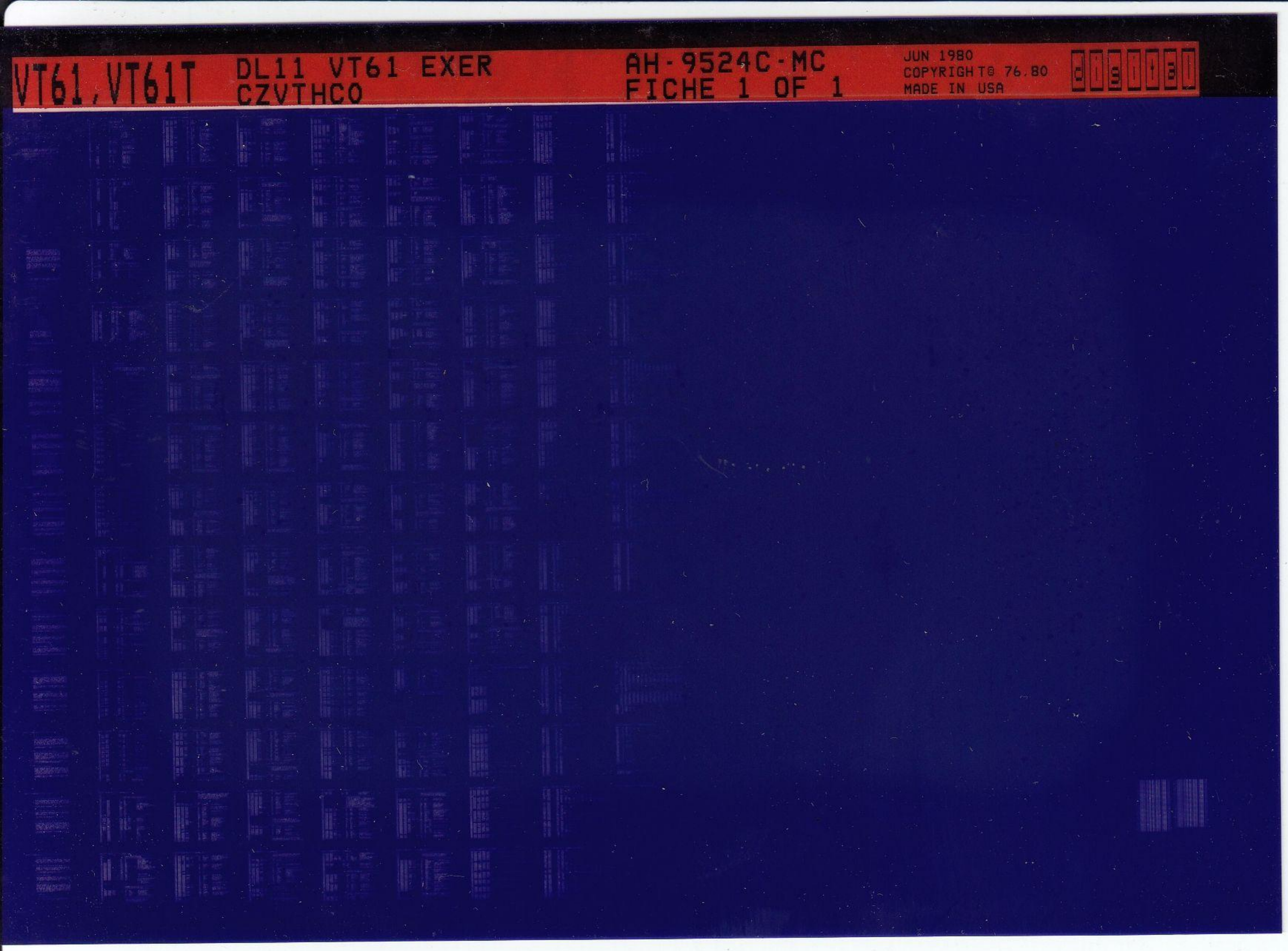
VT61,VT61T DL11 VT61 EXER AH-9524C-MC JUN 1980
CZVTHCO FICHE 1 OF 1 COPYRIGHT@ 76,80
MADE IN USA



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1
2
          .REM %
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IDENTIFICATION

PRODUCT CODE:	AC-9522C-MC
PRODUCT NAME:	CZVTHC0 DL11 VT61 EXER
PRODUCT DATE:	APRIL 1980
MAINTAINER:	DIAGNOSTIC ENGINEERING

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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 WITH A EOM.

THERE ARE TWO DISTINCT MODES IN WHICH THE PROGRAM CAN BE OPERATED. IN "AUTO" MODE ALL DL11'S WITH 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 16 VT61'S CONNECTED TO THE HOST COMPUTER VIA DL11-A,B,C OR D. 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

FOLLOWING IS THE OPERATING PROCEDURE FOR THE "AUTO" AND "MANUAL" MODES OF TESTING.

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 DL11'S 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 DL11'S TO BE TESTED (FORMAT IS 17XXXX, ECT, -UP TO 16 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 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 DL11'S 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,0, 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 DL11'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 (DL11 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 16 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.

10.0 CHANGE HISTORY

NOTE: HISTORY STARTS WITH REV. C0

C0: MODIFIED TO AUTOCK FOR CPU TYPE, AND INSERT APPROPRIATE DELAY VALUES FOR VARIOUS CPU EXECUTION TIMES.

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                                .TITLE  CZVTHCO DL11 VT61 EXER
                                ;*COPYRIGHT (C) 1976/1980
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY DIAGNOSTIC ENGINEERING
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                                ;*
                                .SBTTL  OPERATIONAL SWITCH SETTINGS
                                ;*
                                ;*      SWITCH                  USE
                                ;*      ------          --------------------
                                ;*        15            HALT ON ERROR
                                ;*        14            LOOP ON TEST
                                ;*        13            INHIBIT ERROR TYPEOUTS
                                ;*        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

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

                                ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                          R0=     %0              ;;GENERAL REGISTER
000001                          R1=     %1              ;;GENERAL REGISTER
000002                          R2=     %2              ;;GENERAL REGISTER
000003                          R3=     %3              ;;GENERAL REGISTER
000004                          R4=     %4              ;;GENERAL REGISTER
000005                          R5=     %5              ;;GENERAL REGISTER
000006                          R6=     %6              ;;GENERAL REGISTER
000007                          R7=     %7              ;;GENERAL REGISTER
000006                          SP=     %6              ;;STACK POINTER
000007                          PC=     %7              ;;PROGRAM COUNTER

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

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

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                  BIT15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
000001                  BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
```

```
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .EQUIV  BIT01,BIT1
                        .EQUIV  BIT00,BIT0

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

        000000                  .=0
                        ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                        ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                        ;*LOCATION 0 CONTAIN 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  010776          $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  002236  START:  JMP     AUTO    ;USE AUTO SELECTION OF UNITS
000204  000137  002270  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     000                  $AUTOB: .BYTE   0                ;;AUTOMATIC MODE INDICATOR
001135     000                  $INTAG: .BYTE   0                ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  SWR:    .WORD   DSWR             ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISPLAY: .WORD  DDISP            ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560                   ;;TTY KBD STATUS
001146  177562                  $TKB:   177562                   ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564                   ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566                   ;;TTY PRINTER BUFFER REG. ADDRESS
001154     000                  $NULL:  .BYTE   0                ;;CONTAINS NULL CHARACTER FOR FILLS
001155     002                  $FILLS: .BYTE   2                ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156     012                  $FILLC: .BYTE   12               ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157     000                  $TPFLG: .BYTE   0                ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000                  $TIMES: 0                        ;;MAX. NUMBER OF ITERATIONS
001162  000000                  $ESCAPE:0                        ;;ESCAPE ON ERROR ADDRESS
001164  177607  000377        $BELL:  .ASCIZ  <207><377><377>  ;;CODE FOR BELL
001170     077                  $QUES:  .ASCII  /?/              ;;QUESTION MARK
001171     015                  $CRLF:  .ASCII  <15>             ;;CARRIAGE RETURN
001172  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


001174                          $ERRTB:
                                        ;GENERAL ESCAPE SEQUENCE ERROR MESSAGE

001174  023642                          EM1                     ;AN ESCAPE SEQUENCE TO VT61   FAILED.
001176  023727                          DH1                     ;TEST#,ERROR PC,2 SEQUENCE BYTES,2 SEQUENCE BYTES.
001200  001424                          DT0
001202  001444                          DF0

                                        ;RECEIVE STATUS ERROR MESSAGE

001204  023772                          EM2                     ;RECEIVE STATUS ERROR
001206  024022                          DH2                     ;ADDRESS,STATUS ,ERR. BITS,CHAR.
001210  001454                          DT2
001212  001444                          DF0

                                ;RECIEVE SOFTWARE STATUS ERROR MESSAGE.

001214  024061                  EM3                     ;SFTWARE (SIAT) STATUS ERROR
001216  024122                  DH3                     ;PASS#,TEST#,GOOD STATUS,RECEIVED STATUS
001220  001502                  DT4
001222  001545                  DF6

                                ;DATA ERROR

001224  024171                  EM4                     ;DATA EXPECTED DOES NOT MATCH RECEIVE DATA.
001226  024235                  DH4                     ;TEST#,REC.CNT.,EXPECTED DATA, RECEIVE DATA
001230  001514                  DT5
001232  001444                  DF0

                                ;RECEIVE BYTE COUNT ERROR

001234  024304                  EM5                     ;BYTES EXPECTED DOES NOT EQUAL BYTES RECEIVED.
001236  024363                  DH5                     ;BYTES EXPECTED, BYTES RECEIVED
001240  001436                  DT1
001242  001452                  DF2

                                ;GENERAL DIRECT CURSOR ADDRESS FAILURE

001244  024414                  EM6                     ;CURSOR POSITION ERROR
001246  024447                  DH6                     ;GD LINE, GD COL., BD LINE, BAD COL.
001250  001454                  DT2
```

```
                                        DF3
                                        ;DIRECT CURSOR ADDRESS ERROR
001254  024514                          EM7                     ;DIRECT CURSOR ADDRESS ERROR
001256  024614                          DH10                    ;PASS#,TEST#,BD. ROW,BD. COL.
001260  001502                          DT4
001262  001545                          DF6
                                        ;LAST TEST-SELF TEST FAILED
001264  025016                          EM10                    ;VT61 FAILED SELF-TEST FUNCTION
001266  025365                          DH11                    ;CSR, VECTOR
001270  001436                          DT1
001272  001450                          DF1
                                        ;VT61 FAIL/HUNG ERROR MESSAGE
001274  024653                          EM11                    ;LAST TRANSMISSION TO VT61 CAUSED VT61 TO FAIL/HANG
001276  024557                          DH7                     ;PASS#,TEST#,ERROR PC
001300  001466                          DT3
001302  001536                          DF4
                                        ;GENERAL TEST FAILURE-PRECEEDS DATA/POSITION ERROR
001304  024741                          EM12                    ;VT61 UNDERR TEST FAILED-ERROR DATA FOLLOWS
001306  024557                          DH7                     ;PASS#,TEST#,ERROR PC.
001310  001466                          DT3
001312  001536                          DF4
                                        ;RECEIVE CHECKSUM ERROR
001314  025172                          EM13                    ;VT61 RECEIVER CHECKSUM ERROR
001316  025057                          DH12                    ;PASS#,TEST#,GD.CKSUM,BD CKSUM
001320  001502                          DT4
001322  001545                          DF6
                                        ;TRANSMITTER CHECKSUM ERROR
001324  025241                          EM14                    ;VT61 TRANSMITTER CHECKSUM ERROR
001326  025057                          DH12
001330  001502                          DT4
001332  001545                          DF6
                                        ;XOFF FAILED TO HALT BLOCK XMIT
001334  025460                          EM15                    ;XOFF TO VT61 FAILED TO HALT BLOCK XMIT
001336  026175                          DH13                    ;PASS,TEST,VSTAT
001340  001526                          DT6
001342  001536                          DF4
                                        ;XON FAILED TO RESTART BLOCK XMIT
001344  025531                          EM16                    ;XON TO VT61 FAILED TO RESTART BLOCK XMIT
```

```
                                                DH13
                                                DT6
                                                DF4

                                                ;NO XON AFTER UNIT WAS RESET

                                                EM17                    ;NO XON AFTER UNIT WAS RESET.
                                                DH7                     ;PASS#,TEST#,ERROR PC
                                                DT6
                                                DF4

                                                ;PERIPHERAL ABORT ERROR

                                                EM20                    ;LAST PERIPHERAL OPERATION ABORTED.
                                                DH14                    ;PASS,TEST,ERROR PC, VSTAT
                                                DT4
                                                DF6

                                                ;CANT CLEAR PERIPHERAL ABORT FLAG.

                                                EM21                    ;COULD NOT CLEAR LAST ABORT FLAG.
                                                DH14
                                                DT4
                                                DF6

                                                ;MAINTENANCE MODE DID NOT FORCE A SOM/EOM.

                                                EM22                    ;SOM OR EOM NOT REC. IN MAINT. MODE.
                                                DH3                     ;PASS#,TEST#,EXP.STAT, ACT.STAT
                                                DT4
                                                DF6

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

                                                EM23                    ;NO SCROLL FROM LINE FEED OR CURSOR RIGHT.
                                                DH7
                                                DT6
                                                DF4

001424  001102  001116  001124  DT0:  .WORD   $TSTNM,$ERRPC,$GDDAT,$BDDAT,0                    ;(REV. C0)
001432  001126  000000
001436  001124  001126  000000  DT1:  .WORD   $GDDAT,$BDDAT,0
001444     000     000     000  DF0:  .BYTE   0,0,0,0
001447     000
001450     000     000          DF1:  .BYTE   0,0

001452     001     001          DF2:  .BYTE   1,1               ;DECIMAL TYPE

001454  001120  001124  001122  DT2:  .WORD   $GDADR,$GDDAT,$BDADR,$BDDAT,0
001462  001126  000000
001466  001100  001102  001116  DT3:  .WORD   $PASS,$TSTNM,$ERRPC,0                          ;(REV. C0)
001474  000000
001476     001     001     001  DF3:  .BYTE   1,1,1,1
001501     001
001502  001100  001102  001124  DT4:  .WORD   $PASS,$TSTNM,$GDDAT,$BDDAT,0                   ;(REV. C0)
001510  001126  000000
```

```
1019  001514  001102  001120  001124  DT5:    .WORD   $TSTNM,$GDADR,$GDDAT,$BDDAT,0          ;(REV. C0)
1020  001522  001126  000000
1021  001526  001100  001102  001120  DT6:    .WORD   $PASS,$TSTNM,$GDADR,0                  ;(REV. C0)
1022  001534  000000
1023  001536     001     000     000  DF4:    .BYTE   1,0,0
1024  001541     000     000     001  DF5:    .BYTE   0,0,1,1
1025  001544     001
1026  001545     001     000     000  DF6:    .BYTE   1,0,0,0
1027  001550     000
1028          001552                  .EVEN
1029                                  ;INSTRUCTION DEFINITIONS
1030          022626          POP2SP  =22626
1031          024646          PUSH2SP =24646
1032
1033                          ;;*************************************************************************
1034                                  ;DEFINITION SOFTWARE STATUS(VSTAT) REGISTER BITS
1035                          ;;*************************************************************************
1036
1037          100000          RXOFF   =100000                 ;SET FOR XOFF, CLEARED FOR XON
1038          040000          RSOM    =040000                 ;SET FOR SOM (START OF MESSAGE).
1039          020000          REOM    =020000                 ;SET FOR EOM (END OF MESSAGE).
1040          010000          PABRT   =010000                 ;SET FOR A PERIPHERAL ABORT.
1041          004000          RSTT    =004000                 ;SET FOR RECEIVE STATUS ERROR.
1042          002000          CKSUM   =002000                 ;SET TO CALCULATE 61 REC.  CHECKSUM
1043          001000          EPL     =001000                 ;SET WHEN END OF LINE DETECTED
1044          000400          ESC     =000400                 ;SET WHEN OCTAL 33 RECEIVED.
1045          000200          XMKIL   =000200                 ;SET WHEN TRANSMIT KILLLED.
1046          000100          TXSUM   =000100                 ;SET TO CALCULATE 61 XMIT CHECKSUM
1047          000040          REVID   =000040                 ;SET WHEN REVERSE VIDEO MODE RECEIVED.
1048          000020          COMGP   =000020                 ;SET TO CONVERT REC. CHAR. BY -137.
1049          000004          CURPOS  =000004                 ;SET WHEN CURSOR POS. RECEIVED
1050          000002          TRMID   =000002                 ;SET WHEN TERMINAL I.D. RECEVED.
1051          000001          XMDNE   =000001                 ;SET UPON TRANSMIT COMPLETE
1052
1053                          ;;*************************************************************************
1054                                          ;DEFINITION OF DL11 CONTROL BITS
1055                          ;;*************************************************************************
1056
1057          000200          RECDN   =200
1058          100000          DSCHNG  =100000
1059          000100          RDENA   =000100
1060          100000          RERR    =100000
1061          040000          RORUN   =40000
1062          020000          RFMER   =20000
1063          010000          RPAR    =10000
1064          000200          TRDY    =00200
1065          000100          TENA    =00100
1066          000004          MAINT   =00004
1067          000104          TCOMB   =00104                  ;COMBINATION INTERRUPT ENABLE AND MAINT.
1068
1069          003600          TOTCH   =1920.                  ;TOTAL CHARACTERS ON SCREEN
1070          003601          TOTC1   =1921.                  ;TOTAL SCREEN +1
1071                          ;;*************************************************************************
1072                                  ;FOLLOW ARE DL11 ADDRESS AND VECTOR STORAGE TABLES
1073                          ;;*************************************************************************
1074  001552  000020          VVECT:  .BLKW   20              ;GOOD DL11 VECTOR TABLE
```

```
                                DLTBL:  .BLKW   20              ;GOOD DL11 ADDRESS TABLE
                                INTAB:  .BLKW   20              ;TABLE OF POSSIBLE DL11 ADDRESSES


                                        ;CURRENT POINTERS FOR ADDRESSES AND VECTORS
                                VECPT:  .WORD                   ;VECTOR INDEX
                                DLTPT:  .WORD                   ;ADDRESS INDEX
                                        ;ADDRESS TABLES FOR DL11 INTERFACES
                                STRTAB: .WORD   176500          ;DL11A/B
                                        .WORD   175610          ;DL11 C/D/E
                                        .WORD   0
                                ENDTAB: .WORD   176676          ;DL11 A/B
                                        .WORD   176170          ;DL11 C/D/E
                                        .WORD   0               ;END OF LIST MARKER
                                ;;**************************************************************
                                        ;VT61 ADDRESSES IN TABLE REFLECT UNIT UNDER TEST
                                ;;**************************************************************
                                VRCSR:  .WORD   0
                                VRBUF:  .WORD   0               ;RECEIVE DATA BUFFER
                                VXCSR:  .WORD   0               ;XMITTER CSR
                                VXBUF:  .WORD   0               ;XMITTER DATA BUFFER
                                VECT:   .WORD   0               ;VECTOR FOR UNIT UNDER TEST
                                CRCSR:  .WORD   0               ;CONSOLE RECEIVE CSR
                                CRBUF:  .WORD   0               ;CONSOLE DATA BUFFER


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

            000007              .BEL    =007
001750      000007              BEL:    .WORD   007             ;BELL
            000015              .CARRT  =015
001752      000015              CARRT:  .WORD   015             ;CARRIAGE RETURN
            000012              .LNFED  =012
001754      000012              LNFED:  .WORD   012             ;LINE FEED
            000011              .TAB    =011
001756      000011              TAB:    .WORD   011             ;TAB
                                ;;**************************************************************
001760      000001                      .WORD   01              ;TABLE DELIMITER (ESCN)
                                ;;**************************************************************

            000110              .CHOM   =110
001762      000110              CHOM:   .WORD   110             ;HOME CURSOR  H

            000103              .CRT    =103
001764      000103              CRT:    .WORD   103             ;CURSOR RIGHT  C

            000102              .CDWN   =102
001766      000102              CDWN:   .WORD   102             ;CURSOR DOWN  B

            000104              .CLFT   =104
001770      000104              CLFT:   .WORD   104             ;CURSOR LEFT  D

            000101              .CUP    =101
001772      000101              CUP:    .WORD   101             ;CURSOR UP  A
```

```
1131
1132                    000112                  .EOS    =112
1133    001774  000112                  EOS:    .WORD   112             ;ERASE TO END OF SCREEN  J
1134
1135
1136                                    ;;**********************************************************************
1137    001776  000002                          .WORD   2               ;TABLE DELIMITER (ESC0)
1138                                    ;;**********************************************************************
1139
1140
1141                    000101                  .EMAIN  =101
1142    002000  000101                  EMAIN:  .WORD   101             ;ENTER MAINTENANCE MODE  A
1143                    000141                  .DMAIN  =141
1144    002002  000141                  DMAIN:  .WORD   141             ;EXIT MAINTENANCE MODE  SA
1145
1146                    000105                  .LKKB   =105
1147    002004  000105                  LKKB:   .WORD   105             ;LOCK KEYBOARD  E
1148                    000145                  .UNLKKB =145
1149    002006  000145                  UNLKKB: .WORD   145             ;UNLOCK KEYBOARD  SE
1150
1151                    000103                  .DRECT  =103
1152    002010  000103                  DRECT:  .WORD   103             ;ENABLE LINEAR MODE  C
1153
1154                    000133                  .CLRCK  =133
1155    002012  000133                  CLRCK:  .WORD   133             ;CLEAR RECEIVER CHECKSUM [
1156
1157                    000134                  .CLTCK  =134
1158    002014  000134                  CLTCK:  .WORD   134             ;CLEAR TRANSMITTER CHECKSUM
1159
1160
1161                    000112                  .EEMP   =112
1162    002016  000112                  EEMP:   .WORD   112             ;ENABLE REVERSE  VIDEO  J
1163                    000152                  .DEMP   =152
1164    002020  000152                  DEMP:   .WORD   152             ;DISABLE REVERSE VIDEO  SJ
1165
1166                    000137                  .IABT   =137
1167    002022  000137                  IABT:   .WORD   137             ;INITIALIZE ABORT FLAG  -
1168
1169
1170    002024  000003                  ;;**********************************************************************
1171                                            .WORD   3               ;TABLE DELIMITER (ESCAPE P)
1172                                    ;;**********************************************************************
1173                    000131                  .EAPNT  =131
1174    002026  000131                  EAPNT:  .WORD   131             ;ENABLE AUTO PRINT MODE  Y
1175                    000171                  .DAPNT  =171
1176    002030  000171                  DAPNT:  .WORD   171             ;DISABLE AUTO PRINT MODE  SY
1177
1178                    000111                  .EINST  =111
1179    002032  000111                  EINST:  .WORD   111             ;ENABLE INSERT  I
1180                    000151                  .ERPL   =151
1181    002034  000151                  ERPL:   .WORD   151             ;ENABLE REPLACE  SI
1182
1183
1184                                    ;;**********************************************************************
1185    002036  000004                          .WORD   4               ;TABLE DELIMITER (I/O)
1186                                    ;;**********************************************************************
```

```
1187
1188                    054433          .DCRAD  =054433
1189    002040  054433                  DCRAD:  .WORD   054433          ;DIRECT CURSOR ADDRESSING
1190                    067467          .R23C79 =067467
1191    002042  067467                  R23C79: .WORD   067467          ;CURSOR TO LOWER RIGHT
1192    002044  000000                          .WORD   0
1193
1194    002046  047433                  RCUR:   .WORD   047433          ;DIRECT CURSOR ADDRESSING
1195                    000131          .Y      =131
1196                    000131          .RDCUR  =00131
1197    002050  000131                  RDCUR:  .WORD   00131           ;READ CURSOR POSITION  Y
1198    002052  000000                          .WORD   0
1199
1200                    000117          .O      =117
1201    002054  047433                  ESCO:   .WORD   047433          ;ESCAPE O
1202                    000126          .XMTAL  =000126
1203    002056  000126                  XMTAL:  .WORD   000126          ;TRANSMIT ALL  V
1204    002060  000000                          .WORD   0
1205
1206    002062  047433                          .WORD   047433          ;ESCAPE O
1207                    000127          .TCUCH  =127
1208    002064  000127                  TCUCH:  .WORD   127             ;XMIT CHARACTER AT CURSOR.  W
1209    002066  000000                          .WORD   0
1210
1211    002070  047433                          .WORD   047433          ;ESCAPE O
1212                    000135          .TXRCK  =135
1213    002072  000135                  TXRCK:  .WORD   135             ;XMIT RECIEVER CHECKSUM ]
1214    002074  000000                          .WORD   0
1215
1216    002076  047433                          .WORD   047433          ;ESCAPE O
1217                    000136          .TXTCK  =136
1218    002100  000136                  TXTCK:  .WORD   136             ;XMIT TRANSMITTER CHECKSUM
1219    002102  000000                          .WORD   0
1220
1221    002104  147433                          .WORD   147433          ;ESCAPE O
1222                    000140          .RABT   =140
1223    002106  000140                  RABT:   .WORD   140             ;READ THE ABORT FLAG.  \
1224    002110  000000                          .WORD   0
1225
1226                                    ;;**********************************************************************
1227    002112  177777                          .WORD   -1              ;END OF TABLE TERMINATOR
1228                                    ;;**********************************************************************
1229
1230                                    ;;**********************************************************************
1231                                    ;PERIPHERAL COMMANDS
1232                                    ;;**********************************************************************
1233
1234                    000127          .EPNT   =127
1235    002114  000127                  EPNT:   .WORD   127             ;ENABLE PRINT MODE.  W
1236                    000130          .DPNT   =130
1237    002116  000130                  DPNT:   .WORD   130             ;DISABLE PRINT MODE  X
1238
1239                    000135          .CPYSC  =135            ;COPY SCREEN  ]
1240                    000136          .ENAC   =136            ;ENABLE AUTO COPY MODE  ESC ^
1241                    000137          .DISAC  =137            ;DISABLE AUTO COPY MODE  ESC -
1242                    000150          .PSCRN  =000150         ;PRINT THE SCREEN  H/SH
```

```
1243
1244
1245                                    ;;*****************************************************************
1246                                            ;ESCAPE CODE EQUIVALENCES AND IDENTIFIERS
1247                                    ;;*****************************************************************
1248
1249            000033                  .ESC    =033                    ;PRIMARY ESCAPE CODE.
1250            000120                  .P      =120
1251  002120    050033                  ESCP:   .WORD   050033          ;ESCAPE P
1252            000124                  .TSTER  =124
1253  002122    000124                  TSTER:  .WORD   124             ;TEST TERMINAL(ESC O T)
1254            002040                  ESCYI   =DCRAD                  ;ESCYI EQUALS DCRAD/DCRADI
1255            000057                  SLSH    =000057                 ;SLASH CODE FOR TERMINAL  IDENT ESC.
1256            000106                  CKGP    =106                    ;ENABLE REC.TO SUB 137 FROM ALL REC DATA
1257            000107                  NCKGP   =107                    ;ENABLE NORMAL RECEIVED DATA.
1258            000171                  CPABRT  =171                    ;COPIER ABORT
1259            000172                  PRABRT  =172                    ;PRINTER ABORT
1260            000170                  NABRT   =170                    ;NO ABORT  SX
1261  002124    000000                  IDENT:  .WORD   0               ;VT61 IDENT CODE
1262            002054                  ESCOI   =ESCO
1263            002120                  ESCPI   =ESCP
1264            002126                  ESCZI   =ESCZ
1265            055033                  .ESCZ   =055033
1266  002126    055033                  ESCZ:   .WORD   055033          ;OCTAL EQUIV. OF ESZ SEQUENCE
1267            000122                  .RESET  =122
1268  002130    000122                  RESET:  .WORD   122             ;VT61 INITIALIZE R
1269
1270  002132    000033                  ESCN:   .WORD   000033          ;ESCAPE N-FLAG
1271  002134    020041                  R01C00: .WORD   020041          ;ROW1,COL. 0
1272  002136    032041                  R01C20: .WORD   032041          ;ROW01,COLUMN 20
1273  002140    020066                  R22C00: .WORD   020066          ;ROW22,COL.00
1274  002142    020054                  R12C00: .WORD   020054          ;ROW 12,COLUMN 00
1275            020067                  .R23C00 =020067
1276  002144    020067                  R23C00: .WORD   020067          ;ROW23,COL.00
1277            025440                  .R00C11 =025440
1278  002146    025440                  R00C11: .WORD   025440          ;ROW,COL.11
1279            032040                  .R00C20 =032040
1280  002150    032040                  R00C20: .WORD   032040          ;ROW 0,COLUMN 20
1281  002152    024040                  R00C08: .WORD   024040          ;ROW 00,COLUMN 8
1282  002154    020040                  CUHME:  .WORD   020040          ;OCTAL EQUIV. OF CURSOR HOME.
1283  002156    067440                  R00C80: .WORD   067440          ;ROW 0, COLUMN 80.
1284  002160    067067                  R23C78: .WORD   067067          ;ROW 23,COL. 78.
1285            000040                  .R00    =40                     ;ROW 0
1286            000041                  .R01    =41                     ;ROW 1
1287            000054                  .R12    =54                     ;ROW 12
1288            000066                  .R22    =66                     ;ROW 22
1289            000067                  .R23    =67                     ;ROW 23
1290            000040                  .C00    =40                     ;COLUMN 0
1291            000043                  .C03    =43                     ;COL. 3
1292            000050                  .C08    =50                     ;COL. 8
1293            000053                  .C11    =53                     ;COL. 11
1294            000064                  .C20    =64                     ;COL. 20
1295            000065                  .C21    =65                     ;COL. 21
1296            000110                  .C40    =110                    ;COL. 40
1297            000157                  .C79    =157                    ;COL. 79
1298
```

```
                                        ;;*****************************************************************
                                        ;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
002162      000000                      CHRD:   .WORD   0               ;STORAGE FOR SINGLE CH. READ
002164      000000                      SVER1:  .WORD                   ;TEMP. STORAGE R1.
002166      000000                      SVER2:  .WORD                   ;TEMP. STORAGE R2.
002170      000000                      ZERO:   .WORD   0               ;MUST BE LEFT AS ZERO.
002172      003000                      TYP6:   .WORD   3000            ;TYPE 6 OCTAL CHAR-NO ZEROS
002174      000000                      TSTPTR: .WORD   0               ;TEST POINTER IN MANUAL SELECT MODE
002176      000000                      MODE:   .WORD   0               ;BYTE0=TESTING MODE,BYTE1=INTERFACE TYPE
002200      000000                      FTLCNT: .WORD   0               ;COUNT OF INCOMPLETE XMITS.
002202      000012                      ALWCNT: .WORD   10.             ;# OF ALLOWABLE INCOMPLETE XMITS.
002204      000001                      ONE:    .WORD   1
002206      000000                      TOADD:  .WORD
002210      000000                      BUBCT:  .WORD
002212      000000                      TPREG:  0
002214      000000                      PRESC:  .WORD                   ;PRIMARY ESC COMMAND
002216      000000                      ESSEQ:  .WORD                   ;SEQUENCE ASSEMBLY AREA
002220      000000                      DLAY:   .WORD
002222      000000                      ROSVE:  .WORD                   ;TEMP STORAGE FOR R0 ONLY.
002224      000000                      VSTAT:  .WORD   0
002226      000000                      BLKM:   .WORD   0               ;FLAG LOCATION FOR BLOCK MODE XMITS.
002230      000000                      TSTNM:  .WORD   0               ;DISPLAY STORAGE FOR TEST NUMBER.
002232      000000                      PTYPE:  .WORD   0               ;PROCESSOR TYPE INDICATOR               ;;++C
                                                                        ;IF 0 THEN 11/45-11/70
                                                                        ;IF -1 THEN 11/35,40
                                                                        ;IF 1 THEN 11/04-11/34
002234      000000                      DLYCNT: .WORD   0               ;USED IN WTBGND WAIT LOOP               ;;++C


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

002236  005037  002176                  AUTO:   CLR     MODE            ;ZERO THE MODE SWITCH
002242  000137  012012                          JMP     SETA            ;;DO VECTOR SETUP
002246  004037  012470                  AUTOA:  JSR     R0,TRPVEC       ;GO FIND GOOD DL11S
002252  004037  012606                          JSR     R0,CDEV         ;CHECK DL11S FOUND
002256  004037  013164                          JSR     R0,INITA        ;INSURE VT61S ON DL11
002262  000137  002520                          JMP     MODCK           ;VT61 PRESENT -BEGIN TESTING
002266  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.

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

```
1355
1356  002270  012737  000001  002176  MANS:   MOV     #1,MODE         ;SET MODE TO MANUAL SELECT.
1357  002276  000137  012012                  JMP     SETA            ;GO SET UP CONSTANTS
1358  002302  104401  023512          MANSA:  TYPE    ,DMANA
1359  002306  004037  012470                  JSR     R0,TRPVEC       ;FIND GOOD DL11'S
1360  002312  012703  001652                  MOV     #INTAB,R3
1361  002316  005002                 BLDADD: CLR     R2              /
1362
1363  002320  004037  020014          BLDADA: JSR     R0,GTNUM        ;GET A KEYBOARD INPUT
1364  002324  120127  000054                  CMPB    R1,#54          ;CHAR. = COMMA?
1365  002330  001004                          BNE     1$              ;NO
1366  002332  004037  012424                  JSR     R0,TMNAD        ;YES, VERIFY ENTERED ADDRESS,
1367  002336  010223                          MOV     R2,(R3)+        ; STORE THIS ADDRESS,
1368  002340  000766                          BR      BLDADD          ;AND LOOK FOR ANOTHER ADDRESS.
1369  002342  120137  001754          1$:     CMPB    R1,LNFED        ;CHAR. = LINE FEED?
1370  002346  001024                          BNE     3$              ;NO
1371  002350  005702                          TST     R2              ;ANY ENTRIES CREATED?
1372  002352  001413                          BEQ     2$              ;NO USE AUTO SELECTION OF UNITS
1373  002354  004037  012424                  JSR     R0,TMNAD        ;YES, VERIFY ENTERED ADDRESS,
1374  002360  010223                          MOV     R2,(R3)+        ;STORE LAST ADDRESS,
1375  002362  013723  002170                  MOV     ZERO,(R3)+      ;AND SET A TERMINATOR IN TABLE.
1376  002366  004037  012606                  JSR     R0,CDEV         ;CHECK DL11 ON VT 61 SELECTED
1377  002372  005737  001612                  TST     DLTBL           ;ANY DL11S GOOD?
1378  002376  001741                          BEQ     MANSA           ;NO-BACK TO SQUARE ONE
1379  002400  000412                          BR      BLDTST          ;YES- GO GET TESTS
1380  002402  004037  012606          2$:     JSR     R0,CDEV         ;CHECK DL11'S
1381  002406  004037  013164                  JSR     R0,INITA        ;VERIFY DL11 HAVE VT61 ATTACHED
1382  002412  000137  002426                  JMP     BLDTST          ;BEGIN TEST SELECTION
1383  002416  000731                          BR      MANSA           ;NO UNIT FOUND-LOOP
1384  002420  004037  017750          3$:     JSR     R0,OCTBIN       ;KEEP BUILDING ADDRESS
1385  002424  000735                          BR      BLDADA
1386
1387  002426  104401  023612          BLDTST: TYPE    ,DMANB          ;TYPE 2ND PART OF MANUAL MESSAGE
1388  002432  012703  001652                  MOV     #INTAB,R3       ;USE INTAB AS TEST # STORAGE.
1389  002436  005004                          CLR     R4              ;CLEAR TEST COUNTER
1390  002440  005002                  11$:    CLR     R2              ;CLEAR ASSEMBL WORD
1391  002442  004037  020014          10$:    JSR     R0,GTNUM        ;GET A NUMERIC CHAR.
1392  002446  120127  000054                  CMPB    R1,#54          ;CHAR.=COMMA?
1393  002452  001006                          BNE     1$              ;NO
1394  002454  110223                          MOVB    R2,(R3)+        ;YES STORE A TEST #
1395  002456  005204                          INC     R4              ;AND INCREMENT TEST COUNT.
1396  002460  020437  000040                  CMP     R4,32.          ;COUNT =32?
1397  002464  001415                          BEQ     MODCK           ;YES ACCEPT NO MORE ENTRIES.
1398  002466  000764                          BR      11$             ;NO KEEP LOOKING
1399  002470  120137  001754          1$:     CMPB    R1,LNFED        ;CHAR. = LINE FEED?
1400  002474  001006                          BNE     2$              ;NO
1401  002476  110223                          MOVB    R2,(R3)+        ;LOAD THE LAST TEST
1402  002500  105013                          CLRB    (R3)            ;AND INSERT TEST TABLE TERMINATOR
1403  002502  112737  000001  002176          MOVB    #1,MODE         ;SET MODE SWITCH TO MANUAL
1404  002510  000403                          BR      MODCK           ;AND BEGIN TESTING.
1405
1406  002512  004037  017750          2$:     JSR     R0,OCTBIN       ;CONVERT CHAR.
1407  002516  000751                          BR      10$
1408
1409                                  ;;*****************************************************************
1410                                          ;THIS ROUTINE LOOKS FOR THE OPERATIONAL MODE REQUESTED AND
```

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1411                                    ;SELECTS THE NEXT UNIT TO BE TESTED.
1412
1413                                    ;MODE 0 = ACCEPTANCE TYPE TEST
1414                                    ;MODE 1 = OPERATOR SELECTION OF UNITS AND SEQUENCE OF TESTS.
1415                                ;;**********************************************************************
1416
1417  002520  012737  001612  001714  MODCK:  MOV     #DLTBL,DLTPT    ;INITIAL SETUP OF ADDRESS
1418  002526  012737  001552  001712           MOV     #VVECT,VECPT    ;AND VECTOR POINTERS.
1419  002534  012701  001732          MODCA:  MOV     #VRCSR,R1       ;LOAD ADDRESS DESTINATION
1420  002540  013702  001714                  MOV     DLTPT,R2        ;LOAD CURRENT ADDRESS POINTER
1421  002544  017703  177142                  MOV     @VECPT,R3       ;LOAD CURRENT VECTOR POINTER
1422  002550  005712                          TST     (R2)            ;ALL UNITS CHECKED?
1423  002552  001013                          BNE     1$              ;NO - CONTINUE
1424  002554  005737  002176                  TST     MODE            ;CHECK MODE
1425  002560  001002                          BNE     10$
1426  002562  000137  002246                  JMP     AUTOA           ;GO RESTART AUTO MODE
1427  002566  105777  177402          10$:    TSTB    @TSTPTR         ;MANUAL LOOP REQUESTED?
1428  002572  100001                          BPL     2$              ;NO
1429  002574  000751                          BR      MODCK           ;YES-RESTART COMPLETE TEST.
1430  002576  000137  002302          2$:     JMP     MANSA           ;GO RESTART MANUAL MODE
1431  002602  004037  013404          1$:     JSR     R0,LDADD        ;NO-LOAD NEXT ADDRESSES
1432  002606  010337  001742                  MOV     R3,VECT         ;STORE VECT. OF UNIT UNDER TEST
1433  002612  012723  014312                  MOV     #INTRC,(R3)+    ;YES - NOW SET UP RECEIVE VECTOR
1434  002616  012723  000340                  MOV     #340,(R3)+      ;AND SET RECEIVER PSW TO 7
1435  002622  012723  015234                  MOV     #INTXM,(R3)+    ;SET UP TRANSMIT VECTOR
1436  002626  012723  000340                  MOV     #340,(R3)+      ;AND SET PSW TO 7.
1437  002632  005046                          CLR     -(SP)           ;CLEAR THE PSW,LSI11 STYLE.
1438  002634  012746  002642                  MOV     #100$,-(SP)
1439  002640  000002                          RTI
1440  002642  010237  001714          100$:   MOV     R2,DLTPT        ;SAVE ADDRESS POINTER.
1441  002646  012737  031101  015176          MOV     #RCRLB+477,REBUF        ;SET UP END OF BUFFER
1442  002654  012737  031601  015504          MOV     #TCRLB+477,TEBUF
1443  002662  012737  030402  015174          MOV     #RCRLB,RBBUF    ;INITIIALIZE REC.BUFFER.
1444  002670  012737  031102  015502          MOV     #TCRLB,TBBUF    ;INITIALIZE TRANSMIT BUFFER.
1445  002676  004037  016520                  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
1446  002702  005037  002226                  CLR     BLKM            ;CLEAR BLOCK MODE FLAG.
1447  002706  005037  021074                  CLR     XMZER           ;CLEAR ZERO TRANSMIT FLAG
1448  002712  005037  002224                  CLR     VSTAT           ;CLEAR ALL INTERRUPT FLAGS
1449  002716  004037  015674                  JSR     R0,ZFLAG        ;ISSUE ESC Z TO VT61
1450  002722  012637  002124                  MOV     (SP)+,IDENT     ;;POP STACK INTO IDENT
1451  002726  100002                          BPL     11$             ;IF IDENT IS -1,CLEAR IT.
1452  002730  005037  002124                  CLR     IDENT
1453  002734                          11$:
1454  002734  012637  002162                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
1455  002740  001375                          BNE     11$
1456  002742  104401  001171                  TYPE    ,$CRLF
1457  002746  104401  025314                  TYPE    ,DVUNIT         ;ISSUE UNIT UNDER TEST MESSAGE
1458  002752  013746  001732                  MOV     VRCSR,-(SP)     ;;SAVE VRCSR FOR TYPEOUT
1459                                                                  ;;TYPE THE ADDRESS
1460  002756  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
1461  002760     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
1462  002761     001                          .BYTE   1               ;;TYPE LEADING ZEROS
1463  002762  017746  176724                  MOV     @VECPT,-(SP)    ;;SAVE @VECPT FOR TYPEOUT
1464                                                                  ;;TYPE THE VECTOR
1465  002766  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
1466  002770     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
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1467  002771     000                          .BYTE   0                ;;SUPPRESS LEADING ZEROS
1468  002772  013746  002124                  MOV     IDENT,-(SP)      ;;SAVE IDENT FOR TYPEOUT
1469                                                                    ;;TYPE THE IDENT
1470  002776  104403                          TYPOS                    ;;GO TYPE--OCTAL ASCII
1471  003000     006                          .BYTE   6                ;;TYPE 6 DIGITS
1472  003001     000                          .BYTE   0                ;;SUPPRESS LEADING ZEROS
1473  003002  104401  001171                  TYPE    ,$CRLF           ;CARRIAGE RETURN AND LINE FEED
1474  003006  032737  000001  002124          BIT     #BIT00,IDENT     ;UNIT HAVE A COPIER?
1475  003014  001402                          BEQ     20$              ;NO
1476  003016  104401  025433                  TYPE    ,DCOPYR          ;YES-ISSUE COPIER MESSAGE
1477  003022  032737  000002  002124  20$:    BIT     #BIT01,IDENT     ;UNIT HAVE A PRINTER?
1478  003030  001402                          BEQ     21$              ;NO
1479  003032  104401  025405                  TYPE    ,DPRTR           ;YES-ISSUE PRINTER MESSAGE.
1480  003036  062737  000002  001712  21$:    ADD     #2,VECPT         ;LEAVE WITH VECPOINT AT NEXT VECTOR.
1481  003044  005037  002200                  CLR     FTLCNT           ;CLEAR COUNT OF FATAL XMITS.
1482  003050  012737  031604  031602          MOV     #ABBUF,ABUFP     ;RESET THE REC. DATA POINTER
1483  003056  052777  000100  176646          BIS     #RDENA,@VRCSR    ;SET THE REC. INT. ENABLE  FOR TESTS
1484  003064  105737  002176                  TSTB    MODE             ;CHECK TESTING MODE
1485  003070  001403                          BEQ     ASTRT            ;AUTO MODE
1486  003072  012737  001652  002174          MOV     #INTAB,TSTPTR    ;LOAD THE INITIAL TEST NUMBER
1487
1488                                  ;;*****************************************************************
1489                                  ;;*****************************************************************
1490                                          ;THIS TEST ISSUES ALL ESCAPE SEQUENCES AND
1491                                          ;INSURES THE VT61 HAS NOT FAILED DURING AN
1492                                          ;ESC SEQUENCE BY ISSUING A ESC Z TO FORCE A
1493                                          ;VT61 RESPONSE.  THE PURPOSE OF THE TEST IS TO ATTEMPT TO
1494                                          ;INSURE THAT SUBSEQUENT TESTS WILL NOT RESULT IN
1495                                          ;A "HUNG" UNIT.  DATA IS NOT EVALUATED.
1496                                  ;;*****************************************************************
1497
1498  003100                          ASTRT:
1499                                  ;;*****************************************************************
1500  003100  000004                  TST1:   SCOPE
1501  003102  012737  000001  001160          MOV     #1,$TIMES        ;;DO 1 ITERATION
1502  003110  012737  003116  001106          MOV     #ESTST,$LPADR    ;;SET SCOPE LOOP ADDRESS
1503
1504  003116  012701  001750          ESTST:  MOV     #BEL,R1          ;POINT TO FIRST COMMAND
1505  003122  042777  000100  176602          BIC     #RDENA,@VRCSR    ;CLEAR REC. INT. ENABLE
1506  003130  113737  001102  002230          MOVB    $TSTNM,TSTNM     ;LOAD THE TEST NUMBER.
1507  003136  005037  002214                  CLR     PRESC
1508  003142  005004                          CLR     R4
1509  003144                          ZERST:
1510  003144  013746  002170                  MOV     ZERO,-(SP)       ;;PUSH ZERO ON STACK
1511  003150  012702  002214                  MOV     #PRESC,R2        ;SET UP SEQNENCE ADDRESS
1512  003154  012103                  GCMD:   MOV     (R1)+,R3         ;LOAD THE COMMAND
1513  003156  001405                          BEQ     1$               ;IF CHAR. ZERO,MUST BE XMIT TERMINATOR
1514  003160  100535                          BMI     ESTEX            ;TABLE EXPENDED - EXIT TEST.
1515  003162  120327  000004                  CMPB    R3,#4            ;IS COMMAND ACTUALLY A DELIMITER?
1516  003166  103442                          BLO     DELIM            ;YES, GO UPDATE FUNCTIONS
1517  003170  001471                          BEQ     SPTN             ;NO, ITS A "10" - SPECIAL CASE.
1518  003172  005704                  1$:     TST     R4               ;SEE IF FLAG INDICATING SEQ.
1519  003174  100472                          BMI     SEQ4             ;4 IS SET. - YES EXIT
1520  003176  010337  002216          2$:     MOV     R3,ESSEQ         ;PUSH THE SEQUENCE TO BE TESTED
1521  003202                          INXMT:
1522  003202  013746  002216                  MOV     ESSEQ,-(SP)      ;;PUSH ESSEQ ON STACK
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1523  003206  005704                          TST     R4              ;DOES THIS SEQUENCE REQUIRE
1524  003210  001402                          BEQ     3$              ;ADDITIONAL ESC?
1525  003212  013746  002214                  MOV     PRESC,-(SP)     ;;PUSH PRESC ON STACK
1526
1527  003216  004037  013666          3$:     JSR     R0,TESC         ;GO TRANSMIT THIS SEQUENCE.
1528
1529  003222  005704                  4$:     TST     R4              ;IN I/O SEQUENCES?
1530  003224  100007                          BPL     40$             ;NO
1531  003226  012737  000054  017502          MOV     #44.,DCOUNT     ;YES,SET UP TO DELAY 1+ SEC.
1532  003234  004037  017440                  JSR     R0,DELAY
1533  003240  005777  176470                  TST     @VRBUF          ;CLEAR ANY RECEIVE FLAGS
1534
1535  003244  004037  015674          40$:    JSR     R0,ZFLAG        ;ISSUE ESC Z SEQUENCE-GET IDENT
1536  003250                          5$:
1537  003250  012637  002162                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
1538  003254  123737  002162  002124          CMPB    CHRD,IDENT      ;HAVE WE POPPED THE IDENT?
1539  003262  001045                          BNE     T1ERR           ;NO-ERROR CONDITION
1540  003264                          POPIT:
1541  003264  012637  002162                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
1542  003270  001375                          BNE     .-4
1543  003272  000724                          BR      ZERST           ;GET NEXT COMMAND
1544
1545  003274  120327  000001          DELIM:  CMPB    R3,#1
1546  003300  001407                          BEQ     1$              ;FIRST DELIMITER - SET ESCN
1547
1548  003302  120327  000002                  CMPB    R3,#BIT01       ;SECOND DELIMITER - SET ESCO
1549  003306  001412                          BEQ     2$
1550
1551  003310  120327  000003                  CMPB    R3,#3           ;THIRD DELIMITER - SET ESCP
1552  003314  001413                          BEQ     3$
1553  003316  000716                          BR      GCMD            ;INVALID CHARACTER - GET ANOTHER
1554
1555  003320  012704  000001          1$:     MOV     #1,R4           ;SET FIRST DELIMITER FLAG.
1556  003324  013737  002132  002214          MOV     ESCN,PRESC      ;INSERT ESCN.
1557  003332  000710                          BR      GCMD
1558
1559  003334  013737  002054  002214  2$:     MOV     ESCO,@#PRESC    ;INSERT ESCO
1560  003342  000704                          BR      GCMD
1561
1562  003344  013737  002120  002214  3$:     MOV     ESCP,@#PRESC    ;INSERT ESCP
1563  003352  000700                          BR      GCMD
1564
1565  003354  012704  177777          SPTN:   MOV     #-1,R4          ;SET FLAG INDICATING I/O
1566  003360  000675                          BR      GCMD            ;SEQUENCES.
1567
1568  003362  005703                  SEQ4:   TST     R3              ;CHECK IF COMMAND = 0
1569  003364  001706                          BEQ     INXMT           ;YES, COMPLETE SEQUENCE ASSEMBLED
1570  003366  110322                          MOVB    R3,(R2)+        ;NO - KEEP ASSEMBLING
1571  003370  000303                          SWAB    R3              ;POSITION HIGH  ORDER BIT
1572  003372  110322                          MOVB    R3,(R2)+        ;AND ASSEMBLE IT
1573  003374  000667                          BR      GCMD            ;GET ANOTHER BYTE
1574
1575  003376  004037  016076          T1ERR:  JSR     R0,CLREG
1576  003402  013737  002214  001124          MOV     PRESC,$GDDAT    ;AND INSERT IN ERROR
1577  003410  000337  001124                  SWAB    $GDDAT          ;REASSEMBLE FAILING SEQUENCES
1578  003414  013737  002216  001126          MOV     ESSEQ,$BDDAT
```

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1579  003422  105737  002217                    TSTB    ESSEQ+1         ;IF UPPER BYTE IS CLEAR DO NOT SWAP
1580  003426  001402                            BEQ     1$
1581  003430  000337  001126                    SWAB    $BDDAT          ;MESSAGE 1
1582  003434  104001                    1$:     ERROR   1               ;ISSUE ERROR MESSAGE
1583  003436  005237  002200                    INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
1584  003442  023737  002200  002202            CMP     FTLCNT,ALWCNT   ;FATAL XMITS EXCEEDED ALLOWED?
1585  003450  103003                            BHIS    FTEX1           ;YES-EXIT.
1586  003452  000704                            BR      POPIT           ;CLEAR THE STACK AND TRY ANOTHER COMMAND
1587  003454                            ESTEX:
1588  003454  012637  002162                    MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
1589  003460  052777  000100  176244    FTEX1:  BIS     #RDENA,@VRCSR   ;SET THE REC. INT. ENABLE FOR TESTS
1590
1591                                    ;;**************************************************************************
1592                                            ;ROUTINE TO INSURE ENTERING MAINTENANCE MODE CAUSES SOM AND
1593                                            ;EOM TO BE APPENDED TO ALL TRANSMITS FROM VT61 UNDER TEST.
1594                                            ;MAINTENANCE MODE IS ENTERED , THEN AN ESCAPE Z SEQUNECE
1595                                            ;IS ISSUED TO THE UNIT AND THE RESULTING TRANSMISSION IS
1596                                            ;CHECKED OF SOM/EOM.
1597                                    ;;**************************************************************************
1598
1599                                    ;;**************************************************************************
1600  003466  000004                    TST2:   SCOPE
1601  003470  012737  000005  001160            MOV     #5,$TIMES       ;;DO 5 ITERATIONS
1602  003476  012737  003504  001106            MOV     #CKMNT,$LPADR   ;;SET SCOPE LOOP ADDRESS
1603
1604  003504  004037  015512            CKMNT:  JSR     R0,RESETV       ;RESET THE UNIT AND SETMAINT. MODE.
1605  003510  112777  000002  011770            MOVB    #SOM,@TBUFP     ;ISSUE START OF MESSAGE.
1606  003516  004037  016374                    JSR     R0,XMIT1
1607  003522  113777  002126  011756            MOVB    ESCZ,@TBUFP
1608  003530  004037  016374                    JSR     R0,XMIT1        ;SEND AN IDENT REQUEST.
1609  003534  113777  002127  011744            MOVB    ESCZ+1,@TBUFP
1610  003542  004037  016374                    JSR     R0,XMIT1
1611  003546  112777  000004  011732            MOVB    #EOM,@TBUFP     ;ISSUE END OF MESSAGE.
1612  003554  004037  016374                    JSR     R0,XMIT1
1613  003560  005037  002220                    CLR     DLAY            ;SET UP SOM DELAY OF 100M.S.
1614  003564  032737  040000  002224    1$:     BIT     #RSOM,VSTAT     ;RECEIVED THE START OF MESSAGE?
1615  003572  001003                            BNE     CKEOM           ;YES-GO LOOK FOR EOM.
1616  003574  005337  002220                    DEC     DLAY            ;NO-RUN TIMEOUT DELAY
1617  003600  001371                            BNE     1$              ;AND KEEP LOOKING.
1618
1619  003602  012701  000062            CKEOM:  MOV     #50.,R1         ;SET MAX DELAY FOR 500 M.S.
1620  003606  032737  020000  002224    1$:     BIT     #REOM,VSTAT     ;REECIVED END OF MESSAGE?
1621  003614  001007                            BNE     10$             ;YES-CHECK FOR BOTH RECEIVED.
1622  003616  012737  000001  017502            MOV     #1,DCOUNT       ;DELAY FOR 10 M..S.
1623  003624  004037  017440                    JSR     R0,DELAY
1624  003630  005301                            DEC     R1              ;AND KEEP LOOKING.
1625  003632  001365                            BNE     1$
1626  003634  032737  040000  002224    10$:    BIT     #RSOM,VSTAT     ;RECEIVED SOM?
1627  003642  001404                            BEQ     2$              ;NO ISSUE ERROR
1628  003644  032737  020000  002224            BIT     #REOM,VSTAT     ;RECEIVED EOM?
1629  003652  001007                            BNE     EXMNT           ;YES, NO ERRORS-EXIT.
1630  003654  012737  006001  001124    2$:     MOV     #6001,$GDDAT    ;LOAD ERROR WITH EXPECTED
1631  003662  013737  002224  001126            MOV     VSTAT,$BDDAT    ;AND ACTUAL STATUS.
1632  003670  104022                            ERROR   22
1633
1634  003672  000240                    EXMNT:  NOP
```

```
                                        ;;*****************************************************************
                                        ;THIS TEST INSURES THAT THE CURSOR WILL RESPOND
                                        ;TO DIRECT CUSROR ADDRESSING. THE UNIT IS RESET AND THE CURSOR
                                        ;POSITION IS VERIFIED TO BE HOME . THE CURSOR IS THEN MOVED
                                        ;TO POSITION ROW 23 COLUMN 80 AND THE POSITION IS AGAIN
                                        ;VERIFIED. ERRORS ARE REPORTED IF THE POSITIONS ARE INCORRECT.

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


                                        ;;*****************************************************************
003674  000004                  TST3:   SCOPE
003676  012737  000005  001160          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
003704  012737  003712  001106          MOV     #CURS1,$LPADR   ;;SET SCOPE LOOP ADDRESS

003712  013701  015502          CURS1:  MOV     TBBUF,R1        ;USE R1 AS XMIT BUFFER POINTER.
003716  004037  015512                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
003722  013721  002054                  MOV     ESCOI,(R1)+     ;CLFT. RESET, READ CURSOR
003726  113721  002050                  MOVB    RDCUR,(R1)+     ;POSITION, CURSOR LEFT.
003732  012737  000003  015510          MOV     #3,XMCNT        ;XMIT 3 BYTES

003740  004037  016120                  JSR     R0,XMREC        ;XMIT AND RECEIVE.
003744  000402                          BR      10$             ;NORMAL EXIT.
003746  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
003750  000446                          BR      2$              ;EXIT TEST.
003752  013701  030402          10$:    MOV     RCRLB,R1        ;GET THE CURRENT CURSOR POSITION.
003756  020137  002154                  CMP     R1,CUHME        ;CURSOR REALLY HOME?
003762  001405                          BEQ     1$              ;YES EXIT
003764  104012                          ERROR   12              ;VT61 FAILURE MESSAGE
003766  013746  002154                  MOV     CUHME,-(SP)     ;;PUSH CUHME ON STACK
003772  004037  016600                  JSR     R0,CURER        ;GO LOAD AND ISSUE CURSOR ERROR

003776  013701  015502          1$:     MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
004002  013721  002040                  MOV     DCRAD,(R1)+
004006  013721  002042                  MOV     R23C79,(R1)+    ;CURSOR TO ROW 23,COL.79
004012  013721  002054                  MOV     ESCOI,(R1)+     ;READ CURSOR POSITION
004016  013721  002050                  MOV     RDCUR,(R1)+     ;IT AND CURSOR RIGHT
004022  012737  000007  015510          MOV     #7,XMCNT        ;XMIT 7 BYTES.
004030  004037  016120                  JSR     R0,XMREC        ;XMIT AND RECEIVE
004034  000402                          BR      20$             ;NORMAL EXIT.
004036  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
004040  000412                          BR      2$              ;EXIT TEST.
004042  012701  030402          20$:    MOV     #RCRLB,R1

004046  023711  002042                  CMP     R23C79,(R1)     ;CHECK CURSOR POSITION TO LOWER RT.
004052  001405                          BEQ     2$              ;OK, EXIT
004054  104012                          ERROR   12              ;VT61 FAILURE MESSAGE
004056  013746  002042                  MOV     R23C79,-(SP)    ;;PUSH R23C79 ON STACK
004062  004037  016600                  JSR     R0,CURER        ;LOAD AND ISSUE CURSOR ERROR .
004066  000240                  2$:     NOP
                                        ;;*****************************************************************
                                        ;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.
                                        ;;*****************************************************************
```

```
1691                                    ;;*****************************************************************
1692  004070  000004                    TST4:   SCOPE
1693  004072  012737  000005  001160            MOV     #5,$TIMES       ;;DO 5 ITERATIONS
1694  004100  012737  004106  001106            MOV     #CKLIN,$LPADR   ;;SET SCOPE LOOP ADDRESS
1695
1696  004106  004037  015512            CKLIN:  JSR     R0,RESETV       ;RESET THE UNIT-SET MAINT AND LINEAR MODES
1697  004112  013701  015502                    MOV     TBBUF,R1
1698  004116  012703  000120                    MOV     #80.,R3
1699  004122  004037  017504                    JSR     R0,BLDINC       ;LOAD XMIT BUFFER WITH 80 CHAR AND
1700  004126  013721  002046                    MOV     RCUR,(R1)+
1701  004132  013721  002050                    MOV     RDCUR,(R1)+     ;READ CURSOR POSINION.
1702  004136  012737  000123  015510            MOV     #83.,XMCNT
1703  004144  004037  016120                    JSR     R0,XMREC        ;XMIT THE BUFFER.
1704  004150  000402                            BR      1$
1705  004152  104011                            ERROR   11              ;LAST XMIT CAUSED UNIT TO HANG.
1706  004154  000421                            BR      LINXT           ;EXIT TEST
1707  004156  023777  002134  011010  1$:       CMP     R01C00,@RBBUF   ;CURSOR  AT ROW1,COL. 0?
1708  004164  001415                            BEQ     LINXT           ;YES-EXIT
1709  004166  013737  002054  001124            MOV     ESC0,$GDDAT
1710  004174  000337  001124                    SWAB    $GDDAT
1711  004200  013737  002010  001126            MOV     DRECT,$BDDAT    ;ISSUE ESC SEQUENCE AND CURSOR
1712  004206  104001                            ERROR   1
1713  004210  013746  002134                    MOV     R01C00,-(SP)    ;;PUSH R01C00 ON STACK
1714  004214  004037  016600                    JSR     R0,CURER
1715  004220  000240                    LINXT:  NOP
1716
1717
1718                                    ;;*****************************************************************
1719                                            ;TEST TO INSURE OPERATION OF XON/XOFF COMMANDS
1720                                            ;FROM VT61. XOFF IS FORCED BY TRANSMITTING LINE 23 WHILE SIMUL-
1721                                            ;TANEOUSLY FILLING THE SILO WITH DATA. AFTER SENSING
1722                                            ;THE XOFF, THE TEST WAITS FOR THE TRANSMIT TO FINISH AND
1723                                            ;INSURES XON OCCURS BEFORE THE MAX. TRANSFER TIME HAS ELAPSED.
1724                                            ;(30 SECONDS)
1725                                    ;;*****************************************************************
1726
1727                                    ;;*****************************************************************
1728  004222  000004                    TST5:   SCOPE
1729  004224  012737  000010  001160            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1730  004232  012737  004240  001106            MOV     #BASC3,$LPADR   ;;SET SCOPE LOOP ADDRESS
1731  004240  013701  015502            BASC3:  MOV     TBBUF,R1        ;R1 = 1ST XMIT BUFFER ADDRESS.
1732  004244  012737  001001  002226            MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
1733  004252  005037  002224                    CLR     VSTAT
1734  004256  004037  015512                    JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
1735  004262  013721  002040                    MOV     DCRAD,(R1)+
1736  004266  013721  002144                    MOV     R23C00,(R1)+    ;CURSOR TO ROW 23, COL.0
1737  004272  013721  002054                    MOV     ESC0,(R1)+
1738  004276  013721  002056                    MOV     XMTAL,(R1)+     ;TRANSMIT THE LINE.
1739  004302  012703  000050                    MOV     #40.,R3
1740  004306  004037  017504                    JSR     R0,BLDINC       ;40 CHAR. OF INCREMENTING CHAR.
1741  004312  012737  000057  015510            MOV     #47.,XMCNT      ;SET UP TO XMIT 47 BYTES
1742  004320  052777  000100  175410            BIS     #TENA,@VXCSR    ;TRANSMIT ENABLES
1743  004326  012703  000050                    MOV     #40.,R3         ,MAXIMUM DELAY EQUAL 800 M.S. OR MORE DEPENDING ON PROCE
1744  004332  012737  000001  017502  2$:       MOV     #1,DCOUNT
1745  004340  004037  017440                    JSR     R0,DELAY        ;DELAY FOR 10 MS DEPENDING ON PROCESSOR SPEED.
1746  004344  032737  100000  002224            BIT     #RXOFF,VSTAT    ;CHECK FOR XOFF
```

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1747  004352  001007                        BNE     3$              ;FOUND IT EXIT THIS SECTION.
1748  004354  005303                        DEC     R3              ;DELAYED 800 M.S.?
1749  004356  001365                        BNE     2$              ;NO-KEEP LOOKING FOR XOFF.
1750  004360  104012                        ERROR   12              ;GENERAL VT61 FAILURE MESSAGE
1751  004362  012746  100000                MOV     #100000,-(SP)   ;;PUSH #100000 ON STACK
1752  004366  004037  015734                JSR     R0,CKSFT        ;GO REPORT ERROR
1753  004372                          3$:
1754  004372  012746  000001                MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
1755  004376  005737  002232                TST     PTYPE           ;PROCESSOR TYPE                 ;;++C
1756  004402  001407                        BEQ     8$              ;BR IF 11/45-70.                ;;++C
1757  004404  100403                        BMI     7$              ;BR IF 11/35,40.                ;;++C
1758  004406  012746  000031                MOV     #25.,-(SP)      ;;PUSH #25. ON STACK
1759  004412  000405                        BR      10$                                             ;;++C
1760  004414                          7$:
1761  004414  012746  000062                MOV     #50.,-(SP)      ;;PUSH #50. ON STACK
1762  004420  000402                        BR      10$                                             ;;++C
1763  004422                          8$:
1764  004422  012746  000144                MOV     #100.,-(SP)     ;;PUSH #100. ON STACK
1765  004426  004037  021076          10$:  JSR     R0,WTBGND       ;WAIT XMDNE                     ;;++C
1766  004432  000411                        BR      EXIT3           ;TIMEOUT-EXIT TEST.
1767  004434  127727  025142  000021        CMPB    @ABUFP,#XON     ;RECEIVED A XON?
1768  004442  001405                        BEQ     EXIT3           ;YES-NO ERROR-EXIT
1769
1770  004444  104012                        ERROR   12              ;GENERAL VT61 FAILURE MESSAGE
1771  004446  012746  000001                MOV     #000001,-(SP)   ;;PUSH #000001 ON STACK
1772  004452  004037  015734                JSR     R0,CKSFT
1773  004456  004037  016520          EXIT3:JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
1774
1775                                  ;;**********************************************************************
1776                                  ;ROUTINE TO VERIFY OPERATION OF XOFF AND XON TO THE VT61.
1777                                  ;A FULL SCREEN TRANSMIT IS INITIATED AND A SERIES OF XOFF AND
1778                                  ;XON ARE ISSUED TO THE TERMINAL SEQUENTIALLY.
1779                                  ;ERRORS ARE REPORTED IF XOFF DOES NOT STOP,OR XON RESTART
1780                                  ;THE TRANSMISSION. TEST IS ENDED WHEN EOM IS SENSED.
1781                                  ;;**********************************************************************
1782
1783                                  ;;**********************************************************************
1784  004462  000004                  TST6:   SCOPE
1785  004464  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
1786  004472  012737  004500  001106          MOV     #ONOF61,$LPADR  ;;SET SCOPE LOOP ADDRESS
1787
1788  004500  004037  015512          ONOF61: JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
1789  004504  042737  077577  002224          BIC     #77577,VSTAT    ;CLEAR THE FLAGS
1790  004512  013746  002170                  MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
1791  004516  013746  002056                  MOV     XMTAL,-(SP)     ;;PUSH XMTAL ON STACK
1792  004522  013746  002054                  MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
1793  004526  004037  013666                  JSR     R0,TESC
1794  004532  012737  000010  017502  ONOFLP: MOV     #10,DCOUNT      ;ALLOW 100 M.S. FOR OPERATION
1795  004540  004037  017440                  JSR     R0,DELAY        ;TO BEGIN.
1796  004544  112777  000023  010734          MOVB    #XOFF,@TBUFP
1797  004552  004037  016374                  JSR     R0,XMIT1        ;SEND A XOFF TO VT61.
1798  004556  012704  000036                  MOV     #30.,R4
1799  004562  013705  031602          OFFLP:  MOV     ABUFP,R5        ;ALLOW 300M.S. FOR XMIT TO CEASE
1800  004566  012737  000001  017502          MOV     #1,DCOUNT
1801  004574  004037  017440                  JSR     R0,DELAY
1802  004600  023705  031602                  CMP     ABUFP,R5
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1803   004604  001406                          BEQ     ONOFA           ;XMIT STOPPED-GO RESTART IT.
1804   004606  005304                          DEC     R4
1805   004610  001364                          BNE     OFFLP           ;COUNTER NO EQUAL 300 MS-LOOP
1806   004612  013737  002224  001120          MOV     VSTAT,$GDADR    ;UNIT DID NOT RESPOND TO XOFF
1807   004620  104015                          ERROR   15              ;ISSUE ERROR
1808
1809   004622  112777  000021  010656  ONOFA:  MOVB    #XON,@TBUFP
1810   004630  004037  016374                  JSR     R0,XMIT1        ;SEND A XON TO THE VT61.
1811   004634  012704  000036                  MOV     #30.,R4         ;SET UP FOR 300MS DELAY.
1812   004640  032737  020000  002224  ONLP:   BIT     #REOM,VSTAT     ;EOM RECEIVED?
1813   004646  001020                          BNE     ONOFXT          ;YES-EXIT
1814   004650  013705  031602                  MOV     ABUFP,R5
1815   004654  012737  000001  017502          MOV     #1,DCOUNT
1816   004662  004037  017440                  JSR     R0,DELAY        ;ALLOW 300 MS FOR XMIT TO RESTART
1817   004666  023705  031602                  CMP     ABUFP,R5
1818   004672  001317                          BNE     ONOFLP          ;IT RESTARTED-GO STOP IT.
1819   004674  005304                          DEC     R4
1820   004676  001360                          BNE     ONLP            ;NOT YET 300 MS LOOP.
1821   004700  013737  002224  001120          MOV     VSTAT,$GDADR    ;XMIT DIT NOT RESTART-ISSUE
1822   004706  104016                          ERROR   16              ;ERROR AND EXIT
1823   004710  000240                  ONOFXT: NOP
1824
1825                                  ;;**********************************************************************
1826                                          ;ROUTINE TO TEST VT61 RAM AND THE COMMUNICATION PATHS.
1827                                          ;THIS ROUTINE ISSUES A SERIES OF PATTERNS(77/100,100/77,
1828                                          ;52/125,INCREMENTING,AND REV. VIDEO INCREMENTING) TO THE VT61.
1829                                          ;THE SCREEN IS THEN TRANSMITTED TO THE HOST AND AFTER EACH
1830                                          ;ITERATION RECEIVED DATA IS CHECKED AND ALL ERRORS(INCLUDING
1831                                          ;TRANSMISSION) ARE REPORTED.
1832                                          ;MITTED TO THE HOST COMPUTER AND THE RESULTS ARE CHECKED AND
1833                                          ;ALL ERRORS(INCLUDING TRANSMISSION) REPORTED.
1834                                  ;;**********************************************************************
1835
1836                                  ;;**********************************************************************
1837   004712  000004                  TST7:   SCOPE
1838   004714  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
1839   004722  012737  004730  001106          MOV     #MEM1,$LPADR    ;;SET SCOPE LOOP ADDRESS
1840
1841   004730  004037  015512          MEM1:   JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
1842   004734  005005                          CLR     R5              ;CLEAR PATTERN OFFSET.
1843   004736  016504  005444          MEMA:   MOV     MPATT(R5),R4    ;LOAD PATTERN TO BE TRANSMMITTED
1844   004742  004037  016520                  JSR     R0,RESPTR       ;RESET POINTERS
1845   004746  042737  077577  002224          BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
1846   004754  012702  003600                  MOV     #TOTCH,R2       ;LOAD A COUNT OF SCREEN
1847   004760  112777  000002  010520          MOVB    #SOM,@TBUFP     ;ISSUE START OF MESSAGE.
1848   004766  004037  016374                  JSR     R0,XMIT1
1849   004772  005302                  MEMB:   DEC     R2              ;DECREMENT XMIT COUNT
1850   004774  001414                          BEQ     10$             ;COUNT = ZERO?
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1851
1852  004776  004037  005412          12$:    JSR     R0,PATGN        ;NO-GENERATE NEXT BYTE TO XMIT.
1853  005002  110477  010500                  MOVB    R4,@TBUFP       ;LOAD THE CHARACTER.
1854  005006  004037  016374                  JSR     R0,XMIT1        ;NO-XMIT ANOTHER BYTE.
1855  005012  023737  002200  002202          CMP     FTLCNT,ALWCNT   ;EXCEEDED FATAL ERROR COUNT?
1856  005020  103764                          BLO     MEMB            ;NO-CHECK IF ANOTHER TRANSMISSION REQUIRED.
1857  005022  000137  005464                  JMP     MEMXT           ;YES-GO ABORT TEST.
1858  005026  112777  000004  010452  10$:    MOVB    #EOM,@TBUFP     ;ISSUE END OF MESSAGE.
1859  005034  004037  016374                  JSR     R0,XMIT1
1860  005040  004037  016520                  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
1861
1862  005044  013701  015502                  MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
1863  005050  013721  002132                  MOV     ESCN,(R1)+
1864  005054  013721  001762                  MOV     CHOM,(R1)+      ;CURSOR HOME
1865  005060  013721  002126                  MOV     ESCZI,(R1)+     ;ESCAPE Z
1866  005064  013721  002054                  MOV     ESCO,(R1)+
1867  005070  013721  002056                  MOV     XMTAL,(R1)+     ;TRANSMIT ALL
1868  005074  013711  001754                  MOV     LNFED,(R1)      ;LINE FEED.
1869  005100  012737  000010  015510          MOV     #8.,XMCNT       ;SET UP TO XMIT 8 BYTES
1870  005106  004037  016120                  JSR     R0,XMREC        ;XMIT,WAIT FOR REC. EOM
1871  005112  000402                          BR      1$              ;NORMAL EXIT
1872  005114  104011                          ERROR   11              ;LAST TRANSMIT CAUSED VT61 TO HANG
1873  005116  000562                          BR      MEMXT           ;EXIT TEST
1874  005120  042737  077577  002224  1$:     BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
1875  005126  005002                          CLR     R2              ;CLEAR RECEIVE COUNTER.
1876  005130  016504  005444                  MOV     MPATT(R5),R4    ;LOAD PATTERN
1877  005134  012703  031402                  MOV     #TCRLB+300,R3   ;SET UT ERROR STORAGE
1878  005140  013701  015174                  MOV     RBBUF,R1        ;SET UP RECEIVE POINTER
1879  005144  005037  002220          MEMC:   CLR     DLAY            ;SET UP TIME OUT DELAY
1880  005150  013737  015174  015200          MOV     RBBUF,RBUFP     ;RESET RECEIVE POINTER
1881  005156  023701  015200          1$:     CMP     RBUFP,R1        ;RECEIVED A CHAR?
1882  005162  001013                          BNE     MEMD            ;YES-GO CHECK IT.
1883  005164  032737  020000  002224          BIT     #REOM,VSTAT     ;HAVE WE RECEIVED EOM?
1884  005172  001033                          BNE     CKDAT           ;YES, GO CHECK FOR DATA ERRORS
1885  005174  005337  002220                  DEC     DLAY            ;RUN TIME OUT DELAY.
1886  005200  001366                          BNE     1$              ;NOT EXPIRED-KEEP LOOKING.
1887  005202  005237  002200                  INC     FTLCNT          ;TRANSMISSION FAILED-INCR. FATAL COUNT
1888  005206  104011                          ERROR   11
1889  005210  000525                          BR      MEMXT
1890  005212  005202                  MEMD:   INC     R2              ;DATA IN. INCREMENT COUNTER
1891  005214  004037  005412                  JSR     R0,PATGN        ;GET GOOD CHARACTER ,PUT IN R4 AND
1892  005220  122705  000010                  CMPB    #10,R5          ;CHECKING REV. VIDEO DATA?
1893  005224  001002                          BNE     1$              ;NO-DO NOT MODIFY
1894  005226  052704  000200                  BIS     #BIT07,R4       ;YES-FORCE BIT 7.
1895  005232  121104                  1$:     CMPB    (R1),R4         ;COMPARE DATA
1896  005234  001743                          BEQ     MEMC
1897  005236  020227  003600                  CMP     R2,#TOTCH       ;COMPARING LAST CHAR?
1898  005242  001740                          BEQ     MEMC            ;YES-NEVER COUNT AS A ERROR.
1899
1900  005244  020327  031452                  CMP     R3,#TCRLB+350   ;STORED 20 ERRORS?
1901  005250  103335                          BHIS    MEMC            ;YES-STORE NO MORE.
1902  005252  110423                          MOVB    R4,(R3)+        ;STORE THE GOOD DATA.
1903  005254  111123                          MOVB    (R1),(R3)+      ;STORE THE BAD DATA.
1904  005256  010223                          MOV     R2,(R3)+        ;STORE THE RECEIVE COUNT.
1905  005260  000731                          BR      MEMC
1906  005262  022703  031402          CKDAT:  CMP     #TCRLB+300,R3
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1907  005266  001415                          BEQ     CKMEM
1908  005270  012701  031402                  MOV     #TCRLB+300,R1   ;LOAD FIRST ERROR ADDRESS.
1909  005274  004037  016076          1$:     JSR     R0,CLREG        ;CLEAR ERROR REGISTERS
1910  005300  112137  001124                  MOVB    (R1)+,$GDDAT    ;LOAD THE GOOD DATA.
1911  005304  112137  001126                  MOVB    (R1)+,$BDDAT    ;LOAD THE ERROR BUFFER
1912  005310  012137  001120                  MOV     (P1)+,$GDADR    ;LOAD RECEIVE COUNT
1913  005314  104004                          ERROR   4               ;ISSUE DATA ERROR MESSAGE.
1914  005316  020103                          CMP     R1,R3           ;ISSUED ALL ERRORS?
1915  005320  103765                          BLO     1$              ;NO-CONTINUE
1916
1917  005322  020227  003600          CKMEM:  CMP     R2,#TOTCH       ;DID WE XFER 1920 TIMES?
1918  005326  001406                          BEQ     1$              ;YES - GO CHECK STATUS
1919  005330  012737  003600  001124          MOV     #TOTCH,$GDDAT   ;NO, PUT GOOD COUNT IN GDDAT
1920  005336  010237  001126                  MOV     R2,$BDDAT       ;AND ACTUAL COUNT IN BDDAT.
1921  005342  104005                          ERROR   5               ;ISSUE COUNT ERROR.
1922
1923  005344                          1$:
1924  005344  012746  060000                  MOV     #60000,-(SP)    ;;PUSH #60000 ON STACK
1925  005350  004037  015734                  JSR     R0,CKSFT
1926  005354  062705  000002                  ADD     #2,R5           ;INCREMENT PATTERN POINTER
1927  005360  005765  005444                  TST     MPATT(R5)       ;TEST NEXT PATTERN
1928  005364  001437                          BEQ     MEMXT           ;ZERO-END OF TEST EXIT.
1929  005366  100007                          BPL     2$              ;NOT INCRMENTING PATTERN.
1930  005370  122705  000010                  CMPB    #10,R5          ;SET REVERSE VIDEO?
1931  005374  001004                          BNE     2$              ;NO.
1932  005376  012703  005460                  MOV     #SETREV,R3      ;YES-ENTER REVERSE VIDEO
1933  005402  004037  016460                  JSR     R0,LDXMIT       ;AND RE-ISSUE INCREMENTING PATTERN.
1934  005406  000137  004736          2$:     JMP     MEMA            ;NOT ZERO, GO EXERCISE IT.
1935
1936  005412  042704  000200          PATGN:  BIC     #200,R4         ;CLEAR REV. VIDEO BIT IF SET.
1937  005416  005704                          TST     R4              ;CHECK R4 FOR PATTERN
1938  005420  100402                          BMI     1$              ;IF MINUS, DO INCREMENTING.
1939  005422  000304                          SWAB    R4              ;OTHERWISE SWAP BYTES AND
1940  005424  000200                          RTS     R0              ;EXIT.
1941  005426  105204                  1$:     INCB    R4              ;ADD ONE TO INCREMENTING
1942  005430  120427  000177                  CMPB    R4,#177         ;HAVE WE EXCEEDED LIMIT
1943  005434  103402                          BLO     2$              ;NO, EXIT
1944  005436  016504  005444                  MOV     MPATT(R5),R4    ;YES, RESET PATTERN AND
1945  005442  000200                  2$:     RTS     R0              ;EXIT.
1946                                          .EVEN
1947          005444                  MPATT   =.
1948  005444  037500                          .WORD   037500          ;PATTERN 77,100
1949  005446  040077                          .WORD   040077          ;PATTERN 100,77
1950  005450  025125                          .WORD   025125          ;PATTERN 52,125
1951  005452  100040                          .WORD   100040          ;PATTERN INCREMENTING
1952  005454  100040                          .WORD   100040          ;PATTERN INCREMENTING-REV. VIDEO.
1953  005456  000000                          .WORD   0               ;PATTERN TABLE TERMINATOR
1954                                          ;SEQUENCE TO ENTER REVERSE VIDEO.
1955  005460     033     117     112  SETREV: .BYTE   .ESC,.O,.EEMP,0
1956  005463     000
1957  005464  000240                  MEMXT:  NOP
1958
1959                                  ;;*****************************************************************
1960
1961                                          ;ROUTINE TO TEST THE ABILITY OF THE VT61 TO CALCULATE
1962                                          ;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.

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

                                            ;;**********************************************************************
005466  000004                              TST10:  SCOPE
005470  012737  000003  001160                      MOV     #3,$TIMES       ;;DO 3 ITERATIONS
005476  012737  005504  001106                      MOV     #CKSUMA,$LPADR  ;;SET SCOPE LOOP ADDRESS

005504  004037  015512                      CKSUMA: JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
005510  012737  001001  002226                      MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
005516  004037  016520                              JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS
005522  012703  006202                              MOV     #ITSUMA,R3      ;DIS. RECT. MODE AND CLEAR CHECKSUM
005526  004037  016460                              JSR     R0,LDXMIT
005532  042737  077577  002224                      BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
005540  013701  015502                              MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
005544  012703  000473                              MOV     #315.,R3
005550  004037  017504                              JSR     R0,BLDINC       ;314 INCREMENTING CHAR.
005554  113721  002132                              MOVB    ESCN,(R1)+
005560  113721  001762                              MOVB    CHOM,(R1)+      ;CURSOR HOME
005564  113721  002054                              MOVB    ESCO,(R1)+
005570  113721  002055                              MOVB    ESCO+1,(R1)+
005574  113711  002072                              MOVB    TXRCK,(R1)      ;TRANSMIT RECEIVER CHECKSUM.
005600  005004                                      CLR     R4              ;CLEAR CHECKSUM REGISTER
005602  012705  000004                              MOV     #EOM,R5         ;PRELOAD CHECKSUM REG. WITH
005606  004037  020124                              JSR     R0,CALCK        ;EOM FROM PRIOR XMIT.
005612  052737  002000  002224                      BIS     #CKSUM,VSTAT    ;REQUEST CHECKSUM CALCULATIONS.
005620  012737  000500  015510                      MOV     #320.,XMCNT     ;SETUP TO XMIT 320 BYTES
005626  052777  000100  174102                      BIS     #TENA,@VXCSR    ;ENABLE XMIT INTERRUPTS
005634  012746  020000                              MOV     #REOM,-(SP)     ;;PUSH #REOM ON STACK
005640  005737  002232                              TST     PTYPE           ;PROCESSOR TYPE                         ;;++C
005644  001407                                      BEQ     2$              ;IF 0 THEN 11/45-11/70                  ;;++C
005646  100403                                      BMI     1$              ;IF -1 THEN 11/35,40                    ;;++C
005650  012746  000005                              MOV     #5.,-(SP)       ;;PUSH #5. ON STACK
005654  000405                                      BR      3$                                                      ;;++C
005656                                  1$:
005656  012746  000012                              MOV     #10.,-(SP)      ;;PUSH #10. ON STACK
005662  000402                                      BR      3$                                                      ;;++C
005664                                  2$:
005664  012746  000024                              MOV     #20.,-(SP)      ;;PUSH #20. ON STACK
005670  004037  021076                      3$:     JSR     R0,WTBGND       ;LOOK FOR EOM.                          ;;++C
005674  000546                                      BR      CKEXT           ;ERROR EXIT IF NOT FOUND
005676  127704  007272                              CMPB    @RBBUF,R4       ;COMPARE CHECKSUMS
005702  001414                                      BEQ     CKSUMB          ;GOOD GO TO SUBTEST B
005704  004037  016076                              JSR     R0,CLREG        ;BAD COMPARE
005710  110437  001124                              MOVB    R4,$GDDAT       ;LOAD CALCULATED CHECKSUM
005714  117737  007254  001126                      MOVB    @RBBUF,$BDDAT   ;AND VT61 RECEIVER CHECKSUM
005722  104013                                      ERROR   13              ;ISSUE ERROR
005724  012746  060001                              MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
005730  004037  015734                              JSR     R0,CKSFT        ;ERROR.
```

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2019
2020  005734  042737  077577  002224  CKSUMB: BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
2021  005742  005004                          CLR     R4              ;CLEAR CHECKSUM REGISTER
2022  005744  012737  001001  002226          MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
2023  005752  052737  000100  002224          BIS     #TXSUM,VSTAT    ;SET UP FOR XMIT CHECKSUM GENERATION.
2024  005760  013701  015502                  MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
2025  005764  004037  020172                  JSR     R0,LDBUF        ;LOAD THE BUFFER WITH:
2026  005770     033     117     134          .BYTE   .ESC,.O,.CLTCK,.ESC,.O,.XMTAL,.ESC,.O,.TXTCK,0
2027  005773     033     117     126
2028  005776     033     117     136
2029  006001     000
2030  006002  012737  000011  015510          MOV     #9.,XMCNT       ;SET UP TO XMIT 9 BYTES
2031  006010  052777  000100  173720          BIS     #TENA,@VXCSR    ;ALLOW XMIT INTERRUPTS
2032  006016  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
2033  006022  005737  002232                  TST     PTYPE           ;PROCESSOR TYPE                         ;;++C
2034  006026  001407                          BEQ     2$              ;IF 0 THEN 11/45-11/70                  ;;++C
2035  006030  100403                          BMI     1$              ;IF -1 THEN 11/35,40                    ;;++C
2036  006032  012746  000001                  MOV     #1,-(SP)        ;;PUSH #1 ON STACK
2037  006036  000405                          BR      3$                                                      ;;++C
2038  006040                          1$:
2039  006040  012746  000002                  MOV     #2.,-(SP)       ;;PUSH #2. ON STACK
2040  006044  000402                          BR      3$                                                      ;;++C
2041  006046                          2$:
2042  006046  012746  000004                  MOV     #4.,-(SP)       ;;PUSH #4. ON STACK
2043  006052  004037  021076          3$:     JSR     R0,WTBGND       ;LOOK FOR XMIT DONE.                    ;;++C
2044  006056  000455                          BR      CKEXT           ;TIME OUT - EXIT TEST.
2045  006060  005037  002220          CKSRC:  CLR     DLAY            ;SET UP TIME OUT DELAY
2046  006064  013702  031602                  MOV     ABUFP,R2        ;RESET THE RECEIVER FLAG
2047  006070  023702  031602          1$:     CMP     ABUFP,R2        ;RECEIVED A CHAR?
2048  006074  001007                          BNE     2$              ;YES-GO CHECK IT.
2049  006076  005337  002220                  DEC     DLAY            ;RUN TIME OUT DELAY.
2050  006102  001372                          BNE     1$
2051  006104  005237  002200                  INC     FTLCNT          ;TIMED OUT-INCREMENT FATAL XMIT COUNT
2052  006110  104011                          ERROR   11              ;ISSUE HUNG MESSAGE AND EXIT.
2053  006112  000437                          BR      CKEXT
2054  006114  122777  000004  023460  2$:     CMPB    #EOM,@ABUFP     ;RECEIVED EOM CHAR?
2055  006122  001356                          BNE     CKSRC
2056  006124  042737  020000  002224          BIC     #REOM,VSTAT     ;CLEAR THE EOM FLAG
2057  006132  032737  020000  002224          BIT     #REOM,VSTAT     ;NOW WAIT FOR LAST EOM FLAG
2058  006140  001774                          BEQ     .-6             ;FROM XMIT TRANSMITTER CHECKSUM.
2059  006142  120477  007026                  CMPB    R4,@RBBUF       ;COMPARE 61 TO HOST CHECKSUM.
2060  006146  001421                          BEQ     CKEXT           ;EQUAL - EXIT TEST
2061  006150  004037  016076                  JSR     R0,CLREG
2062  006154  110437  001124                  MOVB    R4,$GDDAT       ;LOAD THE HOST CALCULATED CHECKSUM
2063  006160  117737  007010  001126          MOVB    @RBBUF,$BDDAT   ;LOAD THE VT61 TRANSMITTED CHECKSUM
2064  006166  104014                          ERROR   14              ;ISSUE VT61 XMIT CHECKSUM ERROR
2065  006170  012746  060001                  MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
2066  006174  004037  015734                  JSR     R0,CKSFT        ;CHECK FOR STATUS ERROR
2067  006200  000404                          BR      CKEXT
2068
2069  006202     033     117     103  ITSUMA: .BYTE   .ESC,.O,.DRECT,.ESC,.O,.CLRCK,0,0
2070  006205     033     117     133
2071  006210     000     000
2072
2073  006212  004037  016520          CKEXT:  JSR     R0,RESPTR
2074
```

```
                                        ;;*****************************************************************
                                        ;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.
                                        ;;*****************************************************************

                                        ;;*****************************************************************
006216  000004                  TST11:  SCOPE
006220  012737  000005  001160          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
006226  012737  006234  001106          MOV     #CURS1A,$LPADR  ;;SET SCOPE LOOP ADDRESS

006234  013701  015502          CURS1A: MOV     TBBUF,R1        ;LOAD XMIT BUFFER ADDRESS
006240  004037  015512                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
006244  004037  020172                  JSR     R0,LDBUF        ;LOAD THE BUFFER WITH:
006250     033     103     033          .BYTE   .ESC,.CRT,.ESC,.O,.RDCUR,.ESC,.CDWN,.ESC
006253     117     131     033
006256     102     033
006260     117     131     033          .BYTE   .O,.RDCUR,.ESC,.CLFT,.ESC,.O,.RDCUR
006263     104     033     117
006266     131
006267     033     101     033          .BYTE   .ESC,.CUP,.ESC,.O,.RDCUR,.BEL,0
006272     117     131     007
006275     000
006276  012737  000024  015510          MOV     #20.,XMCNT      ;SET TO XMIT 20 CHARACTERS
006304  012737  000004  016366          MOV     #4,RECITT       ;SET RECEIVE ITERATION TO 4
006312  012737  031202  016370          MOV     #TCRLB+100,WDSTOR;SET UP WORD STORAGE POINTER
006320  004037  016120                  JSR     R0,XMREC        ;XMIT ,AND WAIT FOR REC.DONE
006324  000402                          BR      11$             ;NORMAL EXIT
006326  104011                          ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG.
006330  000436                          BR      CUR1XT          ;EXIT TEST
006332  012701  006416          11$:    MOV     #GDCURP,R1      ;R1=GOOD POSITION TABLE
006336  012702  031202                  MOV     #TCRLB+100,R2   ;R2=ACTUAL CURSOR POSITION
006342  012703  001764                  MOV     #CRT,R3         ;R3=CURSOR COMMAND TABLE

006346  021112          12$:    CMP     (R1),(R2)       ;COMPARE GOOD TO ACTUAL
006350  001415                  BEQ     2$              ;OK-GO UPDATE POINTERS.
006352  113737  002132  001125          MOVB    ESCN,$GDDAT+1
006360  111337  001124                  MOVB    (R3),$GDDAT     ;LOAD COMMAND IN ESC ERROR
006364  005037  001126                  CLR     $BDDAT
006370  104001                          ERROR   1               ;AND ISSUE IT
006372  011237  030402                  MOV     (R2),RCRLB      ;LOAD BAD CURSOR POSITION
006376  011146                          MOV     (R1),-(SP)      ;;PUSH (R1) ON STACK
006400  004037  016600                  JSR     R0,CURER        ;LOAD AND ISSUE CURSRO ERROR MESSAGE
006404  022122          2$:     CMP     (R1)+,(R2)+     ;INCREMENT POSITION POINTERS.
006406  022337  001772                  CMP     (R3)+,CUP       ;CHECK FOR COMMAND TERM.(CUP).
006412  001355                          BNE     12$             ;NOT AT TERMINATOR-COMPARE AGAIN
006414  000404                          BR      CUR1XT          ;EXIT TEST


006416  020440          GDCURP: .WORD   20440           ;ROW 0, COL. 1
006420  020441                  .WORD   20441           ;ROW 1, COL. 1
006422  020041                  .WORD   20041           ;ROW 1, COL. 0
```

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2131  006424  020040                          .WORD   20040           ;ROW 0, COL. 0
2132  006426  000240                  CUR1XT: NOP
2133
2134                                  ;;**********************************************************************
2135                                          ;ROUTINE TO INSURE THAT READ CHARACTER AT CURSOR
2136                                          ;FUNCTIONS CORRECTLY. COMMAND SEQUENCE IS:  RESET, A, CURSOR
2137                                          ;LEFT, READ  CHARACTER AT CURSOR.
2138                                          ;AN ERROR IS REPORTED IF THE LAST READ IS NOT AN "A".
2139                                  ;;**********************************************************************
2140
2141                                  ;;**********************************************************************
2142  006430  000004                  TST12:  SCOPE
2143  006432  012737  000005  001160          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
2144  006440  012737  006446  001106          MOV     #CURS1B,$LPADR  ;;SET SCOPE LOOP ADDRESS
2145
2146  006446  013701  015502          CURS1B: MOV     TBBUF,R1
2147  006452  004037  015512                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
2148  006456  012721  000101                  MOV     #101,(R1)+      ;A
2149  006462  113721  002132                  MOVB    ESCN,(R1)+
2150  006466  113721  001770                  MOVB    CLFT,(R1)+      ;CURSOR LEFT
2151  006472  013721  002054                  MOV     ESCOI,(R1)+
2152  006476  013711  002064                  MOV     TCUCH,(R1)      ;TRANSMIT CH. AT CURSOR
2153  006502  012737  000006  015510          MOV     #6,XMCNT        ;SET UP TO XMIT 6 CHARACTERS
2154  006510  004037  016120                  JSR     R0,XMREC        ;XMIT STRING AND WAIT FOR EOM.
2155  006514  000402                          BR      10$             ;NORMAL EXIT
2156  006516  104011                          ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG/FAIL
2157  006520  000430                          BR      2$              ;EXIT TEST
2158  006522  127727  006446  000101  10$:     CMPB    @RBBUF,#101     ;CHARACTER READ=A
2159  006530  001424                          BEQ     2$              ;YES-NEXT SUBTEST
2160  006532  013737  002054  001124          MOV     ESCOI,$GDDAT
2161  006540  000337  001124                  SWAB    $GDDAT          ;REASSEMBLE ESC DATA
2162  006544  005037  001126                  CLR     $BDDAT
2163  006550  113737  002064  001127          MOVB    TCUCH,$BDDAT+1  ;LOAD FAILING ESC SEQUENCE
2164  006556  104001                          ERROR   1               ;AND ISSUE IT
2165  006560  004037  016076                  JSR     R0,CLREG
2166  006564  112737  000101  001124          MOVB    #101,$GDDAT     ;LOAD GOOD CH. AND CH.
2167  006572  117737  006376  001126          MOVB    @RBBUF,$BDDAT
2168  006600  104004                          ERROR   4               ;READ AND ISSUE THEM.
2169
2170  006602  000240                  2$:     NOP                     ;END OF TEST
2171                                  ;;**********************************************************************
2172                                          ;ROUTINE TO VERIFY OPERATION OF REPLACE AND INSERT MODE.
2173                                          ;INITIALLY ROW 0 IS WRITTEN TO 80 INCREMENTING CHAR.
2174                                          ;ON THE FIRST PASS(REPLACE MODE) A CHARACTER IS REPLACED
2175                                          ;AT HOME AND THE CHAR. AT ROW0,COL.0(172) AND ROW1,COL0(NULL)
2176                                          ;ARE VERIFIED. ON THE SECOND PASS, INSERT MODE IS ENTERED
2177                                          ;AND THE RESULTING INSERTION(AT HOME) IS VERIFIED.ROW0,COL0
2178                                          ;SHOULD BE 172 AND ROW1,COL0 SHOULD BE 161.
2179                                  ;;**********************************************************************
2180
2181                                  ;;**********************************************************************
2182  006604  000004                  TST13:  SCOPE
2183  006606  012737  000005  001160          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
2184  006614  012737  006622  001106          MOV     #INRPL,$LPADR   ;;SET SCOPE LOOP ADDRESS
2185
2186  006622  004037  015512          INRPL:  JSR     R0,RESETV       ;RESET THE UNIT
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2187  006626  013701  015502                    MOV     TBBUF,R1
2188  006632  005201                            INC     R1                  ;LEAVE ROOM IN BUFFER FOR SOM.
2189  006634  012703  000120                    MOV     #80.,R3             ;CREATE A LINE OF 80 INCREMENTING
2190  006640  004037  017504                    JSR     R0,BLDINC           ;CHAR. ON THE SCREEN.
2191  006644  105011                            CLRB    (R1)
2192  006646  013703  015502                    MOV     TBBUF,R3
2193  006652  004037  016460                    JSR     R0,LDXMIT
2194  006656  005005                            CLR     R5                  ;USE R5 AS TEST INDEXER.
2195  006660  012737  000002  016366  INAG:     MOV     #2,RECITT           ;SET UP TO RECEIVE 2 CHAR.
2196  006666  012737  031302  016372            MOV     #TCRLB+200,BYSTOR       ;SET UP STORAGE AREA.
2197  006674  013701  015502                    MOV     TBBUF,R1
2198  006700  004037  020172                    JSR     R0,LDBUF            ;LOAD THE BUFFER WITH:
2199  006704     033     110     172            .BYTE   .ESC,.CHOM,172,.ESC,.CHOM,.ESC,.0,.TCUCH
2200  006707     033     110     033
2201  006712     117     127
2202  006714     033     102     033            .BYTE   .ESC,.CDWN,.ESC,.0,.TCUCH,0
2203  006717     117     127     000
2204  006722  012737  000015  015510            MOV     #13.,XMCNT          ;SET UP TO XMIT 13 CAHR.
2205  006730  004037  016120                    JSR     R0,XMREC
2206  006734  000402                            BR      1$                  ;NORMAL EXIT
2207  006736  104011                            ERROR   11                  ;LAST XMIT CAUSED UNIT TO HANG.
2208  006740  000433                            BR      INRXT               ;EXIT TEST.
2209  006742  026537  007020  031302  1$:       CMP     TDATA(R5),TCRLB+200     ;COMPARE GOOD TO REC.DATA.
2210  006750  001407                            BEQ     2$                  ;GOOD-LOOP OR EXIT.
2211  006752  016537  007012  001126            MOV     TFUNCT(R5),$BDDAT
2212  006760  013737  002120  001124            MOV     ESCP,$GDDAT         ;LOAD ESCAPE SEQ. ERROR.
2213  006766  104001                            ERROR   1
2214  006770  005725                    2$:     TST     (R5)+               ;INCREMENT INDEXER.
2215  006772  020527  000004                    CMP     R5,#4               ;THRU WITH TEST?
2216  006776  001414                            BEQ     INRXT               ;YES-EXIT.
2217  007000  012703  007024                    MOV     #ENSRT,R3           ;NO-SECOND PASS- ENTER
2218  007004  004037  016460                    JSR     R0,LDXMIT           ;INSERT MODE AND DO AGAIN.
2219  007010  000723                            BR      INAG
2220
2221  007012  000151  000111  177777  TFUNCT: .WORD   .ERPL,.EINST,-1
2222  007020     172     000     172  TDATA:  .BYTE   172,0,172,160
2223  007023     160
2224  007024     033     120     111  ENSRT:  .BYTE   .ESC,.P,.EINST,0
2225  007027     000
2226  007030  000240                    INRXT:  NOP
2227
2228                                    ;;*****************************************************************
2229                                            ;ROUTINE TO INSURE VT61 WILL SCROLL IF A LINE FEED
2230                                            ;IS ISSUED FORM ROW 23 OR A CURSOR RIGHT FROM ROW23,COL. 79.
2231                                            ;IN SUBTEST A, ROW 0 IS INTIIALLY WRITTEN TO A 0 AND ROW 1
2232                                            ;A 1. AFTER COMPLETION OF A LINE FEED(AND RESULTING SCROLL)
2233                                            ;ROW 00,COL.00 IS EXPECTED TO CONTAIN A 1.
2234                                            ;IN SUBTEST B, THE CURSOR IS PLACED AT ROW23,COL.79
2235                                            ;AND A DATA CHARACTER "A" IS ENTERED. THE CURSOR
2236                                            ;POSITION IS THEN READ AND SHOULD BE ROW23,COL.00. THE
2237                                            ;CHARACTER AT HOME IS VERIFIED TO BE A NULL.
2238                                    ;;*****************************************************************
2239
2240                                    ;;*****************************************************************
2241  007032  000004                    TST14:  SCOPE
2242  007034  012737  000005  001160            MOV     #5,$TIMES           ;;DO 5 ITERATIONS
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 2243  007042  012737  007050  001106          MOV     #CKSCRA,$LPADR  ;;SET SCOPE LOOP ADDRESS
 2244
 2245  007050  004037  015512          CKSCRA: JSR     R0,RESETV       ;RESET THE UNIT.
 2246  007054  013701  015502                  MOV     TBBUF,R1
 2247  007060  004037  020172                  JSR     R0,LDBUF        ;LOAD THE XMIT BUFFER WITH:
 2248  007064     060     033     102          .BYTE   60,.ESC,.CDWN,.ESC,.CLFT,61,.ESC,.Y,.R23,.C00
 2249  007067     033     104     061
 2250  007072     033     131     067
 2251  007075     040
 2252  007076     012     033     110          .BYTE   .LNFED,.ESC,.CHOM,.ESC,.0,.TCUCH,.BEL,0
 2253  007101     033     117     127
 2254  007104     007     000
 2255  007106  012737  000020  015510          MOV     #16.,XMCNT      ;SET UP TO XMIT 16 BYTES.
 2256  007114  004037  016120                  JSR     R0,XMREC
 2257  007120  000402                          BR      1$              ;NORMAL EXIT
 2258  007122  104011                          ERROR   11              ;LAST XMIT CAUSED UNIT TO HANG.
 2259  007124  000452                          BR      GDSCRL          ;EXIT TEST.
 2260  007126  127727  006042  000061  1$:     CMPB    @RBBUF,#61      ;CHARACTER AT HOME A 1?
 2261  007134  001401                          BEQ     CKSCRB          ;YES-NEXT TEST
 2262  007136  104023                          ERROR   23              ;NO-ISSUE NO SCROLL ERROR.
 2263  007140  012737  000002  016366  CKSCRB: MOV     #2,RECITT       ;SET UP FOR TWO REC. LOOPS.
 2264  007146  012737  031302  016370          MOV     #TCRLB+200,WDSTOR       ;SET UP CURSOR POSITION STROAGE.
 2265  007154  013701  015502                  MOV     TBBUF,R1
 2266  007160  004037  020172                  JSR     R0,LDBUF        ;LOAD XMIT BUFFER WITH:
 2267  007164     033     131     067          .BYTE   .ESC,.Y,.R23,.C79,101,.ESC,.0,.RDCUR
 2268  007167     157     101     033
 2269  007172     117     131
 2270  007174     033     110     033          .BYTE   .ESC,.CHOM,.ESC,.0,.TCUCH,0
 2271  007177     117     127     000
 2272  007202  012737  000015  015510          MOV     #13.,XMCNT      ;SET UP TO XMIT 13 BYTES.
 2273  007210  004037  016120                  JSR     R0,XMREC        ;XMIT AND WAIT FOR RECEIVED DONE.
 2274  007214  000402                          BR      1$
 2275  007216  104011                          ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG.
 2276  007220  000414                          BR      GDSCRL          ;ERROR EXIT
 2277  007222  127737  005746  002170  1$:     CMPB    @RBBUF,ZERO     ;NULL RECEIVED?
 2278  007230  001410                          BEQ     GDSCRL          ;YES-EXIT TEST
 2279  007232  104023                          ERROR   23              ;NO-ISSUE NO SCROLL ERROR.
 2280  007234  013777  031302  005732          MOV     TCRLB+200,@RBBUF        ;LOAD RECEIVED CURSOR POSITION.
 2281  007242  013746  002144                  MOV     R23C00,-(SP)    ;;PUSH R23C00 ON STACK
 2282  007246  004037  016600                  JSR     R0,CURER        ;GO ISSUE CURSOR ERROR.
 2283  007252  000240                  GDSCRL: NOP
 2284
 2285
 2286                                  ;;**********************************************************************
 2287                                  ;THIS TEST INSURES THAT THE VT61 CURSOR CAN BE
 2288                                  ;POSITIONED TO VERY POSSIBLE ROW/COLUMN POSITON
 2289                                  ;ON THE SCREEN.  THIS IS TESTED BY FILLING THE
 2290                                  ;COMPLETE SCREEN WITH A CHARACTER(A) AND THEN
 2291                                  ;POSITONING THE CURSOR (VIA DCA) TO EVERY POSITION
 2292                                  ;AND THE "A" AT THAT POSITION IS REPLACED WITH A SPACE.
 2293                                  ;THE SCREEN IS THEN READ TO VERIFY THAT ONLY SPACES
 2294                                  ;EXIST ON THE SCREEN.  ALL POSITIONS CONTAINING
 2295                                  ;NON-SPACES ARE REPORTED.
 2296
 2297                                  ;;**********************************************************************
 2298
```

```
2299                                    ;;**********************************************************************
2300  007254  000004                    TST15:  SCOPE
2301  007256  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
2302  007264  012737  007272  001106            MOV     #CURS2,$LPADR   ;;SET SCOPE LOOP ADDRESS
2303
2304  007272  042737  077577  002224  CURS2:   BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
2305  007300  004037  015512                    JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
2306  007304  012702  003600                    MOV     #TOTCH,R2       ;LOAD A COUNT OF SCREEN(1920).
2307  007310  112777  000002  006170            MOVB    #SOM,@TBUFP     ;ISSUE START OF MESSAGE.
2308  007316  004037  016374                    JSR     R0,XMIT1
2309  007322  005302                    1$:     DEC     R2              ;DECREMENT XMIT COUNT
2310  007324  001413                            BEQ     10$             ;COUNT = ZERO?
2311
2312  007326  112777  000101  006152            MOVB    #101,@TBUFP     ;LOAD THE CHARACTER(A).
2313  007334  004037  016374                    JSR     R0,XMIT1        ;NO-XMIT ANOTHER BYTE.
2314  007340  023737  002200  002202            CMP     FTLCNT,ALWCNT   ;EXCEEDED FATAL ERROR COUNT?
2315  007346  103765                            BLO     1$              ;NO-CHECK IF DONE NOW
2316  007350  000137  010022                    JMP     C2XT            ;YES-ABORT TESTING THIS UNIT.
2317  007354  112777  000004  006124  10$:     MOVB    #EOM,@TBUFP     ;ISSUE END OF MESSAGE.
2318  007362  004037  016374                    JSR     R0,XMIT1
2319  007366  004037  016520                    JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
2320  007372  013737  002160  017002            MOV     R23C78,LNRW     ;SET UP 1ST ADDRESS
2321  007400  013701  015502                    MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
2322  007404  013721  002040                    MOV     DCRAD,(R1)+
2323  007410  010102                            MOV     R1,R2           ;R2 POINTS TO CURSOR ADD. IN BUFFER
2324  007412  013721  002160                    MOV     R23C78,(R1)+    ;CURSOR TO LOWER RIGHT -1.
2325  007416  112721  000040                    MOVB    #40,(R1)+       ;SPACE
2326  007422  012737  000005  015510  2$:       MOV     #5,XMCNT        ;SET UP TO XMIT 5 CHARACTERS
2327  007430  042737  077577  002224            BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
2328  007436  052777  000100  172272            BIS     #TENA,@VXCSR    ;XMIT INTERRUPTS.
2329  007444  012746  000001                    MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK                  ;;++C
2330  007450  005737  002232                    TST     PTYPE           ;PROCESSOR TYPE                         ;;++C
2331  007454  001407                            BEQ     51$             ;IF 0 THEN 11/45-11/70                  ;;++C
2332  007456  100403                            BMI     50$             ;IF -1 THEN 11/35,40                    ;;++C
2333  007460  012746  000001                    MOV     #1.,-(SP)       ;;PUSH #1. ON STACK
2334  007464  000405                            BR      53$                                                     ;;++C
2335  007466                            50$:
2336  007466  012746  000002                    MOV     #2.,-(SP)       ;;PUSH #2. ON STACK
2337  007472  000402                            BR      53$                                                     ;;++C
2338  007474                            51$:
2339  007474  012746  000004                    MOV     #4.,-(SP)       ;;PUSH #4. ON STACK
2340  007500  004037  021076            53$:    JSR     R0,WTBGND       ;LOOK FOR  XMIT DONE                    ;;++C
2341  007504  000546                            BR      C2XT            ;NOT FOUND-ERROR EXIT
2342  007506  021237  002154                    CMP     (R2),CUHME      ;DELETED TO HOME?
2343  007512  001405                            BEQ     3$              ;YES
2344  007514  004037  016676                    JSR     R0,CMPOS        ;NO-GET NEXT POSITION TO BE DELETED
2345  007520  013712  017002                    MOV     LNRW,(R2)       ;LOAD IT IN XMIT BUFFER
2346  007524  000736                            BR      2$              ;AND DELETE IT.
2347  007526  004037  016520            3$:     JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS
2348  007532  013737  002154  017002            MOV     CUHME,LNRW      ;LOAD INITIAL CHECK POSITION(HOME)
2349  007540  012737  001001  002226            MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
2350  007546  013701  015502                    MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
2351  007552  010102                            MOV     R1,R2           ;STORE ERRORS IN XMIT BUFFER
2352  007554  042737  077577  002224            BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
2353  007562  013721  002132                    MOV     ESCN,(R1)+
2354  007566  013721  001762                    MOV     CHOM,(R1)+      ;CURSOR HOME
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2355  007572  013721  002054                    MOV     ESC0,(R1)+
2356  007576  013721  002056                    MOV     XMTAL,(R1)+     ;TRANSMIT ALL
2357  007602  012737  000005  015510            MOV     #5,XMCNT
2358  007610  052777  000100  172120            BIS     #TENA,@VXCSR    ;SET XMIT ENABLE
2359  007616  012746  000001                    MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
2360  007622  005737  002232                    TST     PTYPE           ;PROCESSOR TYPE                        ;;++C
2361  007626  001407                            BEQ     61$             ;IF 0 THEN 11/45-11/70                 ;;++C
2362  007630  100403                            BMI     60$             ;IF -1 THEN 11/35,40                   ;;++C
2363  007632  012746  000001                    MOV     #1.,-(SP)       ;;PUSH #1. ON STACK
2364  007636  000405                            BR      63$                                                    ;;++C
2365  007640                            60$:
2366  007640  012746  000003                    MOV     #3.,-(SP)       ;;PUSH #3. ON STACK
2367  007644  000402                            BR      63$                                                    ;;++C
2368  007646                            61$:
2369  007646  012746  000006                    MOV     #6.,-(SP)       ;;PUSH #6. ON STACK
2370  007652  004037  021076            63$:    JSR     R0,WTBGND       ;LOOK FOR SOM OR XMIT DONE             ;;++C
2371  007656  000461                            BR      C2XT            ;NOT FOUND-ERROR EXIT
2372  007660  013701  015200            4$:     MOV     RBUFP,R1        ;SET UP RECEIVE FLAG
2373  007664  005037  002220                    CLR     DLAY            ;SET UP TIME OUT DELAY
2374  007670  020137  015200            40$:    CMP     R1,RBUFP        ;CHARACTER RECEIVED?
2375  007674  103411                            BLO     41$             ;YES-GO CHECK IT.
2376  007676  032737  020000  002224            BIT     #REOM,VSTAT     ;LOOK FOR END OF MESSAGE
2377  007704  001025                            BNE     C2CK            ;FOUND IT, EXIT TEST
2378  007706  005337  002220                    DEC     DLAY            ;RUN TIME OUT DELAY.
2379  007712  001366                            BNE     40$             ;AND LOOK FOR RECEIVED CH.
2380  007714  104011                            ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG.
2381  007716  000420                            BR      C2CK            ;GO SEE IF ANY ERRORS STORED.
2382  007720  013737  015174  015200  41$:     MOV     RBBUF,RBUFP     ;RESET RECEIVE POINTER
2383  007726  127727  005242  000040            CMPB    @RBBUF,#40      ;CHAR EQUAL A SPACE?
2384  007734  001003                            BNE     6$              ;NOT A SPACE-MUST BE ERROR-STORE IT
2385  007736  004037  016740            5$:     JSR     R0,CPPOS        ;UPDATE CURSOR POSITION
2386  007742  000746                            BR      4$
2387  007744  022702  031126            6$:     CMP     #TCRLB+20.,R2   ;STORED 10 ERRORS?
2388  007750  101772                            BLOS    5$              ;YES-IGNORE ANY FURTHER ERRORS.
2389  007752  013722  017002                    MOV     LNRW,(R2)+      ;STORE FAILING CURSOR POSITION
2390  007756  000767                            BR      5$
2391
2392  007760  020237  015502            C2CK:   CMP     R2,TBBUF        ;ANY ERRORS STORED?
2393  007764  001416                            BEQ     C2XT            ;NO EXIT TEST
2394  007766  013701  015502                    MOV     TBBUF,R1        ;USE R1 AS ERROR POINTER
2395  007772  021137  002042            1$:     CMP     (R1),R23C79     ;CURSOR TO LOWER RIGHT?
2396  007776  001411                            BEQ     C2XT            ;YES-NOT AN ERROR.
2397  010000  104012                            ERROR   12              ;NO-ISSUE ERROR MESSAGES
2398  010002  012746  020040                    MOV     #20040,-(SP)    ;;PUSH #20040 ON STACK
2399  010006  012177  005162                    MOV     (R1)+,@RBBUF    ;LOAD FAILING POS.
2400  010012  004037  016600                    JSR     R0,CURER        ;ISSUE CURSOR ERROR
2401  010016  020102                            CMP     R1,R2           ;DONE WITH ERRORS?
2402  010020  103764                            BLO     1$              ;NO, DUMP ANOTHER.
2403  010022  000240            C2XT:   NOP                             ;EXIT TEST
2404
2405                              ;;*****************************************************************
2406                                      ;ROUTINE TO INSURE PROPER OPERATION OF CARRIAGE RETURN
2407                                      ;AND LINE FEED DURING NORMAL MODE. INITIALLY THE CURSOR IS
2408                                      ;SET(VIA D.C.A.) TO ROW0,COL 20 AND A LINE FEEL IS ISSUED
2409                                      ;THE CURSOR POSITION IS THEN READ AND MUST BE ROW1,COL20.
2410                                      ;A CARRIAGE RETURN IS THEN ISSUED AND CURSOR POSITION VERIFIED
```

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                                                                                                    H 4
                                        ;TO BE ROW1,COL0.

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

                                ;;*******************************************************************
010024  000004                  TST16:  SCOPE
010026  012737  000005  001160          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
010034  012737  010042  001106          MOV     #NWLN,$LPADR    ;;SET SCOPE LOOP ADDRESS

010042  004037  015512          NWLN:   JSR     R0,RESETV       ;RESET THE UNIT AND ENTER MAINT.MODE
010046  013701  015502                  MOV     TBBUF,R1
010052  004037  020172                  JSR     R0,LDBUF        ;LOAD XMIT BUFFER WITH-
010056     033     131     040          .BYTE   .ESC,.Y,.R00,.C20
010061     064
010062     012     033     117          .BYTE   .LNFED,.ESC,.O,.RDCUR,.BEL,0
010065     131     007     000
010070  012737  000011  015510          MOV     #9.,XMCNT       ;SETUP TO XMIT 9 CHARACTERS
010076  004037  016120                  JSR     R0,XMREC        ;GO DO IT
010102  000402                          BR      30$             ;NORMAL EXIT.
010104  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
010106  000454                          BR      4$              ;EXIT TEST
010110  023777  002136  005056  30$:    CMP     R01C20,@RBBUF   ;CHECK CURSOR POS. S/B ROW 1, COL 20.
010116  001412                          BEQ     3$
010120  005037  001124                  CLR     $GDDAT
010124  013737  001754  001126          MOV     LNFED,$BDDAT
010132  104001                          ERROR   1               ;ISSUE IT
010134  013746  002136                  MOV     R01C20,-(SP)    ;;PUSH R01C20 ON STACK
010140  004037  016600                  JSR     R0,CURER        ;SETUP AND ISSUE CURSOR ERROR
010144  013701  015502          3$:     MOV     TBBUF,R1
010150  013721  001752                  MOV     CARRT,(R1)+     ;LOAD XMIT BUFFER WITH
010154  013721  002054                  MOV     ESCOI,(R1)+     ;CARRIAGE RETURN, READ CURSOR
010160  013721  002050                  MOV     RDCUR,(R1)+     ;POSITION
010164  012737  000004  015510          MOV     #4,XMCNT        ;SET UP TO TRANSMIT 4 CHARACTERS
010172  004037  016120                  JSR     R0,XMREC        ;GO DO IT
010176  000402                          BR      40$             ;NORMAL EXIT.
010200  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
010202  000416                          BR      4$              ;EXIT TEST
010204  023777  002134  004762  40$:    CMP     R01C00,@RBBUF   ;CHECK CURSOR POS. S/B ROW1, COL 0.
010212  001412                          BEQ     4$              ;EXIT TEST IF GOOD.
010214  005037  001124                  CLR     $GDDAT
010220  013737  001752  001126          MOV     CARRT,$BDDAT
010226  104001                          ERROR   1               ;ISSUE IT
010230  013746  002134                  MOV     R01C00,-(SP)    ;;PUSH R01C00 ON STACK
010234  004037  016600                  JSR     R0,CURER        ;SET UP AND ISSUE CURSOR ERROR
010240  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.
                                ;;*******************************************************************

                                ;;*******************************************************************
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2467  010242  000004                    TST17:  SCOPE
2468  010244  012737  000003  001160            MOV     #3,$TIMES       ;;DO 3 ITERATIONS
2469  010252  012737  010260  001106            MOV     #ERSE,$LPADR    ;;SET SCOPE LOOP ADDRESS
2470
2471
2472  010260  004037  015512            ERSE:   JSR     R0,RESETV       ;RESET THE UNIT -SET MAINT. MODE.
2473  010264  005077  004704                    CLR     @RBBUF          ;CLEAR THE CHECK LOCATION.
2474  010270  004037  017532                    JSR     R0,DATSC        ;FILL THE SCREEN.
2475  010274  013701  015502                    MOV     TBBUF,R1
2476  010300  004037  020172                    JSR     R0,LDBUF        ;LOAD XMIT BUFFER WITH:
2477  010304     033     110     033            .BYTE   .ESC,.CHOM,.ESC,.EOS,.ESC,.0,.XMTAL,0
2478  010307     112     033     117
2479  010312     126     000
2480  010314  113737  002132  001125            MOVB    ESCN,$GDDAT+1
2481  010322  113737  001774  001124            MOVB    EOS,$GDDAT      ;LOAD ERROR WITH ERASE TO EOS
2482  010330  005037  001126                    CLR     $BDDAT
2483  010334  005077  004634                    CLR     @RBBUF
2484  010340  012737  000007  015510            MOV     #7,XMCNT        ;SET UP TO XMIT 7 BYTES
2485  010346  004037  016120                    JSR     R0,XMREC        ;XMIT AND WAIT FOR REC. DONE
2486  010352  000402                    BR      5$
2487  010354  104011                    ERROR   11              ;ESC ERROR
2488  010356  000413                    BR      ERSXT           ;EXIT TEST
2489  010360  127737  004610  002170    5$:     CMPB    @RBBUF,ZERO     ;VT61 XMITTED SOM/EOM ONLY?
2490  010366  001407                    BEQ     ERSXT           ;YES-EXIT TEST.
2491  010370  104001                    ERROR   1               ;NO-ERASE TO END OF SCREEN
2492  010372  004037  016076                    JSR     R0,CLREG        ;GO CLEAR ERROR STORAGE
2493  010376  117737  004572  001126            MOVB    @RBBUF,$BDDAT
2494  010404  104004                    ERROR   4               ;ISSUE DATA ERROR
2495  010406  000240                    ERSXT:  NOP
2496
2497
2498
2499                                    ;;**********************************************************************
2500                                    ;ROUTINE TO SET UP END OF PASS INDICATION.
2501                                    ;SELF TEST(ESC P T) IS ISSUED TO THE UNIT UNDER TEST
2502                                    ;AND AN ERROR IS ISSUED IF THE UNIT CANNOT RESPOND AFTER
2503                                    ;SELF TEST IS COMPLETE. IF SELF TEST IS SUCCESSFUL THE
2504                                    ;SCREEN IS WRITTEN TO 23 LINES OF INCREMENTING CHARACTERS
2505                                    ;AND 23 LINES OF INCREMENTING CHAR. IN REVERSE VIDEO.
2506                                    ;THE IDENT IS THEN CHECKED AND IF A COPIER IS PRESENT A
2507                                    ;COPY SCREEN  COMMAND IS ISSUED(NOTE: THIS COMMAND WILL CAUSE
2508                                    ;THE UNIT TO BE "BUSY" AND NOT RESPOND TO ANY FURTHER COMMANDS
2509                                    ;UNTIL THE SCREEN HAS BEEN COMPLETELY COPIED.)
2510                                    ;;**********************************************************************
2511
2512                                    ;;**********************************************************************
2513  010410  000004                    TST20:  SCOPE
2514  010412  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
2515  010420  012737  010426  001106            MOV     #LSTST,$LPADR   ;;SET SCOPE LOOP ADDRESS
2516
2517  010426                            LSTST:
2518  010426  013746  002170                    MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
2519  010432  013746  002122                    MOV     TSTER,-(SP)     ;;PUSH TSTER ON STACK
2520  010436  013746  002054                    MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
2521  010442  004037  013666                    JSR     R0,TESC         ;TRANSMIT IT.
2522  010446  004037  015630                    JSR     R0,GETON        ;GO LOOK FOR A XON.
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2523  010452  000407                          BR      1$              ;VT61RESPONDED-NOT HUNG
2524  010454  013737  001732  001124          MOV     VRCSR,$GDDAT    ;LOAD THE ADDRESS
2525  010462  013737  001742  001126          MOV     VECT,$BDDAT     ;LOAD THE VECTOR
2526  010470  104010                          ERROR   10              ;REPORT SELF TEST FAILURE
2527  010472  004037  015512          1$:     JSR     R0,RESETV       ;RESET AND SET MAINT. MODE.
2528  010476  005037  002210                  CLR     BUBCT           ;SET UP HALF-SCREEN FLAG.
2529  010502  042737  077577  002224  2$:     BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
2530  010510  012737  001001  002226          MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
2531  010516  013701  015502                  MOV     TBBUF,R1        ;SET UP BEG. OF XMIT BUFFER
2532  010522  012703  000500                  MOV     #320.,R3        ;FILL BUFFER WITH INCREMENTING CHAR.
2533  010526  004037  017504                  JSR     R0,BLDINC
2534  010532  012737  001700  015510          MOV     #960.,XMCNT     ;SEND 12 LINE TO VT61
2535  010540  052777  000100  171170          BIS     #TENA,@VXCSR    ;ENABLE XMIT INTERRUPTS
2536  010546  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
2537  010552  005737  002232                  TST     PTYPE           ;PROCESSOR TYPE                         ;;++C
2538  010556  001407                          BEQ     5$              ;IF 0 THEN 11/45-11/70                  ;;++C
2539  010560  100403                          BMI     4$              ;IF -1 THEN 11/34,40                    ;;++C
2540  010562  012746  000031                  MOV     #25.,-(SP)      ;;PUSH #25. ON STACK
2541  010566  000405                          BR      6$                                                      ;;++C
2542  010570                          4$:
2543  010570  012746  000062                  MOV     #50.,-(SP)      ;;PUSH #50. ON STACK
2544  010574  000402                          BR      6$                                                      ;;++C
2545  010576                          5$:
2546  010576  012746  000144                  MOV     #100.,-(SP)     ;;PUSH #100. ON STACK
2547  010602  004037  021076          6$:     JSR     R0,WTBGND       ;LOOK FOR XMDNE.                        ;;++C
2548  010606  000430                          BR      ENDSEL          ;NOT FOUND-EXIT.
2549  010610  005737  002210                  TST     BUBCT           ;DONE WITH SCREEN?
2550  010614  001007                          BNE     3$              ;YES-EXIT
2551  010616  012703  005460                  MOV     #SETREV,R3      ;NO-ISSUE ENTER REVERSE VIDEO
2552  010622  004037  016460                  JSR     R0,LDXMIT       ;ESCAPE SEQUENCE.
2553  010626  005237  002210                  INC     BUBCT           ;INCREMENT SCREEN HALF FLAG.
2554  010632  000723                          BR      2$              ;AND ISSUE SECOND HALF IN REV. VIDEO.
2555  010634  032737  000001  002124  3$:     BIT     #BIT00,IDENT    ;IDENT = COPIER?
2556  010642  001412                          BEQ     ENDSEL          ;NO
2557  010644  013746  002170                  MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
2558  010650  012746  000135                  MOV     #.CPYSC,-(SP)   ;;PUSH #.CPYSC ON STACK
2559  010654  013746  002132                  MOV     ESCN,-(SP)      ;;PUSH ESCN ON STACK
2560  010660  004037  013666                  JSR     R0,TESC
2561  010664  004037  020200                  JSR     R0,CKABRT       ;CHECK FOR A PERIPHERAL ABORT.
2562  010670  105737  002176          ENDSEL: TSTB    MODE            ;IF IN MAN MODE DO NOT ENTER EOP.
2563  010674  001402                          BEQ     ENDPS
2564  010676  000137  003100                  JMP     ASTRT
2565  010702  042777  000100  171022  ENDPS:  BIC     #RDENA,@VRCSR   ;CLEAR REC.INT. BEFORE NEXT UNIT SELECT.
2566                                  .SBTTL  END OF PASS ROUTINE
2567
2568                                  ;;**********************************************************************
2569                                  ;*INCREMENT THE PASS NUMBER ($PASS)
2570                                  ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
2571                                  ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
2572                                  ;*IF THERES A MONITOR GO TO IT
2573                                  ;*IF THERE ISN'T JUMP TO MODCA
2574
2575  010710                          $EOP:
2576  010710  000004                          SCOPE
2577  010712  005037  001102                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
2578  010716  005037  001160                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
```

```
2579  010722  005237  001100                    INC     $PASS           ;;INCREMENT THE PASS NUMBER
2580  010726  042737  100000  001100            BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
2581  010734  005327                            DEC     (PC)+           ;;LOOP?
2582  010736  000001                  $EOPCT:   .WORD   1
2583  010740  003022                            BGT     $DOAGN          ;;YES
2584  010742  012737                            MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
2585  010744  000001                  $ENDCT:   .WORD   1
2586  010746  010736                            $EOPCT
2587  010750  104401  011015                    TYPE    ,$ENDMG         ;;TYPE "END PASS #"
2588  010754  013746  001100                    MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
2589  010760  104405                            TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
2590  010762  104401  011012                    TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
2591  010766  013700  000042          $GET42:   MOV     @#42,R0         ;;GET MONITOR ADDRESS
2592  010772  001405                            BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
2593  010774  000005                            RESET                   ;;CLEAR THE WORLD
2594  010776  004710                  $ENDAD:   JSR     PC,(R0)         ;;GO TO MONITOR
2595  011000  000240                            NOP                     ;;SAVE ROOM
2596  011002  000240                            NOP                     ;;FOR
2597  011004  000240                            NOP                     ;;ACT11
2598  011006                          $DOAGN:
2599  011006  000137                            JMP     @(PC)+          ;;RETURN
2600  011010  002534                  $RTNAD:   .WORD   MODCA
2601  011012     377       377       000  $ENULL:   .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
2602  011015     015  042412  042116  $ENDMG:   .ASCIZ  <15><12>/END PASS #/
2603  011022  050040  051501  020123
2604  011030  000043
2605                                    ;;**************************************************************************
2606                                    ;ROUTINE TO ECHO THE KEYBOARD. KEYS FOR TAB,BELL,CARRIAGE
2607                                    ;AND LINE FEED ECHO A MNEMONIC,NON-DISPLAY CHAR. ECHO OCTAL
2608                                    ;EQUIVALENTS AND DISPLAY CHAR. ECHO THEMSELVES.
2609                                    ;(EXAMPLES-CHAR.,SPACE, ESC, SPACE OR 037, SPACE.) A
2610                                    ;CONTROL C (003) WILL CAUSE A TEST EXIT.
2611
2612                                    ;;**************************************************************************
2613
2614                                    ;;**************************************************************************
2615  011032  000004                  TST21:    SCOPE
2616  011034  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
2617  011042  012737  011050  001106            MOV     #KYBD,$LPADR    ;;SET SCOPE LOOP ADDRESS
2618
2619  011050  004037  016520            KYBD:   JSR     R0,RESPTR
2620  011054  012702  026276                    MOV     #DKYBD,R2       ;LOAD MESSAGE ADDRESS INR2
2621  011060  004037  017600                    JSR     R0,DSMES        ;DISPLAY KEYBOARD MESSAGE
2622  011064  012703  026664                    MOV     #DCNTZ,R3       ;ISSUE CONTROL C EXIT MESSAGE
2623  011070  004037  016460                    JSR     R0,LDXMIT
2624  011074  012703  011332                    MOV     #EXMAIN,R3
2625  011100  004037  016460                    JSR     R0,LDXMIT       ;ISSUE EXIT MAINTENANCE MODE.
2626  011104  042737  077577  002224  KYSTRT:   BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
2627  011112  105777  020464                    TSTB    @ABUFP          ;SEE IF A CHAR. RECEIVED
2628  011116  001001                            BNE     11$             ;YES-GO PROCESS IT
2629  011120  000001                            WAIT                    ;WAIT FOR A CH.
2630  011122  117701  020454            11$:    MOVB    @ABUFP,R1       ;GET RAW RECEIVED DATA
2631  011126  004037  021022                    JSR     R0,EXTST        ;CHECK FOR EXIT CONDITIONS
2632  011132  000402                            BR      10$             ;NO EXIT -CONTINUE.
2633  011134  000137  003100                    JMP     ASTRT           ;EXIT TEST 4
2634  011140  105077  020436            10$:    CLRB    @ABUFP          ;CLEAR CHAR FROM BUFFER
```

```
2635  011144  032737  000400  002224          BIT     #ESC,VSTAT      ;CHAR.=ESC(033)?
2636  011152  001405                          BEQ     12$             ;NO
2637  011154  005037  015202                  CLR     ESAMB           ;YES - RESET ESC ASSEMBLY FLAG
2638  011160  012703  026271                  MOV     #DESC,R3        ;LOAD ESC MESSAGE ADDRESS
2639  011164  000454                          BR      KYBXMT
2640  011166  120127  000041          12$:    CMPB    R1,#41          ;CHAR. LESS THAN 41 OR
2641  011172  103415                          BLO     2$              ;HIGHER THAN 176, GO ECHO
2642  011174  120127  000176                  CMPB    R1,#176         ;OCTAL EQUIVALENT
2643  011200  101012                          BHI     2$
2644  011202  110177  004300                  MOVB    R1,@TBUFP       ;LOAD CHAR. IN XMIT BUFF.
2645  011206  004037  016374                  JSR     R0,XMIT1        ;GO XMIT IT
2646  011212  112777  000040  004266          MOVB    #40,@TBUFP      ;LOAD A SPACE
2647  011220  004037  016374                  JSR     R0,XMIT1        ;AND XMIT IT.
2648  011224  000727                          BR      KYSTRT
2649  011226  120137  001750          2$:     CMPB    R1,BEL          ;CHAR.=BELL?
2650  011232  001003                          BNE     3$
2651  011234  012703  026545                  MOV     #DBELL,R3       ;LOAD BELL MESSAGE ADDRESS
2652  011240  000426                          BR      KYBXMT
2653  011242  120137  001756          3$:     CMPB    R1,TAB          ;CHAR. =TAB?
2654  011246  001003                          BNE     4$
2655  011250  012703  026526                  MOV     #DTAB,R3        ;YES-ECHO 'TAB'
2656  011254  000420                          BR      KYBXMT
2657  011256  123701  001752          4$:     CMPB    CARRT,R1        ;CHAR.=CARRIAGE RETURN?
2658  011262  001003                          BNE     5$
2659  011264  012703  026533                  MOV     #DCR,R3         ;YES - ECHO 'C/R'.
2660  011270  000412                          BR      KYBXMT
2661  011272  120137  001754          5$:     CMPB    R1,LNFED        ;CHAR.=LINE FEED?
2662  011276  001003                          BNE     6$              ;NO CHECK FOR CONTROL Z
2663  011300  012703  026540                  MOV     #DLF,R3         ;YES - ECHO 'L/F'.
2664  011304  000404                          BR      KYBXMT
2665  011306  004037  017674          6$:     JSR     R0,BINOCT       ;CONVERT BINARY TO OCTAL
2666  011312  012703  002164                  MOV     #SVER1,R3
2667  011316  042737  077577  002224  KYBXMT: BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
2668  011324  004037  016460                  JSR     R0,LDXMIT       ;GO XMIT BUFFER
2669  011330  000665                          BR      KYSTRT          ;WAIT FOR NEXT CHAR.
2670
2671                                          ;SEQUENCE TO EXIT MAINTENANCE MODE.
2672  011332      033     117     141  EXMAIN: .BYTE   .ESC,.O,.DMAIN,0
2673  011335      000
2674
2675                                          ;;*****************************************************************
2676                                          ;ROUTINE TO UTILIZE THE VT61 AS A PRINTER CONTROLLER.
2677                                          ;AFTER TEST MESSAGE IS DISPLAYED, THE TEST WAITS
2678                                          ;FOR A C/R BEFORE ACTUALLY ENTERING TEST. A PATTERN
2679                                          ;OF INCREMENTING, ROLLING CHAR. WILL BE OUTPUTTED UNTIL A
2680                                          ;CONTROL C(003) IS RECEIVED.
2681
2682                                          ;;*****************************************************************
2683
2684                                          ;;*****************************************************************
2685  011336  000004                  TST22:  SCOPE
2686  011340  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
2687  011346  012737  011354  001106          MOV     #TPRNT,$LPADR   ;;SET SCOPE LOOP ADDRESS
2688
2689  011354  012702  026730          TPRNT:  MOV     #DPRNT,R2       ;LOAD PRINTER MESSAGE ADDRESS
2690  011360  004037  017600                  JSR     R0,DSMES        ;AND ISSUE IT
```

```
2691  011364  012703  011332                    MOV     #EXMAIN,R3
2692  011370  004037  016460                    JSR     R0,LDXMIT       ;ISSUE EXIT MAINTENANCE MODE.
2693  011374  004037  017772                    JSR     R0,GTCR         ;GO SET CARRIAGE RETURN
2694  011400                            3$:
2695  011400  013746  002170                    MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
2696  011404  013746  002114                    MOV     EPNT,-(SP)      ;;PUSH EPNT ON STACK
2697  011410  013746  002132                    MOV     ESCN,-(SP)      ;;PUSH ESCN ON STACK
2698  011414  004037  013666                    JSR     R0,TESC
2699  011420  013701  015502                    MOV     TBBUF,R1        ;LOAD R1 WITH XMIT BUFFER
2700  011424  012705  000041            4$:     MOV     #41,R5          ;R5=1ST CHAR
2701  011430  042737  077577  002224    5$:     BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
2702  011436  013701  015502                    MOV     TBBUF,R1
2703  011442  012703  000204                    MOV     #132.,R3        ;R3= LINE WIDTH
2704  011446  004037  017510                    JSR     R0,BLDINA       ;GO BUILD A SLIDING PATTERN.
2705  011452  013721  001752                    MOV     CARRT,(R1)+     ;LOAD A C/R AND L/F
2706  011456  013721  001754                    MOV     LNFED,(R1)+
2707  011462  012737  000206  015510           MOV     #134.,XMCNT     ;SET UP TO XMIT BY BYTES.
2708  011470  052777  000100  170240           BIS     #TENA,@VXCSR
2709  011476  032737  000001  002224           BIT     #XMDNE,VSTAT    ;WAIT FOR XMIT DONE
2710  011504  001774                            BEQ     .-6
2711  011506  004037  021022                    JSR     R0,EXTST        ;CHECK FOR EXIT REQUEST.
2712  011512  000402                            BR      6$              ;NO-CONTINUE
2713  011514  000137  003100                    JMP     ASTRT           ;YES-EXIT TEST!!
2714  011520  004037  020200            6$:     JSR     R0,CKABRT       ;CHECK FOR A PERIPHERAL ABORT.
2715  011524  122705  000177                    CMPB    #177,R5         ;EXCEEDED PATT. LIMIT?
2716  011530  001337                            BNE     5$              ;NO
2717  011532  000734                            BR      4$              ;YES RESET IT
2718
2719                                    ;;**********************************************************************
2720
2721                                            ;ROUTINE TO LOOP DATA/COMMANDS FROM THE VT61 BACK TO
2722                                            ;THE VT61. DATA TRANSMISSIONS RESULTING FROM A ESC
2723                                            ;SEQUENCE WILL ALSO BE LOOPED AND WILL ENTER THE SCREEN
2724                                            ;AT THE CURSOR POSITION.THIS TEST CAN BE USED TO SIMULATE,
2725                                            ;OR CREATE, SPECIFIC SCREEN PATTERNS AND OPERATIONS.
2726                                    ;;**********************************************************************
2727
2728                                    ;;**********************************************************************
2729  011534  000004                    TST23:  SCOPE
2730  011536  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
2731  011544  012737  011552  001106            MOV     #LPTST,$LPADR   ;;SET SCOPE LOOP ADDRESS
2732
2733  011552  004037  016520            LPTST:  JSR     R0,RESPTR       ;RESET POINTERS
2734  011556  012702  026553                    MOV     #DLOOP,R2       ;LOAD LOOP MESSAGE ADDRESS
2735  011562  004037  017600                    JSR     R0,DSMES        ;DISPLAY IT
2736  011566  012703  011332                    MOV     #EXMAIN,R3
2737  011572  004037  016460                    JSR     R0,LDXMIT       ;ISSUE EXIT MAINTENANCE MODE.
2738  011576  004037  020572                    JSR     R0,LOOP         ;GO LOOP VT61
2739  011602  000137  003100                    JMP     ASTRT           ;ENTER MAN MODE VIA SCOPE ROUTINE.
2740
2741                                    ;;**********************************************************************
2742
2743                                            ;PRODUCTION KEYBOARD TEST.  ALL KEYS MUST BE DEPRESSED
2744                                            ;IN THE SEQUENCE INDICATED ON THE SCREEN.  ALL ERRORS
2745                                            ;OR MISTAKES ARE DISPLAYED IN OCTAL POSITIONAL FORMAT AND THE
2746                                            ;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. 10
                                        ;ERRORS WILL CAUSE AN AUTOMATIC EXIT FROM TEST.
                                ;;**************************************************************

                                ;;**************************************************************
011606  000004                  TST24:  SCOPE
011610  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
011616  012737  011624  001106          MOV     #PDKBD,$LPADR   ;;SET SCOPE LOOP ADDRESS

011624  012702  027254          PDKBD:  MOV     #DKBD   ,R2
011630  004037  017600                  JSR     R0      ,DSMES  ;DISPLAY KEYBOARD TEST MESSAGE.
011634  005037  002210                  CLR     BUBCT           ;CLEAR ERROR COUNT LOCATION.
011640  005005                          CLR     R5

011642  016504  011766          DOAROW: MOV     DTTBL(R5),R4    ;SET UP 'GOOD' CHAR. POINTER
011646  016503  011740                  MOV     MSTBL(R5),R3
011652  001414                          BEQ     FEXIT           ;MESSAGE WAS ZERO-EXIT.
011654  100421                          BMI     CLMAIN          ;IF MESSAGE IS -1,CLEAR MAINT. MODE.
011656  004037  016460                  JSR     R0,LDXMIT       ;ISSUE 'ROW OR FUNCTION' MESSAGE.
011662  004037  020324                  JSR     R0,CKKBD        ;GO CHECK IT.
011666  123727  002210  000012          CMPB    BUBCT,#10.      ;TEN ERROR EXIT?
011674  103401                          BLO     1$              ;NO-CONTINUE.
011676  000402                          BR      FEXIT           ;YES-EXIT TEST.
011700  005725                  1$:     TST     (R5)+           ;INCREMENT OFFSET.
011702  000757                          BR      DOAROW          ;NO-DO NEXT ROW/FUNCTION.
011704  012702  026715          FEXIT:  MOV     #DEXT,R2
011710  004037  017600                  JSR     R0,DSMES        ;ISSUE EXIT MESSAGE
011714  000137  003100                  JMP     ASTRT
011720  012703  011734          CLMAIN: MOV     #RSMAIN,R3      ;SET UP TO EXIT MAINT. MODE.
011724  004037  016460                  JSR     R0,LDXMIT
011730  005725                          TST     (R5)+           ;INCREMENT OFFSET.
011732  000743                          BR      DOAROW          ;NOW TEST CONTROL AND SHIFT FUNCTIONS.
011734     033     117     141  RSMAIN: .BYTE   .ESC,.O,.DMAIN,0
011737     000

                                        ;TABLE OF MESSAGE ADDRESSES.

011740  027457  027564  027621  MSTBL:  .WORD   DTOP,DSEC,DTHRD,DBOT
011746  027750
011750  030026  030052  177777          .WORD   DSPCE,DKPD,-1,DCONT,DLSHFT,DRSHFT,0
011756  027700  027405  027511
011764  000000

011766  030253  030274  030314  DTTBL:  .WORD   ROW1,ROW2,ROW3,ROW4,SPCB
011774  030332  030354
012000  030356  000000  030350          .WORD   KYPD,0,CNTRA,SHFTA,SHFTA
012006  030352  030352

                                ;;**************************************************************
                                        ;SUBROUTINE TO ALLOW SETUP FROM MULTIPLE ENTRIES
                                ;;**************************************************************

012012                          SETA:
```

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                                        .SBTTL  INITIALIZE THE COMMON TAGS
                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
012012  012706  001100                          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
012016  005026                                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
012020  022706  001140                          CMP     #SWR,R6 ;;DONE?
012024  001374                                  BNE     .-6             ;;LOOP BACK IF NO
012026  012706  001100                          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                        ;;INITIALIZE A FEW VECTORS
012032  012737  021226  000020                  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
012040  012737  000340  000022                  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
012046  012737  021502  000030                  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
012054  012737  000340  000032                  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
012062  012737  023074  000034                  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
012070  012737  000340  000036                  MOV     #340,@#TRAPVEC+2;LEVEL 7
012076  012737  022716  000024                  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
012104  012737  000340  000026                  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
012112  013737  010744  010736                  MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
012120  005037  001160                          CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
012124  005037  001162                          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
012130  112737  000001  001115                  MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
012136  012737  012136  001106                  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
012144  012737  012144  001110                  MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
                                        ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                        ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
012152  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
012156  012737  012212  000004                  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
012164  012737  177570  001140                  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
012172  012737  177570  001142                  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
012200  022777  177777  166732                  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
012206  001012                                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
012210  000403                                  BR      65$             ;;BRANCH IF NO TIMEOUT
012212  012716  012220          64$:            MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
012216  000002                                  RTI
012220  012737  000176  001140  65$:            MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
012226  012737  000174  001142                  MOV     #DISPREG,DISPLAY
012234  012637  000004          66$:            MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR

                                        .SBTTL  TYPE PROGRAM NAME
                                        ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
012240  005227  177777                          INC     #-1             ;;FIRST TIME?
012244  001014                                  BNE     67$             ;;BRANCH IF NO
012246  022737  010776  000042                  CMP     #$ENDAD,@#42    ;;ACT-11?
012254  001410                                  BEQ     67$             ;;BRANCH IF YES
012256  104401  012264                          TYPE    ,68$            ;;TYPE ASCIZ STRING
012262  000405                                  BR      67$             ;;GET OVER THE ASCIZ
                                        ;;68$:  .ASCIZ  <CRLF>*CZVTHCO*<CRLF>
012276                                  67$:
012276  104401  023214                          TYPE    ,STUPM  ;ISSUE SET-UP MESSAGE.
012302  012737  012330  000010                  MOV     #TRPA,@#10      ;AND VECTOR
012310  000230                                  SPL     0               ;PROCESSOR IS 11/45-11/70?
012312  012737  000010  017500                  MOV     #8.,PMULT       ;YES-DELAY MULTIPLIER = 8               ;;++C
012320  012737  000000  002232                  MOV     #0,PTYPE        ;11/45-11/70.                           ;;++C
012326  000424                                  BR      RTRP

012330  022626                  TRPA:   POP2SP                  ;NO
```

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2859  012332  012737  012362  000010          MOV     #TRPB,@#10      ;RELOAD TRAP ADDRESS
2860  012340  006737  002162                  SXT     CHRD            ;PROCESSOR IS 11/40 OR 35?
2861  012344  012737  000003  017500          MOV     #3,PMULT        ;YES-DELAY MULTIPLIER=3                 ;;++C
2862  012352  012737  177777  002232          MOV     #-1,PTYPE       ;11/35 OR 11/40.                        ;;++C
2863  012360  000407                          BR      RTRP
2864
2865  012362  022626                  TRPB:   POP2SP
2866  012364  012737  000002  017500          MOV     #2,PMULT        ;PROCESSOR MUST BE 11/05-11/34          ;;++C
2867  012372  012737  000001  002232          MOV     #1,PTYPE        ;SET PROCESSOR TYPE                     ;;++C
2868  012400  012737  000012  000010  RTRP:   MOV     #12,@#10        ;RESTORE TRAP CATCHER
2869  012406  105737  002176                  TSTB    MODE            ;CHECK MODE FOR CORRECT EXIT.
2870  012412  001402                          BEQ     70$
2871  012414  000137  002302                  JMP     MANSA           ;EXIT TO MANUAL SELECT
2872  012420  000137  002246          70$:    JMP     AUTOA           ;EXIT TO AUTO MODE.
2873
2874                          ;;**************************************************************************
2875                                  ;SUBROUTINE TO VERIFY ADDRESS AS THEY ARE ENTERED IN
2876                                  ;MANUAL SELECT MODE.
2877                          ;;**************************************************************************
2878
2879  012424  020227  160000          TMNAD:  CMP     R2,#160000      ;INSURE ADDRESS IS IN RANGE.
2880  012430  103407                          BLO     BDEXT           ;ITS NOT, TYPE A ? AND EXIT.
2881  012432  012737  012446  000004          MOV     #BDEXTA,@#4     ;SET UP TIME OUT TRAP.
2882  012440  005712                          TST     @R2             ;CHECK THE ADDRESS.
2883  012442  000240                          NOP
2884  012444  000405                          BR      ALEXT           ;ITS OK, USE A NORMAL EXIT.
2885  012446  022626                  BDEXTA: POP2SP                  ;ADDRESS TRAPPED- PURGE IT, TYPE A
2886  012450  104401  027252          BDEXT:  TYPE    ,QMRK           ;QUESTION MARK, RESTORE THE TRAP
2887  012454  012700  002316                  MOV     #BLDADD,R0      ;LOCATION, AND EXIT TO GET NEXT ENTRY.
2888  012460  012737  000006  000004  ALEXT:  MOV     #6,@#4
2889  012466  000200                          RTS     R0
2890
2891                          ;;**************************************************************************
2892                                  ;THIS ROUTINE MAPS ALL POSSIBLE DL11 ADDRESSES AND STORES
2893                                  ;THEM IN A TABLE (INTAB). ALL ADDRESSES WHICH DO NOT
2894                                  ;RESULT IN TIMEOUTS ARE STORED.
2895                          ;;**************************************************************************
2896
2897  012470  012701  000300          TRPVEC: MOV     #300,R1         ;START AT BEG. OF FLOATING VECTORS
2898  012474  012702  000302                  MOV     #302,R2         ;
2899  012500  012703  000004                  MOV     #4,R3           ;R3 CONTAINS IOT TRAP INST.
2900  012504  010221                  1$:     MOV     R2,(R1)+        ;START LOADING ADDRESSES
2901  012506  010321                          MOV     R3,(R1)+        ;LOAD THE TRAP
2902  012510  062702  000004                  ADD     #4,R2           ;ASSUME 4 REGISTERS PER INTERFACE
2903  012514  020127  001000                  CMP     R1,#1000        ;DONE?
2904  012520  002771                          BLT     1$              ;NO CONTINUE LOADING TRAPS
2905  012522  005037  000006                  CLR     @#6
2906  012526  012737  012566  000004          MOV     #TPENT,@#4      ;SET UP TIME-OUT TRAP ADDRESS
2907  012534  005001                          CLR     R1              ;CLEAR THE TABLE POINTER
2908  012536  012705  001652                  MOV     #INTAB,R5       ;R5=DESTINATION TABLE
2909  012542  016102  001716          FADD:   MOV     STRTAB(R1),R2   ;PUT THE ADDRESS TO BE TESTED IN R2
2910  012546  026102  001724          TRPE:   CMP     ENDTAB(R1),R2   ;HAVE WE EXCEEDED END OF TABLE ADDRESS?
2911  012552  103407                          BLO     TBLCK           ;YES GET NEXT BASE ADDRESS.
2912  012554  005712                          TST     @R2             ;ADDRESS THE DEVICE IF POSSIBLE
2913  012556  010225                          MOV     R2,(R5)+        ;IF WE GOT THIS FAR THERE IS A DEVICE THERE-SAVE IT
2914  012560  062702  000010          FADD1:  ADD     #10,R2          ;INCREMENT TO THE NEXT POSSIBLE ADDRESS
```

```
                                        BR      TRPE            ;GO TEST THE NEXT ADDRESS
                                TPENT:  POP2SP                  ;RESTORE THE STACK AND TEST
                                        BR      FADD1           ;NEXT ADDRESS
                                TBLCK:  TST     (R1)+           ;BUMP AREA COUNTER BY 2.
                                        BIT     #BIT02,R1       ;SEE IF BOTH DL11 AREAS CHECKED.
                                        BEQ     FADD            ;NO-GO CHECK THE OTHER AREA
                                        CLR     (R5)            ;SET UP TABLE TERMINATOR OF  ZEROS.
                                        RTS     R0
                                ;;**********************************************************************
                                        ;THIS ROUTINE WILL INSURE THAT THE DEVICE(DL11)
                                        ;WILL INTERRUPT WHEN XMIT INT. ENABLE BIT IS SET.
                                ;;**********************************************************************
                                CDEV:   CLR     -(SP)           ;CLEAR THE PSW,LSI11 STYLE.
                                        MOV     #100$,-(SP)
                                        RTI
                                100$:   MOV     #4,@#4          ;INSTALL IOT TRAP INST. AT LOCATION 4.
                                        MOV     #TDEV,@#IOTVEC  ;SET UP IOT TRAP EXIT ADDRESS
                                        MOV     #340,@#IOTVEC+2 ;SET PSW TO 7-ALLOW NO OTHER INTERRUPTS
                                        RESET                   ;INSURE ALL XMIT FLAGS HIGH.
                                        MOV     #VVECT,R3       ;VECTOR STORAGE ADDRESS SET
                                        MOV     #INTAB,R2       ;PRIMARY DEVICE TABLE ADDRESS SET
                                        MOV     #DLTBL,R5       ;FIN DEVICE TABLE ADDRESS SET.
                                CDEVA:  MOV     #VRCSR,R1       ;VT61 DEVICE ADDRESS SET.
                                        TST     (R2)            ;CHECKED ALL DEVICES?
                                        BEQ     AOUT            ;YES-EXIT
                                        BMI     1$              ;INSURE ADDRESS IS IN PROPER RANGE(17XXXX)

                                        ADD     #2,R2           ;ADDRESS IS DEFINITELY NOT GOOD -PURGE
                                        BR      CDEVA           ;AND LOOK FOR ANOTHER.
                                1$:     JSR     R0,LDADD        ;LOAD NEXT ADDRESSES TO BE CHECKED
                                        MOV     #1200,R1        ;NOW USE R1 AS FAILSAFE COUNTER
                                        BIS     #TENA,@VXCSR    ;SET XMIT ENABLE
                                        DEC     R1              ;IF DEVICE DOES NOT INTERRUPT WITHIN
                                        BNE     .-2             ;APPROX. 200US IT IS NOT A DL11.
                                        BR      CDEVA           ;THEREFORE, GO TRY ANOTHER DEVICE.
                                TDEV:   BIC     #TENA,@VXCSR    ;CLEAR XMIT ENABLE.
                                        SUB     #10,(R6)        ;RESET TO RECEIVER VECTOR ADDRESS
                                        MOV     (R6)+,(R3)      ;STORE IT IN VECTOR TABLE(VVECT).
                                        TST     (R6)+           ;POP THE OLD PSW AND DISCARD
                                        POP2SP                  ;POP THE ADD. AND PSW PRIOR TO INTERRUPT.
                                ;;**********************************************************************
                                        ;THIS ROUTINE IS A QUICK TEST OF ANY DL11 ENCOUNTERED
                                        ;A DATA PATTERN WILL BE RUN ON ALL ENTRIES IN INTAB
                                ;;**********************************************************************
                                        CLR     -(SP)           ;CLEAR THE PSW,LSI11 STYLE.
                                        MOV     #100$,-(SP)
                                        RTI
                                100$:   MOV     (R3)+,R1        ;GET THE RECEIVE VECTOR ADDRESS
                                        MOV     #RECAD,(R1)+    ;AND STORE SAME.
                                        MOV     #340,(R1)+      ;SET RECEIVE PSW TO 7.
                                        MOV     #TSMAD,(R1)+    ;STORE THE XMIT VECTOR ADDRESS
                                        MOV     #340,(R1)       ;SET XMIT PSW TO 7.
                                        MOV     #BIT00,R4       ;R4 IS NOW DATA PATTERN OF 1.
                                        CLR     R1              ;SET UP FAILSAFE DELAY.
                                        BIS     #RDENA,@VRCSR   ;SET RECEIVE ENABLE.
```

```
2971  013010  052777  000104  166720          BIS     #TCOMB,@VXCSR   ;ENABLE XMIT INT. AND MAINTENACE .
2972  013016  105704                  1$:     TSTB    R4              ;XMIT PATTERN COMPLETE?
2973  013020  001423                          BEQ     GDAD            ;YES GO STORE THIS ADDRESS
2974  013022  005301                          DEC     R1              ;CYCLE TIMEOUT DELAY
2975  013024  001374                          BNE     1$              ;NOT YET 'TIMEOUT',KEEP CYCLING.
2976  013026  162703  000002                  SUB     #2,R3           ;RESET VECTOR POINTER
2977  013032  042777  000104  166676          BIC     #TCOMB,@VXCSR   ;CLEAR XMIT AND RECEIVE INT. ENABLES.
2978  013040  042777  000100  166664          BIC     #RDENA,@VRCSR
2979  013046  104401  023461                  TYPE    ,DLERR          ;ISSUE DL11 FAILURE MESSAGE.
2980  013052  013746  001732                  MOV     VRCSR,-(SP)     ;;SAVE VRCSR FOR TYPEOUT
2981                                                                  ;;TYPE BD. ADDRESS
2982  013056  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
2983  013060     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
2984  013061     001                          .BYTE   1               ;;TYPE LEADING ZEROS
2985  013062  104401  001171                  TYPE    ,$CRLF
2986  013066  000673                          BR      CDEVA           ;GO TRY ANOTHER SET OF ADDRESSES.
2987  013070  013725  001732          GDAD:   MOV     VRCSR,(R5)+     ;SAVE GOOD ADDRESS IN DL TABLE
2988  013074  005077  166634                  CLR     @VRBUF          ;CLEAR ANY RECEIVE FLAG STILL SET.
2989  013100  000666                          BR      CDEVA           ;;CHECK ANOTHER DL11
2990  013102  005015                  AOUT:   CLR     (R5)            ;SET A ZERO TABLE TERMINTATOR.
2991  013104  012737  000006  000004          MOV     #6,@#4          ;RESTORE LOCATION 4 TO HALT CONDITION
2992  013112  005037  000006                  CLR     @#6             ;TO CATCH ERRORS AND ILLEGAL INTERRUPTS.
2993  013116  012737  021226  000020          MOV     #$SCOPE,@#IOTVEC        ;RELOAD IOT VECTOR FOR SCOPE
2994  013124  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;LOOP.
2995  013132  012701  000300                  MOV     #300,R1
2996  013136  012702  000302                  MOV     #302,R2
2997  013142  010221                  1$:     MOV     R2,(R1)+
2998  013144  005021                          CLR     (R1)+           ;RESTORE HALTS TO ALL LOCATIONS CONTAINING IOTS
2999  013146  062702  000004                  ADD     #4,R2
3000  013152  020127  001000                  CMP     R1,#1000        ;TO LOCATION 1000
3001  013156  103771                          BLO     1$
3002  013160  000005                          RESET                   ;CLEAR ALL FLAGS
3003  013162  000200                          RTS     R0
3004
3005                                    ;;*****************************************************************
3006                                    ;INITIALIZATION ROUTINE FOR AUTO SELECTION. THIS ROUTINE
3007                                    ;WILL INSURE THAT ALL DL11S IN DLTBL HAVE A VT61 CONNECTED
3008                                    ;ALL UNITS WHICH CANNOT CORRECTLY RESPOND WILL BE PURGED.
3009                                    ;;*****************************************************************
3010
3011  013164  012702  001612  INITA:  MOV     #DLTBL,R2       ;R2 POINTS TO DL11 ADDRESS TABLE
3012  013170  012703  001552          MOV     #VVECT,R3       ;R3 POINTS TO DL11 VECTOR
3013  013174  012701  001732  11$:    MOV     #VRCSR,R1       ;POINTER TO VT61 DL11
3014  013200  005712                  TST     (R2)            ;SEE IF ALL CHECKED
3015  013202  001447                  BEQ     INTXT           ;YES-EXIT
3016  013204  004037  013404          JSR     R0,LDADD        ;NO-GO LOAD THE ADDRESSES
3017  013210  062703  000002          ADD     #2,R3           ;UPDATE VECTOR COUNT
3018  013214  004037  015674          JSR     R0,ZFLAG        ;ISSUE ESCZ AND LOOK FOR RESPONSE.
3019  013220                  2$:
3020  013220  012637  002162          MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
3021  013224  100414                  BMI     5$              ;TIMEOUT OCCURRED NO CHARACTER
```

```
3022  013226  123727  002162  000140          CMPB    CHRD,#140       ;CHECK IDENT FOR VT61 IDENTIFIERS
3023  013234  103410                          BLO     5$              ;NOT A VT61-SET UP TO PURGE ADDRESS
3024  013236  123727  002162  000172          CMPB    CHRD,#172       ;IDENTS ARE SMALL A THRU Z
3025  013244  101004                          BHI     5$              ;NOT A VT61-PURGE
3026  013246                          4$:
3027  013246  012637  002162                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
3028  013252  001375                          BNE     4$
3029  013254  000747                          BR      11$             ;TEST ANOTHER ADDRESS
3030  013256                          5$:
3031  013256  012637  002162                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
3032  013262  001375                          BNE     5$
3033  013264  162702  000002                  SUB     #2,R2           ;RESET ADDRESS AND VECTOR POINTERS
3034  013270  162703  000002                  SUB     #2,R3
3035  013274  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3036  013276  012746  000001                  MOV     #1,-(SP)        ;;PUSH #1 ON STACK
3037  013302  004037  013614                  JSR     R0,BBLUP
3038  013306  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
3039  013310  012746  000001                  MOV     #1,-(SP)        ;;PUSH #1 ON STACK
3040  013314  004037  013614                  JSR     R0,BBLUP
3041  013320  000725                          BR      11$             ;TRY ANOTHER DL11 ADDRESS.
3042
3043  013322  005737  001612          INTXT:  TST     DLTBL           ;CHECK TO INSURE GOOD ADDRESSES
3044  013326  001012                          BNE     EXINT           ;YES-GO TO NEXT TEST
3045  013330  104401  023370                  TYPE    ,NOVT           ;NO-ISSUE NO VT61 MESSAGE.
3046  013334  012737  005670  017502          MOV     #3000.,DCOUNT   ;SET DELAY TO 30 SEC.
3047  013342  004037  017440                  JSR     R0,DELAY        ;AND DO IT.
3048  013346  062700  000004                  ADD     #4,R0           ;SET UP 'NO VT61 FOUND' EXIT
3049  013352  000200                          RTS     R0
3050  013354  012702  001612          EXINT:  MOV     #DLTBL,R2       ;LOAD AND ISSUE GOOD ADDRESSES
3051  013360  104401  023317                  TYPE    ,DUNTST         ;OF RESPONSIVE VT61S.
3052  013364                          1$:
3053  013364  012246                          MOV     (R2)+,-(SP)     ;;SAVE (R2)+ FOR TYPEOUT
3054                                                                  ;;TYPE AN ADDRESS
3055  013366  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
3056  013370     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
3057  013371     001                          .BYTE   1               ;;TYPE LEADING ZEROS
3058  013372  104401  001171                  TYPE    ,$CRLF
3059  013376  005712                          TST     (R2)            ;AT END OF GOOD UNITS?
3060  013400  001371                          BNE     1$              ;NO PRINT ANOTHER ADDRESS.
3061  013402  000200                          RTS     R0
3062                                  ;;*****************************************************************
3063                                  ;SUBOUTINE TO LOAD 4 ADRESSES FROM THE LOCATION AT (R2).
3064                                  ;TO 4 LOCATION POINTED TO BY R1(TO VXBUFF+2).ROUTINE USES R4 AS
3065                                  ;WORK REG AND EXITSD WITH R2 INCREMENTED BY 2.
3066                                  ;;*****************************************************************
3067
3068  013404  012204          LDADD:  MOV     (R2)+,R4        ;LOAD THE ADDRESS
3069  013406  010421          1$:     MOV     R4,(R1)+        ;STORE AN ADDRESS
3070  013410  062704  000002          ADD     #2,R4           ;INCREMENT ADDRESS
3071  013414  020127  001742          CMP     R1,#VXBUF+2     ;LOADED 4?
3072  013420  002772                  BLT     1$              ;NO LOAD ANOTHER
3073  013422  000200                  RTS     R0              ;YES-EXIT
3074
3075                                  ;;*****************************************************************
3076                                  ;ROUTINE TO RECEIVE CHARACTER(S).  ENTERED WITH
3077                                  ;NUMBER OF CHARACTERS TO RECEIVE ON THE STACK.
```

```
                                        ;ROUTINE EXITS WITH CARACTER(S) ON STACK.  IF A
                                        ;PROGRAM TIME-OUT (100 M.S.) OCCURS BEFORE A CHARACTER
                                        ;IS RECEIVED ROUTINE EXITS WITH -1 ON STACK. FORMAT
                                        ;FOR DATA IS (BYTE2, BYTE1) ETC.  A WORD OF ZEROS TERMINATES
                                        ;DATA STRING ON THE STACK. SOM/EOM, IF SENT, ARE RECEIVED
                                        ;BUT NOT STORED.

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

013424                              RECTM:
013424  012637  002222                      MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
013430  012637  002210                      MOV     (SP)+,@#BUBCT   ;;POP STACK INTO @#BUBCT
013434  013746  002170                      MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
013440  005037  002162              1$:     CLR     CHRD            ;CLEAR CHARACTER STORAGE LOCATION.
013444  005037  002220                      CLR     DLAY            ;SET UP FAILSAFE DELAY
013450  032777  000200  166254      3$:     BIT     #RECDN,@VRCSR   ;SEE IF DONE FLAG SET
013456  001007                              BNE     4$
013460  005337  002220                      DEC     DLAY            ;DECREMENT FAILSAFE CNTR.
013464  001371                              BNE     3$              ;NOT AT ZERO-CONTINUE WAITING.
013466  012737  177777  002162      31$:    MOV     #-1,CHRD        ;SET UP FOR FAILSAFE EXIT.
013474  000442                              BR      RECEX           ;EXIT ROUTINE.
013476  117737  166232  002162      4$:     MOVB    @VRBUF,CHRD     ;STORE THIS CHARACTER.
013504  042737  000200  002162              BIC     #200,CHRD       ;STRIP PARITY BIT.
013512  122737  000057  002162              CMPB    #SLSH,CHRD      ;RECEIVED A IDENT SLASH(57)?
013520  001007                              BNE     41$             ;NO-STORE A CHARACTER.
013522  105337  002211                      DECB    BUBCT+1         ;DECREMENT ALLOWABLE SLASH COUNT.
013526  001757                              BEQ     31$             ;COUNT EQUAL ZERO-SET UP ERROR EXIT.
013530  123727  002211  000213              CMPB    BUBCT+1,#139.   ;RECEIVED FIRST SLASH?
013536  103740                              BLO     1$              ;YES-IGNORE THIS ONE.
013540  122737  000002  002162      41$:    CMPB    #SOM,CHRD       ;IS CHAR. ACTUALLY SOM?
013546  001003                              BNE     5$              ;NO
013550  105237  002210                      INCB    BUBCT           ;YES -SET UP TO RECEIVE EOM ALSO
013554  000731                              BR      1$              ;AND RECEIVE NEXT CHAR.
013556  122737  000004  002162      5$:     CMPB    #EOM,CHRD       ;CHAR. = EOM?
013564  001410                              BEQ     RECEXA          ;YES- DO NOT PUSH IT ON STACK
013566  105337  002210                      DECB    BUBCT           ;DECREMENT CHARACTER COUNT.
013572  001403                              BEQ     RECEX           ;COUNT=0. EXIT WERE DONE.
013574  013746  002162                      MOV     CHRD,-(SP)      ;;PUSH CHRD ON STACK
013600  000717                              BR      1$              ;GO READ AGAIN.

013602                              RECEX:
013602  013746  002162                      MOV     CHRD,-(SP)      ;;PUSH CHRD ON STACK
013606                              RECEXA:
013606  013746  002222                      MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
013612  000200                              RTS     R0


                                    ;;**********************************************************************
                                        ;THIS ROUTINE WILL 'BUBBLE UP' XX WORDS TO
                                        ;ELIMINATE NON-RESPONSIVE ADDRESSES.  ENTERED
                                        ;WITH ADDRESS TO BE 'BUBBLED' TO ON THE STACK. LOCATIONS
                                        ;ELIMINATED WILL BE FILLED WITH ZEROS.  THE STACK MUST ALSO
                                        ;BE LOADED WITH THE NUMBER OF POSITIONS TO BUBBLE.
                                    ;;**********************************************************************

013614                              BBLUP:
```

```
3134  013614  012637  002222                    MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
3135  013620  012637  002210                    MOV     (SP)+,BUBCT     ;;POP STACK INTO BUBCT
3136  013624  012637  002206                    MOV     (SP)+,TOADD     ;;POP STACK INTO TOADD
3137  013630  010446                            MOV     R4,-(SP)        ;;PUSH R4 ON STACK
3138  013632  013704  002206            2$:     MOV     @#TOADD,R4      ;PUT LAST GOOD DL11 ADDRESS IN R4
3139  013636  012437  002162                    MOV     (R4)+,CHRD      ;MOVE NEXT WORD TO CHRD FOR STORAGE
3140  013642  012464  177774            1$:     MOV     (R4)+,-4(R4)    ;BUBBLE UP DATA.
3141  013646  001375                            BNE     1$              ;BUBBLE UNTIL ZERO BYTE MOVED.
3142  013650  005337  002210                    DEC     BUBCT           ;SUBTRACT ONE FROM BUBBLE COUNT.
3143  013654  001366                            BNE     2$              ;IF BUBBLE COUNT NOT ZERO - DO AGAIN.
3144  013656                            3$:
3145  013656  012604                            MOV     (SP)+,R4        ;;POP STACK INTO R4
3146  013660  013746  002222                    MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
3147  013664  000200                            RTS     R0              ;YES-EXIT
3148
3149                                    ;;**********************************************************************
3150                                            ;THIS ROUTINE OUTPUTS THE ESC SEQUENCE FOUND ON
3151                                            ;THE STACK. A WORD OF ZEROS MUST TERMINATE THE SEQUENCE.
3152                                            ;FORMAT FOR STACK WORD IS SEQ-ESC, IE-XXX033.
3153                                    ;;**********************************************************************
3154
3155  013666                            TESC:
3156  013666  012637  002222                    MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
3157  013672  010437  002210                    MOV     R4,BUBCT        ;SAVE R4.
3158  013676  112777  000002  166034            MOVB    #SOM,@VXBUF     ;SEND A START OF MESSAGE.
3159  013704  012705  177777            1$:     MOV     #-1,R5          ;ALL ONES THE CHECK LOCATION.
3160  013710  012604                            MOV     (R6)+,R4        ;GET COMMAND FROM STACK.
3161  013712  001415                            BEQ     3$              ;IF ZERO TERMINATOR FOUND-EXIT.
3162  013714  110405                            MOVB    R4,R5           ;LOAD CHECK BYTE.
3163  013716  105704                    2$:     TSTB    R4              ;CHECK BYTE FOR A ZERO.
3164  013720  001406                            BEQ     20$             ;IF ZERO_DO NOT XMIT IT.
3165  013722  032777  000200  166006            BIT     #TRDY,@VXCSR
3166  013730  001774                            BEQ     .-6             ;WAIT FOR XMIT READY BIT
3167  013732  110477  166002                    MOVB    R4,@VXBUF       ;XMIT A BYTE.
3168  013736  000304                    20$:    SWAB    R4              ;GET THE OTHER BYTE .
3169  013740  120405                            CMPB    R4,R5           ;IF GOOD COMPARE WE HAVE CHECKED BOTH
3170  013742  001760                            BEQ     1$              ;BYTES SO POP ANOTHER WORD.
3171  013744  000764                            BR      2$              ;GO XMIT ANOTHER BYTE
3172  013746  032777  000200  165762    3$:     BIT     #TRDY,@VXCSR    ;SEE IF READY SET
3173  013754  001774                            BEQ     .-6
3174  013756  012777  000004  165754            MOV     #EOM,@VXBUF     ;SEND A EOM.
3175  013764  032777  000200  165744            BIT     #TRDY,@VXCSR    ;SEE IF READY SET
3176  013772  001774                            BEQ     .-6
3177  013774  013704  002210                    MOV     BUBCT,R4        ;RESTORE R4.
3178  014000  013746  002222                    MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
3179  014004  000200                            RTS     R0
3180
3181                                    ;;**********************************************************************
3182                                            ;ROUTINE TO READ A CHARACTER FROM THE CONSOLE.
3183                                            ;EXITS WITH CHARACTER ON THE STACK.
3184                                    ;;**********************************************************************
3185
3186  014006                            CONRD:
3187  014006  012637  002222                    MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
3188  014012  032777  000200  165124            BIT     #RECDN,@$TKS    ;LOOK FOR DONE BIT
3189  014020  001774                            BEQ     .-6             ;WAIT FOR IT
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3190  014022  117746  165120                  MOVB    @$TKB,-(R6)     ;PUSH CHARACTER TO STACK
3191  014026  042716  000200                  BIC     #200,(R6)       ;STRIP ANY PARITY BIT.
3192  014032  013746  002222                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
3193  014036  000200                         RTS     R0
3194
3195                                  ;;*****************************************************************
3196                                  ;MANUAL TEST SELECT MONITOR
3197                                  ;SELECTS TESTS TO BE EXECUTED FROM THOSE ENTERED IN
3198                                  ;INITIAL DIALOGE. IF TEST 377 WAS REQUESTED THE TESTS WILL
3199                                  ;REPEAT INFINITELY.
3200                                  ;;*****************************************************************
3201
3202  014040  105737  002176          MONIT:  TSTB    MODE            ;TEST MODE SWITCH
3203  014044  001012                          BNE     1$              ;MANUAL MODE
3204  014046  023737  002200  002202          CMP     FTLCNT,ALWCNT   ;COMPARE FATAL XMITS WITH ALLOWED.
3205  014054  103405                          BLO     100$            ;FATALS LESS THAN ALLOWED-CONTINUE.
3206  014056  104401  025123                  TYPE    ,DABRT          ;ISSUE ABORT MESSAGE.
3207  014062  000005                  200$:   RESET                   ;CLEAR ALL INTERFACE FLAGS.
3208  014064  000137  012012                  JMP     SETA            ;SET UP TO RESTART TEST.
3209  014070  000200                  100$:   RTS     R0              ;AUTO MODE
3210  014072  005726                  1$:     TST     (R6)+           ;POP THE STACK
3211  014074  022626                          POP2SP                  ;POP SCOPE RETURN AND VECTOR
3212  014076  005037  002200                  CLR     FTLCNT          ;DO NOT INC. FATAL COUNT IN MANUAL MODE.
3213  014102  032777  000200  165034  10$:     BIT     #RECDN,@$TKS    ;CONSOLE ACTIVE?
3214  014110  001407                          BEQ     11$
3215  014112  117701  165030                  MOVB    @$TKB,R1        ;STORE INPUT BUFFER
3216  014116  042701  000200                  BIC     #200,R1         ;CLEAR THE PARITY BIT
3217  014122  122701  000003                  CMPB    #3,R1           ;CHAR. EQUAL ESC. C?
3218  014126  001755                          BEQ     200$            ;YES-EXIT
3219  014130  117701  166040          11$:    MOVB    @TSTPTR,R1      ;GET THE NEXT TEST #
3220  014134  003005                          BGT     2$              ;NOT AT END OF LIST
3221  014136  042777  000100  165566          BIC     #RDENA,@VRCSR   ;CLEAR REC. INTERRUPTS BEFORE NEXT UNIT SELECT.
3222  014144  000137  002534                  JMP     MODCA           ;END OF LIST-GO SET UP NEXT 61
3223  014150  005301                  2$:     DEC     R1              ;ADJUST OFFSET
3224  014152  006301                          ASL     R1              ;USE TEST # TO FORM ADDRESS OFFSET
3225  014154  016137  023144  014212          MOV     TSTADD(R1),JMPADD+2     ;LOAD NEW ADDRESS
3226  014162  062737  000002  014212          ADD     #2,JMPADD+2     ;BYPASS INITIAL SCOPE LOOP
3227  014170  005237  002174                  INC     TSTPTR          ;INCREMENT TEST OPINTER
3228  014174  005037  177776                  CLR     PSW             ;SET NON-INT. PRIORITY TO ZERO
3229  014200  005046                          CLR     -(SP)           ;CLEAR THE PSW,LSI 11 STYLE.
3230  014202  012746  014210                  MOV     #JMPADD,-(SP)
3231  014206  000002                          RTI
3232  014210  000137  014210          JMPADD: JMP     JMPADD          ;EXIT TO NEXT SELECTED TEST
3233                                  ;;*****************************************************************
3234                                  ;;*****************************************************************
3235                                  ;FOLLOWING ROUTINES ARE INTERRUPT HANDLERS FOR THE
3236                                  ;DL11 QUICK-TEST.
3237                                  ;;*****************************************************************
3238                                  ;;*****************************************************************
3239  014214  117737  165514  002162  RECAD:  MOVB    @VRBUF,CHRD     ;GET THE RECEIVED CHAR.
3240  014222  042737  000200  002162          BIC     #200,CHRD       ;CLEAR ANY PARITY.
3241  014230  120437  002162                  CMPB    R4,CHRD         ;COMPARE RECEIVED TO XMITTED
3242  014234  001407                          BEQ     UPD4            ;AND UPDATE PATTERN IF OK.
3243  014236  042777  000104  165472  TOFF:   BIC     #TCOMB,@VXCSR   ;DATA ERROR OCCURED OR WE ARE DONE
3244  014244  042777  000100  165460          BIC     #RDENA,@VRCSR   ;EITHER WAY-EXIT.
3245  014252  000002                  REEX:   RTI
```

```
3246  014254  052777  000100  165454  UPD4:   BIS     #TENA,@VXCSR    ;ENABLE XMIT INT.
3247  014262  106304                          ASLB    R4              ;UPDATE DATA PATTERN.
3248  014264  032704  000200                  BIT     #BIT07,R4       ;ROTATED TO PARITY BIT?
3249  014270  001770                          BEQ     REEX            ;NO-CONTINUE TESTING
3250  014272  005004                          CLR     R4              ;YES-SET UP COMPLETE FLAG
3251  014274  000760                          BR      TOFF            ;AND EXIT.
3252  014276  110477  165436          TSMAD:  MOVB    R4,@VXBUF       ;XMIT DATA
3253  014302  042777  000100  165426          BIC     #TENA,@VXCSR    ;CLEAR XMIT INT. UNTIL LAST BIT REC.
3254  014310  000002                          RTI
3255
3256                                  ;;**********************************************************************
3257                                          ;RECEIVE INTERRUPT ROUTINE.AFTER EACH RECEIVE
3258                                          ;CYCLE BUFFER POINTER (RBUFP) WILL BE SET TO (RBBUF).
3259                                          ;MAX. EXECUTION TIME IS APPROX 200US, AVERAGE =100US.
3260                                          ;UPON RECEIPT OF XON, XMTKIL BIT IS CHECKED IN VSTAT
3261                                          ;AND IF SET, WILL BE CLEARED AND XMIT INT. ENABLE SET.
3262                                          ;LOCATION ESAMB IS USED FOR ESC ASSEMBLY FLAGS. IE. BIT
3263                                          ;00 SET MEANS A033 WAS RECEIVED, BIT 01 SET MEANS AN ESCP
3264                                          ;SEQUENCE IS BEING ASSEMBLED. BIT 03
3265                                          ;SET INDICATES AND ESCAPE 0 SEQUENCE IS BEING ASSEMBLED.
3266                                          ;LOCATIONS STR0 AND STRP ARE USED TO STORE ESCAPE
3267                                          ;0 AND ESCAPE P SEQUENCES DETECTED,BUT NOT UTILIZED IN TEST.
3268                                  ;;**********************************************************************
3269
3270  014312                          INTRC:
3271  014312  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3272  014314  017701  165414                  MOV     @VRBUF,R1       ;USE R1 FOR  STORAGE OF STATUS AND CH.
3273  014320  042701  000200                  BIC     #200,R1         ;STRIP PARITY BIT.
3274  014324  032737  000100  002224          BIT     #TXSUM,VSTAT    ;CHECKSUM CALCULATION REQUESTED?
3275  014332  001403                          BEQ     11$             ;NO
3276  014334  010105                          MOV     R1,R5           ;YES-STORE CHAR. AND
3277  014336  004037  020124                  JSR     R0,CALCK        ;CALCULATE THE CHECKSUM.
3278  014342  005237  031602          11$:    INC     ABUFP           ;INCREMINT THE RAW DATA POINTER
3279  014346  023727  031602  031666          CMP     ABUFP,#ABBUF+50.        ;AT THE END OF BUFFER?
3280  014354  001003                          BNE     12$             ;NO
3281  014356  012737  031604  031602          MOV     #ABBUF,ABUFP    ;YES-RESET IT
3282  014364  110177  015212          12$:    MOVB    R1,@ABUFP       ;STORE THE RAW DATA
3283  014370  001505                          BEQ     6$              ;IF CHAR. IS NULL-GO STORE IT
3284  014372  032737  000013  015202          BIT     #BIT00+BIT01+BIT03,ESAMB        ;ESC OR ESC 0?
3285  014400  001150                          BNE     ASESC           ;YES-KEEP ASSEMBLING
3286  014402  120137  002132                  CMPB    R1,ESCN         ;BYTE = ESCN?
3287  014406  101076                          BHI     6$              ;NO-PROBABLY A DISPLAY CH.-STORE IT.
3288  014410  001007                          BNE     1$              ;NO-DECODE FOR XON,XOFF,SOM,EOM
3289  014412  012737  000001  015202          MOV     #1,ESAMB        ;YES SET ESC ASSEMBLY FLAG.
3290  014420  052737  000400  002224          BIS     #ESC,VSTAT      ;SET ESC RECEIVED FLAG
3291  014426  000515                          BR      RSTER           ;AND EXIT
3292  014430  120127  000023          1$:     CMPB    R1,#XOFF        ;SEE IF RECEIVED BYTE WAS XOFF
3293  014434  001004                          BNE     2$              ;NO
3294  014436  052737  100000  002224          BIS     #RXOFF,VSTAT    ;YES, SET XOFF IN STATUS REG.
3295  014444  000506                          BR      RSTER           ;EXIT
3296  014446  120127  000021          2$:     CMPB    R1,#XON         ;SEE IF BYTE WAS XON
3297  014452  001016                          BNE     3$              ;NO
3298  014454  042737  100000  002224          BIC     #RXOFF,VSTAT    ;YES, CLEAR XOFF IN VSTAT.
3299  014462  032737  000200  002224          BIT     #XMKIL,VSTAT    ;CHECK XMIT KILL BIT.
3300  014470  001474                          BEQ     RSTER           ;NOT SET, EXIT
3301  014472  052777  000100  165236          BIS     #TENA,@VXCSR    ;SET XMIT INT. ENABLE.
```

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3302  014500  042737  000200  002224          BIC     #XMKIL,VSTAT    ;CLEAR THE XMIT KILLED FLAG
3303  014506  000465                          BR      RSTER           ;EXIT
3304  014510  120127  000002          3$:     CMPB    R1,#SOM         ;SEE IF BYTE WAS SOM
3305  014514  001004                          BNE     4$              ;NO
3306  014516  052737  040000  002224  31$:    BIS     #RSOM,VSTAT     ;YES, SET SOM IN VSTAT.
3307  014524  000456                          BR      RSTER           ;EXIT
3308
3309  014526  120127  000004          4$:     CMPB    R1,#EOM         ;WAS BYTE EOM?
3310  014532  001012                          BNE     5$              ;NO
3311  014534  052737  020000  002224          BIS     #REOM,VSTAT     ;NOW SET EOM IN VSTAT.
3312  014542  013737  015174  015200          MOV     RBBUF,RBUFP     ;RESET THE BUFFER POINTER.
3313  014550  042737  000100  002224          BIC     #TXSUM,VSTAT    ;CLEAR CHECKSUM REQUEST BIT.
3314  014556  000441                          BR      RSTER           ;AND EXIT
3315  014560  123701  001752          5$:     CMPB    CARRT,R1        ;CHAR. =CARRIAGE RETURN?
3316  014564  001403                          BEQ     51$             ;YES-GO SET END OF LINE FLAG
3317  014566  123701  001754                  CMPB    LNFED,R1        ;CHAR.= LINEFEED?
3318  014572  001004                          BNE     6$              ;NO- GO STORE IT
3319  014574  052737  001000  002224  51$:    BIS     #EPL,VSTAT      ;SET END OF LINE INDICATOR
3320  014602  000427                          BR      RSTER
3321
3322  014604  023737  015200  015176  6$:     CMP     RBUFP,REBUF     ;IS CIRCULAR BUFFER FILLED?
3323  014612  001003                          BNE     61$             ;NO
3324  014614  013737  015174  015200          MOV     RBBUF,RBUFP     ;YES, RESET POINTER TO BEGINNING
3325  014622  032737  000020  002224  61$:    BIT     #COMGP,VSTAT    ;RECEIVING GRAPHICS CHAR.?
3326  014630  001402                          BEQ     7$              ;NO
3327  014632  162701  000137                  SUB     #137,R1         ;YES-SUBTRACT 137 FROM RECEIVED CHAR.
3328
3329  014636  032737  000040  002224  7$:     BIT     #REVID,VSTAT    ;REVERSE VIDEO MODE?
3330  014644  001402                          BEQ     70$             ;NO STORE RECEIVED BYTE.
3331  014646  052701  000200                  BIS     #200,R1         ;YES-FORCE BIT7 AS REV. VIDEO IND.
3332  014652  110177  000322          70$:    MOVB    R1,@RBUFP       ;STORE BYTE AND
3333  014656  005237  015200                  INC     RBUFP           ;INCREMENT POINTER.
3334
3335  014662  005701                  RSTER:  TST     R1              ;CHECK FOR STATUS ERROR
3336  014664  100014                          BPL     RECXT           ;NO, EXIT ROUTINE
3337
3338  014666  052737  004000  002224          BIS     #RSTT,VSTAT     ;SET STATUS ERROR FLAG IN VSTAT
3339  014674  027727  000326  177777          CMP     @STTEP,#-1      ;IS ERROR TABLE FULL?
3340  014702  001405                          BEQ     RECXT           ;YES, EXIT ROUTINE
3341  014704  010177  000316                  MOV     R1,@STTEP       ;NO, STORE STATUS ERR. AND CHECK
3342  014710  062737  000002  015226          ADD     #2,STTEP        ;INCREMENT STATUS ERR. POINTER
3343
3344  014716                  RECXT:
3345  014716  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
3346  014720  000002                          RTI                     ;EXIT
3347  014722  032737  000002  015202  ASESC:  BIT     #2,ESAMB        ;ASSEMBLING ESC P?
3348  014730  001063                          BNE     AESCP           ;YES-GO GET LAST CH,
3349  014732  032737  000010  015202          BIT     #BIT03,ESAMB    ;ASSEMBLING ESC 0?
3350  014740  001062                          BNE     AESC0           ;YES
3351  014742  122701  000120                  CMPB    #120,R1         ;CH.= A P?
3352  014746  001004                          BNE     10$             ;NO KEEP CHECKING
3353  014750  052737  000002  015202          BIS     #BIT01,ESAMB    ;YES-SET ESCP ASSEMBLY FLAG
3354  014756  000741                          BR      RSTER           ;AND EXIT
3355  014760  122701  000077          10$:    CMPB    #77,R1          ;CHAR.IS AN ESC ? ?
3356  014764  001403                          BEQ     110$            ;YES-FAKE AN ESC 0.
3357  014766  122701  000117                  CMPB    #117,R1         ;CHAR = 0?
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3358  014772  001004                          BNE     11$             ;NO
3359  014774  052737  000010  015202  110$:   BIS     #BIT03,ESAMB    ;YES SET ESC 0 ASSEMBLY FLAG
3360  015002  000727                          BR      RSTER           ;AND EXIT
3361  015004  123701  002050          11$:    CMPB    RDCUR,R1        ;BYTE= CURSOR POSITION?
3362  015010  001004                          BNE     1$              ;NO-
3363  015012  052737  000004  002224          BIS     #CURPOS,VSTAT   ;YES-SET RECEIVED CURSOR POSITION.
3364  015020  000424                          BR      CESAM
3365  015022  122701  000057          1$:     CMPB    #SLSH,R1        ;BYTE=TERMINAL ID ESC?
3366  015026  001004                          BNE     2$              ;NO-CHECK FOR GRAPHICS SEQUENCE.
3367  015030  052737  000002  002224          BIS     #TRMID,VSTAT    ;YES-SET TERM. IDENT FLAG IN VSTAT
3368  015036  000415                          BR      CESAM
3369  015040  122701  000106          2$:     CMPB    #CKGP,R1        ;RECEIVED GRAPHICS CHAR. SEQUENCE?
3370  015044  001004                          BNE     3$              ;NO
3371  015046  052737  000020  002224          BIS     #COMGP,VSTAT    ;YES-SET GRAPHICS DATA FLAG.
3372  015054  000406                          BR      CESAM
3373  015056  122701  000107          3$:     CMPB    #NCKGP,R1       ;RECEIVED RESET GRAPHICS SEQ.?
3374  015062  001003                          BNE     CESAM           ;NO
3375  015064  042737  000020  002224          BIC     #COMGP,VSTAT    ;YES-SET NORMAL CHAR. RECEIVE.
3376  015072  005037  015202          CESAM:  CLR     ESAMB           ;CLEAR ASSEMBLY FLAG.
3377  015076  000671                          BR      RSTER           ;AND EXIT.
3378
3379  015100  110137  015232          AESCP:  MOVB    R1,STRP         ;STORE ANY UNCHECKED FOR  ESC. P
3380  015104  000772                          BR      CESAM
3381
3382  015106  123701  002016          AESCO:  CMPB    EEMP,R1         ;BYTE=ESC 0  -REV. VIDEO- ?
3383  015112  001004                          BNE     1$              ;NO
3384  015114  052737  000040  002224          BIS     #REVID,VSTAT    ;YES-SET REVERSE VIDEO MODE IN VSTAT.
3385  015122  000763                          BR      CESAM
3386
3387  015124  123701  002020          1$:     CMPB    DEMP,R1         ;BYTE=ESC 0 DISABLE REV. VIDEO MODE?
3388  015130  001004                          BNE     2$              ;NO
3389  015132  042737  000040  002224          BIC     #REVID,VSTAT    ;YES-CLEAR REVERSE VIDEO MODE IN VSTAT.
3390  015140  000754                          BR      CESAM
3391  015142  122701  000171          2$:     CMPB    #CPABRT,R1      ;COPIER ABORT?
3392  015146  001403                          BEQ     3$              ;YES-SET ABORT FLAG IN VSTAT
3393  015150  122701  000172                  CMPB    #PRABRT,R1      ;PRINTER ABORT?
3394  015154  001004                          BNE     4$              ;NO
3395  015156  052737  010000  002224  3$:     BIS     #PABRT,VSTAT    ;YES-SET THE ABORT FLAG.
3396  015164  000742                          BR      CESAM           ;AND EXIT.
3397  015166  110137  015230          4$:     MOVB    R1,STRO         ;STORE ESCAPE 0 COMMAND
3398  015172  000737                          BR      CESAM
3399
3400  015174  000000          RBBUF:  .WORD                           ;ADDRESS OF STAT OF BUFFER
3401  015176  000000          REBUF:  .WORD                           ;ADDRESS OF END OF BUFFER.
3402  015200  000000          RBUFP:  .WORD                           ;READ BUFFER POINTER.
3403  015202  000000          ESAMB:  .WORD   0                       ;ESCAPE SEQ.ASSEMBLY AREA
3404
3405  015204  000010          STTER:
3406  015204  000000                  0
3407  015206  000000                  0
3408  015210  000000                  0
3409  015212  000000                  0
3410  015214  000000                  0
3411  015216  000000                  0
3412  015220  000000                  0
3413  015222  000000                  0
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3414  015224  177777                          .WORD   -1              ;STATUS REGISTER DELIMITER.
3415  015226  000000                STTEP:    .WORD                   ;STATUS ERROR POINTER.
3416  015230  000000                STRO:     .WORD   0               ;ESCAPE O STORAGE
3417  015232  000000                STRP:     .WORD                   ;ESCAPE P STORAGE
3418
3419                                ;;*****************************************************************
3420                                        ;TRANSMIT INTERRUPT ROUTINE.
3421                                        ;  IF XOFF BIT IS SET IN VSTAT , TRANSMISSION WILL NOT OCCUR
3422                                        ;AND XMIT INT. ENABLE BIT WILL BE CLEARED AND THE ROUTINE
3423                                        ;WILL BE EXITED IMMEDIATELY. IF AFTER THE TRANSMISSION
3424                                        ;OF THE CHARACTER DURING THIS INTERRUPT CYCLE, THE
3425                                        ;XMIT COUNT (XMCNT) IS EQUAL TO ZERO,
3426                                        ;THE XMIT DONE BIT WILL BE SET IN VSTAT AND XMIT
3427                                        ;INT ENABLE BIT WILL CLEARED. TRANSMIT COUNT(XMCNT) MUST BE
3428                                        ;SET TO THE NUMBER OF BYTE/CHARACTER TO TRANSMIT.
3429                                        ;IF LOCATION BLKM IS SET TO 1001,A SOM WILL PRECEED THE
3430                                        ;DATA AND A EOM WILL FOLLOW IT. IF XMZER IS SET TO NON-
3431                                        ;ZERO, ALL DATA(INCLUDING ZEROS) WILL BE XMITTED.
3432                                ;;*****************************************************************
3433  015234  005737  002224        INTXM:  TST     VSTAT           ;HAS 61 TRANSMITTED XOFF?
3434  015240  100004                        BPL     NOKIL           ;NO XMIT ANOTHER
3435  015242  052737  000200  002224        BIS     #XMKIL,VSTAT    ;SET XMIT KILLED BIT IN VSTAT
3436  015250  000510                        BR      KIENA           ;GO KILL XMIT ENABLE
3437
3438  015252  105737  002227        NOKIL:  TSTB    BLKM+1          ;SOM/EOM TRANSMIT?
3439  015256  001406                        BEQ     NOSOM           ;NO
3440  015260  112777  000002  164452        MOVB    #SOM,@VXBUF     ;YES-ISSUE START OF MESSAGE.
3441  015266  105037  002227                CLRB    BLKM+1          ;AND CLEAR SOM FLAG.
3442  015272  000002                        RTI
3443  015274  005737  015510        NOSOM:  TST     XMCNT           ;XMITTED THE BUFFER?
3444  015300  001006                        BNE     100$            ;NO-XMIT A NORMAL CHAR.
3445  015302  112777  000004  164430        MOVB    #EOM,@VXBUF     ;YES SEND EOM AND EXIT
3446  015310  105037  002226                CLRB    BLKM
3447  015314  000452                        BR      2$
3448  015316  105777  000164        100$:   TSTB    @TBUFP          ;CHECK FOR CH.= ZERO. IF SO DO NOT XMIT
3449  015322  001016                        BNE     1$              ;OR COUNT BYTE. OR ARE WE
3450  015324  005737  021074                TST     XMZER           ;XMITTING ZEROS?
3451  015330  001023                        BNE     22$             ;YES-XMIT NEXT BYTE
3452  015332  023737  015506  015504        CMP     TBUFP,TEBUF     ;AT END OF BUFFER?
3453  015340  001004                        BNE     10$             ;NO
3454  015342  013737  015502  015506        MOV     TBBUF,TBUFP     ;YES-RESET BUFFER POINTER
3455  015350  000740                        BR      NOKIL
3456  015352  005237  015506        10$:    INC     TBUFP
3457  015356  000735                        BR      NOKIL           ;LOOK FOR NON-ZERO BYTE TO TRANSMIT.
3458
3459  015360  032737  002000  002224  1$:   BIT     #CKSUM,VSTAT    ;CHECKSUM REQUESTED?
3460  015366  001404                        BEQ     22$
3461  015370  117705  000112                MOVB    @TBUFP,R5       ;YES,LOAD THE BYTE
3462  015374  004037  020124                JSR     R0,CALCK        ;AND CALCULATE THE NEW CHECKSUM.
3463  015400  117777  000102  164332  22$:   MOVB    @TBUFP,@VXBUF   ;TRAMSMIT A CHARACTER
3464  015406  023737  015506  015504        CMP     TBUFP,TEBUF     ;AT END OF CIRCULAR BUFFER?
3465  015414  001004                        BNE     11$             ;NO
3466  015416  013737  015502  015506        MOV     TBBUF,TBUFP     ;YES, RESET IT TO START.
3467  015424  000402                        BR      12$             ;BY-PASS INCREMENT BUFF. POINTER
3468  015426  005237  015506        11$:    INC     TBUFP           ;INCREMENT BUFFER POINTER.
3469
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3470  015432  005337  015510          12$:    DEC     XMCNT           ;DECREMENT THE TRANSMIT COUNT
3471  015436  001401                          BEQ     2$              ;YES,CLEANUP,REQUEST ERRORS AND EXIT.
3472  015440  000002                          RTI                     ;NO, CONTINUE
3473  015442  105737  002226          2$:     TSTB    BLKM            ;SOM/EOM XMIT?
3474  015446  001014                          BNE     TXEX            ;YES-DO NOT SET XMDNE UNTIL EOM SENT.
3475  015450  052737  000001  002224          BIS     #XMDNE,VSTAT    ;SET THE DONE BIT IN VSTAT.
3476  015456  042737  002000  002224          BIC     #CKSUM,VSTAT    ;CLEAR THE CHECKSUM FLAG WHEN DONE.
3477  015464  013737  015502  015506          MOV     TBBUF,TBUFP     ;RESET BUFFER POINTER.
3478  015472  042777  000100  164236  KIENA:  BIC     #TENA,@VXCSR    ;CLEAR XMIT. INT. ENABLE
3479  015500  000002                  TXEX:   RTI
3480
3481
3482  015502  000000                  TBBUF:  .WORD                   ;CONTAINS INITIAL ADDRESS
3483  015504  000000                  TEBUF:  .WORD                   ;CONTAIN LAST ADDRESS
3484  015506  000000                  TBUFP:  .WORD                   ;CONTAINS CURRENT LOCATION
3485
3486  015510  000000                  XMCNT:  .WORD   0               ;LOADED WITH NUMBER OF XMITS.
3487                                  ;;**************************************************************
3488
3489
3490                                          ;SUBROUTINE TO ISSUE RESET TO THE VT61, ENTERS MAINTENANCE MODE
3491                                          ;AND FORCES LINEAR ADDRESSING.
3492                                  ;;**************************************************************
3493
3494  015512  113737  001102  002230  RESETV: MOVB    $TSTNM,TSTNM    ;LOAD THE TEST NUMBER IN ERROR PRINT AREA.
3495  015520  013746  002170                  MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
3496  015524  013746  002130                  MOV     RESET,-(SP)     ;;PUSH RESET ON STACK
3497  015530  013746  002054                  MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
3498  015534  004037  013666                  JSR     R0,TESC         ;GO XIMT IT
3499  015540  052737  100000  002224          BIS     #RXOFF,VSTAT    ;TURN RECEIVER OFF      (REV. C0)
3500  015546  004037  015630                  JSR     R0,GETON        ;GO LOOK FOR XON.
3501  015552  000405                          BR      1$              ;FOUND IT.
3502  015554  005237  002200                  INC     FTLCNT          ;ADD 1 TO FATAL XMIT COUNT.
3503  015560  010037  001120                  MOV     R0,$GDADR       ;NO XON ISSUE XON ERROR
3504  015564  104017                          ERROR   17
3505  015566                          1$:
3506  015566  013746  002170                  MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
3507  015572  013746  002000                  MOV     EMAIN,-(SP)     ;;PUSH EMAIN ON STACK
3508  015576  013746  002054                  MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
3509  015602  013746  002010                  MOV     DRECT,-(SP)     ;;PUSH DRECT ON STACK
3510  015606  013746  002054                  MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
3511  015612  004037  013666          2$:     JSR     R0,TESC
3512  015616  005037  002224                  CLR     VSTAT           ;CLEAR INT. FLAGS AFTER TERMINAL RESET
3513  015622  005037  017354                  CLR     HDFLG           ;CLEAR PRINT HEADER FLAG.
3514  015626  000200                          RTS     R0
3515
3516                                  ;;**************************************************************
3517                                          ;SUBROUTINE TO WAIT FOR AN XON. NO XON EXIT IS PC +2.
3518                                  ;;**************************************************************
3519
3520  015630  012737  000454  002210  GETON:  MOV     #300.,BUBCT     ;SET UP TO LOOK FOR 3 SEC.
3521  015636  032737  100000  002224  1$:     BIT #RXOFF,VSTAT        ;RECEIVED XON?          (REV. C0)
3522  015644  001412                          BEQ     GOTON           ;YES-EXIT.
3523  015646  012737  000001  017502          MOV     #1,DCOUNT       ;NO-DELAY 10 M.S.
3524  015654  004037  017440                  JSR     R0,DELAY
3525  015660  005337  002210                  DEC     BUBCT           ;AT END OF DELAY?
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3526  015664  001364                          BNE     1$                ;NO
3527  015666  062700  000002                  ADD     #2,R0             ;YES-SET UP ERROR EXIT.
3528  015672  000200                  GOTON:  RTS     R0
3529
3530                                  ;;*****************************************************************
3531
3532                                          ;SUBROUTINE TO ISSUE ESCZ AND LOOK FOR A RESPONSE-EITHER
3533                                          ;A -1 OR THE RETURNED IDENT. THE -1 INDICATES NO
3534                                          ;RESPONSE FROM THE UNIT UNDER TEST.
3535                                  ;;*****************************************************************
3536
3537  015674                          ZFLAG:
3538  015674  012637  015732                  MOV     (SP)+,ROSV1       ;;POP STACK INTO ROSV1
3539  015700  013746  002170                  MOV     @#ZERO,-(SP)      ;;PUSH @#ZERO ON STACK
3540  015704  013746  002126                  MOV     @#ESCZ,-(SP)      ;;PUSH @#ESCZ ON STACK
3541  015710  004037  013666                  JSR     R0,TESC           ;GO ISSUE ESZ SEQUENCE
3542  015714  012746  106003                  MOV     #106003,-(SP)     ;;PUSH #106003 ON STACK
3543  015720  004037  013424                  JSR     R0,RECTM          ;GO READ THE CHARACTER
3544  015724  013746  015732                  MOV     ROSV1,-(SP)       ;;PUSH ROSV1 ON STACK
3545  015730  000200                          RTS     R0
3546  015732  000000                  ROSV1:  .WORD   0
3547
3548                                  ;;*****************************************************************
3549                                          ;ROUTINE TO CHECK SOFTWARE STATUS REGISTER (VSTAT)
3550                                          ;RECEIVE FLAGS ONLY.  ENTERED WITH ANTICIPATED
3551                                           TATUS WORD ON THE STACK.
3552                                  ;;*****************************************************************
3553
3554  015734                          CKSFT:
3555  015734  012637  002222                  MOV     (SP)+,ROSVE       ;;POP STACK INTO ROSVE
3556  015740  010137  002164                  MOV     R1,SVER1          ;SAVE R1
3557  015744  010237  002166                  MOV     R2,SVER2          ;SAVE R2
3558
3559  015750  012601                          MOV     (SP)+,R1          ;;POP STACK INTO R1
3560  015752  013702  002224                  MOV     VSTAT,R2          ;SET R2 EQUAL TO VSTAT
3561
3562  015756  042702  003576                  BIC     #003576,R2        ;CLEAR NON-ERROR BITS
3563  015762  020102                          CMP     R1,R2             ;COMPARE ANTICIPATED TO ACTUAL.
3564  015764  001432                          BEQ     NOER              ;NO UNUSAL BITS EXIT
3565
3566  015766  010137  001124                  MOV     R1,$GDDAT         ;MOVE GOOD STATUS TO MESSAGE
3567  015772  013737  002224  001126          MOV     VSTAT,$BDDAT      ;MOVE BAD STATUS TO MESSAGE
3568  016000  104003                          ERROR   3                 ;ISSUE ERROR MESSAGE.
3569
3570
3571                                  ;;*****************************************************************
3572                                          ;ROUTINE TO PRINT THE STATUS REGISTER IN THE FOLLOWING
3573                                          ;FORMAT: STATUS BITS (XXX 000), CHARACTER TRANSFERRED (000  X X)
3574                                  ;;*****************************************************************
3575
3576  016002  012701  015204                  MOV     #STTER,R1         ;SET R1 EQUAL TO FIRST ENTRY
3577  016006  013702  015226                  MOV     STTEP,R2          ;SET R2 EQUAL LAST ENTRY
3578  016012  020102                  1$:     CMP     R1,R2             ;ARE THEY EQUAL
3579  016014  001416                          BEQ     NOER              ;YES-RESET POINTERS AND EXIT.
3580  016016  004037  016076                  JSR     R0,CLREG          ;CLEAR ERROR PRINT LOC.
3581  016022  013737  001732  001120          MOV     VRCSR,$GDADR      ;LOAD ADDRESS
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3582  016030  017737  163676  001124          MOV     @VRCSR,$GDDAT   ;LOAD CSR
3583  016036  112137  001126          2$:     MOVB    (R1)+,$BDDAT    ;MOVE CHARACTER AND
3584  016042  112137  001123                  MOVB    (R1)+,$BDADR+1  ;STATUS BITS TO ERROR REGISTERS.
3585  016046  104002                          ERROR   2               ;ISSUE ERROR MESSAGE
3586  016050  000760                          BR      1$              ;DO AGAIN
3587  016052  013701  002164          NOER:   MOV     SVER1,R1        ;RESTORE R1 AND
3588  016056  013702  002166                  MOV     SVER2,R2        ;R2.
3589  016062  012737  015204  015226          MOV     #STTER,STTEP    ;RESET STATUS ERROR POINTER.
3590  016070  013746  002222                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
3591  016074  000200                          RTS     R0              ;EXIT
3592
3593                                  ;;**********************************************************************
3594                                  ;SUBROUTINE TO CLEAR ERROR/DATA OUTPUT LOCATIONS. NEEDED
3595                                  ;ONLY WHEN DISPLAYING BYTES IN WORD LOCATIONS.
3596                                  ;;**********************************************************************
3597
3598  016076  005037  001120          CLREG:  CLR     $GDADR
3599  016102  005037  001122                  CLR     $BDADR
3600  016106  005037  001124                  CLR     $GDDAT
3601  016112  005037  001126                  CLR     $BDDAT
3602  016116  000200                          RTS     R0
3603                                  ;;**********************************************************************
3604                                  ;SUBROUTINE TO TRANSMIT THE BUFFER AND WAIT FOR XMIT DONE
3605                                  ;AND END OF RECEIVE MESSAGE. SUBROUTINE WILL LOOP IF LOCATION
3606                                  ;RECITT IS PRE-LOADED WITH A NUMBER HIGHER THAN1(IE. MULTIPLE
3607                                  ;RECEIVES CAN BE ACCOMPLISHED WITH ONLY ONE ENTRY TO SUB-
3608                                  ;ROUTINE).WDSTOR AND BYSTOR ARE THE WORD(CURSOR POS.) AND BYTE
3609                                  ;STORAGE LOCATIONS,RESPECTIVELY.DEFAULT STORAGE IS THE REC. BUFFER.
3610
3611                                  ;;**********************************************************************
3612
3613  016120                          XMREC:
3614  016120  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
3615  016122  012737  001001  002226          MOV     #1001,BLKM      ;SET UP FOR A SOM/EOM TRANSMIT.
3616  016130  042737  077577  002224          BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
3617  016136  013701  016372                  MOV     BYSTOR,R1       ;LOAD THE STORAGE POINTERS
3618  016142  013702  016370                  MOV     WDSTOR,R2
3619  016146  052777  000100  163562          BIS     #TENA,@VXCSR    ;SET INTERRUPT ENABLES
3620  016154  042737  061466  002224  XMITT:  BIC     #61466,VSTAT    ;CLEAR SOM,EOM,EPL,ESC,REV.VID., PARA. DELIM.,IDENT,CUR.
3621  016162  005037  002220          1$:     CLR     DLAY            ;SET UP TIME OUT DELAY.
3622  016166  032737  000001  002224          BIT     #XMDNE,VSTAT    ;IS XMIT DONE?
3623  016174  001015                          BNE     3$              ;YES-LOOK FOR RECEIVE DONE.
3624  016176  032737  020000  002224  2$:     BIT     #REOM,VSTAT     ;RECEIVED AN EOM?
3625  016204  001401                          BEQ     20$             ;NO
3626  016206  000435                          BR      CKSTR           ;YES-GO HANDLE DATA
3627  016210  032737  100000  002224  20$:    BIT     #RXOFF,VSTAT    ;NO- IS XOFF SET?
3628  016216  001761                          BEQ     1$              ;NO-STILL TRANSMITTONG.
3629  016220  005337  002220                  DEC     DLAY            ;YES- RUN DELAY
3630  016224  001364                          BNE     2$              ;WAITING FOR XON
3631  016226  000416                          BR      XMAD2           ;NO XON-REPORT VT61 FAILURE.
3632
3633  016230  013705  031602          3$:     MOV     ABUFP,R5        ;LOAD CH. RECEIVED FLAG.
3634  016234  005037  002220                  CLR     DLAY            ;SET UP RECEIVE DELAY.
3635  016240  032737  020000  002224  4$:     BIT     #REOM,VSTAT     ;RECEIVE END OF MESSAGE?
3636  016246  001015                          BNE     CKSTR           ;YES-CHECK DATA STORAGE POINTERS
3637  016250  020537  031602                  CMP     R5,ABUFP        ;RECEIVED ANOTHER CHARACTER?
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3638  016254  001365                          BNE     3$              ;YES-RESET CH. FLAG AND DELAY
3639  016256  005337  002220          5$:     DEC     DLAY            ;RUN DELAY
3640  016262  001366                          BNE     4$              ;AND KEEP LOOKING FOR EOM.
3641  016264  062700  000002          XMAD2:  ADD     #2,R0           ;TIME OUT OCCURRED-SET UP ERROR EXIT.
3642  016270  005237  002200                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
3643  016274  004037  016520                  JSR     R0,RESPTR       ;AND REST ALL INTERRUPT POINTERS.
3644  016300  000422                          BR      CKVST
3645  016302  020102          CKSTR:  CMP     R1,R2           ;STORAGE POINTERS CLEARED?
3646  016304  001413                          BEQ     CHKITT          ;YES--LEAVE DATA IN REC. BUFFER.
3647  016306  032737  000004  002224          BIT     #CURPOS,VSTAT   ;RECEIVED A CURSOR POSITION?
3648  016314  001403                          BEQ     STRBYT          ;NO-GO STORE A BYTE.
3649  016316  017722  176652                  MOV     @RBBUF,(R2)+    ;YES,STORE IT.
3650  016322  000404                          BR      CHKITT          ;AND CHECK ITERATION COUNT.
3651  016324  005701          STRBYT: TST     R1              ;STORING A CHAR?
3652  016326  001402                          BEQ     CHKITT          ;NO
3653  016330  117721  176640                  MOVB    @RBBUF,(R1)+    ;STORE A RECEIVED BYTE
3654  016334  005337  016366          CHKITT: DEC     RECITT          ;DONE RECEIVING?
3655  016340  001305                          BNE     XMITT           ;NO-LOOP SUBROUTINE
3656  016342  004037  021202                  JSR     R0,CKOFF        ;SEE IS XOFF IS UP.
3657  016346                          CKVST:
3658  016346  012746  060001                  MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
3659  016352  004037  015734                  JSR     R0,CKSFT
3660  016356  004037  016520                  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
3661  016362  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
3662  016364  000200          XMXT:   RTS     R0              ;EXIT SUBROUTINE.
3663  016366  000000          RECITT: .WORD   0               ;RECEIVE ITERATION COUNT.
3664  016370  000000          WDSTOR: .WORD   0               ;WORD STORAGE POINTER
3665  016372  000000          BYSTOR: .WORD   0               ;BYTE STORAGE POINTER
3666
3667                          ;;*****************************************************************
3668                                  ;SUBROUTINE TO  XMIT THE BYTE AT TBUFP.
3669                          ;;*****************************************************************
3670
3671  016374  042737  000001  002224  XMIT1:  BIC     #1,VSTAT        ;CLEAR XMIT DONE FLAG
3672  016402  012737  000001  015510          MOV     #1,XMCNT        ;SET UP TO XMIT 1 BYTE
3673  016410  052777  000100  163320          BIS     #TENA,@VXCSR
3674  016416                          1$:
3675  016416  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
3676  016422  005737  002232                  TST     PTYPE           ;PROCESSOR TYPE                         ;;++C
3677  016426  001403                          BEQ     2$              ;IF 0 THEN 11/45-11/70                  ;;++C
3678  016430  012746  000001                  MOV     #1.,-(SP)       ;;PUSH #1. ON STACK
3679  016434  000402                          BR      3$                                                      ;;++C
3680  016436                          2$:
3681  016436  012746  000002                  MOV     #2.,-(SP)       ;;PUSH #2. ON STACK
3682  016442  004037  021076          3$:     JSR     R0,WTBGND       ;LOOK FOR XMIT DONE                     ;;++C
3683  016446  000401                          BR      FTLEXT          ;HUNG TRANSMIT-CLEAR FLAGS AND EXIT
3684  016450  000402                          BR      NORXT           ;NORMAL EXIT.
3685  016452  005037  002224          FTLEXT: CLR     VSTAT           ;CLEAR ANY FLAGS
3686  016456  000200          NORXT:  RTS     R0              ;AND EXIT
3687
3688                          ;;*****************************************************************
3689                                  ;SUBROUTINE TO ISSUE A BYTE AT A TIME UNTIL A ZERO
3690                                  ;BYTE IS ENCOUNTERED.
3691                          ;;*****************************************************************
3692
3693  016460  112777  000002  177020  LDXMIT: MOVB    #SOM,@TBUFP     ;SEND THE START OF MESSAGE.
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3694  016466  000403                          BR      2$
3695  016470  112377  177012          1$:     MOVB    (R3)+,@TBUFP    ;MOVE A BYTE TO XMIT BUFFER
3696  016474  001403                          BEQ     LDOUT           ;IF A ZERO BYTE-EXIT
3697  016476  004037  016374          2$:     JSR     R0,XMIT1        ;GO XMIT A BYTE
3698  016502  000772                          BR      1$              ;XMIT AGAIN.
3699  016504  112777  000004  176774  LDOUT:  MOVB    #EOM,@TBUFP     ;SEND THE END OF MESSAGE.
3700  016512  004037  016374                  JSR     R0,XMIT1
3701  016516  000200                          RTS     R0
3702
3703                                  ;;*****************************************************************
3704                                  ;ROUTINE TO RESET ALL INTERRUPT POINTERS.
3705                                  ;;*****************************************************************
3706
3707  016520  042777  000100  163210  RESPTR: BIC     #TENA,@VXCSR    ;CLEAR INTERRUPT ENABLES
3708  016526  013737  015174  015200          MOV     RBBUF,RBUFP     ;RESET RECEIVE BUF POINTER
3709  016534  013737  015502  015506          MOV     TBBUF,TBUFP     ;RESET XMMT BUF POINTER
3710  016542  012737  015204  015226          MOV     #STTER,STTEP    ;RESET RECEIVE STATUS ERR POINTER
3711  016550  005037  015510                  CLR     XMCNT           ;CLEAR TRANSMIT COUNT
3712  016554  005037  015202                  CLR     ESAMB           ;CLEAR ESC ASSEMBLY FLAGS
3713  016560  012737  000001  016366          MOV     #1,RECITT       ;RESET REC. ITERATION COUNT
3714  016566  005037  016370                  CLR     WDSTOR          ;CLEAR STORAGE POINTERS
3715  016572  005037  016372                  CLR     BYSTOR
3716  016576  000200                          RTS     R0
3717
3718
3719                                  ;;*****************************************************************
3720                                  ;SUBROUTINE TO ISSUE CURSOR POSITION ERROR. GOOD
3721                                  ;LINE/COLUMN MUST BE A WORD ON STACK. ERROR
3722                                  ;POSITION IS EXPECTED TO BE @ RBBUF.
3723                                  ;;*****************************************************************
3724
3725  016600                  CURER:
3726  016600  012637  002222                  MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
3727  016604  012637  002162                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
3728  016610  162737  020040  002162          SUB     #20040,CHRD     ;EXTRACT MOD 40 FROM GOOD POSITION
3729  016616  004037  016076                  JSR     R0,CLREG
3730  016622  113737  002163  001124          MOVB    CHRD+1,$GDDAT   ;LOAD MESSAGE WITH GOOD
3731  016630  113737  002162  001120          MOVB    CHRD,$GDADR     ;LINE AND COLUMN
3732  016636  017737  176332  002162          MOV     @RBBUF,CHRD     ;LINE AND COLUMN.
3733  016644  162737  020040  002162          SUB     #20040,CHRD     ;EXTRACT MOD 40 FROM BAD POSITION.
3734  016652  113737  002163  001126          MOVB    CHRD+1,$BDDAT   ;LOAD MESSAGE WITH BAD
3735  016660  113737  002162  001122          MOVB    CHRD,$BDADR     ;LINE AND COLUMN.
3736  016666  104006                          ERROR   6               ;ISSUE ERROR
3737  016670  013746  002222                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
3738  016674  000200                          RTS     R0
3739
3740                                  ;;*****************************************************************
3741
3742                                  ;;*****************************************************************
3743                                  ;SUBROUTINE TO DECREMENT CUSROR POSITION IN A
3744                                  ;LINEAR SEQUENCE. (IE. ROW 20, COL 1 ;ROW 20 COL0 ;ROW 17, COL 157).
3745                                  ;;*****************************************************************
3746
3747  016676  123727  017003  000040  CMPOS:  CMPB    LNRW+1,#40      ;AT LEFT EDGE OF ROW?
3748  016704  001403                          BEQ     1$              ;YES, GO ADJUST COL., ROW.
3749  016706  105337  017003                  DECB    LNRW+1          ;NO, DECREMENT COL. AND EXIT
```

```
                                        RTS     R0
016712  000200                  1$:     CMPB    LNRW,#40        ;AT ROW 0?
016714  123727  017002  000040          BEQ     2$              ;YES, NO DECREMENT POSSIBLE-EXIT.
016722  001405                          DECB    LNRW            ;NO, DECREMENT ROW AND
016724  105337  017002                  MOVB    #157,LNRW+1     ;SET COL. TO RIGHT EDGE.
016730  112737  000157  017003  2$:     RTS     R0
016736  000200
                                ;;**********************************************************************
                                        ;SUBROUTINE TO INCREMENT CURSOR POSITION IN A LINEAR
                                        ;SEQUENCE (IE. ROW 10, COL 78, ROW 10. COL 79, ROW 11 , COL 0).
                                ;;**********************************************************************

016740  123727  017003  000157  CPPOS:  CMPB    LNRW+1,#157     ;AT RIGHT EDGE OF ROW
016746  001403                          BEQ     1$              ;YES, ADJUST ROW AND COLUMN.
016750  105237  017003                  INCB    LNRW+1          ;NO, INCREMENT COL. COUNT
016754  000200                          RTS     R0              ;AND EXIT
016756  123727  017002  000067  1$:     CMPB    LNRW,#67        ;AT BOTTOM ROW?
016764  001405                          BEQ     2$              ;YES, NO INCREMENT POSSIBLE-EXIT.
016766  105237  017002                  INCB    LNRW            ;NO, INCREMENT ROW COUNT AND
016772  112737  000040  017003          MOVB    #40,LNRW+1      ;SET COL. TO LEFT EDGE.
017000  000200                  2$:     RTS     R0

017002  000000                  LNRW:   .WORD   0               ;CONTAINS UPDATED CURSOR POSITION.
                                ;;**********************************************************************

                                        ;SUBROUTINE TO XMIT, RECEIVE AND COMPARE. DATA ERRORS
                                        ;ARE REPORTED FROM SUBROUTINE. IF THE TRANSMIT OR
                                        ;RECEIVE LOOPS 'TIME OUT', EXIT FROM SUBROUTINE WILL
                                        ;BE NORMAL EXIT +2. SUBROUTINE ENTERED WITH (R1)=
                                        ;GOOD DATA BUFFER, (R2)=RECEIVE DATA BUFFER AND
                                        ;R3=COMPARE COUNT. IF THE VT61 DOES NOT HANG,THE ROUTINE
                                        ;WILL WAIT FOR END OF REC. MESSAGE(EOM).


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

017004                  XRCMP:
017004  010446                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
017006  005004                  CLR     R4              ;USE R4 A RECEIVE COUNTER.
017010  012737  001001  002226  MOV     #1001,BLKM      ;SET UP FOR A SOM/EOM TRANSMIT.
017016  042737  077577  002224  BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
017024  052777  000100  162704  BIS     #TENA,@VXCSR    ;SET INTERRUPT ENABLES.
017032  005037  017354          CLR     HDFLG           ;CLEAR ERROR 13 PRINT FLAG
017036  012705  031552          MOV     #TCRLB+450,R5   ;R5 IS ERROR STORAGE POINTER
017042  005037  002220  1$:     CLR     DLAY            ;SET UP TIME OUT DELAY
017046  032737  000001  002224  BIT     #XMDNE,VSTAT    ;XMIT DONE?
017054  001014                  BNE     XREC            ;YES-GO RECEIVE
017056  023737  015174  015200  2$:     CMP     RBBUF,RBUFP     ;HAS RECEIVE OPERATION BEGUN?
017064  103410                  BLO     XREC            ;YES-GO RECEIVE
017066  032737  100000  002224  BIT     #RXOFF,VSTAT    ;XMIT XOFF SET?
017074  001762                  BEQ     1$              ;NO-KEEP LOOKING FOR XMIT DONE?
017076  005337  002220          DEC     DLAY            ;YES RUN DELAY AND LOOK
017102  001365                  BNE     2$              ;FOR XON OR RECEIVED CH.
017104  000432                  BR      XRERR           ;TRANSMIT TIMEOUT-SET UP ERROR EXIT

017106  005037  002220  XREC:   CLR     DLAY            ;SET UP TIME OUT DELAY
```

```
3806  017112  020237  015200          1$:     CMP     R2,RBUFP        ;INSURE COMPARE POINTER
3807  017116  103410                  BLO     2$              ;LESS THAN RECEIVE POINTER
3808  017120  032737  020000  002224          BIT     #REOM,VSTAT     ;RECEIVE EOM?
3809  017126  001030                  BNE     XREXT           ;YES-SET UP TO EXIT
3810  017130  005337  002220                  DEC     DLAY            ;RUN TIMEOUT DELAY
3811  017134  001416                  BEQ     XRERR           ;TIME OUT OCCURRED-ERROR EXIT
3812  017136  000765                  BR      1$              ;RETURN TO CHECK RECEIVE COUNT
3813  017140  005204                  2$:     INC     R4              ;ADD 1 TO RECEIVE COUNTER.
3814  017142  122122                  CMPB    (R1)+,(R2)+     ;COMPARE CHARACTERS
3815  017144  001407                  BEQ     4$              ;EQUAL-COMPARE AGAIN
3816  017146  020527  031602                  CMP     R5,#TCRLB+500   ;ALLREADY STORED 50 ERRORS?
3817  017152  103004                  BHIS    4$              ;YES-BYPASS STORAGE
3818  017154  114125                  MOVB    -(R1),(R5)+     ;STORE GOOD DATA
3819  017156  114225                  MOVB    -(R2),(R5)+     ;STORE BAD DATA
3820  017160  010425                  MOV     R4,(R5)+        ;LOAD RECEIVE COUNT
3821  017162  132122                  BITB    (R1)+,(R2)+     ;RESET POINTERS AND
3822  017164  005303                  4$:     DEC     R3              ;CHECK COMPARE COUNT
3823  017166  001410                  BEQ     XREXT           ;ALL DONE-EXIT
3824  017170  000746                  BR      XREC            ;COMPARE ANOTHER
3825  017172  062700  000002          XRERR:  ADD     #2,R0           ;SET UP ERROR EXIT
3826  017176  005237  002200                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
3827  017202  004037  016520                  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
3828  017206  000452                  BR      XROUT
3829  017210                          XREXT:
3830  017210  012746  020000                  MOV     #REOM,-(SP)     ;;PUSH #REOM ON STACK
3831  017214  005737  002232                  TST     PTYPE           ;PROCESSOR TYPE                         ;;++C
3832  017220  001407                  BEQ     3$              ;IF 0 THEN 11/45-11/70                  ;;++C
3833  017222  100403                  BMI     2$              ;IF -1 THEN 1135,40                     ;;++C
3834  017224  012746  000002                  MOV     #2.,-(SP)       ;;PUSH #2. ON STACK
3835  017230  000405                  BR      4$                                                      ;;++C
3836  017232                          2$:
3837  017232  012746  000004                  MOV     #4.,-(SP)       ;;PUSH #4. ON STACK
3838  017236  000402                  BR      4$                                                      ;;++C
3839  017240                          3$:
3840  017240  012746  000010                  MOV     #8.,-(SP)       ;;PUSH #8. ON STACK
3841  017244  004037  021076          4$:     JSR     R0,WTBGND       ;WAIT EOM                               ;;++C
3842  017250  000431                  BR      XROUT           ;NO EOM-ISSUE ERROR AND EXIT.
3843  017252  162705  031552                  SUB     #TCRLB+450,R5   ;NOW EXTRACT ERROR COUNT-IF ANY.
3844  017256  010501                  MOV     R5,R1           ;AND STORE IT IN R1
3845  017260  012705  031552                  MOV     #TCRLB+450,R5   ;RELOAD ERROR POINTER
3846  017264  005701                  TST     R1              ;TEST FOR ERRORS
3847  017266  001422                  BEQ     XROUT           ;NO-CHECK STATUS AND EXIT
3848  017270  005737  017354                  TST     HDFLG           ;;DATA ERROR HEADER PRINTED?
3849  017274  001003                  BNE     1$              ;YES-BYPASS HEADER PRINT
3850  017276  104012                  ERROR   12              ;PRINT DATA ERROR HEADER
3851  017300  005237  017354                  INC     HDFLG           ;SET HEADER PRINT FLAG
3852  017304  004037  016076          1$:     JSR     R0,CLREG        ;ERROR WAS LEGTIMATE. LOAD
3853  017310  112537  001124                  MOVB    (R5)+,$GDDAT    ;ERROR MESSAGE AND ISSUE
3854  017314  112537  001126                  MOVB    (R5)+,$BDDAT    ;IT.
3855  017320  012537  001120                  MOV     (R5)+,$GDADR    ;LOAD RECEIVE COUNT
3856  017324  104004                  ERROR   4               ;ISSUE DATA COMPARE ERROR
3857  017326  162701  000004                  SUB     #4,R1           ;DECREMENT ERROR COUNT
3858  017332  001364                  BNE     1$              ;PRINT ANOTHER IF NOT AT ZERO
3859  017334  004037  021202          XROUT:  JSR     R0,CKOFF        ;SEE IS XOFF IS UP.
3860  017340  012746  060001                  MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
3861  017344  004037  015734                  JSR     R0,CKSFT        ;CHECK FOR VSTAT /STATUS ERR.
```

```
3862  017350  012604                  MOV     (SP)+,R4        ;;POP STACK INTO R4
3863  017352  000200                  RTS     R0              ;EXIT SUBROUTINE
3864
3865  017354  000000          HDFLG:  0                       ;INHIBIT PRINT FLAG.
3866
3867                          ;;**************************************************************
3868
3869                          ;SUBROUTINE TO CREATE A 'RULER' IN LOCATIONS 200
3870                          ;TO 317.
3871
3872                          ;;**************************************************************
3873
3874  017356  012701  031302  CRRUL:  MOV     #TCRLB+200,R1   ;LOAD STARTING ADDRESS
3875  017362  012702  130461          MOV     #130461,R2      ;LOAD INITIAL RULER ASCII CODES.
3876  017366  110221          1$:     MOVB    R2,(R1)+        ;STORE A RULER BYTE IN XMIT BUF.
3877  017370  022701  031422          CMP     #TCRLB+320,R1   ;RULER COMPLETE?
3878  017374  103001                  BHIS    2$              ;NO
3879  017376  000200                  RTS     R0              ;AND EXIT.
3880  017400  105202          2$:     INCB    R2              ;INCREMENT ASCII BYTE
3881  017402  122702  000272          CMPB    #272,R2         ;END OF REVERSE VIDEO?
3882  017406  001003                  BNE     3$              ;NO-SEE IF END OF NORMAL.
3883  017410  012702  030660          MOV     #030660,R2      ;SET UP TO ISSUE REVERSE 0.
3884  017414  000405                  BR      5$
3885  017416  122702  000072  3$:     CMPB    #72,R2          ;END OF NORMAL VIDEO?
3886  017422  001361                  BNE     1$              ;NOT AT END OF A VIDEO STRING.
3887  017424  012702  130460          MOV     #130460,R2              ;YES-SET UP TO ISSUE NORMAL 0.
3888  017430  110221          5$:     MOVB    R2,(R1)+        ;DO IT
3889  017432  105202                  INCB    R2              ;SET BYTE TO NEXT ASCII CODE
3890  017434  000302                  SWAB    R2              ;REVERSE VIDEO MODE.
3891  017436  000753                  BR      1$              ;BEGIN NEXT STRING
3892
3893                          ;;**************************************************************
3894                          ;SUBROUTINE TO DELAY 10 M.S. TIME THE NUMBER INLOCATION
3895                          ;DCOUNT. THE PROCESSOR TYPE PRE-DETERMINES THE # OF LOOPS
3896                          ;REQUIRED TO DELAY 10 M.S. FOR ONE ITERATION. LOCATION
3897                          ;PMULT IS PRE-LOADED WITH : 11/45 = 4, 11/40 = 2
3898                          ;AND 11/10 =1.
3899                          ;;**************************************************************
3900
3901  017440          DELAY:
3902  017440  010146          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3903  017442  010246          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3904  017444  013702  017500  1$:     MOV     PMULT,R2        ;LOAD PROCESSOR MULTIPLIER
3905  017450  012701  002570  2$:     MOV     #1400.,R1       ;LOAD 10 M.S. DELAY
3906  017454  005301                  DEC     R1              ;RUN BASIC DELAY
3907  017456  001376                  BNE     .-2
3908  017460  005302                  DEC     R2              ;RUN MULTIPLIER DELAY
3909  017462  001372                  BNE     2$
3910  017464  005337  017502          DEC     DCOUNT          ;RUN ITERATION COUNT
3911  017470  001365                  BNE     1$
3912  017472  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
3913  017474  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
3914  017476  000200                  RTS     R0
3915
3916  017500  000000          PMULT:  0                       ;PROCESSOR MULTIPLIER
3917  017502  000000          DCOUNT: 0                       ;ITERATION COUNT
```

```
3918
3919                                    ;;*****************************************************************
3920
3921                                            ;SUBROUTINE TO GENERATE A INCREMENTING PATTERN AT
3922                                            ;(R1)+.  ENTER WITH R3 EQUAL TO # OF CH. TO CREATE.
3923                                            ;R5 IS UTILIZED AS A WORK REGISTER.
3924
3925                                    ;;*****************************************************************
3926
3927  017504  012705  000041           BLDINC: MOV     #41,R5          ;LOAD R5 WITH INITIAL CH.
3928  017510  110521                   BLDINA: MOVB    R5,(R1)+        ;MOVE A CH. TO BUFFER
3929  017512  005303                           DEC     R3              ;DECREMENT BYTE COUNT
3930  017514  001001                           BNE     2$              ;NOT DONE-UPDATE PATTERN
3931  017516  000200                           RTS     R0              ;EXIT-DONE.
3932  017520  105205                   2$:     INCB    R5              ;UPDATE CH. PATTERN
3933  017522  122705  000177                   CMPB    #177,R5         ;PATTERN EXCEEDED MAX?
3934  017526  001766                           BEQ     BLDINC          ;YES-RESET IT.
3935  017530  000767                           BR      BLDINA          ;NO-ISSUE CURRENT PATTERN.
3936
3937
3938                                    ;;*****************************************************************
3939
3940                                            ;SUBROUTINE TO FILL THE SCREEN WITH INCREMENTING DATA
3941                                    ;;*****************************************************************
3942
3943  017532  042737  077577  002224   DATSC:  BIC     #77577,VSTAT            ;CLEAR INTERRUPT FLAGS.
3944  017540  013701  015502                   MOV     TBBUF,R1
3945  017544  012703  000500                   MOV     #320.,R3        ;FILL XMIT BUFFER WITH INCRE-
3946  017550  004037  017504                   JSR     R0,BLDINC       ;MENTING PATTERN
3947  017554  012737  003600  015510  10$:     MOV     #TOTCH,XMCNT    ;SET UP TO XMIT 1920 BYTES
3948  017562  052777  000100  162146           BIS     #TENA,@VXCSR
3949
3950  017570  032737  000001  002224  1$:     BIT     #XMDNE,VSTAT    ;XMIT DONE?
3951  017576  001774                           BEQ     .-6             ;NO
3952
3953                                    ;;*****************************************************************
3954
3955                                            ;SUBROUTINE TO RESET VT61 AND DISPLAY MESSAGE
3956                                            ;POINTED TO BY R2.
3957
3958                                    ;;*****************************************************************
3959
3960  017600  004037  015512           DSMES:  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
3961  017604  042737  077577  002224           BIC     #77577,VSTAT    ;CLEAR ALL FLAGS EXCEPT XOFF AND XMKIL.
3962  017612  012737  000005  015510           MOV     #5,XMCNT        ;PRE-LOAD XMIT COUNT.
3963  017620  013701  015502                   MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH:
3964  017624  012721  000002                   MOV     #SOM,(R1)+      ;START OF MESSAGE
3965  017630  013721  002054                   MOV     ESCO,(R1)+
3966  017634  013721  002010                   MOV     DRECT,(R1)+     ;DISABLE RECTANGULAR MODE
3967  017640  005237  015510           1$:     INC     XMCNT           ;INCREMENT TRANSMIT COUNT
3968  017644  112221                           MOVB    (R2)+,(R1)+     ;DISPLAY MESSAGE
3969  017646  001374                           BNE     1$
3970  017650  112711  000004                   MOVB    #EOM,(R1)       ;TERMINATE WITH END OF MESSAGE.
3971  017654  052777  000100  162054           BIS     #TENA,@VXCSR    ;XMIT IT AND WAIT FOR
3972  017662  032737  000001  002224  2$:     BIT     #XMDNE,VSTAT    ;DONE
3973  017670  001774                           BEQ     2$
```

```
3974  017672  000200                          RTS     R0
3975
3976                                  ;;*****************************************************************
3977
3978                                          ;SUBROUTINE TO CONVERT A BINARY CHARACTER
3979                                          ;TO 3 OCTAL CHARACTERS. R1 CONTAINS BINARY
3980                                          ;NUMBER. RESULT IS STORED IN LOCATIONS SVER1,
3981                                          ;SVER2
3982
3983                                  ;;*****************************************************************
3984  017674                          BINOCT:
3985  017674  010546                         MOV     R5,-(SP)        ;;PUSH R5 ON STACK
3986  017676  012705  000002                 MOV     #2,R5           ;LOAD ITERATION COUNT
3987  017702  000403                         BR      2$              ;BYPASSS SHIFTS FOR 1ST CONVERSION
3988  017704  106201                  1$:    ASRB    R1
3989  017706  106201                         ASRB    R1              ;SHIFT A CHAR INTO POSITION
3990  017710  106201                         ASRB    R1
3991  017712  110165  002164          2$:    MOVB    R1,SVER1(R5)    ;STORE THE BINARY OFFSET
3992  017716  142765  000370  002164         BICB    #370,SVER1(R5)  ;CLEAR NON ESSENTIAL BITS
3993  017724  152765  000060  002164         BISB    #60,SVER1(R5)   ;CONVERT OFFSET TO OCTAL
3994  017732  005305                         DEC     R5              ;DECREMENT CONVERSION COUNT
3995  017734  100363                         BPL     1$              ;NOT DONE CONVERT ANOTHER
3996  017736  112737  000040  002167         MOVB    #40,SVER2+1     ;LOAD A SPACE
3997  017744  012605                         MOV     (SP)+,R5        ;;POP STACK INTO R5
3998  017746  000200                         RTS     R0
3999
4000                                  ;;*****************************************************************
4001                                          ;SUBROUTINE TO CONVERT AN OCTAL CHAR. TO BINARY.  REG
4002                                          ;R1 CONTAINS OCTAL AND REG R2 IS BINARY ASSEMBLY AREA.
4003                                  ;;*****************************************************************
4004
4005  017750  042701  177770         OCTBIN: BIC     #177770,R1      ;EXTRACT OCTAL COMPONENT
4006  017754  005702                         TST     R2              ;FIRST CONVERSION?
4007  017756  001403                         BEQ     NOSHFT          ;YES - DO NOT SHIFT
4008  017760  006302                         ASL     R2              ;NO - SHIFT PREVIOUS CHAR.
4009  017762  006302                         ASL     R2
4010  017764  006302                         ASL     R2
4011  017766  060102                 NOSHFT: ADD     R1,R2           ;ADD CURRENT CHAR.
4012  017770  000200                         RTS     R0
4013
4014                                  ;;*****************************************************************
4015                                          ;ROUTINE TO WAIT FOR C/R FROM VT61 UNDER TEST
4016                                  ;;*****************************************************************
4017
4018  017772  032777  000200  161732  GTCR:   BIT     #RECDN,@VRCSR   ;WAIT FOR REVEIVE DONE
4019  020000  001774                         BEQ     .-6
4020  020002  127737  161726  001752         CMPB    @VRBUF,CARRT    ;CHAR = CARRIAGE RETURN?
4021  020010  001370                         BNE     GTCR            ;NO-KEEP LOOKING
4022  020012  000200                         RTS     R0              ;YES-EXIT
4023
4024
4025                                  ;;*****************************************************************
4026                                          ;SUBROUTINE TO GET A CHARACTER (NUMERIC) FROM THE
4027                                          ;CONSOLE.  IF OTHER THAN A NUMERIC IS TYPED A
4028                                          ;"?" WILL BE ECHOED.
4029                                  ;;*****************************************************************
```

```
4030
4031  020014  004037  014006          GTNUM:  JSR     R0,CONRD        ;GET A CHAR
4032  020020  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
4033  020022  122701  000054                  CMPB    #54,R1          ;CHAR. =COMMA?
4034  020026  001411                          BEQ     1$              ;YES-GO PRINT IT
4035  020030  123701  001752                  CMPB    CARRT,R1        ;CHAR. = CARRIAGE RETURN?
4036  020034  001406                          BEQ     1$
4037  020036  120127  000060                  CMPB    R1,#60
4038  020042  103421                          BLO     QUST            ;IF CHAR. IS LESS THAN 60
4039  020044  120127  000067                  CMPB    R1,#67          ;OR MORE THAN 67, TYPE
4040  020050  101016                          BHI     QUST            ;A QUESTION MARK
4041  020052  110137  020122          1$:     MOVB    R1,TYPNUM
4042  020056  104401  020122                  TYPE    ,TYPNUM
4043  020062  123701  001754                  CMPB    LNFED,R1
4044  020066  001406                          BEQ     GTEXT
4045  020070  123701  001752                  CMPB    CARRT,R1        ;IF CHAR. - C/R SET UP TO ISSUE
4046  020074  001003                          BNE     GTEXT           ;LINE FEED BEFORE EXITING.
4047  020076  113701  001754                  MOVB    LNFED,R1
4048  020102  000763                          BR      1$
4049  020104  000200                  GTEXT:  RTS     R0              ;GOOD CHAR., EXIT
4050  020106  112737  000077  020122  QUST:   MOVB    #77,TYPNUM
4051  020114  104401  020122                  TYPE    ,TYPNUM         ;TYPE QUESTION MARK AND
4052  020120  000735                          BR      GTNUM           ;KEEP LOOKING.
4053  020122     000                  TYPNUM: .BYTE   0
4054  020123     000                          .BYTE   0
4055
4056
4057                          ;;*****************************************************************
4058                                  ;SUBROUTINE TO CALCULATE CHECKSUM ON THE LOWER
4059                                  ;BYTE OF R5.  R4 IS STORAGE FOR THE CHECKSUM
4060                                  ;CHARACTER. ALGORITHM FOR CHECKSUM IS ROTATE
4061                                  ;CURRENT ONE PLACE LEFT AND XOR NEW CHAR. CHECKSUM
```

```
                                        ;IS THE LOWER 7 BITS OF R4
                                ;;**************************************************************
020124  042705  177400          CALCK:  BIC     #177400,R5      ;CLEAR UPPER BYTE OF R5
020130  120527  000021                  CMPB    R5,#XON         ;CHAR. =XON?
020134  001415                          BEQ     NOCALC          ;YES DO NOT CALCULATE CHECKSUM
020136  120527  000023                  CMPB    R5,#XOFF        ;CHAR =XOFF?
020142  001412                          BEQ     NOCALC          ;YES DO NOT CALCULATE CHECKSUM
                                        CLC                     ;INSURE CARRY BIT INITIALLLY CLEAR
020144  000241                          TSTB    R4              ;SET UP TO ROTATE R4
020146  105704                          BPL     1$              ;A FULL 8 BYTES
020150  100001
                                        SEC                     ;R4 WAS NEG. SO ROTATE A ONE
020152  000261                  1$:     ROLB    R4              ;INTO LOW ORDER BIT.
020154  106104                          MOV     R4,R3
020156  010403                          BIC     R5,R3           ;NOT A AND B
020160  040503                          BIC     R4,R5           ;NOT B AND A
020162  040405                          BIS     R3,R5           ;ORED
020164  050305                          MOV     R5,R4           ;EQUAL NEW CHECKSUM
020166  010504                  NOCALC: RTS     R0
020170  000200                  ;;**************************************************************
                                        ;SUBROUTINE TO LOAD XMIT BUFFER FROM R0 THRU R1
                                ;;**************************************************************
020172  112021                  LDBUF:  MOVB    (R0)+,(R1)+     ;LOAD A BYTE
020174  001376                          BNE     .-2             ; UNTIL ZERO BYTE FOUND.
020176  000200                          RTS     R0
                                ;;**************************************************************
                                        ;SUBROUTINE TO CHECK THE VT61 FOR A PERIPHERAL ABORT.
                                ;;**************************************************************
020200  032737  010000  002224  CKABRT: BIT     #PABRT,VSTAT    ;ABORT FLAG RECEIVED?
020206  001445                          BEQ     2$              ;NO-EXIT
020210  010037  001124                  MOV     R0,$GDDAT
020214  162737  000004  001124          SUB     #4,$GDDAT       ;POINT ERR PC TO MAIN ROUTINE.
020222  013737  002224  001126          MOV     VSTAT,$BDDAT
020230  104020                          ERROR   20              ;ISSUE PERIPHERAL ABORT ERROR

020232  013701  015502                  MOV     TBBUF,R1
020236  004037  020172                  JSR     R0,LDBUF        ;LOAD THE XMIT BUFFER WITH:
020242     033     117     137          .BYTE   .ESC,.O,.IABT,.ESC,.O,.RABT
020245     033     117     140
020250     033     117     145          .BYTE   .ESC,.O,.UNLKKB,0
020253     000
020254  012737  000011  015510          MOV     #9.,XMCNT       ;SET UP TO XMIT 9 BYTES.
020262  004037  016120                  JSR     R0,XMREC        ;XMIT AND RECEIVE.
020266  000240                          NOP
020270  123727  015230  000170          CMPB    STR0,#NABRT     ;ABORT FLAG CLEARED?
020276  001411                          BEQ     2$              ;YES-EXIT
020300  010037  001124                  MOV     R0,$GDDAT       ;NO-SET UP AND ISSUE A CANT
020304  162737  000004  001124          SUB     #4,$GDDAT       ;CLEAR ABORT FLAG ERROR MESSAGE.
020312  013737  002224  001126          MOV     VSTAT,$BDDAT
020320  104021                          ERROR   21
```

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 4118  020322  000200                  2$:     RTS     R0
 4119
 4120                                  ;;*****************************************************************
 4121                                          ;SUBROUTINE TO COMPARE RECEIVED KEYBOARD POSITION WITH
 4122                                          ;EXPECTED KEYBOARD POSITION. ERRORS ARE REPORTED
 4123                                          ;AS POSITIONAL ERRORS AND NOT DATA COMPARE ERRORS.
 4124                                  ;;*****************************************************************
 4125
 4126
 4127  020324  105077  011252         CKKBD:  CLRB    @ABUFP          ;CLEAR RECEIVE BYTE
 4128  020330  005037  002162                 CLR     CHRD            ;CLEAR INPUT STORAGE.
 4129  020334  105777  011242         KBDLP:  TSTB    @ABUFP          ;WAIT FOR A INPUT.
 4130  020340  001775                         BEQ     .-4
 4131
 4132  020342  117737  011234  002162         MOVB    @ABUFP  ,CHRD   ;STORE IT AND
 4133  020350  105077  011226                 CLRB    @ABUFP          ;CLEAR THE INPUT AREA.
 4134  020354  123714  002162         1$:     CMPB    CHRD    ,(R4)   ;RECEIVED EQUAL EXPECTED?
 4135  020360  001500                         BEQ     GDSTRK          ;NO-UPDATE POINTERS.
 4136  020362  005237  002210                 INC     BUBCT           ;INCREMENT ERROR COUNT.
 4137  020366  023727  002210  000012         CMP     BUBCT,#10.      ;COUNT = 10?
 4138  020374  103075                         BHIS    CNTF            ;YES-EXIT SUBROUTINE.
 4139  020376  010401                         MOV     R4,R1
 4140  020400  166501  011766                 SUB     DTTBL(R5),R1    ;EXTRACT KEY POSITION FROM ROW LOC.
 4141  020404  005201                         INC     R1              ;CONVERT LOGICAL POS. TO ACTUAL.
 4142  020406  004037  017674                 JSR     R0,BINOCT       ;GET KEY POSITION IN OCTAL.
 4143  020412  113737  002166  002164         MOVB    SVER2,SVER1     ;RE-ASSEMBLE OCTAL BYTES.
 4144  020420  123727  002165  000060         CMPB    SVER1+1,#60     ;POSITION LESS THAN 8?
 4145  020426  001413                         BEQ     LDPOS           ;YES-GO LOAD IT.
 4146  020430  123727  002164  000062         CMPB    SVER1,#62       ;POSITION GREATER THAN 8 AND LESS THAN12?
 4147  020436  103404                         BLO     BOROW           ;YES-SET UP TO BORROW.
 4148  020440  162737  000002  002164         SUB     #2,SVER1        ;NO-JUST SUBTRACT 2.
 4149  020446  000403                         BR      LDPOS
 4150  020450  162737  000370  002164 BOROW:  SUB     #370,SVER1      ;SUBTRACT AND BORROW.
 4151  020456  113737  002164  030213 LDPOS:  MOVB    SVER1,KYSTRK+1  ;LOAD THE CONVERTED DECIMAL #.
 4152  020464  113737  002165  030212         MOVB    SVER1+1,KYSTRK
 4153  020472  012703  030135         DMPOCT: MOV     #DKBERR ,R3
 4154  020476  004037  016460                 JSR     R0      ,LDXMIT ;ISSUE BODY OF KEYBOARD ERROR.
 4155  020502  111401                         MOVB    (R4)    ,R1
 4156  020504  004037  017674                 JSR     R0      ,BINOCT
 4157  020510  012703  002164                 MOV     #SVER1  ,R3
 4158  020514  004037  016460                 JSR     R0      ,LDXMIT ;CONVERT AND ISSUE GOOD CHAR.
 4159  020520  012703  030244                 MOV     #DSPC6,R3
 4160  020524  004037  016460                 JSR     R0,LDXMIT       ;INSERT 6 SPACES IN MESSAGE.
 4161  020530  113701  002162                 MOVB    CHRD    ,R1
 4162  020534  004037  017674                 JSR     R0      ,BINOCT
 4163  020540  012703  002164                 MOV     #SVER1  ,R3
 4164  020544  004037  016460                 JSR     R0      ,LDXMIT ;CONVERT AND ISSUE RECEIVED CHAR.
 4165  020550  012703  001171                 MOV     #$CRLF  ,R3
 4166  020554  004037  016460                 JSR     R0      ,LDXMIT ;ISSUE C/R AND L/F.
 4167  020560  000665                         BR      KBDLP           ;LOOK FOR SAME KEY AGAIN.
 4168
 4169  020562  005204         GDSTRK: INC     R4              ;INCREMENT KEYBOARD ROW COUNTER.
 4170  020564  105714                 TSTB    (R4)            ;REACHED END OF ROW?
 4171  020566  001262                 BNE     KBDLP           ;NO-LOOK FOR NEXT INPUT
 4172  020570  000200         CNTF:   RTS     R0              ;YES-EXIT.
 4173
```

```
4174                                    ;;*****************************************************************
4175
4176                                            ;SUBROUTINE TO LOOP DATA THROUGH HOST COMPUTER. ALL
4177                                            ;FUNCTIONS ARE ALLOWED, BUT BLOCK TRANSMITS WHICH
4178                                            ;EXCEED 552 BYTES WILL RESULT IN THE TERMINATION
4179                                            ;OF THE OPERATION AFTER 552 RECEIVED BYTES.
4180
4181                                    ;;*****************************************************************
4182
4183  020572  005237  021074          LOOP:   INC     XMZER           ;SET UP TO XMIT NULLS.
4184  020576  012737  031602  015176          MOV     #TCRLB+500,REBUF        ;RESET BUFFER POINTERS
4185  020604  012737  030402  015502          MOV     #RCRLB,TBBUF
4186  020612  004037  016520                  JSR     R0,RESPTR       ;RELOAD ALL INTERRUPT POINTERS
4187  020616  042737  077577  002224          BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
4188  020624  013704  015200          LOOPT:  MOV     RBUFP,R4        ;SET UP RECEIVE FLAG
4189  020630  032737  000001  002224  LOOPTA: BIT     #XMDNE,VSTAT    ;XMIT COMPLETE?
4190  020636  001407                          BEQ     LOOPR           ;NO
4191  020640  042737  000001  002224          BIC     #XMDNE,VSTAT    ;YES RESET FLAG
4192  020646  013737  015174  015200          MOV     RBBUF,RBUFP     ;RESET THE REC. BUFFER POINTER
4193  020654  000763                          BR      LOOPT
4194  020656  032737  001400  002224  LOOPR:  BIT     #EPL+ESC,VSTAT  ;RECEIVED AN ESC OR EPL?
4195  020664  001004                          BNE     LPSTR           ;YES-GO CHECK IT
4196  020666  023704  015200                  CMP     RBUFP,R4        ;RECEIVED A DISPLAY CHAR?
4197  020672  001756                          BEQ     LOOPTA          ;NO-LOOP
4198  020674  000426                          BR      BUMPCT
4199  020676  117777  010700  174274  LPSTR:  MOVB    @ABUFP,@RBUFP   ;YES LOAD IT IN THE BUFFER
4200  020704  005237  015200                  INC     RBUFP           ;AND INCREMENT BUFFER POINTER
4201  020710  005037  015202                  CLR     ESAMB           ;CLEAR ESC ASSEMBLY WORD
4202  020714  042737  001400  002224          BIC     #EPL+ESC,VSTAT  ;CLEAR THE FLAGS
4203  020722  005237  015510                  INC     XMCNT           ;INCREMENT XMIT COUNT
4204  020726  123777  002132  010646          CMPB    ESCN,@ABUFP     ;CHAR. A ESC(033)?
4205  020734  001733                          BEQ     LOOPT           ;YES WAIT FOR NEXT PART OF FUNCTION
4206  020736  113777  001754  174234          MOVB    LNFED,@RBUFP    ;CHAR. WAS EPL ADD A LINE FEED.
4207  020744  005237  015200                  INC     RBUFP
4208  020750  000407                          BR      FRCECT          ;AND ISSUE THEM.
4209  020752  023727  015510  000764  BUMPCT: CMP     XMCNT,#500.     ;BUFFER ABOUT FILLED?
4210  020760  103403                          BLO     FRCECT          ;NO
4211  020762  005337  015200          1$:     DEC     RBUFP           ;YES-RESET THE RECEIVE POINTER
4212  020766  000716                          BR      LOOPT
4213  020770  005237  015510          FRCECT: INC     XMCNT           ;INCREMENT THE XMIT COUNT
4214  020774  023727  015510  000002          CMP     XMCNT,#2        ;FIRST CHAR TO XMIT?
4215  021002  101003                          BHI     XMWT            ;NO
4216  021004  052777  000100  160724          BIS     #TENA,@VXCSR    ;YES-SET THE XMIT ENABLE
4217  021012  004037  021022          XMWT:   JSR     R0,EXTST        ;LOOK FOR END OF TEST COMMAND.
4218  021016  000702                          BR      LOOPT           ;NONE FOUND.
4219  021020  000200                          RTS     R0              ;AND EXIT
4220
4221                                    ;;*****************************************************************
4222                                            ;SUBROUTINE TO CHECK FOR END OF TEST COMMAND. THE CONTROL
4223                                            ;C KEY EXITS ALL TESTS EXCEPT THE BLOCK MODE TEST
4224                                            ;WHICH IS EXITED ON A @ KEY.
4225                                    ;;*****************************************************************
4226
4227  021022  127727  010554  000003  EXTST:  CMPB    @ABUFP,#3       ;LOOK FOR CONTROL C.
4228  021030  001020                          BNE     NOROUT
4229
```

```
 4230  021032  012737  031101  015176  ABSXT:  MOV     #RCRLB+477,REBUF        ;RESET THE BUFFERS
 4231  021040  012737  031102  015502          MOV     #TCRLB,TBBUF
 4232  021046  004037  016520                  JSR     R0,RESPTR       ;RESET ALL POINTERS
 4233  021052  012702  026715                  MOV     #DEXT,R2
 4234  021056  004037  017600                  JSR     R0,DSMES        ;ISSUE EXIT MESSAGE
 4235  021062  005037  021074                  CLR     XMZER           ;CLEAR THE ZERO TRANSMIT FLAG.
 4236  021066  062700  000002                  ADD     #2,R0           ;SET UP TEST EXIT.
 4237  021072  000200                  NOROUT: RTS     R0              ;EXIT SUBROUTINE.
 4238
 4239  021074  000000                  XMZER:  .WORD   0
 4240                                  ;;**********************************************************************
 4241                                          ;SUB-ROUTINE TO LOOK FOR VSTAT BIT ON THE STACK
 4242                                          ;DELAY FACTOR IS FIRST WORD ON THE STACK AND VSTAT BIT
 4243                                          ;IS THE SECOND. MIN. DELAY IS 4 U.S FOR A MOS 11/45.
 4244                                  ;;**********************************************************************
 4245
 4246  021076                          WTBGND:
 4247  021076  012637  002222                  MOV     (SP)+,ROSVE     ;;POP STACK INTO ROSVE
 4248  021102  012637  021200                  MOV     (SP)+,VDLAY     ;;POP STACK INTO VDLAY
 4249  021106  012637  021176                  MOV     (SP)+,VBIT      ;;POP STACK INTO VBIT
 4250  021112  012737  000002  002234          MOV     #2,DLYCNT       ;GO THROUGH DELAY TWICE                 ;;++C
 4251  021120  005037  002220          1$:     CLR     DLAY
 4252  021124  033737  021176  002224  2$:     BIT     VBIT,VSTAT      ;SENSED THE CONDITION?
 4253  021132  001015                          BNE     FNDBT           ;YES-EXIT.
 4254  021134  005337  002220                  DEC     DLAY            ;NO-RUN DELAY.
 4255  021140  001371                          BNE     2$
 4256  021142  005337  002234                  DEC     DLYCNT          ;LOOPED TWICE?                          ;;++C
 4257  021146  001364                          BNE     1$              ;IF NO, GO AGAIN.                       ;;++C
 4258  021150  005337  021200                  DEC     VDLAY           ;DELAY FACTOR EXPIRED?
 4259  021154  001361                          BNE     1$              ;NO-LOOP
 4260  021156  104011                          ERROR   11              ;DELAY EXPIRED-ISSUE HUNG NIT
 4261  021160  005237  002200                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
 4262  021164  000401                          BR      TIMEXT
 4263  021166  005720                  FNDBT:  TST     (R0)+           ;SET UP FOR NORMAL EXIT
 4264  021170                          TIMEXT:
 4265  021170  013746  002222                  MOV     ROSVE,-(SP)     ;;PUSH ROSVE ON STACK
 4266  021174  000200                          RTS     R0
 4267  021176  000000                  VBIT:   0
 4268  021200  000000                  VDLAY:  0
 4269                                  ;;**********************************************************************
 4270                                          ;SUBROUTINE TO LOOK FOR XOFF BEFORE EXITING A RECEIVE ROUTINE.
 4271                                  ;;**********************************************************************
 4272
 4273  021202  005037  002220          CKOFF:  CLR     DLAY
 4274  021206  032737  100000  002224  1$:     BIT     #RXOFF,VSTAT    ;IS XOFF SET?
 4275  021214  001403                          BEQ     2$              ;NO-EXIT
 4276  021216  005337  002220                  DEC     DLAY            ;RUN DELAY.
 4277  021222  001371                          BNE     1$
 4278  021224  000200                  2$:     RTS     R0
 4279
 4280                                  .SBTTL  SCOPE HANDLER ROUTINE
 4281
 4282                                  ;;**********************************************************************
 4283                                  ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
 4284                                  ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
 4285                                  ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
```

```
                                        ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                        ;*SW14=1        LOOP ON TEST
                                        ;*SW11=1        INHIBIT ITERATIONS
                                        ;*SW09=1        LOOP ON ERROR
                                        ;*SW08=1        LOOP ON TEST IN SWR<7:0>
                                        ;*CALL
                                        ;*      SCOPE           ;;SCOPE=IOT

021226                                  $SCOPE:
021226  004037  014040                          JSR     R0,MONIT
021232  032777  040000  157700  1$:      BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
021240  001111                          BNE     $OVER           ;;YES IF SW14=1
                                        ;#####START OF CODE FOR THE XOR TESTER#####
021242  000416                          $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
021244  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
021250  012737  021270  000004                  MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
021256  005737  177060                          TST     @#177060        ;;TIME OUT ON XOR?
021262  012637  000004                          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
021266  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
021270  022626                          5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
021272  012637  000004                          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
021276  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
021300                                  6$:;#####END OF CODE FOR THE XOR TESTER#####
021300  032777  000400  157632                  BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
021306  001404                          BEQ     2$              ;;BR IF NO
021310  127737  157624  001102                  CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
021316  001462                          BEQ     $OVER           ;;BR IF YES
021320  105737  001103                  2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
021324  001421                          BEQ     3$              ;;BR IF NO
021326  123737  001115  001103                  CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
021334  101015                          BHI     3$              ;;BR IF NO
021336  032777  001000  157574                  BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
021344  001404                          BEQ     4$              ;;BR IF NO
021346  013737  001110  001106  7$:      MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
021354  000443                          BR      $OVER
021356  105037  001103                  4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
021362  005037  001160                          CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
021366  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
021370  032777  004000  157542  3$:      BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
021376  001011                          BNE     1$              ;;BR IF YES
021400  005737  001100                          TST     $PASS           ;;IF FIRST PASS OF PROGRAM
021404  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
021406  005237  001104                          INC     $ICNT           ;;INCREMENT ITERATION COUNT
021412  023737  001160  001104                  CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
021420  002021                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
021422  012737  000001  001104  1$:      MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
021430  013737  021500  001160                  MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
021436  105237  001102                  $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
021442  011637  001106                          MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
021446  011637  001110                          MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
021452  005037  001162                          CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
021456  112737  000001  001115                  MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
021464  013777  001102  157450  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
021472  013716  001106                          MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
021476  000002                          RTI                     ;;FIXES PS
```

```
 4342  021500  000005                  $MXCNT: 5                       ;;MAX. NUMBER OF ITERATIONS
 4343                                  .SBTTL  ERROR HANDLER ROUTINE
 4344
 4345                                  ;;**********************************************************************
 4346                                  ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
 4347                                  ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
 4348                                  ;*AND GO TO $ERRTYP ON ERROR
 4349                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 4350                                  ;*SW15=1         HALT ON ERROR
 4351                                  ;*SW13=1         INHIBIT ERROR TYPEOUTS
 4352                                  ;*SW10=1         BELL ON ERROR
 4353                                  ;*SW09=1         LOOP ON ERROR
 4354                                  ;*CALL
 4355                                  ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
 4356
 4357  021502                          $ERROR:
 4358  021502  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
 4359  021506  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
 4360  021510  013777  001102  157424          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
 4361  021516  032777  002000  157414          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
 4362  021524  001402                          BEQ     1$              ;;NO - SKIP
 4363  021526  104401  001164                  TYPE    ,$BELL          ;;RING BELL
 4364  021532  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
 4365  021536  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
 4366  021542  162737  000002  001116          SUB     #2,$ERRPC
 4367  021550  117737  157342  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
 4368  021556  032777  020000  157354          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
 4369  021564  001004                          BNE     20$             ;;SKIP TYPEOUTS
 4370  021566  004737  022070                  JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
 4371  021572  104401  001171                  TYPE    ,$CRLF
 4372  021576                          20$:
 4373  021576  005777  157336          2$:     TST     @SWR            ;;HALT ON ERROR
 4374  021602  100001                          BPL     3$              ;;SKIP IF CONTINUE
 4375  021604  000000                          HALT                    ;;HALT ON ERROR!
 4376  021606  032777  001000  157324  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
 4377  021614  001402                          BEQ     4$              ;;BR IF NO
 4378  021616  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
 4379  021622  005737  001162          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
 4380  021626  001402                          BEQ     5$              ;;BR IF NONE
 4381  021630  013716  001162                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
 4382  021634                          5$:
 4383  021634  022737  010776  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
 4384  021642  001001                          BNE     6$              ;;BRANCH IF NO
 4385  021644  000000                          HALT                    ;;YES
 4386  021646                          6$:
 4387  021646  000002                          RTI                     ;;RETURN
 4388                                  .SBTTL  TYPE ROUTINE
 4389
 4390                                  ;;**********************************************************************
 4391                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
 4392                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
 4393                                  ;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
 4394                                  ;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
 4395                                  ;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
 4396                                  ;*
 4397                                  ;*CALL:
```

```
                                       ;*1) USING A TRAP INSTRUCTION
                                       ;*       TYPE    ,MESADR          ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                       ;*OR
                                       ;*       TYPE
                                       ;*       MESADR
                                       ;*

021650  105737  001157       $TYPE:  TSTB    $TPFLG           ;;IS THERE A TERMINAL?
021654  100002                       BPL     1$               ;;BR IF YES
021656  000000                       HALT                     ;;HALT HERE IF NO TERMINAL
021660  000407                       BR      3$               ;;LEAVE
021662  010046                 1$:   MOV     R0,-(SP)         ;;SAVE R0
021664  017600  000002               MOV     @2(SP),R0        ;;GET ADDRESS OF ASCIZ STRING
021670  112046                 2$:   MOVB    (R0)+,-(SP)      ;;PUSH CHARACTER TO BE TYPED ONTO STACK
021672  001005                       BNE     4$               ;;BR IF IT ISN'T THE TERMINATOR
021674  005726                       TST     (SP)+            ;;IF TERMINATOR POP IT OFF THE STACK
021676  012600                 60$:  MOV     (SP)+,R0         ;;RESTORE R0
021700  062716  000002         3$:   ADD     #2,(SP)          ;;ADJUST RETURN PC
021704  000002                       RTI                      ;;RETURN
021706  122716  000011         4$:   CMPB    #HT,(SP)         ;;BRANCH IF <HT>
021712  001430                       BEQ     8$
021714  122716  000200               CMPB    #CRLF,(SP)       ;;BRANCH IF NOT <CRLF>
021720  001006                       BNE     5$
021722  005726                       TST     (SP)+            ;;POP  <CR><LF> EQUIV
021724  104401                       TYPE                     ;;TYPE A CR AND LF
021726  001171                       $CRLF
021730  105037  022064               CLRB    $CHARCNT         ;;CLEAR CHARACTER COUNT
021734  000755                       BR      2$               ;;GET NEXT CHARACTER
021736  004737  022020         5$:   JSR     PC,$TYPEC        ;;GO TYPE THIS CHARACTER
021742  123726  001156         6$:   CMPB    $FILLC,(SP)+     ;;IS IT TIME FOR FILLER CHARS.?
021746  001350                       BNE     2$               ;;IF NO GO GET NEXT CHAR.
021750  013746  001154               MOV     $NULL,-(SP)      ;;GET # OF FILLER CHARS. NEEDED
                                                              ;;AND THE NULL CHAR.
021754  105366  000001         7$:   DECB    1(SP)            ;;DOES A NULL NEED TO BE TYPED?
021760  002770                       BLT     6$               ;;BR IF NO--GO POP THE NULL OFF OF STACK
021762  004737  022020               JSR     PC,$TYPEC        ;;GO TYPE A NULL
021766  105337  022064               DECB    $CHARCNT         ;;DO NOT COUNT AS A COUNT
021772  000770                       BR      7$               ;;LOOP

                                       ;HORIZONTAL TAB PROCESSOR

021774  112716  000040         8$:   MOVB    #' ,(SP)         ;;REPLACE TAB WITH SPACE
022000  004737  022020         9$:   JSR     PC,$TYPEC        ;;TYPE A SPACE
022004  132737  000007  022064       BITB    #7,$CHARCNT      ;;BRANCH IF NOT AT
022012  001372                       BNE     9$               ;;TAB STOP
022014  005726                       TST     (SP)+            ;;POP SPACE OFF STACK
022016  000724                       BR      2$               ;;GET NEXT CHARACTER
022020  105777  157124       $TYPEC: TSTB    @$TPS            ;;WAIT UNTIL PRINTER IS READY
022024  100375                       BPL     $TYPEC
022026  116677  000002  157116       MOVB    2(SP),@$TPB      ;;LOAD CHAR TO BE TYPED INTO DATA REG.
022034  122766  000015  000002       CMPB    #CR,2(SP)        ;;IS CHARACTER A CARRIAGE RETURN?
022042  001003                       BNE     1$               ;;BRANCH IF NO
022044  105037  022064               CLRB    $CHARCNT         ;;YES--CLEAR CHARACTER COUNT
022050  000406                       BR      $TYPEX           ;;EXIT
022052  122766  000012  000002 1$:   CMPB    #LF,2(SP)        ;;IS CHARACTER A LINE FEED?
022060  001402                       BEQ     $TYPEX           ;;BRANCH IF YES
```

```
 4454  022062  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
 4455  022064  000000                $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
 4456  022066  000207                $TYPEX: RTS     PC
 4457
 4458                                .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
 4459
 4460                                ;;**************************************************************************
 4461                                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
 4462                                ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
 4463                                ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
 4464
 4465  022070                        $ERRTYP:
 4466  022070  104401  001171                TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
 4467  022074  010046                        MOV     R0,-(SP)        ;;SAVE R0
 4468  022076  005000                        CLR     R0              ;;PICKUP THE ITEM INDEX
 4469  022100  153700  001114              BISB    @#$ITEMB,R0
 4470  022104  001004                        BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
 4471                                                                ;;TYPE THE PC OF THE ERROR
 4472  022106  013746  001116              MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
 4473                                                                ;;ERROR ADDRESS
 4474  022112  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 4475  022114  000445                        BR      10$             ;;GET OUT
 4476  022116  005300                1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
 4477  022120  006300                        ASL     R0              ;;      WORK FOR THE ERROR TABLE
 4478  022122  006300                        ASL     R0
 4479  022124  006300                        ASL     R0
 4480  022126  062700  001174              ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
 4481  022132  012037  022142              MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
 4482  022136  001404                        BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
 4483  022140  104401                        TYPE                    ;;TYPE THE "ERROR MESSAGE"
 4484  022142  000000                2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
 4485  022144  104401  001171              TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
 4486  022150  012037  022160        3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
 4487  022154  001404                        BEQ     5$              ;;SKIP TYPEOUT IF 0
 4488  022156  104401                        TYPE                    ;;TYPE THE "DATA HEADER"
 4489  022160  000000                4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
 4490  022162  104401  001171              TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
 4491  022166  010146                5$:     MOV     R1,-(SP)        ;;SAVE R1
 4492  022170  012001                        MOV     (R0)+,R1        ;;PICKUP "DATA TABLE" POINTER
 4493  022172  001415                        BEQ     9$              ;;BR IF NO DATA TO BE TYPED
 4494  022174  012000                        MOV     (R0)+,R0        ;;PICKUP "DATA FORMAT" POINTER
 4495  022176  105720                6$:     TSTB    (R0)+           ;;"OCTAL" OR "DECIMAL"
 4496  022200  001003                        BNE     7$              ;;BR IF DECIMAL
 4497  022202  013146                        MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
 4498  022204  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 4499  022206  000402                        BR      8$
 4500  022210                        7$:
 4501  022210  013146                        MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
 4502  022212  104405                        TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 4503  022214  005711                8$:     TST     (R1)            ;;IS THERE ANOTHER NUMBER?
 4504  022216  001403                        BEQ     9$              ;;BR IF NO
 4505  022220  104401  022240              TYPE    ,11$            ;;TYPE TWO(2) SPACES
 4506  022224  000764                        BR      6$              ;;LOOP
 4507
 4508  022226  012601                9$:     MOV     (SP)+,R1        ;;RESTORE R1
 4509  022230  012600                10$:    MOV     (SP)+,R0        ;;RESTORE R0
```

```
                                        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
                                        RTS     PC              ;;RETURN
                                11$:    .ASCIZ  /  /            ;;TWO(2) SPACES
                                        .EVEN
                                .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                                ;;******************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                ;*      .BYTE   M               ;;M=1 OR 0
                                ;*                                      ;;1=TYPE LEADING ZEROS
                                ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                ;*
                                ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                ;*$TYPOS OR $TYPOC
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPON                   ;;CALL FOR TYPEOUT
                                ;*
                                ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOC                   ;;CALL FOR TYPEOUT

022244  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
022250  116637  000001  022467          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
022256  112637  022471                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
022262  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
022266  000406                          BR      $TYPON
022270  112737  000001  022467  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
022276  112737  000006  022471          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
022304  112737  000005  022466  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
022312  010346                          MOV     R3,-(SP)        ;;SAVE R3
022314  010446                          MOV     R4,-(SP)        ;;SAVE R4
022316  010546                          MOV     R5,-(SP)        ;;SAVE R5
022320  113704  022471                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
022324  005404                          NEG     R4
022326  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
022332  110437  022470                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
022336  113704  022467                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
022342  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
022346  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
022350  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
022352  000404                          BR      3$              ;;GO DO MSB
022354  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
022356  006105                          ROL     R5
022360  006105                          ROL     R5
022362  010503                          MOV     R5,R3
022364  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
022366  105337  022470                  DECB    $OMODE          ;;TYPE THIS DIGIT?
022372  100016                          BPL     7$              ;;BR IF NO
```

```
 4566  022374  042703  177770                BIC     #177770,R3      ;;GET RID OF JUNK
 4567  022400  001002                        BNE     4$              ;;TEST FOR 0
 4568  022402  005704                        TST     R4              ;;SUPPRESS THIS 0?
 4569  022404  001403                        BEQ     5$              ;;BR IF YES
 4570  022406  005204                4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 4571  022410  052703  000060              BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 4572  022414  052703  000040        5$:   BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
 4573  022420  110337  022464              MOVB    R3,8$           ;;SAVE FOR TYPING
 4574  022424  104401  022464              TYPE    ,8$             ;;GO TYPE THIS DIGIT
 4575  022430  105337  022466        7$:   DECB    $OCNT           ;;COUNT BY 1
 4576  022434  003347                        BGT     2$              ;;BR IF MORE TO DO
 4577  022436  002402                        BLT     6$              ;;BR IF DONE
 4578  022440  005204                        INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
 4579  022442  000744                        BR      2$              ;;GO DO THE LAST DIGIT
 4580  022444  012605                6$:     MOV     (SP)+,R5        ;;RESTORE R5
 4581  022446  012604                        MOV     (SP)+,R4        ;;RESTORE R4
 4582  022450  012603                        MOV     (SP)+,R3        ;;RESTORE R3
 4583  022452  016666  000002  000004       MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
 4584  022460  012616                        MOV     (SP)+,(SP)
 4585  022462  000002                        RTI                     ;;RETURN
 4586  022464     000                8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
 4587  022465     000                        .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
 4588  022466     000                $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
 4589  022467     000                $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
 4590  022470  000000                $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
 4591                                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
 4592
 4593                                ;;**************************************************************************
 4594                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
 4595                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
 4596                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
 4597                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
 4598                                ;*REPLACED WITH SPACES.
 4599                                ;*CALL:
 4600                                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
 4601                                ;*      TYPDS                   ;;GO TO THE ROUTINE
 4602
 4603  022472                        $TYPDS:
 4604  022472  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 4605  022474  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 4606  022476  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 4607  022500  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 4608  022502  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 4609  022504  012746  020200               MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
 4610  022510  016605  000020               MOV     20(SP),R5       ;;GET THE INPUT NUMBER
 4611  022514  100004                        BPL     1$              ;;BR IF INPUT IS POS.
 4612  022516  005405                        NEG     R5              ;;MAKE THE BINARY NUMBER POS.
 4613  022520  112766  000055  000001       MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
 4614  022526  005000                1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
 4615  022530  012703  022706              MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
 4616  022534  112723  000040              MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
 4617  022540  005002                2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
 4618  022542  016001  022676              MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
 4619  022546  160105                3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
 4620  022550  002402                        BLT     4$              ;;BR IF DONE
 4621  022552  005202                        INC     R2              ;;INCREASE THE BCD DIGIT BY 1
```

```
4622  022554  000774                        BR      3$
4623  022556  060105                4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
4624  022560  005702                        TST     R2              ;;CHECK IF BCD DIGIT=0
4625  022562  001002                        BNE     5$              ;;FALL THROUGH IF 0
4626  022564  105716                        TSTB    (SP)            ;;STILL DOING LEADING 0'S?
4627  022566  100407                        BMI     7$              ;;BR IF YES
4628  022570  106316                5$:     ASLB    (SP)            ;;MSD?
4629  022572  103003                        BCC     6$              ;;BR IF NO
4630  022574  116663  000001  177777        MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
4631  022602  052702  000060          6$:   BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
4632  022606  052702  000040          7$:   BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
4633  022612  110223                        MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
4634  022614  005720                        TST     (R0)+           ;;JUST INCREMENTING
4635  022616  020027  000010                CMP     R0,#10          ;;CHECK THE TABLE INDEX
4636  022622  002746                        BLT     2$              ;;GO DO THE NEXT DIGIT
4637  022624  003002                        BGT     8$              ;;GO TO EXIT
4638  022626  010502                        MOV     R5,R2           ;;GET THE LSD
4639  022630  000764                        BR      6$              ;;GO CHANGE TO ASCII
4640  022632  105726                8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
4641  022634  100003                        BPL     9$              ;;BR IF NO
4642  022636  116663  177777  177776        MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
4643  022644  105013                9$:     CLRB    (R3)            ;;SET THE TERMINATOR
4644  022646  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
4645  022650  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
4646  022652  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
4647  022654  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
4648  022656  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
4649  022660  104401  022706                TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
4650  022664  016666  000002  000004        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
4651  022672  012616                        MOV     (SP)+,(SP)
4652  022674  000002                        RTI                     ;;RETURN TO USER
4653  022676  023420                $DTBL:  10000.
4654  022700  001750                        1000.
4655  022702  000144                        100.
4656  022704  000012                        10.
4657  022706  000004                $DBLK:  .BLKW   4
4658                                .SBTTL  POWER DOWN AND UP ROUTINES
4659
4660                                ;;**********************************************************************
4661                                ;POWER DOWN ROUTINE
4662  022716  012737  023056  000024 $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
4663  022724  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
4664  022732  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
4665  022734  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
4666  022736  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
4667  022740  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
4668  022742  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
4669  022744  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
4670  022746  017746  156166                MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
4671  022752  010637  023062                MOV     SP,$SAVR6       ;;SAVE SP
4672  022756  012737  022770  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
4673  022764  000000                        HALT
4674  022766  000776                        BR      .-2             ;;HANG UP
4675
4676                                ;;**********************************************************************
4677                                ;POWER UP ROUTINE
```

```
                                                                                                                    
 4678  022770  012737  023056  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
 4679  022776  013706  023062                  MOV     $SAVR6,SP        ;;GET SP
 4680  023002  005037  023062                  CLR     $SAVR6           ;;WAIT LOOP FOR THE TTY
 4681  023006  005237  023062          1$:     INC     $SAVR6           ;;WAIT FOR THE INC
 4682  023012  001375                  BNE     1$                       ;;OF  WORD
 4683  023014  012677  156120                  MOV     (SP)+,@SWR       ;;POP STACK INTO @SWR
 4684  023020  012605                  MOV     (SP)+,R5         ;;POP STACK INTO R5
 4685  023022  012604                  MOV     (SP)+,R4         ;;POP STACK INTO R4
 4686  023024  012603                  MOV     (SP)+,R3         ;;POP STACK INTO R3
 4687  023026  012602                  MOV     (SP)+,R2         ;;POP STACK INTO R2
 4688  023030  012601                  MOV     (SP)+,R1         ;;POP STACK INTO R1
 4689  023032  012600                  MOV     (SP)+,R0         ;;POP STACK INTO R0
 4690  023034  012737  022716  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
 4691  023042  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
 4692  023050  104401                  TYPE                             ;REPORT THE POWER FAILURE
 4693  023052  023064          $PWRMG: .WORD   $POWER           ;;POWER FAIL MESSAGE POINTER
 4694  023054  000002                  RTI
 4695  023056  000000          $ILLUP: HALT                     ;;THE POWER UP SEQUENCE WAS STARTED
 4696  023060  000776                  BR      .-2              ;; BEFORE THE POWER DOWN WAS COMPLETE
 4697  023062  000000          $SAVR6: 0                        ;;PUT THE SP HERE
 4698  023064  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
 4699  023072  000122
 4700                                  .EVEN
 4701                          .SBTTL  TRAP DECODER
 4702
 4703                          ;;**********************************************************************
 4704                          ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
 4705                          ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 4706                          ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 4707                          ;*GO TO THAT ROUTINE.
 4708
 4709  023074  010046          $TRAP:  MOV     R0,-(SP)         ;;SAVE R0
 4710  023076  016600  000002          MOV     2(SP),R0         ;;GET TRAP ADDRESS
 4711  023102  005740                  TST     -(R0)            ;;BACKUP BY 2
 4712  023104  111000                  MOVB    (R0),R0          ;;GET RIGHT BYTE OF TRAP
 4713  023106  006300                  ASL     R0               ;;POSITION FOR INDEXING
 4714  023110  016000  023130          MOV     $TRPAD(R0),R0    ;;INDEX TO TABLE
 4715  023114  000200                  RTS     R0               ;;GO TO ROUTINE
 4716
 4717
 4718                          ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
 4719
 4720  023116  011646          $TRAP2: MOV     (SP),-(SP)       ;;MOVE THE PC DOWN
 4721  023120  016666  000004  000002          MOV     4(SP),2(SP)      ;;MOVE THE PSW DOWN
 4722  023126  000002                  RTI                      ;;RESTORE THE PSW
 4723
 4724                          .SBTTL  TRAP TABLE
 4725
 4726                          ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
 4727                          ;*BY THE "TRAP" INSTRUCTION.
 4728
 4729                          ;       ROUTINE
 4730                          ;       -------
 4731  023130  023116          $TRPAD: .WORD   $TRAP2
 4732  023132  021650                  $TYPE   ;;CALL=TYPE      TRAP+1(104401)  TTY TYPEOUT ROUTINE
 4733  023134  022270                  $TYPOC  ;;CALL=TYPOC     TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
```

```
 4734  023136  022244                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 4735  023140  022304                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 4736  023142  022472                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
 4737
 4738
 4739
 4740  023144  003100  003466  003674  TSTADD: TST1,TST2,TST3
 4741
 4742  023152  004070  004222  004462          TST4,TST5,TST6
 4743
 4744  023160  004712  005466  006216          TST7,TST10,TST11
 4745
 4746  023166  006430  006604  007032          TST12,TST13,TST14
 4747
 4748  023174  007254  010024  010242          TST15,TST16,TST17
 4749
 4750  023202  010410  011032  011336          TST20,TST21,TST22
 4751
 4752  023210  011534  011606                  TST23,TST24
 4753
 4754
 4755
 4756  023214  042523  020124  052126  STUPM:  .ASCII  /SET VT61S TO  FULL DUPLEX, /<15><12>
 4757  023222  030466  020123  047524
 4758  023230  020040  052506  046114
 4759  023236  042040  050125  042514
 4760  023244  026130  006440     012
 4761  023251     122  046505  052117          .ASCIZ  /REMOTE, PARITY MATCHED TO INTERFACE/<15><12>           ;;**C
 4762  023256  026105  050040  051101
 4763  023264  052111  020131  040515
 4764  023272  041524  042510  020104
 4765  023300  047524  044440  052116
 4766  023306  051105  040506  042503
 4767  023314  005015     000
 4768
 4769
 4770
 4771  023317     015  040412  042104  DUNTST: .ASCIZ  <15><12>/ADDRESSES WITH RESPONSIVE VT61S ARE:/<15><12>
 4772  023324  042522  051523  051505
 4773  023332  053440  052111  020110
 4774  023340  042522  050123  047117
 4775  023346  044523  042526  053040
 4776  023354  033124  051461  040440
 4777  023362  042522  006472  000012
 4778  023370  005015  047516  053040  NOVT:   .ASCIZ  <15><12>/NO VT61 RESPONDED TO ESCZ SEQ. AUTO RETRY IN 30 SEC./<15><12>
 4779  023376  033124  020061  042522
 4780  023404  050123  047117  042504
 4781  023412  020104  047524  042440
 4782  023420  041523  020132  042523
 4783  023426  027121  040440  052125
 4784  023434  020117  042522  051124
 4785  023442  020131  047111  031440
 4786  023450  020060  042523  027103
 4787  023456  005015     000
 4788
 4789
```

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 4790  023461     015  042012  030514  DLERR:  .ASCIZ  <15><12>/DL11 FAILED AT ADDRESS/
 4791  023466  020061  040506  046111
 4792  023474  042105  040440  020124
 4793  023502  042101  051104  051505
 4794  023510  000123
 4795
 4796  023512  040515  052516  046101  DMANA:  .ASCII  /MANUAL TEST SELECTED -/<15><12>
 4797  023520  052040  051505  020124
 4798  023526  042523  042514  052103
 4799  023534  042105  026440  005015
 4800  023542  047105  042524  020122          .ASCIZ  /ENTER ADDRESSES OF VT61S TO BE TESTED/<15><12>
 4801  023550  042101  051104  051505
 4802  023556  042523  020123  043117
 4803  023564  053040  033124  051461
 4804  023572  052040  020117  042502
 4805  023600  052040  051505  042524
 4806  023606  006504  000012
 4807
 4808  023612  047105  042524  020122  DMANB:  .ASCIZ  /ENTER TESTS TO BE RUN/<15><12>
 4809  023620  042524  052123  020123
 4810  023626  047524  041040  020105
 4811  023634  052522  006516  000012
 4812
 4813  023642  047101  042440  041523  EM1:    .ASCIZ  /AN ESC SEQ. TO THE VT61  FAILED - OCTAL EQUIV. IS:/<15><12>
 4814  023650  051440  050505  020056
 4815  023656  047524  052040  042510
 4816  023664  053040  033124  020061
 4817  023672  043040  044501  042514
 4818  023700  020104  020055  041517
 4819  023706  040524  020114  050505
 4820  023714  044525  027126  044440
 4821  023722  035123  005015     000
 4822  023727     124  051505  021524  DH1:    .ASCIZ  /TEST#  ERR PC  BYTE 1+2 BYTE 3+4/<15><12>
 4823  023734  020040  051105  020122
 4824  023742  041520  020040  054502
 4825  023750  042524  030440  031053
 4826  023756  041040  052131  020105
 4827  023764  025463  006464  000012
 4828
 4829  023772  042522  042503  053111  EM2:    .ASCIZ  /RECEIVE STATUS ERROR./<15><12>
 4830  024000  020105  052123  052101
 4831  024006  051525  042440  051122
 4832  024014  051117  006456  000012
 4833  024022  042101  027104  020040  DH2:    .ASCIZ  /ADD.  STAT.  ERR.BITS  CHAR./<15><12>
 4834  024030  052123  052101  020056
 4835  024036  042440  051122  041056
 4836  024044  052111  020123  041440
 4837  024052  040510  027122  005015
 4838  024060     000
 4839
 4840  024061     123  043117  053524  EM3:    .ASCIZ  /SOFTWARE (VSTAT) STATUS ERROR./<15><12>
 4841  024066  051101  020105  053050
 4842  024074  052123  052101  020051
 4843  024102  052123  052101  051525
 4844  024110  042440  051122  051117
 4845  024116  006456  000012
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 4846  024122  050040  051501  021523  DH3:    .ASCIZ  / PASS#,  TEST#,  EXP.STAT,  ACT.STAT/<15><12>
 4847  024130  020054  052040  051505
 4848  024136  021524  020054  042440
 4849  024144  050130  051456  040524
 4850  024152  026124  020040  041501
 4851  024160  027124  052123  052101
 4852  024166  005015     000
 4853
 4854  024171     107  027104  042040  EM4:    .ASCIZ  /GD. DATA DOES NOT MATCH REC. DATA/<15><12>
 4855  024176  052101  020101  047504
 4856  024204  051505  047040  052117
 4857  024212  046440  052101  044103
 4858  024220  051040  041505  020056
 4859  024226  040504  040524  005015
 4860  024234     000
 4861  024235     124  051505  021524  DH4:    .ASCIZ  /TEST# ,REC.CNT.,GD. DATA, REC. DATA/<15><12>
 4862  024242  026040  042522  027103
 4863  024250  047103  027124  043454
 4864  024256  027104  042040  052101
 4865  024264  026101  051040  041505
 4866  024272  020056  040504  040524
 4867  024300  005015     000
 4868          024304                  .EVEN
 4869
 4870  024304  054502  042524  020123  EM5:    .ASCIZ  /BYTES EXPECTED DOES NOT EQUAL BYTES RECEIVED/<15><12>
 4871  024312  054105  042520  052103
 4872  024320  042105  042040  042517
 4873  024326  020123  047516  020124
 4874  024334  050505  040525  020114
 4875  024342  054502  042524  020123
 4876  024350  042522  042503  053111
 4877  024356  042105  005015     000
 4878  024363     102  052131  051505  DH5:    .ASCIZ  /BYTES EXP., BYTES REC./<15><12>
 4879  024370  042440  050130  026056
 4880  024376  041040  052131  051505
 4881  024404  051040  041505  006456
 4882  024412  000012
 4883
 4884  024414  052503  051522  051117  EM6:    .ASCIZ  /CURSOR POSITIONING ERROR/<15><12>
 4885  024422  050040  051517  052111
 4886  024430  047511  044516  043516
 4887  024436  042440  051122  051117
 4888  024444  005015     000
 4889  024447     107  020104  044514  DH6:    .ASCIZ  /GD LINE  GD COL.   BD LINE  BD COL/<15><12>
 4890  024454  042516  020040  042107
 4891  024462  041440  046117  020056
 4892  024470  020040  042102  046040
 4893  024476  047111  020105  041040
 4894  024504  020104  047503  006514
 4895  024512  000012
 4896
 4897  024514  044504  042522  052103  EM7:    .ASCIZ  /DIRECT CURSOR ADDRESSING FAILURE/<15><12>
 4898  024522  041440  051125  047523
 4899  024530  020122  042101  051104
 4900  024536  051505  044523  043516
 4901  024544  043040  044501  052514
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4902  024552  042522  005015     000
4903  024557     120  051501  021523  DH7:    .ASCIZ  /PASS#  TEST #  ERROR PC   /<15><12>
4904  024564  020040  042524  052123
4905  024572  021440  020040  051105
4906  024600  047522  020122  041520
4907  024606  020040  006440  000012
4908  024614  040520  051523  020043  DH10:   .ASCIZ  /PASS#  TEST#  BD.ROW  BD.COL/<15><12>
4909  024622  052040  051505  021524
4910  024630  020040  042102  051056
4911  024636  053517  020040  042102
4912  024644  041456  046117  005015
4913  024652     000
4914
4915  024653     114  051501  020124  EM11:   .ASCIZ  /LAST TRANSMISSION TO VT61 CAUSED UNIT TO FAIL-HANG./<15><12>
4916  024660  051124  047101  046523
4917  024666  051511  044523  047117
4918  024674  052040  020117  052126
4919  024702  030466  041440  052501
4920  024710  042523  020104  047125
4921  024716  052111  052040  020117
4922  024724  040506  046111  044055
4923  024732  047101  027107  005015
4924  024740     000
4925
4926  024741     126  033124  020061  EM12:   .ASCIZ  /VT61 UNDER TEST FAILED- ERROR DATA FOLLOWS/<15><12>
4927  024746  047125  042504  020122
4928  024754  042524  052123  043040
4929  024762  044501  042514  026504
4930  024770  042440  051122  051117
4931  024776  042040  052101  020101
4932  025004  047506  046114  053517
4933  025012  006523  000012
4934
4935  025016  052126  030466  043040  EM10:   .ASCIZ  /VT61 FAILED SELF TEST FUNCTION/<15><12>
4936  025024  044501  042514  020104
4937  025032  042523  043114  052040
4938  025040  051505  020124  052506
4939  025046  041516  044524  047117
4940  025054  005015     000
4941
4942
4943  025057     120  051501  021523  DH12:   .ASCIZ  /PASS#,  TEST#, GD.CKSUM, BD.CKSUM/<15><12>
4944  025064  020054  052040  051505
4945  025072  021524  020054  042107
4946  025100  041456  051513  046525
4947  025106  020054  042102  041456
4948  025114  051513  046525  005015
4949  025122     000
4950
4951  025123     124  051505  044524  DABRT:  .ASCIZ  /TESTING ABORTED-TOO MANY FATAL XMITS/<15><12>
4952  025130  043516  040440  047502
4953  025136  052122  042105  052055
4954  025144  047517  046440  047101
4955  025152  020131  040506  040524
4956  025160  020114  046530  052111
4957  025166  006523  000012
```

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                                                                                    B  8
 4958
 4959  025172  052126  030466  051040  EM13:   .ASCIZ  /VT61 RECEIVER CHECKSUM COMPARE ERROR/<15><12>
 4960  025200  041505  044505  042526
 4961  025206  020122  044103  041505
 4962  025214  051513  046525  041440
 4963  025222  046517  040520  042522
 4964  025230  042440  051122  051117
 4965  025236  005015     000
 4966
 4967  025241     126  033124  020061  EM14:   .ASCIZ  /VT61 TRANSMITTER CHECKSUM COMPARE ERROR/<15><12>
 4968  025246  051124  047101  046523
 4969  025254  052111  042524  020122
 4970  025262  044103  041505  051513
 4971  025270  046525  041440  046517
 4972  025276  040520  042522  042440
 4973  025304  051122  051117  005015
 4974  025312     000
 4975
 4976          025314                  .EVEN
 4977  025314  047125  052111  052440  DVUNIT: .ASCII  /UNIT UNDER TEST /<15><12>
 4978  025322  042116  051105  052040
 4979  025330  051505  020124  005015
 4980  025336  041522  051123  020040          .ASCIZ  /RCSR   VECT.   IDENT/<15><12>
 4981  025344  053040  041505  027124
 4982  025352  020040  044440  042504
 4983  025360  052116  005015     000
 4984  025365     040  041522  051123  DH11:   .ASCIZ  / RCSR   VECT./<15><12>
 4985  025372  020040  053040  041505
 4986  025400  027124  005015     000
 4987  025405     120  044522  052116  DPRTR:  .ASCIZ  /PRINTER IS ATTACHED/<15><12>
 4988  025412  051105  044440  020123
 4989  025420  052101  040524  044103
 4990  025426  042105  005015     000
 4991  025433     103  050117  042511  DCOPYR: .ASCIZ  /COPIER IS ATTACHED/<15><12>
 4992  025440  020122  051511  040440
 4993  025446  052124  041501  042510
 4994  025454  006504  000012
 4995  025460  047530  043106  052040  EM15:   .ASCIZ  /XOFF TO VT61 FAILED TO HALT BLOCK XMIT/<15><12>
 4996  025466  020117  052126  030466
 4997  025474  043040  044501  042514
 4998  025502  020104  047524  044040
 4999  025510  046101  020124  046102
 5000  025516  041517  020113  046530
 5001  025524  052111  005015     000
 5002  025531     130  047117  052040  EM16:   .ASCIZ  /XON TO VT61 FAILED TO RESTART BLOCK XMIT/<15><12>
 5003  025536  020117  052126  030466
 5004  025544  043040  044501  042514
 5005  025552  020104  047524  051040
 5006  025560  051505  040524  052122
 5007  025566  041040  047514  045503
 5008  025574  054040  044515  006524
 5009  025602  000012
 5010  025604  047516  054040  047117  EM17:   .ASCIZ  /NO XON RECEIVED WITHIN 3 SEC. AFTER A RESET/<15><12>
 5011  025612  051040  041505  044505
 5012  025620  042526  020104  044527
 5013  025626  044124  047111  031440
```

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5014  025634  051440  041505  020056
5015  025642  043101  042524  020122
5016  025650  020101  042522  042523
5017  025656  006524  000012
5018  025662  040514  052123  050040  EM20:   .ASCIZ  /LAST PERIPHERAL OPERATION ABORTED/<15><12>
5019  025670  051105  050111  042510
5020  025676  040522  020114  050117
5021  025704  051105  052101  047511
5022  025712  020116  041101  051117
5023  025720  042524  006504  000012
5024  025726  047503  046125  020104  EM21:   .ASCIZ  /COULD NOT CLEAR LAST ABORT FLAG./<15><12>
5025  025734  047516  020124  046103
5026  025742  040505  020122  040514
5027  025750  052123  040440  047502
5028  025756  052122  043040  040514
5029  025764  027107  005015     000
5030  025771     123  046517  047440  EM22:   .ASCIZ  /SOM OR EOM NOT RECEIVED DURING MAINT. MODE TRANSMIT/<15><12>
5031  025776  020122  047505  020115
5032  026004  047516  020124  042522
5033  026012  042503  053111  042105
5034  026020  042040  051125  047111
5035  026026  020107  040515  047111
5036  026034  027124  046440  042117
5037  026042  020105  051124  047101
5038  026050  046523  052111  005015
5039  026056     000
5040  026057     114  047111  020105  EM23:   .ASCIZ  /LINE FEED OR CURSOR RIGHT ISSUED FROM ROW 23 DID NOT CAUSE SCREEN TO SC
5041  026064  042506  042105  047440
5042  026072  020122  052503  051522
5043  026100  051117  051040  043511
5044  026106  052110  044440  051523
5045  026114  042525  020104  051106
5046  026122  046517  051040  053517
5047  026130  031040  020063  044504
5048  026136  020104  047516  020124
5049  026144  040503  051525  020105
5050  026152  041523  042522  047105
5051  026160  052040  020117  041523
5052  026166  047522  046114  005015
5053  026174     000
5054  026175     120  051501  020123  DH13:   .ASCIZ  /PASS ,   TEST ,   VSTAT/<15><12>
5055  026202  020054  020040  042524
5056  026210  052123  026040  020040
5057  026216  053040  052123  052101
5058  026224  005015     000
5059  026227     120  051501  026123  DH14:   .ASCIZ  /PASS,   TEST,   ERR PC,   VSTAT/<15><12>
5060  026234  020040  052040  051505
5061  026242  026124  020040  042440
5062  026250  051122  050040  026103
5063  026256  020040  053040  052123
5064  026264  052101  005015     000
5065
5066  026271     105  041523  000040  DESC:   .ASCIZ  /ESC /
5067
5068
5069
```

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5070  026276  042513  041131  040517  DKYBD:  .ASCII  /KEYBOARD TEST/<15><12>
5071  026304  042122  052040  051505
5072  026312  006524     012
5073  026315     113  054505  052123          .ASCII  /KEYSTROKES ECHO:/<15><12>
5074  026322  047522  042513  020123
5075  026330  041505  047510  006472
5076  026336     012
5077  026337     101  042040  051511          .ASCII  /A DISPLAY CHAR. = A DISPLAY CHAR./<15><12>
5078  026344  046120  054501  041440
5079  026352  040510  027122  036440
5080  026360  040440  042040  051511
5081  026366  046120  054501  041440
5082  026374  040510  027122  005015
5083  026402  031463  036440  042440          .ASCII  /33 = ESC/<15><12>
5084  026410  041523  005015
5085  026414  032461  036440  041440          .ASCII  /15 = C-R/<15><12>
5086  026422  051055  005015
5087  026426  031061  036440  046040          .ASCII  /12 = L-F/<15><12>
5088  026434  043055  005015
5089  026440  033460  036440  041040          .ASCII  /07 = BELL/<15><12>
5090  026446  046105  006514     012
5091  026453     061  020060  020075          .ASCII  /10 = TAB/<15><12>
5092  026460  040524  006502     012
5093  026465     116  047117  042055          .ASCIZ  /NON-DISPLAY CHAR.= OCTAL EQUIV/<15><12>
5094  026472  051511  046120  054501
5095  026500  041440  040510  027122
5096  026506  020075  041517  040524
5097  026514  020114  050505  044525
5098  026522  006526  000012
5099
5100  026526  040524  020102     000  DTAB:   .ASCIZ  /TAB /
5101  026533     103  051055  000040  DCR:    .ASCIZ  /C-R /
5102  026540  026514  020106     000  DLF:    .ASCIZ  /L-F /
5103  026545     102  046105  020114  DBELL:  .ASCIZ  /BELL /
5104  026552     000
5105
5106  026553     114  047517  020120  DLOOP:  .ASCII  /LOOP TEST - LOOP COMMANDS AND DATA THRU/<15><12>
5107  026560  042524  052123  026440
5108  026566  046040  047517  020120
5109  026574  047503  046515  047101
5110  026602  051504  040440  042116
5111  026610  042040  052101  020101
5112  026616  044124  052522  005015
5113  026624  047510  052123  041040          .ASCII  /HOST BACK TO VT61 UNDER TEST. /<15><12>
5114  026632  041501  020113  047524
5115  026640  053040  033124  020061
5116  026646  047125  042504  020122
5117  026654  042524  052123  020056
5118  026662  005015
5119  026664  047503  052116  047522  DCNTZ:  .ASCIZ  /CONTROL C  EXITS TEST./<15><12>
5120  026672  020114  020103  042440
5121  026700  044530  051524  052040
5122  026706  051505  027124  005015
5123  026714     000
5124
5125  026715     105  044530  020124  DEXT:   .ASCIZ  /EXIT TEST./
```

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5126  026722  042524  052123  000056
5127
5128  026730  051120  047111  042524  DPRNT:  .ASCII  /PRINTER TEST -/<15><12>
5129  026736  020122  042524  052123
5130  026744  026440  005015
5131  026750  031461  020062  047503          .ASCII  /132 COLUMNS OF A SLIDING PATTERN WILL BE/
5132  026756  052514  047115  020123
5133  026764  043117  040440  051440
5134  026772  044514  044504  043516
5135  027000  050040  052101  042524
5136  027006  047122  053440  046111
5137  027014  020114  042502
5138  027020  047503  052116  047111          .ASCII  /CONTINOUSLY OUTPUTTED TO PRINTER/<15><12>
5139  027026  052517  046123  020131
5140  027034  052517  050124  052125
5141  027042  042524  020104  047524
5142  027050  050040  044522  052116
5143  027056  051105  005015
5144  027062  040503  027122  051040          .ASCII  /CAR. RET. WILL START TEST. ANOTHER/<15><12>            ;;++C
5145  027070  052105  020056  044527
5146  027076  046114  051440  040524
5147  027104  052122  052040  051505
5148  027112  027124  040440  047516
5149  027120  044124  051105  005015
5150  027126  040503  027122  051040          .ASCIZ  /CAR. RET. WILL CAUSE TEST EXIT./<15><12>            ;;++C
5151  027134  052105  020056  044527
5152  027142  046114  041440  052501
5153  027150  042523  052040  051505
5154  027156  020124  054105  052111
5155  027164  006456  000012
5156  027170  040503  027122  051040  DCRST:  .ASCIZ  /CAR. RET. TO START/<15><12>
5157  027176  052105  020056  047524
5158  027204  051440  040524  052122
5159  027212  005015     000
5160
5161  027215     114  051501  020124  DEVERR: .ASCIZ  /LAST XMIT CAUSED VT61 HANG/<15><12>
5162  027222  046530  052111  041440
5163  027230  052501  042523  020104
5164  027236  052126  030466  044040
5165  027244  047101  006507  000012
5166  027252  000077                  QMRK:   .ASCIZ  /?/
5167  027254  051120  042117  041525  DKBD:   .ASCII  /PRODUCTION KEYBOARD TEST. 10 ERRORS CAUSES TEST EXIT./<15><12>
5168  027262  044524  047117  045440
5169  027270  054505  047502  051101
5170  027276  020104  042524  052123
5171  027304  020056  030061  042440
5172  027312  051122  051117  020123
5173  027320  040503  051525  051505
5174  027326  052040  051505  020124
5175  027334  054105  052111  006456
5176  027342     012
5177  027343     104  050105  042522          .ASCIZ  /DEPRESS KEYS FROM LEFT TO RIGHT/<15><12>
5178  027350  051523  045440  054505
5179  027356  020123  051106  046517
5180  027364  046040  043105  020124
5181  027372  047524  051040  043511
```

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5182  027400  052110  005015     000
5183  027405     104  050105  042522  DLSHFT: .ASCIZ  /DEPRESS LEFT SHIFT KEY AND THE "A" KEY /<15><12>
5184  027412  051523  046040  043105
5185  027420  020124  044123  043111
5186  027426  020124  042513  020131
5187  027434  047101  020104  044124
5188  027442  020105  040442  020042
5189  027450  042513  020131  005015
5190  027456     000
5191  027457     104  050105  042522  DTOP:   .ASCIZ  /DEPRESS KEYS IN TOP ROW/<15><12>
5192  027464  051523  045440  054505
5193  027472  020123  047111  052040
5194  027500  050117  051040  053517
5195  027506  005015     000
5196
5197  027511     104  050105  042522  DRSHFT: .ASCIZ  /DEPRESS RIGHT SHIFT KEY AND THE "A" KEY /<15><12>
5198  027516  051523  051040  043511
5199  027524  052110  051440  044510
5200  027532  052106  045440  054505
5201  027540  040440  042116  052040
5202  027546  042510  021040  021101
5203  027554  045440  054505  006440
5204  027562  000012
5205  027564  042504  051120  051505  DSEC:   .ASCIZ  /DEPRESS KEYS IN SECOND ROW/<15><12>
5206  027572  020123  042513  051531
5207  027600  044440  020116  042523
5208  027606  047503  042116  051040
5209  027614  053517  005015     000
5210
5211  027621     104  050105  042522  DTHRD:  .ASCIZ  /DEPRESS KEYS IN THIRD ROW BEGINNING WITH 'A'/<15><12>
5212  027626  051523  045440  054505
5213  027634  020123  047111  052040
5214  027642  044510  042122  051040
5215  027650  053517  041040  043505
5216  027656  047111  044516  043516
5217  027664  053440  052111  020110
5218  027672  040447  006447  000012
5219  027700  042504  051120  051505  DCONT:  .ASCIZ  /DEPRESS CONTROL KEY ,AND THE "A" KEY /<15><12>
5220  027706  020123  047503  052116
5221  027714  047522  020114  042513
5222  027722  020131  040454  042116
5223  027730  052040  042510  021040
5224  027736  021101  045440  054505
5225  027744  006440  000012
5226  027750  042504  051120  051505  DBOT:   .ASCIZ  /DEPRESS KEYS IN FORTH ROW EXCEPT SHIFT KEYS/<15><12>
5227  027756  020123  042513  051531
5228  027764  044440  020116  047506
5229  027772  052122  020110  047522
5230  030000  020127  054105  042503
5231  030006  052120  051440  044510
5232  030014  052106  045440  054505
5233  030022  006523  000012
5234  030026  042504  051120  051505   DSPCE: .ASCIZ  /DEPRESS SPACE BAR/<15><12>
5235  030034  020123  050123  041501
5236  030042  020105  040502  006522
5237  030050  000012
```

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5238
5239  030052  042504  051120  051505  DKPD:   .ASCIZ  /DEPRESS KEYPAD KEYS,LEFT TO RIGHT, TOP TO BOTTOM/<15><12>
5240  030060  020123  042513  050131
5241  030066  042101  045440  054505
5242  030074  026123  042514  052106
5243  030102  052040  020117  044522
5244  030110  044107  026124  052040
5245  030116  050117  052040  020117
5246  030124  047502  052124  046517
5247  030132  005015     000
5248
5249  030135     113  054505  047502  DKBERR: .ASCII  /KEYBOARD ERROR,KEY POSITION IN ROW SHOULD BE /
5250  030142  051101  020104  051105
5251  030150  047522  026122  042513
5252  030156  020131  047520  044523
5253  030164  044524  047117  044440
5254  030172  020116  047522  020127
5255  030200  044123  052517  042114
5256  030206  041040  020105
5257  030212  020040  005015          KYSTRK: .ASCII  /  /<15><12>
5258  030216  041517  040524  020114          .ASCIZ  /OCTAL GD, OCTAL BAD/<15><12>
5259  030224  042107  020054  041517
5260  030232  040524  020114  040502
5261  030240  006504  000012
5262  030244  020040  020040  020040  DSPC6:  .ASCIZ  /      /
5263  030252     000
5264
5265  030253     036     076     020  ROW1:   .BYTE   36,76,20,13,32,12,54,44,14,41,71,57,63,64,3,114,0
5266  030256     013     032     012
5267  030261     054     044     014
5268  030264     041     071     057
5269  030267     063     064     003
5270  030272     114     000
5271
5272  030274     026     056     030  ROW2:   .BYTE   26,56,30,73,52,22,55,34,24,31,51,77,62,61,2,0
5273  030277     073     052     022
5274  030302     055     034     024
5275  030305     031     051     077
5276  030310     062     061     002
5277  030313     000
5278
5279  030314     046     040     053  ROW3:   .BYTE   46,40,53,23,72,42,45,74,11,21,47,27,66,0
5280  030317     023     072     042
5281  030322     045     074     011
5282  030325     021     047     027
5283  030330     066     000
5284
5285  030332     016     070     060  ROW4:   .BYTE   16,70,60,50,33,43,25,35,75,65,37,115,67,0
5286  030335     050     033     043
5287  030340     025     035     075
5288  030343     065     037     115
5289  030346     067     000
5290
5291  030350     001     000          CNTRA:  .BYTE   01,0
5292
5293  030352     101     000          SHFTA:  .BYTE   101,0
```

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                                                                                    H 8
 5294
 5295  030354      015      000           SPCB:   .BYTE   15,0
 5296
 5297  030356      113      004      103  KYPD:   .BYTE   113,04,103,104,1,112,101,102,6,7,106,100,5
 5298  030361      104      001      112
 5299  030364      101      102      006
 5300  030367      007      106      100
 5301  030372      005
 5302  030373      010      105      107           .BYTE   10,105,107,110,17,111,0
 5303  030376      110      017      111
 5304  030401      000
 5305
 5306                                            .EVEN
 5307  030402  000500                    RCRLB:  .BLKB   500     ;RECEIVE CIRCULAR BUFFER
 5308
 5309  031102  000500                    TCRLB:  .BLKB   500             ;TRANSMIT CIRCULAR BUFFER
 5310  031602  000000                    ABUFP:  .WORD   0
 5311  031604  000062                    ABBUF:  .BLKB   50.
 5312  031666  000000                            0
 5313          000001                            .END
```

```
ABBUF   031604          1482    3279    3281    5311#
ABSXT   021032          4230#
ABUFP   031602          1482*   1767    1799    1802    1814    1817    2046    2047    2054    2627    2630    2634*   3278*
                        3279    3281*   3282*   3633    3637    4127*   4129    4132    4133*   4199    4204    4227    5310#
AESCO   015106          3350    3382#
AESCP   015100          3348    3379#
ALEXT   012460          2884    2888#
ALWCNT  002202          1315#   1584    1855    2314    3204
AOUT    013102          2940    2990#
ASESC   014722          3285    3347#
ASTRT   003100          1485    1498#   2564    2633    2713    2739    2776
AUTO    002236           805    1339#
AUTOA   002246          1341#   1345    1426    2872
BASC3   004240          1730    1731#
BBLUP   013614          3037    3040    3133#
BDEXT   012450          2880    2886#
BDEXTA  012446          2881    2885#
BEL     001750          1106#   1504    2649
BINOCT  017674          2665    3984#   4142    4156    4162
BIT0  = 000001           770#
BIT00 = 000001           760#    770     1474    2555    2968    3284
BIT01 = 000002           759#    769     1477    1548    3284    3353
BIT02 = 000004           758#    768     2919
BIT03 = 000010           757#    767     3284    3349    3359
BIT04 = 000020           756#    766
BIT05 = 000040           755#    765
BIT06 = 000100           754#    764
BIT07 = 000200           753#    763     1894    3248
BIT08 = 000400           752#    762     4310
BIT09 = 001000           751#    761     4318    4376
BIT1  = 000002           769#
BIT10 = 002000           750#    4361
BIT11 = 004000           749#    4325
BIT12 = 010000           748#
BIT13 = 020000           747#    4368
BIT14 = 040000           746#    4296
BIT15 = 100000           745#
BIT2  = 000004           768#
BIT3  = 000010           767#
BIT4  = 000020           766#
BIT5  = 000040           765#
BIT6  = 000100           764#
BIT7  = 000200           763#
BIT8  = 000400           762#
BIT9  = 001000           761#
BLDADA  002320          1363#   1385
BLDADD  002316          1361#   1368    2887
BLDINA  017510          2704    3928#   3935
BLDINC  017504          1699    1740    1986    2190    2533    3927#   3934    3946
BLDTST  002426          1379    1382    1387#
BLKM    002226          1325#   1446*   1732*   1979*   2022*   2349*   2530*   3438    3441*   3446*   3473    3615*   3789*
BOROW   020450          4147    4150#
BPTVEC= 000014           777#
BUBCT   002210          1318#   2528*   2549    2553*   2760*   2769    3089*   3103*   3105    3109*   3113*   3135*   3142*
                        3157*   3177    3520*   3525*   4136*   4137
BUMPCT  020752          4198    4209#
```

```
BYSTOR  016372          2196*   3617    3665#   3715*
CALCK   020124          1994    3277    3462    4066#
CARRT   001752          1108#   2440    2451    2657    2705    3315    4020    4035    4045
CDEV    012606          1342    1376    1380    2928#
CDEVA   012656          2938#   2944    2950    2986    2989
CDWN    001766          1124#
CESAM   015072          3364    3368    3372    3374    3376#   3380    3385    3390    3396    3398
CHKITT  016334          3646    3650    3652    3654#
CHOM    001762          1118#   1864    1988    2354
CHRD    002162          1307#   1454*   1537*   1538    1541*   1588*   2860*   3020*   3022    3024    3027*   3031*   3091*
                        3097*   3099*   3100*   3101    3107    3111    3115    3119    3139*   3239*   3240*   3241    3727*
                        3728*   3730    3731    3732*   3733*   3734    3735    4128*   4132*   4134    4161
CKABRT  020200          2561    2714    4096#
CKDAT   005262          1884    1906#
CKEOM   003602          1615    1619#
CKEXT   006212          2010    2044    2053    2060    2067    2073#
CKGP  = 000106          1256#   3369
CKKBD   020324          2768    4127#
CKLIN   004106          1694    1696#
CKMEM   005322          1907    1917#
CKMNT   003504          1602    1604#
CKOFF   021202          3656    3859    4273#
CKSCRA  007050          2243    2245#
CKSCRB  007140          2261    2263#
CKSFT   015734          1752    1772    1925    2018    2066    3554#   3659    3861
CKSRC   006060          2045#   2055
CKSTR   016302          3626    3636    3645#
CKSUM = 002000          1042#   1995    3459    3476
CKSUMA  005504          1976    1978#
CKSUMB  005734          2012    2020#
CKVST   016346          3644    3657#
CLFT    001770          1127#   2150
CLMAIN  011720          2766    2777#
CLRCK   002012          1155#
CLREG   016076          1575    1909    2013    2061    2165    2492    3580    3598#   3729    3852
CLTCK   002014          1158#
CMPOS   016676          2344    3747#
CNTF    020570          4138    4172#
CNTRA   030350          2795    5291#
COMGP = 000020          1048#   3325    3371    3375
CONRD   014006          3186#   4031
CPABRT= 000171          1258#   3391
CPPOS   016740          2385    3762#
CR    = 000015           685#   4448    4458
CRBUF   001746          1098#
CRCSR   001744          1097#
CRLF  = 000200           686#   2850    4419    4458
CRRUL   017356          3874#
CRT     001764          1121#   2111
CUHME   002154          1282#   1661    1664    2342    2348
CUP     001772          1130#   2123
CURER   016600          1665    1683    1714    2121    2282    2400    2438    2454    3725#
CURPOS= 000004          1049#   3363    3647
CURS1   003712          1648    1650#
CURS1A  006234          2088    2090#
CURS1B  006446          2144    2146#
```

```
CURS2   007272            2302    2304#
CUR1XT  006426            2108    2125    2132#
C2CK    007760            2377    2381    2392#
C2XT    010022            2316    2341    2371    2393    2396    2403#
DABRT   025123            3206    4951#
DAPNT   002030            1176#
DATSC   017532            2474    3943#
DBELL   026545            2651    5103#
DBOT    027750            2787    5226#
DCNTZ   026664            2622    5119#
DCONT   027700            2789    5219#
DCOPYR  025433            1476    4991#
DCOUNT  017502            1531*   1622*   1744*   1794*   1800*   1815*   3046*   3523*   3910*   3917#
DCR     026533            2659    5101#
DCRAD   002040            1189#   1254    1668    1735    2322
DCRST   027170            5156#
DDISP = 177570             692#    835    2830
DELAY   017440            1532    1623    1745    1795    1801    1816    3047    3524    3901#
DELIM   003274            1516    1545#
DEMP    002020            1164#   3387
DESC    026271            2638    5066#
DEVERR  027215            5161#
DEXT    026715            2774    4233    5125#
DF0     001444             871     878     893    1005#
DF1     001450             922    1007#
DF2     001452             900    1009#
DF3     001476             907    1015#
DF4     001536             928     935     958     965     972    1000    1023#
DF5     001541            1024#
DF6     001545             886     914     942     949     979     986     993    1026#
DH1     023727             869    4822#
DH10    024614             912    4908#
DH11    025365             920    4984#
DH12    025057             940     947    4943#
DH13    026175             956     963    5054#
DH14    026227             977     984    5059#
DH2     024022             876    4833#
DH3     024122             884     991    4846#
DH4     024235             891    4861#
DH5     024363             898    4878#
DH6     024447             905    4889#
DH7     024557             926     933     970     998    4903#
DISPLA  001142             835#   2830*   2838*   4339*   4360*
DISPRE  000174             792#   2838
DKBD    027254            2758    5167#
DKBERR  030135            4153    5249#
DKPD    030052            2789    5239#
DKYBD   026276            2620    5070#
DLAY    002220            1322#   1613*   1616*   1879*   1885*   2045*   2049*   2373*   2378*   3092*   3095*   3621*   3629*
                          3634*   3639*   3794*   3801*   3805*   3810*   4251*   4254*   4273*   4276*
DLERR   023461            2979    4790#
DLF     026540            2663    5102#
DLOOP   026553            2734    5106#
DLSHFT  027405            2789    5183#
DLTBL   001612            1075#   1377    1417    2937    3011    3043    3050
DLTPT   001714            1081#   1417*   1420    1440*
```

CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0102

```
DLYCNT  002234            1331#   4250*   4256*
DMAIN   002002            1144#
DMANA   023512            1358    4796#
DMANB   023612            1387    4808#
DMPOCT  020472            4153#
DOAROW  011642            2763#   2773    2780
DPNT    002116            1237#
DPRNT   026730            2689    5128#
DPRTR   025405            1479    4987#
DRECT   002010            1152#   1711    3509    3966
DRSHFT  027511            2789    5197#
DSCHNG= 100000            1058#
DSEC    027564            2787    5205#
DSMES   017600            2621    2690    2735    2759    2775    3960#   4234
DSPCE   030026            2789    5234#
DSPC6   030244            4159    5262#
DSWR  = 177570             691#    834    2829
DTAB    026526            2655    5100#
DTHRD   027621            2787    5211#
DTOP    027457            2787    5191#
DTTBL   011766            2763    2793#   4140
DT0     001424             870    1002#
DT1     001436             899     921    1004#
DT2     001454             877     906    1011#
DT3     001466             927     934    1013#
DT4     001502             885     913     941     948     978     985     992    1017#
DT5     001514             892    1019#
DT6     001526             957     964     971     999    1021#
DUNTST  023317            3051    4771#
DVUNIT  025314            1457    4977#
EAPNT   002026            1174#
EEMP    002016            1162#   3382
EINST   002032            1179#
EMAIN   002000            1142#   3507
EMTVEC= 000030             780#   2813*   2814*
EM1     023642             868    4813#
EM10    025016             919    4935#
EM11    024653             925    4915#
EM12    024741             932    4926#
EM13    025172             939    4959#
EM14    025241             946    4967#
EM15    025460             955    4995#
EM16    025531             962    5002#
EM17    025604             969    5010#
EM2     023772             875    4829#
EM20    025662             976    5018#
EM21    025726             983    5024#
EM22    025771             990    5030#
EM23    026057             997    5040#
EM3     024061             883    4840#
EM4     024171             890    4854#
EM5     024304             897    4870#
EM6     024414             904    4884#
EM7     024514             911    4897#
ENDPS   010702            2563    2565#
ENDSEL  010670            2548    2556    2562#
```

```
ENDTAB  001724            1086#   2910
ENSRT   007024            2217    2224#
EOM   = 000004            1304#   1611    1858    1993    2054    2317    3111    3174    3309    3445    3699    3970
EOS     001774            1133#   2481
EPL   = 001000            1043#   3319    4194    4202
EPNT    002114            1235#   2696
ERPL    002034            1181#
ERRVEC= 000004             773#   2827    2828*   2839*   4301    4302*   4304*   4307*
ERSE    010260            2469    2472#
ERSXT   010406            2488    2490    2495#
ESAMB   015202            2637*   3284    3289*   3347    3349    3353*   3359*   3376*   3403#   3712*   4201*
ESC   = 000400            1044#   2635    3290    4194    4202
ESCN    002132            1270#   1556    1863    1987    2115    2149    2353    2480    2559    2697    3286    4204
ESCO    002054            1201#   1262    1559    1709    1737    1792    1866    1989    1990    2355    2520    3497    3508
                          3510    3965
ESCOI = 002054            1262#   1652    1670    2151    2160    2441
ESCP    002120            1251#   1263    1562    2212
ESCPI = 002120            1263#
ESCYI = 002040            1254#
ESCZ    002126            1264    1266#   1607    1609    3540
ESCZI = 002126            1264#   1865
ESSEQ   002216            1321#   1520*   1522    1578    1579
ESTEX   003454            1514    1587#
ESTST   003116            1502    1504#
EXINT   013354            3044    3050#
EXIT3   004456            1766    1768    1773#
EXMAIN  011332            2624    2672#   2691    2736
EXMNT   003672            1629    1634#
EXTST   021022            2631    2711    4217    4227#
FADD    012542            2909#   2920
FADD1   012560            2914#   2917
FEXIT   011704            2765    2771    2774#
FNDBT   021166            4253    4263#
FRCECT  020770            4208    4210    4213#
FTEXT   003460            1585    1589#
FTLCNT  002200            1314#   1481*   1583*   1584    1855    1887*   2051*   2314    3204    3212*   3502*   3642*   3826*
                          4261*
FTLEXT  016452            3683    3685#
GCMD    003154            1512#   1553    1557    1560    1563    1566    1573
GDAD    013070            2973    2987#
GDCURP  006416            2109    2128#
GDSCRL  007252            2259    2276    2278    2283#
GDSTRK  020562            4135    4169#
GETON   015630            2522    3500    3520#
GNS   = ****** U           791    2849    4732    4733    4734    4735    4736
GOTON   015672            3522    3528#
GTCR    017772            2693    4018#   4021
GTEXT   020104            4044    4046    4049#
GTNUM   020014            1363    1391    4031#   4052
HDFLG   017354            3513*   3792*   3848    3851*   3865#
HT    = 000011             683#   4417    4458
IABT    002022            1167#
IDENT   002124            1261#   1450*   1452*   1468    1474    1477    1538    2555
INAG    006660            2195#   2219
INITA   013164            1343    1381    3011#
INRPL   006622            2184    2186#
```

```
INRXT   007030          2208    2216    2226#
INTAB   001652          1076#   1360    1388    1486    2908    2936
INTRC   014312          1433    3270#
INTXM   015234          1435    3433#
INTXT   013322          3015    3043#
INXMT   003202          1521#   1569
IOTVEC= 000020           778#   2811*   2812*   2932*   2933*   2993*   2994*
ITSUMA  006202          1981    2069#
JMPADD  014210          3225*   3226*   3230    3232#
KBDLP   020334          4129#   4167    4171
KIENA   015472          3436    3478#
KYBD    011050          2617    2619#
KYBXMT  011316          2639    2652    2656    2660    2664    2667#
KYPD    030356          2795    5297#
KYSTRK  030212          4151*   4152*   5257#
KYSTRT  011104          2626#   2648    2669
LDADD   013404          1431    2945    3016    3068#
LDBUF   020172          2025    2092    2198    2247    2266    2422    2476    4089#   4104
LDOUT   016504          3696    3699#
LDPOS   020456          4145    4149    4151#
LDXMIT  016460          1933    1982    2193    2218    2552    2623    2625    2668    2692    2737    2767    2778    3693#
                        4154    4158    4160    4164    4166
LF      = 000012         684#   4452    4458
LINXT   004220          1706    1708    1715#
LKKB    002004          1147#
LNFED   001754          1110#   1369    1399    1868    2435    2661    2706    3317    4043    4047    4206
LNRW    017002          2320*   2345    2348*   2389    3747    3749*   3751    3753*   3754*   3762    3764*   3766    3768*
                        3769*   3772#
LOOP    020572          2738    4183#
LOOPR   020656          4190    4194#
LOOPT   020624          4188#   4193    4205    4212    4218
LOOPTA  020630          4189#   4197
LPSTR   020676          4195    4199#
LPTST   011552          2731    2733#
LSTST   010426          2515    2517#
MAINT = 000004          1066#
MANS    002270           806    1356#
MANSA   002302          1358#   1378    1383    1430    2871
MEMA    004736          1843#   1934
MEMB    004772          1849#   1856
MEMC    005144          1879#   1896    1898    1901    1905
MEMD    005212          1882    1890#
MEMXT   005464          1857    1873    1889    1928    1957#
MEM1    004730          1839    1841#
MODCA   002534          1419#   2600    3222
MODCK   002520          1344    1397    1404    1417#   1429
MODE    002176          1313#   1339*   1356*   1403*   1424    1484    2562    2869    3202
MONIT   014040          3202#   4295
MPATT = 005444          1843    1876    1927    1944    1947#
MSTBL   011740          2764    2787#
MSTRT   000204           806#
NABRT = 000170          1260#   4112
NCKGP = 000107          1257#   3373
NOCALC  020170          4068    4070    4083#
NOER    016052          3564    3579    3587#
NOKIL   015252          3434    3438#   3455    3457
```

```
NOROUT  021072            4228    4237#
NORXT   016456            3684    3686#
NOSHFT  017766            4007    4011#
NOSOM   015274            3439    3443#
NOVT    023370            3045    4778#
NWLN    010042            2418    2420#
OCTBIN  017750            1384    1406    4005#
OFFLP   004562            1799#   1805
ONE     002204            1316#
ONLP    004640            1812#   1820
ONOFA   004622            1803    1809#
ONOFLP  004532            1794#   1818
ONOFXT  004710            1813    1823#
ONOF61  004500            1786    1788#
PABRT = 010000            1040#   3395    4096
PATGN   005412            1852    1891    1936#
PDKBD   011624            2755    2758#
PIRQ  = 177772             690#
PIRQVE= 000240             784#
PMULT   017500            2854*   2861*   2866*   3904    3916#
POPIT   003264            1540#   1586
POP2SP= 022626            1030#   2858    2865    2885    2916    2955    3211
PRABRT= 000172            1259#   3393
PRESC   002214            1320#   1507*   1511    1525    1556*   1559*   1562*   1576
PR0   = 000000             707#
PR1   = 000040             708#
PR2   = 000100             709#
PR3   = 000140             710#
PR4   = 000200             711#
PR5   = 000240             712#
PR6   = 000300             713#
PR7   = 000340             714#
PS    = 177776             687#     688
PSW   = 177776             688#    3228*
PTYPE   002232            1327#   1755    1999    2033    2330    2360    2537    2855*   2862*   2867*   3676    3831
PUSH2S= 024646            1031#
PWRVEC= 000024             779#   2817*   2818*   4662*   4663*   4672*   4678*   4690*   4691*
QMRK    027252            2886    5166#
QUST    020106            4038    4040    4050#
RABT    002106            1223#
RBBUF   015174            1443*   1707    1878    1880    2011    2015    2059    2063    2158    2167    2260    2277    2280*
                          2382    2383    2399*   2432    2448    2473*   2483*   2489    2493    3312    3324    3400#   3649
                          3653    3708    3732    3797    4192
RBUFP   015200            1880*   1881    2372    2374    2382*   3312*   3322    3324*   3332*   3333*   3402#   3708*   3797
                          3806    4188    4192*   4196    4199*   4200*   4206*   4207*   4211*
RCRLB   030402            1441    1443    1660    1677    2119*   4185    4230    5307#
RCUR    002046            1194#   1700
RDCUR   002050            1197#   1653    1671    1701    2442    3361
RDENA = 000100            1059#   1483    1505    1589    2565    2970    2978    3221    3244
REBUF   015176            1441*   3322    3401#   4184*   4230*
RECAD   014214            2964    3239#
RECDN = 000200            1057#   3093    3188    3213    4018
RECEX   013602            3098    3114    3118#
RECEXA  013606            3112    3120#
RECITT  016366            2103*   2195*   2263*   3654*   3663#   3713*
RECTM   013424            3087#   3543
```

```
RECXT   014716           3336    3340    3344#
REEX    014252           3245#   3249
REOM  = 020000           1039#   1620    1628    1812    1883    1998    2056    2057    2376    3311    3624    3635    3808
                         3830
RERR  = 100000           1060#
RESET   002130           1268#   3496
RESETV  015512           1604    1651    1696    1734    1788    1841    1978    2091    2147    2186    2245    2305    2420
                         2472    2527    3494#   3960
RESPTR  016520           1445    1773    1844    1860    1980    2073    2319    2347    2619    2733    3643    3660    3707#
                         3827    4186    4232
RESVEC= 000010            774#
REVID = 000040           1047#   3329    3384    3389
RFMER = 020000           1062#
RORUN = 040000           1061#
ROW1    030253           2793    5265#
ROW2    030274           2793    5272#
ROW3    030314           2793    5279#
ROW4    030332           2793    5285#
RPAR  = 010000           1063#
RSMAIN  011734           2777    2781#
RSOM  = 040000           1038#   1614    1626    3306
RSTER   014662           3291    3295    3300    3303    3307    3314    3320    3335#   3354    3360    3377
RSTT  = 004000           1041#   3338
RTRP    012400           2856    2863    2868#
RXOFF = 100000           1037#   1746    3294    3298    3499    3521    3627    3799    4274
ROSVE   002222           1323#   3088*   3121    3134*   3146    3156*   3178    3187*   3192    3555*   3590    3726*   3737
                         4247*   4265
ROSV1   015732           3538*   3544    3546#
ROOC08  002152           1281#
ROOC11  002146           1278#
ROOC20  002150           1280#
ROOC80  002156           1283#
RO1C00  002134           1271#   1707    1713    2448    2453
RO1C20  002136           1272#   2432    2437
R12C00  002142           1274#
R22C00  002140           1273#
R23C00  002144           1276#   1736    2281
R23C78  002160           1284#   2320    2324
R23C79  002042           1191#   1669    1679    1682    2395
SEQ4    003362           1519    1568#
SETA    012012           1340    1357    2802#   3208
SETREV  005460           1932    1955#   2551
SHFTA   030352           2795    5293#
SLSH  = 000057           1255#   3101    3365
SOM   = 000002           1303#   1605    1847    2307    3107    3158    3304    3440    3693    3964
SPCB    030354           2793    5295#
SPTN    003354           1517    1565#
STACK = 001100            678#   2809
START   000200            805#
STKLMT= 177774            689#
STRBYT  016324           3648    3651#
STRO    015230           3397*   3416#   4112
STRP    015232           3379*   3417#
STRTAB  001716           1083#   2909
STTEP   015226           3339    3341*   3342*   3415#   3577    3589*   3710*
STTER   015204           3405#   3576    3589    3710
```

```
STUPM   023214          2851    4756#
SVER1   002164          1308#   2666    3556*   3587    3991*   3992*   3993*   4143*   4144    4146    4148*   4150*   4151
                        4152    4157    4163
SVER2   002166          1309#   3557*   3588    3996*   4143
SWR     001140           834#   2807    2829*   2831    2837*   4296    4310    4312    4318    4325    4361    4368    4373
                        4376    4670    4683*
SWREG   000176           793#   2837
SW0   = 000001           742#
SW00  = 000001           732#    742
SW01  = 000002           731#    741
SW02  = 000004           730#    740
SW03  = 000010           729#    739
SW04  = 000020           728#    738
SW05  = 000040           727#    737
SW06  = 000100           726#    736
SW07  = 000200           725#    735
SW08  = 000400           724#    734
SW09  = 001000           723#    733
SW1   = 000002           741#
SW10  = 002000           722#
SW11  = 004000           721#
SW12  = 010000           720#
SW13  = 020000           719#
SW14  = 040000           718#
SW15  = 100000           717#
SW2   = 000004           740#
SW3   = 000010           739#
SW4   = 000020           738#
SW5   = 000040           737#
SW6   = 000100           736#
SW7   = 000200           735#
SW8   = 000400           734#
SW9   = 001000           733#
TAB     001756          1112#   2653
TBBUF   015502          1444*   1650    1667    1697    1731    1862    1984    2024    2090    2146    2187    2192    2197
                        2246    2265    2321    2350    2392    2394    2421    2439    2475    2531    2699    2702    3454
                        3466    3477    3482#   3709    3944    3963    4103    4185*   4231*
TBITVE= 000014           775#
TBLCK   012572          2911    2918#
TBUFP   015506          1605*   1607*   1609*   1611*   1796*   1809*   1847*   1853*   1858*   2307*   2312*   2317*   2644*
                        2646*   3448    3452    3454*   3456*   3461    3463    3464    3466*   3468*   3477*   3484#   3693*
                        3695*   3699*   3709*
TCOMB = 000104          1067#   2971    2977    3243
TCRLB   031102          1442    1444    1877    1900    1906    1908    2104    2110    2196    2209    2264    2280    2387
                        3793    3816    3843    3845    3874    3877    4184    4231    5309#
TCUCH   002064          1208#   2152    2163
TDATA   007020          2209    2222#
TDEV    012722          2932    2951#
TEBUF   015504          1442*   3452    3464    3483#
TENA  = 000100          1065#   1742    1997    2031    2328    2358    2535    2708    2947    2951    3246    3253    3301
                        3478    3619    3673    3707    3791    3948    3971    4216
TESC    013666          1527    1793    2521    2560    2698    3155#   3498    3511    3541
TFUNCT  007012          2211    2221#
TIMEXT  021170          4262    4264#
TKVEC = 000060           782#
TMNAD   012424          1366    1373    2879#
```

CROSS REFERENCE TABLE -- USER SYMBOLS


```
TOADD   002206            1317#   3136*   3138
TOFF    014236            3243#   3251
TOTCH = 003600            1069#   1846    1897    1917    1919    2306    3947
TOTC1 = 003601            1070#
TPENT   012566            2906    2916#
TPREG   002212            1319#
TPRNT   011354            2687    2689#
TPVEC = 000064             783#
TRAPVE= 000034             781#   2815*   2816*
TRDY  = 000200            1064#   3165    3172    3175
TRMID = 000002            1050#   3367
TRPA    012330            2852    2858#
TRPB    012362            2859    2865#
TRPE    012546            2910#   2915
TRPVEC  012470            1341    1359    2897#
TRTVEC= 000014             776#
TSMAD   014276            2966    3252#
TSTADD  023144            3225    4740#
TSTER   002122            1253#   2519
TSTNM   002230            1326#   1506*   3494*
TSTPTR  002174            1312#   1427    1486*   3219    3227*
TST1    003100            1500#   4740
TST10   005466            1974#   4744
TST11   006216            2086#   4744
TST12   006430            2142#   4746
TST13   006604            2182#   4746
TST14   007032            2241#   4746
TST15   007254            2300#   4748
TST16   010024            2416#   4748
TST17   010242            2467#   4748
TST2    003466            1600#   4740
TST20   010410            2513#   4750
TST21   011032            2615#   4750
TST22   011336            2685#   4750
TST23   011534            2729#   4752
TST24   011606            2753#   4752
TST3    003674            1646#   4740
TST4    004070            1692#   4742
TST5    004222            1728#   4742
TST6    004462            1784#   4742
TST7    004712            1837#   4744
TXEX    015500            3474    3479#
TXRCK   002072            1213#   1991
TXSUM = 000100            1046#   2023    3274    3313
TXTCK   002100            1218#
TYPDS = 104405            2589    4502    4736#
TYPE  = 104401            1358    1387    1456    1457    1473    1476    1479    2587    2590    2847    2851    2886    2979
                          2985    3045    3051    3058    3206    4042    4051    4363    4371    4422    4466    4483    4485
                          4488    4490    4505    4510    4574    4649    4692    4732#
TYPNUM  020122            4041*   4042    4050*   4051    4053#
TYPOC = 104402            4474    4498    4733#
TYPON = 104404            4735#
TYPOS = 104403            1460    1465    1470    2982    3055    4734#
TYP6    002172            1311#
T1ERR   003376            1539    1575#
UNLKKB  002006            1149#
```

```
UPD4    014254          3242    3246#
VBIT    021176          4249*   4252    4267#
VDLAY   021200          4248*   4258*   4268#
VECPT   001712          1080#   1418*   1421    1463    1480*
VECT    001742          1096#   1432*   2525
VRBUF   001734          1093#   1533    2988*   3099    3239    3272    4020
VRCSR   001732          1092#   1419    1458    1483*   1505*   1589*   2524    2565*   2938    2970*   2978*   2980    2987
                        3013    3093    3221*   3244*   3581    3582    4018
VSTAT   002224          1324#   1448*   1614    1620    1626    1628    1631    1733*   1746    1789*   1806    1812    1821
                        1845*   1874*   1883    1983*   1995*   2020*   2023*   2056*   2057    2304*   2327*   2352*   2376
                        2529*   2626*   2635    2667*   2701*   2709    3274    3290*   3294*   3298*   3299    3302*   3306*
                        3311*   3313*   3319*   3325    3329    3338*   3363*   3367*   3371*   3375*   3384*   3389*   3395*
                        3433    3435*   3459    3475*   3476*   3499*   3512*   3521    3560    3567    3616*   3620*   3622
                        3624    3627    3635    3647    3671*   3685*   3790*   3795    3799    3808    3943*   3950    3961*
                        3972    4096    4100    4116    4187*   4189    4191*   4194    4202*   4252    4274
VVECT   001552          1074#   1418    2935    3012
VXBUF   001740          1095#   3071    3158*   3167*   3174*   3252*   3440*   3445*   3463*
VXCSR   001736          1094#   1742*   1997*   2031*   2328*   2358*   2535*   2708*   2947*   2951*   2971*   2977*   3165
                        3172    3175    3243*   3246*   3253*   3301*   3478*   3619*   3673*   3707*   3791*   3948*   3971*
                        4216*
WDSTOR  016370          2104*   2264*   3618    3664#   3714*
WTBGND  021076          1765    2009    2043    2340    2370    2547    3682    3841    4246#
XMAD2   016264          3631    3641#
XMCNT   015510          1654*   1672*   1702*   1741*   1869*   1996*   2030*   2102*   2153*   2204*   2255*   2272*   2326*
                        2357*   2427*   2443*   2484*   2534*   2707*   3443    3470*   3486#   3672*   3711*   3947*   3962*
                        3967*   4109*   4203*   4209    4213*   4214
XMDNE = 000001          1051#   1754    2032    2329    2359    2536    2709    3475    3622    3675    3795    3950    3972
                        4189    4191
XMITT   016154          3620#   3655
XMIT1   016374          1606    1608    1610    1612    1797    1810    1848    1854    1859    2308    2313    2318    2645
                        2647    3671#   3697    3700
XMKIL = 000200          1045#   3299    3302    3435
XMREC   016120          1656    1673    1703    1870    2105    2154    2205    2256    2273    2428    2444    2485    3613#
                        4110
XMTAL   002056          1203#   1738    1791    1867    2356
XMWT    021012          4215    4217#
XMXT    016364          3662#
XMZER   021074          1447*   3450    4183*   4235*   4239#
XOFF = 000023           1305#   1796    3292    4069
XON  = 000021           1306#   1767    1809    3296    4067
XRCMP   017004          3786#
XREC    017106          3796    3798    3805#   3824
XRERR   017172          3803    3811    3825#
XREXT   017210          3809    3823    3829#
XROUT   017334          3828    3842    3847    3859#
ZERO    002170          1310#   1375    1510    1790    2277    2489    2518    2557    2695    3090    3495    3506    3539
ZERST   003144          1509#   1543
ZFLAG   015674          1449    1535    3018    3537#
$AUTOB  001134           831#
$BDADR  001122           826#   1011    3584*   3599*   3735*
$BDDAT  001126           828#   1002    1004    1011    1017    1019    1578*   1581*   1631*   1711*   1911*   1920*   2015*
                        2063*   2117*   2162*   2163*   2167*   2211*   2435*   2451*   2482*   2493*   2525*   3567*   3583*
                        3601*   3734*   3854*   4100*   4116*
$BELL   001164           846#   4363    4388
$CHARC  022064          4424*   4434*   4441    4450*   4455#
$CKSWR= ****** U        4739
```

```
$CMTAG  001100            814#  2804  2805  2813  2819  2820  2821
$CM3  = 000000            844#
$CRLF   001171            848#  1456  1473  2985  3058  4165  4371  4388  4423  4458  4466  4485  4490
                         4510
$DBLK   022706           4615  4649  4657#
$DOAGN  011006           2583  2592  2598#
$DTBL   022676           4618  4653#
$ENDAD  010776            800  2594#  2845  4383
$ENDCT  010744           2585#  2819
$ENDMG  011015           2587  2602#
$ENULL  011012           2590  2601#
$EOP    010710           2575#
$EOPCT  010736           2582#  2586  2819*
$ERFLG  001103            817#  4285  4314  4316  4322*  4343  4358*  4388
$ERMAX  001115            823#  2822*  4316  4338*  4343
$ERROR  021502           2813  4357#
$ERRPC  001116            824#  1002  1013  4365*  4366*  4367  4388  4472
$ERRTB  001174            865#  4480
$ERRTY  022070           4370  4465#
$ERTTL  001112            821#  4364*  4388
$ESCAP  001162            845#  2821*  4337*  4379  4381  4388
$FILLC  001156            842#  4427  4458
$FILLS  001155            841#  4458
$GDADR  001120            825#  1011  1019  1021  1806*  1821*  1912*  3503*  3581*  3598*  3731*  3855*
$GDDAT  001124            827#  1002  1004  1011  1017  1019  1576*  1577*  1630*  1709*  1710*  1910*  1919*
                         2014*  2062*  2115*  2116*  2160*  2161*  2166*  2212*  2434*  2450*  2480*  2481*  2524*
                         3566*  3582*  3600*  3730*  3853*  4098*  4099*  4114*  4115*
$GET42  010766           2591#
$GTSWR= ****** U         4738
$HD   = 000000            664
$ICNT   001104            818#  4329*  4330  4332*  4342
$ILLUP  023056           4662  4678  4695#
$INTAG  001135            832#
$ITEMB  001114            822#  4367*  4388  4469
$LF     001172            849#  4388  4458
$LPADR  001106            819#  1502*  1602*  1648*  1694*  1730*  1786*  1839*  1976*  2088*  2144*  2184*  2243*
                         2302*  2418*  2469*  2515*  2617*  2687*  2731*  2755*  2823*  4320*  4335*  4340  4342
$LPERR  001110            820#  2824*  4320  4336*  4342  4378
$MAIL = ****** U         2841  4335  4373  4411
$MXCNT  021500           4333  4342#
$NULL   001154            840#  4429  4458
$NWTST= 000000           1499#  1599#  1645#  1691#  1727#  1783#  1836#  1973#  2085#  2141#  2181#  2240#  2299#
                         2415#  2466#  2512#  2614#  2684#  2728#  2752#
$OCNT   022466           4546*  4575*  4588#
$OMODE  022470           4541*  4545*  4550  4553*  4564*  4590#
$OVER   021464           4297  4313  4321  4331  4339#
$PASS   001100            815#  1013  1017  1021  2579*  2580*  2588  2601  4327  4343
$POWER  023064           4693  4698#
$PWRDN  022716           2817  4662#  4690
$PWRMG  023052           4693#
$PWRUP  022770           4672  4678#
$QUES   001170            847#  4388  4458
$RDCHR= ****** U         4739
$RDDEC= ****** U         4739
$RDLIN= ****** U         4739
$RDOCT= ****** U         4739
```

```
$RTNAD  011010          2600#
$R2A   = ****** U       4739
$SAVRE= ****** U        4739
$SAVR6  023062          4671*   4679    4680*   4681*   4697#
$SCOPE  021226          2811    2993    4294#
$SETUP= 000037          1334#   2577    2810    2811    2813    2815    2817    2819    2820    2821    2823    2845    2848
                        4295    4358    4376    4383
$STUP  = 177777         1334#
$SVLAD  021436          4305    4334#
$SVPC  = 000200          798#    803
$SWR   = 167400          654#    664     668     669     670     671     672     673     674     844     845     846     1501
                        1601    1647    1693    1729    1785    1838    1975    2087    2143    2183    2242    2301    2417
                        2468    2514    2572    2578    2593    2599    2601    2616    2686    2730    2754    2820    2821
                        2823    2824    4286    4287    4288    4289    4290    4296    4308    4310    4311    4314    4315
                        4316    4323    4324    4325    4336    4339    4342    4349    4350    4351    4352    4353    4361
                        4368    4373    4376    4388    4694
$SWRMK= 000000           674     675    4290    4291    4312
$TIMES  001160           844#   1501*   1601*   1647*   1693*   1729*   1785*   1838*   1975*   2087*   2143*   2183*   2242*
                        2301*   2417*   2468*   2514*   2578*   2616*   2686*   2730*   2754*   2820*   4323*   4330    4333*
                        4342
$TKB    001146           837#   3190    3215
$TKS    001144           836#   3188    3213
$TN    = 000025          654#    664    1499    1501#   1599    1601#   1645    1647#   1691    1693#   1727    1729#   1783
                        1785#   1836    1838#   1973    1975#   2085    2087#   2141    2143#   2181    2183#   2240    2242#
                        2299    2301#   2415    2417#   2466    2468#   2512    2514#   2614    2616#   2684    2686#   2728
                        2730#   2752    2754#
$TPB    001152           839#   4447*   4458
$TPFLG  001157           843#   4405    4458
$TPS    001150           838#   4445    4458
$TRAP   023074          2815    4709#
$TRAP2  023116          4720#   4731
$TRP   = 000006         4724#   4733#   4734#   4735#   4736#   4737#
$TRPAD  023130          4714    4731#
$TSTNM  001102           816#   1002    1013    1017    1019    1021    1506    2577*   3494    4285    4312    4334*   4339
                        4343    4360    4388
$TYPBN= ****** U        4737
$TYPDS  022472          4603#   4736
$TYPE   021650          4405#   4724    4732
$TYPEC  022020          4426    4433    4440    4445#   4446
$TYPEX  022066          4451    4453    4456#
$TYPOC  022270          4544#   4733
$TYPON  022304          4543    4546#   4735
$TYPOS  022244          4539#   4734
$XTSTR  021242          4299#
$$GET4= 000000          2593#
$OFILL  022467          4540*   4544*   4554    4589#
$40CAT= ****** U        4296    4370
.      = 031670          787#    791#    798     799#    801#    803#    804#    813#    850    1028#   1074#   1075#   1076#
                        1542    1947    2058    2601    2605    2710    2808    2823    2824    2949    3166    3173    3176
                        3189    3907    3951    4019    4090    4130    4342    4343    4388    4458    4513#   4657#   4674
                        4696    4868#   4976#   5307#   5309#   5311#
.BEL   = 000007         1105#   2099    2252    2425
.CARRT= 000015          1107#
.CDWN  = 000102         1123#   2093    2202    2248
.CHOM  = 000110         1117#   2199    2252    2270    2477
.CLFT  = 000104         1126#   2096    2248
```

```
.CLRCK= 000133           1154#   2069
.CLTCK= 000134           1157#   2026
.CPYSC= 000135           1239#   2558
.CRT   = 000103          1120#   2093
.CUP   = 000101          1129#   2099
.C0G   = 000040          1290#   2248
.C03   = 000043          1291#
.C08   = 000050          1292#
.C11   = 000053          1293#
.C20   = 000064          1294#   2423
.C21   = 000065          1295#
.C40   = 000110          1296#
.C79   = 000157          1297#   2267
.DAPNT= 000171           1175#
.DCRAD= 054433           1188#
.DEMP  = 000152          1163#
.DISAC= 000137           1241#
.DMAIN= 000141           1143#   2672    2781
.DPNT  = 000130          1236#
.DRECT= 000103           1151#   2069
.EAPNT= 000131           1173#
.EEMP  = 000112          1161#   1955
.EINST= 000111           1178#   2221    2224
.EMAIN= 000101           1141#
.ENAC  = 000136          1240#
.EOS   = 000112          1132#   2477
.EPNT  = 000127          1234#
.ERPL  = 000151          1180#   2221
.ESC   = 000033          1249#   1955    2026    2069    2093    2096    2099    2199    2202    2224    2248    2252    2267
                         2270    2423    2425    2477    2672    2781    4105    4107
.ESCZ  = 055033          1265#
.IABT  = 000137          1166#   4105
.LKKB  = 000105          1146#
.LNFED= 000012           1109#   2252    2425
.O     = 000117          1200#   1955    2026    2069    2093    2096    2099    2199    2202    2252    2267    2270    2425
                         2477    2672    2781    4105    4107
.P     = 000120          1250#   2224
.PSCRN= 000150           1242#
.RABT  = 000140          1222#   4105
.RDCUR= 000131           1196#   2093    2096    2099    2267    2425
.RESET= 000122           1267#
.R00   = 000040          1285#   2423
.R00C1= 025440           1277#
.R00C2= 032040           1279#
.R01   = 000041          1286#
.R12   = 000054          1287#
.R22   = 000066          1288#
.R23   = 000067          1289#   2248    2267
.R23C0= 020067           1275#
.R23C7= 067467           1190#
.TAB   = 000011          1111#
.TCUCH= 000127           1207#   2199    2202    2252    2270
.TSTER= 000124           1252#
.TXRCK= 000135           1212#
.TXTCK= 000136           1217#   2026
.UNLKK= 000145           1148#   4107
```

```
.XMTAL= 000126           1202#   2026    2477
.Y    = 000131           1195#   2248    2267    2423
```

CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0114

```
COMMEN      1#    785#
ENDCOM      1#    785#
ERROR     679#   1582   1632   1658   1663   1675   1681   1705   1712   1750   1770   1807   1822   1872   1888
         1913   1921   2016   2052   2064   2107   2118   2156   2164   2168   2207   2213   2258   2262   2275
         2279   2380   2397   2430   2436   2446   2452   2487   2491   2494   2526   3504   3568   3585   3736
         3850   3856   4101   4117   4260
ESCAPE      1#    785#
GETPRI      1#    785#
GETSWR      1#    785#  2848#
MULT        1#    785#
NEWTST      1#    785#  1498   1599   1645   1691   1727   1783   1836   1973   2085   2141   2181   2240   2299
         2415   2466   2512   2614   2684   2728   2752
POP         1#    785#  1450   1453   1536   1540   1587   3019   3026   3030   3087   3089   3133   3135   3136
         3144   3155   3186   3344   3537   3554   3559   3661   3725   3727   3862   3912   3997   4032   4246
         4248   4249   4644   4683   4684
PUSH        1#    785#  1509   1521   1525   1664   1682   1713   1751   1753   1758   1760   1763   1771   1790
         1791   1792   1923   1998   2002   2004   2007   2017   2032   2036   2038   2041   2065   2120   2281
         2329   2333   2335   2338   2359   2363   2365   2368   2398   2437   2453   2517   2519   2520   2536
         2540   2542   2545   2557   2558   2559   2694   2696   2697   3035   3036   3038   3039   3090   3115
         3118   3120   3137   3146   3178   3192   3270   3495   3496   3497   3505   3507   3508   3509   3510
         3539   3542   3544   3590   3613   3657   3674   3678   3680   3737   3786   3829   3834   3836   3839
         3860   3901   3984   4264   4603   4664   4670
REPORT      1#    785#
SCOPE     680#   1500   1600   1646   1692   1728   1784   1837   1974   2086   2142   2182   2241   2300   2416
         2467   2513   2576   2615   2685   2729   2753
SETPRI      1#    785#
SETTRA    4724#  4733   4734   4735   4736
SETUP       1#    785#  2802
SKIP        1#    785#
SLASH       1#    785#
SPACE     785#
STARS       1#    785#   796    809    850   1033   1035   1053   1055   1071   1073   1089   1091   1101   1103
         1113   1115   1136   1138   1169   1171   1184   1186   1226   1228   1230   1232   1245   1247   1299
         1302   1334   1337   1347   1354   1409   1415   1488   1489   1496   1499   1591   1597   1599   1635
         1642   1645   1685   1689   1691   1718   1725   1727   1775   1781   1783   1825   1834   1836   1959
         1971   1973   2075   2083   2085   2134   2139   2141   2171   2179   2181   2228   2238   2240   2286
         2297   2299   2405   2413   2415   2458   2464   2466   2499   2510   2512   2568   2605   2612   2614
         2675   2682   2684   2719   2726   2728   2741   2750   2752   2798   2800   2874   2877   2891   2895
         2923   2926   2956   2959   3005   3009   3062   3066   3075   3085   3125   3131   3149   3153   3181
         3184   3195   3200   3233   3237   3256   3268   3419   3432   3487   3492   3516   3518   3530   3535
         3548   3552   3571   3574   3593   3596   3603   3611   3667   3669   3688   3691   3703   3705   3719
         3723   3740   3742   3745   3757   3760   3773   3784   3867   3872   3893   3899   3919   3925   3938
         3941   3953   3958   3976   3983   4000   4003   4014   4016   4025   4029   4057   4064   4084   4087
         4092   4094   4120   4124   4174   4181   4221   4225   4240   4244   4269   4271   4282   4345   4390
         4460   4516   4593   4660   4676   4703
SWRSU       1#    785#  2825#
TRMTRP    4724#
TYPBIN      1#    785#
TYPDEC      1#    785#  2588   4500
TYPNAM      1#    654#   785#  2841
TYPNUM      1#    785#
TYPOCS      1#    785#  1458   1463   1468   2980   3052
TYPOCT      1#    785#  4472   4497
TYPTXT      1#    785#
$$CMRE    807#
$$CMTM    807#
```

```
$$ESCA      1#     785#
$$NEWT      1#     785#   1499    1599    1645    1691    1727    1783    1836    1973    2085    2141    2181    2240    2299
         2415     2466    2512    2614    2684    2728    2752
$$SET     4724#    4733    4734    4735    4736
$$SKIP      1#     785#
.EQUAT      1#     654#    675
.HEADE      1#     654#
.KT11       1#
.SETUP      1#     654#   1334
.SWRHI      1#     654#    664
.SWRLO    654#     675#
.$ACT1      1#     654#    794
.$APTB      1#
.$APTH      1#
.$APTY      1#
.$ASTA      1#
.$CATC      1#     654#    785
.$CMTA      1#     654#    807
.$DB2D      1#
.$DB2O      1#
.$DIV       1#
.$EOP       1#     654#   2566
.$ERRO      1#     654#   4343
.$ERRT      1#     654#   4458
.$MULT      1#
.$POWE      1#     654#   4658
.$RAND      1#
.$RDDE      1#
.$RDOC      1#
.$READ      1#
.$R2AZ      1#
.$SAVE      1#     654#
.$SB2D      1#
.$SB2O      1#
.$SCOP      1#     654#   4280
.$SIZE      1#
.$SUPR      1#
.$TRAP      1#     654#   4701
.$TYPB      1#
.$TYPD      1#     654#   4591
.$TYPE      1#     654#   4388
.$TYPO      1#     654#   4514
.$40CA      1#
.1170       1#


. ABS.  031670     000

 ERRORS DETECTED:  0

 CZVTHC.BIN,CZVTHC.LST/CRF/SOL/NL:TOC=SYSMAC.SML,CZVTHC.P11
 RUN-TIME: 66 65 5 SECONDS
 RUN-TIME RATIO: 228/138=1.6
 CORE USED:  33K  (65 PAGES)
```