

4052/54 SERVICE INFORMATION

At power up of a 4052/54 a number of tests are run under routine system initialization. A normal power up sequence will conclude with turning off all front panel lights except power, rewind the tape (if one is present), and display the blinking cursor in the upper left corner of the display. If these conditions cannot be observed then a hardware failure is indicated. At this point the best clue to the source of the failure is the status of the front panel indicator lamps, 4 led's on the MCP board, 1 led on the ALU board and the halt address of the micro-code.

NOTE: Although the major subdivisions of the self test are associated with the various boards of the CPU set, it should not be assumed that failure of a given test is necessarily indicative of a failure of the associated board. The failure may involve a handshake sequence connecting to another board.

Location of the indicators used by the self test are:

Program Counter LED's (DS1, DS2, DS3, DS4) located on the left side of the MCP board (edge connector pointing toward you) show the 4 most significant bits of the Program Counter. DS4 is the most significant bit and is located closest to the edge connector.

Half Carry LED (DS190) is located on the right side of the ALU Board (edge connector pointing away from you) and is the rear most LED.

Busy, Break, I/O are located on the front panel just to the right of the CRT.

Microcode Address Test Pins (J204 & J203) are located on the front left edge of the ALU Board (edge connector pointing away from you). These pins can be measured with a logic probe or scope to indicate the halt address of the microcode.

Decipher the address as follows:

<u>Connector</u>	<u>J204</u>	<u>J203</u>
Pin #	2 1	10 9 8 7 6 5 4 3
Binary	0 0	1 0 0 1 1 0 1 1
HEX	0	9 B

The HEX microcode address is 09B.

The following table indicates how to interpret the stages of the self test.

(continued on the following page)

--Frank Lees
63/503, ext. 3929

4052/54 SERVICE INFORMATION (CONTINUED)

DRP = Diagnostic ROM Pack
h = HEX

		TABLE 1		1 = ON 0 = OFF X = Unpredictable or rapid change B = Observable blinking		Micro Code Address		Program Counter		H C		Front Panel	
1.	Test ALU Problem on ALU Board	During & immediately after restart Test registers, arithmetic & line shorts		0 0 0 0 0 1		X X X X X X X X		X X X X X X X X		0 1		1 1 1 1 1 1	
2.	Test MCP problem on MCP board or with ALU/MCP handshake	Check program counter Ripple 1 bit through program counter and read it back. Data error = μ code hangs at 09B Handshake error = μ code hangs at 068 or 069 Load all 1s into program counter Increment program counter		X X X 0 9 B 0 6 8 0 6 9		X X X 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 1 1 1 0 0 0 0		0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 1 1 1 0 0 0 0		1 1 1 1 1 1 1		1 1	
3.	Test MAS problem on MAS board or with ALU/MCP/MAS handshake	Store 3000h in program counter Memory pump up-write address 4000 with 0's 15 times Store 5000h in program counter Read memory address 4000 Store 6000h in program counter		X X X X X X X X X X X X X X X		X X X X X X X X X X X X X X X		0 0 1 1 0 0 1 1 0 1 0 1 0 1 0 1 0 1 1 0		1 1 1 1 1		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
4.	Test I/O problem on I/O board or w/ALU/MCP/MAS/I/O handshake	Clear PIA at FF0F, load R0 = 01 (16) Write R0 to PIA's DDR Store 7000h in program counter Read PIA's DDR Store 9000h in program counter Check DDR with R0 if bad hang Shift R0 1 bit left, branch back until carry = 1 Init bank switch to left slot; if DRP enabled go to it		X X X X X X X X X X X X X X X 0 8 B X X X X X X		X X X X X X X X X X X X X X X 0 8 B X X X X X X		0 1 1 0 0 1 1 0 0 1 1 1 0 1 1 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1		1 1 1 1 1 1 1 1		1 1	
5.	RAM test Problem on MAS board	Turn off busy light Test RAM memory - if error hang up		X X X 0 C 5		X X X 1 0 0 1 1 0 0 1		1 0 0 1 1 0 0 1		1 1		0 1 1 0 1 1	
6.	Init Basic	Turn busy on, break/I/O off Basic runs RAM memory test Basic init Complete -		X X X X X X X X X		X X X X X X X X B 1 1 B		1 1 B		1 1 0 0 0		1 0 0 1 0 0 0 0 0	