HEWLETT PACKARD

BENCH BRIEFS

SERVICE INFORMATION FROM HEWLETT-PACKARD
JULY-AUGUST 1983

HP Video Tapes for Technical Training

Learn the Practical Aspects of Transistors, Digital Troubleshooting, and Microprocessor Fundamentals

Part of the "extra value" that comes with each Hewlett-Packard product is our continuing commitment to provide our customers with useful training information in the areas of applications and service. In the past, this information has often been in the form of classroom seminars, either at your nearby HP sales office or at one of our training facilities in California. These training programs still exist and are available through your local HP sales representative.

Now our capability is expanding by offering you both service and applications training via video tape. With video tapes, you can tailor your training program to suit the many needs of your organization. You may select training programs for individuals with different backgrounds and specific needs, present effective programs to just one or many technicians, and offer a library of technical programs your staff members can easily consult on their own . . . for new information or for refresher purposes.

Practical Transistors 90100D*

The Practical Transistor Series is a definitive, monochrome, 15-tape excursion into the world of transistors. Each highly informative program in the series is primarily concerned with examining the many practical aspects of transistors rather than just dwelling on theory and math. The end result will be a deeper working understanding of transistors which will make maintenance and troubleshooting prob-

Part No. 5952-0115

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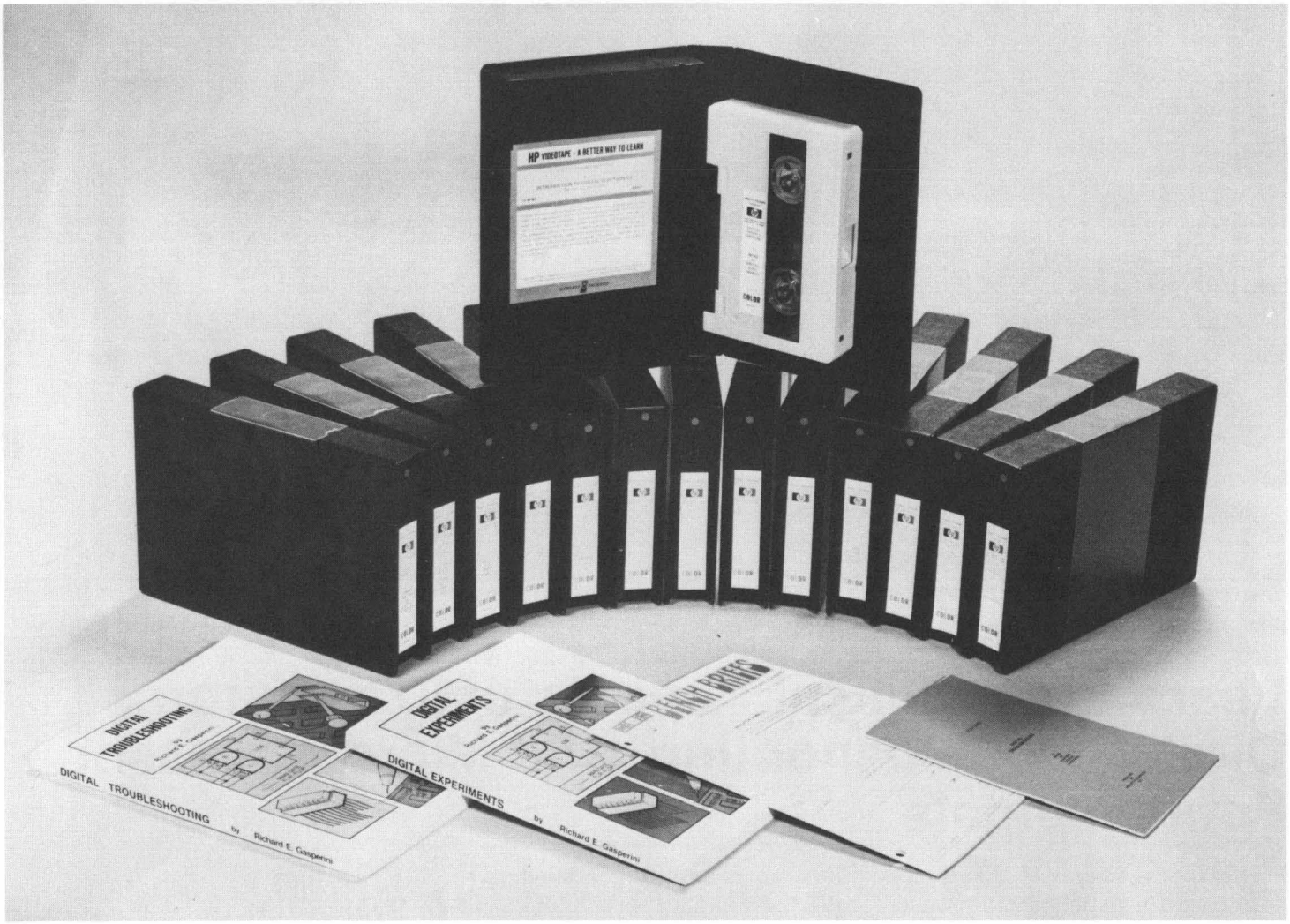
This
lems far easier and more efficient. The series is highly recommended for electronics students, service personnel and engineers. A supplementary textbook by transistor authority George Stanley Jr. (who also hosts the series), plus a complete set of homework problems, answers, and certificates of completion are included with the nearly nine hours of video taped material.†

6. Answers by inspection; rule-of-thumb formulas for emitter follower circuit voltage gain
7. Multi-stage amplifiers
8. Troubleshooting single-stage and multi-stage circuits
9. Feedback amplifiers
10. Why a transistor amplifies
11. Troubleshooting actual multi-stage amplifier circuits

useful in showing how to approach real problems in real equipment. These videocassettes provide:

- Practical demonstrations
- Flexibility of use for classroom or individual study
- Latest in digital troubleshooting tools
- Most recent logic symbology
- Useful troubleshooting tips



Individual tapes are:

1. Transistors vs tubes
2. Temperature effects on biasing
3. Current vs voltage drive
4. Answers by inspection; rule-of-thumb formulas for voltage gain
5. Answers by inspection; rule-of-thumb formulas for voltage gain with feedback
12. FETS and unijunctions
13. Breakdown diodes
14. SCR's and tunnel diodes
15. PIN, SRD, and HC diodes

Digital Troubleshooting 90420D*

Developed to train HP's own technicians, this course is especially

This course was designed, developed, and made for technicians. It is an appropriate bridge from transistors to digital electronics, or a digital refresher course. Equivalent in coverage to a college term of 13 weeks, Digital Troubleshooting is presented in color on 14 videocassettes having a total running time of 5 hours and 31 minutes. The HP

†Not eligible for quantity discount

5035T Logic Lab is recommended for performing assigned experiments. The lab demonstrations shown in video are from the workbook included with the series. Also included is a 180-page text and a study guide plus exams, solutions, and certificates of completion.

Individual tapes are:

1. Introduction to digital electronics
2. Binary nature of digital circuits
3. Basics of transistors and IC's
4. Logic gates and symbols
5. Introduction to digital IC families
6. Modern digital IC families
7. Simple troubleshooting techniques
8. Troubleshooting digital IC's
9. Flip-flops
10. Counters and shift registers
11. Combinational logic circuits
12. Display technologies
13. IC manufacturing
14. Memories

Microprocessor Training and Troubleshooting

This series of videotapes was developed to provide HP technicians with a practical introduction to microprocessor systems.

The course consists of color video cassettes, textbook/experiment book, study guide, quizzes and answers. The HP 5036A Microprocessor Lab is recommended for performing assigned experiments. The lessons are directed to technicians who are already able to troubleshoot and repair digital circuitry equipment, ~~using digital circuitry~~. After completing the following two modules, technicians should be well prepared for more advanced microprocessor troubleshooting modules. The more advanced modules presently are offered as live tutorial training courses (see accompanying photo). They are being produced in video format for future release.

Understanding Microprocessors, Module I 90301R*
(includes the following five tapes)

1. General history of computers and microprocessors
2. Analog vs digital systems, three state bus concept, talkers and listeners
3. Introduction to programming
4. Processor registers and instruction set
5. Simple Assembly language programming

Microprocessor Fundamentals, Module II 90307R*
(includes the following 11 tapes)

1. Algorithmic state machines
2. Basic Design/Terminology of microcomputers
3. Microprocessor internal hardware
4. Stack pointers and internal registers
5. Timing cycles, machine cycles and instructions
6. Troubleshooting status signals
7. DMA and handshaking
8. Principles of interrupts
9. Using interrupts
10. Microprocessor support circuits
11. Communication with keyboards and displays

Ordering Information

To order video programs, books, the HP 5035T Logic Lab or the 5036A Microprocessor Lab, please contact your local Hewlett-Packard sales office.

Product	HP P/N	Price
Practical Transistors	90100D*	$2150
Digital Troubleshooting	90420D*	$4000
Microprocessors Mod. I	90301R*	$1800
Microprocessors Mod. II	90207R*	$3700

* = Tape Formats;

NTSC Format	PAL Format
A = VHS(SP)	C = VHS
B = Beta 1	E = Beta
D = 3/4" Umatic	F = 3/4" Umatic

Recommended Reading

Editor's Note: The following application notes are available free of charge from the following address:

Hewlett-Packard
1820 Embarcadaro Road
Palo Alto, CA 94303
Attn. Appl. Notes

New Application Notes Help Understand Phase Noise and Noise Figure Measurements

Karen Bonner and Steve Thomas, HP

Do you understand the following terms?

- Y-factor
- T_e
- ENR
- $\mathcal{L}(f)$
- Residual Phase Noise
- Absolute Phase Noise
- Quadrature
- Loop Bandwidth

If not, you should immediately obtain copies of two new publications from Hewlett-Packard: AN57-1, called Fundamentals of RF and Microwave Noise Figure Measurements, and Product Note 11729B-1, titled Phase Noise Characterization of Microwave Oscillators.

AN57-1 starts with a fundamental discussion of noise and carefully explains the concepts of noise figure measurement as well as 8970A applications. Several noise measurement techniques are discussed. Appendices in the book include a glossary of noise figure measurement terminology, derivations of many of the common (and not-so-common) noise measurement equations, and a list of precautions used to help keep measurements accurate.

Product Note 11729B-1 tells the complete story of phase noise measurements using the phase detector method. Chapter 1 introduces you to this new measurement concept. The text covers everything from theory to how you make an actual phase noise measurement. The 11729B Carrier Noise Test Set is described in the note, along with the other instruments that make up the Phase Noise System.

These two techniques are rapidly gaining their places as popular "new" measurements in laboratories and on production lines. Every repair technician and system engineer who works around RF and microwave equipment will hear talk about these measurements. Be prepared and know what your co-workers are talking about!

New Application Notes Describe Composite Signature Troubleshooting and the Logic Troubleshooting System

Jim Bechtold, Editor

About AN222-6

AN222-6 shows you how a composite signature can be used to implement a structured troubleshooting procedure without a computer-aided system. The back-tracing algorithm is explained and flow-charted. Examples show how to measure and calculate a composite signature. Potential time savings is estimated. Theory of operation and probability of error detection are also derived.

What is a Composite Signature?

A composite signature is the binary sum of individual signatures. The composite signature *magnifies* the power of Signature Analysis by providing a single signature that verifies the correct operation of an IC, microprocessor bus or digital circuit. Composite signature saves the troubleshooter time by reducing the amount of visual comparisons of the signature analyzer display to printed signature tables. Rough estimates show that one can find the first bad signature ten times faster than by taking individual signatures. The time saved is realized when making manual comparisons of measured signatures to the expected ones recorded on paper. Any grouping of digital signals can be chosen to form a composite signature. One simply probes the individual nodes and then only compares the composite signatures to detect the presence of individual faulty waveforms. Of course, with a computer-aided system there is no advantage because comparisons of signatures to memory are done automatically. Therefore, composite signature is primarily used in manual troubleshooting applications.

About AN222-5

AN222-5 is about the HP 55005A Logic Troubleshooting System and describes how the system can be used in a manufacturing or service test strategy. The Note discusses the system's contribution of faster troubleshooting and cleaner, more accurate documentation. It also explains how the system is used to troubleshoot, manage data bases and create troubleshooting procedures. The cost savings of computer-aided troubleshooting are then reviewed for engineering, manufacturing and service.

The Logic Troubleshooting System

The HP 55005A Logic Troubleshooting System consists of an HP-85 personal computer, an HP 5005B programmable Signature Multimeter, and a sophisticated software package. The software has been optimized to run on the HP-85 so that low-cost computer-aided troubleshooting is attractive to manufacturing and the system is cost effective enough to be dedicated to a specific production line or repair station.

The system provides the user with a universal approach to all digital products. With assistance from the guided probing module, the troubleshooter can quickly isolate the cause of a functional failure to the faulty component(s). All necessary documentation is consolidated into the system data base.

The application software requires no further programming by the user. There is no complicated file system to deal with. Everything is preformatted and self-contained. One need only save and recall data bases. The operating system is present on every tape or disc and is completely menu driven via the HP-85 softkeys.

Safety-Related Service Notes

Service Notes from HP relating to personal safety and possible equipment damage are of vital importance to our customers. To make you more aware of these important notes, they are printed on paper with a red border, and the service note number has a "-S" suffix. In order to make you immediately aware of any potential safety problems, we are highlighting safety-re-

lated 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 back of Bench Briefs, each appropriate number is highlighted by being printed in color.

8660A, 8660B, 8660C Signal Generators

May 1983

SUBJECT: Product Hazard and Correction Notice

Product Models: 8660A, 8660B, 8660C Signal Generators
Hazard: Possible electric shock to operator
Corrective Action: See attached *Product Safety Service Note*

Dear 8660A/B/C Customer:

We have recently discovered a potential safety hazard condition with our 8660A, 8660B and 8660C Signal Generators. In the event an insulation failure were to occur in the instrument cooling fan such that the fan body becomes live, the fan housing could also become live. This condition would present a serious shock hazard to the operator and therefore immediate corrective action should be taken.

We feel that the probability of this condition being present now or in the future is very low. This is based on our evaluation of the condition and the fact that, to our knowledge, there have been no occurrences in the field in over 11 years of instrument use. However, the nature of the possible safety hazard is serious and appropriate precautions should be taken.

In order to have your instrument(s) modified as soon as possible, and to minimize the impact to your operation, please choose from the alternatives given below to correct this situation.

- Send your instrument(s) to the nearest Hewlett-Packard Service Office. The modifications will be made at no charge to you.
- Have your own qualified technician make the modification at your facility with a Hewlett-Packard supplied kit. Contact your local Hewlett-Packard instrument field engineer or instrument service manager to request a modification kit to be sent out at no charge. They will need to know which kit and how many to send. See the attached *Product Safety Service Note* to determine which kit you require. Your qualified technician should be able to make the modification in approximately 30 minutes.
- Have your own qualified technician make the modification at your facility with material you acquire yourself. The attached *Product Safety Service Note* contains a list of the required material and the procedure to perform the modification. If you require assistance, contact your local Hewlett-Packard Service Office. Your qualified technician should be able to make the modification in approximately 30 minutes.

Please accept our apologies for any inconvenience that this situation causes you and our thanks for your help in correcting it.

Spokane Division

Editor's Note:
The above letter is attached to copies of Safety Service Notes 8660A-31-S, 8660B-34-S, and 8660C-11-S. The modification consists of adding an 18 Ga. green/yellow wire to positively connect the fan and housing to the instrument chassis. The old fan is identified by its housing depth of one inch, while the new fan housing depth is 2.7 inches. The part numbers of the modification kits are 08660-60378 for the old fan and 08660-60376 for the new fan. For more details, please order the above referenced Safety Service Notes.

8662A, 8663A Synthesized Signal Generators

8901A Modulation Analyzer

8956A System Interface

The wire used to ground the fan in these instruments is not the type specified by the Hewlett-Packard Product Safety Manual. Therefore, the wire should be changed to make these instruments comply with the standard and prevent a potential safety hazard.

The procedure involves replacing the existing 24 Ga. black wire from the fan frame to the instrument chassis with an 18 Ga. green/yellow wire as required by the standard.

For a detailed procedure, please order Safety Service Notes 8662A-8-S, 8663A-1-S, 8956A-1-S or 8901A-2-S.

8901A Modulation Analyzer

In addition to replacing the black wire from the instrument chassis to the fan frame, the 8901A should have an additional wire installed from the fan frame to the fan cover.

For more information, order Safety Service Note 8901A-2-S.

supplement to

BENCH BRIEFS SERVICE NOTE INDEX

Need Any Service Notes?

They're free!

Here's the latest listing of Service Notes. They recommend modifications to Hewlett-Packard instruments to increase reliability, improve performance, or extend their usefulness.

Use the order form at the rear of Bench Briefs to order, free of charge, individual Service Notes documenting several instruments.

If you would like to purchase large quantities of Service Notes covering a wide range of instruments, or if you desire a complete history of all Service Notes documenting all changes to your instruments, Hewlett-Packard offers a microfiche library for a modest, one time charge. There is also a microfiche subscription service available that automatically updates the library on a quarterly schedule.

The part numbers for the microfiche library and subscription service are:

Library of Service Notes—	5951-6511
Subscription service—	5951-6517

Contact your local HP Sales Office for ordering information.

403B/BB PORTABLE AC VOLTMETER

403B/BB-9C. Serials 0986A20520 and below. New and improved battery replacement.
403B/BB-10A. Serials 0986A20521 to 0986A21374. Battery charging circuit improvement.

410C ELECTRONIC VOLTMETER

410C-23. Serials 0982A22438 and below, and serial prefixes 982 and below. Recommended replacement for the A3 Amplifier Assembly.

419A DC NULL VOLTMETER

419A-9B. Serials 0948A05803 and below. New and improved battery replacement.
419A-10A. Serials 0948A05830 to 0948A06037. Battery charger modification.

546A LOGIC PULSER

546A-2. Configuration Code 01A. Component changes required when changing IC A1U1.

853A SPECTRUM ANALYZER DISPLAY

853A-3. Serials 2223A00101 to 2223A00276, 2223A00278 to 2223A00280, 2223A00286 to 2223A00406. Improved plug-in retaining latch.

1332A X-Y DISPLAY

1332A-3A. Serials 1945A and below. Modification to improve dynamic range. Supersedes 1332A-3 and 1332A-4.

1340A X-Y DISPLAY

1340A-6. Serials 2038A and below. Modification to improve X-Y amplifier performance.

1350A GRAPHICS TRANSLATOR

1350A-7. All serials. Preferred replacement for A4 dynamic RAM.

1351A GRAPHICS GENERATOR

1351A-2. All serials. Preferred replacement for DAC transistor.

1630A/D LOGIC ANALYZER

1630A/D-0. Service Note Index.
1630A/D-1. 1630A serials 2311A00231 and below; 1630D serials 2311A00791 and below. ESD protection for the HP-IL interface.
1630A/D-2. 1630A serials 2311A00213 and below; 1630D serials 2311A00769 and below. 200 MHz oscillator rework to improve performance.
1630A/D-3. 1630A serials 2311A00223 and below; 1630D serials 2311A00790 and below. Display adjustment to improve viewing.

1727A OSCILLOSCOPE

1727A-2. All serials. Modification to improve pulse response and bandwidth.

1980A/B OSCILLOSCOPE MEASUREMENT SYSTEMS

1980A/B-10A. 1980A serials 2240A- and below; 1980B serials 2216A- and below. Modification to prevent random bus lock up or syntax errors.
1980A/B-15A. Serials 2216A and below. Modification to decrease the response time for rapid programmed trigger level slewing routines.
1980A/B-16. 1980A serials 2309A-00205 and below; 1980B serials 2306A-01716 and below. Modification to prevent random line fuse failures and/or A1 board burning associated with A1Q2 failures.

3060A/3061A/3062A BOARD TEST SYSTEM

3060A-54. All serials. Board test language 200, revision 2308.
3061A-1. All serials. Board test language 200, revision 2308.
3062A-1. All serials. Board test language 200, revision 2308.

3325A SYNTHESIZER/FUNCTION GENERATOR

3325A-10B. Serials 1748A-04251 and above have parts 8120-3108 and 1251-6567; 1748A-04401 and above have parts 8120-3216 and 1251-5064. New PC board connectors and cables.

3400A RMS VOLTMETER

3400A-13. Serials 2225 and below. Recommended replacement photochopper amplifier assembly.

3421A DATA ACQUISITION/CONTROL UNIT

3421A-4. All serials. Recommended replacement for the A1U101 Input Operational Amplifier.

3437A SYSTEM VOLTMETER

3437A-7. All serials. Product support package for 3437A Systems Voltmeter.

3453A DIGITAL STIMULUS RESPONSE UNIT

3453A-4A. All serials. Instructions for proper alignment of the HP-IB interface connector.

3455A DIGITAL VOLTMETER

3455A-21. All serials. DC Performance Testing on the 100V and 1000V ranges.
3455A-22. Serials 1622A12900 and below. Recommended replacement of terminal assemblies.
3455A-23. All serials. Recommended test equipment change.

3456A DIGITAL VOLTMETER

3456A-4A. All serials. Recommended spare parts kit—part number 03456-69802.
3456A-12. Serials 2015A. Differences between instruments with and without cooling fans.
3456A-17A. All serials. Customer service kit for component level repair.

3468A/B DIGITAL MULTIMETERS

3468A-2. All serials. Recommended replacement for the A1U101 Input Operational Amplifier.
3468B-1. All serials. Battery Retrofit Kit installation for Battery Retrofit Kit P/N 03468-68701.

3478A DIGITAL MULTIMETER

3478A-3. All serials. Recommended replacement for the A1U101 Input Operational Amplifier.

3484A DIGITAL VOLTMETER SYSTEM

3484A-6. All serials. Recommended substitute transistor for Transistor Q1 of the DC Amplifier assembly.
3484A-7. All serials. Recommended replacement for the front panel Sample Rate adjustment potentiometer, R3.

3495A SCANNER

3495A-7B. All serials. Spare parts and troubleshooting information.

3497A DATA ACQUISITION/CONTROL UNIT

3497A-8A. All serials. Customer spare parts recommendations.
3497A-12. All serials. 3497A mainframe verification checks.

3711A IF/BB TRANSMITTER

3711A-3. All serials. Preferred replacement for transistor A1Q1 and capacitor A1C1.
3711A-4. Serials 2016U-00326 to 2016U-00349. Modification to improve slave output amplitude.

3724A BASEBAND ANALYSER

3724A-3. Serials 2148U-00141 and below. Preferred replacement for −12V regulator (A9U2).

3725A BASEBAND ANALYSER DISPLAY

3725A-1. Serials 2237U-00171 and below. Recommendations when making NPR measurements is a 16kHz slot.

3746A SLMS

3746A-6. Serials 2250U-00332 and below. Preferred replacement for IC A22U16.

3747A/B SELECTIVE LEVEL MEASURING SET

3747A/B-8A. Serials 2030U and below. Preferred replacement of memory assembly A109.
3747A/B-27. Serials below 2142U-00028 for 3747A and below 2143U-00146 for 3747B. Modification to improve noise floor at 100kHz.

3779A PRIMARY MULTIPLEX ANALYSER

3779A-26. All serials. Intermittent incorrect operation of frame alignment measurement.
3779A-27. All serials. Modification to cure A4 filter instability at low temperatures.

3779B PRIMARY MULTIPLEX ANALYSER

3779B-28. All serials. Modification to cure A4 filter instability at low temperatures.

3779C PRIMARY MULTIPLEX ANALYSER

3779C-7. Serials 2235U-00259 to 2235U-00273. Modification to improve mounting security of mains auxiliary transformer.

3779C-8. Serials 2138U-00125 and below. Modification to cure A4 filter instability at low temperatures.

3779C-9. Serials 2235U-00289 and below. Software update for new type EPROMS.

3779C-10. Serials 2235U-00249 and below. Modification to cure "ringing" on power supply.

3779D PRIMARY MULTIPLEX ANALYSER

3779D-7. Serials 2235U-00204 to 2235U-00208. Modification to improve mounting security of mains auxiliary transformer.

3779D-8. Serials 2142U-00125 and below. Modification to cure A4 filter instability at low temperatures.

3779D-10. Serials 2235U-00199 and below. Modification to cure "ringing" on power supply.

3781A/B PATTERN GENERATOR

3781A-2. All serials. Recommended modifications to prevent subsequent power supply failure.

3781A-3. All serials. Preventive maintenance to minimize possibility of intermittent failures.

3781B-5. All serials. Recommended modifications to prevent subsequent power supply failure.

3782A/B ERROR DETECTOR

3782A-2. All serials. Preventive maintenance to minimize possibility of intermittent failures.

3782B-5. All serials. Recommended modifications to prevent subsequent power supply failure.

3785A/B JITTER GENERATOR AND RECEIVER

3785A-8. All serials. Recommended modifications to prevent subsequent power supply failure.

3785B-7. All serials. Recommended modification to prevent subsequent power supply failure.

3793B DIFFERENTIAL PHASE DETECTOR

3793B-4. Serials 2309U-00446 and below. Modification to prevent possible degradation of AM to PM performance.

3964A INSTRUMENTATION TAPE RECORDER

3964A-17A. Serials 2314A and above. New type recommended instrumentation recording tape.

3968A INSTRUMENTATION TAPE RECORDER

3968A-17A. Serials 2314A and above. New type recommended instrumentation recording tape.

4935A TIMS

4935A-9. Serial prefixes 2248 and 2305. Modification to correct P/AR measurement.

5150A THERMAL PRINTER

5150A-5. Serial Prefix 2144A. Change transistor A1Q2 to improve reliability of printer paper advance circuit.

5180A WAVEFORM RECORDER

5180A-12A. Serials 2204A00191 and below. Modification to the bottom cover and information pull-out cards for better durability.

5180A-14. Serials listed in the service note text. Modifications to eliminate generation of data spikes.

5180A-15. Serials 2311A00541 and below. A10 and A11 replacement procedures.

5328A UNIVERSAL COUNTER

5328A-27A. Serials 1944A13473 and below. How to retrofit the new A15 HP-IB assembly (05328-60043).

6012A POWER SUPPLY

6012A-5A. All serials. Assembly level FET repair procedure.

6034A POWER SUPPLY

6034A-6. Serials 2222A00750 and below. Replacement of three 16 K EPROMS by a 64 K ROM.

6140A DIGITAL CURRENT SOURCES

6140A-5. Serials 2227A-00484 and below. All J20, J99, PO5, 061, 062, 063 and 064 options. Modification to simplify calibration. Supersedes 6140A-4.

7470A GRAPHICS PLOTTER

7470A-1. All serials. Modification to improve performance.

7585A DRAFTING PLOTTER

7585A-1. Serials 2309A and below. Modification to improve operation at 9600 baud.

8111A PULSE/FUNCTION GENERATOR

8111A-1A. Serials 2215G00956 and above. Temperature compensation for selected Shaper IC's.

8112A PROGRAMMABLE PULSE GENERATOR

8112A-1. Serials 2136G00405 and below. Protection against damage of the output amplifier by electrostatic discharge.

8160A/8161A PROGRAMMABLE PULSE GENERATOR

8160A-5. Serials 2047G00586 and above. Recommended replacement of ECL dual gate IC.

8161A-1. Serials 2202G00256 and above. Replacement of ECL dual gate IC.

8305A SWEEP OSCILLATOR

8350A-1. Serials 2146A01110 and below. Modification to protect the power supply from shorting to the bottom cover.

8350A-4. Serials 2205 and below. +5VA (A7U16) regulator replacement.

8447A 0.1 to 400 MHz AMPLIFIER

8447A-1. Serial prefix 1937A and below. 400 MHz preamplifier replacement.

8447A, OPTION 001, 0.1 TO 400 MHz DUAL AMPLIFIER

8447A-2. Serials 1937A and below. 400 MHz preamplifier replacement.

8557A SPECTRUM ANALYZER

8557A-9. Serials prefixed 2229A. Recommended bandwidth filter assembly A8/A10 replacement kit.

8557A-10. Serials 2203A01756 to 2229A02131. Preferred replacement for DPM brackets.

8558B SPECTRUM ANALYZER

8558B-27. Serials 2145A and below. Front panel retrofit kit.

8558B-28. All serials. Preferred replacement for transistors A17Q1 and A17Q2.

8558B-29. Serials prefixed 1914A through 2245A. Preferred replacement for bandwidth filter cover #1 or #2.

8559A SPECTRUM ANALYZER

8559A-14. All serials. Preferred replacement for transistor A5A1Q1.

8559A-18. Serials prefixed 2240A and above. Preferred replacement for ribbon connector A16J5.

8559A-19. All serials. Preferred replacement for second converter cover board.

8559A-20. All serials. Electrostatic protection of input circuits.

8566A SPECTRUM ANALYZERS

8566A-19. Serials 2318 and below. Preferred replacement of 18.4 MHz oscillator crystal.

8668A SPECTRUM ANALYZERS

8568A-43. Serials 2318 and below. Preferred replacement of 18.4 MHz oscillator crystal.

8656A SIGNAL GENERATOR

8656A-17. Serials 2136A and below. Modification to improve filtering of the 15 Vdc supply voltage to the heterodyne section.

8656A-18. Serials 2228A and below. Modification to the 50 MHz reference oscillator to improve performance.

8656A-19. Serials 2232A and below. Improved frequency modulation adjustment.

8656A-20. Serials 2223A and below. Improved spectral purity of modulation output.

8660A/B/C SYNTHESIZED SIGNAL GENERATOR

8660A-31-S. Serials 2121A01964 and below. Modification to prevent possible shock hazard.

8660B-34-S. All serials. Modification to prevent possible shock hazard.

8660C-11-S. Serials 2242A04297 and below. Modification to prevent possible shock hazard.

8662A SYNTHESIZED SIGNAL GENERATOR

8662A-7. Serials above 2002A00298 and below 2244A01143. Modification to improve FM spur.

8662A-8-S. Serials 2301A01160 and below. Modification to correct improper grounding of fan.

8663A SYNTHESIZED SIGNAL GENERATOR

8663A-1-S. Serials 2245A00110 and below. Modification to correct improper grounding of fan.

8683A/B SIGNAL GENERATOR

8683A-2. All serials. Retrofitting option 002, reverse power protection.

8683B-1. All serials. RF output assembly kit installation.

8684A/B SIGNAL GENERATOR

8684A-3. All serials. Retrofitting option 002, reverse power protection.

8684B-2. All serials. RF output assembly kit installation.

8901A MODULATION ANALYZER

8901A-2-S. Serials 2251A and below. Modification to correct improper grounding of fan assembly.

8903A AUDIO ANALYZER

8903A-7. Serials 2150A and below. Modification to prevent shorts between the bottom cover and mother board.

8956A SYSTEM INTERFACE

8956A-1-S. Serials 2239A and below. Modification to correct improper grounding of fan.

59308A TIMING GENERATOR

59308A-1A. All serials. HP-IB verification program using the 9825A.

64110A LOGIC DEVELOPMENT SYSTEM MAINFRAME

64151A-4. 64151A static RAM controller. All board numbers. Modification to allow writes to ROM without generating a break.

642XX EMULATOR SUBSYSTEM

64252A-6. 64252A Z80 emulator pod. All board numbers. Modification to pass M1 cycles to the target system during background accesses.

Service Note Order Form

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

Hewlett-Packard
1820 Embarcadero Road
Palo Alto, California 94303

For European customers (ONLY)

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AMSTELVEEN—1134
Netherlands

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☐ 410C-23	☐ 3325A-10B	☐ 3711A-4	☐ 3782B-5	☐ 8161A-1	☐ 8660A-31-S
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☐ 546A-2	☐ 3437A-7	☐ 3746A-6	☐ 3793B-4	☐ 8447A-1	☐ 8662A-7
☐ 853A-3	☐ 3453A-4A	☐ 3747A/B-8A	☐ 3964A-17A	☐ 8447A-2	☐ 8662A-8-S
☐ 1332A-3A	☐ 3455A-21	☐ 3747A/B-27	☐ 3968A-17A	☐ 8557A-9	☐ 8663A-1-S
☐ 1340A-6	☐ 3455A-22	☐ 3779A-26	☐ 4935A-9	☐ 8557A-10	☐ 8683A-2
☐ 1350A-7	☐ 3455A-23	☐ 3779A-27	☐ 5150A-5	☐ 8558B-27	☐ 8683B-1
☐ 1351A-2	☐ 3456A-4A	☐ 3779B-28	☐ 5180A-12A	☐ 8558B-28	☐ 8684A-3
☐ 1630A/D-0	☐ 3456A-12	☐ 3779C-7	☐ 5180A-14	☐ 8558B-29	☐ 8684B-2
☐ 1630A/D-1	☐ 3456A-17A	☐ 3779C-8	☐ 5180A-15	☐ 8559A-14	☐ 8901A-2-S
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