DH11

DH11 AUTO ECHO LOG
CZDHHC0

AH-FG27C-MC
1 OF 1 OCT 1985

digital
MADE IN USA

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.REM !
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IDENTIFICATION

PRODUCT CODE:	AC-8472C-MC
PRODUCT NAME:	CZDHHCO DH11 AUTO-ECHO TEST
DATE:	JUNE 1985
MAINTAINER:	NAC SOFTWARE ENGINEERING
AUTHOR:	G. BAISLEY

1.0 ABSTRACT

VERIFIES THAT THE AUTO ECHO FEATURE OF THE DH11 WORKS.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11 FAMILY STANDARD COMPUTER WITH 4KW OF MEMORY
ASR-33 TELETYPE OR EQUIVALENT
DH11 ASYNCHRONOUS MULTIPLEXER
DM11 MAINTENANCE CARD INSTALLED

2.2 STORAGE

THE PROGRAM LOADS INTO 4KW OF MEMORY

3.0 LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING ABSOLUTE BINARY TAPES IS TO BE USED

4.0 STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

4.1.1 AFTER PROGRAM LOAD (INITIAL PROGRAM START)

ALL CONSOLE SWITCHES DOWN

4.1.2 TO MODIFY DEVICE VECTOR AND CONTROL REGISTER ADDRESSES AFTER PROGRAM RESTART

SW00=1

4.1.3 TO START PROGRAM AT SELECTED TEST AFTER PROGRAM RESTART

SW01=1

4.2 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200
THE RESTART ADDRESS FOR ALL TESTS IS 000200
THE STARTING ADDRESS TO ENTER A SELECTED TEST IS 000200

4.3 PROGRAM AND/OR OPERATOR ACTION

4.3.1 INITIAL PROGRAM START

4.3.1.1 LOAD PROGRAM INTO MEMORY

4.3.1.2 LOAD ADDRESS 000200

4.3.1.3 CLEAR CONSOLE SWITCHES

4.3.1.4 PRESS START

4.3.1.5 THE PROGRAM WILL TYPE "DH11 AUTO-ECHO TEST" AND WILL THEN TYPE "VECTOR ADDRESS-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

4.3.1.6 TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR FOR THE DH11 TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>

NOTE

WORDS IN ANGLE BRACKETS, I.E. <CARRIAGE RETURN> MEAN THAT THE TELETYPE KEY WITH THE NAMED FUNCTION SHOULD BE STRUCK

IF AN INCORRECT ADDRESS IS ENTERED, THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE SECOND MESSAGE OF 4.3.1.5

4.3.1.7 THE PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.1.8 TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER OF THE DH11 TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>

IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL TYPE "?" AND WILL THEN REPEAT THE OF 4.3.1.7

4.3.1.9 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT IS ABOUT TO START TESTING, AND THEN TESTING WILL BEGIN

4.3.2 PROGRAM RESTART WITH ALL SWITCHES DOWN

4.3.2.1 PERFORM 4.3.1.2 TO 4.3.1.5

4.3.2.2 THE PROGRAM WILL TYPE "DH11 AUTO-ECHO TEST" AND WILL THEN CONTINUE AS DESCRIBED IN 4.3.1.9

4.3.3 PROGRAM RESTART WITH SW00=1

4.3.3.1 LOAD ADDRESS 000200

4.3.3.2 SET SW01=1

4.3.3.3 PRESS START

4.3.3.4 THE PROGRAM WILL PERFORM AS DESCRIBED IN 4.3.1.5 TO 4.3.1.9

4.3.4 PROGRAM RESTART WITH SW01=1

4.3.4.1 LOAD ADDRESS 000200

4.3.4.2 SET SW01=1

4.3.4.3 PRESS START

4.3.4.4 THE PROGRAM WILL TYPE "DH11 AUTO-ECHO TEST" AND WILL THEN TYPE "TEST PC-" AND WILL WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.4.5 TYPE IN THE ADDRESS OF THE TEST AT WHICH THE PROGRAM IS TO BE STARTED FOLLOWED BY <CARRIAGE RETURN>

4.3.4.6 THE PROGRAM WILL TYPE R TO INDICATE THAT IT HAS STARTED AND WILL START TESTING AT THE SELECTED TEST.

NOTE

CARE MUST BE TAKEN WHEN THIS FEATURE IS USED, SINCE THERE IS NO PROTECTION AGAINST SELECTING AN ADDRESS THAT IS IN THE MIDDLE OF A TEST

NOTE

IF IT IS DESIRED TO LOOP ON THE TEST
THAT IS SELECTED SET SW14=1 BEFORE
ENTERING THE TEST ADDRESS

5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SW15=1, HALT ON ERROR
SW14=1, LOOP ON CURRENT TEST
SW13=1, SUPPRESS ERROR TYPEOUT
SW11=1, INHIBIT ITERATIONS
SW10=1, ESCAPE TO NEXT TEST ON ERROR
SW09=1, FREEZE VARIABLE PARAMETER IN CURRENT TEST
SW01=1, START PROGRAM AT SELECTED TEST
SW00=1, CHANGE PARAMETERS AT PROGRAM RESTART

5.2 SUBROUTINE ABSTRACTS

5.2.1 TRAPCATCHER (LOCATIONS 000000-000776)

THIS ROUTINE IS USED TO INTERCEPT UNEXPECTED INTERRUPTS AND TRAPS.
THE AREA FROM 000000-000776 IS LOADED WITH THE FOLLOWING SEQUENCE

```
2
0
4
0
...
772
0
776
0
```

IF AN UNEXPECTED INTERRUPT OR TRAP OCCURS, THE PROGRAM WILL HALT WITH
THE PC 2 GREATER THAN THE ADDRESS TO WHICH THE PROGRAM TRAPPED. THE
PROCESSOR STACK MAY BE EXAMINED TO DETERMINE WHERE THE PROGRAM WAS
WHEN THE TRAP OR INTERRUPT OCCURED.

5.2.2 START (PROGRAM INITIALIZATION)

THIS ROUTINE INITIALIZES ALL PROGRAM FLAGS AND COUNTERS, TYPES THE PROGRAM TITLE MESSAGE, AND INPUTS THE VECTOR AND CONTROL REGISTER ADDRESSES OF THE DH11 TO BE TESTED.

5.2.3 BEGIN (PROGRAM START AND RESTART)

THIS ROUTINE IS ENTERED IMMEDIATELY AFTER "START" AND EACH TIME A PROGRAM PASS HAS BEEN COMPLETED. THE ROUTINE SETS UP THE PROCESSOR STACK AND STATUS WORD AND THEN TRANSFERS CONTROL TO THE TEST AT WHICH TESTING WILL BEGIN. IF SW01=0 WHEN THIS ROUTINE IS ENTERED TESTING WILL START AT T1 (TEST 1). IF SW01=1 WHEN THIS ROUTINE IS ENTERED, TESTING WILL START AT THE PC ENTERED FROM THE TELETYPE KEYBOARD.

5.2.4 EOP (END OF PASS)

THIS ROUTINE IS ENTERED ONCE PER PASS AFTER ALL TESTS HAVE BEEN COMPLETED. THIS ROUTINE TYPES THE MAINDEC IDENTIFICATION CODE OF THE PROGRAM, CLEARS ERROR FLAGS AND UPDATES THE PASS COUNT. IF THE PROGRAM WAS LOADED UNDER ACT11 OR DDP, THE ROUTINE CHECKS FOR RETURN TO THE ACT11 OR DDP MONITOR. IF THE PROGRAM IS NOT UNDER MONITOR CONTROL, THE ROUTINE TRANSFERS TO BEGIN.

5.2.5 SCOPER (SCOPE LOOP AND ITERATION HANDLER)

THIS ROUTINE IS ENTERED EACH TIME A TEST IS COMPLETED. THE ROUTINE CHECKS FOR THE FOLLOWING UPON ENTRY

1. IF SW10=1, THE ROUTINE WILL TRANSFER TO THE NEXT TEST IN SEQUENCE, AFTER CLEARING ERROR FLAGS.

2. IF SW11=1, THE ROUTINE WILL TRANSFER TO THE NEXT TEST SEQUENCE, AFTER CLEARING ERROR FLAGS.

3. IF SW14=1, THE ROUTINE WILL LOOP ON THE CURRENT TEST REGARDLESS OF THE ITERATION COUNT.

IF NONE OF THE ABOVE IS TRUE, THE ROUTINE WILL ADD 1 TO THE COUNT OF TEST ITERATIONS, AND COMPARE THIS VALUE TO THE NUMBER OF ITERATIONS THAT SHOULD BE PERFORMED. IF THESE NUMBERS ARE EQUAL, THE ROUTINE WILL TRANSFER TO THE NEXT TEST IN SEQUENCE. IF THE NUMBERS ARE NOT EQUAL, THE TEST CURRENTLY IN PROGRESS WILL BE REPEATED.

5.2.6 SCOP1R (FREEZE ON CURRENT DATA)

THE CALL TO THIS ROUTINE FOLLOWS IMMEDIATELY AFTER THE CALL TO THE ERROR HANDLER IN THOSE TESTS THAT HAVE VARIABLE PARAMETERS. THIS ROUTINE IS ALWAYS ENTERED IN THOSE TESTS, WHETHER OR NOT AN ERROR OCCURS. IF SW09=1, THE ROUTINE WILL TRANSFER CONTROL BACK TO THE TEST AT A POINT WHICH WILL ALLOW REPEATING THE FUNCTION UNDER TEST CONTINUOUSLY WITH THE SAME DATA. IF THIS OPTION IS SELECTED, THE ROUTINE "SCOPER" IS NEVER ENTERED AND ITERATION COUNTS WILL NOT BE UPDATED.

5.2.7 ERRORS (ERROR HANDLER)

THIS ROUTINE IS ENTERED UPON ERROR DETECTION ONLY. WITH ALL CONSOLE SWITCHES DOWN, THE ROUTINE PROCEDES AS FOLLOWS:

1. THE PC OF THE INSTRUCTION THAT CALLED THE ERROR HANDLER IS ACCESSED THRU THE STACK, AND THEN THE EMT INSTRUCTION ITSELF IS FETCHED. THE 8 LSB OF THE EMT INSTRUCTION ARE THE ERROR CODE. THIS CODE IS USED TO ACCESS A TABLE OF ERROR MESSAGES AND ERROR DATA STORAGE LOCATIONS.

2. IF THE TEST THAT FAILED DID NOT FAIL PREVIOUSLY DURING THIS PASS, A COMPLETE ERROR REPORT IS MADE IF THE TEST THAT FAILED FAILED MORE THAN ONCE DURING THE CURRENT PASS, ONLY THE DATA RELATING TO THE FAILURE IS TYPED. IF SW13=1, NO ERROR TYPEOUT IS MADE.

3. THE ROUTINE NOW CHECKS FOR HALT ON ERROR. IF SW15=1 THE PROGRAM WILL HALT WITH THE PC OF THE CALL TO THE ERROR ROUTINE IN R0. IF SW15=0, THE PROGRAM WILL NOT HALT, BUT WILL CHECK FOR ESCAPE TO NEXT TEST.

4. IF SW10=0, THE ROUTINE WILL RETURN TO THE TEST IN PROGRESS. IF SW10=1, THE ROUTINE WILL ABORT THE CURRENT TEST, AND TRANSFER TO THE NEXT TEST IN SEQUENCE, THRU THE ROUTINE "SCOPER".

5.2.8 TRPSRV (TRAP DECODE AND DISPATCH)

THIS ROUTINE DECODES THE 8 LSB OF THE TRAP INSTRUCTION THAT CAUSED THE PROGRAM INTERRUPT, AND TRANSFERS CONTROL TO THE ROUTINE THRU THE TABLE "TRPTAB" USING THE 8 LSB OF THE TRAP INSTRUCTION AS AN OFFSET TO THE POINTER TO THE ROUTINE TO BE ENTERED.

5.3 PROGRAM AND OR OPERATOR ACTION

5.3.1 PROGRAM START WITH ALL SWITCHES DOWN

5.3.1.1 REFER TO SECTIONS 4.3.1 AND 4.3.2 FOR INITIAL PROGRAM BEHAVIOR.

5.3.1.2 AFTER "R" HAS BEEN TYPED BY THE PROGRAM, TEST EXECUTION WILL BEGIN. EACH TEST WILL BE REPEATED A SELECTED NUMBER OF ITERATIONS (SEE LISTING FOR EXACT NUMBER FOR EACH TEST) AND THEN THE PROGRAM WILL PROCEED TO THE NEXT TEST.

5.3.1.3 WHEN ALL ITERATIONS HAVE BEEN COMPLETED, THE PROGRAM WILL TYPE "CZDHH-C" AND THEN RESTART TESTING AT TEST 1 (LOCATION T1 IN THE PROGRAM).

5.3.1.4 IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE, AND THEN CONTINUE THE TEST IN PROGRESS.

5.3.2 PROGRAM START WITH SW00=1

THE PROGRAM WILL PERFORM AS DESCRIBED IN 4.3.1 AND 5.3.1

5.3.3 PROGRAM START WITH SW01=1

5.3.3.1 REFER TO SECTION 4.3.4 FOR INITIAL PROGRAM BEHAVIOR

5.3.3.2 TEST EXECUTION WILL START AT THE ADDRESS SPECIFIED AND WILL CONTINUE AS DESCRIBED IN 5.3.1.2

5.3.3.3 AFTER "CZDHH-C" HAS BEEN TYPED, THE PROGRAM WILL RESUME TESTING AT TEST 1

5.3.4 PROGRAM OPERATION WITH SW15=1

SAME AS 5.3.1, EXCEPT THAT IN THE CASE OF AN ERROR, THE PROGRAM WILL HALT AFTER THE ERROR TYPEOUT, AND THE PC+2 OF THE CALL TO THE ERROR ROUTINE WILL BE DISPLAYED IN R0.

5.3.5 PROGRAM OPERATION WITH SW13=1

SAME AS 5.3.1 EXCEPT THAT NO ERROR TYPEOUTS WILL OCCUR

5.3.6 PROGRAM OPERATION WITH SW11=1

SAME AS 5.3.1 EXCEPT THAT EACH TEST WILL BE REPEATED ONCE ONLY

5.3.7 PROGRAM OPERATION WITH SW10=1

SAME AS 5.3.1, EXCEPT THAT IN THE CASE OF AN ERROR THE CURRENT TEST WILL BE ABORTED, AND THE PROGRAM WILL PROCEED TO THE NEXT TEST IN SEQUENCE.

5.3.8 PROGRAM OPERATION WITH SW14=1, OR SW09=1

THESE FUNCTIONS ARE NORMALLY USED FOR TROUBLE SHOOTING. SEE SECTION 6.3 FOR THEIR USE.

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                        6.0  ERRORS

                        6.1  ERROR HALTS

                        THE ERROR MESSAGE FORMAT FOR ALL ERROR TYPEOUTS IS AS FOLLOWS

                        PC+2                MESSAGE
                                            HEADER (IF APPLICABLE)
                                            DATA   (IF APPLICABLE)

                        WHERE
                        PC+2 IS THE ADDRESS OF THE CALL TO THE ERROR HANDLER + 2;
                        MESSAGE IS AN ASCII MESSAGE DESCRIBING (BRIEFLY) THE FAILURE;
                        HEADER IS A DESCRIPTION OF THE DATA TO FOLLOW;
                        DATA IS OCTAL INFORMATION RELATING TO THE CAUSE OF  THE  FAILURE.   IF
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THE SAME ERRROR OCCURS IN A GIVEN TEST ON THE SAME PASS, AND IF DATA IS ASSOCIATED WITH THAT ERROR, ONLY DATA IS TYPE ON SUCCEEDING ERROR TYPEOUTS.

IF NO DATA IS ASSOCIATED WITH THE ERROR THE COMPLETE ERROR MESSAGE IS TYPED.

6.1.1 ERROR DESCRIPTIONS

SEE LISTING FOR DETAILS OF ERRORS

6.2 ERROR RECOVERY

6.2.1 SW15=0

IF THE PROGRAM IS RUN WITH SW15=0, NO OPERATOR ACTION IS REQUIRED TO CONTINUE TESTING

6.2.2 SW15=1

IF THE PROGRAM IS RUN WITH SW15=1, TO CONTINUE TESTING AFTER THE PROGRAM HAS HALTED, PRESS THE PROCESSOR CONSOLE CONTINUE SWITCH

6.2.3 ILLEGAL INTERRUPTS

IF AN INTERRUPT OCCURS TO A VECTOR ADDRESS NOT SELECTED DURING PROGRAM INITIALIZATION, THE PROGRAM WILL HALT IN THE TRAPCATCHER. THE ADDRESS AT WHICH THE PROGRAM HALTS IS 2 GREATER THAN THE ADDRESS TO WHICH THE INTERRUPT OCCURED. THE PROGRAM MUST BE RESTARTED AT 200 TO RECOVER FROM THIS ERROR.

6.3 SCOPE LOOPING

6.3.1 TO SCOPE ON A SPECIFIC TEST, SET SW14=1 AND SW13=1. THIS WILL CAUSE THE PROGRAM TO CONTINUOUSLY LOOP ON THE SAME TEST, AND WILL CAUSE ALL ERROR TYPEOUTS TO BE INHIBITED

6.3.2 TO SCOPE ON A SPECIFIC VALUE OF A PATAMETER WITHIN A TEST, SET SW09=1 TO FREEZE THE DATA. (SEE LISTING FOR THOSE TESTS THAT INCORPORATE THIS FEATURE)

6.3.3 PROGRAM START TO SCOPE LOOP ON SELECTED TEST

PERFORM SECTION 4.3.4 WITH SW14=1

7.0 RESTRICTIONS

7.1 STARTING

THE DH11 TEST CARD MUST BE INSTALLED

7.2 RUNNING

NONE

8.0 MISCELLANEOUS

8.1 EXECUTION TIME

THE TIME FOR ONE PASS OF THE PROGRAM (END OF TYPEOUT OF CZDHH-C TO END OF TYPEOUT OF CZDHH-C) IS GIVEN FOR VARIOUS PROCESSORS IN THE TABLE BELOW

PROCESSOR	TIME
PDP-11/05,10	
PDP-11/20	
PDP-11/40	
PDP-11/45	

9.0 PROGRAM DESCRIPTION

FIRST, VERIFY THAT AUTO-ECHO WORKS ON ALL LINES BY TRANSMITTING ONE CHARACTER WITH AUTO ECHO ENABLED.

THEN A BINARY PATTERN IS TRANSMITTED ON ALL LINES EXCEPT THE ON WITH AUTO-ECHO ENABLED. A SINGLE CHARACTER IS TRANSMITTED ON THAT LINE. ALL DATA IS VERIFIED TO BE CORRECT.

10.0 LISTING

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                                ; DHMAC-A - DH11 MACRO LIBRARY
                                ; COPYRIGHT 1985, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754


                                .LIST   ME
                                .NLIST  MC,MD,CND
                                                                                                                                ; 3
                                ;  CMS REPLACEMENT HISTORY

                                ; *9 SKONETSKI 26-APR-1985 16:23:08 "FIXED TYPO CAUSING ASSEMBLY ERRORS"
                                ; *8 SKONETSKI 22-APR-1985 16:48:03 "TYPO ERROR IN VECTOR CHANGE CODE SOURCE FIXED"
                                ; *7 SKONETSKI 22-APR-1985 16:26:04 "ADDED CODE TO SET VECTORS FOR PWR FAIL, ERRORS, AND EMT
TRAPS."
                                ; *6 SKONETSKI 22-APR-1985 14:22:35 "FIXED BRANCH ERROR IN END OF PASS ROUTINE"
                                ; *5 SKONETSKI 22-APR-1985 08:28:54 "FIXED BUG (AN OCTASC MACRO CALL WAS WRONG) AND ADDED A
CLEAN END OF PASS
MESSAGE.
                                ; *4 SKONETSKI 18-APR-1985 14:20:15 "ADDED SOFTWARE SWITCH REG SUPPORT, BUT UNTESTED"
                                ; *3 SKONETSKI 12-APR-1985 10:34:52 "FIXED PROBLEMS WITH SPURIOUS CR/LFS"
                                ; *2 SKONETSKI 11-APR-1985 16:00:24 "ADDED MACRO FROM SYSMAC.SML THAT SIZES FOR SOFTWARE SWI
TCH REGISTER"
                                ; *1 SKONETSKI 11-APR-1985 15:49:05 "LIBRARY FOR DH11 DIAGNOSTICS"
```

```
 2                                  .LIST   ME
 3                                  .NLIST  MC,MD,CND
 5 000000                           .HEADER ↑/1972,1985/,↑/DH11 AUTO-ECHO TEST/,↑/CZDHH-CO/

                                            ;STARTING PROCEDURE
                                            ;LOAD PROGRAM
                                            ;LOAD ADDRESS 000200
                                            ;PRESS START
                                            ;PROGRAM WILL TYPE DH11 AUTO-ECHO TEST
                                            ;PROGRAM WILL TYPE "VECTOR ADDRESS-"
                                            ;TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
                                            ;FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
                                            ;PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
                                            ;TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
                                            ;FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>          ; 3
                                            ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                                            ;AT THE END OF A PASS, PROGRAM WILL TYPE " CZDHH-CO "
                                            ;AND THEN RESUM TESTING

                                   .TITLE  CZDHH-CO
   000000                          .ENABLE ABS
                                   .NLIST  MC,MD,CND
                                   .LIST   ME
 6 000000                          .SYMBOLS

                                   ;SWITCH REGISTER OPTIONS

          100000                   SW15=100000              ;=1,HALT ON ERROR
          040000                   SW14=40000               ;=1,LOOP ON CURRENT TEST
          020000                   SW13=20000               ;=1,INHIBIT ERROR TYPEOUT
          010000                   SW12=10000
          004000                   SW11=4000                ;=1,INHIBIT ITERATIONS
          002000                   SW10=2000                ;=1,ESCAPE TO NEXT TEST ON ERROR                   ; 3
          001000                   SW09=1000                ;=1,LOOP WITH CURRENT DATA
          000400                   SW08=400
          000100                   SW06=100
          000040                   SW05=40
          000020                   SW04=20
          000010                   SW03=10
          000004                   SW02=4
          000002                   SW01=2                   ;RESTART PROGRAM AT SELECTED TEST
          000001                   SW00=1                   ;RESELECT VECTOR AND CONTROL REGISTER
                                                            ;ADDRESS AFTER PROGRAM RESTART
```

```
0

                        ;REGISTER DEFINITIONS

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

                        ;LOCATION EQUIVALENCIES                                  ; 3

                        ;SWR=177570     ;CONSOLE SWITCH REGISTER                 ; 4
                        ;LIGHTS=177570  ;PDP-11/45 DISPLAY REGISTER              ; 4
177776                  PS=177776       ;PROCESSOR STATUS WORD
015644                  STACK=ENDCOD+200    ;START OF PROCESSOR STACK            ; 3

                        ;INSTRUCTION DEFINITIONS

005746                  PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD
005726                  POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD
010046                  PUSHR0=10046    ;SAVE R0 ON STACK
012600                  POPR0=12600     ;RESTORE R0 FROM STACK
024646                  PUSH2SP=24646   ;DECREMENT STACK TWICE
022626                  POP2SP=22626    ;INCREMENT STACK TWICE
                        ;
                        .MACRO  HLT     $A
                                EMT     $A
                        .ENDM   HLT
                        ;
                        ;
100000                  BIT15=100000
040000                  BIT14=40000                                              ; 3
020000                  BIT13=20000
010000                  BIT12=10000
004000                  BIT11=4000
002000                  BIT10=2000
001000                  BIT09=1000
000400                  BIT08=400
000200                  BIT07=200
000100                  BIT06=100
000040                  BIT05=40
000020                  BIT04=20
000010                  BIT03=10
000004                  BIT02=4
000002                  BIT01=2
000001                  BIT00=1
1 000000                .CATCH
```

```
0                                       ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
        000000                  .=0
        000200                  .REPT 200
                                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
                                        HALT            ;EXAMINE STACK TO FIND CAUSE
                                .ENDR
  000000  000002                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000002  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000004  000006                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000006  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000010  000012                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000012  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000014  000016                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000016  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000020  000022                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000022  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000024  000026                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000026  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000030  000032                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000032  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000034  000036                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000036  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000040  000042                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000042  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000044  000046                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000046  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000050  000052                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000052  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000054  000056                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000056  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000060  000062                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000062  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000064  000066                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000066  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000070  000072                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000072  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000074  000076                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000076  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000100  000102                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000102  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000104  000106                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000106  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000110  000112                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000112  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000114  000116                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000116  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000120  000122                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000122  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000124  000126                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000126  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000130  000132                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000132  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000134  000136                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000136  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000140  000142                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  000142  000000                        HALT            ;EXAMINE STACK TO FIND CAUSE
  000144  000146                        .+2             ;UNEXPECTED TRAP TO THIS LOCATION
```

```
000146  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000150  000152          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000152  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000154  000156          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000156  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000160  000162          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000162  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000164  000166          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000166  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000170  000172          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000172  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000174  000176          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000176  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000200  000202          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000202  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000204  000206          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000206  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000210  000212          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000212  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000214  000216          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000216  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000220  000222          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000222  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000224  000226          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000226  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000230  000232          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000232  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000234  000236          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000236  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000240  000242          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000242  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000244  000246          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000246  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000250  000252          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000252  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000254  000256          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000256  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000260  000262          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000262  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000264  000266          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000266  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000270  000272          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000272  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000274  000276          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000276  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000300  000302          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000302  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000304  000306          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000306  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000310  000312          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000312  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000314  000316          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000316  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000320  000322          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000322  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000324  000326          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000326  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
```

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000330  000332          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000332  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000334  000336          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000336  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000340  000342          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000342  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000344  000346          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000346  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000350  000352          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000352  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000354  000356          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000356  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000360  000362          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000362  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000364  000366          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000366  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000370  000372          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000372  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000374  000376          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000376  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000400  000402          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000402  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000404  000406          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000406  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000410  000412          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000412  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000414  000416          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000416  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000420  000422          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000422  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000424  000426          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000426  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000430  000432          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000432  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000434  000436          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000436  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000440  000442          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000442  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000444  000446          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000446  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000450  000452          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000452  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000454  000456          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000456  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000460  000462          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000462  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000464  000466          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000466  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000470  000472          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000472  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000474  000476          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000476  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000500  000502          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000502  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000504  000506          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000506  000000          HALT        ;EXAMINE STACK TO FIND CAUSE
000510  000512          .+2         ;UNEXPECTED TRAP TO THIS LOCATION
```

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000512  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000514  000516                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000516  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000520  000522                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000522  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000524  000526                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000526  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000530  000532                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000532  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000534  000536                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000536  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000540  000542                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000542  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000544  000546                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000546  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000550  000552                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000552  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000554  000556                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000556  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000560  000562                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000562  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000564  000566                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000566  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000570  000572                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000572  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000574  000576                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000576  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000600  000602                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000602  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000604  000606                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000606  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000610  000612                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000612  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000614  000616                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000616  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000620  000622                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000622  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000624  000626                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000626  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000630  000632                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000632  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000634  000636                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000636  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000640  000642                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000642  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000644  000646                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000646  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000650  000652                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000652  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000654  000656                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000656  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000660  000662                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000662  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000664  000666                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000666  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
000670  000672                    .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000672  000000                    HALT            ;EXAMINE STACK TO FIND CAUSE
```

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000674  000676                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000676  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000700  000702                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000702  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000704  000706                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000706  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000710  000712                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000712  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000714  000716                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000716  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000720  000722                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000722  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000724  000726                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000726  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000730  000732                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000732  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000734  000736                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000736  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000740  000742                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000742  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000744  000746                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000746  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000750  000752                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000752  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000754  000756                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000756  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000760  000762                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000762  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000764  000766                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000766  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000770  000772                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000772  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
000774  000776                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
000776  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
1 001000                .SETVEC
```

```
0                                       ;STANDARD INTERRUPT VECTORS
        000200                  .=200
  000200 000167  000600                 JMP     START           ;GO TO START OF PROGRAM

1 000204                        .TRPDEF

                                        ;DEFINITIONS FOR TRAP SUBROUTINE CALLS
                                        ;POINTERS TO SUBROUTINES CAN BE FOUND STARTING
                                        ;AT LOCATION "TRPTAB"

  000204                        TRPDEF  SCOPE,↑/SCOPE LOOP AND ITERATION HANDLER/
        104400                          SCOPE=TRAP+Y            ;SCOPE LOOP AND ITERATION HANDLER
        000001                          Y=Y+1
  000204                        TRPDEF  TYPE,↑/TELETYPE OUTPUT ROUTINE/
        104401                          TYPE=TRAP+Y             ;TELETYPE OUTPUT ROUTINE
        000002                          Y=Y+1
  000204                        TRPDEF  OCTASC,↑/OCTAL TO ASCII CONVERSION/
        104402                          OCTASC=TRAP+Y           ;OCTAL TO ASCII CONVERSION
        000003                          Y=Y+1
  000204                        TRPDEF  INSTR,↑/INPUT ASCII STRING/
        104403                          INSTR=TRAP+Y            ;INPUT ASCII STRING
        000004                          Y=Y+1
  000204                        TRPDEF  INSTER,↑/STRING INPUT ERROR/
        104404                          INSTER=TRAP+Y           ;STRING INPUT ERROR
        000005                          Y=Y+1
  000204                        TRPDEF  PARAM,↑/CONVERT STRING TO OCTAL, CHECK LIMITS/
        104405                          PARAM=TRAP+Y            ;CONVERT STRING TO OCTAL, CHECK LIMITS
        000006                          Y=Y+1
  000204                        TRPDEF  SAV05P,↑/SAVE R0-R5, PC/
        104406                          SAV05P=TRAP+Y           ;SAVE R0-R5, PC
        000007                          Y=Y+1
  000204                        TRPDEF  RES05,↑/RESTORE R0-R5/
        104407                          RES05=TRAP+Y            ;RESTORE R0-R5
        000010                          Y=Y+1
  000204                        TRPDEF  SCOPE1,↑/CHECK FOR FREEZE ON CURRENT DATA/
        104410                          SCOPE1=TRAP+Y           ;CHECK FOR FREEZE ON CURRENT DATA
        000011                          Y=Y+1
2                               .MACRO  CODEM1
3                                       MOV     DHSSR,DHSLR             ;SET UP ADDRESS OF SILO
4                                       INC     DHSLR                   ;STATUS REGISTER HIGH BYTE
5                               .ENDM   CODEM1
6 000204                        .START  DHRVEC,3,4,DHSCR,0,177776,7,10,,,1
```

```
0       001000                  .=1000

                                        ;PROGRAM INITIALIZATION
                                        ;LOCK OUT INTERRUPTS
                                        ;SET UP PROCESSOR STACK
                                        ;SET UP POWER FAIL VECTOR
                                        ;CLEAR PROGRAM FLAGS AND COUNTS
                                        ;TYPE TITLE MESSAGE
                                .IIF NB <>,     ;DETERMINE MEMORY SIZE
                                .IIF NB <>,     ;SET UP TRACE TRAP RETURN

  001000  177570                SWR:    .WORD   177570                  ; SWITCH DHSCR ADDRESS          ; 4
  001002  177570                LIGHTS: .WORD   177570                  ; LIGHTS                        ; 4
                                                                                                        ; 4
  001004  012767  000340  176764  START:  MOV     #340,PS                 ;LOCK OUT INTERRUPTS
  001012  012706  015644                  MOV     #STACK,SP               ;SET UP PROCESSOR STACK
  001016  012702  000024                  MOV     #24,R2                  ; POINT TO VECTOR AREA          ; 7
  001022  012722  014510                  MOV     #PFAIL,(R2)+            ;SET UP POWER FAIL TRAP         ; 7
  001026  012722  000340                  MOV     #340, (R2)+             ;SERVICE AT LEVEL 7             ; 7
  001032  012722  012350                  MOV     #ERRORS, (R2)+          ;ERROR HANDLER                  ; 7
  001036  012722  000340                  MOV     #340, (R2)+             ;SERVICE AT LEVEL 7             ; 7
  001042  012722  012562                  MOV     #TRPSRV, (R2)+          ;GENERAL HANDLER DISPATCH SERVICE ; 7
  001046  012712  000340                  MOV     #340, (R2)              ;SERVICE AT LEVEL 7             ; 8
  001052  005067  012556                  CLR     STFLG                   ;CLEAR TEST START FLAG
  001056  005067  012512                  CLR     PASCNT                  ;CLEAR PASS COUNT
  001062  005067  012510                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
  001066  005067  012500                  CLR     ERRFLG                  ;CLEAR ERROR FLAG
  001072  005067  012474                  CLR     ERRFLG                  ;CLEAR LAST ERROR PC
  001076  016746  176702                  MOV     4, -(SP)                ; PUSH TRAP VECTOR              ; 4
  001102  016746  176700                  MOV     6, -(SP)                                                ; 4
  001106  012767  001122  176670          MOV     #10, 4                  ; SET UP TRAP VECTOR            ; 4
  001114  005777  177660                  TST     @SWR                    ; TEST SWITCH REGISTER ADDRESS  ; 4
  001120  000405                          BR      20                      ; IF SUCCESSFUL, LEAVE IT ALONE ; 4
  001122                        10:                                                                     ; 4
  001122  012767  000176  177650          MOV     #176, SWR               ; POINT TO SOFT SWITCH DHSCR    ; 4
  001130  005067  177646                  CLR     LIGHTS                  ; 0 MEANS WE ARE NOT GOING TO USE LIGHTS ; 4
  001134                        20:                                                                     ; 5
  001134  005726                          TST     (SP)+                   ; CLEAN UP STACK                ; 4
  001136  005726                          TST     (SP)+                                                   ; 4
  001140  012667  176642                  MOV     (SP)+, 6                                                ; 4
  001144  012667  176634                  MOV     (SP)+, 4                                                ; 4
  001150  104401  014660                  TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
  001154  005767  012452                  TST     INIFLG                  ;CHECK INITIALIZATION FLAG
                                .IF NB  <DHRVEC>
  001160  001001                          BNE     VEC1                    ;IF NOT 0, CHECK SWITCHES
                                                                          ;FOR REINITIALIZATION
                                .IFF
                                          BNE     BEGIN                   ;IF NOT 0, START TEST
                                .ENDC
                                .IF NB  <>
                                SIZE:     CLR     R0
                                          MOV     #20,@04                 ;SET UP TIME OUT RETURN
                                10:       TST     (R0)+                   ;WILL TRAP WHEN NO MEMORY       ; 9
                                          BR      10                      ;LOCATION RESPONDED, CONTINUE
                                20:       MOV     R0,HCORE                ;R0 CONTAINS ADDRESS OF
                                          SUB     #2,HCORE                ;NON EXISTANT MEMORY            ; 9
                                          MOV     #6,@04                  ;RESTORE TRAPCATCHER
```

```
                                .ENDC
                                .IF NB  <>
                                TRACER: MOV     #1$,@#10                ;SET UP ILLEGAL INSTRUCTION TRAP RETURN
                                        SXT     R0                      ;DO 11/40, 11/45 INSTRUCTION
                                        MOV     #RTT,TRTRET             ;11/40,45 RTT RETURN FROM TRACE TRAP
                                        BR      2$
                                1$:     MOV     #RTI,TRTRET             ;1105,10,20 RTI RETURN FROM TRACE TRAP
                                        MOV     #12,@#10                ;RESTROE TRAPCATCHER
                                        MOV     #TRTRET,@#16            ;SET UP TRACE TRAP VECTOR
                                .ENDC
                                .IF NB  <DHRVEC>                                                                ; 3
                                .IF B   <>
001162  000404                          BR      VEC2
                                .IFF
                                        TST     INIFLG                  ;IF INITIALIZE FLAG=0
                                        BEQ     VEC2                    ;GET VECTOR AND CSR ADDRESS
                                .ENDC
001164  032777  000001  177606  VEC1:   BIT     #SW00,@SWR              ;IF SW00=1, GET NEW VECTOR      ; 4
001172  001445                          BEQ     BEGIN                   ;AND CSR
001174                          VEC2:                                                                           ; 4
001174  012701  000300                  MOV     #300,R1                                                         ; 4
001200  012702  000302                  MOV     #302,R2
001204  012703  000004                  MOV     #4,R3
001210  010211                  1$:     MOV     R2,(R1)                 ;RESTORE TRAPCATCHER
001212  005012                          CLR     (R2)                    ;IN FLOATING VECTOR AREA
001214  060301                          ADD     R3,R1
001216  060302                          ADD     R3,R2
001220  020127  001000                  CMP     R1,#1000
001224  001371                          BNE     1$
001226  104403                          INSTR                           ;INPUT ADDRESS OF DEVICE VECTOR
001230  014712                          MVECTOR                         ;MESSAGE "VECTOR ADDRESS-"
001232  104405                          PARAM                           ;CONVERT STRING TO OCTAL
001234  000300                          300                             ;LOW LIMIT
001236  000770                          770                             ;HIGH  LIMIT                    ; 3
001240  013562                          DHRVEC                          ;LOCATIONS TO BE FILLED
001242     003                  .BYTE   3                               ;NUMBER OF LOCATIONS
001243     004                  .BYTE   4                               ;LSB MASK
001244  104403                          INSTR                           ;INPUT ADDRESS OF DEVICE CSR
001246  014734                          MREGAD                          ;MESSAGE "CONTROL REGISTER ADDRESS-"
001250  104405                          PARAM                           ;CONVERT STRING TO OCTAL
001252  000000                          0                               ;LOW LIMIT
001254  177776                          177776                          ;HIGH LIMIT
001256  013540                          DHSCR                           ;LOCATIONS TO BE FILLED
001260     007                  .BYTE   7                               ;NUMBER OF LOCATIONS
001261     010                  .BYTE   10                              ;LSB MASK
                                .ENDC
                                .IF NB  <1>
001262                                  CODEM1
001262  016767  012270  012270          MOV     DHSSR,DHSLR             ;SET UP ADDRESS OF SILO
001270  005267  012264                  INC     DHSLR                   ;STATUS REGISTER HIGH BYTE
                                .ENDC
001274  005767  012332                  TST     INIFLG                  ;IF INITIALIZATION FLAG
001300  001002                          BNE     BEGIN                   ;IS CLEARED
001302  005167  012324                  COM     INIFLG                  ;SET IT

                                        ;PROGRAM START                                                          ; 3
                                        ;CHECK FOR PROGRAM START AT SELECTED ADDRESS
```

```
001306  012767  000340  176462  BEGIN:  MOV     #340,PS         ;LOCK OUT INTERRUPTS
001314  012706  015644                  MOV     #STACK,SP       ;SET UP PROCESSOR STACK
001320  032777  000002  177452          BIT     #SW01,@SWR      ;IF SW01=1                      ; 4
001326  001410                          BEQ     1$              ;GET PC FOR PROGRAM START
001330  104403                          INSTR                   ;GET PC
001332  015123                          MTSTPC                  ;MESSAGE "TEST PC"
001334  104405                          PARAM                   ;CONVERT STRING TO OCTAL
001336  000000                          0
001340  017500                          17500
001342  013600                          RETRN
001344     001                  .BYTE   1
001345     001                  .BYTE   1
001346  000410                          BR      2$
001350  012767  001400  012222  1$:     MOV     #T1,RETRN       ;NORMAL START, TEST 1
001356  005767  012252                  TST     STFLG           ;IF LOOPING, BYPASS TYPEOUT
001362  001004                          BNE     3$
001364  005167  012244                  COM     STFLG
001370  104401  015117          2$:     TYPE    ,MR             ;TYPE "R" TO INDICATE START
001374  000177  012200          3$:     JMP     @RETRN          ;START TESTING                  ; 3
```

```
                .MACRO  AUTO1   XLINE,XBIT,K

                        ;ENABLE AUTO ECHO ON LINE 'XLINE'
                        ;TRANSMIT ONE CHARACTER ON LINE 'XLINE'
                        ;AT 9600 BAUD, 8 BITS.
                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

                TS \XN,100,4$
                        MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
                1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                        ;BUS ADDRESS REGISTERS
                        MOV     #'XLINE',@DHSCR         ;SELECT LINE 'XLINE'
                        MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
                        MOV     #TWRD'K',@DHBA          ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
                        MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
                        CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
                        MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                        ;8 BITS PER CHARACTER,
                                                        ;AUTO ECHO ENABLED ON LINE 'XLINE'
                        MOV     #'XBIT',@DHBAR          ;SET BAR BIT FOR LINE 'K'
                2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
                        BPL     2$                      ;BE RECEIVED
                        INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
                        MOV     @DHNRC,R4               ;READ CHARACTER
                        CMP     R4,TWRD'K'              ;IS CHARACTER CORRECT
                        BEQ     3$
                        MOV     TWRD'K',R5              ;(R5)=EXPECTED CHARACTER
                        CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
                        HLT     0                       ;CHARACTER ECHOED INCORRECTLY
                        BR      4$                      ;RESTART TEST
                3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
                        BGT     2$                      ;BEEN RECEIVED, CONTINUE
                        BMI     4$
                        BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
                        BR      2$                      ;GET 1 MORE CHARACTER
                4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                .ENDM   AUTO1
```

```
                .MACRO  AUTO2   XLINE,XBIT,K

                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 'K'
                        ;TRANSMIT 1 CHARACTER ON LINE 'K' WITH AUTO ECHO ENABLED
                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                        ;CHARACTER LENGTH IS 8 BITS
                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

                TS \XN,10,5$
                        MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
                        JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                        ;400 (OCTAL) CHARACTERS
                        MOV     #'K',@DHSCR             ;SELECT LINE XLINE FOR TESTING
                        MOV     #TWRD'K',@DHBA  ;CHARACTER TO BE TRANSMITTED
                                                        ;ON LINE XLINE IN AUTO ECHO MODE
                        MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE XLINE
                        MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE XLINE
                        BIC     #'XBIT',LINACT  ;CLEAR LINE ACTIVE BIT
                        MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
                        CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
                1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
                        BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
                        MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
                        SWAB    R3
                        BIC     #177760,R3              ;CLEAR STATUS BITS
                        MOV     R3,R2
                        ASL     R2
                        CMP     R3,#'K'         ;IF LINE NUMBER IS XLINE
                        BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
                        CMP     RBUF(R2),R4             ;IF NOT LINE XLINE, CHECK DATA
                        BEQ     2$
                        MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
                        HLT     1                       ;NON ECHOED DATA ERROR
                        BR      4$
                2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
                        BNE     1$                      ;CONTINUE IF NOT DONE
                        BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
                3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
                        BNE     1$                      ;EXIT
                        MOV     #'K',@DHSCR             ;SELECT LINE XLINE
                        BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE XLINE
                        TSTB    @DHSLR                  ;GET REST OF CHARACTERS
                        BNE     1$                      ;AND CHECK
                        BR      5$
                4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
                        CMP     R4,TWRD'K'              ;CHECK ECHOED DATA
                        BEQ     3$
                        MOV     TWRD'K',R5                      ;(R5)=EXPECTED ECHOED DATA
                        HLT     2                       ;ECHOED DATA ERROR
                5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                .ENDM   AUTO2
```

```
                .MACRO  SSETALL

                        ;SET BYTE COUNT FOR ALL LINES TO 400
                        ;SET BUS ADDRESS FOR ALL LINES TO TBUF
                        ;CLEAR EXPECTED CHARACTER BUFFERS
                        ;SET LINE ACTIVE BITS FOR ALL LINES

                SETALL: MOV     #20,R0                  ;SET UP TO LOAD 16
                                                        ;BYTE COUNT AND BUS ADDRESS
                                                        ;MEMORY LOCATIONS
                        CLR     R1                      ;SET UP TO GENERATE EXPECTED
                                                        ;RECEIVED CHARACTER BUFFER
                        MOV     #200,R2                 ;WILL BE HIGH BYTE
                                                        ;OF EXPECTED RECEIVED CHARACTER
                        MOV     #1,R3                   ;OFFSET FOR HIGH BYTE
                1$:     MOV     #TBUF,@DHBA             ;LOAD BUS ADDRESS
                        MOV     #-400,@DHBC             ;LOAD BYTE COUNT
                        MOV     #31403,@DHLPR           ;SET LINE SPEED TO 4800 BAUD
                        CLRB    RBUF(R1)
                                                        ;RECEIVED CHARACTER
                        MOVB    R2,RBUF(R3)             ;LOAD HIGH BYTE
                        INC     @DHSCR                  ;ADVANCE LINE NUMBER TO NEXT LINE
                        INC     R2                      ;UPDATE POINTERS
                        ADD     #2,R1
                        ADD     #2,R3
                        DEC     R0                      ;CONTINUE IF NOT DONE
                        BNE     1$
                        MOV     #-1,LINACT              ;SET ACTIVE FLAGS FOR ALL LINES
                        RTS     PC                      ;RETURN TO CALLING ROUTINE
                .ENDM   SSETALL

                .MACRO  CCLRALL

                        ;CLEAR ALL BYTE COUNT AND BUS ADDRESS REGISTERS

                CLRALL: MOV     #20,R0                  ;SET UP TO CLEAR 16
                1$:     CLR     @DHBA                   ;CLEAR BUS ADDRESS
                        CLR     @DHBC                   ;CLEAR BYTE COUNT
                        INC     @DHSCR                  ;ANVANCE LINE NUMBER
                        DEC     R0                      ;CONTINUE IF NOT DONE
                        BNE     1$
                        RTS     PC                      ;RETURN TO CALLING ROUTINE
                .ENDM   CCLRALL
```

```
        000020                  XLINE=LINE
        000000                  XBIT=BITX
        000020                  K=KX
        000000                  LINE=0
        000001                  BITX=1
        000000                  KX=0
        000020                  .REPT   20
                                AUTO1   \LINE,\BITX,\KX
                                .NLIST
                                LINE=LINE+1
                                BITX=BITX+BITX
                                KX=KX+1
                                .LIST
                                .ENDR
  001400                        AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 0
                                        ;TRANSMIT ONE CHARACTER ON LINE 0
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

  001400                        TS \XN,100,4$
  001400  012767  000340  176370  T1:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
  001406  012767  000100  012172        MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
  001414  012767  001554  012160        MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #.FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
          000002                XN=XN+1
  001422  012777  004000  012110        MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
  001430  004767  011744          1$:   JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
  001434  012777  000000  012076        MOV     #0,@DHSCR               ;SELECT LINE 0
  001442  012777  177777  012100        MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
  001450  012777  014310  012070        MOV     #TWRDO,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
  001456  012700  000100                MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
  001462  005001                        CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
  001464  012777  133503  012052        MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER.
                                                                        ;AUTO ECHO ENABLED ON LINE 0
  001472  012777  000001  012052        MOV     #1,@DHBAR               ;SET BAR BIT FOR LINE 0
  001500  105777  012034          2$:   TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
  001504  100375                        BPL     2$                      ;BE RECEIVED
  001506  005201                        INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
  001510  017704  012026                MOV     @DHNRC,R4               ;READ CHARACTER
  001514  020467  012570                CMP     R4,TWRDO                ;IS CHARACTER CORRECT
  001520  001406                        BEQ     3$
  001522  016705  012562                MOV     TWRDO,R5                ;(R5)=EXPECTED CHARACTER
  001526  005077  012012                CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
  001532                                HLT     0                       ;CHARACTER ECHOED INCORRECTLY
  001532  104000                        EMT     0
  001534  000407                        BR      4$                      ;RESTART TEST
  001536  005300                  3$:   DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
  001540  003357                        BGT     2$                      ;BEEN RECEIVED, CONTINUE
  001542  100404                        BMI     4$
```

```
001544  042777  100000  011772          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
001552  000752                          BR      2$                      ;GET 1 MORE CHARACTER
001554  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000001                  LINE=LINE+1
        000002                  BITX=BITX+BITX
        000001                  KX=KX+1
001556                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 1
                                        ;TRANSMIT ONE CHARACTER ON LINE 1
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

001556                          TS \XN,100,4$
001556  012767  000340  176212  T2:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
001564  012767  000100  012014          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
001572  012767  001732  012002          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000003                  XN=XN+1
001600  012777  004000  011732          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
001606  004767  011566          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
001612  012777  000001  011720          MOV     #1,@DHSCR               ;SELECT LINE 1
001620  012777  177777  011722          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
001626  012777  014312  011712          MOV     #TWRD1,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
001634  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
001640  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
001642  012777  133503  011674          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 1
001650  012777  000002  011674          MOV     #2,@DHBAR               ;SET BAR BIT FOR LINE 1
001656  105777  011656          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
001662  100375                          BPL     2$                      ;BE RECEIVED
001664  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
001666  017704  011650                  MOV     @DHNRC,R4               ;READ CHARACTER
001672  020467  012414                  CMP     R4,TWRD1                ;IS CHARACTER CORRECT
001676  001406                          BEQ     3$
001700  016705  012406                  MOV     TWRD1,R5                ;(R5)=EXPECTED CHARACTER
001704  005077  011634                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
001710                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
001710  104000                          EMT     0
001712  000407                          BR      4$                      ;RESTART TEST
001714  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
001716  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
001720  100404                          BMI     4$
001722  042777  100000  011614          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
001730  000752                          BR      2$                      ;GET 1 MORE CHARACTER
001732  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000002                  LINE=LINE+1
        000004                  BITX=BITX+BITX
        000002                  KX=KX+1
001734                          AUTO1   \LINE,\BITX,\KX
```

```
                                        ;ENABLE AUTO ECHO ON LINE 2
                                        ;TRANSMIT ONE CHARACTER ON LINE 2
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

001734                          TS \XN,100,4$
001734  012767  000340  176034  T3:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
001742  012767  000100  011636          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
001750  012767  002110  011624          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000004                  XN=XN+1
001756  012777  004000  011554          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
001764  004767  011410          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
001770  012777  000002  011542          MOV     #2,@DHSCR               ;SELECT LINE 2
001776  012777  177777  011544          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
002004  012777  014314  011534          MOV     #TWRD2,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002012  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
002016  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
002020  012777  133503  011516          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 2
002026  012777  000004  011516          MOV     #4,@DHBAR               ;SET BAR BIT FOR LINE 2
002034  105777  011500          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
002040  100375                          BPL     2$                      ;BE RECEIVED
002042  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
002044  017704  011472                  MOV     @DHNRC,R4               ;READ CHARACTER
002050  020467  012240                  CMP     R4,TWRD2                ;IS CHARACTER CORRECT
002054  001406                          BEQ     3$
002056  016705  012232                  MOV     TWRD2,R5                ;(R5)=EXPECTED CHARACTER
002062  005077  011456                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
002066                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
002066  104000                          EMT     0
002070  000407                          BR      4$                      ;RESTART TEST
002072  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
002074  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
002076  100404                          BMI     4$
002100  042777  100000  011436          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
002106  000752                          BR      2$                      ;GET 1 MORE CHARACTER
002110  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000003                  LINE=LINE+1
        000010                  BITX=BITX+BITX
        000003                  KX=KX+1
002112                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 3
                                        ;TRANSMIT ONE CHARACTER ON LINE 3
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

002112                          TS \XN,100,4$
```

```
002112  012767  000340  175656  T4:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
002120  012767  000100  011460          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
002126  012767  002266  011446          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000005                  XN=XN+1
002134  012777  004000  011376          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
002142  004767  011232          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
002146  012777  000003  011364          MOV     #3,@DHSCR               ;SELECT LINE 3
002154  012777  177777  011366          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
002162  012777  014316  011356          MOV     #TWRD3,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002170  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
002174  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
002176  012777  133503  011340          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 3
002204  012777  000010  011340          MOV     #10,@DHBAR              ;SET BAR BIT FOR LINE 3
002212  105777  011322          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
002216  100375                          BPL     2$                      ;BE RECEIVED
002220  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
002222  017704  011314                  MOV     @DHNRC,R4               ;READ CHARACTER
002226  020467  012064                  CMP     R4,TWRD3                ;IS CHARACTER CORRECT
002232  001406                          BEQ     3$
002234  016705  012056                  MOV     TWRD3,R5                ;(R5)=EXPECTED CHARACTER
002240  005077  011300                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
002244                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
002244  104000                          EMT     0
002246  000407                          BR      4$                      ;RESTART TEST
002250  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
002252  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
002254  100404                          BMI     4$
002256  042777  100000  011260          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
002264  000752                          BR      2$                      ;GET 1 MORE CHARACTER
002266  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000004                  LINE=LINE+1
        000020                  BITX=BITX+BITX
        000004                  KX=KX+1
002270                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 4
                                        ;TRANSMIT ONE CHARACTER ON LINE 4
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

002270                          TS \XN,100,4$
002270  012767  000340  175500  T5:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
002276  012767  000100  011302          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
002304  012767  002444  011270          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000006                  XN=XN+1
002312  012777  004000  011220          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
```

```
002320  004767  011054          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
002324  012777  000004  011206          MOV     #4,@DHSCR               ;SELECT LINE 4
002332  012777  177777  011210          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
002340  012777  014320  011200          MOV     #TWRD4,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002346  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
002352  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
002354  012777  133503  011162          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 4
002362  012777  000020  011162          MOV     #20,@DHBAR              ;SET BAR BIT FOR LINE 4
002370  105777  011144          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
002374  100375                          BPL     2$                      ;BE RECEIVED
002376  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
002400  017704  011136                  MOV     @DHNRC,R4               ;READ CHARACTER
002404  020467  011710                  CMP     R4,TWRD4                ;IS CHARACTER CORRECT
002410  001406                          BEQ     3$
002412  016705  011702                  MOV     TWRD4,R5                ;(R5)=EXPECTED CHARACTER
002416  005077  011122                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
002422                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
002422  104000                          EMT     0
002424  000407                          BR      4$                      ;RESTART TEST
002426  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
002430  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
002432  100404                          BMI     4$
002434  042777  100000  011102          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
002442  000752                          BR      2$                      ;GET 1 MORE CHARACTER
002444  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000005                  LINE=LINE+1
        000040                  BITX=BITX+BITX
        000005                  KX=KX+1
002446                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 5
                                        ;TRANSMIT ONE CHARACTER ON LINE 5
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

002446                          TS \XN,100,4$
002446  012767  000340  175322  T6:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
002454  012767  000100  011124          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
002462  012767  002622  011112          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000007                  XN=XN+1
002470  012777  004000  011042          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
002476  004767  010676          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
002502  012777  000005  011030          MOV     #5,@DHSCR               ;SELECT LINE 5
002510  012777  177777  011032          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
002516  012777  014322  011022          MOV     #TWRD5,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002524  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
002530  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
002532  012777  133503  011004          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
```

```
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 5
002540  012777  000040  011004          MOV     #40,@DHBAR              ;SET BAR BIT FOR LINE 5
002546  105777  010766          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
002552  100375                          BPL     2$                      ;BE RECEIVED
002554  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
002556  017704  010760                  MOV     @DHNRC,R4               ;READ CHARACTER
002562  020467  011534                  CMP     R4,TWRD5                ;IS CHARACTER CORRECT
002566  001406                          BEQ     3$
002570  016705  011526                  MOV     TWRD5,R5                ;(R5)=EXPECTED CHARACTER
002574  005077  010744                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
002600                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
002600  104000                          EMT     0
002602  000407                          BR      4$                      ;RESTART TEST
002604  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
002606  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
002610  100404                          BMI     4$
002612  042777  100000  010724          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
002620  000752                          BR      2$                      ;GET 1 MORE CHARACTER
002622  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000006                  LINE=LINE+1
        000100                  BITX=BITX+BITX
        000006                  KX=KX+1
002624                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 6
                                        ;TRANSMIT ONE CHARACTER ON LINE 6
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

002624                          TS \XN,100,4$
002624  012767  000340  175144  T7:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
002632  012767  000100  010746          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
002640  012767  003000  010734          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000010                  XN=XN+1
002646  012777  004000  010664          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
002654  004767  010520          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
002660  012777  000006  010652          MOV     #6,@DHSCR               ;SELECT LINE 6
002666  012777  177777  010654          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
002674  012777  014324  010644          MOV     #TWRD6,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002702  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
002706  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
002710  012777  133503  010626          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 6
002716  012777  000100  010626          MOV     #100,@DHBAR             ;SET BAR BIT FOR LINE 6
002724  105777  010610          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
002730  100375                          BPL     2$                      ;BE RECEIVED
002732  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
002734  017704  010602                  MOV     @DHNRC,R4               ;READ CHARACTER
002740  020467  011360                  CMP     R4,TWRD6                ;IS CHARACTER CORRECT
```

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002744  001406                          BEQ     3$
002746  016705  011352                  MOV     TWRD6,R5                ;(R5)=EXPECTED CHARACTER
002752  005077  010566                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
002756                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
002756  104000                          EMT     0
002760  000407                          BR      4$                      ;RESTART TEST
002762  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
002764  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
002766  100404                          BMI     4$
002770  042777  100000  010546          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
002776  000752                          BR      2$                      ;GET 1 MORE CHARACTER
003000  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000007                  LINE=LINE+1
        000200                  BITX=BITX+BITX
        000007                  KX=KX+1
003002                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 7
                                        ;TRANSMIT ONE CHARACTER ON LINE 7
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

003002                          TS \XN,100,4$
003002  012767  000340  174766  T10:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
003010  012767  000100  010570          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
003016  012767  003156  010556          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000011                  XN=XN+1
003024  012777  004000  010506          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003032  004767  010342          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
003036  012777  000007  010474          MOV     #7,@DHSCR               ;SELECT LINE 7
003044  012777  177777  010476          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
003052  012777  014326  010466          MOV     #TWRD7,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003060  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
003064  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
003066  012777  133503  010450          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 7
003074  012777  000200  010450          MOV     #200,@DHBAR             ;SET BAR BIT FOR LINE 7
003102  105777  010432          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
003106  100375                          BPL     2$                      ;BE RECEIVED
003110  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
003112  017704  010424                  MOV     @DHNRC,R4               ;READ CHARACTER
003116  020467  011204                  CMP     R4,TWRD7                ;IS CHARACTER CORRECT
003122  001406                          BEQ     3$
003124  016705  011176                  MOV     TWRD7,R5                ;(R5)=EXPECTED CHARACTER
003130  005077  010410                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
003134                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
003134  104000                          EMT     0
003136  000407                          BR      4$                      ;RESTART TEST
003140  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
003142  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
```

```
003144  100404                          BMI     4$
003146  042777  100000  010370          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
003154  000752                          BR      2$                      ;GET 1 MORE CHARACTER
003156  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000010                  LINE=LINE+1
        000400                  BITX=BITX+BITX
        000010                  KX=KX+1
003160                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 10
                                        ;TRANSMIT ONE CHARACTER ON LINE 10
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

003160                          TS \XN,100,4$
003160  012767  000340  174610  T11:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
003166  012767  000100  010412          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
003174  012767  003334  010400          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000012                  XN=XN+1
003202  012777  004000  010330          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003210  004767  010164          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
003214  012777  000010  010316          MOV     #10,@DHSCR              ;SELECT LINE 10
003222  012777  177777  010320          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
003230  012777  014330  010310          MOV     #TWRD10,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003236  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
003242  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
003244  012777  133503  010272          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 10
003252  012777  000400  010272          MOV     #400,@DHBAR             ;SET BAR BIT FOR LINE 10
003260  105777  010254          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
003264  100375                          BPL     2$                      ;BE RECEIVED
003266  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
003270  017704  010246                  MOV     @DHNRC,R4               ;READ CHARACTER
003274  020467  011030                  CMP     R4,TWRD10               ;IS CHARACTER CORRECT
003300  001406                          BEQ     3$
003302  016705  011022                  MOV     TWRD10,R5               ;(R5)=EXPECTED CHARACTER
003306  005077  010232                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
003312                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
003312  104000                          EMT     0
003314  000407                          BR      4$                      ;RESTART TEST
003316  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
003320  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
003322  100404                          BMI     4$
003324  042777  100000  010212          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
003332  000752                          BR      2$                      ;GET 1 MORE CHARACTER
003334  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000011                  LINE=LINE+1
        001000                  BITX=BITX+BITX
        000011                  KX=KX+1
003336                          AUTO1   \LINE,\BITX,\KX
```

```
                                        ;ENABLE AUTO ECHO ON LINE 11
                                        ;TRANSMIT ONE CHARACTER ON LINE 11
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

003336                          TS \XN,100,4$
003336  012767  000340  174432  T12:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
003344  012767  000100  010234          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
003352  012767  003512  010222          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000013                  XN=XN+1
003360  012777  004000  010152          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003366  004767  010006          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
003372  012777  000011  010140          MOV     #11,@DHSCR              ;SELECT LINE 11
003400  012777  177777  010142          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
003406  012777  014332  010132          MOV     #TWRD11,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003414  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
003420  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
003422  012777  133503  010114          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 11
003430  012777  001000  010114          MOV     #1000,@DHBAR            ;SET BAR BIT FOR LINE 11
003436  105777  010076          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
003442  100375                          BPL     2$                      ;BE RECEIVED
003444  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
003446  017704  010070                  MOV     @DHNRC,R4               ;READ CHARACTER
003452  020467  010654                  CMP     R4,TWRD11               ;IS CHARACTER CORRECT
003456  001406                          BEQ     3$
003460  016705  010646                  MOV     TWRD11,R5               ;(R5)=EXPECTED CHARACTER
003464  005077  010054                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
003470                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
003470  104000                          EMT     0
003472  000407                          BR      4$                      ;RESTART TEST
003474  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
003476  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
003500  100404                          BMI     4$
003502  042777  100000  010034          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
003510  000752                          BR      2$                      ;GET 1 MORE CHARACTER
003512  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000012                  LINE=LINE+1
        002000                  BITX=BITX+BITX
        000012                  KX=KX+1
003514                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 12
                                        ;TRANSMIT ONE CHARACTER ON LINE 12
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.
```

```
003514                          TS \XN,100,4$
003514  012767  000340  174254  T13:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
003522  012767  000100  010056          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
003530  012767  003670  010044          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000014                  XN=XN+1
003536  012777  004000  007774          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003544  004767  007630          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
003550  012777  000012  007762          MOV     #12,@DHSCR              ;SELECT LINE 12
003556  012777  177777  007764          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
003564  012777  014334  007754          MOV     #TWRD12,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003572  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
003576  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
003600  012777  133503  007736          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 12
003606  012777  002000  007736          MOV     #2000,@DHBAR            ;SET BAR BIT FOR LINE 12
003614  105777  007720          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
003620  100375                          BPL     2$                      ;BE RECEIVED
003622  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
003624  017704  007712                  MOV     @DHNRC,R4               ;READ CHARACTER
003630  020467  010500                  CMP     R4,TWRD12               ;IS CHARACTER CORRECT
003634  001406                          BEQ     3$
003636  016705  010472                  MOV     TWRD12,R5               ;(R5)=EXPECTED CHARACTER
003642  005077  007676                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
003646                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
003646  104000                          EMT     0
003650  000407                          BR      4$                      ;RESTART TEST
003652  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
003654  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
003656  100404                          BMI     4$
003660  042777  100000  007656          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
003666  000752                          BR      2$                      ;GET 1 MORE CHARACTER
003670  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000013                  LINE=LINE+1
        004000                  BITX=BITX+BITX
        000013                  KX=KX+1
003672                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 13
                                        ;TRANSMIT ONE CHARACTER ON LINE 13
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

003672                          TS \XN,100,4$
003672  012767  000340  174076  T14:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
003700  012767  000100  007700          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
003706  012767  004046  007666          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000015                  XN=XN+1
```

```
003714  012777  004000  007616          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003722  004767  007452          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
003726  012777  000013  007604          MOV     #13,@DHSCR              ;SELECT LINE 13
003734  012777  177777  007606          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
003742  012777  014336  007576          MOV     #TWRD13,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003750  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
003754  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
003756  012777  133503  007560          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 13
003764  012777  004000  007560          MOV     #4000,@DHBAR            ;SET BAR BIT FOR LINE 13
003772  105777  007542          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
003776  100375                          BPL     2$                      ;BE RECEIVED
004000  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
004002  017704  007534                  MOV     @DHNRC,R4               ;READ CHARACTER
004006  020467  010324                  CMP     R4,TWRD13               ;IS CHARACTER CORRECT
004012  001406                          BEQ     3$
004014  016705  010316                  MOV     TWRD13,R5               ;(R5)=EXPECTED CHARACTER
004020  005077  007520                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
004024                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
004024  104000                          EMT     0
004026  000407                          BR      4$                      ;RESTART TEST
004030  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
004032  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
004034  100404                          BMI     4$
004036  042777  100000  007500          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
004044  000752                          BR      2$                      ;GET 1 MORE CHARACTER
004046  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000014                  LINE=LINE+1
        010000                  BITX=BITX+BITX
        000014                  KX=KX+1
004050                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 14
                                        ;TRANSMIT ONE CHARACTER ON LINE 14
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

004050                          TS \XN,100,4$
004050  012767  000340  173720  T15:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
004056  012767  000100  007522          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
004064  012767  004224  007510          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000016                  XN=XN+1
004072  012777  004000  007440          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
004100  004767  007274          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
004104  012777  000014  007426          MOV     #14,@DHSCR              ;SELECT LINE 14
004112  012777  177777  007430          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
004120  012777  014340  007420          MOV     #TWRD14,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004126  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
004132  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
```

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004134  012777  133503  007402          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 14
004142  012777  010000  007402          MOV     #10000,@DHBAR           ;SET BAR BIT FOR LINE 14
004150  105777  007364          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
004154  100375                          BPL     2$                      ;BE RECEIVED
004156  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
004160  017704  007356                  MOV     @DHNRC,R4               ;READ CHARACTER
004164  020467  010150                  CMP     R4,TWRD14               ;IS CHARACTER CORRECT
004170  001406                          BEQ     3$
004172  016705  010142                  MOV     TWRD14,R5               ;(R5)=EXPECTED CHARACTER
004176  005077  007342                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
004202                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
004202  104000                          EMT     0
004204  000407                          BR      4$                      ;RESTART TEST
004206  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
004210  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
004212  100404                          BMI     4$
004214  042777  100000  007322          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
004222  000752                          BR      2$                      ;GET 1 MORE CHARACTER
004224  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000015                  LINE=LINE+1
        020000                  BITX=BITX+BITX
        000015                  KX=KX+1
004226                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 15
                                        ;TRANSMIT ONE CHARACTER ON LINE 15
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

004226                          TS \XN,100,4$
004226  012767  000340  173542  T16:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
004234  012767  000100  007344          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
004242  012767  004402  007332          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000017                  XN=XN+1
004250  012777  004000  007262          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
004256  004767  007116          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
004262  012777  000015  007250          MOV     #15,@DHSCR              ;SELECT LINE 15
004270  012777  177777  007252          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
004276  012777  014342  007242          MOV     #TWRD15,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004304  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
004310  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
004312  012777  133503  007224          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 15
004320  012777  020000  007224          MOV     #20000,@DHBAR           ;SET BAR BIT FOR LINE 15
004326  105777  007206          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
004332  100375                          BPL     2$                      ;BE RECEIVED
004334  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
004336  017704  007200                  MOV     @DHNRC,R4               ;READ CHARACTER
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004342  020467  007774                  CMP     R4,TWRD15               ;IS CHARACTER CORRECT
004346  001406                          BEQ     3$
004350  016705  007766                  MOV     TWRD15,R5               ;(R5)=EXPECTED CHARACTER
004354  005077  007164                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
004360                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
004360  104000                          EMT     0
004362  000407                          BR      4$                      ;RESTART TEST
004364  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
004366  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
004370  100404                          BMI     4$
004372  042777  100000  007144          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
004400  000752                          BR      2$                      ;GET 1 MORE CHARACTER
004402  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000016                  LINE=LINE+1
        040000                  BITX=BITX+BITX
        000016                  KX=KX+1
004404                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 16
                                        ;TRANSMIT ONE CHARACTER ON LINE 16
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

004404                          TS \XN,100,4$
004404  012767  000340  173364  T17:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
004412  012767  000100  007166          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
004420  012767  004560  007154          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000020                  XN=XN+1
004426  012777  004000  007104          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
004434  004767  006740          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
004440  012777  000016  007072          MOV     #16,@DHSCR              ;SELECT LINE 16
004446  012777  177777  007074          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
004454  012777  014344  007064          MOV     #TWRD16,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004462  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
004466  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
004470  012777  133503  007046          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 16
004476  012777  040000  007046          MOV     #40000,@DHBAR           ;SET BAR BIT FOR LINE 16
004504  105777  007030          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
004510  100375                          BPL     2$                      ;BE RECEIVED
004512  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
004514  017704  007022                  MOV     @DHNRC,R4               ;READ CHARACTER
004520  020467  007620                  CMP     R4,TWRD16               ;IS CHARACTER CORRECT
004524  001406                          BEQ     3$
004526  016705  007612                  MOV     TWRD16,R5               ;(R5)=EXPECTED CHARACTER
004532  005077  007006                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
004536                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
004536  104000                          EMT     0
004540  000407                          BR      4$                      ;RESTART TEST
004542  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
```

```
004544  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
004546  100404                          BMI     4$
004550  042777  100000  006766          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
004556  000752                          BR      2$                      ;GET 1 MORE CHARACTER
004560  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000017                  LINE=LINE+1
        100000                  BITX=BITX+BITX
        000017                  KX=KX+1
004562                          AUTO1   \LINE,\BITX,\KX

                                        ;ENABLE AUTO ECHO ON LINE 17
                                        ;TRANSMIT ONE CHARACTER ON LINE 17
                                        ;AT 9600 BAUD, 8 BITS.
                                        ;RECEIVE AND VERIFY CHARACTERS UNTIL 64 HAVE BEEN RECEIVED.
                                        ;AFTER 64 CHARACTERS HAVE BEEN RECEIVED, DISABLE AUTO ECHO.
                                        ;EXACTLY ONE MORE CHARACTER SHOULD BE RECEIVED.

004562                          TS \XN,100,4$
004562  012767  000340  173206  T20:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
004570  012767  000100  007010          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
004576  012767  004736  006776          MOV     #4$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000021                  XN=XN+1
004604  012777  004000  006726          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
004612  004767  006562          1$:     JSR     PC,CLRALL               ;CLEAR ALL BYTE COUNT AN
                                                                        ;BUS ADDRESS REGISTERS
004616  012777  000017  006714          MOV     #17,@DHSCR              ;SELECT LINE 17
004624  012777  177777  006716          MOV     #-1,@DHBC               ;SET BYTE COUNT TO 1
004632  012777  014346  006706          MOV     #TWRD17,@DHBA           ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004640  012700  000100                  MOV     #100,R0                 ;SET UP TO RECEIVE 64 CHARACTERS
004644  005001                          CLR     R1                      ;COUNT OF CHARACTERS RECEIVED
004646  012777  133503  006670          MOV     #133503,@DHLPR          ;SET UP SPEED FOR 9600 BAUD
                                                                        ;8 BITS PER CHARACTER,
                                                                        ;AUTO ECHO ENABLED ON LINE 17
004654  012777  100000  006670          MOV     #100000,@DHBAR          ;SET BAR BIT FOR LINE 17
004662  105777  006652          2$:     TSTB    @DHSCR                  ;WAIT FOR CHARACTER TO
004666  100375                          BPL     2$                      ;BE RECEIVED
004670  005201                          INC     R1                      ;UPDATE RECEIVED CHARACTER COUNT
004672  017704  006644                  MOV     @DHNRC,R4               ;READ CHARACTER
004676  020467  007444                  CMP     R4,TWRD17               ;IS CHARACTER CORRECT
004702  001406                          BEQ     3$
004704  016705  007436                  MOV     TWRD17,R5               ;(R5)=EXPECTED CHARACTER
004710  005077  006630                  CLR     @DHLPR                  ;SHUT OFF AUTO ECHO
004714                                  HLT     0                       ;CHARACTER ECHOED INCORRECTLY
004714  104000                          EMT     0
004716  000407                          BR      4$                      ;RESTART TEST
004720  005300                  3$:     DEC     R0                      ;IF 64 CHARACTERS HAVE NOT
004722  003357                          BGT     2$                      ;BEEN RECEIVED, CONTINUE
004724  100404                          BMI     4$
004726  042777  100000  006610          BIC     #100000,@DHLPR          ;SHUT OFF AUTO-ECHO
004734  000752                          BR      2$                      ;GET 1 MORE CHARACTER
004736  104400                  4$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000020                  LINE=LINE+1
        000000                  BITX=BITX+BITX
        000020                  KX=KX+1
```

```
 18          000020                    XLINE=LINE
 19          000000                    XBIT=BITX
 20          000020                    K=KX
 21          000000                    LINE=0
 22          000001                    BITX=1
 23          000000                    KX=0
 25          000020                    .REPT   20
 26                                    AUTO2   \LINE,\BITX,\KX
 27                                    .NLIST
 28                                    LINE=LINE+1
 29                                    BITX=BITX+BITX
 30                                    KX=KX+1
 31                                    .LIST
 32                                    .ENDR
    004740                             AUTO2   \LINE,\BITX,\KX

                                               ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 0
                                               ;TRANSMIT 1 CHARACTER ON LINE 0 WITH AUTO ECHO ENABLED
                                               ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                               ;CHARACTER LENGTH IS 8 BITS
                                               ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

    004740                             TS \XN,10,5$
    004740  012767  000340  173030     T21:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
    004746  012767  000010  006632             MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
    004754  012767  005174  006620             MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                       .IF NB  <>
                                               MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA        ; 3
            000022                     .ENDC
                                       XN=XN+1
    004762  012777  004000  006550             MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
    004770  004767  006432                     JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                               ;400 (OCTAL) CHARACTERS
    004774  012777  000000  006536             MOV     #0,@DHSCR               ;SELECT LINE 0 FOR TESTING
    005002  012777  014310  006536             MOV     #TWRDO,@DHBA        ;CHARACTER TO BE TRANSMITTED
                                                                               ;ON LINE 0 IN AUTO ECHO MODE
    005010  012777  177777  006532             MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 0
    005016  012777  133503  006520             MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 0
    005024  042767  000001  006610             BIC     #1,LINACT           ;CLEAR LINE ACTIVE BIT
    005032  012777  177777  006512             MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
    005040  005000                             CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
    005042  017704  006474          1$:        MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
    005046  100375                             BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
    005050  010403                             MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
    005052  000303                             SWAB    R3
    005054  042703  177760                     BIC     #177760,R3              ;CLEAR STATUS BITS
    005060  010302                             MOV     R3,R2
    005062  006302                             ASL     R2
    005064  020327  000000                     CMP     R3,#0               ;IF LINE NUMBER IS 0
    005070  001432                             BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
    005072  026204  014246                     CMP     RBUF(R2),R4             ;IF NOT LINE 0, CHECK DATA
    005076  001404                             BEQ     2$
    005100  016205  014246                     MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
    005104                                     HLT     1                       ;NON ECHOED DATA ERROR
    005104  104001                             EMT     1
    005106  000423                             BR      4$
    005110  105262  014246          2$:        INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
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```
005114  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
005116  046267  014450  006516          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
005124  005767  006512          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
005130  001344                          BNE     1$                      ;EXIT
005132  012777  000000  006400          MOV     #0,@DHSCR               ;SELECT LINE 0
005140  042777  100000  006376          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 0
005146  105777  006406                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
005152  001333                          BNE     1$                      ;AND CHECK
005154  000407                          BR      5$
005156  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
005160  020467  007124                  CMP     R4,TWRD0                ;CHECK ECHOED DATA
005164  001757                          BEQ     3$
005166  016705  007116                  MOV     TWRD0,R5                        ;(R5)=EXPECTED ECHOED DATA
005172                                  HLT     2                       ;ECHOED DATA ERROR
005172  104002                          EMT     2
005174  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000001                  LINE=LINE+1
        000002                  BITX=BITX+BITX
        000001                  KX=KX+1
005176                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 1
                                        ;TRANSMIT 1 CHARACTER ON LINE 1 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

005176                          TS \XN,10,5$
005176  012767  000340  172572  T22:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
005204  012767  000010  006374          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
005212  012767  005432  006362          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000023                  XN=XN+1
005220  012777  004000  006312          MOV     #6IT11,@DHSCR           ;MASTER CLEAR INTERFACE
005226  004767  006174                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
005232  012777  000001  006300          MOV     #1,@DHSCR               ;SELECT LINE 1 FOR TESTING
005240  012777  014312  006300          MOV     #TWRD1,@DHBA        ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 1 IN AUTO ECHO MODE
005246  012777  177777  006274          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 1
005254  012777  133503  006262          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 1
005262  042767  000002  006352          BIC     #2,LINACT           ;CLEAR LINE ACTIVE BIT
005270  012777  177777  006254          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
005276  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
005300  017704  006236          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
005304  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
005306  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
005310  000303                          SWAB    R3
005312  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
005316  010302                          MOV     R3,R2
005320  006302                          ASL     R2
005322  020327  000001                  CMP     R3,#1               ;IF LINE NUMBER IS 1
005326  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
005330  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 1, CHECK DATA
005334  001404                          BEQ     2$
```

```
005336  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
005342                                  HLT     1                       ;NON ECHOED DATA ERROR
005342  104001                          EMT     1
005344  000423                          BR      4$
005346  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
005352  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
005354  046267  014450  006260          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
005362  005767  006254          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
005366  001344                          BNE     1$                      ;EXIT
005370  012777  000001  006142          MOV     #1,@DHSCR               ;SELECT LINE 1
005376  042777  100000  006140          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 1
005404  105777  006150                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
005410  001333                          BNE     1$                      ;AND CHECK
005412  000407                          BR      5$
005414  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
005416  020467  006670                  CMP     R4,TWRD1                ;CHECK ECHOED DATA
005422  001757                          BEQ     3$
005424  016705  006662                  MOV     TWRD1,R5                        ;(R5)=EXPECTED ECHOED DATA
005430                                  HLT     2                       ;ECHOED DATA ERROR
005430  104002                          EMT     2
005432  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000002                  LINE=LINE+1
        000004                  BITX=BITX+BITX
        000002                  KX=KX+1
005434                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 2
                                        ;TRANSMIT 1 CHARACTER ON LINE 2 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

005434                          TS \XN,10,5$
005434  012767  000340  172334  T23:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
005442  012767  000010  006136          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
005450  012767  005670  006124          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000024                  XN=XN+1
005456  012777  004000  006054          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
005464  004767  005736                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
005470  012777  000002  006042          MOV     #2,@DHSCR               ;SELECT LINE 2 FOR TESTING
005476  012777  014314  006042          MOV     #TWRD2,@DHBA        ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 2 IN AUTO ECHO MODE
005504  012777  177777  006036          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 2
005512  012777  133503  006024          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 2
005520  042767  000004  006114          BIC     #4,LINACT           ;CLEAR LINE ACTIVE BIT
005526  012777  177777  006016          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
005534  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
005536  017704  006000          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
005542  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
005544  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
005546  000303                          SWAB    R3
005550  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
005554  010302                          MOV     R3,R2
```

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005556  006302                          ASL     R2
005560  020327  000002                  CMP     R3,#2           ;IF LINE NUMBER IS 2
005564  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
005566  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 2, CHECK DATA
005572  001404                          BEQ     2$
005574  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
005600                                  HLT     1                       ;NON ECHOED DATA ERROR
005600  104001                          EMT     1
005602  000423                          BR      4$
005604  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
005610  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
005612  046267  014450  006022          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
005620  005767  006016          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
005624  001344                          BNE     1$                      ;EXIT
005626  012777  000002  005704          MOV     #2,@DHSCR               ;SELECT LINE 2
005634  042777  100000  005702          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 2
005642  105777  005712                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
005646  001333                          BNE     1$                      ;AND CHECK
005650  000407                          BR      5$
005652  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
005654  020467  006434                  CMP     R4,TWRD2                ;CHECK ECHOED DATA
005660  001757                          BEQ     3$
005662  016705  006426                  MOV     TWRD2,R5                        ;(R5)=EXPECTED ECHOED DATA
005666                                  HLT     2                       ;ECHOED DATA ERROR
005666  104002                          EMT     2
005670  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000003                  LINE=LINE+1
        000010                  BITX=BITX+BITX
        000003                  KX=KX+1
005672                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 3
                                        ;TRANSMIT 1 CHARACTER ON LINE 3 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

005672                          TS \XN,10,5$
005672  012767  000340  172076  T24:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
005700  012767  000010  005700          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
005706  012767  006126  005666          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000025                  XN=XN+1
005714  012777  004000  005616          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
005722  004767  005500                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
005726  012777  000003  005604          MOV     #3,@DHSCR               ;SELECT LINE 3 FOR TESTING
005734  012777  014316  005604          MOV     #TWRD3,@DHBA    ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 3 IN AUTO ECHO MODE
005742  012777  177777  005600          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 3
005750  012777  133503  005566          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 3
005756  042767  000010  005656          BIC     #10,LINACT      ;CLEAR LINE ACTIVE BIT
005764  012777  177777  005560          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
005772  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
005774  017704  005542          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
```

```
006000  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
006002  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
006004  000303                          SWAB    R3
006006  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
006012  010302                          MOV     R3,R2
006014  006302                          ASL     R2
006016  020327  000003                  CMP     R3,#3           ;IF LINE NUMBER IS 3
006022  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
006024  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 3, CHECK DATA
006030  001404                          BEQ     2$
006032  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
006036                                  HLT     1                       ;NON ECHOED DATA ERROR
006036  104001                          EMT     1
006040  000423                          BR      4$
006042  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
006046  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
006050  046267  014450  005564          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
006056  005767  005560          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
006062  001344                          BNE     1$                      ;EXIT
006064  012777  000003  005446          MOV     #3,@DHSCR               ;SELECT LINE 3
006072  042777  100000  005444          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 3
006100  105777  005454                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
006104  001333                          BNE     1$                      ;AND CHECK
006106  000407                          BR      5$
006110  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
006112  020467  006200                  CMP     R4,TWRD3                ;CHECK ECHOED DATA
006116  001757                          BEQ     3$
006120  016705  006172                  MOV     TWRD3,R5                        ;(R5)=EXPECTED ECHOED DATA
006124                                  HLT     2                       ;ECHOED DATA ERROR
006124  104002                          EMT     2
006126  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000004                  LINE=LINE+1
        000020                  BITX=BITX+BITX
        000004                  KX=KX+1
006130                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 4
                                        ;TRANSMIT 1 CHARACTER ON LINE 4 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

006130                          TS \XN,10,5$
006130  012767  000340  171640  T25:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
006136  012767  000010  005442          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
006144  012767  006364  005430          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000026                  XN=XN+1
006152  012777  004000  005360          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
006160  004767  005242                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
006164  012777  000004  005346          MOV     #4,@DHSCR               ;SELECT LINE 4 FOR TESTING
006172  012777  014320  005346          MOV     #TWRD4,@DHBA    ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 4 IN AUTO ECHO MODE
006200  012777  177777  005342          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 4
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```
006206  012777  133503  005330          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 4
006214  042767  000020  005420          BIC     #20,LINACT      ;CLEAR LINE ACTIVE BIT
006222  012777  177777  005322          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
006230  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
006232  017704  005304          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
006236  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
006240  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
006242  000303                          SWAB    R3
006244  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
006250  010302                          MOV     R3,R2
006252  006302                          ASL     R2
006254  020327  000004                  CMP     R3,#4           ;IF LINE NUMBER IS 4
006260  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
006262  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 4, CHECK DATA
006266  001404                          BEQ     2$
006270  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
006274                                  HLT     1                       ;NON ECHOED DATA ERROR
006274  104001                          EMT     1
006276  000423                          BR      4$
006300  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
006304  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
006306  046267  014450  005326          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
006314  005767  005322          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
006320  001344                          BNE     1$                      ;EXIT
006322  012777  000004  005210          MOV     #4,@DHSCR               ;SELECT LINE 4
006330  042777  100000  005206          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 4
006336  105777  005216                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
006342  001333                          BNE     1$                      ;AND CHECK
006344  000407                          BR      5$
006346  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
006350  020467  005744                  CMP     R4,TWRD4                ;CHECK ECHOED DATA
006354  001757                          BEQ     3$
006356  016705  005736                  MOV     TWRD4,R5                        ;(R5)=EXPECTED ECHOED DATA
006362                                  HLT     2                       ;ECHOED DATA ERROR
006362  104002                          EMT     2
006364  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000005                  LINE=LINE+1
        000040                  BITX=BITX+BITX
        000005                  KX=KX+1
006366                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 5
                                        ;TRANSMIT 1 CHARACTER ON LINE 5 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

006366                          TS \XN,10,5$
006366  012767  000340  171402  T26:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
006374  012767  000010  005204          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
006402  012767  006622  005172          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000027                  XN=XN+1
006410  012777  004000  005122          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
006416  004767  005004                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
```

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                                                                        ;400 (OCTAL) CHARACTERS
006422  012777  000005  005110          MOV     #5,@DHSCR               ;SELECT LINE 5 FOR TESTING
006430  012777  014322  005110          MOV     #TWRD5,@DHBA    ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 5 IN AUTO ECHO MODE
006436  012777  177777  005104          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 5
006444  012777  133503  005072          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 5
006452  042767  000040  005162          BIC     #40,LINACT      ;CLEAR LINE ACTIVE BIT
006460  012777  177777  005064          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
006466  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
006470  017704  005046          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
006474  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
006476  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
006500  000303                          SWAB    R3
006502  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
006506  010302                          MOV     R3,R2
006510  006302                          ASL     R2
006512  020327  000005                  CMP     R3,#5           ;IF LINE NUMBER IS 5
006516  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
006520  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 5, CHECK DATA
006524  001404                          BEQ     2$
006526  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
006532                                  HLT     1                       ;NON ECHOED DATA ERROR
006532  104001                          EMT     1
006534  000423                          BR      4$
006536  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
006542  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
006544  046267  014450  005070          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
006552  005767  005064          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
006556  001344                          BNE     1$                      ;EXIT
006560  012777  000005  004752          MOV     #5,@DHSCR               ;SELECT LINE 5
006566  042777  100000  004750          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 5
006574  105777  004760                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
006600  001333                          BNE     1$                      ;AND CHECK
006602  000407                          BR      5$
006604  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
006606  020467  005510                  CMP     R4,TWRD5                ;CHECK ECHOED DATA
006612  001757                          BEQ     3$
006614  016705  005502                  MOV     TWRD5,R5                        ;(R5)=EXPECTED ECHOED DATA
006620                                  HLT     2                       ;ECHOED DATA ERROR
006620  104002                          EMT     2
006622  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000006                  LINE=LINE+1
        000100                  BITX=BITX+BITX
        000006                  KX=KX+1
006624                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 6
                                        ;TRANSMIT 1 CHARACTER ON LINE 6 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

006624                          TS \XN,10,5$
006624  012767  000340  171144  T27:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
006632  012767  000010  004746          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
006640  012767  007060  004734          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
```

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                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000030                  XN=XN+1
006646  012777  004000  004664          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
006654  004767  004546                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
006660  012777  000006  004652          MOV     #6,@DHSCR               ;SELECT LINE 6 FOR TESTING
006666  012777  014324  004652          MOV     #TWRD6,@DHBA    ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 6 IN AUTO ECHO MODE
006674  012777  177777  004646          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 6
006702  012777  133503  004634          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 6
006710  042767  000100  004724          BIC     #100,LINACT     ;CLEAR LINE ACTIVE BIT
006716  012777  177777  004626          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
006724  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
006726  017704  004610          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
006732  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
006734  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
006736  000303                          SWAB    R3
006740  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
006744  010302                          MOV     R3,R2
006746  006302                          ASL     R2
006750  020327  000006                  CMP     R3,#6           ;IF LINE NUMBER IS 6
006754  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
006756  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 6, CHECK DATA
006762  001404                          BEQ     2$
006764  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
006770                                  HLT     1                       ;NON ECHOED DATA ERROR
006770  104001                          EMT     1
006772  000423                          BR      4$
006774  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
007000  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
007002  046267  014450  004632          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
007010  005767  004626          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
007014  001344                          BNE     1$                      ;EXIT
007016  012777  000006  004514          MOV     #6,@DHSCR               ;SELECT LINE 6
007024  042777  100000  004512          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 6
007032  105777  004522                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
007036  001333                          BNE     1$                      ;AND CHECK
007040  000407                          BR      5$
007042  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
007044  020467  005254                  CMP     R4,TWRD6                ;CHECK ECHOED DATA
007050  001757                          BEQ     3$
007052  016705  005246                  MOV     TWRD6,R5                        ;(R5)=EXPECTED ECHOED DATA
007056                                  HLT     2                       ;ECHOED DATA ERROR
007056  104002                          EMT     2
007060  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000007                  LINE=LINE+1
        000200                  BITX=BITX+BITX
        000007                  KX=KX+1
007062                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 7
                                        ;TRANSMIT 1 CHARACTER ON LINE 7 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES
```

```
007062                                  TS \XN,10
007062  012767  000340  170706  T30:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
007070  012767  000010  004510          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
007076  012767  007316  004476          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA        ; 3
                                        .ENDC
        000031                          XN=XN+1
007104  012777  004000  004426          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
007112  004767  004310                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
007116  012777  000007  004414          MOV     #7,@DHSCR               ;SELECT LINE 7 FOR TESTING
007124  012777  014326  004414          MOV     #TWRD7,@DHBA        ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 7 IN AUTO ECHO MODE
007132  012777  177777  004410          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 7
007140  012777  133503  004376          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 7
007146  042767  000200  004466          BIC     #200,LINACT         ;CLEAR LINE ACTIVE BIT
007154  012777  177777  004370          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
007162  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
007164  017704  004352          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
007170  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
007172  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
007174  000303                          SWAB    R3
007176  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
007202  010302                          MOV     R3,R2
007204  006302                          ASL     R2
007206  020327  000007                  CMP     R3,#7               ;IF LINE NUMBER IS 7
007212  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
007214  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 7, CHECK DATA
007220  001404                          BEQ     2$
007222  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
007226                                  HLT     1                       ;NON ECHOED DATA ERROR
007226  104001                          EMT     1
007230  000423                          BR      4$
007232  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
007236  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
007240  046267  014450  004374          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
007246  005767  004370          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
007252  001344                          BNE     1$                      ;EXIT
007254  012777  000007  004256          MOV     #7,@DHSCR               ;SELECT LINE 7
007262  042777  100000  004254          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 7
007270  105777  004264                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
007274  001333                          BNE     1$                      ;AND CHECK
007276  000407                          BR      5$
007300  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
007302  020467  005020                  CMP     R4,TWRD7                ;CHECK ECHOED DATA
007306  001757                          BEQ     3$
007310  016705  005012                  MOV     TWRD7,R5                        ;(R5)=EXPECTED ECHOED DATA
007314                                  HLT     2                       ;ECHOED DATA ERROR
007314  104002                          EMT     2
007316  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000010                  LINE=LINE+1
        000400                  BITX=BITX+BITX
        000010                  KX=KX+1
007320                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 10
```

```
                                        ;TRANSMIT 1 CHARACTER ON LINE 10 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

007320                          TS \XN,10,5$
007320  012767  000340  170450  T31:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
007326  012767  000010  004252          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
007334  012767  007554  004240          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000032                  XN=XN+1
007342  012777  004000  004170          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
007350  004767  004052                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
007354  012777  000010  004156          MOV     #10,@DHSCR              ;SELECT LINE 10 FOR TESTING
007362  012777  014330  004156          MOV     #TWRD10,@DHBA   ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 10 IN AUTO ECHO MODE
007370  012777  177777  004152          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 10
007376  012777  133503  004140          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 10
007404  042767  000400  004230          BIC     #400,LINACT     ;CLEAR LINE ACTIVE BIT
007412  012777  177777  004132          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
007420  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
007422  017704  004114          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
007426  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
007430  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
007432  000303                          SWAB    R3
007434  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
007440  010302                          MOV     R3,R2
007442  006302                          ASL     R2
007444  020327  000010                  CMP     R3,#10          ;IF LINE NUMBER IS 10
007450  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
007452  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 10, CHECK DATA
007456  001404                          BEQ     2$
007460  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
007464                                  HLT     1                       ;NON ECHOED DATA ERROR
007464  104001                          EMT     1
007466  000423                          BR      4$
007470  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
007474  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
007476  046267  014450  004136          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
007504  005767  004132          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
007510  001344                          BNE     1$                      ;EXIT
007512  012777  000010  004020          MOV     #10,@DHSCR              ;SELECT LINE 10
007520  042777  100000  004016          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 10
007526  105777  004026                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
007532  001333                          BNE     1$                      ;AND CHECK
007534  000407                          BR      5$
007536  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
007540  020467  004564                  CMP     R4,TWRD10               ;CHECK ECHOED DATA
007544  001757                          BEQ     3$
007546  016705  004556                  MOV     TWRD10,R5                       ;(R5)=EXPECTED ECHOED DATA
007552                                  HLT     2                       ;ECHOED DATA ERROR
007552  104002                          EMT     2
007554  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000011                  LINE=LINE+1
```

```
        001000                  BITX=BITX+BITX
        000011                  KX=KX+1
007556                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 11
                                        ;TRANSMIT 1 CHARACTER ON LINE 11 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

007556                          TS \XN,10,5$
007556  012767  000340  170212  T32:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
007564  012767  000010  004014          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
007572  012767  010012  004002          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000033                  XN=XN+1
007600  012777  004000  003732          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
007606  004767  003614                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
007612  012777  000011  003720          MOV     #11,@DHSCR              ;SELECT LINE 11 FOR TESTING
007620  012777  014332  003720          MOV     #TWRD11,@DHBA   ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 11 IN AUTO ECHO MODE
007626  012777  177777  003714          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 11
007634  012777  133503  003702          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 11
007642  042767  001000  003772          BIC     #1000,LINACT    ;CLEAR LINE ACTIVE BIT
007650  012777  177777  003674          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
007656  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
007660  017704  003656          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
007664  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
007666  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
007670  000303                          SWAB    R3
007672  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
007676  010302                          MOV     R3,R2
007700  006302                          ASL     R2
007702  020327  000011                  CMP     R3,#11          ;IF LINE NUMBER IS 11
007706  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
007710  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 11, CHECK DATA
007714  001404                          BEQ     2$
007716  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
007722                                  HLT     1                       ;NON ECHOED DATA ERROR
007722  104001                          EMT     1
007724  000423                          BR      4$
007726  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
007732  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
007734  046267  014450  003700          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
007742  005767  003674          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
007746  001344                          BNE     1$                      ;EXIT
007750  012777  000011  003562          MOV     #11,@DHSCR              ;SELECT LINE 11
007756  042777  100000  003560          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 11
007764  105777  003570                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
007770  001333                          BNE     1$                      ;AND CHECK
007772  000407                          BR      5$
007774  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
007776  020467  004330                  CMP     R4,TWRD11               ;CHECK ECHOED DATA
010002  001757                          BEQ     3$
```

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010004  016705  004322                  MOV     TWRD11,R5                       ;(R5)=EXPECTED ECHOED DATA
010010                                  HLT     2                               ;ECHOED DATA ERROR
010010  104002                          EMT     2
010012  104400                  5$:     SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
        000012                  LINE=LINE+1
        002000                  BITX=BITX+BITX
        000012                  KX=KX+1
010014                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 12
                                        ;TRANSMIT 1 CHARACTER ON LINE 12 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

010014                          TS \XN,10,5$
010014  012767  000340  167754  T33:    MOV     #340,PS                         ;DISABLE ALL INTERRUPTS
010022  012767  000010  003556          MOV     #10,ICOUNT                      ;SET UP FOR 10 ITERATIONS
010030  012767  010250  003544          MOV     #5$,ESCAPE                      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                        ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000034                  XN=XN+1
010036  012777  004000  003474          MOV     #BIT11,@DHSCR                   ;MASTER CLEAR INTERFACE
010044  004767  003356                  JSR     PC,SETALL                       ;SET UP ALL LINES TO TRANSMIT
                                                                                ;400 (OCTAL) CHARACTERS
010050  012777  000012  003462          MOV     #12,@DHSCR                      ;SELECT LINE 12 FOR TESTING
010056  012777  014334  003462          MOV     #TWRD12,@DHBA           ;CHARACTER TO BE TRANSMITTED
                                                                                ;ON LINE 12 IN AUTO ECHO MODE
010064  012777  177777  003456          MOV     #-1,@DHBC                       ;TRANSMIT ONLY 1 CHARACTER ON LINE 12
010072  012777  133503  003444          MOV     #133503,@DHLPR                  ;SET AUTO ECHO FOR LINE 12
010100  042767  002000  003534          BIC     #2000,LINACT            ;CLEAR LINE ACTIVE BIT
010106  012777  177777  003436          MOV     #-1,@DHBAR                      ;SET BAR BITS FOR ALL LINES
010114  005000                          CLR     R0                              ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
010116  017704  003420          1$:     MOV     @DHNRC,R4                       ;GET A CHARACTER FROM SILO
010122  100375                          BPL     1$                              ;IF NOT VALID DATA, TRY AGAIN
010124  010403                          MOV     R4,R3                           ;EXTRACT LINE NUMBER FORM CHARACTER
010126  000303                          SWAB    R3
010130  042703  177760                  BIC     #177760,R3                      ;CLEAR STATUS BITS
010134  010302                          MOV     R3,R2
010136  006302                          ASL     R2
010140  020327  000012                  CMP     R3,#12                  ;IF LINE NUMBER IS 12
010144  001432                          BEQ     4$                              ;CHECK FOR CORRECT ECHOED CHARACTER
010146  026204  014246                  CMP     RBUF(R2),R4                     ;IF NOT LINE 12, CHECK DATA
010152  001404                          BEQ     2$
010154  016205  014246                  MOV     RBUF(R2),R5                     ;(R5)=EXPECTED NON ECHOED DATA
010160                                  HLT     1                               ;NON ECHOED DATA ERROR
010160  104001                          EMT     1
010162  000423                          BR      4$
010164  105262  014246          2$:     INCB    RBUF(R2)                        ;UPDATE EXPECTED RECEIVED DATA
010170  001352                          BNE     1$                              ;CONTINUE IF NOT DONE
010172  046267  014450  003442          BIC     LINBIT(R2),LINACT               ;CLEAR ACTIVE BIT
010200  005767  003436          3$:     TST     LINACT                          ;IF ALL LINES ARE DONE
010204  001344                          BNE     1$                              ;EXIT
010206  012777  000012  003324          MOV     #12,@DHSCR                      ;SELECT LINE 12
010214  042777  100000  003322          BIC     #100000,@DHLPR                  ;CLEAR AUTO ECHO FOR LINE 12
010222  105777  003332                  TSTB    @DHSLR                          ;GET REST OF CHARACTERS
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010226  001333                          BNE     1$                      ;AND CHECK
010230  000407                          BR      5$
010232  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
010234  020467  004074                  CMP     R4,TWRD12               ;CHECK ECHOED DATA
010240  001757                          BEQ     3$
010242  016705  004066                  MOV     TWRD12,R5                       ;(R5)=EXPECTED ECHOED DATA
010246                                  HLT     2                       ;ECHOED DATA ERROR
010246  104002                          EMT     2
010250  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000013                  LINE=LINE+1
        004000                  BITX=BITX+BITX
        000013                  KX=KX+1
010252                          AUTC2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 13
                                        ;TRANSMIT 1 CHARACTER ON LINE 13 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

010252                          TS \XN,10,5$
010252  012767  000340  167516  T34:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
010260  012767  000010  003320          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
010266  012767  010506  003306          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000035                  XN=XN+1
010274  012777  004000  003236          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
010302  004767  003120                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
010306  012777  000013  003224          MOV     #13,@DHSCR              ;SELECT LINE 13 FOR TESTING
010314  012777  014336  003224          MOV     #TWRD13,@DHBA   ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 13 IN AUTO ECHO MODE
010322  012777  177777  003220          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 13
010330  012777  133503  003206          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 13
010336  042767  004000  003276          BIC     #4000,LINACT    ;CLEAR LINE ACTIVE BIT
010344  012777  177777  003200          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
010352  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
010354  017704  003162          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
010360  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
010362  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
010364  000303                          SWAB    R3
010366  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
010372  010302                          MOV     R3,R2
010374  006302                          ASL     R2
010376  020327  000013                  CMP     R3,#13          ;IF LINE NUMBER IS 13
010402  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
010404  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 13, CHECK DATA
010410  001404                          BEQ     2$
010412  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
010416                                  HLT     1                       ;NON ECHOED DATA ERROR
010416  104001                          EMT     1
010420  000423                          BR      4$
010422  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
010426  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
010430  046267  014450  003204          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
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010436  005767  003200          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
010442  001344                          BNE     1$                      ;EXIT
010444  012777  000013  003066          MOV     #13,@DHSCR              ;SELECT LINE 13
010452  042777  100000  003064          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 13
010460  105777  003074                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
010464  001333                          BNE     1$                      ;AND CHECK
010466  000407                          BR      5$
010470  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
010472  020467  003640                  CMP     R4,TWRD13               ;CHECK ECHOED DATA
010476  001757                          BEQ     3$
010500  016705  003632                  MOV     TWRD13,R5                       ;(R5)=EXPECTED ECHOED DATA
010504                                  HLT     2                       ;ECHOED DATA ERROR
010504  104002                          EMT     2
010506  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000014                  LINE=LINE+1
        010000                  BITX=BITX+BITX
        000014                  KX=KX+1
010510                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 14
                                        ;TRANSMIT 1 CHARACTER ON LINE 14 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

010510                          TS \XN,10,5$
010510  012767  000340  167260  T35:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
010516  012767  000010  003062          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
010524  012767  010744  003050          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
        000036                  XN=XN+1
010532  012777  004000  003000          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
010540  004767  002662                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
010544  012777  000014  002766          MOV     #14,@DHSCR              ;SELECT LINE 14 FOR TESTING
010552  012777  014340  002766          MOV     #TWRD14,@DHBA   ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 14 IN AUTO ECHO MODE
010560  012777  177777  002762          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 14
010566  012777  133503  002750          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 14
010574  042767  010000  003040          BIC     #10000,LINACT   ;CLEAR LINE ACTIVE BIT
010602  012777  177777  002742          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
010610  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
010612  017704  002724          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
010616  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
010620  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
010622  000303                          SWAB    R3
010624  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
010630  010302                          MOV     R3,R2
010632  006302                          ASL     R2
010634  020327  000014                  CMP     R3,#14          ;IF LINE NUMBER IS 14
010640  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
010642  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 14, CHECK DATA
010646  001404                          BEQ     2$
010650  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
010654                                  HLT     1                       ;NON ECHOED DATA ERROR
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010654  104001                          EMT     1
010656  000423                          BR      4$
010660  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
010664  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
010666  046267  014450  002746          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
010674  005767  002742          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
010700  001344                          BNE     1$                      ;EXIT
010702  012777  000014  002630          MOV     #14,@DHSCR              ;SELECT LINE 14
010710  042777  100000  002626          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 14
010716  105777  002636                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
010722  001333                          BNE     1$                      ;AND CHECK
010724  000407                          BR      5$
010726  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
010730  020467  003404                  CMP     R4,TWRD14               ;CHECK ECHOED DATA
010734  001757                          BEQ     3$
010736  016705  003376                  MOV     TWRD14,R5                       ;(R5)=EXPECTED ECHOED DATA
010742                                  HLT     2                       ;ECHOED DATA ERROR
010742  104002                          EMT     2
010744  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000015                  LINE=LINE+1
        020000                  BITX=BITX+BITX
        000015                  KX=KX+1
010746                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 15
                                        ;TRANSMIT 1 CHARACTER ON LINE 15 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

010746                          TS \XN,10,5$
010746  012767  000340  167022  T36:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
010754  012767  000010  002624          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
010762  012767  011202  002612          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000037                  XN=XN+1
010770  012777  004000  002542          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
010776  004767  002424                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
011002  012777  000015  002530          MOV     #15,@DHSCR              ;SELECT LINE 15 FOR TESTING
011010  012777  014342  002530          MOV     #TWRD15,@DHBA   ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 15 IN AUTO ECHO MODE
011016  012777  177777  002524          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 15
011024  012777  133503  002512          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 15
011032  042767  020000  002602          BIC     #20000,LINACT   ;CLEAR LINE ACTIVE BIT
011040  012777  177777  002504          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
011046  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
011050  017704  002466          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
011054  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
011056  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
011060  000303                          SWAB    R3
011062  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
011066  010302                          MOV     R3,R2
011070  006302                          ASL     R2
011072  020327  000015                  CMP     R3,#15          ;IF LINE NUMBER IS 15
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011076  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
011100  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 15, CHECK DATA
011104  001404                          BEQ     2$
011106  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
011112                                  HLT     1                       ;NON ECHOED DATA ERROR
011112  104001                          EMT     1
011114  000423                          BR      4$
011116  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
011122  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
011124  046267  014450  002510          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
011132  005767  002504          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
011136  001344                          BNE     1$                      ;EXIT
011140  012777  000015  002372          MOV     #15,@DHSCR              ;SELECT LINE 15
011146  042777  100000  002370          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 15
011154  105777  002400                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
011160  001333                          BNE     1$                      ;AND CHECK
011162  000407                          BR      5$
011164  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
011166  020467  003150                  CMP     R4,TWRD15               ;CHECK ECHOED DATA
011172  001757                          BEQ     3$
011174  016705  003142                  MOV     TWRD15,R5                       ;(R5)=EXPECTED ECHOED DATA
011200                                  HLT     2                       ;ECHOED DATA ERROR
011200  104002                          EMT     2
011202  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000016                  LINE=LINE+1
        040000                  BITX=BITX+BITX
        000016                  KX=KX+1
011204                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 16
                                        ;TRANSMIT 1 CHARACTER ON LINE 16 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

011204                          TS \XN,10,5$
011204  012767  000340  166564  T37:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011212  012767  000010  002366          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
011220  012767  011440  002354          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000040                  XN=XN+1
011226  012777  004000  002304          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
011234  004767  002166                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
011240  012777  000016  002272          MOV     #16,@DHSCR              ;SELECT LINE 16 FOR TESTING
011246  012777  014344  002272          MOV     #TWRD16,@DHBA   ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 16 IN AUTO ECHO MODE
011254  012777  177777  002266          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 16
011262  012777  133503  002254          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 16
011270  042767  040000  002344          BIC     #40000,LINACT   ;CLEAR LINE ACTIVE BIT
011276  012777  177777  002246          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
011304  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
011306  017704  002230          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
011312  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
011314  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
```

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011316  000303                          SWAB    R3
011320  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
011324  010302                          MOV     R3,R2
011326  006302                          ASL     R2
011330  020327  000016                  CMP     R3,#16          ;IF LINE NUMBER IS 16
011334  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
011336  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 16, CHECK DATA
011342  001404                          BEQ     2$
011344  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
011350                                  HLT     1                       ;NON ECHOED DATA ERROR
011350  104001                          EMT     1
011352  000423                          BR      4$
011354  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
011360  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
011362  046267  014450  002252          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
011370  005767  002246          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
011374  001344                          BNE     1$                      ;EXIT
011376  012777  000016  002134          MOV     #16,@DHSCR              ;SELECT LINE 16
011404  042777  100000  002132          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 16
011412  105777  002142                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
011416  001333                          BNE     1$                      ;AND CHECK
011420  000407                          BR      5$
011422  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
011424  020467  002714                  CMP     R4,TWRD16               ;CHECK ECHOED DATA
011430  001757                          BEQ     3$
011432  016705  002706                  MOV     TWRD16,R5                       ;(R5)=EXPECTED ECHOED DATA
011436                                  HLT     2                       ;ECHOED DATA ERROR
011436  104002                          EMT     2
011440  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000017                  LINE=LINE+1
        100000                  BITX=BITX+BITX
        000017                  KX=KX+1
011442                          AUTO2   \LINE,\BITX,\KX

                                        ;TRANSMIT A BINARY COUNT PATTERN ON ALL LINES EXCEPT LINE 17
                                        ;TRANSMIT 1 CHARACTER ON LINE 17 WITH AUTO ECHO ENABLED
                                        ;TRANSMISSION SPEED FOR ALL LINES IS 9600 BAUD
                                        ;CHARACTER LENGTH IS 8 BITS
                                        ;VERIFY THAT CORRECT DATA IS RECEIVED ON ALL LINES

011442                          TS \XN,10,5$
011442  012767  000340  166326  T40:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011450  012767  000010  002130          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
011456  012767  011676  002116          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000041                  XN=XN+1
011464  012777  004000  002046          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
011472  004767  001730                  JSR     PC,SETALL               ;SET UP ALL LINES TO TRANSMIT
                                                                        ;400 (OCTAL) CHARACTERS
011476  012777  000017  002034          MOV     #17,@DHSCR              ;SELECT LINE 17 FOR TESTING
011504  012777  014346  002034          MOV     #TWRD17,@DHBA   ;CHARACTER TO BE TRANSMITTED
                                                                        ;ON LINE 17 IN AUTO ECHO MODE
011512  012777  177777  002030          MOV     #-1,@DHBC               ;TRANSMIT ONLY 1 CHARACTER ON LINE 17
011520  012777  133503  002016          MOV     #133503,@DHLPR          ;SET AUTO ECHO FOR LINE 17
011526  042767  100000  002106          BIC     #100000,LINACT  ;CLEAR LINE ACTIVE BIT
```

```
011534  012777  177777  002010          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
011542  005000                          CLR     R0                      ;KEEP COUNT OF NUMBER OF RECEIVED CHARACTERS
011544  017704  001772          1$:     MOV     @DHNRC,R4               ;GET A CHARACTER FROM SILO
011550  100375                          BPL     1$                      ;IF NOT VALID DATA, TRY AGAIN
011552  010403                          MOV     R4,R3                   ;EXTRACT LINE NUMBER FORM CHARACTER
011554  000303                          SWAB    R3
011556  042703  177760                  BIC     #177760,R3              ;CLEAR STATUS BITS
011562  010302                          MOV     R3,R2
011564  006302                          ASL     R2
011566  020327  000017                  CMP     R3,#17          ;IF LINE NUMBER IS 17
011572  001432                          BEQ     4$                      ;CHECK FOR CORRECT ECHOED CHARACTER
011574  026204  014246                  CMP     RBUF(R2),R4             ;IF NOT LINE 17, CHECK DATA
011600  001404                          BEQ     2$
011602  016205  014246                  MOV     RBUF(R2),R5             ;(R5)=EXPECTED NON ECHOED DATA
011606                                  HLT     1                       ;NON ECHOED DATA ERROR
011606  104001                          EMT     1
011610  000423                          BR      4$
011612  105262  014246          2$:     INCB    RBUF(R2)                ;UPDATE EXPECTED RECEIVED DATA
011616  001352                          BNE     1$                      ;CONTINUE IF NOT DONE
011620  046267  014450  002014          BIC     LINBIT(R2),LINACT       ;CLEAR ACTIVE BIT
011626  005767  002010          3$:     TST     LINACT                  ;IF ALL LINES ARE DONE
011632  001344                          BNE     1$                      ;EXIT
011634  012777  000017  001676          MOV     #17,@DHSCR              ;SELECT LINE 17
011642  042777  100000  001674          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO FOR LINE 17
011650  105777  001704                  TSTB    @DHSLR                  ;GET REST OF CHARACTERS
011654  001333                          BNE     1$                      ;AND CHECK
011656  000407                          BR      5$
011660  005200                  4$:     INC     R0                      ;UPDATE ECHOED CHARACTER COUNT
011662  020467  002460                  CMP     R4,TWRD17               ;CHECK ECHOED DATA
011666  001757                          BEQ     3$
011670  016705  002452                  MOV     TWRD17,R5                       ;(R5)=EXPECTED ECHOED DATA
011674                                  HLT     2                       ;ECHOED DATA ERROR
011674  104002                          EMT     2
011676  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
        000020                  LINE=LINE+1
        000000                  BITX=BITX+BITX
        000020                  KX=KX+1
```

```
                                                ;TRANSMIT 1 CHARACTER ON EACH LINE WITH AUTO ECHO ENABLED
                                                ;RECEIVE 64 CHARACTERS ON EACH LINE

011700                                  TS \XN,100,5$
011700  012767  000340  166070  T41:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011706  012767  000100  001672          MOV     #100,ICOUNT             ;SET UP FOR 100 ITERATIONS
011714  012767  012130  001660          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #.,FREEZ1       ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
        000042                          XN=XN+1
011722  012777  004000  001610          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
011730  012700  000020                  MOV     #20,R0                  ;SET UP PARAMETERS FOR 16 LINES
011734  012701  014310                  MOV     #TWRDO,R1               ;CHARACTER TO BE TRANSMITTED
011740  012702  014350                  MOV     #RCNTO,R2               ;RECEIVED CHARACTER COUNT
011744  012703  014410                  MOV     #RDCTO,R3               ;EXPECTED NUMBER OF CHARACTERS
011750  010177  001572          1$:     MOV     R1,@DHBA                ;LOAD BUS ADDRESS
011754  012777  177777  001566          MOV     #-1,@DHBC               ;LOAD BYTE COUNT
011762  012777  131403  001554          MOV     #131403,@DHLPR          ;SET AUTO ECHO
011770  005022                          CLR     (R2)+                   ;CLEAR RECEIVED CHARACTER COUNT
011772  012723  000100                  MOV     #100,(R3)+              ;-NUMBER OF CHARACTERS TO BE RECEIVED
011776  062701  000002                  ADD     #2,R1                   ;ADVANCE POINTER
012002  005300                          DEC     R0                      ;CONTINUE IF NOT DONE
012004  001361                          BNE     1$
012006  012767  177777  001630          MOV     #-1,AEACT               ;INDICATE AUTO ECHO ACTIVE
                                                                        ;FOR ALL LINES
012014  012777  177777  001530          MOV     #-1,@DHBAR              ;SET BAR BITS FOR ALL LINES
012022  105777  001512          2$:     TSTB    @DHSCR                  ;WAIT FOR A CHARACTER
012026  100375                          BPL     2$
012030  017704  001506                  MOV     @DHNRC,R4               ;GET CHARACTER
012034  010403                          MOV     R4,R3
012036  000303                          SWAB    R3
012040  042703  177760                  BIC     #177760,R3              ;EXTRACT LINE NUMBER
012044  010302                          MOV     R3,R2
012046  006302                          ASL     R2
012050  005262  014350                  INC     RCNTO(R2)               ;UPDATE RECEIVED COUNT FOR LINE
012054  020462  014310                  CMP     R4,TWRDO(R2)            ;CHECK EXPECTED AND RECEIVED DATA
012060  001404                          BEQ     3$
012062  016205  014310                  MOV     TWRDO(R2),R5            ;(R5)=EXPECTED ECHOED DATA
012066                                  HLT     2                       ;AUTO ECHO ERROR
012066  104002                          EMT     2
012070  000417                          BR      5$
012072  005362  014410          3$:     DEC     RDCTO(R2)               ;UPDATE RECEIVED EXPECTED COUNT
012076  003351                          BGT     2$                      ;CONTINUE IF NOT 0
012100  100413                          BMI     5$                      ;EXIT IOF NEGATIVE
012102  010377  001432                  MOV     R3,@DHSCR               ;SELECT LINE THAT FINISHED
012106  042777  100000  001430          BIC     #100000,@DHLPR          ;CLEAR AUTO ECHO
012114  046267  014450  001522          BIC     LINBIT(R2),AEACT        ;CLEAR AUTO ECHO ACTIVE
012122  005767  001516                  TST     AEACT                   ;ALL LINES DONE
012126  001335                          BNE     2$                      ;IF NOT, CONTINUE
012130  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
  1
  2 012132                          .EOP    ↑/BEGIN/

                                            ;END OF PASS
                                            ;TYPE NAME OF TEST
                                            ;UPDATE PASS COUNT
                                            ;CHECK FOR EXIT TO ACT-11
                                            ;RESTART TEST

  012132  104401                    EOP:    TYPE                            ;TYPE NAME OF TEST
  012134  015064                            MEPASS
  012136  005067  001474                    CLR     LAST                    ;CLEAR LAST ERROR PC
  012142  005067  001424                    CLR     ERRFLG                  ;CLEAR ERROR FLAG
  012146  005267  001422                    INC     PASCNT                  ;UPDATE PASS COUNT
  012152  005767  166624                    TST     LIGHTS                  ; ARE WE USING LIGHTS?          ; 4
  012156  001005                            BNE     2$                      ; BRANCH IF WE ARE              ; 6
  012160  104401                            TYPE                            ; TYPE PASCOUNT MESSAGE         ; 5
  012162  015077                            PASTXT                                                          ; 5
  012164  104402                            OCTASC                          ; PRINT PASSCOUNT               ; 4
  012166  012224                            PASARG                                                                  ;4 ; 6
  012170  000403                            BR      3$                      ; CONTINUE                      ; 4
  012172                            2$:                                                                     ; 4
  012172  016767  001376  166602            MOV     PASCNT,LIGHTS           ;DISPLAY PASS COUNT
  012200                            3$:                                                                     ; 4
  012200  013701  000042                    MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DDP
  012204  001405                            BEQ     RESTRT                  ;IF NOT, CONTINUE TESTING
  012206  000005                            RESET
  012210  004711                    LOGICAL:        JSR     PC,(R1)
  012212  000240                            NOP
  012214  000240                            NOP
  012216  000240                            NOP
  012220  000167  167062            RESTRT: JMP     BEGIN
  012224  000001                    PASARG: .WORD   1                       ; PARAMETERS TO PRINT PASSCOUNT ; 5
  012226     006     002                    .BYTE   6,2                                                     ; 5
  012230  013574                            .WORD   PASCNT                                                  ; 5
  3 012232                          .SCOPE

                                            ;CHECK FOR LOOP ON CURRENT TEST                                 ; 3
                                            ;CHECK FOR ITERATION SUPPRESSION

  012232  032777  002000  166540    SCOPER: BIT     #SW10,@SWR                                              ; 4
  012240  001030                            BNE     4$
  012242  032777  040000  166530    1$:     BIT     #SW14,@SWR                                              ; 4
  012250  001021                            BNE     3$
  012252  032777  004000  166520            BIT     #SW11,@SWR                                              ; 4
  012260  001006                            BNE     2$
  012262  005267  001322                    INC     LPCNT
  012266  026767  001316  001312            CMP     LPCNT,ICOUNT
  012274  001007                            BNE     3$
  012276  005067  001306            2$:     CLR     LPCNT
  012302  005067  001264                    CLR     ERRFLG
  012306  011667  001266                    MOV     (SP),RETRN
  012312  000002                            RTI
  012314  016716  001260            3$:     MOV     RETRN,(SP)
  012320  000002                            RTI
  012322  005767  001244            4$:     TST     ERRFLG
  012326  001745                            BEQ     1$
```

```
     012330  000762                          BR      2$
   4 012332                          .SCOP1

                                             ;CHECK FOR FREEZE ON CURRENT DATA

     012332  032777  001000  166440  SCOP1R: BIT     @SW09,@SWR                                  ; 4
     012340  001402                          BEQ     1$
     012342  016716  001236                  MOV     FREEZ1,(SP)
     012346  000002                  1$:     RTI
```

```
1 012350                        .ERROR

                                        ;ERROR HANDLER

  012350  032777  020000  166422  ERRORS: BIT     #SW13,@SWR                      ; 4
  012356  001055                          BNE     HALTS
  012360  021667  001252                  CMP     (SP),LAST
  012364  001404                          BEQ     1$
  012366  011667  001244                  MOV     (SP),LAST
  012372  005067  001174                  CLR     ERRFLG
  012376  104406                  1$:     SAV05P
  012400  011605                          MOV     (SP),R5
  012402  162705  000002                  SUB     #2,R5
  012406  011504                          MOV     (R5),R4
  012410  006304                          ASL     R4
  012412  006304                          ASL     R4
  012414  042704  177001                  BIC     #177001,R4
  012420  062704  015216                  ADD     #ERRTAB,R4
  012424  012467  000040                  MOV     (R4)+,ERRMSG
  012430  011467  000052                  MOV     (R4),DATABP
  012434  005767  001132                  TST     ERRFLG
  012440  001403                          BEQ     TYPMSG
  012442  005767  000040                  TST     DATABP
  012446  001011                          BNE     TYPDAT                          ; 3
  012450  104401                  TYPMSG: TYPE                                    ; 5
  012452  014774                          MCRLF                                   ; 5
  012454  104402                          OCTASC                                  ; 5
  012456  012554                          ERTABO
  012460  012767  000001  001104          MOV     #1,ERRFLG
  012466  104401                          TYPE
  012470  000000                  ERRMSG: 0
  012472  005767  000010          TYPDAT: TST     DATABP
  012476  001404                          BEQ     RESREG
  012500  104401                          TYPE                                    ; 5
  012502  014774                          MCRLF                                   ; 5
  012504  104402                          OCTASC
  012506  000000                  DATABP: 0
  012510  104407                  RESREG: RES05
  012512  005777  166262          HALTS:  TST     @SWR                            ; 4
  012516  100005                          BPL     EXITER
  012520  010046                          PUSHR0
  012522  016600  000002                  MOV     2(SP),R0
  012526  000000                          HALT
  012530  012600                          POPR0
  012532  005267  001040          EXITER: INC     ERRCNT
  012536  032777  002000  166234          BIT     #SW10,@SWR                      ; 4
  012544  001402                          BEQ     1$
  012546  016716  001030                  MOV     ESCAPE,(SP)
  012552  000002                  1$:     RTI
  012554  000001                  ERTABO: 1
  012556     006     002                  .BYTE   6,2
  012560  013630                          SAVPC
```

```
  012562                          .TRPSRV
                                          ;TRAP DISPATCH SERVICE
                                          ;ARGUMENT OF TRAP IS EXTRACTED
                                          ;AND USED AS OFFSET TO OBTAIN POINTER                                   ; 3
                                          ;TO SELECTED SUBROUTINE

  012562  011646                  TRPSRV: MOV     (SP),-(SP)              ;GET PC OF RETURN
  012564  162716  000002                  SUB     #2,(SP)                 ;=PC OF TRAP
  012570  017616  000000                  MOV     @(SP),(SP)              ;GET TRP
  012574  006316                  TRPOK:  ASL     (SP)                    ;MULTIPLY TRAP ARG BY 2
  012576  042716  177001                  BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
  012602  062716  015136                  ADD     #TRPTAB,(SP)            ;POINTER TO SUBROUTINE ADDRESS
  012606  017616  000000                  MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
  012612  000136                          JMP     @(SP)+                  ;GO TO SUBROUTINE
2 012614                          .SAVREG

                                          ;SAVE PC OF TEST THAT FAILED AND R0-R5

  012614  016667  000004  001006  SV05P:  MOV     4(SP),SAVPC

                                          ;SAVE R0-R5

  012622  010567  000776          SV05:   MOV     R5,SAVR5
  012626  010467  000770                  MOV     R4,SAVR4                                                        ; 3
  012632  010367  000762                  MOV     R3,SAVR3
  012636  010267  000754                  MOV     R2,SAVR2
  012642  010167  000746                  MOV     R1,SAVR1
  012646  010067  000740                  MOV     R0,SAVR0
  012652  000002                          RTI
3 012654                          .RESREG
                                          ;RESTORE R0-R5

  012654  016700  000732          RS05:   MOV     SAVR0,R0
  012660  016701  000730                  MOV     SAVR1,R1
  012664  016702  000726                  MOV     SAVR2,R2
  012670  016703  000724                  MOV     SAVR3,R3
  012674  016704  000722                  MOV     SAVR4,R4
  012700  016705  000720                  MOV     SAVR5,R5
  012704  000002                          RTI
```

```
  1 012706                          .TYPER

                                            ;TELETYPE OUTPUT ROUTINE

    012706  017605  000000          TYPER:  MOV     @(SP),R5                        ; 3
    012712  062716  000002                  ADD     #2,(SP)
    012716  105777  000612          1$:     TSTB    @TPCSR
    012722  100375                          BPL     1$
    012724  105715                          TSTB    (R5)
    012726  001001                          BNE     2$
    012730  000002                          RTI
    012732  112577  000600          2$:     MOVB    (R5)+,@TPDBR
    012736  000767                          BR      1$
  2 012740                          .INSTRG

                                            ;ASCII STRING INPUT ROUTINE

    012740  017667  000000  000006  INSTRG: MOV     @(SP),MSG
    012746  062716  000002                  ADD     #2,(SP)
    012752  104401                  INSTR1: TYPE
    012754  000000                  MSG:    0
    012756  012704  015160                  MOV     #INBUF,R4
    012762  012703  000007                  MOV     #7,R3
    012766  105777  000536          1$:     TSTB    @TKCSR
    012772  100375                          BPL     1$
    012774  117714  000532                  MOVB    @TKDBR,(R4)
    013000  142714  000200                  BICB    #200,(R4)
    013004  122427  000015                  CMPB    (R4)+,#15
    013010  001413                          BEQ     INSTR2
    013012  117777  000514  000516          MOVB    @TKDBR,@TPDBR
    013020  105777  000510          2$:     TSTB    @TPCSR
    013024  100375                          BPL     2$
    013026  005303                          DEC     R3
    013030  001356                          BNE     1$
    013032  104401                  INSTRE: TYPE
    013034  014770                          MQM
    013036  000745                          BR      INSTR1
    013040  000002                  INSTR2: RTI
```

```
1 013042                        .PARAMS

                                        ;CONVERT ASCII STRING TO OCTAL                                  ; 3

 013042  011605                 PARAMS: MOV     (SP),R5
 013044  012567  000146                 MOV     (R5)+,LOLIM
 013050  012567  000144                 MOV     (R5)+,HILIM
 013054  012567  000142                 MOV     (R5)+,DEVADR
 013060  112567  000140                 MOVB    (R5)+,LOBITS
 013064  112567  000135                 MOVB    (R5)+,ADRCNT
 013070  010516                         MOV     R5,(SP)
 013072  005005                 PARAM1: CLR     R5
 013074  012704  015160                 MOV     #INBUF,R4
 013100  122714  000015                 CMPB    #15,(R4)
 013104  001420                         BEQ     PARERR
 013106  121427  000060         1$:     CMPB    (R4),#60
 013112  002415                         BLT     PARERR
 013114  121427  000067                 CMPB    (R4),#67
 013120  003012                         BGT     PARERR
 013122  142714  000060                 BICB    #60,(R4)
 013126  152405                         BISB    (R4)+,R5
 013130  122714  000015                 CMPB    #15,(R4)
 013134  001406                         BEQ     LIMITS
 013136  006305                         ASL     R5
 013140  006305                         ASL     R5
 013142  006305                         ASL     R5
 013144  000760                         BR      1$
 013146  104404                 PARERR: INSTER
 013150  000750                         BR      PARAM1

                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS

 013152  020567  000042         LIMITS: CMP     R5,HILIM
 013156  101373                         BHI     PARERR
 013160  020567  000032                 CMP     R5,LOLIM
 013164  103770                         BLO     PARERR
 013166  136705  000032                 BITB    LOBITS,R5                                               ; 3
 013172  001365                         BNE     PARERR

                                        ;STORE NUMBER AT SPECIFIED ADDRESS

 013174  016704  000022                 MOV     DEVADR,R4
 013200  010524                 1$:     MOV     R5,(R4)+
 013202  062705  000002                 ADD     #2,R5
 013206  105367  000013                 DECB    ADRCNT
 013212  001372                         BNE     1$
 013214  000002                         RTI
 013216  000000                 LOLIM:  0
 013220  000000                 HILIM:  0
 013222  000000                 DEVADR: 0
 013224  000000                 LOBITS: 0
         013225                 ADRCNT=LOBITS+1
```

```
013226                          .OCTASC

                                        ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER

013226  017601  000000          OCTASN: MOV     @(SP),R1                                        ; 5
013232  062716  000002                  ADD     #2,(SP)
013236  012167  000130                  MOV     (R1)+,WRDCNT
013242  112167  000126          1$:     MOVB    (R1)+,CHRCNT
013246  112167  000123                  MOVB    (R1)+,SPACNT                                    ; 3
013252  013167  000120                  MOV     @(R1)+,BINWRD
013256  016704  000114          2$:     MOV     BINWRD,R4
013262  116705  000106                  MOVB    CHRCNT,R5
013266  012700  015172                  MOV     #TEMP,R0
013272  010403                  3$:     MOV     R4,R3
013274  042703  177770                  BIC     #177770,R3
013300  062703  000260                  ADD     #260,R3
013304  110320                          MOVB    R3,(R0)+
013306  006204                          ASR     R4
013310  006204                          ASR     R4
013312  006204                          ASR     R4
013314  005305                          DEC     R5
013316  001365                          BNE     3$
013320  012703  015204                  MOV     #MDATA,R3
013324  114023                  4$:     MOVB    -(R0),(R3)+
013326  105367  000042                  DECB    CHRCNT
013332  001374                          BNE     4$
013334  105767  000035                  TSTB    SPACNT
013340  001405                          BEQ     6$
013342  112723  000240          5$:     MOVB    #240,(R3)+
013346  105367  000023                  DECB    SPACNT
013352  001373                          BNE     5$
013354  105013                  6$:     CLRB    (R3)
013356  104401                          TYPE
013360  015204                          MDATA
013362  005367  000004                  DEC     WRDCNT
013366  001325                          BNE     1$
013370  000002                          RTI
013372  000000                  WRDCNT: 0
013374  000000                  CHRCNT: 0
        013375                  SPACNT=CHRCNT+1
013376  000000                  BINWRD: 0
```

```
  013400                                CCLRALL

                                        ;CLEAR ALL BYTE COUNT AND BUS ADDRESS REGISTERS

  013400  012700  000020        CLRALL: MOV     #20,R0                  ;SET UP TO CLEAR 16
  013404  005077  000136        1$:     CLR     @DHBA                   ;CLEAR BUS ADDRESS
  013410  005077  000134                CLR     @DHBC                   ;CLEAR BYTE COUNT
  013414  005277  000120                INC     @DHSCR                  ;ANVANCE LINE NUMBER
  013420  005300                        DEC     R0                      ;CONTINUE IF NOT DONE
  013422  001370                        BNE     1$
  013424  000207                        RTS     PC                      ;RETURN TO CALLING ROUTINE
2 013426                                SSETALL

                                        ;SET BYTE COUNT FOR ALL LINES TO 400
                                        ;SET BUS ADDRESS FOR ALL LINES TO TBUF
                                        ;CLEAR EXPECTED CHARACTER BUFFERS
                                        ;SET LINE ACTIVE BITS FOR ALL LINES

  013426  012700  000020        SETALL: MOV     #20,R0                  ;SET UP TO LOAD 16
                                                                        ;BYTE COUNT AND BUS ADDRESS
                                                                        ;MEMORY LOCATIONS
  013432  005001                        CLR     R1                      ;SET UP TO GENERATE EXPECTED
                                                                        ;RECEIVED CHARACTER BUFFER
  013434  012702  000200                MOV     #200,R2                 ;WILL BE HIGH BYTE
                                                                        ;OF EXPECTED RECEIVED CHARACTER
  013440  012703  000001                MOV     #1,R3                   ;OFFSET FOR HIGH BYTE
  013444  012777  013646  000074  1$:   MOV     #TBUF,@DHBA             ;LOAD BUS ADDRESS
  013452  012777  177400  000070        MOV     #-400,@DHBC             ;LOAD BYTE COUNT
  013460  012777  031403  000056        MOV     #31403,@DHLPR           ;SET LINE SPEED TO 4800 BAUD
  013466  105061  014246                CLRB    RBUF(R1)
                                                                        ;RECEIVED CHARACTER
  013472  110263  014246                MOVB    R2,RBUF(R3)             ;LOAD HIGH BYTE
  013476  005277  000036                INC     @DHSCR                  ;ADVANCE LINE NUMBER TO NEXT LINE
  013502  005202                        INC     R2                      ;UPDATE POINTERS
  013504  062701  000002                ADD     #2,R1
  013510  062703  000002                ADD     #2,R3
  013514  005300                        DEC     R0                      ;CONTINUE IF NOT DONE
  013516  001352                        BNE     1$
  013520  012767  177777  000114        MOV     #-1,LINACT              ;SET ACTIVE FLAGS FOR ALL LINES
  013526  000207                        RTS     PC                      ;RETURN TO CALLING ROUTINE
```

```
  1 013530                    .POINT  †/DHSCR,DHNRC,DHLPR,DHBA,DHBC,DHBAR,DHBCR,DHSSR,DHSLR,DHRVEC,DHRLVL,DHTVEC,DHTLVL/
                                      ;INDIRECT POINTERS                                                          ; 3

    013530  177560                TKCSR:  177560
    013532  177562                TKDBR:  177562
    013534  177564                TPCSR:  177564
    013536  177566                TPDBR:  177566
                                  .IRP    A       <DHSCR,DHNRC,DHLPR,DHBA,DHBC,DHBAR,DHBCR,DHSSR,DHSLR,DHRVEC,DHRLVL,DHTVEC,DH
TLVL>
                                  A:      0
                                  .ENDM
    013540  000000                DHSCR:  0
    013542  000000                DHNRC:  0
    013544  000000                DHLPR:  0
    013546  000000                DHBA:   0
    013550  000000                DHBC:   0
    013552  000000                DHBAR:  0
    013554  000000                DHBCR:  0
    013556  000000                DHSSR:  0
    013560  000000                DHSLR:  0
    013562  000000                DHRVEC: 0
    013564  000000                DHRLVL: 0
    013566  000000                DHTVEC: 0
    013570  000000                DHTLVL: 0
  2 013572                        .VARIA  †/ENDFLG,LINACT,AEACT/
                                      ;PROGRAM VARIABLES

    013572  000000                ERRFLG: 0               ;ERROR FLAG
    013574  000000                PASCNT: 0               ;PASS COUNT
    013576  000000                ERRCNT: 0               ;ERROR COUNT
    013600  000000                RETRN:  0               ;SCOPE RETURN ADDRESS FOR TEST LOOPING
    013602  000000                ESCAPE: 0               ;ADDRESS FOR ERROR ESCAPE
    013604  000000                FREEZ1: 0               ;DATA LOOPING RETURN ADDRESS
    013606  000000                ICOUNT: 0               ;ITERATION COUNT FOR TEST IN PROGRESS
    013610  000000                LPCNT:  0               ;NUMBER OF ITERATIONS THIS TEST
    013612  000000                SAVR0:  0               ;R0 SAVE AREA
    013614  000000                SAVR1:  0               ;R1 SAVE AREA
    013616  000000                SAVR2:  0               ;R2 SAVE AREA                                           ; 3
    013620  000000                SAVR3:  0               ;R3 SAVE ARE
    013622  000000                SAVR4:  0               ;R4 SAVE AREA
    013624  000000                SAVR5:  0               ;R5 SAVE AREA
    013626  000000                SAVSP:  0               ;STACK POINTER SAVE AREA
    013630  000000                SAVPC:  0               ;CALLING ROUTINE SAVE AREA
    013632  000000                INIFLG: 0               ;PROGRAM INITIALIZATION FLAG
    013634  000000                STFLG:  0               ;PROGRAM START FLAG
    013636  000000                LAST:   0               ;LAST ERROR PC
                                  .IRP    A       <ENDFLG,LINACT,AEACT>
                                  A:      0
                                  .ENDM
    013640  000000                ENDFLG: 0
    013642  000000                LINACT: 0
    013644  000000                AEACT:  0
```

```
                000001                  TDAT=1
  4 013646         000                  TBUF:   .BYTE   0
  5             000377                  .REPT   377
  6                                     .BYTE   TDAT
  7                                     .NLIST
  8                                     TDAT=TDAT+1
  9                                     .LIST
 10                                     .ENDR
     013647        001                  .BYTE   TDAT
                000002                  TDAT=TDAT+1
     013650        002                  .BYTE   TDAT
                000003                  TDAT=TDAT+1
     013651        003                  .BYTE   TDAT
                000004                  TDAT=TDAT+1
     013652        004                  .BYTE   TDAT
                000005                  TDAT=TDAT+1
     013653        005                  .BYTE   TDAT
                000006                  TDAT=TDAT+1
     013654        006                  .BYTE   TDAT
                000007                  TDAT=TDAT+1
     013655        007                  .BYTE   TDAT
                000010                  TDAT=TDAT+1
     013656        010                  .BYTE   TDAT
                000011                  TDAT=TDAT+1
     013657        011                  .BYTE   TDAT
                000012                  TDAT=TDAT+1
     013660        012                  .BYTE   TDAT
                000013                  TDAT=TDAT+1
     013661        013                  .BYTE   TDAT
                000014                  TDAT=TDAT+1
     013662        014                  .BYTE   TDAT
                000015                  TDAT=TDAT+1
     013663        015                  .BYTE   TDAT
                000016                  TDAT=TDAT+1
     013664        016                  .BYTE   TDAT
                000017                  TDAT=TDAT+1
     013665        017                  .BYTE   TDAT
                000020                  TDAT=TDAT+1
     013666        020                  .BYTE   TDAT
                000021                  TDAT=TDAT+1
     013667        021                  .BYTE   TDAT
                000022                  TDAT=TDAT+1
     013670        022                  .BYTE   TDAT
                000023                  TDAT=TDAT+1
     013671        023                  .BYTE   TDAT
                000024                  TDAT=TDAT+1
     013672        024                  .BYTE   TDAT
                000025                  TDAT=TDAT+1
     013673        025                  .BYTE   TDAT
                000026                  TDAT=TDAT+1
     013674        026                  .BYTE   TDAT
                000027                  TDAT=TDAT+1
     013675        027                  .BYTE   TDAT
                000030                  TDAT=TDAT+1
     013676        030                  .BYTE   TDAT
                000031                  TDAT=TDAT+1
     013677        031                  .BYTE   TDAT
```

```
          000032                TDAT=TDAT+1
013700       032                .BYTE   TDAT
          000033                TDAT=TDAT+1
013701       033                .BYTE   TDAT
          000034                TDAT=TDAT+1
013702       034                .BYTE   TDAT
          000035                TDAT=TDAT+1
013703       035                .BYTE   TDAT
          000036                TDAT=TDAT+1
013704       036                .BYTE   TDAT
          000037                TDAT=TDAT+1
013705       037                .BYTE   TDAT
          000040                TDAT=TDAT+1
013706       040                .BYTE   TDAT
          000041                TDAT=TDAT+1
013707       041                .BYTE   TDAT
          000042                TDAT=TDAT+1
013710       042                .BYTE   TDAT
          000043                TDAT=TDAT+1
013711       043                .BYTE   TDAT
          000044                TDAT=TDAT+1
013712       044                .BYTE   TDAT
          000045                TDAT=TDAT+1
013713       045                .BYTE   TDAT
          000046                TDAT=TDAT+1
013714       046                .BYTE   TDAT
          000047                TDAT=TDAT+1
013715       047                .BYTE   TDAT
          000050                TDAT=TDAT+1
013716       050                .BYTE   TDAT
          000051                TDAT=TDAT+1
013717       051                .BYTE   TDAT
          000052                TDAT=TDAT+1
013720       052                .BYTE   TDAT
          000053                TDAT=TDAT+1
013721       053                .BYTE   TDAT
          000054                TDAT=TDAT+1
013722       054                .BYTE   TDAT
          000055                TDAT=TDAT+1
013723       055                .BYTE   TDAT
          000056                TDAT=TDAT+1
013724       056                .BYTE   TDAT
          000057                TDAT=TDAT+1
013725       057                .BYTE   TDAT
          000060                TDAT=TDAT+1
013726       060                .BYTE   TDAT
          000061                TDAT=TDAT+1
013727       061                .BYTE   TDAT
          000062                TDAT=TDAT+1
013730       062                .BYTE   TDAT
          000063                TDAT=TDAT+1
013731       063                .BYTE   TDAT
          000064                TDAT=TDAT+1
013732       064                .BYTE   TDAT
          000065                TDAT=TDAT+1
013733       065                .BYTE   TDAT
          000066                TDAT=TDAT+1
```

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013734    066                 .BYTE   TDAT
        000067                TDAT=TDAT+1
013735    067                 .BYTE   TDAT
        000070                TDAT=TDAT+1
013736    070                 .BYTE   TDAT
        000071                TDAT=TDAT+1
013737    071                 .BYTE   TDAT
        000072                TDAT=TDAT+1
013740    072                 .BYTE   TDAT
        000073                TDAT=TDAT+1
013741    073                 .BYTE   TDAT
        000074                TDAT=TDAT+1
013742    074                 .BYTE   TDAT
        000075                TDAT=TDAT+1
013743    075                 .BYTE   TDAT
        000076                TDAT=TDAT+1
013744    076                 .BYTE   TDAT
        000077                TDAT=TDAT+1
013745    077                 .BYTE   TDAT
        000100                TDAT=TDAT+1
013746    100                 .BYTE   TDAT
        000101                TDAT=TDAT+1
013747    101                 .BYTE   TDAT
        000102                TDAT=TDAT+1
013750    102                 .BYTE   TDAT
        000103                TDAT=TDAT+1
013751    103                 .BYTE   TDAT
        000104                TDAT=TDAT+1
013752    104                 .BYTE   TDAT
        000105                TDAT=TDAT+1
013753    105                 .BYTE   TDAT
        000106                TDAT=TDAT+1
013754    106                 .BYTE   TDAT
        000107                TDAT=TDAT+1
013755    107                 .BYTE   TDAT
        000110                TDAT=TDAT+1
013756    110                 .BYTE   TDAT
        000111                TDAT=TDAT+1
013757    111                 .BYTE   TDAT
        000112                TDAT=TDAT+1
013760    112                 .BYTE   TDAT
        000113                TDAT=TDAT+1
013761    113                 .BYTE   TDAT
        000114                TDAT=TDAT+1
013762    114                 .BYTE   TDAT
        000115                TDAT=TDAT+1
013763    115                 .BYTE   TDAT
        000116                TDAT=TDAT+1
013764    116                 .BYTE   TDAT
        000117                TDAT=TDAT+1
013765    117                 .BYTE   TDAT
        000120                TDAT=TDAT+1
013766    120                 .BYTE   TDAT
        000121                TDAT=TDAT+1
013767    121                 .BYTE   TDAT
        000122                TDAT=TDAT+1
013770    122                 .BYTE   TDAT
```

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                000123          TDAT=TDAT+1
013771             123          .BYTE   TDAT
                000124          TDAT=TDAT+1
013772             124          .BYTE   TDAT
                000125          TDAT=TDAT+1
013773             125          .BYTE   TDAT
                000126          TDAT=TDAT+1
013774             126          .BYTE   TDAT
                000127          TDAT=TDAT+1
013775             127          .BYTE   TDAT
                000130          TDAT=TDAT+1
013776             130          .BYTE   TDAT
                000131          TDAT=TDAT+1
013777             131          .BYTE   TDAT
                000132          TDAT=TDAT+1
014000             132          .BYTE   TDAT
                000133          TDAT=TDAT+1
014001             133          .BYTE   TDAT
                000134          TDAT=TDAT+1
014002             134          .BYTE   TDAT
                000135          TDAT=TDAT+1
014003             135          .BYTE   TDAT
                000136          TDAT=TDAT+1
014004             136          .BYTE   TDAT
                000137          TDAT=TDAT+1
014005             137          .BYTE   TDAT
                000140          TDAT=TDAT+1
014006             140          .BYTE   TDAT
                000141          TDAT=TDAT+1
014007             141          .BYTE   TDAT
                000142          TDAT=TDAT+1
014010             142          .BYTE   TDAT
                000143          TDAT=TDAT+1
014011             143          .BYTE   TDAT
                000144          TDAT=TDAT+1
014012             144          .BYTE   TDAT
                000145          TDAT=TDAT+1
014013             145          .BYTE   TDAT
                000146          TDAT=TDAT+1
014014             146          .BYTE   TDAT
                000147          TDAT=TDAT+1
014015             147          .BYTE   TDAT
                000150          TDAT=TDAT+1
014016             150          .BYTE   TDAT
                000151          TDAT=TDAT+1
014017             151          .BYTE   TDAT
                000152          TDAT=TDAT+1
014020             152          .BYTE   TDAT
                000153          TDAT=TDAT+1
014021             153          .BYTE   TDAT
                000154          TDAT=TDAT+1
014022             154          .BYTE   TDAT
                000155          TDAT=TDAT+1
014023             155          .BYTE   TDAT
                000156          TDAT=TDAT+1
014024             156          .BYTE   TDAT
                000157          TDAT=TDAT+1
```

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014025     157                  .BYTE   TDAT
          000160                TDAT=TDAT+1
014026     160                  .BYTE   TDAT
          000161                TDAT=TDAT+1
014027     161                  .BYTE   TDAT
          000162                TDAT=TDAT+1
014030     162                  .BYTE   TDAT
          000163                TDAT=TDAT+1
014031     163                  .BYTE   TDAT
          000164                TDAT=TDAT+1
014032     164                  .BYTE   TDAT
          000165                TDAT=TDAT+1
014033     165                  .BYTE   TDAT
          000166                TDAT=TDAT+1
014034     166                  .BYTE   TDAT
          000167                TDAT=TDAT+1
014035     167                  .BYTE   TDAT
          000170                TDAT=TDAT+1
014036     170                  .BYTE   TDAT
          000171                TDAT=TDAT+1
014037     171                  .BYTE   TDAT
          000172                TDAT=TDAT+1
014040     172                  .BYTE   TDAT
          000173                TDAT=TDAT+1
014041     173                  .BYTE   TDAT
          000174                TDAT=TDAT+1
014042     174                  .BYTE   TDAT
          000175                TDAT=TDAT+1
014043     175                  .BYTE   TDAT
          000176                TDAT=TDAT+1
014044     176                  .BYTE   TDAT
          000177                TDAT=TDAT+1
014045     177                  .BYTE   TDAT
          000200                TDAT=TDAT+1
014046     200                  .BYTE   TDAT
          000201                TDAT=TDAT+1
014047     201                  .BYTE   TDAT
          000202                TDAT=TDAT+1
014050     202                  .BYTE   TDAT
          000203                TDAT=TDAT+1
014051     203                  .BYTE   TDAT
          000204                TDAT=TDAT+1
014052     204                  .BYTE   TDAT
          000205                TDAT=TDAT+1
014053     205                  .BYTE   TDAT
          000206                TDAT=TDAT+1
014054     206                  .BYTE   TDAT
          000207                TDAT=TDAT+1
014055     207                  .BYTE   TDAT
          000210                TDAT=TDAT+1
014056     210                  .BYTE   TDAT
          000211                TDAT=TDAT+1
014057     211                  .BYTE   TDAT
          000212                TDAT=TDAT+1
014060     212                  .BYTE   TDAT
          000213                TDAT=TDAT+1
014061     213                  .BYTE   TDAT
```

```
                000214          TDAT=TDAT+1
014062             214          .BYTE   TDAT
                000215          TDAT=TDAT+1
014063             215          .BYTE   TDAT
                000216          TDAT=TDAT+1
014064             216          .BYTE   TDAT
                000217          TDAT=TDAT+1
014065             217          .BYTE   TDAT
                000220          TDAT=TDAT+1
014066             220          .BYTE   TDAT
                000221          TDAT=TDAT+1
014067             221          .BYTE   TDAT
                000222          TDAT=TDAT+1
014070             222          .BYTE   TDAT
                000223          TDAT=TDAT+1
014071             223          .BYTE   TDAT
                000224          TDAT=TDAT+1
014072             224          .BYTE   TDAT
                000225          TDAT=TDAT+1
014073             225          .BYTE   TDAT
                000226          TDAT=TDAT+1
014074             226          .BYTE   TDAT
                000227          TDAT=TDAT+1
014075             227          .BYTE   TDAT
                000230          TDAT=TDAT+1
014076             230          .BYTE   TDAT
                000231          TDAT=TDAT+1
014077             231          .BYTE   TDAT
                000232          TDAT=TDAT+1
014100             232          .BYTE   TDAT
                000233          TDAT=TDAT+1
014101             233          .BYTE   TDAT
                000234          TDAT=TDAT+1
014102             234          .BYTE   TDAT
                000235          TDAT=TDAT+1
014103             235          .BYTE   TDAT
                000236          TDAT=TDAT+1
014104             236          .BYTE   TDAT
                000237          TDAT=TDAT+1
014105             237          .BYTE   TDAT
                000240          TDAT=TDAT+1
014106             240          .BYTE   TDAT
                000241          TDAT=TDAT+1
014107             241          .BYTE   TDAT
                000242          TDAT=TDAT+1
014110             242          .BYTE   TDAT
                000243          TDAT=TDAT+1
014111             243          .BYTE   TDAT
                000244          TDAT=TDAT+1
014112             244          .BYTE   TDAT
                000245          TDAT=TDAT+1
014113             245          .BYTE   TDAT
                000246          TDAT=TDAT+1
014114             246          .BYTE   TDAT
                000247          TDAT=TDAT+1
014115             247          .BYTE   TDAT
                000250          TDAT=TDAT+1
```

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014116     250                .BYTE   TDAT
          000251              TDAT=TDAT+1
014117     251                .BYTE   TDAT
          000252              TDAT=TDAT+1
014120     252                .BYTE   TDAT
          000253              TDAT=TDAT+1
014121     253                .BYTE   TDAT
          000254              TDAT=TDAT+1
014122     254                .BYTE   TDAT
          000255              TDAT=TDAT+1
014123     255                .BYTE   TDAT
          000256              TDAT=TDAT+1
014124     256                .BYTE   TDAT
          000257              TDAT=TDAT+1
014125     257                .BYTE   TDAT
          000260              TDAT=TDAT+1
014126     260                .BYTE   TDAT
          000261              TDAT=TDAT+1
014127     261                .BYTE   TDAT
          000262              TDAT=TDAT+1
014130     262                .BYTE   TDAT
          000263              TDAT=TDAT+1
014131     263                .BYTE   TDAT
          000264              TDAT=TDAT+1
014132     264                .BYTE   TDAT
          000265              TDAT=TDAT+1
014133     265                .BYTE   TDAT
          000266              TDAT=TDAT+1
014134     266                .BYTE   TDAT
          000267              TDAT=TDAT+1
014135     267                .BYTE   TDAT
          000270              TDAT=TDAT+1
014136     270                .BYTE   TDAT
          000271              TDAT=TDAT+1
014137     271                .BYTE   TDAT
          000272              TDAT=TDAT+1
014140     272                .BYTE   TDAT
          000273              TDAT=TDAT+1
014141     273                .BYTE   TDAT
          000274              TDAT=TDAT+1
014142     274                .BYTE   TDAT
          000275              TDAT=TDAT+1
014143     275                .BYTE   TDAT
          000276              TDAT=TDAT+1
014144     276                .BYTE   TDAT
          000277              TDAT=TDAT+1
014145     277                .BYTE   TDAT
          000300              TDAT=TDAT+1
014146     300                .BYTE   TDAT
          000301              TDAT=TDAT+1
014147     301                .BYTE   TDAT
          000302              TDAT=TDAT+1
014150     302                .BYTE   TDAT
          000303              TDAT=TDAT+1
014151     303                .BYTE   TDAT
          000304              TDAT=TDAT+1
014152     304                .BYTE   TDAT
```

```
          000305                    TDAT=TDAT+1
014153       305                    .BYTE   TDAT
          000306                    TDAT=TDAT+1
014154       306                    .BYTE   TDAT
          000307                    TDAT=TDAT+1
014155       307                    .BYTE   TDAT
          000310                    TDAT=TDAT+1
014156       310                    .BYTE   TDAT
          000311                    TDAT=TDAT+1
014157       311                    .BYTE   TDAT
          000312                    TDAT=TDAT+1
014160       312                    .BYTE   TDAT
          000313                    TDAT=TDAT+1
014161       313                    .BYTE   TDAT
          000314                    TDAT=TDAT+1
014162       314                    .BYTE   TDAT
          000315                    TDAT=TDAT+1
014163       315                    .BYTE   TDAT
          000316                    TDAT=TDAT+1
014164       316                    .BYTE   TDAT
          000317                    TDAT=TDAT+1
014165       317                    .BYTE   TDAT
          000320                    TDAT=TDAT+1
014166       320                    .BYTE   TDAT
          000321                    TDAT=TDAT+1
014167       321                    .BYTE   TDAT
          000322                    TDAT=TDAT+1
014170       322                    .BYTE   TDAT
          000323                    TDAT=TDAT+1
014171       323                    .BYTE   TDAT
          000324                    TDAT=TDAT+1
014172       324                    .BYTE   TDAT
          000325                    TDAT=TDAT+1
014173       325                    .BYTE   TDAT
          000326                    TDAT=TDAT+1
014174       326                    .BYTE   TDAT
          000327                    TDAT=TDAT+1
014175       327                    .BYTE   TDAT
          000330                    TDAT=TDAT+1
014176       330                    .BYTE   TDAT
          000331                    TDAT=TDAT+1
014177       331                    .BYTE   TDAT
          000332                    TDAT=TDAT+1
014200       332                    .BYTE   TDAT
          000333                    TDAT=TDAT+1
014201       333                    .BYTE   TDAT
          000334                    TDAT=TDAT+1
014202       334                    .BYTE   TDAT
          000335                    TDAT=TDAT+1
014203       335                    .BYTE   TDAT
          000336                    TDAT=TDAT+1
014204       336                    .BYTE   TDAT
          000337                    TDAT=TDAT+1
014205       337                    .BYTE   TDAT
          000340                    TDAT=TDAT+1
014206       340                    .BYTE   TDAT
          000341                    TDAT=TDAT+1
```

```
014207     341                  .BYTE   TDAT
          000342                TDAT=TDAT+1
014210     342                  .BYTE   TDAT
          000343                TDAT=TDAT+1
014211     343                  .BYTE   TDAT
          000344                TDAT=TDAT+1
014212     344                  .BYTE   TDAT
          000345                TDAT=TDAT+1
014213     345                  .BYTE   TDAT
          000346                TDAT=TDAT+1
014214     346                  .BYTE   TDAT
          000347                TDAT=TDAT+1
014215     347                  .BYTE   TDAT
          000350                TDAT=TDAT+1
014216     350                  .BYTE   TDAT
          000351                TDAT=TDAT+1
014217     351                  .BYTE   TDAT
          000352                TDAT=TDAT+1
014220     352                  .BYTE   TDAT
          000353                TDAT=TDAT+1
014221     353                  .BYTE   TDAT
          000354                TDAT=TDAT+1
014222     354                  .BYTE   TDAT
          000355                TDAT=TDAT+1
014223     355                  .BYTE   TDAT
          000356                TDAT=TDAT+1
014224     356                  .BYTE   TDAT
          000357                TDAT=TDAT+1
014225     357                  .BYTE   TDAT
          000360                TDAT=TDAT+1
014226     360                  .BYTE   TDAT
          000361                TDAT=TDAT+1
014227     361                  .BYTE   TDAT
          000362                TDAT=TDAT+1
014230     362                  .BYTE   TDAT
          000363                TDAT=TDAT+1
014231     363                  .BYTE   TDAT
          000364                TDAT=TDAT+1
014232     364                  .BYTE   TDAT
          000365                TDAT=TDAT+1
014233     365                  .BYTE   TDAT
          000366                TDAT=TDAT+1
014234     366                  .BYTE   TDAT
          000367                TDAT=TDAT+1
014235     367                  .BYTE   TDAT
          000370                TDAT=TDAT+1
014236     370                  .BYTE   TDAT
          000371                TDAT=TDAT+1
014237     371                  .BYTE   TDAT
          000372                TDAT=TDAT+1
014240     372                  .BYTE   TDAT
          000373                TDAT=TDAT+1
014241     373                  .BYTE   TDAT
          000374                TDAT=TDAT+1
014242     374                  .BYTE   TDAT
          000375                TDAT=TDAT+1
014243     375                  .BYTE   TDAT
```

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                000376                  TDAT=TDAT+1
        014244     376                  .BYTE   TDAT
                000377                  TDAT=TDAT+1
        014245     377                  .BYTE   TDAT
                000400                  TDAT=TDAT+1
    11                                  .EVEN
    12  014246  000000                  RBUF:   0
    13          014310                  .=.+40
```

```
                                .MACRO  WORDS   WDNAME,K,DATA
                                'WDNAME'K':     DATA
                                .ENDM   WORDS
        000020                  K=KX
        000000                  DATA=DATAX
        000000                  KX=0
        000020                  .REPT   20
                                .NLIST
                                DATAX=KX*400+100377
                                .LIST
                                WORDS   ↑/TWRD/,\KX,\DATAX
                                .NLIST
                                KX=KX+1
                                .LIST
                                .ENDR
        100377                  DATAX=KX*400+100377
014310                          WORDS   ↑/TWRD/,\KX,\DATAX
014310  100377                  TWRD0:  100377
        000001                  KX=KX+1
        100777                  DATAX=KX*400+100377
014312                          WORDS   ↑/TWRD/,\KX,\DATAX
014312  100777                  TWRD1:  100777
        000002                  KX=KX+1
        101377                  DATAX=KX*400+100377
014314                          WORDS   ↑/TWRD/,\KX,\DATAX
014314  101377                  TWRD2:  101377
        000003                  KX=KX+1
        101777                  DATAX=KX*400+100377
014316                          WORDS   ↑/TWRD/,\KX,\DATAX
014316  101777                  TWRD3:  101777
        000004                  KX=KX+1
        102377                  DATAX=KX*400+100377
014320                          WORDS   ↑/TWRD/,\KX,\DATAX
014320  102377                  TWRD4:  102377
        000005                  KX=KX+1
        102777                  DATAX=KX*400+100377
014322                          WORDS   ↑/TWRD/,\KX,\DATAX
014322  102777                  TWRD5:  102777
        000006                  KX=KX+1
        103377                  DATAX=KX*400+100377
014324                          WORDS   ↑/TWRD/,\KX,\DATAX
014324  103377                  TWRD6:  103377
        000007                  KX=KX+1
        103777                  DATAX=KX*400+100377
014326                          WORDS   ↑/TWRD/,\KX,\DATAX
014326  103777                  TWRD7:  103777
        000010                  KX=KX+1
        104377                  DATAX=KX*400+100377
014330                          WORDS   ↑/TWRD/,\KX,\DATAX
014330  104377                  TWRD10: 104377
        000011                  KX=KX+1
        104777                  DATAX=KX*400+100377
014332                          WORDS   ↑/TWRD/,\KX,\DATAX
014332  104777                  TWRD11: 104777
        000012                  KX=KX+1
        105377                  DATAX=KX*400+100377
014334                          WORDS   ↑/TWRD/,\KX,\DATAX
```

```
014334  105377          TWRD12: 105377
        000013          KX=KX+1
        105777          DATAX=KX*400+100377
014336                  WORDS   ↑/TWRD/,\KX,\DATAX
014336  105777          TWRD13: 105777
        000014          KX=KX+1
        106377          DATAX=KX*400+100377
014340                  WORDS   ↑/TWRD/,\KX,\DATAX
014340  106377          TWRD14: 106377
        000015          KX=KX+1
        106777          DATAX=KX*400+100377
014342                  WORDS   ↑/TWRD/,\KX,\DATAX
014342  106777          TWRD15: 106777
        000016          KX=KX+1
        107377          DATAX=KX*400+100377
014344                  WORDS   ↑/TWRD/,\KX,\DATAX
014344  107377          TWRD16: 107377
        000017          KX=KX+1
        107777          DATAX=KX*400+100377
014346                  WORDS   ↑/TWRD/,\KX,\DATAX
014346  107777          TWRD17: 107777
        000020          KX=KX+1
        107777          DATA=DATAX
        000020          K=KX
        000000          DATAX=0
        000000          KX=0
        000020          .REPT   20
                        WORDS   ↑/RCNT/,\KX,\DATAX
                        .NLIST
                        KX=KX+1
                        .LIST
                        .ENDR
014350                  WORDS   ↑/RCNT/,\KX,\DATAX
014350  000000          RCNT0:  0
        000001          KX=KX+1
014352                  WORDS   ↑/RCNT/,\KX,\DATAX
014352  000000          RCNT1:  0
        000002          KX=KX+1
014354                  WORDS   ↑/RCNT/,\KX,\DATAX
014354  000000          RCNT2:  0
        000003          KX=KX+1
014356                  WORDS   ↑/RCNT/,\KX,\DATAX
014356  000000          RCNT3:  0
        000004          KX=KX+1
014360                  WORDS   ↑/RCNT/,\KX,\DATAX
014360  000000          RCNT4:  0
        000005          KX=KX+1
014362                  WORDS   ↑/RCNT/,\KX,\DATAX
014362  000000          RCNT5:  0
        000006          KX=KX+1
014364                  WORDS   ↑/RCNT/,\KX,\DATAX
014364  000000          RCNT6:  0
        000007          KX=KX+1
014366                  WORDS   ↑/RCNT/,\KX,\DATAX
014366  000000          RCNT7:  0
        000010          KX=KX+1
014370                  WORDS   ↑/RCNT/,\KX,\DATAX
```

```
014370  000000                RCNT10: 0
        000011                KX=KX+1
014372                        WORDS   ↑/RCNT/,\KX,\DATAX
014372  000000                RCNT11: 0
        000012                KX=KX+1
014374                        WORDS   ↑/RCNT/,\KX,\DATAX
014374  000000                RCNT12: 0
        000013                KX=KX+1
014376                        WORDS   ↑/RCNT/,\KX,\DATAX
014376  000000                RCNT13: 0
        000014                KX=KX+1
014400                        WORDS   ↑/RCNT/,\KX,\DATAX
014400  000000                RCNT14: 0
        000015                KX=KX+1
014402                        WORDS   ↑/RCNT/,\KX,\DATAX
014402  000000                RCNT15: 0
        000016                KX=KX+1
014404                        WORDS   ↑/RCNT/,\KX,\DATAX
014404  000000                RCNT16: 0
        000017                KX=KX+1
014406                        WORDS   ↑/RCNT/,\KX,\DATAX
014406  000000                RCNT17: 0
        000020                KX=KX+1
        000000                DATA=DATAX
        000020                K=KX
        000000                DATAX=0
        000000                KX=0
        000020                .REPT   20
                              WORDS   ↑/RDCT/,\KX,\DATAX
                              .NLIST
                              KX=KX+1
                              .LIST
                              .ENDR
014410                        WORDS   ↑/RDCT/,\KX,\DATAX
014410  000000                RDCT0:  0
        000001                KX=KX+1
014412                        WORDS   ↑/RDCT/,\KX,\DATAX
014412  000000                RDCT1:  0
        000002                KX=KX+1
014414                        WORDS   ↑/RDCT/,\KX,\DATAX
014414  000000                RDCT2:  0
        000003                KX=KX+1
014416                        WORDS   ↑/RDCT/,\KX,\DATAX
014416  000000                RDCT3:  0
        000004                KX=KX+1
014420                        WORDS   ↑/RDCT/,\KX,\DATAX
014420  000000                RDCT4:  0
        000005                KX=KX+1
014422                        WORDS   ↑/RDCT/,\KX,\DATAX
014422  000000                RDCT5:  0
        000006                KX=KX+1
014424                        WORDS   ↑/RDCT/,\KX,\DATAX
014424  000000                RDCT6:  0
        000007                KX=KX+1
014426                        WORDS   ↑/RDCT/,\KX,\DATAX
014426  000000                RDCT7:  0
        000010                KX=KX+1
```

```
        014430                          WORDS   ↑/RDCT/,\KX,\DATAX
        014430  000000                  RDCT10: 0
                000011                  KX=KX+1
        014432                          WORDS   ↑/RDCT/,\KX,\DATAX
        014432  000000                  RDCT11: 0
                000012                  KX=KX+1
        014434                          WORDS   ↑/RDCT/,\KX,\DATAX
        014434  000000                  RDCT12: 0
                000013                  KX=KX+1
        014436                          WORDS   ↑/RDCT/,\KX,\DATAX
        014436  000000                  RDCT13: 0
                000014                  KX=KX+1
        014440                          WORDS   ↑/RDCT/,\KX,\DATAX
        014440  000000                  RDCT14: 0
                000015                  KX=KX+1
        014442                          WORDS   ↑/RDCT/,\KX,\DATAX
        014442  000000                  RDCT15: 0
                000016                  KX=KX+1
        014444                          WORDS   ↑/RDCT/,\KX,\DATAX
        014444  000000                  RDCT16: 0
                000017                  KX=KX+1
        014446                          WORDS   ↑/RDCT/.\KX,\DATAX
        014446  000000                  RDCT17: 0
                000020                  KX=KX+1
    42  014450  000001                  LINBIT: 1
    43  014452  000002                          2
    44  014454  000004                          4
    45  014456  000010                          10
    46  014460  000020                          20
    47  014462  000040                          40
    48  014464  000100                          100
    49  014466  000200                          200
    50  014470  000400                          400
    51  014472  001000                          1000
    52  014474  002000                          2000
    53  014476  004000                          4000
    54  014500  010000                          10000
    55  014502  020000                          20000
    56  014504  040000                          40000
    57  014506  100000                          100000
```

```
1 014510                        .PFAIL
                                        ;ENTER HERE ON POWER FAILURE

  014510  010046                PFAIL:  MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
  014512  010146                        MOV     R1,-(SP)
  014514  010246                        MOV     R2,-(SP)
  014516  010346                        MOV     R3,-(SP)
  014520  010446                        MOV     R4,-(SP)
  014522  010546                        MOV     R5,-(SP)
  014524  016746  163274                MOV     24,-(SP)
  014530  010667  177072                MOV     SP,SAVSP                ;SAVE STACK POINTER
  014534  012767  014546  163262        MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP          ; 3
  014542  000000                        HALT                            ;HALT ON POWER DOWN NORMAL
  014544  000777                        BR      .

                                        ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED

  014546  016706  177054        RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
  014552  012605                        MOV     (SP)+,R5                ;RESTORE R0-R5
  014554  012604                        MOV     (SP)+,R4
  014556  012603                        MOV     (SP)+,R3
  014560  012602                        MOV     (SP)+,R2
  014562  012601                        MOV     (SP)+,R1
  014564  012600                        MOV     (SP)+,R0
  014566  012767  014510  163230        MOV     #PFAIL,24               ;SET UP FOR POWER FAILURE
  014574  012767  000340  163174        MOV     #340,PS
  014602  012706  015644                MOV     #STACK,SP
  014606  005067  000360                CLR     TEMP
  014612  005267  000354                INC     TEMP
  014616  001375                        BNE     .-4
  014620  104401                        TYPE                                                               ; 5
  014622  014774                        MCRLF                                                              ; 5
  014624  104402                        OCTASC
  014626  014650                        PFTAB
  014630  104401                        TYPE
  014632  014777                        MPFAIL
  014634  005067  176732                CLR     ERRFLG
  014640  005067  176772                CLR     LAST
  014644  000177  176730                JMP     @RETRN
  014650  000001                PFTAB:  1
  014652  000006  000002                6,2
  014656  013600                        RETRN
```

```
014660                          .MSG    †/DH11 AUTO ECHO TEST/,†/CZDHH-CO/
014660   015   012   012  MTITLE: .ASCIZ  <15><12><12>/DH11 AUTO ECHO TEST /<15><12>
014663   104   110   061
014666   061   040   101
014671   125   124   117
014674   040   105   103
014677   110   117   040
014702   124   105   123
014705   124   040   015
014710   012   000
014712   015   012   126  MVECTO: .ASCIZ  <15><12>/VECTOR ADDRESS-/
014715   105   103   124
014720   117   122   040
014723   101   104   104
014726   122   105   123
014731   123   055   000
014734   015   012   103  MREGAD: .ASCIZ  <15><12>/CONTROL REGISTER ADDRESS-/
014737   117   116   124
014742   122   117   114
014745   040   122   105
014750   107   111   123
014753   124   105   122
014756   040   101   104
014761   104   122   105
014764   123   123   055
014767   000
014770   040   040   077  MQM:    .ASCIZ  /  ?/
014773   000
014774   015   012   000  MCRLF:  .ASCIZ   <15><12>

014777   040   040   120  MPFAIL: .ASCIZ  /  POWER FAILURE, PROGRAM RESTART AT TEST IN PROGRESS/
015002   117   127   105
015005   122   040   106
015010   101   111   114
015013   125   122   105
015016   054   040   120
015021   122   117   107
015024   122   101   115
015027   040   122   105
015032   123   124   101
015035   122   124   040
015040   101   124   040
015043   124   105   123
015046   124   040   111
015051   116   040   120
015054   122   117   107
015057   122   105   123
015062   123   000
015064   015   012   103  MEPASS: .ASCIZ  <15><12>/CZDHH-CO/
015067   132   104   110
015072   110   055   103
015075   060   000
015077   015   012   120  PASTXT: .ASCIZ  <15><12>/PASS COUNT = /                          ; 5
015102   101   123   123
015105   040   103   117
015110   125   116   124
015113   040   075   040
```

```
     015116    000
     015117    015    012    122  MR:      .ASCIZ  <15><12>/R/
     015122    000
     015123    015    012    124  MTSTPC:  .ASCIZ  <15><12>/TEST PC-/
     015126    105    123    124
     015131    040    120    103
     015134    055    000
                                  .EVEN
  2                               .EVEN
  3 015136                        .TRPTAB

                                          ;TABLE OF POINTERS FOR TRAP DECODING

     015136  012232               TRPTAB:  SCOPER
     015140  012706                        TYPER
     015142  013226                        OCTASN
     015144  012740                        INSTRG
     015146  013032                        INSTRE
     015150  013042                        PARAMS
     015152  012614                        SVO5P
     015154  012654                        RS05
     015156  012332                        SCOP1R
  4 015160                        .BUFFER

                                          ;BUFFERS FOR INPUT-OUTPUT

     015160  000000               INBUF:   0
             015172               .=.+10
     015172  000000               TEMP:    0
             015204               .=.+10

     015204  000000               MDATA:   0
             015216               .=.+10
  5 015216                        .ERRTAB

                                          ;TABLE OF POINTERS TO ERROR MESSAGES AND DATA

     015216                       ERRTAB:
  6 015216  015232                        EM1
  7 015220  015414                        DT1
  8 015222  015267                        EM2
  9 015224  015426                        DT2
 10 015226  015343                        EM3
 11 015230  015426                        DT2
 12 015232    101    125    124  EM1:     .ASCIZ  /AUTO ECHO ERROR/<15><12>/EXP     REC/
    015235    117    040    105
    015240    103    110    117
    015243    040    105    122
    015246    122    117    122
    015251    015    012    105
    015254    130    120    040
    015257    040    040    040
    015262    040    122    105
    015265    103    000
 13 015267    116    117    116  EM2:     .ASCIZ  /NON ECHOED DATA ERROR/<15><12>/EXP     REC     LINE/
    015272    040    105    103
    015275    110    117    105
```

```
    015300    104    040    104
    015303    101    124    101
    015306    040    105    122
    015311    122    117    122
    015314    015    012    105
    015317    130    120    040
    015322    040    040    040
    015325    040    122    105
    015330    103    040    040
    015333    040    040    040
    015336    114    111    116
    015341    105    000
 14 015343    105    103    110   EM3:    .ASCIZ  /ECHOED DATA ERROR/<15><12>/EXP     REC     LINE/
    015346    117    105    104
    015351    040    104    101
    015354    124    101    040
    015357    105    122    122
    015362    117    122    015
    015365    012    105    130
    015370    120    040    040
    015373    040    040    040
    015376    122    105    103
    015401    040    040    040
    015404    040    040    114
    015407    111    116    105
    015412    000
 15                              .EVEN
 16 015414  000002               DT1:    2
 17 015416     006    002        .BYTE   6,2
 18 015420  013624                       SAVR5
 19 015422     006    000        .BYTE   6,0
 20 015424  013622                       SAVR4
 21 015426  000003               DT2:    3
 22 015430     006    002        .BYTE   6,2
 23 015432  013624                       SAVR5
 24 015434     006    002        .BYTE   6,2
 25 015436  013622                       SAVR4
 26 015440     002    002        .BYTE   2,2
 27 015442  013620                       SAVR3
 28 015444                       .ENDCOD
    015444  000000               ENDCOD: 0
 29         000001               .END
```

SYMBOL TABLE

```
ADRCNT = 013225
AEACT   013644
BEGIN   001306
BINWRD  013376
BITX  = 000000
BIT00 = 000001
BIT01 = 000002
BIT02 = 000004
BIT03 = 000010
BIT04 = 000020
BIT05 = 000040
BIT06 = 000100
BIT07 = 000200
BIT08 = 000400
BIT09 = 001000
BIT10 = 002000
BIT11 = 004000
BIT12 = 010000
BIT13 = 020000
BIT14 = 040000
BIT15 = 100000
CHRCNT  013374
CLRALL  013400
DATA  = 000000
DATABP  012506
DATAX = 000000
DEVADR  013222
DHBA    013546
DHBAR   013552
DHBC    013550
DHBCR   013554
DHLPR   013544
DHNRC   013542
DHRLVL  013564
DHRVEC  013562
DHSCR   013540
DHSLR   013560
DHSSR   013556
DHTLVL  013570
DHTVEC  013566
DT1     015414
DT2     015426
EM1     015232
EM2     015267
EM3     015343
ENDCOD  015444
ENDFLG  013640
EOP     012132
ERRCNT  013576
ERRFLG  013572
ERRMSG  012470
ERRCRS  012350
ERRTAB  015216
ERTABO  012554
ESCAPE  013602
EXITER  012532
FREEZ1  013604
HALTS   012512
HILIM   013220
ICOUNT  013606
INBUF   015160
INIFLG  013632
INSTER= 104404
INSTR = 104403
INSTRE  013032
INSTRG  012740
INSTR1  012752
INSTR2  013040
K     = 000020
KX    = 000020
LAST    013636
LIGHTS  001002
LIMITS  013152
LINACT  013642
LINBIT  014450
LINE  = 000020
LOBITS  013224
LOGICA  012210
LOLIM   013216
LPCNT   013610
MCRLF   014774
MDATA   015204
MEPASS  015064
MPFAIL  014777
MQM     014770
MR      015117
MREGAD  014734
MSG     012754
MTITLE  014660
MTSTPC  015123
MVECTO  014712
N     = 000001
OCTASC= 104402
OCTASN  013226
PARAM = 104405
PARAMS  013042
PARAM1  013072
PARERR  013146
PASARG  012224
PASCNT  013574
PASTXT  015077
PFAIL   014510
PFTAB   014650
POPRO = 012600
POP1SP= 005726
POP2SP= 022626
PS    = 177776
PUSHRO= 010046
PUSH1S= 005746
PUSH2S= 024646
RBUF    014246
RCNTO   014350
RCNT1   014352
RCNT10  014370
RCNT11  014372
RCNT12  014374
RCNT13  014376
RCNT14  014400
RCNT15  014402
RCNT16  014404
RCNT17  014406
RCNT2   014354
RCNT3   014356
RCNT4   014360
RCNT5   014362
RCNT6   014364
RCNT7   014366
RDCTO   014410
RDCT1   014412
RDCT10  014430
RDCT11  014432
RDCT12  014434
RDCT13  014436
RDCT14  014440
RDCT15  014442
RDCT16  014444
RDCT17  014446
RDCT2   014414
RDCT3   014416
RDCT4   014420
RDCT5   014422
RDCT6   014424
RDCT7   014426
RESREG  012510
RESTAR  014546
RESTRT  012220
RESO5 = 104407
RETRN   013600
RSO5    012654
SAVPC   013630
SAVRO   013612
SAVR1   013614
SAVR2   013616
SAVR3   013620
SAVR4   013622
SAVR5   013624
SAVSP   013626
SAVO5P= 104406
SCOPE = 104400
SCOPER  012232
SCOPE1= 104410
SCOP1R  012332
SETALL  013426
SPACNT= 013375
STACK = 015644
START   001004
STFLG   013634
SVO5    012622
SVO5P   012614
SWR     001000
SWOO  = 000001
SWO1  = 000002
SWO2  = 000004
SWO3  = 000010
SWO4  = 000020
SWO5  = 000040
SWO6  = 000100
SWO8  = 000400
SWO9  = 001000
SW10  = 002000
SW11  = 004000
SW12  = 010000
SW13  = 020000
SW14  = 040000
SW15  = 100000
TBUF    013646
TDAT  = 000400
TEMP    015172
TKCSR   013530
TKDBR   013532
TPCSR   013534
TPDBR   013536
TRPOK   012574
TRPSRV  012562
TRPTAB  015136
TWRDO   014310
TWRD1   014312
TWRD10  014330
TWRD11  014332
TWRD12  014334
TWRD13  014336
TWRD14  014340
TWRD15  014342
TWRD16  014344
TWRD17  014346
TWRD2   014314
TWRD3   014316
TWRD4   014320
TWRD5   014322
TWRD6   014324
TWRD7   014326
TYPDAT  012472
TYPE  = 104401
TYPER   012706
TYPMSG  012450
T1      001400
T10     003002
T11     003160
T12     003336
T13     003514
T14     003672
T15     004050
T16     004226
T17     004404
T2      001556
T20     004562
T21     004740
T22     005176
T23     005434
T24     005672
T25     006130
T26     006366
T27     006624
T3      001734
T30     007062
T31     007320
T32     007556
T33     010014
T34     010252
T35     010510
T36     010746
T37     011204
T4      002112
T40     011442
T41     011700
T5      002270
T6      002446
T7      002624
VEC1    001164
VEC2    001174
WRDCNT  013372
X     = 000000
XBIT  = 000000
XLINE = 000020
XN    = 000042
Y     = 000011

. ABS.  015446    000
        000000    001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  19200 WORDS  ( 75 PAGES)
```

SYMBOL TABLE

DYNAMIC MEMORY AVAILABLE FOR 71 PAGES
CZDHMC.BIN,CZDHMC.SEQ=CZDHMC.DOC,DHMACA.MAC,CZDHMC.P11