SWTPC 6800 Parallel Interface Diagnostic PARINT-1

This parallel interface diagnostic is one designed to locate problems in the SWTPC 6800 Computer System parallel interface board, MP-L. It is assumed that before loading this program the rest of the system is functioning normally with no problems. The program itself uses 33_{10} words and is loaded within the 128 word RAM used by the MIKBUG operating system on the MP-A Microprocessor/ System Board. A program may reside in external RAM memory simultaneously with the diagnostic loaded within the 128 word RAM, or the diagnostic may be run with no MP-M memory boards installed on the system at all. The diagnostic may be loaded either from tape or instruction by instruction using MIKBUG starting from address A048, thru A068. The address of the parallel interface to be diagnosed is set by using MIKBUG to load the hexadecimal address of the selected port into memory locations A002 and A003 with the most significant byte going into A002 and the least significant byte going into A003. The starting address locations of the interface ports are given below:

Port	Address in Hex
I/O #0	8000
I/O #1	8004 (reserved for control interface)
I/O #2	8008
I/O #3	800C
I/O #4	8010
I/O #5	8014
I/O #6	8018
I/O #7	801C

Since the program counter is set when the program is initially loaded, the diagnostic is initiated as described in the "Go to User's Program" section of the Engineering Note 100. Once initiated, the program can be stopped only by depressing the "RESET" button. The program may then be re-started after resetting the program counter to A04A as described in the "Display contents of MPU Registers Function" section of Engineering Note 100.

The diagnostic itself works by echoing everything entered from the control terminal's keyboard back to the control terminal's display thru the parallel interface board. The control terminal remains connected to the serial control interface (I/O port A). The normal "echo" of the control interface is first software disabled and data is then transferred thru hardwired jumpers from the parallel interface's input to output ports. Neither interrupts nor the CA, CA2, CB1 or CB2 lines are tested. It is unlikely that the rest of the interface would check properly with only these lines inoperative.

To check the board, first make the following jumper connections on the MP-L parallel interface board I/O male connectors:

INPUT CONNECTOR		OUTPUT CONNECTOR
I0	to	O0
Il	to	O1
12	to	O2
13	to	O3
14	to	O4
15	to	O5
16	to	O6
17	to	O7

Plug the wired connectors onto their positions on the MP-L interface board and with the power off, plug the board onto the selected interface location. Power up the system and load in the diagnostic program and the address of the parallel interface. Then execute a "Go to User's Program" as described in Engineering Note 100. Now as each character is typed, it will be "echoed" back and printed on the control terminal's display. At low control interface baud rates you will notice a delay in the "echo" function which is due to the software "echo" routine. You may also notice that the "echo" doesn't work properly if you type too fast. This is normal.

If you have problems, check the data on the output connector of the interface after each key is struck. Bits 0 thru 6 on the connector should be identical to the ASCII bit pattern of the key struck with bit 7 always a zero. The data should remain latched on the output of the interface until the next key is struck.

Never install or remove the interface board when the system is powered up. Doing so is not only hazardous to the equipment, but bypasses the normal powerup sequence required by the internal registers within the 6820 integrated circuit in order to guarantee proper operation.

```
A002                            MSB OF PARADR (PIA address)
A003                            LSB OF PARADR (PIA address)
E1AC                            SUBROUTINE INEEE
E1D1                            SUBROUTINE OUTEEE

                                Start Loading Program At A04A

A048     A0                     (Program Counter MSB)
A049     4A                     (Program Counter LSB)
A04A     86       START         LDA A #$3A
A04B     3C
A04C     B7                     STA A #$8007
A04D     80
A04E     07
A04F     FE                     LDX PARADR
A05B     A0
A051     02
A052     C6                     IDA B #$FF
A053     FF
A054     E7                     STA B 0,X
A055     00
A056     53                     COM B
A057     E7                     STA B 2,X
A058     02
A059     A7                     STA A 1,X
A05A     01
A05B     A7                     STA A 3,X
A05C     03
A05D     BD       LOOP1         JSR INEEE
A05E     E1
A05F     AC
A060     A7                     0,X
A061     00
A062     A6                     LDA A 2,X
A063     02
A064     BD                     JSR OUTEEE
A065     E1
A066     Dl
A067     20                     BRA LOOP1
A068     F4
                                END
```