HEWLETT hp PACKARD

BENCH BRIEFS

SERVICE INFORMATION FROM HEWLETT-PACKARD

JANUARY-APRIL 1978

INSTRUMENT SERVICE

What's Available, And How to Get It

When you purchase Hewlett-Packard test and measurement instruments, HP places its comprehensive customer service organization at your disposal. Both of us have a mutual interest in quick, efficient, high quality repairs — whether we do it or you do it — so HP supports you with parts, service information, training, and advice.

This applies to both warranty and out-of-warranty situations. Our service program will ensure that your instruments are kept properly adjusted and calibrated and that any necessary corrective maintenance is carried out.

Even if production of your instrument is no longer active, HP service is. HP provides full support for a period of at least five years after the manufacture of a particular model has been discontinued. Service, thereafter, continues on a best-effort basis until parts obsolescence and technological change make repairs uneconomical.

HP customer service is based on the capabilities of highly skilled and specially trained people in a large number of well equipped, fully stocked repair centers around the world. High-speed communication and shipping channels link these facilities to HP factories and parts centers so that we can respond rapidly to your service needs.

The HP service program consists of five elements, with a wide range of options available. These five elements are:

- Repair Centers
- Parts Support
- Service Agreements
- Training
- Documentation

REPAIR CENTERS

HP instrument repair centers are located in major industrial areas around the world.

When sending in equipment, you should clearly describe the problem and the type of work desired. If a service quotation is required by your Purchasing Department or if you are trying to make a repair vs. buy decision, HP will be glad to oblige by offering either a verbal or written estimate or a quotation.

An estimate, provided without charge, is an approximate figure and not a firm price commitment.

A quotation is a firm price commitment for the service work requested. A nominal charge is made for this quotation, which includes repair details and is applied against the cost of repair. (Quotations are supplied without charge for calibration or repair work in those cases where standard repair prices are already established for each model.)

Occasionally, in the course of doing your own HP instrument repair, you may have a question or need some technical assistance. You are welcome to call an HP repair center for advice.

PARTS SUPPORT

Each repair center maintains its own large parts inventory.

When ordering a replacement part, please specify:

- The HP part number
- The complete part name (as listed in the operating and service manual).

If you need help identifying either the name or number, call us for assistance.

If you have an urgent time-critical repair, you can request special handling and premium freight via the HP "hotline" to obtain the part in the shortest possible time. (There is a premium freight charge for this service.) If your equipment is located in remote areas or if the instrument downtime is critical, you might also consider purchasing a spare parts kit.

Perhaps you prefer to stock parts at your own facility. If so, Hewlett-Packard will be glad to provide assistance with stocking recommendations based on your instrument inventory.

IN THIS ISSUE

A continuous maintenance program assures you of maximum performance and accuracy with minimum interruption for repair. Therefore, Hewlett-Packard offers several optional service plans to maintain your equipment for an economical, predetermined charge.

Calibration Agreements supplement the warranty for new instruments and help ensure on-going performance for older instruments. Calibration will be performed at either HP-recommended intervals or at intervals which you specify.

Repair Agreements are the equivalent of a health insurance policy for your instrument. HP will repair all instrument failures except those resulting from abuse.

These agreements allow the flexibility of using your own in-house lab for routine calibration, while relying on HP for repair. For out-of-warranty instruments, inspection/calibration may be required prior to entering into an agreement of this type.

Full Service Agreements cover both calibration and repair service described above.

Blanket Purchase Orders are also available to cover service. This can be a local agreement to cover service for all HP instruments at a given facility under predetermined terms and conditions, or a national blanket purchase order. The latter is a convenient, efficient means of servicing a widely dispersed population of instruments. Equipment service is performed at various HP repair centers, but repair costs are invoiced to your central accounting department for easy budgeting and cost control.

On-Site Service Agreements are available for various fixed installation and HP-IB instrument system products. These agreements are tailored to the instrumentation involved and your specific requirements.

For more information about any of these service plans, contact your local HP office. They will be happy to supply details, recommendations, and prices.

TRAINING

If you prefer to maintain equipment yourself, let us train your service personnel. HP offers several factory and local training seminars each year.

Product Service Seminars deal with specific HP instruments. These courses typically are 2 to 5 days in length. Topics covered include theory of operation, service theory and techniques, calibration, troubleshooting, and component level repair.

Digital Troubleshooting Seminars are available which address fundamental troubleshooting procedures. The first seminar, "Basic Digital Troubleshooting," deals with fundamental digital concepts. The second seminar, "Troubleshooting Microprocessor Designs," provides insights and skills in repairing ASM and microprocessor-controlled instruments.

Many of these seminars are announced here in Bench Briefs or you can contact your local HP office for schedules and prices. You can also arrange to have product service or digital troubleshooting seminars taught in-house at your own facility.

Video Tape Training is a cost-effective alternative to live seminars. HP produces video tapes on specific product maintenance, measurement technology, and general service. Two tape series of particular interest to service personnel are "Transistor Basics" and "Digital Troubleshooting." For a catalog of HP video tapes, call your local HP office.

For more information on service please order the following free documents. You can use the service note order form at the rear of Bench Briefs; *just pencil in the numbers.*
5952-0061 *5952-0062* *5952-0063*

Informal Training is also available from the regional HP repair centers. You can arrange to have an HP service specialist visit your facility to provide one-to-one coaching on maintenance and repair of specific products.

SERVICE DOCUMENTATION

Of course, last but not least is documentation. Each Hewlett-Packard instrument has an operating and service manual that contains operation, calibration, troubleshooting, diagnostic, and repair procedures with circuit diagrams and a table of replacement parts.

Companies with a large inventory of HP instruments may choose to subscribe to the new microfiche service library. For a flat fee, you can purchase the existing documentation on microfiche for all HP instruments. Then for a yearly subscription fee, you will receive new documentation updates on microfiche every three months. The HP microfiche library is a complete reference source in convenient, easy-to-store, easy-to-access form. The Instrument Service Library can be ordered as HP No. 5951-6523. The associated update subscription is ordered as HP No. 5951-6529.

As part of after-sale support, HP provides supplementary information through *Service Notes* and *Bench Briefs*. Service notes are documents that convey technical service information about specific products. In addition, *Safety Service Notes* report on recommended safety procedures.

Bench Briefs is a periodic newsletter filled with handy servicing and safety tips, *Service Note* summaries, and other articles.

CUSTOMER SERVICE SEMINAR TRAINING CALENDAR

Hewlett-Packard continually offers training to customers on a worldwide basis to help keep service skills current with HP's extensive product line. Seminars are provided throughout Europe and the United States in an effort to bring our training facilities closer to your area.

Listed below are the training seminars currently planned for the remainder of 1978. Detailed course outlines are provided on the following pages. For more information or registration, please contact your local sales and service office. For registration contact the coordinator at the course location.

DATE	CONTENT	LOCATION	TUITION	COORDINATOR
July 10 thru 14, 1978 September 11 thru 15, 1978	Fourier Analyzers User's Guide	Santa Clara Div. 5301 Stevens Creek Blvd. Santa Clara, CA 95050 (408) 246-4300	$500/Student	George Carey Santa Clara
September 25 thru 28, 1978	Oscilloscope Maintenance Models 1715A/1725A	Colorado Springs Div. 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900	$300/Student	Dick Browne Colorado Springs
October 2 thru 5, 1978	Oscilloscope Maintenance Models 1740A/1741A	Colorado Springs Div. 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900	$300/Student	Dick Browne Colorado Springs
October 9 thru 11, 1978	Logic State Analyzer Maintenance - 1600A/1607A	Colorado Springs Div. 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900	$250/Student	Dick Browne Colorado Springs
October 16 thru 18, 1978	Logic State Analyzer Maintenance - 1611A	Colorado Springs Div. 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900	$250/Student	Dick Browne Colorado Springs
May 15 thru 16, 1978 October 23 thru 24, 1978	Small Screen Display Maintenance — 1332A/1333A/1335A	Colorado Springs Div. 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900	$200/Student	Dick Browne Colorado Springs
May 18 thru 19, 1978 October 26 thru 27, 1978	Large Screen Display Maintenance — 1310A/ 1311A/1317A/1321A	Colorado Springs Div. 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900	$200/Student	Dick Browne Colorado Springs
September 11 thru 15, 1978	8640AM/FM Signal Generator 8660 Synthesized Signal Generator 436 Power Meter	Stanford Park Div. 1501 Page Mill Road Palo Alto, CA 94303 (415) 856-3414	$350/Student	Tom O'Connor 333 Logue Ave. Mt. View, CA 94042 (415) 968-9200
September 18 thru 22, 1978	8505A RF Network Analyzer	Santa Rosa Division 1400 Fountain Grove Parkway Santa Rosa, CA 95404 (707) 525-1400	$350/Student	
October 19 thru 20, 1978	Serial Network Analyzer Maintenance — 1640A	Colorado Springs Div. 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900	$200/Student	Dick Browne Colorado Springs

SIGNAL GENERATORS PALO ALTO, CALIFORNIA SEPTEMBER 11-15, 1978

This one-week customer seminar on Signal Generators takes place at the HP manufacturing facility in Palo Alto, California which is approximately 30 miles south of San Francisco, or 20 miles north of San Jose, both having a major airport and car rental facilities.

Attendance is limited to 20 participants so file your applications early (registration cut-off date is August 11) to avoid disappointment. The application form is on the last page of BENCH BRIEFS.

The course objective is to teach front panel control operations, circuit theory, interpretation of signal waveforms and voltage levels at test points, how to efficiently perform critical adjustments during calibration, and how to isolate troubles to individual circuits.

COURSE CONTENT

LECTURE

I. Introduction
II. Features and Model Options
III. Front Panel Features
  A. Video Tape
  B. Demonstration
IV. Theory
  A. Block Diagram
  B. Assembly Locations
  C. Schematic

LAB

I. Adjustments
II. Performance Tests
III. Troubleshooting

PREREQUISITES — Basic knowledge of digital logic circuits and general knowledge of electronics including operational amplifiers and phase lock circuits.

PRESTUDY — Review digital logic and block diagram information in 8640, 8660 and 435/436 manuals.

Read pages 1-48 in "Signal Generator Seminar" testbook.

View video tape 90030_566 (Optional).

RF NETWORK ANALYZERS SANTA ROSA, CALIFORNIA SEPTEMBER 18-22, 1978

This one-week customer seminar on Network Analyzers takes place at the HP manufacturing facility in Santa Rosa, California which is approximately 60 miles north of San Francisco. Attendance is limited to 20 participants so file your applications early (registration cut-off date is August 11) to avoid disappointment. The application form is on the last page of BENCH BRIEFS.

The course objective is to teach front panel control operations, circuit theory, interpretation of signal waveforms and voltage levels at test points, how to efficiently perform critical adjustments during calibration, and how to isolate troubles to individual circuits.

COURSE CONTENT

LECTURE

I. Introduction
II. Specifications, features, and options
III. Simplified Block Diagram
IV. Front Panel Operation
V. Detailed Block Diagram
VI. A1 Source/Converter
  A. Circuit description
  B. Circuit alignment
  C. Troubleshooting
VII. A2 Frequency Control
  A. Circuit description
  B. Circuit alignment
  C. Troubleshooting
VIII. A3 Signal Processor
  A. Circuit description
  B. Circuit alignment
  C. Troubleshooting using Signature Analysis
IX. Option 001, HP-Interface Bus
  A. Circuit description
  B. Troubleshooting using Signature Analysis

LAB — The lecture is given in a lab environment. Attendees make measurements during circuit alignment and troubleshooting sessions.

PREREQUISITES — Basic understanding of network analysis. Good understanding of digital logic circuits.

PRESTUDY — Application Note 219, "8505A Network Analyzer Basic Measurements".

OSCILLOSCOPES COLORADO SPRINGS, COLORADO

Hewlett-Packard, Colorado Springs Division, offers the following Service Training Seminars to customers. All training will be conducted at Colorado Springs, Colorado on the dates indicated.

These seminars, directed to calibration and repair technicians, teach operation, circuit-theory, calibration and troubleshooting to component level repair. Attendees should have some prior knowledge of standard oscilloscope circuits, such as differential amplifiers, integrators, comparators and basic logic devices.

In case of insufficient enrollment, classes may be cancelled.

Service training for other instruments is also available, at factory, local HP facility or at customer facility. Consult your local HP Sales/Service office for further information.

1715A/1725A OSCILLOSCOPE

April 17-20, 1978
September 25-28, 1978

The 1715A/1725A Oscilloscope seminar is taught to component-level of troubleshooting and repair. Popular options such as state-display and digital-multimeter and ΔT options are included. Class duration is 4 days.

1332A/1333A/1335A SMALL SCREEN DISPLAYS

May 15-16, 1978
October 23-24, 1978

These small-screen displays are offered in a 2 day class consisting of 1 day of theory (including variable persistence and storage) and 1 day of calibration, troubleshooting and repair.

1310A/1311A/1317A/1321A LARGE SCREEN DISPLAYS

May 18-19, 1978
October 26-27, 1978

Large-screen displays comprise a 2 day seminar; 1 day theory and 1 day calibration, troubleshooting and repair.

FOURIER ANALYSIS SANTA CLARA, CALIFORNIA JULY 10-14, 1978 SEPTEMBER 11-15, 1978

The Fourier Analyzer 5-Day User Training Course is geared primarily for 5451C users, although 5451B users will also find it relevant.

The course emphasizes measurements, applications, and system operation. Pre-study material will be mailed prior to the course to bring all attendees up to a basic theoretical understanding. Each day includes lab exercises with time for discussion and review of key points.

COURSE OBJECTIVES

I. Enable the attendee to:
   - A. Utilize documentation to:
     1. Cold start the system.
     2. Find appropriate data and instruction formats.
   - B. Perform and understand all "standard" calibrated time and frequency measurements.
   - C. Utilize Mass Store, Zoom and Graphics Software.
   - D. Generate and modify keyboard programs.
   - E. Make use of variable parameters and other "Gold Key" functions.
   - F. To sort, analyze and manipulate data.

II. Provide the attendee with:
   - A. Basic measurement principles.
   - B. A basic understanding of keyboard programming principles.
   - C. A basic appreciation of the system architecture and the various programming levels.

PREREQUISITES — Basic understanding of Fourier Analysis and Time and Frequency Domain measurements.

PRESTUDY — Application Note 140-0 (part no. 02-5952-0651), Fourier Analysis Training Manual.

supplement to

BENCH BRIEFS SERVICE NOTE INDEX

NEED ANY SERVICE NOTES?

GENERAL
M58-S. Elimination of a potential safety hazard.

419A DC NULL VOLTMETER
419A-9A. Serials 0948A05803 and below. Preferred battery replacements.
419A-10. Serials 0948A05830 to 0948A06037. Battery charger modification.

435A POWER METER
435A-3. Serials 1733A and below. Fuse replacement.
435A-U-3. Serials 1731U and below. Fuse replacement.
435A-4. Serials 1750A and below. Power supply crowbar modification.

626A SIGNAL GENERATOR
626A-9. Serials 1741A and below. Modification to improve pulse jitter.

745A AC CALIBRATOR
745A-17-S. Serials 0741-00101 through 1319A01670. 745A-H18 serials 1319A01671 and above. Detection and elimination of a potential safety hazard at the 745A counter output. Supersedes 745A-10B-S, 745A-12B-S, 745A-13B-S.

1332A X-Y DISPLAY
1332A-7. All serials. Eliminate potential CRT damage.

1611A LOGIC STATE ANALYZER
1611A-5. Serials 1723A00696 and below. Trace point output correction.
1611A-6. Serials 1723A-00700 and below. Modification to eliminate random incorrect triggering.

1740A OSCILLOSCOPE
1740A-14. Serials 1729A and below. Modification to eliminate intermittent vertical or horizontal jitter.

1741A OSCILLOSCOPE
1741A-5. Serials 1704A and below. Modification to eliminate intermittent vertical or horizontal jitter.
1741A-7. Serials 1739A and below. CRT replacement and wiring change.

1743A OSCILLOSCOPE
1743A-1. Serials 1740A and below. Modification to eliminate intermittent vertical or horizontal jitter.

3320A/B FREQUENCY SYNTHESIZER
3320A/B-3B. All serials. Modification to improve air capacitor reliability.
3320B-7. All serials. Improved stability for D/A converter.

3320C LEVEL GENERATOR
3320C-5. All serials. Improved stability for D/A converter.

3420A/B DC DIFFERENTIAL VOLTMETER/RATIOMETER
3420B-8A. All serials. Modification to accept new type batteries.

3455A DIGITAL VOLTMETER
3455A-7. Serials 1622A01505 and below. Turn-on reliability improvement.
3455A-8. Serials 1622A01655 and below. Improvement in AC heat sensitivity.

3575A GAIN-PHASE METER
3575A-4B. All serials. Description of different configurations of panel meters and interconnect boards.
3575A-5A. All serials. Interchangeability of panel meter and interconnect boards.

3702B IF/BB RECEIVER
3702B-39. Serials 1737U-02166 and below. Recommended replacement resistor in I.F. amplifier (A22R34).

3705A DIFFERENTIAL PHASE DETECTOR
3705A-6. Serials 1218U-01777 and below. Possible problems when replacing A1MC1, A1MC2 (1820-0595).

3710A IF/BB TRANSMITTER
3710A-17. Serials 1637U-01686 and below. Removal of +15V and −15V rectifiers from A15 PC board to reduce temperature on PC board.
3710A-18. Serials 1637U-02155 and below. Recommended replacement resistor in power supply assembly A15R33.
3710A-19. Serials 1637U-02271 and below. Recommended replacement resistors in I.F. amplifier assembly (A6R28, A6R29, A6R33).

3716A BB TRANSMITTER
3716A-10. Serials 1350U-01259 and below. Modification to prevent blowing −15V fuse in 3710A when removing and inserting 3716A with 3710A switched on.

3721A CORRELATOR
3721A-15. Serials 1544U-00645 and below. Preferred replacement for A1Q16.

3745A/B SELECTIVE LEVEL MEASURING SET
3745A/B-4B. Serials 1607U and below. Modification to prevent HP-IB system operational errors and control hang-ups.
3745A/B-15. All serials. Installation of option 021 CCITT weighted filter and phase jitter.

3760A DATA GENERATOR
3760A-10. Serials 1744U-00351 and below. Modification to improve −5.2KV power supply assembly.

3762A DATA GENERATOR
3762A-1. Serials 1738U-00140 and below. Modification to improve performance.

3770B TELEPHONE LINE ANALYSER
3770B-13. All serials. Preferred replacement of A34C5.

3780A PATTERN GENERATOR/ ERROR DETECTOR
3780A-14. Serials 1620U-00211 and above. Possible incorrect detection of systematic errors.
3780A-15. Serials 1620U-00211 and below. Preferred replacement of A20, A36 and A37 assemblies.

3790A IF/BB RECEIVER
3790A-4A. All serials. Preferred replacement for A15CR23.
3790A-7. Serials 1741U-00156 and below. Underrated resistor in power supply assembly A15R33.
3790A-8. Serials 1625U-00121 and below. Removal of +15V and −15V rectifiers from A15 PC board to reduce temperature on PC board.

3964A INSTRUMENTATION TAPE RECORDER
3964A-11/3968A-11. All serials. Troubleshooting tables.
3964A-12. Serials 1714A and above. New adjustment procedure for option 021 recorders.
3964-13. Serials 1637A and below. FM backdating supplement.

3968A INSTRUMENTATION TAPE RECORDER
3964A-11/3968A-11. All serials. Troubleshooting tables.
3968A-12. Serials 1714A and above. Option 21 adjustments.
3968A-13/8868A-11. Serials 1637A and below. FM backdating supplement.

5004A SIGNATURE ANALYSER
5004A-1. Serials 1736 and above. Data probe threshold voltage adjustment and compensation.

5045A DIGITAL IC TESTER
5045A-4A. All serials. Installation and operation of monostable multivibrator adapter.
5045A-5A. Serials 1748 and above. New and improved "Relays Check" magnetic cards.
5045A-6. All serials. Revised A9 4MHz clock frequency adjustment.

5150A THERMAL PRINTER
5150A-1. Option 002 BCD interface all serials. To improve immunity to spurious print signals.

5328A UNIVERSAL COUNTER
5328A-9A. Serials 1728A05785 and below (standard instrument); 1744A05710 and below (option 096). A2 power supply adjustments.
5328A-11. Option 010 oven oscillator serials 1728A03235 and below; serials 1719U and below. Preferred replacement for A3C5.
5328A-12. Option 011 HP-IB all serials. Missing decimal point in 5328A option 011 output.
5328A-13. Option 041 programmable input module and option 096 (5328AF) all serials. Revision of DAC adjustment procedure.
5328A-14. Option 041 programmable input module all serials. Revision of in-cabinet performance check.
5328A-15. Serials 1804A05786 and above, standard instrument; serials 1804A05861 and above, option 096. New A2 power supply assembly.
5328A-16. Option 096 all serials. Revision of in-cabinet performance check.

5340A FREQUENCY COUNTER
5340A-11. HP-IB verification program for 5340A opt. 011.

5500C LASER HEAD
5500C-1. All serials. Interpretation of zero warm-up time.

5501A LASER HEAD
5501A-3. All serials. Interpretation of zero warm-up time.

6002A EXTENDED RANGE DC POWER SUPPLY

6002A-1. Serials 1802-00796 and below. Modification to improve reliability.

6129B/C DIGITAL VOLTAGE SOURCE

6129B-2/6129C-1/6131B-6/6131C-1. 6129B all serials; 6129C serials 1637A00303 and below; 6131B all serials; 6131C serials 1716A00535 and below. Modification kit for output transistor replacement.

6130B/C DIGITAL VOLTAGE SOURCE

6130B-5/6130C-1. 6130B all serials; 6130C serials 1713A00795 and below.

6131B/C DIGITAL VOLTAGE SOURCE

6129B-2/6129C-1/6131B-6/6131C-1. 6129B all serials; 6129C serials 1637A00303 and below; 6131B all serials; 6131C serials 1716A00535 and below. Modification kit for output transistor replacement.

7040A/7041A X-Y RECORDERS

7040A-7/7041A-5. Serials 1739A and below. Diode bridge rectifier replacement to discrete rectifiers.

7044A/7045A X-Y RECORDERS

7044A-4/7045A-4. Serials 1739A and below. Diode bridge rectifier replacement to discrete rectifiers.

7044A/7045A-5. Serials 1739A and below. Enhanced Vernier (CAL) potentiometer modification.

7046A X-Y RECORDERS

7046A-7. Serials 1739A and below. Diode bridge rectifier replacement to discrete rectifiers.

7046A-8. Serials 1739A and below. Enhanced Vernier (CAL) potentiometer modification.

7047A X-Y RECORDERS

7047A-3. Serials 1739A and below. Diode bridge rectifier replacement to discrete rectifiers.

7221A GRAPHIC PLOTTER

7221A-4/9872A-6. 7221A serials 1801A and below; 9872A serials 1802A and below. Power supply switch change.

8557A SPECTRUM ANALYZER

8557A-1A. Serials 1652A and below. Modification for use with 8750A Storage-Normalizer.

8558B SPECTRUM ANALYZER

8558B-11A. Serials 1652A and below. Modification for use with 8750A Storage-Normalizer.

8558B-12. All serials. RF input limiter modification.

8565A SPECTRUM ANALYZER

8565A-1. All serials. Modify 8565A to option 400 (50-400 Hz mains operation).

8565A-2S. Potential shock hazard.

8640A/B SIGNAL GENERATOR

8640A-28. All serials. Recommended replacement line fuse for 220/240V operation.

8640B-31. All serials. Recommended replacement line fuse for 220/240V operation.

8868A INSTRUMENTATION TAPE RECORDER

3968A-13/8868A-11. Serials 1637A and below. FM backdating supplement.

9872A GRAPHIC PLOTTER

7221A-4/9872A-6. 7221A serials 1801A and below; 9872A serials 1802A and below. Power supply switch change.

10780A RECEIVER

10780A-1. Serials 1644A00680 and below. Modification to eliminate degradation of the output signal duty cycle at low signal levels.

86242A/C RF PLUG-IN

86242A-3A. All serials. YTO replacement kit, HP part number 86242-60041.

86242C-1B. Serials 1626A and below. YTO replacement kit, HP part number 86342-60017.

86250A/B/C/D RF PLUG-IN

86250A-3. Serials 1246A and above; serials 1238A and below. Recommended replacement YIG tuned oscillator and modification to reduce bias voltage.

86250B-3. Serials 1246A and above; serials 1238A and below. Recommended replacement YIG tuned oscillator and modification to reduce bias voltage.

86250C-1. Serials 1627A and below. YTO replacement kit, HP part number 86250-60042.

86250D-1. Serials 1709A and below. YTO replacement kit, HP part number 86250-60043.

86342A/C OSCILLATOR MODULE

86342A-4A. All serials. YTO replacement kit, HP part number 86342-60017. Supersedes 86342A-1, 86342A-4.

86342C-1A. Serials 1631A and below. YTO replacement kit, HP part number 86342-60017.

86350A/C OSCILLATOR MODULE

86350A-5. All serials. YTO replacement kit, HP part number 86350-60021. Supersedes 86350A-2.

86350C-1. Serials 1741A and below. YTO replacement kit, HP part number 86350-60021.

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

Safety Service Note 745A-17-S has been published to revise and compile all previous safety service notes regarding the Calibrator. 745A-17-S describes the installation of an isolation transformer in the COUNTER OUTPUT circuit. The transformer kit is available at no cost with a small charge for installation. Please contact your local HP Sales and Service Office.

8565A SPECTRUM ANALYZER

An error in the 8565A Operating and Service Manual, HP p/n 0865-90014 could lead to a shock hazard.

Page 5-20, paragraph 5-13 steps J and L, and Figure 5-5 call for oscilloscope probe to be connected to

A8TP1 for the intensity limit adjustment. TP1 may be the High Voltage Test Point (HVTP) as documented in the schematic Service Sheet 32.

The test point that should be monitored when setting the intensity limit is TP2 and is located towards the bottom of the circuit board assembly, approximately one inch (2½ cm) above PC Board Connector P1 pin 1. The HVTP is located at the top of the assembly.

Page 5-19, 5-20 has been revised and is available with the 8565A-2S service note. Both may be ordered from your local HP Sales and Service Office.

LOGIC PROBLEMS

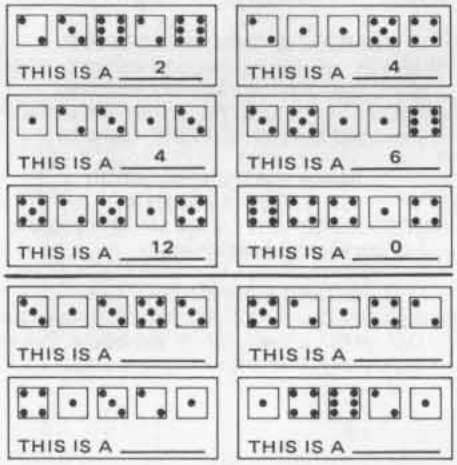
Do you have a favorite logic puzzle or problem? Send it along (with the answer please) and if appropriate, I'll be glad to print it.

Last issue's problem, courtesy of Len Kraska, Hewlett-Packard, concerned the Hudson-Palmer Electronic Corporation. An easy way to solve the problem is to build a matrix of division numbers, products, production %, and profit % and then line out the combinations in the matrix when the clues rule it out. The answers are:

Division	Product	Production %	Profit %
1	Calculators	15	18
2	Oscilloscopes	10	11
3	Counters	25	33
4	Computers	20	16
5	Printers	30	22

The name of this issue's problem is "Petals Around The Rose." It comes from Advanced Computation's *Newsletter* by way of the IEEE *Grid*. It's a simple problem. It was, in fact, invented by a four-year-old child. Look at the illustrations below, and try to determine the pattern which determines the 'value' of the dice. When you think you know the secret, identify the remaining examples and write your solution in the space provided.

Think: Petals Around The Rose.



ASK A COMPUTER HOW TO REPAIR DEFECTIVE EQUIPMENT

(Editor's Note: The following article appeared in the Science/Scope periodical, and is reproduced with permission of Hughes Aircraft Company.)

Printed repair manuals may soon be replaced by an electronic display, part of the Technician's Maintenance Information System (TMIS) developed by Hughes. It can direct the repair of equipment as complex as a radar unit simply by asking the technician to describe the problem. The system comes in two portable packages: a video display with an electronic keyboard; and a mass memory device that uses floppy disks, plus a microprocessor. A few disks can store all the troubleshooting data normally contained in a large stack of manuals.

A technician simply selects the appropriate disk, loads it into the system and types in the problem. In less than two seconds, the video unit displays a series of pertinent questions. After the technician provides the answers, the system pinpoints the failure, the part needing replacement, shows its location, and tells how to replace it. It also explains what tools and test equipment are needed, and how to use them. With this method, many technicians will no longer require extensive technical training or cumbersome stacks of data. By cutting troubleshooting and repair time to a small fraction of present requirements, costs can be reduced drastically.

LONGER-LIFE BATTERIES

Several battery-powered instruments, including the 204C/D Oscillator, 403B AC Voltmeter, 419A DC Null Voltmeter, and 3420B Differential Voltmeter, now have available an improved nickle cadmium (NI-CAD) rechargeable cell. These new NI-CAD's should be substituted if shortened battery life occurs due to continuous charging/discharging cycles.

The conversions, which require a modification kit, are described in service notes 204C/D-3, 403B/BB-9, 419A-9A, and 3420B-8A. Use the order form at the rear of *Bench Briefs*.

WHAT'S A ¾ DIGIT DVM?

Most everyone knows that the ½ digit part of a voltmeter means that its most significant digit can be either a one or a zero. For example, while a 3-digit voltmeter has a maximum reading of 999, a 3½ digit meter has a maximum reading of 1999.

So what is the maximum reading of a 3¾-digit voltmeter? What value can the meter's most significant digit assume? What it boils down to is you can't really know. The ¾ digit could be a 3; so a 3¾ digit meter could have a maximum reading of 3999. That's very common. But the ¾ digit could also be a 4, or a 5 (4999 or 5999).

The plain fact is that while the ½ digit clearly tells you the maximum meter count the ¾ digit doesn't. The only purpose the ¾ digit serves is to indicate that the meter will read higher than the ½ digit but lower than the next full digit.

CORRECTION!!!

Safety Service Note M58-S, concerned with "Littlefuse" brand of 3AG slo-blo fuses, contains a list of HP instruments in which we recommend the fuses be changed. Two instruments should be deleted from the list. Models 13251A and 13251B DC Power Conversions for the 7970 Magnetic Tape Drive.

SERVICE TRAINING LITERATURE

A whole series of Service Training Manuals on signal generators and spectrum analyzers have been produced for technicians. These manuals are self-contained service training guides covering all service aspects of the instruments. Each manual is essentially a service seminar in printed form, following the basic philosophy that, "The most effective tool for troubleshooting the instrument is a basic knowledge of its operation." The manuals try to impact this knowledge without attempting to be exhaustive — which is the purpose of the regular Operating and Service Manual.

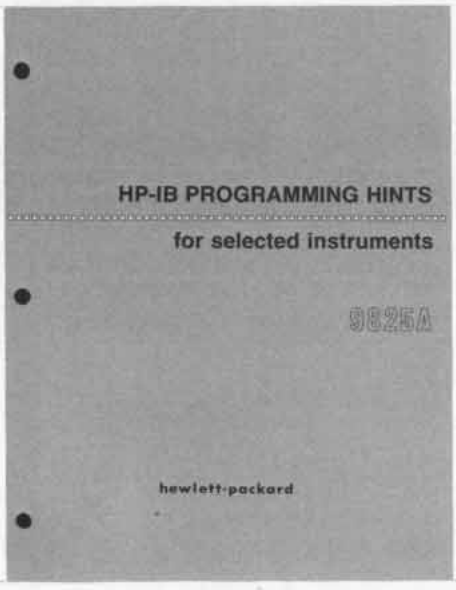
The training manuals cover features, options, specifications (what they mean), front panel controls, theory, and troubleshooting on a functional or block diagram level.

Orders can be placed through your local HP Sales and Service Office by specifying the part numbers listed below.

8552A/B	Spectrum Analyzer — IF Section	08552-90536
8555A	Spectrum Analyzer — Tuning Section	08555-90055
8558B	Spectrum Analyzer	08558-90049
8620C	Sweeper Mainframe	08620-90099
8640	Series Signal Generator	08640-90131
8660	Series Synthesized Signal Generator	08660-90072
8672A	Synthesized Signal Generator	08672-90071
86290A	Broadband Sweeper Plug-in	86290-90032

HP-IB PROGRAMMING HINTS

For Selected Instruments



Here's a beginner's manual designed to help you program a 9825A or 9830A/B desktop computer to operate many popular HP instruments via the Hewlett-Packard Interface Bus (HP-IB).

The manual contains a wide variety of tested example programs, in addition to several workshop problems along with their answers. The programming examples are built up around the following HP-IB instruments.

3330B	Frequency Synthesizer
3437A	Systems DVM
3438A	DMM
3455A	DVM
3495A	Scanner
3571A	Spectrum Analyzer
5328A	Universal Counter
5340A	Microwave Counter
5345A	Plug-In Counter
5901A	D/A Pwr. Sup. Prog.
9825A	Desktop Computer
9830A/B	Desktop Computer
9871A	Printer Plotter
59304A	Numeric Display
59306A	Universal Switch
59307A	UHF Switch
59308A	Timing Generator
59309A	Digital Clock
59403A	Common Carrier Interface

Some of the topics covered are:

- Getting Started — configuration, setting addresses, connecting bus cables.
- Programming Commands — set local, device clear, serial poll enable/disable, checking bus status and many more.
- Programming Measuring Instruments — use of the "time", "trg", "on err", "rom", "ern", and "erl" statements.
- Programming Stimulus, Display, Computation and Control Devices.
- Transmitting HP-IB Information Over Long Distances.

To order a copy of this programming guide, contact your HP Sales and Service Office and specify HP part number 59300-90005.

For Selected HP-IB Instruments

HP-IB VERIFICATION PROGRAMS

Many Hewlett-Packard instruments with HP-IB capability have test programs available that can save you considerable time in verifying instrument operation. Each program is fully documented with instructions, listing, flowchart, check points, etc. The verification programs listed below can be ordered from your local HP Sales and Service Office.

Model		Tape	Prog. Documentation
59301A	ASCII/Parallel Converter	59300-10001 (9825A)	Service Note 59301A-2
59303A	D to A Converter		Service Note 59303A-1
59304A	Numeric Display		Service Note 59304A-1
59306A	Relay Actuator		Service Note 59306A-4
59307A	VHF Switch		Service Note 59307A-3
59308A	Timing Generator		Service Note 59308A-1
59309A	Digital Clock		Service Note 59309A-3
59313A	A to D Converter		59313A Manual 59313-91999
5328A	Universal Counter (Opt. 011)		Service Note 5328A-17
5340A	Freq. Counter (Opt. 011)		Service Note 5340A-11
5341A	Freq. Counter (Opt. 011)		5341A Manual 05341-90005
5342A	μwave Freq. Counter (Opt. 011)		5342A Manual 05342-90004
5345A	Electronic Counter (Opt. 011)		Service Note 5345A-9
5359A	Time Synthesizer		5359A Manual 05359-90001
8672A	Synth. Sig. Gen.	11712-10001 (9830A)	Kit Manual 11712-90001
8568A	Spectrum Analyzer	08568-10001 (9825A)	8568A Manual 08568-90005
8507A	Network Analyzer	85030-10002 (9830A)	8507A Manual 85030-90001
			8507A Manual 08507-90005
8507B	Network Analyzer	85030-10007 (9825A)	8507B Manual 85030-90005
			8507B Manual 08507-90022
3042A	Network Analyzer	03042-90211 (9825A)	3042A Manual 03042-90204
3045A	Spectrum Analyzer	03045-10001 (9825A)	3045A Manual 03045-90203
3050B	Voltmeter System	03050-90230 (9825A)	3050B Manual 03050-90223
		03050-90212 (9830A)	3050B Manual 03050-90200
3052A	Voltmeter System	03052-90011 (9825A)	3052A Manual 03052-90004
3437A	System DVM	03437-10001 (9825A)	3052A Manual 03052-90004
3455A	System DVM	03455-10001 (9830A)	3052A Manual 03052-90004
		03455-10002 (9825A)	3052A Manual 03052-90004
3495A	Scanner	03495-10001 (9830A)	3495A Manual 03495-90012
		03495-10002 (9825A)	3495A Manual 03495-90012

SERVICE NOTE ORDER FORM

INSTRUCTIONS

1. If you want service notes please check the appropriate boxes below and return this form separately to one of the following addresses.

For European customers (ONLY)

Hewlett-Packard
Central Mailing Dept.
P. O. Box 529
Van Hueven Goedhartlaan 121
AMSTELVEEN—1134
Netherlands

All other customers

Hewlett-Packard
1820 Embarcadero Road
Palo Alto, California 94303

Name _____

Company Name _____

Address _____

City _____ State _____ Zip _____

- ☐ M58-S
- ☐ 419A-9A
- ☐ 419A-10
- ☐ 435A-3
- ☐ 435A-U-3

- ☐ 435A-14
- ☐ 626A-9
- ☐ 745A-17-S
- ☐ 1332A-7
- ☐ 1611A-5

- ☐ 1611A-6
- ☐ 1740A-14
- ☐ 1741A-5
- ☐ 1741A-7
- ☐ 1743A-1

- ☐ 3320A/B-3B
- ☐ 3320B-7
- ☐ 3320C-5
- ☐ 3420B-8A
- ☐ 3455A-7

- ☐ 3455A-8
- ☐ 3575A-4B
- ☐ 3575A-5A
- ☐ 3702B-39
- ☐ 3705A-6

- ☐ 3710A-17
- ☐ 3710A-18
- ☐ 3710A-19
- ☐ 3716A-10
- ☐ 3721A-15

- ☐ 3745A/B-4B
- ☐ 3745A/B-15
- ☐ 3760A-10
- ☐ 3762A-1
- ☐ 3770B-13

- ☐ 3780A-14
- ☐ 3780A-15
- ☐ 3790A-4A
- ☐ 3790A-7
- ☐ 3790A-8

- ☐ 3964A-11/3968A-11
- ☐ 3964A-12
- ☐ 3964A-13
- ☐ 3968A-12
- ☐ 3968A-13/8868A-11

- ☐ 5004A-1
- ☐ 5045A-4A
- ☐ 5045A-5A
- ☐ 5045A-6
- ☐ 5150A-1

- ☐ 5328A-9A
- ☐ 5328A-11
- ☐ 5328A-12
- ☐ 5328A-13
- ☐ 5328A-14

- ☐ 5328A-15
- ☐ 5328A-16
- ☐ 5340A-11
- ☐ 5500C-1

- ☐ 5501A-3
- ☐ 6002A-1
- ☐ 6129B-2/6129C-1/ 6131B-6/6131C-1
- ☐ 6130B-5/6130C-1

- ☐ 7040A-7/7041A-5
- ☐ 7044A-4/7045A-4
- ☐ 7044A/7045A-5
- ☐ 7046A-7
- ☐ 7046A-8

- ☐ 7047A-3
- ☐ 7221A-4/9872A-6
- ☐ 8557A-1A
- ☐ 8558B-11A
- ☐ 8558B-12

- ☐ 8565A-1
- ☐ 8565A-2S
- ☐ 8640A-28
- ☐ 8640B-31
- ☐ 10780A-1

- ☐ 86242A-3A
- ☐ 86242C-1B
- ☐ 86250A-3
- ☐ 86250B-3
- ☐ 86250C-1

- ☐ 86250D-1
- ☐ 86342A-4A
- ☐ 86342C-1A
- ☐ 86350A-5
- ☐ 86350C-1

U.S. SEMINAR REGISTRATION FORM

	COURSE	DATE	TUITION	COORDINATOR
☐	Fourier Analyzers User's Guide	July 10 thru 14, 1978 September 11 thru 15, 1978	$500/Student	George Carey 5301 Stevens Creek Blvd. Santa Clara, CA 95050 (408) 246-4300
☐	Oscilloscope Maintenance Models 1715A/1725A	September 25 thru 28, 1978	$300/Student	Dick Browne 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 (303) 598-1900
☐	Small Screen Display Maintenance — 1332A/1333A/1335A	May 15 thru 16, 1978 October 23 thru 24, 1978	$200/Student	
☐	Large Screen Display Maintenance — 1310A/ 1311A/1317A/1321A	May 18 thru 19, 1978 October 26 thru 27, 1978	$200/Student	
☐	8640AM/FM Signal Generator 8660 Synthesized Signal Generator 436 Power Meter	September 11 thru 15, 1978	$350/Student	Tom O'Connor 333 Logue Avenue Mountain View, CA 94042 (415) 968-9200
☐	8505A RF Network Analyzer	September 18 thru 22, 1978	$350/Student	

Name _____

Company Name _____

Address _____

City _____ State _____ Zip _____

REGISTRATION INSTRUCTIONS

To enroll in any of the seminars, fill out the registration form and mail it with your check to the address shown for the coordinator. Please use separate registration forms for each student.

Make your check payable to Hewlett-Packard Company in U.S. currency.

Upon receipt of your registration and check we will confirm your enrollment by returning all necessary prestudy material along with a list of nearby motel accommodations and reservation forms. Attendees are responsible for their own transportation, accommodations, and meals.

HEWLETT-PACKARD COMPANY
1820 Embarcadero Road
Palo Alto, California 94303

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Reader comments or technical article contributions are welcomed. Please send them to the above address, attention Bench Briefs.

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