

64000

**HP64000
Logic Development
System**

**Model 64604A
Timing Analysis
Probe**

 **HEWLETT
PACKARD**

CERTIFICATION

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard 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.

WARRANTY

This Hewlett-Packard system product is warranted against defects in materials and workmanship for a period of 90 days from date of installation. During the warranty period, HP will, at its options, either repair or replace products which prove to be defective.

Warranty service of this product will be performed at Buyer's facility at no charge within HP service travel areas. Outside HP service travel areas, warranty service will be performed at Buyer's facility only upon HP's prior agreement and Buyer shall pay HP's round trip travel expenses. In all other cases, products must be returned to a service facility designated by HP.

For products returned to HP for warranty service. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

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THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. HP SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

ASSISTANCE

Product maintenance agreements and other 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.

HEWLETT-PACKARD
SERVICE MANUAL
MODEL 64604A
TIMING ANALYSIS PROBE

REPAIR NUMBERS

This Manual applies directly to Models
with Repair Numbers prefixed 2142A.

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SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

GROUND THE INSTRUMENT.

To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument is equipped with a three-conductor ac power cable. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE.

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS.

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE.

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the instrument. Return the instrument to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

DANGEROUS PROCEDURE WARNINGS.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

**Dangerous voltages, capable of causing death, are present in this instrument.
Use extreme caution when handling, testing, and adjusting.**

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Figure 1-1. Model 64604A Timing Analysis Probe
(With Timing Cable 64604-61601)

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This Service Manual contains information required to install, test and service the Hewlett-Packard Model 64604A Timing Analysis Probe. Operating instructions are provided in a separate Operating Manual supplied with the instrument. It should be kept with the instrument for use by the operator.

1-3. Shown on the title page is a microfiche part number. This number can be used to order 4X6-inch microfilm transparencies of the manual. Each microfiche contains up to 96 photoduplicates of the manual pages.

1-4. SPECIFICATIONS.

1-5. Instrument specifications are listed in Table 1-1. These specifications are the performance standards or limits against which the instrument is tested.

Table 1-1. Specifications.

Includes Models 64601A Control Board, 64602A 8-Channel Acquisition, and 64604A 8-Channel Timing Probes.

Sample rates

Wide Sample Mode: variable from 2Hz to 200MHz.

Glitch mode: variable from 2Hz to 100MHz.

Dual Threshold: same as Wide Sample Mode.

Fast Sample: 400MHz.

Memory length:

Wide Sample, Glitch, & Dual Threshold Modes: 4060 samples.

400MHz Mode.....: 8140 samples.

Memory width (8 channel system)

Wide Sample.....: 8 channels.

Dual Threshold, Glitch, and 400MHz modes: 4 channels.

Memory width (16 channel system--two acquisition boards)

Double the width for a single, 8-channel system.

Resolution:

Total skew from probe tip:

Within pod: +/- 1.5ns.

Pod to pod: +/- 3.0ns.

Conditions: Input signal: $V_H = -1.0V$, $V_L = -1.6V$,

V_{TH} at $-1.3V$

Input slew rate $> .25 V/ns$

Sample rate accuracy: typically +/- .002%

General Information - Model 64604A

Specifications (continued)

Probe characteristics

Input Z: 100K ohms +/- 2%, shunted by <6pf.

Drive requirements:

Minimum input amplitude: 600mV P/P.

Minimum input overdrive: 200mV or 25% of input amplitude, whichever is greater.

Minimum input pulse width: 3.0ns at threshold.

Dynamic range: +/- 10V.

Maximum input: +/- 40V.

Threshold accuracy: +/- 50mV or +/- 2% whichever is greater.

Hysteresis: Typically 50mV.

Glitch Mode

Maximum sample rate: 100MHz.

Minimum width: 3.0ns at threshold.

Maximum width: sample period less 4.0ns.

Triggering

Time duration accuracy: +/- (20% + 2ns).

Minimum width for narrower-than trigger: 6ns typical.

Minimum width for transition trigger: 6ns typical.

Displayed position accuracy: +/- 4 samples in Wide Sample, Dual Threshold, and Glitch Modes.

: +/- 8 samples in Fast Sample Mode.

Delay from input to external BNC drive: Typically 60ns.

Delay from input to internal IMB drive: Typically 55ns.

Dead time for post-qualify measurement reset.

Typically 50ns + the time required to fill the memory with the selected amount of pre-trigger information.

Reset time for duration trigger: To meet the duration specifications, the trigger duty cycle must be no greater than 40%.

BNC Drive

Output signal swing in transition trigger mode:

Amplitude: 2.0V typical.

Width at 50%: 10ns typical.

Output signal swing in width greater-than trigger mode:

Amplitude: 2.5V typical.

Width: Input trigger width minus the selected duration.

Output signal swing in width less-than trigger mode:

Amplitude: same as in transition trigger mode.

Width: same as in transition trigger mode.

Position: occurs when trigger pattern disappears, before the selected duration times out.

IMB Functions (interconnection with other modules):

Master Enable (LE/ME)-----: drive, receive (Execute/Halt only)

Trigger Enable (LE/TE)-----: drive, receive.

Trigger (HE/TR)-----: drive, receive.

Delay Clock (HE/GMC)-----: receive only.

Storage Enable (LE/SE)-----: not used.

1-6. INSTRUMENTS COVERED BY THIS MANUAL.

1-7. Attached to the instrument or printed on the printed circuit board is the repair number. The repair number is in the form: 0000A0000. It is in two parts; the first four digits and the letter are the repair prefix, and the last five are the suffix. The prefix is the same for all identical instruments. The suffix, however, is assigned sequentially and is different for each instrument. The contents of this manual apply to instruments with the repair number prefix(es) listed under REPAIR NUMBERS on the title page.

1-8. An instrument manufactured after the printing of this manual may have a repair number prefix that is not listed on the title page. This unlisted repair number prefix indicates that the instrument is different from those described in this manual. The manual for this newer instrument is accompanied by a Manual Changes supplement. This supplement contains "change information" that explains how to adapt the manual for the newer instrument.

1-9. In addition to change information, the supplement contains information for correcting errors in the manual. To keep this manual as current as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is identified with the manual print date and part number, both of which appear on the manual title page. Complimentary copies of the supplement are available from Hewlett-Packard.

1-10. For information concerning a repair number prefix that is not listed on the title page or in the Manual Changes supplement, contact your nearest Hewlett-Packard Sales and Service Office.

1-11. DESCRIPTION.

1-12. The timing analyzer is used to monitor information flow in the time domain. The information may be a software program, the actions of a hardware state machine, or random logic signals.

1-13. The timing Analyzer consists of one Model 64604A Timing Control Board, and from one to two Timing Data Acquisition Boards.

1-14. Up to two acquisition boards may be combined to form a timing analyzer with as many as 16 channels.

1-15. Each acquisition board is connected to a 64604A timing probe via the probe bus at the top center of the board. Thus, in a 16-channel system with two acquisition boards, two timing probes are needed.

SECTION II

INSTALLATION

2-1. INTRODUCTION.

2-2. This section contains information for installing and removing the Model 64604A. Included are initial inspection procedures, preparation for use, and instructions for repacking the instrument for shipment.

2-3. INITIAL INSPECTION.

2-4. Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. Procedures for checking electrical performance are given in Section IV. If the contents are not complete, if there is mechanical damage or defect, or if the instrument does not pass the Performance Tests, notify the nearest Hewlett-Packard Office. If the shipping container is damaged, or if the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard Office. Keep the shipping materials for carrier's inspection. The HP office will arrange for repair or replacement at HP option without waiting for claim settlement.

2-5. PREPARATION FOR USE.

2-6. There are no specific preparation for use procedures except the actual connection of the probe to the timing acquisition board probe bus.

2-7. MAINFRAME CONFIGURATION.

2-8. Depending on the number of channels required, the timing analysis subsystem will use two or three card slots of the mainframe card-cage.

2-9. A timing subsystem consists of a maximum of two 64602A timing acquisition boards installed on either side of one 64601A timing control board.

2-10. Each timing acquisition board requires a 64604A timing probe. The timing probe is connected to the acquisition board probe bus by timing cable 64604-61601 (W2 on the 64602A parts list).

Installation - Model 64604A

2-11. DISASSEMBLY

2-12. Refer to figure 2-1 for disassembly.

2-13. To disassemble the 64604A:

- a. Remove the base (A1MP2) and top (A1MP3) covers from the 64604A timing probe.
- b. Turn the A2 PC board assembly so the eight RF SMB connectors are on your right.
- c. Press down on the left side of the IC socket cover, and slide to the right.
- d. Slide the cover all the way to the right and lift it off.
- e. You can now remove the 1NB7-8001 hybrid IC. DO NOT TOUCH OR BEND THE METAL CONTACT FINGERS!

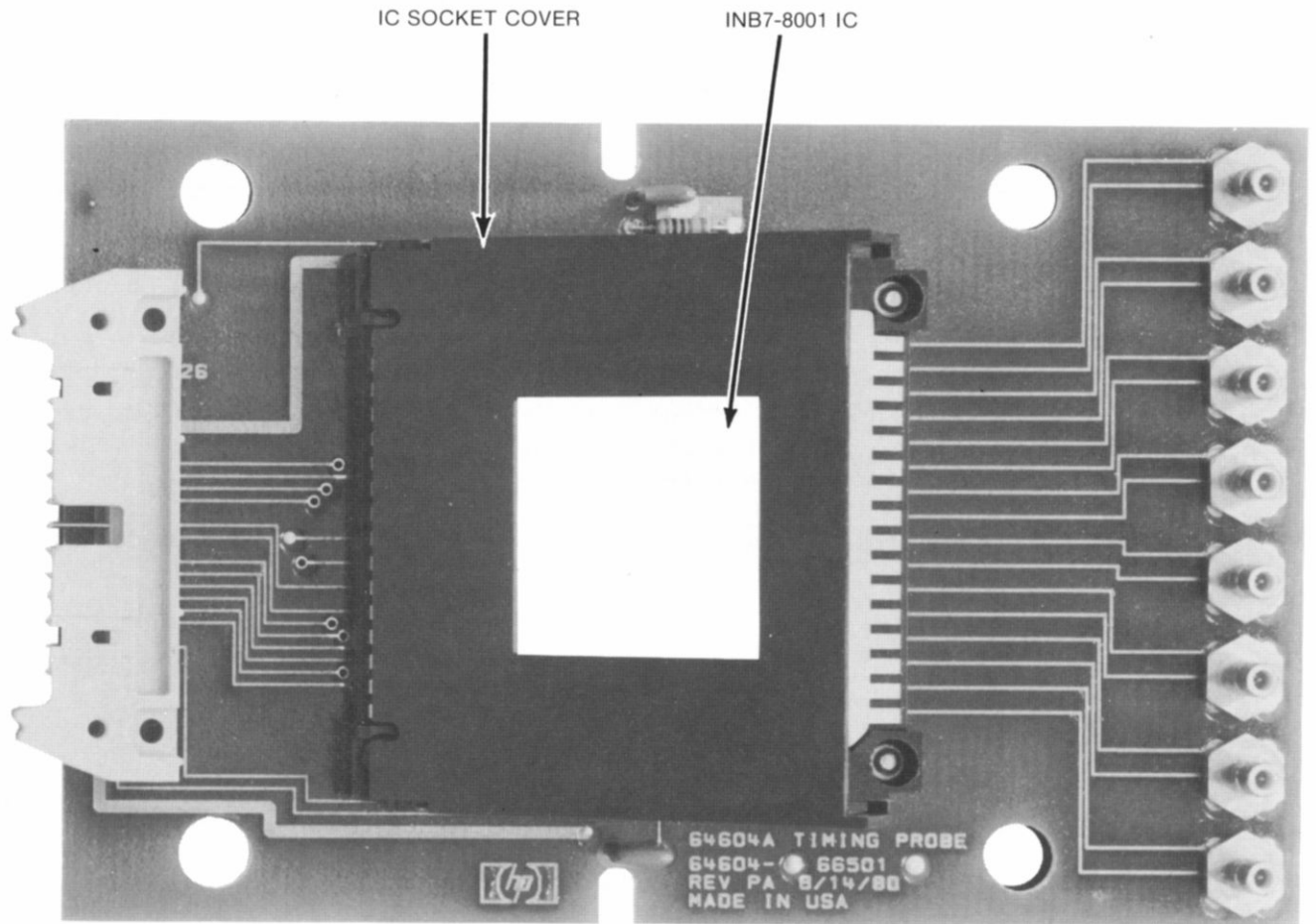


Figure 2-1. PC Board Assembly

Installation - Model 64604A

2-14. STORAGE AND SHIPMENT.

2-15. Environment.

2-16. The instrument should be protected from temperature extremes which cause condensation within the instrument.

2-17. Packing.

2-18. Tagging for Service. If the instrument is to be shipped to a Hewlett-Packard Sales/Service Office for service or repair, attach a tag showing owner (with address), complete instrument repair number, and a description of the service required.

2-19. Original Packing. Containers and materials identical to those used in factory packing are available through Hewlett-Packard Offices. Mark the container FRAGILE to ensure careful handling. In any correspondence, refer to the instrument by model number and complete repair number.

2-20. Other Packing. The following general instructions should be used for repacking with commercially available materials:

- a. Wrap instrument in heavy plastic or paper. (If shipping to Hewlett-Packard Office or Service Center, attach a tag indicating type of service required, return address, model number, and complete repair number.
- b. Use a strong shipping container. A double wall carton made of 350 pound test material is adequate.
- c. Use a layer of shock-absorbing material 70 to 100 mm (3 to 4 inches) thick around all sides of the instrument to provide firm cushioning and prevent movement inside container.
- d. Seal shipping container securely.
- e. Mark shipping container FRAGILE to ensure careful handling.
- f. In any correspondence, refer to instrument by model number and complete repair number.

SECTION III

OPERATION

The Model 64604A is an integral part of the timing analyzer. See the listed specifications in Section 1 to ensure that maximum limits are not exceeded.

SECTION IV

PERFORMANCE TESTS

4-1. There are no specific performance verification tests for the timing probe. See the performance verification section of the 64602A timing acquisition service manual for tests which exercise the probe comparators: specifically, the DACs and Dual Threshold tests.

SECTION V

ADJUSTMENTS

5-1. SAFETY REQUIREMENTS.

5-2. Although this instrument has been designed in accordance with international safety standards, general safety precautions must be observed during all phases of operation, service, and repair of the instrument. Failure to comply with precautions listed in the Safety Summary at the front of this manual or with specific warnings given throughout the manual could result in serious injury or death or damage to equipment. Service adjustments should be performed only by qualified service personnel.

5-3. ADJUSTMENTS.

5-4. There are no adjustments for the 64604A timing probe.

SECTION VI

REPLACEABLE PARTS

6-1. INTRODUCTION.

6-2. This section contains information for ordering parts. Table 6-1 lists abbreviations used in the parts list and throughout the manual. Table 6-2 lists all replaceable parts in reference designator order. Table 6-3 contains the names and addresses that correspond to the manufacturers' five-digit code numbers.

6-3. ABBREVIATIONS.

6-4. Table 6-1 lists abbreviations used in the parts list, the schematics and throughout the manual. In some cases, two forms of the abbreviation are used: one all in capital letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always capitals. However, in the schematics and other parts of the manual, other abbreviation forms are used with both lower-case and uppercase letters.

6-5. REPLACEABLE PARTS LIST.

6-6. Table 6-2 is the list of replaceable parts and is organized as follows:

- a. Chassis-mounted parts in alphanumerical order by reference designation.
- b. Electrical assemblies and their components in alphanumerical order by reference designation.
- c. Miscellaneous parts.

The information given for each part consists of the following:

- a. The Hewlett-Packard part number and the check digit.
- b. The total quantity (Qty) in the instrument.
- c. The description of the part.
- d. A five-digit code that indicates the manufacturer.
- e. The manufacturer's part number.

The total quantity for each part is given only once - at the first appearance of the part number in the list.

Replaceable Parts - Model 64604A

6-7. ORDERING INFORMATION.

6-8. To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number and check digit, indicate the quantity required, and address the order to the nearest Hewlett-Packard sales and service office.

6-9. To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument repair number, the description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard sales and service office.

6-10. SPARE PARTS KIT.

6-11. A spare parts kit is available. To order, please contact your local sales and service representative.

6-12. DIRECT MAIL ORDER SYSTEM.

6-13. Within the USA, Hewlett-Packard can supply parts through a direct mail order system. Advantages of using the system are as follows:

- a. Direct ordering and shipment from the HP Parts Center in Mountain View, California.
- b. No Maximum or minimum on any mail order (there is a minimum order amount, for parts ordered through a local HP office when the orders require billing and invoicing).
- c. Prepaid transportation (there is a small handling charge for each order).
- d. No invoices - to provide these advantages, a check or money order must accompany each order.

6-14. Mail-order forms and specific ordering information are available through your local HP office. Addresses and phone numbers are located at the back of this manual.

Table 6-1. Reference Designators and Abbreviations

REFERENCE DESIGNATORS

A	= assembly	F	= fuse	MP	= mechanical part	U	= integrated circuit
B	= motor	FL	= filter	P	= plug	V	= vacuum, tube, neon bulb, photocell, etc
BT	= battery	IC	= integrated circuit	Q	= transistor	VR	= voltage regulator
C	= capacitor	J	= jack	R	= resistor	W	= cable
CP	= coupler	K	= relay	RT	= thermistor	X	= socket
CR	= diode	L	= inductor	S	= switch	Y	= crystal
DL	= delay line	LS	= loud speaker	T	= transformer	Z	= tuned cavity network
DS	= device signaling (lamp)	M	= meter	TB	= terminal board		
E	= misc electronic part	MK	= microphone	TP	= test point		

ABBREVIATIONS

A	= amperes	H	= henries	N/O	= normally open	RMO	= rack mount only
AFC	= automatic frequency control	HDW	= hardware	NOM	= nominal	RMS	= root-mean square
AMPL	= amplifier	HEX	= hexagonal	NPO	= negative positive zero (zero temperature coefficient)	RWV	= reverse working voltage
BFO	= beat frequency oscillator	HG	= mercury	NPN	= negative-positive-negative	S-B	= slow-blow
BE CU	= beryllium copper	HR	= hour(s)	NRFR	= not recommended for field replacement	SCR	= screw
BH	= binder head	HZ	= hertz	NSR	= not separately replaceable	SE	= selenium
BP	= bandpass	IF	= intermediate freq			SECT	= section(s)
BRS	= brass	IMPG	= impregnated	OB	= order by description	SEMICON	= semiconductor
BWO	= backward wave oscillator	INCD	= incandescent	OH	= oval head	SI	= silicon
CCW	= counter-clockwise	INCL	= include(s)	OX	= oxide	SIL	= silver
CER	= ceramic	INS	= insulation(ed)			SL	= slide
CMO	= cabinet mount only	INT	= internal	PH BRZ	= phosphor bronze	SPG	= spring
COEF	= coefficient	K	= kilo=1000	PHL	= phillips	SPL	= special
COM	= common	LH	= left hand	P	= peak	SST	= stainless steel
COMP	= composition	LIN	= linear taper	PC	= printed circuit	SR	= split ring
COMPL	= complete	LK WASH	= lock washer	PF	= picofarads= 10 ⁻¹² farads	STL	= steel
CONN	= connector	LOG	= logarithmic taper	PIV	= peak inverse voltage	TA	= tantalum
CP	= cadmium plate	LPF	= low pass filter	PNP	= positive-negative-positive	TD	= time delay
CRT	= cathode-ray tube	M	= milli=10 ⁻³	P/O	= part of	TGL	= toggle
CW	= clockwise	MEG	= meg=10 ⁶	POLY	= polystyrene	THD	= thread
DEPC	= deposited carbon	MET FLM	= metal film	PORC	= porcelain	TI	= titanium
DR	= drive	MET OX	= metallic oxide	POS	= position(s)	TOL	= tolerance
ELECT	= electrolytic	MFR	= manufacturer	POT	= potentiometer	TRIM	= trimmer
ENCAP	= encapsulated	MHZ	= mega hertz	PP	= peak-to-peak	TWT	= traveling wave tube
EXT	= external	MINAT	= miniature	PT	= point	U	= micro=10 ⁻⁶
F	= farads	MOM	= momentary	PWV	= peak working voltage	VAR	= variable
FH	= flat head	MOS	= metal oxide substrate	RECT	= rectifier	VDCW	= dc working volts
FIL H	= fillister head	MTG	= mounting	RF	= radio frequency	W/	= with
FXD	= fixed	MY	= "mylar"	RH	= round head or right hand	W	= watts
G	= giga (10 ⁹)	N	= nano (10 ⁻⁹)			WIV	= working inverse voltage
GE	= germanium	N/C	= normally closed			WW	= wirewound
GL	= glass	NE	= neon			W/O	= without
GRD	= grounded	NI PL	= nickel plate				

Replaceable Parts - Model 64604A

Table 6-2. Replaceable Parts List

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
	64604A	2		TIMING ANALYSIS PROBE	28480	64604A
A1	64604-62102	3	1	TIMING PROBE	28480	64604-62102
A1MP1	2200-0151	0	4	SCREW-MACH 4-40 .75-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP2	5041-3079	2	1	BASE-TIMING POD	28480	5041-3079
A1MP3	64604-62104	5	1	TOP ASSEMBLY-PROBE POD	28480	64604-62104
A2	64604-66501	4	1	PC BOARD ASSEMBLY	28480	64604-66501
A2C1	0160-3443	1	2	CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-3443
A2C2	0160-3443	1		CAPACITOR-FXD .1UF +80-20% 50VDC CER	28480	0160-3443
A2J1	1251-4058	0	1	CONNECTOR 26-PIN M RECTANGULAR	28480	1251-4058
A2J2	1250-0257	1	8	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2J3	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2J4	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2J5	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2J6	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2J7	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2J8	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2J9	1250-0257	1		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-0257
A2MP10	0520-0130	1	4	SCREW-MACH 2-56 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2R1	0757-0280	3	1	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2TP1	0360-0535	0	3	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A2TP2	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A2TP3	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A2U1	1NB7-8001	4	1	IC-PROBE	28480	1NB7-8001
A2XU1	1251-7511	2	1	CONNECTOR-HYBRID W1	28480	1200-09705
MP1	10006-61301	5	8	LEAD ASSEMBLY-GROUND	28480	10006-61301
MP2	10017-62302	1	8	ASSEMBLY-PROBE HOLDER	28480	10017-62302
MP3	10017-69501	6	8	GRABBER ASSEMBLY	28480	10017-69501
MP4	10024A	7	1	CLIP-IC	28480	10024A
MP5	5061-1258	7	8	CLIP-ASSEMBLY	28480	5061-1258
MP6	64604-23201	1	8	SPLIT RINGS	28480	64604-23201
MP7	10211A	2	1	PROBE CLIP	28480	10211A
W1	64604-62101	2	8	TIMING LEAD	28480	64604-62101

See introduction to this section for ordering information
 *Indicates factory selected value

Replaceable Parts - Model 64604A

Table 6-3. List of Manufacturers' Codes

Mfr No.	Manufacturer Name	Address	Zip Code
50167	FUJITSU LTD	TOKYO JP	
54013	HITACHI	TOKYO JP	
00000	ANY SATISFACTORY SUPPLIER		
01121	ALLEN-BRADLEY CO	MILWAUKEE WI	53204
01295	TEXAS INSTR INC SEMICOND CMPNT DIV	DALLAS TX	75222
02111	SPECTROL ELECTRONICS CORP	CITY OF IND CA	91745
04713	MOTOROLA SEMICONDUCTOR PRODUCTS	PHOENIX AZ	85008
07263	FAIRCHILD SEMICONDUCTOR DIV	MOUNTAIN VIEW CA	94042
11236	CTS OF BERNE INC	BERNE IN	46711
19701	MEPCO/ELECTRA CORP	MINERAL WELLS TX	76067
20932	EMCON DIV ITW	SAN DIEGO CA	92129
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD PA	16701
25403	AMPREX ELEK CORP SEMICON & MC DIV	SLATERSVILLE RI	02876
27014	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA CA	95051
27167	CORNING GLASS WORKS (WILMINGTON)	WILMINGTON NC	28401
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO CA	94304
31585	RCA CORP SOLID STATE DIV	SOMERVILLE NJ	
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See introduction to this section for ordering information

SECTION VII

MANUAL CHANGES

This Section normally contains information for backdating this Manual for Models with repair numbers prior to the one shown on the Title Page. Because this Edition includes the information for the first repair number, there is no backdating material.

SECTION VIII

SERVICE

8-1. INTRODUCTION.

8-2. This section contains block diagrams, component locators, and schematics for servicing the Model 64604A Timing Analysis Probe.

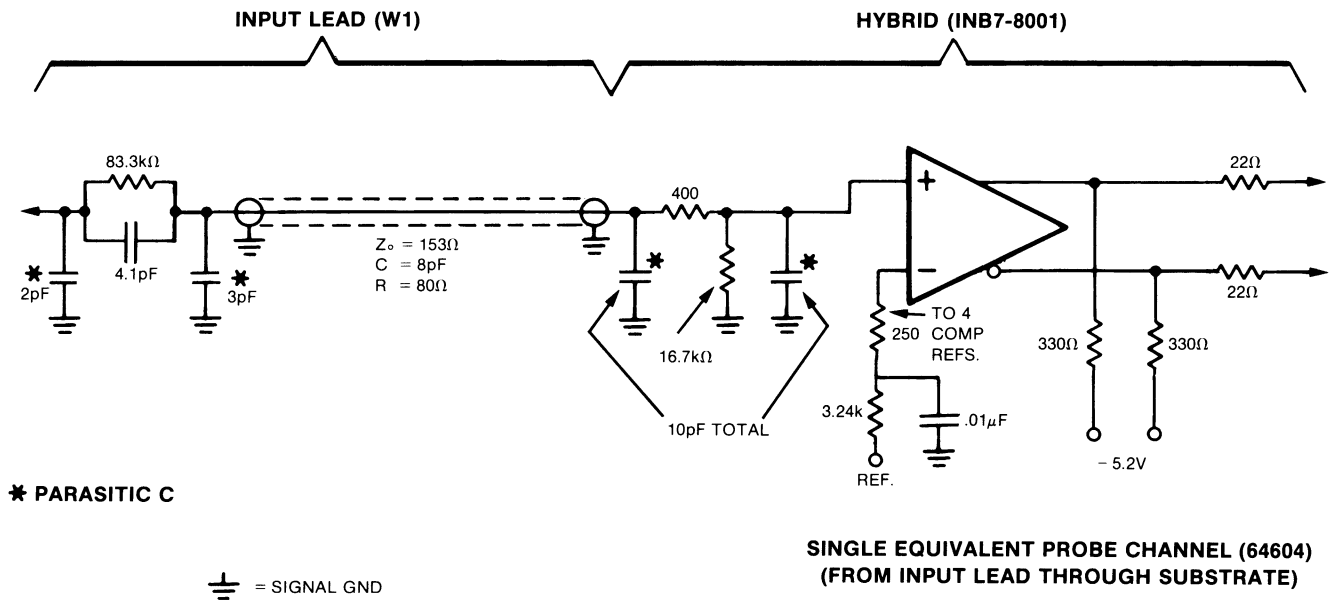


Figure 8-1. Equivalent Single Probe Channel

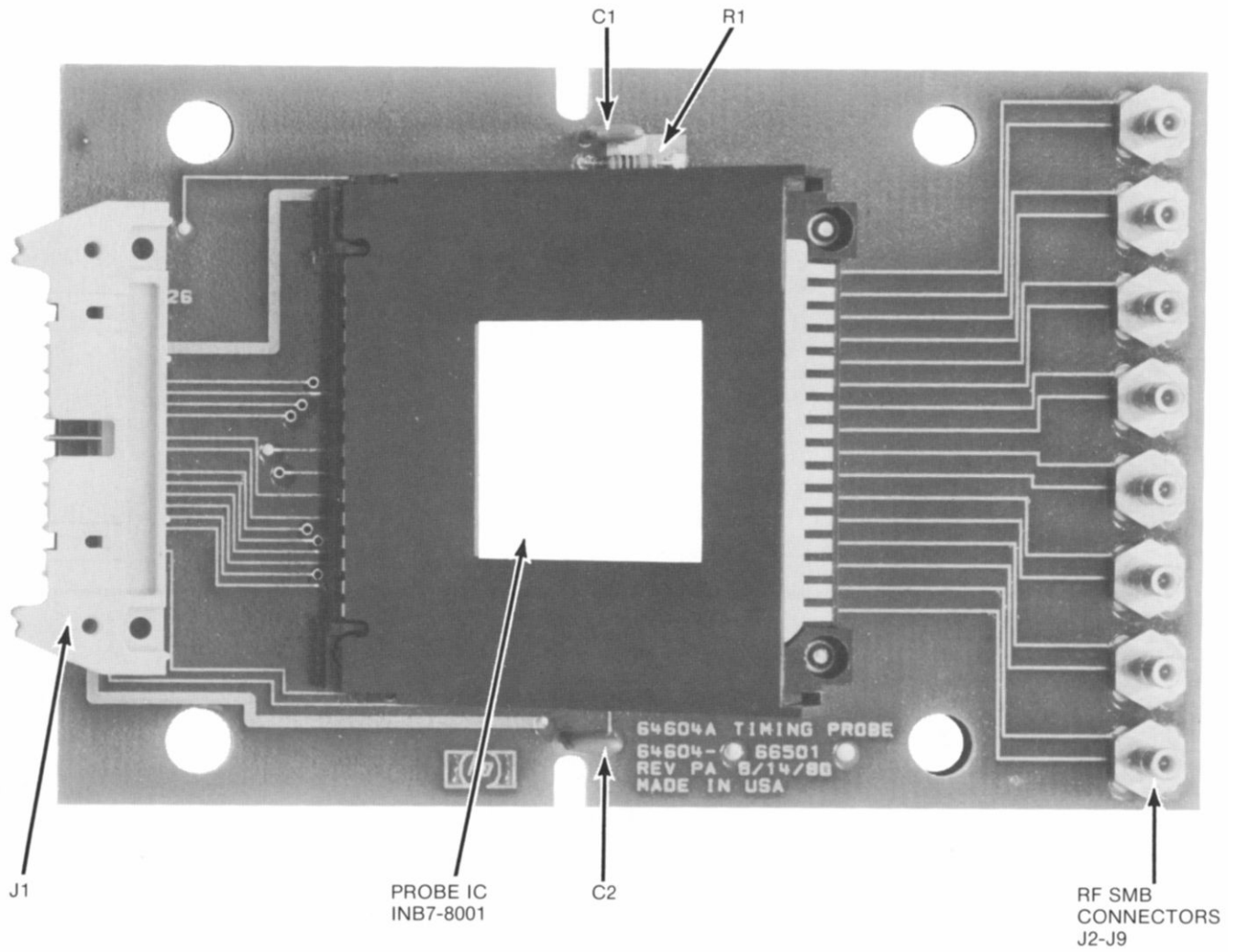
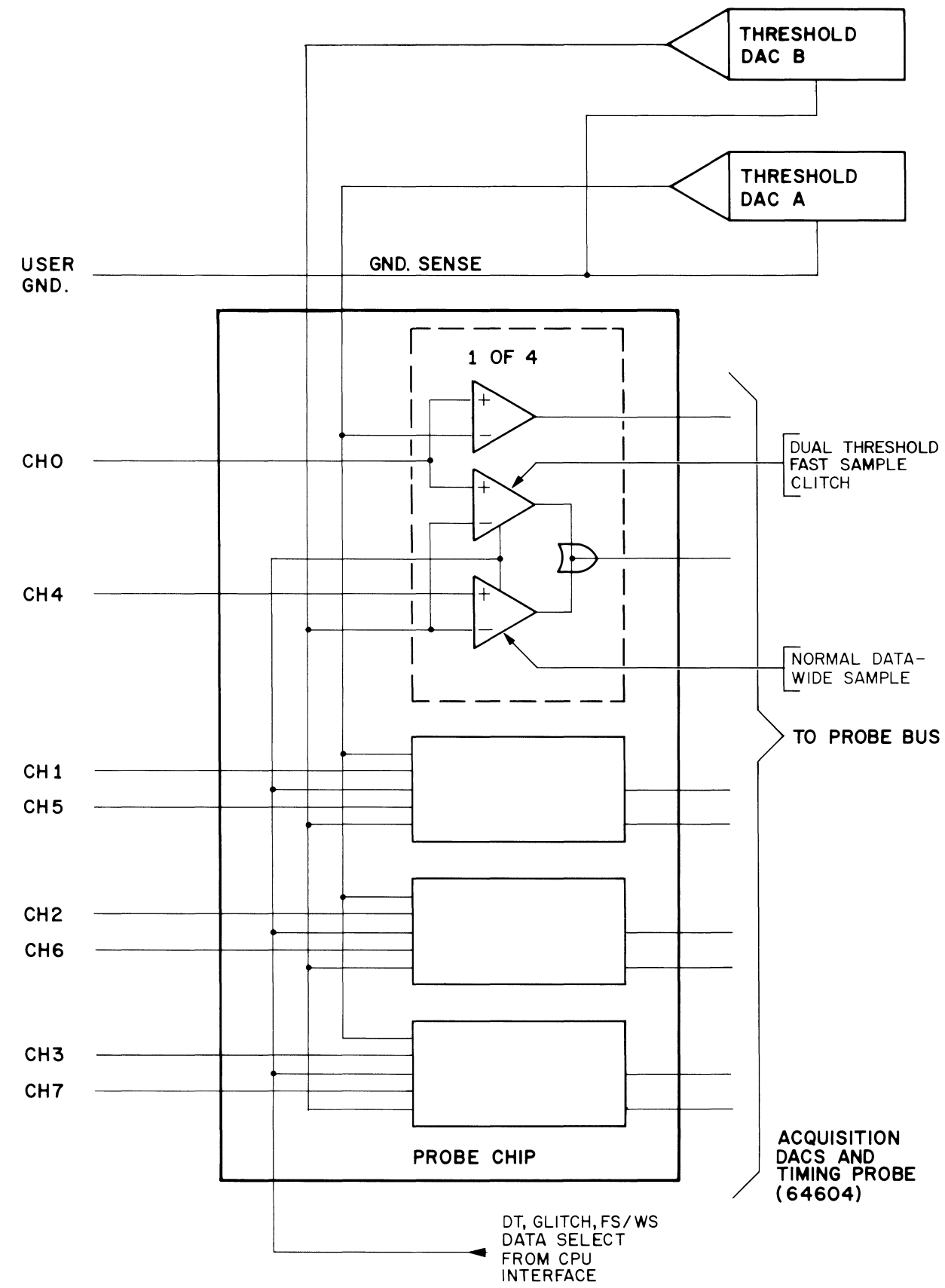
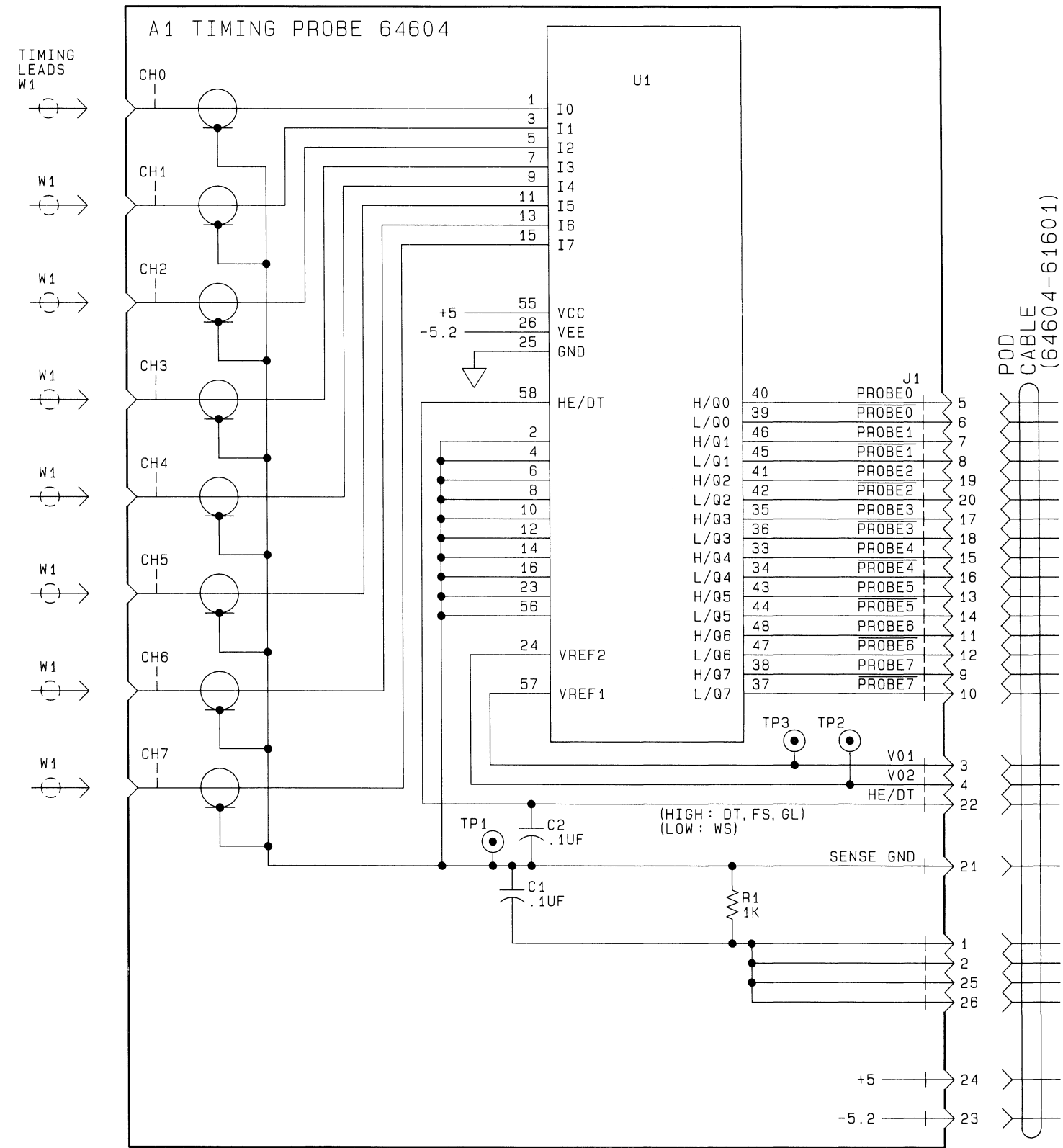


Figure 8-2. PC Board Assembly



FROM CIRCUIT UNDER TEST



TO/FROM TIMING ACQUISITION BOARD (64602A)

Figure 8-3.
Service Sheet 1
Timing Probe
TAP 8-3

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Arranged alphabetically by country



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I-80131 NAPLES
Tel: (081) 7413544
Telex: 710698
A,CH,E

Hewlett-Packard Italiana S.p.A.
Viale G. Modugno 33
I-16156 GENOVA PEGLI
Tel: (010) 68-37-07
Telex: 215238
E,C

Hewlett-Packard Italiana S.p.A.
Via Turazza 14
I-35100 PADOVA
Tel: (049) 664888
Telex: 430315
A,CH,E,MS

Hewlett-Packard Italiana S.p.A.
Viale C. Pavese 340
I-00144 ROMA
Tel: (06) 54831
Telex: 610514
A,CH,CM,CS,E,MS,P*

Hewlett-Packard Italiana S.p.A.
Corso Svizzera, 184
I-10149 TORINO
Tel: (011) 74 4044
Telex: 221079
CH,E

JAPAN

Yokogawa-Hewlett-Packard Ltd.
152-1, Onna
000 ATSUGI, Kanagawa, 243
Tel: (0462) 28-0451
CM,C*,E

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 Daiichi Seimei Bldg.
4-7, Hanabata-cho
KUMAMOTO, 860
Tel: (0963) 54-7311
CH,E

Yokogawa-Hewlett-Packard Ltd.
Shin-Kyoto Center Bldg.
614, Higashi-Shiokoji-cho

Karasuma-Nishiiru
Shiokoji-dori, Shimogyo-ku
KYOTO, 600
Tel: 075-343-0921
CH,E

Yokogawa-Hewlett-Packard Ltd.
Mito Mitsui Bldg
4-73, Sannomaru, 1 Chome
MITO, Ibaragi 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: YHPOSA 523-3624
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: 03-348-4611-5
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
YOKOHAMA221
Tel: (045) 312-1252
CH,CM,E

JORDAN

Mouasher Cousins Company
P.O. Box 1387
AMMAN
Tel: 24907, 39907
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 Computer
Division
76-561 Yeoksam-Dong
Kwangnam-Ku
C.P.O. Box 2775
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 kt
CH,E,M
Photo & Cine Equipment
P.O. Box 270 Safat
KUWAIT
Tel: 42-2846, 42-3801
Telex: 22247 Matin kt
P

LEBANON

G.M. Dolmajian
Achralfieh
P.O. Box 165.167
BEIRUT
Tel: 290293
MP**

LUXEMBOURG

Hewlett-Packard Belgium S.A./N.V.
Blvd de la Woluwe, 100
Woluwedal
B-1200 BRUSSELS
Tel: (02) 762-32-00
Telex: 23-494 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 23-03
Tel: 943022
Telex: MA31011
A,CH,E,M,P*

Protel Engineering
P.O.Box 1917
Lot 6624, Section 64
23/4 Pending Road
Kuching, SARAWAK
Tel: 362299
Telex: MA 70904 PROTEL
Cable: PROTELENG
A,E,M

MALTA

Philip Toledo Ltd.
Notabile Rd.
MRIEHEL
Tel: 447 47, 455 66
Telex: Media MW 649
P

MEXICO

Hewlett-Packard Mexicana, S.A.
de C.V.
Av. Periferico Sur No. 6501
Tepepan, Xochimilco
MEXICO D.F. 16020
Tel: 676-4600
Telex: 17-74-507 HEWPACK MEX
A,CH,CS,E,MS,P
Hewlett-Packard Mexicana, S.A.
de C.V.
Ave. Colonia del Valle #409
Col. del Valle
Municipio de Garza Garcia
MONTERREY, N.L.
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) 51-64-44
Telex: 21261 HEPAC NL
A,CH,CS,E

NEW ZEALAND

Hewlett-Packard (N.Z.) Ltd.
169 Manukau 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 Cruickshank Street
Kilbirnie, WELLINGTON 3
P.O. Box 9443
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: 794-091
Telex: 60605
A,M

Northrop Instruments & Systems
Ltd.
110 Mandeville St.
P.O. Box 8388
CHRISTCHURCH
Tel: 486-928
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: (05) 16-55-40
Telex: 16621 hpnas n
CH,CS,E,MS
Hewlett-Packard Norge A/S
Østerndalen 18
P.O. Box 34
N-1345 ØSTERÅS
Tel: (02) 17-11-80
Telex: 16621 hpnas n
A,CH,CM,CS,E,M,P

OMAN

Khimjil 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: 26875
Cable: FEMUS Rawalpindi
A,E,M

Mushko & Company Ltd.
Oosman Chambers
Abdullah Haroon Road
KARACHI 0302
Tel: 524131, 524132
Telex: 2894 MUSKO PK
Cable: COOPERATOR Karachi
A,E,M,P*

PANAMA

Electrónico Balboa, S.A.
Calle Samuel Lewis, Ed. Alfa
Apartado 4929
PANAMA 5
Tel: 64-2700
Telex: 3483 ELECTRON PG
A,CM,E,M,P



SALES & SUPPORT OFFICES

Arranged alphabetically by country

PERU

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

PHILIPPINES

The Online Advanced Systems
Corporation
Rico House, Amoroso 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
Avenida 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 Codex
Tel: 56 21 81/2/3
Telex: 13316 SABASA
P
Telectra-Empresa Técnica de
Equipamentos Eléctricos S.A.R.L.
Rua Rodrigo da 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
P.O. Box 4407
CAROLINA, Puerto Rico 00628
Calle 272 Edificio 203
Urb. Country Club
RIO PIEDRAS, Puerto Rico
Tel: (809) 762-7255
A,CH,CS

QATAR

Computearbia
P.O. Box 2750
DOHA
Tel: 883555
Telex: 4806 CHPARB
P
Eastern Technical Services
P.O.Box 4747
DOHA
Tel: 329 993
Telex: 4156 EASTEC DH

Nasser Trading & Contracting
P.O.Box 1563
DOHA
Tel: 22170, 23539
Telex: 4439 NASSEER DH
M

SAUDI ARABIA

Modern Electronic Establishment
Hewlett-Packard Division
P.O. Box 281
Thuobah
AL-KHOBAR
Tel: 864-46 78
Telex: 671 106 HPMEEK SJ
Cable: ELECTA AL-KHOBAR
CH,CS,E,M,P
Modern Electronic Establishment
Hewlett-Packard Division
P.O. Box 1228
Redec Plaza, 6th Floor
JEDDAH
Tel: 644 38 48
Telex: 4027 12 FARNAS SJ
Cable: ELECTA JEDDAH
CH,CS,E,M,P
Modern Electronic Establishment
Hewlett-Packard Division
P.O.Box 2728
RIYADH
Tel: 491-97 15, 491-63 87
Telex: 202049 MEERYD SJ
CH,CS,E,M,P

SCOTLAND

See United Kingdom

SINGAPORE

Hewlett-Packard Singapore (Sales)
Pte. Ltd.
P.O. Box 58 Alexandra Post Office
SINGAPORE, 9115
6th Floor, Inchcape House
450-452 Alexandra Road
SINGAPORE 0511
Tel: 631788
Telex: HPSGSO RS 34209
Cable: HEWPACK, Singapore
A,CH,CS,E,MS,P
Dynamar International Ltd.
Unit 05-11 Block 6
Kohlam 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 4067
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 6001
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: 802-5111, 802-5125
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 hpbee
A,CH,CS,E,MS,P
Hewlett-Packard Española S.A.
Calle San Vicente S/No
Edificio Albia II
E-BILBAO 11
Tel: 423.83.06
A,CH,E,MS
Hewlett-Packard Española S.A.
Cria. 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 Gordillo, 1 (Entlo.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
Vastra Vintergatan 9
S-70344 ÖREBRO
Tel: (19) 10-48-80
Telex: (854) 17886 (via Spånga
office)
CH

Hewlett-Packard Sverige AB
Skalholtsgatan 9, Kista
Box 19
S-16393 SPÅNGA
Tel: (08) 750-2000
Telex: (854) 17886
A,CH,CM,CS,E,MS,P
Hewlett-Packard Sverige AB
Fröttaligsgatan 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 BASLE
Tel: (61) 33-59-20
A
Hewlett-Packard (Schweiz) AG
7, rue du Bois-du-Lan
Case Postale 365
CH-1217 MEYRIN 1
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 P.O. Box 5781
DAMASCUS
Tel: 33-24-87
Telex: 11216 ITIKAL SY
Cable: ELECTROBOR DAMASCUS
E
Middle East Electronics
Place Azmé
P.O.Box 2308
DAMASCUS
Tel: 334592
Telex: 11304 SATACO SY
M,P

TAIWAN

Hewlett-Packard Far East Ltd.
Kaohsiung Office
2/F 68-2, Chung Cheng 3rd Road
KAOHSIUNG
Tel: 241-2318, 261-3253
CH,CS,E
Hewlett-Packard Far East Ltd.
Taiwan Branch
5th Floor
205 Tun Hwa North Road
TAIPEI
Tel: (02) 712-0404
Cable: HEWPACK Taipei
A,CH,CM,CS,E,M,P
Ing Lih Trading Co.
3rd Floor, 7 Jen-Ai Road, Sec. 2
TAIPEI 100
Tel: (02) 3948191
Cable: INGLIH TAIPEI
A

THAILAND

Unimesa
30 Palpong 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
CM,E,M,P

TUNISIA

Tunisie 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
Kavaklidere, ANKARA
Tel: 275800
Telex: 42155 TKNM TR
E
E.M.A.
Medina Eldem Sokak No.4/1/6
Yuksel Caddesi
ANKARA
Tel: 175 622
M

UNITED ARAB EMIRATES

Emitac Ltd.
P.O. Box 1641
SHARJAH
Tel: 354121, 354123
Telex: 68136 Emitac Sh
CH,CS,E,M,P

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
Hewlett-Packard Ltd.
Oakfield House, Oakfield Grove
Clifton
BRISTOL BS8 2BN, Avon
Tel: (027) 38606
Telex: 444302
CH,M,P

**GREAT BRITAIN (Cont'd)**

Hewlett-Packard Ltd.
Fourier House
257-263 High Street
LONDON COLNEY
Herts., AL2 1HA, St. Albans
Tel: (0727) 24400
Telex: 1-8952716
CH,CS,E

Hewlett-Packard Ltd.
Quadrangle
106-118 Station Road
REDHILL, Surrey
Tel: (0737) 68655
Telex: 947234
CH,CS,E

Hewlett-Packard Ltd.
Avon House
435 Stratford Road
SHIRLEY, Solihull
West Midlands B90 4BL
Tel: (021) 745 8800
Telex: 339105
CH

Hewlett-Packard Ltd.
West End House 41
High Street, West End
SOUTHAMPTON
Hampshire SO3 3DQ
Tel: (703) 886767
Telex: 477138
CH

Hewlett-Packard Ltd.
King Street Lane
WINNERSH, Wokingham
Berkshire RG11 5AR
Tel: (0734) 784774
Telex: 847178
A,CH,E,M

Hewlett-Packard Ltd.
Nine Mile Ride
WOKINGHAM
Berkshire, RG11 3LL
Tel: 3446 3100
Telex: 84-88-05
CH,CS,E

NORTHERN IRELAND

Cardiac Services Company
95A Finaghy Road South
BELFAST BT 10 0BY
Tel: (0232) 625-566
Telex: 747626
M

SCOTLAND

Hewlett-Packard Ltd.
SOUTH QUEENSFERRY
West Lothian, EH30 9GT
Tel: (031) 3311188
Telex: 72682
A,CH,CM,CS,E,M

UNITED STATES**Alabama**

Hewlett-Packard Co.
P.O. Box 7000
8290 Whitesburg Drive, S.E.
HUNTSVILLE, AL 35802
Tel: (205) 830-2000
CH,CM,CS,E,M*

Arizona

Hewlett-Packard Co.
8080 Point 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.
4BRISBANE, CA 94005
Tel: (415) 330-2500
CH,CS
Hewlett-Packard Co.
7621 Canoga Avenue
CANOGA PARK, CA 91304
Tel: (213) 702-8363
A,CH,CS,E,P

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
LAWDALE, 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.
3200 Hillview Avenue
PALO ALTO, CA 94304
Tel: (415) 857-8000
CH,CS,E

Hewlett-Packard Co.
P.O. Box 15976 (95813)
4244 So. Market Court, Suite A
SACRAMENTO, CA 95834
Tel: (916) 929-7222
A*,CH,CS,E,MS

Hewlett-Packard Co.
9606 Aero Drive
P.O. Box 23333 **SAN DIEGO, CA 92123**
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.
P.O. Box 4230
Fullerton, CA 92631
363 Brookhollow Drive
SANTA ANA, CA 92705
Tel: (714) 641-0977
A,CH,CM,CS,MP
Hewlett-Packard Co.
3003 Scott Boulevard
SANTA CLARA, CA 95050
Tel: (408) 988-7000
Telex: 910-338-0586
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) 771-3455
Telex: 910-935-0785
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.
P.O. Box 24210 (33307)
2901 N.W. 62nd Street
FORT LAUDERDALE, FL 33309
Tel: (305) 973-2600
CH,CS,E,MP

Hewlett-Packard Co.
P.O. Box 13910
6177 Lake Ellenor Drive
ORLANDO, FL 32809
Tel: (305) 859-2900
A,CH,CM,CS,E,MS

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Kawaiahao Plaza, Suite 190
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Suite 100
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Louisiana

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Arranged alphabetically by country

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TULSA, OK 74145
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15815 S.E. 37th Street
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Hewlett-Packard Co.
Suite A
708 North Argonne Road
SPOKANE, WA 99206
Tel: (509) 922-7000
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West Virginia

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4604 MacCorkle Ave., S.E.
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Apartado 1053
CARACAS 1010
Tel: 571-3511
Telex: 21529 COLMODIO
M

ZIMBABWE

Field Technical Sales
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P.B. 3458
SALISBURY
Tel: 705 231
Telex: 4-122 RH
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HEADQUARTERS OFFICES

If there is no sales office listed for your area, contact one of these headquarters offices.

NORTH/CENTRAL AFRICA

Hewlett-Packard S.A.
7 Rue du Bois-du-Lan
CH-1217 MEYRIN 1, Switzerland
Tel: (022) 83 12 12
Telex: 27835 hpse
Cable: HEWPACKSA Geneve

ASIA

Hewlett-Packard Asia Ltd.
6th Floor, Sun Hung Kai Centre
30 Harbour Rd.
G.P.O. Box 795
HONG KONG
Tel: 5-832 3211
Telex: 66678 HEWPA HX
Cable: HEWPACK HONG KONG

CANADA

Hewlett-Packard (Canada) Ltd.
6877 Goreway Drive
MISSISSAUGA, Ontario L4V 1M8
Tel: (416) 678-9430
Telex: 610-492-4246

EASTERN EUROPE

Hewlett-Packard Ges.m.b.h.
Lieblgasse 1
P.O.Box 72
A-1222 VIENNA, Austria
Tel: (222) 2365110
Telex: 1 3 4425 HEPA A

NORTHERN EUROPE

Hewlett-Packard S.A.
Uilenstede 475
NL-1183 AG AMSTELVEEN
The Netherlands
P.O.Box 999
NL-1180 AZ AMSTELVEEN
The Netherlands
Tel: 20 437771

OTHER EUROPE

Hewlett-Packard S.A.
7 rue du Bois-du-Lan
CH-1217 MEYRIN 1, Switzerland
Tel: (022) 83 12 12
Telex: 27835 hpse
Cable: HEWPACKSA Geneve

MEDITERRANEAN AND MIDDLE EAST

Hewlett-Packard S.A.
Mediterranean and Middle East
Operations
Atrina Centre
32 Kifissias Ave.
Maroussi, ATHENS, Greece
Tel: 682 88 11
Telex: 21-6588 HPAT GR
Cable: HEWPACKSA Athens

EASTERN USA

Hewlett-Packard Co.
4 Choke Cherry Road
Rockville, MD 20850
Tel: (301) 258-2000

MIDWESTERN USA

Hewlett-Packard Co.
5201 Tollview Drive
ROLLING MEADOWS, IL 60008
Tel: (312) 255-9800

SOUTHERN USA

Hewlett-Packard Co.
P.O. Box 105005
450 Interstate N. Parkway
ATLANTA, GA 30339
Tel: (404) 955-1500

WESTERN USA

Hewlett-Packard Co.
3939 Lankershim Blvd.
LOS ANGELES, CA 91604
Tel: (213) 877-1282

OTHER INTERNATIONAL AREAS

Hewlett-Packard Co.
Intercontinental Headquarters
3495 Deer Creek Road
PALO ALTO, CA 94304
Tel: (415) 857-1501
Telex: 034-8300
Cable: HEWPACK

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