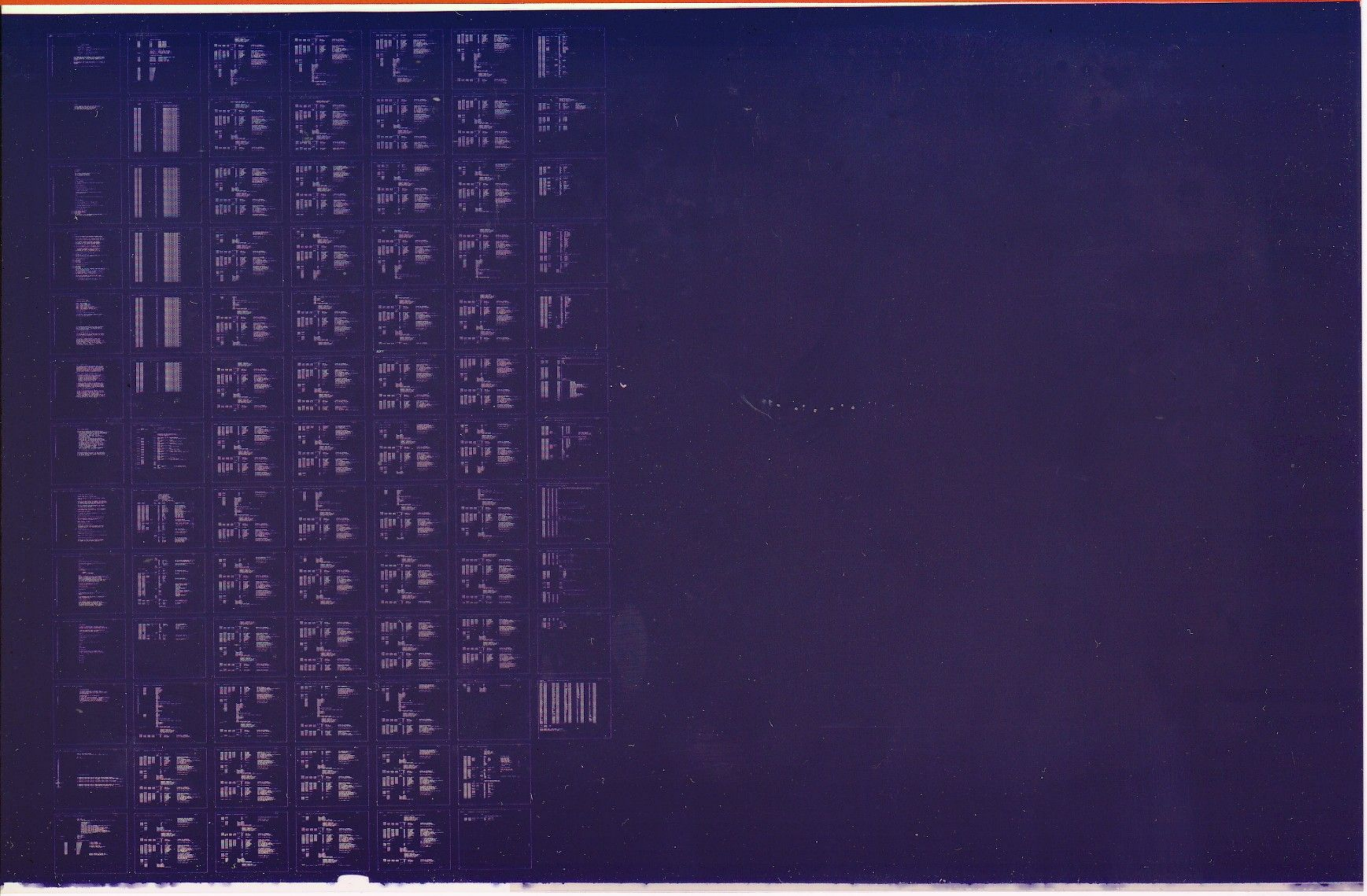
DH11

DH11 CHA LEN BAS DAT
CZDHEC0

AH-FG24C-MC
1 OF 1 OCT 1985

digital
MADE IN USA



```
                .REM !
```

IDENTIFICATION

PRODUCT CODE: AC-8460C-MC

PRODUCT NAME: CZDHECO DH11 CHARACTER LENGTH/BASIC DATA TEST

DATE: JUNE 1985

MAINTAINER: NAC SOFTWARE ENGINEERING

AUTHOR: MICHAEL DAVIS

1. ABSTRACT

THE DH11 CHARACTER LENGTH AND BASIC DATA TEST VERIFIES
THAT CHARACTER LENGTH CAN BE SELECTED CORRECTLY ON
EACH LINE CORRECTLY, AND THAT THE CORRECT
LINE NUMBER AND CHARACTER STATUS ARE RECEIVED ON
EACH LINE SELECTED FOR TRANSMISSION.

```
                        2.      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.      LOADING PROCEDURE

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

                        4.      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 I 0002000

                                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 CHARACTER LENGTH AND BASIC DATA TEST"
                                AND WILL THEN TYPE "VECTOR ADDRESS-" AND WAIT FOR AN
                                INPUT FROM THE TELETYPE KEYBOARD.
```

4.3 (CONT'D)

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 MESSAGE 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 CHARACTER LENGTH AND BASIC DATA 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 CHARACTER LENGTH AND BASIC DATA 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 THS 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. 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 IMMEDIATLY 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 ENTERD
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
A) IF SW10=1, THE ROUTINE WILL TRANSFER TO THE NEXT TEST IN SEQUENCE, AFTER CLEARING ERROR FLAGS.
B) IF SW11=1, THE ROUTINE WILL TRANSFER TO THE NEXT TEST SEQUENCE, AFTER CLEARING ERROR FLAGS.
C) 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. THE 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 IMMEDIATLY AFTER THE 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:
A) 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.
B) IF THE TEST THAT FAILED DID NOT FAIL PREVIOUSLY
DURING THIS PASS, A COMPLETE ERROR REPORT IS MADE
IF THE TEST THAT FAILED FAILED MOR THAT ONCE DURING
THE CURRENT PASS, ONLY THE DATA RELATING TO THE FAILUER
IS TYPED. IF SW13=1, NO ERROR TYPEOUT IS MADE.
C) 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.
D) 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 TH 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 "CZDHE-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 "CZDHE-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. (CONT'D)

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.

6. 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 THE SAME ERROR 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 OPERATOT A TION 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 PARAMETER WITHIN
A TEST, SET SW09=1 TO FREEZE THE DATA
(SEE LISTING FOR THOSE TESTS THAT INCORPORATE THIS FEATURE)

6. (CONT'D)

6.3.3 PROGRAM START TO SCOPE LOOP ON SELECTED TEST

PERFORM SECTION 4.3.4 WITH SW14=1

7. RESTRICTIONS

7.1 STARTING

THE DH11 TEST CARD MUST BE INSTALLED

7.2 RUNNING

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIME

THE TIME FOR ONE PASS OF THE PROGRAM (END OF
TYPEOUT OF CZDHE-C TO END OF TYPEOUT OF CZDHE-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.      PROGRAM DESCRIPTION

                                THIS PROGRAM CONSISTS OF 64 (DECIMAL) TESTS
                                THAT CHECK, IN INDIVIDUAL TEST LOOPS, CHARACTER LENGTH
                                SELECTION FOR EACH LINE AT EACH LENGTH OF 5,6,7, OR 8
                                BITS PER CHARACTER.

                                A CHARACTER CODE OF 377 IS TRANSMITTED
                                ON A EACH LINE
                                AT 5,6,7, AND 8 BITS PER CHARACTER.  THE RECEIVED CHARACTER
                                IS CHECKED TO VERIFY THAT THE DATA IS CORRECT
                                (A CODE OF 37, 77, 177, OR 377 IF THE LENGTH IS 5,6,7, OR
                                8 BITS, RESPECTIVELY), AND THAT THE RECEIVED
                                LINE NUMBER AND CHARACTER STATUS INFORMATION ARE CORRECT.

                        10.     LISTING

                        !
```

```
; 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 SWITCH REGISTER"
; *1 SKONETSKI 11-APR-1985 15:49:05 "LIBRARY FOR DH11 DIAGNOSTICS"
```

```
                        .LIST   ME
                        .NLIST  MC,MD,CND
000000                  .HEADER /1972,1985/,/DH11 CHARACTER LENGTH AND BASIC DATA TEST/,/CZDHE-CO/

                                ;STARTING PROCEDURE
                                ;LOAD PROGRAM
                                ;LOAD ADDRESS 000200
                                ;PRESS START
                                ;PROGRAM WILL TYPE DH11 CHARACTER LENGTH AND BASIC DATA 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 " CZDHE-CO "
                                ;AND THEN RESUM TESTING

                        .TITLE  CZDHE-CO
000000                  .ENABLE ABS
                        .NLIST  MC,MD,CND
                        .LIST   ME
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
017004                  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
```

```
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
```

```
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
```

```
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
                 000200                 .=200                  ;STANDARD INTERRUPT VECTORS
   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                000046                 .=46
3   000046       014456                 LOGICAL
4                000052                 .=52
5   000052       040000                 40000
6                                       .MACRO  CODEM1
7                                               MOV     DHSSR,DHSLR            ;SET UP ADDRESS OF SILO
8                                               INC     DHSLR                  ;STATUS REGISTER HIGH BYTE
9                                       .ENDM   CODEM1
10  000054                              .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  017004          MOV     #STACK,SP       ;SET UP PROCESSOR STACK
001016  012702  000024          MOV     #24,R2          ; POINT TO VECTOR AREA          ; 7
001022  012722  015760          MOV     #PFAIL,(R2)+    ;SET UP POWER FAIL TRAP         ; 7
001026  012722  000340          MOV     #340, (R2)+     ;SERVICE AT LEVEL 7             ; 7
001032  012722  014616          MOV     #ERRORS, (R2)+  ;ERROR HANDLER                  ; 7
001036  012722  000340          MOV     #340, (R2)+     ;SERVICE AT LEVEL 7             ; 7
001042  012722  015030          MOV     #TRPSRV, (R2)+  ;GENERAL HANDLER DISPATCH SERVICE ; 7
001046  012712  000340          MOV     #340, (R2)      ;SERVICE AT LEVEL 7             ; 8
001052  005067  014674          CLR     STFLG           ;CLEAR TEST START FLAG
001056  005067  014630          CLR     PASCNT          ;CLEAR PASS COUNT
001062  005067  014626          CLR     ERRCNT          ;CLEAR ERROR COUNT
001066  005067  014616          CLR     ERRFLG          ;CLEAR ERROR FLAG
001072  005067  014612          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     #1$, 4          ; SET UP TRAP VECTOR    ; 4
001114  005777  177660          TST     @SWR            ; TEST SWITCH REGISTER ADDRESS  ; 4
001120  000405                 BR      2$              ; IF SUCCESSFUL, LEAVE IT ALONE ; 4
001122                  1$:                                                             ; 4
001122  012767  000176  177650          MOV     #176, SWR       ; POINT TO SOFT SWITCH DHSCR ; 4
001130  005067  177646          CLR     LIGHTS          ; 0 MEANS WE ARE NOT GOING TO USE LIGHTS ; 4
001134                  2$:                                                             ; 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  016130          TYPE    ,MTITLE         ;TYPE TITLE MESSAGE             ; 4
001154  005767  014570          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     #2$,@#4         ;SET UP TIME OUT RETURN
                        1$:     TST     (R0)+           ;WILL TRAP WHEN NO MEMORY       ; 9
                                BR      1$              ;LOCATION RESPONDED, CONTINUE
                        2$:     MOV     R0,HCORE        ;R0 CONTAINS ADDRESS OF
                                SUB     #2,HCORE        ;NON EXISTANT MEMORY            ; 9
                                MOV     #6,@#4          ;RESTORE TRAPCATCHER
```

```
                                .ENDC
                                .IF NB  <>
                                TRACER: MOV     #1$,@#10                ;SET UP ILLEGAL INSTRUCTION TRAP RETURN
                                        SXT     R0                      ;DO 11/40, 11/45 INSTRUCTION
                                        MOV     #RTT,TRTRET             ;11/40,45 RTT RETURN FRUM TRACE TRAP
                                        BR      2$
                                1$:     MOV     #RTI,TRTRET             ;1105,10,20 RTI RETURN FROM TRACE TRAP
                                        MOV     #12,@#10                ;RESTROE TRAPCATCHER
                                        MOV     #TRTRET,@#16            ;SET UP TRACE TRAP VECTOR
                                .ENDC
                                .IF NB  <DHRVEC>
                                .IF B   <>                                                              ; 3
001162  000404                          BR      VEC2
                                .IFF
                                        TST     INIFLG                  ;IF INITIALIZE FLAG=0
                                        BEQ     VEC2                    ;GET VECTOR AND CSR ADDRESS
                                .ENDC
001164  032777  000001  177606  VEC1:   BIT     #SW00,@SWR              ;IF SW00=1, GET NEW VECTOR      ; 4
001172  001445                          BEQ     BEGIN                   ;AND CSR
001174                          VEC2:
001174  012701  000300                  MOV     #300,R1                                                 ; 4
001200  012702  000302                  MOV     #302,R2                                                 ; 4
001204  012703  000004                  MOV     #4,R3
001210  010211                  1$:     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  016210                          MVECTOR                         ;MESSAGE "VECTOR ADDRESS-"
001232  104405                          PARAM                           ;CONVERT STRING TO OCTAL
001234  000300                          300                             ;LOW LIMIT
001236  000770                          770                             ;HIGH  LIMIT                    ; 3
001240  015700                          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  016232                          MREGAD                          ;MESSAGE "CONTROL REGISTER ADDRESS-"
001250  104405                          PARAM                           ;CONVERT STRING TO OCTAL
001252  000000                          0                               ;LOW LIMIT
001254  177776                          177776                          ;HIGH LIMIT
001256  015656                          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  014406  014406          MOV     DHSSR,DHSLR             ;SET UP ADDRESS OF SILO
001270  005267  014402                  INC     DHSLR                   ;STATUS REGISTER HIGH BYTE
                                .ENDC
001274  005767  014450                  TST     INIFLG                  ;IF INITIALIZATION FLAG
001300  001002                          BNE     BEGIN                   ;IS CLEARED
001302  005167  014442                  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  017004                  MOV     #STACK,SP       ;SET UP PROCESSOR STACK
001320  032777  000002  177452          BIT     #SW01,@SWR      ;IF SW01=1
001326  001410                          BEQ     1$              ;GET PC FOR PROGRAM START      ; 4
001330  104403                          INSTR                   ;GET PC
001332  016421                          MTSTPC                  ;MESSAGE "TEST PC"
001334  104405                          PARAM                   ;CONVERT STRING TO OCTAL
001336  000000                          0
001340  017500                          17500
001342  015716                          RETRN
001344     001                  .BYTE   1
001345     001                  .BYTE   1
001346  000410                          BR      2$
001350  012767  001400  014340  1$:     MOV     #T1,RETRN       ;NORMAL START, TEST 1
001356  005767  014370                  TST     STFLG           ;IF LOOPING, BYPASS TYPEOUT
001362  001004                          BNE     3$
001364  005167  014362                  COM     STFLG
001370  104401  016415          2$:     TYPE    ,MR             ;TYPE "R" TO INDICATE START
001374  000177  014316          3$:     JMP     @RETRN          ;START TESTING                 ; 3
```

```
                                XLINE=LINEX
                                XBIT=BITX
                                XLENGTH=LENGTX
                                CLENGTH=LENGTC
                                CODEX=XCODE
                                RDATA=DATAR
                                LINEX=0
                                BITX=1
                                .REPT   20
                                .NLIST
                                LENGTX=0
                                LENGTC=5
                                XCODE=37
                                .LIST
                                .REPT   4
                                .NLIST
                                DATAR=LINEX*400+100000+XCODE
                                .LIST
                                CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                .NLIST
                                LENGTX=LENGTX+1
                                LENGTC=LENGTC+1
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
                                .NLIST
                                LINEX=LINEX+1
                                BITX=BITX+BITX
                                .LIST
                                .ENDR
                        000000  LENGTX=0
                        000005  LENGTC=5
                        000037  XCODE=37
                        000004  .REPT   4
                                .NLIST
                                DATAR=LINEX*400+100000+XCODE
                                .LIST
                                CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                .NLIST
                                LENGTX=LENGTX+1
                                LENGTC=LENGTC+1
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
                        100037  DATAR=LINEX*400+100000+XCODE
001400                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 0
                                ;CHARACTER LENGTH IS 5 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 37
                                ;LINE SPEED IS 9600 BAUD

001400                          TS \XN,400,2$
001400  012767  000340  176370  T1:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
001406  012767  000400  014310          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
001414  012767  001526  014276          MOV     #2$,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  014226          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
001430  012767  000037  014320          MOV     #37,TDATA               ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
001436  012777  000000  014212          MOV     #0,@DHSCR               ;SELECT LINE 0
001444  012777  177777  014214          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
001452  012777  015756  014204          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
001460  012777  033500  014174          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
001466  052777  000000  014166          BIS     #0,@DHLPR               ;SET CHARACTER LENGTH FOR 5 BITS
001474  012777  000001  014166          MOV     #1,@DHBAR               ;START TRANSMITTER
001502  105777  014150          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
001506  100375                          BPL     1$
001510  017704  014144                  MOV     @DHNRC,R4               ;(P4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
001514  012705  100037                  MOV     #100037,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
001520  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
001522  001401                          BEQ     2$
001524                                  HLT                             ;CHARACTER LENGTH, DATA
001524  104000                          EMT                             ;OR LINE NUMBER ERROR

001526  10440C          2$:     SCOPE
                000001          LENGTX=LENGTX+1
                000006          LENGTC=LENGTC+1
                000077          XCODE=XCODE*2+1
                100077          DATAR=LINEX*400+100000+XCODE
001530                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 0
                                ;CHARACTER LENGTH IS 6 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 77
                                ;LINE SPEED IS 9600 BAUD

001530                  TS \XN,400,2$
001530  012767  000340  176240  T2:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
001536  012767  000400  014160          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
001544  012767  001656  014146          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
                000003          XN=XN+1
001552  012777  004000  014076          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
001560  012767  000077  014170          MOV     #77,TDATA               ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
001566  012777  000000  014062          MOV     #0,@DHSCR               ;SELECT LINE 0
001574  012777  177777  014064          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
001602  012777  015756  014054          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
001610  012777  033500  014044          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
001616  052777  000001  014036          BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
001624  012777  000001  014036          MOV     #1,@DHBAR               ;START TRANSMITTER
001632  105777  014020          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
001636  100375                          BPL     1$
001640  017704  014014                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
```

```
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
001644  012705  100077                MOV     #100077,R5        ;CHARACTER STATUS IN HIGH BYTE
                                                                ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
001650  020504                        CMP     R5,R4             ;STATUS IN HIGH BYTE
001652  001401                        BEQ     2$                ;ARE EXPECTED AND RECEIVED DATA THE SAME
001654                                HLT
001654  104000                        EMT                       ;CHARACTER LENGTH, DATA

001656  104400                2$:     SCOPE                     ;OR LINE NUMBER ERROR
        000002              LENGTX=LENGTX+1
        000007              LENGTC=LENGTC+1
        000177              XCODE=XCODE+2+1
        100177              DATAR=LINEX+400+100000+XCODE
001660                      CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 0
                                ;CHARACTER LENGTH IS 7 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 177
                                ;LINE SPEED IS 9600 BAUD

001660                      TS \XN,400,2$
001660  012767  000340  176110 T3:     MOV     #340,PS           ;DISABLE ALL INTERRUPTS
001666  012767  000400  014030        MOV     #400,ICOUNT       ;SET UP FOR 400 ITERATIONS
001674  012767  002006  014016        MOV     #2$,ESCAPE        ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #.,FREEZ1       ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000004                  XN=XN+1
001702  012777  004000  013746        MOV     #BIT11,@DHSCR     ;MASTER CLEAR INTERFACE
001710  012767  000177  014040        MOV     #177,TDATA        ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
001716  012777  000000  013732        MOV     #0,@DHSCR         ;SELECT LINE 0
001724  012777  177777  013734        MOV     #-1,@DHBC         ;SET UP TO TRANSMIT 1 BYTE
001732  012777  015756  013724        MOV     #TDATA,@DHBA      ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
001740  012777  033500  013714        MOV     #33500,@DHLPR     ;SET LINE SPEED FOR 9600 BAUD
001746  052777  000002  013706        BIS     #2,@DHLPR         ;SET CHARACTER LENGTH FOR 7 BITS
001754  012777  000001  013706        MOV     #1,@DHBAR         ;START TRANSMITTER
001762  105777  013670        1$:     TSTB    @DHSCR            ;WAIT TO RECEIVE CHARACTER
001766  100375                        BPL     1$
001770  017704  013664                MOV     @DHNRC,R4         ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
001774  012705  100177                MOV     #100177,R5        ;CHARACTER STATUS IN HIGH BYTE
                                                                ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
002000  020504                        CMP     R5,R4             ;STATUS IN HIGH BYTE
002002  001401                        BEQ     2$                ;ARE EXPECTED AND RECEIVED DATA THE SAME
002004                                HLT
002004  104000                        EMT                       ;CHARACTER LENGTH, DATA

002006  104400                2$:     SCOPE                     ;OR LINE NUMBER ERROR
        000003              LENGTX=LENGTX+1
        000010              LENGTC=LENGTC+1
        000377              XCODE=XCODE+2+1
        100377              DATAR=LINEX+400+100000+XCODE
```

```
002010                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 0
                                        ;CHARACTER LENGTH IS 10 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 377
                                        ;LINE SPEED IS 9600 BAUD

002010                          TS \XN,400,2$
002010  012767  000340  175760 T4:     MOV     #340,PS         ;DISABLE ALL INTERRUPTS
002016  012767  000400  013700         MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
002024  012767  002136  013666         MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000005                  XN=XN+1
002032  012777  004000  013616         MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
002040  012767  000377  013710         MOV     #377,TDATA      ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
002046  012777  000000  013602         MOV     #0,@DHSCR       ;SELECT LINE 0
002054  012777  177777  013604         MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
002062  012777  015756  013574         MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002070  012777  033500  013564         MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
002076  052777  000003  013556         BIS     #3,@DHLPR       ;SET CHARACTER LENGTH FOR 10 BITS
002104  012777  000001  013556         MOV     #1,@DHBAR       ;START TRANSMITTER
002112  105777  013540         1$:    TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
002116  100375                       BPL     1$
002120  017704  013534               MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                               ;IN LOW BYTE, AND LINE NUMBER AND
                                                               ;CHARACTER STATUS IN HIGH BYTE
002124  012705  100377               MOV     #100377,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                               ;AND LINE NUMBER AND CHARACTER
                                                               ;STATUS IN HIGH BYTE
002130  020504                       CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
002132  001401                       BEQ     2$
002134                               HLT                     ;CHARACTER LENGTH, DATA
002134  104000                       EMT

002136  104400                 2$:   SCOPE                   ;OR LINE NUMBER ERROR
        000004                 LENGTX=LENGTX+1
        000011                 LENGTC=LENGTC+1
        000777                 XCODE=XCODE*2+1
        000001                 LINEX=LINEX+1
        000002                 BITX=BITX+BITX
        000000                 LENGTX=0
        000005                 LENGTC=5
        000037                 XCODE=37
        000004                 .REPT   4
                               .NLIST
                               DATAR=LINEX*400+100000+XCODE
                               .LIST
                               CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                               .NLIST
                               LENGTX=LENGTX+1
                               LENGTC=LENGTC+1
                               XCODE=XCODE*2+1
                               .LIST
                               .ENDR
```

```
                100437                  DATAR=LINEX*400+100000+XCODE
        002140                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 1
                                                ;CHARACTER LENGTH IS 5 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 37
                                                ;LINE SPEED IS 9600 BAUD

        002140                          TS \XN,400,2$
        002140  012767  000340  175630  T5:     MOV     #340,PS         ;DISABLE ALL INTERRUPTS
        002146  012767  000400  013550          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
        002154  012767  002266  013536          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
                000006                  XN=XN+1
        002162  012777  004000  013466          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
        002170  012767  000037  013560          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
        002176  012777  000001  013452          MOV     #1,@DHSCR       ;SELECT LINE 1
        002204  012777  177777  013454          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
        002212  012777  015756  013444          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
        002220  012777  033500  013434          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
        002226  052777  000000  013426          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
        002234  012777  000002  013426          MOV     #2,@DHBAR       ;START TRANSMITTER
        002242  105777  013410          1$:    TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
        002246  100375                          BPL     1$
        002250  017704  013404                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
        002254  012705  100437                  MOV     #100437,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
        002260  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
        002262  001401                          BEQ     2$
        002264                                  HLT                     ;CHARACTER LENGTH, DATA
        002264  104000                          EMT                     ;OR LINE NUMBER ERROR

        002266  104400          2$:     SCOPE
                000001                  LENGTX=LENGTX+1
                000006                  LENGTC=LENGTC+1
                000077                  XCODE=XCODE+2+1
                100477                  DATAR=LINEX+400+100000+XCODE
        002270                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 1
                                                ;CHARACTER LENGTH IS 6 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 77
                                                ;LINE SPEED IS 9600 BAUD

        002270                          TS \XN,400,2$
        002270  012767  000340  175500  T6:     MOV     #340,PS         ;DISABLE ALL INTERRUPTS
        002276  012767  000400  013420          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
        002304  012767  002416  013406          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
```

```
                                .ENDC
            000007              XN=XN+1
002312  012777  004000  013336          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
002320  012767  000077  013430          MOV     #77,TDATA               ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
002326  012777  000001  013322          MOV     #1,@DHSCR               ;SELECT LINE 1
002334  012777  177777  013324          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
002342  012777  015756  013314          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002350  012777  033500  013304          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
002356  052777  000001  013276          BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
002364  012777  000002  013276          MOV     #2,@DHBAR               ;START TRANSMITTER
002372  105777  013260          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
002376  100375                          BPL     1$
002400  017704  013254                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
002404  012705  100477                  MOV     #100477,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
002410  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
002412  001401                          BEQ     2$
002414                                  HLT                             ;CHARACTER LENGTH, DATA
002414  104000                          EMT                             ;OR LINE NUMBER ERROR

002416  104400            2$:     SCOPE
            000002      LENGTX=LENGTX+1
            000007      LENGTC=LENGTC+1
            000177      XCODE=XCODE+2+1
            100577      DATAR=LINEX*400+100000+XCODE
002420                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 1
                                ;CHARACTER LENGTH IS 7 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 177
                                ;LINE SPEED IS 9600 BAUD

002420                  TS \XN,400,2$
002420  012767  000340  175350  T7:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
002426  012767  000400  013270          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
002434  012767  002546  013256          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
            000010              XN=XN+1
002442  012777  004000  013206          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
002450  012767  000177  013300          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
002456  012777  000001  013172          MOV     #1,@DHSCR               ;SELECT LINE 1
002464  012777  177777  013174          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
002472  012777  015756  013164          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002500  012777  033500  013154          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
002506  052777  000002  013146          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
002514  012777  000002  013146          MOV     #2,@DHBAR               ;START TRANSMITTER
002522  105777  013130          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
002526  100375                          BPL     1$
002530  017704  013124                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
```

```
002534  012705  100577          MOV     #100577,R5          ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                            ;AND LINE NUMBER AND CHARACTER
                                                            ;STATUS IN HIGH BYTE
002540  020504                  CMP     R5,R4               ;ARE EXPECTED AND RECEIVED DATA THE SAME
002542  001401                  BEQ     2$
002544                          HLT                         ;CHARACTER LENGTH, DATA
002544  104000                  EMT                         ;OR LINE NUMBER ERROR

002546  104400          2$:     SCOPE
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE*2+1
        100777          DATAR=LINEX*400+100000+XCODE
002550                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 1
                        ;CHARACTER LENGTH IS 10 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 377
                        ;LINE SPEED IS 9600 BAUD

002550                  TS \XN,400,2$
002550  012767  000340  175220  T10:    MOV     #340,PS             ;DISABLE ALL INTERRUPTS
002556  012767  000400  013140          MOV     #400,ICOUNT         ;SET UP FOR 400 ITERATIONS
002564  012767  002676  013126          MOV     #2$,ESCAPE          ;SET UP TO ESCAPE TO NEXT TEST
                        .IF NB  <>
                                MOV     #,FREEZ1            ;SET UP TO LOOP WITH DATA       ; 3
                        .ENDC
        000011          XN=XN+1
002572  012777  004000  013056          MOV     #BIT11,@DHSCR       ;MASTER CLEAR INTERFACE
002600  012767  000377  013150          MOV     #377,TDATA          ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
002606  012777  000001  013042          MOV     #1,@DHSCR           ;SELECT LINE 1
002614  012777  177777  013044          MOV     #-1,@DHBC           ;SET UP TO TRANSMIT 1 BYTE
002622  012777  015756  013034          MOV     #TDATA,@DHBA        ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
002630  012777  033500  013024          MOV     #33500,@DHLPR       ;SET LINE SPEED FOR 9600 BAUD
002636  052777  000003  013016          BIS     #3,@DHLPR           ;SET CHARACTER LENGTH FOR 10 BITS
002644  012777  000002  013016          MOV     #2,@DHBAR           ;START TRANSMITTER
002652  105777  013000          1$:     TSTB    @DHSCR              ;WAIT TO RECEIVE CHARACTER
002656  100375                  BPL     1$
002660  017704  012774          MOV     @DHNRC,R4           ;(R4)=RECEIVED CHARACTER
                                                            ;IN LOW BYTE, AND LINE NUMBER AND
                                                            ;CHARACTER STATUS IN HIGH BYTE
002664  012705  100777          MOV     #100777,R5          ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                            ;AND LINE NUMBER AND CHARACTER
                                                            ;STATUS IN HIGH BYTE
002670  020504                  CMP     R5,R4               ;ARE EXPECTED AND RECEIVED DATA THE SAME
002672  001401                  BEQ     2$
002674                          HLT                         ;CHARACTER LENGTH, DATA
002674  104000                  EMT

                                                            ;OR LINE NUMBER ERROR
002676  104400          2$:     SCOPE
        000004          LENGTX=LENGTX+1
        000011          LENGTC=LENGTC+1
        000777          XCODE=XCODE*2+1
        000002          LINEX=LINEX+1
        000004          BITX=BITX+BITX
        000000          LENGTX=0
```

```
                000005                  LENGTC=5
                000037                  XCODE=37
                000004                  .REPT   4
                                        .NLIST
                                        DATAR=LINEX*400+100000+XCODE
                                        .LIST
                                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                        .NLIST
                                        LENGTX=LENGTX+1
                                        LENGTC=LENGTC+1
                                        XCODE=XCODE*2+1
                                        .LIST
                                        .ENDR
                101037                  DATAR=LINEX*400+100000+XCODE
        002700                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 2
                                                ;CHARACTER LENGTH IS 5 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 37
                                                ;LINE SPEED IS 9600 BAUD

        002700                          TS \XN,400,2$
        002700  012767  000340  175070  T11:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
        002706  012767  000400  013010          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
        002714  012767  003026  012776          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
                000012                  XN=XN+1
        002722  012777  004000  012726          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
        002730  012767  000037  013020          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
        002736  012777  000002  012712          MOV     #2,@DHSCR       ;SELECT LINE 2
        002744  012777  177777  012714          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
        002752  012777  015756  012704          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
        002760  012777  033500  012674          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
        002766  052777  000000  012666          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
        002774  012777  000004  012666          MOV     #4,@DHBAR       ;START TRANSMITTER
        003002  105777  012650          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
        003006  100375                  BPL     1$
        003010  017704  012644          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
        003014  012705  101037          MOV     #101037,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
        003020  020504                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
        003022  001401                  BEQ     2$
        003024                          HLT                             ;CHARACTER LENGTH, DATA
        003024  104000                  EMT

        003026  104400          2$:     SCOPE                           ;OR LINE NUMBER ERROR
                000001                  LENGTX=LENGTX+1
                000006                  LENGTC=LENGTC+1
                000077                  XCODE=XCODE*2+1
                101077                  DATAR=LINEX*400+100000+XCODE
        003030                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
```

```
                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 2
                                        ;CHARACTER LENGTH IS 6 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 77
                                        ;LINE SPEED IS 9600 BAUD

003030                          TS \XN,400,2$
003030  012767  000340  174740 T12:     MOV     #340,PS         ;DISABLE ALL INTERRUPTS
003036  012767  000400  012660          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
003044  012767  003156  012646          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000013                  XN=XN+1
003052  012777  004000  012576          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
003060  012767  000077  012670          MOV     #77,TDATA       ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
003066  012777  000002  012562          MOV     #2,@DHSCR       ;SELECT LINE 2
003074  012777  177777  012564          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
003102  012777  015756  012554          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003110  012777  033500  012544          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
003116  052777  000001  012536          BIS     #1,@DHLPR       ;SET CHARACTER LENGTH FOR 6 BITS
003124  012777  000004  012536          MOV     #4,@DHBAR       ;START TRANSMITTER
003132  105777  012520        1$:       TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
003136  100375                          BPL     1$
003140  017704  012514                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
003144  012705  101077                  MOV     #101077,R5      ;CHARACTER STATUS IN HIGH BYTE
                                                                ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
003150  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
003152  001401                          BEQ     2$
003154                                  HLT                     ;CHARACTER LENGTH, DATA
003154  104000                          EMT
                                                                ;OR LINE NUMBER ERROR
003156  104400                2$:       SCOPE
        000002                  LENGTX=LENGTX+1
        000007                  LENGTC=LENGTC+1
        000177                  XCODE=XCODE*2+1
        101177                  DATAR=LINEX*400+100000+XCODE
003160                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 2
                                        ;CHARACTER LENGTH IS 7 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 177
                                        ;LINE SPEED IS 9600 BAUD

003160                          TS \XN,400,2$
003160  012767  000340  174610 T13:     MOV     #340,PS         ;DISABLE ALL INTERRUPTS
003166  012767  000400  012530          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
003174  012767  003306  012516          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000014                  XN=XN+1
```

```
003202  012777  004000  012446          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003210  012767  000177  012540          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
003216  012777  000002  012432          MOV     #2,@DHSCR               ;SELECT LINE 2
003224  012777  177777  012434          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
003232  012777  015756  012424          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003240  012777  033500  012414          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
003246  052777  000002  012406          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
003254  012777  000004  012406          MOV     #4,@DHBAR               ;START TRANSMITTER
003262  105777  012370          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
003266  100375                  1$
003270  017704  012364          MOV     @DHNRC,R4

                                                                        ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
003274  012705  101177          MOV     #101177,R5                      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
003300  020504                  CMP     R5,R4                           ;ARE EXPECTED AND RECEIVED DATA THE SAME
003302  001401                  BEQ     2$
003304                          HLT                                     ;CHARACTER LENGTH, DATA
003304  104000                  EMT

003306  104400          2$:     SCOPE                                   ;OR LINE NUMBER ERROR
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE*2+1
        101377          DATAR=LINEX*400+100000+XCODE
003310                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 2
                                ;CHARACTER LENGTH IS 10 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 377
                                ;LINE SPEED IS 9600 BAUD

003310                  TS \XN,400,2$
003310  012767  000340  174460  T14:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
003316  012767  000400  012400          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
003324  012767  003436  012366          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                        .IF NB  <>
                                MOV     #,FREEZ1                        ;SET UP TO LOOP WITH DATA       ; 3
                        .ENDC
        000015          XN=XN+1
003332  012777  004000  012316          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003340  012767  000377  012410          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
003346  012777  000002  012302          MOV     #2,@DHSCR               ;SELECT LINE 2
003354  012777  177777  012304          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
003362  012777  015756  012274          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003370  012777  033500  012264          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
003376  052777  000003  012256          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
003404  012777  000004  012256          MOV     #4,@DHBAR               ;START TRANSMITTER
003412  105777  012240          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
003416  100375                  1$
003420  017704  012234          MOV     @DHNRC,R4

                                                                        ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
003424  012705  101377          MOV     #101377,R5                      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
```

```
003430  020504                  CMP     R5,R4           ;STATUS IN HIGH BYTE
003432  001401                  BEQ     2$              ;ARE EXPECTED AND RECEIVED DATA THE SAME
003434                          HLT
003434  104000                  EMT                     ;CHARACTER LENGTH, DATA

003436  104400          2$:     SCOPE                   ;OR LINE NUMBER ERROR
        000004          LENGTX=LENGTX+1
        000011          LENGTC=LENGTC+1
        000777          XCODE=XCODE*2+1
        000003          LINEX=LINEX+1
        000010          BITX=BITX+BITX
        000000          LENGTX=0
        000005          LENGTC=5
        000037          XCODE=37
        000004          .REPT   4
                        .NLIST
                        DATAR=LINEX*400+100000+XCODE
                        .LIST
                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                        .NLIST
                        LENGTX=LENGTX+1
                        LENGTC=LENGTC+1
                        XCODE=XCODE*2+1
                        .LIST
                        .ENDR
        101437          DATAR=LINEX*400+100000+XCODE
003440                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 3
                        ;CHARACTER LENGTH IS 5 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 37
                        ;LINE SPEED IS 9600 BAUD

003440                  TS \XN,400,2$
003440  012767  000340  174330  T15:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
003446  012767  000400  012250          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
003454  012767  003566  012236          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                        .IF NB  <>
                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                        .ENDC
        000016          XN=XN+1
003462  012777  004000  012166          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
003470  012767  000037  012260          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
003476  012777  000003  012152          MOV     #3,@DHSCR       ;SELECT LINE 3
003504  012777  177777  012154          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
003512  012777  015756  012144          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003520  012777  033500  012134          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
003526  052777  000000  012126          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
003534  012777  000010  012126          MOV     #10,@DHBAR      ;START TRANSMITTER
003542  105777  012110          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
003546  100375                  BPL     1$
003550  017704  012104          MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                        ;CHARACTER STATUS IN HIGH BYTE
003554  012705  101437          MOV     #101437,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
```

```
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
003560  020504                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
003562  001401                  BEQ     2$
003564                          HLT                             ;CHARACTER LENGTH, DATA
003564  104000                  EMT
                                                                ;OR LINE NUMBER ERROR
003566  104400          2$:     SCOPE
        000001          LENGTX=LENGTX+1
        000006          LENGTC=LENGTC+1
        000077          XCODE=XCODE*2+1
        101477          DATAR=LINEX*400+100000+XCODE
003570                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 3
                                ;CHARACTER LENGTH IS 6 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 77
                                ;LINE SPEED IS 9600 BAUD

003570                  TS \XN,400,2$
003570  012767  000340  174200 T16:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
003576  012767  000400  012120        MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
003604  012767  003716  012106        MOV     #2' ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                        .IF NB  <>
                                MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                        .ENDC
        000017          XN=XN+1
003612  012777  004000  012036        MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
003620  012767  000077  012130        MOV     #77,TDATA               ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
003626  012777  000003  012022        MOV     #3,@DHSCR               ;SELECT LINE 3
003634  012777  177777  012024        MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
003642  012777  015756  012014        MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
003650  012777  033500  012004        MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
003656  052777  000001  011776        BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
003664  012777  000010  011776        MOV     #10,@DHBAR              ;START TRANSMITTER
003672  105777  011760          1$:   TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
003676  100375                  BPL     1$
003700  017704  011754          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
003704  012705  101477          MOV     #101477,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
003710  020504                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
003712  001401                  BEQ     2$
003714                          HLT                             ;CHARACTER LENGTH, DATA
003714  104000                  EMT
                                                                ;OR LINE NUMBER ERROR
003716  104400          2$:     SCOPE
        000002          LENGTX=LENGTX+1
        000007          LENGTC=LENGTC+1
        000177          XCODE=XCODE*2+1
        101577          DATAR=LINEX*400+100000+XCODE
003720                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
```

```
                                        ;TRANSMIT 1 CHARACTER ON LINE 3
                                        ;CHARACTER LENGTH IS 7 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 177
                                        ;LINE SPEED IS 9600 BAUD

003720                          TS \XN,400,2$
003720  012767  000340  174050 T17:     MOV     #340,PS         ;DISABLE ALL INTERRUPTS
003726  012767  000400  011770         MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
003734  012767  004046  011756         MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000020                  XN=XN+1
003742  012777  004000  011706         MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
003750  012767  000177  012000         MOV     #177,TDATA      ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
003756  012777  000003  011672         MOV     #3,@DHSCR       ;SELECT LINE 3
003764  012777  177777  011674         MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
003772  012777  015756  011664         MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004000  012777  033500  011654         MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
004006  052777  000002  011646         BIS     #2,@DHLPR       ;SET CHARACTER LENGTH FOR 7 BITS
004014  012777  000010  011646         MOV     #10,@DHBAR      ;START TRANSMITTER
004022  105777  011630        1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
004026  100375                        BPL     1$
004030  017704  011624                MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
004034  012705  101577                MOV     #101577,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
004040  020504                        CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
004042  001401                        BEQ     2$
004044                                HLT
004044  104000                        EMT                     ;CHARACTER LENGTH, DATA

                                                                ;OR LINE NUMBER ERROR
004046  104400        2$:     SCOPE
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE*2+1
        101777          DATAR=LINEX*400+100000+XCODE
004050                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 3
                                        ;CHARACTER LENGTH IS 10 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 377
                                        ;LINE SPEED IS 9600 BAUD

004050                          TS \XN,400,2$
004050  012767  000340  173720 T20:     MOV     #340,PS         ;DISABLE ALL INTERRUPTS
004056  012767  000400  011640         MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
004064  012767  004176  011626         MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000021                  XN=XN+1
004072  012777  004000  011556         MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
004100  012767  000377  011650         MOV     #377,TDATA      ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
```

```
004106  012777  000003  011542          MOV     #3,@DHSCR               ;SELECT LINE 3
004114  012777  177777  011544          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
004122  012777  015756  011534          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004130  012777  033500  011524          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
004136  052777  000003  011516          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
004144  012777  000010  011516          MOV     #10,@DHBAR              ;START TRANSMITTER
004152  105777  011500          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
004156  100375                          BPL     1$
004160  017704  011474                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
004164  012705  101777                  MOV     #101777,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
004170  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
004172  001401                          BEQ     2$
004174                                  HLT                             ;CHARACTER LENGTH, DATA
004174  104000                          EMT

004176  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
        000004                  LENGTX=LENGTX+1
        000011                  LENGTC=LENGTC+1
        000777                  XCODE=XCODE*2+1
        000004                  LINEX=LINEX+1
        000020                  BITX=BITX+BITX
        000000                  LENGTX=0
        000005                  LENGTC=5
        000037                  XCODE=37
        000004                  .REPT   4
                                .NLIST
                                DATAR=LINEX*400+100000+XCODE
                                .LIST
                                CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                .NLIST
                                LENGTX=LENGTX+1
                                LENGTC=LENGTC+1
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
        102037                  DATAR=LINEX*400+100000+XCODE
004200                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 4
                                ;CHARACTER LENGTH IS 5 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 37
                                ;LINE SPEED IS 9600 BAUD

004200                          TS \XN,400,2$
004200  012767  000340  173570  T21:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
004206  012767  000400  011510          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
004214  012767  004326  011476          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000022                  XN=XN+1
004222  012777  004000  011426          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
```

```
004230  012767  000037  011520          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
004236  012777  000004  011412          MOV     #4,@DHSCR       ;SELECT LINE 4
004244  012777  177777  011414          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
004252  012777  015756  011404          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004260  012777  033500  011374          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
004266  052777  000000  011366          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
004274  012777  000020  011366          MOV     #20,@DHBAR      ;START TRANSMITTER
004302  105777  011350          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
004306  100375                          BPL     1$
004310  017704  011344                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
004314  012705  102037                  MOV     #102037,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
004320  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
004322  001401                          BEQ     2$
004324                                  HLT                     ;CHARACTER LENGTH, DATA
004324  104000                          EMT                     ;OR LINE NUMBER ERROR

004326  104400          2$:     SCOPE
        000001          LENGTX=LENGTX+1
        000006          LENGTC=LENGTC+1
        000077          XCODE=XCODE*2+1
        102077          DATAR=LINEX*400+100000+XCODE
004330                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 4
                        ;CHARACTER LENGTH IS 6 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 77
                        ;LINE SPEED IS 9600 BAUD

004330                  TS \XN,400,2$

004330                  TS \XN,400,2$
004330  012767  000340  173440  T22:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
004336  012767  000400  011360          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
004344  012767  004456  011346          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                        .IF NB  <>
                                MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                        .ENDC
        000023          XN=XN+1
004352  012777  004000  011276          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
004360  012767  000077  011370          MOV     #77,TDATA       ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
004366  012777  000004  011262          MOV     #4,@DHSCR       ;SELECT LINE 4
004374  012777  177777  011264          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
004402  012777  015756  011254          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004410  012777  033500  011244          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
004416  052777  000001  011236          BIS     #1,@DHLPR       ;SET CHARACTER LENGTH FOR 6 BITS
004424  012777  000020  011236          MOV     #20,@DHBAR      ;START TRANSMITTER
004432  105777  011220          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
004436  100375                          BPL     1$
004440  017704  011214                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
004444  012705  102077                  MOV     #102077,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
```

```
004450  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
004452  001401                          BEQ     2$
004454                                  HLT                             ;CHARACTER LENGTH, DATA
004454  104000                          EMT                             ;OR LINE NUMBER ERROR

004456  104400                  2$:     SCOPE
        000002                  LENGTX=LENGTX+1
        000007                  LENGTC=LENGTC+1
        000177                  XCODE=XCODE+2+1
        102177                  DATAR=LINEX+400+100000+XCODE
004460                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 4
                                ;CHARACTER LENGTH IS 7 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 177
                                ;LINE SPEED IS 9600 BAUD

004460                          TS \XN,400,2$
004460  012767  000340  173310  T23:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
004466  012767  000400  011230          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
004474  012767  004606  011216          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000024                  XN=XN+1
004502  012777  004000  011146          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
004510  012767  000177  011240          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
004516  012777  000004  011132          MOV     #4,@DHSCR               ;SELECT LINE 4
004524  012777  177777  011134          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
004532  012777  015756  011124          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004540  012777  033500  011114          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
004546  052777  000002  011106          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
004554  012777  000020  011106          MOV     #20,@DHBAR              ;START TRANSMITTER
004562  105777  011070          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
004566  100375                          BPL     1$
004570  017704  011064                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
004574  012705  102177                  MOV     #102177,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
004600  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
004602  001401                          BEQ     2$
004604                                  HLT                             ;CHARACTER LENGTH, DATA
004604  104000                          EMT                             ;OR LINE NUMBER ERROR

004606  104400                  2$:     SCOPE
        000003                  LENGTX=LENGTX+1
        000010                  LENGTC=LENGTC+1
        000377                  XCODE=XCODE+2+1
        102377                  DATAR=LINEX+400+100000+XCODE
004610                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 4
                                ;CHARACTER LENGTH IS 10 BITS
```

```
                                        ;EXPECTED RECEIVED CHARACTER IS 377
                                        ;LINE SPEED IS 9600 BAUD

004610                          TS \XN,400,2$
004610  012767  000340  173160  T24:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
004616  012767  000400  011100          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
004624  012767  004736  011066          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000025                  XN=XN+1
004632  012777  004000  011016          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
004640  012767  000377  011110          MOV     #377,TDATA      ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
004646  012777  000004  011002          MOV     #4,@DHSCR       ;SELECT LINE 4
004654  012777  177777  011004          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
004662  012777  015756  010774          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
004670  012777  033500  010764          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
004676  052777  000003  010756          BIS     #3,@DHLPR       ;SET CHARACTER LENGTH FOR 10 BITS
004704  012777  000020  010756          MOV     #20,@DHBAR      ;START TRANSMITTER
004712  105777  010740          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
004716  100375                  BPL     1$
004720  017704  010734          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
004724  012705  102377          MOV     #102377,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
004730  020504                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
004732  001401                  BEQ     2$
004734                          HLT                             ;CHARACTER LENGTH, DATA
004734  104000                  EMT

004736  104400                  2$:     SCOPE                   ;OR LINE NUMBER ERROR
        000004                  LENGTX=LENGTX+1
        000011                  LENGTC=LENGTC+1
        000777                  XCODE=XCODE*2+1
        000005                  LINEX=LINEX+1
        000040                  BITX=BITX+BITX
        000000                  LENGTX=0
        000005                  LENGTC=5
        000037                  XCODE=37
        000004                  .REPT   4
                                .NLIST
                                DATAR=LINEX*400+100000+XCODE
                                .LIST
                                CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                .NLIST
                                LENGTX=LENGTX+1
                                LENGTC=LENGTC+1
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
        102437                  DATAR=LINEX*400+100000+XCODE
004740                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 5
```

```
                                        ;CHARACTER LENGTH IS 5 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 37
                                        ;LINE SPEED IS 9600 BAUD

004740                          TS \XN,400,2$
004740  012767  000340  173030  T25:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
004746  012767  000400  010750          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
004754  012767  005066  010736          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000026                  XN=XN+1
004762  012777  004000  010666          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
004770  012767  000037  010760          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
004776  012777  000005  010652          MOV     #5,@DHSCR       ;SELECT LINE 5
005004  012777  177777  010654          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
005012  012777  015756  010644          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
005020  012777  033500  010634          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
005026  052777  000000  010626          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
005034  012777  000040  010626          MOV     #40,@DHBAR      ;START TRANSMITTER
005042  105777  010610          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
005046  100375                          BPL     1$
005050  017704  010604                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
005054  012705  102437                  MOV     #102437,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
005060  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
005062  001401                          BEQ     2$
005064                                  HLT                     ;CHARACTER LENGTH, DATA
005064  104000                          EMT
                                                                ;OR LINE NUMBER ERROR
005066  104400                  2$:     SCOPE
        000001                  LENGTX=LENGTX+1
        000006                  LENGTC=LENGTC+1
        000077                  XCODE=XCODE*2+1
        102477                  DATAR=LINEX*400+100000+XCODE
005070                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 5
                                        ;CHARACTER LENGTH IS 6 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 77
                                        ;LINE SPEED IS 9600 BAUD

005070                          TS \XN,400,2$
005070  012767  000340  172700  T26:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
005076  012767  000400  010620          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
005104  012767  005216  010606          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000027                  XN=XN+1
005112  012777  004000  010536          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
005120  012767  000077  010630          MOV     #77,TDATA       ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
005126  012777  000005  010522          MOV     #5,@DHSCR       ;SELECT LINE 5
```

```
005134  012777  177777  010524          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
005142  012777  015756  010514          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
005150  012777  033500  010504          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
005156  052777  000001  010476          BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
005164  012777  000040  010476          MOV     #40,@DHBAR              ;START TRANSMITTER
005172  105777  010460          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
005176  100375                          BPL     1$
005200  017704  010454                  MOV     @DHNRC,R4

                                                                        ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
005204  012705  102477                  MOV     #102477,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
005210  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
005212  001401                          BEQ     2$
005214                                  HLT                             ;CHARACTER LENGTH, DATA
005214  104000                          EMT

005216  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
        000002                  LENGTX=LENGTX+1
        000007                  LENGTC=LENGTC+1
        000177                  XCODE=XCODE*2+1
        102577                  DATAR=LINEX*400+100000+XCODE
0C5220                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 5
                                        ;CHARACTER LENGTH IS 7 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 177
                                        ;LINE SPEED IS 9600 BAUD

005220                          TS \XN,400,2$

005220                          T27:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
005220  012767  000340  172550          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
005226  012767  000400  010470          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
005234  012767  005346  010456  .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA         ; 3
                                .ENDC
        000030                  XN=XN+1
005242  012777  004000  010406          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
005250  012767  000177  010500          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
005256  012777  000005  010372          MOV     #5,@DHSCR               ;SELECT LINE 5
005264  012777  177777  010374          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
005272  012777  015756  010364          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
005300  012777  033500  010354          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
005306  052777  000002  010346          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
005314  012777  000040  010346          MOV     #40,@DHBAR              ;START TRANSMITTER
005322  105777  010330          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
005326  100375                          BPL     1$
005330  017704  010324                  MOV     @DHNRC,R4

                                                                        ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
005334  012705  102577                  MOV     #102577,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
005340  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
005342  001401                          BEQ     2$
```

```
005344
005344  104000                          HLT                             ;CHARACTER LENGTH, DATA
                                        EMT
                                                                        ;OR LINE NUMBER ERROR
005346  104400                  2$:     SCOPE
        000003                  LENGTX=LENGTX+1
        000010                  LENGTC=LENGTC+1
        000377                  XCODE=XCODE*2+1
        102777                  DATAR=LINEX*400+100000+XCODE
005350                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 5
                                ;CHARACTER LENGTH IS 10 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 377
                                ;LINE SPEED IS 9600 BAUD

005350                          TS \XN,400,2$
005350  012767  000340  172420  T30:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
005356  012767  000400  010340          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
005364  012767  005476  010326          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000031                  XN=XN+1
005372  012777  004000  010256          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
005400  012767  000377  010350          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
005406  012777  000005  010242          MOV     #5,@DHSCR               ;SELECT LINE 5
005414  012777  177777  010244          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
005422  012777  015756  010234          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
005430  012777  033500  010224          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
005436  052777  000003  010216          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
005444  012777  000040  010216          MOV     #40,@DHBAR              ;START TRANSMITTER
005452  105777  010200          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
005456  100375                  BPL     1$
005460  017704  010174          MOV     @DHNRC,R4

                                                                        ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
005464  012705  102777          MOV     #102777,R5                      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
005470  020504                  CMP     R5,R4                           ;ARE EXPECTED AND RECEIVED DATA THE SAME
005472  001401                  BEQ     2$
005474                          HLT
005474  104000                  EMT

                                                                        ;CHARACTER LENGTH, DATA

                                                                        ;OR LINE NUMBER ERROR
005476  104400          2$:     SCOPE
        000004          LENGTX=LENGTX+1
        000011          LENGTC=LENGTC+1
        000777          XCODE=XCODE*2+1
        000006          LINEX=LINEX+1
        000100          BITX=BITX+BITX
        000000          LENGTX=0
        000005          LENGTC=5
        000037          XCODE=37
        000004          .REPT   4
                        .NLIST
                        DATAR=LINEX*400+100000+XCODE
```

```
                                .LIST
                                CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                .NLIST
                                LENGTX=LENGTX+1
                                LENGTC=LENGTC+1
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
        103037                  DATAR=LINEX*400+100000+XCODE
005500                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 6
                                        ;CHARACTER LENGTH IS 5 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 37
                                        ;LINE SPEED IS 9600 BAUD

005500                          TS \XN,400,2$
005500  012767  000340  172270  T31:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
005506  012767  000400  010210          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
005514  012767  005626  010176          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000032                  XN=XN+1
005522  012777  004000  010126          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
005530  012767  000037  010220          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
005536  012777  000006  010112          MOV     #6,@DHSCR       ;SELECT LINE 6
005544  012777  177777  010114          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
005552  012777  015756  010104          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
005560  012777  033500  010074          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
005566  052777  000000  010066          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
005574  012777  000100  010066          MOV     #100,@DHBAR     ;START TRANSMITTER
005602  105777  010050          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
005606  100375                  BPL     1$
005610  017704  010044          MOV     @DHNRC,R4

                                                                ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
005614  012705  103037          MOV     #103037,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                        ;AND LINE NUMBER AND CHARACTER
                                                        ;STATUS IN HIGH BYTE
005620  020504                  CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
005622  001401                  BEQ     2$
005624                          HLT                     ;CHARACTER LENGTH, DATA
005624  104000                  EMT

                                                        ;OR LINE NUMBER ERROR

005626  104400          2$:     SCOPE
        000001                  LENGTX=LENGTX+1
        000006                  LENGTC=LENGTC+1
        000077                  XCODE=XCODE*2+1
        103077                  DATAR=LINEX*400+100000+XCODE
005630                  -       CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 6
                                        ;CHARACTER LENGTH IS 6 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 77
```

```
                                        ;LINE SPEED IS 9600 BAUD

005630                                  TS \XN,400,2$
005630  012767  000340  172140  T32:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
005636  012767  000400  010060          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
005644  012767  005756  010046          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000033                  XN=XN+1
005652  012777  004000  007776          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
005660  012767  000077  010070          MOV     #77,TDATA       ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
005666  012777  000006  007762          MOV     #6,@DHSCR       ;SELECT LINE 6
005674  012777  177777  007764          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
005702  012777  015756  007754          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
005710  012777  033500  007744          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
005716  052777  000001  007736          BIS     #1,@DHLPR       ;SET CHARACTER LENGTH FOR 6 BITS
005724  012777  000100  007736          MOV     #100,@DHBAR     ;START TRANSMITTER
005732  105777  007720          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
005736  100375                  BPL     1$
005740  017704  007714          MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                        ;CHARACTER STATUS IN HIGH BYTE
005744  012705  103077          MOV     #103077,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                        ;AND LINE NUMBER AND CHARACTER
                                                        ;STATUS IN HIGH BYTE
005750  020504                  CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
005752  001401                  BEQ     2$
005754                          HLT
005754  104000                  EMT                     ;CHARACTER LENGTH, DATA

005756  104400          2$:     SCOPE                   ;OR LINE NUMBER ERROR
        000002                  LENGTX=LENGTX+1
        000007                  LENGTC=LENGTC+1
        000177                  XCODE=XCODE*2+1
        103177                  DATAR=LINEX*400+100000+XCODE
005760                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 6
                                        ;CHARACTER LENGTH IS 7 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 177
                                        ;LINE SPEED IS 9600 BAUD

005760                                  TS \XN,400,2$
005760  012767  000340  172010  T33:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
005766  012767  000400  007730          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
005774  012767  006106  007716          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000034                  XN=XN+1
006002  012777  004000  007646          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
006010  012767  000177  007740          MOV     #177,TDATA      ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
006016  012777  000006  007632          MOV     #6,@DHSCR       ;SELECT LINE 6
006024  012777  177777  007634          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
006032  012777  015756  007624          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
```

```
006040  012777  033500  007614          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
006046  052777  000002  007606          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
006054  012777  000100  007606          MOV     #100,@DHBAR             ;START TRANSMITTER
006062  105777  007570          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
006066  100375                          BPL     1$
006070  017704  007564                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        .CHARACTER STATUS IN HIGH BYTE
006074  012705  103177                  MOV     #103177,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
006100  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
006102  001401                          BEQ     2$
006104                                  HLT                             ;CHARACTER LENGTH, DATA
006104  104000                          EMT                             ;OR LINE NUMBER ERROR

006106  104400          2$:     SCOPE
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE*2+1
        103377          DATAR=LINEX*400+100000+XCODE
006110                  CHART1  \LINEX,\DITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 6
                        ;CHARACTER LENGTH IS 10 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 377
                        ;LINE SPEED IS 9600 BAUD

006110                  TS \XN,400,2$
006110  012767  000340  171660  T34:    MOV     #340.PS                 ;DISABLE ALL INTERRUPTS
006116  012767  000400  007600          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
006124  012767  006236  007566          MOV     #2$,ESCAPF              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000035                  XN=XN+1
006132  012777  004000  007516          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
006140  012767  000377  007610          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
006146  012777  000006  007502          MOV     #6,@DHSCR               ;SELECT LINE 6
006154  012777  177777  007504          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
006162  012777  015756  007474          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
006170  012777  033500  007464          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
006176  052777  000003  007456          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
006204  012777  000100  007456          MOV     #100,@DHBAR             ;START TRANSMITTER
006212  105777  007440          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
006216  100375                          BPL     1$
006220  017704  007434                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
006224  012705  103377                  MOV     #103377,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
006230  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
006232  001401                          BEQ     2$
006234                                  HLT                             ;CHARACTER LENGTH, DATA
006234  104000                          EMT
```

```
                                                                        ;OR LINE NUMBER ERROR
006236  104400                  2$:     SCOPE
        000004                  LENGTX=LENGTX+1
        000011                  LENGTC=LENGTC+1
        000777                  XCODE=XCODE*2+1
        000007                  LINEX=LINEX+1
        000200                  BITX=BITX+BITX
        000000                  LENGTX=0
        000005                  LENGTC=5
        000037                  XCODE=37
        000004                  .REPT   4
                                .NLIST
                                DATAR=LINEX*400+100000+XCODE
                                .LIST
                                CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                .NLIST
                                LENGTX=LENGTX+1
                                LENGTC=LENGTC+1
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
        103437                  DATAR=LINEX*400+100000+XCODE
006240                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 7
                                ;CHARACTER LENGTH IS 5 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 37
                                ;LINE SPEED IS 9600 BAUD

006240                          TS \XN,400,2$
006240  012767  000340  171530  T35:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
006246  012767  000400  007450          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
006254  012767  006366  007436          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000036                  XN=XN+1
006262  012777  004000  007366          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
006270  012767  000037  007460          MOV     #37,TDATA               ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
006276  012777  000007  007352          MOV     #7,@DHSCR               ;SELECT LINE 7
006304  012777  177777  007354          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
006312  012777  015756  007344          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
006320  012777  033500  007334          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
006326  052777  000000  007326          BIS     #0,@DHLPR               ;SET CHARACTER LENGTH FOR 5 BITS
006334  012777  000200  007326          MOV     #200,@DHBAR             ;START TRANSMITTER
006342  105777  007310          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
006346  100375                  BPL     1$
006350  017704  007304          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
006354  012705  103437          MOV     #103437,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
006360  020504                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
006362  001401                  BEQ     2$
006364                          HLT                             ;CHARACTER LENGTH, DATA
```

```
006364  104000                          EMT
                                                                ;OR LINE NUMBER ERROR
006366  104400                  2$:     SCOPE
        000001                  LENGTX=LENGTX+1
        000006                  LENGTC=LENGTC+1
        000077                  XCODE=XCODE*2+1
        103477                  DATAR=LINEX*400+100000+XCODE
006370                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 7
                                ;CHARACTER LENGTH IS 6 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 77
                                ;LINE SPEED IS 9600 BAUD

006370                          TS \XN,400,2$
006370  012767  000340  171400  T36:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
006376  012767  000400  007320          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
006404  012767  006516  007306          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000037                  XN=XN+1
006412  012777  004000  007236          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
006420  012767  000077  007330          MOV     #77,TDATA       ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
006426  012777  000007  007222          MOV     #7,@DHSCR       ;SELECT LINE 7
006434  012777  177777  007224          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
006442  012777  015756  007214          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
006450  012777  033500  007204          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
006456  052777  000001  007176          BIS     #1,@DHLPR       ;SET CHARACTER LENGTH FOR 6 BITS
006464  012777  000200  007176          MOV     #200,@DHBAR     ;START TRANSMITTER
006472  105777  007160          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
006476  100375                  BPL     1$
006500  017704  007154          MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                        ;CHARACTER STATUS IN HIGH BYTE
006504  012705  103477          MOV     #103477,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                        ;AND LINE NUMBER AND CHARACTER
                                                        ;STATUS IN HIGH BYTE
006510  020504                  CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
006512  001401                  BEQ     2$
006514                          HLT                     ;CHARACTER LENGTH, DATA
006514  104000                  EMT

                                                        ;OR LINE NUMBER ERROR
006516  104400          2$:     SCOPE
        000002          LENGTX=LENGTX+1
        000007          LENGTC=LENGTC+1
        000177          XCODE=XCODE*2+1
        103577          DATAR=LINEX*400+100000+XCODE
006520                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 7
                        ;CHARACTER LENGTH IS 7 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 177
                        ;LINE SPEED IS 9600 BAUD
```

```
006520                          TS \XN,400,2$
006520  012767  000340  171250  T37:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
006526  012767  000400  007170          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
006534  012767  006646  007156          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000040                  XN=XN+1
006542  012777  004000  007106          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
006550  012767  000177  007200          MOV     #177,TDATA      ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
006556  012777  000007  007072          MOV     #7,@DHSCR       ;SELECT LINE 7
006564  012777  177777  007074          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
006572  012777  015756  007064          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
006600  012777  033500  007054          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
006606  052777  000002  007046          BIS     #2,@DHLPR       ;SET CHARACTER LENGTH FOR 7 BITS
006614  012777  000200  007046          MOV     #200,@DHBAR     ;START TRANSMITTER
006622  105777  007030          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
006626  100375                          BPL     1$
006630  017704  007024                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
006634  012705  103577                  MOV     #103577,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
006640  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
006642  001401                          BEQ     2$
006644                                  HLT                     ;CHARACTER LENGTH, DATA
006644  104000                          EMT                     ;OR LINE NUMBER ERROR

006646  104400          2$:     SCOPE
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE*2+1
        103777          DATAR=LINEX*400+100000+XCODE
006650                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 7
                                ;CHARACTER LENGTH IS 10 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 377
                                ;LINE SPEED IS 9600 BAUD

006650                          TS \XN,400,2$
006650  012767  000340  171120  T40:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
006656  012767  000400  007040          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
006664  012767  006776  007026          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000041                  XN=XN+1
006672  012777  004000  006756          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
006700  012767  000377  007050          MOV     #377,TDATA      ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
006706  012777  000007  006742          MOV     #7,@DHSCR       ;SELECT LINE 7
006714  012777  177777  006744          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
006722  012777  015756  006734          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
006730  012777  033500  006724          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
006736  052777  000003  006716          BIS     #3,@DHLPR       ;SET CHARACTER LENGTH FOR 10 BITS
```

```
006744  012777  000200  006716          MOV     #200,@DHBAR             ;START TRANSMITTER
006752  105777  006700          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
006756  100375                          BPL     1$
006760  017704  006674                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
006764  012705  103777                  MOV     #103777,R5              ;CHARACTER STATUS IN HIGH BYTE
                                                                        ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
006770  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
006772  001401                          BEQ     2$
006774                                  HLT                             ;CHARACTER LENGTH, DATA
006774  104000                          EMT
                                                                        ;OR LINE NUMBER ERROR
006776  104400          2$:     SCOPE
        000004          LENGTX=LENGTX+1
        000011          LENGTC=LENGTC+1
        000777          XCODE=XCODE*2+1
        000010          LINEX=LINEX+1
        000400          BITX=BITX+BITX
        000000          LENGTX=0
        000005          LENGTC=5
        000037          XCODE=37
        000004          .REPT   4
                        .NLIST
                        DATAR=LINEX*400+100000+XCODE
                        .LIST
                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                        .NLIST
                        LENGTX=LENGTX+1
                        LENGTC=LENGTC+1
                        XCODE=XCODE*2+1
                        .LIST
                        .ENDR
        104037          DATAR=LINEX*400+100000+XCODE
007000                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 10
                        ;CHARACTER LENGTH IS 5 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 37
                        ;LINE SPEED IS 9600 BAUD

007000                  TS \XN,400,2$
007000  012767  000340  170770  T41:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
007006  012767  000400  006710          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
007014  012767  007126  006676          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                        .IF NB  <>
                                MOV     #,FREEZ1                        ;SET UP TO LOOP WITH DATA       ; 3
                        .ENDC
        000042          XN=XN+1
007022  012777  004000  006626          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
007030  012767  000037  006720          MOV     #37,TDATA               ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
007036  012777  000010  006612          MOV     #10,@DHSCR              ;SELECT LINE 10
007044  012777  177777  006614          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
007052  012777  015756  006604          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
007060  012777  033500  006574          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
```

```
007066  052777  000000  006566          BIS     #0,@DHLPR               ;SET CHARACTER LENGTH FOR 5 BITS
007074  012777  000400  006566          MOV     #400,@DHBAR             ;START TRANSMITTER
007102  105777  006550          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
007106  100375                          BPL     1$
007110  017704  006544                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
007114  012705  104037                  MOV     #104037,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
007120  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
007122  001401                          BEQ     2$
007124                                  HLT
007124  104000                          EMT                             ;CHARACTER LENGTH, DATA

007126  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
        000001          LENGTX=LENGTX+1
        000006          LENGTC=LENGTC+1
        000077          XCODE=XCODE*2+1
        104077          DATAR=LINEX*400+100000+XCODE
007130                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 10
                                ;CHARACTER LENGTH IS 6 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 77
                                ;LINE SPEED IS 9600 BAUD

007130                  TS \XN,400,2$
007130  012767  000340  170640  T42:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
007136  012767  000400  006560          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
007144  012767  007256  006546          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000043          XN=XN+1
007152  012777  004000  006476          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
007160  012767  000077  006570          MOV     #77,TDATA               ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
007166  012777  000010  006462          MOV     #10,@DHSCR              ;SELECT LINE 10
007174  012777  177777  006464          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
007202  012777  015756  006454          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
007210  012777  033500  006444          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
007216  052777  000001  006436          BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
007224  012777  000400  006436          MOV     #400,@DHBAR             ;START TRANSMITTER
007232  105777  006420          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
007236  100375                          BPL     1$
007240  017704  006414                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
007244  012705  104077                  MOV     #104077,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
007250  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
007252  001401                          BEQ     2$
007254                                  HLT
007254  104000                          EMT                             ;CHARACTER LENGTH, DATA

                                                                        ;OR LINE NUMBER ERROR
```

```
007256  104400                  2$:     SCOPE
        000002                  LENGTX=LENGTX+1
        000007                  LENGTC=LENGTC+1
        000177                  XCODE=XCODE*2+1
        104177                  DATAR=LINEX*400+100000+XCODE
007260                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 10
                                ;CHARACTER LENGTH IS 7 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 177
                                ;LINE SPEED IS 9600 BAUD

007260                          TS \XN,400,2$
007260  012767  000340  170510  T43:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
007266  012767  000400  006430          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
007274  012767  007406  006416          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000044                  XN=XN+1
007302  012777  004000  006346          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
007310  012767  000177  006440          MOV     #177,TDATA      ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
007316  012777  000010  006332          MOV     #10,@DHSCR      ;SELECT LINE 10
007324  012777  177777  006334          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
007332  012777  015756  006324          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
007340  012777  033500  006314          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
007346  052777  000002  006306          BIS     #2,@DHLPR       ;SET CHARACTER LENGTH FOR 7 BITS
007354  012777  000400  006306          MOV     #400,@DHBAR     ;START TRANSMITTER
007362  105777  006270          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
007366  100375                          BPL     1$
007370  017704  006264                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
007374  012705  104177                  MOV     #104177,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
007400  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
007402  001401                          BEQ     2$
007404                                  HLT                     ;CHARACTER LENGTH, DATA
007404  104000                          EMT

007406  104400                          ;OR LINE NUMBER ERROR
                        2$:     SCOPE
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE*2+1
        104377          DATAR=LINEX*400+100000+XCODE
007410                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 10
                        ;CHARACTER LENGTH IS 10 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 377
                        ;LINE SPEED IS 9600 BAUD

007410                  TS \XN,400,2$
007410  012767  000340  170360  T44:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
```

```
007416  012767  000400  006300          MOV     #400.ICOUNT             ;SET UP FOR 400 ITERATIONS
007424  012767  007536  006266          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000045                  XN=XN+1
007432  012777  004000  006216          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
007440  012767  000377  006310          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
007446  012777  000010  006202          MOV     #10,@DHSCR              ;SELECT LINE 10
007454  012777  177777  006204          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
007462  012777  015756  006174          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
007470  012777  033500  006164          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
007476  052777  000003  006156          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
007504  012777  000400  006156          MOV     #400,@DHBAR             ;START TRANSMITTER
007512  105777  006140          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
007516  100375                  BPL     1$
007520  017704  006134          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
007524  012705  104377          MOV     #104377,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
007530  020504                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
0C7532  001401                  BEQ     2$
007534                          HLT
007534  104000                  EMT                             ;CHARACTER LENGTH, DATA

007536  104400          2$:     SCOPE                           ;OR LINE NUMBER ERROR
                        LENGTX=LENGTX+1
                        LENGTC=LENGTC+1
                        XCODE=XCODE+2+1
                        LINEX=LINEX+1
                        BITX=BITX+BITX
                        LENGTX=0
                        LENGTC=5
                        XCODE=37
                        .REPT   4
                        .NLIST
                        DATAR=LINEX+400+100000+XCODE
                        .LIST
                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                        .NLIST
                        LENGTX=LENGTX+1
                        LENGTC=LENGTC+1
                        XCODE=XCODE+2+1
                        .LIST
                        .ENDR
        104437          DATAR=LINEX+400+100000+XCODE
007540                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 11
                                ;CHARACTER LENGTH IS 5 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 37
                                ;LINE SPEED IS 9600 BAUD

007540                  TS \XN,400,2$
```

```
007540  012767  000340  170230  T45:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
007546  012767  000400  006150          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
007554  012767  007666  006136          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                MOV     #.,FREEZ1       ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000046                  XN=XN+1
007562  012777  004000  006066          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
007570  012767  000037  006160          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
007576  012777  000011  006052          MOV     #11,@DHSCR      ;SELECT LINE 11
007604  012777  177777  006054          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
007612  012777  015756  006044          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
007620  012777  033500  006034          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
007626  052777  000000  006026          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
007634  012777  001000  006026          MOV     #1000,@DHBAR    ;START TRANSMITTER
007642  105777  006010          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
007646  100375                  BPL     1$
007650  017704  006004          MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                        ;CHARACTER STATUS IN HIGH BYTE
007654  012705  104437          MOV     #104437,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                        ;AND LINE NUMBER AND CHARACTER
                                                        ;STATUS IN HIGH BYTE
007660  020504                  CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
007662  001401                  BEQ     2$
007664                          HLT                     ;CHARACTER LENGTH, DATA
007664  104000                  EMT                     ;OR LINE NUMBER ERROR

007666  104400          2$:     SCOPE
        000001          LENGTX=LENGTX+1
        000006          LENGTC=LENGTC+1
        000077          XCODE=XCODE+2+1
        104477          DATAR=LINEX+400+100000+XCODE
007670                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 11
                                ;CHARACTER LENGTH IS 6 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 77
                                ;LINE SPEED IS 9600 BAUD

007670                  TS \XN,400,2$
007670  012767  000340  170100  T46:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
007676  012767  000400  006020          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
007704  012767  010016  006006          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                MOV     #.,FREEZ1       ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000047                  XN=XN+1
007712  012777  004000  005736          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
007720  012767  000077  006030          MOV     #77,TDATA       ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
007726  012777  000011  005722          MOV     #11,@DHSCR      ;SELECT LINE 11
007734  012777  177777  005724          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
007742  012777  015756  005714          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
007750  012777  033500  005704          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
007756  052777  000001  005676          BIS     #1,@DHLPR       ;SET CHARACTER LENGTH FOR 6 BITS
007764  012777  001000  005676          MOV     #1000,@DHBAR    ;START TRANSMITTER
```

```
007772  105777  005660          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
007776  100375                          BPL     1$
010000  017704  005454                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
010004  012705  104477                  MOV     #104477,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
010010  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
010012  001401                          BEQ     2$
010014                                  HLT                             ;CHARACTER LENGTH, DATA
010014  104000                          EMT                             ;OR LINE NUMBER ERROR

010016  104400          2$:     SCOPE
        000002          LENGTX=LENGTX+1
        000007          LENGTC=LENGTC+1
        000177          XCODE=XCODE*2+1
        104577          DATAR=LINEX*400+100000+XCODE
010020                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                        ;CHARACTER LENGTH TEST
                        ;TRANSMIT 1 CHARACTER ON LINE 11
                        ;CHARACTER LENGTH IS 7 BITS
                        ;EXPECTED RECEIVED CHARACTER IS 177
                        ;LINE SPEED IS 9600 BAUD

010020                  TS \XN,400,2$
010020  012767  000340  167750  T47:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
010026  012767  000400  005670          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
010034  012767  010146  005656          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                        .IF NB  <>
                                MOV     #,FREEZ1                        ;SET UP TO LOOP WITH DATA       ; 3
                        .ENDC
        000050          XN=XN+1
010042  012777  004000  005606          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
010050  012767  000177  005700          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
010056  012777  000011  005572          MOV     #11,@DHSCR              ;SELECT LINE 11
010064  012777  177777  005574          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
010072  012777  015756  005564          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
010100  012777  033500  005554          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
010106  052777  000002  005546          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
010114  012777  001000  005546          MOV     #1000,@DHBAR            ;START TRANSMITTER
010122  105777  005530          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
010126  100375                          BPL     1$
010130  017704  005524                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
010134  012705  104577                  MOV     #104577,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
010140  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
010142  001401                          BEQ     2$
010144                                  HLT                             ;CHARACTER LENGTH, DATA
010144  104000                          EMT

010146  104400          2$:     SCOPE                                   ;OR LINE NUMBER ERROR
        000003          LENGTX=LENGTX+1
```

```
                000010                  LENGTC=LENGTC+1
                000377                  XCODE=XCODE*2+1
                104777                  DATAR=LINEX*400+100000+XCODE
010150                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 11
                                                ;CHARACTER LENGTH IS 10 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 377
                                                ;LINE SPEED IS 9600 BAUD

010150                                  TS \XN,400,2$
010150  012767  000340  167620          T50:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
010156  012767  000400  005540                  MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
010164  012767  010276  005526                  MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
                000051                  XN=XN+1
010172  012777  004000  005456                  MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
010200  012767  000377  005550                  MOV     #377,TDATA      ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
010206  012777  000011  005442                  MOV     #11,@DHSCR      ;SELECT LINE 11
010214  012777  177777  005444                  MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
010222  012777  015756  005434                  MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
010230  012777  033500  005424                  MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
010236  052777  000003  005416                  BIS     #3,@DHLPR       ;SET CHARACTER LENGTH FOR 10 BITS
010244  012777  001000  005416                  MOV     #1000,@DHBAR    ;START TRANSMITTER
010252  105777  005400                  1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
010256  100375                                  BPL     1$
010260  017704  005374                          MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
010264  012705  104777                          MOV     #104777,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
010270  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
010272  001401                          BEQ     2$
010274                                  HLT                             ;CHARACTER LENGTH, DATA
010274  104000                          EMT

010276  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
                000004                  LENGTX=LENGTX+1
                000011                  LENGTC=LENGTC+1
                000777                  XCODE=XCODE*2+1
                000012                  LINEX=LINEX+1
                002000                  BITX=BITX+BITX
                000000                  LENGTX=0
                000005                  LENGTC=5
                000037                  XCODE=37
                000004                  .REPT   4
                                        .NLIST
                                        DATAR=LINEX*400+100000+XCODE
                                        .LIST
                                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                        .NLIST
                                        LENGTX=LENGTX+1
                                        LENGTC=LENGTC+1
```

```
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
            105037              DATAR=LINEX*400+100000+XCODE
  010300                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 12
                                        ;CHARACTER LENGTH IS 5 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 37
                                        ;LINE SPEED IS 9600 BAUD

  010300                        TS \XN,400,2$
  010300  012767  000340  167470 T51:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
  010306  012767  000400  005410         MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
  010314  012767  010426  005376         MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #.,FREEZ1       ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
          000052                XN=XN+1
  010322  012777  004000  005326         MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
  010330  012767  000037  005420         MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
  010336  012777  000012  005312         MOV     #12,@DHSCR      ;SELECT LINE 12
  010344  012777  177777  005314         MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
  010352  012777  015756  005304         MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
  010360  012777  033500  005274         MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
  010366  052777  000000  005266         BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
  010374  012777  002000  005266         MOV     #2000,@DHBAR    ;START TRANSMITTER
  010402  105777  005250        1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
  010406  100375                        BPL     1$
  010410  017704  005244                MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
  010414  012705  105037                MOV     #105037,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
  010420  020504                        CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
  010422  001401                        BEQ     2$
  010424                                HLT                     ;CHARACTER LENGTH, DATA
  010424  104000                        EMT
                                                                ;OR LINE NUMBER ERROR
  010426  104400          2$:   SCOPE
          000001                LENGTX=LENGTX+1
          000006                LENGTC=LENGTC+1
          000077                XCODE=XCODE*2+1
          105077                DATAR=LINEX*400+100000+XCODE
  010430                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 12
                                        ;CHARACTER LENGTH IS 6 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 77
                                        ;LINE SPEED IS 9600 BAUD

  010430                        TS \XN,400,2$
  010430  012767  000340  167340 T52:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
  010436  012767  000400  005260         MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
```

```
010444  012767  010556  005246          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000053                  XN=XN+1
010452  012777  004000  005176          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
010460  012767  000077  005270          MOV     #77,TDATA               ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
010466  012777  000012  005162          MOV     #12,@DHSCR              ;SELECT LINE 12
010474  012777  177777  005164          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
010502  012777  015756  005154          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
010510  012777  033500  005144          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
010516  052777  000001  005136          BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
010524  012777  002000  005136          MOV     #2000,@DHBAR            ;START TRANSMITTER
010532  105777  005120          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
010536  100375                          BPL     1$
010540  017704  005114                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
010544  012705  105077                  MOV     #105077,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
010550  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
010552  001401                          BEQ     2$
010554                                  HLT                             ;CHARACTER LENGTH, DATA
010554  104000                          EMT

010556  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
        000002                  LENGTX=LENGTX+1
        000007                  LENGTC=LENGTC+1
        000177                  XCODE=XCODE+2+1
        105177                  DATAR=LINEX*400+100000+XCODE
010560                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 12
                                        ;CHARACTER LENGTH IS 7 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 177
                                        ;LINE SPEED IS 9600 BAUD

010560                          TS \XN,400,2$
010560  012767  000340  167210  T53:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
010566  012767  000400  005130          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
010574  012767  010706  005116          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000054                  XN=XN+1
010602  012777  004000  005046          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
010610  012767  000177  005140          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
010616  012777  000012  005032          MOV     #12,@DHSCR              ;SELECT LINE 12
010624  012777  177777  005034          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
010632  012777  015756  005024          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
010640  012777  033500  005014          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
010646  052777  000002  005006          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
010654  012777  002000  005006          MOV     #2000,@DHBAR            ;START TRANSMITTER
010662  105777  004770          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
010666  100375                          BPL     1$
```

```
010670  017704  004764                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
010674  012705  105177                  MOV     #105177,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
010700  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
010702  001401                          BEQ     2$
010704                                  HLT                             ;CHARACTER LENGTH, DATA
010704  104000                          EMT                             ;OR LINE NUMBER ERROR

010706  104400                  2$:     SCOPE
        000003                  LENGTX=LENGTX+1
        000010                  LENGTC=LENGTC+1
        000377                  XCODE=XCODE*2+1
        105377                  DATAR=LINEX*400+100000+XCODE
010710                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 12
                                ;CHARACTER LENGTH IS 10 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 377
                                ;LINE SPEED IS 9600 BAUD

010710                          TS \XN,400,2$
010710  012767  000340  167060  T54:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
010716  012767  000400  005000          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
010724  012767  011036  004766          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000055                  XN=XN+1
010732  012777  004000  004716          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
010740  012767  000377  005010          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
010746  012777  000012  004702          MOV     #12,@DHSCR              ;SELECT LINE 12
010754  012777  177777  004704          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
010762  012777  015756  004674          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
010770  012777  033500  004664          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
010776  052777  000003  004656          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
011004  012777  002000  004656          MOV     #2000,@DHBAR            ;START TRANSMITTER
011012  105777  004640          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
011016  100375                          BPL     1$
011020  017704  004634                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
011024  012705  105377                  MOV     #105377,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
011030  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
011032  001401                          BEQ     2$
011034                                  HLT                             ;CHARACTER LENGTH, DATA
011034  104000                          EMT                             ;OR LINE NUMBER ERROR

011036  104400                  2$:     SCOPE
        000004                  LENGTX=LENGTX+1
        000011                  LENGTC=LENGTC+1
        000777                  XCODE=XCODE*2+1
```

```
                000013                  LINEX=LINEX+1
                004000                  BITX=BITX+BITX
                000000                  LENGTX=0
                000005                  LENGTC=5
                000037                  XCODE=37
                000004                  .REPT   4
                                        .NLIST
                                        DATAR=LINEX*400+100000+XCODE
                                        .LIST
                                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                        .NLIST
                                        LENGTX=LENGTX+1
                                        LENGTC=LENGTC+1
                                        XCODE=XCODE*2+1
                                        .LIST
                                        .ENDR
                105437                  DATAR=LINEX*400+100000+XCODE
        011040                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 13
                                                ;CHARACTER LENGTH IS 5 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 37
                                                ;LINE SPEED IS 9600 BAUD

        011040                          TS \XN,400,2$
        011040  012767  000340  166730  T55:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
        011046  012767  000400  004650          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
        011054  012767  011166  004636          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
                000056                  XN=XN+1
        011062  012777  004000  004566          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
        011070  012767  000037  004660          MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
        011076  012777  000013  004552          MOV     #13,@DHSCR      ;SELECT LINE 13
        011104  012777  177777  004554          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
        011112  012777  015756  004544          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
        011120  012777  033500  004534          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
        011126  052777  000000  004526          BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
        011134  012777  004000  004526          MOV     #4000,@DHBAR    ;START TRANSMITTER
        011142  105777  004510          1$:    TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
        011146  100375                  BPL     1$
        011150  017704  004504          MOV     @DHNRC,R4

                                                ;(R4)=RECEIVED CHARACTER
                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                ;CHARACTER STATUS IN HIGH BYTE
        011154  012705  105437          MOV     #105437,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                ;AND LINE NUMBER AND CHARACTER
                                                ;STATUS IN HIGH BYTE
        011160  020504                  CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
        011162  001401                  BEQ     2$
        011164                          HLT                     ;CHARACTER LENGTH, DATA
        011164  104000                  EMT

        011166  104400          2$:     SCOPE                   ;OR LINE NUMBER ERROR
                000001          LENGTX=LENGTX+1
                000006          LENGTC=LENGTC+1
```

```
                000077                  XCODE=XCODE+2+1
                105477                  DATAR=LINEX+400+100000+XCODE
011170                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 13
                                                ;CHARACTER LENGTH IS 6 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 77
                                                ;LINE SPEED IS 9600 BAUD

011170                                  TS \XN,400,2$
011170  012767  000340  166600        T56:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
011176  012767  000400  004520                MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
011204  012767  011316  004506                MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
                000057                  XN=XN+1
011212  012777  004000  004436                MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
011220  012767  000077  004530                MOV     #77,TDATA       ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
011226  012777  000013  004422                MOV     #13,@DHSCR      ;SELECT LINE 13
011234  012777  177777  004424                MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
011242  012777  015756  004414                MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
011250  012777  033500  004404                MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
011256  052777  000001  004376                BIS     #1,@DHLPR       ;SET CHARACTER LENGTH FOR 6 BITS
011264  012777  004000  004376                MOV     #4000,@DHBAR    ;START TRANSMITTER
011272  105777  004360                1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
011276  100375                              BPL     1$
011300  017704  004354                      MOV     @DHNRC,R4

                                                                        ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
011304  012705  105477                      MOV     #105477,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
011310  020504                              CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
011312  001401                              BEQ     2$
011314                                      HLT                     ;CHARACTER LENGTH, DATA
011314  104000                              EMT

                                                                        ;OR LINE NUMBER ERROR
011316  104400                  2$:     SCOPE
                000002                  LENGTX=LENGTX+1
                000007                  LENGTC=LENGTC+1
                000177                  XCODE=XCODE+2+1
                105577                  DATAR=LINEX+400+100000+XCODE
011320                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 13
                                                ;CHARACTER LENGTH IS 7 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 177
                                                ;LINE SPEED IS 9600 BAUD

011320                                  TS \XN,400,2$
011320  012767  000340  166450        T57:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
011326  012767  000400  004370                MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
011334  012767  011446  004356                MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
```

```
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
                                XN=XN+1
        000060
011342  012777  004000  004306          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
011350  012767  000177  004400          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
011356  012777  000013  004272          MOV     #13,@DHSCR              ;SELECT LINE 13
011364  012777  177777  004274          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
011372  012777  015756  004264          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
011400  012777  033500  004254          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
011406  052777  000002  004246          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
011414  012777  004000  004246          MOV     #4000,@DHBAR            ;START TRANSMITTER
011422  105777  004230          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
011426  100375                          BPL     1$
011430  017704  004224                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
011434  012705  105577                  MOV     #105577,R5              ;CHARACTER STATUS IN HIGH BYTE
                                                                        ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
011440  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
011442  001401                          BEQ     2$
011444                                  HLT
011444  104000                          EMT                             ;CHARACTER LENGTH, DATA

011446  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
        000003                  LENGTX=LENGTX+1
        000010                  LENGTC=LENGTC+1
        000377                  XCODE=XCODE*2+1
        105777                  DATAR=LINEX*400+100000+XCODE
011450                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 13
                                        ;CHARACTER LENGTH IS 10 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 377
                                        ;LINE SPEED IS 9600 BAUD

011450                          TS \XN,400,2$
011450  012767  000340  166720  T60:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011456  012767  000400  004240          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
011464  012767  011576  004226          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000061
                                XN=XN+1
011472  012777  004000  004156          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
011500  012767  000377  004250          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
011506  012777  000013  004142          MOV     #13,@DHSCR              ;SELECT LINE 13
011514  012777  177777  004144          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
011522  012777  015756  004134          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
011530  012777  033500  004124          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
011536  052777  000003  004116          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
011544  012777  004000  004116          MOV     #4000,@DHBAR            ;START TRANSMITTER
011552  105777  004100          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
011556  100375                          BPL     1$
011560  017704  004074                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
```

```
011564  012705  105777                  MOV     #105777,R5              ;CHARACTER STATUS IN HIGH BYTE
                                                                        ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
011570  020504                          CMP     R5,R4                   ;STATUS IN HIGH BYTE
011572  001401                          BEQ     2$                      ;ARE EXPECTED AND RECEIVED DATA THE SAME
011574                                  HLT
011574  104000                          EMT                             ;CHARACTER LENGTH, DATA

                                                                        ;OR LINE NUMBER ERROR
011576  104400              2$:         SCOPE
        000004              LENGTX=LENGTX+1
        000011              LENGTC=LENGTC+1
        000777              XCODE=XCODE*2+1
        000014              LINEX=LINEX+1
        010000              BITX=BITX+BITX
        000000              LENGTX=0
        000005              LENGTC=5
        000037              XCODE=37
        000004              .REPT   4
                            .NLIST
                            DATAR=LINEX*400+100000+XCODE
                            .LIST
                            CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                            .NLIST
                            LENGTX=LENGTX+1
                            LENGTC=LENGTC+1
                            XCODE=XCODE*2+1
                            .LIST
                            .ENDR
        106037              DATAR=LINEX*400+100000+XCODE
011600                      CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                            ;CHARACTER LENGTH TEST
                            ;TRANSMIT 1 CHARACTER ON LINE 14
                            ;CHARACTER LENGTH IS 5 BITS
                            ;EXPECTED RECEIVED CHARACTER IS 37
                            ;LINE SPEED IS 9600 BAUD

011600                      TS \XN,400,2$
011600  012767  000340  166170  T61:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011606  012767  000400  004110        MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
011614  012767  011726  004076        MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                            .IF NB  <>
                            MOV     #,FREEZ1                        ;SET UP TO LOOP WITH DATA       ; 3
                            .ENDC
        000062              XN=XN+1
011622  012777  004000  004026        MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
011630  012767  000037  004120        MOV     #37,TDATA               ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
011636  012777  000014  004012        MOV     #14,@DHSCR              ;SELECT LINE 14
011644  012777  177777  004014        MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
011652  012777  015756  004004        MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
011660  012777  033500  003774        MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
011666  052777  000000  003766        BIS     #0,@DHLPR               ;SET CHARACTER LENGTH FOR 5 BITS
011674  012777  010000  003766        MOV     #10000,@DHBAR           ;START TRANSMITTER
011702  105777  003750          1$:   TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
011706  100375                        BPL     1$
011710  017704  003744                MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
```

```
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
011714  012705  106037                MOV     #106037,R5        ;CHARACTER STATUS IN HIGH BYTE
                                                                ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
011720  020504                        CMP     R5,R4             ;STATUS IN HIGH BYTE
011722  001401                        BEQ     2$                ;ARE EXPECTED AND RECEIVED DATA THE SAME
011724                                HLT
011724  104000                        EMT                       ;CHARACTER LENGTH, DATA

011726  104400                2$:     SCOPE                     ;OR LINE NUMBER ERROR
        000001                LENGTX=LENGTX+1
        000006                LENGTC=LENGTC+1
        000077                XCODE=XCODE*2+1
        106077                DATAR=LINEX*400+100000+XCODE
011730                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                              ;CHARACTER LENGTH TEST
                              ;TRANSMIT 1 CHARACTER ON LINE 14
                              ;CHARACTER LENGTH IS 6 BITS
                              ;EXPECTED RECEIVED CHARACTER IS 77
                              ;LINE SPEED IS 9600 BAUD

011730                        TS \XN,400,2$
011730  012767  000340  166040 T62:     MOV     #340,PS           ;DISABLE ALL INTERRUPTS
011736  012767  000400  003760        MOV     #400,ICOUNT       ;SET UP FOR 400 ITERATIONS
011744  012767  012056  003746        MOV     #2$,ESCAPE        ;SET UP TO ESCAPE TO NEXT TEST
                              .IF NB  <>
                                      MOV     #.,FREEZ1         ;SET UP TO LOOP WITH DATA       ; 3
                              .ENDC
        000063                XN=XN+1
011752  012777  004000  003676        MOV     #BIT11,@DHSCR     ;MASTER CLEAR INTERFACE
011760  012767  000077  003770        MOV     #77,TDATA         ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
011766  012777  000014  003662        MOV     #14,@DHSCR        ;SELECT LINE 14
011774  012777  177777  003664        MOV     #-1,@DHBC         ;SET UP TO TRANSMIT 1 BYTE
012002  012777  015756  003654        MOV     #TDATA,@DHBA      ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
012010  012777  033500  003644        MOV     #33500,@DHLPR     ;SET LINE SPEED FOR 9600 BAUD
012016  052777  000001  003636        BIS     #1,@DHLPR         ;SET CHARACTER LENGTH FOR 6 BITS
012024  012777  010000  003636        MOV     #10000,@DHBAR     ;START TRANSMITTER
012032  105777  003620        1$:     TSTB    @DHSCR            ;WAIT TO RECEIVE CHARACTER
012036  100375                BPL     1$
012040  017704  003614        MOV     @DHNRC,R4         ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
012044  012705  106077        MOV     #106077,R5        ;CHARACTER STATUS IN HIGH BYTE
                                                                ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
012050  020504                CMP     R5,R4             ;STATUS IN HIGH BYTE
012052  001401                BEQ     2$                ;ARE EXPECTED AND RECEIVED DATA THE SAME
012054                        HLT
012054  104000                EMT                       ;CHARACTER LENGTH, DATA

012056  104400                2$:     SCOPE             ;OR LINE NUMBER ERROR
        000002                LENGTX=LENGTX+1
        000007                LENGTC=LENGTC+1
        000177                XCODE=XCODE*2+1
        106177                DATAR=LINEX*400+100000+XCODE
```

```
012060                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 14
                                        ;CHARACTER LENGTH IS 7 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 177
                                        ;LINE SPEED IS 9600 BAUD

012060                          TS \XN,400,2$
012060  012767  000340  165710  T63:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
012066  012767  000400  003630          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
012074  012767  012206  003616          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000064                  XN=XN+1
012102  012777  004000  003546          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
012110  012767  000177  003640          MOV     #177,TDATA      ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
012116  012777  000014  003532          MOV     #14,@DHSCR      ;SELECT LINE 14
012124  012777  177777  003534          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
012132  012777  015756  003524          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
012140  012777  033500  003514          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
012146  052777  000002  003506          BIS     #2,@DHLPR       ;SET CHARACTER LENGTH FOR 7 BITS
012154  012777  010000  003506          MOV     #10000,@DHBAR   ;START TRANSMITTER
012162  105777  003470          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
012166  100375                  BPL     1$
012170  017704  003464          MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                        ;CHARACTER STATUS IN HIGH BYTE
012174  012705  106177          MOV     #106177,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                        ;AND LINE NUMBER AND CHARACTER
                                                        ;STATUS IN HIGH BYTE
012200  020504                  CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
012202  001401                  BEQ     2$
012204                          HLT
012204  104000                  EMT                     ;CHARACTER LENGTH, DATA

                                                        ;OR LINE NUMBER ERROR
012206  104400          2$:     SCOPE
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE+2+1
        106377          DATAR=LINEX+400+100000+XCODE
012210                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 14
                                        ;CHARACTER LENGTH IS 10 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 377
                                        ;LINE SPEED IS 9600 BAUD

012210                          TS \XN,400,2$
012210  012767  000340  165560  T64:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
012216  012767  000400  003500          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
012224  012767  012336  003466          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
```

```
                000065                          XN=XN+1
012232  012777  004000  003416                          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
012240  012767  000377  003510                          MOV     #377,TDATA      ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
012246  012777  000014  003402                          MOV     #14,@DHSCR      ;SELECT LINE 14
012254  012777  177777  003404                          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
012262  012777  015756  003374                          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
012270  012777  033500  003364                          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
012276  052777  000003  003356                          BIS     #3,@DHLPR       ;SET CHARACTER LENGTH FOR 10 BITS
012304  012777  010000  003356                          MOV     #10000,@DHBAR   ;START TRANSMITTER
012312  105777  003340                        1$:       TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
012316  100375                                          BPL     1$
012320  017704  003334                                  MOV     @DHNRC,R4

012324  012705  106377                                  MOV     #106377,R5      ;(R4)=RECEIVED CHARACTER
                                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                                ;CHARACTER STATUS IN HIGH BYTE
                                                                                ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                                ;AND LINE NUMBER AND CHARACTER
                                                                                ;STATUS IN HIGH BYTE
012330  020504                                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
012332  001401                                          BEQ     2$
012334                                                  HLT
012334  104000                                          EMT

012336  104400                          2$:     SCOPE                           ;CHARACTER LENGTH, DATA
                000004                  LENGTX=LENGTX+1
                000011                  LENGTC=LENGTC+1                         ;OR LINE NUMBER ERROR
                000777                  XCODE=XCODE+2+1
                000015                  LINEX=LINEX+1
                020000                  BITX=BITX+BITX
                000000                  LENGTX=0
                000005                  LENGTC=5
                000037                  XCODE=37
                000004                  .REPT   4
                                        .NLIST
                                        DATAR=LINEX+400+100000+XCODE
                                        .LIST
                                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                        .NLIST
                                        LENGTX=LENGTX+1
                                        LENGTC=LENGTC+1
                                        XCODE=XCODE+2+1
                                        .LIST
                                        .ENDR
        106437                          DATAR=LINEX+400+100000+XCODE
012340                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 15
                                                ;CHARACTER LENGTH IS 5 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 37
                                                ;LINE SPEED IS 9600 BAUD

012340                                  TS \XN,400,2$
012340  012767  000340  165430          T65:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
012346  012767  000400  003350                  MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
012354  012767  012466  003336                  MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
```

```
                                        .ENDC
        000066                          XN=XN+1
012362  012777  004000  003266                  MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
012370  012767  000037  003360                  MOV     #37,TDATA               ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
012376  012777  000015  003252                  MOV     #15,@DHSCR              ;SELECT LINE 15
012404  012777  177777  003254                  MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
012412  012777  015756  003244                  MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
012420  012777  033500  003234                  MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
012426  052777  000000  003226                  BIS     #0,@DHLPR               ;SET CHARACTER LENGTH FOR 5 BITS
012434  012777  020000  003226                  MOV     #20000,@DHBAR           ;START TRANSMITTER
012442  105777  003210                  1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
012446  100375                                  BPL     1$
012450  017704  003204                          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                                ;CHARACTER STATUS IN HIGH BYTE
012454  012705  106437                          MOV     #106437,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                                ;AND LINE NUMBER AND CHARACTER
                                                                                ;STATUS IN HIGH BYTE
012460  020504                                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
012462  001401                                  BEQ     2$
012464                                          HLT                             ;CHARACTER LENGTH, DATA
012464  104000                                  EMT
                                                                                ;OR LINE NUMBER ERROR
012466  104400                          2$:     SCOPE
        000001                          LENGTX=LENGTX+1
        000006                          LENGTC=LENGTC+1
        000077                          XCODE=XCODE*2+1
        106477                          DATAR=LINEX*400+100000+XCODE
012470                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTFR ON LINE 15
                                                ;CHARACTER LENGTH IS 6 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 77
                                                ;LINE SPEED IS 9600 BAUD

012470                                  TS \XN,400,2$
012470  012767  000340  165300          T66:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
012476  012767  000400  003220                  MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
012504  012767  012616  003206                  MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA         ; 3
                                        .ENDC
        000067                          XN=XN+1
012512  012777  004000  003136                  MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
012520  012767  000077  003230                  MOV     #77,TDATA               ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
012526  012777  000015  003122                  MOV     #15,@DHSCR              ;SELECT LINE 15
012534  012777  177777  003124                  MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
012542  012777  015756  003114                  MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
012550  012777  033500  003104                  MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
012556  052777  000001  003076                  BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
012564  012777  020000  003076                  MOV     #20000,@DHBAR           ;START TRANSMITTER
012572  105777  003060                  1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
012576  100375                                  BPL     1$
012600  017704  003054                          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                                ;CHARACTER STATUS IN HIGH BYTE
```

```
012604  012705  106477                  MOV     #106477,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
012610  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
012612  001401                          BEQ     2$
012614                                  HLT                             ;CHARACTER LENGTH, DATA
012614  104000                          EMT                             ;OR LINE NUMBER ERROR

012616  104400              2$:         SCOPE
        000002              LENGTX=LENGTX+1
        000007              LENGTC=LENGTC+1
        000177              XCODE=XCODE*2+1
        106577              DATAR=LINEX*400+100000+XCODE
012620                      CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                            ;CHARACTER LENGTH TEST
                            ;TRANSMIT 1 CHARACTER ON LINE 15
                            ;CHARACTER LENGTH IS 7 BITS
                            ;EXPECTED RECEIVED CHARACTER IS 177
                            ;LINE SPEED IS 9600 BAUD

012620                      TS \XN,400,2$
012620  012767  000340  165150  T67:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
012626  012767  000400  003070        MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
012634  012767  012746  003056        MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                            .IF NB  <>
                                    MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                            .ENDC
        000070              XN=XN+1
012642  012777  004000  003006        MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
012650  012767  000177  003100        MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
012656  012777  000015  002772        MOV     #15,@DHSCR              ;SELECT LINE 15
012664  012777  177777  002774        MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
012672  012777  015756  002764        MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
012700  012777  033500  002754        MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
012706  052777  000002  002746        BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
012714  012777  020000  002746        MOV     #20000,@DHBAR           ;START TRANSMITTER
012722  105777  002730        1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
012726  100375                      BPL     1$
012730  017704  002724              MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
012734  012705  106577              MOV     #106577,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
012740  020504                      CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
012742  001401                      BEQ     2$
012744                              HLT                             ;CHARACTER LENGTH, DATA
012744  104000                      EMT                             ;OR LINE NUMBER ERROR

012746  104400              2$:     SCOPE
        000003              LENGTX=LENGTX+1
        000010              LENGTC=LENGTC+1
        000377              XCODE=XCODE*2+1
        106777              DATAR=LINEX*400+100000+XCODE
012750                      CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
```

```
                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 15
                                        ;CHARACTER LENGTH IS 10 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 377
                                        ;LINE SPEED IS 9600 BAUD

012750                                  TS \XN,400,2$
012750  012767  000340  165020  T70:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
012756  012767  000400  002740          MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
012764  012767  013076  002726          MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                        MOV     #.,FREEZ1       ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
        000071                          XN=XN+1
012772  012777  004000  002656          MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
013000  012767  000377  002750          MOV     #377,TDATA      ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
013006  012777  000015  002642          MOV     #15,@DHSCR      ;SELECT LINE 15
013014  012777  177777  002644          MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
013022  012777  015756  002634          MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
013030  012777  033500  002624          MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
013036  052777  000003  002616          BIS     #3,@DHLPR       ;SET CHARACTER LENGTH FOR 10 BITS
013044  012777  020000  002616          MOV     #20000,@DHBAR   ;START TRANSMITTER
013052  105777  002600          1$:     TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
013056  100375                          BPL     1$
013060  017704  002574                  MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                ;CHARACTER STATUS IN HIGH BYTE
013064  012705  106777                  MOV     #106777,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                ;AND LINE NUMBER AND CHARACTER
                                                                ;STATUS IN HIGH BYTE
013070  020504                          CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
013072  001401                          BEQ     2$
013074                                  HLT
013074  104000                          EMT                     ;CHARACTER LENGTH, DATA

                                                                ;OR LINE NUMBER ERROR
013076  104400          2$:     SCOPE
        000004                  LENGTX=LENGTX+1
        000011                  LENGTC=LENGTC+1
        000777                  XCODE=XCODE*2+1
        000016                  LINEX=LINEX+1
        040000                  BITX=BITX+BITX
        000000                  LENGTX=0
        000005                  LENGTC=5
        000037                  XCODE=37
        000004                  .REPT   4
                                .NLIST
                                DATAR=LINEX*400+100000+XCODE
                                .LIST
                                CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                .NLIST
                                LENGTX=LENGTX+1
                                LENGTC=LENGTC+1
                                XCODE=XCODE*2+1
                                .LIST
                                .ENDR
        107037                  DATAR=LINEX*400+100000+XCODE
013100                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
```

```
                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 16
                                        ;CHARACTER LENGTH IS 5 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 37
                                        ;LINE SPEED IS 9600 BAUD

013100                          TS \XN,400,2$
013100  012767  000340  164670 T71:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
013106  012767  000400  002610        MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
013114  012767  013226  002576        MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                       MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000072                  XN=XN+1
013122  012777  004000  002526        MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
013130  012767  000037  002620        MOV     #37,TDATA       ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
013136  012777  000016  002512        MOV     #16,@DHSCR      ;SELECT LINE 16
013144  012777  177777  002514        MOV     #-1,@DHBC       ;SET UP TO TRANSMIT 1 BYTE
013152  012777  015756  002504        MOV     #TDATA,@DHBA    ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
013160  012777  033500  002474        MOV     #33500,@DHLPR   ;SET LINE SPEED FOR 9600 BAUD
013166  052777  000000  002466        BIS     #0,@DHLPR       ;SET CHARACTER LENGTH FOR 5 BITS
013174  012777  040000  002466        MOV     #40000,@DHBAR   ;START TRANSMITTER
013202  105777  002450        1$:    TSTB    @DHSCR          ;WAIT TO RECEIVE CHARACTER
013206  100375                       BPL     1$
013210  017704  002444               MOV     @DHNRC,R4       ;(R4)=RECEIVED CHARACTER
                                                               ;IN LOW BYTE, AND LINE NUMBER AND
                                                               ;CHARACTER STATUS IN HIGH BYTE
013214  012705  107037               MOV     #107037,R5      ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                               ;AND LINE NUMBER AND CHARACTER
                                                               ;STATUS IN HIGH BYTE
013220  020504                       CMP     R5,R4           ;ARE EXPECTED AND RECEIVED DATA THE SAME
013222  001401                       BEQ     2$
013224                               HLT
013224  104000                       EMT                     ;CHARACTER LENGTH, DATA

013226  104400                       SCOPE           2$:     ;OR LINE NUMBER ERROR
        000001                  LENGTX=LENGTX+1
        000006                  LENGTC=LENGTC+1
        000077                  XCODE=XCODE*2+1
        107077                  DATAR=LINEX*400+100000+XCODE
013230                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 16
                                        ;CHARACTER LENGTH IS 6 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 77
                                        ;LINE SPEED IS 9600 BAUD

013230                          TS \XN,400,2$
013230  012767  000340  164540 T72:    MOV     #340,PS         ;DISABLE ALL INTERRUPTS
013236  012767  000400  002460        MOV     #400,ICOUNT     ;SET UP FOR 400 ITERATIONS
013244  012767  013356  002446        MOV     #2$,ESCAPE      ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                       MOV     #,FREEZ1        ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000073                  XN=XN+1
```

```
013252  012777  004000  002376          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
013260  012767  000077  002470          MOV     #77,TDATA               ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
013266  012777  000016  002362          MOV     #16.,@DHSCR             ;SELECT LINE 16
013274  012777  177777  002364          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
013302  012777  015756  002354          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
013310  012777  033500  002344          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
013316  052777  000001  002336          BIS     #1,@DHLPR               ;SET CHARACTER LENGTH FOR 6 BITS
013324  012777  040000  002336          MOV     #40000,@DHBAR           ;START TRANSMITTER
013332  105777  002320          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
013336  100375                          BPL     1$
013340  017704  002314                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
013344  012705  107077                  MOV     #107077,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
013350  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
013352  001401                          BEQ     2$
013354                                  HLT                             ;CHARACTER LENGTH, DATA
013354  104000                          EMT                             ;OR LINE NUMBER ERROR

013356  104400          2$:     SCOPE
        000002          LENGTX=LENGTX+1
        000007          LENGTC=LENGTC+1
        000177          XCODE=XCODE*2+1
        107177          DATAR=LINEX*400+100000+XCODE
013360                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 16
                                ;CHARACTER LENGTH IS 7 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 177
                                ;LINE SPEED IS 9600 BAUD

013360                  TS \XN,400,2$

013360                  TS \XN,400,2$
013360  012767  000340  164410  T73:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
013366  012767  000400  002330          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
013374  012767  013506  002316          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA          ; 3
                                .ENDC
        000074                  XN=XN+1
013402  012777  004000  002246          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
013410  012767  000177  002340          MOV     #177,TDATA              ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
013416  012777  000016  002232          MOV     #16,@DHSCR              ;SELECT LINE 16
013424  012777  177777  002234          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
013432  012777  015756  002224          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
013440  012777  033500  002214          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
013446  052777  000002  002206          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
013454  012777  040000  002206          MOV     #40000,@DHBAR           ;START TRANSMITTER
013462  105777  002170          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
013466  100375                          BPL     1$
013470  017704  002164                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
013474  012705  107177                  MOV     #107177,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
```

```
013500  020504                          CMP     R5,R4                   ;STATUS IN HIGH BYTE
013502  001401                          BEQ     2$                      ;ARE EXPECTED AND RECEIVED DATA THE SAME
013504                                  HLT
013504  104000                          EMT                             ;CHARACTER LENGTH, DATA

013506  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
        000003                  LENGTX=LENGTX+1
        000010                  LENGTC=LENGTC+1
        000377                  XCODE=XCODE+2+1
        107377                  DATAR=LINEX+400+100000+XCODE
013510                          CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 16
                                ;CHARACTER LENGTH IS 10 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 377
                                ;LINE SPEED IS 9600 BAUD

013510                          TS \XN,400,2$
013510  012767  000340  164260  T74:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
013516  012767  000400  002200          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
013524  012767  013636  002166          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000075                  XN=XN+1
013532  012777  004000  002116          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
013540  012767  000377  002210          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
013546  012777  000016  002102          MOV     #16,@DHSCR              ;SELECT LINE 16
013554  012777  177777  002104          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
013562  012777  015756  002074          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
013570  012777  033500  002064          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
013576  052777  000003  002056          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
013604  012777  040000  002056          MOV     #40000,@DHBAR           ;START TRANSMITTER
013612  105777  002040          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
013616  100375                          BPL     1$
013620  017704  002034                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
013624  012705  107377                  MOV     #107377,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
013630  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
013632  001401                          BEQ     2$
013634                                  HLT
013634  104000                          EMT                             ;CHARACTER LENGTH, DATA

013636  104400                  2$:     SCOPE                           ;OR LINE NUMBER ERROR
        000004                  LENGTX=LENGTX+1
        000011                  LENGTC=LENGTC+1
        000777                  XCODE=XCODE+2+1
        000017                  LINEX=LINEX+1
        100000                  BITX=BITX+BITX
        000000                  LENGTX=0
        000005                  LENGTC=5
        000037                  XCODE=37
```

```
                000004                  .REPT   4
                                        .NLIST
                                        DATAR=LINEX*400+100000+XCODE
                                        .LIST
                                        CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR
                                        .NLIST
                                        LENGTX=LENGTX+1
                                        LENGTC=LENGTC+1
                                        XCODE=XCODE*2+1
                                        .LIST
                                        .ENDR
                107437                  DATAR=LINEX*400+100000+XCODE
013640                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
                                                ;TRANSMIT 1 CHARACTER ON LINE 17
                                                ;CHARACTER LENGTH IS 5 BITS
                                                ;EXPECTED RECEIVED CHARACTER IS 37
                                                ;LINE SPEED IS 9600 BAUD

013640                                  TS \XN,400,2$
013640  012767  000340  164130          T75:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
013646  012767  000400  002050                  MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
013654  012767  013766  002036                  MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                                MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
                000076                  XN=XN+1
013662  012777  004000  001766                  MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
013670  012767  000037  002060                  MOV     #37,TDATA               ;CHARACTER TO BE TRANSMITTED = 37(OCTAL)
013676  012777  000017  001752                  MOV     #17,@DHSCR              ;SELECT LINE 17
013704  012777  177777  001754                  MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
013712  012777  015756  001744                  MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
013720  012777  033500  001734                  MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
013726  052777  000000  001726                  BIS     #0,@DHLPR               ;SET CHARACTER LENGTH FOR 5 BITS
013734  012777  100000  001726                  MOV     #100000,@DHBAR          ;START TRANSMITTER
013742  105777  001710                  1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
013746  100375                                  BPL     1$
013750  017704  001704                          MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                                ;IN LOW BYTE, AND LINE NUMBER AND
                                                                                ;CHARACTER STATUS IN HIGH BYTE
013754  012705  107437                          MOV     #107437,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                                ;AND LINE NUMBER AND CHARACTER
                                                                                ;STATUS IN HIGH BYTE
013760  020504                                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
013762  001401                                  BEQ     2$
013764                                          HLT                             ;CHARACTER LENGTH, DATA
013764  104000                                  EMT                             ;OR LINE NUMBER ERROR

013766  104400                  2$:     SCOPE
                000001                  LENGTX=LENGTX+1
                000006                  LENGTC=LENGTC+1
                000077                  XCODE=XCODE*2+1
                107477                  DATAR=LINEX*400+100000+XCODE
013770                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                                ;CHARACTER LENGTH TEST
```

```
                                        ;TRANSMIT 1 CHARACTER ON LINE 17
                                        ;CHARACTER LENGTH IS 6 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 77
                                        ;LINE SPEED IS 9600 BAUD

013770                                  TS \XN,400,2$
013770  012767  000340  164000  T76:    MOV     #340,PS             ;DISABLE ALL INTERRUPTS
013776  012767  000400  001720          MOV     #400,ICOUNT         ;SET UP FOR 400 ITERATIONS
014004  012767  014116  001706          MOV     #2$,ESCAPE          ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                        MOV     #,FREEZ1            ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
        000077                          XN=XN+1
014012  012777  004000  001636          MOV     #BIT11,@DHSCR       ;MASTER CLEAR INTERFACE
014020  012767  000077  001730          MOV     #77,TDATA           ;CHARACTER TO BE TRANSMITTED = 77(OCTAL)
014026  012777  000017  001622          MOV     #17,@DHSCR          ;SELECT LINE 17
014034  012777  177777  001624          MOV     #-1,@DHBC           ;SET UP TO TRANSMIT 1 BYTE
014042  012777  015756  001614          MOV     #TDATA,@DHBA        ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
014050  012777  033500  001604          MOV     #33500,@DHLPR       ;SET LINE SPEED FOR 9600 BAUD
014056  052777  000001  001576          BIS     #1,@DHLPR           ;SET CHARACTER LENGTH FOR 6 BITS
014064  012777  100000  001576          MOV     #100000,@DHBAR      ;START TRANSMITTER
014072  105777  001560          1$:     TSTB    @DHSCR              ;WAIT TO RECEIVE CHARACTER
014076  100375                          BPL     1$
014100  017704  001554                  MOV     @DHNRC,R4           ;(R4)=RECEIVED CHARACTER
                                                                    ;IN LOW BYTE, AND LINE NUMBER AND
                                                                    ;CHARACTER STATUS IN HIGH BYTE
014104  012705  107477                  MOV     #107477,R5          ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                    ;AND LINE NUMBER AND CHARACTER
                                                                    ;STATUS IN HIGH BYTE
014110  020504                          CMP     R5,R4               ;ARE EXPECTED AND RECEIVED DATA THE SAME
014112  001401                          BEQ     2$
014114                                  HLT
014114  104000                          EMT                         ;CHARACTER LENGTH, DATA

014116  104400                          SCOPE               2$:     ;OR LINE NUMBER ERROR
        000002                          LENGTX=LENGTX+1
        000007                          LENGTC=LENGTC+1
        000177                          XCODE=XCODE*2+1
        107577                          DATAR=LINEX*400+100000+XCODE
014120                                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                        ;CHARACTER LENGTH TEST
                                        ;TRANSMIT 1 CHARACTER ON LINE 17
                                        ;CHARACTER LENGTH IS 7 BITS
                                        ;EXPECTED RECEIVED CHARACTER IS 177
                                        ;LINE SPEED IS 9600 BAUD

014120                                  TS \XN,400,2$
014120  012767  000340  163650  T77:    MOV     #340,PS             ;DISABLE ALL INTERRUPTS
014126  012767  000400  001570          MOV     #400,ICOUNT         ;SET UP FOR 400 ITERATIONS
014134  012767  014246  001556          MOV     #2$,ESCAPE          ;SET UP TO ESCAPE TO NEXT TEST
                                        .IF NB  <>
                                        MOV     #,FREEZ1            ;SET UP TO LOOP WITH DATA       ; 3
                                        .ENDC
        000100                          XN=XN+1
014142  012777  004000  001506          MOV     #BIT11,@DHSCR       ;MASTER CLEAR INTERFACE
014150  012767  000177  001600          MOV     #177,TDATA          ;CHARACTER TO BE TRANSMITTED = 177(OCTAL)
```

```
014156  012777  000017  001472          MOV     #17,@DHSCR              ;SELECT LINE 17
014164  012777  177777  001474          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
014172  012777  015756  001464          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
014200  012777  033500  001454          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
014206  052777  000002  001446          BIS     #2,@DHLPR               ;SET CHARACTER LENGTH FOR 7 BITS
014214  012777  100000  001446          MOV     #100000,@DHBAR          ;START TRANSMITTER
014222  105777  001430          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
014226  100375                          BPL     1$
014230  017704  001424                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
014234  012705  107577                  MOV     #107577,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
014240  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
014242  001401                          BEQ     2$
014244                                  HLT                             ;CHARACTER LENGTH, DATA
014244  104000                          EMT                             ;OR LINE NUMBER ERROR

014246  104400          2$:     SCOPE
        000003          LENGTX=LENGTX+1
        000010          LENGTC=LENGTC+1
        000377          XCODE=XCODE*2+1
        107777          DATAR=LINEX*400+100000+XCODE
014250                  CHART1  \LINEX,\BITX,\LENGTX,\LENGTC,\XCODE,\DATAR

                                ;CHARACTER LENGTH TEST
                                ;TRANSMIT 1 CHARACTER ON LINE 17
                                ;CHARACTER LENGTH IS 10 BITS
                                ;EXPECTED RECEIVED CHARACTER IS 377
                                ;LINE SPEED IS 9600 BAUD

014250                  IS \XN,400,2$
014250                  TS \XN,400,2$
014250  012767  000340  163520  T100:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
014256  012767  000400  001440          MOV     #400,ICOUNT             ;SET UP FOR 400 ITERATIONS
014264  012767  014376  001426          MOV     #2$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
                                .IF NB  <>
                                        MOV     #,FREEZ1                ;SET UP TO LOOP WITH DATA       ; 3
                                .ENDC
        000101          XN=XN+1
014272  012777  004000  001356          MOV     #BIT11,@DHSCR           ;MASTER CLEAR INTERFACE
014300  012767  000377  001450          MOV     #377,TDATA              ;CHARACTER TO BE TRANSMITTED = 377(OCTAL)
014306  012777  000017  001342          MOV     #17,@DHSCR              ;SELECT LINE 17
014314  012777  177777  001344          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT 1 BYTE
014322  012777  015756  001334          MOV     #TDATA,@DHBA            ;SET UP ADDRESS OF CHARACTER TO BE TRANSMITTED
014330  012777  033500  001324          MOV     #33500,@DHLPR           ;SET LINE SPEED FOR 9600 BAUD
014336  052777  000003  001316          BIS     #3,@DHLPR               ;SET CHARACTER LENGTH FOR 10 BITS
014344  012777  100000  001316          MOV     #100000,@DHBAR          ;START TRANSMITTER
014352  105777  001300          1$:     TSTB    @DHSCR                  ;WAIT TO RECEIVE CHARACTER
014356  100375                          BPL     1$
014360  017704  001274                  MOV     @DHNRC,R4               ;(R4)=RECEIVED CHARACTER
                                                                        ;IN LOW BYTE, AND LINE NUMBER AND
                                                                        ;CHARACTER STATUS IN HIGH BYTE
014364  012705  107777                  MOV     #107777,R5              ;(R5)=EXPECTED CHARACTER IN LOW BYTE
                                                                        ;AND LINE NUMBER AND CHARACTER
                                                                        ;STATUS IN HIGH BYTE
014370  020504                          CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED DATA THE SAME
```

```
014372  001401                  BEQ     2$
014374                          hLT
014374  104000                  EMT                     ;CHARACTER LENGTH, DATA

014376  104400          2$:     SCOPE                   ;OR LINE NUMBER ERROR
        000004          LENGTX=LENGTX+1
        000011          LENGTC=LENGTC+1
        000777          XCODE=XCODE&2+1
        000020          LINEX=LINEX+1
        000000          BITX=BITX+BITX
```

```
      1 014400                          .EOP    ↑/BEGIN/

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

 014400  104401                 EOP:    TYPE                            ;TYPE NAME OF TEST
 014402  016362                         MEPASS
 014404  005067  001344                 CLR     LAST                    ;CLEAR LAST ERROR PC
 014410  005067  001274                 CLR     ERRFLG                  ;CLEAR ERROR FLAG
 014414  005267  001272                 INC     PASCNT                  ;UPDATE PASS COUNT
 014420  005767  164356                 TST     LIGHTS                  ; ARE WE USING LIGHTS?          ; 4
 014424  001005                         BNE     2$                      ; BRANCH IF WE ARE              ; 6
 014426  104401                         TYPE                            ; TYPE PASCOUNT MESSAGE         ; 5
 014430  016375                         PASTXT                                                          ; 5
 014432  104402                         OCTASC                          ; PRINT PASSCOUNT               ; 4
 014434  014472                         PASARG                                                                  ;4 ; 6
 014436  000403                         BR      3$                      ; CONTINUE                      ; 4
 014440                         2$:                                                                     ; 4
 014440  016767  001246  164334         MOV     PASCNT,LIGHTS           ;DISPLAY PASS COUNT
 014446                         3$:                                                                     ; 4
 014446  013701  000042                 MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DDP
 014452  001405                         BEQ     RESTRT                  ;IF NOT, CONTINUE TESTING
 014454  000005                         RESET
 014456  004711                 LOGICAL:        JSR     PC,(R1)
 014460  000240                         NOP
 014462  000240                         NOP
 014464  000240                         NOP
 014466  000167  164614         RESTRT: JMP     BEGIN
 014472  000001                 PASARG: .WORD   1                       ; PARAMETERS TO PRINT PASSCOUNT  ; 5
 014474     006     002                 .BYTE   6,2                                                     ; 5
 014476  015712                         .WORD   PASCNT                                                  ; 5
      2 014500                          .SCOPE

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

 014500  032777  002000  164272 SCOPER: BIT     @#SW10,@SWR                                             ; 4
 014506  001030                         BNE     4$
 014510  032777  040000  164262 1$:     BIT     @#SW14,@SWR                                             ; 4
 014516  001021                         BNE     3$
 014520  032777  004000  164252         BIT     @#SW11,@SWR                                             ; 4
 014526  001006                         BNE     2$
 014530  005267  001172                 INC     LPCNT
 014534  026767  001166  001162         CMP     LPCNT,ICOUNT
 014542  001007                         BNE     3$
 014544  005067  001156         2$:     CLR     LPCNT
 014550  005067  001134                 CLR     ERRFLG
 014554  011667  001136                 MOV     (SP),RETRN
 014560  000002                         RTI
 014562  016716  001130         3$:     MOV     RETRN,(SP)
 014566  000002                         RTI
 014570  005767  001114         4$:     TST     ERRFLG
 014574  001745                         BEQ     1$
 014576  000762                         BR      2$
```

```
      3 014600                          .SCOP1

                                                ;CHECK FOR FREEZE ON CURRENT DATA

        014600  032777  001000  164172  SCOP1R: BIT     @SW09,@SWR                    ; 4
        014606  001402                          BEQ     1$
        014610  016716  001106                 MOV     FREEZ1,(SP)
        014614  000002                  1$:     RTI
```

```
1 014616                                ERROR

                                        ;ERROR HANDLER

014616  032777  020000  164154  ERRORS: BIT     @SW13,@SWR              ; 4
014624  001055                          BNE     HALTS
014626  021667  001122                  CMP     (SP),LAST
014632  001404                          BEQ     1$
014634  011667  001114                  MOV     (SP),LAST
014640  005067  001044                  CLR     ERRFLG
014644  104406                  1$:     SAVOSP
014646  011605                          MOV     (SP),R5
014650  162705  000002                  SUB     #2,R5
014654  011504                          MOV     (R5),R4
014656  006304                          ASL     R4
014660  006304                          ASL     R4
014662  042704  177001                  BIC     #177001,R4
014666  062704  016514                  ADD     #ERRTAB,R4
014672  012467  000040                  MOV     (R4)+,ERRMSG
014676  011467  000052                  MOV     (R4),DATABP
014702  005767  001002                  TST     ERRFLG
014706  001403                          BEQ     TYPMSG
014710  005767  000040                  TST     DATABP
014714  001011                          BNE     TYPDAT
014716  104401                  TYPMSG: TYPE                            ; 3
014720  016272                          MCRLF                           ; 5
014722  104402                          OCTASC                          ; 5
014724  015022                          ERTABO                          ; 5
014726  012767  000001  000754          MOV     #1,ERRFLG
014734  104401                          TYPE
014736  000000                  ERRMSG: 0
014740  005767  000010          TYPDAT: TST     DATABP
014744  001404                          BEQ     RESREG
014746  104401                          TYPE
014750  016272                          MCRLF                           ; 5
014752  104402                          OCTASC                          ; 5
014754  000000                  DATABP: 0
014756  104407                  RESREG: RESO5
014760  005777  164014          HALTS:  TST     @SWR
014764  100005                          BPL     EXITER                  ; 4
014766  010046                          PUSHRO
014770  016600  000002                  MOV     2(SP),RO
014774  000000                          HALT
014776  012600                          POPRO
015000  005267  000710          EXITER: INC     ERRCNT
015004  032777  002000  163766          BIT     @SW10,@SWR              ; 4
015012  001402                          BEQ     1$
015014  016716  000700                  MOV     ESCAPE,(SP)
015020  000002                  1$:     RTI
015022  000001                  ERTABO: 1
015024     006     002                  .BYTE   6,2
015026  015746                          SAVPC
```

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

015030  011646          TRPSRV: MOV     (SP),-(SP)          ;GET PC OF RETURN
015032  162716  000002          SUB     #2,(SP)             ;=PC OF TRAP
015036  017616  000000          MOV     @(SP),(SP)          ;GET TRP
015042  006316          TRPOK:  ASL     (SP)                ;MULTIPLY TRAP ARG BY 2
015044  042716  177001          BIC     #177001,(SP)        ;CLEAR UNWANTED BITS
015050  062716  015434          ADD     #TRPTAB,(SP)        ;POINTER TO SUBROUTINE ADDRESS
015054  017616  000000          MOV     @(SP),(SP)          ;SUBROUTINE ADDRESS
015060  000136                  JMP     @(SP)+              ;GO TO SUBROUTINE
      2 015062                  .SAVREG

                                ;SAVE PC OF TEST THAT FAILED AND R0-R5

015062  016667  000004  000656  SV05P:  MOV     4(SP),SAVPC

                                ;SAVE R0-R5

015070  010567  000646          SV05:   MOV     R5,SAVR5
015074  010467  000640                  MOV     R4,SAVR4                                ; 3
015100  010367  000632                  MOV     R3,SAVR3
015104  010267  000624                  MOV     R2,SAVR2
015110  010167  000616                  MOV     R1,SAVR1
015114  010067  000610                  MOV     R0,SAVR0
015120  000002                          RTI
      3 015122                  .RESREG
                                ;RESTORE R0-R5

015122  016700  000602          RS05:   MOV     SAVR0,R0
015126  016701  000600                  MOV     SAVR1,R1
015132  016702  000576                  MOV     SAVR2,R2
015136  016703  000574                  MOV     SAVR3,R3
015142  016704  000572                  MOV     SAVR4,R4
015146  016705  000570                  MOV     SAVR5,R5
015152  000002                          RTI
```

```
      1 015154                                .TYPER

                                              ;TELETYPE OUTPUT ROUTINE

 015154  017605  000000          TYPER:  MOV     @(SP),R5                ; 3
 015160  062716  000002                  ADD     #2,(SP)
 015164  105777  000462          1$:     TSTB    @TPCSR
 015170  100375                          BPL     1$
 015172  105715                          TSTB    (R5)
 015174  001001                          BNE     2$
 015176  000002                          RTI
 015200  112577  000450          2$:     MOVB    (R5)+,@TPDBR
 015204  000767                          BR      1$
    2 015206                     .INSTRG

                                              ;ASCII STRING INPUT ROUTINE

 015206  017667  000000  000006  INSTRG: MOV     @(SP),MSG
 015214  062716  000002                  ADD     #2,(SP)
 015220  104401                  INSTR1: TYPE
 015222  000000                  MSG:    0
 015224  012704  016456                  MOV     #INBUF,R4
 015230  012703  000007                  MOV     #7,R3
 015234  105777  000406          1$:     TSTB    @TKCSR
 015240  100375                          BPL     1$
 015242  117714  000402                  MOVB    @TKDBR,(R4)
 015246  142714  000200                  BICB    #200,(R4)
 015252  122427  000015                  CMPB    (R4)+,#15
 015256  001413                          BEQ     INSTR2
 015260  117777  000364  000366          MOVB    @TKDBR,@TPDBR
 015266  105777  000360          2$:     TSTB    @TPCSR
 015272  100375                          BPL     2$
 015274  005303                          DEC     R3
 015276  001356                          BNE     1$
 015300  104401                  INSTRE: TYPE
 015302  016266                          MQM
 015304  000745                          BR      INSTR1
 015306  000002                  INSTR2: RTI
```

```
1 015310                                .PARAMS

                                        ;CONVERT ASCII STRING TO OCTAL                  ; 3

 015310  011605                 PARAMS: MOV     (SP),R5
 015312  012567  000146                 MOV     (R5)+,LOLIM
 015316  012567  000144                 MOV     (R5)+,HILIM
 015322  012567  000142                 MOV     (R5)+,DEVADR
 015326  112567  000140                 MOVB    (R5)+,LOBITS
 015332  112567  000135                 MOVB    (R5)+,ADRCNT
 015336  010516                         MOV     R5,(SP)
 015340  005005                 PARAM1: CLR     R5
 015342  012704  016456                 MOV     #INBUF,R4
 015346  122714  000015                 CMPB    #15,(R4)
 015352  001420                         BEQ     PARERR
 015354  121427  000060         1$:     CMPB    (R4),#60
 015360  002415                         BLT     PARERR
 015362  121427  000067                 CMPB    (R4),#67
 015366  003012                         BGT     PARERR
 015370  142714  000060                 BICB    #60,(R4)
 015374  152405                         BISB    (R4)+,R5
 015376  122714  000015                 CMPB    #15,(R4)
 015402  001406                         BEQ     LIMITS
 015404  006305                         ASL     R5
 015406  006305                         ASL     R5
 015410  006305                         ASL     R5
 015412  000760                         BR      1$
 015414  104404                 PARERR: INSTER
 015416  000750                         BR      PARAM1

                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS

 015420  020567  000042         LIMITS: CMP     R5,HILIM
 015424  101373                         BHI     PARERR
 015426  020567  000032                 CMP     R5,LOLIM
 015432  103770                         BLO     PARERR
 015434  136705  000032                 BITB    LOBITS,R5                               ; 3
 015440  001365                         BNE     PARERR

                                        ;STORE NUMBER AT SPECIFIED ADDRESS

 015442  016704  000022                 MOV     DEVADR,R4
 015446  010524                 1$:     MOV     R5,(R4)+
 015450  062705  000002                 ADD     #2,R5
 015454  105367  000013                 DECB    ADRCNT
 015460  001372                         BNE     1$
 015462  000002                         RTI
 015464  000000                 LOLIM:  0
 015466  000000                 HILIM:  0
 015470  000000                 DEVADR: 0
 015472  000000                 LOBITS: 0
         015473                 ADRCNT=LOBITS+1
```

```
015474                                  .OCTASC

                                        ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER

015474  017601  000000        OCTASN: MOV     @(SP),R1
015500  062716  000002                ADD     #2,(SP)                 ; 5
015504  012167  000130                MOV     (R1)+,WRDCNT
015510  112167  000126        1$:     MOVB    (R1)+,CHRCNT
015514  112167  000123                MOVB    (R1)+,SPACNT
015520  013167  000120                MOV     @(R1)+,BINWRD           ; 3
015524  016704  000114        2$:     MOV     BINWRD,R4
015530  116705  000106                MOVB    CHRCNT,R5
015534  012700  016470                MOV     #TEMP,R0
015540  010403                3$:     MOV     R4,R3
015542  042703  177770                BIC     #177770,R3
015546  062703  000260                ADD     #260,R3
015552  110320                        MOVB    R3,(R0)+
015554  006204                        ASR     R4
015556  006204                        ASR     R4
015560  006204                        ASR     R4
015562  005305                        DEC     R5
015564  001365                        BNE     3$
015566  012703  016502                MOV     #MDATA,R3
015572  114023                4$:     MOVB    -(R0),(R3)+
015574  105367  000042                DECB    CHRCNT
015600  001374                        BNE     4$
015602  105767  000035                TSTB    SPACNT
015606  001405                        BEQ     6$
015610  112723  000240        5$:     MOVB    #240,(R3)+
015614  105367  000023                DECB    SPACNT
015620  001373                        BNE     5$
015622  105013                6$:     CLRB    (R3)
015624  104401                        TYPE
015626  016502                        MDATA
015630  005367  000004                DEC     WRDCNT
015634  001325                        BNE     1$
015636  000002                        RTI
015640  000000                WRDCNT: 0
015642  000000                CHRCNT: 0
        015643                SPACNT=CHRCNT+1
015644  000000                BINWRD: 0
```

```
        015646                          .POINT  ↑/DHSCR,DHNRC,DHLPR,DHBA,DHBC,DHBAR,DHBCR,DHSSR,DHSLR,DHRVEC,DHRLVL,DHTVEC,DHTLVL/
                                                ;INDIRECT POINTERS                                                              ; 3

        015646  177560                  TKCSR:  177560
        015650  177562                  TKDBR:  177562
        015652  177564                  TPCSR:  177564
        015654  177566                  TPDBR:  177566
                                        .IRP    A       <DHSCR,DHNRC,DHLPR,DHBA,DHBC,DHBAR,DHBCR,DHSSR,DHSLR,DHRVEC,DHRLVL,DHTVEC,DH
TLVL>
                                        A:      0
                                        .ENDM
        015656  000000                  DHSCR:  0
        015660  000000                  DHNRC:  0
        015662  000000                  DHLPR:  0
        015664  000000                  DHBA:   0
        015666  000000                  DHBC:   0
        015670  000000                  DHBAR:  0
        015672  000000                  DHBCR:  0
        015674  000000                  DHSSR:  0
        015676  000000                  DHSLR:  0
        015700  000000                  DHRVEC: 0
        015702  000000                  DHRLVL: 0
        015704  000000                  DHTVEC: 0
        015706  000000                  DHTLVL: 0
      2 015710                          .VARIA  <↑/TDATA/>
                                                ;PROGRAM VARIABLES

        015710  000000                  ERRFLG: 0               ;ERROR FLAG
        015712  000000                  PASCNT: 0               ;PASS COUNT
        015714  000000                  ERRCNT: 0               ;ERROR COUNT
        015716  000000                  RETRN:  0               ;SCOPE RETURN ADDRESS FOR TEST LOOPING
        015720  000000                  ESCAPE: 0               ;ADDRESS FOR ERROR ESCAPE
        015722  000000                  FREEZ1: 0               ;DATA LOOPING RETURN ADDRESS
        015724  000000                  ICOUNT: 0               ;ITERATION COUNT FOR TEST IN PROGRESS
        015726  000000                  LPCNT:  0               ;NUMBER OF ITERATIONS THIS TEST
        015730  000000                  SAVR0:  0               ;R0 SAVE AREA
        015732  000000                  SAVR1:  0               ;R1 SAVE AREA
        015734  000000                  SAVR2:  0               ;R2 SAVE AREA                                                   ; 3
        015736  000000                  SAVR3:  0               ;R3 SAVE ARE
        015740  000000                  SAVR4:  0               ;R4 SAVE AREA
        015742  000000                  SAVR5:  0               ;R5 SAVE AREA
        015744  000000                  SAVSP:  0               ;STACK POINTER SAVE AREA
        015746  000000                  SAVPC:  0               ;CALLING ROUTINE SAVE AREA
        015750  000000                  INIFLG: 0               ;PROGRAM INITIALIZATION FLAG
        015752  000000                  STFLG:  0               ;PROGRAM START FLAG
        015754  000000                  LAST:   0               ;LAST ERROR PC
                                        .IRP    A       <↑/TDATA/>
                                        A:      0
                                        .ENDM
        015756  000000                  TDATA:  0
```

```
1 015760                                .PFAIL
                                        ;ENTER HERE ON POWER FAILURE

 015760  010046                PFAIL:  MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
 015762  010146                        MOV     R1,-(SP)
 015764  010246                        MOV     R2,-(SP)
 015766  010346                        MOV     R3,-(SP)
 015770  010446                        MOV     R4,-(SP)
 015772  010546                        MOV     R5,-(SP)
 015774  016746  162024               MOV     24,-(SP)
 016000  010667  177740               MOV     SP,SAVSP                ;SAVE STACK POINTER
 016004  012767  016016  162012       MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP       ; 3
 016012  000000                       HALT                            ;HALT ON POWER DOWN NORMAL
 016014  000777                       BR      .

                                        ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED

 016016  016706  177722       RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
 016022  012605                       MOV     (SP)+,R5                ;RESTORE R0-R5
 016024  012604                       MOV     (SP)+,R4
 016026  012603                       MOV     (SP)+,R3
 016030  012602                       MOV     (SP)+,R2
 016032  012601                       MOV     (SP)+,R1
 016034  012600                       MOV     (SP)+,R0
 016036  012767  015760  161760       MOV     #PFAIL,24               ;SET UP FOR POWER FAILURE
 016044  012767  000340  161724       MOV     #340,PS
 016052  012706  017004               MOV     #STACK,SP
 016056  005067  000406               CLR     TEMP
 016062  005267  000402               INC     TEMP
 016066  001375                       BNE     .-4
 016070  104401                       TYPE
 016072  016272                       MCRLF                                                   ; 5
 016074  104402                       OCTASC                                                  ; 5
 016076  016120                       PFTAB
 016100  104401                       TYPE
 016102  016275                       MPFAIL
 016104  005067  177600               CLR     ERRFLG
 016110  005067  177640               CLR     LAST
 016114  000177  177576               JMP     @RETRN
 016120  000001              PFTAB:  1
 016122  000006  000002               6,2
 016126  015716                       RETRN
```

```
016130                                  .MSG    †/DH11 CHARACTER LENGTH AND BASIC DATA TEST/,†/CZDHE-CO/
016130  015  012  012  MTITLE: .ASCIZ  <15><12><12>/DH11 CHARACTER LENGTH AND BASIC DATA TEST /<15><12>
016133  104  110  061
016136  061  040  103
016141  110  101  122
016144  101  103  124
016147  105  122  040
016152  114  105  116
016155  107  124  110
016160  040  101  116
016163  104  040  102
016166  101  123  111
016171  103  040  104
016174  101  124  101
016177  040  124  105
016202  123  124  040
016205  015  012  000
016210  015  012  126  MVECTO: .ASCIZ  <15><12>/VECTOR ADDRESS-/
016213  105  103  124
016216  117  122  040
016221  101  104  104
016224  122  105  123
016227  123  055  000
016232  015  012  103  MREGAD: .ASCIZ  <15><12>/CONTROL REGISTER ADDRESS-/
016235  117  116  124
016240  122  117  114
016243  040  122  105
016246  107  111  123
016251  124  105  122
016254  040  101  104
016257  104  122  105
016262  123  123  055
016265  000
016266  040  040  077  MQM:    .ASCIZ  /  ?/
016271  000
016272  015  012  000  MCRLF:  .ASCIZ   <15><12>

016275  040  040  120  MPFAIL: .ASCIZ  /  POWER FAILURE, PROGRAM RESTART AT TEST IN PROGRESS/
016300  117  127  105
016303  122  040  106
016306  101  111  114
016311  125  122  105
016314  054  040  120
016317  122  117  107
016322  122  101  115
016325  040  122  105
016330  123  124  101
016333  122  124  040
016336  101  124  040
016341  124  105  123
016344  124  040  111
016347  116  040  120
016352  122  117  107
016355  122  105  123
016360  123  000
016362  015  012  103  MEPASS: .ASCIZ  <15><12>/CZDHE-CO/
016365  132  104  110
```

```
 016370   105   055   103
 016373   060   000
 016375   015   012   120  PASTXT: .ASCIZ  <15><12>/PASS COUNT = /
 016400   101   123   123
 016403   040   103   117
 016406   125   116   124
 016411   040   075   040
 016414   000
 016415   015   012   122  MR:     .ASCIZ  <15><12>/R/
 016420   000
 016421   015   012   124  MTSTPC: .ASCIZ  <15><12>/TEST PC-/
 016424   105   123   124
 016427   040   120   103
 016432   055   000

                           .EVEN
                           .EVEN
 016434                    .TRPTAB

                                   ;TABLE OF POINTERS FOR TRAP DECODING

 016434  014500            TRPTAB: SCOPER
 016436  015154                    TYPER
 016440  015474                    OCTASN
 016442  015206                    INSTRG
 016444  015300                    INSTRE
 016446  015310                    PARAMS
 016450  015062                    SV05P
 016452  015122                    RS05
 016454  014600                    SCOP1R
 016456                    .BUFFER

                                   ;BUFFERS FOR INPUT-OUTPUT

 016456  000000            INBUF:  0
         016470                    .=.+10
 016470  000000            TEMP:   0
         016502                    .=.+10

 016502  000000            MDATA:  0
         016514                    .=.+10
 016514                    .ERRTAB

                                   ;TABLE OF POINTERS TO ERROR MESSAGES AND DATA

 016514                    ERRTAB:
 016514  016520                    EM1
 016516  016572                    DT1
 016520    103   110   101  EM1:    .ASCIZ  /CHARACTER LENGTH ERROR/<15><12>/EXP     REC     /
 016523    122   101   103
 016526    124   105   122
 016531    040   114   105
 016534    116   107   124
 016537    110   040   105
 016542    122   122   117
 016545    122   015   012
 016550    105   130   120
 016553    040   040   040
```

```
    016556     040     040     122
    016561     105     103     040
    016564     040     040     040
    016567     040     000
 9                                      .EVEN
10 016572  000002                      DT1:    2
11 016574     006     002               .BYTE   6,2
12 016576  015742                              SAVR5
13 016600     006     000               .BYTE   6,0
14 016602  015740                              SAVR4
15 016604                               .ENDCOD
   016604  000000                      ENDCOD: 0
16         000001                      .END
```

SYMBOL TABLE

```
ADRCNT= 015473
BEGIN   001306
BINWRD  015644
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  015642
CLENGT= 000011
CODEX = 000777
DATABP  014754
DATAR = 107777
DEVADR  015470
DHBA    015664
DHBAR   015670
DHBC    015666
DHBCR   015672
DHLPR   015662
DHNRC   015660
DHRLVL  015702
DHRVEC  015700
DHSCR   015656
DHSLR   015676
DHSSR   015674
DHTLVL  015706
DHTVEC  015704
DT1     016572
EM1     016520
ENDCOD  016604
EOP     014400
ERRCNT  015714
ERRFLG  015710
ERRMSG  014736
ERRORS  014616
ERRTAB  016514
ERTABO  015022
ESCAPE  015720
EXITER  015000
FREEZ1  015722
HALTS   014760
HILIM   015466
ICOUNT  015724
INBUF   016456
INIFLG  015750
INSTER= 104404
INSTR = 104403
INSTRE  015300
INSTRG  015206
INSTR1  015220
INSTR2  015306
LAST    015754
LENGTC= 000011
LENGTX= 000004
LIGHTS  001002
LIMITS  015420
LINEX = 000020
LOBITS  015472
LOGICA  014456
LOLIM   015464
LPCNT   015726
MCRLF   016272
MDATA   016502
MEPASS  016362
MPFAIL  016275
MQM     016266
MR      016415
MREGAD  016232
MSG     015222
MTITLE  016130
MTSTPC  016421
MVECTO  016210
N     = 000001
OCTASC= 104402
OCTASN  015474
PARAM = 104405
PARAMS  015310
PARAM1  015340
PARERR  015414
PASARG  014472
PASCNT  015712
PASTXT  016375
PFAIL   015760
PFTAB   016120
POPRO = 012600
POP1SP= 005726
POP2SP= 022626
PS    = 177776
PUSHRO= 010046
PUSH1S= 005746
PUSH2S= 024646
RDATA = 107777
RESREG  014756
RESTAR  016016
RESTRT  014466
RES05 = 104407
RETRN   015716
RS05    015122
SAVPC   015746
SAVR0   015730
SAVR1   015732
SAVR2   015734
SAVR3   015736
SAVR4   015740
SAVR5   015742
SAVSP   015744
SAV05P= 104406
SCOPE = 104400
SCOPER  014500
SCOPE1= 104410
SCOP1R  014600
SPACNT= 015643
STACK = 017004
START   001004
STFLG   015752
SV05    015070
SV05P   015062
SWR     001000
SW00  = 000001
SW01  = 000002
SW02  = 000004
SW03  = 000010
SW04  = 000020
SW05  = 000040
SW06  = 000100
SW08  = 000400
SW09  = 001000
SW10  = 002000
SW11  = 004000
SW12  = 010000
SW13  = 020000
SW14  = 040000
SW15  = 100000
TDATA   015756
TEMP    016470
TKCSR   015646
TKDBR   015650
TPCSR   015652
TPDBR   015654
TRPOK   015042
TRPSRV  015030
TRPTAB  016434
TYPDAT  014740
TYPE  = 104401
TYPER   015154
TYPMSG  014716
T1      001400
T10     002550
T100    014250
T11     002700
T12     003030
T13     003160
T14     003310
T15     003440
T16     003570
T17     003720
T2      001530
T20     004050
T21     004200
T22     004330
T23     004460
T24     004610
T25     004740
T26     005070
T27     005220
T3      001660
T30     005350
T31     005500
T32     005630
T33     005760
T34     006110
T35     006240
T36     006370
T37     006520
T4      002010
T40     006650
T41     007000
T42     007130
T43     007260
T44     007410
T45     007540
T46     007670
T47     010020
T5      002140
T50     010150
T51     010300
T52     010430
T53     010560
T54     010710
T55     011040
T56     011170
T57     011320
T6      002270
T60     011450
T61     011600
T62     011730
T63     012060
T64     012210
T65     012340
T66     012470
T67     012620
T7      002420
T70     012750
T71     013100
T72     013230
T73     013360
T74     013510
T75     013640
T76     013770
T77     014120
VEC1    001164
VEC2    001174
WRDCNT  015640
X     = 000000
XBIT  = 000000
XCODE = 000777
XLENGT= 000004
XLINE = 000020
XN    = 000101
Y     = 000011

. ABS.  016606      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  17664 WORDS  ( 69 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  71 PAGES
CZDHEC.BIN,CZDHEC.SEQ=CZDHEC.DOC,DHMACA.MAC,CZDHEC.P11
```