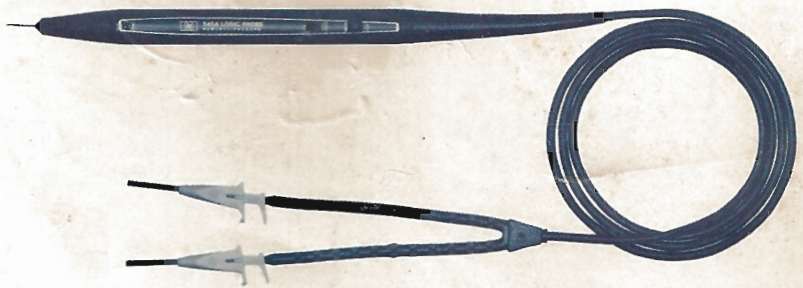
OPERATING AND SERVICE MANUAL

LOGIC PROBE

545A



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WARRANTY AND ASSISTANCE

This Hewlett-Packard product is warranted against defects in materials and workmanship for a period of one year from the date of shipment. Hewlett-Packard will, at its option, repair or replace products which prove to be defective during the warranty period provided they are returned to Hewlett-Packard, and provided the preventive maintenance procedures in this manual are followed. Repairs necessitated by misuse of the product are not covered by this warranty. NO OTHER WARRANTIES ARE EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. HEWLETT-PACKARD IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES.

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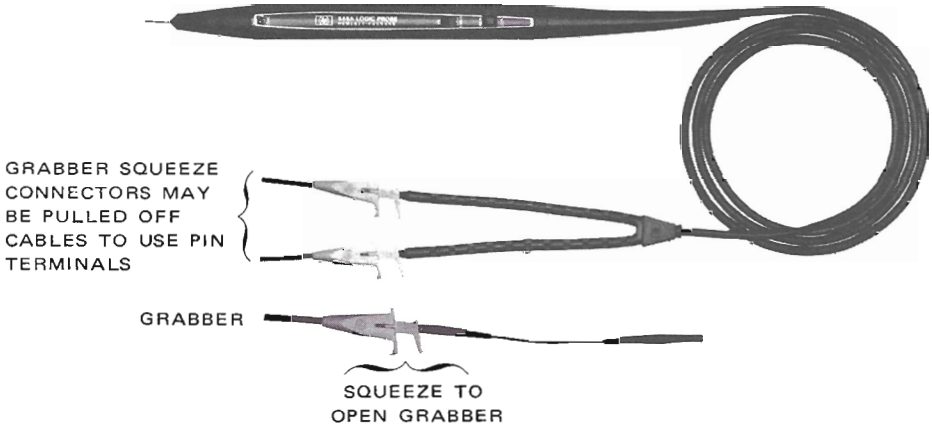

Figure 1. HP Model 545A Logic Probe

AVAILABLE ACCESSORIES
KIT MODEL NO. 00545-60104

Figure 1a. Tip Kit (00545-60104)

INTRODUCTION

The Hewlett-Packard Model 545A Logic Probe will detect and indicate HIGH and LOW logic levels. The probe will also indicate intermediate or "bad" Logic levels, including an open circuit on a TTL or CMOS gate, and open circuits such as an open collector output without pull-up resistors. The presence and polarity of single pulses of ≥10 nsec in duration and pulse trains up to 40 MHz CMOS and 80 MHz TTL will also be indicated. The probe is compatible with virtually all TTL, DTL, RTL, HTL, MOS, CMOS, and HiNIL integrated circuits. A memory indicator lamp is located under the MEM-CLR button. This indicator turns on when 1) either HIGH or LOW level logic change is detected; 2) when the probe is first powered; 3) when the probe tip is touched to any circuit. The memory indicator remains on until the MEM-CLR button is depressed.

LOGIC LEVEL LAMP INDICATIONS

The logic level indicator lamp, near the probe tip, will give an immediate indication of the logic states, either static or dynamic, existing in the circuit under test. Figures 2 and 3 show how the logic level indicator lamp responds to voltage levels and pulses for TTL and CMOS operation respectively. The indicator lamp can give any of four indications: 1) off; 2) dim (about half brilliance; 3) bright (full brilliance); 4) flashing on and off. The lamp is normally in its dim state and must be driven to one of the other three states by voltage levels at the probe tip. The lamp is bright for inputs above the logic 1 threshold and off for inputs below the logic Ø threshold. The lamp is dim for voltages between the logic 1 and the logic Ø thresholds and for open circuits. Pulsating inputs will cause the lamp to flash at about a 10 Hz rate. More information about using the 545A is on page 7.

MATCHING INSTRUMENTS

Hewlett-Packard makes several digital troubleshooting instruments that complement the Logic Probe. These are the Model 546A or 10526T Logic Pulser, Model 548A or 10528A Logic Clip, Model 547A Current Tracer, and Model 10529A Logic Comparator. The Logic Pulser can be used to stimulate the input of a logic element while the Logic Probe is touching the output to sense the activity of the element.

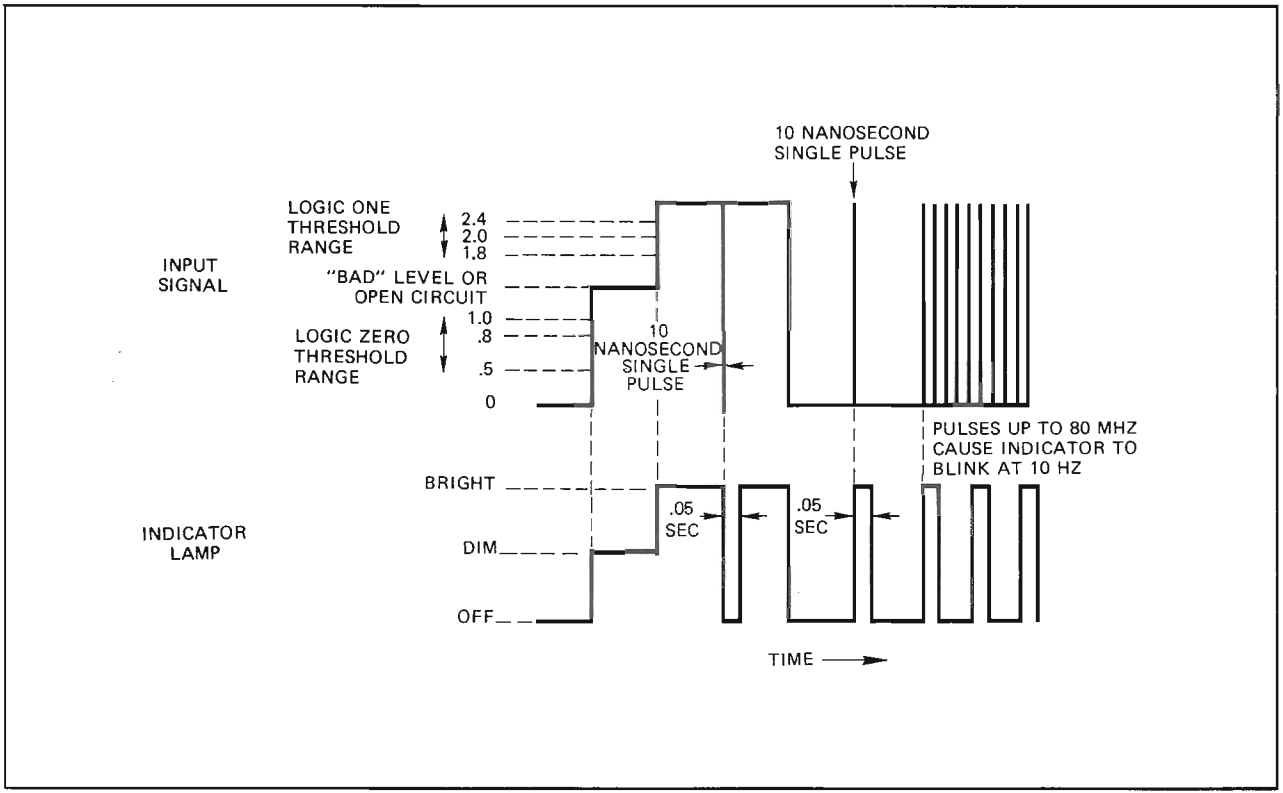

Figure 2. TTL Logic Level Lamp Indications with Probe Input Voltage Levels (5 Vdc Power Supply)

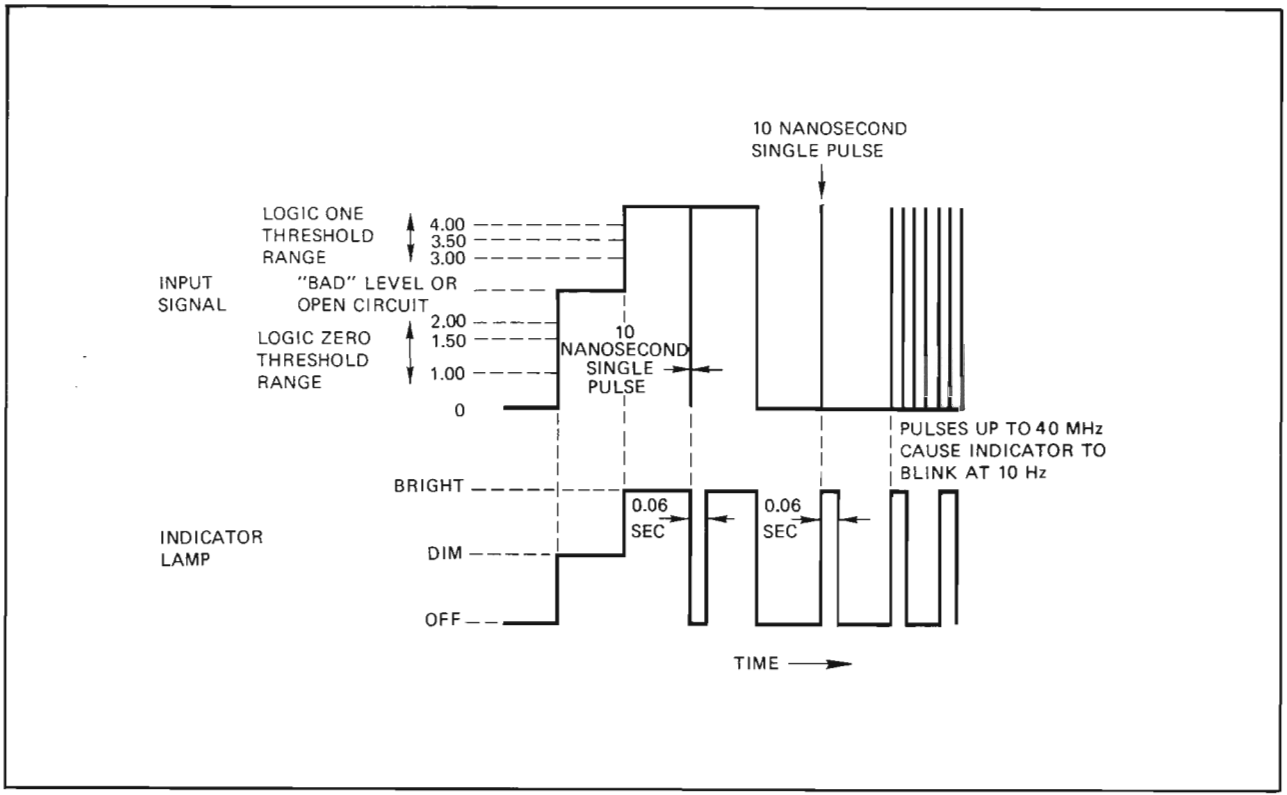

Figure 3. CMOS Logic Level Lamp Indications with Probe Input Voltage Levels (5 Vdc Power Supply)

SPECIFICATIONS

Specifications for the 545A Logic Probe are given in Table 1.

Table 1. HP 545A Logic Probe Specifications

Input Current: ≤15 μA (source or sink)
Input Capacitance: ≤15 pF

Logic Thresholds: *TTL: Logic ONE 2.0 + 0.4, -0.2 Vdc
Logic ZERO 0.8 + 0.2, -0.3 Vdc

CMOS: Logic ONE $0.7 \times V_{supply} \pm 0.5$ Vdc
Logic ZERO $0.3 \times V_{supply} \pm 0.5$ Vdc

Input Minimum Pulse Width: 10 ns with ground lead (typically 20 ns without ground lead)
Input Maximum Pulse Repetition Frequency: TTL: 80 MHz; CMOS: 40 MHz.
Input Overload Protection: ±120V continuous (dc to 1 kHz); ±250V for 15 seconds (dc to 1 kHz)
Pulse Memory: Indicates first entry into new valid logic level: also indicates return to initial valid level from bad level for pulse ≥1 μsec wide.

Power Requirements: TTL: 4.5 to 15 Vdc
CMOS: 3 to 18 Vdc
Maximum Current: 70 mA
Overload Protection: ±25 Vdc for 1 minute

Temperature: 0° to 55°C
Weight: 113.4 g (4 oz) net; Shipping Weight: 170 g (6 oz)
Size: Probe body, 15.24 cm (6 in); Cable, 119.38 cm (47 in)
Accessories Included: Ground Wire, HP Part No. 00545-60105
Tip Cover, HP Part No. 00547-40005
Three Grabber Squeeze Connectors HP No. 10230-62101
Accessories Available: Tip Kit, HP Part No. 00545-60104

*+5 Vdc power supply; usable to +15 Vdc with slightly increased thresholds.

DATE CODE

The year and week of manufacture are stamped on the circuit board. Example: "5-24" would indicate 24th Week of 1975. There is no serial number.

SERIES CODE

A 4-digit series number is also stamped on the circuit board. This number should match the series number on the title page of this manual. If the board series number differs from the manual series number, there are other differences between the manual and the Logic Probe. These differences are covered by MANUAL CHANGES sheets included with the manual. The MANUAL CHANGES sheet should have a series number matching the board. If it does not, ask your Hewlett-Packard representative for a MANUAL CHANGES sheet with the matching series number. This manual covers probes with several series numbers. Each item in the manual affected by a different series is labelled with the appropriate series number.

UNPACKING

If the shipping package is damaged, ask that the carrier's agent be present when the package is opened. Inspect the Logic Probe for obvious physical damage (dents, scratches, etc.) If the Logic Probe is damaged or fails to meet specifications, notify the carrier and nearest Hewlett-Packard Sales and Service Office immediately. (Sales and Service offices are listed at the back of this manual). Retain shipping package and packaging material for carrier's inspection. The Sales and Service office will arrange for replacement of your Logic Probe without waiting for a claim against the carrier to be settled.

GRABBER SQUEEZE CONNECTORS

Three grabber squeeze connectors are supplied with the 545A. Two grabbers may be pressed on the two ends of the 545A power cable for power supply connections. One grabber may be pressed on the end of the short ground wire for ground connections. Use of the grabber is shown in Figure 1.

USING THE LOGIC PROBE

Probe Power Supply. The Logic Probe can be powered from the supply of the circuit under test or from a regulated DC power supply. If a separate power supply is used, the power supply and circuit-under-test grounds should be connected together. The power supply voltage range for TTL operation is 4.5—15 Vdc, and for CMOS the range is 3—18 Vdc. In the TTL mode the thresholds change slightly as the supply voltage is increased (see Figure 4). In the CMOS mode the threshold levels are a function of the supply voltage (see Figure 5). A ground wire (provided with the Probe) may be connected just behind the Probe indicator window. The ground wire is a convenient means of connecting grounds when using external regulated power supplies. It also improves pulse width sensitivity and noise immunity. However, its use is optional and not required for all applications.

Pulse Detection. The Logic Probe is ideal for detecting short duration and low repetition rate pulses that would be difficult to observe on an oscilloscope. Positive pulses to ≥10 nsec or more in width trigger the indicator on for ≥50 msec. Negative pulses cause the indicator to go off momentarily.

Troubleshooting. The bad level feature of the Model 545A Logic Probe is useful for testing three-state logic outputs. The logic HIGH and the logic LOW states are detected as described under Pulse Detection and the third state (i.e., high impedance output) is detected as an open circuit (or bad level) condition, which leaves the probe indicator dim. It is also useful for detecting floating or unconnected TTL or CMOS gate inputs which look like a bad level to the logic probe.

Several logic circuit analysis techniques are useful with the Logic Probe. One technique is to run the circuit under test at its normal clock rate while monitoring for various control signals such as reset, start, stop shift, transfer, or clock signals. Questions such as "is the counter operating?" are quickly resolved by noting if the probe indicator is flashing on and off, indicating that pulse train activity is present.

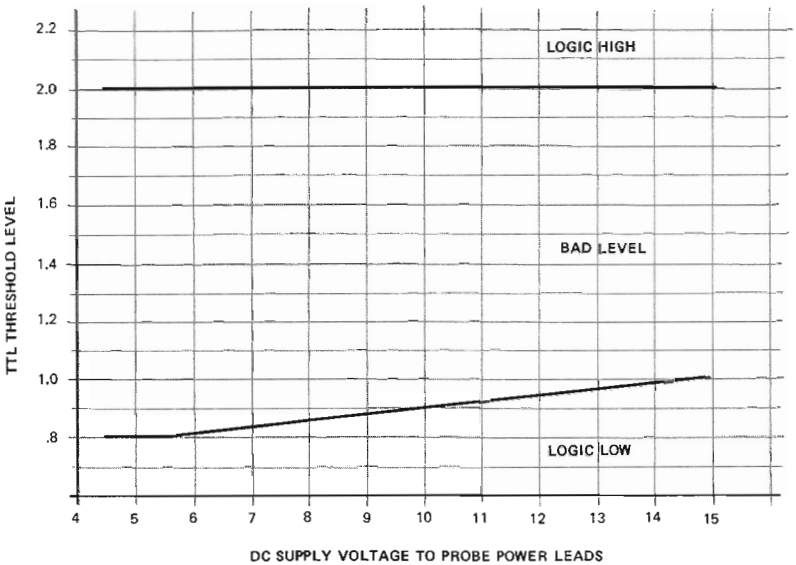

Figure 4. TTL Mode Threshold Level vs Supply Voltage

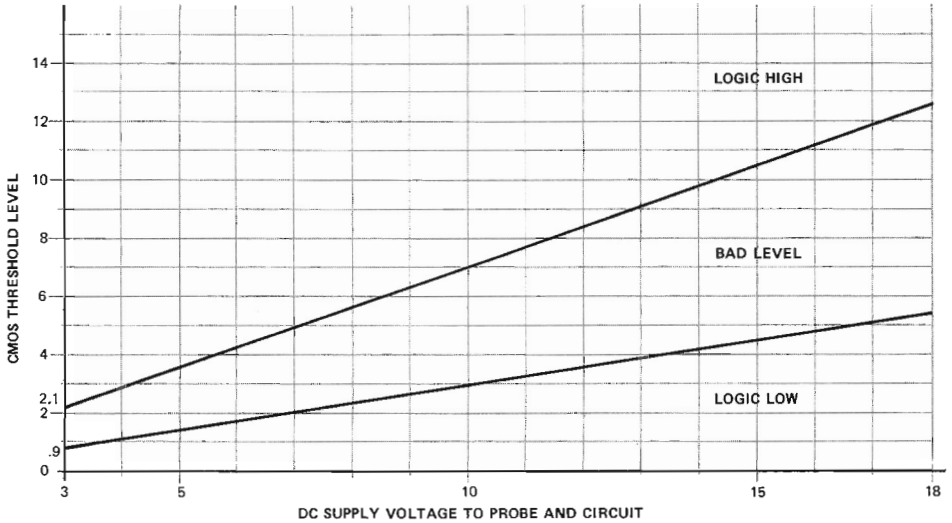

Figure 5. CMOS Mode Threshold Level vs Supply Voltage

Another useful technique is to replace the normal clock signal with a very slow clock signal from a pulse generator or to single-step the clock input with a pulse generator similar to the HP Model 10526T or 546A Logic Pulser. This allows changes in logic signals to occur at a rate slow enough that they can be observed on a real-time basis. This real-time analysis method, coupled with the ability to inject logic level pulses anywhere in the circuit with a Logic Pulser and the means to detect logic state changes with the Logic Probe, contribute to rapid troubleshooting and fault finding in digital circuits.

LOGIC PROBE THEORY OF OPERATION

The following Logic Probe Theory of Operation should be referenced to the schematic diagram near the back of this manual.

Input Circuits. At the probe signal input, resistor R2 and clamp diodes in U1 protect the probe from input overloads. Capacitor C1 and resistor R3 provide a path for narrow pulses. At the power input Q1, Q2, CR1, and R1 protect the probe circuits from reversed polarity of the power connections and provide a low series voltage drop across Q2 for normal operation. At power input voltages above approximately 20V, CR1 conducts and limits the voltage applied to probe circuitry.

Threshold Detection and Selection. Input signals are applied to two parallel threshold detectors which compare the input signal to internal reference voltages as selected by the TTL–CMOS switch S1. TTL levels are fixed and CMOS levels track the power supply voltage to which the probe is connected.

Logic Levels and Pulses. If the probe level is continuously HIGH, the indicator lamp will be bright. A single negative pulse ≥10 nsec will cause the lamp to switch off for approximately 50 msec. If the probe input is continuously LOW the lamp will be off. A single positive pulse ≥10 nsec will cause the lamp to flash bright for about 50 msec. If the probe input is not connected to an external circuit, or is connected to a voltage between logic LOW and logic HIGH, the lamp will be lighted dimly. A single pulse will also be stretched to 50 msec. Pulsating inputs cause the lamp to flash at about a 10 Hz rate.

Memory and Reset. The Model 545A Logic Probe contains a memory indicator lamp, located under the MEM-CLR button, which turns on when either a HIGH or LOW level change is detected, and remains on until the MEM-CLR button is depressed. It will also come on if a pulse of the form good level/bad level/same good level occurs, providing the pulse is at least 1 μsec wide. Transitions from a good level to a bad level will not turn on the indicator lamp if the slew rate is faster than 1V/msec. The indicator turns on when 1) either HIGH or LOW level logic is detected; 2) when the probe is first powered; 3) when the probe tip is touched to any circuit.

MAINTENANCE

Probe Disassembly. To disassemble Logic Probe, refer to Figure 6, and proceed as follows:

1. With fingers, unscrew (ccw) the probe tip (MP7).
2. Remove indicator window (MP5). If window has a protruding rear stud, skip step 3.
3. With probe tip, remove retainer ring (MP4).
4. Slide bottom shell (MP3) off probe tip end.
5. Lift top shell (MP2) off the probe.

Probe Assembly. Reverse disassembly procedure.

CAUTION

BE CAREFUL WHEN REPLACING PARTS ON THE FRAGILE PRINTED-CIRCUIT BOARD. EXCESS HEAT CAN RUIN THE BOARD. USE A LOW WATTAGE (≤25 WATTS) IRON AND APPLY THE MINIMUM HEAT NECESSARY TO UNSOLDER THE LEADS.

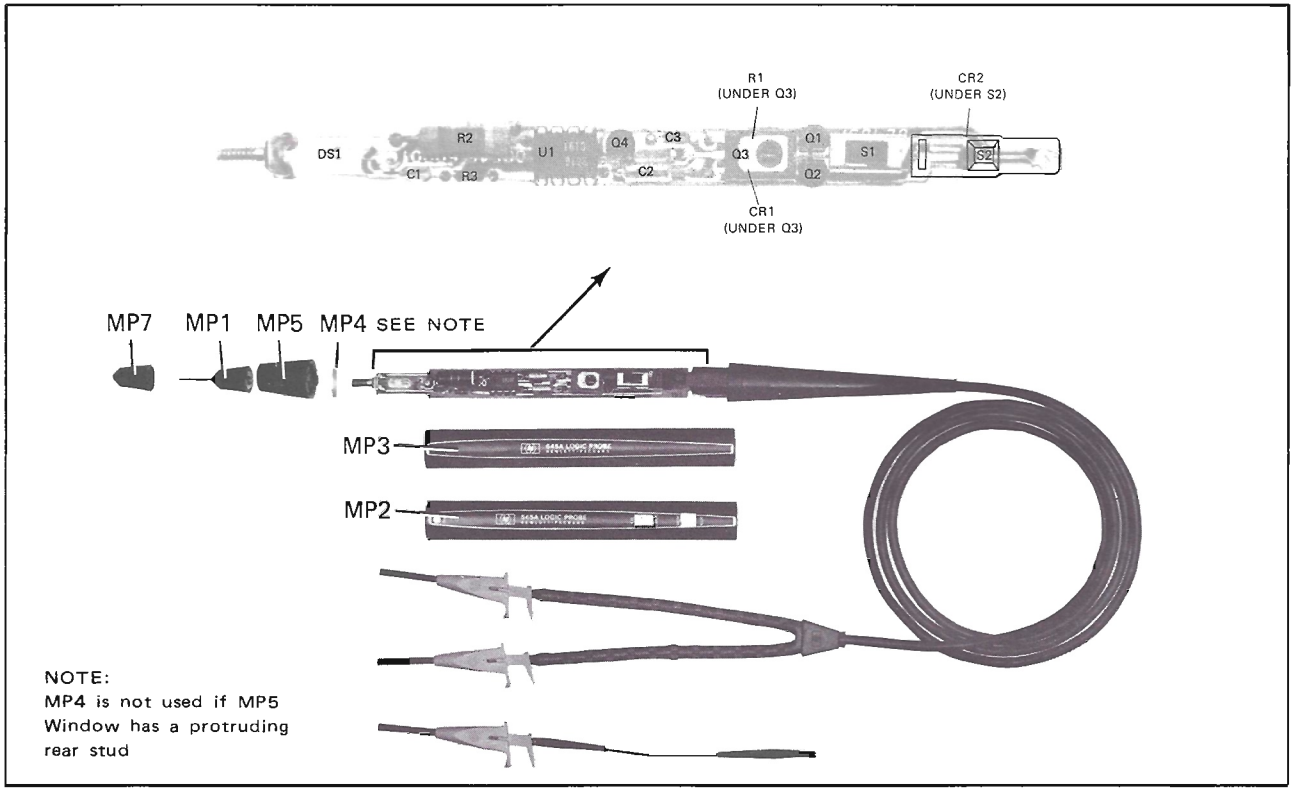

Figure 6. Disassembled View of Logic Probe with A1 (00545-60001) Component Locator

Test Procedure. There are no adjustments or preventive maintenance procedures for the Logic Probe.

Proof of Performance Test. Tests to assure correct operation of the Model 545A Logic Probe according to specifications listed in Table 1 are described in the following paragraphs. Test equipment required for these tests is described in Table 2.

Table 2. Test Equipment Required and Recommended

Qty.	Instrument	Required Characteristics	HP Type Recommended
1	Power Supply (A)	0—40 Vdc ± 0.1% 0—1 Ampere	HP 6104A
1	Power Supply (B)	0—20 Vdc ± 0.1% 0—1 Ampere	HP 6111A
1	Volt-Ohmmeter	0—10 Vdc; 2% Accuracy	HP 427A
1	Oscilloscope	10 nsec/div Horizontal 1 volt/div Vertical	HP 1710B
1	Pulse Generator	±20V Output; 10 nsec pulse	HP 214A
1	Resistor	1000Ω 5% 1/4W	HP 0683-1025
1	Resistor	50Ω 5% 2W	HP 0698-3311
1	Capacitor	0.1 μF ±20% 25V	HP 0170-0022
1	Capacitor	10 μF +75 -10% 25V	HP 0180-0059

Logic Level Performance Test. With test equipment connected as shown in Figure 7, proceed as follows:

a. Set power supply A to +5.0V.

b. Set power supply B to 0V.

c. Set TTL–CMOS switch to TTL.

d. Set power supply B to +1.5V. Probe indicator should light dimly.

e. Increase power supply B voltage until indicator just reaches full brilliance. Probe tip voltage should be +2.0, +0.4 -0.2V.

f. Reduce power supply B voltage until indicator is just extinguished. Probe tip voltage should be +0.8V, +0.2V -0.3V.

NOTE

For use in the TTL mode, the 545A Logic Probe can use power supplies up to +15V, with slightly changed thresholds. See Figure 4.

g. Set TTL–CMOS switch to CMOS.

h. Set power supply A to +5.0V.

i. Set power supply B to +2.5V. Probe indicator should light dimly.

j. Increase power supply B voltage until probe indicator just reaches full brilliance. Probe tip voltage should be +3.5V, ±0.5V.

k. Reduce power supply B voltage until indicator is just extinguished. Probe tip voltage should be +1.5V to ±0.5V.

l. Disconnect test equipment.

NOTE

In the CMOS mode the 545A Logic Probe can use power supplies up to +18V. Thresholds levels are a function of the supply voltage. See Figure 5.

Positive Pulse Performance Test. With test equipment connected as shown in Figure 8, proceed as follows:

a. Set power supply A to +5.0V.

b. Set TTL–CMOS switch to TTL.

c. Set pulse generator to output a positive-going 5V/10 nsec pulse.

d. Set pulse generator repetition rate to approximately one-pulse-per-second. The probe indicator should flash once every second.

e. Gradually increase power supply A voltage to +15.0V while observing probe indicator. There should be no change in probe indicator response.

f. Set TTL–CMOS switch to CMOS.

g. Set power supply A to +5.0V.

h. Repeat steps c and d.

NOTE

To test CMOS operation over voltage range in specifications vary power supply A from +3V to +18V and change pulse generator output to track power supply voltage. Observe that probe indicator flashes on once-per-second.

i. Disconnect test equipment.

Negative Pulse Performance Test. With test equipment connected as shown in Figure 9, proceed as follows:

a. Set power supply A to +5.0V; set power supply B to +5.0V.

b. Set TTL-CMOS switch to TTL.

c. Set pulse generator to output a negative-going pulse.

d. Adjust pulse gneerator to give waveform at probe tip as shown in Figure 9, with a repetition rate of one-pulse-per-second. Probe indicator should flash off once per second.

e. Gradually increase power supply B voltage to +15.0V while observing probe indicator. There should be no change in probe indicator response.

f. Set TTL-CMOS switch to CMOS.

g. Connect test equipment as shown in Figure 10.

h. Set power supply A to +3.0V.

i. Set pulse generator to output a negative-going pulse.

j. Adjust pulse gneerator to give waveform at probe tip as shown in Figure 10 with a repetition rate of one-pulse-per-second. Probe indicator should flash off once per second.

k. Gradually increase power supply A voltage to +18.0V, adjusting the pulse generator output to track with power supply A output. There should be no change in probe indicator response.

i. Disconnect test equipment.

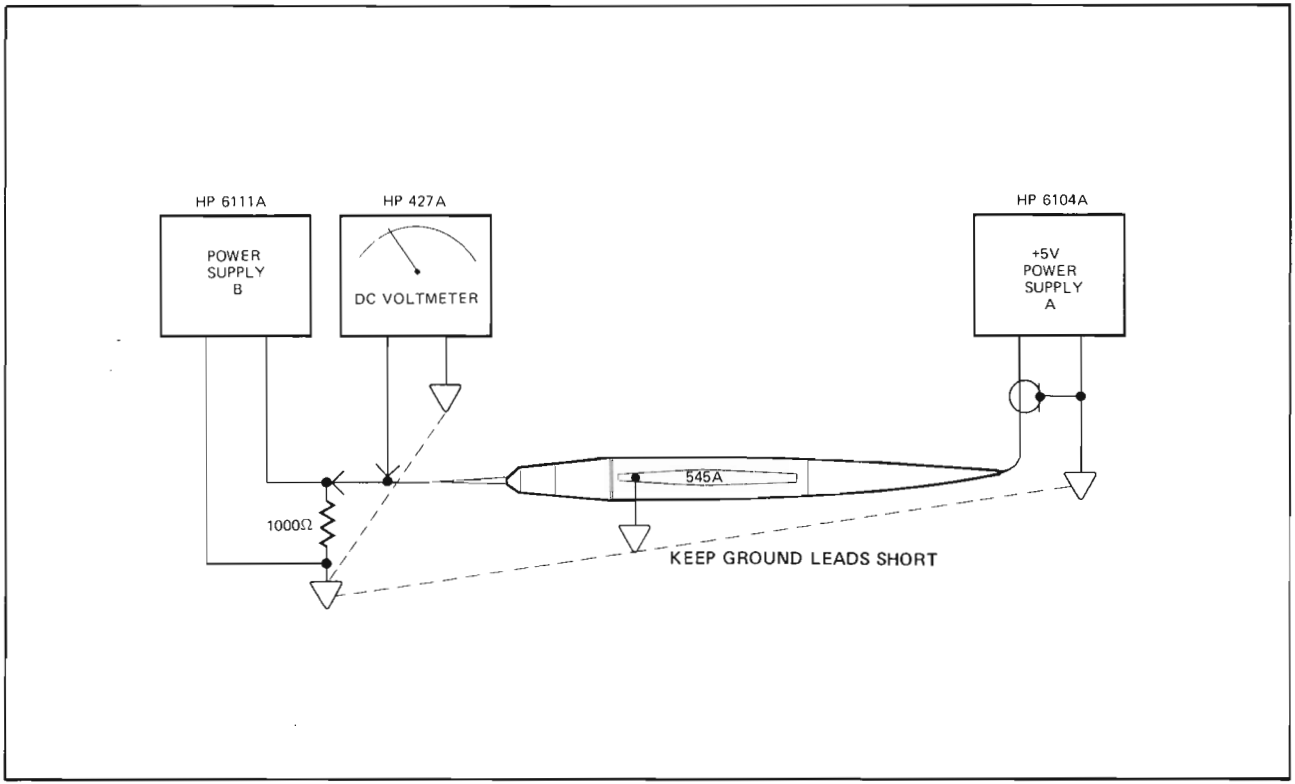

Figure 7. Logic Level Performance Test Setup

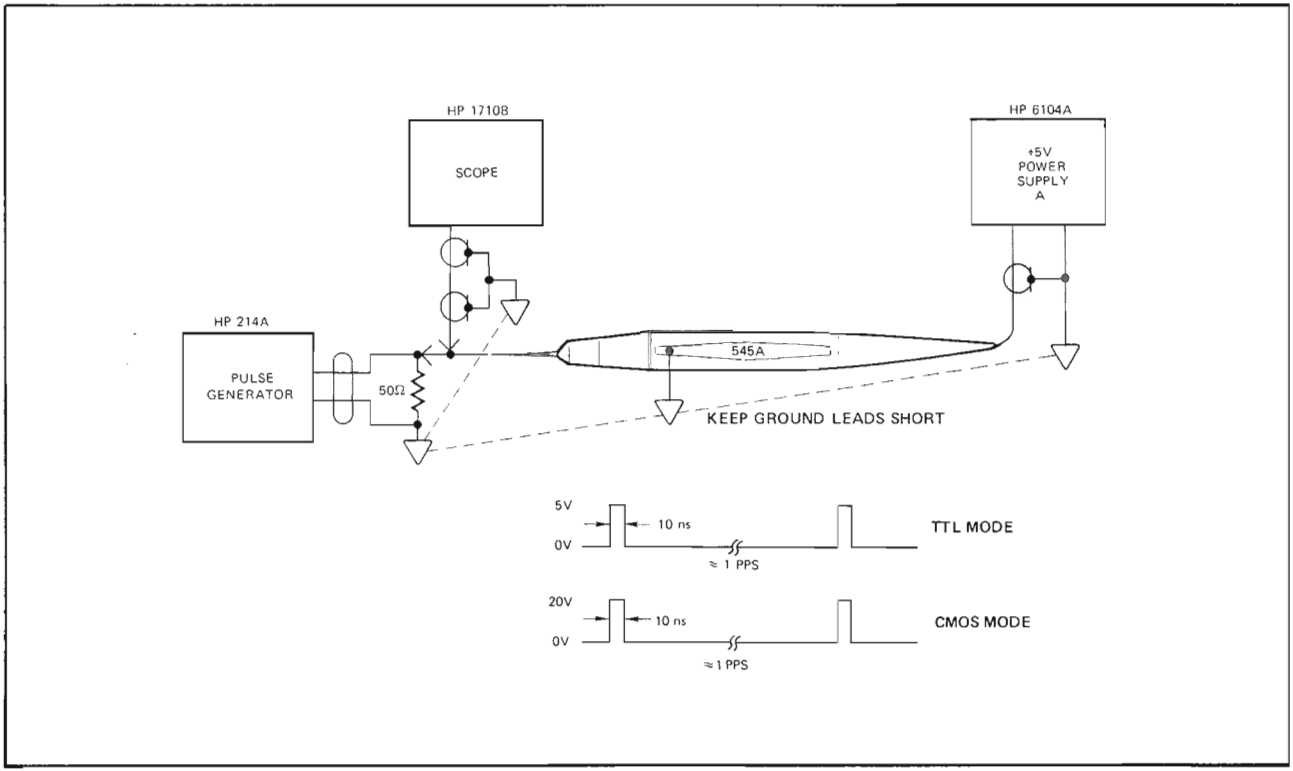

Figure 8. Positive Pulse Performance Test Setup

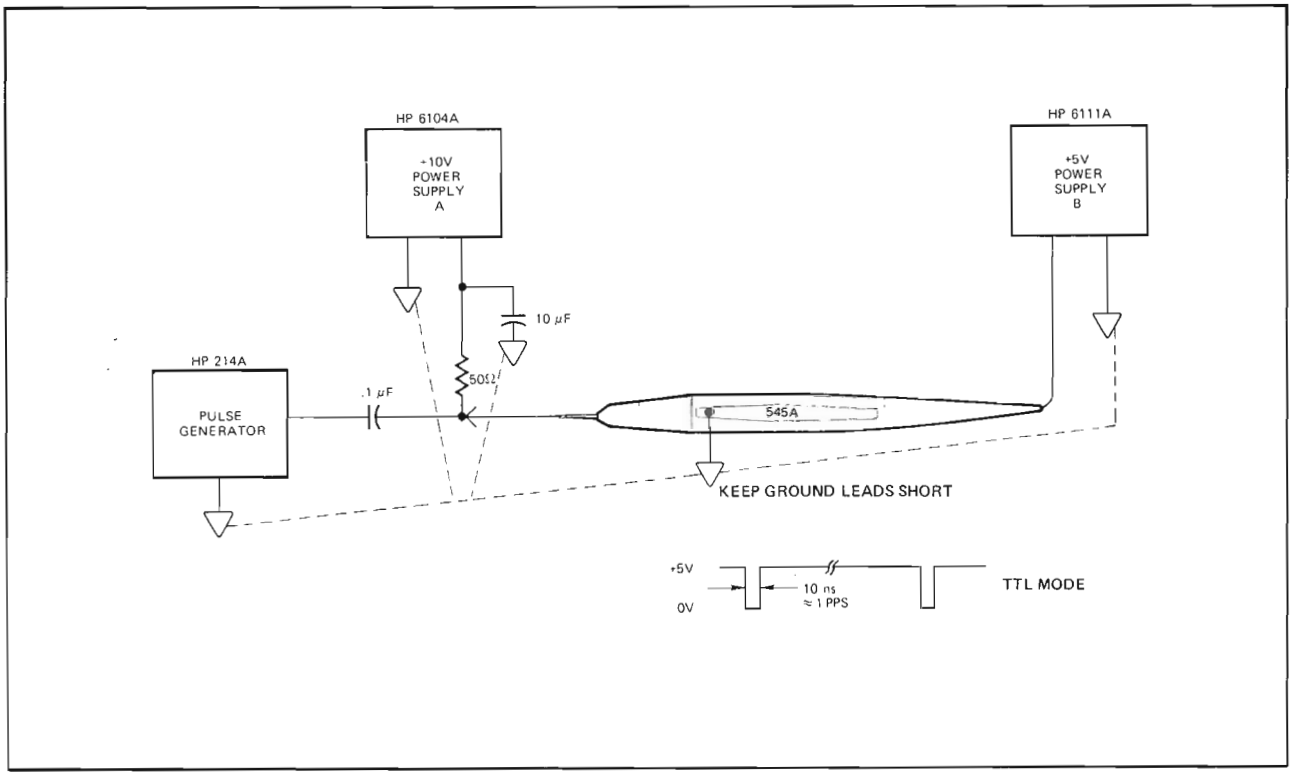

Figure 9. TTL Negative Pulse Performance Test Setup

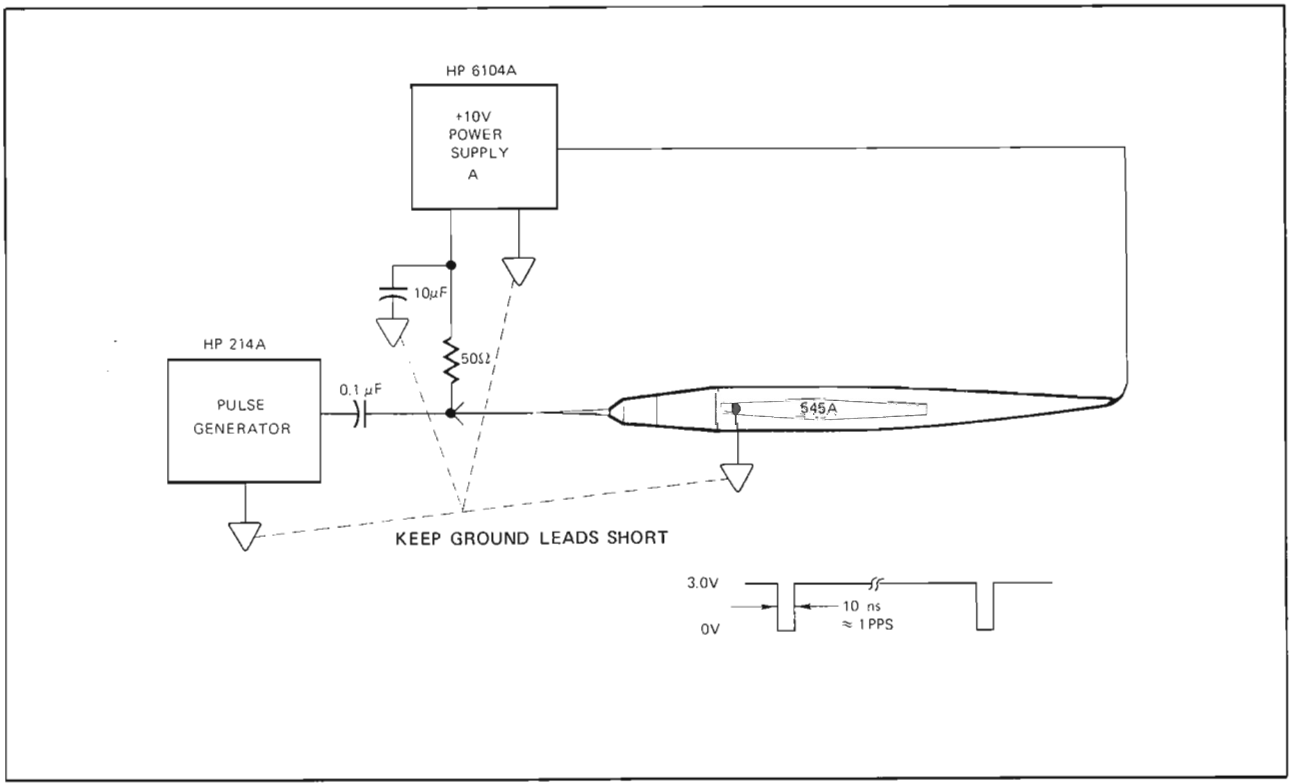

Figure 10. CMOS Negative Pulse Performance Test Setup

REPLACEABLE PARTS

The replaceable parts for the 545A Logic Probe are listed in Table 3. Parts may be ordered through your local Hewlett-Packard Sales and Service Office (see lists at rear of this manual for addresses). When ordering identify parts by their Hewlett-Packard part numbers and reference designation. Include instrument model number.

SCHEMATIC

The schematic diagram for the printed circuit board HP 00545-60001 is shown in Figure 11.

Table 3. Replaceable Parts List Series 1628

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	00545-60001	1	BOARD ASSEMBLY, LOGIC	28480	00545-60001
A1C1	0160-4374	1	CAPACITOR-FXD 47PF +-10% 400WVDC CER	28480	0160-4374
A1C2	0180-0197	1	CAPACITOR-FXD 2.2UF +-10% 20VDC TA	56289	150D225X9020A2
A1C3	0180-2513	1	CAPACITOR-FXD 10UF +-20% 2WVDC TA	28480	0180-2513
A1CR1	1902-0594	1	DIODE-ZNR 18.2V 5% DO-15 PD=1W TC=+.068%	28480	1902-0594
A1CR2	1990-0486	1	LED-VISIBLE	28480	1990-0486
A1DS1	2140-0346	1	LAMP-INCAND T-1 BULB 5V	71744	7210(ANSI 7210)
A1J1	1251-4259	1	CONNECTOR-SGL CONT PIN .031-IN-BSC-SZ	28480	1251-4259
A1MP1	00545-20202	1	STUB, TIP	28480	00545-20202
	0340-0780	1	INSULATOR: MISC; SPACER; .125 ID; .13	28480	0340-0780
A1Q1	1855-0228	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	28480	1855-0228
A1Q2	1853-0389	1	TRANSISTOR PNP SI TO-92 PD=350MW FT=4MHZ	28480	1853-0389
A1Q3	1854-0699	1	TRANSISTOR NPN SI PD=30W FT=3MHZ	28480	1854-0699
A1Q4	1853-0412	1	TRANSISTOR PNP SI	28480	1853-0412
A1R1	0683-1815	1	RESISTOR 180 5% .25W FC TC=-400/+600	01121	CB1815
A1R2 } Note 1	0761-0004	1	RESISTOR 20K, 5%, 1W MO TC=0+200	24546	FP32-1-2002-J
A1R2 }	0761-0077	1	RESISTOR 24K, 5% 1W MO TC=0+200	24546	FP32-1-TOO-2402-J
A1R3	0698-5075	1	RESISTOR 130 5% .125W CC TC=0+882	01121	BB1315
A1S1	3101-2039	1	SWITCH-SL SPDT-NS SUBMIN .3A 125VAC NCH	28480	3101-2039
A1U1	1820-1610	1	TTL/CMOS PROBE IC	28480	1820-1610
A2	00545-60102	1	SWITCH ASSEMBLY	28480	00545-60102
	00545-40002	2	BUTTON, RESET (CLR)	28480	00545-40002
A2S1	3130-0384	1	CONTACT, PC, ROTARY SWITCH	28480	3130-0384

NOTE 1: A1R2 MUST BE 0761-0077 (24K) WHEN A1U1 IS MARKED WITH THE SUFFIX "T" (1820-1610T). WITHOUT THE SUFFIX "T" (1820-1610) A1R2 MUST BE 0761-0004 (20K).

Table 3. Replaceable Parts List (Continued) All Series

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	00545-60104	1	TIP KIT	28480	00545-60104
			CONSISTS OF:		
	1251-0013	1	CONNECTOR-BANANA PLUG SINGLE	83330	100
	5060-0418	1	TIP STRAIGHT	28480	5060-0418
	5060-0419	1	TIP ANGLE (HOOK)	28480	5060-0419
	5060-0420	1	SPRING TIP ASSY	28480	5060-0420
	1400-0844	1	ADAPTER, TEST LEAD	42470	SAF-T-LEED
MP1	5060-0418	1	TIP ASSEMBLY	28480	5060-0418
MP2	00545-20201	1	BODY, UPPER HALF	28480	00545-20201
MP3	00545-20203	1	BODY, BOTTOM HALF	28480	00545-20203
MP4	00545-20204	1	RING, RETAINER	28480	00545-20204
MP5	00545-40001	1	WINDOW	28480	00545-40001
MP5 Note 2	00546-40002	1	WINDOW	28480	00546-40002
MP6	00545-40002		BUTTON, RESET	28480	00545-40002
MP7	00547-40005	1	COVER, TIP	28480	00547-40005
P1	10230-62101	3	GRABBER SQUEEZE CONNECTOR	28480	10230-62101
P2	10230-62101		GRABBER SQUEEZE CONNECTOR	28480	10230-62101
P3	10230-62101		GRABBER SQUEEZE CONNECTOR	28480	10230-62101
W1	00545-60105	1	CABLE ASSEMBLY, GROUND	28480	00545-60105
W2	00547-60100	1	CABLE ASSEMBLY, PROBE	28480	00547-60100
	7120-5000	1	LABEL, 545A SERIAL	28480	7120-5000
	7120-5001	1	LABEL, 545A PROBE	28480	7120-5001
	9211-2088	1	CARTON-CORR RSEO 2.5-LG 2.125-WD	28480	9211-2088
	9220-0008	1	BAG-PLSTC POLYETH FLM ENV 6-OPNG 12-DP	28480	9220-0008

NOTE 2: MP4 IS NOT USED WITH MP5 00546-40002 WINDOW (WHICH HAS PROTRUDING STUD AT REAR) 00545-20204 RING AND 00545-40001 WINDOW CAN BOTH BE REPLACED WITH ONE 00546-40002 WINDOW

Table 4. Manufacturers Code List

MFR NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
01121	ALLEN-BRADLEY CO.	MILWAUKEE WI	53212
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD PA	16701
28480	HEWLETT-PACKARD CO CORPORATE HQ.	PALO ALTO CA	94304
42470	NATIONAL CASH REGISTER CO	DAYTON OH	45409
56289	SPRAGUE ELECTRIC CO	NORTH ADAMS MA	01247
71744	CHICAGO MINIATURE LAMP WORKS	CHICAGO IL	60640
83330	SMITH HERMAN H INC.	BROOKLYN NY	11207

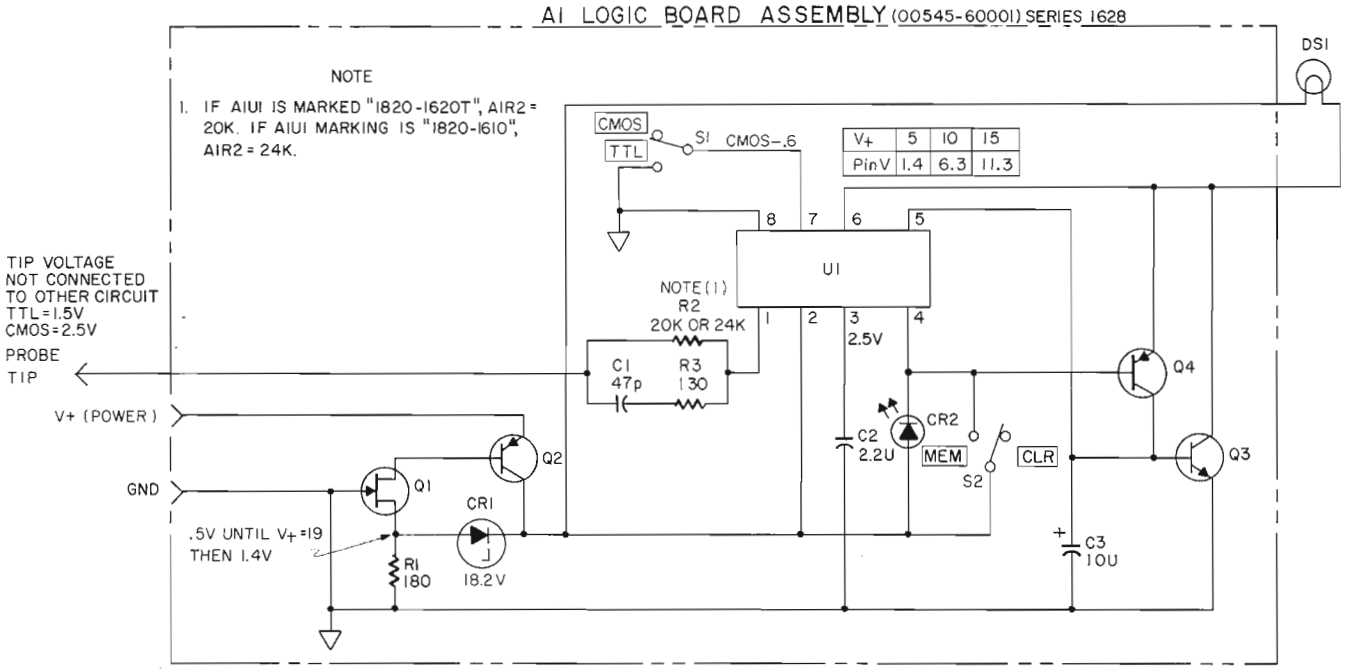

Figure 11. Model 545A Schematic Diagram Series 1628

Table 5. Replaceable Parts for Series 1540 and 1544

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	00545-60001	1	BOARD ASSEMBLY, LOGIC	28480	00545-60001
A1C1	0160-4374	1	CAPACITOR-FXD 47PF +-10% 400WVDC CER	28480	0160-4374
A1C2	0180-0197	1	CAPACITOR-FXD 2.2UF +-10% 20VDC TA	56289	150D225X9020A2
A1C3	0180-1701	1	CAPACITOR-FXD 6.8UF +-20% 6VDC TA	56289	150D685X006A2
A1CR1	1902-0594	1	DIODE-ZNR 18.2V 5% DO-15 PD=1W TC=+.068%	28480	1902-0594
A1CR2	1990-0486	1	LED-VISIBLE	28480	1990-0486
A1DS1	2140-0346	1	LAMP-INCAND T-1 BULB 5V	71744	7210(ANSI 7210)
A1J1	1251-4259	1	CONNECTOR-SGL CONT PIN .031-IN-BSC-SZ	28480	1251-4259
A1MP1	00545-20202	1	STUB, TIP	28480	00545-20202
	0340-0780	1	INSULATOR: MISC; SPACER; .125 ID; .13	28480	0340-0780
A1Q1	1855-0228	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	28480	1855-0228
A1Q2	1853-0389	1	TRANSISTOR PNP SI TO-92 PD=350MW FT=4MHZ	28480	1853-0389
A1Q3	1854-0699	1	TRANSISTOR NPN SI PD=30W FT=3MHZ	28480	1854-0699
A1R1	0683-1815	1	RESISTOR 180 5% .25W FC TC=-400/+600	01121	CB1815
A1R2 } Note 1	0761-0004	1	RESISTOR 20K, 5%, 1W MO TC=0+200	24546	FP32-1-2002-J
A1R2 }	0761-0077	1	RESISTOR 24K, 5% 1W MO TC=0+200	24546	FP32-1-TOO-2402-J
A1R3	0698-5075	1	RESISTOR 130 5% .125W CC TC=0+882	01121	BB1315
A1S1	3101-2039	1	SWITCH-SL SPDT-NS SUBMIN .3A 125VAC NCH	28480	3101-2039
A1U1	1820-1610	1	TTL/CMOS PROBE IC	28480	1820-1610
A2	00545-60102	1	SWITCH ASSEMBLY	28480	00545-60102
	00545-40002	2	BUTTON, RESET (CLR)	28480	00545-40002
A2S1	3130-0384	1	CONTACT, PC, ROTARY SWITCH	28480	3130-0384

NOTE 1: A1R2 MUST BE 0761-0077 (24K) WHEN A1U1 IS MARKED WITH THE SUFFIX "T" (1820-1610T). WITHOUT THE SUFFIX "T" (1820-1610) A1R2 MUST BE 0761-0004 (20K).

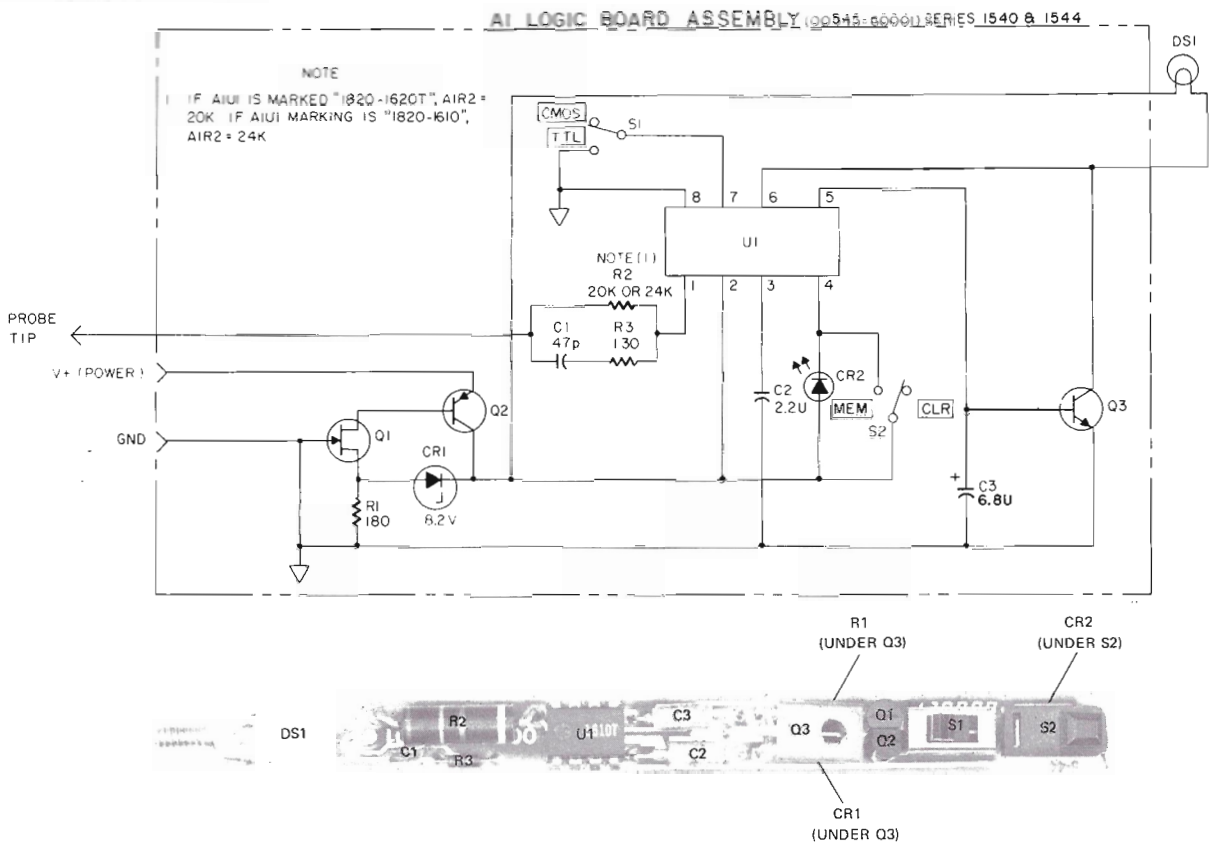

Figure 12. Model 545A Schematic Diagram and Component Locator Series 1540 and 1544

LOGIC PROBE
545A

OPERATING AND SERVICE MANUAL

SERIES NUMBERS: 1540, 1544, AND 1628

This manual refers directly to HP Model 545A Logic Probes with Series Numbers 1540, 1544, and 1628.

NEWER SERIES LOGIC PROBES

The changes in Logic Probes with Series Numbers higher than 1628 are described in CHANGE SHEETS included with the manual.

5301 STEVENS CREEK BLVD., SANTA CLARA, CALIF. 95050

Printed: NOV 1976

MANUAL PART NO. 00545-90004
Microfiche Part No. 00545-90005

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HEWLETT PACKARD

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