

O P E R A T I N G A N D S E R V I C E M A N U A L

LOGIC CLIP
548A



HEWLETT  PACKARD

CERTIFICATION

Hewlett-Packard Company certifies that this instrument met its published specifications at the time of shipment from the factory. Hewlett-Packard Company further certifies that its calibration measurements are traceable to the United States National Bureau of Standards, to the extent allowed by the Bureau's calibration facility, and to the calibration facilities of other International Standards Organization members.

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This Hewlett-Packard product is warranted against defects in materials and workmanship for a period of one year from the date of shipment except that in the case of certain components listed in Section I of this manual, the warranty shall be for the specified period. 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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Service contracts or customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Addresses are provided at the back of this manual.

OPERATING AND SERVICE MANUAL

**LOGIC CLIP
548A**

548A LOGIC CLIP INSTRUCTIONS

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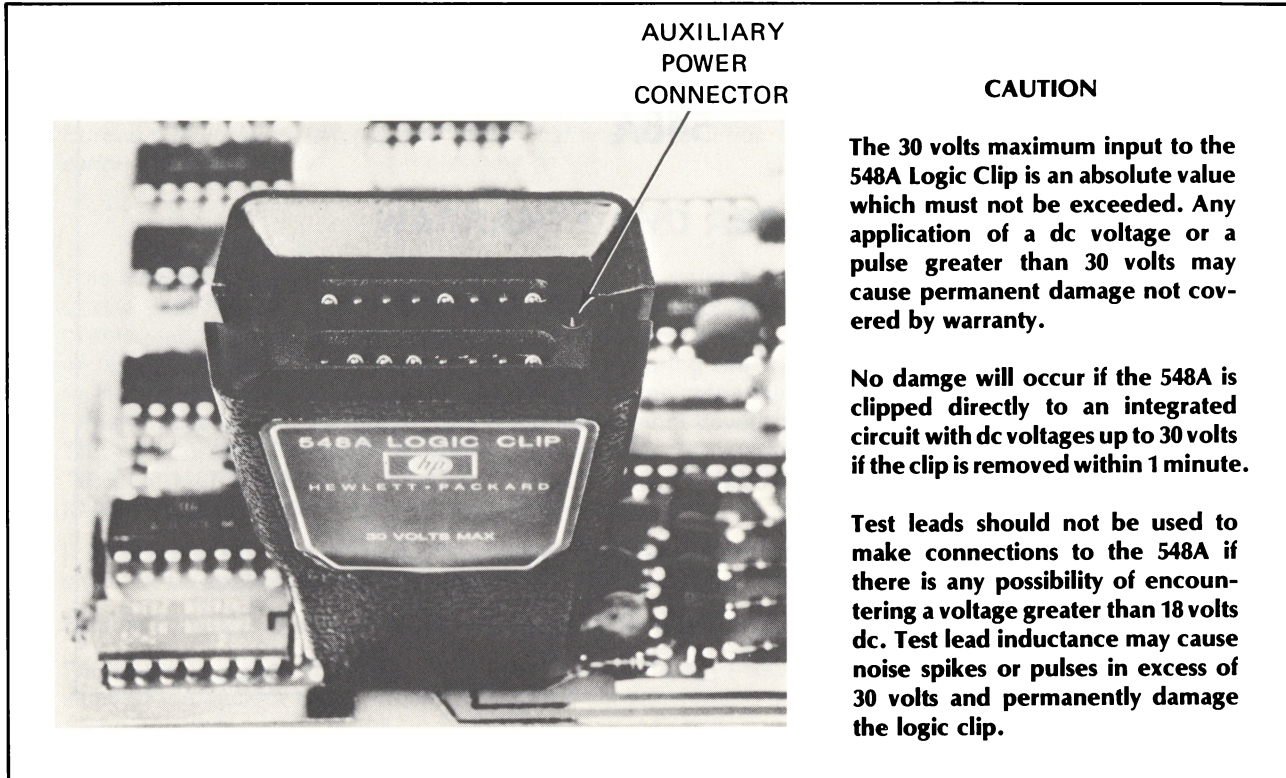


Figure 1. HP Model 548A Logic Clip

APPLICATION

The 548A Logic Clip light-emitting-diodes (LED's) will indicate logic levels on most integrated circuit (IC) logic families, including TTL, HTL, DTL, CMOS, and NMOS. It displays, simultaneously, logic levels for all 8, 14 or 16 pins of a dual in-line IC which operates from a supply of 4 to 18 volts. The clip can test flip-flops, gates, counters, buffers, adders, and shift registers. All 16 input gates are electronically buffered to minimize loading on any IC being tested. Sixteen high-efficiency LED's provide HIGH (LED on) and LOW (LED off) logic level indication. No power supply connections are necessary; the Logic Clip powers itself from the V_{CC} and ground pins of the IC under test.

NOTE: Accidental connection of up to +30 volts on 548A clip pins for a minute will not damage 548A circuits.

SPECIFICATIONS

Input Protection: 30V absolute maximum for one minute.

Input Current: $\pm 15 \mu\text{A}$ maximum over the range of +0.5V to $V_{\text{supply}} - 0.5\text{V}$.

Supply Voltage: 4 to 18V across any two pins.

Supply Current: 50 mA maximum with 15 LED's on.

Auxiliary Positive Supply Voltage: +4.5 to +20V applied to connector on top of clip (ground supplied by IC under test).

Supply must be at least 1.5V more positive than any pin on IC under test to prevent drawing power from the IC.

Input Threshold Voltage Range: $V_{\text{supply}} \times (0.4 \pm 0.06)$. Example: at +5V_{supply} LED's will be off below 1.7V and on above 2.3V.

Logic Family Compatibility: DTL, TTL, HTL, CMOS and NMOS in dual in-line packages up to 16 pins.

Operating Temperature Range: 0 to 55°C.

Indications:

LED	Indication
On	Pin voltage above threshold or no connection (open)
Off	Pin voltage below threshold
Dim	Pin voltage pulsating

OPERATION (See Photo)

Squeeze the Logic Clip to open the contact jaws and place the clip on the pins of the IC to be tested. Pin-to-pin contact must be good. The LED's will indicate the logic level (LED on = logic HIGH and LED off = logic LOW) on the corresponding IC pin. There are no operating controls or service adjustments on the clip.

OPERATION WITH AUXILIARY POWER SUPPLY

If the IC's being tested use low voltage (below 4V) or if power may not be drawn from circuit under test, an external voltage applied to the 548A top terminal (see photo) allows complete use of the clip. Refer to the "Specifications" for details. An auxiliary power cable is supplied with the clip. **NOTE:** Input threshold with auxiliary power supply is nominally $0.4 \times (V_{\text{supply}} - 0.8)$.

TESTING

If faulty operation of the Logic Clip is suspected, each pin network should be tested. A 4 to 18 volt supply can be used to check for correct operation. With the supply connected across any two pins, the V_{CC} LED and the remaining 14 LED's should light. Ground each pin separately (except the V_{CC} LED), and each LED, when that pin is grounded, should go off. A separate adjustable voltage power supply can be used to check the threshold voltage of each Logic Clip pin. Test leads can be used for testing provided the applied voltage does not exceed 18V dc maximum.

The threshold voltage which will switch one LED on is variable, and it depends on the IC supply voltage. See the specifications. Test the threshold by applying a steady monitored supply voltage to a pair of 548A pins (e.g., +5 volts), and connect a monitored variable threshold test voltage to each LED pin to be tested. Increase the test voltage from zero and note the threshold voltage (e.g., 1.7 to 2.3 volts) for each LED.

MAINTENANCE

The Logic Clip internal electronics assembly is a single molded part and is not repairable. To obtain other replacement parts, address inquiry to the nearest Hewlett-Packard Sales and Service Office. Give Logic Clip model number and identify parts by description.

HEWLETT-PACKARD SALES AND SERVICE OFFICES

To obtain servicing information and order replacement parts, contact the nearest Hewlett-Packard Sales and Service Office in HP Catalog, or contact the nearest regional office.

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Insert this Warning after the Certification/Warranty and Assistance which is on the inside front cover.

WARNING

This product should be connected to a power source that is sufficiently isolated from the main supply to prevent the risk of electric shock.

To further reduce the risk of electric shock, refer to the service manual for the equipment under test (when applicable) and follow the manufacturer's service and safety precautions particularly when voltages exceeding 30 VRMS or 50 VDC are present.



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