

## Errata

**Title & Document Type:** 547A Current Tracer Operating and Service Manual

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### About this Manual

We've added this manual to the Agilent website in an effort to help you support your product. This manual provides the best information we could find. It may be incomplete or contain dated information, and the scan quality may not be ideal. If we find a better copy in the future, we will add it to the Agilent website.

### HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, life sciences, and chemical analysis businesses are now part of Agilent Technologies. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A. We have made no changes to this manual copy.

### Support for Your Product

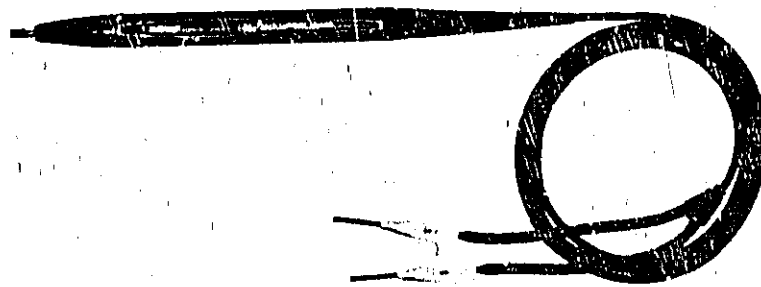
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OPERATING AND SERVICE MANUAL

# CURRENT TRACER 547A



HEWLETT  PACKARD

## CERTIFICATION

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## WARRANTY AND ASSISTANCE

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# CURRENT TRACER

## 547A

### OPERATING AND SERVICE MANUAL

**SERIAL NUMBER: A00051 and above**

This manual refers directly to Model 547A Current Tracers with Serial numbers A00051.

#### NEWER INSTRUMENTS

The changes in Current Tracers with Serial numbers higher than A00051 are described in "Change Sheets" included with the manual.

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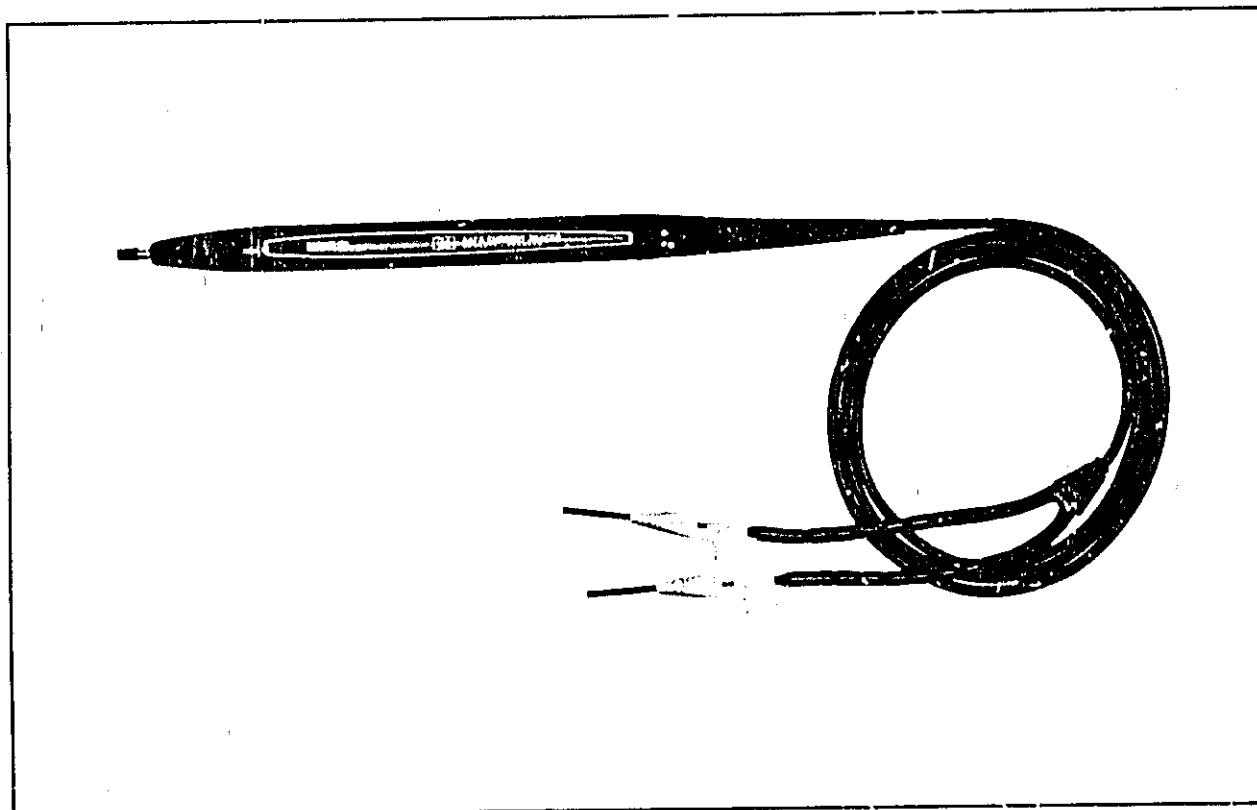


Figure 1. HP Model 547A Current Tracer

## SCOPE OF MANUAL

This manual contains information about the Hewlett-Packard 547A Current Tracer. Coverage includes a description of the instrument, its applications, specifications, instructions in its use, theory of operation, maintenance, performance tests, adjustments, list of replaceable parts and how to obtain them, component locators, and schematics.

## DESCRIPTION

The HP 547A Current Tracer is a hand-held probe which enables the precise localization of low-impedance faults in electrical systems. The probe senses the magnetic field generated by a pulsing current internal to the circuit or by current pulses supplied by an external stimulus such as the HP 546A or 10526T Logic Pulsers. Indication of the presence of current pulses is provided by lighting the indicator lamp near the Current Tracer tip. Adjustment of probe sensitivity over the 1 mA to 1A range is provided by the SENSITIVITY control near the indicator. The probe is self-contained and requires <75 mA at 4.5V to 18V from any convenient source.

## INSTRUMENT IDENTIFICATION

Hewlett-Packard uses a 6-digit serial number (A00000) to identify the Current Tracer. If the serial number of your instrument differs from the serial number(s) on the title page of this manual, there are other differences between the manual and your instrument. These differences are covered in a "MANUAL CHANGES" sheet which is included with the manual.

## SPECIFICATIONS

Table 1 lists all specifications for HP Model 547A Current Tracer.

Table 1. Model 547A Current Tracer Specifications

**INPUT:**

Sensitivity: 1 mA to 1A

**Frequency Response:**

Light indicates Single-step current transitions: single pulses  $\geq 50$  ns in width; pulse trains to 10 MHz (typically 20 MHz for current pulses  $\geq 10$  mA)

Risetime: Light indicates current transitions with risetimes  $\leq 200$  ns at 1 mA.

**POWER SUPPLY REQUIREMENTS:**

Voltage: 4.5 to 18 Vdc

Input Current:  $\leq 75$  mA

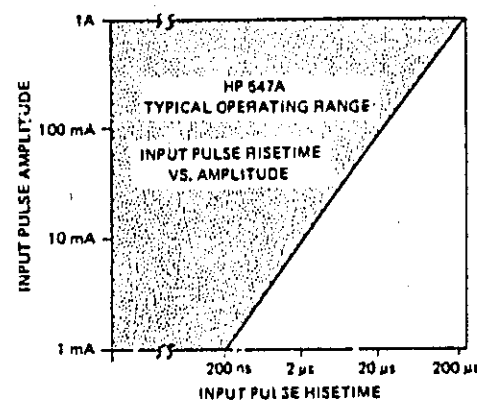
Maximum Ripple:  $\pm 500$  mV above 5 Vdc

Overvoltage Protection:  $\pm 25$  Vdc for one minute

TEMPERATURE:  $0^\circ$  to  $55^\circ\text{C}$

WEIGHT: 113.4 g (4 oz.) net; Shipping Weight: 170 g (6 oz.)

Size Probe body 15.24 cm (6 in.); Cable, 110.38 cm (47 in.)



## APPLICATIONS

The Current Tracer operates on the principle that whatever is driving a low-impedance fault node must be delivering the majority of the current. Tracing the path of this current leads directly to the fault. Problems that are compatible with this method are:

- Shorted inputs of integrated circuits.
- Solder-bridges on printed-circuit boards.
- Shorted conductors in cables.
- Shorts in voltage distribution networks, e.g., Vcc-to-ground shorts.
- Stuck data buses, such as three state, open-collector, or Hewlett-Packard Interface Bus (HP-IB).
- Stuck wire-AND structure.

## UNPACKING AND INSPECTION

If the shipping carton is damaged, ask that the carrier's agent be present when the Current Tracer is unpacked. Inspect the instrument for obvious damage such as dents, scratches, etc. If the instrument is damaged or fails to meet performance tests, notify the carrier and the nearest Hewlett-Packard Sales and Service Office immediately. Retain the shipping carton and the padding material for the carrier's inspection. The Sales and Service Office will arrange for the repair or replacement of the instrument without waiting for the claim against the carrier to be settled.

## STORAGE AND SHIPMENT

To protect valuable electronic equipment during storage or shipment, always use the best packaging methods available. Your Hewlett-Packard Sales and Service Office can provide packaging material such as that used for original

factory packaging. Contract packaging companies in many cities can provide dependable custom packaging on short notice. Environmental conditions during storage and shipment should normally be limited as follows:

- a. Maximum altitude: 25,000 ft.
- b. Minimum temperature:  $-40^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$ ).
- c. Maximum temperature:  $+149^{\circ}\text{F}$  ( $+65^{\circ}\text{C}$ ).

## OPERATING CHARACTERISTICS

Three conditions must be met before the Current Tracer can properly respond to circuit stimulus:

1. The mark on the probe's tip must be aligned along the length of the printed-circuit trace.
2. The probe be held perpendicular to the printed-circuit trace — not at an angle.
3. The printed-circuit trace must be conducting an alternating current, either from an internal source or, from an external stimulus such as a Logic Pulser with a rise-time of  $\leq 200$  ns.

### NOTE

The voltage present on the black power supply lead (negative side of supply) is also present on the tracer's anodized aluminum case. Do not lay the tracer on any grounded area, such as an instrument chassis, unless the chassis is at the same potential as the black lead. Damage to the power supply may result.

## CURRENT TRACER OPERATION

Use of the Current Tracer is indicated when conventional troubleshooting reveals a low-impedance fault. The operator aligns the mark on the probe tip along the length of the printed-circuit trace at the driver and adjusts the sensitivity control until the indicator lamp just lights. The probe is then moved along the trace or placed directly on the terminal points of the nodes (or IC pins), while observing the indicator light. This method of

following the path of the current leads directly to the fault responsible for the abnormal current flow. If the driving point does not provide pulse stimulation, the node may be driven externally by using a Logic Pulser at the driving point. The following paragraphs describe troubleshooting techniques for some of the more common problems.

### Wire-AND Node

One of the most difficult problems encountered in troubleshooting integrated circuits is a stuck wire-AND node. Typically, one of the open-collector gates may still continue sinking current after it has been turned off. The Current Tracer provides an easy method of identifying the fault gate.

Referring to Figure 2 place the Current Tracer on the gate side of the pull-up resistor. Align the mark on the probe tip along the length of the printed-circuit trace and adjust the probe's sensitivity control until the indicator is just fully lighted. If the indicator will not light — use a Logic Pulser to excite the line. Place the tracer tip on the output pin of each gate; only the faulty gate will cause the indicator to light.

### Gate-to-Gate Faults

When a low-impedance fault exists between two gates, the Current Tracer and Logic Pulser combine to quickly pinpoint the defect. In Figure 3 gate A's output is shorted to ground. Place the pulser midway between the two gates and place the Current Tracer's tip on the Pulser's pin. Pulse the line and adjust the Current Tracer's sensitivity control until the indicator just lights. First place the Current Tracer tip next to gate A and then gate B while continuing to excite the trace. The tracer will light only on the gate A side, since gate A, (the defect in this example), is sinking the majority of the current.

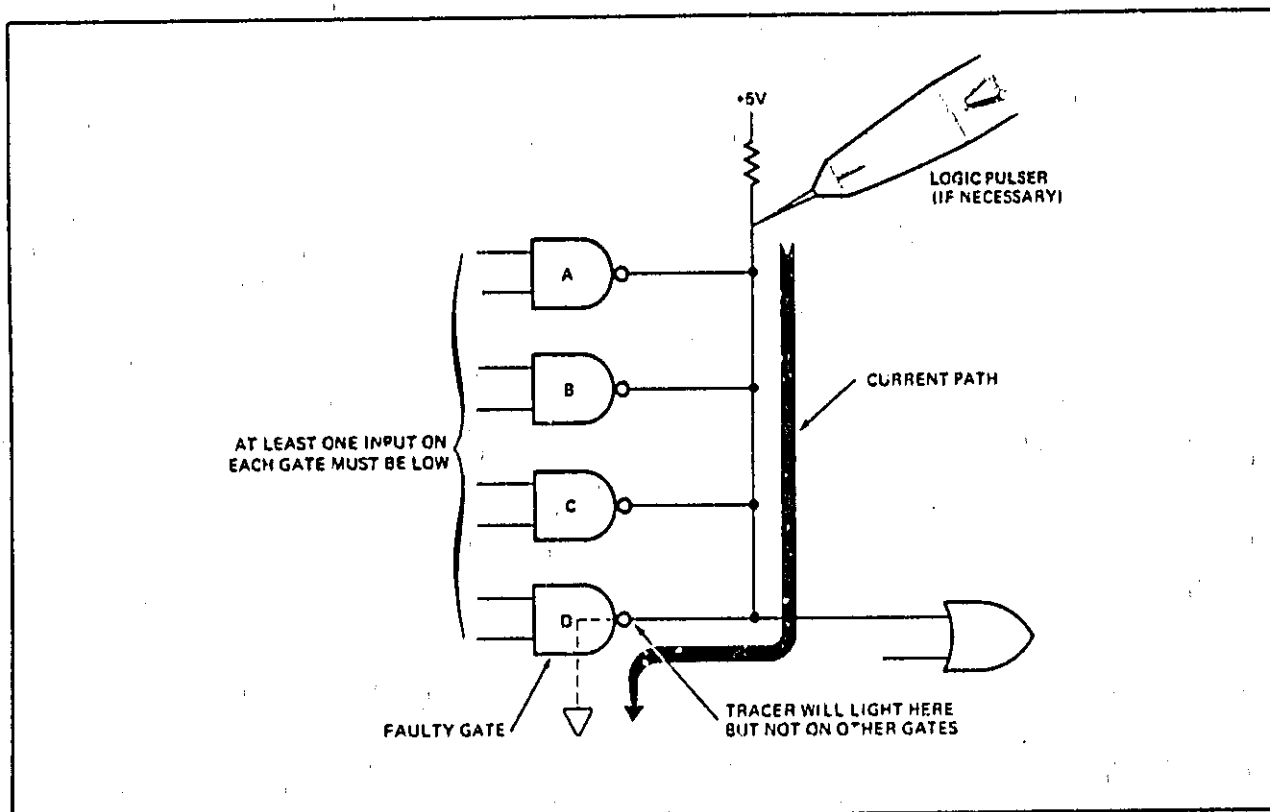


Figure 2. Wire-AND Node Fault

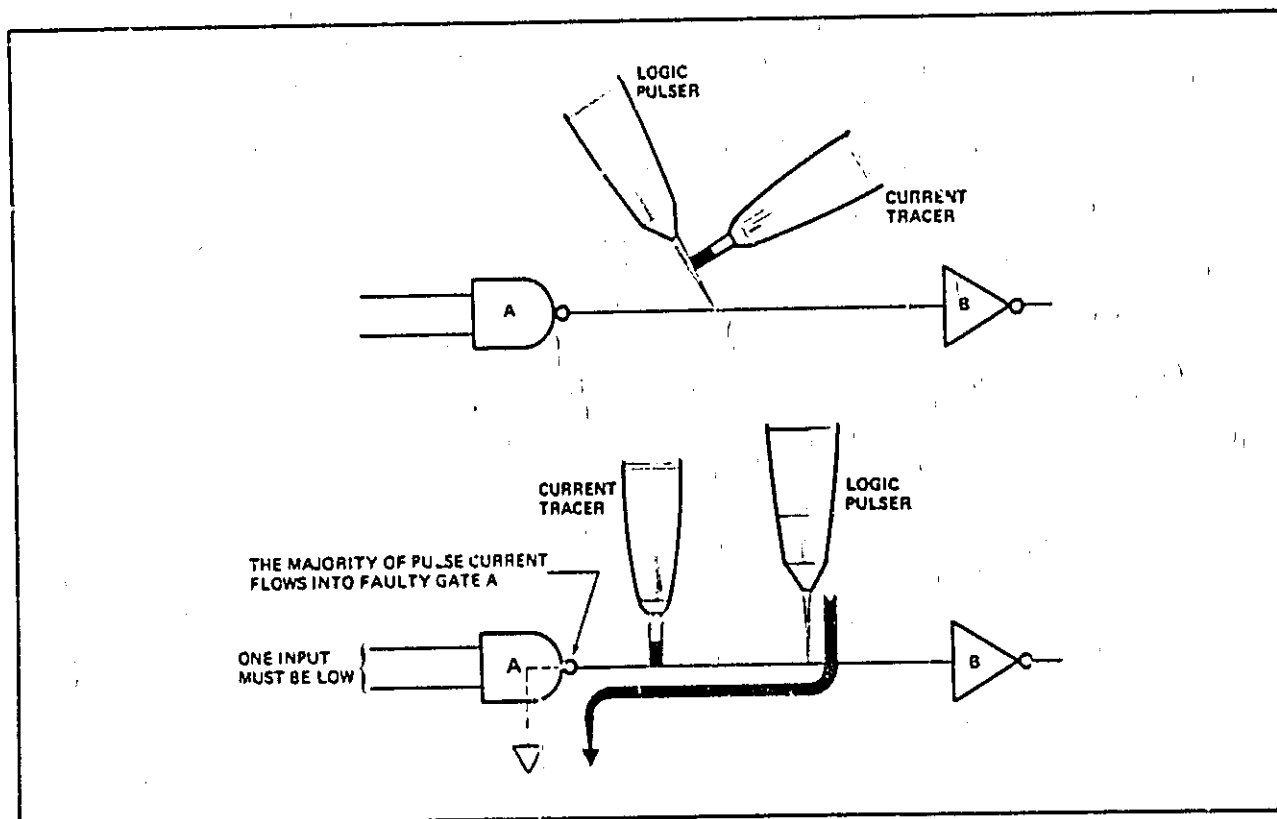


Figure 3. Gate-to-Gate Faults

### Solder Bridge/Cable Problems

When checking printed-circuit traces which may be shorted by solder-bridges or by other means, start the Current Tracer at the driver and follow the trace. Figure 4 shows an example of an incorrect current path due to a solder-bridge. As the tracer probe follows the trace from gate A toward gate B, the indicator remains lighted until it passes the bridge. This is an indication that the current has found some path other than the trace. Visually inspect this area for solder-splashes, gold-bridges, etc. These principles also apply when troubleshooting shorted cable assemblies.

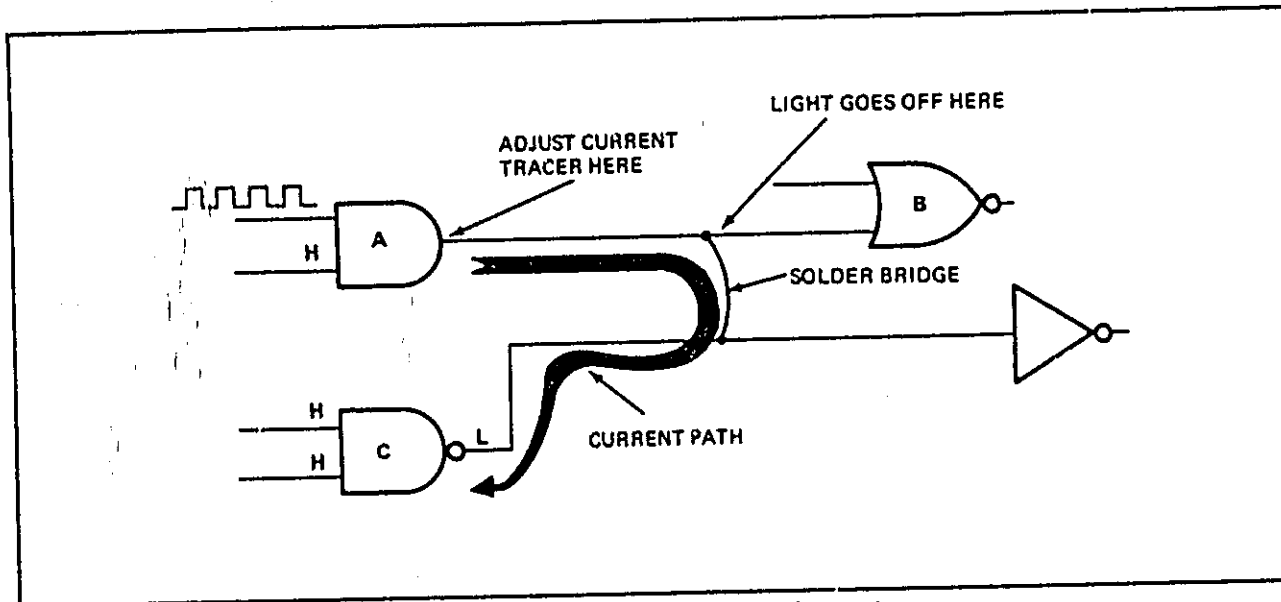


Figure 4. Solder-Bridge in Printed-Circuit

### Multiple Gate Inputs

Another type of IC nodal structure is the one-output multiple-input configuration. Figure 5 shows this type of circuit being pulsed by a signal on gate A's input. In this case, place the Current Tracer's tip on the output pin of gate A and adjust the sensitivity control until the indicator light just comes on. Then check the input pins of gates B through E. If one of the input pins is shorted, that pin will be the only one to light the indicator.

Should the tracer fail to light when placed next to gate A's output, it is a good indication that the problem exists in gate A. To be sure that this is true, use the Pulser in the manner described under Gate-to-Gate Faults. If the circuit has no input signal to excite the node, use a Logic Pulser to excite the circuit.

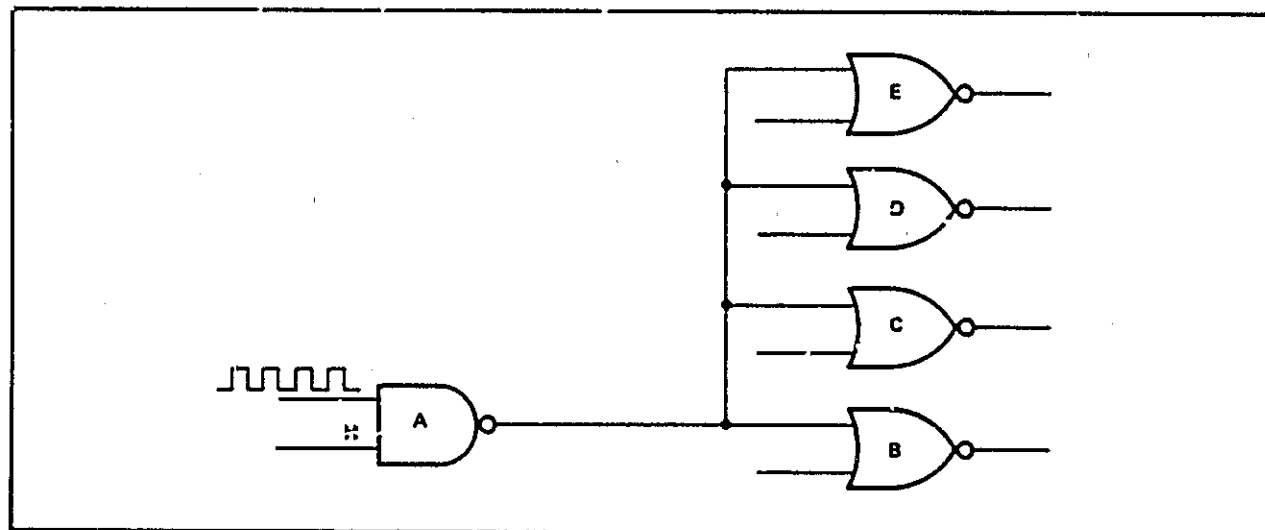


Figure 5. Multiple Gate Inputs

### CMOS and ECL Circuits

Troubleshooting CMOS and ECL circuits is performed in the same manner as troubleshooting TTL circuits. The only difference is in the voltages available for the Current Tracer's power supply connections. The following table shows voltage range from each:

Circuit	Typical Voltage Supply Range
CMOS	3V to 15V
ECL	-5.2V — 0V
TTL	0V — 5V

#### CAUTION

THE VOLTAGE PRESENT ON THE BLACK POWER SUPPLY LEAD IS ALSO PRESENT ON THE TRACER'S ANODIZED ALUMINUM CASE. DO NOT LAY THE TRACER ON ANY GROUNDED AREA, SUCH AS AN INSTRUMENT CHASSIS. DAMAGE TO THE POWER SUPPLY MAY RESULT.

These are differences in potential and the Current Tracer's supply voltages may use both negative and positive, e.g.,  $V_{DD} = +8V$ ;  $V_{SS} = -8V$ . The Current Tracer is compatible with TTL, CMOS, and ECL circuits and operates on supply voltages from 4.5V to 18V. Connect the Current Tracer's black lead to the more negative supply line ( $V_{SS}$ ) and the red lead to the more positive line ( $V_{DD}$ ).

### THEORY OF OPERATION (Refer to Figure 9 Schematic)

**CURRENT-STEP SENSOR.** The Current-Step Sensor comprises a pickup core and winding, and eddy-current shield. The signal to be traced is sensed by the pickup winding and core.

**VARIABLE-GAIN PREAMP.** The Variable-Gain Preamp consists of Q1 and peripheral components. The signal from the Current-Step-Sensor is fed directly to the base of Q1. The output of Q1 is taken directly to U1.

**GAIN-CONTROL NETWORK.** The gain of the Variable-Gain Preamp is controlled by ac-coupling the emitter and collector of Q1, via capacitors C4 and C5, to the current-controlled variable resistance presented by diode pairs CR4-CR6, and CR5-CR7. Each end of each diode pair is returned to signal ground or one of the ac grounds formed by capacitors C6, C7, and C8. Diodes CR1, CR2, and CR3 determine the control current for the diode pairs. The Gain-Control Network adjusts the gain of the Variable-Gain Preamp from -40 dB to +20 dB with essentially constant, high bandwidth.

**FIXED-GAIN AMPLIFIER.** U1 serves to increase the output of the Variable-Gain Preamp. Interstage ac-coupling of U1 is effected via R12 and C10.

**AMPLIFIER AND BIPOLAR PEAK DETECTOR.** The output of the Fixed-Gain Amplifier is ac-coupled through C12 to amplifier U2 which provides additional gain. The output of this amplifier is internally coupled to a bipolar peak detector (p/o U2) where a pulse of either polarity results in rapid charging of C14. This charging signal, a positive, stretched version of the input, with an amplitude proportional to the input, discharges through R20.

**2ND PEAK DETECTOR.** The output of the Bipolar Peak Detector is fed into another peak-detector consisting of an operational-amplifier (p/o U3), with an additional stage in the feedback loop (p/o U2). When the signal on C14 is positive, C15 is rapidly charged by U2 until the inputs to the operational-amplifier are equalized. The charge on C15 slowly discharges through R18, stretching the input pulse for sufficient time to light the indicator lamp.

**DC AMPLIFIER AND DISPLAY DRIVER.** The signal at C15 is dc-coupled to this amplifier, which consists of an operational-amplifier (p/o U3) and series-pass transistor Q3. The gain is set by R25 and R27; C19 is provided to suppress oscillations.

### MAINTENANCE

**PROBE DISASSEMBLY.** To disassemble Current Tracer, refer to Figure 6, and proceed as follows:

1. With fingers, unscrew (ccw) the plastic Indicator light window (MP4).
2. Slide the bottom shell off probe tip end (MP1).
3. Lift the top shell off the probe (MP3).
4. Carefully separate the circuit board and cable assembly.

**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 SOLDERING IRON ( $\leq 25$  WATTS) AND APPLY THE MINIMUM HEAT NECESSARY TO UNSOLDER THE LEADS.

**PREVENTIVE MAINTENANCE.** No periodic adjustment or preventive maintenance procedures are necessary for the Current Tracer.

**ADJUSTMENTS.** Potentiometer R21 is the only maintenance adjustment in the Model 547A. This trimmer may be used as a supplementary adjustment to the gain control (R3) and as a troubleshooting adjustment. Refer to information adjacent to the schematic diagram. Preliminary adjustment of R21 is made by setting the wiper arm approximately midway in its range. If this setting results in too little or too much sensitivity, with R3 set at the 1 mA end, then R21 can be adjusted to correct this. To assure there is 1 mA in the test circuit — refer to Figure 7.

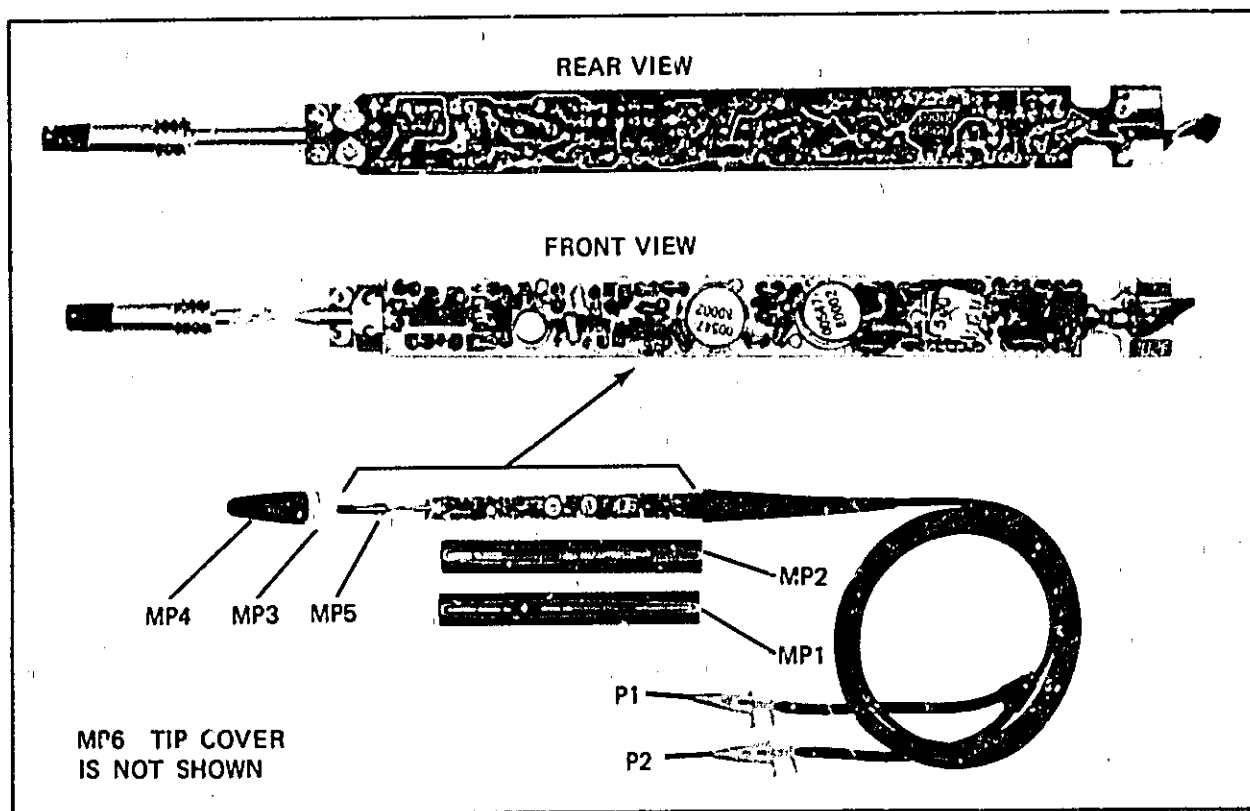


Figure 6. Exploded View of Current Tracer

**PERFORMANCE TESTS**

The following performance tests validate the dynamic range specifications of the 547A. Equipment required is listed below:

*Equipment List for In-Cabinet Performance Tests*

Instrument	Required Characteristics	Recommended HP Type
Pulse Generator	Single shot up to 10 MHz 50V, 1 Amp	HP 1915A
Power Supply	0-20 Vdc, Current Limiting at 75 mA.	HP 6823A
Decade Attenuator	40 dB	HP 355D
1 50 $\Omega$	$\pm 1\%$ , 0.5W	0811-0592
1 50 $\Omega$	$\pm 5\%$ , 20W	0819-0022

**Minimum Current (1.0 mA) Performance Test**

Equipment Required:

- HP 1915A Pulse Generator.
- HP 355D Decade Attenuator.
- HP 6823A Power Supply.
- 50 $\Omega$ , 1/2W Resistor.

**CAUTION**

USE A CURRENT-LIMITED POWER SUPPLY (75 mA), TO PREVENT DESTRUCTION OF TRANSISTORS Q2 AND Q3, DIODE CR8 AND COIL L1 IN EVENT TEST PROBE SHOULD ACCIDENTLY SLIP AND GROUND POINT "A".

With test equipment connected as shown in Figure 7, proceed as follows:

- Set attenuator to 0 (zero) dB.
- Set Pulse Generator to 5V at the output of attenuator.
- Set attenuator to 40 dB.
- Adjust power supply output to 4.5 volts with 75 mA current limiting.
- Adjust Current Tracer Sensitivity to the 1 mA end (all the way forward).
- Place Current Tracer tip at point "A".
- Orient Current Tracer for maximum magnetic coupling to the signal at point "A". (Point at which maximum brilliance of indicator occurs).
- Vary pulse generator frequency from single — step up to 10 MHz and observe that there is no visible change in indicator brilliance.
- Vary power supply output from 4.5 volts to 18 volts and observe that there is little or no change in the indicator brilliance.
- Disconnect test equipment.

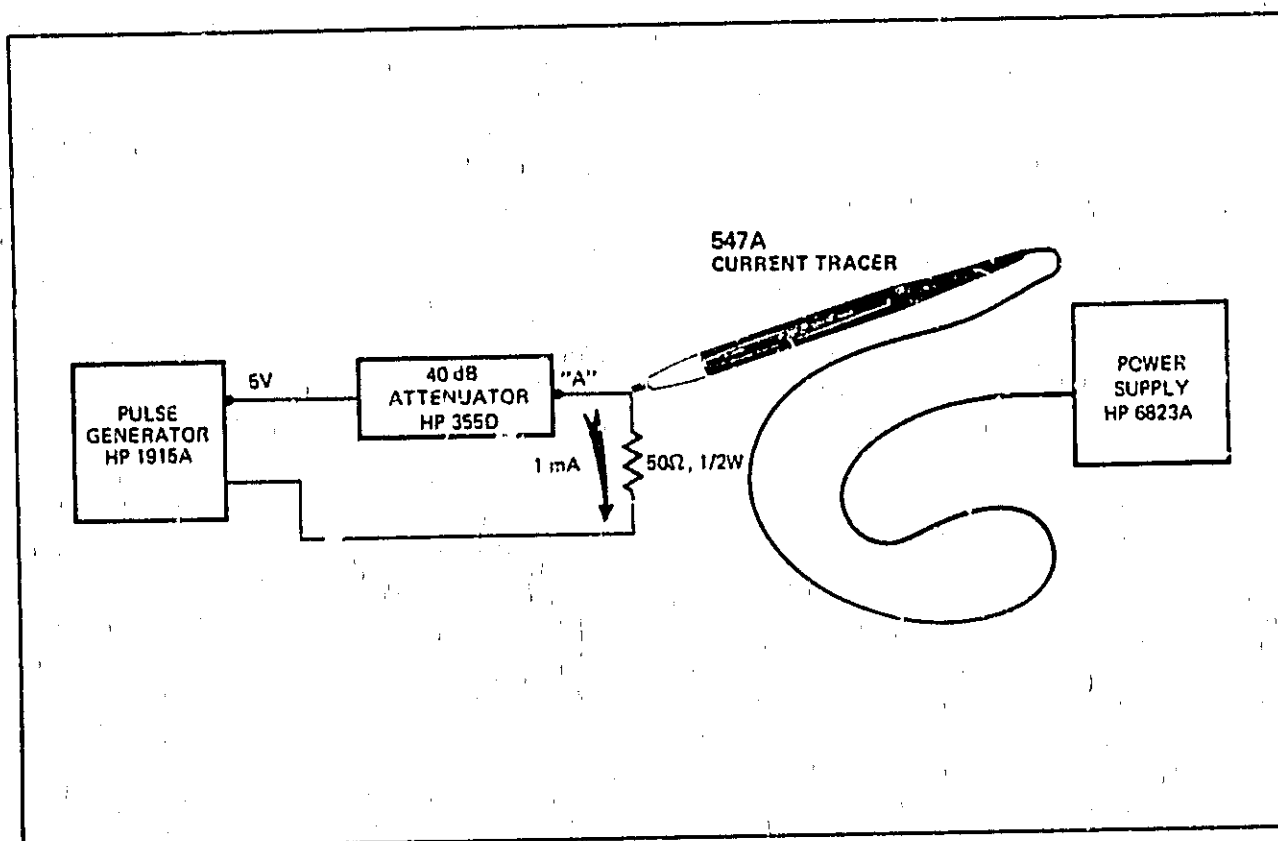


Figure 7. Setup for 1 mA Test

### Maximum Current (1.0A) Performance Test

Test equipment required:

- a. HP 1915A Pulse Generator.
- b. HP 6823A Power Supply.
- c. 50Ω, 20W Resistor.

With test equipment connected as shown in Figure 8, proceed as follows:

1. Set pulse generator to 50V amplitude.
2. Adjust power supply output to 4.5 volts.
3. Set Current Tracer sensitivity control at the 1 A end.
4. Place current tracer tip at point "A".
5. Orient current tracer for maximum magnetic coupling to the signal at point "A". (This is the point at which maximum brilliance of the indicator is obtained.)
6. Vary pulse generator frequency from single-step up to 10 MHz and observe that there is no visible change in indicator brilliance.
7. Set pulse generator frequency to 1 kHz.
8. Vary power supply voltage from 4.5V to 18V and observe that there is little or no visible change in brilliance.
9. Disconnect test equipment.

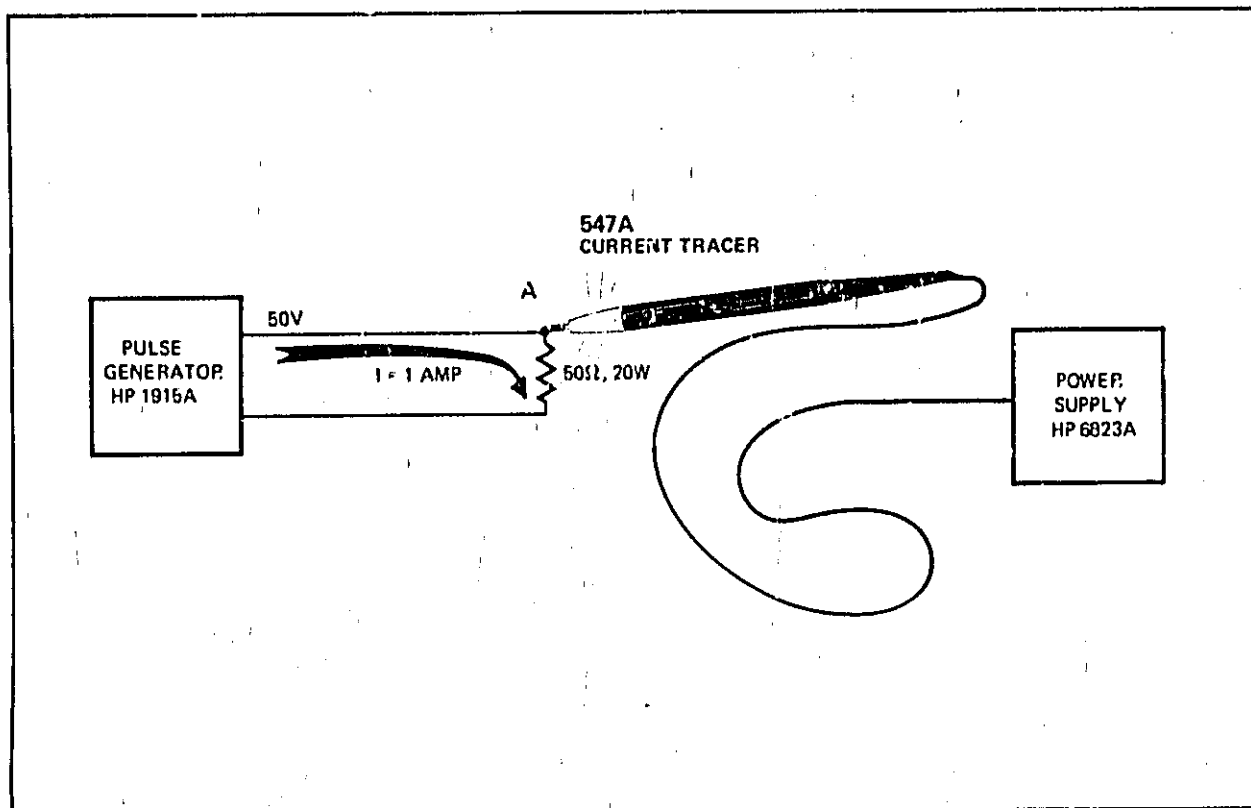


Figure 8. Setup for 1A Test

# PARTS LIST

Table 2. Replaceable Parts List

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	00547-60001	1	BOARD ASSEMBLY CURRENT TRACER SERIES 163E OR 1640	28480	00547-60001
A1C1	0180-0684	9	CAPACITOR-FXD 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C2	0180-0684		CAPACITOR-FXD 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C3	0180-0684		CAPACITOR-FXC 6.8UF+-20% 6VDC TA	144K	T3740685M006A5
A1C4	0160-0574	2	CAPACITOR-FXD .1UF +-20% 50WVDC CER	26654	21308R050R104M
A1C5	0160-0574		CAPACITOR-FXD .1UF +-20% 50WVDC CER	26654	21308R050R104M
A1C6	0180-0684		CAPACITOR-FXD 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C7	0180-0684		CAPACITOR-FXD 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C8	0180-0684		CAPACITOR-FXC 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C9	0160-0574	4	CAPACITOR-FXD .022UF +-20% 100WVDC CER	28480	0160-0574
A1C10	0160-0574		CAPACITOR-FXC .022UF +-20% 100WVDC CER	28480	0160-0574
A1C11	0180-0684		CAPACITOR-FXC 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C12	0160-0574		CAPACITOR-FXC .022UF +-20% 100WVDC CER	28480	0160-0574
A1C13	0160-0574		CAPACITOR-FXD .022UF +-20% 100WVDC CER	28480	0160-0574
A1C14	0160-4460	1	CAPACITOR-FXD .01UF +-50% 100WVDC CER	28480	0160-4460
A1C15	0180-4340	2	CAPACITOR-FXD 1.2UF +-20% 25WVDC CER	28480	0160-4340
A1C16	0180-0684		CAPACITOR-FXD 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C17	0180-0684		CAPACITOR-FXC 6.8UF+-20% 6VDC TA	0044K	T3740685M006A5
A1C18	0160-4340		CAPACITOR-FXD .64UF +-36UF 25WVDC CER	28480	0160-4340
A1C19	0180-2608	1	CAPACITOR-FXD .68UF+-20% 35VDC TA	0044K	T3740684M035A5
A1CR1	1901-0040	5	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A1CR2	1901-0040		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A1CR3	1901-0040		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A1CR4	1901-1068	2	DIODE-SCHOTTKY	28480	1901-1068
A1CR5	1901-0040		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A1CR6	1901-1068		DIODE-SCHOTTKY	28480	1901-1068
A1CR7	1901-0040		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A1CR8	1901-0619	1	DIODE-200V 50NS	28480	1901-0619
A1L1	9100-2265	1	COIL-FXD MOLDED RF SMOKE 10UH 10% 1000	24226	10/102

Table 2. Replaceable Parts List (Continued)

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1Q1	1834-0345 0340-0410	1	TRANSISTOR NPN 2N5179 SI TO-18 PD=200MW	04713	2N5179
A1Q2	1833-0389 0340-0410	2	INSULATOR-XSTR TO-18 .13-THK	07047	TRANSIPAD 10168
A1Q3	1833-0389 0340-0410	2	TRANSISTOR PNP SI TO-18 PD=150MW FT=4MHZ	28480	1833-0389
			INSULATOR-XSTR TO-18 .13-THK	07047	TRANSIPAD 10168
			TRANSISTOR PNP SI TO-18 PD=150MW FT=4MHZ	29480	1833-0389
			INSULATOR-XSTR TO-18 .13-THK	07047	TRANSIPAD 10168
A1R1	0498-7247	1	RESISTOR 2.47K 2% .05W F TC=0+-100	24546	C3-1/8-TO-2871-G
A1R2	0498-7240	4	RESISTOR 10K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1002-G
A1R3	00547-80004	1	RESISTOR, VAR 1.53K OHM WITH MTG BKT	28480	00547-80004
A1R4	0498-7245	2	RESISTOR 2.37K 2% .05W F TC=0+-100	24546	C3-1/8-TO-2371-G
A1R5	0498-7240	2	RESISTOR 10K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1002-G
A1R6	0498-7220	2	RESISTOR 215 2% .05W F TC=0+-100	24546	C3-1/8-TO-215R-G
A1R7	0498-7240	2	RESISTOR 10K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1002-G
A1R8	0498-7233	4	RESISTOR 750 2% .05W F TC=0+-100	24546	C3-1/8-TO-750R-G
A1R9	0498-7233	4	RESISTOR 750 2% .05W F TC=0+-100	24546	C3-1/8-TO-750R-G
A1R10	0098-7208	2	RESISTOR 75 2% .05W F TC=0+-100	24546	C3-1/8-TO-75R-G
A1R11	0098-7190	1	RESISTOR 12.1 2% .05W F TC=0+-100	24546	C3-1/8-TO-12R1-G
A1R12	0098-7243	2	RESISTOR 1.06K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1061-G
A1R13	0098-7233	2	RESISTOR 750 2% .05W F TC=0+-100	24546	C3-1/8-TO-750R-G
A1R14	0098-7198	1	RESISTOR 20.1 2% .05W F TC=0+-100	24546	C3-1/8-TO-20R1-G
A1R15	0098-7228	1	RESISTOR 484 2% .05W F TC=0+-100	24546	C3-1/8-TO-484R-G
A1R16	0498-7209	1	RESISTOR 75 2% .05W F TC=0+-100	24546	C3-1/8-TO-75R-G
A1R17	0498-7233	1	RESISTOR 750 2% .05W F TC=0+-100	24546	C3-1/8-TO-750R-G
A1R18	0498-7185	1	RESISTOR 220K 5% .125W CC TC=0+-1176	01121	882245
A1R19	0498-7220	1	RESISTOR 215 2% .05W F TC=0+-100	24546	C3-1/8-TO-215R-G
A1R20	0498-7288	1	RESISTOR 147K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1473-G
A1R21	2100-0954 00547-40004	1	RESISTOR-TAHR 500 20% CC SIDE-ADJ 1-TURN	71590	SERIES 3
A1R22	0498-7243	1	SUPPORT, PCY	28480	00547-40004
A1R23	0498-7243	1	RESISTOR 1.96K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1961-G
A1R24	0498-7944	1	RESISTOR 2.37K 2% .05W F TC=0+-100	24546	C3-1/8-TO-2371-G
			RESISTOR 680K 5% .125W CC TC=0+-850	01121	886845
A1R25	0498-7270	1	RESISTOR 26.2K 2% .05W F TC=0+-100	24546	C3-1/8-TO-2612-G
A1R26	0498-7249	2	RESISTOR 3.48K 2% .05W F TC=0+-100	24546	C3-1/8-TO-3481-G
A1R27	0498-7239	1	RESISTOR 1.31K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1331-G
A1R28	0498-7249	1	RESISTOR 3.48K 2% .05W F TC=0+-100	24546	C3-1/8-TO-3481-G
A1R29	0498-7240	1	RESISTOR 10K 2% .05W F TC=0+-100	24546	C3-1/8-TO-1002-G

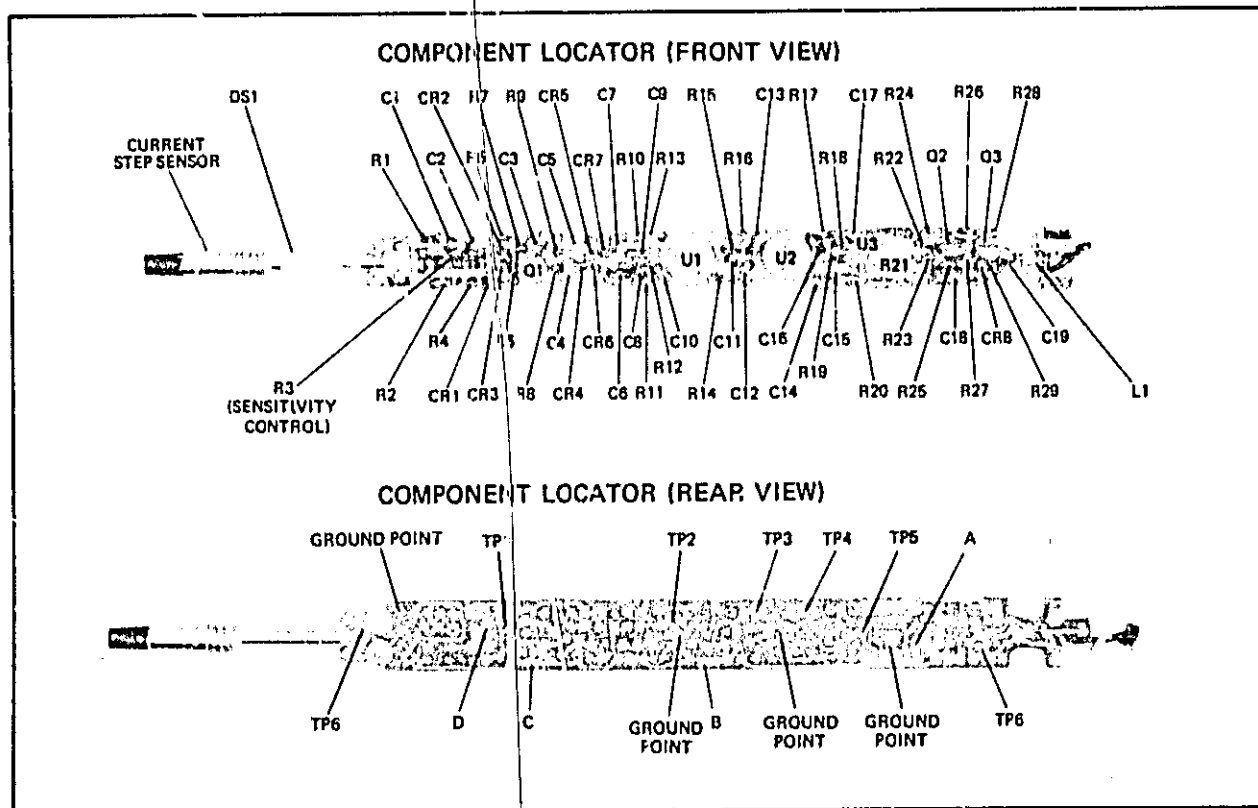
Table 2. Replaceable Parts List (Continued)

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1U1	00547-80002	2	IC, LINEAR	28480	00547-80002
A1U2	00547-80002	2	IC, LINEAR	28480	00547-80002
A1U3	1826-0291	1	IC LM 324 Q <sup>+</sup> AMP	27014	LM324P
A1DS1	2140-0378	1	LAMP-INCAND T-1 BULB 5V	00501	210
MP1	00547-20206	1	BOD F, BOTTOM HALF	28480	00547-20206
MP2	00547-20207	1	BODY, TOP HALF	28480	00547-20207
MP3	2190-0104	1	WASHER, LOCK	28480	2190-0104
MP4	00547-40001	1	WINDOW, TIGHTENER	28480	00547-40001
MP5	5088-7024	1	TIP ASSEMBLY	28480	5088-7024
LPS	00547-40005	1	COVER, TIP	28480	00547-40005
P1	10230-62101	2	GRABBER	28480	10230-62101
P2	10230-62101	2	GRABBER	28480	10230-62101
W1	00547-60100	1	C. LE ASSEMBLY, PRGBE	28480	00547-60100

Table 3. Manufacturers Code List


MFR NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
0044K	KEMET	MOUNTAIN VIEW CA	94040
00501	ILLUMINATED PRODUCTS INC	ANAHEIM CA	92803
01121	ALLEN-BRADLEY CO	MILWAUKEE WI	53212
04713	MOTOROLA SEMICONDUCTOR PRODUCTS	PHOENIX AZ	85008
07047	ROSS MILTON CO	SOUTHAMPTON PA	18966
24226	GOWANDA ELECTRONICS CORP	GOWANDA NY	14070
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD PA	16701
26654	VARADYNE INC	SANTA MONICA CA	90403
27014	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA CA	95051
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO CA	94304
71590	CENTRALAB ELEK DIV GLOBE-UNION INC	MILWAUKEE WI	53201

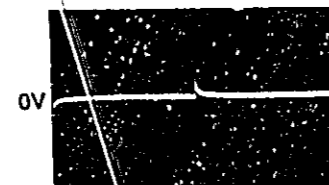
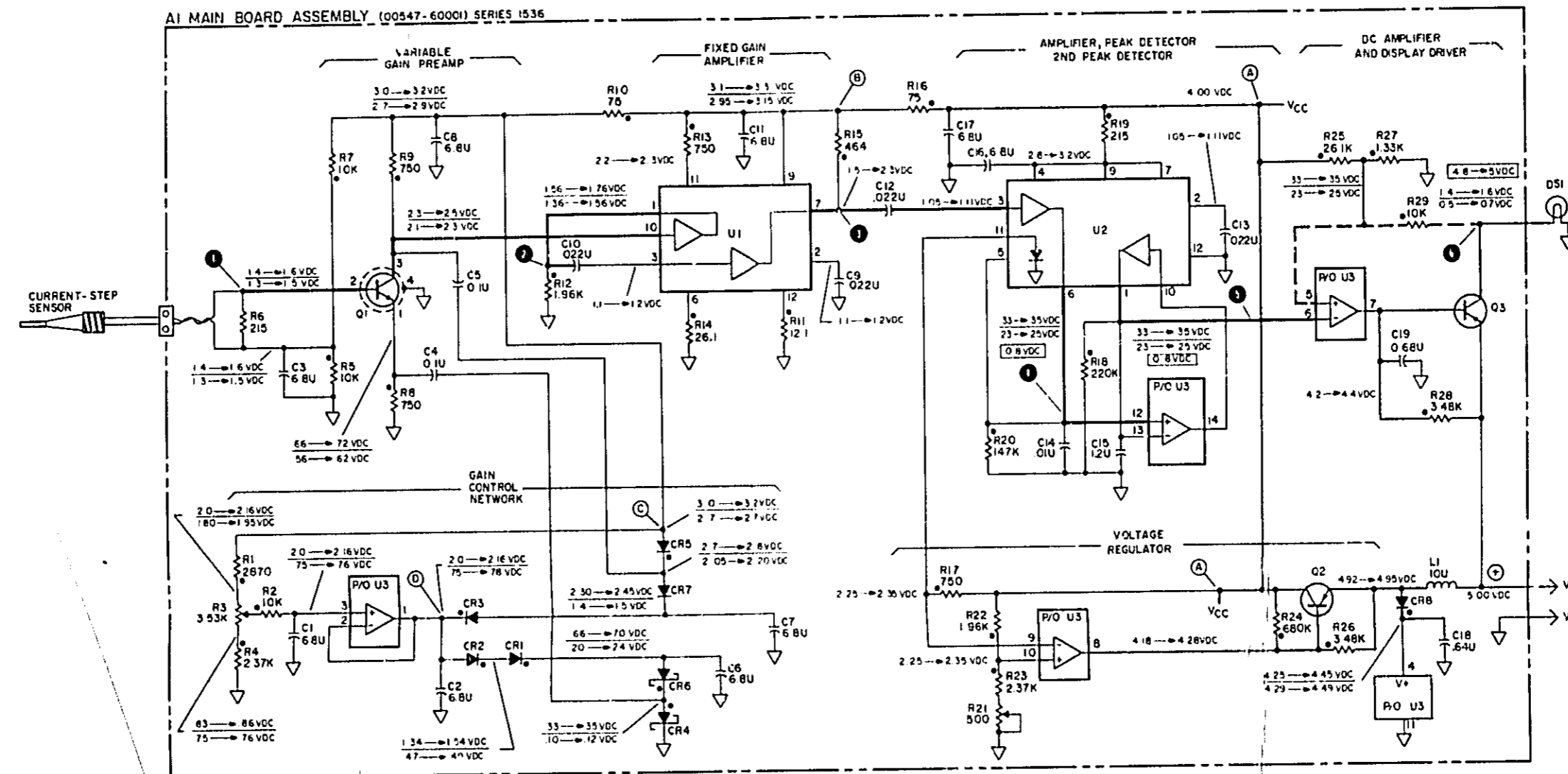
# **SCHEMATIC DIAGRAMS**



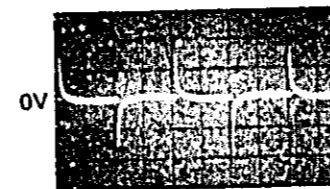
Part of Figure 9. Schematic Diagram

## NOTES

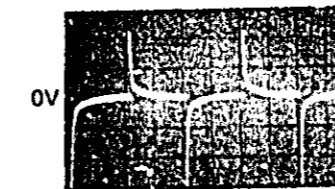
1. Reference designations within this assembly are abbreviated. Add assembly number to abbreviation for complete description.
2. Unless otherwise indicated:  
Resistance in ohms;  
Capacitance in farads;  
Inductance in henries.
3. "●" Indicates short lead at component end to be placed on PC board.
4. Voltage and current measurements taken under the following conditions:
  - a. Ambient temperature range 65°F to 85°F.
  - b. Power supply adjusted to give 5.00 Vdc at Test Point (C).
  - c. Trimmer R21 adjusted to give 4.00 Vdc at Test Point (A).
5. If a measured value falls slightly out of the specified range it does not necessarily indicate a malfunction. However, the area might be suspect if the tracer is not working properly.
6. Single line, double line, and boxed values are used at various points on the schematic to give troubleshooting data. These values are defined as follows:
  - a. A single line specification, e.g., 1.4 — 1.6 Vdc indicates measurement to be made at any setting of SENSITIVITY control.
  - b. A double line specification, e.g.,  $\frac{31 \rightarrow 35 \text{ mA}}{27 \rightarrow 31 \text{ mA}}$  indicates measurement to be made with the sensitivity control in the most sensitive position for the upper value and the least sensitive position for lower value.
  - c. A value shown in a box, e.g., 4.8 — 5.0 Vdc indicates measurement is to be made with sufficient stimulus present to light indicator to full brightness.
7. Numbered points, i.e., ③, on the PC board, designate the signal output or block sections on schematic. Refer to waveforms. Lettered points, i.e., (C), on the PC board. Indicate dc level points.
8. Circuits marked with shaded overlay, i.e.,  if grounded, and power supply is not current-limited, could result in destruction of Q2, Q3, L1 and CR8.
9. The broken lines, i.e., ---, are feedback paths.
10. Heavy black lines, i.e., ——— indicate path of signal flow.



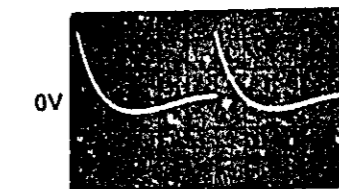
1 10 mV/cm, 5 μsec/cm  
PULSE PERIOD (PP) = 34.5 μsec  
SQW = 5.0V  
(SQW=SQUAREWAVE)



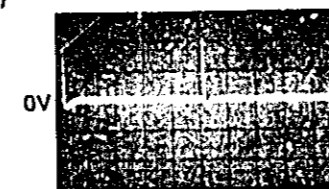
2 50 mV/cm, 5 μsec/cm  
PULSE PERIOD (PP) = 34.5 μsec  
SQW = 5.0V



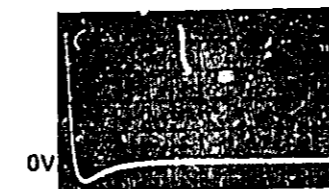
3 100 mV/cm, 5 μsec/cm  
PULSE PERIOD (PP) = 34.5 μsec  
SQW = 5.0V



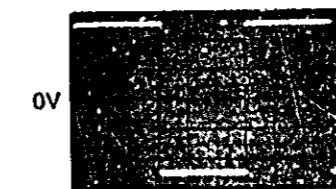
4 200 mV/cm, 0.2 msec/cm  
PULSE PERIOD (PP) = 3.3 msec  
SQW = 5.0V



5 100 mV/cm, 5 msec/cm  
PULSE PERIOD (PP) = 60 msec  
SQW = 5.0V



6 200 mV/cm, 1 msec/cm  
PULSE PERIOD (PP) = 60 msec  
SQW = 5.0V



5 6 INPUT (for test points 5 and 6)  
1V/cm, 10 μsec/cm

# **MANUAL CHANGES**

# MANUAL CHANGES

CHANGE DATE: 01 October 83  
(This change supersedes all earlier dated changes.)

\*\*\* Make all corrections listed under ERRATA before making other changes.

\*\*\* Check following table for your instrument's serial prefix, series number, or date code and make listed change(s) to manual.

## MANUAL DESCRIPTION

```
*****
* INSTRUMENT: 547A Current Probe
* Operating and Service Manual
*
*
*
* SERIAL PREFIX: A00051 and above
*
*
* DATE PRINTED: JAN 1978
* HP PART NO: 00547-90006
* MICROFICHE NO: 00547-90007
*
*****
```

# INDICATES NEW OR REVISED ITEM

> INDICATES ACTION TO BE TAKEN.

SERIAL PREFIX, SERIES NUMBER OR DATE CODE	MANUAL CHANGE(S)
---	---------------------

SERIES 1932 . . . . .	1
01A2132 . . . . .	3, 4

SERIAL PREFIX, SERIES NUMBER OR DATE CODE	MANUAL CHANGE(S)
---	---------------------

(C547A0SX)

1=8950/2=12008, 12415, 15013/3=15331/4=14228



HEWLETT  
PACKARD

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.

MANUAL CHANGE MODEL 00547A (00547-90006) Page 1

#ERRATA

Page 11, Table 2, Replaceable Parts:

>Delete 00547-40004; 2; SUPPORT, POT; 28480; 00547-40004.

MANUAL CHANGE MODEL 547A (00547-90006) Page 2

CHANGE 1 (Series 1932)

Page 7, Adjustments:

>Delete entire "ADJUSTMENTS" paragraph. Resistor R21 is replaced by a fixed resistor with a factory selected value.

Pages 10 and 11, Table 2, Replaceable Parts:

>Change "SERIES 1536 OR 1540" to SERIES 1932.

>Change R21 from 2100-0956 (500 Ohms adj.) to R21\*; 0698-7206; RESISTOR 56.2 Ohms 1% .05W F TC=0+/-100; 24546; C3-1/8-T00-56R2-G.

Page 13, Figure 9, Schematic Diagram:

>Change series number at top of diagram to 1932.

>Change R21 to a fixed value of 56.2 Ohms.

>Add an asterisk (\*) adjacent to R21.

CHANGE 2

Title Page NEWER INSTRUMENTS:

>Change to read as follows:

The changes in Current Probes with circuit board Series Numbers higher than A00051 or with condensed Series Numbers provided on the Date Code label, are described in the MANUAL CHANGES included with the manual.

CHANGE 2 (cont'd)

Page 1 INSTRUMENT IDENTIFICATION

>Delete the paragraph under "INSTRUMENT IDENTIFICATION".

>Replace with the following information:

SERIES/DATE CODE This product is identified by a SERIES CODE and DATE CODE, located on a vinyl label affixed to the inside of either the top or bottom of the probe shell. The Series/Date Code format used in all logic probes is as follows:

"01A2132"

The first two digits represent a condensed Series Code. When a change occurs to any model of HP logic probe family which affects the schematic, parts list, or specifications, the condensed SERIES CODE is incremented by one.

The letter "A" designates the country of origin; "A" indicates USA.

#CHANGE 2 (cont'd)

The last four digits represent the Date Code. The Date Code identifies the date-of-manufacture for the probe. The first two digits indicate the year the product was manufactured; the last two digits indicate the week of that year. Datecoding originated in the year 1960, at which time the code "00" was used for the first two digits to represent 1960. Every year after 1960 the code was incremented by one; for example, the Date Code "2012" indicates the product was manufactured in the 12th week of the year 1980 (1960+20).

Your probe will have either a four-digit Series Number stamped on the printed circuit board or a condensed Series Code, prefixing the Date Code on a vinyl label affixed to the inside of the probe shell.

WHICH CHANGES APPLY TO YOUR CURRENT PROBE?

There is a SERIES/DATE CODE number listed on the cover of the MANUAL CHANGES sheet. As changes are made, the condensed Series Code is incremented by one. Make all changes to your manual for Series Codes less than or equal to your tracer Series/Date Code.

Page 10, Table 2. A1(00547-60001) Replaceable Parts List:

>Change A1C15 from 0160-4340 to 0160-5611 CAPACITOR-FXD 1UF SP CER

MANUAL CHANGES MODEL 547A (00547-90006) Page 5

CHANGE 3

Page 11, Table 2. A1 (00547-60001) Replaceable Parts List:

>Change R21 from 0698-7206 to 0698-7225 RESISTOR-FXD 348 1% .05W TC=0+-100.

#CHANGE 4

Page 12, Table 2. Replacement Parts List:

>Change U3 from 1826-0291 to 1826-1072 IC OP AMP LM324D.

# SALES & SUPPORT OFFICES

Arranged alphabetically by country



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- Key Product Line  
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**CM** Components  
**C** Computer Systems Sales only  
**CH** Computer Systems Hardware Sales and Services  
**CS** Computer Systems Software Sales and Services  
**E** Electronic Instruments & Measurement Systems  
**M** Medical Products  
**MP** Medical Products Primary BRO  
**MS** Medical Products Secondary BRO  
**P** Personal Computation Products  
 \* Sales only for specific product line  
 - Support only for specific product line

**IMPORTANT:** These symbols designate general product line capability. They do not insure sales or support availability for all products within a line, at all locations. Contact your local sales office for information regarding locations where HP support is available for specific products.

*HP distributors are printed in italics.*

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 47th Floor, China Resources Bldg.  
 26 Harbour Rd., Wanchai  
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 Woluwedal  
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## CHILE

Jorge Calcagni y Cia. Ltda.  
Av. Italia 634 Santiago  
Casilla 16475  
SANTIAGO 9  
Tel: 222-0222  
Telex: Public Booth 440001  
A,CM,E,M

Olympia (Chile) Ltda.  
Av. Rodrigo de Araya 1045  
Casilla 256-V  
SANTIAGO 21  
Tel: (02) 22 55 044  
Telex: 240-545 OLYMP CL  
Cable: Olympia Chile Santiago Chile  
CH,CS,P

**CHINA, People's Republic of**  
China Hewlett-Packard Rep. Office  
P.O. Box 418  
1A Lane 2, Luchang St.  
Beiwei Rd., Xuanwu District  
BEIJING  
Tel: 33-1947, 33-7426  
Telex: 22601 CTSHP CN  
Cable: 1920  
A,CH,CM,CS,E,P

## COLOMBIA

Instrumentación  
H. A. Langebaek & Kier S.A.  
Carrera 4A No. 52A-26  
Apartado Aereo 6287  
BOGOTA 1, D.E.  
Tel: 212-1466  
Telex: 44400 INST CO  
Cable: AARIS Bogota  
CM,E,M

Casa Humboldt Ltda.  
Carrera 14, No. 98-60  
Apartado Aereo 51283  
BOGOTA 1, D.E.  
Tel: 256-1686  
Telex: 45403 CCAL CO.  
A

## COSTA RICA

Cientifica Costarricense S.A.  
Avenida 2, Calle 5  
San Pedro de Montes de Oca  
Apartado 10159  
SAN JOSE  
Tel: 24-38-20, 24-08-19  
Telex: 2367 GALGR CR  
CM,E,M

## CYPRUS

Telefax Ltd.  
P.O. Box 4809  
14C Stassinos Avenue  
NICOSIA  
Tel: 62696  
Telex: 2894 LFVDO CY  
E,MP

## DENMARK

Hewlett-Packard A/S  
Datavej 52  
DK-3460 BIRKERØD  
Tel: (02) 81-86-40  
Telex: 37409 hpas dk  
A,C\*,CM,CS,E,MS,P

Hewlett-Packard A/S  
Rølgædsvej 32  
DK-8240 RISSKOV, Aarhus  
Tel: (06) 17-60-00  
Telex: 37409 hpas dk  
CH,E

## DOMINICAN REPUBLIC

Microprog S.A.  
Juan Tomás Mejía y Cotes No. 60.  
Arroyo Hondo  
SANTO DOMINGO  
Tel: 565-6268  
Telex: 4510 ARENTA DR (RCA) P

## ECUADOR

CYEDE Cia. Ltda.  
Avenida Eloy Alfaro 1749  
Casilla 6423 CCI  
QUITO  
Tel: 450-975, 243-052  
Telex: 2548 CYEDE ED  
CM,E,P

Hospitalar S.A.  
Robles 625  
Casilla 3590  
QUITO  
Tel: 545-250, 545-122  
Telex: 2485 HOSPTL ED  
Cable: HOSPITALAR-Quito  
M

## EGYPT

International Engineering Associates  
24 Hussein Hegazi Street  
Kasr-el-Aini  
CAIRO  
Tel: 23829, 21641  
Telex: JEA UN 93830  
CH,CS,E,M

EGYPTOR  
P.O. Box 2558  
42 El Zahraa Street  
CAIRO, Egypt  
Tel: 65 00 21  
Telex: 83 337  
P

## EL SALVADOR

IPESA de El Salvador S.A.  
29 Avenida Norte 1216  
SAN SALVADOR  
Tel: 26-6858, 26-6868  
Telex: 20539 IPESASAL  
A,CH,CM,CS,E,P

## FINLAND

Hewlett-Packard Oy  
Revontulentie 7  
PL 24  
SF-02101 ESPOO 10  
Tel: (90) 4550211  
Telex: 121563 hpwpa fi  
CH,CM,CS,P

Hewlett-Packard Oy  
Carinkuoma 7  
PL 24  
02101 ESPOO 10  
Tel: (90) 4521022  
A,E,MS

Hewlett-Packard Oy  
Aatoksankatu 10-C  
SF-00720-72 JYVASKYLÄ  
Tel: (941) 216318  
CH

Hewlett-Packard Oy  
Kainuntie 1-C  
SF-90140-14 OULU  
Tel: (981) 338785  
CH

## FRANCE

Hewlett-Packard France  
Z.I. Mercure B  
Rue Berthelot  
F-13783 Les Milles Cedex  
AIX-EN-PROVENCE  
Tel: 16 (42) 59-41-02  
Telex: 410770F  
A,CH,E,MS,P\*

Hewlett-Packard France  
64, rue Marchand Saillant  
F-61000 ALENCON  
Tel: 16 (33) 29 04 42

Hewlett-Packard France  
Boite Postale 503  
F-25026 BESANCON  
28 rue de la République  
F-25000 BESANCON  
Tel: 16 (81) 83-16-22  
CH,M

Hewlett-Packard France  
13, Place Napoléon III  
F-29000 BREST  
Tel: 16 (98) 03-38-35

Hewlett-Packard France  
Chemin des Mouilles  
Boite Postale 162  
F-69130 ECULLY Cedex (Lyon)  
Tel: 16 (78) 833-81-25  
Telex: 310617F  
A,CH,CS,E,MP

Hewlett-Packard France  
Tour Lorraine  
Boulevard de France  
F-91035 EVRY Cedex  
Tel: 16 6 077-96-60  
Telex: 092315F  
E

Hewlett-Packard France  
Parc d'Activité du Bois Briard  
Ave. du Lac  
F-91040 EVRY Cedex  
Tel: 16 6 077-8383  
Telex: 692315F  
E

Hewlett-Packard France  
5, avenue Raymond Chanas  
F-38320 EYBENS (Grenoble)  
Tel: 16 (76) 25-81-41  
Telex: 980124 HP GRENBO EYBE  
CH

Hewlett-Packard France  
Centre d'Affaires Paris-Nord  
Bâtiment Ampère 5 étage  
Rue de la Commune de Paris  
Boite Postale 3  
F-93153 LE BLANC MESSIL  
Tel: 16 (1) 865-44-52  
Telex: 211032F  
CH,CS,E,MS

Hewlett-Packard France  
Parc d'Activités Cadere  
Quartier Jean Mennec  
Avenue du Président JF Kennedy  
F-33700 MERIGNAC (Bordeaux)  
Tel: 16 (56) 34-00-84  
Telex: 550105F  
CH,E,MC

Hewlett-Packard France  
Immeuble "Les 3 B"  
Nouveau Chemin de la Garde  
ZAC de Bois Briard  
F-44085 NANTES Cedex  
Tel: 16 (40) 50-32-22  
CH\*\*

# SALES & SUPPORT OFFICES

Arranged alphabetically by country

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## FRANCE (Cont'd)

Hewlett-Packard France  
125, rue du Faubourg Banner  
F-45000 OPLEANS  
Tel: 16 (38) 68 01 63

Hewlett-Packard France  
Zone Industrielle de Courtaboeuf  
Avenue des Tropiques  
F-91947 Les Ulis Cedex ORSAY  
Tel: (6) 907-78-25  
Telex: 600048F  
A,CH,CM,CS,E,MP,P

Hewlett-Packard France  
Paris Porte-Maillot  
15, Avenue de L'Amiral Bruix  
F-75782 PARIS CEDEX 16  
Tel: 16 (1) 502-12-20  
Telex: 613663F  
CH,MS,P

Hewlett-Packard France  
124, Boulevard Tourasse  
F-84000 PAU  
Tel: 16 (59) 80 38 02

Hewlett-Packard France  
2 Allée de la Bourgonnette  
F-35100 RENNES  
Tel: 16 (99) 51-42-44  
Telex: 740912F  
CH,CM,E,MS,P\*

Hewlett-Packard France  
88 Avenue de Bretagne  
F-76100 ROUEN  
Tel: 16 (35) 63-57-66  
CH\*\*CS

Hewlett-Packard France  
4 Rue Thomas Mann  
Boite Postale 58  
F-67033 STRASBOURG Cedex  
Tel: 16 (88) 28-58-48  
Telex: 890141F  
CH,E,MS,P\*

Hewlett-Packard France  
Le Péripole  
20, Chemin du Pigeonnier de la  
Céplère  
F-31083 TOULOUSE Cedex  
Tel: 16 (61) 40-11-12  
Telex: 531639F  
A,CH,CS,E,P\*

Hewlett-Packard France  
9, rue Baudin  
F-26000 VALENCE  
Tel: 16 (75) 42 78 16

Hewlett-Packard France  
Carolor  
ZAC de Bois Briand  
F-57640 VIGY (Metz)  
Tel: 16 (8) 77 20 22  
CH

Hewlett-Packard France  
Immerable Péricestra  
F-59638 VILLENEUVY D'ASCO Cedex  
Tel: 16 (20) 91-41-25  
Telex: 190124F  
CH,E,MS,P\*

## GERMAN FEDERAL REPUBLIC

Hewlett-Packard GmbH  
Geschäftsstelle  
Keithstrasse 2-4  
D-1000 BERLIN 30  
Tel: (030) 24-91-86  
Telex: 018 3405 hpbln d  
A,CH,E,MP

Hewlett-Packard GmbH  
Geschäftsstelle  
Herrenberger Strasse 130  
D-7030 BOBLINGEN  
Tel: (7031) 14-0  
Telex:

A,CH,CM,CS,E,MP,P  
Hewlett-Packard GmbH  
Geschäftsstelle  
Emanuel-Lutze-Strasse 1  
D-4000 DUISSELDORF  
Tel: (0211) 5971-1  
Telex: 085/65 533 hpdd d  
A,CH,CS,E,MS,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Schleefstr. 28a  
D-4600 DORTMUND-Aplerbeck  
Tel: (0231) 45001

Hewlett-Packard GmbH  
Vertriebszentrale Frankfurt  
Berner Strasse 117  
Postfach 560 140  
D-6000 FRANKFURT 56  
Tel: (0611) 50-04-1  
Telex: 04 13249 hpfm d  
A,CH,CM,CS,E,MP,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Aussenstelle Bad Homburg  
Luisenstrasse 115  
D-6380 BAD HOMBURG  
Tel: (06172) 109-0

Hewlett-Packard GmbH  
Geschäftsstelle  
Kapstadtring 5  
D-2000 HAMBURG 60  
Tel: (040) 63804-1  
Telex: 021 63 032 hphh d  
A,CH,CS,E,MS,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Heidering 37-39  
D-3000 HANNOVER 61  
Tel: (0511) 5706-0  
Telex: 092 3259  
A,CH,CM,E,MS,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Rosslauer Weg 2-4  
D-6800 MANNHEIM  
Tel: (0621) 70050  
Telex: 0462105  
A,C,E

Hewlett-Packard GmbH  
Geschäftsstelle  
Messerschmittstrasse 7  
D-7910 NEU-ULM  
Tel: 0731-70241  
Telex: 0712816 HP ULM-D  
A,C,E\*

Hewlett-Packard GmbH  
Geschäftsstelle  
Ehrlacherstr. 13  
D-8500 MÜNCHEN 10  
Tel: (0911) 5205-0  
Telex: 0623 8J0  
CH,CM,E,MS,P

Hewlett-Packard GmbH  
Geschäftsstelle  
Eschenstrasse 5  
D-8028 TAUFKIRCHEN  
Tel: (089) 6117-1  
Telex: 0524985  
A,CH,CM,E,MS,P

## GREAT BRITAIN

See United Kingdom

## GREECE

Kostas Karayannis S.A.  
8 Omirou Street  
ATHENS 133  
Tel: 32 30 37 J, 32 37 771  
Telex: 215967 FKAT GR  
A,CH,CM,CS,E,MP  
PLASO S.A.  
G. Gerardos  
24 Stourara Street  
ATHENS  
Tel: 36-11-160  
Telex: 221871  
P

## GUATEMALA

IPESA  
Avenida Reforma 3-48, Zona 9  
GUATEMALA CITY  
Tel: 316627, 314786  
Telex: 4192 TELTRO GU  
A,CH,CM,CS,E,MP

## HONG KONG

Hewlett-Packard Hong Kong, Ltd.  
G.P.O. Box 795  
5th Floor, Sun Hung Kai Centre  
30 Harbour Road  
HONG KONG  
Tel: 5-8323211  
Telex: 66678 HEWPA HX  
Cable: HEWPAK HONG KONG  
E,CH,CS,P  
CET Ltd.  
1402 Tung Wah Mansion  
199-203 Hennessy Rd.  
Wanchia, HONG KONG  
Tel: 5-729376  
Telex: 85148 CET HX  
CM  
Schmidt & Co. (Hong Kong) Ltd.  
Wing On Centre, 28th Floor  
Connaught Road, C.  
HONG KONG  
Tel: 5-455644  
Telex: 74766 SCHMX HX  
AM

## ICELAND

Elding Trading Company Inc.  
Halnamvolf-Tryggvagotu  
P.O. Box 895  
IS-REYKJAVIK  
Tel: 1-58-20, 1-63-03  
M

## INDIA

Computer products are sold through  
Blue Star Ltd. All computer repairs and  
maintenance service is done through  
Computer Maintenance Corp.

Blue Star Ltd.  
Sabri Complex II Floor  
24 Residency Rd.  
BANGALORE 560 025  
Tel: 55660  
Telex: 0845-430  
Cable: BLUESTAR  
A,CH\*,CM,CS\*,E

Blue Star Ltd.  
Band Box House  
Prabhadevi  
BOMBAY 400 025  
Tel: 422-3101  
Telex: 011-3751  
Cable: BLUESTAR  
AM

Blue Star Ltd.  
Sahas  
414/2 Vr Savarkar Marg  
Prabhadevi  
BOMBAY 400 025  
Tel: 422-6155  
Telex: 011-4093  
Cable: FROSTELUE  
A,CH\*,CM,CS\*,E,M

Blue Star Ltd.  
Kalyan, 19 Vishwas Colony  
Akrapul, BORODA, 390 005  
Tel: 65235  
Cable: BLUE STAR  
A

Blue Star Ltd.  
7 Hare Street  
CALCUTTA 700 001  
Tel: 12-01-31  
Telex: 021-7655  
Cable: BLUESTAR  
AM

Blue Star Ltd.  
133 Kodambakkam High Road  
MADRAS 600 034  
Tel: 82957  
Telex: 041-379  
Cable: BLUESTAR  
AM

Blue Star Ltd.  
Bhandari House, 7th/8th Floors  
91 Nehru Place  
NEW DELHI 110 024  
Tel: 682547  
Telex: 031-2463  
Cable: BLUESTAR  
A,CH\*,CM,CS\*,E,M

Blue Star Ltd.  
15/16, C Wellesley Rd.  
PUNE 411 011  
Tel: 22775  
Cable: BLUE STAR  
A

Blue Star Ltd.  
2-2-47/1108 Bolarum Rd.  
SECUNDERABAD 500 003  
Tel: 72057  
Telex: 0155-459  
Cable: BLUEFROST  
A,E

Blue Star Ltd.  
T.C. 7/603 Poomina  
Maruthankuzhi  
TRIVANDRUM 695 013  
Tel: 65799  
Telex: 0884-259  
Cable: BLUESTAR  
E

Computer Maintenance Corporation  
Ltd.  
115, Sarojini Devi Road  
SECUNDERABAD 500 003  
Tel: 310-184, 345-774  
Telex: 031-2960  
CH\*\*



## SALES & SUPPORT OFFICES

Arranged alphabetically by country

### INDONESIA

**BERCA Indonesia P.T.**

P.O. Box 496/Jkt.

J. Abdul Muis 62

JAKARTA

Tel: 21-375009

Telex: 46748 BERSAL IA

Cable: BERSAL JAKARTA

P

**BERCA Indonesia P.T.**

P.O. Box 2497/Jkt

Antara Bldg., 17th Floor

J. Medan Merdeka Selatan 17

JAKARTA-PUSAT

Tel: 21-344-181

Telex: BERSAL IA

A.C.S.E.M

**BERCA Indonesia P.T.**

P.O. Box 174/SBY.

J. Kutei No. 11

SURABAYA

Tel: 68172

Telex: 31148 BERSAL SB

Cable: BERSAL-SURABAYA

A\*,E,M,P

### IRAQ

**Hewlett-Packard Trading S.A.**

Service Operation

Al Mansoor City 98/3/7

BAGHDAD

Tel: 551-49-73

Telex: 212-455 HEPARAO IK

CH,CS

### IRELAND

**Hewlett-Packard Ireland Ltd.**

82/83 Lower Leeson Street

DUBLIN 2

Tel: 0001 608800

Telex: 30439

A,CH,CM,CS,E,M,P

**Cardiac Services Ltd.**

Kilmore Road

Arlane

DUBLIN 5

Tel: (01) 351820

Telex: 30439

M

### ISRAEL

**Eidan Electronic Instrument Ltd.**

P.O. Box 1270

JERUSALEM 91000

16, Chelav St.

JERUSALEM 94467

Tel: 533 221, 553 242

Telex: 25231 AB/PAKRD IL

A

**Electronics Engineering Division**

**Motorola Israel Ltd.**

16 Kremenetski Street

P.O. Box 25016

TEL-AVIV 67899

Tel: 3 08 388

Telex: 33569 Mott IL

Cable: BASTEL Tel-Aviv

CH,CM,CS,E,M,P

### ITALY

**Hewlett-Packard Italiana S.p.A.**

Traversa 99C

Via Giulio Petroni, 19

I-70124 BARI

Tel: (080) 41-07-44

M

**Hewlett-Packard Italiana S.p.A.**

Via Martin Luther King, 38/M

I-40132 BOLOGNA

Tel: (051) 402394

Telex: 511630

CH,E,MS

**Hewlett-Packard Italiana S.p.A.**

Via Principe Nicola 436/C

I-95126 CATANIA

Tel: (095) 37-10-87

Telex: 970291

C,P

**Hewlett-Packard Italiana S.p.A.**

Via G. Di Vittorio 9

I-20063 CERNUSCO SUL NAVIGLIO

(Milano)

Tel: (02) 923691

Telex: 334832

A,CH,CM,CS,E,M,P

**Hewlett-Packard Italiana S.p.A.**

Via C. Colombo 49

I-20090 TREZZANO SUL NAVIGLIO

(Milano)

Tel: (02) 4459041

Telex: 322116

C,M

**Hewlett-Packard Italiana S.p.A.**

Via Nuova San Rocco a

Cepodimonte, 62/A

I-60131 NAPOLI

Tel: (081) 7413544

Telex: 710698

A,CH,E

**Hewlett-Packard Italiana S.p.A.**

Viale G. Modugno 33

I-16158 GENOVA PEGLI

Tel: (010) 63-37-07

Telex: 215238

E,C

**Hewlett-Packard Italiana S.p.A.**

Via F. Jizzo 15

I-35128 PADOVA

Tel: (049) 664888

Telex: 430315

A,CH,E,MS

**Hewlett-Packard Italiana S.p.A.**

Viale C. Pavese 340

I-00144 ROMA EUR

Tel: (06) 54831

Telex: 610514

A,CH,CM,CS,E,MS,P\*

**Hewlett-Packard Italiana S.p.A.**

Via di Casellina 57/C

I-50018 SCANDICCIO FIRENZE

Tel: (055) 753863

**Hewlett-Packard Italiana S.p.A.**

Corso Svizzera, 185

I-10144 TORINO

Tel: (011) 74 4044

Telex: 221079

CH,E

### JAPAN

**Yokogawa-Hewlett-Packard Ltd.**

152-1, Onna

ATSUMI, Kanagawa, 243

Tel: (0462) 28-0451

CM,C\*,E

**Yokogawa-Hewlett-Packard Ltd.**

Meiji-Seimei Bldg. 2F

3-1 Hon Chiba-Cho

CHIBA, 280

Tel: 472 25 7701

E,CH,CS

**Yokogawa-Hewlett-Packard Ltd.**

Yasuda-Seimei Hirschman Bldg.

8-11, Hon-dori, Naka-ku

HIROSHIMA, 730

Tel: 82-241-0611

**Yokogawa-Hewlett-Packard Ltd.**

Towa Building

2-3, Kaigan-dori, 2 Chome Chuo-ku

KOBE, 650

Tel: (078) 392-4791

C,E

**Yokogawa-Hewlett-Packard Ltd.**

Kumagaya Asahi 82 Bldg

3-4 Tsukuba

KUMAGAYA, Saitama 360

Tel: (0485) 24-6563

CH,CM,E

**Yokogawa-Hewlett-Packard Ltd.**

Asahi Shinbun Daichi Seimei Bldg.

4-7, Hanabata-cho

KUMAMOTO, 860

Tel: (0963) 54-7311

CH,E

**Yokogawa-Hewlett-Packard Ltd.**

Shin-Kyoto Center Bldg.

614, Higashi-Shikokji-cho

Karasuma-Nishiku

Shikokji-dori, Shimogyo-ku

KYOTO, 600

Tel: 075-343-0921

CH,E

**Yokogawa-Hewlett-Packard Ltd.**

Mito Mitsui Bldg

4-73, Sanno-maru, 1 Chome

MITO, Ibaraki 310

Tel: (0292) 25-7470

CH,CM,E

**Yokogawa-Hewlett-Packard Ltd.**

Sumitomo Seimei 14-9 Bldg.

Meieki-Minami, 2 Chome

Nakamura-ku

NAGOYA, 450

Tel: (052) 571-5171

CH,CM,CS,E,MS

**Yokogawa-Hewlett-Packard Ltd.**

Chuo Bldg.,

4-20 Nishinakajima, 5 Chome

Yodogawa-ku

OSAKA, 532

Tel: (06) 304-6021

Telex: YHFGSA 523-3824

A,CH,CM,CS,E,MP,P\*

**Yokogawa-Hewlett-Packard Ltd.**

27-15, Yabe, 1 Chome

SAGAMIHARA Kanagawa, 229

Tel: 0427 59-1311

**Yokogawa-Hewlett-Packard Ltd.**

Daichi Seimei Bldg.

7-1, Nishi Shinjuku, 2 Chome

Shinjuku-ku, TOKYO 160

Tel: 03-348-4811

CH,E

**Yokogawa-Hewlett-Packard Ltd.**

29-21 Takaido-Higashi, 3 Chome

Suginami-ku TOKYO 168

Tel: (03) 331-6111

Telex: 232-2024 YHPTOK

A,CH,CM,CS,E,MP,P\*

**Yokogawa-Hewlett-Packard Ltd.**

Daichi Asano Building

2-8, Odori, 5 Chome

UTSUNOMIYA, Tochigi 320

Tel: (0286) 25-7155

CH,CS,E

**Yokogawa-Hewlett-Packard Ltd.**

Yasuda Seimei Nishiguchi Bldg.

30-4 Tsuruya-cho, 3 Chome

YOKOHAMA 221

Tel: (045) 312-1252

CH,CM,E

### JORDAN

**Mousher Cousins Company**

P.O. Box 1387

AMMAN

Tel: 24907, 399C

Telex: 21456 SABCO JO

CH,E,M,P

### KENYA

**ADCOM Ltd., Inc., Kenya**

P.O. Box 30070

NAIROBI

Tel: 331955

Telex: 22639

E,M

### KOREA

**Samsung Electronics HP Division**

12 Fl. Kiam Bldg.

San 75-31, Yeoksam-Dong

Kangnam-Ku

Yeongdong P.O. Box 72

SEOUL

Tel: 555-7555, 555-5447

Telex: K27364 SAMSAN

A,CH,CM,CS,E,M,P

### KUWAIT

**Al-Khaldiya Trading & Contracting**

P.O. Box 830 Safat

KUWAIT

Tel: 42-4910, 41-1726

Telex: 22481 Areeg ki

CH,E,M

**Photo & Cine Equipment**

P.O. Box 270 Safat

KUWAIT

Tel: 42-2846, 42-3801

Telex: 22247 Matin ki

P

### LEBANON

**G.M. Dolmactian**

Achrafieh

P.O. Box 165.167

BEIRUT

Tel: 290293

MP\*\*

**Computer Information Systems**

P.O. Box 11-6274

BEIRUT

Tel: 89 48 73

Telex: 22259

C

### LUXEMBOURG

**Hewlett-Packard Belgium S.A./N.V.**

Bvd de la Woluwe, 100

Woluwe

B-1200 BRUSSELS

Tel: (02) 762-32-00

Telex: 23-484 paloben bru

A,CH,CM,CS,E,MP,P

### MALAYSIA

**Hewlett-Packard Sales (Malaysia)**

Sdn. Bhd.

1st Floor, Bangunan British

American

Jalan Semantan, Damansara Heights

KUALA LUMPUR 23-0

# SALES & SUPPORT OFFICES

Arranged alphabetically by country

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## MALAYSIA (Cont'd)

Protel Engineering  
P.O. Box 1917  
Lot 6624, Section 64  
23/4 Pandan Road  
Kuching, SARAWAK  
Tel: 36299  
Telex: MA 70904 PROMAL  
Cable: PROTELENG  
J.E.M.

## MALTA

Philp Toledo Ltd.  
Notable Rd.  
BIRKBECK  
Tel: 447 47, 455 66  
Telex: Media MH 649  
E.P.

## MEXICO

Hewlett-Packard Mexicana, S.A.  
de C.V.  
Av. Periferico Sur No. 6501  
Tepepan, Xochimilco  
16020 MEXICO D.F.  
Tel: 6-78-46-00  
Telex: 17-74-507 HEWPACK MEX  
A.CH,CS,E,MS,F  
Hewlett-Packard Mexicana, S.A.  
de C.V.  
Ave. Colonia del Valle 409  
Col. del Valle  
Municipio de Garza Garcia  
MONTERREY, Nuevo Leon  
Tel: 78 42 41  
Telex: 038 410  
CH  
ECISA  
José Vasconcelos No. 218  
Col. Condesa Deleg. Cuauhtémoc  
MEXICO D.F. 06140  
Tel: 553-1206  
Telex: 17-72755 ECE ME  
M

## MOROCCO

Dolbeau  
81 rue Karachi  
CASABLANCA  
Tel: 3041-82, 3068-38  
Telex: 23051, 22822  
E

## Gerep

2 rue d'Agadir  
Boite Postale 156  
CASABLANCA  
Tel: 272093, 272095  
Telex: 23 739  
P

## NETHERLANDS

Hewlett-Packard Nederland B.V.  
Van Heuven Goedhartlaan 121  
NL 1181KK AMSTELVEEN  
P.O. Box 667  
NL 1180 AR AMSTELVEEN  
Tel: (020) 47-20-21  
Telex: 13 216 HEPA NL  
A.CH,CM,CS,E,MP,P  
Hewlett-Packard Nederland B.V.  
Bongerd 2  
NL 2906VK CAPELLE A/D IJSSEL  
P.O. Box 41  
NL 2900AA CAPELLE A/D IJSSEL  
Tel: (10) 51-84-44  
Telex: 21261 HEPAC NL  
A.CH,CS,E

Hewlett-Packard Nederland B.V.  
Pastoor Petersstraat 134-136  
NL 5612 LV EINDHOVEN  
P.O. Box 2342  
NL 5600 CH EINDHOVEN  
Tel: (040) 326911  
Telex: 51484 hepas nl  
A.CH\*\*E,M

## NEW ZEALAND

Hewlett-Packard (N.Z.) Ltd.  
5 Owens Road  
P.O. Box 26-189  
Epsom, AUCKLAND  
Tel: 687-159  
Cable: HEWPACK Auckland  
CH,CM,E,P

Hewlett-Packard (N.Z.) Ltd.  
4-12 Crickshank Street  
Kilbirnie, WELLINGTON 3  
P.O. Box 8443  
Courtenay Place, WELLINGTON 3  
Tel: 877-199  
Cable: HEWPACK Wellington  
CH,CM,E,P

Northrop Instruments & Systems Ltd.  
369 Khyber Pass Road  
P.O. Box 8602  
AUCKLAND  
Tel: 784-091  
Telex: 60605  
A.M

Northrop Instruments & Systems Ltd.  
110 Mendenhall St.  
P.O. Box 8388  
CHRISTCHURCH  
Tel: 486-828  
Telex: 4203  
A.M

Northrop Instruments & Systems Ltd.  
Sturdee House  
85-87 Ghuznee Street  
P.O. Box 2406  
WELLINGTON  
Tel: 850-091  
Telex: NZ 3380  
A.M

## NORTHERN IRELAND

See United Kingdom

## NORWAY

Hewlett-Packard Norge A/S  
Folke Bernadottes vei 50  
P.O. Box 3558  
N-5033 FYLLINGSDALEN (Bergen)  
Tel: 0047/5/18 55 40  
Telex: 16621 hpnas n  
CH,CS,E,MS

Hewlett-Packard Norge A/S  
Østerdalen 16-18  
P.O. Box 34  
N-1345 ØSTERÅS  
Tel: 0047/2/17 11 80  
Telex: 16621 hpnas n  
A.CH,CM,CS,E,MP

## OMAN

Khimil Ramdas  
P.O. Box 19  
MUSCAT  
Tel: 722225, 745601  
Telex: 3289 BROKER MB MUSCAT  
P

Suhail & Saud Bahwan  
P.O. Box 169  
MUSCAT  
Tel: 734 201-3  
Telex: 3274 BAHWAN MB

## PAKISTAN

Mushko & Company Ltd.  
1-B, Street 43  
Sector F-8/1  
ISLAMABAD  
Tel: 51071  
Cable: FEMUS Rawalpindi  
A.E.M

Mushko & Company Ltd.  
Doshman Chambers  
Abdullah Haroon Road  
KARACHI 0302  
Tel: 524131, 524132  
Telex: 2894 MUSYO PK  
Cable: COOPERA FOR Karachi  
A.E.M.P

## PANAMA

Electrónico Balboa, S.A.  
Calle Samuel Lewis, Ed. Alfa  
Apartado 4829  
PANAMA 5  
Tel: 63-6613, 63-6748  
Telex: 3483 ELECTRON PG  
A.CH,CM,E,P

## PERU

Cia Electro Médica S.A.  
Los Flamencos 145, San Isidro  
Casilla 1030  
LIMA 1  
Tel: 41-4325, 41-3703  
Telex: Pub. Booth 25306  
CH,CM,E,P

## PHILIPPINES

The Online Advanced Systems  
Corporation  
Rico House, Amorsolo Cor. Herrera  
Street  
Legaspi Village, Makati  
P.O. Box 1510  
Metro MANILA  
Tel: 85-35-81, 85-34-91, 85-32-21  
Telex: 3274 ONLINE  
A.CH,CS,E,M  
Electronic Specialists and Proponents  
Inc.  
690-B Epifanio de los Santos Avenue  
Cubao, QUEZON CITY  
P.O. Box 2649 Manila  
Tel: 98-96-81, 98-96-82, 98-96-83  
Telex: 40018, 42000 ITT GLOBE  
MACKAY BOOTH  
P

## PORTUGAL

Mundinter  
Intercambio Mundial de Comércio  
S.A.R.L.  
P.O. Box 2761  
Av. Antonio Augusto de Aguiar 138  
P-LISBON  
Tel: (19) 53-21-31, 53-21-37  
Telex: 16691 munter p  
M

Soquímica  
Av. da Liberdade, 220-2  
1298 LISBOA C. dex  
Tel: 56 21 81/2/3  
Telex: 13318 SABACA  
P

Teletra-Empresa Técnica de  
Equipamentos Eléctricos S.A.R.L.  
Rua Rodrigo de Fonseca 103  
P.O. Box 2531  
P-LISBON 1  
Tel: (19) 68-60-72  
Telex: 12598  
CH,CS,E,P

## PUERTO RICO

Hewlett-Packard Puerto Rico  
Ave. Muñoz Rivera #101  
Esq. Calle Ochoa  
HATO REY, Puerto Rico 00918  
Tel: (809) 754-7800  
Hewlett-Packard Puerto Rico  
Calle 272 Edificio 203  
Urb. Country Club  
RIO PIEDRAS, Puerto Rico  
P.O. Box 4407  
CAROLINA, Puerto Rico 00628  
Tel: (809) 762-7255  
A.CH,CS

## QATAR

Computarbia  
P.O. Box 2750  
DOHA  
Tel: 883555  
Telex: 4806 CHPARB  
P  
Eastern Technical Services  
P.O. Box 4747  
DOHA  
Tel: 329 693  
Telex: 4156 EASTEC DH  
Nasser Trading & Contracting  
P.O. Box 1563  
DOHA  
Tel: 22170, 23539  
Telex: 4439 NASCER DH  
M

## SAUDI ARABIA

Modern Electronic Establishment  
Hewlett-Packard Division  
P.O. Box 22015  
Thuobah  
AL-KHOBAR  
Tel: 895-1760, 895-1764  
Telex: 671 106 HPMEEK SJ  
Cable: ELECTA AL-KHOBAR  
CH,CS,E,M  
Modern Electronic Establishment  
Hewlett-Packard Division  
P.O. Box 1228  
Rodeo Plaza, 6th Floor  
JEDDAH  
Tel: 644 38 48  
Telex: 4027 12 FARNAS SJ  
Cable: ELECTA JEDDAH  
CH,CS,E,M

Modern Electronic Establishment  
Hewlett-Packard Division  
P.O. Box 22015  
RIYADH  
Tel: 491-97 15, 491-63 87  
Telex: 202049 MEERYD SJ  
CH,CS,E,M  
Abdul Ghani El Ajou  
P.O. Box 78  
RIYADH  
Tel: 40 41 717  
Telex: 200 932 EL AJOU  
P

## SCOTLAND

See United Kingdom

## SINGAPORE

Hewlett-Packard Singapore (Sales)  
Pte. Ltd.  
#08-00 Inchope House  
450-2 Alexandra Road  
P.O. Box 58 Alexandra Rd. Post Office  
SINGAPORE, 9115  
Tel: 631788  
Telex: HPSSGO PS 34209  
Cable: HEWPACK, Singapore  
A.CH,CS,E,MS,P



## SALES & SUPPORT OFFICES

Arranged alphabetically by country

### SINGAPORE (Cont'd)

*Dynamar International Ltd.*  
Unit 05-11 Block 6  
Kohlan Ayer Industrial Estate  
SINGAPORE 1334  
Tel: 747-6188  
Telex: RS 26283  
CM

### SOUTH AFRICA

Hewlett-Packard So Africa (Pty.) Ltd.  
P.O. Box 120  
Howard Place CAPE PROVINCE 7450  
Pine Park Center, Forest Drive,  
Pinelands

CAPE PROVINCE 7405

Tel: 53-7954

Telex: 57-20006

A,CH,CM,E,MS,P

Hewlett-Packard So Africa (Pty.) Ltd.

P.O. Box 37099

92 Overport Drive

DURBAN 4007

Tel: 28-4178, 28-4179, 28-4110

Telex: 6-22954

CH,CM

Hewlett-Packard So Africa (Pty.) Ltd.

6 Linton Arcade

511 Cape Road

Linton Grange

PORT ELIZABETH 6000

Tel: 041-302148

CH

Hewlett-Packard So Africa (Pty.) Ltd.

P.O. Box 33345

Glenstantia 0010 TRANSVAAL

1st Floor East

Constantia Park Ridge Shopping

Centre

Constantia Park

PRETORIA

Tel: 982043

Telex: 32163

CH,E

Hewlett-Packard So Africa (Pty.) Ltd.

Private Bag Wendywood

SANDTON 2144

Tel: 602-5111, 602-5125

Telex: 4-20877

Cable: HEWPACK Johannesburg

A,CH,CM,CS,E,MS,P

### SPAIN

Hewlett-Packard Española S.A.

Calle Entenza, 321

E-BARCELONA 29

Tel: 322.24.51, 321.73.54

Telex: 52603 hpbce

A,CH,CS,E,MS,P

Hewlett-Packard Española S.A.

Calle San Vicente S/No

Edificio Albia II

E-BILBAO 1

Tel: 423.83.06

A,CH,E,MS

Hewlett-Packard Española S.A.

Ctra. de la Coruña, Km. 16, 400

Las Rozas

E-MADRID

Tel: (1) 637.00.11

CH,CS,M

Hewlett-Packard Española S.A.

Avda. S. Francisco Javier, S/No

Planta 10. Edificio Sevilla 2,

E-SEVILLA 5

Tel: 64.44.54

Telex: 72933

A,CS,MS,P

Hewlett-Packard Española S.A.

Calle Ramon Gordoño, 1 (Entro.3)

E-VALENCIA 10

Tel: 361-1354

CH,P

### SWEDEN

Hewlett-Packard Sverige AB

Sunnanvagen 14K

S-22226 LUND

Tel: (046) 13-69-79

Telex: (854) 17886 (via Spånga

office)

CH

Hewlett-Packard Sverige AB

Östra Tullgatan 3

S-21128 MALMÖ

Tel: (040) 70270

Telex: (854) 17886 (via Spånga

office)

Hewlett-Packard Sverige AB

Västra Vintergatan 9

S-70344 ÖREBRO

Tel: (19) 10-48-80

Telex: (854) 17886 (via Spånga

office)

CH

Hewlett-Packard Sverige AB

Skallholtsgränd 9, Kista

Box 19

S-16383 SPÅNGA

Tel: (08) 750-2000

Telex: (854) 17886

Telefax: (08) 7527781

A,CH,CM,CS,E,MS,P

Hewlett-Packard Sverige AB

Fröfallsgränd 30

S-42132 VÄSTRA-FRÖLUNDA

Tel: (031) 49-09-50

Telex: (854) 17886 (via Spånga

office)

CH,E,P

### SWITZERLAND

Hewlett-Packard (Schweiz) AG

Clarastrasse 12

CH-4058 BASEL

Tel: (61) 33-59-20

A

Hewlett-Packard (Schweiz) AG

7, rue du Bois-du-Lan

Casa Postale 365

CH-1217 MEYRIN 2

Tel: (0041) 22-83-11-11

Telex: 27333 HPAG CH

CH,CM,CS

Hewlett-Packard (Schweiz) AG

Allmend 2

CH-8967 WIDEN

Tel: (0041) 57 31 21 11

Telex: 53933 hpag ch

Cable: HPAG CH

A,CH,CM,CS,E,MS,P

### SYRIA

General Electronic Inc.

Nuri Basha Ahmad Ebn Kays Street

P.O. Box 5781

DAMASCUS

Tel: 33-24-87

Telex: 411 215

Cable: ELECTROBOR DAMASCUS

E

Middle East Electronics

P.O. Box 2308

Abu Rummaneh

DAMASCUS

Tel: 33 4 5 92

Telex: 411 304

M

### TAIWAN

Hewlett-Packard Far East Ltd.

Kaohsiung Office

2/F 68-2, Chung Cheng 3rd Road

KAOHSIUNG

Tel: (07) 241-2318

CH,CS,E

Hewlett-Packard Far East Ltd.

Taiwan Branch

8th Floor

337 Fu Hsing North Road

TAIPEI

Tel: (02) 712-0404

Telex: 24439 HEWPACK

Cable: HEWPACK Taipei

A,CH,CM,CS,E,MS,P

Ing Lih Trading Co.

3rd Floor, 7 Jen-Ai Road, Sec. 2

TAIPEI 100

Tel: (02) 3948191

Cable: INGLI TAIPEI

A

### THAILAND

Unimesa

30 Patpong Ave., Suriwong

BANGKOK 5

Tel: 235-5727

Telex: 84439 Simonco TH

Cable: UNIMESA Bangkok

A,CH,CS,E,M

Bangkok Business Equipment Ltd.

5/5-6 Dejo Road

BANGKOK

Tel: 234-8670, 234-8671

Telex: 87669-BEQUIPT TH

Cable: BUSIQUIPT Bangkok

P

### TRINIDAD & TOBAGO

Caribbean Telecoms Ltd.

50/A Jerningham Avenue

P.O. Box 732

PORT-OF-SPAIN

Tel: 62-44213, 62-44214

Telex: 235,272 HUGCO WG

CH,E,MP

### TUNISIA

Tunis Electronique

31 Avenue de la Liberté

TUNIS

Tel: 280-144

E,P

Corema

1 ter. Av. de Carthage

TUNIS

Tel: 253-821

Telex: 12319 CABAM TN

M

### TURKEY

Teknim Company Ltd.

Iran Caddesi No. 7

Kavakdere, ANKARA

Tel: 275800

Telex: 42155 TKNM TR

E

E.M.A.

Medina Eidem Sokak No.4/1/6

Yüksel Caddesi

ANKARA

Tel: 175 622

Telex: 42 591

M

### UNITED ARAB EMIRATES

Emilac Ltd.

P.O. Box 2711

ABU DHABI

Tel: 82 04 19-20

Cable: EMTAC ABUDHABI

Emilac Ltd.

P.O. Box 1641

SHARJAH

Tel: 591 181

Telex: 68136 Emilac Sh

CH,CS,E,MP

### UNITED KINGDOM

#### GREAT BRITAIN

Hewlett-Packard Ltd.

Trafalgar House

Navigation Road

ALTRINCHAM

Cheshire WA14 1NU

Tel: 061 928 6422

Telex: 668068

A,CH,CS,E,M,MS,P

Hewlett-Packard Ltd.

Elstree House, Elstree Way

BOREHAMWOOD, Herts WD6 1SG

Tel: 01 207 5000

Telex: 8952716

E,CH,CS,P

Hewlett-Packard Ltd.

Oakfield House, Oakfield Grove

Clifton BRISTOL, Avon BS8 2BN

Tel: 0272 736806

Telex: 444302

CH,CS,E,P

Hewlett-Packard Ltd.

Bridewell House

Bridewell Place

LONDON EC4V 6BS

Tel: 01 583 6565

Telex: 298163

CH,CS,P

Hewlett-Packard Ltd.

Fourier House

257-263 High Street

LONDON COLNEY

Herts. AL2 1HA, St. Albans

Tel: 0727 24400

Telex: 1-8952716

CH,CS

Hewlett-Packard Ltd.

Pontefract Road

NORMANTON, West Yorkshire WF6 1RN

Tel: 0824 895566

Telex: 557355

CH,CS,P

Hewlett-Packard Ltd.

The Quadrangle

106-118 Station Road

REDHILL, Surrey RH1 1PS

Tel: 0737 68655

Telex: 947234

CH,CS,E,P

# SALES & SUPPORT OFFICES

Arranged alphabetically by country

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## GREAT BRITAIN (Cont'd)

Hewlett-Packard Ltd.  
Avon House  
435 Stratford Road  
Shirley, BOLLING, West Midlands  
B90 4BL  
Tel: 021 745 8800  
Telex: 339105  
CH,CS,E,P  
Hewlett-Packard Ltd.  
West End House  
41 High Street, West End  
SOUTHAMPTON  
Hampshire SO3 3DQ  
Tel: 04218 6767  
Telex: 477138  
CH,CS,P  
Hewlett-Packard Ltd.  
Eskdale Rd.  
Winnersh, WOKINGHAM  
Berkshire RG11 0DZ  
Tel: 0734 696822  
Telex: 848884  
E

Hewlett-Packard Ltd.  
King Street Lane  
Winnersh, WOKINGHAM  
Berkshire RG11 5AR  
Tel: 0734 784774  
Telex: 847178  
A,CH,CS,E,MP,P  
Hewlett-Packard Ltd.  
Nine Mile Ride  
Easthampstead, WOKINGHAM  
Berkshire, RG11 3LL  
Tel: 0344 773100  
Telex: 848805  
CH,CS,E,P

## IRELAND

### NORTHERN IRELAND

Hewlett-Packard Ltd.  
Cardiac Services Building  
95A Finaghy Road South  
BELFAST BT10 0BY  
Tel: 0232 625-566  
Telex: 747626  
CH,CS

### SCOTLAND

Hewlett-Packard Ltd.  
SOUTH QUEENSFERRY  
West Lothian, EH30 9TG  
Tel: 031 331 1188  
Telex: 72682  
CH,CM,CS,E,M,P

## UNITED STATES

### Alabama

Hewlett-Packard Co.  
700 Century Park South, Suite 128  
BIRMINGHAM, AL 35226  
Tel: (205) 822-8802  
A,CH,M

Hewlett-Packard Co.  
420 Wynn Drive  
HUNTSVILLE, AL 35805  
P.O. Box 7700  
HUNTSVILLE, AL 35807  
Tel: (205) 830-2000  
CH,CM,CS,E,M\*

### Arizona

Hewlett-Packard Co.  
8080 Pointe Parkway West  
PHOENIX, AZ 85044  
Tel: (602) 273-8000  
A,CH,CM,CS,E,MS

Hewlett-Packard Co.  
2424 East Aragon Road  
TUCSON, AZ 85706  
Tel: (602) 889-4631  
CH,E,MS\*\*

### California

Hewlett-Packard Co.  
99 South Hill Dr.  
BRISBANE, CA 94005  
Tel: (415) 330-2500  
CH,CS

Hewlett-Packard Co.  
P.O. Box 7830 (93747)  
5060 E. Clinton Avenue, Suite 102  
FRESNO, CA 93727  
Tel: (209) 252-9652  
CH,CS,MS

Hewlett-Packard Co.  
P.O. Box 4230  
1430 East Orangethorpe  
FULLERTON, CA 92631  
Tel: (714) 870-1000  
CH,CM,CS,E,MP

Hewlett-Packard Co.  
320 S. Kellogg, Suite B  
GOLETA, CA 93117  
Tel: (805) 967-3405  
CH

Hewlett-Packard Co.  
5400 W. Rosecrans Boulevard  
LAWNDALE, CA 90260  
P.O. Box 92105  
LOS ANGELES, CA 90009  
Tel: (213) 970-7500  
Telex: 910-325-6608  
CH,CM,CS,MP

Hewlett-Packard Co.  
3155 Porter Oaks Drive  
PALO ALTO, CA 94304  
Tel: (415) 857-8000  
CH,CS,E

Hewlett-Packard Co.  
4244 So. Market Court, Suite A  
P.O. Box 15976  
SACRAMENTO, CA 95852  
Tel: (916) 929-7222  
A\*,CH,CS,E,MS

Hewlett-Packard Co.  
9606 Aero Drive  
P.O. Box 23333  
SAN DIEGO, CA 92139  
Tel: (619) 279-3200  
CH,CM,CS,E,MP

Hewlett-Packard Co.  
2305 Camino Ramon "C"  
SAN RAMON, CA 94583  
Tel: (415) 838-5900  
CH,CS

Hewlett-Packard Co.  
3005 Scott Boulevard  
SANTA CLARA, CA 95050  
Tel: (408) 988-7000  
Telex: 910-338-0566  
A,CH,CM,CS,E,MP

Hewlett-Packard Co.  
5703 Corsa Avenue  
WESTLAKE VILLAGE, CA 91362  
Tel: (213) 706-6800  
E\*,CH\*,CS\*

### Colorado

Hewlett-Packard Co.  
24 Inverness Place, East  
ENGLEWOOD, CO 80112  
Tel: (303) 649-5000  
A,CH,CM,CS,E,MS

## Connecticut

Hewlett-Packard Co.  
47 Barnes Industrial Road South  
P.O. Box 5007  
WALLINGFORD, CT 06492  
Tel: (203) 265-7801  
A,CH,CM,CS,E,MS

## Florida

Hewlett-Packard Co.  
2901 N.W. 82nd Street  
P.O. Box 24210  
FORT LAUDERDALE, FL 33307  
Tel: (305) 973-2600  
CH,CS,E,MP

Hewlett-Packard Co.  
6177 Lake Ellenor Drive  
P.O. Box 13910  
ORLANDO, FL 32859  
Tel: (305) 859-2900  
A,CH,CM,CS,E,MS

Hewlett-Packard Co.  
5750B N. Hoover Blvd., Suite 123  
P.O. Box 15200  
TAMPA, FL 33614  
Tel: (813) 884-3282  
A\*,CH,CM,CS,E\*,M\*

## Georgia

Hewlett-Packard Co.  
2000 South Park Place  
P.O. Box 105005  
ATLANTA, GA 30348  
Tel: (404) 955-1500  
Telex: 810-766-4890  
A,CH,CM,CS,E,MP

## Hawaii

Hewlett-Packard Co.  
Kawaiahao Plaza, Suite 190  
567 South King Street  
HONOLULU, HI 96813  
Tel: (808) 526-1555  
A,CH,E,MS

## Illinois

Hewlett-Packard Co.  
304 Eldorado Road  
P.O. Box 1807  
BLOOMINGTON, IL 61701  
Tel: (309) 662-9411  
CH,MS\*\*

Hewlett-Packard Co.  
1100 31st Street, Suite 100  
DOWNERS GROVE, IL 60515  
Tel: (312) 960-5760  
CH,CS

Hewlett-Packard Co.  
5201 Tollview Drive  
ROLLING MEADOWS, IL 60008  
Tel: (312) 255-9800  
Telex: 910-687-1066  
A,CH,CM,CS,E,MP

## Indiana

Hewlett-Packard Co.  
7301 No. Shadeland Avenue  
P.O. Box 50807  
INDIANAPOLIS, IN 46250  
Tel: (317) 842-1000  
A,CH,CM,CS,E,MS

## Iowa

Hewlett-Packard Co.  
1776 22nd Street, Suite 1  
WEST DES MOINES, IA 50265  
Tel: (515) 224-1435  
CH,MS\*\*

## Kansas

Hewlett-Packard Co.  
7804 East Funston Road, #203  
WICHITA, KS 67207  
Tel: (316) 684-8491  
CH

## Kentucky

Hewlett-Packard Co.  
10300 Linn Station Road, #100  
LOUISVILLE, KY 40223  
Tel: (502) 426-0100  
A,CH,CS,MS

## Louisiana

Hewlett-Packard Co.  
160 James Drive East  
ST. ROSE, LA 70087  
P.O. Box 1449  
KENNER, LA 70063  
Tel: (504) 467-4100  
A,CH,CS,E,MS

## Maryland

Hewlett-Packard Co.  
3701 Koppers Street  
BALTIMORE, MD 21227  
Tel: (301) 644-5800  
Telex: 710-882-1943  
A,CH,CM,CS,E,MS

Hewlett-Packard Co.  
2 Choke Cherry Road  
ROCKVILLE, MD 20850  
Tel: (301) 948-6370  
A,CH,CM,CS,E,MP

## Massachusetts

Hewlett-Packard Co.  
1775 Minuteman Road  
ANDOVER, MA 01810  
Tel: (617) 682-1500  
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Hewlett-Packard Co.  
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Hewlett-Packard Co.  
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Hewlett-Packard Co.  
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Hewlett-Packard Co.  
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Hewlett-Packard Co.  
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MONTEVIDEO  
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### VENEZUELA

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Tel: 239-4133

Telex: 251046 HEWPACK  
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Edificio Seguros Carabobo, Piso 10  
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