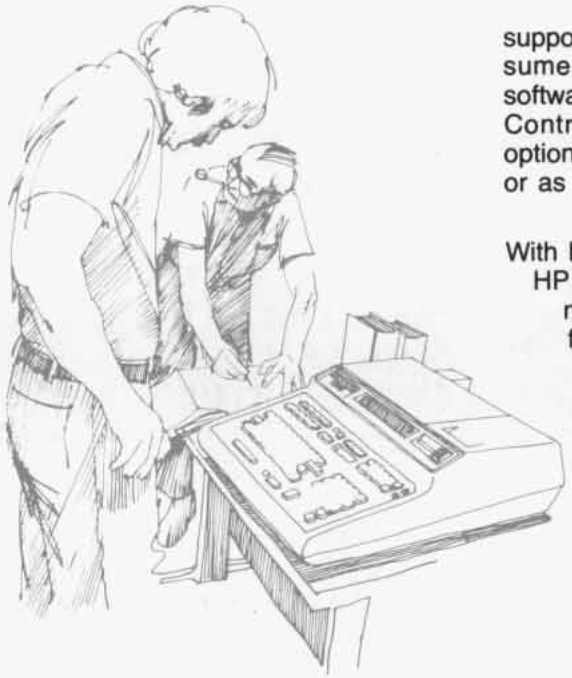
HEWLETT hp PACKARD

# BENCH BRIEFS

SERVICE INFORMATION FROM HEWLETT-PACKARD

NOVEMBER-DECEMBER 1977



Help When You Need It

## MAINTENANCE ASSURANCE PROGRAM FOR HP-IB PROGRAMS

### WHAT IS MAP?

Hewlett-Packard's Maintenance Assurance Program (MAP) for HP-IB* systems offers you a versatile, modular service plan designed to complement your own system service and maintenance capabilities. In a sense, we become your partner in performance. (*HP-IB is HP's implementation of IEEE Standard 488, Digital Interface for Programmable Instrumentation.)

MAP offers you a modular, menu-like approach for selecting various system support options. At the system level, these include installation/diagnostic training and system level diagnostic support. (Hewlett-Packard cannot assume responsibility for application software generated by the customer.) Controller and instrument service options are available either separately or as part of a total package.

With MAP, you select those specific HP support activities that complement your own internal support functions. And MAP customers receive priority service. Since all MAP services are available for a fixed annual charge, you are also able to budget your system maintenance costs. Whether you select total or partial system support, HP will help assure proper performance of your local HP-IB measurement system. Contact your local HP field engineer for prices and additional information.

### SYSTEM LEVEL MAINTENANCE

At the overall HP-IB system level, service activities fall into two basic areas: installation and system diagnosis of an apparent malfunction.

INSTALLATION — When the system arrives, an HP-IB service specialist will spend a day with you assuring proper system operation and providing user orientation. This service specialist will train your personnel to perform functional verification tests on the system, and will also demonstrate a number of system operational checks. These manual and software tests comprise a significant portion of system diagnosis at time of trouble, and having designated individuals in your organization understand them can be valuable. During installation, your staff will learn how to access the HP-IB service specialist in case of trouble. In most cases, the person installing your system will be your service contact.

DIAGNOSTIC ASSISTANCE — System diagnosis consists of determining whether the system hardware or HP-supplied software is malfunctioning and if so, which functional unit is causing the problem. Your HP-IB service specialist is available for diagnostic assistance either by telephone or a visit to your facility.

Usually, a brief phone call — combined with your own expertise — identifies the problem. In a few cases, the problem may be elusive enough to require on-site diagnosis by the specialist.

With MAP, telephone diagnosis is available during normal business hours without charge. In some areas toll-free direct lines have been installed into our larger Instrument Service Centers.

## COMPUTING CONTROLLER MAINTENANCE

If the service problem relates to your HP computing controller or one of its peripherals, the unit can either be returned to your HP field office for repair, or an HP service representative can travel to your location for faster on-site repair. MAP options are available for either return or on-site controller maintenance. The on-site repair option also includes any necessary preventive maintenance.

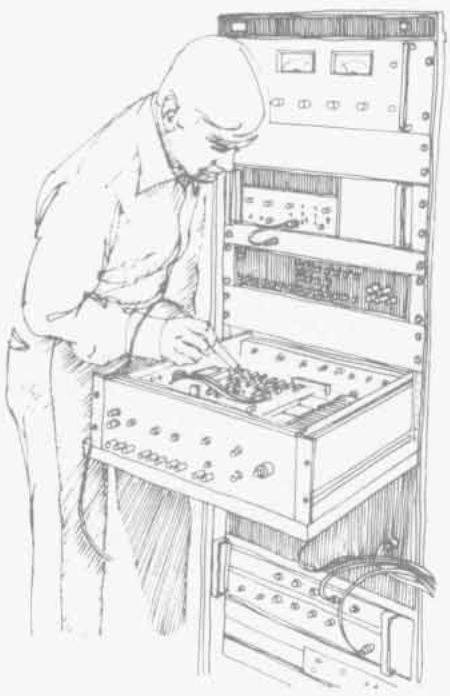
## INSTRUMENT MAINTENANCE

There are a number of distinct options for instrument servicing. Test instrumentation not only can fail like other system elements, but it periodically may need calibration as well. Due to the basic nature of test and measuring equipment, it generally must be repaired/calibrated in a repair center environment. This typically results in longer turn-around time than on-site repair of system controllers and peripherals. To minimize downtime, there are MAP options that provide spare instruments during the repair interval.

The following MAP options may be selected in various combinations to provide instrument maintenance that best fits your organization, system, and application.

SERVICE CENTER REPAIR — With the Service Center Repair option your instruments are repaired on an expedited basis at one of the HP regional service centers. Here, factory trained HP technicians correct all instrument malfunctions that restrict performance. This effort is aimed at getting your repaired unit back to work in the shortest possible period of time. However, if system downtime is critical, you may desire a backup instrument while yours is being repaired. The following two MAP options provide for this contingency.

DEDICATED SPARES — The dedicated spares options reserves one or more HP instruments specifically as



backup for your system. If a corresponding instrument in your system should fail, the dedicated spare is quickly dispatched to your facility. These dedicated instruments are routinely checked and calibrated by HP to ensure operational readiness. If you require that a dedicated spare be maintained at your own facility, a purchase or lease agreement is recommended.

SHARED SPARES — When you enter the shared spares program, you join a group of system users who share a common spare instrument. These shared spares are maintained in a centralized pool more distant from your location. The cost is significantly reduced below that of a dedicated spare; however, you do assume the risk that the shared spare may be in use if your instrument fails. The shared spares pool is managed to provide spares availability at an 85% confidence level.

Note: The shared spares program may not be offered in some countries.

CALIBRATION — In addition to your own need for accurate, reliable measurements, a number of system applications require that measurements be traceable to the National Bureau of Standards or other appropriate international standards organization. With MAP, you can have your equipment calibrated at an HP service center for a fixed charge per calibration on a regularly scheduled basis which you specify. In this way, you can schedule calibration during periods of light system demand.

For additional information about this service contract, contact your local HP sales and service office.

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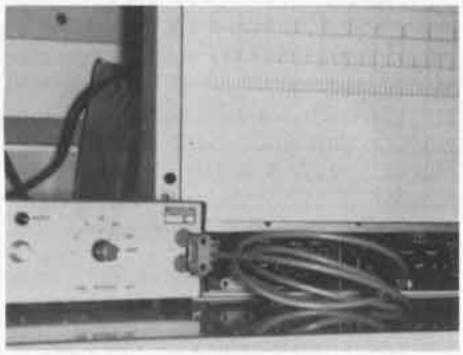
Calibrating X-Y Recorders

# SOLID STATE MARKER GENERATOR

*Ron Slota,*
*Hewlett Packard, Paramus N.J.*

## DESCRIPTION

This solid state marker generator is designed to calibrate the time-base circuitry of X-Y recorders. It replaces electro-mechanical devices which can deteriorate with prolonged use, and pulse generators that sometimes can't quite generate the correct intervals required for accurate recorder time-base calibration. In addition, this solid state marker generator aids new calibration procedures that require greater precision in checking sweep linearity. Sweep linearity is based on the precise measurement of the distance between pulses over a full scale sweep. Obviously the generator supplying the pulses should be more accurate than the recorder measuring them.



**Test Box with BNC output cable connected. Sample time marks on recorder.**

The marker generator's accuracy is directly related to the accuracy of the input voltage line frequency (typically 0.033% or better). Output rates of 1,2,5,10,20,50, and 100 seconds-per-pulse are available, with an approximate pulse width of 20 ms. The output level is adjustable from 0 to +2.5 Vdc, and internally protected against short circuits. Pressing the RESET switch on the front panel will hold off the generator pulses while you make adjustments to the X-Y recorder under test. The RESET switch is also used to reset the generator's count on long sweeps of 50 or 100 second intervals, or to initialize the generator after turn-on.

## OPERATION

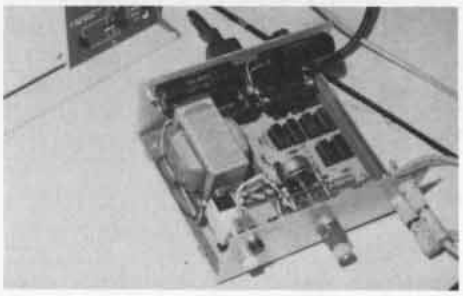
Operation is straightforward with only one control. By simultaneously releasing the RESET button and energizing the recorder sweep, you can start the pen very close to the first grid mark on the paper. However, do not use this first mark as part of the sweep calibration due to possible inaccuracies in operator reflex or pen drop delay.

## THEORY OF OPERATION

The 60Hz sync signal is divided to 6.0Hz by U1 and further divided by U2 to get the three basic signals of 0.5Hz, 1.0Hz, and 2.0Hz. Only one of the three gates A, B, or C is selected (made high) by the TIME INTERVAL switch in any of its positions. This allows only one of the basic signals to pass through the U6 OR gate (pin 3).

U5 and U7 are divide-by-ten counters. The INTERVAL switch selects none, one, or both of them to further divide the basic signal. When Gate D is low (0.0V) U5 is selected, and when Gate E is high (+5.0V) U7 is selected.

The signal finally passes through U9, a monostable multivibrator that provides the 20 ms wide pulses at whatever rate has been previously selected.

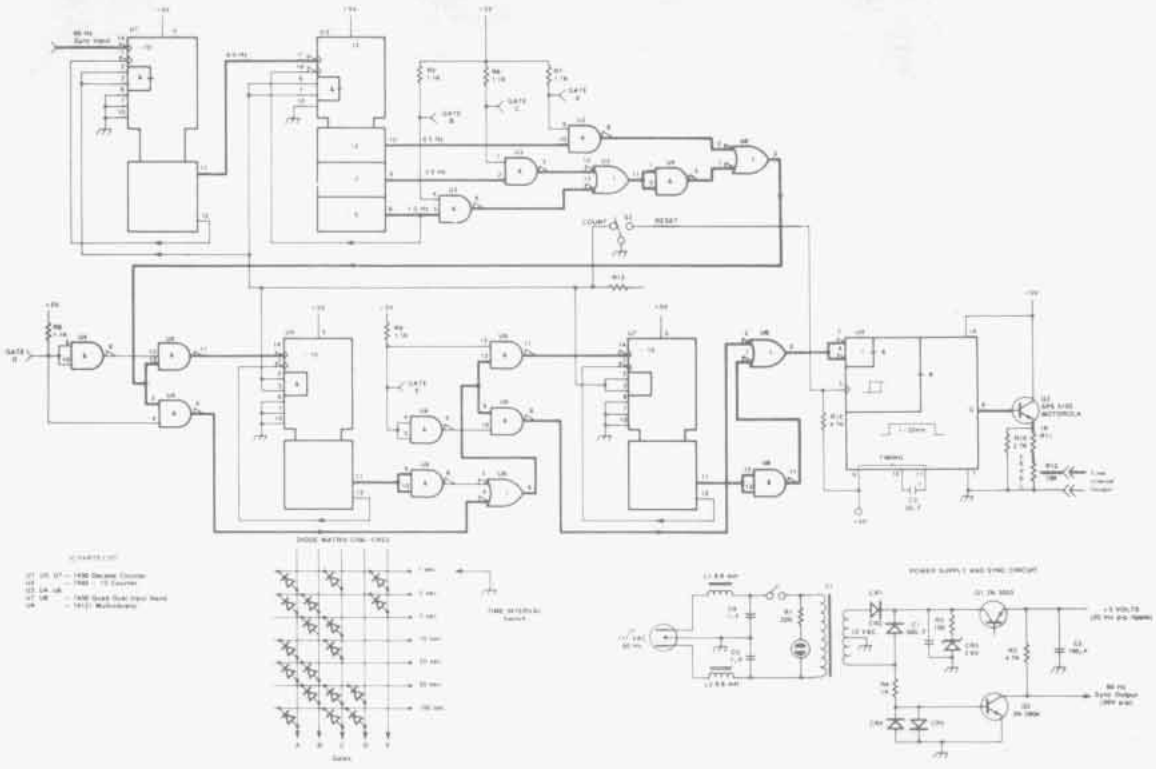


**Test box with cover removed.**

**RON SLOTA**
**"Inventor, designer, builder, user."**

*Ron Slota, who has been with Hewlett-Packard 9 years, is an instrument service technician at the HP Eastern repair center in Paramus, New Jersey (Paramus is located within the metropolitan area of New York City). In addition to his regular duties of instrument repair, Ron also writes auto test programs for HP 9825 Calculator-driven instruments.*

*Ron enjoys gardening, carpentry and ham radio. He is married and lives in Wanaque, New Jersey.*



# "... call your local HP

That's a phrase frequently seen in HP publications. It appears with shipping instructions, parts ordering information and service literature. That phrase reminds you to call your local HP office if you need help. But to do that you must know where to find your local HP office. As HP continues to grow, many offices find themselves outgrowing their facilities and moving to larger quarters. Occasionally an additional office is added to serve an area. These changes may mean that an HP office is now more conveniently located for you.

Although many HP manuals and other publications contain a complete list of HP offices, the list may not be completely current since it is revised only when the publication is reprinted.

To make sure that you can easily locate your local HP office to obtain the service you have come to expect of Hewlett-Packard, here's an up-to-date listing of field offices for all areas of the world.

An asterisk (*) by the office serving your area indicates that there has been a change in address or telephone number, etc. during the past year. It may be helpful to note this new information and to pass it along to others in your facility also.

## AFRICA, ASIA, AUSTRALIA

**ANGOLA**
Telectra
Empresa Tecnica de Equipamentos Electricos, S.A.R.L.
R. Barbosa Rodrigues, 42-1 DT
Caixa Postal 6487
**Luanda**
Tel: 35515,6
Cable: TELECTRA Luanda

**AUSTRALIA**
Hewlett-Packard Australia Pty. Ltd.
31-41 Joseph Street
**Blackburn**, Victoria 3130
P.O. Box 36
**Doncaster East**, Victoria 3109
Tel: 89-6351
Telex: 31-024
Cable: HEWPARD Melbourne

Hewlett-Packard Australia Pty. Ltd.
31 Bridge Street
**Pymble**
New South Wales, 2073
Tel: 449-6566
Telex: 21561
Cable: HEWPARD Sydney

Hewlett-Packard Australia Pty. Ltd.
153 Greenhill Road
**Parkside**, S.A., 5063
Tel: 272-5911
Telex: 82536 ADEL
Cable: HEWPARD ADELAID

Hewlett-Packard Australia Pty. Ltd.
141 Stirling Highway
**Nedlands**, W.A. 6009
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Telex: 93859 PERTH
Cable: HEWPARD PERTH

Hewlett-Packard Australia Pty. Ltd.
121 Wollongong Street
**Fyshwick**, A.C.T. 2609
Tel: 95-2733
Telex: 62650 Canberra
Cable: HEWPARD CANBERRA

Hewlett-Packard Australia Pty. Ltd.
5th Floor
Teachers Union Building
495-499 Boundary Street
**Spring Hill**, 4000 Queensland
Tel: 229-1544
Cable: HEWPARD Brisbane

**GUAM**
Medical Pocket Calculators Only
Guam Medical Supply, Inc.
Jay Ease Building, Room 210
P.O. Box 8947
**Tamuning** 96911
Tel: 646-4513
Cable: EARMED Guam

**HONG KONG**
Schmidt & Co. (Hong Kong) Ltd.
P.O. Box 297
Connaught Centre
39th Floor
Connaught Road, Central
**Hong Kong**
Tel: H-255291-5
Telex: 74766 SCHMC HX
Cable: SCHMIDTCO Hong Kong

**INDIA**
Blue Star Ltd.
Kasturi Buildings
Jamshedji Tata Rd.
**Bombay** 400 020
Tel: 29 50 21
Telex: 001-2156
Cable: BLUEFROST

Blue Star Ltd.
Sahas
414 2 Vir Savarkar Marg
Prabhadevi
**Bombay** 400 025
Tel: 45 78 87
Telex: 011-4093
Cable: FROSTBLUE

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Prabhadevi
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Telex: 011-3751
Cable: BLUESTAR

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Cable: BLUESTAR

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**New Delhi** 110024
Tel: 634770 & 635166
Telex: 031-2463
Cable: BLUESTAR

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**Bangalore** 560 025
Tel: 55668
Telex: 043-430
Cable: BLUESTAR

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Meeakshi Mandiran
xxx 1678 Mahatma Gandhi Rd.
**Cochin** 682 016
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Telex: 0885-514
Cable: BLUESTAR

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**Secunderabad** 500 003
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Cable: BLUEFROST
Telex: 015-459

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Tel: 82056
Telex: 041-379
Cable: BLUESTAR

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JLN•Abdul Muis 62
**Jakarta**
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JKT 42895
Cable: BERCACON

BERCA Indonesia P.T.
63 JL. Raya Gubeng
**Surabaya**
Tel: 44309

**ISRAEL**
Electronics & Engineering Div. of Motorola Israel Ltd.
17, Kremenetski Street
P.O. Box 25016
**Tel-Aviv**
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Telex: 33569
Cable: BASTEL Tel-Aviv

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*Telex: 232-2024YHP MARKET
TOK 23-724
Cable: YHPMARKET

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**Osaka** 532
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24 Kami Sasajima-cho
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Yokogawa-Hewlett-Packard Ltd.
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2-24-1 Tsuruya-cho
Kanagawa-ku
**Yokohama**, 221
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Telex: 382-3204 YHP YOK

Yokogawa-Hewlett-Packard Ltd.
Mito Mitsu Building
105, Chome-1 San-no-maru
**Mito**, Ibaragi 310
Tel: 0292-25-7470

Yokogawa-Hewlett-Packard Ltd.
Inoue Building
1348-3, Asahi-cho, 1-chome
**Atsugi**, Kanagawa 243
Tel: 0462-24-0452

*Yokogawa-Hewlett-Packard Ltd.
Kumagaya Asahi
Hacksuni Building
4th Floor
3-4 Tsukuba
**Kumagaya**, Saitama 360
Tel: 0485-24-6563

**KENYA**
Technical Engineering Services(E.A.)Ltd.
P.O. Box 18311
**Nairobi**
Tel: 557726,556762
Cable: PROTON

Medical Only
International Aeradio(E.A.)Ltd.
P.O. Box 19012
Nairobi Airport
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Tel: 336055,56
Telex: 22201 22501
Cable: INTAERIO Nairobi

**KOREA**
Samsung Electronics Co., Ltd.
20th Fl. Dongbang Bldg. 250, 2-KA
C.P.O. Box 2775
Taepyung-Ro, Chung-Ku
**Seoul**
Tel: (23) 6811
Telex: 22575
Cable: ELEKSTAR Seoul

**MALAYSIA**
Teknik Mutu Sdn. Bhd.
2 Lorong 13 6A
Section 13
Petaling Jaya, **Selangor**
Tel: 54994 54986
Telex: MA 37605

Protel Engineering
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Lot 259, Satok Road
Kuching, **Sarawak**
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Cable: PROTEL ENG

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Caixa Postal 107
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Telex: 6-203 NEGON Mo
Cable: NEGON

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Cable: HEWPACK Wellington

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**Pakuranga**
Tel: 569-651
Cable: HEWPACK Auckland

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Medical Supplies N.Z. Ltd.
Scientific Division
79 Carlton Gore Rd., Newmarket
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**Auckland**
Tel: 75-289
Cable: DENTAL Auckland

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Medical Supplies N.Z. Ltd.
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147-161 Tory St.
**Wellington**
Tel: 850-799
Telex: 3858
Cable: DENTAL, Wellington

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Medical Supplies N.Z. Ltd.
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239 Stanmore Road
**Christchurch**
Tel: 892-019
Cable: DENTAL, Christchurch

Analytical Medical Only
Medical Supplies N.Z. Ltd.
303 Great King Street
P.O. Box 233
**Dunedin**
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N6B 770 Oyo Road
Oluseun House
P.M.B. 5402
**Ibadan**
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Telex: 31231 TEIL Nigeria
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Mushko & Company, Ltd.
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Abdullah Haroon Road
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Telex: 2894
Cable: COOPERATOR Karachi

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38B, Satellite Town
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Cable: FEMUS Rawalpindi

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Telex: 3274 ONLINE

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Telex: 41030

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Elcom Research Building
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Cable: UNIMESA Bangkok

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International Aeradio(E.A.), Ltd.
P.O. Box 2577
**Kampala**
Tel: 54388
Cable: INTAERIO Kampala

**ZAMBIA**
R.J. Tilbury (Zambia) Ltd.
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**Lusaka**
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3200 Hillview Ave.
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TWX: 910-373-1267
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Cable PALOBEN Brussels
Telex 23 494 paloben bru

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19 Gregorios & Xenopoulos Rd
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Cable KYPRONICS PANOEHIS
Telex 3018

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Vyvojová a Provozní Zakladna
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CSSR-25097 **Bechovice u Prahy**
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Telex 121333

Institute of Medical Bionics
Vyskumny Ustav Lekarskej Bioniky
Jedlova 6
CS-88346 **Bratislava-Kramare**
Tel 44-551 45-541

**DDR**
Entwicklungslabor der TU Dresden
Forschungsinstitut Meinsberg
DDR-7305
**Waldheim/Meinsberg**
Tel 37 667
Telex 112145

Export Contact AG Zuerich
Guenther Forgber
Schlegelstrasse 15
1040 **Berlin**
Tel 42-74-12
Telex 111889

**DENMARK**
Hewlett-packard A/S
Datavej 52
DK-3460 **Birkerod**
Tel (02) 81 66 40
Cable HEWPACK AS
Telex 37409 hpas dk

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Telex 37409 hpas dk
Cable HEWPACK AS

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Telex 31 06 17

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Chemin de la Cépière 20
F-31300 **Toulouse-Le Mirail**
Tel (61) 40 11 12
Cable HEWPACK 51957
Telex 510957

Hewlett-Packard France
Agence Régionale
Aéroport principal de
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F-13721 **Marignane**
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Cable HEWPACK MARGN
Telex 410770

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Agence Régionale
63, Avenue de Rochester
B P 1124
F-35014 **Rennes** Cédex
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Cable HEWPACK 74912
Telex 740912

Hewlett-Packard France
Agence Régionale
74, Allée de la Robertsau
F-67000 **Strasbourg**
Tel (88) 35 23 20 21
Telex 890141
Cable HEWPACK STRBG

Hewlett-Packard France
Agence Régionale
Centre Vauban
201 rue Colbert
Entrée A2
F-59000 **Lille**
Tel (20) 51 44 14
Telex 820744

Hewlett-Packard France
Centre d' Affaires Paris-Nord
Bâtiment Ampère
Rue de La Commune de Paris
B P 300
F-93153 **Le Blanc Mesnil Cedex**
Tel (01) 931 88 50

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Hewlett-Packard GmbH
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Bernerstrasse 117
Postfach 560 140
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Cable HEWPACKSA Frankfurt
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Telex 04 13249 hpftmd

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Technisches Buero Böblingen
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TWX 610-422-3022
TLX 05-821521 HPCL

**FOR CANADIAN AREAS NOT LISTED:**
Contact Hewlett-Packard (Canada) Ltd. in Mississauga

supplement to

# BENCH BRIEFS SERVICE NOTE INDEX

## NEED ANY SERVICE NOTES?

Here's the latest listing of Service Notes available for Hewlett-Packard products. To obtain information for instruments you own, remove the order form and mail it to the nearest HP distribution center.

### 332A DISTORTION ANALYZER

332A-11A. Serials 1145A22870 and below. Revision of R.F. Detector.

### 333A/334A DISTORTION ANALYZERS

333A/334A-9B-S. Serials below 1137A00316 for the 333A and below 1140A06311 for the 334A. Elimination of a potential safety hazard.

334A-10A. Serials 1145A05870 and below. Revision of R.F. Detector.

### 419A DC NULL VOLTMETER

419A-9. Serials 0948A05803 and below. Battery replacement.

### 745A AC CALIBRATOR

745A-10B-S. Serials 1319A01251 through 1319A01670; 745A-H18's serials 1319A01671 and above. Modification to eliminate potential safety hazard.

745A-12B-S. Serials 00741-00101 through 1319A01250. Elimination of a potential safety hazard.

745A-13B-S. Serials 00741-00101 through 1319A01670; 745A-H18's serials 1319A01671 and above. Elimination of a potential safety hazard.

745A-16. Serials 1319A02021 and below. Modification to eliminate high frequency oscillations.

### 1106A/B AND 1108A TUNNEL DIODE MOUNTS

1106A/B-1B/1108A-1A. All serials. Repair policy and prices.

### 1300A X-Y DISPLAY

1300A-13A. All serials. Required modification if high-voltage oscillator is replaced.

### 1308A MONITOR

1308A-13A. All serials. Required modification if high-voltage oscillator is replaced.

### 1309A X-Y DISPLAY

1309A-13A. All serials. Required modification if high-voltage oscillator is replaced.

### 1310A X-Y DISPLAY

1310A-18. All serials. Improved reliability for the X, Y & Z axis amplifier.

### 1311A X-Y DISPLAY

1311A-19. All serials. Improved reliability for the X, Y & Z axis amplifier.

### 1317A X-Y DISPLAY

1317A-5. All serials. Improved reliability for the X, Y & Z axis amplifiers.

### 1321A X-Y DISPLAY

1321A-5. All serials. Improved reliability for the X, Y & Z axis amplifiers.

### 1335X-Y DISPLAY
1332A-6. All serials. Improved reliability for the X, Y & Z axis amplifier.

### 1333A X-Y DISPLAY
1333A-2. All serials. Improved reliability for the X, Y & Z axis amplifier.

### 1335A X-Y DISPLAY
1335A-4. All serials. Improved reliability for the X, Y & Z axis amplifiers.

### 1715A DIGITAL MULTIMETER
1715A-1-S. 1715A Opt. 034 all serials. Elimination of a potential safety hazard.

### 1725A DIGITAL MULTIMETER
1725A-1-S. 1725A Opt. 034 all serials. Elimination of a potential safety hazard.

### 1740A OSCILLOSCOPE
1740A-15. All serials. Preferred replacement for input FETs.

### 1741A OSCILLOSCOPE
1741A-6. All serials. Preferred replacement for input FETs.

### 1743A OSCILLOSCOPE
1743A-2. All serials. Preferred replacement for input FETs.

### 2801A QUARTZ THERMOMETER
2801A-1. All serials. Changing the thermometer from celsius to fahrenheit.
2801A-2. All serials. Changing the thermometer from fahrenheit to celsius.

### 2802A THERMOMETER SYSTEM
2802A-1. All serials. Modification to prevent difference in readings between normal and expand ranges.
2802A-2. All serials. 18641A, 18642A, 18643A probe leakage at high humidity.

### 2816A PRESSURE SIGNAL PROCESSOR
2816A-1. Serials 1312A-00161 and below. Potential power supply oscillation problem.
2816A-2. Serials 1312A-00186 and below. Improvement in output waveform to prevent double-counts.

### 3050A AUTO DATA ACQUISITION SYSTEM
3050A-5B. Leeds & Northrup 2740 Scanner HP to L & N part number cross reference.

### 3320C LEVEL GENERATOR
3320C-1A. All serials. How to improve air capacitor reliability.

### 3403A/B/C TRUE RMS VOLTMETER
3403A/B-2-S/3403C-6-S. 3403A/B all serials; 3403C serials 1452A01206 and below. Banana adapter miswiring.

### 3437A SYSTEM VOLTMETER
3437A-1. Serial numbers: As stated within the service note. Change to improve instrument accuracy.
3437A-2. All serials. Application and programming considerations.

### 3455A DIGITAL VOLTMETER
3455A-5. All serials. Removal and replacement of front panel switch.
3455A-6. Serials 1622A00544 and below. Fuse modification to prevent component damage.

### 3461A DIGITAL VOLTMETER
3461A-4-S. All serials. Revision to minimize shock potential.

### 3552A TRANSMISSION TEST SET
3552A-6. All serials. Power supply fuse change.
3552A-U-103. All serials. Replacement part numbers for LED displays.

### 3580A SPECTRUM ANALYZER
3580A-5A. All serials. Modification to improve the fit of 10361A Camera Adapter on 3580A Spectrum Analyzer.
3580A-6. Serial numbers effectivity:
3580A: 1415A02091 and above
3581A: 1351A00726 and above
3581C: 1411A00581 and above
A2 VTO and tracking oscillator noise problems.
3580-7. All serials. Correct procedure for installing A2/A5 crystals.

### 3581A/C SPECTRUM ANALYZER
3581A/C-3. Serial numbers effectivity:
3580A: 1415A02091 and above
3581A: 1351A00726 and above
3581C: 1411A00581 and above
A2 VTO and tracking oscillator noise problems
3581A/C-4. All serials. Correct procedure for installing A2/A5 crystals.

### 3594A SWEEPING LOCAL OSCILLATOR
3594A-1. Serials 1220A01370 and below; 1220A01450 and above. A5 heater control circuit modification.

### 3702B IF/BB RECEIVER
3702B-13B. Serials 1703U-01776 and below. Preferred replacement for A23 assembly.
3702B-17A. Serials 1703U-01776 and below. Preferred replacement for A24 assembly.
3702B-36. All serials. Preferred replacement for A20C3, A22C27, A24C20.
3702B-37. Serials 1730U-02076 and below. Faulty intensity, or inoperative blanking of display due to A6R4 resistance going high.
3702B-38. All serials. Preferred replacement for A2MC3, A2MC5, A2MC12, A3MC3, A4MC1, A4MC5, A23MC1, A24MC1, A24MC2 and A24MC3.

### 3710A IF/BB TRANSMITTER
3710A-15. All serials. Preferred replacement for A7C4, A8C2, A9C13.
3710A-16. All serials. Preferred replacement for A1MC1, A2MC1, A11MC1, A11MC2, A11MC3, A12MC1, A12MC2 and A13MC8.

### 3715A BB TRANSMITTER
3715A-1. All serials. Preferred replacement for A3MC1.

### 3716A BB TRANSMITTER
3716A-9. All serials. Preferred replacement for A1MC1.

### 3730A DOWN CONVERTER
3730A-4. All serials. Preferred replacement for A2C38, A7C38.

### 3745A/B SELECTIVE LEVEL MEASURING SET
3745A/B-13A. All serials. Installation of Option 040
3745A/B-14. Serials between 1609U and 1720U and all instruments which have service note 3745A/B-4A actioned. HP-IB cable configuration problem in remote systems.

### 3761A ERROR DETECTOR
3761A-6B. Serials 1707U-00306 and below. Modification to improve performance.

### 3763A ERROR DETECTOR
3763A-1. All serials. Modification to eliminate spurious printing when the 3763A is used with HP models 5050B, 5055A and 5150A printers.

### 3790A IF/BB TRANSMITTER
3790A-5. All serials. Preferred replacement for A9C6.
3790A-6. All serials. Preferred replacement for A1MC1, A2MC1, A8MC1, A11MC1, A11MC2, A11MC3, A12MC1, A12MC2 and A13MC8.

### 3791A BB TRANSMITTER
3791A-5. All serials. Preferred replacement for A1MC1.

### 3792A IF/BB RECEIVER
3792A-3. All serials. Preferred replacement for A24C20.
3792A-4. All serials. Preferred replacement for A2MC17, A2MC19, A2MC25, A2MC26, A2MC28, A3MC3, A4MC1, A4MC5, A22MC1, A23MC1, A24MC1, A24MC2, A24MC3, A25MC7, A25MC8 and A25MC9.

### 4262A DIGITAL LCR METER
4262A-1A. Serials 1710J00116 to 1710J00200. Elimination of a potential safety hazard.

### 4940A TRANSMISSION IMPAIRMENT MEASURING SET (TIMS)
4940A-3A. Serials 1401A-00300 and below. Modification to improve power supply reliability.
4940A-9. Serials 1401A-00555 and below. Modification to prevent potential envelope delay zeroing problem.
4940A-11. Serials 1401A-00780 and below. Change in dropout duration specification.
4940A-12. All serials. Field installation of option HO2 (transient outputs).
4940A-13. Serials 1401A-01234 and below. Improved power supply reliability.
4940A-14. Serials 1401A-01131 and below. Receiver input improvement.

### 4942A TRANSMISSION IMPAIRMENT MEASURING SET (TIMS)
4942A-1. All serials. Field installation of Option 010 (HP-IB).
4942A-2. Serials 1624A-00182 and below. Active hold circuitry improvements.
4942A-3. Serials 1624A-00197 and below. Envelope delay improvements.

### 5300A MEASURING SYSTEM
5300A-4. All serials. Recommended use of 10548A test cards on 5300A.

### 5300B MEASURING SYSTEM
5300B-1. All serials. Recommended use of 10548A test cards on 5300B.

### 5328A UNIVERSAL COUNTER
5328A-5A. Installation procedure: Option 041 programmable module.
5328A-6. All serials. Revision of multiplier performance test for Option 040, 041.
5328A-7. All serials. Delay check for Option 040.
5328A-8. All serials with Option 040, 041. Revision of adjustment of the A14 multiplier and noise generator.
5328A-9. All serials. A2 power supply adjustments.
5328A-10. All serials. Modification to improve compatibility of A16 display assemblies.

### 5501A LASER TRANSDUCER
5501A-2. Serials 1712A and below. Modification to eliminate random retune problems.

### 7035B X-Y RECORDER
7035B-4. Serials 1620 and above. Modification to eliminate Y-arm oscillations at 240 VAC.

### 7221A GRAPHIC PLOTTER
7221A-2. Serials 1729A, 1732A, 1751A. Modification to improve firmware.

**7221A GRAPHICS PLOTTER**

7221A-3. All serials. Recommended memory replacement.

**8505A NETWORK ANALYZER**

8505A-1A. Serials 1716A00380 and below. Increased power supply reliability.

8505A-5. Serials 1723A00396 and below. Modification of the air filter retainer.

8505A-6. All serials. Troubleshooting the A3A11 Group Delay Detector.

8505A-7. All serials. Troubleshooting the A3A4 Processor Interface board.

8505A-8. Serials 1716A00380 and below. Elimination of marker glitches on CRT when 8505A is used with HP 8501A Storage-Normalizer.

8505A-10. All serials. Troubleshooting the A3A5 Processor D/A board.

8505A-12. All serials. Troubleshooting CRT control circuits.

8505A-17. All serials. A3A17 Marker I assembly troubleshooting.

8505A-18. All serials. A34A18 Marker II assembly troubleshooting.

**8614A SIGNAL GENERATOR**

8614A-17. Serials 1748A and below. Improvement in line-related residual FM.

**8614B SIGNAL GENERATOR**

8614B-9. All serials. Improvement in line-related residual FM.

**8616A SIGNAL GENERATOR**

8616A-15. Serials 1748A and below. Improvement in line-related residual FM.

**8616B SIGNAL GENERATOR**

8616B-9. All serials. Improvement in line-related residual FM.

**8660B SYNTHESIZED SIGNAL GENERATORS**

8660B-18B. Serials 1343A and below. Recommended replacement for A7 power line module.

**8672A SYNTHESIZED SIGNAL GENERATOR**

8672A-1. Serials 1725A00247 and below. Preferred replacement for capacitor A2A11C20.

8672A-2. All serials. Preferred replacement for 1853-0050 transistor.

**59307A VHF SWITCH**

59307A-4. Serials 1644A and below. Modification to prevent switch from dropping out of REMOTE due to excessive noise sensitivity.

**59308A TIMING GENERATOR**

59308A-2. Serials 1632A and below. Modification to prevent generator from dropping out of REMOTE due to excessive noise sensitivity.

**63005C/63315D POWER SUPPLIES**

63005C-1/63315D-1. 63005C serials 1620A00649 and below; 63315D serials 1633A00553 and below. Modification when replacing A1CR1 and A1CR2.

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# SAFETY-RELATED SERVICE NOTES

Service Notes from HP relating to personal safety and possible equipment damage are of vital importance. To make you more aware of these important notes, HP has recently modified the Safety Service Note format. The note is now printed on paper with a red border, and a "-S" suffix has been added to the note's number. In order to make you immediately aware of any potential safety problems, we are highlighting safety-related Service Notes here with a brief description of each problem. Also, in order to draw your attention to safety-related Service Notes on the Service Note order form at the rear of *Bench Briefs*, each appropriate number is highlighted by being printed in color.

## 745AC CALIBRATOR

Certain 745A Calibrators (see the service note list for specific serial numbers) require the installation of an isolation transformer in the OUTPUT CONNECTOR BNC circuit. There have been several safety service notes written about this problem, and we strongly recommend that if you

own a 745A, please order the following safety service notes.

745A-10B-S
745A-12B-S
745A-13B-S

## 3461A AC/OHMS CONVERTER

Some 3461A Converters have a potential shock hazard in that the FRONT/REAR select switch shaft floats at the same potential as the VOLTS LOW and/or GUARD terminals. Use the following procedure to test your instrument for this potential shock hazard.

1. Turn the power switch off, disconnect all power cords and signal cables. Connect the ground strap between the LOW and GUARD terminals (this tests both terminals at the same time).

2. Set an ohmmeter to the 1 kilohm range and connect one lead to the LOW or GUARD terminal.

3. Connect the other ohmmeter lead to the set screw on the front panel FRONT/REAR control.

4. The ohmmeter should indicate infinity. If not, order the following parts and Service Note to modify the 3461A to conform to current safety standards.

Service Note 3461A-4-S

| | | |
|---|---|---|
| 1 ea | 20.0 mm round knob | 0370-2562 |
| 1 ea | 20.0 mm knob cap | 5040-8016 |
| 1 ea | Warning label | 7120-4082 |

# A POTENTIAL SAFETY HAZARD

**Do you own one of these instruments?**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10163A | 193A | 3551A | 43807N | 5315A | 59307A | 7010A | 78330A |
| 1036A | 195A | 3552A | 43815P | 5321B | 59313A | 7010B | 78331A |
| 11440A | 197A | 3555A | 43846A | 5325B | 59500A | 7015B | 78332A |
| 1220A | 211B | 3555B | 47000S | 5330A | 59501A | 7123A | 78333A |
| 1221A | 21101A | 3575A | 47302A | 5330B | 59992A | 7143A | 7833A |
| 1222A | 21125A | 400E | 47305A | 5332B | 612A | 7560 | 7835A |
| 1340A | 250B | 400EL | 47310A | 5360A | 62003A | 7561 | 78620A |
| 13251A | 2607A | 400F | 47312A | 5381A | 62004A | 7562A | 78635A |
| 13251B | 2640 | 400FL | 47313A | 5382A | 62005A | 7563A | 7970B |
| 14010A | 2645 | 402B | 47402A | 5383A | 62006A | 780-21 | 7970C |
| 15139A | 3070A | 410C | 47804 | 5390A | 62010A | 7803B | 7970E |
| 15180A | 3071A | 43113A | 47804A | 5477A | 62012A | 7804B | 8003A |
| 15254B | 313A | 43114A | 4800A | 5526A | 62015A | 7805B | 8004A |
| 1602A | 3310A | 431C | 48304D | 5601B | 62018A | 7805C | 8021A |
| 1620A | 3310B | 432A | 5005A | 5621A | 62024A | 7807C | 8022A |
| 1700A | 3311A | 432B | 5062C | 5664B | 62028A | 78200B | 8025B |
| 1700B | 3312A | 43804D | 5100B | 5720A | 62048A | 78201A | 8031A |
| 1701A | 3351B | 43804M | 5256B | 5750B | 6256B | 78201B | 8032A |
| 1701B | 3352C | 43804N | 5263B | 5751A | 6263B | 7822C | 8412A |
| 1702A | 3352D | 43804P | 5264B | 5753G | 6264B | 7825A | 846608 |
| 1703A | 3353A | 43804T | 5265B | 5754G | 6265B | 7828A | 846619 |
| 1706A | 3354A | 43805D | 5266B | 5755G | 6266B | 7829B | 851B |
| 1707A | 3406A | 43805M | 5267B | 5756G | 6267B | 7830A | 8601A |
| 1707B | 3455A | 43805N | 5271B | 59301A | 6271B | 78311A | 9863A |
| 1744A | 3465A | 43805P | 5280A | 59303A | 6515A | 78312A | 9865A |
| 191A | 3465B | 43805T | 5300A | 59304A | 680 | 78313A | 9872A |
| | | 43807D | 5300B | 49306A | 7010 | | |

If you do, check the line fuse to see if it's a "Littlefuse" 3AG "slo-blo", rated 0.3 amperes or below. **Some of these fuses have been found to overheat or explode when subjected to certain overloads.** Note that other "Littlefuse" brand fuses with greater current ratings do not have this problem.

The "Littlefuse" brand fuses listed below should be replaced with a "Bussman" type fuse. HP part numbers and ratings are given for reference.

For more information, order Product Safety Service Note M58-S with the order form on page 12.

| HP Part Number | Rating (Amps) | Supplier's Part Number Littlefuse (remove) | Bussman |
|---|---|---|---|
| 2110-0521 | .010 | 313.010 | MDL 1/100 |
| 2110-0337 | .031/.040 | 313.031 | MDL 132 |
| 2110-0040/0311 | .062 | 313.062 | MDL 1/16 |
| 2110-0234 | .100 | 313.100 | MDL 1/10 |
| 2110-0064/0318 | .125 | 313.125 | MDL 1/8 |
| 2110-0017/0320 | .150/.175 | 313.150 | MDL 15/100 |
| 2110-0235 | .200 | 313.200 | MDL 2/10 |
| 2110-0018/0201 | .250 | 313.250 | MDL 1/4 |
| 2110-0044 | .300 | 313.300 | MDL 3/10 |

## 1715A/1725A-OPT 034 DIGITAL MULTIMETER

This is a relatively new product and requires a warning label next to the DMM Multimeter/Time Interval switch. The label cautions against applying voltages in excess of 200V to the V-Ω terminal when the switch is set to the Time Interval position. The switch may arc and create a safety hazard to personnel and/or damage to the instrument.

Please contact your local HP sales and service office to obtain one of these labels for your instrument.

## 3403A/B/C TRUE RMS VOLTMETER

The 3403 Voltmeter includes a floating "banana plug to BNC" adapter. Some of these adapters have been miswired which could create a safety hazard to personnel and/or damage to the instrument.

To see if you have a good adapter, test for continuity between the terminal marked ⏚ and the sleeve of the adapter. If the terminal marked ⏚ is connected to the center conductor instead, it is miswired and should be returned to Hewlett-Packard for replacement.

## 4262A DIGITAL LCR METER

Some 4262A LCR Meters have an improper fitting power module (the power cord receptacle) that can be jarred loose under extraordinary force.

To modify your instrument please order safety service note 4262A-1A and a special L-bracket (no part number) from your local HP Sales and Service office. The service note provides complete instructions for installing the L-bracket.

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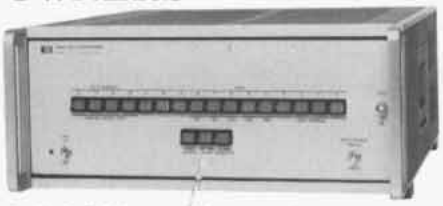
69421A Voltage Monitor Card

## ATTENTION 6940A/6941A MULTI-PROGRAMMER OWNERS

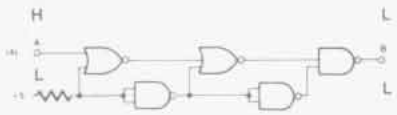


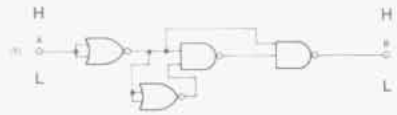
6921A Voltage Monitor Cards for the 6940A/6941A Multiprogrammer, serials 1637A-00910 to 00959 may make accidental electrical contact to the adjacent plug-in card. The culprit in these serials is an excessively thick spacer under transistor Q4. The correct thin spacer is HP part number 0340-0453, available from your HP Sales and Service office by referencing this article and giving your plug-in serial number.

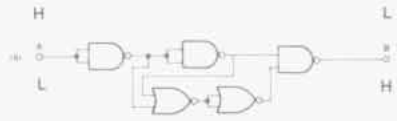
## TTL LOGIC QUIZ

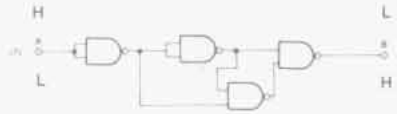
The last issue carried these logic circuits with the objective to determine the resulting outputs at B for the two possible logic inputs "high" or "low" at A.



## NEW APPLICATION NOTES

**Application Note 200-1**, titled Fundamentals of Microwave Frequency Counters, discusses the various designs of microwave counters, tradeoffs available to the user from these designs, and a few useful applications of the new HP 5342A Counter.

**Application Note 235** discusses balanced circuits and balanced lines, impedance matching, and common mode rejection, terms familiar to the communications industry. A quick overview of the use and reasons behind balanced circuitry is given, in addition to examples of common errors in balanced measurements.

# READERS CORNER

**Here's your chance to share your ideas and views with other *Bench Briefs* recipients. In Reader's Corner, we will print letters to the Editor, troubleshooting tips, modification information, and new tools and products that have made your job easier. In short, Reader's Corner will feature anything from readers that is of general interest to electronic service personnel.**

**If there is something you have to share with other *Bench Briefs* readers, let us hear from you.**

### THAT *%$!@# SHEEP PUZZLE

*My apologies to Joe Granger of Alcoa Laboratories. Letters and phone calls (some rather strongly worded) have poured in supporting Joe's contention that there is an alternate interpretation to the sheep puzzle. Simply put, since the older brother already owned the knife, its value should be subtracted from his share when he gives it to his younger brother. And of course, added to the younger brother's share. The problem then becomes: "How much is the knife worth?" Working the problem out on this basis the knife's value becomes two rubles, not four.*

### ANOTHER LOGIC PROBLEM

*I think the readers of Bench Briefs might enjoy the attached logic problem. It is not easy, but there is only* one *correct answer.*

The Hudson-Palmer Electronic Corporation is composed of five divisions (1 thru 5), each of which manufactures either Calculators, Computers, Counters, Oscilloscopes or Printers, not necessarily in that order. The five products amounted variously to 10, 15, 20, 25 and 30 percent of the total corporation production, and to 11, 16, 18, 22 and 33 percent of the total profit. From the clues below, try to determine the number of the division where the products were manufactured, and the percentage of production and profit for each product.

1) The number of the Oscilloscope division is one higher than the Calculator division and one lower than the division that produced the greatest profit.

2) The Computers accounted for a greater percentage of production and a lesser percentage of profit than the Calculator division. The two divisions together accounted for 35 percent of the production and more than one third of the profit.

3) Although the fifth division did not account for the greatest profit, the totaled percentages of profit of that division and the Calculators exactly equaled the totaled percentages of production for the Counter division and the first division.

4) The totaled percentages of production of the Counters and the fifth division exactly equaled the totaled percentages of profit for the Printers and the third division.

Len Kraska
Hewlett-Packard

*Len's right, this one's a pip.*

*Editor*

### SERVICE INFORMATION

Dear Sirs:

We have a CAQ1-616B (Signal Generator) that has a potential shock hazard. We are requesting your Bench Briefs service information of . . .

Dear Sir:

I am writing to get consent to reproduce one of your service notes . . . I need to distribute copies to our western region repair centers . . .

Editor, Bench Briefs;

Information taken from your Bench Briefs indicates that a personnel shock hazard may exist in several pieces of test equipment held onboard. The test procedures listed in Bench Briefs would be most helpful. Would you please mail a copy . . .

*These represent a sample of the letters we receive every month requesting additional information about service notes. We are more than happy to oblige. Service notes are written for our customers that already have Hewlett-Packard equipment. They communicate the following information:*

- *Instrument design change or modification information which results in broader or extended usefulness of an instrument or improved instrument performance and/or reliability.*
- *Instrument-related replacement part change information. Substitution to table of replacement parts list which will result in customer ordering the correct (a substituted or improved) replacement part.*
- *Instrument-related servicing procedures which supplement the service portion of any final manual.*
- *Instrument-related operating procedures which supplement the operating portion of any final manual.*

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*Editor*

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