  012723  015040                  MOV     #INTRC,(R3)+    ;YES - NOW SET UP RECEIVE VECTOR
1437  002736  012723  000340                  MOV     #340,(R3)+      ;AND SET RECEIVER PSW TO 7
1438  002742  012723  016014                  MOV     #INTXM,(R3)+    ;SET UP TRANSMIT VECTOR
1439  002746  012723  000340                  MOV     #340,(R3)+      ;AND SET PSW TO 7.
1440  002752  017737  176776  001774  MODCA:  MOV     @LNEPT,TSTLNE   ;LOAD LINE TO UTILIZED.
1441  002760  023727  001774  177777          CMP     TSTLNE,#-1      ;THIS LINE REALLY A SEPARATOR?
1442  002766  001007                  BNE     12$             ;NO-TEST IT.
1443  002770  062737  000002  001754          ADD     #2,LNEPT        ;YES-BUMP LINE POINTER ,UPDATE VECTOR
1444  002776  062737  000002  001750          ADD     #2,VECPT        ; POINTER AND GET NEXT ADDRESS.
1445  003004  000721                  BR      MODCO
1446  003006  005046                  12$:    CLR     -(SP)           ;CLEAR THE PSW,LSI11 STYLE.
1447  003010  012746  003016                  MOV     #100$,-(SP)
1448  003014  000002                  RTI
1449  003016  012737  031617  015756  100$:   MOV     #RCRLB+477,REBUF        ;SET UP END OF BUFFER
1450  003024  012737  032317  016264          MOV     #TCRLB+477,TEBUF
1451  003032  012737  031120  015754          MOV     #RCRLB,RBBUF    ;INITIIALIZE REC.BUFFER.
1452  003040  012737  031620  016262          MOV     #TCRLB,TBBUF    ;INITIALIZE TRANSMIT BUFFER.
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 1453  003046  004037  011262                JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
 1454  003052  005037  002262                CLR     BLKM            ;CLEAR BLOCK MODE FLAG.
 1455  003056  005037  002264                CLR     TSTNM           ;CLEAR CURRENT TEST LOCATION.
 1456  003062  005037  021652                CLR     XMZER           ;CLEAR ZERO TRANSMIT FLAG
 1457  003066  005037  002260                CLR     VSTAT           ;CLEAR ALL INTERRUPT FLAGS
 1458  003072  004037  020510                JSR     R0,CONVLN       ;CONVERT BINARY LINE # TO ,OCTAL.
 1459  003076  052777  000010  176656        BIS     #MCLR,@VJCSR    ;CLEAR SILO AND UARTS.
 1460  003104  000240                        NOP
 1461  003106  013777  001774  176652        MOV     TSTLNE,@VXTCR   ;LOAD THE XMITTER LINE #.
 1462  003114  052777  000401  176640        BIS     #SCAN,@VJCSR    ;ALLOW REC. AND XMIT. SCANS.
 1463  003122  004037  016452                JSR     R0,ZFLAG        ;ISSUE ESC Z TO VT61
 1464  003126  012637  002160                MOV     (SP)+,IDENT     ;;POP STACK INTO IDENT
 1465  003132  100002                        BPL     11$             ;IF IDENT IS -1,CLEAR IT.
 1466  003134  005037  002160                CLR     IDENT
 1467  003140                          11$:
 1469  003140  012637  002216                MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
 1469  003144  001375                        BNE     11$
 1470  003146  105037  002161                CLRB    IDENT+1         ;CLEAR ALL BUT IDENT BITS.
 1471  003152  104400  001167                TYPE    ,$CRLF
 1472  003156  104400  026132                TYPE    ,DVUNIT         ;ISSUE UNIT UNDER TEST MESSAGE
 1473  003162  013746  001762                MOV     VJCSR,-(SP)     ;;SAVE VJCSR FOR TYPEOUT
 1474                                                                  ;;TYPE THE ADDRESS
 1475  003166  104402                        TYPOS                   ;;GO TYPE--OCTAL ASCII
 1476  003170     006                        .BYTE   6               ;;TYPE 6 DIGIT(S)
 1477  003171     001                        .BYTE   1               ;;TYPE LEADING ZEROS
 1478  003172  017746  176552                MOV     @VECPT,-(SP)    ;;SAVE @VECPT FOR TYPEOUT
 1479                                                                  ;;TYPE THE VECTOR
 1480  003176  104402                        TYPOS                   ;;GO TYPE--OCTAL ASCII
 1481  003200     006                        .BYTE   6               ;;TYPE 6 DIGIT(S)
 1482  003201     000                        .BYTE   0               ;;SUPPRESS LEADING ZEROS
 1483  003202  013737  001776  002216        MOV     OCTLNE,CHRD
 1484  003210  000337  002216                SWAB    CHRD
 1485  003214  013746  002216                MOV     CHRD,-(SP)      ;;SAVE CHRD FOR TYPEOUT
 1486                                                                  ;;TYPE THE LINE
 1487  003220  104402                        TYPOS                   ;;GO TYPE--OCTAL ASCII
 1488  003222     006                        .BYTE   6               ;;TYPE 6 DIGIT(S)
 1489  003223     000                        .BYTE   0               ;;SUPPRESS LEADING ZEROS
 1490  003224  013746  002160                MOV     IDENT,-(SP)     ;;SAVE IDENT FOR TYPEOUT
 1491                                                                  ;;TYPE THE IDENT
 1492  003230  104402                        TYPOS                   ;;GO TYPE--OCTAL ASCII
 1493  003232     006                        .BYTE   6               ;;TYPE 6 DIGITS
 1494  003233     000                        .BYTE   0               ;;SUPPRESS LEADING ZEROS
 1495  003234  104400  001167                TYPE    ,$CRLF          ;CARRIAGE RETURN AND LINE FEED
 1496  003240  032737  000001  002160        BIT     #BIT00,IDENT    ;UNIT HAVE A COPIER?
 1497  003246  001402                        BEQ     20$             ;NO
 1498  003250  104400  026257                TYPE    ,DCOPYR         ;YES-ISSUE COPIER MESSAGE
 1499  003254  032737  000002  002160  20$:  BIT     #BIT01,IDENT    ;UNIT HAVE A PRINTER?
 1500  003262  001402                        BEQ     21$             ;NO
 1501  003264  104400  026231                TYPE    ,DPRTR          ;YES-ISSUE PRINTER MESSAGE.
 1502  003270  005037  002234          21$:  CLR     FTLCNT          ;CLEAR COUNT OF FATAL XMITS.
 1503  003274  062737  000002  001754        ADD     #2,LNEPT        ;UPDATE LINE POINTER.
 1504  003302  012737  032322  032320        MOV     #ABBUF,ABUFP    ;RESET THE REC. DATA POINTER
 1505  003310  052777  000100  176444        BIS     #RENA,@VJCSR    ;SET THE REC. INT. ENABLE  FOR TESTS
 1506  003316  105737  002232                TSTB    MODE            ;CHECK TESTING MODE
 1507  003322  001403                        BEQ     ASTRT           ;AUTO MODE
 1508  003324  012737  001570  002230        MOV     #INTAB,TSTPTR   ;LOAD THE INITIAL TEST NUMBER
```

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1509
1510                                    ;*****************************************************************
1511                                    ;*****************************************************************
1512                                            ;THIS TEST ISSUES ALL ESCAPE SEQUENCES AND
1513                                            ;INSURES THE VT61 HAS NOT FAILED DURING AN
1514                                            ;ESC SEQUENCE BY ISSUING A ESC Z TO FORCE A
1515                                            ;VT61 RESPONSE.  THE PURPOSE OF THE TEST IS TO ATTEMPT TO
1516                                            ;INSURE THAT SUBSEQUENT TESTS WILL NOT RESULT IN
1517                                            ;A "HUNG" UNIT.  DATA IS NOT EVALUATED.
1518                                    ;*****************************************************************
1519
1520  003332                            ASTRT:
1521                                    ;*****************************************************************
1522  003332  000C04                    TST1:   SCOPE
1523  003334  012737  000001  001156            MOV     #1,$TIMES       ;;DO 1 ITERATION
1524  003342  012737  003350  001106            MOV     #ESTST,$LPADR   ;;SET SCOPE LOOP ADDRESS
1525
1526  003350  012701  002004            ESTST:  MOV     #BEL,R1         ;POINT TO FIRST COMMAND
1527  003354  042777  000100  176400            BIC     #RENA,@VJCSR    ;CLEAR REC. INT. ENABLE
1528  003362  113737  001102  002264            MOVB    $TSTNM,TSTNM    ;LOAD THE TEST NUMBER.
1529  003370  005037  002250                    CLR     PRESC
1530  003374  005004                            CLR     R4
1531  003376                            ZERST:
1532  003376  013746  002224                    MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
1533  003402  012702  002250                    MOV     #PRESC,R2       ;SET UP SEQNENCE ADDRESS
1534  003406  012103                    GCMD:   MOV     (R1)+,R3        ;LOAD THE COMMAND
1535  003410  001405                            BEQ     1$              ;IF CHAR. ZERO,MUST BE XMIT TERMINATOR
1536  003412  100537                            BMI     ESTEX           ;TABLE EXPENDED - EXIT TEST.
1537  003414  120327  000004                    CMPB    R3,#4           ;IS COMMAND ACTUALLY A DELIMITER?
1538  003420  103444                            BLO     DELIM           ;YES, GO UPDATE FUNCTIONS
1539  003422  001473                            BEQ     SPTN            ;NO, ITS A "10" - SPECIAL CASE.
1540  003424  005704                    1$:     TST     R4              ;SEE IF FLAG INDICATING SEQ.
1541  003426  100474                            BMI     SEQ4            ;4 IS SET. - YES EXIT
1542  003430  010337  002252            2$:     MOV     R3,ESSEQ        ;PUSH THE SEQUENCE TO BE TESTED
1543  003434                            INXMT:
1544  003434  013746  002252                    MOV     ESSEQ,-(SP)     ;;PUSH ESSEQ ON STACK
1545  003440  005704                            TST     R4              ;DOES THIS SEQUENCE REQUIRE
1546  003442  001402                            BEQ     3$              ;ADDITIONAL ESC?
1547  003444  013746  002250                    MOV     PRESC,-(SP)     ;;PUSH PRESC ON STACK
1548
1549  003450  004037  014370            3$:     JSR     R0,TESC         ;GO TRANSMIT THIS SEQUENCE.
1550
1551  003454  005704                    4$:     TST     R4              ;IN I/O SEQUENCES?
1552  003456  100011                            BPL     40$             ;NO
1553  003460  012737  000054  020220            MOV     #44.,DCOUNT     ;YES,SET UP TO DELAY 1+ SEC.
1554  003466  004037  020156                    JSR     R0,DELAY
1555  003472  032777  100000  176264            BIT     #RRDY,@VRBUF    ;CLEAR THE SILO
1556  003500  001374                            BNE     .-6
1557
1558  003502  004037  016452            40$:    JSR     R0,ZFLAG        ;ISSUE ESC Z SEQUENCE-GET IDENT
1559  003506                            5$:
1560  003506  012637  002216                    MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
1561  003512  123737  002216  002160            CMPB    CHRD,IDENT      ;HAVE WE POPPED THE IDENT?
1562  003520  001045                            BNE     T1ERR           ;NO-ERROR CONDITION
1563  003522                            POPIT:
1564  003522  012637  002216                    MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
```

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1565  003526  001375                          BNE     .-4
1566  003530  000722                          BR      ZERST           ;GET NEXT COMMAND
1567
1568  003532  120327  000001        DELIM:    CMPB    R3,#1
1569  003536  001407                          BEQ     1$              ;FIRST DELIMITER - SET ESCN
1570
1571  003540  120327  000002                  CMPB    R3,#BIT01       ;SECOND DELIMITER - SET ESCO
1572  003544  001412                          BEQ     2$
1573
1574  003546  120327  000003                  CMPB    R3,#3           ;THIRD DELIMITER - SET ESCP
1575  003552  001413                          BEQ     3$
1576  003554  000714                          BR      GCMD            ;INVALID CHARACTER - GET ANOTHER
1577
1578  003556  012704  000001        1$:       MOV     #1,R4           ;SET FIRST DELIMITER FLAG.
1579  003562  013737  002166  002250          MOV     ESCN,PRESC      ;INSERT ESCN.
1580  003570  000706                          BR      GCMD
1581
1582  003572  013737  002110  002250  2$:     MOV     ESCO,@#PRESC    ;INSERT ESCO
1583  003600  000702                          BR      GCMD
1584
1585  003602  013737  002154  002250  3$:     MOV     ESCP,@#PRESC    ;INSERT ESCP
1586  003610  000676                          BR      GCMD
1587
1588  003612  012704  177777        SPTN:     MOV     #-1,R4          ;SET FLAG INDICATING I/O
1589  003616  000673                          BR      GCMD            ;SEQUENCES.
1590
1591  003620  005703                SEQ4:     TST     R3              ;CHECK IF COMMAND = 0
1592  003622  001704                          BEQ     INXMT           ;YES, COMPLETE SEQUENCE ASSEMBLED
1593  003624  110222                          MOVB    R3,(R2)+        ;NO - KEEP ASSEMBLING
1594  003626  000303                          SWAB    R3              ;POSITION HIGH  ORDER BIT
1595  003630  110322                          MOVB    R3,(R2)+        ;AND ASSEMBLE IT
1596  003632  000665                          BR      GCMD            ;GET ANOTHER BYTE
1597
1598  003634  004037  016654        T1ERR:    JSR     R0,CLREG
1599  003640  013737  002250  001124          MOV     PRESC,$GDDAT    ;AND INSERT IN ERROR
1600  003646  000337  001124                  SWAB    $GDDAT          ;REASSEMBLE FAILING SEQUENCES
1601  003652  013737  002252  001126          MOV     ESSEQ,$BDDAT
1602  003660  105737  002253                  TSTB    ESSEQ+1         ;IF UPPER BYTE IS CLEAR DO NOT SWAP
1603  003664  001402                          BEQ     1$
1604  003666  000337  001126                  SWAB    $BDDAT          ;MESSAGE 1
1605  003672  104001                1$:       ERROR   1               ;ISSUE ERROR MESSAGE
1606  003674  005237  002234                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
1607  003700  023737  002234  002236          CMP     FTLCNT,ALWCNT   ;FATAL XMITS EXCEEDED ALLOWED?
1608  003706  103003                          BHIS    FTEX1           ;YES-EXIT.
1609  003710  000704                          BR      POPIT           ;CLEAR THE STACK AND TRY ANOTHER COMMAND
1610  003712                        ESTEX:
1611  003712  012637  002216                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
1612  003716  052777  000100  176036  FTEX1:  BIS     #RENA,@VJCSR    ;SET THE REC. INT. ENABLE FOR TESTS
1613
1614                                  ;*****************************************************************
1615                                          ;ROUTINE TO INSURE ENTERING MAINTENANCE MODE CAUSES SOM AND
1616                                          ;EOM TO BE APPENDED TO ALL TRANSMITS FROM VT61 UNDER TEST.
1617                                          ;MAINTENANCE MODE IS ENTERED , THEN AN ESCAPE Z SEQUNECE
1618                                          ;IS ISSUED TO THE UNIT AND THE RESULTING TRANSMISSION IS
1619                                          ;CHECKED OF SOM/EOM.
1620                                  ;*****************************************************************
```

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1621
1622                                    ;*****************************************************************
1623  003724  000004                    TST2:   SCOPE
1624  003726  012737  000005  001156            MOV     #5,$TIMES       ;;DO 5 ITERATIONS
1625  003734  012737  003742  001106            MOV     #CKMNT,$LPADR   ;;SET SCOPE LOOP ADDRESS
1626
1627  003742  004037  016272            CKMNT:  JSR     R0,RESETV       ;RESET THE UNIT AND SETMAINT. MODE.
1628  003746  112777  000002  012312            MOVB    #SOM,@TBUFP     ;XMIT THE START OF MESSAGE.
1629  003754  004037  017152                    JSR     R0,XMIT1
1630  003760  112777  002162  012300            MOVB    ESCZ,@TBUFP
1631  003766  004037  017152                    JSR     R0,XMIT1        ;SEND AN IDENT REQUEST.
1632  003772  112777  002163  012266            MOVB    ESCZ+1,@TBUFP
1633  004000  004037  017152                    JSR     R0,XMIT1
1634  004004  112777  000004  012254            MOVB    #EOM,@TBUFP     ;XMIT END OF MESSAGE.
1635  004012  004037  017152                    JSR     R0,XMIT1
1636  004016  005037  002254                    CLR     DLAY            ;SET UP SOM DELAY OF 100M.S.
1637  004022  032737  040000  002260  1$:       BIT     #RSOM,VSTAT     ;RECEIVED THE START OF MESSAGE?
1638  004030  001003                            BNE     CKEOM           ;YES-GO LOOK FOR EOM.
1639  004032  005337  002254                    DEC     DLAY            ;NO-RUN TIMEOUT DELAY
1640  004036  001371                            BNE     1$              ;AND KEEP LOOKING.
1641
1642  004040  012701  000062            CKEOM:  MOV     #50.,R1         ;SET MAX DELAY FOR 500 M.S.
1643  004044  032737  020000  002260  1$:       BIT     #REOM,VSTAT     ;REECIVED END OF MESSAGE?
1644  004052  001007                            BNE     10$             ;YES-CHECK FOR BOTH RECEIVED.
1645  004054  012737  000001  020220            MOV     #1,DCOUNT       ;DELAY FOR 10 M..S.
1646  004062  004037  020156                    JSR     R0,DELAY
1647  004066  005301                            DEC     R1              ;AND KEEP LOOKING.
1648  004070  001365                            BNE     1$
1649  004072  032737  040000  002260  10$:      BIT     #RSOM,VSTAT     ;RECEIVED SOM?
1650  004100  001404                            BEQ     2$              ;NO ISSUE ERROR
1651  004102  032737  020000  002260            BIT     #REOM,VSTAT     ;RECEIVED EOM?
1652  004110  001007                            BNE     EXMNT           ;YES, NO ERRORS-EXIT.
1653  004112  012737  006001  001124  2$:       MOV     #6001,$GDDAT    ;LOAD ERROR WITH EXPECTED
1654  004120  013737  002260  001126            MOV     VSTAT,$BDDAT    ;AND ACTUAL STATUS.
1655  004126  104022                            ERROR   22
1656
1657  004130  000240                    EXMNT:  NOP
1658                                    ;*****************************************************************
1659                                            ;THIS TEST INSURES THAT THE CURSOR WILL RESPOND
1660                                            ;TO DIRECT CUSROR ADDRESSING  THE UNIT IS RESET AND THE CURSOR
1661                                            ;POSITION IS VERIFIED TO BE HOME . THE CURSOR IS THEN MOVED
1662                                            ;TO POSITION ROW 23 COLUMN 80 AND THE POSITION IS AGAIN
1663                                            ;VERIFIED. ERRORS ARE REPORTED IF THE POSITIONS ARE INCORRECT.
1664
1665                                    ;*****************************************************************
1666
1667
1668                                    ;*****************************************************************
1669  004132  000004                    TST3:   SCOPE
1670  004134  012737  000005  001156            MOV     #5,$TIMES       ;;DO 5 ITERATIONS
1671  004142  012737  004150  001106            MOV     #CURS1,$LPADR   ;;SET SCOPE LOOP ADDRESS
1672
1673  004150  013701  016262            CURS1:  MOV     TBBUF,R1        ;USE R1 AS XMIT BUFFER POINTER.
1674  004154  004037  016272                    JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
1675  004160  013721  002110                    MOV     ESC0I,(R1)+     ;CLFT. RESET, READ CURSOR
1676  004164  113721  002104                    MOVB    RDCUR,(R1)+     ;POSITION, CURSOR LEFT.
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1677  004170  012737  000003  016270          MOV     #3,XMCNT        ;XMIT 3 BYTES
1678
1679  004176  004037  016676                  JSR     R0,XMREC        ;XMIT AND RECEIVE.
1680  004202  000402                          BR      10$             ;NORMAL EXIT.
1681  004204  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
1682  004206  000446                          BR      2$              ;EXIT TEST.
1683  004210  013701  031120          10$:    MOV     RCRLB,R1        ;GET THE CURRENT CURSOR POSITION.
1684  004214  020137  002210                  CMP     R1,CUHME        ;CURSOR REALLY HOME?
1685  004220  001405                          BEQ     1$              ;YES EXIT
1686  004222  104012                          ERROR   12              ;VT61 FAILURE MESSAGE
1687  004224  013746  002210                  MOV     CUHME,-(SP)     ;;PUSH CUHME ON STACK
1688  004230  004037  017342                  JSR     R0,CURER        ;GO LOAD AND ISSUE CURSOR ERROR
1689
1690  004234  013701  016262          1$:     MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
1691  004240  013721  002074                  MOV     DCRAD,(R1)+
1692  004244  013721  002076                  MOV     R23C79,(R1)+    ;CURSOR TO ROW 23,COL.79
1693  004250  013721  002110                  MOV     ESC0I,(R1)+     ;READ CURSOR POSITION
1694  004254  013721  002104                  MOV     RDCUR,(R1)+     ;IT AND CURSOR RIGHT
1695  004260  012737  000007  016270          MOV     #7,XMCNT        ;XMIT 7 BYTES.
1696  004266  004037  016676                  JSR     R0,XMREC        ;XMIT AND RECEIVE
1697  004272  000402                          BR      20$             ;NORMAL EXIT.
1698  004274  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
1699  004276  000412                          BR      2$              ;EXIT TEST.
1700  004300  012701  031120          20$:    MOV     #RCRLB,R1
1701
1702  004304  023711  002076                  CMP     R23C79,(R1)     ;CHECK CURSOR POSITION TO LOWER RT.
1703  004310  001405                          BEQ     2$              ;OK, EXIT
1704  004312  104012                          ERROR   12              ;VT61 FAILURE MESSAGE
1705  004314  013746  002076                  MOV     R23C79,-(SP)    ;;PUSH R23C79 ON STACK
1706  004320  004037  017342                  JSR     R0,CURER        ;LOAD AND ISSUE CURSOR ERROR .
1707  004324  000240                  2$:     NOP
1708                                  ;*****************************************************************
1709                                  ;ROUTINE TO INSURE THE UNIT CAN ENTER LINEAR ADDRESSING
1710                                  ;MODE.  81 CHARACTERS ARE ISSUED TO THE UNIT UNDER TEST
1711                                  ;THEN THE CURSOR POSITION IS READ AND MUST BE ROW1,COL.0.
1712                                  ;*****************************************************************
1713
1714                                  ;*****************************************************************
1715  004326  000004                  TST4:   SCOPE
1716  004330  012737  000005  001156          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
1717  004336  012737  004344  001106          MOV     #CKLIN,$LPADR   ;;SET SCOPE LOOP ADDRESS
1718
1719  004344  004037  016272          CKLIN:  JSR     R0,RESETV       ;RESET THE UNIT-SET MAINT AND LINEAR MODES
1720  004350  013701  016262                  MOV     TBBUF,R1
1721  004354  012703  000120                  MOV     #80.,R3
1722  004360  004037  020222                  JSR     R0,BLDINC       ;LOAD XMIT BUFFER WITH 80 CHAR AND
1723  004364  013721  002102                  MOV     RCUR,(R1)+
1724  004370  013721  002104                  MOV     RDCUR,(R1)+     ;READ CURSOR POSINION.
1725  004374  012737  000123  016270          MOV     #83.,XMCNT
1726  004402  004037  016676                  JSR     R0,XMREC        ;XMIT THE BUFFER.
1727  004406  000402                          BR      1$
1728  004410  104011                          ERROR   11              ;LAST XMIT CAUSED UNIT TO HANG.
1729  004412  000421                          BR      LINXT           ;EXIT TEST
1730  004414  023777  002170  011332  1$:     CMP     R01C00,@RBBUF   ;CURSOR  AT ROW1,COL. 0?
1731  004422  001415                          BEQ     LINXT           ;YES-EXIT
1732  004424  013737  002110  001124          MOV     ESC0,$GDDAT
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 1733  004432  000337  001124                  SWAB    $GDDAT
 1734  004436  013737  002344  001126          MOV     DRECT,$BDDAT    ;ISSUE ESC SEQUENCE AND CURSOR
 1735  004444  104001                          ERROR   1
 1736  004446  013746  002170                  MOV     R01CDD,-(SP)    ;;PUSH R01CDD ON STACK
 1737  004452  004037  017342                  JSR     R0,CURER
 1738  004456  000240                  LINXT:  NOP
 1739
 1740
 1741                                          ;*****************************************************************
 1742                                          ;TEST TO INSURE OPERATION OF XON/XOFF COMMANDS
 1743                                          ;FROM VT61. XOFF IS FORCED BY TRANSMITTING LINE 23 WHILE SIMUL-
 1744                                          ;TANEOUSLY FILLING THE SILO WITH DATA. AFTER SENSING
 1745                                          ;THE XOFF, THE TEST WAITS FOR THE TRANSMIT TO FINISH AND
 1746                                          ;INSURES XON OCCURS BEFORE THE MAX. TRANSFER TIME HAS ELAPSED.
 1747                                          ;(30 SECONDS)
 1748                                          ;*****************************************************************
 1749
 1750                                          ;*****************************************************************
 1751  004460  000004                  TSTS:   SCOPE
 1752  004462  012737  000010  001156          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
 1753  004470  012737  004476  001106          MOV     #BASC3,$LPADR   ;;SET SCOPE LOOP ADDRESS
 1754  004476  013701  016262          BASC3:  MOV     TBBUF,R1        ;R1 = 1ST XMIT BUFFER ADDRESS.
 1755  004502  012737  001001  002262          MOV     #1001,BLKM      ;SET XMIT TO SOM- DATA -EOM.
 1756  004510  005037  002260                  CLR     VSTAT
 1757  004514  004037  016272                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
 1758  004520  013721  002074                  MOV     DCRAD,(R1)+
 1759  004524  013721  002200                  MOV     R23C00,(R1)+    ;CURSOR TO ROW 23, COL.0
 1760  004530  013721  002110                  MOV     ESC0,(R1)+
 1761  004534  013721  002112                  MOV     XMTAL,(R1)+     ;TRANSMIT THE LINE.
 1762  004540  012703  000050                  MOV     #40.,R3
 1763  004544  004037  020222                  JSR     R0,BLDINC       ;40 CHAR. OF INCREMENTING CHAR.
 1764  004550  012737  000057  016270          MOV     #47.,XMCNT      ;SET UP TO XMIT 47 BYTES
 1765  004556  052777  040000  175176          BIS     #XENA,@VJCSR    ;TRANSMIT ENABLES
 1766  004564  012703  000050                  MOV     #40.,R3         ;MAXIMUM DELAY EQUAL 400 M.S.
 1767  004570  012737  000001  020220  2$:     MOV     #1,DCOUNT
 1768  004576  004037  020156                  JSR     R0,DELAY        ;DELAY FOR 10 MILLISEC.
 1769  004602  032737  100000  002260          BIT     #RXOFF,VSTAT    ;CHECK FOR XOFF
 1770  004610  001007                          BNE     3$              ;FOUND IT EXIT THIS SECTION.
 1771  004612  005303                          DEC     R3              ;DELAYED 400 M.S.?
 1772  004614  001365                          BNE     2$              ;NO-KEEP LOOKING FOR XOFF.
 1773  004616  104012                          ERROR   12              ;GENERAL VT61 FAILURE MESSAGE
 1774  004620  012746  100000                  MOV     #100000,-(SP)   ;;PUSH #100000 ON STACK
 1775  004624  004037  016512                  JSR     R0,CKSFT        ;GO REPORT ERROR
 1776  004630                          3$:
 1777  004630  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
 1778  004634  012746  000062                  MOV     #50.,-(SP)      ;;PUSH #50. ON STACK
 1779  004640  004037  021654                  JSR     R0,WTBGND
 1780  004644  000411                          BR      EXIT3           ;TIMEOUT-EXIT TEST.
 1781  004646  127727  025446  000021          CMPB    @ABUFP,#XON     ;RECEIVED A XON?
 1782  004654  001405                          BEQ     EXIT3           ;YES-NO ERROR-EXIT
 1783
 1784  004656  104012                          ERROR   12              ;GENERAL VT61 FAILURE MESSAGE
 1785  004660  012746  000001                  MOV     #000001,-(SP)   ;;PUSH #000001 ON STACK
 1786  004664  004037  016512                  JSR     R0,CKSFT
 1787  004670  004037  017262          EXIT3:  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
 1788
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1789                                    ;*****************************************************************
1790                                    ;ROUTINE TO VERIFY OPERATION OF XOFF AND XON TO THE VT61.
1791                                    ;A FULL SCREEN TRANSMIT IS INITIATED AND A SERIES OF XOFF AND
1792                                    ;XON ARE ISSUED TO THE TERMINAL SEQUENTIALLY.
1793                                    ;ERRORS ARE REPORTED IF XOFF DOES NOT STOP OR XON RESTART
1794                                    ;THE TRANSMISSION. TEST IS ENDED WHEN EOM IS SENSED.
1795                                    ;*****************************************************************
1796
1797                                    ;*****************************************************************
1798  004674  000004                    TST6:   SCOPE
1799  004676  012737  000001  001156            MOV     #1,$TIMES       ;;DO 1 ITERATION
1800  004704  012737  004712  001106            MOV     #ONOF61,$LPADR  ;;SET SCOPE LOOP ADDRESS
1801
1802  004712  004037  016272            ONOF61: JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
1803  004716  042737  077577  002260            BIC     #77577,VSTAT    ;CLEAR THE FLAGS
1804  004724  013746  002224                    MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
1805  004730  013746  002112                    MOV     XMTAL,-(SP)     ;;PUSH XMTAL ON STACK
1806  004734  013746  002110                    MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
1807  004740  004037  014370                    JSR     R0,TESC
1808  004744  012737  000010  020220    ONOFLP: MOV     #10,DCOUNT      ;ALLOW 100 M.S. FOR OPERATION
1809  004752  004037  020156                    JSR     R0,DELAY        ;TO BEGIN.
1810  004756  112777  000023  011302            MOVB    #XOFF,@TBUFP
1811  004764  004037  017152                    JSR     R0,XMIT1        ;SEND A XOFF TO VT61.
1812  004770  012704  000036                    MOV     #30.,R4
1813  004774  013705  032320            OFFLP:  MOV     ABUFP,R5        ;ALLOW 300M.S. FOR XMIT TO CEASE
1814  005000  012737  000001  020220            MOV     #1,DCOUNT
1815  005006  004037  020156                    JSR     R0,DELAY
1816  005012  023705  032320                    CMP     ABUFP,R5
1817  005016  001406                            BEQ     ONOFA           ;XMIT STOPPED-GO RESTART IT.
1818  005020  005304                            DEC     R4
1819  005022  001364                            BNE     OFFLP           ;COUNTER NO EQUAL 300 MS-LOOP
1820  005024  013737  002260  001120            MOV     VSTAT,$GDADR    ;UNIT DID NOT RESPOND TO XOFF
1821  005032  104015                            ERROR   15              ;ISSUE ERROR
1822
1823  005034  112777  000021  011224    ONOFA:  MOVB    #XON,@TBUFP
1824  005042  004037  017152                    JSR     R0,XMIT1        ;SEND A XON TO THE VT61.
1825  005046  012704  000036                    MOV     #30.,R4         ;SET UP FOR 300MS DELAY.
1826  005052  032737  020000  002260    ONLP:   BIT     #REOM,VSTAT     ;EOM RECEIVED?
1827  005060  001020                            BNE     ONOFXT          ;YES-EXIT
1828  005062  013705  032320                    MOV     ABUFP,R5
1829  005066  012737  000001  020220            MOV     #1,DCOUNT
1830  005074  004037  020156                    JSR     R0,DELAY        ;ALLOW 300 MS FOR XMIT TO RESTART
1831  005100  023705  032320                    CMP     ABUFP,R5
1832  005104  001317                            BNE     ONOFLP          ;IT RESTARTED-GO STOP IT.
1833  005106  005304                            DEC     R4
1834  005110  001360                            BNE     ONLP            ;NOT YET 300 MS LOOP.
1835  005112  013737  002260  001120            MOV     VSTAT,$GDADR    ;XMIT DIT NOT RESTART-ISSUE
1836  005120  104016                            ERROR   16              ;ERROR AND EXIT
1837  005122  000240                    ONOFXT: NOP
1838
1839                                    ;*****************************************************************
1840                                    ;ROUTINE TO TEST VT61 RAM AND THE COMMUNICATION PATHS.
1841                                    ;THIS ROUTINE ISSUES A SERIES OF PATTERNS(77/100,100/77,
1842                                    ;52/125,INCREMENTING,AND REV. VIDEO INCREMENTING) TO THE VT61.
1843                                    ;THE SCREEN IS THEN TRANSMITTED TO THE HOST AND AFTER EACH
1844                                    ;ITERATION RECEIVED DATA IS CHECKED AND ALL ERRORS(INCLUDING
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                                        ;TRANSMISSION) ARE REPORTED.
                                    ;*****************************************************************
                                    ;*****************************************************************
005124  000004                    TST7:   SCOPE
005126  012737  000001  001156            MOV     #1,$TIMES       ;;DO 1 ITERATION
005134  012737  005142  001106            MOV     #MEM1,$LPADR    ;;SET SCOPE LOOP ADDRESS

005142  004037  016272            MEM1:   JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XCN.
005146  005005                    MEMA:   CLR     R5              ;CLEAR PATTERN OFFSET.
005150  016504  005656            MEMA:   MOV     MPATT(R5),R4    ;LOAD PATTERN TO BE TRANSMMITTED
005154  004037  017262                    JSR     R0,RESPTR       ;RESET POINTERS
005160  042737  077577  002260            BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
005166  112777  000002  011072            MOVB    #SOM,@TBUFP     ;XMIT THE START OF MESSAGE.
005174  004037  017152                    JSR     R0,XMIT1
005200  012702  003600                    MOV     #TOTCH,R2       ;LOAD A COUNT OF SCREEN
005204  005302                    MEMB:   DEC     R2              ;DECREMENT XMIT COUNT
005206  001414                            BEQ     10$             ;COUNT = ZERO?

005210  004037  005624            12$:    JSR     R0,PATGN        ;NO-GENERATE NEXT BYTE TO XMIT.
005214  110477  011046                    MOVB    R4,@TBUFP       ;LOAD THE CHARACTER.
005220  004037  017152                    JSR     R0,XMIT1        ;NO-XMIT ANOTHER BYTE.
005224  023737  002234  002236            CMP     FTLCNT,ALWCNT   ;EXCEEDED FATAL ERROR COUNT?
005232  103764                            BLO     MEMB            ;NO-CHECK IF ANOTHER TRANSMISSION REQUIRED.
005234  000137  005676                    JMP     MEMXT           ;YES-GO ABORT TEST.
005240  112777  000004  011020  10$:     MOVB    #EOM,@TBUFP     ;XMIT END OF MESSAGE.
005246  004037  017152                    JSR     R0,XMIT1
005252  004037  017262                    JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.

005256  013701  016262                    MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
005262  013721  002166                    MOV     ESCN,(R1)+
005266  013721  002016                    MOV     CHOM,(R1)+      ;CURSOR HOME
005272  013721  002162                    MOV     ESCZI,(R1)+     ;ESCAPE Z
005276  013721  002110                    MOV     ESCO,(R1)+
005302  013721  002112                    MOV     XMTAL,(R1)+     ;TRANSMIT ALL
005306  013711  002010                    MOV     LNFED,(R1)      ;LINE FEED.
005312  012737  000010  016270            MOV     #8.,XMCNT       ;SET UP TO XMIT 8 BYTES
005320  004037  016676                    JSR     R0,XMREC        ;XMIT,WAIT FOR REC. EOM
005324  000402                            BR      1$              ;NORMAL EXIT
005326  104011                            ERROR   11              ;LAST TRANSMIT CAUSES VT61 TO HANG
005330  000562                            BR      MEMXT           ;EXIT TEST
005332  042737  077577  002260  1$:       BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
005340  005002                            CLR     R2              ;CLEAR RECEIVE COUNTER.
005342  016504  005656                    MOV     MPATT(R5),R4    ;LOAD PATTERN
005346  012703  032120                    MOV     #TCRLB+300,R3   ;SET UT ERROR STORAGE
005352  013701  015754                    MOV     RBBUF,R1        ;SET UP RECEIVE POINTER
005356  005037  002254            MEMC:   CLR     DLAY            ;SET UP TIME OUT DELAY
005362  013737  015754  015760            MOV     RBBUF,RBUFP     ;RESET RECEIVE POINTER
005370  023701  015760            1$:     CMP     RBUFP,R1        ;RECEIVED A CHAR?
005374  001013                            BNE     MEMD            ;YES-GO CHECK IT.
005376  032737  020000  002260            BIT     #EOM,VSTAT      ;HAVE WE RECEIVED EOM?
005404  001033                            BNE     CKDAT           ;YES, GO CHECK FOR DATA ERRORS
005406  005337  002254                    DEC     DLAY            ;RUN TIME OUT DELAY.
005412  001366                            BNE     1$              ;NOT EXPIRED-KEEP LOOKING.
005414  005237  002234                    INC     FTLCNT          ;TRANSMISSION FAILED-INCR. FATAL COUNT
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 1900  005420  104011                        ERROR   11
 1901  005422  000525                        BR      MEMXT
 1902  005424  005202              MEMD:     INC     R2              ;DATA IN. INCREMENT COUNTER
 1903  005426  004037  005624               JSR     R0,PATGN        ;GET GOOD CHARACTER ,PUT IN R4 AND
 1904  005432  122705  000010               CMPB    #10,R5          ;CHECKING REV. VIDEO DATA?
 1905  005436  001002                       BNE     1$              ;NO-DO NOT MODIFY
 1906  005440  052704  000200               BIS     #BIT07,R4       ;YES-FORCE BIT 7.
 1907  005444  121104              1$:       CMPB    (R1),R4         ;COMPARE DATA
 1908  005446  001743                       BEQ     MEMC
 1909  005450  020227  003600               CMP     R2,#TOTCH       ;COMPARING LAST CHAR?
 1910  005454  001740                       BEQ     MEMC            ;YES-NEVER COUNT AS A ERROR.
 1911
 1912  005456  020327  032170               CMP     R3,#TCRLB+350   ;STORED 20 ERRORS?
 1913  005462  103335                       BHIS    MEMC            ;YES-STORE NO MORE.
 1914  005464  110423                       MOVB    R4,(R3)+        ;STORE THE GOOD DATA.
 1915  005466  111123                       MOVB    (R1),(R3)+      ;STORE THE BAD DATA.
 1916  005470  010223                       MOV     R2,(R3)+        ;STORE THE RECEIVE COUNT.
 1917  005472  000731                       BR      MEMC
 1918  005474  022703  032120      CKDAT:   CMP     #TCRLB+300,R3
 1919  005500  001415                       BEQ     CKMEM
 1920  005502  012701  032120               MOV     #TCRLB+300,R1   ;LOAD FIRST ERROR ADDRESS.
 1921  005506  004037  016654      1$:      JSR     R0,CLREG        ;CLEAR ERROR REGISTERS
 1922  005512  112137  001124               MOVB    (R1)+,$GDDAT    ;LOAD THE GOOD DATA.
 1923  005516  112137  001126               MOVB    (R1)+,$BDDAT    ;LOAD THE ERROR BUFFER
 1924  005522  012137  001120               MOV     (R1)+,$GDADR    ;LOAD RECEIVE COUNT
 1925  005526  104004                       ERROR   4               ;ISSUE DATA ERROR MESSAGE.
 1926  005530  020103                       CMP     R1,R3           ;ISSUED ALL ERRORS?
 1927  005532  103765                       BLO     1$              ;NO-CONTINUE
 1928
 1929  005534  020227  003600      CKMEM:   CMP     R2,#TOTCH       ;DID WE XFER 1920 TIMES?
 1930  005540  001406                       BEQ     1$              ;YES - GO CHECK STATUS
```

```
 1931  005542  012737  003600  001124          MOV     #TOTCH,$GDDAT   ;NO. PUT GOOD COUNT IN GDDAT
 1932  005550  010237  001126                  MOV     R2,$BDDAT       ;AND ACTUAL COUNT IN BDDAT.
 1933  005554  104005                          ERROR   5               ;ISSUE COUNT ERROR.
```

```
1934
1935  005556                                  1$:
1936  005556  012746  060000                          MOV     #60000,-(SP)    ;;PUSH #60000 ON STACK
1937  005562  004037  015512                          JSR     R0,CKSFT
1938  005566  062705  000002                          ADD     #2,R5           ;INCREMENT PATTERN POINTER
1939  005572  005765  005656                          TST     MPATT(R5)       ;TEST NEXT PATTERN
1940  005576  001437                                  BEQ     MEMXT           ;ZERO-END OF TEST EXIT.
1941  005600  100007                                  BPL     2$              ;NOT INCRMENTING PATTERN.
1942  005602  022705  000010                          CMPB    #10,R5          ;SET REVERSE VIDEO?
1943  005606  001004                                  BNE     2$              ;NO.
1944  005610  012703  005672                          MOV     #SETREV,R3      ;YES-ENTER REVERSE VIDEO
1945  005614  004037  017222                          JSR     R0,LDXMIT       ;AND RE-ISSUE INCREMENTING PATTERN.
1946  005620  000137  005150          2$:     JMP     MEMA            ;NOT ZERO, GO EXERCISE IT.
1947
1948  005624  042704  000200          PATGN:  BIC     #200,R4         ;CLEAR REV. VIDEO BIT IF SET.
1949  005630  005704                          TST     R4              ;CHECK R4 FOR PATTERN
1950  005632  100402                          BMI     1$              ;IF MINUS, DO INCREMENTING.
1951  005634  000304                          SWAB    R4              ;OTHERWISE SWAP BYTES AND
1952  005636  000200                          RTS     R0              ;EXIT.
1953  005640  105204                  1$:     INCB    R4              ;ADD ONE TO INCREMENTING
1954  005642  120427  000177                  CMPB    R4,#177         ;HAVE WE EXCEEDED LIMIT
1955  005646  103402                          BLO     2$              ;NO, EXIT
1956  005650  016504  005656                  MOV     MPATT(R5),R4    ;YES, RESET PATTERN AND
1957  005654  000200                  2$:     RTS     R0              ;EXIT.
1958                                          .EVEN
1959          005656                  MPATT   =.
1960  005656  037500                          .WORD   037500          ;PATTERN 77,100
1961  005660  040077                          .WORD   040077          ;PATTERN 100,77
1962  005662  025125                          .WORD   025125          ;PATTERN 52,125
1963  005664  100040                          .WORD   100040          ;PATTERN INCREMENTING
1964  005666  100040                          .WORD   100040          ;PATTERN INCREMENTING-REV. VIDEO.
1965  005670  000000                          .WORD   0               ;PATTERN TABLE TERMINATOR
1966                                          ;SEQUENCE TO ENTER REVERSE VIDEO.
1967  005672     033     117     112  SETREV: .BYTE   .ESC,.O,.EEMP,0
1968  005675     000
1969  005676  000240                  MEMXT:  NOP
1970
1971                                  ;*****************************************************
1972
1973                                          ;ROUTINE TO TEST THE ABILITY OF THE VT61 TO CALCULATE
1974                                          ;AND TRANSMIT CHECKSUMS OF BOTH TRANSMITTED AND RECEIVED
1975                                          ;DATA.  SUBTEST A TRANSMITS A FULL BUFFER UPDATING A CALCULATED
1976                                          ;CHECKSUM ON EACH CHARACTER TRANSMITTED.  AN ESCAPE SEQUENCE
1977                                          ;REQUESTING THE RECEIVER CHECKSUM IS EMBEDDED AT THE END OF
1978                                          ;XMIT BUFFER AND THE RECEIVED CHECKSUM IS COMPARED TO THE
1979                                          ;CALCULATED.  SUBTEST B PERFORMS THE SAME TYPE OF CHECK ON
1980                                          ;THE VT61 TRANSMIT CHECKSUM,UTILIZING THE DATA SENT TO THE VT61
1981                                          ;IN SUBTEST A,DURING A FULL SCREEN TRANSMIT.
1982
1983                                  ;*****************************************************
1984
1985                                  ;*****************************************************
1986  005700  000004                  TST10:  SCOPE
1987  005702  012737  000003  001156          MOV     #3,$TIMES       ;;DO 3 ITERATIONS
1988  005710  012737  005716  001106          MOV     #CKSUMA,$LPADR  ;;SET SCOPE LOOP ADDRESS
1989
```

```
005716 004037 016272          CKSUMA: JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
005722 004037 017262                  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS
005726 012737 001001 002262           MOV     #1001,BLKM      ;SET XMIT TO SOM- DATA -EOM.
005734 012703 006344                  MOV     #ITSUMA,R3      ;DIS. RECT. MODE AND CLEAR CHECKSUM
005740 004037 017222                  JSR     R0,LDXMIT
005744 042737 077577 002260           BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
005752 013701 016262                  MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
005756 012703 000473                  MOV     #315.,R3
005762 004037 020222                  JSR     R0,BLDINC       ;314 INCREMENTING CHAR.
005766 113721 002166                  MOVB    ESCN,(R1)+
005772 113721 002016                  MOVB    CHOM,(R1)+      ;CURSOR HOME
005776 113721 002110                  MOVB    ESCO,(R1)+
006002 113721 002111                  MOVB    ESCO+1,(R1)+
006006 113711 002126                  MOVB    TXRCK,(R1)      ;TRANSMIT RECEIVER CHECKSUM.
006012 005004                         CLR     R4              ;CLEAR CHECKSUM REGISTER
006014 012705 000004                  MOV     #EOM,R5         ;PRELOAD CHECKSUM REG. WITH
006020 004037 020700                  JSR     R0,CALCK        ;EOM FROM PRIOR XMIT.
006024 052737 002000 002260           BIS     #CKSUM,VSTAT    ;REQUEST CHECKSUM CALCULATIONS.
006032 012737 000500 016270           MOV     #320.,XMCNT     ;SETUP TO XMIT 320 BYTES
006040 052777 040000 173714           BIS     #XENA,@VJCSR    ;ENABLE XMIT INTERRUPTS
006046 012746 020000                  MOV     #REOM,-(SP)     ;;PUSH #REOM ON STACK
006052 012746 000012                  MOV     #10.,-(SP)      ;;PUSH #10. ON STACK
006056 004037 021654                  JSR     R0,WTBGND       ;LOOK FOR EOM.
006062 000524                         BR      CKEXT           ;ERROR EXIT IF NOT FOUND
006064 127704 007664                  CMPB    @RBBUF,R4       ;COMPARE CHECKSUMS
006070 001414                         BEQ     CKSUMB          ;GOOD GO TO SUBTEST B
006072 004037 016654                  JSR     R0,CLREG        ;BAD COMPARE
006076 110437 001124                  MOVB    R4,$GDDAT       ;LOAD CALCULATED CHECKSUM
006102 117737 007646 001126           MOVB    @RBBUF,$BDDAT   ;AND VT61 RECEIVER CHECKSUM
006110 104013                         ERROR   13              ;ISSUE ERROR
006112 012746 060001                  MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
006116 004037 016512                  JSR     R0,CKSFT        ;ERROR.

006122 042737 077577 002260   CKSUMB: BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
006130 005004                         CLR     R4              ;CLEAR CHECKSUM REGISTER
006132 052737 000100 002260           BIS     #TXSUM,VSTAT    ;SET UP FOR XMIT CHECKSUM GENERATION.
006140 012737 001001 002262           MOV     #1001,BLKM      ;SET XMIT TO SOM- DATA -EOM.
006146 013701 016262                  MOV     TBBUF,R1
006152 004037 020746                  JSR     R0,LDBUF        ;LOAD THE BUFFER WITH:
006156    033    117    134           .BYTE   .ESC,.O,.CLTCK,.ESC,.O,.XMTAL,.ESC,.O,.TXTCK,0
006161    033    117    126
006164    033    117    136
006167    000
006170 012737 000011 016270           MOV     #9.,XMCNT       ;SET UP TO XMIT 9 BYTES
006176 052777 040000 173556           BIS     #XENA,@VJCSR    ;ALLOW XMIT INTERRUPTS
006204 012746 000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
006210 012746 000002                  MOV     #2,-(SP)        ;;PUSH #2 ON STACK
006214 004037 021654                  JSR     R0,WTBGND       ;LOOK FOR XMIT DONE.
006220 000455                         BR      CKEXT           ;TIME OUT - EXIT TEST.
006222 005037 002254          CKSRC:  CLR     DLAY            ;SET UP TIME OUT DELAY
006226 013702 032320                  MOV     ABUFP,R2        ;RESET THE RECEIVER FLAG
006232 023702 032320          1$:     CMP     ABUFP,R2        ;RECEIVED A CHAR?
006236 001007                         BNE     2$              ;YES-GO CHECK IT.
006240 005337 002254                  DEC     DLAY            ;RUN TIME OUT DELAY.
006244 001372                         BNE     1$
006246 005237 002234                  INC     FTLCNT          ;TIMED OUT-INCREMENT FATAL XMIT COUNT
```

```
006252  104011                          ERROR   11              ;ISSUE HUNG MESSAGE AND EXIT.
006254  000437                          BR      CKEXT
006256  122777  000004  024034  2$:     CMPB    #EOM,@ABUFP     ;RECEIVED EOM CHAR?
006264  001355                          BNE     C/SRC
006266  042737  020000  002260          BIC     #RECM,VSTAT     ;CLEAR THE EOM FLAG
006274  032737  020000  002260          BIT     #RECM,VSTAT     ;NOW WAIT FOR LAST EOM FLAG
006302  001774                          BEQ     .-6             ;FROM XMIT TRANSMITTER CHECKSUM.
006304  120477  007444                  CMPB    R4,@RBBUF       ;COMPARE 61 TO HOST CHECKSUM.
006310  001421                          BEQ     CKEXT           ;EQUAL - EXIT TEST
006312  004037  016654                  JSR     R0,CLREG
006316  110437  001124                  MOVB    R4,$GDDAT       ;LOAD THE HOST CALCULATED CHECKSUM
006322  117737  007426  001126          MOVB    @RBBUF,$BDDAT   ;LOAD THE VT61 TRANSMITTED CHECKSUM
006330  104014                          ERROR   14              ;ISSUE VT61 XMIT CHECKSUM ERROR
006332  012746  060001                  MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
006336  004037  016512                  JSR     R0,CKSFT        ;CHECK FOR STATUS ERROR
006342  000404                          BR      CKEXT

006344     033     117     103  ITSJMA: .BYTE   .ESC,.0,. ECT,.ESC,.0, CLRCK,0,0
006347     033     117     133
006352     000     000

006354  004037  017262          CKEXT:  JSR     R0,RESPTR

                                ;*****************************************************************
                                ;ROUTINE TO INSURE BASIC CURSOR COMMANDS
                                ;RESULT IN CORRECT CURSOR MOVEMENT. COMMANDS
                                ;ARE ISSUED IN THE SEQUENCE:  RESET, CURSOR RIGHT,
                                ;CURSOR DOWN, CURSOR LEFT, AND CURSOR UP. THE READ
                                ;CURSOR POSITION COMMAND IS ISSUED AFTER EVERY
                                ;CURSOR COMMAND AND CURRENT IS COMPARED TO GOOD
                                ;AND ANY ERRORS REPORTED.
                                ;*****************************************************************

                                ;*****************************************************************
006360  000004          TST11:  SCOPE
006362  012737  000005  001156          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
006370  012737  006376  001106          MOV     #CURS1A,$LPADR  ;;SET SCOPE LOOP ADDRESS

006376  013701  016262          CURS1A: MOV     TBBUF,R1        ;LOAD XMIT BUFFER ADDRESS
006402  004037  016272                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
006406  004037  020746                  JSR     R0,LDBUF        ;LOAD THE BUFFER WITH:
006412     033     103     033          .BYTE   .ESC,.CRT,.ESC,.0,.RDCUR,.ESC,.CDWN,.ESC
006415     117     131     033
006420     102     033
006422     117     131     033          .BYTE   .0,.RDCUR,.ESC,.CLFT,.ESC,.0,.RDCUR
006425     104     033     117
006430     131
006431     033     101     033          .BYTE   .ESC,.CUP,.ESC,.0,.RDCUR,.BEL,0
006434     117     131     007
006437     000
006440  012737  000024  016270          MOV     #20.,XMCNT      ;SET TO XMIT 20 CHARACTERS
006446  012737  000004  017144          MOV     #4,RECITT       ;SET RECEIVE ITERATION TO 4
006454  012737  031720  017146          MOV     #TCRLB+100,WDSTOR;SET UP WORD STORAGE POINTER
006462  004037  016676                  JSR     R0,XMREC        ;XMIT ,AND WAIT FOR REC.DONE
006466  000402                          BR      11$             ;NORMAL EXIT
006470  104011                          ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG.
```

```
002132  006472  000436                        BR      CUR1XT          ;EXIT TEST
002133  006474  012701  006560          11$:  MOV     #GDCURP,R1      ;R1=GOOD POSITION TABLE
002134  006500  012702  031720                MOV     #TCRLB+100,R2   ;R2=ACTUAL CURSOR POSITION
002135  006504  012703  002020                MOV     #CRT,R3         ;R3=CURSOR COMMAND TABLE
002136
002137  006510  021112                  12$:  CMP     (R1),(R2)       ;COMPARE GOOD TO ACTUAL
002138  006512  001415                        BEQ     2$              ;OK-GO UPDATE POINTERS.
002139  006514  113737  002166  001125        MOVB    ESCN,$GDDAT+1
002140  006522  111337  001124                MOVB    (R3),$GDDAT     ;LOAD COMMAND IN ESC ERROR
002141  006526  005037  001126                CLR     $BDDAT
002142  006532  104001                        ERROR   1               ;AND ISSUE IT
002143  006534  011237  031120                MOV     (R2),RCRLB      ;LOAD BAD CURSOR POSITION
002144  006540  011146                        MOV     (R1),-(SP)      ;;PUSH (R1) ON STACK
002145  006542  004037  017342                JSR     R0,CURER        ;LOAD AND ISSUE CURSRO ERROR MESSAGE
002146  006546  022122                  2$:   CMP     (R1)+,(R2)+     ;INCREMENT POSITION POINTERS.
002147  006550  022337  002026                CMP     (R3)+,CUP       ;CHECK FOR COMMAND TERM.(CUP).
002148  006554  001355                        BNE     12$             ;NOT AT TERMINATOR-COMPARE AGAIN
002149  006556  000404                        BR      CUR1XT          ;EXIT TEST
002150
002151
002152  006560  020440          GDCURP: .WORD   20440           ;ROW 0, COL. 1
002153  006562  020441                  .WORD   20441           ;ROW 1, COL. 1
002154  006564  020041                  .WORD   20041           ;ROW 1, COL. 0
002155  006566  020040                  .WORD   20040           ;ROW 0, COL. 0
002156  006570  000240          CUR1XT: NOP
002157
002158                          ;*****************************************************************
002159                                  ;ROUTINE TO INSURE THAT READ CHARACTER AT CURSOR
002160                                  ;FUNCTIONS CORRECTLY. COMMAND SEQUENCE IS:  RESET, A, CURSOR
002161                                  ;LEFT, READ  CHARACTER AT CURSOR.
002162                                  ;AN ERROR IS REPORTED IF THE LAST READ IS NOT AN "A".
002163                          ;*****************************************************************
002164
002165                          ;*****************************************************************
002166  006572  000004          TST12:  SCOPE
002167  006574  012737  000005  001156        MOV     #5,$TIMES       ;;DO 5 ITERATIONS
002168  006602  012737  006610  001106        MOV     #CURS1B,$LPADR  ;;SET SCOPE LOOP ADDRESS
002169
002170  006610  013701  016262          CURS1B: MOV     TBBUF,R1
002171  006614  004037  016272                JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
002172  006620  012721  000101                MOV     #101,(R1)+      ;A
002173  006624  113721  002166                MOVB    ESCN,(R1)+
002174  006630  113721  002024                MOVB    CLFT,(R1)+      ;CURSOR LEFT
002175  006634  013721  002110                MOV     ESCOI,(R1)+
002176  006640  013711  002120                MOV     TCUCH,(R1)      ;TRANSMIT CH. AT CURSOR
002177  006644  012737  000006  016270        MOV     #6,XMCNT        ;SET UP TO XMIT 6 CHARACTERS
002178  006652  004037  016676                JSR     R0,XMREC        ;XMIT STRING AND WAIT FOR EOM.
002179  006656  000402                        BR      10$             ;NORMAL EXIT
002180  006660  104011                        ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG/FAIL
002181  006662  000430                        BR      2$              ;EXIT TEST
002182  006664  127727  007064  000101  10$:  CMPB    @RBBUF,#101     ;CHARACTER READ=A
002183  006672  001424                        BEQ     2$              ;YES-NEXT SUBTEST
002184  006674  013737  002110  001124        MOV     ESCOI,$GDDAT
002185  006702  000337  001124                SWAB    $GDDAT          ;REASSEMBLE ESC DATA
002186  006706  005037  001126                CLR     $BDDAT
002187  006712  113737  002120  001127        MOVB    TCUCH,$BDDAT+1  ;LOAD FAILING ESC SEQUENCE
```

```
2158  006720  104001                          ERROR   1               ;AND ISSUE IT
2159  006722  004037  016654                  JSR     R0,CLREG
2160  006726  112737  000101  001124          MOVB    #101,$GDDAT     ;LOAD GOOD CH. AND CH.
2161  006734  117737  007014  001126          MOVB    @RBBUF,$BDDAT
2162  006742  104004                          ERROR   4               ;READ AND ISSUE THEM.
2163
2164  006744  000240                  2$:     NOP                     ;END OF TEST
2165                                  ;*****************************************************************
2166                                  ;ROUTINE TO VERIFY OPERATION OF REPLACE AND INSERT MODE.
2167                                  ;INITIALLY ROW 0 IS WRITTEN TO 80 INCREMENTING CHAR.
2168                                  ;ON THE FIRST PASS(REPLACE MODE) A CHARACTER IS REPLACED
2169                                  ;AT HOME AND THE CHAR. AT ROW0,COL.0(172) AND ROW1,COL0(NULL)
2170                                  ;ARE VERIFIED. ON THE SECOND PASS, INSERT MODE IS ENTERED
2171                                  ;AND THE RESULTING INSERTION(AT HOME) IS VERIFIED.ROW0,COL0
2172                                  ;SHOULD BE 172 AND ROW1,COL0 SHOULD BE 161.
2173                                  ;*****************************************************************
2174
2175                                  ;*****************************************************************
2176  006746  000004                  TST13:  SCOPE
2177  006750  012737  000005  001156          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
2178  006756  012737  006764  001106          MOV     #INRPL,$LPADR   ;;SET SCOPE LOOP ADDRESS
2179
2180  006764  004037  016272          INRPL:  JSR     R0,RESETV       ;RESET THE UNIT
2181  006770  013701  016262                  MOV     TBBUF,R1
2182  006774  005201                          INC     R1              ;LEAVE ROOM IN BUFFER FOR SOM.
2183  006776  012703  000120                  MOV     #80.,R3         ;CREATE A LINE OF 80 INCREMENTING
2184  007002  004037  020222                  JSR     R0,BLDINC       ;CHAR. ON THE SCREEN.
2185  007006  105011                          CLRB    (R1)
2186  007010  013703  016262                  MOV     TBBUF,R3
2187  007014  004037  017222                  JSR     R0,LDXMIT
2188  007020  005005                          CLR     R5              ;USE R5 AS TEST INDEXER.
2189  007022  012737  000002  017144  INAG:   MOV     #2,RECITT       ;SET UP TO RECEIVE 2 CHAR.
2190  007030  012737  032020  017150          MOV     #TCRLB+200,BYSTOR       ;SET UP STORAGE AREA.
2191  007036  013701  016262                  MOV     TBBUF,R1
2192  007042  004037  020746                  JSR     R0,LDBUF        ;LOAD THE BUFFER WITH:
2193  007046     033     110     172          .BYTE   .ESC,.CHOM,172,.ESC,.CHOM,.ESC,.0,.TCUCH
2194  007051     033     110     033
2195  007054     117     127
2196  007056     033     102     033          .BYTE   .ESC,.CDWN,.ESC,.0,.TCUCH,0
2197  007061     117     127     000
2198  007064  012737  000015  016270          MOV     #13.,XMCNT      ;SET UP TO XMIT 13 CAHR.
2199  007072  004037  016676                  JSR     R0,XMREC
2200  007076  000402                          BR      1$              ;NORMAL EXIT
2201  007100  104011                          ERROR   11              ;LAST XMIT CAUSED UNIT TO HANG.
2202  007102  000433                          BR      INRXT           ;EXIT TEST.
2203  007104  026537  007162  032020  1$:     CMP     TDATA(R5),TCRLB+200     ;COMPARE GOOD TO REC.DATA.
2204  007112  001407                          BEQ     2$              ;GOOD-LOOP OR EXIT.
2205  007114  016537  007154  001126          MOV     TFUNCT(R5),$BDDAT
2206  007122  013737  002154  001124          MOV     ESCP,$GDDAT     ;LOAD ESCAPE SEQ. ERROR.
2207  007130  104001                          ERROR   1
2208  007132  005725                  2$:     TST     (R5)+           ;INCREMENT INDEXER.
2209  007134  020527  000004                  CMP     R5,#4           ;THRU WITH TEST?
2210  007140  001414                          BEQ     INRXT           ;YES-EXIT.
2211  007142  012703  007166                  MOV     #ENSRT,R3       ;NO-SECOND PASS- ENTER
2212  007146  004037  017222                  JSR     R0,LDXMIT       ;INSERT MODE AND DO AGAIN.
2213  007152  000723                          BR      INAG
```

```
2214
2215  007154  000151  000111  177777  TFUNCT: .WORD   .ERPL,.EINST,-1
2216  007162     172     000     172  TDATA:  .BYTE   172,0,172,160
2217  007165     160
2218  007166     033     120     111  ENSRT:  .BYTE   .ESC,.P,.EINST,0
2219  007171     000
2220  007172  000240                  INRXT:  NOP
2221
2222                                  ;*****************************************************************
2223                                          ;ROUTINE TO INSURE VT61 WILL SCROLL IF A LINE FEED
2224                                          ;IS ISSUED FROM ROW 23 OR A DATA ENTRY FROM ROW23,COL. 79.
2225                                          ;IN SUBTEST A, ROW 0 IS INTIIALLY WRITTEN TO A 0 AND ROW 1
2226                                          ;A 1. AFTER COMPLETION OF A LINE FEED(AND RESULTING SCROLL)
2227                                          ;ROW 00,COL.00 IS EXPECTED TO CONTAIN A 1.
2228                                          ;IN SUBTEST B, THE CURSOR IS PLACED AT ROW23,COL.79
2229                                          ;AND A DATA CHARACTER "A" IS ENTERED. THE CURSOR
2230                                          ;POSITION IS THEN READ AND SHOULD BE ROW23,COL.00. THE
2231                                          ;CHARACTER AT HOME IS VERIFIED TO BE A NULL.
2232                                  ;*****************************************************************
2233
2234                                  ;*****************************************************************
2235  007174  000004                  TST14:  SCOPE
2236  007176  012737  000005  001156          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
2237  007204  012737  007212  001106          MOV     #CKSCRA,$LPADR  ;;SET SCOPE LOOP ADDRESS
2238
2239  007212  004037  016272          CKSCRA: JSR     R0,RESETV       ;RESET THE UNIT.
2240  007216  013701  016262                  MOV     TBBUF,R1
2241  007222  004037  020746                  JSR     R0,LDBUF        ;LOAD THE XMIT BUFFER WITH:
2242  007226     060     033     102          .BYTE   60,.ESC,.CDWN,.ESC,.CLFT,61,.ESC,.Y,.R23,.C00
2243  007231     033     104     061
2244  007234     033     131     067
2245  007237     040
2246  007240     012     033     110          .BYTE   .LNFED,.ESC,.CHOM,.ESC,.0,.TCUCH,.BEL,0
2247  007243     033     117     127
2248  007246     007     000
2249  007250  012737  000020  016270          MOV     #16.,XMCNT      ;SET UP TO XMIT 16 BYTES.
2250  007256  004037  016676                  JSR     R0,XMREC
2251  007262  000402                          BR      1$              ;NORMAL EXIT
2252  007264  104011                          ERROR   11              ;LAST XMIT CAUSED UNIT TO HANG.
2253  007266  000452                          BR      GDSCRL          ;EXIT TEST.
2254  007270  127727  006460  000061  1$:     CMPB    @RBBUF,#61      ;CHARACTER AT HOME A 1?
2255  007276  001401                          BEQ     CKSCRB          ;YES-NEXT TEST
2256  007300  104023                          ERROR   23              ;NO-ISSUE NO SCROLL ERROR.
2257  007302  012737  000002  017144  CKSCRB: MOV     #2,RECITT       ;SET UP FOR TWO REC. LOOPS.
2258  007310  012737  032020  017146          MOV     #TCRLB+200,WDSTOR       ;SET UP CURSOR POSITION STROAGE.
2259  007316  013701  016262                  MOV     TBBUF,R1
2260  007322  004037  020746                  JSR     R0,LDBUF        ;LOAD XMIT BUFFER WITH:
2261  007326     033     131     067          .BYTE   .ESC,.Y,.R23,.C79,101,.ESC,.0,.RDCUR
2262  007331     157     101     033
2263  007334     117     131
2264  007336     033     110     033          .BYTE   .ESC,.CHOM,.ESC,.0,.TCUCH,0
2265  007341     117     127     000
2266  007344  012737  000015  016270          MOV     #13.,XMCNT      ;SET UP TO XMIT 13 BYTES.
2267  007352  004037  016676                  JSR     R0,XMREC        ;XMIT AND WAIT FOR RECEIVED DONE.
2268  007356  000402                          BR      1$
2269  007360  104011                          ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG.
```

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2270  007362  000414                          BR      GDSCRL          ;ERROR EXIT
2271  007364  127737  006364  002224  1$:     CMPB    @RBBUF,ZERO     ;NULL RECEIVED?
2272  007372  001410                          BEQ     GDSCRL          ;YES-EXIT TEST
2273  007374  104023                          ERROR   23              ;NO-ISSUE NO SCROLL ERROR.
2274  007376  013777  032020  006350          MOV     TCRLB+200,@RBBUF        ;LOAD RECEIVED CURSOR POSITION.
2275  007404  013746  002200                  MOV     R23C00,-(SP)    ;;PUSH R23C00 ON STACK
2276  007410  004037  017342                  JSR     R0,CURER        ;GO ISSUE CURSOR ERROR.
2277  007414  000240                  GDSCRL: NOP
2278
2279
2280                                  ;*****************************************************************
2281                                  ;THIS TEST INSURES THAT THE VT61 CURSOR CAN BE
2282                                  ;POSITIONED TO VERY POSSIBLE ROW/COLUMN POSITON
2283                                  ;ON THE SCREEN.  THIS IS TESTED BY FILLING THE
2284                                  ;COMPLETE SCREEN WITH A CHARACTER(A) AND THEN
2285                                  ;POSITONING THE CURSOR (VIA DCA) TO EVERY POSITION
2286                                  ;AND THE "A" AT THAT POSITION IS REPLACED WITH A SPACE.
2287                                  ;THE SCREEN IS THEN READ TO VERIFY THAT ONLY SPACES
2288                                  ;EXIST ON THE SCREEN.  ALL POSITIONS CONTAINING
2289                                  ;NON-SPACES ARE REPORTED.
2290
2291                                  ;*****************************************************************
2292
2293                                  ;*****************************************************************
2294  007416  000004                  TST15:  SCOPE
2295  007420  012737  000001  001156          MOV     #1,$TIMES       ;;DO 1 ITERATION
2296  007426  012737  007434  001106          MOV     #CURS2,$LPADR   ;;SET SCOPE LOOP ADDRESS
2297
2298  007434  042737  077577  002260  CURS2:  BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
2299  007442  004037  016272                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
2300  007446  012702  003600                  MOV     #TOTCH,R2       ;LOAD A COUNT OF SCREEN(1920).
2301  007452  112777  000002  005606          MOVB    #SOM,@TBUFP     ;XMIT THE START OF MESSAGE.
2302  007460  004037  017152                  JSR     R0,XMIT1
2303  007464  005302                  1$:     DEC     R2              ;DECREMENT XMIT COUNT
2304  007466  001413                          BEQ     10$             ;COUNT = ZERO?
2305
2306  007470  112777  000101  006570          MOVB    #101,@TBUFP     ;LOAD THE CHARACTER(A).
2307  007476  004037  017152                  JSR     R0,XMIT1        ;NO-XMIT ANOTHER BYTE.
2308  007502  023737  002234  002236          CMP     FTLCNT,ALWCNT   ;EXCEEDED FATAL ERROR COUNT?
2309  007510  103765                          BLO     1$              ;NO-CHECK IF XMIT COMPLETE.
2310  007512  000137  010102                  JMP     C2XT            ;YES-GO ABORT TEST.
2311  007516  004037  017262          10$:    JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
2312  007522  013737  002214  017544          MOV     R23C78,LNRW     ;SET UP 1ST ADDRESS
2313  007530  013701  016262                  MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
2314  007534  013721  002074                  MOV     DCRAD,(R1)+
2315  007540  010102                          MOV     R1,R2           ;R2 POINTS TO CURSOR ADD. IN BUFFER
2316  007542  013721  002214                  MOV     R23C78,(R1)+    ;CURSOR TO LOWER RIGHT -1.
2317  007546  112721  000040                  MOVB    #40,(R1)+       ;SPACE
2318  007552  012737  000005  016270  2$:     MOV     #5,XMCNT        ;SET UP TO XMIT 5 CHARACTERS
2319  007560  042737  077577  002260          BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
2320  007566  052777  040000  172166          BIS     #XENA,@VJCSR    ;XMIT INTERRUPTS.
2321  007574  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
2322  007600  012746  000002                  MOV     #2,-(SP)        ;;PUSH #2 ON STACK
2323  007604  004037  021654                  JSR     R0,WTBGND       ;LOOK FOR  XMIT DONE
2324  007610  000534                          BR      C2XT            ;NOT FOUND-ERROR EXIT
2325  007612  021237  002210                  CMP     (R2),CUHME      ;DELETED TO HOME?
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2326  007616  001405                          BEQ     3$              ;YES
2327  007620  004037  017440                  JSR     R0,CMPOS        ;NO-GET NEXT POSITION TO BE DELETED
2328  007624  013712  017544                  MOV     LNRW,(R2)       ;LOAD IT IN XMIT BUFFER
2329  007630  000750                          BR      2$              ;AND DELETE IT.
2330  007632  004037  017262          3$:     JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS
2331  007636  013737  002210  017544          MOV     CUHME,LNRW      ;LOAD INITIAL CHECK POSITION(HOME)
2332  007644  013701  016262                  MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
2333  007650  010102                          MOV     R1,R2           ;STORE ERRORS IN XMIT BUFFER
2334  007652  042737  077577  002260          BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
2335  007660  012737  001001  002262          MOV     #1001,BLKM      ;SET XMIT TO SOM- DATA -EOM.
2336  007666  013721  002166                  MOV     ESCN,(R1)+
2337  007672  013721  002016                  MOV     CHOM,(R1)+      ;CURSOR HOME
2338  007676  013721  002110                  MOV     ESCO,(R1)+
2339  007702  013721  002112                  MOV     XMTAL,(R1)+     ;TRANSMIT ALL
2340  007706  012737  000005  016270          MOV     #5,XMCNT
2341  007714  052777  040000  172040          BIS     #XENA,@VJCSR    ;SET XMIT ENABLE
2342  007722  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
2343  007726  012746  000003                  MOV     #3,-(SP)        ;;PUSH #3 ON STACK
2344  007732  004037  021654                  JSR     R0,WTBGND       ;LOOK FOR SOM OR XMIT DONE
2345  007736  000461                          BR      C2XT            ;NOT FOUND-ERROR EXIT
2346  007740  013701  015760          4$:     MOV     RBUFP,R1        ;SET UP RECEIVE FLAG
2347  007744  005037  002254                  CLR     DLAY            ;SET UP TIME OUT DELAY
2348  007750  020137  015760          40$:    CMP     R1,RBUFP        ;CHARACTER RECEIVED?
2349  007754  103411                          BLO     41$             ;YES-GO CHECK IT.
2350  007756  032737  020000  002260          BIT     #RECM,VSTAT     ;LOOK FOR END OF MESSAGE
2351  007764  001025                          BNE     C2CK            ;FOUND IT, EXIT TEST
2352  007766  005337  002254                  DEC     DLAY            ;RUN TIME OUT DELAY.
2353  007772  001366                          BNE     40$             ;AND LOOK FOR RECEIVED CH.
2354  007774  104011                          ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG.
2355  007776  000420                          BR      C2CK            ;GO SEE IF ANY ERRORS STORED.
2356  010000  013737  015754  015760  41$:    MOV     RBBUF,RBUFP     ;RESET RECEIVE POINTER
2357  010006  127727  005742  000040          CMPB    @RBBUF,#40      ;CHAR EQUAL A SPACE?
2358  010014  001003                          BNE     6$              ;NOT A SPACE-MUST BE ERROR-STORE IT
2359  010016  004037  017502          5$:     JSR     R0,CPPOS        ;UPDATE CURSOR POSITION
2360  010022  000746                          BR      4$
2361  010024  022702  031644          6$:     CMP     #TCRLB+20.,R2   ,STORED 10 ERRORS?
2362  010030  101772                          BLOS    5$              ;YES-IGNORE ANY FURTHER ERRORS.
2363  010032  013722  017544                  MOV     LNRW,(R2)+      ;STORE FAILING CURSOR POSITION
2364  010036  000767                          BR      5$
2365
2366  010040  020237  016262          C2CK:   CMP     R2,TBBUF        ;ANY ERRORS STORED?
2367  010044  001416                          BEQ     C2XT            ;NO EXIT TEST
2368  010046  013701  016262                  MOV     TBBUF,R1        ;USE R1 AS ERROR POINTER
2369  010052  021137  002076          1$:     CMP     (R1),R23C79     ;CURSOR TO LOWER RIGHT?
2370  010056  001411                          BEQ     C2XT            ;YES-NOT AN ERROR.
2371  010060  104012                          ERROR   12              ;NO-ISSUE ERROR MESSAGES
2372  010062  012746  020040                  MOV     #20040,-(SP)    ;;PUSH #20040 ON STACK
2373  010066  012177  005662                  MOV     (R1)+,@RBBUF    ;LOAD FAILING POS.
2374  010072  004037  017342                  JSR     R0,CURER        ;ISSUE CURSOR ERROR
2375  010076  020102                          CMP     R1,R2           ;DONE WITH ERRORS?
2376  010100  103764                          BLO     1$              ;NO, DUMP ANOTHER.
2377  010102  000240          C2XT:   NOP                             ;EXIT TEST
2378
2379                          ;*****************************************************************
2380                                  ;ROUTINE TO INSURE PROPER OPERATION OF CARRIAGE RETURN
2381                                  ;AND LINE FEED DURING NORMAL MODE. INITIALLY THE CURSOR IS
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                                        ;SET(VIA D.C.A.) TO ROW0,COL 20 AND A LINE FEED IS ISSUED
                                        ;THE CURSOR POSITION IS THEN READ AND MUST BE ROW1,COL20.
                                        ;A CARRIAGE RETURN IS THEN ISSUED AND CURSOR POSITION VERIFIED
                                        ;TO BE ROW1,COL0.

                                    ;*******************************************************************

                                    ;*******************************************************************
010104  000004                      TST16:  SCOPE
010106  012737  000005  001156              MOV     #5,$TIMES       ;;DO 5 ITERATIONS
010114  012737  010122  001106              MOV     #NWLN,$LPADR    ;;SET SCOPE LOOP ADDRESS

010122  004037  016272              NWLN:   JSR     R0,RESETV       ;RESET THE UNIT AND ENTER MAINT.MODE
010126  013701  016262                      MOV     TBBUF,R1
010132  004037  020746                      JSR     R0,LDBUF        ;LOAD XMIT BUFFER WITH-
010136     033     131     040              .BYTE   .ESC,.Y,.R00,.C20
010141     064
010142     012     033     117              .BYTE   .LNFED,.ESC,.O,.RDCUR,.BEL,0
010145     131     007     000
010150  012737  000011  016270              MOV     #9.,XMCNT       ;SETUP TO XMIT 9 CHARACTERS
010156  004037  016676                      JSR     R0,XMREC        ;GO DO IT
010162  000402                              BR      30$             ;NORMAL EXIT.
010164  104011                              ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
010166  000454                              BR      4$              ;EXIT TEST
010170  023777  002172  005556  30$:       CMP     R01C20,@RBBUF   ;CHECK CURSOR POS. S/B ROW 1, COL 20.
010176  001412                              BEQ     3$
010200  005037  001124                      CLR     $GDDAT
010204  013737  002010  001126              MOV     LNFED,$BDDAT
010212  104001                              ERROR   1               ;ISSUE IT
010214  013746  002172                      MOV     R01C20,-(SP)    ;;PUSH R01C20 ON STACK
010220  004037  017342                      JSR     R0,CURER        ;SETUP AND ISSUE CURSOR ERROR
010224  013701  016262              3$:     MOV     TBBUF,R1
010230  013721  002006                      MOV     CARRT,(R1)+     ;LOAD XMIT BUFFER WITH
010234  013721  002110                      MOV     ESCOI,(R1)+     ;CARRIAGE RETURN, READ CURSOR
010240  013721  002104                      MOV     RDCUR,(R1)+     ;POSITION
010244  012737  000004  016270              MOV     #4,XMCNT        ;SET UP TO TRANSMIT 4 CHARACTERS
010252  004037  016676                      JSR     R0,XMREC        ;GO DO IT
010256  000402                              BR      40$             ;NORMAL EXIT.
010260  104011                              ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
010262  000416                              BR      4$              ;EXIT TEST
010264  023777  002170  005462  40$:       CMP     R01C00,@RBBUF   ;CHECK CURSOR POS. S/B ROW1, COL C.
010272  001412                              BEQ     4$              ;EXIT TEST IF GOOD.
010274  005037  001124                      CLR     $GDDAT
010300  013737  002006  001126              MOV     CARRT,$BDDAT
010306  104001                              ERROR   1               ;ISSUE IT
010310  013746  002170                      MOV     R01C00,-(SP)    ;;PUSH R01C00 ON STACK
010314  004037  017342                      JSR     R0,CURER        ;SET UP AND ISSUE CURSOR ERROR
010320  000240                      4$:     NOP


                                    ;*******************************************************************

                                        ;ROUTINE TO VERIFY PROPER OPERATION OF ERASE TO END-OF-
                                        ;SCREEN. SCREEN IS WRITTEN TO 1920 INCREMENTING CHAR.
                                        ;ERASE TO END OF SCREEN IS THEN ISSUED AND THE
                                        ;ENTIRE SCREEN IS READ VERIFYING THAT IT IS ALL NULLS.
```

```
                                        ;*****************************************************************
                                        ;*****************************************************************
010322  000004                  TST17:  SCOPE
010324  012737  000003  001156          MOV     #3,$TIMES       ;;DO 3 ITERATIONS
010332  012737  010340  001106          MOV     #ERSE,$LPADR    ;;SET SCOPE LOOP ADDRESS

010340  004037  016272          ERSE:   JSR     R0,RESETV       ;RESET THE UNIT -SET MAINT. MODE.
010344  005077  005404                  CLR     @RBBUF          ;CLEAR THE CHECK LOCATION.
010350  004037  020250                  JSR     R0,DATSC        ;FILL THE SCREEN.
010354  013701  016262                  MOV     TBBUF,R1
010360  004037  020746                  JSR     R0,LDBUF        ;LOAD XMIT BUFFER WITH:
010364     033     110     033          .BYTE   .ESC,.CHOM,.ESC,.EOS,.ESC,.0,.XMTAL,0
010367     112     033     117
010372     126     000
010374  113737  002166  001125          MOVB    ESCN,$GDDAT+1
010402  113737  002030  001124          MOVB    EOS,$GDDAT      ;LOAD ERROR WITH ERASE TO EOS
010410  005037  001126                  CLR     $BDDAT
010414  005077  005334                  CLR     @RBBUF
010420  012737  000007  016270          MOV     #7,XMCNT        ;SET UP TO XMIT 7 BYTES
010426  004037  016676                  JSR     R0,XMREC        ;XMIT AND WAIT FOR REC. DONE
010432  000402                          BR      5$
010434  104011                          ERROR   11              ;ESC ERROR
010436  000413                          BR      ERSXT           ;EXIT TEST
010440  127737  005310  002224  5$:     CMPB    @RBBUF,ZERO     ;VT61 XMITTED SOM/EOM ONLY?
010446  001407                          BEQ     ERSXT           ;YES-EXIT TEST.
010450  104001                          ERROR   1               ;NO-ERASE TO END OF SCREEN
010452  004037  016654                  JSR     R0,CLREG        ;GO CLEAR ERROR STORAGE
010456  117737  005272  001126          MOVB    @RBBUF,$BDDAT
010464  104004                          ERROR   4               ;ISSUE DATA ERROR
010466  000240                  ERSXT:  NOP


                                        ;*****************************************************************
                                        ;ROUTINE TO SET UP END OF PASS INDICATION.
                                        ;SELF TEST(ESC O T) IS ISSUED TO THE UNIT UNDER TEST
                                        ;AND AN ERROR IS ISSUED IF THE UNIT CANNOT RESPOND AFTER
                                        ;SELF TEST IS COMPLETE. IF SELF TEST IS SUCCESSFUL THE
                                        ;SCREEN IS WRITTEN TO 23 LINES OF INCREMENTING CHARACTERS
                                        ;AND 23 LINES OF INCREMENTING CHAR. IN REVERSE VIDEO.
                                        ;THE IDENT IS THEN CHECKED AND IF A COPIER IS PRESENT A
                                        ;COPY SCREEN  COMMAND IS ISSUED(NOTE: THIS COMMAND WILL CAUSE
                                        ;THE UNIT TO BE "BUSY" AND NOT RESPOND TO ANY FURTHER COMMANDS
                                        ;UNTIL THE SCREEN HAS BEEN COMPLETELY COPIED.)
                                        ;*****************************************************************

                                        ;*****************************************************************
010470  000004                  TST20:  SCOPE
010472  012737  000001  001156          MOV     #1,$TIMES       ;;DO 1 ITERATION
010500  012737  010506  001106          MOV     #LSTST,$LPADR   ;;SET SCOPE LOOP ADDRESS

010506                          LSTST:
010506  013746  002224                  MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
010512  013746  002156                  MOV     TSTER,-(SP)     ;;PUSH TSTER ON STACK
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2494  010516  013746  002110                    MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
2495  010522  004037  014370                    JSR     R0,TESC         ;TRANSMIT IT.
2496  010526  004037  016402                    JSR     R0,GETON        ;GO LOOK FOR A XON.
2497  010532  000407                            BR      1$              ;VT61RESPONDED-NOT HUNG
2498  010534  013737  001762  001124            MOV     VJCSR,$GDDAT    ;LOAD THE ADDRESS
2499  010542  013737  001772  001126            MOV     VECT,$BDDAT     ;LOAD THE VECTOR
2500  010550  104010                            ERROR   10              ;REPORT SELF TEST FAILURE
2501  010552  004037  016272          1$:       JSR     R0,RESETV       ;RESET AND SET MAINT. MODE.
2502  010556  005037  002244                    CLR     BUBCT           ;SET UP HALF-SCREEN FLAG.
2503  010562  042737  077577  002260  2$:       BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
2504  010570  013701  016262                    MOV     TBBUF,R1        ;SET UP BEG. OF XMIT BUFFER
2505  010574  012703  000500                    MOV     #320.,R3        ;FILL BUFFER WITH INCREMENTING CHAR.
2506  010600  004037  020222                    JSR     R0,BLDINC
2507  010604  012737  001001  002262            MOV     #1001,BLKM      ;SET XMIT TO SOM- DATA -EOM.
2508  010612  012737  001700  016270            MOV     #960.,XMCNT     ;SEND 12 LINE TO VT61
2509  010620  052777  040000  171134            BIS     #XENA,@VJCSR    ;ENABLE XMIT INTERRUPTS
2510  010626  012746  000001                    MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
2511  010632  012746  000012                    MOV     #10.,-(SP)      ;;PUSH #10. ON STACK
2512  010636  004037  021654                    JSR     R0,WTBGND       ;LOOK FOR XMDNE.
2513  010642  000430                            BR      ENDSEL          ;NOT FOUND-EXIT.
2514  010644  005737  002244                    TST     BUBCT           ;DONE WITH SCREEN?
2515  010650  001007                            BNE     3$              ;YES-EXIT
2516  010652  012703  005672                    MOV     #SETREV,R3      ;NO-ISSUE ENTER REVERSE VIDEO
2517  010656  004037  017222                    JSR     R0,LDXMIT       ;ESCAPE SEQUENCE.
2518  010662  005237  002244                    INC     BUBCT           ;INCREMENT SCREEN HALF FLAG.
2519  010666  000735                            BR      2$              ;AND ISSUE SECOND HALF IN REV. VIDEO.
2520  010670  032737  000001  002160  3$:       BIT     #BIT00,IDENT    ;IDENT = COPIER?
2521  010676  001412                            BEQ     ENDSEL          ;NO
2522  010700  013746  002224                    MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
2523  010704  012746  000135                    MOV     #.CPYSC,-(SP)   ;;PUSH #.CPYSC ON STACK
2524  010710  013746  002166                    MOV     ESCN,-(SP)      ;;PUSH ESCN ON STACK
2525  010714  004037  014370                    JSR     R0,TESC
2526  010720  004037  020754                    JSR     R0,CKABRT       ;CHECK FOR A PERIPHERAL ABORT.
2527  010724  105737  002232          ENDSEL:   TSTB    MODE            ;IF IN MAN MODE DO NOT ENTER EOP.
2528  010730  001402                            BEQ     ENDPS
2529  010732  000137  003332                    JMP     ASTRT
2530  010736  042777  000100  171016  ENDPS:    BIC     #RENA,@VJCSR    ;CLEAR REC.INT. BEFORE NEXT UNIT SELECT.
2531                                    ;*******************************************************************
2532
2533                                    .SBTTL  END OF PASS ROUTINE
2534
2535                                    ;*INCREMENT THE PASS NUMBER ($PASS)
2536                                    ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
2537                                    ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
2538                                    ;*IF SW12=1 INHIBIT TRACE TRAP
2539                                    ;*IF THERES A MONITOR GO TO IT
2540                                    ;*IF THERE ISN'T JUMP TO MODCA
2541
2542  010744                            $EOP:
2543  010744  000004                            SCOPE
2544  010746  005037  001102                    CLR     $TSTNM          ;;ZERO THE TEST NUMBER
2545  010752  005037  001156                    CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
2546  010756  005237  001100                    INC     $PASS           ;;INCREMENT THE PASS NUMBER
2547  010762  042737  100000  001100            BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
2548  010770  005327                            DEC     (PC)+           ;;LOOP?
2549  010772  000001                    ;;LPCT: .WORD   1
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2550  010774  003032                    BGT     $DOAGN          ;;YES
2551  010776  012737                    MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
2552  011000  000001            $ENDCT: .WORD   1
2553  011002  010772                    $EOPCT
2554  011004  104400  011154          TYPE    $ENDMG          ;;TYPE "END PASS #"
2555  011010  013746  001100          MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
2556  011014  104404                    TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
2557  011016  104400  011171          TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
2558  011022                    $GET42:
2559  011022  013700  000042          MOV     @#42,R0         ;;GET MONITOR ADDRESS
2560  011026  001415                    BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
2561  011030  000005                    RESET                   ;;MONITOR,CLEAR WORLD
2562  011032  005046                    CLR     -(SP)           ;;INSURE THE "T" BIT IS CLEAR
2563  011034  012746  011052          MOV     #$ENDAD,-(SP)   ;;SETUP FOR AN RTI OR RTT
2564  011040  000441                    BR      $RTRN           ;;GO DO AN RTI OR RTT TO LOAD THE PSW
2565                                                            ;;WITH A CLEARED "T" BIT
2566
2567  011042  013700  000042          MOV     @#42,R0         ;;GET MONITOR ADDRESS
2568  011046  001405                    BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
2569  011050  000005                    RESET                   ;;CLEAR THE WORLD
2570  011052  004710            $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
2571  011054  000240                    NOP                     ;;SAVE ROOM
2572  011056  000240                    NOP                     ;;FOR
2573  011060  000240                    NOP                     ;;ACT11
2574  011062                    $DOAGN:
2575  011062  005046                    CLR     -(SP)           ;;RESERVE A STACK LOC. FOR THE PS
2576  011064  013746  000034          MOV     @#34,-(SP)      ;;SETUP THE TRAP VECTOR
2577  011070  012737  011100  000034  MOV     #1$,@#34        ;; TO GET THE PS
2578  011076  104400                    TRAP
2579  011100  005726            1$:     TST     (SP)+           ;;CLEAN OFF THE USED PC
2580  011102  012666  000002          MOV     (SP)+,2(SP)     ;;SAVE OFF THE PS
2581  011106  012637  000034          MOV     (SP)+,@#34      ;;RESTORE TRAP VECTOR
2582  011112  042716  000020          BIC     #20,(SP)        ;;CLEAR THE "T" BIT
2583  011116  032777  010000  170012  BIT     #BIT12,@SWR     ;; RUN WITH TRACE TRAP?
2584  011124  001005                    BNE     2$              ;;BR IF NO
2585  011126  005137  011152          COM     $TBIT           ;;IS IT TIME FOR TRACE TRAP
2586  011132  100402                    BMI     2$              ;;BR IF NO
2587  011134  052716  000020          BIS     #20,(SP)        ;;SET TRACE TRAP
2588  011140  012746  011146    2$:   MOV     #$LOOP,-(SP)    ;;JUMP TO START OF TEST
2589  011144  000002            $RTRN:  RTI                     ;;RETURN--THIS IS CHANGED TO
2590                                                            ;;AN "RTT" IF "RTT" IS LEGAL
2591                                                            ;;INSTRUCTION
2592  011146                    $LOOP:
2593  011146  000137  002752          JMP     @#MODCA         ;;RETURN
2594  011152  000000            $TBIT:  0
2595  011154  005015  047105  020104  $ENDMG: .ASCIZ  <15><12>/END PASS #/
2596  011162  040520  051523  021440
2597  011170     000
2598  011171     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
2599                                    ;*****************************************************
2600                                    ;ROUTINE TO ECHO THE KEYBOARD. KEYS FOR TAB,BELL,CARRIAGE
2601                                    ;AND LINE FEED ECHO A MNEMONIC,NON-DISPLAY CHAR. ECHO OCTAL
2602                                    ;EQUIVALENTS AND DISPLAY CHAR. ECHO THEMSELVES.
2603                                    ;(EXAMPLES-CHAR.,SPACE, ESC, SPACE OR 037, SPACE.) A
2604                                    ;CONTROL C (003) WILL CAUSE A TEST EXIT.
2605
```

```
                                        ;*****************************************************************
                                        ;*****************************************************************
011174  000004                  TST21:  SCOPE
011176  012737  000001  001156          MOV     #1,$TIMES       ;;DO 1 ITERATION
011204  012737  011212  001106          MOV     #KYBD,$LPADR    ;;SET SCOPE LOOP ADDRESS

011212  004037  017262          KYBD:   JSR     R0,RESPTR
011216  012702  027122                  MOV     #CKYBD,R2       ;LOAD MESSAGE ADDRESS INR2
011222  004037  020316                  JSR     R0,OSMES        ;DISPLAY KEYBOARD MESSAGE
011226  012703  027510                  MOV     #DCNTZ,R3       ;ISSUE CONTROL C EXIT MESSAGE
011232  004037  017222                  JSR     R0,LDXMIT
011236  012703  011474                  MOV     #EXMAIN,R3
011242  004037  017222                  JSR     R0,LDXMIT       ;ISSUE EXIT MAINTENANCE MODE.
011246  042737  077577  002260  KYSTRT: BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
011254  105777  021040                  TSTB    @#RBUFP         ;SEE IF A CHAR. RECEIVED
011260  001001                          BNE     11$             ;YES-GO PROCESS IT
011262  000001                          WAIT                    ;WAIT FOR A CH.
011264  117701  021030          11$:    MOVB    @#RBUFP,R1      ;GET RAW RECEIVED DATA
011270  004037  021600                  JSR     R0,EXTST        ;CHECK FOR EXIT CONDITIONS
011274  000402                          BR      10$             ;NO EXIT -CONTINUE.
011276  000137  003332                  JMP     ASTRT           ;EXIT TEST 4
011302  105077  021012          10$:    CLRB    @#RBUFP         ;CLEAR CHAR FROM BUFFER
011306  032737  000400  002260          BIT     #ESC,VSTAT      ;CHAR.=ESC(033)?
011314  001405                          BEQ     12$             ;NO
011316  005037  015762                  CLR     ESAMB           ;YES - RESET ESC ASSEMBLY FLAG
011322  012703  027115                  MOV     #DESC,R3        ;LOAD ESC MESSAGE ADDRESS
011326  000454                          BR      KYBXMT
011330  120127  000041          12$:    CMPB    R1,#41          ;CHAR. LESS THAN 41 OR
011334  103415                          BLO     2$              ;HIGHER THAN 176, GO ECHO
011336  120127  000176                  CMPB    R1,#176         ;OCTAL EQUIVALENT
011342  101012                          BHI     2$
011344  110177  004716                  MOVB    R1,@#TBUFP      ;LOAD CHAR. IN XMIT BUFF.
011350  004037  017152                  JSR     R0,XMIT1        ;GO XMIT IT
011354  112777  000040  004704          MOVB    #40,@#TBUFP     ;LOAD A SPACE
011362  004037  017152                  JSR     R0,XMIT1        ;AND XMIT IT.
011366  000727                          BR      KYSTRT
011370  120137  002004          2$:     CMPB    R1,BEL          ;CHAR.=BELL?
011374  001003                          BNE     3$
011376  012703  027371                  MOV     #DBELL,R3       ;LOAD BELL MESSAGE ADDRESS
011402  000426                          BR      KYBXMT
011404  120137  002012          3$:     CMPB    R1,TAB          ;CHAR. =TAB?
011410  001003                          BNE     4$
011412  012703  027352                  MOV     #DTAB,R3        ;YES-ECHO 'TAB'
011416  000420                          BR      KYBXMT
011420  123701  002006          4$:     CMPB    CARRT,R1        ;CHAR.=CARRIAGE RETURN?
011424  001003                          BNE     5$
011426  012703  027357                  MOV     #DCR,R3         ;YES - ECHO 'C/R'.
011432  000412                          BR      KYBXMT
011434  120137  002010          5$:     CMPB    R1,LNFED        ;CHAR.=LINE FEED?
011440  001003                          BNE     6$              ;NO CHECK FOR CONTROL Z
011442  012703  027364                  MOV     #DLF,R3         ;YES - ECHO 'L/F'.
011446  000404                          BR      KYBXMT
011450  004037  020412          6$:     JSR     R0,BINOCT       ;CONVERT BINARY TO OCTAL
011454  012703  002220                  MOV     #SVER1,R3
011460  042737  077577  002260  KYBXMT: BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
```

```
 2662  011466  004037  017222                JSR     R0,,DXMIT       ;GO XMIT BUFFER
 2663  011472  000665                        BR      KYSTRT          ;WAIT FOR NEXT CHAR.
 2664
 2665                                        ;SEQUENCE TO EXIT MAINTENANCE MODE.
 2666  011474      033      117      141  EXMAIN: .BYTE   .ESC,.O..DMAIN,0
 2667  011477      000
 2668
 2669                                        ;*****************************************************************
 2670                                        ;ROUTINE TO UTILIZE THE VT61 AS A PRINTER CONTROLLER.
 2671                                        ;AFTER TEST MESSAGE IS DISPLAYED, THE TEST WAITS
 2672                                        ;FOR A C/R BEFORE ACTUALLY ENTERING TEST. A PATTERN
 2673                                        ;OF INCREMENTING, ROLLING CHAR. WILL BE OUTPUTTED UNTIL A
 2674                                        ;CONTROL C(003) IS RECEIVED.
 2675
 2676                                        ;*****************************************************************
 2677
 2678                                        ;*****************************************************************
 2679  011500  000004                TST22:  SCOPE
 2680  011502  012737  000001  001156        MOV     #1,$TIMES       ;;DO 1 ITERATION
 2681  011510  012737  011516  001106        MOV     #TPRNT,$LPADR   ;;SET SCOPE LOOP ADDRESS
 2682
 2683  011516  012702  027554        TPRNT:  MOV     #DPRNT,R2       ;LOAD PRINTER MESSAGE ADDRESS
 2684  011522  004037  020316                JSR     R0,DSMES        ;AND ISSUE IT
 2685  011526  012703  011474                MOV     #EXMAIN,R3
 2686  011532  004037  017222                JSR     R0,LDXMIT       ;ISSUE EXIT MAINTENANCE MODE.
 2687  011536  004037  020546                JSR     R0,GTCR         ;GO SET CARRIAGE RETURN
 2688  011542                        3$:
 2689  011542  013746  002224                MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
 2690  011546  013746  002150                MOV     EPNT,-(SP)      ;;PUSH EPNT ON STACK
 2691  011552  013746  002166                MOV     ESCN,-(SP)      ;;PUSH ESCN ON STACK
 2692  011556  004037  014370                JSR     R0,TESC
 2693  011562  013701  016262                MOV     TBBUF,R1        ;LOAD R1 WITH XMIT BUFFER
 2694  011566  012705  000041        4$:     MOV     #41,R5          ;R5=1ST CHAR
 2695  011572  042737  077577  002260  5$:   BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
 2696  011600  013701  016262                MOV     TBBUF,R1
 2697  011604  012703  000204                MOV     #132.,R3                ;R3= LINE WIDTH
 2698  011610  004037  020226                JSR     R0,BLDINA       ;GO BUILD A SLIDING PATTERN.
 2699  011614  013721  002006                MOV     CARRT,(R1)+     ;LOAD A C/R AND L/F
 2700  011620  013721  002010                MOV     LNFED,(R1)+
 2701  011624  012737  000206  016270        MOV     #134.,XMCNT     ;SET UP TO XMIT BY BYTES.
 2702  011632  052777  040000  170122        BIS     #XENA,@VJCSR
 2703  011640  032737  000001  002260        BIT     #XMDNE,VSTAT    ;WAIT FOR XMIT DONE
 2704  011646  001774                        BEQ     .-6
 2705  011650  004037  021600                JSR     R0,EXTST        ;CHECK FOR EXIT REQUEST.
 2706  011654  000402                        BR      6$              ;NO-CONTINUE
 2707  011656  000137  003332                JMP     ASTRT           ;YES-EXIT TEST!!
 2708  011662  004037  020754        6$:     JSR     R0,CKABRT       ;CHECK FOR A PERIPHERAL ABORT.
 2709  011666  122705  000177                CMPB    #177,R5         ;EXCEEDED PATT. LIMIT?
 2710  011672  001337                        BNE     5$              ;NO
 2711  011674  000734                        BR      4$              ;YES RESET IT
 2712
 2713                                        ;*****************************************************************
 2714
 2715                                        ;ROUTINE TO LOOP DATA/COMMANDS FROM THE VT61 BACK TO
 2716                                        ;THE VT61. DATA TRANSMISSIONS RESULTING FROM A ESC
 2717                                        ;SEQUENCE WILL ALSO BE LOOPED AND WILL ENTER THE SCREEN
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                                        ;HT THE CURSOR POSITION.THIS TEST CAN BE USED TO SIMULATE,
                                        ;OR CREATE, SPECIFIC SCREEN PATTERNS AND OPERATIONS.
                                ;*******************************************************************

                                ;*******************************************************************
011676  000004                  TST23:  SCOPE
011700  012737  000001  001156          MOV     #1,$TIMES       ;;DO 1 ITERATION
011706  012737  011714  001106          MOV     #LPTST,$LPADR   ;;SET SCOPE LOOP ADDRESS

011714  004037  017262          LPTST:  JSR     R0,RESPTR       ;RESET POINTERS
011720  012702  027377                  MOV     #DLOOP,R2       ;LOAD LOOP MESSAGE ADDRESS
011724  004037  020316                  JSR     R0,DSMES        ;DISPLAY IT
011730  012703  011474                  MOV     #EXMAIN,R3
011734  004037  017222                  JSR     R0,LDXMIT       ;ISSUE EXIT MAINTENANCE MODE.
011740  004037  021350                  JSR     R0,LOOP         ;GO LOOP VT61
011744  000137  003332                  JMP     ASTRT           ;ENTER MAN MODE VIA SCOPE ROUTINE.

                                ;*******************************************************************

                                        ;PRODUCTION KEYBOARD TEST.  ALL KEYS MUST BE DEPRESSED
                                        ;IN THE SEQUENCE INDICATED ON THE SCREEN.  ALL ERRORS
                                        ;OR MISTAKES ARE DISPLAYED IN OCTAL POSITIONAL FORMAT AND THE
                                        ;CORRECT KEY POSITION IN THE ROW  IS DISPLAYED IN DECIMAL.
                                        ;THIS TEST IS RUN IN MAINTENANCE MODE, THEREFORE THE KEYS
                                        ;WILL ECHO THEIR POSITION ,NOT THEIR INDICATED MNEMONIC. ID
                                        ;ERRORS WILL CAUSE AN AUTOMATIC EXIT FROM TEST.
                                ;*******************************************************************

                                ;*******************************************************************
011750  000004                  TST24:  SCOPE
011752  012737  000001  001156          MOV     #1,$TIMES       ;;DO 1 ITERATION
011760  012737  011766  001106          MOV     #PDKBD,$LPADR   ;;SET SCOPE LOOP ADDRESS

011766  012702  027772          PDKBD:  MOV     #DKBD   ,R2
011772  004037  020316                  JSR     R0      ,DSMES  ;DISPLAY KEYBOARD TEST MESSAGE.
011776  005037  002244                  CLR     BUBCT           ;CLEAR ERROR COUNT LOCATION.
012002  005005                          CLR     R5

012004  016504  012130          DOAROW: MOV     DTTBL(R5),R4    ;SET UP 'GOOD' CHAR. POINTER
012010  016503  012102                  MOV     MSTBL(R5),R3
012014  001414                          BEQ     FEXIT           ;MESSAGE WAS ZERO-EXIT.
012016  100421                          BMI     CLMAIN          ;IF MESSAGE IS -1,CLEAR MAINT. MODE.
012020  004037  017222                  JSR     R0,LDXMIT       ;ISSUE 'ROW OR FUNCTION' MESSAGE.
012024  004037  021102                  JSR     R0,CKKBD        ;GO CHECK IT.
012030  123727  0022-4  000012          CMPB    BUBCT,#10.      ;TEN ERROR EXIT?
012036  103401                          BLO     1$              ;NO-CONTINUE.
012040  000402                          BR      FEXIT           ;YES-EXIT TEST.
012042  005725                  1$:     TST     (R5)+           ;INCREMENT OFFSET.
012044  000757                          BR      DOAROW          ;NO-DO NEXT ROW/FUNCTION.
012046  012702  027541          FEXIT:  MOV     #DEXT,R2
012052  004037  020316                  JSR     R0,DSMES        ;ISSUE EXIT MESSAGE
012056  000137  003332                  JMP     ASTRT
012062  012703  012076          CLMAIN: MOV     #RSMAIN,R3      ;SET UP TO EXIT MAINT. MODE.
012066  004037  017222                  JSR     R0,LDXMIT
012072  005725                          TST     (R5)+           ;INCREMENT OFFSET.
```

```
012074 000743                          BR      DOAROW          ;NOW TEST CONTROL AND SHIFT FUNCTIONS.
012076     033      117      141  RSMAIN: .BYTE   .ESC.,0,.DMAIN,0
012101     000
                                        ;TABLE OF MESSAGE ADDRESSES.
012102 030175 030302 030337  MSTBL:  .WORD   DTOP,DSEC,DTHRD,DBOT
012110 030466
012112 030544 030570 177777          .WORD   DSPCE,DKPD,-1,DCONT,DLSHFT,DRSHFT,0
012120 030416 030123 030227
012126 000000
012130 030771 031012 031032  DTTBL:  .WORD   ROW1,ROW2,ROW3,ROW4,SPCB
012136 031050 031072
012142 031074 000000 031066          .WORD   KYPD,0,CNTRA,SHFTA,SHFTA
012150 031070 031070
                                ;*****************************************************************
                                        ;SUBROUTINE TO ALLOW SETUP FROM MULTIPLE ENTRIES
                                ;*****************************************************************
012154                          SETA:
012154 012706 001100                    MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
012160 005026                           CLR     (R6)+           ;;CLEAR MEMORY LOCATION
012162 022706 001126                    CMP     #$BDDAT,R6      ;;DONE?
012166 001374                           BNE     .-6             ;;LOOP BACK IF NO
012170 012706 001100                    MOV     #STACK,SP       ;;SETUP THE STACK POINTER
012174 012737 021770 000020             MOV     #$SCOPE,@#IOTVEC;;IOT VECTOR FOR SCOPE ROUTINE
012202 012737 000340 000022             MOV     #340,@#IOTVEC+2 ;;LEVEL 7
012210 012737 022244 000030             MOV     #$ERROR,@#EMTVEC;;EMT VECTOR FOR ERROR ROUTINE
012216 012737 000340 000032             MOV     #340,@#EMTVEC+2 ;;LEVEL 7
012224 012737 023622 000034             MOV     #$TRAP,@#TRAPVEC;;TRAP VECTOR FOR TRAP CALLS
012232 012737 000340 000036             MOV     #340,@#TRAPVEC+2;LEVEL 7
012240 012737 023454 000024             MOV     #$PWRDN,@#PWRVEC;;POWER FAILURE VECTOR
012246 012737 000340 000026             MOV     #340,@#PWRVEC+2 ;;LEVEL 7
012254 013737 011000 010772             MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
012262 005037 001156                    CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
012266 005037 001160                    CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
012272 112737 000001 001115             MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
012300 012737 011144 000014             MOV     #$RTRN,@#TBITVEC;;SET "T" BIT VECTOR TO $RTRN
012306 012737 000340 000016             MOV     #340,@#TBITVEC+2;;LEVEL 7
012314 012737 000002 011144             MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
012322 012737 012350 000010             MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
012330 005046                           CLR     -(SP)           ;;DUMMY PS
012332 012746 012340                    MOV     #64$,-(SP)      ;;AND PC
012336 000006                           RTT                     ;;TRY THE RTT
012340 012737 000006 011144  64$:       MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
012346 000402                           BR      66$
012350 062706 000010         65$:       ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
012354 012737 000012 000010  66$:       MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
012362 005037 011152                    CLR     $TBIT           ;;CLEAR "T" BIT SWITCH
012366 012737 012366 001106             MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
012374 012737 012374 001110             MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
012402 013746 000004                    MOV     @#4,-(SP)       ;;SAVE ERROR VECTOR
012406 013746 000006                    MOV     @#6,-(SP)
```

```
 2830  012412  012737  012426  000004          MOV     #67$,4          ;;SET UP TIME OUT VECTOR
 2831  012420  005777  166512                  TST     @SWR            ;;TRY TO REFERENCE HARDWARE SWR
 2832  012424  000407                          BR      68$             ;;BRANCH IF NO TIMEOUT TRAP OCCURS
 2833  012426  012737  000176  001136  67$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
 2834  012434  012737  000174  001140          MOV     #DISPREG,DISPLAY ;;POINT TO SOFTWARE DISPLAY REG
 2835  012442  022626                          CMP     (SP)+,(SP)+     ;;RESTORE STACK
 2836  012444  012637  000006          68$:    MOV     (SP)+,@#6       ;;RESTORE ERROR VECTOR
 2837  012450  012637  000004                  MOV     (SP)+,@#4
 2838  012454  005227  177777                  INC     #-1             ;;FIRST TIME?
 2839  012460  001017                          BNE     69$             ;;BRANCH IF NO
 2840  012462  022737  011052  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
 2841  012470  001413                          BEQ     69$             ;;BRANCH IF NO
 2842  012472  104400  012500                  TYPE    ,70$            ;;TYPE ASCIZ STRING
 2843  012476  000410                          BR      69$             ;;GET OVER THE ASCIZ
 2844                                  ;;70$:  .ASCIZ  <200>#MD-11-DZVTJ-A#<200>
 2845  012520                          69$:
 2846  012520  104400  023726                  TYPE    ,STUPM  ;ISSUE SET-UP MESSAGE.
 2847  012524  012737  012544  000010          MOV     #TRPA,@#10      ;AND VECTOR
 2848  012532  000230                          SPL     0               ;PROCESSOR IS 11/45?
 2849  012534  012737  000004  020216          MOV     #4,PMULT        ;YES-DELAY MULTIPLIER = 4
 2850  012542  000416                          BR      RTRP
 2851
 2852  012544  022626                  TRPA:   POP2SP                  ;NO
 2853  012546  012737  012570  000010          MOV     #TRPB,@#10      ;RELOAD TRAP ADDRESS
 2854  012554  006737  002216                  SXT     CHRD            ;PROCESSOR IS 11/40 OR 35?
 2855  012560  012737  000002  020216          MOV     #2,PMULT        ;YES-DELAY MULTIPLIER=2
 2856  012566  000404                          BR      RTRP
 2857
 2858  012570  022626                  TRPB:   POP2SP
 2859  012572  012737  000001  020216          MOV     #1,PMULT        ;PROCESSOR MUST BE 11/05
 2860  012600  012737  000012  000310  RTRP:   MOV     #12,@#10        ;RESTORE TRAP CATCHER
 2961  012606  105737  012232                  TSTB    MODE            ;CHECK MODE FOR CORRECT EXIT.
 2862  012612  001402                          BEQ     70$
 2863  012614  000137  002332                  JMP     MANSA           ;EXIT TO MANUAL SELECT
 2864  012620  000137  002276          70$:    JMP     AUTOA           ;EXIT TO AUTO MODE.
 2865                                  ;*****************************************************************
 2866                                          ;THIS SUBROUTINE WILL VERIFY EACH ADDRESS AS IT IS
 2867                                          ;ENTERED VIA THE KEYBOARD WHEN IN MANUAL MODE.
 2868                                  ;*****************************************************************
 2869
 2870  012624  020227  160000          TMNAD:  CMP     R2,#160000      ;INSURE ADDRESS IS IN RANGE.
 2871  012630  103407                          BLO     BDEXT           ;ITS NOT-TYPE A ? AND EXIT.
 2872  012632  012737  012646  000004          MOV     #BDEXTA,@#4     ;SET UP TRAP EXIT.
 2873  012640  005712                          TST     @R2             ;CHECK THE ADDRESS.
 2874  012642  000240                          NOP
 2875  012644  000405                          BR      ALEXT           ;IF WE GOT THIS FAR ITS OK.
 2876
 2877  012646  022626                  BDEXTA: POP2SP                  ;ADDRESS TRAPPED-PURGE IT, TYPE A
 2878  012650  104400  027770          BDEXT:  TYPE    ,QMRK           ;QUESTION MARK, RESTORE TRAP
 2879  012654  012700  002346                  MOV     #BLDADD,R0      ;LOCATION, AND EXIT TO BUILD THE
 2880  012660  012737  000006  000004  ALEXT:  MOV     #6,@#4          ;NEXT ENTRY.
 2881  012666  000200                          RTS     R0
 2882
 2883                                  ;*****************************************************************
 2884                                          ;THIS ROUTINE MAPS ALL POSSIBLE DJ11 ADDRESSES AND STORES
 2885                                          ;THEM IN A TABLE (INTAB). ALL ADDRESSES WHICH DO NOT
```

```
                                        ;RESULT IN TIMEOUTS ARE STORED.
                                        ;*************************************************************
                                        
012670  012701  000300          TRPVEC: MOV     #300,R1         ;START AT BEG. OF FLOATING VECTORS
012674  012702  000302                  MOV     #302,R2         ;
012700  012703  000004                  MOV     #4,R3           ;R3 CONTAINS IOT TRAP INST.
012704  010221                  1$:     MOV     R2,(R1)+        ;START LOADING ADDRESSES
012706  010321                          MOV     R3,(R1)+        ;LOAD THE TRAP
012710  062702  000004                  ADD     #4,R2           ;ASSUME 4 REGISTERS PER INTERFACE
012714  020127  001000                  CMP     R1,#1000        ;DONE?
012720  002771                          BLT     1$              ;NO CONTINUE LOADING TRAPS
012722  005037  000006                  CLR     @#6
012726  012737  012766  000004          MOV     #TPENT,@#4      ;SET UP TIME-OUT TRAP ADDRESS
012734  005001                          CLR     R1              ;CLEAR THE TABLE POINTER
012736  012705  001570                  MOV     #INTAB,R5       ;R5=DESTINATION TABLE
012742  013702  001756          FADD:   MOV     STRTAB,R2       ;PUT THE ADDRESS TO BE TESTED IN R2
012746  023702  001760          TRPE:   CMP     ENDTAB,R2       ;HAVE WE EXCEEDED END OF TABLE ADDRESS?
012752  103407                          BLO     TBLCK           ;YES GET NEXT BASE ADDRESS.
012754  005712                          TST     @R2             ;ADDRESS THE DEVICE IF POSSIBLE
012756  010225                          MOV     R2,(R5)+        ;IF WE GOT THIS FAR THERE IS A DEVICE THERE-SAVE IT
012760  062702  000010          FADD1:  ADD     #10,R2          ;INCREMENT TO THE NEXT POSSIBLE ADDRESS
012764  000770                          BR      TRPE            ;GO TEST THE NEXT ADDRESS
012766  022626                  TPENT:  POP2SP                  ;RESTORE THE STACK AND TEST
012770  000773                          BR      FADD1           ;NEXT ADDRESS
012772  005015                  TBLCK:  CLR     (R5)            ;SET UP TABLE TERMINATOR OF  ZEROS.
012774  000200                          RTS     R0
                                        ;*************************************************************
                                        ;THIS ROUTINE WILL INSURE THAT THE DEVICE(DJ11)
                                        ;WILL INTERRUPT WHEN XMIT INT. ENABLE BIT IS SET.
                                        ;*************************************************************

012776  005046                  CDEV:   CLR     -(SP)           ;CLEAR THE PSW,LSI11 STYLE.
013000  012746  013006                  MOV     #100$,-(SP)
013004  000002                          RTI
013006  012737  000004  000004  100$:   MOV     #4,@#4          ;INSTALL IOT TRAP INST. AT LOCATION 4.
013014  012737  013132  000020          MOV     #TDEV,@#IOTVEC  ;SET UP IOT TRAP EXIT ADDRESS
013022  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;SET PSW TO 7-ALLOW NO OTHER INTERRUPTS
013030  000005                          RESET                   ;INSURE ALL XMIT FLAGS HIGH.
013032  012703  001550                  MOV     #VVECT,R3       ;VECTOR STORAGE ADDRESS SET
013036  012702  001570                  MOV     #INTAB,R2       ;PRIMARY DEVICE TABLE ADDRESS SET
013042  012704  001630                  MOV     #DJLNE,R4       ;DJ11 LINE TABLE SET.
013046  012705  001560                  MOV     #DJTBL,R5       ;DEVICE TABLE ADDRESS SET.
013052  012701  001762          CDEVA:  MOV     #VJCSR,R1       ;VT61 DEVICE ADDRESS SET.
013056  005712                          TST     (R2)            ;CHECKED ALL DEVICES?
013060  001574                          BEQ     AOUT            ;YES-EXIT
013062  100403                          BMI     1$              ;INSURE ADDRESS IS IN PROPER RANGE(17XXXX)

013064  062702  000002                  ADD     #2,R2           ;ADDRESS IS DEFINITELY NOT GOOD -PURGE
013070  000770                          BR      CDEVA           ;AND LOOK FOR ANOTHER.
013072  004037  014076          1$:     JSR     R0,LDADD        ;LOAD NEXT ADDRESSES TO BE CHECKED
013076  012701  001200                  MOV     #1200,R1        ;NOW USE R1 AS FAILSAFE COUNTER
013102  052777  177777  166656          BIS     #177777,@VXTCR  ;ENABLE ALL LINES TO BE SCANNED.
013110  052777  000400  166644          BIS     #XSCN,@VJCSR    ;ENABLE THE XMITTER SCANNER.
013116  052777  040000  166636          BIS     #XENA,@VJCSR    ;SET XMIT ENABLE
013124  005301                          DEC     R1              ;IF DEVICE DOES NOT INTERRUPT WITHIN
013126  001376                          BNE     .-2             ;APPROX. 200US IT IS NOT A DJ11.
```

```
                                        BR      CDEVA           ;THEREFORE, GO TRY ANOTHER DEVICE.
013130  000750
013132  042777  040000  166622  TDEV:   BIC     #XENA,@VJCSR    ;CLEAR XMIT ENABLE.
013140  042777  000400  166614          BIC     #XSCN,@VJCSR    ;DISABLE THE XMIT SCANS.
013146  005077  166614                  CLR     @VXTCR          ;CLEAR XMIT LINE SCAN REG.
013152  162716  000010                  SUB     #10,(R6)        ;RESET TO RECEIVER VECTOR ADDRESS
013156  012613                          MOV     (R6)+,(R3)      ;STORE IT IN VECTOR TABLE(VVECT).
013160  005726                          TST     (R6)+           ;POP THE OLD PSW AND DISCARD
013162  022626                          POP2SP                  ;POP THE ADD. AND PSW PRIOR TO INTERRUPT.
                                ;*****************************************************************
                                ;THIS ROUTINE IS A QUICK TEST OF ANY DJ11 ENCOUNTERED
                                ;A DATA PATTERN WILL BE RUN ON ALL ENTRIES IN INTAB
                                ;*****************************************************************
013164  005046                  CLR     -(SP)           ;CLEAR THE PSW,LSI11 STYLE.
013166  012746  013174          MOV     #100$,-(SP)
013172  000002                  RTI
013174  012301          100$:   MOV     (R3)+,R1        ;GET THE RECEIVE VECTOR ADDRESS
013176  012721  014730          MOV     #RECAD,(R1)+    ;AND STORE SAME.
013202  012721  000340          MOV     #340,(R1)+      ;SET RECEIVE PSW TO 7.
013206  012721  015022          MOV     #TSMAD,(R1)+    ;STORE THE XMIT VECTOR ADDRESS
013212  012711  000340          MOV     #340,(R1)       ;SET XMIT PSW TO 7.
013216  012737  000001  001774  MOV     #1,TSTLNE       ;SET UP TO TEST LINE 0 FIRST.
013224  005037  020072          CLR     HDFLG
013230  012737  000001  002246  LNECK:  MOV     #BIT00,TPREG    ;TPREG IS NOW DATA PATTERN OF 1.
013236  005001                  CLR     R1              ;SET UP FAILSAFE DELAY.
013240  052777  000010  166514          BIS     #MCLR,@VJCSR    ;CLEAR SILO AND UARTS.
013246  000240                  NOP                     ;CLEAR PROPOGATION TIME
013250  013777  001774  166510          MOV     TSTLNE,@VXTCR   ;LOAD THE LINE TO BE CHECKED.
013256  052777  000401  166476          BIS     #SCAN,@VJCSR    ;ENABLE XMIT AND RECIEVE SCANNERS.
013264  052777  000100  166470          BIS     #RENA,@VJCSR    ;SET RECEIVE ENABLE.
013272  052777  040004  166462          BIS     #TCOMB,@VJCSR   ;ENABLE XMIT INT. AND MAINT MODE.
013300  105737  002246          1$:     TSTB    TPREG           ;SEE IF COMPLETE PATTERN XMITTED.
013304  001436                          BEQ     GDAD            ;YES GO STORE THIS ADDRESS
013306  005301                          DEC     R1              ;CYCLE TIMEOUT DELAY
013310  001373                          BNE     1$              ;NOT YET 'TIMEOUT',KEEP CYCLING.
013312  042777  040000  166442          BIC     #XENA,@VJCSR    ;CLEAR INTERRUPT ENABLES ON BAD UNITS.
013320  042777  000100  166434          BIC     #RENA,@VJCSR
013326  005737  020072                  TST     HDFLG           ;ADDRESSES ISSUED?
013332  001010                          BNE     2$              ;YES-ISSUE LINES.
013334  104400  024202                  TYPE    ,DLERR          ;ISSUE DJ11 FAILURE MESSAGE.
013340  013746  001762                  MOV     VJCSR,-(SP)     ;;SAVE VJCSR FOR TYPEOUT
                                                                ;;TYPE BD. ADDRESS
013344  104402                          TYPOS                   ;;GO TYPE--OCTAL ASCII
013346     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
013347     001                          .BYTE   1               ;;TYPE LEADING ZEROS
013350  104400  001167                  TYPE    ,$CRLF
013354  004037  020510          2$:     JSR     R0,CONVLN       ;CONVERT BINARY LINE TO OCTAL LINE.
013360  000337  001776                  SWAB    OCTLNE          ;MOVE  OCTAL LINE # INTO POSITION.
013364  013746  001776                  MOV     OCTLNE,-(SP)    ;;SAVE OCTLNE FOR TYPEOUT
                                                                ;;TYPE A BAD LINE
013370  104402                          TYPOS                   ;;GO TYPE--OCTAL ASCII
013372     003                          .BYTE   3               ;;TYPE 3 DIGIT(S)
013373     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
013374  005237  020072                  INC     HDFLG
013400  000402                          BR      BDAD            ;GO TRY ANOTHER LINE OR ADDRESS.
013402  013724  001774  GDAD:   MOV     TSTLNE,(R4)+    ;STORE THE GOOD LINE
013406  006327  001774  BDAD:   ASL     TSTLNE          ;SET UP TO CHECK NEXT LINE.
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 2998  013412  001306                        BNE     LNECK           ;IF NOT ZERO-GO CHECK IT.
 2999  013414  012724  177777                MOV     #-1,(R4)+       ;STORE DJ11 LINE SEPARATOR.
 3000  013420  013725  001762                MOV     VJCSR,(R5)+     ;STORE THE DJ11 ADDRESS.
 3001  013424  005037  020072                CLR     HDFLG           ;SET UP TO TYPE AN ADDRESS.
 3002  013430  042777  000401  166324        BIC     #SCAN,@VJCSR    ;DISABLE REC. AND XMIT SCANNERS.
 3003  013436  052777  000010  166316        BIS     #MCLR,@VJCSR    ;CLEAR SILO AND UARTS
 3004  013444  104400  001167                TYPE    ,$CRLF
 3005  013450  000600                        BR      CDEVA           ;;CHECK ANOTHER DJ11
 3006  013452  005015                ADJT:   CLR     (R5)            ;SET A ZERO TABLE TERMINTATOR.
 3007  013454  005014                        CLR     (R4)            ;SET THE LINE TABLE TERMINATOR
 3008  013456  012737  000006  000004        MOV     #6,@#4          ;RESTORE LOCATION 4 TO HALT CONDITION
 3009  013464  005037  000006                CLR     @#6             ;TO CATCH ERRORS AND ILLEGAL INTERRUPTS.
 3010  013470  012737  021770  000020        MOV     #$SCOPE,@#IOTVEC        ;RELOAD IOT VECTOR FOR SCOPE
 3011  013476  012737  000340  000022        MOV     #340,@#IOTVEC+2 ;LOOP.
 3012  013504  012701  000300                MOV     #300,R1
 3013  013510  012702  000302                MOV     #302,R2
 3014  013514  010221                1$:     MOV     R2,(R1)+
 3015  013516  005021                        CLR     (R1)+           ;RESTORE HALTS TO ALL LOCATIONS CONTAINING IOTS
 3016  013520  062702  000004                ADD     #4,R2
 3017  013524  020127  001000                CMP     R1,#1000        ;TO LOCATION 1000
 3018  013530  103771                        BLO     1$
 3019  013532  000005                        RESET                   ;CLEAR ALL FLAGS
 3020  013534  000200                        RTS     R0
 3021
 3022                                ;*****************************************************************
 3023                                ;INITIALIZATION ROUTINE FOR AUTO SELECTION. THIS ROUTINE
 3024                                ;WILL INSURE THAT ALL DJ11S IN DJTBL HAVE A VT61 CONNECTED
 3025                                ;ALL UNITS WHICH EITHER DO NOT OR DO NOT RESPOND WILL BE PURGED.
 3026                                ;*****************************************************************
 3027  013536  012702  001560        INITA:  MOV     #DJTBL,R2       ;R2 POINTS TO DJ11 ADDRESS TABLE
 3028  013542  012703  001630                MOV     #DJLNE,R3       ;POINTER TO DJ11 LINES.
 3029  013546  012701  001762        11$:    MOV     #VJCSR,R1       ;POINTER TO VT61 DJ11
 3030  013552  052777  000010  166202        BIS     #MCLR,@VJCSR    ;CLEAR SILO AND UARTS.
 3031  013560  000240                        NOP                     ;CLEAR PROPOGATION TIME
 3032
 3033  013562  005712                        TST     (R2)            ;SEE IF ALL CHECKED
 3034  013564  001456                        BEQ     INTXT           ;YES-EXIT
 3035  013566  004037  014076                JSR     R0,LDADD        ;NO-GO LOAD THE ADDRESSES
 3036  013572  022713  177777        12$:    CMP     #-1,(R3)        ;AT A LINE TABLE TERMINATOR?
 3037  013576  001004                        BNE     13$             ;NO-CONTINUE TESTING THIS ADDRESS.
 3038  013600  005723                        TST     (R3)+           ;IT IS-BUMP THE POINTER AND GET NEXT
 3039  013602  005077  166154                CLR     @VJCSR          ;SHUT DOWN DJ11 AFTER SAMPLING COMPLETE.
 3040  013606  000757                        BR      11$             ;DJ11 ADDRESS(IF ANY).
 3041  013610  011337  001774        13$:    MOV     (R3),TSTLNE     ;LOAD LINE TO BE TESTED.
 3042  013614  004037  020510                JSR     R0,CONVLN       ;CONVERT BINARY LINE TO OCTAL LINE.
 3043  013620  012377  166142                MOV     (R3)+,@VXTCR    ;ENABLE LINE TO BE SCANNED.
 3044  013624  052777  000401  166130        BIS     #SCAN,@VJCSR    ;ENABLE XMIT AND REC SCANNERS.
 3045  013632  004037  016452                JSR     R0,ZFLAG        ;ISSUE ESCZ AND LOOK FOR RESPONSE.
 3046  013636                        2$:
 3047  013636  012637  002216                MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
 3048  013642  100414                        BMI     5$              ;TIMEOUT OCCURRED NO CHARACTER
 3049  013644  123727  002216  000140        CMPB    CHRD,#140       ;CHECK IDENT FOR VT61 IDENTIFIERS
 3050  013652  103410                        BLO     5$              ;NOT A VT61-SET UP TO PURGE ADDRESS
 3051  013654  123727  002216  000172        CMPB    CHRD,#172       ;IDENTS ARE SMALL A THRU Z
 3052  013662  101004                        BHI     5$              ;NOT A VT61-PURGE
 3053  013664                        4$:
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3054  013664  012637  002216                    MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
3055  013670  001375                            BNE     4$
3056  013672  000737                            BR      12$             ;TEST ANOTHER ADDRESS
3057  013674                            5$:
3058  013674  012637  002216                    MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
3059  013700  001375                            BNE     5$
3060  013702  162703  000002                    SUB     #2,R3           ;RESET LINE POINTER.
3061  013706  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
3062  013710  012746  000001                    MOV     #1,-(SP)        ;;PUSH #1 ON STACK
3063  013714  004037  014316                    JSR     R0,BBLUP
3064  013720  000724                            BR      12$             ;TRY ANOTHER DJ11 LINE.
3065  013722  022737  177777  001630  INTXT:   CMP     #-1,DJLNE       ;GOOD LINE FROM 1ST ADDRESS?
3066  013730  001021                            BNE     EXINT           ;YES-BEGIN TESTING.
3067  013732  022737  177777  001632            CMP     #-1,DJLNE+2     ;SEE IF SECOND DJ HAS GOOD LINES.
3068  013740  001403                            BEQ     NOUNIT          ;NO GOOD LINES ON 2ND DJ11.
3069  013742  005737  001632                    TST     DJLNE+2         ;ZERO TERMINATOR FOUND?
3070  013746  001012                            BNE     EXINT           ;NO-FIRST DJ11 HAS GOOD LINES.
3071  013750  104400  024113            NOUNIT: TYPE    ,NOVT           ;NO-ISSUE NO VT61 MESSAGE.
3072  013754  012737  005670  020220            MOV     #3000.,DCOUNT   ;SET DELAY TO 30 SEC.
3073  013762  004037  020156                    JSR     R0,DELAY        ;AND DO IT.
3074  013766  062700  000004                    ADD     #4,R0           ;SET UP 'NO VT61 FOUND' EXIT
3075  013772  000200                            RTS     R0
3076  013774  012702  001560            EXINT:  MOV     #DJTBL,R2       ;LOAD AND ISSUE GOOD ADDRESSES
3077  014000  005712                            TST     (R2)            ;INSURE A GOOD ADDRESS.
3078  014002  001762                            BEQ     NOUNIT          ;NONE FOUND-EXIT
3079  014004  012703  001630                    MOV     #DJLNE,R3       ;LOAD TABLE ADDRESS OF GOOD LINES.
3080  014010  104400  024042                    TYPE    ,DUNTST         ;OF RESPONSIVE VT61S.
3081  014014                            1$:
3082  014014  012246                            MOV     (R2)+,-(SP)     ;;SAVE (R2)+ FOR TYPEOUT
3083                                            ;;TYPE AN ADDRESS
3084  014016  104402                            TYPOS                   ;;GO TYPE--OCTAL ASCII
3085  014020     006                            .BYTE   6               ;;TYPE 6 DIGIT(S)
3086  014021     001                            .BYTE   1               ;;TYPE LEADING ZEROS
3087  014022  104400  001167                    TYPE    ,$CRLF
3088  014026  012337  001774            2$:     MOV     (R3)+,TSTLNE    ;LOAD A LINE TO PRINT
3089  014032  022737  177777  001774            CMP     #-1,TSTLNE      ;IF LINE IS A TERMINATOR, DO NOT
3090  014040  001411                            BEQ     3$              ;DISPLAY - GO SET UP NEXT DJ11.
3091  014042  004037  020510                    JSR     R0,CONVLN       ;CONVERT IT TO A OCTAL #.
3092  014046  000337  001776                    SWAB    OCTLNE          ;MOVE 1ST INTO PRINT POSITION.
3093  014052  013746  001776                    MOV     OCTLNE,-(SP)    ;;SAVE OCTLNE FOR TYPEOUT
3094                                            ;;TYPE A GOOD LINE
3095  014056  104402                            TYPOS                   ;;GO TYPE--OCTAL ASCII
3096  014060     003                            .BYTE   3               ;;TYPE 3 DIGIT(S)
3097  014061     000                            .BYTE   0               ;;SUPPRESS LEADING ZEROS
3098  014062  000761                            BR      2$              ;NO-TYPE ANOTHER LINE.
3099  014064  104400  001167            3$:     TYPE    ,$CRLF
3100  014070  005712                            TST     (R2)            ;AT END OF GOOD UNITS?
3101  014072  001350                            BNE     1$              ;NO PRINT ANOTHER ADDRESS.
3102  014074  000200                            RTS     R0
3103
3104                                    ;*****************************************************************
3105                                            ;SUBROUTINE TO LOAD 4 ADDRESSES FROM THE LOCATION AT (R2).
3106                                            ;TO A LOCATION POINTED TO BY R1.EXITS WITH R2 INC. BY 2.
3107                                    ;*****************************************************************
3108
3109
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 3110
 3111  014076  012211                    LDADD:  MOV     (R2)+,(R1)      ;LOAD THE ADDRESS
 3112  014100  012111                    1$:     MOV     (R1)+,(R1)      ;STORE AN ADDRESS
 3113  014102  062711  000002                    ADD     #2,(R1)         ;INCREMENT THE ADDRESS
 3114  014106  020127  001770                    CMP     R1,#VXBUF       ;LOADED 4?
 3115  014112  002772                            BLT     1$              ;NO LOAD ANOTHER
 3116  014114  000200                            RTS     R0              ;YES-EXIT
 3117
 3118                                    ;*****************************************************************
 3119                                            ;ROUTINE TO RECEIVE CHARACTER(S).  ENTERED WITH
 3120                                            ;NUMBER OF CHARACTERS TO RECEIVE ON THE STACK.
 3121                                            ;ROUTINE EXITS WITH CARACTER(S) ON STACK.  IF A
 3122                                            ;PROGRAM TIME-OUT (100 M.S.) OCCURS BEFORE A CHARACTER
 3123                                            ;IS RECEIVED ROUTINE EXITS WITH -1 ON STACK. FORMAT
 3124                                            ;FOR DATA IS (BYTE2, BYTE1) ETC.  A WORD OF ZEROS TERMINATES
 3125                                            ;DATA STRING ON THE STACK. SOM/EOM, IF SENT, ARE RECEIVED
 3126                                            ;BUT NOT STORED.
 3127
 3128                                    ;*****************************************************************
 3129
 3130  014116                            RECTM:
 3131  014116  012637  002256                            MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
 3132  014122  012637  002244                            MOV     (SP)+,@#BUBCT   ;;POP STACK INTO @#BUBCT
 3133  014126  013746  002224                            MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
 3134  014132  005037  002216                    1$:     CLR     CHRD            ;CLEAR CHARACTER STORAGE LOCATION.
 3135  014136  005037  002254                            CLR     DLAY            ;SET UP FAILSAFE DELAY
 3136  014142  032777  000200  165612            3$:     BIT     #RECDN,@VJCSR   ;SEE IF DONE FLAG SET
 3137  014150  001007                            BNE     4$
 3138  014152  005337  002254                            DEC     DLAY            ;DECREMENT FAILSAFE CNTR.
 3139  014156  001371                            BNE     3$              ;NOT AT ZERO-CONTINUE WAITING.
 3140  014160  012737  177777  002216    31$:    MOV     #-1,CHRD        ;SET UP FOR FAILSAFE EXIT.
 3141  014166  000446                            BR      RECEX           ;EXIT ROUTINE.
 3142  014170  017737  165570  002216    4$:     MOV     @VRBUF,CHRD     ;STORE THIS CHARACTER.
 3143  014176  042737  170200  002216            BIC     #170200,CHRD    ;STRIP ALL BUT CHAR. AND LINE #.
 3144  014204  123737  001777  002217            CMPB    OCTLNE+1,CHRD+1 ;RECEIVED FROM CORRECT LINE?
 3145  014212  001347                            BNE     1$              ;NO-IGNORE THIS CHAR.
 3146  014214  122737  000057  002216            CMPB    #SLSH,CHRD      ;RECEIVED A IDENT SLASH(57)?
 3147  014222  001007                            BNE     41$             ;NO-STORE A CHARACTER.
 3148  014224  105337  002245                            DECB    BUBCT+1         ;DECREMENT ALLOWABLE SLASH COUNT.
 3149  014230  001753                            BEQ     31$             ;COUNT EQUAL ZERO-SET UP ERROR EXIT.
 3150  014232  123727  002245  000213            CMPB    BUBCT+1,#139.   ;RECEIVED FIRST SLASH?
 3151  014240  103734                            BLO     1$              ;YES-IGNORE THIS ONE.
 3152  014242  122737  000002  002216    41$:    CMPB    #SOM,CHRD       ;IS CHAR. ACTUALLY SOM?
 3153  014250  001003                            BNE     5$              ;NO
 3154  014252  105237  002244                            INCB    BUBCT           ;YES -SET UP TO RECEIVE EOM ALSO
 3155  014256  000725                            BR      1$              ;AND RECEIVE NEXT CHAR.
 3156  014260  122737  000004  002216    5$:     CMPB    #EOM,CHRD       ;CHAR. = EOM?
 3157  014266  001410                            BEQ     RECEXA          ;YES- DO NOT PUSH IT ON STACK
 3158  014270  105337  002244                            DECB    BUBCT           ;DECREMENT CHARACTER COUNT.
 3159  014274  001403                            BEQ     RECEX           ;COUNT=0. EXIT WERE DONE.
 3160  014276  013746  002216                            MOV     CHRD,-(SP)      ;;PUSH CHRD ON STACK
 3161  014302  000713                            BR      1$              ;GO READ AGAIN.
 3162
 3163  014304                            RECEX:
 3164  014304  013746  002216                    RECEXA: MOV     CHRD,-(SP)      ;;PUSH CHRD ON STACK
 3165  014310                            %RECEXA:
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  3166  014310  013746  002256                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
  3167  014314  000200                          RTS     R0
  3168
  3169
  3170                                  ;*****************************************************************
  3171                                          ;THIS ROUTINE WILL 'BUBBLE UP' XX WORDS TO
  3172                                          ;ELIMINATE NON-RESPONSIVE ADDRESSES.  ENTERED
  3173                                          ;WITH ADDRESS TO BE 'BUBBLED' TO ON THE STACK.  LOCATIONS
  3174                                          ;ELIMINATED WILL BE FILLED WITH ZEROS.  THE STACK MUST ALSO
  3175                                          ;BE LOADED WITH THE NUMBER OF POSITIONS TO BUBBLE.
```

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                                        ;*****************************************************************

                                BBLUP:
                                        MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
                                        MOV     (SP)+,BUBCT     ;;POP STACK INTO BUBCT
                                        MOV     (SP)+,TOADD     ;;POP STACK INTO TOADD
                                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
                                2$:     MOV     @#TOADD,R4      ;PUT LAST GOOD DJ11 ADDRESS IN R4
                                        MOV     (R4)+,CHRD      ;MOVE NEXT WORD TO CHRD FOR STORAGE
                                1$:     MOV     (R4)+,-4(R4)    ;BUBBLE UP DATA.
                                        BNE     1$              ;BUBBLE UNTIL ZERO BYTE MOVED.
                                        DEC     BUBCT           ;SUBTRACT ONE FROM BUBBLE COUNT.
                                        BNE     2$              ;IF BUBBLE COUNT NOT ZERO - DO AGAIN.
                                3$:
                                        MOV     (SP)+,R4        ;;POP STACK INTO R4
                                        MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
                                        RTS     R0              ;YES-EXIT

                                ;*****************************************************************
                                        ;THIS ROUTINE OUTPUTS THE ESC SEQNENCE FOUND ON
                                        ;THE STACK. A WORD OF ZEROS MUST TERMINATE THE SEQUENCE.
                                        ;FORMAT FOR STACK WORD IS SEQ-ESC, IE-XXX033.
                                ;*****************************************************************

                                TESC:
                                        MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
                                        MOV     R4,SUBCT        ;SAVE R4.
                                        MOVB    #SOM,@VXBUF     ;SEND A START OF MESSAGE.
                                1$:     MOV     #-1,R5          ;ALL ONES TO THE CHECK LOCATION.
                                        MOV     (R6)+,R4        ;GET COMMAND FROM STACK.
                                        BEQ     3$              ;IF ZERO TERMINATOR FOUND-EXIT.
                                        MOVB    R4,R5           ;LOAD CHECK BYTE.
                                2$:     TSTB    R4              ;CHECK BYTE FOR A ZERO.
                                        BEQ     20$             ;IF ZERO+DO NOT XMIT IT.
                                        BIT     #TRDY,@VJCSR
                                        BEQ     .-6             ;WAIT FOR XMIT READY BIT
                                        MOVB    R4,@VXBUF       ;XMMIT A BYTE.
                                20$:    SWAB    R4              ;GET THE OTHER BYTE .
                                        CMPB    R4,R5           ;IF GOOD COMPARE WE HAVE CHECKED BOTH
                                        BEQ     1$              ;BYTES SO POP ANOTHER WORD.
                                        BR      2$              ;GO XMIT ANOTHER BYTE
                                3$:     BIT     #TRDY,@VJCSR    ;SEE IF READY SET
                                        BEQ     .-6
                                        MOV     #EOM,@VXBUF     ;SEND A EOM.
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 3220  014466  032777  100000  165266          BIT     #TRDY,@VJCSR    ;SEE IF READY SET
 3221  014474  001774                          BEQ     .-6
 3222  014476  013704  002244                  MOV     SUBCT,R4        ;RESTORE R4.
 3223  014502  013746  002256                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
 3224  014506  000200                          RTS     R0
 3225
 3226                                  ;*****************************************************************
 3227                                          ;ROUTINE TO READ A CHARACTER FROM THE CONSOLE.
 3228                                          ;EXITS WITH CHARACTER ON THE STACK.
 3229                                  ;*****************************************************************
 3230
 3231  014510                          CONRD:
 3232  014510  012637  002256                  MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
 3233  014514  032777  000200  164420          BIT     #RECDN,@$TKS    ;LOOK FOR DONE BIT
 3234  014522  001774                          BEQ     .-6             ;WAIT FOR IT
 3235  014524  117746  164414                  MOVB    @$TKB,-(R6)     ;PUSH CHARACTER TO STACK
 3236  014530  042716  000200                  BIC     #200,(R6)       ;STRIP ANY PARITY BIT.
 3237  014534  013746  002256                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
 3238  014540  000200                          RTS     R0
 3239
 3240                                  ;*****************************************************************
 3241                                          ;MANUAL TEST SELECT MONITOR
 3242                                          ;SELECTS TESTS TO BE EXECUTED FROM THOSE ENTERED IN
 3243                                          ;INITIAL DIALOGUE. IF TEST 377 WAS REQUESTED THE TESTS WILL
 3244                                          ;REPEAT INFINITELY.
 3245                                  ;*****************************************************************
 3246
 3247  014542  105737  002232          MONIT:  TSTB    MODE            ;TEST MODE SWITCH
 3248  014546  001012                          BNE     1$              ;MANUAL MODE
 3249  014550  023737  002234  002236          CMP     FTLCNT,ALWCNT   ;COMPARE FATAL XMITS WITH ALLOWED.
 3250  014556  103405                          BLO     100$            ;FATALS LESS THAN ALLOWED-CONTINUE.
 3251  014560  104400  025741                  TYPE    ,DABRT          ;ISSUE ABORT MESSAGE.
 3252  014564  000005                  200$:   RESET                   ;CLEAR ALL INTERFACE FLAGS.
 3253  014566  000137  012154                  JMP     SETA            ;SET UP TO RESTART TEST.
 3254  014572  000200                  100$:   RTS     R0              ;AUTO MODE
 3255  014574  005726                  1$:     TST     (R6)+           ;POP THE STACK
 3256  014576  022626                          POP2SP                  ;POP SCOPE RETURN AND VECTOR
 3257  014600  005037  002234                  CLR     FTLCNT          ;DO NOT INC. FATAL COUNT IN MANUAL MODE.
 3258  014604  032777  000200  164330  10$:    BIT     #RECDN,@$TKS    ;CONSOLE ACTIVE?
 3259  014612  001407                          BEQ     11$
 3260  014614  117701  164324                  MOVB    @$TKB,R1        ;STORE INPUT BUFFER
 3261  014620  042701  000200                  BIC     #200,R1         ;CLEAR THE PARITY BIT
 3262  014624  122701  000003                  CMPB    #3,R1           ;CHAR. EQUAL ESC. C?
 3263  014630  001755                          BEQ     200$            ;YES-EXIT
 3264  014632  117701  165372          11$:    MOVB    @TSTPTR,R1      ;GET THE NEXT TEST #
 3265  014636  001005                          BNE     2$              ;NOT AT END OF LIST
 3266  014640  042777  000100  165114  12$:    BIC     #RENA,@VJCSR    ;CLEAR REC. INTERRUPTS BEFORE NEXT UNIT SELECT.
 3267  014646  000137  002752                  JMP     MODCA           ;END OF LIST-GO SET UP NEXT 61
 3268  014652  100004                  2$:     BPL     3$              ;WAS TEST REPEAT REQUESTED?
 3269  014654  012737  001570  002230          MOV     #INTAB,TSTPTR   ;YES-RESET TEST POINTER
 3270  014662  000750                          BR      10$             ;AND GET FIRST TEST SELECTED
 3271  014664  005301                  3$:     DEC     R1              ;ADJUST OFFSET
 3272  014666  006301                          ASL     R1              ;USE TEST # TO FORM ADDRESS OFFSET
 3273  014670  016137  023656  014726          MOV     TSTADD(R1),JMPADD+2     ;LOAD NEW ADDRESS
 3274  014676  062737  000002  014726          ADD     #2,JMPADD+2     ;BYPASS INITIAL SCOPE LOOP
 3275  014704  005237  002230                  INC     TSTPTR          ;INCREMENT TEST POINTER
```

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3276  014710  005037  177776            CLR     PSW             ;SET NON-INT. PRIORITY TO ZERO
3277  014714  005046                    CLR     -(SP)           ;CLEAR THE PSW,LSI11 STYLE.
3278  014716  012746  014724            MOV     #JMPADD,-(SP)
3279  014722  000002                    RTI
3280  014724  000137  014724  JMPADD:   JMP     JMPADD          ;EXIT TO NEXT SELECTED TEST
3281                                    ;*****************************************************************
3282                                    ;*****************************************************************
3283                                    ;FOLLOWING ROUTINES ARE INTERRUPT HANDLERS FOR THE
3284                                    ;DJ11 QUICK-TEST.
3285                                    ;*****************************************************************
3286                                    ;*****************************************************************
3287  014730  117737  165030  002216  RECAD:  MOVB    @VRBUF,CHRD     ;GET THE RECEIVED CHAR.
3288  014736  042737  000200  002216           BIC     #200,CHRD       ;CLEAR ANY PARITY.
3289  014744  123737  002246  002216           CMPB    TPREG,CHRD      ;COMPARE RECEIVED TO XMITTED
3290  014752  001407                           BEQ     UPD4            ;AND UPDATE PATTERN IF OK.
3291  014754  042777  040004  165000  TOFF:    BIC     #TCOMB,@VJCSR   ;DATA ERROR OCCURED OR WE ARE DONE
3292  014762  042777  000100  164772           BIC     #RENA,@VJCSR    ;EITHER WAY-EXIT.
3293  014770  000002                  REEX:    RTI
3294  014772  052777  040000  164762  UPD4:    BIS     #XENA,@VJCSR    ;ENABLE XMIT INT.
3295  015000  106337  002246                   ASLB    TPREG           ;UPDATE DATA PATTERN.
3296  015004  032737  000200  002246           BIT     #BIT07,TPREG    ;ROTATED TO PARITY BIT?
3297  015012  001766                           BEQ     REEX            ;NO-CONTINUE TESTING
3298  015014  005037  002246                   CLR     TPREG           ;YES-SET UP COMPLETE FLAG
3299  015020  000755                           BR      TOFF            ;AND EXIT.
3300  015022  113777  002246  164740  TSMAD:   MOVB    TPREG,@VXBUF    ;XMIT DATA
3301  015030  042777  040000  164724           BIC     #XENA,@VJCSR    ;CLEAR XMIT INT. UNTIL LAST BIT REC.
3302  015036  000002                           RTI
3303
3304                                    ;*****************************************************************
3305                                            ;RECEIVE INTERRUPT ROUTINE. ROUTINE WILL TRAP ALL ESC
3306                                            ;FUNCTIONS AND WILL SET FLAGS IN VSTAT FOR SOM, EOM, XON,
3307                                            ;XOFF, AND OTHER SPECIAL FUNCTIONS(SEE VSTAT TABLE DEFINITION).
3308                                            ;ALL INTERFACE STATUS ERRORS WILL BE REPORTED. MAXIMUM EXECUTION
3309                                            ;TIME FOR THIS ROUTINE IS 200 MICRO SECONDS. AV. = 100.
3310                                            ;UPON RECEIPT ON XON, XMTKIL BIT IS CHECKED IN VSTAT
3311                                            ;AND IF SET, WILL BE CLEARED AND XMIT INT. ENABLE SET.
3312                                            ;LOCATION ESAMB IS USED FOR ESC ASSEMBLY FLAGS. IE. BIT
3313                                            ;00 SET MEANS A033 WAS RECEIVED, BIT 01 SET MEANS AN ESCP
3314                                            ;SEQUENCE IS BEING ASSEMBLED. BIT 03
3315                                            ;SET INDICATES AND ESCAPE O SEQUENCE IS BEING ASSEMBLED.
3316                                    ;*****************************************************************
3317
3318  015040                          INTRC:
3319  015040  010146                           MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3320  015042  010246                           MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3321  015044  017701  164714                   MOV     @VRBUF,R1       ;USE R1 FOR  STORAGE OF STATUS AND CH.
3322  015050  010102                           MOV     R1,R2           ;SET UP LINE CHECK LOCATION.
3323  015052  042702  170377                   BIC     #170377,R2      ;CLEAR ALL BUT LINE BITS.
3324  015056  023702  001776                   CMP     OCTLNE,R2       ;COMPARE CHAR LINE TO LINE UNDER TEST.
3325  015062  001404                           BEQ     13$             ;YES-EXAMINE IT.
3326  015064  052737  000010  002260           BIS     #ILLNE,VSTAT    ;NO-SET ILLEGAL LINE FLAG AND EXIT.
3327  015072  000567                           BR      ERLNE
3328  015074  042701  000200          13$:     BIC     #200,R1         ;STRIP PARITY BIT.
3329  015100  032737  000100  002260           BIT     #TXSUM,VSTAT    ;CHECKSUM CALCULATION REQUESTED?
3330  015106  001403                           BEQ     11$             ;NO
3331  015110  010105                           MOV     R1,R5           ;YES-STORE CHAR. AND
```

```
 3332  015112  004037  020700                JSR     R0,CALCK        ;CALCULATE THE CHECKSUM.
 3333  015116  005237  032323          11$:  INC     ABUFP           ;INCREMINT THE RAW DATA POINTER
 3334  015122  023727  032320  032404        CMP     ABUFP,#ABBUF+50.        ;AT THE END OF BUFFER?
 3335  015130  001003                        BNE     12$             ;NO
 3336  015132  012737  032322  032320        MOV     #ABBUF,ABUFP    ;YES-RESET IT
 3337  015140  110177  015154          12$:  MOVB    R1,@ABUFP       ;STORE THE RAW DATA
 3338  015144  001505                        BEQ     6$              ;IF CHAR. IS NULL-GO STORE IT
 3339  015146  032737  000013  015762        BIT     #BIT00+BIT01+BIT03,ESAMB        ;ESC OR ESC 0?
 3340  015154  001152                        BNE     ASESC           ;YES-KEEP ASSEMBLING
 3341  015156  120137  002166                CMPB    R1,ESCN         ;BYTE = ESCN?
 3342  015162  101076                        BHI     6$              ;NO-PROBABLY A DISPLAY CH.-STORE IT.
 3343  015164  001007                        BNE     1$              ;NO-DECODE FOR XON,XOFF,SOM,EOM
 3344  015166  012737  000001  015762        MOV     #1,ESAMB        ;YES SET ESC ASSEMBLY FLAG.
 3345  015174  052737  000400  002260        BIS     #ESC,VSTAT      ;SET ESC RECEIVED FLAG
 3346  015202  000515                        BR      RSTER           ;AND EXIT
 3347  015204  120127  000023          1$:   CMPB    R1,#XOFF        ;SEE IF RECEIVED BYTE WAS XOFF
 3348  015210  001004                        BNE     2$              ;NO
 3349  015212  052737  100000  002260        BIS     #RXOFF,VSTAT    ;YES, SET XOFF IN STATUS REG.
 3350  015220  000506                        BR      RSTER           ;EXIT
 3351  015222  120127  000021          2$:   CMPB    R1,#XON         ;SEE IF BYTE WAS XON
 3352  015226  001016                        BNE     3$              ;NO
 3353  015230  042737  100000  002260        BIC     #RXOFF,VSTAT    ;YES, CLEAR XOFF IN VSTAT.
 3354  015236  032737  000200  002260        BIT     #XMKIL,VSTAT    ;CHECK XMIT KILL BIT.
 3355  015244  001474                        BEQ     RSTER           ;NOT SET, EXIT
 3356  015246  052777  040000  164506        BIS     #XENA,@VJCSR    ;SET XMIT INT. ENABLE.
 3357  015254  042737  000200  002260        BIC     #XMKIL,VSTAT    ;CLEAR THE XMIT KILLED FLAG
 3358  015262  000465                        BR      RSTER           ;EXIT
 3359  015264  120127  000002          3$:   CMPB    R1,#SOM         ;SEE IF BYTE WAS SOM
 3360  015270  001004                        BNE     4$              ;NO
 3361  015272  052737  040000  002260  31$:  BIS     #RSOM,VSTAT     ;YES, SET SOM IN VSTAT.
 3362  015300  000456                        BR      RSTER           ;EXIT
 3363
 3364  015302  120127  000004          4$:   CMPB    R1,#EOM         ;WAS BYTE EOM?
 3365  015306  001012                        BNE     5$              ;NO
 3366  015310  052737  020000  002260        BIS     #REOM,VSTAT     ;NOW SET EOM IN VSTAT.
 3367  015316  013737  015754  015760        MOV     RBBUF,RBUFP     ;RESET THE BUFFER POINTER.
 3368  015324  042737  000100  002260        BIC     #TXSUM,VSTAT    ;CLEAR CHECKSUM REQUEST BIT.
 3369  015332  000441                        BR      RSTER           ;AND EXIT
 3370  015334  123701  002006          5$:   CMPB    CARRT,R1        ;CHAR. =CARRIAGE RETURN?
 3371  015340  001403                        BEQ     51$             ;YES-GO SET END OF LINE FLAG
 3372  015342  123701  002010                CMPB    LFED,R1         ;CHAR.= LINEFEED?
 3373  015346  001004                        BNE     6$              ;NO- GO STORE IT
 3374  015350  052737  001000  002260  51$:  BIS     #EPL,VSTAT      ;SET END OF LINE INDICATOR
 3375  015356  000427                        BR      RSTER
 3376
 3377  015360  023737  015760  015756  6$:   CMP     RBUFP,REBUF     ;IS CIRCULAR BUFFER FILLED?
 3378  015366  001003                        BNE     61$             ;NO
 3379  015370  013737  015754  015760        MOV     RBBUF,RBUFP     ;YES, RESET POINTER TO BEGINNING
 3380  015376  032737  000020  002260  61$:  BIT     #COMGP,VSTAT    ;RECEIVING GRAPHICS CHAR.?
 3381  015404  001402                        BEQ     7$              ;NO
 3382  015406  162701  000137                SUB     #137,R1         ;YES-SUBTRACT 137 FROM RECEIVED CHAR.
 3383
 3384  015412  032737  000040  002260  7$:   BIT     #REVID,VSTAT    ;REVERSE VIDEO MODE?
 3385  015420  001402                        BEQ     70$             ;NO STORE RECEIVED BYTE.
 3386  015422  052701  000200                BIS     #200,R1         ;YES-FORCE BIT7 AS REV. VIDEO IND.
 3387  015426  110177  000326          70$:  MOVB    R1,@RBUFP       ;STORE BYTE AND
```

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015432 005237 015760                   INC     RBUFP           ;INCREMENT POINTER.

015436 032701 070000          RSTER:   BIT     #70000,R1       ;CHECK FOR STATUS ERROR
015442 001414                          BEQ     RECXT           ;NO, EXIT ROUTINE

015444 052737 004000 002260            BIS     #RSTT,VSTAT     ;SET STATUS ERROR FLAG IN VSTAT
015452 027727 000330 177777   ERLNE:   CMP     @STTEP,#-1      ;IS ERROR TABLE FULL?
015460 001405                          BEQ     RECXT           ;YES, EXIT ROUTINE
015462 010177 000320                   MOV     R1,@STTEP       ;NO, STORE STATUS ERR. AND CHECK
015466 062737 000002 016006            ADD     #2,STTEP        ;INCREMENT STATUS ERR. POINTER

015474                        RECXT:
015474 012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
015476 012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
015500 000002                          RTI                     ;EXIT
015502 032737 000002 015762   ASESC:   BIT     #2,ESAMB        ;ASSEMBLING ESC P?
015510 001063                          BNE     AESCP           ;YES-GO GET LAST CH.
015512 032737 000010 015762            BIT     #BIT03,ESAMB    ;ASSEMBLING ESC O?
015520 001062                          BNE     AESCO           ;YES
015522 122701 000120                   CMPB    #120,R1         ;CH.= A P?
015526 001004                          BNE     10$             ;NO KEEP CHECKING
015530 052737 000002 015762            BIS     #BIT01,ES    B  ;YES-SET ESCP ASSEMBLY FLAG
015536 000737                          BR      RSTER           ;AND EXIT
015540 122701 000077          10$:     CMPB    #77,R1          ;CHAR.IS AN ESC ? ?
015544 001403                          BEQ     110$            ;YES-FAKE AN ESC C.
015546 122701 000117                   CMPB    #117,R1         ;CHAR = O?
015552 001004                          BNE     11$             ;NO
015554 052737 000010 015762   110$:    BIS     #BIT03,ESAMB    ;YES SET ESC O ASSEMBLY FLAG
015562 000725                          BR      RSTER           ;AND EXIT
015564 123701 002104          11$:     CMPB    RDCUR,R1        ;BYTE= CURSOR POSITION?
015570 001004                          BNE     1$              ;NO-
015572 052737 000004 002260            BIS     #CURPOS,VSTAT   ;YES-SET RECEIVED CURSOR POSITION.
015600 000424                          BR      CESAM
015602 122701 000057          1$:      CMPB    #SLSH,R1        ;BYTE=TERMINAL ID ESC?
015606 001004                          BNE     2$              ;NO-CHECK FOR GRAPHICS SEQUENCE.
015610 052737 000002 002260            BIS     #TRMID,VSTAT    ;YES-SET TERM. IDENT FLAG IN VSTAT
015616 000415                          BR      CESAM
015620 122701 000106          2$:      CMPB    #CKGP,R1        ;RECEIVED GRAPHICS CHAR. SEQUENCE?
015624 001004                          BNE     3$              ;NO
015626 052737 000020 002260            BIS     #COMGP,VSTAT    ;YES-SET GRAPHICS DATA FLAG.
015634 000406                          BR      CESAM
015636 122701 000107          3$:      CMPB    #NCKGP,R1       ;RECEIVED RESET GRAPHICS SEQ.?
015642 001003                          BNE     CESAM           ;NO
015644 042737 000020 002260            BIC     #COMGP,VSTAT    ;YES-SET NORMAL CHAR. RECEIVE.
015652 005037 015762          CESAM:   CLR     ESAMB           ;CLEAR ASSEMBLY FLAG.
015656 000667                          BR      RSTER           ;AND EXIT.

015660 110137 016012          AESCP:   MOVB    R1,STRP         ;STORE ANY UNCHECKED FOR  ESC. P
015664 000772                          BR      CESAM

015666 123701 002052          AESCO:   CMPB    EEMP,R1         ;BYTE=ESC O  -REV. VIDEO- ?
015672 001004                          BNE     1$              ;NO
015674 052737 000040 002260            BIS     #REVID,VSTAT    ;YES-SET REVERSE VIDEO MODE IN VSTAT.
015702 000763                          BR      CESAM

015704 123701 002054          1$:      CMPB    DEMP,R1         ;BYTE=ESC O DISABLE REV. VIDEO MODE?
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```
3444  015710  001004                          BNE     2$                ;NO
3445  015712  042737  000040  002260          BIC     #REVID,VSTAT      ;YES-CLEAR REVERSE VIDEO MODE IN VSTAT.
3446  015720  000754                          BR      CESAM
3447  015722  122701  000171          2$:     CMPB    #CPABRT,R1        ;COPIER ABORT?
3448  015726  001403                          BEQ     3$                ;YES-SET ABORT FLAG IN VSTAT
3449  015730  122701  000172                  CMPB    #PRABRT,R1        ;PRINTER ABORT?
3450  015734  001004                          BNE     4$                ;NO
3451  015736  052737  010000  002260  3$:     BIS     #PABRT,VSTAT      ;YES-SET THE ABORT FLAG.
3452  015744  000742                          BR      CESAM             ;AND EXIT.
3453  015746  112737  016010          4$:     MOVB    R1,STRO           ;STORE ESCAPE 0 COMMAND
3454  015752  000737                          BR      CESAM
3455
3456  015754  000000                  RBBUF:  .WORD                     ;ADDRESS OF STAT OF BUFFER
3457  015756  000000                  REBUF:  .WORD                     ;ADDRESS OF END OF BUFFER.
3458  015760  000000                  RBUFP:  .WORD                     ;READ BUFFER POINTER.
3459  015762  000000                  ESAMB:  .WORD   0                 ;ESCAPE SEQ.ASSEMBLY AREA
3460
3461  015764                          STTER:
3462  015764  000000                          0
3463  015766  000000                          0
3464  015770  000000                          0
3465  015772  000000                          0
3466  015774  000000                          0
3467  015776  000000                          0
3468  016000  000000                          0
3469  016002  000000                          0
3470  016004  177777                  .WORD   -1                        ;STATUS REGISTER DELIMITER.
3471  016006  000000                  STTEP:  .WORD                     ;STATUS ERROR POINTER.
3472  016010  000000                  STRO:   .WORD   0                 ;ESCAPE 0 STORAGE
3473  016012  000000                  STRP:   .WORD                     ;ESCAPE P STORAGE
3474
3475                                  ;*****************************************************************
3476                                  ;TRANSMIT INTERRUPT ROUTINE. IF XOFF BIT IS SET
3477                                  ;IN VSTAT TRANMISSION WILL NOT OCCUR AND THIS ROUTINE
3478                                  ;WILL RESET XMIT INT. ENABLE.  IF AFTER TRANSMISSION
3479                                  ;OF THE CHARACTER DURING THIS INTERRUPT CYCLE, THE
3480                                  ;XMIT COUNT (XMCNT) IS EQUAL TO ZERO,
3481                                  ;THE XMIT DONE BIT WILL BE SET IN VSTAT AND XMIT
3482                                  ;INT ENABLE BIT WILL CLEARED. TRANSMIT COUNT(XMCNT) MUST BE
3483                                  ;SET TO THE NUMBER OF BYTE/CHARACTER TO TRANSMIT.
3484                                  ;IF LOCATION BLKM IS SET TO 1001,A SOM WILL PRECEED THE
3485                                  ;DATA AND A EOM WILL FOLLOW IT. IF XMZER IS SET TO NON-
3486                                  ;ZERO, ALL DATA(INCLUDING ZEROS) WILL BE XMITTED.
3487                                  ;*****************************************************************
3488  016014  005737  002260          INTXM:  TST     VSTAT             ;HAS 61 TRANSMITTED XOFF?
3489  016020  100004                          BPL     NOKIL             ;NO XMIT ANOTHER
3490  016022  052737  000200  002260          BIS     #XMKIL,VSTAT      ;SET XMIT KILLED BIT IN VSTAT
3491  016030  000510                          BR      KIENA             ;GO KILL XMIT ENABLE
3492
3493  016032  105737  002263          NOKIL:  TSTB    BLKM+1            ;SOM/EOM TRANSMIT?
3494  016036  001406                          BEQ     NOSOM             ;NO
3495  016040  112777  000002  163722          MOVB    #SOM,@VXBUF       ;YES-ISSUE START OF MESSAGE.
3496  016046  105037  002263                  CLRB    BLKM+1            ;AND CLEAR SOM FLAG.
3497  016052  000002                          RTI
3498  016054  005737  016270          NOSOM:  TST     XMCNT             ;XMITTED THE BUFFER?
3499  016060  001006                          BNE     100$              ;NO-XMIT A NORMAL CHAR.
```

```
3500  016062  112777  000004  163700          MOVB    #EOM,@VXBUF     ;YES SEND EOM AND EXIT
3501  016070  105037  002262                  CLRB    BLKM
3502  016074  000452                          BR      2$
3503  016076  105777  000164          100$:   TSTB    @TBUFP          ;CHECK FOR CH.= ZERO. IF SO DO NOT XMIT
3504  016102  001016                          BNE     1$              ;OR COUNT BYTE. OR ARE WE
3505  016104  005737  021652                  TST     XMZER           ;XMITTING ZEROS?
3506  016110  001023                          BNE     22$             ;YES-XMIT NEXT BYTE
3507  016112  023737  016266  016264          CMP     TBUFP,TEBUF     ;AT END OF BUFFER?
3508  016120  001004                          BNE     10$             ;NO
3509  016122  013737  016262  016266          MOV     TBBUF,TBUFP     ;YES-RESET BUFFER POINTER
3510  016130  000740                          BR      NOKIL
3511  016132  005237  016266          10$:    INC     TBUFP
3512  016136  000735                          BR      NOKIL           ;LOOK FOR NON-ZERO BYTE TO TRANSMIT.
3513
3514  016140  032737  002000  002260  1$:     BIT     #CKSUM,VSTAT    ;CHECKSUM REQUESTED?
3515  016146  001404                          BEQ     22$
3516  016150  117705  000112                  MOVB    @TBUFP,R5       ;YES,LOAD THE BYTE
3517  016154  004037  020700                  JSR     R0,CALCK        ;AND CALCULATE THE NEW CHECKSJM.
3518  016160  117777  000102  163602  22$:    MOVB    @TBUFP,@VXBUF   ;TRAMSMIT A CHARACTER
3519  016166  023737  016266  016264          CMP     TBUFF,TEBUF     ;AT END OF CIRCULAR BUFFER?
3520  016174  001004                          BNE     11$             ;NO
3521  016176  013737  016262  016266          MOV     TBBUF,TBUFP     ;YES, RESET IT TO START.
3522  016204  000402                          BR      12$             ;BY-PASS INCREMENT BUFF. POINTER
3523  016206  005237  016266          11$:    INC     TBUFP           ;INCREMENT BUFFER POINTER.
3524
3525  016212  005337  016270          12$:    DEC     XMCNT           ;DECREMENT THE TRANSMIT COUNT
3526  016216  001401                          BEQ     2$              ;YES,CLEANUP,REQUEST ERRORS AND EXIT.
3527  016220  000002                          RTI                     ;NO, CONTINUE
3528  016222  105737  002262          2$:     TSTB    BLKM            ;SOM/EOM XMIT?
3529  016226  001014                          BNE     TXEX            ;YES-DO NOT SET XMDNE UNTIL EOM SENT.
3530  016230  052737  000001  002260          BIS     #XMDNE,VSTAT    ;SET THE DONE BIT IN VSTAT.
3531  016236  042737  002000  002260          BIC     #CKSUM,VSTAT    ;CLEAR THE CHECKSUM FLAG WHEN DONE.
3532  016244  013737  016262  016266          MOV     TBBUF,TBUFP     ;RESET BUFFER POINTER.
3533  016252  042777  040000  163502  KIENA:  BIC     #XENA,@VJCSR    ;CLEAR XMIT. INT. ENABLE
3534  016260  000002                  TXEX:   RTI
3535
3536
3537  016262  000000                  TBBUF:  .WORD                   ;CONTAINS INITIAL ADDRESS
3538  016264  000000                  TEBUF:  .WORD                   ;CONTAIN LAST ADDRESS
3539  016266  000000                  TBUFP:  .WORD                   ;CONTAINS CURRENT LOCATION
3540
3541  016270  000000                  XMCNT:  .WORD   0               ;LOADED WITH NUMBER OF XMITS.
3542                                  ;*****************************************************************
3543
3544
3545                                          ;SUBROUTINE TO ISSUE RESET TO THE VT61, ENTERS MAINTENANCE MODE
3546                                          ;AND FORCES LINEAR ADDRESSING.
3547                                  ;*****************************************************************
3548
3549  016272  113737  001102  002264  RESETV: MOVB    $TSTNM,TSTNM    ;LOAD THE TEST NUMBER IN ERROR PRINT AREA.
3550  016300  013746  002224                  MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
3551  016304  013746  002164                  MOV     RESET,-(SP)     ;;PUSH RESET ON STACK
3552  016310  013746  002110                  MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
3553  016314  004037  014370                  JSR     R0,TESC         ;GO XIMT IT
3554  016320  004037  016402                  JSR     R0,GETON        ;GO LOOK FOR XON.
3555  016324  000405                          BR      1$              ;FOUND IT.
```

```
 3556  016326  005237  002234                INC     FTLCNT          ;ADD 1 TO FATAL XMIT COUNT.
 3557  016332  010037  001120                MOV     R0,$GDADR       ;NO XON ISSUE XON ERROR
 3558  016336  104017                        ERROR   17
 3559  016340                        1$:
 3560  016340  013746  002224                MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
 3561  016344  013746  002034                MOV     EMAIN,-(SP)     ;;PUSH EMAIN ON STACK
 3562  016350  013746  002110                MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
 3563  016354  013746  002044                MOV     DRECT,-(SP)     ;;PUSH DRECT ON STACK
 3564  016360  013746  002110                MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
 3565  016364  004037  014370        2$:     JSR     R0,TESC
 3566  016370  005037  002260                CLR     VSTAT           ;CLEAR INT. FLAGS AFTER TERMINAL RESET
 3567  016374  005037  020072                CLR     HDFLG           ;CLEAR PRINT HEADER FLAG.
 3568  016400  000200                        RTS     R0
 3569
 3570                                ;****************************************************************
 3571                                        ;SUBROUTINE TO WAIT FOR AN XON. NO XON EXIT IS PC +2.
 3572                                ;****************************************************************
 3573
 3574  016402  012737  000454  002244  GETON: MOV     #300.,BUBCT     ;SET UP TO LOOK FOR 3 SEC.
 3575  016410  105077  013704                CLRB    @ABUFP
 3576  016414  127727  013700  000021  1$:    CMPB    @ABUFP,#XON     ;RECEIVED A XON?
 3577  016422  001412                        BEQ     GOTON           ;YES-EXIT.
 3578  016424  012737  000001  020220        MOV     #1,DCOUNT       ;NO-DELAY 10 M.S.
 3579  016432  004037  020156                JSR     R0,DELAY
 3580  016436  005337  002244                DEC     BUBCT           ;AT END OF DELAY?
 3581  016442  001364                        BNE     1$              ;NO
 3582  016444  062700  000002                ADD     #2,R0           ;YES-SET UP ERROR EXIT.
 3583  016450  000200                GOTON:  RTS     R0
 3584
 3585                                ;****************************************************************
 3586
 3587                                        ;SUBROUTINE TO ISSUE ESCZ AND LOOK FOR A RESPONSE-EITHER
 3588                                        ;A -1 OR THE RETURNED IDENT. THE -1 INDICATES NO
 3589                                        ;RESPONSE FROM THE UNIT UNDER TEST.
 3590                                ;****************************************************************
 3591
 3592  016452                        ZFLAG:
 3593  016452  012637  016510                MOV     (SP)+,ROSV1     ;;POP STACK INTO ROSV1
 3594  016456  013746  002224                MOV     @#ZERO,-(SP)    ;;PUSH @#ZERO ON STACK
 3595  016462  013746  002162                MOV     @#ESCZ,-(SP)    ;;PUSH @#ESCZ ON STACK
 3596  016466  004037  014370                JSR     R0,TESC         ;GO ISSUE ESZ SEQUENCE
 3597  016472  012746  106003                MOV     #106003,-(SP)   ;;PUSH #106003 ON STACK
 3598  016476  004037  014116                JSR     R0,RECTM        ;GO READ THE CHARACTER
 3599  016502  013746  016510                MOV     ROSV1,-(SP)     ;;PUSH ROSV1 ON STACK
 3600  016506  000200                        RTS     R0
 3601  016510  000000                ROSV1:  .WORD   0
 3602
 3603                                ;****************************************************************
 3604                                        ;ROUTINE TO CHECK SOFTWARE STATUS REGISTER (VSTAT)
 3605                                        ;RECEIVE FLAGS ONLY.  ENTERED WITH ANTICIPATED
 3606                                        ;STATUS WORD ON THE STACK.
 3607                                ;****************************************************************
 3608
 3609  016512                        CKSFT:
 3610  016512  012637  002256                MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
 3611  016516  010137  002220                MOV     R1,SVER1        ;SAVE R1
```

```
 3612  016522  010237  002222                MOV     R2,SVER2        ;SAVE R2
 3613
 3614  016526  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 3615  016530  013702  002260                MOV     VSTAT,R2        ;SET R2 EQUAL TO VSTAT
 3616
 3617  016534  042702  003566                BIC     #003566,R2      ;CLEAR NON-ERROR BITS
 3618  016540  020102                        CMP     R1,R2           ;COMPARE ANTICIPATED TO ACTUAL.
 3619  016542  001432                        BEQ     NOER            ;NO UNUSAL BITS EXIT
 3620
 3621  016544  010137  001124                MOV     R1,$GDDAT       ;MOVE GOOD STATUS TO MESSAGE
 3622  016550  013737  002260  001126        MOV     VSTAT,$BDDAT    ;MOVE BAD STATUS TO MESSAGE
 3623  016556  104003                        ERROR   3               ;ISSUE ERROR MESSAGE.
 3624
 3625
 3626                                ;*****************************************************************
 3627                                        ;ROUTINE TO PRINT THE STATUS REGISTER IN THE FOLLOWING
 3628                                        ;FORMAT: STATUS BITS (XXX 000), CHARACTER TRANSFERRED (000  X X)
 3629                                ;*****************************************************************
 3630
 3631  016560  012701  015764                MOV     #STTER,R1       ;SET R1 EQUAL TO FIRST ENTRY
 3632  016564  013702  016006                MOV     STTEP,R2        ;SET R2 EQUAL LAST ENTRY
 3633  016570  020102                1$:     CMP     R1,R2           ;ARE THEY EQUAL
 3634  016572  001416                        BEQ     NOER            ;YES-RESET POINTERS AND EXIT.
 3635  016574  004037  016654                JSR     R0,CLREG        ;CLEAR ERROR PRINT LOC.
 3636  016600  013737  001762  001120        MOV     VJCSR,$GDADR    ;LOAD ADDRESS
 3637  016606  017737  163150  001124        MOV     @VJCSR,$GDDAT   ;LOAD CSR
 3638  016614  112137  001126          2$:   MOVB    (R1)+,$BDDAT    ;MOVE CHARACTER AND
 3639  016620  112137  001123                MOVB    (R1)+,$BDADR+1  ;STATUS BITS TO ERROR REGISTERS.
 3640  016624  104002                        ERROR   2               ;ISSUE ERROR MESSAGE
 3641  016626  000760                        BR      1$              ;DO AGAIN
 3642  016630  013701  002220          NOER: MOV     SVER1,R1        ;RESTORE R1 AND
 3643  016634  013702  002222                MOV     SVER2,R2        ;R2.
 3644  016640  012737  015764  016006        MOV     #STTER,STTEP    ;RESET STATUS ERROR POINTER.
 3645  016646  013746  002256                MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
 3646  016652  000200                        RTS     R0              ;EXIT
 3647
 3648                                ;*****************************************************************
 3649                                        ;SUBROUTINE TO CLEAR ERROR/DATA OUTPUT LOCATIONS. NEEDED
 3650                                        ;ONLY WHEN DISPLAYING BYTES IN WORD LOCATIONS.
 3651                                ;*****************************************************************
 3652
 3653  016654  005037  001120          CLREG: CLR    $GDADR
 3654  016660  005037  001122                 CLR    $BDADR
 3655  016664  005037  001124                 CLR    $GDDAT
 3656  016670  005037  001126                 CLR    $BDDAT
 3657  016674  000200                        RTS     R0
 3658                                ;*****************************************************************
 3659                                        ;SUBROUTINE TO TRANSMIT THE BUFFER AND WAIT FOR XMIT DONE
 3660                                        ;AND END OF RECEIVE MESSAGE. SUBPOUTINE WILL LOOP IF LOCATION
 3661                                        ;RECITT IS PRE-LOADED WITH A NUMBER HIGHER THAN1(IE. MULTIPLE
 3662                                        ;RECEIVES CAN BE ACCOMPLISHED WITH ONLY ONE ENTRY TO SUB-
 3663                                        ;ROUTINE).WDSTOR AND BYSTOR ARE THE WORD(CURSOR POS.) AND BYTE
 3664                                        ;STORAGE LOCATIONS,RESPECTIVELY.DEFAULT STORAGE IS THE PEC. BUFFER.
 3665
 3666                                ;*****************************************************************
 3667
```

```
3668  016676                                XMREC:
3669  016676  010546                              MOV     R5,-(SP)        ;PUSH R5 ON STACK
3670  016700  012737  001001  002262              MOV     #1001,BLKM      ;SET UP FOR A SOM/EOM TRANSMIT.
3671  016706  042737  077577  002260              BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMAIL.
3672  016714  013701  017150                      MOV     BYSTOR,R1       ;LOAD THE STORAGE POINTERS
3673  016720  013702  017146                      MOV     WDSTOR,R2
3674  016724  052777  040000  163030              BIS     #XENA,@VJCSR    ;SET INTERRUPT ENABLES
3675  016732  042737  061466  002260  XMITT:     BIC     #61466,VSTAT    ;CLEAR SOM,EOM,EPL,ESC,REV.VID., PARA. DELIM.,IDENT,CUR.
3676  016740  005037  002254           1$:       CLR     DLAY            ;SET UP TIME OUT DELAY.
3677  016744  032737  000001  002260              BIT     #XMDNE,VSTAT    ;IS XMIT DONE?
3678  016752  001015                              BNE     3$              ;YES-LOOK FOR RECEIVE DONE.
3679  016754  032737  020000  002260  2$:        BIT     #REOM,VSTAT     ;RECEIVED AN EOM?
3680  016762  001401                              BEQ     20$             ;NO
3681  016764  000435                              BR      CKSTR           ;YES-GO HANDLE DATA
3682  016766  032737  100000  002260  20$:       BIT     #RXOFF,VSTAT    ;NO- IS XOFF SET?
3683  016774  001761                              BEQ     1$              ;NO-STILL TRANSMITTONG.
3684  016776  005337  002254                      DEC     DLAY            ;YES- RUN DELAY
3685  017002  001364                              BNE     2$              ;WAITING FOR XON
3686  017004  000416                              BR      XMAD2           ;NO XON-REPORT VT61 FAILURE.
3687
3688  017006  013705  032320           3$:       MOV     ABUFP,R5        ;LOAD CH. RECEIVED FLAG.
3689  017012  005037  002254                      CLR     DLAY            ;SET UP RECEIVE DELAY.
3690  017016  032737  020000  002260  4$:        BIT     #REOM,VSTAT     ;RECEIVE END OF MESSAGE?
3691  017024  001015                              BNE     CKSTR           ;YES-CHECK DATA STORAGE POINTERS
3692  017026  020537  032320                      CMP     R5,ABUFP        ;RECEIVED ANOTHER CHARACTER?
3693  017032  001365                              BNE     3$              ;YES-RESET CH. FLAG AND DELAY
3694  017034  005337  002254           5$:       DEC     DLAY            ;RUN DELAY
3695  017040  001366                              BNE     4$              ;AND KEEP LOOKING FOR EOM.
3696  017042  062700  000002           XMAD2:    ADD     #2,R0           ;TIME OUT OCCURRED-SET UP ERROR EXIT.
3697  017046  005237  002234                      INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
3698  017052  004037  017262                      JSR     R0,RESPTR       ;AND REST ALL INTERRUPT POINTERS.
3699  017056  000422                              BR      CKVST
3700  017060  020102                   CKSTR:     CMP     R1,R2           ;STORAGE POINTERS CLEARED?
3701  017062  001413                              BEQ     CHKITT          ;YES--LEAVE DATA IN REC. BUFFER.
3702  017064  032737  000004  002260              BIT     #CURPOS,VSTAT   ;RECEIVED A CURSOR POSITION?
3703  017072  001403                              BEQ     STRBYT          ;NO-GO STORE A BYTE.
3704  017074  017722  176654                      MOV     @RBBUF,(R2)+    ;YES,STORE IT.
3705  017100  000404                              BR      CHKITT          ;AND CHECK ITERATION COUNT.
3706  017102  005701                   STRBYT:    TST     R1              ;STORING A CHAR?
3707  017104  001402                              BEQ     CHKITT          ;NO
3708  017106  117721  176642                      MOVB    @RBBUF,(R1)+    ;STORE A RECEIVED BYTE
3709  017112  005337  017144           CHKITT:    DEC     RECITT          ;DONE RECEIVING?
3710  017116  001305                              BNE     XMITT           ;NO-LOOP SUBROUTINE
3711  017120  004037  021744                      JSR     R0,CKOFF        ;SEE IS XOFF IS UP.
3712  017124                           CKVST:
3713  017124  012746  060001                      MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
3714  017130  004037  016512                      JSR     R0,CKSFT
3715  017134  004037  017262                      JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
3716  017140  012605                              MOV     (SP)+,R5        ;;POP STACK INTO R5
3717  017142  000200                   XMXT:      RTS     R0              ;EXIT SUBROUTINE.
3718  017144  000000                   RECITT:    .WORD   0               ;RECEIVE ITERATION COUNT.
3719  017146  000000                   WDSTOR:    .WORD   0               ;WORD STORAGE POINTER
3720  017150  000000                   BYSTOR:    .WORD   0               ;BYTE STORAGE POINTER
3721
3722                                   ;*****************************************************************
3723                                           ;SUBROUTINE TO  XMIT THE BYTE AT TBUFP.
```

```
                                        ;*****************************************************************
                                        ;
017152  042737  000001  002260  XMIT1:  BIC     #1,VSTAT        ;CLEAR XMIT DONE FLAG
017160  012737  000001  016270          MOV     #1,XMCNT        ;SET UP TO XMIT 1 BYTE
017166  052777  040000  162566          BIS     #XENA,@VJCSR
017174                          1$:
017174  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
017200  012746  000001                  MOV     #1,-(SP)        ;;PUSH #1 ON STACK
017204  004037  021654                  JSR     R0,WTBGND       ;LOOK FOR XMIT DONE
017210  000401                          BR      FTLEXT          ;HUNG TRANSMIT-CLEAR FLAGS AND EXIT
017212  000402                          BR      NORXT           ;NORMAL EXIT.
017214  005037  002260          FTLEXT: CLR     VSTAT           ;CLEAR ANY FLAGS
017220  000200                  NORXT:  RTS     R0              ;AND EXIT
                                        ;
                                        ;*****************************************************************
                                                ;SUBROUTINE TO ISSUE A BYTE AT A TIME UNTIL A ZERO
                                                ;BYTE IS ENCOUNTERED.
                                        ;*****************************************************************
                                        ;
017222  112777  000002  177036  LDXMIT: MOVB    #SOM,@TBUFP     ;SEND THE START OF MESSAGE.
017230  000403                          BR      2$
017232  112377  177030          1$:     MOVB    (R3)+,@TBUFP    ;MOVE A BYTE TO XMIT BUFFER
017236  001403                          BEQ     LDOUT           ;IF A ZERO BYTE-EXIT
017240  004027  017152          2$:     JSR     R0,XMIT1        ;GO XMIT A BYTE
017244  000772                          BR      1$              ;XMIT AGAIN.
017246  112777  000004  177012  LDOUT:  MOVB    #EOM,@TBUFP     ;SEND THE END OF MESSAGE.
017254  004037  017152                  JSR     R0,XMIT1
017260  000200                          RTS     R0
                                        ;
                                        ;*****************************************************************
                                                ;ROUTINE TO RESET ALL INTERRUPT POINTERS.
                                        ;*****************************************************************
                                        ;
017262  040000  162472  RESPTR: BIC     #XENA,@VJCSR    ;CLEAR INTERRUPT ENABLES
017270  012737  015754  015760          MOV     RBBUF,RBUFP     ;RESET RECEIVE BUF POINTER
017276  012737  016262  016266          MOV     TBBUF,TBUFP     ;RESET XMMT BUF POINTER
017304  012737  015764  016006          MOV     #STTER,STTEP    ;RESET RECEIVE STATUS ERR POINTER
017312  005037  016270                  CLR     XMCNT           ;CLEAR TRANSMIT COUNT
017316  005037  015762                  CLR     ESAMB           ;CLEAR ESC ASSEMBLY FLAGS
017322  012737  000001  017144          MOV     #1,RECITT       ;RESET REC. ITERATION COUNT
017330  005037  017146                  CLR     WDSTOR          ;CLEAR STORAGE POINTERS
017334  005037  017150                  CLR     BYSTOR
017340  000200                          RTS     R0
                                        ;
                                        ;*****************************************************************
                                                ;SUBROUTINE TO ISSUE CURSOR POSITION ERROR. GOOD
                                                ;LINE/COLUMN MUST BE A WORD ON STACK. ERROR
                                                ;POSITION IS EXPECTED TO BE @ RBBUF.
                                        ;*****************************************************************
                                        ;
017342                          CURER:
017342  012637  002256                  MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
017346  012637  002216                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
017352  162737  020040  002216          SUB     #20040,CHRD     ;EXTRACT MOD 40 FROM GOOD POSITION
017360  004037  016654                  JSR     R0,CLREG
```

```
3780  017364  113737  002217  001124          MOVB    CHRD+1,$GDDAT   ;LOAD MESSAGE WITH GOOD
3781  017372  113737  002216  001120          MOVB    CHRD,$GDADR     ;LINE AND COLUMN
3782  017400  017737  176350  002216          MOV     @RBBUF,CHRD     ;LINE AND COLUMN.
3783  017406  162737  020040  002216          SUB     #20040,CHRD     ;EXTRACT MOD 40 FROM BAD POSITION.
3784  017414  113737  002217  001126          MOVB    CHRD+1,$BDDAT   ;LOAD MESSAGE WITH BAD
3785  017422  113737  002216  001122          MOVB    CHRD,$BDADR     ;LINE AND COLUMN.
3786  017430  104006                          ERROR   6               ;ISSUE ERROR
3787  017432  013746  002256                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
3788  017436  000200                          RTS     R0
3789
3790                                  ;*****************************************************************
3791
3792                                  ;*****************************************************************
3793                                          ;SUBROUTINE TO DECREMENT CUSROR POSITION IN A
3794                                          ;LINEAR SEQUENCE. (IE. ROW 20, COL 1 ;ROW 20 COLO ;ROW 17, COL 157).
3795                                  ;*****************************************************************
3796
3797  017440  123727  017545  000040  CMPOS:  CMPB    LNRW+1,#40      ;AT LEFT EDGE OF ROW?
3798  017446  001403                          BEQ     1$              ;YES, GO ADJUST COL., ROW.
3799  017450  105337  017545                  DECB    LNRW+1          ;NO, DECREMENT COL. AND EXIT
3800  017454  000200                          RTS     R0
3801  017456  123727  017544  000040  1$:     CMPB    LNRW,#40        ;AT ROW 0?
3802  017464  001405                          BEQ     2$              ;YES, NO DECREMENT POSSIBLE-EXIT.
3803  017466  105337  017544                  DECB    LNRW            ;NO, DECREMENT ROW AND
3804  017472  112737  000157  017545          MOVB    #157,LNRW+1     ;SET COL. TO RIGHT EDGE.
3805  017500  000200                  2$:     RTS     R0
3806
3807                                  ;*****************************************************************
3808                                          ;SUBROUTINE TO INCREMENT CURSOR POSITION IN A LINEAR
3809                                          ;SEQUENCE (IE. ROW 10, COL 78, ROW 10. COL 79, ROW 11 , COL 0).
3810                                  ;*****************************************************************
3811
3812  017502  123727  017545  000157  CPPOS:  CMPB    LNRW+1,#157     ;AT RIGHT EDGE OF ROW
3813  017510  001403                          BEQ     1$              ;YES, ADJUST ROW AND COLUMN.
3814  017512  105237  017545                  INCB    LNRW+1          ;NO, INCREMENT COL. COUNT
3815  017516  000200                          RTS     R0              ;AND EXIT
3816  017520  123727  017544  000067  1$:     CMPB    LNRW,#67        ;AT BOTTOM ROW?
3817  017526  001405                          BEQ     2$              ;YES, NO INCREMENT POSSIBLE-EXIT.
3818  017530  105237  017544                  INCB    LNRW            ;NO, INCREMENT ROW COUNT AND
3819  017534  112737  000040  017545          MOVB    #40,LNRW+1      ;SET COL. TO LEFT EDGE.
3820  017542  000200                  2$:     RTS     R0
3821
3822  017544  000000                  LNRW:   .WORD   0               ;CONTAINS UPDATED CURSOR POSITION.
3823                                  ;*****************************************************************
3824
3825                                          ;SUBROUTINE TO XMIT, RECEIVE AND COMPARE. DATA ERRORS
3826                                          ;ARE REPORTED FROM SUBROUTINE. IF THE TRANSMIT OR
3827                                          ;RECEIVE LOOPS 'TIME OUT', EXIT FROM SUBROUTINE WILL
3828                                          ;BE NORMAL EXIT +2. SUBROUTINE ENTERED WITH (R1)=
3829                                          ;GOOD DATA BUFFER, (R2)=RECEIVE DATA BUFFER AND
3830                                          ;R3=COMPARE COUNT. IF THE VT61 DOES NOT HANG,THE ROUTINE
3831                                          ;WILL WAIT FOR END OF REC. MESSAGE(EOM).
3832
3833
3834                                  ;*****************************************************************
3835
```

```
 3836  017546                                XRCMP:
 3837  017546  010446                              MOV     R4,-(SP)        ;;PUSH R4 ON STACK
 3838  017550  005004                              CLR     R4              ;USE R4 A RECEIVE COUNTER.
 3839  017552  012737  001001  002262              MOV     #1001,BLKM      ;SET UP FOR A SOM/EOM TRANSMIT.
 3840  017560  042737  077577  002260              BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
 3841  017566  052777  040000  162166              BIS     #XENA,@VJCSR    ;SET INTERRUPT ENABLES.
 3842  017574  005037  020072                      CLR     HDFLG           ;CLEAR ERROR 13 PRINT FLAG
 3843  017600  012705  032270                      MOV     #TCRLB+450,R5   ;R5 IS ERROR STORAGE POINTER
 3844  017604  005037  002254          1$:         CLR     DLAY            ;SET UP TIME OUT DELAY
 3845  017610  032737  000001  002260              BIT     #XMDNE,VSTAT    ;XMIT DONE?
 3846  017616  001014                              BNE     XREC            ;YES-GO RECEIVE
 3847  017620  023737  015754  015760  2$:         CMP     RBBUF,RBUFP     ;HAS RECEIVE OPERATION BEGUN?
 3848  017626  103410                              BLO     XREC            ;YES-GO RECEIVE
 3849  017630  032737  100000  002260              BIT     #RXOFF,VSTAT    ;XMIT XOFF SET?
 3850  017636  001762                              BEQ     1$              ;NO-KEEP LOOKING FOR XMIT DONE?
 3851  017640  005337  002254                      DEC     DLAY            ;YES RUN DELAY AND LOOK
 3852  017644  001365                              BNE     2$              ;FOR XON OR RECEIVED CH.
 3853  017646  000432                              BR      XRERR           ;TRANSMIT TIMEOUT-SET UP ERROR EXIT
 3854
 3855  017650  005037  002254          XREC:       CLR     DLAY            ;SET UP TIME OUT DELAY
 3856  017654  020237  015760          1$:         CMP     R2,RBUFP        ;INSURE COMPARE POINTER
 3857  017660  103410                              BLO     2$              ;LESS THAN RECEIVE POINTER
 3858  017662  032737  020000  002260              BIT     #REOM,VSTAT     ;RECEIVE EOM?
 3859  017670  001030                              BNE     XREXT           ;YES-SET UP TO EXIT
 3860  017672  005337  002254                      DEC     DLAY            ;RUN TIMEOUT DELAY
 3861  017676  001416                              BEQ     XRERR           ;TIME OUT OCCURRED-ERROR EXIT
 3862  017700  000765                              BR      1$              ;RETURN TO CHECK RECEIVE COUNT
 3863  017702  005204                  2$:         INC     R4              ;ADD 1 TO RECEIVE COUNTER.
 3864  017704  122122                              CMPB    (R1)+,(R2)+     ;COMPARE CHARACTERS
 3865  017706  001407                              BEQ     4$              ;EQUAL-COMPARE AGAIN
 3866  017710  020527  032320                      CMP     R5,#TCRLB+500   ;ALLREADY STORED 50 ERRORS?
 3867  017714  103004                              BHIS    4$              ;YES-BYPASS STORAGE
 3868  017716  114125                              MOVB    -(R1),(R5)+     ;STORE GOOD DATA
 3869  017720  114225                              MOVB    -(R2),(R5)+     ;STORE BAD DATA
 3870  017722  010425                              MOV     R4,(R5)+        ;LOAD RECEIVE COUNT
 3871  017724  132122                              BITB    (R1)+,(R2)+     ;RESET POINTERS AND
 3872  017726  005303                  4$:         DEC     R3              ;CHECK COMPARE COUNT
 3873  017730  001410                              BEQ     XREXT           ;ALL DONE-EXIT
 3874  017732  000746                              BR      XREC            ;COMPARE ANOTHER
 3875  017734  062700  000002          XRERR:      ADD     #2,R0           ;SET UP ERROR EXIT
 3876  017740  005237  002234                      INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
 3877  017744  004037  017262                      JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
 3878  017750  000440                              BR      XROUT
 3879  017752                            XREXT:
 3880  017752  012746  020000                      MOV     #REOM,-(SP)     ;;PUSH #REOM ON STACK
 3881  017756  012746  000004                      MOV     #4,-(SP)        ;;PUSH #4 ON STACK
 3882  017762  004037  021654                      JSR     R0,WTBGND
 3883  017766  000431                              BR      XROUT           ;NO EOM-ISSUE ERROR AND EXIT.
 3884  017770  162705  032270                      SUB     #TCRLB+450,R5   ;NOW EXTRACT ERROR COUNT-IF ANY.
 3885  017774  010501                              MOV     R5,R1           ;AND STORE IT IN R1
 3886  017776  012705  032270                      MOV     #TCRLB+450,R5   ;RELOAD ERROR POINTER
 3887  020002  005701                              TST     R1              ;TEST FOR ERRORS
 3888  020004  001422                              BEQ     XROUT           ;NO-CHECK STATUS AND EXIT
 3889  020006  005737  020072                      TST     HDFLG           ;;DATA ERROR HEADER PRINTED?
 3890  020012  001003                              BNE     1$              ;YES-BYPASS HEADER PRINT
 3891  020014  104012                              ERROR   12              ;PRINT DATA ERROR HEADER
```

```
 3892  020016  005237  020072          INC     HDFLG           ;SET HEADER PRINT FLAG
 3893  020022  004037  016654  1$:     JSR     R0,CLREG        ;ERROR WAS LEGTIMATE. LOAD
 3894  020026  112537  001124          MOVB    (R5)+,$GDDAT    ;ERROR MESSAGE AND ISSUE
 3895  020032  112537  001126          MOVB    (R5)+,$BDDAT    ;IT.
 3896  020036  012537  001120          MOV     (R5)+,$GDADR    ;LOAD RECEIVE COUNT
 3897  020042  104004                  ERROR   4               ;ISSUE DATA COMPARE ERROR
 3898  020044  162701  000004          SUB     #4,R1           ;DECREMENT ERROR COUNT
 3899  020050  001364                  BNE     1$              ;PRINT ANOTHER IF NOT AT ZERO
 3900  020052  004037  021744  XROUT:  JSR     R0,CKOFF        ;SEE IS XOFF IS UP.
 3901  020056  012746  060001          MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
 3902  020062  004037  016512          JSR     R0,CKSFT        ;CHECK FOR VSTAT /STATUS ERR.
 3903  020066  012604                  MOV     (SP)+,R4        ;;POP STACK INTO R4
 3904  020070  000200                  RTS     R0              ;EXIT SUBROUTINE
 3905
 3906  020072  000000  HDFLG:  0                               ;INHIBIT PRINT FLAG.
 3907
 3908                  ;*****************************************************************
 3909
 3910                          ;SUBROUTINE TO CREATE A 'RULER' IN LOCATIONS 200
 3911                          ;TO 317.
 3912
 3913                  ;*****************************************************************
 3914
 3915  020074  012701  032020  CRRUL:  MOV     #TCRLB+200,R1   ;LOAD STARTING ADDRESS
 3916  020100  012702  130461          MOV     #130461,R2      ;LOAD INITIAL RULER ASCII CODES.
 3917  020104  110221  1$:     MOVB    R2,(R1)+        ;STORE A RULER BYTE IN XMIT BUF.
 3918  020106  022701  032140          CMP     #TCRLB+320,R1   ;RULER COMPLETE?
 3919  020112  103001                  BHIS    2$              ;NO
 3920  020114  000200                  RTS     R0              ;AND EXIT.
 3921  020116  105202  2$:     INCB    R2              ;INCREMENT ASCII BYTE
 3922  020120  122702  000272          CMPB    #272,R2         ;END OF REVERSE VIDEO?
 3923  020124  001003                  BNE     3$              ;NO-SEE IF END OF NORMAL.
 3924  020126  012702  030660          MOV     #030660,R2      ;SET UP TO ISSUE REVERSE 0.
 3925  020132  000405                  BR      5$
 3926  020134  122702  000072  3$:     CMPB    #72,R2          ;END OF NORMAL VIDEO?
 3927  020140  001361                  BNE     1$              ;NOT AT END OF A VIDEO STRING.
 3928  020142  012702  130460          MOV     #130460,R2              ;YES-SET UP TO ISSUE NORMAL 0.
 3929  020146  110221  5$:     MOVB    R2,(R1)+        ;DO IT
 3930  020150  105202                  INCB    R2              ;SET BYTE TO NEXT ASCII CODE
 3931  020152  000302                  SWAB    R2              ;REVERSE VIDEO MODE.
 3932  020154  000753                  BR      1$              ;BEGIN NEXT STRING
 3933
 3934                  ;*****************************************************************
 3935                          ;SUBROUTINE TO DELAY 10 M.S. TIME THE NUMBER INLOCATION
 3936                          ;DCOUNT. THE PROCESSOR TYPE PRE-DETERMINES THE # OF LOOPS
 3937                          ;REQUIRED TO DELAY 10 M.S. FOR ONE ITERATION. LOCATION
 3938                          ;PMULT IS PRE-LOADED WITH : 11/45 = 4, 11/40 = 2
 3939                          ;AND 11/10 =1.
 3940                  ;*****************************************************************
 3941
 3942  020156          DELAY:
 3943  020156  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 3944  020160  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 3945  020162  013702  020216  1$:     MOV     PMULT,R2        ;LOAD PROCESSOR MULTIPLIER
 3946  020166  012701  002570  2$:     MOV     #1400.,R1       ;LOAD 10 M.S. DELAY
 3947  020172  005301                  DEC     R1              ;RUN BASIC DELAY
```

```
 3948  020174  001376                        BNE     .-2
 3949  020176  005302                        DEC     R2              ;RUN MULTIPLIER DELAY
 3950  020200  001372                        BNE     2$
 3951  020202  005337  020220                DEC     DCOUNT          ;RUN ITERATION COUNT
 3952  020206  001365                        BNE     1$
 3953  020210  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
 3954  020212  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 3955  020214  000200                        RTS     R0
 3956
 3957  020216  000000              PMULT:    0                       ;PROCESSOR MULTIPLIER
 3958  020220  000000              DCOUNT:   0                       ;ITERATION COUNT
 3959
 3960                              ;*****************************************************************
 3961
 3962                                      ;SUBROUTINE TO GENERATE A INCREMENTING PATTERN AT
 3963                                      ;(R1)+.  ENTER WITH R3 EQUAL TO # OF CH. TO CREATE.
 3964                                      ;R5 IS UTILIZED AS A WORK REGISTER.
 3965
 3966                              ;*****************************************************************
 3967
 3968  020222  012705  000041      BLDINC:   MOV     #41,R5          ;LOAD R5 WITH INITIAL CH.
 3969  020226  110521              BLDINA:   MOVB    R5,(R1)+        ;MOVE A CH. TO BUFFER
 3970  020230  005303                        DEC     R3              ;DECREMENT BYTE COUNT
 3971  020232  001001                        BNE     2$              ;NOT DONE-UPDATE PATTERN
 3972  020234  000200                        RTS     R0              ;EXIT-DONE.
 3973  020236  105205              2$:       INCB    R5              ;UPDATE CH. PATTERN
 3974  020240  122705  000177              CMPB    #177,R5         ;PATTERN EXCEEDED MAX?
 3975  020244  001766                        BEQ     BLDINC          ;YES-RESET IT.
 3976  020246  000767                        BR      BLDINA          ;NO-ISSUE CURRENT PATTERN.
 3977
 3978
 3979                              ;*****************************************************************
 3980
 3981                                      ;SUBROUTINE TO FILL THE SCREEN WITH INCREMENTING DATA
 3982                              ;*****************************************************************
 3983
 3984  020250  042737  077577  002260  DATSC:   BIC     #77577,VSTAT            ;CLEAR INTERRUPT FLAGS.
 3985  020256  013701  016262                    MOV     TBBUF,R1
 3986  020262  012703  000500                    MOV     #320.,R3        ;FILL XMIT BUFFER WITH INCRE-
 3987  020266  004037  020222                    JSR     R0,BLDINC       ;MENTING PATTERN
 3988  020272  012737  003600  016270  10$:     MOV     #TOTCH,XMCNT    ;SET UP TO XMIT 1920 BYTES
 3989  020300  052777  040000  161454          BIS     #XENA,@VJCSR
 3990
 3991  020306  032737  000001  002260  1$:      BIT     #XMDNE,VSTAT    ;XMIT DONE?
 3992  020314  001774                        BEQ     .-6             ;NO
 3993
 3994                              ;*****************************************************************
 3995
 3996                                      ;SUBROUTINE TO RESET VT61 AND DISPLAY MESSAGE
 3997                                      ;POINTED TO BY R2.
 3998
 3999                              ;*****************************************************************
 4000
 4001  020316  004037  016272      DSMES:    JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
 4002  020322  042737  077577  002260          BIC     #77577,VSTAT    ;CLEAR ALL FLAGS EXCEPT XOFF AND XMKIL.
 4003  020330  012737  000005  016270          MOV     #5,XMCNT        ;PRE-LOAD XMIT COUNT.
```

```
 4004  020336  013701  016262                    MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH:
 4005  020342  012721  000002                    MOV     #SOM,(R1)+      ;START OF MESSAGE
 4006  020346  013721  002110                    MOV     ESCO,(R1)+
 4007  020352  013721  002044                    MOV     DRECT,(R1)+     ;DISABLE RECTANGULAR MODE
 4008  020356  005237  016270          1$:       INC     XMCNT           ;INCREMENT TRANSMIT COUNT
 4009  020362  112221                            MOVB    (R2)+,(R1)+     ;DISPLAY MESSAGE
 4010  020364  001374                            BNE     1$
 4011  020366  112711  000004                    MOVB    #EOM,(R1)       ;TERMINATE WITH END OF MESSAGE.
 4012  020372  052777  040000  161362            BIS     #XENA,@VJCSR    ;XMIT IT AND WAIT FOR
 4013  020400  032737  000001  002260  2$:       BIT     #XMDNE,VSTAT    ;DONE
 4014  020406  001774                            BEQ     2$
 4015  020410  000200                            RTS     R0
 4016
 4017                                    ;*****************************************************************
 4018
 4019                                            ;SUBROUTINE TO CONVERT A BINARY CHARACTER
 4020                                            ;TO 3 OCTAL CHARACTERS. R1 CONTAINS BINARY
 4021                                            ;NUMBER. RESULT IS STORED IN LOCATIONS SVER1,
 4022                                            ;SVER2
 4023
 4024                                    ;*****************************************************************
 4025  020412                            BINOCT:
 4026  020412  010546                            MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 4027  020414  012705  000002                    MOV     #2,R5           ;LOAD ITERATION COUNT
 4028  020420  000403                            BR      2$              ;BYPASSS SHIFTS FOR 1ST CONVERSION
 4029  020422  106201                  1$:       ASRB    R1
 4030  020424  106201                            ASRB    R1              ;SHIFT A CHAR INTO POSITION
 4031  020426  106201                            ASRB    R1
 4032  020430  110165  002220          2$:       MOVB    R1,SVER1(R5)    ;STORE THE BINARY OFFSET
 4033  020434  142765  000370  002220            BICB    #370,SVER1(R5)  ;CLEAR NON ESSENTIAL BITS
 4034  020442  152765  000060  002220            BISB    #60,SVER1(R5)   ;CONVERT OFFSET TO OCTAL
 4035  020450  005305                            DEC     R5              ;DECREMENT CONVERSION COUNT
 4036  020452  100363                            BPL     1$              ;NOT DONE CONVERT ANOTHER
 4037  020454  112737  000040  002223            MOVB    #40,SVER2+1     ;LOAD A SPACE
 4038  020462  012605                            MOV     (SP)+,R5        ;;POP STACK INTO R5
 4039  020464  000200                            RTS     R0
 4040
 4041                                    ;*****************************************************************
 4042                                            ;SUBROUTINE TO CONVERT AN OCTAL CHAR. TO BINARY.  REG
 4043                                            ;R1 CONTAINS OCTAL AND REG R2 IS BINARY ASSEMBLY AREA.
 4044                                    ;*****************************************************************
 4045
 4046  020466  042701  177770           OCTBIN:  BIC     #177770,R1      ;EXTRACT OCTAL COMPONENT
 4047  020472  005702                            TST     R2              ;FIRST CONVERSION?
 4048  020474  001403                            BEQ     NOSHFT          ;YES - DO NOT SHIFT
 4049  020476  006302                            ASL     R2              ;NO - SHIFT PREVIOUS CHAR.
 4050  020500  006302                            ASL     R2
 4051  020502  006302                            ASL     R2
 4052  020504  060102                  NOSHFT:   ADD     R1,R2           ;ADD CURRENT CHAR.
 4053  020506  000200                            RTS     R0
 4054                                    ;*****************************************************************
 4055                                            ;SUBROUTINE TO CONVERT A BINARY POSITION TO A OCTAL #.
 4056                                    ;*****************************************************************
 4057  020510  005037  001776            CONVLN:  CLR     OCTLNE
 4058  020514  013737  001774  002246            MOV     TSTLNE,TPREG    ;LOAD OCTLNE WITH OCTAL EQUIVALENT
 4059  020522  032737  000001  002246  101$:     BIT     #BIT00,TPREG    ;OF TSTLNE IN BITS 8 THRU 11.
```

```
 4060  020530  001005                        BNE     102$
 4061  020532  006037  002246                ROR     TPREG
 4062  020536  105237  001777                INCB    OCTLNE+1
 4063  020542  000767                        BR      101$
 4064  020544  000200              102$:     RTS     R0
 4065
 4066                                  ;*****************************************************************
 4067                                  ;ROUTINE TO WAIT FOR C/R FROM VT61 UNDER TEST
 4068                                  ;*****************************************************************
 4069
 4070  020546  032777  000200  161206  GTCR:   BIT     #RECDN,@VJCSR   ;WAIT FOR REVEIVE DONE
 4071  020554  001774                        BEQ     .-6
 4072  020556  127737  161202  002006        CMPB    @VRBUF,CARRT    ;CHAR = CARRIAGE RETURN?
 4073  020564  001370                        BNE     GTCR            ;NO-KEEP LOOKING
 4074  020566  000200                        RTS     R0              ;YES-EXIT
 4075
 4076
 4077                                  ;*****************************************************************
 4078                                  ;SUBROUTINE TO GET A CHARACTER (NUMERIC) FROM THE
 4079                                  ;CONSOLE.  IF OTHER THAN A NUMERIC IS TYPED A
 4080                                  ;"?" WILL BE ECHOED.
 4081                                  ;*****************************************************************
 4082
 4083  020570  004027  014510          GTNUM:  JSR     R0,CONRD        ;GET A CHAR
 4084  020574  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 4085  020576  122701  000054                CMPB    #54,R1          ;CHAR. =COMMA?
 4086  020602  001411                        BEQ     1$              ;YES-GO PRINT IT
 4087  020604  123701  002006                CMPB    CARRT,R1        ;CHAR. = CARRIAGE RETURN?
 4088  020610  001406                        BEQ     1$
 4089  020612  120127  000060                CMPB    R1,#60
 4090  020616  103421                        BLO     QUST            ;IF CHAR. IS LESS THAN 60
 4091  020620  120127  000067                CMPB    R1,#67          ;OR MORE THAN 67, TYPE
 4092  020624  101016                        BHI     QUST            ;A QUESTION MARK
 4093  020626  110137  020676          1$:   MOVB    R1,TYPNUM
 4094  020632  104400  020676                TYPE    ,TYPNUM
 4095  020636  123701  002010                CMPB    LNFED,R1
 4096  020642  001406                        BEQ     GTEXT
 4097  020644  123701  002006                CMPB    CARRT,R1        ;IF CHAR. - C/R SET UP TO ISSUE
 4098  020650  001003                        BNE     GTEXT           ;LINE FEED BEFORE EXITING.
 4099  020652  113701  002010                MOVB    LNFED,R1
 4100  020656  000763                        BR      1$
 4101  020660  000200              GTEXT:    RTS     R0              ;GOOD CHAR., EXIT
 4102  020662  112737  000077  020676  QUST:   MOVB    #77,TYPNUM
 4103  020670  104400  020676                TYPE    ,TYPNUM         ;TYPE QUESTION MARK AND
 4104  020674  000735                        BR      GTNUM           ;KEEP LOOKING.
 4105  020676     000          TYPNUM: .BYTE   0
 4106  020677     000                  .BYTE   0
 4107
 4108
 4109                                  ;*****************************************************************
 4110                                  ;SUBROUTINE TO CALCULATE CHECKSUM ON THE LOWER
 4111                                  ;BYTE OF R5.  R4 IS STORAGE FOR THE CHECKSUM
 4112                                  ;CHARACTER. ALGORITHM FOR CHECKSUM IS ROTATE
 4113                                  ;CURRENT ONE PLACE LEFT AND XOR NEW CHAR. CHECKSUM
 4114                                  ;IS THE LOWER 7 BITS OF R4
 4115
```

```
                                ;*****************************************************************

020700  042705  177400  CALCK:  BIC     #177400,R5      ;CLEAR UPPER BYTE OF R5
020704  120527  000021          CMPB    R5,#XON         ;CHAR. =XON?
020710  001415                  BEQ     NOCALC          ;YES DO NOT CALCULATE CHECKSUM
020712  120527  000023          CMPB    R5,#XOFF        ;CHAR =XOFF?
020716  001412                  BEQ     NOCALC          ;YES DO NOT CALCULATE CHECKSUM

020720  000241                  CLC                     ;INSURE CARRY BIT INITIALLLY CLEAR
020722  105704                  TSTB    R4              ;SET UP TO ROTATE R4
020724  100001                  BPL     1$              ;A FULL 8 BYTES

020726  000261                  SEC                     ;R4 WAS NEG. SO ROTATE A ONE
020730  106104          1$:     ROLB    R4              ;INTO LOW ORDER BIT.
020732  010403                  MOV     R4,R3
020734  040503                  BIC     R5,R3           ;NOT A AND B
020736  040405                  BIC     R4,R5           ;NOT B AND A
020740  050305                  BIS     R3,R5           ;ORED
020742  010504                  MOV     R5,R4           ;EQUAL NEW CHECKSUM
020744  000200          NOCALC: RTS     R0
                                ;*****************************************************************

                                        ;SUBROUTINE TO LOAD XMIT BUFFER FROM R0 THRU R1
                                ;*****************************************************************

020746  112021          LDBUF:  MOVB    (R0)+,(R1)+     ;LOAD A BYTE
020750  001376                  BNE     .-2             ; UNTIL ZERO BYTE FOUND.
020752  000200                  RTS     R0
                                ;*****************************************************************
                                        ;SUBROUTINE TO CHECK THE VT61 FOR A PERIPHERAL ABORT.
                                ;*****************************************************************

020754  032737  010000  002260  CKABRT: BIT     #PABRT,VSTAT    ;ABORT FLAG RECEIVED?
020762  001446                  BEQ     2$              ;NO-EXIT
020764  010037  001124          MOV     R0,$GDDAT
020770  162737  000004  001124  SUB     #4,$GDDAT       ;POINT ERR PC TO MAIN ROUTINE.
020776  013737  002260  001126  MOV     VSTAT,$BDDAT
021004  104020                  ERROR   20              ;ISSUE PERIPHERAL ABORT ERROR

021006  013701  016262          MOV     TBBUF,R1
021012  004037  020746          JSR     R0,LDBUF        ;LOAD THE XMIT BUFFER WITH:
021016     033     117     137  .BYTE   .ESC,.0,.IABT,.ESC,.0,.RABT
021021     033     117     140
021024     033     117     145  .BYTE   .ESC,.0,.UNLKKB,.BEL,0,0
021027     007     000     000
021032  012737  000007  016270  MOV     #7,XMCNT        ;SET UP TO XMIT 7 BYTES.
021040  004037  016676          JSR     R0,XMREC        ;XMIT AND RECEIVE.
021044  000240                  NOP
021046  123727  016010  000170  CMPB    STR0,#NABRT     ;ABORT FLAG CLEARED?
021054  001411                  BEQ     2$              ;YES-EXIT
021056  010037  001124          MOV     R0,$GDDAT       ;NO-SET UP AND ISSUE A CANT
021062  162737  000004  001124  SUB     #4,$GDDAT       ;CLEAR ABORT FLAG ERROR MESSAGE.
021070  013737  002260  001126  MOV     VSTAT,$BDDAT
021076  104021                  ERROR   21
021100  000200          2$:     RTS     R0
```

```
                                ;*****************************************************************
                                ;SUBROUTINE TO COMPARE RECEIVED KEYBOARD DATA WITH
                                ;DATA EXPECTED. ERRORS ARE REPORTED AS POSITIONAL
                                ;ERROR ONLY.
                                ;*****************************************************************

021102  105077  011212          CKKBD:  CLRB    @ABUFP          ;CLEAR RECEIVE BYTE
021106  005037  002216                  CLR     CHRD            ;CLEAR INPUT STORAGE.
021112  105777  011202          KBDLP:  TSTB    @ABUFP          ;WAIT FOR A INPUT.
021116  001775                  BEQ     .-4
021120  117737  011174  002216          MOVB    @ABUFP  ,CHRD   ;STORE IT AND
021126  105077  011166          CLRB    @ABUFP                  ;CLEAR THE INPUT AREA.
021132  123714  002216          1$:     CMPB    CHRD    ,(R4)   ;RECEIVED EQUAL EXPECTED?
021136  001500                  BEQ     GDSTRK                  ;NO-UPDATE POINTERS.
021140  005237  002244          INC     BUBCT                   ;INCREMENT ERROR COUNT.
021144  023727  002244  000012  CMP     BUBCT,#10.              ;COUNT = 10?
021152  103075                  BHIS    CNTF                    ;YES-EXIT SUBROUTINE.
021154  010401                  MOV     R4,R1
021156  166501  012130          SUB     DTTBL(R5),R1            ;EXTRACT KEY POSITION FROM ROW LOC.
021162  005201                  INC     R1                      ;CONVERT LOGICAL POS. TO ACTUAL.
021164  004037  020412          JSR     R0,BINOCT               ;GET KEY POSITION IN OCTAL.
021170  113737  002222  002220  MOVB    SVER2,SVER1             ;RE-ASSEMBLE OCTAL BYTES.
021176  123727  002221  000060  CMPB    SVER1+1,#60             ;POSITION LESS THAN 8?
021204  001413                  BEQ     LDPOS                   ;YES-GO LOAD IT.
021206  123727  002220  000062  CMPB    SVER1,#62               ;POSITION GREATER THAN 8 AND LESS THAN12?
021214  103404                  BLO     BOROW                   ;YES-SET UP TO BORROW.
021216  162737  000002  002220  SUB     #2,SVER1                ;NO-JUST SUBTRACT 2.
021224  000403                  BR      LDPOS
021226  162737  000370  002220  BOROW:  SUB     #370,SVER1      ;SUBTRACT AND BORROW.
021234  113737  002220  030731  LDPOS:  MOVB    SVER1,KYSTRK+1  ;LOAD THE CONVERTED DECIMAL #.
021242  113737  002221  030730          MOVB    SVER1+1,KYSTRK
021250  012703  030653          DMPOCT: MOV     #DKBERR ,R3
021254  004037  017222                  JSR     R0      ,LDXMIT ;ISSUE BODY OF KEYBOARD ERROR.
021260  111401                  MOVB    (R4)    ,R1
021262  004037  020412                  JSR     R0      ,BINOCT
021266  012703  002220                  MOV     #SVER1  ,R3
021272  004037  017222                  JSR     R0      ,LDXMIT ;CONVERT AND ISSUE GOOD CHAR.
021276  012703  030762                  MOV     #DSPC6,R3
021302  004037  017222                  JSR     R0,LDXMIT       ;INSERT 6 SPACES IN MESSAGE.
021306  113701  002216                  MOVB    CHRD    ,R1
021312  004037  020412                  JSR     R0      ,BINOCT
021316  012703  002220                  MOV     #SVER1  ,R3
021322  004037  017222                  JSR     R0      ,LDXMIT ;CONVERT AND ISSUE RECEIVED CHAR.
021326  012703  001167                  MOV     #$CRLF  ,R3
021332  004037  017222                  JSR     R0      ,LDXMIT ;ISSUE C/R AND L/F.
021336  000665                  BR      KBDLP                   ;LOOK FOR SAME KEY AGAIN.

021340  005204          GDSTRK: INC     R4                      ;INCREMENT KEYBOARD ROW COUNTER.
021342  105714                  TSTB    (R4)                    ;REACHED END OF ROW?
021344  001262                  BNE     KBDLP                   ;NO-LOOK FOR NEXT INPUT
021346  000200          CNTF:   RTS     R0                      ;YES-EXIT.

                                ;*****************************************************************
```

```
                                        ;SUBROUTINE TO LOOP DATA THROUGH HOST COMPUTER. ALL
                                        ;FUNCTIONS ARE ALLOWED, BUT BLOCK TRANSMITS WHICH
                                        ;EXCEED 552 BYTES WILL RESULT IN THE TERMINATION
                                        ;OF THE OPERATION AFTER 552 RECEIVED BYTES.

                                        ;*****************************************************************

021350  005237  021652          LOOP:   INC     XMZER           ;SET UP TO XMIT NULLS.
021354  012737  032320  015756          MOV     #TCRLB+500,REBUF        ;RESET BUFFER POINTERS
021362  012737  031120  016262          MOV     #RCRLB,TBBUF
021370  004037  017262                  JSR     R0,RESPTR       ;RELOAD ALL INTERRUPT POINTERS
021374  042737  077577  002260          BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
021402  013704  015760          LOOPT:  MOV     RBUFP,R4        ;SET UP RECEIVE FLAG
021406  032737  000001  002260  LOOPTA: BIT     #XMDNE,VSTAT    ;XMIT COMPLETE?
021414  001407                  BEQ     LOOPR           ;NO
```

```
 4243  021416  042737  000001  002260          BIC     #XMDNE,VSTAT    ;YES RESET FLAG
 4244  021424  013737  015754  015760          MOV     RBBUF,RBUFP     ;RESET THE REC. BUFFER POINTER
 4245  021432  000763                          BR      LOOPT
 4246  021434  032737  001400  002260  LOOPR:  BIT     #EPL+ESC,VSTAT  ;RECEIVED AN ESC OR EPL?
 4247  021442  001004                          BNE     LPSTR           ;YES-GO CHECK IT
 4248  021444  023704  015760                  CMP     RBUFP,R4        ;RECEIVED A DISPLAY CHAR?
 4249  021450  001756                          BEQ     LOOPTA          ;NO-LOOP
 4250  021452  000426                          BR      BUMPCT
 4251  021454  117777  010640  174276  LPSTR:  MOVB    @ABUFP,@RBUFP   ;YES LOAD IT IN THE BUFFER
 4252  021462  005237  015760                  INC     RBUFP           ;AND INCREMENT BUFFER POINTER
 4253  021466  005037  015762                  CLR     ESAMB           ;CLEAR ESC ASSEMBLY WORD
 4254  021472  042737  001400  002260          BIC     #EPL+ESC,VSTAT  ;CLEAR THE FLAGS
 4255  021500  005237  016270                  INC     XMCNT           ;INCREMENT XMIT COUNT
 4256  021504  123777  002166  010606          CMPB    ESCN,@ABUFP     ;CHAR. A ESC(033)?
 4257  021512  001733                          BEQ     LOOPT           ;YES WAIT FOR NEXT PART OF FUNCTION
 4258  021514  113777  002010  174236          MOVB    LNFED,@RBUFP    ;CHAR. WAS EPL ADD A LINE FEED.
 4259  021522  005237  015760                  INC     RBUFP
 4260  021526  000407                          BR      FRCECT          ;AND ISSUE THEM.
 4261  021530  023727  016270  000764  BUMPCT: CMP     XMCNT,#500.     ;BUFFER ABOUT FILLED?
 4262  021536  103403                          BLO     FRCECT          ;NO
 4263  021540  005337  015760          1$:     DEC     RBUFP           ;YES-RESET THE RECEIVE POINTER
```

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 4264  021544  000716                          BR      LOOPT
 4265  021546  005237  016270                FRCECT: INC     XMCNT           ;INCREMENT THE XMIT COUNT
 4266  021552  023727  016270  000002              CMP     XMCNT,#2        ;FIRST CHAR TO XMIT?
 4267  021560  101003                              BHI     XMWT            ;NO
 4268  021562  052777  040000  160172              BIS     #XENA,@VJCSR    ;YES-SET THE XMIT ENABLE
 4269  021570  004037  021600                XMWT:   JSR     R0,EXTST        ;LOOK FOR END OF TEST COMMAND.
 4270  021574  000702                              BR      LOOPT           ;NONE FOUND.
 4271  021576  000200                              RTS     R0              ;AND EXIT
 4272
 4273                                        ;*****************************************************************
 4274                                        ;SUBROUTINE TO CHECK FOR END OF TEST COMMAND. THE CONTROL
 4275                                        ;C KEY EXITS ALL TESTS.
 4276                                        ;*****************************************************************
 4277
 4278  021600  127727  010514  000003  EXTST:  CMPB    @ABUFP,#3       ;LOOK FOR CONTROL C.
 4279  021606  001020                          BNE     NOROUT
 4280
 4281  021610  012737  031617  015756  ABSXT:  MOV     #RCRLB+477,REBUF        ;RESET THE BUFFERS
 4282  021616  012737  031620  016262          MOV     #TCRLB,TBBUF
 4283  021624  004037  017262                  JSR     R0,RESPTR       ;RESET ALL POINTERS
 4284  021630  012702  027541                  MOV     #DEXT,R2
 4285  021634  004037  020316                  JSR     R0,DSMES        ;ISSUE EXIT MESSAGE
 4286  021640  005037  021652                  CLR     XMZER           ;CLEAR THE ZERO TRANSMIT FLAG.
 4287  021644  062700  000002                  ADD     #2,R0           ;SET UP TEST EXIT.
 4288  021650  000200                NOROUT: RTS     R0              ;EXIT SUBROUTINE.
 4289
 4290  021652  000000                XMZER:  .WORD   0
 4291                                        ;*****************************************************************
 4292                                        ;SUB-ROUTINE TO LOOK FOR VSTAT BIT ON THE STACK
 4293                                        ;DELAY FACTOR IS FIRST WORD ON THE STACK AND VSTAT BIT
 4294                                        ;IS THE SECOND. MIN. DELAY IS 4 U.S FOR A MOS 11/45.
 4295                                        ;*****************************************************************
 4296
 4297  021654                                WTBGND:
 4298  021654  012637  002256                          MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
 4299  021660  012637  021742                          MOV     (SP)+,VDLAY     ;;POP STACK INTO VDLAY
 4300  021664  012637  021740                          MOV     (SP)+,VBIT      ;;POP STACK INTO VBIT
 4301  021670  005037  002254          1$:     CLR     DLAY
 4302  021674  033737  021740  002260  2$:     BIT     VBIT,VSTAT      ;SENSED THE CONDITION?
 4303  021702  001012                          BNE     FNDBT           ;YES-EXIT.
 4304  021704  005337  002254                  DEC     DLAY            ;NO-RUN DELAY.
 4305  021710  001371                          BNE     2$
 4306  021712  005337  021742                  DEC     VDLAY           ;DELAY FACTOR EXPIRED?
 4307  021716  001364                          BNE     1$              ;NO-LOOP
 4308  021720  104011                          ERROR   11              ;DELAY EXPIRED-ISSUE HUNG NIT
 4309  021722  005237  002234                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
 4310  021726  000401                          BR      TIMEXT
 4311  021730  005720                FNDBT:  TST     (R0)+           ;SET UP FOR NORMAL EXIT
 4312  021732                        TIMEXT:
 4313  021732  013746  002256                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
 4314  021736  000200                          RTS     R0
 4315  021740  000000                VBIT:   0
 4316  021742  000000                VDLAY:  0
 4317                                        ;*****************************************************************
 4318                                        ;SUBROUTINE TO LOOK FOR XOFF BEFORE EXITING A RECEIVE ROUTINE.
 4319                                        ;*****************************************************************
```

```
 4320
 4321  021744  005037  002254            CKOFF:  CLR     DLAY
 4322  021750  032737  100000  002260    1$:     BIT     #RXOFF,VSTAT    ;IS XOFF SET?
 4323  021756  001403                            BEQ     2$              ;NO-EXIT
 4324  021760  005337  002254                    DEC     DLAY            ;RUN DELAY.
 4325  021764  001371                            BNE     1$
 4326  021766  000200                    2$:     RTS     R0
 4327
 4328                                    ;*********************************************************************
 4329
 4330                                    .SBTTL  SCOPE HANDLER ROUTINE
 4331
 4332                                    ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
 4333                                    ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
 4334                                    ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
 4335                                    ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 4336                                    ;*SW14=1        LOOP ON TEST
 4337                                    ;*SW11=1        INHIBIT ITERATIONS
 4338                                    ;*SW09=1        LOOP ON ERROR
 4339                                    ;*SW08=1        LOOP ON TEST IN SWR<7:0>
 4340                                    ;*CALL
 4341                                    ;*      SCOPE           ;;SCOPE=IOT
 4342
 4343  021770                            $SCOPE:
 4344  021770  004037  014542                    JSR     R0,MONIT
 4345  021774  032777  040000  157134    1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
 4346  022002  001111                            BNE     $OVER           ;;YES IF SW14=1
 4347                                    ;*****START OF CODE FOR THE XOR TESTER*****
 4348  022004  000416                    $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
 4349                                                                    ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
 4350  022006  013746  000004                    MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
 4351  022012  012737  022032  000004            MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
 4352  022020  005737  177060                    TST     @#177060        ;;TIME OUT ON XOR?
 4353  022024  012637  000004                    MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
 4354  022030  000463                            BR      $SVLAD          ;;GO TO THE NEXT TEST
 4355  022032  022626                    5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
 4356  022034  012637  000004                    MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
 4357  022040  000423                            BR      7$              ;;LOOP ON THE PRESENT TEST
 4358  022042                            6$:;*****END OF CODE FOR THE XOR TESTER*****
 4359  022042  032777  000400  157066            BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
 4360  022050  001404                            BEQ     2$              ;;BR IF NO
 4361  022052  127737  157060  001102            CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
 4362  022060  001462                            BEQ     $OVER           ;;BR IF YES
 4363  022062  105737  001103            2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
 4364  022066  001421                            BEQ     3$              ;;BR IF NO
 4365  022070  123737  001115  001103            CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
 4366  022076  101015                            BHI     3$              ;;BR IF NO
 4367  022100  032777  001000  157030            BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
 4368  022106  001404                            BEQ     4$              ;;BR IF NO
 4369  022110  013737  001110  001106    7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
 4370  022116  000443                            BR      $OVER
 4371  022120  105037  001103            4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
 4372  022124  005037  001156                    CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
 4373  022130  000415                            BR      1$              ;;ESCAPE TO THE NEXT TEST
 4374  022132  032777  004000  156776    3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
 4375  022140  001011                            BNE     1$              ;;BR IF YES
```

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 43.6  022142  005737  001100                TST     $PASS           ;;IF FIRST PASS OF PROGRAM
 4377  022146  001406                        BEQ     1$              ;;      INHIBIT ITERATIONS
 4378  022150  005237  001104                INC     $ICNT           ;;INCREMENT ITERATION COUNT
 4379  022154  023737  001156  001104        CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
 4380  022162  002021                        BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
 4381  022164  012737  000001  001104  1$:   MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
 4382  022172  013737  022242  001156        MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
 4383  022200  105237  001102        $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
 4384  022204  011637  001106                MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 4385  022210  011637  001110                MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
 4386  022214  005037  001160                CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
 4387  022220  112737  000001  001115        MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
 4388  022226  013777  001102  156704  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 4389  022234  013716  001106                MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 4390  022240  000002                        RTI                     ;;FIXES PS
 4391  022242  000005                $MXCNT: 5                       ;;MAX. NUMBER OF ITERATIONS
 4392                                ;*****************************************************************
 4393
 4394                                .SBTTL  ERROR HANDLER ROUTINE
 4395
 4396                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
 4397                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
 4398                                ;*AND GO TO $ERRTYP ON ERROR
 4399                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 4400                                ;*SW15=1        HALT ON ERROR
 4401                                ;*SW13=1        INHIBIT ERROR TYPEOUTS
 4402                                ;*SW10=1        BELL ON ERROR
 4403                                ;*SW09=1        LOOP ON ERROR
 4404                                ;*CALL
 4405                                ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
 4406
 4407  022244                        $ERROR:
 4408  022244  105237  001103        7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
 4409  022250  001775                        BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
 4410  022252  013777  001102  156660        MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
 4411  022260  032777  002000  156650        BIT     #BIT10,@SWR     ;;BELL ON ERROR?
 4412  022266  001402                        BEQ     1$              ;;NO - SKIP
 4413  022270  104400  001162                TYPE    ,$BELL          ;;RING BELL
 4414  022274  005237  001112        1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
 4415  022300  011637  001116                MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
 4416  022304  162737  000002  001116        SUB     #2,$ERRPC
 4417  022312  117737  156600  001114        MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
 4418  022320  032777  020000  156610        BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
 4419  022326  001004                        BNE     20$             ;;SKIP TYPEOUTS
 4420  022330  004737  022626                JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
 4421  022334  104400  001167                TYPE    ,$CRLF
 4422  022340                        20$:
 4423  022340  005777  156572        2$:     TST     @SWR            ;;HALT ON ERROR
 4424  022344  100006                        BPL     3$              ;;SKIP IF CONTINUE
 4425  022346  000000                        HALT                    ;;HALT ON ERROR!
 4426  022350  022737  011052  000042        CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
 4427  022356  001001                        BNE     3$              ;;BRANCH IF NO
 4428  022360  000000                        HALT                    ;;YES
 4429  022362  032777  001000  156546  3$:   BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
 4430  022370  001402                        BEQ     4$              ;;BR IF NO
 4431  022372  013716  001110                MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
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```
4432  022376  005737  001160          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
4433  022402  001402                          BEQ     5$              ;;BR IF NONE
4434  022404  013716  001160                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
4435  022410                          5$:
4436  022410  000002                          RTI                     ;;RETURN
4437                                  ;*****************************************************************
4438
4439                                  .SBTTL  TYPE ROUTINE
4440
4441                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
4442                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
4443                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
4444                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
4445                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
4446                                  ;*
4447                                  ;*CALL:
4448                                  ;*1) USING A TRAP INSTRUCTION
4449                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
4450                                  ;*OR
4451                                  ;*      TYPE
4452                                  ;*      MESADR
4453                                  ;*
4454
4455  022412  105737  001155          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
4456  022416  100002                          BPL     1$              ;;BR IF YES
4457  022420  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
4458  022422  000407                          BR      3$              ;;LEAVE
4459  022424  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
4460  022426  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
4461  022432  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
4462  022434  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
4463  022436  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
4464  022440  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
4465  022442  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
4466  022446  000002                          RTI                     ;;RETURN
4467  022450  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
4468  022454  001426                          BEQ     8$
4469  022456  122716  000200                  CMPB    #TCRLF,(SP)     ;;BRANCH IF NOT <CRLF>
4470  022462  001004                          BNE     5$
4471  022464  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
4472  022466  104400                          TYPE                    ;;TYPE A CR AND LF
4473  022470  001167                          $CRLF
4474  022472  000757                          BR      2$              ;;GET NEXT CHARACTER
4475  022474  004737  022556          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
4476  022500  123726  001154          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
4477  022504  001352                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
4478  022506  013746  001152                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
4479                                                                  ;;AND THE NULL CHAR.
4480  022512  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
4481  022516  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
4482  022520  004737  022556                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
4483  022524  105337  022622                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
4484  022530  000770                          BR      7$              ;;LOOP
4485
4486                                  ;HORIZONTAL TAB PROCESSOR
4487
```

```
4488  022532  112716  000040          9$:     MOVB    #40,(SP)        ;;REPLACE TAB WITH SPACE
4489  022536  004737  022556          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
4490  022542  132737  000007  022622          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
4491  022550  001372                          BNE     9$              ;;TAB STOP
4492  022552  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
4493  022554  000726                          BR      2$              ;;GET NEXT CHARACTER
4494  022556  105777  156364          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
4495  022562  100375                          BPL     $TYPEC
4496  022564  116677  000002  156356          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
4497  022572  122766  000015  000002          CMPB    #15,2(SP)       ;;BRANCH IF
4498  022600  001003                          BNE     1$              ;;NOT <CR>
4499  022602  105037  022622                  CLRB    $CHARCNT        ;;
4500  022606  000406                          BR      $TYPEX          ;;EXIT
4501  022610  122766  000012  000002  1$:     CMPB    #12,2(SP)       ;;BRANCH IF
4502  022616  002002                          BGE     $TYPEX          ;;<LF>
4503  022620  105227                          INCB    (PC)+           ;;INC SPACE
4504  022622  000000                  $CHARCNT:.WORD  0               ;;COUNT
4505  022624  000207                  $TYPEX: RTS     PC
4506                                  ;;      EQUATES
4507          000011                  THT=11
4508          000200                  TCRLF=200
4509
4510                                  ;******************************************************************
4511
4512                                  .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
4513
4514                                  ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
4515                                  ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
4516                                  ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
4517
4518  022626                          $ERRTYP:
4519  022626  104400  001167                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
4520  022632  010046                          MOV     R0,-(SP)        ;;SAVE R0
4521  022634  005000                          CLR     R0              ;;PICKUP THE ITEM INDEX
4522  022636  153700  001114                  BISB    @#$ITEMB,R0
4523  022642  001004                          BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
4524                                                                  ;;TYPE THE PC OF THE ERROR
4525  022644  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
4526                                                                  ;;ERROR ADDRESS
4527  022650  104401                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
4528  022652  000445                          BR      10$             ;;GET OUT
4529  022654  005300                  1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
4530  022656  006300                          ASL     R0              ;;      WORK FOR THE ERROR TABLE
4531  022660  006300                          ASL     R0
4532  022662  006300                          ASL     R0
4533  022664  062700  001172                  ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
4534  022670  012037  022700                  MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
4535  022674  001404                          BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
4536  022676  104400                          TYPE                    ;;TYPE THE "ERROR MESSAGE"
4537  022700  000000                  2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
4538  022702  104400  001167                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
4539  022706  012037  022716          3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
4540  022712  001404                          BEQ     5$              ;;SKIP TYPEOUT IF 0
4541  022714  104400                          TYPE                    ;;TYPE THE "DATA HEADER"
4542  022716  000000                  4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
4543  022720  104400  001167                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
```

```
 4544  022724  010146                  5$:     MOV     R1,-(SP)        ;;SAVE R1
 4545  022726  012001                          MOV     (R0)+,R1        ;;PICKUP "DATA TABLE" POINTER
 4546  022730  001415                          BEQ     9$              ;;BR IF NO DATA TO BE TYPED
 4547  022732  012000                          MOV     (R0)+,R0        ;;PICKUP "DATA FORMAT" POINTER
 4548  022734  105720                  6$:     TSTB    (R0)+           ;;"OCTAL" OR "DECIMAL"
 4549  022736  001003                          BNE     7$              ;;BR IF DECIMAL
 4550  022740  013146                          MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
 4551  022742  104401                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 4552  022744  000402                          BR      8$
 4553  022746                          7$:
 4554  022746  013146                          MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
 4555  022750  104404                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 4556  022752  005711                  8$:     TST     (R1)            ;;IS THERE ANOTHER NUMBER?
 4557  022754  001403                          BEQ     9$              ;;BR IF NO
 4558  022756  104400  022776                  TYPE    ,11$            ;;TYPE TWO(2) SPACES
 4559  022762  000764                          BR      6$              ;;LOOP
 4560
 4561  022764  012601                  9$:     MOV     (SP)+,R1        ;;RESTORE R1
 4562  022766  012600                  10$:    MOV     (SP)+,R0        ;;RESTORE R0
 4563  022770  104400  001167                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
 4564  022774  000207                          RTS     PC              ;;RETURN
 4565  022776  020040      000         11$:    .ASCIZ  /  /            ;;TWO(2) SPACES
 4566          023002                          .EVEN
 4567                                  ;*******************************************************************
 4568
 4569                                  .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
 4570
 4571                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
 4572                                  ;*OCTAL (ASCII) NUMBER AND TYPE IT.
 4573                                  ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
 4574                                  ;*CALL:
 4575                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 4576                                  ;*      TYPOS                   ;;CALL FOR TYPEOUT
 4577                                  ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
 4578                                  ;*      .BYTE   M               ;;M=1 OR 0
 4579                                  ;*                                      ;;1=TYPE LEADING ZEROS
 4580                                  ;*                                      ;;0=SUPPRESS LEADING ZEROS
 4581                                  ;*
 4582                                  ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
 4583                                  ;*$TYPOS OR $TYPOC
 4584                                  ;*CALL:
 4585                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 4586                                  ;*      TYPON                   ;;CALL FOR TYPEOUT
 4587                                  ;*
 4588                                  ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
 4589                                  ;*CALL:
 4590                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 4591                                  ;*      TYPOC                   ;;CALL FOR TYPEOUT
 4592
 4593  023002  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
 4594  023006  116637  000001  023225          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
 4595  023014  112637  023227                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
 4596  023020  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
 4597  023024  000406                          BR      $TYPON
 4598  023026  112737  000001  023225  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
 4599  023034  112737  000006  023227          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
```

```
4600  023042  112737  000005  023224  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
4601  023050  010346                          MOV     R3,-(SP)        ;;SAVE R3
4602  023052  010446                          MOV     R4,-(SP)        ;;SAVE R4
4603  023054  010546                          MOV     R5,-(SP)        ;;SAVE R5
4604  023056  113704  023227                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
4605  023062  005404                          NEG     R4
4606  023064  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
4607  023070  110437  023226                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
4608  023074  113704  023225                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
4609  023100  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
4610  023104  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
4611  023106  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
4612  023110  000404                          BR      3$              ;;GO DO MSB
4613  023112  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
4614  023114  006105                          ROL     R5
4615  023116  006105                          ROL     R5
4616  023120  010503                          MOV     R5,R3
4617  023122  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
4618  023124  105337  023226                  DECB    $OMODE          ;;TYPE THIS DIGIT?
4619  023130  100016                          BPL     7$              ;;BR IF NO
4620  023132  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
4621  023136  001002                          BNE     4$              ;;TEST FOR 0
4622  023140  005704                          TST     R4              ;;SUPPRESS THIS 0?
4623  023142  001403                          BEQ     5$              ;;BR IF YES
4624  023144  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
4625  023146  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
4626  023152  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
4627  023156  110337  023222                  MOVB    R3,8$           ;;SAVE FOR TYPING
4628  023162  104400  023222                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
4629  023166  105337  023224          7$:     DECB    $OCNT           ;;COUNT BY 1
4630  023172  003347                          BGT     2$              ;;BR IF MORE TO DO
4631  023174  002402                          BLT     6$              ;;BR IF DONE
4632  023176  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
4633  023200  000744                          BR      2$              ;;GO DO THE LAST DIGIT
4634  023202  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
4635  023204  012604                          MOV     (SP)+,R4        ;;RESTORE R4
4636  023206  012603                          MOV     (SP)+,R3        ;;RESTORE R3
4637  023210  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
4638  023216  012616                          MOV     (SP)+,(SP)
4639  023220  000002                          RTI                     ;;RETURN
4640  023222     000          8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
4641  023223     000                  .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
4642  023224     000          $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
4643  023225     000          $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
4644  023226  000000          $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
4645                          ;******************************************************************
4646
4647                          .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
4648
4649                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
4650                          ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
4651                          ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
4652                          ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
4653                          ;*REPLACED WITH SPACES.
4654                          ;*CALL:
4655                          ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
```

```
                                        :*      TYPDS                   ;;GO TO THE ROUTINE
                                        $TYPDS:
023230  010046                                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
023232  010146                                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
023234  010246                                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
023236  010346                                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
023240  010546                                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
023242  012746  020200                         MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
023246  016605  000020                         MOV     20(SP),R5       ;;GET THE INPUT NUMBER
023252  100004                                  BPL     1$              ;;BR IF INPUT IS POS.
023254  005405                                  NEG     R5              ;;MAKE THE BINARY NUMBER POS.
023256  112766  000055  000001                 MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
023264  005000                        1$:       CLR     R0              ;;ZERO THE CONSTANTS INDEX
023266  012703  023444                         MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
023272  112723  000040                         MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
023276  005002                        2$:       CLR     R2              ;;CLEAR THE BCD NUMBER
023300  016001  023434                         MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
023304  160105                        3$:       SUB     R1,R5           ;;FORM THIS BCD DIGIT
023306  002402                                  BLT     4$              ;;BR IF DONE
023310  005202                                  INC     R2              ;;INCREASE THE BCD DIGIT BY 1
023312  000774                                  BR      3$
023314  060105                        4$:       ADD     R1,R5           ;;ADD BACK THE CONSTANT
023316  005702                                  TST     R2              ;;CHECK IF BCD DIGIT=0
023320  001003                                  BNE     5$              ;;FALL THROUGH IF 0
023322  105716                                  TSTB    (SP)            ;;STILL DOING LEADING 0'S?
023324  100407                                  BMI     7$              ;;BR IF YES
023326  106316                        5$:       ASLB    (SP)            ;;MSD?
023330  103003                                  BCC     6$              ;;BR IF NO
023332  116663  000001  177777                 MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
023340  052702  000060                 6$:      BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
023344  052702  000040                 7$:      BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
023350  110223                                  MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
023352  005720                                  TST     (R0)+           ;;JUST INCREMENTING
023354  020027  000010                         CMP     R0,#10          ;;CHECK THE TABLE INDEX
023360  002746                                  BLT     2$              ;;GO DO THE NEXT DIGIT
023362  003002                                  BGT     8$              ;;GO TO EXIT
023364  010502                                  MOV     R5,R2           ;;GET THE LSD
023366  000764                                  BR      6$              ;;GO CHANGE TO ASCII
023370  105726                        8$:       TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
023372  100003                                  BPL     9$              ;;BR IF NO
023374  116663  177777  177776                 MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
023402  105013                        9$:       CLRB    (R3)            ;;SET THE TERMINATOR
023404  012605                                  MOV     (SP)+,R5        ;;POP STACK INTO R5
023406  012603                                  MOV     (SP)+,R3        ;;POP STACK INTO R3
023410  012602                                  MOV     (SP)+,R2        ;;POP STACK INTO R2
023412  012601                                  MOV     (SP)+,R1        ;;POP STACK INTO R1
023414  012600                                  MOV     (SP)+,R0        ;;POP STACK INTO R0
023416  104400  023444                         TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
023422  016666  000002  000004                 MOV     2(SP),4(SP)     ;;ADJUST THE STACK
023430  012616                                  MOV     (SP)+,(SP)
023432  000002                                  RTI                     ;;RETURN TO USER
023434  023420                        $DTBL:    10000.
023436  001750                                  1000.
023440  000144                                  100.
023442  000012                                  10.
```

```
 4712  023444  000004                    $CBLK:  .BLKW   4
 4713                                    ;*****************************************************************
 4714
 4715                                    .SBTTL  POWER DOWN AND UP ROUTINES
 4716
 4717                                    ;POWER DOWN ROUTINE
 4718  023454  012737  023604  000024    $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
 4719  023462  012737  000340  000026            MOV     #340,@#PWRVEC+2 ;;PRIO:7
 4720  023470  010046                            MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 4721  023472  010146                            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 4722  023474  010246                            MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 4723  023476  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 4724  023500  010446                            MOV     R4,-(SP)        ;;PUSH R4 ON STACK
 4725  023502  010546                            MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 4726  023504  010637  023610                    MOV     SP,$SAVR6       ;;SAVE SP
 4727  023510  012737  023522  000024            MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
 4728  023516  000000                            HALT
 4729  023520  000776                            BR      .-2             ;;HANG UP
 4730
 4731                                    ;POWER UP ROUTINE
 4732  023522  013706  023610            $PWRUP: MOV     $SAVR6,SP       ;;GET SP
 4733  023526  005037  023610                    CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
 4734  023532  005237  023610            1$:     INC     $SAVR6          ;;WAIT FOR THE INC
 4735  023536  001375                            BNE     1$              ;;OF  WORD
 4736  023540  012605                            MOV     (SP)+,R5        ;;POP STACK INTO R5
 4737  023542  012604                            MOV     (SP)+,R4        ;;POP STACK INTO R4
 4738  023544  012603                            MOV     (SP)+,R3        ;;POP STACK INTO R3
 4739  023546  012602                            MOV     (SP)+,R2        ;;POP STACK INTO R2
 4740  023550  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
 4741  023552  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
 4742  023554  012737  023454  000024            MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
 4743  023562  012737  000340  000026            MOV     #340,@#PWRVEC+2 ;;PRIO:7
 4744  023570  104400                            TYPE                    ;REPORT THE POWER FAILURE
 4745  023572  023612                    $PWRMG: .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
 4746  023574  042766  000020  000002    BIC     #20,2(SP)               ;;CLEAR "T" BIT
 4747  023602  000002                            RTI
 4748  023604  000000                    $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
 4749  023606  000776                            BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
 4750  023610  000000                    $SAVR6: 0                       ;;PUT THE SP HERE
 4751  023612  005015  047520  042527    $POWER: .ASCIZ  <15><12>"POWER"
 4752  023620  000122
 4753                                            .EVEN
 4754                                    ;*****************************************************************
 4755
 4756                                    .SBTTL  TRAP DECODER
 4757
 4758                                    ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
 4759                                    ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 4760                                    ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 4761                                    ;*GO TO THAT ROUTINE.
 4762
 4763  023622  010046                    $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
 4764  023624  016600  000002                    MOV     2(SP),R0        ;;GET TRAP ADDRESS
 4765  023630  005740                            TST     -(R0)           ;;BACKUP BY 2
 4766  023632  111000                            MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
 4767  023634  006300                            ASL     R0              ;;POSITION FOR INDEXING
```

```
                                                    MOV     $TRPAD(RO),RC   ;;INDEX TO TABLE
                                                    RTS     RO              ;;GO TO ROUTINE


                                        .SBTTL  TRAP TABLE

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

                                        ;       ROUTINE
                                        ;       -------
                023644                  $TRPAD:
                023644  022412                  $TYPE   ;;CALL=TYPE     TRAP+0(104400)  TTY TYPEOUT ROUTINE
                023646  023026                  $TYPOC  ;;CALL=TYPOC    TRAP+1(104401)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
                023650  023002                  $TYPOS  ;;CALL=TYPOS    TRAP+2(104402)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
                023652  023042                  $TYPON  ;;CALL=TYPON    TRAP+3(104403)  TYPE OCTAL NUMBER (AS PER LAST CALL)
                023654  023230                  $TYPDS  ;;CALL=TYPDS    TRAP+4(104404)  TYPE DECIMAL NUMBER (WITH SIGN)

                023656  003332  003724  004132  TSTADD: TST1,TST2,TST3

                023664  004326  004460  004674          TST4,TST5,TST6

                023672  005124  005700  006360          TST7,TST10,TST11

                023700  006572  006746  007174          TST12,TST13,TST14

                023706  007416  010104  010322          TST15,TST16,TST17

                023714  010470  011174  011500          TST20,TST21,TST22

                023722  011676  011750                  TST23,TST24


                023726  042523  020124  052126  STUPM:  .ASCII  /SET VT61S TO  FULL DUPLEX, /<15><12>
                023734  030466  020123  047524
                023742  020040  052506  046114
                023750  042040  050125  042514
                023756  026130  006440     012
                023763     071  030060  041060          .ASCIZ  /9600BAUD, REMOTE,PARITY MATCHED TO INTERFACE/<15><12>
                023770  052501  026104  051040
                023776  046505  052117  026105
                024004  040520  044502  054524
                024012  046440  052101  044103
                024020  042105  052040  020117
                024026  047111  042524  043122
                024034  041501  006505  000012


                024042  005015  042101  051104  DUNTST: .ASCIZ  <15><12>/ADDRESSES WITH RESPONSIVE VT61S ARE:/<15><12>
                024050  051505  042523  020123
                024056  044527  044124  051040
                024064  051505  047520  051516
                024072  053111  020105  052126
                024100  030466  020123  051101
```

```
 4824  024106  035105  005015     000
 4825  024113     116  020117  052126  NOVT:   .ASCIZ  /NO VT61 RESPONDED TO ESCZ SEQ. AUTO RETRY IN 30 SEC./<15><12>
 4826  024120  030466  051040  051505
 4827  024126  047520  042116  042105
 4828  024134  052040  020117  051505
 4829  024142  055103  051440  050505
 4830  024150  020056  052501  047524
 4831  024156  051040  052105  054522
 4832  024164  044440  020116  030063
 4833  024172  051440  041505  006456
 4834  024200  000012
 4835
 4836
 4837  024202  005015  045104  030461  DLERR:  .ASCIZ  <15><12>/DJ11 FAILED AT ADDRESS/
 4838  024210  043040  044501  042514
 4839  024216  020104  052101  040440
 4840  024224  042104  042522  051523
 4841  024232     000
 4842
 4843  024233     115  047101  040525  DMANA:  .ASCII  /MANUAL TEST SELECTED -/<15><12>
 4844  024240  020114  042524  052123
 4845  024246  051440  046105  041505
 4846  024254  042524  020104  006455
 4847  024262     012
 4848  024263     105  052116  051105          .ASCIZ  /ENTER ADDRESSES OF VT615 TO BE TESTED/<15><12>
 4849  024270  040440  042104  042522
 4850  024276  051523  051505  047440
 4851  024304  020106  052126  030466
 4852  024312  020123  047524  041040
 4853  024320  020105  042524  052123
 4854  024326  042105  005015     000
 4855
 4856  024333     105  052116  051105  DMANB:  .ASCIZ  /ENTER TESTS TO BE RUN/<15><12>
 4857  024340  052040  051505  051524
 4858  024346  052040  020117  042502
 4859  024354  051040  047125  005015
 4860  024362     000
 4861  024363     105  052116  051105  DMANL:  .ASCIZ  /ENTER LINES TO BE TESTED IN BINARY FORMAT(I.E.0=1,10=2000)/<15><12>
 4862  024370  046040  047111  051505
 4863  024376  052040  020117  042502
 4864  024404  052040  051505  042524
 4865  024412  020104  047111  041040
 4866  024420  047111  051101  020131
 4867  024426  047506  046522  052101
 4868  024434  044450  042456  030056
 4869  024442  030475  030454  036460
 4870  024450  030062  030060  006451
 4871  024456  000012
 4872
 4873  024460  047101  042440  041523  EM1:    .ASCIZ  /AN ESC SEQ. TO THE VT61  FAILED - OCTAL EQUIV. IS:/<15><12>
 4874  024466  051440  050505  020056
 4875  024474  047524  052040  042510
 4876  024502  053040  033124  020061
 4877  024510  043040  044501  042514
 4878  024516  020124  020055  041517
 4879  024524  040524  020114  050505
```

```
4880  024532  044525  027126  044440
4881  024540  035123  005015     000
4882  024545     124  051505  021524  DH1:    .ASCIZ  'TEST#  ERR PC  BYTE 1+2 BYTE 3+4/<15><12>
4883  024552  020040  051105  020122
4884  024560  041520  020040  054502
4885  024566  042524  030440  031053
4886  024574  041040  052131  020105
4887  024602  025463  006464  000012
4888
4889  024610  042522  042503  053111  EM2:    .ASCIZ  /RECEIVE STATUS ERROR./<15><12>
4890  024616  020105  052123  052101
4891  024624  051525  042440  051122
4892  024632  051117  006456  000012
4893  024640  042101  027104  020040  DH2:    .ASCIZ  /ADD.  STAT.  ERR.BITS  CHAR./<15><12>
4894  024646  052123  052101  020056
4895  024654  042440  051122  041056
4896  024662  052111  020123  041440
4897  024670  040510  027122  005015
4898  024676     000
4899
4900  024677     123  043117  053524  EM3:    .ASCIZ  /SOFTWARE (VSTAT) STATUS ERROR./<15><12>
4901  024704  051101  020105  053050
4902  024712  052123  052101  020051
4903  024720  052123  052101  051525
4904  024726  042440  051122  051117
4905  024734  006456  000012
4906  024740  050040  051501  021523  DH3:    .ASCIZ  / PASS#,  TEST#,  EXP.STAT,  ACT.STAT/<15><12>
4907  024746  020054  052040  051505
4908  024754  021524  020054  042440
4909  024762  050130  051456  040524
4910  024770  026124  020040  041501
4911  024776  027124  052123  052101
4912  025004  005015     000
4913
4914  025007     107  027104  042040  EM4:    .ASCIZ  /GD. DATA DOES NOT MATCH REC. DATA/<15><12>
4915  025014  052101  020101  047504
4916  025022  051505  047040  052117
4917  025030  046440  052101  044103
4918  025036  051040  041505  020056
4919  025044  040504  040524  005015
4920  025052     000
4921  025053     124  051505  021524  DH4:    .ASCIZ  /TEST# ,REC.CNT.,GD. DATA, REC. DATA/<15><12>
4922  025060  026040  042522  027103
4923  025066  047103  027124  043454
4924  025074  027104  042040  052101
4925  025102  026101  051040  041505
4926  025110  020056  040504  040524
4927  025116  005015     000
4928          025122                          .EVEN
4929
4930  025122  054502  042524  020123  EM5:    .ASCIZ  /BYTES EXPECTED DOES NOT EQUAL BYTES RECEIVED/<15><12>
4931  025130  054105  042520  052103
4932  025136  042105  042040  042517
4933  025144  020123  047516  020124
4934  025152  050505  040525  020114
4935  025160  054502  042524  020123
```

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 4936  025166  042522  042503  053111
 4937  025174  042105  005015     000
 4938  025201     102  052131  051505  DH5:    .ASCIZ  /BYTES EXP., BYTES REC./<15><12>
 4939  025206  042440  050130  026056
 4940  025214  041040  052131  051505
 4941  025222  051040  041505  006456
 4942  025230  000012
 4943
 4944  025232  052503  051522  051117  EM6:    .ASCIZ  /CURSOR POSITIONING ERROR/<15><12>
 4945  025240  050040  051517  052111
 4946  025246  047511  044516  043516
 4947  025254  042440  051122  051117
 4948  025262  005015     000
 4949  025265     107  020104  044514  DH6:    .ASCIZ  /GD LINE  GD COL.   BD LINE  BD COL/<15><12>
 4950  025272  042516  020040  042107
 4951  025300  041440  046117  020056
 4952  025306  020040  042102  046040
 4953  025314  047111  020105  041040
 4954  025322  020104  047503  006514
 4955  025330  000012
 4956
 4957  025332  044504  042522  052103  EM7:    .ASCIZ  /DIRECT CURSOR ADDRESSING FAILURE/<15><12>
 4958  025340  041440  051125  047523
 4959  025346  020122  042101  051104
 4960  025354  051505  044523  043516
 4961  025362  043040  044501  052514
 4962  025370  042522  005015     000
 4963  025375     120  051501  021523  DH7:    .ASCIZ  /PASS#  TEST #  ERROR PC   /<15><12>
 4964  025402  020040  042524  052123
 4965  025410  021440  020040  051105
 4966  025416  047522  020122  041520
 4967  025424  020040  006440  000012
 4968  025432  040520  051523  020043  DH10:   .ASCIZ  /PASS#  TEST#  BD.ROW  BD.COL/<15><12>
 4969  025440  052040  051505  021524
 4970  025446  020040  042102  051056
 4971  025454  053517  020040  042102
 4972  025462  041456  046117  005015
 4973  025470     000
 4974
 4975  025471     114  051501  020124  EM11:   .ASCIZ  /LAST TRANSMISSION TO VT61 CAUSED UNIT TO FAIL-HANG./<15><12>
 4976  025476  051124  047101  046523
 4977  025504  051511  044523  047117
 4978  025512  052040  020117  052126
 4979  025520  030466  041440  052501
 4980  025526  042523  020104  047125
 4981  025534  052111  052040  020117
 4982  025542  040506  046111  044055
 4983  025550  047101  027107  005015
 4984  025556     000
 4985
 4986  025557     126  033124  020061  EM12:   .ASCIZ  /VT61 UNDER TEST FAILED- ERROR DATA FOLLOWS/<15><12>
 4987  025564  047125  042504  020122
 4988  025572  042524  052123  043040
 4989  025600  044501  042514  026504
 4990  025606  042440  051122  051117
 4991  025614  042040  052101  020101
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 4992  025622  047506  046114  053517
 4993  025630  006523  000012
 4994
 4995  025634  052126  030466  043040  EM10:   .ASCIZ  /VT61 FAILED SELF TEST FUNCTION/<15><12>
 4996  025642  044501  042514  020104
 4997  025650  042523  043114  052040
 4998  025656  051505  020124  052506
 4999  025664  041516  044524  047117
 5000  025672  005015     000
 5001
 5002
 5003  025675     120  051501  021523  DH12:   .ASCIZ  /PASS#,  TEST#, GD.CKSUM, BD.CKSUM/<15><12>
 5004  025702  020054  052040  051505
 5005  025710  021524  020054  042107
 5006  025716  041456  051513  046525
 5007  025724  020054  042102  041456
 5008  025732  051513  046525  005015
 5009  025740     000
 5010
 5011  025741     124  051505  044524  DABRT:  .ASCIZ  /TESTING ABORTED-TOO MANY FATAL XMITS/<15><12>
 5012  025746  043516  040440  047502
 5013  025754  052122  042105  052055
 5014  025762  047517  046440  047101
 5015  025770  020131  040506  040524
 5016  025776  020114  046530  052111
 5017  026004  006523  000012
 5018
 5019  026010  052126  030466  051040  EM13:   .ASCIZ  /VT61 RECEIVER CHECKSUM COMPARE ERROR/<15><12>
 5020  026016  041505  044505  042526
 5021  026024  020122  044103  041505
 5022  026032  051513  046525  041440
 5023  026040  046517  040520  042522
 5024  026046  042440  051122  051117
 5025  026054  005015     000
 5026
 5027  026057     126  053124  020061  EM14:   .ASCIZ  /VT61 TRANSMITTER CHECKSUM COMPARE ERROR/<15><12>
 5028  026064  051124  047101  046523
 5029  026072  052111  042524  020122
 5030  026100  044103  041505  051513
 5031  026106  046525  041440  046517
 5032  026114  040520  042522  042440
 5033  026122  051122  051117  005015
 5034  026130     000
 5035
 5036          026132                  .EVEN
 5037  026132  047125  052111  052440  DVUNIT: .ASCII  /UNIT UNDER TEST /<15><12>
 5038  026140  042116  051105  052040
 5039  026146  051505  020124  005015
 5040  026154  041522  051123  020040          .ASCIZ  /RCSR   VECT.   LINE  IDENT/<15><12>
 5041  026162  053040  041505  027124
 5042  026170  020040  046040  047111
 5043  026176  020105  044440  042504
 5044  026204  052116  005015     000
 5045  026211     040  041522  051123  DH11:   .ASCIZ  / RCSR   VECT./<15><12>
 5046  026216  020040  053040  041505
 5047  026224  027124  005015     000
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5048  026231     120  044522  052116  DPRTR:  .ASCIZ  /PRINTER IS ATTACHED/<15><12>
5049  026236  051105  044440  020123
5050  026244  052101  040524  044103
5051  026252  042105  005015     000
5052  026257     103  050117  042511  DCOPYR: .ASCIZ  /COPIER IS ATTACHED/<15><12>
5053  026264  020122  051511  040440
5054  026272  052124  041501  042510
5055  026300  006504  000012
5056  026304  047530  043106  052040  EM15:   .ASCIZ  /XOFF TO VT61 FAILED TO HALT BLOCK XMIT/<15><12>
5057  026312  020117  052126  030466
5058  026320  043040  044501  042514
5059  026326  020104  047524  044040
5060  026334  046101  020124  046102
5061  026342  041517  020113  046530
5062  026350  052111  005015     000
5063  026355     130  047117  052040  EM16:   .ASCIZ  /XON TO VT61 FAILED TO RESTART BLOCK XMIT/<15><12>
5064  026362  020117  052126  030466
5065  026370  043040  044501  042514
5066  026376  020104  047524  051040
5067  026404  051505  040524  052122
5068  026412  041040  047514  045503
5069  026420  054040  044515  006524
5070  026426  000012
5071  026430  047516  054040  047117  EM17:   .ASCIZ  /NO XON RECEIVED WITHIN 3 SEC. AFTER A RESET/<15><12>
5072  026436  051040  041505  044505
5073  026444  042526  020104  044527
5074  026452  044124  047111  031440
5075  026460  051440  041505  020056
5076  026466  043101  042524  020122
5077  026474  020101  042522  042523
5078  026502  006524  000012
5079  026506  040514  052123  050040  EM20:   .ASCIZ  /LAST PERIPHERAL OPERATION ABORTED/<15><12>
5080  026514  051105  050111  042510
5081  026522  040522  020114  050117
5082  026530  051105  052101  047511
5083  026536  020116  041101  051117
5084  026544  042524  006504  000012
5085  026552  047503  046125  020104  EM21:   .ASCIZ  /COULD NOT CLEAR LAST ABORT FLAG./<15><12>
5086  026560  047516  020124  046103
5087  026566  040505  020122  040514
5088  026574  052123  040440  047502
5089  026602  052122  043040  040514
5090  026610  027107  005015     000
5091  026615     123  046517  047440  EM22:   .ASCIZ  /SOM OR EOM NOT RECEIVED DURING MAINT. MODE TRANSMIT/<15><12>
5092  026622  020122  047505  020115
5093  026630  047516  020124  042522
5094  026636  042503  053111  042105
5095  026644  042040  051125  047111
5096  026652  020107  040515  047111
5097  026660  027124  046440  042117
5098  026666  020105  051124  047101
5099  026674  046523  052111  005015
5100  026702     000
5101  026703     114  047111  020105  EM23:   .ASCIZ  /LINE FEED OR CURSOR RIGHT ISSUED FROM ROW 23 DID NOT CAUSE SCREEN TO SC
5102  026710  042506  042105  047440
5103  026716  020122  052503  051522
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5104  026724  051117  051040  043511
5105  026732  052110  044440  051523
5106  026740  042525  020104  051106
5107  026746  046517  051040  053517
5108  026754  031040  020063  044504
5109  026762  020104  047516  020124
5110  026770  040503  051525  020105
5111  026776  041523  042522  047105
5112  027004  052040  020117  041523
5113  027012  047522  046114  005015
5114  027020     000
5115  027021     120  051501  020123  DH13:   .ASCIZ  /PASS ,   TEST ,   VSTAT/<15><12>
5116  027026  020054  020040  042524
5117  027034  052123  026040  020040
5118  027042  053040  052123  052101
5119  027050  005015     000
5120  027053     120  051501  026123  DH14:   .ASCIZ  /PASS,   TEST,   ERR PC,   VSTAT/<15><12>
5121  027060  020040  052040  051505
5122  027066  026124  020040  042440
5123  027074  051122  050040  026103
5124  027102  020040  053040  052123
5125  027110  052101  005015     000
5126
5127  027115     105  041523  000040  DESC:   .ASCIZ  /ESC /
5128
5129
5130
5131  027122  042513  041131  040517  DKYBD:  .ASCII  /KEYBOARD TEST/<15><12>
5132  027130  042122  052040  051505
5133  027136  006524     012
5134  027141     113  054505  052123          .ASCII  /KEYSTROKES ECHO:/<15><12>
5135  027146  047522  042513  020123
5136  027154  041505  047510  006472
5137  027162     012
5138  027163     101  042040  051511          .ASCII  /A DISPLAY CHAR. = A DISPLAY CHAR./<15><12>
5139  027170  046120  054501  041440
5140  027176  040510  027122  036440
5141  027204  040440  042040  051511
5142  027212  046120  054501  041440
5143  027220  040510  027122  005015
5144  027226  031463  036440  042440          .ASCII  /33 = ESC/<15><12>
5145  027234  041523  005015
5146  027240  032461  036440  041440          .ASCII  /15 = C-R/<15><12>
5147  027246  051055  005015
5148  027252  031061  036440  046040          .ASCII  /12 = L-F/<15><12>
5149  027260  043055  005015
5150  027264  033460  036440  041040          .ASCII  /07 = BELL/<15><12>
5151  027272  046105  006514     012
5152  027277     061  020060  020075          .ASCII  /10 = TAB/<15><12>
5153  027304  040524  006502     012
5154  027311     116  047117  042055          .ASCIZ  /NON-DISPLAY CHAR.= OCTAL EQUIV/<15><12>
5155  027316  051511  046120  054501
5156  027324  041440  040510  027122
5157  027332  020075  041517  040524
5158  027340  020114  050505  044525
5159  027346  006526  000012
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5160
5161  027352  040524  020102     000  DTAB:   .ASCIZ  /TAB /
5162  027357     103  051055  000040  DCR:    .ASCIZ  /C-R /
5163  027364  026514  020106     000  DLF:    .ASCIZ  /L-F /
5164  027371     102  046105  020114  DBELL:  .ASCIZ  /BELL /
5165  027376     000
5166
5167  027377     114  047517  020120  DLOOP:  .ASCII  /LOOP TEST - LOOP COMMANDS AND DATA THRU/<15><12>
5168  027404  042524  052123  026440
5169  027412  046040  047517  020120
5170  027420  047503  046515  047101
5171  027426  051504  040440  042116
5172  027434  042040  052101  020101
5173  027442  044124  052522  005015
5174  027450  047510  052123  041040          .ASCII  /HOST BACK TO VT61 UNDER TEST. /<15><12>
5175  027456  041501  020113  047524
5176  027464  053040  033124  020061
5177  027472  047125  042504  020122
5178  027500  042524  052123  020056
5179  027506  005015
5180  027510  047503  052116  047522  DCNTZ:  .ASCIZ  /CONTROL C  EXITS TEST./<15><12>
5181  027516  020114  020103  042440
5182  027524  044530  051524  052040
5183  027532  051505  027124  005015
5184  027540     000
5185
5186  027541     105  044530  020124  DEXT:   .ASCIZ  /EXIT TEST./
5187  027546  042524  052123  000056
5188
5189  027554  051120  047111  042524  DPRNT:  .ASCII  /PRINTER TEST -/<15><12>
5190  027562  020122  042524  052123
5191  027570  026440  005015
5192  027574  031461  020062  047503          .ASCII  /132 COLUMNS OF A SLIDING PATTERN WILL BE/
5193  027602  052514  047115  020123
5194  027610  043117  040440  051440
5195  027616  044514  044504  043516
5196  027624  050040  052101  042524
5197  027632  047122  053440  046111
5198  027640  020114  042502
5199  027644  047503  052116  047111          .ASCII  /CONTINOUSLY OUTPUTTED TO PRINTER/<15><12>
5200  027652  052517  046123  020131
5201  027660  052517  050124  052125
5202  027666  042524  020104  047524
5203  027674  050040  044522  052116
5204  027702  051105  005015
5205  027706  040503  027122  051040  DCRST:  .ASCIZ  /CAR. RET. TO START/<15><12>
5206  027714  052105  020056  047524
5207  027722  051440  040524  052122
5208  027730  005015     000
5209
5210  027733     114  051501  020124  DEVERR: .ASCIZ  /LAST XMIT CAUSED VT61 HANG/<15><12>
5211  027740  046530  052111  041440
5212  027746  052501  042523  020104
5213  027754  052126  030466  044040
5214  027762  047101  006507  000012
5215  027770  000077                  QMRK:   .ASCIZ  /?/
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5216  027772  051120  042117  041525  DKBD:   .ASCII  /PRODUCTION KEYBOARD TEST. 10 ERRORS CAUSES TEST EXIT./<15><12>
5217  030000  044524  047117  045440
5218  030006  054505  047502  051101
5219  030014  020104  042524  052123
5220  030022  020056  030061  042440
5221  030030  051122  051117  020123
5222  030036  040503  051525  051505
5223  030044  052040  051505  020124
5224  030052  054105  052111  006456
5225  030060     012
5226  030061     104  050105  042522          .ASCIZ  /DEPRESS KEYS FROM LEFT TO RIGHT/<15><12>
5227  030066  051523  045440  054505
5228  030074  020123  051106  046517
5229  030102  046040  043105  020124
5230  030110  047524  051040  043511
5231  030116  052110  005015     000
5232  030123     104  050105  042522  DLSHFT: .ASCIZ  /DEPRESS LEFT SHIFT KEY AND THE "A" KEY /<15><12>
5233  030130  051523  046040  043105
5234  030136  020124  044123  043111
5235  030144  020124  042513  020131
5236  030152  047101  020104  044124
5237  030160  020105  040442  020042
5238  030166  042513  020131  005015
5239  030174     000
5240  030175     104  050105  042522  DTOP:   .ASCIZ  /DEPRESS KEYS IN TOP ROW/<15><12>
5241  030202  051523  045440  054505
5242  030210  020123  047111  052040
5243  030216  050117  051040  053517
5244  030224  005015     000
5245
5246  030227     104  050105  042522  DRSHFT: .ASCIZ  /DEPRESS RIGHT SHIFT KEY AND THE "A" KEY /<15><12>
5247  030234  051523  051040  043511
5248  030242  052110  051440  044510
5249  030250  052106  045440  054505
5250  030256  040440  042116  052040
5251  030264  042510  021040  021101
5252  030272  045440  054505  006440
5253  030300  000012
5254  030302  042504  051120  051505  DSEC:   .ASCIZ  /DEPRESS KEYS IN SECOND ROW/<15><12>
5255  030310  020123  042513  051531
5256  030316  044440  020116  042523
5257  030324  047503  042116  051040
5258  030332  053517  005015     000
5259
5260  030337     104  050105  042522  DTHRD:  .ASCIZ  /DEPRESS KEYS IN THIRD ROW BEGINNING WITH 'A'/<15><12>
5261  030344  051523  045440  054505
5262  030352  020123  047111  052040
5263  030360  044510  042122  051040
5264  030366  053517  041040  042505
5265  030374  047111  044516  043516
5266  030402  053440  052111  020110
5267  030410  040447  006447  000012
5268  030416  042504  051120  051505  DCONT:  .ASCIZ  /DEPRESS CONTROL KEY ,AND THE "A" KEY /<15><12>
5269  030424  020123  047503  052116
5270  030432  047522  020114  042513
5271  030440  020131  040454  042116
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5272  030446  052040  042510  021040
5273  030454  021101  045440  054505
5274  030462  006440  000012
5275  030466  042504  051120  051505  DBOT:   .ASCIZ  /DEPRESS KEYS IN FORTH ROW EXCEPT SHIFT KEYS/<15><12>
5276  030474  020123  042513  051531
5277  030502  044440  020116  047506
5278  030510  052122  020110  047522
5279  030516  020127  054105  042503
5280  030524  052120  051440  044510
5281  030532  052106  045440  054505
5282  030540  006523  000012
5283  030544  042504  051120  051505   DSPCE: .ASCIZ  /DEPRESS SPACE BAR/<15><12>
5284  030552  020123  050123  041501
5285  030560  020105  040502  006522
5286  030566  000012
5287
5288  030570  042504  051120  051505  DKPD:   .ASCIZ  /DEPRESS KEYPAD KEYS,LEFT TO RIGHT, TOP TO BOTTOM/<15><12>
5289  030576  020123  042513  050131
5290  030604  042101  045440  054505
5291  030612  026123  042514  052106
5292  030620  052040  020117  044522
5293  030626  044107  026124  052040
5294  030634  050117  052040  020117
5295  030642  047502  052124  046517
5296  030650  005015     000
5297
5298  030653     113  054505  047502  DKBERR: .ASCII  /KEYBOARD ERROR,KEY POSITION IN ROW SHOULD BE /
5299  030660  051101  020104  051105
5300  030666  047522  026122  042513
5301  030674  020131  047520  044523
5302  030702  044524  047117  044440
5303  030710  020116  047522  020127
5304  030716  044123  052517  042114
5305  030724  041040  020105
5306  030730  020040  005015          KYSTRK: .ASCII  /  /<15><12>
5307  030734  041517  040524  020114          .ASCIZ  /OCTAL GD, OCTAL BAD/<15><12>
5308  030742  042107  020054  041517
5309  030750  040524  020114  040502
5310  030756  006504  000012
5311  030762  020040  020040  020040  DSPC6:  .ASCIZ  /      /
5312  030770     000
5313
5314  030771     036     076     020  ROW1:   .BYTE   36,76,20,13,32,12,54,44,14,41,71,57,63.64,3,114,0
5315  030774     013     032     012
5316  030777     054     044     014
5317  031002     041     071     057
5318  031005     063     064     003
5319  031010     114     000
5320
5321  031012     026     056     030  ROW2:   .BYTE   26,56,30,73,52,22,55,34,24,31,51,77,62,61,2,0
5322  031015     073     052     022
5323  031020     055     034     024
5324  031023     031     051     077
5325  031026     062     061     002
5326  031031     000
5327
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 5328  031032  046  040  053  ROW3:   .BYTE   46,40,53,23,72,42,45,74,11,21,47,27,66,0
 5329  031035  023  072  042
 5330  031040  045  074  011
 5331  031043  021  047  027
 5332  031046  066  000
 5333
 5334  031050  016  070  060  ROW4:   .BYTE   16,70,60,50,33,43,25,35,75,65,37,115,67,0
 5335  031053  050  033  043
 5336  031056  025  035  075
 5337  031061  065  037  115
 5338  031064  067  000
 5339
 5340  031066  001  000       CNTRA:  .BYTE   01,0
 5341
 5342  031070  101  000       SHFTA:  .BYTE   101,0
 5343
 5344  031072  015  000       SPCB:   .BYTE   15,0
 5345
 5346  031074  113  004  103  KYPD:   .BYTE   113,04,103,104,1,112,101,102,6,7,106,100,5
 5347  031077  104  001  112
 5348  031102  101  102  006
 5349  031105  007  106  100
 5350  031110  005
 5351  031111  010  105  107       .BYTE   10,105,107,110,17,111,0
 5352  031114  110  017  111
 5353  031117  000
 5354
 5355                            .EVEN
 5356  031120  000500            RCRLB:  .BLKB   500     ;RECEIVE CIRCULAR BUFFER
 5357
 5358  031620  000500            TCRLB:  .BLKB   500             ;TRANSMIT CIRCULAR BUFFER
 5359  032320  000000            ABUFP:  .WORD   0
 5360  032322  000062            ABBUF:  .BLKB   50.
 5361  032404  000000                    0
 5362          000001                    .END
```

```
ABBUF   032322          1504    3334    3336    5360#
ABSNT   021610          4281#
ABUFP   032320          1504#   1781    1813    1816    1828    1831    2040    2041    2048    2621    2624    2628#   3333#
                        3334    3336#   3337#   3575#   3576    3688    3692    4179#   4191    4184    4185#   4251    4256
                        4278    5359#
AESCO   015666          3406    3438#
AESCP   015660          3404    3435#
ALEXT   012660          2875    2880#
ALWCNT  002236          1306#   1607    1867    2308    3249
ADJT    013452          2930    3006#
ASESC   015502          3340    3403#
ASTRT   002332          1507    1520#   2529    2627    2707    2733    2770
AUTO    002206           793    1325#
AUTOA   002276          1327#   1331    1428    2864
BASC3   004476          1753    1754#
BELUP   014316          3063    3178#
BCLR  = 000020          1051#
BDAD    013406          2995    2997#
BDEXT   012650          2871    2878#
BDEXTA  012646          2872    2877#
BEL     002004          1097#   1526    2643
BINOCT  020412          2659    4025#   4194    4208    4214
BIT0  = 000001           757#    757    1496    2520    2964    3339    4059
BIT00 = 000001           747#    757    1496    2520    2964    3339    4059
BIT01 = 000002           746#    756    1499    1571    3339    3409
BIT02 = 000004           745#    755
BIT03 = 000010           744#    754    3339    3405    3415
BIT04 = 000020           743#    753
BIT05 = 000040           742#    752
BIT06 = 000100           741#    751
BIT07 = 000200           740#    750    1506    3296
BIT08 = 000400           739#    749    4359
BIT09 = 001000           738#    748    4367    4429
BIT1  = 000002           756#
BIT10 = 002000           737#   4411
BIT11 = 004000           736#   4374
BIT12 = 010000           735#   2583
BIT13 = 020000           734#   4418
BIT14 = 040000           733#   4345
BIT15 = 100000           732#
BIT2  = 000004           755#
BIT3  = 000010           754#
BIT4  = 000020           753#
BIT5  = 000040           752#
BIT6  = 000100           751#
BIT7  = 000200           750#
BIT8  = 000400           749#
BIT9  = 001000           748#
B_DADA  002350          1349#   1371
B_DADD  002346          1347#   1354    2879
B_DINA  020226          2698    3969#   3976
B_DINC  020222          1722    1763    1998    2184    2506    3968#   3975    3987
B_DLNA  002470          1374#   1379
B_DLNE  002460          1365    1368    1372#
B_DTST  002534          1388#
B_KM    002262          1316#   1454#   1755#   1992#   2026#   2335#   2507#   3493    3496#   3501#   3528    3670#   3833#
```

```
BIRCW     021226      4199   4202#
BPT.EC= 000014         764#
BUBCT     002244      1309#  2502*  2514   2518*  2754*  2763   3132*  3148*  3150   3154*  3158*  3180*  3187*
                      3202*  3222   3574*  3580*  4188*  4189
BUMPCT    021530      4250   4261#
BYSTOR    017150      2190*  3672   3720#  3765*
CALCK     020700      2006   3332   3517   4118#
CARRT     002006      1099#  2414   2425   2651   2699   3370   4072   4087   4097
CBEV      012776      1328   1362   1366   2917#
CDE.A     013052      2928#  2934   2942 - 3005
CD.N      002022      1115#
CESRM     015652      3420   3424   3428   3430   3432#  3436   3441   3446   3452   3454
CHNITT    017112      3701   3705   3707   3709#
CHCM      002016      1109#  1876   2000   2337
CHRD      002216      1298#  1468*  1483*  1484*  1485   1560*  1561   1564*  1611*  2854*  3047*  3049   3051
                      3054*  3058*  3134*  3140*  3142*  3143*  3144   3146   3152   3156   3160   3164   3164*
                      3287*  3288*  3289   3777*  3778*  3780   3781   3782*  3783*  3784   3785   4180*  4184*
                      4186   4213
CKABRT    020754      2526   2708   4148#
CKDAT     005474      1896   1919#
CKECM     004040      1638   1642#
CKEXT     006354      2013   2038   2047   2054   2061   2067#
CKGP    = 000106      1247#  3425
CKKBD     021102      2762   4179#
CKLIN     004244      1717   1719#
CKMEM     005534      1919   1929#
CKMNT     003742      1625   1627#
CKOFF     021744      3711   3900   4321#
CKSCRA    007212      2237   2239#
CKSCRB    007302      2255   2257#
CKSFT     016512      1775   1786   1937   2021   2060   3609#  3714   3902
CKSRC     006222      2039#  2049
CKSTR     017060      3681   3691   3700#
CKSUM   = 002000      1030#  2007   3514   3531
CKSUMA    005716      1988   1990#
CKSUMB    006122      2015   2023#
CKVST     017124      3699   3712#
CLFT      002024      1118#  2144
CLMAIN    012062      2760   2771#
CLRCK     002046      1146#
CLREG     016654      1598   1921   2016   2055   2159   2466   3635   3653#  3779   3893
CLTCK     002050      1149#
CMPOS     017440      2327   3797#
CNTF      021346      4190   4224#
CNTRA     031066      2789   5340#
COMGP   = 000020      1036#  3380   3427   3431
CONRD     014510      3231#  4083
CONVLN    020510      1458   2987   3042   3091   4057#
CPABRT= 000171        1249#  3447
CPPOS     017502      2359   3812#
CRBUF     002002      1089#
CRCSR     002000      1088#
CRRUL     020074      3915#
CRT       002020      1112#  2105
CUHME     002210      1273#  1684   1687   2325   2331
CUP       002026      1121#  2117
```

```
MAINDEC-11-DZVTJ-A      MACY11 27(732)  25-SEP-76  09:05  PAGE 106
DZVTJ.P11       CROSS REFERENCE TABLE -- USER SYMBOLS

CURER   017342          1629    1706    1737    2115    2276    2374    2412    2429    3775#
CURPOS= 000004          1039#   3419    3702
CURS1   004150          1671    1673#
CURS1A  006376          2082    2084#
CURS1B  006610          2138    2140#
CURS2   007434          2296    2298#
CUR1XT  006570          2102    2119    2126#
C2CK    010040          2351    2355    2366#
C2XT    010102          2310    2324    2345    2367    2370    2377#
DABRT   025741          3251    5011#
DAPNT   002064          1167#
DATSC   020250          2448    3984#
DBELL   027371          2645    5164#
DBOT    030466          2791    5275#
DCNTZ   027510          2616    5180#
DCONT   030416          2783    5269#
DCOPYR  026257          1498    5052#
DCOUNT  020220          1553*   1645*   1767*   1808*   1814*   1829*   3072*   3578*   3951*   3958#
DCR     027357          2653    5162#
DCRAD   002074          1180#   1245    1691    1758    2314
DCRST   027706          5205#
DDISP = 177570           679#    822
DELAY   020156          1554    1646    1768    1809    1815    1830    3073    3579    3942#
DELIM   003532          1538    1568#
DEMP    002054          1155#   3443
DESC    027115          2632    5127#
DEVERR  027733          5210#
DEXT    027541          2768    4284    5186#
DF0     001442           859     866     881     993#
DF1     001446           910     995#
DF2     001450           868     997#
DF3     001474           895    1003#
DF4     001534           916     923     946     953     960     988    1011#
DF5     001537          1012#
DF6     001543           874     902     930     937     967     974     981    1014#
DH1     024545           857    4882#
DH10    025432           900    4968#
DH11    026211           909    5045#
DH12    025675           928     935    5003#
DH13    027021           944     951    5115#
DH14    027053           965     972    5120#
DH2     024640           864    4893#
DH3     024740           872     979    4906#
DH4     025053           879    4921#
DH5     025201           886    4938#
DH6     025265           893    4949#
DH7     025375           914     921     958     986    4963#
DISPLA  001140           822#   2834*   4388*   4410*
DISPRE  000174           780#   2834
DJAPT   001752          1073#   1418*   1422    1434*
DJLNE   001630          1067#   1373    1420    2926    3028    3065    3067    3069    3079
DJTBL   001560          1065#   1363    1418    2927    3027    3076
DKBD    027772          2752    5216#
DKBERR  030653          4205    5298#
DKPD    030570          2783    5288#
DKYBD   027122          2614    5131#
```

```
DLAY    002254          1313#  1636*  1639*  1831*  1897*  2039*  2043*  2347*  2352*  3135*  3138*  3676*  3684*
                        3689*  3694*  3844*  3851*  3855*  3860*  4301*  4304*  4321*  4324*
DLERR   024202          2980   4837#
DLF     027364          2657   5163#
DLOOP   027377          2728   5167#
DLSHFT  030123          2783   5232#
DMAIN   002036          1135#
DMANA   024233          1344   4843#
DMANB   024333          1388   4856#
DMANL   024363          1372   4861#
DMPCCT  021250          4205#
DOARQW  012004          2757#  2767   2774
DPNT    002152          1228#
DPRNT   027554          2683   5189#
DPRTR   026231          1501   5048#
DRECT   002044          1143#  1734   3563   4007
DRSHFT  030227          2783   5246#
DSEC    030302          2721   5254#
DSMES   020316          2615   2684   2729   2753   2769   4001#  4285
DSPCE   030544          2783   5283#
DSPC6   030762          4211   5311#
DSWR  = 177570           678#   821
DTAB    027352          2649   5161#
DTHPD   030337          2781   5260#
DTOP    030175          2781   5240#
DTTBL   012130          2757   2787#  4192
DT0     001460           858    990#
DT1     001434           887    909    992#
DT2     001452           865    894    999#
DT3     001464           915    922   1001#
DT4     001500           873    901    929    936    966    973    980   1005#
DT5     001512           880   1007#
DT6     001524           945    952    959    987   1009#
DUNTST  024042          3080   4818#
DVUNIT  026132          1472   5037#
EAPNT   002062          1165#
EEMP    002052          1153#  3438
EINST   002066          1170#
EMAIN   002034          1133#  3561
EMTVEC= 000030           767#  2804*  2805*
EM1     024460           856   4873#
EM10    025634           907   4995#
EM11    025471           913   4975#
EM12    025557           920   4986#
EM13    026010           927   5019#
EM14    026057           934   5027#
EM15    026304           943   5056#
EM16    026355           950   5063#
EM17    026430           957   5071#
EM2     024610           863   4889#
EM20    026506           964   5079#
EM21    026552           971   5085#
EM22    026615           978   5091#
EM23    026703           985   5101#
EM3     024677           871   4900#
EM4     025007           878   4914#
```

D09


```
EM5      025122            965    4930#
EM6      025232            892    4944#
EM7      025332            899    4957#
ENDPS    010736           2528    2530#
ENDSEL   010724           2513    2521    2527#
ENDTAB   001760           1077#   2902
ENSRT    007166           2211    2218#
EOM    = 000004           1295#   1634    1870    2005    2048    3156    3219    3364    3500    3749    4011
EOS      002030           1124#   2455
EPL    = 001000           1031#   3374    4246    4254
EPNT     002150           1226#   2690
ERLNE    015452           3327    3394#
ERPL     002070           1172#
ERRVEC= 000004            760#   4350    4351*   4353*   4356*
ERSE     010340           2443    2446#
ERSXT    010466           2462    2464    2469#
ESAMB    015762           2631*   3339    3344*   3403    3405    3409*   3415*   3432*   3459#   3762*   4253*
ESC    = 000400           1032#   2629    3345    4246    4254
ESCN     002166           1261#   1579    1875    1999    2109    2143    2336    2454    2524    2691    3341    4256
ESCO     002110           1192#   1253    1582    1732    1760    1806    1878    2001    2002    2338    2494    3552    3562
                          3564    4006
ESCOI  = 002110           1253#   1675    1693    2145    2154    2415
ESCP     002154           1242#   1254    1585    2206
ESCPI  = 002154           1254#
ESCYI  = 002074           1245#
ESCZ     002162           1255    1257#   1630    1632    3595
ESCZI  = 002162           1255#   1877
ESSEQ    002262           1312#   1542*   1544    1601    1602
ESTEX    003712           1536    1610#
ESTST    003350           1524    1526#
EXINT    013774           3066    3070    3076#
EXIT3    004670           1780    1782    1787#
EXMAIN   011474           2618    2666#   2685    2730
EXMNT    004130           1652    1657#
EXTST    021600           2625    2705    4269    4278#
FADD     012742           2901#
FADD1    012760           2906#   2909
FEXIT    012046           2759    2765    2768#
FNOBT    021730           4303    4311#
FRCECT   021546           4260    4262    4265#
FTEX1    003716           1608    1612#
FTLCNT   002234           1305#   1502*   1606*   1607    1867    1899*   2045*   2308    3249    3257*   3556*   3697*   3876*
                          4309*
FTLEXT   017214           3733    3735#
GCMD     003406           1534#   1576    1580    1583    1586    1589    1596
GDAD     013402           2973    2996#
GDCURP   006560           2103    2122#
GDSCRL   007414           2253    2270    2272    2277#
GDSTRK   021340           4187    4221#
GETON    016402           2496    3554    3574#
GNS    = ****** U          779    2844    4780    4781    4782    4783    4784
GOTON    016450           3577    3583#
GTCR     020546           2687    4070#   4073
GTEXT    020660           4096    4098    4101#
GTNUM    020570           1349    1375    1392    4083#   4104
HDFLG    020072           2963*   2978    2994*   3001*   3567*   3842*   3889    3892*   3906#
```

```
IABT    002056          1158#
IDENT   002160          1252#   1464*   1466*   1470*   1490    1496    1493    1561    2520
ILLNE = 000010          1037#   3326
INAG    007022          2189#   2213
INITA   013536          1329    1367    3027#
INRPL   006764          2178    2180#
INRXT   007172          2202    2210    2220#
INTAB   001570          1066#   1346    1389    1508    2900    2925    3269
INTRC   015040          1436    3318#
INTXM   016014          1438    3438#
INTXT   013722          3034    3065#
INXMT   003434          1543#   1592
IOTVEC= 000020           765#   2802*   2803*   2921*   2922*   3010*   3011*
ITSUMA  006344          1993    2063#
JMPADD  014724          3273*   3274*   3278    3280#
KBDLP   021112          4181#   4219    4223
KIENA   016252          3491    3533#
KYBD    011212          2611    2613#
KYBXMT  011460          2633    2646    2650    2654    2658    2661#
KYPD    031074          2789    5346#
KYSTRK  030730          4203*   4204*   5306#
KYSTRT  011246          2620#   2642    2663
LDADD   014076          1433    2935    3035    3111#
LDBUF   020746          2028    2086    2192    2241    2260    2396    2450    4141#   4156
LDOUT   017246          3746    3749#
LDPOS   021234          4197    4201    4203#
LDXMIT  017222          1945    1994    2187    2212    2517    2617    2619    2662    2686    2731    2761    2772    3743#
                        4206    4210    4212    4216    4218
LINXT   004456          1729    1731    1738#
LKKB    002040          1138#
LNECK   013230          2964#   2998
LNEPT   001754          1074#   1420*   1440    1443*   1503*
LNFED   002010          1171#   1355    1380    1400    1880    2409    2655    2700    3372    4095    4099    4258
LNRW    017544          2312#   2328    2331*   2363    3797    3799*   3801    3803*   3804*   3812    3814*   3816    3819*
                        3819#   3822#
LOOP    021350          2732    4235#
LOOPR   021434          4242    4246#
LOOPT   021402          4240#   4245    4257    4264    4270
LOOPTA  021406          4241#   4249
LPSTR   021454          4247    4251#
LPTST   011714          2725    2727#
LSTST   010506          2489    2491#
MAINT = 000004          1053#
MANS    002320           794    1342#
MANSA   002332          1344#   1364    1369    1432    2863
MCLR  = 000010          1052#   1459    2966    3003    3030
MEMA    005150          1855#   1946
MEMB    005204          1861#   1868
MEMC    005356          1891#   1908    1910    1913    1917
MEMD    005424          1894    1902#
MEMXT   005676          1869    1885    1901    1940    1969#
MEM1    005142          1851    1853#
MODCA   002752          1440#   2593    3267
MODCK   002626          1330    1398    1405    1418    1431
MODCO   002650          1421#   1445
MODE    002232          1304#   1325*   1342*   1404*   1426    1506    2527    2861    3247
```

```
MONIT   014542          3247*   4344
MPATT = 005656          1855    1888    1939    1956    1959*
MSTBL   012102          2758    2781*
MSTRT   000204           794*
NABRT = 000170          1251*   4164
NCKGP = 000107          1248*   3429
NOCALC  020744          4120    4122    4135*
NOER    016630          3619    3634    3642*
NOKIL   016032          3489    3493*   3510    3512
NOROUT  021650          4279    4288*
NORXT   017220          3734    3736*
NOSHFT  020504          4048    4052*
NOSOM   016054          3494    3498*
NOUNIT  013750          3068    3071*   3078
NOVT    024113          3071    4825*
NULN    010122          2392    2394*
OCTBIN  020466          1370    1392    1407    4046*
OCTLNE  001776          1087*   1483    2988*   2989    3092*   3093    3144    3324    4057*   4062*
OFFLP   004774          1813*   1819
ONE     002240          1307*
ONLP    005052          1826*   1834
ONOFA   005034          1817    1823*
ONOFLP  004744          1808*   1832
ONOFXT  005122          1827    1837*
ONOF61  004712          1800    1802*
PABRT = 010000          1028*   3451    4148
PATGN   005624          1864    1903    1948*
PC    =%000007           691*   2548*   2551*   2570*   4420*   4475*   4482*   4489*   4503*   4505*   4564*
PDKBD   011766          2749    2752*
PIRQ  = 177772           677*
PIRQVE= 000240           771*
PMULT   020216          2849*   2855*   2859*   3945    3957*
POPIT   003522          1563*   1609
POP2SP= 022626          1018*   2852    2858    2877    2908    2949    3256
PRABRT= 000172          1250*   3449
PRESC   002250          1311*   1529*   1533    1547    1579*   1582*   1585*   1599
PR0   = 000000           694*
PR1   = 000040           695*
PR2   = 000100           696*
PR3   = 000140           697*
PR4   = 000200           698*
PR5   = 000240           699*
PR6   = 000300           700*
PR7   = 000340           701*
PS    = 177776           674*    675
PSW   = 177776           675*   3276*
PUSH2S= 024646          1019*
PWRVEC= 000024           766*   2808*   2809*   4718*   4719*   4727*   4742*   4743*
QMRK    027770          2878    5215*
QUST    020662          4090    4092    4102*
RABT    002142          1214*
RBBUF   015754          1451*   1730    1890    1892    2014    2018    2053    2057    2152    2161    2254    2271    2274*
                        2356    2357    2373*   2406    2422    2447*   2457*   2463    2467    3367    3379    3456*   3704
                        3708    3758    3782    3847    4244
RBJFP   015760          1892*   1893    2346    2348    2356*   3367*   3377    3379*   3387*   3388*   3458*   3758*   3847
                        3856    4240    4244*   4248    4251*   4252*   4258*   4259*   4263*
```

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RCR_B   031120          1449    1451    1683    1700    2113*   4237    4281    5356*
RCUR    002102          1185*   1723
RDCUR   002104          1188*   1676    1694    1724    2416    3417
REBUF   015756          1449*   3377    3457*   4236*   4281*
RECAD   014730          2958    3287*
RECDN = 000200          1049*   3136    3233    3258    4070
RECEX   014304          3141    3159    3163*
RECEXA  014310          3157    3165*
RECITT  017144          2097*   2189*   2257*   3709*   3718*   3763*
RECTM   014116          3130*   3598
RECXT   015474          3391    3395    3399*
REEX    014770          3293*   3297
RENA  = 000100          1050*   1505    1527    1612    2530    2970    2977    3266    3292
REOM  = 020000          1027*   1643    1651    1826    1895    2010    2050    2051    2350    3366    3679    3690    3858
                        3880
RESET   002164          1259*   3551
RESETV  016272          1627    1674    1719    1757    1802    1853    1990    2085    2141    2180    2239    2299    2394
                        2446    2501    3549*   4001
RESPTR  017262          1453    1787    1856    1872    1991    2067    2311    2330    2613    2727    3692    3715    3757*
                        3877    4238    4283
RESVEC= 000010           761*   2817*   2824*
REVID = 000040          1035*   3384    3440    3445
ROW1    030771          2787    5314*
ROW2    031012          2787    5321*
ROW3    031032          2787    5328*
ROW4    031050          2787    5334*
RRDY  = 100000          1057*   1555
RSCN  = 000001          1054*
RSMAIN  012076          2771    2775*
RSOM  = 040000          1026*   1637    1649    3361
RSTER   015436          3346    3350    3355    3358    3362    3369    3375    3390*   3410    3416    3433
RSTT  = 004000          1029*   3393
RTRP    012600          2850    2856    2860*
RXOFF = 100000          1025*   1769    3349    3353    3682    3849    4322
RC    =%000000           682*   1327*   1328*   1329*   1345*   1349*   1352*   1359*   1362*   1366*   1367*   1370*   1375*
                        1382*   1392*   1407*   1433*   1453*   1458*   1463*   1549*   1554*   1558*   1598*   1627*   1629*
                        1631*   1633*   1635*   1646*   1674*   1679*   1688*   1696*   1706*   1719*   1722*   1726*   1737*
                        1757*   1763*   1768*   1775*   1779*   1786*   1787*   1802*   1807*   1809*   1811*   1815*   1824*
                        1830*   1853*   1856*   1859*   1864*   1866*   1871*   1872*   1882*   1903*   1921*   1937*   1945*
                        1952*   1957*   1990*   1991*   1994*   1998*   2006*   2012*   2016*   2021*   2028*   2037*   2055*
                        2060*   2067*   2085*   2086*   2099*   2115*   2141*   2148*   2159*   2180*   2184*   2187*   2192*
                        2199*   2212*   2239*   2241*   2250*   2260*   2267*   2276*   2299*   2302*   2307*   2311*   2323*
                        2327*   2330*   2344*   2359*   2374*   2394*   2396*   2402*   2412*   2418*   2428*   2446*   2448*
                        2450*   2459*   2466*   2495*   2496*   2501*   2506*   2512*   2517*   2525*   2526*   2559*   2567*
                        2570    2613*   2615*   2617*   2619*   2625*   2639*   2641*   2659*   2662*   2684*   2686*   2687*
                        2692*   2698*   2705*   2708*   2727*   2729*   2731*   2732*   2753*   2761*   2762*   2769*   2772*
                        2879*   2881*   2911*   2935*   2987*   3020*   3035*   3042*   3045*   3063*   3073*   3074*   3075*
                        3091*   3102*   3116*   3167*   3192*   3224*   3238*   3254*   3332*   3517*   3553*   3554*   3557
                        3565*   3568*   3579*   3582*   3583*   3596*   3598*   3600*   3635*   3646*   3657*   3696*   3698*
                        3711*   3714*   3715*   3717*   3732*   3736*   3747*   3750*   3751*   3766*   3779*   3788*   3800*
                        3805*   3815*   3820*   3875*   3877*   3882*   3893*   3900*   3902*   3904*   3920*   3955*   3972*
                        3987*   4001*   4015*   4039*   4053*   4064*   4074*   4083*   4101*   4135*   4141    4143*   4150
                        4156*   4162*   4166    4170*   4194*   4206*   4208*   4210*   4212*   4214*   4216*   4218*   4224*
                        4238*   4269*   4271*   4283*   4285*   4287*   4288*   4311    4314*   4326*   4344*   4459    4460*
                        4461    4464*   4520    4521*   4522*   4529*   4530*   4531*   4532*   4533*   4534    4539    4545
                        4547*   4548    4562*   4659    4669*   4673    4689    4690    4703*   4720    4741*   4763    4764*
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                    4765    4766*   4767*   4768*   4769*
ROSVE   002256      1314*   3131*   3166    3179*   3191    3201*   3223    3232*   3237    3610*   3645    3776*   3787
                    4298*   4313
ROSV1   016510      3593*   3599    3601*
R00C08  002206      1272*
R00C11  002202      1269*
R00C20  002204      1271*
R00C80  002212      1274*
R01C00  002170      1262*   1730    1736    2422    2427
R01C20  002172      1263*   2406    2411
R1      =%000001     683*   1350    1355    1376    1380    1393    1400    1421*   1526*   1534    1642*   1647*   1673*
                    1675*   1676*   1683*   1684    1690*   1691*   1692*   1693*   1694*   1700*   1702    1720*   1723*
                    1724*   1754*   1758*   1759*   1760*   1761*   1874*   1875*   1876*   1877*   1878*   1879*   1880*
                    1890*   1893    1907    1915    1920*   1922    1923    1924    1926    1996*   1999*   2000*   2001*
                    2002*   2003*   2027*   2084*   2103*   2107    2114    2116    2140*   2142*   2143*   2144*   2145*
                    2146*   2181*   2182*   2185*   2191*   2240*   2259*   2313*   2314*   2315    2316*   2317*   2332*
                    2333    2336*   2337*   2338*   2339*   2346*   2348    2368*   2369    2373    2375    2395*   2413*
                    2414*   2415*   2416*   2449*   2504*   2624*   2634    2636    2638    2643    2647    2651    2655
                    2693*   2696*   2699*   2700*   2889*   2892*   2893*   2895    2899*   2928*   2936*   2940*   2957*
                    2958*   2959*   2960*   2961*   2965*   2974*   3012*   3014*   3015*   3017    3029*   3111*   3112*
                    3113*   3114    3260*   3261*   3262    3264*   3271*   3272*   3273    3319    3321*   3322    3328*
                    3331    3337    3341    3347    3351    3359    3364    3370    3372    3382*   3386*   3387    3390
                    3396    3401*   3407    3411    3413    3417    3421    3425    3429    3435    3438    3443    3447
                    3449    3453    3611    3614*   3618    3621    3631*   3633    3638    3639    3642*   3672*   3700
                    3706    3708*   3854    3868    3871    3885*   3887    3898*   3915*   3917*   3918    3929*   3943
                    3946*   3947*   3954*   3969*   3985*   4004*   4005*   4006*   4007*   4009*   4011*   4029*   4030*
                    4031*   4032    4046*   4052    4084*   4085    4087    4089    4091    4093    4095    4097    4099*
                    4141*   4155*   4191*   4192*   4193*   4207*   4213*   4544    4545*   4550    4554    4556    4561*
                    4660    4673*   4674    4678    4702*   4721    4740*
R12C00  002176      1265*
R2      =%000002     684*   1347*   1353    1357    1360    1374*   1378    1384    1391*   1395    1402    1422*   1424
                    1434    1533*   1593*   1595*   1860*   1861*   1887*   1902*   1909    1916    1929    1932    2040*
                    2041    2104*   2107    2113    2116    2300*   2303*   2315*   2325    2328*   2333*   2361    2363*
                    2366    2375    2614*   2683*   2728*   2752*   2768*   2870    2873    2890*   2892    2894*   2901*
                    2902    2904    2905    2906*   2925*   2929    2933*   3013*   3014    3016*   3027*   3033    3076*
                    3077    3082    3100    3111    3320    3322*   3323*   3324    3400*   3612    3615*   3617*   3618
                    3632*   3633    3643*   3673*   3700    3704*   3856    3864    3869    3871    3916*   3917    3921*
                    3922    3924*   3926    3928*   3929    3930*   3931*   3944    3945*   3949*   3953*   4009    4047
                    4049*   4050*   4051*   4052*   4284*   4661    4672*   4676*   4679    4686*   4687*   4688    4693*
                    4701*   4722    4739*
R22C00  002174      1264*
R23C00  002200      1267*   1759    2275
R23C78  002214      1275*   2312    2316
R23C79  002076      1182*   1692    1702    1705    2369
R3      =%000003     685*   1346*   1353*   1360*   1361*   1373*   1378*   1384*   1385*   1386*   1389*   1395*   1402*
                    1403*   1423*   1435    1436*   1437*   1438*   1439*   1534*   1537    1542    1568    1571    1574
                    1591    1593    1594*   1595    1721*   1762*   1766*   1771*   1889*   1912    1914*   1915*   1916*
                    1918    1926    1944*   1993*   1997*   2105*   2110    2117    2183*   2186*   2211*   2505*   2516*
                    2616*   2618*   2632*   2645*   2649*   2653*   2657*   2660*   2685*   2697*   2730*   2758*   2771*
                    2891*   2893    2924*   2947*   2957    3028*   3036    3038    3041    3043    3060*   3061    3079*
                    3088    3745    3872*   3970*   3986*   4130*   4131*   4133    4205*   4209*   4211*   4215*   4217*
                    4601    4610*   4616*   4617*   4620*   4625*   4626*   4627    4636*   4662    4670*   4671*   4685*
                    4688*   4697*   4698*   4700*   4723    4738*
R4      =%000004     686*   1390*   1396*   1397    1530*   1540    1545    1551    1578*   1588*   1812*   1818*   1825*
                    1833*   1855*   1865    1888*   1906*   1907    1914    1948*   1949    1951*   1953*   1954    1956*
                    2004*   2014    2017    2024*   2053    2056    2757*   2926*   2996*   2999*   3007*   3182    3193*
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                    3184    3185*   3190*   3202    3205*   3207    3208    3212    3213*   3214    3222*   3837    3838*
                    3863*   3870    3903*   4125    4129*   4130    4132    4134*   4186    4191    4207    4221*   4222
                    4240*   4248    4602    4604*   4605*   4606*   4607    4608*   4622    4624*   4632*   4635*   4724
                    4737*
R5      =%000005     687*   1813*   1816    1828*   1831    1854*   1855    1888    1904    1938*   1939    1942    1956
                    2005*   2188*   2203    2205    2208    2209    2694*   2709    2755*   2757    2758    2766    2773
                    2900*   2905*   2910*   2927*   3000*   3006*   3204*   3207*   3214    3331*   3516*   3669    3688*
                    3692    3716*   3843*   3866    3868*   3869*   3870*   3884*   3835    3886*   3894    3895    3896
                    3968*   3969    3973*   3974    4026    4027*   4032*   4033*   4034*   4035*   4038*   4118*   4119
                    4121    4131    4132*   4133*   4134    4192    4603    4609*   4611*   4613*   4614*   4615*   4616
                    4634*   4663    4665*   4667*   4674*   4678*   4693    4699*   4725    4736*
R6      =%000006     688*    690    2797*   2798*   2799    2946*   2947    2948    3205    3235*   3236*   3255
R7      =%000007     689*    691
SCAN    = 000401    1056*   1462    2969    3002    3044
SEQ4      003620    1541    1591*
SETA      012154    1326    1343    2796*   3253
SETREV    005672    1944    1967*   2516
SHFTA     031070    2789    5342*
SLSH    = 000057    1246*   3146    3421
SOM     = 000002    1294*   1628    1858    2301    3152    3203    3359    3495    3743    4005
SP      =%000006     690*   1446*   1447*   1464    1468    1473*   1478*   1485*   1490*   1532*   1544*   1547*   1560
                    1564    1611    1687*   1705*   1736*   1774*   1777*   1778*   1785*   1804*   1805*   1806*   1936*
                    2010*   2011*   2020*   2035*   2036*   2059*   2114*   2275*   2321*   2322*   2342*   2343*   2372*
                    2411*   2427*   2492*   2493*   2494*   2510*   2511*   2522*   2523*   2524*   2555*   2562*   2563*
                    2575*   2576*   2579    2580*   2581    2582*   2587*   2588*   2689*   2690*   2691*   2801*   2818*
                    2819*   2823*   2828*   2829*   2835    2836    2837    2917*   2918*   2954*   2955*   2981*   2989*
                    3047    3054    3058    3061*   3062*   3082*   3093*   3131    3132    3133*   3160*   3164*   3166*
                    3179    3180    3181    3182*   3190    3191*   3201    3223*   3232    3237*   3277*   3278*   3319*
                    3320*   3400    3401    3550*   3551*   3552*   3560*   3561*   3562*   3563*   3564*   3593    3594*
                    3595*   3597*   3599*   3610    3614    3645*   3669*   3713*   3716    3730*   3731*   3776    3777
                    3787*   3837*   3880*   3881*   3901*   3903    3943*   3944*   3953    3954    4026*   4038    4084
                    4298    4299    4300    4313*   4350*   4353    4355    4356    4384    4385    4389*   4415    4431*
                    4434*   4459*   4460    4461*   4463    4464    4465*   4467    4469    4471    4476    4478*   4480*
                    4488*   4492    4496    4497    4501    4520*   4525*   4544*   4550*   4554*   4561    4562    4593*
                    4594    4595    4596*   4601*   4602*   4603*   4609    4634    4635    4636    4637*   4638*   4659*
                    4660*   4661*   4662*   4663*   4664*   4665    4668*   4681    4683*   4685    4695    4697    4699
                    4700    4701    4702    4703    4705*   4706*   4720*   4721*   4722*   4723*   4724*   4725*   4726
                    4732*   4736    4737    4738    4739    4740    4741    4746*   4763*   4764
SPCB      031072    2787    5344*
SPTN      003612    1539    1588*
STACK   = 001100     671*   2801
START     000200     793*
STKLMT= 177774       676*
STRBYT    017102    3703    3706*
STRO      016010    3453*   3472*   4164
STRP      016012    3435*   3473*
STRTAB    001756    1076*   2901
STTEP     016006    3394    3396*   3397*   3471*   3632    3644*   3760*
STTER     015764    3461*   3631    3644    3760
STUPM     023726    2846    4802*
SVER1     002220    1299*   2660    3611*   3642    4032*   4033*   4034*   4195*   4196    4198    4200*   4202*   4203
                    4204    4209    4215
SVER2     002222    1300*   3612*   3643    4037*   4195
SWR       001136     821*   2583    2831    2833*   4345    4359    4361    4367    4374    4411    4418    4423    4429
SWREG     000176     781*   2833
SWO     = 000001     729*
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SW00  = 000001          719*   729
SW01  = 000002          718*   728
SW02  = 000004          717*   727
SW03  = 000010          716*   726
SW04  = 000020          715*   725
SW05  = 000040          714*   724
SW06  = 000100          713*   723
SW07  = 000200          712*   722
SW08  = 000400          711*   721
SW09  = 001000          710*   720
SW1   = 000002          726*
SW10  = 002000          709*
SW11  = 004000          708*
SW12  = 010000          707*
SW13  = 020000          706*
SW14  = 040000          705*
SW15  = 100000          704*
SW2   = 000004          727*
SW3   = 000010          726*
SW4   = 000020          725*
SW5   = 000040          724*
SW6   = 000100          723*
SW7   = 000200          722*
SW8   = 000400          721*
SW9   = 001000          720*
TAB     002012         1103*  2647
TBBUF   016262         1452*  1673   1690   1720   1754   1874   1996   2027   2084   2140   2181   2186   2191
                       2240   2259   2313   2332   2366   2368   2395   2413   2449   2504   2693   2696   3509
                       3521   3532   3537*  3759   3985   4004   4155   4237*  4282*
TBITVE= 000014          762*  2814*  2815*
TBLCK   012772         2903   2910*
TBUFP   016266         1628*  1630*  1632*  1634*  1810*  1823*  1858*  1865*  1870*  2301*  2306*  2638*  2640*
                       3503   3507   3509*  3511*  3516   3518   3519   3521*  3523*  3532*  3539*  3743*  3745*
                       3749*  3759*
TCOMB = 040004         1055*  2971   3291
TCRLB   031520         1450   1452   1889   1912   1918   1920   2098   2104   2190   2203   2258   2274   2361
                       3843   3866   3884   3886   3915   3918   4236   4282   5358*
TCRLF = 000200         4469   4508*
TCUCH   002120         1199*  2146   2157
TDATA   007162         2203   2216*
TDEV    013132         2921   2943*
TEBUF   016264         1450*  3507   3519   3538*
TESC    014370         1549   1807   2495   2525   2692   3200*  3553   3565   3596
TFUNCT  007154         2205   2215*
THT   = 000011         4467   4507*
TIMEXT  021732         4310   4312*
TKVEC = 000060          769*
TMNAD   012624         1352   1359   2870*
TOADD   002242         1308*  3181*  3183
TOFF    014754         3291*  3299
TOTCH = 003600         1059*  1860   1909   1929   1931   2300   3988
TOTC1 = 003601         1060*
TPENT   012766         2898   2908*
TPREG   002246         1310*  2964*  2972   3289   3295*  3296   3298*  3300   4058*  4059   4061*
TPRNT   011516         2681   2683*
TPVEC = 000064          770*
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TRAPVE= 000034           768*   2806*   2807*
TRDY  = 100000          1046*   3210    3217    3220
TRMID = 000002          1039*   3423
TRPA    012544          2847    2852*
TRPB    012570          2853    2858*
TRPE    012746          2902*   2907
TRPVEC  012670          1327    1345    2889*
TRTVEC= 000014           763*
TSMAD   015022          2960    3300*
TSTADD  023653          3273    4786*
TSTER   002156          1244*   2493
TSTLNE  001774          1086*   1440*   1441    1461    2962*   2968    2996    2997*   3041*   3068*   3089    4058
TSTNM   002264           990    1001    1005    1007    1009    1317*   1455*   1528*   3549*
TSTPTR  002230          1303*   1429    1508*   3264    3269*   3275*
TST1    003332          1522*   4786
TST10   005700          1986*   4790
TST11   006360          2080*   4790
TST12   006572          2136*   4792
TST13   006746          2176*   4792
TST14   007174          2235*   4792
TST15   007416          2294*   4794
TST16   010104          2390*   4794
TST17   010322          2441*   4794
TST2    003724          1623*   4786
TST20   010470          2487*   4796
TST21   011174          2609*   4796
TST22   011500          2679*   4796
TST23   011676          2723*   4798
TST24   011750          2747*   4798
TST3    004132          1669*   4786
TST4    004326          1715*   4788
TST5    004460          1751*   4788
TST6    004674          1798*   4788
TST7    005124          1849*   4790
TXEX    016260          3529    3534*
TXRCK   002126          1204*   2003
TXSJM = 000100          1034*   2025    3329    3368
TXTCK   002134          1209*
TYPDS = 104404          2556    4555    4784*
TYPE  = 104400          1344    1372    1388    1471    1472    1495    1498    1501    2554    2557    2842    2846    2878
                        2980    2986    3004    3071    3080    3087    3099    3251    4094    4103    4413    4421    4472
                        4519    4536    4538    4541    4543    4558    4563    4628    4704    4744    4780*
TYPNUM  020676          4093*   4094    4102*   4103    4105*
TYPOC = 104401          4527    4551    4781*
TYPON = 104403          4763*
TYPOS = 104402          1475    1480    1487    1492    2983    2991    3084    3095    4782*
TYP6    002226          1302*
T1ERR   003634          1562    1598*
UNLKKB  002042          1140*
UPD4    014772          3290    3294*
VBIT    021740          4300*   4302    4315*
VDLAY   021742          4299*   4306*   4316*
VECPT   001750          1072*   1419*   1423    1444*   1478
VECT    001772          1085*   1435*   2499
VJCSR   001762          1081*   1421    1459*   1462*   1473    1505*   1527*   1612*   1765*   2009*   2034*   2320*   2341*
                        2498    2509*   2530*   2702*   2928    2938*   2939*   2943*   2944*   2966*   2969*   2970*   2971*
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                    2976*  2977*  2981   3000   3002*  3003*  3029   3030*  3033*  3044*  3136   3210   3217
                    3220   3266*  3291*  3292*  3294*  3301*  3356*  3533*  3636   3637   3674*  3728*  3757*
                    3841*  3989*  4012*  4070   4268*
VRBUF   001764      1082*  1555   3142   3287   3321   4072
VSTAT   002260      1315*  1457*  1637   1643   1649   1651   1654   1756*  1769   1803*  1820   1826   1835
                    1857*  1886*  1895   1995*  2007*  2023*  2025*  2050*  2051   2238*  2319*  2334*  2350
                    2503*  2620*  2629   2661*  2695*  2703   3326*  3329   3345*  3349*  3353*  3354   3357*
                    3361*  3366*  3368*  3374*  3380   3384   3393*  3419*  3423*  3427*  3431*  3440*  3445*
                    3451*  3488   3490*  3514   3530*  3531*  3566*  3615   3622   3671*  3675*  3677   3679
                    3682   3690   3702   3726*  3735*  3840*  3845   3849   3858   3924*  3991   4002*  4013
                    4148   4152   4168   4239*  4241   4243*  4246   4254*  4302   4322
VVECT   001550      1064*  1419   2924
VXBUF   001770      1084*  3114   3203*  3212*  3219*  3300*  3495*  3500*  3518*
VXTCR   001766      1083*  1461*  2937*  2945*  2968*  3043*
WDSTOR  017146      2098*  2258*  3673   3719*  3764*
WTBGND  021654      1779   2012   2037   2323   2344   2512   3732   3882   4297*
XENA  = 040000      1047*  1765   2009   2034   2320   2341   2509   2702   2939   2943   2976   3294   3301
                    3356   3533   3674   3728   3757   3841   3989   4012   4268
XMAD2   017042      3686   3696*
XMCNT   016270      1677*  1695*  1725*  1764*  1881*  2008*  2033*  2096*  2147*  2198*  2249*  2266*  2318*
                    2340*  2401*  2417*  2458*  2508*  2701*  3498   3525*  3541*  3727*  3761*  3988*  4003*
                    4008*  4161*  4255*  4261   4265*  4266
XMDNE = 000001      1040*  1777   2035   2321   2342   2510   2703   3530   3677   3730   3845   3991   4013
                    4241   4243
XMITT   016732      3675*  3710
XMIT1   017152      1629   1631   1633   1635   1811   1824   1859   1866   1871   2302   2307   2639   2641
                    3726*  3747   3750
XMKIL = 000200      1033*  3354   3357   3490
XMREC   016676      1679   1696   1726   1882   2099   2148   2199   2250   2267   2402   2418   2459   3668*
                    4162
XMTAL   002112      1194*  1761   1805   1879   2339
XMWT    021570      4267   4269*
XMXT    017142      3717*
XMZER   021652      1456*  3505   4235*  4286*  4290*
XOFF  = 000023      1296*  1810   3347   4121
XON   = 000021      1297*  1781   1823   3351   3576   4119
XRCMP   017546      3836*
XREC    017650      3846   3848   3855*  3874
XRERR   017734      3853   3861   3875*
XREXT   017752      3859   3873   3879*
XROUT   020052      3878   3883   3888   3900*
XSCN  = 000400      1048*  2938   2944
ZERO    002224      1301*  1361   1532   1804   2271   2463   2492   2522   2689   3133   3550   3560   3594
ZERST   003376      1531*  1566
ZFLAG   016452      1463   1558   3045   3592*
$BDADR  001122       815*   999   3639*  3654*  3785*
$BDDAT  001126       817*   990    992    999   1005   1007   1601*  1604*  1654*  1734*  1923*  1932*  2018*
                    2057*  2111*  2156*  2157*  2161*  2205*  2409*  2425*  2456*  2467*  2499*  2799   3622*
                    3638*  3656*  3784*  3895*  4152*  4168*
$BELL   001162       833*  4413   4437
$CHARC  022622      4483*  4490   4499*  4504*
$CMTAG  001100       803*  2797   2804   2810   2811   2812
$CM3  = 000000       831*
$CRLF   001167       835*  1471   1495   2986   3004   3087   3099   4217   4421   4437   4473   4510   4519
                    4538   4543   4563
$DB_K   023444      4670   4704   4712*
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M09


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$DTBL   022434          4673    4708#
$ENDAD  011052           788    2563    2570#   2840    4426
$ENDCT  011000          2552#   2810
$ENDMG  011154          2554    2595#
$ENULL  011171          2557    2598#
$EOP    010744          2542#
$EOPCT  010772          2549#   2553    2910*
$ERFLG  001103           806#   4334    4363    4365    4371*   4392    4408*   4437
$ERMAX  001115           812#   2813*   4365    4387*   4392
$ERROR  022244          2804    4407#
$ERRPC  001116           813#    990    1001    4415*   4416*   4417    4437    4525
$ERRTB  001172           853#   4533
$ERRTY  022626          4420    4518#
$ERTTL  001112           810#   4414*   4437
$ESCAP  001160           832#   2812*   4386*   4432    4434    4437
$FILLC  001154           829#   4476    4510
$FILLS  001153           828#   4510
$GDADR  001120           814#    999    1007    1009    1820*   1835*   1924*   3557*   3636*   3653*   3781*   3896*
$GDDAT  001124           816#    990     992     999    1005    1007    1599*   1600*   1653*   1732*   1733*   1922*   1931*
                        2017*   2056*   2109*   2110*   2154*   2155*   2150*   2206*   2408*   2424*   2454*   2455*   2498*
                        3621*   3637*   3655*   3780*   3894*   4150*   4151*   4166*   4167*
$GET42  011022          2558#
$HD   = 000000           654
$ICNT   001104           807#   4378*   4379    4391*   4391
$ILLUP  023604          4718    4749#
$ITEMB  001114           811#   4417*   4437    4522
$LF     001170           836#   4437    4510
$LOOP   011146          2588    2593#
$LPADR  001106           808#   1524*   1625*   1671*   1717*   1753*   1800*   1851*   1988*   2082*   2138*   2178*   2237*
                        2296*   2392*   2443*   2489*   2611*   2681*   2725*   2749*   2826*   4369*   4384*   4399    4391
$LPERR  001110           809#   2827*   4369    4385*   4391    4431
$MAIL = ****** U        1525    1626    1672    1718    1754    1801    1852    1989    2083    2139    2179    2238    2297
                        2393    2444    2490    2612    2682    2726    2750    2838    4384    4423    4461
$MXCNT  022242          4382    4391#
$NULL   001152           827#   4478    4510
$NWTST= 000000          1521#   1622#   1668#   1714#   1750#   1797#   1848#   1985#   2079#   2135#   2175#   2234#   2293#
                        2389#   2440#   2486#   2608#   2678#   2722#   2746#
$OCNT   023224          4600*   4629*   4642#
$OMODE  023226          4595*   4599*   4604    4607*   4618*   4644#
$OVER   022226          4346    4362    4370    4380    4388#
$PASS   001100           804#   1001    1005    1009    2546*   2547*   2555    2594    4376    4392
$POWER  023612          4745    4751#
$PWRDN  023454          2808    4718#   4742
$PWRMG  023572          4745#
$PWRUP  023522          4727    4732#
$QUES   001166           834#   4437    4510
$RDCHR= ****** U        4785
$RDDEC= ****** U        4785
$RDLIN= ****** U        4785
$RDOCT= ****** U        4785
$RTRN   011144          2564    2589#   2814    2816*   2821*
$R2A  = ****** U        4785
$SAVRE= ****** U        4785
$SAVR6  023610          4726*   4732    4733*   4734*   4750#
$SCOPE  021770          2802    3010    4343#
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$SETUP= 000037          1320*  2544   2802   2804   2806   2808   2810   2811   2812   2814   2826   2840   4426
$STUF = 177777          1320*
$SVLAD  022200          4354   4383*
$SVPC = 000200           786*   791
$SWR  = 177400           644*   654    659    660    661    662    663    664    665    666    831    832    833
                        1523   1624   1670   1716   1752   1799   1850   1987   2081   2137   2177   2236   2295
                        2391   2442   2488   2538   2545   2559   2575   2594   2610   2680   2724   2748   2811
                        2813   2814   2826   2827   4335   4336   4337   4338   4339   4345   4357   4359   4360
                        4363   4364   4365   4372   4373   4374   4385   4388   4391   4399   4400   4401   4402
                        4403   4411   4418   4423   4429   4437   4746
$SWSEM= 000000           666    667   4339   4340   4361
$TBIT   011152          2585*  2594*  2825*
$TIMES  001156           831*  1523*  1624*  1670*  1716*  1752*  1799*  1850*  1987*  2081*  2137*  2177*  2236*
                        2295*  2391*  2442*  2488*  2545*  2610*  2680*  2724*  2748*  2811*  4372*  4379   4382*
                        4391
$TKB    001144           824*  3235   3260
$TKS    001142           823*  3233   3258
$TN   = 000025           644*   654   1521   1523*  1622   1624*  1668   1670*  1714   1716*  1750   1752*  1797
                        1799*  1848   1850*  1985   1987*  2079   2081*  2135   2137*  2175   2177*  2234   2236*
                        2293   2295*  2389   2391*  2440   2442*  2486   2488*  2608   2610*  2678   2680*  2722
                        2724*  2746   2748*
$TPB    001150           826*  4496*  4510
$TPFLG  001155           830*  4455   4510
$TPS    001146           825*  4494   4510
$TRAP   023622          2806   4763*
$TRP  = 000005          4771*  4781*  4782*  4783*  4784*  4785*
$TRPAD  023614          4768   4779*
$TSTNM  001102           805*  1528   2544*  3549   4334   4361   4383*  4388   4392   4410   4437
$TYPBN= ******          4785
$TYPDS  023230          4658*  4784
$TYPE   022412          4455*  4771   4780
$TYPEC  022556          4475   4482   4489   4494*  4495
$TYPEX  022624          4500   4502   4505*
$TYPOC  023026          4598*  4781
$TYPON  023042          4597   4600*  4783
$TYPOS  023002          4593*  4782
$XTSTR  022004          4348*
$0FILL  023225          4594*  4598*  4608   4643*
$40CAT= ****** U        4345   4420
.     = 032406           775*   779*   786    787*   789*   791*   792*   802*   837   1016*  1064*  1065*  1066*
                        1067*  1556   1565   1959   2052   2594   2599   2704   2800   2826   2827   2941   3211
                        3218   3221   3234   3948   3992   4071   4142   4182   4391   4392   4437   4510   4566*
                        4712*  4729   4749   4928*  5036*  5356*  5358*  5360*
.BEL  = 000007          1096*  2093   2246   2399   4159
.CARRT= 000015          1098*
.CDWN = 000102          1114*  2087   2196   2242
.CHOM = 000110          1108*  2193   2246   2264   2451
.CLFT = 000104          1117*  2090   2242
.CLRCK= 000133          1145*  2063
.CLTCK= 000134          1148*  2029
.CPYSC= 000135          1230*  2523
.CRT  = 000103          1111*  2087
.CUP  = 000101          1120*  2093
.C00  = 000040          1281*  2242
.C03  = 000043          1282*
.C08  = 000050          1283*
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.C11   = 000053     1284#
.C20   = 000064     1285#   2397
.C21   = 000065     1286#
.C40   = 000110     1287#
.C79   = 000157     1289#   2261
.CAPNT= 000171      1166#
.CORRO= 054433      1179#
.DEMP  = 000152     1154#
.DISAC= 000137      1232#
.DMAIN= 000141      1134#   2666    2775
.DPNT  = 000130     1227#
.DRECT= 000103      1142#   2063
.ERPNT= 000131      1164#
.EEMP  = 000112     1152#   1967
.EINST= 000111      1169#   2215    2218
.EMAIN= 000101      1132#
.ENAC  = 000136     1231#
.ECS   = 000112     1123#   2451
.EPNT  = 000127     1225#
.ERPL  = 000151     1171#   2215
.ESC   = 000033     1240#   1967    2025    2063    2087    2090    2093    2193    2196    2218    2242    2246    2261
                    2264    2397    2399    2451    2666    2775    4157    4159
.ESCZ  = 055033     1256#
.IRBT  = 000137     1157#   4157
.LKKB  = 000105     1137#
.LNFED= 000012      1100#   2246    2399
.O     = 000117     1191#   1967    2029    2063    2087    2090    2093    2193    2196    2246    2261    2264    2399
                    2451    2665    2775    4157    4159
.P     = 000120     1241#   2218
.PSCRN= 000150      1233#
.RABT  = 000140     1213#   4157
.RDCUR= 000131      1187#   2087    2090    2093    2261    2399
.RESET= 000122      1258#
.R00   = 000040     1276#   2397
.R00C1= 025440      1268#
.R00C2= 032040      1270#
.R01   = 000041     1277#
.R12   = 000054     1278#
.R22   = 000066     1279#
.R23   = 000067     1280#   2242    2261
.R23C0= 020067      1266#
.R23C7= 057467      1181#
.TAB   = 000011     1102#
.TCUCH= 000127      1198#   2193    2196    2246    2264
.TSTER= 000124      1243#
.TXRCK= 000135      1203#
.TXTCK= 000136      1208#   2029
.UNLKK= 000145      1139#   4159
.XMTAL= 000126      1193#   2029    2451
.Y     = 000131     1186#   2242    2261    2397
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ENDCOM   772#
ERROR    672#  1605  1655  1681  1686  1698  1704  1728  1735  1773  1784  1821  1836  1884  1900
        1925  1933  2019  2046  2058  2101  2112  2150  2158  2162  2201  2207  2252  2256  2269
        2273  2354  2371  2404  2410  2420  2426  2461  2465  2468  2500  3558  3623  3640  3786
        3891  3897  4153  4169  4308
ESCAPE   772#
MULT     772#
NEWST    772#  1520  1622  1668  1714  1750  1797  1848  1985  2079  2135  2175  2234  2293  2389
        2440  2486  2608  2678  2722  2746
POP      772#  1464  1467  1559  1563  1610  3046  3053  3057  3130  3132  3178  3180  3181  3189
        3200  3231  3399  3592  3609  3614  3716  3775  3777  3903  3953  4038  4084  4297  4299
        4300  4699  4736
PUSH     772#  1531  1543  1547  1687  1705  1736  1774  1776  1778  1785  1804  1805  1806  1935
        2010  2011  2020  2035  2036  2059  2114  2275  2321  2322  2342  2343  2372  2411  2427
        2491  2493  2494  2510  2511  2522  2523  2524  2688  2690  2691  3061  3062  3133  3160
        3163  3165  3182  3191  3223  3237  3318  3550  3551  3552  3559  3561  3562  3563  3564
        3594  3597  3599  3645  3668  3712  3729  3731  3787  3836  3879  3881  3901  3942  4025
        4312  4658  4720
SCOPE    673#  1522  1623  1669  1715  1751  1796  1849  1996  2080  2136  2176  2235  2294  2390
        2441  2487  2543  2609  2679  2723  2747
SETTRA  4771#  4781  4782  4783  4784
SETUP    772#  2796
SKIP     772#
SLASH    772#
SPACE    772#
STARS    772#   782   795   837  1021  1023  1042  1044  1061  1063  1069  1071  1078  1080  1092
        1094  1104  1106  1127  1129  1160  1162  1175  1177  1217  1219  1221  1223  1236  1238
        1290  1293  1320  1323  1333  1340  1410  1416  1510  1511  1518  1521  1614  1620  1622
        1658  1665  1668  1708  1712  1714  1741  1748  1750  1789  1795  1797  1839  1846  1848
        1971  1983  1985  2069  2077  2079  2128  2133  2135  2165  2173  2175  2222  2232  2234
        2280  2291  2293  2379  2387  2389  2432  2438  2440  2473  2484  2486  2531  2599  2606
        2608  2669  2676  2678  2713  2720  2722  2735  2744  2746  2792  2794  2865  2868  2883
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        3590  3603  3607  3626  3629  3648  3651  3658  3666  3722  3724  3738  3741  3753  3755
        3769  3773  3790  3792  3795  3807  3810  3823  3834  3908  3913  3934  3940  3960  3966
        3979  3982  3994  3999  4017  4024  4041  4044  4054  4056  4066  4068  4077  4081  4109
        4116  4136  4139  4144  4146  4172  4176  4226  4233  4273  4276  4291  4295  4317  4319
        4328  4392  4437  4510  4567  4645  4713  4754
SWRSU    2828#
TRMTRP   4771#
TYPBIN    772#
TYPDEC    772#  2555  4553
TYPNUM    644#  2838
TYPNUM    772#
TYPOCS    772#  1473  1478  1485  1490  2981  2989  3081  3093
TYPOCT    772#  4525  4550
TYPTXT    772#
$$CMPE    795#
$$CMTM    795#
$$ESCA    772#
$$NEWT    772#  1521  1622  1668  1714  1750  1797  1848  1985  2079  2135  2175  2234  2293  2389
        2440  2486  2608  2678  2722  2746
$$SET    4771#  4781  4782  4783  4784
$$SETU   2814#
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.HEADE	644#	
.SETUP	644#	1320
.SWRHI	644#	654
.SWRLO	644#	667#
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.$CATC	644#	772
.$CMTA	644#	795
.$EOP	644#	2531
.$ERRO	644#	4392
.$ERRT	644#	4510
.$POWE	644#	4713
.$SAVE	644#	
.$SCOP	644#	4328
.$TRAP	644#	4754
.$TYPO	644#	4645
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CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

F10


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            3555  3641  3681  3686  3699  3705  3733  3734  3744  3748  3853  3862  3874  3878  3883
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            4633  4677  4694  4729  4749
CLC         4124
CLR         1325  1347  1374  1386  1390  1391  1446  1454  1455  1456  1457  1466  1502  1529  1530
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            3135  3257  3276  3277  3298  3432  3566  3567  3653  3654  3655  3656  3676  3689  3735
            3761  3762  3764  3765  3838  3842  3844  3855  4057  4180  4253  4286  4301  4321  4372
            4386  4521  4610  4669  4672  4733
CLRB        1403  1470  2185  2628  3496  3501  3575  4179  4185  4271  4499  4698
CMF         1397  1441  1607  1684  1702  1730  1816  1831  1867  1893  1909  1912  1918  1926  1929
            2041  2107  2116  2117  2203  2209  2308  2325  2348  2361  2366  2369  2375  2406  2422
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            3377  3394  3507  3519  3618  3633  3692  3700  3847  3856  3866  3918  4189  4248  4261
            4266  4355  4379  4426  4690
CMPB        1350  1355  1376  1380  1393  1400  1537  1561  1568  1571  1574  1781  1904  1907  1942
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            3359  3364  3370  3372  3407  3411  3413  3417  3421  3425  3429  3438  3443  3447  3449
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            4097  4119  4121  4164  4186  4196  4198  4256  4278  4361  4365  4467  4469  4476  4497
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DZVTJ.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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L10

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