DL11

DL11-E, C/D OFFLINE TEST

MD-11-DDDLA-A

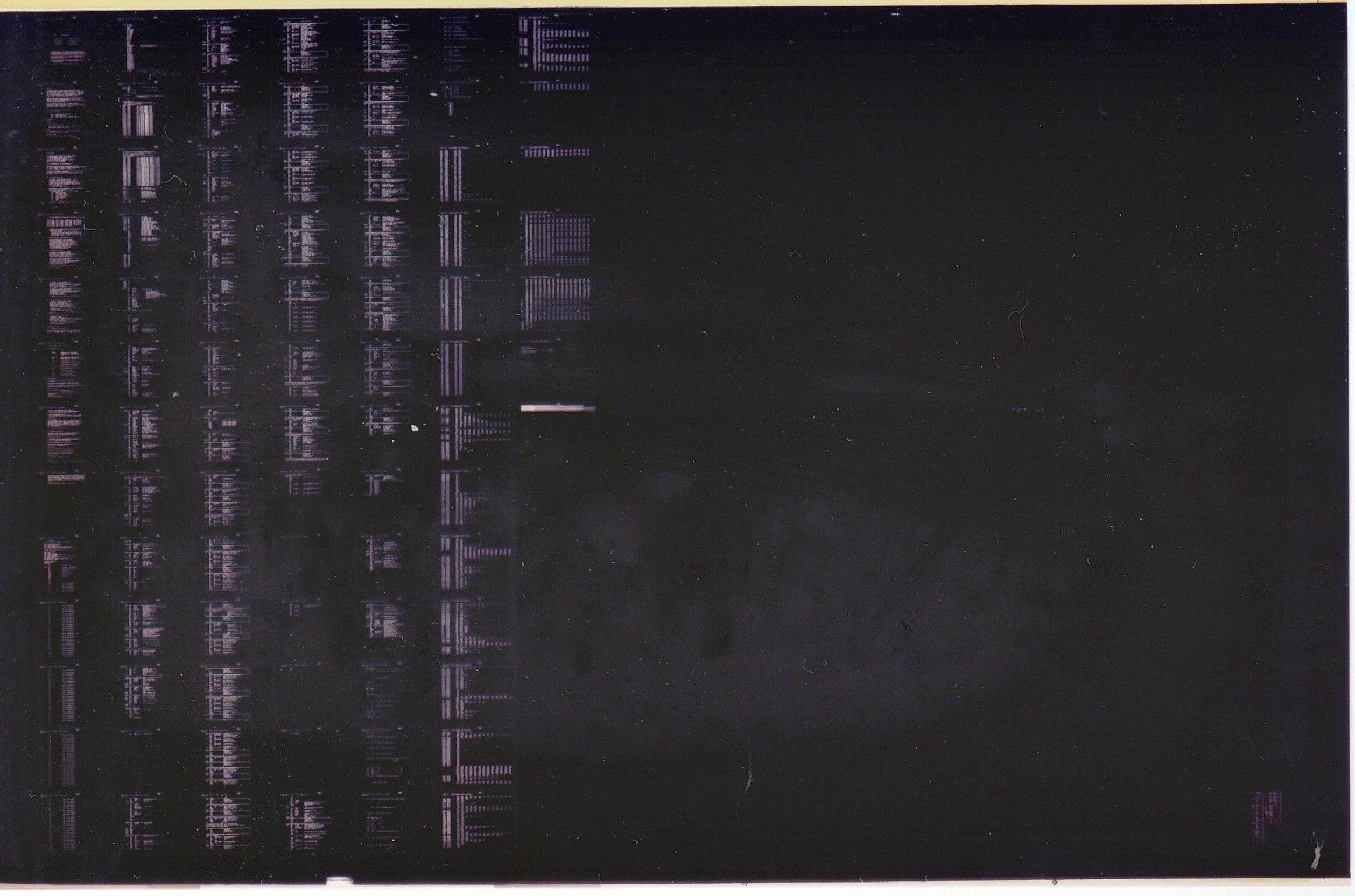
EP-DDDLB-A-DL-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN USA



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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DDDLA-A-D

PRODUCT NAME: DL11-E,C/D OFF LINE TEST

DATE RELEASED: 21 DECEMBER 1975

MAINTAINER: DIAGNOSTIC GROUP

1. ABSTRACT

TWO SEPARATE DIAGNOSTIC PROGRAMS ARE PROVIDED FOR THE DL11-E (ASYNCRONOUS MODEM INTERFACE), MAINDEC-11-DDDLA-A (DL11-E OFF LINE TESTS) AND MAINDEC-11-DYDLB-A (DL11-E ON LINE TESTS). THE OFF LINE TEST TESTS ALL DL11-E LOGIC . THE OFF LINE TESTS DO NOT REQUIRE THE USE OF A MODEM, HOWEVER A SPECIAL JUMPER CONNECTOR H315 IS REQUIRED. THE ON LINE TESTS ARE ESSENTIALLY DATA RELIABILITY TESTS REQUIRING THE USE OF MODEMS AND A SUITABLE TERMINAL DEVICE.

THE DL11-C AND DL11-D CAN ALSO BE TESTED WITH THIS OFF LINE TEST. THESE ARE BOTH TESTED IN MAINTENANCE MODE AND ONLY THOSE TESTS MARKED C,D IN THE TEST NUMBER ARE EXECUTED. IN ORDER TO TEST C AND D VERSIONS IT IS NECESSARY TO MODIFY THE TABLE AT LOCATION 1300 ACCORDING TO THE INSTRUCTIONS CONTAINED THERE.

TESTS WHICH ARE NOT EXECUTED FOR DL11C+D CAN BE PERFORMED BY USING THE SELECT SWITCH OPTION (SR9). TEST 56 IS A DATA TEST WHICH CAN BE USED FOR CABLE TESTING DL11-D'S. WARNING--A FAILURE IN THIS TEST MAY OCCUR DUE TO A SPLIT BAUD RATE OF RCVTR/TXVTR.

THIS DOCUMENT DESCRIBES THE OFF LINE TESTS.

THE AVAILABLE TESTS ARE:

PRG0	INPUT/OUTPUT LOGIC TESTS
PRG1	TRANSMITTER SCOPE LOOP
PRG2	RECEIVER SCOPE LOOP
PRG3	SINGLE CHARACTER MAINT. MODE DATA TEST
PRG4	SPECIAL BINARY COUNT MAINTENANCE MODE DATA TEST

2. REQUIREMENTS

2.1 EQUIPMENT

A. PDP 11 SYSTEM

B. DL11-E OR DL11-C OR DL11-D

C. SPECIAL JUMPER CONNECTOR H315 (SEE DL11 MAINTENANCE MANUAL FOR DETAILED DESCRIPTION) IF DL11-E.

2.2 STORAGE

THIS PROGRAM USES ALL OF CORE (4K) EXCEPT THAT AREA RESERVED FOP THE BOOTSTRAP AND ABSOLUTE LOADERS.

3. LOADING PROCEDURE

THE ABSOLUTE LOADER IS USED TO LOAD THE PROGRAM.

4. USE PROCEDURE

THIS PROGRAM HAS BEEN MODIFIED TO RUN WITH OR WITHOUT
A CONSOLE PROCESSOR. AND ALSO WITH OR WITHOUT A TTY
IF A CONSOLE MACHINE IS USED; THEN THE PROGRAM
LOOKS AT THE HARDWARE SWITCH REGISTER.
IF A CONSOLE-LESS MACHINE IS USED;THEN THE PROGRAM
AUTOMATICALLY LOOKS AT THE CONTENTS OF LOCATION
SOFTSR (176) AS A SWITCH REGISTER.

IT'S THE RESPONSIBILITY OF THE OPERATOR TO SET UP
THIS LOCATION PRIOR TO STARTING THE PROGRAM.

BEFORE STARTING ANY OF THE SELECTABLE PROGRAMS MAKE SURE
THAT THE TTY IS IN REMOTE MODE (IF THERE IS ONE); AND THAT THE PROGRAM SELECTED
IS A LEGAL PROGRAM,IE: SR 0-2=0-4, OTHERWISE AN ERROR MESSAGE
WILL OCCUR. (IGNORE THIS PARAGRAPH IF THERE IS NO TTY)

A MAP OF DEVICES PRESENT WILL BE TYPED AT RUN TIME. THIS MAP WILL NOT
 BE TYPED OUT AGAIN UNLESS THE PROGRAM IS
RESTARTED AT LOCATION 200. A RESTART FROM THIS LOCATION WILL CAUSE
THE MAP OF DEVICES TO BE TYPED OUT AGAIN AND THEN A NORMAL START
WILL OCCUR.

4.1 PRGO INPUT/OUTPUT LOGIC TESTS

A. LOAD ADDRESS = 000200 (RESTART LOAD ADDR. = 000204)
LOAD SR 0-2 = 0, AND PRESS START SWITCH.
THE DIAGNOSTIC WILL IDENTIFY THE PROGAM YOU SELECTED,
IF THERE IS A TTY AND WILL HALT AT LOCATION 6444.
DISCONNECT THE DL11-E FROM THE MODEM AND INSERT THE JUMPER CON-
NECTOR IN THE MODEM END OF THE CABLE,AND PRESS CONTINUE.
NOTE, IF THE CABLE IS LEFT CONNECTED TO THE MODEM THE FOL-
LOWING TESTS WILL FAIL:
AT22,AT23,AT25,AT30,AT32,AT56

B. THE PROGRAM WILL TYPE OUT INSTRUCTIONS TO SET IN THE DESIRED
SR OPTIONS, IF TTY IS AVAILABLE AND WILL HALT AT LOCATION 4724.
PRESS CONTINUE WHEN THE OPTIONS ARE IN THE SR.
THE AVAILABLE OPTIONS ARE:

SR 0-5	ROUTINE TO BE RUN (IF ENABLED BY SR9)
SR6	HALT ON END OF PASS.
SR7	DISABLE STALL MODE
SR9	LOOP SELECTED ROUTINE
SR10	HALT AT END OF CURRENT TEST
SR11	INHIBIT ITERATION
SR12	SELECT LINE NUMBER AND LOCK ON IT
SR13	INHIBIT PRINTOUT
SR14	SCOPE
SR15	HALT ON ERROR.

C. THE PROGRAM WILL NOW REQUEST THE LINE #(IF SR12=1) YOU WISH TO
TEST. AND WILL HALT AT LOCATION 3776.

LOAD THE LINE # AS REQUESTED AND PRESS CONTINUE.
LINE NUMBER REFERS TO THE ADDRESSES TO WHICH THE DL11-E RESPONDS.

LINE 00 77561X	LINE 10 77571X	LINE 20 77601X	LINE 30 77611X
LINE 01 77562X	LINE 11 77572X	LINE 21 77602X	LINE 31 77612X
LINE 02 77563X	LINE 12 77573X	LINE 22 77603X	LINE 32 77613X
LINE 03 77564X	LINE 13 77574X	LINE 23 77604X	LINE 33 77614X
LINE 04 77565X	LINE 14 77575X	LINE 24 77605X	LINE 34 77615X
LINE 05 77656X	LINE 15 77576X	LINE 25 77606X	LINE 35 77616X
LINE 06 77567X	LINE 16 77577X	LINE 26 77607X	LINE 36 77617X
LINE 07 77570X	LINE 17 77600X	LINE 27 77610X	

D. THE PROGRAM WILL NOW BEGIN TESTING THE DL11-E OR C/D YOU SELECTED.
ALL DL11'S WILL BE TESTED AUTOMATICALLY AND SEQUENTIALLY
UNLESS SR12 IS SELECTED.
NOTE: ALL LOGIC TESTS WILL NOT BE RUN AUTOMATICALLY.
THERE ARE TWO TESTS WHICH REQUIRE MANUAL INTERVENTION
WHICH ARE USED TO TEST THE SPEED SELECTION SWITCHES.
THESE ARE TESTS T34,T40. TO EXECUTE THESE TESTS USE SR9 AND
SR 0-6 TO SELECT THEM.

E. REFER TO SECTION 5.1.2 FOR ERROR DESCRIPTION

F. AFTER ONE COMPLETE PASS THE BELL WILL RING
FOLLOWED BY "END PASS = " WITH THE NUMBER OF
PASSES COMPLETED SINCE PROGRAM LAST STARTED AND
THE DEVICE ADDRESS UNDER TEST AND ITS TRAP VECTOR.
ALSO, THERE WILL BE A 5 ON THE DISPLAY LIGHTS FOR A
FEW SECONDS JUST BEFORE THE TIME OF TYPING OUT.
PROGRAM WILL STORE AWAY IN CORE THE NUMBER OF PASSES
COMPLETED, THE DEVICE ADDRESS UNDER TEST AND ITS
TRAP VECTOR STARTING AT LOCATION 17420.
IF SR6 WAS UP PROGRAM WILL HALT AT LOCATION
252. PRESS CONTINUE FOR ANOTHER PASS.

4.2 PRG1 - TRANSMITTER SCOPE LOOP

A. LOAD ADDRESS = 000200 (RESTART = 000204)
LOAD SR 0-2 = 1, AND PRESS START SWITCH.
THE DIAGNOSTIC WILL IDENTIFY THE PROGRAM YOU SELECTED, AND
REQUEST THE LINE # YOU WISH TO TEST, IF TTY IS
AVAILABLE AND WILL HALT AT LOCATION 3776.
LOAD THE LINE # AS REQESTED AND PRESS CONTINUE.

B. THE PROGRAM WILL REQUEST A CHARACTER CODE, AND A DELAY
TIME. AND WILL HALT AT LOCATION 14370.
THE CHARACTER CODE IS THE DATA THE DL11-E WILL TRANSMIT
AND THE DELAY IS THE TIME ELAPSED BETWEEN SUCCESSIVE TRANS-
MISSIONS OF ONE CHARACTER. LOAD CHARACTER CODE IN
SR15-SR8; SET DELAY TIME IN SR7-SR0.
PRESS CONTINUE WHEN THIS DONE.

C. THE PROGAM WILL RUN WITHOUT ERROR OR END TYPEOUTS.

4.3 PRG2 - RECEIVER SCOPE LOOP

A. LOAD ADDRESS = 000200 (RESTART = 000204)
LOAD SR 0-2 = 2, AND PRESS START.
THE DIAGNOSTIC WILL IDENTIFY THE PROGRAM YOU SELECTED, AND
REQUEST THE LINE # YOU WISH TO TEST, IF TTY IS AVAILABLE
AND WILL HALT AT LOCATION 3776
LOAD THE LINE NO. AS REQUESTED AND PRESS CONTINUE.

B. THE PROGRAM WILL REQUEST A TEST CHARACTER CODE, AND A DELAY
TIME AND WILL HALT AT LOCATION 14430.
THE CHARACTER CODE IS THE DATA THAT THE DL11-E WILL BE
TRANSMITTING AND THE DELAY IS THE ELAPSED TIME BETWEEN SUCCES-
SIVE CHARACTERS. LOAD CHARACTER CODE IN SR15-SR8;
SET DELAY TIME IN SR7-SR0.
PRESS CONTINUE WHEN THIS DONE.

C. THE PROGRAM WILL NOW RUN WITHOUT ERROR OR END TYPEOUTS.

4.4 PRG3 - SINGLE CHARACTER MAINT MODE DATA TEST

A. LOAD ADDRESS = 000200 (RESTART = 000204)
LOAD SR 0-2 = 3, AND PRESS START.
THE DIAGNOSTIC WILL IDENTIFY THE PROGRAM YOU SELECTED, AND
REQUEST THE LINE # YOU WISH TO TEST, IF TTY IS
AVAILABLE AND WILL HALT AT LOCATION 3776.
LOAD THE LINE # AS REQUESTED AND PRESS CONTINUE.

B. THE PROGRAM WILL REQUEST A TEST CHARACTER. AND WILL HALT
AT LOCATION 14514.
LOAD THE TEST CHARACTER AND PRESS CONTINUE.

C. THE PROGRAM WILL NOW RUN CONTINUOSLY REPORTING ANY DATA FAIL-
URES.

4.5 PRG4 - SPECIAL BINARY COUNT MAINT. MODE DATA TEST

A. LOAD ADDRESS = 000200
LOAD SR 0-2 = 4, AND PRESS START.
THE DIAGNOSTIC WILL IDENTIFY THE PROGRAM YOU SELECTED, AND
REQUEST THE LINE # YOU WISH TO TEST, IF TTY IS AVAILABLE
AND WILL HALT AT LOCATION 3776.
LOAD THE LINE # AS REQUESTED AND PRESS CONINUE.

B. THE PROGRAM WILL BEGIN TESTING THE LINE YOU SELECTED.
AND REPORT ANY DATA ERRORS.

5. PROGRAM DESCRIPTIONS

5.1 PRG0 - INPUT/OUTPUT LOGIC TESTS

THE INPUT/OUTPUT LOGIC TESTS CONSIST OF 57(8) ROUTINES WHICH
MAY BE RUN IN SEQUENTIAL ORDER OR INDIVIDUALLY LOOPED (SEE
SECT 4.1, C FOR SWITCH SETTINGS). THE JUMPER CONNECTOR MUST

BE INSERTED BEFORE STARTING IF DL11-E.

5.1.1 ROUTINE DESCRIPTIONS

ROUTINE	TESTS
AT0-AT3	ADDRESSABILITY OF CSRS & DBRS
AT4-AT27	DIDDLES ALL BITS IN THE CSRS AND CHECKS THAT THEY CAN BE READ/WRITTEN PROPERLY.
AT31-AT32	PROPER OPERATION OF RESET INSTRUCTION
AT33	PROPER OPERATION OF READY BIT
AT34	PROPER OPERATION OF TRANSMIT SPEED SELECTION
AT35-AT37	PROPER OPERATION OF DONE BIT
AT40	PROPER OPERATION RECEIVER SPEED SELECT
AT41	PROPER OPERATION OF DATA OVERRUN
AT42-AT52	PROPER OPERATION OF INTERRUPTS
AT53	READING RXCSR DOES NOT CLEAR DONE
AT54	ERROR CAUSES INTERRUPT
AT55	DATA TEST MAINTENANCE MODE
AT56	DATA TEST WITH JUMPER
AT57	PROPER OPERATION OF BREAK BIT

5.1.2 ERROR DESCRIPTION

IF SR15 IS UP, PROGRAM WILL HALT AT LOCATION 5310
ON ANY ERROR.

IF A ROUTINE FAILS AND THE INHIBIT PRINTOUT SWITCH IS NOT
ENABLED (SR13) A PRINTOUT RESULTS. THE PRINTOUT FORMAT IS:

T(ROUTINE#) PC=(PC OF ERROR CALL) RXCSR=(ADDRESS OF DEVICE UNDER TEST)
AND AN ADDITIONAL/MESSAGE (IF APPLICABLE)

T005 PC=XXXX RXCSR=XXXX

T56 PC=XXXX RXCSR=XXXX DATA S/B:---WAS:---
INDICATING A DATA ERROR

THE ABOVE INFORMATION IS STORED IN CORE STARTING AT
LOCATION 17400.
FOR EXAMPLE :
17400 WILL CONTAIN ROUTINE # THAT FAILED
17402 WILL CONTAIN ERROR PC

17404 WILL CONTAIN ADDRESS OF DEVICE UNDER TEST
17406 WILL CONTAIN DATA SHOULD BE (IN CASE OF DATA ERROR)
17410 WILL CONTAIN DATA WAS (IN CASE OF DATA ERROR)

TO RESUME TESTING PRESS CONTINUE.
IF THE VECTOR PROVIDED BY THE INTERRUPTING DL11-E IS INCORRECT
A TRAP TO THE WRONG LOCATION WILL OCCUR AND AN ERROR MESSAGE
WILL OCCUR.

5.1.3 JUMPER CONNECTOR

THE JUMPER CONNECTOR TESTS THOSE F/F'S, GATES (RING INDICATOR, CARRIER TRANSITION, CLEAR TO SEND, AND SUPERVISORY RECEIVE DATA) WHICH CANNOT BE TESTED UNLESS A DATA SET IS ACTUALLY CONNECTED TO THE DL11-E. IN ADDITION TO TESTING DL11-E LOGIC THE JUMPER ALSO TESTS CABLE WIRING TO/FROM THE DL11-E/DATA SET. THE FOLLOWING TESTS WILL FAIL IF THE CABLE IS NOT INSALLED IN THE DL11-E:

AT22,AT23,AT25,AT30,AT32,AT56

5.2 PRG1-TRANSMITTER SCOPE LOOP

THE PURPOSE OF PRG1 IS TO ALLOW SCOPING OF TRANSMITTER FUNCTIONS IN A RUN CONDITION USING USER SPECIFIED DL11-E PARMATERS AND DATA. NO ERROR PRINTOUTS ARE PROVIDED.

5.3 PRG2-RECEIVER SCOPE LOOP

THE PURPOSE OF PRG2 IS TO ALLOW SCOPING OF RECEIVER FUNCTIONS IN A RUN CONDITION USING USER SPECIFIED DL11-E PARAMETERS AND DATA. NO ERROR PRINTOUTS ARE PROVIDED.

5.4 PRG3-SINGLE CHARACTER MAINT MODE DATA TEST

PRG3 TRANSMITS, RECEIVES AND CHECKS RECEIVED DATA USING USER SPECIFIED DL11-E PARAMETERS, AND DATA.

5.4.1 ERROR PRINTOUTS

SELF EXPLANITORY ERROR PRINTOUTS ARE PROVIDED.

5.5 PRG4-SPECIAL BINARY COUNT MAINT MODE DATA TEST

PRG4 IS THE SAME AS PRG0 ROUTINE 54 EXCEPT THAT THE USER SPECIFIES DL11-E RUNNING PARAMETERS.

5.5.1 ERROR PRINTOUTS

SELF EXPLANATORY PRINTOUTS ARE PROVIDED.

6.0 POWER FAIL

A POWER FAIL ROUTINE IS INCLUDED IN THE PROGRAM. WHEN THE POWER FAILS

THE PROGRAM WILL AUTOMATICALLY RESTART USING THE PRESENT SR OPTIONS
AND THE LINE PREVIOUSLY SELECTED. NOTE: THE POWER MAY FAIL WHEN THE
PROGRAM IS EXECUTING A 'RESET' INSTRUCTION, IN THIS CASE OPERATOR
INTERVENTION IS NEEDED TO PRESS CONTINUE. AN ERROR TYPEOUT RESULTS
AND WILL TYPE THE PROGRAM #, THE ROUTINE THAT WAS RUNNING AT THE TIME
THE POWER FAILED (PROGRAM 0 ONLY), AND THE PC OF THE POWER FAIL ER-
ROR CALL.

RECOVERED FROM POWER FAILURE.
P(PRG#) T(ROUTINE #) PC = (ADDRESS OF ERROR CALL)

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                .ENABLE ABS

        ;DL11-E,C/D DIAGNOSTIC PROGRAM (OFF LINE TESTS)
        ;
        ;PRG0- INPUT-OUTPUT LOGIC TESTS
        ;PRG1- TRANSMITTER SCOPE LOOP
        ;PRG2- RECEIVER SCOPE LOOP
        ;PRG3- SINGLE CHARACTER MAINTENANCE MODE DATA TEST
        ;PRG4- SPECIAL BINARY COUNT MAINTENANCE MODE DATA TEST
        ;
        ;STANDARD SR SWITCH OPTIONS (SWITCH SET TO A 1 )
        ;
        ;SR15- HALT ON ERROR
        ;SR14- SCOPE.
        ;SR13- INHIBIT PRINTOUT
        ;SR12- SELECT LINE NUMBER AND LOCK ON IT
        ;SR11- INHIBIT ITERATION.
        ;SR10- HALT AT END CURRENT TEST, TEST NO. IN DATA LIGHTS
        ;SR9- SELECT ROUTINE.
        ;SR7- DISABLE STALL MODE AND RUN FULL SPEED.
        ;SR5 THROUGH SR0 - NUMBER OF ROUTINE TO BE SELECTED.
        ;SR6- HALT ON END OF PASS.
        ;
        ;STANDARD CONFIGURATION
        ;CHARACTER LENGTH 8
        ;STOP CODE 2
                .=0
                ERTP                    ;UNASSIGNED TRAP
                0
        MACHER: ERTP                    ;SP OVERFLOW, BUS ERROR TRAP
                40
                ERTP                    ;RESERVED INSTRUCTION TRAP
                100
                ERTP                    ;TRACE TRAP
                140
                MAPVEC                  ;TRAP TO MAP VECTOR
                PRTY7
                PFAIL                   ;POWER FAIL TRAP
                PRTY7
                EMTINT                  ;EMT TRAP
                PRTY7
                ERTP
                340
                .+2
                HALT
                .=46
                LOGIC
                .+2                     ;TRAP TO TRAP REPORTER
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        ;EQUATE STATEMENTS
                PSW=177776
                SPBOT=1176
                NOP=240
                OPEN=0
                MANUAL=BIT15
                BIT15=100000
                BIT14=40000
                BIT13=20000
                BIT12=10000
                BIT11=4000
                BIT10=2000
                BIT9=1000
                BIT8=400
                BIT7=200
                BIT6=100
                BIT5=40
                BIT4=20
                BIT3=10
                BIT2=4
                BIT1=2
                BIT0=1
                POPSP=5726              ;POP THE STACK. SAME AS TST (6)+
                POPSP2=022626           ;POP STACK TWICE. SAME AS CMP (6)+,(6)+
                PRTY7=340               ;PRIORITY LEVEL DEFINITIONS
                PRTY6=300
                PRTY5=240
                PRTY4=200
                PRTY3=140
                PRTY2=100
                PRTY1=40
                PRTY0=0
                TYPE=EMT+0
                TYPES=EMT+1
                STALL=EMT+2
                ERROR=EMT+3
                DATCHK=EMT+4
                CHALT=EMT+5
                STRXV=EMT+6
                STTXV=EMT+7
                EHALT=EMT+10
                SRESET=EMT+11
                SCOPE=EMT+12
                SAVREG=EMT+13
                RSTREG=EMT+14
                ERROR1=EMT+15
                DELAY=EMT+16
                TIMERX=EMT+17
                TIMETX=EMT+20
                ATLAST=-1
                CD=100000       ;FLAG FOR C/D TESTS

                .LIST   ME
```

```
                .=172
SRPTRH: 177571                          ;HIGH BYTE OF SWITCH REGISTER
SRPTR:  177570
SOFTSR: 000000
                .=200
                JMP     @#STARTZ                ;GO TO START OF PROGRAM.
                .=204
                JMP     @#RESTART

                .=250
EOPHLT: HALT                    ;THIS IS AN END OF PASS HALT; NOT AN ERROR HALT.
                                ;THIS HAPPENS ONLY IF SW6 IS UP. PRESS CONTINUE
                                ;TO GET ANOTHER PASS.
                RTS     PC
                .=1200
;
;DEVICE ADDRESS LIST
;LSB BIT0 IS SET TO A 1 BY MAPPER IF DEVICE NOT FOUND
;TO TEST THAT LINE NOT FOUND CLEAR BIT0 IN THAT DEVICE ADDRESS
;IN THIS TABLE AFTER MAPPING DONE
;**********************
RXCR0:  175610          ;LINE 0 DEVICE ADDRESS (RXCSR)
RXCR1:  175620          ;LINE 1 DEVICE ADDRESS (RXCSR)
RXCR2:  175630          ;LINE 2 DEVICE ADDRESS (RXCSR)
RXCR3:  175640          ;LINE 3 DEVICE ADDRESS (RXCSR)
RXCR4:  175650          ;LINE 4 DEVICE ADDRESS (RXCSR)
RXCR5:  175660          ;LINE 5 DEVICE ADDRESS (RXCSR)
RXCR6:  175670          ;LINE 6 DEVICE ADDRESS (RXCSR)
RXCR7:  175700          ;LINE 7 DEVICE ADDRESS (RXCSR)
RXCR10: 175710          ;LINE 10 DEVICE ADDRESS (RXCSR)
RXCR11: 175720          ;LINE 11 DEVICE ADDRESS (RXCSR)
RXCR12: 175730          ;LINE 12 DEVICE ADDRESS (RXCSR)
RXCR13: 175740          ;LINE 13 DEVICE ADDRESS (RXCSR)
RXCR14: 175750          ;LINE 14 DEVICE ADDRESS (RXCSR)
RXCR15: 175760          ;LINE 15 DEVICE ADDRESS (RXCSR)
RXCR16: 175770          ;LINE 16 DEVICE ADDRESS (RXCSR)
RXCR17: 176000          ;LINE 17 DEVICE ADDRESS (RXCSR)
RXCR20: 176010          ;LINE 20 DEVICE ADDRESS (RXCSR)
RXCR21: 176020          ;LINE 21 DEVICE ADDRESS (RXCSR)
RXCR22: 176030          ;LINE 22 DEVICE ADDRESS (RXCSR)
RXCR23: 176040          ;LINE 23 DEVICE ADDRESS (RXCSR)
RXCR24: 176050          ;LINE 24 DEVICE ADDRESS (RXCSR)
RXCR25: 176060          ;LINE 25 DEVICE ADDRESS (RXCSR)
RXCR26: 176070          ;LINE 26 DEVICE ADDRESS (RXCSR)
RXCR27: 176100          ;LINE 27 DEVICE ADDRESS (RXCSR)
RXCR30: 176110          ;LINE 30 DEVICE ADDRESS (RXCSR)
RXCR31: 176120          ;LINE 31 DEVICE ADDRESS (RXCSR)
RXCR32: 176130          ;LINE 32 DEVICE ADDRESS (RXCSR)
RXCR33: 176140          ;LINE 33 DEVICE ADDRESS (RXCSR)
RXCR34: 176150          ;LINE 34 DEVICE ADDRESS (RXCSR)
RXCR35: 176160          ;LINE 35 DEVICE ADDRESS (RXCSR)
RXCR36: 176170          ;LINE 36 DEVICE ADDRESS (RXCSR)
XORADD: 177777          ;LINE 37 SPECIAL ADDRESS FOR XOR
RXEND:  177777          ;LINE XX DEVICE ADDRESS (RXCSR)
;
;CHARACTER LENGTH, PRIORITY, C/D MASK
```

```
        ;INITIALLY SET FOR DL11-E, PRIORITY=4,CHARACTER LENGTH=8
        ;BIT 15 SET TO A 1 = THAT LINE HAS DL11-C OR DL11-D
        ;EX: 140377 = DL11C OR DL11D, PRIORITY = 4, CHARACTER LENGTH = 8
        ;BITS 12-14 = PRIORITY LEVEL THAT LINE
        ;BITS 0-7 = CHARACTER MASK EX. 377=8, 177=7, 77=6, 37=5
        ;********************
CMAS0:   040377          ;LINE 0 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS1:   040377          ;LINE 1 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS2:   040377          ;LINE 2 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS3:   040377          ;LINE 3 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS4:   040377          ;LINE 4 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS5:   040377          ;LINE 5 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS6:   040377          ;LINE 6 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS7:   040377          ;LINE 7 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS10:  040377          ;LINE 10 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS11:  040377          ;LINE 11 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS12:  040377          ;LINE 12 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS13:  040377          ;LINE 13 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS14:  040377          ;LINE 14 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS15:  040377          ;LINE 15 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS16:  040377          ;LINE 16 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS17:  040377          ;LINE 17 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS20:  040377          ;LINE 20 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS21:  040377          ;LINE 21 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS22:  040377          ;LINE 22 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS23:  040377          ;LINE 23 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS24:  040377          ;LINE 24 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS25:  040377          ;LINE 25 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS26:  040377          ;LINE 26 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS27:  040377          ;LINE 27 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS30:  040377          ;LINE 30 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS31:  040377          ;LINE 31 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS32:  040377          ;LINE 32 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS33:  040377          ;LINE 33 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS34:  040377          ;LINE 34 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS35:  040377          ;LINE 35 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS36:  040377          ;LINE 36 CHARACTER MASK, PRIORITY, C/D FLAG
CMAS37:  040377          ;LINE 37 SPECIAL ADDRESS FOR XOR
.
UMASK:   0               ;MASK FOR DEVICE UT
RMASK:   0               ;MASK FOR CHAR LENGTH FOR DEVICE UT
STLMSK:  177740          ;MASK FOR MAX RANDOM STALL
.
RXCSR:   0               ;RECEIVER UNDER TEST
RXBUF:   0               ;RECEIVER BUFFER UNDER TEST
TXCSR:   0               ;TRANSMITTER CSR UNDER TEST
TXBUF:   0               ;TRANSMITTER BUFFER UNDER TEST
RXVTR:   0               ;RECEIVER VECTOR UNDER TEST
RXLVL:   0               ;RECEIVER PRIORITY LEVEL UT
TXVTR:   0               ;TRANSMITTER VECTOR UNDER TEST
TXLVL:   0               ;TRANSMITTER PRIORITY LEVEL UT
        ;********************
.
TKS:     177560          ;LSR CSR
TKB:     177562          ;LSR BUFFER
TPS:     177564          ;LSP CSR
```

```
TPB:    177566                  ;LSP BUFFER
TKVTR:  60                      ;LSR INTERRUPT VECTOR
TKLVL:  PRTY4                   ;LSR PRIORITY LEVEL
TPVTR:  64                      ;LSP INTERRUPT VECTOR
TPLVL:  PRTY4                   ;LSP PRIORITY LEVEL
PRGNUM: OPEN                    ;CONTAINS CURRENT PROGRAM#
KSTART: OPEN                    ;CURRENT PROGRAM START ADDRESS.
CURTST: OPEN                    ;CONTAINS ADDR OF CURRENT TEST.
RTNNO:  OPEN                    ;CONTAINS CURRENT TEST #.
TNNO:   0                       ;CONTAINES EDITED TNUM
NXTST:  OPEN                    ;CONTAINS ADDR OF NEXT TEST.
ICTR:   OPEN                    ;CONTAINS CURRENT ITERATION COUNT
SCOPTR: OPEN                    ;CONTAINS CURRENT SCOPE POINTER.
OLDPS:  0                       ;PS SAVED FROM TRAP TO EMT ROUTINE
FMAP:   0                       ;MAPPING FLAG, 1= MAPPING IN PROGRESS
PRGTAB: PRG0                    ;PRG0 START ADDRESS
        PRG1                    ;PRG1 START ADDRESS
        PRG2                    ;PRG2 START ADDRESS
        PRG3                    ;PRG3 START ADDRESS
        PRG4                    ;PRG4 START ADDRESS
        INCRPG                  ;INCORRECT PROGRAM SELECTED
        INCRPG
        INCRPG
EMTTAB: TYP                     ;POINTER TO TYPEOUT ROUTINE
        TYPS                    ;POINTER TO CHAINED MESSAGES ROUTINE
        STAL                    ;POINTER TO RANDOM STALL ROUTINE
        ERR                     ;POINTER TO ERROR ROUTINE
        DTCHK
        OPEN
        STLSRV
        STLSPV
        EHLT                    ;POINTER TO ERROR HALT ROUTINE.
        SRSETT
        CHAINN
        SAVRG
        RSTRG
        ERR1
        DLY
        TMRX
        TMTX
;
CRBUF:  OPEN
CRBUFA: OPEN
CRBUFB: OPEN
CTR0:   OPEN
CTR1:   OPEN
CTR2:   OPEN
CTR3:   OPEN
CTR4:   OPEN
CTR5:   OPEN
CTR6:   OPEN
CTR7:   OPEN
TXCSRT: OPEN
RXCSRT: OPEN
RXBUFT: OPEN
FOUNDV: 0
```

```
        LINENO: 0
        TEMP:   OPEN
        TEMP1:  0
        FTITLE: 0
        FNONE:  0
        TOPC:   0
        FROMPC: 0
        PASCNT: 0
        START2: MOV     #SPBOT,%6
                MOV     6,-(SP)         ;SAVE CURRENT VECTOR
                MOV     4,-(SP)
                MOV     #1$,4                   ;SET UP TIME OUT VECTOR
                TST     @SRPTR                  ;TRY TO REFERENCE THE
                                                ;HARDWARE SWITCH REGISTER
                BR      2$                      ;BRANCH IF NO TIME OUT TRAP OCCURRS
        1$:     MOV     #SOFTSR,SRPTR           ;CHANGE THE SWITCH REGISTER POINTER
                                                ;TO POINT TO A SOFTWARE  SWITCH REGISTER
                CMP     (6)+,(6)+               ;RESTORE THE STACK
        2$:     MOV     (6)+,4                  ;RESTORE TIME OUT VECTOR
                MOV     (6)+,6
                MOV     SRPTR,SRPTRH
                INC     SRPTRH
                CLR     @#FTITLE
                MOV     @#4,-(%6)
                MOV     #XORA,@#4
                TST     @#177060
                MOV     (%6)+,@#4
                MOV     #174000,@#XORADD
                MOV     #-1,@#XORFLG
                TYPE
                MESSI
                JMP     @#START
        MESSI:  .ASCII  <15><12>'YOU ARE ON AN XOR TESTER@'



                .EVEN
        XORFLG: .WORD   0

        XORA:   CMP     (%6)+,(%6)+
                MOV     (%6)+,@#4
                MOV     #-1,@#XORADD
                CLR     @#XORFLG
                JMP     @#START


        START:  MOV     #SPBOT,%6       ;SET BOTTOM OF SP STACK.
                MOV     #PFAIL,24
                CLR     FOUNDV
                CLR     FMAP
                JSR     %7,CLRCD        ;CLEAR DEVICE UT PARAMETERS
                JSR     %7,OVRLAY       ;OVERLAY TRAP AREA
                TST     FTITLE          ;TITLE PRINTED AND MAP MADE
                BNE     START1          ;YES, SKIP OVER THIS
```

```
                TYPE
                MTIT
                INC     FTITLE
                CLR     FNONE                   ;CLEAR DEVICE PRESENT FLAG
                MOV     #MAPNE,MACHER           ;SET UP NO DEVICE PRESENT RETURN
                MOV     #RXCRD,%4               ;SET UP DEVICE POINTER
MAPA:           CMP     (%4),@#RXEND            ;LAST DEVICE
                BEQ     MAPEND                  ;YES, EXIT
                BIC     #BIT0,(4)               ;CLEAR ODD ADDRESS
                CLR     PSW
                TST     @(4)                    ;TEST DEVICE
                NOP
                BR      MAPOK
MAPNE:          BIS     #BIT0,(4)+              ;NOT LIVING
                POPSP2
                BR      MAPA
MAPOK:          MOV     (4)+,TEMP1              ;SAVE DEVICE ADDRESS FOR TYPING
                JSR     %5,OACNV
                TEMP1
                MDEVAD
                6
                TYPE
                MDEVAD
                INC     FNONE                   ;SET HAVE DEVICE
                BR      MAPA
MAPEND:         MOV     #ERTP,MACHER            ;RESET TRAPS
                TST     FNONE                   ;ANY DEVICES PRESENT
                BEQ     MAPERR                  ;NO, ERROR
START1:         MOV     #RXCRD,%1
START2:         BIT     #BIT0,(1)               ;IS DEVICE LIVING
                BNE     START3                  ;NO, CHECK FOR END
                MOV     %1,LINENO               ;CALCULATE LINE NUMBER UNDER TEST
                SUB     #RXCRD,LINENO
                ASR     LINENO
                MOV     (1),%1                  ;YES, LOAD AND EXIT
                JSR     %7,FORMAD
                BR      START4
START3:         TST     (1)+
                CMP     %1,#RXEND               ;END OF TABLE
                BNE     START2                  ;NO, LOOP
MAPERR:         TYPE
                MNONE
                TST     @#42                    ;MONITOR LOAD
                BEQ     .+6                     ;NO, CONTINUE
                JMP     PRGXTL                  ;YES, EXIT
                CLR     FTITLE
                HALT
                JMP     START
START4:         MOV     #1,PASCNT
                CLR     PSW
                CLR     RTNNO
                MOV     @SRPTR,%0                       ;(SR) TO R0
                BIC     #177770,%0              ;LIMIT (SR) TO BITS 3-0
                MOV     %0,PRGNUM               ;SAVE PROGRAM #
                ASL     %0
                JMP     @PRGTAB(0)              ;GO TO SELECTED PROGRAM.
```

```
;
GETRDY: MOV     KSTART,NXTST    ;ADDR OF 1ST ROUTINE TO NXTST
GTRDYX: MOV     #ERTP,MACHER    ;RESET MACHER TRAP.
        MOV     #40,MACHER+2
        CLR     FMAP
        MOV     #SPBOT,%6       ;SET BOTTOM OF STACK.
        SRESET                  ;ISSUE RESET.
        CLR     PSW
GTRDYA: JSR     %7,FORWD        ;ROLL FORWARD TO "NEXT" ROUTINE.
        BIT     #BIT9,@SRPTR    ;CHECK SELECT ROUTINE SWITCH
        BNE     GTRDYC          ;BRANCH IF SELECT ROUTINE SWITCH IS SET.
        TST     UMASK           ;C/D DEVICE
        BPL     GTRDA1          ;NO, CONTINUE
        TST     RTNNO           ;THIS A C/D TEST
        BPL     GTRDYA          ;NO, DO NEXT TEST
GTRDA1: JMP     @CURTST         ;GO RUN CURRENT ROUTINE.
        BR      CHNB            ;NO GO. MANUAL RTN BYPASSED.
GTRDYC: MOV     @SRPTR,%0               ;(SR) TO R0
        BIC     #177600,%0      ;MASK UNDESIRED BITS
        CMPB    RTNNO,%0        ;COMPARE RTNNO TO (R0)
        BNE     GTRDYD          ;BRANCH IF ROUTINE NOT FOUND YET.
        JMP     @CURTST         ;GO RUN ROUTINE.
GTRDYD: CMP     #-1,NXTST       ;NO. CHECK FOR LAST ROUTINE.
        BNE     GTRDYA          ;BRANCH IF NOT LAST ROUTINE.
        JSR     %7,INCRTN       ;YES. INCORRECT ROUTINE SELECTED.
        BR      GETRDY          ;START OVER.
;
CHAINN: BIT     #BIT14,@SRPTR   ;CHECK FOR SCOPE OPTION.
        BEQ     CHNA            ;BRANCH IF SCOPE SW NOT SET.
CHNAB:  MOV     SCOPTR,@%6      ;SET UP TO RETURN TO ROUTINE.
        RTI                     ;RETURN TO ROUTINE.
CHNA:   TST     @#XORFLG
        BPL     1$
        MOV     @#4,-(%6)
        MOV     #XOR,@#4
        TST     @#177060        ;TEST FOR XOR
        MOV     (%6)+,@#4
1$:     BIT     #BIT11,@SRPTR   ;TEST INHIBIT ITERATION SWITCH
        BNE     CHNAA           ;BRANCH IF INHIBIT ITERATION SW SET.
        DEC     ICTR            ;DECREMENT ITERATION COUNT.
        BNE     CHNAB           ;BRANCH IF COUNT NOT 0.
CHNAA:  POPSP2                  ;POP STACK TWICE
        BIT     #BIT10,@SRPTR
        BEQ     CHNB
        MOV     RTNNO,%0
        BIC     #BIT15,%0
        HALT
CHNB:   BIT     #BIT9,@SRPTR    ;CHECK SELECT ROUTINE SWITCH
        BNE     GETRDY          ;BRANCH IF SELECT RTN SW SET
        CMP     #-1,NXTST       ;LAST TEST?
        BNE     GTRDYX          ;BRANCH IF NOT LAST TEST.
        JSR     %7,PRGEND       ;PROGRAM END.
        BR      GETRDY

XOR:    CMP     (%6)+,(%6)+
        MOV     (%6)+,@#4
```

```
                BR      CHNAB

;
;INIT FOR C/D - WITHOUT JUMPER RESET STARTS ASSEMBLING CHARACTER SETTING DONE
;SET MAINT, DELAY, CLEAR RX DONE
CDINIT: TST     UMASK           ;C-D DEVICE
        BPL     CDINX           ;NO, EXIT
        BIS     #BIT2,@TXCSR    ;SET MAINT BIT
        DELAY                   ;WAIT 1.5 SEC
        1500.
        TST     @RXBUF          ;CLEAR RX DONE
CDINX:  RTS     %7

;
FORWD:  MOV     NXTST,%5        ;ADDR OF NEXT ROUTINE TO R5.
        MOV     (5)+,RTNNO      ;GET NEXT ROUTINE NUMBER.
        MOV     (5)+,NXTST      ;GET ADDR OF NEXT "NEXT" ROUTINE.
        MOV     (5)+,ICTR       ;GET ITERATION COUNT.
        MOV     (5)+,SCOPTR     ;GET SCOPE LOOP ENTRY POINTER.
        MOV     %5,CURTST       ;ADDR OF NOW CURRENT TEST TO CURTST.
        RTS     %7              ;EXIT FORWD SUBROUTINE.

;
EMTINT: MOV     @%6,-(6)        ;GET SAVED PC.
        SUB     #2,@%6          ;DECREMENT PC BY 2.
        MOV     @(6),@%6
EMTA:   ASL     @%6             ;EMT ARG X 2.
        BIC     #177001,@%6     ;REMOVE 7 MSB.
        ADD     #EMTTAB,@%6     ;FORM EMT RTN ADDR.
        MOV     @(6),@%6
        JMP     @(6)+           ;GO TO EMT ROUTINE.

;
;SAVE REGS 0 TO 4 SUBROUTINE.
;
SAVRG:  MOV     (6)+,SVRPC      ;SAVE PC AND PSW.
        MOV     (6)+,SVRPSW
        MOV     %4,-(6)         ;SAVE REGS 0 - 4
        MOV     %3,-(6)         ;IN STACK.
        MOV     %2,-(6)
        MOV     %1,-(6)
        MOV     %0,-(6)
        MOV     SVRPSW,-(6)     ;RESTORE PC AND PSW.
        MOV     SVRPC,-(6)
        RTI                     ;EXIT.
SVRPC:  OPEN
SVRPSW: OPEN

;
;RESTORE REGS 0 TO 4 SUBROUTINE.
;
RSTRG:  MOV     (6)+,RSTPC      ;SAVE PC AND PSW.
        MOV     (6)+,RSTPSW
        MOV     (6)+,%0         ;RESTORE REGS 0 - 4
        MOV     (6)+,%1         ;FROM STACK.
        MOV     (6)+,%2
        MOV     (6)+,%3
        MOV     (6)+,%4
        MOV     RSTPSW,-(6)     ;RESTORE PC AND PSW.
        MOV     RSTPC,-(6)
```

```
                RTI                             ;EXIT
        RSTPC:  OPEN
        RSTPSW: OPEN

        ;ROUTINE TO SET RECEIVER INTERRUPT VECTOR AND PRIORITY
        STLSRV: JSR     %7,TSTVEC
                MOV     @(6),STPRA+2            ;MOVE VECTOR ADDR TO STPRA+2
                ADD     #2,@%6                  ;SET UP EXIT
                MOV     RXVTR,%1
        STPRA:  MOV     #OPEN,(1)+              ;SET VECTOR ADDRESS
                MOV     RXLVL,(1)+              ;SET PRIORITY
                RTI                             ;EXIT
        ;
        ;ROUTINE TO SET TRANSMITTER INTERRUPT VECTOR AND PRIORITY.
        STLSPV: JSR     %7,TSTVEC
                MOV     @(6),STPPA+2            ;MOVE VECTOR ADDR TO STPPA+2
                ADD     #2,@%6                  ;SET UP EXIT
                MOV     TXVTR,%1
        STPPA:  MOV     #OPEN,(1)+              ;SET VECTOR ADDRESS.
                MOV     TXLVL,(1)+              ;SET PRIORITY
                RTI                             ;EXIT.
        ;
        ;ROUTINE TO ISSUE RESET.
        SRSETT: MOV     #52525,%0               ;DATA TO R0.
                COM     %0                      ;COMPLEMENT (R0).
                MOV     %0,SRSETT+2             ;(R0) TO SRSETT+2.
                RESET                           ;ISSUE RESET. (R0) IS
                RTI                             ;DISPLAYED. EXIT.
        ;
        ;RANDOM NUMBER GENERATOR. ROUTINE EXITS WITH NUMBER IN REGISTER 0.
        RNGEN:  MOV     RP1,%0
                ROL     %0
                ROL     %0
                ADD     RP2,%0
                MOV     %0,RP1
                ROL     %0
                ROL     %0
                ADD     RP2,%0
                ROL     %0
                ROL     %0
                MOV     %0,RP2
                MOV     RP1,%0
                RTS     %7                      ;EXIT. NUMBER IN R0
        RP1:    1233
        RP2:    7622
        ;
        ;CLRCD - CLEAR CURRENT DEVICE PARAMETERS
        CLRCD:  CLR     TXBUF
                CLR     TXCSR
                CLR     RXCSR
                CLR     RXBUF
                CLR     RXVTR
                CLR     TXVTR
                CLR     RXLVL
                CLR     TXLVL
                RTS     %7
```

```
        ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
TYP:    MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS.
        ADD     #2,@%6          ;SET UP EXIT.
        MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0.
TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
        CMPB    #100,TYPDAT     ;CHECK FOR"@"CHARACTER
        BNE     TYPC            ;BRANCH IF NOT"@".
        RTI                     ;TERMINATOR CHAR. DONE. EXIT.
TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR"%".
        BEQ     TYPF            ;BRANCH IF"%"
        CMPB    #43,TYPDAT      ;NOT"%".CHECK FOR"#".
        BEQ     TYPG            ;BRANCH IF "#"
        JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
        BR      TYPA
TYPD:   MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
        TSTB    @TPS            ;WAIT FOR DONE FLAG.
        BPL     .-4
        RTS     %7              ;EXIT
TYPF:   MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
        JSR     %7,TYPD         ;GO TYPE CHAR.
TYPG:   MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT.
        JSR     %7,TYPD         ;GO TYPE CHAR.
        BR      TYPA
TYPDAT: OPEN
;
;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
TYPS:   MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
        ADD     #2,@%6          ;UPDATE TO NEXT MESSAGE ADDRESS
        MOV     @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
        CMP     #-1,TYPSB       ;CHECK FOR TERMINATOR
        BNE     TYPSA           ;BRANCH IF NOT TERMINATOR.
        RTI                     ;TERMINATOR, EXIT
TYPSA:  TYPE                    ;CALL ON TYP SUB TO TYPE MESSAGE
TYPSB:  OPEN                    ;ADDRESS OF MESSAGE GOES HERE
        BR      TYPS            ;GO PROCESS NEXT MESSAGE
;
;OVERLAY VECTOR AREA
OVRLAY: MOV     #300,%1         ;GET DL11-E VECTOR BASE ADDRESS
        MOV     #302,%2
        MOV     #4,%3
OVRLYA: MOV     %2,(1)+         ;LOAD VECTOR WITH IOT ERROR TRAP
        MOV     %3,(1)+
        ADD     #4,%2
        CMP     %1,#1000                ;ALL VECTORS BEEN LOADED
        BEQ     OVRLYB
        BR      OVRLYA
OVRLYB: RTS     7               ;EXIT

;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS
DLY:    MOV     @%6,DLCNT       ;GET DELAY COUNT ADDRESS.
        ADD     #2,@%6          ;SET UP EXIT ADDRESS
        MOV     @DLCNT,-(6)     ;DELAY COUNT TO STACK
        BEQ     DLYC
        CLR     PSW             ;SET PRIORITY 0
DLYA:   MOV     #226,-(6)       ;1 MSEC COUNT TO STACK
```

```
DLYB:   DEC     @%6             ;DECREMENT 1 MSEC COUNT
        BNE     DLYB            ;BRANCH IF NOT 0.
        POPSP                   ;ZERO. UNCOVER MSECS. COUNT.
        DEC     @%6             ;DECREMENT IT
        BNE     DLYA            ;BR IF NOT DONE DELAYING
DLYC:   POPSP                   ;DONE
        RTI                     ;EXIT.
DLCNT:  OPEN                    ;CONTAINS MILLISECONDS COUNT ADDRESS.
;
;SUBROUTINE TO STALL A RANDOM NUMBER OF MILLISECONDS. MAXIMUM STALL
;DETERMINED BY CONTENTS OF LOC STLMSK.
STAL:   JSR     %7,RNGEN        ;GO GET RANDOM NUMBER.
        BIC     STLMSK,%0       ;# IN R0. APPLY STALL MASK,
        BEQ     STALB           ;BRANCH IF RESULT IS 0.
        MOV     %0,STALA
        DELAY                   ;DELAY
STALA:  OPEN                    ;DELAY COUNT
STALB:  RTI                     ;DONE. EXIT.
;
;SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT
GRCNT:  JSR     %7,RNGEN        ;GET RANDOM NUMBER
        BIC     RCMSK,%0        ;APPLY MASK
        BEQ     GRCNT           ;TRY AGAIN IF RESULT 0
        MOV     %0,RNCNT        ;COUNT TO RNCNT
        RTS     %7              ;EXIT.
RCMSK:  OPEN                    ;RANDOM CHARACTER MASK.
RNCNT:  OPEN                    ;RANDOM CHARACTER COUNT.
;
;SUBROUTINE TO SKIP ON FLAG AND TIME OUT IF SKIP FAILS
TMRX:   MOV     RXCSR,SIOT      ;SET UP RXCSR ADDRESS
        BR      TIME1
TMTX:   MOV     TXCSR,SIOT      ;SET UP TXCSR ADDRESS
TIME1:  CLR     TIMER
TIME2:  INC     TIMER
        BEQ     TIMEX           ;BRANCH IF COUNTER OVERFLOW
        TSTB    @SIOT
        BPL     TIME2
        ADD     #2,@%6          ;SET UP EXIT RETURN
TIMEX:  RTI
TIMER:  0
SIOT:   0

;SUBROUTINE TO SELECT LINE
LINSEL: BIT     #BIT12,@SRPTR
        BNE     LINSLX          ;BRANCH IF SET
        CLR     FOUNDV
        RTS     5
LINSLX: JSR     %7,OVRLAY
        JSR     %7,CLRCD
        TYPE
        LDLINE
        HALT
        MOV     @SRPTR,TEMP
        BIC     #177740,TEMP
```

```
                MOV     TEMP,LINENO     ;SAVE FOR TYPING
                ASL     TEMP
```

```
                MOV     TEMP,%1
                MOV     RXCRO(1),%1     ;GET RXCSR DEVICE ADDRESS
                BIT     #BIT0,%1        ;IS DEVICE THERE
                BEQ     LINB            ;YES
        LINA:   TYPE                    ;NO, REPORT
                MNOLIN
                BR      LINSLX
        LINB:   JSR     %7,FORMAD
                CLR     PSW
                BIS     #BIT0,FMAP      ;SET MAPPING FLAG
                BIC     #BIT6,@TXCSR
                BIS     #BIT6,@TXCSR
                NOP
                NOP
                TST     RXVTR
                BEQ     LINA
                BIC     #BIT6,@TXCSR
                MOV     #PRTY7,PSW
                JSR     5,OACNV         ;TYPE LINE #
                LINENO
                SELINE
                2
                TYPE
                ALINE
                RTS     5
;
;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
INBIN:  MOV     #-1,RIND        ;SET ALL VARIABLES
        JSR     %5,BMOVE        ;TO MINUS 1.
        RIND
        RIND+1
        11.
        RTS     %7              ;EXIT
RIND:   OPEN
PTO:    OPEN
PT1:    OPEN
PIND:   OPEN
PTOP:   OPEN
PT1P:   OPEN
;
;SPECIAL BINARY COUNT PATTERN SUBROUTINE. EXITS WITH BIN CHAR IN RO
GTBIN:  MOV     PTO,PT1         ;PREVIOUS BIN CHAR TO PT1
        COM     PT1
        COM     RIND
        BNE     .+6
        INC     PT1
        BIC     #177400,PT1     ;MASK TO 8 BITS
        MOV     PT1,PTO         ;SAVE BIN CHAR IN PTO
        MOV     PT1,%0          ;BIN CHAR TO RO.
        RTS     %7              ;EXIT.
GTBINP: MOV     PTOP,PT1P       ;PREVIOUS BIN CHAR TO PT1P
        COM     PT1P
        COM     PIND
        BNE     .+6
        INC     PT1P
        BIC     #177400,PT1P    ;MASK TO 8 BITS.
```

```
                MOV     PTIP,PTOP       ;SAVE BIN CHAR IN PTOP.
                MOV     PTIP,%1         ;BIN CHAR TO R1.
                RTS     %7              ;EXIT.

        ;
        ;OCTAL TO ASCII CONVERT ROUTINE
        OACNV:  SAVREG
                MOV     @(5)+,OACNVX    ;GET OCTAL VALUE.
                MOV     (5)+,%1         ;GET DESTINATION ADDR.
                MOV     (5)+,%2         ;GET CONVERT COUNT.
                ADD     %2,%1           ;DEVELOP ADDR TO STORE 1ST CHAR.
        OACNVA: MOV     OACNVX,%3
                BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT DIGIT.
                ADD     #60,%3          ;CONVERT DIGIT TO ASCII.
                MOVB    %3,-(1)         ;STORE ASCII CHARACTER.
                BIC     #7,OACNVX
                ROR     OACNVX
                ROR     OACNVX
                ROR     OACNVX
                DEC     %2              ;DONE ALL DIGITS?
                BNE     OACNVA          ;BRANCH IF NOT DONE.
                RSTREG
                RTS     %5              ;DONE. EXIT.
        OACNVX: OPEN

        ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
        BMOVE:  SAVREG                  ;SAVE REGS.
                MOV     (5)+,%1         ;GET"FROM"ADDRESS
                MOV     (5)+,%2         ;GET"TO"ADDRESS
                MOV     (5)+,%3         ;GET COUNT
        BMOVA:  MOVB    (1)+,(2)+       ;MOVE BYTE
                DEC     %3              ;DECREMENT COUNT
                BNE     BMOVA           ;BRANCH IF NOT DONE.
                RSTREG                  ;RESTORE REGS.
                RTS     %5              ;DONE EXIT
        ;
        ;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.
        BDCNV:  SAVREG
                MOV     #DECVAL,%0      ;SET UP ADDR TO STORE DECIMAL ASCII IN R0
                MOV     @(5)+,%1        ;BINARY VALUE TO R1.
                MOV     (5)+,BDCNVC     ;GET DEST ADDR
                MOV     (5)+,BDCNVD     ;GET CHAR COUNT
                MOV     #ADTENP,%2      ;ADDR OF TEN POWER STRING TO R2.
                MOV     #5,CNVCTR       ;SET UP FOR 5 POWER CONVERSIONS.
        BDCNVA: MOV     (2)+,TENPWR     ;MOVE POWER OF TEN VALUE TO TENPWR.
                JSR     %7,SUBTEN       ;PERFORM CONVERSION
                DEC     CNVCTR          ;DONE 5 CONVERSIONS?
                BNE     BDCNVA          ;BRANCH IF NOT YET 5.
                SUB     BDCNVD,%0
                MOV     %0,BDCNVB
                JSR     %5,BMOVE
        BDCNVB: 0
        BDCNVC: 0
        BDCNVD: 0
                RSTREG
                RTS     %5              ;YES, EXIT.
        SUBTEN: CLR     DIGIT           ;CLEAR DIGIT
```

```
SUBTNA: SUB     TENPWR,%1       ;SUBTRACT TEN POWER FROM BINARY VALUE.
        BCS     SUBTN8          ;BRANCH IF UNSUCCESSFUL SUBTRACTION.
        INC     DIGIT
        BR      SUBTNA
SUBTN8: ADD     TENPWR,%1       ;RESTORE SUBTRACTED VALUE.
        ADD     #60,DIGIT       ;CONVERT (DIGIT) TO ASCII
        MOVB    DIGIT,(0)+      ;MOVE ASCII CHAR TO DECVAL FIELD.
        RTS     %7              ;EXIT.
CNVCTR: OPEN
DIGIT:  OPEN
TENPWR: OPEN
ADTENP: 10000.
        1000.
        100.
        10.
        1
DECVAL: .BYTE   040,040,040,040,040,040

DATTST: BIC     #BIT1,@RXCSR    ;CLEAR DATA TERM. READY
        BIS     #BIT2,@TXCSR    ;SET MAINTENANCE BIT
        MOV     #100.,CTR0      ;GET CHARACTER COUNT
DATAA:  TSTB    @TXCSR          ;WAIT FOR
        BPL     .-4             ;READY FLAG
        JSR     7,GTBINP        ;GET CHARACTER
        MOVB    %1,CRBUFA       ;MOVE CHARACTER
        JSR     7,MASKIT        ;MASK OFF NON TRANSMITTED BITS
        MOVB    %1,@TXBUF       ;TRANSMIT CHARACTER
        TSTB    @RXCSR          ;WAIT FOR
        BPL     .-4             ;DONE FLAG
        MOVB    @RXBUF,CRBUF    ;GET RECEIVED CHARACTER
        DATCHK                  ;CHK DATA
        DEC     CTR0            ;DECREMENT CHARACTER COUNT
        BNE     DATAA
        TST     (6)+            ;POP STACK
        SCOPE

SETSR:  TYPE                    ;TYPE SELECT OPTION MESSAGE.
        ASETSR
        HALT                    ;COMMON HALT.
        RTS     %7              ;EXIT.
INCRTN: TYPE                    ;TYPE INCORRECT ROUTINE SELECTED.
        AINCRT
        HALT                    ;COMMON HALT.
        RTS     %7              ;EXIT.
INCRPG: TYPE
        AINCPG
        HALT
        JMP     START
PRGEND: CLR     FOUNDV
        MOV     PASCNT,ERRST+20 ;STORE AWAY PASS COUNT
        MOV     LINENO,ERRST+22
        MOV     RXCSR,ERRST+24
        MOV     RXVTR,ERRST+26
        MOV     #60.,TEMP6
1$:     RESET
        DEC     TEMP6
```

```
                BNE     1$
                BIT     #BIT6,@SRPTR    ;HALT ON END OF PASS?
                BEQ     2$
                JSR     PC,EOPHLT
        2$:     BIT     #BIT13,@SRPTR   ;INHIBIT PRINT SET?
                BNE     PRGEXT          ;BR IF SET
                JSR     %5,BDCNV
                PASCNT
                APCNT
                6
                JSR     %5,DACNV        ;CONVERT LINE NUMBER
                LINENO
                ACLIN
                2
                JSR     %5,DACNV        ;CONVERT RXCSR
                RXCSR
                APRXC
                6
                JSR     %5,DACNV        ;CONVERT VECTOR
                RXVTR
                APVEC
                4
                TYPE                    ;TYPE PROGRAM END.
                APGEND
                JMP     .+6

        TEMP6:  .WORD 0

PRGEXT: BIT     #BIT12,@SRPTR   ;LOCK ON LINE
        BEQ     PRGXT1          ;BR IF NOT SET
        INC     PASCNT
        BR      PRGXTL
PRGXT1: MOV     LINENO,TEMP     ;GET LINENO
        ASL     TEMP
PRGEC:  ADD     #2,TEMP         ;UPDATE LINE NUMBER
PRGEA:  MOV     TEMP,%1
        MOV     RXCRO(1),%1     ;GET RXCSR DEVICE ADDRESS
        CMP     #177777,%1      ;LAST ONE
        BNE     PRGEB           ;NO,CONTINUE
        INC     PASCNT
        CLR     LINENO
        CLR     TEMP
PRGXTL: MOV     @#42,%5
        BEQ     CONT
        RESET
LOGIC:  JSR     7,(5)
        NOP
        NOP
        NOP
CONT:   BIT     #BIT12,@SRPTR   ;LOCK ON LINE
        BEQ     PRGEA           ;BRANCH IF NOT SET
        RTS     7
PRGEB:  BIT     #BIT0,%1        ;DEVICE THERE
        BNE     PRGEC           ;NO
        ASR     TEMP
        MOV     TEMP,LINENO
```

```
                JSR     %7,FORMAD
                RTS     %7                      ;EXIT.
        ;
        ;CONDITIONAL ERROR HALT ROUTINE.
        EHLT:   TST     @SRPTR                  ;CHECK FOR HALT ON ERROR.
                BPL     EHLTA                   ;BRANCH IF NO HALT DESIRED.
                HALT                            ;HALT.
        EHLTA:  RTI                             ;IN DATA LIGHTS.
        ;
        ;MASKIT - MASK DATA ACCORDING TO LINE NUMBER
        MASKIT: MOV     UMASK,RMASK             ;GET MASK
                BIC     #177000,RMASK           ;REMOVE C/D FLAG+PRIORITY
                COM     RMASK
                BIC     RMASK,CRBUFA            ;MASK DESIRED BITS
                RTS     7
        ;
        ;DATA CHECK ROUTINE, TEST ERROR BITS
        DTCHK:  MOV     @RXBUF,CRBUFB           ;DID ANY ERROR BITS SET
                BIT     #170000,CRBUFB
                BNE     DTCHKX                  ;YES, TYPE ERROR
                CMP     CRBUF,CRBUFA            ;COMPARE EXPECTED AND RECEIVED
                BEQ     DTCHKA                  ;CHARS. BRANCH IF SAME.
        DTCHKX: MOV     CRBUFA,ERRST+6
                MOV     CRBUF,ERRST+10
                JSR     %5,OACNV                ;GO TO OCTAL TO ASCII CONVERT.
                CRBUF                           ;SOURCE ADDR.
                AWAS                            ;DESTINATION ADDR.
                3                               ;#OF DIGITS TO CONVERT.
                JSR     %5,OACNV                ;GO TO OCTAL TO ASCII CONVERT.
                CRBUFA                          ;SOURCE ADDR.
                AASB                            ;DESTINATION ADDR.
                3                               ;#OF DIGITS TO CONVERT.
                JSR     %5,OACNV
                CRBUFB
                ARXBUF
                6
                ERROR1
                ERDAT
        DTCHKA: RTI
        ;
        ;ERROR HANDLER
        ERR:    MOV     #-1,ERRB                ;SET UP ONE MESSAGE CALL.
                MOV     #240,ERRB+2
                CLR     ERRE
                BR      ERRA
        ERR1:   MOV     @%6,ERRB                ;DEVELOP ADDT'L MESSAGE ADDR.
                MOV     @ERRB,ERRB              ;STORE AT ERRB.
                MOV     #-1,ERRB+2
                MOV     #2,ERRE
        ERRA:   BIT     #BIT13,@SRPTR           ;INHIBIT ERROR PRINT?
                BNE     ERRC                    ;BRANCH TO INHIBIT PRINT.
                MOV     @%6,ERRD                ;DEVELOP CALLING ADDR.
                SUB     #2,ERRD
                MOV     RTNNO,TNNO
                BIC     #BIT15,TNNO
                JSR     %5,OACNV                ;GO TO OCTAL TO ASCII CONVERT.
```

```
                ERRD                    ;SOURCE ADDR.
                APC                     ;DESTINATION ADDR.
                6                       ;#OF DIGITS TO CONVERT.
                JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
                RXCSR                   ;SOURCE ADDR.
                MRXNUM                  ;DESTINATION ADDR.
                6                       ;#OF DIGITS TO CONVERT.
                JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
                RTNNO                   ;SOURCE ADDR.
                ATNUMB                  ;DESTINATION ADDR.
                3                       ;#OF DIGITS TO CONVERT.
                TYPES                   ;TYPE:
                EMD                     ;ERROR HEADER.
        ERRB:   OPEN                    ;ADDT'L ERROR MESSAGE IF ANY.
                -1
                MOV     RTNNO,ERRST
                MOV     ERRD,ERRST+2
                MOV     RXCSR,ERRST+4
        ERRC:   EHALT                   ;GO ERR HALT IF DESIRED..
                ADD     ERRE,@%6
                RTI                     ;EXIT.
        ERRD:   OPEN
        ERRE:   OPEN
        ;
        ;ERROR TRAP HANDLER - TYPE TO AND FROM WHERE ERROR TRAP OCCURRED
        ERTP:   MOV     PSW,OLDPS       ;SAVE OLD STATUS
                MOV     #PRTY7,PSW
                ASR     OLDPS
                ASR     OLDPS
                ASR     OLDPS
                BIC     #177740,OLDPS
                MOV     OLDPS,TOPC
                MOV     @%6,FROMPC      ;GET FROM PC
        ERTPA:  JSR     %5,OACNV
                TOPC
                MTO
                6
                JSR     %5,OACNV
                FROMPC
                MFROM
                5
                TYPE
                MTERR
                HALT
                JMP     START
        ;
        ;MAPVEC - MAP VECTOR OR REPORT ERROR DEPENDING ON FMAP FLAG
        MAPVEC: MOV     @%6,TOPC
                POPSP2
                MOV     @%6,FROMPC
                SUB     #4,TOPC
                TST     FMAP
                BEQ     ERTPA           ;NOT MAPPING, REPORT ERROR
                MOV     TOPC,TXVTR      ;STORE VECTOR
                SUB     #4,TOPC
                MOV     TOPC,RXVTR
```

```
                CLR     FMAP
                RTI
        ;
        ;FORMAD-FORM DEVICE AT ADDRESSES
        FORMAD: MOV     %1,RXCSR
                ADD     #2,%1
                MOV     %1,RXBUF
                ADD     #2,%1
                MOV     %1,TXCSR
                ADD     #2,%1
                MOV     %1,TXBUF
                MOV     LINENO,TEMP     ;GET PRIORITY
                ASL     TEMP
                ADD     #CMASO,TEMP
                MOV     @TEMP,TEMP1
                MOV     TEMP1,UMASK
                SWAB    TEMP1
                ASL     TEMP1
                BIC     #177437,TEMP1
                MOV     TEMP1,RXLVL
                MOV     TEMP1,TXLVL
                RTS     %7
        ;
        ;DOTHIS - SELECTABLE TEST DECISION MAKER
        ;
        DOTHIS: BIT     #BIT9,@SRPTR    ;IS SELECT TEST SWITCH SET
                BNE     GOBACK          ;RETURN TO TEST IF SW SET
                JMP     GTRDYX          ;GO TO NEXT TEST
        GOBACK: RTS     %7
        ;
        PFAIL:  MOV     #PWRUP,24
                HALT
        PWRUP:  MOV     #PFAIL,24
                RESET
                MOV     #SPBOT,%6
                TYPE
                MPWRF
                ERROR
                BR      RESTART
        ;
        ;DECIDE IF VECTOR TO BE MAPPED AND MAP
        TSTVEC: CMP     #0,FOUNDV       ;NEED VECTOR MAPPING
                BNE     TSTVEX          ;NO, EXIT
                JSR     %7,OVRLAY
                CLR     RXVTR
                CLR     PSW
                BIS     #BIT0,FMAP      ;SET MAPPING FLAG
                BIC     #BIT6,@TXCSR    ;CAUSE INTERRUPT
                BIS     #BIT6,@TXCSR
                NOP
                NOP
                TST     RXVTR           ;DID TRAP OCCUR?
                BNE     TSTVA           ;YES, OK
                BIT     #BIT13,@SRPTR
                BNE     TSTVEC
                TYPE                    ;NO, ERROR
```

```
                INTER
                ERROR
                JMP     TSTVEC
TSTVA:          BIC     #BIT6,@TXCSR
                MOV     #PRTY7,PSW      ;RAISE PRIORITY, RETURN
                INC     FOUNDV
TSTVEX:         RTS     %7
;
;RESTART ROUTINE
RESTART:MOV     PRGNUM,%0
                ASL     %0
                JMP     @RSTART(0)      ;GO RESTART SELECTED PROGRAM

RSTART:         PRG0A                   ;PROGRAM 0 RESTART ADDRESS
                PRG1A                   ;PROGRAM 1 RESTART ADDRESS
                PRG2A                   ;PROGRAM 2 RESTART ADDRESS
                PRG3A                   ;PROGRAM 3 RESTART ADDRESS
                PRG4A                   ;PROGRAM 4 RESTART ADDRESS
                INCRPG
                INCRPG
                INCRPG

;
;PRG0 - INPUT-OUTPUT LOGIC TESTS
;
PRG0:           MOV     #AT0,KSTART
                TST     @#42            ;MONITOR LOAD
                BNE     PRG0B           ;YES, START TEST
                TYPE                    ;TYPE TITLE AND INSTRUCTIONS
                POTIT
                HALT
                JSR     7,SETSR
PRG0B:          JSR     5,LINSEL        ;GO GET LINE # FROM USER
PRG0A:          JMP     GETRDY          ;GET STARTED.
                X=-1
;*****************************************************************************
AT0:            100000                  ;TEST NUMBER                          *
                AT1                     ;ADDRESS OF NEXT TEST                 *
                1000.                   ;ITERATION COUNT                      *
                AAA                     ;SCOPE ENTRY POINT                    *
                X=X+1                   ;                                     *
;*****************************************************************************
;TEST ABILITY TO REFERENCE RECEIVER CSR WITHOUT TRAPPING
AAA:            MOV     #AAE,MACHER     ;SET UP MACHINE ERROR TRAP.
                CLR     @RXCSR          ;REFERENCE RXCSR
AAB:            SCOPE                   ;OK IF NO TRAP. SCOPE
AAE:            POPSP2
                ERROR                   ;TRAPPED WHEN REFERENCING RXCSR.
                BR      AAB
;*****************************************************************************
AT1:            100001                  ;TEST NUMBER                          *
                AT2                     ;ADDRESS OF NEXT TEST                 *
                1000.                   ;ITERATION COUNT                      *
                ABA                     ;SCOPE ENTRY POINT                    *
                X=X+1                   ;                                     *
;*****************************************************************************
```

```
        ;TEST ABILITY TO REFERENCE RECEIVER BUFFER WITHOUT TRAPPING
ABA:    MOV     #ABE,MACHER     ;SET UP MACHINE ERROR TRAP.
        TST     @#XORFLG
        BMI     ABB
        TST     @RXBUF          ;REFERENCE RXBUF
ABB:    SCOPE                   ;OK IF NO TRAP SCOPE
ABE:    POPSP2
        ERROR                   ;TRAPPED WHEN REFERENCING RXBUF
        BR      ABB
;*****************************************************************************
AT2:    100002                  ;TEST NUMBER                                  *
        AT3                     ;ADDRESS OF NEXT TEST                         *
        1000.                   ;ITERATION COUNT                              *
        ACA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST ABILITY TO REFERENCE TRANSMITTER CSR WITHOUT TRAPPING.
ACA:    MOV     #ACE,MACHER     ;SET UP MACHINE ERROR TRAP.
        TST     @TXCSR          ;REFERENCE TXCSR
ACB:    SCOPE                   ;SCOPE
ACE:    POPSP2
        ERROR                   ;TRAPPED WHEN REFERENCING TXCSR
        BR      ACB
;*****************************************************************************
AT3:    100003                  ;TEST NUMBER                                  *
        AT4                     ;ADDRESS OF NEXT TEST                         *
        1000.                   ;ITERATION COUNT                              *
        ADA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST ABILITY TO REFERENCE TRANSMITTER BUFFER WITHOUT TRAPPING
ADA:    MOV     #ADE,MACHER     ;SET UP MACHINE ERROR TRAP.
        TST     @TXBUF          ;REFERENCE TX BUF.
ADB:    SCOPE                   ;SCOPE
ADE:    POPSP2
        ERROR                   ;TRAPPED WHEN REFERENCING TXBUF
        BR      ADB
;*****************************************************************************
AT4:    100004                  ;TEST NUMBER                                  *
        AT5                     ;ADDRESS OF NEXT TEST                         *
        10.                     ;ITERATION COUNT                              *
        AEA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST THAT TXCSR BIT 0 (BREAK) CAN BE SET AND CLEARED
;AND THAT RESET CLEARS IT
AEA:    BIT     #BIT0,@TXCSR    ;SEE IF BIT IS CLEAR
        BEQ     AEB             ;BR IF CLEAR
        ERROR                   ;RESET DID NOT CLEAR IT
        BR      AED
AEB:    BIS     #BIT0,@TXCSR    ;SET TXCSR BIT 0
        BIT     #BIT0,@TXCSR    ;DID IT SET
        BNE     AEC             ;YES, GO ON
        ERROR                   ;TXCSR BIT0 FAILED TO SET
        BR      AED
AEC:    BIC     #BIT0,@TXCSR    ;CLEAR TXCSR BIT 0
```

```
                BIT     #BIT0,@TXCSR    ;DID IT CLEAR
                BEQ     AED
                ERROR                   ;TXCSR BIT 0 DID NOT CLEAR
AED:            BIS     #BIT0,@TXCSR
                SRESET                  ;ISSUE RESET TO CLEAR
                SCOPE
;*************************************************************************************
AT5:    100005                          ;TEST NUMBER                                  *
        AT6                             ;ADDRESS OF NEXT TEST                         *
        10.                             ;ITERATION COUNT                              *
        AGA                             ;SCOPE ENTRY POINT                            *
        X=X+1                           ;                                             *
;*************************************************************************************
;TEST THAT TXCSR BIT2 CAN BE SET, CLEARED, AND THAT RESET CLEARS IT.
AGA:    BIT     #BIT2,@TXCSR            ;SEE IF TXCSR BIT2 IS CLEAR.
        BEQ     AGB                     ;BRANCH IF BIT IS CLEAR.
        ERROR                           ;RESET DID NOT CLEAR TXCSR BIT2
        BR      AGD
AGB:    BIS     #BIT2,@TXCSR            ;SET TXCSR BIT2.
        BIT     #BIT2,@TXCSR            ;SEE IF BIT IS SET.
        BNE     AGC                     ;BRANCH IF BIT IS SET.
        ERROR                           ;TXCSR BIT2 FAILED TO SET.
        BR      AGD
AGC:    BIC     #BIT2,@TXCSR            ;CLEAR TXCSR BIT2
        BIT     #BIT2,@TXCSR            ;SEE IF BIT IS CLEAR.
        BEQ     AGD
        ERROR                           ;TXCSR BIT2 FAILED TO CLEAR.
AGD:    BIS     #BIT2,@TXCSR            ;SET TXCSR BIT2.
        SRESET                          ;ISSUE RESET TO CLEAR BIT.
        SCOPE                           ;SCOPE
;*************************************************************************************
AT6:    100006                          ;TEST NUMBER                                  *
        AT7                             ;ADDRESS OF NEXT TEST                         *
        10.                             ;ITERATION COUNT                              *
        AJA                             ;SCOPE ENTRY POINT                            *
        X=X+1                           ;                                             *
;*************************************************************************************
;TEST THAT TXCSR BIT6 CAN BE SET, CLEARED, AND THAT RESET CLEARS IT.
AJA:    MOV     #PRTY7,PSW              ;SET PRIORITY 7.
        BIT     #BIT6,@TXCSR            ;SEE IF TXCSR BIT6 IS CLEAR.
        BEQ     AJB                     ;BRANCH IF BIT IS CLEAR.
        ERROR                           ;RESET DID NOT CLEAR TXCSR BIT6
        BR      AJD
AJB:    BIS     #BIT6,@TXCSR            ;SET TXCSR BIT6.
        BIT     #BIT6,@TXCSR            ;SEE IF BIT IS SET.
        BNE     AJC                     ;BRANCH IF BIT IS SET.
        ERROR                           ;TXCSR BIT6 FAILED TO SET.
        BR      AJD
AJC:    BIC     #BIT6,@TXCSR            ;CLEAR TXCSR BIT6
        BIT     #BIT6,@TXCSR            ;SEE IF BIT IS CLEAR.
        BEQ     AJD
        ERROR                           ;TXCSR BIT6 FAILED TO CLEAR.
AJD:    BIS     #BIT6,@TXCSR            ;SET TXCSR BIT6.
        SRESET                          ;ISSUE RESET TO CLEAR BIT.
        SCOPE                           ;SCOPE
;*************************************************************************************
```

```
AT7:    100007                  ;TEST NUMBER                                    *
        AT10                    ;ADDRESS OF NEXT TEST                           *
        100.                    ;ITERATION COUNT                                *
        AKA                     ;SCOPE ENTRY POINT                              *
        X=X+1                   ;                                               *
;*******************************************************************************
;TEST THAT TXCSR BIT 7 (READY BIT) IS SET UPON ENTERING ROUTINE AND
;THAT IT CAN BE READ REL..BLY.
AKA:    TSTB    @TXCS           ;SEE IF TXCSR BIT 7 IS SET.
        BMI     AKB             ;BRANCH IF SET.
        ERROR                   ;TXCSR BIT 7 NOT SET.
        SRESET                  ;ISSUE RESET TO CLEAR BIT IF ERROR
AKB:    SCOPE                   ;SCOPE
;*******************************************************************************
AT10:   10                      ;TEST NUMBER                                    *
        AT11                    ;ADDRESS OF NEXT TEST                           *
        100.                    ;ITERATION COUNT                                *
        ALA                     ;SCOPE ENTRY POINT                              *
        X=X+1                   ;                                               *
;*******************************************************************************
;TEST THAT RXCSR BIT 1 CAN BE SET + CLEARED
ALA:    BIC     #BIT1,@RXCSR
        BIS     #BIT1,@RXCSR    ;SET RXCSR BIT1
        BIT     #BIT1,@RXCSR    ;SEE IF BIT IS SET
        BNE     ALY             ;BRANCH IF SET
        ERROR                   ;RXCSR BIT 1 FAILED TO SET
        BR      ALZ
ALY:    BIC     #BIT1,@RXCSR    ;CLEAR RXCSR BIT 1
        BIT     #BIT1,@RXCSR    ;SEE IF BIT IS CLEAR
        BEQ     ALZ
        ERROR                   ;RXCSR BIT 1 FAILED TO CLEAR
ALZ:    SCOPE                   ;SCOPE
;*******************************************************************************
AT11:   11                      ;TEST NUMBER                                    *
        AT12                    ;ADDRESS OF NEXT TEST                           *
        10.                     ;ITERATION COUNT                                *
        APA                     ;SCOPE ENTRY POINT                              *
        X=X+1                   ;                                               *
;*******************************************************************************
;TEST THAT RXCSR BIT2 IS CLEAR AND CAN BE READ RELIABLY.
APA:    BIT     #BIT2,@RXCSR    ;SEE IF RXCSR BIT2 IS CLEAR.
        BEQ     APB             ;BRANCH IF BIT IS CLEAR.
        ERROR                   ;RXCSR BIT2 IS NOT CLEAR.
        BR      APD
APB:    BIS     #BIT2,@RXCSR    ;SET RXCSR BIT2
        BIT     #BIT2,@RXCSR    ;SEE IF BIT IS SET
        BNE     APCX            ;BRANCH IF SET
        ERROR                   ;RXCSR BIT2 FAILED TO SET
        BR      APD
APCX:   BIC     #BIT2,@RXCSR    ;CLEAR RXCSR BIT2
        BIT     #BIT2,@RXCSR    ;SEE IF BIT IS CLEAR
        BEQ     APD
        ERROR                   ;RXCSR BIT2 FAILED TO CLEAR
APD:    BIS     #BIT2,@RXCSR    ;SET BIT
        SRESET                  ;ISSUE RESET TO CLEAR BIT
        SCOPE
```

```
;*****************************************************************************
AT12:   12                      ;TEST NUMBER                                  *
        AT13                    ;ADDRESS OF NEXT TEST                         *
        10.                     ;ITERATION COUNT                              *
        AQA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST THAT RXCSR BIT3 CAN BE SET, CLEARED, AND THAT RESET CLEARS IT.
AQA:    BIT     #BIT3,@RXCSR    ;SEE IF RXCSR BIT3 IS CLEAR.
        BEQ     AQB             ;BRANCH IF BIT IS CLEAR.
        ERROR                   ;RESET DID NOT CLEAR RXCSR BIT3
        BR      AQD
AQB:    BIS     #BIT3,@RXCSR    ;SET RXCSR BIT3.
        BIT     #BIT3,@RXCSR    ;SEE IF BIT IS SET.
        BNE     AQC             ;BRANCH IF BIT IS SET.
        ERROR                   ;RXCSR BIT3 FAILED TO SET.
        BR      AQD
AQC:    BIC     #BIT3,@RXCSR    ;CLEAR RXCSR BIT3
        BIT     #BIT3,@RXCSR    ;SEE IF BIT IS CLEAR.
        BEQ     AQD
        ERROR                   ;RXCSR BIT3 FAILED TO CLEAR.
AQD:    BIS     #BIT3,@RXCSR    ;SET RXCSR BIT3.
        SRESET                  ;ISSUE RESET TO CLEAR BIT.
        SCOPE                   ;SCOPE
;*****************************************************************************
AT13:   13                      ;TEST NUMBER                                  *
        AT14                    ;ADDRESS OF NEXT TEST                         *
        10.                     ;ITERATION COUNT                              *
        ARA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST THAT RXCSR BIT5 CAN BE SET, CLEARED, AND THAT RESET CLEARS IT.
ARA:    MOV     #PRTY7,PSW      ;PRTY7 TO INHIBIT ANY INT
        BIT     #BIT5,@RXCSR    ;SEE IF RXCSR BIT5 IS CLEAR.
        BEQ     ARB             ;BRANCH IF BIT IS CLEAR.
        ERROR                   ;RESET DID NOT CLEAR RXCSR BIT5
        BR      ARD
ARB:    BIS     #BIT5,@RXCSR    ;SET RXCSR BIT5.
        BIT     #BIT5,@RXCSR    ;SEE IF BIT IS SET.
        BNE     ARC             ;BRANCH IF BIT IS SET.
        ERROR                   ;RXCSR BIT5 FAILED TO SET.
        BR      ARD
ARC:    BIC     #BIT5,@RXCSR    ;CLEAR RXCSR BIT5
        BIT     #BIT5,@RXCSR    ;SEE IF BIT IS CLEAR.
        BEQ     ARD
        ERROR                   ;RXCSR BIT4 FAILED TO CLEAR.
ARD:    BIS     #BIT5,@RXCSR    ;SET RXCSR BIT5.
        SRESET                  ;ISSUE RESET TO CLEAR BIT.
        SCOPE                   ;SCOPE
;*****************************************************************************
AT14:   100014                  ;TEST NUMBER                                  *
        AT15                    ;ADDRESS OF NEXT TEST                         *
        10.                     ;ITERATION COUNT                              *
        ASA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
```

```
        ;TEST THAT RXCSR BIT6 CAN BE SET, CLEARED, AND THAT RESET CLEARS IT.
ASA:    MOV     #PRTY7,PSW      ;SET PRIORITY 7.
        BIT     #BIT6,@RXCSR    ;SEE IF RXCSR BIT6 IS CLEAR.
        BEQ     ASB             ;BRANCH IF BIT IS CLEAR.
        ERROR                   ;RESET DID NOT CLEAR RXCSR BIT6
        BR      ASD
ASB:    BIS     #BIT6,@RXCSR    ;SET RXCSR BIT6.
        BIT     #BIT6,@RXCSR    ;SEE IF BIT IS SET.
        BNE     ASC             ;BRANCH IF BIT IS SET.
        ERROR                   ;RXCSR BIT6 FAILED TO SET.
        BR      ASD
ASC:    BIC     #BIT6,@RXCSR    ;CLEAR RXCSR BIT6
        BIT     #BIT6,@RXCSR    ;SEE IF BIT IS CLEAR.
        BEQ     ASD
        ERROR                   ;RXCSR BIT6 FAILED TO CLEAR.
ASD:    BIS     #BIT6,@RXCSR    ;SET RXCSR BIT6.
        SRESET                  ;ISSUE RESET TO CLEAR BIT.
        SCOPE                   ;SCOPE
;*****************************************************************************
AT15:   15                      ;TEST NUMBER                                  *
        AT16                    ;ADDRESS OF NEXT TEST                         *
        100.                    ;ITERATION COUNT                              *
        ATA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST THAT RXCSR BIT7 IS CLEAR AND CAN BE READ RELIABLY.
ATA:    BIT     #BIT7,@RXCSR    ;SEE IF RXCSR BIT7 IS CLEAR.
        BEQ     ATB             ;BRANCH IF BIT IS CLEAR.
        ERROR                   ;RXCSR BIT7 IS NOT CLEAR.
        SRESET                  ;RESET IF ERROR
ATB:    SCOPE                   ;SCOPE
;*****************************************************************************
AT16:   16                      ;TEST NUMBER                                  *
        AT17                    ;ADDRESS OF NEXT TEST                         *
        100.                    ;ITERATION COUNT                              *
        AXA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST THAT RXCSR BIT10 IS CLEAR AND CAN BE READ RELIABLY.
AXA:    BIT     #BIT10,@RXCSR   ;SEE IF RXCSR BIT10 IS CLEAR.
        BEQ     AXB             ;BRANCH IF BIT IS CLEAR.
        ERROR                   ;RXCSR BIT10 IS NOT CLEAR.
        SRESET                  ;RESET BIT IF ERROR
AXB:    SCOPE                   ;SCOPE
;*****************************************************************************
AT17:   100017                  ;TEST NUMBER                                  *
        AT20                    ;ADDRESS OF NEXT TEST                         *
        100.                    ;ITERATION COUNT                              *
        AYA                     ;SCOPE ENTRY POINT                            *
        X=X+1                   ;                                             *
;*****************************************************************************
;TEST THAT RXCSR BIT11 IS CLEAR AND CAN BE READ RELIABLY.
AYA:    BIT     #BIT11,@RXCSR   ;SEE IF RXCSR BIT11 IS CLEAR.
        BEQ     AYB             ;BRANCH IF BIT IS CLEAR.
        ERROR                   ;RXCSR BIT11 IS NOT CLEAR.
        SRESET                  ;RESET BIT IF ERROR
```

```
AYB:    SCOPE                           ;SCOPE
;*****************************************************************************
AT20:   100020                          ;TEST NUMBER                          *
        AT21                            ;ADDRESS OF NEXT TEST                 *
        100.                            ;ITERATION COUNT                      *
        AZA                             ;SCOPE ENTRY POINT                    *
        X=X+1                           ;                                     *
;*****************************************************************************
;TEST THAT RXCSR BIT14 IS CLEAR AND CAN BE READ RELIABLY.
AZA:    BIT     #BIT14,@RXCSR           ;SEE IF RXCSR BIT14 IS CLEAR.
        BEQ     AZB                     ;BRANCH IF BIT IS CLEAR.
        ERROR                           ;RXCSR BIT14 IS NOT CLEAR.
        SRESET                          ;RESET BIT IF ERROR
AZB:    SCOPE                           ;SCOPE
;*****************************************************************************
AT21:   100021                          ;TEST NUMBER                          *
        AT22                            ;ADDRESS OF NEXT TEST                 *
        100.                            ;ITERATION COUNT                      *
        AAAA                            ;SCOPE ENTRY POINT                    *
        X=X+1                           ;                                     *
;*****************************************************************************
;TEST THAT RXCSR BIT15 IS CLEAR AND CAN BE READ RELIABLY.
AAAA:   BIT     #BIT15,@RXCSR           ;SEE IF RXCSR BIT15 IS CLEAR.
        BEQ     AAAB                    ;BRANCH IF BIT IS CLEAR.
        ERROR                           ;RXCSR BIT15 IS NOT CLEAR.
        SRESET                          ;RESET BIT IF ERROR
AAAB:   SCOPE                           ;SCOPE
;
;ALL PREVIOUS TESTS MUST HAVE BEEN RUN SUCCESSFULLY PRIOR
;TO RUNNING THE FOLLOWING TESTS.  ALSO, THE JUMPER CONNECTOR
;MUST BE INSERTED IN THE DL11-E CABLE IN PLACE OF THE MODEM.  COMMENTS
;REFER TO OPERATION WITH JUMPER INSERTED.
;
;*****************************************************************************
AT22:   22                              ;TEST NUMBER                          *
        AT23                            ;ADDRESS OF NEXT TEST                 *
        100.                            ;ITERATION COUNT                      *
        AFBA                            ;SCOPE ENTRY POINT                    *
        X=X+1                           ;                                     *
;*****************************************************************************
;TEST THAT CARRIER DETECT SETS AND CLEARS WHEN DATA TERMINAL
;READY SETS AND CLEARS.
AFBA:   BIS     #BIT1,@RXCSR            ;SET DATA TERMINAL READY
        BIT     #BIT12,@RXCSR           ;TEST CARRIER DETECT
        BNE     AFBB                    ;SHOULD BE SET
        ERROR                           ;WASN'T
        BR      AFBC
AFBB:   BIC     #BIT1,@RXCSR            ;CLEAR DATA TERMINAL READY
        BIT     #BIT12,@RXCSR           ;TEST CARRIER DETECT
        BEQ     AFBC
        ERROR                           ;WAS SET, ERROR
AFBC:   SCOPE
;*****************************************************************************
AT23:   23                              ;TEST NUMBER                          *
        AT24                            ;ADDRESS OF NEXT TEST                 *
        100.                            ;ITERATION COUNT                      *
```

```
                AGBA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************
        ;TEST THAT MODEM INTERRUPT (BIT 15) SETS WHEN CARRIER DETECT
        ;CHANGES STATE, AND IS CLEARED WHEN RXCSR IS READ.
        AGBA:   BIC     #BIT1,@RXCSR    ;CLEAR DATA TERMINAL READY
                MOV     @RXCSR,RXCSRT   ;READ RXCSR
                BIT     #BIT15,@RXCSR   ;TEST MODEM INTERRUPT
                BEQ     AGBB            ;WAS CLEAR  GO TO AGBB
                ERROR                   ;WASN'T CLEAR
                BR      AGBE            ;GO TO SCOPE
        AGBB:   BIS     #BIT1,@RXCSR    ;SETTING DATA TERMINAL READY
                                        ;CAUSES CARRIER DETECT TO SET
                                        ;WHICH CAUSES MODEM INTERRUPT TO SET
                MOV     @RXCSR,RXCSRT   ;MOVE RXCSR TO TEMPORARY LOCATION
                BIT     #BIT15,RXCSRT   ;TEST MODEM INTERRUPT
                BNE     AGBC            ;SHOULD BE SET  GO TO AGBC
                ERROR                   ;WAS CLEAR
                BR      AGBE            ;GO TO SCOPE
        AGBC:   BIT     #BIT15,@RXCSR   ;MODEM INTERRUPT BIT SHOULD
                                        ;HAVE BEEN CLEARED
                BEQ     AGBD            ;IT WAS  GO TO AGBD
                ERROR                   ;IT WASN'T
                BR      AGBE            ;GO TO SCOPE
        AGBD:   BIC     #BIT1,@RXCSR    ;CLEARING DATA TERMINAL READY
                                        ;CAUSES CARRIER DETECT TO CLEAR
                                        ;BUT MODEM INTERRUPT WILL SET
                MOV     @RXCSR,RXCSRT   ;MOV RXCSR TO TEMPORARY LOCATION
                BIT     #BIT15,RXCSRT   ;TEST MODEM INTERRUPT
                BNE     AGBE            ;SHOULD BE SET
                ERROR                   ;IT WASN'T
                BR      AGBE
        AGBE:   SCOPE                   ;SCOPE
        ;*******************************************************************************
        AT24:   24                      ;TEST NUMBER                                    *
                AT25                    ;ADDRESS OF NEXT TEST                           *
                100.                    ;ITERATION COUNT                                *
                AJBA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************
        ;TEST THAT CLEAR TO SEND (BIT13) SETS/CLEARS WHEN DATA TERMINAL
        ;READY SETS/CLEARS.
        AJBA:   BIC     #BIT1,@RXCSR    ;CLEAR DATA TERMINAL READY
                BIT     #BIT13,@RXCSR   ;TEST CLEAR TO SEND
                BEQ     AJBB
                ERROR                   ;CLEAR TO SEND SHOULD BE CLEAR
                BR      AJBD
        AJBB:   BIS     #BIT1,@RXCSR    ;SET DATA TERMINAL READY
                BIT     #BIT13,@RXCSR   ;TEST CLEAR TO SEND
                BNE     AJBC            ;BRANCH IF SET
                ERROR                   ;CLEAR TO SEND SHOULD BE SET
                BR      AJBD
        AJBC:   BIC     #BIT1,@RXCSR    ;CLEAR DATA TERMINAL READY
                BIT     #BIT13,@RXCSR   ;TEST CLEAR TO SEND
                BEQ     AJBD
                ERROR                   ;CLEAR TO SEND SHOULD BE CLEAR
```

```
        AJBD:   SCOPE                           ;SCOPE
        ;*******************************************************************************
        AT25:   25                              ;TEST NUMBER                            *
                AT26                            ;ADDRESS OF NEXT TEST                   *
                100.                            ;ITERATION COUNT                        *
                AKBA                            ;SCOPE ENTRY POINT                      *
                X=X+1                           ;                                       *
        ;*******************************************************************************
        ;TEST THAT RING (BIT 14 RXCSR) SETS WHEN REQUEST TO
        ;SEND SETS AND CLEARS AND RESET CLEARS RING
        AKBA:   BIC     #BIT2,@RXCSR    ;CLEAR REQUEST TO SEND
                BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
                BIT     #BIT14,@RXCSR   ;TEST RING
                BNE     AKBC
                ERROR                   ;RING SHOULD BE SET
        AKBC:   BIC     #BIT2,@RXCSR    ;CLEAR REQUEST TO SEND
                BIT     #BIT14,@RXCSR   ;TEST RING
                BEQ     .+4             ;SHOULD BE CLEAR
                ERROR
                SCOPE                   ;SCOPE
        ;*******************************************************************************
        AT26:   26                              ;TEST NUMBER                            *
                AT27                            ;ADDRESS OF NEXT TEST                   *
                100.                            ;ITERATION COUNT                        *
                AOBA                            ;SCOPE ENTRY POINT                      *
                X=X+1                           ;                                       *
        ;*******************************************************************************
        ;TEST THAT MODEM INTERRUPT (BIT 15 RXCSR) SETS WHEN RING SETS.
        AOBA:   BIC     #BIT2,@RXCSR    ;CLEAR REQUEST TO SEND
                BIT     #BIT15,@RXCSR   ;TEST MODEM INTERRUPT BIT
                BEQ     AOBB
                ERROR
                BR      AOBD
        AOBB:   BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
                BIT     #BIT15,@RXCSR   ;TEST MODEM INTERRUPT BIT
                BNE     AOBC
                ERROR
                BR      AOBD
        AOBC:   BIC     #BIT2,@RXCSR    ;CLEAR REQUEST TO SEND
                BIT     #BIT15,@RXCSR   ;TEST MODEM INTERRUPT BIT
                BEQ     AOBD
                ERROR
        AOBD:   SCOPE                           ;SCOPE
        ;*******************************************************************************
        AT27:   27                              ;TEST NUMBER                            *
                AT30                            ;ADDRESS OF NEXT TEST                   *
                100.                            ;ITERATION COUNT                        *
                ALBA                            ;SCOPE ENTRY POINT                      *
                X=X+1                           ;                                       *
        ;*******************************************************************************
        ;TEST THAT SUPERVISORY RECEIVE DATA (BIT 10 RXCSR) SETS/CLEARS
        ;WHEN SUPERVISORY XMIT DATA SETS/CLEARS.
        ALBA:   BIC     #BIT3,@RXCSR    ;CLEAR SUPERVISOR XMIT DATA
                BIT     #BIT10,@RXCSR   ;TEST SUPERVISORY RECEIVE DATA.
                BEQ     ALBB
                ERROR                   ;SHOULD HAVE BEEN CLEAR
```

```
                BR      ALBD
        ALBB:   BIS     #BIT3,@RXCSR    ;SET SUPERVISORY XMIT DATA
                BIT     #BIT10,@RXCSR   ;TEST SUPERVISORY RECEIVE DATA
                BNE     ALBC
                ERROR                   ;SHOULD HAVE BEEN SET
                BR      ALBD
        ALBC:   BIC     #BIT3,@RXCSR    ;CLEAR SUPERVISORY XMIT DATA
                BIT     #BIT10,@RXCSR   ;TEST SUPERVISORY RECEIVE DATA
                BEQ     ALBD
                ERROR                   ;SHOULD HAVE BEEN CLEAR
        ALBD:   SCOPE                   ;SCOPE
        ;***************************************************************************
        AT30:   30                      ;TEST NUMBER                               *
                AT31                    ;ADDRESS OF NEXT TEST                      *
                100.                    ;ITERATION COUNT                           *
                AMBA                    ;SCOPE ENTRY POINT                         *
                X=X+1                   ;                                          *
        ;***************************************************************************
        ;TEST THAT SUP REC DATA TRANSISTIONS SET MODEM INTERRUPT
        AMBA:   BIC     #BIT3,@RXCSR    ;CLEAR SUP REC
                BIS     #BIT3,@RXCSR    ;SET SUP REC
                BIT     #BIT15,@RXCSR   ;TEST MODEM INTERRUPT
                BNE     AMBB            ;MODEM INTERRUPT SHOULD BE SET
                ERROR
                BR      AMBE
        AMBB:   BIT     #BIT15,@RXCSR   ;MODEM INTERRUPT SHOULD BE
                BEQ     AMBC            ;CLEARED BY PREVIOUS READ
                ERROR
                BR      AMBE
        AMBC:   BIC     #BIT3,@RXCSR    ;1-0 TRANS OF SUP REC DATA
                BIT     #BIT15,@RXCSR   ;TEST MODEM INTERRUPT
                BNE     AMBD            ;SHOULD BE SET
                ERROR
                BR      AMBE
        AMBD:   BIS     #BIT3,@RXCSR    ;0-1 TRANS OF SUP REC DATA
                BIT     #BIT15,@RXCSR   ;TEST MODEM INTERRUPT
                BNE     AMBE            ;SHOULD BE SET
                ERROR
        AMBE:   SCOPE
        ;***************************************************************************
        AT31:   100031                  ;TEST NUMBER                               *
                AT32                    ;ADDRESS OF NEXT TEST                      *
                10.                     ;ITERATION COUNT                           *
                ABAA                    ;SCOPE ENTRY POINT                         *
                X=X+1                   ;                                          *
        ;***************************************************************************
        ;TEST THAT RESET CLEARS ALL TXCSR BITS, AND SETS BIT 7 (READY)
        ABAA:   MOV     #PRTY7,PSW      ;SET PRIORITY 7.
                MOV     #-1,@TXCSR      ;SET ALL POSSIBLE BITS IN TXCSR
                SRESET                  ;ISSUE RESET TO CLEAR BITS
                CMP     #BIT7,@TXCSR    ;SEE IF ONLY BIT 7 IS SET.
                BEQ     ABAB            ;BRANCH IF ONLY BIT 7 IS SET
                MOV     @TXCSR,TXCSRT   ;SAVE CONTENTS OF TXCSR
                MOV     #BIT7,TEMP      ;MOVE EXPECTED TXCSR TO TEMP.
                JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
                TEMP                    ;SOURCE ADDR.
```

```
                ATXSB                   ;DESTINATION ADDR.
                6                       ;#OF DIGITS TO CONVERT.
                JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
                TXCSRT                  ;SOURCE ADDR.
                ATXWAS                  ;DESTINATION ADDR.
                6                       ;#OF DIGITS TO CONVERT.
                ERROR1                  ;RESET FAILED TO CLEAR ALL BITS EXCEPT
                ATXCSR                  ;BIT 7 - SEE PRINTOUT
ABAB:           SCOPE                   ;SCOPE
;*****************************************************************************
AT32:   32                              ;TEST NUMBER                          *
        AT33                            ;ADDRESS OF NEXT TEST                 *
        10.                             ;ITERATION COUNT                      *
        ACAA                            ;SCOPE ENTRY POINT                    *
        X=X+1                           ;                                     *
;*****************************************************************************
;TEST THAT RESET CLEARS ALL RXCSR BITS EXCEPT DATA TERMINAL READY, RING
;CLEAR TO SEND,CARRIER DET
ACAA:   MOV     #PRTY7,PSW              ;SET PRIORITY 7
        BIC     #BIT1,@RXCSR            ;CLEAR DATA TERM.READY
        MOV     #-1,@RXCSR              ;SET ALL POSSIBLE BITS IN RXCSR
        BIS     #4,@TXCSR               ;SET MAINT BIT
        CLR     @TXBUF                  ;TRANSMIT A CHAR
        TIMETX                          ;TIME OUT TX DONE
        ERROR                           ;ERROR DONE NOT SETTING
        MOV     #1,@TXBUF               ;TRANSMIT ANOTHER CHAR.
        TIMERX                          ;TIME OUT RX DONE
        ERROR                           ;ERROR DONE NOT SETTING
        SRESET                          ;ISSUE RESET TO CLEAR BITS.
        MOV     @RXCSR,RXCSRT           ;MOVE RXCSR CONTENTS TO RXCSRT
        CMP     #30002,RXCSRT           ;SEE IF ONLY BITS 1,12,13 SET
        BEQ     ACAB                    ;BRANCH IF ONLY BITS 1,12,13 SET.
        MOV     #30002,TEMP
        JSR     %5,OACNV                ;GO TO OCTAL TO ASCII CONVERT.
        TEMP                            ;SOURCE ADDR.
        ARXSB                           ;DESTINATION ADDR.
        6                               ;#OF DIGITS TO CONVERT.
        JSR     %5,OACNV                ;GO TO OCTAL TO ASCII CONVERT.
        RXCSRT                          ;SOURCE ADDR.
        ARXWAS                          ;DESTINATION ADDR.
        6                               ;#OF DIGITS TO CONVERT.
        ERROR1                          ;RESET FAILED TO CLEAR ALL BITS EXCEPT
        ARXCSR                          ;BIT 0. SEE ERROR PRINTOUT.
ACAB:   BIC     #BIT1,@RXCSR            ;CLEAR DATA TERM. READY
        SCOPE                           ;SCOPE
;*****************************************************************************
AT33:   100033                          ;TEST NUMBER                          *
        AT34                            ;ADDRESS OF NEXT TEST                 *
        10.                             ;ITERATION COUNT                      *
        ADAA                            ;SCOPE ENTRY POINT                    *
        X=X+1                           ;                                     *
;*****************************************************************************
;TEST THAT LOADING TXBUF (TRANSMITTER BUFFER) CLEARS TXCSR BIT 7 (READY)
;AND WITHOUT MAINT SET THAT TXDONE SETS READY
ADAA:   CLR     @TXBUF                  ;LOAD TXBUF
        TIMETX                          ;TIME OUT TX DONE
```

```
                ERROR                   ;ERROR, DONE NOT SETTING
                CLR     @TXBUF          ;LOAD TX BUF
                TSTB    @TXCSR          ;TEST TXCSR BIT 7 (READY BIT)
                BPL     ADAB            ;BRANCH IF BIT NOT SET.
                ERROR                   ;ERROR. LOADING TXBUF FAILED TO CLEAR READY.
                BR      ADAC
ADAB:           TIMETX                  ;WAIT FOR DONE
                ERROR                   ;DONE NEVER SET
                BIT     #BIT7,@TXCSR
                BNE     .+4
                ERROR                   ;READY DID NOT SET
ADAC:           SRESET
                SCOPE                   ;SCOPE.
;*****************************************************************************
AT34:           100034                  ;TEST NUMBER                          *
                AT35                    ;ADDRESS OF NEXT TEST                 *
                1.                      ;ITERATION COUNT                      *
                AIAA                    ;SCOPE ENTRY POINT                    *
                X=X+1                   ;                                     *
;*****************************************************************************
;TEST THAT TRANSMIT SPEEDS ARE ARRANGED IN ASCENDING ORDER BY CHECKING THAT TIME
;TO READY BIT (TXCSR BIT 7) DECREASES AS A HIGHER SPEED IS SELECTED.
AIAA:           JSR     %7,DOTHIS       ;TEST IF THIS TEST SELECTED
                TYPES
                MSETTX
                MSETC
                MSD
                -1
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME.
                MOV     AIAST,CTR0      ;MOVE ELAPSED TIME TO CTR0.
                TYPE
                MS1
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME.
                MOV     AIAST,CTR1      ;MOVE ELAPSED TIME TO CTR1.
                TYPE
                MS2
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME.
                MOV     AIAST,CTR2      ;MOVE ELAPSED TIME TO CTR2.
                TYPE
                MS3
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME.
                MOV     AIAST,CTR3      ;MOVE ELAPSED TIME TO CTR3.
                TYPE
                MS4
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME
                MOV     AIAST,CTR4      ;MOVE ELAPSED TIME TO CTR4
                TYPE
                MS5
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME
                MOV     AIAST,CTR5      ;MOVE ELAPSED TIME TO CTR5
```

```
                TYPE
                MS6
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME
                MOV     AIAST,CTR6      ;MOVE ELAPSED TIME TO CTR6
                TYPE
                MS7
                HALT
                JSR     %7,AIAS         ;OUTPUT CHAR AND TIME
                MOV     AIAST,CTR7      ;MOVE ELAPSED TIME TO CTR7
                JSR     %7,CMPT         ;CHECK THAT CTR0 THROUGH CTR7 CONTAIN
                BR      AIAF            ;DESCENDING VALUES
                ERROR1                  ;TRANSMIT SPEEDS NOT ARRANGED IN
                ETXTIM                  ;ASCENDING ORDER.
AIAF:           SCOPE                   ;SCOPE
;
AIAS:           CLR     AIAST           ;CLEAR ELAPSED TIME COUNTER.
                TSTB    @TXCSR          ;WAIT FOR TX READY.
                BPL     .-4
                CLR     @TXBUF
                TSTB    @TXCSR
                BPL     .-4
                CLR     @TXBUF          ;LOAD TXBUF.
AIASA:          JSR     %7,TIME         ;WAIT 75 US
                INC     AIAST           ;INCREMENT ELAPSED TIME COUNTER.
                TSTB    @TXCSR          ;READY SET?
                BPL     AIASA           ;BRANCH IF READY NOT SET.
                RTS     %7              ;EXIT.
;
TIME:           MOV     #15.,%0
TIM1:           DEC     %0
                BNE     TIM1
                RTS     %7
AIAST:          OPEN
;*****************************************************************************
AT35:           35                      ;TEST NUMBER                        *
                AT36                    ;ADDRESS OF NEXT TEST               *
                10.                     ;ITERATION COUNT                    *
                ALAA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;*****************************************************************************
;TEST THAT OUTPUTTING A CHARACTER WITH THE MAINTENANCE BIT SET (TXCSR BIT 2)
;RESULTS IN DONE BIT SETTING (RXCSR BIT 7) NO LATER THAN 500 MSECS, AND
;THAT RESET INSTRUCTION CLEARS THE DONE BIT

ALAA:           BIS     #BIT2,@TXCSR            ;SET MAINTENANCE BIT
                CLR     @TXBUF          ;LOAD TXBUF
                DELAY                   ;WAIT 500 MSECS.
                500.
                TSTB    @RXCSR          ;SEE IF DONE BIT IS SET
                BMI     ALAB            ;BRANCH IF DONE BIT IS SET
                ERROR                   ;DONE BIT FAILED TO SET
                BR      ALAC
ALAB:           SRESET                  ;ISSUE RESET TO CLEAR DONE BIT
                TSTB    @RXCSR          ;SEE IF DONE BIT IS CLEARED
                BPL     ALAC            ;BRANCH IF DONE BIT IS CLEARED
```

```
                ERROR                   ;RESET FAILED TO CLEAR DONE BIT
ALAC:           SCOPE                   ;SCOPE
;***************************************************************************
AT36:           100036                  ;TEST NUMBER                        *
                AT37                    ;ADDRESS OF NEXT TEST               *
                100.                    ;ITERATION COUNT                    *
                AMAA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;***************************************************************************
;TEST THAT DONE BIT (RXCSR BIT 7) IS CLEARED BY READING RXBUF.
;DONE SET BY OUTPUTTING CHARACTER WITH MAINTENANCE BIT SET (TXCSR BIT 2)
AMAA:           BIS     #BIT2,@TXCSR    ;SET MAINTENANCE BIT (TXCSR BIT 2)
                CLR     @TXBUF          ;LOAD TXBUF
                TIMERX                  ;WAIT FOR DONE BIT TO SET.
                ERROR
                TST     @RXBUF          ;READ RXBUF TO CLEAR DONE BIT
                TSTB    @RXCSR          ;SEE IF DONE BIT IS CLEAR
                BPL     AMAC            ;BRANCH IF DONE BIT IS CLEAR
                ERROR                   ;READING RXBUF FAILED TO CLEAR DONE BIT
AMAC:           SCOPE                   ;SCOPE
;***************************************************************************
AT37:           100037                  ;TEST NUMBER                        *
                AT40                    ;ADDRESS OF NEXT TEST               *
                100.                    ;ITERATION COUNT                    *
                AOAA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;***************************************************************************
;TEST THAT RECEIVER ACTIVE SETS WHEN CHAR STARTS AND
;CLEARS WHEN RECEIVER DONE SETS
                JSR     %7,CDINIT       ;INIT IF C-D DEVICE
AOAA:           BIS     #BIT2,@TXCSR    ;SET MAINT
                CLR     @TXBUF          ;TRANSMIT CHAR
                CLR     TEMP            ;CLEAR BUSY INDICATOR
AOAB:           BIT     #BIT11,@RXCSR   ;IS RECEIVER ACTIVE SET
                BEQ     AOAB1           ;BRANCH IF CLEAR
                INC     TEMP            ;YES, REMEMBER THAT
AOAB1:          TSTB    @RXCSR          ;SEE IF DONE SET
                BPL     AOAB
                CMP     TEMP,#0         ;DID RECEIVER ACTIVE SET
                BNE     AOAC
                ERROR                   ;RECEIVER ACTIVE NEVER SET
                BR      AOAD
AOAC:           BIT     #BIT11,@RXCSR   ;DID DONE CLEAR ACTIVE
                BEQ     AOAD
                ERROR                   ;NO, RECEIVER ACTIVE DID NOT CLEAR
AOAD:           TST     @RXBUF          ;CLEAR RX DONE
                SCOPE
;***************************************************************************
AT40:           40                      ;TEST NUMBER                        *
                AT41                    ;ADDRESS OF NEXT TEST               *
                1.                      ;ITERATION COUNT                    *
                AQAA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;***************************************************************************
;TEST THAT RECEIVE SPEEDS ARE ARRANGED IN ASCENDING ORDER BY CHECKING THAT TIME
;ELAPSED TO DONE BIT SETTING (RXCSR BIT 7) DECREASES AS A HIGHER SPEED
```

```
        ;THIS IS NOT DONE IN MAINTENANCE MODE TX AND RX
        ;POTS MUST BE STEPPED TOGETHER
        ;IS SELECTED.
        AQAA:   JSR     %7,DOTHIS       ;CHECK IF THIS TEST TO BE DONE
                TYPES
                MSETRX
                MSETC
                MSD
                -1
                HALT
                JSR     %7,AQAS         ;OUTPUT CHARACTER AND TIME DONE BIT
                MOV     AQAST,CTR0      ;MOVE ELAPSED TIME TO CTR0
                TYPE
                MS1
                HALT
                JSR     %7,AQAS         ;OUTPUT CHARACTER AND TIME DONE BIT
                MOV     AQAST,CTR1      ;MOVE ELAPSED TIME TO CTR1
                TYPE
                MS2
                HALT
                JSR     %7,AQAS         ;OUTPUT CHARACTER AND TIME DONE BIT.
                MOV     AQAST,CTR2      ;MOVE ELAPSED TIME TO CTR2.
```

TYPE

```
                MS3
                HALT
                JSR     %7,AQAS         ;OUTPUT CHARACTER AND TIME DONE BIT
                MOV     AQAST,CTR3      ;MOVE ELAPSED TIME TO CTR3.
                TYPE
                MS4
                HALT
                JSR     %7,AQAS
                MOV     AQAST,CTR4
                TYPE
                MS5
                HALT
                JSR     %7,AQAS
                MOV     AQAST,CTR5
```

```
                TYPE
                MS6
                HALT
```

```
                JSR     %7,AQAS
                MOV     AQAST.CTR6
```

```
                TYPE
                MS7
                HALT
                JSR     %7,AQAS
                MOV     AQAST,CTR7
                JSR     %7,CMPT         ;CHECK THAT CTR0 THROUGH CTR3 CONTAIN
                BR      AQAB            ;DESCENDING VALUES.
                ERROR1                  ;RECEIVE SPEEDS NOT ARRANGED IN
                ERXTIM                  ;ASCENDING ORDER.
AQAB:           SCOPE                   ;SCOPE
;
AQAS:           CLR     AQAST           ;CLEAR ELAPSED TIME COUNTER AQAST
                TSTB    @TXCSR          ;WAIT FOR TX READY.
                BPL     .-4
                TST     @RXBUF          ;CLEAR DONE BIT IF SET
                CLR     @TXBUF          ;LOAD TXBUF
AQASA:          JSR     %7,TIME
                INC     AQAST           ;INCREMENT ELAPSED TIME COUNTER
                TSTB    @RXCSR          ;DONE SET?
                BPL     AQASA           ;BRANCH IF DONE NOT SET
                RTS     %7              ;EXIT
AQAST:          OPEN                    ;ELAPSED TIME COUNTER
;*****************************************************************************
AT41:           100041                  ;TEST NUMBER                          *
                AT42                    ;ADDRESS OF NEXT TEST                 *
                10.                     ;ITERATION COUNT                      *
                ARAA                    ;SCOPE ENTRY POINT                    *
                X=X+1                   ;                                     *
;*****************************************************************************
;TEST CORRECT OPERATION OF DATA OVERRUN BIT (RXBUF BIT 14)
ARAA:           JSR     %7,ARAS         ;OUTPUT CHARACTER AND WAIT 500 MSECS
                JSR     %7,ARAS         ;OUTPUT CHARACTER AND WAIT 500 MSECS
                MOV     @RXBUF,RXBUFT   ;SAVE RXBUF CONTENTS + CLEAR DONE
                BIT     #BIT14,RXBUFT   ;SEE IF DATA OVERRUN BIT WAS SET
                BNE     .+6             ;BRANCH IF BIT WAS SET
                ERROR
                SCOPE
                TST     RXBUFT          ;SEE THAT ERROR BIT WAS SET (RXBUF BIT 15)
                BMI     .+6
                ERROR                   ;ERROR BIT FAILED TO SET WHEN OVERRUN SET
                SCOPE
                BIT     #BIT14,@RXBUF   ;SEE THAT DATA OVERRUN WAS NOT
                                        ;CLEARED WHEN RXBUF WAS READ
                BNE     .+6             ;BRANCH IF SET
                ERROR                   ;READING RXBUF CLEARED DATA OVERRUN
                SCOPE
                JSR     %7,ARAS
                BIT     #BIT15,@RXBUF   ;OUTPUT CHAR +WAIT 500MS
                BEQ     .+6             ;TEST THAT ERROR CLEARED
                ERROR
                SCOPE
                BIT     #BIT14,@RXBUF   ;TEST THAT OVERRUN CLEARED
                BEQ     .+4
                ERROR
                SCOPE                   ;SCOPE
ARAS:           BIS     #BIT2,@TXCSR    ;SET MAINTENANCE BIT
```

```
                CLR     @TXBUF          ;LOAD TXBUF
                DELAY                   ;DELAY 500 MSECS
                500.
                RTS     %7              ;EXIT
        ;*************************************************************************************
        AT42:   100042                  ;TEST NUMBER                                        *
                AT43                    ;ADDRESS OF NEXT TEST                               *
                10.                     ;ITERATION COUNT                                    *
                ATAA                    ;SCOPE ENTRY POINT                                  *
                X=X+1                   ;                                                   *
        ;*************************************************************************************
        ;TEST THAT TRANSMITTER IS ABLE TO INTERRUPT.  IF THE INTERRUPT IS SERVICED,
        ;IT WILL HAVE OCCURRED AT THE CORRECT VECTOR.
                JSR     7,OVRLAY        ;GO TO OVER LAY ROUTINE
                STTXV                   ;SET TX INTERRUPT SERVICE
                ATAC                    ;TO ATAC
        ATAA:   BIC     #BIT6,@TXCSR    ;DISABLE TX INTERRUPT
                CLR     PSW             ;SET PROCESSOR PRIORITY TO 0
                BIS     #BIT6,@TXCSR    ;ENABLE TX INTERRUPT
                NOP
                ERROR                   ;READY DID NOT CAUSE AN INTERRUPT
                BIC     #BIT6,@TXCSR
        ATAB:   SCOPE                   ;SCOPE
        ATAC:   BIC     #BIT6,@TXCSR    ;HERE IF INT, DISABLE TX INT
                POPSP2
                BR      ATAB
        ;*************************************************************************************
        AT43:   100043                  ;TEST NUMBER                                        *
                AT44                    ;ADDRESS OF NEXT TEST                               *
                1000.                   ;ITERATION COUNT                                    *
                AUAA                    ;SCOPE ENTRY POINT                                  *
                X=X+1                   ;                                                   *
        ;*************************************************************************************
        ;TEST THAT READY DOES NOT CAUSE AN INTERRUPT WHEN THE PROCESSOR IS
        ;AT THE SAME PRIORITY AS THE TRANSMITTER INTERRUPT REQUEST LEVEL
                STTXV                   ;SET TX INTERRUPT SERVICE TO
                AUAC
        AUAA:   MOV     TXLVL,PSW       ;SET PROCESSOR PRIORITY SAME AS TX PRIORITY
                BIC     #BIT6,@TXCSR
                BIS     #BIT6,@TXCSR    ;ENABLE TX INTERRUPTS
                NOP
        AUAB:   BIC     #BIT6,@TXCSR    ;OK IF NO INTERRUPT OCCURS.  DISABLE INTERRUPTS
                SCOPE                   ;SCOPE
        AUAC:   POPSP2                  ;HERE IF INTERRUPT OCCURS. POP STOCK TWICE
                ERROR                   ;TX INTERRUPTED WITH PROCESSOR AT SAME
                BR      AUAB            ;PRIORITY AS THE TRANSMITTER
        ;*************************************************************************************
        AT44:   100044                  ;TEST NUMBER                                        *
                AT45                    ;ADDRESS OF NEXT TEST                               *
                10.                     ;ITERATION COUNT                                    *
                AVAA                    ;SCOPE ENTRY POINT                                  *
                X=X+1                   ;                                                   *
        ;*************************************************************************************
        ;TEST THAT TRANSMITTER INTERRUPTS WHEN PROCESSOR IS AT PRIORITY ONE LEVEL
        ;LOWER THAN THE TRANSMITTER INTERRUPT PRIORITY.
                STTXV                   ;SET TX INTERRUPT SERVICE TO AVAB
```

```
                AVAB
AVAA:           BIC     #BIT6,@TXCSR    ;DISABLE TX INTERRUPTS
                MOV     TXLVL,PSW       ;SET PROCESSOR PRIORITY TO ONE LEVEL
                SUB     #40,PSW         ;LOWER THAN TX PRIORITY
                BIS     #BIT6,@TXCSR    ;ENABLE TX INTERRUPTS
                NOP
                ERROR                   ;TX FAILED TO INTERRUPT
                BR      AVAC
AVAB:           POPSP2                  ;HERE IF INTERRUPT OCCURS. POP STOCK TWICE
AVAC:           BIC     #BIT6,@TXCSR    ;DISABLE TX INTERRUPTS
                SCOPE                   ;SCOPE
;***************************************************************************
AT45:           100045                  ;TEST NUMBER                        *
                AT46                    ;ADDRESS OF NEXT TEST               *
                100.                    ;ITERATION COUNT                    *
                AWAA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;***************************************************************************
;TEST THAT TRANSMITTER DOES NOT REINTERRUPT AFTER THE INITIAL INTERRUPT HAS
;OCCURRED AND HAS BEEN SERVICED.
AWAA:           STTXV                   ;SET TX INTERRUPT SERVICE TO AWAC
                AWAC
                BIC     #BIT6,@TXCSR    ;DISABLE TX INTERRUPTS
                CLR     PSW             ;SET PROCESSOR PRIORITY TO 0
                BIS     #BIT6,@TXCSR    ;ENABLE TX INTERRUPTS
                NOP
                ERROR                   ;TRANSMITTER FAILED TO INTERRUPT
AWAB:           BIC     #BIT6,@TXCSR    ;DISABLE TX INTERRUPTS
                SCOPE                   ;SCOPE
AWAC:           MOV     #AWAE,@TXVTR    ;HERE IF INTERRUPT OCCURS. CHANGE EXIT
                MOV     #AWAD,@%6       ;POINTER TO AWAD AND EXIT INTERRUPT
                RTI
AWAD:           NOP                     ;OK IF NO INTERRUPT REOCCURS.
                BR      AWAB
AWAE:           POPSP2                  ;HERE IF INTERRUPT REOCCURS
                ERROR                   ;TX REINTERRUPTED AFTER RTI
                BR      AWAB
;***************************************************************************
AT46:           100046                  ;TEST NUMBER                        *
                AT47                    ;ADDRESS OF NEXT TEST               *
                10.                     ;ITERATION COUNT                    *
                AXAA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;***************************************************************************
;TEST THAT RECEIVER DONE BIT IS ABLE TO INTERRUPT. IF THE INTERRUPT IS
;SERVICED IT WILL HAVE OCCURRED AT THE CORRECT VECTOR.
                JSR     7,OVRLAY        ;GO TO OVERLAY ROUTINE
                STRXV                   ;SET RX INTERRUPT SERIVCE TO AXAB
                AXAB
                JSR     %7,STRXD        ;SET RX DONE BIT
AXAA:           BIC     #BIT6,@RXCSR    ;DISABLE RX INTERRUPTS
                CLR     PSW             ;SET PROCESSOR PRIORITY TO 0
                BIS     #BIT6,@RXCSR    ;ENABLE RX INTERRUPTS
                NOP
                ERROR                   ;RX FAILED TO INTERRUPT
                BR      AXAC
```

```
AXAB:   POPSP2                          ;HERE IF INTERRUPT OCCURS
AXAC:   BIC     #BIT6,@RXCSR            ;DISABLE INT EN
        SCOPE                           ;SCOPE
;*****************************************************************************
AT47:   47                              ;TEST NUMBER                           *
        AT50                            ;ADDRESS OF NEXT TEST                  *
        10.                             ;ITERATION COUNT                       *
        AX1A                            ;SCOPE ENTRY POINT                     *
        X=X+1                           ;                                      *
;*****************************************************************************
;TEST THAT MODEM INTERRUPT BIT IS ABLE TO INTERRUPT. IF THE INTERRUPT IS
;SERVICED IT WILL HAVE OCCURRED AT THE CORRECT VECTOR.
        JSR     7,OVRLAY                ;GO TO OVERLAY ROUTINE
        STRXV                           ;SET RX INTERRUPT SERIVCE TO AXAB
        AX1B
AX1A:   BIC     #44,@RXCSR              ;DISABLE MODEM INTERRUPTS
        CLR     PSW                     ;SET PROCESSOR PRIORITY TO 0
        BIS     #44,@RXCSR              ;ENABLE MODEM INTERRUPTS,RQ TO SND
        DELAY
        5.
        ERROR                           ;MODEM FAILED TO INTERRUPT
        BR      AX1C
AX1B:   POPSP2                          ;HERE IF INTERRUPT OCCURS
AX1C:   BIC     #BIT5,@RXCSR            ;DISABLE INT EN
        SCOPE
;*****************************************************************************
AT50:   100050                          ;TEST NUMBER                           *
        AT51                            ;ADDRESS OF NEXT TEST                  *
        1000.                           ;ITERATION COUNT                       *
        AYAA                            ;SCOPE ENTRY POINT                     *
        X=X+1                           ;                                      *
;*****************************************************************************
;TEST THAT RECEIVER DONE BIT DOES NOT CAUSE AN INTERRUPT WHEN THE PROCESSOR
;IS AT THE SAME PRIORITY LEVEL AS THE RECEIVER INTERRUPT REQUEST LEVEL
        STRXV                           ;SET RX INTERRUPT SERVICE TO AYAC
        AYAC
        JSR     %7,STRXD                ;SET RX DONE BIT
AYAA:   BIC     #BIT6,@RXCSR            ;DISABLE RX INTERRUPTS
        MOV     RXLVL,PSW               ;SET PROCESSOR PRIORITY SAME AS RECEIVER'S
        BIS     #BIT6,@RXCSR            ;ENABLE RX INTERRUPTS
        NOP
AYAB:   BIC     #BIT6,@RXCSR            ;OK IF NO INTERRUPT. DISABLE RX INTERRUPTS
        SCOPE                           ;SCOPE
AYAC:   POPSP2                          ;HERE IF INTERRUPT OCCURS. POP STOCK TWICE
        ERROR                           ;RX INTERRUPTED WITH PROCESOR AT SAME
        BR      AYAB                    ;PRIORITY AS THE RECEIVER
;*****************************************************************************
AT51:   100051                          ;TEST NUMBER                           *
        AT52                            ;ADDRESS OF NEXT TEST                  *
        10.                             ;ITERATION COUNT                       *
        AZAA                            ;SCOPE ENTRY POINT                     *
        X=X+1                           ;                                      *
;*****************************************************************************
;TEST THAT RECEIVER DONE BIT CAUSES INTERRUPT WHEN PROCESSOR IS AT PRIORITY
;ONE LEVEL LOWER THAN THE RECEIVER'S INTERRUPT REQUEST LEVEL
        STRXV                           ;SET RX INTERRUPT TO AZAB
```

```
                AZAB
                JSR     %7,STRXD        ;SET RX DONE BIT
AZAA:           BIC     #BIT6,@RXCSR    ;DISABLE RX INTERRUPTS
                MOV     RXLVL,PSW       ;SET PROCESSOR PRIORITY ONE LEVEL
                SUB     #40,PSW         ;LOWER THAN RECEIVER'S PRIORITY
                BIS     #BIT6,@RXCSR    ;ENABLE RX INTERRUPTS
                NOP
                ERROR                   ;RX FAILED TO INTERRUPT WITH PROCESSOR AT
                BR      AZAC            ;PRIORITY ONE LEVEL LOWER THAN RECEIVER'S
AZAB:           POPSP2                  ;HERE IF INTERRUPT OCCURS
AZAC:           BIC     #BIT6,@RXCSR    ;DISABLE RX INTERRUPTS
                SCOPE                   ;SCOPE
;***************************************************************************
AT52:           100052                  ;TEST NUMBER                        *
                AT53                    ;ADDRESS OF NEXT TEST               *
                100.                    ;ITERATION COUNT                    *
                AABA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;***************************************************************************
;TEST THAT RECEIVER DOES NOT INTERRUPT AFTER THE INITIAL INTERRUPT HAS
;OCCURED AND DONE BIT HAS NOT BEEN CLEARED
                JSR     %7,STRXD        ;SET RX DONE BIT
AABA:           STRXV                   ;SET RX INTERRUPT SERVICE TO AABC
                AABC
                BIC     #BIT6,@RXCSR    ;DISABLE RX INTERRUPTS
                BIS     #BIT6,@RXCSR    ;ENABLE RX INTERRUPTS
                NOP
                ERROR                   ;RX FAILED TO INTERRUPT
AABB:           BIC     #BIT6,@RXCSR    ;DISABLE RX INTERRUPTS
                SCOPE                   ;SCOPE
AABC:           MOV     #AABE,@RXVTR    ;HERE IF INTERRUPT OCCURS. CHANGE SERVICE TO
                MOV     #AABD,@%6       ;AABE, SET EXIT POINTER TO AABD
                RTI                     ;EXIT INTERRUPT SERVICE
AABD:           NOP                     ;OK IF NO INTERRUPT REOCCURS
                BR      AABB
AABE:           POPSP2                  ;HERE IF INTERRUPT REOCCURS
                ERROR                   ;RX REINTERRUPTED AFTER RTI
                BR      AABB
;***************************************************************************
AT53:           100053                  ;TEST NUMBER                        *
                AT54                    ;ADDRESS OF NEXT TEST               *
                100.                    ;ITERATION COUNT                    *
                ABBA                    ;SCOPE ENTRY POINT                  *
                X=X+1                   ;                                   *
;***************************************************************************
;TEST THAT READING RXCSR DOES NOT CLEAR DONE BIT (RXCSR BIT 7 )
ABBA:           JSR     %7,STRXD        ;SET RX DONE BIT
                MOV     @RXCSR,RXCSRT   ;SAVE CONTENT OF RXCSR
                TSTB    @RXCSR          ;SEE IF DONE BIT IS CLEAR
                BMI     ABBB            ;BRANCH IF DONE BIT IS NOT CLEAR
                ERROR
ABBB:           TST     @RXBUF          ;CLEAR DONE BIT IF SET
                SCOPE                   ;SCOPE
;***************************************************************************
AT54:           100054                  ;TEST NUMBER                        *
                AT55                    ;ADDRESS OF NEXT TEST               *
```

```
                100.                    ;ITERATION COUNT                                *
                ACBA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************
        ;TEST THAT DONE CAN CAUSE INT WITH ERROR SET
                STRXV                   ;SET RX INTERRUPT SERVICE TO ACBB.
                ACBB
        ACBA:   JSR     %7,STRXD        ;SET RX DONE BIT
                JSR     %7,STRXD        ;SET RX DATA OFLOW
                BIC     #BIT6,@RXCSR    ;DISABLE RX INTERRUPTS
                CLR     PSW             ;SET PROCESSOR PRIORITY TO 0
                BIS     #BIT6,@RXCSR    ;ENABLE RX INTERRUPTS
                NOP
                ERROR                   ;RX DONE FAILED TO CAUSE INTERRUPT
                BR      ACBC
        ACBB:   POPSP2                  ;HERE IF INTERRUPT OCCURS. POP STOCK TWICE
        ACBC:   BIC     #BIT6,@RXCSR
                SCOPE
        ;*******************************************************************************
        AT55:   100055                  ;TEST NUMBER                                    *
                AT56                    ;ADDRESS OF NEXT TEST                           *
                3.                      ;ITERATION COUNT                                *
                ADDA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************
        ;DATA TEST USING NORMAL CONFIGURATION
                JSR     %7,CDINIT       ;INIT IF C-D DEVICE
        ADDA:   JSR     5,DATTST
                SCOPE
        ;*******************************************************************************
        AT56:   56                      ;TEST NUMBER                                    *
                AT57                    ;ADDRESS OF NEXT TEST                           *
                3.                      ;ITERATION COUNT                                *
                APBA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************
        ;DATA TEST USING JUMPER CONNECTOR.
        ;USES SPECIAL BINARY COUNT PATTERN FOR DATA. NO INTERRUPT.
                JSR     7,INBIN         ;INITIALIZE BINARY COUNT PATTERN
        APBA:   MOV     #1000.,CTR0     ;SET CHARACTER COUNT TO 1000
        APBB:   TIMETX                  ;TIME OUT TX DONE
                ERROR                   ;ERROR DONE NOT SETTING
                JSR     7,GTBINP        ;GET BINARY CHARACTER
                MOVB    %1,CRBUFA       ;SAVE CHAR IN CRBUFA AND
                JSR     7,MASKIT        ;MASK OFF NON TRANSMITTED BITS
                MOVB    %1,@TXBUF       ;LOAD CHAR.
                TIMERX                  ;TIME OUT RX DONE
                ERROR                   ;ERROR DONE NOT SETTING
                MOVB    @RXBUF,CRBUF    ;LOAD RECEIVED DATA INTO CRBUF
                DATCHK                  ;CHECK DATA
                DEC     CTR0            ;TESTED 1000 CHARACTERS
                BNE     APBB            ;BRANCH IF NOT
                SCOPE                   ;YES. SCOPE
        ;*******************************************************************************
        AT57:   57                      ;TEST NUMBER                                    *
                AT60                    ;ADDRESS OF NEXT TEST                           *
```

```
                3.                      ;ITERATION COUNT                                *
                EXTA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************

        ;TEST THAT RDR BUSY TURNS OFF RDR ENABLE
        ;WHEN RUN ON AN XOR TESTER
        EXTA:   RESET                   ;RESET
                INC     @RXCSR          ;SET RDR ENABLE, SEE IF RDE IS TURNED OFF BY RDR BUSY
                MOV     #-10,3$+2
        2$:     INC     3$+2            ;WAIT LOOP FOR XOR TESTER
                BNE     2$
                CLR     @TXBUF          ;SHIP OUT CHAR.
                MOV     #-50000,3$+2
        5$:     TSTB    @RXCSR          ;TEST COMPLETE
                BMI     6$
        3$:     INC     #-10            ;ALLOW TIME FOR RDR DONE TO SET
                BNE     5$
                ERROR                   ;FAILURE OF RDR DONE TO SET
        6$:     SCOPE
        ;*******************************************************************************
        AT60:   60                      ;TEST NUMBER                                    *
                AT61                    ;ADDRESS OF NEXT TEST                           *
                10.                     ;ITERATION COUNT                                *
                EXA                     ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************
        ;TEST THAT WHEN RDR ENABLE IS SET THAT THE RXCSR DONE
        ;BIT IS CLEARED
        EXA:    RESET
                JSR     PC,STRXD        ;SET RCVR DONE
                INC     @RXCSR          ;SET ENABLE
                TSTB    @RXCSR          ;DONE SHOULD CLEAR
                BPL     1$
                ERROR                   ;DONE NOT CLEAR
        1$:     MOV     #-10,3$+2
        3$:     INC     #-10            ;WAIT 100MIC. SEC. FOR XOR
                BNE     3$
                SCOPE
        ;*******************************************************************************
        AT61:   61                      ;TEST NUMBER                                    *
                AT62                    ;ADDRESS OF NEXT TEST                           *
                3.                      ;ITERATION COUNT                                *
                EXAA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************************************************************
        EXAA:   TST     XORFLG          ;CHECKING JUMPER CONNECTIONS FOR XOR, RCVR
                BPL     3$
                MOV     #-1,@RXCSR
                TST     @RXCSR
                RESET
        3$:     SCOPE
        ;*******************************************************************************
        AT62:   62                      ;TEST NUMBER                                    *
                AT63                    ;ADDRESS OF NEXT TEST                           *
                3.                      ;ITERATION COUNT                                *
```

```
                EXBA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************;*******************************************
        EXBA:   TST     XORFLG          ;SAME AS ABOVE BUT FOR XMTR
                BPL     4$
                MOV     #177677,@TXCSR
                TST     @TXCSR
                RESET
        4$:     SCOPE
        ;*******************************************************************************
        AT63:   100063                  ;TEST NUMBER                                    *
                ATLAST                  ;ADDRESS OF NEXT TEST                           *
                10.                     ;ITERATION COUNT                                *
                AQBA                    ;SCOPE ENTRY POINT                              *
                X=X+1                   ;                                               *
        ;*******************************;*******************************************
        ;TEST THAT WHEN TXCSR BIT 0 IS SET THAT THE OUTPUT DATA LINE
        ;IS PULLED TO A SPACE.
        AQBA:   JSR     %7,CDINIT       ;INIT IF C-D DEVICE
                BIS     #BIT2,@TXCSR    ;SET MAINTENANCE BIT IN TXCSR
                BIS     #BIT0,@TXCSR    ;SET BREAK BIT
                MOV     #252,@TXBUF     ;LOAD BUFFER
                TIMERX                  ;TIME OUT RX DONE
                ERROR                   ;ERROR DONE NOT SETTING
                CMPB    @RXBUF,#0       ;CHARACTER RECEIVED SHOULD BE 0
                BEQ     .+4
                ERROR                   ;CHARACTER OTHER THAN 0
                SRESET                  ;ISSUE RESET
                SCOPE
```

```
                ;
                ;SUBROUTINE TO SET RXCSR DONE BIT.
                STRXD:  BIS     #BIT2,@TXCSR    ;SET MAINTENANCE BIT.
                        CLR     @TXBUF          ;LOAD TXBUF.
                        TIMERX                  ;TIME OUT TX DONE
                        ERROR                   ;ERROR DONE NOT SETTING
                        RTS     %7              ;EXIT.
                ;SUBROUTINE TO CHECK THAT CTR0 THROUGH CTR3 CONTAIN DESCENDING VALUES.
                CMPT:   CMP     CTR0,CTR1
                        BLOS    CMPTNG
                        CMP     CTR1,CTR2
                        BLOS    CMPTNG
                        CMP     CTR2,CTR3
                        BLOS    CMPTNG
                        CMP     CTR3,CTR4
                        BLOS    CMPTNG
                        CMP     CTR4,CTR5
                        BLOS    CMPTNG
                        CMP     CTR5,CTR6
                        BLOS    CMPTNG
                        CMP     CTR6,CTR7
                        BHI     CMPTOK
                CMPTNG: ADD     #2,@%6
                CMPTOK: RTS     %7
```

```
                ;**********
                ;PRG1 - TRANSMITTER SCOPE LOOP
                ;**********
PRG1:           TYPE                            ;TYPE PROGRAM TITLE.
                P1TIT
                JSR     5,LINSLX                ;GO GET LINE # FROM USER
                TYPE                            ;TYPE SELECT CHAR AND DELAY.
                SELCAD
                HALT                            ;WAIT FOR USER.
PRG1A:          MOVB    @SRPTR,PRG1B            ;DELAY COUNT TO PRG1B.
                MOVB    @SRPTRH,@TXBUF          ;LOAD TXBUF.
                DELAY                           ;DELAY # OF MSECS. SET AT SR.
PRG1B:          OPEN
                BR      PRG1A                   ;REPEAT.
                ;**********
                ;PRG2 - RECEIVER SCOPE LOOP.
                ;**********
PRG2:           TYPE                            ;TYPE PROGRAM TITLE.
                P2TIT
                JSR     5,LINSLX                ;GO GET LINE # FROM USER
                TYPE                            ;TYPE SELECT CHAR AND DELAY.
                SELCAD
                HALT                            ;WAIT FOR USER.
PRG2A:          BIS     #BIT2,@TXCSR            ;SET MAINTENANCE BIT.
                MOVB    @SRPTR,PRG2B            ;DELAY COUNT TO PRG2B.
                MOVB    @SRPTRH,@TXBUF          ;LOAD TXBUF.
                DELAY                           ;DELAY # OF MSECS. SET IN SR.
PRG2B:          OPEN
                MOV     @RXBUF,%0               ;RXBUF CONTENTS TO R0.
                RESET                           ;DISPLAY CONTENTS OF RXBUF (IN R0),
                RESET                           ;BY ISSUING 5 RESET INSTRUCTIONS
                RESET
                RESET
                RESET
                BR      PRG2A
```

```
        ;**********
        ;PRG3 - SINGLE CHARACTER MAINTENANCE MODE DATA TEST.
        ;**********
PRG3:   TYPE                            ;TYPE PROGRAM TITLE.
        P3TIT
        JSR     5,LINSLX                ;GO GET LINE # FROM USER
        TYPE                            ;TYPE: SELECT CHARACTER.
        SELCAR
        HALT
PRG3A:  MOVB    @SRPTRH,CRBUFA          ;MOVE DATA CHAR TO CRBUFA.
        JSR     %7,MOUTIN               ;GO OUTPUT, RECEIVE, AND CHECK DATA.
        BR      PRG3A
        ;**********
        ;PRG4 - SPECIAL BINARY COUNT MAINTENANCE MODE DATA TEST.
        ;**********
PRG4:   TYPE                            ;TYPE PROGRAM TITLE.
        P4TIT
        JSR     5,LINSLX                ;GO GET LINE # FROM USER
        JSR     %7,INBIN                ;INITIALIZE BINARY COUNT.
PRG4A:  JSR     %7,GTBINP               ;GET BINARY CHARACTER.
        MOVB    %1,CRBUFA               ;SAVE AT CRBUFA.
        JSR     %7,MOUTIN               ;GO OUTPUT, RECEIVE, AND CHECK DATA.
        BR      PRG4A                   ;REPEAT.
        ;SUBROUTINE TO OUTPUT, RECEIVE, AND CHECK DATA WITH MAINTENANCE BIT SET.
MOUTIN: BIT     #BIT7,@SRPTR            ;SEE IF BIT 7 IS SET.
        BNE     .+4                     ;BRANCH IF SET.
        STALL                           ;SET. DO A RANDOM STALL.
        TIMETX                          ;TIME OUT TX DONE
        ERROR                           ;ERROR DONE NOT SETTING
        BIS     #BIT2,@TXCSR            ;SET MAINTENANCE BIT.
        MOV     CRBUFA,@TXBUF           ;LOAD TXBUF.
        JSR     7,MASKIT                ;MASK OFF NON TRANSMITTED BITS
        TIMERX                          ;TIME OUT RX DONE
        ERROR                           ;ERROR DONE NOT SETTING
        MOV     @RXBUF,CRBUF            ;MOVE CHAR IN RX BUFFER TO CRBUF.
        DATCHK                          ;COMPARE EXPECTED AND RECEIVED DATA
        RTS     %7                      ;EXIT.
```

```
        ;ASCII MESSAGES
        ;
        MTIT:   .ASCII  '%DL11-E,C/D OFF LINE TEST - MAINDEC-11-DZDLA-D%'



                .ASCII  '%MAP OF DEVICES PRESENT%@'


        MDEVAD: .ASCII  '               %@'

        MNONE:  .ASCII  '%NONE FOUND%@'

        EMO:    .ASCII  '%T'
        ATNUMB: .ASCII  '    PC= '
        APC:    .ASCII  '        RXCSR= '
        MRXNUM: .ASCII  '        @'
        POTIT:  .ASCII  '%%PRGO - INPUT-OUTPUT LOGIC TESTS. '


                .ASCII  '%DISCONNECT DL11-E FROM MODEM'


                .ASCII  ' AND CONNECT JUMPER TO CABLE.%@'


        ATXCSR: .ASCII  'TXCSR S/B: '
        ATXSB:  .ASCII  '        WAS: '
        ATXWAS: .ASCII  '      @'
        ARXCSR: .ASCII  'RXCSR S/B: '
```

```
ARXSB:  .ASCII  '        WAS: '

ARXWAS: .ASCII  '       @'
ETXTIM: .ASCII  'TX SPEEDS NOT IN ASCENDING ORDER.@'


ERXTIM: .ASCII  'RX SPEEDS NOT IN ASCENDING ORDER.@'


P1TIT:  .ASCII  '%%PRG1 - TRANSMITTER SCOPE LOOP@'


P2TIT:  .ASCII  '%%PRG2 - RECEIVER SCOPE LOOP@'

SELCAD: .ASCII  '%SET TEST CHAR CODE IN SR15-SR8, SET DELAY TIME IN SR7-SR0.@'


ERDAT:  .ASCII  'DATA S/B: '
AASB:   .ASCII  '    WAS: '
AWAS:   .ASCII  '   '
        .ASCII  ' RXBUF: '
ARXBUF: .ASCII  '       @'
ASETSR: .ASCII  '%SET DESIRED SR OPTIONS. NORMAL OPERATION '


        .ASCII  'IS WITH SR = 000000@'
```

```
AINCRT: .ASCII  '%INCORRECT ROUTINE SELECTED, PLACE CORRECT PROGRAM'



        .ASCII  '%IN SR 0-2 AND PRESS CONTINUE.@'


AINCPG: .ASCII  '%INVALID PROGRAM SELECTED.@'


APGEND: .BYTE   207
        .ASCII  '%END PASS = '

APCNT:  .ASCII  '       LINE =  '

ACLIN:  .ASCII  '    RXCSR = '

APRXC:  .ASCII  '       VECTOR = '

APVEC:  .ASCII  '       @'
P3TIT:  .ASCII  '%%PRG3-SINGLE CHAR MAINT MODE DATA TEST@'
                ;
                ;
                .
P4TIT:  .ASCII  '%%PRG4-SPEC BIN COUNT MAINT MODE DATA TEST@'



SELCAR: .ASCII  '%SET TEST CHAR CODE IN SR15-SR8.@'
```

```
LDLINE: .ASCII  '%LOAD LINE NO. INTO SR 0-2@'


ALINE:  .ASCII  '  LINE NO.'
SELINE: .ASCII  '   WAS SELECTED@'

MSETRX: .ASCII  '%RECEIVER SPEED CHECK@'

MSETTX: .ASCII  '%TRANSMIT SPEED CHECK@'

MSETC:  .ASCII  '%SET CLOCK SWITCHES TO POSITION, THEN PRESS CONTINUE.@'



MTERR:  .ASCII  '%ERROR - UNEXPECTED TRAP'

        .ASCII  '%TRAPPED TO  '

MTO:    .ASCII  '         '
        .ASCII  '%TRAPPED FROM PC  '

MFROM:  .ASCII  '         @'
MNOLIN: .ASCII  '%NO DEVICE PRESENT - THIS LINE NO.@'


INTER:  .ASCII  '%NO INTERRUPT@'

MS0:    .ASCII  '%CS = 0@'
MS1:    .ASCII  '%CS = 1@'
```

```
MS2:    .ASCII  '%CS = 2@'
MS3:    .ASCII  '%CS = 3@'
MS4:    .ASCII  '%CS = 4@'
MS5:    .ASCII  '%CS = 5@'
MS6:    .ASCII  '%CS = 6@'
MS7:    .ASCII  '%CS = 7@'
MPWRF:  .ASCII  '%RECOVERED FROM POWER FAILURE@'



        .EVEN
        .=17400
ERRST:  .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .WORD 0
        .END
```

```
AAA     006470          1723    1727#
AAAA    010026          2038    2042#
AAAB    010042          2043    2046#
AAB     006502          1729#   1732
AABA    013406          2750    2756#
AABB    013432          2762#   2768    2771
AABC    013442          2757    2764#
AABD    013456          2765    2767#
AABE    013462          2764    2769#
AAE     006504          1727    1730#
AASB    015612          1546    3125#
ABA     006522          1737    1741#
ABAA    010760          2231    2235#
ABAB    011052          2239    2252#
ABB     006542          1743    1745#   1748
ABBA    013500          2776    2780#
ABBB    013522          2783    2785#
ABE     006544          1741    1746#
ACA     006562          1753    1757#
ACAA    011064          2257    2262#
ACAB    011214          2275    2287#
ACB     006574          1759#   1762
ACBA    013544          2791    2797#
ACBB    013602          2796    2805#
ACBC    013604          2804    2806#
ACE     006576          1757    1760#
ACLIN   016155          1472    3170#
ADA     006614          1767    1771#
ADAA    011234          2293    2298#
ADAB    011262          2303    2306#
ADAC    011300          2305    2311#
ADB     006626          1773#   1776
ADDA    013630          2812    2817#
ADE     006630          1771    1774#
ADTENP  004576          1389    1415#
AEA     006646          1781    1786#
AEB     006662          1787    1790#
AEC     006704          1792    1795#
AED     006724          1789    1794    1797    1799#
AFBA    010054          2057    2062#
AFBB    010076          2064    2067#
AFBC    010116          2066    2069    2071#
AGA     006746          1806    1810#
AGB     006762          1811    1814#
AGBA    010130          2076    2081#
AGBB    010160          2084    2087#
AGBC    010210          2092    2095#
AGBD    010224          2097    2100#
AGBE    010254          2086    2094    2099    2105    2107    2108#
AGC     007004          1816    1819#
AGD     007024          1813    1818    1821    1823#
AIAA    011314          2317    2322#
AIAF    011540          2367    2370#
AIAS    011542          2329    2334    2339    2344    2349    2354    2359    2364    2372#
AIASA   011572          2379#   2382
AIAST   011624          2330    2335    2340    2345    2350    2355    2360    2365    2372*   2380*   2389#
```

```
AINCPG  016065            1449    3158#
AINCRT  015744            1445    3143#
AJA     007046            1830    1834#
AJB     007070            1836    1839#
AJBA    010266            2113    2118#
AJBB    010310            2120    2123#
AJBC    010332            2125    2128#
AJBD    010352            2122    2127    2130    2132#
AJC     007112            1841    1844#
AJD     007132            1838    1843    1846    1848#
AKA     007154            1855    1860#
AKB     007166            1861    1864#
AKBA    010364            2137    2142#
AKBC    010412            2145    2147#
ALA     007200            1869    1873#
ALAA    011636            2394    2401#
ALAB    011666            2406    2409#
ALAC    011700            2408    2411    2413#
ALBA    010542            2179    2184#
ALBB    010564            2186    2189#
ALBC    010606            2191    2194#
ALBD    010626            2188    2193    2196    2198#
ALINE   016442            1315    3204#
ALY     007230            1876    1879#
ALZ     007250            1878    1881    1883#
AMAA    011712            2418    2423#
AMAC    011744            2429    2431#
AMBA    010640            2203    2207#
AMBB    010670            2210    2213#
AMBC    010704            2214    2217#
AMBD    010726            2219    2222#
AMBE    010746            2212    2216    2221    2224    2226#
AOAA    011762            2436    2442#
AOAB    012000            2445#   2449
AOAB1   012014            2446    2448#
AOAC    012036            2451    2454#
AOAD    012050            2453    2455    2457#
AOBA    010444            2156    2160#
AOBB    010466            2162    2165#
AOBC    010510            2167    2170#
AOBD    010530            2164    2169    2172    2174#
APA     007262            1888    1892#
APB     007276            1893    1896#
APBA    013652            2823    2829#
APBB    013660            2830#   2841
APC     015015            1573    3054#
APCNT   016135            1468    3167#
APCX    007320            1898    1901#
APD     007340            1895    1900    1903    1905#
APGEND  016120            1483    3163#
APRXC   016171            1476    3173#
APVEC   016212            1480    3176#
AQA     007362            1912    1916#
AQAA    012066            2463    2471#
AQAB    012312            2516    2519#
AQAS    012314            2478    2483    2488    2493    2498    2503    2508    2513    2521#
```

```
AQASA   012336           2526#   2529
AQAST   012356           2479    2484    2489    2494    2499    2504    2509    2514    2521*   2527*   2531#
AQB     007376           1917    1920#
AQBA    014164           2915    2920#
AQC     007420           1922    1925#
AQD     007440           1919    1924    1927    1929#
ARA     007462           1936    1940#
ARAA    012370           2536    2540#
ARAS    012504           2540    2541    2556    2565#
ARB     007504           1942    1945#
ARC     007526           1947    1950#
ARD     007546           1944    1949    1952    1954#
ARXBUF  015636           1550    3130#
ARXCSR  015243           2286    3083#
ARXSB   015256           2279    3085#
ARXWAS  015273           2283    3088#
ASA     007570           1961    1965#
ASB     007612           1967    1970#
ASC     007634           1972    1975#
ASD     007654           1969    1974    1977    1979#
ASETSR  015646           1441    3132#
ATA     007676           1986    1990#
ATAA    012544           2574    2582#
ATAB    012576           2588#   2591
ATAC    012600           2581    2589#
ATB     007712           1991    1994#
ATLAST= 177777            728#   2913
ATNUMB  015005           1581    3052#
ATXCSR  015204           2251    3076#
ATXSB   015217           2244    3078#
ATXWAS  015234           2248    3081#
ATO     006460           1709    1720#
AT1     006512           1721    1734#
AT10    007170           1853    1866#
AT11    007252           1867    1885#
AT12    007352           1886    1909#
AT13    007452           1910    1933#
AT14    007560           1934    1958#
AT15    007666           1959    1983#
AT16    007714           1984    1996#
AT17    007742           1997    2009#
AT2     006552           1735    1750#
AT20    007770           2010    2022#
AT21    010016           2023    2035#
AT22    010044           2036    2054#
AT23    010120           2055    2073#
AT24    010256           2074    2110#
AT25    010354           2111    2134#
AT26    010434           2135    2153#
AT27    010532           2154    2176#
AT3     006604           1751    1764#
AT30    010630           2177    2200#
AT31    010750           2201    2228#
AT32    011054           2229    2254#
AT33    011224           2255    2290#
AT34    011304           2291    2314#
```

AT35	011626	2315	2391#	
AT36	011702	2392	2415#	
AT37	011746	2416	2433#	
AT4	006636	1765	1778#	
AT40	012056	2434	2460#	
AT41	012360	2461	2533#	
AT42	012524	2534	2571#	
AT43	012612	2572	2593#	
AT44	012670	2594	2613#	
AT45	012754	2614	2634#	
AT46	013052	2635	2660#	
AT47	013136	2661	2682#	
AT5	006736	1779	1803#	
AT50	013220	2683	2704#	
AT51	013302	2705	2725#	
AT52	013372	2726	2747#	
AT53	013470	2748	2773#	
AT54	013530	2774	2788#	
AT55	013614	2789	2809#	
AT56	013636	2810	2820#	
AT57	013730	2821	2844#	
AT6	007036	1804	1827#	
AT60	014014	2845	2867#	
AT61	014064	2868	2886#	
AT62	014120	2887	2899#	
AT63	014154	2900	2912#	
AT7	007144	1828	1852#	
AUAA	012626	2596	2603#	
AUAB	012652	2607#	2611	
AUAC	012662	2602	2609#	
AVAA	012704	2616	2623#	
AVAB	012742	2622	2630#	
AVAC	012744	2629	2631#	
AWAA	012764	2637	2642#	
AWAB	013014	2649#	2655	2658
AWAC	013024	2643	2651#	
AWAD	013040	2652	2654#	
AWAE	013044	2651	2656#	
AWAS	015623	1542	3127#	
AXA	007724	1999	2003#	
AXAA	013076	2663	2672#	
AXAB	013124	2670	2678#	
AXAC	013126	2677	2679#	
AXB	007740	2004	2007#	
AX1A	013156	2685	2693#	
AX1B	013206	2692	2700#	
AX1C	013210	2699	2701#	
AYA	007752	2012	2016#	
AYAA	013240	2707	2715#	
AYAB	013264	2719#	2723	
AYAC	013274	2713	2721#	
AYB	007766	2017	2020#	
AZA	010000	2025	2029#	
AZAA	013322	2728	2736#	
AZAB	013360	2734	2743#	
AZAC	013362	2742	2744#	

DDDLAA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
AZB     010014          2030    2033#
BDCNV   004432          1384#   1466
BDCNVA  004464          1391#   1394
BDCNVB  004516          1396*   1398#
BDCNVC  004520          1387*   1399#
BDCNVD  004522          1388*   1395    1400#
BIT0  = 000001           700#    964     969     985    1294    1301    1512    1674    1786    1790    1791    1795    1796
                        1799    2922
BIT1  = 000002           699#   1422    1873    1874    1875    1879    1880    2062    2067    2081    2087    2100    2118
                        2123    2128    2263    2287
BIT10 = 002000           690#   1054    2003    2185    2190    2195
BIT11 = 004000           689#   1049    2016    2445    2454
BIT12 = 010000           688#   1279    1488    1509    2063    2068
BIT13 = 020000           687#   1464    1565    1681    2119    2124    2129
BIT14 = 040000           686#   1039    2029    2144    2148    2543    2551    2561
BIT15 = 100000           684     685#   1057    1570    2042    2083    2091    2095    2104    2161    2166    2171    2209
                        2213    2218    2223    2557
BIT2  = 000004           698#   1074    1423    1810    1814    1815    1819    1820    1823    1892    1896    1897    1901
                        1902    1905    2142    2143    2147    2160    2165    2170    2401    2423    2442    2565    2921
                        2933    2979    3021
BIT3  = 000010           697#   1916    1920    1921    1925    1926    1929    2184    2189    2194    2207    2208    2217
                        2222
BIT4  = 000020           696#
BIT5  = 000040           695#   1941    1945    1946    1950    1951    1954    2701
BIT6  = 000100           694#   1302    1303    1308    1461    1675    1676    1687    1835    1839    1840    1844    1845
                        1848    1966    1970    1971    1975    1976    1979    2582    2584    2587    2589    2604    2605
                        2607    2623    2626    2631    2644    2646    2649    2672    2674    2679    2715    2717    2719
                        2736    2739    2744    2758    2759    2762    2799    2801    2806
BIT7  = 000200           693#   1990    2238    2241    2308    3016
BIT8  = 000400           692#
BIT9  = 001000           691#   1021    1059    1653
BMOVA   004420          1377#   1379
BMOVE   004410          1320    1373#   1397
CD    = 100000           729#   1719    1733    1749    1763    1777    1802    1826    1851    1957    2008    2021    2034
                        2227    2289    2313    2414    2432    2532    2570    2592    2612    2633    2659    2703    2724
                        2746    2772    2787    2808    2911
CDINIT  002706          1072#   2441    2816    2920
CDINX   002732          1073    1078#
CHAINN  002540           877    1039#
CHALT = 104005           716#
CHNA    002556          1040    1043#
CHNAA   002624          1050    1053#
CHNAB   002550          1041#   1052    1068
CHNB    002650          1028    1055    1059#
CLRCD   003300           952    1171#   1284
CMAS0   001302           794#   1641
CMAS1   001304           795#
CMAS10  001322           802#
CMAS11  001324           803#
CMAS12  001326           804#
CMAS13  001330           805#
CMAS14  001332           806#
CMAS15  001334           807#
CMAS16  001336           808#
CMAS17  001340           809#
CMAS2   001306           796#
```

```
CMAS20  001342            810*
CMAS21  001344            811*
CMAS22  001346            812*
CMAS23  001350            813*
CMAS24  001352            814*
CMAS25  001354            815*
CMAS26  001356            816*
CMAS27  001360            817*
CMAS3   001310            797*
CMAS30  001362            818*
CMAS31  001364            819*
CMAS32  001366            820*
CMAS33  001370            821*
CMAS34  001372            822*
CMAS35  001374            823*
CMAS36  001376            824*
CMAS37  001400            825*
CMAS4   001312            798*
CMAS5   001314            799*
CMAS6   001316            800*
CMAS7   001320            801*
CMPT    014254           2366    2515    2939*
CMPTNG  014344           2940    2942    2944    2946    2948    2950    2953*
CMPTOK  014350           2952    2954*
CNVCTR  004570           1390*   1393*   1412*
CONT    005240           1503    1509*
CRBUF   001556            885*   1433*   1536    1539    1541    2838*   3026*
CRBUFA  001560            886*   1428*   1529*   1536    1538    1545    2833*   3001*   3012*   3022
CRBUFB  001562            887*   1533*   1534    1549
CTR0    001564            888*   1424*   1435*   2330*   2479*   2829*   2840*   2939
CTR1    001566            889*   2335*   2484*   2939    2941
CTR2    001570            890*   2340*   2489*   2941    2943
CTR3    001572            891*   2345*   2494*   2943    2945
CTR4    001574            892*   2350*   2499*   2945    2947
CTR5    001576            893*   2355*   2504*   2947    2949
CTR6    001600            894*   2360*   2509*   2949    2951
CTR7    001602            895*   2365*   2514*   2951
CURTST  001454            851*   1027    1033    1086*
DATAA   004640           1425*   1436
DATCHK= 104004            715*   1434    2839    3027
DATTST  004616           1422*   2817
DECVAL  004610           1385    1420*
DELAY = 104016            725*   1075    1251    2403    2567    2696    2967    2982
DIGIT   004572           1403*   1406*   1409*   1410    1413*
DLCNT   003620           1230*   1232    1243*
DLY     003554            881    1230*
DLYA    003576           1235*   1240
DLYB    003602           1236*   1237
DLYC    003614           1233    1241*
DOTHIS  006172           1653*   2322    2471
DTCHK   005342            871    1533*
DTCHKA  005446           1537    1554*
DTCHKX  005370           1535    1538*
EHALT = 104010            719*   1590
EHLT    005300            875    1520*
EHLTA   005310           1521    1523*
```

DDDLAA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
EMTA    003000          1092#
EMTINT  002766           435    1089#
EMTTAB  001514           867#   1094
EMO     015003          1584    3051#
EOPHLT  000250           742#   1463
ERDAT   015600          1553    3123#
ERR     005450           870    1557#
ERRA    005520          1560    1565#
ERRB    005620          1557*   1558*   1561*   1562*   1563*   1585#
ERRC    005646          1566    1590#
ERRD    005656          1567*   1568*   1572    1588    1593#
ERRE    005660          1559*   1564*   1591    1594#
ERROR = 104003           714#   1665    1685    1731    1747    1761    1775    1788    1793    1798    1812    1817    1822
                        1837    1842    1847    1862    1877    1882    1894    1899    1904    1918    1923    1928    1943
                        1948    1953    1968    1973    1978    1992    2005    2018    2031    2044    2065    2070    2085
                        2093    2098    2106    2121    2126    2131    2146    2150    2163    2168    2173    2187    2192
                        2197    2211    2215    2220    2225    2268    2271    2300    2304    2307    2310    2407    2412
                        2426    2430    2452    2456    2545    2549    2554    2559    2563    2586    2610    2628    2648
                        2657    2676    2698    2722    2741    2761    2770    2784    2803    2831    2837    2864    2880
                        2925    2928    2936    3020    3025
ERROR1= 104015           724#   1552    2250    2285    2368    2517
ERRST   017400          1453*   1454*   1455*   1456*   1538*   1539*   1587*   1588*   1589*   3274#
ERR1    005472           880    1561#
ERTP    005662           423     425     427     429     437     981    1014    1597#
ERTPA   005732          1605#   1624
ERXTIM  015345          2518    3096#
ETXTIM  015303          2369    3090#
EXA     014024          2870    2875#
EXAA    014074          2889    2892#
EXBA    014130          2902    2905#
EXTA    013740          2847    2853#
FMAP    001472           858#    951#   1016#   1301#   1623    1628#   1674#
FNONE   001624           904#    959#    979#    982
FORMAD  006046           991    1299    1516    1632#
FORWD   002734          1020    1081#
FOUNDV  001612           899#    950#   1281#   1452#   1669    1689#
FROMPC  001630           906#   1604#   1610    1621#
FTITLE  001622           903#    922#    954     958#   1001#
GETRDY  002402          1013#   1037    1060    1064    1717
GOBACK  006206          1654    1656#
GRCNT   003646          1256#   1258
GTBIN   004206          1333#
GTBINP  004254          1342#   1427    2832    3011
GTRDA1  002472          1024    1027#
GTRDYA  002442          1020#   1026    1035
GTRDYC  002500          1022    1029#
GTRDYD  002522          1032    1034#
GTRDYX  002410          1014#   1062    1655
ICTR    001464           855#   1051*   1084*
INBIN   004150          1319#   2828    3010
INCRPG  004736           864     865     866    1448#   1702    1703    1704
INCRTN  004726          1036    1444#
INTER   017011          1684    3247#
KSTART  001452           850#   1013    1709*
LOLINE  016407          1286    3199#
LINA    004042          1296#   1307
```

```
LINB    004050          1295    1299#
LINENO  001614           900#    987*    988*    989*   1290*   1311    1454    1471    1492    1500*   1515*   1639
LINSEL  003742          1279#   1716
LINSLX  003760          1280    1283#   1298    2961    2975    2997    3009
LOGIC   005230           442    1505#
MACHER  000004           425#    960*    981*   1014*   1015*   1727*   1741*   1757*   1771*
MANUAL= 100000           684#
MAPA    002140           962#    971     980
MAPEND  002226           963     981#
MAPERR  002312           983     996#
MAPNE   002166           960     969#
MAPOK   002176           968     972#
MAPVEC  005770           431    1619#
MASKIT  005312          1429    1526#   2834    3023
MDEVAD  014746           975     978    3045#
MESS1   001770           930     932#
MFROM   016735          1611    3239#
MNOLIN  016746          1297    3241#
MNONE   014766           997    3048#
MOUTIN  014562          3002    3013    3016#
MPWRF   017127          1664    3266#
MRXNUM  015034          1577    3057#
MSETC   016550          2325    2474    3217#
MSETRX  016474          2473    3209#
MSETTX  016522          2324    3213#
MS0     017027          2326    2475    3250#
MS1     017037          2332    2481    3252#
MS2     017047          2337    2486    3254#
MS3     017057          2342    2491    3256#
MS4     017067          2347    2496    3258#
MS5     017077          2352    2501    3260#
MS6     017107          2357    2506    3262#
MS7     017117          2362    2511    3264#
MTERR   016636          1614    3226#
MTIT    014636           957    3032#
MTO     016703          1607    3233#
NOP   = 000240           682#
NXTST   001462           854#   1013*   1034    1061    1081    1083*
OACNV   004322           973    1310    1353#   1470    1474    1478    1540    1544    1548    1571    1575    1579    1605
                        1609    2242    2246    2277    2281
OACNVA  004336          1358#   1367
OACNVX  004406          1354*   1358    1362*   1363*   1364*   1365*   1370#
OLDPS   001470           857#   1597*   1599*   1600*   1601*   1602*   1603
OPEN  = 000000           683#    849     850     851     852     854     855     856     872     885     886     887     888
                         889     890     891     892     893     894     895     896     897     898     901    1110    1111
                        1125    1126    1133    1142    1204    1214    1243    1252    1261    1262    1325    1326    1327
                        1328    1329    1330    1370    1412    1413    1414    1585    1593    1594    2389    2531    2968
                        2983
OVRLAY  003516           953    1218#   1283    1671    2579    2668    2690
OVRLYA  003532          1221#   1226
OVRLYB  003552          1225    1227#
PASCNT  001632           907#   1004*   1453    1467    1490*   1499*
PC    =%000007           745*   1463*   2876*
PFAIL   006210           433     949    1658#   1660
PIND    004200          1328#   1344*
POPSP = 005726           701#   1238    1241
```

```
POPS?2= 022626           702*   970   1053   1620   1730   1746   1760   1774   2590   2609   2630   2656   2678
                        2700   2721   2743   2769   2805
PRGEA   005166          1495*  1510
PRGEB   005252          1498   1512*
PRGEC   005160          1494*  1513
PRGEND  004750          1063   1452*
PRGEXT  005130          1465   1488*
PRGNUM  001450           849*  1009*  1693
PRGTAB  001474           859*  1011
PRGXTL  005220          1000   1491   1502*
PRGXT1  005146          1489   1492*
PRGO    006422           859   1709*
PRGOA   006454          1697   1717*
PRGOB   006450          1711   1716*
PRG1    014352           860   2959*
PRG1A   014370          1698   2965*  2969
PRG1B   014406          2965*  2968*
PRG2    014412           861   2973*
PRG2A   014430          1699   2979*  2990
PRG2B   014454          2980*  2983*
PRG3    014476           862   2995*
PRG3A   014514          1700   3001*  3003
PRG4    014530           863   3007*
PRG4A   014544          1701   3011*  3014
PRTY0 = 000000           710*
PRTY1 = 000040           709*
PRTY2 = 000100           708*
PRTY3 = 000140           707*
PRTY4 = 000200           706*   846    848
PRTY5 = 000240           705*
PRTY6 = 000300           704*
PRTY7 = 000340           432    434    436    703*  1309   1598   1688   1834   1940   1965   2235   2262
PSW   = 177776           680*   965*  1005*  1019*  1234*  1300*  1309*  1597   1598*  1673*  1688*  1834*  1940*
                        1965*  2235*  2262*  2583*  2603*  2624*  2625*  2645*  2673*  2694*  2716*  2737*  2738*
                        2800*
PTO     004174          1326*  1333   1339*
PTOP    004202          1329*  1342   1348*
PT1     004176          1327*  1333*  1334*  1337*  1338*  1339   1340
PT1P    004204          1330*  1342*  1343*  1346*  1347*  1348   1349
PWRUP   006220          1658   1660*
POTIT   015045          1713   3059*
P1TIT   015407          2960   3102*
P2TIT   015447          2974   3108*
P3TIT   016223          2996   3178*
P4TIT   016273          3008   3185*
RCMSK   003666          1257   1261*
RESTAR  006370           739   1666   1693*
RIND    004172          1319*  1321   1322   1325*  1335*
RMASK   001404           828*  1526*  1527*  1528*  1529
RNCNT   003670          1259*  1262*
RNGEN   003226          1154*  1247   1256
RP1     003274          1154   1158*  1165   1167*
RP2     003276          1157   1161   1164*  1168*
RSTART  006402          1695   1697*
RSTPC   003114          1115*  1123   1125*
RSTPSW  003116          1116*  1122   1126*
```

```
RSTREG= 104014            723#   1368   1380   1401
RSTRG   003060            879    1115#
RTNNO   001456            852#   1006*  1025   1031   1056   1082*  1569   1580   1587
RXBUF   001412            832#   1077   1174*  1433   1533   1634*  1744   2427   2457   2524   2542   2551   2557
                         2561    2785   2838   2926   2984   3026
RXBUFT  001610            898#   2542*  2543   2547
RXCR0   001200            753#    961    984    988   1293   1496
RXCR1   001202            754#
RXCR10  001220            761#
RXCR11  001222            762#
RXCR12  001224            763#
RXCR13  001226            764#
RXCR14  001230            765#
RXCR15  001232            766#
RXCR16  001234            767#
RXCR17  001236            768#
RXCR2   001204            755#
RXCR20  001240            769#
RXCR21  001242            770#
RXCR22  001244            771#
RXCR23  001246            772#
RXCR24  001250            773#
RXCR25  001252            774#
RXCR26  001254            775#
RXCR27  001256            776#
RXCR3   001206            756#
RXCR30  001260            777#
RXCR31  001262            778#
RXCR32  001264            779#
RXCR33  001266            780#
RXCR34  001270            781#
RXCR35  001272            782#
RXCR36  001274            783#
RXCR4   001210            757#
RXCR5   001212            758#
RXCR6   001214            759#
RXCR7   001216            760#
RXCSR   001410            831#   1173*  1265   1422*  1431   1455   1475   1576   1589   1632*  1728*  1873*  1874*
                         1875    1879*  1880   1892   1896*  1897   1901*  1902   1905*  1916   1920*  1921   1925*
                         1926    1929*  1941   1945*  1946   1950*  1951   1954*  1966   1970*  1971   1975*  1976
                         1979*   1990   2003   2016   2029   2042   2062*  2063   2067*  2068   2081*  2082   2083
                         2087*   2090   2095   2100*  2103   2118*  2119   2123*  2124   2128*  2129   2142*  2143*
                         2144    2147*  2148   2160*  2161   2165*  2166   2170*  2171   2184*  2185   2189*  2190
                         2194*   2195   2207*  2208*  2209   2213   2217*  2218   2222*  2223   2263*  2264*  2273
                         2287*   2405   2410   2428   2445   2448   2454   2528   2672*  2674*  2679*  2693*  2695*
                         2701*   2715*  2717*  2719*  2736*  2739*  2744*  2758*  2759*  2762*  2781   2782   2799*
                         2801*   2806*  2854*  2860   2877*  2878   2894*  2895
RXCSRT  001606            897#   2082*  2090*  2091   2103*  2104   2273*  2274   2282   2781*
RXEND   001300            785#    962    994
RXLVL   001422            836#   1134   1177*  1647*  2716   2737
RXVTR   001420            835#   1132   1175*  1306   1456   1479   1627*  1672*  1679   2764*
SAVREG= 104013            722#   1353   1373   1384
SAVRG   003020            878    1100#
SCOPE =  104012           721#   1438   1729   1745   1759   1773   1801   1825   1850   1864   1883   1907   1931
                         1956    1981   1994   2007   2020   2033   2046   2071   2108   2132   2151   2174   2198
                         2226    2252   2288   2312   2370   2413   2431   2458   2519   2546   2550   2555   2560
```

```
                    2564    2588    2608    2632    2650    2680    2702    2720    2745    2763    2786    2807    2818
                    2842    2865    2884    2897    2910    2930
SCOPTR  001466       856#    1041    1085*
SELCAD  015504      2963    2977    3113#
SELCAR  016346      2999    3193#
SELINE  016454      1312    3206#
SETSR   004716      1440#   1715
SIOT    003740      1265*   1267*   1271    1276#
SOFTSR  000176       735#    915
SP     =%000006      909*    910*
SPBOT = 001176       681#    908     948     1017    1662
SRESET= 104011       720#   1018    1800    1824    1849    1863    1906    1930    1955    1980    1993    2006    2019
                    2032    2045    2237    2272    2311    2409    2929
SRPTR   000174       734#    912     915*    920     1007    1021    1029    1039    1049    1054    1059    1279    1288
                    1461    1464    1488    1509    1520    1565    1653    1681    2965    2980    3016
SRPTRH  000172       733#    920*    921*    2966    2981    3001
SRSETT  003210       876     1147#   1149*
STAL    003622       869     1247#
STALA   003642      1250*   1252#
STALB   003644      1249    1253#
STALL = 104002       713#   3018
START   002052       931     944     948#    1003    1451    1616
STARTZ  001634       737     908#
START1  002242       955     984#
START2  002246       985#    995
START3  002302       986     993#
START4  002342       992    1004#
STLMSK  001406       829#   1248
STLSPV  003154       874    1138#
STLSRV  003120       873    1129#
STPPA   003176      1139*   1142#
STPRA   003142      1130*   1133#
STRXD   014234      2671    2714    2735    2755    2780    2797    2798    2876    2933#
STRXV = 104006       717#   2669    2691    2712    2733    2756    2795
STTXV = 104007       718#   2580    2601    2621    2642
SUBTEN  004530      1392    1403#
SUBTNA  004534      1404#   1407
SUBTNB  004550      1405    1408#
SVRPC   003054      1100*   1108    1110#
SVRPSW  003056      1101*   1107    1111#
TEMP    001616       301#   1288*   1289*   1290    1291*   1292    1492*   1493*   1494*   1495    1501*   1514*   1515
                    1639*   1640*   1641*   1642    2241*   2243    2276*   2278    2444*   2447*   2450
TEMP1   001620       902#    972*    974     1642*   1643    1644*   1645*   1646*   1647    1648
TEMP6   005126      1457*   1459*   1486#
TENPWR  004574      1391*   1404    1408    1414#
TIME    011612      2379    2385#   2526
TIMER   003736      1268*   1269*   1275#
TIMERX= 104017       726#   2270    2425    2836    2924    2935    3024
TIMETX= 104020       727#   2267    2299    2306    2830    3019
TIMEX   003734      1270    1274#
TIME1   003710      1266    1268#
TIME2   003714      1269#   1272
TIM1    011616      2386#   2387
TKB     001432       842#
TKLVL   001442       846#
TKS     001430       841#
```

DDDLAA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
TKVTR   001440          845#
TMRX    003672          882    1265#
TMTX    003702          883    1267#
TNNO    001460          853#   1569*  1570*
TOPC    001626          905#   1603*  1606    1619*  1622*  1625    1626*  1627
TPB     001436          844#   1195*
TPLVL   001446          848#
TPS     001434          843#   1196
TPVTR   001444          847#
TSTVA   006346         1680    1687#
TSTVEC  006244         1129    1138   1669#   1682   1686
TSTVEX  006366         1670    1690#
TXBUF   001416          834#   1171*  1430*  1638*  1772   2266*  2269*  2298*  2301*  2375*  2378*  2402*  2424*
                       2443*  2525*  2566*  2835*  2858*  2923*  2934*  2966*  2981*  3022*
TXCSR   001414          833#   1074*  1172*  1267   1302*  1303*  1308*  1423*  1425   1636*  1675*  1676*  1687*
                       1758    1786   1790*  1791   1795*  1796   1799*  1810   1814*  1815   1819*  1820   1823*
                       1835    1839*  1840   1844*  1845   1848*  1860   2236*  2238   2240   2265*  2302   2308
                       2373    2376   2381   2401*  2423*  2442*  2522   2565*  2582*  2584*  2587*  2589*  2604*
                       2605*  2607*  2623*  2626*  2631*  2644*  2646*  2649*  2907*  2908   2921*  2922*  2933*
                       2979*  3021*
TXCSRT  001604          896#   2240*  2247
TXLVL   001426          838#   1143   1178*  1648*  2603   2624
TXVTR   001424          837#   1141   1176*  1625*  2651*
TYP     003342          867    1182#
TYPA    003352         1185#   1194   1203
TYPC    003370         1187    1189#
TYPD    003416         1193    1195#  1200   1202
TYPDAT  003462         1185*  1186   1189   1191   1195   1199*  1201*  1204#
TYPE  = 104000          711#   929    956    977    996   1213   1285   1296   1314   1440   1444   1448   1482
                       1613    1663   1683   1712   2331   2336   2341   2346   2351   2356   2361   2480   2485
                       2490    2495   2500   2505   2510   2959   2962   2973   2976   2995   2998   3007
TYPES = 104001          712#   1583   2323   2472
TYPF    003434         1190    1199#
TYPG    003446         1192    1201#
TYPS    003464          868    1207#  1215
TYPSA   003510         1211    1213#
TYPSB   003512         1209*  1210   1214#
UMASK   001402          827#   1023   1072   1526   1643*
X     = 000063         1718#  1719   1724#  1733   1738#  1749   1754#  1763   1768#  1777   1782#  1802   1807#
                       1826    1831#  1851   1856#  1865   1870#  1884   1889#  1908   1913#  1932   1937#  1957
                       1962#  1982   1987#  1995   2000#  2008   2013#  2021   2026#  2034   2039#  2053   2058#
                       2072    2077#  2109   2114#  2133   2138#  2152   2157#  2175   2180#  2199   2204#  2227
                       2232#  2253   2258#  2289   2294#  2313   2318#  2390   2395#  2414   2419#  2432   2437#
                       2459    2464#  2532   2537#  2570   2575#  2592   2597#  2612   2617#  2633   2638#  2659
                       2664#  2681   2686#  2703   2708#  2724   2729#  2746   2751#  2772   2777#  2787   2792#
                       2808    2813#  2819   2824#  2843   2848#  2866   2871#  2885   2890#  2898   2903#  2911
                       2916#
XOR     002676         1046    1066#
XORA    002026          924    940#
XORADD  001276          784#   927*   942*
XORFLG  002024          928*   938#   943*  1043   1742   2892   2905
.     = 017430          422#   439    441#   443    445    447    449    451    453    455    457    459    461
                        463    465    467    469    471    473    475    477    479    481    483    485    487
                        489    491    493    495    497    499    501    503    505    507    509    511    513
                        515    517    519    521    523    525    527    529    531    533    535    537    539
                        541    543    545    547    549    551    553    555    557    559    561    563    565
```

```
  567   569   571   573   575   577   579   581   583   585   587   589   591
  593   595   597   599   601   603   605   607   609   611   613   615   617
  619   621   623   625   627   629   631   633   635   637   639   641   643
  645   647   649   651   653   655   657   659   661   663   665   667   669
  671   673   675   732#  736#  738#  741#  746#  937#  999  1197  1336  1345
 1426  1432  1484  2149  2309  2374  2377  2523  2544  2548  2553  2558  2562
 2927  3017  3272#  3273#
```

```
TSTA      947*  1719  1733  1749  1763  1777  1802  1826  1851  1865  1884  1908  1932  1957  1982
          1995  2008  2021  2034  2053  2072  2109  2133  2152  2175  2199  2227  2253  2289  2313
          2390  2414  2432  2459  2532  2570  2592  2612  2633  2659  2681  2703  2724  2746  2772
          2787  2808  2819  2843  2866  2885  2898

TSTAA     947*  1719  1733  1749  1763  1777  1802  1826  1851  1865  1884  1908  1932  1957  1982
          1995  2008  2021  2034  2053  2072  2109  2133  2152  2175  2199  2227  2253  2289  2313
          2390  2414  2432  2459  2532  2570  2592  2612  2633  2659  2681  2703  2724  2746  2772
          2787  2808  2819  2843  2866  2885  2898  2911
```

DDDLAA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

```
ADD     1094  1131  1140  1157  1161  1183  1208  1223  1231  1273  1357  1360  1408  1409  1494
        1591  1633  1635  1637  1641  2953
ASL     1010  1092  1291  1493  1640  1645  1694
ASR      989  1514  1599  1600  1601
BCS     1405
BEQ      963   983   999  1040  1055  1190  1192  1225  1233  1249  1258  1270  1295  1307  1462
        1489  1503  1510  1537  1624  1787  1797  1811  1821  1836  1846  1881  1893  1903  1917
        1927  1942  1952  1967  1977  1991  2004  2017  2030  2043  2069  2084  2097  2120  2130
        2149  2162  2172  2186  2196  2214  2239  2275  2446  2455  2558  2562  2927
BHI     2952
BIC      964  1008  1030  1057  1093  1248  1257  1289  1302  1308  1338  1347  1359  1362  1422
        1527  1529  1570  1602  1646  1675  1687  1795  1819  1844  1873  1879  1901  1925  1950
        1975  2067  2081  2100  2118  2128  2142  2147  2160  2170  2184  2194  2207  2217  2263
        2287  2582  2587  2589  2604  2607  2623  2631  2644  2649  2672  2679  2693  2701  2715
        2719  2736  2744  2758  2762  2799  2806
BIS      969  1074  1301  1303  1423  1674  1676  1790  1799  1814  1823  1839  1848  1874  1896
        1905  1920  1929  1945  1954  1970  1979  2062  2087  2123  2143  2165  2189  2208  2222
        2265  2401  2423  2442  2565  2584  2605  2626  2646  2674  2695  2717  2739  2759  2801
        2921  2922  2933  2979  3021
BIT      985  1021  1039  1049  1054  1059  1279  1294  1461  1464  1488  1509  1512  1534  1565
        1653  1681  1786  1791  1796  1810  1815  1820  1835  1840  1845  1875  1880  1892  1897
        1902  1916  1921  1926  1941  1946  1951  1966  1971  1976  1990  2003  2016  2029  2042
        2063  2068  2083  2091  2095  2104  2119  2124  2129  2144  2148  2161  2166  2171  2185
        2190  2195  2209  2213  2218  2223  2308  2445  2454  2543  2551  2557  2561  3016
BLOS    2940  2942  2944  2946  2948  2950
BMI     1743  1861  2406  2548  2783  2861
BNE      955   986   995  1022  1032  1035  1050  1052  1060  1062  1187  1211  1237  1240  1280
        1336  1345  1367  1379  1394  1436  1460  1465  1498  1513  1535  1566  1654  1670  1680
        1682  1711  1792  1816  1841  1876  1898  1922  1947  1972  2064  2092  2105  2125  2145
        2167  2191  2210  2219  2224  2309  2387  2451  2544  2553  2841  2857  2863  2883  3017
BPL     1024  1026  1044  1073  1197  1272  1426  1432  1521  2303  2374  2377  2382  2411  2429
        2449  2523  2529  2879  2893  2906
BR       914   968   971   980   992  1028  1037  1064  1068  1194  1203  1215  1226  1266  1298
        1407  1491  1560  1666  1732  1748  1762  1776  1789  1794  1813  1818  1838  1843  1878
        1895  1900  1919  1924  1944  1949  1969  1974  2066  2086  2094  2099  2107  2122  2127
        2164  2169  2188  2193  2212  2216  2221  2305  2367  2408  2453  2516  2591  2611  2629
        2655  2658  2677  2699  2723  2742  2768  2771  2804  2969  2990  3003  3014
CLR      922   943   950   951   959   965  1001  1005  1006  1016  1019  1171  1172  1173  1174
        1175  1176  1177  1178  1234  1268  1281  1300  1403  1452  1500  1501  1559  1628  1672
        1673  1728  2266  2298  2301  2372  2375  2378  2402  2424  2443  2444  2521  2525  2566
        2583  2645  2673  2694  2800  2858  2934
CMP      917   940   962   994  1034  1061  1066  1210  1224  1497  1536  1669  2238  2274  2450
        2939  2941  2943  2945  2947  2949  2951
CMPB    1031  1186  1189  1191  2926
COM     1148  1334  1338  1343  1344  1528
DEC     1051  1236  1239  1366  1378  1393  1435  1459  2386  2840
EMT      711   712   713   714   715   716   717   718   719   720   721   722   723   724   725
        726   727
HALT     440   742  1002  1058  1287  1442  1446  1450  1522  1615  1659  1714  2328  2333  2338
        2343  2348  2353  2358  2363  2477  2482  2487  2492  2497  2502  2507  2512  2964  2978
        3000
INC      921   958   979  1269  1337  1346  1406  1490  1499  1689  2380  2447  2527  2854  2856
        2862  2877  2882
JMP      737   739   931   944  1000  1003  1011  1027  1033  1096  1451  1484  1616  1655  1686
        1695  1717
JSR      952   953   973   991  1020  1036  1063  1129  1138  1193  1200  1202  1247  1256  1283
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F07


```
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                1540    1544    1548    1571    1575    1579    1605    1609    1671    1715    1716    2242    2246    2277    2281
                2322    2329    2334    2339    2344    2349    2354    2359    2364    2366    2379    2441    2471    2478    2483
                2488    2493    2498    2503    2508    2513    2515    2526    2540    2541    2556    2579    2668    2671    2690
                2714    2735    2755    2780    2797    2798    2816    2817    2828    2832    2834    2876    2920    2961    2975
                2997    3002    3009    3010    3011    3013    3023
MOV              908     909     910     911     915     918     919     920     923     924     926     927     928     941     942
                 948     949     960     961     972     981     984     987     990    1004    1007    1009    1013    1014    1015
                1017    1029    1041    1045    1046    1048    1056    1067    1081    1082    1083    1084    1085    1086    1089
                1091    1095    1100    1101    1102    1103    1104    1105    1106    1107    1108    1115    1116    1117    1118
                1119    1120    1121    1122    1123    1130    1132    1133    1134    1139    1141    1142    1143    1147    1149
                1154    1158    1164    1165    1182    1184    1207    1209    1218    1219    1220    1221    1222    1230    1232
                1235    1250    1259    1265    1267    1288    1290    1292    1293    1309    1319    1333    1339    1340    1342
                1348    1349    1354    1355    1356    1358    1374    1375    1376    1385    1386    1387    1388    1389    1390
                1391    1396    1424    1453    1454    1455    1456    1457    1492    1495    1496    1502    1515    1526    1533
                1538    1539    1557    1558    1561    1562    1563    1564    1567    1569    1587    1588    1589    1597    1598
                1603    1604    1619    1621    1625    1627    1632    1634    1636    1638    1639    1642    1643    1647    1648
                1658    1660    1662    1688    1693    1709    1727    1741    1757    1771    1834    1940    1965    2082    2090
                2103    2235    2236    2240    2241    2262    2264    2269    2273    2276    2330    2335    2340    2345    2350
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                2651    2652    2716    2737    2764    2765    2781    2829    2855    2859    2881    2894    2907    2923    2984
                3022    3026
MOVB            1185    1195    1199    1201    1361    1377    1410    1428    1430    1433    2833    2835    2838    2965    2966
                2980    2981    3001    3012
NOP              967    1304    1305    1506    1507    1508    1677    1678    2585    2606    2627    2647    2654    2675    2719
                2740    2760    2767    2802
RESET           1150    1458    1504    1661    2853    2875    2896    2909    2985    2986    2987    2988    2989
ROL             1155    1156    1159    1160    1162    1163
ROR             1363    1364    1365
RTI             1042    1109    1124    1135    1144    1151    1188    1212    1242    1253    1274    1523    1554    1592    1629
                2653    2766
RTS              745    1078    1087    1166    1179    1198    1227    1260    1282    1316    1324    1341    1350    1369    1381
                1402    1411    1443    1447    1511    1517    1530    1649    1656    1690    2383    2388    2530    2569    2937
                2954    3028
SUB              988    1090    1395    1404    1568    1622    1626    2625    2738
SWAB            1644
TST              912     925     954     966     982     993     998    1023    1025    1043    1047    1072    1077    1306    1437
                1520    1623    1679    1710    1742    1744    1758    1772    2427    2457    2524    2547    2785    2892    2895
                2905    2908
TSTB            1196    1271    1425    1431    1860    2302    2373    2376    2381    2405    2410    2428    2448    2522    2528
                2782    2860    2878
.ASCII           932    3032    3040    3045    3048    3051    3052    3054    3057    3059    3065    3070    3076    3078    3081
                3083    3085    3088    3090    3096    3102    3108    3113    3123    3125    3127    3128    3130    3132    3139
                3143    3152    3158    3164    3167    3170    3173    3176    3178    3185    3193    3199    3204    3206    3209
                3213    3217    3226    3230    3233    3235    3239    3241    3247    3250    3252    3254    3256    3258    3260
                3262    3264    3266
.BYTE           1420    3163
.ENABL             4     396
.END            3286
.EVEN            937    3272
.LIST              4     396     731
.MACR            947
.NLIST             4     396
.REM               5
.REPT            443
.WORD            938    1486    3274    3275    3276    3277    3278    3279    3280    3281    3282    3283    3284    3285
```

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.MAIN.  MACY11 27(732)  10-SEP-76  09:54  PAGE 87
DDDLAA.P11      CROSS REFERENCE TABLE -- PERMANENT SYMBOLS



ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

*DDDLAA,DDDLAA.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DDDLAA.P11
RUN-TIME:  10 16 5 SECONDS
RUN-TIME RATIO: 50/34=1.4
CORE USED:  12K  (23 PAGES)
```