TROUBLESHOOTING

MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope. If a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.

Figure 1

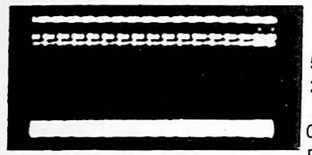

Figure 2

If the processor is not functioning, check the source voltages at pins 1, 2, 27, 33 and 59. Check the 48 MHz Oscillator Crystal (Y600) by checking the waveforms at pins 1 and 18 of IC U601. The frequency at pin 1 of IC U601 should measure 12.00MHz. Check the phase relationships of the Ø1, Ø2, Ø3 and Ø4 clocks at pins 12, 11, 8 and 9 of IC U601 (See Figure 3). Check the phase relationships of the Ø1, Ø2, Ø3 and Ø4 clocks at pins 14, 15, 7 and 6 of IC U601 (See Figure 4). Use a logic probe and check the readings at pins 4 thru 9, 25, 28, 29 and 61 thru 64 of IC U600 (See "Logic Chart").

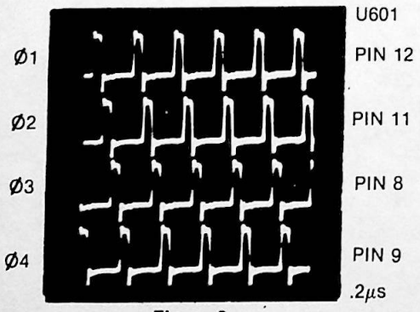

Figure 3

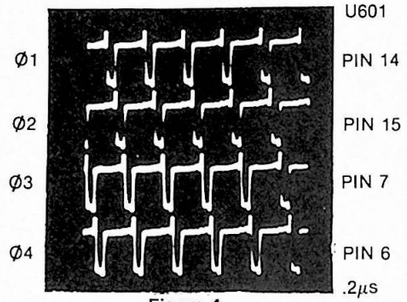

Figure 4

CRYSTAL OSCILLATORS

Connect a frequency counter to pin 1 of IC U601 to check the 48 MHz oscillator. The frequency should read 12.00 MHz. Connect a frequency counter to pin 39 of IC U100 to check the 10.7 MHz oscillator. The frequency should read 10.738635 MHz. The frequency of the 10.7 MHz oscillator can be adjusted by Coil L100.

VIDEO SIGNALS

Verify the operation of the video circuits by checking the waveforms at pin 36 of IC U100 and pin 4 of Jack J201. If the waveform is absent at pin 36 of IC U100, check the 10.7 MHz oscillator at pins 39 and 40 of IC U100 and check pins 1 thru 38 with a logic probe (See the "Logic Chart"). If the waveform at pin 4 of J201 is absent, check the voltages and components associated with Amp Transistor (Q200) and Predriver Transistor (Q201).

SOUND

Type in and run the following program if there is no sound. Check for a .7V p-p waveform at pin 7 of IC U511.

```
1 CALL SOUND (-400,200,2)
2 GOTO 1
```

If the waveform is present, check Capacitors C502, C503, C206 and C208 and Coil L201. If the waveform is absent, use a logic probe and check pins 1 thru 14 of IC U511. The readings should be the same as given in the "Logic Chart", except pin 6 will show pulses while the program is running. Check the clock waveform on pin 14 with a scope.

KEYBOARD

The computer comes up with the main title screen displayed on the monitor, but the keyboard has no effect when the keys are pressed. Check the waveforms on pins 1, 3, 6, 7, 9, 10, 11, 12 and 13 of IC U302 and pins 6, 7, 8, 9, 20, 31, 32, 33 and 34 of IC U300. Use a logic probe and check the readings on pins 1 thru 5, 10, 11, 17, 18, 24, 25, 35, 36, 39 and 40 of IC U300 (See "Logic Chart").

LOGIC (Continued)

PIN NO.	IC U507	IC U508	IC U509	IC U510	IC U511	PIN NO.	IC U600	PIN NO.	IC U600	PIN NO.	IC U600	PIN NO.	IC U600
1	P	P	L	L	P	1	L	21	P	41	P	61	P
2	P	P	P	L	P	2	H	22	L	42	P	62	P
3	P	H	P	H	P	3	P	23	L	43	P	63	P
4	H	L	P	L	P	4	H	24	P	44	P	64	H
5	P	L	P	P	P	5	L	25	P	45	P		
6	H	H	P	P	H	6	H	26	L	46	P		
7	L	L	P	P	H(1)	7	P	27	H	47	P		
8	P	P	L	P	L	8	P	28	H	48	P		
9	P	P	P	P	L	9	P	29	P	49	P		
10	P	P	P	L	P	10	P	30	P	50	P		
11	P	P	P	P	P	11	P	31	P	51	P		
12	P	P	P	P	P	12	P	32	P	52	P		
13	P	P	P	P	P	13	P	33	H	53	P		
14	H	H	P	P	P	14	P	34	L	54	P		
15			L	P	P	15	P	35	L	55	P		
16			H	L	H	16	P	36	L	56	P		
17				H		17	P	37	L	57	*		
18				L		18	P	38	L	58	*		
19				L		19	P	39	L	59	H		
20				H		20	P	40	L	60	P		

PIN NO.	IC U601	IC U602	IC U603	IC U604	IC U605	IC U606	IC U607	IC U608	IC U609	IC U610	IC U611	IC U612	IC U613
1	L	P	P	P	L	P	H	L	L	P	P	H	P
2	L	P	P	P	P	P	P	P	P	P	P	P	P
3	L	P	P	P	P	P	P	P	P	P	P	P	L
4	H	P	P	P	L	P	P	P	P	P	P	P	L
5	H	P	P	*	P	P	P	P	P	P	P	P	L
6	P	P	P	L	P	P	P	P	P	P	P	P	*
7	P	L	L	L	L	L	L	P	P	P	P	L	*
8	P	P	P	P	P	P	P	P	P	P	P	H	L
9	P	P	P	P	P	P	P	P	P	P	P	L	P
10	L	P	P	H	P	P	H	H	P	P	P	L	P
11	P	P	P	L	P	P	P	P	P	P	P	P	P
12	P	P	P	H	P	P	P	L	L	L	L	P	P
13	H	P	P	L	P	P	H	H	H	P	P	H	P
14	P	H	H	H	H	H	H	L	L	P	P	H	P
15	P							L	L	P	P		P
16	P							P	P	P	P		H
17	H							P	P	P	P		
18	L							P	P	P	P		
19	L							P	P	P	P		
20	H							P	P	P	P		
21								P	P	L	L		
22								P	P	P	P		
23								P	P	P	P		
24								H	H	H	H		

NOTE: Logic probe readings taken with computer in Power Up mode (Main title screen displayed) unless otherwise noted.

Logic Probe Display
L = Low
H = High
P = Pulse
* = Open (no light on)
(1) Probe will show P when sound is being produced.