VT50A,B,H

ACCEPTANCE TEST
MD-11-DZVTC-C

EP-DZVTC-C-DL-A

FICHE 1 OF 1

NOV 1976
digital
MADE IN USA

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZVTC-C
PRODUCT NAME: VT50A, B, H, 52 ACCEPTANCE TEST
DATE CREATED: MAY 21, 1975
DATE REVISED: OCTOBER, 1975
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 AT 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 CONNECTED
THE PROGRAM WILL TYPE 'END PASS' ON THE CONSOLE WHEN A PASS HAS BEEN COMPLETED.
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 (177560)
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.

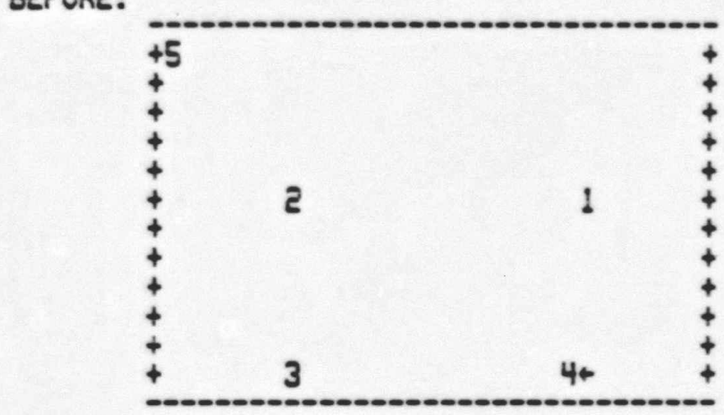
THIS PATTERN WILL VERIFY THAT THE FULL
CHARACTER SET CAN BE DISPLAYED IN EACH
SCREEN WORD.

9.6 F CURSOR MOTION

H01

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"

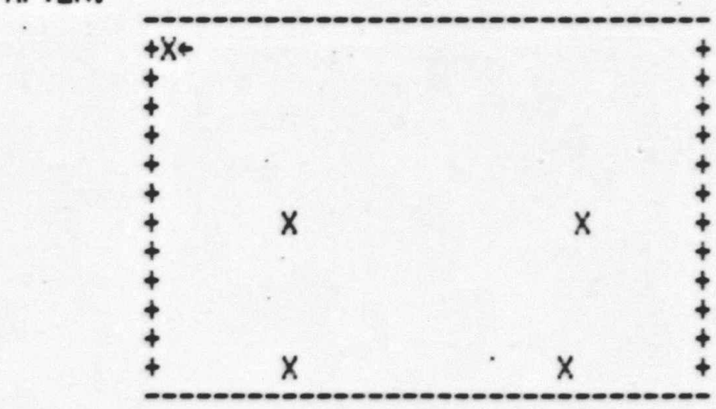
TO TEST "CURSOR LEFT": GENERATE CURSOR LEFT (BACKSPACE)
FOURTY FOUR TIMES AND DISPLAY A "X"

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:



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' CHAR.
THE BELL WILL RING AT THE BEGINNING OF EACH LINE. THE SECOND SECTION TESTS
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       + (REF.LINE USING SPACES)
+I       I       I       I       I       I       I       I       I       I       +
+IA      IA      IA      IA      IA      IA      IA      IA      IA      IA      +
+IAA     IAA     IAA     IAA     IAA     IAA     IAA     IAA     IAA     IAA     +
+IAAA    IAAA    IAAA    IAAA    IAAA    IAAA    IAAA    IAAA    IAAA    IAAA    +
+IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   IAAAA   +
+IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  IAAAAA  +
+IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA IAAAAAA +

 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

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

```
                                                                                X0 (BLANK LINE)
EEEEEE                                                                          X6
EEEEEEEEEEEE                                                                    X12
EEEEEEEEEEEEEEEEEE                                                              X18
EEEEEEEEEEEEEEEEEEEEEEEE                                                        X24
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEE                                                  X30
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE                                            X36
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE                                      X42
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE                                X48
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE                          X54
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE                    X60
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE              X66
```

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 EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T
T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T
T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE 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 CORRECTLY.
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

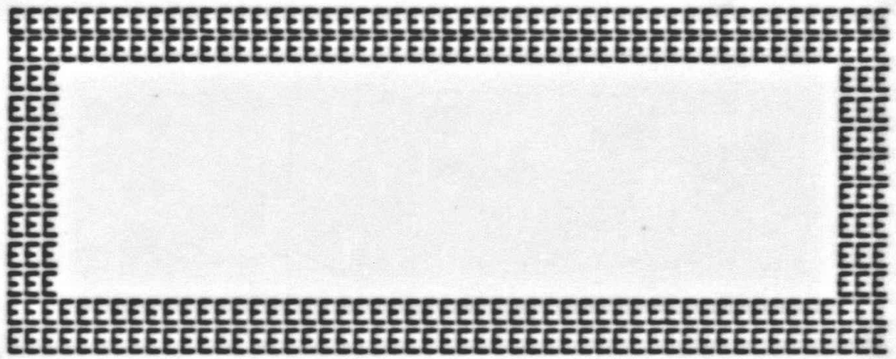
9.22 R COPIER - ROTATING CHARACTER TEST

SAME AS SCREEN PATTERN

9.23 S COPIER - PERIMETER TEST

SEQ 0011

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.

DZVTCC.P13 TABLE OF CONTENTS

```
                        .TITLE  MAINDEC-11-DZVTC-C
                        ;*COPYRIGHT (C) 1975
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY RAYMOND SHOOP
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-B).
                        ;*

                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                  STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE SWITCH REGISTER

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

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

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
```

```
(1)                     SW06=   100
(1)                     SW05=   40
(1)                     SW04=   20
(1)                     SW03=   10
(1)                     SW02=   4
(1)                     SW01=   2
(1)                     SW00=   1
(1)                     .EQUIV  SW09,SW9
(1)                     .EQUIV  SW08,SW8
(1)                     .EQUIV  SW07,SW7
(1)                     .EQUIV  SW06,SW6
(1)                     .EQUIV  SW05,SW5
(1)                     .EQUIV  SW04,SW4
(1)                     .EQUIV  SW03,SW3
(1)                     .EQUIV  SW02,SW2
(1)                     .EQUIV  SW01,SW1
(1)                     .EQUIV  SW00,SW0
(1)
(1)                     ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
(1)             100000  BIT15=  100000
(1)             040000  BIT14=  40000
(1)             020000  BIT13=  20000
(1)             010000  BIT12=  10000
(1)             004000  BIT11=  4000
(1)             002000  BIT10=  2000
(1)             001000  BIT09=  1000
(1)             000400  BIT08=  400
(1)             000200  BIT07=  200
(1)             000100  BIT06=  100
(1)             000040  BIT05=  40
(1)             000020  BIT04=  20
(1)             000010  BIT03=  10
(1)             000004  BIT02=  4
(1)             000002  BIT01=  2
(1)             000001  BIT00=  1
(1)                     .EQUIV  BIT09,BIT9
(1)                     .EQUIV  BIT08,BIT8
(1)                     .EQUIV  BIT07,BIT7
(1)                     .EQUIV  BIT06,BIT6
(1)                     .EQUIV  BIT05,BIT5
(1)                     .EQUIV  BIT04,BIT4
(1)                     .EQUIV  BIT03,BIT3
(1)                     .EQUIV  BIT02,BIT2
(1)                     .EQUIV  BIT01,BIT1
(1)                     .EQUIV  BIT00,BIT0
(1)
(1)                     ;*BASIC "CPU" TRAP VECTOR ADDRESSES
(1)             000004  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
(1)             000010  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
(1)             000014  TBITVEC=14              ;;"T" BIT
(1)             000014  TRTVEC= 14              ;;TRACE TRAP
(1)             000014  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
(1)             000020  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
(1)             000024  PWRVEC= 24              ;;POWER FAIL
(1)             000030  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
(1)             000034  TRAPVEC=34              ;;"TRAP" TRAP
```

```
(1)          000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
(1)          000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
(1)          000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
  13
  14
(1)                                  .SBTTL  OPERATIONAL SWITCH SETTINGS
(1)                                  ;*
(1)                                  ;*      SWITCH                  USE
(1)                                  ;*      ------          --------------------
(1)                                  ;*        15            HALT ON ERROR
(1)                                  ;*        14            LOOP ON TEST
(1)                                  ;*        13            INHIBIT ERROR TYPEOUTS
(1)                                  ;*        12            INHIBIT SUB-TEST DELAY'S
(1)                                  ;*        10            ENABLE SAVE COPIER PAPER MODE
(1)                                  ;*         8            LOOP ON TEST IN SWR<7:0>
  15
(1)                                  .SBTTL  TRAP CATCHER
(1)
(1)          000000                          .=0
(1)                                  ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
(1)                                  ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
(1)                                  ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
(1)
(1)                                  .SBTTL  STARTING ADDRESS(ES)
(1)          000200                          .=200
(1)
(1)  000200  000137  001336                  JMP     @#BEGIN         ;;JUMP TO STARTING ADDRESS OF PROGRAM
  16 000204  000137  001402                  JMP     RBEGIN          ;JUMP TO RESTART ADDRESS
  17 000210  000137  001426                  JMP     BEGIN1          ;JUMP TO KEYBOARD CHARACTER TEST
  18 000214  000137  001436                  JMP     BEGIN2          ;JUMP TO CHAR OCTAL VALUE LOOP
  19 000220  000137  001416                  JMP     BEGIN3          ;JUMP TO ASCII ECHO LOOP
  20 000224  000137  001376                  JMP     MANFU           ;JUMP TO W.F. SPECIAL TEST PARAM.
```

```
 21                                 ;*****************************************************************
(1)
(1)                                 .SBTTL  COMMON TAGS
(1)
(1)                                 ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
(1)                                 ;*USED IN THE PROGRAM.
(1)
(1)          001100                         .=1100
(1)  001100  177570                 SWR:    .WORD   DSWR            ;; OF SWITCH REGISTER
(1)  001102  177570                 DISPLAY: .WORD  DDISP           ;; OF DISPLAY REGISTER
(1)  001104                         $CMTAG:                         ;;START OF COMMON TAGS
(1)  001104  000000                 $PASS:  .WORD   0               ;;CONTAINS PASS COUNT
(1)  001106     000                 $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
(1)  001107     000                 $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
(1)  001110  000000                 $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
(1)  001112  000000                 $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP
(1)  001114  000000                 $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
(1)  001116  000000                 $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
(1)  001120     000                 $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
(1)  001121     001                 $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
(1)  001122  000000                 $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
(1)  001124  000000                 $GDADR: .WORD   0               ;;CONTAINS  OF 'GOOD' DATA
(1)  001126  000000                 $BDADR: .WORD   0               ;;CONTAINS  OF 'BAD' DATA
(1)  001130  000000                 $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
(1)  001132  000000                 $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
(1)  001134  000000                         .WORD   0               ;;RESERVED--NOT TO BE USED
(1)  001136  000000                 $SWREG: .WORD   0               ;;SOFTWARE SWITCH REG
(1)  001140  000000                 $DISPLAY:       .WORD   0       ;;DISPLAY REG
(1)  001142  177560                 $TKS:   177560                  ;;TTY KBD STATUS
(1)  001144  177562                 $TKB:   177562                  ;;TTY KBD BUFFER
(1)  001146  177564                 $TPS:   177564                  ;;TTY PRINTER STATUS REG.
(1)  001150  177566                 $TPB:   177566                  ;;TTY PRINTER BUFFER REG.
(1)  001152     000                 $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
(1)  001153     002                 $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
(1)  001154     012                 $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
(1)  001155     000                 $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
(1)  001156  000000                 $REGAD: .WORD   0               ;;CONTAINS THE  FROM
(1)                                                                 ;;WHICH  ($REG0) WAS OBTAINED
(3)  001160  000000                 $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
(3)  001162  000000                 $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
(1)  001164     077                 $QUES:  .ASCII  /?/             ;;QUESTION MARK
(1)  001165     015                 $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
(1)  001166  000012                 $LF:    .ASCIZ  <12>            ;;LINE FEED
```

```
(2)                                 ;*****************************************************************
(1)
(1)                                 .SBTTL  ERROR POINTER TABLE
(1)
(1)                                 ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
(1)                                 ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
(1)                                 ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
(1)                                 ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
(1)                                 ;*NOTE2:       EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
(1)
(1)                                 ;*      EM              ;;POINTS TO THE ERROR MESSAGE
(1)                                 ;*      DH              ;;POINTS TO THE DATA HEADER
(1)                                 ;*      DT              ;;POINTS TO THE DATA
(1)                                 ;*      DF              ;;POINTS TO THE DATA FORMAT
(1)
(1)
(1)  001170                         $ERRTB:
 22
 24
 25                                 ;ITEM   1
 26  001170  017664                         EM1             ;ERROR FLAG ON HOST TRANSMIT STATUS
 27  001172  020107                         DH1             ;ERRPC  VTNOW   TSTNUM
 28  001174  020254                         DT1             ;$ERRPC VTNOW   TSTNUM
 29  001176  000000                         0
 30
 31                                 ;ITEM   2
 32  001200  017731                         EM2             ;NO HOST INPUT FLAG RECEIVED
 33  001202  020107                         DH1             ;ERRPC  VTNOW   TSTNUM
 34  001204  020254                         DT1             ;$ERRPC VTNOW   TSTNUM
 35  001206  000000                         0
 36
 37                                 ;ITEM   3
 38  001210  017760                         EM3             ;INCORRECT I.D. RESPONSE
 39  001212  020136                         DH3             ;ERRPC  VTNOW   1ST WD  2ND WD  3RD WD
 40  001214  020264                         DT3             ;$ERRPC VTNOW   SAVE4   SAVE2   SAVE3
 41  001216  000000                         0
 42
 43                                 ;ITEM   4
 44  001220  020004                         EM4             ;INCORRECT OR UNEXPECTED INPUT CHARACTER
 45  001222  020205                         DH4             ;ERRPC  VTNOW   TSTNUM  EXPT    RCVD
 46  001224  020300                         DT4             ;$ERRPC VTNOW   TSTNUM  $GDDAT $BDDAT
 47  001226  000000                         0
 48
 49                                 ;ITEM   5
 50  001230  020047                         EM5             ;INVALID BUSS ADDRESS, TRY AGAIN
 51  001232  000000                         0
 52  001234  000000                         0
 53  001236  000000                         0
 54  001240  177560                 FIRST:  177560                  ;FIRST DEVICE ADDRESS OF SEQUIENTAL DL-11-A/B TYPE DEVIC
 55                                                                 ;DEFAULT TO THE CONSOLE ADDRESS
 56  001242  000000                 LAST:   0                       ;LAST DEVICE ADDRESS OF DL-11-A/B TYPE
 57  001244  177560                 VTNOW:  177560                  ;CURRENT DEVICE BUSS ADDRESS
 58  001246  100011                 PTCT:   100011                  ;COPIER PAPER SAVE COUNT <LOW BYTE>
 59  001250  000000                 TSTNUM: 0                       ;ERROR PATTERN
 60
 61  001252  000300                 TIMEO:  300                     ;CHARACTER FLAG TIMEOUT CONSTANT
```

```
                                SUBTST: 5                       ;SUBTEST DELAY CONSTANT
                                VT5XX:  0                       ;I.D. AND CHARASTICS
                                LASTLN: 53      ;OR 67          ;LAST VALID LINE # +40
                                TOTALC: 960.    ;OR 1920.       ;TOTAL CHARACTER COUNT
                                VHO:    12.     ;24.            ;VERTICAL LINE COUNT
                                VH1:    6.      ;12.            ;1/2 VERTICAL LINE COUNT
                                VH2:    3.      ;6.             ;1/4 VERTICAL LINE COUNT
                                PRTCNT: 0
                                VTIS:   177560                  ;DEVICE ADDRESSES
                                VTIB:   177562                  ;IN DATA
                                VTOS:   177564                  ;OUT STAT
                                VTOB:   177566                  ;OUT DATA
                                STCHAR: 0                       ;TEMP REG'S
                                LASTCH: 140     ;OR 200         ;FIRST NON-VALID CHARACTER
                                TEMP:   0                       ;TEMP REG'S
                                TEMP0:  0                       ;
                                PNTWID: 132.                    ;COLUMN COUNT FOR LINE PRINTER.
                                WIDTH:  80.                     ;COLUMN WIDTH
                                SAVE1:  0                       ;TEMP REG'S
                                SAVE2:  0
                                SAVE3:  0
                                SAVE4:  0
                                WFTEST: 0                       ;NON-ZERO IF SA = 224

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

                                BEGIN:  MOV     #TST1,WHERE     ;STARTING ACCEPTANCE TEST ADDRESS
                                        CLR     SAVE4
                                        CLR     WFTEST
                                        MOV     #BUSSTR,@#4
                                        MOV     #340,@#6
                                        CLR     PRTCNT
                                        BR      GINA
                                MANFU:  INC     WFTEST          ;SET W.F. PARAM.
                                RBEGIN: CLR     PRTCNT          ;RESTART ADDRESS
                                        MOV     #TST1,WHERE
                                        BR      GIN
                                BEGIN3: MOV     #KRBECH,WHERE   ;START AT ECHO LOOP
                                        BR      GIN
                                BEGIN1: MOV     #KRBTST,WHERE   ;STARTING CHARACTER TEST ADDRESS
                                        BR      GIN
                                BEGIN2: MOV     #KRBECO,WHERE   ;STARTING CHARACTER LOOP ADDRESS
                                GIN:    MOV     #1,SAVE4
                                GINA:   RESET
                                        MOV     #340,@#PS       ;;LOCK OUT ALL INTERRUPTS
(1)                                     MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
(1)                                     CLR     (R6)+           ;;CLEAR MEMORY LOCATION
(1)                                     CMP     #$BDDAT,R6      ;;DONE?
(1)                                     BNE     .-6             ;;LOOP BACK IF NO
(1)                                     MOV     #STACK,SP       ;;SETUP THE STACK POINTER
(1)                                     MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
(1)                                     MOV     #340,@#IOTVEC+2 ;;LEVEL 7
(1)                                     MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
(1)                                     MOV     #340,@#EMTVEC+2 ;;LEVEL 7
(1)                                     MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
```

```
(1)  001540  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
(1)  001546  012737  024152  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
(1)  001554  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
(1)  001562  013737  006674  006666          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
(1)  001570  012737  001570  001112          MOV     #.,$LPADR.      ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
113  001576  005037  010760                  CLR     IGNORE
114  001602  005037  010742                  CLR     LOOP
115  001606  012737  022710  000020          MOV     #MSCOPE,@#IOTVEC
116  001614  005737  001326                  TST     SAVE4           ;TEST FLAG
117  001620  001036                          BNE     SBEGIN          ;BR IF NON-ZERO
118  001622  104400                          TYPE
119  001624  012630                          TITLE
120  001626  105777  177246                  TSTB    @SWR
121  001632  100031                          BPL     SBEGIN          ;BR IF CLEARED
122  001634  104400                  11$:    TYPE
123  001636  017475                          WHAT0                   ;FIND OUT THE DEVICE ADDRESS
124  001640  104407                          RDOCT
125  001642  012637  001240                  MOV     (SP)+,FIRST     ;SAVE THE ADDRESS
126  001646  022737  160000  001240          CMP     #160000,FIRST
127  001654  101367                          BHI     11$             ;BR IF INVALID
128  001656  005777  177356                  TST     @FIRST          ;TEST IF VALID
129  001662  005037  001242                  CLR     LAST
130  001666  104400                          TYPE
131  001670  017540                          WHAT1                   ;FIND OUT THE LAST ADDRESS
132  001672  104407                          RDOCT
133  001674  012637  001242                  MOV     (SP)+,LAST      ;SAVE LAST ADDRESS
134  001700  005777  177336                  TST     @LAST           ;TEST IF VALID
135  001704  012737  000006  000004          MOV     #6,@#4
136  001712  005037  000006                  CLR     @#6
137  001716  013737  001240  001244  SBEGIN: MOV     FIRST,VTNOW     ;LOAD INITIAL DEVICE ADDRESS
138
139  001724  012700  001274          RSTRT:  MOV     #VTIS,R0        ;LOAD POINTER
140  001730  013701  001244                  MOV     VTNOW,R1        ;LOAD INPUT STAT
141  001734  010120                          MOV     R1,(R0)+
142  001736  005721                          TST     (R1)+
143  001740  010120                          MOV     R1,(R0)+
144  001742  005721                          TST     (R1)+
145  001744  010120                          MOV     R1,(R0)+
146  001746  005721                          TST     (R1)+
147  001750  010110                          MOV     R1,(R0)
148  001752  000177  000000                  JMP     @WHERE          ;JUMP TO STARTING ADDRESS
149  001756  001760                  WHERE:  TST1
154                                  ;*****************************************************************
(3)                                  ;*TEST 1         A       TERMINAL IDENTIFICATION TEST
(3)                                  ;*****************************************************************
(2)  001760  000004                  TST1:   SCOPE
155  001762  004537  011534                  JSR     R5,AMSG         ;DISPLAY HEADER
156  001766  013342                          M914
157  001770  004537  011534                  JSR     R5,AMSG         ;SEND REQUEST FOR IDENTIFICATION
158  001774  017070                          RFI
159
160  001776  004737  012536                  JSR     PC,GETCHR       ;GET A CHARACTER
161  002002  000537                          BR      2$              ;;BR BACK IF NO INPUT
162  002004  010037  001326                  MOV     R0,SAVE4        ;SAVE RESPONSE
163  002010  004737  012536                  JSR     PC,GETCHR       ;GET A CHAR.
164  002014  000532                          BR      2$              ;;BR IF NO INPUT
```

```
                                                MOV     R0,SAVE2
                                                JSR     PC,GETCHR       ;GET A CHAR.
                                                BR      2$              ;;BR IF NO INPUT
                                                MOV     R0,SAVE3
                                                BIC     #177600,SAVE4   ;MASK BIT 7
                                                BIC     #177600,SAVE2
                                                BIC     #177600,SAVE3
                                                TST     WFTEST
                                                BEQ     10$
                                                JSR     PC,ADELAY       ;EXTRA DELAY
                                        10$:    CMPB    #33,SAVE4       ;TEST FIRST CHAR.
                                                BNE     1$              ;BR TO ERROR
                                                CMPB    #'/,SAVE2       ;TEST SECOND CHAR.
                                                BNE     1$              ;BR TO ERROR

                        ;NOW DETERMINE WHICH VT5XX AND ITS CHARASTICS

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

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

                                        4$:     MOV     TYPEPT(R0),VT5XX        ;SAVE I.D. AND CHARASTICS
                                                MOV     MSGTYP(R0),5$           ;SAVE ASCII MESSAGE POINTER
                                                BEQ     13$                     ;BR IF ZERO MESSAGE POINTER
                                                JSR     R5,AMSG                 ;TELL THE UUT
                                        5$:     VT50A                           ;POINTER TO VT5XX MESSAGE

                                        13$:    MOV     #960.,TOTALC            ;LOAD TOTAL CHARACTER COUNT
                                                MOV     #12.,VH0                ;LOAD MAX VERTICAL LINE COUNT
                                                MOV     #53,LASTLN              ;LOAD LAST LINE VALUE +40 FOR DCA TESTING
                                                TST     VT5XX                   ;TEST IF 24 LINES AVAIL
                                                BPL     6$                      ;BR IF NOT
                                                ASL     TOTALC                  ;ADJUST CHARACTER COUNT
                                                ASL     VH0                     ;ADJUST LINE COUNT
                                                ADD     #12.,LASTLN             ;ADJUST VALID LINE # +40

                                        6$:     MOV     VH0,VH1                 ;LOAD OTHER LINE COUNTS
                                                ASR     VH1
                                                MOV     VH1,VH2
                                                ASR     VH2
                                                MOV     #140,LASTCH             ;LOAD FIRST NON-VALID CHARACTER
                                                BIT     #BIT11,VT5XX            ;TEST IF UPPER-LOWER CASE TERM.
                                                BEQ     7$                      ;BR IF NOT
                                                ADD     #40,LASTCH              ;UPDATE TO ALLOW UP-LW CASE CHARACTER SET
                                        7$:
(1)                                             BR      12$             ;;BR AND START TESTING

                                        2$:     ERROR   2                       ;NO RESPONSE FROM UUT ADTER ASKING FOR IDENTIFY
                                                BR      11$
```

```
                                        NOP
002306  000240
002310  004737  011354                 12$:    JSR     PC,DELAY
002314  000431                                  BR      TST2            ;;BR AND START TESTING

                                        ;I.D. VALUES AND CHARACTERISTICS
                                        ;       BIT15 = 1       24 LINES
                                        ;       BIT14 = 1       COPIER CONNECTED
                                        ;       BIT13 = 1       DIRECT CURSOR ADDRESSING (ESC Y) + "ESC-B" + "ESC-D"
                                        ;       BIT12 = 1       VT50H KEYPAD
                                        ;       BIT11 = 1       UPPER AND LOWER CASE CHARACTERS
                                        ;       BIT10 = 1       PRINTER CONNECTED
                                        ;       BIT09 = 1       VT52X MODEL

                                        ;LOW BYTE CONTAINS THE I.D. FOR EACH KNOWN VT5??

002316  000101                          TYPEPT: .WORD   000101  ;I.D. = 101      ;VT50A
002320  040102                                  .WORD   040102  ;I.D. = 102      ;VT50B COPIER
002322  140103                                  .WORD   140103  ;I.D. = 103      ;VT55 24. LINES, COPIER
002324  070110                                  .WORD   070110  ;I.D. = 110      ;VT50H COPIER DCA VT50H KEYPAD
002326  135113                                  .WORD   135113  ;I.D. = 113      ;VT52
002330  175114                                  .WORD   175114  ;I.D. = =114     ;VT52 WITH COPIER
002332  137115                                  .WORD   137115  ;I.D. = 115      ;VT52 WITH PRINTER.
002334  000000                                  0
002336  000000                                  0
002340  000000                                  0
002342  000000                                  0
002344  000000                                  0
002346  000000                                  0

                                        ;ASCII MESSAGE POINTERS

002350  016376                          MSGTYP: VT50A                   ;VT50A NO COPIER
002352  016450                                  VT50B                   ;VT50B COPIER
002354  016517                                  VT55                    ;VT55 COPIER
002356  016565                                  VT50H                   ;VT50H COPIER
002360  016643                                  VT52K                   ;VT52
002362  016726                                  VT52L                   ;VT52 WITH COPIER
002364  017007                                  VT52M                   ;VT52 WITH PRINTER
002366  000000                                  0
002370  000000                                  0
002372  000000                                  0
002374  000000                                  0
002376  000000                                  0
                                        ;*******************************************************************
(3)                                     ;*TEST 2        B       FULL SCREEN OF A CHARACTER
(3)                                     ;*******************************************************************
(2)  002400  000004                     TST2:   SCOPE

002402  004537  011534                          JSR     R5,AMSG
002406  012731                                  M91

002410  004737  012474                          JSR     PC,FILLWC       ;FILL SCREEN WITH A 'E'S

002414  004737  011354                          JSR     PC,DELAY

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

```
(3)                                     ;*TEST 3        C       DATA TRANSFER PATH TEST
(3)                                     ;*****************************************************************
(2)  002420  000004                     TST3:   SCOPE
273  002422  004537  011534                       JSR     R5,AMSG         ;DISPLAY HEADING
274  002426  012777                               M92
275  002430  013737  001266  001310               MOV     VH1,TEMP        ;SET-UP A COUNTER
276
277  002436  004537  011246                       JSR     R5,DTPSR        ;SET-UP BUFFER
278  002442  000077                               77                      ;OCTAL '?'
279  002444  000100                               100                     ;OCTAL '@'
280
281  002446  004537  011252                       JSR     R5,DTPSRB       ;SET-UP BUFFER
282  002452  000125                               125                     ;OCTAL 'U'
283  002454  000052                               52                      ;OCTAL '*'
284
285  002456  004737  010330           1$:         JSR     PC,XPRNT        ;DISPLAY THIS LINE
286  002462  005337  001310                       DEC     TEMP            ;COMPLETED FULL COUNT?
287  002466  001373                               BNE     1$              ;BRANCH IF NOT COMPLETED
288
289  002470  004737  011354                       JSR     PC,DELAY        ;TEST DELAY SWITCH
290                                     ;*****************************************************************
(3)                                     ;*TEST 4        D       SINGLE CHARACTER ACROSS ALL COLS. <ALL CHARACTERS>
(3)                                     ;*****************************************************************
(2)  002474  000004                     TST4:   SCOPE
291  002476  004537  011534                       JSR     R5,AMSG         ;DISPLAY HEADING
292  002502  013026                               M93
293  002504  012737  000040  001304               MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
294
295  002512  013737  001264  001312               MOV     VH0,TEMP0       ;LOAD COUNT
296  002520  013701  001304           1$:         MOV     STCHAR,R1       ;LOAD R1= TO CHARACTER
297  002524  004737  010226                       JSR     PC,FILBUF       ;LOAD A BUFFER WITH THAT CHARACTER
298
299  002530  004737  010330                       JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
300
301  002534  005337  001312                       DEC     TEMP0           ;DONE ?
302  002540  001005                               BNE     2$              ;FINISHED
303  002542  004737  011354                       JSR     PC,DELAY
304  002546  013737  001264  001312               MOV     VH0,TEMP0
305  002554  005237  001304           2$:         INC     STCHAR          ;UPDATE THE CHARACTER
306  002560  023737  001306  001304               CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
307  002566  001354                               BNE     1$              ;BRANCH IF NOT COMPLETED
308
309  002570  004737  011354                       JSR     PC,DELAY        ;TEST DELAY SWITCH
310
311                                     ;*****************************************************************
(3)                                     ;*TEST 5        E       ROTATING CHARACTERS ACROSS ALL COLS. <ALL CHARACTERS>
(3)                                     ;*****************************************************************
(2)  002574  000004                     TST5:   SCOPE
312  002576  004537  011534                       JSR     R5,AMSG         ;DISPLAY HEADING
313  002602  013070                               M94
314  002604  012737  000040  001304               MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
315
316  002612  013737  001264  001312               MOV     VH0,TEMP0       ;LOAD TEMP
317  002620  013701  001304           1$:         MOV     STCHAR,R1       ;LOAD R1=TO CHARACTER
318  002624  004537  010262                       JSR     R5,LIC          ;LOAD A BUFFER STARTING WITH
319  002630  001316                               WIDTH                   ; THAT CHARACTER AND WIDTH <BYTE>
```

```
321  002632  004737  010330                JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
322
323  002636  005337  001312                DEC     TEMPO           ;DONE ?
324  002642  001005                        BNE     2$              ;BR IF YES
325  002644  004737  011354                JSR     PC,DELAY
326  002650  013737  001264  001312        MOV     VHD,TEMPO
327  002656  005237  001304        2$:     INC     STCHAR          ;UPDATE THE STARTING CHARACTER
328  002662  023737  001306  001304        CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
329  002670  001353                        BNE     1$              ;BRANCH IF NOT COMPLETED
330
331  002672  004737  011354                JSR     PC,DELAY        ;TEST DELAY SWITCH
332                                ;*****************************************************************
(3)                               ;*TEST 6        F       CURSOR MOTION TEST
(3)                               ;*****************************************************************
(2)  002676  000004               TST6:   SCOPE
333  002700  004537  011534                JSR     R5,AMSG         ;DISPLAY HEADING
334  002704  013121                        M96
335
336                               ;ROUTINE TO LOAD REFERENCE LINES FOR CURSOR MOTION TEST
337
338  002706  012700  024312        LBMT:   MOV     #BUFFER,R0      ;LOAD POINTER
339  002712  012720  000065                MOV     #65.,(R0)+      ;LOAD #5
340  002716  013701  001266                MOV     VH1,R1          ;LOAD R1
341  002722  005301                        DEC     R1
342  002724  004737  003022                JSR     PC,MOVDN1       ;MOVE CURSOR DOWN
343  002730  004737  003040                JSR     PC,MOVRIG       ;MOVE RIGHT
344  002734  112720  000062                MOVB    #62.,(R0)+      ;LOAD #2
345  002740  004737  003040                JSR     PC,MOVRIG       ;MOVE RIGHT
346  002744  004737  003040                JSR     PC,MOVRIG       ;MOVE RIGHT
347  002750  112720  000040                MOVB    #40,(R0)+
348  002754  112720  000061                MOVB    #61.,(R0)+      ;LOAD #1
349  002760  004737  003016                JSR     PC,MOVDWN       ;MOVE DOWN
350  002764  004737  003040                JSR     PC,MOVRIG       ;MOVE RIGHT
351  002770  112720  000063                MOVB    #63.,(R0)+      ;LOAD #3
352  002774  004737  003040                JSR     PC,MOVRIG
353  003000  004737  003040                JSR     PC,MOVRIG       ;MOVE RIGHT
354  003004  112720  000064                MOVB    #64.,(R0)+      ;LOAD #4
355  003010  112710  000377                MOVB    #377,(R0)       ;TERM
356  003014  000420                        BR      LBMT1           ;;BR TO NEXT PART
357
358  003016  013701  001266        MOVDWN: MOV     VH1,R1
359  003022  112720  000015        MOVDN1: MOVB    #15.,(R0)+      ;LOAD CR
360  003026  112720  000012                MOVB    #12.,(R0)+      ;LOAD LF
361  003032  005301                        DEC     R1
362  003034  001372                        BNE     MOVDN1          ;LOOP UNTIL DONE
363  003036  000207                        RTS     PC              ;ESIT
364
365  003040  012701  000024        MOVRIG: MOV     #20.,R1         ;LOAD R1
366  003044  112720  000040        1$:     MOVB    #40,(R0)+       ;LOAD SPACES
367  003050  005301                        DEC     R1
368  003052  100374                        BPL     1$              ;LOOP UNTIL DONE
369  003054  000207                        RTS     PC              ;EXIT
370
371  003056  004737  010330        LBMT1:  JSR     PC,XPRNT        ;DISPLAY THIS LINE
372  003062  004737  011354                JSR     PC,DELAY        ;TEST DELAY SWITCH
```

```
                                        ;CURSOR MOTION SUBROUTINE
                                        ;IF VT50H TYPE - USE "ESC-D" FOR CURSOR LEFT AND USE "ESC-B" FOR CURSOR DOWN
003066  013701  001266          LCM:    MOV     VH1,R1          ;LOAD COUNT
003072  012700  024312                  MOV     #BUFFER,R0      ;LOAD BUFFER POINTER
003076  112720  000033          1$:     MOVB    #33,(R0)+       ;LOAD 'ESC'
003102  112720  000101                  MOVB    #101,(R0)+      ;LOAD 'A' CURSOR UP
003106  005301                          DEC     R1
003110  001372                          BNE     1$              ;LOOP UNTIL DONE
003112  112720  000130                  MOVB    #130,(R0)+      ;LOAD 'X'
003116  012701  000054                  MOV     #44.,R1         ;LOAD COUNT
003122  032737  020000  001256          BIT     #BIT13,VT5XX    ;TEST IF VT50H TYPE
003130  001407                          BEQ     20$             ;BR IF NOT
003132  112720  000033          2$:     MOVB    #33,(R0)+       ;LOAD 'ESC'
003136  112720  000104                  MOVB    #104,(R0)+      ;LOAD 'CURSOR LEFT'
003142  005301                          DEC     R1
003144  100372                          BPL     2$              ;LOOP UNTIL DONE
003146  000404                          BR      21$
003150  112720  000010          20$:    MOVB    #10,(R0)+       ;LOAD "BACKSPACE
003154  005301                          DEC     R1              ;DONE ALL ?
003156  100374                          BPL     20$             ;BR IF NOT
003160  112720  000130          21$:    MOVB    #130,(R0)+      ;LOAD 'X'
003164  112720  000010                  MOVB    #10,(R0)+       ;LOAD BACKSPACE
003170  013701  001266                  MOV     VH1,R1          ;LOAD COUNT
003174  032737  020000  001256          BIT     #BIT13,VT5XX    ;TEST IF VT50H TYPE
003202  001407                          BEQ     30$             ;BR IF NOT
003204  112720  000033          3$:     MOVB    #33,(R0)+       ;LOAD 'ESC' CURSOR DOWN
003210  112720  000102                  MOVB    #102,(R0)+      ;
003214  005301                          DEC     R1
003216  001372                          BNE     3$              ;LOOP UNTIL DONE
003220  000404                          BR      31$
003222  112720  000012          30$:    MOVB    #12,(R0)+       ;LOAD CURSOR DOWN (LF)
003226  005301                          DEC     R1              ;DONE ?
003230  001374                          BNE     30$             ;BR IF NOT
003232  112720  000130          31$:    MOVB    #130,(R0)+      ;LOAD 'X'
003236  112720  000010                  MOVB    #10,(R0)+       ;LOAD BACKSPACE
003242  012701  000052                  MOV     #42.,R1         ;LOAD COUNT
003246  112720  000033          4$:     MOVB    #33,(R0)+       ;LOAD 'ESC'
003252  112720  000103                  MOVB    #103,(R0)+      ;LOAD 'C' CURSOR RIGHT
003256  005301                          DEC     R1
003260  100372                          BPL     4$              ;LOOP UNTIL DONE
003262  112720  000130                  MOVB    #130,(R0)+      ;LOAD 'X'
003266  112720  000033                  MOVB    #33,(R0)+       ;LOAD 'ESC'
003272  112720  000110                  MOVB    #110,(R0)+      ;LOAD 'H' CURSOR HOME
003276  112720  000130                  MOVB    #130,(R0)+
003302  112720  000377                  MOVB    #377,(R0)+
003306  004737  010330                  JSR     PC,XPRNT        ;DISPLAY THIS LINE
003312  004737  011354                  JSR     PC,DELAY        ;DELAY
003316  004537  011534                  JSR     R5,AMSG         ;
003322  016101                          CRLF
003324  005737  001256                  TST     VT5XX           ;TEST IF 24 LINES
003330  100003                          BPL     TST7            ;;BR IF 12 LINES
003332  004537  011534                  JSR     R5,AMSG         ;SCROLL MORE LINES
003336  016101                          CRLF

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

```
(3)                                     ;*TEST 7        G       TAB, BACKSPACE AND BELL TEST
(3)                                     ;*****************************************************************
(2)  003340  000004                     TST7:   SCOPE
429  003342  004537  011534                    JSR     R5,AMSG         ;DISPLAY HEADING
430  003346  013154                            M97
431
432  003350  012700  024312             LRL:   MOV     #BUFFER,R0      ;LOAD BUFFER POINTER
433  003354  112720  000007                    MOVB    #7,(R0)+        ;LOAD 'BELL'
434  003360  012701  000011                    MOV     #9.,R1          ;LOAD LINE COUNT
435  003364  012702  000006             1$:    MOV     #6.,R2          ;LOAD COLUMN COUNT
436  003370  112720  000111                    MOVB    #111,(R0)+      ;LOAD COLUMN MARK
437  003374  112720  000040             2$:    MOVB    #40,(R0)+       ;LOAD SPACE
438  003400  005302                            DEC     R2              ;
439  003402  100374                            BPL     2$              ;BR UNTIL DONE
440  003404  005301                            DEC     R1              ;
441  003406  100366                            BPL     1$              ;BR UNTIL FINISHED ALL TAB STOPS
442  003410  112720  000015                    MOVB    #15,(R0)+       ;LOAD CR
443  003414  112720  000012                    MOVB    #12,(R0)+       ;LOAD LF
444  003420  112720  000377                    MOVB    #377,(R0)+      ;LOAD TERM
445
446  003424  004737  010330                    JSR     PC,XPRNT
447
448  003430  004537  003620                    JSR     R5,LTAB         ;LOAD TAB LINE #1
449  003434  000000                            0
450  003436  004737  010330                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
451
452  003442  004537  003620                    JSR     R5,LTAB         ;LOAD TAB LINE #2
453  003446  000001                            1
454  003450  004737  010330                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
455
456  003454  004537  003620                    JSR     R5,LTAB         ;LOAD TAB LINE #3
457  003460  000002                            2
458  003462  004737  010330                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
459
460  003466  004537  003620                    JSR     R5,LTAB         ;LOAD TAB LINE #4
461  003472  000003                            3
462  003474  004737  010330                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
463
464  003500  004537  003620                    JSR     R5,LTAB         ;LOAD TAB LINE #5
465  003504  000004                            4
466  003506  004737  010330                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
467
468  003512  004537  003620                    JSR     R5,LTAB         ;LOAD TAB LINE #6
469  003516  000005                            5
470  003520  004737  010330                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
471
472  003524  004537  003620                    JSR     R5,LTAB         ;LOAD TAB LINE #7
473  003530  000006                            6
474  003532  004737  010330                    JSR     PC,XPRNT        ;DISPLAY THIS LINE
475                                     ;NOW EXECUTE THE BACKSPACE SECTION
476
477  003536  013702  001316                    MOV     WIDTH,R2        ;LOAD WIDTH COUNT
478  003542  005302                            DEC     R2              ;ADJUST WIDTH
479  003544  005302                            DEC     R2              ;  BY 2
480  003546  012701  000040                    MOV     #40,R1          ;LOAD "SPACE" INTO THE LINE
481  003552  004737  010232                    JSR     PC,FILBFB       ;LOAD LINE
```

```
                                                ;LOAD # OF CHARACTER POSITIONS
003556  013701  001316          3$:   MOV   WIDTH,R1
003562  112720  000130                MOVB  #'X,(R0)+       ;LOAD ASCII "X"
003566  112720  000010                MOVB  #10,(R0)+       ;LOAD BACKSPACE CODE
003572  112720  000010                MOVB  #10,(R0)+
003576  005301                       DEC   R1              ;DONE ALL POSITIONS ?
003600  001370                       BNE   3$              ;BR IF NOT
003602  112720  000377                MOVB  #377,(R0)+      ;LOAD TERM.
003606  004737  010330                JSR   PC,XPRNT        ;EXECUTE ASCII CODE
003612  004737  011354                JSR   PC,DELAY        ;TEST DELAY SWITCH
003616  000434                       BR    TST10           ;;BR TO NEXT TEST

                        ;SUBROUTINE TO LOAD THE TAB TEST INTO THE BUFFER

003620  012537  001320          LTAB: MOV   (R5)+,SAVE1     ;LOAD # OF CHARACTERS
003624  012702  024312                MOV   #BUFFER,R2      ;LOAD BUFFER POINTER
003630  012701  000011                MOV   #9.,R1          ;LOAD WIDTH COUNTER
003634  112722  000007                MOVB  #7,(R2)+        ;LOAD BELL AT START OF LINE
003640  112722  000111          3$:   MOVB  #'I,(R2)+       ;LOAD 'I
003644  013700  001320                MOV   SAVE1,R0        ;GET THE  NO. OF THE CHAR
003650  001404                       BEQ   1$              ;BR IF 0
003652  112722  000101          2$:   MOVB  #'A,(R2)+       ;LOAD THE 'A' CHAR.
003656  005300                       DEC   R0              ;
003660  001374                       BNE   2$              ;LOOP UNTIL DONE
003662  112722  000011          1$:   MOVB  #11,(R2)+       ;LOAD 'TAB' CHAR
003666  005301                       DEC   R1              ;
003670  100363                       BPL   3$              ;BR TO NEXT TAB COLUMN CHAR
003672  112722  000015                MOVB  #15,(R2)+       ;LOAD 'CR'
003676  112722  000012                MOVB  #12,(R2)+       ;LOAD 'LF'
003702  112722  000377                MOVB  #377,(R2)+      ;LOAD TERM
003706  000205                       RTS   R5              ;EXIT

                        ;*********************************************************
                        ;*TEST 10       H       ERASE FROM CURSOR TO END OF LINE
                        ;*********************************************************
(3)
(3)
(2) 003710  000004          TST10: SCOPE
003712  004537  011534                JSR   R5,AMSG         ;DISPLAY HEADING
003716  013222                       M910
003720  004737  012474                JSR   PC,FILLWC       ;FILL BUFFER WITH A CHAR
                                                          ;DISPLAY THIS LINE
003724  004737  011354                JSR   PC,DELAY        ;DELAY

                        ;LOAD ERASE LINE TEST INTO BUFFER

003730  012700  024312          LODERL: MOV   #BUFFER,R0
003734  112720  000033                MOVB  #33,(R0)+       ;LOAD ESC
003740  112720  000110                MOVB  #'H,(R0)+       ;LOAD HOME
003744  013737  001264  004046        MOV   VH0,2$          ;LOAD COUNT
003752  005337  004046                DEC   2$
003756  112720  000033          3$:   MOVB  #33,(R0)+       ;LOAD ESC
003762  112720  000113                MOVB  #'K,(R0)+       ;LOAD ERASE LINE CHAR
003766  005337  004046                DEC   2$              ;FINISHED ?
003772  100427                       BMI   1$              ;BR WHEN DONE
003774  012737  000006  004050        MOV   #6.,10$         ;LOAD COUNT
004002  005737  001256                TST   VT5XX           ;TEST IF 12 LINES
004006  100005                       BPL   4$              ;BR IF 12 LINES
004010  006237  004050                ASR   10$             ;ADJUST HORIZ. COUNT
```

```
                                        NOP
                                        NOP
                                        NOP
                        4$:             MOVB    #33,(R0)+
                                        MOVB    #'C,(R0)+       ;CURSOR RIGHT
                                        DEC     10$             ;
                                        BNE     4$              ;LOOP
                                        MOVB    #12,(R0)+       ;CURSOR DOWN
                                        BR      3$
                        2$:             0
                        10$:            0
                        1$:             MOVB    #377,(R0)+      ;LOAD TERM


                                        JSR     PC,XPRNT        ;DISPLAY THIS TEST

                                        JSR     PC,DELAY        ;TEST DELAY SWITCH

                        ;*******************************************************************
                        ;*TEST 11       I       ERASE FROM CURSOR TO END OF SCREEN
                        ;*******************************************************************
                        TST11:  SCOPE
                                JSR     R5,AMSG         ;DISPLAY HEADING
                                M911
                                JSR     PC,FILLWC       ;FILL BUFFER WITH A CHAR
                                                        ;DISPLAY THIS LINE
                                JSR     PC,DELAY        ;DELAY

                        ;LOAD ERASE SCREEN TEST INTO BUFFER

004202  LODERS: MOV     WIDTH,2$        ;LOAD COUNT
                ASR     2$
                MOV     #BUFFER,R0
                1$:     MOVB    #10,(R0)+       ;LOAD CURSOR LEFT
                        DEC     2$              ;DONE ?
                        BPL     1$              ;BR UNTIL DONE
                        MOV     VHO,2$          ;LOAD COUNT
                4$:     MOVB    #33,(R0)+       ;LOAD ESC
                        MOVB    #'J,(R0)+       ;LOAD ERASE SCREEN
                        DEC     2$              ;DONE ?
                        BMI     3$              ;BR WHEN DONE
                        MOVB    #33,(R0)+       ;LOAD ESC
                        MOVB    #'A,(R0)+       ;LOAD CURSOR UP
                        BR      4$              ;LOOP
                3$:     MOVB    #377,(R0)+      ;LOAD TERM
                        BR      5$
                2$:     0


                5$:     JSR     PC,XPRNT        ;DISPLAY THIS TEST
                        JSR     PC,DELAY        ;TEST DELAY SWITCH


                        ;*******************************************************************
                        ;*TEST 12       J       VIDEO COUPLING TEST
                        ;*******************************************************************
                        TST12:  SCOPE
                                JSR     R5,AMSG         ;DISPLAY HEADER
```

```
   585  004222  013306                          M912
   586  004224  013737  001266  001310          MOV     VH1,TEMP        ;LOAD COUNTER
   587  004232  004537  011534          1$:     JSR     R5,AMSG
   588  004236  016127                          PATH
   589
   590  004240  005337  001310                  DEC     TEMP            ;FINISHED COUNT ?
   591  004244  001372                          BNE     1$              ;BR UNTIL DONE
   592  004246  004737  011354                  JSR     PC,DELAY        ;TEST DELAY SWITCH
   593
   594                                  ;*****************************************************************
   (3)                                  ;*TEST 13       K       DIRECT CURSOR ADDRESS TEST
   (3)                                  ;*****************************************************************
   (2)  004252  000004                  TST13:  SCOPE
   595                                  ;       RANDOM NUMBERS ARE GENERATED AND USED AS "X" AND "Y" COORDINATES
   596                                  ;ADDRESSING A 960 CHARACTER PRINTOUT.
   597                                  ;VERFICATION OF DISPLAY IS PERFORMED VISUALLY BY THE USER
   598                                  ;EXECUTE 1ST TIME USING "ESC-Y" SEQUENCE AND IF I.D. IS AN "H"
   599                                  ;       EXECUTE 2ND TIME USING "CODE 16" SEQUENCE
   600
   601  004254  032737  020000  001256          BIT     #BIT13,VT5XX    ;TEST IF DCA TYPE TERMINAL
   602  004262  001002                          BNE     3$              ;;BR IF CURSOR ADDRESSING
   603  004264  000137  005012          1$:     JMP     TST14           ;BYPASS THIS TEST
   604  004270  005737  001330          3$:     TST     WFTEST          ;TEST IF IN W.F. MODE
   605  004274  001373                          BNE     1$              ;BYPASS IF W.F. MODE
   606  004276  004537  011534                  JSR     R5,AMSG         ;ERASE SCREEN AND IDENTIFY TEST
   607  004302  017427                          M98
   608  004304  112737  000033  024312          MOVB    #33,BUFFER      ;LOAD "ESC" CODE
   609  004312  112737  000131  024313          MOVB    #'Y,BUFFER+1    ;LOAD ASCII "Y" (D.C.A. ENABLE)
   610  004320  004737  004374                  JSR     PC,DCATST       ;RUN TEST WITH ESC Y SEQUENCE
   611  004324  004737  011354                  JSR     PC,DELAY        ;DELAY TESTING
   612  004330  122737  000110  001256          CMPB    #'H,VT5XX       ;TEST IF VT50H TYPE DISPLAY
   613  004336  001352                          BNE     1$              ;;BR IF NOT VT50H TYPE
   614  004340  004537  011534                  JSR     R5,AMSG         ;ERASE SCREEN AND IDENTIFY TEST
   615  004344  017427                          M98
   616  004346  112737  000000  024312          MOVB    #0,BUFFER       ;LOAD "SPACE" AS FIRST VALUE
   617  004354  112737  000016  024313          MOVB    #16,BUFFER+1    ;LOAD CODE-16 SEQUENCE
   618  004362  004737  004374                  JSR     PC,DCATST       ;RUN TEST WITH CODE 16 SEQUENCE
   619  004366  004737  011354                  JSR     PC,DELAY
   620  004372  000734                          BR      1$              ;;BR TO NEXT TEST
   621
   622  004374  012737  123456  024106  DCATST: MOV     #123456,$LONUM  ;PRIME RANDOM NUMBER GENERATOR
   623  004402  012737  176543  024104          MOV     #176543,$HINUM
   624  004410  013737  001262  004666          MOV     TOTALC,OVRAL    ;LOAD CHAR COUNT
   625  004416  013737  001264  004664          MOV     VHO,SET         ;LOAD LINE COUNT
   626  004424  012700  024332                  MOV     #BUFFER+20,R0   ;LOAD DESTINATION BUFFER
   627  004430  012701  004670          2$:     MOV     #MSGTXT,R1      ;LOAD MESSAGE POINTER
   628  004434  012120                  1$:     MOV     (R1)+,(R0)+     ;LOAD 2 CHARACTERS
   629  004436  022701  005010                  CMP     #MSGTND,R1      ;TEST FOR LAST CHAR
   630  004442  001374                          BNE     1$              ;BR UNTIL DONE 1 LINE
   631  004444  005337  004664                  DEC     SET             ;FINISHED ALL LINES
   632  004450  001367                          BNE     2$              ;BR IF NOT
   633  004452  012737  177777  024316          MOV     #-1,BUFFER+4    ;LOAD MESSAGE TERMINATOR
   634
   635  004460  004737  023760          GENER:  JSR     %7,$RAND        ;GENERATE RANDOM NUMBER
   636  004464  013700  024106                  MOV     $LONUM,R0       ;GET RNADOM NUMBER
   637  004470  042700  177700                  BIC     #177700,%0      ;RANDOM NO. MUST BE TWO DIGITS
```

```
                                    CMP     %0,#37          ;NO, MUST BE LESS THAN 40
                                    BLOS    GENER           ;LOWER, REGENERATION
                                    CMP     %0,LASTLN               ;NO, MUST NOT BE GREATER THAN 54 OR 67
                                    BHI     GENER           ;GREATER, REGENERATION
                                    MOV     %0,YADDS        ;STORE RANDOM Y COORDINATE
                                    MOV     %0,%1           ;COPY DATA
                                    MOV     #BUFFER+20,SET  ;LOAD BASE POINTER
                                    SUB     #40,%1          ;MINIMUM Y INDEX
                                    BEQ     GENRX           ;RESULT, MINIMUM Y COORDINATE
                            1$:     ADD     #80.,SET        ;SETUP  Y INDEX LOCATION FOR PRINTOUT
                                    DEC     %1
                                    BNE     1$              ;Y COORDINATE IS SET
                            GENRX:  JSR     %7,$RAND        ;GENERATE RANDOM NUMBER
                                    MOV     $LONUM,R0       ;GET A RANDOM NUMBER
                                    BIC     #177600,%0      ;RANDOM NO. MAY BE LESS THAN 200
                                    CMP     %0,#37          ; MUST NOT BE LESS THAN 40
                                    BLOS    GENRX           ;LOWER, REGENERATION
                                    CMP     %0,#157         ; MUST NOT BE GREATER THAN 157
                                    BHI     GENRX           ;GREATER, REGENERATION
                                    MOV     %0,XADDS        ;STORE RANDOM X COORDINATE
                                    SUB     #40,%0          ;SETUP MINIMUM X INDEX
                                    ADD     %0,SET          ;SETUP X COOR, FOR PNTOUT.
                                    MOV     SET,%1          ;SETUP CHECK
                                    TSTB    (1)             ;HAS CURRENT CHAR, ALREADY BEEN USED?
                                    BMI     GENER           ;YES, REGENERATE
                                    MOVB    YADDS,BUFFER+2  ;LOAD Y COORDINATE
                                    MOVB    XADDS,BUFFER+3  ;LOAD X COORDINATE
                                    MOVB    (1),BUFFER+4    ;LOAD CHARACTER TO BE PRINTED
                                    BISB    #200,(1)        ;INDICATE USE OF CURSOR POSITION
                                    JSR     PC,XPRNT        ;EXECUTE AND PRINT CHARACTER
                                    DEC     OVRAL           ;MAXIMUM NO. OF COORDINATES
                                    BNE     GENER           ;BR BACK UNTIL DONE
                                    RTS     PC              ;EXIT

                            YADDS:  0
                            XADDS:  0
                            SET:    0
                            OVRAL:  0
                            MSGTXT: .ASCII  \VT50-PLUS-DIRECT-CURSOR-ADDRESSING-TEST\
                                    .ASCII  \-DIGITAL-EQUIPMENT-CORP.-MAYNARD-MA.-VT50\
                            MSGTND: BIT15
                            ;ONLY 12 LINE TERMINALS WILL RUN THIS TEST
                            ;*****************************************************************
(3)                         ;*TEST 14       L       HOLD SCREEN TEST
```

```
(3)                                     ;*****************************************************************
(2)  005012  000004                     TST14:  SCOPE
681  005014  005037  010750                    CLR     AXOFF
682  005020  005037  010752                    CLR     XOFFRC          ;CLEAR SOFT FLAG
683  005024  004537  011534                    JSR     R5,AMSG         ;DISPLAY
684  005030  016101                            CRLF
685  005032  004537  011534                    JSR     R5,AMSG         ;CR-LF
686  005036  016101                            CRLF
687
688  005040  005737  001330                    TST     WFTEST          ;TEST IF IN W.F. MODE
689  005044  001046                            BNE     TST15           ;;BR IF W.F. MODE
690  005046  005737  001256                    TST     VT5XX           ;TEST IF 12 LINE
691  005052  100443                            BMI     TST15           ;;BR IF NOT 12 LINE
692  005054  004537  011534                    JSR     R5,AMSG         ;DISPLAY MESSAGE
693  005060  013473                            M922
694
695  005062  012737  000001  010746            MOV     #1,XOFFOK
696  005070  012737  000001  010744            MOV     #1,XOFFBR       ;ENABLE XOFF
697  005076  004537  011534                    JSR     R5,AMSG         ;TRY TO  SCROLL THE SCREEN
698  005102  017317                            GOHDSC                  ;ENABLE HOLD SCREEN
699
700  005104  005737  010752                    TST     XOFFRC          ;TEST IF XOFF SENSED
701  005110  001001                            BNE     1$              ;BR IF SENSED
702
703  005112  104002                            ERROR   2               ;ENABLE HOLD SCREEN MODE FAILED TO
704                                                                    ;INHIBIT THE SCREEN FROM SCROLLING
705                                                                    ;BY SENDING "X-OFF"
706
707  005114  005037  010754          1$:       CLR     XONRC           ;CLEAR SOFT FLAG
708  005120  005037  010744                    CLR     XOFFBR
709  005124  012737  000001  010750            MOV     #1,AXOFF
710  005132  004537  011534                    JSR     R5,AMSG
711  005136  017345                            GODSHS                  ;DISABLE HOLD SCREEN MODE
712
713  005140  004537  011534                    JSR     R5,AMSG
714  005144  016112                            CRLFA                   ;TRY SCROLLING THE SCREEN
715
716  005146  005737  010754                    TST     XONRC           ;TEST SOFT FLAG (X-ON)
717  005152  001001                            BNE     2$              ;BR IF SENSED
718
719  005154  104002                            ERROR   2               ;DISABLE HOLD SCREEN MODE FAILED TO ENABLE
720                                                                    ;THE SCREEN TO SCROLL BY SENDING AN "X-ON"
721
722  005156  004737  011354          2$:       JSR     PC,DELAY        ;PROGRAM DELAY
723
724                                     ;*****************************************************************
(3)                                     ;*TEST 15       M       TEST GRAPHICS MODE AND REV. LINE FEED
(3)                                     ;*****************************************************************
(2)  005162  000004                     TST15:  SCOPE
725  005164  032737  001000  001256            BIT     #BIT09,VT5XX    ;IS UNIT VT52?
726  005172  001002                            BNE     GRPHST          ;YES-TEST GRAPHICS AND REV. LINE FEED
727  005174  000137  005274                    JMP     COPTST          ;NO-GO CHECK FOR COPIER
728  005200  012704  000120          GRPHST:   MOV     #80.,R4
729  005204  004537  011534          1$:       JSR     R5,AMSG         ;HOME THE CURSOR AND CLEAR THE SCREEN.
730  005210  016121                            HOMERS
731  005212  004537  011534                    JSR     R5,AMSG         ;DISPLAY TEST MESSAGE
```

```
                                        M9221
                                        JSR     R5,AMSG         ;ENTER GRAPHICS MODE.
                                        ENGRAF
                                        MOV     #37.,TEMPO      ;SET UP TO XMIT 80 LINES
                                2$:     JSR     PC,GBBUF        ;LOAD BUFFER WITH GRAPHICS
                                        JSR     PC,XPRNT        ;DISPLAY 1 LINE
                                        JSR     R5,AMSG         ;ISSUE REV. LINE FEED AND
                                        REVLF                   ;A CARRIAGE RETURN
                                        DEC     R4              ;DECREMENT BUFFER COUNT
                                3$:     DEC     TEMPO           ;DONE?
                                        BNE     2$              ;NO-LOOP
                                        JSR     R5,AMSG         ;YES-EXIT GRAPHICS MODE
                                        EXGRAF
                                        JSR     PC,DELAY        ;AND GO CHECK DELAY
                                COPTST:
(4)                                     ;*****************************************************************
(3)                                     ;*TEST 16       N       COPIER - AUTO COPY TEST
(3)                                     ;*****************************************************************
(2)                             TST16:  SCOPE
                                        BIT     #BIT14,VT5XX    ;TEST IF COPIER IS AVAILABLE
                                        BNE     2$              ;;BR IF AVAILABLE
                                3$:     JMP     PRNTST          ;NOT AVAILABLE SO BYPASS COPIER TESTS
                                2$:     BIT     #BIT11,@SWR     ;TEST IF INHIBIT COPIER TEST SWITCH IS SET
                                        BNE     3$              ;BR IF SET
                                        BIT     #BIT10,@SWR     ;TEST IF PAPER SAVE SWITCH IS SET
                                        BEQ     6$              ;BR IF NOT SET AND START COPIER TESTING
                                        TSTB    PRTCNT          ;TEST IF TIME TO TEST COPIER
                                        BNE     3$              ;NOT TIME TO RUN THE COPIER
                                        MOV     PTCT,PRTCNT     ;RELOAD COUNTER AND TEST COPIER

                                6$:     JSR     R5,AMSG
                                        M923                    ;DISPLAY HEADER
                                        JSR     R5,AMSG         ;ENABLE AUTO-COPY
                                        GOAPMD

                                        MOV     VHO,TEMPO       ;LOAD A EXECUTION COUNT
                                        MOV     #101,R1         ;LOAD A CHARACTER
                                        JSR     PC,FILBUF       ;LOAD CHARACTER INTO BUFFER
                                1$:     MOV     #1,XOFFOK
                                        JSR     PC,XPRNT        ;DISPLAY IT
                                        JSR     PC,DELAY        ;PROGRAM DELAY
                                        DEC     TEMPO           ;FINISHED ?
                                        BPL     1$              ;BR IF NOT
                                        MOV     #1,XOFFOK
                                        JSR     R5,AMSG         ;DISABLE AUTO-COPY
                                        GONAPM
                                        JSR     PC,DELAY        ;ANOTHER DELAY


                                ;*****************************************************************
                                ;*TEST 17       0       COPIER - FULL SCREEN OF A CHARACTER
                                ;*****************************************************************
                                TST17:  SCOPE
                                1$:     JSR     R5,AMSG         ;DISPLAY HEADER
                                        M91
                                        JSR     PC,FILLWC       ;FILL BUFFER WITH CHAR
                                                                ;DISPLAY IT
```

```
  781  005460  012737  000001  010746          MOV     #1,XOFFOK       ;ALLOW XOFF
  782  005466  004537  011534                  JSR     R5,AMSG         ;COPY INST
  783  005472  017271                          GOPRNT
  784  005474  004737  011354                  JSR     PC,DELAY
  785
  786
  787                                  ;*****************************************************************
  (3)                                  ;*TEST 20       P       COPIER - DATA PATH TEST
  (3)                                  ;*****************************************************************
  (2)  005500  000004                  TST20:  SCOPE
  788  005502  004537  011534                  JSR     R5,AMSG         ;DISPLAY HEADING
  789  005506  012777                          M92
  790  005510  013737  001266  001310          MOV     VH1,TEMP        ;SET-UP A COUNTER
  791  005516  004537  011246                  JSR     R5,DTPSR        ;SET-UP BUFFER
  792  005522  000077                          77                      ;OCTAL '?'
  793  005524  000100                          100                     ;OCTAL '@'
  794  005526  004537  011252                  JSR     R5,DTPSRB       ;SET-UP BUFFER
  795  005532  000125                          125                     ;OCTAL 'U'
  796  005534  000052                          52                      ;OCTAL '*'
  797  005536  004737  010330          1$:     JSR     PC,XPRNT        ;DISPLAY THIS LINE
  798  005542  005337  001310                  DEC     TEMP            ;COMPLETED FULL COUNT?
  799  005546  001373                          BNE     1$              ;BRANCH IF NOT COMPLETED
  800  005550  012737  000001  010746          MOV     #1,XOFFOK
  801  005556  004537  011534                  JSR     R5,AMSG
  802  005562  017271                          GOPRNT                  ;COPY INST
  803  005564  004737  011354                  JSR     PC,DELAY        ;TEST DELAY SWITCH
  804
  805                                  ;*****************************************************************
  (3)                                  ;*TEST 21       Q       COPIER - SINGLE CHARACTER ACROSS ALL COLS. <ALL CHARACTERS>
  (3)                                  ;*****************************************************************
  (2)  005570  000004                  TST21:  SCOPE
  806  005572  004537  011534                  JSR     R5,AMSG         ;DISPLAY HEADING
  807  005576  013026                          M93
  808  005600  012737  000040  001304          MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
  809  005606  013737  001264  001312          MOV     VH0,TEMP0
  810  005614  013701  001304          1$:     MOV     STCHAR,R1       ;LOAD R1= TO CHARACTER
  811  005620  004737  010226                  JSR     PC,FILBUF       ;LOAD A BUFFER WITH THAT CHARACTER
  812  005624  004737  010330                  JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
  813  005630  005337  001312                  DEC     TEMP0           ;DONE
  814  005634  001011                          BNE     3$
  815  005636  013737  001264  001312          MOV     VH0,TEMP0
  816  005644  012737  000001  010746          MOV     #1,XOFFOK       ;ALLOW XOFF
  817  005652  004537  011534                  JSR     R5,AMSG
  818  005656  017271                          GOPRNT                  ;COPY INST
  819  005660  005237  001304          3$:     INC     STCHAR          ;UPDATE THE CHARACTER
  820  005664  023737  001306  001304          CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
  821  005672  001350                          BNE     1$              ;BRANCH IF NOT COMPLETED
  822  005674  004537  011534                  JSR     R5,AMSG         ;CRLF
  823  005700  016110                          CRLFA-2
  824  005702  012737  000001  010746          MOV     #1,XOFFOK       ;ENABLE XOFF
  825  005710  004537  011534                  JSR     R5,AMSG         ;COPY INS
  826  005714  017271                          GOPRNT
  827  005716  004737  011354                  JSR     PC,DELAY        ;TEST DELAY SWITCH
  828
  829                                  ;*****************************************************************
  (3)                                  ;*TEST 22       R       COPIER - ROTATING CHARACTERS ACROSS ALL COLS. <ALL CHARACTERS>
```

```
(3)
(2)  005722  000004                    ;*****************************************************************
                                        TST22:  SCOPE
830  005724  004537  011534                      JSR     R5,AMSG         ;DISPLAY HEADING
831  005730  013070                              M94
832  005732  012737  000040  001304              MOV     #40,STCHAR      ;SET-UP STARTING CHARACTER
833  005740  013737  001264  001312              MOV     VHO,TEMPO       ;
834  005746  013701  001304          1$:         MOV     STCHAR,R1       ;LOAD R1=TO CHARACTER
835  005752  004537  010262                      JSR     R5,LIC          ;LOAD A BUFFER STARTING WITH
836  005756  001316                              WIDTH                   ; THAT CHARACTER AND WIDTH <BYTE>
837  005760  004737  010330                      JSR     PC,XPRNT        ;DISPLAY A FULL LINE FROM THE BUFFER
838  005764  005337  001312                      DEC     TEMPO           ;DONE ?
839  005770  001011                              BNE     3$
840  005772  013737  001264  001312              MOV     VHO,TEMPO
841  006000  012737  000001  010746              MOV     #1,XOFFOK
842  006006  004537  011534                      JSR     R5,AMSG
843  006012  017271                              GOPRNT                  ;COPY INST
844  006014  005237  001304          3$:         INC     STCHAR          ;UPDATE THE STARTING CHARACTER
845  006020  023737  001306  001304              CMP     LASTCH,STCHAR   ;TEST FOR FINAL CHARACTER
846  006026  001347                              BNE     1$              ;BRANCH IF NOT COMPLETED
847  006030  004537  011534                      JSR     R5,AMSG         ;CRLF
848  006034  016110                              CRLFA-2
849  006036  012737  000001  010746              MOV     #1,XOFFOK       ;ENABLE XOFF
850  006044  004537  011534                      JSR     R5,AMSG         ;COPY INST
851  006050  017271                              GOPRNT
852  006052  004737  011354                      JSR     PC,DELAY        ;TEST DELAY SWITCH
853
854                                     ;*****************************************************************
(3)                                     ;*TEST 23       S       COPIER - PERIMETER PATTERN
(3)                                     ;*****************************************************************
(2)  006056  000004                     TST23:  SCOPE
855  006060  004537  011534                      JSR     R5,AMSG         ;DISPLAY HEADER
856  006064  013407                              M920
857  006066  012701  000105                      MOV     #'E,R1          ;LOAD STARTING CHARACTER
858  006072  004737  010226                      JSR     PC,FILBUF       ;FILL THE BUFFER
859  006076  004737  010330                      JSR     PC,XPRNT        ;DISPLAY A LINE
860  006102  004737  010330                      JSR     PC,XPRNT        ;DISPLAY A LINE
861  006106  013737  001266  001310              MOV     VH1,TEMP        ;LOAD VERT COUNT
862  006114  062737  000002  001310              ADD     #2,TEMP         ;UPDATE BY 2
863  006122  004737  011152          1$:         JSR     PC,FIRLST       ;FILL FIRST AND LAST
864  006126  004737  010330                      JSR     PC,XPRNT        ;DISPLAY A LINE
865  006132  005337  001310                      DEC     TEMP            ;DONE ?
866  006136  001371                              BNE     1$
867  006140  012701  000105                      MOV     #'E,R1          ;LOAD STARTING CHAR
868  006144  004737  010226                      JSR     PC,FILBUF       ;LOAD LINE WITH E'S
869  006150  004737  010330                      JSR     PC,XPRNT        ;DISPLAY A LINE
870  006154  004737  010330                      JSR     PC,XPRNT
871  006160  012737  000001  010746              MOV     #1,XOFFOK
872  006166  004537  011534                      JSR     R5,AMSG
873  006172  017271                              GOPRNT                  ;COPY SCREEN
874  006174  004737  011354                      JSR     PC,DELAY
875
876                                     ;*****************************************************************
(3)                                     ;*TEST 24       T       COPIER - DISCLAIMER STATEMENT
(3)                                     ;*****************************************************************
(2)  006200  000004                     TST24:  SCOPE
877
```

```
  878  006202  004537  011534                    JSR     R5,AMSG         ;DISPLAY HEADER
  879  006206  013437                            M921
  880
  881  006210  005004                            CLR     R4
  882  006212  016437  006530  006226  1$:      MOV     DISPCH(R4),10$  ;LOAD A POINTER
  883  006220  001405                            BEQ     2$              ;BR IF DONE
  884  006222  004537  011534                    JSR     R5,AMSG         ;DISPLAY COPYRIGHT
  885  006226  021352                    10$:    MTEXTO
  886  006230  005724                            TST     (R4)+           ;UPDATE POINTER
  887  006232  000767                            BR      1$
  888
  889
  890  006234  012737  000001  010746  2$:      MOV     #1,XOFFOK       ;ENABLE XOFF
  891  006242  004537  011534                    JSR     R5,AMSG         ;COPY SCREEN
  892  006246  017271                            GOPRNT
  893  006250  004737  011354                    JSR     PC,DELAY
  894  006254  000240                    PRNTST: NOP                     ;TRY PRINTER TESTS
  895
  896                                    ;*****************************************************************
  (3)                                    ;*TEST 25       U       PRINTER CONTROLLER MODE TEST
  (3)                                    ;*****************************************************************
  (2)  006256  000004                    TST25:  SCOPE
  897  006260  032737  002000  001256            BIT     #BIT10,VT5XX    ;IS UNIT EQUIPPED WITH PRINTER.
  898  006266  001002                            BNE     1$              ;YES-TEST IT
  899  006270  000137  006556                    JMP     $EOP            ;NO-EXIT TEST
  900  006274  004537  011534            1$:     JSR     R5,AMSG         ;DISPLAY HEADER
  901  006300  013644                            MPTCNT
  902  006302  004537  011534                    JSR     R5,AMSG         ;ENABLE PRINTER CONTROLLER MODE.
  903  006306  021107                            ENPNTM
  904  006310  012737  000040  001304            MOV     #40,STCHAR      ;LOAD INITIAL CHAR.
  905  006316  013701  001304            2$:     MOV     STCHAR,R1
  906  006322  004537  010262                    JSR     R5,LIC          ;BUILD A 132 COL. LINE.
  907  006326  001314                            PNTWID
  908  006330  012737  000001  010746            MOV     #1,XOFFOK       ;ALLOW XOFF/XON PROTOCOL
  909  006336  004737  010330                    JSR     PC,XPRNT        ;DISPLAY IT.
  910  006342  005237  001304                    INC     STCHAR          ;INCREMENT 1ST CHAR.
  911  006346  023737  001304  001306            CMP     STCHAR,LASTCH   ;ISSUED 92 LINES?
  912  006354  001360                            BNE     2$              ;NO-LOOP
  913  006356  004537  011534                    JSR     R5,AMSG         ;YES-DISABLE PRINTER
  914  006362  021114                            EXPNTM                  ;CONTROLLER MODE.
  915  006364  004737  011354                    JSR     PC,DELAY        ;TEST DELAY SWITCH AND EXIT.
  916
  917                                    ;*****************************************************************
  (3)                                    ;*TEST 26       V       PRINT SCREEN TEST
  (3)                                    ;*****************************************************************
  (2)  006370  000004                    TST26:  SCOPE
  918
  919
  920  006372  004537  011534                    JSR     R5,AMSG         ;DISPLAY PRINT SCREEN MESSAGE
  921  006376  013713                            MPTSCN
  922
  923  006400  004737  012474                    JSR     PC,FILLWC       ;FILL THE SCREEN WITH E
  924
  925  006404  012737  000001  010746            MOV     #1,XOFFOK       ;ALLOW XOFF/XON PROTOCOL
  926  006412  004537  011534                    JSR     R5,AMSG         ;PRINT THEM
  927  006416  017271                            GOPRNT
```

```
                                                ;*****************************************************************
                                                ;*TEST 27        W       AUTO PRINT TEST
                                                ;*****************************************************************
006424  000004                                  TST27:  SCOPE

006426  004537  011534                                  JSR     R5,AMSG
006432  013750                                          M923A                   ;DISPLAY HEADER
006434  004537  011534                                  JSR     R5,AMSG         ;ENABLE AUTO-PRINT
006440  017373                                          GOAPMD

006442  013737  001264  001312                          MOV     VHO,TEMPO       ;LOAD A EXECUTION COUNT
006450  012701  000101                                  MOV     #101,R1         ;LOAD A CHARACTER
006454  004737  010226                                  JSR     PC,FILBUF       ;LOAD CHARACTER INTO BUFFER
006460  012737  000001  010746  1$:                     MOV     #1,XOFFOK
006466  004737  010330                                  JSR     PC,XPRNT        ;DISPLAY IT
006472  004737  011354                                  JSR     PC,DELAY        ;PROGRAM DELAY
006476  005337  001312                                  DEC     TEMPO           ;FINISHED ?
006502  100366                                          BPL     1$              ;BR IF NOT
006504  012737  000001  010746                          MOV     #1,XOFFOK
006512  004537  011534                                  JSR     R5,AMSG         ;DISABLE AUTO-PRINT
006516  017400                                          GONAPM
006520  004737  011354                                  JSR     PC,DELAY        ;ANOTHER DELAY

006524  000137  006556                                  JMP     $EOP            ;END OF PASS
006530  021352                          DISPCH: MTEXT0
006532  021456                                  MTEXT1
006534  021557                                  MTEXT2
006536  021661                                  MTEXT3
006540  021744                                  MTEXT4
006542  022046                                  MTEXT5
006544  022147                                  MTEXT6
006546  022201                                  MTEXT7
006550  022301                                  MTEXT8
006552  000000                                  0
006554  000000                                  0

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

                                                .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

006556                                          $EOP:
006556  000004                                          SCOPE
006560  005737  001242                                  TST     LAST                    ;TEST IF MORE
006564  001414                                          BEQ     1$                      ;BR IF NONE
006566  023737  001242  001244                          CMP     LAST,VTNOW              ;IS THIS THE LAST ONE
006574  001410                                          BEQ     1$                      ;BR IF YES
006576  062737  000010  001244                          ADD     #10,VTNOW
```

```
(3)  006604  012737  001760  001756          MOV     #TST1,WHERE
(3)  006612  000137  001724                  JMP     RSTRT                   ;TEST NEXT ONE
(3)  006616  005737  001104          1$:     TST     $PASS                   ;TEST IF FIRST PASS
(3)  006622  001002                          BNE     2$                      ;BR IF NOT
(3)  006624  104400  017617                  TYPE    ,PASHED                 ;TYPE EOP HEADER
(3)  006630  000005          2$:     RESET
(3)  006632  005737  001330                  TST     WFTEST          ;TEST IF W.F. MODE
(3)  006636  001402                          BEQ     3$              ;BR IF NOT
(3)  006640  004737  011462                  JSR     PC,ADELAY       ;EXTRA DELAY
(3)  006644  000240          3$:     NOP
(3)
(1)  006646  005037  001106                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
(1)  006652  005237  001104                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
(1)  006656  042737  100000  001104          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
(1)  006664  005327                          DEC     (PC)+           ;;LOOP?
(1)  006666  000001          $EOPCT: .WORD   1
(1)  006670  003022                          BGT     $DOAGN          ;;YES
(1)  006672  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
(1)  006674  000001          $ENDCT: .WORD   1
(1)  006676  006666                          $EOPCT
(1)  006700  104400  006742                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
(2)  006704  013746  001104                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
(2)  006710  104404                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
(1)  006712  104400  006757                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
(1)  006716                  $GET42:
(1)
(1)  006716  013700  000042                  MOV     @#42,R0         ;;GET MONITOR ADDRESS
(1)  006722  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
(1)  006724  000005                          RESET                   ;;CLEAR THE WORLD
(1)  006726  004710          $ENDAD: JSR     PC,(R0)                 ;;GO TO MONITOR
(1)  006730  000240                          NOP                     ;;SAVE ROOM
(1)  006732  000240                          NOP                     ;;FOR
(1)  006734  000240                          NOP                     ;;ACT11
(1)  006736                  $DOAGN:
(1)  006736  000137  006762                  JMP     @#NOWEOP                ;;RETURN
(1)  006742  005015  047105  020104  $ENDMG: .ASCIZ   <15><12>/END PASS #/
(1)  006750  040520  051523  021440
(1)  006756     000
(1)  006757     377     377     000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
984  006762  005737  001272          NOWEOP: TST     PRTCNT
985  006766  100002                          BPL     11$
986  006770  105337  001272                  DECB    PRTCNT
987  006774  012737  001760  001756  11$:    MOV     #TST1,WHERE
988  007002  013746  001116                  MOV     $ERTTL,-(SP)
989  007006  104404                          TYPDS
990  007010  104400  006757                  TYPE    ,$ENULL
991  007014  000137  001716                  JMP     $BEGIN
995                          ;*****************************************************************
(3)                          ;*TEST 30        X       KEYBOARD OCTAL VALUE LOOP
(3)                          ;*****************************************************************
(2)  007020  000004          TST30:  SCOPE
996  007022  012706  001100  KRBEC0: MOV     #STACK,SP
997  007026  004537  011534          JSR     R5,AMSG                 ;DISPLAY HEADER
998  007032  015620                  MKE
999  007034  004737  012536  1$:     JSR     PC,GETCHR               ;GET CHAR
1000 007040  000775                  BR      1$              ;;BR BACK IF NO INPUT
```

```
1001  007042  004737  011554                JSR     PC,OCTAL        ;CONVERT R0 TO OCTAL
1002  007046  113737  011644  016043        MOVB    DIG0,MKEB       ;LOAD DIGIT
1003  007054  113737  011646  016044        MOVB    DIG1,MKEB+1     ;LOAD DIGIT
1004  007062  113737  011650  016045        MOVB    DIG2,MKEB+2     ;LOAD DIGIT
1005  007070  042700  177600                BIC     #177600,R0
1006  007074  001001                        BNE     10$
1007  007076  005200                        INC     R0
1008  007100  012701  007210        10$:    MOV     #BFCHR,R1       ;LOAD POINTER
1009  007104  121100                5$:     CMPB    (R1),R0         ;TEST IF = TO VALUE IN TABLE ?
1010  007106  001403                        BEQ     3$              ;BR IF FOUND
1011  007110  005721                        TST     (R1)+           ;MOVE POINTER
1012  007112  001374                        BNE     5$              ;BR IF MORE
1013  007114  000407                        BR      2$              ;BR IF NOT IN LIST
1014  007116  062701  000040        3$:     ADD     #BFCHAR-BFCHR,R1 ;UPDATE POINTER
1015  007122  112137  016036                MOVB    (R1)+,MKEA1     ;LOAD 1ST CHAR
1016  007126  112137  016037                MOVB    (R1)+,MKEA1+1   ;LOAD 2ND
1017  007132  000420                        BR      4$
1018  007134  120027  000040        2$:     CMPB    R0,#40          ;TEST IF LESS THAN 40
1019  007140  101010                        BHI     6$              ;BR IF ABOVE
1020  007142  062700  000100                ADD     #100,R0         ;MAKE PRINTABLE
1021  007146  110037  016037                MOVB    R0,MKEA1+1      ;SAVE CHAR
1022  007152  112737  000136  016036        MOVB    #136,MKEA1      ;ADD A '↑' BEFORE CHARACTER
1023  007160  000405                        BR      4$
1024  007162  112737  000040  016037  6$:   MOVB    #40,MKEA1+1     ;LOAD SPACE
1025  007170  110037  016036                MOVB    R0,MKEA1        ;LOAD CHARACTER
1026  007174  005237  010760        4$:     INC     IGNORE          ;IGNORE DOUBLE CHARACTER FLAG
1027  007200  004537  011534                JSR     R5,AMSG         ;DISPLAY MESSAGE
1028  007204  016025                        MKEA
1029  007206  000712                        BR      1$              ;LOOP BACK
1030
1031                                  ;TABLE OF DEFINED CHARACTERS
1032
1033  007210  000007                BFCHR:  7                       ;BELL CODE
1034  007212  000010                        10                      ;CURSOR LEFT CODE
1035  007214  000011                        11                      ;TAB CODE
1036  007216  000012                        12                      ;LINE FEED CODE
1037  007220  000015                        15                      ;CARRIAGE RETURN CODE
1038  007222  000033                        33                      ;ESCAPE CODE
1039  007224  000040                        40                      ;SPACE CODE
1040  007226  000177                        177                     ;DELETE CODE
1041  007230  000000                        0
1042  007232  000000                        0
1043  007234  000000                        0
1044  007236  000000                        0
1045  007240  000000                        0
1046  007242  000000                        0
1047  007244  000000                        0
1048  007246  000000                        0
1049
1050                                  ;DEFINED CHARACTER EQUIL
1051
1052  007250  046102                BFCHAR: .ASCII  /BL/             ;BELL
1053  007252  046103                        .ASCII  /CL/            ;CURSOR LEFT
1054  007254  052110                        .ASCII  /HT/            ;H TAB
1055  007256  043114                        .ASCII  /LF/            ;LINE FEED
1056  007260  051103                        .ASCII  /CR/            ;CARIAGE RETURN
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 1057  007262  051505                          .ASCII  /ES/                    ;ESCAPE
 1058  007264  050123                          .ASCII  /SP/                    ;SPACE
 1059  007266  042504                          .ASCII  /DE/                    ;DELETE
 1060  007270  000000  000000  000000          0,0,0,0,0,0,0,0,0,0
       007276  000000  000000  000000
       007304  000000  000000  000000
       007312  000000
 1061                                          .EVEN
 1062                                  ;*****************************************************************
  (3)                                  ;*TEST 31       Y       KEYBOARD CHARACTER TEST
  (3)                                  ;*****************************************************************
  (2)  007314  000004                  TST31:  SCOPE
 1063  007316  032737  001000  001256  KRBTST: BIT     #BIT09,VT5XX    ;IS UNIT A VT52?
 1064  007324  001403                          BEQ     1$
 1065  007326  012703  020332                  MOV     #V52RW,R3       ;YES-SET UP FOR LOWER CASE CHAR.
 1066  007332  000402                          BR      2$
 1067  007334  012703  020314          1$:     MOV     #V50RW,R3       ;NO-SET UP FOR UPPER CASE CHAR.
 1068  007340  012706  001100          2$:     MOV     #STACK,SP
 1069  007344  004537  011534          A:      JSR     R5,AMSG         ;DISPLAY HEADER
 1070  007350  014005                          MKB
 1071  007352  012302                          MOV     (R3)+,R2        ;LOAD ROW #
 1072  007354  032737  001000  001256          BIT     #BIT09,VT5XX    ;UNIT A VT52?
 1073  007362  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
 1074  007364  004537  011534                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
 1075  007370  014300                          MKBB2
 1076  007372  000403                          BR      2$
 1077  007374  004537  011534          1$:     JSR     R5,AMSG
 1078  007400  014163                          MKBB                    ;TOP ROW
 1079  007402  004737  011652          2$:     JSR     PC,TSTROW       ;CHECK THE ROW
 1080
 1081  007406  012302                  B:      MOV     (R3)+,R2        ;LOAD ROW #
 1082  007410  004537  011534                  JSR     R5,AMSG         ;2ND ROW
 1083  007414  014363                          MKBC
 1084  007416  004737  011652                  JSR     PC,TSTROW       ;CHECK 2ND ROW
 1085
 1086  007422  012302                  C:      MOV     (R3)+,R2        ;LOAD ROW #
 1087  007424  032737  001000  001256          BIT     #BIT09,VT5XX    ;UNIT A VT52?
 1088  007432  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
 1089  007434  004537  011534                  JSR     R5,AMSG         ;ISSUE VT52 ROW 3 MESSAGE.
 1090  007440  014527                          MKBD2
 1091  007442  000403                          BR      2$
 1092  007444  004537  011534          1$:     JSR     R5,AMSG
 1093  007450  014422                          MKBD
 1094  007452  004737  011652          2$:     JSR     PC,TSTROW       ;CHECK ROW 3
 1095
 1096  007456  012302                          MOV     (R3)+,R2        ;LOAD ROW #
 1097  007460  004537  011534                  JSR     R5,AMSG
 1098  007464  014615                          MKBE
 1099  007466  004737  011652                  JSR     PC,TSTROW       ;CHECK ROW 4
 1100
 1101  007472  012702  020516                  MOV     #ROW5,R2
 1102  007476  004537  011534                  JSR     R5,AMSG
 1103  007502  014735                          MKBF
 1104  007504  004737  011652                  JSR     PC,TSTROW       ;CHECK ROW 5
 1105
 1106                                  ;TEST THE "LEFT"-SHIFT KEY
```

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1107
1108  007510  004537  011534          D:      JSR     R5,AMSG         ;DEPRESS THE "LEFT-SHIFT" KEY
1109  007514  014773                          MKBG
1110  007516  012302                          MOV     (R3)+,R2        ;LOAD ROW 1 SHIFTED TABLE
1111  007520  032737  001000  001256          BIT     #BIT09,VT5XX    ;UNIT A VT52?
1112  007526  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
1113  007530  004537  011534                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
1114  007534  014300                          MKBB2
1115  007536  000403                          BR      2$
1116  007540  004537  011534          1$:     JSR     R5,AMSG         ;TEST ROW 1
1117  007544  014163                          MKBB
1118  007546  004737  011652          2$:     JSR     PC,TSTROW       ;TEST THE ROW
1119  007552  004537  011534                  JSR     R5,AMSG         ;RELEASE THE SHIFT KEY
1120  007556  014041                          MKB1
1121
1122                                  ;TEST THE "RIGHT-SHIFT" KEY
1123
1124  007560  004537  011534          E:      JSR     R5,AMSG         ;SET THE "RIGHT-SHIFT" KEY
1125  007564  015042                          MKBGA
1126  007566  012302                          MOV     (R3)+,R2        ;LOAD TABLE POINTER
1127  007570  032737  001000  001256          BIT     #BIT09,VT5XX    ;UNIT A VT52?
1128  007576  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
1129  007600  004537  011534                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
1130  007604  014300                          MKBB2
1131  007606  000403                          BR      2$
1132  007610  004537  011534          1$:     JSR     R5,AMSG
1133  007614  014163                          MKBB
1134  007616  004737  011652          2$:     JSR     PC,TSTROW       ;TEST THE ROW AGAIN WITH THE RIGHT-SHIFT SET
1135  007622  004537  011534                  JSR     R5,AMSG
1136  007626  014041                          MKB1                    ;RELEASE SKIFT KEY
1137                                  ;TEST THE CONTROL MODE
1138
1139  007630  004537  011534          F:      JSR     R5,AMSG         ;SET CTRL
1140  007634  015112                          MKBH
1141  007636  012302                          MOV     (R3)+,R2        ;LOAD ROW 1 CTRL TABLE
1142  007640  032737  001000  001256          BIT     #BIT09,VT5XX    ;UNIT A VT52?
1143  007646  001404                          BEQ     1$              ;NO-USE UPPER CASE KEYBOARD.
1144  007650  004537  011534                  JSR     R5,AMSG         ;ISSUE VT52 ROW1 MESSAGE.
1145  007654  014300                          MKBB2
1146  007656  000403                          BR      2$
1147  007660  004537  011534          1$:     JSR     R5,AMSG
1148  007664  014163                          MKBB
1149  007666  004737  011652          2$:     JSR     PC,TSTROW       ;TEST THE ROW
1150
1151                                  ;TEST THE VT50H KEYPAD
1152
1153  007672  032737  010000  001256          BIT     #BIT12,VT5XX    ;TEST IF VT50H EXTRA KEYPAD
1154  007700  001526                          BEQ     KRBDON          ;;BR IF NOT DETECTED
1155  007702  004537  011534                  JSR     R5,AMSG         ;TELL OPERATOR THE TEST NAME
1156  007706  015364                          MKBN
1157  007710  012702  021122                  MOV     #ROW6,R2        ;LOAD ROW POINTER VALUES
1158  007714  004537  011534                  JSR     R5,AMSG
1159  007720  015153                          MKBI                    ;SET TOP ROW KEYPAD
1160  007722  004737  011652                  JSR     PC,TSTROW       ;TEST THAT ROW
1161  007726  012702  021142                  MOV     #ROW7,R2
1162  007732  004537  011534                  JSR     R5,AMSG         ;2ND ROW KEYPAD TEST
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1163  007736  015206                    MKBJ
1164  007740  004737  011652            JSR     PC,TSTROW       ;TEST 2ND KEYPAD ROW
1165  007744  012702  021154            MOV     #ROW8,R2
1166  007750  004537  011534            JSR     R5,AMSG
1167  007754  015241                    MKBK
1168  007756  004737  011652            JSR     PC,TSTROW       ;TEST 3RD KEYPAD ROW
1169  007762  012702  021166            MOV     #ROW9,R2
1170  007766  004537  011534            JSR     R5,AMSG         ;TELL ABOUT 4TH ROW
1171  007772  015275                    MKBL
1172  007774  004737  011652            JSR     PC,TSTROW       ;TEST 4TH ROW
1173  010000  012702  021200            MOV     #ROW10,R2
1174  010004  004537  011534            JSR     R5,AMSG
1175  010010  015330                    MKBM
1176  010012  004737  011652            JSR     PC,TSTROW       ;TEST 5TH ROW
1177  010016  032737  001000  001256    BIT     #1000,VTSXX     ;IS UNIT A VT52?
1178  010024  001454                    BEQ     KRBDON          ;NO-EXIT
1179  010026  004537  011534            JSR     R5,AMSG         ;YES-TELL OPERATOR ALT. KEYPAD TEST.
1180  010032  015413                    MKB52
1181  010034  004537  011534            JSR     R5,AMSG         ;PUT THE UNIT IN ALT. KEYPAD MODE.
1182  010040  021063                    ENAKP
1183  010042  012702  021206            MOV     #ROW6A,R2       ;LOAD ROW POINTER VALUES
1184  010046  004537  011534            JSR     R5,AMSG
1185  010052  015153                    MKBI                    ;SET TOP ROW KEYPAD
1186  010054  004737  011652            JSR     PC,TSTROW       ;TEST THAT ROW
1187  010060  012702  021226            MOV     #ROW7A,R2
1188  010064  004537  011534            JSR     R5,AMSG         ;2ND ROW KEYPAD TEST
1189  010070  015206                    MKBJ
1190  010072  004737  011652            JSR     PC,TSTROW       ;TEST 2ND KEYPAD ROW
1191  010076  012702  021254            MOV     #ROW8A,R2
1192  010102  004537  011534            JSR     R5,AMSG
1193  010106  015241                    MKBK
1194  010110  004737  011652            JSR     PC,TSTROW       ;TEST 3RD KEYPAD ROW
1195  010114  012702  021302            MOV     #ROW9A,R2
1196  010120  004537  011534            JSR     R5,AMSG         ;TELL ABOUT 4TH ROW
1197  010124  015275                    MKBL
1198  010126  004737  011652            JSR     PC,TSTROW       ;TEST 4TH ROW
1199  010132  012702  021330            MOV     #ROW10A,R2
1200  010136  004537  011534            JSR     R5,AMSG
1201  010142  015330                    MKBM
1202  010144  004737  011652            JSR     PC,TSTROW       ;TEST 5TH ROW
1203  010150  004537  011534            JSR     R5,AMSG         ;EXIT ALT. KEYPAD MODE.
1204  010154  021070                    EXAKP
1205
1206                          ;COMPLETION OF KEYBOARD-KEYPAD TEST
1207
1208  010156  004537  011534  KRBDON:   JSR     R5,AMSG         ;END OF KEYBOARD TEST
1209  010162  015552                    MKBR
1210  010164  000137  007316            JMP     KRBTST          ;LOOP
1211                          ;*****************************************************************
  (3)                         ;*TEST 32       Z       KEYBOARD ECHO LOOP
  (3)                         ;*****************************************************************
  (2)  010170  000004         TST32:    SCOPE
1212  010172  012706  001100  KRBECH:   MOV     #STACK,SP
1213  010176  004537  011534            JSR     R5,AMSG         ;DISPLAY HEADER
1214  010202  016052                    MKEH
1215
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1216  010204  004737  012536          1$:     JSR     PC,GETCHR       ;GET CHARACTER
1217  010210  000775                          BR      1$
1218  010212  110077  171064                  MOVB    R0,@VTOB        ;LOAD THE CHARACTER
1219  010216  105777  171056          2$:     TSTB    @VTOS           ;WAIT FOR DONE
1220  010222  100375                          BPL     2$
1221  010224  000767                          BR      1$              ;LOOP BACK
1225
1226                                  ;LOAD A SINGLE CHARACTER ACROSS THE SCREEN WIDTH
1227                                  ;
1228
1229  010226  013702  001316          FILBUF: MOV     WIDTH,R2        ;LOAD WIDTH VALUE
1230  010232  012700  024312          FILBFB: MOV     #BUFFER,R0      ;SET-UP BUFFER POINTER
1231  010236  112720  000015                  MOVB    #15,(R0)+       ;LOAD 'CR'
1232  010242  112720  000012                  MOVB    #12,(R0)+       ;LOAD 'FL'
1233  010246  110120                  FILBFA: MOVB    R1,(R0)+        ;SAVE THE CHARACTER IN THE BUFFER
1234  010250  005302                          DEC     R2              ;FINISHED?
1235  010252  001375                          BNE     FILBFA          ;BRANCH IF NOT COMPLETED
1236  010254  112710  000377                  MOVB    #377,(R0)       ;LOAD TERM.
1237  010260  000207                          RTS     PC              ;EXIT
1238
1239                                  ;LOAD A INCREMENTING CHARACTER ACROSS THE SCREEN WIDTH
1240                                  ;ONLY 40 THRU 177 ARE LEGAL CHARACTERS
1241
1242  010262  012700  024312          LIC:    MOV     #BUFFER,R0      ;SET-UP BUFFER POINTER
1243  010266  013502                          MOV     @(5)+,R2        ;SET-UP WIDTH
1244  010270  112720  000015                  MOVB    #15,(R0)+       ;LOAD 'CR'
1245  010274  112720  000012                  MOVB    #12,(R0)+       ;LOAD 'LF'
1246  010300  110120                  LICA:   MOVB    R1,(0)+         ;SAVE A CHARACTER IN THE BUFFER
1247  010302  005201                          INC     R1              ;UPDATE THE CHARACTER
1248  010304  023701  001306                  CMP     LASTCH,R1       ;TEST FOR
1249  010310  001002                          BNE     LICB            ;BRANCH IF NOT
1250  010312  012701  000040                  MOV     #40,R1          ;MAKE A LEGAL CHARACTER
1251  010316  005302                  LICB:   DEC     R2              ;DECREMENT COUNT
1252  010320  001367                          BNE     LICA            ;BRANCH IF NOT COMPLETED
1253  010322  112710  000377                  MOVB    #377,(R0)       ;LOAD TERM
1254  010326  000205                          RTS     R5              ;EXIT
1255
1256                                  ;DISPLAY SUBROUTINE
1257
1258  010330  012700  024312          XPRNT:  MOV     #BUFFER,R0      ;SETUP BUFFER POINTER
1259  010334  105777  170740          XPRNTA: TSTB    @VTOS           ;TEST READY
1260  010340  100404                          BMI     XPRNTB          ;BRANCH IF SET
1261  010342  005777  170732                  TST     @VTOS           ;TEST ERROR
1262  010346  100372                          BPL     XPRNTA          ;BRANCH IF RESET
1263  010350  104001                          ERROR   1               ;ERROR FLAG SET ON TRANSMITTER STATUS
1264  010352  112001                  XPRNTB: MOVB    (0)+,R1
1265  010354  100563                          BMI     1$              ;BR IF MINUS
1266  010356  122701  000033          5$:     CMPB    #33,R1          ;TEST FOR ESC
1267  010362  001003                          BNE     3$              ;BR IF NOT
1268  010364  005237  010756                  INC     ANESC           ;SET SOFT FLAG
1269  010370  000402                          BR      4$
1270  010372  005037  010756          3$:     CLR     ANESC           ;CLEAR SOFT FLAG
1271  010376  110177  170700          4$:     MOVB    R1,@VTOB        ;LOAD CHAR
1272  010402  105777  170666                  TSTB    @VTIS           ;TEST INPUT FLAG
1273  010406  100352                          BPL     XPRNTA          ;BR IF CLEARED
1274  010410  005737  010756                  TST     ANESC           ;TEST IF ESC
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1275  010414  001347                          BNE     XPRNTA
1276  010416  013737  001252  012610  52$:    MOV     TIMEO,TIME1
1277  010424  005037  012612                  CLR     TIME2           ;LOAD DELAY
1278  010430  105777  170640          2$:     TSTB    @VTIS           ;TEST IF INPUT FLAG
1279  010434  100407                          BMI     53$             ;BR IF SET
1280  010436  005337  012612                  DEC     TIME2           ;DELAY
1281  010442  001372                          BNE     2$
1282  010444  005337  012610                  DEC     TIME1           ;DELAY
1283  010450  001367                          BNE     2$
1284  010452  000440                          BR      60$             ;REPORT ERROR
1285  010454  005737  010760          53$:    TST     IGNORE          ;IGNORE KEYBOARD CHARACTERS ?
1286  010460  001104                          BNE     15$             ;BR IF YES
1287  010462  017737  170610  001132          MOV     @VTIB,$BDDAT    ;READ CHAR
1288  010470  042737  177600  001132          BIC     #177600,$BDDAT  ;MASK
1289  010476  022737  000021  001132          CMP     #XON,$BDDAT     ;TEST FOR X ON
1290  010504  001003                          BNE     50$
1291  010506  005237  010754                  INC     XONRC           ;SET FLAG
1292  010512  000710                          BR      XPRNTA          ;START AGAIN
1293  010514  022737  000023  001132  50$:    CMP     #XOFF,$BDDAT    ;TEST FOR X OFF
1294  010522  001020                          BNE     51$             ;BR IF NOT
1295  010524  005237  010752                  INC     XOFFRC
1296  010530  005737  010746                  TST     XOFFOK          ;XOFF ENABLED ?
1297  010534  001730                          BEQ     52$
1298  010536  012737  000001  010750          MOV     #1,AXOFF        ;SET X OFF SOFT FLAG
1299  010544  005737  010744                  TST     XOFFBR          ;TEST
1300  010550  001271                          BNE     XPRNTA          ;BR BACK
1301  010552  000721                          BR      52$             ;BR
1302  010554  012737  000000  001130  60$:    MOV     #0,$GDDAT
1303  010562  000437                          BR      13$
1304  010564  105777  170310          51$:    TSTB    @SWR            ;TEST SWR
1305  010570  100371                          BPL     60$             ;BR IF CLEARED
1306  010572  012737  000057  001130          MOV     #'/,$GDDAT      ;LOAD EXPECTED
1307  010600  023737  001130  001132          CMP     $GDDAT,$BDDAT   ;COMPARE
1308  010606  001437                          BEQ     14$             ;;BR IF EQUAL
1309  010610  012737  000134  001130          MOV     #'\,$GDDAT      ;LOAD EXPECTED
1310  010616  023737  001130  001132          CMP     $GDDAT,$BDDAT   ;COMPARE
1311  010624  001016                          BNE     13$             ;BR IF NOT
1312
1313                                  ;"\" OR LOOP EXIT
1314
1315  010626  012737  000001  010742          MOV     #1,LOOP         ;SET SOFT FLAG
1316  010634  012737  017075  011000          MOV     #MQQ,FINDTA     ;SETUP MESSAGE
1317  010642  005037  010744          16$:    CLR     XOFFBR
1318  010646  005037  010746                  CLR     XOFFOK
1319  010652  005037  010760                  CLR     IGNORE
1320  010656  000137  010770                  JMP     FINDOT
1321
1322  010662  005737  010760          13$:    TST     IGNORE          ;IGNORE INPUT CHARACTER
1323  010666  001001                          BNE     15$
1324  010670  104004                          ERROR   4               ;UNEXPECTED OR INCORRECT INPUT FLAG
1325  010672  000240          15$:    NOP
1326  010674  000240                  NOP
1327  010676  000240                  NOP
1328  010700  000240                  NOP
1329  010702  000137  010334                  JMP     XPRNTA
1330
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1331                                    ;"/" OR STANDARD EXIT
1332
1333  010706  005037  010742          14$:    CLR     LOOP
1334  010712  012737  017163  011000          MOV     #MQ1,FINDTA     ;SETUP MESSAGE
1335  010720  000137  010642                  JMP     16$
1336
1337                                    ;NORMAL EXIT
1338
1339  010724  005037  010746          1$:     CLR     XOFFOK
1340  010730  005037  010760                  CLR     IGNORE
1341  010734  005037  010744                  CLR     XOFFBR
1342  010740  000207                          RTS     PC              ;EXIT
1343
1344  010742  000000                  LOOP:   0
1345  010744  000000                  XOFFBR: 0
1346  010746  000000                  XOFFOK: 0
1347  010750  000000                  AXOFF:  0
1348  010752  000000                  XOFFRC: 0
1349  010754  000000                  XONRC:  0
1350  010756  000000                  ANESC:  0
1351  010760  000000                  IGNORE: 0               ;WHEN SET IGNORE KEYBOARD FLAGS
1352
1353                                  ;DETERMINE THE  TEST TO GO TO
1354  010762  004537  011534          FNDA:   JSR     R5,AMSG
1355  010766  017250                          MQ2                     ;ERROR ASK AGAIN
1356  010770  012706  001100          FINDOT: MOV     #STACK,SP
1357  010774  004537  011534                  JSR     R5,AMSG
1358  011000  017162                  FINDTA: MQ1
1359  011002  004737  012536                  JSR     PC,GETCHR
1360  011006  000770                          BR      FINDOT
1361  011010  042700  100600                  BIC     #100600,R0      ;MASK
1362  011014  122700  000101                  CMPB    #'A,R0          ;TEST FOR NUMBER
1363  011020  101360                          BHI     FNDA
1364  011022  122700  000132                  CMPB    #'Z,R0          ;TEST FOR OTHERS
1365  011026  103755                          BLO     FNDA
1366  011030  042700  177740                  BIC     #177740,R0      ;MAKE 0-32
1367  011034  005300                          DEC     R0
1368  011036  110037  001106                  MOVB    R0,$TSTNM       ;LOAD THAT TEST #
1369  011042  006300                          ASL     R0
1370  011044  005760  011070                  TST     DSPCH(R0)       ;TEST IF VALID
1371  011050  001744                          BEQ     FNDA                    ;BR IF NOT
1372  011052  000240                          NOP
1373  011054  000240                          NOP
1374  011056  016037  011070  001112          MOV     DSPCH(R0),$LPADR        ;LOAD LOOP ADDRESS
1375  011064  000170  011070                  JMP     @DSPCH(R0)      ;GO TO THAT TEST
1376
1377                                  ;SUBTEST DISPATCH TABLE
1378
1379  011070  001762                  DSPCH:  TST1+2
1380  011072  002402                          TST2+2
1381  011074  002422                          TST3+2
1382  011076  002476                          TST4+2
1383  011100  002576                          TST5+2
1384  011102  002700                          TST6+2
1385  011104  003342                          TST7+2
1386  011106  003712                          TST10+2
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 1387  011110  004070                        TST11+2
 1388  011112  004216                        TST12+2
 1389  011114  004254                        TST13+2
 1390  011116  005014                        TST14+2
 1391  011120  005164                        TST15+2
 1392  011122  005276                        TST16+2
 1393  011124  005446                        TST17+2
 1394  011126  005502                        TST20+2
 1395  011130  005572                        TST21+2
 1396  011132  005724                        TST22+2
 1397  011134  006060                        TST23+2
 1398  011136  006202                        TST24+2
 1399  011140  006260                        TST25+2
 1400  011142  006372                        TST26+2
 1401  011144  006426                        TST27+2
 1402  011146  007022                        TST30+2
 1403  011150  007316                        TST31+2
 1404                          ;SUBROUTINE TO LOAD COPIER TEST
 1405
 1406  011152  012700  024312  FIRLST: MOV     #BUFFER,R0
 1407  011156  112720  000015          MOVB    #15,(R0)+       ;LOAD CR
 1408  011162  112720  000012          MOVB    #12,(R0)+       ;LOAD LF
 1409  011166  112720  000105          MOVB    #'E,(R0)+
 1410  011172  112720  000105          MOVB    #'E,(R0)+
 1411  011176  112720  000105          MOVB    #'E,(R0)+
 1412  011202  013702  001316          MOV     WIDTH,R2        ;LOAD WIDTH
 1413  011206  163702  001266          SUB     VH1,R2
 1414  011212  005302                  DEC     R2
 1415  011214  112720  000040  1$:     MOVB    #40,(R0)+       ;LOAD A SPACE
 1416  011220  005302                  DEC     R2              ;DONE ?
 1417  011222  100374                  BPL     1$              ;BR UNTIL DONE
 1418  011224  112720  000105          MOVB    #'E,(R0)+
 1419  011230  112720  000105          MOVB    #'E,(R0)+
 1420  011234  112720  000105          MOVB    #'E,(R0)+       ;LOAD 80 TH
 1421  011240  112710  000377          MOVB    #377,(R0)       ;LOAD TERM
 1422  011244  000207                  RTS     PC              ;EXIT
 1423
 1424                          ;SUBROUTINE FOR THE DATA PATH TEST
 1425
 1426  011246  012700  024312  DTPSR:  MOV     #BUFFER,R0
 1427  011252  012501          DTPSRB: MOV     (5)+,R1         ;GET FIRST CHARACTER
 1428  011254  012502                  MOV     (5)+,R2         ;GET SECOND CHARACTER
 1429  011256  013703  001316          MOV     WIDTH,R3                ;SET THE WIDTH
 1430  011262  006203                  ASR     R3              ;DIVIDE BY 2
 1431  011264  112720  000015          MOVB    #15,(R0)+       ;LOAD 'CR'
 1432  011270  112720  000012          MOVB    #12,(R0)+       ;LOAD 'LF'
 1433  011274  110120          DTPSRA: MOVB    R1,(0)+         ;
 1434  011276  110220                  MOVB    R2,(0)+
 1435  011300  005303                  DEC     R3
 1436  011302  100374                  BPL     DTPSRA
 1437  011304  112710  000377          MOVB    #377,(R0)       ;LOAD TERM
 1438  011310  000205                  RTS     R5
 1439
 1440                          ;SUBROUTINE TO LOAD BUFFER WITH GRAPHICS CHARACTERS
 1441
 1442  011312  012700  024312  GBBUF:  MOV     #BUFFER,R0      ;LOAD BUFFER ADDRESS
```

```
 1443  011316  012701  000136              MOV     #136,R1         ;LOAD INITIAL CHAR.
 1444  011322  010402                      MOV     R4,R2           ;LOAD BUFFER COUNT
 1445  011324  110120              1$:     MOVB    R1,(R0)+        ;INSERT A CHAR. IN THE BUFFER
 1446  011326  005201                      INC     R1              ;INCREMENT CHAR.
 1447  011330  122701  000177              CMPB    #177,R1         ;AT END OF GRAPHICS STRING?
 1448  011334  001002                      BNE     2$              ;NO
 1449  011336  012701  000136              MOV     #136,R1         ;YES-RESET IT TO 1ST GRAPH. CHAR.
 1450  011342  005302              2$:     DEC     R2              ;DECREMENT BUFFER COUNT.
 1451  011344  001367                      BNE     1$              ;NOT AT END-LOOP
 1452  011346  112710  000377              MOVB    #377,(R0)       ;END OF BUFFER-INSERT TERMINATOR
 1453  011352  000207                      RTS     PC              ;AND EXIT.
 1454
 1455                              ;PROGRAM DELAY ROUTINE
 1456
 1457  011354  013737  001254  011456 DELAY: MOV     SUBTST,10$      ;LOAD COUNT
 1458  011362  005037  011460              CLR     11$
 1459  011366  005737  001330              TST     WFTEST          ;TEST IF W.F. MODE
 1460  011372  001413                      BEQ     2$              ;BR IF NOT
 1461  011374  006237  011456              ASR     10$             ;CHANGE DELAY TIMER
 1462  011400  006237  011456              ASR     10$
 1463  011404  006237  011456              ASR     10$
 1464  011410  000240                      NOP
 1465  011412  000240                      NOP
 1466  011414  000240                      NOP
 1467  011416  000240                      NOP
 1468  011420  000240                      NOP
 1469  011422  032777  010000  167450 2$:  BIT     #BIT12,@SWR     ;TEST SR
 1470  011430  001006                      BNE     3$              ;BR IF SET
 1471  011432  005337  011460              DEC     11$             ;DELAY
 1472  011436  001371                      BNE     2$
 1473  011440  005337  011456              DEC     10$
 1474  011444  100366                      BPL     2$              ;DELAY
 1475  011446  000240              3$:     NOP
 1476  011450  000240                      NOP
 1477  011452  000240                      NOP
 1478  011454  000207                      RTS     PC              ;EXIT
 1479
 1480  011456  000002              10$:    2
 1481  011460  000000              11$:    0
 1482
 1483  011462  013737  001254  011530 ADELAY: MOV     SUBTST,10$
 1484  011470  005037  011532              CLR     11$
 1485  011474  006237  011530              ASR     10$
 1486  011500  006237  011530              ASR     10$
 1487  011504  005337  011532      2$:     DEC     11$
 1488  011510  001375                      BNE     2$
 1489  011512  005337  011530              DEC     10$
 1490  011516  100372                      BPL     2$
 1491  011520  000240                      NOP
 1492  011522  000240                      NOP
 1493  011524  000240                      NOP
 1494  011526  000207                      RTS     PC
 1495  011530  000000              10$:    0
 1496  011532  000000              11$:    0
 1497
 1498
```

```
                                        ;HEADER SUBROUTINE FOR VT-50
                                        AMSG:   MOV     (R5)+,10$       ;GET POINTER
                                        1$:     JSR     R5,MTOB         ;MOVE TO BUFFER
                                        10$:    0
                                        11$:    JSR     PC,XPRNT        ;DISPLAY IT
                                                RTS     R5              ;EXIT

                                        ;OCTAL - 3 BIT CONVERSION

                                        OCTAL:  MOV     R0,R1           ;LOAD R1
                                                BIC     #177770,R1      ;MASK
                                                ADD     #60,R1
                                                MOVB    R1,DIG2         ;SAVE LSD
                                                MOV     R0,R1
                                                ROR     R1
                                                ROR     R1
                                                ROR     R1
                                                BIC     #177770,R1
                                                ADD     #60,R1
                                                MOVB    R1,DIG1         ;SAVE IT
                                                MOV     R0,R1
                                                ROL     R1
                                                ROL     R1
                                                SWAB    R1
                                                BIC     #177770,R1
                                                ADD     #60,R1
                                                MOVB    R1,DIG0         ;SAVE MSD
                                                RTS     PC              ;EXIT

                                        DIG0:   0
                                        DIG1:   0
                                        DIG2:   0

                                        ;SUBROUTINE FOR THE KEYBOARD CHARACTER TEST

                                        TSTROW: JSR     R5,AMSG         ;DISPLAY HEADER
                                                MKBA

                                        1$:     JSR     PC,GETCHR       ;GET CHAR
                                                BR      1$              ;;BR BACK IF NO INPUT
                                                MOV     #177600,MASK1
                                                CLR     MASK2
                                                BIT     #BIT2,@SWR      ;TEST SWR
                                                BEQ     4$              ;DO NOT TEST PARITY BIT
                                                BIC     #BIT7,MASK1     ;ENABLE PARITY BIT
                                                BIT     #BIT1,@SWR      ;TEST IF FORCED PARITY
                                                BEQ     5$              ;BR IF NOT FORCED PARITY BIT
                                                BIT     #BIT0,@SWR      ;TEST FOR EVEN/ODD PARITY
                                                BEQ     4$              ;BR IF ALLWAYS OFF
                                                BIS     #BIT7,MASK2     ;SET BIT 7
                                        4$:     MOV     (R2),100$       ;GET EXPECTED
                                                BIS     MASK2,100$      ;SET BIT 7 IF EXPECTED
                                                BIC     MASK1,R0        ;MASK VALUE READ
                                                CMPB    R0,100$         ;COMPARE CHARS
```

```
1555  011766  001041                        BNE     2$              ;BR IF NOT EQUAL
1556  011770  005722                        TST     (R2)+           ;BUMP R2
1557  011772  100332                        BPL     1$              ;LOOP TILL DONE
1558  011774  000207                        RTS     PC              ;EXIT
1559
1560                                ;COME HERE ONLY IF TESTING "PARITY" OPTION
1561
1562  011776  005037  012242        5$:     CLR     10$             ;CLEAR TEMP
1563  012002  011237  012240                MOV     (R2),100$       ;CLEAR CHAR SAVE
1564  012006  006037  012240        20$:    ROR     100$            ;ROTATE CHAR
1565  012012  103002                        BCC     21$             ;BR IF NO CARRY
1566  012014  005237  012242                INC     10$             ;UPDATE CNT
1567  012020  105737  012240        21$:    TSTB    100$            ;DONE ?
1568  012024  001370                        BNE     20$             ;BR IF NOT
1569  012026  032777  000001  167044        BIT     #BIT0,@SWR      ;TEST EVEN/ODD
1570  012034  001407                        BEQ     23$             ;BR IF OPER. SAYS EVEN
1571  012036  006037  012242                ROR     10$             ;
1572  012042  103403                        BCS     22$             ;BR IF ODD ALREADY
1573  012044  052737  000200  012246        BIS     #BIT7,MASK2     ;SET PARITY BIT
1574  012052  000734                22$:    BR      4$              ;BR TO TEST CHAR
1575  012054  006037  012242        23$:    ROR     10$             ;
1576  012060  103003                        BCC     24$             ;BR IF EVEN ALREADY
1577  012062  052737  000200  012246        BIS     #BIT7,MASK2
1578  012070  000725                24$:    BR      4$              ;BR TO TEST CHAR
1579
1580                                ;COME HERE IF EXPECTED NOT EQUAL TO RECVD
1581                                ;CONVERT RESULTS TO OCTAL FOR TYPEOUT
1582
1583  012072  010037  001132        2$:     MOV     R0,$BDDAT       ;LOAD BAD CHARACTER
1584  012076  004737  011554                JSR     PC,OCTAL        ;CONVERT TO OCTAL
1585  012102  113737  011644  015543        MOVB    DIG0,MKBQB      ;LOAD OCTAL #
1586  012110  113737  011646  015544        MOVB    DIG1,MKBQB+1
1587  012116  113737  011650  015545        MOVB    DIG2,MKBQB+2
1588  012124  042700  177600                BIC     #177600,R0
1589  012130  120027  000040                CMPB    R0,#40          ;TEST IF PRINTABLE
1590  012134  101002                        BHI     10$             ;BR IF PRINTABLE
1591  012136  112700  000056                MOVB    #56,R0          ;CONVERT TO A "*" CHARACTER
1592  012142  110037  015537        10$:    MOVB    R0,MKBQ2        ;SAVE CHAR
1593  012146  011200                        MOV     (R2),R0         ;GET GOOD CHAR
1594  012150  053700  012246                BIS     MASK2,R0
1595  012154  010037  001130                MOV     R0,$GDDAT       ;LOAD GOOD CHARACTER
1596  012160  004737  011554                JSR     PC,OCTAL        ;CONVERT IT
1597  012164  113737  011644  015524        MOVB    DIG0,MKBQA      ;LOAD DIGIT
1598  012172  113737  011646  015525        MOVB    DIG1,MKBQA+1
1599  012200  113737  011650  015526        MOVB    DIG2,MKBQA+2
1600  012206  042700  177600                BIC     #177600,R0
1601  012212  110037  015520                MOVB    R0,MKBQ1        ;SAVE CHAR
1602
1603  012216  023737  001274  001142        CMP     VTIS,$TKS       ;TEST IF ON CTY
1604  012224  001403                        BEQ     3$              ;BR IF YES
1605
1606  012226  004537  011534                JSR     R5,AMSG         ;DISPLAY ERROR  MESSAGE
1607  012232  015457                        MKBQ
1608  012234  104004                3$:     ERROR   4               ;CHARACTER RECVD NOT EQUAL TO EXPECTED
1609  012236  000610                        BR      1$              ;BR BACK AND TEST THE CHARACTER AGAIN
1610
```

```
  1611  012240  000000                    100$:   0
  1612  012242  000000                    101$:   0
  1613  012244  177600                    MASK1:  177600
  1614  012246  000000                    MASK2:  0
  1615
  1616                                    ;*****************************************************************
   (1)
   (1)                                    .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
   (1)
   (1)                                    ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
   (1)                                    ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
   (1)                                    ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
   (1)                                    ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
   (1)                                    ;*REPLACED WITH SPACES.
   (1)                                    ;*CALL:
   (1)                                    ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
   (1)                                    ;*      TYPDS                   ;;GO TO THE ROUTINE
   (1)
   (2)  012250                            $TYPDS:
   (3)  012250  010046                            MOV     R0,-(SP)        ;;PUSH R0 ON STACK
   (3)  012252  010146                            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
   (3)  012254  010246                            MOV     R2,-(SP)        ;;PUSH R2 ON STACK
   (3)  012256  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
   (3)  012260  010546                            MOV     R5,-(SP)        ;;PUSH R5 ON STACK
   (1)  012262  012746  020200                    MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
   (1)  012266  016605  000020                    MOV     20(SP),R5       ;;GET THE INPUT NUMBER
   (1)  012272  100004                            BPL     1$              ;;BR IF INPUT IS POS.
   (1)  012274  005405                            NEG     R5              ;;MAKE THE BINARY NUMBER POS.
   (1)  012276  112766  000055  000001            MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
   (1)  012304  005000                    1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
   (1)  012306  012703  012464                    MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
   (1)  012312  112723  000040                    MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
   (1)  012316  005002                    2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
   (1)  012320  016001  012454                    MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
   (1)  012324  160105                    3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
   (1)  012326  002402                            BLT     4$              ;;BR IF DONE
   (1)  012330  005202                            INC     R2              ;;INCREASE THE BCD DIGIT BY 1
   (1)  012332  000774                            BR      3$
   (1)  012334  060105                    4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
   (1)  012336  005702                            TST     R2              ;;CHECK IF BCD DIGIT=0
   (1)  012340  001002                            BNE     5$              ;;FALL THROUGH IF 0
   (1)  012342  105716                            TSTB    (SP)            ;;STILL DOING LEADING 0'S?
   (1)  012344  100407                            BMI     7$              ;;BR IF YES
   (1)  012346  106316                    5$:     ASLB    (SP)            ;;MSD?
   (1)  012350  103003                            BCC     6$              ;;BR IF NO
   (1)  012352  116663  000001  177777            MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
   (1)  012360  052702  000060            6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
   (1)  012364  052702  000040            7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
   (1)  012370  110223                            MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
   (1)  012372  005720                            TST     (R0)+           ;;JUST INCREMENTING
   (1)  012374  020027  000010                    CMP     R0,#10          ;;CHECK THE TABLE INDEX
   (1)  012400  002746                            BLT     2$              ;;GO DO THE NEXT DIGIT
   (1)  012402  003002                            BGT     8$              ;;GO TO EXIT
   (1)  012404  010502                            MOV     R5,R2           ;;GET THE LSD
   (1)  012406  000764                            BR      6$              ;;GO CHANGE TO ASCII
   (1)  012410  105726                    8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
```

```
  (1)  012412  100003                        BPL     9$              ;;BR IF NO
  (1)  012414  116663  177777  177776        MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
  (1)  012422  105013                 9$:    CLRB    (R3)            ;;SET THE TERMINATOR
  (3)  012424  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
  (3)  012426  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
  (3)  012430  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
  (3)  012432  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
  (3)  012434  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
  (1)  012436  104400  012464                TYPE    $DBLK           ;;NOW TYPE THE NUMBER
  (1)  012442  016666  000002  000004        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
  (1)  012450  012616                        MOV     (SP)+,(SP)
  (1)  012452  000002                        RTI                     ;;RETURN TO USER
  (1)  012454  023420                 $DTBL: 10000.
  (1)  012456  001750                        1000.
  (1)  012460  000144                        100.
  (1)  012462  000012                        10.
  (1)  012464  000004                 $DBLK: .BLKW   4
1617
1618                                  ;SUBROUTINE TO FILL THE SCREEN WITH AN CHARACTER
1619
1620  012474  012701  000105          FILLWC: MOV     #'E,R1          ;LOAD CHARACTER BYTE
1621  012500  004737  010226                  JSR     PC,FILBUF       ;LOAD THE LINE WITH CHAR
1622  012504  013737  001264  012534          MOV     VHO,10$         ;LOAD COUNT
1623  012512  012737  000001  010746  1$:     MOV     #1,XOFFOK       ;INSURE XOFF/XON CONTROL.
1624  012520  004737  010330                  JSR     PC,XPRNT        ;DISPLAY THE LINE
1625  012524  005337  012534                  DEC     10$
1626  012530  001370                        BNE     1$              ;LOOP UNTIL DONE
1627  012532  000207                        RTS     PC              ;EXIT
1628  012534  000000                 10$:   0
1629
1630                                  ;SUBROUTINE TO GET A CHARACTER FROM THE VT50
1631
1632  012536  013737  001252  012610  GETCHR: MOV     TIME0,TIME1     ;LOAD TIME COUNTER
1633  012544  005037  012612                  CLR     TIME2
1634
1635  012550  105777  166520          1$:     TSTB    @VTIS           ;TEST INPUT STATUS
1636  012554  100005                        BPL     2$              ;BR IF CLEARED
1637  012556  017700  166514                  MOV     @VTIB,R0        ;READ A CHAR
1638  012562  062716  000002                  ADD     #2,(SP)         ;UPDATE RETURN
1639  012566  000207                        RTS     PC              ;EXIT
1640
1641  012570  005337  012612          2$:     DEC     TIME2           ;DELAY
1642  012574  001365                        BNE     1$
1643  012576  005337  012610                  DEC     TIME1           ;FINISHED ?
1644  012602  100362                        BPL     1$              ;LOOP TILL TIME EXPIRED
1645  012604  104002                        ERROR   2               ;NO INPUT FLAG FROM DEVICE
1646  012606  000207                        RTS     PC              ;EXIT
1647
1648  012610  000000                 TIME1: 0
1649  012612  000000                 TIME2: 0
1650
1651                                  ;MOVE TO THE OUTPUT BUFFER
1652
1653  012614  012500                 MTOB:  MOV     (R5)+,R0        ;LOAD DEST.
1654  012616  012701  024312                  MOV     #BUFFER,R1      ;LOAD R1
1655  012622  112021                  1$:     MOVB    (R0)+,(R1)+     ;LOAD BYTE
```

```
1656  012624  100376                        BPL     1$              ;BR UNTIL DONE
1657  012626  000205                        RTS     R5              ;EXIT
1658
1659                                        .SBTTL  ASCII MESSAGES
1660
1661                                ;ASCII MESSAGES
1662
1663  012630  006415  046412  044501  TITLE:  .ASCIZ  <15><15><12>\MAINDEC-11-DZVTC-C VT50A, B, VT50H AND VT52 ACCEPTANCE TEST
      012636  042116  041505  030455
      012644  026461  055104  052126
      012652  026503  020103  052126
      012660  030065  026101  041040
      012666  020054  052126  030065
      012674  020110  047101  020104
      012702  052126  031065  040440
      012710  041503  050105  040524
      012716  041516  020105  042524
      012724  052123  005015     000
1664  012731     015  020012  043040  M91:    .ASCIZ  <15><12>/  FULL SCREEN OF THE CHARACTER E/<15><12><377>
      012736  046125  020114  041523
      012744  042522  047105  047440
      012752  020106  044124  020105
      012760  044103  051101  041501
      012766  042524  020122  006505
      012774  177412     000
1665  012777     015  020012  042040  M92:    .ASCIZ  <15><12>/  DATA PATH TEST /<15><12><377>
      013004  052101  020101  040520
      013012  044124  052040  051505
      013020  020124  005015  000377
1666  013026  005015  020040  044523  M93:    .ASCIZ  <15><12>/  SINGLE CHARACTER PER LINE /<15><12><377>
      013034  043516  042514  041440
      013042  040510  040522  052103
      013050  051105  050040  051105
      013056  046040  047111  020105
      013064  005015  000377
1667  013070  005015  020040  047522  M94:    .ASCIZ  <15><12>/  ROTATING PATTERN /<15><12><377>
      013076  040524  044524  043516
      013104  050040  052101  042524
      013112  047122  006440  177412
      013120     000
1668  013121     015  020012  041440  M96:    .ASCIZ  <15><12>/  CURSOR MOTION TEST /<15><12><377>
      013126  051125  047523  020122
      013134  047515  044524  047117
      013142  052040  051505  020124
      013150  005015  000377
1669  013154  005015  020040  040524  M97:    .ASCIZ  <15><12>/  TAB, BACKSPACE AND BELL TEST  /<15><12><377>
      013162  026102  041040  041501
      013170  051513  040520  042503
      013176  040440  042116  041040
      013204  046105  020114  042524
      013212  052123  020040  005015
      013220  000377
1670  013222  005015  020040  051105  M910:   .ASCIZ  <15><12>/  ERASE LINE TEST  /<15><12><377>
      013230  051501  020105  044514
      013236  042516  052040  051505
      013244  020124  006440  177412
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                013252      000
1671            013253      015  020012  042440  M911:   .ASCIZ  <15><12>/  ERASE SCREEN TEST  /<15><12><377>
                013260  040522  042523  051440
                013266  051103  042505  020116
                013274  042524  052123  020040
                013302  005015  000377
1672            013306  005015  020040  044526  M912:   .ASCIZ  <15><12>/  VIDEO COUPLING TEST /<15><12><377>
                013314  042504  020117  047503
                013322  050125  044514  043516
                013330  052040  051505  020124
                013336  005015  000377
1673            013342  044033  045033  005015  M914:   .ASCIZ  <33><110><33><112><15><12>/  TERMINAL IDENTIFIER TEST /<15><12><377>
                013350  020040  042524  046522
                013356  047111  046101  044440
                013364  042504  052116  043111
                013372  042511  020122  042524
                013400  052123  006440  177412
                013406      000
1674            013407      015  020012  041440  M920:   .ASCIZ  <15><12>/  COPIER PERIMETER/<15><12><377>
                013414  050117  042511  020122
                013422  042520  044522  042515
                013430  042524  006522  177412
                013436      000
1675            013437      015  020012  042040  M921:   .ASCIZ  <15><12>/  DISCLAIMER STATEMENT/<15><12><377>
                013444  051511  046103  044501
                013452  042515  020122  052123
                013460  052101  046505  047105
                013466  006524  177412      000
1676            013473      015  020012  044040  M922:   .ASCIZ  <15><12>/  HOLD SCREEN MODE TEST/<15><12><377>
                013500  046117  020104  041523
                013506  042522  047105  046440
                013514  042117  020105  042524
                013522  052123  005015  000377
1677            013530  005015  020040  051107  M9221:  .ASCIZ  <15><12>/  GRAPHICS MODE AND REV. LINE FEED TEST/<15><12><377>
                013536  050101  044510  051503
                013544  046440  042117  020105
                013552  047101  020104  042522
                013560  027126  046040  047111
                013566  020105  042506  042105
                013574  052040  051505  006524
                013602  177412      000
1678            013605      033  015537  015510  M923:   .ASCIZ  <33><137><33><110><33><112>/  AUTO COPY MODE TEST/<15><12><377>
                013612  020112  040440  052125
                013620  020117  047503  054520
                013626  046440  042117  020105
                013634  042524  052123  005015
                013642  000377
1679            013644  044033  045033  051120  MPTCNT: .ASCIZ  <33><110><33><112>/PRINTER CONTROLLER MODE ENTERED/<15><12><377>
                013652  047111  042524  020122
                013660  047503  052116  047522
                013666  046114  051105  046440
                013674  042117  020105  047105
                013702  042524  042522  006504
                013710  177412      000
1680            013713      033  015510  050112  MPTSCN: .ASCIZ  <33><110><33><112>/PRINT A SCREEN OF E'S/<15><12><377>
                013720  044522  052116  040440
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                013726  051440  051103  042505
                013734  020116  043117  042440
                013742  051447  005015  000377
 1681   013750  015510  020112  040440  M923A:  .ASCIZ  <110><33><112>/  AUTO PRINT MODE TEST/<15><12><377>
                013756  052125  020117  051120
                013764  047111  020124  047515
                013772  042504  052040  051505
                014000  006524  177412     000
 1682   014005     015  020012  042513  MKB:    .ASCII  <15><12>/ KEYBOARD CHARACTER TEST/<15><12>
                014012  041131  040517  042122
                014020  041440  040510  040522
                014026  052103  051105  052040
                014034  051505  006524     012
 1683   014041     122  046105  040505  MKB1:   .ASCIZ  /RELEASE THE "SHIFT" KEY/<15><12><377>
                014046  042523  052040  042510
                014054  021040  044123  043111
                014062  021124  045440  054505
                014070  005015  000377
 1684   014074  005015  042514  052106  MKBA:   .ASCIZ  <15><12>/LEFT TO RIGHT IN A ROW, DEPRESS ONE KEY AT A TIME/<15><12><377>
                014102  052040  020117  044522
                014110  044107  020124  0471..
                014116  040440  051040  053517
                014124  020054  042504  051120
                014132  051505  020123  047117
                014140  020105  042513  020131
                014146  052101  040440  052040
                014154  046511  006505  177412
                014162     000
 1685   014163     015  051412  040524  MKBB:   .ASCII  <15><12>/STARTING WITH THE TOP ROW EXCEPT THE THIRD/
                014170  052122  047111  020107
                014176  044527  044124  052040
                014204  042510  052040  050117
                014212  051040  053517  042440
                014220  041530  050105  020124
                014226  044124  020105  044124
                014234  051111     104
 1686   014237     040  051106  046517          .ASCIZ  / FROM RIGHT END AND LAST KEYS/<15><12><377>
                014244  051040  043511  052110
                014252  042440  042116  040440
                014260  042116  046040  051501
                014266  020124  042513  051531
                014274  005015  000377
 1687   014300  005015  052123  051101  MKBB2:  .ASCIZ  <15><12>/STARTING WITH THE TOP ROW EXCEPT THE LAST KEY/<15><12><377>
                014306  044524  043516  053440
                014314  052111  020110  044124
                014322  020105  047524  020120
                014330  047522  020127  054105
                014336  042503  052120  052040
                014344  042510  046040  051501
                014352  020124  042513  006531
                014360  177412     000
 1688   014363     015  051412  040524  MKBC:   .ASCIZ  <15><12>/START WITH THE SECOND ROW/<15><12><377>
                014370  052122  053440  052111
                014376  020110  044124  020105
                014404  042523  047503  042116
                014412  051040  053517  005015
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                014420  000377
1689            014422  005015  052123  051101  MKBD:   .ASCII  <15><12>/START WITH THE THIRD ROW EXCEPT THE CTRL/
                014430  020124  044527  044124
                014436  052040  042510  052040
                014444  044510  042122  051040
                014452  053517  042440  041530
                014460  050105  020124  044124
                014466  020105  052103  046122
1690            014474  005015  040440  042116          .ASCIZ  <15><12>/ AND THE "BLANK" KEYS/<15><12><377>
                014502  052040  042510  021040
                014510  046102  047101  021113
                014516  045440  054505  006523
                014524  177412    000
1691            014527     015  051412  040524  MKBD2:  .ASCIZ  <15><12>/START WITH THE THIRD ROW ,BEGIN ROW WITH "A" KEY/<15><12><377>
                014534  052122  053440  052111
                014542  020110  044124  020105
                014550  044124  051111  020104
                014556  047522  020127  041054
                014564  043505  047111  051040
                014572  053517  053440  052111
                014600  020110  040442  020042
                014606  042513  006531  177412
                014614     000
1692            014615     015  051412  040524  MKBE:   .ASCII  <15><12>/START WITH THE FOURTH ROW EXCEPT THE SCROLL/
                014622  052122  053440  052111
                014630  020110  044124  020105
                014636  047506  051125  044124
                014644  051040  053517  042440
                014652  041530  050105  020124
                014660  044124  020105  041523
                014666  047522  046114
1693            014672  005015  051454  044510          .ASCIZ  <15><12>/,SHIFT, REPEAT AND AUTO-PRINT/<15><12><377>
                014700  052106  020054  042522
                014706  042520  052101  040440
                014714  042116  040440  052125
                014722  026517  051120  047111
                014730  006524  177412    000
1694            014735     015  051412  040524  MKBF:   .ASCIZ  <15><12>/START WITH THE FIFTH ROW/<15><12><377>
                014742  052122  053440  052111
                014750  020110  044124  020105
                014756  044506  052106  020110
                014764  047522  006527  177412
                014772     000
1695            014773     015  047012  053517  MKBG:   .ASCII  <15><12>/NOW HOLD DOWN THE "LEFT-SHIFT" KEY/<15><12><377>
                015000  044040  046117  020104
                015006  047504  047127  052040
                015014  042510  021040  042514
                015022  052106  051455  044510
                015030  052106  020042  042513
                015036  006531  177412
1696            015042  005015  047516  020127  MKBGA:  .ASCII  <15><12>/NOW HOLD DOWN THE "RIGHT-SHIFT" KEY/<15><12><377>
                015050  047510  042114  042040
                015056  053517  020116  044124
                015064  020105  051042  043511
                015072  052110  051455  044510
                015100  052106  020042  042513
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                015106  006531  177412
1697            015112  005015  047516  020127  MKBH:   .ASCII  <15><12>/NOW HOLD DOWN THE "CTRL" KEY/<15><12><377>
                015120  047510  042114  042040
                015126  053517  020116  044124
                015134  020105  041442  051124
                015142  021114  045440  054505
                015150  005015     377
1698            015153     015  051412  040524  MKBI:   .ASCII  <15><12>/START WITH THE TOP ROW/<15><12><377>
                015160  052122  053440  052111
                015166  020110  044124  020105
                015174  047524  020120  047522
                015202  006527  177412
1699            015206  005015  052123  051101  MKBJ:   .ASCII  <15><12>/START WITH THE 2ND ROW/<15><12><377>
                015214  020124  044527  044124
                015222  052040  042510  031040
                015230  042116  051040  053517
                015236  005015     377
1700            015241     015  051412  040524  MKBK:   .ASCII  <15><12>/START  WITH THE 3RD ROW/<15><12><377>
                015246  052122  020040  044527
                015254  044124  052040  042510
                015262  031440  042122  051040
                015270  053517  005015     377
1701            015275     015  051412  040524  MKBL:   .ASCII  <15><12>/START WITH THE 4TH ROW/<15><12><377>
                015302  052122  053440  052111
                015310  020110  044124  020105
                015316  052064  020110  047522
                015324  006527  177412
1702            015330  005015  052123  051101  MKBM:   .ASCII  <15><12>/START WITH THE LAST ROW/<15><12><377>
                015336  020124  044527  044124
                015344  052040  042510  046040
                015352  051501  020124  047522
                015360  006527  177412
1703            015364  005015  053012  032524  MKBN:   .ASCII  <15><12><12>/VT50H KEYPAD TEST/<15><12><377>
                015372  044060  045440  054505
                015400  040520  020104  042524
                015406  052123  005015     377
1704            015413     015  053012  032524  MKB52:  .ASCII  <15><12>/VT52 ALTERNATE KEYPAD MODE TEST/<15><12><377>
                015420  020062  046101  042524
                015426  047122  052101  020105
                015434  042513  050131  042101
                015442  046440  042117  020105
                015450  042524  052123  005015
                015456     377
1705            015457     015  041412  040510  MKBQ:   .ASCII  <15><12>/CHARACTER WAS IN ERROR/<15><12>
                015464  040522  052103  051105
                015472  053440  051501  044440
                015500  020116  051105  047522
                015506  006522     012
1706            015511     107  047517  020104          .ASCII  /GOOD = /
                015516  020075
1707            015520     040     040     075  MKBQ1:  .BYTE   40,40,75,40
                015523     040
1708            015524     040     040     040  MKBQA:  .BYTE   40,40,40,40,40
                015527     040     040
1709            015531     102  042101  036440          .ASCII  /BAD = /
                015536     040
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1710  015537  040     040     075     MKBQ2:  .BYTE   40,40,75,40
      015542  040
1711  015543  040     040     040     MKBQB:  .BYTE   40,40,40,15,12,377,0
      015546  015     012     377
      015551  000
1712  015552  005015  042513  041131  MKBR:   .ASCIZ  <15><12>/KEYBOARD CHARACTER TEST COMPLETE/<15><12><377>
      015560  040517  042122  041440
      015566  040510  040522  052103
      015574  051105  052040  051505
      015602  020124  047503  050115
      015610  042514  042524  005015
      015616  000377
1713
1714  015620  005015  045440  054505  MKE:    .ASCII  <15><12>/ KEYBOARD ASCII AND OCTAL LOOP/<15><12>
      015626  047502  051101  020104
      015634  051501  044503  020111
      015642  047101  020104  041517
      015650  040524  020114  047514
      015656  050117  005015
1715  015662  015     012             .BYTE   15,12
1716  015664  044127  047105  040440          .ASCII  /WHEN A KEY IS DEPRESSED, THE ASCII CHARACTER AND/
      015672  045440  054505  044440
      015700  020123  042504  051120
      015706  051505  042523  026104
      015714  052040  042510  040440
      015722  041523  044511  041440
      015730  040510  040522  052103
      015736  051105  040440  042116
1717  015744  015     012             .BYTE   15,12
1718  015746  052040  042510  052040          .ASCIZ  / THE THREE DIGIT OCTAL CODE WILL BE ECHOED/
      015754  051110  042505  042040
      015762  043511  052111  047440
      015770  052103  046101  041440
      015776  042117  020105  044527
      016004  046114  041040  020105
      016012  041505  047510  042105
      016020  000
1719  016021  015     012     377             .BYTE   15,12,377,0
      016024  000
1720  016025  015     041412  040510  MKEA:   .ASCII  <15><12>/CHAR = /
      016032  020122  020075
1721  016036  040     040     040     MKEA1:  .BYTE   40,40,40,75,40
      016041  075     040
1722  016043  040     040     040     MKEB:   .BYTE   40,40,40,15,12,377,0
      016046  015     012     377
      016051  000
1723  016052  005015  042513  041131  MKEH:   .ASCIZ  <15><12>/KEYBOARD ECHO LOOP/<15><12>
      016060  040517  042122  042440
      016066  044103  020117  047514
      016074  050117  005015  000
1724  016101  015     012     012     CRLF:   .BYTE   15,12,12,12,12,12,12,12,12
      016104  012     012     012
      016107  012     012     012
1725  016112  012     012     012     CRLFA:  .BYTE   12,12,12,12,12,377,0
      016115  012     012     377
      016120  000
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 1726                                           ;HOME AND ERASE SCREEN OPCODE
 1727  016121      033      110      033  HOMERS: .BYTE   33,110,33,112,377,0
       016124      112      377      000
 1728  016127      015   052012   040040  PATH:   .ASCII  <15><12>/T @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@/
       016134   040100   040100   040100
       016142   040100   040100   040100
       016150   040100   040100   040100
       016156   040100   040100   040100
       016164   040100   040100   040100
       016172   040100   040100   040100
       016200      100
 1729  016201      100   040100   040100          .ASCII  /@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ T/
       016206   040100   040100   040100
       016214   040100   040100   040100
       016222   040100   040100   040100
       016230   040100   040100   040100
       016236   040100   040100   040100
       016244   040100   020100      124
 1730  016251      015   052012   042440          .ASCII  <15><12>/T EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE/
       016256   042505   042505   042505
       016264   042505   042505   042505
       016272   042505   042505   042505
       016300   042505   042505   042505
       016306   042505   042505   042505
       016314   042505   042505   042505
       016322      105
 1731  016323      105   042505   042505          .ASCII  /EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE T/
       016330   042505   042505   042505
       016336   042505   042505   042505
       016344   042505   042505   042505
       016352   042505   042505   042505
       016360   042505   042505   042505
       016366   042505   020105      124
 1732  016373      377      000      000          .BYTE   377,0,0
 1733  016376   005015   042524   052123  VT50A:  .ASCII  <15><12>/TESTING VT50A (12 LINES-NO COPIER)/
       016404   047111   020107   052126
       016412   030065   020101   030450
       016420   020062   044514   042516
       016426   026523   047516   041440
       016434   050117   042511   024522
 1734  016442      015      012      012          .BYTE   15,12,12,377,0,0
       016445      377      000      000
 1735  016450   005015   042524   052123  VT50B:  .ASCII  <15><12>/TESTING VT50B (12 LINES-COPIER)/
       016456   047111   020107   052126
       016464   030065   020102   030450
       016472   020062   044514   042516
       016500   026523   047503   044520
       016506   051105      051
 1736  016511      015      012      012          .BYTE   15,12,12,377,0,0
       016514      377      000      000
 1737  016517      015   052012   051505  VT55:   .ASCII  <15><12>/TESTING VT55 (24 LINES-COPIER)/
       016524   044524   043516   053040
       016532   032524   020065   031050
       016540   020064   044514   042516
       016546   026523   047503   044520
       016554   051105      051
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1738  016557  015     012     012          .BYTE   15,12,12,377,0,0
      016562  377     000     000
1739  016565  015     052012  051505  VT50H:  .ASCII  <15><12>/TESTING VT50H (12 LINES-COPIER-D.C.A.)/
      016572  044524  043516  053040
      016600  032524  044060  024040
      016606  031061  046040  047111
      016614  051505  041455  050117
      016622  042511  026522  027104
      016630  027103  027101  051
1740  016635  015     012     012          .BYTE   15,12,12,377,0,0
      016640  377     000     000
1741  016643  015     052012  051505  VT52K:  .ASCII  <15><12>/TESTING VT52 (24 LINES-NO COPIER OR PRINTER/
      016650  044524  043516  053040
      016656  032524  020062  031050
      016664  020064  044514  042516
      016672  026523  047516  041440
      016700  050117  042511  020122
      016706  051117  050040  044522
      016714  052116  051105
1742  016720  015     012     012          .BYTE   15,12,12,377,0,0
      016723  377     000     000
1743  016726  005015  042524  052123  VT52L:  .ASCII  <15><12>/TESTING VT52 (24 LINES,COPIER-NO PRINTER)/
      016734  047111  020107  052126
      016742  031065  024040  032062
      016750  046040  047111  051505
      016756  041454  050117  042511
      016764  026522  047516  050040
      016772  044522  052116  051105
      017000  051
1744  017001  015     012     012          .BYTE   15,12,12,377,0,0
      017004  377     000     000
1745  017007  015     052012  051505  VT52M:  .ASCII  <15><12>/TESTING VT52 (24 LINES,PRINTER-NO COPIER)/
      017014  044524  043516  053040
      017022  032524  020062  031050
      017030  020064  044514  042516
      017036  026123  051120  047111
      017044  042524  026522  047516
      017052  041440  050117  042511
      017060  024522
1746  017062  015     012     012          .BYTE   15,12,12,377,0,0
      017065  377     000     000
1747  017070  033     132     377  RFI:    .BYTE   33,132,377,0,0
      017073  000     000
1748  017075  033     015534  006537  MQ0:    .ASCIZ  <33><134><33><137><15><12><12>/LOOP ON TEST PATTERN LETTER (A THRU Z) ?
      017102  005012  047514  050117
      017110  047440  020116  042524
      017116  052123  050040  052101
      017124  042524  047122  046040
      017132  052105  042524  020122
      017140  040450  052040  051110
      017146  020125  024532  037440
      017154  036440  020040  000377
1749  017162  056033  057433  005015  MQ1:    .ASCIZ  <33><134><33><137><15><12><12>/START AT TEST PATTERN LETTER (A THRU Z) ?
      017170  051412  040524  052122
      017176  040440  020124  042524
      017204  052123  050040  052101
```

```
                017212  042524  047122  046040
                017220  052105  042524  020122
                017226  040450  052040  051110
                017234  020125  024532  037440
                017242  036440  020040  000377
1750            017250  005015  052012  054522  MQ2:    .ASCIZ  <15><12><12>/TRY AGAIN /<15><12><377>
                017256  040440  040507  047111
                017264  006440  177412     000
1751            017271     033     135     012  GOPRNT: .BYTE   33,135,12,12,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0377,0,0
                017274     012     000     000
                017277     000     000     000
                017302     000     000     000
                017305     000     000     000
                017310     000     000     000
                017313     000     377     000
                017316     000
1752            017317     033  006533  052012  GOHDSC: .ASCIZ  <33><133><15><12>/TESTING SILO REG/<377>
                017324  051505  044524  043516
                017332  051440  046111  020117
                017340  042522  177507     000
1753            017345     033  006534  051412  GODSHS: .ASCIZ  <33><134><15><12>/SILO TEST DONE/<15><12><377>
                017352  046111  020117  042524
                017360  052123  042040  047117
                017366  006505  177412     000
1754            017373     033     136     377  GOAPMD: .BYTE   33,136,377,0,0
                017376     000     000
1755            017400     033     137     015  GONAPM: .BYTE   33,137,15,12,12,12,0,0,0,0,0,0,0,0,0,0,0,0,377,0,0,0,0
                017403     012     012     012
                017406     000     000     000
                017411     000     000     000
                017414     000     000     000
                017417     000     000     000
                017422     377     000     000
                017425     000     000
1756            017427     033  015510  020112  M98:    .ASCIZ  <33><110><33><112>/   DIRECT CURSOR ADDRESSING TEST/<377>
                017434  020040  044504  042522
                017442  052103  041440  051125
                017450  047523  020122  042101
                017456  051104  051505  044523
                017464  043516  052040  051505
                017472  177524     000
1757            017475     015  005012  044506  WHAT0:  .ASCIZ  <15><12><12>/FIRST LINE DEVICE ADDRESS ? = /<200>
                017502  051522  020124  044514
                017510  042516  042040  053105
                017516  041511  020105  042101
                017524  051104  051505  020123
                017532  020077  020075  000200
1758            017540  005015  046012  051501  WHAT1:  .ASCIZ  <15><12><12>/LAST LINE DEVICE ADDRESS (CR IF NONE) ? = /<200>
                017546  020124  044514  042516
                017554  042040  053105  041511
                017562  020105  042101  051104
                017570  051505  020123  041450
                017576  020122  043111  047040
                017604  047117  024505  037440
                017612  036440  100040     000
1759            017617     015  020012  020040  PASHED: .ASCIZ  <15><12>/          PASS #    # OF ERRORS   /
```

```
                017624  020040  020040  020040
                017632  050040  051501  020123
                017640  020043  020040  021440
                017646  047440  020106  051105
                017654  047522  051522  020040
                017662  000040
1760            017664  051105  047522  020122  EM1:    .ASCIZ  /ERROR FLAG SET ON TRANSMITTER STATUS/
                017672  046106  043501  051440
                017700  052105  047440  020116
                017706  051124  047101  046523
                017714  052111  042524  020122
                017722  052123  052101  051525
                017730     000
1761            017731     116  020117  047111  EM2:    .ASCIZ  /NO INPUT FLAG DETECTED/
                017736  052520  020124  046106
                017744  043501  042040  052105
                017752  041505  042524  000104
1762            017760  047111  047503  051122  EM3:    .ASCIZ  /INCORRECT I.D. CODE/
                017766  041505  020124  027111
                017774  027104  041440  042117
                020002  000105
1763            020004  047125  054105  042520  EM4:    .ASCIZ  /UNEXPECTED OR INCORRECT INPUT CHAR/
                020012  052103  042105  047440
                020020  020122  047111  047503
                020026  051122  041505  020124
                020034  047111  052520  020124
                020042  044103  051101     000
1764            020047     111  053116  046101  EM5:    .ASCIZ  /INVALID BUSS ADDRESS, TRY AGAIN/
                020054  042111  041040  051525
                020062  020123  042101  051104
                020070  051505  026123  052040
                020076  054522  040440  040507
                020104  047111     000
1765            020107     105  051122  041520  DH1:    .ASCIZ  /ERRPC   VTNOW   TSTNUM/
                020114  020040  053040  047124
                020122  053517  020040  052040
                020130  052123  052516  000115
1766            020136  051105  050122  020103  DH3:    .ASCIZ  /ERRPC   VTNOW   1ST WD  2ND WD  3RD WD/
                020144  020040  052126  047516
                020152  020127  020040  051461
                020160  020124  042127  020040
                020166  047062  020104  042127
                020174  020040  051063  020104
                020202  042127     000
1767            020205     105  051122  041520  DH4:    .ASCIZ  /ERRPC   VTNOW   TSTNUM   EXPCT   RECV/
                020212  020040  053040  047124
                020220  053517  020040  052040
                020226  052123  052516  020115
                020234  020040  054105  041520
                020242  020124  020040  042522
                020250  053103     000
1768                    020254          .EVEN
1769            020254  001122  001244  001250  DT1:    $ERRPC,VTNOW,TSTNUM,0
                020262  000000
1770            020264  001122  001244  001326  DT3:    $ERRPC,VTNOW,SAVE4,SAVE2,SAVE3,0
                020272  001322  001324  000000
```

```
1771  020300  001122  001244  001250  DT4:    $ERRPC,VTNOW,TSTNUM,$GDDAT,$BDDAT,0
      020306  001130  001132  000000
1772
1773                                          .SBTTL  KEYBOARD CHARACTER CODE TABLES
1774
1775                                  ;THE ACTUAL KEYBOARD LAYOUT IS REQUIRED
1776
1777  020314  020350  020404  020442  V50RW:  ROW1,ROW2,ROW3,ROW4,ROW1S,ROW1S,ROW1C
      020322  020472  020672  020672
      020330  020764
1778  020332  020520  020556  020614  V52RW:  ROW12,ROW22,ROW32,ROW42,ROW12S,ROW12S,ROW12C
      020340  020646  020726  020726
      020346  021020
1779
1780
1781  020350  000033  000061  000062  ROW1:   .WORD   33,61,62,63,64,65,66,67,70,71,60,55,75,100010
      020356  000063  000064  000065
      020364  000066  000067  000070
      020372  000071  000060  000055
      020400  000075  100010
1782  020404  000011  000121  000127  ROW2:   .WORD   11,121,127,105,122,124,131,125,111,117,120,133,134,12,100177
      020412  000105  000122  000124
      020420  000131  000125  000111
      020426  000117  000120  000133
      020434  000134  000012  100177
1783  020442  000101  000123  000104  ROW3:   .WORD   101,123,104,106,107,110,112,113,114,73,47,100015
      020450  000106  000107  000110
      020456  000112  000113  000114
      020464  000073  000047  100015
1784  020472  000132  000130  000103  ROW4:   .WORD   132,130,103,126,102,116,115,54,56,100057
      020500  000126  000102  000116
      020506  000115  000054  000056
      020514  100057
1785  020516  100040                  ROW5:   .WORD   100040
1786                                  ;VT52 KEYBOARD EQUIVALENCES(LOWER CASE CHAR.)
1787
1788  020520  000033  000061  000062  ROW12:  .WORD   33,61,62,63,64,65,66,67,70,71,60,55,75,140,100010
      020526  000063  000064  000065
      020534  000066  000067  000070
      020542  000071  000060  000055
      020550  000075  000140  100010
1789  020556  000011  000161  000167  ROW22:  .WORD   11,161,167,145,162,164,171,165,151,157,160,133,134,12,100177
      020564  000145  000162  000164
      020572  000171  000165  000151
      020600  000157  000160  000133
      020606  000134  000012  100177
1790  020614  000141  000163  000144  ROW32:  .WORD   141,163,144,146,147,150,152,153,154,73,47,173,100015
      020622  000146  000147  000150
      020630  000152  000153  000154
      020636  000073  000047  000173
      020644  100015
1791  020646  000172  000170  000143  ROW42:  .WORD   172,170,143,166,142,156,155,54,56,100057
      020654  000166  000142  000156
      020662  000155  000054  000056
      020670  100057
1792
```

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                                        ;SHIFTED ROW CODES
                                        
020672  000033  000041  000100  ROW1S:  .WORD   33,41,100,43,44,45,136,46,52,50,51,137,53,100010
020700  000043  000044  000045
020706  000136  000046  000052
020714  000050  000051  000137
020722  000053  100010
020726  000033  000041  000100  ROW12S: .WORD   33,41,100,43,44,45,136,46,52,50,51,137,53,176,100010
020734  000043  000044  000045
020742  000136  000046  000052
020750  000050  000051  000137
020756  000053  000176  100010

                                        ;CONTROL ROW CODES

020764  000033  000021  000022  ROW1C:  .WORD   33,21,22,23,24,25,26,27,30,31,20,15,35,100010
020772  000023  000024  000025
021000  000026  000027  000030
021006  000031  000020  000015
021014  000035  100010
021020  000033  000021  000022  ROW12C: .WORD   33,21,22,23,24,25,26,27,30,31,20,15,35,0,100010
021026  000023  000024  000025
021034  000026  000027  000030
021042  000031  000020  000015
021050  000035  000000  100010
                                        ;VT52   ESCAPE SEQUENCES

021056      033     111     015  REVLF:  .BYTE   33,111,015,377,0        ;REVERSE LINE FEED.
021061      377     000

021063      033     075     377  ENAKP:  .BYTE   33,075,377,0,0          ;ENABLE ALTERNATE KEYPAD MODE.
021066      000     000
021070      033     076     377  EXAKP:  .BYTE   33,076,377,0,0          ;EXIT ALTERNATE KEYPAD MODE
021073      000     000

021075      033     106     377  ENGRAF: .BYTE   33,106,377,0,0          ;ENTER GRAPHICS MODE.
021100      000     000
021102      033     107     377  EXGRAF: .BYTE   33,107,377,0,0          ;EXIT GRAPHICS MODE.
021105      000     000

021107      033     127     377  ENPNTM: .BYTE   33,127,377,0,0          ;ENABLE PRINTER CONTROLLER MODE.
021112      000     000
021114      033     130     377  EXPNTM: .BYTE   33,130,377,0,0          ;DISABLE PRINTER CONTROLLER MODE.
021117      000     000

                                        ;VT50-H KEYPAD CODES

            021122                      .EVEN
021122  000033  000120  000033  ROW6:   .WORD   33,'P,33,'Q,33,'R,33,100101
021130  000121  000033  000122
021136  000033  100101
021142  000067  000070  000071  ROW7:   .WORD   67,70,71,33,100102
021150  000033  100102
021154  000064  000065  000066  ROW8:   .WORD   64,65,66,33,100103
021162  000033  100103
```

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 1822  021166  000061  000062  000063  ROW9:    .WORD   61,62,63,33,100104
       021174  000033  100104
 1823  021200  000060  000056  100015  ROW10:   .WORD   60,56,100015
 1824  021206  000033  000120  000033  ROW6A:   .WORD   33,'P,33,'Q,33,'R,33,100101
       021214  000121  000033  000122
       021222  000033  100101
 1825  021226  000033  000077  000167  ROW7A:   .WORD   33,'?,167,33,'?,170,33,'?,171,33,100102
       021234  000033  000077  000170
       021242  000033  000077  000171
       021250  000033  100102
 1826  021254  000033  000077  000164  ROW8A:   .WORD   33,'?,164,33,'?,165,33,'?,166,33,100103
       021262  000033  000077  000165
       021270  000033  000077  000166
       021276  000033  100103
 1827  021302  000033  000077  000161  ROW9A:   .WORD   33,'?,161,33,'?,162,33,'?,163,33,100104
       021310  000033  000077  000162
       021316  000033  000077  000163
       021324  000033  100104
 1828  021330  000033  000077  000160  ROW10A:  .WORD   33,'?,160,33,'?,156,33,'?,100115
       021336  000033  000077  000156
       021344  000033  000077  100115
 1829  021352  005015  052012  044510  MTEXT0:  .ASCIZ  <15><12><12>/THIS SOFTWARE IS FURNISHED TO PURCHASER UNDER A LICENSE FOR
       021360  020123  047523  052106
       021366  040527  042522  044440
       021374  020123  052506  047122
       021402  051511  042510  020104
       021410  047524  050040  051125
       021416  044103  051501  051105
       021424  052440  042116  051105
       021432  040440  046040  041511
       021440  047105  042523  043040
       021446  051117  052440  042523
       021454  000377
 1830  021456  005015  047117  040440  MTEXT1:  .ASCIZ  <15><12>/ON A SINGLE COMPUTER SYSTEM AND CAN BE COPIED (WITH INCLUSION/<
       021464  051440  047111  046107
       021472  020105  047503  050115
       021500  052125  051105  051440
       021506  051531  042524  020115
       021514  047101  020104  040503
       021522  020116  042502  041440
       021530  050117  042511  020104
       021536  053450  052111  020110
       021544  047111  046103  051525
       021552  047511  177516     000
 1831  021557     015  047412  020106  MTEXT2:  .ASCIZ  <15><12>/OF DEC'S COPYRIGHT NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT/
       021564  042504  023503  020123
       021572  047503  054520  044522
       021600  044107  020124  047516
       021606  044524  042503  020051
       021614  047117  054514  043040
       021622  051117  052440  042523
       021630  044440  020116  052523
       021636  044103  051440  051531
       021644  042524  026115  042440
       021652  041530  050105  177524
       021660     000
```

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1832  021661  000015  040412  020123  MTEXT3: .ASCIZ  <15><12>/AS MAY OTHERWISE BE PROVIDED IN WRITING BY DEC./<377>
      021666  040515  020131  052117
      021674  042510  053522  051511
      021702  020105  042502  050040
      021710  047522  044526  042504
      021716  020104  047111  053440
      021724  044522  044524  043516
      021732  041040  020131  042504
      021740  027103  000377
1833
1834  021744  005015  052012  042510  MTEXT4: .ASCIZ  <15><12><12>/THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHO
      021752  044440  043116  051117
      021760  040515  044524  047117
      021766  044440  020116  044124
      021774  051511  042040  041517
      022002  046525  047105  020124
      022010  051511  051440  041125
      022016  042512  052103  052040
      022024  020117  044103  047101
      022032  042507  053440  052111
      022040  047510  052125  000377
1835  022046  005015  047516  044524  MTEXT5: .ASCIZ  <15><12>/NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL/<
      022054  042503  040440  042116
      022062  051440  047510  046125
      022070  020104  047516  020124
      022076  042502  041440  047117
      022104  052123  052522  042105
      022112  040440  020123  020101
      022120  047503  046515  052111
      022126  042515  052116  041040
      022134  020131  044504  044507
      022142  040524  177514  000000
1836  022147  000015  042412  052521  MTEXT6: .ASCIZ  <15><12>/EQUIPMENT CORPORATION./<377>
      022154  050111  042515  052116
      022162  041440  051117  047520
      022170  040522  044524  047117
      022176  177456  000000
1837  022201  000015  005012  042504  MTEXT7: .ASCIZ  <15><12><12>/DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF
      022206  020103  051501  052523
      022214  042515  020123  047516
      022222  051040  051505  047520
      022230  051516  041111  046111
      022236  052111  020131  047506
      022244  020122  044124  020105
      022252  051525  020105  051117
      022260  051040  046105  040511
      022266  044502  044514  054524
      022274  047440  177506  000000
1838  022301  000015  044412  051524  MTEXT8: .ASCII  <15><12>/ITS SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC./
      022306  051440  043117  053524
      022314  051101  020105  047117
      022322  042440  052521  050111
      022330  042515  052116  053440
      022336  044510  044103  044440
      022344  020123  047516  020124
      022352  052523  050120  044514
```

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        022360  042105  041040  020131
        022366  042504  027103
 1839   022372     015     012     377          .BYTE   15,12,377,0
        022375     000
 1840                                .EVEN
 1841                               ;*****************************************************************
  (1)                               
  (1)                               .SBTTL  TTY INPUT ROUTINE
  (1)                               
  (1)                               ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
  (1)                               ;*CALL:
  (1)                               ;*      RDCHR                       ;;INPUT A SINGLE CHARACTER FROM THE TTY
  (1)                               ;*      RETURN HERE                 ;;CHARACTER IS ON THE STACK
  (1)                               ;
  (1)                               
  (1)  022376  011646               $RDCHR: MOV     (SP),-(SP)          ;;PUSH DOWN THE PC
  (1)  022400  016666  000004  000002       MOV     4(SP),2(SP)         ;;SAVE THE PS
  (1)  022406  105777  156530       1$:     TSTB    @$TKS               ;;WAIT FOR
  (1)  022412  100375                       BPL     1$                  ;;A CHARACTER
  (1)  022414  117766  156524  000004       MOVB    @$TKB,4(SP)         ;;READ THE TTY
  (1)  022422  042766  177600  000004       BIC     #^C<177>,4(SP)      ;;GET RID OF JUNK IF ANY
  (1)  022430  000002                       RTI                         ;;GO BACK TO USER
  (2)                               ;*****************************************************************
  (1)                               ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
  (1)                               ;*CALL:
  (1)                               ;*      RDLIN                       ;;INPUT A STRING FROM THE TTY
  (1)                               ;*      RETURN HERE                 ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
  (1)                               ;*                                  ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
  (1)                               
  (1)  022432  010346               $RDLIN: MOV     R3,-(SP)            ;;SAVE R3
  (1)  022434  012703  022540       1$:     MOV     #$TTYIN,R3          ;;GET ADDRESS
  (1)  022440  022703  022550       2$:     CMP     #$TTYIN+8.,R3       ;;BUFFER FULL?
  (1)  022444  101405                       BLOS    4$                  ;;BR IF YES
  (1)  022446  104405                       RDCHR                       ;;GO READ ONE CHARACTER FROM THE TTY
  (1)  022450  112613                       MOVB    (SP)+,(R3)          ;;GET CHARACTER
  (1)  022452  122713  000177               CMPB    #177,(R3)           ;;IS IT A RUBOUT
  (1)  022456  001003                       BNE     3$                  ;;SKIP IF NOT
  (1)  022460  104400  001164       4$:     TYPE    ,$QUES              ;;TYPE A '?'
  (1)  022464  000763                       BR      1$                  ;;CLEAR THE BUFFER AND LOOP
  (1)  022466  111337  022536       3$:     MOVB    (R3),9$             ;;ECHO THE CHARACTER
  (1)  022472  104400  022536               TYPE    ,9$
  (1)  022476  122723  000015               CMPB    #15,(R3)+           ;;CHECK FOR RETURN
  (1)  022502  001356                       BNE     2$                  ;;LOOP IF NOT RETURN
  (1)  022504  105063  177777               CLRB    -1(R3)              ;;CLEAR RETURN (THE 15)
  (1)  022510  104400  001166               TYPE    ,$LF                ;;TYPE A LINE FEED
  (1)  022514  012603                       MOV     (SP)+,R3            ;;RESTORE R3
  (1)  022516  011646                       MOV     (SP),-(SP)          ;;ADJUST THE STACK AND PUT ADDRESS OF THE
  (1)  022520  016666  000004  000002       MOV     4(SP),2(SP)         ;;      FIRST ASCII CHARACTER ON IT
  (1)  022526  012766  022540  000004       MOV     #$TTYIN,4(SP)
  (1)  022534  000002                       RTI                         ;;RETURN
  (1)  022536     000               9$:     .BYTE   0                   ;;STORAGE FOR ASCII CHAR. TO TYPE
  (1)  022537     000                       .BYTE   0                   ;;TERMINATOR
  (1)  022540  000010               $TTYIN: .BLKB   8.                  ;;RESERVE 8 BYTES FOR TTY INPUT
 1842                               ;*****************************************************************
  (1)                               
  (1)                               .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
```

```
(1)
(1)                                     ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
(1)                                     ;*CHANGE IT TO BINARY.
(1)                                     ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
(1)                                     ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
(1)                                     ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
(1)                                     ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
(1)                                     ;*CALL:
(1)                                     ;*      RDOCT                   ;;READ AN OCTAL NUMBER
(1)                                     ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
(1)                                     ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
(1)
(1)  022550  011646                     $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
(1)  022552  016666  000004  000002             MOV     4(SP),2(SP)     ;;INPUT NUMBER
(3)  022560  010046                             MOV     R0,-(SP)        ;;PUSH R0 ON STACK
(3)  022562  010146                             MOV     R1,-(SP)        ;;PUSH R1 ON STACK
(3)  022564  010246                             MOV     R2,-(SP)        ;;PUSH R2 ON STACK
(1)  022566  104406                     1$:     RDLIN                   ;;READ AN ASCIZ LINE
(1)  022570  012600                             MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
(1)  022572  010037  022676                     MOV     R0,5$           ;;AND SAVE IT
(1)  022576  005001                             CLR     R1              ;;CLEAR DATA WORD
(1)  022600  005002                             CLR     R2
(1)  022602  112046                     2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
(1)  022604  001420                             BEQ     3$              ;;IF ZERO GET OUT
(1)  022606  122716  000060                     CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
(1)  022612  003026                             BGT     4$              ;;IS AN OCTAL DIGIT
(1)  022614  122716  000067                     CMPB    #'7,(SP)
(1)  022620  002422                             BLT     4$
(1)  022622  006301                             ASL     R1              ;;*2
(1)  022624  006102                             ROL     R2
(1)  022626  006301                             ASL     R1              ;;*4
(1)  022630  006102                             ROL     R2
(1)  022632  006301                             ASL     R1              ;;*8
(1)  022634  006102                             ROL     R2
(1)  022636  042716  177770                     BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
(1)  022642  062601                             ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
(1)  022644  000756                             BR      2$              ;;LOOP
(1)  022646  005726                     3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
(1)  022650  010166  000012                     MOV     R1,12(SP)       ;;SAVE THE RESULT
(1)  022654  010237  022706                     MOV     R2,$HIOCT
(3)  022660  012602                             MOV     (SP)+,R2        ;;POP STACK INTO R2
(3)  022662  012601                             MOV     (SP)+,R1        ;;POP STACK INTO R1
(3)  022664  012600                             MOV     (SP)+,R0        ;;POP STACK INTO R0
(1)  022666  000002                     4$      RTI                     ;;RETURN
(1)  022670  005726                     4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
(1)  022672  105010                             CLRB    (R0)            ;;SET A TERMINATOR
(1)  022674  104400                             TYPE                    ;;TYPE UP THRU THE BAD CHAR.
(1)  022676  000000                     5$:     .WORD   0
(1)  022700  104400  001164                     TYPE    ,$QUES          ;;"?" "CR" & "LF"
(1)  022704  000730                             BR      1$              ;;TRY AGAIN
(1)  022706  000000                     $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
1843 022710  105777  156164             MSCOPE: TSTB    @$WR            ;TEST BIT 7
1844 022714  100003                             BPL     $SCOPE          ;NOT SET
1845 022716  005737  010742                     TST     LOOP            ;TEST LOOP
1846 022722  001041                             BNE     $OVER           ;SET LOOP ON TEST
1847
```

```
1848                                    ;*********************************************************************
 (1)                                    
 (1)                                    .SBTTL  SCOPE HANDLER ROUTINE
 (1)                                    
 (1)                                    ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
 (1)                                    ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
 (1)                                    ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
 (1)                                    ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 (1)                                    ;*SW14=1        LOOP ON TEST
 (1)                                    ;*SW08=1        LOOP ON TEST IN SWR<7:0>
 (1)                                    ;*CALL
 (1)                                    ;*      SCOPE           ;;SCOPE=IOT
 (1)                                    
 (1)  022724                            $SCOPE:
 (1)  022724  032777  040000  156146    1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
 (1)  022732  001035                            BNE     $OVER           ;;YES IF SW14=1
 (1)                                    ;*****START OF CODE FOR THE XOR TESTER*****
 (1)  022734  000416                    $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
 (1)                                                                    ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
 (1)  022736  013746  000004                    MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
 (1)  022742  012737  022762  000004            MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
 (1)  022750  005737  177060                    TST     @#177060        ;;TIME OUT ON XOR?
 (1)  022754  012637  000004                    MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
 (1)  022760  000414                            BR      $SVLAD          ;;GO TO THE NEXT TEST
 (1)  022762  022626                    5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
 (1)  022764  012637  000004                    MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
 (1)  022770  000416                            BR      $OVER           ;;LOOP ON THE PRESENT TEST
 (1)  022772                            6$:;*****END OF CODE FOR THE XOR TESTER*****
 (1)  022772  032777  000400  156100            BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
 (1)  023000  001404                            BEQ     $SVLAD          ;;BR IF NO
 (1)  023002  127737  156072  001106            CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
 (1)  023010  001406                            BEQ     $OVER           ;;BR IF YES
 (1)  023012  105237  001106            $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
 (1)  023016  011637  001112                    MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 (1)  023022  105037  001107                    CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
 (1)  023026  013777  001106  156046    $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 (1)  023034  013716  001112                    MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 (1)  023040  000002                            RTI                     ;;FIXES PS
1849
1850                                    ;*********************************************************************
 (1)                                    
 (1)                                    .SBTTL  ERROR HANDLER ROUTINE
 (1)                                    
 (1)                                    ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT.
 (1)                                    ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
 (1)                                    ;*AND GO TO $ERRTYP ON ERROR
 (1)                                    ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 (1)                                    ;*SW15=1        HALT ON ERROR
 (1)                                    ;*SW13=1        INHIBIT ERROR TYPEOUTS
 (1)                                    ;*CALL
 (1)                                    ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
 (1)                                    
 (1)  023042                            $ERROR:
 (2)  023042  113737  001106  001250            MOVB    $TSTNM,TSTNUM
 (1)  023050  105237  001107            7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
 (1)  023054  001775                            BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
```

```
(1)  023056  013777  001106  156016          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
(1)  023064  005237  001116                  INC     $ERTTL          ;;INC THE ERROR COUNT
(1)  023070  011637  001122                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
(1)  023074  162737  000002  001122          SUB     #2,$ERRPC
(1)  023102  117737  156014  001120          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
(1)  023110  032777  020000  155762          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
(1)  023116  001004                          BNE     20$             ;;SKIP TYPEOUTS
(1)  023120  004737  023154                  JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
(1)  023124  104400  001165                  TYPE    ,$CRLF
(1)  023130                          20$:
(1)  023130  005777  155744          2$:     TST     @SWR            ;;HALT ON ERROR
(1)  023134  100006                          BPL     3$              ;;SKIP IF CONTINUE
(1)  023136  000000                          HALT                    ;;HALT ON ERROR!
(1)  023140  022737  006726  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
(1)  023146  001001                          BNE     3$              ;;BRANCH IF NO
(1)  023150  000000                          HALT                    ;;YES
(1)  023152                          3$:
(1)  023152  000002                          RTI                     ;;RETURN
1851
1852                                 ;*****************************************************************
(1)                                  .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
(1)
(1)                                  ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
(1)                                  ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
(1)                                  ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
(1)
(1)  023154                          $ERRTYP:
(1)  023154  104400  001165                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  023160  010046                          MOV     R0,-(SP)        ;;SAVE R0
(1)  023162  005000                          CLR     R0              ;;PICKUP THE ITEM INDEX
(1)  023164  153700  001120                  BISB    @#$ITEMB,R0
(1)  023170  001004                          BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
(1)                                                                  ;;TYPE THE PC OF THE ERROR
(2)  023172  013746  001122                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
(2)                                                                  ;;ERROR ADDRESS
(2)  023176  104401                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
(1)  023200  000426                          BR      6$              ;;GET OUT
(1)  023202  005300                  1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
(1)  023204  006300                          ASL     R0              ;;       WORK FOR THE ERROR TABLE
(1)  023206  006300                          ASL     R0
(1)  023210  006300                          ASL     R0
(1)  023212  062700  001170                  ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
(1)  023216  012037  023226                  MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
(1)  023222  001404                          BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
(1)  023224  104400                          TYPE                    ;;TYPE THE "ERROR MESSAGE"
(1)  023226  000000                  2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
(1)  023230  104400  001165                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  023234  012037  023244          3$:     MOV     @(R0)+,4$       ;;PICKUP "DATA HEADER" POINTER
(1)  023240  001404                          BEQ     5$              ;;SKIP TYPEOUT IF 0
(1)  023242  104400                          TYPE                    ;;TYPE THE "DATA HEADER"
(1)  023244  000000                  4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
(1)  023246  104400  001165                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  023252  011000                  5$:     MOV     @(R0),R0        ;;PICKUP "DATA TABLE" POINTER
(1)  023254  001004                          BNE     7$              ;;GO TYPE THE DATA
(1)  023256  012600                  6$:     MOV     (SP)+,R0        ;;RESTORE R0
```

```
(1)  023260  104400  001165                TYPE    $CRLF           ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  023264  000207                        RTS     PC              ;;RETURN
(2)  023266                          7$:
(2)  023266  013046                        MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
(2)  023270  104401                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
(1)  023272  005710                        TST     (R0)            ;;IS THERE ANOTHER NUMBER?
(1)  023274  001770                        BEQ     6$              ;;BR IF NO
(1)  023276  104400  023304                TYPE    ,8$             ;;TYPE TWO(2) SPACES
(1)  023302  000771                        BR      7$              ;;LOOP
(1)  023304  020040     000          8$:   .ASCIZ  / /             ;;TWO(2) SPACES
(1)          023310                        .EVEN
1853
1854
(1)                                  ;*****************************************************************
(1)
(1)                                  .SBTTL  TYPE ROUTINE
(1)
(1)                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
(1)                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
(1)                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
(1)                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
(1)                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
(1)                                  ;*
(1)                                  ;*CALL:
(1)                                  ;*1) USING A TRAP INSTRUCTION
(1)                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
(1)                                  ;*OR
(1)                                  ;*      TYPE
(1)                                  ;*      MESADR
(1)                                  ;*
(1)                                  ;*2) USING A JSR INSTRUCTION
(1)                                  ;*      MOV     PS,-(SP)        ;;PUSH PROCESSOR STATUS WORD ON THE STACK
(1)                                  ;*      JSR     PC,$TYPE        ;;CALL TYPE ROUTINE
(1)                                  ;*      MESADDR                 ;;FIRST ADRESS OF MESSAGE
(1)
(1)  023310  105737  001155          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
(1)  023314  100002                         BPL     1$              ;;BR IF YES
(1)  023316  000000                         HALT                    ;;HALT HERE IF NO TERMINAL
(1)  023320  000407                         BR      3$              ;;LEAVE
(1)  023322  010046                  1$:    MOV     R0,-(SP)        ;;SAVE R0
(1)  023324  017600  000002                 MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
(1)  023330  112046                  2$:    MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
(1)  023332  001005                         BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
(1)  023334  005726                         TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
(1)  023336  012600                  60$:   MOV     (SP)+,R0        ;;RESTORE R0
(1)  023340  062716  000002          3$:    ADD     #2,(SP)         ;;ADJUST RETURN PC
(1)  023344  000002                         RTI                     ;;RETURN
(1)  023346  122716  000011          4$:    CMPB    #THT,(SP)       ;;BRANCH IF <HT>
(1)  023352  001431                         BEQ     8$
(1)  023354  122716  000200                 CMPB    #TCRLF,(SP)     ;;BRANCH IF NOT <CRLF>
(1)  023360  001007                         BNE     5$
(1)  023362  005726                         TST     (SP)+           ;;POP  <CR><LF> EQUIV
(1)  023364  013746  177776                 MOV     PS,-(SP)        ;;TYPE CR AND LF
(1)  023370  004737  023310                 JSR     PC,$TYPE
(1)  023374  001165                         $CRLF
(1)  023376  000754                         BR      2$              ;;GET NEXT CHARACTER
(1)  023400  004737  023462          5$:    JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
```

```
(1)  023404  123726  001154          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
(1)  023410  001347                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
(1)  023412  013746  001152                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
(1)                                                                  ;;AND THE NULL CHAR.
(1)  023416  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
(1)  023422  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
(1)  023424  004737  023462                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
(1)  023430  105337  023526                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
(1)  023434  000770                          BR      7$              ;;LOOP
(1)
(1)                                  ;HORIZONTAL TAB PROCESSOR
(1)
(1)  023436  112716  000040          8$:     MOVB    #40,(SP)        ;;REPLACE TAB WITH SPACE
(1)  023442  004737  023462          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
(1)  023446  132737  000007  023526          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
(1)  023454  001372                          BNE     9$              ;;TAB STOP
(1)  023456  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
(1)  023460  000723                          BR      2$              ;;GET NEXT CHARACTER
(1)  023462  105777  155460          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
(1)  023466  100375                          BPL     $TYPEC
(1)  023470  116677  000002  155452          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
(1)  023476  122766  000015  000002          CMPB    #15,2(SP)       ;;BRANCH IF
(1)  023504  001003                          BNE     1$              ;;NOT <CR>
(1)  023506  105037  023526                  CLRB    $CHARCNT        ;;
(1)  023512  000406                          BR      $TYPEX          ;;EXIT
(1)  023514  122766  000012  000002  1$:     CMPB    #12,2(SP)       ;;BRANCH IF
(1)  023522  002002                          BGE     $TYPEX          ;;<LF>
(1)  023524  105227                          INCB    (PC)+           ;;INC SPACE
(1)  023526  000000          $CHARCNT:.WORD  0                       ;;COUNT
(1)  023530  000207          $TYPEX: RTS     PC
(1)                          ;       EQUATES
(1)          000011          THT=11
(1)          000200          TCRLF=200
(1)
1855
1856                         ;*****************************************************************
(1)
(1)                          .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
(1)
(1)                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
(1)                          ;*OCTAL (ASCII) NUMBER AND TYPE IT.
(1)                          ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
(1)                          ;*CALL:
(1)                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                          ;*      TYPOS                   ;;CALL FOR TYPEOUT
(1)                          ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
(1)                          ;*      .BYTE   M               ;;M=1 OR 0
(1)                          ;*                                      ;;1=TYPE LEADING ZEROS
(1)                          ;*                                      ;;0=SUPPRESS LEADING ZEROS
(1)                          ;*
(1)                          ;*$TYPON----ENTER HERE TO TYPE,OUT WITH THE SAME PARAMETERS AS THE LAST
(1)                          ;*$TYPOS OR $TYPOC
(1)                          ;*CALL:
(1)                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                          ;*      TYPON                   ;;CALL FOR TYPEOUT
(1)                          ;*
```

```
(1)                                     ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
(1)                                     ;*CALL:
(1)                                     ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                                     ;*      TYPOC                   ;;CALL FOR TYPEOUT
(1)
(1)  023532  017646  000000             $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
(1)  023536  116637  000001  023755             MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
(1)  023544  112637  023757                      MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
(1)  023550  062716  000002                      ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
(1)  023554  000406                              BR      $TYPON
(1)  023556  112737  000001  023755     $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
(1)  023564  112737  000006  023757             MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
(1)  023572  112737  000005  023754     $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
(1)  023600  010346                              MOV     R3,-(SP)        ;;SAVE R3
(1)  023602  010446                              MOV     R4,-(SP)        ;;SAVE R4
(1)  023604  010546                              MOV     R5,-(SP)        ;;SAVE R5
(1)  023606  113704  023757                      MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
(1)  023612  005404                              NEG     R4
(1)  023614  062704  000006                      ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
(1)  023620  110437  023756                      MOVB    R4,$OMODE       ;;SAVE IT FOR USE
(1)  023624  113704  023755                      MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
(1)  023630  016605  000012                      MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
(1)  023634  005003                              CLR     R3              ;;CLEAR THE OUTPUT WORD
(1)  023636  006105                     1$:     ROL     R5              ;;ROTATE MSB INTO "C"
(1)  023640  000404                              BR      3$              ;;GO DO MSB
(1)  023642  006105                     2$:     ROL     R5              ;;FORM THIS DIGIT
(1)  023644  006105                             ROL     R5
(1)  023646  006105                             ROL     R5
(1)  023650  010503                             MOV     R5,R3
(1)  023652  006103                     3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
(1)  023654  105337  023756                     DECB    $OMODE          ;;TYPE THIS DIGIT?
(1)  023660  100016                             BPL     7$              ;;BR IF NO
(1)  023662  042703  177770                     BIC     #177770,R3      ;;GET RID OF JUNK
(1)  023666  001002                             BNE     4$              ;;TEST FOR 0
(1)  023670  005704                             TST     R4              ;;SUPPRESS THIS 0?
(1)  023672  001403                             BEQ     5$              ;;BR IF YES
(1)  023674  005204                     4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
(1)  023676  052703  000060                     BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
(1)  023702  052703  000040             5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
(1)  023706  110337  023752                     MOVB    R3,8$           ;;SAVE FOR TYPING
(1)  023712  104400  023752                     TYPE    ,8$             ;;GO TYPE THIS DIGIT
(1)  023716  105337  023754             7$:     DECB    $OCNT           ;;COUNT BY 1
(1)  023722  003347                             BGT     2$              ;;BR IF MORE TO DO
(1)  023724  002402                             BLT     6$              ;;BR IF DONE
(1)  023726  005204                             INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
(1)  023730  000744                             BR      2$              ;;GO DO THE LAST DIGIT
(1)  023732  012605                     6$:     MOV     (SP)+,R5        ;;RESTORE R5
(1)  023734  012604                             MOV     (SP)+,R4        ;;RESTORE R4
(1)  023736  012603                             MOV     (SP)+,R3        ;;RESTORE R3
(1)  023740  016666  000002  000004             MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
(1)  023746  012616                             MOV     (SP)+,(SP)
(1)  023750  000002                             RTI                     ;;RETURN
(1)  023752     000             8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
(1)  023753     000                     .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
(1)  023754     000             $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
(1)  023755     000             $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
```

```
  (1)  023756  000000                    $OMODE: .WORD   0                ;;NUMBER OF DIGITS TO TYPE
1857
  (1)                                    ;*****************************************************************
  (1)
  (1)                                    .SBTTL  RANDOM NUMBER GENERATOR ROUTINE
  (1)
  (1)                                    ;*THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
  (1)                                    ;*WITH A RANGE OF 0 TO 2(+33)-1.
  (1)                                    ;*CALL:
  (1)                                    ;*      JSR     PC,$RAND        ;;CALL THE ROUTINE
  (1)                                    ;*      RETURN                  ;;RETURN HERE THE RANDOM
  (1)                                    ;*                              ;;NUMBER WILL BE IN
  (1)                                    ;*                              ;;$HINUM,$LONUM
  (1)
  (2)  023760                            $RAND:
  (3)  023760  010046                            MOV     R0,-(SP)        ;;PUSH R0 ON STACK
  (3)  023762  010146                            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
  (3)  023764  010246                            MOV     R2,-(SP)        ;;PUSH R2 ON STACK
  (3)  023766  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
  (1)  023770  013700  024106                    MOV     $LONUM,R0       ;;SET R0 WITH LOW
  (1)  023774  013701  024104                    MOV     $HINUM,R1       ;;SET R1 WITH HIGH
  (1)  024000  012703  177771                    MOV     #-7,R3          ;;SET SHIFT COUNT
  (1)  024004  005002                            CLR     R2              ;;ZERO R2
  (1)  024006  006300                    1$:     ASL     R0              ;;SHIFT R0 LEFT AND
  (1)  024010  006101                            ROL     R1              ;;ROTATE CARRY INTO R1 AND
  (1)  024012  006102                            ROL     R2              ;;ROTATE CARRY INTO R2
  (1)  024014  005203                            INC     R3              ;;CHECK FOR DONE
  (1)  024016  001373                            BNE     1$              ;;CONTINUE SHIFT LOOP
  (1)  024020  063700  024106                    ADD     $LONUM,R0       ;;ADD NUMBER TO MAKE X 129
  (1)  024024  005501                            ADC     R1              ;;PROPOGATE CARRY
  (1)  024026  063701  024104                    ADD     $HINUM,R1       ;;ADD NUMBER TO MAKE X 129
  (1)  024032  005502                            ADC     R2              ;;PROPOGATE CARRY
  (1)  024034  062700  001057                    ADD     #1057,R0        ;;ADD LOW CONSTANT
  (1)  024040  005501                            ADC     R1              ;;PROPOGATE CARRY
  (1)  024042  005502                            ADC     R2              ;;PROPOGATE CARRY
  (1)  024044  062701  047401                    ADD     #47401,R1       ;;ADD HIGH CONSTANT
  (1)  024050  005502                            ADC     R2              ;;PROPOGATE CARRY
  (1)  024052  062702  000006                    ADD     #6,R2           ;;ADD HIGHEST CONSTART
  (1)  024056  060200                            ADD     R2,R0           ;;REPRIME R0 WITH HIGHEST DIGIT
  (1)  024060  005501                            ADC     R1              ;;PROPOGATE CARRY
  (1)  024062  010037  024106                    MOV     R0,$LONUM       ;;SAVE R0
  (1)  024066  010137  024104                    MOV     R1,$HINUM       ;;SAVE R1
  (3)  024072  012603                            MOV     (SP)+,R3        ;;POP STACK INTO R3
  (3)  024074  012602                            MOV     (SP)+,R2        ;;POP STACK INTO R2
  (3)  024076  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
  (3)  024100  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
  (1)  024102  000207                            RTS     PC              ;;RETURN
  (1)  024104  176543                    $HINUM: .WORD   176543
  (1)  024106  123456                    $LONUM: .WORD   123456
1858
  (1)                                    ;*****************************************************************
  (1)
  (1)                                    .SBTTL  TRAP DECODER
  (1)
  (1)                                    ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
  (1)                                    ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
  (1)                                    ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
  (1)                                    ;*GO TO THAT ROUTINE.
```

```
(1)
(1)  024110  010046                $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
(1)  024112  016600  000002                MOV     2(SP),R0        ;;GET TRAP ADDRESS
(1)  024116  005740                        TST     -(R0)           ;;BACKUP BY 2
(1)  024120  111000                        MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
(1)  024122  006300                        ASL     R0              ;;POSITION FOR INDEXING
(1)  024124  016000  024132                MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
(1)  024130  000200                        RTS     R0              ;;GO TO ROUTINE
(1)
(3)
(3)                                 .SBTTL  TRAP TABLE
(3)
(3)                                 ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
(3)                                 ;*BY THE "TRAP" INSTRUCTION.
(3)
(3)                                 ;       ROUTINE
(3)                                 ;       -------
(3)  024132                         $TRPAD:
(3)  024132  023310                        $TYPE   ;;CALL=TYPE     TRAP+0(104400)  TTY TYPEOUT ROUTINE
(3)  024134  023556                        $TYPOC  ;;CALL=TYPOC    TRAP+1(104401)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
(3)  024136  023532                        $TYPOS  ;;CALL=TYPOS    TRAP+2(104402)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
(3)  024140  023572                        $TYPON  ;;CALL=TYPON    TRAP+3(104403)  TYPE OCTAL NUMBER (AS PER LAST CALL)
(3)  024142  012250                        $TYPDS  ;;CALL=TYPDS    TRAP+4(104404)  TYPE DECIMAL NUMBER (WITH SIGN)
(3)  024144  022376                        $RDCHR  ;;CALL=RDCHR    TRAP+5(104405)  TTY TYPEIN CHARACTER ROUTINE
(3)  024146  022432                        $RDLIN  ;;CALL=RDLIN    TRAP+6(104406)  TTY TYPEIN STRING ROUTINE
(3)  024150  022550                        $RDOCT  ;;CALL=RDOCT    TRAP+7(104407)  READ AN OCTAL NUMBER FROM TTY
1859                                ;*****************************************************************
(1)
(1)                                 .SBTTL  POWER DOWN AND UP ROUTINES
(1)
(1)                                 ;POWER DOWN ROUTINE
(1)  024152  012737  024274  000024 $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
(1)  024160  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
(3)  024166  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
(3)  024170  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
(3)  024172  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
(3)  024174  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
(3)  024176  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
(3)  024200  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
(1)  024202  010637  024300                MOV     SP,$SAVR6       ;;SAVE SP
(1)  024206  012737  024220  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
(1)  024214  000000                        HALT
(1)  024216  000776                        BR      .-2             ;;HANG UP
(1)
(1)                                 ;POWER UP ROUTINE
(1)  024220  013706  024300        $PWRUP: MOV     $SAVR6,SP       ;;GET SP
(1)  024224  005037  024300                CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
(1)  024230  005237  024300        1$:     INC     $SAVR6          ;;WAIT FOR THE INC
(1)  024234  001375                        BNE     1$              ;;OF  WORD
(3)  024236  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
(3)  024240  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
(3)  024242  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
(3)  024244  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
(3)  024246  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
(3)  024250  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
(1)  024252  012737  024152  000024        MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
```

```
   (1)  024260  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
   (1)  024266  104400                          TYPE                    ;REPORT THE POWER FAILURE
   (1)  024270  024302                  $PWRMG: .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
   (1)  024272  000002                          RTI
   (1)  024274  000000                  $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
   (1)  024276  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
   (1)  024300  000000                  $SAVR6: 0                       ;;PUT THE SP HERE
   (1)  024302  005015  047520  042527  $POWER: .ASCIZ   <15><12>"POWER"
   (1)  024310  000122
   (1)                                          .EVEN
1860    024312  000000                  BUFFER: 0
1861            000001                          .END
```

```
A       007344          1069#
ADELAY  011462           174    983   1483#
AMSG    011534           155    157    196    265    273    291    312    333    421    425    429    513    554
                         584    587    606    614    683    685    692    697    710    713    729    731    733
                         738    743    758    760    772    777    782    788    801    806    817    822    825
                         830    842    847    850    855    872    878    884    891    900    902    913    920
                         926    933    935    947    997   1027   1069   1074   1077   1082   1089   1092   1097
                        1102   1108   1113   1116   1119   1124   1129   1132   1135   1139   1144   1147   1155
                        1158   1162   1166   1170   1174   1179   1181   1184   1188   1192   1196   1200   1203
                        1208   1213   1354   1357   1501#  1536   1606
ANESC   010756          1268*  1270*  1274   1350#
AXCFF   010750           681*   709*  1298*  1347#
B       007406          1081#
BEGIN   001336            15     94#
BEGIN1  001426            17    107#
BEGIN2  001436            18    109#
BEGIN3  001416            19    105#
BFCHAR  007250          1014   1052#
BFCHR   007210          1008   1014   1033#
BIT0  = 000001            12#  1548   1569
BIT00 = 000001            12#
BIT01 = 000002            12#
BIT02 = 000004            12#
BIT03 = 000010            12#
BIT04 = 000020            12#
BIT05 = 000040            12#
BIT06 = 000100            12#
BIT07 = 000200            12#
BIT08 = 000400            12#  1848
BIT09 = 001000            12#   725   1063   1072   1087   1111   1127   1142
BIT1  = 000002            12#  1546
BIT10 = 002000            12#   752    897
BIT11 = 004000            12#   213    750
BIT12 = 010000            12#  1153   1469
BIT13 = 020000            12#   384    397    601   1850
BIT14 = 040000            12#   747   1848
BIT15 = 100000            12#   678
BIT2  = 000004            12#  1543
BIT3  = 000010            12#
BIT4  = 000020            12#
BIT5  = 000040            12#
BIT6  = 000100            12#
BIT7  = 000200            12#  1545   1550   1573   1577
BIT8  = 000400            12#
BIT9  = 001000            12#
BPTVEC= 000014            12#
BUFFER  024312           338    377    432    496    522    564    608*   609*   616*   617*   626    633*   644
                         663*   664*   665*  1230   1242   1258   1406   1426   1442   1654   1860#
BUSSTR  001332            91#    97
C       007422          1086#
COPTST  005274           727    746#
CRLF    016101           422    426    684    686   1724#
CRLFA   016112           714    823    848   1725#
D       007510          1108#
DCATST  004374           610    618    622#
DDISP = 177570            12#    21
```

```
DELAY   011354          221     270     289     303     309     325     331     372     420     490     518     551     558
                        581     592     611     619     722     745     768     774     784     803     827     852     874
                        893     915     929     943     949    1457#
DH1     020107           27      33    1765#
DH3     020136           39    1766#
DH4     020205           45    1767#
DIG0    011644         1002    1527*   1530#   1585    1597
DIG1    011646         1003    1520*   1531#   1586    1598
DIG2    011650         1004    1513*   1532#   1587    1599
DISPCH  006530          882     952#
DISPLA  001102           21#   1848*   1850*
DSPCH   011070         1370    1374    1375    1379#
DSWR  = 177570           12#     21
DTPSR   011246          277     791    1426#
DTPSRA  011274         1433#   1436
DTPSRB  011252          281     794    1427#
DT1     020254           28      34    1769#
DT3     020264           40    1770#
DT4     020300           46    1771#
E       007560         1124#
EMTVEC= 000030           12#     112*
EM1     017664           26    1760#
EM2     017731           32    1761#
EM3     017760           38    1762#
EM4     020004           44    1763#
EM5     020047           50    1764#
ENAKP   021063         1182    1806#
ENGRAF  021075          734    1809#
ENPNTM  021107          903    1812#
ERRVEC= 000004           12#   1848*
EXAKP   021070         1204    1807#
EXGRAF  021102          744    1810#
EXPNTM  021114          914    1813#
F       007630         1139#
FILBFA  010246         1233#   1235
FILBFB  010232          481    1230#
FILBUF  010226          297     765     811     858     868     940    1229#   1621
FILLWC  012474          268     516     556     779     923    1620#
FINDOT  010770         1320    1356#   1360
FINDTA  011000         1316*   1334*   1358#
FIRLST  011152          863    1406#
FIRST   001240           54#   125*    126     128     137
FNDA    010762         1354#   1363    1365    1371
GBBUF   011312          736    1442#
GENER   004460          635#    639     641     662     669
GENRX   004544          646     650#    654     656
GETCHR  012536          160     163     166     999    1216    1359    1539    1632#
GIN     001444          104     106     108     110#
GINA    001452          100     111#
GNS   = ****** U         15    1858
GOAPMD  017373          761     936    1754#
GODSHS  017345          711    1753#
GOHDSC  017317          698    1752#
GONAPM  017400          773     948    1755#
GOPRNT  017271          783     802     818     826     843     851     873     892     927    1751#
GRPHST  005200          726     728#
```

```
HOMERS  016121            730    1727#
IGNORE  010760            113*   1026*  1285   1319*  1322   1340*  1351#
IOTVEC= 000020             12#    112*   115*
KRBDON  010156           1154    1178   1208#
KRBECH  010172            105    1212#
KRBECO  007022            109     996#
KRBTST  007316            107    1063#  1210
LAST    001242             56#    129*   133*   134    983
LASTCH  001306             80#    212*   215*   306    328    820    845    911    1248
LASTLN  001260             69#    201*   206*   640
LBMT    002706            338#
LBMT1   003056            356     371#
LCM     003066            376#
LIC     010262            318     835    906    1242#
LICA    010300           1246#   1252
LICB    010316           1249    1251#
LODERL  003730            522#
LODERS  004106            562#
LOOP    010742            114*   1315*  1333*  1344#  1845
LRL     003350            432#
LTAB    003620            448     452    456    460    464    468    472    495#
MANFU   001376             20     101#
MASK1   012244           1541*   1545*  1553   1613#
MASK2   012246           1542*   1550*  1552   1573*  1577*  1594   1614#
MKB     014005           1070    1682#
MKBA    014074           1537    1684#
MKBB    014163           1078    1117   1133   1148   1685#
MKBB2   014300           1075    1114   1130   1145   1687#
MKBC    014363           1083    1688#
MKBD    014422           1093    1689#
MKBD2   014527           1090    1691#
MKBE    014615           1098    1692#
MKBF    014735           1103    1694#
MKBG    014773           1109    1695#
MKBGA   015042           1125    1696#
MKBH    015112           1140    1697#
MKBI    015153           1159    1185   1698#
MKBJ    015206           1163    1189   1699#
MKBK    015241           1167    1193   1700#
MKBL    015275           1171    1197   1701#
MKBM    015330           1175    1201   1702#
MKBN    015364           1156    1703#
MKBQ    015457           1607    1705#
MKBQA   015524           1597*   1598*  1599*  1708#
MKBQB   015543           1585*   1586*  1587*  1711#
MKBQ1   015520           1601*   1707#
MKBQ2   015537           1592*   1710#
MKBR    015552           1209    1712#
MKB1    014041           1120    1136   1683#
MKB52   015413           1180    1704#
MKE     015620            998    1714#
MKEA    016025           1028    1720#
MKEA1   016036           1015*   1016*  1021*  1022*  1024*  1025*  1721#
MKEB    016043           1002*   1003*  1004*  1722#
MKEH    016052           1214    1723#
MOVDN1  003022            342     359#   362
```

```
MOVDWN  003016            349     358#
MOVRIG  003040            343     345     346     350     352     353     365#
MPTCNT  013644            901    1679#
MPTSCN  013713            921    1680#
MQ0     017C75           1316    1748#
MQ1     017162           1334    1358    1749#
MQ2     017250           1355    1750#
MSCOPE  022710            115    1843#
MSGTND  005010            629     678#
MSGTXT  004670            627     676#
MSGTYP  002350            194     251#
MTEXT0  021352            885     952    1829#
MTEXT1  021456            953    1830#
MTEXT2  021557            954    1831#
MTEXT3  021661            955    1832#
MTEXT4  021744            956    1834#
MTEXT5  022046            957    1835#
MTEXT6  022147            958    1836#
MTEXT7  022201            959    1837#
MTEXT8  022301            960    1838#
MTOB    012614           1502    1653#
M91     012731            266     778    1664#
M910    013222            514    1670#
M911    013253            555    1671#
M912    013306            585    1672#
M914    013342            156    1673#
M92     012777            274     789    1665#
M920    013407            856    1674#
M921    013437            879    1675#
M922    013473            693    1676#
M9221   013530            732    1677#
M923    013605            759    1678#
M923A   013750            934    1681#
M93     013026            292     807    1666#
M94     013070            313     831    1667#
M96     013121            334    1668#
M97     013154            430    1669#
M98     017427            607     615    1756#
NOWEOP  006762            983     984#
OCTAL   011554           1001    1510#   1584    1596
OVRAL   004666            624*    668*    675#
PASHED  017617            983    1759#
PATH    016127            588    1728#
PC     =%000007            12#     160*    163*    166*    174*    221*    268*    270*    285*    289*    297*    299*    303*
                          309*    321*    325*    331*    342*    343*    345*    346*    349*    350*    352*    353*    363*
                          369*    371*    372*    419*    420*    446*    450*    454*    458*    462*    466*    470*    474*
                          481*    489*    490*    516*    518*    549*    551*    556*    558*    580*    581*    592*    610*
                          611*    618*    619*    667*    670*    722*    736*    737*    745*    765*    767*    768*    774*
                          779*    784*    797*    803*    811*    812*    827*    837*    852*    858*    859*    860*    863*
                          864*    868*    869*    870*    874*    893*    909*    915*    923*    929*    940*    942*    943*
                          949*    983*    999*   1001*   1079*   1084*   1094*   1099*   1104*   1118*   1134*   1149*   1160*
                         1164*   1168*   1172*   1176*   1186*   1190*   1194*   1198*   1202*   1216*   1237*   1342*   1359*
                         1422*   1453*   1478*   1494*   1504*   1528*   1539*   1558*   1584*   1596*   1621*   1624*   1627*
                         1639*   1646*   1850*   1852*   1854*   1857*
PIRQ   = 177772            12#
PIRQVE= 000240             12#
```

```
PNTWID  001314            83#   907
PRNTST  006254           749    894#
PRTCNT  001272            74#    99*   102*   754    756*   984    986*
PR0     =  000000         12#
PR1     =  000040         12#
PR2     =  000100         12#
PR3     =  000140         12#
PR4     =  000200         12#
PR5     =  000240         12#
PR6     =  000300         12#
PR7     =  000340         12#
PS      =  177776         12#   112*  1854
PSW     =  177776         12#
PTCT    001246            58#   756
PWRVEC=  000024           12#   112*  1859*
RBEGIN  001402            16    102#
RDCHR   =  104405       1841    1858#
RDLIN   =  104406       1842    1859#
RDOCT   =  104407        124     132   1858#
RESVEC=  000010           12#
REVLF   021056           739    1804#
RFI     017070           158    1747#
ROW1    020350          1777    1781#
ROW1C   020764          1777    1800#
ROW1S   020672          1777    1795#
ROW1D   021200          1173    1823#
ROW1DA  021330          1199    1828#
ROW12   020520          1778    1788#
ROW12C  021020          1778    1801#
ROW12S  020726          1778    1796#
ROW2    020404          1777    1782#
ROW22   020556          1778    1789#
ROW3    020442          1777    1783#
ROW32   020614          1778    1790#
ROW4    020472          1777    1784#
ROW42   020646          1778    1791#
ROW5    020516          1101    1785#
ROW6    021122          1157    1819#
ROW6A   021206          1183    1824#
ROW7    021142          1161    1820#
ROW7A   021226          1187    1825#
ROW8    021154          1165    1821#
ROW8A   021254          1191    1826#
ROW9    021166          1169    1822#
ROW9A   021302          1195    1827#
RSTRT   001724           139#   983
R0      =%000000          12#   139*   141*   143*   145*   147*   162    165    168    192*   183    185    196
                         189*   193    194    338*   339*   344*   347*   348*   351*   354*   355*   359*   360*
                         366*   377*   378*   379*   382*   386*   387*   391*   394*   395*   399*   400*   404*
                         407*   408*   410*   411*   414*   415*   416*   417*   418*   432*   433*   436*   437*
                         442*   443*   444*   483*   484*   485*   488*   500*   503*   522*   523*   524*   527*
                         528*   538*   539*   542*   546*   564*   565*   569*   570*   573*   574*   576*   626*
                         628*   636*   651*   983*  1005*  1007*  1009   1018   1020*  1021   1025   1218   1230*
                        1231*  1232*  1233*  1236*  1242*  1244*  1245*  1253*  1258*  1361*  1362   1364   1366*
                        1367*  1368   1369*  1370   1374   1375   1406*  1407*  1408*  1409*  1410*  1411*  1415*
                        1418*  1419*  1420*  1421*  1426*  1431*  1432*  1437*  1442*  1445*  1452*  1510   1514
```

```
                    1521    1553*   1554    1583    1588*   1589    1591*   1592    1593*   1594*   1595    1600*   1601
                    1616*   1637*   1653*   1655    1842*   1852*   1854*   1857*   1858*   1859*
R1      =%000001      12#     140*    141     142     143     144     145     146     147     296*    317*    340*    341*
                     358*    361*    365*    367*    376*    380*    383*    388*    392*    396*    401*    405*    409*
                     412*    434*    440*    480*    482*    486*    497*    506*    627*    628     629     764*    810*
                     834*    857*    867*    905*    939*    1008*   1009    1011    1014*   1015    1016    1233    1246
                    1247*   1248    1250*   1264*   1266    1271    1427*   1433    1443*   1445    1446*   1447    1449*
                    1510*   1511*   1512*   1513    1514*   1515*   1516*   1517*   1518*   1519*   1520    1521*   1522*
                    1523*   1524*   1525*   1526*   1527    1616*   1620*   1654*   1655*   1842*   1857*   1859*
R2      =%000002      12#     435*    438*    477*    478*    479*    496*    498*    499*    502*    505*    508*    509*
                     510*    1071*   1081*   1086*   1096*   1101*   1110*   1126*   1141*   1157*   1161*   1165*   1169*
                    1173*   1183*   1187*   1191*   1195*   1199*   1229*   1234*   1243*   1251*   1412*   1413*   1414*
                    1416*   1428*   1434    1444*   1450*   1551    1556    1563    1593    1616*   1842*   1857*   1859*
R3      =%000003      12#     1065*   1067*   1071    1081    1086    1096    1110    1126    1141    1429*   1430*   1435*
                    1616*   1841*   1856*   1857*   1859*
R4      =%000004      12#     728*    740*    881*    882     886     1444    1856*   1859*
R5      =%000005      12#     155*    157*    196*    265*    273*    277*    281*    291*    312*    318*    333*    421*
                     425*    429*    448*    452*    456*    460*    464*    468*    472*    495     511*    513*    554*
                     584*    587*    606*    614*    683*    685*    692*    697*    710*    713*    729*    731*    733*
                     738*    743*    758*    760*    772*    777*    782*    788*    791*    794*    801*    806*    817*
                     822*    825*    830*    835*    842*    847*    850*    855*    872*    878*    884*    891*    900*
                     902*    906*    913*    920*    926*    933*    935*    947*    997*    1027*   1069*   1074*   1077*
                    1082*   1089*   1092*   1097*   1102*   1108*   1113*   1116*   1119*   1124*   1129*   1132*   1135*
                    1139*   1144*   1147*   1155*   1158*   1162*   1166*   1170*   1174*   1179*   1181*   1184*   1188*
                    1192*   1196*   1200*   1203*   1208*   1213*   1254*   1354*   1357*   1438*   1501    1502*   1505*
                    1536*   1606*   1616*   1653    1657*   1856*   1859*
R6      =%000006      12#     112*
R7      =%000007      12#
SAVE1     001320      85#     495*    500
SAVE2     001322      86#     165*    170*    177     1770
SAVE3     001324      87#     168*    171*    183     1770
SAVE4     001326      88#      95*    110*    116      162*    169*    175     1770
SBEGIN    001716     117      121     137#    991
SET       004664     625*    631*    644*    647*    659*    660     674#
SP      =%000006      12#      91     112*    125     133     983*    988*    996*    1068*   1212*   1356*   1616*   1638*
                    1841*   1842*   1848*   1850    1852*   1854*   1856*   1857*   1858*   1859*
STACK   = 001100      12#     112     996     1068    1212    1356
STCHAR    001304      79#     293*    296     305*    306     314*    317     327*    328     808*    810     819*    820
                     832*    834     844*    845     904*    905     910*    911
STKLMT= 177774        12#
SUBTST    001254      62#    1457    1483
SWR       001100      21#     120     750     752     1304    1469    1543    1546    1548    1569    1843    1848    1850
SW0     = 000001      12#
SW00    = 000001      12#
SW01    = 000002      12#
SW02    = 000004      12#
SW03    = 000010      12#
SW04    = 000020      12#
SW05    = 000040      12#
SW06    = 000100      12#
SW07    = 000200      12#
SW08    = 000400      12#
SW09    = 001000      12#
SW1     = 000002      12#
SW10    = 002000      12#
SW11    = 004000      12#
```

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SW12   = 010000            12#
SW13   = 020000            12#
SW14   = 040000            12#
SW15   = 100000            12#
SW2    = 000004            12#
SW3    = 000010            12#
SW4    = 000020            12#
SW5    = 000040            12#
SW6    = 000100            12#
SW7    = 000200            12#
SW8    = 000400            12#
SW9    = 001000            12#
TBITVE= 000014             12#
TCRLF  = 000200           1854#
TEMP    001310             81#   275*   286*   586*   590*   790*   798*   861*   862*   865*
TEMPO   001312             82#   295*   301*   304*   316*   323*   326*   735*   741*   763*   769*   809*   813*
                          815*   833*   838*   840*   938*   944*
THT    = 000011           1854#
TIME0   001252             61#  1276    1632
TIME1   012610           1276*  1282*  1632*  1643*  1648#
TIME2   012612           1277*  1280*  1633*  1641*  1649#
TITLE   012630            119   1663#
TKVEC  = 000060             12#
TOTALC  001262             70#   199*   204*   624
TPVEC  = 000064             12#
TRAPVE= 000034              12#   112*
TRTVEC= 000014              12#
TSTNUM  001250              59#  1769    1771   1850*
TSTROW  011652            1079   1084    1094   1099   1104   1118   1134   1149   1160   1164   1168   1172   1176
                          1186   1190    1194   1198   1202   1536#
TST1    001760              94    103     149    154#   983    987   1379
TST10   003710             491    512#   1386
TST11   004066             553#  1387
TST12   004214             583#  1388
TST13   004252             594#  1389
TST14   005012             603    680#   1390
TST15   005162             689    691     724#  1391
TST16   005274             746#  1392
TST17   005444             776#  1393
TST2    002400             222    263#   1380
TST20   005500             787#  1394
TST21   005570             805#  1395
TST22   005722             829#  1396
TST23   006056             854#  1397
TST24   006200             876#  1398
TST25   006256             896#  1399
TST26   006370             917#  1400
TST27   006424             931#  1401
TST3    002420             272#  1381
TST30   007020             995#  1402
TST31   007314            1062#  1403
TST32   010170            1211#
TST4    002474             290#  1382
TST5    002574             311#  1383
TST6    002676             332#  1384
TST7    003340             424    428#   1385
```

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TYPDS = 104404          983   989  1858#
TYPE  = 104400          118   122   130   983   990  1616  1841  1842  1850  1852  1856  1858#  1859
TYPEPT  002316          183   186   193   235#
TYPOC = 104401         1852  1858#
TYPON = 104403         1858#
TYPOS = 104402         1858#
VHD     001264           71#   200*  205*  208   295   304   316   326   525   568   625   763   809
                        815   833   840   938  1622
VH1     001266           72#   208*  209*  210   275   340   358   376   396   586   790   861  1413
VH2     001270           73#   210*  211*
VTIB    001276           76#  1287  1637
VTIS    001274           75#   139  1272  1278  1603  1635
VTNOW   001244           57#   137*  140   983*  1769  1770  1771
VTOB    001302           78#  1218*  1271*
VTOS    001300           77#  1219  1259  1261
VT5XX   001256           68#   193*  202   213   384   397   423   532   601   612   690   725   747
                        897  1063  1072  1087  1111  1127  1142  1153  1177
VT50A   016376          197   251  1733#
VT50B   016450          252  1735#
VT50H   016565          254  1739#
VT52K   016643          255  1741#
VT52L   016726          256  1743#
VT52M   017007          257  1745#
VT55    016517          253  1737#
V50RW   020314         1067  1777#
V52RW   020332         1065  1778#
WFTEST  001330           89#   96*  101*  172   604   688   983  1459
WHAT0   017475          123  1757#
WHAT1   017540          131  1758#
WHERE   001756           94*  103*  105*  107*  109*  148   149*  983*  987*
WIDTH   001316           84#   319   477   482   562   836  1229  1412  1429
XADDS   004662          657*  664   673#
XOFF  = 000023           64#  1293
XOFFBR  010744          696*  708*  1299  1317*  1341*  1345#
XOFFOK  010746          695*  766*  771*  781*  800*  816*  824*  941*  949*  871**  890*  908*  925*
                        941*  946*  1296  1318*  1339*  1346#  1623*
XOFFRC  010752          682*  700   1295*  1348#
XON   = 000021           65#  1289
XONRC   010754          707*  716  1291*  1349#
XPRNT   010330          285   299   321   371   419   446   450   454   458   462   466   470   474
                        489   549   580   667   737   767   797   812   837   859   860   864   869
                        870   909   942  1258#  1504  1624
XPRNTA  010334         1259#  1262  1273  1275  1292  1300  1329
XPRNTB  010352         1260  1264#
YADDS   004660          642*  663   672#
$BDADR  001126           21#
$BDDAT  001132           21#   112  1287*  1288*  1289  1293  1307  1310  1583*  1771
$CHARC  023526         1854#*
$CMTAG  001104           21#   112
$CM1  = 000002           21#
$CM2  = 000004           21#
$CM3  = 000002           21#
$CRLF   001165           21#  1841  1842  1850  1852  1854
$DBLK   012464         1616#
$DISPL  001140           21#
$DOAGN  006736          983#
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$DTBL   012454          1616#
$ENDAD  006726           983#   1850
$ENDCT  006674           112     983#
$ENDMG  006742           983#
$ENULL  006757           983#    990
$EOP    006556           899     951    983#
$EOPCT  006666           112*    983#
$ERFLG  001107            21#   1848*  1850*
$ERMAX  001121            21#   1848
$ERROR  023042           112    1850#
$ERRPC  001122            21#   1769   1770   1771   1850*  1852
$ERRTB  001170            21#   1852
$ERRTY  023154          1850    1852#
$ERTTL  001116            21#    988   1850*
$FILLC  001154            21#   1854
$FILLS  001153            21#   1854
$GDADR  001124            21#
$GDDAT  001130            21#   1302*  1306*  1307   1309*  1310   1595*  1771
$GET42  006716           983#
$HD   = 000000            11
$HINUM  024104           623*   1857#*
$HIOCT  022706          1842#*
$ICNT   001110            21#
$ILLUP  024274          1859#
$ITEMB  001120            21#   1850*  1852
$LF     001166            21#   1841   1842   1850   1854
$LONUM  024106           622*    636    651   1857#*
$LPADR  001112            21#    112*  1374*  1848*
$LPERR  001114            21#
$MAIL = ****** U          112     154    263    272    290    311    332    428    512    553    583    594    680
                          724     746    776    787    805    829    854    876    896    917    931    995   1062
                         1211    1848   1850   1854
$NULL   001152            21#   1854
$NWTST= 000001           154#    263#   272#   290#   311#   332#   428#   512#   553#   583#   594#   680#   724#
                         746#    776#   787#   805#   829#   854#   876#   896#   917#   931#   995#  1062#  1211#
$OCNT   023754          1856#*
$OMODE  023756          1856#*
$OVER   023026          1846    1848#
$PASS   001104            21#    983*
$POWER  024302          1859#
$PWRDN  024152           112    1859#
$PWRMG  024270          1859#
$PWRUP  024220          1859#
$QUES   001164            21#   1841   1842   1850
$RAND   023760           635     650   1857#
$RDCHR  022376          1841#   1858
$RDDEC= ****** U        1858
$RDLIN  022432          1841#   1858
$RDOCT  022550          1842#   1858
$RDSZ = 000010          1841#
$REGAD  001156            21#
$REGO   001160            21#
$REG1   001162            21#
$R2A  = ****** U        1858
$SAVRE= ****** U        1858
$SAVR6  024300          1859#*
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$SCOPE  022724          112   1844   1848#
$SETUP= 000037           23#    112    983   1850
$STUP = ;77777           23#
$SVLAD  023012         1848#
$SWR  = 160400            5#     11     14     21    112    154    263    272    290    311    332    428    512
                        553    583    594    680    724    746    776    787    805    829    854    876    896
                        917    931    983    995   1062   1211   1848   1850   1859
$SWREG  001136           21#
$SWRMK= 000000           14   1848
$TKB    001144           21#   1841
$TKS    001142           21#   1603   1841
$TN   = 000033            6#     11    154#    222    263#    272#    290#    311#    332#    424    428#    491    512#
                        553#    583#    594#    680#    689     691     724#    746#    776#    787#    805#    829#    854#
                        876#    896#    917#    931#    995#   1062#   1211#
$TPB    001150           21#   1854*
$TPFLG  001155           21#   1854
$TPS    001146           21#   1854
$TRAP   024110          112    1858#
$TRP  = 000010         1858#
$TRPAD  024132         1858#
$TSTNM  001106           21#    983*   1368*   1848*   1850
$TTYIN  022540         1841#
$TYPBN= ****** U       1858
$TYPDS  012250         1616#   1858
$TYPE   023310         1854#   1858
$TYPEC  023462         1854#
$TYPEX  023530         1854#
$TYPOC  023556         1856#   1858
$TYPON  023572         1856#   1858
$TYPOS  023532         1856#   1858
$XTSTR  022734         1848#
$OFILL  023755         1856#*
$40CAT= ****** U       1848   1850
.     = 024314           15#     21#    112    983   1616#   1768#   1818#   1841#   1842   1848   1850   1852#   1854
                       1859
```

```
ANYMOR   964#   983
COMMEN    12#
ENDCOM    12#
ERROR     12#    92   188   218   703   719  1263  1324  1608  1645
ESCAPE    12#
MULT      12#
NEWTST    12#   154   263   272   290   311   332   428   512   553   583   594   680   724   746
           776   787   805   829   854   876   896   917   931   995  1062  1211
POP       12#  1616  1842  1857  1859
PUSH      12#  1616  1842  1857  1859
SCOPE     12#   154   263   272   290   311   332   428   512   553   583   594   680   724   746
           776   787   805   829   854   876   896   917   931   983   995  1062  1211
SETTRA   1859#
SETUP     12#   112
SKIP      12#   161   164   167   216   222   356   424   491   602   613   620   689   691   748
          1000  1154  1308  1540
SLASH     12#
SPACE     12#
STARS     12#    21   154   263   272   290   311   332   428   512   553   583   594   680   724
           746   776   787   805   829   854   876   896   917   931   983   995  1062  1211  1616
          1841  1842  1848  1850  1852  1854  1856  1857  1858  1859
TRMTRP   1858#
TYPBIN    12#
TYPDEC    12#   983
TYPNUM    12#
TYPOCS    12#
TYPOCT    12#  1852
TYPTXT    12#
$$CMRE    21#
$$CMTM    21#
$$ESCA    12#
$$NEWT    12#   154   263   272   290   311   332   428   512   553   583   594   680   724   746
           776   787   805   829   854   876   896   917   931   995  1062  1211
$$SET    1858#
$$SKIP    12#   222   424   491   689   691
.EQUAT     7#    12
.HEADE     7#    11
.SETUP     8#    23
.SWRHI     9#    14
.SWRLO    14#
.$CATC     7#    15
.$CMTA     7#    21
.$EOP      7#   983
.$ERRO     7#  1850
.$ERRT     9#  1852
.$PARM     8#
.$POWE     8#  1859
.$RAND     9#  1857
.$RDOC     9#  1842
.$READ     8#  1841
.$SAVE     8#
.$SCOP     8#  1848
.$SPAC     8#
.$SWDO     8#
.$TRAP     8#  1858
.$TYPD     9#  1616
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.$TYPE      7#      8#   1854
.$TYPO      7#   1856
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DZVTCC.P13 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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ADC     1857
ADD      206   215   647   659   862   983  1014  1020  1512  1519  1526  1616  1638  1842  1852
        1854  1856  1857
ASL      204   205  1369  1842  1852  1857  1858
ASLB    1616
ASR      209   211   534   563  1430  1461  1462  1463  1485  1486
BCC     1565  1576  1616
BCS     1572
BEQ      173   184   195   214   385   398   501   646   753   883   983  1010  1064  1073  1088
        1112  1128  1143  1154  1178  1297  1308  1371  1460  1544  1547  1549  1570  1604  1842
        1848  1850  1852  1854  1856
BGE     1854
BGT      983  1616  1842  1856
BHI      127   641   656  1019  1363  1590
BIC      169   170   171   637   652   983  1005  1288  1361  1366  1511  1513  1525  1545  1553
        1588  1600  1841  1842  1856
BIS     1550  1552  1573  1577  1594  1616  1856
BISB     666  1852
BIT      213   384   397   601   725   747   750   752   897  1063  1072  1087  1111  1127  1142
        1153  1177  1469  1543  1546  1548  1569  1848  1850
BITB    1854
BLO     1365
BLOS     639   654  1841
BLT     1616  1842  1854  1856
BMI      530   572   662   691  1260  1265  1279  1616
BNE      112   117   176   178   187   287   302   307   324   329   362   381   402   406   487
         504   541   591   602   605   613   630   632   649   669   689   701   717   726   742
         748   751   755   799   814   821   839   846   866   898   912   983  1006  1012  1235
        1249  1252  1267  1275  1281  1283  1286  1290  1294  1300  1311  1323  1448  1451  1470
        1472  1488  1555  1568  1616  1626  1642  1841  1846  1848  1850  1852  1854  1856  1857
        1859
BPL      121   203   368   389   393   413   424   439   441   507   533   567   770   945   985
        1220  1262  1273  1305  1417  1436  1474  1490  1557  1616  1636  1644  1656  1841  1844
        1850  1854  1856
BR       100   104   106   108   161   164   167   216   219   222   356   390   403   491   543
         575   577   620   887  1000  1013  1017  1023  1029  1066  1076  1091  1115  1131  1146
        1217  1221  1269  1284  1292  1301  1303  1360  1540  1574  1578  1609  1616  1841  1842
        1848  1852  1854  1856  1859
CLR       95    96    99   102   112   113   114   129   136   182   189   681   682   707   708
         881   983  1270  1277  1317  1318  1319  1333  1339  1340  1341  1458  1484  1542  1562
        1616  1633  1842  1852  1856  1857  1859
CLRB    1616  1841  1842  1848  1854
CMP       91   112   126   306   328   629   638   640   653   655   820   845   911   983  1248
        1289  1293  1307  1310  1603  1616  1841  1848  1850
CMPB     175   177   183   612  1009  1018  1266  1362  1364  1447  1554  1589  1841  1842  1848
        1854
DEC      286   301   323   341   361   367   380   388   392   401   405   412   438   440   478
         479   486   503   506   526   529   540   566   571   590   631   648   668   740   741
         769   798   813   838   865   944   983  1234  1251  1280  1282  1367  1414  1416  1435
        1450  1471  1473  1487  1489  1625  1641  1643  1852
DECB     986  1854  1856
EMT       12
HALT      15  1850  1854  1859
INC      101   305   327   819   844   910   983  1007  1026  1247  1268  1291  1295  1446  1566
        1616  1850  1856  1857  1859
INCB    1848  1850  1854
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JMP      15   16   17   18   19   20  148  603  727  749  899  951  983  991 1210
        1320 1329 1335 1375
JSR     155  157  160  163  166  174  196  221  265  268  270  273  277  281  285
        289  291  297  299  303  309  312  318  321  325  331  333  342  343  345
        346  349  350  352  353  371  372  419  420  421  425  429  446  448  450
        452  454  456  458  460  462  464  466  468  470  472  474  481  489  490
        513  516  518  549  551  554  556  558  580  581  584  587  592  606  610
        611  614  618  619  635  650  667  683  685  692  697  710  713  722  729
        731  733  736  737  738  743  745  758  760  765  767  768  772  774  777
        779  782  784  788  791  794  797  801  803  806  811  812  817  822  825
        827  830  835  837  842  847  850  852  855  858  859  860  863  864  868
        869  870  872  874  878  884  891  893  900  902  906  909  913  915  920
        923  926  929  933  935  940  942  943  947  949  983  997  999 1001 1027
       1069 1074 1077 1079 1082 1084 1089 1092 1094 1097 1099 1102 1104 1108 1113
       1116 1118 1119 1124 1129 1132 1134 1135 1139 1144 1147 1149 1155 1158 1160
       1162 1164 1166 1168 1170 1172 1174 1176 1179 1181 1184 1186 1188 1190 1192
       1194 1196 1198 1200 1202 1203 1208 1213 1216 1354 1357 1359 1502 1504 1536
       1539 1584 1596 1606 1621 1624 1850 1854
MOV      94   97   98  103  105  107  109  110  112  115  125  133  135  137  139
        140  141  143  145  147  162  165  168  193  194  199  200  201  208  210
        212  275  293  295  296  304  314  316  317  326  338  339  340  358  365
        376  377  383  396  409  432  434  435  477  480  482  495  496  497  500
        522  525  531  562  564  568  586  622  623  624  625  626  627  628  633
        636  642  643  644  651  657  660  695  696  709  728  735  756  763  764
        766  771  781  790  800  808  809  810  815  816  824  832  833  834  840
        841  849  857  861  867  871  882  890  904  905  908  925  938  939  941
        946  983  987  988  996 1008 1065 1067 1068 1071 1081 1086 1096 1101 1110
       1126 1141 1157 1161 1165 1169 1173 1183 1187 1191 1195 1199 1212 1229 1230
       1242 1243 1250 1258 1276 1287 1298 1302 1306 1309 1315 1316 1334 1356 1374
       1406 1412 1426 1427 1428 1429 1442 1443 1444 1449 1457 1483 1501 1510 1514
       1521 1541 1551 1563 1583 1593 1595 1616 1620 1622 1623 1632 1637 1653 1654
       1841 1842 1848 1850 1852 1854 1856 1857 1858 1859
MOVB     344  347  348  351  354  355  359  360  366  378  379  382  386  387  391
        394  395  399  400  404  407  408  410  411  414  415  416  417  418  433
        436  437  442  443  444  483  484  485  488  498  499  502  505  508  509
        510  523  524  527  528  538  539  542  546  565  569  570  573  574  576
        608  609  616  617  663  664  665 1002 1003 1004 1015 1016 1021 1022 1024
       1025 1218 1231 1232 1233 1236 1244 1245 1246 1253 1264 1271 1368 1407 1408
       1409 1410 1411 1415 1418 1419 1420 1421 1431 1432 1433 1434 1437 1445 1452
       1513 1520 1527 1585 1586 1587 1591 1592 1597 1598 1599 1601 1616 1655 1841
       1842 1850 1854 1856 1858
NEG     1616 1856
NOP      220  535  536  537  894  983 1325 1326 1327 1328 1372 1373 1464 1465 1466
       1467 1468 1475 1476 1477 1491 1492 1493
RESET    111  983
ROL     1522 1523 1842 1856 1857
ROR     1515 1516 1517 1564 1571 1575
RTI     1616 1841 1842 1848 1850 1854 1856 1859
RTS      363  369  511  670 1237 1254 1342 1422 1438 1453 1478 1494 1505 1528 1558
       1627 1639 1646 1657 1852 1854 1857 1858
SUB      645  658 1413 1616 1850
SWAB    1524
TRAP    1858
TST      116  128  134  142  144  146  172  185  202  423  532  604  688  690  700
        716  886  983  984 1011 1261 1274 1285 1296 1299 1322 1370 1459 1556 1616
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        1842  1845  1848  1850  1852  1854  1856  1858
TSTB     120   186   661   754  1219  1259  1272  1278  1304  1567  1616  1635  1841  1843  1854
.ASCII    21   676   677  1052  1053  1054  1055  1056  1057  1058  1059  1682  1685  1689  1692
        1695  1696  1697  1698  1699  1700  1701  1702  1703  1704  1705  1706  1709  1714  1716
        1720  1728  1729  1730  1731  1733  1735  1737  1739  1741  1743  1745  1838
.ASCIZ    21   983  1663  1664  1665  1666  1667  1668  1669  1670  1671  1672  1673  1674  1675
        1676  1677  1678  1679  1680  1681  1683  1684  1686  1687  1688  1690  1691  1693  1694
        1712  1718  1723  1748  1749  1750  1752  1753  1756  1757  1758  1759  1760  1761  1762
        1763  1764  1765  1766  1767  1829  1830  1831  1832  1834  1835  1836  1837  1852  1859
.BLKB   1841
.BLKW   1616
.BYTE     21   983  1707  1708  1710  1711  1715  1717  1719  1721  1722  1724  1725  1727  1732
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        1810  1812  1813  1839  1841  1856
.ENABL     4
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         689   691   724   746   748   776   787   805   829   854   876   896   917   931   983
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        1857  1858  1859
.EQUIV    12
.EVEN   1061  1768  1818  1840  1852  1859
.IF       11    12    14    15    21    23   112   154   161   164   167   216   222   263   272
         290   311   332   356   424   428   491   512   553   583   594   602   613   620   680
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        1857  1858  1859
.IFF      12    14    21   112   154   161   164   167   216   222   263   272   290   311   332
         356   424   428   491   512   553   583   594   602   613   620   680   689   691   724
         746   748   776   787   805   829   854   876   896   917   931   983   995  1000  1062
        1154  1211  1308  1540  1616  1841  1842  1848  1850  1852  1854  1856  1857  1858  1859
.IFT    1841  1842  1848  1850
.IFTF   1841  1842  1848  1850
.IIF      11    14    15    21   112   983  1841  1842  1848  1850  1852  1854  1858
.IRP      23   154   263   272   290   311   332   428   512   553   583   594   680   724   746
         776   787   805   829   854   876   896   917   931   983   995  1062  1211  1616  1842
        1850  1857  1859
.LIST      2    10    12    14    15    21    23    67   153   154   263   272   290   311   332
         428   512   553   583   594   680   724   746   776   787   805   829   854   876   996
         917   931   983   994   995  1062  1211  1224  1841  1848  1850  1858
.MACRO    14    21   964  1858
.MCALL     7     8     9    12
.NLIST     1     3    12    14    15    21    23    63   150   154   263   272   290   311   332
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.PAGE     21
.REPT     15    21
.SBTTL    12    14    15    21   151   152   154   263   272   290   311   332   428   512   553
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         993   995  1062  1211  1223  1616  1659  1773  1841  1842  1848  1850  1852  1854  1856
        1857  1858  1859
.TITLE    11
.WORD     15    21   235   236   237   238   239   240   241   983  1781  1782  1783  1784  1785
        1788  1789  1790  1791  1795  1796  1800  1801  1819  1820  1821  1822  1823  1824  1825
        1826  1827  1828  1842  1852  1854  1856  1857  1859
```

```
ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

*,DZVTCC/CRF=DZVTCC.P13
RUN-TIME: 42 28 5 SECONDS
RUN-TIME RATIO: 313/77=4.0
CORE USED:  22K  (43 PAGES)
```

N07.

```
Spooler runtime 13 Seconds, 57 KCS, 372 disk reads, 3 disk writes, 90 pages
[redacted] Date 14-Oct-76 13:18:54 Monitor IPC-0 5078 [103] ***
000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000111111111111111111111111111111111110
00000000011111111112222222222333333333344444444445555555555666666666677777777778888888888999999999900000000001111111111222222222233312
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