HEWLETT-PACKARD CO.

LINE PRETEST PROCEDURE

09810-67980 POWER SUPPLY

1 GENERAL

1.1 Purpose and Scope:

This document establishes the requirement and specifications which all production stock number 09810-67980 boards shall meet when tested in accordance with the following procedure under normal manufacturing environmental conditions.

Loveland Division Production Engineering and Quality Assurance authorization is required for all changes affecting this Pretest Procedure.

1.2 Method

The purpose of the Power Supply system is to provide through-put testing of the 9810 Power Supply boards--66581, 66582 and 66583. For the 66581 and 66582 this is nominally a single pass test procedure. For the 66583, a component is selected on the first pass and the complete test is performed on the second pass.

ET 6111 is a complete power supply tester for the 9810 power supplies. It provides AC line conditioning (voltage adjustment and current limiting). It supplies appropriate AC and DC bias to the board under test. It provides programmable loads and excessive voltage supplies for crowbar circuit tests. All measurement ciruitry is built in. Measurements include DC voltage, transient voltage excursions, current levels, crowbar circuit testing and measurements of the POP signal.

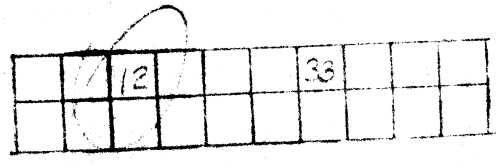
1.3 Test Equipment:

1.3.1 Instruments: (one unless noted)

1) HP 180A Oscilloscope with 1801A and 1820A drawers or equivalent.
2) HP 3440A DVM or equivalent.

1.3.2 Electronic Tools: (one unless noted)

1) ET 6111 Power Supply Tester.



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2 TURN-ON PROCEDURE

2.1 Mechanical Inspection:

Inspect the board to be tested before inserting it in ET 6111 power supply tester. Check for completion and quality of workmanship.

2.2 ET 6111 Setup:

2.2.1 Set the five LOAD CURRENT switches to PROG.

2.2.2 Set the five TEST switches to +12, -12, +5, +16 and +24.

2.2.3 Set the LINE VOLTAGE switch to PROG.

2.2.4 Turn the LINE VOLTAGE switch ON.

2.2.5 Turn on the external -12V crobar supply and set voltage to 14.0V.

2.2.6 Turn the TEST POWER switch ON.

2.2.7 Adjust the line voltage variac until the H and L LINE VOLTAGE lamps are out. These should be checked before each test as the line voltage varies widely during the day.

2.2.8 Excess line current is indicated by the EXCESS LINE CURRENT being ON. Line power may be restored by depressing the CURRENT RESET switch.

2.3 Testing the Boards:

The procedure for checking each power supply board can be found by doing the appropriate section as shown below:

BOARD	SECTION
09810-66581	2.4
09810-66582	2.5
09810-66583	2.6

2.4 66581 5V Test

2.4.1 Reference 09810-66582 and 583 boards in place.

2.4.2 R13 Switch to "0". Loops Switch to LOOP.

2.4.3 Place the board to be tested in the right most slot.

2.4.4 Connect scope probe to the flyback diode on the 81 board.

2.4.5 Set up the oscilloscope as shown in Figure 1. Refer to section 4 for setup.

2.4.6 Depress the START switch. The tester will continually cycle through the test. The frequency of the switching supply will now be checked. The frequency must meet the following conditions:

TEST LIMITS: MIN: 18 k Hz (Period = 55.6 mS)
MAX: 30 k Hz (Period = 33.3 mS)

2.4.7 CAUTION: The 66581 board should not be continously cycled with the LOOP switch up for more than one minute. To do so will overheat the switching transistor and flyback diode.

2.4.8 Check the frequency on the scope. It should be within the limits shown in Section 2.4.6. The scope wave forms are shown in Figure 2.

2.4.9 If the switching frequency is not within the above specifications R4 must be changed.

Place LOOP switch down, wait for TEST COMPLETE light ON.

The loaded value of R4 is 392K.

If the frequency is too high--(See Figure 2) then replace with the next lower value of resistance of 330K.

If the frequency is too low--(See Figure 2) then replace with the next higher value of resistance of 468K.

After replacing the resistor go back to Section 2.4.3. Re-check the frequency. If the resistor change does not bring the frequency within specs send the board to trouble shoot.

2.4.10 Set the LOOP switch down. The ET 6111 tester will go through an automatic test and a good board will be indicated by the five GOOD lamps ON, the TEST COMPLETE lamp ON and the $\overline{\text{POP}}$ lamp OFF.

2.5 <u>66582 +16, +20, +24V Test</u>:

2.5.1 Reference 66581 and 66582 in place.

2.5.2 R13 switch at "0", LOOP switch down.

2.5.3 Place board to be tested in the center slot.

2.5.4 Depress START switch.

2.5.5 The test will cycle automatically and a good board will be indicated by all five GOOD lamps being ON and the TEST COMPLETE lamp ON.

2.5.6 Remove the board.

2.6 66583 +12, -12V Test:

2.6.1 Reference 66581 and 66582 boards in place.

2.6.2 LOOP switch to LOOP.

2.6.3 Place board to be tested in the left most slot.

2.6.4 Connect the DVM to the 12V test point on the front of the tester.

2.6.5 Depress START. Adjust the R13 switch on the front panel until the voltage measured is 12.1 volts. Tag the board with the position of the R13 switch for a later addition of R13.

2.6.6 Remove the board.

2.6.7 Values of R13:

POSITION	VALUE
0	00
1	221K
2	56.2K
3	32.4K
4	22.6K
5	17.4K
6	14.0K
7	11.5K
8	10.0K
9	8.87K

10	7.87K
11	6.98K
12	6.34K
13	5.90K
14	5.36K
15	4.99K
16	4.64K
17	4.32K
18	4.12K
19	3.83K
20	3.65K
21	3.40K
22	3.24K
23	3.09K

2.6.8 Final test of 66583 board:

1) Reference 66581 and 66582 boards in place.

2) R13 switch at 0, LOOP switch down.

3) Place the board to be tested in the left slot.

4) Depress START switch.

5) The tester will cycle automatically and a good board will be indicated by the GOOD lamps being lit and the TEST COMPLETE lamp ON.

6) TEST POWER to OFF and remove the board.

3 TROUBLESHOOTING

3.1 General Notes:

The primary mode of ET 6111 for trouble shooting is the "Loop" mode. The LOOP switch should be set to "Loop". In this switch position the tester will be completely energized and will cycle through four states repeatedly toggling all loads from maximum to minimum current, etc. on all supplies that have their "load" switches in the PROG position. A load switch set LOW means that minimum current will be drawn from the supply. A load switch at HI means maximum current will be taken from the suppy.

4 OSCILLOSCOPE OPERATION

This is the scope setup procedure for Section 2.4.

4.1 Set the Oscilloscope controls up in the following manner:

4.1.1 Set the switches up as shown in Figure 1 starting at Step 1 and continuing on through Step 18.

At Step 15 adjust the trace to line up with the center line on the scope.

At Steps 16 and 17 adjust the trace for brightness and focus.

At Step 18 adjust so the trace starts at point A in Figure 1.

4.1.2 When looking at the switching signal the LEVEL Control 19 may have to be adjusted to get the trace to appear as in Figure 2.

5 POWER SUPPLY SPECIFICATIONS

	VOLTAGE				CURRENT			
NOM V	MIN V	DESIGN V	MAX V	ΔV ±%	LOAD MAX	SHORT CIRCUIT CURRENT LOW	DESIGN	HIGH
+5	5.00	5.10	5.20	1	6.0A		12A	
-12	-11.50	-12.00	-12.25	1	475mA	600mA		1.00mA
+12	12.05	12.10	12.15	*	475mA	600mA		1.00mA
+16	15.68	16.00	16.32	1	300mA	400mA		750mA
+19.5	19.40	19.50	20.06	1	4mA			
+24	23.28	24.00	24.72	3	900mA		2.6A	

* REFERENCE-VALUE SET BY PADDING RESISTOR

ΔV = TRANSIENT VARIATIONS

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6 TESTER LEVELS

VOLTAGE	CURRENT LOW	CURRENT HIGH	CURRENT LIMIT LOW	CURRENT LIMIT DESIGN	CURRENT LIMIT HIGH
5 *	5.0A	6.0A			
-12 *	235mA	475mA	600mA		1.00A
+12 *	295mA	475mA	600mA		1.00A
+16 *	200mA	300mA	400mA		750mA
+19.5 *	4mA	4mA			
+24 *	25mA	900mA			

* SEE VOLTAGE SPECIFICATIONS SECTION 5

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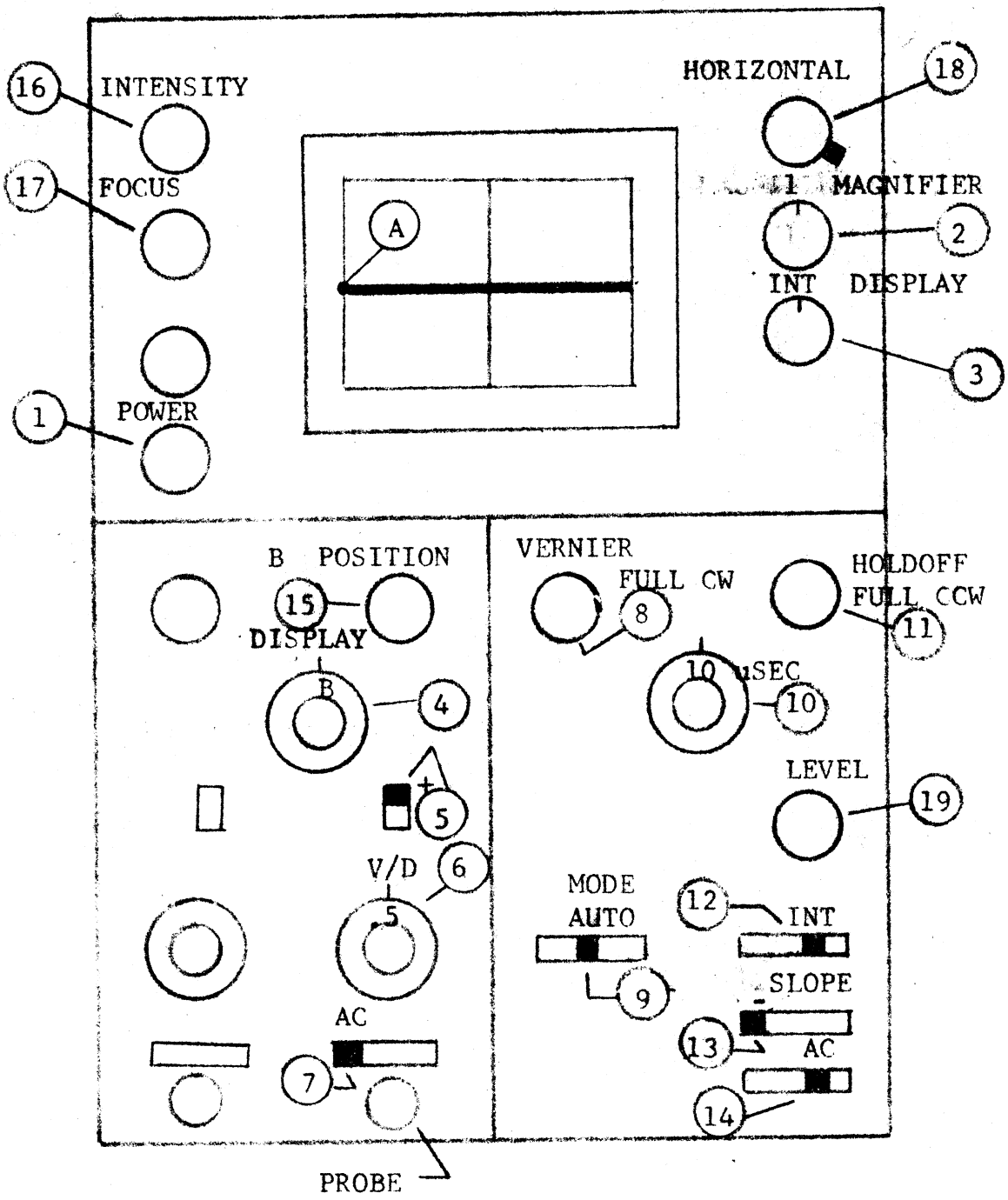

FIGURE 1 SCOPE ADJUSTMENTS

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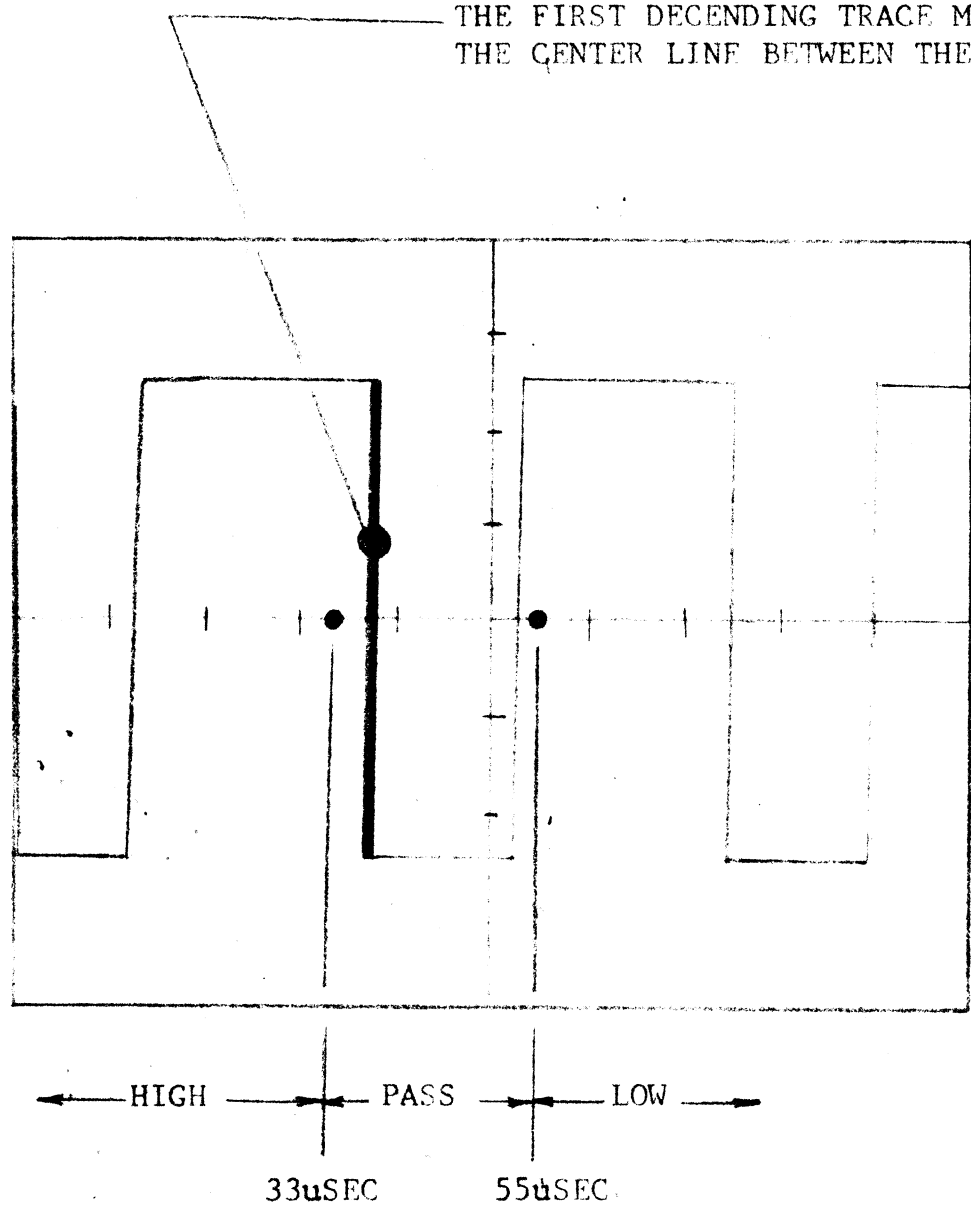

FIGURE 2 SCOPE SCREEN

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