DL11

DL11-E, C/D OFFLINE TEST

MD-11-DDDLA-A

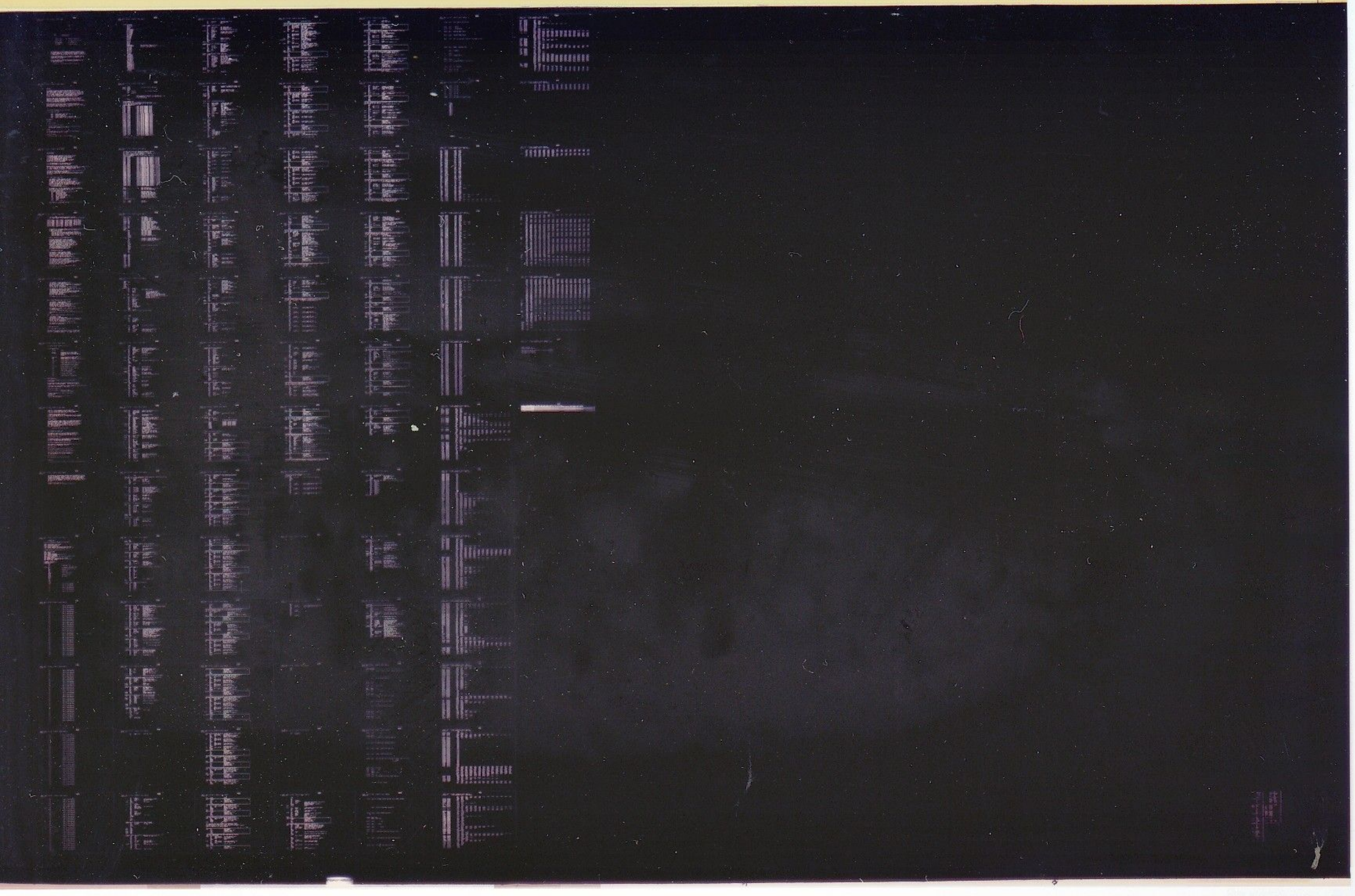
EP-DDDLB-A-DL-A

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 FOR 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 PROG 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.

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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 SUCCESSIVE 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 FAILURES.

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 AT4-AT27	ADDRESSABILITY OF CSRS & DBRS 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...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
                CATCHK=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
                AT_LAST=-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
ECPHLT: 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)
XCRADD: 177777          ;LINE 37 SPECIAL ADDRESS FOR XCR
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
;**********************
.
LCS:    177560          ;LSR CSR
LBF:    177562          ;LSR BUFFER
LPS:    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.
ITTR:   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
        CHAINM
        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
FOUND:: 0
```

```
        LINENO: 0
        TEMP:   OPEN
        TEMP1:  0
        FTITLE: 0
        FNONE:  0
        TOPC:   0
        FROMPC: 0
        PASCNT: 0
        START:  MOV     #SPBOT,%6
                MOV     6,-(SP)         ;SAVE CURRENT VECTOR
                MOV     #-(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
                MESS1
                JMP     @#START
        MESS1:  .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     FOUND
                CLR     FMAP
                TSR     %7,CLRDD        ;CLEAR DEVICE UT PARAMETERS
                TSR     %7,OVRLAY       ;OVERLAY TRAP AREA
                TST     FTITLE          ;TITLE PRINTED AND MAP MADE
                BNE     START           ;YES. SKIP OVER THIS
```

```
                TYPE
                MTIT
                INC     FTITLE
                CLR     FNONE                   ;CLEAR DEVICE PRESENT FLAG
                MOV     #MAPNE,MACHER           ;SET UP NO DEVICE PRESENT RETURN
                MOV     #RXCRO,%4               ;SET UP DEVICE POINTER
MAPA:           CMP     (%4),@#RXEND            ;LAST DEVICE
                BEQ     MAPEND                  ;YES, EXIT
                BIC     #BITO,(4)               ;CLEAR ODD ADDRESS
                CLR     PSW
                TST     @(4)                    ;TEST DEVICE
                NOP
                BR      MAPOK
MAPNE:          BIS     #BITO,(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
MAPENC:         MOV     #ERTP,MACHER            ;RESET TRAPS
                TST     FNONE                   ;ANY DEVICES PRESENT
                BEQ     MAPERR                  ;NO, ERROR
START1:         MOV     #RXCRO,%1
START2:         BIT     #BITO,(1)               ;IS DEVICE LIVING
                BNE     START3                  ;NO, CHECK FOR END
                MOV     %1,LINENO               ;CALCULATE LINE NUMBER UNDER TEST
                SUB     #RXCRO,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     #START,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

;OP:     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 R0
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 R0.
        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     SUBTNB          ;BRANCH IF UNSUCCESSFUL SUBTRACTION.
        INC     DIGIT
        BR      SUBTNA
SUBTNB: 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
        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.,CTRD      ;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     CTRD            ;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
PASENC: 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,OACNV        ;CONVERT LINE NUMBER
                LINENO
                ACLIN
                2
                JSR     %5,OACNV        ;CONVERT RXCSR
                RXCSR
                APRXC
                6
                JSR     %5,OACNV        ;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.
```

```
                ERRC                    ;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.
                RTNUMB                  ;DESTINATION ADDR.
                3                       ;#OF DIGITS TO CONVERT.
                TYPES                   ;TYPE:
                EMO                     ;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
ERTPA:          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
                MTG
                6
                JSR     %5,OACNV
                FROMPC
                MFROM
                5
                TYPE
                M"ERR
                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,TYVTR     ;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
RESTRT:         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

;
;PRGC - INPUT-OUTPUT LOGIC TESTS
;
PRGC:           MOV     #ATC,KSTART
                TST     @#42            ;MONITOR LOAD
                BNE     PRGOB           ;YES, START TEST
                TYPE                    ;TYPE TITLE AND INSTRUCTIONS
                POINT
                HALT
                JSR     7,SETSR
PRGOB:          JSR     5,LINSEL        ;GO GET LINE # FROM USER
PRGOA:          JMP     GETRDY          ;GET STARTED.
                X=-1
;*****************************************************************************
ATC:            100000                  ;TEST NUMBER                          *
                ATI                     ;ADDRESS OF NEXT TEST                 *
                100C.                   ;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
;*****************************************************************************
ATC:            100001                  ;TEST NUMBER                          *
                ATC2                    ;ADDRESS OF NEXT TEST                 *
                100C.                   ;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
;*****************************************************************************
AT3:    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      AEC
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:    1000C7                  ;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 RELIABLY.
AKA:    TSTB    @TXCSR          ;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 BI`.
        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                    ;SCOFE 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.
            JSP     %5,CACNV        ;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,R  SRT           ;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.
;*****************************************************************************
A734:           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
                MSG
                -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
A_AC:           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                          *
                AT4C                    ;ADDRESS OF NEXT TEST                 *
                100.                    ;ITERATION COUNT                      *
                AQAA                    ;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
AQAA:           BIS     #BIT2,@TXCSR    ;SET MAINT
                CLR     @TXBUF          ;TRANSMIT CHAR
                CLR     TEMP            ;CLEAR BUSY INDICATOR
AQAB:           BIT     #BIT11,@RXCSR   ;IS RECEIVER ACTIVE SET
                BEQ     AQAB1           ;BRANCH IF CLEAR
                INC     TEMP            ;YES, REMEMBER THAT
AQAB1:          TSTB    @RXCSR          ;SEE IF DONE SET
                BPL     AQAB
                CMP     TEMP,#0         ;DID RECEIVER ACTIVE SET
                BNE     AQAC
                ERROR                   ;RECEIVER ACTIVE NEVER SET
                BR      AQAD
AQAC:           BIT     #BIT11,@RXCSR   ;DID DONE CLEAR ACTIVE
                BEQ     AQAD
                ERROR                   ;NO, RECEIVER ACTIVE DID NOT CLEAR
AQAD:           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
                MSC
                -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     PC              ;EXIT
;*****************************************************************************
ATA2:   100042                          ;TEST NUMBER                          *
                ATA3                    ;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
                STXV                    ;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
;*****************************************************************************
ATA3:   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
A.AA:           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
A.AB:           POPSP2                  ;HERE IF INTERRUPT OCCURS. POP STOCK TWICE
A.AC:           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 STACK 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.,CTRO     ;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     CTRO            ;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
        ;*****************************************************************************
        A063:   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.
SETRXD:  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.
CMPCTR:  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  '        @'
PCTIT:  .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.@'
```

```
        LCLINE: .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  '

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

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


        INTER:  .ASCII  '%NO INTERRUPT@'

        MSO:    .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
        .END
```

[illegible]	006470	1723	1727#								
[illegible]	010026	2038	2042#								
[illegible]	010042	2043	2046#								
[illegible]	006502	1729#	1732								
[illegible]	013406	2750	2756#								
[illegible]	013432	2762#	2768	2771							
[illegible]	013442	2757	2764#								
[illegible]	013456	2765	2767#								
[illegible]	013462	2764	2769#								
[illegible]	006504	1727	1730#								
[illegible]	015612	1546	3125#								
[illegible]	006522	1737	1741#								
[illegible]	010760	2231	2235#								
[illegible]	011052	2239	2252#								
[illegible]	006542	1743	1745#	1748							
[illegible]	013500	2776	2780#								
[illegible]	013522	2783	2785#								
[illegible]	006544	1741	1746#								
[illegible]	006562	1753	1757#								
[illegible]	011064	2257	2262#								
[illegible]	011214	2275	2287#								
[illegible]	006574	1759#	1762								
[illegible]	013544	2791	2797#								
[illegible]	013602	2796	2805#								
[illegible]	013604	2804	2806#								
[illegible]	006576	1757	1760#								
[illegible]IN	016155	1472	3170#								
[illegible]	006614	1767	1771#								
[illegible]	011234	2293	2298#								
[illegible]	011262	2303	2306#								
[illegible]	011300	2305	2311#								
[illegible]	006626	1773#	1776								
[illegible]	013630	2812	2817#								
[illegible]	006630	1771	1774#								
[illegible]TEMP	004576	1389	1415#								
[illegible]	006646	1781	1786#								
[illegible]	006662	1787	1790#								
[illegible]	006704	1792	1795#								
[illegible]	006724	1789	1794	1797	1799#						
[illegible]	010054	2057	2062#								
[illegible]	010076	2064	2067#								
[illegible]	010116	2066	2069	2071#							
[illegible]	006746	1806	1810#								
[illegible]	006762	1811	1814#								
[illegible]	010130	2076	2081#								
[illegible]	010160	2084	2087#								
[illegible]	010210	2092	2095#								
[illegible]	010224	2097	2100#								
[illegible]	010254	2086	2094	2099	2105	2107	2108#				
[illegible]	007004	1816	1819#								
[illegible]	007024	1813	1818	1821	1823#						
[illegible]	011314	2317	2322#								
[illegible]	011540	2367	2370#								
[illegible]	011542	2329	2334	2339	2344	2349	2354	2359	2364	2372#	
[illegible]	011572	2379#	2382								
[illegible]	011624	2330	2335	2340	2345	2350	2355	2360	2365	2372#	2380# 2389#

E06


```
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#
AJCX    007132            1838    1843    1846    1848#
AJD     007154            1855    1860#
AJDB    007166            1861    1864#
AJDBD   010364            2137    2142#
AJDBC   010412            2145    2147#
AJDC    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#
APPXC   016171            1476    3173#
APVEC   016212            1480    3176#
ARGA    007362            1912    1916#
ARGAA   012066            2463    2471#
ARGAB   012312            2516    2519#
ARGB    012014            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#
AQBB    014164           2915    2920#
AQC     007420           1922    1925#
AQCC    007440           1919    1924    1927    1929#
AQD     007462           1936    1940#
AQDD    012370           2536    2540#
AQDS    012504           2540    2541    2556    2565#
AQE     007504           1942    1945#
AQF     007526           1947    1950#
AQG     007546           1944    1949    1952    1954#
AQXBUF  015636           1550    3130#
AQXCSR  015243           2286    3083#
AQXSB   015256           2279    3085#
AQXWAS  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#
AT0     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#
```

DDDLAA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
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#
```

```
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
CC    = 100000           729#   1719    1733    1749    1763    1777    1802    1826    1351    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
EHL*    005300           875    1520*
EHL*A   005310          1521    1523*
```

```
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    2890
                        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#
ERRI    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#
LOCINE  016407          1286    3199#
LIMA    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#
MESSI   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#
MSO     017027          2326    2475    3250#
MSI     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    =%J00007           745*   1463*   2876*
PFAIL   006210           433     949    1658#   1660
PIND    004200          1328#   1344*
POPSP = 005726           701#   1238    1241
```

```
POPS:C=  022626          702*   970   1053  1620  1730  1746  1760  1774  2590  2609  2630  2656  2678
                        2700   2721   2743  2769  2805
PRGEA    005166         1495*  1510
PPGEB    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*
PRG0     006422          859   1709*
PRG0A    006454         1697   1717*
PRG0B    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*  1934*  1940*
                        1965*  2235*  2262*  2583*  2603*  2624*  2625*  2645*  2673*  2694*  2716*  2737*  2739*
                        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    2199
                         2226    2252    2288    2312    2370    2413    2431    2458    2519    2546    2550    2555    2560
```

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                        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           701*   1288*   1289*   1290    1291*   1292    1492*   1493*   1494*   1495    1501*   1514*   1515
                          39*   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*
```

```
TKVTR   001440          845#
TMRX    003672          882    1265#
TMTX    003702          883    1267#
TNNO    001460          853#   1569*  1570#
TOPC    001626          905#   1603*  1605    1619*  1622*  1625    1626*  1627
TPB     001436          944#   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    1680#
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*  2609*  2614*
                       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    003362         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   1452
                       1613   1663   1683   1712   2331   2336   2341   2346   2355   2356   2361   2490   2495
                       2490   2495   2500   2505   2510   2959   2962   2973   2976   2995   2998   3004
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     = 000053         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   2990#  2899   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	[illegible]
593	595	597	599	601	603	605	607	609	611	613	[illegible]	[illegible]
619	621	623	625	627	629	631	633	635	637	[illegible]	[illegible]	[illegible]
645	647	649	651	653	655	657	659	661	663	665	[illegible]	[illegible]
671	673	675	732#	736#	738#	741#	746#	937#	999	[illegible]	[illegible]	[illegible]
1426	1432	1484	2149	2309	2374	2377	2523	2544	2548	[illegible]	[illegible]	[illegible]
2927	3017	3272#	3273#									

[illegible]	947#	1719	1733	1749	1763	1777	1802	1826	1851	1865	1884	1908	1932	1957	[illegible]
	1995	2008	2021	2034	2053	2072	2109	2133	2152	2175	2199	2227	2253	2289	[illegible]
	2390	2414	2432	2459	2532	2570	2592	2612	2633	2659	2681	2703	2724	2746	[illegible]
	[illegible]97	2808	2819	2843	2866	2885	2898								
[illegible]	947#	1719	1733	1749	1763	1777	1802	1826	1851	1865	1884	1908	1932	1957	[illegible]
	1995	2008	2021	2034	2053	2072	2109	2133	2152	2175	2199	2227	2253	2289	[illegible]
	2390	2414	2432	2459	2532	2570	2592	2612	2633	2659	2681	2703	2724	2746	[illegible]
	[illegible]97	2808	2819	2843	2866	2885	2898	2911							

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)