

TEXT LISTING

068-000034-04

PROGRAM

MCA 4038 RELIABILITY TEST

TEXT TAPE

097-000034-04

ABSTRACT

THIS IS A MAINTENANCE PROGRAM TO ASSURE THE RELIABLE  
SIMULTAEIOUS OPERATION OF FROM 1 TO 15 MCA'S INTER-  
CONNECTING AS MANY NOVA FAMILY PROCESSORS.

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: NAME: MCA.TX          PART NUMBER: 097-000034
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: DESCRIPTION: MCA 4038 RELIABILITY TEST
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: REVISION HISTORY:
:   REV.      DATE
:   ---      ---
:   00      09/10/71
:   01      01/12/72
:   02      03/09/72
:   03      03/07/75
:   04      04/23/76
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10002 .MAIN
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: MULTIPROCESSOR COMMUNICATIONS ADAPTER 4038
: RELIABILITY TEST
:
: 1. ABSTRACT
:
: THIS IS A MAINTENANCE PROGRAM TO ASSURE THE RELIABLE
: SIMULTANEOUS OPERATION OF FROM 1 TO 15 MCA'S
: INTERCONNECTING AS MANY NOVA-FAMILY PROCESSORS.
:
: THE SYSTEM SHOULD INCLUDE AT LEAST ONE "MASTER" CPU
: WITH A TTY AND FROM 1 TO 14 "SLAVE" CPU 'S WITH
: OR WITHOUT TTY'S.
:
: THE PROGRAM HAS SEVERAL MODES OF OPERATION.THEY
: ARE AS FOLLOWS.
:
: 1.RANDOM EXERCISE MODE
:
: PSEUDO-RANDOM LENGTH BLOCKS OF PSEUDO-RANDOM DATA
: ARE SENT AT RANDOM TIMES FROM EACH PROCESSOR TO ALL
: PROCESSORS.
:
: 2.OPERATOR SELECTABLE WORD COUNT
:
: THE OPERATOR MAY SELECT A WORD COUNT OF 1-2000.
: THE DATA EMPLOYED IS RANDOM.
:
: 3.OPERATOR SELECTABLE DATA
:
: THE OPERATOR MAY SELECT ANY DATA PATTERN DESIRED.
: THE WORD COUNT IS FORCED TO 1.
:
: 2. MACHINE REQUIREMENTS
: 2.1 ONE OR MORE NOVA-FAMILY PROCESSORS
: 2.2 AT LEAST ONE TELETYPE (SEE SECTION 5.6)
: 2.3 EACH WITH 4K READ/WRITE MEMORY
: 2.4 EACH WITH A 4206/4038 MCA WITH A UNIQUE
:     NON-ZERO CODE.
:
: 3. SWITCH SETTINGS
: 3.1 STARTING ADDRESS = 2
: 3.2 SWITCH 0 (1) NO TTY (SLAVE CPU'S)
: 3.3 SWITCH 2 (1) INHIBIT TTY PRINTING
: 3.4 SWITCH 3 (1) HOLDS UP THE PROGRAM BEFORE PRINTOUTS
:     UNTIL SWITCH 3 IS TURNED OFF (0).
:     (SEE PARAGRAPH 5.6)
:
: SWITCH 5 (1) OUTPUT TO LPT
:
: 4. OPERATING PROCEDURE
: 4.1 INSERT 4038/4206 MCA BOARDS IN PROPER SLOTS
:     WITH POWER OFF.
:
: 4.2 INTERCONNECT MCA'S WITH PROPER CABLES.
:
: 4.3 LOAD THE PROGRAM WITH THE BINARY LOADER OR DIAGNOSTIC
:     OPERATING SYSTEM.

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? THE PROGRAM MAY BE TRANSMITTED TO THE NOVAS
? IN THE SYSTEM IF THE SYSTEM WORKS WELL ENOUGH.
?4.4 ?
? USE PROGRAM LOAD WITH DEVICE
? CODE 7 AT EACH RCVR, OR TOGGLE
? THIS FOUR INSTRUCTION PROGRAM IN EACH RECEIVER MEMORY
? (AND START IT) UNLESS IT IS ALREADY IN, AT
? LOCATION TAGGED "YRCVR".
?4.5 ?
? :SUB 0,0 :CLEAR ACO
? :DOAC 0,MCAR :CLEAR ADDRESS REGISTER
? :DOBS 0,MCAR :LOAD MC,START
? :JMP. :WAIT
?
? START THE NOVA WITH THE GOOD COPY OF THE MCA
? RELIABILITY TEST AT LOCATION 4.
? IT WILL HALT.
?
?4.6 ?
? SET CONSOLE SWITCHES OFF(0) EXCEPT FOR THE ONES
? NUMBERED CORRESPONDING TO RECEIVERS YOU WANT
? TO SEND TO SWITCH 1=CODE 1, SWITCH 2
? = CODE 2, SWITCH 15=CODE 17 ETC.
?
?4.7 ?
? PRESS CONTINUE. THOSE RCVRs WILL GET THIS PROGRAM
? AND COME TO A HALT.
? THE MASTER MACHINE WILL AGAIN
? HALT AFTER THE DOWN-LINE LOAD.
? CHECK THE HALT ON THE DOWN LINE CPU'S
? TO SEE IF IT WAS A GOOD ERROR FREE LOAD
? OR A CHECKSUM ERROR OCCURRED.
? IF AN ERROR DID OCCUR, ON THAT SPECIFIC CPU
? PRESS CONTINUE AND REPEAT STEPS
? 4.5 AND 4.6, USING ONLY THE
? FALLING CPU'S MCA CODE.
?
?4.8 ?
? IF ALL THE DOWN-LINE LOADS ARE
? O.K., SET THE SWITCHES ON THE
? MASTER CPU TO 2.
?
?4.9 ?
? SET SW0 TO DESIRED VALUE,PRESS START
?
? TTY SYSTEM
?
? THE MESSAGE "CORE,MCAR#" WILL BE PRINTED.
? CORE INFORMATION WILL BE THE LAST MEMORY
? LOCATION AVAILABLE+1. THE MCA CODE # WILL
? BE THE CODE FOR THE RECEIVER/XMITTER
? AS DEFINED BY THE JUMPER(S).
?
? NEXT THE MESSAGE "TYPE MCA
? CODES" WILL BE PRINTED.
?
? NO TTY
?
? IF NO TTY, (SWITCH 0=1), THE CPU WILL HALT
? TO ALLOW MANUAL ENTRY OF MCA CODE(S).
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? WHEN THIS HALT OCCURS,AC0=LAST
? MEMORY LOCATION+1,AND AC1=MCA CODE NUMBER.
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?4.10 ?
? TTY SYSTEM
?
? TYPE THE TWO-DIGIT CODE OF EACH MCA
? AND A CARRIAGE RETURN AT IT'S OWN TELETYPE.
? THIS ALLOWS EACH PROCESSOR TO TEST TRANSMISSION OF
? DATA TO ITSELF. ALL PROCESSORS ARE SHARING THE MCA
? BUS, BUT NOT TRANSMITTING TO EACH OTHER.
? NO TTY
?
? SET THE DATA SWITCH =1 FOR THE MCA YOU WISH
? TO TRANSMIT TO AS FOLLOWS.SWITCH 1=CODE 1,
? SWITCH 2=CODE 2,SWITCH 15=CODE 17 ETC.
? PRESS CONTINUE.
?
? TTY
? ALLOW THIS TEST TO RUN UNTIL EACH TELETYPE
? TYPES "PASS" TWICE OR MORE.
? NO TTY
? BY THE TIME THE "MASTER" CPU HAS TYPED "PASS"
? TWICE,THE "SLAVE" CPU'S SHOULD ALSO HAVE MADE
? TWO PASSES.THE LOCATION TAGGED "XPCAT" MAY
? BE EXAMINED TO CHECK THE PASS COUNT.
?
?4.12 ?
? TURN OFF THE POWER OF ONE PROCESSOR AND
? OBSERVE THAT ALL OTHERS CONTINUE TO FUNCTION; THEN
? TURN POWER BACK ON, START THE PROGRAM, AND
? ENTER IN THE MCA CODE AGAIN.
?
?4.13 ?
? REPEAT THE POWER-OFF TEST ABOVE ON ALL PROCESSORS.
?
?4.14 ?
? TTY
?
? ON EACH TELETYPE, ENTER THE CODES OF
? OTHER MCA'S YOU WISH IT TO TRANSMIT TO.
? THE CODES MAY BE ENTERED BY TYPING
? ONE CODE AT A TIME AND CR,OR BY SEPARATING
? EACH CODE WITH A COMMA (,).LAST CODE
? ENTERED SHOULD RE FOLLOWED BY A CR.
? NO TTY
?
? START AT LOCATION 2,WITH SWITCH 0=1.THE CPU WILL HALT
? TO ALLOW FOR MANUAL ENTRY OF MCA CODES.SWITCH 1=CODE 1,
? SWITCH 2=CODE 2,SWITCH 15=CODE 17 ETC.
? PRESS CONTINUE.

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: 4.15 TTY
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: WHEN ALL PROCESSORS ARE TRANSMITTING TO ALL
: PROCESSORS, ALLOW THE TEST TO RUN UNTIL
: EACH TELETYPE HAS TYPED "PASS" TWICE OR MORE.
:
: NO TTY
:
: BY THE TIME THE "MASTER" CPU HAS TYPED "PASS"
: MORE THAN TWO TIMES, EACH "SLAVE" CPU PROBABLY
: WILL HAVE MADE TWO PASSES. LOCATION TAGGED "XPCNT"
: MAY BE EXAMINED TO CHECK THE PASS COUNT.
:
: 5. ERROR INDICATIONS
:
: ERROR INDICATIONS VARY DEPENDING ON THE ERROR
: TYPE AND THE SYSTEM CONFIGURATION. IF A TTY
: IS AVAILABLE, AN ERROR PRINTOUT WILL
: BE THE INITIAL INDICATION OF AN ERROR.
: IF THERE IS NO TTY, THE PROGRAM WILL PROCEED
: THROUGH THE NORMAL ERROR PATH, GENERATING THE
: DATA TO BE PRINTED ETC., BUT INSTEAD OF AN
: ERROR PRINTOUT A HALT WILL OCCUR.
: PRESSING CONTINUE WILL REPEAT THE
: FAILING SEQUENCE.
:
: IN THE EFFORT TO INTERPRET THE ERROR PRINTOUTS,
: THE FOLLOWING INFORMATION SHOULD BE KEPT IN MIND.
:
: FOLLOWING A SUCCESSFUL XMIT SEQUENCE:
:
: 1. XMITTER DIA=ADDRESS OF THE NEXT WORD TO BE XMITTED.
: 2. XMITTER DIB=2'S COMPLEMENT OF THE # OF WORDS
: REMAINING TO BE TRANSFERRED.
:
: FOLLOWING A SUCCESSFUL RECEIVE SEQUENCE:
:
: 1. REC DIA=ADDRESS OF THE NEXT WORD TO BE STORED.
: 2. REC DIB=2'S COMPLEMENT OF THE # OF WORDS
: REMAINING TO BE RECEIVED.
:
: FOR BOTH A RECEIVE AND XMIT SEQUENCE:
:
: 1. DIB SHOULD=0, SPECIFYING THAT ALL WORDS WERE IN
: FACT XMITTED/RECEIVED.
:
: 2. DIA SHOULD = BUFFER ADDRESS + 2'S COMPLEMENT
: OF BLOCK LENGTH. FOR EXAMPLE:
:
: BUFFER ADDRESS=3000, BLOCK LENGTH=176000, DIA ADDRESS
: READ SHOULD= 5000.
:
: 3. IN A CASE WHERE THE ENTIRE BLOCK WAS NOT
: XMITTED/RECEIVED, THE ADDRESS READ BY THE DIA
: SHOULD=THE BUFFER ADDRESS + THE 2'S COMPLEMENT
: OF THE BLOCK LENGTH + THE WORD COUNT READ BY THE DIB.
: FOR EXAMPLE: BUFFER ADDRESS=3000, BLOCK LENGTH=176000,
:
: 4.15 DIB READ=177777.
: ADDRESS READ SHOULD =3000+2000+(-1)=4777
:
: IN A CASE WHERE A STATUS ERROR HAS OCCURRED,
: THE EXPECTED STATUS AND THE ACTUAL STATUS
: IS PROVIDED.
:
: DATA OR WORD-COUNT (BLOCK LENGTH) ERRORS ARE
: IDENTIFIED AT THE RECEIVING END OF A RAD
: TRANSMISSION, UNLESS NO LOCK-ON WAS ESTABLISHED.
: THE SAME DATA BLOCK WILL BE TRANSMITTED REPEATEDLY
: THEREAFTER. EXAMPLE:
:
: ADDRESS OF RECEIVER BUFFER 4764
: ADDRESS OF TRANSMITTER BUFFER 7314 (IF FROM SAME MACHINE)
:
: #C-1= RCVD:4 SENT:1
: 1 000244 000243
: 2 000000 031332
: 3 051332 125440
: 4 125440 134507
: 5 134507 126712
:
: THE ABOVE PRINTOUT PROVIDES THE STARTING
: ADDRESS OF THE RECEIVER BUFFER -1 (4764) ALONG WITH
: THE MCA CODES FOR THE RECEIVER AND THE TRANSMITTER.
: THE FIRST WORD OF THE RECEIVER BUFFER IS AT LOC. 4765.
:
: IF THE REC-XMITTER, THE TRANSMITTER BUFFER ADDRESS -1
: IS ALSO PRINTED, THE FIRST LOC. OF THE XMITTER BUFFER IS THE
: PRINTED ADDRESS +1 (7315).
:
: PRINTED NEXT IS THE ACTUAL WORD COUNT RECEIVED -1
: AND THE COMPUTED WORD COUNT XMITTED -1.
:
: THE NUMBERS ON THE FAR LEFT ARE THE OFFSETS
: FROM THE BASE ADDRESS OF THE BUFFER. FOR EXAMPLE
: 1 REPRESENTS THE FIRST LOCATION IN THE BUFFER.
: IN THE EXAMPLE ABOVE, NOTE THAT WE RECEIVED ONE
: MORE WORD THAN WE TRANSMITTED. NEXT, THE FIRST FOUR
: NON-MATCHING DATA WORDS ARE PRINTED. IN THE
: ABOVE EXAMPLE, WE RECEIVED AN EXTRA WORD OF ZERO'S
: AND ALL THE SUBSEQUENT DATA WORDS ARE MISMATCHED.
:
: DATA OR WORD-COUNT (BLOCK LENGTH) ERRORS ARE
: REPORTED AT THE TRANSMITTING END OF A BAD
: TRANSMISSION TYPICALLY IN ONE OF THESE WAYS.
: THE SAME DATA WILL BE TRANSMITTED REPEATEDLY THEREAFTER.
:
: FROM 1 TO 4
: DATA ERRORS
:
: 5.1
: 5.2
: 5.3

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10007 .MAIN
01
02 STATUS ERRORS AT RCVR 4
03 WORDS SENT=244 ACKNOWLEDGED=245
04
05 NOTE:
06
07 ;IN PRBUF IS THE ADDRESS WHERE W.C.-1 IS STORED (WORD #0).
08 ;IN PRBUF IS THE ADDRESS OF THE RECEIVER BUFFER (WORD #1).
09 ;IN PRBUF IS THE ADDRESS OF THE TRANSMITTER BUFFER.
10 002000 BUFL=2000; THE LENGTH OF BOTH BUFFERS
11 ;S.4 OTHER FAILURES MAY RESULT. IN ONE OF THESE MESSAGES:
12
13 STATUS ERROR,RCVR 4
14 ADDRESS -WD CNT STATUS
15 004502 176000 040406
16 DIA-R DIB-R DIC-R
17 006502 000000 040405
18
19 ADDRESS ERROR,RCVR 4
20 ADDRESS -WD CNT STATUS
21 4502 176000 040406
22 DIA-R DIB-R DIC-R
23 6506 000000 040406
24
25 UNDER ADDRESS IS THE CONTENTS OF "PRBUF" WHICH IS
26 THE ADDRESS OF THE RECEIVER BUFFER WORD # 1.
27 UNDER -WD COUNT IS THE CONTENTS OF "MHUFL" WHICH IS
28 THE LENGTH OF THE MCA WORD COUNT.UNDER STATUS IS
29 WHAT THE STATUS SHOULD BE.THE NEXT TWO LINES
30 PRESENT THE PERTINENT RECEIVER REGISTERS AS READ.
31 DIA-R = MCA RECEIVER ADDRESS REGISTER
32 DIB-R = MCA RECEIVER WORD COUNT REGISTER
33 DIC-R = MCA RECEIVER STATUS REGISTER
34
35 RECEIVER STATUS REGISTER
36
37 R RRR TTT T00 000 11C
38
39
40
41
42
43 BITS
44 0,1,2,3 RCVR CODE
45 4,5,6,7 TRANSMITTER LINK
46 12 TIME-OUT ERROR
47 13 LOCK-ON (RCVR IS LOCKED TO XMTR LINK)
48 14 XMTR COUNT DONE
49 15 RCVR COUNT DONE
50
51 STATUS ERROR,XMTR 4
52 ADDRESS -WD CNT STATUS
53 002505 177000 040406
54 DIA-X DIB-X DIC-X
55 004505 000000 040410
56
57 ADDRESS ERROR,XMTR 4
58 ADDRESS -WD CNT STATUS
59 2505 177000 040406

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10006 .MAIN
01
02 DIA-X DIB-X DIC-X
03 2505 000000 040406
04
05 WORD COUNT ERROR,XMTR 4
06 ADDRESS -WD CNT STATUS
07 2505 177000 040406
08 DIA-X DIB-X DIC-X
09 4505 177777 040406
10
11 UNDER ADDRESS IS THE CONTENTS OF "ADM" WHICH IS
12 THE ADDRESS OF THE TRANSMITTER BUFFER.UNDER -WD
13 COUNT IS THE CONTENTS OF "MWC" WHICH IS THE BLOCK
14 LENGTH.UNDER STATUS IS WHAT THE STATUS SHOULD BE.
15 THE NEXT TWO LINES PRESENT THE PERTINENT TRANSMITTER
16 REGISTERS AS READ.
17 DIA-X = MCA TRANSMITTER ADDRESS REGISTER
18 DIB-X = MCA TRANSMITTER WORD COUNT
19 DIC-X = MCA TRANSMITTER STATUS REGISTER
20
21 XMTR STATUS REGISTER
22
23 R RRR TTT T00 000 11C
24
25
26
27
28 BITS
29 0,1,2,3 RCVR LINK
30 4,5,6,7 TRANSMITTER CODE
31 10 DIAGNOSTIC STATUS PHASE
32 11 DIAGNOSTIC MODE
33 12 TIME-OUT
34 13 LOCK (STATE OF RCVR BEFORE LAST WORD)
35 14 XMTR COUNT DONE
36 15 RCVR COUNT DONE
37
38 CIRCUIT FAILURE, NO XMTR DONE OR
39 TIME-OUT OCCURRED, XMTR 4
40 ADDRESS -WD CNT STATUS
41 003550 177251 012014
42 DIA-X DIB-X DIC-X
43 003550 176722 012004
44
45 TIME-OUT OCCURRED, XMTR 4
46 ADDRESS -WD CNT STATUS
47 003221 176722 012004
48 DIA-X DIB-X DIC-X
49 003550 177251 012014
50
51 THE FOLLOWING ERRORS WILL PRINT AN ERROR
52 MESSAGE AND RESULT IN A
53 SCOPE LOOP ISSUING THE PULSE IN QUESTION.
54 IF NO ITY,AN ERROR HALT WILL OCCUR.PRESS CONTINUE
55 TO ENTER SCOPE LOOP ISSUING THE PULSE
56 IN QUESTION.
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10009 .MAIN
01
02 RCVR START FAILED TO SET BUSY
03
04 RCVR CLEAR FAILED TO CLR DONE
05
06 XMTR CLEAR FAILED TO CLR DONE
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IF YOU HAVE FEWER TELETYPE THAN NOVAS, YOU CAN CONNECT
THE TELETYPE TO EACH NOVA, ONE AT A TIME,
TO DO INPUT OR OUTPUT (PROVIDING YOU HAVE ENOUGH
TELETYPE INTERFACES TO GO AROUND). ALWAYS KEEP
SWITCH 3 UP(1) WHEN THE TELETYPE
IS NOT CONNECTED. THE PROGRAM WILL RUN UNATTENDED,
TESTING THE SYSTEM. THE CARRY LIGHT WILL BLINK
IF THE TELETYPE IS NEEDED, AS IN THE CASE
OF AN ERROR MESSAGE.

OF COURSE, IF SWITCH 0=1 (NO TTY), IT IS
NOT NECESSARY TO HAVE A TTY. ONE MAY HOWEVER
DESIRE TO INSTALL A TTY IN A CASE WHERE
HE FEELS THE ERROR PRINTOUTS
WOULD BE OF HELP.

SWITCH 0 (1) WILL OVERRIDE THE EFFECTS OF SWITCH 2 (1).

PROGRAM WILL HALT IF
AN INTERRUPT OCCURED FROM AN UNKNOWN DEVICE
NO MCA BOARD (OR MCA CODE IS 0)
SOME IO INSTRUCTION TO MCAR OR MCAI FAILED DURING
INITIAL TESTS.

PROGRAM INPUT
ANY TIME AFTER THE MESSAGE "TYPE OCTAL CODES" YOU MAY
TYPE A ONE- OR TWO- DIGIT OCTAL NUMBER FOLLOWED BY A
CARRIAGE RETURN. THIS ADDS THE CODE OF SOME MCA TO THE
LIST, AND COMMUNICATION WILL START TO THAT MCA:
10

YOU MAY TYPE A MINUS SIGN AND A ONE- OR TWO- DIGIT
CODE FOLLOWED BY A CARRIAGE RETURN. THIS STOPS
COMMUNICATION TO THAT MCA:
-10

YOU MAY TYPE AN OCTAL NUMBER BETWEEN 1 AND 2000
INCLUSIVE FOLLOWED BY THE LETTER "B" AND A CARRIAGE
RETURN. THIS FORCES THE BLOCK LENGTH OF
TRANSMISSION TO THE
VALUE TYPED.
THE WORD "CYCLE" WILL BE PRINTED.

IT SHOULD BE REMEMBERED THAT ONE WORD BLOCKS ARE
NEVER ACKNOWLEDGED, SO THAT IF THE OPERATOR SPECIFIES
15, THE OPERATION WILL PROCEED AS USUAL, BUT THE
TYPICAL SUCCESS MESSAGE "CYCLE" WILL NOT BE PRINTED.
NORMAL STATUS AND DATA CHECKS ARE MADE.

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IF THE WORD COUNT IS SELECTED AS 1, THE WC-1 (0)
WILL BE FED TO THE RAM # GEN ON THE RECEIVING
END AND THE RESULTING DATA WORD WILL BE 033031.

YOU MAY TYPE AN OCTAL NUMBER BETWEEN 0 AND 177777
INCLUSIVE FOLLOWED BY THE LETTER "D" AND A CARRIAGE
RETURN. THIS FORCES THE BLOCK LENGTH OF TRANSMISSION
TO ONE WORD. THE VALUE OF THE DATA WORD IS THE
VALUE TYPED.

IN THIS MODE THE RECEIVER WILL CONTINUOUSLY
INDICATE AN ERROR CONDITION WHICH WILL
SHOW THE XMT WORD AS 033031 AND THE REC WORD
AS THE DATA WORD SELECTED. PLEASE NOTE THAT THIS
IS THE NORMAL OPERATION OF THIS MODE. IT IS
INTENDED ONLY TO REPEATEDLY XMT THE SAME
FIXED DATA WORD AS SELECTED BY THE OPERATOR.
USE THE SWITCH OPTIONS TO DELETE
TYPEOUTS AND PROCEED VIA USE OF SCOPE. THIS
MODE IS INTENDED TO BE USED IN A SITUATION
WHERE A PARTICULAR DATA PATTERN IS FAILING
OR ONE BIT IS BEING DROPPED ETC.

YOU MAY TYPE CONTROL-R TO INTERRUPT
THE PROGRAM AND RESTART IT AT LOCATION 2.

HOW IT WORKS:
THE PROGRAM SELECTS A RECEIVER AT RANDOM TO SEND TO.
A RANDOM LOCATION ABOVE THE PROGRAM IS SELECTED FOR THE
TRANSMITTER BUFFER. THE LENGTH OF THE BUFFER IS PICKED
AT RANDOM. THIS IS FROM 2 WORDS TO 2000.
THE BUFFER LENGTH-1 IS USED AS THE BASE TO COMPUTE
THE FIRST RANDOM NUMBER IN IT. THE FIRST IS USED TO
COMPUTE THE SECOND, AND SO ON. ALL THESE PSEUDO-RANDOM
VALUES ARE COMPUTED BY SUBROUTINE RAND, WHERE EACH IS
BASED ON THE PREVIOUS ONE.

PLEASE NOTE THE FIRST DATA WORD IS NOT THE WC-1,
BUT THE OUTPUT OF THE RANDOM # GENERATOR
WHEN THE WC-1 IS USED AS THE BASE.

THE TRANSMITTER STARTS TRANSMISSION. IT WAITS FOR
A) DONE, OR
B) TRANSMITTER TIME-OUT, OR
C) NEITHER ONE AND A TIME LAPSE OF 100 MILLISECOND.
IF (A), THE PROGRAM RETURNS TO STEP 8.1 ABOVE.
IF (B), THE PROGRAM RESTARTS TRANSMISSION ON THE THEORY
THAT THE RECEIVER WAS TIED UP WITH PRINT-OUTS. HOWEVER,
WE WILL TOLERATE ONLY 1024 OF THESE (BETWEEN 10 SECONDS
AND 2 MINUTES) UNTIL WE PRINT AN ERROR MESSAGE AND GO TO
STEP 8.1.
IF (C), A MESSAGE IS PRINTED ABOUT THE FAILURE OF THE

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: MCA'S TIME-OUT LOGIC. THEN BACK TO STEP R.1
:
:8.3 AFTER HAVING SENT A BLOCK OF DATA TO A RECEIVER,
: THE TRANSMITTER WILL NOT SEND ANY MORE UNTIL
: A ONE-WORD ACKNOWLEDGEMENT BLOCK COMES BACK FROM THAT
: MCA.
:
:8.4 THE "PASS" MESSAGE IS TYPED ONLY IF 512 BLOCKS HAVE
: BEEN SENT AND ACKNOWLEDGED FROM EACH MCA WHOSE CODE
: HAS BEEN ENTERED, AND NO ERRORS WERE DETECTED.
:
: AS THE NUMBER OF CPU'S IN THE SYSTEM
: INCREASES, THE TIME FOR EACH "PASS" MESSAGE
: ALSO INCREASES. THIS TIME MAY BE DECREASED BY
: CHANGING THE CONTENTS OF THE LOCATION TAGGED
: "MPNO" TO THE 2'S COMPLEMENT OF THE # OF
: BLOCKS DESIRED PER EACH PASS. FOR
: EXAMPLE, FOR 512 DECIMAL, ENTER 177000
: INTO LOCATION "MPNO".
:
:8.5 IF AN ERROR HAS BEEN DETECTED IN THE TRANSMITTER ITSELF,
: OR THE LINKED RECEIVER (AS REPORTED IN THE
: ACKNOWLEDGMENT WORD), THEN ALL FUTURE TRANSMISSIONS
: WILL BE THE SAME DATA FROM THE SAME LENGTH BUFFER THAT
: CAUSED THE ERROR. THE TRANSMITTER BUFFER IS FROZEN.
: THE CORE LOCATION IS FROZEN TOO, BUT NOT ALWAYS IN
: THE LOCATION IT WAS WHEN THE ERROR OCCURRED.
:
:8.6 INPUT OPTIONS B AND D (7.3, 7.4) ALSO FREEZE THE
: TRANSMITTER BUFFER.
:8.7 EACH MCA RECEIVER IS ALWAYS OPEN FOR RECEPTION FROM ANY
: TRANSMITTER. WHEN AN INCOMING DATA BLOCK IS
: COMPLETE, AN INTERRUPT OCCURS, AND THE DATA IS VERIFIED
: BEFORE THE MAIN PROGRAM RESUMES. AFTER THE MAIN PROGRAM
: RESUMES, A ONE-WORD ACKNOWLEDGMENT IS SENT OFF TO THE
: TRANSMITTER IF IT IS ON THE LIST OF TYPED-IN CODES.
: OTHERWISE, NO ACKNOWLEDGEMENT. THIS DELIBERATE
: SNUB WOULD CURTAIL ANY FURTHER COMMUNICATIONS
: FROM THAT MCA.
:
:8.8 THE ACKNOWLEDGEMENT WORD CONTAINS THE NUMBER
: OF WORDS RECEIVED-1 IN BITS 6 TO 15, THE OCCURRENCE
: OF DATA ERRORS IN BIT 0, AND THE OCCURRENCE OF RECEIVER
: STATUS REGISTER ERRORS IN BIT 1. ONE WORD BLOCKS ARE
: NEVER ACKNOWLEDGED.
:
:8.9 IF THE TRANSMITTER TALKS TO ITS OWN RECEIVER,
: NO ACKNOWLEDGEMENT WORD IS SENT BACK, BECAUSE
: BOTH TRANSMITTER PROGRAM AND RECEIVER PROGRAM
: HAVE COMPLETE ACCESS TO EACH OTHER.
:
:8.10 THE DATA BLOCK IS CHECKED FOR ERRORS BY
: SEEING IF EACH WORD RECEIVED EQUALS THE NUMBER PRODUCED
: BY THE SUBROUTINE "RAND" WHEN THE WORD BEFORE IT IS
: USED AS THE BASE. THE FIRST BASE VALUE IS SIMPLY THE
: BLOCK LENGTH-1. EVEN IF ONLY TWO DATA WORDS ARE CORRECT
: WE CAN RECONSTRUCT THE WHOLE BUFFER AND COMPUTE
: THE RIGHT LENGTH. ALSO IF THE LENGTH IS CORRECT AND ALL

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10012 .MAIN
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: THE DATA IS BAD. IF THE LENGTH IS WRONG, AND THERE IS
: NOT TWO GOOD WORDS, THE PRINT OUT WILL BE MEANINGLESS.
:
: CHANGING DEVICE CODES
:
: IF "DEVCO" DOES NOT EQUAL "LSTDC" ALL THE
: XMITTER/RECEIVER I-O INSTRUCTIONS ARE AUTOMATICALLY
: CHANGED TO THE NEW DESIRED VALUE IN LOCATION "DEVCO"
: FROM THE OLD VALUE IN "LSTDC".
:
: TO CHANGE THE DEVICE CODES FOR XMITTER/RECEIVER
: I-O INSTRUCTIONS, PLEASE FOLLOW THIS SEQUENCE.
:
: 1. SET NEW DESIRED XMITTER CODE INTO LOCATION "DEVCO".
: 2. START PROGRAM AT LOCATION 2.
: 3. PROGRAM WILL CHANGE ALL I-O INSTRUCTIONS
: AND START NORMAL EXECUTION.
:
: .EOT

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0013 .MAIN

\*\*00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

0014 .MAIN

HUFL 002000

7/09