DataGeneral

TECHNICAL STATEMENT

TEXT LISTING

068-000123-01

PROGRAM

4100 MULTIPLEXOR RELI. TEST

TEXT TAPE

097-000123-01

ABSTRACT

THE MULTIPLEXOR RELIABILITY TEST IS A MAINTENANCE PROGRAM DESIGNED TO EXERCISE THE TYPE 4100 COMMUNICATIONS MULTIPLEXOR. THE METHOD OF TEST CONSISTS OF TRANSMISSION AND RECEPTION (VIA MAINTENANCE FEATURES OF THE HARDWARE) OF PSEUDO RANDOM CHARACTERS.

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 0001 .MAIN    MACRO REV 06.30          11:50:21 02/15/79
01
02
03
04
05
06
07              ;*****************************************************************
08              ;
09              ; NAME: 4100MXR.TX                        PART NUMBER: 097-000123
10              ;
11              ;
12              ; DESCRIPTION: TYPE 4100 MULTIPLEXER RELIABILITY TEST
13              ;
14              ;
15              ; REVISION HISTORY:
16              ;
17              ;       REV.            DATE
18              ;
19              ;       00              09/25/73
20              ;       01              07/23/76
21              ;
22              ;
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24              ; ALL RIGHTS RESERVED.
25              ;*****************************************************************
26              ;       TYPE 4100 MULTIPLEXER RELIABILITY TEST
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!0002 .MAIN
01
02              ;1.     ABSTRACT
03              ;         MULTIPLEXER RELIABILITY TEST IS A MAINTENANCE PROGRAM
04              ;         DESIGNED TO EXERCISE THE TYPE 4100 COMMUNICATIONS
05              ;         MULTIPLEXER.  THE METHOD OF TEST CONSISTS OF TRANS-
06              ;         MISSION AND RECEPTION (VIA MAINTENANCE FEATURES OF THE
07              ;         HARDWARE) OF PSEUDO RANDOM CHARACTERS.  SINCE CHARAC-
08              ;         TERISTICS ARE DETERMINED VIA A RANDOM NUMBER GENERATOR
09              ;         AND ARE CHANGED PERIODICALLY, SELECTION OF LINES FOR
10              ;         TESTING IS VIA THE CONSOLE TELETYPE.  IN MULTI-
11              ;         PROCESSOR CONFIGURATIONS, THIS PERMITS NORMAL
12              ;         OPERATION OF LINE GROUPS NOT UNDER TEST.
13              ;
14              ;
15              ;2.     MACHINE REQUIREMENTS
16              ;2.1      NOVA (EXCEPT MICRO)/ECLIPSE FAMILY PROCESSOR
17              ;2.2      8K READ/WRITE MEMORY
18              ;2.3      CONSOLE TELETYPE
19              ;2.4      ONE OR MORE 4100 MULTIPLEXERS
20              ;2.5      4108/4103 BUS DROP UNITS AND ONE OR MORE LINE CARDS
21              ;2.6      TEST PLUG (IF MODEM CNTL TEST DESIRED)
22              ;         AND 4112 OPTION SUBASSEMBLY
23              ;
24              ;
25              ;3.     SWITCH SETTINGS
26              ;3.1      STARTING ADDRESS =2 (FOR MASTER MULTIPLEXER)
27              ;                          =3 (FOR SLAVE MULTIPLEXER)
28              ;3.2      SWITCH 1(1)=  REQUEST OPERATOR PARAMETERS
29              ;                       (UPON STARTING THE PROGRAM)
30              ;3.3      SWITCH 1(1)=  PROCEED FROM AN ERROR
31              ;3.4      SWITCH 2(1)=  INHIBIT TTY OUTPUT
32              ;3.5      SWITCH 5(1)= OUTPUT TO LPT
33              ;4.     OPERATING PROCEDURE
34              ;NOTE:  WHEN IT IS DESIRED TO START THE PROGRAM AT A
35              ;       GIVEN ADDRESS AND ALSO HAVE A GIVEN CONFIGURATION OF
36              ;       DATA SWITCHES SET ON STARTING, DO THE
37              ;       FOLLOWING:
38              ;
39              ;       ENTER STARTING ADDRESS IN DATA SWITCHES, PRESS "EXAMINE",
40              ;       RESET ALL DATA SWITCHES EXCEPT THOSE DESIRED TO BE ON,
41              ;       PRESS "CONTINUE".
42              ;4.0      CONNECT THE MODEM TEST PLUGS - IF IT IS DESIRED
43              ;         TO TEST ANY MODEM LINES.
44              ;4.1      LOAD THE TEST PROGRAM VIA THE BINARY LOADER OR DTOS
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!0003 .MAIN
01
02              ;4.2      SET MAINTENANCE SWITCHES FOR LINE GROUPS TO BE TESTED
03              ;4.3      SET CONSOLE SWITCHES TO 000002 (FOR MASTER MULTIPLEXER)
04              ;                                 000003 (FOR SLAVE MULTIPLEXER)
05              ;4.4      PRESS START
06              ;4.5      THE PROGRAM WILL REQUEST THE DEVICE CODE TO BE TYPED.
07              ;         THE OPERATOR SHOULD RESPOND BY TYPING THE TWO DIGIT
08              ;         OCTAL PRIME DEVICE CODE ASSIGNED TO THE MULTIPLEXER
09              ;         SYSTEM.  THIS DEVICE CODE (USUALLY 34) IS TO BE
10              ;         FOLLOWED BY A CARRIAGE RETURN.
11              ;4.5.1      OPERATOR WILL TYPE A 1 OR 0 TO THE PARITY
12              ;           QUESTION.
13              ;4.5.2  OPERATOR WILL TYPE 1 OR 0 TO THE MODEM
14              ;       CNTL OPTION.  IF TESTING OF THE MODEM IS
15              ;       NOT DESIRED TYPE A 0.
16              ;4.6      THE PROGRAM WILL NEXT REQUEST THE MULTIPLEXER
17              ;         BOUNDARY ADDRESS DEFINITIONS.  THE OPERATOR SHOULD
18              ;         TYPE A NUMBER (0-15 DECIMAL) REPRESENTING THE
19              ;         MULTIPLEXER JUMPER CONFIGURATION, SLASH, AND THE
20              ;         FIRST LINE NUMBER (IN DECIMAL) IN THAT
21              ;         MULTIPLEXER.  IF ONLY ONE MULTIPLEXER IS TO BE
22              ;         TESTED, TERMINATE THE LINE WITH A CARRIAGE RETURN.
23              ;         IF ANOTHER MULTIPLEXER IS TO BE TESTED, SEPARATE ITS
24              ;         (MULTIPLEXER/LINE NUMBER) PAIR FROM THE FIRST PAIR VIA
25              ;         A COMMA.  UP TO 16 MULTIPLEXER BOUNDARY ADDRESSES MAY
26              ;         BE DEFINED, A CARRIAGE RETURN WILL TERMINATE THE FINAL
27              ;         PAIR.  A LINE FEED MAY BE USED AS A TERMINATOR IN
28              ;         PLACE OF A COMMA.  THIS WILL ECHO A CARRIAGE BUT WILL
29              ;         NOT TERMINATE THE INPUT.  FOR EXAMPLE:  2/128, 3/192
30              ;         "CARRIAGE RETURN".  MULTIPLEXER 2 IS ASSIGNED A BOUND-
31              ;         ARY ADDRESS OF 128 (200 OCTAL), MULTIPLEXER 3 BOUND-
32              ;         ARY ADDRESS IS 192 (300 OCTAL).
33              ;4.7      THE PROGRAM WILL REQUEST THE TELETYPE LINES THAT ARE
34              ;         TO BE TESTED. THE OPERATOR MAY DEFINE A GROUP OF LINES
35              ;         FOR TESTING BY TYPING (FIRST LINE, SLASH, LAST LINE).
36              ;         SINGLE LINES MAY BE TESTED BY TYPING THE LINE NUMBER.
37              ;         ALL LINE NUMBERS ARE IN DECIMAL.  LINES OR GROUPS OF
38              ;         LINES ARE SEPARATED FROM EACH OTHER VIA COMMAS WITH
39              ;         THE FINAL LINE OR GROUP ENDING IN A CARRIAGE RETURN.
40              ;         FOR EXAMPLE: 19,24/27,38 "CARRIAGE" LINES 19,24,
41              ;         25,26,27 AND 38 WILL BE EXERCISED.  THE LINE FEED
42              ;         CHARACTER MAY BE USED LIKE A COMMA WHEN INPUT
43              ;         FORMATTING IS NECESSARY.
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!0004 .MAIN
01
02              ;4.8    IF MODEM LINES ARE TO BE TESTED, TYPE THE
03              ;       LINE NUMBERS AS ABOVE.  A TEST FIXTURE IS
04              ;       REQUIRED FOR THE MODEM TEST.
05              ;5.     ERROR DESCRIPTION
06              ;5.1      THE PROGRAM ENTERS AN ERROR STATE WHEN RECEIVER AND
07              ;         TRANSMITTER DATA DO NOT COMPARE. A FAULTY STATUS
08              ;         CONDITION EXISTS, AN OUT OF SEQUENCE OR UNEXPECTED
09              ;         EVENT OCCURS.  AN ERROR MESSAGE TO THE OPERATOR WILL
10              ;         BE TYPED AT THE CONSOLE TELETYPE.  DURING THE PRESEN-
11              ;         TATION OF THE ERROR MESSAGE, NORMAL OPERATION WILL
12              ;         CONTINUE ON THE OTHER LINES.  DURING THIS TIME, HOW-
13              ;         EVER, OTHER ERRORS DETECTED WILL BE IGNORED. WHEN THE
14              ;         ERROR MESSAGE IS COMPLETE, THE CONDITION OF THE LINE
15              ;         IS MAINTAINED. THE OPERATOR MAY SCOPE THE LINE TO
16              ;         DETERMINE THE CAUSE OF FAILURE.
17              ;5.2      SETTING SWITCH 1(1) WILL ALLOW NEW PSEUDO RANDOM
18              ;         NUMBERS TO BE GENERATED AFTER THE ERROR STATE
19              ;         HAS BEEN ENTERED.  ERROR MESSAGES WILL CONTINUE TO BE
20              ;         TYPED AS ERRORS ARE DETECTED.  SETTING SWITCH 2(1)
21              ;         WILL INHIBIT THIS PRINTOUT ON THE TTY.
22
23
24              ;6.     PROGRAM DESCRIPTION
25              ;6.1      FOR OPERATOR SELECTED LINES, THIS PROGRAM IS DESIGNED TO
26              ;         EXERCISE THE COMMUNICATIONS SYSTEM FROM MULTIPLEXER TO
27              ;         LINE DRIVER CARDS.  FOR SYSTEM FAILURES WHERE A MULTI-
28              ;         PLEXER IS SUSPECT, THE TYPE 4100 MULTIPLEXER
29              ;         DIAGNOSTIC IS A PREREQUISITE.
30              ;6.2      THE MAIN LOOP OF THIS PROGRAM CHECKS SOFTWARE FLAGS
31              ;         AND TIMES OUT THE RECEIVER/TRANSMITTER COUNTERS FOR
32              ;         EACH ACTIVE LINE.  THIS FUNCTION IS PERFORMED APPROX-
33              ;         IMATELY TEN TIMES EACH SECOND.  INTERRUPT ROUTINES
34              ;         CHECK FOR ERRORS, SEND AND RECEIVE CHARACTERS, AND
35              ;         GENERATE NEW PSEUDO RANDOM LINE CHARACTERISTICS.
36              ;         WITH THE EXCEPTION OF INITIALIZING ROUTINES,
37              ;         ALL OPERATIONS TO THE MULTIPLEXER ARE AT INTER-
38              ;         RUPT SERVICE TIME.
39
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!0005 .MAIN
01
02              ;7.     MISCELLANEOUS
03
04              ;7.1    MODEM CONTROL TEST PLUG CONNECTS:
05              ;       CTS,DSR _RTS
06              ;       RING,CD _DTR
07              ;7.2    THE PROGRAM ISSUES A 'NIOP CPU' AT THE START OF EACH
08              ;       PASS THROUGH THE MODEM TEST SEQUENCE.
09              ;
10              ;* * * * NOTE:  DUE TO THE AMOUNT OF CHARACTER CHECKING,
11              ;       ERROR MESSAGE HANDLING, AND STATUS CONFIRMATION
12              ;       DONE DURING INTERRUPT SERVICE TIME,  THE MAXIMUM
13              ;       THROUGHPUT EXPECTED TO BE HANDLED BY THIS
14              ;       PROGRAM MAY NOT EXCEED 1000 CHARA/SEC.  IF A LARGE
15              ;       NUMBER OF MODERATELY HIGH SPEED BAUD RATES ARE
16              ;       PRESENT IN THE SYSTEM UNDER TEST, IT MAY BE NEC-
17              ;       ESSARY TO CHECK SMALL GROUPS OF LINES AT A TIME.* * * *
18              ;7.3    DESCRIPTION OF MULTIPLEXER I/O FUNCTIONS:
19              ;
20              ;       DEVICE CODES MX1 (PRIMARY) = 34 (OCTAL)
21              ;                    MX2 (SECONDARY)= 35 (OCTAL)
22              ;
23              ;
24              ;       DOA AC,MX1      SPECIFIES THE CHARACTER TO BE
25              ;                       TRANSMITTED.  THE CHARACTER IS
26              ;                       RIGHT JUSTIFIED IN THE AC.  THE
27              ;                       UNUSED PORTION OF THE AC SHOULD
28              ;                       BE 'ZERO'.
29              ;
30              ;               BITS 0-5        NOT USED
31              ;
32              ;               BITS 8-15       CHARACTER TO TRANSMIT
33              ;
34              ;
35              ;       DOB AC,MX1      SPECIFIES PARITY, STOP BITS,
36              ;                       LINE SPEED, CHAR CODE LEVEL, AND
37              ;                       TRANSMIT CONTROL.
38              ;
39              ;               BITS 0-5        NOT USED
40              ;
41              ;               BITS 6-7        PARITY SELECT
42              ;
43              ;                               00 - IGNORE PARITY
44              ;                               01 - ODD
45              ;                               10 - EVEN
46              ;                               11 - FORCE A 'ONE'
47              ;
48              ;               BITS 8-9        SPECIFY NUMBER OF STOP BITS
49              ;
50              ;                               00 - 1.5 STOP BITS
51              ;                               01 - 1 STOP BIT
52              ;                               10 - 2 STOP BITS
53              ;                               11 - IGNORE THIS LINE
54              ;
55              ;               BITS 10-11      SELECT LINE SPEED
56              ;
57              ;                               00 - CLK0
58              ;                               01 - CLK1
59              ;                               10 - CLK2
60              ;                               11 - CLK3
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 0006 .MAIN
01              ;
02              ;               BITS 12-13      SPECIFY CODE LEVEL
03              ;
04              ;                               00 - 5 LEVEL CODE
05              ;                               01 - 6 LEVEL CODE
06              ;                               10 - 7 LEVEL CODE
07              ;                               11 - 8 LEVEL CODE
08              ;
09              ;               BITS 14-15      TRANSMITTER CONTROL
10              ;
11              ;                               00 - FORCE A 'SPACE' (BREAK)
12              ;                               01 - TEST "OFF", DISCON. TRANS.
13              ;                               10 - TEST "ON", CONNECT TRANS.
14              ;                               11 - NORMAL DATA
15              ;
16              ;       DOC AC,MX1      CONTROL ACTION TO XMIT OR RECV
17              ;
18              ;               BITS 0-13       NOT USED
19              ;
20              ;               BITS 14         ON/OFF CONTROL
21              ;
22              ;                               0 - TURN INDICATED DEV OFF
23              ;                               1 - TURN INDICATED DEV ON
24              ;
25              ;               BITS 15         DEVICE INDICATOR
26              ;
27              ;                               0 - TRANSMITTER
28              ;                               1 - RECEIVER
29              ;
30              ;
31              ;       DOA AC,MX2      SPECIFIES THE ABSOLUTE LINE
32              ;                       ADDRESS TO USED IN CONJUNCTION WITH
33              ;                       A DATA OUT INSTRUCTION TO THE DATA
34              ;                       OR THE MODEM CONTROLLERS.
35              ;
36              ;               BITS 0-5        NOT USED
37              ;
38              ;               BITS 6-15       ABSOLUTE LINE ADDRESS
39              ;
40              ;
41              ;       DOB AC,MX2      SPEIFIES THE CONTENTS OF
42              ;                       THE BOUNDARY ADDRESS REGISTER.
43              ;
44              ;               BITS 0-3        NOT USED
45              ;
46              ;               BITS 4-7        BOUNDARY ADDRESS
47              ;
48              ;               BITS 8-11       NOT USED
49              ;
50              ;               BITS 12-15      DATA CONTROLLER NUMBER
51              ;
52              ;
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10007 .MAIN
01                ;
02                ;       DIA AC,MX1      SPECIFIES NATURE OF INTERRUPT, AND
03                ;                       SOME ERROR CONDITIONS
04                ;
05                ;               BITS 0-1        GET INTERRUPT TYPE
06                ;
07                ;                               00 - RECEIVER (NO ERRORS)
08                ;                               01 - 'RESERVED'
09                ;                               11 - TRANSMITTER (NO ERRORS
10                ;                                    ARE POSSIBLE)
11                ;                               10 - ERRORS PRESENT
12                ;
13                ;               BITS 2          RECEIVER OVERRUN!
14                ;
15                ;               BITS 3          BREAK CHAR DETECTED.
16                ;
17                ;               BITS 4          TIME OUT ERROR
18                ;
19                ;               BITS 5          'RESERVED'
20                ;
21                ;               BITS 6-15       ABSOLUTE LINE ADDRESS
22                ;
23                ;
24                ;       DIB AC,MX1      INTERROGATE FOR PARITY ERROR
25                ;
26                ;               BITS 0          DATA PARITY ERROR DETECED
27                ;
28                ;               BITS 1-7        NOT USED
29                ;
30                ;               BITS 8-15       CHAR ON INDICATED LINE
31                ;
32                ;       DOA AC,MXM      CONTROL THE MODEM
33                ;
34                ;               BITS 0          CONTROL DTR
35                ;
36                ;                               0 - DTR OFF
37                ;                               1 - DTR ON
38                ;
39                ;               BITS 1          CONTROL RTS
40                ;
41                ;                               0 - RTS OFF
42                ;                               1 - RTS ON
43                ;
44                ;               BITS 2-5        NOT USED
45                ;
46                ;               BITS 6-15       ABSOLUTE LINE ADDRESS
47                ;
48                ;
49                ;       DOB AC,MXM      TRANS LINE ADDRESS TO MODEM OUTPUT
50                ;                       REGISTER, AND REQUESTS THE STATUS
51                ;                       WORD FOR THE SPECIFIED LINE TO BE
52                ;                       TRANSFERRED TO THE MODEM INPUT REGISTER.
53                ;
54                ;               BITS 0-5        NOT USED
55                ;
56                ;               BITS 6-15       ABSOLUTE LINE ADDRESS
57                ;
58                ;
```

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10008 .MAIN
01                ;
02                ;       DIA AC,MXM      READ MODEM LINE STATUS
03                ;
04                ;               BITS 0          RING INDICATOR
05                ;
06                ;               BITS 1          DSR
07                ;
08                ;               BITS 2          CS (CLEAR TO SEND)
09                ;
10                ;               BITS 3          CD (CARRIER DETECT)
11                ;
12                ;               BITS 4-5        NOT USED
13                ;
14                ;               BITS 6-15       ABSOLUTE LINE ADDRESS
15                ;
16                ;7.4   EFFECT OF 'BUSY', 'DONE', ETC. ON MODEM CONTROL
17                ;
18                ;
19                ;       BUSY:   A 'DOA' OR 'DOB' WILL SET THE BUSY
20                ;               CONDITION.  WHEN THE INFORMATION HAS BEEN
21                ;               TO THE TWO LINE MODEM INTERFACE CARD, THE
22                ;               'BUSY' CONDITION WILL BE CLEARED.  A TEST
23                ;               OF 'BUSY' SHOULD BE MADE PRIOR TO ISSUING
24                ;               ANOTHER OUTPUT INSTRUCTION TO PREVENT LOSS
25                ;               OF A PREVIOUS COMMAND.
26                ;
27                ;               WHEN 'DOB' IS USED, A TEST OF 'BUSY ZERO'
28                ;               WILL INDICATE THAT THE STATUS WORD IS
29                ;               AVAILABLE FROM THE MODEM INPUT REGISTER
30                ;               VIA A 'DIA'.
31                ;
32                ;
33                ;       DONE:   INTERRUPTING CONDITIONS FROM THE MODEM
34                ;               ALONG WITH THE LINE ADDRESS ARE LOADED
35                ;               INTO THE MODEM INPUT REGISTER AND 'DONE'/
36                ;               INTERRUPT LOGIC IS SET.  THE PROGRAM
37                ;               SHOULD RESPOND WITH A 'DIAC' TO READ
38                ;               THE DATA AND RESET THE INTERRUPT.
39                ;
40                ;               ONCE 'DONE' HAS BEEN SET, ALL SUBSEQUENT
41                ;               INTERRUPTING CONDITIONS WILL BE HELD BY THE
42                ;               TWO LINE MODEM INTERFACE CARD AND PRESENTED
43                ;               TO THE MODEM CONTROLLER WHEN 'DONE' IS CLEARED.
44                ;
45                ;               WHEN THE 'DOB AC,MXM' REQUEST IS ISSUED,
46                ;               INTERRUPTING CONDITIONS FROM ALL LINES WILL
47                ;               BE BLOCKED UNTIL THE STATUS WORD IS READ
48                ;               VIA A 'DIAC AC,MXM'.
49                ;
50                ;               IT SHOULD ALSO BE NOTED THAT 'BUSY' AND
51                ;               'DONE' ARE INDEPENDENT OF EACH OTHER EXCEPT
52                ;               IN THE 'DOB' CASE DESCRIBED ABOVE.
53                ;
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10009 .MAIN
01                ;
02                ;               'MOD DONE' WILL SET IF ANY OF THE FOLLOWING
03                ;               CONDITIONS OCCUR:
04                ;
05                ;                       1)      RING INDICATOR PRESENT
06                ;
07                ;                       2)      THE FALL OF 'DATA SET READY' (DSR)
08                ;                               WHILE 'DATA TERMINAL READY' (DTR)
09                ;                               IS ON.
10                ;
11                ;                       3)      WHEN LINE STATUS REQUESTED BY
12                ;                               'DOB AC,MXM' IS AVAILABLE
13                ;
14                ;       IOREST: CLEARS 'BUSY', 'DONE' MODEM INPUT AND
15                ;               OUTPUT REGISTERS, AND ALL INTERRUPT CONTROL
16                ;               LOGIC.  PLACES THE MODEM CONTROLLER IN THE
17                ;               IDLE STATE.
18                ;
19                ;       CLEAR:  RESETS 'DONE' AND INTERRUPT REQUEST LOGIC.
20                ;
21                ;       IOPULSE:        RESETS BUSY ONLY!
22                ;
23                ;
24                ;7.5   SPECIAL CONDITIONS (GENERATION OF A BREAK)
25                ;
26                ;
27                ;               TO GENERATE A BREAK CHARACTER, THE PROGRAM
28                ;               MUST SPECIFY A "SPACE" ON THE TRANSMIT DATA
29                ;               LEAD (SEE- DOB AC,MX1) AND SEND 'ONE' BREAK
30                ;               CHARACTER, HOLD THE TRANSMIT DATA LEAD IN THE
31                ;               SPACE STATE (I.E., STRIPS OFF STOP BITS) AND
32                ;               CONTINUE TO SEND BREAK CHARACTERS.  AFTER
33                ;               EACH CHARACTER TIME, THE DATA CONTROLLER WILL
34                ;               INTERRUPT THE 'CPU' AND PRESENT THE LINE
35                ;               ADDRESS.
36                ;
37                ;
38                ;
39                ;7.6   EFFECTS OF 'BUSY', 'DONE', ETC. ON DATA MULTIPLEXER
40                ;
41                ;
42                ;       DONE (MX1):     DONE WILL BE SET IF ANY ONE OF THE
43                ;                       FOLLOWING OCCURS:
44                ;
45                ;               1)      CHARACTER TRANSMITTED
46                ;
47                ;               2)      CHARACTER RECEIVED
48                ;
49                ;               3)      BREAK CHARACTER DETECTED
50                ;
51                ;               4)      TIME-OUT ERROR
52                ;
53                ;               5)      RECEIVER OVERRUN
54                ;
55                ;               DONE SHOULD NOT BE CLEARED UNTIL THE PROGRAM
56                ;               HAS PERFORMED ALL INPUT INSTRUCTIONS DESIRED.
57                ;               IN SYSTEMS WHERE SEVERAL DATA CONTROLLERS ARE
58                ;               USED, AND INTERNAL DAISY CHAIN PRIORITY SCHEME
59                ;               IS EMPLOYED.
```

```
10010 .MAIN
01                ;
02                ;       BUSY (MX1):     'BUSY' IS SET UPON THE RECEIPT OF A
03                ;                       'DOA','DOB', OR 'DOC' 'MX1'.  THE
04                ;               CONDITION IS RESET WHEN THE DATA CONTROLLER HAS
05                ;               PROCESSED THE INSTRUCTION.  NO FURTHER DATA OUT
06                ;               INSTRUCTIONS SHOULD BE ISSUED UNTIL 'BUSY' IS
07                ;               RESET BY THE DATA CONTROLLER.  IN SYSTEMS
08                ;               WHERE SEVERAL DATA CONTROLLERS ARE USED, IF
09                ;               ANY ONE DATA CONTROLLER IS BUSY, IT SHOULD BE
10                ;               ASSUMED THAT THEY ARE ALL BUSY.  HOWEVER,
11                ;               THROUGH CAREFUL PROGRAMMING, EACH DATA
12                ;               CONTROLLER MAY BE ISSUED A DATA OUT INSTRUCTION
13                ;               EVEN THOUGH THE 'BUSY' CONDITION IS NOT CLEAR.
14                ;
15                ;       START (MX1):    SETS THE SYSTEM IN THE "ON LINE MODE",
16                ;                       CLEARS 'DONE MX1'.
17                ;
18                ;       START (MX2):    SETS THE SYSTEM TO THE "OFF LINE
19                ;                       INITIALIZATION MODE".
20                ;
21                ;       I/O PULSE MX2:  STEPS THE INTERNAL CLOCK IN THE "OFF
22                ;                       LINE DIAGNOSTIC MODE".
23                ;
24                ;       CLEAR MX1:      CLEARS 'DONE' AND 'INTERRUPT REQUEST'
25                ;
26                ;       IORESET:        INITIALIZES ALL LOGIC, PUTS THE UNIT
27                ;                       INTO THE "OFF LINE DIAGNOSTIC MODE" AND
28                ;                       OPENS THE TRANSMITTER/RECEIVER LOOP.
29                ;
30                ;7.7   FORMAT OF PROGRAM INTERNAL CONTROL WORD (CNTLB)
31                ;
32                ;
33                ;       BIT 0           ERROR OCCURED
34                ;
35                ;       BIT 1           MODEM CHANGE
36                ;
37                ;       BIT 2           TEST SPACE (TRANSMIT)
38                ;
39                ;       BIT 3           BREAK STORED (RECEIVE)
40                ;
41                ;       BIT 4           TRANSMIT TIME OUT
42                ;
43                ;       BIT 5           RECEIVE TIME OUT
44                ;
45                ;       BIT 6-7         PARITY
46                ;
47                ;       BIT 8-9         STOP BITS
48                ;
49                ;       BIT 10-11       CLK 0-3
50                ;
51                ;       BIT 12-13       LEVEL
52                ;
53                ;       BIT 14          RECEIVE ON
54                ;
55                ;       BIT 15          TOGGLE (SHOWS WHICH BUFFER HAS
56                ;                       THE TRANSMITTED CHARACTER)
57
58                .EOT
```

```
0011 .MAIN
**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS
```