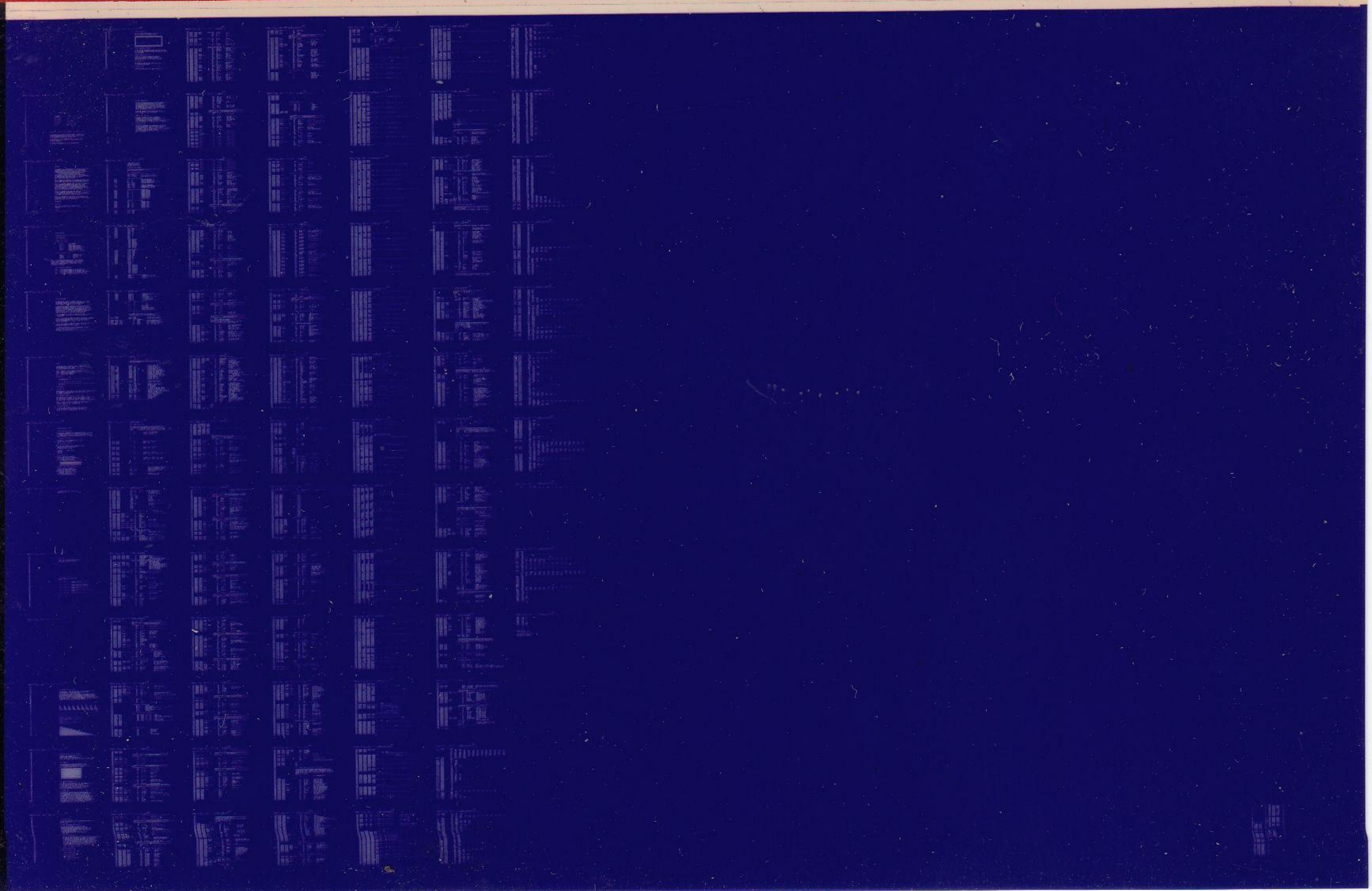
VT50A/B/H

ACCEPTANCE TEST
MD-11-DZVTC-D

EP-DZVTC-D-DL-B

FICHE 1 OF 1

MAR 1977
digital
MADE IN USA



EOF1DZTUGASEQ	00010000	770224	PDP10 411	HDR1DZVTCDSEQ	00010000	770224

.REM ↑

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZVTC-D-D
PRODUCT NAME:	VT50A, B, H, 52 ACCEPTANCE TEST
DATE CREATED:	MAY 21, 1975
DATE REVISED:	JANUARY 1977
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	P NELSON/R SHOOP

1. ABSTRACT

THIS PROGRAM IS AN ACCEPTANCE TEST OF THE VT50/52 VIDEO TERMINAL.
THE PROGRAM CONSISTS OF FOUR PARTS, ALL OF WHICH REQUIRE
OPERATOR INSPECTION OR INTERACTION. THE PROGRAM IS CAPABLE
OF HANDLING MULTIPLE UNITS IN A SEQUENTIAL DL-11 FASHION (REF 8.2).
****
ONLY ONE VT50/52 IS TESTED AT ONE TIME.
****
THE PROGRAM WILL DEFAULT TO THE CONSOLE TTY (REF 5.0 AND 8.2).
ALL CHARACTERS AND COMMANDS ARE TESTED. IN THE KEYBOARD CHARACTER
TEST THE FOLLOWING "FUNCTION" KEYS ARE NOT TESTED:
BREAK, REPEAT, AUTO-PRINT, AND SCROLL.

PART 1 CONSISTS OF A SERIES OF TEST PATTERNS DISPLAYED ON THE
VT50/52 SCREEN AND COPIER (REF 9. FOR DESCRIPTION). THE OPERATOR
MUST VISUALLY INSPECT EACH TEST PATTERN FOR ERROR DETECTION.

PART 2 IS A KEYBOARD CHARACTER TEST. THIS TEST IS TO DETERMINE
THAT THE TERMINAL IS GENERATING THE EXPECTED ASCII CODES.
IN THIS TEST AN OPERATOR WILL BE REQUIRED TO FOLLOW THE
INSTRUCTIONS DISPLAYED ON THE VT50/52 SCREEN AND EXECUTE THEM.
DUE TO THE FLEXIBILITY OF DIFFERENT PROCESSORS OR OPTIONS,
PARITY BIT TESTING MUST BE SELECTED BY THE OPERATOR. THE OPERATOR
SELECTS THE TYPE OF PARITY TO BE TESTED BY SW 00-01

PART 3 IS A KEYBOARD OCTAL VALUE LOOP. WHEN A KEY IS DEPRESSED,
THE OCTAL VALUE WILL BE DISPLAYED ON THE SCREEN.
IF THE KEY DEPRESSED WAS PRINTABLE, IT WILL ALSO BE DISPLAYED
ON THE SCREEN. IF A "DEFINED" CHARACTER, A TWO LETTER EQUALIVENT
(IE. BL=BELL, ES=ESCAPE ETC.) WILL BE DISPLAYED.

PART 4 IS A KEYBOARD ECHO LOOP. WHEN A KEY IS DEPRESSED, THE
CHARACTER IS ECHOED TO THE SCREEN. NO TESTING OF THE CHARACTER
IS PERFORMED. THIS ALLOWS THE OPERATOR A 'LOCAL' MODE OF OPERATION
BETWEEN THE VT50/52 AND THE HOST COMPUTER.

2. REQUIREMENTS

2.1 EQUIPTMENT

PDP-11 FAMILY COMPUTER WITH 8K WORDS OF MEMORY
VT50A, B, H, 52 VIDEO TERMINAL CONNECTED VIA A DL-11A/B TYPE
INTERFACE.

2.2 STORAGE

THIS PROGRAM USES 8K OF MEMORY.

3. LOADING PROCEDURE

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

STANDARD PDP-11 FORMAT

SW 15 = 1	HALT ON ERROR
SW 14 = 1	LOOP ON TEST
SW 13 = 1	INHIBIT ERROR TYPEOUTS
SW 12 = 1	INHIBIT PROGRAM SUB-TEST DELAY
SW 11 = 1	INHIBIT COPIER TESTING
SW 10 = 1	ENABLE "SAVE COPIER PAPER" MODE
SW 08 = 1	LOOP ON TEST IN SWR <4:0>
SW 07 = 1	KEYBOARD CONTROL OF THE TEST <SW 8 AND SW 7 = 1 IS AN ERROR>

KEYBOARD CHARACTER TEST ONLY

SW02 =	1	ENABLE PARITY BIT TEST
SW00-01=	00	EVEN PARITY CHECK
SW00-01=	01	ODD PARITY CHECK
SW00-01=	10	ALWAYS A 0
SW00-01=	11	ALWAYS A 1

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 RESPONDSIBLE FOR THE LOADING OF THE "SWITCH" REGISTER LOCATION PRIOR TO STARTING OR RESTARTING THE PROGRAM.

4.2 STARTING ADDRESS OR ADDRESSES

200	IS THE STARTING ADDRESS OF THE ACCEPTANCE TEST
204	IS THE RESTART ADDRESS OF THE ACCEPTANCE TEST
210	IS THE STARTING ADDRESS OF THE KEYBOARD CHARACTER TEST
214	IS THE STARTING ADDRESS OF THE KEYBOARD OCTAL VALUE LOOP
220	IS THE STARTING ADDRESS OF THE KEYBOARD ECHO LOOP
224	IS THE SPECIAL STARTING ADDRESS FOR VT-50 PRODUCTION

5. OPERATING PROCEDURE

THE OPERATOR MUST INSERT THE CORRECT INFORMATION IN THE SWITCH REGISTER WHEN REQUIRED BY THE PROGRAM OR AN ERROR WILL OCCUR. ONCE STARTED, THE TEST WILL RUN IN ITS NORMAL MANNER WITHOUT OPERATOR INTERVENTION OR SWITCH CHANGES.

THIS PROGRAM ALLOWS THE OPERATOR TWO MODES OF TEST PATTERN SELECTION. THESE MODES ARE SELECTED BY THE STATE OF SW 07 AT THE BEGINNING OF THE PROGRAM. WHEN SW 07 IS A ZERO, THE PROGRAM IS UNDER SWITCH REGISTER CONTROL FOR TEST PATTERN SELECTION. IF SW07 IS EQUAL TO A ONE, THE PROGRAM IS UNDER KEYBOARD CONTROL OF THE TEST PATTERN SELECTION. IN THIS MODE THE OPERATOR WILL BE REQUIRED TO TYPE IN ON THE CONSOLE TTY THE FIRST AND LAST OCTAL BASE ADDRESS OF THE DL-11'S TO WHICH VT-50'S ARE CONNECTED.

IN THE KEYBOARD SELECT MODE, TWO CHARACTERS ARE USED TO SELECT THE "STARTING WITH" OR "LOOPING ON" A PATICULAR TEST PATTERN BY "/" OR "\" RESPECTFULY.

THE "/" KEY IS USED TO SUSPEND THE CURRENT TEST AND ASK THE OPERATOR A WHICH TEST PATTERN HE/SHE WISHES TO START. THE OPERATOR NOW DEPRESSES THE LETTER WHICH REPRESENTS THE TEST PATTERN TO BE STARTED WITH. REFER TO THE PROGRAM LISTING TABLE OF CONTENTS FOR THE TEST LETTER OF EACH PATTERN.

THE "\" KEY IS USED TO SUSPEND THE CURRENT TEST AND ASK THE OPERATOR WHICH TEST PATTERN HE/SHE WISHES TO LOOP ON. THE OPERATOR NOW DEPRESSES THE LETTER OF THE TEST TO LOOP ON.

IF DURING THE EXECUTION OF A TEST PATTERN, A KEY IS DEPRESSED AND SW 07 EQUALS A ZERO, AN ERROR WILL BE REPORTED TO THE CONSOLE TTY. IF SW 07 EQUALS A ONE, AND THE CHARACTER RECEIVED WAS NOT A "/" OR "\", AN ERROR WILL BE REPORTED. THE CODES "X-OFF" AND "X-ON" ARE THE ONLY EXCEPTIONS.

6. ERRORS

THIS PROGRAM USES THE DIAGNOSTIC 'SYSMAC' PACKAGE FOR
ERROR REPORTING AND TYPEOUT. REFER TO THE "ERROR POINTER TABLE"
FOR TYPE AND DESCRIPTION OF ERRORS.
THE ERROR INFORMATION CONSISTS OF THE FOLLOWING:

ERRPC - LOCATION AT WHICH AN ERROR WAS DETECTED
VTNOW - CURRENT DL-11 BUS ADDRESS OF VT50/52 UNDER TEST
TSTNUM- TEST PATTERN NUMBER OF FAILING TEST
EXPT - EXPECTED INPUT CHARACTER
RCVD - RECEIVED INPUT CHARACTER

7. RESTRICTIONS

A. THE OPERATOR SHOULD SET SW 15 AND 13 IF THE VT50/52 UNDER TEST
   IS THE CONSOLE TTY.

B. ONLY ONE VT50/52 CAN BE TESTED AT ONE TIME.

C. THE FIRST TIME AFTER LOADING THE PROGRAM, THE TERMINAL IDENTIFIER
   MUST BE RUN.

8. MISCELLANEOUS

8.1 EXECUTION TIME

EXECUTION TIME WILL VARY WITH THE "BAUD" RATE, AND IF A COPIER IS CONNEC
THE PROGRAM WILL TYPE 'END PASS' ON THE CONSOLE WHEN A PASS HAS BEEN COM
THE KEYBOARD LOOP AND CHARACTER TEST WILL NOT EXIT UNTIL
THE PROGRAM IS RESTARTED.

8.2 DEVICE ADDRESS PROGRAM LOCATIONS (AT APPROX. 1240)

THE LOCATION "FIRST" CONTAINS THE FIRST DL11 ADDRESS IF SEVERAL VT-50'S
ARE BEING TESTED. THE DEFAULT IS THE CONSOLE ADDRESS <17756O>
THE LOCATION "LAST" CONTAINS THE LAST DL11 ADDRESS IF SEVERAL VT-50'S
ARE BEING TESTED. LOCATION VTNOW CONTAINS THE CURRENT DL11 BASE ADDRESS.

*NOTE: IF THESE LOCATIONS ARE CHANGED, THE OPERATOR MUST START
THE TEST AGAIN AT LOC. 200. THE PROGRAM WILL USE THE BASE
ADDRESS TO UPDATE THE ACTUAL PROGRAM VALUES.

8.3 COPIER SAVE PAPER SWITCH

IF SW 10 = 1 AND A COPIER IS INSTALLED, THE COPIER TESTS
WILL BE EXECUTED ON THE FIRST PASS AND THEN BYPASSED FOR
THE NEXT TEN PASSES. THIS REDUCES PAPER USAGE WHEN THE
PROGRAM IS RUN FOR AN EXTENDED PERIOD. (LOC. PTCT IS # OF PASSES)

9. PROGRAM DESCRIPTION <SCREEN>

9.1 A TERMINAL IDENTIFICATION TEST

THIS TEST WILL INTERROGATE THE VT50/52 UNDER TEST AS TO IT'S TYPE.
THE RESPONSE RECIEVED IS USED TO DETERMINE THE MODES TO BE TESTED
(IE. COPIER, 12/24 LINES, D.C.A <DIRECT CURSOR ADDRESSING> ETC.)
IF AN UNDEFINED OR AN INCORRECT RESPONSE IS RECIEVED, THE PROGRAM
ASSUMES VT50A MODEL (IE. 12 LINES, NO COPIER, NO D.C.A., NO EXTRA KEYPAD

9.2 B FULL SCREEN OF THE LETTER E

THIS TEST WILL FILL THE SCREEN WITH THE LETTER E.
THIS TEST WILL LOAD THE SCREEN RAM WITH A SINGLE
CHARACTER IN ALL LOCATIONS

9.3 C DATA PATH AND RAM NOISE TEST

THIS TEST WILL PRODUCE TWO FULL SCREENS OF A WORST CASE
NOISE PATTERN FOR THE SCREEN RAM AND THE DATA PATH.
ALTERNATING LINES OF THE FOLLOWING
PATTERNS SHOULD BE DISPLAYED.

```
*U*U*U*U*U        CODES 52 AND 125
@?@?@?@?@?        CODES 77 AND 100
*U*U*U*U*U
@?@?@?@?@?
```

9.4 . D SIMPLE CHARACTER SET

ONE FULL LINE OF EACH CHARACTER
(CODES 40 THRU 137) OF THE CHARACTER
SET. THIS WILL ALSO TEST THAT ALL WORDS
IN THE SCREEN RAM CAN BE LOADED.
THIS WILL ALSO EXERCISE THE SCROLLING FUNCTION.

IE:
```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
```

9.5 E INCREMENTING AND SLIDING CHARACTER SET

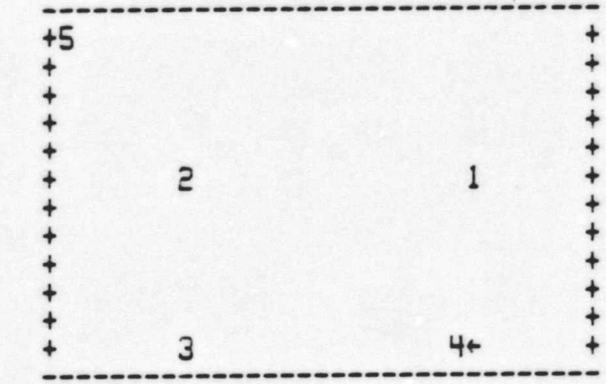
ONE FULL LINE OF AN INCREMENTING
CHARACTER SET ACROSS THE FULL SCREEN
STARTING WITH THE CODE 40 (SPACE)
THE NEXT LINE SHOULD BEGIN WITH THE
"!" CHARACTER (CODE 41) ETC. CONTINUE
THE PATTERN BY INCREMENTING THE
FIRST COLUMN CHARACTER UNTIL THE
FULL CHARACTER SET HAS BEEN EXHAUSTED.

```
                                ;
                                ;THIS PATTERN WILL VERIFY THAT THE FULL
                                ;CHARACTER SET CAN BE DISPLAYED IN EACH
                                ;SCREEN WORD.
                                ;
                                ;
```

9.6 F CURSOR MOTION

IN THIS TEST THE BASIC CURSOR MOTIONS ARE TESTED. THE FOLLOWING TEST PATTERN IS GENERATED TO TEST THE CURSOR FUNCTIONS

BEFORE:



UPON COMPLETION OF THE SETUP THE BLINKING CURSOR WILL BE TO THE RIGHT OF #4.

TO TEST "CURSOR UP": GENERATE CURSOR UP 6/12 TIMES AND DISPLAY A "X"

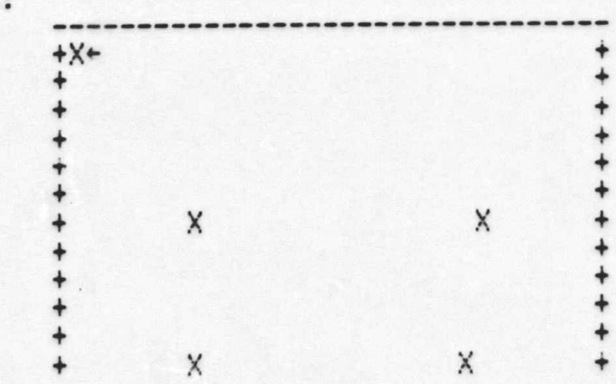
TO TEST "CURSOR LEFT": GENERATE CURSOR LEFT (BACKSPACE) FOURTY FOUR TIMES AND DISPLAY A "X"

TO TEST "CURSOR DOWN": GENERATE CURSOR DOWN 6/12 TIMES AND DISPLAY A "X"

TO TEST "CURSOR RIGHT": GENERATE CURSOR RIGHT FOURTY TWO TIMES AND DISPLAY A "X"

TO TEST "CURSOR HOME": GENERATE CURSOR HOME AND DISPLAY A "X"

AFTER:



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368
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9.7 G TAB, BACKSPACE AND BELL TEST

THIS PATTERN WILL TEST THAT THE 'TAB' FUNCTIONS CORRECTLY FROM EACH
COLUMN POSITION. GENERATE A REFERENCE LINE USING SPACES
AND THE LETTER 'I'. ON THE NEXT LINE
RING THE BELL AND DISPLAY ONE CHARACTER IN COLUMN ONE AND EXECUTE A 'TAB
THE CURSOR SHOULD THEN BE POSITIONED BELOW THE REFERENCE TAB STOP.
REPEAT THE ONE CHARACTER IN THE FIRST TAB COLUMN ACROSS THE SCREEN.
ON THE NEXT LINES USE INCREASING NUMBERS OF CHARACTERS BEFORE THE 'TAB'
THE BELL WILL RING AT THE BEGINNING OF EACH LINE. THE SECOND SECTION TES
THE BACKSPACE CODE. A FULL LINE OF THE CHARACTER "X" WILL BE DISPLAYED
STARTING AT THE RIGHT EDGE AND EXTENDING TO THE LEFT.

```
---------------------------------------------------------------------------
+I      I       I       I       I       I       I       I       I
+I      I       I       I       I       I       I       I       I
+IA     IA      IA      IA      IA      IA      IA      IA      IA
+IAA    IAA     IAA     IAA     IAA     IAA     IAA     IAA     IAA
+IAAA   IAAA    IAAA    IAAA    IAAA    IAAA    IAAA    IAAA    IAAA
+IAAAA  IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA
+IAAAAA IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA
+IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

9.10 H ERASE FROM CURSOR TO END OF LINE:

H.1 GENERATE A FULL SCREEN OF THE CHARACTER "E"
H.2 EXECUTE A "CURSOR HOME"
H.3 EXECUTE "ERASE FROM CURSOR TO END OF LINE"
H.4 EXECUTE "CURSOR RIGHT" 6/3 TIMES
H.5 EXECUTE "LF"
REPEAT H.3 THRU H.5 12/24 TIMES
THE END DISPLAY SHOULD APPEAR TO BE A
STAIR STEP PATTERN

```
EEEEEE
EEEEEEEEEEEE
EEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
```

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9.11 I  ERASE FROM CURSOR TO END OF THE SCREEN:

        GENERATE A FULL SCREEN OF THE CHARACTER "E"
        EXECUTE FOURTY "CURSORS LEFT"
        EXECUTE "ERASE SCREEN" AND "CURSOR UP"
        REPEAT THIS 12 OR 24 TIMES, UPON COMPLETION THE PATTERN WILL
        BE A LINE OF FOURTY CHARACTERS AT THE TOP LEFT OF THE SCREEN.


9.12 J  VIDEO COUPLING:

        THIS PATTERN WILL ALLOW FOR THE CHECKING OF VIDEO
        COUPLING BETWEEN THE VIDEO AND VERTICAL CIRCUITS.
        IF COUPLING OCCURS, THE VERTICAL DOTS OF THE CHARACTERS
        WILL BE UNEVENLY SPACED OR DOTS WILL SPARKLE.

        T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
        T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
        T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
        T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
        T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
        T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
        T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
        T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
        T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
        T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
        T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
        T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T


9.13 K  DIRECT CURSOR ADDRESSING (D.C.A.)

        THIS TEST IS ONLY EXECUTED ON A VT50H. WHEN EXECUTED ON A VT50H
        THIS TEST WILL BE RUN TWO TIMES. THE FIRST TIME WILL BE WITH
        AN "ESC-Y" AND THE SECOND WITH AN "CODE 16".
        IF AN INCORRECT I.D., THIS TEST WILL NOT BE EXECUTED.
        THIS TEST WILL RANDOMLY FILL THE SCREEN. THE END RESULT
        WILL BE THE SAME STATEMENT ON ALL VERTICAL LINES.
        EACH OF THE LINES SHOULD APPEAR THE SAME.

9.14 L  HOLD SCREEN TEST

        NOT EXECUTED IF VT50/52 PRODUCTION STARTING ADDRESS.
        THIS TEST DETERMINES THAT THE "XON-XOFF" FEATURE IS FUNCTIONING.
        A FULL SCREEN SCROLL IS EXECUTED AND A SUB-TEST TITLE
        WILL BE DISPLAYED. THE HOLD SCREEN MODE IS ENABLED AND
        THE PROGRAM WILL ATTEMP TO SCROLL THE SCREEN AGAIN AND SEND A MESSAGE.
        THIS WILL CAUSE AN "X-OFF" TO BE SENT AND THE SCREEN IS
        INHIBITED FROM SCROLLING. ANY ADDITIONAL CHARACTERS RECEIVED
        WILL BE PLACED INTO THE SILO STORAGE BUFFER. UPON RECEIPT
        OF AN "X-OFF", THE PROGRAM WILL DISABLE HOLD SCREEN MODE AND
        SHOULD RECEIVE AN "X-ON". TO CHECK PROPER SILO OPERATION,
        THE MESSAGE "TESTING SILO REG" SHOULD APPEAR UNDER THE SUB-TEST TITLE
        FOLLOWED BY "SILO TEST DONE" ON THE NEXT LINE.
```

```
                        COPIER TEST PATTERNS

                        THE TEST PATTERNS USED TO TEST THE COPIER ARE THE SAME PATTERNS
                        AS SOME OF THE SCREEN TESTS. TWO ADDITIONAL PATTERNS HAVE
                        BEEN INCLUDED.

9.15 M                  GRAPHICS MODE/REVERSE LINE FEED TEST

                        THIS TEST IS EXECUTED ONLY IF UNIT IS A VT52.
                        GRAPHICS MODE IS ENTERED AND 37 LINES OF GRAPHICS
                        CHARACTERS(LINE LENGTH IS DECREMENTED BY ONE CHAR. AFTER
                        A LINE IS PRINTED)ARE GENERATED. THE BOTTOM LINE OF THE
                        WILL FORM A COMPLETE SERIES OF GRAPHIC CHARACTERS WHICH
                        CAN BE VERIFIED FOR ACCURACY.
                        IF REVERSE LINE FEED IS NOT OPERATIONAL A SINGLE
                        LINE OF GRAPHICS CHARACTERS WILL BE GENERATED
                        ON LINE 0 ONLY.

9.16 N                  COPIER - AUTO COPY MODE

                        THIS TEST IS USED TO DETERMINE IF THE AUTO COPY MODE IS FUNCTIONING CORR
                        THE SUB-TEST TITLE AND A ROW OF THE LETTER 'E' WILL BE DISPLAYED.
                        THE AUTO-COPY MODE IS ENABLED. THE COPIER SHOULD THEN START.
                        A PROGRAM DELAY IS EXECUTED BETWEEN EACH LINE. THE RESULT
                        IS THE COPIER SHOULD COPY ONE LINE AND THEN STOP FOR THE PROGRAM
                        DELAY TIME. WHEN THE PROGRAM DELAY IS COMPLETED ANOTHER LINE
                        OF 'E'S WILL BE DISPLAYED AND THE COPIER SHOULD START AGAIN.
                        UPON COMPLETION OF THE 12 OR 24 LINES, DISABLE AUTO-COPY MODE
                        IS SENT TO THE VT50. IF THE AUTO COPY MODE IS NOT DISABLED
                        THE NEXT SUB-TEST WOULD PERFORM IN A SIMILAR MANNER.

9.17 O                  COPIER - FULL SCREEN OF THE LETTER E

                        SAME AS SCREEN PATTERN

9.20 P                  COPIER - DATA PATH TEST PATTERN

                        SAME AS SCREEN PATTERN

9.21 Q                  COPIER - SINGLE CHARACTER PER LINE

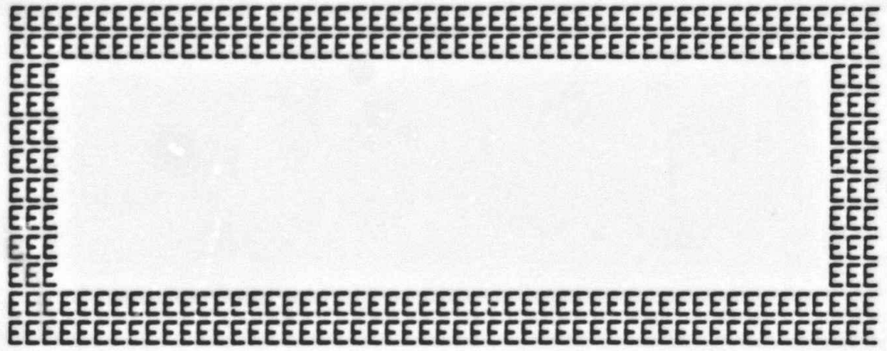
                        SAME AS SCREEN PATTERN

9.22 R                  COPIER - ROTATING CHARACTER TEST

                        SAME AS SCREEN PATTERN
```

9.23 S COPIER - PERIMETER TEST

THIS TEST COPIES THE PERIMETER OF THE SCREEN AND THE
RESULTING PICTURE SHOULD RESEMBLE BELOW



9.24 T COPIER - DISCLAIMER STATEMENT

IN THIS TEST THE DISCLAMER STATEMENT FROM THE COVER PAGE
OF THIS DOCUMENT IS DISPLAYED ON THE SCREEN AND THEN COPIED.
THE COPIED VERSION SHOULD BE COMPARED TO THE FRONT COVER TO
CHECK FOR ERRORS.

9.25 U PRINTER CONTROLLER MODE TEST

A 'ROLLING' PATTERN OF INCREMENTING CHARACTERS IS
ISSUED TO THE UNIT AFTER PRINTER CONTROLLER
MODE HAS BEEN ENTERED. 92 LINES(OF 132 CHAR. EACH)
SHOULD BE PRINTED WITH NO DATA APPERING ON SCREEN.

9.26 V PRINT SCREEN TEST

THE SCREEN IS FILLED WITH 24 LINES OF 'E'S. THE
PRINT SCREEN ESCAPE SEQUENCE IS THE ISSUED AND ALL
24 LINES SHOULD BE PRINTED.

9.27 W AUTO PRINT TEST

OPERATION IS SAME AS AUTO COPY TEST EXCEPT THAT
THE PRINTER,RATHER THAN THE COPIER IS THE DESTINATION.

9.30 X KEYBOARD CHARACTER TEST

THIS TEST IS DESIGNED TO VERIFY THAT CORRECT CHARACTER CODES
AND PARITY BIT ARE GENERATED WHEN A KEY IS DEPRESSED.
THIS TEST REQUIRES THE OPERATOR TO EXECUTE THE
INSTRUCTIONS DISPLAYED ON THE SCREEN. THE OPERATOR SHOULD
ONLY DEPRESS ONE KEY AT A TIME, WITH SOME EXCEPTIONS.
THE OPERATOR WILL BE REQUIRED TO SKIP THOSE KEYS THAT
ARE NOT IMPLEMENTED IF THE UNIT IS A VT50. THE PROGRAM WILL
INFORM THE OPERATOR WHICH ROW TO TEST.

IN TESTING THE PARITY BIT, SW 0 AND 1 ARE USED TO
INFORM THE PROGRAM OF THE EXPECTED PARITY. AN INCORRECT
SWITCH SETTING WILL RESULT IN AN ERROR.

9.31 Y KEYBOARD OCTAL VALUE LOOP

THIS LOOP IS PROVIDED TO ENABLE THE OPERATOR
TO EXAMINE THE OCTAL VALUE OF A CHARACTER. WHEN A KEY IS
DEPRESSED, THE OCTAL VALUE WILL BE DISPLAYED.
IF THE CHARACTER WAS A PRINTABLE CHARACTER, IT WILL BE DISPLAYED.
THOSE CODES DEFINED AS "CONTROL" WILL BE DISPLAYED AS A
TWO LETTER MNEMONIC (IE. DE=DELETE, BL=BELL, CL=CURSOR LEFT ETC.)

9.32 Z KEYBOARD ECHO LOOP

WHEN A KEY IS DEPRESSED, THE CHARACTER WILL BE DISPLAYED.
NO MODIFICATION OR DATA TEST IS PERFORMED. THIS TEST CAN
BE USED TO DETERMINE IF THERE IS A "UART" OR SERIAL
LINE PROBLEM. WHEN THE VT50/52 IS IN LOCAL MODE (NO UART/SERIAL LINE)
THE CHARACTERS SHOULD BE ECHOED CORRECTLY. IF NOT, THE PROBLEM
IS IN THE VT50 UNIT. IF CHANGED TO REMOTE
MODE AND THE CHARACTERS ARE IN ERROR, THERE IS A UART/
SERIAL LINE PROBLEM.

```
                        .TITLE  MAINDEC-11-DZVTC-D
                        ;*COPYRIGHT (C) 1975
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY MIKE DENSMORE
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                        ;*
                        .SBTTL  BASIC DEFINITIONS

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

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

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

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

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
```

```
                004000          SW11=   4000
                002000          SW10=   2000
                001000          SW09=   1000
                000400          SW08=   400
                000200          SW07=   200
                000100          SW06=   100
                000040          SW05=   40
                000020          SW04=   20
                000010          SW03=   10
                000004          SW02=   4
                000002          SW01=   2
                000001          SW00=   1
                                .EQUIV  SW09,SW9
                                .EQUIV  SW08,SW8
                                .EQUIV  SW07,SW7
                                .EQUIV  SW06,SW6
                                .EQUIV  SW05,SW5
                                .EQUIV  SW04,SW4
                                .EQUIV  SW03,SW3
                                .EQUIV  SW02,SW2
                                .EQUIV  SW01,SW1
                                .EQUIV  SW00,SW0

                                ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
                100000          BIT15=  100000
                040000          BIT14=  40000
                020000          BIT13=  20000
                010000          BIT12=  10000
                004000          BIT11=  4000
                002000          BIT10=  2000
                001000          BIT09=  1000
                000400          BIT08=  400
                000200          BIT07=  200
                000100          BIT06=  100
                000040          BIT05=  40
                000020          BIT04=  20
                000010          BIT03=  10
                000004          BIT02=  4
                000002          BIT01=  2
                000001          BIT00=  1
                                .EQUIV  BIT09,BIT9
                                .EQUIV  BIT08,BIT8
                                .EQUIV  BIT07,BIT7
                                .EQUIV  BIT06,BIT6
                                .EQUIV  BIT05,BIT5
                                .EQUIV  BIT04,BIT4
                                .EQUIV  BIT03,BIT3
                                .EQUIV  BIT02,BIT2
                                .EQUIV  BIT01,BIT1
                                .EQUIV  BIT00,BIT0

                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
                000004          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
                000010          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
                000014          TBITVEC=14              ;;"T" BIT
                000014          TRTVEC= 14              ;;TRACE TRAP
```

```
                        000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
                        000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
                        000024                  PWRVEC= 24              ;;POWER FAIL
                        000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
                        000034                  TRAPVEC=34              ;;"TRAP" TRAP
                        000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
                        000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
                        000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR

                                                .SBTTL  OPERATIONAL SWITCH SETTINGS
                                                ;*
                                                ;*      SWITCH                  USE
                                                ;*      ------          --------------------
                                                ;*        15            HALT ON ERROR
                                                ;*        14            LOOP ON TEST
                                                ;*        13            INHIBIT ERROR TYPEOUTS
                                                ;*        12            INHIBIT SUB-TEST DELAY'S
                                                ;*        10            ENABLE SAVE COPIER PAPER MODE
                                                ;*         8            LOOP ON TEST IN SWR<7:0>
                                                .SBTTL  TRAP CATCHER

                        000000                          .=0
                                                ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                        000174                          .=174
000174  000000         DISPREG: .WORD  0                ;;SOFTWARE DISPLAY REGISTER
000176  000000         SWREG:   .WORD  0                ;;SOFTWARE SWITCH REGISTER
                                                .SBTTL  STARTING ADDRESS(ES)
000200  000137  001340          JMP     @#BEGIN ;;JUMP TO STARTING ADDRESS OF PROGRAM
000204  000137  001404          JMP     RBEGIN          ;JUMP TO RESTART ADDRESS
000210  000137  001430          JMP     BEGIN1          ;JUMP TO KEYBOARD CHARACTER TEST
000214  000137  001440          JMP     BEGIN2          ;JUMP TO CHAR OCTAL VALUE LOOP
000220  000137  001420          JMP     BEGIN3          ;JUMP TO ASCII ECHO LOOP
000224  000137  001400          JMP     MANFU           ;JUMP TO W.F. SPECIAL TEST PARAM.
```

```
                                .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          $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REGO) WAS OBTAINED
001162  000000          $REGO:  .WORD   0               ;;CONTAINS (($REGAD)+0)
001164  000000          $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
001166  077             $QUES:  .ASCII  /?/             ;;QUESTION MARK
001167  015             $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
001170  000012          $LF:    .ASCIZ  <12>            ;;LINE FEED
                                ;;**********************************************************************
```

```
                                .SBTTL  ERROR POINTER TABLE

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

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

001172                          $ERRTB:

                                ;ITEM   1
001172  020045                          EM1             ;ERROR FLAG ON HOST TRANSMIT STATUS
001174  020270                          DH1             ;ERRPC  VTNOW   TSTNUM
001176  020434                          DT1             ;$ERRPC VTNOW   TSTNUM
001200  000000                          0

                                ;ITEM   2
001202  020112                          EM2             ;NO HOST INPUT FLAG RECEIVED
001204  020270                          DH1             ;ERRPC  VTNOW   TSTNUM
001206  020434                          DT1             ;$ERRPC VTNOW   TSTNUM
001210  000000                          0

                                ;ITEM   3
001212  020141                          EM3             ;INCORRECT I.D. RESPONSE
001214  020317                          DH3             ;ERRPC  VTNOW   1ST WD  2ND WD  3RD WD
001216  020444                          DT3             ;$ERRPC VTNOW   SAVE4   SAVE2   SAVE3
001220  000000                          0

                                ;ITEM   4
001222  020165                          EM4             ;INCORRECT OR UNEXPECTED INPUT CHARACTER
001224  020366                          DH4             ;ERRPC  VTNOW   TSTNUM   EXPT    RCVD
001226  020460                          DT4             ;$ERRPC VTNOW   TSTNUM   $GDDAT $BDDAT
001230  000000                          0

                                ;ITEM   5
001232  020230                          EM5             ;INVALID BUSS ADDRESS, TRY AGAIN
001234  000000                          0
001236  000000                          0
001240  000000                          0
001242  177560          FIRST:  177560                  ;FIRST DEVICE ADDRESS OF SEQUIENTAL DL-11-A/B TYPE DEVIC
                                                        ;DEFAULT TO THE CONSOLE ADDRESS
001244  000000          LAST:   0                       ;LAST DEVICE ADDRESS OF DL-11-A/B TYPE
001246  177560          VTNOW:  177560                  ;CURRENT DEVICE BUSS ADDRESS
001250  100011          PTCT:   100011                  ;COPIER PAPER SAVE COUNT <LOW BYTE>
001252  000000          TSTNUM: 0                       ;ERROR PATTERN

001254  000300          TIMEO:  300                     ;CHARACTER FLAG TIMEOUT CONSTANT
001256  000005          SUBTST: 5                       ;SUBTEST DELAY CONSTANT
001260  000000          VTSXX:  0                       ;I.D. AND CHARASTICS
```

```
000053                  LASTLN: 53          ;OR 67          ;LAST VALID LINE # +40
001700                  TOTALC: 960.        ;OR 1920.       ;TOTAL CHARACTER COUNT
000014                  VH0:    12.         ;24.            ;VERTICAL LINE COUNT
000006                  VH1:    6.          ;12.            ;1/2 VERTICAL LINE COUNT
000003                  VH2:    3.          ;6.             ;1/4 VERTICAL LINE COUNT
000000                  PRTCNT: 0
177560                  VTIS:   177560                      ;DEVICE ADDRESSES
177562                  VTIB:   177562                      ;IN DATA
177564                  VTOS:   177564                      ;OUT STAT
177566                  VTOB:   177566                      ;OUT DATA
000000                  STCHAR: 0                           ;TEMP REG'S
000140                  LASTCH: 140         ;OR 200         ;FIRST NON-VALID CHARACTER
000000                  TEMP:   0                           ;TEMP REG'S
000000                  TEMP0:  0                           ;
000204                  PNTWID: 132.                        ;COLUMN COUNT FOR LINE PRINTER.
000120                  WIDTH:  80.                         ;COLUMN WIDTH
000000                  SAVE1:  0                           ;TEMP REG'S
000000                  SAVE2:  0
000000                  SAVE3:  0
000000                  SAVE4:  0
000000                  WFTEST: 0                           ;NON-ZERO IF SA = 224

022626                  BUSSTR: CMP     (SP)+,(SP)+             ;POP STACK
104005                          ERROR   5                       ;INVALID BUSS ADDRESS

002042  002040          BEGIN:  MOV     #TST1,WHERE     ;STARTING ACCEPTANCE TEST ADDRESS
001330                          CLR     SAVE4
001332                          CLR     WFTEST
001334  000004                  MOV     #BUSSTR,@#4
000340  000006                  MOV     #340,@#6
001274                          CLR     PRTCNT
000426                          BR      GINA
001332                  MANFU:  INC     WFTEST          ;SET W.F. PARAM.
001274                  RBEGIN: CLR     PRTCNT          ;RESTART ADDRESS
002042  002040                  MOV     #TST1,WHERE
000413                          BR      GIN
010254  002040          BEGIN3: MOV     #KRBECH,WHERE   ;START AT ECHO LOOP
000407                          BR      GIN
007400  002040          BEGIN1: MOV     #KRBTST,WHERE   ;STARTING CHARACTER TEST ADDRESS
000403                          BR      GIN
007104  002040          BEGIN2: MOV     #KRBECO,WHERE   ;STARTING CHARACTER LOOP ADDRESS
000001  001330          GIN:    MOV     #1,SAVE4
000005                  GINA:   RESET
                        .SBTTL  INITIALIZE THE COMMON TAGS
                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
001100                          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
001140                          CMP     #SWR,R6 ;;DONE?
001374                          BNE     .-6             ;;LOOP BACK IF NO
001100                          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                        ;;INITIALIZE A FEW VECTORS
023224  000020                  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
000340  000022                  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
023342  000030                  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
000340  000032                  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
024360  000034                  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
```

```
                                                MOV     #340,@#TRAPVEC+2;LEVEL 7
                                                MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
                                                MOV     #340,@#PWRVEC+2 ;;LEVEL 7
                                                MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
                                                MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
                                        ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                        ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
                                                MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
                                                MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
                                                MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
                                                MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
                                                CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
                                                BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
                                                BR      65$             ;;BRANCH IF NO TIMEOUT
                                        64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
                                                RTI
                                        65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
                                                MOV     #DISPREG,DISPLAY
                                        66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR

                                                CLR     IGNORE
                                                CLR     LOOP
                                                MOV     #MSCOPE,@#IOTVEC
                                                TST     SAVE4           ;TEST FLAG
                                                BNE     SBEGIN          ;BR IF NON-ZERO
                                                TYPE
                                                TITLE
                                                TSTB    @SWR
                                                BPL     SBEGIN          ;BR IF CLEARED
                                        11$:    TYPE
                                                WHAT0                   ;FIND OUT THE DEVICE ADDRESS
                                                RDOCT
                                                MOV     (SP)+,FIRST     ;SAVE THE ADDRESS
                                                CMP     #160000,FIRST
                                                BHI     11$             ;BR IF INVALID
                                                TST     @FIRST          ;TEST IF VALID
                                                CLR     LAST
                                                TYPE
                                                WHAT1                   ;FIND OUT THE LAST ADDRESS
                                                RDOCT
                                                MOV     (SP)+,LAST      ;SAVE LAST ADDRESS
                                                TST     @LAST           ;TEST IF VALID
                                                MOV     #6,@#4
                                                CLR     @#6
                                        SBEGIN: MOV     FIRST,VTNOW     ;LOAD INITIAL DEVICE ADDRESS

                                        RSTRT:  MOV     #VTIS,R0        ;LOAD POINTER
                                                MOV     VTNOW,R1        ;LOAD INPUT STAT
                                                MOV     R1,(R0)+
                                                TST     (R1)+
                                                MOV     R1,(R0)+
                                                TST     (R1)+
                                                MOV     R1,(R0)+
                                                TST     (R1)+
                                                MOV     R1,(R0)
```

```
                        000177  000000                  JMP     @WHERE          ;JUMP TO STARTING ADDRESS
                        002042                  WHERE:  TST1
                                                ;;*****************************************************************
                                                ;*TEST 1         A       TERMINAL IDENTIFICATION TEST
                                                ;;*****************************************************************
                        000004                  TST1:   SCOPE
                        004537  011616                  JSR     R5,AMSG         ;DISPLAY HEADER
                        013424                          M914
                        004537  011616                  JSR     R5,AMSG         ;SEND REQUEST FOR IDENTIFICATION
                        017251                          RFI

                        004737  012620                  JSR     PC,GETCHR       ;GET A CHARACTER
                        000537                          BR      2$              ;;BR BACK IF NO INPUT
                        010037  001330                  MOV     R0,SAVE4        ;SAVE RESPONSE
                        004737  012620                  JSR     PC,GETCHR       ;GET A CHAR.
                        000532                          BR      2$              ;;BR IF NO INPUT
                        010037  001324                  MOV     R0,SAVE2
                        004737  012620                  JSR     PC,GETCHR       ;GET A CHAR.
                        000525                          BR      2$              ;;BR IF NO INPUT
                        010037  001326                  MOV     R0,SAVE3
                        042737  177500  001330          BIC     #177600,SAVE4   ;MASK BIT 7
                        042737  177600  001324          BIC     #177600,SAVE2
                        042737  177600  001326          BIC     #177600,SAVE3
                        005737  001332                  TST     WFTEST
                        001402                          BEQ     10$
                        004737  011544                  JSR     PC,ADELAY       ;EXTRA DELAY
                        122737  000033  001330  10$:    CMPB    #33,SAVE4       ;TEST FIRST CHAR.
                        001015                          BNE     1$              ;BR TO ERROR
                        122737  000057  001324          CMPB    #'/,SAVE2       ;TEST SECOND CHAR.
                        001011                          BNE     1$              ;BR TO ERROR

                                                ;NOW DETERMINE WHICH VT5XX AND ITS CHARASTICS

                        005000                          CLR     R0              ;CLEAR INITIAL POINTER
                        126037  002400  001326  3$:     CMPB    TYPEPT(R0),SAVE3        ;TEST I.D. TO KNOWN VALUE
                        001406                          BEQ     4$              ;BR IF CORRECT
                        005720                          TST     (R0)+           ;BUMP THE INDEX
                        105760  002400                  TSTB    TYPEPT(R0)      ;CHECK IF MORE VALID I.D.'S
                        001370                          BNE     3$              ;BR IF MORE
                        104003                  1$:     ERROR   3               ;INCORRECT I.D. CODE
                        005000                  11$:    CLR     R0              ;DEFAULT TO VT50A MODE

                                                ;HAVE NOW FOUND THE I.D. - REPORT TO CONSOLE

                        016037  002400  001260  4$:     MOV     TYPEPT(R0),VT5XX        ;SAVE I.D. AND CHARASTICS
                        016037  002432  002242          MOV     MSGTYP(R0),5$           ;SAVE ASCII MESSAGE POINTER
                        001403                          BEQ     13$             ;BR IF ZERO MESSAGE POINTER
                        004537  011616                  JSR     R5,AMSG         ;TELL THE UUT
                        016460                  5$:     VT50A                   ;POINTER TO VT5XX MESSAGE

                        012737  001700  001264  13$:    MOV     #960.,TOTALC            ;LOAD TOTAL CHARACTER COUNT
                        012737  000014  001266          MOV     #12.,VHO                ;LOAD MAX VERTICAL LINE COUNT
                        012737  000053  001262          MOV     #53,LASTLN              ;LOAD LAST LINE VALUE +40 FOR DCA TESTING
                        005737  001260                  TST     VT5XX                   ;TEST IF 24 LINES AVAIL
                        100007                          BPL     6$                      ;BR IF NOT
                        006337  001264                  ASL     TOTALC                  ;ADJUST CHARACTER COUNT
```

```
1028  002300  006337  001266            ASL     VH0                     ;ADJUST LINE COUNT
1029  002304  062737  000014  001262    ADD     #12.,LASTLN             ;ADJUST VALID LINE # +40
1030
1031  002312  013737  001266  001270  6$: MOV     VH0,VH1                 ;LOAD OTHER LINE COUNTS
1032  002320  006237  001270            ASR     VH1
1033  002324  013737  001270  001272    MOV     VH1,VH2
1034  002332  006237  001272            ASR     VH2
1035  002336  012737  000140  001310    MOV     #140,LASTCH             ;LOAD FIRST NON-VALID CHARACTER
1036  002344  032737  004000  001260    BIT     #BIT11,VT5XX            ;TEST IF UPPER-LOWER CASE TERM.
1037  002352  001403                    BEQ     7$                      ;BR IF NOT
1038  002354  062737  000040  001310    ADD     #40,LASTCH              ;UPDATE TO ALLOW UP-LW CASE CHARACTER SET
1039  002362                          7$:
1040  002362  000403                    BR      12$             ;;BR AND START TESTING
1041
1042  002364  104002                  2$: ERROR   2                       ;NO RESPONSE FROM UUT ADTER ASKING FOR IDENTIFY
1043  002366  000713                    BR      11$
1044  002370  000240                    NOP
1045  002372  004737  011436          12$: JSR     PC,DELAY
1046  002376  000431                    BR      TST2            ;;BR AND START TESTING
1047
1048                                  ;I.D. VALUES AND CHARACTERISTICS
1049                                  ;       BIT15 = 1       24 LINES
1050                                  ;       BIT14 = 1       COPIER CONNECTED
1051                                  ;       BIT13 = 1       DIRECT CURSOR ADDRESSING (ESC Y) + "ESC-B" + "ESC-D"
1052                                  ;       BIT12 = 1       VT50H KEYPAD
1053                                  ;       BIT11 = 1       UPPER AND LOWER CASE CHARACTERS
1054                                  ;       BIT10 = 1       PRINTER CONNECTED
1055                                  ;       BIT09 = 1       VT52X MODEL
1056
1057                                  ;LOW BYTE CONTAINS THE I.D. FOR EACH KNOWN VT5??
1058
1059  002400  000101                  TYPEPT: .WORD   000101  ;I.D. = 101      ;VT50A
1060  002402  040102                          .WORD   040102  ;I.D. = 102      ;VT50B COPIER
1061  002404  140103                          .WORD   140103  ;I.D. = 103      ;VT55 24. LINES, COPIER(VT50 BASED).
1062  002406  070110                          .WORD   070110  ;I.D. = 110      ;VT50H COPIER DCA VT50H KEYPAD
1063  002410  135113                          .WORD   135113  ;I.D. = 113      ;VT52
1064  002412  175114                          .WORD   175114  ;I.D. = =114     ;VT52 WITH COPIER
1065  002414  137115                          .WORD   137115  ;I.D. = 115      ;VT52 WITH PRINTER.
1066  002416  175105                          .WORD   175105  ;I.D. = 105      ;VT55,24LINES,WITH COPIER(VT52 BASED)
1067  002420  000000                          0
1068  002422  000000                          0
1069  002424  000000                          0
1070  002426  000000                          0
1071  002430  000000                          0
1072
1073                                  ;ASCII MESSAGE POINTERS
1074
1075  002432  016460                  MSGTYP: VT50A                   ;VT50A NO COPIER
1076  002434  016532                          VT50B                   ;VT50B COPIER
1077  002436  016601                          VT55                    ;VT55 COPIER
1078  002440  016663                          VT50H                   ;VT50H COPIER
1079  002442  016741                          VT52K                   ;VT52
1080  002444  017024                          VT52L                   ;VT52 WITH COPIER
1081  002446  017105                          VT52M                   ;VT52 WITH PRINTER
1082  002450  017166                          VT55E
1083  002452  000000                          0
```

```
1084  002454  000000                          0
1085  002456  000000                          0
1086  002460  000000                          0
1087                          ;;*****************************************************************
1088                          ;*TEST 2         B       FULL SCREEN OF A CHARACTER
1089                          ;;*****************************************************************
1090  002462  000004          TST2:   SCOPE
1091
1092  002464  004537  011616          JSR     R5,AMSG
1093  002470  013013                  M91
1094
1095  002472  004737  012556          JSR     PC,FILLWC       ;FILL SCREEN WITH A 'E'S
1096
1097  002476  004737  011436          JSR     PC,DELAY
1098
1099                          ;;*****************************************************************
1100                          ;*TEST 3         C       DATA TRANSFER PATH TEST
1101                          ;;*****************************************************************
1102  002502  000004          TST3:   SCOPE
1103  002504  004537  011616          JSR     R5,AMSG         ;DISPLAY HEADING
1104  002510  013061                  M92
1105  002512  013737  001270  001312  MOV     VH1,TEMP        ;SET-UP A COUNTER
1106
1107  002520  004537  011330          JSR     R5,DTPSR        ;SET-UP BUFFER
1108  002524  000077                  77                      ;OCTAL '?'
1109  002526  000100                  100                     ;OCTAL '@'
1110
1111  002530  004537  011334          JSR     R5,DTPSRB       ;SET-UP BUFFER
1112  002534  000125                  125                     ;OCTAL 'U'
1113  002536  000052                  52                      ;OCTAL '*'
1114
1115  002540  004737  010412  1$:     JSR     PC,XPRNT        ;DISPLAY THIS LINE
1116  002544  005337  001312          DEC     TEMP            ;COMPLETED FULL COUNT?
1117  002550  001373                  BNE     1$              ;BRANCH IF NOT COMPLETED
1118
1119  002552  004737  011436          JSR     PC,DELAY        ;TEST DELAY SWITCH
1120                          ;;*****************************************************************
1121                          ;*TEST 4         D       SINGLE CHARACTER ACROSS ALL COLS. <ALL CHARACTERS>
1122                          ;;*****************************************************************
1123  002556  000004          TST4:   SCOPE
1124  002560  004537  011616          JSR     R5,AMSG         ;DISPLAY HEADING
1125  002564  013110                  M93
1126  002566  012737  000040  001306  MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
1127
1128  002574  013737  001266  001314  MOV     VH0,TEMPO       ;LOAD COUNT
1129  002602  013701  001306  1$:     MOV     STCHAR,R1       ;LOAD R1= TO CHARACTER
1130  002606  004737  010310          JSR     PC,FILBUF       ;LOAD A BUFFER WITH THAT CHARACTER
1131
1132  002612  004737  010412          JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
1133
1134  002616  005337  001314          DEC     TEMPO           ;DONE ?
1135  002622  001005                  BNE     2$              ;FINISHED
1136  002624  004737  011436          JSR     PC,DELAY
1137  002630  013737  001266  001314  MOV     VH0,TEMPO
1138  002636  005237  001306  2$:     INC     STCHAR          ;UPDATE THE CHARACTER
1139  002642  023737  001310  001306  CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
```

```
                                T4      D       SINGLE CHARACTER ACROSS ALL COLS. <ALL CHARACTERS>

1140  002650  001354                          BNE     1$              ;BRANCH IF NOT COMPLETED
1141
1142  002652  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH
1143
1144                                ;;*****************************************************************
1145                                ;*TEST 5         E       ROTATING CHARACTERS ACROSS ALL COLS. <ALL CHARACTERS>
1146                                ;;*****************************************************************
1147  002656  000004                TST5:   SCOPE
1148  002660  004537  011616                  JSR     R5,AMSG         ;DISPLAY HEADING
1149  002664  013152                          M94
1150  002666  012737  000040  001306          MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
1151
1152  002674  013737  001266  001314          MOV     VHO,TEMPO       ;LOAD TEMP
1153  002702  013701  001306          1$:     MOV     STCHAR,R1       ;LOAD R1=TO CHARACTER
1154  002706  004537  010344                  JSR     R5,LIC          ;LOAD A BUFFER STARTING WITH
1155  002712  001320                          WIDTH                   ; THAT CHARACTER AND WIDTH <BYTE>
1156
1157  002714  004737  010412                  JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
1158
1159  002720  005337  001314                  DEC     TEMPO           ;DONE ?
1160  002724  001005                          BNE     2$              ;BR IF YES
1161  002726  004737  011436                  JSR     PC,DELAY
1162  002732  013737  001266  001314          MOV     VHO,TEMPO
1163  002740  005237  001306          2$:     INC     STCHAR          ;UPDATE THE STARTING CHARACTER
1164  002744  023737  001310  001306          CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
1165  002752  001353                          BNE     1$              ;BRANCH IF NOT COMPLETED
1166
1167  002754  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH
1168                              ;;*****************************************************************
1169                              ;*TEST 6         F       CURSOR MOTION TEST
1170                              ;;*****************************************************************
1171  002760  000004                TST6:   SCOPE
1172  002762  004537  011616                  JSR     R5,AMSG         ;DISPLAY HEADING
1173  002766  013203                          M96
1174
1175                              ;ROUTINE TO LOAD REFERENCE LINES FOR CURSOR MOTION TEST
1176
1177  002770  012700  024614        LBMT:     MOV     #BUFFER,R0      ;LOAD POINTER
1178  002774  012720  000065                  MOV     #65,(R0)+       ;LOAD #5
1179  003000  013701  001270                  MOV     VH1,R1          ;LOAD R1
1180  003004  005301                          DEC     R1
1181  003006  004737  003104                  JSR     PC,MOVDN1       ;MOVE CURSOR DOWN
1182  003012  004737  003122                  JSR     PC,MOVRIG       ;MOVE RIGHT
1183  003016  112720  000062                  MOVB    #62,(R0)+       ;LOAD #2
1184  003022  004737  003122                  JSR     PC,MOVRIG       ;MOVE RIGHT
1185  003026  004737  003122                  JSR     PC,MOVRIG       ;MOVE RIGHT
1186  003032  112720  000040                  MOVB    #40,(R0)+
1187  003036  112720  000061                  MOVB    #61,(R0)+       ;LOAD #1
1188  003042  004737  003100                  JSR     PC,MOVDWN       ;MOVE DOWN
1189  003046  004737  003122                  JSR     PC,MOVRIG       ;MOVE RIGHT
1190  003052  112720  000063                  MOVB    #63,(R0)+       ;LOAD #3
1191  003056  004737  003122                  JSR     PC,MOVRIG
1192  003062  004737  003122                  JSR     PC,MOVRIG       ;MOVE RIGHT
1193  003066  112720  000064                  MOVB    #64,(R0)+       ;LOAD #4
1194  003072  112710  000377                  MOVB    #377,(R0)       ;TERM
1195  003076  000420                          BR      LBMT1           ;;BR TO NEXT PART
```

```
1196
1197  003100  013701  001270          MOVDWN: MOV     VH1,R1
1198  003104  112720  000015          MOVDN1: MOVB    #15,(R0)+       ;LOAD CR
1199  003110  112720  000012                  MOVB    #12,(R0)+       ;LOAD LF
1200  003114  005301                          DEC     R1
1201  003116  001372                          BNE     MOVDN1          ;LOOP UNTIL DONE
1202  003120  000207                          RTS     PC              ;ESIT
1203
1204  003122  012701  000024          MOVRIG: MOV     #20.,R1         ;LOAD R1
1205  003126  112720  000040          1$:     MOVB    #40,(R0)+       ;LOAD SPACES
1206  003132  005301                          DEC     R1
1207  003134  100374                          BPL     1$              ;LOOP UNTIL DONE
1208  003136  000207                          RTS     PC              ;EXIT
1209
1210  003140  004737  010412          LBMT1:  JSR     PC,XPRNT        ;DISPLAY THIS LINE
1211  003144  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH
1212
1213                                   ;CURSOR MOTION SUBROUTINE
1214                                   ;IF VT50H TYPE - USE "ESC-D" FOR CURSOR LEFT AND USE "ESC-B" FOR CURSOR DOWN
1215  003150  013701  001270          LCM:    MOV     VH1,R1          ;LOAD COUNT
1216  003154  012700  024614                  MOV     #BUFFER,R0      ;LOAD BUFFER POINTER
1217  003160  112720  000033          1$:     MOVB    #33,(R0)+       ;LOAD 'ESC'
1218  003164  112720  000101                  MOVB    #101,(R0)+      ;LOAD 'A' CURSOR UP
1219  003170  005301                          DEC     R1
1220  003172  001372                          BNE     1$              ;LOOP UNTIL DONE
1221  003174  112720  000130                  MOVB    #130,(R0)+      ;LOAD 'X'
1222  003200  012701  000054                  MOV     #44.,R1         ;LOAD COUNT
1223  003204  032737  020000  001260          BIT     #BIT13,VT5XX    ;TEST IF VT50H TYPE
1224  003212  001407                          BEQ     20$             ;BR IF NOT
1225  003214  112720  000033          2$:     MOVB    #33,(R0)+       ;LOAD 'ESC'
1226  003220  112720  000104                  MOVB    #104,(R0)+      ;LOAD 'CURSOR LEFT'
1227  003224  005301                          DEC     R1
1228  003226  100372                          BPL     2$              ;LOOP UNTIL DONE
1229  003230  000404                          BR      21$
1230  003232  112720  000010          20$:    MOVB    #10,(R0)+       ;LOAD "BACKSPACE
1231  003236  005301                          DEC     R1              ;DONE ALL ?
1232  003240  100374                          BPL     20$             ;BR IF NOT
1233  003242  112720  000130          21$:    MOVB    #130,(R0)+      ;LOAD 'X'
1234  003246  112720  000010                  MOVB    #10,(R0)+       ;LOAD BACKSPACE
1235  003252  013701  001270                  MOV     VH1,R1          ;LOAD COUNT
1236  003256  032737  020000  001260          BIT     #BIT13,VT5XX    ;TEST IF VT50H TYPE
1237  003264  001407                          BEQ     30$             ;BR IF NOT
1238  003266  112720  000033          3$:     MOVB    #33,(R0)+       ;LOAD 'ESC' CURSOR DOWN
1239  003272  112720  000102                  MOVB    #102,(R0)+      ;
1240  003276  005301                          DEC     R1
1241  003300  001372                          BNE     3$              ;LOOP UNTIL DONE
1242  003302  000404                          BR      31$
1243  003304  112720  000012          30$:    MOVB    #12,(R0)+       ;LOAD CURSOR DOWN (LF)
1244  003310  005301                          DEC     R1              ;DONE ?
1245  003312  001374                          BNE     30$             ;BR IF NOT
1246  003314  112720  000130          31$:    MOVB    #130,(R0)+      ;LOAD 'X'
1247  003320  112720  000010                  MOVB    #10,(R0)+       ;LOAD BACKSPACE
1248  003324  012701  000052                  MOV     #42.,R1         ;LOAD COUNT
1249  003330  112720  000033          4$:     MOVB    #33,(R0)+       ;LOAD 'ESC'
1250  003334  112720  000103                  MOVB    #103,(R0)+      ;LOAD 'C' CURSOR RIGHT
1251  003340  005301                          DEC     R1
```

```
1252  003342  100372                    BPL     4$                ;LOOP UNTIL DONE
1253  003344  112720  000130            MOVB    #130,(R0)+        ;LOAD 'X'
1254  003350  112720  000033            MOVB    #33,(R0)+         ;LOAD 'ESC'
1255  003354  112720  000110            MOVB    #110,(R0)+        ;LOAD 'H' CURSOR HOME
1256  003360  112720  000130            MOVB    #130,(R0)+
1257  003364  112720  000377            MOVB    #377,(R0)+
1258  003370  004737  010412            JSR     PC,XPRNT          ;DISPLAY THIS LINE
1259  003374  004737  011436            JSR     PC,DELAY          ;DELAY
1260  003400  004537  011616            JSR     R5,AMSG           ;
1261  003404  016163                    CRLFB
1262  003406  005737  001260            TST     VT5XX             ;TEST IF 24 LINES
1263  003412  100003                    BPL     TST7              ;;BR IF 12 LINES
1264  003414  004537  011616            JSR     R5,AMSG           ;SCROLL MORE LINES
1265  003420  016163                    CRLFB
1266
1267                                    ;;*****************************************************************
1268                                    ;*TEST 7        G       TAB, BACKSPACE AND BELL TEST
1269                                    ;;*****************************************************************
1270  003422  000004            TST7:   SCOPE
1271  003424  004537  011616            JSR     R5,AMSG           ;DISPLAY HEADING
1272  003430  013236                    M97
1273
1274  003432  012700  024614    LRL:    MOV     #BUFFER,R0        ;LOAD BUFFER POINTER
1275  003436  112720  000007            MOVB    #7,(R0)+          ;LOAD 'BELL'
1276  003442  012701  000011            MOV     #9.,R1            ;LOAD LINE COUNT
1277  003446  012702  000006    1$:     MOV     #6.,R2            ;LOAD COLUMN COUNT
1278  003452  112720  000111            MOVB    #111,(R0)+        ;LOAD COLUMN MARK
1279  003456  112720  000040    2$:     MOVB    #40,(R0)+         ;LOAD SPACE
1280  003462  005302                    DEC     R2                ;
1281  003464  100374                    BPL     2$                ;BR UNTIL DONE
1282  003466  005301                    DEC     R1                ;
1283  003470  100366                    BPL     1$                ;BR UNTIL FINISHED ALL TAB STOPS
1284  003472  112720  000015            MOVB    #15,(R0)+         ;LOAD CR
1285  003476  112720  000012            MOVB    #12,(R0)+         ;LOAD LF
1286  003502  112720  000377            MOVB    #377,(R0)+        ;LOAD TERM
1287
1288  003506  004737  010412            JSR     PC,XPRNT
1289
1290  003512  004537  003702            JSR     R5,LTAB           ;LOAD TAB LINE #1
1291  003516  000000                    0
1292  003520  004737  010412            JSR     PC,XPRNT          ;DISPLAY THIS LINE
1293
1294  003524  004537  003702            JSR     R5,LTAB           ;LOAD TAB LINE #2
1295  003530  000001                    1
1296  003532  004737  010412            JSR     PC,XPRNT          ;DISPLAY THIS LINE
1297
1298  003536  004537  003702            JSR     R5,LTAB           ;LOAD TAB LINE #3
1299  003542  000002                    2
1300  003544  004737  010412            JSR     PC,XPRNT          ;DISPLAY THIS LINE
1301
1302  003550  004537  003702            JSR     R5,LTAB           ;LOAD TAB LINE #4
1303  003554  000003                    3
1304  003556  004737  010412            JSR     PC,XPRNT          ;DISPLAY THIS LINE
1305
1306  003562  004537  003702            JSR     R5,LTAB           ;LOAD TAB LINE #5
1307  003566  000004                    4
```

```
1308  003570  004737  010412                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
1309
1310  003574  004537  003702                    JSR     5,LTAB          ;LOAD TAB LINE #6
1311  003600  000005                            5
1312  003602  004737  010412                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
1313
1314  003606  004537  003702                    JSR     R5,LTAB         ;LOAD TAB LINE #7
1315  003612  000006                            6
1316  003614  004737  010412                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
1317                                    ;NOW EXECUTE THE BACKSPACE SECTION
1318
1319  003620  013702  001320                    MOV     WIDTH,R2        ;LOAD WIDTH COUNT
1320  003624  005302                            DEC     R2              ;ADJUST WIDTH
1321  003626  005302                            DEC     R2              ;   BY 2
1322  003630  012701  000040                    MOV     #40,R1          ;LOAD "SPACE" INTO THE LINE
1323  003634  004737  010314                    JSR     PC,FILBFB       ;LOAD LINE
1324  003640  013701  001320                    MOV     WIDTH,R1        ;LOAD # OF CHARACTER POSITIONS
1325  003644  112720  000130            3$:     MOVB    #'X,(R0)+       ;LOAD ASCII "X"
1326  003650  112720  000010                    MOVB    #10,(R0)+       ;LOAD BACKSPACE CODE
1327  003654  112720  000010                    MOVB    #10,(R0)+
1328  003660  005301                            DEC     R1              ;DONE ALL POSITIONS ?
1329  003662  001370                            BNE     3$              ;BR IF NOT
1330  003664  112720  000377                    MOVB    #377,(R0)+      ;LOAD TERM.
1331  003670  004737  010412                    JSR     PC,XPRNT        ;EXECUTE ASCII CODE
1332  003674  004737  011436                    JSR     PC,DELAY        ;TEST DELAY SWITCH
1333  003700  000434                            BR      TST10           ;;BR TO NEXT TEST
1334
1335                                    ;SUBROUTINE TO LOAD THE TAB TEST INTO THE BUFFER
1336
1337  003702  012537  001322            LTAB:   MOV     (R5)+,SAVE1     ;LOAD # OF CHARACTERS
1338  003706  012702  024614                    MOV     #BUFFER,R2      ;LOAD BUFFER POINTER
1339  003712  012701  000011                    MOV     #9.,R1          ;LOAD WIDTH COUNTER
1340  003716  112722  000007                    MOVB    #7,(R2)+        ;LOAD BELL AT START OF LINE
1341  003722  112722  000111            3$:     MOVB    #111,(R2)+      ;LOAD 'I
1342  003726  013700  001322                    MOV     SAVE1,R0        ;GET THE  NO. OF THE CHAR
1343  003732  001404                            BEQ     1$              ;BR IF 0
1344  003734  112722  000101            2$:     MOVB    #101,(R2)+      ;LOAD THE 'A' CHAR.
1345  003740  005300                            DEC     R0              ;
1346  003742  001374                            BNE     2$              ;LOOP UNTIL DONE
1347  003744  112722  000011            1$:     MOVB    #11,(R2)+       ;LOAD 'TAB' CHAR
1348  003750  005301                            DEC     R1              ;
1349  003752  100363                            BPL     3$              ;BR TO NEXT TAB COLUMN CHAR
1350  003754  112722  000015                    MOVB    #15,(R2)+       ;LOAD 'CR'
1351  003760  112722  000012                    MOVB    #12,(R2)+       ;LOAD 'LF'
1352  003764  112722  000377                    MOVB    #377,(R2)+      ;LOAD TERM
1353  003770  000205                            RTS     R5              ;EXIT
1354                                    ;;**************************************************************
1355                                    ;*TEST 10        H       ERASE FROM CURSOR TO END OF LINE
1356                                    ;;**************************************************************
1357  003772  000004                    TST10:  SCOPE
1358  003774  004537  011616                    JSR     R5,AMSG         ;DISPLAY HEADING
1359  004000  013304                            M910
1360
1361  004002  004737  012556                    JSR     PC,FILLWC       ;FILL BUFFER WITH A CHAR
1362                                            ;DISPLAY THIS LINE
1363  004006  004737  011436                    JSR     PC,DELAY        ;DELAY
```

```
1364
1365                                        ;LOAD ERASE LINE TEST INTO BUFFER
1366
1367  004012  012700  024614          LODERL: MOV     #BUFFER,R0
1368  004016  112720  000033                  MOVB    #33,(R0)+       ;LOAD ESC
1369  004022  112720  000110                  MOVB    #'H,(R0)+       ;LOAD HOME
1370  004026  013737  001266  004130          MOV     VH0,2$          ;LOAD COUNT
1371  004034  005337  004130                  DEC     2$
1372  004040  112720  000033          3$:     MOVB    #33,(R0)+       ;LOAD ESC
1373  004044  112720  000113                  MOVB    #'K,(R0)+       ;LOAD ERASE LINE CHAR
1374  004050  005337  004130                  DEC     2$              ;FINISHED ?
1375  004054  100427                          BMI     1$              ;BR WHEN DONE
1376  004056  012737  000006  004132          MOV     #6.,10$         ;LOAD COUNT
1377  004064  005737  001260                  TST     VT5XX           ;TEST IF 12 LINES
1378  004070  100005                          BPL     4$              ;BR IF 12 LINES
1379  004072  006237  004132                  ASR     10$             ;ADJUST HORIZ. COUNT
1380  004076  000240                          NOP
1381  004100  000240                          NOP
1382  004102  000240                          NOP
1383  004104  112720  000033          4$:     MOVB    #33,(R0)+
1384  004110  112720  000103                  MOVB    #'C,(R0)+       ;CURSOR RIGHT
1385  004114  005337  004132                  DEC     10$             ;
1386  004120  001371                          BNE     4$              ;LOOP
1387  004122  112720  000012                  MOVB    #12,(R0)+       ;CURSOR DOWN
1388  004126  000744                          BR      3$
1389  004130  000000          2$:     0
1390  004132  000000          10$:    0
1391  004134  112720  000377          1$:     MOVB    #377,(R0)+      ;LOAD TERM
1392
1393
1394  004140  004737  010412                  JSR     PC,XPRNT        ;DISPLAY THIS TEST
1395
1396  004144  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH
1397
1398                                        ;;**************************************************************
1399                                        ;*TEST 11        I       ERASE FROM CURSOR TO END OF SCREEN
1400                                        ;;**************************************************************
1401  004150  000004          TST11:  SCOPE
1402  004152  004537  011616                  JSR     R5,AMSG         ;DISPLAY HEADING
1403  004156  013335                          M911
1404  004160  004737  012556                  JSR     PC,FILLWC       ;FILL BUFFER WITH A CHAR
1405                                                                   ;DISPLAY THIS LINE
1406  004164  004737  011436                  JSR     PC,DELAY        ;DELAY
1407
1408                                        ;LOAD ERASE SCREEN TEST INTO BUFFER
1409
1410  004170  013737  001320  004264  LODERS: MOV     WIDTH,2$        ;LOAD COUNT
1411  004176  006237  004264                  ASR     2$
1412  004202  012700  024614                  MOV     #BUFFER,R0
1413  004206  112720  000010          1$:     MOVB    #10,(R0)+       ;LOAD CURSOR LEFT
1414  004212  005337  004264                  DEC     2$              ;DONE ?
1415  004216  100373                          BPL     1$              ;BR UNTIL DONE
1416  004220  013737  001266  004264          MOV     VH0,2$          ;LOAD COUNT
1417  004226  112720  000033          4$:     MOVB    #33,(R0)+       ;LOAD ESC
1418  004232  112720  000112                  MOVB    #'J,(R0)+       ;LOAD ERASE SCREEN
1419  004236  005337  004264                  DEC     2$              ;DONE ?
```

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                                        T11     I       ERASE FROM CURSOR TO END OF SCREEN

1420  004242  100405                                    BMI     3$              ;BR WHEN DONE
1421  004244  112720  000033                            MOVB    #33,(R0)+       ;LOAD ESC
1422  004250  112720  000101                            MOVB    #'A,(R0)+       ;LOAD CURSOR UP
1423  004254  000764                                    BR      4$              ;LOOP
1424  004256  112720  000377          3$:               MOVB    #377,(R0)+      ;LOAD TERM
1425  004262  000401                                    BR      5$
1426  004264  000000                 2$:               0
1427
1428  004266  004737  010412          5$:               JSR     PC,XPRNT        ;DISPLAY THIS TEST
1429  004272  004737  011436                            JSR     PC,DELAY        ;TEST DELAY SWITCH
1430
1431                                  ;;*****************************************************************
1432                                  ;*TEST 12       J       VIDEO COUPLING TEST
1433                                  ;;*****************************************************************
1434  004276  000004                 TST12:  SCOPE
1435  004300  004537  011616                            JSR     R5,AMSG         ;DISPLAY HEADER
1436  004304  013370                                    M912
1437  004306  013737  001270  001312                    MOV     VH1,TEMP        ;LOAD COUNTER
1438  004314  004537  011616          1$:               JSR     R5,AMSG
1439  004320  016211                                    PATH
1440
1441  004322  005337  001312                            DEC     TEMP            ;FINISHED COUNT ?
1442  004326  001372                                    BNE     1$              ;BR UNTIL DONE
1443  004330  004737  011436                            JSR     PC,DELAY        ;TEST DELAY SWITCH
1444
1445                                  ;;*****************************************************************
1446                                  ;*TEST 13       K       DIRECT CURSOR ADDRESS TEST
1447                                  ;;*****************************************************************
1448  004334  000004                 TST13:  SCOPE
1449                                  ;       RANDOM NUMBERS ARE GENERATED AND USED AS "X" AND "Y" COORDINATES
1450                                  ;ADDRESSING A 960 CHARACTER PRINTOUT.
1451                                  ;VERFICATION OF DISPLAY IS PERFORMED VISUALLY BY THE USER
1452                                  ;EXECUTE 1ST TIME USING "ESC-Y" SEQUENCE AND IF I.D. IS AN "H"
1453                                  ;       EXECUTE 2ND TIME USING "CODE 16" SEQUENCE
1454
1455  004336  032737  020000  001260                    BIT     #BIT13,VT5XX    ;TEST IF DCA TYPE TERMINAL
1456  004344  001002                                    BNE     3$              ;;BR IF CURSOR ADDRESSING
1457  004346  000137  005074          1$:               JMP     TST14           ;BYPASS THIS TEST
1458  004352  005737  001332          3$:               TST     WFTEST          ;TEST IF IN W.F. MODE
1459  004356  001373                                    BNE     1$              ;BYPASS IF W.F. MODE
1460  004360  004537  011616                            JSR     R5,AMSG         ;ERASE SCREEN AND IDENTIFY TEST
1461  004364  017610                                    M98
1462  004366  112737  000033  024614                    MOVB    #33,BUFFER      ;LOAD "ESC" CODE
1463  004374  112737  000131  024615                    MOVB    #'Y,BUFFER+1    ;LOAD ASCII "Y" (D.C.A. ENABLE)
1464  004402  004737  004456                            JSR     PC,DCATST       ;RUN TEST WITH ESC Y SEQUENCE
1465  004406  004737  011436                            JSR     PC,DELAY        ;DELAY TESTING
1466  004412  122737  000110  001260                    CMPB    #'H,VT5XX       ;TEST IF VT50H TYPE DISPLAY
1467  004420  001352                                    BNE     1$              ;;BR IF NOT VT50H TYPE
1468  004422  004537  011616                            JSR     R5,AMSG         ;ERASE SCREEN AND IDENTIFY TEST
1469  004426  017610                                    M98
1470  004430  112737  000000  024614                    MOVB    #0,BUFFER       ;LOAD "SPACE" AS FIRST VALUE
1471  004436  112737  000016  024615                    MOVB    #16,BUFFER+1    ;LOAD CODE-16 SEQUENCE
1472  004444  004737  004456                            JSR     PC,DCATST       ;RUN TEST WITH CODE 16 SEQUENCE
1473  004450  004737  011436                            JSR     PC,DELAY
1474  004454  000734                                    BR      1$              ;;BR TO NEXT TEST
1475
```

```
1476  004456  012737  123456  024356  DCATST: MOV     #123456,$LONUM  ;PRIME RANDOM NUMBER GENERATOR
1477  004464  012737  176543  024354          MOV     #176543,$HINUM
1478  004472  013737  001264  004750          MOV     TOTALC,OVRAL    ;LOAD CHAR COUNT
1479  004500  013737  001266  004746          MOV     VHD,SET         ;LOAD LINE COUNT
1480  004506  012700  024634                  MOV     #BUFFER+20,R0   ;LOAD DESTINATION BUFFER
1481  004512  012701  004752          2$:     MOV     #MSGTXT,R1      ;LOAD MESSAGE POINTER
1482  004516  012120                  1$:     MOV     (R1)+,(R0)+     ;LOAD 2 CHARACTERS
1483  004520  022701  005072                  CMP     #MSGTND,R1      ;TEST FOR LAST CHAR
1484  004524  001374                          BNE     1$              ;BR UNTIL DONE 1 LINE
1485  004526  005337  004746                  DEC     SET             ;FINISHED ALL LINES
1486  004532  001367                          BNE     2$              ;BR IF NOT
1487  004534  012737  177777  024620          MOV     #-1,BUFFER+4    ;LOAD MESSAGE TERMINATOR
1488
1489  004542  004737  024256          GENER:  JSR     %7,$RAND        ;GENERATE RANDOM NUMBER
1490  004546  013700  024356                  MOV     $LONUM,R0       ;GET RNADOM NUMBER
1491  004552  042700  177700                  BIC     #177700,%0      ;RANDOM NO. MUST BE TWO DIGITS
1492  004556  020027  000037                  CMP     %0,#37          ;NO, MUST BE LESS THAN 40
1493  004562  101767                          BLOS    GENER           ;LOWER, REGENERATION
1494  004564  020037  001262                  CMP     %0,LASTLN               ;NO, MUST NOT BE GREATER THAN 54 OR 67
1495  004570  101364                          BHI     GENER           ;GREATER, REGENERATION
1496  004572  010037  004742                  MOV     %0,YADDS        ;STORE RANDOM Y COORDINATE
1497  004576  010001                          MOV     %0,%1           ;COPY DATA
1498  004600  012737  024634  004746          MOV     #BUFFER+20,SET  ;LOAD BASE POINTER
1499  004606  162701  000040                  SUB     #40,%1          ;MINIMUM Y INDEX
1500  004612  001405                          BEQ     GENRX           ;RESULT, MINIMUM Y COORDINATE
1501  004614  062737  000120  004746  1$:     ADD     #80.,SET        ;SETUP 'Y INDEX LOCATION FOR PRINTOUT
1502  004622  005301                          DEC     %1
1503  004624  001373                          BNE     1$              ;Y COORDINATE IS SET
1504  004626  004737  024256          GENRX:  JSR     %7,$RAND        ;GENERATE RANDOM NUMBER
1505  004632  013700  024356                  MOV     $LONUM,R0       ;GET A RANDOM NUMBER
1506  004636  042700  177600                  BIC     #177600,%0      ;RANDOM NO. MAY BE LESS THAN 200
1507  004642  020027  000037                  CMP     %0,#37          ;  MUST NOT BE LESS THAN 40
1508  004646  101767                          BLOS    GENRX           ;LOWER, REGENERATION
1509  004650  020027  000157                  CMP     %0,#157         ;  MUST NOT BE GREATER THAN 157
1510  004654  101364                          BHI     GENRX           ;GREATER, REGENERATION
1511  004656  010037  004744                  MOV     %0,XADDS        ;STORE RANDOM X COORDINATE
1512  004662  162700  000040                  SUB     #40,%0          ;SETUP MINIMUM X INDEX
1513  004666  060037  004746                  ADD     %0,SET          ;SETUP X COOR, FOR PNTOUT.
1514  004672  013701  004746                  MOV     SET,%1          ;SETUP CHECK
1515  004676  105711                          TSTB    (1)             ;HAS CURRENT CHAR, ALREADY BEEN USED?
1516  004700  100720                          BMI     GENER           ;YES, REGENERATE
1517  004702  113737  004742  024616          MOVB    YADDS,BUFFER+2  ;LOAD Y COORDINATE
1518  004710  113737  004744  024617          MOVB    XADDS,BUFFER+3  ;LOAD X COORDINATE
1519  004716  111137  024620                  MOVB    (1),BUFFER+4    ;LOAD CHARACTER TO BE PRINTED
1520  004722  152711  000200                  BISB    #200,(1)        ;INDICATE USE OF CURSOR POSITION
1521  004726  004737  010412                  JSR     PC,XPRNT        ;EXECUTE AND PRINT CHARACTER
1522  004732  005337  004750                  DEC     OVRAL           ;MAXIMUM NO. OF COORDINATES
1523  004736  001301                          BNE     GENER           ;BR BACK UNTIL DONE
1524  004740  000207                          RTS     PC              ;EXIT
1525
1526  004742  000000          YADDS:  0
1527  004744  000000          XADDS:  0
1528  004746  000000          SET:    0
1529  004750  000000          OVRAL:  0
1530  004752  052126  030065  050055  MSGTXT: .ASCII  \VT50-PLUS-DIRECT-CURSOR-ADDRESSING-TEST\
1531  004760  052514  026523  044504
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1532  004766  042522  052103  041455
1533  004774  051125  047523  026522
1534  005002  042101  051104  051505
1535  005010  044523  043516  052055
1536  005016  051505     124
1537  005021     055  044504  044507          .ASCII  \-DIGITAL-EQUIPMENT-CORP.-MAYNARD-MA.-VT50\
1538  005026  040524  026514  050505
1539  005034  044525  046520  047105
1540  005042  026524  047503  050122
1541  005050  026456  040515  047131
1542  005056  051101  026504  040515
1543  005064  026456  052126  030065
1544  005072  100000                  MSGTND: BIT15
1545                                  ;ONLY 12 LINE TERMINALS WILL RUN THIS TEST
1546                                  ;;*****************************************************************
1547                                  ;*TEST 14        L       HOLD SCREEN TEST
1548                                  ;;*****************************************************************
1549  005074  000004                  TST14:  SCOPE
1550  005076  005037  011032                  CLR     AXOFF
1551  005102  005037  011034                  CLR     XOFFRC          ;CLEAR SOFT FLAG
1552  005106  004537  011616                  JSR     R5,AMSG         ;DISPLAY
1553  005112  016163                          CRLFB
1554  005114  004537  011616                  JSR     R5,AMSG         ;CR-LF
1555  005120  016163                          CRLFB
1556
1557  005122  005737  001332                  TST     WFTEST          ;TEST IF IN W.F. MODE
1558  005126  001046                          BNE     TST15           ;;BR IF W.F. MODE
1559  005130  005737  001260                  TST     VT5XX           ;TEST IF 12 LINE
1560  005134  100443                          BMI     TST15           ;;BR IF NOT 12 LINE
1561  005136  004537  011616                  JSR     R5,AMSG         ;DISPLAY MESSAGE
1562  005142  013555                          M922
1563
1564  005144  012737  000001  011030          MOV     #1,XOFFOK
1565  005152  012737  000001  011026          MOV     #1,XOFFBR       ;ENABLE XOFF
1566  005160  004537  011616                  JSR     R5,AMSG         ;TRY TO  SCROLL THE SCREEN
1567  005164  017500                          GOHDSC                  ;ENABLE HOLD SCREEN
1568
1569  005166  005737  011034                  TST     XOFFRC          ;TEST IF XOFF SENSED
1570  005172  001001                          BNE     1$              ;BR IF SENSED
1571
1572  005174  104002                          ERROR   2               ;ENABLE HOLD SCREEN MODE FAILED TO
1573                                                                  ;INHIBIT THE SCREEN FROM SCROLLING
1574                                                                  ;BY SENDING "X-OFF"
1575
1576  005176  005037  011036          1$:     CLR     XONRC           ;CLEAR SOFT FLAG
1577  005202  005037  011026                  CLR     XOFFBR
1578  005206  012737  000001  011032          MOV     #1,AXOFF
1579  005214  004537  011616                  JSR     R5,AMSG
1580  005220  017526                          GODSHS                  ;DISABLE HOLD SCREEN MODE
1581
1582  005222  004537  011616                  JSR     R5,AMSG
1583  005226  016174                          CRLFA                   ;TRY SCROLLING THE SCREEN
1584
1585  005230  005737  011036                  TST     XONRC           ;TEST SOFT FLAG (X-ON)
1586  005234  001001                          BNE     2$              ;BR IF SENSED
1587
```

```
                        T14     L       HOLD SCREEN TEST

1588  005236  104002                    ERROR   2               ;DISABLE HOLD SCREEN MODE FAILED TO ENABLE
1589                                                              ;THE SCREEN TO SCROLL BY SENDING AN "X-ON"
1590
1591  005240  004737  011436      2$:   JSR     PC,DELAY        ;PROGRAM DELAY
1592
1593                              ;;*****************************************************************
1594                              ;*TEST 15       M       TEST GRAPHICS MODE AND REV. LINE FEED
1595                              ;;*****************************************************************
1596  005244  000004              TST15:  SCOPE
1597  005246  032737  001000  001260      BIT     #BIT09,VT5XX    ;IS UNIT VT52?
1598  005254  001002                      BNE     GRPHST          ;YES-TEST GRAPHICS AND REV. LINE FEED
1599  005256  000137  005356              JMP     COPTST          ;NO-GO CHECK FOR COPIER
1600  005262  012704  000120      GRPHST: MOV     #80.,R4
1601  005266  004537  011616      1$:     JSR     R5,AMSG         ;HOME THE CURSOR AND CLEAR THE SCREEN.
1602  005272  016203                      HOMERS
1603  005274  004537  011616              JSR     R5,AMSG         ;DISPLAY TEST MESSAGE
1604  005300  013612                      M9221
1605  005302  004537  011616              JSR     R5,AMSG         ;ENTER GRAPHICS MODE.
1606  005306  021255                      ENGRAF
1607  005310  012737  000045  001314      MOV     #37.,TEMPO      ;SET UP TO XMIT 80 LINES
1608  005316  004737  011374      2$:     JSR     PC,GBBUF        ;LOAD BUFFER WITH GRAPHICS
1609  005322  004737  010412              JSR     PC,XPRNT        ;DISPLAY 1 LINE
1610  005326  004537  011616              JSR     R5,AMSG         ;ISSUE REV. LINE FEED AND
1611  005332  021236                      REVLF                   ;A CARRIAGE RETURN
1612  005334  005304                      DEC     R4              ;DECREMENT BUFFER COUNT
1613  005336  005337  001314      3$:     DEC     TEMPO           ;DONE?
1614  005342  001365                      BNE     2$              ;NO-LOOP
1615  005344  004537  011616              JSR     R5,AMSG         ;YES-EXIT GRAPHICS MODE
1616  005350  021262                      EXGRAF
1617  005352  004737  011436              JSR     PC,DELAY        ;AND GO CHECK DELAY
1618  005356                      COPTST:
1619                              ;;*****************************************************************
1620                              ;*TEST 16       N       COPIER - AUTO COPY TEST
1621                              ;;*****************************************************************
1622  005356  000004              TST16:  SCOPE
1623  005360  032737  040000  001260      BIT     #BIT14,VT5XX    ;TEST IF COPIER IS AVAILABLE
1624  005366  001002                      BNE     2$              ;;BR IF AVAILABLE
1625  005370  000137  006336      3$:     JMP     PRNTST          ;NOT AVAILABLE SO BYPASS COPIER TESTS
1626  005374  032777  004000  173536  2$: BIT     #BIT11,@SWR     ;TEST IF INHIBIT COPIER TEST SWITCH IS SET
1627  005402  001372                      BNE     3$              ;BR IF SET
1628  005404  032777  002000  173526      BIT     #BIT10,@SWR     ;TEST IF PAPER SAVE SWITCH IS SET
1629  005412  001406                      BEQ     6$              ;BR IF NOT SET AND START COPIER TESTING
1630  005414  105737  001274              TSTB    PRTCNT          ;TEST IF TIME TO TEST COPIER
1631  005420  001363                      BNE     3$              ;NOT TIME TO RUN THE COPIER
1632  005422  013737  001250  001274      MOV     PTCT,PRTCNT     ;RELOAD COUNTER AND TEST COPIER
1633
1634  005430  004537  011616      6$:     JSR     R5,AMSG
1635  005434  013667                      M923                    ;DISPLAY HEADER
1636  005436  004537  011616              JSR     R5,AMSG         ;ENABLE AUTO-COPY
1637  005442  017554                      GOAPMD
1638
1639  005444  013737  001266  001314      MOV     VHO,TEMPO       ;LOAD A EXECUTION COUNT
1640  005452  012701  000101              MOV     #101,R1         ;LOAD A CHARACTER
1641  005456  004737  010310              JSR     PC,FILBUF       ;LOAD CHARACTER INTO BUFFER
1642  005462  012737  000001  011030  1$: MOV     #1,XOFFOK
1643  005470  004737  010412              JSR     PC,XPRNT        ;DISPLAY IT
```

```
1644  005474  004737  011436              JSR     PC,DELAY        ;PROGRAM DELAY
1645  005500  005337  001314              DEC     TEMPO           ;FINISHED ?
1646  005504  100366                      BPL     1$              ;BR IF NOT
1647  005506  012737  000001  011030      MOV     #1,XOFFOK
1648  005514  004537  011616              JSR     R5,AMSG         ;DISABLE AUTO-COPY
1649  005520  017561                      GONAPM
1650  005522  004737  011436              JSR     PC,DELAY        ;ANOTHER DELAY
1651
1652                                  ;;*****************************************************************
1653                                  ;*TEST 17       0       COPIER - FULL SCREEN OF A CHARACTER
1654                                  ;;*****************************************************************
1655  005526  000004                  TST17:  SCOPE
1656  005530  004537  011616          1$:     JSR     R5,AMSG         ;DISPLAY HEADER
1657  005534  013013                          M91
1658  005536  004737  012556              JSR     PC,FILLWC       ;FILL BUFFER WITH CHAR
1659                                                              ;DISPLAY IT
1660  005542  012737  000001  011030      MOV     #1,XOFFOK       ;ALLOW XOFF
1661  005550  004537  011616              JSR     R5,AMSG         ;COPY INST
1662  005554  017452                      GOPRNT
1663  005556  004737  011436              JSR     PC,DELAY
1664
1665
1666                                  ;;*****************************************************************
1667                                  ;*TEST 20       P       COPIER - DATA PATH TEST
1668                                  ;;*****************************************************************
1669  005562  000004                  TST20:  SCOPE
1670  005564  004537  011616              JSR     R5,AMSG         ;DISPLAY HEADING
1671  005570  013061                      M92
1672  005572  013737  001270  001312      MOV     VH1,TEMP        ;SET-UP A COUNTER
1673  005600  004537  011330              JSR     R5,DTPSR        ;SET-UP BUFFER
1674  005604  000077                      77                      ;OCTAL '?'
1675  005606  000100                      100                     ;OCTAL '@'
1676  005610  004537  011334              JSR     R5,DTPSRB       ;SET-UP BUFFER
1677  005614  000125                      125                     ;OCTAL 'U'
1678  005616  000052                      52                      ;OCTAL '*'
1679  005620  004737  010412          1$:     JSR     PC,XPRNT        ;DISPLAY THIS LINE
1680  005624  005337  001312              DEC     TEMP            ;COMPLETED FULL COUNT?
1681  005630  001373                      BNE     1$              ;BRANCH IF NOT COMPLETED
1682  005632  012737  000001  011030      MOV     #1,XOFFOK
1683  005640  004537  011616              JSR     R5,AMSG
1684  005644  017452                      GOPRNT                  ;COPY INST
1685  005646  004737  011436              JSR     PC,DELAY        ;TEST DELAY SWITCH
1686
1687                                  ;;*****************************************************************
1688                                  ;*TEST 21       Q       COPIER - SINGLE CHARACTER ACROSS ALL COLS. <ALL CHARACTERS>
1689                                  ;;*****************************************************************
1690  005652  000004                  TST21:  SCOPE
1691  005654  004537  011616              JSR     R5,AMSG         ;DISPLAY HEADING
1692  005660  013110                      M93
1693  005662  012737  000040  001306      MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
1694  005670  013737  001266  001314      MOV     VH0,TEMPO
1695  005676  013701  001306          1$:     MOV     STCHAR,R1       ;LOAD R1= TO CHARACTER
1696  005702  004737  010310              JSR     PC,FILBUF       ;LOAD A BUFFER WITH THAT CHARACTER
1697  005706  004737  010412              JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
1698  005712  005337  001314              DEC     TEMPO           ;DONE
1699  005716  001011                      BNE     3$
```

```
1700  005720  013737  001266  001314          MOV     VHO,TEMPO
1701  005726  012737  000001  011030          MOV     #1,XOFFOK       ;ALLOW XOFF
1702  005734  004537  011616                  JSR     R5,AMSG
1703  005740  017452                          GOPRNT                  ;COPY INST
1704  005742  005237  001306          3$:     INC     STCHAR          ;UPDATE THE CHARACTER
1705  005746  023737  001310  001306          CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
1706  005754  001350                          BNE     1$              ;BRANCH IF NOT COMPLETED
1707  005756  004537  011616                  JSR     R5,AMSG         ;CRLF
1708  005762  016172                          CRLFA-2
1709  005764  012737  000001  011030          MOV     #1,XOFFOK       ;ENABLE XOFF
1710  005772  004537  011616                  JSR     R5,AMSG         ;COPY INS
1711  005776  017452                          GOPRNT
1712  006000  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH
1713
1714                                  ;;*****************************************************************
1715                                  ;*TEST 22       R       COPIER - ROTATING CHARACTERS ACROSS ALL COLS. <ALL CHARACTERS>
1716                                  ;;*****************************************************************
1717  006004  000004                  TST22:  SCOPE
1718  006006  004537  011616                  JSR     R5,AMSG         ;DISPLAY HEADING
1719  006012  013152                          M94
1720  006014  012737  000040  001306          MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
1721  006022  013737  001266  001314          MOV     VHO,TEMPO       ;
1722  006030  013701  001306          1$:     MOV     STCHAR,R1       ;LOAD R1=TO CHARACTER
1723  006034  004537  010344                  JSR     R5,LIC          ;LOAD A BUFFER STARTING WITH
1724  006040  001320                          WIDTH                   ; THAT CHARACTER AND WIDTH <BYTE>
1725  006042  004737  010412                  JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
1726  006046  005337  001314                  DEC     TEMPO           ;DONE ?
1727  006052  001011                          BNE     3$
1728  006054  013737  001266  001314          MOV     VHO,TEMPO
1729  006062  012737  000001  011030          MOV     #1,XOFFOK
1730  006070  004537  011616                  JSR     R5,AMSG
1731  006074  017452                          GOPRNT                  ;COPY INST
1732  006076  005237  001306          3$:     INC     STCHAR          ;UPDATE THE STARTING CHARACTER
1733  006102  023737  001310  001306          CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
1734  006110  001347                          BNE     1$              ;BRANCH IF NOT COMPLETED
1735  006112  004537  011616                  JSR     R5,AMSG         ;CRLF
1736  006116  016172                          CRLFA-2
1737  006120  012737  000001  011030          MOV     #1,XOFFOK       ;ENABLE XOFF
1738  006126  004537  011616                  JSR     R5,AMSG         ;COPY INST
1739  006132  017452                          GOPRNT
1740  006134  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH
1741
1742                                  ;;*****************************************************************
1743                                  ;*TEST 23       S       COPIER - PERIMETER PATTERN
1744                                  ;;*****************************************************************
1745  006140  000004                  TST23:  SCOPE
1746  006142  004537  011616                  JSR     R5,AMSG         ;DISPLAY HEADER
1747  006146  013471                          M920
1748  006150  012701  000105                  MOV     #'E,R1          ;LOAD STARTING CHARACTER
1749  006154  004737  010310                  JSR     PC,FILBUF       ;FILL THE BUFFER
1750  006160  004737  010412                  JSR     PC,XPRNT        ;DISPLAY A LINE
1751  006164  004737  010412                  JSR     PC,XPRNT        ;DISPLAY A LINE
1752  006170  013737  001270  001312          MOV     VH1,TEMP        ;LOAD VERT COUNT
1753  006176  062737  000002  001312          ADD     #2,TEMP         ;UPDATE BY 2
1754  006204  004737  011234          1$:     JSR     PC,FIRLST       ;FILL FIRST AND LAST
1755  006210  004737  010412                  JSR     PC,XPRNT        ;DISPLAY A LINE
```

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1756  006214  005337  001312                  DEC     TEMP            ;DONE ?
1757  006220  001371                          BNE     1$
1758  006222  012701  000105                  MOV     #'E,R1          ;LOAD STARTING CHAR
1759  006226  004737  010310                  JSR     PC,FILBUF       ;LOAD LINE WITH E'S
1760  006232  004737  010412                  JSR     PC,XPRNT        ;DISPLAY A LINE
1761  006236  004737  010412                  JSR     PC,XPRNT
1762  006242  012737  000001  011030          MOV     #1,XOFFOK
1763  006250  004537  011616                  JSR     R5,AMSG
1764  006254  017452                          GOPRNT                  ;COPY SCREEN
1765  006256  004737  011436                  JSR     PC,DELAY
1766
1767                                  ;;**********************************************************************
1768                                  ;*TEST 24        T       COPIER - DISCLAIMER STATEMENT
1769                                  ;;**********************************************************************
1770  006262  000004                  TST24:  SCOPE
1771
1772  006264  004537  011616                  JSR     R5,AMSG         ;DISPLAY HEADER
1773  006270  013521                          M921
1774
1775  006272  005004                          CLR     R4
1776  006274  016437  006612  006310  1$:     MOV     DISPCH(R4),10$  ;LOAD A POINTER
1777  006302  001405                          BEQ     2$              ;BR IF DONE
1778  006304  004537  011616                  JSR     R5,AMSG         ;DISPLAY COPYRIGHT
1779  006310  021532                  10$:    MTEXTO
1780  006312  005724                          TST     (R4)+           ;UPDATE POINTER
1781  006314  000767                          BR      1$
1782
1783
1784  006316  012737  000001  011030  2$:     MOV     #1,XOFFOK       ;ENABLE XOFF
1785  006324  004537  011616                  JSR     R5,AMSG         ;COPY SCREEN
1786  006330  017452                          GOPRNT
1787  006332  004737  011436                  JSR     PC,DELAY
1788  006336  000240                  PRNTST: NOP                     ;TRY PRINTER TESTS
1789
1790                                  ;;**********************************************************************
1791                                  ;*TEST 25        U       PRINTER CONTROLLER MODE TEST
1792                                  ;;**********************************************************************
1793  006340  000004                  TST25:  SCOPE
1794  006342  032737  002000  001260          BIT     #BIT10,VT5XX    ;IS UNIT EQUIPPED WITH PRINTER.
1795  006350  001002                          BNE     1$              ;YES-TEST IT
1796  006352  000137  006640                  JMP     $EOP            ;NO-EXIT TEST
1797  006356  004537  011616          1$:     JSR     R5,AMSG         ;DISPLAY HEADER
1798  006362  013726                          MPTCNT
1799  006364  004537  011616                  JSR     R5,AMSG         ;ENABLE PRINTER CONTROLLER MODE.
1800  006370  021267                          ENPNTM
1801  006372  012737  000040  001306          MOV     #40,STCHAR      ;LOAD INITIAL CHAR.
1802  006400  013701  001306          2$:     MOV     STCHAR,R1
1803  006404  004537  010344                  JSR     R5,LIC          ;BUILD A 132 COL. LINE.
1804  006410  001316                          PNTWID
1805  006412  012737  000001  011030          MOV     #1,XOFFOK       ;ALLOW XOFF/XON PROTOCOL
1806  006420  004737  010412                  JSR     PC,XPRNT        ;DISPLAY IT.
1807  006424  005237  001306                  INC     STCHAR          ;INCREMENT 1ST CHAR.
1808  006430  023737  001306  001310          CMP     STCHAR,LASTCH   ;ISSUED 92 LINES?
1809  006436  001360                          BNE     2$              ;NO-LOOP
1810  006440  004537  011616                  JSR     R5,AMSG         ;YES-DISABLE PRINTER
1811  006444  021274                          EXPNTM                  ;CONTROLLER MODE.
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1812  006446  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH AND EXIT.
1813
1814                                  ;;*******************************************************************
1815                                  ;*TEST 26        V       PRINT SCREEN TEST
1816                                  ;;*******************************************************************
1817  006452  000004                 TST26:  SCOPE
1818
1819
1820  006454  004537  011616                  JSR     R5,AMSG         ;DISPLAY PRINT SCREEN MESSAGE
1821  006460  013775                          MPTSCN
1822
1823  006462  004737  012556                  JSR     PC,FILLWC       ;FILL THE SCREEN WITH E
1824
1825  006466  012737  000001  011030          MOV     #1,XOFFOK       ;ALLOW XOFF/XON PROTOCOL
1826  006474  004537  011616                  JSR     R5,AMSG         ;PRINT THEM
1827  006500  017452                          GOPRNT
1828
1829  006502  004737  011436                  JSR     PC,DELAY        ;TEST DELAY SWITCH.
1830
1831                                  ;;*******************************************************************
1832                                  ;*TEST 27        W       AUTO PRINT TEST
1833                                  ;;*******************************************************************
1834  006506  000004                 TST27:  SCOPE
1835
1836  006510  004537  011616                  JSR     R5,AMSG
1837  006514  014032                          M923A                   ;DISPLAY HEADER
1838  006516  004537  011616                  JSR     R5,AMSG         ;ENABLE AUTO-PRINT
1839  006522  017554                          GOAPMD
1840
1841  006524  013737  001266  001314          MOV     VHO,TEMPO       ;LOAD A EXECUTION COUNT
1842  006532  012701  000101                  MOV     #101,R1         ;LOAD A CHARACTER
1843  006536  004737  010310                  JSR     PC,FILBUF       ;LOAD CHARACTER INTO BUFFER
1844  006542  012737  000001  011030  1$:     MOV     #1,XOFFOK
1845  006550  004737  010412                  JSR     PC,XPRNT        ;DISPLAY IT
1846  006554  004737  011436                  JSR     PC,DELAY        ;PROGRAM DELAY
1847  006560  005337  001314                  DEC     TEMPO           ;FINISHED ?
1848  006564  100366                          BPL     1$              ;BR IF NOT
1849  006566  012737  000001  011030          MOV     #1,XOFFOK
1850  006574  004537  011616                  JSR     R5,AMSG         ;DISABLE AUTO-PRINT
1851  006600  017561                          GONAPM
1852  006602  004737  011436                  JSR     PC,DELAY        ;ANOTHER DELAY
1853
1854  006606  000137  006640                  JMP     $EOP            ;END OF PASS
1855  006612  021532                  DISPCH: MTEXT0
1856  006614  021636                          MTEXT1
1857  006616  021737                          MTEXT2
1858  006620  022041                          MTEXT3
1859  006622  022124                          MTEXT4
1860  006624  022226                          MTEXT5
1861  006626  022327                          MTEXT6
1862  006630  022361                          MTEXT7
1863  006632  022461                          MTEXT8
1864  006634  000000                          0
1865  006636  000000                          0
1866
1867                                  .SBTTL  END OF PASS ROUTINE
```

```
                                ;;*****************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
                                ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO NOWEOP

006640                          $EOP:
006640  000004                          SCOPE
006642  005737  001244                  TST     LAST                    ;TEST IF MORE
006646  001414                          BEQ     1$                      ;BR IF NONE
006650  023737  001244  001246          CMP     LAST,VTNOW              ;IS THIS THE LAST ONE
006656  001410                          BEQ     1$                      ;BR IF YES
006660  062737  000010  001246          ADD     #10,VTNOW
006666  012737  002042  002040          MOV     #TST1,WHERE
006674  000137  002006                  JMP     RSTRT                   ;TEST NEXT ONE
006700  005737  001100          1$:     TST     $PASS                   ;TEST IF FIRST PASS
006704  001002                          BNE     2$                      ;BR IF NOT
006706  104401  020000                  TYPE    ,PASHED                 ;TYPE EOP HEADER
006712  000005                  2$:     RESET
006714  005737  001332                  TST     WFTEST          ;TEST IF W.F. MODE
006720  001402                          BEQ     3$              ;BR IF NOT
006722  004737  011544                  JSR     PC,ADELAY       ;EXTRA DELAY
006726  000240                  3$:     NOP
006730  005037  001102                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
006734  005237  001100                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
006740  042737  100000  001100          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
006746  005327                          DEC     (PC)+           ;;LOOP?
006750  000001                  $ECPCT: .WORD   1
006752  003022                          BGT     $DOAGN          ;;YES
006754  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
006756  000001                  $ENDCT: .WORD   1
006760  006750                          $EOPCT
006762  104401  007027                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
006766  013746  001100                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
006772  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
006774  104401  007024                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
007000  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
007004  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
007006  000005                          RESET                   ;;CLEAR THE WORLD
007010  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
007012  000240                          NOP                     ;;SAVE ROOM
007014  000240                          NOP                     ;;FOR
007016  000240                          NOP                     ;;ACT11
007020                          $DOAGN:
007020  000137                          JMP     @(PC)+          ;;RETURN
007022  007044                  $RTNAD: .WORD   NOWEOP
007024     377     377     000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
007027     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
007034  050040  051501  020123
007042  000043
007044  005737  001274          NOWEOP: TST     PRTCNT
007050  100002                          BPL     11$
007052  105337  001274                  DECB    PRTCNT
```

```
1924  007056  012737  002042  002040  11$:    MOV     #TST1,WHERE
1925  007064  013746  001112                  MOV     $ERTTL,-(SP)
1926  007070  104405                          TYPDS
1927  007072  104401  007024                  TYPE    ,$ENULL
1928  007076  000137  002000                  JMP     $BEGIN
1929                                  ;;*****************************************************************
1930                                  ;*TEST 30        X       KEYBOARD OCTAL VALUE LOOP
1931                                  ;;*****************************************************************
1932  007102  000004                  TST30:  SCOPE
1933  007104  012706  001100          KRBEC0: MOV     #STACK,SP
1934  007110  004537  011616                  JSR     R5,AMSG                 ;DISPLAY HEADER
1935  007114  015702                          MKE
1936  007116  004737  012620          1$:     JSR     PC,GETCHR               ;GET CHAR
1937  007122  000775                          BR      1$              ;;BR BACK IF NO INPUT
1938  007124  004737  011636                  JSR     PC,OCTAL                ;CONVERT R0 TO OCTAL
1939  007130  113737  011726  016125          MOVB    DIG0,MKEB               ;LOAD DIGIT
1940  007136  113737  011730  016126          MOVB    DIG1,MKEB+1             ;LOAD DIGIT
1941  007144  113737  011732  016127          MOVB    DIG2,MKEB+2             ;LOAD DIGIT
1942  007152  042700  177600                  BIC     #177600,R0
1943  007156  001001                          BNE     10$
1944  007160  005200                          INC     R0
1945  007162  012701  007272          10$:    MOV     #BFCHR,R1               ;LOAD POINTER
1946  007166  121100                  5$:     CMPB    (R1),R0                 ;TEST IF = TO VALUE IN TABLE ?
1947  007170  001403                          BEQ     3$                      ;BR IF FOUND
1948  007172  005721                          TST     (R1)+                   ;MOVE POINTER
1949  007174  001374                          BNE     5$                      ;BR IF MORE
1950  007176  000407                          BR      2$                      ;BR IF NOT IN LIST
1951  007200  062701  000040          3$:     ADD     #BFCHAR-BFCHR,R1        ;UPDATE POINTER
1952  007204  112137  016120                  MOVB    (R1)+,MKEA1             ;LOAD 1ST CHAR
1953  007210  112137  016121                  MOVB    (R1)+,MKEA1+1           ;LOAD 2ND
1954  007214  000420                          BR      4$
1955  007216  120027  000040          2$:     CMPB    R0,#40                  ;TEST IF LESS THAN 40
1956  007222  101010                          BHI     6$                      ;BR IF ABOVE
1957  007224  062700  000100                  ADD     #100,R0                 ;MAKE PRINTABLE
1958  007230  110037  016121                  MOVB    R0,MKEA1+1              ;SAVE CHAR
1959  007234  112737  000136  016120          MOVB    #136,MKEA1              ;ADD A '↑' BEFORE CHARACTER
1960  007242  000405                          BR      4$
1961  007244  112737  000040  016121  6$:     MOVB    #40,MKEA1+1             ;LOAD SPACE
1962  007252  110037  016120                  MOVB    R0,MKEA1                ;LOAD CHARACTER
1963  007256  005237  011042          4$:     INC     IGNORE                  ;IGNORE DOUBLE CHARACTER FLAG
1964  007262  004537  011616                  JSR     R5,AMSG                 ;DISPLAY MESSAGE
1965  007266  016107                          MKEA
1966  007270  000712                          BR      1$                      ;LOOP BACK
1967
1968                                  ;TABLE OF DEFINED CHARACTERS
1969
1970  007272  000007                  BFCHR:  7                               ;BELL CODE
1971  007274  000010                          10                              ;CURSOR LEFT CODE
1972  007276  000011                          11                              ;TAB CODE
1973  007300  000012                          12                              ;LINE FEED CODE
1974  007302  000015                          15                              ;CARRIAGE RETURN CODE
1975  007304  000033                          33                              ;ESCAPE CODE
1976  007306  000040                          40                              ;SPACE CODE
1977  007310  000177                          177                             ;DELETE CODE
1978  007312  000000                          0
1979  007314  000000                          0
```

```
1980  007316  000000                          0
1981  007320  000000                          0
1982  007322  000000                          0
1983  007324  000000                          0
1984  007326  000000                          0
1985  007330  000000                          0
1986
1987                                  ;DEFINED CHARACTER EQUIL
1988
1989  007332  046102                  BFCHAR: .ASCII  /BL/                    ;BELL
1990  007334  046103                          .ASCII  /CL/                    ;CURSOR LEFT
1991  007336  052110                          .ASCII  /HT/                    ;H TAB
1992  007340  043114                          .ASCII  /LF/                    ;LINE FEED
1993  007342  051103                          .ASCII  /CR/                    ;CARIAGE RETURN
1994  007344  051505                          .ASCII  /ES/                    ;ESCAPE
1995  007346  050123                          .ASCII  /SP/                    ;SPACE
1996  007350  042504                          .ASCII  /DE/                    ;DELETE
1997  007352  000000  000000  000000          0,0,0,0,0,0,0,0,0,0
1998  007360  000000  000000  000000
1999  007366  000000  000000  000000
2000  007374  000000
2001                                          .EVEN
2002                                  ;;**************************************************************
2003                                  ;*TEST 31       Y       KEYBOARD CHARACTER TEST
2004                                  ;;**************************************************************
2005  007376  000004                  TST31:  SCOPE
2006  007400  032737  001000  001260  KRBTST: BIT     #BIT09,VT5XX    ;IS UNIT A VT52?
2007  007406  001403                          BEQ     1$
2008  007410  012703  020512                  MOV     #V52RW,R3       ;YES-SET UP FOR LOWER CASE CHAR.
2009  007414  000402                          BR      2$
2010  007416  012703  020474          1$:     MOV     #V50RW,R3       ;NO-SET UP FOR UPPER CASE CHAR.
2011  007422  012706  001100          2$:     MOV     #STACK,SP
2012  007426  004537  011616          A:      JSR     R5,AMSG         ;DISPLAY HEADER
2013  007432  014067                          MKB
2014  007434  012302                          MOV     (R3)+,R2        ;LOAD ROW #
2015  007436  032737  001000  001260          BIT     #BIT09,VT5XX    ;UNIT A VT52?
2016  007444  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
2017  007446  004537  011616                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
2018  007452  014362                          MKBB2
2019  007454  000403                          BR      2$
2020  007456  004537  011616          1$:     JSR     R5,AMSG
2021  007462  014245                          MKBB                    ;TOP ROW
2022  007464  004737  011734          2$:     JSR     PC,TSTROW       ;CHECK THE ROW
2023
2024  007470  012302                  B:      MOV     (R3)+,R2        ;LOAD ROW #
2025  007472  004537  011616                  JSR     R5,AMSG         ;2ND ROW
2026  007476  014445                          MKBC
2027  007500  004737  011734                  JSR     PC,TSTROW       ;CHECK 2ND ROW
2028
2029  007504  012302                  C:      MOV     (R3)+,R2        ;LOAD ROW #
2030  007506  032737  001000  001260          BIT     #BIT09,VT5XX    ;UNIT A VT52?
2031  007514  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
2032  007516  004537  011616                  JSR     R5,AMSG         ;ISSUE VT52 ROW 3 MESSAGE.
2033  007522  014611                          MKBD2
2034  007524  000403                          BR      2$
2035  007526  004537  011616          1$:     JSR     R5,AMSG
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2036  007532  014504                          MKBD
2037  007534  004737  011734          2$:     JSR     PC,TSTROW       ;CHECK ROW 3
2038
2039  007540  012302                          MOV     (R3)+,R2        ;LOAD ROW #
2040  007542  004537  011616                  JSR     R5,AMSG
2041  007546  014677                          MKBE
2042  007550  004737  011734                  JSR     PC,TSTROW       ;CHECK ROW 4
2043
2044  007554  012702  020676                  MOV     #ROW5,R2
2045  007560  004537  011616                  JSR     R5,AMSG
2046  007564  015017                          MKBF
2047  007566  004737  011734                  JSR     PC,TSTROW       ;CHECK ROW 5
2048
2049                                  ;TEST THE "LEFT"-SHIFT KEY
2050
2051  007572  004537  011616          D:      JSR     R5,AMSG         ;DEPRESS THE "LEFT-SHIFT" KEY
2052  007576  015055                          MKBG
2053  007600  012302                          MOV     (R3)+,R2        ;LOAD ROW 1 SHIFTED TABLE
2054  007602  032737  001000  001260          BIT     #BIT09,VT5XX    ;UNIT A VT52?
2055  007610  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
2056  007612  004537  011616                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
2057  007616  014362                          MKBB2
2058  007620  000403                          BR      2$
2059  007622  004537  011616          1$:     JSR     R5,AMSG         ;TEST ROW 1
2060  007626  014245                          MKBB
2061  007630  004737  011734          2$:     JSR     PC,TSTROW       ;TEST THE ROW
2062  007634  004537  011616                  JSR     R5,AMSG         ;RELEASE THE SHIFT KEY
2063  007640  014123                          MKB1
2064
2065                                  ;TEST THE "RIGHT-SHIFT" KEY
2066
2067  007642  004537  011616          E:      JSR     R5,AMSG         ;SET THE "RIGHT-SHIFT" KEY
2068  007646  015124                          MKBGA
2069  007650  012302                          MOV     (R3)+,R2        ;LOAD TABLE POINTER
2070  007652  032737  001000  001260          BIT     #BIT09,VT5XX    ;UNIT A VT52?
2071  007660  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
2072  007662  004537  011616                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
2073  007666  014362                          MKBB2
2074  007670  000403                          BR      2$
2075  007672  004537  011616          1$:     JSR     R5,AMSG
2076  007676  014245                          MKBB
2077  007700  004737  011734          2$:     JSR     PC,TSTROW       ;TEST THE ROW AGAIN WITH THE RIGHT-SHIFT SET
2078  007704  004537  011616                  JSR     R5,AMSG
2079  007710  014123                          MKB1                    ;RELEASE SKIFT KEY
2080                                  ;TEST THE CONTROL MODE
2081
2082  007712  004537  011616          F:      JSR     R5,AMSG         ;SET CTRL
2083  007716  015174                          MKBH
2084  007720  012302                          MOV     (R3)+,R2        ;LOAD ROW 1 CTRL TABLE
2085  007722  032737  001000  001260          BIT     #BIT09,VT5XX    ;UNIT A VT52?
2086  007730  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
2087  007732  004537  011616                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
2088  007736  014362                          MKBB2
2089  007740  000403                          BR      2$
2090  007742  004537  011616          1$:     JSR     R5,AMSG
2091  007746  014245                          MKBB
```

```
2092  007750  004737  011734          2$:     JSR     PC,TSTROW       ;TEST THE ROW
2093
2094                                  ;TEST THE VT50H KEYPAD
2095
2096  007754  032737  010000  001260          BIT     #BIT12,VT5XX    ;TEST IF VT50H EXTRA KEYPAD
2097  007762  001526                          BEQ     KRBDON          ;;BR IF NOT DETECTED
2098  007764  004537  011616                  JSR     R5,AMSG         ;TELL OPERATOR THE TEST NAME
2099  007770  015446                          MKBN
2100  007772  012702  021302                  MOV     #ROW6,R2        ;LOAD ROW POINTER VALUES
2101  007776  004537  011616                  JSR     R5,AMSG
2102  010002  015235                          MKBI                    ;SET TOP ROW KEYPAD
2103  010004  004737  011734                  JSR     PC,TSTROW       ;TEST THAT ROW
2104  010010  012702  021322                  MOV     #ROW7,R2
2105  010014  004537  011616                  JSR     R5,AMSG         ;2ND ROW KEYPAD TEST
2106  010020  015270                          MKBJ
2107  010022  004737  011734                  JSR     PC,TSTROW       ;TEST 2ND KEYPAD ROW
2108  010026  012702  021334                  MOV     #ROW8,R2
2109  010032  004537  011616                  JSR     R5,AMSG
2110  010036  015323                          MKBK
2111  010040  004737  011734                  JSR     PC,TSTROW       ;TEST 3RD KEYPAD ROW
2112  010044  012702  021346                  MOV     #ROW9,R2
2113  010050  004537  011616                  JSR     R5,AMSG         ;TELL ABOUT 4TH ROW
2114  010054  015357                          MKBL
2115  010056  004737  011734                  JSR     PC,TSTROW       ;TEST 4TH ROW
2116  010062  012702  021360                  MOV     #ROW10,R2
2117  010066  004537  011616                  JSR     R5,AMSG
2118  010072  015412                          MKBM
2119  010074  004737  011734                  JSR     PC,TSTROW       ;TEST 5TH ROW
2120  010100  032737  001000  001260          BIT     #1000,VT5XX     ;IS UNIT A VT52?
2121  010106  001454                          BEQ     KRBDON          ;NO-EXIT
2122  010110  004537  011616                  JSR     R5,AMSG         ;YES-TELL OPERATOR ALT. KEYPAD TEST.
2123  010114  015475                          MKB52
2124  010116  004537  011616                  JSR     R5,AMSG         ;PUT THE UNIT IN ALT. KEYPAD MODE.
2125  010122  021243                          ENAKP
2126  010124  012702  021366                  MOV     #ROW6A,R2       ;LOAD ROW POINTER VALUES
2127  010130  004537  011616                  JSR     R5,AMSG
2128  010134  015235                          MKBI                    ;SET TOP ROW KEYPAD
2129  010136  004737  011734                  JSR     PC,TSTROW       ;TEST THAT ROW
2130  010142  012702  021406                  MOV     #ROW7A,R2
2131  010146  004537  011616                  JSR     R5,AMSG         ;2ND ROW KEYPAD TEST
2132  010152  015270                          MKBJ
2133  010154  004737  011734                  JSR     PC,TSTROW       ;TEST 2ND KEYPAD ROW
2134  010160  012702  021434                  MOV     #ROW8A,R2
2135  010164  004537  011616                  JSR     R5,AMSG
2136  010170  015323                          MKBK
2137  010172  004737  011734                  JSR     PC,TSTROW       ;TEST 3RD KEYPAD ROW
2138  010176  012702  021462                  MOV     #ROW9A,R2
2139  010202  004537  011616                  JSR     R5,AMSG         ;TELL ABOUT 4TH ROW
2140  010206  015357                          MKBL
2141  010210  004737  011734                  JSR     PC,TSTROW       ;TEST 4TH ROW
2142  010214  012702  021510                  MOV     #ROW10A,R2
2143  010220  004537  011616                  JSR     R5,AMSG
2144  010224  015412                          MKBM
2145  010226  004737  011734                  JSR     PC,TSTROW       ;TEST 5TH ROW
2146  010232  004537  011616                  JSR     R5,AMSG         ;EXIT ALT. KEYPAD MODE.
2147  010236  021250                          EXAKP
```

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                                ;COMPLETION OF KEYBOARD-KEYPAD TEST
                                ;
                                ;
010240  004537  011616  KRBDON: JSR     R5,AMSG         ;END OF KEYBOARD TEST
010244  015634                  MKBR
010246  000137  007400          JMP     KRBTST          ;LOOP
                                ;;*****************************************************************
                                ;*TEST 32        Z       KEYBOARD ECHO LOOP
                                ;;*****************************************************************
010252  000004                  TST32:  SCOPE
010254  012706  001100  KRBECH: MOV     #STACK,SP
010260  004537  011616          JSR     R5,AMSG         ;DISPLAY HEADER
010264  016134                  MKEH
                                ;
010266  004737  012620  1$:     JSR     PC,GETCHR       ;GET CHARACTER
010272  000775                  BR      1$
010274  110077  171004          MOVB    R0,@VTDB        ;LOAD THE CHARACTER
010300  105777  170776  2$:     TSTB    @VTOS           ;WAIT FOR DONE
010304  100375                  BPL     2$
010306  000767                  BR      1$              ;LOOP BACK
                                ;
                                ;LOAD A SINGLE CHARACTER ACROSS THE SCREEN WIDTH
                                ;
                                ;
010310  013702  001320  FILBUF: MOV     WIDTH,R2        ;LOAD WIDTH VALUE
010314  012700  024614  FILBFB: MOV     #BUFFER,R0      ;SET-UP BUFFER POINTER
010320  112720  000015          MOVB    #15,(R0)+       ;LOAD 'CR'
010324  112720  000012          MOVB    #12,(R0)+       ;LOAD 'FL'
010330  110120  FILBFA: MOVB    R1,(R0)+        ;SAVE THE CHARACTER IN THE BUFFER
010332  005302                  DEC     R2              ;FINISHED?
010334  001375                  BNE     FILBFA          ;BRANCH IF NOT COMPLETED
010336  112710  000377          MOVB    #377,(R0)       ;LOAD TERM.
010342  000207                  RTS     PC              ;EXIT
                                ;
                                ;LOAD A INCREMENTING CHARACTER ACROSS THE SCREEN WIDTH
                                ;ONLY 40 THRU 177 ARE LEGAL CHARACTERS
                                ;
010344  012700  024614  LIC:    MOV     #BUFFER,R0      ;SET-UP BUFFER POINTER
010350  013502                  MOV     @(5)+,R2        ;SET-UP WIDTH
010352  112720  000015          MOVB    #15,(R0)+       ;LOAD 'CR'
010356  112720  000012          MOVB    #12,(R0)+       ;LOAD 'LF'
010362  110120  LICA:   MOVB    R1,(0)+         ;SAVE A CHARACTER IN THE BUFFER
010364  005201                  INC     R1              ;UPDATE THE CHARACTER
010366  023701  001310          CMP     LASTCH,R1       ;TEST FOR
010372  001002                  BNE     LICB            ;BRANCH IF NOT
010374  012701  000040          MOV     #40,R1          ;MAKE A LEGAL CHARACTER
010400  005302  LICB:   DEC     R2              ;DECREMENT COUNT
010402  001367                  BNE     LICA            ;BRANCH IF NOT COMPLETED
010404  112710  000377          MOVB    #377,(R0)       ;LOAD TERM
010410  000205                  RTS     R5              ;EXIT
                                ;
                                ;DISPLAY SUBROUTINE
                                ;
010412  012700  024614  XPRNT:  MOV     #BUFFER,R0      ;SETUP BUFFER POINTER
010416  105777  170660  XPRNTA: TSTB    @VTOS           ;TEST READY
010422  100404                  BMI     XPRNTB          ;BRANCH IF SET
```

```
2204  010424  005777  170652                    TST     @VTOS           ;TEST ERROR
2205  010430  100372                            BPL     XPRNTA          ;BRANCH IF RESET
2206  010432  104001                            ERROR   1               ;ERROR FLAG SET ON TRANSMITTER STATUS
2207  010434  112001                  XPRNTB:   MOVB    (0)+,R1
2208  010436  100563                            BMI     1$              ;BR IF MINUS
2209  010440  122701  000033          5$:       CMPB    #33,R1          ;TEST FOR ESC
2210  010444  001003                            BNE     3$              ;BR IF NOT
2211  010446  005237  011040                    INC     ANESC           ;SET SOFT FLAG
2212  010452  000402                            BR      4$
2213  010454  005037  011040          3$:       CLR     ANESC           ;CLEAR SOFT FLAG
2214  010460  110177  170620          4$:       MOVB    R1,@VTOB        ;LOAD CHAR
2215  010464  105777  170606                    TSTB    @VTIS           ;TEST INPUT FLAG
2216  010470  100352                            BPL     XPRNTA          ;BR IF CLEARED
2217  010472  005737  011040                    TST     ANESC           ;TEST IF ESC
2218  010476  001347                            BNE     XPRNTA
2219  010500  013737  001254  012672  52$:      MOV     TIME0,TIME1
2220  010506  005037  012674                    CLR     TIME2           ;LOAD DELAY
2221  010512  105777  170560          2$:       TSTB    @VTIS           ;TEST IF INPUT FLAG
2222  010516  100407                            BMI     53$             ;BR IF SET
2223  010520  005337  012674                    DEC     TIME2           ;DELAY
2224  010524  001372                            BNE     2$
2225  010526  005337  012672                    DEC     TIME1           ;DELAY
2226  010532  001367                            BNE     2$
2227  010534  000440                            BR      60$             ;REPORT ERROR
2228  010536  005737  011042          53$:      TST     IGNORE          ;IGNORE KEYBOARD CHARACTERS ?
2229  010542  001104                            BNE     15$             ;BR IF YES
2230  010544  017737  170530  001126            MOV     @VTIB,$BDDAT    ;READ CHAR
2231  010552  042737  177600  001126            BIC     #177600,$BDDAT  ;MASK
2232  010560  022737  000021  001126            CMP     #XON,$BDDAT     ;TEST FOR X ON
2233  010566  001003                            BNE     50$
2234  010570  005237  011036                    INC     XONRC           ;SET FLAG
2235  010574  000710                            BR      XPRNTA          ;START AGAIN
2236  010576  022737  000023  001126  50$:      CMP     #XOFF,$BDDAT    ;TEST FOR X OFF
2237  010604  001020                            BNE     51$             ;BR IF NOT
2238  010606  005237  011034                    INC     XOFFRC
2239  010612  005737  011030                    TST     XOFFOK          ;XOFF ENABLED ?
2240  010616  001730                            BEQ     52$
2241  010620  012737  000001  011032            MOV     #1,AXOFF        ;SET X OFF SOFT FLAG
2242  010626  005737  011026                    TST     XOFFBR          ;TEST
2243  010632  001271                            BNE     XPRNTA          ;BR BACK
2244  010634  000721                            BR      52$             ;BR
2245  010636  012737  000000  001124  60$:      MOV     #0,$GDDAT
2246  010644  000437                            BR      13$
2247  010646  105777  170266          51$:      TSTB    @SWR            ;TEST SWR
2248  010652  100371                            BPL     60$             ;BR IF CLEARED
2249  010654  012737  000057  001124            MOV     #'/,$GDDAT      ;LOAD EXPECTED
2250  010662  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;COMPARE
2251  010670  001437                            BEQ     14$             ;;BR IF EQUAL
2252  010672  012737  000134  001124            MOV     #'\,$GDDAT      ;LOAD EXPECTED
2253  010700  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;COMPARE
2254  010706  001016                            BNE     13$             ;BR IF NOT
2255
2256                                    ;"\" OR LOOP EXIT
2257
2258  010710  012737  000001  011024            MOV     #1,LOOP         ;SET SOFT FLAG
2259  010716  012737  017256  011062            MOV     #MQO,FINDTA     ;SETUP MESSAGE
```

```
2260  010724  005037  011026          16$:    CLR     XOFFBR
2261  010730  005037  011030                  CLR     XOFFOK
2262  010734  005037  011042                  CLR     IGNORE
2263  010740  000137  011052                  JMP     FINDOT
2264
2265  010744  005737  011042          13$:    TST     IGNORE          ;IGNORE INPUT CHARACTER
2266  010750  001001                          BNE     15$
2267  010752  104004                          ERROR   4               ;UNEXPECTED OR INCORRECT INPUT FLAG
2268  010754  000240                  15$:    NOP
2269  010756  000240                          NOP
2270  010760  000240                          NOP
2271  010762  000240                          NOP
2272  010764  000137  010416                  JMP     XPRNTA
2273
2274                                  ;"/" OR STANDARD EXIT
2275
2276  010770  005037  011024          14$:    CLR     LOOP
2277  010774  012737  017343  011062          MOV     #MQ1,FINDTA     ;SETUP MESSAGE
2278  011002  000137  010724                  JMP     16$
2279
2280                                  ;NORMAL EXIT
2281
2282  011006  005037  011030          1$:     CLR     XOFFOK
2283  011012  005037  011042                  CLR     IGNORE
2284  011016  005037  011026                  CLR     XOFFBR
2285  011022  000207                          RTS     PC              ;EXIT
2286
2287  011024  000000          LOOP:   0
2288  011026  000000          XOFFBR: 0
2289  011030  000000          XOFFOK: 0
2290  011032  000000          AXOFF:  0
2291  011034  000000          XOFFRC: 0
2292  011036  000000          XONRC:  0
2293  011040  000000          ANESC:  0
2294  011042  000000          IGNORE: 0               ;WHEN SET IGNORE KEYBOARD FLAGS
2295
2296                          ;DETERMINE THE  TEST TO GO TO
2297  011044  004537  011616  FNDA:   JSR     R5,AMSG
2298  011050  017431                  MQ2                     ;ERROR ASK AGAIN
2299  011052  012706  001100  FINDOT: MOV     #STACK,SP
2300  011056  004537  011616          JSR     R5,AMSG
2301  011062  017343          FINDTA: MQ1
2302  011064  004737  012620          JSR     PC,GETCHR
2303  011070  000770                  BR      FINDOT
2304  011072  042700  100600          BIC     #100600,R0      ;MASK
2305  011076  122700  000101          CMPB    #'A,R0          ;TEST FOR NUMBER
2306  011102  101360                  BHI     FNDA
2307  011104  122700  000132          CMPB    #'Z,R0          ;TEST FOR OTHERS
2308  011110  103755                  BLO     FNDA
2309  011112  042700  177740          BIC     #177740,R0      ;MAKE 0-32
2310  011116  005300                  DEC     R0
2311  011120  110037  001102          MOVB    R0,$TSTNM       ;LOAD THAT TEST #
2312  011124  006300                  ASL     R0
2313  011126  005760  011152          TST     DSPCH(R0)       ;TEST IF VALID
2314  011132  001744                  BEQ     FNDA                    ;BR IF NOT
2315  011134  000240                  NOP
```

```
2316  011136  000240                        NOP
2317  011140  016037  011152  001106        MOV     DSPCH(R0),$LPADR        ;LOAD LOOP ADDRESS
2318  011146  000170  011152                JMP     @DSPCH(R0)              ;GO TO THAT TEST
2319
2320                                ;SUBTEST DISPATCH TABLE
2321
2322  011152  002044                DSPCH:  TST1+2
2323  011154  002464                        TST2+2
2324  011156  002504                        TST3+2
2325  011160  002560                        TST4+2
2326  011162  002660                        TST5+2
2327  011164  002762                        TST6+2
2328  011166  003424                        TST7+2
2329  011170  003774                        TST10+2
2330  011172  004152                        TST11+2
2331  011174  004300                        TST12+2
2332  011176  004336                        TST13+2
2333  011200  005076                        TST14+2
2334  011202  005246                        TST15+2
2335  011204  005360                        TST16+2
2336  011206  005530                        TST17+2
2337  011210  005564                        TST20+2
2338  011212  005654                        TST21+2
2339  011214  006006                        TST22+2
2340  011216  006142                        TST23+2
2341  011220  006264                        TST24+2
2342  011222  006342                        TST25+2
2343  011224  006454                        TST26+2
2344  011226  006510                        TST27+2
2345  011230  007104                        TST30+2
2346  011232  007400                        TST31+2
2347                              ;SUBROUTINE TO LOAD COPIER TEST
2348
2349  011234  012700  024614        FIRLST: MOV     #BUFFER,R0
2350  011240  112720  000015                MOVB    #15,(R0)+       ;LOAD CR
2351  011244  112720  000012                MOVB    #12,(R0)+       ;LOAD LF
2352  011250  112720  000105                MOVB    #'E,(R0)+
2353  011254  112720  000105                MOVB    #'E,(R0)+
2354  011260  112720  000105                MOVB    #'E,(R0)+
2355  011264  013702  001320                MOV     WIDTH,R2        ;LOAD WIDTH
2356  011270  163702  001270                SUB     VH1,R2
2357  011274  005302                        DEC     R2
2358  011276  112720  000040        1$:     MOVB    #40,(R0)+       ;LOAD A SPACE
2359  011302  005302                        DEC     R2              ;DONE ?
2360  011304  100374                        BPL     1$              ;BR UNTIL DONE
2361  011306  112720  000105                MOVB    #'E,(R0)+
2362  011312  112720  000105                MOVB    #'E,(R0)+
2363  011316  112720  000105                MOVB    #'E,(R0)+       ;LOAD 80 TH
2364  011322  112710  000377                MOVB    #377,(R0)       ;LOAD TERM
2365  011326  000207                        RTS     PC              ;EXIT
2366
2367                              ;SUBROUTINE FOR THE DATA PATH TEST
2368
2369  011330  012700  024614        DTPSR:  MOV     #BUFFER,R0
2370  011334  012501                DTPSRB: MOV     (5)+,R1         ;GET FIRST CHARACTER
2371  011336  012502                        MOV     (5)+,R2         ;GET SECOND CHARACTER
```

```
                                        MOV     WIDTH,R3                ;SET THE WIDTH
                                        ASR     R3              ;DIVIDE BY 2
                                        MOVB    #15,(R0)+       ;LOAD 'CR'
                                        MOVB    #12,(R0)+       ;LOAD 'LF'
                                DTPSRA: MOVB    R1,(0)+         ;
                                        MOVB    R2,(0)+
                                        DEC     R3
                                        BPL     DTPSRA
                                        MOVB    #377,(R0)       ;LOAD TERM
                                        RTS     R5

                                ;SUBROUTINE TO LOAD BUFFER WITH GRAPHICS CHARACTERS

                                GBBUF:  MOV     #BUFFER,R0      ;LOAD BUFFER ADDRESS
                                        MOV     #136,R1         ;LOAD INITIAL CHAR.
                                        MOV     R4,R2           ;LOAD BUFFER COUNT
                                1$:     MOVB    R1,(R0)+        ;INSERT A CHAR. IN THE BUFFER
                                        INC     R1              ;INCREMENT CHAR.
                                        CMPB    #177,R1         ;AT END OF GRAPHICS STRING?
                                        BNE     2$              ;NO
                                        MOV     #136,R1         ;YES-RESET IT TO 1ST GRAPH. CHAR.
                                2$:     DEC     R2              ;DECREMENT BUFFER COUNT.
                                        BNE     1$              ;NOT AT END-LOOP
                                        MOVB    #377,(R0)       ;END OF BUFFER-INSERT TERMINATOR
                                        RTS     PC              ;AND EXIT.

                                ;PROGRAM DELAY ROUTINE

                        DELAY:  MOV     SUBTST,10$      ;LOAD COUNT
                                CLR     11$
                                TST     WFTEST          ;TEST IF W.F. MODE
                                BEQ     2$              ;BR IF NOT
                                ASR     10$             ;CHANGE DELAY TIMER
                                ASR     10$
                                ASR     10$
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                        2$:     BIT     #BIT12,@SWR     ;TEST SR
                                BNE     3$              ;BR IF SET
                                DEC     11$             ;DELAY
                                BNE     2$
                                DEC     10$
                                BPL     2$              ;DELAY
                        3$:     NOP
                                NOP
                                NOP
                                RTS     PC              ;EXIT

                        10$:    2
                        11$:    0

                        ADELAY: MOV     SUBTST,10$
                                CLR     11$
```

```
2428  011556  006237  011612              ASR     10$
2429  011562  006237  011612              ASR     10$
2430  011566  005337  011614      2$:     DEC     11$
2431  011572  001375                      BNE     2$
2432  011574  005337  011612              DEC     10$
2433  011600  100372                      BPL     2$
2434  011602  000240                      NOP
2435  011604  000240                      NOP
2436  011606  000240                      NOP
2437  011610  000207                      RTS     PC
2438  011612  000000              10$:    0
2439  011614  000000              11$:    0
2440
2441
2442                              ;HEADER SUBROUTINE FOR VT-50
2443
2444  011616  012537  011626      AMSG:   MOV     (R5)+,10$       ;GET POINTER
2445  011622  004537  012676      1$:     JSR     R5,MTOB         ;MOVE TO BUFFER
2446  011626  000000              10$:    0
2447  011630  004737  010412      11$:    JSR     PC,XPRNT        ;DISPLAY IT
2448  011634  000205                      RTS     R5              ;EXIT
2449
2450
2451                              ;OCTAL - 3 BIT CONVERSION
2452
2453  011636  010001              OCTAL:  MOV     R0,R1           ;LOAD R1
2454  011640  042701  177770              BIC     #177770,R1      ;MASK
2455  011644  062701  000060              ADD     #60,R1
2456  011650  110137  011732              MOVB    R1,DIG2         ;SAVE LSD
2457  011654  010001                      MOV     R0,R1
2458  011656  006001                      ROR     R1
2459  011660  006001                      ROR     R1
2460  011662  006001                      ROR     R1
2461  011664  042701  177770              BIC     #177770,R1
2462  011670  062701  000060              ADD     #60,R1
2463  011674  110137  011730              MOVB    R1,DIG1         ;SAVE IT
2464  011700  010001                      MOV     R0,R1
2465  011702  006101                      ROL     R1
2466  011704  006101                      ROL     R1
2467  011706  000301                      SWAB    R1
2468  011710  042701  177770              BIC     #177770,R1
2469  011714  062701  000060              ADD     #60,R1
2470  011720  110137  011726              MOVB    R1,DIG0         ;SAVE MSD
2471  011724  000207                      RTS     PC              ;EXIT
2472
2473  011726  000000              DIG0:   0
2474  011730  000000              DIG1:   0
2475  011732  000000              DIG2:   0
2476
2477                              ;SUBROUTINE FOR THE KEYBOARD CHARACTER TEST
2478
2479  011734  004537  011616      TSTROW: JSR     R5,AMSG         ;DISPLAY HEADER
2480  011740  014156                      MKBA
2481
2482  011742  004737  012620      1$:     JSR     PC,GETCHR       ;GET CHAR
2483  011746  000775                      BR      1$              ;;BR BACK IF NO INPUT
```

```
2484  011750  012737  177600  012326          MOV     #177600,MASK1
2485  011756  005037  012330                  CLR     MASK2
2486  011762  032777  000004  167150          BIT     #BIT2,@SWR      ;TEST SWR
2487  011770  001416                          BEQ     4$              ;DO NOT TEST PARITY BIT
2488  011772  042737  000200  012326          BIC     #BIT7,MASK1     ;ENABLE PARITY BIT
2489  012000  032777  000002  167132          BIT     #BIT1,@SWR      ;TEST IF FORCED PARITY
2490  012006  001424                          BEQ     5$              ;BR IF NOT FORCED PARITY BIT
2491  012010  032777  000001  167122          BIT     #BIT0,@SWR      ;TEST FOR EVEN/ODD PARITY
2492  012016  001403                          BEQ     4$              ;BR IF ALLWAYS OFF
2493  012020  052737  000200  012330          BIS     #BIT7,MASK2     ;SET BIT 7
2494  012026  011237  012322          4$:     MOV     (R2),100$       ;GET EXPECTED
2495  012032  053737  012330  012322          BIS     MASK2,100$      ;SET BIT 7 IF EXPECTED
2496  012040  043700  012326                  BIC     MASK1,R0        ;MASK VALUE READ
2497  012044  120037  012322                  CMPB    R0,100$         ;COMPARE CHARS
2498  012050  001041                          BNE     2$              ;BR IF NOT EQUAL
2499  012052  005722                          TST     (R2)+           ;BUMP R2
2500  012054  100332                          BPL     1$              ;LOOP TILL DONE
2501  012056  000207                          RTS     PC              ;EXIT
2502
2503                                  ;COME HERE ONLY IF TESTING "PARITY" OPTION
2504
2505  012060  005037  012324          5$:     CLR     101$            ;CLEAR TEMP
2506  012064  011237  012322                  MOV     (R2),100$       ;CLEAR CHAR SAVE
2507  012070  006037  012322          20$:    ROR     100$            ;ROTATE CHAR
2508  012074  103002                          BCC     21$             ;BR IF NO CARRY
2509  012076  005237  012324                  INC     101$            ;UPDATE CNT
2510  012102  105737  012322          21$:    TSTB    100$            ;DONE ?
2511  012106  001370                          BNE     20$             ;BR IF NOT
2512  012110  032777  000001  167022          BIT     #BIT0,@SWR      ;TEST EVEN/ODD
2513  012116  001407                          BEQ     23$             ;BR IF OPER. SAYS EVEN
2514  012120  006037  012324                  ROR     101$            ;
2515  012124  103403                          BCS     22$             ;BR IF ODD ALREADY
2516  012126  052737  000200  012330          BIS     #BIT7,MASK2     ;SET PARITY BIT
2517  012134  000734                  22$:    BR      4$              ;BR TO TEST CHAR
2518  012136  006037  012324          23$:    ROR     101$            ;
2519  012142  103003                          BCC     24$             ;BR IF EVEN ALREADY
2520  012144  052737  000200  012330          BIS     #BIT7,MASK2
2521  012152  000725                  24$:    BR      4$              ;BR TO TEST CHAR
2522
2523                                  ;COME HERE IF EXPECTED NOT EQUAL TO RECVD
2524                                  ;CONVERT RESULTS TO OCTAL FOR TYPEOUT
2525
2526  012154  010037  001126          2$:     MOV     R0,$BDDAT       ;LOAD BAD CHARACTER
2527  012160  004737  011636                  JSR     PC,OCTAL        ;CONVERT TO OCTAL
2528  012164  113737  011726  015625          MOVB    DIG0,MKBQB      ;LOAD OCTAL #
2529  012172  113737  011730  015626          MOVB    DIG1,MKBQB+1
2530  012200  113737  011732  015627          MOVB    DIG2,MKBQB+2
2531  012206  042700  177600                  BIC     #177600,R0
2532  012212  120027  000040                  CMPB    R0,#40          ;TEST IF PRINTABLE
2533  012216  101002                          BHI     10$             ;BR IF PRINTABLE
2534  012220  112700  000056                  MOVB    #56,R0          ;CONVERT TO A "*" CHARACTER
2535  012224  110037  015621          10$:    MOVB    R0,MKBQ2        ;SAVE CHAR
2536  012230  011200                          MOV     (R2),R0         ;GET GOOD CHAR
2537  012232  053700  012330                  BIS     MASK2,R0
2538  012236  010037  001124                  MOV     R0,$GDDAT       ;LOAD GOOD CHARACTER
2539  012242  004737  011636                  JSR     PC,OCTAL        ;CONVERT IT
```

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2540  012246  113737  011726  015606          MOVB    DIGO,MKBQA      ;LOAD DIGIT
2541  012254  113737  011730  015607          MOVB    DIG1,MKBQA+1
2542  012262  113737  011732  015610          MOVB    DIG2,MKBQA+2
2543  012270  042700  177600                  BIC     #177600,R0
2544  012274  110037  015602                  MOVB    R0,MKBQ1        ;SAVE CHAR
2545
2546  012300  023737  001276  001144          CMP     VTIS,$TKS       ;TEST IF ON CTY
2547  012306  001403                          BEQ     3$              ;BR IF YES
2548
2549  012310  004537  011616                  JSR     R5,AMSG         ;DISPLAY ERROR  MESSAGE
2550  012314  015541                          MKBQ
2551  012316  104004                  3$:     ERROR   4               ;CHARACTER RECVD NOT EQUAL TO EXPECTED
2552  012320  000610                          BR      1$              ;BR BACK AND TEST THE CHARACTER AGAIN
2553
2554  012322  000000                  100$:   0
2555  012324  000000                  101$:   0
2556  012326  177600                  MASK1:  177600
2557  012330  000000                  MASK2:  0
2558
2559                                  .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
2560
2561                                  ;;*****************************************************************
2562                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
2563                                  ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
2564                                  ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
2565                                  ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
2566                                  ;*REPLACED WITH SPACES.
2567                                  ;*CALL:
2568                                  ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
2569                                  ;*.     TYPDS                   ;;GO TO THE ROUTINE
2570
2571  012332                          $TYPDS:
2572  012332  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
2573  012334  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
2574  012336  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
2575  012340  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
2576  012342  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
2577  012344  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
2578  012350  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
2579  012354  100004                          BPL     1$              ;;BR IF INPUT IS POS.
2580  012356  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
2581  012360  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
2582  012366  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
2583  012370  012703  012546                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
2584  012374  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
2585  012400  005002                  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
2586  012402  016001  012536                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
2587  012406  160105                  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
2588  012410  002402                          BLT     4$              ;;BR IF DONE
2589  012412  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
2590  012414  000774                          BR      3$
2591  012416  060105                  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
2592  012420  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
2593  012422  001002                          BNE     5$              ;;FALL THROUGH IF 0
2594  012424  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
2595  012426  100407                          BMI     7$              ;;BR IF YES
```

```
2596  012430  106316                  5$:     ASLB    (SP)            ;;MSD?
2597  012432  103003                          BCC     6$              ;;BR IF NO
2598  012434  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
2599  012442  052702  000060            6$:   BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
2600  012446  052702  000040            7$:   BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
2601  012452  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
2602  012454  005720                          TST     (R0)+           ;;JUST INCREMENTING
2603  012456  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
2604  012462  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
2605  012464  003002                          BGT     8$              ;;GO TO EXIT
2606  012466  010502                          MOV     R5,R2           ;;GET THE LSD
2607  012470  000764                          BR      6$              ;;GO CHANGE TO ASCII
2608  012472  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
2609  012474  100003                          BPL     9$              ;;BR IF NO
2610  012476  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
2611  012504  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
2612  012506  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
2613  012510  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
2614  012512  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
2615  012514  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
2616  012516  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
2617  012520  104401  012546                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
2618  012524  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
2619  012532  012616                          MOV     (SP)+,(SP)
2620  012534  000002                          RTI                     ;;RETURN TO USER
2621  012536  023420                  $DTBL:  10000.
2622  012540  001750                          1000.
2623  012542  000144                          100.
2624  012544  000012                          10.
2625  012546  000004                  $DBLK:  .BLKW   4
2626
2627                                  ;SUBROUTINE TO FILL THE SCREEN WITH AN CHARACTER
2628
2629  012556  012701  000105          FILLWC: MOV     #'E,R1          ;LOAD CHARACTER BYTE
2630  012562  004737  010310                  JSR     PC,FILBUF       ;LOAD THE LINE WITH CHAR
2631  012566  013737  001266  012616          MOV     VHO,10$         ;LOAD COUNT
2632  012574  012737  000001  011030  1$:     MOV     #1,XOFFOK       ;INSURE XOFF/XON CONTROL.
2633  012602  004737  010412                  JSR     PC,XPRNT        ;DISPLAY THE LINE
2634  012606  005337  012616                  DEC     10$
2635  012612  001370                          BNE     1$              ;LOOP UNTIL DONE
2636  012614  000207                          RTS     PC              ;EXIT
2637  012616  000000                  10$:    0
2638
2639                                  ;SUBROUTINE TO GET A CHARACTER FROM THE VT50
2640
2641  012620  013737  001254  012672  GETCHR: MOV     TIME0,TIME1     ;LOAD TIME COUNTER
2642  012626  005037  012674                  CLR     TIME2
2643
2644  012632  105777  166440          1$:     TSTB    @VTIS           ;TEST INPUT STATUS
2645  012636  100005                          BPL     2$              ;BR IF CLEARED
2646  012640  017700  166434                  MOV     @VTIB,R0        ;READ A CHAR
2647  012644  062716  000002                  ADD     #2,(SP)         ;UPDATE RETURN
2648  012650  000207                          RTS     PC              ;EXIT
2649
2650  012652  005337  012674          2$:     DEC     TIME2           ;DELAY
2651  012656  001365                          BNE     1$
```

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                                        DEC     TIME1           ;FINISHED ?
                                        BPL     1$              ;LOOP TILL TIME EXPIRED
                                        ERROR   2               ;NO INPUT FLAG FROM DEVICE
                                        RTS     PC              ;EXIT

012672  000000                  TIME1:  0
012674  000000                  TIME2:  0

                                ;MOVE TO THE OUTPUT BUFFER

012676  012500                  MTOB:   MOV     (R5)+,R0        ;LOAD DEST.
012700  012701  024614                  MOV     #BUFFER,R1      ;LOAD R1
012704  112021                  1$:     MOVB    (R0)+,(R1)+     ;LOAD BYTE
012706  100376                          BPL     1$              ;BR UNTIL DONE
012710  000205                          RTS     R5              ;EXIT

                                        .SBTTL  ASCII MESSAGES

                                ;ASCII MESSAGES

012712  006415  046412  044501  TITLE:  .ASCIZ  <15><15><12>\MAINDEC-11-DZVTC-C VT50A, B, VT50H AND VT52 ACCEPTANCE TEST
012720  042116  041505  030455
012726  026461  055104  052126
012734  026503  020103  052126
012742  030065  026101  041040
012750  020054  052126  030065
012756  020110  047101  020104
012764  052126  031065  040440
012772  041503  050105  040524
013000  041516  020105  042524
013006  052123  005015     000
013013     015  020012  043040  M91:    .ASCIZ  <15><12>/  FULL SCREEN OF THE CHARACTER E/<15><12><377>
013020  046125  020114  041523
013026  042522  047105  047440
013034  020106  044124  020105
013042  044103  051101  041501
013050  042524  020122  006505
013056  177412     000
013061     015  020012  042040  M92:    .ASCIZ  <15><12>/  DATA PATH TEST /<15><12><377>
013066  052101  020101  040520
013074  044124  052040  051505
013102  020124  005015  000377
013110  005015  020040  044523  M93:    .ASCIZ  <15><12>/  SINGLE CHARACTER PER LINE /<15><12><377>
013116  043516  042514  041440
013124  040510  040522  052103
013132  051105  050040  051105
013140  046040  047111  020105
013146  005015  000377
013152  005015  020040  047522  M94:    .ASCIZ  <15><12>/  ROTATING PATTERN /<15><12><377>
013160  040524  044524  043516
013166  050040  052101  042524
013174  047122  006440  177412
013202     000
013203     015  020012  041440  M96:    .ASCIZ  <15><12>/  CURSOR MOTION TEST /<15><12><377>
013210  051125  047523  020122
013216  047515  044524  047117
```

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2708  013224  052040  051505  020124
2709  013232  005015  000377
2710  013236  005015  020040  040524  M97:    .ASCIZ  <15><12>/  TAB, BACKSPACE AND BELL TEST  /<15><12><377>
2711  013244  026102  041040  041501
2712  013252  051513  040520  042503
2713  013260  040440  042116  041040
2714  013266  046105  020114  042524
2715  013274  052123  020040  005015
2716  013302  000377
2717  013304  005015  020040  051105  M910:   .ASCIZ  <15><12>/  ERASE LINE TEST  /<15><12><377>
2718  013312  051501  020105  044514
2719  013320  042516  052040  051505
2720  013326  020124  006440  177412
2721  013334     000
2722  013335     015  020012  042440  M911:   .ASCIZ  <15><12>/  ERASE SCREEN TEST  /<15><12><377>
2723  013342  040522  042523  051440
2724  013350  051103  042505  020116
2725  013356  042524  052123  020040
2726  013364  005015  000377
2727  013370  005015  020040  044526  M912:   .ASCIZ  <15><12>/  VIDEO COUPLING TEST /<15><12><377>
2728  013376  042504  020117  047503
2729  013404  050125  044514  043516
2730  013412  052040  051505  020124
2731  013420  005015  000377
2732  013424  044033  045033  005015  M914:   .ASCIZ  <33><110><33><112><15><12>/  TERMINAL IDENTIFIER TEST /<15><12><377>
2733  013432  020040  042524  046522
2734  013440  047111  046101  044440
2735  013446  042504  052116  043111
2736  013454  042511  020122  042524
2737  013462  052123  006440  177412
2738  013470     000
2739  013471     015  020012  041440  M920:   .ASCIZ  <15><12>/  COPIER PERIMETER/<15><12><377>
2740  013476  050117  042511  020122
2741  013504  042520  044522  042515
2742  013512  042524  006522  177412
2743  013520     000
2744  013521     015  020012  042040  M921:   .ASCIZ  <15><12>/  DISCLAIMER STATEMENT/<15><12><377>
2745  013526  051511  046103  044501
2746  013534  042515  020122  052123
2747  013542  052101  046505  047105
2748  013550  006524  177412     000
2749  013555     015  020012  044040  M922:   .ASCIZ  <15><12>/  HOLD SCREEN MODE TEST/<15><12><377>
2750  013562  046117  020104  041523
2751  013570  042522  047105  046440
2752  013576  042117  020105  042524
2753  013604  052123  005015  000377
2754  013612  005015  020040  051107  M9221:  .ASCIZ  <15><12>/  GRAPHICS MODE AND REV. LINE FEED TEST/<15><12><377>
2755  013620  050101  044510  051503
2756  013626  046440  042117  020105
2757  013634  047101  020104  042522
2758  013642  027126  046040  047111
2759  013650  020105  042506  042105
2760  013656  052040  051505  006524
2761  013664  177412     000
2762  013667     033  015537  015510  M923:   .ASCIZ  <33><137><33><110><33><112>/  AUTO COPY MODE TEST/<15><12><377>
2763  013674  020112  040440  052125
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2764  013702  020117  047503  054520
2765  013710  046440  042117  020105
2766  013716  042524  052123  005015
2767  013724  000377
2768  013726  044033  045033  051120  MPTCNT: .ASCIZ  <33><110><33><112>/PRINTER CONTROLLER MODE ENTERED/<15><12><377>
2769  013734  047111  042524  020122
2770  013742  047503  052116  047522
2771  013750  046114  051105  046440
2772  013756  042117  020105  047105
2773  013764  042524  042522  006504
2774  013772  177412     000
2775  013775     033  015510  050112  MPTSCN: .ASCIZ  <33><110><33><112>/PRINT A SCREEN OF E'S/<15><12><377>
2776  014002  044522  052116  040440
2777  014010  051440  051103  042505
2778  014016  020116  043117  042440
2779  014024  051447  005015  000377
2780  014032  015510  020112  040440  M923A:  .ASCIZ  <110><33><112>/  AUTO PRINT MODE TEST/<15><12><377>
2781  014040  052125  020117  051120
2782  014046  047111  020124  047515
2783  014054  042504  052040  051505
2784  014062  006524  177412     000
2785  014067     015  020012  042513  MKB:    .ASCII  <15><12>/ KEYBOARD CHARACTER TEST/<15><12>
2786  014074  041131  040517  042122
2787  014102  041440  040510  040522
2788  014110  052103  051105  052040
2789  014116  051505  006524     012
2790  014123     122  046105  040505  MKB1:   .ASCIZ  /RELEASE THE "SHIFT" KEY/<15><12><377>
2791  014130  042523  052040  042510
2792  014136  021040  044123  043111
2793  014144  021124  045440  054505
2794  014152  005015  000377
2795  014156  005015  042514  052106  MKBA:   .ASCIZ  <15><12>/LEFT TO RIGHT IN A ROW, DEPRESS ONE KEY AT A TIME/<15><12><377>
2796  014164  052040  020117  044522
2797  014172  044107  020124  047111
2798  014200  040440  051040  053517
2799  014206  020054  042504  051120
2800  014214  051505  020123  047117
2801  014222  020105  042513  020131
2802  014230  052101  040440  052040
2803  014236  046511  006505  177412
2804  014244     000
2805  014245     015  051412  040524  MKBB:   .ASCII  <15><12>/STARTING WITH THE TOP ROW EXCEPT THE THIRD/
2806  014252  052122  047111  020107
2807  014260  044527  044124  052040
2808  014266  042510  052040  050117
2809  014274  051040  053517  042440
2810  014302  041530  050105  020124
2811  014310  044124  020105  044124
2812  014316  051111     104
2813  014321     040  051106  046517          .ASCIZ  / FROM RIGHT END AND LAST KEYS/<15><12><377>
2814  014326  051040  043511  052110
2815  014334  042440  042116  040440
2816  014342  042116  046040  051501
2817  014350  020124  042513  051531
2818  014356  005015  000377
2819  014362  005015  052123  051101  MKBB2:  .ASCIZ  <15><12>/STARTING WITH THE TOP ROW EXCEPT THE LAST KEY/<15><12><377>
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2820  014370  044524  043516  053440
2821  014376  052111  020110  044124
2822  014404  020105  047524  020120
2823  014412  047522  020127  054105
2824  014420  042503  052120  052040
2825  014426  042510  046040  051501
2826  014434  020124  042513  006531
2827  014442  177412     000
2828  014445     015  051412  040524  MKBC:   .ASCIZ  <15><12>/START WITH THE SECOND ROW/<15><12><377>
2829  014452  052122  053440  052111
2830  014460  020110  044124  020105
2831  014466  042523  047503  042116
2832  014474  051040  053517  005015
2833  014502  000377
2834  014504  005015  052123  051101  MKBD:   .ASCII  <15><12>/START WITH THE THIRD ROW EXCEPT THE CTRL/
2835  014512  020124  044527  044124
2836  014520  052040  042510  052040
2837  014526  044510  042122  051040
2838  014534  053517  042440  041530
2839  014542  050105  020124  044124
2840  014550  020105  052103  046122
2841  014556  005015  040440  042116          .ASCIZ  <15><12>/ AND THE "BLANK" KEYS/<15><12><377>
2842  014564  052040  042510  021040
2843  014572  046102  047101  021113
2844  014600  045440  054505  006523
2845  014606  177412     000
2846  014611     015  051412  040524  MKBD2:  .ASCIZ  <15><12>/START WITH THE THIRD ROW ,BEGIN ROW WITH "A" KEY/<15><12><377>
2847  014616  052122  053440  052111
2848  014624  020110  044124  020105
2849  014632  044124  051111  020104
2850  014640  047522  020127  041054
2851  014646  043505  047111  051040
2852  014654  053517  053440  052111
2853  014662  020110  040442  020042
2854  014670  042513  006531  177412
2855  014676     000
2856  014677     015  051412  040524  MKBE:   .ASCII  <15><12>/START WITH THE FOURTH ROW EXCEPT THE SCROLL/
2857  014704  052122  053440  052111
2858  014712  020110  044124  020105
2859  014720  047506  051125  044124
2860  014726  051040  053517  042440
2861  014734  041530  050105  020124
2862  014742  044124  020105  041523
2863  014750  047522  046114
2864  014754  005015  051454  044510          .ASCIZ  <15><12>/,SHIFT, REPEAT AND AUTO-PRINT/<15><12><377>
2865  014762  052106  020054  042522
2866  014770  042520  052101  040440
2867  014776  042116  040440  052125
2868  015004  026517  051120  047111
2869  015012  006524  177412     000
2870  015017     015  051412  040524  MKBF:   .ASCIZ  <15><12>/START WITH THE FIFTH ROW/<15><12><377>
2871  015024  052122  053440  052111
2872  015032  020110  044124  020105
2873  015040  044506  052106  020110
2874  015046  047522  006527  177412
2875  015054     000
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2876  015055     015  047012  053517  MKBG:   .ASCII  <15><12>/NOW HOLD DOWN THE "LEFT-SHIFT" KEY/<15><12><377>
2877  015062  044040  046117  020104
2878  015070  047504  047127  052040
2879  015076  042510  021040  042514
2880  015104  052106  051455  044510
2881  015112  052106  020042  042513
2882  015120  006531  177412
2883  015124  005015  047516  020127  MKBGA:  .ASCII  <15><12>/NOW HOLD DOWN THE "RIGHT-SHIFT" KEY/<15><12><377>
2884  015132  047510  042114  042040
2885  015140  053517  020116  044124
2886  015146  020105  051042  043511
2887  015154  052110  051455  044510
2888  015162  052106  020042  042513
2889  015170  006531  177412
2890  015174  005015  047516  020127  MKBH:   .ASCII  <15><12>/NOW HOLD DOWN THE "CTRL" KEY/<15><12><377>
2891  015202  047510  042114  042040
2892  015210  053517  020116  044124
2893  015216  020105  041442  051124
2894  015224  021114  045440  054505
2895  015232  005015     377
2896  015235     015  051412  040524  MKBI:   .ASCII  <15><12>/START WITH THE TOP ROW/<15><12><377>
2897  015242  052122  053440  052111
2898  015250  020110  044124  020105
2899  015256  047524  020120  047522
2900  015264  006527  177412
2901  015270  005015  052123  051101  MKBJ:   .ASCII  <15><12>/START WITH THE 2ND ROW/<15><12><377>
2902  015276  020124  044527  044124
2903  015304  052040  042510  031040
2904  015312  042116  051040  053517
2905  015320  005015     377
2906  015323     015  051412  040524  MKBK:   .ASCII  <15><12>/START  WITH THE 3RD ROW/<15><12><377>
2907  015330  052122  020040  044527
2908  015336  044124  052040  042510
2909  015344  031440  042122  051040
2910  015352  053517  005015     377
2911  015357     015  051412  040524  MKBL:   .ASCII  <15><12>/START WITH THE 4TH ROW/<15><12><377>
2912  015364  052122  053440  052111
2913  015372  020110  044124  020105
2914  015400  052064  020110  047522
2915  015406  006527  177412
2916  015412  005015  052123  051101  MKBM:   .ASCII  <15><12>/START WITH THE LAST ROW/<15><12><377>
2917  015420  020124  044527  044124
2918  015426  052040  042510  046040
2919  015434  051501  020124  047522
2920  015442  006527  177412
2921  015446  005015  053012  032524  MKBN:   .ASCII  <15><12><12>/VT50H KEYPAD TEST/<15><12><377>
2922  015454  044060  045440  054505
2923  015462  040520  020104  042524
2924  015470  052123  005015     377
2925  015475     015  053012  032524  MKB52:  .ASCII  <15><12>/VT52 ALTERNATE KEYPAD MODE TEST/<15><12><377>
2926  015502  020062  046101  042524
2927  015510  047122  052101  020105
2928  015516  042513  050131  042101
2929  015524  046440  042117  020105
2930  015532  042524  052123  005015
2931  015540     377
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2932  015541     015  041412  040510  MKBQ:   .ASCII  <15><12>/CHARACTER WAS IN ERROR/<15><12>
2933  015546  040522  052103  051105
2934  015554  053440  051501  044440
2935  015562  020116  051105  047522
2936  015570  006522     012
2937  015573     107  047517  020104          .ASCII  /GOOD = /
2938  015600  020075
2939  015602     040     040     075  MKBQ1:  .BYTE   40,40,75,40
2940  015605     040
2941  015606     040     040     040  MKBQA:  .BYTE   40,40,40,40,40
2942  015611     040     040
2943  015613     102  042101  036440          .ASCII  /BAD = /
2944  015620     040
2945  015621     040     040     075  MKBQ2:  .BYTE   40,40,75,40
2946  015624     040
2947  015625     040     040     040  MKBQB:  .BYTE   40,40,40,15,12,377,0
2948  015630     015     012     377
2949  015633     000
2950  015634  005015  042513  041131  MKBR:   .ASCIZ  <15><12>/KEYBOARD CHARACTER TEST COMPLETE/<15><12><377>
2951  015642  040517  042122  041440
2952  015650  040510  040522  052103
2953  015656  051105  052040  051505
2954  015664  020124  047503  050115
2955  015672  042514  042524  005015
2956  015700  000377
2957
2958  015702  005015  045440  054505  MKE:    .ASCII  <15><12>/ KEYBOARD ASCII AND OCTAL LOOP/<15><12>
2959  015710  047502  051101  020104
2960  015716  051501  044503  020111
2961  015724  047101  020104  041517
2962  015732  040524  020114  047514
2963  015740  050117  005015
2964  015744     015     012          .BYTE   15,12
2965  015746  044127  047105  040440  .ASCII  /WHEN A KEY IS DEPRESSED, THE ASCII CHARACTER AND/
2966  015754  045440  054505  044440
2967  015762  020123  042504  051120
2968  015770  051505  042523  026104
2969  015776  052040  042510  040440
2970  016004  041523  044511  041440
2971  016012  040510  040522  052103
2972  016020  051105  040440  042116
2973  016026     015     012          .BYTE   15,12
2974  016030  052040  042510  052040  .ASCIZ  / THE THREE DIGIT OCTAL CODE WILL BE ECHOED/
2975  016036  051110  042505  042040
2976  016044  043511  052111  047440
2977  016052  052103  046101  041440
2978  016060  042117  020105  044527
2979  016066  046114  041040  020105
2980  016074  041505  047510  042105
2981  016102     000
2982  016103     015     012     377          .BYTE   15,12,377,0
2983  016106     000
2984  016107     015  041412  040510  MKEA:   .ASCII  <15><12>/CHAR = /
2985  016114  020122  020075
2986  016120     040     040     040  MKEA1:  .BYTE   40,40,40,75,40
2987  016123     075     040
```

```
016125     040     040     040  MKEB:   .BYTE   40,40,40,15,12,377,0
016130     015     012     377
016133     000
016134  005015  042513  041131  MKEH:   .ASCIZ  <15><12>/KEYBOARD ECHO LOOP/<15><12>
016142  040517  042122  042440
016150  044103  020117  047514
016156  050117  005015     000
016163     015     012     012  CRLFB:  .BYTE   15,12,12,12,12,12,12,12,12
016166     012     012     012
016171     012     012     012
016174     012     012     012  CRLFA:  .BYTE   12,12,12,12,12,377,0
016177     012     012     377
016202     000

                                ;HOME AND ERASE SCREEN OPCODE
016203     033     110     033  HOMERS: .BYTE   33,110,33,112,377,0
016206     112     377     000
016211     015  052012  040040  PATH:   .ASCII  <15><12>/T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@/
016216  040100  040100  040100
016224  040100  040100  040100
016232  040100  040100  040100
016240  040100  040100  040100
016246  040100  040100  040100
016254  040100  040100  040100
016262     100
016263     100  040100  040100          .ASCII  /@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T/
016270  040100  040100  040100
016276  040100  040100  040100
016304  040100  040100  040100
016312  040100  040100  040100
016320  040100  040100  040100
016326  040100  020100     124
016333     015  052012  042440          .ASCII  <15><12>/T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE/
016340  042505  042505  042505
016346  042505  042505  042505
016354  042505  042505  042505
016362  042505  042505  042505
016370  042505  042505  042505
016376  042505  042505  042505
016404     105
016405     105  042505  042505          .ASCII  /EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T/
016412  042505  042505  042505
016420  042505  042505  042505
016426  042505  042505  042505
016434  042505  042505  042505
016442  042505  042505  042505
016450  042505  020105     124
016455     377     000     000          .BYTE   377,0,0
016460  005015  042524  052123  VT50A:  .ASCII  <15><12>/TESTING VT50A (12 LINES-NO COPIER)/
016466  047111  020107  052126
016474  030065  020101  030450
016502  020062  044514  042516
016510  026523  047516  041440
016516  050117  042511  024522
016524     015     012     012          .BYTE   15,12,12,377,0,0
016527     377     000     000
016532  005015  042524  052123  VT50B:  .ASCII  <15><12>/TESTING VT50B (12 LINES-COPIER)/
```

```
3044  016540  047111  020107  052126
3045  016546  030065  020102  030450
3046  016554  020062  044514  042516
3047  016562  026523  047503  044520
3048  016570  051105    051
3049  016573     015     012     012          .BYTE   15,12,12,377,0,0
3050  016576     377     000     000
3051  016601     015  052012  051505  VT55:   .ASCII  <15><12>/TESTING VT55 (24 LINES-COPIER, VT50 BASED)/
3052  016606  044524  043516  053040
3053  016614  032524  020065  031050
3054  016622  020064  044514  042516
3055  016630  026523  047503  044520
3056  016636  051105  020054  052126
3057  016644  030065  041040  051501
3058  016652  042105    051
3059  016655     015     012     012          .BYTE   15,12,12,377,0,0
3060  016660     377     000     000
3061  016663     015  052012  051505  VT50H:  .ASCII  <15><12>/TESTING VT50H (12 LINES-COPIER-D.C.A.)/
3062  016670  044524  043516  053040
3063  016676  032524  044060  024040
3064  016704  031061  046040  047111
3065  016712  051505  041455  050117
3066  016720  042511  026522  027104
3067  016726  027103  027101    051
3068  016733     015     012     012          .BYTE   15,12,12,377,0,0
3069  016736     377     000     000
3070  016741     015  052012  051505  VT52K:  .ASCII  <15><12>/TESTING VT52 (24 LINES-NO COPIER OR PRINTER/
3071  016746  044524  043516  053040
3072  016754  032524  020062  031050
3073  016762  020064  044514  042516
3074  016770  026523  047516  041440
3075  016776  050117  042511  020122
3076  017004  051117  050040  044522
3077  017012  052116  051105
3078  017016     015     012     012          .BYTE   15,12,12,377,0,0
3079  017021     377     000     000
3080  017024  005015  042524  052123  VT52L:  .ASCII  <15><12>/TESTING VT52 (24 LINES,COPIER-NO PRINTER)/
3081  017032  047111  020107  052126
3082  017040  031065  024040  032062
3083  017046  046040  047111  051505
3084  017054  041454  050117  042511
3085  017062  026522  047516  050040
3086  017070  044522  052116  051105
3087  017076     051
3088  017077     015     012     012          .BYTE   15,12,12,377,0,0
3089  017102     377     000     000
3090  017105     015  052012  051505  VT52M:  .ASCII  <15><12>/TESTING VT52 (24 LINES,PRINTER-NO COPIER)/
3091  017112  044524  043516  053040
3092  017120  032524  020062  031050
3093  017126  020064  044514  042516
3094  017134  026123  051120  047111
3095  017142  042524  026522  047516
3096  017150  041440  050117  042511
3097  017156  024522
3098  017160     015     012     012          .BYTE   15,12,12,377,0,0
3099  017163     377     000     000
```

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3100  017166  005015  042524  052123  VT55E:  .ASCII  <15><12>/TESTING VT55 (24 LINES, COPIER, VT52 BASED)/
3101  017174  047111  020107  052126
3102  017202  032465  024040  032062
3103  017210  046040  047111  051505
3104  017216  020054  047503  044520
3105  017224  051105  020054  052126
3106  017232  031065  041040  051501
3107  017240  042105     051
3108  017243     015     012     012          .BYTE   15,12,12,377,0,0
3109  017246     377     000     000
3110  017251     033     132     377  RFI:    .BYTE   33,132,377,0,0
3111  017254     000     000
3112  017256  056033  057433  005015  MQ0:    .ASCIZ  <33><134><33><137><15><12><12>/LOOP ON TEST PATTERN LETTER (A THRU Z) ?
3113  017264  046012  047517  020120
3114  017272  047117  052040  051505
3115  017300  020124  040520  052124
3116  017306  051105  020116  042514
3117  017314  052124  051105  024040
3118  017322  020101  044124  052522
3119  017330  055040  020051  020077
3120  017336  020075  177440     000
3121  017343     033  015534  006537  MQ1:    .ASCIZ  <33><134><33><137><15><12><12>/START AT TEST PATTERN LETTER (A THRU Z) ?
3122  017350  005012  052123  051101
3123  017356  020124  052101  052040
3124  017364  051505  020124  040520
3125  017372  052124  051105  020116
3126  017400  042514  052124  051105
3127  017406  024040  020101  044124
3128  017414  052522  055040  020051
3129  017422  020077  020075  177440
3130  017430     000
3131  017431     015  005012  051124  MQ2:    .ASCIZ  <15><12><12>/TRY AGAIN /<15><12><377>
3132  017436  020131  043501  044501
3133  017444  020116  005015  000377
3134  017452     033     135     012  GOPRNT: .BYTE   33,135,12,12,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0377,0,0
3135  017455     012     000     000
3136  017460     000     000     000
3137  017463     000     000     000
3138  017466     000     000     000
3139  017471     000     000     000
3140  017474     000     377     000
3141  017477     000
3142  017500  055433  005015  042524  GOHDSC: .ASCIZ  <33><133><15><12>/TESTING SILO REG/<377>
3143  017506  052123  047111  020107
3144  017514  044523  047514  051040
3145  017522  043505  000377
3146  017526  056033  005015  044523  GODSHS: .ASCIZ  <33><134><15><12>/SILO TEST DONE/<15><12><377>
3147  017534  047514  052040  051505
3148  017542  020124  047504  042516
3149  017550  005015  000377
3150  017554     033     136     377  GOAPMD: .BYTE   33,136,377,0,0
3151  017557     000     000
3152  017561     033     137     015  GONAPM: .BYTE   33,137,15,12,12,12,0,0,0,0,0,0,0,0,0,0,0,0,0,377,0,0,0,0
3153  017564     012     012     012
3154  017567     000     000     000
3155  017572     000     000     000
```

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3156  017575      000      000      000
3157  017600      000      000      000
3158  017603      377      000      000
3159  017606      000      000
3160  017610  044033  045033  020040  M98:    .ASCIZ  <33><110><33><112>/   DIRECT CURSOR ADDRESSING TEST/<377>
3161  017616  042040  051111  041505
3162  017624  020124  052503  051522
3163  017632  051117  040440  042104
3164  017640  042522  051523  047111
3165  017646  020107  042524  052123
3166  017654  000377
3167  017656  005015  043012  051111  WHAT0:  .ASCIZ  <15><12><12>/FIRST LINE DEVICE ADDRESS ? = /<200>
3168  017664  052123  046040  047111
3169  017672  020105  042504  044526
3170  017700  042503  040440  042104
3171  017706  042522  051523  037440
3172  017714  036440  100040      000
3173  017721      015  005012  040514  WHAT1:  .ASCIZ  <15><12><12>/LAST LINE DEVICE ADDRESS (CR IF NONE) ? = /<200>
3174  017726  052123  046040  047111
3175  017734  020105  042504  044526
3176  017742  042503  040440  042104
3177  017750  042522  051523  024040
3178  017756  051103  044440  020106
3179  017764  047516  042516  020051
3180  017772  020077  020075  000200
3181  020000  005015  020040  020040  PASHED: .ASCIZ  <15><12>/          PASS #    # OF ERRORS   /
3182  020006  020040  020040  020040
3183  020014  040520  051523  021440
3184  020022  020040  020040  020043
3185  020030  043117  042440  051122
3186  020036  051117  020123  020040
3187  020044      000
3188  020045      105  051122  051117  EM1:    .ASCIZ  /ERROR FLAG SET ON TRANSMITTER STATUS/
3189  020052  043040  040514  020107
3190  020060  042523  020124  047117
3191  020066  052040  040522  051516
3192  020074  044515  052124  051105
3193  020102  051440  040524  052524
3194  020110  000123
3195  020112  047516  044440  050116  EM2:    .ASCIZ  /NO INPUT FLAG DETECTED/
3196  020120  052125  043040  040514
3197  020126  020107  042504  042524
3198  020134  052103  042105      000
3199  020141      111  041516  051117  EM3:    .ASCIZ  /INCORRECT I.D. CODE/
3200  020146  042522  052103  044440
3201  020154  042056  020056  047503
3202  020162  042504      000
3203  020165      125  042516  050130  EM4:    .ASCIZ  /UNEXPECTED OR INCORRECT INPUT CHAR/
3204  020172  041505  042524  020104
3205  020200  051117  044440  041516
3206  020206  051117  042522  052103
3207  020214  044440  050116  052125
3208  020222  041440  040510  000122
3209  020230  047111  040526  044514  EM5:    .ASCIZ  /INVALID BUSS ADDRESS, TRY AGAIN/
3210  020236  020104  052502  051523
3211  020244  040440  042104  042522
```

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3212  020252  051523  020054  051124
3213  020260  020131  043501  044501
3214  020266  000116
3215  020270  051105  050122  020103  DH1:    .ASCIZ  /ERRPC   VTNOW   TSTNUM/
3216  020276  020040  052126  047516
3217  020304  020127  020040  051524
3218  020312  047124  046525     000
3219  020317     105  051122  041520  DH3:    .ASCIZ  /ERRPC   VTNOW   1ST WD  2ND WD  3RD WD/
3220  020324  020040  053040  047124
3221  020332  053517  020040  030440
3222  020340  052123  053440  020104
3223  020346  031040  042116  053440
3224  020354  020104  031440  042122
3225  020362  053440  000104
3226  020366  051105  050122  020103  DH4:    .ASCIZ  /ERRPC   VTNOW   TSTNUM   EXPCT   RECV/
3227  020374  020040  052126  047516
3228  020402  020127  020040  051524
3229  020410  047124  046525  020040
3230  020416  042440  050130  052103
3231  020424  020040  051040  041505
3232  020432  000126
3233                                    .EVEN
3234  020434  001116  001246  001252  DT1:    $ERRPC,VTNOW,TSTNUM,0
3235  020442  000000
3236  020444  001116  001246  001330  DT3:    $ERRPC,VTNOW,SAVE4,SAVE2,SAVE3,0
3237  020452  001324  001326  000000
3238  020460  001116  001246  001252  DT4:    $ERRPC,VTNOW,TSTNUM,$GDDAT,$BDDAT,0
3239  020466  001124  001126  000000
3240
3241                                    .SBTTL  KEYBOARD CHARACTER CODE TABLES
3242
3243                                    ;THE ACTUAL KEYBOARD LAYOUT IS REQUIRED
3244
3245  020474  020530  020564  020622  V50RW:  ROW1,ROW2,ROW3,ROW4,ROW1S,ROW1S,ROW1C
3246  020502  020652  021052  021052
3247  020510  021144
3248  020512  020700  020736  020774  V52RW:  ROW12,ROW22,ROW32,ROW42,ROW12S,ROW12S,ROW12C
3249  020520  021026  021106  021106
3250  020526  021200
3251
3252
3253  020530  000033  000061  000062  ROW1:   .WORD   33,61,62,63,64,65,66,67,70,71,60,55,75,100010
3254  020536  000063  000064  000065
3255  020544  000066  000067  000070
3256  020552  000071  000060  000055
3257  020560  000075  100010
3258  020564  000011  000121  000127  ROW2:   .WORD   11,121,127,105,122,124,131,125,111,117,120,133,134,12,100177
3259  020572  000105  000122  000124
3260  020600  000131  000125  000111
3261  020606  000117  000120  000133                  /
3262  020614  000134  000012  100177
3263  020622  000101  000123  000104  ROW3:   .WORD   101,123,104,106,107,110,112,113,114,73,47,100015
3264  020630  000106  000107  000110
3265  020636  000112  000113  000114
3266  020644  000073  000047  100015
3267  020652  000132  000130  000103  ROW4:   .WORD   132,130,103,126,102,116,115,54,56,100057
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3268  020660  000126  000102  000116
3269  020666  000115  000054  000056
3270  020674  100057
3271  020676  100040                  ROW5:   .WORD   100040
3272                                          ;VT52 KEYBOARD EQUIVALENCES(LOWER CASE CHAR.)
3273
3274  020700  000033  000061  000062  ROW12:  .WORD   33,61,62,63,64,65,66,67,70,71,60,55,75,140,100010
3275  020706  000063  000064  000065
3276  020714  000066  000067  000070
3277  020722  000071  000060  000055
3278  020730  000075  000140  100010
3279  020736  000011  000161  000167  ROW22:  .WORD   11,161,167,145,162,164,171,165,151,157,160,133,134,12,100177
3280  020744  000145  000162  000164
3281  020752  000171  000165  000151
3282  020760  000157  000160  000133
3283  020766  000134  000012  100177
3284  020774  000141  000163  000144  ROW32:  .WORD   141,163,144,146,147,150,152,153,154,73,47,173,100015
3285  021002  000146  000147  000150
3286  021010  000152  000153  000154
3287  021016  000073  000047  000173
3288  021024  100015
3289  021026  000172  000170  000143  ROW42:  .WORD   172,170,143,166,142,156,155,54,56,100057
3290  021034  000166  000142  000156
3291  021042  000155  000054  000056
3292  021050  100057
3293
3294                                  ;SHIFTED ROW CODES
3295
3296  021052  000033  000041  000100  ROW1S:  .WORD   33,41,100,43,44,45,136,46,52,50,51,137,53,100010
3297  021060  000043  000044  000045
3298  021066  000136  000046  000052
3299  021074  000050  000051  000137
3300  021102  000053  100010
3301  021106  000033  000041  000100  ROW12S: .WORD   33,41,100,43,44,45,136,46,52,50,51,137,53,176,100010
3302  021114  000043  000044  000045
3303  021122  000136  000046  000052
3304  021130  000050  000051  000137
3305  021136  000053  000176  100010
3306
3307                                  ;CONTROL ROW CODES
3308
3309  021144  000033  000021  000022  ROW1C:  .WORD   33,21,22,23,24,25,26,27,30,31,20,15,35,100010
3310  021152  000023  000024  000025
3311  021160  000026  000027  000030
3312  021166  000031  000020  000015
3313  021174  000035  100010
3314  021200  000033  000021  000022  ROW12C: .WORD   33,21,22,23,24,25,26,27,30,31,20,15,35,0,100010
3315  021206  000023  000024  000025
3316  021214  000026  000027  000030
3317  021222  000031  000020  000015
3318  021230  000035  000000  100010
3319
3320                                          ;VT52   ESCAPE SEQUENCES
3321  021236     033     111     015  REVLF:  .BYTE   33,111,015,377,0        ;REVERSE LINE FEED.
3322  021241     377     000
3323
```

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3324  021243  033     075     377  ENAKP:  .BYTE   33,075,377,0,0          ;ENABLE ALTERNATE KEYPAD MODE.
3325  021246  000     000
3326  021250  033     076     377  EXAKP:  .BYTE   33,076,377,0,0          ;EXIT ALTERNATE KEYPAD MODE
3327  021253  000     000
3328
3329  021255  033     106     000  ENGRAF: .BYTE   33,106,0,377,0          ;ENTER GRAPHICS MODE.
3330  021260  377     000
3331  021262  033     107     000  EXGRAF: .BYTE   33,107,0,377,0          ;EXIT GRAPHICS MODE.
3332  021265  377     000
3333
3334  021267  033     127     377  ENPNTM: .BYTE   33,127,377,0,0          ;ENABLE PRINTER CONTROLLER MODE.
3335  021272  000     000
3336  021274  033     130     377  EXPNTM: .BYTE   33,130,377,0,0          ;DISABLE PRINTER CONTROLLER MODE.
3337  021277  000     000
3338
3339
3340                                ;VT50-H KEYPAD CODES
3341
3342          021302                        .EVEN
3343  021302  000033  000120  000033  ROW6:   .WORD   33,'P,33,'Q,33,'R,33,100101
3344  021310  000121  000033  000122
3345  021316  000033  100101
3346  021322  000067  000070  000071  ROW7:   .WORD   67,70,71.33,100102
3347  021330  000033  100102
3348  021334  000064  000065  000066  ROW8:   .WORD   64,65,66,33,100103
3349  021342  000033  100103
3350  021346  000061  000062  000063  ROW9:   .WORD   61,62,63,33,100104
3351  021354  000033  100104
3352  021360  000060  000056  100015  ROW10:  .WORD   60,56,100015
3353  021366  000033  000120  000033  ROW6A:  .WORD   33,'P,33,'Q,33,'R,33,100101
3354  021374  000121  000033  000122
3355  021402  000033  100101
3356  021406  000033  000077  000167  ROW7A:  .WORD   33,'?,167,33,'?,170,33,'?,171,33,100102
3357  021414  000033  000077  000170
3358  021422  000033  000077  000171
3359  021430  000033  100102
3360  021434  000033  000077  000164  ROW8A:  .WORD   33,'?,164,33,'?,165,33,'?,166,33,100103
3361  021442  000033  000077  000165
3362  021450  000033  000077  000166
3363  021456  000033  100103
3364  021462  000033  000077  000161  ROW9A:  .WORD   33,'?,161,33,'?,162,33,'?,163,33,100104
3365  021470  000033  000077  000162
3366  021476  000033  000077  000163
3367  021504  000033  100104
3368  021510  000033  000077  000160  ROW10A: .WORD   33,'?,160,33,'?,156,33,'?,100115
3369  021516  000033  000077  000156
3370  021524  000033  000077  100115
3371  021532  005015  052012  044510  MTEXTO: .ASCIZ  <15><12><12>/THIS SOFTWARE IS FURNISHED TO PURCHASER UNDER A LICENSE FOR
3372  021540  020123  047523  052106
3373  021546  040527  042522  044440
3374  021554  020123  052506  047122
3375  021562  051511  042510  020104
3376  021570  047524  050040  051125
3377  021576  044103  051501  051105
3378  021604  052440  042116  051105
3379  021612  040440  046040  041511
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3380  021620  047105  042523  043040
3381  021626  051117  052440  042523
3382  021634  000377
3383  021636  005015  047117  040440  MTEXT1: .ASCIZ  <15><12>/ON A SINGLE COMPUTER SYSTEM AND CAN BE COPIED (WITH INCLUSION/<
3384  021644  051440  047111  046107
3385  021652  020105  047503  050115
3386  021660  052125  051105  051440
3387  021666  051531  042524  020115
3388  021674  047101  020104  040503
3389  021702  020116  042502  041440
3390  021710  050117  042511  020104
3391  021716  053450  052111  020110
3392  021724  047111  046103  051525
3393  021732  047511  177516  000
3394  021737  015  047412  020106  MTEXT2: .ASCIZ  <15><12>/OF DEC'S COPYRIGHT NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT/
3395  021744  042504  023503  020123
3396  021752  047503  054520  044522
3397  021760  044107  020124  047516
3398  021766  044524  042503  020051
3399  021774  047117  054514  043040
3400  022002  051117  052440  042523
3401  022010  044440  020116  052523
3402  022016  044103  051440  051531
3403  022024  042524  026115  042440
3404  022032  041530  050105  177524
3405  022040  000
3406  022041  015  040412  020123  MTEXT3: .ASCIZ  <15><12>/AS MAY OTHERWISE BE PROVIDED IN WRITING BY DEC./<377>
3407  022046  040515  020131  052117
3408  022054  042510  053522  051511
3409  022062  020105  042502  050040
3410  022070  047522  044526  042504
3411  022076  020104  047111  053440
3412  022104  044522  044524  043516
3413  022112  041040  020131  042504
3414  022120  027103  000377
3415
3416  022124  005015  052012  042510  MTEXT4: .ASCIZ  <15><12><12>/THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHO
3417  022132  044440  043116  051117
3418  022140  040515  044524  047117
3419  022146  044440  020116  044124
3420  022154  051511  042040  041517
3421  022162  046525  047105  020124
3422  022170  051511  051440  041125
3423  022176  042512  052103  052040
3424  022204  020117  044103  047101
3425  022212  042507  053440  052111
3426  022220  047510  052125  000377
3427  022226  005015  047516  044524  MTEXT5: .ASCIZ  <15><12>/NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL/<
3428  022234  042503  040440  042116
3429  022242  051440  047510  046125
3430  022250  020104  047516  020124
3431  022256  042502  041440  047117
3432  022264  052123  052522  042105
3433  022272  040440  020123  020101
3434  022300  047503  046515  052111
3435  022306  042515  052116  041040
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3436  022314  020131  044504  044507
3437  022322  040524  177514     000
3438  022327     015  042412  052521  MTEXT6: .ASCIZ  <15><12>/EQUIPMENT CORPORATION./<377>
3439  022334  050111  042515  052116
3440  022342  041440  051117  047520
3441  022350  040522  044524  047117
3442  022356  177456     000
3443  022361     015  005012  042504  MTEXT7: .ASCIZ  <15><12><12>/DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF
3444  022366  020103  051501  052523
3445  022374  042515  020123  047516
3446  022402  051040  051505  047520
3447  022410  051516  041111  046111
3448  022416  052111  020131  047506
3449  022424  020122  044124  020105
3450  022432  051525  020105  051117
3451  022440  051040  046105  040511
3452  022446  044502  044514  054524
3453  022454  047440  177506     000
3454  022461     015  044412  051524  MTEXT8: .ASCII  <15><12>/ITS SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC./
3455  022466  051440  043117  053524
3456  022474  051101  020105  047117
3457  022502  042440  052521  050111
3458  022510  042515  052116  053440
3459  022516  044510  044103  044440
3460  022524  020123  047516  020124
3461  022532  052523  050120  044514
3462  022540  042105  041040  020131
3463  022546  042504  027103
3464  022552     015     012     377          .BYTE   15,12,377,0
3465  022555     000
3466                                          .EVEN
3467                                  .SBTTL  TTY INPUT ROUTINE
3468
3469                                  ;;**********************************************************************
3470                                  .ENABL  LSB
3471
3472                                  .DSABL  LSB
3473
3474
3475                                  ;;**********************************************************************
3476                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
3477                                  ;*CALL:
3478                                  ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
3479                                  ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
3480                                  ;*                              ;;WITH PARITY BIT STRIPPED OFF
3481                                  ;
3482
3483  022556  011646          $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
3484  022560  016666  000004  000002  MOV     4(SP),2(SP)     ;;SAVE THE PS
3485  022566  105777  156352  1$:     TSTB    @$TKS           ;;WAIT FOR
3486  022572  100375          BPL     1$              ;;A CHARACTER
3487  022574  117766  156346  000004  MOVB    @$TKB,4(SP)     ;;READ THE TTY
3488  022602  042766  177600  000004  BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
3489  022610  026627  000004  000023  CMP     4(SP),#23       ;;IS IT A CONTROL-S?
3490  022616  001013          BNE     3$              ;;BRANCH IF NO
3491  022620  105777  156320  2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
```

```
3492  022624  100375                        BPL     2$                      ;;LOOP UNTIL ITS THERE
3493  022626  117746  156314                MOVB    @$TKB,-(SP)             ;;GET CHARACTER
3494  022632  042716  177600                BIC     #^C177,(SP)             ;;MAKE IT 7-BIT ASCII
3495  022636  022627  000021                CMP     (SP)+,#21               ;;IS IT A CONTROL-Q?
3496  022642  001366                        BNE     2$                      ;;IF NOT DISCARD IT
3497  022644  000750                        BR      1$                      ;;YES, RESUME
3498  022646  026627  000004  000140  3$:   CMP     4(SP),#140              ;;IS IT UPPER CASE?
3499  022654  002407                        BLT     4$                      ;;BRANCH IF YES
3500  022656  026627  000004  000175        CMP     4(SP),#175              ;;IS IT A SPECIAL CHAR?
3501  022664  003003                        BGT     4$                      ;;BRANCH IF YES
3502  022666  042766  000040  000004        BIC     #40,4(SP)               ;;MAKE IT UPPER CASE
3503  022674  000002                4$:     RTI                             ;;GO BACK TO USER
3504                                        ;;**************************************************************
3505                                        ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
3506                                        ;*CALL:
3507                                        ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
3508                                        ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
3509                                        ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
3510
3511  022676  010346                $RDLIN: MOV     R3,-(SP)                ;;SAVE R3
3512  022700  012703  023004        1$:     MOV     #$TTYIN,R3              ;;GET ADDRESS
3513  022704  022703  023014        2$:     CMP     #$TTYIN+8.,R3           ;;BUFFER FULL?
3514  022710  101405                        BLOS    4$                      ;;BR IF YES
3515  022712  104406                        RDCHR                           ;;GO READ ONE CHARACTER FROM THE TTY
3516  022714  112613                        MOVB    (SP)+,(R3)              ;;GET CHARACTER
3517  022716  122713  000177        10$:    CMPB    #177,(R3)               ;;IS IT A RUBOUT
3518  022722  001003                        BNE     3$                      ;;SKIP IF NOT
3519  022724  104401  001166        4$:     TYPE    ,$QUES                  ;;TYPE A '?'
3520  022730  000763                        BR      1$                      ;;CLEAR THE BUFFER AND LOOP
3521  022732  111337  023002        3$:     MOVB    (R3),9$                 ;;ECHO THE CHARACTER
3522  022736  104401  023002                TYPE    ,9$
3523  022742  122723  000015                CMPB    #15,(R3)+               ;;CHECK FOR RETURN
3524  022746  001356                        BNE     2$                      ;;LOOP IF NOT RETURN
3525  022750  105063  177777                CLRB    -1(R3)                  ;;CLEAR RETURN (THE 15)
3526  022754  104401  001170                TYPE    ,$LF                    ;;TYPE A LINE FEED
3527  022760  012603                        MOV     (SP)+,R3                ;;RESTORE R3
3528  022762  011646                        MOV     (SP),-(SP)              ;;ADJUST THE STACK AND PUT ADDRESS OF THE
3529  022764  016666  000004  000002        MOV     4(SP),2(SP)             ;;      FIRST ASCII CHARACTER ON IT
3530  022772  012766  023004  000004        MOV     #$TTYIN,4(SP)
3531  023000  000002                        RTI                             ;;RETURN
3532  023002     000                9$:     .BYTE   0                       ;;STORAGE FOR ASCII CHAR. TO TYPE
3533  023003     000                        .BYTE   0                       ;;TERMINATOR
3534  023004  000010                $TTYIN: .BLKB   8.                      ;;RESERVE 8 BYTES FOR TTY INPUT
3535  023014  052536  005015  000  $CNTLU: .ASCIZ  /^U/<15><12>            ;;CONTROL "U"
3536  023021     136  006507  000012 $CNTLG: .ASCIZ  /^G/<15><12>          ;;CONTROL "G"
3537  023026  005015  053523  020122 $MSWR:  .ASCIZ  <15><12>/SWR = /
3538  023034  020075     000
3539  023037     040  047040  053505 $MNEW:  .ASCIZ  /  NEW = /
3540  023044  036440  000040
3541                                    .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
3542
3543                                    ;;**************************************************************
3544                                    ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
3545                                    ;*CHANGE IT TO BINARY.
3546                                    ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
3547                                    ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
```

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                                        ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
                                        ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
                                        ;*CALL:
                                        ;*      RDOCT                   ;;READ AN OCTAL NUMBER
                                        ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
                                        ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT

023050  011646                  $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
023052  016666  000004  000002          MOV     4(SP),2(SP)     ;;INPUT NUMBER
023060  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
023062  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
023064  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
023066  104407                  1$:     RDLIN                   ;;READ AN ASCIZ LINE
023070  012600                          MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
023072  010037  023176                  MOV     R0,5$           ;;AND SAVE IT
023076  005001                          CLR     R1              ;;CLEAR DATA WORD
023100  005002                          CLR     R2
023102  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
023104  001420                          BEQ     3$              ;;IF ZERO GET OUT
023106  122716  000060                  CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
023112  003026                          BGT     4$              ;;IS AN OCTAL DIGIT
023114  122716  000067                  CMPB    #'7,(SP)
023120  002423                          BLT     4$
023122  006301                          ASL     R1              ;;*2
023124  006102                          ROL     R2
023126  006301                          ASL     R1              ;;*4
023130  006102                          ROL     R2
023132  006301                          ASL     R1              ;;*8
023134  006102                          ROL     R2
023136  042716  177770                  BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
023142  062601                          ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
023144  000756                          BR      2$              ;;LOOP
023146  005726                  3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
023150  010166  000012                  MOV     R1,12(SP)       ;;SAVE THE RESULT
023154  010237  023206                  MOV     R2,$HIOCT
023160  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
023162  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
023164  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
023166  000002                          RTI                     ;;RETURN
023170  005726                  4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
023172  105010                          CLRB    (R0)            ;;SET A TERMINATOR
023174  104401                          TYPE                    ;;TYPE UP THRU THE BAD CHAR.
023176  000000                  5$:     .WORD   0
023200  104401  001166                  TYPE    ,$QUES          ;;"?" "CR" & "LF"
023204  000730                          BR      1$              ;;TRY AGAIN
023206  000000                  $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
023210  105777  155724          MSCOPE: TSTB    @$SWR           ;TEST BIT 7
023214  100003                          BPL     $SCOPE          ;NOT SET
023216  005737  011024                  TST     LOOP            ;TEST LOOP
023222  001041                          BNE     $OVER           ;SET LOOP ON TEST

                                .SBTTL  SCOPE HANDLER ROUTINE

                                ;;**************************************************************
                                ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
```

```
                                ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW14=1         LOOP ON TEST
                                ;*SW08=1         LOOP ON TEST IN SWR<7:0>
                                ;*CALL
                                ;*      SCOPE           ;;SCOPE=IOT

023224                          $SCOPE:
023224  032777  040000  155706  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
023232  001035                          BNE     $OVER           ;;YES IF SW14=1
                                ;*****START OF CODE FOR THE XOR TESTER*****
023234  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
023236  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
023242  012737  023262  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
023250  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
023254  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
023260  000414                          BR      $SVLAD          ;;GO TO THE NEXT TEST
023262  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
023264  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
023270  000416                          BR      $OVER           ;;LOOP ON THE PRESENT TEST
023272                          6$:;*****END OF CODE FOR THE XOR TESTER*****
023272  032777  000400  155640          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
023300  001404                          BEQ     $SVLAD          ;;BR IF NO
023302  127737  155632  001102          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
023310  001406                          BEQ     $OVER           ;;BR IF YES
023312  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
023316  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
023322  105037  001103                  CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
023326  013777  001102  155606  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
023334  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
023340  000002                          RTI                     ;;FIXES PS

                                .SBTTL  ERROR HANDLER ROUTINE

                                ;;**************************************************************
                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT.
                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                ;*AND GO TO $ERRTYP ON ERROR
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW15=1         HALT ON ERROR
                                ;*SW13=1         INHIBIT ERROR TYPEOUTS
                                ;*CALL
                                ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER

023342                          $ERROR:
023342  113737  001102  001252          MOVB    $TSTNM,TSTNUM
023350  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
023354  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
023356  013777  001102  155556          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
023364  005237  001112                  INC     $ERTTL          ;;INC THE ERROR COUNT
023370  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
023374  162737  000002  001116          SUB     #2,$ERRPC
023402  117737  155510  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
023410  032777  020000  155522          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
023416  001004                          BNE     20$             ;;SKIP TYPEOUTS
```

```
                                ERROR HANDLER ROUTINE

                        JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
                        TYPE    ,$CRLF
                20$:
                2$:     TST     @SWR            ;;HALT ON ERROR
                        BPL     3$              ;;SKIP IF CONTINUE
                        HALT                    ;;HALT ON ERROR!
                3$:
                        CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
                        BNE     6$              ;;BRANCH IF NO
                        HALT                    ;;YES
                6$:
                        RTI                     ;;RETURN

                .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE

                ;;**************************************************************
                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
                ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.

                $ERRTYP:
                        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
                        MOV     R0,-(SP)        ;;SAVE R0
                        CLR     R0              ;;PICKUP THE ITEM INDEX
                        BISB    @#$ITEMB,R0
                        BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                ;;TYPE THE PC OF THE ERROR
                        MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                ;;ERROR ADDRESS
                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                        BR      6$              ;;GET OUT
                1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
                        ASL     R0              ;;      WORK FOR THE ERROR TABLE
                        ASL     R0
                        ASL     R0
                        ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
                        MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
                        BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
                        TYPE                    ;;TYPE THE "ERROR MESSAGE"
                2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
                        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
                3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
                        BEQ     5$              ;;SKIP TYPEOUT IF 0
                        TYPE                    ;;TYPE THE "DATA HEADER"
                4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
                        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
                5$:     MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
                        BNE     7$              ;;GO TYPE THE DATA
                6$:     MOV     (SP)+,R0        ;;RESTORE R0
                        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
                        RTS     PC              ;;RETURN
                7$:
                        MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                        TST     (R0)            ;;IS THERE ANOTHER NUMBER?
                        BEQ     6$              ;;BR IF NO
```

```
3716  023576  104401  023604          TYPE    ,8$             ;;TYPE TWO(2) SPACES
3717  023602  000771                  BR      7$              ;;LOOP
3718  023604  020040      000   8$:   .ASCIZ  /  /            ;;TWO(2) SPACES
3719          023610                  .EVEN
3720
3721                                  .SBTTL  TYPE ROUTINE
3722
3723                                  ;;*****************************************************************
3724                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
3725                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
3726                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
3727                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
3728                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
3729                                  ;*
3730                                  ;*CALL:
3731                                  ;*1) USING A TRAP INSTRUCTION
3732                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
3733                                  ;*OR
3734                                  ;*      TYPE
3735                                  ;*      MESADR
3736                                  ;*
3737
3738  023610  105737  001157  $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
3739  023614  100002                  BPL     1$              ;;BR IF YES
3740  023616  000000                  HALT                    ;;HALT HERE IF NO TERMINAL
3741  023620  000407                  BR      3$              ;;LEAVE
3742  023622  010046          1$:     MOV     R0,-(SP)        ;;SAVE R0
3743  023624  017600  000002          MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
3744  023630  112046          2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
3745  023632  001005                  BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
3746  023634  005726                  TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
3747  023636  012600          60$:    MOV     (SP)+,R0        ;;RESTORE R0
3748  023640  062716  000002  3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
3749  023644  000002                  RTI                     ;;RETURN
3750  023646  122716  000011  4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
3751  023652  001430                  BEQ     8$
3752  023654  122716  000200          CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
3753  023660  001006                  BNE     5$
3754  023662  005726                  TST     (SP)+           ;;POP  <CR><LF> EQUIV
3755  023664  104401                  TYPE                    ;;TYPE A CR AND LF
3756  023666  001167                  $CRLF
3757  023670  105037  024024          CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
3758  023674  000755                  BR      2$              ;;GET NEXT CHARACTER
3759  023676  004737  023760  5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
3760  023702  123726  001156  6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
3761  023706  001350                  BNE     2$              ;;IF NO GO GET NEXT CHAR.
3762  023710  013746  001154          MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
3763                                                          ;;AND THE NULL CHAR.
3764  023714  105366  000001  7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
3765  023720  002770                  BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
3766  023722  004737  023760          JSR     PC,$TYPEC       ;;GO TYPE A NULL
3767  023726  105337  024024          DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
3768  023732  000770                  BR      7$              ;;LOOP
3769
3770                                  ;HORIZONTAL TAB PROCESSOR
3771
```

```
3772  023734  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
3773  023740  004737  023760          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
3774  023744  132737  000007  024024          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
3775  023752  001372                          BNE     9$              ;;TAB STOP
3776  023754  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
3777  023756  000724                          BR      2$              ;;GET NEXT CHARACTER
3778  023760  105777  155164          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
3779  023764  100375                          BPL     $TYPEC
3780  023766  116677  000002  155156          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
3781  023774  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
3782  024002  001003                          BNE     1$              ;;BRANCH IF NO
3783  024004  105037  024024                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
3784  024010  000406                          BR      $TYPEX          ;;EXIT
3785  024012  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
3786  024020  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
3787  024022  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
3788  024024  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
3789  024026  000207          $TYPEX: RTS     PC
3790
3791
3792                                  .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
3793
3794                                  ;;**************************************************************
3795                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
3796                                  ;*OCTAL (ASCII) NUMBER AND TYPE IT.
3797                                  ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
3798                                  ;*CALL:
3799                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
3800                                  ;*      TYPOS                   ;;CALL FOR TYPEOUT
3801                                  ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
3802                                  ;*      .BYTE   M               ;;M=1 OR 0
3803                                  ;*                                      ;;1=TYPE LEADING ZEROS
3804                                  ;*                                      ;;0=SUPPRESS LEADING ZEROS
3805                                  ;*
3806                                  ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
3807                                  ;*$TYPOS OR $TYPOC
3808                                  ;*CALL:
3809                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
3810                                  ;*      TYPON                   ;;CALL FOR TYPEOUT
3811                                  ;*
3812                                  ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
3813                                  ;*CALL:
3814                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
3815                                  ;*      TYPOC                   ;;CALL FOR TYPEOUT
3816
3817  024030  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
3818  024034  116637  000001  024253          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
3819  024042  112637  024255                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
3820  024046  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
3821  024052  000406                          BR      $TYPON
3822  024054  112737  000001  024253  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
3823  024062  112737  000006  024255          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
3824  024070  112737  000005  024252  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
3825  024076  010346                          MOV     R3,-(SP)        ;;SAVE R3
3826  024100  010446                          MOV     R4,-(SP)        ;;SAVE R4
3827  024102  010546                          MOV     R5,-(SP)        ;;SAVE R5
```

```
3828  024104  113704  024255              MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
3829  024110  005404                      NEG     R4
3830  024112  062704  000006              ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
3831  024116  110437  024254              MOVB    R4,$OMODE       ;;SAVE IT FOR USE
3832  024122  113704  024253              MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
3833  024126  016605  000012              MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
3834  024132  005003                      CLR     R3              ;;CLEAR THE OUTPUT WORD
3835  024134  006105              1$:     ROL     R5              ;;ROTATE MSB INTO "C"
3836  024136  000404                      BR      3$              ;;GO DO MSB
3837  024140  006105              2$:     ROL     R5              ;;FORM THIS DIGIT
3838  024142  006105                      ROL     R5
3839  024144  006105                      ROL     R5
3840  024146  010503                      MOV     R5,R3
3841  024150  006103              3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
3842  024152  105337  024254              DECB    $OMODE          ;;TYPE THIS DIGIT?
3843  024156  100016                      BPL     7$              ;;BR IF NO
3844  024160  042703  177770              BIC     #177770,R3      ;;GET RID OF JUNK
3845  024164  001002                      BNE     4$              ;;TEST FOR 0
3846  024166  005704                      TST     R4              ;;SUPPRESS THIS 0?
3847  024170  001403                      BEQ     5$              ;;BR IF YES
3848  024172  005204              4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
3849  024174  052703  000060              BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
3850  024200  052703  000040      5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
3851  024204  110337  024250              MOVB    R3,8$           ;;SAVE FOR TYPING
3852  024210  104401  024250              TYPE    ,8$             ;;GO TYPE THIS DIGIT
3853  024214  105337  024252      7$:     DECB    $OCNT           ;;COUNT BY 1
3854  024220  003347                      BGT     2$              ;;BR IF MORE TO DO
3855  024222  002402                      BLT     6$              ;;BR IF DONE
3856  024224  005204                      INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
3857  024226  000744                      BR      2$              ;;GO DO THE LAST DIGIT
3858  024230  012605              6$:     MOV     (SP)+,R5        ;;RESTORE R5
3859  024232  012604                      MOV     (SP)+,R4        ;;RESTORE R4
3860  024234  012603                      MOV     (SP)+,R3        ;;RESTORE R3
3861  024236  016666  000002  000004      MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
3862  024244  012616                      MOV     (SP)+,(SP)
3863  024246  000002                      RTI                     ;;RETURN
3864  024250     000              8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
3865  024251     000                      .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
3866  024252     000              $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
3867  024253     000              $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
3868  024254  000000              $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
3869                                      .SBTTL  RANDOM NUMBER GENERATOR ROUTINE
3870
3871                                      ;;**************************************************************
3872                                      ;*THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
3873                                      ;*WITH A RANGE OF 0 TO 2(+33)-1.
3874                                      ;*CALL:
3875                                      ;*      JSR     PC,$RAND        ;;CALL THE ROUTINE
3876                                      ;*      RETURN                  ;;RETURN HERE THE RANDOM
3877                                      ;*                              ;;NUMBER WILL BE IN
3878                                      ;*                              ;;$HINUM,$LONUM
3879
3880  024256                              $RAND:
3881  024256  010046                      MOV     R0,-(SP)        ;;PUSH R0 ON STACK
3882  024260  010146                      MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3883  024262  010246                      MOV     R2,-(SP)        ;;PUSH R2 ON STACK
```

```
                        MOV     $LONUM,R0       ;;SET R0 WITH LOW
                        MOV     $HINUM,R1       ;;SET R1 WITH HIGH
                        MOV     #-7,R2          ;;SET SHIFT COUNT
                1$:     ASL     R0              ;;SHIFT R0 LEFT AND
                        ROL     R1              ;;ROTATE CARRY INTO R1 AND
                        INC     R2              ;;CHECK FOR DONE
                        BNE     1$              ;;CONTINUE SHIFT LOOP
                        ADD     $LONUM,R0       ;;ADD NUMBER TO MAKE X 129
                        ADC     R1              ;;PROPOGATE CARRY
                        ADD     $HINUM,R1       ;;ADD NUMBER TO MAKE X 129
                        ADD     #1057,R0        ;;ADD LOW CONSTANT
                        ADC     R1              ;;PROPOGATE CARRY
                        ADD     #47401,R1       ;;ADD HIGH CONSTANT
                        MOV     R0,$LONUM       ;;SAVE R0
                        MOV     R1,$HINUM       ;;SAVE R1
                        MOV     (SP)+,R2        ;;POP STACK INTO R2
                        MOV     (SP)+,R1        ;;POP STACK INTO R1
                        MOV     (SP)+,R0        ;;POP STACK INTO R0
                        RTS     PC              ;;RETURN
                $HINUM: .WORD   176543
                $LONUM: .WORD   123456
                .SBTTL  TRAP DECODER

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

                $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
                        MOV     2(SP),R0        ;;GET TRAP ADDRESS
                        TST     -(R0)           ;;BACKUP BY 2
                        MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
                        ASL     R0              ;;POSITION FOR INDEXING
                        MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
                        RTS     R0              ;;GO TO ROUTINE


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

                $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
                        MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
                        RTI                     ;;RESTORE THE PSW

                .SBTTL  TRAP TABLE

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

                ;       ROUTINE
                ;       -------
                $TRPAD: .WORD   $TRAP2
                        $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
                        $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
                        $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
                        $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
```

```
3940  024426  012332                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
3941
3942
3943  024430  022556                          $RDCHR  ;;CALL=RDCHR    TRAP+6(104406)  TTY TYPEIN CHARACTER ROUTINE
3944  024432  022676                          $RDLIN  ;;CALL=RDLIN    TRAP+7(104407)  TTY TYPEIN STRING ROUTINE
3945  024434  023050                          $RDOCT  ;;CALL=RDOCT    TRAP+10(104410) READ AN OCTAL NUMBER FROM TTY
3946                                  .SBTTL  POWER DOWN AND UP ROUTINES
3947
3948                                  ;;**************************************************************
3949                                  ;POWER DOWN ROUTINE
3950  024436  012737  024576  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
3951  024444  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
3952  024452  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
3953  024454  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3954  024456  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3955  024460  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
3956  024462  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
3957  024464  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
3958  024466  017746  154446                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
3959  024472  010637  024602                  MOV     SP,$SAVR6       ;;SAVE SP
3960  024476  012737  024510  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
3961  024504  000000                          HALT
3962  024506  000776                          BR      .-2             ;;HANG UP
3963
3964                                  ;;**************************************************************
3965                                  ;POWER UP ROUTINE
3966  024510  012737  024576  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
3967  024516  013706  024602                  MOV     $SAVR6,SP       ;;GET SP
3968  024522  005037  024602                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
3969  024526  005237  024602          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
3970  024532  001375                          BNE     1$              ;;OF  WORD
3971  024534  012677  154400                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
3972  024540  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
3973  024542  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
3974  024544  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
3975  024546  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
3976  024550  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
3977  024552  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
3978  024554  012737  024436  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
3979  024562  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
3980  024570  104401                          TYPE                    ;REPORT THE POWER FAILURE
3981  024572  024604                  $PWRMG: .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
3982  024574  000002                          RTI
3983  024576  000000                  $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
3984  024600  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
3985  024602  000000                  $SAVR6: 0                       ;;PUT THE SP HERE
3986  024604  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
3987  024612  000122
3988                                          .EVEN
3989  024614  000000                  BUFFER: 0
3990          000001                          .END
```

```
A       007426          2012#
ADELAY  011544           997   1891   2426#
AMSG    011616           978    980   1019  1092  1103  1124  1148  1172  1260  1264  1271  1358  1402
                        1435   1438   1460  1468  1552  1554  1561  1566  1579  1582  1601  1603  1605
                        1610   1615   1634  1636  1648  1656  1661  1670  1683  1691  1702  1707  1710
                        1718   1730   1735  1738  1746  1763  1772  1778  1785  1797  1799  1810  1820
                        1826   1836   1838  1850  1934  1964  2012  2017  2020  2025  2032  2035  2040
                        2045   2051   2056  2059  2062  2067  2072  2075  2078  2082  2087  2090  2098
                        2101   2105   2109  2113  2117  2122  2124  2127  2131  2135  2139  2143  2146
                        2151   2159   2297  2300  2444#  2479  2549
ANESC   011040          2211*  2213*  2217  2293#
AXOFF   011032          1550*  1578*  2241*  2290#
B       007470          2024#
BEGIN   001340           753    885#
BEGIN1  001430           755    898#
BEGIN2  001440           756    900#
BEGIN3  001420           757    896#
BFCHAR  007332          1951   1989#
BFCHR   007272          1945   1951   1970#
BIT0  = 000001           717#  2491   2512
BIT00 = 000001           707#   717
BIT01 = 000002           706#   716
BIT02 = 000004           705#   715
BIT03 = 000010           704#   714
BIT04 = 000020           703#   713
BIT05 = 000040           702#   712
BIT06 = 000100           701#   711
BIT07 = 000200           700#   710
BIT08 = 000400           699#   709   3626
BIT09 = 001000           698#   708   1597  2006  2015  2030  2054  2070  2085
BIT1  = 000002           716#  2489
BIT10 = 002000           697#  1628   1794
BIT11 = 004000           696#  1036   1626
BIT12 = 010000           695#  2096   2412
BIT13 = 020000           694#  1223   1236  1455  3658
BIT14 = 040000           693#  1623   3612
BIT15 = 100000           692#  1544
BIT2  = 000004           715#  2486
BIT3  = 000010           714#
BIT4  = 000020           713#
BIT5  = 000040           712#
BIT6  = 000100           711#
BIT7  = 000200           710#  2488   2493  2516  2520
BIT8  = 000400           709#
BIT9  = 001000           708#
BPTVEC= 000014           724#
BUFFER  024614          1177   1216   1274  1338  1367  1412  1462*  1463*  1470*  1471*  1480  1487*  1498
                        1517*  1518*  1519*  2173  2185  2201  2349  2369  2385  2663  3989#
BUSSTR  001334           882#   888
C       007504          2029#
COPTST  005356          1599   1618#
CR    = 000015           632#  3781   3791
CRLF  = 000200           633#  3752   3791
CRLFA   016174          1583   1708   1736  2998#
CRLFB   016163          1261   1265   1553  1555  2995#
D       007572          2051#
```

```
DCATST  004456          1464    1472    1476#
DDISP = 177570           639#    787     926
DELAY   011436          1045    1097    1119    1136    1142    1161    1167    1211    1259    1332    1363    1396    1406
                        1429    1443    1465    1473    1591    1617    1644    1650    1663    1585    1712    1740    1765
                        1787    1812    1829    1846    1852    2400#
DH1     020270           823     829    3215#
DH3     020317           835    3219#
DH4     020366           841    3226#
DIG0    011726          1939    2470*   2473#   2528    2540
DIG1    011730          1940    2463*   2474#   2529    2541
DIG2    011732          1941    2456*   2475#   2530    2542
DISPCH  006612          1776    1855#
DISPLA  001142           787#    926*    934*   3633*   3653*
DISPRE  000174           750#    934
DSPCH   011152          2313    2317    2318    2322#
DSWR  = 177570           638#    786     925
DTPSR   011330          1107    1673    2369#
DTPSRA  011356          2376#   2379
DTPSRB  011334          1111    1676    2370#
DT1     020434           824     830    3234#
DT3     020444           836    3236#
DT4     020460           842    3238#
E       007642          2067#
EMTVEC= 000030           727#    913*    914*
EM1     020045           822    3188#
EM2     020112           828    3195#
EM3     020141           834    3199#
EM4     020165           840    3203#
EM5     020230           846    3209#
ENAKP   021243          2125    3324#
ENGRAF  021255          1606    3329#
ENPNTM  021267          1800    3334#
ERRVEC= 000004           720#    923     924*    935*   3617    3618*   3620*   3623*
EXAKP   021250          2147    3326#
EXGRAF  021262          1616    3331#
EXPNTM  021274          1811    3336#
F       007712          2082#
FILBFA  010330          2176#   2178
FILBFB  010314          1323    2173#
FILBUF  010310          1130    1641    1696    1749    1759    1843    2172#   2630
FILLWC  012556          1095    1361    1404    1658    1823    2629#
FINDOT  011052          2263    2299#   2303
FINDTA  011062          2259*   2277*   2301#
FIRLST  011234          1754    2349#
FIRST   001242           850#    949*    950     952     961
FNDA    011044          2297#   2306    2308    2314
GBBUF   011374          1608    2385#
GENER   004542          1489#   1493    1495    1516    1523
GENRX   004626          1500    1504#   1508    1510
GETCHR  012620           983     986     989    1936    2162    2302    2482    2641#
GIN     001446           895     897     899     901#
GINA    001454           891     902#
GNS   = ****** U         749    3936    3937    3938    3939    3940    3943    3944    3945
GOAPMD  017554          1637    1839    3150#
GODSHS  017526          1580    3146#
GOHDSC  017500          1567    3142#
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```
GONAPM  017561          1649    1851    3152#
GOPRNT  017452          1662    1684    1703    1711    1731    1739    1764    1786    1827    3134#
GRPHST  005262          1598    1600#
HOMERS  016203          1602    3002#
HT    = 000011           630#   3750    3791
IGNORE  011042           937*   1963*   2228    2262*   2265    2283*   2294#
IOTVEC= 000020           725#    911*    912*    939*
KRBDON  010240          2097    2121    2151#
KRBECH  010254           896    2158#
KRBECO  007104           900    1933#
KRBTST  007400           898    2006#   2153
LAST    001244           852#    953*    957*    958    1878    1880
LASTCH  001310           871#   1035*   1038*   1139    1164    1705    1733    1808    2191
LASTLN  001262           860#   1024*   1029*   1494
LBMT    002770          1177#
LBMT1   003140          1195    1210#
LCM     003150          1215#
LF    = 000012           631#   3785    3791
LIC     010344          1154    1723    1803    2185#
LICA    010362          2189#   2195
LICB    010400          2192    2194#
LODERL  004012          1367#
LODERS  004170          1410#
LOOP    011024           938*   2258*   2276*   2287#   3596
LRL     003432          1274#
LTAB    003702          1290    1294    1298    1302    1306    1310    1314    1337#
MANFU   001400           758     892#
MASK1   012326          2484*   2488*   2496    2556#
MASK2   012330          2485*   2493*   2495    2516*   2520*   2537    2557#
MKB     014067          2013    2765#
MKBA    014156          2480    2795#
MKBB    014245          2021    2060    2076    2091    2805#
MKBB2   014362          2018    2057    2073    2088    2819#
MKBC    014445          2026    2828#
MKBD    014504          2036    2834#
MKBD2   014611          2033    2846#
MKBE    014677          2041    2856#
MKBF    015017          2046    2870#
MKBG    015055          2052    2876#
MKBGA   015124          2068    2883#
MKBH    015174          2083    2890#
MKBI    015235          2102    2128    2896#
MKBJ    015270          2106    2132    2901#
MKBK    015323          2110    2136    2906#
MKBL    015357          2114    2140    2911#
MKBM    015412          2118    2144    2916#
MKBN    015446          2099    2921#
MKBQ    015541          2550    2932#
MKBQA   015606          2540*   2541*   2542*   2941#
MKBQB   015625          2528*   2529*   2530*   2947#
MKBQ1   015602          2544*   2939#
MKBQ2   015621          2535*   2945#
MKBR    015634          2152    2950#
MKB1    014123          2063    2079    2790#
MKB52   015475          2123    2925#
MKE     015702          1935    2958#
```

```
MKEA    016107            1965    2984#
MKEA1   016120            1952*   1953*   1958*   1959*   1961*   1962*   2986#
MKEB    016125            1939*   1940*   1941*   2988#
MKEH    016134            2160    2991#
MOVDN1  003104            1181    1198#   1201
MOVDWN  003100            1188    1197#
MOVRIG  003122            1182    1184    1185    1189    1191    1192    1204#
MPTCNT  013726            1798    2768#
MPTSCN  013775            1821    2775#
MQ0     017256            2259    3112#
MQ1     017343            2277    2301    3121#
MQ2     017431            2298    3131#
MSCOPE  023210             939    3594#
MSGTND  005072            1483    1544#
MSGTXT  004752            1481    1530#
MSGTYP  002432            1017    1075#
MTEXT0  021532            1779    1855    3371#
MTEXT1  021636            1856    3383#
MTEXT2  021737            1857    3394#
MTEXT3  022041            1858    3406#
MTEXT4  022124            1859    3416#
MTEXT5  022226            1860    3427#
MTEXT6  022327            1861    3438#
MTEXT7  022361            1862    3443#
MTEXT8  022461            1863    3454#
MTOB    012676            2445    2662#
M91     013013            1093    1657    2683#
M910    013304            1359    2717#
M911    013335            1403    2722#
M912    013370            1436    2727#
M914    013424             979    2732#
M92     013061            1104    1671    2690#
M920    013471            1747    2739#
M921    013521            1773    2744#
M922    013555            1562    2749#
M9221   013612            1604    2754#
M923    013667            1635    2762#
M923A   014032            1837    2780#
M93     013110            1125    1692    2694#
M94     013152            1149    1719    2700#
M96     013203            1173    2705#
M97     013236            1272    2710#
M98     017610            1461    1469    3160#
NOWEOP  007044            1916    1921#
OCTAL   011636            1938    2453#   2527    2539
OVRAL   004750            1478*   1522*   1529#
PASHED  020000            1887    3181#
PATH    016211            1439    3004#
PIRQ  = 177772             637#
PIRQVE= 000240             731#
PNTWID  001316             874#   1804
PRNTST  006336            1625    1788#
PRTCNT  001274             865#    890*    893*   1630    1632*   1921    1923*
PR0   = 000000             654#
PR1   = 000040             655#
PR2   = 000100             656#
```

```
PR3    = 000140            657#
PR4    = 000200            658#
PR5    = 000240            659#
PR6    = 000300            660#
PR7    = 000340            661#
PS     = 177776            634#    635
PSW    = 177776            635#
PTCT     001250            854#   1632
PWRVEC= 000024            726#    917*    918*   3950*   3951*   3960*   3966*   3978*   3979*
RBEGIN   001404            754     893#
RDCHR  = 104406           3515    3943#
RDLIN  = 104407           3560    3944#
RDOCT  = 104410            948     956   3945#
RESVEC= 000010            721#
REVLF    021236           1611    3321#
RFI      017251            981    3110#
ROW1     020530           3245    3253#
ROW1C    021144           3245    3309#
ROW1S    021052           3245    3296#
ROW1O    021360           2116    3352#
ROW1OA   021510           2142    3368#
ROW12    020700           3248    3274#
ROW12C   021200           3248    3314#
ROW12S   021106           3248    3301#
ROW2     020564           3245    3258#
ROW22    020736           3248    3279#
ROW3     020622           3245    3263#
ROW32    020774           3248    3284#
ROW4     020652           3245    3267#
ROW42    021026           3248    3289#
ROW5     020676           2044    3271#
ROW6     021302           2100    3343#
ROW6A    021366           2126    3353#
ROW7     021322           2104    3346#
ROW7A    021406           2130    3356#
ROW8     021334           2106    3348#
ROW8A    021434           2134    3360#
ROW9     021346           2112    3350#
ROW9A    021462           2138    3364#
RSTRT    002006            963#   1884
SAVE1    001322            876#   1337*   1342
SAVE2    001324            877#    988*    993*   1000   3236
SAVE3    001326            878#    991*    994*   1006   3236
SAVE4    001330            879#    886*    901*    940    985*    992*    998   3236
SBEGIN   002000            941     945     961#   1928
SET      004746           1479*   1485*   1498*   1501*   1513*   1514   1528#
STACK  = 001100            625#    909    1933    2011    2158   2299
STCHAR   001306            870#   1126*   1129    1138*   1139   1150*   1153   1163*   1164   1693*   1695   1704*   1705
                          1720*   1722    1732*   1733    1801*   1802   1807*   1808
STKLMT= 177774             636#
SUBTST   001256            858#   2400    2426
SWR      001140            786#    907     925*    927     933*    944   1626   1628   2247   2412   2486   2489   2491
                          2512    3594    3612    3626    3628    3658   3663   3958   3971*
SWREG    000176            751#    933
SWO    = 000001            689#
SWOO   = 000001            679#    689
```

```
SW01   = 000002            678*    688
SW02   = 000004            677*    687
SW03   = 000010            676*    686
SW04   = 000020            675*    685
SW05   = 000040            674*    684
SW06   = 000100            673*    683
SW07   = 000200            672*    682
SW08   = 000400            671*    681
SW09   = 001000            670*    680
SW1    = 000002            688*
SW10   = 002000            669*
SW11   = 004000            668*
SW12   = 010000            667*
SW13   = 020000            666*
SW14   = 040000            665*
SW15   = 100000            664*
SW2    = 000004            687*
SW3    = 000010            686*
SW4    = 000020            685*
SW5    = 000040            684*
SW6    = 000100            683*
SW7    = 000200            682*
SW8    = 000400            681*
SW9    = 001000            680*
TBITVE= 000014             722*
TEMP    001312             872*   1105*  1116*  1437*  1441*  1672*  1680*  1752*  1753*  1756*
TEMPO   001314             873*   1128*  1134*  1137*  1152*  1159*  1162*  1607*  1613*  1639*  1645*  1694*  1698*
                          1700*   1721*  1726*  1728*  1841*  1847*
TIMEO   001254             857*   2219   2641
TIME1   012672            2219*   2225*  2641*  2652*  2657#
TIME2   012674            2220*   2223*  2642*  2650*  2658#
TITLE   012712             943    2672#
TKVEC  = 000060            729*
TOTALC  001264             861*   1022*  1027*  1478
TPVEC  = 000064            730*
TRAPVE= 000034             728*    915*   916*
TRTVEC= 000014             723*
TSTNUM  001252             855*   3234   3238   3650*
TSTROW  011734            2022    2027   2037   2042   2047   2061   2077   2092   2103   2107   2111   2115   2119
                          2129    2133   2137   2141   2145   2479#
TST1    002042             885     894    973    977#  1883   1924   2322
TST10   003772            1333    1357#  2329
TST11   004150            1401#   2330
TST12   004276            1434#   2331
TST13   004334            1448#   2332
TST14   005074            1457    1549#  2333
TST15   005244            1558    1560   1596#  2334
TST16   005356            1622#   2335
TST17   005526            1655#   2336
TST2    002462            1046    1090#  2323
TST20   005562            1669#   2337
TST21   005652            1690#   2338
TST22   006004            1717#   2339
TST23   006140            1745#   2340
TST24   006262            1770#   2341
TST25   006340            1793#   2342
```

```
TST26   006452          1817#   2343
TST27   006506          1834#   2344
TST3    002502          1102#   2324
TST30   007102          1932#   2345
TST31   007376          2005#   2346
TST32   010252          2157#
TST4    002556          1123#   2325
TST5    002656          1147#   2326
TST6    002760          1171#   2327
TST7    003422          1263    1270#   2328
TYPDS = 104405          1905    1926    3940#
TYPE  = 104401           942     946     954    1887    1903    1906    1927    2617    3519    3522    3526    3589    3591
                        3661    3681    3698    3700    3703    3705    3709    3716    3755    3852    3936#   3980
TYPEPT  002400          1006    1009    1016    1059#
TYPOC = 104402          3689    3713    3937#
TYPON = 104404          3939#
TYPOS = 104403          3938#
VHO     001266           862#   1023*   1028*   1031    1128    1137    1152    1162    1370    1416    1479    1639    1694
                        1700    1721    1728    1841    2631
VH1     001270           863#   1031*   1032*   1033    1105    1179    1197    1215    1235    1437    1672    1752    2356
VH2     001272           864#   1033*   1034*
VTIB    001300           867#   2230    2646
VTIS    001276           866#    963    2215    2221    2546    2644
VTNOW   001246           953#    961*    964    1880    1882*   3234    3236    3238
VTOB    001304           869#   2164*   2214*
VTOS    001302           868#   2165    2202    2204
VTSXX   001260           859#   1016*   1025    1036    1223    1236    1262    1377    1455    1466    1559    1597    1623
                        1794    2006    2015    2030    2054    2070    2085    2096    2120
VT50A   016460          1020    1075    3035#
VT50B   016532          1076    3043#
VT50H   016663          1078    3061#
VT52K   016741          1079    3070#
VT52L   017024          1080    3080#
VT52M   017105          1081    3090#
VT55    016601          1077    3051#
VT55E   017166          1082    3100#
V50RW   020474          2010    3245#
V52RW   020512          2008    3248#
WFTEST  001332           880#    887*    892*    995    1458    1557    1889    2402
WHAT0   017656           947    3167#
WHAT1   017721           955    3173#
WHERE   002040           885*    894*    896*    898*    900*    972     973#   1883*   1924*
WIDTH   001320           875#   1155    1319    1324    1410    1724    2172    2355    2372
XADDS   004744          1511*   1518    1527#
XOFF .= 000023           859#   2236
XOFFBR  011026          1565*   1577*   2242    2260*   2284*   2288#
XOFFOK  011030          1564*   1642*   1647*   1660*   1682*   1701*   1709*   1729*   1737*   1762*   1784*   1805*   1825*
                        1844*   1849*   2239    2261*   2282*   2289#   2632*
XOFFRC  011034          1551*   1569    2238*   2291#
XON   = 000021           859#   2232
XONRC   011036          1576*   1585    2234*   2292#
XPRNT   010412          1115    1132    1157    1210    1258    1288    1292    1296    1300    1304    1308    1312    1316
                        1331    1394    1428    1521    1609    1643    1679    1697    1725    1750    1751    1755    1760
                        1761    1806    1845    2201#   2447    2633
XPRNTA  010416          2202#   2205    2216    2218    2235    2243    2272
XPRNTB  010434          2203    2207#
```

```
YADDS   004742          1496*   1517    1526#
$AUTOB  001134           783#
$BDADR  001122           778#
$BDDAT  001126           780#   2230*   2231*   2232    2236    2250    2253    2526*   3238
$CHARC  024024          3757*   3767*   3774    3783*   3788#
$CKSWR= ****** U        3943
$CMTAG  001100           766#    904     905     913     919     920
$CM1    = 000002         798#    799#    800#
$CM2    = 000004         798#    799#    800#
$CM3    = 000002         796#    798
$CNTLG  023021          3536#
$CNTLU  023014          3535#
$CRLF   001167           801#   3535    3594    3661    3672    3681    3700    3705    3709    3756    3731
$DBLK   012546          2583    2617    2625#
$DOAGN  007020          1899    1908    1914#
$DTBL   012536          2586    2621#
$ENDAD  007010          1910#   3667
$ENDCT  006756           919    1901#
$ENDMG  007027          1903    1918#
$ENULL  007024          1906    1917#   1927
$EOP    006640          1796    1854    1876#
$EOPCT  006750           919*   1898#   1902
$ERFLG  001103           769#   3604    3632*   3636    3651*   3672
$ERMAX  001115           775#   3636
$ERROR  023342           913    3649#
$ERRPC  001116           776#   3234    3236    3238    3655*   3656*   3657    3672    3687
$ERRTB  001172           818#   3695
$ERRTY  023454          3660    3680#
$ERTTL  001112           773#   1925    3654*   3672
$FILLC  001156           794#   3760    3791
$FILLS  001155           793#   3791
$GDADR  001120           777#
$GDDAT  001124           779#   2245*   2249*   2250    2252*   2253    2538*   3238
$GET42  007000          1907#
$GTSWR= ****** U        3942
$HD     = 000000         622
$HINUM  024354          1477*   3885    3893    3898*   3903#
$HIOCT  023206          3582*   3593#
$ICNT   001104           770#
$ILLUP  024576          3950    3966    3983#
$INTAG  001135           784#
$ITEMB  001114           774#   3657*   3672    3684
$LF     001170           802#   3526    3535    3594    3672    3791
$LONUM  024356          1476*   1490    1505    3884    3891    3897*   3904#
$LPADR  001106           771#    920*   2317*   3631*   3634    3636
$LPERR  001110           772#
$MAIL = ****** U         937    3631    3663    3744
$MNEW   023037          3539#
$MSWR   023026          3537#
$NULL   001154           792#   3762    3791
$NWTST= 000001           974#   1087#   1099#   1120#   1144#   1168#   1267#   1354#   1398#   1431#   1445#   1546#   1593#
                        1619#   1652#   1666#   1687#   1714#   1742#   1767#   1790#   1814#   1831#   1929#   2002#   2154#
$OCNT   024252          3824*   3853*   3866#
$OMODE  024254          3819*   3823*   3828    3831*   3842*   3868#
$OVER   023326          3597    3613    3624    3629    3633#
$PASS   001100           767#   1885    1895*   1896*   1904    1917
```

```
$POWER  024604          3981    3986#
$PWRDN  024436           917    3950#   3978
$PWRMG  024572          3981#
$PWRUP  024510          3960    3966#
$QUES   001166           800#   3519    3535    3591    3594    3672    3791
$RAND   024256          1489    1504    3880#
$RDCHR  022556          3483#   3943
$RDDEC= ****** U        3946
$RDLIN  022676          3511#   3944
$RDOCT  023050          3555#   3945
$RDSZ = 000010          3504#
$REGAD  001160           796#
$REGO   001162           798#
$REGI   001164           799#
$RTNAD  007022          1916#
$R2A  = ****** U        3946
$SAVRE= ****** U        3946
$SAVR6  024602          3959*   3967    3968*   3969*   3985#
$SCOPE  023224           911    3595    3611#
$SETUP= 000037           820#    910     911     913     915     917     919     920    1894    3472    3541    3612    3650
                        3666    3667
$STUP = 177777           820#
$SVLAD  023312          3621    3627    3630#
$SWR  = 160400           612#    622     737     738     739     740     741     742     800     920     921     978    1091
                        1103    1124    1148    1172    1271    1358    1402    1435    1449    1550    1597    1623    1656
                        1670    1691    1718    1746    1771    1794    1818    1835    1873    1895    1909    1915    1917
                        1933    2006    2158    3605    3606    3607    3612    3624    3626    3627    3630    3632    3636
                        3643    3644    3645    3646    3654    3658    3663    3666    3672    3982
$SWRMK= 000000           742     743    3607    3608    3628
$TKB    001146           789#   3470    3487    3493
$TKS    001144           788#   2546    3470    3485    3491
$TN   = 000033           612#    622     974     978#   1046    1087    1091#   1099    1103#   1120    1124#   1144    1148#
                        1168    1172#   1263    1267    1271#   1333    1354    1358#   1398    1402#   1431    1435#   1445
                        1449#   1546    1550#   1558    1560    1593    1597#   1619    1623#   1652    1656#   1666    1670#
                        1687    1691#   1714    1718#   1742    1746#   1767    1771#   1790    1794#   1814    1818#   1831
                        1835#   1929    1933#   2002    2006#   2154    2158#
$TPB    001152           791#   3780*   3791
$TPFLG  001157           795#   3738    3791
$TPS    001150           790#   3778    3791
$TRAP   024360           915    3913#
$TRAP2  024402          3924#   3935
$TRP  = 000011          3928#   3937#   3938#   3939#   3940#   3941#   3943    3944#   3945#   3946#
$TRPAD  024414          3918    3935#
$TSTNM  001102           768#   1894*   2311*   3604    3628    3630*   3633    3636    3650    3653    3672
$TTYIN  023004          3512    3513    3530    3534#
$TYPBN= ****** U        3941
$TYPDS  012332          2571#   3940
$TYPE   023610          3738#   3928    3936
$TYPEC  023760          3759    3766    3773    3778#   3779
$TYPEX  024026          3784    3786    3789#
$TYPOC  024054          3822#   3937
$TYPON  024070          3821    3824#   3939
$TYPOS  024030          3817#   3938
$XTSTR  023234          3615#
$$GET4= 000000          1909#
$OFILL  024253          3818*   3822*   3832    3867#
```

```
$4DCAT= ****** U        3612    3660
.     = 024616           745#    749#    765#     803     908     920    1917    1921    2625#    3342#    3470    3534#    3535
                        3541    3594    3636    3672    3719#    3791    3962    3984
```

```
ANYMOR   1867#   1877
COMMEN    732#
ENDCOM    732#
ERROR     626#    883    1011    1042    1572    1588    2206    2267    2551    2654
ESCAPE    732#
GETPRI    732#
GETSWR    732#
MULT      732#
NEWTST    732#    974    1087    1099    1120    1144    1168    1267    1354    1398    1431    1445    1546    1593    1619
         1652    1666    1687    1714    1742    1767    1790    1814    1831    1929    2002    2154
POP       732#   2612    3583    3899    3971    3972
PUSH      732#   2571    3557    3880    3952    3958
REPORT    732#
SCOPE     627#    977    1090    1102    1123    1147    1171    1270    1357    1401    1434    1448    1549    1596    1622
         1655    1669    1690    1717    1745    1770    1793    1817    1834    1877    1932    2005    2157
SETPRI    732#
SETTRA   3928#   3937    3938    3939    3940    3943    3944    3945
SETUP     732#    903
SKIP      732#    984     987     990    1039    1046    1195    1263    1333    1456    1467    1474    1558    1560    1624
         1937    2097    2251    2483
SLASH     732#
SPACE     732#
STARS     732#    761     803     974     976    1087    1089    1099    1101    1120    1122    1144    1146    1168    1170
         1267    1269    1354    1356    1398    1400    1431    1433    1445    1447    1546    1548    1593    1595    1619
         1621    1652    1654    1666    1668    1687    1689    1714    1716    1742    1744    1767    1769    1790    1792
         1814    1816    1831    1833    1869    1929    1931    2002    2004    2154    2156    2561    3469    3475    3504
         3543    3601    3639    3675    3723    3794    3871    3907    3948    3964
SWRSU     732#    921#
TRMTRP   3928#
TYPBIN    732#
TYPDEC    732#   1904
TYPNAM    732#
TYPNUM    732#
TYPOCS    732#
TYPOCT    732#   3687    3711
TYPTXT    732#
$$CMRE    759#    798     799
$$CMTM    759#
$$ESCA    732#
$$NEWT    732#    974    1087    1099    1120    1144    1168    1267    1354    1398    1431    1445    1546    1593    1619
         1652    1666    1687    1714    1742    1767    1790    1814    1831    1929    2002    2154
$$SET    3928#   3937    3938    3939    3940    3943    3944    3945
$$SKIP    732#   1046    1263    1333    1558    1560
.EQUAT    612#    622
.HEADE    612#
.SETUP    612#    820
.SWRHI    612#    733
.SWRLO    743#
.$CATC    612#    743
.$CMTA    612#    759
.$EOP     612#   1867
.$ERRO    612#   3637
.$ERRT    612#   3673
.$PARM    612#
.$POWE    612#   3946
.$RAND    612#   3869
```

```
.$RDOC    612#   3541
.$READ    612#   3467
.$SAVE    612#
.$SCOP    612#   3599
.$SPAC    612#
.$SWDC    612#
.$TRAP    612#   3905
.$TYPD    612#   2559
.$TYPE    612#   3721
.$TYPO    612#   3792


. ABS.  024616     000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 ,DZVTCD.SEQ/CRF/SOL/NL:TOC=DSKZ:DZVTCD.P11
 RUN-TIME:  15  10  1 SECONDS
 RUN-TIME RATIO:  282/27=10.2
 CORE USED:  25K  (49 PAGES)
```