

M7142

ACCP TST
CZVTOA0

AH-F208A-MC

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This microfiche card contains a grid of frames, each containing technical data. The data is organized into columns and rows, with some frames containing tables and others containing text. The text is too small to read clearly but appears to be technical specifications or test results. The card is oriented vertically and has a small white mark at the bottom center.

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IDENTIFICATION

PRODUCT CODE:	AC-F207A-MC
PRODUCT NAME:	CZVTOAO M7142 (SERIAL VIDEO BOARD) ACCEPTANCE TEST
PROGRAM DATE:	JANUARY 1979
MAINTAINER:	DIAGNOSTICS - MERRIMACK

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1. ABSTRACT

THIS PROGRAM IS AN ACCEPTANCE TEST OF THE M7142 SERIAL VIDEO BOARD. THE PROGRAM CONSISTS OF FIVE PARTS, ALL OF WHICH REQUIRE OPERATOR INSPECTION OR INTERACTION. THE PROGRAM IS CAPABLE OF HANDLING MULTIPLE UNITS IN A SEQUENTIAL DLV-11 FASHION (REF 8.2).

ONLY ONE M7142 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 BREAK, AND REPEAT 'FUNCTION' KEYS ARE NOT TESTED.

PART 1 CONSISTS OF A SERIES OF TEST PATTERNS DISPLAYED ON THE SCREEN (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 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. SOME NON-PRINTING CHARACTERS (SUCH AS CTRL-C, CTRL-D... OR CR, LF...) HAVE BEEN 'DEFINED' IN THE PROGRAM SO IF ANY OF THESE KEYS ARE DEPRESSED, IT'S TWO LETTER EQUIVALENT 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 M7142 AND THE HOST COMPUTER.

PART 5 IS A CHARACTER ATTRIBUTE TEST (M.S.B. SELETED). A FULL SCREEN OF FIVE BLOCKS (FIVE LINES EACH) IS PRINTED WITH ALTERNATE BLOCKS HAVING ANY ENABLED CHARACTER ATTRIBUTES SELECTED BY SETTING THE MOST SIGNIFICANT BIT (MSB) IN EACH OF THE CHARACTER CODES AS THEY ARE PRINTED.

THIS TEST IS DESIGNED TO TEST THAT M.S.B.=1 IN THE CHARACTER CODE WILL CAUSE ANY ENABLED CHARACTER ATTRIBUTES TO BE SELECTED.

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2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 FAMILY COMPUTER WITH 6K WORDS OF READ/WRITE MEMORY
M7142 SERIAL VIDEO BOARD WITH (SCREEN AND KEYBOARD) CONNECTED
VIA A DLV-11 TYPE INTERFACE.

- "FORM-FEED INIT." MUST BE JUMPER ENABLED.
- "SI/SO CHARACTER ATTRIBUTE SELECTION" MUST BE ENABLED
IN ORDER FOR TEST "F" TO RUN CORRECTLY.
- "MSB SET IN CHAR. CODE TO SELECT CHAR. ATTRIBUTE" MUST BE
ENABLED IN ORDER FOR TEST "M" TO RUN CORRECTLY.
- AT LEAST ONE CHAR. ATTRIBUTE MUST BE SELECTED FOR TESTS
"F" AND "M" TO RUN CORRECTLY.

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	(100000)	HALT ON ERROR
SW 14 = 1	(040000)	LOOP ON PRESENT TEST
SW 13 = 1	(020000)	INHIBIT ERROR TYPEOUTS
SW 12 = 1	(010000)	INHIBIT PROGRAM SUB-TEST DELAY
SW 10 = 1	(002000)	SKIP KEYBOARD CHARACTER TEST (1)
SW 09 = 1	(001000)	SELECT NON-DEFAULT (NON-CONSOLE) ADDRESSES FOR M7142'S BEING TESTED
SW 08 = 1	(000400)	LOOP ON TEST IN SWR <7:0>

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

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174 AND 176 AS A "DISPLAY" REGISTER AND A "SWITCH" REGISTER
RESPECTIVELY. THE OPERATOR WILL BE RESPONSIBLE FOR THE
LOADING OF THE "SWITCH" REGISTER LOCATION PRIOR TO STARTING
OR RESTARTING THE PROGRAM.

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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 FULL KEYBOARD CHAR. 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 STARTING ADDRESS OF THE CHARACTER ATTRIBUTE
TEST (M.S.B. SELECTED)

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 WHICH INCLUDES THE EXECUTION OF A "QUICK" KEYBOARD TEST THAT REQUIRES OPERATOR INTERVENTION UNLESS SW 10 IS SET IN THE SWITCH REGISTER. HOWEVER, IF SW 10 IS NOT SET THE PROGRAM DOES "TIMEOUT" AND PRINT A "TIMEOUT MESSAGE" IF A KEY IS NOT DEPRESSED IN A REASONABLE PERIOD OF TIME.

IF THE M7142 IS NOT THE CONSOLE TERMINAL WITH IT'S FIRST DEVICE ADDRESS AT 177560, THEN SW 09 MUST BE SET TO TELL THE PROGRAM WHERE IT IS. SW 09 MUST ALSO BE SET IF MORE THAN ONE M7142 IS TO BE TESTED.

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6. ERRORS

MOST ERRORS MUST BE DETECTED BY VISUAL INSPECTION OF PATTERNS PRINTED ON THE SCREEN. ONLY THE KEYBOARD TESTS RESULT IN ANY 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 DLV-11 BUS ADDRESS OF M7142 UNDER TEST
TSTNUM- TEST NUMBER OF FAILING TEST
EXPT - EXPECTED INPUT CHARACTER
RCVD - RECEIVED INPUT CHARACTER

7. RESTRICTIONS

THE OPERATOR SHOULD SET SW 09 IF THE M7142 UNDER TEST IS NOT THE CONSOLE TTY, OR NOT AT THE ADDRESS = 177560.

8. MISCELLANEOUS

8.1 EXECUTION TIME

EXECUTION TIME WILL VARY WITH THE "BAUD" RATE, 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. 1222)

THE LOCATION "FIRST" CONTAINS THE FIRST DLV11 ADDRESS IF SEVERAL M7142'S ARE BEING TESTED. THE DEFAULT IS THE CONSOLE ADDRESS <177560>
THE LOCATION "LAST" CONTAINS THE LAST DLV11 ADDRESS IF SEVERAL M7142'S ARE BEING TESTED. LOCATION "VTNOW" CONTAINS THE CURRENT DLV11 BASE ADDRESS. IF SEVERAL M7142'S ARE BEING TESTED, THEIR ADDRESSES ARE ASSUMED TO BE 10 OCTAL BYTES APART.

*NOTE: IF THE LOCS. "FIRST" OR "LAST" 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.

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9. PROGRAM DESCRIPTION <SCREEN>

9.1 A 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. THIS TEST IS USED TO
VISUALLY CHECK THE LINEARITY AND CENTERING OF THE
M7142/CRT SYSTEM.

9.2 B SIMPLE CHARACTER SET

ONE FULL LINE OF EACH CHARACTER
(CODES 40 THRU 176) 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: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

9.3 C 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.

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9.4 D CURSOR MOTION TEST (CR,TAB,LF,BKSP,VT USED)
(FORM-FEED INITIALIZED)

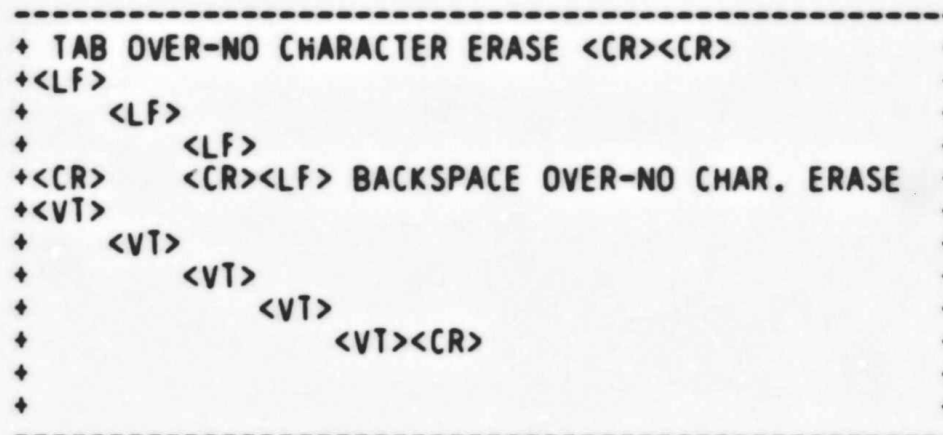
THIS TEST IS THE BASIC CURSOR MOTION TEST USING THE CARRIAGE-RETURN, TAB, LINE-FEED, BACKSPACE, AND VERTICAL TAB CAHRACTERS.

THE FIRST PART OF THE TEST PRINTS A LINE OF TEXT, "CARRIAGE-RETURN'S" BACK TO THE LEFT MARGIN AND THEN "TAB'S" OVER THE TEXT TO BE SURE A "TAB" DOESN'T ERASE CHARACTERS.

THE SECOND PART OF THE TEST MOVES THE CURSOR DOWN BY PRINTING SOME LINE-FEEDS, PRINTS A MESSAGE, AND THEN BACKSPACES OVER THAT MESSAGE TO BE SURE A BACKSPACE DOES NOT ERASE CHARACTERS.

THE THIRD PART OF THE TEST DOES A SERIES OF VERTICAL TABS TO BE SURE THAT A VERTICAL TAB ADVANCES THE CURSOR DOWN THE SCREEN ONE LINE.

THE FOLLOWING DIAGRAM IS WHAT THE SCREEN SHOULD LOOK LIKE WHEN THE TEST IS COMPLETE:



NOTE: "FORM-FEED-INIT." FUNCTION MUST BE ENABLED.

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9.5 3 DIRECT CURSOR ADDRESSING (D.C.A.) FORM-FEED INITIALIZED

THIS TEST WILL BE RUN USING THE 'ESC-Y' SEQUENCE.
THIS TEST WILL RANDOMLY FILL THE SCREEN.
THE END RESULT WILL BE A FULL SCREEN OF 25 STATEMENTS,
EACH STATEMENT ROTATED RIGHT ONE CHAR. WITH RESPECT
TO THE LINE ABOVE IT.

NOTE: "FORM-FEED-INIT." FUNCTION MUST BE ENABLED.

9.6 F CHARACTER ATTRIBUTE TESTS (SO/SI SELECTED)
(FORM-FEED INITIALIZED)

THIS TEST PRINTS A FULL SCREEN OF FIVE BLOCKS (FIVE LINES EACH)
WITH ALTERNATE BLOCKS HAVING ANY ENABLED CHARACTER ATTRIBUTES
SELECTED USING A "SO (CNTRL-N)" TO SELECT CHAR. ATTRIBUTES AND
"SI (CNTRL-O)" TO DESELECT CHAR. ATTRIBUTES.

NOTE: THE ABILITY TO SELECT CHAR. ATTRIBUTES USING SO/SI
----- AND AT LEAST ONE CHAR. ATTRIBUTE MUST BE ENABLED.

9.7 G SCROLL SPEED JUMP TESTS (FORM-FEED INTIALIZED)

THIS TEST USES SETS OF VERTICAL TABS TO TEST THE
SCROLLING ABILITIES OF THE M7142. THE SCREEN IS
FIRST FILLED WITH 25 LINES OF SINGLE CHARACTERS ACROSS
ALL COLUMNS. THE TOP LINE WILL CONTAIN ALL A'S AND
THE BOTTOM LINE SHOULD BE A SERIES OF Y'S AND A SCROLL COUNT
AT THE RIGHT END OF THE LAST LINE. THEN 3 SETS OF 25
VERTICAL TABS ARE SENT (WITH A DELAY BETWEEN SETS) TO SEE
IF THE SCREEN SCROLLS CORRECTLY. AFTER EACH SET OF VERTICAL
TABS, THE TOP LINE SHOULD STILL BE ALL A'S, BUT NOW THE BOTTOM
LINE SHOULD BE A SERIES OF Y'S AND THE "SCROLL-COUNT" WILL BE
INCREMENTED.

9.8 H COLUMN ADDRESS TEST

THIS TEST PRINTS 25 LINES OF A FULL LINE OF AN INCREMENTING
CHARACTER SET. EACH LINE STARTS WITH THE CHARACTER '/',
FOLLOWED BY '0123456789:;<' AND SO ON SO THAT EACH COLUMN ON THE
SCREEN IS FILLED WITH A SINGLE CHARACTER.

THIS PATTERN WILL VERIFY THAT EACH COLUMN IS UNIQUELY ADDRESSABLE.

9.9 I "QUICK" KEYBOARD CHARACTER TEST

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IF SW 10 IS SET (=1) THEN THIS TEST IS NOT EXECUTED.

THIS IS A PARTIAL TEST IF THE KEYBOARD INCLUDED IN EVERY PASS OF THIS ACCEPTANCE PROCEDURE TO PROVIDE A QUICK CHECK OF THE KEYBOARD INTERFACE UNLESS SW 10 IS SET. SW 0 AND 1 HAVE THE SAME USE AS IN THE FULL-BLOWN KEYBOARD CHARACTER TEST. THE FULL-BLOWN TEST SHOULD BE RUN TO ADEQUATELY CHECK THE KEYBOARD. (SEE SECTION 9.10).

ONLY PRINTING CHARACTERS ARE ECHOED AS THE KEYS ARE PRESSED.

9.10 J FULL 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 PROGRAM WILL INFORM THE OPERATOR WHICH ROW TO TEST. ONLY PRINTING CHARACTERS ARE ECHOED AS THE KEYS ARE PRESSED.

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.

9.11 K 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.)

9.12 L 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.

9.13 M CHARACTER ATTRIBUTE TEST (M.S.B. OF CHAR. CODE SELECTED)

THIS TEST IS STARTED BY USING A SEPERATE STARTING ADDRESS AND IS DESIGNED TO TEST THAT SETTING THE M.S.B. OF THE CHARACTER CODES SENT TO THE M7142 WILL CAUSE ENABLED CHARACTER ATTRIBUTES TO BE DISPLAYED.

A FULL SCREEN OF FIVE "BLOCKS" (FIVE LINES EACH) IS PRINTED WITH ALTERNATE BLOCKS HAVING ANY ENABLED CHARACTER ATTRIBUTES

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SELECTED USING 'M.S.B.' ON EACH OF THE CHARACTERS AS THEY ARE
PRINTED.

NOTE: THE ABILITY TO SELECT CHARACTER ATTRIBUTES USING
----- THE M.S.B. AND AT LEAST ONE CHAR. ATTRIBUTE MUST BE
ENABLED.

```
452 .TITLE CZVTOAO
453 :*COPYRIGHT (C) 1978
454 :*DIGITAL EQUIPMENT CORP.
455 :*MAYNARD, MASS. 01754
456 :*
457 :*PROGRAM BY DIAGNOSTIC ENGINEERING
458 :*
459 :*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
460 :*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
461 :*
462 .SBTTL BASIC DEFINITIONS
463
464 :*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
465 001100 STACK= 1100
466 .EQUIV EMT,ERROR ;;BASIC DEFINITION OF ERROR CALL
467 .EQUIV IOT,SCOPE ;;BASIC DEFINITION OF SCOPE CALL
468
469 :*MISCELLANEOUS DEFINITIONS
470 000011 HT= 11 ;;CODE FOR HORIZONTAL TAB
471 000012 LF= 12 ;;CODE FOR LINE FEED
472 000015 CR= 15 ;;CODE FOR CARRIAGE RETURN
473 000200 CRLF= 200 ;;CODE FOR CARRIAGE RETURN-LINE FEED
474 177776 PS= 177776 ;;PROCESSOR STATUS WORD
475 .EQUIV PS,PSW
476 177774 STKLMT= 177774 ;;STACK LIMIT REGISTER
477 177772 PIRQ= 177772 ;;PROGRAM INTERRUPT REQUEST REGISTER
478 177570 DSWR= 177570 ;;HARDWARE SWITCH REGISTER
479 177570 DDISP= 177570 ;;HARDWARE DISPLAY REGISTER
480
481 :*GENERAL PURPOSE REGISTER DEFINITIONS
482 000000 R0= %0 ;;GENERAL REGISTER
483 000001 R1= %1 ;;GENERAL REGISTER
484 000002 R2= %2 ;;GENERAL REGISTER
485 000003 R3= %3 ;;GENERAL REGISTER
486 000004 R4= %4 ;;GENERAL REGISTER
487 000005 R5= %5 ;;GENERAL REGISTER
488 000006 R6= %6 ;;GENERAL REGISTER
489 000007 R7= %7 ;;GENERAL REGISTER
490 000006 SP= %6 ;;STACK POINTER
491 000007 PC= %7 ;;PROGRAM COUNTER
492
493 :*PRIORITY LEVEL DEFINITIONS
494 000000 PR0= 0 ;;PRIORITY LEVEL 0
495 000040 PR1= 40 ;;PRIORITY LEVEL 1
496 000100 PR2= 100 ;;PRIORITY LEVEL 2
497 000140 PR3= 140 ;;PRIORITY LEVEL 3
498 000200 PR4= 200 ;;PRIORITY LEVEL 4
499 000240 PR5= 240 ;;PRIORITY LEVEL 5
500 000300 PR6= 300 ;;PRIORITY LEVEL 6
501 000340 PR7= 340 ;;PRIORITY LEVEL 7
502
503 :*'SWITCH REGISTER' SWITCH DEFINITIONS
504 100000 SW15= 100000
505 040000 SW14= 40000
506 020000 SW13= 20000
507 010000 SW12= 10000
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508	004000	SW11=	4000
509	002000	SW10=	2000
510	001000	SW09=	1000
511	000400	SW08=	400
512	000200	SW07=	200
513	000100	SW06=	100
514	000040	SW05=	40
515	000020	SW04=	20
516	000010	SW03=	10
517	000004	SW02=	4
518	000002	SW01=	2
519	000001	SW00=	1
520		.EQUIV	SW09,SW9
521		.EQUIV	SW08,SW8
522		.EQUIV	SW07,SW7
523		.EQUIV	SW06,SW6
524		.EQUIV	SW05,SW5
525		.EQUIV	SW04,SW4
526		.EQUIV	SW03,SW3
527		.EQUIV	SW02,SW2
528		.EQUIV	SW01,SW1
529		.EQUIV	SW00,SW0

;*DATA BIT DEFINITIONS (BIT00 TO BIT15)

531		BIT15=	100000
532	100000	BIT14=	40000
533	040000	BIT13=	20000
534	020000	BIT12=	10000
535	010000	BIT11=	4000
536	004000	BIT10=	2000
537	002000	BIT09=	1000
538	001000	BIT08=	400
539	000400	BIT07=	200
540	000200	BIT06=	100
541	000100	BIT05=	40
542	000040	BIT04=	20
543	000020	BIT03=	10
544	000010	BIT02=	4
545	000004	BIT01=	2
546	000002	BIT00=	1
547	000001	.EQUIV	BIT09,BIT9
548		.EQUIV	BIT08,BIT8
549		.EQUIV	BIT07,BIT7
550		.EQUIV	BIT06,BIT6
551		.EQUIV	BIT05,BIT5
552		.EQUIV	BIT04,BIT4
553		.EQUIV	BIT03,BIT3
554		.EQUIV	BIT02,BIT2
555		.EQUIV	BIT01,BIT1
556		.EQUIV	BIT00,BIT0

;*BASIC "CPU" TRAP VECTOR ADDRESSES
ERRVEC= 4 ;;TIME OUT AND OTHER ERRORS
RESVEC= 10 ;;RESERVED AND ILLEGAL INSTRUCTIONS
TBITVEC=14 ;;'T' BIT
TRTVEC= 14 ;;TRACE TRAP

558	
559	
560	000004
561	000010
562	000014
563	000014

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564      000014      BPTVEC= 14      ;;BREAKPOINT TRAP (BPT)
565      000020      IOTVEC= 20      ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
566      000024      PWRVEC= 24      ;;POWER FAIL
567      000030      EMTVEC= 30      ;;EMULATOR TRAP (EMT) **ERROR**
568      000034      TRAPVEC=34      ;;"TRAP" TRAP
569      000060      TKVEC= 60      ;;TTY KEYBOARD VECTOR
570      000064      TPVEC= 64      ;;TTY PRINTER VECTOR
571      000240      PIRQVEC=240    ;;PROGRAM INTERRUPT REQUEST VECTOR
  
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.SBTTL OPERATIONAL SWITCH SETTINGS

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572
573      ;*
574      ;*      SWITCH      USE
575      ;*      -----      -----
576      ;*
577      ;*      15      HALT ON ERROR
578      ;*      14      LOOP ON TEST
579      ;*      13      INHIBIT ERROR TYPEOUTS
580      ;*      12      INHIBIT SUB-TEST DELAY'S
581      ;*      10      SKIP KEYBOARD CHARACTER TEST
582      ;*      9      SELECT NON-CONSOLE ADDRESS
583      ;*      8      LOOP ON TEST IN SWR<7:0>
  
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.SBTTL TRAP CATCHER

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584
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586      000000      .=0
587
588      ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
589      ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
590      ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
591      000174      .=174
592      000174      000000      DISPREG: .WORD 0      ;;SOFTWARE DISPLAY REGISTER
593      000176      000000      SWREG: .WORD 0      ;;SOFTWARE SWITCH REGISTER
594
595      .SBTTL STARTING ADDRESS(ES)
596      000200      000137      001274      JMP @#BEGIN ;;JUMP TO STARTING ADDRESS OF PROGRAM
597      000204      000137      001314      JMP RBEGIN ;;JUMP TO RESTART ADDRESS
598      000210      000137      001340      JMP BEGIN1 ;;JUMP TO FULL KEYBOARD CHAR. TEST
599      000214      000137      001360      JMP BEGIN2 ;;JUMP TO CHAR OCTAL VALUE LOOP
600      000220      000137      001330      JMP BEGIN3 ;;JUMP TO ASCII ECHO LOOP
601      000224      000137      001350      JMP BEGIN4 ;;JUMP TO CHAR. ATTRIB. TEST (BIT7 SELECT)
  
```

.SBTTL ACT11 HOOKS

```

602
603      ;*****
604      ;HOOKS REQUIRED BY ACT11
605      000230      $SVPC=.      ;SAVE PC
606      000046      .=46
607      000046      003764      $ENDAD      ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
608      000052      .=52
609      000052      000000      .WORD 0      ;;2)SET LOC.52 TO ZERO
610      000230      .= $SVPC      ;; RESTORE PC
  
```

```

611          .SBTTL COMMON TAGS
612
613          ;:*****
614          ;:*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
615          ;:*USED IN THE PROGRAM.
616
617          001100          .=1100
618 001100          $CMTAG:          ;;START OF COMMON TAGS
619 001100 000000          $PASS: .WORD 0          ;;CONTAINS PASS COUNT
620 001102 000          $TSTNM: .BYTE 0          ;;CONTAINS THE TEST NUMBER
621 001103 000          $ERFLG: .BYTE 0          ;;CONTAINS ERROR FLAG
622 001104 000000          $ICNT: .WORD 0          ;;CONTAINS SUBTEST ITERATION COUNT
623 001106 000000          $LPADR: .WORD 0          ;;CONTAINS SCOPE LOOP ADDRESS
624 001110 000000          $LPERR: .WORD 0          ;;CONTAINS SCOPE RETURN FOR ERRORS
625 001112 000000          $ERTTL: .WORD 0          ;;CONTAINS TOTAL ERRORS DETECTED
626 001114 000          $ITEMB: .BYTE 0          ;;CONTAINS ITEM CONTROL BYTE
627 001115 001          $ERMAX: .BYTE 1          ;;CONTAINS MAX. ERRORS PER TEST
628 001116 000000          $ERRPC: .WORD 0          ;;CONTAINS PC OF LAST ERROR INSTRUCTION
629 001120 000000          $GDADR: .WORD 0          ;;CONTAINS ADDRESS OF 'GOOD' DATA
630 001122 000000          $BDADR: .WORD 0          ;;CONTAINS ADDRESS OF 'BAD' DATA
631 001124 000000          $GDDAT: .WORD 0          ;;CONTAINS 'GOOD' DATA
632 001126 000000          $BDDAT: .WORD 0          ;;CONTAINS 'BAD' DATA
633 001130 000000          .WORD 0          ;;RESERVED--NOT TO BE USED
634 001132 000000          .WORD 0
635 001134 000          $AUTOB: .BYTE 0          ;;AUTOMATIC MODE INDICATOR
636 001135 000          $INTAG: .BYTE 0          ;;INTERRUPT MODE INDICATOR
637 001136 000000          .WORD 0
638 001140 177570          $SWR: .WORD DSWR          ;;ADDRESS OF SWITCH REGISTER
639 001142 177570          $DISPLAY: .WORD DDISP          ;;ADDRESS OF DISPLAY REGISTER
640 001144 177560          $TKS: 177560          ;;TTY KBD STATUS
641 001146 177562          $TKB: 177562          ;;TTY KBD BUFFER
642 001150 177564          $TPS: 177564          ;;TTY PRINTER STATUS REG. ADDRESS
643 001152 177566          $TPB: 177566          ;;TTY PRINTER BUFFER REG. ADDRESS
644 001154 000          $NULL: .BYTE 0          ;;CONTAINS NULL CHARACTER FOR FILLS
645 001155 002          $FILLS: .BYTE 2          ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
646 001156 012          $FILLC: .BYTE 12          ;;INSERT FILL CHARS. AFTER A 'LINE FEED'
647 001157 000          $TPFLG: .BYTE 0          ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
648 001160 000000          $REGAD: .WORD 0          ;;CONTAINS THE ADDRESS FROM
649          ;;WHICH ($REGO) WAS OBTAINED
650 001162 000000          $REGO: .WORD 0          ;;CONTAINS (($REGAD)+0)
651 001164 000000          $REG1: .WORD 0          ;;CONTAINS (($REGAD)+2)
652 001166 077          $QUES: .ASCII /?/          ;;QUESTION MARK
653 001167 015          $CRLF: .ASCII <15>          ;;CARRIAGE RETURN
654 001170 000012          $LF: .ASCIZ <12>          ;;LINE FEED
655          ;:*****

```

```

656      .SBTTL  ERROR POINTER TABLE
657
658      ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
659      ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
660      ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
661      ;*NOTE1:      IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
662      ;*NOTE2:      EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
663
664      ;*      EM      ;;POINTS TO THE ERROR MESSAGE
665      ;*      DH      ;;POINTS TO THE DATA HEADER
666      ;*      DT      ;;POINTS TO THE DATA
667      ;*      DF      ;;POINTS TO THE DATA FORMAT
668
669
670 001172 $ERRTB:
671
672
673      ;ITEM 1
674 001172 011665      EM1      ;ERROR FLAG ON HOST TRANSMIT STATUS
675 001174 012024      DH1      ;ERRPC VTNOW TSTNUM
676 001176 012122      DT1      ;$ERRPC VTNOW TSTNUM
677 001200 000000      0
678
679      ;ITEM 2
680 001202 011732      EM2      ;NO HOST INPUT FLAG RECEIVED
681 001204 012024      DH1      ;ERRPC VTNOW TSTNUM
682 001206 012122      DT1      ;$ERRPC VTNOW TSTNUM
683 001210 000000      0
684
685      ;ITEM 3
686
687 001212 011761      EM3      ;INCORRECT OR UNEXPECTED INPUT CHARACTER
688 001214 012053      DH3      ;ERRPC VTNOW TSTNUM EXPT RCVD
689 001216 012132      DT3      ;$ERRPC VTNOW TSTNUM $GDDAT $BDDAT
690 001220 000000      0
691
692 001222 177560      FIRST: 177560      ;FIRST DEVICE ADDRESS OF SEQUENTIAL DLV-11-A/B TYPE DEVI
693      ;DEFAULT TO THE CONSOLE ADDRESS
694 001224 000000      LAST: 0
695 001226 177560      VTNOW: 177560      ;LAST DEVICE ADDRESS OF DLV-11-A/B TYPE
696 001230 000000      TSTNUM: 0      ;CURRENT DEVICE BUS ADDRESS
697      ;ERROR PATTERN
698 001232 000015      TIMEO: 15      ;CHARACTER FLAG TIMEOUT CONSTANT
699 001234 000005      SUBTST: 5      ;SUBTEST DELAY CONSTANT
700 001236 000070      LASTLN: 70      ;LAST VALID LINE # +40
701 001240 003720      TOTALC: 2000.      ;TOTAL CHARACTER COUNT
702 001242 000031      VHO: 25.      ;VERTICAL LINE COUNT
703 001244 000014      VH1: 12.      ;1/2 VERTICAL LINE COUNT
704 001246 000006      VH2: 6.      ;1/4 VERTICAL LINE COUNT
705 001250 000000      PRTCNT: 0
706 001252 177560      VTIS: 177560      ;DEVICE ADDRESSES
707 001254 177562      VTIB: 177562      ;IN DATA
708 001256 177564      VTOS: 177564      ;OUT STAT
709 001260 177566      VTOB: 177566      ;OUT DATA
710 001262 000000      STCHAR: 0      ;TEMP REG'S
711 001264 000200      LASTCH: 200      ;FIRST NON-VALID CHARACTER
  
```

```

712 001266 000000          TEMPO: 0
713 001270 000120          WIDTH: 80.
714 001272 000000          SAVE4: 0
715
716
717 001274 012737 002112 002110 BEGIN: MOV #TST1,WHERE ;STARTING ACCEPTANCE TEST ADDRESS
718 001302 005037 001272          CLR SAVE4
719 001306 005037 001250          CLR PRTCNT
720 001312 000430          BR GINA
721 001314 005037 001250 RBEGIN: CLR PRTCNT ;RESTART ADDRESS
722 001320 012737 002112 002110 MOV #TST1,WHERE
723 001326 000417          BR GIN
724 001330 012737 004606 002110 BEGIN3: MOV #KRBECH,WHERE ;START AT ECHO LOOP
725 001336 000413          BR GIN
726 001340 012737 004052 002110 BEGIN1: MOV #KRBTST,WHERE ;STARTING KEYBOARD CHAR. TEST ADDRESS
727 001346 000407          BR GIN
728 001350 012737 004644 002110 BEGIN4: MOV #CHRATT,WHERE ;STARTING CHARACTER ATTRIBUTE (BIT8) ADDRESS
729 001356 000403          BR GIN
730 001360 012737 004316 002110 BEGIN2: MOV #KRBECH,WHERE ;STARTING CHARACTER LOOP ADDRESS
731 001366 012737 000001 001272 GIN: MOV #1,SAVE4
732 001374 000005          GINA: RESET
733
734 .SBTTL INITIALIZE THE COMMON TAGS
735 001376 012706 001100          ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
736 001402 005026          MOV # $CMTAG,R6 ;;FIRST LOCATION TO BE CLEARED
737 001404 022706 001140          CLR (R6)+ ;;CLEAR MEMORY LOCATION
738 001410 001374          CMP #SWR,R6 ;;DONE?
739 001412 012706 001100          BNE -6 ;;LOOP BACK IF NO
740          MOV #STACK,SP ;;SETUP THE STACK POINTER
741          ;;INITIALIZE A FEW VECTORS
742 001416 012737 014550 000020 MOV # $SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
743 001424 012737 000340 000022 MOV #340,@#IOTVEC+2 ;;LEVEL 7
744 001432 012737 014666 000030 MOV # $ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
745 001440 012737 000340 000032 MOV #340,@#EMTVEC+2 ;;LEVEL 7
746 001446 012737 015704 000034 MOV # $TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
747 001454 012737 000340 000036 MOV #340,@#TRAPVEC+2;LEVEL 7
748 001462 012737 015762 000024 MOV # $PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
749 001470 012737 000340 000026 MOV #340,@#PWRVEC+2 ;;LEVEL 7
750 001476 013737 003732 003724 MOV #ENDCT,$EOPCT ;;SETUP END-OF-PROGRAM COUNTER
751 001504 012737 001504 001106 MOV #.,$LPADR ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
752          ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
753          ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
754 001512 013746 000004          MOV @#ERRVEC,-(SP) ;;SAVE ERROR VECTOR
755 001516 012737 001552 000004 MOV #64,$@#ERRVEC ;;SET UP ERROR VECTOR
756 001524 012737 177570 001140 MOV #DSWR,SWR ;;SETUP FOR A HARDWARE SWICH REGISTER
757 001532 012737 177570 001142 MOV #DDISP,DISPLAY ;;AND A HARDWARE DISPLAY REGISTER
758 001540 022777 177777 177372 CMP #-1,@SWR ;;TRY TO REFERENCE HARDWARE SWR
759 001546 001012          BNE 66$ ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
760          ;;AND THE HARDWARE SWR IS NOT = -1
761 001550 000403          BR 65$ ;;BRANCH IF NO TIMEOUT
762 001552 012716 001560 64$: MOV #65$,(SP) ;;SET UP FOR TRAP RETURN
763 001556 000002          RTI
764 001560 012737 000176 001140 65$: MOV #SWREG,SWR ;;POINT TO SOFTWARE SWR
765 001566 012737 000174 001142 MOV #DISPREG,DISPLAY
766 001574 012637 000004 66$: MOV (SP)+,@#ERRVEC ;;RESTORE ERROR VECTOR
767 001600 005037 005172          CLR IGNORE
    
```

```

768 001604 005037 005154 CLR LOOP
769 001610 012737 014532 000020 MOV #MSCOPE,@#IOTVEC
770 001616 005737 001272 TST SAVE4 ;TEST FLAG
771 001622 001052 BNE SBEGIN ;BR IF NON-ZERO
772 001624 104401 TYPE
773 001626 006426 TITLE
774 001630 032777 001000 177302 BIT #BIT9,@SWR
775 001636 001444 BEQ SBEGIN ;BR IF CLEARED
776 001640 012737 001740 000004 MOV #12$,4 ;SET UP SLAVE TIMEOUT
777 001646 012737 000340 000006 MOV #340,6 ;LOCK OUT ANY INTERRUPTS
778 001654 104401 11$: TYPE
779 001656 011520 WHAT0 ;FIND OUT THE DEVICE ADDRESS
780 001660 104410 RDOCT
781 001662 012637 001222 MOV (SP)+,FIRST ;SAVE THE ADDRESS
782 001666 022737 160000 001222 CMP #160000,FIRST
783 001674 101367 BHI 11$ ;BR IF INVALID
784 001676 005777 177320 TST @FIRST ;TEST IF VALID
785 001702 005037 001224 CLR LAST
786 001706 104401 TYPE
787 001710 011563 WHAT1 ;FIND OUT THE LAST ADDRESS
788 001712 104410 RDOCT
789 001714 012637 001224 MOV (SP)+,LAST ;SAVE LAST ADDRESS
790 001720 005777 177300 TST @LAST ;TEST IF VALID
791 001724 012737 000006 000004 MOV #6,@#4
792 001732 005037 000006 CLR @#6
793 001736 000404 BR SBEGIN
794 001740 022626 12$: CMP (SP)+,(SP)+ ;ADJUST STACK FROM TIMEOUT
795 001742 104401 TYPE
796 001744 010303 INVLID ;INVALID ADDRESS MESSAGE
797 001746 000742 BR 11$ ;LET OPERATOR HAVE ANO TRY
798 001750 013737 001222 001226 SBEGIN: MOV FIRST,VTNOW ;LOAD INITIAL DEVICE ADDRESS
799
800 001756 012700 001252 RSTRT: MOV #VTIS,R0 ;LOAD POINTER
801 001762 013701 001226 MOV VTNOW,R1 ;LOAD INPUT STAT
802 001766 010120 MOV R1,(R0)+
803 001770 005721 TST (R1)+
804 001772 010120 MOV R1,(R0)+
805 001774 005721 TST (R1)+
806 001776 010120 MOV R1,(R0)+
807 002000 005721 TST (R1)+
808 002002 010110 MOV R1,(R0)

```

```

809
810
811
812 002004 012737 003720 001240 13$: MOV #2000.,TOTALC ;LOAD TOTAL CHARACTER COUNT
813 002012 012737 000031 001242 MOV #25.,VH0 ;LOAD MAX VERTICAL LINE COUNT
814 002020 012737 000070 001236 MOV #70,LASTLN ;LOAD LAST LINE VALUE +40 FOR DCA TESTING
815
816 002026 013737 001242 001244 6$: MOV VH0,VH1 ;LOAD OTHER LINE COUNTS
817 002034 006237 001244 ASR VH1
818 002040 013737 001244 001246 MOV VH1,VH2
819 002046 006237 001246 ASR VH2
820 002052 012737 000177 001264 MOV #177,LASTCH ;LOAD FIRST NON-VALID CHARACTER
821
822 002060 004537 005340 12$: JSR R5,AMSG ;INIT THE DEVICE WITH A FORM-FEED
823 002064 011205 FRMFED
824 002066 004737 005266 JSR PC,ADELAY ;WAIT FOR FORM-FEED TO FINISH
825 002072 004537 005340 JSR R5,AMSG ;PRINT TITLE OF DIAGNOSTIC
826 002076 006426 TITLE
827 002100 004737 005214 JSR PC,DELAY
828 002104 000177 000000 JMP @WHERE
829 002110 002112 WHERE: TST1
  
```

```

830
831
832 ;:*****
833 ;*TEST 1 A FULL SCREEN OF A CHARACTER
834 ;:*****
835 002112 000004 TST1: SCOPE
836
837 002114 004537 005340 JSR R5,AMSG
838 002120 006516 M91
839 002122 012701 000105 FILLWC: MOV #'E,R1 ;LOAD CHARACTER BYTE
840 002126 004737 004754 JSR PC,FILBUF ;LOAD THE LINE WITH CHAR
841 002132 013737 001242 002162 MOV VH0,10$ ;LOAD COUNT
842 002140 012737 000001 005160 1$: MOV #1,XOFFOK ;INSURE XOFF/XON CONTROL.
843 002146 004737 005056 JSR PC,XPRNT ;DISPLAY THE LINE
844 002152 005337 002162 DEC 10$
845 002156 001370 BNE 1$ ;LOOP UNTIL DONE
846 002160 000401 BR 11$ ;EXIT
847 002162 000000 10$: 0
848 002164 004737 005214 11$: JSR PC,DELAY
  
```

```

849
850
851 ;:*****
852 ;*TEST 2 B SINGLE CHARACTER ACROSS ALL COLS. <ALL CHARACTERS>
853 ;:*****
854 TST2: SCOPE
855 002170 000004 JSR R5,AMSG ;DISPLAY HEADING
856 002172 004537 005340 M93
857 002176 006566 MOV #40,STCHAR ;SET-UP STARTING CHARACTER
858 002200 012737 000040 001262 MOV VH0,TEMPO ;LOAD COUNT
859 002206 013737 001242 001266 1$: MOV STCHAR,R1 ;LOAD R1= TO CHARACTER
860 002214 013701 001262 JSR PC,FILBUF ;LOAD A BUFFER WITH THAT CHARACTER
861 002220 004737 004754 JSR PC,XPRNT ;DISPLAY A FULL LINE FROM THE BUFFER
862 002224 004737 005056 DEC TEMPO ;DONE ?
863 002230 005337 001266 BNE 2$ ;FINISHED
864 002234 001005
  
```

SINGLE CHARACTER ACROSS ALL COLS. <ALL CHARACTERS>

SEQ 0020

```
865 002236 004737 005214 JSR PC,DELAY
866 002242 013737 001242 001266 MOV V#0,TEMPO
867 002250 005237 001262 2$: INC STCHAR ;UPDATE THE CHARACTER
868 002254 023737 001264 001262 CMP LASTCH,STCHAR ;TEST FOR FINAL CHARACTER
869 002262 001354 BNE 1$ ;BRANCH IF NOT COMPLETED
870 002264 004737 005214 JSR PC,DELAY ;TEST DELAY SWITCH
```

871
872
873
874
875

```
:::*****  
:*TEST 3 C ROTATING CHARACTERS ACROSS ALL COLS. <ALL CHARACTERS>  
:::*****
```

```
878 002270 000004 TST3: SCOPE  
879 002272 004537 005340 JSR R5,AMSG ;DISPLAY HEADING  
880 002276 006632 M94  
881 002300 012737 000040 001262 MOV #40,STCHAR ;SET-UP STARTING CHARACTER  
882 002306 013737 001242 001266 MOV V#0,TEMPO ;LOAD TEMP  
883 002314 013701 001262 1$: MOV STCHAR,R1 ;LOAD R1=TO CHARACTER  
884 002320 004537 005010 JSR R5,LIC ;LOAD A BUFFER STARTING WITH  
885 002324 001270 WIDTH ; THAT CHARACTER AND WIDTH <BYTE>  
886 002326 004737 005056 JSR PC,XPRNT ;DISPLAY A FULL LINE FROM THE BUFFER  
887 002332 005337 001266 DEC TEMPO ;DONE ?  
888 002336 001005 BNE 2$ ;BR IF YES  
889 002340 004737 005214 JSR PC,DELAY  
890 002344 013737 001242 001266 MOV V#0,TEMPO  
891 002352 005237 001262 2$: INC STCHAR ;UPDATE THE STARTING CHARACTER  
892 002356 023737 001264 001262 CMP LASTCH,STCHAR ;TEST FOR FINAL CHARACTER  
893 002364 001353 BNE 1$ ;BRANCH IF NOT COMPLETED  
894 002366 004737 005214 JSR PC,DELAY ;TEST DELAY SWITCH
```

895
896
897

```
:::*****  
:*TEST 4 D CURSOR MOTION TEST (FORM-FEED INIT USED)  
:::*****
```

```
900 002372 000004 TST4: SCOPE  
901 002374 004537 005340 JSR R5,AMSG ;ERASE-SCREEN (FORM-FEED INIT.)  
902 002400 011205 FRMFED  
903 002402 004737 005266 JSR PC,ADELAY ;WAIT FOR FORM-FEED INIT TO FINISH  
904 002406 004537 005340 JSR R5,AMSG ;DISPLAY HEADING  
905 002412 006665 M96  
906  
907 002414 012700 022066 MOVTAB: MOV #BUFFER,R0 ;LOAD POINTER TO BUFFER  
908 002420 012701 012540 MOV #MTAB,R1 ;LOAD POINTER TO TAB MESSAGE  
909 002424 112120 1$: MOV#B (R1)+,(R0)+ ;PUT TAB MESSAGE INTO BUFFER  
910 002426 100376 BPL 1$  
911 002430 004737 005056 JSR PC,XPRNT ;DISPLAY THIS LINE  
912 002434 004737 005214 JSR PC,DELAY ;TEST DELAY SWITCH  
913  
914 002440 012700 022066 MOV#BSP: MOV #BUFFER,R0 ;LOAD POINTER TO BUFFER  
915 002444 012701 012654 MOV #MBKSP,R1 ;LOAD POINTER TO BACKSPACE MESSAGE  
916 002450 112120 2$: MOV#B (R1)+,(R0)+ ;PUT MESSAGE INTO BUFFER  
917 002452 100376 BPL 2$  
918 002454 004737 005056 JSR PC,XPRNT ;DISPLAY THIS LINE  
919 002460 004737 005214 JSR PC,DELAY ;TEST DELAY SWITCH
```

920

CURSOR MOTION TEST (FORM-FEED INIT USED)

SEQ 0021

```

921 002464 012700 022066      MOVVT:  MOV    #BUFFER,RO      ;LOAD POINTER TO BUFFER
922 002470 012701 013006      MOV    #MVT,R1        ;LOAD POINTER TO VERT. TAB MESSAGE
923 002474 112120              3$:    MOVB   (R1)+,(R0)+    ;PUT VERT. TAB MESSAGE INTO BUFFER
924 002476 100376              BPL    3$
925 002500 004737 005056      JSR    PC,XPRNT       ;DISPLAY THIS LINE
926 002504 004737 005214      JSR    PC,DELAY       ;TEST DELAY SWITCH
927
928
929
930
931

```

```

:*****
:*TEST 5          E          DIRECT CURSOR ADDRESS TEST (FORM-FEED INIT USED)
:*****
934
935 002510 000004      TST5:  SCOPE
936
937

```

```

;RANDOM NUMBERS ARE GENERATED AND USED AS "X" AND "Y" COORDINATES
;ADDRESSING A 2000 CHARACTER PRINTOUT.
;VERIFICATION OF DISPLAY IS PERFORMED VISUALLY BY THE USER
;USING THE "ESC-Y" SEQUENCE.

```

```

943 002512 004537 005340      4$:    JSR    R5,AMSG
944 002516 011205              FRMFED
945 002520 004737 005266      JSR    PC,ADELAY     ;WAIT FOR FORM-FEED INIT TO FINISH
946 002524 004537 005340      JSR    R5,AMSG       ;IDENTIFY TEST
947 002530 011136              M98
948 002532 112737 000033 022066  MOVB   #33,BUFFER    ;LOAD "ESC" CODE
949 002540 112737 000131 022067  MOVB   #'Y,BUFFER+1  ;LOAD ASCII "Y" (D.C.A. ENABLE)
950
951 002546 012737 123456 015702  DCATST: MOV    #123456,$LONUM ;PRIME RANDOM NUMBER GENERATOR
952 002554 012737 176543 015700  MOV    #176543,$HINUM
953 002562 013737 001240 003030  MOV    TOTALC,OVRAL  ;LOAD CHAR COUNT
954 002570 012700 022106  MOV    #BUFFER+20,RO ;LOAD DESTINATION BUFFER
955 002574 012701 016142  2$:    MOV    #MSGTXT,R1  ;LOAD MESSAGE POINTER
956 002600 012120  1$:    MOV    (R1)+,(R0)+  ;LOAD 2 CHARACTERS
957 002602 122711 000377  CMPB   #377,(R1)     ;TEST FOR LAST CHAR
958 002606 001374  BNE    1$            ;BR UNTIL DONE
959 002610 012737 177777 022072  MOV    #-1,BUFFER+4 ;LOAD MESSAGE TERMINATOR (IN 4&5)
960
961 002616 004737 015602  GENER: JSR    PC,$RAND  ;GENERATE RANDOM NUMBER
962 002622 013700 015700  MOV    $HINUM,RO    ;GET RANDOM NUMBER
963 002626 042700 177700  BIC    #177700,RO   ;RANDOM NO. MUST BE TWO DIGITS
964 002632 020027 000037  CMP    RO,#37       ;NO, MUST BE LESS THAN 40
965 002636 101767  BLOS   GENER        ;LOWER, REGENERATION
966 002640 020037 001236  CMP    RO,LASTLN   ;NO, MUST NOT BE GREATER THAN 70
967 002644 101364  BHI    GENER        ;GREATER, REGENERATION
968 002646 010037 003022  MOV    RO,YADDS     ;STORE RANDOM Y COORDINATE
969 002652 010001  MOV    RO,R1        ;COPY DATA
970 002654 012737 022106 003026  MOV    #BUFFER+20,SET ;LOAD BASE POINTER
971 002662 162701 000040  SUB    #40,R1       ;MINIMUM Y INDEX
972 002666 001405  BEQ    GENRX        ;RESULT, MINIMUM Y COORDINATE
973 002670 062737 000120 003026  1$:    ADD    #80.,SET    ;SETUP Y INDEX LOCATION FOR PRINTOUT
974 002676 005301  DEC    R1
975 002700 001373  BNE    1$          ;Y COORDINATE IS SET
976 002702 004737 015602  GENRX: JSR    PC,$RAND ;GENERATE RANDOM NUMBER

```

DIRECT CURSOR ADDRESS TEST (FORM-FEED INIT USED)

```

977 002706 013700 015700      MOV      $HINUM,RO      ;GET A RANDOM NUMBER
978 002712 042700 177600      BIC      #177600,RO     ;RANDOM NO. MAY BE LESS THAN 200
979 002716 020027 000037      CMP      RO,#37        ; MUST NOT BE LESS THAN 40
980 002722 101767              BLOS     GENRX         ;LOWER, REGENERATION
981 002724 020027 000157      CMP      RO,#157       ; MUST NOT BE GREATER THAN 157
982 002730 101364              BHI     GENRX         ;GREATER, REGENERATION
983 002732 010037 003024      MOV      RO,XADDS      ;STORE RANDOM X COORDINATE
984 002736 162700 000040      SUB      #40,RO        ;SETUP MINIMUM X INDEX
985 002742 060037 003026      ADD      RO,SET        ;SETUP X COOR, FOR PNTOUT.
986 002746 013701 003026      MOV      SET,R1        ;SETUP CHECK
987 002752 105711              TSTB    (R1)          ;HAS CURRENT CHAR, ALREADY BEEN USED?
988 002754 001720              BEQ     GENER         ;YES, REGENERATE
989 002756 113737 003022 022070  MOVB    YADDS,BUFFER+2 ;LOAD Y COORDINATE
990 002764 113737 003024 022071  MOVB    XADDS,BUFFER+3 ;LOAD X COORDINATE
991 002772 111137 022072      MOVB    (R1),BUFFER+4 ;LOAD CHARACTER TO BE PRINTED
992 002776 105011              CLRB    (R1)          ;INDICATE USE OF CURSOR POSITION
993 003000 004737 005056      JSR     PC,XPRNT      ;EXECUTE AND PRINT CHARACTER
994 003004 005337 003030      DEC     OVRAL         ;MAXIMUM NO. OF COORDINATES
995 003010 001302              BNE     GENER         ;BR BACK UNTIL DONE
996
997 003012 004737 005214      JSR     PC,DELAY      ;DELAY TESTING
998 003016 000137 003032      JMP     TST6          ;SKIP OVER STORAGE LOCS. TO NEXT TEST
999

```

```

1000 003022 000000      YADDS: 0
1001 003024 000000      XADDS: 0
1002 003026 000000      SET: 0
1003 003030 000000      OVRAL: 0
1004
1005
1006
1007
1008
1009

```

```

*****
:*TEST 6          F          CHARACTER ATTRIBUTE TEST (SI-SO SELECT)
*****
TST6:  SCOPE

```

```

1010
1011
1012 003032 000004
1013
1014 003034 004537 005340      JSR     R5,AMSG       ;ERASE AND INIT SCREEN WITH FORM-FEED
1015 003040 011205              FRMFED
1016 003042 004737 005266      JSR     PC,ADELAY     ;WAIT FOR FORM-FEED TO FINISH
1017 003046 004537 005340      JSR     R5,AMSG       ;DISPLAY HEADER
1018 003052 007043              M9221
1019 003054 004537 005340      JSR     R5,AMSG       ;SELECT ANY ENABLED CHAR. ATTRIBUTES
1020 003060 011512              SO
1021 003062 004737 005174      JSR     PC,BLKPRNT   ;GO PRINT ATTR. MSG. FIVE TIMES
1022 003066 004537 005340      JSR     R5,AMSG       ;DESELECT ANY CHAR. ATTRIBUTES
1023 003072 011515              SI
1024 003074 004737 005174      JSR     PC,BLKPRNT   ;GO PRINT ATTR. MSG FIVE TIMES
1025 003100 004537 005340      JSR     R5,AMSG       ;SELECT ANY ENABLED CHAR. ATTRIBUTES
1026 003104 011512              SO
1027 003106 004737 005174      JSR     PC,BLKPRNT   ;GO PRINT ATTR. MSG. FIVE TIMES
1028 003112 004537 005340      JSR     R5,AMSG       ;DESELECT ANY CHAR. ATTRIBUTES
1029 003116 011515              SI
1030 003120 004737 005174      JSR     PC,BLKPRNT   ;GO PRINT ATTR. MSG. FIVE TIMES
1031 003124 004537 005340      JSR     R5,AMSG       ;SELECT ANY ENABLED CHAR. ATTRIBUTES
1032 003130 011512              SO

```

CHARACTER ATTRIBUTE TEST (SI-SO SELECT)

```

1033 003132 004737 005174      JSR    PC,BLKPRN      ;GO PRINT ATTR. MSG. FIVE TIMES
1034 003136 004537 005340      JSR    R5,AMSG       ;DESELECT ANY CHAR. ATTRIBUTES
1035 003142 011515                SI
1036 003144 004737 005214      JSR    PC,DELAY      ;AND GO CHECK DELAY
1037
1038
1039      ;*****
1040      ;*TEST 7          G          SCROLL SPEED JUMP TEST
1041      ;*****
1041 003150 000004      TST7:  SCOPE
1042
1043 003152 004537 005340      JSR    R5,AMSG       ;ERASE AND INIT SCREEN WITH FORM-FEED
1044 003156 011205      FRMFED
1045 003160 004737 005266      JSR    PC,ADELAY     ;WAIT FOR FORM-FEED TO FINISH
1046 003164 004537 005340      JSR    R5,AMSG       ;DISPLAY HEADER
1047 003170 006746      M97
1048 003172 012737 000101 001262  1$:  MOV    #101,STCHAR    ;SETUP STARTING CHARACTER
1049 003200 013701 001262      MOV    STCHAR,R1     ;LOAD R1 WITH CHAR. CODE
1050 003204 004737 004754      JSR    PC,FILBUF     ;LOAD LINE BUFFER WITH THAT CHAR.
1051 003210 004737 005056      JSR    PC,XPRNT      ;DISPLAY A FULL LINE FROM THE BUFFER
1052 003214 005237 001262      INC    STCHAR        ;PUT NEXT CHAR. CODE IN R1
1053 003220 023727 001262 000132  2$:  CMP    STCHAR,#132   ;SEE IF HAVE DONE 25 LINES YET
1054 003226 001364      BNE    1$
1055 003230 004537 005340      JSR    R5,AMSG       ;PUT SCROLL COUNT ON LAST LINE
1056 003234 011210      SCRL
1057
1058 003236 012737 000003 001266  3$:  MOV    #3,TEMPO      ;SET-UP LOOP COUNTER
1059 003244 112737 000060 011236  4$:  MOVB   #60,SCRNO    ;INIT SCROLL COUNT MESSAGE
1060 003252 012701 000031      MOV    #25.,R1       ;SET-UP VT COUNTER
1061 003256 012700 000013      MOV    #13,R0        ;PUT VERT. TAB CHAR. CODE IN R0
1062 003262 110077 175772      MOVB   R0,@VTOB      ;LOAD CHAR. IN OUTPUT BUFFER
1063 003266 105777 175764      TSTB   @VTOS        ;WAIT UNTIL PRINTED
1064 003272 100375      BPL    4$
1065 003274 005301      DEC    R1            ;DECREMENT VT COUNTER
1066 003276 001371      BNE    3$           ;LOOP UNTIL 25. VT'S PRINTED
1067 003300 105237 011236      INCB   SCRNO        ;INCREMENT SCROLL COUNT MSG.
1068 003304 004537 005340      JSR    R5,AMSG       ;UPDATE SCROLL COUNT MSG ON LAST LINE
1069 003310 011210      SCRL
1070 003312 004737 005214      JSR    PC,DELAY      ;THEN DELAY BETWEEN SETS OF VT'S
1071 003316 005337 001266      DEC    TEMPO
1072 003322 001353      BNE    2$           ;LOOP UNTIL 3 SETS HAVE BEEN DONE
1073
1074      ;*****
1075      ;*TEST 10         H          COLUMN ADDRESS TEST
1076      ;*****
1077 003324 000004      TST10: SCOPE
1078 003326 004537 005340      JSR    R5,AMSG       ;DISPLAY HEADING
1079 003332 007006      M99
1080 003334 012737 000057 001262  1$:  MOV    #57,STCHAR    ;SET-UP STARTING CHARACTER
1081 003342 013737 001242 001266  2$:  MOV    V#0,TEMPO    ;LOAD TEMP
1082 003350 005037 001162      CLR    $REGO        ;CLEAR LINE COUNTER
1083 003354 013701 001262      MOV    STCHAR,R1     ;LOAD R1=TO CHARACTER
1084 003360 004537 005010      JSR    R5,LIC        ;LOAD A BUFFER (STARTING WITH
1085 003364 001270      WIDTH              ; THAT CHARACTER AND WIDTH <BYTE>
1086 003366 004737 005056      JSR    PC,XPRNT      ;DISPLAY A FULL LINE FROM THE BUFFER
1087 003372 005337 001266      DEC    TEMPO        ;DONE ?
1088 003376 001005      BNE    2$           ;BR IF YES

```

```

1089 003400 004737 005214 JSR PC,DELAY
1090 003404 013737 001242 001266 MOV VHO,TEMPO
1091 003412 005237 001162 2$: INC $REGO ;INCREMENT THE LINE COUNTER
1092 003416 023737 001242 001162 CMP VHO,$REGO ;TEST FOR FULL SCREEN
1093 003424 001353 BNE 1$ ;BRANCH IF NOT COMPLETED
1094 003426 004737 005214 JSR PC,DELAY ;TEST DELAY SWITCH
1095
1096
1097 ;*****
1098 ;*TEST 11 I QUICK KEYBOARD CHARACTER TEST
1099 ;*****
1099 003432 000004 1ST11: SCOPE
1100 003434 032777 002000 175476 QKBTST: BIT #BIT10,@SWR ;SEE IF BIT10 OF SWR SET
1101 003442 001402 BEQ 1$ ;IF IT ISN'T EXECUTE KEYBD. CHAR. TEST
1102 003444 000137 003624 JMP $EOP ;IF IT IS GO TO $EOP
1103 003450 012703 012146 1$: MOV #V52RW,R3 ;SET UP FOR LOWER CASE CHAR.
1104 003454 012706 001100 2$: MOV #STACK,SP
1105 003460 004537 005340 A: JSR R5,AMSG ;DISPLAY HEADER
1106 003464 007206 MKB
1107 003466 012302 MOV (R3)+,R2 ;LOAD ROW #
1108 003470 004537 005340 JSR R5,AMSG ;ISSUE ROW1 MESSAGE.
1109 003474 007375 MKBB2
1110 003476 004737 005456 2$: JSR PC,TSTROW ;CHECK THE ROW
1111
1112 003502 012302 B: MOV (R3)+,R2 ;LOAD ROW #
1113 003504 004537 005340 JSR R5,AMSG ;2ND ROW
1114 003510 007463 MKBC
1115 003512 004737 005456 JSR PC,TSTROW ;CHECK 2ND ROW
1116
1117 003516 012302 C: MOV (R3)+,R2 ;LOAD ROW #
1118 003520 004537 005340 JSR R5,AMSG ;ISSUE ROW 3 MESSAGE.
1119 003524 007524 MKBD2
1120 003526 004737 005456 2$: JSR PC,TSTROW ;CHECK ROW 3
1121
1122 003532 012302 MOV (R3)+,R2 ;LOAD ROW #
1123 003534 004537 005340 JSR R5,AMSG
1124 003540 007614 MKBE
1125 003542 004737 005456 JSR PC,TSTROW ;CHECK ROW 4
1126
1127 003546 012702 012164 MOV #ROW5,R2
1128 003552 004537 005340 JSR R5,AMSG
1129 003556 007705 MKBF
1130 003560 004737 005456 JSR PC,TSTROW ;CHECK ROW 5
1131
1132 ;COMPLETION OF KEYBOARD-KEYPAD TEST
1133
1134 003564 004537 005340 QKBDON: JSR R5,AMSG ;END OF KEYBOARD TEST
1135 003570 010235 MKBR
1136 003572 000137 003624 JMP $EOP ;GO TO END OF PASS
1137 003576 013053 DISPCH: MTEXT0
1138 003600 013157 MTEXT1
1139 003602 013260 MTEXT2
1140 003604 013362 MTEXT3
1141 003606 013445 MTEXT4
1142 003610 013547 MTEXT5
1143 003612 013650 MTEXT6
1144 003614 013702 MTEXT7

```

1145 003616 014002
1146 003620 000000
1147 003622 000000
1148
1149
1150
1151
1152
1153
1154
1155
1156
1157
1158
1159 003624
1160 003624 000004
1161 003626 005737 001224
1162 003632 001414
1163 003634 023737 001224 001226
1164 003642 001410
1165 003644 062737 000010 001226
1166 003652 012737 002112 002110
1167 003660 000137 001756
1168 003664 005737 001100
1169 003670 001002
1170 003672 104401 011642
1171 003676 000005
1172 003700 004737 005266
1173
1174 003704 005037 001102
1175 003710 005237 001100
1176 003714 042737 100000 001100
1177 003722 005327
1178 003724 000001
1179 003726 003022
1180 003730 012737
1181 003732 000001
1182 003734 003724
1183 003736 104401 004003
1184 003742 013746 001100
1185 003746 104405
1186 003750 104401 004000
1187 003754 013700 000042
1188 003760 001405
1189 003762 000005
1190 003764 004710
1191 003766 000240
1192 003770 000240
1193 003772 000240
1194 003774
1195 003774 000137
1196 003776 004020
1197 004000 377 377 000
1198 004003 015 042412 042116
1199 004010 050040 051501 020123
1200 004016 000043

MTEXT8
0
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

\$EOP:

SCOPE
TST LAST :TEST IF MORE
BEQ 1\$:BR IF NONE
CMP LAST,VTNOW :IS THIS THE LAST ONE
BEQ 1\$:BR IF YES
ADD #10,VTNOW
MOV #TST1,WHERE
JMP RSTRT :TEST NEXT ONE
1\$: TST \$PASS :TEST IF FIRST PASS
BNE 2\$:BR IF NOT
TYPE ,PASHED :TYPE EOP HEADER
2\$: RESET
JSR PC,ADELAY :EXTRA DELAY

CLR \$TSTNM ;;ZERO THE TEST NUMBER
INC \$PASS ;;INCREMENT THE PASS NUMBER
BIC #100000,\$PASS ;;DON'T ALLOW A NEG. NUMBER
DEC (PC)+ ;;LOOP?

\$EOPCT: .WORD 1
BGT \$DOAGN ;;YES
MOV (PC)+,@(PC)+ ;;RESTORE COUNTER

\$ENDCT: .WORD 1
\$EOPCT
TYPE ,SENDMG ;;TYPE 'END PASS #'
MOV \$PASS,-(SP) ;;SAVE \$PASS FOR TYPEOUT
TYPDS ;;GO TYPE--DECIMAL ASCII WITH SIGN

\$GET42: MOV @#42,R0 ;;GET MONITOR ADDRESS
BEQ \$DOAGN ;;BRANCH IF NO MONITOR
RESET ;;CLEAR THE WORLD
\$ENDAD: JSR PC,(R0) ;;GO TO MONITOR
NOP ;;SAVE ROOM
NOP ;;FOR
NOP ;;ACT11

\$DOAGN: JMP @(PC)+ ;;RETURN

\$RTNAD: .WORD NOWEOP
\$ENULL: .BYTE -1,-1,0 ;;NULL CHARACTER STRING
\$ENDMG: .ASCIZ <15><12>/END PASS #/

1201	004020	005737	001250	NOWEOP:	TST	PRTCNT	
1202	004024	100002			BPL	11\$	
1203	004026	105337	001250		DECB	PRTCNT	
1204	004032	012737	002112	002110	11\$:	MOV	#TST1,WHERE
1205	004040	104401	004000			TYPE	,SENULL
1206	004044	000137	001750			JMP	SBEGIN
1207					:*****		
1208					:*TEST 12 J FULL KEYBOARD CHARACTER TEST		
1209					:*****		
1210	004050	000004			TST12:	SCOPE	
1211	004052	012703	012146		KRBTST:	MOV	#V52RW,R3 ;SET UP FOR LOWER CASE CHAR.
1212	004056	012706	001100		2\$:	MOV	#STACK,SP
1213	004062	004537	005340		A1:	JSR	R5,AMSG ;ERASE AND INIT SCREEN WITH FORM-FEED
1214	004066	011205				FRMFED	
1215	004070	004737	005266			JSR	PC,ADELAY ;WAIT FOR FORM-FEED TO FINISH
1216	004074	004537	005340			JSR	R5,AMSG ;DISPLAY HEADER
1217	004100	010350				MKBX	
1218	004102	012302				MOV	(R3)+,R2 ;LOAD ROW #
1219	004104	004537	005340			JSR	R5,AMSG ;ISSUE ROW1 MESSAGE.
1220	004110	007375				MKBB2	
1221	004112	004737	005456		2\$:	JSR	PC,TSTROW ;CHECK THE ROW
1222							
1223	004116	012302			B1:	MOV	(R3)+,R2 ;LOAD ROW #
1224	004120	004537	005340			JSR	R5,AMSG ;2ND ROW
1225	004124	007463				MKBC	
1226	004126	004737	005456			JSR	PC,TSTROW ;CHECK 2ND ROW
1227							
1228	004132	012302			C1:	MOV	(R3)+,R2 ;LOAD ROW #
1229	004134	004537	005340			JSR	R5,AMSG ;ISSUE ROW 3 MESSAGE.
1230	004140	007524				MKBD2	
1231	004142	004737	005456		2\$:	JSR	PC,TSTROW ;CHECK ROW 3
1232							
1233	004146	012302				MOV	(R3)+,R2 ;LOAD ROW #
1234	004150	004537	005340			JSR	R5,AMSG
1235	004154	007614				MKBE	
1236	004156	004737	005456			JSR	PC,TSTROW ;CHECK ROW 4
1237							
1238	004162	012702	012164			MOV	#ROW5,R2
1239	004166	004537	005340			JSR	R5,AMSG
1240	004172	007705				MKBF	
1241	004174	004737	005456			JSR	PC,TSTROW ;CHECK ROW 5
1242							
1243					;TEST THE "LEFT"-SHIFT KEY		
1244							
1245	004200	004537	005340		D:	JSR	R5,AMSG ;DEPRESS THE "LEFT-SHIFT" KEY
1246	004204	007762				MKBG	
1247	004206	012302				MOV	(R3)+,R2 ;LOAD ROW 1 SHIFTED TABLE
1248	004210	004537	005340			JSR	R5,AMSG ;ISSUE ROW1 MESSAGE.
1249	004214	007375				MKBB2	
1250	004216	004737	005456		2\$:	JSR	PC,TSTROW ;TEST THE ROW
1251	004222	004537	005340			JSR	R5,AMSG ;RELEASE THE SHIFT KEY
1252	004226	007253				MKB1	
1253					;TEST THE "RIGHT-SHIFT" KEY		
1254							
1255							
1256	004230	004537	005340		E:	JSR	R5,AMSG ;SET THE "RIGHT-SHIFT" KEY

FULL KEYBOARD CHARACTER TEST

```

1257 004234 010031 MKBGA
1258 004236 012302 MOV (R3)+,R2 ;LOAD TABLE POINTER
1259 004240 004537 005340 JSR R5,AMSG ;ISSUE ROW1 MESSAGE.
1260 004244 007375 MKBB2
1261 004246 004737 005456 2$: JSR PC,TSTROW ;TEST THE ROW AGAIN WITH THE RIGHT-SHIFT SET
1262 004252 004537 005340 JSR R5,AMSG
1263 004256 007253 MKB1 ;RELEASE SKIFT KEY
1264 ;TEST THE CONTROL MODE
1265
1266 004260 004537 005340 F: JSR R5,AMSG ;SET CTRL
1267 004264 010101 MKBH
1268 004266 012302 MOV (R3)+,R2 ;LOAD ROW 1 CTRL TABLE
1269 004270 004537 005340 JSR R5,AMSG ;ISSUE ROW1 MESSAGE.
1270 004274 007375 MKBB2
1271 004276 004737 005456 2$: JSR PC,TSTROW ;TEST THE ROW
1272
1273 ;COMPLETION OF KEYBOARD TEST
1274
1275 004302 004537 005340 KRBDon: JSR R5,AMSG ;END OF KEYBOARD TEST
1276 004306 010235 MKBR
1277 004310 000137 004052 JMP KRBtST ;LOOP ON TEST
1278
1279
1280
1281 ;*****
1282 ;*TEST 13 K KEYBOARD OCTAL VALUE LOOP
1283 ;*****
1283 004314 000004 TST13: SCOPE
1284 004316 012706 001100 KRBECO: MOV #STACK,SP
1285 004322 004537 005340 JSR R5,AMSG ;DISPLAY HEADER
1286 004326 010460 MKE
1287 004330 004737 006334 1$: JSR PC,GETCHR ;GET CHAR
1288 004334 000775 BR 1$ ;:BR BACK IF NO INPUT
1289 004336 004737 005360 JSR PC,OCTAL ;CONVERT R0 TO OCTAL
1290 004342 113737 005450 010703 MOVB DIG0,MKEB ;LOAD DIGIT
1291 004350 113737 005452 010704 MOVB DIG1,MKEB+1 ;LOAD DIGIT
1292 004356 113737 005454 010705 MOVB DIG2,MKEB+2 ;LOAD DIGIT
1293 004364 042700 177600 BIC #177600,R0
1294 004370 001001 BNE 10$
1295 004372 005200 INC R0
1296 004374 012701 004504 10$: MOV #BFCHR,R1 ;LOAD POINTER
1297 004400 121100 5$: CMPB (R1),R0 ;TEST IF = TO VALUE IN TABLE ?
1298 004402 001403 BEQ 3$ ;BR IF FOUND
1299 004404 005721 TST (R1)+ ;MOVE POINTER
1300 004406 001374 BNE 5$ ;BR IF MORE
1301 004410 000407 BR 2$ ;BR IF NOT IN LIST
1302 004412 062701 000036 3$: ADD #BFCHAR-BFCHR,R1 ;UPDATE POINTER
1303 004416 112137 010676 MOVB (R1)+,MKEA1 ;LOAD 1ST CHAR
1304 004422 112137 010677 MOVB (R1)+,MKEA1+1 ;LOAD 2ND
1305 004426 000420 BR 4$
1306 004430 120027 000040 2$: CMPB R0,#40 ;TEST IF LESS THAN 40
1307 004434 101010 BHI 6$ ;BR IF ABOVE
1308 004436 062700 000100 ADD #100,R0 ;MAKE PRINTABLE
1309 004442 110037 010677 MOVB R0,MKEA1+1 ;SAVE CHAR
1310 004446 112737 000136 010676 MOVB #136,MKEA1 ;ADD A '^' BEFORE CHARACTER
1311 004454 000405 BR 4$
1312 004456 112737 000040 010677 6$: MOVB #40,MKEA1+1 ;LOAD SPACE

```

KEYBOARD OCTAL VALUE LOOP

```
1313 004464 110037 010676      MOVB   R0,MKEA1      ;LOAD CHARACTER
1314 004470 005237 005172      4$:   INC   IGNORE    ;IGNORE DOUBLE CHARACTER FLAG
1315 004474 004537 005340      JSR    R5,AMSG      ;DISPLAY MESSAGE
1316 004500 010665                MKEA
1317 004502 000712                BR     1$           ;LOOP BACK
1318
1319
```

:TABLE OF DEFINED CHARACTERS

```
1320
1321 004504 000010      BFCHR: 10          ;BACKSPACE (CURSOR LEFT CODE)
1322 004506 000011          11          ;TAB CODE
1323 004510 000012          12          ;LINE FEED CODE
1324 004512 000013          13          ;VERTICAL TAB
1325 004514 000014          14          ;FORM FEED
1326 004516 000015          15          ;CARRIAGE RETURN CODE
1327 004520 000016          16          ;SO (^N)
1328 004522 000017          17          ;SI (^O)
1329 004524 000033          33          ;ESCAPE CODE
1330 004526 000040          40          ;SPACE CODE
1331 004530 000177          177         ;DELETE CODE
1332 004532 000000          0
1333 004534 000000          0
1334 004536 000000          0
1335 004540 000000          0
1336
1337
```

:DEFINED CHARACTER EQUIVALENTS

```
1338
1339 004542 051502      BFCHAR: .ASCII /BS/      ;BACKSPACE (CURSOR LEFT)
1340 004544 052110          .ASCII /HT/          ;H TAB
1341 004546 043114          .ASCII /LF/          ;LINE FEED
1342 004550 052126          .ASCII /VT/          ;VERTICAL TAB
1343 004552 043106          .ASCII /FF/          ;FORM-FEED
1344 004554 051103          .ASCII /CR/          ;CARIAGE RETURN
1345 004556 047523          .ASCII /SO/          ;SO - ^N
1346 004560 044523          .ASCII /SI/          ;SI - ^O
1347 004562 051505          .ASCII /ES/          ;ESCAPE
1348 004564 050123          .ASCII /SP/          ;SPACE
1349 004566 042504          .ASCII /DE/          ;DELETE
1350 004570 000000 000000 000000      0,0,0,0,0,0
1351 004576 000000 000000 000000
```

.EVEN

```
::*****
:*TEST 14      L      KEYBOARD ECHO LOOP
::*****
```

```
1352
1353
1354
1355
1356 004604 000004      TST14: SCOPE
1357 004606 012706 001100      KRBECH: MOV   #STACK,SP
1358 004612 004537 005340      JSR    R5,AMSG      ;DISPLAY HEADER
1359 004616 010712      MKEH
1360
1361 004620 004737 006334      1$:   JSR    PC,GETCHR  ;GET CHARACTER
1362 004624 000775          BR     1$
1363 004626 110077 174426      MOVB   R0,@VTOB    ;LOAD THE CHARACTER
1364 004632 105777 174420      2$:   TSTB  @VTOS    ;WAIT FOR DONE
1365 004636 100375          BPL   2$
1366 004640 000767          BR     1$           ;LOOP BACK
1367
1368
```

```

1369
1370
1371
1372 004642 000004
1373
1374 004644 004537 005340
1375 004650 007124
1376 004652 005002
1377 004654 005037 001162
1378 004660 012700 011242
1379 004664 112001
1380 004666 120127 000377
1381 004672 001413
1382 004674 032702 000001
1383 004700 001002
1384 004702 052701 000200
1385 004706 110177 174346
1386 004712 105777 174340
1387 004716 100375
1388 004720 000761
1389
1390 004722 005237 001162
1391 004726 022737 000005 001162
1392 004734 001351
1393 004736 005202
1394 004740 022702 000005
1395 004744 001343
1396 004746 004737 005214
1397 004752 000734
1398
1399
1400
1401
1402
1403
1404
1405 004754 013702 001270
1406 004760 012700 022066
1407 004764 112720 000015
1408 004770 112720 000012
1409 004774 110120
1410 004776 005302
1411 005000 001375
1412 005002 112710 000377
1413 005006 000207
1414
1415
1416
1417
1418 005010 012700 022066
1419 005014 013502
1420 005016 112720 000015
1421 005022 112720 000012
1422 005026 110120
1423 005030 005201
1424 005032 023701 001264

;*****
;*TEST 15 M CHARACTER ATTRIBUTE TEST (M.S.B. SELECT)
;*****
TST15: SCOPE

CHRATT: JSR R5,AMSG ;DISPLAY HEADER
M9222
CLR R2 ;CLEAR BLOCK COUNTER
1$: CLR $REGO ;CLEAR LINE COUNTER
6$: MOV #ATTR8,R0 ;SETUP MESSAGE POINTER
2$: MOVB (R0)+,R1 ;GET A CHARACTER
CMPB R1,#377 ;SEE IF REACHED END OF LINE YET
BEQ 5$
BIT #BIT0,R2 ;SEE IF ON AN EVEN OR ODD BLOCK
BNE 3$ ;IF ON EVEN BLOCK SET CHAR. ATTR.
BIS #BIT7,R1 ;SET M.S.B. OF THE CHAR. CODE
3$: MOVB R1,@VTOB ;LOAD THE CHAR.
4$: TSTB @VTOS ;WAIT UNTIL PRINTED
BPL 4$
BR 2$ ;GO GET NEXT CHAR.

5$: INC $REGO ;INCREMENT LINE COUNTER
CMP #5,$REGO ;SEE IF 5 LINES OF BLOCK PRINTED YET?
BNE 6$ ;CONTINUE IF BLOCK NOT DONE
INC R2 ;ELSE INCREMENT BLOCK COUNTER
CMP #5,R2 ;SEE IF SCREEN FULL (5 BLOCKS)?
BNE 1$ ;IF NO CONTINUE
JSR PC,DELAY ;WAIT A WHILE BEFORE LOOPING ON TEST
BR CHRATT

;***** PROGRAM SUBROUTINES *****
;LOAD A SINGLE CHARACTER ACROSS THE SCREEN WIDTH
;
FILBUF: MOV WIDTH,R2 ;LOAD WIDTH VALUE
FILBFB: MOV #BUFFER,R0 ;SET-UP BUFFER POINTER
MOVB #15,(R0)+ ;LOAD 'CR'
MOVB #12,(R0)+ ;LOAD 'FL'
FILBFA: MOVB R1,(R0)+ ;SAVE THE CHARACTER IN THE BUFFER
DEC R2 ;FINISHED?
BNE FILBFA ;BRANCH IF NOT COMPLETED
MOVB #377,(R0) ;LOAD TERM.
RTS PC ;EXIT

;LOAD A INCREMENTING CHARACTER ACROSS THE SCREEN WIDTH
;ONLY 40 THRU 177 ARE LEGAL CHARACTERS
LIC: MOV #BUFFER,R0 ;SET-UP BUFFER POINTER
MOV @5+,R2 ;SET-UP WIDTH
MOVB #15,(R0)+ ;LOAD 'CR'
MOVB #12,(R0)+ ;LOAD 'LF'
LICA: MOVB R1,(R0)+ ;SAVE A CHARACTER IN THE BUFFER
INC R1 ;UPDATE THE CHARACTER
CMP LASTCH,R1 ;TEST FOR

```

```

1425 005036 001002          BNE      LICB      ;BRANCH IF NOT
1426 005040 012701 000040  LICB:  MOV      #40,R1 ;MAKE A LEGAL CHARACTER
1427 005044 005302          DEC      R2         ;DECREMENT COUNT
1428 005046 001367          BNE      LICA      ;BRANCH IF NOT COMPLETED
1429 005050 112710 000377  MOVB    #377,(R0) ;LOAD TERM
1430 005054 000205          RTS      R5         ;EXIT
1431
1432          ;DISPLAY SUBROUTINE
1433
1434 005056 012700 022066  XPRNT: MOV      #BUFFER,R0 ;SETUP BUFFER POINTER
1435 005062 105777 174170  XPRNTA: TSTB    @VTOS      ;TEST READY
1436 005066 100404          BMI      XPRNTB     ;BRANCH IF SET
1437 005070 005777 174162  TST     @VTOS      ;TEST ERROR
1438 005074 100372          BPL      XPRNTA     ;BRANCH IF RESET
1439 005076 104001          ERROR    1         ;ERROR FLAG SET ON TRANSMITTER STATUS
1440 005100 112001          XPRNTB: MOVB    (R0)+,R1
1441 005102 122701 000377  CMPB    #377,R1
1442 005106 001413          BEQ     1$         ;BR IF END OF MSG.
1443 005110 122701 000033  5$:    CMPB    #33,R1   ;TEST FOR ESC
1444 005114 001003          BNE     3$         ;BR IF NOT
1445 005116 005237 005170  INC     ANESC     ;SET SOFT FLAG
1446 005122 000402          BR      4$
1447 005124 005037 005170  3$:    CLR     ANESC     ;CLEAR SOFT FLAG
1448 005130 110177 174124  4$:    MOVB    R1,@VTOB  ;LOAD CHAR
1449 005134 000752          BR      XPRNTA     ;GO GET NEXT CHAR.
1450
1451          ;NORMAL EXIT
1452
1453 005136 005037 005160  1$:    CLR     XOFFOK
1454 005142 005037 005172  CLR     IGNORE
1455 005146 005037 005156  CLR     XOFFBR
1456 005152 000207          RTS     PC         ;EXIT
1457
1458 005154 000000  LOOP:  0
1459 005156 000000  XOFFBR: 0
1460 005160 000000  XOFFOK: 0
1461 005162 000000  AXOFF:  0
1462 005164 000000  XOFFRC: 0
1463 005166 000000  XONRC:  0
1464 005170 000000  ANESC:  0
1465 005172 000C00  IGNORE: 0          ;WHEN SET IGNORE KEYBOARD FLAGS
1466
1467          ;SUBROUTINE TO PRINT A BLOCK OF 5 LINES EACH (FOR CHAR. ATTR. TEST F - SO/SI)
1468
1469          BLKPRT: MOV      #5,R2      ;SET UP LINE COUNTER
1470 005174 012702 000005  1$:    JSR     R5,AMSG    ;TYPE CHAR. ATTR. MSG (SO/SI)
1471 005200 004537 005340  ATTS
1472 005204 011366          DEC     R2         ;DECREMENT LINE COUNTER
1473 005206 005302          BNE     1$         ;LOOP UNTIL MSG PRINTED 5 TIMES
1474 005210 001373          RTS     PC         ;THEN RETURN
1475 005212 000207
1476
1477          ;PROGRAM DELAY ROUTINE
1478
1479
1480 005214 013737 001234 005262  DELAY: MOV      SUBTST,10$   ;LOAD COUNT

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1481 005222 005037 005264          CLR      11$
1482 005226 032777 010000 173704 2$:  BIT      #BIT12,@SWR      ;TEST SR
1483 005234 001006          BNE      3$              ;BR IF SET
1484 005236 005337 005264          DEC      11$            ;DELAY
1485 005242 001371          BNE      2$
1486 005244 005337 005262          DEC      10$
1487 005250 100366          BPL      2$              ;DELAY
1488 005252 000240          3$:  NOP
1489 005254 000240          NOP
1490 005256 000240          NOP
1491 005260 000207          RTS      PC              ;EXIT
1492
1493 005262 000002          10$:  2
1494 005264 000000          11$:  0
1495
1496 005266 013737 001234 005334 ADELAY: MOV      SUBTST,10$
1497 005274 005037 005336          CLR      11$
1498 005300 006237 005334          ASR      10$
1499 005304 006237 005334          ASR      10$
1500 005310 005337 005336          2$:  DEC      11$
1501 005314 001375          BNE      2$
1502 005316 005337 005334          DEC      10$
1503 005322 100372          BPL      2$
1504 005324 000240          NOP
1505 005326 000240          NOP
1506 005330 000240          NOP
1507 005332 000207          RTS      PC
1508 005334 000000          10$:  0
1509 005336 000000          11$:  0
1510
1511
1512          ;HEADER SUBROUTINE FOR M7142
1513
1514 005340 012537 005350          AM$G:  MOV      (R5)+,10$      ;GET POINTER
1515 005344 004537 006412          1$:  JSR      R5,MTOB          ;MOVE TO BUFFER
1516 005350 000000          10$:  0
1517 005352 004737 005056          11$:  JSR      PC,XPRNT        ;DISPLAY IT
1518 005356 000205          RTS      R5              ;EXIT
1519
1520
1521          ;OCTAL - 3 BIT CONVERSION
1522
1523 005360 010001          OCTAL:  MOV      R0,R1          ;LOAD R1
1524 005362 042701 177770          BIC      #177770,R1          ;MASK
1525 005366 062701 000060          ADD      #60,R1
1526 005372 110137 005454          MOV      R1,DIG2          ;SAVE LSD
1527 005376 010001          MOV      R0,R1
1528 005400 006001          ROR      R1
1529 005402 006001          ROR      R1
1530 005404 006001          ROR      R1
1531 005406 042701 177770          BIC      #177770,R1
1532 005412 062701 000060          ADD      #60,R1
1533 005416 110137 005452          MOV      R1,DIG1          ;SAVE IT
1534 005422 010001          MOV      R0,R1
1535 005424 006101          ROL      R1
1536 005426 006101          ROL      R1
  
```

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1537 005430 000301          SWAB    R1
1538 005432 042701 177770    BIC    #177770,R1
1539 005436 062701 000060    ADD    #60,R1
1540 005442 110137 005450    MOVB   R1,DIG0      ;SAVE MSD
1541 005446 000207          RTS     PC           ;EXIT
1542
1543 005450 000000          DIG0:   0
1544 005452 000000          DIG1:   0
1545 005454 000000          DIG2:   0
1546
1547          ;SUBROUTINE FOR THE KEYBOARD CHARACTER TEST
1548 005456 004537 005340    TSTROW: JSR    R5,AMSG      ;DISPLAY HEADER
1549 005462 007310          MKBA
1550 005464 004737 006334    1$:    CALL   GETCHR          ;GET A CHARACTER
1551 005470 000775          BR     1$              ;WAIT FOR INPUT
1552 005472 004737 005716    CALL   PARITY          ;ADJUST CHAR IF PARITY
1553 005476 120027 000040    CMPB   RO,#40          ;SEE IF IT IS A PRINTING CHAR.
1554 005502 002410          BLT    12$             ;ECHO IF IT IS (40-176)
1555 005504 120027 000176    CMPB   RO,#176
1556 005510 003005          BGT    12$
1557 005512 110077 173542    MOVB   RO,@VTOB        ;ECHO THE CHAR.
1558 005516 105777 173534    11$:   TSTB   @VTOS          ;WAIT UNTIL ECHO'D
1559 005522 100375          BPL    11$
1560 005524 120037 005706    12$:   CMPB   RO,100$       ;CMP EXPCT AND RCVD
1561 005530 001003          BNE    2$              ;TYPE ERROR INFO
1562 005532 005722          TST    (R2)+
1563 005534 100353          BPL    1$              ;LOOP TILL DONE
1564 005536 000207          RETURN                 ;EXIT TEST
1565
1566          ;COME HERE IF EXPECTED NOT EQUAL TO RECVD
1567          ;CONVERT RESULTS TO OCTAL FOR TYPEOUT
1568
1569 005540 010037 001126    2$:    MOV    RO,$BDDAT      ;LOAD BAD CHARACTER
1570 005544 004737 005360    JSR    PC,OCTAL        ;CONVERT TO OCTAL
1571 005550 113737 005450 010226    MOVB   DIG0,MKBQB      ;LOAD OCTAL #
1572 005556 113737 005452 010227    MOVB   DIG1,MKBQB+1
1573 005564 113737 005454 010230    MOVB   DIG2,MKBQB+2
1574 005572 042700 177600    BIC    #177600,RO
1575 005576 120027 000040    CMPB   RO,#40          ;TEST IF PRINTABLE
1576 005602 101002          BHI    10$             ;BR IF PRINTABLE
1577 005604 112700 000056    MOVB   #56,RO          ;CONVERT TO A "*" CHARACTER
1578 005610 110037 010222    10$:   MOVB   RO,MKBQ2        ;SAVE CHAR
1579 005614 011200          MOV    (R2),RO         ;GET GOOD CHAR
1580 005616 053700 005714    BIS    MASK2,RO
1581 005622 010037 001124    MOV    RO,$GDDAT      ;LOAD GOOD CHARACTER
1582 005626 004737 005360    JSR    PC,OCTAL        ;CONVERT IT
1583 005632 113737 005450 010207    MOVB   DIG0,MKBQA      ;LOAD DIGIT
1584 005640 113737 005452 010210    MOVB   DIG1,MKBQA+1
1585 005646 113737 005454 010211    MOVB   DIG2,MKBQA+2
1586 005654 042700 177600    BIC    #177600,RO
1587 005660 110037 010203    MOVB   RO,MKBQ1        ;SAVE CHAR
1588 005664 023737 001252 001144    CMP    VTIS,$TKS      ;TEST IF ON CTY
1589 005672 001403          BEQ    3$              ;BR IF YES
1590 005674 004537 005340    JSR    R5,AMSG        ;DISPLAY ERROR MESSAGE
1591 005700 010142          MKBQ
1592 005702 104003    3$:    ERROR  3             ;CHARACTER RECVD NOT EQUAL TO EXPECTED
    
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1593 005704 000667          BR      1$          ;BR BACK AND TEST THE CHARACTER AGAIN
1594
1595 005706 000000          100$:  0
1596 005710 000000          101$:  0
1597 005712 177600          MASK1: 177600
1598 005714 000000          MASK2:  0
1599
1600          ;TEST TO ADD PARITY TO EXPCTD CHAR
1601 005716 012737 177600 005712 PARITY: MOV      #177600,MASK1
1602 005724 005037 005714          CLR      MASK2
1603 005730 032777 000004 173202          BIT      #BIT2,@SWR          ;TEST SWR
1604 005736 001416          BEQ      4$          ;DO NOT TEST PARITY BIT
1605 005740 042737 000200 005712          BIC      #BIT7,MASK1          ;ENABLE PARITY BIT
1606 005746 032777 000002 173164          BIT      #BIT1,@SWR          ;TEST IF FORCED PARITY
1607 005754 001417          BEQ      5$          ;BR IF NOT FORCED PARITY BIT
1608 005756 032777 000001 173154          BIT      #BIT0,@SWR          ;TEST FOR EVEN/ODD PARITY
1609 005764 001403          BEQ      4$          ;BR IF ALWAYS OFF
1610 005766 052737 000200 005714          BIS      #BIT7,MASK2          ;SET BIT 7
1611 005774 111237 005706          4$:  MOVB     (R2),100$          ;GET EXPECTED
1612 006000 053737 005714 005706          BIS      MASK2,100$          ;SET BIT 7 IF EXPECTED
1613 006006 043700 005712          BIC      MASK1,R0          ;MASK VALUE READ
1614 006012 000207          RETURN          ;EXIT ROUTINE
1615 006014 005037 005710          5$:  CLR      101$          ;CLEAR TEMP
1616 006020 111237 005706          MOVB     (R2),100$          ;CLEAR CHAR SAVE
1617 006024 006037 005706          20$:  ROR      100$          ;ROTATE CHAR
1618 006030 103002          BCC      21$          ;BR IF NO CARRY
1619 006032 005237 005710          INC      101$          ;UPDATE CNT
1620 006036 105737 005706          21$:  TSTB     100$          ;DONE ?
1621 006042 001370          BNE      20$          ;BR IF NOT
1622 006044 032777 000001 173066          BIT      #BIT0,@SWR          ;TEST EVEN/ODD
1623 006052 001407          BEQ      23$          ;BR IF OPER. SAYS EVEN
1624 006054 006037 005710          ROR      101$          ;
1625 006060 103403          BCS      22$          ;BR IF ODD ALREADY
1626 006062 052737 000200 005714          BIS      #BIT7,MASK2          ;SET PARITY BIT
1627 006070 000741          22$:  BR      4$          ;BR TO TEST CHAR
1628 006072 006037 005710          23$:  ROR      101$          ;
1629 006076 103003          BCC      24$          ;BR IF EVEN ALREADY
1630 006100 052737 000200 005714          BIS      #BIT7,MASK2
1631 006106 000732          24$:  BR      4$          ;BR TO TEST CHAR
1632
1633
1634
1635
1636          .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
1637
1638          ;*****
1639          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
1640          ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
1641          ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
1642          ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
1643          ;*REPLACED WITH SPACES.
1644          ;*CALL:
1645          ;*      MOV      NUM,-(SP)          ;;PUT THE BINARY NUMBER ON THE STACK
1646          ;*      TYPDS          ;;GO TO THE ROUTINE
1647
1648 006110          $TYPDS:
  
```

```

1649 006110 010046      MOV      R0,-(SP)      ;;PUSH R0 ON STACK
1650 006112 010146      MOV      R1,-(SP)      ;;PUSH R1 ON STACK
1651 006114 010246      MOV      R2,-(SP)      ;;PUSH R2 ON STACK
1652 006116 010346      MOV      R3,-(SP)      ;;PUSH R3 ON STACK
1653 006120 010546      MOV      R5,-(SP)      ;;PUSH R5 ON STACK
1654 006122 012746 020200  MOV      #20200,-(SP)  ;;SET BLANK SWITCH AND SIGN
1655 006126 016605 000020  MOV      20(SP),R5    ;;GET THE INPUT NUMBER
1656 006132 100004      BPL      1$           ;;BR IF INPUT IS POS.
1657 006134 005405      NEG      R5           ;;MAKE THE BINARY NUMBER POS.
1658 006136 112766 000055 000001  MOVB     #'-,1(SP)    ;;MAKE THE ASCII NUMBER NEG.
1659 006144 005000      CLR      R0           ;;ZERO THE CONSTANTS INDEX
1660 006146 012703 006324 1$:      MOV      #SDBLK,R3    ;;SETUP THE OUTPUT POINTER
1661 006152 112723 000040  MOVB     #' ,(R3)+    ;;SET THE FIRST CHARACTER TO A BLANK
1662 006156 005002      CLR      R2           ;;CLEAR THE BCD NUMBER
1663 006160 016001 006314 2$:      MOV      $DTBL(R0),R1 ;;GET THE CONSTANT
1664 006164 160105      SUB      R1,R5        ;;FORM THIS BCD DIGIT
1665 006166 002402      BLT     4$           ;;BR IF DONE
1666 006170 005202      INC     R2           ;;INCREASE THE BCD DIGIT BY 1
1667 006172 000774      BR      3$
1668 006174 060105      4$:      ADD     R1,R5        ;;ADD BACK THE CONSTANT
1669 006176 005702      TST     R2           ;;CHECK IF BCD DIGIT=0
1670 006200 001002      BNE     5$           ;;FALL THROUGH IF 0
1671 006202 105716      TSTB    (SP)         ;;STILL DOING LEADING 0'S?
1672 006204 100407      BMI     7$           ;;BR IF YES
1673 006206 106316      5$:      ASLB    (SP)         ;;MSD?
1674 006210 103003      BCC     6$           ;;BR IF NO
1675 006212 116663 000001 177777  MOVB     1(SP),-1(R3) ;;YES--SET THE SIGN
1676 006220 052702 000060 6$:      BIS     #'0,R2       ;;MAKE THE BCD DIGIT ASCII
1677 006224 052702 000040 7$:      BIS     #' ,R2       ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
1678 006230 110223      MOVB     R2,(R3)+    ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
1679 006232 005720      TST     (R0)+       ;;JUST INCREMENTING
1680 006234 020027 000010  CMP     R0,#10      ;;CHECK THE TABLE INDEX
1681 006240 002746      BLT     2$           ;;GO DO THE NEXT DIGIT
1682 006242 003002      BGT     8$           ;;GO TO EXIT
1683 006244 010502      MOV     R5,R2       ;;GET THE LSD
1684 006246 000764      BR      6$           ;;GO CHANGE TO ASCII
1685 006250 105726      8$:      TSTB    (SP)+       ;;WAS THE LSD THE FIRST NON-ZERO?
1686 006252 100003      BPL     9$           ;;BR IF NO
1687 006254 116663 177777 177776  MOVB     -1(SP),-2(R3) ;;YES--SET THE SIGN FOR TYPING
1688 006262 105013      9$:      CLRB    (R3)        ;;SET THE TERMINATOR
1689 006264 012605      MOV     (SP)+,R5    ;;POP STACK INTO R5
1690 006266 012603      MOV     (SP)+,R3    ;;POP STACK INTO R3
1691 006270 012602      MOV     (SP)+,R2    ;;POP STACK INTO R2
1692 006272 012601      MOV     (SP)+,R1    ;;POP STACK INTO R1
1693 006274 012600      MOV     (SP)+,R0    ;;POP STACK INTO R0
1694 006276 104401 006324  TYPE     $SDBLK      ;;NOW TYPE THE NUMBER
1695 006302 016666 000002 000004  MOV     2(SP),4(SP)  ;;ADJUST THE STACK
1696 006310 012616      MOV     (SP)+,(SP)
1697 006312 000002      RTI
1698 006314 023420      SDBLK: 1000.
1699 006316 001750      1000.
1700 006320 000144      100.
1701 006322 000012      10.
1702 006324 000004      SDBLK: .BLKW 4
1703
1704
;SUBROUTINE TO GET A CHARACTER FROM THE KEYBOARD

```

```
1705
1706 006334 013737 001232 006406 GETCHR: MOV    TIME0,TIME1    ;LOAD TIME COUNTER
1707 006342 005037 006410          CLR    TIME2
1708
1709 006346 105777 172700          1$:   TSTB   @VTIS      ;TEST INPUT STATUS
1710 006352 100005          BPL    2$           ;BR IF CLEARED
1711 006354 017700 172674          MOV    @VTIB,R0    ;READ A CHAR
1712 006360 062716 000002          ADD    #2,(SP)     ;UPDATE RETURN
1713 006364 000207          RTS    PC          ;EXIT
1714
1715 006366 005337 006410          2$:   DEC    TIME2      ;DELAY
1716 006372 001365          BNE    1$
1717 006374 005337 006406          DEC    TIME1      ;FINISHED ?
1718 006400 100362          BPL    1$         ;LOOP TILL TIME EXPIRED
1719 006402 104002          ERROR  2         ;NO INPUT FLAG FROM DEVICE
1720 006404 000207          RTS    PC          ;EXIT
1721
1722 006406 000000          TIME1: 0
1723 006410 000000          TIME2: 0
1724
1725          ;MOVE TO THE OUTPUT BUFFER
1726
1727 006412 012500          MTOB: MOV    (R5)+,R0    ;LOAD DEST.
1728 006414 012701 022066          MOV    #BUFFER,R1    ;LOAD R1
1729 006420 112021          1$:   MOVB   (R0)+,(R1)+ ;LOAD BYTE
1730 006422 100376          BPL    1$         ;BR UNTIL DONE
1731 006424 000205          RTS    R5         ;EXIT
1732
```

1733
1734
1735
1736
1737
1738

.SBTTL ASCII MESSAGES
:ASCII MESSAGES
: MESSAGES TO BE PRINTED BY "XPRNT" SUBROUTINE MUST BE TERMINATED
: BY A "377".

006426	006415	020012	055103	TITLE:	.ASCII	<15><15><12>\ CZVTOA M7142 SERIAL VIDEO BOARD ACCEPTANCE TEST\<15><12><0
006516	005015	005015	020040	M91:	.ASCII	<15><12><15><12>/ FULL SCREEN OF THE CHARACTER E/<15><12><377>
006566	005015	005015	020040	M93:	.ASCII	<15><12><15><12>/ SINGLE CHARACTER PER LINE /<15><12><377>
006632	005015	005015	020040	M94:	.ASCII	<15><12><15><12>/ ROTATING PATTERN /<15><12><377>
006665	015	006412	020012	M96:	.ASCII	<15><12><15><12>/ CURSOR MOTION TEST (CR,TAB,LF,BKSP,VT) /<15><12><377>
006746	005015	005015	020040	M97:	.ASCII	<15><12><15><12>/ SCROLL SPEED JUMP TEST/<15><12><377>
007006	005015	005015	020040	M99:	.ASCII	<15><12><15><12>/ COLUMN ADDRESS TEST/<15><12><377>
007043	015	006412	020012	M9221:	.ASCII	<15><12><15><12>/ CHARACTER ATTRIBUTE TEST (SO-SI SELECT)/<15><12><377>
007124	005015	005015	020040	M9222:	.ASCII	<15><12><15><12>/ CHARACTER ATTRIBUTE TEST (M.S.B. SELECT)/<15><12><377>
007206	005015	005015	020040	MKB:	.ASCII	<15><12><15><12>/ QUICK KEYBOARD CHARACTER TEST/<15><12>
007253	015	051012	046105	MKB1:	.ASCII	<15><12>/RELEASE THE "SHIFT" KEY/<15><12><377>
007310	042514	052106	052040	MKBA:	.ASCII	/LEFT TO RIGHT IN A ROW, DEPRESS ONE KEY AT A TIME/<15><12><377>
007375	015	006412	051412	MKBB2:	.ASCII	<15><12><15><12>/STARTING WITH THE TOP ROW EXCEPT THE BREAK KEY/<15><12>
007463	015	006412	051412	MKBC:	.ASCII	<15><12><15><12>/START WITH THE SECOND ROW/<15><12><377>
007524	005015	005015	052123	MKBD2:	.ASCII	<15><12><15><12>/START WITH THE THIRD ROW ,BEGIN ROW WITH "A" KEY/<15><1
007614	005015	005015	052123	MKBE:	.ASCII	<15><12><15><12>/START WITH THE FOURTH ROW EXCEPT SHIFT AND REPEAT/<15><
007705	015	006412	042012	MKBF:	.ASCII	<15><12><15><12>/DEPRESS THE SPACE BAR (THE FIFTH ROW)/<15><12><377>
007762	005015	047516	020127	MKBG:	.ASCII	<15><12>/NOW HOLD DOWN THE "LEFT-SHIFT" KEY/<15><12><377>
010031	015	047012	053517	MKPGA:	.ASCII	<15><12>/NOW HOLD DOWN THE "RIGHT-SHIFT" KEY/<15><12><377>
010101	015	047012	053517	MKBH:	.ASCII	<15><12>/NOW HOLD DOWN THE "CTRL" KEY/<15><12><377>
010142	005015	044103	051101	MKBQ:	.ASCII	<15><12>/CHARACTER WAS IN ERROR/<15><12>
010174	047507	042117	036440		.ASCII	/GOOD = /
010203	040	040	075	MKBQ1:	.BYTE	40,40,75,40
010207	040	040	040	MKBQA:	.BYTE	40,40,40,40,40
010214	040502	020104	020075		.ASCII	/BAD = /
010222	040	040	075	MKBQ2:	.BYTE	40,40,75,40
010226	040	040	040	MKBQB:	.BYTE	40,40,40,15,12,377,0
010235	015	045412	054505	MKBR:	.ASCII	<15><12>/KEYBOARD CHARACTER TEST COMPLETE/<15><12><377>
010303	015	044412	053116	INVALID:	.ASCII	<15><12>/INVALID BUS ADDRESS-PLEASE RETRY/<15><12>
010350	005015	005015	025040	MKBX:	.ASCII	<15><12><15><12>/ *** FULL KEYBOARD CHARACTER TEST ***/<15><12>
010423	015	051012	046105	MKBX1:	.ASCII	<15><12>/RELEASE THE "SHIFT" KEY/<15><12><377>
010460	005015	045440	054505	MKE:	.ASCII	<15><12>/ KEYBOARD ASCII AND OCTAL LOOP/<15><12>
010522	015	012			.BYTE	15,12
010524	044127	047105	040440		.ASCII	/WHEN A KEY IS DEPRESSED, THE ASCII CHARACTER AND/
010604	015	012			.BYTE	15,12
010606	052040	042510	052040		.ASCII	/ THE THREE DIGIT OCTAL CODE WILL BE ECHOED/
010661	015	012	377		.BYTE	15,12,377,0
010665	015	041412	040510	MKEA:	.ASCII	<15><12>/CHAR = /
010676	040	040	040	MKEA1:	.BYTE	40,40,40,75,40
010703	040	040	040	MKEB:	.BYTE	40,40,40,15,12,377,0
010712	005015	042513	041131	MKEH:	.ASCII	<15><12>/KEYBOARD ECHO LOOP/<15><12><377>
010742	056033	057433	005015	MQ0:	.ASCII	<33><134><33><137><15><12><12>/LOOP ON TEST PATTERN LETTER (A THRU M) ?
011027	033	015534	006537	MQ1:	.ASCII	<33><134><33><137><15><12><12>/START AT TEST PATTERN LETTER (A THRU M) ?
011115	015	005012	051124	MQ2:	.ASCII	<15><12><12>/TRY AGAIN /<15><12><377>
011136	005015	005015	020040	M98:	.ASCII	<15><12><15><12>/ DIRECT CURSOR ADDRESSING TEST /<377>
011205	014	000377		FRMFED:	.ASCII	<14><377>
011210	010	010	010	SCRL:	.BYTE	10,10,10,10,10,10,10,10,10,10
011223	040	051440	051103		.ASCII	/ SCROLL # /
011236	060	000	377	SCRNO:	.BYTE	60,0,377,0

```
011242 005015 044124 026505 ATTR8: .ASCII <15><12>/THE-CHARACTER-ATTRIBUTE(S)-ON-THIS-LINE-IS/  
011316 040450 042522 026451 .ASCIIZ /(ARE)-SELECTED(DESELECTED)-BY-'M.S.B'./<377>  
011366 005015 044124 026505 ATTRS: .ASCII <15><12>/THE-CHARACTER-ATTRIBUTE(S)-ON-THIS-LINE-IS/  
011442 040450 042522 026451 .ASCIIZ /(ARE)-SELECTED(DESELECTED)-BY-'SO-SI'./<377>  
011512 177416 000 SI: .ASCIIZ <16><377>  
011515 017 000377 SI: .ASCIIZ <17><377>  
011520 005015 043012 051111 WHAT0: .ASCIIZ <15><12><12>/FIRST LINE DEVICE ADDRESS ? = /<377>  
011563 015 005012 040514 WHAT1: .ASCIIZ <15><12><12>/LAST LINE DEVICE ADDRESS (CR IF NONE) ? = /<377>  
011642 005015 020040 020040 PASHED: .ASCIIZ <15><12>/ PASS #/  
011665 105 051122 051117 EM1: .ASCIIZ /ERROR FLAG SET ON TRANSMITTER STATUS/  
011732 047516 044440 050116 EM2: .ASCIIZ /NO INPUT FLAG DETECTED/  
011761 125 042516 050130 EM3: .ASCIIZ /UNEXPECTED OR INCORRECT INPUT CHAR/  
012024 051105 050122 020103 DH1: .ASCIIZ /ERRPC VTNOW TSTNUM/  
012053 105 051122 041520 DH3: .ASCIIZ /ERRPC VTNOW TSTNUM EXPCT RECV/  
 .EVEN  
012122 001116 001226 001230 DT1: $ERRPC,VTNOW,TSTNUM,0  
012132 001116 001226 001230 DT3: $ERRPC,VTNOW,TSTNUM,$GDDAT,$BDDAT,0
```

.SBTTL KEYBOARD CHARACTER CODE TABLES

;THE ACTUAL KEYBOARD LAYOUT IS REQUIRED

```
012146 012166 012224 012262 V52RW: ROW12,ROW22,ROW32,ROW42,ROW12S,ROW12S,ROW12C
```

```
012164 100040 ROW5: .WORD 100040
```

;M7142 KEYBOARD EQUIVALENCES(LOWER CASE CHAR.)

```
012166 000033 000061 000062 ROW12: .WORD 33,61,62,63,64,65,66,67,70,71,60,55,75,140,100010  
012224 000011 000161 000167 ROW22: .WORD 11,161,167,145,162,164,171,165,151,157,160,133,134,12,100177  
012262 000141 000163 000144 ROW32: .WORD 141,163,144,146,147,150,152,153,154,73,47,173,100015  
012314 000172 000170 000143 ROW42: .WORD 172,170,143,166,142,156,155,54,56,100057
```

;SHIFTED ROW CODES

```
012340 000033 000041 000100 ROW12S: .WORD 33,41,100,43,44,45,136,46,52,50,51,137,53,176,100010
```

;CONTROL ROW CODES

```
012376 000033 000021 000022 ROW12C: .WORD 33,21,22,23,24,25,26,27,30,31,20,15,35,0,100010
```

```
012434 005015 042513 020131 ERCHR: .ASCII <15><12>/KEY CODE ERROR/<377>  
012455 123 040524 052122 INSTR: .ASCII /START 1ST ROW LEFT TO RIGHT/<15><12>  
012512 051120 041517 042505 .ASCII /PROCEED TO LAST ROW/<15><12><377>
```

```
012540 005015 020012 040524 MTAB: .ASCII <15><12><12>/ TAB OVER-NO CHARACTER ERASE <CR>/<15>  
012605 011 011 011 .BYTE 11,11,11,11,11,11,11,11,11,11,11,11,11,11,11,11,11,11  
012631 011 011 011 .BYTE 11,11,11,11,11,11,11,11,11,11,11,11,11  
012646 041474 037122 177415 .ASCII /<CR>/<15><377>  
012654 036012 043114 005076 MBKSP: .ASCII <12>/<LF>/<12>/<LF>/<12>/<LF>/<12>/<LF>/  
012700 041040 041501 051513 .ASCII / BACKSPACE OVER-NO CHAR. ERASE/  
012736 010 010 010 .BYTE 10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10  
012755 010 010 010 .BYTE 10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10  
012774 010 010 010 .BYTE 10,10,10,10,10,10,10,10,10,10,377
```

```

013006 036015 051103 006476 MVT: .ASCII <15>/<CR>/<15><13>/<VT>/<13>/<VT>/
013026 036013 052126 005476 .ASCII <13>/<VT>/<13>/<VT>/<13>/<VT><CR>/<15><377>

013053 015 005012 044124 MTEXT0: .ASCIZ <15><12><12>/THIS SOFTWARE IS FURNISHED TO PURCHASER UNDER A LICENSE FOR
013157 015 047412 020116 MTEXT1: .ASCIZ <15><12>/ON A SINGLE COMPUTER SYSTEM AND CAN BE COPIED (WITH INCLUSION/<
013260 005015 043117 042040 MTEXT2: .ASCIZ <15><12>/OF DEC'S COPYRIGHT NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT/
013362 005015 051501 046440 MTEXT3: .ASCIZ <15><12>/AS MAY OTHERWISE BE PROVIDED IN WRITING BY DEC./<377>

013445 015 005012 044124 MTEXT4: .ASCIZ <15><12><12>/THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHO
013547 015 047012 052117 MTEXT5: .ASCIZ <15><12>/NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL/<
013650 005015 050505 044525 MTEXT6: .ASCIZ <15><12>/EQUIPMENT CORPORATION./<377>
013702 005015 042012 041505 MTEXT7: .ASCIZ <15><12><12>/DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF
014002 005015 052111 020123 MTEXT8: .ASCII <15><12>/ITS SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC./
014073 015 012 377 .BYTE 15,12,377,0
.SBTTL TTY INPUT ROUTINE

```

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:*****
.ENABL LSB

.DSABL LSB

:*****
: *THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
: *CALL:
: *   RDCHR           ;; INPUT A SINGLE CHARACTER FROM THE TTY
: *   RETURN HERE    ;; CHARACTER IS ON THE STACK
: *                 ;; WITH PARITY BIT STRIPPED OFF
:
SRDCHR: MOV      (SP),-(SP)      ;; PUSH DOWN THE PC
        MOV      4(SP),2(SP)    ;; SAVE THE PS
1$:     TSTB     @TKS           ;; WAIT FOR
        BPL      1$             ;; A CHARACTER
        MOVB     @TKB,4(SP)     ;; READ THE TTY
        BIC      #^C<177>,4(SP) ;; GET RID OF JUNK IF ANY
        CMP      4(SP),#23     ;; IS IT A CONTROL-S?
        BNE      3$            ;; BRANCH IF NO
2$:     TSTB     @TKS           ;; WAIT FOR A CHARACTER
        BPL      2$             ;; LOOP UNTIL ITS THERE
        MOVB     @TKB,-(SP)     ;; GET CHARACTER
        BIC      #^C177,(SP)    ;; MAKE IT 7-BIT ASCII
        CMP      (SP)+,#21     ;; IS IT A CONTROL-Q?
        BNE      2$            ;; IF NOT DISCARD IT
        BR       1$            ;; YES, RESUME
3$:     CMP      4(SP),#140     ;; IS IT UPPER CASE?
        BLT      4$            ;; BRANCH IF YES
        CMP      4(SP),#175    ;; IS IT A SPECIAL CHAR?
        BGT      4$            ;; BRANCH IF YES
        BIC      #40,4(SP)     ;; MAKE IT UPPER CASE
4$:     RTI                    ;; GO BACK TO USER
:*****
: *THIS ROUTINE WILL INPUT A STRING FROM THE TTY
: *CALL:
: *   RDLIN          ;; INPUT A STRING FROM THE TTY
: *   RETURN HERE    ;; ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK

```

```

1780 ;* ;: TERMINATOR WILL BE A BYTE OF ALL 0'S
1781
1782 014220 010346 $RDLIN: MOV R3,-(SP) ;: SAVE R3
1783 014222 012703 014326 1$: MOV #$TTYIN,R3 ;: GET ADDRESS
1784 014226 022703 014336 2$: CMP #$TTYIN+8.,R3 ;: BUFFER FULL?
1785 014232 101405 BLOS 4$ ;: BR IF YES
1786 014234 104406 RDCHR ;: GO READ ONE CHARACTER FROM THE TTY
1787 014236 112613 MOVB (SP)+,(R3) ;: GET CHARACTER
1788 014240 122713 000177 10$: CMPB #177,(R3) ;: IS IT A RUBOUT
1789 014244 001003 BNE 3$ ;: SKIP IF NOT
1790 014246 104401 001166 4$: TYPE ,9QUES ;: TYPE A '?'
1791 014252 000763 BR 1$ ;: CLEAR THE BUFFER AND LOOP
1792 014254 111337 014324 3$: MOVB (R3),9$ ;: ECHO THE CHARACTER
1793 014260 104401 014324 TYPE ,9$
1794 014264 122723 000015 CMPB #15,(R3)+ ;: CHECK FOR RETURN
1795 014270 001356 BNE 2$ ;: LOOP IF NOT RETURN
1796 014272 105063 177777 CLRB -1(R3) ;: CLEAR RETURN (THE 15)
1797 014276 104401 001170 TYPE ,SLF ;: TYPE A LINE FEED
1798 014302 012603 MOV (SP)+,R3 ;: RESTORE R3
1799 014304 011646 MOV (SP),-(SP) ;: ADJUST THE STACK AND PUT ADDRESS OF THE
1800 014306 016666 000004 000002 MOV 4(SP),2(SP) ;: FIRST ASCII CHARACTER ON IT
1801 014314 012766 014326 000004 MOV #$TTYIN,4(SP)
1802 014322 000002 RTI ;: RETURN
1803 014324 000 9$: .BYTE 0 ;: STORAGE FOR ASCII CHAR. TO TYPE
1804 014325 000 .BYTE 0 ;: TERMINATOR
1805 014326 000010 $TTYIN: .BLKB 8. ;: RESERVE 8 BYTES FOR TTY INPUT
1806 014336 052536 005015 000 $CNTLU: .ASCIZ /^U/<15><12> ;: CONTROL 'U'
1807 014343 136 006507 000012 $CNTLG: .ASCIZ /^G/<15><12> ;: CONTROL 'G'
1808 014350 005015 053523 020122 $MSWR: .ASCIZ <15><12>/SWR = /
1809 014356 020075 000 $MNEW: .ASCIZ / NEW = /
1810 014361 040 047040 053505
1811 014366 036440 000040
1812 .SBTTL READ AN OCTAL NUMBER FROM THE TTY
1813
1814 ;:*****
1815 ;: THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
1816 ;: CHANGE IT TO BINARY.
1817 ;: THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
1818 ;: OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
1819 ;: FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
1820 ;: THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
1821 ;: CALL:
1822 ;: * RDOCT ;: READ AN OCTAL NUMBER
1823 ;: * RETURN HERE ;: LOW ORDER BITS ARE ON TOP OF THE STACK
1824 ;: * ;: HIGH ORDER BITS ARE IN $HIOCT
1825
1826 014372 011646 $RDOCT: MOV (SP),-(SP) ;: PROVIDE SPACE FOR THE
1827 014374 016666 000004 000002 MOV 4(SP),2(SP) ;: INPUT NUMBER
1828 014402 010046 MOV R0,-(SP) ;: PUSH R0 ON STACK
1829 014404 010146 MOV R1,-(SP) ;: PUSH R1 ON STACK
1830 014406 010246 MOV R2,-(SP) ;: PUSH R2 ON STACK
1831 014410 104407 1$: RDLIN ;: READ AN ASCII LINE
1832 014412 012600 MOV (SP)+,R0 ;: GET ADDRESS OF 1ST CHARACTER
1833 014414 010037 014520 MOV R0,5$ ;: AND SAVE IT
1834 014420 005001 CLR R1 ;: CLEAR DATA WORD
1835 014422 005002 CLR R2

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1836 014424 112046          2$:   MOVB   (R0)+,-(SP)   ;;PICKUP THIS CHARACTER
1837 014426 001420          BEQ    3$              ;;IF ZERO GET OUT
1838 014430 122716 000060   CMPB   #'0,(SP)       ;;MAKE SURE THIS CHARACTER
1839 014434 003026          BGT    4$              ;;IS AN OCTAL DIGIT
1840 014436 122716 000067   CMPB   #'7,(SP)
1841 014442 002423          BLT    4$
1842 014444 006301          ASL    R1              ;;*2
1843 014446 006102          ROL    R2
1844 014450 006301          ASL    R1              ;;*4
1845 014452 006102          ROL    R2
1846 014454 006301          ASL    R1              ;;*8
1847 014456 006102          ROL    R2
1848 014460 042716 177770   BIC    #'^C7,(SP)     ;;STRIP THE ASCII JUNK
1849 014464 062601          ADD    (SP)+,R1       ;;ADD IN THIS DIGIT
1850 014466 000756          BR     2$              ;;LOOP
1851 014470 005726          3$:   TST    (SP)+       ;;CLEAN TERMINATOR FROM STACK
1852 014472 010166 000012   MOV    R1,12(SP)      ;;SAVE THE RESULT
1853 014476 010237 014530   MOV    R2,$HIOCT
1854 014502 012602          MOV    (SP)+,R2       ;;POP STACK INTO R2
1855 014504 012601          MOV    (SP)+,R1       ;;POP STACK INTO R1
1856 014506 012600          MOV    (SP)+,R0       ;;POP STACK INTO R0
1857 014510 000002          RTI                    ;;RETURN
1858 014512 005726          4$:   TST    (SP)+       ;;CLEAN PARTIAL FROM STACK
1859 014514 105010          CLRB   (R0)           ;;SET A TERMINATOR
1860 014516 104401          TYPE                    ;;TYPE UP THRU THE BAD CHAR.
1861 014520 000000          5$:   .WORD   0
1862 014522 104401 001166   TYPE   ,SQUES        ;; "?" "CR" & "LF"
1863 014526 000730          BR     1$              ;;TRY AGAIN
1864 014530 000000          $HIOCT: .WORD 0       ;;HIGH ORDER BITS GO HERE
1865 014532 032777 001000 164400 MSCOPE: BIT   #BIT9,@SWR  ;;TEST BIT 7
1866 014540 001403          BEQ    $SCOPE         ;;NOT SET
1867 014542 005737 005154   TST    LOOP           ;;TEST LOOP
1868 014546 001041          BNE    $OVER          ;;SET LOOP ON TEST
1869
1870          .SBTTL  SCOPE HANDLER ROUTINE
1871
1872          ;;*****
1873          ;;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
1874          ;;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
1875          ;;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
1876          ;;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
1877          ;;*SW14=1      LOOP ON TEST
1878          ;;*SW08=1      LOOP ON TEST IN SWR<7:0>
1879          ;;*CALL
1880          ;;*      SCOPE          ;;SCOPE=IOT
1881
1882 014550          $SCOPE:
1883 014550 032777 040000 164362 1$:   BIT    #BIT14,@SWR    ;;LOOP ON PRESENT TEST?
1884 014556 001035          BNE    $OVER          ;;YES IF SW14=1
1885          ;;*****START OF CODE FOR THE XOR TESTER*****
1886 014560 000416          $XTSTR: BR    6$      ;;IF RUNNING ON THE "XOR" TESTER CHANGE
1887          ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
1888 014562 013746 000004          MOV    @#ERRVEC,-(SP) ;;SAVE THE CONTENTS OF THE ERROR VECTOR
1889 014566 012737 014606 000004   MOV    #5$,@#ERRVEC  ;;SET FOR TIMEOUT
1890 014574 005737 177060          TST    @#177060      ;;TIME OUT ON XOR?
1891 014600 012637 000004          MOV    (SP)+,@#ERRVEC ;;RESTORE THE ERROR VECTOR

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1892 014604 000414          BR      $SVLAD          ;;GO TO THE NEXT TEST
1893 014606 022626          5$:    CMP      (SP)+,(SP)+  ;;CLEAR THE STACK AFTER A TIME OUT
1894 014610 012637 000004    MOV      (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
1895 014614 000416          BR      $OVER          ;;LOOP ON THE PRESENT TEST
1896 014616                6$:    ;#####END OF CODE FOR THE XOR TESTER#####
1897 014616 032777 000400 164314  BIT      #BIT08,@SWR      ;;LOOP ON SPEC. TEST?
1898 014624 001404          BEQ      $SVLAD          ;;BR IF NO
1899 014626 127737 164306 001102  CMPB     @SWR,$STNM      ;;ON THE RIGHT TEST?   SWR<7:0>
1900 014634 001406          BEQ      $OVER          ;;BR IF YES
1901 014636 105237 001102  $SVLAD: INCB     $STNM      ;;COUNT TEST NUMBERS
1902 014642 011637 001106    MOV      (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
1903 014646 105037 001103    CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
1904 014652 013777 001102 164262 $OVER:  MOV      $STNM,@DISPLAY ;;DISPLAY TEST NUMBER
1905 014660 013716 001106    MOV      $LPADR,(SP)    ;;FUDGE RETURN ADDRESS
1906 014664 000002          RTI                    ;;FIXES PS
    
```

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1907
1908          .SBTTL  ERROR HANDLER ROUTINE
1909
1910          ;*****
1911          ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
1912          ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
1913          ;*AND GO TO $ERRTYP ON ERROR
1914          ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
1915          ;*SW15=1          HALT ON ERROR
1916          ;*SW13=1          INHIBIT ERROR TYPEOUTS
1917          ;*CALL
1918          ;*      ERROR  N          ;;ERROR=EMT AND N=ERROR ITEM NUMBER
1919
    
```

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1920 014666                $ERROR:
1921 014666 113737 001102 001230    MOVB     $STNM,$TSTNUM
1922 014674 105237 001103          7$:    INCB     $ERFLG          ;;SET THE ERROR FLAG
1923 014700 001775          BEQ      7$              ;;DON'T LET THE FLAG GO TO ZERO
1924 014702 013777 001102 164232    MOV      $STNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
1925 014710 005237 001112          INC      $ERTTL          ;;INC THE ERROR COUNT
1926 014714 011637 001116    MOV      (SP),$ERRPC    ;;GET ADDRESS OF ERROR INSTRUCTION
1927 014720 162737 000002 001116  SUB      #2,$ERRPC
1928 014726 117737 164164 001114    MOVB     @ $ERRPC,$ITEMB ;;STRIP AND SAVE THE ERROR ITEM CODE
1929 014734 032777 020000 164176  BIT      #BIT13,@SWR    ;;SKIP TYPEOUT IF SET
1930 014742 001004          BNE     20$              ;;SKIP TYPEOUTS
1931 014744 004737 015000          JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
1932 014750 104401 001167          TYPE    , $CRLF
1933 014754                20$:
1934 014754 005777 164160          2$:    TST      @SWR            ;;HALT ON ERROR
1935 014760 100001          BPL     3$              ;;SKIP IF CONTINUE
1936 014762 000000          HALT                    ;;HALT ON ERROR!
1937 014764                3$:
1938 014764 022737 003764 000042    CMP      # $ENDAD,@#42  ;;ACT-11 AUTO-ACCEPT?
1939 014772 001001          BNE     6$              ;;BRANCH IF NO
1940 014774 000000          HALT                    ;;YES
1941 014776                6$:
1942 014776 000002          RTI                    ;;RETURN
    
```

```

1943          .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
1944
1945          ;*****
1946          ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
1947
    
```

```

1948      ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE 'ERROR TABLE' ($ERRTB),
1949      ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
1950
1951 015000 $ERRTYP:
1952 015000 104401 001167      TYPE      , $CRLF      ;; "CARRIAGE RETURN" & "LINE FEED"
1953 015004 010046      MOV      RO, -(SP)      ;; SAVE RO
1954 015006 005000      CLR      RO      ;; PICKUP THE ITEM INDEX
1955 015010 153700 001114      BISB     @#$ITEMB, RO
1956 015014 001004      BNE     1$      ;; IF ITEM NUMBER IS ZERO, JUST
1957      ;; TYPE THE PC OF THE ERROR
1958 015016 013746 001116      MOV      $ERRPC, -(SP)      ;; SAVE $ERRPC FOR TYPEOUT
1959      ;; ERROR ADDRESS
1960 015022 104402      TYPOC     ;; GO TYPE--OCTAL ASCII(ALL DIGITS)
1961 015024 000426      BR      6$      ;; GET OUT
1962 015026 005300 1$:      DEC      RO      ;; ADJUST THE INDEX SO THAT IT WILL
1963 015030 006300      ASL     RO      ;; WORK FOR THE ERROR TABLE
1964 015032 006300      ASL     RO
1965 015034 006300      ASL     RO
1966 015036 062700 001172      ADD     #$ERRTB, RO      ;; FORM TABLE POINTER
1967 015042 012037 015052      MOV     (RO)+, 2$      ;; PICKUP "ERROR MESSAGE" POINTER
1968 015046 001404      BEQ     3$      ;; SKIP TYPEOUT IF NO POINTER
1969 015050 104401      TYPE     ;; TYPE THE "ERROR MESSAGE"
1970 015052 000000 2$:      .WORD   0      ;; "ERROR MESSAGE" POINTER GOES HERE
1971 015054 104401 001167      TYPE     , $CRLF      ;; "CARRIAGE RETURN" & "LINE FEED"
1972 015060 012037 015070 3$:      MOV     (RO)+, 4$      ;; PICKUP "DATA HEADER" POINTER
1973 015064 001404      BEQ     5$      ;; SKIP TYPEOUT IF 0
1974 015066 104401      TYPE     ;; TYPE THE "DATA HEADER"
1975 015070 000000 4$:      .WORD   0      ;; "DATA HEADER" POINTER GOES HERE
1976 015072 104401 001167      TYPE     , $CRLF      ;; "CARRIAGE RETURN" & "LINE FEED"
1977 015076 011000 5$:      MOV     (RO), RO      ;; PICKUP "DATA TABLE" POINTER
1978 015100 001004      BNE     7$      ;; GO TYPE THE DATA
1979 015102 012600 6$:      MOV     (SP)+, RO      ;; RESTORE RO
1980 015104 104401 001167      TYPE     , $CRLF      ;; "CARRIAGE RETURN" & "LINE FEED"
1981 015110 000207      RTS     PC      ;; RETURN
1982 015112 7$:
1983 015112 013046      MOV     @ (RO)+, -(SP)      ;; SAVE @ (RO)+ FOR TYPEOUT
1984 015114 104402      TYPOC     ;; GO TYPE--OCTAL ASCII(ALL DIGITS)
1985 015116 005710      TST     (RO)      ;; IS THERE ANOTHER NUMBER?
1986 015120 001770      BEQ     6$      ;; BR IF NO
1987 015122 104401 015130      TYPE     , 8$      ;; TYPE TWO(2) SPACES
1988 015126 000771      BR      7$      ;; LOOP
1989 015130 020040 000 8$:      .ASCIZ  / /      ;; TWO(2) SPACES
1990      .EVEN

```

.SBTTL TYPE ROUTINE

```

1991
1992
1993
1994
1995      ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
1996      ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
1997      ;*NOTE1:      $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
1998      ;*NOTE2:      $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
1999      ;*NOTE3:      $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
2000
2001      ;*
2002      ;*CALL:
2003      ;*1) USING A TRAP INSTRUCTION
2004      ;*      TYPE      ,MESADR      ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING

```

```

2004 ;*OR
2005 ;*
2006 ;* TYPE
2007 ;* MESADR
2008 ;*
2009 015134 105737 001157 $TYPE: TSTB $TPFLG ;; IS THERE A TERMINAL?
2010 015140 100002 BPL 1$ ;; BR IF YES
2011 015142 000000 HALT ;; HALT HERE IF NO TERMINAL
2012 015144 000407 BR 3$ ;; LEAVE
2013 015146 010046 1$: MOV RO,-(SP) ;; SAVE RO
2014 015150 017600 000002 MOV @2(SP),RO ;; GET ADDRESS OF ASCIZ STRING
2015 015154 112046 2$: MOVB (RO)+,-(SP) ;; PUSH CHARACTER TO BE TYPED ONTO STACK
2016 015156 001005 BNE 4$ ;; BR IF IT ISN'T THE TERMINATOR
2017 015160 005726 TST (SP)+ ;; IF TERMINATOR POP IT OFF THE STACK
2018 015162 012600 60$: MOV (SP)+,RO ;; RESTORE RO
2019 015164 062716 000002 3$: ADD #2,(SP) ;; ADJUST RETURN PC
2020 015170 000002 RTI ;; RETURN
2021 015172 122716 000011 4$: CMPB #HT,(SP) ;; BRANCH IF <HT>
2022 015176 001430 BEQ 8$
2023 015200 122716 000200 CMPB #CRLF,(SP) ;; BRANCH IF NOT <CRLF>
2024 015204 001006 BNE 5$
2025 015206 005726 TST (SP)+ ;; POP <CR><LF> EQUIV
2026 015210 104401 TYPE ;; TYPE A CR AND LF
2027 015212 001167 $CRLF
2028 015214 105037 015350 CLRB $CHARCNT ;; CLEAR CHARACTER COUNT
2029 015220 000755 BR 2$ ;; GET NEXT CHARACTER
2030 015222 004737 015304 5$: JSR PC,$TYPEC ;; GO TYPE THIS CHARACTER
2031 015226 123726 001156 6$: CMPB $FILLC,(SP)+ ;; IS IT TIME FOR FILLER CHARS.?
2032 015232 001350 BNE 2$ ;; IF NO GO GET NEXT CHAR.
2033 015234 013746 001154 MOV $NULL,-(SP) ;; GET # OF FILLER CHARS. NEEDED
2034 ;; AND THE NULL CHAR.
2035 015240 105366 000001 7$: DECB 1(SP) ;; DOES A NULL NEED TO BE TYPED?
2036 015244 002770 BLT 6$ ;; BR IF NO--GO POP THE NULL OFF OF STACK
2037 015246 004737 015304 JSR PC,$TYPEC ;; GO TYPE A NULL
2038 015252 105337 015350 DECB $CHARCNT ;; DO NOT COUNT AS A COUNT
2039 015256 000770 BR 7$ ;; LOOP
2040
2041 ;HORIZONTAL TAB PROCESSOR
2042
2043 015260 112716 000040 8$: MOVB #' ,(SP) ;; REPLACE TAB WITH SPACE
2044 015264 004737 015304 9$: JSR PC,$TYPEC ;; TYPE A SPACE
2045 015270 132737 000007 015350 BITB #7,$CHARCNT ;; BRANCH IF NOT AT
2046 015276 001372 BNE 9$ ;; TAB STOP
2047 015300 005726 TST (SP)+ ;; POP SPACE OFF STACK
2048 015302 000724 BR 2$ ;; GET NEXT CHARACTER
2049 015304 105777 163640 $TYPEC: TSTB @2$TPS ;; WAIT UNTIL PRINTER IS READY
2050 015310 100375 BPL $TYPEC
2051 015312 116677 000002 163632 MOVB 2(SP),@2$TPB ;; LOAD CHAR TO BE TYPED INTO DATA REG.
2052 015320 122766 000015 000002 CMPB #CR,2(SP) ;; IS CHARACTER A CARRIAGE RETURN?
2053 015326 001003 BNE 1$ ;; BRANCH IF NO
2054 015330 105037 015350 CLRB $CHARCNT ;; YES--CLEAR CHARACTER COUNT
2055 015334 000406 BR $TYPEX ;; EXIT
2056 015336 122766 000012 000002 1$: CMPB #LF,2(SP) ;; IS CHARACTER A LINE FEED?
2057 015344 001402 BEQ $TYPEX ;; BRANCH IF YES
2058 015346 105227 INCB (PC)+ ;; COUNT THE CHARACTER
2059 015350 000000 $CHARCNT: .WORD 0 ;; CHARACTER COUNT STORAGE

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```

2060 015352 000207 $TYPEX: RTS PC
2061
2062
2063 .SBTTL BINARY TO OCTAL (ASCII) AND TYPE
2064
2065 ;*****
2066 ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
2067 ;*OCTAL (ASCII) NUMBER AND TYPE IT.
2068 ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
2069 ;*CALL:
2070 ;* MOV NUM,-(SP) ;;NUMBER TO BE TYPED
2071 ;* TYPOS ;;CALL FOR TYPEOUT
2072 ;* .BYTE N ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
2073 ;* .BYTE M ;;M=1 OR 0
2074 ;* ;;1=TYPE LEADING ZEROS
2075 ;* ;;0=SUPPRESS LEADING ZEROS
2076
2077 ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
2078 ;*$TYPOS OR $TYPOC
2079 ;*CALL:
2080 ;* MOV NUM,-(SP) ;;NUMBER TO BE TYPED
2081 ;* TYPON ;;CALL FOR TYPEOUT
2082
2083 ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
2084 ;*CALL:
2085 ;* MOV NUM,-(SP) ;;NUMBER TO BE TYPED
2086 ;* TYPOC ;;CALL FOR TYPEOUT
2087
2088 015354 017646 000000 $TYPOS: MOV @ (SP),-(SP) ;;PICKUP THE MODE
2089 015360 116637 000001 015577 MOV 1(SP),%OFILL ;;LOAD ZERO FILL SWITCH
2090 015366 112637 015601 MOV 1(SP),%SOMODE+1 ;;NUMBER OF DIGITS TO TYPE
2091 015372 062716 000002 ADD #2,(SP) ;;ADJUST RETURN ADDRESS
2092 015376 000406 BR $TYPON
2093 015400 112737 000001 015577 $TYPOC: MOV #1,%OFILL ;;SET THE ZERO FILL SWITCH
2094 015406 112737 000006 015601 MOV #6,%SOMODE+1 ;;SET FOR SIX(6) DIGITS
2095 015414 112737 000005 015576 $TYPON: MOV #5,%SOCNT ;;SET THE ITERATION COUNT
2096 015422 010346 MOV R3,-(SP) ;;SAVE R3
2097 015424 010446 MOV R4,-(SP) ;;SAVE R4
2098 015426 010546 MOV R5,-(SP) ;;SAVE R5
2099 015430 113704 015601 MOV %SOMODE+1,R4 ;;GET THE NUMBER OF DIGITS TO TYPE
2100 015434 005404 NEG R4
2101 015436 062704 000006 ADD #6,R4 ;;SUBTRACT IT FOR MAX. ALLOWED
2102 015442 110437 015600 MOV R4,%SOMODE ;;SAVE IT FOR USE
2103 015446 113704 015577 MOV %OFILL,R4 ;;GET THE ZERO FILL SWITCH
2104 015452 016605 000012 MOV 12(SP),R5 ;;PICKUP THE INPUT NUMBER
2105 015456 005003 CLR R3 ;;CLEAR THE OUTPUT WORD
2106 015460 006105 1$: ROL R5 ;;ROTATE MSB INTO 'C'
2107 015462 000404 BR 3$ ;;GO DO MSB
2108 015464 006105 2$: ROL R5 ;;FORM THIS DIGIT
2109 015466 006105 ROL R5
2110 015470 006105 ROL R5
2111 015472 010503 MOV R5,R3
2112 015474 006103 3$: ROL R3 ;;GET LSB OF THIS DIGIT
2113 015476 105337 015600 DECB %SOMODE ;;TYPE THIS DIGIT?
2114 015502 100016 BPL 7$ ;;BR IF NO
2115 015504 042703 177770 BIC #177770,R3 ;;GET RID OF JUNK

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2116 015510 001002      BNE      4$      ;;TEST FOR 0
2117 015512 005704      TST      R4      ;;SUPPRESS THIS 0?
2118 015514 001403      BEQ      5$      ;;BR IF YES
2119 015516 005204      4$: INC      R4      ;;DON'T SUPPRESS ANYMORE 0'S
2120 015520 052703 000060  BIS      #'0,R3  ;;MAKE THIS DIGIT ASCII
2121 015524 052703 000040  5$: BIS      #' ,R3  ;;MAKE ASCII IF NOT ALREADY
2122 015530 110337 015574  MOVB     R3,8$   ;;SAVE FOR TYPING
2123 015534 104401 015574  TYPE     ,8$    ;;GO TYPE THIS DIGIT
2124 015540 105337 015576  7$: DECB    $OCNT ;;COUNT BY 1
2125 015544 003347      BGT      2$      ;;BR IF MORE TO DO
2126 015546 002402      BLT      6$      ;;BR IF DONE
2127 015550 005204      INC      R4      ;;INSURE LAST DIGIT ISN'T A BLANK
2128 015552 000744      BR       2$      ;;GO DO THE LAST DIGIT
2129 015554 012605      6$: MOV     (SP)+,R5 ;;RESTORE R5
2130 015556 012604      MOV     (SP)+,R4  ;;RESTORE R4
2131 015560 012603      MOV     (SP)+,R3  ;;RESTORE R3
2132 015562 016666 000002 000004  MOV     2(SP),4(SP) ;;SET THE STACK FOR RETURNING
2133 015570 012616      MOV     (SP)+,(SP)
2134 015572 000002      RTI                      ;;RETURN
2135 015574      000      8$: .BYTE   0      ;;STORAGE FOR ASCII DIGIT
2136 015575      000      .BYTE   0      ;;TERMINATOR FOR TYPE ROUTINE
2137 015576      000      $OCNT: .BYTE  0      ;;OCTAL DIGIT COUNTER
2138 015577      000      $OFILL: .BYTE  0      ;;ZERO FILL SWITCH
2139 015600 000000      $OMODE: .WORD  0      ;;NUMBER OF DIGITS TO TYPE
2140      .SBTIL  RANDOM NUMBER GENERATOR ROUTINE
2141
2142      ;;*****
2143      ;;*THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
2144      ;;*WITH A RANGE OF 0 TO 2(+33)-1.
2145      ;;*CALL:
2146      ;;*   JSR      PC,$RAND      ;;CALL THE ROUTINE
2147      ;;*   RETURN                    ;;RETURN HERE THE RANDOM
2148      ;;*                               ;;NUMBER WILL BE IN
2149      ;;*                               ;;$HINUM,$LONUM
2150
2151 015602      $RAND:
2152 015602 010046      MOV     R0,-(SP)   ;;PUSH R0 ON STACK
2153 015604 010146      MOV     R1,-(SP)   ;;PUSH R1 ON STACK
2154 015606 010246      MOV     R2,-(SP)   ;;PUSH R2 ON STACK
2155 015610 013700 015702  MOV     $LONUM,R0  ;;SET R0 WITH LOW
2156 015614 013701 015700  MOV     $HINUM,R1  ;;SET R1 WITH HIGH
2157 015620 012702 177771  MOV     #-7,R2     ;;SET SHIFT COUNT
2158 015624 006300      1$: ASL     R0      ;;SHIFT R0 LEFT AND
2159 015626 006101      ROL     R1      ;;ROTATE CARRY INTO R1 AND
2160 015630 005202      INC     R2      ;;CHECK FOR DONE
2161 015632 001374      BNE     1$      ;;CONTINUE SHIFT LOOP
2162 015634 063700 015702  ADD     $LONUM,R0  ;;ADD NUMBER TO MAKE X 129
2163 015640 005501      ADC     R1      ;;PROPOGATE CARRY
2164 015642 063701 015700  ADD     $HINUM,R1  ;;ADD NUMBER TO MAKE X 129
2165 015646 062700 001057  ADD     #1057,R0   ;;ADD LOW CONSTANT
2166 015652 005501      ADC     R1      ;;PROPOGATE CARRY
2167 015654 062701 047401  ADD     #47401,R1  ;;ADD HIGH CONSTANT
2168 015660 010037 015702  MOV     R0,$LONUM ;;SAVE R0
2169 015664 010137 015700  MOV     R1,$HINUM ;;SAVE R1
2170 015670 012602      MOV     (SP)+,R2  ;;POP STACK INTO R2
2171 015672 012601      MOV     (SP)+,R1  ;;POP STACK INTO R1
  
```

2172 015674 012600
2173 015676 000207
2174 015700 176543
2175 015702 123456

MOV (SP)+,R0 ;;POP STACK INTO R0
RTS PC ;;RETURN
\$HINUM: .WORD 176543
\$LONUM: .WORD 123456
.SBTTL TRAP DECODER

2176
2177
2178
2179
2180
2181
2182

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

2183
2184 015704 010046
2185 015706 016600 000002
2186 015712 005740
2187 015714 111000
2188 015716 006300
2189 015720 016000 015740
2190 015724 000200

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

2191
2192
2193

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

2194
2195 015726 011646
2196 015730 016666 000004 000002
2197 015736 000002

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

2198
2199
2200

.SBTTL TRAP TABLE

2201
2202
2203

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

2204
2205

: ROUTINE
:-----

2206 015740 015726
2207 015742 015134
2208 015744 015400
2209 015746 015354
2210 015750 015414
2211 015752 006110

\$TRPAD: .WORD \$TRAP2
\$TYPE ;;CALL=TYPE TRAP+1(104401) TTY TYPEOUT ROUTINE
\$TYPOC ;;CALL=TYPOC TRAP+2(104402) TYPE OCTAL NUMBER (WITH LEADING ZEROS)
\$TYPOS ;;CALL=TYPOS TRAP+3(104403) TYPE OCTAL NUMBER (NO LEADING ZEROS)
\$TYPON ;;CALL=TYPON TRAP+4(104404) TYPE OCTAL NUMBER (AS PER LAST CALL)
\$TYPDS ;;CALL=TYPDS TRAP+5(104405) TYPE DECIMAL NUMBER (WITH SIGN)

2212
2213

2214 015754 014100
2215 015756 014220
2216 015760 014372

\$RDCHR ;;CALL=RDCHR TRAP+6(104406) TTY TYPEIN CHARACTER ROUTINE
\$RDLIN ;;CALL=RDLIN TRAP+7(104407) TTY TYPEIN STRING ROUTINE
\$RDOCT ;;CALL=RDOCT TRAP+10(104410) READ AN OCTAL NUMBER FROM TTY

2217
2218
2219

.SBTTL POWER DOWN AND UP ROUTINES

2220
2221 015762 012737 016122 000024
2222 015770 012737 000340 000026
2223 015776 010046
2224 016000 010146
2225 016002 010246
2226 016004 010346
2227 016006 010446

:POWER DOWN ROUTINE
\$PWRDN: MOV #SILLUP,#PWRVEC ;;SET FOR FAST UP
MOV #340,#PWRVEC+2 ;;PRIO:7
MOV R0,-(SP) ;;PUSH R0 ON STACK
MOV R1,-(SP) ;;PUSH R1 ON STACK
MOV R2,-(SP) ;;PUSH R2 ON STACK
MOV R3,-(SP) ;;PUSH R3 ON STACK
MOV R4,-(SP) ;;PUSH R4 ON STACK

```

2228 016010 010546      MOV      R5,-(SP)          ;;PUSH R5 ON STACK
2229 016012 017746 163122  MOV      @SWR,-(SP)        ;;PUSH @SWR ON STACK
2230 016016 010637 016126  MOV      SP,$SAVR6        ;;SAVE SP
2231 016022 012737 016034 000024  MOV      #SPWRUP,@PWRVEC  ;;SET UP VECTOR
2232 016030 000000      HALT
2233 016032 000776      BR       -2              ;;HANG UP
2234
2235
2236
2237 016034 012737 016122 000024  $PWRUP: MOV      #SILLUP,@PWRVEC  ;;SET FOR FAST DOWN
2238 016042 013706 016126      MOV      $SAVR6,SP        ;;GET SP
2239 016046 005037 016126      CLR      $SAVR6          ;;WAIT LOOP FOR THE TTY
2240 016052 005237 016126 1$:      INC      $SAVR6          ;;WAIT FOR THE INC
2241 016056 001375      BNE     1$              ;;OF WORD
2242 016060 012677 163054      MOV      (SP)+,@SWR        ;;POP STACK INTO @SWR
2243 016064 012605      MOV      (SP)+,R5         ;;POP STACK INTO R5
2244 016066 012604      MOV      (SP)+,R4         ;;POP STACK INTO R4
2245 016070 012603      MOV      (SP)+,R3         ;;POP STACK INTO R3
2246 016072 012602      MOV      (SP)+,R2         ;;POP STACK INTO R2
2247 016074 012601      MOV      (SP)+,R1         ;;POP STACK INTO R1
2248 016076 012600      MOV      (SP)+,R0         ;;POP STACK INTO R0
2249 016100 012737 015762 000024  MOV      #SPWRDN,@PWRVEC  ;;SET UP THE POWER DOWN VECTOR
2250 016106 012737 000340 000026  MOV      #340,@PWRVEC+2  ;;PRIO:7
2251 016114 104401      TYPE
2252 016116 016130  $PWRMG: .WORD   $POWER      ;;POWER FAIL MESSAGE POINTER
2253 016120 000002      RTI
2254 016122 000000  $SILLUP: HALT              ;;THE POWER UP SEQUENCE WAS STARTED
2255 016124 000776      BR       -2              ;; BEFORE THE POWER DOWN WAS COMPLETE
2256 016126 000000  $SAVR6: 0
2257 016130 005015 047520 042527  $POWER: .ASCIZ  <15><12>'POWER'  ;;PUT THE SP HERE
2258 016136 000122
2259
2260 016140 000000  RETRY:  .WORD   0
2261
2262
2263
2264
2265
2266
2267
; THIS TEXT IS THE SOURCE OF THE CHARACTERS TO BE PLACED IN THE MESSAGE
; AREA "BUFFER" FOR THE DIRECT CURSOR ADDRESSING TEST (E).
; THE BUFFER IS 2000. CHARS. LONG FOR TEST "E" AND SHOULD BE TERMINATED
; BY 3 OR 4 "377"'S AS A TERMINATOR.
.NLIST  BEX
MSGTXT:
(1) 016142 033515 032061 026462 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1) 016212 040524 026514 050505 .ASCII  \TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1) 016263 115 030467 031064 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1) 016333 124 046101 042455 .ASCII  \TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1) 016404 033515 032061 026462 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1) 016454 040524 026514 050505 .ASCII  \TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1) 016525 115 030467 031064 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1) 016575 124 046101 042455 .ASCII  \TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1) 016646 033515 032061 026462 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1) 016716 040524 026514 050505 .ASCII  \TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1) 016767 115 030467 031064 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1) 017037 124 046101 042455 .ASCII  \TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1) 017110 033515 032061 026462 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1) 017160 040524 026514 050505 .ASCII  \TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1) 017231 115 030467 031064 .ASCII  \M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\

```

(1)	017301	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	017352	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	017422	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	017473	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	017543	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	017614	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	017664	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	017735	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	020005	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	020056	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	020126	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	020177	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	020247	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	020320	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	020370	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	020441	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	020511	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	020562	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	020632	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	020703	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	020753	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	021024	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	021074	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	021145	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	021215	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	021266	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	021336	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	021407	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	021457	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	021530	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	021600	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
(1)	021651	115	030467	031064	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
(1)	021721	124	046101	042455	.ASCII	\TAL-EQUIPMENT-CORP.-MERRIMACK-N.H.-M7142-\
	021772	033515	032061	026462	.ASCII	\M7142-DIRECT-CURSOR-ADDRESSING-TEST-DIGI\
	022042	040524	026514	050505	.ASCII	\TAL-EQUIPMENT-CO\
	022062	377	377	377	MSGTND:	.BYTE 377,377,377,377
						.LIST BEX
2268	022066	001762			BUFFER:	.BLKW 1010.
2269		000001				.END

MKB	007206	1106	1738#						
MKBA	007310	1549	1738#						
MKBB2	007375	1109	1220	1249	1260	1270	1738#		
MKBC	007463	1114	1225	1738#					
MKBD2	007524	1119	1230	1738#					
MKBE	007614	1124	1235	1738#					
MKBF	007705	1129	1240	1738#					
MKBG	007762	1246	1738#						
MKBGA	010031	1257	1738#						
MKBH	010101	1267	1738#						
MKBQ	010142	1591	1738#						
MKBQA	010207	1583*	1584*	1585*	1738#				
MKBQB	010226	1571*	1572*	1573*	1738#				
MKBQ1	010203	1587*	1738#						
MKBQ2	010222	1578*	1738#						
MKBR	010235	1135	1276	1738#					
MKBX	010350	1217	1738#						
MKBX1	010423	1738#							
MKB1	007253	1252	1263	1738#					
MKE	010460	1286	1738#						
MKEA	010665	1316	1738#						
MKEA1	010676	1303*	1304*	1309*	1310*	1312*	1313*	1738#	
MKEB	010703	1290*	1291*	1292*	1738#				
MKEH	010712	1359	1738#						
MOVBS	002440	914#							
MOVTA	002414	907#							
MOVVT	002464	921#							
MQ0	010742	1738#							
MQ1	011027	1738#							
MQ2	011115	1738#							
MSCOPE	014532	769	1865#						
MSGTND	022062	2267#							
MSGTXT	016142	955	2267#						
MTAB	012540	908	1738#						
MTEXT0	013053	1137	1738#						
MTEXT1	013157	1138	1738#						
MTEXT2	013260	1139	1738#						
MTEXT3	013362	1140	1738#						
MTEXT4	013445	1141	1738#						
MTEXT5	013547	1142	1738#						
MTEXT6	013650	1143	1738#						
MTEXT7	013702	1144	1738#						
MTEXT8	014002	1145	1738#						
MTOB	006412	1515	1727#						
MVT	013006	922	1738#						
M91	006516	838	1738#						
M9221	007043	1018	1738#						
M9222	007124	1375	1738#						
M93	006566	857	1738#						
M94	006632	880	1738#						
M96	006665	905	1738#						
M97	006746	1047	1738#						
M98	011136	947	1738#						
M99	007006	1079	1738#						
NOWEOP	004020	1196	1201#						
OCTAL	005360	1289	1523#	1570	1582				

CROSS REFERENCE TABLE -- USER SYMBOLS

STRP = 000011	2199#	2208#	2209#	2210#	2211#	2212#	2214	2215#	2216#	2217#										
STRPAD 015740	2189	2206#																		
STSTNM 001102	620#	1174*	1875	1899	1901*	1904	1907	1921	1924	1943										
STTYIN 014326	1783	1784	1801	1805#																
STYPBN= ***** U	2212																			
STYPDS 006110	1648#	2211																		
STYPE 015134	2009#	2199	2207																	
STYPEC 015304	2030	2037	2044	2049#	2050															
STYPEX 015352	2055	2057	2060#																	
STYPOC 015400	2093#	2208																		
STYPON 015414	2092	2095#	2210																	
STYPOS 015354	2088#	2209																		
\$XTSTR 014560	1886#																			
\$GET4= 000000	1189#																			
\$OFILL 015577	2089*	2093*	2103	2138#																
\$4OCAT= ***** U	1883	1931																		
. = 026032	587#	591#	605	606#	608#	610#	617#	655	738	750	1197	1201	1702#							
	1738#	1741	1805#	1806	1812	1865	1907	1943	1990#	2062	2233	2255	2268#							

.SERRT	1#	452#	1944
.SMULT	1#		
.SPARM	452#		
.SPOWE	1#	452#	2217
.SRAND	1#	452#	2140
.SRDDE	1#		
.SRDOC	1#	452#	1812
.SREAD	1#	452#	1738
.SR2AZ	1#		
.SSAVE	1#	452#	
.SSB2D	1#		
.SSB2O	1#		
.SSCOP	1#	452#	1870
.SSIZE	1#		
.SSPAC	452#		
.SSUPR	1#		
.SSWDO	452#		
.STRAP	1#	452#	2176
.STYPB	1#		
.STYPD	1#	452#	1636
.STYPE	1#	452#	1992
.STYPO	1#	452#	2063
.S4OCA	1#		
.1170	1#		

. ABS. 026032 000

ERRORS DETECTED: 0

CZVTOA/1,CZVTOA.SEQ/CRF/SOL=CZVTOA.SML,CZVTOA.P11
RUN-TIME: 14 11 .8 SECONDS
RUN-TIME RATIO: 30/26=1.1
CORE USED: 32K (63 PAGES)