

TEXT LISTING

068-000305-04

PROGRAM

SYNCHRONOUS LINE DIAGNOSTIC

TEXT TAPE

097-000305-04

ABSTRACT

THE SLM DIAGNOSTIC PERFORMS A GATE BY GATE TEST
OF ONE TYPE SYNCHRONOUS LINE MODULE CONTROLLER.

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; NAME: SLM.D.X          PART NUMBER: 097-000305
; DESCRIPTION: SYNCHRONOUS LINE DIAGNOSTIC
; REVISION HISTORY:
;   REV.          DATE
;   00          09/19/75
;   01          05/14/76
;   02          01/26/78
;   03          12/01/78
;   04          12/15/79
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SYNCHRONOUS LINE MODULE DIAGNOSTIC
PROGRAM NAME SLM.D.X

REVISION HISTORY
REV 5- REMOVED 30 IN LOCATION 1 FOR INTERRUPT TEST
FIXED DTRS.

MACHINE REQUIREMENTS
NOVA/ECLIPSE FAMILY PROCESSOR
CONSOLE DEVICE
SYNCHRONOUS LINE MODULE
16K READ/WRITE MEMORY
SET OF JUMPER PLUGS

OPTIONAL HARDWARE SUPPORTED:
DCU 50 OR DCU 200
M600 IOP OR HOST DIRECTORY
DUAL PORT COMMUNICATIONS CONTROLLER

TEST REQUIREMENTS
JUMPER PLUGS REQUIRED FOR FULL TEST,NO
PLUGS NEEDED FOR BAUD TEST ONLY.

SUMMARY
THE SLM DIAGNOSTIC PERFORMS A GATE
BY GATE TEST OF ONE TYPE SYNCHRONOUS LINE MODULE
CONTROLLER. THE TEST INCLUDES MOST OF THE LOGIC
ON THE 15X15 INCH SYNCHRONOUS BOARD. THE TEST IS EYE-
CUTTED USING JUMPER PLUGS WHICH CONNECT LINE 0 TRANS-
MITTER TO LINE 1 RECEIVER AND LINE 1 TRANSMITTER
TO LINE 0 RECEIVER.
THE JUMPER PLUGS ALSO CONNECT THE FOUR MODEM OUTPUTS
TO THE FOUR MODEM INPUTS IN THE FOLLOWING MANNER:
DTR TO RING
RTS TO DSR
SPA TO CD
SPB TO CTS
NOTE: W1 THRU W4 HAVE TO BE IN TO RUN MODEM TESTS

RESTRICTIONS NONE

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"CR" A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM
AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE

"D" THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG"
TO DEFAULT MODE AND RESTART THE PROGRAM.

"R" THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE
PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY
HAD BEFORE THE COMMAND WAS ISSUED.

"O" THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE
PROGRAM CONTROL TO GO TO ODT (NOTE: THIS IS AN
OPTIONAL COMMAND AND IS AVAILABLE ONLY IF
ODTPK IS PRESENT)

M THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE
CURRENT OPERATING MODES.

18.2. OCTAL DEBUG TOOL (ODT)
THIS DIAGNOSTIC IS EQUIPPED WITH A BUILT IN ODT WHICH CAN
BE ACCESSED BY HITTING CONTROL 0 ("O") AT ANY TIME DURING
THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARA-
METERS).
ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE
NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED=OUT.

18.2.1 CONVENTIONS AND SYMBOLS
THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:
? POUND WITH A "?"
@ ODT IS READY AND AT YOUR SERVICE.

18.2.2 COMMAND STRUCTURE
AN ODT COMMAND HAS THE FOLLOWING FORMAT:
(ARGUMENT) [COMMAND]
AN ARGUMENT MAY BE ONE OF THE FOLLOWING:
"EXP" AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS
SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-
ING ZEROS NEED NOT BE TYPED.
"ADR" AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT
THAT BIT 0 IS NEGLECTED.
A COMMAND IS A SINGLE TELETYPE CHARACTER

18.2.3 ODT COMMANDS
THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE
USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:
INTERNAL CPU CELLS AND MEMORY LOCATIONS.

18.2.3.1 OPENING INTERNAL CELLS
THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF
THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN
0 AND 7
0-3 FOR ACCUMULATORS
4 FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN
THE EVENT OF A "P" COMMAND.

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CPU AND I/O STATUS
BIT INTERPRETATION
15 STATUS OF I/O DONE FLAG
14 STATUS OF INTERRUPTS (ION FLAG)
13 STATUS OF CARRY BIT
12 ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF
ANY)
7 INSTRUCTION AT THE BREAK POINT LOCATION
OTHER COMMANDS TO OPEN CELLS ARE:
"ADR/" OPEN THE CELL AND PRINT ITS CONTENTS
"/ OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER
AND PRINT ITS CONTENTS.
"*/" ADD "ADR/" TO THE POINTER, OPEN THE CELL
AND PRINT ITS CONTENTS.
"*/" SUBTRACT "ADR/" FROM THE POINTER, OPEN
THE CELL AND PRINT ITS CONTENTS
"CR" THE RETURN KEY IS USED TO CLOSE THE OPEN CELL
WITH OR WITHOUT MODIFICATION.
"LF" LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR
WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
CELL.
^ CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
AND OPEN THE PRECEDING CELL
/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
OPEN THE CELL POINTED TO BY ITS CONTENTS.
*/" CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADR".
-*/" CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".

18.2.3.2 MODIFICATION OF A CELL
ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED
BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE
FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE
ADDRESS ITSELF OR AN EXPRESSION RELATIVE TO THE ADDRESS
CAN BE DEPOSITED BY TYPING A " " OR "*/" OCTAL EXPRES-
SION. A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A CELL
ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.

18.2.3.3 OTHER ODT COMMANDS
THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELLS
CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
KEY WAS PRESSED.
"ADR"8 INSERT A BREAK POINT AT LOCATION "ADR".
ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
ENTRY TO ODT AFTER EXECUTING A BREAK POINT WILL
CAUSE IT TO BE DELETED.
D DELETE THE BREAK POINT IF ANY.
P RESTART THE EXECUTION OF THE PROGRAM AT LOCATION

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POINTED BY 4A.
START EXECUTING THE PROGRAM AT "ADR" AFTER AN
IO=RESET.
KILL THE STRING TYPED SO FAR. THE OUT RESPONDS
WITH A "?" AND THE OPEN CELL IS CLOSED WITHOUT
MODIFICATION.
PRINT THE OCTAL VALUE OF THE INPUT ONLY.
THIS WILL CLOSE ANY OPEN CELLS WITHOUT
MODIFICATION AND WILL NOT OPEN A CELL

NOTE:
IN PROGRAMS WHICH RELOCATE THEMSELVES THE
THE USER SHOULD PLACE BREAK POINTS ONLY IN THE
ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
PLACED OUTSIDE THIS AREA THE RESULTS WILL
BE UNPREDICTABLE.

"ADR"R
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OPERATING PROCEDURE
TURN POWER OFF
CONNECT TEST PLUGS
TURN POWER ON
LOAD THE PROGRAM VIA THE BINARY LOADER OR DTOS TAPE
SET SWITCHES TO 000200 (BINARY LOADER ONLY)
PRESS START (BINARY LOADER ONLY)

THE PROGRAM WILL RESPOND BY REQUESTING THE OPERATOR
TO TYPE 1 TO RUN BAUD RATE TEST ONLY. THE OPERATOR
MUST TYPE A 1 TO RUN BAUD RATE ONLY. TYPING ANYTHING
ELSE WILL CAUSE PROGRAM TO ASSUME FULL TEST IS DESIRED.

THE PROGRAM WILL NEXT ASK THE OPERATOR
TO TYPE THE DEVICE CODE. A 2 DIGIT OCTAL NUMBER FOL-
LOWED BY A CARRIAGE RETURN IS EXPECTED. THIS NUMBER
SHOULD CORRESPOND TO THE SYNC CONTROLLER DEVICE CODE
(EITHER 34 OR 44).

THE PROGRAM WILL NEXT ASK THE OPERATOR TO TYPE THE
ADDRESS OF THE FIRST LINE (IN DECIMAL). THIS IS THE
*RIGHT JUSTIFIED*(1) BOUNDARY ADDRESS AS DEFINED BY
JUMPERS #22 THROUGH #28 IF 2-LINE CONTROLLER, AND
THE ACTUAL RIGHT JUSTIFIED LINE ADDRESS IF 1-LINE
CONTROLLER, OR IF TESTING ONLY ONE LINE IS DESIRED.
TYPE DECIMAL ADDRESS OF THAT LINE AND CARRIAGE RETURN.

TYPE A 1 TO CRC OPTION QUESTION ONLY IF THERE IS A
CRC GENERATOR ON THE SLIM UNDER TEST.

INPUT TRANSMIT CLOCK FREQUENCY IN HERTZ, ONE OF
THE FOLLOWING VALUES: 38400,19200,9600
4800,2400,1200,600,OR 300.

THE PROGRAM WILL THEN ASK IF THIS IS A DUAL PORT SYSTEM
TYPE 1 OR OTHERWISE 0. IF THE RESPONSE IS "YES"
A DCU MUST BE PRESENT AND THE DCU EXISTENCE
QUESTION IS SKIPPED.

THE PROGRAM WILL ASK IF THIS IS A DCU SYSTEM
TYPE A 1 OTHERWISE 0. IF A ONE IS TYPED THE PROG
WILL FIRST REQUEST THE OPERATOR TO TYPE THE DCU
DEVICE CODE. A 2 DIGIT OCTAL NUMBER FOLLOWED BY A
CARRIAGE RETURN IS EXPECTED. THIS NUMBER SHOULD
CORRESPOND TO THE DCU DEVICE CODE (ANY NUMBER
FROM 1 TO 76 OCTAL).

WHEN OPERATOR INPUT IS COMPLETE, EXECUTION OF THE
TEST PROGRAM BEGINS. WHEN A COMPLETE PASS IS MADE
WITH ALL LINES TESTED, THE WORD "PASS" WILL BE
TYPED ON THE CONSOLE DEVICE.

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111.1.4 DOC AC,MUX SPECIFIES ON/OFF CONTROL OF TRANSMITTER
OR RECEIVER, OUTPUT LINE CHARACTER-
ISTICS.

BITS 0-1 00=XMIT/RCV CONTROL
NOT USED
0=OFF
1=ON

BITS 2-14 NOT USED

BIT 15 0=OFF
1=ON

BITS 0-1 NOT USED

BITS 2-7 NOT USED

BITS 8-15 SYNC CHARACTER

BITS 0-1 11=DLE CHARACTER

BITS 2-7 NOT USED

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DOC AC,MUX (CONTINUED)

BITS 0-1 10 SPECIFIES PARITY, STOP BITS,
LINE SPEED, CHAR CODE LEVEL, AND
LOOPBACK CONTROL.

BITS 2-5 NOT USED

BIT 6 CRC POLY SELECT

BITS 7-10 NOT USED

BITS 11-12 SPECIFY CODE LEVEL

00 = 5 LEVEL CODE
01 = 6 LEVEL CODE
10 = 7 LEVEL CODE
11 = 8 LEVEL CODE

BITS 13-14 PARITY SELECT

00 = NOT USED
01 = ODD PARITY
10 = EVEN PARITY
11 = RESERVED

BIT 15 LOOPBACK CONTROL

0 = LOOPBACK OFF
1 = LOOPBACK ON

10015 -MAIN

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01 ;11.1.8 EFFECT OF 'BUSY' AND 'DONE' ON COMMUNICATIONS CONTROL
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DONE: DONE SETS ON LINES WHEN ONE OF THE FOLLOWING EVENTS OCCURS:

1. CHARACTER RECEIVED.
2. TRANSMIT BUFFER EMPTY
3. MODEM STATUS HAS CHANGED.

INTERRUPTS OCCUR IN THE ABOVE ORDER OF PRIORITY, AND FROM LOWEST TO HIGHEST NUMBERED LINES. A 'NIOC MUX' WILL CLEAR DONE, AS WELL AS A 'NIDS MUX' AND 'IORST'.

IORESET: CLEARS LOGIC AND PLACES CONTROLLERS IN OFFLINE DIAGNOSTIC MODE.

START: SAME AS IORESET .

CLEAR: CLEARS 'DONE', AND INTERRUPT LOGIC AND PLACES CONTROLLERS IN ONLINE MODE.

IOPLS(MUX): STEPS INTERNAL CLOCKS IN 'DIAGNOSTIC' MODE.

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SPECIAL NOTES/SPECIAL FEATURES

112. IN THE EVENT OF SUCCESSFUL OPERATION OF THIS TEST, THE COMMUNICATIONS RELIABILITY TEST SHOULD BE RUN IF A PROBLEM STILL EXISTS.

112.1 DON'T RUN TEST ROUTINES OUT OF SEQUENCE, AS A TEST MAY REQUIRE SCRATCH PAD DATA OR SETUP SEQUENCING FROM A PREVIOUS TEST. AFTER A POWER DOWN, RELOAD THE PROGRAM

112.2 THE FOLLOWING FUNCTIONS ARE NOT TESTED BY THIS PROGRAM: INTERRUPT PRIORITY AND MUX DEVICE PRIORITY.

112.3 THE SLM TEST PLUG (003--2109) (005-9349) CONNECTS THE FOLLOWING SIGNALS:
INT CLK, XMIT CLK, REC CLK
RING, DTR
CAR DET, SPARE A
SPARE B, CTS
DSR, RTS

112.4 CERTAIN TESTS ARE LABELED "KEY TESTS" BECAUSE THEY LOAD THE DLE AND SYN REGISTERS IN THE TRANSMITTER AND/OR RECEIVER. THIS INFORMATION IS USED IN SUBSEQUENT TESTS AND THEREFORE NOT RELOADED IN THESE TESTS. IF A TRANSMITTER, RECEIVER, OR COMBINATION TEST (TXXX) FAILS, IT MAY BE DUE TO IMPROPER LOADING OF THE DLE OR SYN REGISTERS IN THESE PREVIOUS "KEY TESTS". IF THIS CONDITION IS SUSPECTED, LOOK UP THE NEAREST, PREVIOUS "KEY TEST" AND FORCE A SCOPE LOOP BY CHANGING THE CODE IN THE LOC= ACTION JUST PRECEDING THE "HALT" TO A "401" (JMP .+1) AND RESTART THE PROGRAM. THE PROGRAM WILL EVENTUALLY HALT AT THAT TEST. AFTER PRESSING CONTINUE, EXAMINE PROPER LOADING OF THESE REGISTERS AT THAT TIME BY SYNCING ON -(LOAD). THE "KEY TESTS" ARE AS FOLLOWS:

TR03	TR40	R030	T071
TR13	TR49	T046	T072
TR21	TR69	T066	T082
TR29	R025	T070	T089

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10018 *.MAIN
**000000 TOTAL ERRORS, 00000 FIRST PASS ERRORS

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;12.6 IF THE SYNC CONTROLLER IS BEING RUN VIA A DCU, ALL
; CODE WILL BE EXECUTED BY THE DCU, AND THE DCU WILL
; TRANSFER CONTROL OF THE PROGRAM TO THE MAIN PROCESSOR
; FOR ALL OPERATOR AND CONSOLE INTERFACING
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; NOTE: THE DCU DIAGNOSTIC SHOULD BE
; RUN PRIOR TO RUNNING THIS PROGRAM TO INSURE ITS
; RELIABILITY
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; IF THE CONTROL 0 INPUT IS MADE TO TRANSFER
; CONTROL TO THE HARDWARE OOI IN A DCU SYSTEM
; THE OOI IS EXECUTED FROM THE DCU AND WILL REFERECE
; DCU LOCAL MEMORY. AVOID RESTARTING THE PROGRAM
; WITH A 200R COMMAND IN THIS CASE AS THE DCU WILL
; BE EXECUTING THE INITIAL CODE NOT INTENDED FOR ITSELF
; AND WILL PRODUCE THE "UNANTICIPATED DCU HALT"
; MESSAGE.
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;12.7 THE CYCLE TIME OF MOST TESTS HAS BEEN DELAYED
; TO USE THE SOFT SWITCH REGISTER. IF THIS DELAY LOOP
; IS OBJECTIONABLE, THE SOFT SWITCH REGISTER MAY BE
; FORSAKEN BY CHANGING THE LOOP CALL FROM A "JSR@ ICY7C"
; (006231) TO A "JSR@ ICYC?" (006227)
;
;12.8 ON ALL INPUT REQUESTS THE OPERATOR MAY ELECT
; TO ALTER FLOW OF THE PROGRAM BY STRIKING A
; CONTROL 0, R OR D.
;
;12.9 IF DUAL PORT OPTION IS SELECTED, ONLY THE ON LINE CRC
; TESTS ARE PERFORMED. A MORE COMPLETE TEST OF THE DUAL
; PORT CRC MAY BE DONE BY RUNNING THE DUAL PORT DIAGNOSTIC.
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;13. RUN TIME EACH PASS DEPENDS UPON THE NUMBER
; OF LINE AND THE BAUD RATE SELECTED. AT THE HIGHEST
; RATE A SINGLE LINE WILL TYPE PASS IN ABOUT 6 SECONDS
; AT THE LOWEST RATE TWO LINES WILL TAKE 25 MINUTES.
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0019 .MAIN

070TD 000521 MC 5/22
STMPD 000051 MC 4/02