SERVICE MANUAL

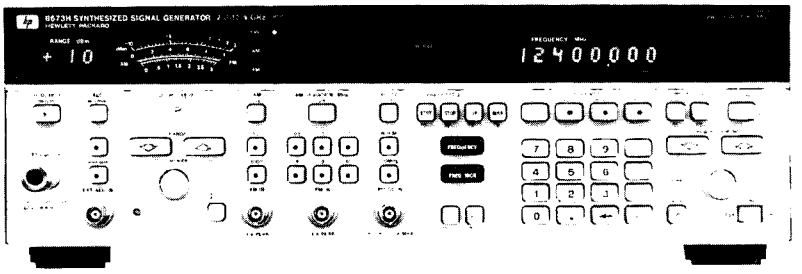
HP 8673B

SYNTHESIZED SIGNAL GENERATOR

2.0 – 26.0 GHz

For Serial Number Prefixes

2918A and Above



HP Part No. 08673-90134
Edition 1 E0690
HP Binder Part No. 9282-1080

HEWLETT PACKARD

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Errata

Title & Document Type: 8763B Synthesized Signal Generator Service Manual

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HP References in this Manual

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

About this Manual

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

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Agilent Technologies

Service Manual

HP 8673B Synthesized Signal Generator

2.0 — 26.0 GHz

Including Options 001, 002, 003, 004, 005, 006, 008, 907, 908, 909, 915, 916

SERIAL NUMBERS

Attached to the rear panel of the instrument is a serial number plate. The serial number is in the form: 0000A00000. The first four digits and the letter are the serial number prefix. The last five digits are the suffix. The prefix is the same for identical instruments; it changes only when a configuration change is made to the instrument. The suffix, however, is assigned sequentially and is different for each instrument.

This manual applies directly to instruments with serial numbers prefixed 2918A and above. For instruments with higher serial number prefixes, *Manual Updates* containing new information will be made available if changes significantly affect operation or performance.

This manual does not apply to instruments with serial number prefixes 2823A and below. To obtain service information for instruments with these serial number prefixes, order HP 8673B Service Manual part number HP 08673-90116.



HP Part No. 08673-90134
Microfiche Part No. 08673-90135
E0690

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Printed in USA

CERTIFICATION

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, (NIST), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

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For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Addresses are provided at the back of this manual.

HP 8673B

Herstellerbescheinigung

Hiermit wird bescheinigt, dass dieses Gerät/System in Übereinstimmung mit den Bestimmungen von Postverfügung 1046/84 funkenstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes/System angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Zusatzinformation für Mess- und Testgeräte:

Werden Mess- und Testgeräte mit ungeschirmten Kabeln und/oder in offenen Messaufbauten verwendet so ist vom betreiber sicherzustellen dass die Funk-Entstörbestimmungen unter Betriebsbedingungen an seiner Grundstücksgrenze eingehalten werden.

Manufacturer's Declaration

This is to certify that this product meets the radio frequency interference requirements of Directive FTZ 1046/1984. The German Bundespost has been notified that this equipment was put into circulation and has been granted the right to check the product type for compliance with these requirements.

Note: If test and measurement equipment is operated with unshielded cables and/or used for measurements on open setups, the user must ensure that under these operating conditions, the radio frequency interference limits are met at the border of his premises.

Contents

Chapter 5. Adjustments

5-1. Introduction 5-1
5-2. Safety Considerations 5-1
5-3. Equipment Required 5-2
5-4. Automated Adjustment Procedures 5-2
5-5. Factory Selected Components 5-4
5-6. Related Adjustments 5-4
5-7. Power Supply Adjustments 5-10
5-8. 10 MHz Reference Oscillator Adjustment . . . 5-11
5-9. Reference Loop (VCXO) Adjustment 5-12
5-10. M/N Loop Adjustments 5-16
5-11. 20/30 MHz (LFS) Loop Divider Bias Adjustment 5-19
5-12. 160—240 MHz (20/30 MHz or LFS Loop) VCO Pretune 5-21
5-13. YTO Pretune Digital-to-Analog Converter Adjustment 5-23
5-14. YTO Driver Adjustment 5-24
5-15. YTO Loop Sampler Adjustments 5-25
5-16. YTO Loop Offset and FM Overmodulation Adjustments 5-29
5-17. YTO Loop Phase Detector Adjustments . . . 5-32
5-18. FM Driver Adjustment 5-36
5-19. FM Accuracy and Overmodulation Adjustments 5-38
5-20. YTM Tune Adjustment 5-40
5-21. Power Clamp Adjustment 5-43
Checking the YTM Performance and Maximum Available Power 5-44
5-22. Flatness and ALC Adjustments 5-46
5-23. External System Mode ALC Adjustment . . . 5-50
External Offset Adjustment 5-50
System Mode ALC Adjustment 5-51
5-24. AM Bandwidth Adjustment 5-54
5-25. AM Accuracy and Meter Adjustment 5-57
5-26. Pulse Modulation Adjustment 5-59
Pulse Clamp and PAC DAC Sensitivity Adjustments 5-59
YTM Injected Pulse Width Adjustment 5-60
Series Pulse Width Adjustment 5-60
ALC Sample Pulse Adjust 5-62
Minimum Pulse Width Indicator Adjustment . 5-64
5-27. Sweep Out and Blanking/Marker Adjustments 5-65

6. Replaceable Parts

6-1. Introduction 6-1
6-2. Exchange Assemblies 6-1
6-3. Abbreviations 6-1
6-4. Replaceable Parts List 6-1
6-5. Ordering Information 6-2
6-6. Spare Parts Kit 6-2

7. Manual Changes

7-1. General Information 7-1

Chapter 8. Service

8-1. Introduction 8-1
8-2. Failure Modes and Service Strategy 8-1
8-3. General 8-1
8-4. Turn-on Errors 8-1
8-5. Operator Errors 8-1
8-6. Instrument Performance Out of Specification 8-1
8-7. Catastrophic Failures 8-2
8-8. Service Sheets 8-2
8-9. Manual Updates 8-11
8-10. Safety Considerations 8-11
8-11. Before Applying Power 8-11
8-12. Warnings and Cautions 8-11
8-13. After Service Safety Checks 8-12
8-14. Recommended Test Equipment 8-13
8-15. Service Tools, Aids, and Information 8-13
8-16. Service Accessories 8-13
8-17. Service Functions 8-14
8-18. Signature Analysis 8-14
8-19. Required Service Tools 8-15
Pozidrive Screwdrivers 8-15
Tuning Tools 8-15
Heat Staking Tools 8-16
8-20. Hardware Characteristics 8-16
Assembly Locations 8-16
Parts and Cable Locations 8-16
Test Points and Adjustment Locations 8-16
Service Aids on Printed Circuit Boards 8-17
Other Service Documents 8-17
8-21. Repair and Replacement 8-17
8-22. Service Procedures 8-17
After-Repair Adjustments 8-17
Top and Bottom Cover Removal 8-17
Front Panel Key Cap Replacement 8-17
Front Panel Switch Replacement 8-18
8-23. Etched Circuits (PC Boards) 8-21
8-24. Electrostatic Discharge (ESD) Precautions . 8-21
8-25. Module Exchange Program 8-23

8-26. Non-Repairable Assemblies 8-23
8-27. Factory Selected Components 8-23
8-28. Periodic Maintenance 8-23
Cleaning Intervals 8-23
Cleaning Solution 8-23
Top Cover Removal and Replacement 8-24
6-Month Cleaning 8-24
12-Month Cleaning 8-25
8-30. Schematic Symbology 8-28
8-31. Basic Logic Symbology 8-28
Gates and Qualifiers 8-28
Indicator Symbols 8-28
Contiguous Blocks 8-31
Dependency Notation 8-31
Common Control Block 8-33
8-32. Complex Device Symbology 8-35
Shift Register 8-35
AND-OR Selector 8-35
UP-DOWN Counter 8-36
Quad D-Type Latch 8-37

Service Sheet BD1

Overall Block Diagram and Troubleshooting 8-39
Principles of Operation 8-39
Major Mechanical Assemblies 8-39
Functional Description 8-40
Troubleshooting 8-44
General 8-44
Overall Level Procedure 8-44
Block Diagram Checks 8-45
Turn-On Check (√1) 8-45
Power Supply Checks (√2) 8-46
Front Panel Checks (√3) 8-47
Base Band Checks 8-55
YTO Loop Frequency Check (√4) 8-55
Reference Loop Checks (√4a) 8-56
LFS Loop Checks (√4b) 8-56
M/N Loop Checks (√4c) 8-57
YTO Loop Power Checks (√5) 8-58
YTO/FM Checks (√6) 8-58
Output Level Checks (√7) 8-59
ALC/FM Checks (√8) 8-60
Pulse Modulation Checks (√9) 8-61

Service Sheet BD2

Time Base Reference 8-65
Principles of Operation 8-65
Troubleshooting 8-66
General 8-66
Troubleshooting Procedure 8-66
Reference Oscillator Check (√1) 8-66
100 MHz VCXO Check (√2) 8-66

Service Sheet BD3

RF Phase Locked Loops 8-71
Principles of Operation 8-71
General 8-71
Low Frequency Source (LFS) Loop 8-71
M/N Loop 8-73

Troubleshooting 8-86
General 8-86
Troubleshooting Procedures 8-87
LFS Loop Checks 8-87
10 MHz Reference Check (√1) 8-87
20/30 Divider Check (√2) 8-87
160-240 MHz VCO Check (√3) 8-89
20/30 Phase Detector Checks (√4) 8-90
M/N Loop Checks 8-90
20 MHz Reference Check (√5) 8-90
400 MHz Reference Check (√6) 8-91
M/N Phase Detector Check (√7) 8-91
M/N VCO Check (√8) 8-93
M/N Output Check (√9) 8-93

Service Sheet BD4

YTO Summing Loop 8-97
Principles of Operation 8-97
General 8-97
Digital to Analog Converter 8-97
Yig Tuned Oscillator (YTO) Driver 8-97
YTO Loop 8-98
YTO/FM Coil Driver 8-98
FM Subsystem 8-98
Troubleshooting 8-99
General 8-99
Troubleshooting Procedures 8-100
YTO Summing Loop Checks 8-100
YTO Check (√1) 8-100
DAC Check (√2) 8-100
YTO Driver Check (Unlocked) (√3) 8-101
YTO Power Check (√4) 8-102
Sampler Input Check (√5) 8-102

Sampler Output Check (√6) 8-102
YTO Phase Detector Check (√7) 8-103
Coil Driver Check (√8) 8-103
YTO Driver Check (Locked) (√9) 8-104
FM Checks 8-104
FM Amplifier Check (√10) 8-104
FM 40 Check (√11) 8-105

Service Sheet BD5

Microwave Signal Path 8-109
Principles of Operation 8-109
General 8-109
YIG Tuned Multiplier 8-110
Troubleshooting 8-111
General 8-111
Troubleshooting Hints 8-112
Troubleshooting Procedure 8-112
Block Diagram Checks 8-113
Baseband Power Check (√1) 8-113
YTM Output Power Check (√2) 8-113
SRD Bias Board Checks (√2a), (√2b) 8-114
Peaker DAC Check (√2c) 8-116
Final Output Power Check (√3) 8-116
Programmable Output Attenuator Check (√4) . 8-117

Service Sheet BD6

ALC Loop 8-121
Principles of Operation 8-121
Troubleshooting 8-122
General 8-122
Troubleshooting Procedure 8-122
Troubleshooting Hints 8-123
Internal ALC Checks 8-123
F CORRECT Checks (√1) 8-123
ALC Reference Checks (√2) 8-124
Detector Checks (√3) 8-124
ALC Modulator Drive Checks (√4) 8-126
LVL and AM Meter Checks (√5) 8-126
LVL Meter Checks 8-126

Service Sheet BD7

Pulse Modulation 8-131
Principles of Operation 8-131
Troubleshooting 8-133
General 8-133
Troubleshooting Hints 8-133
Troubleshooting Procedures 8-134
Initial Checks 8-134
Shunt Pulse Check (√1) 8-137
Series Pulse Checks (√2) 8-138
Bias Tee/Pulse Modulator Check (√3) 8-140
Sample Gate Checks (√4) 8-140
Level Check (√5) 8-141
Band 2—4 Checks 8-142
YTM Pulse Check (√6) 8-142
PAC DAC Check (√7) 8-142
PAC Check (√8) 8-143

Service Sheet BD8

Digital Control Unit (DCU) 8-147
Principles of Operation 8-147
Digital Controller (A2A8, A2A10) 8-147
Control Section (A2A9, A2A7, A2A2, A2A1, A4) 8-148
Troubleshooting 8-149
General 8-149
Troubleshooting Procedure 8-150
Power-Up Failures 8-150
Front Panel Display, Annunciator and Switch Failures 8-152
Faulty Data to M/N Phase Detector, LFS Loop DAC or 20/30 Divider 8-155
Diagnostic Test Procedures 8-155
General 8-155
Diagnostic ROM Date Code Check 8-157
MPU Free Run Diagnostic (A2A8) 8-158
MPU Timer and IRQ Encoder Diagnostic (A2A8) 8-164
Front Panel Display and Driver Diagnostic (A2A1) 8-167
RAM Verification (A2A10) 8-173
Divide-By-Three Diagnostic (P/O A2A10) . . . 8-173
ROM Diagnostic (A2A10) 8-176
Memory/Interface Assembly Check 8-177
Frequency Output Diagnostic (A2A9) 8-180
HP-IB Diagnostic (A2A9) 8-186
HP-IB Diagnostic — Talk Only Mode 8-191
I/O Assembly Talk-Around Diagnostic (A2A7) . 8-193
Key Code Assembly (A2A2) Checks 8-205
DAC and Enable Assembly (A1A5) 8-206

Service Sheet BD9

Power Supplies 8-215
Principles of Operation 8-215
Troubleshooting 8-216
General 8-216
Troubleshooting Procedures 8-216
Block Diagram Checks 8-216
Rectifier Assembly Check 8-216
Positive Regulator Assembly Checks 8-217
Negative Regulator Assembly Checks 8-218

Figures

5-1. Title Screen 5-3
5-2. Main Menu 5-4
5-3. Special Function Keys 5-5
5-4. 10 MHz Reference Oscillator Adjustment Test Setup 5-11
5-5. Reference Loop (VCXO) Adjustment Test Setup . 5-12
5-6. M/N Loop Adjustment Test Setup 5-16
5-7. 20/30 MHz (LFS) Loop Divider Bias Adjustment Test Setup 5-19
5-8. YTO Loop Sampler Adjustment Test Setup . . . 5-25
5-9. Sampler Frequency Response 5-27
5-10. YTO Loop Offset and FM Overmodulation Adjustment Test Setup 5-29
5-11. YTO Loop Offset Adjustment Waveforms 5-31
5-12. YTO Loop Phase Detector Adjustment Test Setup 5-32
5-13. Special Interconnect Cable 5-33
5-14. Spectrum Analyzer Display of Phase Locked Loop Gain 5-34
5-15. FM Driver Adjustment Test Setup 5-36
5-16. FM Accuracy and Overmodulation Adjustment Test Setup 5-38
5-17. Optimum YTM Response 5-40
5-18. YTM Tune Adjustment Test Setup 5-41
5-19. Power Clamp Adjustment Test Setup 5-43
5-20. Utility Menu 5-45
5-21. Maximum Power Plot 5-45
5-22. Typical Flatness Plot Before Adjustment 5-46
5-23. Flatness Adjustment Display 5-47
5-24. Flatness and ALC Adjustment Test Setup 5-49
5-25. External Offset Adjustment Test Setup 5-50
5-26. External ALC Amplifier 5-51
5-27. External System Mode ALC Adjustment Test Setup 5-52
5-28. AM Bandwidth Adjustment Test Setup 5-54
5-29. AM Accuracy and Meter Adjustment Test Setup . 5-57
5-30. PAC DAC Adjustment Test Setup 5-60
5-31. Series Pulse Width Adjustment Test Setup . . . 5-60
5-32. Series Pulse Width Waveform 5-61
5-33. Pulse Shunt Adapter 5-62
5-34. ALC Sample Pulse Adjustment Test Setup . . . 5-63
5-35. ALC Sample Pulse Waveform 5-64
5-36. Sweep Out and Blanking/Marker Adjustments Test Setup 5-65
5-37. Sweep Out Waveform 5-66

5-38. Marker Waveform 5-66

8-1. Front Panel Pushbutton Switch Assembly 8-18
8-2. Pushbutton Switch Support Anvil 8-19
8-3. Heat Staking Tip 8-20
8-4. Typical Assembly for Heat Staking Operation . . 8-20
8-5. Basic Logic Symbols and Qualifiers 8-29
8-6. Indicator Symbols 8-30
8-7. Contiguous Blocks 8-31
8-8. AND Dependency Notation 8-32
8-9. Address Dependency Notation 8-32
8-10. OR and Free Dependency Notation 8-33
8-11. Common Control Block 8-33
8-12. Quad D-Type Latch (Combined) 8-34
8-13. Quad D-Type Latch (Individual) 8-34
8-14. Shift Register 8-35
8-15. AND-OR Selector 8-36
8-16. UP-DOWN Counter 8-37
8-17. Quad D-Type Latch 8-37
8-18. HP 8673B Assemblies and Subassemblies 8-40
8-19. HP 8673B Simpified Block Diagram 8-41
8-20. HP 8673B Baseband Frequency Test Setup . . . 8-56
8-21. HP 8673B FM Test Setup 8-58
8-22. HP 8673B Power Output Test Setup 8-59
8-23. HP 8673B Power Plot 8-60
8-24. Overall Troubleshooting Block Diagram 8-63
8-25. Timebase Reference Block Diagram 8-69
8-26. 80 kHz Reference, A2A5TP2 8-88
8-27. A2A5TP3, A2A3 Test Switch HIGH 8-88
8-28. RF Phase Locked Loops Block Diagram 8-95
8-29. FM Amplifier Check, Initial Test Setup 8-105
8-30. YTO Summing Loop Block Diagram 8-107
8-31. YTM Simplified Block Diagram 8-111
8-32. Squegging 8-112
8-33. YTM Power Output Power Check Test Setup . . 8-113
8-34. YTM Power Output Plot 8-114
8-35. YTM Bias Label 8-115
8-36. Peaker DAC Ramp Output 8-116
8-37. Final Output Power Check Test Setup 8-117
8-38. Power Output Plot 8-117
8-39. Microwave Signal Path Block Diagram 8-119
8-40. ALC Loop Block Diagram 8-129
8-41. Pulse Modulation Waveforms 8-132
8-42. Pulse Modulation Initial Check Test Setup 8-135
8-43. Pulse Shunt Adapter 8-135
8-44. Pulse Modulation Check Setup 8-137
8-45. Pulse Driver Board Input and Shunt Pulses . . . 8-137
8-46. Pulse Driver Board Input and Series Pulses . . . 8-138
8-47. Bias Tee 8-139
8-48. Pulse Driver Board Input Pulse and Sample Pulse 8-141
8-49. Pulse Modulation Block Diagram 8-145

8-50. Front Panel Keyboard and Indicator Block Diagram 8-152
8-51. M/N Phase Detector, DAC, 20/30 Divider, and Front Panel Interface Block Diagram 8-155
8-52. HP 9825A and HP 85F Sample Program Listing . 8-192
8-53. Sample Error Printout 8-193
8-54. Controller Assembly Block Diagram 8-213
8-55. Power Supply Block Diagram 8-221
8-56. A3A1A6 Reference and M/N Motherboard Assembly Component Locations (Top View) 8-223
8-57. A3A1A6 Reference and M/N Motherboard Assembly Component Locations (Bottom View) 8-223
8-58. A3A1A1 Reference Phase Detector Assembly Component and Test Point Locations 8-224
8-59. A3A1A1 Reference Phase Detector Assembly Schematic Diagram 8-225
8-60. A3A1A2 100 MHz VCXO Assembly Component and Test Point Locations 8-227
8-61. 100 MHz VCXO Assembly Schematic Diagram . . 8-227
8-62. A3A1A3 M/N Phase Detector Assembly Component and Test Point Locations 8-229
8-63. M/N Phase Detector Assembly Schematic Diagram 8-229
8-64. A3A1A4A2 M/N VCO Assembly Component and Test Point Locations 8-231
8-65. M/N VCO Assembly Schematic Diagram 8-231
8-66. A3A1A5 M/N Output Component and Test Point Locations 8-233
8-67. M/N Output Assembly Schematic Diagram . . . 8-233
8-68. A2A5 20/30 MHz Divider Assembly Component and Test Point Locations 8-235
8-69. 20/30 MHz Divider Assembly Schematic Diagram 8-235
8-70. A2A4 20/30 MHz Phase Detector Assembly Component and Test Point Locations 8-237
8-71. 20/30 MHz Phase Detector Assembly Schematic Diagram 8-237
8-72. A2A3 VCO 160—240 MHz Assembly Component Locations 8-239
8-73. VCO 160—240 MHz Assembly Schematic Diagram 8-239
8-74. A3A5 DAC Assembly Component and Test Point Locations 8-241
8-75. Digital-to-Analog Converter Assembly Schematic Diagram 8-241
8-76. A3A6 YTO Driver Assembly Component and Test Point Locations 8-243
8-77. YTO Divider Assembly Schematic Diagram . . . 8-243
8-78. A3A9A5 Sampler Assembly Component and Test Point Locations 8-245
8-79. P/O YTO Loop Assembly Schematic Diagram . . 8-245
8-80. A3A9A4 YTO Phase Detector Assembly Component and Test Point Locations 8-247
8-81. A3A9A4 YTO Phase Detector Assembly Schematic Diagram 8-247

8-82. A3A7 YTO/FM Coil Driver Assembly Component and Test Point Locations 8-249
8-83. YTO/FM Coil Driver Assembly Schematic Diagram 8-249
8-84. P/O A1A2 Detector-ALC Assembly Component and Test Point Locations 8-251
8-85. Detector-ALC Board Assembly Schematic Diagram 8-251
8-86. A1A4 Pulse Driver Processing Assembly Component and Test Point Locations 8-253
8-87. Pulse Driver Processing Assembly Schematic Diagram 8-253
8-88. A1A7 YIG Driver Board Assembly Component and Test Point Locations 8-255
8-89. A1A10A1 YIG Assembly Component and Test Point Locations 8-255
8-90. YIG Driver Assembly Schematic Diagram 8-255
8-91. A1A14A1 Amplifier Bias Board Assembly Component Locations (2930A and Above) . . 8-257
8-92. Option 008 (2930A and Above) 8-257
8-93. A1A14A1 Amplifier Bias Board Assembly Component Locations (2918A And Below) . . 8-259
8-94. A1A2 Detector-ALC Assembly Component and Test Point Locations 8-259
8-96. A1A1 Attenuator Driver Board Assembly Component and Test Point Locations 8-261
8-97. Attenuator Driver Assembly Schematic Diagram . 8-261
8-98. A1A8 SRD Bias Board Assembly Component and Test Point Locations 8-263
8-99. SRD Control Assembly Schematic Diagram . . . 8-263
8-100. A1A3 Function Board Assembly Component and Test Point Locations 8-265
8-101. Function Assembly Schematic Diagram, Part 1 . . 8-265
8-102. A1A3 Function Board Assembly Component and Test Point Locations 8-267
8-103. Function Assembly Schematic Diagram, Part 2 . . 8-267
8-104. A1A6 Meter Board Assembly Component and Test Point Locations 8-269
8-105. Meter Board Assembly Schematic Diagram . . . 8-269
8-106. A1A5 DAC and Enable Assembly Component and Test Point Locations 8-271
8-107. DAC and Enable Assembly Schematic Diagram . 8-271
8-108. A4A1 Front Panel Assembly Component Locations 8-273
8-109. P/O A4A1 Front Panel Keyboard Schematic Diagram 8-275
8-110. A2A2 Key Code Assembly Component Locations . 8-277
8-111. A2A1 Key Code Assembly Schematic Diagram . . 8-277
8-112. A2A1 Panel Driver Assembly Component Locations 8-279
8-113. Panel Driver Assembly Schematic Diagram . . . 8-279
8-114. A2A8 Microprocessor Assembly Component and Test Point Locations 8-281
8-115. Microprocessor Assembly Schematic Diagram . . 8-281

8-116. A2A10 Memory/Interface Assembly Component Locations 8-283
8-117. Memory/Interface Assembly Schematic Diagram . 8-283
8-118. A2A9 Frequency Output — HP-IB Assembly Component and Test Point Locations 8-285
8-119. Frequency Output HP-IB Assembly Schematic Diagram 8-285
8-120. A2A7 I/O Assembly Component and Test Point Locations 8-287
8-121. I/O Assembly Schematic Diagram, Part 1 8-287
8-122. A2A7 I/O Assembly Component and Test Point Locations 8-289
8-123. I/O Assembly Schematic Diagram 8-289
8-124. A4A1 Front Panel Assembly Component Locations 8-291
8-125. P/O A4A1 Front Panel Display Schematic Diagram 8-293
8-126. A3A1 Rectifier Assembly Component and Test Point Locations 8-295
8-127. Rectifier Assembly Schematic Diagram 8-295
8-128. A3A3 Positive Regulator Assembly Component and Test Point Locations 8-297
8-129. Positive Regulator Schematic Diagram 8-297
8-130. A3A4 Negative Regulator Assembly Component and Test Point Locations 8-299
8-131. Negative Regulator Assembly Schematic Diagram 8-299
8-132. SSA YTO Loop in Service Position (Side View) . 8-301
8-133. SSA YTO Loop in Service Position (Side View) . 8-301
8-134. SSB Component Location (Top View) 8-303
8-135. SSB Assembly Location, Covers Removed (Top View) 8-303
8-136. SSB Test Point Location (Top View) 8-303
8-137. SSB Component Location (Bottom View) 8-303

Tables

5-1. Factory Selected Components 5-6
5-2. Performance Test Failure and Required Action . . 5-7
5-3. Post-Repair Adjustments 5-8
8-1. Schematic Diagram Notes 8-3
8-2. Service Functions 8-15
8-3. Etched Circuit Soldering Equipment 8-22
8-4. Front Panel Status Annunciators 8-49
8-5. Listing of all M and N Numbers and Resulting Frequencies 8-74
8-6. LFS 1K—8M Inputs 8-89
8-7. LFS 1K—8M Outputs 8-89
8-8. M1—M5 and N1—N6 Inputs 8-92
8-9. A2A9 M1—M5 and N1—N6 Outputs 8-93
8-10. DAC 1—4800 MHz Inputs 8-101
8-11. A2A9 DAC 1—4800 MHz Outputs 8-101
8-12. Band Numbers and Frequencies 8-110
8-13. SRD Bias Voltages 8-115
8-14. Power-Up Tests and Error Messages 8-151
8-15. Key-Code Patterns 8-152
8-16. Signal Conditions for Keyboard to Front Panel Indicators Operation 8-154
8-17. Diagnostic Tests 8-157
8-18. MPU Address Line and Address Decoder Signatures 8-160
8-19. Diagnostic ROM (A2A8U3) Signatures 8-160
8-20. MPU Signatures 8-161
8-21. Timing, Interrupt and Buffered Data Circuits Signatures 8-165
8-22. MPU Timer and IRQ Encoder Signatures 8-166
8-23. Frequency Data Signatures 8-168
8-24. Front Panel Assembly Signatures 8-168
8-25. Divide-By-Three Circuit Signatures 8-174
8-26. Memory/Interface Assembly Signatures 8-175
8-27. ROM Error Codes 8-177
8-28. Memory/Interface and Converter Signatures . . . 8-179
8-29. Frequency Diagnostic Output Lines Signatures . . 8-182
8-30. Frequency Diagnostic Input Lines Signatures . . . 8-183
8-31. Frequency Output —HP-IB Assembly Diagnostic . 8-183
8-32. HP-IB Diagnostic Output Lines Signatures . . . 8-188
8-33. HP-IB Diagnostic Input Lines Signatures 8-188
8-34. HP-IB Diagnostic Signatures 8-189
8-35. I/O Assembly Diagnostic Signatures 8-195
8-36. Key-Code Patterns 8-205
8-37. DAC and Enable Diagnostic Signatures) 8-207

Safety Considerations

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

Before Applying Power

Verify that the product is set to match the available line voltage and the correct fuse is installed.

Safety Earth Ground

An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

Warning



Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection.) In addition, verify that a common ground exists between the unit under test and this instrument prior to energizing either unit.

Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to neutral (that is, the grounded side of the mains supply).

Servicing instructions are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing unless qualified to do so.

Adjustments described in the manual are performed with power supplied to the instrument while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.

Warning (cont'd)



For continued protection against fire hazard, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example, normal blow, time delay, etc.). Do not use repaired fuses or short circuited fuse holders.

Safety Symbols



Instruction manual symbol: The product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (see Table of Contents for page references).



Indicates hazardous voltages.



Indicates earth (ground) terminal.

Warning



The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

Caution



The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

HP 8673B
Synthesized Signal Generator
Service Manual

MANUAL IDENTIFICATION

Manual Part Number: 08673-90116
Manual Title: HP 8673B Synthesized Signal Generator Service Manual (For Serial Number Prefixes 2332A Through 2823A)

Manual Part Number: 08673-90134
Manual Title: HP 8673B Synthesized Signal Generator Service Manual (For Serial Number Prefixes 2918A and Above)

INSTRUCTIONS

This update package contains a complete chapter 5 for the manuals identified above. This updated chapter 5 contains instructions for adjusting all configurations of the signal generators that are covered by the manual.

Several adjustments can be performed with computer assistance using the HP-85 computer. However, for every computer assisted procedure there is a corresponding manual procedure for those who do not have the HP-85 computer. (The computer, its required ROM package, its software, and specified test equipment are described in the chapter 5 text.)

To use this update package, simply remove and discard the old chapter 5. Then insert the new chapter 5 in place of the old material.

Please ignore any chapter 5 change instructions in the manual's yellow change sheet. These changes have been incorporated into the new chapter 5.

5

Adjustments

5-1. Introduction

This chapter contains adjustments and checks that assure peak performance of the Signal Generator. This instrument should be readjusted after repair to assure performance. Allow a one hour warm-up prior to performing the adjustments. If the mains power cable is removed and reinstalled during an adjustment, be sure that the OVEN COLD status annunciator is off before proceeding with the adjustment.

Most adjustments are performed manually. However, several adjustments are performed with computer assistance using the adjustment software, HP Part Number 11726-10002, and the HP 85B as a controller. For every automated adjustment procedure there is a corresponding manual adjustment procedure for those who do not have the HP 85B Controller.

The order in which the adjustments are made is critical. Prior to making any adjustments, refer to the paragraph entitled "Related Adjustments".

Determining the adjustments to be performed after a component failure and subsequent repair or a performance test failure is important. This will help keep the adjustment time to a minimum. After the repair and/or adjustment, performance tests are usually required to verify proper performance. Refer to the paragraph entitled "Related Adjustments".

5-2. Safety Considerations

This chapter contains information, cautions and warnings which must be followed for your protection and to avoid damage to the equipment.

Warning



Maintenance described in this chapter is performed with power supplied to the instrument and with protective covers removed. Maintenance should be performed only by service trained personnel who are aware of the hazard involved (for example, fire and electrical shock). Where maintenance can be performed without power applied, the power should be removed.

Warning (cont'd)

A pin-to-pin voltage difference of 60 Vdc may be found on many of the Signal Generator's circuit board connectors. If a circuit board is placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. The voltage could cause personal injury if contacted.

5-3. Equipment Required

Each adjustment procedure contains a list of required test equipment and accessories. The test equipment is identified by callouts in the test setup diagrams included with each procedure.

If substitutions must be made for the specified test equipment, refer to Table 1-3 of the operating manual for the minimum specifications. It is important that the test equipment meet the critical specifications listed in the table if the Signal Generator is to meet its performance requirements.

YTM Tune, Flatness and ALC, and Pulse Modulation adjustment procedures are automated. Automated adjustment programs are written for specific test equipment; therefore, substitute test equipment cannot be used.

Automated adjustments require a test cassette containing the programs (HP part number 11726-10002) and an HP 85B Controller plus the Advanced Programming ROM (00085-15005), the Plotter/Printer ROM (00085-15002), and the Matrix ROM (00085-15004). The test cassette is included in the 11726A Support Kit or it can be ordered separately from your nearest Hewlett-Packard office.

5-4. Automated Adjustment Procedures

The adjustment software is a set of menu driven programs written in BASIC language. Adjustment programs are accessed via an executive program named "EXEC". Special function keys, which are enabled by software, select individual adjustment procedures and test routines from the executive program's main menu. Labels for enabled special function keys are displayed on the bottom two lines of the controller's CRT screen.

To load the adjustment software, insert the tape cassette into the controller's tape drive, type the command LOAD "Autost" and then press END LINE. When the tape stops, press RUN. The calculator will then display the title screen (see figure 5-1).

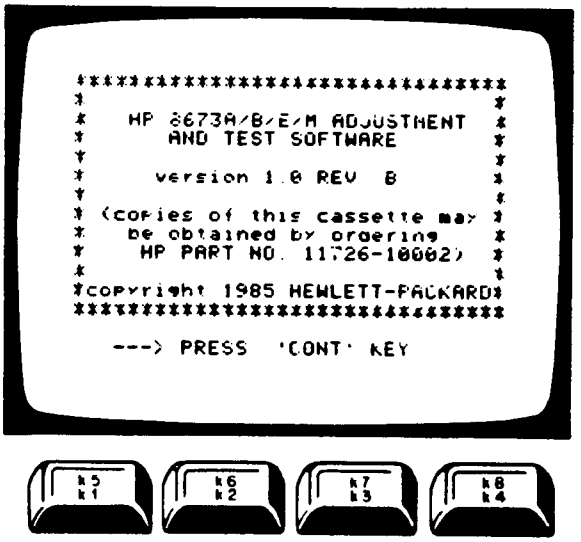


Figure 5-1. Title Screen

The title screen identifies the software version and cassette tape part number. Version 1.0 revision B or later is used to test the HP 8673B.

After the title screen is displayed, press the 'CONT' key. The "Autost" program will ask several hardware related questions, then test the HP Interface Bus for proper operation. In addition, the Signal Generator is preset. After the checks are completed, the "EXEC" program will be loaded and run. The main menu of adjustments is displayed (see figure 5-2).

Note

"Autost" may be bypassed if desired by initially loading "EXEC" program instead.

Press the special function key ([k1] through [k8]) that corresponds to the adjustment or test that you want to perform. The appropriate program is loaded by the "EXEC" program and executed.

See figure 5-3 for a flowchart of the adjustment software as it relates to the special function keys. Below the figure is a brief description of each item in the "EXEC" program's menu. Detailed descriptions of individual adjustments are included in the appropriate adjustment procedure.

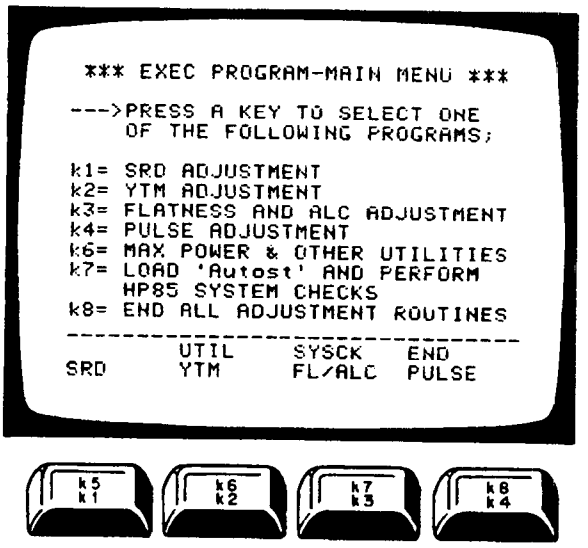


Figure 5-2. Main Menu

5-5. Adjustment Procedures Format

The adjustment procedures contained in this chapter are assigned individual paragraph numbers. Extensive use of notes has been made to clarify the applicability of each procedure, when two or more procedures (manual or automated) are provided relative to the same adjustment. The Service Technician should have no difficulty choosing the procedure best suited to the instrument he is working with.

5-6. Factory Selected Components

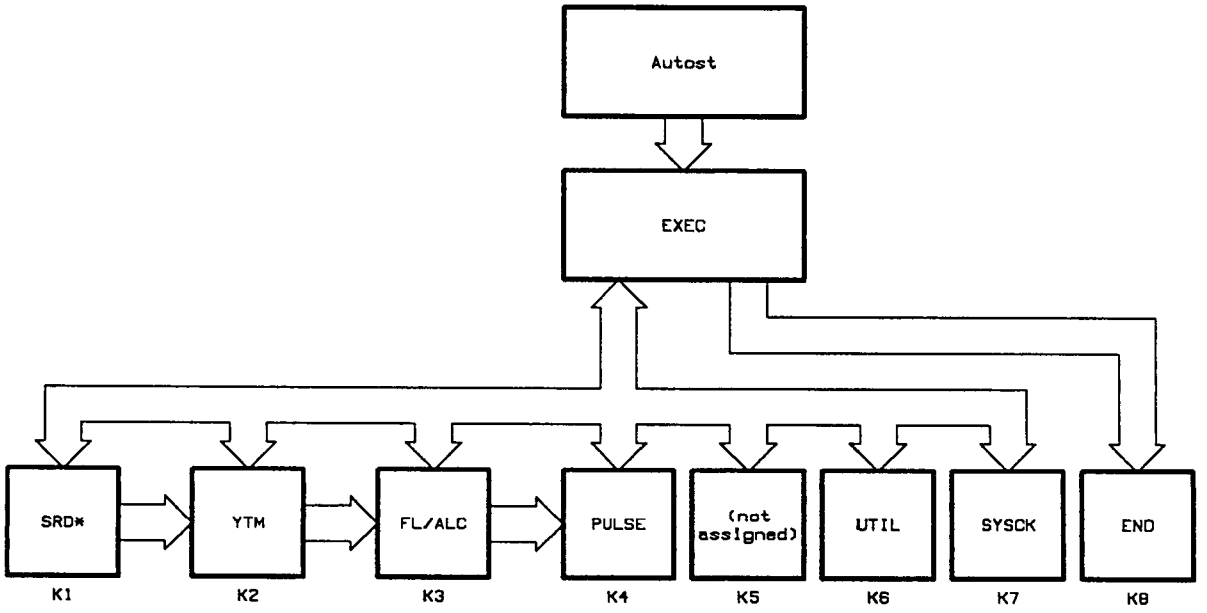
Factory selected components are identified on the schematics and parts list by an asterisk (*) that follows the reference designator. The nominal value of the component is shown. *Manual Updates* will provide updated information pertaining to selected components. Table 5-1 lists the reference designator, the service sheet where the component is shown, the normal value range, and the criteria used for selecting a particular value.

5-7. Related Adjustments

If all the adjustments are to be performed, they should be done in order of appearance in this manual.

In the event of a performance test or component failure, it must be determined if an individual adjustment procedure should be performed or if the instrument should be repaired. Tables 5-2 and 5-3 indicate the required action in either case.

After the instrument is repaired or adjusted, "Performance Tests" in chapter 4 must be performed to verify proper operation of the Signal Generator. Tables 5-2 and 5-3 can also be used as a guideline when repairing or adjusting the instrument.



* SRD is not used on instruments with serial number prefixes 2522A, 2634A and above.

Figure 5-3. Special Function Keys

Adjustment Software

Key	Name	Description
	Autost	Autostart program. Contains system hardware checks. Loads and runs EXEC program. Automatically loads and runs if the tape cassette is in the tape drive when power is applied to the controller.
	EXEC	Executive program. Allows access to the individual adjustment procedures and test routines via special function keys, as selected by the user.
k1	SRD	Not used on the HP 8673B with serial number prefixes 2522A, 2634A, and above.
k2	YTM	YTM Tune Adjustment. Accessed through EXEC or SRD "Load Next Test" function.
k3	FL/ALC	Flatness and ALC Adjustment. Accessed through EXEC or YTM "Load Next Test" function.
k4	PULSE	Pulse Adjustments. Accessed through EXEC or FL/ALC "Load Next Test" function.
k6	UTIL	Utility programs. Tests for maximum power, verification of HP-IB and management of power meter calibration factors.
k7	SYSCK	Loads and executes Autost.
k8	END	Terminates all adjustment programs. Accessed through EXEC.

Table 5-1. Factory Selected Components

Reference Designator	Service Sheet	Range of Values	Basis of Selection
A1A2A1C18	14	30 to 47 pF	Selected for correct frequency response in the AM bandwidth. Perform AM bandwidth Adjustment.
A3A1A2C8 and A3A1A2L4	2	0 to 12.0 pF 0.22 to 6.8 μH	100 MHz VCXO Assembly. Centers the frequency adjustment range of A3A1A2C4 around 100 MHz. Refer to the Reference Loop (VCXO) Adjustment procedure.
A3A1A2R67, R68, and R69	2	Refer to Table in VCXO adjustment	100 MHz VCXO Assembly. Required change in attenuation necessary for a −10 dBm output level of the 400 MHz signal. Refer to the Reference Loop (VCXO) Adjustment procedure.
A3A1A5C38, R36, R40, and R41	5	R36: 82.5 or 56.2Ω R41: 100Ω or deleted R40: 51.1Ω or C38 at 27 pF	M/N Loop 5—45 MHz IF Output. If the power output from the IF OUT jack (A3A1A5J2) is less then −5 dBm at any frequency between 5 MHz to 45 MHz, replace R36 82.5Ω with a 56.2Ω resistor, R40 51.1Ω with C38 27 pF capacitor, and remove R41. Proper power output level is 0 ± 5 dBm from 5 to 45 MHz. If this range cannot be met, service may be required.
A3A3R43	34	12 to 14.7 kΩ	Positive Regulator Assembly. Select so that pin 2 of V1 Power Up/Down Detector is 0.1 to 0.2V lower than the +5.2V Power Supply.
A3A7C48	13	3.9 to 5.6 pF	YTO/FM/Coil Driver Assemby. Selected for frequency response on the 100 kHz and lower FM deviation ranges. Use figure 4-9, FM Frequency Response Test Setup (test oscillator and spectrum analyzer only). Set the test oscillator's controls so the spectrum analyzer's display of the first FM sidebands are 30 dB down from the carrier at 1 MHz. At 3.16 MHz the sidebands should be 40 dB down; at 10 MHz, 50 dB down. If the response is peaking (sidebands are too high), insert a smaller value capacitor. If the response is rolling off (sidebands are too low), insert a larger value capacitor.
A3A7R61, R65, and R75	13	Refer to table	YTO/FM/Coil Driver Assembly. FM sensitivity is changed by replacing R61, R65 and R75 as a set. Except for the spectrum analyzer, connect equipment as shown in figure 4-9, FM Frequency Response Test Setup (omit frequency counter). Connect the spectrum analyzer to the junction of A3A9J1 and A3A9J2. Set the Signal Generator to 10 MHz deviation range. Set the test oscillator's output level for the first carrier null (deviation approximately 240 kHz) at a 100 kHz rate. Measure the test oscillator FM drive voltage. The normal value is between 15.42 and 18.86 mV. Change R61, R65 and R75, using the values in the following table, to obtain the normal ac value. Voltage can be raised or lowered by the approximate increments shown in the table that follows:

Table 5-1. Factory Selected Components (continued)

Reference Designator	Service Sheet	Range of Values	Basis of Selection

Resistor	Nominal Value	Raise Voltmeter Reading		Lower Voltmeter Reading	
		+1 mV	+2.5 mV	−0.75 mV	−1.5 mV
R61	1.96 kΩ	1.78 kΩ	1.62 kΩ	1.96 kΩ	1.96 kΩ
R65	5.11 kΩ	6.19 kΩ	6.19 kΩ	4.64 kΩ	3.83 kΩ
R75	1.82 kΩ	1.78 kΩ	1.78 kΩ	1.96 kΩ	2.15 kΩ

A3A9A5C10	11	20—22 pF	Sampler Assembly. Centers YTO phase detector sampler response. Refer to "YTO Loop Sampler Adjustments".
A3A9A5C22	11	120—150 pF	Selected for proper IF gain. Perform "YTO Loop Sampler Adjustments".
A3A9R20	12	348Ω to 1.21 kΩ	YTO Loop Assembly. Sets YTO Loop gain crossover of 20 ± 2 kHz. Refer to "YTO Loop Phase Detector Adjustments".

Table 5-2. Performance Test Failure and Required Action

Performaqnce Test Failure	Required Action
Frequency Range and Resolution	Check phase lock loops. See BD2, 3, and 4.
Output Level, High Level Accuracy and Flatness	Perform Flatness and ALC adjustment. Check output attenuator. See BD5 and 6.
Low Level Accuracy	Check attenuator and attenuator driver. See to BD5 and 6.
Harmonics, Subharmonics and Multiples	Perform YTM Tune and Flatness and ALC adjustments. Check YTM. See BD5.
Non-Harmonically Related Spurious Signals (CW and AM Modes)	This problem can occur anywhere in the instrument. Isolate the defective component and make adjustments as required (see table 5-3). *NOTE:* If the problem is in Band 1 (2.0 to 6.6 GHz), the output of the A3 RF Source section, W7, should be checked.
Power Line Related Spurious	Refer to Chapter 8, Power Supply Schematics.
Single-Sideband Phase Noise	Perform 20/30 MHz (LFS) Loop Divider Bias, 160—240 MHz (20/30 MHz or LFS Loop) VCO Pretune, M/N Loop, YTO Driver, YTO Loop Sampler, YTO Loop Offset and FM Overmodulation, and FM Driver adjustments. Check the YTO Loop for phase lock to within 1 Hz resolution. *NOTE:* An efficient troubleshooting technique is to isolate the problem to one of the phase lock loops, if possible, and then perform the adjustment for that loop. See BD2, 3 and 4.
AM Meter Accuracy Accuracy Relative to External AM Input Incidental Phase Modulation AM Rates (3 dB bandwidth)	Perform AM Accuracy and Meter adjustments. Troubleshoot the AM and ALC circuits. See BD5 and 6. Repair AM, YTM, or ALC circuits. Perform AM Bandwidth adjustment.
FM Frequency Response	Perform FM Driver and FM Accuracy and Overmodulation adjustments. See BD4.
FM Input and Meter Accuracy	Perform FM Driver and FM Accuracy and Overmodulation adjustments. See BD4.
Incidental AM	Repair or adjust the YTM and ALC circuits. See BD1, 5, 6 and 7.
Pulse	Repair or adjust YTM, ALC and pulse circuits. See BD1, 5, 6 and 7.

Table 5-3. Post-Repair Adjustments

Repaired Assembly	Adjustments
A1A2 — Detector Module Assembly	Flatness and ALC AM Bandwidth AM Accuracy and Meter
A1A3 — Functions Board Assembly	AM Accuracy and Meter FM Accuracy and Overmodulation
A1A4 — Pulse Driver Processing Board Assembly	Flatness and ALC Pulse Modulation Pulse Amplitude Control
A1A5 — DAC and Enable Board Assembly	Pulse Modulation Pulse Amplitude Control
A1A6 — Meter Board Assemby	AM Accuracy and Meter FM Accuracy and Overmodulation
A1A7 — YTM Driver Board Assembly	YTM Tune
A1A8 — SRD Bias Board Assembly	SRD Bias Flatness and ALC Pulse Modulation Pulse Amplitude Control
A1A9 — Preamp Assembly	Flatness and ALC AM Bandwidth AM Accuracy and Meter
A1A10 — YTM Assembly	SRD Bias YTM Tune Flatness and ALC AM Bandwidth AM Accuracy and Meter Pulse Modulation Pulse Amplitude Control
A1A11 — Power Amplifier Assembly	Power Clamp Flatness and ALC Pulse Modulation — Pulse Clamp and ALC Sample Pulse portions only
A1AT2 — Isolator	None
A1AT3 — Pulse Modulator	Pulse Modulation
A1CP1 — Bias Tee	Pulse Amplitude Control
A1CR1 — Crystal Detector	Flatness and ALC Pulse Modulation — ALC Sample Pulse portion only

Table 5-3. Post-Repair Adjustments (continued)

Repaired Assembly	Adjustments
A1AR1 K-Band Amplifier Assembly (Option 008 only)	YTM Tune Power Clamp Flatness & ALC AM Bandwidth AM Accuracy and Meter Pulse Modulation Pulse Amplitude Control
A1DC1 — Directional Coupler	Flatness and ALC Pulse Modulation — ALC Sample Pulse portion only
A1FL1 — High-Pass Filter	Pulse Modulation Pulse Amplitude Control
A2A3, A2A4, A2A5 — LFS Loop Circuits 20/30	MHz Loop Divider 160—240 MHz (20/30 MHz or LFS Loop) VCO Pretune LFS Loop Filter
A2A7 — I/O Assembly	Sweep Out and Blanking/Marker
A3A1, A3A3, A3A4 — Power Supplies	Power Supply
A3A1A1, A3A1A2 — Reference Loop Circuits	Reference Loop
A3A1A3, A3A1A4, A3A1A5 — M/N Loop Circuits	M/N Loop
A3A5 — DAC Assembly A3A6 — YTO Driver Assembly	YTO Pretune Digital-to-Analog Converter YTO Driver YTO Loop Sampler YTO Offset and FM Overmodulation YTO Loop Phase Detector
A3A7 — YTO FM Coil Driver Assembly	YTO Pretune Digital-to-Analog Converter YTO Driver YTO Loop Sampler YTO Offset and FM Overmodulation YTO Loop Phase Detector FM Driver
A3A8 — 10 MHz Crystal Reference Assembly	10 MHz Reference Oscillator
A3A9A3 — 2.0 to 6.6 GHz YTO Assembly	YTO Pretune Digital-to-Analog Converter YTO Driver YTO Loop Sampler YTO Offset and FM Overmodulation YTO Loop Phase Detector FM Driver FM Accuracy and Overmodulation

5-8. Power Supply Adjustments

Reference Service Sheets 33, 34, and 35

Description Adjust the +22 volt and +20 volt power supplies in the A3 Assembly to their required tolerance. Check the remaining supply voltages referenced to the +20 volt supply (+11V, +5.2V, −5.2V, −10V, and −40V).

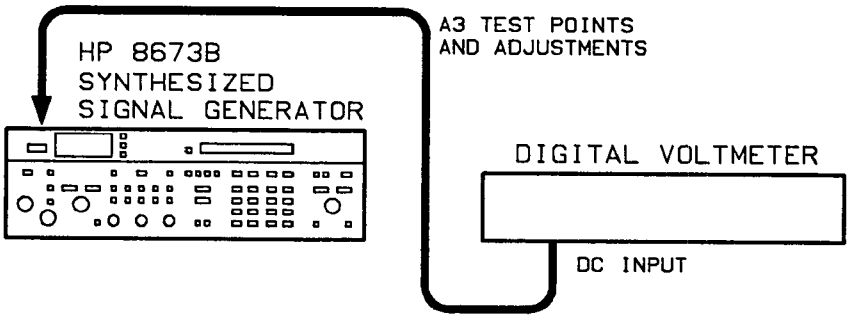


Figure 5-4. Power Supply Adjustment Test Setup

Equipment Digital Voltmeter (DVM)..... HP 3456A

Procedure

1. Set the Signal Generator's rear panel FREQ STANDARD INT/EXT switch to INT.
2. Connect the DVM input to A3A12TP1 on the Rectifier Assembly.
3. Adjust +22 ADJ (A3A12R2) for a DVM reading of +22.00 ± 0.02 Vdc.

4. Connect the DVM input to A3A3TP5 on the Positive Regulator Assembly.
5. Set +20 ADJ (A3A3R50) for a DVM reading of +20.000 ± 0.002 Vdc.
6. Check the power supplies shown in the following table. All voltages should be within tolerance.

Power Supply	Test Point	Power Supply Voltage (Vdc)	
		Min.	Max.
+11 Vdc	A3A3TP6	+9.9	+12.1
+5.2 Vdc	A3A3TP2	+5.1	+5.3
−5.2 Vdc	A3A4TP5	−5.1	−5.3
−10 Vdc	A3A4TP4	−9.8	−10.2
−40 Vdc	A3A4TP1	−39.00	−40.60

5-9. 10 MHz Reference Oscillator Adjustment

Reference Service Sheet 1

Description Connect the reference signal from the Signal Generator (10 MHz OUT) to the oscilloscope's vertical input. A frequency standard (with long term stability greater than 1×10^{-10}) is connected to the trigger input. Adjust the A3A8 Assembly's FREQ adjustment for a minimum drift rate.

Equipment

Frequency Standard	HP 5065A
Oscilloscope	HP 1980B

Note

Be sure the Signal Generator has had one hour to warm up before performing the adjustment. Verify that the OVEN COLD and ϕ UNLOCKED status annunciators are off. If necessary, refer to the troubleshooting information in chapter 8.

Procedure

1. Set the Signal Generator's rear panel FREQ STANDARD INT/EXT switch to the INT position.
2. Connect the equipment as shown in figure 5-5. Set vertical input of oscilloscope for 50Ω input impedance.
3. Set the FREQ adjustment (on the A3A8 10 MHz Reference Oscillator Assembly) so the signal, as observed on the oscilloscope display, is not drifting.
4. Verify that in 10 seconds the display drifts less than 360°. A drift of 360° in 10 seconds corresponds to an adjustment accuracy of 1×10^{-8}. Adjustment accuracy is not specified for this instrument; the numbers shown are what can typically be obtained.

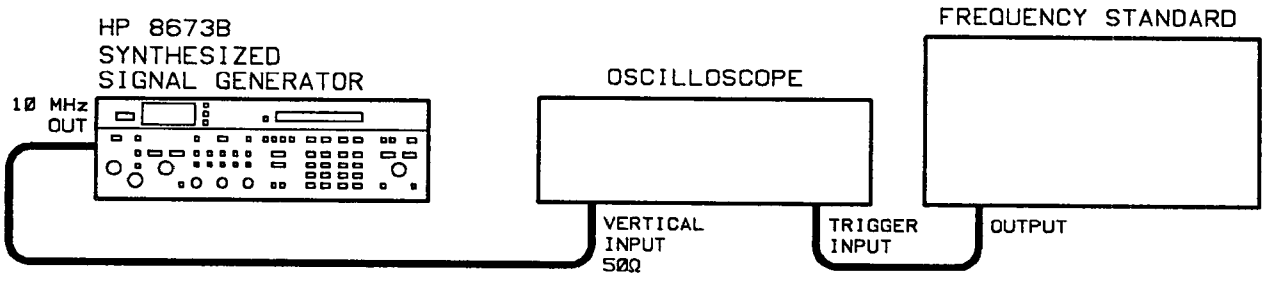


Figure 5-5. 10 MHz Reference Oscillator Adjustment Test Setup

5-10. Reference Loop (VCXO) Adjustment

Reference Service Sheet 2

Description The open loop frequency and maximum power output of the 100 MHz VCXO is centered around 100 MHz. The output is set as close as practical to 100 MHz. The 400 MHz signal is adjusted for maximum 400 MHz output and minimum spurious signal output. An attenuator is selected to provide a 400 MHz output of −10 dBm.

Equipment

Frequency Counter	HP 5343A
Spectrum Analyzer	HP 8566B
Power Supply	HP 6202B
Power Meter	HP 436A
Power Sensor	HP 8485A
Digital Voltmeter (DVM)	HP 3456A

Procedure

1. Connect the frequency counter to A3A1A2J2 in place of the termination and connect the spectrum analyzer to A3A1A2J1 in place of the gray-orange-white cable, as shown in figure 5-6.

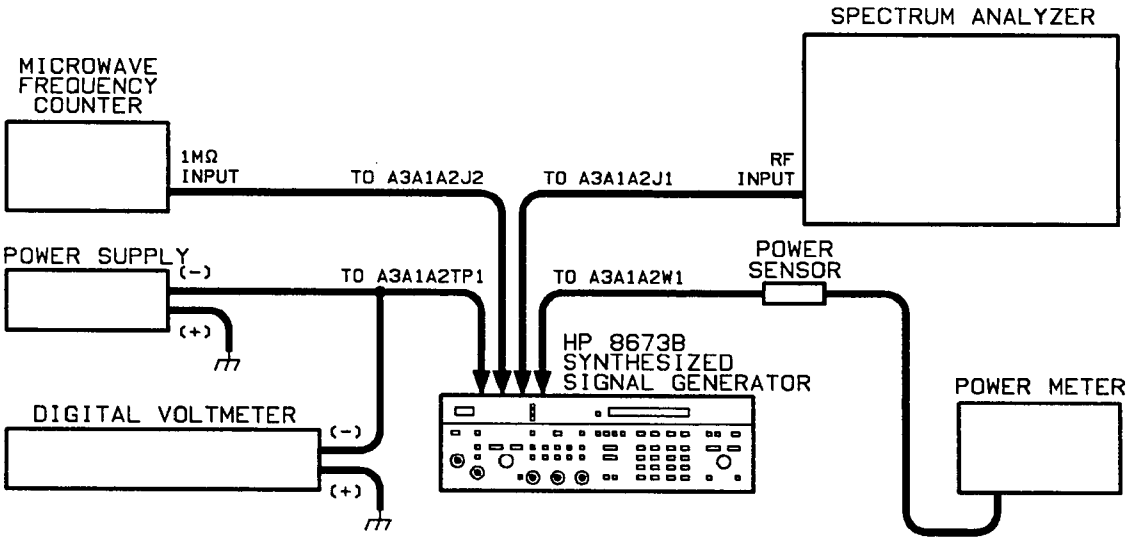


Figure 5-6. Reference Loop (VCXO) Adjustment Test Setup

2. Set the output of a low voltage power supply to −8.00 ± 0.01 Vdc. Connect the positive lead to ground and the negative lead to A3A1A2TP1, 100 MHz TUNE.
3. Tune A3A1A2C4, 100 MHz, for the maximum 100 MHz signal level as viewed on the spectrum analzyer display.
4. Tune A3A1A2C4 to increase the frequency (and decrease the amplitude) until the oscillation stops on the high frequency

side; then tune A3A1A2C4 to start the oscillation. Continue to decrease the frequency until the oscillation stops. If the VCXO does not stop oscillating at the high end, decrease the value of A3A1A2C8 by 1 pF from its present value. If it does not stop at the low end, increase the value of A3A1A2C8 by 1 pF. If a change is necessary, repeat this step. If a value of A3A1A2C8 cannot be found within the range of 0 to 12 pF, change A3A1A2L4. (The range of values for A3A1A2L4 is listed in step 7.) Then repeat this step.

5. Adjust A3A1A2C4 to obtain the maximum signal level as viewed on the spectrum analyzer display. Slowly tune to a higher frequency until the power drops by 1 dB. Record ΔF_1, that is, how far the 1 dB point is above 100 MHz. Use the frequency counter to make the measurements to 10 Hz resolution.

   _____ ΔF_1

6. Tune to a lower frequency until the power is decreased 1 dB on the other side of the peak. Record ΔF_2, that is, how far the 1 dB point is below 100 MHz.

   _____ ΔF_2

7. The VCXO centering about 100 MHz is correct if

$$0.5 \leq \frac{\Delta F_1}{\Delta F_2} \leq 2$$

   If the ratio is less than 0.5, decrease A3A1A2L4 one value to increase the center frequency. If the ratio is greater than 2, increase A3A1A2L4 one value to decrease center frequency. Refer to the following table for the inductor values.

A3A1A2L4 Inductor Values

Value	HP Part Number
0.68 μH	9140-0141
0.56 μH	9100-2256
0.47 μH	9100-2255
0.39 μH	9100-2254
0.33 μH	9100-0368
0.27 μH	9100-2252
0.22 μH	9100-2251

8. If the inductor value is changed, repeat steps 3 through 7.
9. Adjust A3A1A2C4 to obtain a VCXO output of 100 MHz $\pm$100 Hz.
10. Disconnect the spectrum analyzer from A3A1A2J1 and reconnect the gray-orange-white cable.
11. Disconnect the 400 MHz Output cable (gray-red-white cable) from A3A1A5J1 and connect the cable to the spectrum

analyzer. Set the spectrum analyzer's controls for a center frequency of 500 MHz, frequency span per division 100 MHz, and vertical sensitivity per division 10 dB log. Adjust the 400 MHz A3A1A2C3, C2, and C1 adjustments in that order to obtain the maximum 400 MHz signal with the lowest harmonic levels possible.

12. Check the various harmonics of the 100 MHz signal relative to the 400 MHz signal level. The 200 and 800 MHz harmonics should be greater than 25 dB down; 100, 300, 500, 600, 700, and 900 MHz harmonics should be greater than 35 dB down. If necessary, repeat steps 11 and 12.
13. Disconnect the spectrum analyzer from the gray-red-white cable and connect the cable to the power meter.
14. Check the power meter reading. The power should be −10 to −13 dBm. If the power is incorrect, select the values of A3A1A2R67, R68, and R69 from the table below to obtain the proper power level. The attenuation should always be 3 dB or greater.

Attenuation (dB)	Resistors (ohms)		
	R67	R68	R69
3	261	17.8	261
4	215	23.7	215
5	178	31.6	178
6	147	38.3	147
7	133	46.4	133
8	121	51.1	121
9	110	61.9	110

15. If the amount of attenuation is changed, recheck the harmonic levels.
16. Set the Signal Generator's LINE switch to STBY. Disconnect all test equipment except the DVM and reconnect all instrument cables.
17. Set the Signal Generator's LINE switch to ON. Verify that the dc voltage at A3A1A2TP1 is 8 ±1 Vdc. If the voltage is out of tolerance, repeat step 9 or check the 10 MHz Reference Adjustment.
18. Connect the frequency counter to the Signal Generator's RF OUTPUT connector.
19. Verify that the counter reading is within ±1 kHz of the Signal Generator's FREQUENCY MHz display at 2.0 and 6.6 GHz.

5-11. M/N Loop Adjustments

Reference Service Sheet 4

Description The M/N loop frequency is set to track tuning voltage across the frequency range. The output level is set and checked to ensure an adequate RF output level across the band.

Equipment

Digital Voltmeter (DVM)	HP 3456A
Frequency Counter	HP 5343A
Spectrum Analyzer	HP 8566B
Power Supply	HP 6202B

Procedure

1. On the Signal Generator, key in RCL 0 and set the frequency to 6090.000 MHz. Set the FREQ STANDARD INT/EXT on the rear panel to INT.
2. Connect the equipment as shown in figure 5-7.

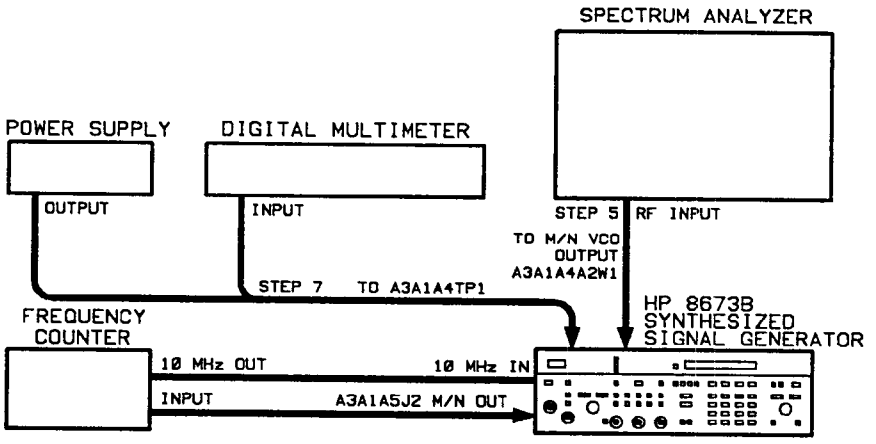


Figure 5-7. M/N Loop Adjustment Test Setup

3. Verify that the M/N output frequency is exactly 197.419 MHz ±1 kHz.

Warning **Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. The voltage could cause personal injury if contacted.**

4. Set the LINE switch to STBY and disconnect the mains power cable. Remove the A3A1A4/A5 Assembly and place it on an extender board.

5. Connect the spectrum analyzer input to the M/N VCO output A3A1A4A2W1 (white coax).

Caution

Do not apply a positive voltage to A3A1A4TP1. A positive voltage will forward bias the VCO tuning diodes and may destroy them.

6. Connect the mains power cable and set the LINE switch to ON.
7. Set the power supply for −35.0 ±0.5 Vdc. Connect the positive output of the power supply to ground and connect the negative output to the A3A1A4TP1 TUNE.

Note

The adjustment screws for A3A1A4A1C1 and C5 are held in place by locknuts. After making the adjustment, tighten the locknuts and recheck the frequency and level.

8. Release the locknut for the PWR adjustment, A3A1A4A1C5. Adjust A3A1A4A1C5 for an output level of 0 ±2 dBm. Tighten the locknut.
9. Slowly reduce the dc voltage at A3A1A4TP1, TUNE, while monitoring the VCO output power on the spectrum analyzer. The output power should be greater than −2 dBm between 395 MHz (−35 Vdc) and 355 MHz (−2.3 Vdc).
10. Remove the power supply connection to A3A1A4TP1.
11. Set the LINE switch to STBY and disconnect the mains power cable. Remove A3A1A4/A5 from the extender board and reinstall the assembly in the Signal Generator.
12. Connect the mains power cable and set the LINE switch to ON. Verify that the frequency is still at 6090.000 MHz.
13. Set FREQ ADJ A3A1A4A1C1 for a voltage level of −35.0 ±0.5 Vdc, measured at A3A1A4TP1.
14. Tune the Signal Generator frequency to 2100.000 MHz. Verify that the M/N output frequency is 177.500 MHz and the tuning voltage is −2.4 ±0.7 Vdc.
15. Disconnect all test equipment from the Signal Generator and reconnect all instrument cables.
16. Connect the frequency counter to the Signal Generator's RF OUTPUT connector.
17. Verify that the counter reading is within ±1 kHz of the Signal Generator's FREQUENCY MHz display at 2.0 and 6.6 GHz.

5-12. 20/30 MHz (LFS) Loop Divider Bias Adjustment

Reference Service Sheet 6

Description A substitute VCO feedback signal, derived from an external RF signal source, is monitored with an oscilloscope. The RF signal level is slowly reduced and the CLK BIAS ADJ is set to obtain a stable clock signal. The RF input is reduced to the minimum level that provides a stable signal.

Equipment

Oscilloscope	HP 1980B
Signal Generator	HP 8640B

Procedure

1. Set the LINE switch to STBY.
2. Remove the screws that hold the A2A5 20/30 MHz Divider Assembly in place.

Warning 

Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. The voltage could cause personal injury is contacted.

3. Remove the A2A5 Assembly, place it on an extender board, and reinstall the assembly.
4. Set the LINE switch to ON.
5. Set the controls of the signal generator in the test setup for continuous wave output of −5 dBm at 240 MHz.
6. Remove the red cable A2W1 from the 160/240 MHz INPUT, A2A5J1.
7. Connect the equipment as shown in figure 5-8.

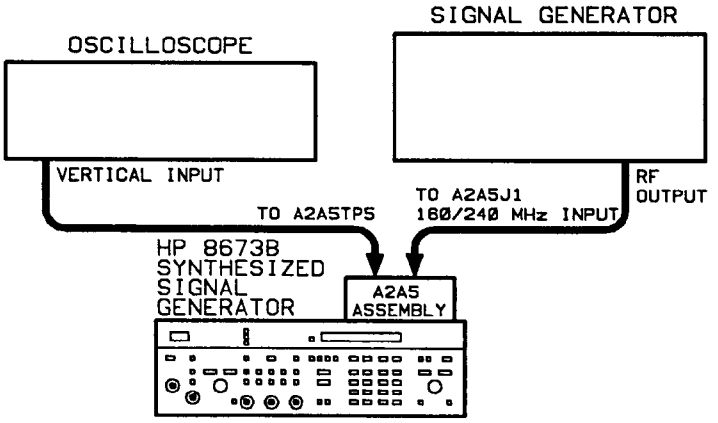


Figure 5-8. 20/30 MHz (LFS) Loop Divider Bias Adjustment Test Setup

8. Center A2A5R4 (CLK BIAS ADJ).
9. Observe the clock signal on the oscilloscope display.
10. Adjust A2A5R4 to obtain a stable clock frequency.
11. Reduce the output level of the signal generator in the test setup while readjusting A2A5R4 to obtain a stable clock at the lowest possible signal.
12. Verify that a stable clock signal is obtained with an input signal of −10 dBm or less.
13. Disconnect the test equipment. Set the Signal Generator to STBY and reinstall A2A5 in its cavity. Reconnect cable A2W1 to A2A5J1.

5-13. 160—240 MHz (20/30 MHz or LFS Loop) VCO Pretune

Reference Service Sheet 8

Description If any of the 160—240 MHz oscillator components have been replaced, the low and high frequency limits of the oscillator must be checked to ensure proper operation. The oscillator coil is moved closer to or away from the circuit board in order to set the low and high frequency limits.

Equipment Frequency Counter ..... HP 5343A

Note This procedure need be performed only if major repair has been done to the oscillator.

Procedure

1. Set the LINE switch to STBY.
2. Remove the screws that hold the A2A3 VCO assembly in place.

Warning **Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. The voltage could cause personal injury if contacted.**

3. Remove the A2A3 assembly, place it on an extender board, and reinstall the assembly.
4. Remove the green cable A3W14 that is connected to the 20/30 MHz OUTPUT A2A3J1. Connect the frequency counter output to A2A3J1.
5. Set the LINE switch to ON.
6. Set A2A3S1 (FREQ TEST SWITCH) to the TEST HIGH FREQ position. The frequency should be greater than 30.5 MHz.

7. If the frequency is less than 30.4 MHz, the oscillator coil must be moved closer to the circuit board. The oscillator cover must be removed before adjusting the coil. Unsolder the four corners of the oscillator cover before removing it. Next, unsolder the oscillator coil leads, move the coil closer to the circuit board, and resolder the coil leads. Clip excess oscillator lead length on the circuit side of board if necessary.

Note

The oscillator coil is normally mounted parallel to the circuit board with the bottom threads approximately 1.3 mm (0.050 inch) above the board.

8. Replace the oscillator cover by temporarily soldering one corner of the cover. Then recheck the frequency.
9. Set A2A3S1 to the TEST LOW FREQ position. Verify a frequency reading of less than 19.5 MHz. If necessary, set the LINE switch to STBY, remove the cover, reset the coil, replace the cover, and repeat steps 6 through 9.
10. Set A2A3S1 to the NORMAL position.
11. Replace the oscillator cover permanently by soldering all four corners. Do not solder the entire perimeter of the oscillator cover. The cover is for frequency stability, not for RFI leakage.
12. Set the LINE switch to STBY. Reinstall A2A3 in its cavity and reconnect the green cable to A2A3J1.

5-14. LFS Loop Notch Filter Adjustment

Note This procedure applies only to instruments with serial number prefixes 2704A and below. In other instruments, adjustable parts have been replaced by fixed-value components.

Reference Service Sheet 7

Description A 7985 Hz signal is passed through the 8 kHz notch filter. The adjustable components are set for the minimum signal transfer.

Equipment

Test Oscillator	HP 3335A
Frequency Counter	HP 5343A
AC Voltmeter	HP 400E
3 dB Attenuator	HP 8491A Option 003

Procedure

1. Set the LINE switch to STBY.

Warning **Because this circuit board is being placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. The voltage could cause personal injury if contacted.**

2. Remove the A2A4 20/30 Phase Detector Assembly.
3. Unsolder the input end (top) of A2A4R28 (refer to the component location diagram in chapter 8).
4. Install the circuit board on the extender board.
5. Connect the equipment as shown in figure 5-9. The leads from the 3 dB attenuator should be as short as possible. Connect the ground wire to the negative side of A2A4C4.

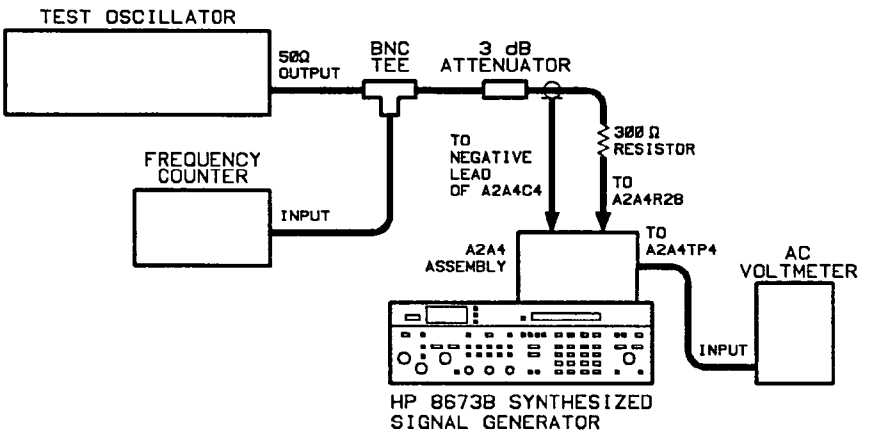


Figure 5-9. LFS Loop Notch Filter Adjustment Test Setup

6. Set the Signal Generator's LINE switch to ON.
7. Set the test oscillator's controls for 1 kHz and an AC voltmeter indication of +10 dBm.
8. Set the test oscillator as close to 7985 Hz as possible.
9. Adjust A2A4L3 and L4 to minimize the meter reading. The indication must be less than −50 dBm.
10. Detune the test oscillator away from 7985 Hz while monitoring the AC voltmeter reading. As the oscillator is detuned, the meter indication should increase.
11. Set the Signal Generator's LINE switch to STBY. Resolder A2A4R28 and reinstall the A2A4 assembly.

5-15. YTO Pretune DAC Converter Adjustment (A)

Note This procedure applies only to instruments with serial number prefixes 2747A and below where the A3A5 DAC Assembly is 08673-60015. In instruments with other serial number prefixes or where the A3A5 DAC Assembly has been replaced by 08673-60229, use the procedure that follows this one.

Reference Service Sheet 9

Description This adjustment sets the analog voltages with respect to the digital frequency tuning data. Adjustments are made at selected frequencies. Some of these frequencies are below the low frequency limit of YIG Tuned Oscillator (2 GHz). These frequencies are selected by shorting test point pair A2A9TP1 and tuning to the specified frequencies.

Equipment Digital Voltmeter (DVM) ..... HP 3456A or HP 3455A

Procedure

1. Key in [RCL] and [0] on the Signal Generator and set the frequency to 4800.000 MHz.
2. Connect the DVM ground lead to the reference ground, A3A6TP5. (The ground lead remains connected here for the remainder of this procedure.)
3. Attach the DVM test lead to A3A5TP4. Set REF ADJ (Reference Buffer output) A3A5R13 for a DVM reading of −6.50 ±0.04 Vdc.
4. Check the output voltages of the Reference Buffers at A3A5TP1 (+10.75 ±0.25 Vdc) and A3A5TP2 (+10.00 ±0.15 Vdc). Make repairs if necessary.
5. Connect the DVM to the YTO Pretune Output, A3A5TP3.
6. Short test point pair A2A9TP1 with an alligator clip.
7. Adjust 1.6 GHz A3A5R4 (not 1.61) to obtain a DVM reading of −4.80 ±0.01 Vdc.
8. Remove the clip from test point pair A2A9TP1.
9. Adjust 4.8 GHz A3A5R3 to obtain a reading of −14.400 ±0.001 Vdc.
10. Tune to 4900.000 MHz and short the test point pair A2A9TP1.
11. Adjust 1.7 GHz A3A5R29 to obtain −5.100 ±0.001 Vdc.
12. Tune to 4800.000 MHz and repeat steps 7 through 11 until step 7 is within 0.01 Vdc and steps 9 through 11 are within 0.001 Vdc of the specified value.

13. Tune to 4810.000 MHz. Verify that the clip is connected to test point pair A2A9TP1.
14. Adjust 1.61 GHz A3A5R42 (not 1.6) to obtain a DVM reading of −4.830 ±0.001 Vdc.
15. Tune to 5000.000 MHz. Adjust 1.8 GHz A3A5R24 to obtain −5.400 ±0.001 Vdc.
16. Remove the alligator clip. Tune to 2000.000 MHz.
17. Adjust 2.0 GHz A3A5R22 to obtain −6.000 ±0.001 Vdc.
18. Tune to 2400.000 MHz. Adjust 2.4 GHz A3A5R20 to obtain −7.200 ±0.001 Vdc.
19. Tune to 3200.000 MHz. Adjust 3.2 GHz A3A5R18 to obtain −9.600 ±0.001 Vdc.
20. At each frequency listed in the table, check the YTO pretune voltage at A3A5TP3 with the clip attached to the test point pair A2A9TP1.

Signal Generator Frequency	Voltage at A3A5TP3
4.801 GHz	−4.803 ±0.001 Vdc
4.802 GHz	−4.806 ±0.001 Vdc
4.804 GHz	−4.812 ±0.001 Vdc
4.808 GHz	−4.824 ±0.001 Vdc
4.810 GHz	−4.830 ±0.001 Vdc
4.820 GHz	−4.860 ±0.001 Vdc
4.840 GHz	−4.920 ±0.001 Vdc
4.880 GHz	−5.040 ±0.001 Vdc

21. Tune to 4910.000 MHz and measure the voltage at A3A5TP3. The voltage should read −5.130 ±0.002 Vdc with the clip in place.
22. Remove the clip and measure the voltage at A3A5TP3. The voltage should now read −14.730 ±0.002 Vdc. If the voltage tolerances in steps 21 and 22 are not met, repeat this procedure starting from step 5. Then if the voltage tolerances cannot be met, refer to chapter 8 for troubleshooting information.

5-16. YTO Pretune DAC Adjustment (B)

Note This procedure applies only to instruments with serial number prefixes 2823A and above, or where the A3A5 DAC Assembly is 08673-60229. In instruments with other serial number prefixes or where the A3A5 DAC Assembly has been replaced by 08673-60015, use the procedure that precedes this one.

Reference Service Sheet 9

Description This adjustment sets the analog output voltage with respect to the digital frequency tuning data.

Equipment Digital Voltmeter (DVM) ..... HP 3456A or HP 3455A

Procedure

1. Key in [RCL] and [0] on the Signal Generator and set the frequency to 6598.000 MHz.
2. Connect the DVM ground lead to the reference ground, A3A6TP5. (The ground lead remains connected here for the rest of the procedure).
3. Check the voltage of the Reference Voltage Buffer at A3A5TP4. Verify that the voltage is −6.300 ±0.063 Vdc. Make repairs if necessary.
4. Connect the DVM to the YTO Pretune Output, A3A5TP5.
5. Connect test points A3A5TP1 and A3A5TP2 together with an alligator clip.
6. Adjust A3A5R15 (OFFSET) to obtain a DVM reading of +6.00 mV ±0.02 mVdc.
7. Remove the alligator clip from testpoints A3A5TP1 and A3A5TP2.
8. Adjust A3A5R8 (GAIN) to obtain a voltage of −19.794 ±0.001 Vdc.
9. Tune the Signal Generator to 3066.000 MHz. Verify that the voltage at A3A5TP5 is −9.198 ±~~0.003~~ Vdc.
10. Tune the Signal Generator to 4049.000 MHz. Verify that the voltage at A3A5TP5 is −12.147 ±~~0.03~~ Vdc.
11. Disconnect the DVM from the Signal Generator.

5-17. YTO Driver Adjustment

Reference Service Sheet 10

Description The Signal Generator is set to the maximum and minimum frequencies in Band 1 and the YTO driver's gain and offset currents are set to give specified YTO output frequencies.

Equipment Frequency Counter ..... HP 5343A

Note All boards must be installed in the instrument before these adjustments are made.

Procedure

1. On the Signal Generator, press [RCL] and [0] and set the output level to 0 dBm.
2. Connect the frequency counter to the Signal Generator's RF OUTPUT connector.
3. Connect A3A6TP5 (GND) to A3A7TP2 (TUN VOLT) with a clip-on jumper wire. (This grounds the feedback voltage and opens the YTO phase lock loop.)
4. Tune the Signal Generator to 2000.000 MHz. Adjust A3A6R34, 2 GHz, to obtain 2000.0 ±0.1 MHz on the frequency counter. Wait until the drift is minimal (approximately 30 seconds) before making this adjustment.
5. Tune the Signal Generator to 6599.000 MHz. Adjust A3A6R25, which is labeled 6.199 GHz, to obtain 6599.0 ±0.1 MHz on the frequency counter. Wait until the drift is minimal (approximately 30 seconds) before making this adjustment.
6. Repeat steps 4 and 5 until the required tolerance is obtained at both frequencies.
7. Disconnect A3A6TP5 from A3A7TP2.
8. Verify that the counter reading is within ±1 kHz of the Signal Generator's FREQUENCY MHz display at 2.0 and 6.6 GHz.

5-18. YTO Loop Sampler Adjustments

Reference Service Sheet 11

Description The sampler is driven by a sweep oscillator and the dc output is monitored with an oscilloscope. The sampler driver circuit is adjusted for maximum amplitude and flatness over the range of the M/N loop. The sampler's IF preamplifier is adjusted for correct level and the frequency response is checked.

Equipment

Oscilloscope	HP 1980B
Sweep Oscillator	HP 86222B/8620C
Spectrum Analyzer	HP 8566B
Frequency Counter	HP 5343A
50Ω Termination	HP 11593A

Note An HP 8485A Power Sensor can be used in place of the 50Ω termination.

Procedure

1. Set the Signal Generator's LINE switch to STBY and disconnect the mains power cable.
2. Place the A3A9 Assembly into the service position. (Refer to Service Sheet B for disassembly procedures.)
3. Remove the right side cover of A3A9.
4. (For *2703A and below.*) Connect a 50Ω termination to the A3A9A1 Directional Coupler output, which normally connects to A1W1.

   (For *2704A and above.*) Connect 50Ω termination to A3A9A8U1J5, the preamplifier output which connects to A1W11.
5. Set the sweep oscillator's controls for a leveled output level of 0 dBm, center frequency range of 187.5 ±1.0 MHz (measured by frequency counter) and a sweep range of 200 MHz ±100 MHz.
6. Connect the equipment as shown in figure 5-10. Connect the Signal Generator's mains power cord and set the LINE switch to ON.

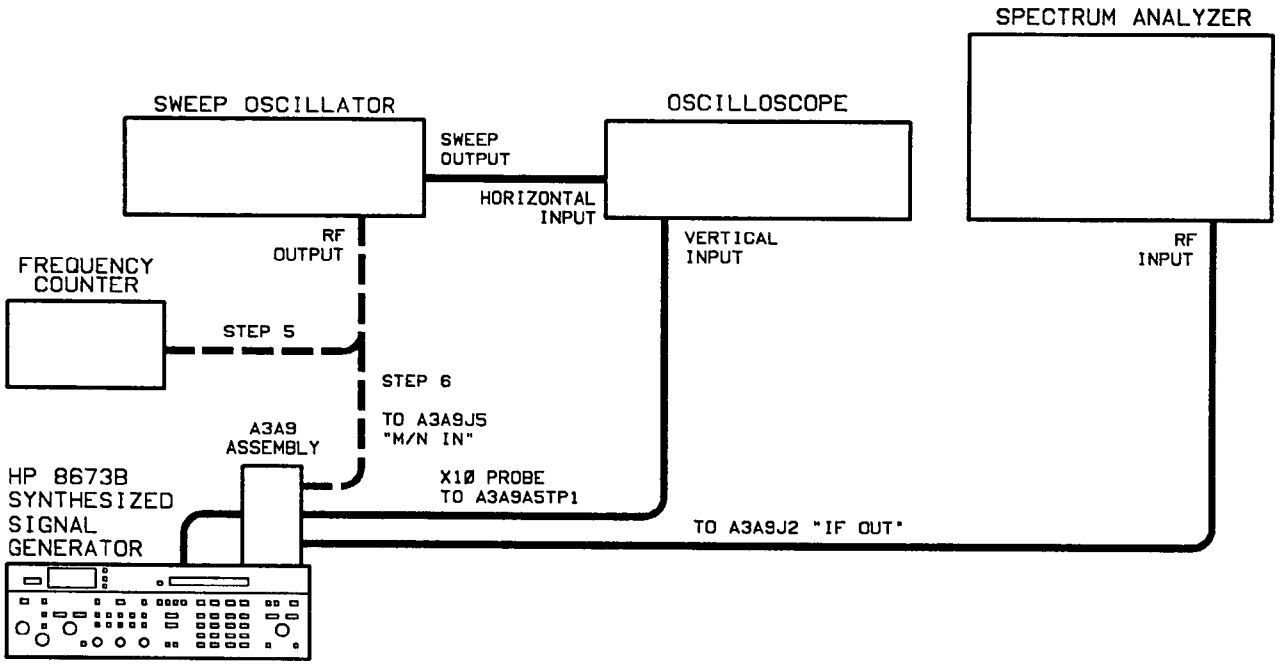


Figure 5-10. YTO Loop Sampler Adjustment Test Setup

7. Connect the sweep oscillator's RF output to the M/N LOOP SIGNAL connector, A3A9J5, in place of the white-orange cable.
8. Adjust A3A9A5C1 and C2 (with an insulated adjustment tool) to get an oscilloscope display similar to figure 5-11. Tune for maximum negative voltage and flatness over the center two divisions. The minimum change from the reference level to the maximum negative voltage should be 0.4 volts. (*Troubleshooting Note:* If the minimum change is out of tolerance, A3A9A5Q3 and Q8 may have low gain, the YTO feedback signal feeding the RF port of the mixer may be low, or the sampler may be bad.)

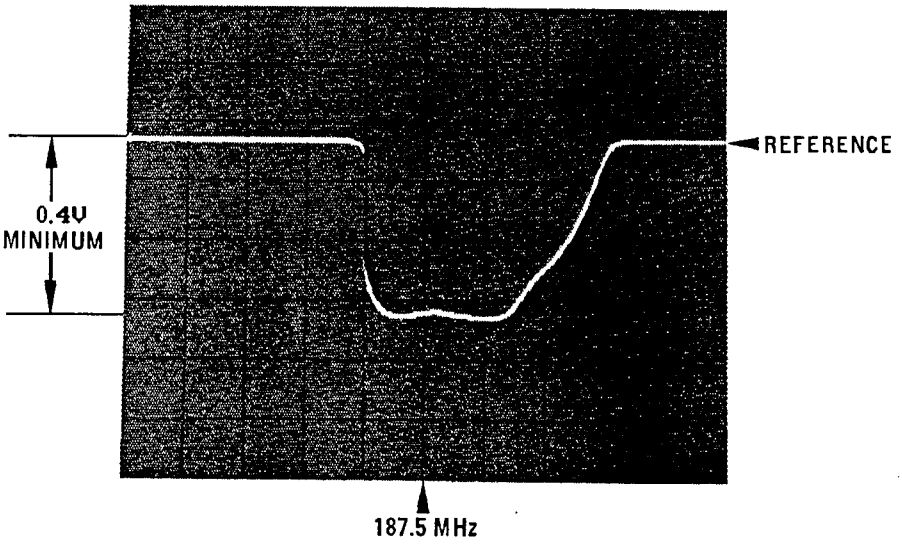


Figure 5-11. Sampler Frequency Response

9. Short A3A7TP2 to ground to open the YTO phase lock loop.
10. Tune to 2100 MHz and disconnect the gray cable from the phase detector output, A3A9J6. Remove the oscilloscope's probe from A3A9A5TP1.
11. Connect the spectrum analyzer's input directly to IF OUT, A3A9J2.
12. Set the sweep oscillator's controls for a center frequency of 177.5 ±1.0 MHz and set the sweep width to 10 MHz.
13. Connect the sweep oscillator's output to the M/N LOOP SIGNAL input A3A9J5.
14. Set the spectrum analyzer's controls for a 0 to 100 MHz frequency span. Set the other controls to display the swept IF signal. The fundamental, second and third harmonics should be visible at 30, 60, and 90 MHz. Tune the sweep oscillator slightly to align the signals on the display.

15. (For serial number prefix *2635A and below*, where A3A9A6 is 15 dB.) Adjust the A3A9A5R1, IF GAIN, so that the displayed IF signal at 30 MHz is +2 ±1 dBm. If the level is too low, or if the levels in the following step are not within the levels given, select a new value for C22. Values should be within the range of 120 to 150 pF, and 130 is usually the best value.

    (For serial number prefix *2640A and above*, where A3A9A6 is 18 dB.) Adjust A3A9A5R1, IF Gain, so that the displayed IF signal at 30 MHz is 0 ±1 dBm.

    If the level is too low, or if the levels in the following step are incorrect, select a new value for C22. Values should be within the range of 120 to 150 pF, and 130 is usually the best value.

16. Slowly tune the sweep oscillator's center frequency from 174 to 181 MHz and observe the fundamental's output level. Verify that the allowable level variation is not exceeded or that the power does not drop below the stated level over the frequency range:

    a. from 6 to 20 MHz, −3 dBm minimum,
    b. from 20 to 30 MHz, +2 to +6 dBm,
    c. from 30 to 70 MHz, −10 dBm minimum.

17. Return the Signal Generator to normal operation as follows:

    a. Disconnect all test equipment.
    b. Reconnect the gray cable to A3A9J6 and the white-orange cable to A3A9J3.
    c. Reverse the instructions in step 4, 3, 2, and 1.

18. Connect the frequency counter to the Signal Generator's RF OUTPUT connector.

19. Verify that the counter reading is within ±1 kHz of the Signal Generator's FREQUENCY MHz display at 2.0 and 6.6 GHz.

5-19. YTO Loop Offset and FM Overmodulation Adjustments

Reference Service Sheet 12

Description To operate the YTO loop phase detector in the linear region, the loop offset adjustment is set so that the foldover at the peak of the phase detector output signal just begins. To set the FM overmodulation threshold, the FM overmodulation adjustment is set to a position that just lights the front panel FM OVERMOD status annunciator.

Equipment

Oscilloscope	HP 1980B
Spectrum Analyzer	HP 8566B
Test Oscillator	HP 3335A
Digital Voltmeter (DVM)	HP 3456A

Procedure

1. Set the Signal Generator's LINE switch to STBY and disconnect the mains power cord.
2. Place the A3A9 Assembly into the test position.
3. Remove the A3A9A4 cover.
4. Connect the equipment as shown in figure 5-12. Connect the Signal Generator's mains power cord and set the LINE switch to ON.

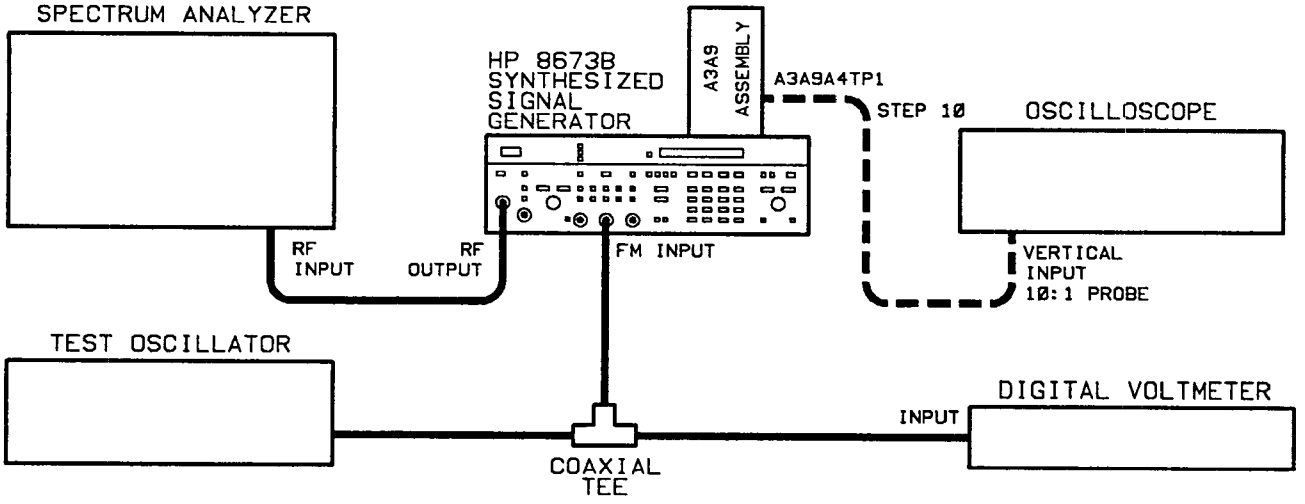


Figure 5-12. YTO Loop Offset and FM Overmodulation Adjustment Test Setup

5. On the Signal Generator, key in [RCL] and [0] and then set FM DEVIATION to 10 MHz.
6. Tune the test oscillator to 100 kHz.

7. Adjust the spectrum analyzer's controls to display the carrier and the 100 kHz sidebands.
8. Adjust the test oscillator's output level for the first carrier null as observed on the spectrum analyzer's display. Record the test oscillator's output level as measured with the voltmeter.

   _____Vrms (V_1)
9. Divide the measured value by 2.4. Readjust the test oscillator's output level to the computed level, V_2.

   $\frac{V_1}{2.4}$ _____(V_2)
10. Connect the oscilloscope to A3A9A4TP1 through a divide-by-ten probe. Adjust the oscilloscope's controls to view the 100 kHz signal.
11. Set the YTO loop offset adjustment A3A9A4R53, OFST, so the sinusoidal waveform just begins to fold over. See figure 5-13.

Note

There may be two settings of A3A9A4R53 that give the proper offset. Use the position closer to the center of the adjustment range.

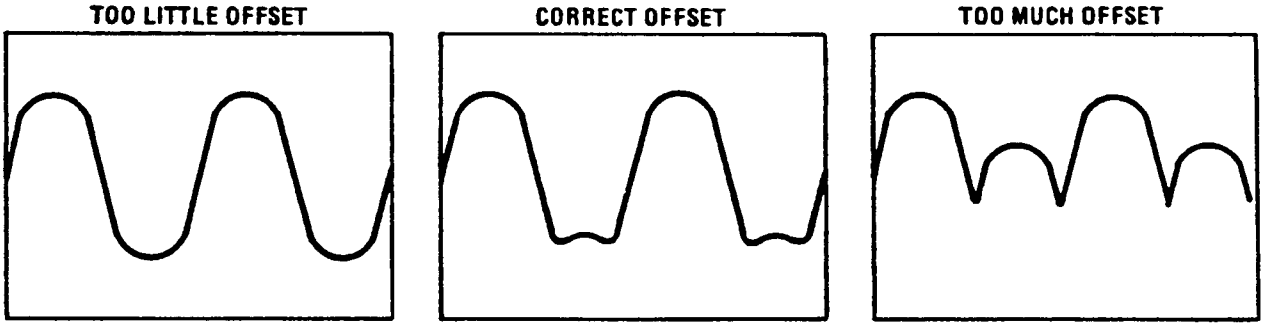


Figure 5-13. YTO Loop Offset Adjustment Waveforms

12. Disconnect the oscilloscope's probe.
13. Adjust the test oscillator's output level for the second carrier null as observed on the spectrum analyzer's display. Record the test oscillator's output level.

    _____Vrms (V_3)

14. Multiply the measured value by 1.18. Readjust the test oscillator's output level to the computed level, V_4.

    $V_3 \times 1.18$ _____(V_4)

15. Set the FM overmodulation adjustment A3A9A4R30, OMOD, to the full clockwise position. Slowly rotate the adjustment counterclockwise until the front panel FM OVERMOD status annunciator just turns on.
16. Return the Signal Generator to normal operation by reversing the instructions in steps 4, 3, 2, and 1.

5-20. YTO Loop Phase Detector Adjustments

Reference Service Sheet 12

Description The gain crossover frequency of the YTO phase lock loop is measured and adjusted using a low frequency spectrum analyzer and tracking generator.

Equipment

Spectrum Analyzer (with tracking generator)	HP 8556A/8552B/141T
AC Current Probe	HP 1110B
Special Interconnect Cable	(See figure 1-2)

Procedure

1. Set the Signal Generator's RF switch to ON.
2. Connect the equipment as shown in figure 5-14. The special interconnect cable is inserted between A3W16 (gray cable) and A3A9J6 (YTO TUNE 1).

Note When clipping the current probe around the special cable's center conductor, do not allow the metal surface to come in contact with the center conductor connection of the SMA connectors.

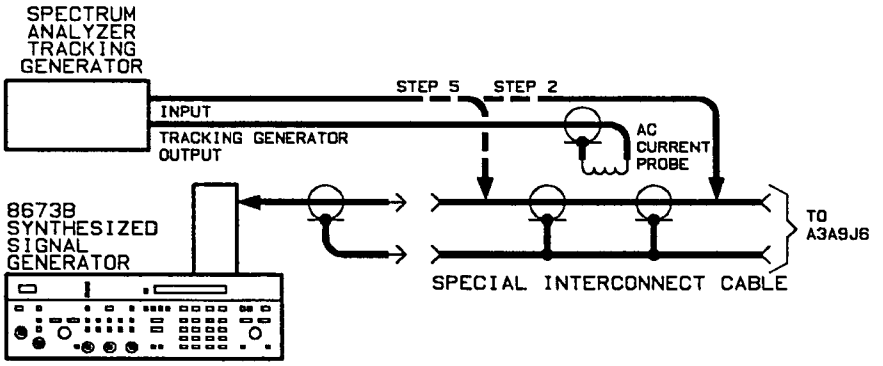


Figure 5-14. YTO Loop Phase Detector Adjustment Test Setup

3. Set the spectrum analyzer to scan from 0 to 50 kHz, vertical sensitivity per division to 2 dB, scan mode to single, and set the display's variable persistence to maximum.
4. Press the single sweep key on the spectrum analyzer.
5. Move the spectrum analyzer's input to the cable side (A3W16) of the special cable.

6. Press the single sweep key. Check that the gain-crossover frequency is 20 ±2 kHz. If the gain-crossover frequency is not correct, A3A9A4R20 must be changed to set the correct frequency; otherwise, this adjustment is complete. See figure 5-15.

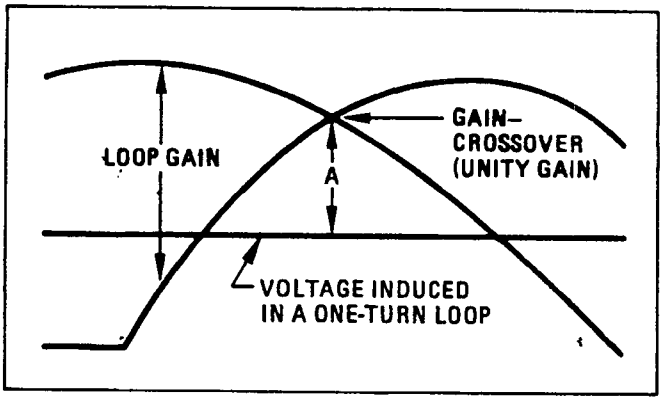


Figure 5-15.
Spectrum Analyzer Display of Phase Locked Loop Gain

7. If A3A9A4R20 must be changed, perform the following steps:
   a. Set the LINE switch to STANDBY.
   b. Disconnect the mains power cord.
   c. Place the A3A9 Assembly in the test position. (Refer to chapter 8, disassembly procedures.)
   d. Remove the A3A9A4 cover.
   e. Select the value of R20 using the following formula:

$$R2 = R1\left(\frac{F1}{20\ kHz}\right)$$

where

R2 = required value for R20
R1 = present value of R20
F1 = measured frequency

for example, if R1 = 619Ω and F1 = 25 kHz then

$$R2 = 619\left(\frac{25\ kHz}{20\ kHz}\right)$$

R2 = 773Ω or 750Ω (closest value)

8. Install R20, reconnect the mains power cord and set the LINE switch to ON. Recheck the gain-crossover frequency.

Note

The other loop parameters, phase margin and loop gain, may be checked if the loop does not operate correctly. Loop gain is checked at 1 kHz and should be approximately 40 dB. Phase margin is checked by disconnecting the input to the ac probe, shorting the input, and pressing the SINGLE (•) sweep key. Phase margin should be approximately 45° and is calculated by the following expression:

$$\theta = \cos^{-1}\left(1 - \frac{10^{\left(\frac{A}{10}\right)}}{2}\right)$$

where θ = phase margin and A = ratio (in dB) of the induced voltage to the gain-crossover. (Gain-crossover is the reference, therefore the ratio is negative.)

9. Return the Signal Generator to normal operation as follows:
   a. Set the LINE switch to STBY.
   b. Disconnect the mains power cord.
   c. Install the A3A9A4 cover.
   d. Return the A3A9 Assembly to its normal position.
   e. Install the top and bottom covers.

5-21. FM Driver Adjustments

Reference Service Sheet 13

Description The dc offset of the FM integrator amplifier is set as close to zero volts as possible. Any FM signal present on the error signal line of the YTO phase lock loop is nulled at both high and low FM driver sensitivities.

Equipment

Oscilloscope	HP 1980B
Test Oscillator	HP 3335A

Procedure

1. Set FM DEVIATION to 0.1 MHz.
2. Connect the oscilloscope to A3A7TP3.

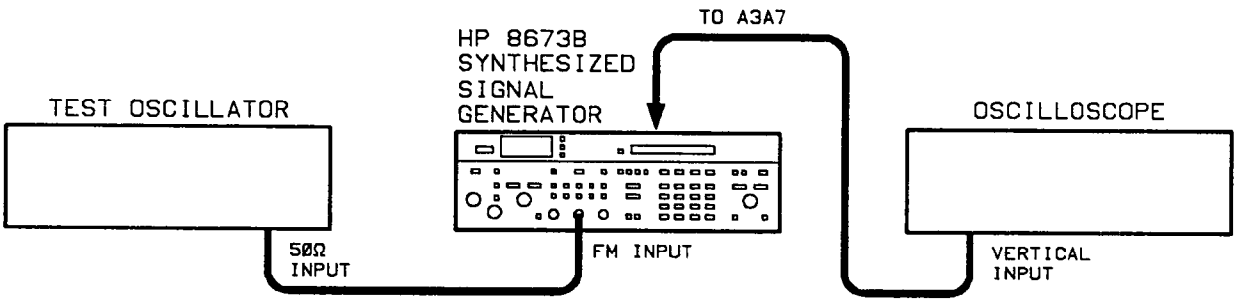


Figure 5-16. FM Driver Adjustment Test Setup

3. Set A3A7R28, OFST (offset adjust), for 0.0 ±0.1 Vdc.
4. Set FM DEVIATION to 10 MHz.
5. Verify a voltage level of 0 ±2 Vdc at A3A7TP3.
6. If the RF switch is off, set it to ON.
7. Set the test oscillator controls for an output of 1.5 mVrms at 5 kHz.
8. Connect the oscilloscope to A3A7TP2; connect the test oscillator output to the FM IN connector. The signal displayed by the oscilloscope will generally be less than 20 mV peak-to-peak.
9. Set A3A7R40, GAIN, to null any FM signal present at A3A7TP2.
10. Set FM DEVIATION to 0.1 MHz and test oscillator output level to 0.15 Vrms.
11. Set A3A7R46, −40 GN (−40 Gain), to null any FM signal present at A3A7TP2.

5-22. FM Accuracy and Overmodulation Adjustments

Reference Service Sheet 21

Description The FM gain is set. The modulation drive is set to a level that causes FM deviation to equal a full scale meter reading. The meter drive adjustment is set accordingly. The modulation drive is then set to a level that causes overmodulation. The FM overmodulation adjustment is set to a position that just lights the front panel FM OVERMOD status annunicator.

Equipment

Digital Voltmeter	HP 3456A
Modulation Analyzer	HP 8902A
Test Oscillator	HP 3335A
Preamplifier	HP 8477D
Mixer	RHG DMS1-26
Local Oscillator	HP 8340A

Procedure

1. Connect the equipment as shown in figure 5-17.

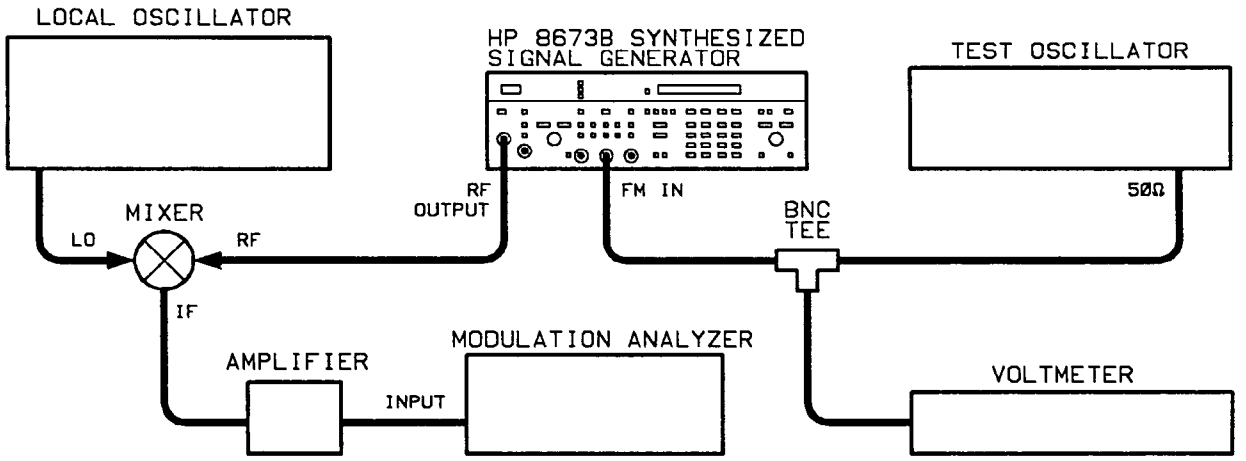


Figure 5-17. FM Accuracy and Overmodulation Adjustment Test Setup

2. On the Signal Generator press [RCL] and [0]. Set the instrument to the following conditions:

Frequency	15 GHz
Output Level	−20 dBm
Meter Scale	FM
FM Deviation	0.1 MHz

3. Set the local oscillator's frequency to 15.1 GHz at an output level of +7 dBm, with all modulation off.
4. Set the test oscillator's amplitude for a voltmeter reading of 0.7071 Vrms.
5. Adjust FM GAIN (A1A6R35) on the A1A6 Meter Assembly for a modulation analyzer reading of 100.0 ±0.1 kHz.
6. Adjust FM MTR (A1A6R70) for a full scale reading of 100 kHz on the Signal Generator's front panel meter.
7. Set the Signal Generator to the 0.03 MHz FM deviation range.
8. Verify that the Signal Generator's front panel meter agrees with the modulation analyzer (approximately 30 kHz) to within 4 kHz.
9. Set the test oscillator's amplitude for a voltmeter reading of 0.7425 Vrms.
10. Set FM OMOD (A1A6R54) to the extreme clockwise position.

Note

Adjust FM OMOD as accurately as possible to avoid turning on the front panel FM OVERMOD status annunciator erroneously.

11. Adjust FM OMOD (A1A6R54) in a counterclockwise direction until the FM OVERMOD status annunciator on the Signal Generator's front panel just turns on.

5-23. SRD Bias Adjustment—Manual Procedure

Note

This procedure applies only to instruments with serial number prefixes 2629A, 2626A, 2608A, 2536A and below. In other instruments, adjustments have been replaced by data in the SRD Bias Board ROM A1A8U13. Data is unique for each YTM.

This is a manual procedure. An alternate SRD Bias procedure follows this one. It is an automated procedure which should be used if an HP-85 computer and 11726-10002 software are available.

Reference

Service Sheet 19

Description

The YIG Tuned Multiplier (YTM) multiplies the fundamental frequency of the YIG Tuned Oscillator (2.0 to 6.6 GHz). Multiplication is achieved via the step recovery diode (SRD) inside the YTM. The bias voltages on the SRD control the signal levels of the harmonics generated. Misadjusted bias voltages result in low harmonic levels, and thus low power out in the harmonic frequency bands (6.6—26 GHz). Extreme misadjustment can cause YTM spurious oscillations and poor pulse shape in pulse modulation mode.

The SRD bias adjustment procedure consists of setting both the source and gate bias voltages of the SRD bias FET. There are a maximum of four source voltage adjustments; one for each frequency band. There are a maximum of six gate voltage adjustments; two for each of the harmonic bands. The adjustment is performed as follows:

a. The bias voltages are listed on a label located inside the Signal Generator near the A2A5 assembly on the A2 Controller chassis. Data on the label is similar to that shown in figure 5-18. The label has unique calibration voltages for source and gate bias for the YTM with the indicated serial number. Notice that the calibration label has one source voltage and two gate voltages for each band.

b. Source voltages for each band are adjusted. Band 1 (2.0 to 6.6 GHz) source voltage is always set to 3.80 ±0.01 Vdc. Band 2 (6.6 to 12.3 GHz), band 3 (12.3 to 18.6 GHz), and band 4 (18.6 to 26.0 GHz) source voltages are set to within ±0.001 Vdc of the voltage listed on the YTM label.

c. Gate bias voltages are adjusted for bands 2, 3, and band 4. Gate bias voltages are adjusted at the high end and the low end of each band. Voltages are adjusted to be within ±0.005 Vdc of the voltages listed on the YTM label.

Equipment Digital Voltmeter (DVM) ..... HP 3456A or HP 3455A

Procedure

1. On the Signal Generator:
   a. Set LINE switch to STBY.
   b. Remove A1 Assembly Cover at the left front of the Signal Generator.
2. Connect digital voltmeter to A1A8TP1 (source).
3. On the Signal Generator:
   a. Set LINE switch to ON.
   b. Press the [6] key and the service switch A2A2S1. This stores the start and stop frequencies of bands 1 through 4 in registers 1 through 4 respectively. The start and stop frequencies are near the low and high ends of each band.
   c. Press [RCL] and [1] keys. This places the Signal Generator in manual sweep mode with the frequency near the low end of band 1.
   d. Adjust A1A8R84 (B1 Source) to −3.80 ±0.01 Vdc.
4. Locate SRD calibration label located directly behind A2A5 20/30 Divider assembly. Sample label is shown. (See figure 5-18.)

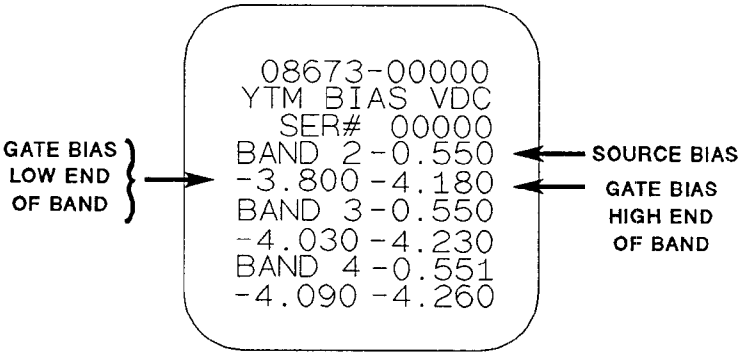


Figure 5-18. YTM Bias Label

5. On the Signal Generator:
   a. Press [RCL] and [2] keys.
   b. Adjust A1A8R85 (B2 Source) equal to Band 2 source voltage on YTM calibration label ±0.001 Vdc.
   c. Press [RCL] and [3] keys.
   d. Adjust A1A8R86 (B3 Source) equal to Band 3 source voltage on YTM calibration label ±0.001 Vdc.
6. Connect digital voltmeter to A1A8TP2.
7. On the Signal Generator:

a. Press [RCL] and [2] keys.

b. Tune frequency to 12299.902 MHz (near the high end of Band 1).

c. Adjust A1A8R31 (B2 HI) equal to Band 2 HI gate voltage ±0.005 Vdc, located on right side of YTM calibration label.

d. Tune frequency to 6600.002 MHz (near the low end of Band 2).

e. Adjust A1A8R61 (B2 LO) equal to Band 2 LO gate voltage ±0.005 Vdc, located on left side of YTM calibration label.

8. Repeat adjustments in step 7 until voltages are within ±0.005 Vdc.

9. On the Signal Generator:

a. Press [RCL] and [3] keys.

b. Tune frequency to 18599.901 MHz.

c. Adjust A1A8R32 (B3 HI) equal to Band 3 HI gate voltage ±0.005 Vdc, located on right side of YTM calibration label.

d. Tune frequency to 12300.003 MHz.

e. Adjust A1A8R62 (B3 LO) equal to Band 3 LO gate voltage ±0.005 Vdc, located on left side of YTM calibration label.

10. Repeat adjustments in step 9 until voltages are within ±0.005 Vdc.

11. On the Signal Generator:

a. Press [RCL] and [4] keys.

b. Tune frequency to 25999.904 MHz.

c. Adjust A1A8R33 (B4 HI) equal to Band 4 HI gate voltage ±0.005 Vdc, located on right side of YTM calibration label.

d. Tune frequency to 18600.004 MHz.

e. Adjust A1A8R63 (B4 LO) equal to Band 3 LO gate voltage ±0.005 Vdc, located on left side of YTM calibration label.

12. Repeat adjustments in step 11 until voltages are within ±0.005 Vdc.

5-24. SRD Bias Adjustment—Automated Procedure

Note

This procedure applies only to instruments with serial number prefixes 2629A, 2626A, 2608A, 2536A and below. In other instruments, adjustments have been replaced by data in the SRD Bias Board ROM A1A8U13. Data is unique for each YTM.

This is an automated procedure. An alternate SRD Bias procedure precedes this one. It is a manual procedure which should be used if an HP-85 computer and 11726-10002 software are not available.

Reference

Service Sheet 19

Description

Automated Adjustment. The YIG Tuned Multiplier (YTM) multiplies the fundamental frequency of the YIG Tuned Oscillator (2.0 to 6.6 GHz). Multiplication is achieved via the step recovery diode (SRD) inside the YTM. The bias voltages on the SRD control the signal levels of the harmonics generated. Misadjusted bias voltages result in low harmonic levels, and thus low power out in the harmonic frequency bands (6.6—26 GHz). Extreme misadjustment can cause YTM spurious oscillations and poor pulse shape in pulse modulation mode.

The SRD bias adjustment procedure consists of setting both the source and gate bias voltages of the SRD bias FET. There are a maximum of four source voltage adjustments; one for each frequency band. There are a maximum of six gate voltage adjustments; two for each of the harmonic bands. The adjustment is performed as follows:

a. Source and gate dc bias voltage values are entered into the controller as shown in figure 5-19. The bias voltages are listed on the YTM label located inside the Signal Generator near the A2A5 assembly on the A2 Controller chassis. The question mark (?) is used as a prompt to indicate when and where data should be entered.

b. Source voltages for each band are adjusted. Band 1 (2.0 to 6.6 GHz) source voltage is always set to 3.80 ±0.01 Vdc. Band 2 (6.6 to 12.3 GHz), band 3 (12.3 to 18.6 GHz), and band 4 (18.6 to 26.0 GHz) source voltages are set to within ±0.001 Vdc of the voltage listed on the YTM label. After the source voltages are adjusted, the results are printed.

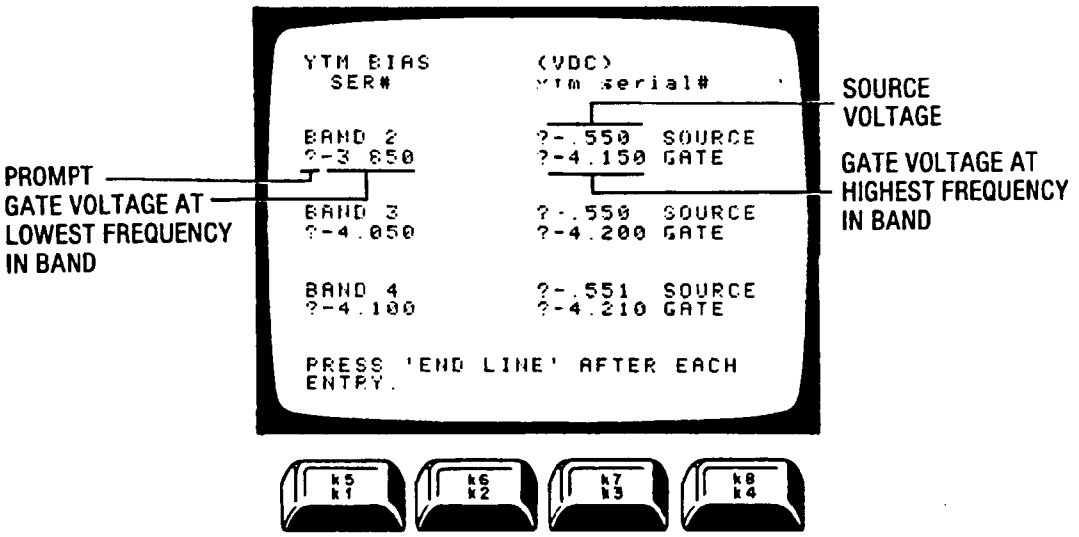


Figure 5-19. Format for Entering SRD Bias Voltages

c. Gate bias voltages are adjusted for bands 2, 3, and band 4. Six rectangles are drawn on the controller screen, each one representing an adjustment. The center of the rectangle represents the entered gate voltage. The flashing "X", which represents the error from the entered gate voltage, is adjusted to within one-half division of the rectangle center. See figure 5-20.

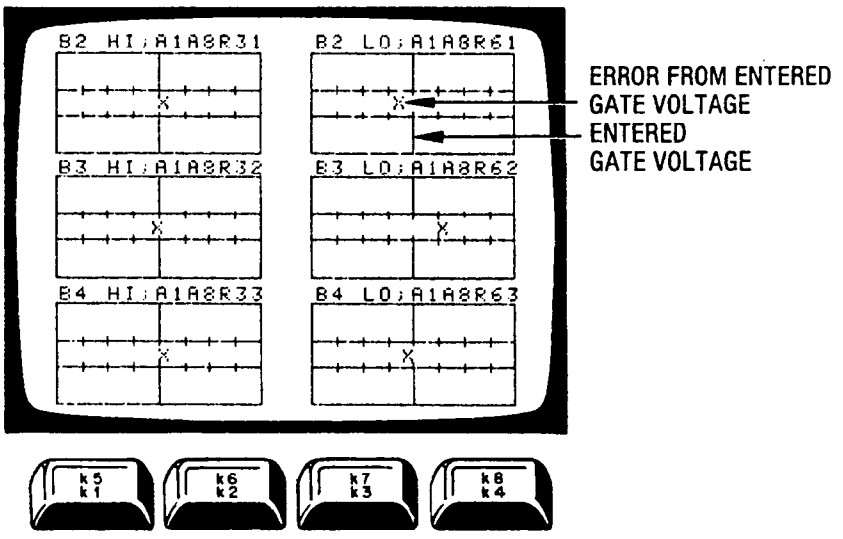


Figure 5-20. Gate Voltage Adjustment

After the gate voltages are adjusted, the results are printed.

Note

If a gate voltage cannot be adjusted, check the controller printout of the entered SRD bias voltages and verify that the gate voltages were entered correctly. The center of the rectangle represents the gate voltage that was entered into the controller.

Gate voltages can be checked manually by measuring dc voltage at the lowest and highest frequency of each band. These voltages should correspond to the voltages on the YTM label.

Equipment

Digital Voltmeter (DVM)	HP 3456A
HP-IB Controller with	HP 85B/00085-15002/
Optional ROM	00085-15004/00085-15005
Test Cassette	HP 11726-10002

Procedure

1. Connect the Signal Generator and voltmeter to the controller via the HP Interface Bus as shown in figure 5-21.

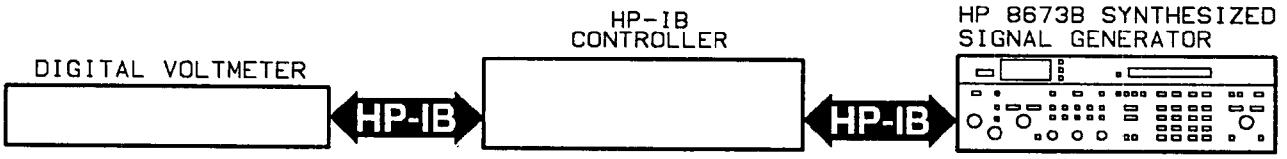


Figure 5-21. SRD Bias Adjustment Test Setup

2. Ensure that the Signal Generator's HP-IB address is set to 19 and that the voltmeter's HP-IB address is set to 22.
3. Load and run the test program "Exec", if the Main Menu, figure 5-2, is not presently displayed. Instructions can be found in the paragraph titled "Automated Adjustment Procedures" in this section.
4. After the program is loaded and the main menu is displayed, press [k1] to run the SRD bias adjustment program.
5. Instructions for the remainder of the procedure will be displayed on the controller screen. The program will indicate when the SRD bias adjustment has been completed.

5-25. YTM Tune—Manual Procedure

Note 

This is a manual procedure. An alternate YTM Tune procedure follows this one. It is an automated procedure which should be used if an HP-85 computer and 11726-10002 software are available.

Reference Service Sheets 14, 16, 17, 20, and 22

Description The YIG-Tuned Multiplier (YTM) is swept approximately 200 MHz above and below the Signal Generator's set RF output frequency. The YTM pass band is adjusted so that its center frequency tracks the desired YTM output frequency over its entire range.

If the YTM tuning is out of adjustment, the bandpass filter either attenuates the YIG Tuned Oscillator (YTO) signal more than normal, resulting in low output power, or insufficiently filters signal harmonics. The YTM tune adjustment should be performed whenever the YTM or associated circuitry has been repaired or whenever low output power or high harmonics exist.

The YTM tune adjustment is performed as follows:

a. Preliminary adjustments are made. These include setting the +12.4 voltage reference, setting the peaker DAC input bits low, adjusting "INT OS", disabling the power clamp circuit, and setting the front panel CAL control.

b. The oscilloscope display is calibrated to monitor the detected output of the YTM.

c. YTM tuning is adjusted by centering the YTM response peak on the oscilloscope display (see figure 5-22). Adjustments are made at the highest and lowest frequency in each band. In addition, band 3 and 4 are adjusted at "breakpoints" to correct for tracking deviation at the higher frequencies.

d. Each band is swept to check the YTM tracking response of its passband after adjustment.

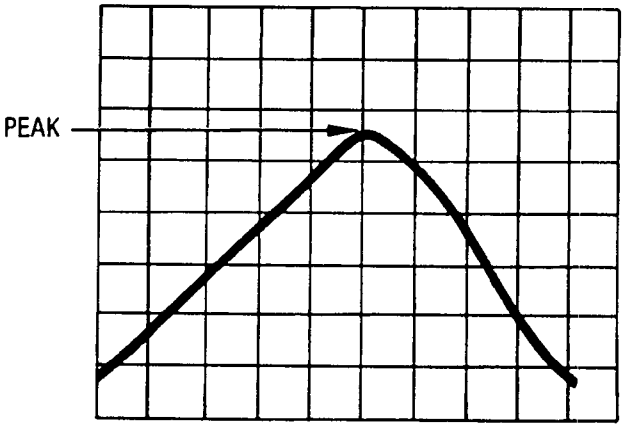


Figure 5-22. Optimum YTM Response

Equipment

Digital Voltmeter (DVM)	HP 3456A or HP 3455A
Oscilloscope	HP 1980B/19860A
50Ω Termination	HP 11593A
MPU Test Board (p/n 11726-60001) P/O Support Kit	HP 11726A

Procedure

1. On the Signal Generator:
   a. Set LINE switch to STBY.
   b. Remove A1 access cover in the left front of the Signal Generator.
   c. Set LINE switch to ON.
2. Connect digital voltmeter negative to A1A7TP1 and positive to A1A7TP6.
   a. Adjust A1A7R8 for +12.400 ±0.005 Vdc.
3. On oscilloscope:
   a. Connect ground lead to A1A5TP5.
   b. Connect probe to A1A5TP4.
   c. Set vertical sensitivity to 1V/DIV.
   d. Set DC Coupling to ON.
   e. Set horizontal time base to 5 msec/DIV.
4. On the Signal Generator:
   a. Set LINE switch to STBY.
   b. Remove A2 access cover in the right rear of the Signal Generator.
   c. Install MPU Test Connector on top of A2A8 Assembly.
   d. Install jumper between A2A8TP5 and adjacent A2A8TPGND.
   e. Set A2A8S1 to 5.
   f. Set LINE switch to ON.
   g. Verify that FREQUENCY MHz display indicates "05-1".
   h. Disconnect jumper between A2A8TP5 and adjacent A2A8TPGND.

i. Adjust A1A5R60 for an absolute negative peak on sawtooth ramp of −4.30 ±0.1 Vdc, referenced to ground.
j. Set LINE switch to STBY.
k. Remove MPU Test connector on A2A8 Assembly.
l. Set A2A8S1 to 1.

5. Connect digital voltmeter to A1A2C6, (2708A and below), to A1A2TP6 (2729A and above).
6. On Signal Generator:
   a. Set LINE switch to ON.
   b. Press [RCL] and [0] keys.
   c. Turn RF OUTPUT ON/OFF to OFF.
   d. (*2708A and below*): Adjust A1A2A2R12 for −0.920 ±0.1 Vdc.
      (*2729A and above*): Adjust A1A2R88 for −0.920 ±0.1 Vdc.
7. Disconnect digital voltmeter.
8. On Signal Generator:
   a. Rotate A1A3R51 fully counterclockwise to disable the power clamp circuit.
   b. Rotate EXT ALC IN CAL adjustment (front panel) fully clockwise.
9. On oscilloscope:
   a. Using 10:1 probe, connect channel A input to A1A2C6 (*2708A and below*); to A1A2TP6 (*2729A and above*).
   b. Using 10:1 probe, connect channel B input to A1A5TP4.
   c. Set vertical sensitivity channel A to 0.01 V/DIV.
   d. Set horizontal display to X-Y (A vs. B).
10. On the Signal Generator:
    a. Press [RCL], [0], and [6] keys.
    b. Press service switch A2A2S1.
    c. Set output level to −70 dBm.
    d. Press Pulse NORM [•] key.
    e. Press [3] key.
    f. Press service switch A2A2S1.
11. Use oscilloscope channel B VOLTS/DIV CAL control and horizontal position control to adjust for a full 10 division horizontal sweep across display.

Note This sets YIG Tuned Multiplier "auto-peak" sweep sensitivity to approximately 40 MHz/DIV as measured on oscilloscope.

12. On Signal Generator:
    a. Press [4] key.
    b. Press service switch A2A2S1.
13. Using Oscilloscope horizontal position control, center dot on oscilloscope display. Do not adjust vertical gain controls to center dot.

Caution Be careful not to allow the cable connector to short against any printed wiring board traces.

14. Disconnect A1W7 from A1AT3.

Note If amplitude of displayed signal decreases at any time during adjustment, press PULSE OFF, PULSE NORM ⊙, then 3 keys, then service switch A2A2S1 before proceeding with adjustment.

15. On the Signal Generator:
    a. Press PULSE OFF then PULSE NORM ⊙ keys.
    b. Press 3 key.
    c. Press service switch A2A2S1.
    d. Tune frequency down to 2000.000 MHz.
    e. Adjust A1A7R69 (B1 LO) to center YIG Tuned Multiplier passband response horizontally on oscilloscope display (see figure 5-22).
    f. Using TUNE KNOB, tune frequency to 6.6 GHz.
    g. Press PULSE OFF then PULSE NORM ⊙ keys.
    h. Press 3 key.
    i. Press service switch A2A2S1.
    j. Adjust A1A7R14 (B1 HI) to center YIG Tuned Multiplier passband on oscilloscope display.
16. Repeat step 15 until both ends of band are within 1 division of screen center on oscilloscope display.
17. Using TUNE KNOB, tune Signal Generator to scan entire band (from 2.0 to 6.6 GHz) and verify that YIG Tuned Multiplier passband response tracks within 2 divisions of screen center on oscilloscope display.

    If response peak does vary more than 2 divisions, readjust A1A7R14 (B1 HI) and A1A7R69 (B1 LO) for beset compromise.
18. On Signal Generator:
    a. Press RCL then 2 keys.
    b. Press PULSE NORM ⊙ key.
    c. Press 3 key.
    d. Press service switch A2A2S1.
    e. Using TUNE KNOB, tune frequency to 6600.002 MHz.
    f. Adjust A1A7R68 (B2 LO) to center YIG Tuned Multiplier response peak on oscilloscope display.
    g. Using TUNE KNOB, tune frequency to 12299.902 MHz.
    h. Adjust A1A7R17 (B2 HI) to center YIG Tuned Multiplier response peak on oscilloscope display.
19. Repeat step 18 until both ends of band are within 1 division of screen center on oscilloscope display.
20. Using TUNE KNOB, tune Signal Generator to scan entire band (from 6.6 to 12.3 GHz) and verify that YIG Tuned Multiplier

passband response tracks within 2 divisions of screen center on oscilloscope display.

If response peak does not vary more than 2 divisions, readjust A1A7R17 (B2 HI) and A1A7R68 (B2 LO) for best compromise.

21. On the Signal Generator:
    a. Press [RCL] then [3] keys.
    b. Press PULSE NORM [•] key.
    c. Press [3] key.
    d. Press service switch A2A2S1.
    e. Using TUNE KNOB, tune frequency to 12300.003 MHz.
    f. Adjust A1A7R67 (B3 LO) to center YIG Tuned Multiplier response peak on oscilloscope display.
    g. Using TUNE KNOB, tune frequency to 17024.928 MHz.
    h. Adjust A1A7R18 to center YIG Tuned Multiplier response peak on oscilloscope display.
22. Repeat step 21 until both ends of band are within 1 division of screen center on oscilloscope display.
23. On the Signal Generator:
    a. Using TUNE KNOB, tune frequency to 18599.901 MHz.
    b. Adjust A1A7R51 to center YIG Tuned Multiplier response peak on oscilloscope display.
    c. Using TUNE KNOB, tune Signal Generator to scan entire band (from 12.3 to 18.6 GHz) and verify that YIG Tuned Multiplier passband response tracks within 2 divisions of screen center on oscilloscope display.

    If response peak does vary more than 2 divisions, readjust A1A7R67 (B3 LO), A1A7R18, and A1A7R51 for best compromise.
24. On the Signal Generator:
    a. Press [RCL], [4] keys.
    b. *For Option 008 only.* Press [9] key, then press service switch A2A2S1 to disable the K-Band amp.
    c. Press Pulse NORM [•] key.
    d. Press [3] key.
    e. Press service switch A2A2S1.
    f. Using TUNE KNOB, tune frequency to 18600.004 MHz.
    g. Adjust A1A7R66 (B4 LO) to center YIG Tuned Multiplier response peak on oscilloscope display.
    h. Using TUNE KNOB, tune frequency to 25037.916 MHz.
    i. Adjust A1A7R54 to center YIG Tuned Multiplier response peak on oscilloscope display.
    j. Using TUNE KNOB, tune frequency to 25999.904 MHz.
    k. Adjust A1A7R55 to center YIG Tuned Multiplier response peak on oscilloscope display.
25. Using TUNE KNOB, tune Signal Generator to scan entire band (from 18.6 to 26 GHz) and verify that YIG Tuned Multiplier

passband response tracks within 2 divisions of screen center on oscilloscope display.

If response peak does vary more than 2 divisions, readjust A1A7R66 (B4 LO), A1A7R54, and A1A7R51 for best compromise.

26. Reconnect A1W7 to A1AT3.
27. *For Option 008 only*. Press [8] key, then press service switch A2A2S1 to enable the K-Band amp.

Note

Perform the procedure titled "Clamp Adjustment" after completing this adjustment.

5-26. YTM Tune—Automated Procedure

Note This is an automated procedure. An alternate YTM Tune procedure precedes this one. It is a manual procedure which should be used if an HP-85 computer and 11726-10002 software are not available.

Reference Service Sheets 14, 16, 17, 20, and 22

Description **Automated Adjustment.** The YIG Tuned Multiplier (YTM) is swept approximately 200 MHz above and below the Signal Generator's set RF output frequency. The YTM passband is then checked. If out of spec, it is adjusted so that its center frequency tracks the desired YTM output frequency over its entire range.

If the YTM tuning is out of adjustment, the bandpass filter either attenuates the YIG Tuned Oscillator (YTO) signal more than normal, resulting in low output power, or insufficiently filters signal harmonics. The YTM Tune adjustment should be performed whenever the YTM or associated circuitry has been repaired or whenever low output power or high harmonics exist.

The YTM tune adjustment is performed as follows:

a. Preliminary adjustments are made. These include setting the +12.4 voltage reference, setting the peaker DAC input bits low via the Special Function learn mode, adjusting "INT OS", disabling the power clamp circuit, and setting the front panel CAL control.

b. The oscilloscope display is calibrated to monitor the detected output of the YTM.

c. YTM tuning is adjusted by centering the YTM response peak on the oscilloscope display (see figure 5-23). Adjustments are made at the highest and lowest frequency in each band. In addition, band 3 and band 4 are adjusted at "breakpoints" to correct for tracking deviation at the higher frequencies.

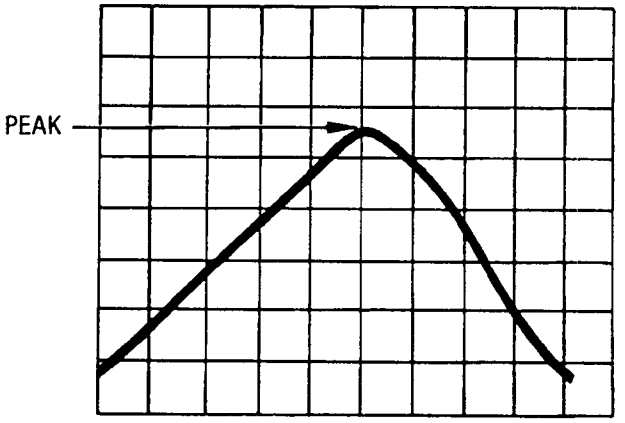


Figure 5-23. Optimum YTM Response

d. Each band is swept to check the YTM tracking response of its passband after adjustment.

Equipment

Digital Voltmeter (DVM)	HP 3456A
Oscilloscope	HP 1980B
50Ω Termination	HP 11593A
HP-IB Controller with Optional ROM	HP 85B/00085-15002/ 00085-15004/00085-15005
Test Cassette	HP 11726-10002

Procedure

1. Connect equipment as shown in figure 5-24.

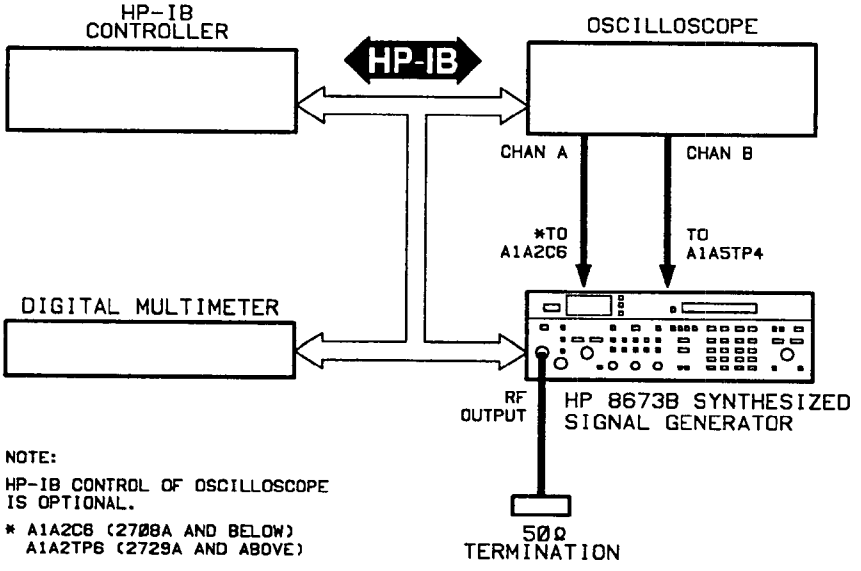


Figure 5-24. YTM Tune Adjustment Test Setup

2. Ensure that the Signal Generator's HP-IB address is set to 19, that the voltmeter's HP-IB address is set to 22, and the oscilloscope's address is set to 07.

Note

The use of a remotely controlled oscilloscope is optional.The test will run with either a manual oscilloscope or a remotely controlled HP 1980B.

3. The YTM adjustment program can be loaded by either of two methods: a) by using the "SRD" adjustment program "Load next test" function or b) by loading and running the "EXEC" program to display the Main Menu, figure 5-2.
4. After the "EXEC" program is loaded and the Main Menu is displayed, press [k2] to run the "YTM" tune adjustment program.
5. Instructions for the remainder of the procedure will be displayed on the controller screen. The program will indicate when the YTM tune adjustment has been completed.

   For serial number prefixes 2729A and above, the A1A2 Detector Module Assembly is different. Use Test point A1A2TP6 instead of A1A2C6, and adjust pot A1A2R88 instead of A1A2A2R12.

Note

Perform the procedure titled "Clamp Adjustment" after completing this adjustment.

5-27. Clamp Adjustment

Reference Service Sheet 20

Description The power clamp circuit is used to limit power in band 1 (2.0 to 6.6 GHz) below the level where YIG tuned multiplier (YTM) spurious oscillations (squegging) occur. Spurious oscillations vary with each YTM and with frequency, but generally occur at high power levels (>12 dBm) and at frequencies within band 1. The power clamp operates in external ALC mode only. The clamp level is adjusted to prevent spurious oscillations and the YTM is then checked for absence of squegging.

Equipment

Power Meter	HP 436A
Power Sensor	HP 8485A

Procedure

1. Calibrate the power meter to the power sensor.
2. Connect the equipment as shown in figure 5-25.

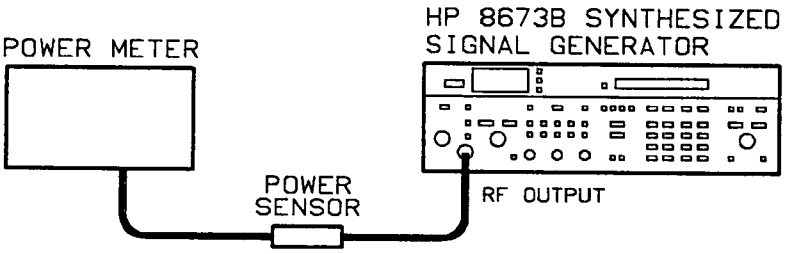


Figure 5-25. Power Clamp Adjustment Test Setup

3. Set CLAMP (A1A3R51) on the Function Assembly fully clockwise for maximum power output.
4. On the Signal Generator, press [RCL] [0]; set frequency to 6 GHz, RANGE to 0 dBm, and ALC DIODE to on.

5. Set the CAL control on the Signal Generator's front panel fully clockwise.
6. Set the power meter's cal factor for 6 GHz correction.
7. Adjust CLAMP counterclockwise until the power meter reads +11.0 ±0.2 dBm.
8. Set the Signal Generator's frequency increment to 50 MHz. Then, press the FREQ INCREMENT (⇩) key to tune down in frequency across band 1 while observing the power meter reading. If the power changes suddenly by several dB while changing frequency, the Signal Generator has entered the spurious oscillation (squegging) mode. Decrease the clamp level in 0.5 dB increments at 6 GHz, each time setting the RF key to OFF momentarily and starting the CLAMP adjustment from its fully clockwise position. Repeat this step until no squegging exists.

Note 

It should not be necessary to set the clamp level lower then +10 dBm.

9. Record this level below for use as a reference. _____dBm

5-28. Flatness and ALC—Manual Adjustment

Note

This is one of three modules for Flatness and ALC adjustments in this manual. The three modules are the following:

1. Flatness and ALC—Manual Adjustment (covering Bands 1 through 4, but not the +20 dBm range of System Mode). See paragraph 5-28.
2. Flatness and ALC—Automated Adjustment (covering bands 1 through 4, but not the +20 dBm range of System Mode). See paragraph 5-29.
3. System Mode ALC—Manual Adjustment (covering the +20 dBm range). See paragraph 5-30.

Reference

Service Sheets 14, 17, 19, 20, and 22

Description

The flatness adjustments compensate for power variations caused by RF output cables, the attenuator, the crystal detector, and the directional coupler. Misadjusted flatness can cause large variations in power level as frequency changes.

The ALC adjustments include centering the ALC loop error voltage within the unleveled detector range, adjusting the AM carrier level, and calibrating the ALC log amp curve. Misadjusted ALC can cause poor AM performance, high level accuracy errors, and LVL meter errors.

Equipment

Power Meter	HP 436A
Power Sensor	HP 8485A
Digital Voltmeter	HP 3456A or HP 3455A
50Ω Termination	HP 909D Opt. 011

Procedure

Note

If either flatness or ALC requires adjustment, all adjustments must be performed. Flatness should be adjusted first because it affects level accuracy at most frequencies.

Different printed circuit board layouts exist. The same adjustment procedure applies to all. However, reference designations for the pots and test points are different. These parts are referred to by their descriptive name first, then by their newer reference designation and finally, in parentheses, by their older reference designation. For example, "–4" A5A2R105 (A5A2A2R29).

Note (cont'd)

Newer A1A3 and A1A8 reference designations apply to instruments with serial number prefixes 2552A, and 2634A and above. Older A1A3 and A1A8 reference designations apply to instruments with serial number prefixes 2629A, 2626A, 2608A, and 2536A and below.

Newer A1A2 reference designations apply to instruments with serial number prefixes 2729A and above. Older A1A2 reference designations apply to instruments with serial number prefixes 2708A and below.

Flatness Adjustments

Note

Each band adjustment for flatness affects all of the higher band adjustments. If adjustment of a band is necessary, readjust the higher bands also to ensure level flatness. (For example, adjusting band 2 requires readjusting bands 3 and 4.)

1. Connect the power meter's sensor to the Signal Generator's RF OUTPUT.
2. Press [RCL] and [0].
3. Set the Signal Generator's RANGE to 0 dB. Adjust the VERNIER for a power meter reading of −3.0 dBm.
4. Press [6], then press service function switch A2A2S1. This stores the high and low frequencies for bands 1 through 4 into registers 1 through 4 respectively. Along with these frequencies, the following settings are placed into the registers: Manual sweep mode, frequency set to the start frequency, and 100 steps per sweep. Finally, it executes a RCL 1 to place the instrument into band 1 with those settings described above.
5. Adjust "−4" A1A2R105 (A1A2A2R29) for a power meter reading of −3.0 ±0.2 dBm.
6. Using the TUNE knob, tune the Signal Generator from 2.0 to 6.600 000 GHz. Note the minimum and maximum power levels and the frequencies at which they occur.
7. Adjust "2" A1A8R20 (A1A8R55) to minimize the difference between the maximum and minimum power levels.
8. Tune the Signal Generator to 2.0 GHz.
9. Readjust "−4" A1A2R105 (A1A2A2R29) for a power meter reading of −3.0 ±0.2 dBm.
10. Set the Signal Generator's SWEEP MODE to OFF.
11. Set the Signal Generator to a frequency increment of 200 MHz.
12. Using the TUNE knob, tune the Signal Generator from 2.0 to 6.600 000 GHz. Verify that the difference between maximum and minimum power levels is less than 1.5 dB.

If the difference in power levels exceeds the specified limit, repeat steps 6 through 12 until satisfactory results are attained.

13. Press [RCL] and [2] to place the instrument into band 2.
14. Using the TUNE knob, tune the Signal Generator from 6.600 002 to 12.299 902 GHz. Note the minimum and maximum power levels and the frequencies at which they occur.
15. Adjust "14" A1A8R23 (A1A8R82) to minimize the difference between the maximum and minimum power levels.
16. Tune the Signal Generator to 2.0 GHz.
17. Readjust "−4" A1A2R105 (A1A2A2R29) for a power meter reading of −3.0 ±0.2 dBm.
18. Set the Signal Generator's SWEEP MODE to OFF.
19. Set the Signal Generator to a frequency increment of 200 MHz.
20. Using the TUNE knob, tune the Signal Generator from 2.0 to 12.300 000 GHz. (Note that the last step will have to be less than 200 MHz.) Verify that the difference between the maximum and minimum power levels is less than 2.0 dB.

    If the difference in power levels exceeds the specified limit, repeat steps 13 through 20 until satisfactory results are attained.

21. Press [RCL] and [3] to place the instrument into band 3.
22. Using the TUNE knob, tune the Signal Generator from 12.300 003 to 18.599 901 GHz. Note the minimum and maximum power levels and the frequencies at which they occur.
23. Adjust "18" A1A8R47 (A1A8R67) to minimize the difference between the maximum and minimum power levels.
24. Tune the Signal Generator to 2.0 GHz.
25. Readjust "−4" A1A2R105 (A1A2A2R29) for a power meter reading of −3.0 ±0.2 dBm.
26. Set the Signal Generator's SWEEP MODE to OFF.
27. Set the Signal Generator to a frequency increment of 200 MHz.
28. Using the TUNE knob, tune the Signal Generator from 2.0 MHz to 18.600 000 GHz. Verify that the difference between the maximum and minimum power levels is less than 2.5 dB.

    If the difference in power levels exceeds the specified limit, repeat steps 21 through 28 until satisfactory results are attained.

29. Press [RCL] and [4] to place the instrument into band 4.
30. Using the TUNE knob, tune the Signal Generator from 18.600 004 to 25.999 904 GHz. Note the minimum and maximum power levels and the frequencies at which they occur.
31. Adjust "22" A1A8R51 (A1A8R50) to minimize the difference between the maximum and minimum power levels.

32. Tune the Signal Generator to 2.0 GHz.
33. Readjust "−4" A1A2R105 (A1A2A2R29) for a power meter reading of −3.0 ±0.2 dBm.
34. Set the Signal Generator's SWEEP MODE to OFF.
35. Set the Signal Generator to a frequency increment of 200 MHz.
36. Using the TUNE knob, tune the Signal Generator from 2.0 to 26.000 000 GHz. Verify that the difference between the maximum and minimum power levels is less than 3.5 dB.

    If the difference in power levels exceeds the specified limit, repeat steps 29 through 36 until satisfactory results are attained.

Centering the ALC Loop Error Voltage

1. Tune the Signal Generator from 2.0 to 26.000 000 GHz . Record the minimum and maximum power levels.

   Minimum Power Level_____
   Maximum Power Level_____

2. Tune the Signal Generator to a frequency that has a power level halfway betweeen the minimum and maximum output power levels recorded in the previous step.

Note

Remaining adjustments are made at this frequency setting where the power level is halfway between the minimum and maximum. Do not change the frequency for the remainder of this procedure.

AM Balance Adjustment

1. Set the Signal Generator's RANGE to 0 dB. Adjust the VERNIER for a power meter reading of −3.0 dBm.
2. Set AM mode to 30%.
3. Adjust "AM BAL" A1A3R43 for a power meter reading of −3.0 dBm.
4. Set AM mode to OFF, then to 30% again. There should be no noticeable output power level difference between AM OFF and AM 30%.
5. If a power level difference exists, readjust "AM BAL" A1A3R43.

Level Meter Adjustment

1. Connect the voltmeter's positive lead to A1A5TP10. Connect the ground lead to A1A5TP1.
2. Set AM mode to OFF.
3. Set MTR mode to LVL.
4. Set RANGE to 0 dB. Adjust the VERNIER for a voltmeter reading of 0.0V ±0.05V.

5. Adjust "MET CAL" A1A3R31 for an indication of +3.0 dBm on the Signal Generator's front panel meter.
6. Adjust the VERNIER for a voltmeter reading of −6.5V ±0.05V.
7. Adjust "GAIN" A1A5R9 for an indication of −10.0 dBm on the Signal Generator's front panel meter.

Overrange Adjustment

1. Set the Signal Generator's RANGE to 0 dB.
2. Adjust the VERNIER for a voltmeter reading of −1.50V ±0.05V.
3. Record the power meter reading (the reading should be close to 0.0 dBm).

   Power meter reading_____
4. Set the Signal Generator's RANGE to +10 dBm.
5. Adjust the VERNIER for a voltmeter reading of −6.50V ±0.05V.
6. Adjust "IO VR" A1A2R1 (A1A2A1R1) for a power meter reading equal to the reading recorded in step 3.

Internal Offset Adjustment

1. Connect the voltmeter's positive lead to "BUF OUT" A1A2TP3 (A1A2C6). Connect the ground lead to chassis ground.
2. Press the RF OUTPUT ON/OFF key on the Signal Generator's front panel to turn the RF output OFF.
3. Adjust "INT OS" A1A2R88 (A1A2A2R12) for a voltmeter reading of −0.920V ±0.1V.
4. With voltmeter still connected, put the Signal Generator's top cover in place but do not screw it in.
5. Allow the Signal Generator to warm up for at least 15 minutes. This stabilizes the internal temperature.
6. Remove the Signal Generator's top cover and quickly readjust "INT OS" A1A2R88 (A1A2A2R12) for a voltmeter reading of −0.920V ±0.02V. Then return the Signal Generator's top cover to place.
7. The voltmeter reading should remain at −0.920V ±0.02V. If it does not, repeat step 6 until it does.

Absolute Power Level Adjustment

1. Connect the voltmeter's positive lead to A1A5TP10. Connect the ground lead to A1A5TP1.
2. Set the Signal Generator's RANGE to 0 dB.
3. Adjust the VERNIER for a voltmeter reading of −6.5V ±0.05V.
4. Adjust "-10" A1A2R116 (A1A2A2R40) for a power meter reading of −10.0 dBm.

5. Adjust the VERNIER for a voltmeter reading of −3.5V ±0.05V.
6. Adjust "−4" A1A2R105 (A1A2A2R29) for a power meter reading of −4.0 dBm.
7. Set the Signal Generator's RANGE to +10 dB.
8. Adjust the VERNIER for a voltmeter reading of −2.5V ±0.05V.
9. Adjust "+8" A1A2R102 (A1A2A2R26) for a power meter reading of +8.0 dBm.
10. Repeat steps 2 through 9 until all power meter readings are within 0.2 dB of specifications.

External ALC Adjustment

1. Press [RCL] and [0] on the Signal Generator.
2. Connect a 50Ω termination to EXT ALC IN connector on the Signal Generator's front panel.
3. Connect the positive lead of the voltmeter to test point A1A3TP9 (A1A3TP5). Connect the negative lead to test point A1A3TP3 (A1A3TP4).
4. Tune the Signal Generator to 2 GHz.
5. Press the RF OUTPUT ON/OFF key on the Signal Generator to turn the RF output OFF.
6. Adjust "EXT OS" A1A3R12 for a voltmeter reading of 0.0 Vdc ± 10 μV.
7. Disconnect the 50Ω termination.
8. Connect the positive lead of the voltmeter to test point A1A5TP10. Connect the negative lead to test point A1A5TP1.
9. Connect a BNC cable between the Signal Generator's EXT ALC IN connector and the power meter's RECORDER OUTPUT connector.
10. Set the Signal Generator's RANGE to 0 dB.
11. Adjust the VERNIER for a voltmeter reading of −4.0V ±0.05V.
12. Press RANGE HOLD on the power meter.
13. Press the PWR MTR [•] key on the Signal Generator's front panel.
14. Set the Signal Generator's RANGE to +10 dBm.
15. Adjust the Signal Generator's VERNIER for a voltmeter reading of −2.0V ±0.05V.
16. Adjust CAL (near the EXT ALC IN connector) on the Signal Generator's front panel for a power meter reading of −1.0 dBm ±0.1 dBm.
17. Adjust the VERNIER for a voltmeter reading of −5.5V ±0.05V.

18. Adjust "EXG" A1A3R72 for a power meter reading of −8.0 dBm ±0.1 dBm. (Reference designation for EXG is the same in older and newer Signal Generators.)
19. Repeat steps 15 through 18 until the power meter readings are within specifications.

5-29. Flatness and ALC—Automated Adjustment

Note

This is one of three modules for Flatness and ALC adjustments in this manual. The three modules are the following:

1. Flatness and ALC—Manual Adjustment (covering Bands 1 through 4, but not the +20 dBm range of System Mode). See paragraph 5-28.
2. Flatness and ALC—Automated Adjustment (covering bands 1 through 4, but not the +20 dBm range of System Mode). See paragraph 5-29.
3. System Mode ALC—Manual Adjustment (covering the +20 dBm range). See paragraph 5-30.

This procedure can only be used if you have an HP 85 computer and 11726-10002 software available. If these are not available, perform the manual adjustments that come before this procedure.

Reference

Service Sheets 14, 17, 19, 20, and 22

Description

Automated Adjustment. The flatness adjustments compensate for power variations caused by RF output cables, the attenuator, the crystal detector, and the directional coupler. Misadjusted flatness can cause large variations in power level as frequency changes.

The ALC adjustments include centering the ALC loop error voltage within the unleveled detector range, adjusting the AM carrier level, and calibrating the ALC log amp curve. Misadjusted ALC can cause poor AM performance, high level accuracy errors, and LVL meter errors.

Flatness. The flatness adjustment procedure is performed as follows:

a. The program runs a flatness plot of the Signal Generator, which is displayed on the controller screen.

b. The program calculates and draws the specification lines and optimum slope for each of the four flatness regions.

c. A copy of the flatness plot is printed. See figure 5-26.

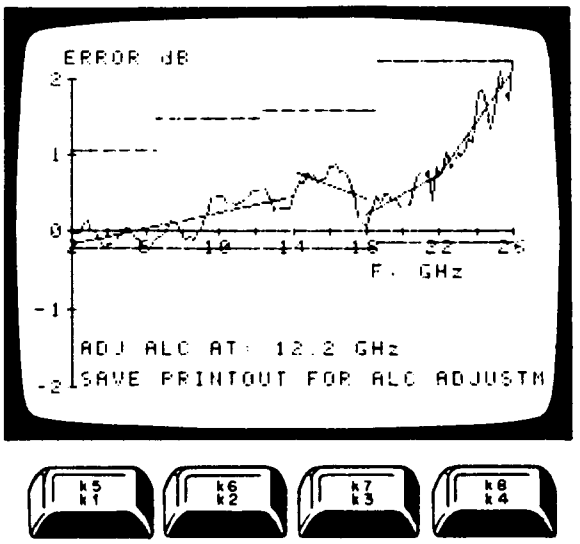


Figure 5-26. Typical Flatness Plot Before Adjustment

d. Axes representing the slope adjustment for each flatness region, are drawn on the controller screen (see figure 5-27). The center of each axis represents zero error (the optimum slope for that region). The "X" is adjusted as close as possible for zero error.

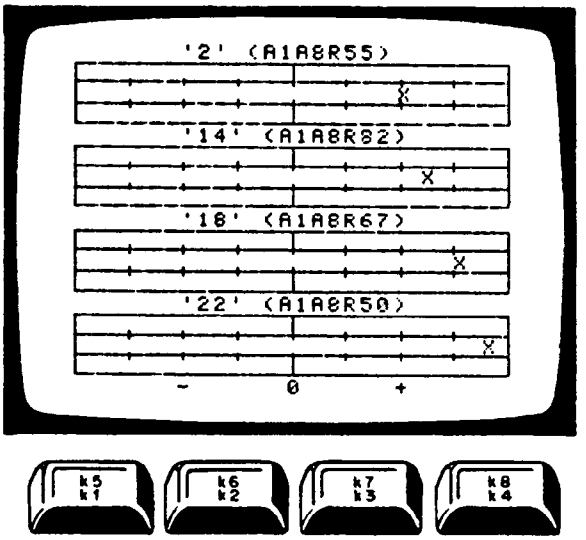


Figure 5-27. Flatness Adjustment

e. After the flatness adjustments are made, the controller will print a new flatness plot. Included on the plot is an ALC adjustment frequency that is used in the ALC portion of this adjustment procedure.

ALC. The ALC adjustment procedure is performed as follows:

a. The front panel meter's mechanical zero is set for a mechanical indication of exactly zero on the lower scale.

b. The ALC adjustment frequency, provided on the flatness plot printout, is entered into the controller.

c. The ALC loop error voltage is centered within the unleveled detector's window.

d. AM carrier level (with no modulation input) is set to the same power level as the CW level (AM off).

e. Vernier and meter circuits are adjusted.

f. The overrange adjustment is set to obtain the same RF level in and out of the overrange mode.

g. The internal ALC log amp curve is adjusted to produce an output voltage proportional to the log of the detected input power (in watts) at all levels. This ensures that the proper output power level will be obtained across the full vernier range.

h. The external ALC log amp is adjusted to minimize dc offset and to center the operating range of the external leveling circuitry.

Equipment

Power Meter	HP 436A
Power Sensor	HP 8485A
Digital Voltmeter	HP 3456A
HP-IB Controller with Optional ROM	HP 85B/00085-15002/ 00085-15004/00085-15005
Test Cassette	HP 11726-10002
50Ω Termination	HP 909D Opt. 011

Procedure

Note

If either flatness or ALC requires adjustment, both adjustments must be performed. Flatness should be adjusted first because it affects level accuracy at most frequencies.

Preliminary Settings

1. Press [RCL] and [0] on the Signal Generator.
2. Connect a 50Ω termination to EXT ALC IN connector on the Signal Generator's front panel.
3. Connect the positive lead of the voltmeter to test point A1A3TP9 (A1A3TP5). Connect the negative lead to test point A1A3TP3 (A1A3TP4).
4. Tune the Signal Generator to 2 GHz.
5. Press the RF OUTPUT ON/OFF key on the Signal Generator to turn the RF output OFF.

6. Adjust "EXT OS" A1A3R12 for a voltmeter reading of 0.0 Vdc ±10 μV. (Reference designation for EXT OS is the same in older and newer Signal Generators.)
7. Disconnect the 50Ω termination and voltmeter.

Automated Procedure

1. Set the Signal Generator's HP-IB address to 19, set the voltmeter's HP-IB address to 22, and set the power meter's HP-IB address to 13.
2. Calibrate the power meter to the power sensor.
3. Connect the equipment as shown in figure 5-28.

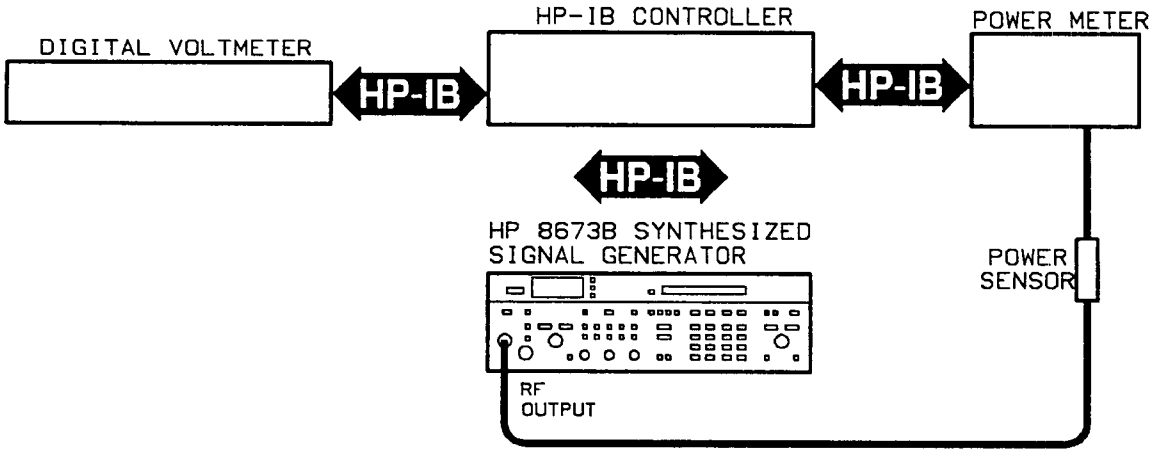


Figure 5-28. Flatness and ALC Adjustment Test Setup

4. Load the test program "EXEC" if the Main Menu, figure 5-2, is not presently displayed. Instructions can be found in the paragraph titled "Automated Adjustment Procedures" in this section.
5. After the program is loaded and the Main Menu is displayed, press (k3) to run the Flatness and ALC adjustment program.
6. Instructions for the remainder of the procedure will be displayed on the controller's screen. The program will indicate when the flatness and ALC adjustments are completed.

Note

Different printed circuit board layouts exist. The same adjustment procedure applies to all. However, reference designations for the pots and test points are different. Old and new reference designations are cross referenced in the following list. Reference designations that are not listed have not changed.

Old Reference Designations	Name	New Reference Designations
A1A2C6	BUF OUT	A1A2TP6
A1A2A1R1	IOVR	A1A2R1
A1A2A2R12	INT OS	A1A2R88
A1A2A2R26	+8	A1A2R102
A1A2A2R29	−4	A1A2R105
A1A2A2R40	−10	A1A2R116
A1A3TP4	EXT GND	A1A3TP3
A1A3TP5	test point	A1A3TP9
A1A8R50	22	A1A8R51
A1A8R55	2	A1A8R20
A1A8R67	18	A1A8R47
A1A8R82	14	A1A8R23

Older reference designations for A1A2, A1A2A1, and A1A2A2 apply to instruments with serial number prefixes 2708A and below. Newer serial number prefixes apply to instruments with serial number prefixes 2729A and above.

Older reference designations for A1A3 and A1A8 apply to instruments with serial number prefixes 2629A, 2626A, 2608A, and 2536A and below. Newer serial number prefixes apply to instruments with serial number prefixes 2552A, and 2634A and above.

5-30. System Mode ALC—Manual Adjustment

Note

This is one of three modules for Flatness and ALC adjustments in this manual. The three modules are the following:

1. Flatness and ALC—Manual Adjustment (covering Bands 1 through 4, but not the +20 dBm range of System Mode). See paragraph 5-28.
2. Flatness and ALC—Automated Adjustment (covering bands 1 through 4, but not the +20 dBm range of System Mode). See paragraph 5-29.
3. System Mode ALC—Manual Adjustment (covering the +20 dBm range). See paragraph 5-30.

This procedure applies only to instruments with serial number prefixes 2552A, and 2634A and above. Instruments with serial number prefixes 2629A, 2626A, 2608A, and 2536A and below are not millimeter-wave system compatible and do not have the +20 dBm range.

Reference

Service Sheet 17, 20, 22

Description

The external system mode ALC is adjusted for the +20 dB RANGE. This ensures optimum accuracy of the +20 dB RANGE when the Signal Generator is used in system mode.

Equipment

Digital Voltmeter	HP 3456A or HP 3455A
External ALC Amplifier	Locally Fabricated
50Ω Termination	HP HP 909D Opt. 011
Power Supply	HP 6200B

Procedure

Note

This test requires an external amplifier. The amplifier can be fabricated using the circuit shown in figure 5-29.

1. Connect the DVM OUT connector of the external amplifier to the voltmeter.
2. Connect the ALC OUT connector of the external amplifier to the EXT ALC IN connector of the Signal Generator.
3. Apply power to the external amplifier.
4. Attach a 50Ω termination to the ALC IN connector of the external amplifier.

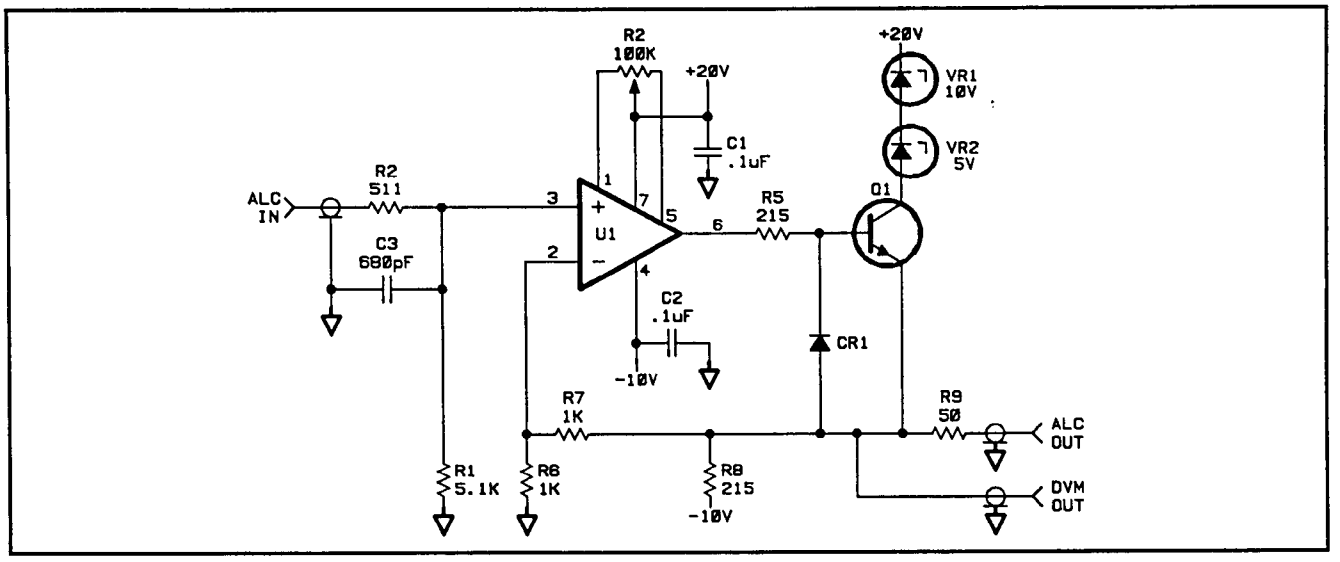


Figure 5-29. External ALC Amplifier

Material List for External ALC Amplifier

Reference Designator	Component Value	Part Number
R1	5.11 kΩ, 1%, .125W	0757-0438
R2	511 Ω, 1%, .125W	0757-0416
R3	100 kΩ variable	2100-3094
R5	215 Ω, 1%, .05W	0698-7220
R6	1 kΩ, 1%, .125W	0757-0280
R7	1 kΩ, 1%, .125W	0757-0280
R8	215 Ω, 1%, .5W	0698-3401
R9	50 Ω, 1%, .1W	0699-0452
C1	0.1 μF	0160-0576
C2	0.1 μF	0160-0576
C3	680 pF	0160-4824
CR1	Switching Diode	1901-0050
U1	Operational Amplifier	1826-0413
Q1	2N5943, NPN	1854-0597
VR1	Zener Diode, 10V	1902-0958
VR2	Zener Diode, 5.1V	1902-0951

5. Adjust R3 on the external amplifier for a voltmeter reading of 0.0V, ± 0.1 mV. This minimizes any dc offset of the amplifier.
6. Disconnect the 50Ω termination from the ALC IN connector of the external amplifier.
7. Connect the equipment as shown in figure 5-30.

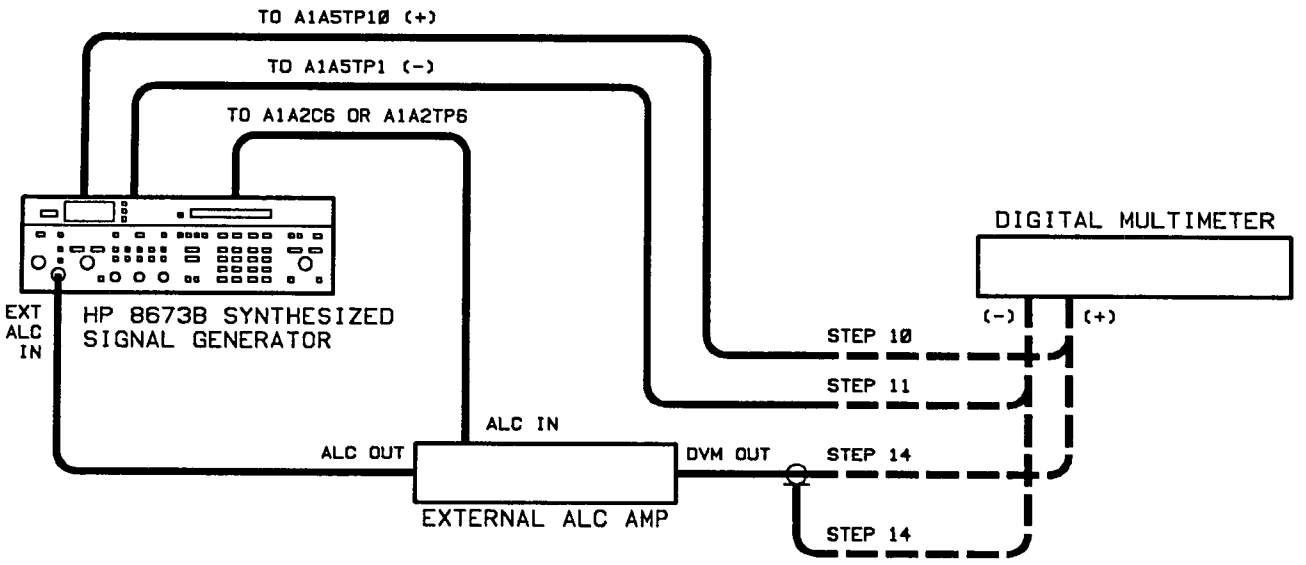


Figure 5-30. External System Mode ALC Adjustment Test Setup

8. Press the SHIFT then DIODE ⊙ key on the Signal Generator to invoke system mode ALC. Note that both the INTERNAL and SYS/DIODE key indicators light.
9. Set the OUTPUT LEVEL RANGE on the Signal Generator to 0 dB.
10. Connect the positive lead of the voltmeter to A1A5TP10.
11. Connect the negative lead of the voltmeter to A1A5TP1.
12. Adjust the OUTPUT LEVEL VERNIER on the Signal Generator for a voltmeter reading of −1.5 Vdc ±0.05V. This corresponds to an output level of 0 dBm.
13. Connect the ALC IN connector of the external amplifier to A1A2C6, the top feed-through capacitor of the detector board. This is the output of the log amplifier and provides a dc voltage that is proportional to output power in dB.

14. Adjust A1A3R105 ("SO") for a voltmeter reading of 0.0 Vdc ±0.0005V.
15. Connect the positive lead of the voltmeter to A1A5TP10.
16. Connect the negative lead of the voltmeter to A1A5TP1.
17. Adjust the OUTPUT LEVEL VERNIER on the Signal Generator for a voltmeter reading of −6.50 Vdc ±0.05V. This corresponds to an output level of −10 dBm.
18. Connect the voltmeter to the DVM OUT connector of the external amplifier.
19. Adjust A1A3R21 ("SG") for a voltmeter reading of −600 mVdc ±0.5 mV. This sets the gain of the system circuitry for 30 mV/dB.
20. Set the Signal Generator's OUTPUT LEVEL RANGE to +10 dB. DO NOT readjust the VERNIER.
21. Adjust A1A2R20 ("EOVR") for a voltmeter reading of 0.0 Vdc ±0.5 mV.
22. Set the Signal Generator's RANGE to +20 dB. DO NOT readjust the VERNIER.
23. Adjust A1A3R98 ("S20") for a voltmeter reading of +600 mVdc ±0.5 mV.

5-31. AM Bandwidth Adjustment

Reference Service Sheet 14

Description ALC loop gain is adjusted separately for each band to optimize ALC loop stability, level switching speed, AM bandwidth. Each band is scanned in small steps to determine where maximum rolloff and peaking occur in the ALC response. The bandwidth is then adjusted to optimize the above three performance parameters.

Equipment

Spectrum Analyzer	HP 8566B
50Ω Termination	HP 11593A

Procedure

Note Different printed circuit board layouts exist. The same adjustment procedure applies to all. However, reference designations for the pots and test points are different. These parts are referred to by their descriptive name first, then by their newer reference designation and finally, in parentheses, by their older reference designation. For example, "B1" A1A2R61 (A1A2A1R61).

Newer A1A2 reference designations apply to instruments with serial number prefixes 2729A and above. Older A1A2A1 reference designations apply to instruments with serial number prefixes 2708A and below.

1. Connect the equipment as shown in figure 5-31.
2. Key in [RCL] [0] and then set the Signal Generator to the following conditions:

Start Frequency	2 GHz
Stop Frequency	6.6 GHz
Step Size	10 MHz
Output Level	0 dBm
AM Mode	100%
Meter Scale	AM
AUTO PEAK	Off

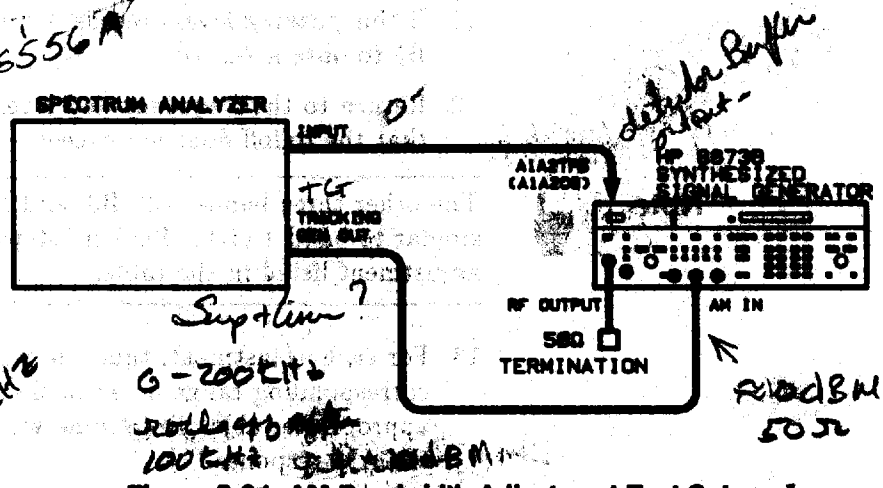


Figure 5-31. AM Bandwidth Adjustment Test Setup

3. Center the following components: "B1" A1A2R61 (A1A2A1R61), "B2" A1A2R59 (A1A2A1R59), "B3" A1A2R58 (A1A2A1R58), and "B4" A1A2R57 (A1A2A57).
4. Adjust the tracking generator level on the spectrum analyzer so that the Signal Generator's meter reads approximately 30% AM.
5. Change the Signal Generator's meter scale to LVL.
6. Set the spectrum analyzer to sweep between 0 and 200 kHz. Set the spectrum analyzer's vertical sensitivity to 2 dB per division. Adjust the spectrum analyzer's log reference level and linear sensitivity to set the left portion of the displayed signal on a convenient CRT graticule line (two or three divisions from the top of the screen). This represents the reference level for determining AM rolloff.
7. Using the manual sweep mode, tune the Signal Generator from 2.0—6.6 GHz in 20 MHz steps to determine where the sharpest rolloff occurs in the AM response.

   This corresponds to the highest negative difference in level at the far right of the display (200 kHz) as compared to the reference at the left side (0 kHz).
8. When the sharpest rolloff frequency is found, vary the Signal Generator's output level from −10 dBm to maximum to determine at what level the sharpest rolloff occurs. (Maximum is defined in the following tables. You will see that maximum output level depends on the serial number prefix and option configuration of your signal generator.
9. At the worst-case rolloff frequency and level, adjust "B1" A1A2R61 (A1A2A1R61) to set the AM rolloff to −3 dB at 200 kHz as displayed on the spectrum analyzer.
10. Vary the output level from −10 to maximum to determine at what level the sharpest peaking occurs.

11. If this peaking level exceeds +2 dB with respect to 0 Hz, readjust B1 to obtain +2 dB.
12. Return to the frequency and level of maximum rolloff and verify that the rolloff does not exceed −3 dB at a 100 kHz rate.

Note

The other three bands (B2, B3, and B4) are adjusted in a manner similar to band 1 (B1). Perform steps 13 through 18 for each adjustment listed in the table.

13. For each adjustment, tune the Signal Generator over the corresponding range listed in the Frequency Range column of the appropriate table. Determine where the sharpest rolloff occurs in the AM response.
14. When the sharpest rolloff frequency is found, vary the Signal Generator's output level from −10 dBm to maximum.
15. At the worst-case rolloff frequency and level, set the appropriate adjustment for AM rolloff of −3 dB at 200 kHz as displayed on the spectrum analyzer.
16. Vary the output level over the range used in step 13 to determine at what level the sharpest peaking occurs.
17. If this peaking level exceeds +2 dB with respect to 0 Hz, readjust the adjustment for +2 dB.
18. Return to the frequency and level of maximum rolloff and verify that the rolloff does not exceed −3 dB at a 100 kHz rate.

Serial Number Prefixes 3024A and Below — Maximum Output Level

Adjustment	Frequency Range (MHz)	Std (dBm)	Opt. 001 (dBm)	Opt. 004 (dBm)	Opt. 005 (dBm)	Opt. 008 (dBm)	001 008 (dBm)	004 008 (dBm)	005 008 (dBm)
"B1" A1A2R61 (A1A2A1R61)	2000-6600	+8	+10	+7	+9	+8	+10	+7	+9
"B2" A1A2R59 (A1A2A1R59)	6620-12300	+8	+10	+7	+9	+8	+10	+7	+9
"B3" A1A2R58	12320-18000	+8	+10	+7	+9	+8	+10	+7	+9
(A1A2A1R58)	18020-18600	+4	+6	+2	+4	+7	+9	+5	+7
"B4" A1A2R57	18620-22000	+4	+6	+2	+4	+7	+9	+5	+7
(A1A2A1R57)	22020-26000	0	+3	−2	+1	+7	+10	+5	+8

Serial Number Prefixes 3031A and Above — Maximum Output Level

Adjustment	Frequency Range (MHz)	Std (dBm)	Opt. 001 (dBm)	Opt. 004 (dBm)	Opt. 005 (dBm)	Opt. 008 (dBm)	001 008 (dBm)	004 008 (dBm)	005 008 (dBm)
"B1" A1A2R61	2000-6600	+8	+10	+7	+9	+8	+9	+7	+8
"B2"	6620-8000	+8	+10	+7	+9	+8	+9	+7	+8
A1A2R59	8020-12300	+10	+11	+9	+9	+10	+11	+9	+10
"B3"	12320-16000	+10	+11	+9	+9	+10	+11	+9	+10
A1A2R58	16020-18000	+8	+10	+7	+9	+10	+12	+8	+10
	18020-18600	+4	+6	+2	+4	+10	+12	+8	+10
"B4"	18620-22000	+4	+6	+2	+4	+10	+12	+8	+10
A1A2R57	22020-26000	0	+3	−2	+1	+10	+12	+8	+10

5-32. AM Accuracy and Meter Adjustment

Reference Service Sheets 20 and 21

Description The AM log amp is adjusted for calibrated AM depth accuracy and the AM meter circuit is adjusted for accurate indication of AM depth.

Equipment

Digital Voltmeter (DVM)	HP 3456A or HP 3455A
Modulation Analyzer	HP 8902A/HP 11722A
Amplifier	HP 8447E or HP 8447F
Test Oscillator	HP 8116A
Mixer	RHG DMS1-26
Local Oscillator	HP 8340B

Procedure

1. Connect the equipment as shown in figure 5-33.

Note

Connect the mixer directly to the local oscillator to avoid any power loss.

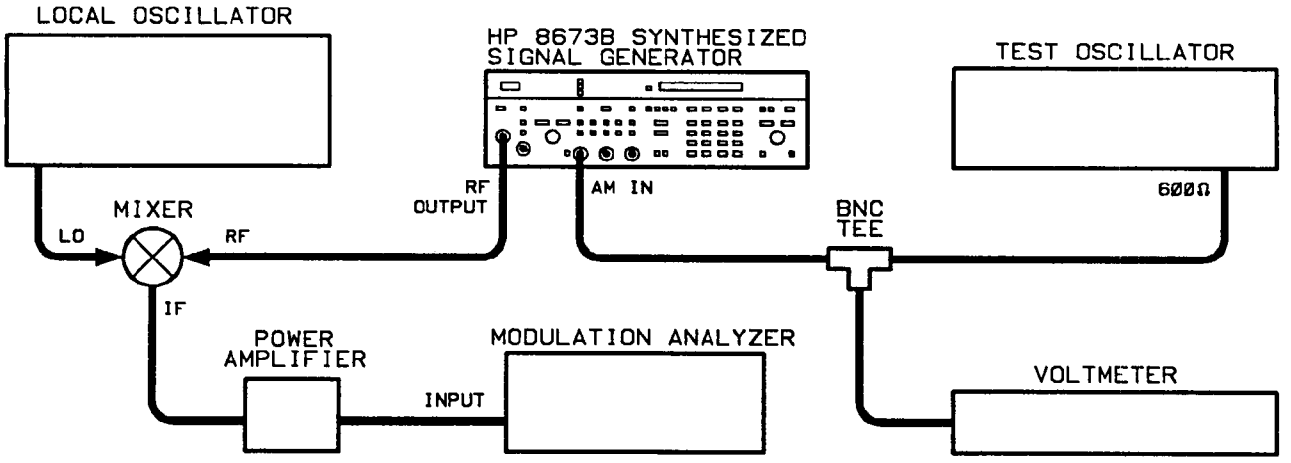


Figure 5-32. AM Accuracy and Meter Adjustment Test Setup

2. On the Signal Generator press (RCL) (0). Set the instrument to 2 GHz, −25 dBm output level, 100% AM, and AM meter scale.
3. Set the local oscillator to 2.07 GHz at +5 dBm.
4. Set the test oscillator's amplitude for a voltmeter reading of 0.5303 Vrms at 1 kHz.
5. Adjust "AM CAL" A1A3R83 on the Function Assembly for a modulation analyzer reading of 73.00 ±0.01% AM depth.

Note

AM CAL is set to 73% AM instead of 75% AM to compensate for internal temperature variations. With the covers installed the actual 75% AM corresponds to the meter reading of 75% AM.

6. Adjust "AM MTR" A1A6R84 on the meter assembly so that the signal generator's meter reads exactly 75% on the middle scale.

5-33. Pulse Modulation Adjustment

Reference Service Sheets 15, 17, and 22

Description The pulse clamp circuitry is adjusted to the low level dynamic range of the internal ALC detector circuitry in pulse mode. This prevents excessively long response times at low duty cycles. The maximum output of the Pulse Amplitude Control (PAC) DAC is adjusted with all DAC bits set high. This affects the range and resolution of the YTM bias sensing that supplies the input to the pulse amplitude control (PAC) circuit. The YTM injected pulse width is adjusted to provide pre-biasing of the YTM step-recovery diode at the proper time. The series pulse width between adjustment is set so as to not conflict with the shunt pulse. The relative timing between the series and shunt pulses is critical for proper modulation performance. The ALC sample pulse timing is adjusted to select the optimum time period for which the ALC loop is activated for pulse purposes. The ALC sample pulse fine adjustments are set to minimize the difference in power between CW (continuous wave) and pulse modes at minimum pulse width. The minimum pulse width indicator circuit is adjusted to turn on the UNLEVELED status annunciator when the pulse width becomes less than 100 ns.

Equipment

Digital Voltmeter	HP 3456A or HP 3455A
Oscilloscope	HP 1980B/19860A
Pulse Generator	HP 8116A or HP 8013B
HP-IB Controller	HP 85B/00085-15002/00085-15004/00085-15005
Crystal Detector	HP 8473C
Test Cassette	HP 11726-10002
Shunt Adapter	Fabricated Locally (see figure 5-36)

Procedure

Note

Different printed circuit board layouts exist. The same adjustment procedure applies to all. However, reference designations for the pots and test points are different. These parts are referred to by their descriptive name first, then by their newer reference designation and finally, in parentheses, by their older reference designation. For example, "PCP" A1A2R97 (A1A2A2R21).

Newer A1A2 reference designations apply to instruments with serial number prefixes 2729A and above. Older A1A2 and A1A2A1 reference designations apply to instruments with serial number prefixes 2708A and below.

Pulse Clamp and PAC DAC Sensitivity—Manual Adjustment

Note

This is a manual procedure. An alternate Pulse Clamp and PAC DAC Sensitivity adjustment procedure follows this. It is an automated procedure which should be used if an HP-85 computer and 11726-10002 software are available.

1. On the Signal Generator, set RF ON/OFF to ON and PULSE NORM to on.
2. Connect the digital multimeter to "BUF OUT" A1A2TP6 (A1A2C6).
3. Adjust "PCP" A1A2R97 (A1A2A2R21) for −0.61 ±0.03 Vdc.
4. Connect digital multimeter to "BIAS 2" A1A5TP2. Jumper "BIAS TRK" A1A5TP3 to chassis ground.
5. Set RF ON/OFF to ON.
6. Adjust "BIAS" A1A5R47 for +2.750 ±0.005 Vdc.
7. Remove jumper and digital multimeter.

Pulse Clamp and PAC DAC Sensitivity—Automated Adjustment

Note

This is an automated procedure. An alternate Pulse Clamp and PAC DAC Sensitivity adjustment procedure precedes this. It is a manual procedure which should be used if an HP-85 computer and 11726-10002 software are not available.

Note (cont'd)

Some of the reference designations for the pots and test points have changed. Old and new reference designations are referenced in the following list. Reference designations that are not listed have not changed.

Old Reference Designations	Name	New Reference Designations
A1A2C6	BUF OUT	A1A2TP6
A1A2A2R21	PCP	A1A2R97

1. Set the Signal Generator's HP-IB address to 19.
2. Connect the equipment as shown in figure 5-33.

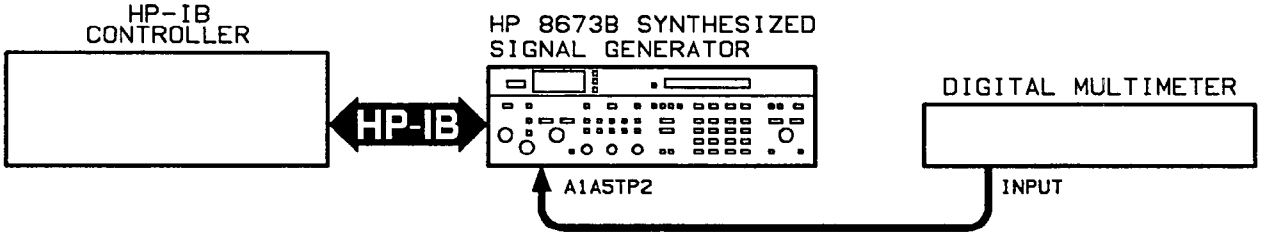


Figure 5-33. PAC DAC Adjustment Test Setup

3. Load the test program "EXEC" if the Main Menu, figure 5-2, is not presently displayed. Instructions can be found in the paragraph entitled "Automated Adjustment Procedures" in this chapter.
4. After the program is loaded and the Main Menu is displayed, press [k4] to run the "Pulse" adjustment program.
5. When the Pulse adjustment program appears press [k1], DACSENS, to select the PAC DAC adjustment routine.
6. Instructions for the remainder of the procedure will be displayed on the controller's screen.

YTM Injected Pulse Width Adjustment

Note

This adjustment is not critical and is being reserved for future options.

1. Set "YPW" A1A4R19 to the center of its range.

Series Pulse Width Adjustment

1. Connect the pulse generator to the oscilloscope as shown in figure 5-34.

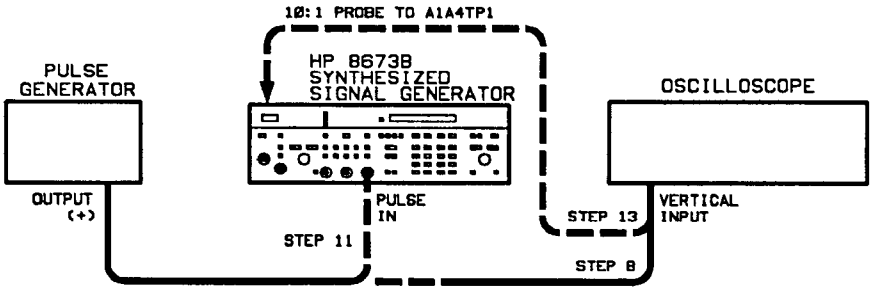


Figure 5-34. Series Pulse Width Adjustment Test Setup

2. Set the pulse generator pulse period range to 20 ns – 1 μs range, pulse delay range to the 35 ns – 1 μs range, pulse width range to 10 ns – 1 μs, and the amplitude range to 4 –10 Vpk. Select pulse DOUBLE/NORM to NORM, output NORM/COMPL to NORM, Offset (μ Output) to OFF, and INT load to OUT.
3. Set the oscilloscope's vertical input to DC coupled, 50Ω impedance and adjust the pulse generator's amplitude for a 5V peak-to-peak signal, the pulse period to 1 μs, and the pulse width to approximately 200 ns using the waveform displayed on the oscilloscope.
4. Connect the output of the pulse generator to the PULSE IN connector on the Signal Generator.
5. Set the oscilloscope's input to AC mode, 1 MΩ impedance.
6. Connect the input of the oscilloscope to A1A4TP1 using a 10:1 high frequency probe.
7. Set the oscilloscope's vertical sensitivity to 0.1V per division.
8. On the Signal Generator, set the frequency to 6.6 GHz and select PULSE NORM mode.
9. Adjust the pulse generator's pulse delay to center the pulse waveform on the oscilloscope display.
10. Adjust "SPW" A1A4R25 to obtain the waveform shown in figure 5-35.

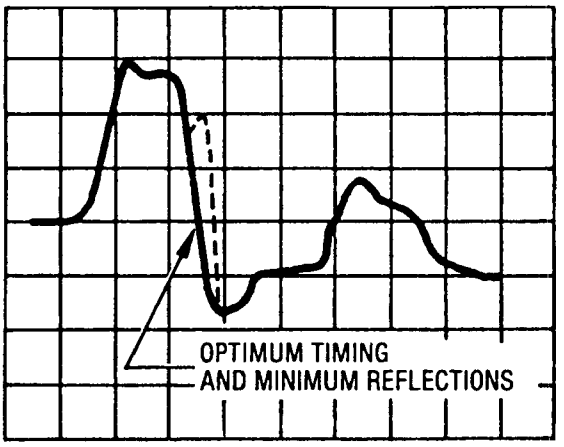


Figure 5-35. Series Pulse Width Waveform

ALC Sample Pulse Adjust

1. Set "MPW" A1A4R9 fully clockwise.
2. Set the pulse generator's pulse period to 1 μs and the pulse width to 98 μs.
3. Connect a 10:1 high impedance probe from the channel 1 input of the oscilloscope to "SMPL" A1A4TP14.
4. Set the Signal Generator's frequency to 6.6 GHz and PULSE NORM mode to on.
5. Set the oscilloscope as follows:
   a. Channel 1 = 2 V/Div, dc coupled.
   b. Channel 2 = .005 V/Div, dc coupled, 50Ω.
   c. Display Modes = vert disp to alt, horiz disp to main, sweep mode to auto, main trig to dc, ext; time/div to 0.05 μs.
6. Connect channel 2 to the shunt adapter (figure 5-36) output as shown in figure 5-37. The cable between the oscilloscope and the shunt adapter must not be longer than 24 inches.

Note The shunt adapter can easily be fabricated using 2 BNC connectors and a 147 ohm resistor as shown in figure 5-36.

7. Set the Signal Generator's output level to +10 dBm.
8. Adjust channel 2 vertical sensitivity for maximum vertical deflection.
9. On the pulse generator, set the pulse period to approximately 1 μs and the pulse width to 100 $\pm$ 3 ns using the displayed RF detected pulse waveform on channel 2 of the oscillocope.

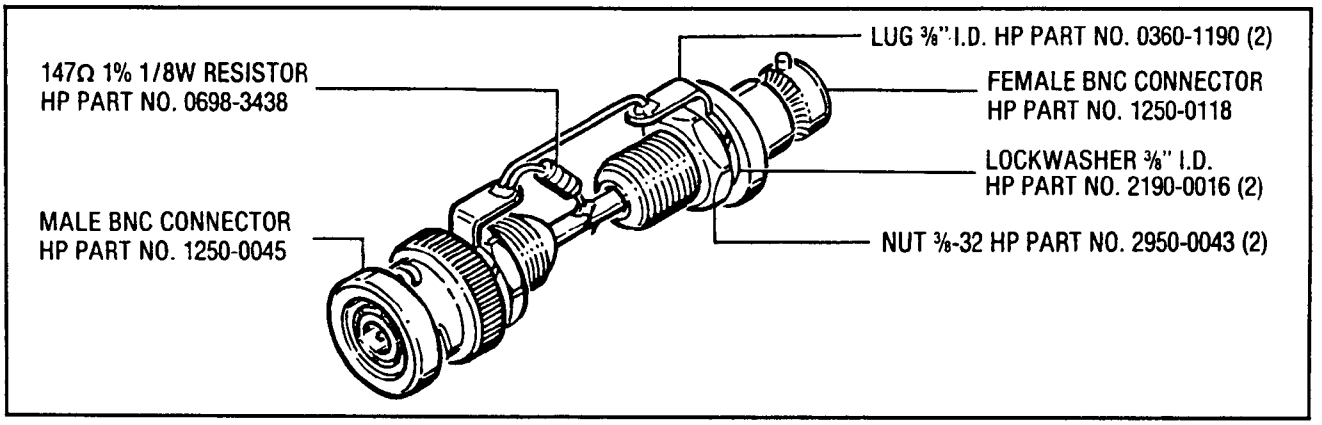


Figure 5-36. Pulse Shunt Adapter

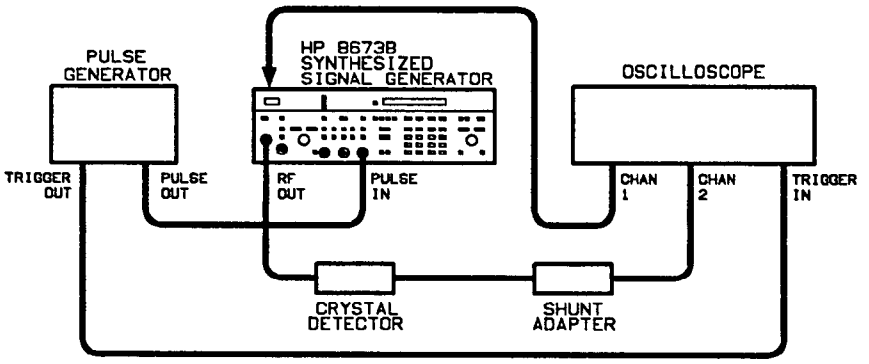


Figure 5-37. ALC Sample Pulse Adjustment Test Setup

10. Switch the Signal Generator between PULSE NORM and PULSE OFF modes.
11. Adjust "TE" A1A4R43 to minimize the difference between PULSE OFF (CW) and PULSE NORM modes. The modes should be within ± 1 dB of each other on the scope display.

Note

The display can be calibrated to show ± 1 dB using the output level vernier control and the Signal Generator's front panel meter.

12. Set the Signal Generator's output level to −10 dBm or the lowest power out that will give at least 4 divisions of deflection on the oscilloscope's 1 mV/div range. Change oscilloscope channel 2 coupling to dc (switch out of 50Ω mode).

Note The closer the adjustment point is to −10 dBm output power, the more accurate the measurement becomes as long as a four division deflection is maintained.

13. Readjust the oscilloscope's channel 2 vertical sensitivity for a display greater than 4 divisions.
14. Adjust "LE" A1A4R52 to minimize the difference between PULSE OFF and PULSE NORM modes.
15. Repeat steps 7 through 14 until the error is minimized at both power levels. Remember to use dc 50Ω coupling when making the high output level adjustment.

Note Try to adjust sample pulse as wide as possible while not sacrificing accuracy in order to do so. See figure 5-38.

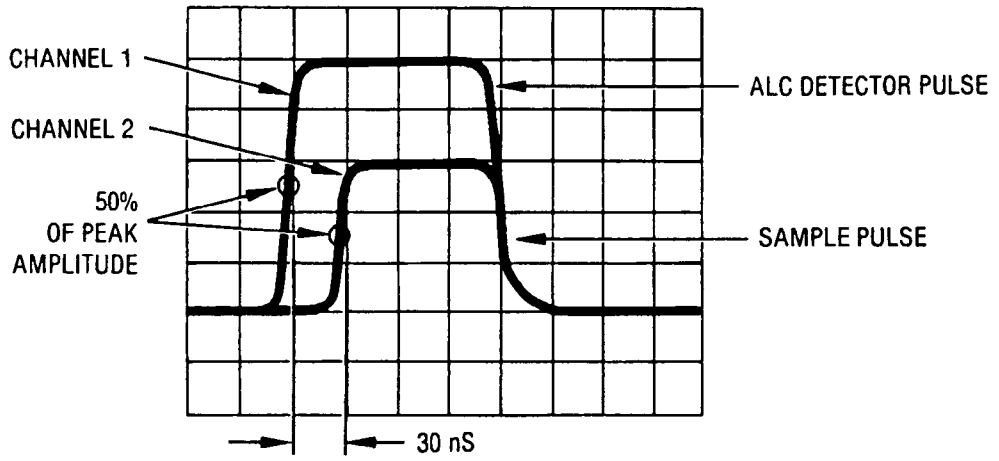


Figure 5-38. ALC Sample Pulse Waveform

Minimum Pulse Width Indicator Adjustment

1. Set the Signal Generator to PULSE NORM mode and output frequency to 6.6 GHz.
2. Set "MPW" A1A4R9 fully clockwise.
3. Set the pulse generator's pulse period to approximately 1 μs and the pulse width to 80 ±3 ns using the oscilloscope display.
4. Adjust "MPW" A1A4R9 in a counterclockwise direction until the Signal Generator's front panel UNLEVELED status annunciator just turns off.
5. Set the pulse generator's pulse width vernier fully clockwise, then slowly rotate it counterclockwise. The UNLEVELED status annunciator should turn on after the pulse width narrows to less than 100 ns.

5-34. Pulse Amplitude Control—Manual Adjustment

Note

This procedure applies only to instruments with serial number prefixes 2629A, 2626A, 2608A, and 2536A and below. In other instruments, adjustments have been replaced by data in the SRD Bias Board ROM A1A8U13. Data is unique for each YTM and instrument.

This is a manual procedure. An alternate Pulse Amplitude Control procedure follows this. It is an automated procedure which should be used if an HP 85 computer and 11726-10002 software are available.

Reference

Service Sheet 19

Description

The amplitude of the YTM Bias pulse affects rise time, overshoot, and general pulse shape of the pulse modulat ed microwave carrier. This amplitude is controlled by the pulse amplitude control (PAC) voltage. To maintain good pulse shape over the Signal Generators full frequency and output level range, the PAC voltage must be adjusted properly. The required PAC voltage will vary with both frequency and output level setting of the Signal Generator. The level of the PAC voltage in each harmonic frequency band is controlled by a slope and offset adjustment. The label for each adjustment is as follows:

Frequency:	Band 2	Band3	Band4
Adjustment:	B2 OF B2 SL	B3 OF B3 SL	B4 OF B4 SL

Equipment

Oscilloscope	HP 1980B/19860A
Pulse Generator	HP 8116A or HP 8013B
Crystal Detector	HP 8473C
Shunt Adapter	Locally fabricated (see figure 5-36)

Procedure

1. Connect the equipment as shown in figure 5-39.
2. On the Signal Generator:
   a. Press [6] key.
   b. Press service switch A2A2S1.
3. On Pulse Generator:
   a. Set pulse period range to 20 ns −1 μs.
   b. Set pulse delay range to 35 ns −1 μs.
   c. Set pulse width range to 10 ns −1 μs.
   d. Set MODE to NORM.
   e. Set POL to POS.
   f. Set amplitude range to 4 to 10 Vpk.

g. Set OFFSET (+Output) to OFF.
h. Set INT LOAD to OUT.

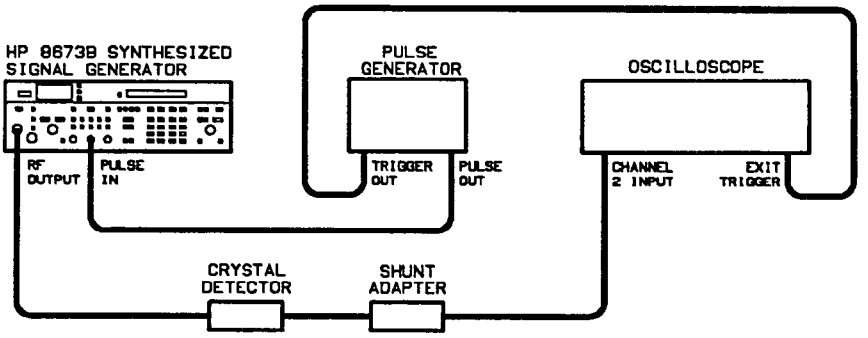


Figure 5-39. Pulse Amplitude Control Manual Adjustment Test Setup

4. Set Oscilloscope channel 2 input to DC coupled, 50Ω impedance, inverted. Adjust Pulse Generator amplitude to display waveform as shown in figure 5-40.
5. On the Signal Generator:
   a. Press (RCL) then (2) keys.
   b. Set OUTPUT LEVEL RANGE to 0.0 dB.
   c. Using OUTPUT LEVEL VERNIER, set output power level to −10 dBm.
   d. Set PULSE NORM to ON.

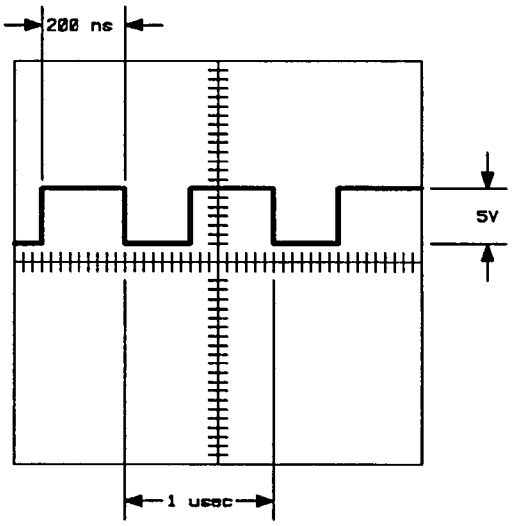


Figure 5-40. PAC Adjustment Waveform

6. Set the Signal Generator frequency to 6.600 002 GHz. Set Oscilloscope input coupling to DC 1MEGΩ.

a. Adjust "B2 OF" A1A8R13 overshoot and undershoot to under 20%.

7. Using TUNE KNOB, tune the Signal Generator to 12.2 GHz.

   a. Adjust "B2 SL" A1A8R10 for a pulse shape with less than 20% overshoot and undershoot.

8. Using TUNE KNOB, tune the Signal Generator to 6.600 002 GHz. Using OUTPUT LEVEL VERNIER, set output power level to +3 dBm. Switch Oscilloscope input coupling to DC 50Ω.

   a. Adjust "B2 OF" A1A8R13 for a detected pulse with less than 20% overshoot and undershoot.

9. Using TUNE KNOB, tune the Signal Generator to 12.200 000 GHz.

   a. Adjust "B2 SL" A1A8R10 for a detected pulse with less than 20% overshoot and undershoot.

10. Repeat steps 6 through 9 until four points are within specifications.

11. Using OUTPUT LEVEL VERNIER, set the Signal Generator output power level to +3 dBm.

12. Using TUNE KNOB, tune the Signal Generator from 6.600 002 GHz to 12.200 000 GHz and verify that detected pulse has less than 20% overshoot and undershoot.

13. Repeat steps 11 and 12 with output power levels of −5 and −10 dBm. Use DC 1MEGΩ coupling to view −10 dBm pulse.

14. On the Signal Generator:

    a. Press (RCL) then (3) keys.
    b. Set frequency to 12.300 003 GHz.
    c. Set OUTPUT LEVEL RANGE to 0.0 dB.
    d. Using OUTPUT LEVEL VERNIER, set output power level to −10 dBm.
    e. Adjust "B3 OF" A1A8R14 for a detected pulse with less than 20% overshoot and undershoot.

15. Using TUNE KNOB, tune the Signal Generator to 18.5999 901 GHz.

    a. Adjust "B3 SL" A1A8R11 for a detected pulse with less than 20% overshoot and undershoot.

16. Using TUNE KNOB, tune the Signal Generator to 12.300 003 GHz. Using OUTPUT LEVEL VERNIER, set output power level to +3 dBm. Switch Oscilloscope input coupling to DC 50Ω.

    a. Adjust "B3 OF" A1A8R14 for a detected pulse with less than 20% overshoot and undershoot.

17. Using TUNE KNOB, tune the Signal Generator to 18.599 901 GHz.

a. Adjust "B3 SL" A1A8R11 for a detected pulse with less than 20% undershoot and overshoot.

18. Repeat steps 14 through 17 until all four frequency/power output levels are within specifications.
19. Set the Signal Generator output power level to +3 dBm.
20. Using TUNE KNOB, tune from 12.300 003 to 18.599 901 GHz and verify that detected pulse has less than 20% overshoot and undershoot.
21. Repeat steps 19 and 20 with output power levels of −5 and −10 dBm. Use DC 1MEGΩ coupling to view −10 dBm.
22. On the Signal Generator:
    a. Press (RCL) then (4) keys.
    b. Set frequency to 18.600 004 GHz.
    c. Set OUTPUT LEVEL RANGE to 0.0 dB.
    d. Using OUTPUT LEVEL VERNIER, set output power level to −10 dBm.
    e. Adjust "B4 OF" A1A8R15 for a detected pulse with less than 20% overshoot and undershoot.
23. Using the TUNE KNOB, tune the Signal Generator to 25.999 904 GHz.
    a. Adjust "B4 SL" A1A8R12 for a detected pulse with less than 20% overshoot and undershoot.
24. Using TUNE KNOB, tune to 18.600 004 GHz. Using OUTPUT LEVEL VERNIER, set output power level to +3 dBm. Switch oscilloscope input coupling to DC 50Ω.
    a. Adjust "B4 OF" A1A8R15 for a detected pulse with less than 20% overshoot and undershoot.
25. Using the TUNE KNOB, tune the Signal Generator to 25.999 904 GHz.
    a. Adjust "B4 SL" A1A8R12 for a detected pulse with less than 20% overshoot and undershoot.
26. Repeat steps 22 through 25 until all four frequency/power output levels are within specifications.
27. Set the Signal Generator output power level to +3 dBm.
28. Using TUNE KNOB, tune from 18.600 004 GHz to 25.999 904 GHz and verify that detected pulse has less than 20% overshoot and undershoot.
29. Repeat steps 27 and 28 with output power levels of −5 and −10 dBm. Use DC 1MEGΩ coupling to view −10 dBm pulse.

5-35. Pulse Amplitude Control—Automated Adjustment

Note

This procedure applies only to instruments with serial number prefixes 2629A, 2626A, 2608A, and 2536A and below. In other instruments, adjustments have been replaced by data in the SRD Bias Board ROM A1A8U13. Data is unique for each YTM and instrument.

This is an automated procedure. An alternate Pulse Amplitude Control procedure follows this. It is a manual procedure which should be used if an HP 85 computer and 11726-10002 software are not available.

Reference

Service Sheet 19

Description

The amplitude of the YTM Bias pulse affects rise time, overshoot, and general pulse shape of the pulse modulated microwave carrier. This amplitude is controlled by the pulse amplitude control (PAC) voltage. To maintain good pulse shape over the Signal Generators full frequency and output level range, the PAC voltage must be adjusted properly. The required PAC voltage will vary with both frequency and output level setting of the Signal Generator. The level of the PAC voltage in each harmonic frequency band is controlled by a slope and offset adjustment. The label for each adjustment is as follows:

Frequency:	Band 2	Band3	Band4
Adjustment:	B2 OF	B3 OF	B4 OF
	B2 SL	B3 SL	B4 SL

Pulse Program Menu

The PAC voltage adjustment is computer assisted and runs on an HP 85B controller. To run the program, load the "Autost" file on the Test Cassette, HP Part No. 11726-10002. Press run when loaded. After the "EXEC" Program Main Menu is displayed, press the special function key [k4], PULSE. This will load and run the Pulse adjustment routine. The following Pulse Program Menu will then be displayed.

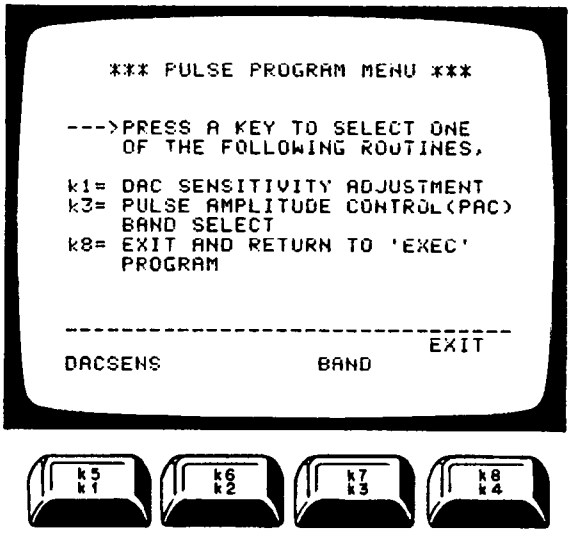


Figure 5-41. Pulse Program Menu

The user then selects [k3], Band. After [k3] is pressed a new menu (figure 5-42) will be displayed.

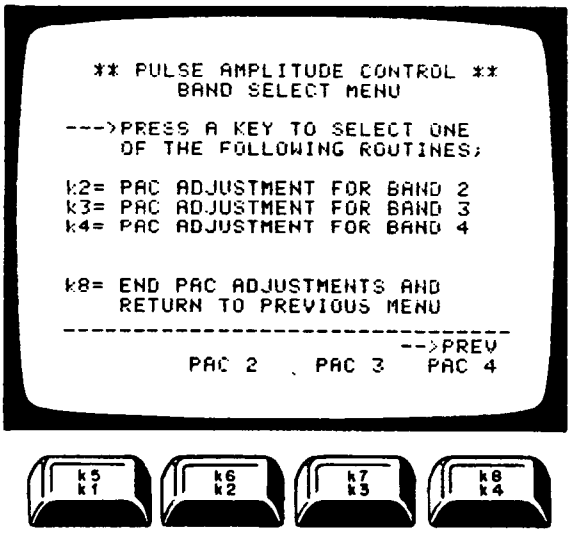


Figure 5-42. Pulse Amplitude Control Band Select Menu

The user can then select Bands 2, 3 or 4 PAC adjustment. The adjustment procedure for each band is identical, therefore the following discussion for Band 2 applies to all bands.

Band 2 Adjustment

The user then selects [k2], PAC 2, for the Band 2 adjustment. Keys [k3] and [k4] are selected for Band 3 and Band 4 PAC adjustments, respectively. The following PAC Adjustment Menu will then be displayed.

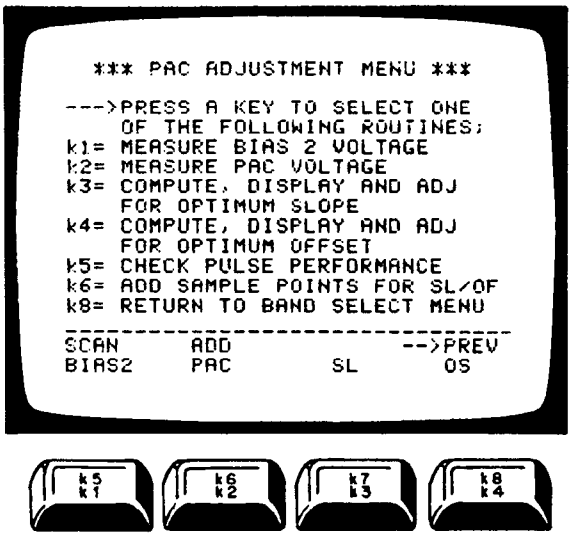


Figure 5-43. PAC Adjustment Menu

BIAS 2

The user then selects (k1), BIAS 2. This routine will first set the Signal Generator to the highest frequency in the band (example 12.3 GHz for Band 2). Next it will measure and store the YTM Bias 2 voltage at two different output level vernier settings, −10 dBm and +8 dBm. These two Bias 2 voltage levels will be used later to calculate and plot the optimum settings for the PAC voltage slope and offset adjustments.

PAC

The user then selects (k2), PAC. The controller will then set the Signal Generator to the PULSE NORM mode and the user will view the detected pulse modulated signal on the oscilloscope. The user then adjusts the PAC voltage using either B2 OF or B2 SL pots to obtain the optimum pulse shape. The pulse shape should be as flat as possible with minimum overshoot and rise time. The user can observe the PAC voltage change on the DVM while adjusting OF or SL pots.

The PAC voltage is adjusted initially at one frequency for two power level settings (for example, 12.3 GHz at −10 dBm and +8 dBm). The optimum PAC voltage found by the user for these two points is then measured and stored by the controller when the 'CONT' key is pressed.

The controller then uses these two PAC voltages to compute the optimum slope and offset settings for all frequency and output levels. The user will then be guided to these desired settings in the SL, (k3) and OS, (k4) routines. This will result in the most optimum PAC voltages providing the best possible pulse shape, at all instrument sampled frequency and output levels.

SL

The user then selects [k3], SL. The controller switches the instrument between two output levels continuously and measures the PAC voltage at each level. It will then compute the real-time slope and display the slope error from the optimum computed slope. To observe the slope error, the user views the DVM and notes the reading during the time that the DVM is in "External Trigger Mode". All other readings must be ignored. The reading displayed will be a dimensionless number representing the slope error. The slope pot for that band is then adjusted for 0.00 ±0.005 on the DVM. If the error is negative, turn the pot clockwise to compensate. If the error is positive, turn the pot counterclockwise.

OS

The user then selects [k4], OS. Again the DVM will continuously cycle and switch between internal and external trigger. Observe the reading during the DVM "External Trigger Mode" and adjust the OS pot for 0.00 ±0.001.

SCAN

The user must now check the adjustment at several frequencies and power levels. To do this the user can select [k5], SCAN. When [k5], SCAN, is selected the Pulse Scan Menu will be displayed. See figure 5-44.

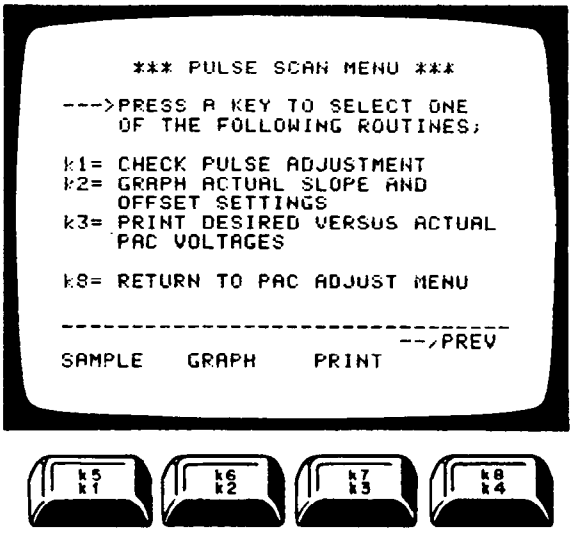


Figure 5-44. Pulse Scan Menu

SAMPLE

The user should select [k1], SAMPLE, at this time. Sample is used to check selected frequency points. The controller will set the Signal Generator to various frequencies and power levels as the user checks for excessive overshoot and rise times.

GRAPH and PRINT Routines

Graph, [k2] and Print, [k3] can optionally be selected by the user to print actual data results of the adjustment. GRAPH prints a graph of Vbias2 versus Vpac. PRINT is used to print the desired versus actual PAC voltages. Examples of both printouts are shown below. See figures 5-45 and 5-46.

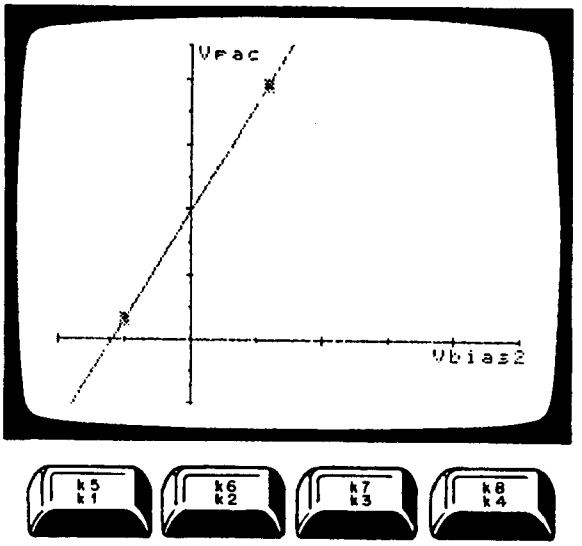


Figure 5-45. Graph Routine

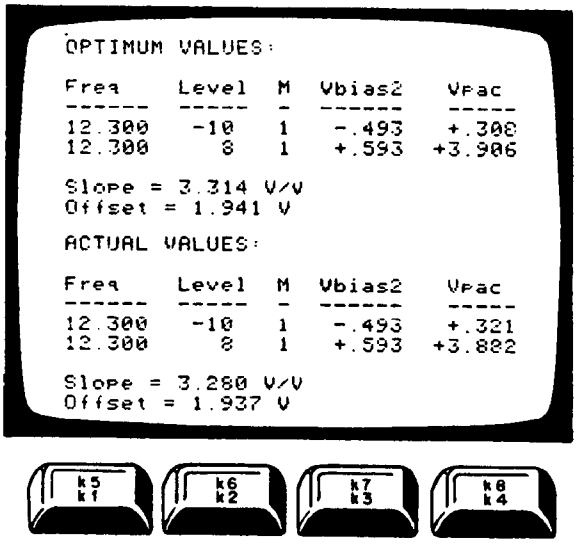


Figure 5-46. Print Routine

Once the user is satisfied with the adjustment of the sampled points, it is then necessary to return the Signal Generator to local operation by pressing the LOCAL key and check all frequencies and power levels in Band 2. If points are found out of specification press [k8],

PREV and refer to ADD function, [k6] below. If all points in Band 2 are within specification then press [k8], PREV twice to return to the PAC Band Select Menu.

Note

Care should be taken when checking performance to the instrument specification with this test setup. High overshoot and ringing can be caused by SWR reflections in the test system. If this occurs, add additional attenuator pads to the output of the detector before the amplifier. This may alleviate problems.

ADD FUNCTION

The add function is selected if the user finds one or several frequencies or power levels that are out of specification while checking overall instrument pulse performance. By selecting [k6], ADD, compromises in the optimum slope and offset adjustment settings can be made. The user will first enter the frequencies where out of spec performance was found. Bias 2 and PAC voltage data will then be entered for the new sampled points. The controller will then recompute the optimum slope and offset, taking into consideration all sampled data points. The PAC Adjustment Menu will then be displayed. The user then readjusts the recommended points using SL and OS key functions.The SCAN function is then used again to observe the performance of all sampled points. This iterative procedure is continued until all frequency and output level points are within specified performance. Normally this will be achieved in one iteration of the procedure.

Equipment

Oscilloscope	HP 1980B
Pulse Generator	HP 8013B
Preamplifier	HP 8447F
Crystal Detector	HP 8473C
HP-IB Controller with Optional ROM	HP 85B/00085-15005/ 00085-15002/00085-15004
Test Cassette	HP 11726-10002
Attenuator, Step	HP 355D

Procedure

1. Set the Signal Generator's HP-IB address to 19.
2. Connect the equipment as shown in figure 5-47.

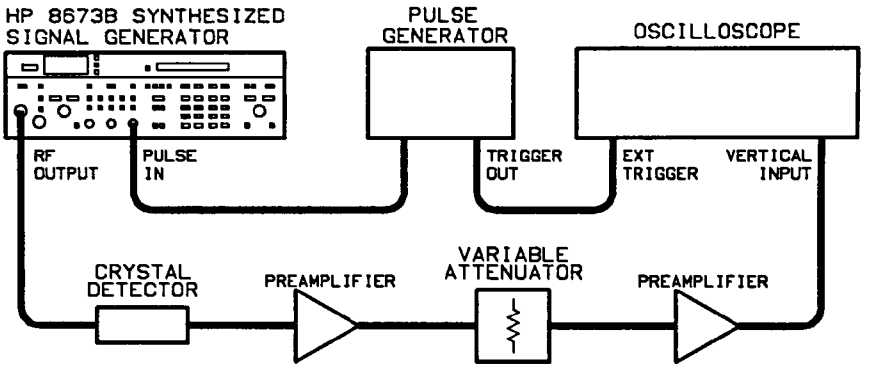


Figure 5-47. Pulse Amplitude Control Adjustment Test Setup

3. Load the test program "EXEC" if the Main Menu is not presently displayed. Instructions can be found in the paragraph titled "Automated Adjustment Procedures" in this section.
4. After the "EXEC" program is loaded and the Main Menu is displayed, press [k4] to run the "Pulse" adjustment.

5-36. Sweep Out, Blanking/Marker, and Frequency Reference Adjustments

Reference Service Sheets 26 and 31

Description The ramp is adjusted for 0 to +10V and is available at the rear panel SWP OUT connector. The Z-axis intensity marker is adjusted to −5V and is available at the rear panel Blanking/Marker connector.

For instruments with serial number prefixes 2552A, and 2634A and above, the 0.5 V/GHz FREQ REF output is adjusted.

Equipment

Oscilloscope	HP 1980B/19860A
MPU Test Board	HP 11726-60001

Note The MPU Test Board is part of the HP 11726A Support Kit or can be ordered separately from your nearest HP Sales office.

Procedure

1. Set the Signal Generator's LINE switch to STBY, then remove the top cover.
2. Connect the MPU test board to Microprocessor Assembly A2A8.
3. On the Microprocessor Assembly, short A2A8TP5 to the adjacent GND test point.
4. Set diagnostic switch A2A8S1, on the Microprocessor Assembly, to 4. (Diagnostic mode 4 enables testing of circuits on the A2A7 I/O Assembly.)
5. Set the LINE switch to ON.
6. Verify that the FREQUENCY MHz display shows 04-1, indicating that the diagnostic switch is correctly set to diagnostic mode 4.
7. Connect the Signal Generator to the oscilloscope's channel 2 input as shown in figure 5-48.

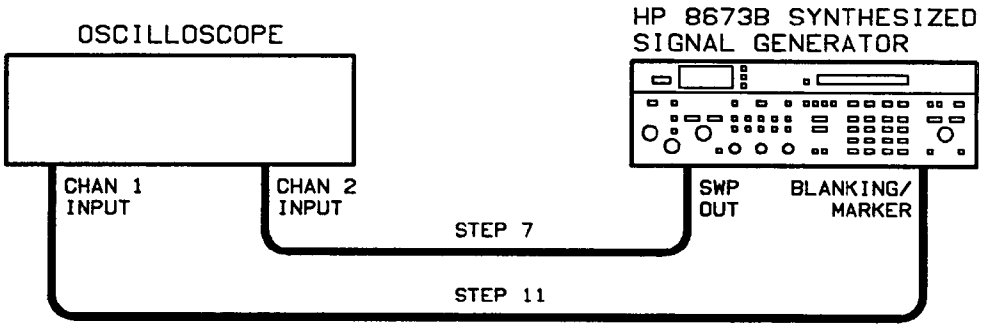


Figure 5-48. Sweep Out, Blanking/Marker, and Frequency Reference Adjustments Test Setup

8. Set the oscilloscope's trigger to channel 2 and set channel 2 vertical input for dc coupling. Adjust the oscilloscope for the display shown in figure 5-49.

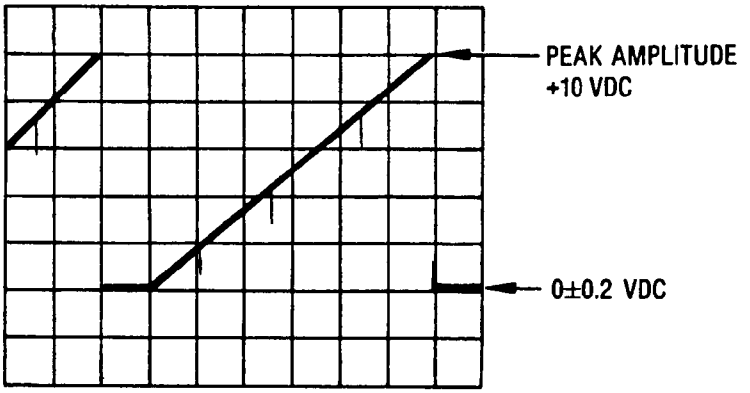


Figure 5-49. Sweep Out Waveform

9. Set SWP (A2A7R34) for a +10V ramp peak-to-peak. Verify that the ramp contains no discontinuities.
10. Connect the rear panel BLANKING/MARKER BNC connector to channel 1 of the oscilloscope, leaving the trigger set to channel 2.
11. Using the GND on channel 1 of the oscilloscope, set a reference for normal output level (see figure 5-50).

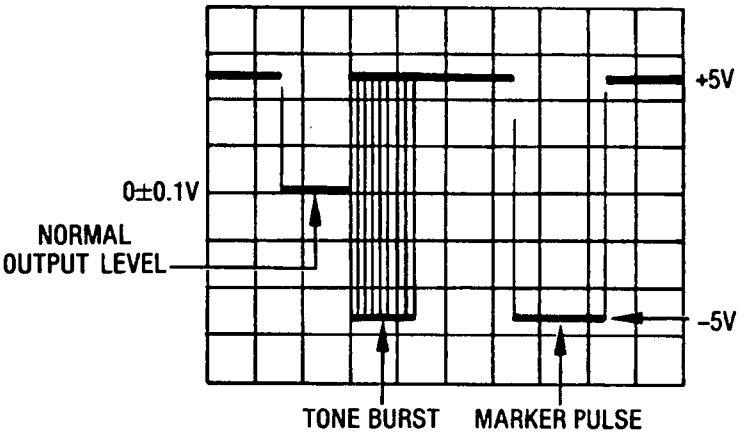


Figure 5-50. Marker Waveform

12. Switch channel 1 to dc coupling.
13. Adjust MKR (A2A7R50) for a marker pulse −5V below the reference.

Note

This procedure applies only to instruments with serial number prefixes 2552A, 2634A, and above. These are the only instruments that have the adjustable 0.5 V/GHz output.

14. Set the FREQ REF switch A2A7S2 to the 0.5 position.
15. Remove the MPU test board and jumper.
16. Connect the rear panel FREQ REF connector to channel 1 of the oscilloscope. Switch the oscilloscope to internal trigger.
17. On the Signal Generator, press [RCL] and [0] and set the frequency to 26 GHz.
18. Adjust FREF A2A7R59 for an oscilloscope indication of +13.0 Vdc.

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6

Replaceable Parts

6-1. Introduction

This chapter contains information for ordering parts. Table 6-1 lists exchange assemblies. Table 6-2 lists abbreviations used in the parts list and the manual. Table 6-3 lists all replaceable parts in reference designator order. Table 6-4 contains the names and addresses that correspond to the manufacturer's code numbers.

6-2. Exchange Assemblies

Table 6-1 lists assemblies within the instrument that may be replaced on an exchange basis. Exchange, factory-repaired and tested assemblies are available only on a trade-in basis. Defective assemblies must be returned for credit. Assemblies required for spare parts stock must be ordered by the new assembly part number.

6-3. Abbreviations

Table 6-2 lists abbreviations used in the parts list, schematics, and throughout the manual. In some cases, two forms of the abbreviation are used, one all in capital letters, and one with partial or no capitals. This occurs because the abbreviations in the parts list are always all capitals. However, in the schematics and other parts of the manual, other abbreviation forms are used with both lower case and upper case letters.

6-4. Replaceable Parts List

Table 6-3 is the list of replaceable parts and is organized as follows:

a. Electrical assemblies and their components in alpha-numerical order by reference designation.

b. Chassis-mounted parts in alpha-numerical order by reference designation.

c. Mechanical parts.

Information given for each part consists of the following:

a. The Hewlett-Packard part number.

b. Part number check digit (CD).

c. The total quantity (Qty) for the entire instrument except for option assemblies.

d. The description of the part.

e. A typical manufacturer of the part in a five-digit code.

f. The manufacturer's number for the part.

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

Note Total quantities for optional assemblies are totaled by assembly and not integrated into the standard list.

6-5. Ordering Information

To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number (with the check digit), indicate the quantity required, and address the order to the nearest Hewlett-Packard office. The check digit will ensure accurate and timely processing of your order.

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

6-6. Spare Parts Kit

Stocking spare parts for an instrument is often done to ensure quick return to service after a malfunction occurs. Hewlett-Packard has a "Spare Parts Kit " available for this purpose. The kit consists of selected replaceable assemblies and components for this instrument. The contents of the kit and the "Recommended Spares" list are based on failure reports and repair data, and provide parts support for one year. A complimentary "Recommended Spares" list for this instrument may be obtained on request and the "Spare Parts Kit" may be ordered through the nearest Hewlett-Packard office.

Table 6-1. Part Numbers for Exchange Assemblies

Reference Designation	Description	Part Number*	
		Exchange Assy	New Assy
A1A10	YTM Assembly (Except Opt. 008) YTM Assembly (Opt. 008)	08673-69011 08673-69013	08673-60165 08673-60187
A1A11	Power Amplifier	08673-69017	08673-67017
A1AT1	Programmed Attenuator −90 dB	08673-60254	08673-60244
A3A1A4	M/N VCO Assembly	86701-60071	86701-60029
A3A9A8	Preamplifier Assembly	08673-69016	08673-67016

*When ordering extra assemblies for spare parts stock, use new assembly part number only. Exchange orders require return of the defective part.

Table 6-2. Reference Designations

REFERENCE DESIGNATIONS

A . . . . . assembly
AT . . . attenuator; isolator; termination
B . . . . . fan; motor
BT . . . . . battery
C . . . . . capacitor
CP . . . . . coupler
CR . . . . . diode; diode thyristor; varactor
DC . . . . directional coupler
DL . . . . . delay line
DS . . . . . annunciator; signaling device (audible or visual); lamp; LED
E . . . . . miscellaneous electrical part
F . . . . . fuse
FL . . . . . filter
H . . . . . hardware
HY . . . . . circulator
J . . . . electrical connector (stationary portion); jack
K . . . . . relay
L . . . . . coil; inductor
M . . . . . meter
MP . . . . . miscellaneous mechanical part
P . . . . electrical connector (movable portion); plug
Q . . . . . transistor; SCR; triode thyristor
R . . . . . resistor
RT . . . . . thermistor
S . . . . . switch
T . . . . . transformer
TB . . . . . terminal board
TC . . . . . thermocouple
TP . . . . . test point
U . . . . . integrated circuit; microcircuit
V . . . . . electron tube
VR . . . . voltage regulator; breakdown diode
W . . . . cable; transmission path; wire
X . . . . . socket
Y . . . . . crystal unit (piezoelectric or quartz)
Z . . . . tuned cavity; tuned circuit

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A1	08673-60104	6	1	BD AY ATTEN DRVR	28480	08673-60104
A1A1C1	0180-0291	3	1	CAP-FXD 1uF 35 V TA	56289	150D105X9035A2-DYS
A1A1C2	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A1A1C3	0160-0572	1	1	CAP-FXD 2200pF 100 V	04222	SR201C222MAAH
A1A1C4	0160-0572	1	1	CAP-FXD 2200pF 100 V	04222	SR201C222MAAH
A1A1C5	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A1C6	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A1CR2	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR3	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR4	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR5	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR6	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR7	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR8	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR9	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR10	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR11	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR12	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR13	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR14	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR15	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR16	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR17	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR18	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR19	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR20	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR21	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR22	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR23	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR24	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR25	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1CR26	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A1Q2	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A1A1R1	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A1R2	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A1R4	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A1R5	0757-0288	1	1	RESISTOR 9.09K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A1R6	0757-0289	2	1	RESISTOR 13.3K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A1U1	1820-0535	7	1	IC-INTERFACE DRVR BCD AND DUAL	01295	SN75451BP
A1A1U2	1820-0535	7	1	IC-INTERFACE DRVR BCD AND DUAL	01295	SN75451BP
A1A1U3	1820-1445	0	1	IC LCH TTL LS 4-BIT	01295	SN74LS375N
A1A1U4	1820-0535	7	1	IC-INTERFACE DRVR BCD AND DUAL	01295	SN75451BP
A1A1U5	1820-0535	7	1	IC-INTERFACE DRVR BCD AND DUAL	01295	SN75451BP
A1A1U6	1820-1445	0	1	IC LCH TTL LS 4-BIT	01295	SN74LS375N
A1A1U7	1820-0535	7	1	IC-INTERFACE DRVR BCD AND DUAL	01295	SN75451BP
A1A1U8	1820-0535	7	1	IC-INTERFACE DRVR BCD AND DUAL	01295	SN75451BP

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A2	08673-60200	3	1	ALC DET BD AY	28480	08673-60200
A1A2C1	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A2C2	0180-0374	3	1	CAP-FXD 10uF 20 V TA	56289	150D106X9020B2-DYS
A1A2C3	0180-2141	6	1	CAP-FXD 3.3uF 50 V TA	56289	150D335X9050B2-DYS
A1A2C4	0180-2141	6	1	CAP-FXD 3.3uF 50 V TA	56289	150D335X9050B2-DYS
A1A2C5	0160-3447	5	1	CAP-FXD 470pF 1 kV		CK45XE3A471K-A
A1A2C6	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C7	0160-2209	5	1	CAP-FXD 360pF 300 V MICA	09023	CD15FD361J03
A1A2C8	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C9	0160-5467	3	1	CAP-FXD 0.01uF 63 V POLYE-MET		MKS 2
A1A2C10	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C11	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C12	0160-5581	2	1	CAP-FXD 0.033uF 63 V POLYE-MET		MKS-2
A1A2C13	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A2C14	0180-0491	5	1	CAP-FXD 10uF 25 V TA		202L2502-106-M7-552
A1A2C15	0160-0573	2	1	CAP-FXD 4700pF 100 V	04222	SR201C472MAAH
A1A2C16	0160-0575	4	1	CAP-FXD 0.047uF 50 V	04222	SR205C473MAAH
A1A2C17	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A1A2C18	0160-4766	3	1	CAP-FXD 30pF 200 V		FD12C0G2D300J
A1A2C19	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A1A2C20	0160-0573	2	1	CAP-FXD 4700pF 100 V	04222	SR201C472MAAH
A1A2C21	0160-4794	7	1	CAP-FXD 5.6pF 100 V	04222	SA102A5R6DAAH
A1A2C22	0160-4574	1	1	CAP-FXD 1000pF 100 V	04222	SA101C102KAAH
A1A2C23	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C24	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C25	0180-2661	5	1	CAP-FXD 1uF 50 V TA		221M5002-105-K3-552
A1A2C26	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C27	0180-0374	3	1	CAP-FXD 10uF 20 V TA	56289	150D106X9020B2-DYS
A1A2C28	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C29	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C30	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C31	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A2C32	0180-2661	5	1	CAP-FXD 1uF 50 V TA		221M5002-105-K3-552
A1A2C33	0160-2244	8	1	CAP-FXD 3pF 500 V	52763	
A1A2C34	0160-0174	9	1	CAP-FXD 0.47uF 50 V	04222	SR835E474ZAAH
A1A2C35	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A2C36	0160-3877	5	1	CAP-FXD 100pF 200 V	04222	SR202C101MAAH
A1A2C37	0160-2256	2	1	CAP-FXD 9.1pF 500 V	52763	2RDPLX0509R1NP0
A1A2C38	0160-2250	6	1	CAP-FXD 5.1pF 500 V	52763	
A1A2C39	0160-2250	6	1	CAP-FXD 5.1pF 500 V	52763	
A1A2C40	0160-4574	1	1	CAP-FXD 1000pF 100 V	04222	SA101C102KAAH
A1A2C41	0160-4574	1	1	CAP-FXD 1000pF 100 V	04222	SA101C102KAAH
A1A2C42	0160-4574	1	1	CAP-FXD 1000pF 100 V	04222	SA101C102KAAH
A1A2CR1	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A2CR2	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A2CR3	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A2CR4	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A2CR5	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A2CR6	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A2CR7	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A2CR8	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A2E1	9170-0962	3	1	CORE-SHIELDING BEAD	19701	56-590-65/4B
A1A2E2	9170-0962	3	1	CORE-SHIELDING BEAD	19701	56-590-65/4B
A1A2E3	9170-0962	3	1	CORE-SHIELDING BEAD	19701	56-590-65/4B
A1A2E4	9170-0962	3	1	CORE-SHIELDING BEAD	19701	56-590-65/4B
A1A2E5	9170-0962	3	1	CORE-SHIELDING BEAD	19701	56-590-65/4B
A1A2J1	1250-1255	1	1	CONNECTOR-RF SMB M PC 50-OHM	98291	51-051-0000
A1A2J2	1250-1220	0	1	CONNECTOR-RF SMC M PC 50-OHM	98291	050-051-0109-220
A1A2L1	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH +-10% .105D-INX	24226	10M471K
A1A2L2	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH +-10% .105D-INX	24226	10M471K

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A2L3	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH +-10% .105D-INX	24226	10M471K
A1A2MP1	0590-0526	6	1	THREADED INSERT-NUT 4-40 .065-IN-LG SST	30343	
A1A2MP2	08673-00080	1	1	BRACKET-RTANG	28480	08673-00080
A1A2MP3	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI		
A1A2MP4	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS 1-	28480	4040-0748
A1A2MP5	4040-0750	7	1	EXTR-PC BD RED POLYC .062-IN-BD-THKNS 1-	28480	4040-0750
A1A2Q1	1855-0395	0	1	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	17856	FN2645
A1A2Q2	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q3	1855-0276	6	1	TRANSISTOR J-FET 2N4416A N-CHAN D-MODE T	04713	2N4416A
A1A2Q4	~~1854-0977~~	2	1	TRANSISTOR NPN SI DARL TO-92 PD=625MW	04713	MPS-A14
A1A2Q5	1853-0322	9	1	TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	04713	
A1A2Q6	1855-0276	6	1	TRANSISTOR J-FET 2N4416A N-CHAN D-MODE T	04713	2N4416A
A1A2Q7	1853-0269	3	1	TRANSISTOR-DUAL PNP 2N3809 PD=600MW	04713	2N3809
A1A2Q8	1854-0477	7	1	TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A1A2Q9	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A1A2Q10	1853-0529	8	1	TRANSISTOR-DUAL PNP PD=2.5W	04713	MD1130
A1A2Q11	1853-0459	3	1	TRANSISTOR PNP SI PD=625MW FT=200MHZ	04713	
A1A2Q12	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A1A2Q13	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q14	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A1A2Q15	1855-0251	7	1	TRANSISTOR MOSFET N-CHAN E-MODE TO-39 SI	04713	2N6659
A1A2Q16	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q17	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q18	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q19	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q20	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q21	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q22	1855-0253	9	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	
A1A2Q23	1855-0395	0	1	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	17856	FN2645
A1A2Q24	1853-0451	5	1	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	04713	
A1A2Q25	1853-0459	3	1	TRANSISTOR PNP SI PD=625MW FT=200MHZ	04713	
A1A2Q26	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A1A2Q27	1855-0268	6	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	J309
A1A2Q28	1855-0268	6	1	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	17856	J309
A1A2Q29	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A1A2Q30	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A1A2Q31	1853-0405	9	1	TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A1A2Q32	1853-0075	9	1	TRANSISTOR-DUAL PNP PD=400MW	04713	
A1A2Q33	1854-0712	3	1	TRANSISTOR-DUAL NPN PD=1.8W	06665	MAT-01GH
A1A2Q34	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A1A2Q35	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A1A2Q36	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A1A2Q37	1854-0295	7	1	TRANSISTOR-DUAL NPN PD=400MW	04713	
A1A2R1	2100-3273	1	1	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-202
A1A2R2	0698-7576	8	1	RESISTOR 217 +-0.1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A1A2R3	0698-6323	1	1	RESISTOR 100 +-0.1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A1A2R4	0699-1775	9	1	RESISTOR 59K +-0.1% .05W TF TC=0+-15	19701	5013Z
A1A2R5	0698-7261	8	1	RESISTOR 11K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R6	0698-7220	9	1	RESISTOR 215 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R7	0699-1773	7	1	RESISTOR 12K +-0.1% .05W TF TC=0+-15	19701	5013Z
A1A2R8	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R9	0698-7222	1	1	RESISTOR 261 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R10	1810-0367	2	1	NETWORK-RES 6-SIP 4.7K OHM X 5	11236	750-61
A1A2R11	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R12	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R13	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R14	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R15	0699-1771	5	1	RESISTOR 17.55K +-0.1% .05W TF TC=0+-15	19701	5013Z
A1A2R16	0698-7576	8	1	RESISTOR 217 +-0.1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A1A2R17	0699-1783	9	1	RESISTOR 28.54K +-0.1% .05W TF TC=0+-15	19701	5013Z

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A2R18	0699-1773	7	1	RESISTOR 12K +-0.1% .05W TF TC=0+-15	19701	5013Z
A1A2R19	0698-7276	5	1	RESISTOR 46.4K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R20	0699-1770	4	1	RESISTOR 227.2 +-0.1% .1W TF TC=0+-15	19701	5013Z
A1A2R21	0699-1772	6	1	RESISTOR 4.452K +-0.1% .05W TF TC=0+-15	19701	5013Z
A1A2R22	0699-1774	8	1	RESISTOR 16.7K +-0.1% .05W TF TC=0+-15	19701	5013Z
A1A2R23	0699-1776	0	1	RESISTOR 1.129K +-0.1% .05W TF TC=0+-15	19701	5013Z
A1A2R24	2100-3273	1	1	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-202
A1A2R25	0698-7234	5	1	RESISTOR 825 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R26	0698-6329	7	1	RESISTOR 845 +-1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A1A2R27	0698-7223	2	1	RESISTOR 287 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R28	0698-7272	1	1	RESISTOR 31.6K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R29	0698-8827	4	1	RESISTOR 1M +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R30	2100-3353	8	1	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-203
A1A2R31	0698-7267	4	1	RESISTOR 19.6K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R32	0698-7284	5	1	RESISTOR 100K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R33	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R34	0698-7267	4	1	RESISTOR 19.6K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R35	0757-0424	7	1	RESISTOR 1.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R36	0698-3152	8	1	RESISTOR 3.48K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R37	0698-7198	0	1	RESISTOR 26.1 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R38	0698-7220	9	1	RESISTOR 215 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R39	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R40	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R41	0698-3153	9	1	RESISTOR 3.83K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R42	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R43	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R44	0698-7224	3	1	RESISTOR 316 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R45	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R46	0757-0424	7	1	RESISTOR 1.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R47	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R48	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R49	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R50	0698-3459	8	1	RESISTOR 383K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R51	0698-7236	7	1	RESISTOR 1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R52	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R53	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R54	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R55	0757-0290	5	1	RESISTOR 6.19K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R56	0698-7216	3	1	RESISTOR 147 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R57	2100-3353	8	1	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-203
A1A2R58	2100-3353	8	1	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-203
A1A2R59	2100-3353	8	1	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-203
A1A2R60	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R61	2100-3353	8	1	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-203
A1A2R62	0698-7276	5	1	RESISTOR 46.4K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R63	0698-7272	1	1	RESISTOR 31.6K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R64	0698-7271	0	1	RESISTOR 28.7K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R65	0698-7268	5	1	RESISTOR 21.5K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R66	0698-7282	3	1	RESISTOR 82.5K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R67	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R68	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R69	0698-7280	1	1	RESISTOR 68.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R70	0757-0180	2	1	RESISTOR 31.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R71	0698-7222	1	1	RESISTOR 261 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R73	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R74	0698-7252	7	1	RESISTOR 4.64K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R75	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R76	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R77	0811-3591	1	1	RESISTOR .1 +-5% 1W PWN TC=0+-90	91637	GN-1
A1A2R78	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A2R79	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R80	0698-7198	0	1	RESISTOR 26.1 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R81	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R82	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R83	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R84	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R85	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R86	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R87	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R88	2100-2039	5	1	RESISTOR-TRMR 20K 5% WW SIDE-ADJ 10-TRN	12697	76-3
A1A2R89	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R90	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R91	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R92	0698-7202	7	1	RESISTOR 38.3 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R93	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R94	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R95	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R96	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R97	2100-4090	2	1	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 25-TRN	32997	3296X-EE3-102
A1A2R98	0698-7272	1	1	RESISTOR 31.6K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R99	0698-7229	8	1	RESISTOR 511 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R100	0698-7203	8	1	RESISTOR 42.2 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R101	0698-7236	7	1	RESISTOR 1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R102	2100-4089	9	1	RESISTOR-TRMR 10 10% TKF SIDE-ADJ 25-TRN	32997	3296X-EE3-100
A1A2R103	0757-0459	8	1	RESISTOR 56.2K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R104	0811-2031	2	1	RESISTOR 815 +-3% .25W PN TC=+5900+-300	01686	7010
A1A2R105	2100-1922	3	1	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 22-TRN	02111	70Y-502
A1A2R106	0698-7279	8	1	RESISTOR 61.9K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R107	0698-7279	8		RESISTOR 61.9K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R108	0698-6320	8	1	RESISTOR 5K +-0.1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A1A2R109	0698-7253	8	1	RESISTOR 5.11K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R110	0698-7216	3	1	RESISTOR 147 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R111	0757-0317	7	1	RESISTOR 1.33K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2R112	0698-7249	2	1	RESISTOR 3.48K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R113	0698-7253	8	1	RESISTOR 5.11K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R114	0698-7248	1	1	RESISTOR 3.16K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A2R115	0699-0140	0	1	RESISTOR 524 +-0.1% .1W TF TC=0+-15	19701	5023Z
A1A2R116	2100-4090	2	1	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 25-TRN	32997	3296X-EE3-102
A1A2R117	0698-8779	5	1	RESISTOR 280 +-0.1% .1W TF TC=0+-5	19701	5023Z
A1A2R118	0698-6320	8	1	RESISTOR 5K +-0.1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A1A2R119	0698-6329	7	1	RESISTOR 845 +-1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A1A2R120	0757-0274	5	1	RESISTOR 1.21K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A2RT1	0837-0124	4	1	THERMISTOR DISC 250-OHM TC=-4.4%/C-DEG	83186	23D14%5/3
A1A2TP1	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A2TP2	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A2TP3	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A2TP4	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A2TP5	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A2TP6	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A2TP7	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A2U1	1826-0601	0	1	IC OP AMP PRCN TO-99 PKG	06665	OP-16FJ
A1A2U2	1826-0486	9	1	ANALOG MULTIPLEXER 8 CHNL 16 -DIP-P	04713	MC14052BCP
A1A2U3	1826-0413	2	1	IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	34371	HA2-2605-5
A1A2U4	1826-0601	0	1	IC OP AMP PRCN TO-99 PKG	06665	OP-16FJ
A1A2U5	1826-0759	9	1	IC COMPARATOR GP QUAD 14-DIP-C PKG	04713	LM339J
A1A2U6	1826-0471	2	1	IC OP AMP LOW-DRIFT TO-99 PKG	06665	OP-07CJ SELECTED
A1A2VR1	1902-0951	5	1	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	04713	SZ30035-9RL
A1A2W1	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	55210	L-2007-1

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A3	08673-60171	7	1	FUNCTION BOARD ASSEMBLY	28480	08673-60171
A1A3C1	0180-0374	3	1	CAP-FXD 10uF 20 V TA	56289	150D106X9020B2
A1A3C2	0160-5983	8	1	CAP-FXD 220pF 100 V	12344	C114C221K1R5CA
A1A3C3	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A3C4	0180-0291	3	1	CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A3C5	0180-2620	6	1	CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A1A3C6	0160-0576	5	10	CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C7	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C8	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C9	0160-3879	7	5	CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A1A3C10	0140-0196	3	1	CAP-FXD 150pF 300 V MICA	28480	0140-0196
A1A3C11	0180-2661	5	4	CAP-FXD 1uF 50 V TA	12344	T355B105K050AS
A1A3C12	0180-2661	5		CAP-FXD 1uF 50 V TA	12344	T355B105K050AS
A1A3C13	0160-4795	8	1	CAP-FXD 4.7pF 100 V	12344	C410C479D1G5CA
A1A3C14	0160-5905	4	1	CAP-FXD 42pF 200 V	12344	C114C420J2G5CA
A1A3C15				NOT ASSIGNED		
A1A3C16	0180-2661	5		CAP-FXD 1uF 50 V TA	12344	T355B105K050AS
A1A3C17	0180-2661	5		CAP-FXD 1uF 50 V TA	12344	T355B105K050AS
A1A3C18	0160-0155	6	1	CAP-FXD 3300pF 200 V POLYE-FL	19701	708D1AC332PK201AX
A1A3C19	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C20	0160-6472	2	2	CAP-FXD 4.7uF 50 V	06383	FD41Y5V1H475Z
A1A3C21	0160-4031	5	1	CAP-FXD 330pF 100 V	12344	C320C331J1G5CA
A1A3C22	0160-6472	2		CAP-FXD 4.7uF 50 V	06383	FD41Y5V1H475Z
A1A3C23	0160-5901	0	1	CAP-FXD 10pF 200 V	06383	MA12C0G2D100D
A1A3C24	0160-2055	9	2	CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A3C25	0160-5348	9	1	CAP-FXD 51pF 100 V	12344	C410C510J1G5CA
A1A3C26	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A1A3C27	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A1A3C28	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A1A3C29	0160-4787	8	1	CAP-FXD 22pF 100 V	12344	C410C220J1G5CA
A1A3C30	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C31	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C32	0160-0161	4	1	CAP-FXD 0.01uF 200 V POLYE-FL	19701	708D1CC103PK201AX
A1A3C33	0160-4386	3	1	CAP-FXD 33pF 200 V	12344	C320C330J2G5CA
A1A3C34	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A3C35	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C36	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C37	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3C38	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A1A3C39	0180-2683	1	2	CAP-FXD 4.7uF 35 V TA	04222	MD6-035-475-20/9038
A1A3C40	0180-2683	1		CAP-FXD 4.7uF 35 V TA	04222	MD6-035-475-20/9038
A1A3C41	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A3CR1	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR6	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	12403	A2X355
A1A3CR7	1901-0376	6	2	DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A3CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A3CR14	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A3L1	9140-0144	0	3	INDUCTOR RF-CH-MLD 4.7UH +-10%	91637	IM-2 4.7UH 10%
A1A3L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH +-10%	91637	IM-2 4.7UH 10%
A1A3L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH +-10%	91637	IM-2 4.7UH 10%

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A1A3MP1				NOT ASSIGNED		
A1A3MP2	4040-0749	4	1	EXTR-PC BD BRN POLYC .062-IN-BD-THKNS	28480	4040-0749
A1A3MP3	4040-0751	8	1	EXTR-PC BD ORN POLYC .062-IN-BD-THKNS	28480	4040-0751
A1A3Q1	1854-0810	2	4	TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A3Q2	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A3Q3	1855-0253	9	3	TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	28480	1855-0253
A1A3Q4	1854-0830	6	1	TRANSISTOR-DUAL NPN PD=500MW	27014	LM394
A1A3Q5	1855-0276	6	3	TRANSISTOR J-FET 2N4416A N-CHAN D-MODE	04713	2N4416A
A1A3Q6	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A3Q7	1855-0395	0	2	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	17856	FN2645
A1A3Q8	1855-0276	6		TRANSISTOR J-FET 2N4416A N-CHAN D-MODE	04713	2N4416A
A1A3Q9	1855-0276	6		TRANSISTOR J-FET 2N4416A N-CHAN D-MODE	04713	2N4416A
A1A3Q10	1855-0253	9		TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	28480	1855-0253
A1A3Q11	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A3Q12	1853-0269	3	1	TRANSISTOR-DUAL PNP 2N3809 PD=600MW	04713	2N3809
A1A3Q13	1854-0712	3	2	TRANSISTOR-DUAL NPN PD=1.8W	06665	MAT-01GH
A1A3Q14	1853-0322	9	2	TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	28480	1853-0322
A1A3Q15	1855-0395	0		TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	17856	FN2645
A1A3Q16	1854-0712	3		TRANSISTOR-DUAL NPN PD=1.8W	06665	MAT-01GH
A1A3Q17	1853-0322	9		TRANSISTOR PNP 2N2946A SI TO-46 PD=400MW	28480	1853-0322
A1A3Q18	1855-0414	4	1	TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	17856	2N4393
A1A3Q19	1855-0253	9		TRANSISTOR J-FET N-CHAN D-MODE TO-92 SI	28480	1855-0253
A1A3R1	0698-8812	7	2	RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L04D
A1A3R2	0698-7160	6	1	RESISTOR 113.65 +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R3	0698-8812	7		RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L04D
A1A3R4	0698-0024	7	1	RESISTOR 2.61K +-1% .5W TF TC=0+-100	K8479	H2
A1A3R5	0698-6362	8	1	RESISTOR 1K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R6	0699-0924	8	1	RESISTOR 11K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R7	0698-7212	9	4	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A3R8	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A3R9	0698-6963	5	1	RESISTOR 5.55K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R10	0698-7277	6	5	RESISTOR 51.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5112-F
A1A3R11	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-196R-F
A1A3R12	2100-0670	6	2	RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	09969	3105X103
A1A3R13	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-316R-F
A1A3R14	0699-0590	4	1	RESISTOR 15.758K +-0.1% .125W TF	12498	NE55
A1A3R15	1810-0367	2	1	NETWORK-RES 6-SIP 4.7K OHM X 5	C1433	750-61
A1A3R16	0698-6625	6	1	RESISTOR 6K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R17	0698-8445	2	1	RESISTOR 76.98 +-0.25% .125W TF TC=0+-50	12498	NC55
A1A3R18	0698-6347	9	1	RESISTOR 1.5K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R19	0698-6348	0	2	RESISTOR 3K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R20	0698-8827	4	4	RESISTOR 1M +-1% .125W TF TC=0+-100	12498	CT4
A1A3R21	2100-3755	4	1	RESISTOR-TRMR 50 10% TKF SIDE-ADJ 17-TRN	09969	3105X500
A1A3R22	0698-7254	9	2	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A1A3R23	0757-0441	8	3	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A1A3R24	0698-4014	3	1	RESISTOR 787 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-787R-F
A1A3R25	0698-3510	2	1	RESISTOR 453 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-453R-F
A1A3R26	0698-4414	7	1	RESISTOR 158 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-158R-F
A1A3R27	0698-7240	3	1	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A1A3R28	0698-3495	2	1	RESISTOR 866 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-866R-F
A1A3R29	0698-6348	0		RESISTOR 3K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R30	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A1A3R31	2100-3351	6	2	RESISTOR-TRMR 500 10% TKF SIDE-ADJ 1-TRN	28480	2100-3351
A1A3R32	0757-0317	7	3	RESISTOR 1.33K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1331-F
A1A3R33	0698-7222	1	2	RESISTOR 261 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-261R-F
A1A3R34	0698-7222	1		RESISTOR 261 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-261R-F
A1A3R35	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A1A3R36	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A1A3R37	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A1A3R38	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A1A3R39	0698-7277	6		RESISTOR 51.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5112-F
A1A3R40	0698-7277	6		RESISTOR 51.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5112-F
A1A3R41	0698-0083	8	5	RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A3R42	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A3R43	2100-3353	8	1	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	28480	2100-3353
A1A3R44	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A3R45	0698-3450	9	1	RESISTOR 42.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4222-F

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A3R46	0698-7253	8	3	RESISTOR 5.11K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5111-F
A1A3R47	0698-3456	5	1	RESISTOR 287K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2873-F
A1A3R48	0698-8749	9	1	RESISTOR 67.5 +-0.25% .125W TF TC=0+-50	12498	NC55
A1A3R49	0698-6965	7	1	RESISTOR 505 +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R50	0757-0447	4	1	RESISTOR 16.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1622-F
A1A3R51	2100-3352	7	1	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 1-TRN	28480	2100-3352
A1A3R52	0757-0317	7		RESISTOR 1.33K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1331-F
A1A3R53	0757-0346	2	4	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A3R54	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A3R55	0698-7515	5	1	RESISTOR 66.7 +-0.25% .125W TF TC=0+-50	19701	5033R-1/8-T2-66R7-C
A1A3R56	0698-7268	5	1	RESISTOR 21.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2152-F
A1A3R57	0698-3157	3	2	RESISTOR 19.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1962-F
A1A3R58	0757-0274	5	1	RESISTOR 1.21K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1211-F
A1A3R59	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A3R60	0698-3158	4	1	RESISTOR 23.7K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2372-F
A1A3R61	0698-7277	6		RESISTOR 51.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5112-F
A1A3R62				NOT ASSIGNED		
A1A3R63	0698-7260	7	7	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A3R64	0698-3236	9	2	RESISTOR 15K +-0.25% .125W TF TC=0+-50	12498	NC55
A1A3R65	0698-8827	4		RESISTOR 1M +-1% .125W TF TC=0+-100	12498	CT4
A1A3R66	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A3R67	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4641-F
A1A3R68	0698-6977	1	1	RESISTOR 30K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R69	0698-3445	2	1	RESISTOR 348 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-348R-F
A1A3R70	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A3R71	0698-3236	9		RESISTOR 15K +-0.25% .125W TF TC=0+-50	12498	NC55
A1A3R72	2100-3732	7	1	RESISTOR-TRMR 500 10% TKF SIDE-ADJ	09969	3105X501
A1A3R73	0698-7252	7	2	RESISTOR 4.64K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-4641-F
A1A3R74	0698-7243	6	1	RESISTOR 1.96K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1961-F
A1A3R75	0698-7261	8	1	RESISTOR 11K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1102-F
A1A3R76	0698-7284	5	7	RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A3R77	0698-7252	7		RESISTOR 4.64K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-4641-F
A1A3R78	0698-7284	5		RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A3R79	0757-0402	1	1	RESISTOR 110 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-111-F
A1A3R80	0698-3157	3		RESISTOR 19.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1962-F
A1A3R81	0698-8466	7	1	RESISTOR 942 +-0.5% .125W TF TC=0+-50	12498	NC55
A1A3R82	0757-0317	7		RESISTOR 1.33K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1331-F
A1A3R83	2100-3350	5	1	RESISTOR-TRMR 200 10% TKF SIDE-ADJ 1-TRN	28480	2100-3350
A1A3R84	0698-7284	5		RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A3R85	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A3R86	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A3R87	0698-7283	4	1	RESISTOR 90.9K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-9092-F
A1A3R88	0698-8827	4		RESISTOR 1M +-1% .125W TF TC=0+-100	12498	CT4
A1A3R89	0698-7284	5		RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A3R90	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A3R91	0757-0438	3	2	RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A1A3R92	0698-7206	1	1	RESISTOR 56.2 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-56R2-F
A1A3R93	0698-7253	8		RESISTOR 5.11K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5111-F
A1A3R94	2100-3351	6		RESISTOR-TRMR 500 10% TKF SIDE-ADJ 1-TRN	28480	2100-3351
A1A3R95	0698-7253	8		RESISTOR 5.11K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5111-F
A1A3R96	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A3R97	0698-3446	3	1	RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A1A3R98	2100-3759	8	1	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A1A3R99	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A3R100	0698-7284	5		RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A3R101	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A3R102	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A3R103	0698-7284	5		RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A3R104	0698-7267	4	1	RESISTOR 19.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1962-F
A1A3R105	2100-0670	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	09969	3105X103
A1A3R106	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A3R107	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A1A3R108	0698-7188	8	2	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A3R109	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A3R110	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A3R111	0698-7284	5		RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A3R112	0698-8827	4		RESISTOR 1M +-1% .125W TF TC=0+-100	12498	CT4
A1A3R113	0698-7277	6		RESISTOR 51.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5112-F
A1A3R114	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A3R115	0698-6358	2	1	RESISTOR 100K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A3R116	0698-7248	1	1	RESISTOR 3.16K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3161-F
A1A3R117	0698-7282	3	1	RESISTOR 82.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-8252-F
A1A3RT1	0837-0295	0	1	THERMISTOR TUB WITH AXL LEADS 2.7K-OHM	12845	DG125-272-K
A1A3RT2	0837-0343	9	1	THERMISTOR TUB WITH AXL LEADS 100-OHM	12845	DG125-101J
A1A3TP1	0360-0535	0	10	CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP2	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP3	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP4	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP5	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP6	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP7	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP8	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP9	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3TP10	0360-0535	0		CONNECTOR-SGL CONT TML-TS-PT	28480	0360-0535
A1A3U1	1826-0413	2	3	IC OP AMP LOW-BIAS-H-IMPD 8-TO-99 PKG	34371	HA2-2605-5
A1A3U2	1826-0501	9	1	ANALOG MULTIPLEXER 6 CHNL 16 -DIP-P	04713	MC14053BCP
A1A3U3	1826-0547	3	1	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072ACP
A1A3U4	1826-0413	2		IC OP AMP LOW-BIAS-H-IMPD 8-TO-99 PKG	34371	HA2-2605-5
A1A3U5	1820-0125	1	1	IC COMPARATOR GP DUAL 10-TO-100 PKG	27014	UA711HC
A1A3U6	1826-0413	2		IC OP AMP LOW-BIAS-H-IMPD 8-TO-99 PKG	34371	HA2-2605-5
A1A3U7	1820-1445	0	1	IC LCH TTL LS 4-BIT	01295	SN74LS375N
A1A3U8	1820-1729	3	1	IC LCH TTL LS COM CLEAR 8-BIT	04713	SN74LS259N
A1A3U9	1826-0759	9	2	IC COMPARATOR GP QUAD 14-DIP-C PKG	27014	LM339J
A1A3U10	1826-0759	9		IC COMPARATOR GP QUAD 14-DIP-C PKG	27014	LM339J
A1A3U11	1826-0600	9	1	IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-P	01295	TL074ACN
A1A3U12	1826-0932	0	3	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27FZ
A1A3U13	1826-0932	0		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27FZ
A1A3U14	1826-0932	0		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27FZ
A1A3U15	1826-0471	2	1	IC OP AMP LOW-DRIFT 8-TO-99 PKG	06665	OP-07CJ SELECTED
A1A3VR1	1902-0951	5	3	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	50088	1N5231B
A1A3VR2	1902-0963	9	1	DIODE-ZNR 16V 5% DO-35 PD=.4W TC=+.088%	50088	1N5246B
A1A3VR3	1902-0961	7	1	DIODE-ZNR 13V 5% DO-35 PD=.4W TC=+.082%	28480	1902-0961
A1A3VR4	1902-0948	0	3	DIODE-ZNR 3.9V 5% DO-35 PD=.4W TC=-.012%	50088	1N5228B
A1A3VR5	1902-0948	0		DIODE-ZNR 3.9V 5% DO-35 PD=.4W TC=-.012%	50088	1N5228B
A1A3VR6	1902-0951	5		DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	50088	1N5231B
A1A3VR7	1902-0948	0		DIODE-ZNR 3.9V 5% DO-35 PD=.4W TC=-.012%	50088	1N5228B
A1A3VR8	1902-0951	5		DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	50088	1N5231B
A1A3VR9	1902-0954	8	1	DIODE-ZNR 6.8V 5% DO-35 PD=.4W TC=+.057%	28480	1902-0954
A1A3VR10	1902-0554	4	1	DIODE-ZNR 10V 5% PD=1W IR=10UA	28480	1902-0554
A1A3W1	8159-0005	0	2	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A1A3W2	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
	1480-0073	6	2	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A4	08673-60137	5	1	PULSE DRVR BD AY	28480	08673-60137
A1A4C1	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A1A4C2	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A1A4C3	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A1A4C4	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C5	0180-0229	7	1	CAP-FXD 33uF 10 V TA	56289	150D336X9010B2-DYS
A1A4C6	0160-5910	1	1	CAP-FXD 0.47uF 25 V		MA14Y5V1H474Z
A1A4C7	0160-5539	0	1	CAP-FXD 0.047uF 100 V	04222	SA301C473KAAH
A1A4C8	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A1A4C9	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C10	0160-5910	1	1	CAP-FXD 0.47uF 25 V		MA14Y5V1H474Z
A1A4C11	0160-5910	1	1	CAP-FXD 0.47uF 25 V		MA14Y5V1H474Z
A1A4C12	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C13	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C14	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C15	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C16	0160-5910	1	1	CAP-FXD 0.47uF 25 V		MA14Y5V1H474Z
A1A4C17	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C18	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C19	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C20	0160-5910	1	1	CAP-FXD 0.47uF 25 V		MA14Y5V1H474Z
A1A4C21	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C22	0160-4031	5	1	CAP-FXD 330pF 100 V	04222	SR201A331JAAH
A1A4C23	0160-4350	1	1	CAP-FXD 68pF 200 V		FD12C0G2D680J
A1A4C24	0160-0573	2	1	CAP-FXD 4700pF 100 V	04222	SR201C472MAAH
A1A4C25	0160-4387	4	1	CAP-FXD 47pF 200 V		FD12C0G2D470J
A1A4C26	0160-4389	6	1	CAP-FXD 100pF 200 V	04222	SR202A101JAAH
A1A4C27	0160-4350	1	1	CAP-FXD 68pF 200 V		FD12C0G2D680J
A1A4C28	0160-4520	7	1	CAP-FXD 11pF 200 V		FD12C0G2D110J
A1A4C29	0160-5901	0	1	CAP-FXD 10pF 200 V		MA12C0G2D100D
A1A4C30	0160-4389	6	1	CAP-FXD 100pF 200 V	04222	SR202A101JAAH
A1A4C31	0160-4387	4	1	CAP-FXD 47pF 200 V		FD12C0G2D470J
A1A4C32	0160-5903	2	1	CAP-FXD 24pF 200 V		MA12C0G2D240J
A1A4C33	0160-3874	2	1	CAP-FXD 10pF 200 V		FD12C0G2D100D
A1A4C34	0160-5901	0	1	CAP-FXD 10pF 200 V		MA12C0G2D100D
A1A4C35	0160-5903	2	1	CAP-FXD 24pF 200 V		MA12C0G2D240J
A1A4C36	0180-0374	3	1	CAP-FXD 10uF 20 V TA	56289	150D106X9020B2-DYS
A1A4C37	0160-4790	3	1	CAP-FXD 12pF 100 V	04222	SA102A120JAAH
A1A4C38	0160-5904	3	1	CAP-FXD 30pF 200 V		MA12C0G2D300J
A1A4C39	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C40	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A4C41	0160-5901	0	1	CAP-FXD 10pF 200 V		MA12C0G2D100D
A1A4C42	0160-4103	2	1	CAP-FXD 220pF 100 V		FD12C0G2A221J
A1A4C43	0160-3875	3	1	CAP-FXD 22pF 200 V		FD12C0G2D220J
A1A4C44	0160-4821	1	1	CAP-FXD 1200pF 100 V	04222	SA201A122JAAH
A1A4C45	0160-4829	9	1	CAP-FXD 680pF 100 V	04222	SA101C681KAAH
A1A4C46	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A1A4C47	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A1A4C48	0160-4787	8	1	CAP-FXD 22pF 100 V	04222	SA102A220JAAH
A1A4C49	0160-3875	3	1	CAP-FXD 22pF 200 V		FD12C0G2D220J
A1A4CR1	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR2	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR3	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR4	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR5	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR6	1901-0179	7	1	DIODE-SWITCHING 15V 50MA 750PS DO-7	27014	FD777
A1A4CR7	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR8	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR9	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR10	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A4CR11	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR12	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR13	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR14	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR15	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR16	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR17	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR18	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4CR19	1901-0539	3	1	DIODE-SCHOTTKY SM SIG	28480	50825510
A1A4DL1	08673-80021	8	1	DELAY LINE 5NS	28480	08673-80021
A1A4DL2	08673-80022	9	1	DELAY LINE 10NS	28480	08673-80022
A1A4J1	1250-1377	8	1	CONNECTOR-RF SMB M PC 50-OHM	16179	5164-5003-09
A1A4J2	1250-0836	2	1	CONNECTOR-RF SMC M PC 50-OHM	16179	5064-5006-09
A1A4J3	1250-1377	8	1	CONNECTOR-RF SMB M PC 50-OHM	16179	5164-5003-09
A1A4L1	9100-1618	1	1	INDUCTOR RF-CH-MLD 5.6UH +-10% .166D-INX	24226	15M561K
A1A4L2	9100-1618	1	1	INDUCTOR RF-CH-MLD 5.6UH +-10% .166D-INX	24226	15M561K
A1A4L3	9140-0142	8	1	INDUCTOR RF-CH-MLD 2.2UH +-10% .105D-INX	24226	10M221K
A1A4L4	9100-2261	2	1	INDUCTOR RF-CH-MLD 2.7UH +-10% .105D-INX	24226	10M271K
A1A4L5	9140-0158	6	1	INDUCTOR RF-CH-MLD 1UH +-10% .105D-INX.2	24226	10M101K
A1A4MP1	1480-0073	6	1	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A1A4MP2	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS 1-	28480	4040-0748
A1A4MP3	4040-0752	9	1	EXTR-PC BD YEL POLYC .062-IN-BD-THKNS 1-	28480	4040-0752
A1A4MP4	0340-1098	0	1	INSULATOR-IC B-NITRIDE	28480	0340-1098
A1A4Q1	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4Q2	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4Q3	1854-0979	4	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	MPS2369
A1A4Q4	1854-0979	4	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	MPS2369
A1A4Q5	1854-0979	4	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	MPS2369
A1A4Q6	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4Q7	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4Q8	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4Q9	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4Q10	1854-0979	4	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	MPS2369
A1A4Q11	1854-0979	4	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	MPS2369
A1A4Q12	1854-0979	4	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	MPS2369
A1A4Q13	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4Q14	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A1A4Q15	1853-0540	3	1	TRANSISTOR PNP 2N5771 SI TO-92 PD=625MW	04713	2N5771
A1A4R1	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R2	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	19701	SFR25H
A1A4R3	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	19701	SFR25H
A1A4R4	0698-3429	2	1	RESISTOR 19.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R5	0757-1000	7	1	RESISTOR 51.1 +-1% .5W TF TC=0+-100	K8479	H2
A1A4R6	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R7	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A1A4R8	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R9	2100-3759	8	1	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	32997	3296X-DM3-202
A1A4R10	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R11	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R12	0698-3450	9	1	RESISTOR 42.2K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R13	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R14	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R15	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R16	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R17	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R18	0757-0274	5	1	RESISTOR 1.21K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R19	2100-2413	9	1	RESISTOR-TRMR 200 10% TKF SIDE-ADJ 1-TRN	32997	3329W-DM3-201
A1A4R20	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R21	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R22	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A4R23	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R24	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R25	2100-2574	3	1	RESISTOR-TRMR 500 10% TKF SIDE-ADJ 1-TRN	32997	3329W-DM3-501
A1A4R26	0698-3160	8	1	RESISTOR 31.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R27	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R28	0698-3438	3	1	RESISTOR 147 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R29	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R30	0698-3437	2	1	RESISTOR 133 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R31	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R32	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R33	0757-0294	9	1	RESISTOR 17.8 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R34	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R35	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R36	0757-1094	9	1	RESISTOR 1.47K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R37	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R38	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R39	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R40	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R41	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R42	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R43	2100-3749	6	1	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	32997	3296X-DM3-502
A1A4R44	0698-3151	7	1	RESISTOR 2.87K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R45	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R46	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R47	0764-0013	5	1	RESISTOR 56 +-5% 2W MO TC=0+-200	11502	GS-3
A1A4R48	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R49	0698-3623	8	1	RESISTOR 130 +-5% 2W MO TC=0+-200	11502	GS-3
A1A4R50	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R51	0698-8817	2	1	RESISTOR 2.61 +-1% .125W TF TC=0+-100	19701	SFR25H
A1A4R52	2100-3749	6	1	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	32997	3296X-DM3-502
A1A4R53	0698-7242	5	1	RESISTOR 1.78K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A4R54	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R55	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R56	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R57	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R58	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R59	0698-0082	7	1	RESISTOR 464 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R60	0698-3152	8	1	RESISTOR 3.48K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R61	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R62	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R63	0698-3441	8	1	RESISTOR 215 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R64	0757-0428	1	1	RESISTOR 1.62K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R65	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4R66	0698-3441	8	1	RESISTOR 215 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A4TP1	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP2	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP3	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP4	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP5	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP6	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP7	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP8	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP9	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP10	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP11	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP12	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP13	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP14	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP15	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	
A1A4TP16	0360-0535	0	1	TERMINAL-TEST POINT .330IN ABOVE	4G819	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A4U1	1820-0694	9	1	IC GATE TTL S EXCL-OR QUAD 2-INP	01295	SN74S86N
A1A4U2	1820-0684	7	1	IC INV TTL S HEX 1-INP	01295	SN74S05N
A1A4U3	1820-1367	5	1	IC GATE TTL S AND QUAD 2-INP	01295	SN74S08N
A1A4U4	1820-0682	5	1	IC GATE TTL S NAND QUAD 2-INP	01295	SN74S03N
A1A4U5	1820-1144	6	1	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A1A4U6	1820-0681	4	1	IC GATE TTL S NAND QUAD 2-INP	01295	SN74S00N
A1A4U7	1820-1797	5	1	IC DRVR TTL 2-INP	27014	DH0035CG
A1A4U8	1820-0683	6	1	IC INV TTL S HEX 1-INP	01295	SN74S04N
A1A4U9	1820-1729	3	1	IC LCH TTL/LS ADDRESSABLE 8-BIT	04713	SN74LS259N
A1A4U10	1820-1423	4	1	IC MV TTL/LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A1A4VR1	1902-0533	9	1	DIODE-ZNR 4.99V 2% DO-15 PD=1W TC=-.012%	04713	
A1A4VR2	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	04713	SZ30035-10RL
A1A4VR3	1902-0551	1	1	DIODE-ZNR 6.2V 5% PD=1W IR=10UA	04713	SZ40145-8RL
A1A4VR4	1902-0948	0	1	DIODE-ZNR 3.9V 5% DO-35 PD=.4W TC=-.012%	04713	SZ30035-6RL

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A5	08673-60162	6	1	DAC ENABLE BOARD ASSEMBLY	28480	08673-60162
A1A5C1	0160-4527	4	1	CAP-FXD 56pF 200 V	12344	C320C560J2G5CA
A1A5C2	0160-2055	9	1	CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A5C3	0160-0576	5	10	CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C4	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A1A5C5	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C6	0160-3878	6	4	CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A1A5C7	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C8	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C10	0180-0291	3	3	CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C16				NOT ASSIGNED		
A1A5C17	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A1A5C18	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A1A5C19	0160-3877	5	1	CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A1A5C20	0160-3872	0	1	CAP-FXD 2.2pF 200 V	09969	RPE121-105C0G2R2C200V
A1A5C21	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A5C22	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A5C23	0160-0570	9	2	CAP-FXD 220pF 100 V	12344	C320C221M1R5CA
A1A5C24	0160-0570	9		CAP-FXD 220pF 100 V	12344	C320C221M1R5CA
A1A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A5C26	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A1A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A5MP1	1480-0073	6	1	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A1A5MP2	4040-0749	4	1	EXTR-PC BD BRN POLYC .062-IN-BD-THKNS	28480	4040-0749
A1A5MP3	4040-0753	0	1	EXTR-PC BD GRN POLYC .062-IN-BD-THKNS	28480	4040-0753
A1A5Q1	1853-0459	3	5	TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A5Q2	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A5Q3	1854-0810	2	3	TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A5Q4	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A5Q5	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A5Q6	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A5Q7	1855-0414	4	1	TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	17856	2N4393
A1A5Q8	1855-0420	2	2	TRANSISTOR J-FET 2N4391 N-CHAN D-MODE	17856	2N4391
A1A5Q9	1855-0420	2		TRANSISTOR J-FET 2N4391 N-CHAN D-MODE	17856	2N4391
A1A5Q10	1854-0809	9	1	TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	04713	2N2369A
A1A5Q11	1854-0637	1	1	TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	04713	2N2219A
A1A5Q12	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A1A5Q13	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A5Q14	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A5R1	0698-3403	2	2	RESISTOR 348 +-1% .5W TF TC=0+-100	K8479	H2
A1A5R2	0757-0444	1	3	RESISTOR 12.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1212-F
A1A5R3	0698-3403	2		RESISTOR 348 +-1% .5W TF TC=0+-100	K8479	H2
A1A5R4	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A1A5R5	0757-0280	3	2	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A5R6	0698-3153	9	1	RESISTOR 3.83K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3831-F
A1A5R7	0757-0797	7	1	RESISTOR 90.9 +-1% .5W TF TC=0+-100	K8479	H2
A1A5R8	0698-3450	9	3	RESISTOR 42.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4222-F
A1A5R9	2100-3103	6	3	RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A5R10	0698-0084	9	1	RESISTOR 2.15K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2151-F
A1A5R11	0757-1094	9	1	RESISTOR 1.47K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1471-F
A1A5R12	0699-2376	8	2	RESISTOR 30.615K +-0.1% .125W TF	09464	PR1/8
A1A5R13	0698-0083	8	9	RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R14	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R15	0698-5355	7	1	RESISTOR 5.62K +-1% .1W TF TC=0+-10	09464	PR1/10

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A5R16	0698-3156	2	2	RESISTOR 14.7K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1472-F
A1A5R17	0698-3156	2		RESISTOR 14.7K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1472-F
A1A5R18	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R19	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R20	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R21	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R22	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R23	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R24	0757-0442	9	2	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A5R25	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A5R26	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A5R27	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4221-F
A1A5R28	0698-7284	5	1	RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A5R29	0757-0465	6	1	RESISTOR 100K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1003-F
A1A5R30	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A5R31	0699-0722	4	2	RESISTOR 23.7K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A5R32	0699-0722	4		RESISTOR 23.7K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A5R33	0698-7263	0	1	RESISTOR 13.3K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1332-F
A1A5R34	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A5R35	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A5R36	0699-2376	8		RESISTOR 30.615K +-0.1% .125W TF	09464	PR1/8
A1A5R37	0757-0444	1		RESISTOR 12.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1212-F
A1A5R38	0698-3136	8	1	RESISTOR 17.8K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1782-F
A1A5R39	0757-0444	1		RESISTOR 12.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1212-F
A1A5R40	0757-0459	8	1	RESISTOR 56.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5622-F
A1A5R41	0757-0440	7	1	RESISTOR 7.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7501-F
A1A5R42	0698-7198	0	1	RESISTOR 26.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-26R1-F
A1A5R43	0698-7194	6	1	RESISTOR 17.8 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-17R8-F
A1A5R44	0757-0199	3	1	RESISTOR 21.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2152-F
A1A5R45	0698-3450	9		RESISTOR 42.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4222-F
A1A5R46	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A5R47	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A5R48	0698-8061	8	1	RESISTOR 8.25K +-0.1% .125W TF TC=0+-25	19701	5033R-1/8-T9-8251-B
A1A5R49	0757-0428	1	1	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A1A5R50	0757-0447	4	2	RESISTOR 16.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1622-F
A1A5R51	0757-0458	7	3	RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A1A5R52	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A1A5R53	0757-0447	4		RESISTOR 16.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1622-F
A1A5R54	0757-0458	7		RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A1A5R55	0757-0438	3	2	RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A1A5R56	0757-0466	7	1	RESISTOR 110K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1103-F
A1A5R57	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2611-F
A1A5R58	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A1A5R59	0698-3450	9		RESISTOR 42.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4222-F
A1A5R60	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A5R61	0757-0395	1	1	RESISTOR 56.2 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-56R2-F
A1A5R62	0757-0458	7		RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A1A5R63	0698-3161	9	1	RESISTOR 38.3K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3832-F
A1A5TP1	1251-0600	0	10	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A5U1	1826-0972	8	1	D/A 10-BIT 24 BPLR	18324	NE5020F
A1A5U2	1826-0798	6	2	D/A 8-BIT 22-CERDIP BPLR	18324	NE5018F
A1A5U3	1820-1445	0	1	IC LCH TTL LS 4-BIT	01295	SN74LS375N
A1A5U4	1826-0798	6		D/A 8-BIT 22-CERDIP BPLR	18324	NE5018F
A1A5U5	1826-0025	2	1	IC OP AMP LOW-DRIFT 8-TO-99 PKG	27014	LM208AH

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A5U6	1826-0217	4	1	IC OP AMP GP DUAL 8-TO-99 PKG	07933	RC4558H
A1A5U7	1826-0065	0	1	IC COMPARATOR PRCN 8-DIP-P PKG	27014	LM311N
A1A5U8	1820-0495	8	1	IC DCDR TTL 4-TO-16-LINE 4-INP	01295	SN74154N
A1A5U9	1820-1917	1	1	IC DRVR TTL LS LINE OCTL	01295	SN74LS240N
A1A5U10	1826-0191	3	1	IC COMPARATOR GP DUAL 10-TO-100 PKG	27014	LM319H
A1A5U11	1826-0059	2	1	IC OP AMP GP 8-TO-99 PKG	27014	LM201AH
A1A5U12	1820-1208	3	1	IC GATE TTL LS OR QUAD 2-INP	01295	SN74LS32N

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A6	08673-60029	4	1	METER BOARD ASSEMBLY	28480	08673-60029
A1A6C1	0180-0291	3	10	CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A6C2	0180-1746	5	4	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A1A6C3	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A6C4	0180-2207	5	3	CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A1A6C5	0180-0197	8	10	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C6	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A1A6C7	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A6C8	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C9	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A6C10	0180-2620	6	1	CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A1A6C11	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C12	0180-0491	5	1	CAP-FXD 10uF 25 V TA	12344	T355E106M025AS
A1A6C13	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C14	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A6C15	0180-2619	3	1	CAP-FXD 22uF 15 V TA	12344	T355F226K016AS
A1A6C16	0160-3875	3	2	CAP-FXD 22pF 200 V	12344	C320C220J2G5CA
A1A6C17	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A1A6C18	0160-2252	8	1	CAP-FXD 6.2pF 500 V	09641	301-000-C0H0-629C
A1A6C19	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C20	0160-3875	3		CAP-FXD 22pF 200 V	12344	C320C220J2G5CA
A1A6C21	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C22	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A1A6C23	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C24	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C25	0160-3879	7	1	CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A1A6C26	0180-2206	4	2	CAP-FXD 60uF 6 V TA	56289	150D606X9006B2
A1A6C27	0180-2206	4		CAP-FXD 60uF 6 V TA	56289	150D606X9006B2
A1A6C28	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A1A6C29	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A6C30	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A6C31	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A1A6C32	0180-0229	7	1	CAP-FXD 33uF 10 V TA	56289	150D336X9010B2
A1A6C33	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A6CR1	1901-0535	9	6	DIODE-SCHOTTKY SM SIG	12403	A2X356
A1A6CR2	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A6CR3	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A1A6CR4	1901-0040	1	8	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A6CR9	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR10	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A6CR12	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR13	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A1A6CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A6CR15	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A1A6CR16	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A1A6CR17	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A1A6CR18	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A1A6MP1	1200-0173	5	1	INSULATOR-XSTR DAP-GL	13103	7717-86 DAP
A1A6MP2	1480-0073	6	4	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A1A6MP3	4040-0748	3	2	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
A1A6MP4	4040-0754	1	1	EXTR-PC BD BLU POLYC .062-IN-BD-THKNS	28480	4040-0754
A1A6Q1	1854-0810	2	13	TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q2	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q3	1854-0610	0	5	TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A6Q4	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A6Q5	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A6Q6	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q7	1854-0809	9	2	TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	04713	2N2369A
A1A6Q8	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q9	1854-0809	9		TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	04713	2N2369A
A1A6Q10	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q11	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q12	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q13	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A6Q14	1854-0597	2	1	TRANSISTOR NPN 2N5943 SI TO-39 PD=1W	04713	2N5943
A1A6Q15	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A6Q16	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A1A6Q17	1854-0477	7	1	TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A1A6Q18	1853-0281	9	1	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A1A6Q19	1853-0459	3	3	TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A6Q20	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6Q21	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A6R1	0757-0442	9	7	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A6R2	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A6R3	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A6R4	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A6R5	0757-0199	3	1	RESISTOR 21.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2152-F
A1A6R6	0698-7188	8	6	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A6R7	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A1A6R8	0757-0397	3	1	RESISTOR 68.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-68R1-F
A1A6R9	0757-0290	5	1	RESISTOR 6.19K +-1% .125W TF TC=0+-100	19701	5033R-1/8-T0-6191-F
A1A6R10	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A6R11	0698-7205	0	4	RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A1A6R12	0757-0401	0	6	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A1A6R13	0757-0389	3	1	RESISTOR 33.2 +-1% .125W TF TC=0+-100	D8439	MK2
A1A6R14	0698-8651	2	1	RESISTOR 16.7 +-1% .05W TF TC=0+-100	12666	MBA 0204
A1A6R15	0698-5068	9	1	RESISTOR 50 +-1% .125W TF TC=0+-25	12498	NE55
A1A6R16	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A6R17	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A1A6R18	0698-0083	8	8	RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R19	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R20	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R21	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R22	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R23	0698-3136	8	1	RESISTOR 17.8K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1782-F
A1A6R24	0757-0418	9	3	RESISTOR 619 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-619R-F
A1A6R25	0757-0797	7	1	RESISTOR 90.9 +-1% .5W TF TC=0+-100	K8479	H2
A1A6R26	0757-0394	0	1	RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A1A6R27	0698-0084	9	1	RESISTOR 2.15K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2151-F
A1A6R28	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A6R29	0698-7209	4	1	RESISTOR 75 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-75R0-F
A1A6R30	0757-0403	2	1	RESISTOR 121 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-121R-F
A1A6R31	0698-7236	7	2	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A1A6R32	0698-7233	4	3	RESISTOR 750 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-750R-F
A1A6R33	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A1A6R34	0698-7224	3	2	RESISTOR 316 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-316R-F
A1A6R35	2100-2574	3	3	RESISTOR-TRMR 500 10% TKF SIDE-ADJ 1-TRN	73138	82PAR500
A1A6R36	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R37	0698-7241	4	1	RESISTOR 1.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1621-F
A1A6R38	0698-7238	9	1	RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A1A6R39	0698-7224	3		RESISTOR 316 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-316R-F
A1A6R40	0698-8816	1	1	RESISTOR 2.15 +-1% .125W TF TC=0+-100	12498	L04D
A1A6R41	0698-7260	7	8	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A6R42	0698-7230	1	1	RESISTOR 562 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-562R-F
A1A6R43	0698-3438	3	2	RESISTOR 147 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-147R-F
A1A6R44	0698-3438	3		RESISTOR 147 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-147R-F
A1A6R45	0698-8817	2	1	RESISTOR 2.61 +-1% .125W TF TC=0+-100	12498	L04D
A1A6R46	0757-0402	1	1	RESISTOR 110 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-111-F
A1A6R47	0757-0180	2	1	RESISTOR 31.6 +-1% .125W TF TC=0+-100	D8439	MK2
A1A6R48	0757-0378	0	1	RESISTOR 11 +-1% .125W TF TC=0+-100	19701	5033R-1/8-T0-11R0-F
A1A6R49	0757-0280	3	3	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A6R50	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A6R51	0698-7251	6	1	RESISTOR 4.22K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-4221-F
A1A6R52	0698-7263	0	1	RESISTOR 13.3K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1332-F
A1A6R53	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A1A6R54	2100-2632	4	1	RESISTOR-TRMR 100 10% TKF SIDE-ADJ 1-TRN	73138	82PAR100
A1A6R55	0698-7220	9	1	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A1A6R56	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A1A6R57	0757-0418	9		RESISTOR 619 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-619R-F
A1A6R58	0698-7265	2	1	RESISTOR 16.2K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1622-F
A1A6R59	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A6R60	0698-7229	8	1	RESISTOR 511 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-511R-F
A1A6R61	0757-0405	4	2	RESISTOR 162 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-162R-F
A1A6R62	0757-0405	4		RESISTOR 162 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-162R-F
A1A6R63	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A1A6R64	0683-1055	5	1	RESISTOR 1M +-5% .25W CF TC=0-800	19701	(CR-25) 1-4-5P-1M
A1A6R65	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A6R66	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A6R67	0698-7288	9	1	RESISTOR 147K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1473-F
A1A6R68	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R69	0698-7233	4		RESISTOR 750 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-750R-F
A1A6R70	2100-2574	3		RESISTOR-TRMR 500 10% TKF SIDE-ADJ 1-TRN	73138	82PAR500
A1A6R71	0698-3152	8	1	RESISTOR 3.48K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3481-F
A1A6R72	0757-0462	3	1	RESISTOR 75K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7502-F
A1A6R73	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A6R74	0757-0418	9		RESISTOR 619 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-619R-F
A1A6R75	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A1A6R76	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4641-F
A1A6R77	0698-7232	3	1	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A1A6R78	0698-3447	4	1	RESISTOR 422 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-422R-F
A1A6R79	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A6R80	0698-7216	3	1	RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A1A6R81	0698-3156	2	1	RESISTOR 14.7K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1472-F
A1A6R82	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A6R83	0698-7233	4		RESISTOR 750 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-750R-F
A1A6R84	2100-2574	3		RESISTOR-TRMR 500 10% TKF SIDE-ADJ 1-TRN	73138	82PAR500
A1A6TP1	1251-0600	0	13	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A6TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A6TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A6TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A6TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A6TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A6TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A6U1	1820-0919	1	1	IC COMPTR ECL A/D DUAL	04713	MC1650L
A1A6U2	1826-0256	1	1	IC COMPARATOR HS DUAL 14-DIP-P PKG	18324	NE522N
A1A6U3	1820-1374	4	2	ANALOG SWITCH 4 SPST 16 -DIP-P	24355	AD7510DIJN
A1A6U4	1826-0582	6	4	ANALOG SWITCH 4 SPST 16 -CBRZ/SDR	27014	LF13201D
A1A6U5	1820-1445	0	2	IC LCH TTL LS 4-BIT	01295	SN74LS375N
A1A6U6	1820-1445	0		IC LCH TTL LS 4-BIT	01295	SN74LS375N
A1A6U7	1820-1374	4		ANALOG SWITCH 4 SPST 16 -DIP-P	24355	AD7510DIJN
A1A6VR1	1902-0962	8	1	DIODE-ZNR 15V 5% DO-35 PD=.4W TC=+.087%	28480	1902-0962
A1A6VR2	1902-0951	5	1	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	50088	1N5231B
A1A6VR3	1902-0957	1	1	DIODE-ZNR 9.1V 5% DO-35 PD=.4W TC=+.069%	28480	1902-0957

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A7	08673-60032	9	1	YTM DRIVER BOARD ASSEMBLY	28480	08673-60032
A1A7C1	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A7C2	0180-2141	6	2	CAP-FXD 3.3uF 50 V TA	56289	150D335X9050B2
A1A7C3	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A7C4	0180-2141	6		CAP-FXD 3.3uF 50 V TA	56289	150D335X9050B2
A1A7C5	0160-4103	2	1	CAP-FXD 220pF 100 V	12344	C320C221J1G5CA
A1A7C6	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A7C7	0160-4387	4	6	CAP-FXD 47pF 200 V	12344	C320C470J2G5CA
A1A7C8	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A7C9	0160-0576	5	3	CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A7C10	0160-4387	4		CAP-FXD 47pF 200 V	12344	C320C470J2G5CA
A1A7C11	0160-2055	9	5	CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A7C12	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A7C13	0160-4387	4		CAP-FXD 47pF 200 V	12344	C320C470J2G5CA
A1A7C14	0160-3491	9	1	CAP-FXD 0.47uF 50 V	09969	RPE123-166Z5U474M50V
A1A7C15	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A7C16	0160-4387	4		CAP-FXD 47pF 200 V	12344	C320C470J2G5CA
A1A7C17	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A7C18	0160-4387	4		CAP-FXD 47pF 200 V	12344	C320C470J2G5CA
A1A7C19	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A7C20	0160-4387	4		CAP-FXD 47pF 200 V	12344	C320C470J2G5CA
A1A7C21	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A1A7C22	0160-0576	5		CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A1A7CR1	1901-0376	6	6	DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A7CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A7CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A7CR4	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A7CR5	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A7CR6	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A7CR7	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A7CR8	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A7CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A7MP1	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A1A7MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
A1A7MP3	4040-0755	2	1	EXTR-PC BD VIO POLYC .062-IN-BD-THKNS	28480	4040-0755
A1A7Q1	1853-0462	8	1	TRANSISTOR PNP 2N3635 SI TO-39 PD=1W	04713	2N3635
A1A7Q2	1854-0637	1	1	TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	04713	2N2219A
A1A7Q3	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A7Q4	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A7Q5	1855-0020	8	3	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	04713	SFE793
A1A7Q6	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	04713	SFE793
A1A7Q7	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	04713	SFE793
A1A7Q8	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A7Q9	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A1A7Q10	1854-0712	3	1	TRANSISTOR-DUAL NPN PD=1.8W	06665	MAT-01GH
A1A7Q11	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	56289	CT-1058
A1A7Q12	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A7R1	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2611-F
A1A7R2	0757-0288	1	1	RESISTOR 9.09K +-1% .125W TF TC=0+-100	19701	5033R-1/8-T0-9091-F
A1A7R3	0698-3334	8	1	RESISTOR 178 +-1% .5W TF TC=0+-100	K8479	H2
A1A7R4	0757-0814	9	1	RESISTOR 511 +-1% .5W TF TC=0+-100	K8479	H2
A1A7R5	0757-0293	8	2	RESISTOR 1.96K +-1% .125W TF TC=0+-25	19701	5033R-1/8-T9-1961-F
A1A7R6	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-825R-F
A1A7R7	0699-0237	6	1	RESISTOR 1.7K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R8	2100-3351	6	1	RESISTOR-TRMR 500 10% TKF SIDE-ADJ 1-TRN	28480	2100-3351
A1A7R9	0699-2375	7	1	RESISTOR 18.5K +-1% .125W TF TC=0+-5	09464	PR1/8
A1A7R10	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A7R11	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A7R12	0757-0464	5	1	RESISTOR 90.9K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-9092-F
A1A7R13	0698-3439	4	1	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A1A7R14	2100-3152	5	1	RESISTOR-TRMR 5K 10% TF SIDE-ADJ 25-TRN	18612	1202-P
A1A7R15	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A1A7R16	0757-0317	7	2	RESISTOR 1.33K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1331-F
A1A7R17	2100-3103	6	7	RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A7R18	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A7R19	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A7R20	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A7R21	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A7R22	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A7R23	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A7R24	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-681R-F
A1A7R25	0699-1832	9	3	RESISTOR 17.9K +-0.1% .1W TF TC=0+-5	09464	PR 1/10
A1A7R26	0699-1832	9		RESISTOR 17.9K +-0.1% .1W TF TC=0+-5	09464	PR 1/10
A1A7R27	0699-1832	9		RESISTOR 17.9K +-0.1% .1W TF TC=0+-5	09464	PR 1/10
A1A7R28	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A7R29	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A7R30	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A1A7R31	0699-0096	5	2	RESISTOR 12K +-0.1% .1W TF TC=0+-10	09464	PR1/10
A1A7R32	0699-2373	5	1	RESISTOR 12.5K +-0.1% .125W TF TC=0+-5	09464	PR1/8
A1A7R33	0699-0096	5		RESISTOR 12K +-0.1% .1W TF TC=0+-10	09464	PR1/10
A1A7R34	0757-0417	8	1	RESISTOR 562 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-562R-F
A1A7R35	0699-0059	0	4	RESISTOR 5K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R36	0699-0059	0		RESISTOR 5K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R37	0699-0059	0		RESISTOR 5K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R38	0699-0059	0		RESISTOR 5K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R39	0757-0317	7		RESISTOR 1.33K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1331-F
A1A7R40	0698-3162	0	1	RESISTOR 46.4K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4642-F
A1A7R41	0757-0439	4	1	RESISTOR 6.81K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-6811-F
A1A7R42	0699-0790	6	1	RESISTOR 100K +-0.1% .1W TF TC=0+-15	09464	PR1/10
A1A7R43	0699-0473	2	2	RESISTOR 50K +-0.1% .1W TF TC=0+-10	09464	PR1/10
A1A7R44	0699-0473	2		RESISTOR 50K +-0.1% .1W TF TC=0+-10	09464	PR1/10
A1A7R45	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A1A7R46	0757-0293	8		RESISTOR 1.96K +-1% .125W TF TC=0+-25	19701	5033R-1/8-T9-1961-F
A1A7R47	0698-5446	7	1	RESISTOR 31.6K +-0.25% .125W TF TC=0+-50	12498	NC55
A1A7R48	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A1A7R49	0757-0289	2	1	RESISTOR 13.3K +-1% .125W TF TC=0+-100	19701	5033R-1/8-T0-1332-F
A1A7R50	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A1A7R51	2100-3274	2	3	RESISTOR-TRMR 10K 10% TKF SIDE-ADJ 1-TRN	28480	2100-3274
A1A7R52	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A1A7R53	0699-2377	9	2	RESISTOR 1K +-0.05% .25W TF TC=0+-10	91637	PTF-65-6
A1A7R54	2100-3274	2		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ 1-TRN	28480	2100-3274
A1A7R55	2100-3274	2		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ 1-TRN	28480	2100-3274
A1A7R56	0698-3151	7	2	RESISTOR 2.87K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2871-F
A1A7R57	0699-2376	8	1	RESISTOR 30.615K +-0.1% .125W TF	09464	PR1/8
A1A7R58	0699-0118	2	2	RESISTOR 20K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R59	0698-3151	7		RESISTOR 2.87K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2871-F
A1A7R60	0699-0118	2		RESISTOR 20K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R61	0699-0642	7	3	RESISTOR 10K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R62	0699-0642	7		RESISTOR 10K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R63	0699-2446	3	1	RESISTOR 11K +-1% .1W TF TC=0+-10	09464	PR1/10
A1A7R64	0699-0642	7		RESISTOR 10K +-0.1% .1W TF TC=0+-5	09464	PR1/10
A1A7R65	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A1A7R66	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A7R67	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A7R68	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A7R69	2100-3103	6		RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A1A7R70	0699-2377	9		RESISTOR 1K +-0.05% .25W TF TC=0+-10	91637	PTF-65-6
A1A7TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A7TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A7TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A7TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A7TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A7TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A7U1	1820-0477	6	7	IC OP AMP GP 8-DIP-P PKG	27014	LM301AN
A1A7U2	1820-0477	6		IC OP AMP GP 8-DIP-P PKG	27014	LM301AN
A1A7U3	1826-0229	8	1	IC OP AMP LOW-DRIFT 8-TO-99 PKG	06665	OP-05CJ
A1A7U4	1826-0582	6		ANALOG SWITCH 4 SPST 16 -CBRZ/SDR	27014	LF13201D
A1A7U5	1826-0582	6		ANALOG SWITCH 4 SPST 16 -CBRZ/SDR	27014	LF13201D

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A7U6	1826-0582	6		ANALOG SWITCH 4 SPST 16 -CBRZ/SDR	27014	LF13201D
A1A7U7	1820-0477	6		IC OP AMP GP 8-DIP-P PKG	27014	LM301AN
A1A7U8	1820-0477	6		IC OP AMP GP 8-DIP-P PKG	27014	LM301AN
A1A7U9	1820-0477	6		IC OP AMP GP 8-DIP-P PKG	27014	LM301AN
A1A7U10	1820-0477	6		IC OP AMP GP 8-DIP-P PKG	27014	LM301AN
A1A7U11	1820-0477	6		IC OP AMP GP 8-DIP-P PKG	27014	LM301AN
A1A7VR1	1902-0958	2	1	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.075%	28480	1902-0958
A1A7VR2	1902-0680	7	1	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W	04713	1N827
A1A7VR3	1902-0956	0	1	DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A1A7VR4	1902-0965	1	1	DIODE-ZNR 20V 5% DO-35 PD=.4W TC=+.092%	28480	1902-0965

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1A8	08673-60163	7	1	SRD BIAS BOARD ASSY	28480	08673-60163
A1A8C1	0160-4812	0	1	CAP-FXD 220pF 100 V	12344	C410C221J1G5CA
A1A8C2	0160-4832	4	5	CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A1A8C3	0160-4832	4		CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A1A8C4	0160-4835	7	18	CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C5	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C6	0180-0291	3	3	CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A8C7	0180-2141	6	1	CAP-FXD 3.3uF 50 V TA	56289	150D335X9050B2
A1A8C8	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C9	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A8C10	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A1A8C11	0180-0291	3		CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A1A8C12	0160-4832	4		CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A1A8C13	0160-4832	4		CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A1A8C14	0160-4574	1	1	CAP-FXD 1000pF 100 V	12344	C410C102K1R5CA
A1A8C15	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C16	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C17	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C18	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C19	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C20	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C21	0160-4801	7	5	CAP-FXD 100pF 100 V	12344	C410C101J1G5CA
A1A8C22	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C23	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C24	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C25	0160-4801	7		CAP-FXD 100pF 100 V	12344	C410C101J1G5CA
A1A8C26	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C27	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C28	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C29	0160-4801	7		CAP-FXD 100pF 100 V	12344	C410C101J1G5CA
A1A8C30	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C31	0160-4808	4	5	CAP-FXD 470pF 100 V	12344	C410C471J1G5CA
A1A8C32	0160-4801	7		CAP-FXD 100pF 100 V	12344	C410C101J1G5CA
A1A8C33	0160-4808	4		CAP-FXD 470pF 100 V	12344	C410C471J1G5CA
A1A8C34	0160-4832	4		CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A1A8C35	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C36	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A1A8C37	0160-4808	4		CAP-FXD 470pF 100 V	12344	C410C471J1G5CA
A1A8C38	0160-4808	4		CAP-FXD 470pF 100 V	12344	C410C471J1G5CA
A1A8C39	0160-4801	7		CAP-FXD 100pF 100 V	12344	C410C101J1G5CA
A1A8C40	0160-4808	4		CAP-FXD 470pF 100 V	12344	C410C471J1G5CA
A1A8CR1	1901-0376	6	1	DIODE-GEN PRP 35V 50MA DO-35	9N171	1N3595
A1A8L1	9140-0210	1	1	INDUCTOR RF-CH-MLD 100UH +-5%	91637	IM-4 100UH 5%
A1A8MP1	1480-0073	6	1	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A1A8MP2	4040-0747	2	1	EXTR-PC BD GRA POLYC .062-IN-BD-THKNS	28480	4040-0747
A1A8MP3	4040-0749	4	1	EXTR-PC BD BRN POLYC .062-IN-BD-THKNS	28480	4040-0749
A1A8P1	1251-0600	0	5	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A8P2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A8P3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A8P4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A8P5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A1A8Q1	1854-0477	7	1	TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A1A8Q2	1853-0459	3	2	TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A8Q3	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A1A8Q4	1855-0420	2	1	TRANSISTOR J-FET 2N4391 N-CHAN D-MODE	17856	2N4391
A1A8Q5	1858-0076	0	1	TRANSISTOR ARRAY 14-PIN PLSTC TO-116	04713	MPQ2907P
A1A8R1	0698-7253	8	1	RESISTOR 5.11K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5111-F
A1A8R2	0698-7188	8	2	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A1A8R3	0698-7260	7	6	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A8R4	0698-7248	1	2	RESISTOR 3.16K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3161-F
A1A8R5	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A1A8R6	0698-7236	7	5	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A1A8R7	0757-0346	2	4	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A8R8	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A1A8R9	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A1A8R10	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A8R11	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A1A8R12	0698-7244	7	1	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A1A8R13	0698-7232	3	3	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A1A8R14	0698-6320	8	4	RESISTOR 5K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A8R15	0757-0280	3	3	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A8R16	0698-7266	3	1	RESISTOR 17.8K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1782-F
A1A8R17	0698-7264	1	2	RESISTOR 14.7K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1472-F
A1A8R18	0698-7267	4	3	RESISTOR 19.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1962-F
A1A8R19	0698-7267	4		RESISTOR 19.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1962-F
A1A8R20	2100-3094	4	2	RESISTOR-TRMR 100K 10% TKF SIDE-ADJ	73138	89PR100K
A1A8R21	0698-7267	4		RESISTOR 19.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1962-F
A1A8R22	0698-7272	1	5	RESISTOR 31.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3162-F
A1A8R23	2100-3094	4		RESISTOR-TRMR 100K 10% TKF SIDE-ADJ	73138	89PR100K
A1A8R24	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A8R25	0698-0083	8	3	RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A8R26	0698-7233	4	4	RESISTOR 750 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-750R-F
A1A8R27	0698-7233	4		RESISTOR 750 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-750R-F
A1A8R28	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A8R29	0698-3157	3	3	RESISTOR 19.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1962-F
A1A8R30	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A8R31	0698-7264	1		RESISTOR 14.7K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1472-F
A1A8R32	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A1A8R33	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A1A8R34	0698-3157	3		RESISTOR 19.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1962-F
A1A8R35	0698-7233	4		RESISTOR 750 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-750R-F
A1A8R36	0698-7233	4		RESISTOR 750 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-750R-F
A1A8R37	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A1A8R38	0698-3236	9	1	RESISTOR 15K +-0.25% .125W TF TC=0+-50	12498	NC55
A1A8R39	0698-6320	8		RESISTOR 5K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A8R40	0698-3157	3		RESISTOR 19.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1962-F
A1A8R41	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A8R42	0698-7250	5	3	RESISTOR 3.83K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3831-F
A1A8R43	0698-7269	6	1	RESISTOR 23.7K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2372-F
A1A8R44	0698-7259	4	1	RESISTOR 9.09K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-9091-F
A1A8R45	0698-7270	9	1	RESISTOR 26.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2612-F
A1A8R46	0698-7262	9	1	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A1A8R47	2100-3161	6	2	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	73138	89PR20K
A1A8R48	0698-7272	1		RESISTOR 31.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3162-F
A1A8R49	0698-7272	1		RESISTOR 31.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3162-F
A1A8R50	0698-7250	5		RESISTOR 3.83K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3831-F
A1A8R51	2100-3161	6		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	73138	89PR20K
A1A8R52	0698-7272	1		RESISTOR 31.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3162-F
A1A8R53	0698-7272	1		RESISTOR 31.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3162-F
A1A8R54	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A8R55	0698-7246	9	2	RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A1A8R56	0698-7212	9	2	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A8R57	0698-7250	5		RESISTOR 3.83K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3831-F
A1A8R58	0698-6320	8		RESISTOR 5K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A8R59	0698-7248	1		RESISTOR 3.16K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3161-F
A1A8R60	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A1A8R61	0698-7241	4	1	RESISTOR 1.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1621-F
A1A8R62	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A1A8R63	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A1A8R64	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A1A8R65	0698-3442	9	1	RESISTOR 237 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-237R-F
A1A8R66	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A1A8R67	0698-6320	8		RESISTOR 5K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A8R68	0698-7246	9		RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A1A8R69	0698-7240	3	2	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A1A8R70	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A1A8R71	0698-7240	3		RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A1A8R72	0698-6347	9	1	RESISTOR 1.5K +-0.1% .125W TF TC=0+-25	12498	NE55
A1A8R73	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A1A8R74	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A8R75	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A1A8R76	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A1A8R77	0699-0096	5	1	RESISTOR 12K +-0.1% .1W TF TC=0+-10	09464	PR1/10
A1A8R78	0698-7254	9	1	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A1A8R79	0698-7284	5	1	RESISTOR 100K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1003-F
A1A8R80	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5112-F
A1A8R81	0698-0082	7	1	RESISTOR 464 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4640-F
A1A8R82	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A1A8U1	1826-0323	3	3	IC OP AMP GP QUAD 14-DIP-C PKG	34371	HA1-4741-5 (SELECTED)
A1A8U2	1826-0323	3		IC OP AMP GP QUAD 14-DIP-C PKG	34371	HA1-4741-5 (SELECTED)
A1A8U3	1826-0759	9	1	IC COMPARATOR GP QUAD 14-DIP-C PKG	27014	LM339J
A1A8U4	1820-1199	1	1	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A1A8U5	1820-0684	7	1	IC INV TTL S HEX 1-INP	01295	SN74S05N
A1A8U6	1820-1216	3	1	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A1A8U7	1820-1934	2	3	D/A 8-BIT 16-CERDIP BPLR	06665	DAC-08EQ
A1A8U8	1820-1934	2		D/A 8-BIT 16-CERDIP BPLR	06665	DAC-08EQ
A1A8U9	1820-1934	2		D/A 8-BIT 16-CERDIP BPLR	06665	DAC-08EQ
A1A8U10	1826-0323	3		IC OP AMP GP QUAD 14-DIP-C PKG	34371	HA1-4741-5 (SELECTED)
A1A8U11	1820-2757	9	5	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A1A8U12	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A1A8U13	08673-80090	1	1	CALIBRATED EPROM (TO PERMIT CALIBRATION SUBMIT SERIAL NUMBER OF HP 8673 AND ITS YTM A1A10)	28480	08673-80090
A1A8U14	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A1A8U15	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A1A8U16	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A1A8VR1	1902-0244	9	1	DIODE-ZNR 30V 5% PD=1W IR=5UA	28480	1902-0244
A1A8VR2	1902-0556	6	1	DIODE-ZNR 20V 5% PD=1W IR=5UA	28480	1902-0556
A1A8VR3	1902-0554	4	1	DIODE-ZNR 10V 5% PD=1W IR=10UA	28480	1902-0554
A1A8VR4	1902-0579	3	1	DIODE-ZNR 5.1V 5% PD=1W IR=10UA	28480	1902-0579
A1A8XU13	1200-0567	1	1	SOCKET-IC-DIP 28-CONT DIP DIP-SLDR	01295	C8728-01

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A9				NOT ASSIGNED		
A1A10	08673-60165	0	1	YTM ASSEMBLY, LESS RFI GASKET (EXCEPT OPTION 008)	28480	08673-60165
	08673-69011	3	1	RESTORED 08673-60165	28480	08673-69011
	08673-60187		1	YTM ASSEMBLY, LESS RFI GASKET (OPT. 008)	28480	08673-60187
	08673-69013		1	RESTORED 08673-60187	28480	08673-69013
	08673-20142	8	1	YTM SIDE RFI GASKET	28480	08673-20142
	08673-20143	9	1	YTM TOP RFI GASKET	28480	08673-20143
A1A10A1	08673-60027	2	1	BD AY YTM HEATER	28480	08673-60027
A1A10A1C1	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A1A10A1C2	0160-3876	4	1	CAP-FXD 47pF 200 V	04222	SR202C470MAAH
A1A10A1C3	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A1A10A1C5	0160-3876	4	1	CAP-FXD 47pF 200 V	04222	SR202C470MAAH
A1A10A1C6	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A1A10A1C7	0180-2104	1	1	CAP-FXD 40uF 30 V WT-SLG-TA-ELCTLT	19701	40EW406A030MIC
A1A10A1C8	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A10A1C9	0160-0576	5	1	CAP-FXD 0.1uF 50 V	04222	SR205C104MAAH
A1A10A1CR1	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A1A10A1E1	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A1A10A1E2	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A1A10A1E3	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A1A10A1E4	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A1A10A1E5	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A1A10A1E6	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A1A10A1J1	1250-0257	1	1	CONNECTOR-RF SMB M PC-W-STDFS 50-OHM	16179	5162-5021-09
A1A10A1J2	1200-1204	5	1	SOCKET-IC 14-CONT DIP DIP-SLDR	00779	2-641609-2
A1A10A1Q1	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A1A10A1R1	0698-7252	7	1	RESISTOR 4.64K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R2	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R3	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R4	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R5	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R6	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R7	0698-7188	8	1	RESISTOR 10 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R8	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R9	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R10	0757-0288	1	1	RESISTOR 9.09K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A10A1R11	0699-0068	1	1	RESISTOR 1.47M +-1% .125W TF TC=0+-100	19701	5033R
A1A10A1R12	0698-7237	8	1	RESISTOR 1.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A1A10A1R13	0757-0180	2	1	RESISTOR 31.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A1A10A1U1	1826-0059	2	1	IC OP AMP GP TO-99 PKG	04713	LM201AH
A1A10A1U2	1826-0025	2	1	IC OP AMP LOW-DRIFT TO-99 PKG	27014	LM208AH
A1A10A1VR1	1902-0176	6	1	DIODE-ZNR 47V 5% PD=1W IR=5UA	04713	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A11	08673-67017	4	1	POWER AMP	28480	08673-67017
	08673-69017	8	1	RESTORED 08673-67017	28480	08673-69017
A1A12	08673-60164	8	1	RF MOTHER BD AY	28480	08673-60164
A1A12	1251-0600	0	2	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A1A12	0380-0688	6	*	SPACER-RVT-ON .156-IN-LG .15-IN-ID	05791	
A1A12C1	0180-2207	5	1	CAP-FXD 100uF 10 V TA	56289	150D107X9010R2-DYS
A1A12C2	0180-2207	5	1	CAP-FXD 100uF 10 V TA	56289	150D107X9010R2-DYS
A1A12C3	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C4	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C5	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C6	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C7	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C8	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C9	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C10	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C11	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C12	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C13	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C14	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12C15	0160-0570	9	1	CAP-FXD 220pF 100 V	04222	SR201C221MAAH
A1A12J1	1251-3905	4	1	CONN-POST TYPE .100-PIN-SPCG 20-CONT	76381	3428-2003
A1A12J2	1250-0257	1	1	CONNECTOR-RF SMB M PC-W-STDFS 50-OHM	16179	5162-5021-09
A1A12J3	1250-0257	1	1	CONNECTOR-RF SMB M PC-W-STDFS 50-OHM	16179	5162-5021-09
A1A12J4	1250-0257	1	1	CONNECTOR-RF SMB M PC-W-STDFS 50-OHM	16179	5162-5021-09
A1A12J5	1200-1204	5	1	SOCKET-IC 14-CONT DIP DIP-SLDR	00779	2-641609-2
A1A12J6	1250-0257	1	1	CONNECTOR-RF SMB M PC-W-STDFS 50-OHM	16179	5162-5021-09
A1A12J7	1250-0257	1	1	CONNECTOR-RF SMB M PC-W-STDFS 50-OHM	16179	5162-5021-09
A1A12J8	1250-0257	1	1	CONNECTOR-RF SMB M PC-W-STDFS 50-OHM	16179	5162-5021-09
A1A12J9	1200-1204	5	1	SOCKET-IC 14-CONT DIP DIP-SLDR	00779	2-641609-2
A1A12J10	1252-0078	8	1	CONN-POST TYPE .100-PIN-SPCG 20-CONT	76381	3428-5202
A1A12J11	1200-0812	9	1	SOCKET-IC 16-CONT DIP DIP-SLDR	91506	716-AG1D
A1A12J12	1251-5547	4	1	CONN-POST TYPE .100-PIN-SPCG 6-CONT	18873	68015-606
A1A12W1	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	55210	L-2007-1
A1A12XA1	1252-2855	3	1			252-12-50-123
A1A12XA2	1251-8116	9	1	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS		252-18-50-123
A1A12XA3	1251-8115	8	1	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS		252-22-50-123
A1A12XA4	1251-8116	9	1	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS		252-18-50-123
A1A12XA5	1251-8115	8	1	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS		252-22-50-123
A1A12XA6	1251-8116	9	1	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS		252-18-50-123
A1A12XA7	1251-8116	9	1	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS		252-18-50-123
A1A12XA8	1251-8116	9	1	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS		252-18-50-123
A1A12XA9	1251-8117	0	1	CONNECTOR-PC EDGE 6-CONT/ROW 2-ROWS		252-06-50-123
A1A14	08673-67008	3	1	26 GHZ AMP ASSY (OPTION 8 ONLY) (INCLUDES A1A14A1 & A1A14AR1) (2918A & BELOW)	28480	08673-67008
A1A14	08673-67018		1	26 GHZ AMP ASSY (OPTION 8 ONLY) (INCLUDES A1A14A1 & A1A14AR1) (2930A & ABOVE)	28480	08673-67008
A1A14AR1				26 GHZ AMPLIFIER ASSY (P/OA1A14 NSR)		
A1A14A1				AMP BIAS BD ASSY (P/O A1A14 NS)		
A1A14A1C1	0180-1745	4	2	CAP-FXD 1.5UF20 V TA (2918A & BELOW)	56289	150D155X9020A2
A1A14A1C1	0180-1743			CF 0.1UF 10% 35V (2930A & ABOVE)		
A1A14A1C2	0160-3879	7	1	CAP-FXD 0.01UF 100 V (2918A & BELOW)	09969	RPE121-105X7R103M100V
A1A14A1C2	0180-0374			CF 10UF 10% 20V (2930A & ABOVE)		
A1A14A1C3	0180-1745	4		CAP-FXD 1.5UF 20 V TA (2918A & BELOW)	56289	150D155X9020A2
A1A14A1C3	0180-3771			CAP TANT 1.0UF (2930A & ABOVE)		
A1A14A1J1	1250-0836		1	CONNECTOR JACK RECP (2930A & ABOVE)		

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1A14A1MP1	0362-0265	7	1	CONNECTOR-SGL CONT SKT 1.14-MM-BSC-SZ (2918A & BELOW)	27264	02-05-5204
A1A14A1MP2	1251-3172	7	1	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A1A14A1MP3	0360-0535	0	1	CONNECTOR-SGL CONT TML-TS-PT (2918A & BELOW)	28480	0360-0535
A1A14A1Q1	1855-0778		1	TRANSISTOR (2930A & ABOVE)		
A1A14A1Q2	1826-0393		1	IC LM317T (2930A & ABOVE)		
A1A14A1R1	0811-1670	3	1	RESISTOR 2.2 +-5% 2W PWI TC=0+-400 (2918A & BELOW)	11502	SPH
A1A14A1R1	0757-0278		3	RF 1.78K 1% .125W (2930A & ABOVE)		
A1A14A1R2	0698-7260	7	1	RESISTOR 10K +-1% .05W TF TC=0+-100 (2918A & BELOW)	12498	C3-1/8-TO-1002-F
A1A14A1R2	0698-3452		1	RF 147K 1% .125W (2930A & ABOVE)		
A1A14A1R3	0757-0424		1	RF 1.1K 1% .125W (2930A & ABOVE)		
A1A14A1R4	0698-3442		1	RF 237 1% .125W (2930A & ABOVE)		
A1A14A1R5	0757-0278			RF 1.78K 1% .125W (2930A & ABOVE)		
A1A14A1R6	0757-0278			RF 1.78K 1% .125W (2930A & ABOVE)		
A1A14A1R8	2100-2061		3	R-V 200 10% (2930A & ABOVE)		
A1A14A1R9	2100-2061			R-V 200 10% (2930A & ABOVE)		
A1A14A1R10	2100-2061			R-V 200 10% (2930A & ABOVE)		
A1A14A1U1	1826-0527	9	1	IC V RGLTR-ADJ-NEG 1.2/37V TO-220 PKG (2918A & BELOW)	27014	LM337T
A1A14A1VR1	1902-0960		1	DIO-ZNR 12V 5% (2930A & ABOVE)		
A1AT1	08673-60244	5	1	PROGRAMMED ATTENUATOR-90 DB	28480	08673-60244
	08673-60254	7	1	PROGRAMMED ATTENUATOR-90 DB (RESTORED 08673-60244)	28480	08673-60254
A1AT1W1	5062-0701	5	1	CBL AY-RBN 8.8IN	28480	5062-0701
A1AT2	0960-0699	9	1	ISOLATOR	16453	PMI-9482
A1AT3	0955-0160	8	1	U-WAVE SWITCH-COAXIAL 6.5GHZ MAX (PULSE MODULATOR)	28480	33144A H08
A1AT5	0955-0192	6	1	ISOLATOR-MICROWAVE 16-26.5 GHZ, OPT 008		
A1AT6	0960-0672	8	1	U-WAVE ISOLATOR, OPT 008		
A1CP1	11720-60002	8	1	BIAS TEE ASSEMBLY	28480	11720-60002
A1CR1	08673-60083	0	1	CRYSTAL DETECTOR ASSEMBLY	28480	08673-60083
A1DC1	0955-0125	7	1	DIRECTIONAL COUPLER	06587	1818
A1K1	08673-60107	9	1	COAXIAL SWITCH, OPT 008		
A1MP1	0520-0128	7	2	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP2	0400-0018	0	1	GROMMET-CHAN NCH .056-IN-GRV-WD	12323	GSNY-052NA
A1MP3	0403-0194	9	4	GUIDE-PC BD BE-CU .062-IN-BD-THKNS	05820	35-1215-2077
A1MP4	0520-0155	0	8	SCREW-MACH 2-56 .125-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP5	1200-0043	8	1	INSULATOR-XSTR ALUMINUM	76530	322047
A1MP6	2200-0558	1	2	SCREW-MACH 4-40 2.25-IN-LG PAN-HD-POZI OPT 008 ONLY	28480	2200-0558
A1MP7	2190-0018	5	4	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
A1MP8	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A1MP9	2190-0019	6	20	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A1MP10	2190-0045	8	10	WASHER-LK HLCL NO. 2 .088-IN-ID	76854	1501-009
A1MP11	2200-0091	7	2	SCREW-MACH 4-40 .562-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP12	2200-0103	2	4	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP13	2200-0111	2	3	SCREW-MACH 4-40 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP14	2200-0143	0	17	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP15	2190-0891	2	3	WASHER-FL MTLC NO. 4 .125-IN-ID	28480	2190-0891
A1MP16	2200-0113	4	14	SCREW-MACH 4-40 .625-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A1MP17	3050-0227	3	1	WASHER-FL MTLC NO. 6 .149-IN-ID	80120	AN960C-6
A1MP18	2360-0113	2	10	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP19	2360-0180	3	2	SCREW-MACH 6-32 .188-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A1MP20	2360-0195	0	2	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP21	2360-0197	2	2	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1MP22	2360-0333	8	10	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
A1MP23	2420-0001	5	4	NUT-HEX W/LKWR 6-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
A1MP24	3050-0010	2	6	WASHER-FL MTLC NO. 6 .147-IN-ID	28480	3050-0010
A1MP25	08673-20115	5	2	BUSHING, INSULATOR	28480	08673-20115
A1MP26	3050-0105	6	1	WASHER-FL MTLC NO. 4 .125-IN-ID OPT 008 ONLY	28480	3050-0105
A1MP27	5040-0170	6	2	BOARD SUPPORT	28480	5040-0170
A1MP28	08673-00078	7	1	REAR SUPPORT	28480	08673-00078
A1MP30	08673-00050	5	1	GUSSET-RF (LEFT)	28480	08673-00050
A1MP31	08673-00029	8	1	GUSSET-RF (RIGHT)	28480	08673-00029
A1MP32	08673-00055	0	1	SUPPORT-P.C. (FRONT)	28480	08673-00055
A1MP33	08673-00051	6	1	CHASSIS	28480	08673-00051
A1MP34	08673-00032	3	1	SUPPORT-P.C. (REAR)	28480	08673-00032
A1MP35	08673-00033	4	1	SUPPORT-ISOLATOR	28480	08673-00033
A1MP36	08673-00034	5	2	SHIELD-PULSE BOARD	28480	08673-00034
A1MP37	08673-00049		1	SUPPORT-COUPLER	28480	08673-00049
A1MP38	08673-20046	1	1	SHIELD-ISOLATOR	28480	08673-20046
A1MP41	2200-0127	0	1	SCREW-MACH 4-40 1.75-IN-LG PAN-HD-POZI OPT 008		
A1MP42	2200-0167	8	1	SCREW-MACH 4-40 .375IN-LG 82 DEG OPT 008		
A1MP43	08673-00047	0	1	SHIELD SUPPORT, ~~OPTION 008~~		
A1MP44	08673-20099	4	1	SHIELD, POLYRUBBER, ~~OPTION 008~~		
A1MP49	08673-20098	3	2	SPACER OPT 8		
A1MP58	08673-20093	8	1	SPACER-KBAND AMPLIFIER, OPTION 008 (2918A & BELOW)		
A1MP61	0340-1228		1	PAPER INSULATOR (2930A & ABOVE)		
A1Q1	1853-0344	5	1	TRANSISTOR PNP 2N5876 SI TO-3 PD=150W	04713	2N5876
A1R1	0811-3477	2	1	RESISTOR 25 +-1% 25W PWI TC=0+-2	01686	AL-25
A1W1	08673-20055	2	1	RF OUTPUT (EXCEPT OPTIONS 001,004,005)	28480	08673-20055
A1W1	08673-20095	0	1	RF OUTPUT (OPTION 001 ONLY)	28480	08673-20095
A1W1	08673-20088	1	1	RF OUTPUT (OPTION 004 ONLY)	28480	08673-20088
A1W1	08673-20090	5	1	RF OUTPUT (OPTION 005 ONLY)	28480	08673-20090
A1W2	08673-20146		1	DIRECTIONAL COUPLER OUTPUT	28480	08673-20146
A1W3	08673-20196		1	CABLE ASSY-YTM OUTPUT (EXCEPT OPT 008)	28480	08673-20196
A1W4	08673-20191	7	1	CABLE ASSY-POWER AMP INPUT	28480	08673-20191
A1W5	08673-20166	6	1	CABLE ASSY-YTM INPUT	28480	08673-20166
A1W6	08672-60071	5	1	CABLE-RIBBON,14 COND(MOTHERBOARD TO YTM) (2918A & BELOW)	28480	08672-60071
A1W6	08673-60240		1	CABLE RIBBON, 14 COND (2930A & ABOVE)		
A1W7	08673-60069	2	1	PULSE MODULATOR CABLE ASSEMBLY	28480	08673-60069
A1W8	08673-60049	8	1	YTM PULSE CABLE ASSEMBLY	28480	08673-60049
A1W9	08673-60048	7	1	BIAS TEE CABLE ASSEMBLY	28480	08673-60048
A1W10	08673-20190	6	1	CABLE ASSEMBLY-POWER AMP OUTPUT	28480	08673-20190
A1W11	08673-20182	6	1	CABLE ASSEMBLY-PREAMP OUTPUT	28480	08673-20182
A1W12	08673-60210	5	1	CABLE ASSEMBLY-RIBBON 14-PIN (POWER AMP TO PRE-AMP)	28480	08673-60210
A1W13	08673-60045	4	1	CABLE ASSEMBLY-ALC OUTPUT	28480	08673-60045
A1W14	08673-20101		1	CABLE ASSY-YTM OUTPUT (OPT 008 ONLY)		
A1W15	08673-20096		1	CABLE ASSY-K AMP IN (OPT 008 ONLY) (2918A & BELOW)		
A1W15	08673-20240		1	CABLE ASSEMBLY (OPT 008 ONLY) (2930A & ABOVE)		
A1W16	08673-20097		1	CABLE ASSEMBLY (OPT 008 ONLY) (2918A & BELOW)		
A1W16	08673-20291		1	CABLE ASSEMBLY (OPT 008 ONLY) (2930A & ABOVE)		
A1W17	08673-20100		1	CABLE ASSEMBLY (OPT 008 ONLY)		

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2				CONTROLLER ASSEMBLY		
A2A1	08673-60159	1	1	PANEL DRIVER BOARD ASSEMBLY	28480	08673-60159
A2A1C1	0180-1746	5	7	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A2A1C2	0160-4389	6	2	CAP-FXD 100pF 200 V	12344	C320C101J2G5CA
A2A1C3	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A2A1C4	0160-4389	6		CAP-FXD 100pF 200 V	12344	C320C101J2G5CA
A2A1C5	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A2A1C6	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A2A1C7	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A2A1C8	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A2A1C9	0180-1746	5		CAP-FXD 15uF 20 V TA	56289	150D156X9020B2
A2A1CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A1CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A1CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A1L1	9100-3922	4	1	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A2A1MP1	1480-0073	6	2	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A2A1MP2	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
A2A1MP3	4040-0749	4	1	EXTR-PC BD BRN POLYC .062-IN-BD-THKNS	28480	4040-0749
A2A1R1	0698-3132	4	29	RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R2	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R3	0698-3136	8	3	RESISTOR 17.8K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1782-F
A2A1R4	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R5	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R6	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R7	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R8	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R9	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R10	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R11	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R12	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R13	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R14	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R15	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R16	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R17	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R18	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R19	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R20	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R21	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R22	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R23	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R24	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R25	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R26	0757-0397	3	2	RESISTOR 68.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-68R1-F
A2A1R27	0757-0397	3		RESISTOR 68.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-68R1-F
A2A1R28	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R29	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R30	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R31	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1R32	0698-3159	5	2	RESISTOR 26.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2612-F
A2A1R33	0698-3136	8		RESISTOR 17.8K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1782-F
A2A1R34	0698-3159	5		RESISTOR 26.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2612-F
A2A1R35	0698-3136	8		RESISTOR 17.8K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1782-F
A2A1R36	0698-3132	4		RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A2A1U1	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A2A1U2	1820-1423	4	2	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A2A1U3	1820-1201	6	1	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A1U4	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A2A1U5	1820-1858	9	7	IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A1U6	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A1U7	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A1U8	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A1U9	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A1U10	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A1U11	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A1U12	1820-1740	8	2	IC-INTERFACE DRVR DISPLAY	27014	DS8863N
A2A1U13	1820-1740	8		IC-INTERFACE DRVR DISPLAY	27014	DS8863N
A2A1U14	1820-1216	3	2	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A1U15	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A2	08673-60004	5	1	KEY CODE BOARD ASSEMBLY	28480	08673-60004
A2A2C1	0180-0197	8	4	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A2C2	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A2C3	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A2C4	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A2C5	0160-4574	1	2	CAP-FXD 1000pF 100 V	12344	C410C102K1R5CA
A2A2C6	0160-4574	1		CAP-FXD 1000pF 100 V	12344	C410C102K1R5CA
A2A2C7	0160-4835	7	1	CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A2C8	0160-4801	7	1	CAP-FXD 100pF 100 V	12344	C410C101J1G5CA
A2A2CR1	1901-0040	1	2	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A2A2CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A2A2DS1	1990-0678	8	7	LED-LAMP LUM-INT=800UCD IF=30MA-MAX	28480	HLMP-6500 (SEL)
A2A2DS2	1990-0678	8		LED-LAMP LUM-INT=800UCD IF=30MA-MAX	28480	HLMP-6500 (SEL)
A2A2DS3	1990-0678	8		LED-LAMP LUM-INT=800UCD IF=30MA-MAX	28480	HLMP-6500 (SEL)
A2A2DS4	1990-0678	8		LED-LAMP LUM-INT=800UCD IF=30MA-MAX	28480	HLMP-6500 (SEL)
A2A2DS5	1990-0678	8		LED-LAMP LUM-INT=800UCD IF=30MA-MAX	28480	HLMP-6500 (SEL)
A2A2DS6	1990-0678	8		LED-LAMP LUM-INT=800UCD IF=30MA-MAX	28480	HLMP-6500 (SEL)
A2A2DS7	1990-0678	8		LED-LAMP LUM-INT=800UCD IF=30MA-MAX	28480	HLMP-6500 (SEL)
A2A2L1	9100-3922	4	1	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A2A2MP1	1480-0073	6	2	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A2A2MP2	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
A2A2MP3	4040-0750	7	1	EXTR-PC BD RED POLYC .062-IN-BD-THKNS	28480	4040-0750
A2A2R1	1810-0280	8	3	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A2A2R2	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A2A2R3	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A2A2R4	0757-0442	9	3	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A2R5	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A2R6	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2A2R7	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A2R8	1810-0339	8	1	NETWORK-RES 8-SIP 270.0 OHM X 7	C1433	750-81
A2A2S1	3101-2170	8	1	SWITCH-PB SPDT MOM	09353	8125-D8ABEQ
A2A2U1	1820-1201	6	2	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A2U2	1820-1422	3	1	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A2U3	1820-1199	1	2	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A2U4	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A2U5	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A2U6	1820-1195	7	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS175N
A2A2U7	1820-1112	8	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A2U8	1820-1197	9	2	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A2U9	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A2U10	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A2U11	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A2A2U12	1820-1851	2	3	IC ENCDR TTL LS	01295	SN74LS148N
A2A2U13	1820-1851	2		IC ENCDR TTL LS	01295	SN74LS148N
A2A2U14	1820-1851	2		IC ENCDR TTL LS	01295	SN74LS148N
A2A2W1				NOT ASSIGNED		
A2A2W2	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A2A3	08672-60212	6	1	VCO BD AY	28480	08672-60212
A2A3C1	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C2	0160-0164	7	1	CAP-FXD 0.039uF 200 V POLYE-FL	09023	WMC2S39
A2A3C3	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A2A3C4	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A2A3C5	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A2A3C6	0160-2259	5	1	CAP-FXD 12pF 500 V	52763	2RDPLX05012RNP0
A2A3C7	0160-6650	8	1	CAP-FXD 0.022uF 50 V POLYC-MET	84411	X463UW-0.022-1%-50VDC
A2A3C8	0160-0166	9	1	CAP-FXD 0.068uF 200 V POLYE-FL	09023	WMC-2S68
A2A3C9	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C10	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C11	0160-6650	8	1	CAP-FXD 0.022uF 50 V POLYC-MET	84411	X463UW-0.022-1%-50VDC
A2A3C12	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C13	0180-2211	1	1	CAP-FXD 5uF 150 V AL-ELCTLT		150T5R0(T)8X18M
A2A3C14	0180-2214	4	1	CAP-FXD 90uF 16 V AL-ELCTLT		16T90R(U)8X16M
A2A3C15	0160-0166	9	1	CAP-FXD 0.068uF 200 V POLYE-FL	09023	WMC-2S68
A2A3C16	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C17	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C18	0160-3466	8	1	CAP-FXD 100pF 1 kV		CK45XE3A101K-H
A2A3C19	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C20	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C21	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C22	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C23	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C24	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C25	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C26	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C27	0160-2240	4	1	CAP-FXD 2pF 500 V	52763	
A2A3C28	0160-2262	0	1	CAP-FXD 16pF 500 V	52763	
A2A3C29	0160-2262	0	1	CAP-FXD 16pF 500 V	52763	
A2A3C30	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C31	0160-3456	6	1	CAP-FXD 1000pF 1 kV		CK45XE3A102K-H
A2A3C32	0140-0195	2	1	CAP-FXD 130pF 300 V MICA	09023	CD15FD131J03
A2A3C33	0140-0195	2	1	CAP-FXD 130pF 300 V MICA	09023	CD15FD131J03
A2A3CR1	0122-0085	1	1	DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5 BVR=30	S0545	1S2208(B)
A2A3CR2	0122-0085	1	1	DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5 BVR=30	S0545	1S2208(B)
A2A3CR3	0122-0085	1	1	DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5 BVR=30	S0545	1S2208(B)
A2A3CR4	0122-0085	1	1	DIODE-VVC 2.2PF 7% C3/C25-MIN=4.5 BVR=30	S0545	1S2208(B)
A2A3J1	1250-0544	9	1	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A2A3J2	1250-0544	9	1	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A2A3L1	9140-0180	4	1	INDUCTOR RF-CH-MLD 2.7UH +-10% .166D-INX	24226	15M271K
A2A3L2	9140-1190	8	1	INDUCTOR RF-CH-MLD 4.7MH +-5%		TPFT0410-472J
A2A3L3	9140-1190	8	1	INDUCTOR RF-CH-MLD 4.7MH +-5%		TPFT0410-472J
A2A3L4	9100-2249	6	1	INDUCTOR RF-CH-MLD 150NH +-10% .105D-INX	24226	10M150K
A2A3L5	9100-2891	4	1	INDUCTOR RF-CH-MLD 50NH +-10% .105D-INX.	24226	10M050K-1
A2A3L6	9100-2248	5	1	INDUCTOR RF-CH-MLD 120NH +-10% .105D-INX	24226	10M120K
A2A3L7	9100-2254	3	1	INDUCTOR RF-CH-MLD 390NH +-10% .105D-INX	24226	10M390K
A2A3L8	9100-2248	5	1	INDUCTOR RF-CH-MLD 120NH +-10% .105D-INX	24226	10M120K
A2A3MP1	2190-0016	3	2	WASHER-LK INTL T 3/8 IN .377-IN-ID	0G791	
A2A3MP2	2200-0101	0	1	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI		
A2A3MP3	4330-0145	9		INSULATOR-BEAD GLASS		
A2A3MP4	08672-20135	8	1		28480	08672-20135
A2A3Q1	1855-0276	6	1	TRANSISTOR J-FET 2N4416A N-CHAN D-MODE T	04713	2N4416A
A2A3Q2	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A2A3Q3	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A2A3Q4	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A2A3Q5	1853-0020	4	1	TRANSISTOR PNP SI PD=300MW FT=150MHZ	2M627	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A2A3Q6	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A2A3R1	0757-0199	3	1	RESISTOR 21.5K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R2	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R3	0698-3156	2	1	RESISTOR 14.7K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R4	0757-0834	3	1	RESISTOR 5.62K +-1% .5W TF TC=0+-100	K8479	H2
A2A3R5	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R6	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R7	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R8	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R9	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R10	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R11	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R12	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R13	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R14	0757-0180	2	1	RESISTOR 31.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R15	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R16	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R17	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R18	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R19	0757-0428	1	1	RESISTOR 1.62K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R20	0698-3160	8	1	RESISTOR 31.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R21	0698-3452	1	1	RESISTOR 147K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R22	0757-0123	3	1	RESISTOR 34.8K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R23	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R24	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R25	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R26	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R27	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R28	0757-0418	9	1	RESISTOR 619 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R29	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R30	0757-0418	9	1	RESISTOR 619 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R31	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R32	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R33	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3R34	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A3S1	3101-1524	4	1	SWITCH-SL DP3T SUBMIN .5A 125VAC/DC PC	79727	GI-154-0005
A2A3T1	08673-80003	5	1	INDUCTOR, 3 WINDG	28480	08673-80003
A2A3U1	1820-1225	4	1	IC FF ECL D-M/S DUAL	04713	MC10231P
A2A3U2	1820-0794	0	1	IC FF ECL D-M/S	04713	MC1670L

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2A4	08672-60211	5	1	PHASE DETECTOR ASSEMBLY- 20/30	28480	08672-60211
A2A4C1	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A2A4C2	0160-6650	8	5	CAP-FXD 0.022uF 50 V POLYC-MET	28480	0160-6650
A2A4C3	0180-0197	8	2	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A4C4	0180-0141	2	1	CAP-FXD 50uF 50 V AL-ELCTLT	56289	30D506G050DD2
A2A4C5	0160-4835	7	8	CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C6	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X902CA2
A2A4C7	0160-0161	4	2	CAP-FXD 0.01uF 200 V POLYE-FL	19701	708D1CC103PK201AX
A2A4C8	0160-0161	4		CAP-FXD 0.01uF 200 V POLYE-FL	19701	708D1CC103PK201AX
A2A4C9	0160-2290	4	2	CAP-FXD 0.15uF 80 V POLYE-FL	19701	708D1MP154PK800AX
A2A4C10	0160-4800	6	1	CAP-FXD 120pF 100 V	12344	C410C121J1G5CA
A2A4C11	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C12	0160-2290	4		CAP-FXD 0.15uF 80 V POLYE-FL	19701	708D1MP154PK800AX
A2A4C13	0160-6650	8		CAP-FXD 0.022uF 50 V POLYC-MET	28480	0160-6650
A2A4C14	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C15	0160-6294	6	1	CAP-FXD 1000pF 50 V	12344	C420C102J5G5CA
A2A4C16	0160-3334	9	1	CAP-FXD 0.01uF 50 V	12344	C410C103K5R5CA
A2A4C17	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C18	0170-0040	9	1	CAP-FXD 0.047uF 200 V POLYE-FL	19701	708D1HP473PK201AX
A2A4C19	0160-6650	8		CAP-FXD 0.022uF 50 V POLYC-MET	28480	0160-6650
A2A4C20	0160-6650	8		CAP-FXD 0.022uF 50 V POLYC-MET	28480	0160-6650
A2A4C21	0160-5901	0	1	CAP-FXD 10pF 200 V	06383	MA12C0G2D100D
A2A4C22	0160-6650	8		CAP-FXD 0.022uF 50 V POLYC-MET	28480	0160-6650
A2A4C23	0160-6649	5	3	CAP-FXD 0.1uF 50 V POLYC-MET	28480	0160-6649
A2A4C24	0160-6649	5		CAP-FXD 0.1uF 50 V POLYC-MET	28480	0160-6649
A2A4C25	0160-6649	5		CAP-FXD 0.1uF 50 V POLYC-MET	28480	0160-6649
A2A4C26	0160-0301	4	1	CAP-FXD 0.012uF 200 V POLYE-FL	19701	708D1EH123PK201AX
A2A4C27	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C28	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C29	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C30	0160-4835	7		CAP-FXD 0.1uF 50 V	12344	C430C104K5R5CA
A2A4C31	0160-4805	1	1	CAP-FXD 47pF 100 V	12344	C410C470J1G5CA
A2A4CR1	1901-0535	9	4	DIODE-SCHOTTKY SM SIG	12403	A2X356
A2A4CR2	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A2A4CR3	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A2A4CR4	1901-0535	9		DIODE-SCHOTTKY SM SIG	12403	A2X356
A2A4L1	9100-1629	4	2	INDUCTOR RF-CH-MLD 47UH +-5%	91637	IM-4 47UH 5%
A2A4L2	9100-1629	4		INDUCTOR RF-CH-MLD 47UH +-5%	91637	IM-4 47UH 5%
A2A4L3	9140-1191	9	4	INDUCTOR RF-CH-MLD 3.9MH +-5%	06383	TPFT0410-392J
A2A4L4	9140-1191	9		INDUCTOR RF-CH-MLD 3.9MH +-5%	06383	TPFT0410-392J
A2A4L5	9140-1191	9		INDUCTOR RF-CH-MLD 3.9MH +-5%	06383	TPFT0410-392J
A2A4L6	9140-1191	9		INDUCTOR RF-CH-MLD 3.9MH +-5%	06383	TPFT0410-392J
A2A4Q1	1854-0071	7	1	TRANSISTOR NPN SI TO-92 PD=300MW	2M627	CP4071
A2A4R1	0757-0280	3	6	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A4R2	0698-3629	4	1	RESISTOR 270 +-5% 2W MO TC=0+-200	12498	FP-69
A2A4R3	0757-1094	9	1	RESISTOR 1.47K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1471-F
A2A4R4	0698-3153	9	3	RESISTOR 3.83K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3831-F
A2A4R5	0698-3153	9		RESISTOR 3.83K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3831-F
A2A4R6	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A4R7	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A4R8	0757-0440	7	2	RESISTOR 7.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7501-F
A2A4R9	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A4R10	0757-0438	3	5	RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A4R11	0757-0440	7		RESISTOR 7.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7501-F
A2A4R12	0757-0422	5	3	RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A2A4R13	0757-0422	5		RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A2A4R14	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A4R15	0698-3160	8	1	RESISTOR 31.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3162-F

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A4R16	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A4R17	0757-0467	8	2	RESISTOR 121K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1213-F
A2A4R18	0698-6362	8	4	RESISTOR 1K +-0.1% .125W TF TC=0+-25	12498	NE55
A2A4R19	0698-6362	8		RESISTOR 1K +-0.1% .125W TF TC=0+-25	12498	NE55
A2A4R20	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A4R21	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2A4R22	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A4R23	0757-0819	4	1	RESISTOR 909 +-1% .5W TF TC=0+-100	K8479	H2
A2A4R24	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A4R25	0757-0424	7	1	RESISTOR 1.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1101-F
A2A4R26	0698-3443	0	1	RESISTOR 287 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-287R-F
A2A4R27	0698-3153	9		RESISTOR 3.83K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3831-F
A2A4R28	0757-0346	2	7	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A4R29	0757-0200	7	1	RESISTOR 5.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5621-F
A2A4R30	0757-0422	5		RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A2A4R31	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1781-F
A2A4R32	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2A4R33	0698-6362	8		RESISTOR 1K +-0.1% .125W TF TC=0+-25	12498	NE55
A2A4R34	0698-7394	8	1	RESISTOR 698 +-0.1% .125W TF TC=0+-25	19701	5033R-1/8-T9-698R-R
A2A4R35	0698-6362	8		RESISTOR 1K +-0.1% .125W TF TC=0+-25	12498	NE55
A2A4R36	0757-0467	8		RESISTOR 121K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1213-F
A2A4R37	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A4R38	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4221-F
A2A4R39	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-196R-F
A2A4R40	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A4R41	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A4R42	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A4R43	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A4R44	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A4R45	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A4R46*	0698-3158	4	1	RESISTOR 23.7K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2372-F
A2A4R47	0698-3441	8	4	RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A2A4R48	0698-3441	8		RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A2A4R49	0698-3441	8		RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A2A4R50	0698-3441	8		RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A2A4TP1	1251-0600	0	4	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A4U1	1820-0429	8	1	IC V RGLTR-FXD-POS 4.8/5.2V TO-39 PKG	27014	LM309H
A2A4U2	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A4U3	1820-0281	0	1	IC FF TTL J-K M/S PULSE CLEAR DUAL	01295	SN74107N
A2A4U4	1820-1422	3	2	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A4U5	1826-0783	9	1	IC OP AMP LOW-NOISE 8-DIP-C PKG	18324	NE5534AFE
A2A4U6	1826-0716	8	2	IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A2A4U7	1820-1112	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A4U8	1820-1422	3		IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A4U9	1820-1645	2	1	IC BFR TTL LS BUS QUAD	01295	SN74LS126AN
A2A4U10	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A2A4VR1	1902-3234	3	1	DIODE-ZNR 19.6V 5% DO-35 PD=.4W	28480	1902-3234
	08672-20136	9	1	COVER-PHASE DET	28480	08672-20136
	0890-0212	3	1	TUBING-FLEX .032-ID TFE .012-WALL	28480	0890-0212
	1205-0250	9	1	THERMAL LINK SGL TO-5/TO-39-CS	05820	2604 TH 5E
	2200-0101	0	4	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A5	08672-60145	4	1	DIVIDER ASSEMBLY- 20/30	28480	08672-60145
A2A5C1	0160-2055	9	12	CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C2	0180-0229	7	4	CAP-FXD 33uF 10 V TA	56289	150D336X9010B2
A2A5C3	0180-0229	7		CAP-FXD 33uF 10 V TA	56289	150D336X9010B2
A2A5C4	0180-2205	3	1	CAP-FXD 0.33uF 35 V TA	56289	150D334X9035A2
A2A5C5	0160-3466	8	1	CAP-FXD 100pF 1 kV	06383	CK45XE3A101K-H
A2A5C6	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C7	0180-0229	7		CAP-FXD 33uF 10 V TA	56289	150D336X9010B2
A2A5C8	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A5C9	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C10	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C11	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C12	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C13	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C14	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C15	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C16	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C17	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C18	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A5C19	0160-3537	4	1	CAP-FXD 680pF 100 V MICA	28480	0160-3537
A2A5C20	0180-0229	7		CAP-FXD 33uF 10 V TA	56289	150D336X9010B2
A2A5CR1	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A2A5J1	1250-0544	9	1	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A2A5L1*	08672-80001	3	2	TOROID FILTER	28480	08672-80001
A2A5L2	9100-1618	1	1	INDUCTOR RF-CH-MLD 5.6UH +-10%	91637	IM-4 5.6UH 5%
A2A5L3	08672-80001	3		TOROID FILTER	28480	08672-80001
A2A5MP1	1205-0250	9	1	THERMAL LINK SGL TO-5/TO-39-CS	05820	2604 TH 5E
A2A5MP2	08672-20134	7	1	COVER-DIVIDER	28480	08672-20134
A2A5MP3	1200-0081	4	1	INSULATOR-FLG-BSHG NYLON	28480	1200-0081
A2A5MP4	2190-0016	3	14	WASHER-LK INTL T 3/8 IN .377-IN-ID	28480	2190-0016
A2A5MP5	2200-0101	0	8	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2A5MP6	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2A5Q1	1854-0019	3	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A2A5R1	0698-3628	3	1	RESISTOR 220 +-5% 2W MO TC=0+-200	12498	FP-69
A2A5R2	0757-0397	3	1	RESISTOR 68.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-68R1-F
A2A5R3	0698-3444	1	2	RESISTOR 316 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-316R-F
A2A5R4	2100-2413	9	1	RESISTOR-TRMR 200 10% TKF SIDE-ADJ 1-TRN	73138	82PAR200
A2A5R5	0698-7216	3	16	RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R6	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R7	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R8	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R9	0757-0280	3	9	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R10	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R11	0757-0438	3	2	RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A5R12	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A2A5R13	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A5R14	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R15	0698-3444	1		RESISTOR 316 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-316R-F
A2A5R16	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R17	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R18	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R19	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R20	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1962-F
A2A5R21	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R22	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R23	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R24	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F
A2A5R25	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-147R-F

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A5R26	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A2A5R27	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A2A5R28	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R29	0757-0422	5	1	RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A2A5R30	0757-0418	9	2	RESISTOR 619 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-619R-F
A2A5R31	0757-0418	9		RESISTOR 619 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-619R-F
A2A5R32	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R33	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A5R34	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A2A5R35	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A2A5R36	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A2A5R37	0698-7216	3		RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A2A5TP1	1251-0600	0	6	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A5TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A5U1	1820-1251	6	5	IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U2	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U3	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U4	1820-0261	6	1	IC MV TTL MONOSTBL	01295	SN74121N
A2A5U5	1820-0686	9	1	IC GATE TTL S AND TPL 3-INP	01295	SN74S11N
A2A5U6	1820-0629	0	2	IC FF TTL S J-K NEG-EDGE-TRIG	01295	SN74S112N
A2A5U7	1820-0629	0		IC FF TTL S J-K NEG-EDGE-TRIG	01295	SN74S112N
A2A5U8	1820-1384	6	1	IC PRESCR ECL	52648	SP8647BDG
A2A5U9	1820-0429	8	1	IC V RGLTR-FXD-POS 4.8/5.2V TO-39 PKG	27014	LM309H
A2A5U10	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U11	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A2A5U12	1820-0909	9	1	IC MULTR TTL	01295	SN74167N
A2A5U13	1820-0751	9	2	IC CNTR TTL DECD NEG-EDGE-TRIG PRESET	01295	SN74196N
A2A5U14	1820-0751	9		IC CNTR TTL DECD NEG-EDGE-TRIG PRESET	01295	SN74196N
A2A5U15	1820-0685	8	1	IC GATE TTL S NAND TPL 3-INP	01295	SN74S10N
A2A5U16	1820-0690	5	1	IC BFR TTL S NAND DUAL 4-INP	01295	SN74S40N

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2A6				NOT ASSIGNED		
A2A7	08673-60176	2	1	I/O BOARD ASSEMBLY	28480	08673-60176
A2A7C1	0180-2620	6	12	CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C2	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C3	0160-0572	1	3	CAP-FXD 2200pF 100 V	12344	C320C222M1R5CA
A2A7C4	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C5	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C6				NOT ASSIGNED		
A2A7C7	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C8	0160-0576	5	1	CAP-FXD 0.1uF 50 V	12344	C320C104M5R5CA
A2A7C9	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C10	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C11	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C12	0160-0174	9	1	CAP-FXD 0.47uF 50 V	09969	RPE123-149Z5U474Z50V
A2A7C13	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C14	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C15	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7C16	0160-0572	1		CAP-FXD 2200pF 100 V	12344	C320C222M1R5CA
A2A7C17	0160-0572	1		CAP-FXD 2200pF 100 V	12344	C320C222M1R5CA
A2A7C18	0160-0153	4	1	CAP-FXD 1000pF 200 V POLYE-FL	19701	708D1AA102PK201AX
A2A7C19	0160-4103	2	2	CAP-FXD 220pF 100 V	12344	C320C221J1G5CA
A2A7C20	0160-0162	5	1	CAP-FXD 0.022uF 200 V POLYE-FL	19701	708D1HH223PK201AX
A2A7C21	0170-0040	9	1	CAP-FXD 0.047uF 200 V POLYE-FL	19701	708D1HP473PK201AX
A2A7C22	0160-4103	2		CAP-FXD 220pF 100 V	12344	C320C221J1G5CA
A2A7C23	0160-4832	4	3	CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A2A7C24	0160-4832	4		CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A2A7C25	0160-4832	4		CAP-FXD 0.01uF 100 V	12344	C420C103K1R5CA
A2A7C26	0180-2620	6		CAP-FXD 2.2uF 50 V TA	12344	T355E225K050AS
A2A7CR1	1901-0050	3	14	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2A7DS1	1990-0670	0	4	LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	HLMP-6400
A2A7DS2	1990-0670	0		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	HLMP-6400
A2A7DS3	1990-0670	0		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	HLMP-6400
A2A7DS4	1990-0670	0		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	HLMP-6400
A2A7L1	9100-3922	4	1	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A2A7MP1	1480-0073	6	2	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A2A7MP2	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
A2A7MP3	4040-0755	2	1	EXTR-PC BD VIO POLYC .062-IN-BD-THKNS	28480	4040-0755
A2A7MP4	0360-0124	3	2	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A2A7MP5	0360-0124	3		CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A2A7Q1	1853-0281	9	5	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A2A7Q2	1853-0281	9		TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A2A7Q3	1853-0281	9		TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A2A7Q4	1853-0281	9		TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A2A7Q5	1853-0281	9		TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A2A7Q6	1854-0477	7	4	TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A2A7Q7	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A2A7Q8	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2A7Q9	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A2A7Q10	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2A7R1	0757-0465	6	5	RESISTOR 100K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1003-F
A2A7R2	0757-0438	3	10	RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R3	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R4	0698-0083	8	5	RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A2A7R5	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R6	0698-3160	8	4	RESISTOR 31.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3162-F
A2A7R7	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R8	0757-0458	7	5	RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A2A7R9	0698-3442	9	4	RESISTOR 237 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-237R-F
A2A7R10	0757-0279	0	4	RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A7R11	0698-3160	8		RESISTOR 31.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3162-F
A2A7R12	0757-0442	9	8	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7R13	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R14	0757-0458	7		RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A2A7R15	0698-3442	9		RESISTOR 237 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-237R-F
A2A7R16	0757-0458	7		RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A2A7R17	0698-3160	8		RESISTOR 31.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3162-F
A2A7R18	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7R19	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R20	0698-3442	9		RESISTOR 237 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-237R-F
A2A7R21	0698-3160	8		RESISTOR 31.6K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3162-F
A2A7R22	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R23	0698-3442	9		RESISTOR 237 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-237R-F
A2A7R24	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R25	0757-0819	4	1	RESISTOR 909 +-1% .5W TF TC=0+-100	K8479	H2
A2A7R26	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A2A7R27	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R28	0757-0199	3	1	RESISTOR 21.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2152-F
A2A7R29	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A7R30	0757-0438	3		RESISTOR 5.11K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5111-F
A2A7R31	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A2A7R32	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A2A7R33	1810-0280	8	1	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A2A7R34	2100-3353	8	2	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	28480	2100-3353
A2A7R35	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7R36	0698-0083	8		RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A2A7R37	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A7R38	0757-0274	5	3	RESISTOR 1.21K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1211-F
A2A7R39	0757-0440	7	3	RESISTOR 7.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7501-F
A2A7R40	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7R41	0757-0394	0	3	RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A2A7R42	0698-3161	9	1	RESISTOR 38.3K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3832-F
A2A7R43	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A7R44	0757-0401	0	4	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2A7R45	0757-0465	6		RESISTOR 100K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1003-F
A2A7R46	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7R47	0757-0465	6		RESISTOR 100K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1003-F
A2A7R48	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2A7R49	0757-0465	6		RESISTOR 100K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1003-F
A2A7R50	2100-3353	8		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	28480	2100-3353
A2A7R51	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7R52	0757-0458	7		RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A2A7R53	0757-0465	6		RESISTOR 100K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1003-F
A2A7R54	0757-0458	7		RESISTOR 51.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-5112-F
A2A7R55	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2A7R56	0757-0460	1	1	RESISTOR 61.9K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-6192-F
A2A7R57	0757-0274	5		RESISTOR 1.21K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1211-F
A2A7R58	0757-0274	5		RESISTOR 1.21K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1211-F
A2A7R59	2100-3103	6	1	RESISTOR-TRMR 10K 10% TKF SIDE-ADJ	73138	89PR10K
A2A7R60	0698-3236	9	1	RESISTOR 15K +-0.25% .125W TF TC=0+-50	12498	NC55
A2A7R61	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7R62	0757-0346	2	2	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A7R63	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2A7R64	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A2A7R65	0757-0440	7		RESISTOR 7.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7501-F

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A7R66	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A2A7R67	0757-0440	7		RESISTOR 7.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7501-F
A2A7R68	0698-7280	1	1	RESISTOR 68.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6812-F
A2A7R69	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A2A7R70	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A2A7R71	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A7S1	3101-2094	5	1	SWITCH-DIP RKR 8-1A 0.05A 30VDC	81073	76SB08S
A2A7S2	3101-2135	5	1	SWITCH-DIP RKR 3-SPDT 0.05A 30VDC	81073	76SC02S
A2A7TP1	1251-0600	0	4	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A7TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A7TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A7TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A7U1	1820-2079	8	1	IC GATE CMOS NOR DUAL 4-INP	04713	MC14002BCP
A2A7U2	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A2A7U3	1820-1422	3	1	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A2A7U4	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A7U5	1820-1216	3	1	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A7U6	1820-0693	8	1	IC FF TTL S D-TYPE POS-EDGE-TRIG	01295	SN74S74N
A2A7U7	1820-1858	9	4	IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A7U8	1826-0600	9	2	IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-P	01295	TL074ACN
A2A7U9	1820-1199	1	2	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A7U10	1820-1445	0	2	IC LCH TTL LS 4-BIT	01295	SN74LS375N
A2A7U11	1820-2983	3	1	IC-PERIPHERAL INTERFACE ADAPTER;CLK=2MHZ	04713	MC68B21P
A2A7U12	1820-1759	9	4	IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A7U13	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A7U14	1826-0462	1	2	D/A 10-BIT 16-CERDIP BPLR	18324	MC3410CF
A2A7U15	1820-1445	0		IC LCH TTL LS 4-BIT	01295	SN74LS375N
A2A7U16	1820-1195	7	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS175N
A2A7U17	1820-1747	5	1	IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A7U18	1826-0600	9		IC OP AMP LOW-BIAS-H-IMPD QUAD 14-DIP-P	01295	TL074ACN
A2A7U19	1820-1419	8	1	IC COMPTR TTL LS MAGTD 4-BIT	01295	SN74LS85N
A2A7U20	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A7U21	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A7U22	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A7U23	1826-0065	0	1	IC COMPARATOR PRCN 8-DIP-P PKG	27014	LM311N
A2A7U24	1820-1285	6	1	IC GATE TTL LS AND-OR-INV 4-INP	01295	SN74LS54N
A2A7U25	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A7U26	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A7U27	1820-1195	7		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS175N
A2A7U28	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A7U29	1826-0853	4	1	IC V RGLTR-V-REF-FXD 9.95/10.05V TO-99	06665	REF-01HJ
A2A7U30	1826-0462	1		D/A 10-BIT 16-CERDIP BPLR	18324	MC3410CF
A2A7U31	1826-0574	6	1	IC OP AMP LOW-DRIFT 8-TO-99 PKG	27014	UA714LHC
A2A7VR1	1902-0962	8	1	DIODE-ZNR 15V 5% DO-35 PD=.4W TC=+.087%	28480	1902-0962
A2A7VR2	1902-0950	4	1	DIODE-ZNR 4.7V 5% DO-35 PD=.4W TC=+.025%	28480	1902-0950
A2A7VR3	1902-0967	3	1	DIODE-ZNR 24V 5% DO-35 PD=.4W TC=+.094%	28480	1902-0967

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A8	08673-60110	4	1	MICROPROCESSOR BOARD ASSEMBLY	28480	08673-60110
A2A8C1	0160-2055	9	2	CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A8C2	0180-0197	8	8	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C3	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C4	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C5	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C6	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C7	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C8	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C9	0160-2255	1	1	CAP-FXD 8.2pF 500 V	09641	301-000-C0H0-829C
A2A8C10	0160-3466	8	1	CAP-FXD 100pF 1 kV	06383	CK45XE3A101K-H
A2A8C11	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A2A8C12	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A2A8CR1	1901-0028	5	1	DIODE-PWR RECT 400V 750MA DO-29	71744	MP493
A2A8L1	9100-3922	4	1	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A2A8L2	9140-0179	1	1	INDUCTOR RF-CH-MLD 22UH +-10%	91637	IM-4 22UH 5%
A2A8MP1	1480-0073	6	2	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A2A8MP2	4040-0747	2	1	EXTR-PC BD GRA POLYC .062-IN-BD-THKNS	28480	4040-0747
A2A8MP3	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
A2A8MP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8Q1	1853-0393	4	1	TRANSISTOR PNP SI TO-92 PD=500MW	28480	1853-0393
A2A8Q2	1854-0019	3	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A2A8R1	0757-0279	0	9	RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R2	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R3	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R4	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-316R-F
A2A8R5	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R6	0757-0442	9	4	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A8R7	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A8R8	0757-0199	3	2	RESISTOR 21.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2152-F
A2A8R9	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2A8R10	0757-0280	3	4	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A8R11	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R12	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R13	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R14	0757-0199	3		RESISTOR 21.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2152-F
A2A8R15	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R16	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A2A8R17	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A8R18	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A8R19	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A8R20	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A2A8R21	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A8R22	1810-0275	1	1	NETWORK-RES 10-SIP 1.0K OHM X 9	C1433	750-101
A2A8S1	3100-3364	2	1	SWITCH-ROTARY 16 PIN DIP 4PDT	00779	54792-1
A2A8TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8TP2G	1251-0600	0	14	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8TP5G	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A8U1	1820-1112	8	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A8U2	1820-1201	6	2	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A8U3	08673-80018	3	1	ROM-PROGRAMMED	28480	08673-80018
A2A8U4	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A8U5	1820-1144	6	1	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A8U6	1820-3929	9	1	IC-8BIT MPU WITH CLOCK AND OPTIONAL RAM	04713	MC68B02P
A2A8U7	1820-1203	8	1	IC GATE TTL LS AND TPL 3-INP	01295	SN74LS11N
A2A8U8	1820-2469	0	1	IC-PROGRAMMABLE TIMER, 3 TIME INTERVALS	04713	MC6840P
A2A8U9	1820-1759	9	6	IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A8U10	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A8U11	1820-1197	9	3	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A8U12	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A8U13	1820-1216	3	3	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A8U14	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A8U15	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A8U16	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A2A8U17	1820-1199	1	1	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A8U18	1820-1932	0	1	IC MV CMOS MONOSTBL RETRIG/RESET DUAL	04713	MC14538BCP
A2A8U19	1820-1747	5	1	IC GATE CMOS NAND QUAD 2-INP	04713	MC14011BCP
A2A8U20	1820-1746	4	1	IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A8U21	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A8U22	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A8U23	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A8U24	1820-1851	2	1	IC ENCDR TTL LS	01295	SN74LS148N
A2A8U25	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A8U26	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A8U27	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A8U28	1820-2102	8	1	IC LCH TTL LS D-TYPE OCTL	01295	SN74LS373N
A2A8XU3	1200-0541	1	1	SOCKET-IC-DIP 24-CONT DIP DIP-SLDR	01295	C8724-01

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A9	08673-60006	7	1	FREQUENCY/HP-IB BOARD ASSEMBLY	28480	08673-60006
A2A9C1	0180-0116	1	3	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A2A9C2	0180-0116	1		CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A2A9C3	0180-0116	1		CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A2A9L1	9100-3922	4	1	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A2A9MP1	1480-0073	6	2	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A2A9MP2	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS	28480	4040-0748
A2A9MP3	4040-0756	3	1	EXTR-PC BD WHT POLYC .062-IN-BD-THKNS	28480	4040-0756
A2A9Q1	1854-0071	7	2	TRANSISTOR NPN SI TO-92 PD=300MW	2M627	CP4071
A2A9Q2	1854-0071	7		TRANSISTOR NPN SI TO-92 PD=300MW	2M627	CP4071
A2A9R1	1810-0275	1	2	NETWORK-RES 10-SIP 1.0K OHM X 9	C1433	750-101
A2A9R2	0757-0442	9	3	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A9R3	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A9R4	1810-0275	1		NETWORK-RES 10-SIP 1.0K OHM X 9	C1433	750-101
A2A9R5	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2A9R6	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2A9R7	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A2A9S1	3101-2094	5	1	SWITCH-DIP RKR 8-1A 0.05A 30VDC	81073	76SB08S
A2A9TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A9U1	1820-1955	7	5	IC ADDR CMOS FULL ADDER 4-BIT	04713	MC14008BCP
A2A9U2	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	04713	MC14008BCP
A2A9U3	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	04713	MC14008BCP
A2A9U4	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	04713	MC14008BCP
A2A9U5	1820-1955	7		IC ADDR CMOS FULL ADDER 4-BIT	04713	MC14008BCP
A2A9U6	1820-1208	3	1	IC GATE TTL LS OR QUAD 2-INP	01295	SN74LS32N
A2A9U7	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A9U8	1820-1216	3	1	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A9U9	1820-1199	1	1	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A9U10	1820-2549	7	1	IC-GPIB TALKER/LISTENER	34649	P8291A SELECTED
A2A9U11	1820-3431	8	1	IC-INTERFACE XCVR INSTRUMENT BUS IEEE	27014	DS75160AN
A2A9U12	1820-1746	4	1	IC BFR CMOS INV HEX	04713	MC14049UBCP
A2A9U13	1820-1976	2	2	IC BFR CMOS NON-INV HEX	04713	MC14050BCP
A2A9U14	1820-1976	2		IC BFR CMOS NON-INV HEX	04713	MC14050BCP
A2A9U15	1820-1858	9	4	IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A9U16	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A9U17	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A9U18	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A9U19	1820-1759	9	3	IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A9U20	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A9U21	1820-1759	9		IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A9U22	1820-3513	7	1	IC-INTERFACE XCVR INSTRUMENT BUS IEEE	27014	DS75161AN

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A2A10	08673-60155	7	1	MEMORY BD AY (DOES NOT INCLUDE A2A10U7)	28480	08673-60155
A2A10C1	0180-0230	0	1	CAP-FXD 1uF 50 V TA	56289	150D105X0050A2-DYS
A2A10C2	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A2A10C3	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A2A10C4	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A2A10C5	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A2A10C6	0160-4801	7	1	CAP-FXD 100pF 100 V	04222	SA102A101JAAH
A2A10J1	1251-8471	9	1	CONN-POST TYPE .100-PIN-SPCG 40-CONT	00779	499160-9
A2A10J2	1251-8471	9	1	CONN-POST TYPE .100-PIN-SPCG 40-CONT	00779	499160-9
A2A10L1	9100-3922	4	1	INDUCTOR-FIXED 120-1300 HZ	23880	14067
A2A10MP	4040-0748	3	1	EXTR-PC BD BLK POLYC .062-IN-BD-THKNS 1-		
A2A10MP	1480-0073	6	2	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	72962	99-012-062-0250
A2A10Q1	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A2A10R1	0757-1094	9	1	RESISTOR 1.47K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A10R2	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A10R3	1810-0280	8	1	NETWORK-RES 10-SIP 10.0K OHM X 9	11236	750-101
A2A10R4	1810-0280	8	1	NETWORK-RES 10-SIP 10.0K OHM X 9	11236	750-101
A2A10R5	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A10R6	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A2A10S1	3101-2135	5	1	SWITCH-DIP RKR 3-SPDT 0.05A 30VDC	81073	76SC02S
A2A10U1	1820-2081	2	1	IC-PERIPHERAL INTERFACE ADAPTER (PIA) F=	04713	MC68A21P
A2A10U10	1820-1759	9	1	IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A10U11	1820-1730	6	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM CL	01295	SN74LS273N
A2A10U12	08673-80001	4	1		28480	08673-80001
A2A10U2	1820-1759	9	1	IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A10U3	1820-1759	9	1	IC BFR TTL LS NON-INV OCTL	27014	DM81LS97N
A2A10U4	1820-1216	3	1	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A10U5	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A10U6	08673-80084	3	1	EPROM CONTROLLER	28480	08673-80084
A2A10U7	08673-80095		1	EPROM CONTROLLER	28480	08673-80095
A2A10U8	1818-1768	5	1	IC CMOS 16384 (16K) STAT RAM 150-NS 3-S		1818-1768
A2A10U9	1820-2075	4	1	IC TRANSCEIVER TTL LS BUS OCTL	01295	SN74LS245N
A2A10W1	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	55210	L-2007-1
A2A10XU7	1200-0567	1	1	SOCKET-IC 28-CONT DIP DIP-SLDR	00779	2-641605-1

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2A11				NOT ASSIGNED		
A2A12				NOT ASSIGNED		
A2A13	08673-60201	4	1	MOTHERBOARD ASSEMBLY	28480	08673-60201
A2A13C1	0160-3879	7	2	CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A2A13C2	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A2A13C3	0160-3877	5	16	CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C4	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C5	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C6	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C7	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C8	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C9	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C10	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C11	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C12	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C13	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C14	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C15	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C16	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C17	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C18	0160-3877	5		CAP-FXD 100pF 200 V	12344	C320C101M2R5CA
A2A13C19	0160-3873	1	4	CAP-FXD 4.7pF 200 V	12344	C320C479D2G5CA
A2A13C20	0160-3873	1		CAP-FXD 4.7pF 200 V	12344	C320C479D2G5CA
A2A13C21	0160-3873	1		CAP-FXD 4.7pF 200 V	12344	C320C479D2G5CA
A2A13C22	0160-3873	1		CAP-FXD 4.7pF 200 V	12344	C320C479D2G5CA
A2A13J1	1250-1255	1	1	CONNECTOR-RF SMB M PC 50-OHM	98291	51-051-0000
A2A13J2	1251-8929	2	2	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-8929
A2A13J3	1251-8471	9	1	CONN-POST TYPE .100-PIN-SPCG 40-CONT	28480	1251-8471
A2A13J4	1252-0242	8	1	CONN-POST TYPE .100-PIN-SPCG 34-CONT	28480	1252-0242
A2A13J5	1252-0078	8	1	CONN-POST TYPE .100-PIN-SPCG 20-CONT	28480	1252-0078
A2A13J6	1251-8929	2		CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-8929
A2A13MP1	0380-0817	3	2	SPACER-RVT-ON .095-IN-LG .152-IN-ID	28480	0380-0817
A2A13MP2	1251-0600	0	2	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A2A13R1	0757-1000	7	1	RESISTOR 51.1 +-1% .5W TF TC=0+-100	K8479	H2
A2A13W1	08673-20070	1	1	CABLE-SEMI RIGID	28480	08673-20070
A2A13XA1A	1251-8116	9	11	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA1B	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA2	1251-8115	8	1	CONNECTOR-PC EDGE 22-CONT/ROW 2-ROWS	04072	252-22-50-123
A2A13XA3	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA4	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA5	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA6				NOT ASSIGNED		
A2A13XA7A	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA7B	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA7C	1252-2856	4	4	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	04072	252-15-50-123
A2A13XA8B	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA8C	1252-2856	4		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	04072	252-15-50-123
A2A13XA9A	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA9B	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA9C	1252-2856	4		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	04072	252-15-50-123
A2A13XA10B	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A2A13XA10C	1252-2856	4		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	04072	252-15-50-123

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2A14	08673-60013	6	1	REAR INTERCONNECT BOARD ASSEMBLY	28480	08673-60013
A2A14J1	1251-3025	9	1	CONN-POST TYPE .100-PIN-SPCG 34-CONT	28480	1251-3025
A2A14MP1	0380-0339	4	1	STANDOFF-RVT-ON .25-IN-LG 4-40-THD	28480	0380-0339
A2A15	08673-60010	3	1	HP-IB CONNECTOR BOARD ASSEMBLY	28480	08673-60010
A2A15J1	1251-3283	1	1	CONN-RECT MICRORBN 24-CKT 24-CONT	28480	1251-3283
A2A15MP1	0380-0643	3	2	STANDOFF-HEX .255-IN-LG 6-32-THD	28480	0380-0643
A2A15MP2	2190-0017	4	2	WASHER-LK HLCL NO. 8 .168-IN-ID	28480	2190-0017
A2A15MP3	2190-0019	6	2	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A2A15MP4	2200-0109	8	2	SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2A15MP5	2260-0002	6	2	NUT-HEX-DBL-CHAM 4-40-THD .062-IN-THK	00000	ORDER BY DESCRIPTION
A2A15MP6	3050-0139	6	2	WASHER-FL MTLC NO. 8 .172-IN-ID	28480	3050-0139
A2A15MP7	1530-1098	4	1	MACHINED PART-BRS CLEVIS	28480	1530-1098
A2A15XA1	1251-3403	7	1	CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	05574	600201-4539

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2BT1	08672-60092	0	1	BATTERY PACK ASSEMBLY	28480	08672-60092
A2J1				NOT ASSIGNED		
A2J2	1250-0083	1	5	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
A2J3	1250-0083	1		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
A2J4	1250-0083	1		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
A2J5	1250-0083	1		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
A2J6	1251-0143	6	1	CONN-RECT MICRORBN 14-CKT 14-CONT	28480	1251-0143
A2J7	1250-0083	1		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	24931	28JR130-1
A2MP1	0624-0268	6	48	SCREW-TPG 4-24 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2MP2				NOT ASSIGNED		
A2MP3	2190-0401	0	14	WASHER-FL NM NO. 4 .12-IN-ID .312-IN-OD	73734	1470
A2MP4	2200-0103	2	14	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2MP5	2360-0115	4	2	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2MP6	2360-0333	8	13	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
A2MP7	0624-0097	9	2	SCREW-TPG 4-40 .188-IN-LG PAN-HD-POZI	28480	0624-0097
A2MP8				NOT ASSIGNED		
A2MP9				NOT ASSIGNED		
A2MP10	3050-0010	2	2	WASHER-FL MTLC NO. 6 .147-IN-ID	28480	3050-0010
A2MP11	7100-1266	3	1	CAN-SQUARE	02875	HU-4265-.500-ST
A2MP12	85660-00054	6	1	CLAMP-BATTERY	28480	85660-00054
A2MP13				NOT ASSIGNED		
A2MP14	08672-20142	7	1	AMPLIFIER HOUSING	28480	08672-20142
A2MP15	08672-20146	1	1	MOUNTING BLOCK	28480	08672-20146
A2MP16	08672-60029	3	1	BATTERY HOLDER ASSEMBLY	28480	08672-60029
A2MP17	08673-00062	9	1	SUPPORT-FRONT DCU	28480	08673-00062
A2MP18	08673-00005	0	1	GUSSET-RIGHT DCU	28480	08673-00005
A2MP19	08673-00006	1	1	GUSSET-CENTER DCU	28480	08673-00006
A2MP20	08673-00007	2	1	GUSSET-LEFT DCU	28480	08673-00007
A2MP21				NOT ASSIGNED		
A2MP22	0520-0129	8	2	SCREW-MACH 2-56 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A2MP23				NOT ASSIGNED		
A2MP24	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
A2MP25	2190-0016	3	5	WASHER-LK INTL T 3/8 IN .377-IN-ID	28480	2190-0016
A2MP26	2190-0045	8	2	WASHER-LK HLCL NO. 2 .088-IN-ID	76854	1501-009
A2MP27				NOT ASSIGNED		
A2MP28	2950-0001	8	5	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A2MP29	08673-00074	3	1	PANEL-REAR DCU	28480	08673-00074
A2MP30				NOT ASSIGNED		
A2MP31	2510-0195	9	4	SCREW-MACH 8-32 .375-IN-LG 100 DEG	28480	2510-0195
A2W1	08672-60030	6	1	CABLE ASSEMBLY-VCO OUTPUT	28480	08672-60030
A2W2	08673-60024	9	1	CABLE ASSEMBLY-34 CONDUCTOR S	28480	08673-60024
A2W3				NOT ASSIGNED		
A2W4	5060-0366	4	1	RIBBON CBL AY 50	28480	5060-0366

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3			1	RF SOURCE MAINFRAME ASSEMBLY		
A3A1				REFERENCE AND M/N ASSEMBLY		
A3A1A1	86701-60021	5	1	BD PHASE LOCK	28480	86701-60021
A3A1A1C1	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A1A1C2	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A1A1C3	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A1A1C4	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A1A1C5	0140-0190	7	1	CAP-FXD 39pF 300 V MICA	09023	CD15ED390J03
A3A1A1C6	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A1A1C7	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C8	0180-1846	6	1	CAP-FXD 2.2uF 35 V TA	56289	150D225X9035B2-DYS
A3A1A1C9	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A1A1C10	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C11	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A1A1C12	0160-2199	2	1	CAP-FXD 30pF 300 V MICA	09023	CD15ED300J03
A3A1A1C13	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A1A1C14	0160-2204	0	1	CAP-FXD 100pF 300 V MICA	09023	CD15FD101J03
A3A1A1C15	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A1A1C16	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C17	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C18	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C19	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C20	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C21	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C22	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C23	0180-0553	0	1	CAP-FXD 22uF 25 V TA		202L2502-226-M6-552
A3A1A1C24	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C25	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C26	0160-2204	0	1	CAP-FXD 100pF 300 V MICA	09023	CD15FD101J03
A3A1A1C27	0140-0193	0	1	CAP-FXD 82pF 300 V MICA	09023	CD15ED820J03
A3A1A1C28	0180-0553	0	1	CAP-FXD 22uF 25 V TA		202L2502-226-M6-552
A3A1A1C29	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C30	0140-0193	0	1	CAP-FXD 82pF 300 V MICA	09023	CD15ED820J03
A3A1A1C31	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A1A1C32	0170-0066	9	1	CAP-FXD 0.027uF 200 V POLYE-FL	09023	WMC 2S27
A3A1A1C33	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C34	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C35	0140-0193	0	1	CAP-FXD 82pF 300 V MICA	09023	CD15ED820J03
A3A1A1C36	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C37	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C38	0140-0193	0	1	CAP-FXD 82pF 300 V MICA	09023	CD15ED820J03
A3A1A1C39	0160-3454	4	1	CAP-FXD 220pF 1 kV		CK45XE3A221K-H
A3A1A1C40	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A1A1C41	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C42	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C43	0160-2206	2	1	CAP-FXD 160pF 300 V MICA	09023	CD15FD161J03
A3A1A1C44	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C45	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C46	0140-0210	2	1	CAP-FXD 270pF 300 V MICA	09023	CD15FD271J03
A3A1A1C47	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C48	0140-0210	2	1	CAP-FXD 270pF 300 V MICA	09023	CD15FD271J03
A3A1A1C49	0160-2201	7	1	CAP-FXD 51pF 300 V MICA	09023	CD15ED510J03
A3A1A1C50	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C51	0140-0210	2	1	CAP-FXD 270pF 300 V MICA	09023	CD15FD271J03
A3A1A1C52	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C53	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A1A1C54	0180-0183	2	1	CAP-FXD 10uF 50 V AL-ELCTLT		SL50T10RU6X16
A3A1A1C55	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A1A1C56	0180-0229	7	1	CAP-FXD 33uF 10 V TA	56289	150D336X9010B2-DYS
A3A1A1C57	0160-2204	0	1	CAP-FXD 100pF 300 V MICA	09023	CD15FD101J03

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A1A1C58	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A1A1C59	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A3A1A1C60	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A1A1C61	0160-3454	4	1	CAP-FXD 220pF 1 kV		CK45XE3A221K-H
A3A1A1C62	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A3A1A1CR1	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	28480	5082-5509
A3A1A1CR2	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	28480	5082-5509
A3A1A1CR3	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	28480	5082-5509
A3A1A1CR4	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	28480	5082-5509
A3A1A1CR5	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	28480	5082-5509
A3A1A1CR6	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	28480	5082-5509
A3A1A1L1	9140-0238	3	1	INDUCTOR RF-CH-MLD 82UH +-5% .166D-INX.3	24226	15M822J
A3A1A1L2	9140-0238	3	1	INDUCTOR RF-CH-MLD 82UH +-5% .166D-INX.3	24226	15M822J
A3A1A1L3	9140-0143	9	1	INDUCTOR RF-CH-MLD 3.3UH +-10% .105D-INX	24226	10M331K
A3A1A1L4	9140-0143	9	1	INDUCTOR RF-CH-MLD 3.3UH +-10% .105D-INX	24226	10M331K
A3A1A1L5	9100-2261	2	1	INDUCTOR RF-CH-MLD 2.7UH +-10% .105D-INX	24226	10M271K
A3A1A1L6	9140-0114	4	1	INDUCTOR RF-CH-MLD 10UH +-10% .166D-INX.	24226	15M102K
A3A1A1L7	9100-2255	4	1	INDUCTOR RF-CH-MLD 470NH +-10% .105D-INX	24226	10M470K
A3A1A1L8	9100-0368	6	1	INDUCTOR RF-CH-MLD 330NH +-10% .105D-INX	24226	10M330K
A3A1A1L9	9100-2257	6	1	INDUCTOR RF-CH-MLD 820NH +-10% .105D-INX	24226	10M820K
A3A1A1L10	9100-2255	4	1	INDUCTOR RF-CH-MLD 470NH +-10% .105D-INX	24226	10M470K
A3A1A1L11	9100-2257	6	1	INDUCTOR RF-CH-MLD 820NH +-10% .105D-INX	24226	10M820K
A3A1A1L12	9100-2255	4	1	INDUCTOR RF-CH-MLD 470NH +-10% .105D-INX	24226	10M470K
A3A1A1L13	9100-2257	6	1	INDUCTOR RF-CH-MLD 820NH +-10% .105D-INX	24226	10M820K
A3A1A1L14	9100-2255	4	1	INDUCTOR RF-CH-MLD 470NH +-10% .105D-INX	24226	10M470K
A3A1A1L15	9100-2256	5	1	INDUCTOR RF-CH-MLD 560NH +-10% .105D-INX	24226	10M560K
A3A1A1J1	1250-0544	9	1	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A1J3	1250-0544	9	1	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A1J4	1250-0544	9	1	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A1J5	1250-0544	9	1	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A1J6	1250-0544	9	1	CONNECTOR-RF SM-SNP M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A1MP1	1205-0250	9	1	THERMAL LINK SGL TO-5/TO-39-CS	05820	2604 TH 5E
A3A1A1MP2	2190-0124	4	2	WASHER-LK INTL T NO. 10 .195-IN-ID	16179	500222
A3A1A1MP3	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI		
A3A1A1MP4	2950-0078	9	1	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	24931	HN100-11
A3A1A1MP5	6040-0239	9		HEAT SINK COMPOUND SIL	05820	120
A3A1A1MP6	86701-20040	4	1		28480	86701-20040
A3A1A1MP7	86701-40001	9	2		28480	86701-40001
A3A1A1MP8	2200-0139	4	2	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI		
A3A1A1MP9	2190-0019	6	2	WASHER-LK HLCL NO. 4 .115-IN-ID	73734	
A3A1A1Q1	1854-0019	3	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A1A1Q2	1854-0019	3	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A1A1Q3	1854-0019	3	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A1A1Q4	1855-0049	1	1	TRANSISTOR-JFET DUAL N-CHAN D-MODE SI PD	17856	
A3A1A1Q5	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A1A1Q6	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A1A1Q7	1853-0034	0	1	TRANSISTOR PNP SI TO-18 PD=360MW	04713	
A3A1A1R1	0757-0399	5	1	RESISTOR 82.5 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R2	0757-0417	8	1	RESISTOR 562 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R3	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R4	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R5	0698-3156	2	1	RESISTOR 14.7K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R6	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R7	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R8	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R9	0757-0399	5	1	RESISTOR 82.5 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R10	0698-7222	1	1	RESISTOR 261 +-1% .05W TF TC=0+-100	2M627	CRB20

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A1A1R11	0698-7219	6	1	RESISTOR 196 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A1R12	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R13	0698-3453	2	1	RESISTOR 196K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R14	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R15	0698-3453	2	1	RESISTOR 196K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R16	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R17	0698-3438	3	1	RESISTOR 147 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R18	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R19	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R20	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R21	0698-3438	3	1	RESISTOR 147 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R22	0698-3136	8	1	RESISTOR 17.8K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R23	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R24	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R25	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R26	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R27	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R28	0698-3450	9	1	RESISTOR 42.2K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R29	0698-3449	6	1	RESISTOR 28.7K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R30	0757-0444	1	1	RESISTOR 12.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R31	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R32	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R33	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R34	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R35	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R36	0757-0444	1	1	RESISTOR 12.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R37	0757-0200	7	1	RESISTOR 5.62K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R38	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R39	0757-0440	7	1	RESISTOR 7.5K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R40	0757-0394	0	1	RESISTOR 51.1 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R41	0698-3446	3	1	RESISTOR 383 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R42	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R43	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R44	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R45	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R46	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R47	0698-3453	2	1	RESISTOR 196K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R48	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R49	0698-7285	6	1	RESISTOR 110K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A1R50	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R51	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R52	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R53	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R54	0698-7234	5	1	RESISTOR 825 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A1R55	0698-7257	2	1	RESISTOR 7.5K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A1R56	0757-0394	0	1	RESISTOR 51.1 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R57	0698-3446	3	1	RESISTOR 383 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R58	0698-7246	9	1	RESISTOR 2.61K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A1R59	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R60	0757-0276	7	1	RESISTOR 61.9 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R61	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R62	0757-1094	9	1	RESISTOR 1.47K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R63	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R64	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R65	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R66	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R67	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R68	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R69	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R70	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A1A1R71	0757-0274	5	1	RESISTOR 1.21K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R72	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R73	0757-0317	7	1	RESISTOR 1.33K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R74	0757-0289	2	1	RESISTOR 13.3K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A1R75	0698-7236	7	1	RESISTOR 1K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A1T1	86701-60082	8	1	TRANSFORMER-RF	28480	86701-60082
A3A1A1T2	86701-60082	8	1	TRANSFORMER-RF	28480	86701-60082
A3A1A1TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A1U1	1821-0001	4	1	TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MC3346P
A3A1A1U2	1820-0328	6	1	IC GATE TTL NOR QUAD 2-INP	01295	SN7402N
A3A1A1U3	1820-1383	5	1	IC CNTR ECL BCD POS-EDGE-TRIG	04713	MC10138L
A3A1A1U4	1820-0802	1	1	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A1U5	1820-0477	6	1	IC OP AMP GP 8-DIP-P PKG	S0545	UPC301AC
A3A1A1U6	1820-0429	8	1	IC V RGLTR-FXD-POS 4.8/5.2V TO-39 PKG	27014	LM309H
A3A1A1VR1	1902-3082	9	1	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	04713	
A3A1A1VR2	1902-3256	9	1	DIODE-ZNR 23.7V 5% DO-35 PD=.4W	04713	
A3A1A1W1	86701-60059	9	1	CABLE ASSEMBLY-GRAY/ORANGE/WHITE	28480	86701-60059

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A2	86701-60020	4	1	100 MHZ VCXO ASSEMBLY	28480	86701-60020
A3A1A2C1	0121-0495	5	3	CAP-VAR 15.7pF 1.9pF 175 V AIR	74970	187-0309-125
A3A1A2C2	0121-0495	5		CAP-VAR 15.7pF 1.9pF 175 V AIR	74970	187-0309-125
A3A1A2C3	0121-0495	5		CAP-VAR 15.7pF 1.9pF 175 V AIR	74970	187-0309-125
A3A1A2C4	0121-0493	3	1	CAP-VAR 11pF 1.7pF 175 V AIR	74970	187-0306-125
A3A1A2C5	0180-0049	9	1	CAP-FXD 20uF 50 V AL-ELCTLT	56289	30D206G050CC2
A3A1A2C6	0160-3456	6	3	CAP-FXD 1000pF 1 kV	06383	CK45XE3A102K-H
A3A1A2C7	0160-3454	4	22	CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C8*	0160-2251	7	2	CAP-FXD 5.6pF 500 V	09641	301-000-C0H-569C
A3A1A2C9	0160-4084	8	1	CAP-FXD 0.1uF 50 V	12344	C322C104M5R5CA
A3A1A2C10	0140-0191	8	1	CAP-FXD 56pF 300 V MICA	28480	0140-0191
A3A1A2C11	0160-2204	0	1	CAP-FXD 100pF 300 V MICA	28480	0160-2204
A3A1A2C12	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C13	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C14	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C15	0160-2261	9	8	CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C16	0160-2261	9		CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C17	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C18	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C19	0160-2261	9		CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C20	0160-2261	9		CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C21	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C22	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C23	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C24	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C25	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C26	0160-2261	9		CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C27	0160-2261	9		CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C28	0160-2251	7		CAP-FXD 5.6pF 500 V	09641	301-000-C0H-569C
A3A1A2C29	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C30	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C31	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C32	0160-2261	9		CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C33	0160-2261	9		CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A2C34	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C35	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C36	0160-3878	6	6	CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A2C37	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A2C38	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A2C39	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C40	0160-2238	0	1	CAP-FXD 1.5pF 500 V	09641	301-000-C0K0-159C
A3A1A2C41	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A2C42	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A2C43	0180-0116	1	2	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A3A1A2C44	0160-2253	9	1	CAP-FXD 6.8pF 500 V	09641	301-000-C0H0-689C
A3A1A2C45				NOT ASSIGNED		
A3A1A2C46	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A2C47	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C48	0160-3456	6		CAP-FXD 1000pF 1 kV	06383	CK45XE3A102K-H
A3A1A2C49	0160-3456	6		CAP-FXD 1000pF 1 kV	06383	CK45XE3A102K-H
A3A1A2C50	0180-0116	1		CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A3A1A2C51	0160-4299	7	1	CAP-FXD 2200pF 250 V	09969	DD09NWB302X5R222M250V
A3A1A2C52	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C53	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C54	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C55	0160-3454	4		CAP-FXD 220pF 1 kV	06383	CK45XE3A221K-H
A3A1A2C56	0160-2437	1	1	CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A2CR1	0122-0245	5	1	DIODE-VVC 1N5139 6.8PF 10%	04713	1N5139
A3A1A2CR2				NOT ASSIGNED		
A3A1A2CR3	1901-0539	3	2	DIODE-SCHOTTKY SM SIG	12403	A2X355
A3A1A2CR4	1901-0539	3		DIODE-SCHOTTKY SM SIG	12403	A2X355

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A2J1	1250-0544	9	3	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A2J2	1250-0544	9		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A2J3	1250-0544	9		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-049-0000-220
A3A1A2J4				PART OF A3A1A2W1		
A3A1A2L1				NOT ASSIGNED		
A3A1A2L2	9100-2249	6	1	INDUCTOR RF-CH-MLD 150NH +-10%	91637	IM-2 .15UH 10%
A3A1A2L3	9140-0158	6	1	INDUCTOR RF-CH-MLD 1UH +-10%	91637	IM-2 1UH 10%
A3A1A2L4*	9100-2254	3	1	INDUCTOR RF-CH-MLD 390NH +-10%	91637	IM-2 .39UH 10%
A3A1A2L5	9100-2538	6	1	INDUCTOR RF-CH-MLD 1UH +-10%	28480	9100-2538
A3A1A2L6	9100-2251	0	4	INDUCTOR RF-CH-MLD 220NH +-10%	91637	IM-2 .22UH 10%
A3A1A2L7	9100-2251	0		INDUCTOR RF-CH-MLD 220NH +-10%	91637	IM-2 .22UH 10%
A3A1A2L8	9100-2251	0		INDUCTOR RF-CH-MLD 220NH +-10%	91637	IM-2 .22UH 10%
A3A1A2L9	9100-2251	0		INDUCTOR RF-CH-MLD 220NH +-10%	91637	IM-2 .22UH 10%
A3A1A2L10				PART OF ETCHED CIRCUIT BOARD		
A3A1A2L11				PART OF ETCHED CIRCUIT BOARD		
A3A1A2L12				PART OF ETCHED CIRCUIT BOARD		
A3A1A2L13				NOT ASSIGNED		
A3A1A2L14	9100-2247	4	2	INDUCTOR RF-CH-MLD 100NH +-10%	91637	IM-2 .1UH 10%
A3A1A2L15	9100-2247	4		INDUCTOR RF-CH-MLD 100NH +-10%	91637	IM-2 .1UH 10%
A3A1A2MP1	2190-0019	6	1	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A3A1A2MP2	2190-0124	4	1	WASHER-LK INTL T NO. 10 .195-IN-ID	16179	500222
A3A1A2MP3	1200-0173	5	1	INSULATOR-XSTR DAP-GL	13103	7717-86 DAP
A3A1A2MP4	2200-0139	4		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A2MP5	86701-60073	7	1	SHIELD ASSEMBLY	28480	86701-60073
A3A1A2MP6	86701-20039	1	1	COVER- P.C. VCXO BOARD	28480	86701-20039
A3A1A2MP7	86701-40001	9	1	EXTRACTOR-P.C. BOARD	28480	86701-40001
A3A1A2MP8	1400-0401	6	1	CABLE TIE .75-DIA .094-WD NYL	06394	SST1M-M-8
A3A1A2MP9	2580-0002	4	1	NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
A3A1A2Q1	1854-0345	8	9	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q2	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q5	1854-0247	9	1	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A1A2Q6	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q7	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q8	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q9	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2Q10	1854-0404	0	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A1A2Q11	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A2R1	0757-0279	0	3	RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A3A1A2R2	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-681R-F
A3A1A2R3	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-196R-F
A3A1A2R4	0757-0422	5	6	RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A3A1A2R5	0698-3155	1	2	RESISTOR 4.64K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4641-F
A3A1A2R6	0698-7224	3	1	RESISTOR 316 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-316R-F
A3A1A2R7	0757-0346	2	2	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A3A1A2R8	0757-0422	5		RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A3A1A2R9	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A3A1A2R10	0757-0401	0	7	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A2R11	0757-0394	0	5	RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A1A2R12	0757-0416	7	6	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A3A1A2R13	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A1A2R14	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A3A1A2R15	0757-0422	5		RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A3A1A2R16	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A2R17	0698-3150	6	8	RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A3A1A2R18	0698-3150	6		RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A3A1A2R19	0698-7198	0	2	RESISTOR 26.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-26R1-F
A3A1A2R20	0698-3443	0	6	RESISTOR 287 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-287R-F
A3A1A2R21	0698-3429	2	3	RESISTOR 19.6 +-1% .125W TF TC=0+-100	2N014	CRB14 OR CRB25
A3A1A2R22	0698-3443	0		RESISTOR 287 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-287R-F
A3A1A2R23	0698-3150	6		RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A3A1A2R24	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A2R25	0698-3150	6		RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A2R26	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A3A1A2R27	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A3A1A2R28	0757-0422	5		RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A3A1A2R29	0698-7198	0		RESISTOR 26.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-26R1-F
A3A1A2R30	0698-3443	0		RESISTOR 287 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-287R-F
A3A1A2R31	0698-3429	2		RESISTOR 19.6 +-1% .125W TF TC=0+-100	2N014	CRB14 OR CRB25
A3A1A2R32	0698-3443	0		RESISTOR 287 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-287R-F
A3A1A2R33	0698-3443	0		RESISTOR 287 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-287R-F
A3A1A2R34	0698-3429	2		RESISTOR 19.6 +-1% .125W TF TC=0+-100	2N014	CRB14 OR CRB25
A3A1A2R35	0698-3443	0		RESISTOR 287 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-287R-F
A3A1A2R36	0698-3150	6		RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A3A1A2R37	0757-0422	5		RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A3A1A2R38	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A2R39	0698-3150	6		RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A3A1A2R40	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A3A1A2R41	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A1A2R42	0698-0084	9	3	RESISTOR 2.15K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2151-F
A3A1A2R43	0698-3155	1		RESISTOR 4.64K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4641-F
A3A1A2R44	0698-0084	9		RESISTOR 2.15K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2151-F
A3A1A2R45	0698-0084	9		RESISTOR 2.15K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2151-F
A3A1A2R46	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A3A1A2R47	0757-0439	4	2	RESISTOR 6.81K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-6811-F
A3A1A2R48	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A3A1A2R49	0757-0279	0		RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A3A1A2R50	0757-0439	4		RESISTOR 6.81K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-6811-F
A3A1A2R51	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A3A1A2R52	0757-0280	3	2	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A1A2R53	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A1A2R54	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A1A2R55	0757-0422	5		RESISTOR 909 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-909R-F
A3A1A2R56	0698-3150	6		RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A3A1A2R57	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A2R58	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A2R59	0698-3150	6		RESISTOR 2.37K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2371-F
A3A1A2R60	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A1A2R61	0698-3441	8	1	RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A3A1A2R62	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A2R63				NOT ASSIGNED		
A3A1A2R64				NOT ASSIGNED		
A3A1A2R65				NOT ASSIGNED		
A3A1A2R66				NOT ASSIGNED		
A3A1A2R67*	0698-3437	2	2	RESISTOR 133 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-133R-F
A3A1A2R68*	0698-4037	0	1	RESISTOR 46.4 +-1% .125W TF TC=0+-100	D8439	MK2
A3A1A2R69*	0698-3437	2		RESISTOR 133 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-133R-F
A3A1A2T1	86701-60081	7	3	TRANSFORMER-RF, BLUE	28480	86701-60081
A3A1A2T2	86701-60081	7		TRANSFORMER-RF, BLUE	28480	86701-60081
A3A1A2T3	86701-60081	7		TRANSFORMER-RF, BLUE	28480	86701-60081
A3A1A2TP2	1251-0600	0	3	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A1A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A1A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A1A2W1	86701-60031	7	1	CABLE ASSEMBLY-GRAY/RED/WHITE	28480	86701-60031
A3A1A2Y1	0410-1086	5	1	CRYSTAL-QUARTZ 100 MHZ HC-35/U-HLDR	28480	0410-1086

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A1A3	86701-60098	6	1	M/N PH DET BD AY	28480	86701-60098
A3A1A3C1	0160-4299	7	1	CAP-FXD 2200pF 250 V		CK45XR2E222M-H
A3A1A3C2	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A1A3C3	0160-4299	7	1	CAP-FXD 2200pF 250 V		CK45XR2E222M-H
A3A1A3C4	0180-0100	3	1	CAP-FXD 4.7uF 35 V TA	56289	150D475X9035B2-DYS
A3A1A3C5	0160-0572	1	1	CAP-FXD 2200pF 100 V	04222	SR201C222MAAH
A3A1A3C6	0160-0572	1	1	CAP-FXD 2200pF 100 V	04222	SR201C222MAAH
A3A1A3C7	0160-3876	4	1	CAP-FXD 47pF 200 V	04222	SR202C470MAAH
A3A1A3C8	0160-3877	5	1	CAP-FXD 100pF 200 V	04222	SR202C101MAAH
A3A1A3C9	0160-3876	4	1	CAP-FXD 47pF 200 V	04222	SR202C470MAAH
A3A1A3C10	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A1A3C11	0160-3873	1	1	CAP-FXD 4.7pF 200 V		FD12C0G2D4R7D
A3A1A3C12	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A1A3C13	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A3A1A3C14	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A1A3C15	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A3A1A3C16	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A3A1A3C17	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A1A3C18	0160-4299	7	1	CAP-FXD 2200pF 250 V		CK45XR2E222M-H
A3A1A3C19	0180-0291	3	1	CAP-FXD 1uF 35 V TA	56289	150D105X9035A2-DYS
A3A1A3C20	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A1A3C21	0160-4299	7	1	CAP-FXD 2200pF 250 V		CK45XR2E222M-H
A3A1A3C22	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A1A3J1	1250-0690	6	1	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	51-047-4610
A3A1A3L1	9100-1641	0	1	INDUCTOR RF-CH-MLD 240UH +-5% .166D-INX.	24226	15M243J
A3A1A3L2	9100-2259	8	1	INDUCTOR RF-CH-MLD 1.5UH +-10% .105D-INX	24226	10M151K
A3A1A3L3	9100-1641	0	1	INDUCTOR RF-CH-MLD 240UH +-5% .166D-INX.	24226	15M243J
A3A1A3L4	9100-2891	4	1	INDUCTOR RF-CH-MLD 50NH +-10% .105D-INX.	24226	10M050K-1
A3A1A3L5	9100-2891	4	1	INDUCTOR RF-CH-MLD 50NH +-10% .105D-INX.	24226	10M050K-1
A3A1A3L6	9100-2248	5	1	INDUCTOR RF-CH-MLD 120NH +-10% .105D-INX	24226	10M120K
A3A1A3L7	9100-2248	5	1	INDUCTOR RF-CH-MLD 120NH +-10% .105D-INX	24226	10M120K
A3A1A3L8	9100-2248	5	1	INDUCTOR RF-CH-MLD 120NH +-10% .105D-INX	24226	10M120K
A3A1A3MP1	85660-20136	7	1	M/N PHASE DETECTOR BD	28480	85660-20136
A3A1A3MP3	0520-0129	8	13	SCREW-MACH 2-56 .312-IN-LG PAN-HD-POZI		
A3A1A3MP4	0590-0533	5	13	THREADED INSERT-NUT 2-56 .06-IN-LG SST	46384	KFS2-256
A3A1A3MP5	1205-0285	0	5	HEAT SINK SGL DIP	13103	6007A-TOP
A3A1A3MP6	2190-0014	1	3	WASHER-LK INTL T NO. 2 .089-IN-ID	78189	1902-00-00-2580
A3A1A3MP7	2190-0124	4	5	WASHER-LK INTL T NO. 10 .195-IN-ID	16179	500222
A3A1A3MP8	2200-0101	0	2	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI		
A3A1A3MP10	2950-0078	9	3	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	24931	HN100-11
A3A1A3MP12	86701-20101	8	1	CV-PC M/N PH DET	28480	86701-20101
A3A1A3MP13	85660-20068	4	2	GRND LUG	28480	85660-20068
A3A1A3MP14	86701-00032	2	1	HEATSINK	28480	86701-00032
A3A1A3MP16	86701-40001	9	2	EXTRACTOR PC	28480	86701-40001
A3A1A3MP18	8151-0013	4		WIRE 22AWG 1X22	16428	8021-100
A3A1A3Q1	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A1A3Q2	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A1A3Q3	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A3Q4	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A3R1	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R2	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R3	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R4	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R5	0698-7267	4	1	RESISTOR 19.6K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R6	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R7	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R8	0698-7192	4	1	RESISTOR 14.7 +-1% .05W TF TC=0+-100	2M627	CRB20

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A1A3R9	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R10	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R11	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R12	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R13	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R14	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R15	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R16	0698-7248	1	1	RESISTOR 3.16K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R17	0698-7248	1	1	RESISTOR 3.16K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R18	0698-7223	2	1	RESISTOR 287 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R19	0698-7256	1	1	RESISTOR 6.81K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R20	0698-7248	1	1	RESISTOR 3.16K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R21	0698-7220	9	1	RESISTOR 215 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R22	0698-7220	9	1	RESISTOR 215 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R23	0698-7192	4	1	RESISTOR 14.7 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A1A3R24	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R25	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R26	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R27	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R28	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R29	0698-3162	0	1	RESISTOR 46.4K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3R30	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A1A3TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A3TP2	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A3TP3	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A3TP4	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A3TP5	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A3TP6	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A3TP7	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A1A3U1	1820-1344	8	1	IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A3A1A3U2	1826-0092	3	1	IC OP AMP GP DUAL TO-99 PKG	04713	
A3A1A3U3	1810-0251	3	1	NETWORK-RES 10-SIP MULTI-VALUE	01121	410S
A3A1A3U4	1820-1225	4	1	IC FF ECL D-M/S DUAL	04713	MC10231P
A3A1A3U5	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A3A1A3U6	1820-3126	8	1	IC CNTR ECL HEXADEC SYNCHRO POS-EDGE-TRI	04713	MC10136P
A3A1A3U7	1820-0802	1	1	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U8	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A3A1A3U9	1820-0806	5	1	IC GATE ECL OR-NOR DUAL 4-5-INP	04713	MC10109P
A3A1A3U10	1820-0820	3	1	IC FF ECL J-BAR K-BAR COM CLOCK DUAL	04713	MC10135L
A3A1A3U11	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A3A1A3U12	1820-0802	1	1	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U13	1810-0251	3	1	NETWORK-RES 10-SIP MULTI-VALUE	01121	410S
A3A1A3U14	1820-1225	4	1	IC FF ECL D-M/S DUAL	04713	MC10231P
A3A1A3U15	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A3A1A3U16	1820-3126	8	1	IC CNTR ECL HEXADEC SYNCHRO POS-EDGE-TRI	04713	MC10136P
A3A1A3U17	1810-0251	3	1	NETWORK-RES 10-SIP MULTI-VALUE	01121	410S
A3A1A3U18	1820-0802	1	1	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U19	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A3A1A3U20	1820-0806	5	1	IC GATE ECL OR-NOR DUAL 4-5-INP	04713	MC10109P
A3A1A3U21	1820-0820	3	1	IC FF ECL J-BAR K-BAR COM CLOCK DUAL	04713	MC10135L
A3A1A3U22	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A3A1A3U23	1820-0802	1	1	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A1A3U24	0955-0063	0	1	U-WAVE MIXER 500 MHZ MAX	15542	SRA-1-32
A3A1A3VR1	1902-3082	9	1	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	04713	
A3A1A3W1	86701-60051	1	1	CBL AY IF IN-OUT	28480	86701-60051
A3A1A3W2	85660-60085	9	1	CABLE ASSEMBLY	28480	85660-60085

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A4	86701-60029	3	1	M/N VCO ASSEMBLY (INCLUDES A3A1A4A1&2)	28480	86701-60029
A3A1A4	86701-60071	5	1	M/N VCO ASSEMBLY (RESTORED 86701-60029)	28480	86701-60071
A3A1A4MP1	0362-0227	1	1	CONNECTOR-SGL CONT SKT 1.14-MM-BSC-SZ	27264	02-05-5216
A3A1A4MP2	0520-0165	2	1	SCREW-MACH 2-56 .312-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A3A1A4MP3	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A4MP4	2200-0167	8	1	SCREW-MACH 4-40 .375-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A3A1A4A1				VCO RESONATOR ASSY (NSR P/O A3A1A4)		
A3A1A4A2	86701-60027	1	1	BOARD ASSEMBLY-M/N VCO	28480	86701-60027
A3A1A4A2C1	0160-3878	6	6	CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A4A2C2	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A4A2C3	0160-3879	7	2	CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A3A1A4A2C4	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A4A2C5	0180-2139	2	1	CAP-FXD 10uF 60 V WT-SLG-TA-ELCTLT	56289	109D106X0060C2
A3A1A4A2C6	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A4A2C7	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A4A2C8	0160-3873	1	1	CAP-FXD 4.7pF 200 V	12344	C320C479D2G5CA
A3A1A4A2C9	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A4A2C10	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A3A1A4A2C11	0180-2161	0	1	CAP-FXD 0.75uF 50 V TA	56289	150D754X9050A2
A3A1A4A2L1	9140-0770	8	2	INDUCTOR RF-CH-MLD 50NH +-10%	24226	10-M050K-2
A3A1A4A2L2	9140-0770	8		INDUCTOR RF-CH-MLD 50NH +-10%	24226	10-M050K-2
A3A1A4A2L3	86701-20051	7	1	INDUCTOR	28480	86701-20051
A3A1A4A2L4	9140-0158	6	1	INDUCTOR RF-CH-MLD 1UH +-10%	91637	IM-2 1UH 10%
A3A1A4A2Q1	1854-0686	0	1	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A3A1A4A2Q2	1854-0610	0	1	TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A3A1A4A2R1	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A1A4A2R2	0698-7219	6	1	RESISTOR 196 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-196R-F
A3A1A4A2R3	0698-7193	5	1	RESISTOR 16.2 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-16R2-F
A3A1A4A2R4	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4221-F
A3A1A4A2R5	0757-0428	1	2	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A3A1A4A2R6	0698-7262	9	1	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A3A1A4A2R7	0757-0428	1		RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A3A1A4A2R8	0698-7254	9	1	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A3A1A4A2R9	0698-7205	0	1	RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A3A1A4A2R10	0698-7265	2	1	RESISTOR 16.2K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1622-F
A3A1A4A2R11	0698-7250	5	1	RESISTOR 3.83K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3831-F
A3A1A4A2R12	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A3A1A4A2R13	0757-0400	9	1	RESISTOR 90.9 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-90R9-F
A3A1A4A2TP1	1251-0600	0	3	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A1A4A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A1A4A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A1A4A2W1	86701-60058	8	1	CABLE ASSEMBLY-VCO OUTPUT	28480	86701-60058
A3A1A4A2W2	86701-20050	6	1	CABLE- S/R JUMPER	28480	86701-20050
A3A1A4A2MP1	0590-0526	6	1	THREADED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
A3A1A4A2MP2	86701-20052	8	1	SPACER-INSULATOR	28480	86701-20052
A3A1A4A2MP3	1251-2313	6	1	CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	00779	3-332070-5

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3A1A5	86701-60097	5	1	M/N OUTPUT BD AY	28480	86701-60097
A3A1A5C1	0160-3878	6	14	CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C2	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C3	0160-3874	2	1	CAP-FXD 10pF 200 V	12344	C320C100J2G5CA
A3A1A5C4	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C5	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C6	0160-4383	0	1	CAP-FXD 6.8pF 200 V	12344	C320C689D2G5CA
A3A1A5C7	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C8	0160-3873	1	1	CAP-FXD 4.7pF 200 V	12344	C320C479D2G5CA
A3A1A5C9	0160-4491	1	1	CAP-FXD 8.2pF 200 V	12344	C320C829D2G5CA
A3A1A5C10	0160-4490	0	1	CAP-FXD 1.8pF 200 V	09969	RPE121-105C0G1R8C200V
A3A1A5C11				NOT ASSIGNED		
A3A1A5C12	0160-2261	9	1	CAP-FXD 15pF 500 V	09641	301-000-C0G0-150J
A3A1A5C13	0160-2290	4	2	CAP-FXD 0.15uF 80 V POLYE-FL	19701	708D1MP154PK800AX
A3A1A5C14	0160-2290	4		CAP-FXD 0.15uF 80 V POLYE-FL	19701	708D1MP154PK800AX
A3A1A5C15	0140-0196	3	1	CAP-FXD 150pF 300 V MICA	28480	0140-0196
A3A1A5C16	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C17	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C18	0160-4389	6	1	CAP-FXD 100pF 200 V	12344	C320C101J2G5CA
A3A1A5C19	0160-3876	4	1	CAP-FXD 47pF 200 V	12344	C320C470M2G5CA
A3A1A5C20	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C21	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C22	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C23	0160-4351	2	1	CAP-FXD 1000PF 0 V	33095	54-713-032-X5F-102M
A3A1A5C24	0160-0161	4	2	CAP-FXD 0.01uF 200 V POLYE-FL	19701	708D1CC103PK201AX
A3A1A5C25	0160-0153	4	1	CAP-FXD 1000pF 200 V POLYE-FL	19701	708D1AA102PK201AX
A3A1A5C26	0160-0161	4		CAP-FXD 0.01uF 200 V POLYE-FL	19701	708D1CC103PK201AX
A3A1A5C27	0160-3534	1	1	CAP-FXD 510pF 100 V MICA	28480	0160-3534
A3A1A5C28	0160-0298	8	1	CAP-FXD 1500pF 200 V POLYE-FL	19701	708D1AA152PK201AX
A3A1A5C29	0180-0197	8	2	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A3A1A5C30	0160-0575	4	1	CAP-FXD 0.047uF 50 V	12344	C320C473M5R5CA
A3A1A5C31	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A3A1A5C32				NOT ASSIGNED		
A3A1A5C33	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C34	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C35	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C36	0180-0291	3	1	CAP-FXD 1uF 35 V TA	56289	150D105X9035A2
A3A1A5C37	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A1A5C38	0180-0630	4	1	CAP-FXD 4.7uF 50 V TA	12344	T355G475M050AS
A3A1A5CR1				NOT ASSIGNED		
A3A1A5CR2				NOT ASSIGNED		
A3A1A5CR3	1901-0040	1	2	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A1A5CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A1A5CR5	1901-1098	1	2	DIODE-SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A3A1A5CR6	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A3A1A5CR7	1901-1098	1		DIODE-SWITCHING 1N4150 50V 200MA 4NS	9N171	1N4150
A3A1A5J1	1250-0657	5	2	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-047-0000-220
A3A1A5J2	1250-0657	5		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-047-0000-220
A3A1A5J3	1250-0257	1	1	CONNECTOR-RF SMB M PC 50-OHM	16179	5162-5021-09
A3A1A5L1	9100-2891	4		INDUCTOR RF-CH-MLD 50NH +-10%	32159	6-02729
A3A1A5L2*	9100-2891	4	5	INDUCTOR RF-CH-MLD 50NH +-10%	32159	6-02729
A3A1A5L3	9135-0073	3	2	INDUCTOR RF-CH-MLD 51NH +-6.596%	24226	10M051X-1
A3A1A5L4	9100-2891	4		INDUCTOR RF-CH-MLD 50NH +-10%	32159	6-02729
A3A1A5L5				NOT ASSIGNED		
A3A1A5L6	9100-1634	1	1	INDUCTOR RF-CH-MLD 75UH +-5%	91637	IM-4 75UH 5%
A3A1A5L7	9100-1635	2	1	INDUCTOR RF-CH-MLD 91UH +-5%	91637	IM-4 91UH 5%
A3A1A5L8	9100-1620	5	1	INDUCTOR RF-CH-MLD 15UH +-10%	91637	IM-4 15UH 10%
A3A1A5L9	9140-0210	1	1	INDUCTOR RF-CH-MLD 100UH +-5%	91637	IM-4 100UH 5%
A3A1A5L10	9100-2891	4		INDUCTOR RF-CH-MLD 50NH +-10%	32159	6-02729

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A5L11	9100-2891	4		INDUCTOR RF-CH-MLD 50NH +-10%	32159	6-02729
A3A1A5L12	9135-0079	9	1	INDUCTOR 100NH +-5.5% 2.6D-MMX6.6LG-MM	24226	10M0100X-1
A3A1A5L13	9135-0073	3		INDUCTOR RF-CH-MLD 51NH +-6.596%	24226	10M051X-1
A3A1A5L14	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH +-10%	91637	IM-2 4.7UH 10%
A3A1A5L15	9100-1641	0	1	INDUCTOR RF-CH-MLD 240UH +-5%	91637	IM-4 240UH 5%
A3A1A5MP1				NOT ASSIGNED		
A3A1A5MP2				NOT ASSIGNED		
A3A1A5MP3	2190-0009	4	1	WASHER-LK INTL T NO. 8 .168-IN-ID	U1453	1908
A3A1A5MP4	2190-0124	4	4	WASHER-LK INTL T NO. 10 .195-IN-ID	16179	500222
A3A1A5MP5	2200-0101	0	2	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A5MP6	2580-0002	4	1	NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
A3A1A5MP7	2950-0078	9	2	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A1A5MP8	3050-0079	3	1	WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	23050	2
A3A1A5MP9	4330-0145	9	1	INSULATOR-BEAD GLASS	28480	4330-0145
A3A1A5MP10	8151-0013	4	1	WIRE 22AWG 1X22	28480	8151-0013
A3A1A5MP11	86701-20100	7	1	COV-PC M/N OUT	28480	86701-20100
A3A1A5MP12	85660-20068	4	2	GROUND LUG	28480	85660-20068
A3A1A5MP13	86701-40001	9	1	EXTRACTOR PC	28480	86701-40001
A3A1A5MP14	2200-0103	2	2	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A5MP15	0520-0128	7	2	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A5MP16	0590-0533	5	2	THREADED INSERT-NUT 2-56 .06-IN-LG SST	46384	KFS2-256
A3A1A5MP17	1205-0285	0	1	HEAT SINK SGL DIP	13103	6007A-TOP
A3A1A5MP18	85660-00065	9	1	HEAT SINK	28480	85660-00065
A3A1A5MP19	2190-0112	0	2	WASHER-LK HLCL NO. 2 .088-IN-ID	28480	2190-0112
A3A1A5MP20	6040-0454	0	1	HEAT SINK COMPOUND SYNTH/REFRC	92895	52022IJ
A3A1A5Q1	1854-0546	1	2	TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q2	1854-0345	8	4	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q5	1854-0546	1		TRANSISTOR NPN SI TO-72 PD=200MW	28480	1854-0546
A3A1A5Q6	1854-0686	0	1	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A3A1A5Q7	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A1A5Q8	1853-0451	5	2	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	28480	1853-0451
A3A1A5Q9	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	28480	1853-0451
A3A1A5Q10	1853-0281	9	1	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A3A1A5R1	0698-7212	9	4	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-100R-F
A3A1A5R2	0698-7248	1	4	RESISTOR 3.16K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-3161-F
A3A1A5R3	0698-7243	6	4	RESISTOR 1.96K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-1961-F
A3A1A5R4	0698-7205	0	1	RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A3A1A5R5	0698-7223	2	4	RESISTOR 287 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-287R-F
A3A1A5R6	0698-7248	1		RESISTOR 3.16K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-3161-F
A3A1A5R7	0698-7243	6		RESISTOR 1.96K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-1961-F
A3A1A5R8	0757-0316	6	1	RESISTOR 42.2 +-1% .125W TF TC=0+-100	D8439	MK2
A3A1A5R9	0698-7221	0	2	RESISTOR 237 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-237R-F
A3A1A5R10	0698-7188	8	4	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-10R-F
A3A1A5R11	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-100R-F
A3A1A5R12	0757-0394	0	1	RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A1A5R13	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-100R-F
A3A1A5R14	0757-1094	9	4	RESISTOR 1.47K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1471-F
A3A1A5R15	0757-1094	9		RESISTOR 1.47K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1471-F
A3A1A5R16	0757-1094	9		RESISTOR 1.47K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1471-F
A3A1A5R17	0757-1094	9		RESISTOR 1.47K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1471-F
A3A1A5R18	0698-7260	7	2	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A3A1A5R19	0698-7248	1		RESISTOR 3.16K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3161-F
A3A1A5R20	0698-7223	2		RESISTOR 287 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-287R-F
A3A1A5R21	0698-7223	2		RESISTOR 287 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-287R-F
A3A1A5R22	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-10R-F
A3A1A5R23	0698-7229	8	3	RESISTOR 511 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-511R-F
A3A1A5R24	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-100R-F
A3A1A5R25	0698-7221	0		RESISTOR 237 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-237R-F
A3A1A5R26	0698-7243	6		RESISTOR 1.96K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1961-F
A3A1A5R27	0698-7248	1		RESISTOR 3.16K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3161-F
A3A1A5R28	0698-7229	8		RESISTOR 511 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-511R-F
A3A1A5R29	0698-7243	6		RESISTOR 1.96K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1961-F
A3A1A5R30	0698-7195	7	1	RESISTOR 19.6 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-19R6-F

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A5R31	0698-7227	6	1	RESISTOR 422 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-422R-F
A3A1A5R32	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A3A1A5R33	0757-0280	3	2	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A1A5R34	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A3A1A5R35	0698-7223	2		RESISTOR 287 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-287R-F
A3A1A5R36	0698-7210	7	1	RESISTOR 82.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-82R5-F
A3A1A5R37	0698-7257	2	1	RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F
A3A1A5R38	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A3A1A5R39	0698-7229	8		RESISTOR 511 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-511R-F
A3A1A5R40	0757-0440	7	1	RESISTOR 7.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7501-F
A3A1A5R41	0757-0199	3	1	RESISTOR 21.5K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2152-F
A3A1A5R42*	0698-7272	1	1	RESISTOR 31.6K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-3162-F
A3A1A5R43	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5112-F
A3A1A5R44	0698-0024	7	1	RESISTOR 2.61K +-1% .5W TF TC=0+-100	K8479	H2
A3A1A5R45	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A3A1A5R46	0757-0447	4	1	RESISTOR 16.2K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1622-F
A3A1A5R47	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A3A1A5R48	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A1A5U1	1826-0059	2	1	IC OP AMP GP 8-TO-99 PKG	27014	LM201AH
A3A1A5U2	1820-3485	2	1	IC PRESCR ECL	04713	MC12090L
A3A1A5VR1	1902-3070	5	2	DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070
A3A1A5VR2	1902-3070	5		DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070
A3A1A5W1	85660-60103	2	1	JUMPER WIRE AY	28480	85660-60103

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A6	86701-60101	2	1	M/N REFERENCE MOTHER ASSEMBLY	28480	86701-60101
A3A1A6C1	0160-2437	1	12	CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C2	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C3	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C4	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C5	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C6	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C7	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C8	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C9				NOT ASSIGNED		
A3A1A6C10	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C11	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C12	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6C13	0160-6211	7	2	CAP-FXD 10PF 0 V	33095	54-779-003-X5F-100M
A3A1A6C14	0160-6211	7		CAP-FXD 10PF 0 V	33095	54-779-003-X5F-100M
A3A1A6C15	0160-2437	1		CAP-FXD 5000PF 0 V	09641	2425-086 X5W0 502Z
A3A1A6E1				NOT ASSIGNED		
A3A1A6E2				NOT ASSIGNED		
A3A1A6E3				NOT ASSIGNED		
A3A1A6E4				NOT ASSIGNED		
A3A1A6E5				NOT ASSIGNED		
A3A1A6E6	9170-0029	3	6	CORE-SHIELDING BEAD	19701	56-590-65A2/4A
A3A1A6E7	9170-0029	3		CORE-SHIELDING BEAD	19701	56-590-65A2/4A
A3A1A6E8	9170-0029	3		CORE-SHIELDING BEAD	19701	56-590-65A2/4A
A3A1A6E9				NOT ASSIGNED		
A3A1A6E10				NOT ASSIGNED		
A3A1A6E11				NOT ASSIGNED		
A3A1A6E12				NOT ASSIGNED		
A3A1A6E13	9170-0029	3		CORE-SHIELDING BEAD	19701	56-590-65A2/4A
A3A1A6E14	9170-0029	3		CORE-SHIELDING BEAD	19701	56-590-65A2/4A
A3A1A6E15	9170-0029	3		CORE-SHIELDING BEAD	19701	56-590-65A2/4A
A3A1A6MP1	0360-1514	7	1	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-1514
A3A1A6MP2	2190-0843	4	1	WASHER-LK INTL T NO. 8 .165-IN-ID	78189	1208-12
A3A1A6MP3	2580-0002	4	1	NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
A3A1A6MP4	86701-00031	1	1	INSULATOR (FOR A3A1A6XA3A1A2)	28480	86701-00031
A3A1A6MP5	86701-00046	8	1	INSULATOR (FOR A3A1A6XA3A1A1)	28480	86701-00046
A3A1A6XA3A1A	5060-0112	8	2	CONNECTOR-15 CONTACTS	28480	5060-0112
A3A1A6XA3A1B	5060-0112	8		CONNECTOR-15 CONTACTS	28480	5060-0112
A3A1A6XA3A1A1	1251-4423	3	1	CONNECTOR-PC EDGE	26742	190-275-01
A3A1A6XA3A1A2	1251-4174	1	1	CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-4174
A3A1A6XA3A1A3	1252-2856	4	1	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	04072	252-15-50-123
A3A1A6XA3A1A5	1251-5020	8	1	CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	26742	190-282-01

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A1A7	86701-60086	2		REFERENCE AND M/N HOUSING ASSY (INCLUDES A3A1A6)	28480	86701-60086
A3A1A7MP1	5021-3208	7	1	REFERENCE HOUSING BLOCK	28480	5021-3208
A3A1A7MP2	86701-00024	2	1	SCOOP, AIR	28480	86701-00024
A3A1A7MP3	86701-00029	7	1	BAFFLE, AIR, TOP	28480	86701-00029
A3A1A7MP4	86701-00030	0	1	BAFFLE, AIR, BOTTOM	28480	86701-00030
A3A1A7MP5	2200-0103	2	31	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A1A7MP6				NOT ASSIGNED		
A3A1A7MP7	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A2				NOT ASSIGNED		
A3A3	86701-60096	4	1	POS RGLTR BD AY	28480	86701-60096
A3A3C1	0180-2205	3	1	CAP-FXD 0.33uF 35 V TA	56289	150D334X9035A2-DYS
A3A3C2	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A3C3	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A3C4	0160-5904	3	1	CAP-FXD 30pF 200 V		MA12C0G2D300J
A3A3C5	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A3C6	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A3C7	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A3C8	0160-5909	8	1	CAP-FXD 0.047uF 50 V	04222	SA20C4773KAAH
A3A3C9	0160-5909	8	1	CAP-FXD 0.047uF 50 V	04222	SA20C4773KAAH
A3A3C10	0160-5904	3	1	CAP-FXD 30pF 200 V		MA12C0G2D300J
A3A3C11	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A3C12	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A3C13	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A3A3C14	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A3C15	0160-4831	3	1	CAP-FXD 4700pF 100 V	04222	SA101C472KAAH
A3A3C16	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A3CR1	1884-0018	5	1	THYRISTOR-SCR 2N4186 VRRM=200	28480	1884-0018
A3A3CR2	1884-0046	9	1	THYRISTOR-SCR VRRM=50	9M011	
A3A3CR3	1990-0487	7	1	LED-LAMP LUM-INT=2MCD BVR=5V	28480	HLMP-1401
A3A3CR4	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A3CR5	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A3CR6	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A3CR7	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A3CR8	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A3CR9	1990-0486	6	1	LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A3A3CR10	1990-0486	6	1	LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A3A3CR11	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A3CR12	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A3F1	2110-0036	9	1	FUSE 8A 125V NTD FE UL	16428	GLH-8
A3A3F2	2110-0003	0	1	FUSE 3A 250V NTD FE UL	16428	AGC-3
A3A3MP1	0520-0128	7	2	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI		
A3A3MP2	2190-0014	1	2	WASHER-LK INTL T NO. 2 .089-IN-ID	78189	1902-00-00-2580
A3A3MP3	2190-0027	6	1	WASHER-LK INTL T 1/4 IN .256-IN-ID	78189	1914-00
A3A3MP4	2950-0051	8	1	NUT-HEX-DBL-CHAM 1/4-28-THD .094-IN-THK	73743	
A3A3MP5	5000-9043	6	1	PIN-P.P. BOARD EXTRACTOR	28480	5000-9043
A3A3MP6	5040-6843	2	1	BOARD EXTRACTOR	28480	5040-6843
A3A3MP7	86701-20036	8	1	MOUNTING BLOCK-DIODE	28480	86701-20036
A3A3MP8	1200-0081	4	*	INSULATOR-FLG-BSHG NYLON	23050	
A3A3MP9	1205-0280	5	1	HEAT SINK TO-66-CS	98978	LAIC66A2CB
A3A3Q1	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A3Q2	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A3Q3	1853-0012	4	1	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	04713	2N2904A
A3A3Q4	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A3Q5	1854-0072	8	1	TRANSISTOR NPN 2N3054 SI TO-66 PD=25W	04713	2N3054
A3A3Q6	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A3Q7	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A3Q8	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A3Q9	1854-0005	7	1	TRANSISTOR NPN 2N708 SI TO-18 PD=360MW	04713	2N708
A3A3Q10	1854-0039	7	1	TRANSISTOR NPN 2N3053S SI TO-39 PD=1W	04713	2N3053S
A3A3R1	0757-0443	0	1	RESISTOR 11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R2	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R3	0811-1659	8	1	RESISTOR .27 +-5% 2W PWI TC=0+-800	11502	SPH
A3A3R4	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R5	0757-0443	0	1	RESISTOR 11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R6	0757-0394	0	1	RESISTOR 51.1 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A3R7	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R8	0698-3442	9	1	RESISTOR 237 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R9	0698-8465	6	1	RESISTOR 7.15K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A3R10	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A3R11	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R12	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R13	0683-0275	9	1	RESISTOR 2.7 +-5% .25W CF TC=0-400	2M627	R-25J
A3A3R14	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R15	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R16	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R17	0698-3162	0	1	RESISTOR 46.4K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R18	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R19	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R20	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R21	0757-0317	7	1	RESISTOR 1.33K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R22	0698-0084	9	1	RESISTOR 2.15K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R23	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R24	0698-3629	4	1	RESISTOR 270 +-5% 2W MO TC=0+-200	11502	GS-3
A3A3R25	0698-0084	9	1	RESISTOR 2.15K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R26	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R27	0812-0019	4	1	RESISTOR .33 +-5% 3W PWI TC=0+-90	01686	T2B-79
A3A3R28	0812-0019	4	1	RESISTOR .33 +-5% 3W PWI TC=0+-90	01686	T2B-79
A3A3R29	0812-0019	4	1	RESISTOR .33 +-5% 3W PWI TC=0+-90	01686	T2B-79
A3A3R30	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R31	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R32	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R33	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R34	0698-8466	7	1	RESISTOR 942 +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A3R35	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A3R36	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A3R37	0683-0275	9	1	RESISTOR 2.7 +-5% .25W CF TC=0-400	2M627	R-25J
A3A3R38	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R39	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R40	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R41	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R42	0757-0418	9	1	RESISTOR 619 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R43	0698-3156	2	1	RESISTOR 14.7K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R44	0757-0459	8	1	RESISTOR 56.2K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R45	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R46	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R47	0757-0288	1	1	RESISTOR 9.09K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R48	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R49	0698-8464	5	1	RESISTOR 12.6K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A3R50	2100-3095	5	1	RESISTOR-TRMR 200 10% TKF SIDE-ADJ 17-TR	32997	3006P-DM3-201
A3A3R51	0757-0440	7	1	RESISTOR 7.5K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R52	0698-0084	9	1	RESISTOR 2.15K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R53	0698-4405	6	1	RESISTOR 107 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R54	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R55	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R56	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R57	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R58	0698-3634	1	1	RESISTOR 470 +-5% 2W MO TC=0+-200	11502	GS-3
A3A3R59	0698-3162	0	1	RESISTOR 46.4K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R60	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A3R61	0698-3631	8	1	RESISTOR 330 +-5% 2W MO TC=0+-200	11502	GS-3
A3A3RT1	0837-0126	6	1	THERMISTOR DISC 1K-OHM TC=-4.4%/C-DEG		STD-0163
A3A3TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A3TP2	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A3TP3	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A3TP4	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A3TP5	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A3TP6	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A3U1	1826-0161	7	1	IC OP AMP GP QUAD 14-DIP-P PKG	04713	LM324N
A3A3U2	1820-0477	6	1	IC OP AMP GP 8-DIP-P PKG	S0545	UPC301AC
A3A3U3	1820-0477	6	1	IC OP AMP GP 8-DIP-P PKG	S0545	UPC301AC
A3A3VR1	1902-3171	7	1	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	04713	
A3A3VR2	1902-0686	3	1	DIODE-ZNR 6.2V 2% DO-7 PD=.4W TC=+.002%	04713	1N825
A3A3VR3	1902-3252	5	1	DIODE-ZNR 22.6V 2% DO-35 PD=.4W	04713	
A3A3VR4	1902-0049	2	1	DIODE-ZNR 6.19V 5% DO-35 PD=.4W	04713	SZ30016-122RL
A3A3VR5	1902-0686	3	1	DIODE-ZNR 6.2V 2% DO-7 PD=.4W TC=+.002%	04713	1N825
A3A3VR6	1902-3082	9	1	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	04713	
A3A3XF1	2110-0269	0	4	FUSEHOLDER-CLP-TYP.25D-FUSE	13060	
A3A3XF2	2110-0269	0		FUSEHOLDER-CLP-TYP.25D-FUSE	13060	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A4	86701-60095	3	1	NEG RGLTR BD AY	28480	86701-60095
A3A4C1	0160-5904	3	1	CAP-FXD 30pF 200 V		MA12C0G2D300J
A3A4C2	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A4C3	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A4C4	0160-5904	3	1	CAP-FXD 30pF 200 V		MA12C0G2D300J
A3A4C5	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A4C6	0160-5904	3	1	CAP-FXD 30pF 200 V		MA12C0G2D300J
A3A4C7	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A4C8	0180-1731	8	1	CAP-FXD 4.7uF 50 V TA	56289	150D475X9050B2-DYS
A3A4C9	0160-5909	8	1	CAP-FXD 0.047uF 50 V	04222	SA20C4773KAAH
A3A4C10	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A4C11	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A3A4C12	0160-0575	4	1	CAP-FXD 0.047uF 50 V	04222	SR205C473MAAH
A3A4C13	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A3A4C14	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A3A4C15	0160-5909	8	1	CAP-FXD 0.047uF 50 V	04222	SA20C4773KAAH
A3A4C16	0180-0100	3	1	CAP-FXD 4.7uF 35 V TA	56289	150D475X9035B2-DYS
A3A4C17	0160-6295	7	1	CAP-FXD 910pF 50 V		DA13C0G1H911J
A3A4CR1	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR2	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR3	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR4	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR5	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR6	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR7	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR8	1901-0662	3	1	DIODE-PWR RECT 100V 6A	04713	MR751
A3A4CR9	1901-0662	3	1	DIODE-PWR RECT 100V 6A	04713	MR751
A3A4CR10	1990-0486	6	1	LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A3A4CR11	1990-0486	6	1	LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A3A4CR12	1901-0662	3	1	DIODE-PWR RECT 100V 6A	04713	MR751
A3A4CR13	1990-0486	6	1	LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A3A4CR14	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A4CR15	1901-0743	1	1	DIODE-PWR RECT 1N4004 400V 1A DO-41	71744	1N4004
A3A4CR25	1884-0018	5	1	THYRISTOR-SCR 2N4186 VRRM=200	28480	1884-0018
A3A4CR26	1884-0018	5	1	THYRISTOR-SCR 2N4186 VRRM=200	28480	1884-0018
A3A4CR27	1884-0018	5	1	THYRISTOR-SCR 2N4186 VRRM=200	28480	1884-0018
A3A4F1	2110-0083	6	1	FUSE 2.5A 250V NTD FE UL	75915	312 02.5
A3A4F2	2110-0043	8	1	FUSE 1.5A 250V NTD FE UL	16428	AGC 1-1/2
A3A4F3	2110-0010	9	1	FUSE (INCH) 5A 250V NTD FE UL	75915	312 005
A3A4K1	0490-0916	6	1	RELAY-REED 1A 500MA 100VDC 5VDC-COIL 10V	15636	R-6966-1
A3A4MP1	5000-9043	6	1	PIN-PC BOARD EXTRACTOR	28480	5000-9043
A3A4MP2	5040-6843	2	1	BOARD EXTRACTOR	28480	5040-6843
A3A4MP3	1200-0081	4	6	INSULATOR-FLG-BSHG NYLON	23050	
A3A4MP4	1205-0280	5	1	HEAT SINK TO-66-CS	98978	LAIC66A2CB
A3A4MP	2200-0107	6	2	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI		
A3A4Q1	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A4Q2	1854-0072	8	1	TRANSISTOR NPN 2N3054 SI TO-66 PD=25W	04713	2N3054
A3A4Q3	1853-0001	1	1	TRANSISTOR PNP SI TO-39 PD=600MW	27014	
A3A4Q4	1853-0007	7	1	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A4Q5	1854-0271	9	1	TRANSISTOR NPN SI TO-39 PD=1W FT=150MHZ	04713	
A3A4Q6	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A4Q7	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A4R1	0812-0020	7	1	RESISTOR .39 +-5% 3W PWI TC=0+-90	01686	T2B-79
A3A4R2	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R3	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R4	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R5	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R6	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R7	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R8	0683-0275	9	1	RESISTOR 2.7 +-5% .25W CF TC=0-400	2M627	R-25J

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A4R9	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R10	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R11	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R12	0757-0428	1	1	RESISTOR 1.62K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R13	0698-3447	4	1	RESISTOR 422 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R14	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R15	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R16	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R17	0811-1665	6	1	RESISTOR .82 +-5% 2W PWI TC=0+-800	11502	SPH
A3A4R18	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R19	0698-3449	6	1	RESISTOR 28.7K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R20	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R21	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R22	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R23	0812-0020	7	1	RESISTOR .39 +-5% 3W PWI TC=0+-90	01686	T2B-79
A3A4R24	0698-8464	5	1	RESISTOR 12.6K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R25	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R26	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R27	0683-0275	9	1	RESISTOR 2.7 +-5% .25W CF TC=0-400	2M627	R-25J
A3A4R28	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R29	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R30	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R31	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R32	0812-0066	1	1	RESISTOR .33 +-5% 2W PWI TC=0+-800	11502	SPH
A3A4R33	0812-0066	1	1	RESISTOR .33 +-5% 2W PWI TC=0+-800	11502	SPH
A3A4R34	0812-0066	1	1	RESISTOR .33 +-5% 2W PWI TC=0+-800	11502	SPH
A3A4R35	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R36	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R37	0698-6835	0	1	RESISTOR 3.16K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R38	0698-7050	3	1	RESISTOR 4.48K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R39	0698-6853	2	1	RESISTOR 7.68K +-0.5% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A4R40	0683-0275	9	1	RESISTOR 2.7 +-5% .25W CF TC=0-400	2M627	R-25J
A3A4R41	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R42	0698-3160	8	1	RESISTOR 31.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R43	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R44	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R45	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R46	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R47	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4R48	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A4TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A4TP2	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A4TP3	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A4TP4	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A4TP5	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A4U1	1820-0477	6	1	IC OP AMP GP 8-DIP-P PKG	S0545	UPC301AC
A3A4U2	1820-0477	6	1	IC OP AMP GP 8-DIP-P PKG	S0545	UPC301AC
A3A4U3	1820-0477	6	1	IC OP AMP GP 8-DIP-P PKG	S0545	UPC301AC
A3A4VR1	1902-0025	4	1	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	04713	
A3A4VR2	1902-3171	7	1	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	04713	
A3A4VR3	1902-3330	0	1	DIODE-ZNR 44.2V 2% DO-35 PD=.4W	04713	
A3A4VR4	1902-0049	2	1	DIODE-ZNR 6.19V 5% DO-35 PD=.4W	04713	SZ30016-122RL
A3A4XF1	2110-0269	0	6	FUSEHOLDER-CLP-TYP.25D-FUSE	13060	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A5	08673-60229	6	1	YTO DAC BD AY	28480	08673-60229
A3A5C1	0180-2141	6	1	CAP-FXD 3.3uF 50 V TA	56289	150D335X9050B2-DYS
A3A5C2	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A5C3	0180-0229	7	1	CAP-FXD 33uF 10 V TA	56289	150D336X9010B2-DYS
A3A5C4	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A5C5	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A5C6	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A5C7	0180-3721	0	1	CAP-FXD 22uF 50 V AL-ELCTLT		KM50T22RM6.3X16LL
A3A5C8	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A5C9	0180-1731	8	1	CAP-FXD 4.7uF 50 V TA	56289	150D475X9050B2-DYS
A3A5C10	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A5C11	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A5L1	9100-1631	8	1	INDUCTOR RF-CH-MLD 56UH +-5% .166D-INX.3	24226	15M562J
A3A5L2	9100-1641	0	1	INDUCTOR RF-CH-MLD 240UH +-5% .166D-INX.	24226	15M243J
A3A5L3	9100-1641	0	1	INDUCTOR RF-CH-MLD 240UH +-5% .166D-INX.	24226	15M243J
A3A5MP1	0590-0526	6	1	THREADED INSERT-NUT 4-40 .065-IN-LG SST	30343	
A3A5MP2	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI		
A3A5MP3	5000-9043	6	1	PIN-PC BOARD EXTRACTOR	28480	5000-9043
A3A5MP4	5040-6843	2	1	EXTRACTOR-PC BOARD	28480	5040-6843
A3A5Q1	1854-0474	4	1	TRANSISTOR NPN SI PD=310MW FT=100MHZ	04713	2N5551
A3A5Q2	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A5Q3	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A5Q4	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A5R1	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R2	0699-0476	5	1	RESISTOR 100 +-0.1% .1W TF TC=0+-10	19701	5023Z
A3A5R3	0698-3442	9	1	RESISTOR 237 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R4	0699-2410	1	1	RESISTOR 250 +-0.1% .125W TF TC=0+-5	19701	5033Z
A3A5R5	0699-0078	3	1	RESISTOR 2.1K +-0.1% .1W TF TC=0+-10	19701	5023Z
A3A5R6	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R7	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R8	2100-4215	3	1	RESISTOR-TRMR 100 10% TF SIDE-ADJ 25-TRN	18612	1202Y100R10
A3A5R9	0699-0236	5	1	RESISTOR 2.5K +-0.1% .1W TF TC=0+-5	19701	5023Z
A3A5R10	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R11	0757-0465	6	1	RESISTOR 100K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R12	0757-0317	7	1	RESISTOR 1.33K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R13	0698-3136	8	1	RESISTOR 17.8K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R14	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R15	2100-3122	9	1	RESISTOR-TRMR 100 10% TKF SIDE-ADJ 17-TR	32997	3006P-DM3-101
A3A5R16	0757-0465	6	1	RESISTOR 100K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R17	0699-0072	7	1	RESISTOR 6.81M +-1% .125W TF TC=0+-150	19701	5053YL6M810F
A3A5R18	0699-0642	7	1	RESISTOR 10K +-0.1% .1W TF TC=0+-5	19701	5023ZA10K00B
A3A5R19	0757-1094	9	1	RESISTOR 1.47K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R20	0698-3455	4	1	RESISTOR 261K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R21	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R22	0698-4037	0	1	RESISTOR 46.4 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R23	0757-0290	5	1	RESISTOR 6.19K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R24	0757-0818	3	1	RESISTOR 825 +-1% .5W TF TC=0+-100	K8479	H2
A3A5R25	0698-3408	7	1	RESISTOR 2.15K +-1% .5W TF TC=0+-100	K8479	H2
A3A5R26	0698-3454	3	1	RESISTOR 215K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R27	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R28	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A5R29	0757-0158	4	1	RESISTOR 619 +-1% .5W TF TC=0+-100	K8479	H2
A3A5TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A5TP2	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A5TP3	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A5TP4	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A5TP5	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A5U1	1826-0607	6	1	IC V RGLTR-FXD-POS 14.7/15.3V TO-220 PKG	27014	LM340AT-15
A3A5U2	1826-1590	8	1	IC OP AMP PRCN QUAD 14-DIP-P PKG		LT1014CN
A3A5U3	08673-80098	9	1		28480	08673-80098

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A5U4	08673-80098	9	1		28480	08673-80098
A3A5U5	1826-1386	0	1	D/A 12-BIT 18-PLASTIC CMOS	24355	AD7541AKN
A3A5VR1	1902-0692	1	1	DIODE-ZNR 6.3V 1% DO-7 PD=.4W TC=+.001%	28480	1902-0692
A3A5VR2	1902-0958	2	1	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.075%	04713	
A3A5VR3	1902-0085	6	1	DIODE-ZNR 27V 5% DO-41 PD=1W IR=5000000U	04713	1N4750A

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A6	86701-60016	8	1	BD AY YIG DRIVER	28480	86701-60016
A3A6C1	0160-3451	1	1	CAP-FXD 0.01uF 100 V		CK45YV2A103Z-A
A3A6C2	0180-1731	8	1	CAP-FXD 4.7uF 50 V TA	56289	150D475X9050B2-DYS
A3A6C3	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A6C4	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A6C5	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A6C6	0160-3451	1	1	CAP-FXD 0.01uF 100 V		CK45YV2A103Z-A
A3A6C7	0180-2139	2	1	CAP-FXD 10uF 60 V WT-SLG-TA-ELCTLT	19701	40EW106A060MIC
A3A6C8	0160-3451	1	1	CAP-FXD 0.01uF 100 V		CK45YV2A103Z-A
A3A6C9	0160-3452	2	1	CAP-FXD 0.02uF 100 V		CK45YV2A203Z-A
A3A6C10	0180-0229	7	1	CAP-FXD 33uF 10 V TA	56289	150D336X9010B2-DYS
A3A6C11	0160-3451	1	1	CAP-FXD 0.01uF 100 V		CK45YV2A103Z-A
A3A6C12	0160-3451	1	1	CAP-FXD 0.01uF 100 V		CK45YV2A103Z-A
A3A6C13	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A6C14	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A6C15	0180-1746	5	1	CAP-FXD 15uF 20 V TA	56289	150D156X9020B2-DYS
A3A6C16	0160-3451	1	1	CAP-FXD 0.01uF 100 V		CK45YV2A103Z-A
A3A6C17	0160-3460	2	1	CAP-FXD 0.05uF 100 V		CK45YV2A503Z-H
A3A6C18	0160-3451	1	1	CAP-FXD 0.01uF 100 V		CK45YV2A103Z-A
A3A6C19	0160-3877	5	1	CAP-FXD 100pF 200 V	04222	SR202C101MAAH
A3A6CR1	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A6CR2	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A6CR3	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A6CR5	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A6CR6	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A6CR7	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A6CR8	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A6CR9	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A6CR10	1901-0033	2	1	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A3A6CR11	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A6MP1	1205-0280	5	1	HEAT SINK TO-66-CS	98978	LAIC66A2CB
A3A6MP2	5000-9043	6	1		28480	5000-9043
A3A6MP3	5040-6843	2	1		28480	5040-6843
A3A6MP4	2360-0117	6	4	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI		ORDER BY DESCRIPTION
A3A6MP6	0590-0526	6	4	THREADAED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
A3A6MP7	2360-0197	2	4	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI		ORDER BY DESCRIPTION
A3A6MP8	1200-0081	4	2	INSULATOR-FLG-BSHG NYLON	23050	
A3A6Q1	1854-0237	7	1	TRANSISTOR NPN SI TO-66 PD=20W FT=10MHZ	04713	
A3A6Q2	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A6Q3	1854-0022	8	1	TRANSISTOR NPN SI TO-39 PD=700MW	27014	S17843
A3A6Q4	1854-0232	2	1	TRANSISTOR NPN SI TO-39 PD=1W FT=15MHZ	04713	
A3A6Q5	1853-0038	4	1	TRANSISTOR PNP SI TO-39 PD=1W FT=100MHZ	04713	
A3A6Q6	1854-0810	2	1	TRANSISTOR NPN SI PD=625MW FT=200MHZ	04713	
A3A6Q7	1853-0007	7	1	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A6Q8	1854-0022	8	1	TRANSISTOR NPN SI TO-39 PD=700MW	27014	S17843
A3A6Q9	1854-0712	3	1	TRANSISTOR-DUAL NPN PD=1.8W	06665	MAT-01GH
A3A6Q10	1853-0007	7	1	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A6Q11	1853-0451	5	1	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	04713	
A3A6Q12	1853-0012	4	1	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	04713	2N2904A
A3A6Q13	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A6R3	0757-0456	5	1	RESISTOR 43.2K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R4	0698-4492	1	1	RESISTOR 32.4K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R5	0757-0440	7	1	RESISTOR 7.5K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R6	0757-0440	7	1	RESISTOR 7.5K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R7	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R8	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R9	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R10	0757-0465	6	1	RESISTOR 100K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R11	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R12	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A6R13	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R14	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R15	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R16	0811-3440	9	1	RESISTOR 125 +-1% 25W PWN TC=0+-2	01686	ALN-25
A3A6R17	0757-0465	6	1	RESISTOR 100K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R18	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R19	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R20	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R21	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R22	0757-0290	5	1	RESISTOR 6.19K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R23	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R24	0811-2936	6	1	RESISTOR 15 +-0.1% .5W PN TC=0+-5	01686	R348
A3A6R25	2100-0635	3	1	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 20-TRN	32997	3009P-P25-202
A3A6R26	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R27	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R28	0757-0467	8	1	RESISTOR 121K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R29	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R30	0698-8025	4	1	RESISTOR 1.91K +-0.25% .125W TF TC=0+-50	2M627	CRB14 OR CRB25
A3A6R31	0757-0402	1	1	RESISTOR 110 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R32	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R33	0757-0428	1	1	RESISTOR 1.62K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R34	2100-0635	3	1	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 20-TRN	32997	3009P-P25-202
A3A6R35	0698-3153	9	1	RESISTOR 3.83K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R36	0698-3447	4	1	RESISTOR 422 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R37	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R38	0698-5673	2	1	RESISTOR 3.9K +-1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A3A6R39	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R40	0698-8420	3	1	RESISTOR 4.22K +-1% .125W TF TC=0+-25	2M627	CRB14 OR CRB25
A3A6R41	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6R42	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A6TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A6TP2	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A6TP3	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A6TP4	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A6TP5	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A6U1	1826-0092	3	1	IC OP AMP GP DUAL TO-99 PKG	04713	
A3A6VR1	1902-0680	7	1	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W TC=+	04713	1N827
A3A6VR2	1902-3404	9	1	DIODE-ZNR 82.5V 5% DO-7 PD=.4W TC=+.082%	04713	
A3A6VR3	1902-3323	1	1	DIODE-ZNR 42.2V 5% DO-35 PD=.4W TC=+.08%	04713	
A3A6VR4	1902-0025	4	1	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	04713	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A7	86701-60017	9	1	BD YTO FM COIL	28480	86701-60017
A3A7C1	0160-0578	7	1	CAP-FXD 0.047uF 50 V POLYC-MET	84411	HEW-249
A3A7C2	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C3	0160-0578	7	1	CAP-FXD 0.047uF 50 V POLYC-MET	84411	HEW-249
A3A7C4	0160-0573	2	1	CAP-FXD 4700pF 100 V	04222	SR201C472MAAH
A3A7C5	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A3A7C6	0160-3874	2	1	CAP-FXD 10pF 200 V		FD12C0G2D100D
A3A7C7	0160-0127	2	1	CAP-FXD 1uF 50 V	04222	SR835E105MAAH
A3A7C8	0160-4298	6	1	CAP-FXD 4700pF 250 V		CK45XR2E472M-H
A3A7C9	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A7C10	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C11	0160-4084	8	1	CAP-FXD 0.1uF 50 V	04222	SR215C104MAAH
A3A7C12	0160-0174	9	1	CAP-FXD 0.47uF 50 V	04222	SR835E474ZAAH
A3A7C13	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C14	0180-0491	5	1	CAP-FXD 10uF 25 V TA		202L2502-106-M7-552
A3A7C15	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A7C16	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A7C17	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C18	0160-4084	8	1	CAP-FXD 0.1uF 50 V	04222	SR215C104MAAH
A3A7C19*	0160-2207	3	1	CAP-FXD 300pF 300 V MICA	09023	CD15FD301J03
A3A7C20	0160-3533	0	1	CAP-FXD 470pF 300 V MICA	09023	CD15FD471J03
A3A7C21	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A3A7C22	0160-0158	9	1	CAP-FXD 5600pF 200 V POLYE-FL	09023	WMC 2D56
A3A7C23	0180-1719	2	1	CAP-FXD 22uF 25 V WT-SLG-TA-ELCTLT	19701	40LW226A025KIA
A3A7C24	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C25	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C26	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A7C27	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C28	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A7C29	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A7C30	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A7C31	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C32	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C33	0160-4084	8	1	CAP-FXD 0.1uF 50 V	04222	SR215C104MAAH
A3A7C34	0160-4084	8	1	CAP-FXD 0.1uF 50 V	04222	SR215C104MAAH
A3A7C35	0180-0234	4	1	CAP-FXD 33uF 75 V WT-SLG-TA-ELCTLT	19701	40LW336B075MIA
A3A7C36	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2-DYS
A3A7C37	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C38	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C39	0180-0491	5	1	CAP-FXD 10uF 25 V TA		202L2502-106-M7-552
A3A7C40	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C41	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A7C42	0160-2202	8	1	CAP-FXD 75pF 300 V MICA	09023	CD15ED750J03
A3A7C43	0140-0194	1	1	CAP-FXD 110pF 300 V MICA	09023	CD15FD111J03
A3A7C44	0160-3872	0	1	CAP-FXD 2.2pF 200 V		FD12C0G2D2R2C
A3A7C45	0160-0578	7	1	CAP-FXD 0.047uF 50 V POLYC-MET	84411	HEW-249
A3A7C46	0160-0578	7	1	CAP-FXD 0.047uF 50 V POLYC-MET	84411	HEW-249
A3A7C47	0160-3878	6	1	CAP-FXD 1000pF 100 V	04222	SR201C102MAAH
A3A7C48*	0160-2248	2	1	CAP-FXD 4.3pF 500 V	52763	
A3A7C49	0160-3491	9	1	CAP-FXD 0.47uF 50 V	04222	SR305E474MAAH
A3A7C50	0160-3874	2	1	CAP-FXD 10pF 200 V		FD12C0G2D100D
A3A7CR1	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A7CR2	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A7CR3	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A7CR4	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A7CR5	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A7CR6	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A7CR7	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A7K1	0490-0564	0	1	RELAY-REED 1C 350MA 70VAC 5VDC-COIL 10VA	94696	118DIP-87
A3A7K2	0490-0564	0	1	RELAY-REED 1C 350MA 70VAC 5VDC-COIL 10VA	94696	118DIP-87

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A7L1	9100-2259	8	1	INDUCTOR RF-CH-MLD 1.5UH +-10% .105D-INX	24226	10M151K
A3A7MP1	1205-0011	0	1	HEAT SINK TO-5/TO-39-CS	13103	2226B
A3A7MP2	1205-0037	0	1	HEAT SINK TO-18-CS	98978	TXBF-019-025B
A3A7MP3	1200-0173	5	4	INSULATOR-XSTR DAP-GL	07047	A-10001 DAP
A3A7MP4	5000-9043	6	1	PIN-PC BOARD EXTRACTOR	28480	5000-9043
A3A7MP5	5040-6843	2	1	EXTRACTOR-PC BOARD	28480	5040-6843
A3A7Q1	1854-0013	7	1	TRANSISTOR NPN 2N2218A SI TO-5 PD=800MW	27014	2N2218A
A3A7Q2	1853-0012	4	1	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	04713	2N2904A
A3A7Q3	1854-0401	7	1	TRANSISTOR NPN SI TO-72 PD=200MW	04713	
A3A7Q4	1854-0404	0	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A7Q5	1854-0404	0	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A7Q6	1854-0345	8	1	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A7Q7	1854-0023	9	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A7Q8	1854-0247	9	1	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	04713	
A3A7Q9	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A7Q10	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A7Q11	1854-0404	0	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A7Q12	1855-0020	8	1	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	17856	FN1962
A3A7Q13	1853-0281	9	1	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A3A7Q14	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A7Q15	1855-0417	7	1	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	04713	
A3A7R1	0757-0447	4	1	RESISTOR 16.2K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R2	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R3	0757-0443	0	1	RESISTOR 11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R4	0757-0465	6	1	RESISTOR 100K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R5	0698-7277	6	1	RESISTOR 51.1K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R6	0698-7258	3	1	RESISTOR 8.25K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R7	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R8	0757-0465	6	1	RESISTOR 100K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R9	0698-3441	8	1	RESISTOR 215 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R10	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R11	0698-3432	7	1	RESISTOR 26.1 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R13	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R15	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R16	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R17	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R18	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R19	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R20	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R21	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R22	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R23	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R24	0698-7224	3	1	RESISTOR 316 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R26	0698-7276	5	1	RESISTOR 46.4K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R27	0698-7276	5	1	RESISTOR 46.4K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R28	2100-3353	8	1	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-203
A3A7R29	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R30	0683-1555	0	1	RESISTOR 1.5M +-5% .25W CF TC=0-900	2M627	R-25J
A3A7R31	0698-4414	7	1	RESISTOR 158 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R32	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R33	0698-7271	0	1	RESISTOR 28.7K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R34	0698-7283	4	1	RESISTOR 90.9K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R35	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R36	0698-7272	1	1	RESISTOR 31.6K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R37	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R38	0757-0316	6	1	RESISTOR 42.2 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R39	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R40	2100-3354	9	1	RESISTOR-TRMR 50K 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-503
A3A7R41	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A7R42	0698-3153	9	1	RESISTOR 3.83K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R43	0698-3152	8	1	RESISTOR 3.48K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R44	0698-7229	8	1	RESISTOR 511 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R45	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R46	2100-3350	5	1	RESISTOR-TRMR 200 10% TKF SIDE-ADJ 1-TRN	32997	3386X-Y46-201
A3A7R47	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R48	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R49	0698-3429	2	1	RESISTOR 19.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R50	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R51	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R52	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R53	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R54	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R55	0698-3443	0	1	RESISTOR 287 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R56	0698-3150	6	1	RESISTOR 2.37K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R57	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R58	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R59	0757-0441	8	1	RESISTOR 8.25K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R60	0757-0447	4	1	RESISTOR 16.2K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R61*	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R62	0698-3447	4	1	RESISTOR 422 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R63	0698-3438	3	1	RESISTOR 147 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R65*	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R66	0698-3442	9	1	RESISTOR 237 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R67*	0698-3437	2	1	RESISTOR 133 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R68	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R69	0757-0428	1	1	RESISTOR 1.62K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R70	0757-0424	7	1	RESISTOR 1.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R71	0686-1525	0	1	RESISTOR 1.5K +-5% .5W CC TC=0+647	01121	EB1525
A3A7R72	0757-0346	2	1	RESISTOR 10 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R73	0757-0802	5	1	RESISTOR 162 +-1% .5W TF TC=0+-100	K8479	H2
A3A7R74	0757-0394	0	1	RESISTOR 51.1 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R75*	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R77	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R78	0757-0802	5	1	RESISTOR 162 +-1% .5W TF TC=0+-100	K8479	H2
A3A7R79	0698-3452	1	1	RESISTOR 147K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R80	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R81	0698-7224	3	1	RESISTOR 316 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R82	0698-7224	3	1	RESISTOR 316 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R83	0683-1555	0	1	RESISTOR 1.5M +-5% .25W CF TC=0-900	2M627	R-25J
A3A7R84	0698-4414	7	1	RESISTOR 158 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7R85	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A7R86	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A7TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A7TP2	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A7TP3	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A7TP4	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A7TP5	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A7U1	1826-0013	8	1	IC OP AMP LOW-NOISE TO-99 PKG	24355	AD741CH
A3A7U2	1826-0081	0	1	IC OP AMP WB TO-99 PKG	27014	LM318H
A3A7U3	1826-0044	5	1	IC OP AMP GP DUAL 14-DIP-C PKG	27014	UA739DC

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A8	10811-60102	7	1	10 MHZ REF OSC **(EXCEPT OPTION 002)**	28480	10811-60102
A3A9				YTO LOOP ASSEMBLY		
A3A9C1	0160-3036	8	6	CAP-FXD 5000PF 0 V	09641	2425-011 X5V 502Z
A3A9C2	0160-3036	8		CAP-FXD 5000PF 0 V	09641	2425-011 X5V 502Z
A3A9C3	0160-4748	1	3	CAP-FXD 1000pF 0 V	33095	54779004X5F102M
A3A9C4	0160-3036	8		CAP-FXD 5000PF 0 V	09641	2425-011 X5V 502Z
A3A9C5	0160-3036	8		CAP-FXD 5000PF 0 V	09641	2425-011 X5V 502Z
A3A9C6	0160-4748	1		CAP-FXD 1000pF 0 V	33095	54779004X5F102M
A3A9C7	0160-3036	8		CAP-FXD 5000PF 0 V	09641	2425-011 X5V 502Z
A3A9C8	0160-4748	1		CAP-FXD 1000pF 0 V	33095	54779004X5F102M
A3A9C9	0160-3036	8		CAP-FXD 5000PF 0 V	09641	2425-011 X5V 502Z
A3A9J1	1250-0691	7	6	CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-045-4610-220
A3A9J2	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-045-4610-220
A3A9J3	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-045-4610-220
A3A9J4	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-045-4610-220
A3A9J5	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-045-4610-220
A3A9J6	1250-0691	7		CONNECTOR-RF SMB M SGL-HOLE-FR 50-OHM	98291	051-045-4610-220
A3A9MP1	2200-0113	4	2	SCREW-MACH 4-40 .625-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A9MP2	1250-1142	5	1	WASHER-LK INTL T 1/2 IN .26-IN-ID	24931	LW101-38
A3A9MP3	1250-1143	6	1	NUT-RF CONNECTOR SERIES SMA; HEX NUT	16179	2098-5862-00
A3A9MP4	1400-0024	9	1	CLMP-CA .25-DIA .5-WD NYL	85480	F6NY-250NA
A3A9MP5				NOT ASSIGNED		
A3A9MP6				NOT ASSIGNED		
A3A9MP7	2200-0111	2	2	SCREW-MACH 4-40 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A9MP8	3050-0105	6	2	WASHER-FL MTLC NO. 4 .125-IN-ID	28480	3050-0105
A3A9MP9	08673-00076	5	1	DECK-YTO PHASE LOCK	28480	08673-00076
A3A9MP10	86701-00010	6	1	COVER-SAMPLER	28480	86701-00010
A3A9MP11	86701-00011	7	1	COVER-PHASE LOCK	28480	86701-00011
A3A9MP12	86701-00054	8	1	SPACER-SAMPLER	28480	86701-00054
A3A9MP13	86701-20009	5	1	HOUSING-CASTING	28480	86701-20009
A3A9MP14	86701-40001	9	1	EXTRACTOR-P.C. BOARD	28480	86701-40001
A3A9MP15	2200-0103	2	13	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A9MP16	2200-0138	3	1	SCREW-MACH 4-40 .188-IN-LG 100 DEG	00000	ORDER BY DESCRIPTION
A3A9MP17				NOT ASSIGNED		
A3A9MP18	2360-0115	4	1	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A9MP19	2200-0107	6	1	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A9MP20	3030-0189	4	1	SCREW-SKT HD CAP 4-40 .25-IN-LG SST	00000	ORDER BY DESCRIPTION
A3A9MP21	3050-0105	6		WASHER-FL MTLC NO. 4 .125-IN-ID	28480	3050-0105
A3A9MP22	2190-0124	4	1	WASHER-LK INTL T NO. 10 .195-IN-ID	16179	500222
A3A9MP23	6960-0016	0	1	PLUG-HOLE TR-HD FOR .125-D-HOLE NYL	02768	207-080501-01-0101
A3A9U1	86701-67001	5	1	SAMPLER-2-6.5 GHZ	28480	86701-67001
A3A9W1	08673-20180	4	1	CABLE ASSEMBLY- YTO OUTPUT	28480	08673-20180
A3A9W2	08673-20187	1	1	CABLE ASSEMBLY- ATTENUATOR OUTPUT	28480	08673-20187
A3A9W3	08673-20186	0	1	CABLE ASSEMBLY- FILTER INPUT	28480	08673-20186
A3A9W4	86701-60052	2	1	CABLE ASSEMBLY- COAX, BLACK	28480	86701-60052

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A9A1				NOT ASSIGNED		
A3A9A2	08673-60089	6	1	YTO INTERCONNECT ASSEMBLY	28480	08673-60089
A3A9A2J1	1250-0543	8	1	CONNECTOR-RF SMB M PC 50-OHM	98291	51-053-0349-BE8
A3A9A2MP1	3050-0079	3	1	WASHER-FL NM NO. 2 .094-IN-ID .188-IN-OD	23050	2
A3A9A2W1	86701-60010	2	1	CABLE ASSY-YTO LOOP RIBBON	28480	86701-60010
A3A9A2W2	86701-60009	9	1	CABLE ASSY-YTO LOOP RIBBON	28480	86701-60009

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A9A3	5086-7366	2	1	2-6.5 GHZ YTO ASSEMBLY	28480	5086-7366
A3A9A4	86701-60024	8	1	BD YTO PHASE DET	28480	86701-60024
A3A9A4C1	0160-2307	4	1	CAP-FXD 47pF 300 V MICA	09023	CD15ED470J03
A3A9A4C2	0160-2307	4	1	CAP-FXD 47pF 300 V MICA	09023	CD15ED470J03
A3A9A4C3	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A9A4C4	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A9A4C5	0160-3879	7	1	CAP-FXD 0.01uF 100 V	04222	SR201C103MAAH
A3A9A4C6	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A9A4C9	0160-3538	5	1	CAP-FXD 750pF 100 V MICA	09023	RDM15F751J1C
A3A9A4C10	0160-3538	5	1	CAP-FXD 750pF 100 V MICA	09023	RDM15F751J1C
A3A9A4C11	0160-0165	8	1	CAP-FXD 0.056uF 200 V POLYE-FL	09023	WMC2S56
A3A9A4C12	0160-0575	4	1	CAP-FXD 0.047uF 50 V	04222	SR205C473MAAH
A3A9A4C13	0160-3873	1	1	CAP-FXD 4.7pF 200 V		FD12C0G2D4R7D
A3A9A4C14	0160-2453	1	1	CAP-FXD 0.22uF 80 V POLYE-FL	09023	WMC08P22
A3A9A4C15	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A9A4C16	0160-0168	1	1	CAP-FXD 0.1uF 200 V POLYE-FL	09023	WMC2P1
A3A9A4C17	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A9A4C18	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A9A4C19	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2-DYS
A3A9A4C20	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A9A4C21	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2-DYS
A3A9A4C22	0160-2055	9	1	CAP-FXD 0.01uF 100 V	50088	
A3A9A4C23	0160-3873	1	1	CAP-FXD 4.7pF 200 V		FD12C0G2D4R7D
A3A9A4C24	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A9A4C25	0140-0190	7	1	CAP-FXD 39pF 300 V MICA	09023	CD15ED390J03
A3A9A4C26	0160-3490	8	1	CAP-FXD 1uF 50 V	04222	SR305E105MAAH
A3A9A4C27	0160-0574	3	1	CAP-FXD 0.022uF 100 V	04222	SR201C223MAAH
A3A9A4C28	0160-4084	8	1	CAP-FXD 0.1uF 50 V	04222	SR215C104MAAH
A3A9A4C29	0160-4084	8	1	CAP-FXD 0.1uF 50 V	04222	SR215C104MAAH
A3A9A4C30	0160-2200	6	1	CAP-FXD 43pF 300 V MICA	09023	CD15ED430J03
A3A9A4C31	0160-2264	2	1	CAP-FXD 20pF 500 V	52763	2RDPLX05020RNP0
A3A9A4C32	0140-0194	1	1	CAP-FXD 110pF 300 V MICA	09023	CD15FD111J03
A3A9A4C33	0160-4084	8	1	CAP-FXD 0.1uF 50 V	04222	SR215C104MAAH
A3A9A4CR1	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A9A4CR2	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A9A4CR5	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3A9A4CR6	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A9A4CR7	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A9A4CR11	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3A9A4CR12	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A9A4CR13	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A9A4CR14	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	9N171	1N4148
A3A9A4L1	9100-2254	3	1	INDUCTOR RF-CH-MLD 390NH +-10% .105D-INX	24226	10M390K
A3A9A4L2	9100-1620	5	1	INDUCTOR RF-CH-MLD 15UH +-10% .166D-INX.	24226	15M152K
A3A9A4L3	9100-1620	5	1	INDUCTOR RF-CH-MLD 15UH +-10% .166D-INX.	24226	15M152K
A3A9A4L4	9100-1641	0	1	INDUCTOR RF-CH-MLD 240UH +-5% .166D-INX.	24226	15M243J
A3A9A4L5	9100-1620	5	1	INDUCTOR RF-CH-MLD 15UH +-10% .166D-INX.	24226	15M152K
A3A9A4L6	9100-1641	0	1	INDUCTOR RF-CH-MLD 240UH +-5% .166D-INX.	24226	15M243J
A3A9A4L7	9100-0368	6	1	INDUCTOR RF-CH-MLD 330NH +-10% .105D-INX	24226	10M330K
A3A9A4L8	9140-0179	1	1	INDUCTOR RF-CH-MLD 22UH +-10% .166D-INX.	24226	15M222K
A3A9A4L9	9100-2254	3	1	INDUCTOR RF-CH-MLD 390NH +-10% .105D-INX	24226	10M390K
A3A9A4L10	9100-0368	6	1	INDUCTOR RF-CH-MLD 330NH +-10% .105D-INX	24226	10M330K
A3A9A4L11	9140-0179	1	1	INDUCTOR RF-CH-MLD 22UH +-10% .166D-INX.	24226	15M222K
A3A9A4MP1	86701-20024	4	1		28480	86701-20024
A3A9A4MP	0460-1292	0		TAPE-INDL .25-IN-W .0065-IN-T	00488	BD-1
A3A9A4MP	8151-0013	4		WIRE 22AWG 1X22	16428	8021-100
A3A9A4MP	4330-0145	9		INSULATOR-BEAD GLASS		
A3A9A4Q1	1854-0404	0	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A9A4Q2	1853-0569	6	1	TRANSISTOR PNP SI TO-92 PD=310MW	04713	
A3A9A4Q3	1855-0395	0	1	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	17856	FN2645

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A9A4Q4	1854-0712	3	1	TRANSISTOR-DUAL NPN PD=1.8W	06665	MAT-01GH
A3A9A4Q5	1854-0404	0	1	TRANSISTOR NPN SI TO-18 PD=360MW	04713	
A3A9A4R1	0698-7288	9	1	RESISTOR 147K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R2	0757-0464	5	1	RESISTOR 90.9K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R3	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R4	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R5	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R6	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R7	0698-7219	6	1	RESISTOR 196 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R8	0698-7212	9	1	RESISTOR 100 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R9	0698-7219	6	1	RESISTOR 196 +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R10	0698-3429	2	1	RESISTOR 19.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R11	0698-3429	2	1	RESISTOR 19.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R12	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R13	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R14	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R15	0698-3155	1	1	RESISTOR 4.64K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R16	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R17	0757-0280	3	1	RESISTOR 1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R18	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R19	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R20*	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R21	0757-1094	9	1	RESISTOR 1.47K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R22	0698-3152	8	1	RESISTOR 3.48K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R24	0698-3157	3	1	RESISTOR 19.6K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R25	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R26	0698-4020	1	1	RESISTOR 9.53K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R27	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R28	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R29	0757-0394	0	1	RESISTOR 51.1 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R30	2100-3212	8	1	RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	32997	3386P-Y46-201
A3A9A4R31	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R32	0757-0440	7	1	RESISTOR 7.5K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R33	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R34	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R35	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R36	0757-0438	3	1	RESISTOR 5.11K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R37	0757-0422	5	1	RESISTOR 909 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R38	0757-0422	5	1	RESISTOR 909 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R39	0757-0467	8	1	RESISTOR 121K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R43	0757-0458	7	1	RESISTOR 51.1K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R44	0757-0442	9	1	RESISTOR 10K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R45	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R46	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R47	0757-0416	7	1	RESISTOR 511 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R48	0698-7236	7	1	RESISTOR 1K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R49	0757-0439	4	1	RESISTOR 6.81K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R50	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R51	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R52	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R53	2100-3211	7	1	RESISTOR-TRMR 1K 10% TKF TOP-ADJ 1-TRN	32997	3386P-Y46-102
A3A9A4R54	0698-7245	8	1	RESISTOR 2.37K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R55	0698-7242	5	1	RESISTOR 1.78K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R56	0698-7253	8	1	RESISTOR 5.11K +-1% .05W TF TC=0+-100	2M627	CRB20
A3A9A4R57	0757-0418	9	1	RESISTOR 619 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4R58	0698-3451	0	1	RESISTOR 133K +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB25
A3A9A4TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A9A4TP2	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A9A4TP3	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A9A4TP4	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A9A4TP5	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	83486	928-196-004140
A3A9A4U1	1826-0092	3	1	IC OP AMP GP DUAL TO-99 PKG	04713	
A3A9A4U2	1826-0065	0	1	IC COMPARATOR PRCN 8-DIP-P PKG	01295	LM311P
A3A9A4U3	1826-0044	5	1	IC OP AMP GP DUAL 14-DIP-C PKG	27014	UA739DC
A3A9A4U4	1820-1423	4	1	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A3A9A4U5	1820-1344	8	1	IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A3A9A4U6	1820-0802	1	1	IC GATE ECL NOR QUAD 2-INP	04713	MC10102P
A3A9A4U7	1820-0817	8	1	IC FF ECL D-M/S DUAL	04713	MC10131P
A3A9A4U8	1810-0204	6	1	NETWORK-RES 8-SIP 1.0K OHM X 7	11236	750-81
A3A9A4U9	1820-0817	8	1	IC FF ECL D-M/S DUAL	04713	MC10131P
A3A9A4VR1	1902-1260	1	1	DIODE-ZNR 1N5525C 6.2V 2% DO-7 PD=.4W IR	04713	1N5525C
A3A9A4VR2	1902-1260	1	1	DIODE-ZNR 1N5525C 6.2V 2% DO-7 PD=.4W IR	04713	1N5525C
A3A9A4VR3	1902-0041	4	1	DIODE-ZNR 5.11V 5% DO-35 PD=.4W	04713	
A3A9A4VR4	1902-3104	6	1	DIODE-ZNR 5.62V 5% DO-35 PD=.4W	04713	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A9A5	86701-60089	5	1 3	SAMPLER ASSEMBLY (DOES NOT INCLUDE A3A9U1)	28480	86701-60089
A3A9A5C1	0121-0046	2	2	CAP-VAR 35pF 9pF 200 V	52763	304322 9/35PF N650
A3A9A5C2	0121-0046	2		CAP-VAR 35pF 9pF 200 V	52763	304322 9/35PF N650
A3A9A5C3	0180-0197	8	2	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A3A9A5C4	0180-0116	1	1	CAP-FXD 6.8uF 35 V TA	56289	150D685X9035B2
A3A9A5C5	0160-2055	9	11	CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C6	0160-2150	5	1	CAP-FXD 33pF 300 V MICA	28480	0160-2150
A3A9A5C7	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C8	0160-3878	6	3	CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A9A5C9	0180-0197	8		CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A3A9A5C10	0160-2265	3	1	CAP-FXD 22pF 500 V	09641	301-000-C0G0-220J
A3A9A5C11	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A9A5C12	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C13	0180-0228	6	1	CAP-FXD 22uF 15 V TA	56289	150D226X9015B2
A3A9A5C14	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C15	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C16	0160-3879	7	5	CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A3A9A5C17	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C18	0160-3878	6		CAP-FXD 1000pF 100 V	12344	C320C102M1R5CA
A3A9A5C19	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A3A9A5C20	0160-0939	4	1	CAP-FXD 430pF 300 V MICA	28480	0160-0939
A3A9A5C21	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C22*	0140-0196	3	1	CAP-FXD 150pF 300 V MICA	28480	0140-0196
A3A9A5C23	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C24	0140-0193	0	2	CAP-FXD 82pF 300 V MICA	28480	0140-0193
A3A9A5C25	0140-0193	0		CAP-FXD 82pF 300 V MICA	28480	0140-0193
A3A9A5C26	0160-2308	5	1	CAP-FXD 36pF 300 V MICA	28480	0160-2308
A3A9A5C27	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C28	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C29	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A3A9A5C30	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A3A9A5C31	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A9A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	12344	C320C103M1R5CA
A3A9A5J1	1251-3172	7	3	CONNECTOR-SGL CONT SKT .03-IN-BSC-SZ RND	00779	2-331677-9
A3A9A5L1				NSR, PART OF CIRCUIT BOARD		
A3A9A5L2	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH +-10%	91637	IM-2 4.7UH 10%
A3A9A5L3	9100-1623	8	1	INDUCTOR RF-CH-MLD 27UH +-5%	91637	IM-4 27UH 5%
A3A9A5L4	9100-2251	0	1	INDUCTOR RF-CH-MLD 220NH +-10%	91637	IM-2 .22UH 10%
A3A9A5L5	9100-2258	7	2	INDUCTOR RF-CH-MLD 1.2UH +-10%	91637	IM-2 1.2UH 10%
A3A9A5L6	9100-2258	7		INDUCTOR RF-CH-MLD 1.2UH +-10%	91637	IM-2 1.2UH 10%
A3A9A5L7	9140-0770	8	1	INDUCTOR RF-CH-MLD 50NH +-10%	24226	10-M050K-2
A3A9A5L8				NSR, PART OF CIRCUIT BOARD		
A3A9A5L9				NSR, PART OF CIRCUIT BOARD		
A3A9A5L10	9140-0539	7	1	INDUCTOR RF-CH-MLD 3UH +-5%	91637	IM-2 3UH 5%
A3A9A5L11	9100-0368	6	1	INDUCTOR RF-CH-MLD 330NH +-10%	91637	IM-2 .33UH 10%
A3A9A5L12	9100-2249	6	2	INDUCTOR RF-CH-MLD 150NH +-10%	91637	IM-2 .15UH 10%
A3A9A5L13	9100-2250	9	1	INDUCTOR RF-CH-MLD 180NH +-10%	91637	IM-2 .18UH 10%
A3A9A5L14	9100-2249	6		INDUCTOR RF-CH-MLD 150NH +-10%	91637	IM-2 .15UH 10%
A3A9A5MP1	1205-0011	0	1	HEAT SINK TO-5/TO-39-CS	13103	2226B
A3A9A5MP2	1205-0037	0	1	HEAT SINK TO-18-CS	98978	TXBF-019-025B
A3A9A5MP3				NOT ASSIGNED		
A3A9A5MP4	1200-0173	5	1	INSULATOR-XSTR DAP-GL	13103	7717-86 DAP
A3A9A5Q1	1854-0247	9	3	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A9A5Q2	1854-0345	8	3	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A9A5Q3	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A9A5Q4	1855-0235	7	1	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	04713	U310(SELECTED)
A3A9A5Q5	1853-0015	7	1	TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
A3A9A5Q6	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A9A5Q7	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
A3A9A5Q8	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3A9A5R1	2100-3383	4	1	RESISTOR-TRMR 50 10% TKF TOP-ADJ 1-TRN	28480	2100-3383
A3A9A5R2	0757-0394	0	5	RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A9A5R3	0698-3440	7	1	RESISTOR 196 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-196R-F
A3A9A5R4	0698-0085	0	1	RESISTOR 2.61K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2611-F
A3A9A5R5	0757-0424	7	3	RESISTOR 1.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1101-F
A3A9A5R6	0757-0280	3	3	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A9A5R7	0757-0278	9	1	RESISTOR 1.78K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1781-F
A3A9A5R8	0757-0796	6	1	RESISTOR 82.5 +-1% .5W TF TC=0+-100	K8479	H2
A3A9A5R9	0757-0399	5	1	RESISTOR 82.5 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-82R5-F
A3A9A5R10	0698-3457	6	1	RESISTOR 316K +-1% .125W TF TC=0+-100	12498	CT4
A3A9A5R11	0757-0470	3	1	RESISTOR 162K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1623-F
A3A9A5R12				NOT ASSIGNED		
A3A9A5R13	0698-7216	3	1	RESISTOR 147 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-147R-F
A3A9A5R14				NOT ASSIGNED		
A3A9A5R15	0757-0424	7		RESISTOR 1.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1101-F
A3A9A5R16	0757-0398	4	1	RESISTOR 75 +-1% .125W TF TC=0+-100	D8439	MK2
A3A9A5R17	0757-0424	7		RESISTOR 1.1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1101-F
A3A9A5R18	0757-0419	0	1	RESISTOR 681 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-681R-F
A3A9A5R19	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-825R-F
A3A9A5R20	0698-7224	3	1	RESISTOR 316 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-316R-F
A3A9A5R21	0698-7212	9	2	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A3A9A5R22	0698-7195	7	1	RESISTOR 19.6 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-19R6-F
A3A9A5R23	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A3A9A5R24	0698-0084	9	1	RESISTOR 2.15K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2151-F
A3A9A5R25	0698-0082	7	2	RESISTOR 464 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4640-F
A3A9A5R26	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A9A5R27	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A9A5R28	0698-0082	7		RESISTOR 464 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4640-F
A3A9A5R29	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A3A9A5R30	0757-0346	2	2	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A3A9A5R31	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-751-F
A3A9A5R32	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A3A9A5R33	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A3A9A5R34	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A3A9A5R35	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A3A9A5R36	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A9A5R37	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A9A5R38	0757-0276	7	2	RESISTOR 61.9 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-6192-F
A3A9A5R39	0757-0276	7		RESISTOR 61.9 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-6192-F
A3A9A5R40	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A3A9A5R41	0698-7196	8	1	RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A3A9A5TP1	1251-0600	0	1	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3A9A6	0955-0331	5	1	ATTENUATOR ASSEMBLY- 18DB	28480	0955-0331
A3A9A7	9135-0111	0	1	6.625 GHZ LOW PASS FILTER ASSEMBLY	50140	6L250-X6625-010
A3A9A8	08673-67016	3	1	PREAMPLIFIER ASSEMBLY	28480	08673-67016
	08673-69016	7	1	RESTORED 08673-67016	28480	08673-69016

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3A10	08673-60195	5	1	MOTHERBOARD ASSEMBLY (DOES NOT INCLUDE A3A10C5) (2918A & BELOW)	28480	08673-60195
A3A10	08673-60236		1	MOTHERBOARD ASSEMBLY (DOES NOT INCLUDE A3A10C5) (2930A & ABOVE)		
A3A10C5	0160-5492	4	1	CAPACITOR-FXD 1UF +-10% 400VDC MET-POLYC (OPTION 003 ONLY)	28480	0160-5492
A3A10C7	0160-6761	2	1	CAP-FXD 1UF 0 V POLYE-MET	11890	PHE800MF7100M
A3A10CR1	1901-0159	3	1	DIODE-PWR RECT 400V 750MA DO-41	28480	1901-0159
A3A10CR2	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3A10CR3	1990-0517	4	1	LED-LAMP LUM-INT=3MCD IF=20MA-MAX BVR=5V	28480	5082-4655
A3A10J1	1200-0812	9	1	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	91506	716-AG1D
A3A10J2	1251-3905	4	1	CONN-POST TYPE .100-PIN-SPCG 20-CONT	28480	1251-3905
A3A10J3	1252-0473	7	1	CONN-POST TYPE .100-PIN-SPCG 5-CONT	28480	1252-0473
A3A10J4	1251-8836	0	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-8836
A3A10K1	0490-0618	5	1	RELAY 2C 24VDC-COIL 5A 115VAC	77342	R40-E0161-1
A3A10L1	9100-3922	4	12	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L4	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L5	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L6	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L7	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L8	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L9	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L10	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L11	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10L12	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A3A10MP1	0380-0076	6	1	SPACER-RVT-ON .5-IN-LG .152-IN-ID	28480	0380-0076
A3A10MP2	0380-1819	7	1	SPACER-RVT-ON .313-IN-LG .15-IN-ID	28480	0380-1819
A3A10MP3	0380-0677	3	1	SPACER-RVT-ON .156-IN-LG .152-IN-ID	28480	0380-0677
A3A10MP4	0380-1715	2	1	STANDOFF-RVT-ON .156-IN-LG 4-40-THD	28480	0380-1715
A3A10MP5	0590-0526	6	1	THREADED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
A3A10MP7	1400-0249	0	1	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
A3A10MP8	1400-0619	8	1	CABLE CLAMP-HFCL .312-DIA .5-WD	85480	CPFR-297WT
A3A10MP9	2190-0019	6	1	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A3A10MP10	2200-0141	8	1	SCREW-MACH 4-40 .312-IN-LG PAN-HD POZI	00000	ORDER BY DESCRIPTION
A3A10MP11	3050-0105	6	1	WASHER-FL MTLC NO. 4 .125-IN-ID	28480	3050-0105
A3A10R1	0757-0421	4	1	RESISTOR 825 +-1% .125W TF TC=0+-100	12498	CT4-1/8-TO-825R-F
A3A10R2	0687-3321	0	1	RESISTOR 3.3K +-10% .5W CC TO=0+647	01121	EB3321
A3A10R3	0683-7515	4	1	RESISTOR 750 +-5% .25W CF TC=0-400	19701	(CR-25) 1-4-5P-750E
A3A10R4	0686-7525	2	1	RESISTOR 7.5K +-5% .5W CC TC=0+647	01121	EB7525
A3A10R5	0683-2225	3	1	RESISTOR 2.2K +-5% .25W CF TC=0-400	19701	(CR-25) 1-4-5P-2K2
A3A10R6	0811-1669	0	1	RESISTOR 1.8 +-5% 2W PWI TC=0+-400	11502	SPH
A3A10W1	86701-60033	9	1	CABLE ASSY (VIO) A3 M/B TO A3A9A2 YTO	28480	86701-60033
A3A10W2	86701-60039	5	1	CABLE ASSY-YTM TUNE (YELLOW)	28480	86701-60039
A3A10W3	86701-60046	4	1	CABLE ASSY A1 M/B TO FM DRIVER ASSY(BRN)	28480	86701-60046
A3A10W4	86701-60054	4	1	CABLE ASSY (WHITE) A3 M/B TO A3A9 IFM IN	28480	86701-60054
A3A10W5	86701-60055	5	1	CABLE ASSY (GRAY) A3 M/B TO A3A9YTO TUN	28480	86701-60055
A3A10XA3A2	1251-8116	9	4	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A3A10XA3A3	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A3A10XA3A4	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A3A10XA3A5	1251-8116	9		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	04072	252-18-50-123
A3A10XA3A6	1252-2856	4	2	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	04072	252-15-50-123
A3A10XA3A7	1252-2856	4	1	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	04072	252-15-50-123
A3A10XA3Q1	1251-2313	6	4	CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	00779	3-332070-5
A3A10XA3Q2	1251-2313	6		CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	00779	3-332070-5
A3A10XA3Q3	1251-2313	6		CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	00779	3-332070-5
A3A10XA3Q4	1251-2313	6		CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	00779	3-332070-5

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3A11	0960-0443	1	1	LINE MODULE-FILTERED	05245	F2058D
A3A12	08673-60133	1	1	RECTIFIER ASSEMBLY	28480	08673-60133
A3A12C1	0160-2055	9	3	CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A12C2	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A12C3	0160-2055	9		CAP-FXD 0.01uF 100 V	28480	0160-2055
A3A12C4	0160-4084	8	2	CAP-FXD 0.1uF 50 V	12344	C322C104M5R5CA
A3A12C5	0180-0230	0	1	CAP-FXD 1uF 50 V TA	56289	150D105X0050A2
A3A12C6	0160-4084	8		CAP-FXD 0.1uF 50 V	12344	C322C104M5R5CA
A3A12C7	0180-0197	8	1	CAP-FXD 2.2uF 20 V TA	56289	150D225X9020A2
A3A12C8	0160-6633	7	2	CAP-FXD 2.2uF 100 V	06383	FD23Y5V2A225Z
A3A12C9	0160-6633	7		CAP-FXD 2.2uF 100 V	06383	FD23Y5V2A225Z
A3A12C10	0160-4005	3	1	CAP-FXD 1uF 100 V	09969	RPE114-130Z5U105M100V
A3A12CR1	1901-0662	3	13	DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR2	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR3	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR4	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR5	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR6	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR7	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR8	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR9	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR10	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR11	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR12	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR13	1901-0765	7	2	DIODE-PWR RECT 1N5812 50V 20A 35NS DO-4	30043	1N5812
A3A12CR14	1901-0765	7		DIODE-PWR RECT 1N5812 50V 20A 35NS DO-4	30043	1N5812
A3A12CR15			1	NOT ASSIGNED		
A3A12CR16	1884-0018	5	2	THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A12CR17	1901-0662	3		DIODE-PWR RECT 100V 6A	04713	MR751
A3A12CR18	1884-0018	5		THYRISTOR-SCR 2N4186 VRRM=200	04713	2N4186
A3A12DS1	1990-0487	7	2	LED-LAMP LUM-INT=2MCD BVR=5V	28480	HLMP-1401
A3A12F1	2110-0001	8	1	FUSE (INCH) 1A 250V NTD FE UL	75915	312 001
A3A12MP1				NOT ASSIGNED		
A3A12MP2	0590-0526	6	1	THREADED INSERT-NUT 4-40 .065-IN-LG SST	28480	0590-0526
A3A12MP3	1200-0081	4	1	INSULATOR-FLG-BSHG NYLON	28480	1200-0081
A3A12MP4	1251-2313	6	1	CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	00779	3-332070-5
A3A12MP5	2740-0003	5	2	NUT-HEX-W/LKWR 10-32-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
A3A12MP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A3A12MP7	5000-9043	6	1	PIN-P.C. BOARD EXTRACTOR	28480	5000-9043
A3A12MP8	5040-6843	2	1	BOARD EXTRACTOR	28480	5040-6843
A3A12MP9	86701-00018	4	1	HEAT SINK	28480	86701-00018
A3A12MP10	2740-0003	5		NUT-HEX-W/LKWR 10-32-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
A3A12MP11	2200-0107	6	2	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A12R1	0698-0083	8	1	RESISTOR 1.96K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1961-F
A3A12R2	2100-3123	0	1	RESISTOR-TRMR 500 10% TKF SIDE-ADJ	73138	89PR500
A3A12R3	0757-0346	2	3	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A3A12R4	0698-3444	1	1	RESISTOR 316 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-316R-F
A3A12R5	0698-3447	4	1	RESISTOR 422 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-422R-F
A3A12R6	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A3A12R7	0698-3428	1	1	RESISTOR 14.7 +-1% .125W TF TC=0+-100	2N014	CRB14 OR CRB25
A3A12R8	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A3A12U1	1826-0126	4	1	IC V RGLTR-FXD-POS 17.3/18.7V TO-3 PKG	04713	MC7818CK
A3A12VR1	1902-3263	8	1	DIODE-ZNR 24.9V 2% DO-35 PD=.4W	28480	1902-3263
A3A12VR2	1902-3404	9	1	DIODE-ZNR 82.5V 5% DO-7 PD=.4W TC=+.082%	28480	1902-3404
A3A12XF1	2110-0269	0	1	FUHLR-CLP-TYP	91506	6008-32CN

See introduction to this section for ordering information

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3AT1	86701-60066	8	2	TERMINATION- 50 OHM	28480	86701-60066
A3AT21	86701-60066	8		TERMINATION- 50 OHM	28480	86701-60066
A3B1	3160-0296	9	1	FAN-SKL 72-CFM 115V 50/60-HZ 3.875-OD (EXCEPT OPTION 003) (2930A & BELOW)	12330	SWS2107FL-51
A3B1	3160-0288		1	FAN-SKL 72-CFM 115V 50/60 HZ (EXCEPT OPTION 003) (2938A & ABOVE)		
A3B1	3160-0298	1	1	FAN-SKL 72-CFM 115V 50/60/400-HZ (OPTION 003 ONLY)	28875	SBC2206F-3
A3C1	0180-0452	8	1	CAP-FXD 25 V AL-ELCTLT	09023	5001334U025AC2A
A3C2	0180-0454	0	1	CAP-FXD 4200UF 75 V AL-ELCTLT	09023	500422U075AC2A
A3C3	0180-0453	9	1	CAP-FXD 8700UF 40 V AL-ELCTLT	09023	DCM872U040AC2A
A3C4	0180-2798	9	1	CAP-FXD 25 V AL-ELCTLT	19701	3186EE303V025AH
A3C5	0160-4065	5	1	CAP-FXD 0.1UF 0 V PPR-MET	11890	PME271M610M
A3F1	2110-0055	2	1	FUSE (INCH) 4A 250V NTD FE UL (FOR 100/120V OPERATION)	75915	312 004
A3F1	2110-0002	9	1	FUSE (INCH) 2A 250V NTD FE UL (FOR 220/240V OPERATION)	75915	312 002
A3J6	08673-60040		1	CONNECTOR ASSEMBLY-OUTPUT (OPTION 004, 005 ONLY)	28480	08673-60040
A3J7				P/O A3W7, NSR		
A3J8				P/O A3W5, NSR		
A3J9				P/O A3W2, NSR		
A3J10				P/O A3W13, NSR		
A3MP1	0360-0268	6	1	TERMINAL-SLDR LUG LK-MTG FOR-#6-SCR	91967	1414-6
A3MP2	0400-0001	1	1	GROMMET-RND .562-IN-ID .75-IN-GRV-OD	73734	1662
A3MP3	0400-0005	5	1	GROMMET-RND .438-IN-ID .562-IN-GRV-OD	73734	1660
A3MP4	0400-0018	0	1	GROMMET-CHAN NCH .056-IN-GRV-WD	12323	GSNY-052NA
A3MP5	0403-0265	5	1	GUIDE-PC BD BLK NYL .078-IN-BD THKNS	32559	E-300
A3MP6	2190-0010	7	9	WASHER-LK EXT T NO. 8 .168-IN-ID	28480	2190-0010
A3MP7	2200-0139	4	15	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP8	2200-0147	4	2	SCREW-MACH 4-40 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP9	2200-0155	4	4	SCREW-MACH 4-40 1-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP10	2360-0113	2	6	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP11	2360-0180	3	5	SCREW-MACH 6-32 .188-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A3MP13	1400-0618	7	1	CABLE CLAMP-HFCL .125-DIA .5-WD	85480	CPFR-115WT
A3MP14	2360-0195	0	2	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP15	1400-0673	4	1	CLMP-CA 2-DIA .5-WD SST	18076	MS21103-32
A3MP16	1520-0065	2	1	SHOCK MOUNT .5-EFF-HGT 6-LB-LOAD-CAP	76005	SMB 003-0100-1
A3MP17	1520-0094	7	1	SHOCK MOUNT .45-EFF-HGT 1-LB-LOAD-CAP	76005	J-2924-2-1
A3MP18	2360-0333	8	7	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
A3MP19	2360-0334	9	2	SCREW-MACH 6-32 .312-IN-LG 100 DEG	28480	2360-0334
A3MP20	2190-0011	8	8	WASHER-LK INTL T NO. 10 .195-IN-ID	78189	1910-00
A3MP21	2190-0017	4	8	WASHER-LK HLCL NO. 8 .168-IN-ID	28480	2190-0017
A3MP22	2190-0018	5	28	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
A3MP23	2190-0019	6	34	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A3MP24	2360-0459	9	1	SCREW-MACH 6-32 .375-IN-LG 82 DEG	28480	2360-0459
A3MP25	2190-0102	8	4	WASHER-LK INTL T 15/32 IN .472-IN-ID	78189	1922-01
A3MP26	2420-0001	5	3	NUT-HEX-W/LKWR 6-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
A3MP27	2420-0003	7	4	NUT-HEX-DBL-CHAM 6-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A3MP28	2190-0018	5		WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
A3MP29	2200-0141	8	3	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP30	3050-0105	6	4	WASHER-FL MTLC NO. 4 .125-IN-ID	28480	3050-0105
A3MP31	3050-0010	2	10	WASHER-FL MTLC NO. 6 .147-IN-ID	28480	3050-0010
A3MP32	2360-0115	4	17	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP33	3050-0010	2		WASHER-FL MTLC NO. 6 .147-IN-ID	28480	3050-0010
A3MP35	2360-0197	2	18	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP36	2360-0219	9	2	SCREW-MACH 6-32 1.375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP37	2360-0332	7	6	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	28480	2360-0332

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3MP38	0515-1331	5	12	SCREW-METRIC SPECIALTY M4 X 0.7 THD;7MM	00000	ORDER BY DESCRIPTION
A3MP39	0515-0896	5	8	SCREW-MACH M4 X 0.7 10MM-LG	00000	ORDER BY DESCRIPTION
A3MP40	2580-0002	4	1	NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	00000	ORDER BY DESCRIPTION
A3MP41	2680-0099	1	8	SCREW-MACH 10-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP42	2950-0035	8	1	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
A3MP43	5001-8232	5	1	GUSSET, SIDE	28480	5001-8232
A3MP44	5021-5803	2	1	FRAME, FRONT	28480	5021-5803
A3MP45	5021-5883	8	1	STRUT CORNER	28480	5021-5883
A3MP46	08673-00013	0	1	CHASSIS M/F	28480	08673-00013
A3MP47	0340-0564	3	1	INSULATOR-XSTR THRM-CNDCT	55285	7403-09FR-51
A3MP48	0515-1055	0	1	SCREW-MACH M4 X 0.7 6MM-LG 90-DEG-FLH-HD	00000	ORDER BY DESCRIPTION
A3MP49	08673-00015	2	1	REAR PANEL M/F	28480	08673-00015
A3MP50	08673-00023	2	1	CHASSIS CONT MOD	28480	08673-00023
A3MP51	08673-00046	9	1	SUPPORT, RECT. BD. BOARD	28480	08673-00046
A3MP52	08673-20036	9	1	HEAT SINK "A"	28480	08673-20036
A3MP53	08673-20037	0	1	HEAT SINK "B"	28480	08673-20037
A3MP54	08673-20197	3	1	HEAT SINK	28480	08673-20197
A3MP55	08673-20067	6	1	FRAME SUPPORT	28480	08673-20067
A3MP56	86701-00016	2	1	SUPPORT-CAPACITOR	28480	86701-00016
A3MP57	86701-00017	3	1	DISK-FAN SHIELD	28480	86701-00017
A3MP58	86701-00007	1	1	GUARD FAN	28480	86701-00007
A3MP66	86701-00062	8	1	STRUT ASSEMBLY (LEFT)	28480	86701-00062
A3MP67	86701-00063	9	1	STRUT ASSEMBLY (RIGHT)	28480	86701-00063
A3MP68	86701-00042	4	1	SUPPORT-MOUNT (BOTTOM)	28480	86701-00042
A3MP69	86701-00043	5	1	SUPPORT-MOUNT (TOP)	28480	86701-00043
A3MP70	86701-00044	6	1	SNUBBER	28480	86701-00044
A3MP71	86701-20002	8	1	COWLING FAN	28480	86701-20002
A3MP74	86701-20005	1	1	GUIDE-P.C. BOARD (REAR)	28480	86701-20005
A3MP75	86701-20006	2	1	GUIDE-P.C. BOARD (FRONT)	28480	86701-20006
A3MP76	86701-20092	6	1	FRAME-MOD (REAR)	28480	86701-20092
A3MP83	1400-0249	0	9	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
A3MP84	2200-0103	2	2	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP86	2200-0138	3	4	SCREW-MACH 4-40 .188-IN-LG 100 DEG	00000	ORDER BY DESCRIPTION
A3MP88	2200-0153	2	9	SCREW-MACH 4-40 .875-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP89	2360-0207	5	9	SCREW-MACH 6-32 .875-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP90	6960-0001	3	3	PLUG-HOLE TR-HD FOR .375-D-HOLE STL	71785	SS-48192-K1110
A3MP93	08673-00014	1	1	DIVIDER CENTER	28480	08673-00014
A3MP97	86701-00028	6	1	SPRING FLAT	28480	86701-00028
A3MP104	1200-0043	8	1	INSULATOR-XSTR ALUMINUM	76530	322047
A3MP105	2190-0010	7		WASHER-LK EXT T NO. 8 .168-IN-ID	28480	2190-0010
A3MP106	1200-0147	3	1	INSULATOR-FLG-BSHG NYLON	28480	1200-0147
A3MP107	2200-0153	2		SCREW-MACH 4-40 .875-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3MP111	3050-0139	6	1	WASHER-FL MTLC NO. 8 .172-IN-ID	28480	3050-0139
A3MP112	1400-0907					
A3MP140	2360-0220		3	SCREW, RD HD #6-32UNC (2938A & ABOVE)		
A3MP141	3160-0300		1	GUARD, FINGER (2938A & ABOVE)		
A3MP142	5040-6999		1	COVER, FAN (2938A & ABOVE)		
A3MP143	0380-1730		3	SPACER (2938A & ABOVE)		
A3MP144	1400-0510		1	CLAMP, CABLE (2938A & ABOVE)		
A3MP145	5001-~~0544~~ 6583		1	BRACKET, MOUNTING (2938A & ABOVE)		
A3Q1	1854-0887	3	2	TRANSISTOR NPN DARL TO-3 PD=200W	04713	MJ11016
A3Q2	1854-0743	0	1	TRANSISTOR NPN 2N5878 SI TO-3 PD=150W	04713	2N5878
A3Q3	1854-0887	3		TRANSISTOR NPN DARL TO-3 PD=200W	04713	MJ11016
A3Q4	1854-0679	1	1	TRANSISTOR NPN 2N5885 SI TO-3 PD=200W	04713	2N5885

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A3T1	9100-2653	6	1	TRANSFORMER	09553	53T-23
A3W2	86701-60007	7	1	CABLE ASSY-FREQ. STD. OUTPUT(GRAY/VIO)	28480	86701-60063
A3W5	86701-60005	5	1	CABLE ASSY-10 MHZ OUTPUT (GRAY/BLUE)	28480	86701-60005
A3W6	86701-60049	7	1	CABLE ASSY-10 MHZ OUTPUT (BLUE)	28480	86701-60049
A3W7	86701-60004	4	1	CABLE ASSY-100 MHZ OUTPUT (GRAY/GREEN)	28480	86701-60004
A3W8	86701-60053	3	1	CABLE ASSY-M/N OUTPUT (WHITE/ORANGE)	28480	86701-60053
A3W13	86701-60006	6	1	CABLE ASSY-FREQ. STD. INPUT (GRAY/BLACK)	28480	86701-60006
A3W14	86701-60056	6	1	CABLE ASSY-20/30 MHZ OUTPUT (GREEN)	28480	86701-60056

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A4				PANEL ASSEMBLY		
A4A1	08673-60175	1	1	FRONT PANEL BOARD ASSEMBLY (INCLUDES R1, R2, & A4U1, BUT NOT A4DS1-3, 5-15)	28480	08673-60175
A4A1	08673-60131	9	1	FRONT PANEL BOARD ASSEMBLY (DOES NOT INCLUDE R1, R2, A4DS1-3, 5-15, A4U1)	28480	08673-60131
A4A1C1	0180-2139	2	1	CAP-FXD 10uF 60 V WT-SLG-TA-ELCTLT	56289	109D106X0060C2
A4A1DS1-A4A1DS14			1	NOT ASSIGNED		
A4A1DS15	1990-0665	3	23	LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS16	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS17	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS18	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS19	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS20	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS21	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS22	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS23	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS24	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS25	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS26	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS27	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS28	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS29	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS30	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS31	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS32	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS33	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS34	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS35	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS36	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS37	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=30MA-MAX BVR=5V	28480	1990-0665
A4A1DS38	1990-0486	6	4	LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A4A1DS39	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A4A1DS40	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A4A1DS41	1990-0486	6		LED-LAMP LUM-INT=2MCD IF=25MA-MAX BVR=5V	28480	HLMP-1301
A4A1DS42	1990-0793	8	4	LED-LIGHT BAR LUM-INT=6MCD IF=30MA-MAX	28480	HLMP-2635
A4A1DS43	1990-0793	8		LED-LIGHT BAR LUM-INT=6MCD IF=30MA-MAX	28480	HLMP-2635
A4A1DS44	1990-0793	8		LED-LIGHT BAR LUM-INT=6MCD IF=30MA-MAX	28480	HLMP-2635
A4A1DS45	1990-0793	8		LED-LIGHT BAR LUM-INT=6MCD IF=30MA-MAX	28480	HLMP-2635
A4A1J1	1251-8106	7	1	CONN-POST TYPE .100-PIN-SPCG 20-CONT	28480	1251-8106
A4A1J2	1251-8262	6	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-8262
A4A1J3	1251-8471	9	1	CONN-POST TYPE .100-PIN-SPCG 40-CONT	28480	1251-8471
A4A1MP1	0360-0270	0	1	TERMINAL-SLDR LUG LK-MTG FOR-#10-SCR	79963	807-196
A4A1MP2	1200-0645	6	2	SOCKET-STRP 12-CONT STRIP DIP-SLDR	12360	TSA3000-12BC
A4A1MP3	1200-0874	3	4	SOCKET-STRP 22-CONT SIP DIP-SLDR	91506	X325-AG10D-22
A4A1MP4	1251-0600	0	2	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	12360	94-155-1010-01-03-00
A4A1MP5				NOT ASSIGNED		
A4A1MP6	1200-0507	9	7	SOCKET-IC-DIP 16-CONT DIP-SLDR	06776	ICN-163B-S3-G30
A4A1MP7	2950-0001	8	3	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A4A1MP8	2190-0016	3	4	WASHER-LK INTL T 3/8 IN .377-IN-ID	28480	2190-0016
A4A1MP9	2190-0067	4	1	WASHER-LK INTL T 1/4 IN .256-IN-ID	78189	1914-05
A4A1MP10				NOT ASSIGNED		
A4A1MP11	2950-0072	3	1	NUT-HEX-DBL-CHAM 1/4-32-THD .062-IN-THK	00000	ORDER BY DESCRIPTION
A4A1MP12	0380-1339	6	1	SPACER-RND .25-IN-LG .115-IN-ID	28480	0380-1339
A4A1R1	2100-2590	3	1	RES-V SS 10K +-10% 10	12697	392
A4A1R2	2100-4065	1	1	RES-V SS 10K +-10% LIN	32997	82A1JB36E15
A4A1R3	0698-4037	0	1	RESISTOR 46.4 +-1% .125W TF TC=0+-100	D8439	MK2
A4A1R4	0698-3445	2	1	RESISTOR 348 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-348R-F
A4A1R5	1810-0370	7	3	NETWORK-RES 8-SIP 220.0 OHM X 7	C1433	750-81

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4A1R6	1810-0370	7		NETWORK-RES 8-SIP 220.0 OHM X 7	C1433	750-81
A4A1R7	0757-0317	7	2	RESISTOR 1.33K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1331-F
A4A1R8	0757-0317	7		RESISTOR 1.33K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1331-F
A4A1R9	0698-3441	8	3	RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A4A1R10	1810-0370	7		NETWORK-RES 8-SIP 220.0 OHM X 7	C1433	750-81
A4A1R11	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	D8439	MK2
A4A1R12	0698-3441	8		RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A4A1R13	0698-3441	8		RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A4A1S1	5060-9436	7	58	SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0819	2	1	KEY CAP-HALF, SKY GRAY "0"	28480	5041-0819
A4A1S2	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0811	4	1	KEY CAP-HALF, SKY GRAY "1"	28480	5041-0811
A4A1S3	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0812	5	1	KEY CAP-HALF, SKY GRAY "2"	28480	5041-0812
A4A1S4	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0813	6	1	KEY CAP-HALF, SKY GRAY "3"	28480	5041-0813
A4A1S5	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0814	7	1	KEY CAP-HALF, SKY GRAY "4"	28480	5041-0814
A4A1S6	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0815	8	1	KEY CAP-HALF, SKY GRAY "5"	28480	5041-0815
A4A1S7	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0816	9	2	KEY CAP-HALF, SKY GRAY "6"	28480	5041-0816
A4A1S8	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0817	0	1	KEY CAP-HALF, SKY GRAY "7"	28480	5041-0817
A4A1S9	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0818	1	1	KEY CAP-HALF, SKY GRAY "8"	28480	5041-0818
A4A1S10	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0816	9		KEY CAP-HALF, SKY GRAY "6"	28480	5041-0816
A4A1S11	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-4646	1	1	KEY CAP-QUARTER, JADE GRAY (DELTA-F)	28480	5041-4646
A4A1S12	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0128	6	4	KEY CAP-HALF, JADE GRAY (ILLUMINATED)	28480	5041-0128
A4A1S13	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-4645	0	1	KEY CAP-QUARTER, JADE GRAY (MKR)	28480	5041-4645
A4A1S14	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0123	1	3	KEY CAP-HALF, JADE GRAY (BLANK)	28480	5041-0123
A4A1S15	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0128	6		KEY CAP-HALF, JADE GRAY (ILLUMINATED)	28480	5041-0128
A4A1S16	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0123	1		KEY CAP-HALF, JADE GRAY (BLANK)	28480	5041-0123
A4A1S17	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0122	0	4	KEY CAP-QUARTER, JADE GRAY (BLANK)	28480	5041-0122
A4A1S18	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1829	6	4	KEY CAP-QUARTER, SHORT DB UP ARROW	28480	5041-1829
A4A1S19	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1829	6		KEY CAP-QUARTER, SHORT DB DOWN ARROW	28480	5041-1829
A4A1S20	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6	14	KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S21	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1923	1	1	KEY CAP-QUARTER "KHz"	28480	5041-1923
A4A1S22	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1920	8	1	KEY CAP-QUARTER "<-----"	28480	5041-1920
A4A1S23	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0808	9	1	KEY CAP-HALF, SKY GRAY "DECIMAL"	28480	5041-0808
A4A1S24	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0127	5	1	KEY CAP-QUARTER, SHORT DB (ILLUMINATED)	28480	5041-0127
A4A1S25	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0128	6		KEY CAP-HALF, JADE GRAY (ILLUMINATED)	28480	5041-0128
A4A1S26	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1829	6		KEY CAP-QUARTER, SHORT DB UP ARROW (EXCEPT OPTIONS 001, 005)	28480	5041-1829
	5041-2797	9	1	KEY CAP-QUARTER, BLUE "+10DBM" (OPTIONS 001, 005 ONLY)	28480	5041-2797
A4A1S27	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S28	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S29	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1829	6		KEY CAP-QUARTER, SHORT DB DOWN ARROW (EXCEPT OPTIONS 001, 005)	28480	5041-1829

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
	5041-2796	8	1	KEY CAP-QUARTER, BLUE "0 DBM" (OPTIONS 001, 005 ONLY)	28480	5041-2796
A4A1S30	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S31	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-4643	8	1	KEY CAP-QUARTER, JADE GRAY (START)	28480	5041-4643
A4A1S32	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-4644	9	1	KEY CAP-QUARTER, JADE GRAY (STOP)	28480	5041-4644
A4A1S33	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S34	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1827	4	1	KEY CAP-QUARTER, SHORT DB "FREQUENCY"	28480	5041-1827
A4A1S35	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1828	5	1	KEY CAP-QUARTER, SHORT DB "FREQ INCR"	28480	5041-1828
A4A1S36	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S37	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0441	6	1	KEY CAP-QUARTER BLUE	28480	5041-0441
A4A1S38	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1918	4	1	KEY CAP-QUARTER "RCL"	28480	5041-1918
A4A1S39	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0122	0		KEY CAP-QUARTER, JADE GRAY (BLANK)	28480	5041-0122
A4A1S40	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0384	6	4	KEY CAP-QUARTER, SKY GRAY (ILLUMINATED)	28480	5041-0384
A4A1S41	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0384	6		KEY CAP-QUARTER, SKY GRAY (ILLUMINATED)	28480	5041-0384
A4A1S42	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0123	1		KEY CAP-HALF, JADE GRAY (BLANK)	28480	5041-0123
A4A1S43	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0384	6		KEY CAP-QUARTER, SKY GRAY (ILLUMINATED)	28480	5041-0384
A4A1S44	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0122	0		KEY CAP-QUARTER, JADE GRAY (BLANK)	28480	5041-0122
A4A1S45	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0384	6		KEY CAP-QUARTER, SKY GRAY (ILLUMINATED)	28480	5041-0384
A4A1S46	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S47	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S48	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S49	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S50	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S51	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S52	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S53	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0285	6		KEY CAP-QUARTER, LITE GRAY (ILLUMINATED)	28480	5041-0285
A4A1S54	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0128	6		KEY CAP-HALF, JADE GRAY (ILLUMINATED)	28480	5041-0128
A4A1S55	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-0122	0		KEY CAP-QUARTER, JADE GRAY (BLANK)	28480	5041-0122
A4A1S56	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1919	5	1	KEY CAP-QUARTER "STEPS ms"	28480	5041-1919
A4A1S57	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1921	9	1	KEY CAP-QUARTER "GHZ"	28480	5041-1921
A4A1S58	5060-9436	7		SWITCH-PB SPST-NO MOM	71468	5560-9436
	5041-1922	0	1	KEY CAP-QUARTER "MHZ"	28480	5041-1922

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
A4DS1	1990-0821	3	1	DISPLAY (+-)	28480	1990-0821
A4DS2	1990-0822	4	13	DISPLAY-NUMERIC	28480	HDSP-0761
A4DS3	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS4	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS5	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS6	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS7	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS8	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS9	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS10	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS11	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS12	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS13	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS14	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4DS15	1990-0822	4		DISPLAY-NUMERIC	28480	HDSP-0761
A4J1	08673-60040		1	CONNECTOR ASSEMBLY-OUTPUT	28480	08673-60040
A4J2				NSR, P/O A4W1		
A4J3				NSR, P/O A4W2		
A4J4				NSR, P/O A4W3		
A4J5				NSR, P/O A4W4		
A4M1	1120-0585	3	1	METER 2.50-IN; 1 MA FSD; TAUT BAND; LIN	28480	1120-0585
A4MP2	0370-3023	8	2	KNOB3/4 JGK .25-IN-ID	28480	0370-3023
A4MP3	0510-1148	2	4	RETAINER-PUSH-ON KB-TO-SHFT EXT	78553	C4154-017-27
A4MP4	0590-1649	6	4	NUT-KNRLD-R 15/32-32-THD .08-IN-THK	00000	ORDER BY DESCRIPTION
A4MP6	2190-0019	6	2	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
A4MP7	2190-0022		1	WASHER-LK INTL T 7/16 IN .439-IN-ID	78189	2190-0022
A4MP9	2200-0105	4	18	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A4MP10	2200-0143	0	2	SCREW-MACH 4-40 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A4MP11	2200-0164	5	2	SCREW-MACH 4-40 .188-IN-LGUNCT 82 DEG	00000	ORDER BY DESCRIPTION
A4MP12	2200-0166	7	18	SCREW-MACH 4-40 .312-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A4MP13	2740-0001	3	1	NUT-HEX DBL-CHAM 10-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
A4MP17	5040-6928	4	1	DIVIDER STRIP	28480	5040-6928
A4MP18	5041-1418	9	1	ROCKER	28480	5041-1418
A4MP20	3050-0161	4	1	WASHER-SPR WAVY 1/4 IN .265-IN-ID	92830	W0367-006
A4MP21	08672-20037	9	4	SUPPORT-FRONT PANEL	28480	08672-20037
A4MP22	08672-20056	2	1	PAD-L.E.D.	28480	08672-20056
A4MP23	08672-20057	3	1	HEAT SINK-L.E.D.	28480	08672-20057
A4MP26	08673-80069			PLUG, FRONT PANEL (OPT 004,005 ONLY)	28480	08673-80069
A4MP27	08673-00070		1	PANEL (FRONT)	28480	08673-00070
A4MP28	08673-00084		1	PANEL-SUB (FRONT)	28480	08673-00084
A4MP29	08673-00017	4	1	METER SPACER	28480	08673-00017
A4MP30	08673-20016	5	1	HEAT SINK-L.E.D.	28480	08673-20016
A4MP31	08673-20018	7	4	SUPPORT (BOTTOM)	28480	08673-20018
A4MP32	08673-80025	2	1	WASHER ASSY	28480	08673-80025
A4MP33	2950-0001	6	1	NUT-HEX-DBL-CHAM 7/16-28-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A4MP35	08640-40044	2	1	METER ZERO SCREW	28480	08640-40044
A4MP36	00310-48801	0	4	WASHER SHOULDERED	28480	00310-48801
A4S1	3101-2080	9	1	SWITCH-LINE DPDT (LINE)	K5260	MSLA-206N-5
A4U1	0960-0683	1	1	ROTARY PULSE GENERATOR INPUT POWER: 5VDC	28480	QEDS-8830
A4W1	08673-60036	3	1	CABLE ASSEMBLY-ALC	28480	08673-60036
A4W2	08673-60037	4	1	CABLE ASSEMBLY AM INPUT	28480	08673-60037
A4W3	08673-60038	5	1	CABLE ASSEMBLY FM INPUT	28480	08673-60038
A4W4	08673-60039	6	1	CABLE ASSEMBLY PULSE INPUT	28480	08673-60039

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Manufacturer Part Number
				CHASSIS/MISCELLANEOUS PARTS		
MP2	0570-0034	9	5	SCREW-MACH 4-40 .25-IN-LG RD-HD-SLT	00000	ORDER BY DESCRIPTION
MP3	0570-0632	3	4	SCREW-SPCL 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP4	0624-0268	6	24	SCREW-TPG 4-24 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP5	1400-0082	9	1	CLMP-CA .125-DIA .375-WD NYL	85480	F4NY-125 NA
MP6	1460-0553	5	7	STAMPING-BE-CU CLIP-WINDOW	28480	1460-0553
MP7	1494-0059	7	1	SLIDE-CHAS 25-IN-LG 27.84-IN-TRVL (OPTION 006)	01561	C858-1(METRIC MTG HARD
MP8	2190-0018	5	4	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
MP9	2190-0019	6	6	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0019
MP10	2200-0103	2	6	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP11	2200-0105	4	24	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP12	2200-0138	3	19	SCREW-MACH 4-40 .188-IN-LG 100 DEG	00000	ORDER BY DESCRIPTION
MP13	2200-0141	8	2	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP14	2200-0145	2	4	SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP15	2200-0151	0	2	SCREW-MACH 4-40 .75-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP16	2360-0113	2	1	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP17	2360-0115	4	2	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP18	2360-0117	6	5	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP19	0515-1232	5	4	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
MP20	2360-0197	2	1	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP21	2360-0229	1	3	SCREW-MACH 6-32 .562-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP22	2360-0333	8	11	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
MP24	2420-0001	5	2	NUT-HEX-W/LKWR 6-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
MP25	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	00000	ORDER BY DESCRIPTION
MP26	3030-0152	1	2	SCREW-SET 4-40 .312-IN-LG SMALL CUP-PT	28480	3030-0152
MP27	3050-0010	2	2	WASHER-FL MTLC NO. 6 .147-IN-ID	28480	3050-0010
MP28	3050-0105	6	6	WASHER-FL MTLC NO. 4 .125-IN-ID	28480	3050-0105
MP29	5040-7201	8	4	FOOT (STANDARD)	28480	5040-7201
MP30	5040-7202	9	1	TRIM, TOP	28480	5040-7202
MP31	5041-6819	4	2	HANDLE, CAP-FRONT	28480	5041-6819
MP32	5041-6820	7	2	HANDLE, CAP-REAR	28480	5041-6820
MP33	5040-7221	2	4	STANDOFF, REAR PANEL	28480	5040-7221
MP37	5060-9805	4	2	STRAP HANDLE 21 IN	28480	5060-9805
MP38	5061-9436	9	1	TOP COVER 21 IN.	28480	5061-9436
MP39	5061-9448	3	1	COVER BOTTOM 21 IN	28480	5061-9448
MP40	5061-9689	4	1	FRONT HANDLE KIT (OPTION 907 ONLY)	28480	5061-9689
MP41	5061-9677	0	1	RACK FLANGE KIT (OPTION 908 ONLY)	28480	5061-9677
MP42	5061-9683	8	1	RACK FLANGE & HDL KIT(OPTION 909 ONLY)	28480	5061-9683
MP45	08672-20120	1	12	STEPWASHER	28480	08672-20120
MP46	08673-00073	2	1	COVER, DCU	28480	08673-00073
MP49	08673-00058	3	1	COVER, RF SECTION	28480	08673-00058
MP50	08673-20225	8	1	INSULATOR, M/B	28480	08673-20225
MP51	08673-20172		1	WINDOW FRONT "B"	28480	08673-20172
MP52	08673-20132	6	1	SHIELD RFI	28480	08673-20132
MP57	86701-00066		1	COVER GUARD	28480	86701-00066
MP58	5060-9938	4	2	SIDE COVER	28480	5060-9938
MP60	2190-0891	2	1	WASHER-FL MTLC NO. 4 .125-IN-ID	28480	2190-0891
MP61	1460-1345	5	2	TILT STAND SST	28480	1460-1345
MP62	5001-0439	8	2	TRIM SIDE FRT FRAME	28480	5001-0439
MP67	0570-1171	7	1	SCREW-SPCL 6-32 .468-IN-LG UNCT 100	00000	ORDER BY DESCRIPTION
MP68	0510-0043	4	1	RETAINER-RING E-R EXT .141-IN-DIA STL	54963	1500-14-ZD
W1	08672-60057	7	1	CABLE ASSY 20 COND	28480	08672-60057
W2	08673-60023	8	1	CABLE ASSY 50 COND	28480	08673-60023
W3	08673-60022	7	1	CABLE ASSY 40 COND	28480	08673-60022
W4	08673-60092	1	1	CABLE ASSY RBN 16 PN	28480	08673-60092
W5	08673-60086	3	1	CABLE ASSY CNTR IFCE	28480	08673-60086
W6	8120-1378	1	1	POWER CORD SET 18-AWG 3-COND 90-IN-LG	11383	PS-204-625
W8	5060-9462	9	1	HP-IB ADAPTER	28480	5060-9462
W50	08673-60242		1	CABLE ASSY, BLUE (2930A & ABOVE)	28480	08673-60242

Table 6-4. Code List of Manufacturers

Mfr Code	Manufacturer Name	Address	Zip Code
C1433	AB ELEKTRONIK GMBH	SALZBURG AU	A-501
D8439	ROEDERSTEIN/RESISTA GMBH	LANDSHUT GM	8300
K5260	FUJISOKU ELECTRIC CO LTD	TOKYO JP	
K8479	HOLSWORTHY ELECTRONICS LTD	HOLSWORTHY EG	
S0545	NEC ELECTRONICS INC	MTN VIEW CA US	94043
U1453	BARBER & COLEMAN LTD	SALE CHES EG	
00000	ANY SATISFACTORY SUPPLIER		
00494	ADDRESSOGRAPH FARRINGTON	TREVOSE PA	44117
00779	AMP INC	HARRISBURG PA US	17111
01121	ALLEN-BRADLEY CO INC	EL PASO TX US	79935
01295	TEXAS INSTRUMENTS INC	DALLAS TX US	75265
01561	CHASSIS TRAK DIV GENERAL DEVICES CO	INDIANAPOLIS IN	46219
01686	RCL ELECTRONICS INC	NORTHBROOK IL US	60062
02768	ITW FASTEX	DES PLAINES IL US	60016
02875	HUDSON TOOL & DIE CO INC	NEWARK NJ	07105
04072	BELL INDUSTRIES INC MILLER JW DIV	COMPTON CA	90224
04222	AVX CORP	GREAT NECK NY US	11021
04713	MOTOROLA INC	ROSELLE IL US	60195
05245	CORCOM INC	LIBERTYVILLE IL US	60048
05574	VIKING CONNECTORS	CHATSWORTH CA US	91311
05820	EG & G INC	WELLESLEY MA US	02181
05876	U S POLYMERIC INC	STAMFORD CT	06904
06132	COMPUTER TERMINAL CORP	SAN ANTONIO TX	78784
06383	PANDUIT CORP	TINLEY PARK IL US	60477
06394	HOOVER UNIVERSAL INC BALL & RLR DIV	SALINE MI	68310
06587	AMERICAN SILVER CO ING	FLUSHING NY	11354
06665	PRECISION MONOLITHICS INC	SANTA CLARA CA US	95054
06776	ROBINSON NUGENT INC	NEW ALBANY IN US	47150
06877	UNITRON INSTRUMENTS INC	WOODBURY NY	11797
07263	FAIRCHILD SEMICONDUCTOR CORP	CUPERTINO CA US	95014
07933	RAYTHEON CO SEMICONDUCTOR DIV HQ	MOUNTAIN VIEW CA	94040
09023	CORNELL-DUBILIER/SANGAMO	WAYNE NJ US	07470
09133	KIERULFF ELECTRONICS INC	LOS ANGELES CA	90015
09353	C & K COMPONENTS INC	NEWTON MA US	02158
09464	DRYCO MFG CO INC	CHICAGO IL	60612
09535	JOHNSON MATTHEY AND MALLORY LTD	TORONTO CN	
09553	MARCONI INSTR DIV ENGLISH ELEC CORP	ENGLEWOOD NJ	07631
09641	ELECTRI-FLEX COMPANY	ROSELLE IL	60172
09969	DALE ELECTRONICS INC	YANKTON SD US	57078
10454	GENERAL MFG CO	GLENDALE CA	91201
10899	EASTERN AIR DEVICES INC	GREAT NECK NY	11021
11383	AMETEK/ALUMINUM EXTRUSION	LOS ANGELES CA	90065
11502	IRC INC	BOONE NC US	28607
11870	MELABS INC	PALO ALTO CA	94304
11890	TOMIC ELECTRIC DIV	DETROIT MI	48234
11983	NORTRONICS CO INC	MINNEAPOLIS MN	55427
12323	PRESIN CO/PRACTICAL AUTOMATION INC	SHELTON CT	06484
12330	MONTROSE PRODUCTS CO	AUBURN MA US	01501
12344	TALLY CORP	KENT WA	98031
12360	ALBANY PROD CO DIV OF PHEUMO DYN	NORWALK CT	06850
12403	CANFIELD H O CO OF INDIANA INC THE	SEYMOUR IN	47274
12498	CRYSTALONICS, DIV TELEDYNE	CAMBRIDGE MA	02140
12666	CAHN DIV VENTRON INSTRUMENTS CORP	PARAMOUNT CA	90273
12697	CLAROSTAT MFG CO INC	DOVER NH US	03820
12845	TELEDYNE STD COLLAPSIBLE TUBE	ROCHESTER PA	15074
13103	THERMALLOY INC	DALLAS TX US	75234
14140	EDISON ELEK DIV MCGRAW-EDISON	MANCHESTER NH	03130
14552	MICROSEMI CORP	SCOTSDALE AZ US	85252
15636	ELEC-TROL INC	SAUGUS CA US	91350
16179	M/A-COM INC	BURLINGTON MA US	01803
16453	WESTERN MICROWAVE INC	SUNNYVALE CA US	94089
16956	DENNISON MFG CO	FRAMINGHAM MA US	01701
17856	SILICONIX INC	SANTA CLARA CA US	95054
18076	UMPCO INC	GARDEN GROVE CA	91746
18324	SIGNETICS CORP	SUNNYVALE CA US	94086
18612	VISHAY INTERTECHNOLOGY INC	MALVERN PA US	19355
19701	NORTH AMERICAN PHILIPS CORP	NEW YORK NY US	10017
2M627	ROHM CORP	IRVINE CA US	92713
2N014	AMERICAN FEINTOOL INC	WHITE PLAINS NY	10603
20940	MICRO-OHM CORP	EL TORO CA US	92630
23050	PRODUCT COMPONENT CORP	MT VERNON NY	10553
24226	GOWANDA ELECTRONICS CORP	GOWANDA NY US	14070
24355	ANALOG DEVICES INC	NORWOOD MA US	02062
24931	SPECIALTY CONNECTOR CO	FRANKLIN IN US	46131
26742	METHODE ELECTRONICS INC	CHICAGO IL US	60656
27014	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA CA US	95052
27264	MOLEX INC	LISLE IL US	60532
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO CA	94304
28875	IMC MAGNETICS CORP	JERICO NY US	11753

Table 6-4. Code List of Manufacturers

Mfr Code	Manufacturer Name	Address		Zip Code
30043	SOLID STATE DEVICES INC	LA MIRADA	CA	90638
32159	WEST-CAP ARIZONA	SAN FERNANDO	CA US	91340
32559	BIVAR INC	SANTA ANA	CA	92705
32997	BOURNS INC	RIVERSIDE	CA US	92507
33095	SPECTRUM CONTROL INC	ERIE	PA US	16505
33399	TELE-TECH CORP	BOZEMAN	MT US	59771
34371	HARRIS CORP	MELBOURNE	FL US	32901
34649	INTEL CORP	SANTA CLARA	CA US	95054
46384	PENN ENGINEERING & MFG CORP	DOYLESTOWN	PA US	18901
50088	SGS-THOMSON MICROELECTRONICS INC	PHOENIX	AZ US	85022
50140	K & L MICROWAVE	SALISBURY	MD US	21801
52648	PLESSEY SEMICONDUCTORS	SANTA ANA	CA	92705
52763	STETTNER & CO	LAUF	GM	D-856
54963	ANDERTON DARBY INC	CLIFTON	NJ	07015
55285	BERGQUIST CO	MINNEAPOLIS	MN	55420
56289	SPRAGUE ELECTRIC CO	LEXINGTON	MA US	02173
71468	ITT CORP	NEW YORK	NY US	10022
71744	GENERAL INSTRUMENT CORP	CLIFTON	NJ US	07012
71785	TRW INC	CLEVELAND	OH US	44124
72962	ELASTIC STOP NUT DIVOF HARVARD	UNION	NJ US	07083
73138	BECKMAN INDUSTRIAL CORP	FULLERTON	CA US	92635
73734	FEDERAL SCREW PRODUCTS CO	CHICAGO	IL	60618
74970	EF JOHNSON CO	WASECA	MN US	56093
75915	LITTELFUSE INC	DES PLAINES	IL US	60016
76005	LORD CORP INDUSTRIAL PROD DIV	ERIE	PA US	16514
76530	MONADNOCK CO, THE	CITY OF IND	CA	91747
76854	OAK SWITCH SYSTEMS INC	CRYSTAL LAKE	IL US	60014
77342	POTTER & BRUMFIELD INC	PRINCETON	IN US	47671
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF	ELGIN	IL	60126
78553	TINNERMAN PRODUCTS INC	CLEVELAND	OH	44101
79727	C-W INDUSTRIES	WARMINSTER	PA	18974
79963	ZIERICK MFG CO	MT KISCO	NY	10549
80120	SCHNITZER ALLOY PRODUCTS CO	ELIZABETH	NJ	07206
81073	GRAYHILL INC	LA GRANGE	IL US	60525
83186	VICTORY ENGINEERING CORP	SPRINGFIELD	NJ US	07081
85480	BRADY W H CO	MILWAUKEE	WI	53209
9N171	UNITRODE CORP	LEXINGTON	MA US	02173
91506	AUGAT INC	MANSFIELD	MA US	02048
91637	DALE ELECTRONICS INC	COLUMBUS	NE US	68601
91967	NATIONAL TEL TRONICS CORP	YONKERS	NY	10701
92830	ASSOCIATED SPRING CORP	BRISTOL	CT	06010
92895	AMERICAN OIL & SUPPLY CO	NEWARK	NJ	07105
94696	MAGNECRAFT ELECTRIC CO	CHICAGO	IL	60630
98291	ITT SEALECTRO CORP	TRUMBULL	CT US	06611
98978	INTL ELECTRONIC RESEARCH CORP	BURBANK	CA US	91502

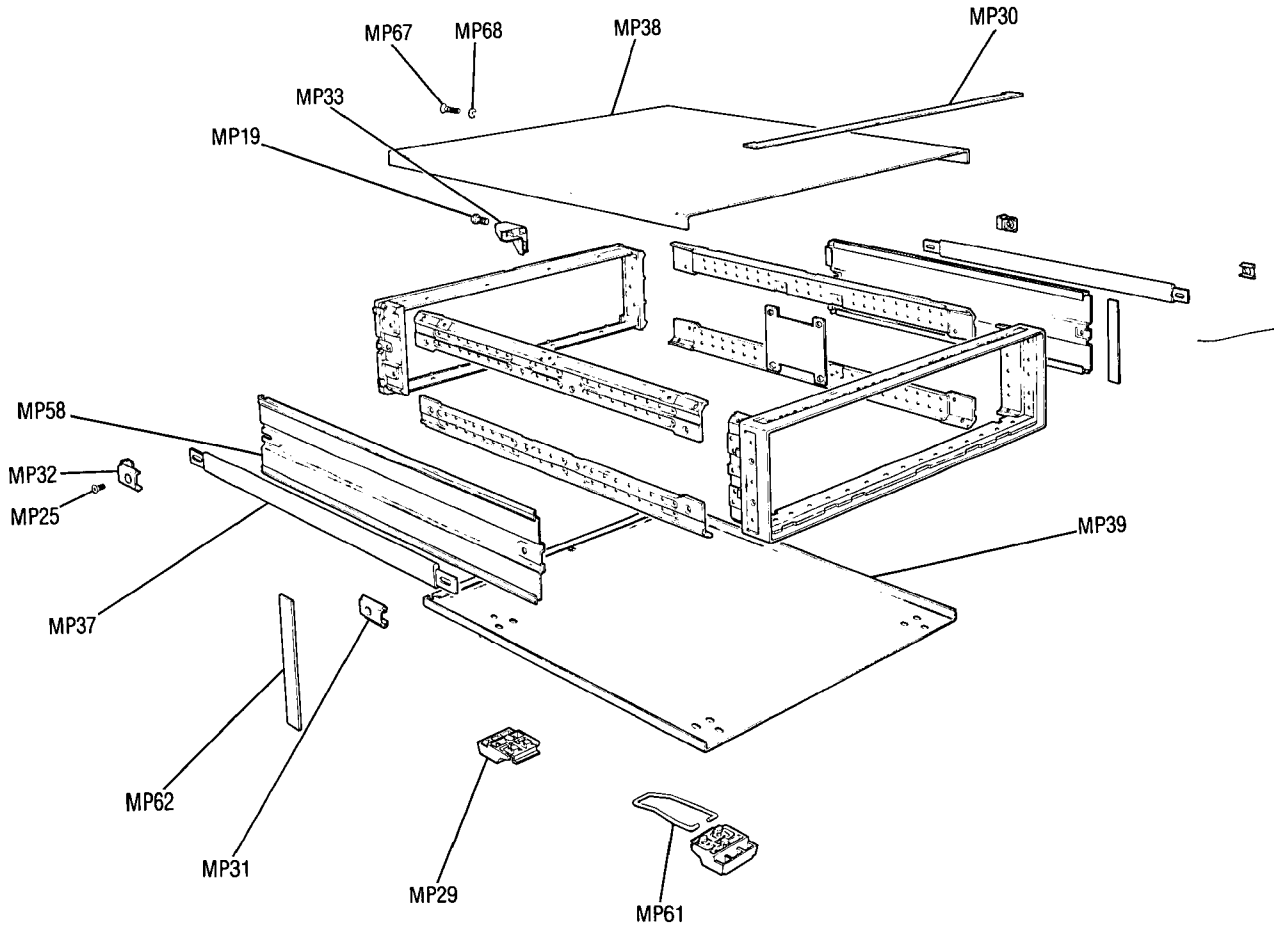


Figure 6-1. Cabinet Illustrated Parts Breakdown

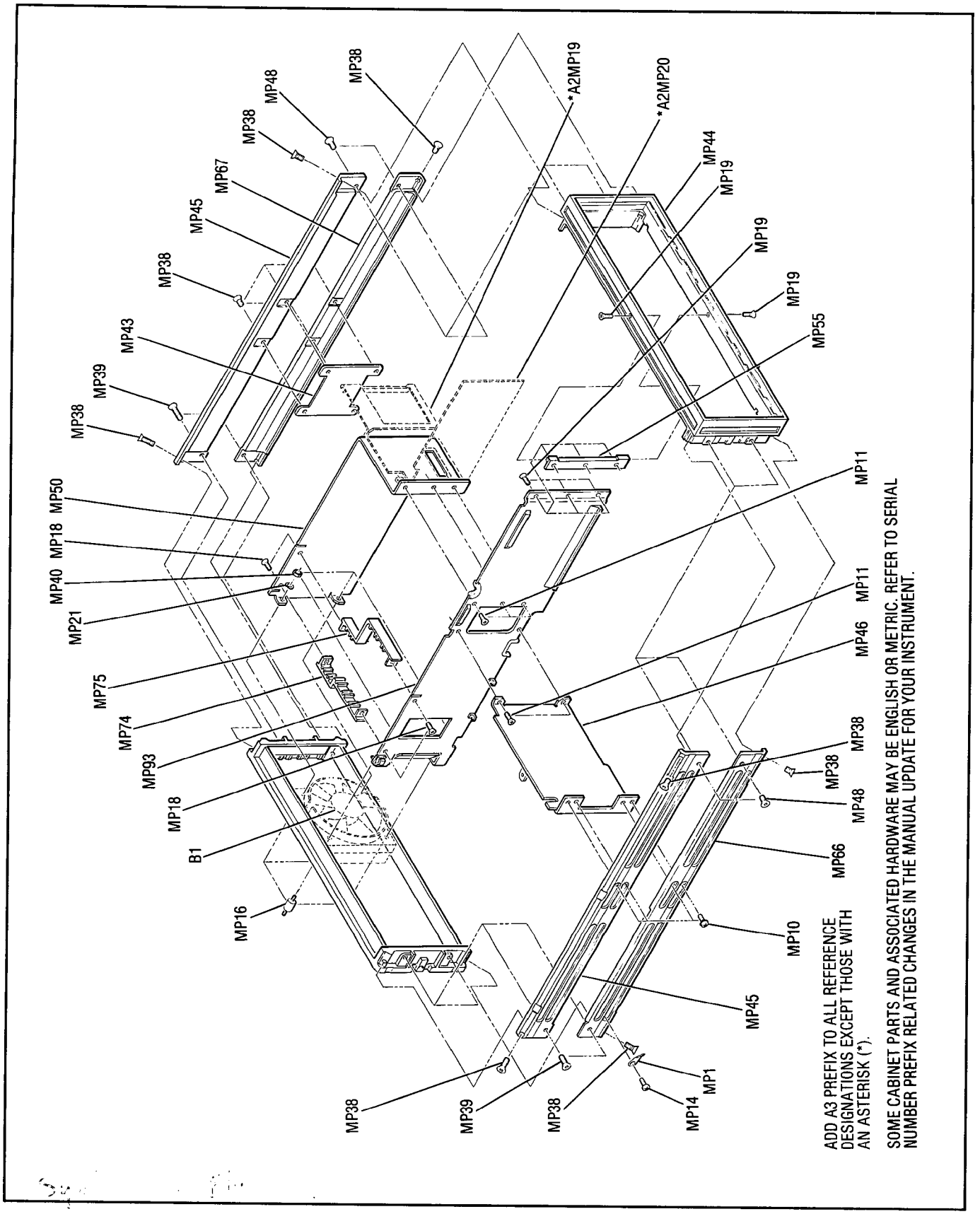


Figure 6-2. Cabinet and Frame Illustrated Parts Breakdown

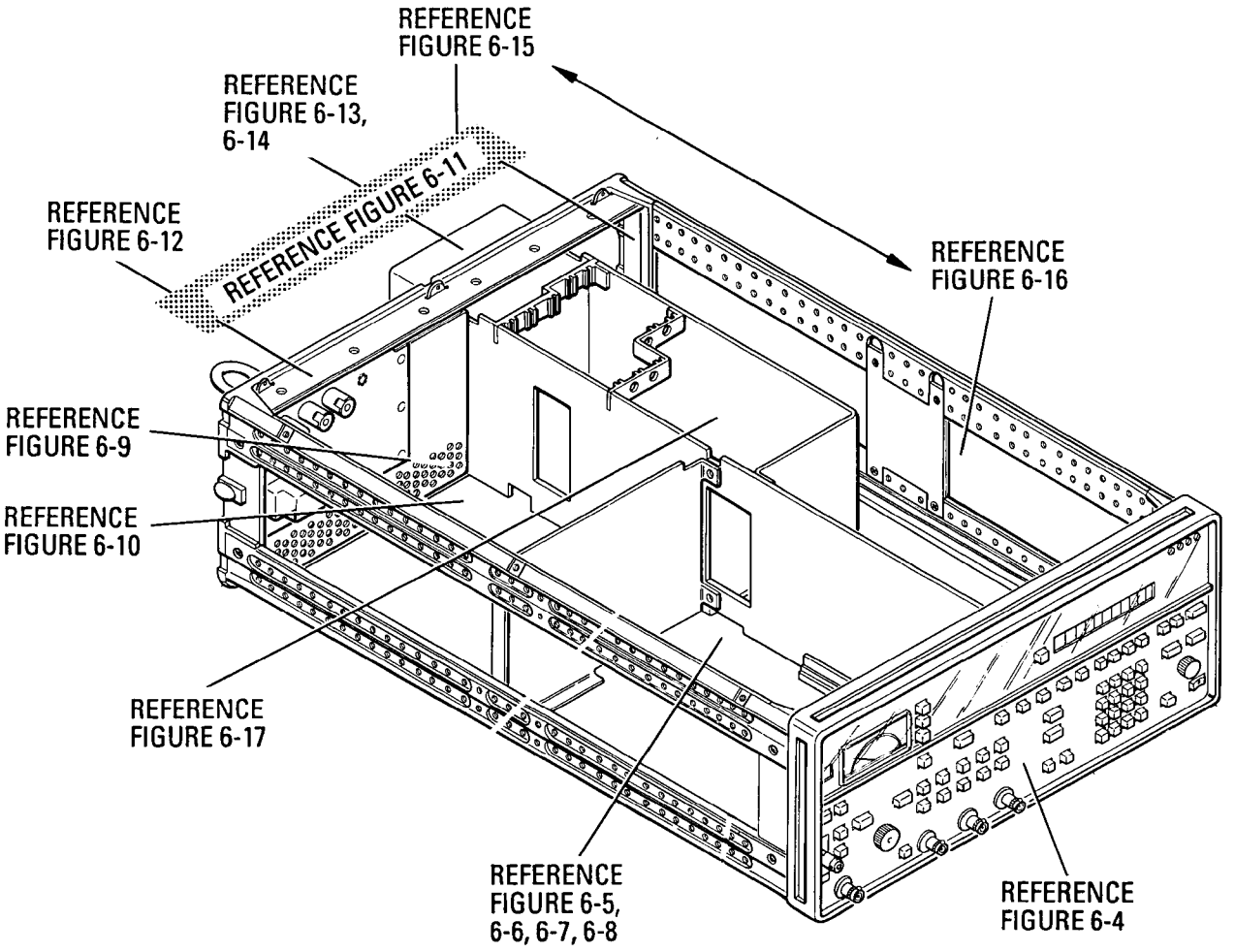


Figure 6-3. Overall Illustrated Parts Breakdown

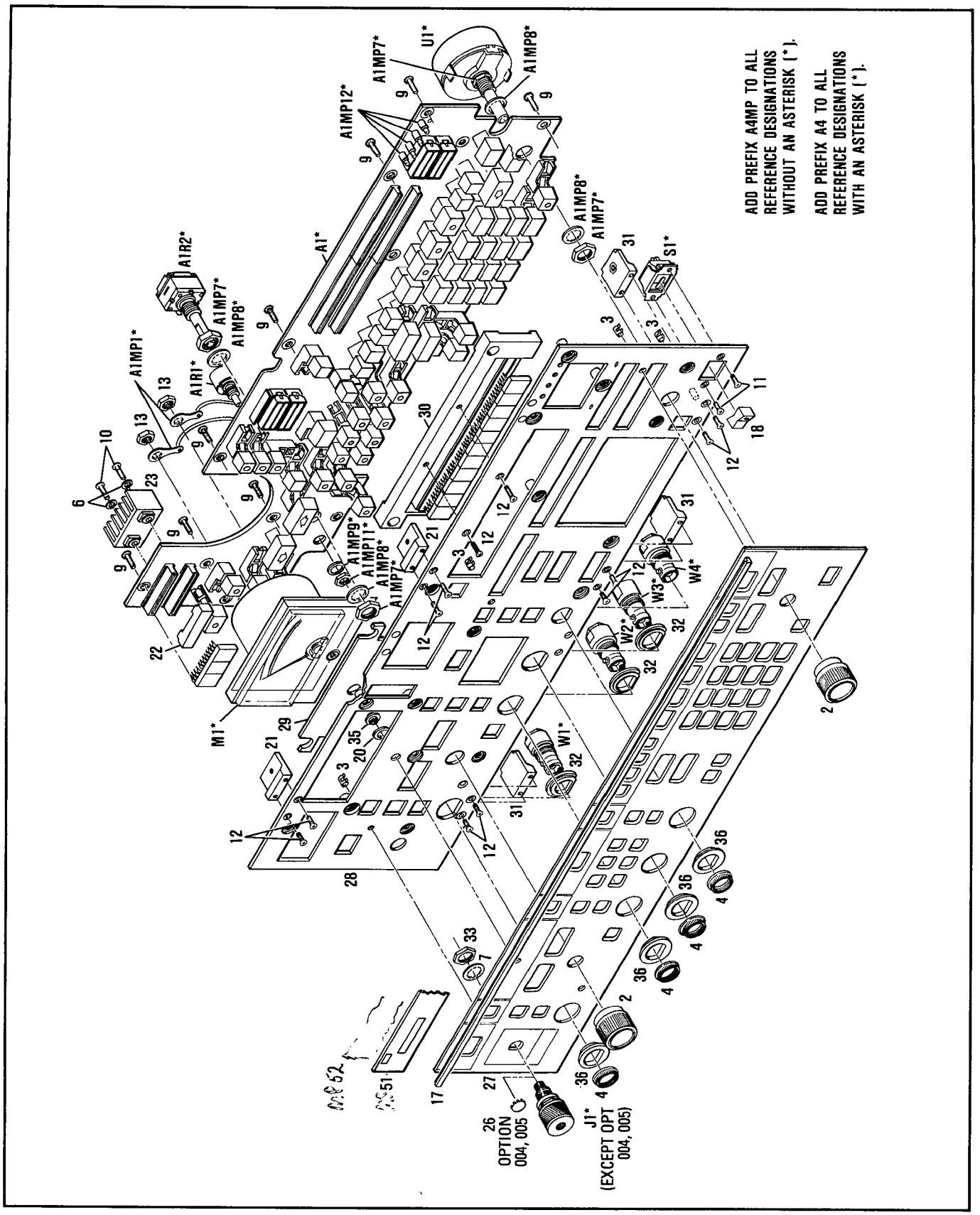


Figure 6-4. A4 Front Panel Illustrated Parts Breakdown

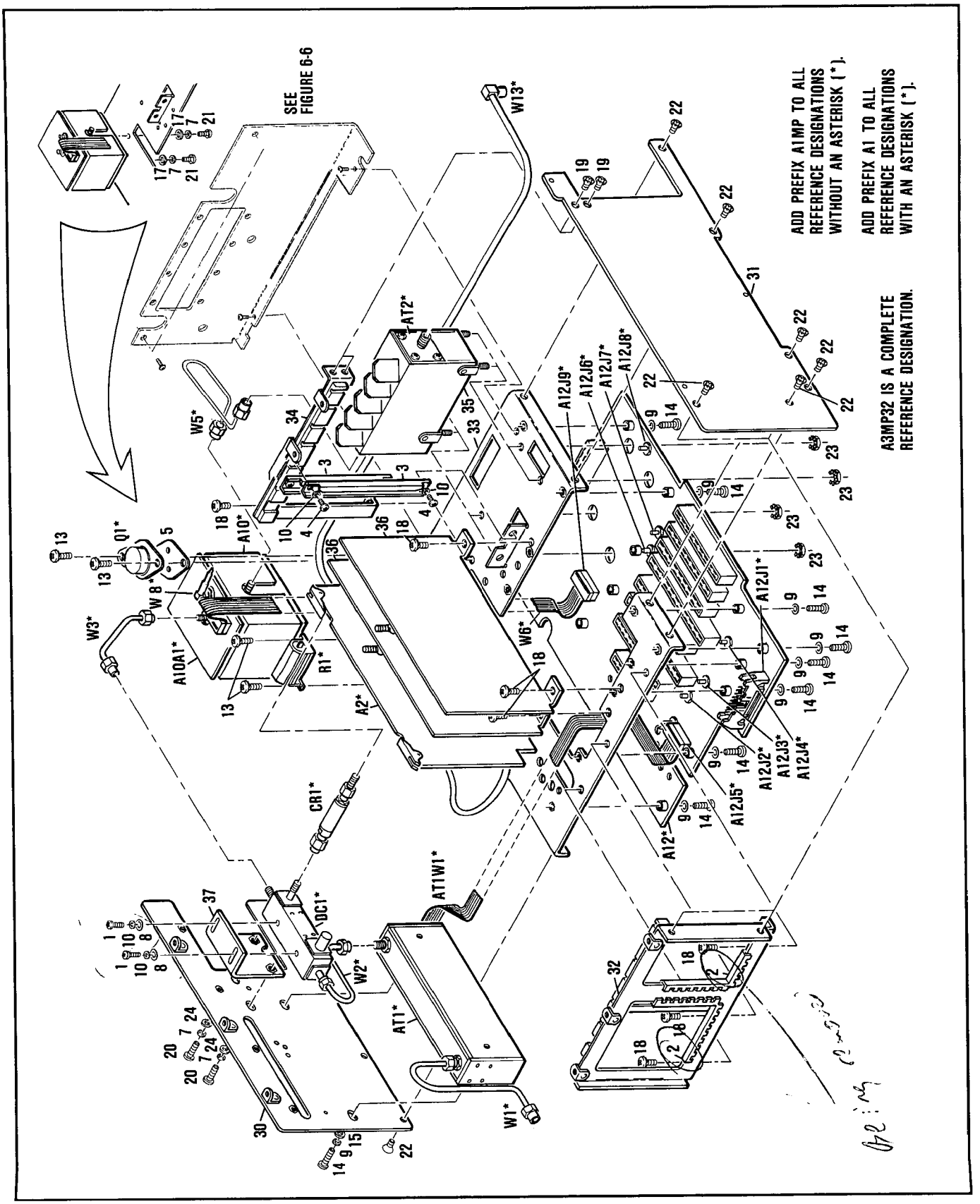


Figure 6-5. P/O A1 RF Output Illustrated Parts Breakdown

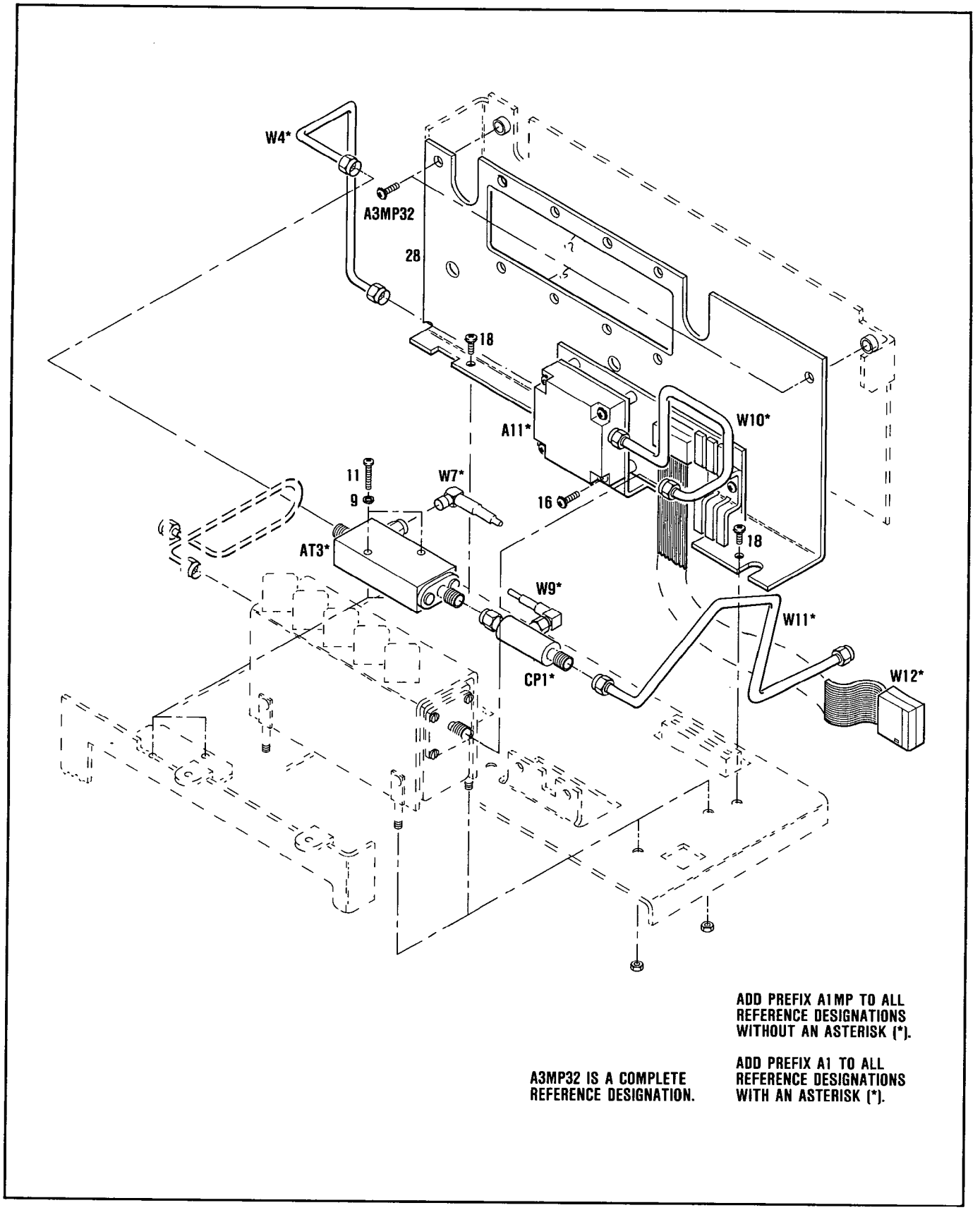


Figure 6-6. P/O A1 Microwave Signal Path Illustrated Parts Breakdown

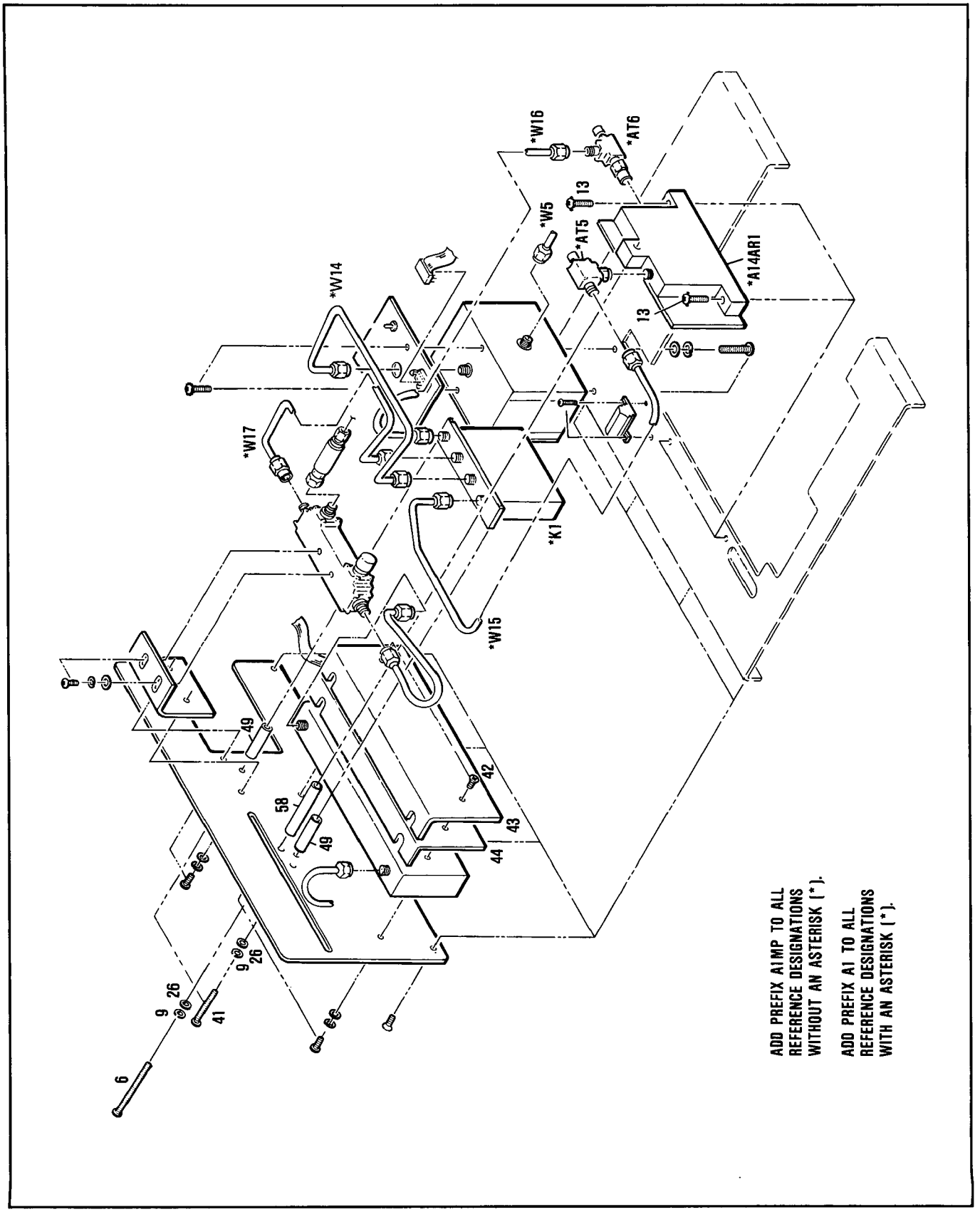


Figure 6-7. Option 008 Illustrated Parts Breakdown (2918A and Below)

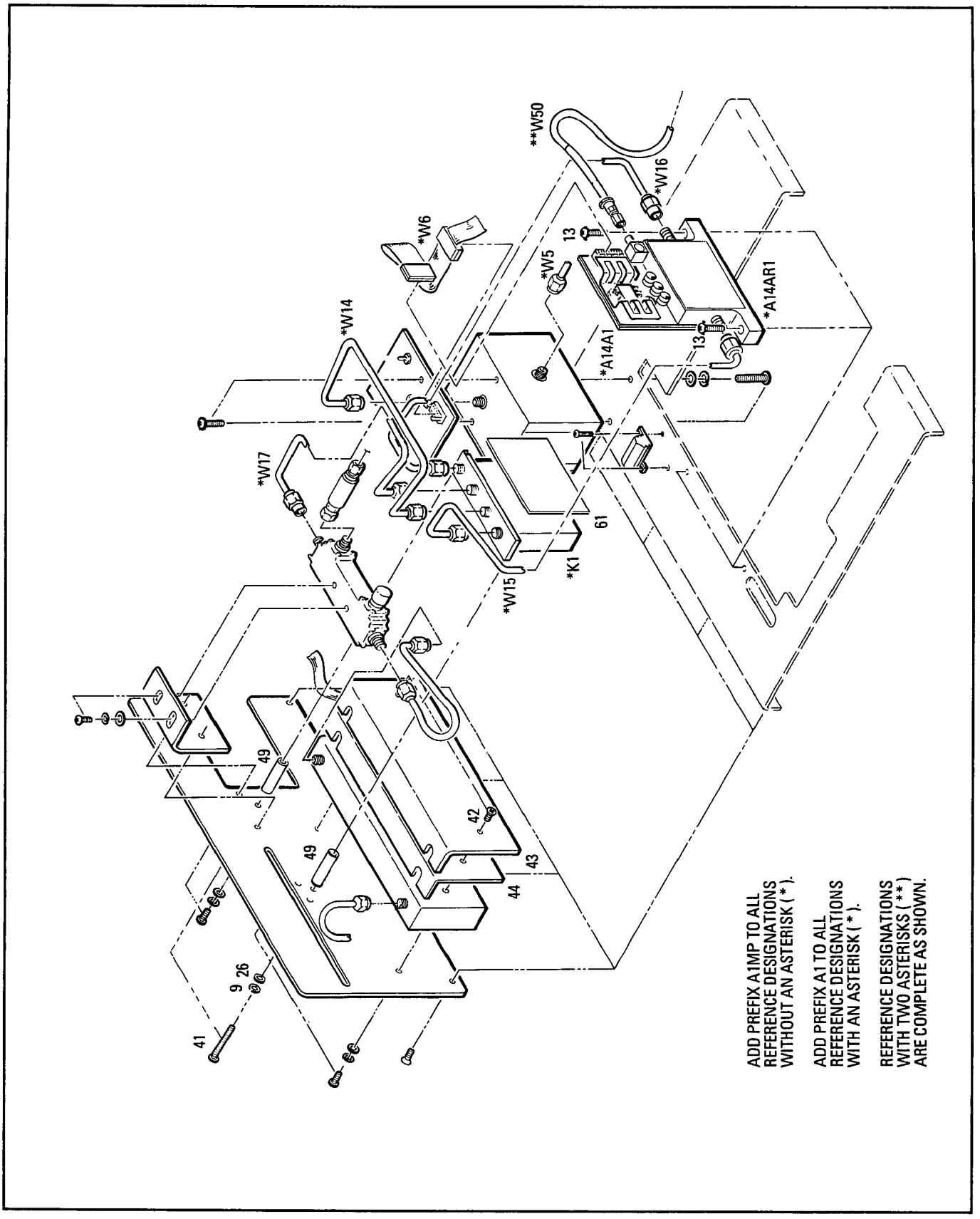


Figure 6-8. Option 008 Illustrated Parts Breakdown (2930A and Above)

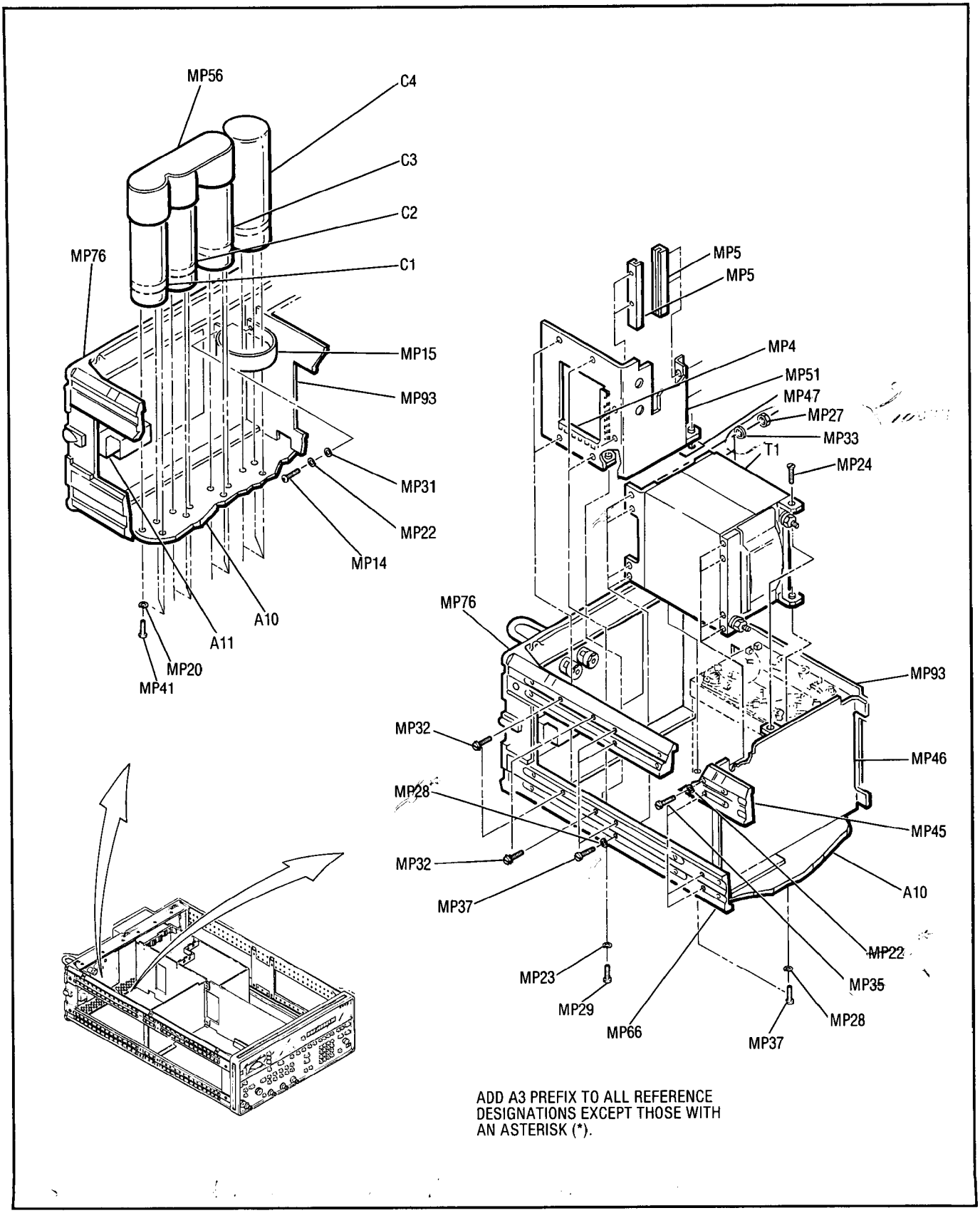


Figure 6-9. A3 Power Supply and RF Source Illustrated Parts Breakdown

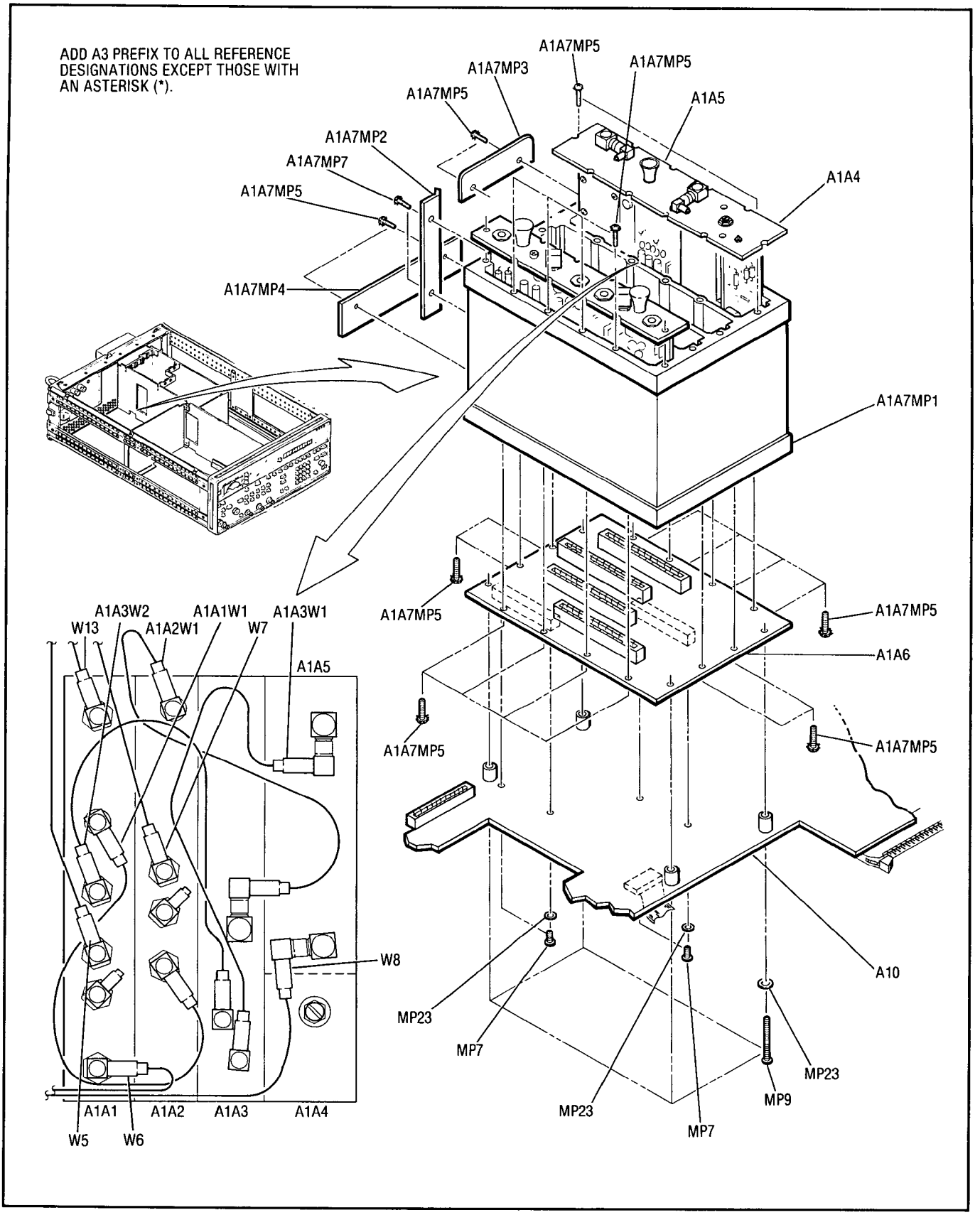
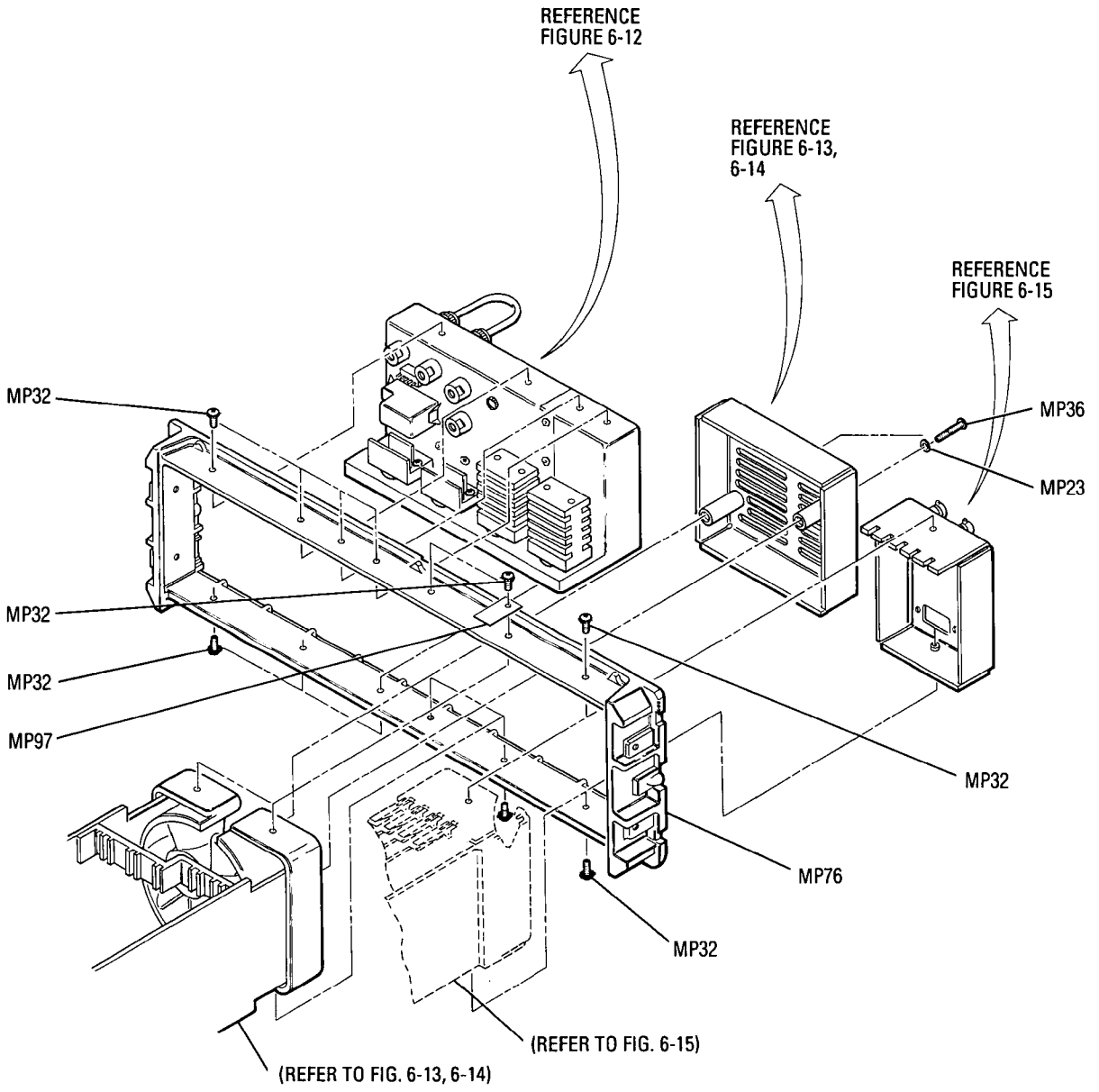


Figure 6-10. A3 RF Source Illustrated Parts Breakdown



ADD A3 PREFIX TO ALL REFERENCE DESIGNATIONS EXCEPT THOSE WITH AN ASTERISK (*).

Figure 6-11. A3 Rear Panel Illustrated Parts Breakdown

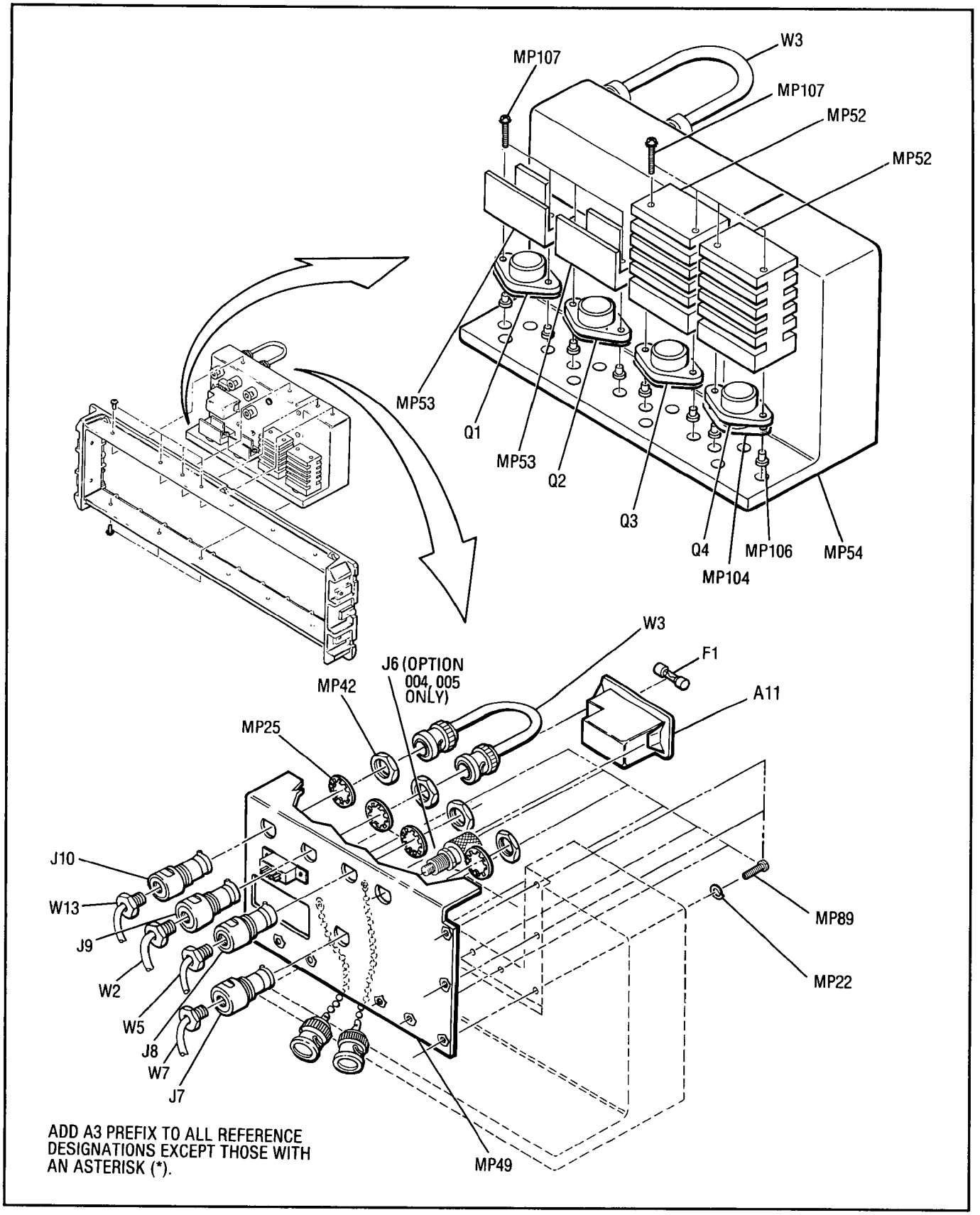


Figure 6-12. A3 Power Supply and Rear Panel Illustrated Parts Breakdown

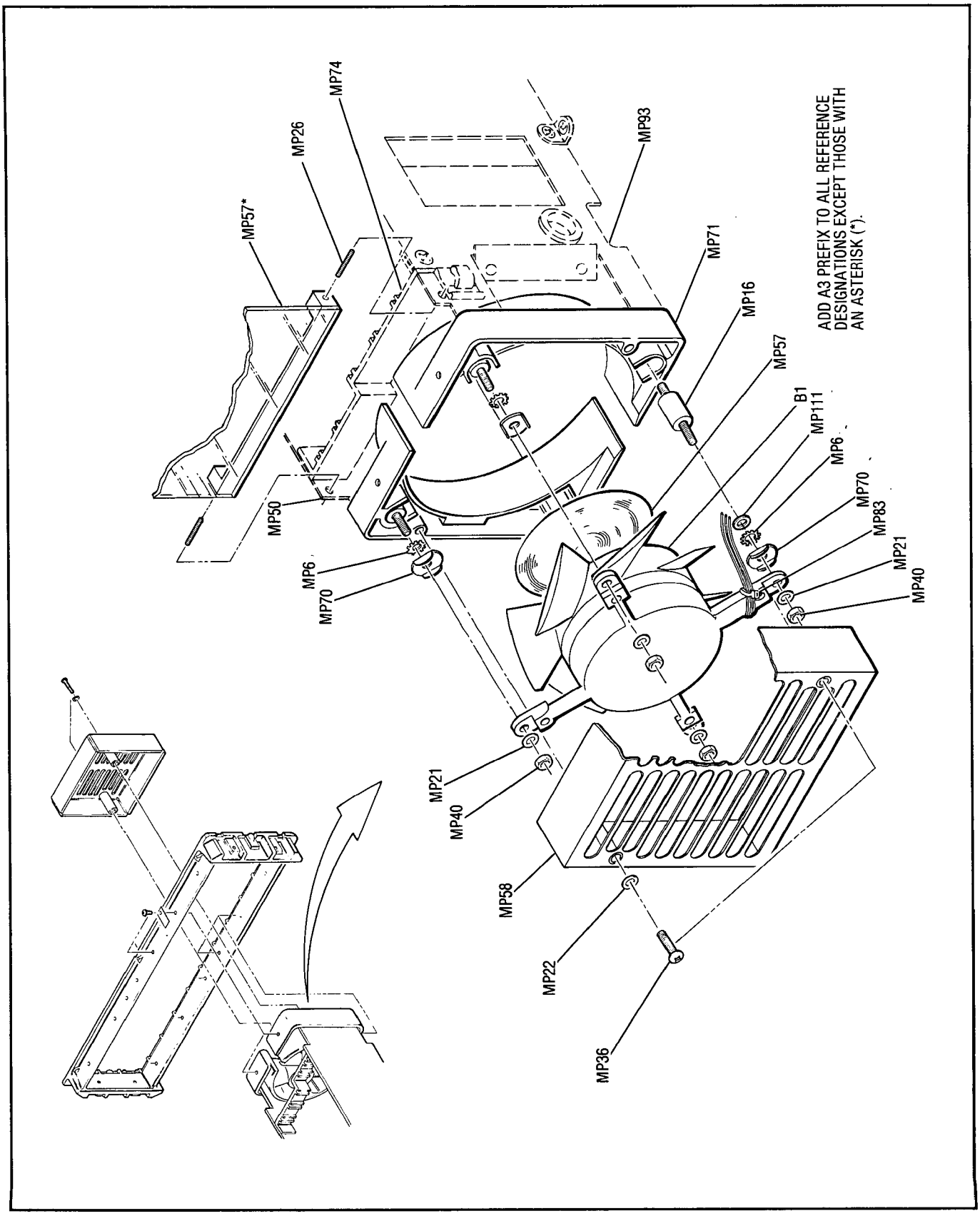


Figure 6-13. A3 Fan Assembly Illustrated Parts Breakdown (2918A and Below)

Add Option 003 (400 Hz)

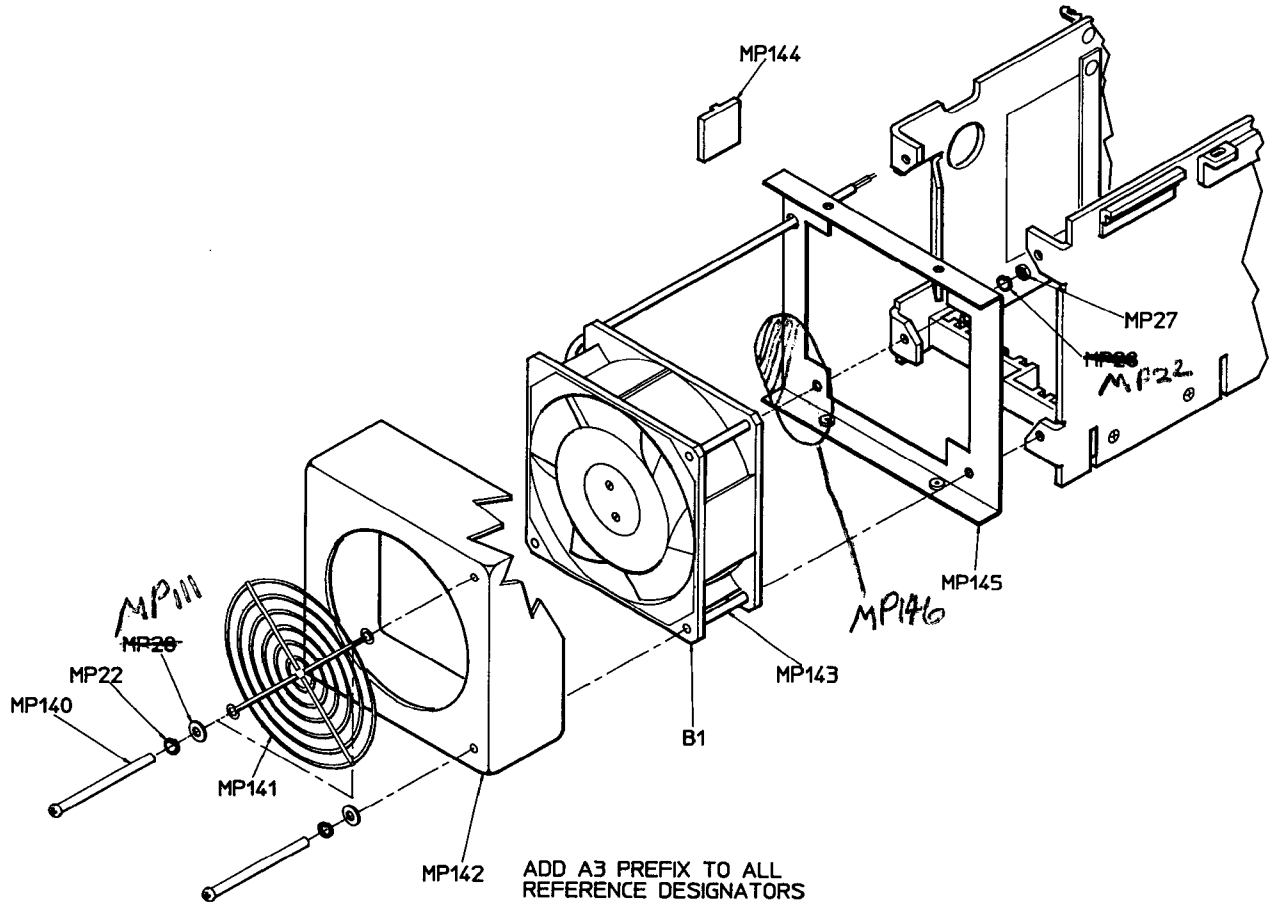


Figure 6-14. A3 Fan Assembly Illustrated Parts Breakdown (2938A and Above)

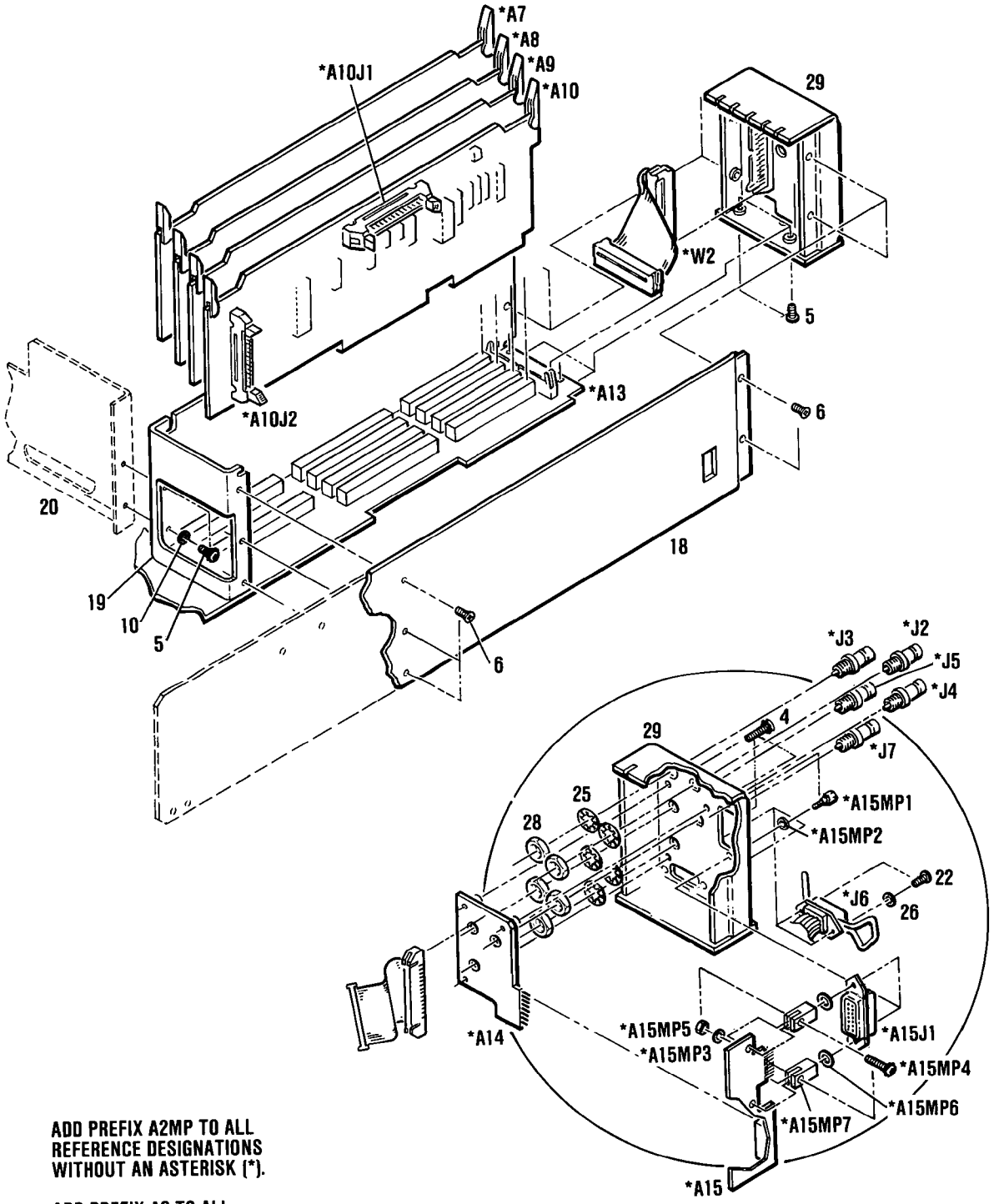


Figure 6-15. P/O A2 Controller Assembly Illustrated Parts Breakdown

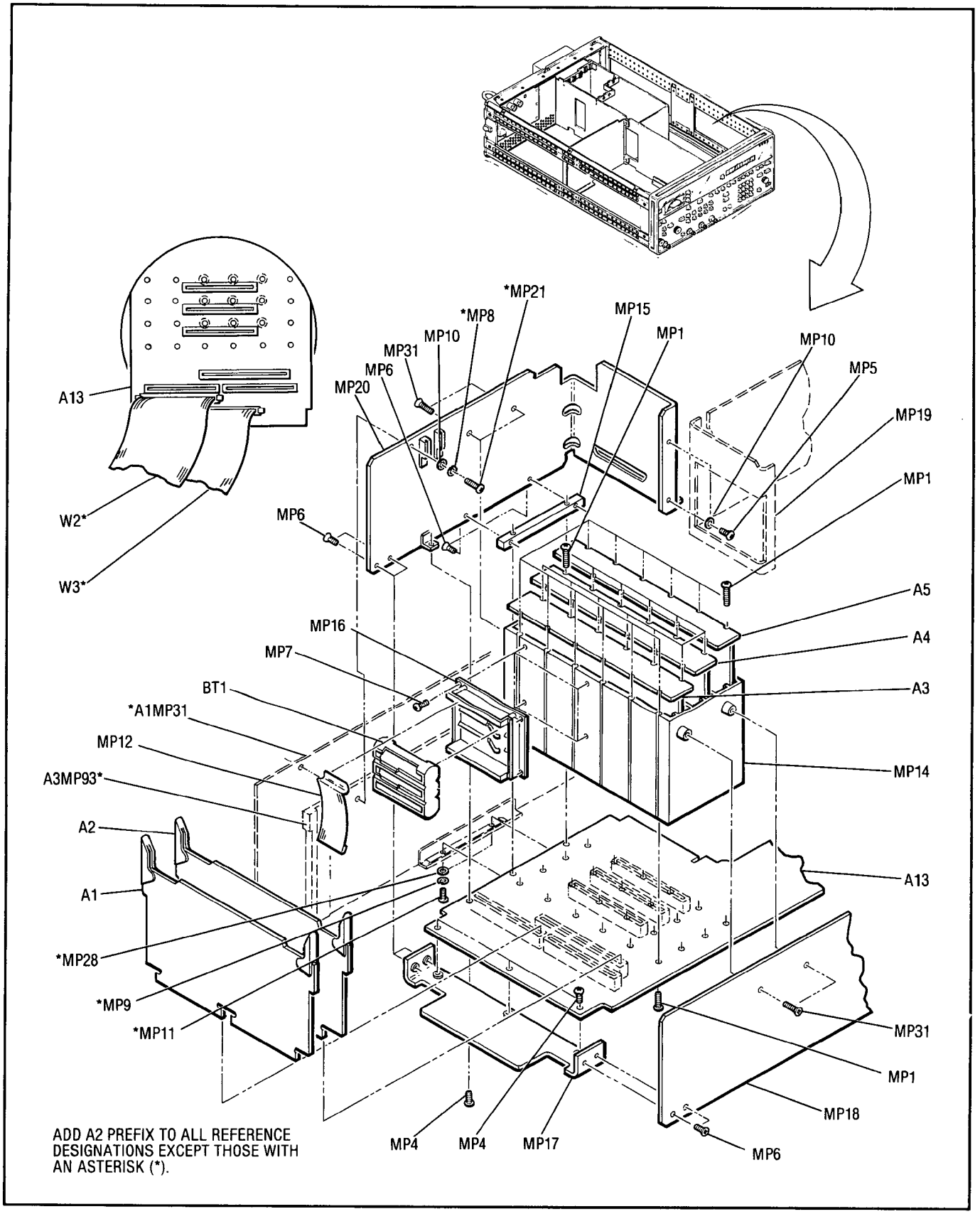


Figure 6-16. P/O A2 Controller Assembly and Rear Panel Illustrated Parts Breakdown

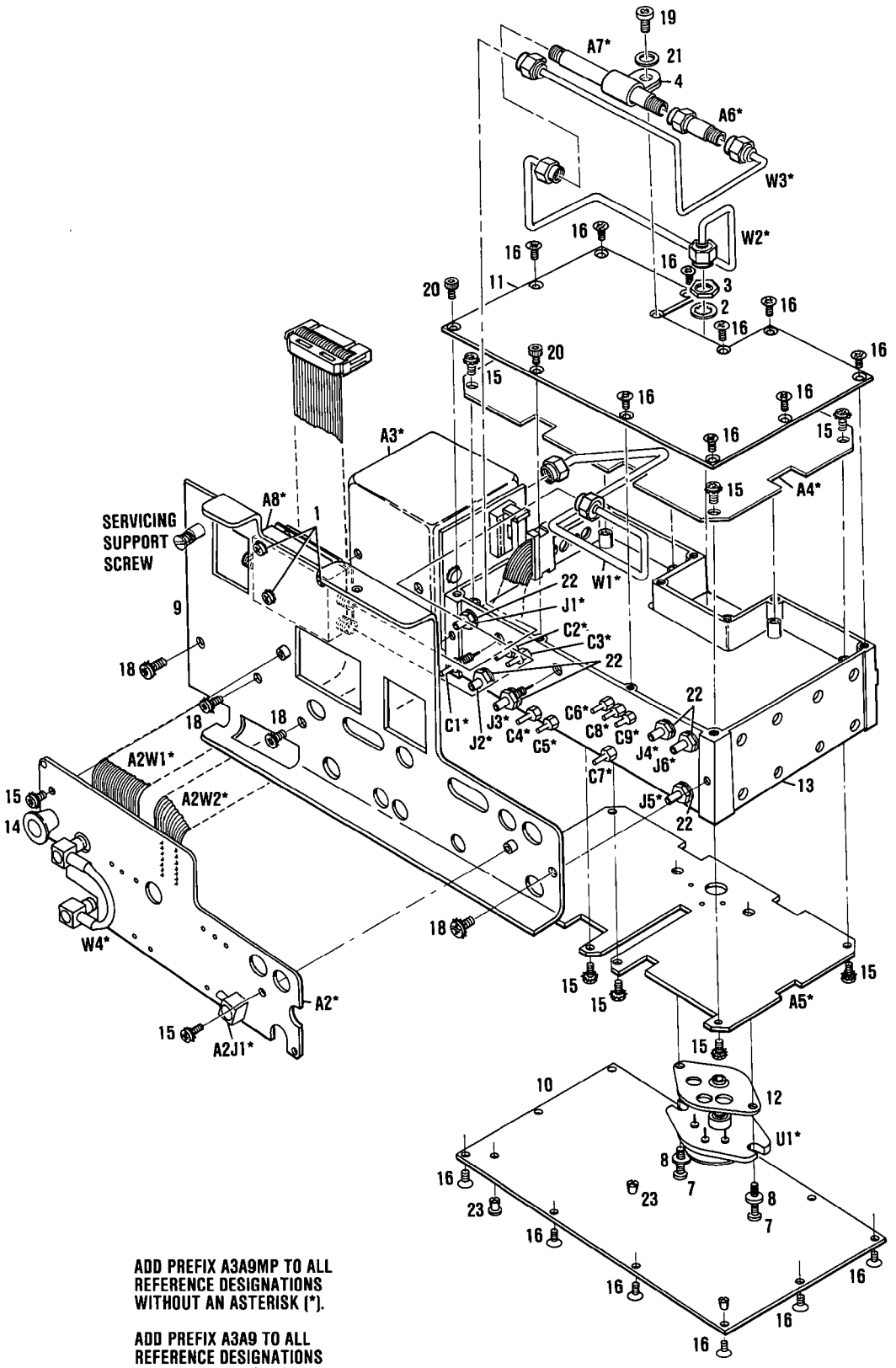


Figure 6-17. A3A9 YTO Loop Assembly Illustrated Parts Breakdown

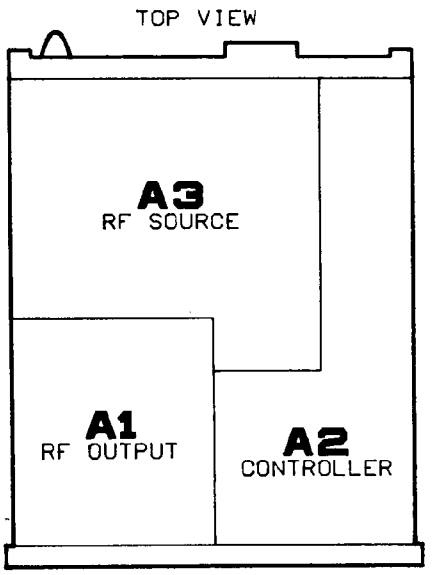
7

Manual Changes

7-1. General Information

Chapter 7 is not applicable to this manual.

Index To Service Sheets by Assembly



MAJOR ASSEMBLIES

Assembly	Description	Service Sheet
A1A1	Attenuator Driver Board	18
A1A2	Detector/ALC Board	14,17
A1A3	Function Board	20
A1A4	Pulse Driver Board	15
A1A5	DAC and Enable Board	22
A1A6	Meter Board	21
A1A7	YTM Driver Board	16
A1A8	SRD Bias Board	19
A1A9	Not Assigned	
A1A10	Yig-Tuned Multiplier	16
A1A10A1	YIG Heater Control	16
A1A11	Power Amplifier	16
A1A12	RF Output Motherboard	14–16, 18–22, 30,31
A1A13	Not Assigned	
A1A14	26 GHz Amplifier	17
A1A14A1	26 GHz Amp Bias Board	17
A2A1	Panel Driver Board	25
A2A2	Key Code Board	24
A2A3	160–240 MHz VCO	8
A2A4	20/30 MHz Phase Detector	7
A2A5	20/30 MHz Divider	6
A2A6	Not Assigned	
A2A7	I/O Board	30,31
A2A8	Microprocessor Board	26
A2A9	Frequency/HP-IB Board	29
A2A10	Memory/Interface	28
A2A11	Not Assigned	
A2A12	Not Assigned	
A2A13	Controller Motherboard	6–8,10, 20–32
A2A14	Rear Interconnect Board	24,29,31
A2A15	HP-IB Connector Board	29
A3A1	Reference and M/N	
A3A1A1	Reference Phase Detector	1
A3A1A2	100 MHz VCXO	2
A3A1A3	M/N Phase Detector	3
A3A1A4	M/N VCO	4
A3A1A4A1	VCO Resonator	4
A3A1A4A2	VCO Board	4
A3A1A5	M/N Output	5
A3A1A6	M/N Reference Motherboard	1–3,5
A3A1A7	Reference and M/N Housing	
A3A2	Not Assigned	
A3A3	Positive Regulator	34
A3A4	Negative Regulator	35
A3A5	DAC	9
A3A6	YTO Driver	10
A3A7	YTO/FM Coil Driver	13
A3A8	10 MHz Reference Oscillator	1
A3A9	YTO Loop	11,12
A3A9A1	Not Assigned	
A3A9A2	YTO Interconnect	11–13
A3A9A3	2.0–6.6 GHz YTO	13
A3A9A4	YTO Phase Detector	12
A3A9A5	Sampler	11
A3A9A6	Attenuator	13
A3A9A7	6.6 GHz Low Pass Filter	13
A3A9A8	Preamplifier	13
A3A10	RF Source Motherboard	1,3,4, 6,10,12–14,21–23,26, 29–31,33–35
A3A11	Line Module	33
A3A12	Rectifier Assembly	33
A4A1	Front Panel Board	20,22, 23,25,32

8

Service

8-1. Introduction

This chapter contains information for troubleshooting and repairing the Signal Generator. Included are block diagrams, schematic diagrams, principles of operation, and procedures for troubleshooting, repair, disassembly, and reassembly. The block diagrams and schematics are on foldout pages, and the symbols used in them are summarized in table 8-1.

8-2. Failure Modes and Service Strategy

8-3. General

Instrument problems usually fall into four general categories: turn-on errors, operator errors, instrument performance out of specification, and catastrophic failures. The troubleshooting strategy is different for each category.

8-4. Turn-on Errors

An error message displayed on the front panel when the Signal Generator is turned on indicates that the built-in diagnostic routine has detected some problem. Turn the instrument off and on again. If the error repeats, do one of the following:

a. Press Recall 0. If operation seems to be normal, the instrument may be useable with limited functions.

b. Go to service sheet BD1 to begin troubleshooting.

8-5. Operator Errors

Apparent failures often result from operator errors and may take one of three forms: invalid entry (message codes 01—09), "soft errors" that result from incorrect combinations of sweep entries (message codes 10—16), and HP-IB errors (message codes 20—24). Refer to table 3-8 for additional information on these errors.

8-6. Instrument Performance Out of Specification

Two levels of testing can be performed to verify that the instrument is operating normally and within specification. The first level of testing is the "Abbreviated Performance Tests" in chapter 4, part 1 of the operating manual. These tests involve the least amount of time and can reveal much about overall operation. For a complete test, perform the full "Performance Tests" in chapter 4, part 2. The specifications are listed in table 1-1.

If a parameter is only slightly out of limits, it can often be brought into specification by an adjustment. The procedures

for all adjustments are in chapter 5. A cross-reference table for performance tests and adjustment procedures is also included. If the adjustment fails to bring the parameter into specification, use the troubleshooting procedures starting on service sheet BD1.

8-7. Catastrophic Failures

When a catastrophic failure occurs, begin troubleshooting on service sheet BD1. The information there is used to quickly isolate the problem to one of the major functional sections of the instrument. Troubleshooting catastrophic failures in the Signal Generator is structured into three levels:

a. The overall troubleshooting level, where problems are isolated to the power supply or one of the functional sections. This level of troubleshooting is supported by service sheet BD1, which includes diagrams, theory of operation, and troubleshooting information.

b. The functional level of troubleshooting isolates the malfunction to a circuit or circuit board. This level of troubleshooting is supported by service sheets BD2 through BD9, which include diagrams, theory of operation, and troubleshooting information.

c. Circuit level troubleshooting isolates the problem to a stage within the circuits shown on the schematic. This level of troubleshooting is supported by service sheets 1-35, which include circuit level block diagrams, schematics, theory of operation, and troubleshooting information. It is expected that further troubleshooting, to the component level, depends on the skill and experience of the troubleshooter.

8-8. Service Sheets

The foldout pages in the last part of this chapter are the service sheets. They consist of block diagrams, circuit schematic diagrams, supplemental diagrams, troubleshooting information, and internal views.

Table 8-1. Schematic Diagram Notes (1 of 8)

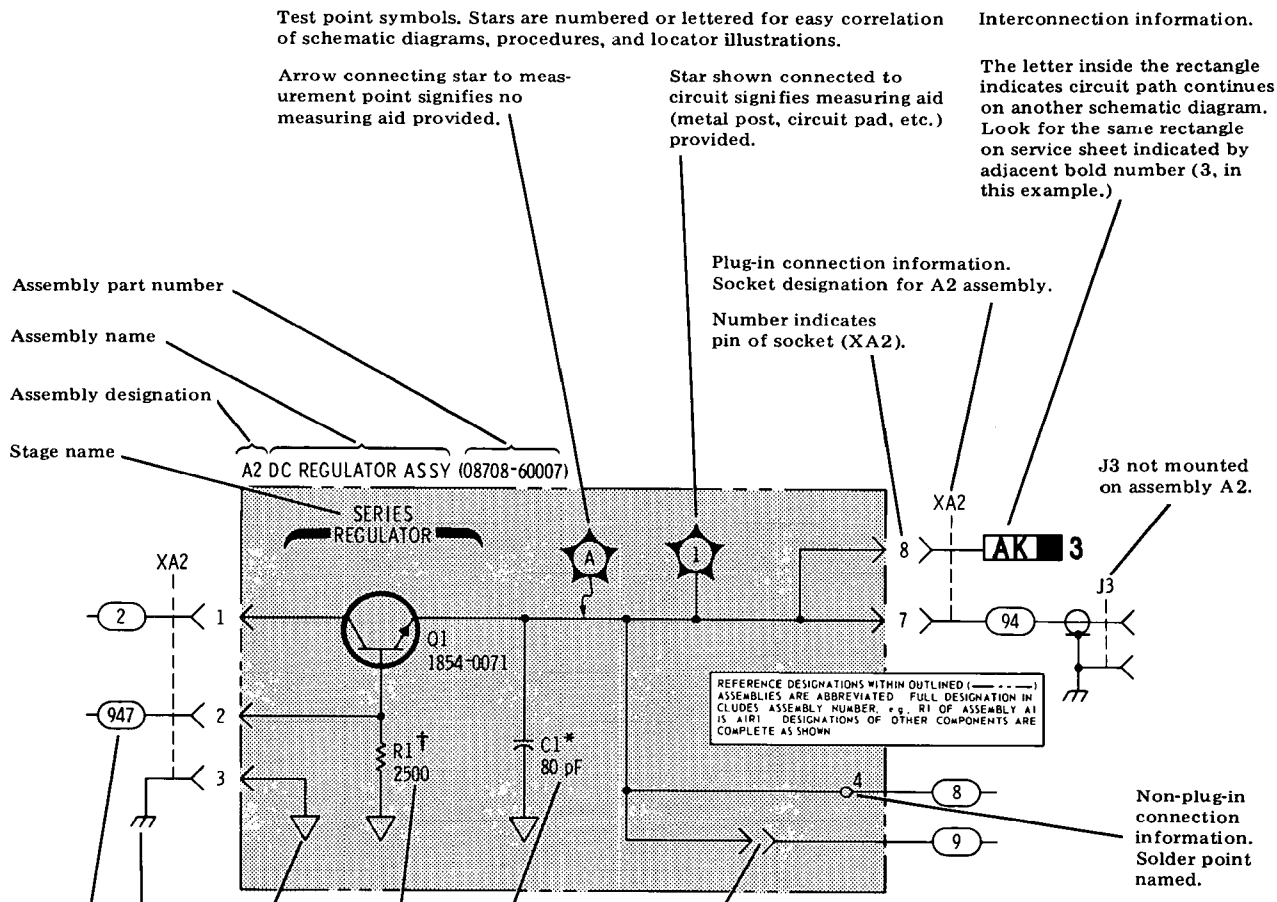


Table 8-1. Schematic Diagram Notes (2 of 8)

SCHEMATIC DIAGRAM NOTES

* Asterisk denotes a factory-selected value. Value shown is typical.

† Dagger indicates circuit change. See Section VII.

Tool-aided adjustment. ○ Manual control.

Encloses front-panel designation.

Encloses rear-panel designation.

Circuit assembly borderline.

Other assembly borderline.

Heavy line with arrows indicates path and direction of main signal.

Heavy dashed line with arrows indicates path and direction of main feedback.

Indicates stripline (i.e., RF transmission line above ground).



Wiper moves toward cw with clockwise rotation of control (as viewed from shaft or knob).



Numbered Test Point
measurement aid provided.

Encloses wire or cable color code. Code used is the same as the resistor color code. First number identifies the base color, second number identifies the wider stripe, and the third number identifies the narrower stripe, e.g., denotes white base, yellow wide stripe, violet narrow stripe.

A direct conducting connection to earth, or a conducting connection to a structure that has a similar function (e.g., the frame of an air, sea, or land vehicle).

A conducting connection to a chassis or frame.

Common connections. All like-designation points are connected.



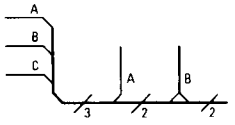
Letters = off-page connection, e.g., AK
Number = Service Sheet number for off-page connection, e.g., 12



Number (only) = on-page connection.

Table 8-1. Schematic Diagram Notes (3 of 8)

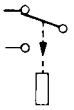
SCHEMATIC DIAGRAM NOTES



Indicates multiple paths represented by only one line. Letters or names identify individual paths. Numbers indicate number of paths represented by the line.



Coaxial or shielded cable.



Relay. Contact moves in direction of arrow when energized.



Indicates a pushbutton switch with a momentary (ON) position.



Indicates a PIN diode.



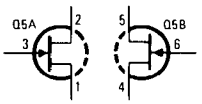
Indicates a current regulation diode.



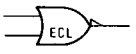
Indicates a voltage regulation diode.



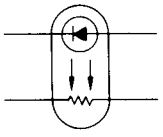
Indicates a Schottky (hot-carrier) diode.



Multiple transistors in a single package—physical location of the pins is shown in package outline on schematic.



Identification of logic families as shown (in this case, ECL).

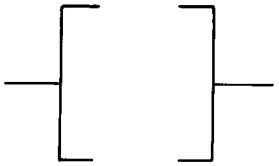


Indicates an opto-isolator of a LED and a photoresistor packaged together. The resistance of the photoresistor is a function of the current flowing through the LED.

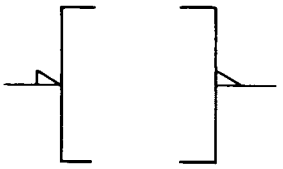
Table 8-1. Schematic Diagram Notes (4 of 8)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

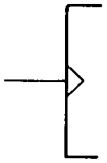
Input and Output Indicators



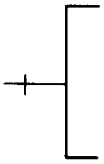
Implied Indicator—Absence of polarity indicator (see below) implies that the active state is a relative high voltage level. Absence of negation indicator (see below) implies that the active state is a relative high voltage level at the input or output.



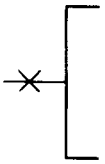
Polarity Indicator—The active state is a relatively low voltage level.



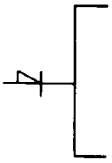
Dynamic Indicator—The active state is a transition from a relative low to a relative high voltage level.



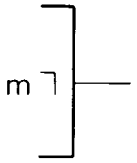
Inhibit Input—Input that, when active, inhibits (blocks) the active state outputs of a digital device.



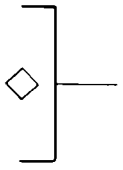
Analog Input—Input that is a continuous signal function (e.g., a sine wave).



Polarity Indicator used with Inhibit Indicator—Indicates that the relatively low level signal inhibits (blocks) the active state outputs of a digital device.



Output Delay—Binary output changes state only after the referenced input (m) returns to its inactive state (m should be replaced by appropriate dependency or function symbols).



Open Collector Output—Output that must form part of a distributed connection.

Table 8-1. Schematic Diagram Notes (5 of 8)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Input and Output Indicators (Cont'd)

3-STATE	Three-state Output—Indicates outputs that can have a high impedance (disconnect) state in addition to the normal binary logic states.

Combinational Logic Symbols and Functions

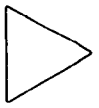
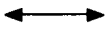
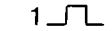
&	AND—All inputs must be active for the output to be active.
≥1	OR—One or more inputs being active will cause the output to be active.
≥m	Logic Threshold—m or more inputs being active will cause the output to be active (replace m with a number).
=1	EXCLUSIVE OR—Output will be active when one (and only one) input is active.
=m	m and only m—Output will be active when m (and only m) inputs are active (replace m with a number).
=	Logic Identity—Output will be active only when all or none of the inputs are active (i.e., when all inputs are identical, output will be active).
	Amplifier—The output will be active only when the input is active (can be used with polarity or logic indicator at input or output to signify inversion).
X/Y	Signal Level Converter—Input level(s) are different than output level(s).
	Bilateral Switch—Binary controlled switch which acts as an on/off switch to analog or binary signals flowing in both directions. Dependency notation should be used to indicate affecting/affected inputs and outputs. Note: amplifier symbol (with dependency notation) should be read to indicate unilateral switching.
X→Y	Coder—Input code (X) is converted to output code (Y) per weighted values or a table.
(Functional Labels)	The following labels are to be used as necessary to ensure rapid identification of device function.
MUX	Multiplexer—The output is dependent only on the selected input.
DEMUX	Demultiplexer—Only the selected output is a function of the input.
CPU	Central Processing Unit
PIO	Peripheral Input/Output
SMI	Static Memory Interface

Table 8-1. Schematic Diagram Notes (6 of 8)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Sequential Logic Functions

1 	Monostable—Single shot multivibrator. Output becomes active when the input becomes active. Output remains active (even if the input becomes inactive) for a period of time that is characteristic of the device and/or circuit.
G 	Oscillator—The output is a uniform repetitive signal which alternates between the high and low state values. If an input is shown, then the output will be active if and only if the input is in the active state.
FF	Flip-Flop—Binary element with two stable states, set and reset. When the flip-flop is set, its outputs will be in their active states. When the flip-flop is reset, its outputs will be in their inactive states.
T	Toggle Input—When active, causes the flip-flop to change states.
S	Set Input—When active, causes the flip-flop to set.
R	Reset Input—When active, causes the flip-flop to reset.
J	J Input—Analogous to set input.
K	K Input—Analogous to reset input.
D	Data Input—Always enabled by another input (generally a C input—see Dependency Notation). When the D input is dependency-enabled, a high level at D will set the flip-flop; a low level will reset the flip-flop. Note: strictly speaking, D inputs have no active or inactive states—they are just enabled or disabled.
m	Count-Up Input—When active, increments the contents (count) of a counter by "m" counts (m is replaced with a number).
−m	Count-Down Input—When active, decrements the contents (count) of a counter by "m" counts (m is replaced with a number).
→m	Shift Right (Down) Input—When active, causes the contents of a shift register to shift to the right or down "m" places (m is replaced with a number).
← m	Shift Left (Up) Input—When active, causes the contents of a shift register to shift to the left or up "m" places (m is replaced with a number).

NOTE

For the four functions shown above, if m is one, it is omitted.

(Functional Labels)	The following functional labels are to be used as necessary in symbol build-ups to ensure rapid identification of device function.

Table 8-1. Schematic Diagram Notes (7 of 8)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Sequential Logic Functions (Cont'd)

mCNTR	Counter—Array of flip-flops connected to form a counter with modulus m (m is replaced with a number that indicates the number of states: 5 CNTR, 10 CNTR, etc.).
REG	Register—Array of unconnected flip-flops that form a simple register or latch.
SREG	Shift Register—Array of flip-flops that form a register with internal connections that permit shifting the contents from flip-flop to flip-flop.
ROM	Read Only Memory—Addressable memory with read-out capability only.
RAM	Random Access Memory—Addressable memory with read-in and read-out capability.

Dependency Notation

mAm	Address Dependency—Binary affecting inputs of affected outputs. The m prefix is replaced with a number that differentiates between several address inputs, indicates dependency, or indicates demultiplexing and multiplexing of address inputs and outputs. The m suffix indicates the number of cells that can be addressed.
Gm	Gate (AND) Dependency—Binary affecting input with an AND relationship to those inputs or outputs labeled with the same identifier. The m is replaced with a number or letter (the identifier).
Cm	Control Dependency—Binary affecting input used where more than a simple AND relationship exists between the C input and the affected inputs and outputs (used only with D-type flip-flops).
Vm	OR Dependency—Binary affecting input with an OR relationship to those inputs or outputs labeled with the same identifier. The m is replaced with a number or the letter (the identifier).
Fm	Free Dependency—Binary affecting input acting as a connect switch when active and a disconnect when inactive. Used to control the 3-state behavior of a 3-state device.

NOTE

The identifier (m) is omitted if it is one—that is, when there is only one dependency relationship of that kind in a particular device. When this is done, the dependency indicator itself (G, C, F, or V) is used to prefix or suffix the affected (dependent) input or output.

Table 8-1. Schematic Diagram Notes (8 of 8)

DIGITAL SYMBOLOGY REFERENCE INFORMATION

Miscellaneous



Schmitt Trigger — Input characterized by hysteresis; one threshold for positive going signals and a second threshold for negative going signals.

Active

Active State — A binary physical or logical state that corresponds to the true of an input, an output, or a function. The opposite of the inactive state.

Enable

Enabled Condition — A logical state that occurs when dependency conditions are satisfied. Although not explicitly stated in the definitions listed above, functions are assumed to be enabled when their behavior is described. A convenient way to think of it as follows:

A function becomes active when:

- it is enabled (dependency conditions — if any — are satisfied)
- and its external stimulus (e.g., voltage level) enters the active state.

8-9. Manual Updates

Production changes to the instrument made after the publication date of this manual are indicated by a change in the serial number prefix. *Manual Updates* provide information for these new instruments.

Keep this manual up to date by periodically requesting the latest *Manual Update* from your Hewlett-Packard office.

8-10. Safety Considerations

8-11. Before Applying Power

Verify that the instrument is set to match the available line voltage and that the correct fuse is installed. An uninterrupted safety earth ground must be provided from the main power source to the instrument input wiring terminals, power cable, or supplied power cable set.

8-12. Warnings and Cautions

Pay attention to WARNINGS and CAUTIONS. They must be followed for your protection and to avoid damage to the equipment.

Warning



Maintenance described herein is performed with power supplied to the instrument and with protective covers removed. Such maintenance should be performed only by service-trained personnel who are aware of the hazards involved (for example, fire and electrical shock). Where maintenance can be performed without power supplied, the power should be removed.

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection.) In addition, verify that a common ground exists between this instrument and any other equipment used in conjunction with it prior to energizing any of the units.

Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an autotransformer (for voltage reduction) make sure that the common terminal is connected to neutral (that is, the grounded side of the mains supply).

Servicing instructions are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing unless qualified to do so.

Warning (cont'd)



Adjustments described in the manual are performed with power supplied to the instrument while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.

For continued protection against fire hazard, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example normal blow, time delay, etc.). Do not use repaired fuses or short circuited fuseholders.

Caution



Do not disconnect or remove any boards in the Signal Generator unless the instrument is unplugged. Some boards contain devices that can be damaged if the board is removed when the power is on. Several components, including MOS devices, can be damaged by electrostatic dischage. Use conductive foam and grounding straps when servicing is required on sensitive components. Use care when unplugging ICs from high-grip sockets.

8-13. After Service Safety Checks

Visually inspect interior of instrument for any signs of abnormal internally generated heat, such as discolored printed circuit boards or components, damaged insulation, or evidence of arcing. Determine and remedy the cause of any such condition.

Using a suitable ohmmeter, check resistance from instrument enclosure to ground pin on power cable plug. The reading must be less than one ohm. Flex the power cable while making this measurement to determine whether intermittent discontinuities exist.

Check any indicated front or rear panel ground terminals that are marked, using the above procedures.

Check resistance from instrument enclosure to line and neutral (tied together) with the power switch on and the power source disconnected. The minimum acceptable resistance is two megohms. Replace any component that results in a failure.

Check line fuse to verify that a correctly rated fuse is installed.

8-14. Recommended Test Equipment

Test equipment and accessories required to maintain the Signal Generator are listed in table 1-3, "Recommended Test Equipment". Equipment other than that listed may be used if it meets the critical specifications listed in the table.

8-15. Service Tools, Aids, and Information

8-16. Service Accessories

The following parts are available for servicing and maintaining the Signal Generator. The HP 11726A Support Kit contains most of these parts.

HP Part No.	Description
11726-10002	Adjustment Cassette
11726-60001	MPU Test connector
11726-60002	Super Extender 1 Test Board
11726-60003	Super Extender 2 Test Board (Checks M/N numbers and YTO center frequency.)
11726-60004	Super Extender 3 Test Board
08673-60123	Test Connector Board Assembly
5060-0258	24-Pin Extender Board
08672-60117	30-Pin Extender Board
08672-60020	36-Pin Extender Board
5060-0630	44-Pin Extender Board
05342-60035	48-Pin Extender Board
08673-60022	Extender Cable for A2A10
08673-60048	Bias Tee Cable Assembly
11661-60056	50 MHz Cable Assembly
11726-20005	External ALC Cable
11726-20006	Pulse Cable
11726-20007	Pulse Mixer Cable

HP Part No.	Description
8120-1578	50-ohm, 18-inch Cable Assembly
1250-0781	Female BNC-Male BNC-Female BNC Tee Adapter
1250-0827	Male SMC to Male SMC Adapter
1250-1158	Female SMA to Female SMA Adapter
1250-1236	Female BNC to Female SMB Adapter
1250-1237	Female BNC to Male SMB Adapter
1250-1250	Type N Male to Female SMA Adapter (2 required)
1250-1391	Male SMB-Female SMB-Male SMB Tee Adapter
1250-1694	Female SMA to Female SMC Adapter
1250-1749	Female APC-3.5 to Female APC-3.5 Adapter
1250-2189	Adapter
11095A	600-ohm Feedthrough
1250-0207	50-ohm BNC Termination
8830-0024	Alignment Tool

8-17. Service Functions

The Service Functions listed in table 8-2 are used in the adjustment procedures in chapter 5, and in Power-up checks. They can be executed manually or via HP-IB control. Service Functions are activated manually by entering the proper service number from the front panel and then pressing the switch located on the top of the Keycode Board (A2A2). In remote, these functions can be activated by programming a data message with the service number followed by the program code "SV". All service functions can be disabled by pressing RCL 0.

8-18. Signature Analysis

Signature analysis is a simple means of verifying the operation of digital circuitry. When properly used, signature analysis can detect extremely subtle hardware faults. Signatures must identically match those given in the signature tables.

Table 8-2. Service Functions

Service Number	Function
1	Performs a test of the RAM circuit. While the test is being performed, the FREQUENCY MHz display indicates 00. If a display other than 00 is present, that number indicates which part(s) of the RAM failed. Refer to service sheet BD8 for an explanation of the error codes.
2	Performs a checksum test of the microprocessor ROM. Refer to service sheet BD8 for an explanation of the error codes.
3	Disables the YTM AUTO PEAK tuning function and sweeps the YTM over a limited range so the tuning curve can be examined.
4	Disables the YTM AUTO PEAK tuning function and centers the YTM peak tuning DAC.
6	Stores the start and stop frequencies of bands 1, 2, 3, and 4 in storage registers 1 through 4. These frequencies can be recalled by pressing RCL1, RCL2, RCL3 or RCL4. This function can be used when performing individual band tests or adjustments.
7	Tests Pulse Modulation Video Feedthrough.
8	Not used
9	Not used
10	Not used
11	Displays setting of configuration switch A2A7S1 (W1—W7).
12	Performs a front panel LED test. Simultaneously lights all front panel LED's except STANDBY and OVEN COLD.
33	Not used
34	Not used
35	Not used
36	Inhibits YTM peaking.
37	Re-enables peaking.

8-19. Required Service Tools

Pozidriv Screwdrivers

Many screws in the Signal Generator appear to be Phillips type, but are not. To avoid damage to the screw head slots, Pozidriv screwdrivers should be used. HP 8710-0899 is the No. 1 Pozidriv. HP 8710-0900 is the No. 2 Pozidriv.

Tuning Tools

For adjustments requiring non-metalic tuning tools, use the HP 8710-0033 blade tuning tool or the HP 8710-1010 (JFD Model No. 5284) hex tuning tool. For other adjustments an ordinary small screwdriver or suitable tool is sufficient. No matter which tool is used, never force any adjustment control. This is especially critical when adjusting variable inductors or capacitors.

Heat Staking Tools

The front panel pushbutton switches have small plastic posts protruding from the back. These posts fit through holes in the front panel printed circuit board and are melted down to hold the switch in place. This process is known as heat staking. The heat staking tool is a standard soldering iron with a special tip attached.

Refer to the paragraph entitled "Replacement of Key Cap and Pushbutton Switches" under "Repair and Replacement" in this chapter for the heat staking procedure.

8-20. Hardware Characteristics

Caution



The Signal Generator has a mixture of Unified National (inch) and metric screws. The metric screws are defined in Industrial Fasteners publication (IFI 500) and are identified in the replaceable parts list as M(metric). Metric screws have a shiny silver appearance and are used throughout the instrument. The Unified National screws have a dull steel-gray appearance. Do not use a metric screw in a Unified National nut; thread damage will result.

Assembly Locations

Assemblies in the Signal Generator are numbered in groups, both by function and by location. Refer to lettered service sheet(s) for identification of assemblies. In addition, each tab has major assembly location figures. Also, each tab has a table listing the service sheets where each major assembly is found.

Parts and Cable Locations

The location of individual components mounted on printed circuit boards or other assemblies are shown near the schematic diagram. The part reference designator is the assembly designator plus the part designator. For example, A2A3R9 is R9 on the A2A3 assembly. For specific component descriptions and ordering information, refer to table 6-3, "Replaceable Parts", in chapter 6. Chassis and frame parts, as well as mechanical parts (MPs) and cables (W), are identified on illustrated parts breakdowns (IPBs) in chapter 6, or in this chapter on the lettered diagrams.

Test Points and Adjustment Locations

Most test points and adjustments are indicated on circuit board assemblies. Test points and adjustments can also be found on the component locator figure near the assembly's schematic diagram. Test points identified on block diagrams are also shown on the lettered service sheets following the schematic diagram foldouts.

Service Aids on Printed Circuit Boards

Service aids on printed circuit boards include test points, indicator lights, some reference designations, adjustment names, and assembly part numbers.

Other Service Documents

Service Notes, *Manual Updates*, and other service literature are available through Hewlett-Packard. For further information, contact your nearest Hewlett-Packard office.

8-21. Repair and Replacement

8-22. Servicing Procedures

After-Repair Adjustments

After repairs are made, adjustments may be needed to assure optimum performance. Refer to table 5-3, "Post Repair Adjustments" in chapter 5 of this manual to determine what, if any, adjustments are needed after any repair is made.

Top and Bottom Cover Removal

1. Place the instrument with the appropriate cover up.
2. Remove the appropriate rear panel standoffs MP33.
3. Loosen the captive screw securing the cover to the frame.
4. Slide the cover to the rear and remove.
5. For replacement, follow the above steps in the inverse order.

Front Panel Key Cap Replacement

If key cap replacement is necessary, removing the front panel key cap can be done in one of two ways. If the front panel has been removed, as described on the lettered service sheet diagrams, use a small flat blade screwdriver to press on the switch side of the key cap while working it from side-to-side with your fingers. Removing the key cap without opening the instrument is done as follows. Grasp the key cap firmly with pliers. Work it from side to side while pulling away from the panel.

Note

The pliers may damage the key cap unless the jaws are covered with a protective material.

Be sure the key cap is aligned properly before snapping into place. Note that the key cap has 8 possible positions (see figure 8-1).

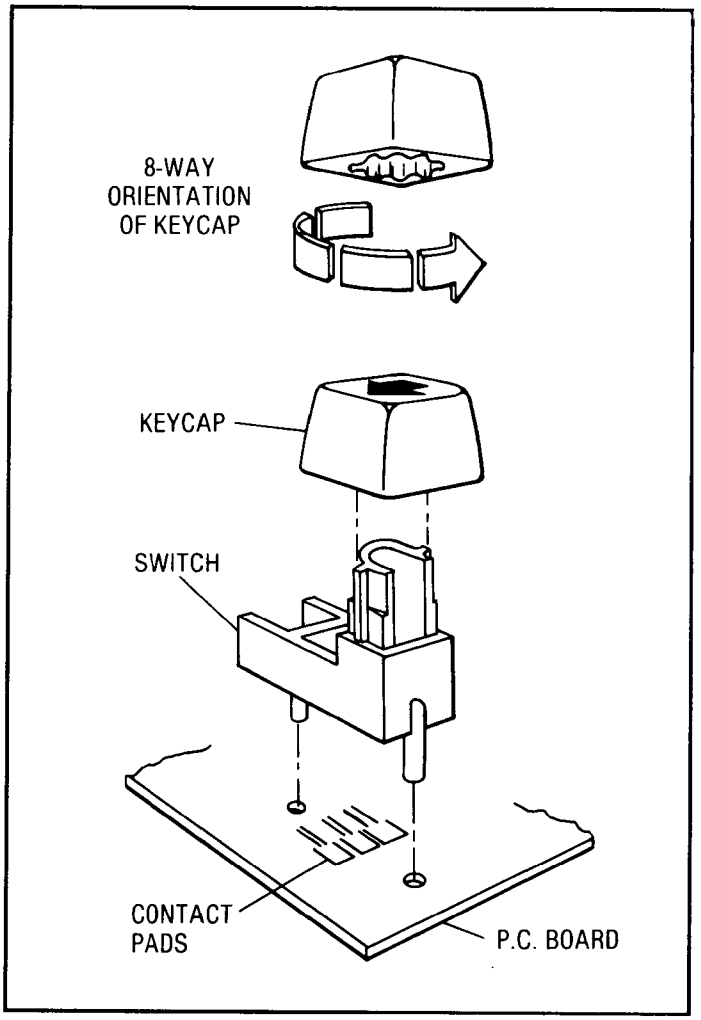


Figure 8-1. Front Panel Pushbutton Switch Assembly

Front Panel Switch Replacement

Note

The front panel switch traces and contacts are specially cleaned at the factory. Do not handle or attempt to clean them. Wear linen gloves when making any repairs.

The front panel switches have a very high cycle life. However, if one becomes faulty and needs replacement, follow the procedure outlined below:

1. Remove the front panel.
2. Remove the key cap as indicated above.
3. Remove the switch by chipping away the melted plastic tabs at the circuit side of the keyboard that hold the switch in place.

Note

The following operation should be done in a well ventilated area. If the heat staking tip is too hot, the plastic will vaporize and emit fumes. However, these fumes are non-toxic.

4. For reliable operation, the switch must be mounted tightly against the printed circuit board. To facilitate the heat staking operation, specially molded support anvils (HP 5040-6881) can be ordered. See figure 8-2.

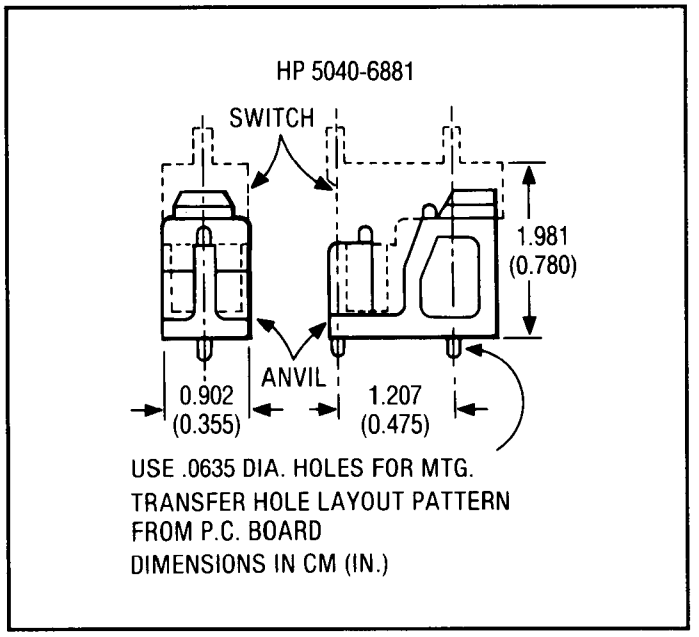


Figure 8-2. Pushbutton Switch Support Anvil

Note

Do not disturb the assembly for at least 10 seconds after heat staking.

If not enough heat is applied, the plastic will tend to stick to the tip of the iron.

If too much heat is applied, the plastic will fume profusely, the plastic post will be irregularly shaped, and the plastic will be permanently discolored.

If the staking tool is worn or flaked, it will cause a misshaped plastic post and/or a contamination deposit on the surface.

5. To ensure proper switch assembly, verify that the switch is pushed firmly against the circuit board and, with the hot (440°C or 825°F) staking tip (see figure 8-3) push down on each of the two posts on the switch. Each post should take about one second to stake. With the proper cycle, the post should turn a darker color

and, in about ten seconds, return to its original bright red color. The correctly staked post should have a smooth round rivet-like top. See figure 8-4.

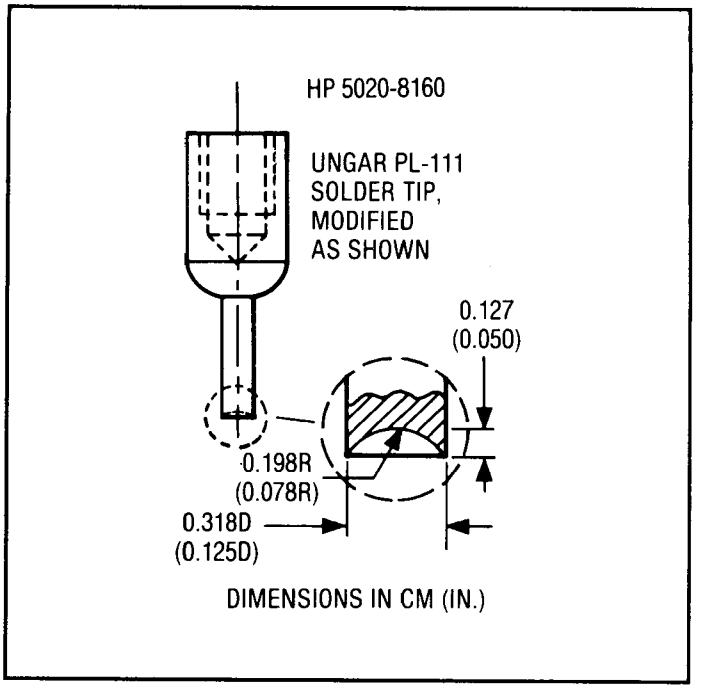


Figure 8-3. Heat Staking Tip

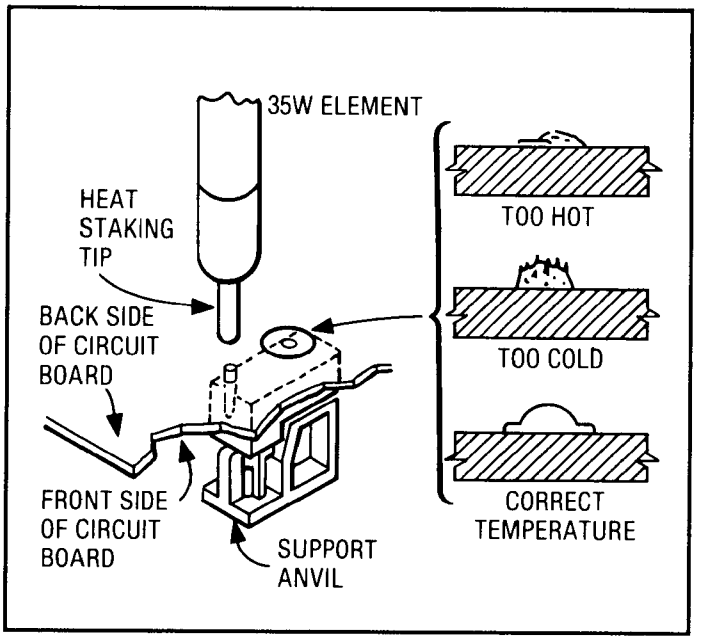


Figure 8-4. Typical Assembly for Heat Staking Operation

8-23. Etched Circuits (Printed Circuit Boards)

The etched circuit boards in the Signal Generator have plated through holes which make a solder path through to both sides of the insulating material. Soldering can be done from either side of the board with equally good results. When soldering to any circuit board, keep in mind the following recommendations:

1. Avoid unnecessary component unsoldering and soldering. Excessive replacement can result in damage to the circuit board and/or adjacent components.
2. Do not use a high power soldering iron on etched circuit boards. A 35-watt soldering iron is recommended. Excessive heat may lift a conductor or damage the board.

Caution



Do not use a sharp metal object such as an awl or twist drill in the following step. Sharp objects may damage the plated through conductor.

3. Use a suction device or wooden toothpick to remove solder from component mounting holes. When using a suction device make sure that equipment is properly grounded to prevent electrostatic discharge from damaging MOS devices. Refer to table 8-3, "Etched Circuit Soldering Equipment", for information on available tools for working on etched circuit boards.

8-24. Electrostatic Discharge (ESD) Precautions

Electrostatic discharge (ESD) can cause damage to certain devices in the Signal Generator. The damage can range from slight degradation of a parameter to catastrophic failures.

MOS, CMOS, and other static sensitive devices are used in this instrument. They are prone to damage from both static electricity and transient signals. They must be handled carefully. When working on the Signal Generator, keep in mind the following recommendations to avoid damaging these sensitive components.

1. Use a static-free work station with a pad of conductive rubber or similar material.
2. Do not remove any board unless the Signal Generator has been unplugged.
3. After removing boards from the Signal Generator, be sure that they are placed on a conductive surface to guard against ESD damage. Do not stack boards.
4. When removing a MOS or CMOS device from a high grip socket, be careful not to damage it. Avoid removing devices from these sockets with pullers. Instead, use a small screwdriver to pry the device up from one end, slowly pulling it up one pair of pins at a time.

Table 8-3. Etched Circuit Soldering Equipment

Item	Use	Specification	Item Recommended	HP Part No.
Soldering Tool	Soldering, Heat Staking	Wattage: 35W Tip Temp.: 390—440°C (735—825°F)	Ungar No. 135 Ungar Division Eldon Ind, Corp. Compton, CA 90220	8690-0167
Soldering Tip	Soldering, Unsoldering	*Shape:Chisel	*Ungar PL113	8690-0007
Soldering Tip	Heat Staking	Shape:Cupped	HP 5020-8160 or modified Ungar Pl11	5020-8160
De-Solder Aid	To remove molten solder from connection	Suction Device	Soldapullt by Edsyn Co., Van Nuys, CA 91406	8690-0060
Rosin (Flux) Solvent	To remove excess flux from soldered area before application of protective coating	Must not dissolve etched circuit base board.	Freon TF	8500-0232
Solder	Component replacement, Circuit Board repair wiring	Rosin (flux core, high tin content (63/37 tin/lead)), 18 gauge (AWG) 0.040 in. diameter preferred.		8090-0607

* For working on circuit boards; for general pupose work, use No. 555 Handle (8690-0261) and No. 4037 Heating Unit $47\frac{1}{2}$—$56\frac{1}{2}$ W (HP 8690-0006); tip temperature of 850—900°F; and Ungar No. PL113 $1\frac{1}{8}$ inch chisel tip.

5. Once a MOS or CMOS device has been removed from an assembly, immediately stick it into a pad of conductive foam or other suitable holding medium.
6. When replacing a MOS or CMOS device, ground the foam on which it resides to the instrument before removing it. If a device requires soldering, make sure that the assembly is lying on a pad of conductive material, and that the pad, soldering iron tip, and personnel, are grounded to the assembly. Apply as little heat as possible.
7. Before turning the instrument off, remove any large ac sources that may be driving MOS switches.

8-25. Module Exchange Program

Table 6-1 lists assemblies that are available on an exchange basis. Refer to the table, and the "Exchange Assemblies" paragraph in chapter 6 for further information.

8-26. Non-Repairable Assemblies

The following assemblies are not factory repairable and must be discarded.

A1AT2	Isolator
A1AT3	Pulse Modulator
A1CP1	Bias Tee
A1CR1	Crystal Detector
A2A1	Rotary Pulse Generator
A3A9A6	Attenuator
A3A9A7	Low Pass Filter
A3A9U1	Sampler

8-27. Factory Selected Components (*)

Some component values are selected at the factory to provide optimum compatibility with associated components. These components are identified on individual schematics and the replaceable parts list by an asterisk (*). Refer to table 5-1, "Factory Selected Components", for the selection procedures.

8-28. Periodic Maintenance

8-29. Cleaning

Cleaning Intervals

Hewlett-Packard recommends a 6-month interval between cleaning for some parts of the Generator and a 12-month interval for other parts. However, cleaning intervals are mostly dependent upon where the Generator is used. The Generator should be cleaned more often if it is used in a dusty or very humid area.

Cleaning Solution

Hewlett-Packard recommends using either of two cleaning solutions on printed circuit (PC) board edge connectors. For best cleaning results, we recommend an ammonium hydroxide solution (NH_4OH, 29.5% NH_3 by weight). However, using concentrated solutions of ammonia requires using gloves, eye goggles, and proper ventilation. The second recommendation is an 80:20 solution of isopropyl alcohol and water (IPA/H_2O). This should serve as a satisfactory cleaner where one would rather not use ammonium hydroxide.

Top Cover Removal and Replacement

1. At the rear corners of the top cover, remove two plastic standoffs.
2. At the center-rear of the top cover, loosen the captive screw securing the cover to the frame.
3. Slide the cover to the rear and remove it.
4. When the cleaning is completed, position the cover on top of the Generator and gently slide it as far forward as possible.
5. Secure the cover to the frame by tightening the captive screw at the center-rear of the cover.
6. Replace the two plastic standoffs on the rear corners.

6-Month Cleaning

Warning 

Before cleaning, make sure the Generator is disconnected from the power source to eliminate the possiblity of electrical shock.

Caution 

In procedures that call for a vacuum cleaner to remove dust, do not use a blower or compressed air. Doing so will cause the dust to be transferred throughout the Generator.

The following items should be cleaned at 6-month intervals and more often if located in very dusty or humid areas:

Fan

1. At the rear of the Generator, remove two screws and lock washers that secure the fan cover.
2. Remove the fan cover.
3. Using a vacuum cleaner and a soft-bristle brush, remove dust from the fan and its cover.
4. Replace the fan cover.

Vents

1. Locate the ventilation holes at the rear of the Generator (in the lower right corner as viewed from the rear).
2. Using a vacuum cleaner and a soft-bristle brush, remove dust from the ventilation holes.

Power Supply Filter Capacitors

1. Inside the Generator, locate the power supply filter capacitor area (just forward and to the right of the fan as viewed from the rear).
2. Using a vacuum cleaner and a soft-bristle brush, remove dust from the entire area.

Area in Front of Fan

1. Locate the hinged plastic cover just forward of the fan.
2. Raise the plastic cover into its upright position.
3. Using the plastic-loop PC board extractors, remove all boards.

Note

As you remove each board, locate its silkscreened reference designation. (The reference designations are A3A3, A3A4, A3A5, A3A6, and A3A7.) When you return the boards, you can identify the proper slot by matching reference designations on the PC board, the motherboard, and the plastic cover.

4. Using a vacuum cleaner and a soft-bristle brush, remove dust from the fan and the entire area forward of it.
5. Using a vacuum cleaner and a soft-bristle brush, remove dust from each of the PC boards.

Caution

In the next step, do not let the cleaning solution touch circuit portions of the PC board. This could cause residual flux on solder connections to liquify and contaminate the edge connectors.

6. Using a lint-free cloth saturated with cleaning solution, rub each PC board edge connector 3 or 4 times to remove any foreign material.
7. Rinse the PC board edge connectors with deionized water and wipe them dry.

Note

Before returning the PC boards to their their normal places, it is a good idea to inspect them for heat damage. The PC boards that are mounted directly in front of the fan, produce relatively high amounts of heat. Heat discoloration of the PC board material can be a sign that the fan is not working properly.

8. Carefully insert the PC boards into their guides and mother board connectors. (The component side of each PC board faces right when viewed from the rear of the Generator.)
9. Lower the hinged plastic cover into its normal position.

12-Month Cleaning

Warning

Before cleaning, make sure the Generator is disconnected from the power source to eliminate the possiblity of electrical shock.

Caution

In procedures that call for a vacuum cleaner to remove dust, do not use a blower or compressed air. Doing so will cause the dust to be transferred throughout the Generator.

The following items should be serviced at 12-month intervals and more often if located in very dusty or humid areas:

Digital Control Unit (DCU) Area

1. Just forward and to the left of the fan (as viewed from the rear), locate the long aluminum cover over the DCU assembly.
2. Remove the screw and lock washer located at the rear of the cover.
3. Remove the cover by sliding it to the rear and up.

Note

Before removing any PC board, notice that each board in the DCU has a unique set of color coded plastic extractors. At the forward end, these extractors match the colors of the guides on the aluminum frame. At the rear, the first four extractors are black; the fifth extractor, on the A2A10 Memory Assembly, is brown.

4. Remove all four PC boards. To remove each board, grasp both of its extractors. Then, by pulling up on the extractors, the board will gently pry itself from its mother board connectors.

Caution

In the next step, do not use a vacuum cleaner to remove dust from the A2 Assembly PC boards. The boards have static sensitive devices that can be damaged by a vacuum cleaner.

5. Using a soft-bristle brush only, remove dust from PC boards.
6. Using a vacuum cleaner and a soft-bristle brush, remove dust from the entire DCU area (especially from the mother board connectors).

Caution

In the next step, do not let the cleaning solution touch circuit portions of the PC board. This could cause residual flux on solder connections to liquify and contaminate the edge connectors.

7. Using a lint-free cloth saturated with cleaning solution, rub each PC board edge connector 3 or 4 times to remove any foreign material.
8. Rinse the PC board edge connectors with deionized water and wipe them dry.

Caution The next step requires care to ensure that PC board edge connectors are properly aligned with the mother board connectors. When properly aligned, the PC board will press snuggly into the mother board connectors. However, if they are not properly aligned, pressure on the PC board can damage the mother board and its connector.

9. Carefully insert the PC boards into their guides and mother board connectors. Ensure that the extractors match the colors on their plastic guides.
10. Install the DCU cover by tilting its front-end down and into the locking slots provided for the cover's front tabs. Then, lower the cover into place and secure it with its screw and lock washer.

Battery, Contacts

1. Locate the battery pack in the general area of the forward-right corner (as viewed from the front).
2. Remove PC boards A2A1 and A2A2. To remove each board, grasp both of its extractors. Then, by pulling up on the extractors, the board will gently pry itself from its mother board connector(s).
3. With your fingers, remove the spring retaining clip that holds the battery pack in its plastic holder.

Caution In the next two steps, be careful not to bend the spring-contacts in the battery holder.

4. Using a lint-free cloth saturated with cleaning solution, rub each contact on the battery pack and holder 3 or 4 times to remove any foreign matter.
5. Using a lint-free cloth saturated with deionized water, rinse the contacts. Then wipe them dry.
6. Position the battery pack so that its contacts are on the right side and facing to the rear. Place the battery pack into its holder.

Note The next step refers to the top and bottom of the spring retaining clip. The bottom of the clip is identified by a single bend of metal; the top is identified by a double bend.

7. Slip the bottom end of the spring retaining clip under the bottom lip of the plastic battery holder. Snap the top end of the clip over the top of the holder.

Caution 

In the next step, do not let the cleaning solution touch circuit portions of the PC board. This could cause residual flux on solder connections to liquify and contaminate the edge connectors.

8. Using a lint-free cloth saturated with cleaning solution, rub each PC board edge connector 3 or 4 times to remove any foreign material.
9. Rinse the PC board edge connectors with deionized water and wipe them dry.
10. Carefully insert the PC boards into their guides and mother board connectors. Ensure that the extractors match the colors of their plastic guides.

8-30. Schematic Symbology

8-31. Basic Logic Symbology

The logic symbols used in this manual are based on the American National Standards Institute (ANSI) Y32.14-1973, "Graphic Symbols for Logic Diagrams (Two State Devices)." A summary of this symbology is provided to aid in interpreting these symbols.

Power supply and ground connections are not shown on the symbols. This information is tabulated on the right margins of the service sheets.

Gates and Qualifiers

This section includes a brief description of the basic logic symbols used on the service sheets, a summary of indicator symbols, a discussion of contiguous blocks, control blocks, and dependency notation, and a summary of symbology for some of the more complex devices.

Qualifiers are that portion of a device symbol that denotes the logic function. For example, "&" denotes the AND function. See figure 8-5 for a summary of the basic logic symbols and their qualifiers.

Indicator Symbols

Indicator symbols identify the active state of a device's input or output, as shown in figure 8-6.

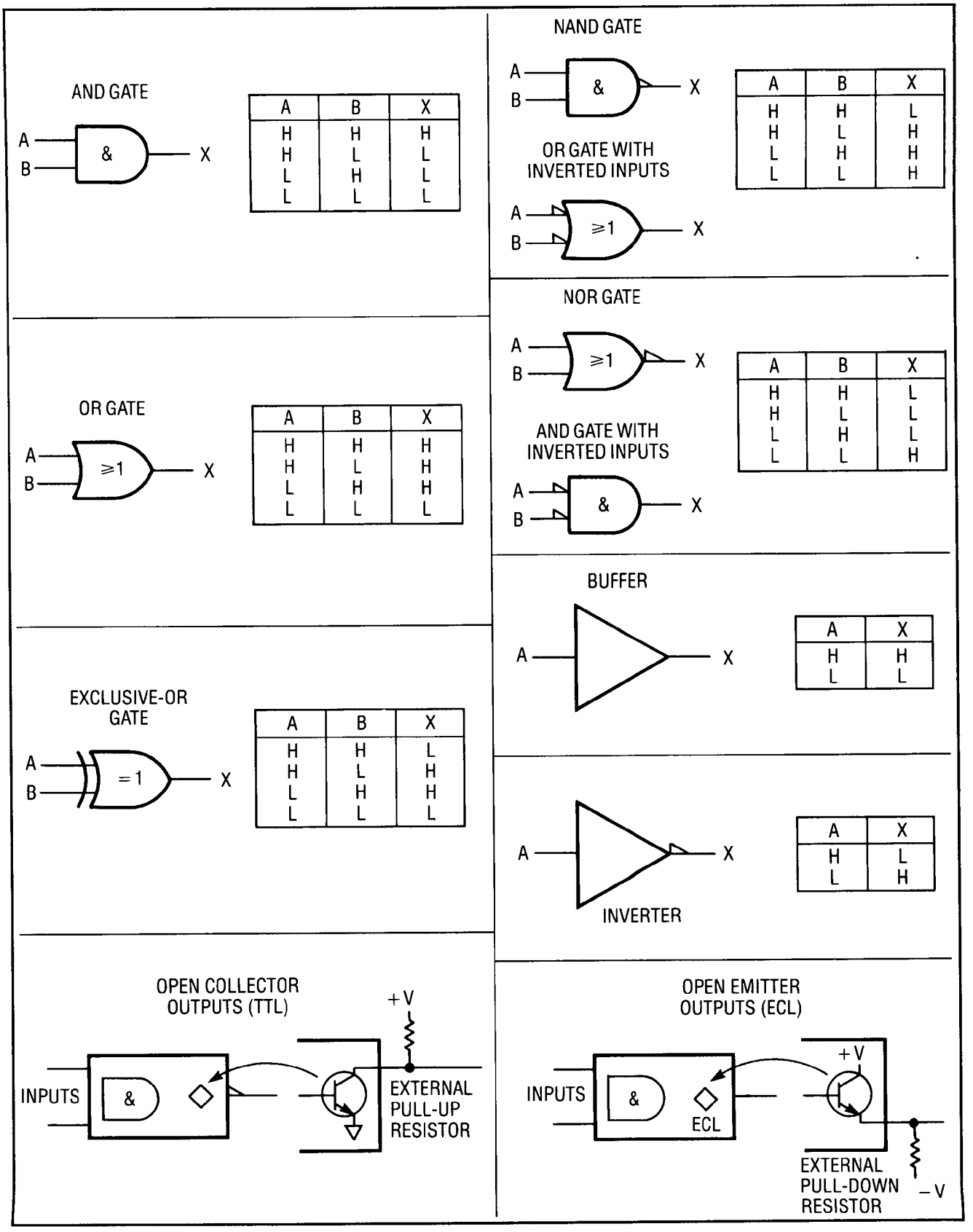


Figure 8-5. Basic Logic Symbols and Qualifiers

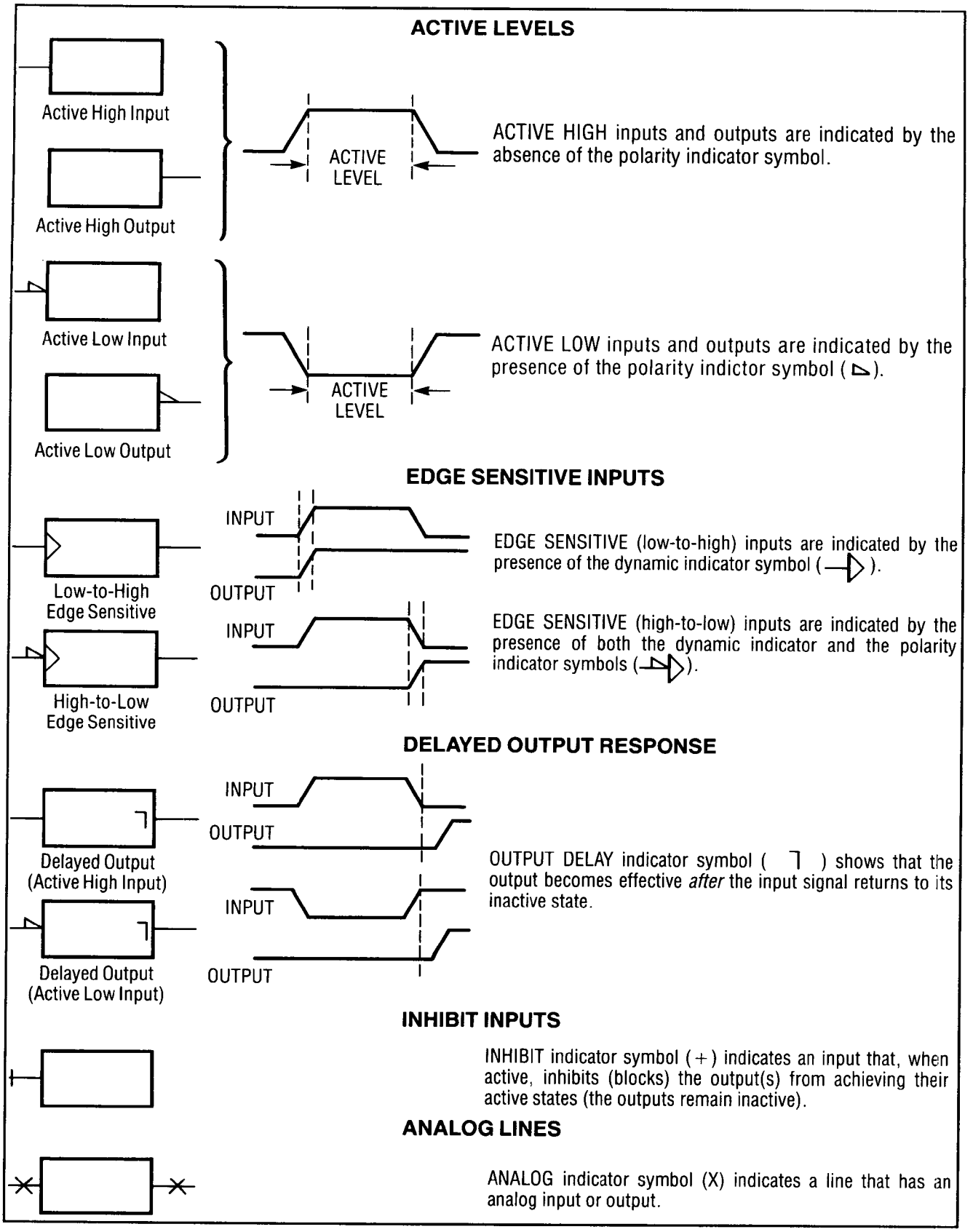


Figure 8-6. Indicator Symbols

Contiguous Blocks

Two symbols may share a common boundary, parallel or perpendicular to the direction of the signal flow. Note that in the examples shown in figure 8-7, there is generally no logic connection across a horizontal line, but there is always an implied logic connection across a vertical line. Notable exceptions to this rule are the horizontal lines beneath control blocks and between sections of shift registers and counters (dividers).

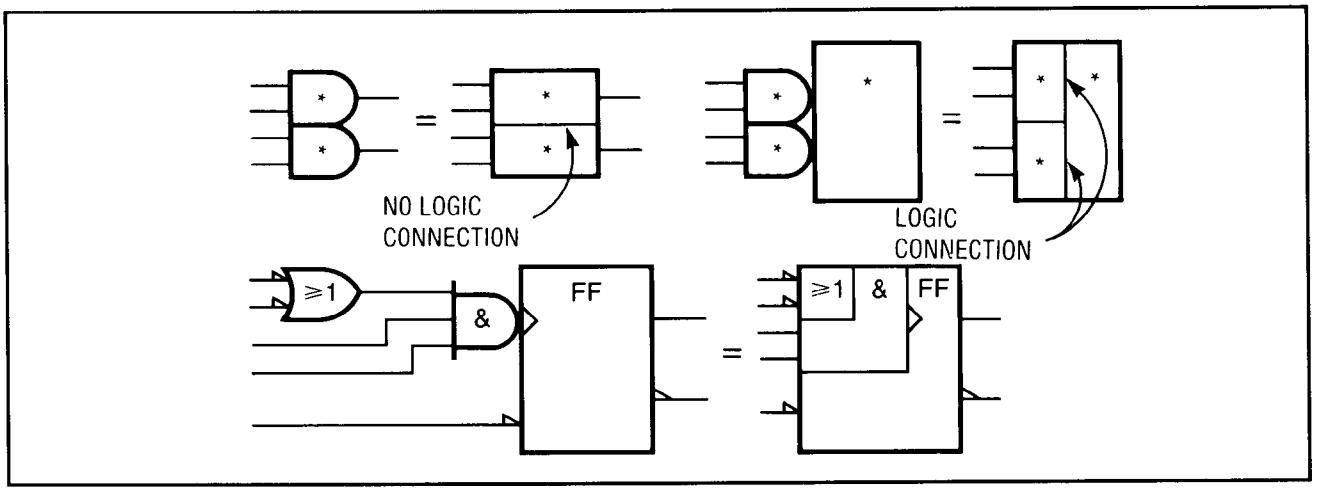


Figure 8-7. Contiguous Blocks

Dependency Notation

Dependency notation simplifies symbols for complex integrated circuit elements by defining the relationship between inputs and outputs without actually showing all the elements and connections involved (see figures 8-8 through 8-10). The following examples use the letter A for address, C for control, G for AND, V for OR, and F for free dependencies. The dependent input or output is labeled with a number that is either prefixed (e.g., 1X) or subscripted (e.g., X1). They both mean the same thing. Note that many times a controlled line may already be labeled with a number that indicates input or output weighting (for example, in a coder). In this case, the controlling or gating input will be labeled with a letter.

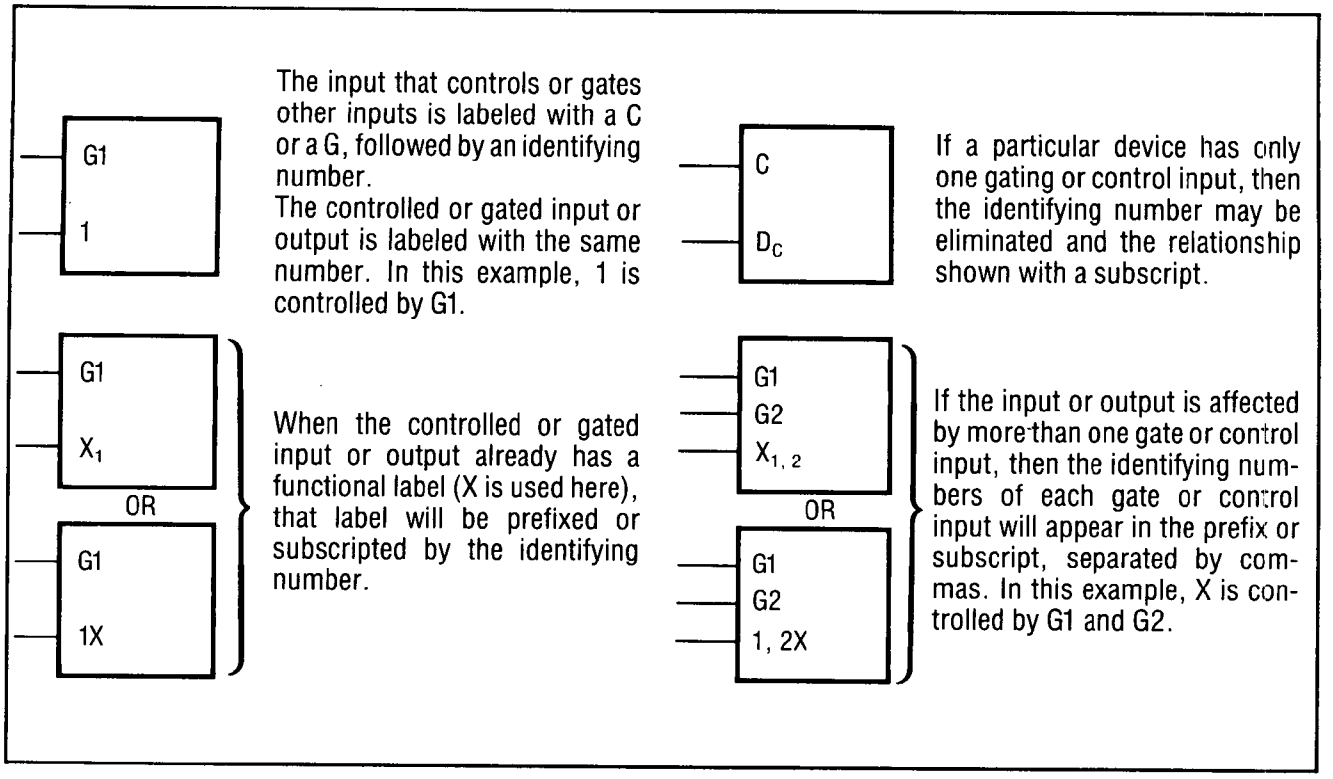


Figure 8-8. AND Dependency Notation

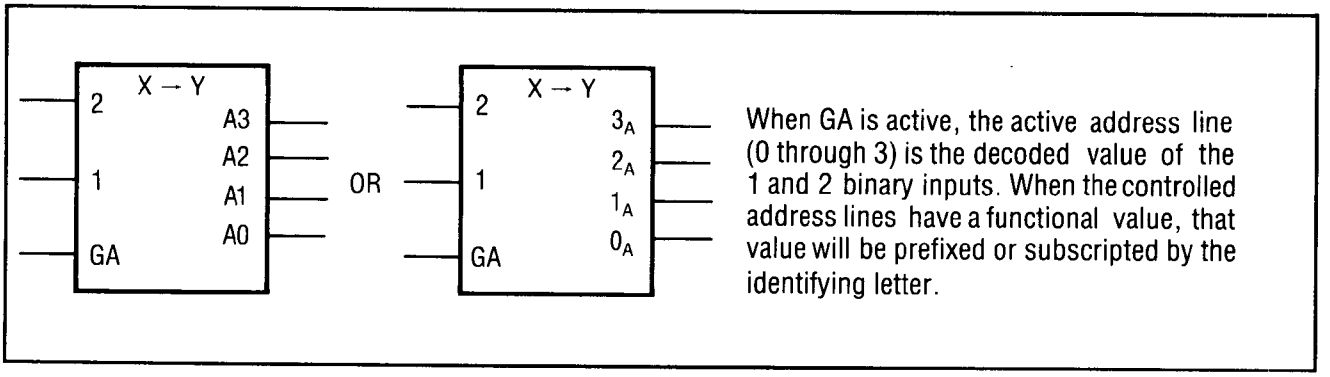
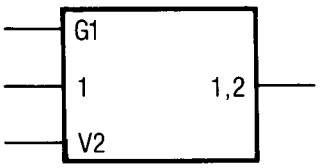
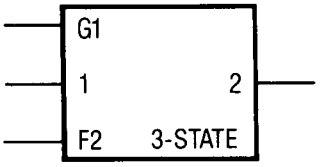


Figure 8-9. Address Dependency Notation



When a V input is active, the output will be in its active state. With the V input inactive, the device functions as if the V input doesn't exist.



When an F input is active, the output is enabled to function normally. When an F input is inactive, the output becomes a high impedance, effectively removing that device from the circuit.

The 3-STATE label is sometimes used with the free dependency notation.

Figure 8-10. OR and Free Dependency Notation

Common Control Block

The control block is used in conjunction with an array of related symbols in order to group common logic lines. Figure 8-11 shows how the control block is usually represented. Figure 8-12 shows a quad D-type flip-flop with reset. This can be redrawn as shown in figure 8-13. Note that the representation shown in figure 8-13 can be used when the flip-flops are functionally scattered around the schematic (i.e., not used as a quad unit).

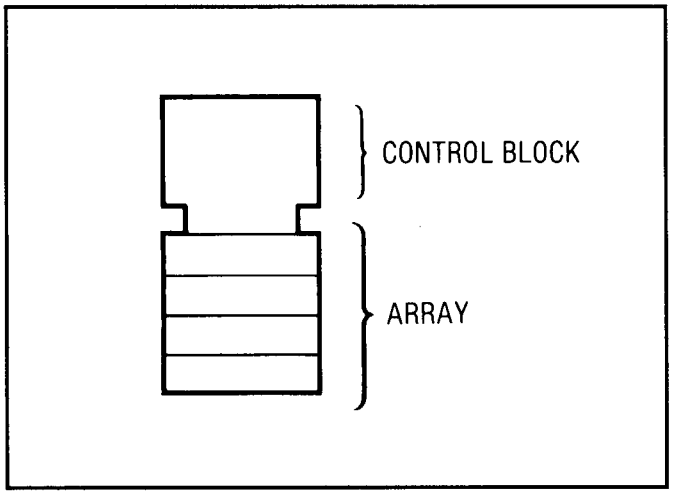


Figure 8-11. Common Control Block

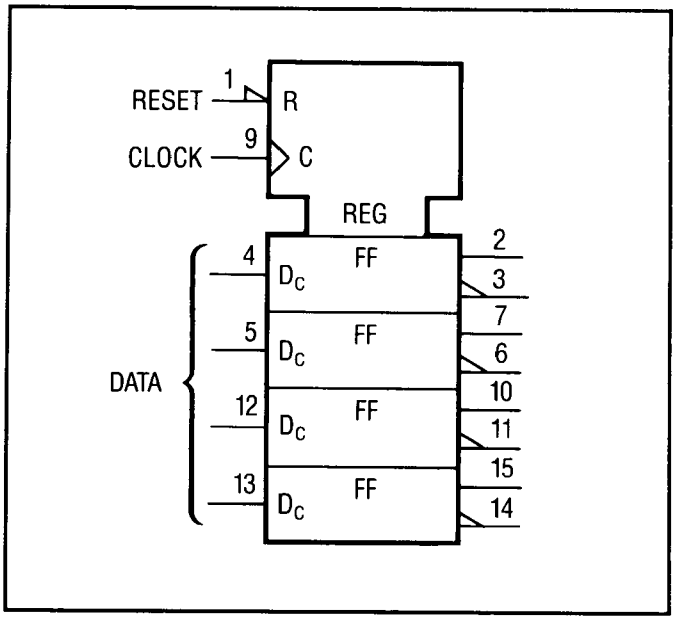


Figure 8-12. Quad D-Type Latch (Combined)

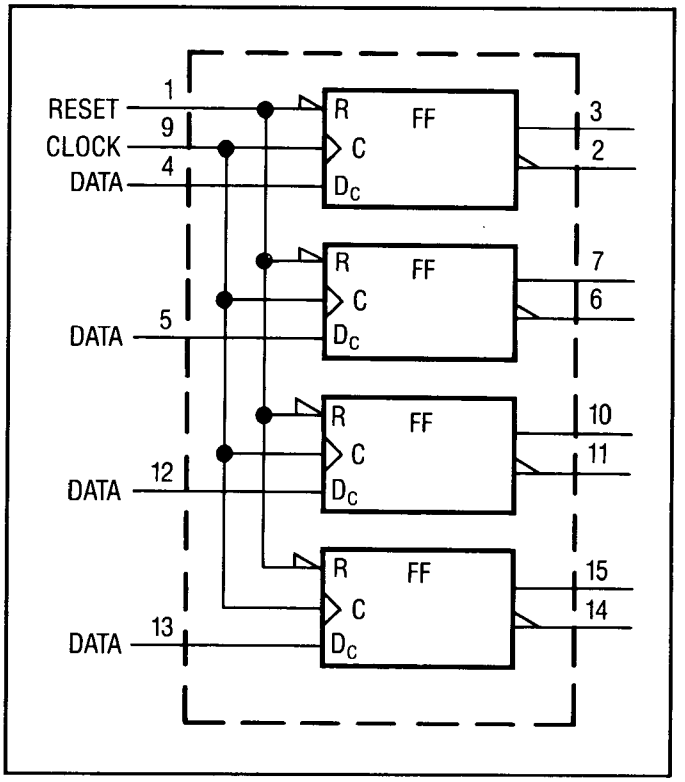


Figure 8-13. Quad D-Type Latch (Individual)

8-32. Complex Device Symbology

Figures for complex device symbology show how the basic symbols can be combined to illustrate the behavior of fairly complex devices.

Shift Register

The shift register (see figure 8-14) control block shows common inputs to a bidirectional shift register. Notice that "$>m$" means shift the contents to the right or down by "m" units. And "$<m$" means shift the contents to the left or up by "m" units. Note: If $m = 1$, then "m" may be omitted. Inputs "a" and "b" are each single IC pins that have two functions. Input "a" enables one of the inputs to the top D-type flip-flop (1D) and also shifts the register contents down "m" units. Input "b" enables one of the inputs to the bottom flip-flop (2D), and also shifts the register contents up "m" units. Input "c" loads all four flip-flops in parallel (3D). Input "d" is a common reset. The output delay indicator is used because these are master-slave flip-flops.

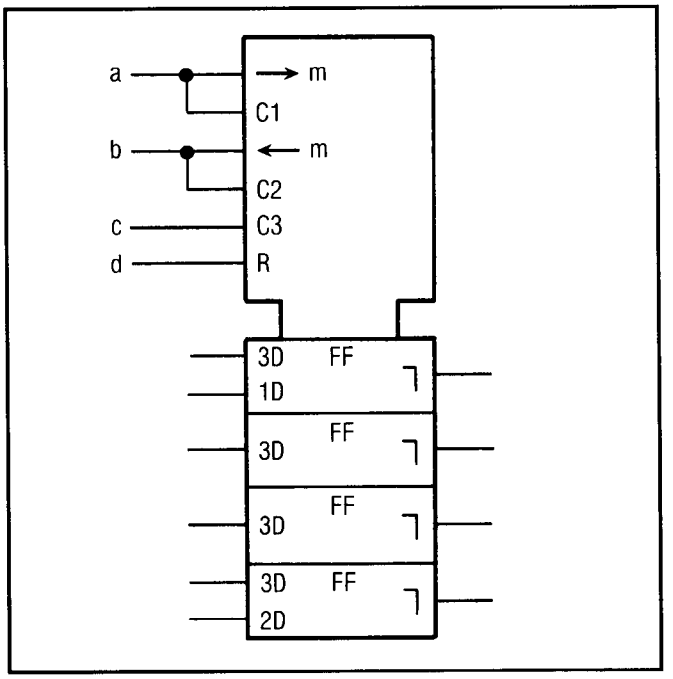


Figure 8-14. Shift Register

AND-OR Selector

The selector control block simplifies the AND portion of a quad AND-OR select gate (see figure 8-15). When G1 is high, the data presented at the "1" inputs is gated through. When G2 is high, the data presented at the "2" inputs is gated through.

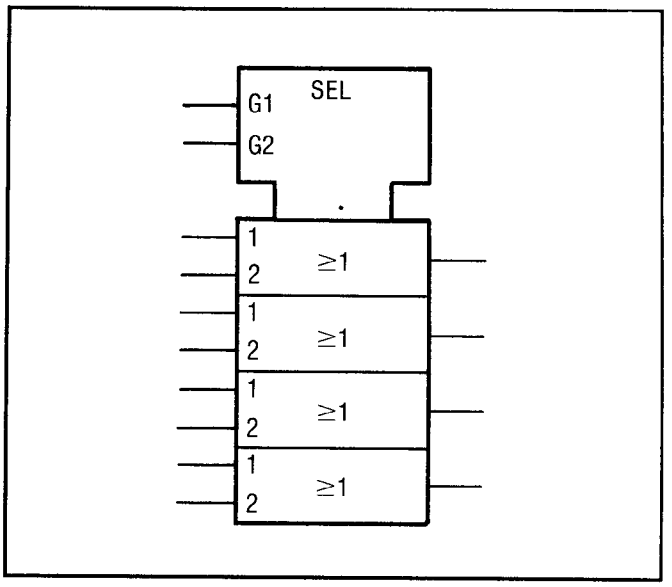


Figure 8-15. AND-OR Selector

UP-DOWN Counter

The counter control block shows common inputs to a Presettable Decade UP-DOWN Counter (see figure 8-16). Notice that "+m" means count up (increment the count) by "m"; "−m" means count down by "m". Note: if m=1, then "m" may be omitted. Since the D-type flip-flops are master-slave, the output delay indicator is used. The "=9, +1" and "=0, −1" notation defines when the carry and borrow outputs are generated. They also define it as a decade counter; a binary counter would have the carry indicated with "=15, +1". Flip-flop weighting is indicated in parentheses. Input "C1" allows all four "D1" flip-flops to be preset in parallel.

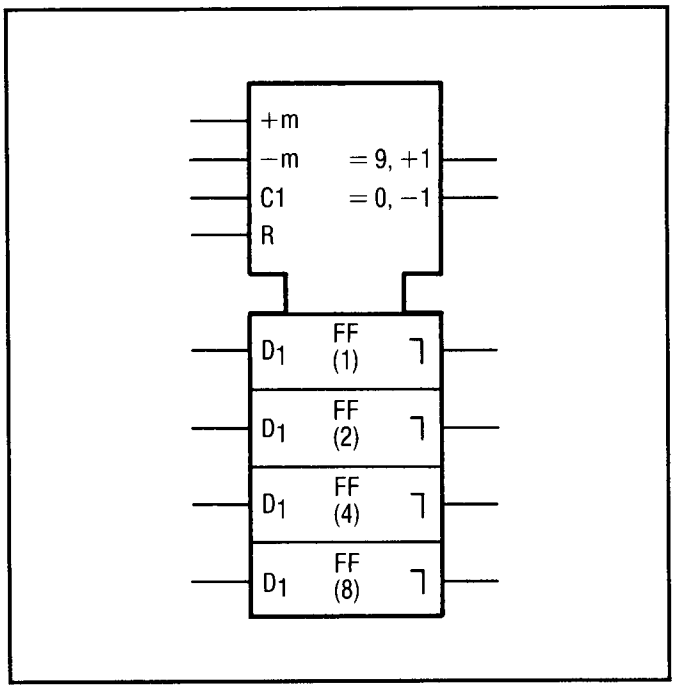


Figure 8-16. UP-DOWN Counter

Quad D-Type Latch

The register control block illustrates a quad D-type latch (see figure 8-17). There is a common active-low reset (R), and a common edge triggered control input (C). Since there is only one dependency relationship, the controlling input is not numbered and the controlled functions (D) are subscripted with a "C".

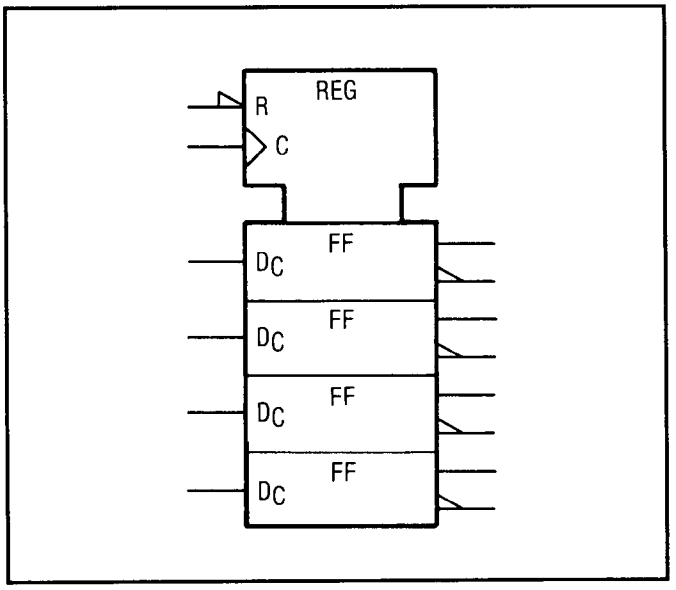
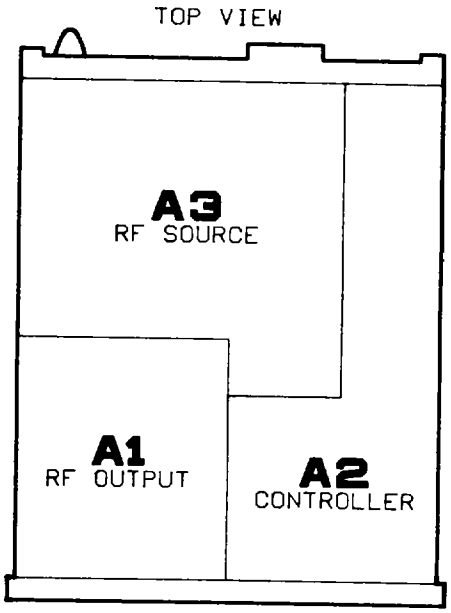


Figure 8-17. Quad D-Type Latch

Index To Service Sheets by Assembly



MAJOR ASSEMBLIES

Assembly	Description	Service Sheet
A1A1	Attenuator Driver Board	18
A1A2	Detector/ALC Board	14,17
A1A3	Function Board	20
A1A4	Pulse Driver Board	15
A1A5	DAC and Enable Board	22
A1A6	Meter Board	21
A1A7	YTM Driver Board	16
A1A8	SRD Bias Board	19
A1A9	Not Assigned	
A1A10	Yig-Tuned Multiplier	16
A1A10A1	YIG Heater Control	16
A1A11	Power Amplifier	16
A1A12	RF Output Motherboard	14–16, 18–22, 30,31
A1A13	Not Assigned	
A1A14	26 GHz Amplifier	17
A1A14A1	26 GHz Amp Bias Board	17
A2A1	Panel Driver Board	25
A2A2	Key Code Board	24
A2A3	160–240 MHz VCO	8
A2A4	20/30 MHz Phase Detector	7
A2A5	20/30 MHz Divider	6
A2A6	Not Assigned	
A2A7	I/O Board	30,31
A2A8	Microprocessor Board	26
A2A9	Frequency/HP-IB Board	29
A2A10	Memory/Interface	28
A2A11	Not Assigned	
A2A12	Not Assigned	
A2A13	Controller Motherboard	6–8,10, 20–32
A2A14	Rear Interconnect Board	24,29,31
A2A15	HP-IB Connector Board	29
A3A1	Reference and M/N	
A3A1A1	Reference Phase Detector	1
A3A1A2	100 MHz VCXO	2
A3A1A3	M/N Phase Detector	3
A3A1A4	M/N VCO	4
A3A1A4A1	VCO Resonator	4
A3A1A4A2	VCO Board	4
A3A1A5	M/N Output	5
A3A1A6	M/N Reference Motherboard	1–3,5
A3A1A7	Reference and M/N Housing	
A3A2	Not Assigned	
A3A3	Positive Regulator	34
A3A4	Negative Regulator	35
A3A5	DAC	9
A3A6	YTO Driver	10
A3A7	YTO/FM Coil Driver	13
A3A8	10 MHz Reference Oscillator	1
A3A9	YTO Loop	11,12
A3A9A1	Not Assigned	
A3A9A2	YTO Interconnect	11–13
A3A9A3	2.0–6.6 GHz YTO	13
A3A9A4	YTO Phase Detector	12
A3A9A5	Sampler	11
A3A9A6	Attenuator	13
A3A9A7	6.6 GHz Low Pass Filter	13
A3A9A8	Preamplifier	13
A3A10	RF Source Motherboard	1,3,4, 6,10,12–14,21–23,26, 29–31,33–35
A3A11	Line Module	33
A3A12	Rectifier Assembly	33
A4A1	Front Panel Board	20,22, 23,25,32

BD1 Overall Block Diagram and Troubleshooting

References

Servicing Strategy	Beginning of chapter 8
Operator's Checks	Chapter 3
YTO Loop Assembly	Service Sheet A
Interior Views	Service Sheet B
Replaceable Parts List	Chapter 6
Illustrated Parts Breakdown (IPB)	Chapter 6
Post Repair Adjustments	Chapter 5

Principles of Operation

Major Mechanical Assemblies

The HP 8673B Signal Generator consists of four major mechanical assemblies as listed below:

- A1 RF Output Assembly
- A2 Controller Assembly
- A3 RF Source Assembly
- A4 Front Panel Assembly

These assemblies are shown in figure 8-18 with their associated subsystems. Each is discussed briefly below:

A1 RF Output Assembly. This assembly multiplies the output of the RF Source Assembly, amplifies it, and provides the selected output attenuation. Automatic Leveling Control (ALC), AM, and pulse modulation take place in this assembly. The subsystems of the RF Ouput Assembly are:

- Microwave Signal Path Circuits
- ALC Circuit/AM Circuits
- Pulse Modulation Circuits

A2 Controller Assembly. This assembly contains the Digital Control Unit (DCU) that controls the entire operation of the Signal Generator. It also contains part of the RF Phase Locked Loops subsystem.

A3 RF Source Assembly. This Assembly generates all the reference frequencies used in the Signal Generator. It uses some of these reference signals plus control signals from the DCU to generate the baseband signal of 2.0—6.6 GHz. This baseband signal is applied to the RF Output Assembly. The RF Source Assembly also handles frequency modulation. Subsystems are:

- Time Base Reference
- Part of the RF Phase Lock Loops
- YIG Tuned Oscillator (YTO)

A4 Front Panel Assembly. This assembly is the user interface to the HP 8673B. It contains the keys, indicators, and annunciators that are connected to the DCU. It is part of the digital control unit subsystem.

Functional Description

Functionally, the HP 8673B can be divided into eight electrical subsystems. These are listed below with the physical assemblies of which they are a part:

- Time Base Reference A3
- RF Phase Locked Loops A2 and A3
- YIG Tuned Oscillator (YTO) Summing Loop A3
- Microwave Signal Path A1
- Automatic Level Control (ALC) A1
- Pulse Modulation A1
- Digital Control Unit A2 and A4
- Power Supplies A3

These subsystems are illustrated in the simplified block diagram of figure 8-19, and in the more detailed block diagram of BD1. Each block of BD1 is further expanded in the block diagram indicated in the lower right hand corner of each block. The following discussion is referenced to figure 8-19 and to BD1. A more detailed discussion of each block is found with block diagrams BD2—BD9.

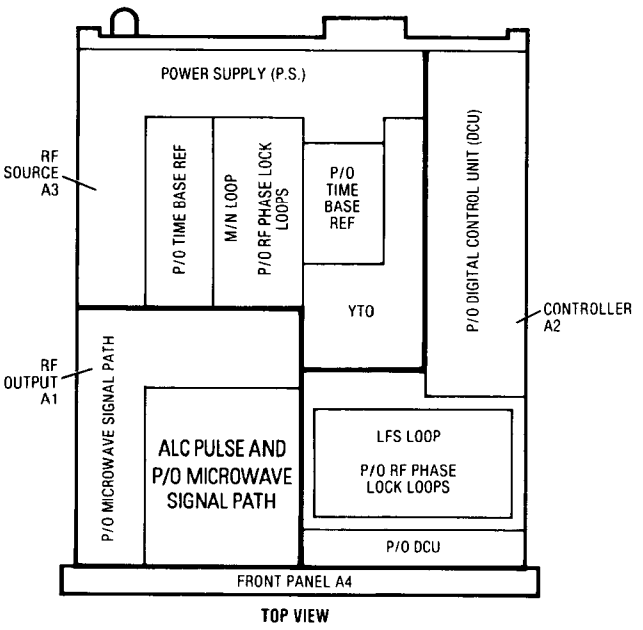


Figure 8-18. HP 8673B Assemblies and Subassemblies

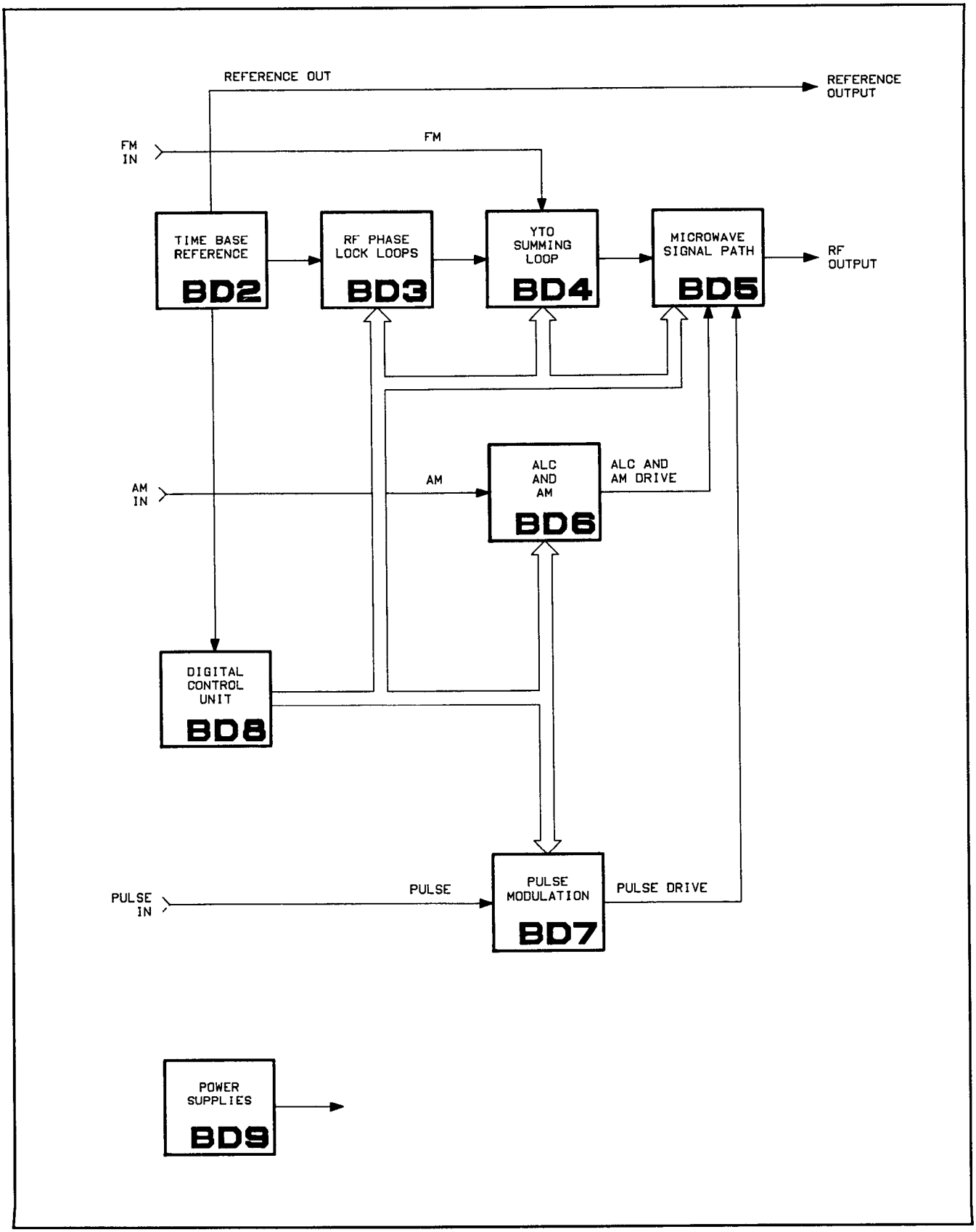


Figure 8-19. HP 8673B Simpified Block Diagram

Time Base Reference. This subsystem generates the reference frequencies for the Signal Generator. It consists of the following:

- 10 MHz Reference Oscillator
- Reference Loop

The 10 MHz Reference Oscillator is a temperature controlled, crystal oscillator that generates the basic 10 MHz reference signal. Provision is also made for use of an external 5 or 10 MHz reference signal. The Reference Loop also contains a 100 MHz voltage-controlled crystal oscillator (VCXO) that is phase locked to the internal 10 MHz Reference Oscillator, or to an external 5 or 10 MHz reference.

In the Reference Loop, the 100 MHz signal from the VCXO is divided and multiplied to produce reference frequencies for the RF Phase Locked Loops, and for the DCU. A 10 MHz and 100 MHz reference signal is also available at a rear-panel BNC connector.

RF Phase Locked Loops. These loops are phase locked to the Timebase Reference. Under control of the Digital Control Unit (DCU), they generate the signals that control the YIG Tuned Oscillator (YTO) Summing Loop. The RF Phase Locked Loops subsystem contains the following:

- Low Frequency Source (LFS) Loop
- M/N Loop

The LFS Loop generates a 20—30 MHz control signal. This signal is controlled by the DCU to tune the YTO in 1-kHz steps. This controls the least significant four digits in the front panel FREQUENCY MHz display. The M/N Loop generates a 177—197.5 MHz control signal that is controlled by the DCU to tune the YTO in 10-MHz steps. This controls the 10-MHz and higher digits of the front panel FREQUENCY MHz display. The RF Phase Locked Loops subsystem is located in RF Source Assembly A3 (M/N Loop), and Controller Assembly A2 (LFS Loop).

YIG Tuned Oscillator (YTO) Summing Loop. This subsystem generates the baseband or Band 1 frequencies (2—6.6 GHz.) under control of the DCU, and signals from the RF Phase Locked Loops subsystem.

The YTO Summing Loop consists of the YTO Loop and a Digital-to-Analog Converter (DAC). The DAC, under control of digital signals from the DCU, pretunes the YTO to within about 2 MHz of the desired YTO frequency. For fine tuning to the desired frequency, the YTO loop is phase locked to the 20—30 MHz and 177—197.5 MHz outputs of the LFS and M/N loops. Frequency modulation (FM) also takes place in the YTO Summing Loop. The YTO subsystem is located in RF Source Assembly A3.

Microwave Signal Path. This subsystem receives the baseband frequencies from the YTO Summing Loop and, under DCU control, multiplies this signal to generate the final desired output frequency. The Microwave Signal Path also performs the following functions:

- Automatic Level Control
- AM and Pulse Modulation
- Attenuation

For Automatic Level Control, the Microwave Signal path output is sampled, detected and routed to the Automatic Level Control (ALC) subassembly which sends a signal to the ALC modulator (in the Microwave Signal Path) to control signal level. Amplitude modulation also comes from the ALC subassembly. The pulse modulation signal comes from the Pulse Modulation subassembly.

The DCU controls the output attenuation based on the front panel RANGE inputs. The Microwave Signal Path is located in RF Output Assembly A1.

Automatic Level Control. This subassembly has two functions:

- Leveling the Signal Generator RF output
- Amplitude modulating the Signal Generator RF Output.

To level the RF signal, the ALC monitors the output level, either from the internal coupler and detector or from an external reference. If the level starts to change, the ALC changes the drive to the ALC modulator in the Microwave Signal Path to counteract the change, and the level stays constant. The front panel VERNIER control adjusts the ALC level to adjust the output level within a 15 dB range.

The AM input is added directly to the ALC/AM modulator drive signal after passing through correction circuitry in the ALC subsystem.

The ALC subsystem is located in RF Output Assembly A1.

Pulse Modulation. This subsystem includes circuits that control the pulse modulator in the Microwave Signal Path. It also generates the YTM injected pulse that compensates for YTM SRD bias which is lost between pulses in pulse mode. This subsystem is located in RF Output Assembly A1.

Digital Control Unit. This is the brain of the Signal Generator. It receives data from the front panel keys (local mode) or from HP-IB (remote mode). After receiving the input data, the DCU processes it and sends it to the various assemblies to control frequency, power level, modulation levels and modes, and other operating modes. The controller also runs diagnostics and monitors operating conditions. If a problem is detected, the controller activates the appropriate annunciators on the front panel. The Digital Control Unit subsystem is located in Controller Assembly A2.

Power Supplies. The Signal Generator contains negative and positive voltage regulators that provide the dc voltages required for operation. The +22V regulator is turned on whenever main power is applied to the Signal Generator. The remaining regulators are not turned on

until the Front Panel LINE switch is set to ON. The power supplies are located in RF Source Assembly A3.

Troubleshooting

General

If the instrument is not operating properly in the local mode, use the following Overall Level Procedure to isolate the problem to one of the eight subsystems. The appropriate Functional Level Procedures (associated with BD2—BD9) and Circuit Level Procedures (associated with service sheets 1—35) should then be followed to isolate the problem to the defective assembly within the subsystem, and then to the defective component within the defective assembly.

Once the defective component has been replaced, run the Overall Level Procedure again to check for other possible defects.

When the Overall Level Procedure can be run with no failures, run the Abbreviated Performance Tests in chapter 4, Part 1 before putting the unit back into service.

Overall Level Procedure

The Overall Level Procedure consists of the following:

1. Turn-On Check (√1)
2. Power Supply Checks (√2)
3. Front Panel Checks (√3)
4. Baseband (2—6.6 GHz) Checks (√4), (√5), and (√6)
   a. YTO Frequency Check (√4)
      Reference Loop Check (√4a)
      LFS Loop Check (√4b)
      M/N Loop Check (√4c)
   b. YTO Power Check (√5)
   c. YTO FM Check (√6)
5. Output Level Check (√7)
6. ALC/AM Check (√8)
7. Pulse Modulation Check (√9)

These checks should be run in sequence because each step assumes that previous steps have been run with no errors. Also, because of the interrelationship of the various elements of the Signal Generator, it is difficult to determine which element is at fault without running the checks in order.

Equipment

Frequency Counter	HP 5343A
Spectrum Analyzer	HP 8566B
Test Oscillator	HP 8116A
Digital Voltmeter	HP 3456A or 3455A
Power Meter/Sensor	HP 436A/HP 8485A
Oscilloscope	HP 1980B/19680A
HP 8673A/B Adjustment Cassette	HP P/N 11726-10002
HP-IB Controller	HP 85B/82937A/82936A 00085-15002, 4, 5

Block Diagram Checks

Turn-On Check (√1)

1. Set LINE switch to STBY. Remove all external cables from the front and rear panels of the Signal Generator, including the primary power cable.
2. Set the rear panel FREQ STANDARD INT/EXT switch to INT and connect the jumper (A3W3) between A3J9 and A3J10.
3. After the primary power cable has been disconnected from the Signal Generator for at least one minute, reconnect it, and check for the following indications:

   - Front panel STANDBY annunciator ON
   - Front Panel OVEN COLD annunciator ON
   - Fan OFF.

   All of the above indications are controlled by the +22V supply which is on when the unit is in STBY.

   If the above indications are correct, proceed with step 6. If any of the above indications are incorrect, proceed with with step 4.
4. Remove the top cover and observe the +22V indicator (see BD1 for location).

   If the +22V indicator is on and the STANDBY and/or OVEN COLD annunciators are OFF, check the associated LED and proceed with step 6.

   If the indicator is off, proceed with step 5.
5. Observe the Primary "ON" Indicator.

   If this indicator is ON, the +22V regulator is probably defective. Go to BD9 to further isolate the problem.

   If the indicator is off, check that the fuse is not open and that the Voltage Selection Card is properly installed. See chapter 2 of the operating manual.

Note

An improper voltage selection can cause all supplies to be on, but too low in voltage. This is indicated by very dimly lit front panel displays.

If the necessary repair or adjustments have been completed, repeat steps 1 through 5.

6. Leave the LINE switch set to STBY until the OVEN COLD annunciator turns off. This should occur within 15 minutes or less depending on how long the Signal Generator was disconnected from main power.

   Once the OVEN COLD annunciator turns off, set the LINE switch to ON.

Note

The OVEN COLD annunciator may flicker on and off temporarily just as the oven stabilization temperature is reached. This is normal.

The FREQUENCY MHZ display should show a frequency between 2 and 26.0 GHz.

If the FREQUENCY MHz display is not as indicated, proceed with step 7 to check the power supply voltages. If the voltages check out, go to BD8 to troubleshoot the DCU.

If everything is normal at this point, proceed with step 7 to confirm proper operating voltages before proceeding with the remaining checks.

Power Supply Checks ($\sqrt{2}$)

7. An improper operating voltage can manifest itself in unpredictable ways. Therefore, check the operating voltages before proceeding with the remaining overall level checks. Proceed as follows:

   Remove the top cover and check the voltages at the following test points. Test point locations are given on BD1.

Test Point	Voltage
BD1 A3A12TP1	+22 ±0.2 Vdc
BD1 A3A3TP6	+11 ±1.1 Vdc
BD1 A3A3TP5	+20 ±0.002 Vdc
BD1 A3A3TP2	+5.2 ±0.1 Vdc
BD1 A3A4TP5	−5.2 ±0.05 Vdc
BD1 A3A4TP1	−40.0 −0.6, +1.0 Vdc
BD1 A3A4TP4	−10.0 ±0.2 Vdc

   If any voltage is incorrect, proceed to Power Supply adjustments in chapter 5 and attempt to adjust the faulty output to the correct voltage.

If the voltage cannot be adjusted, proceed to BD9 to isolate the power supply fault.

If any adjustments or repairs are required, repeat this procedure from step 1 after making the appropriate adjustments or repairs.

If all voltages are correct, proceed with step 8.

Front Panel Checks (√3)

8. Press RCL 0 to initialize the Signal Generator to a known state (see step 11). Turn the line switch to STBY then to ON. This ensures that no false errors will occur in the following steps.
9. Observe the MESSAGE key on the Signal Generator front panel.

   If the MESSAGE key is flashing, depress and hold it and read the error message in the FREQUENCY MHz display. This display will be a two-digit Error Message Number. Refer to table 3-8 in the operating manual for a description of each Error Message Number and action to take for each. If the message key is not flashing, proceed with step 10.

Note

Occasionally, transient conditions occur that cause a false error indication. If an error condition occurs, repeat the condition that caused the error. If the error repeats, it is probably a real error.

If the message key is on but not flashing, a soft error is indicated, that is, you hit the wrong button. Depress and hold the MESSAGE key as above and refer to table 3-8 to learn the nature of the problem.

10. Observe the Signal Generator front panel status annunciators.

    If any of the following status annunciators are on, a hardware problem is indicated. Refer to the list of Status Annunciators below and take the indicated action.

    - OVEN COLD
    - UNLEVELED
    - ϕUNLOCKED

    The remaining Status Annunciators indicate operating modes. See table 8-4 for a description of all Status Annunciators.

    If no Status Annunciators are on, proceed with step 11.

    OVEN COLD. Indicates that the reference oven in the A3 assembly is faulty or is in the warm-up stage. If the Signal Generator has just been connected to the power mains, this annunciator should turn off within 15 minutes. Otherwise, a fault is indicated. Proceed to BD2 to isolate the problem.

    UNLEVELED. Indicates that the Automatic Level control circuit is not providing a leveled output. This problem could have

several different causes, including low power output from the YIG Tuned Multiplier (YTM). To isolate the cause, proceed with step 14 of this procedure.

ϕUNLOCKED. Indicates that one or more of the phase lock loops in the Signal Generator are not locked. To further isolate the problem, look at the Phase Lock indicators on A2A7. Remember that the phase locked loops are chained together, that is, the YTO loop is phase locked to the outputs of the M/N and LFS loops which are phase locked to the REF loop output. If more than one Phase Lock indicator is off, check the first loop in the chain. For example, if all Phase Lock indicators are off, check the reference loop first.

For REF loop problems go to BD2.

For M/N or LFS loop problems go to BD3.

For YTO problems go to BD4.

LSN or TLK. If one of these annunciators is lighted when the Signal Generator is first turned on, check the HP-IB address by pressing the LOCAL key. If the HP-IB address is set to 49, the LSN annunciator will be lighted. HP-IB address 50 will light the TLK annunciator. These two addresses are reserved for a master/slave mode of operation described in chapter 3. To change the address back to the factory selected HP-IB address, enter 19 from the numeric keypad and then press the SHIFT STO and LOCAL keys. The LSN and TLK annunciators should now be off and pressing the LOCAL key should display "19" in the FREQUENCY MHz display.

11. The front panel should now be set to the following conditions.

    RF OUTPUT to ON
    ALC INTERNAL to ON
    RANGE to −70 dBm (0 dB for Options 001 and 005)
    AUTO PEAK to ON
    MTR scale to LVL
    AM, FM, and PULSE modulation to OFF
    FREQUENCY to 3000.000 MHz
    FREQ INCR to 1.000 MHz
    START to 2000.000 MHz
    STOP to 4000.000 MHz
    ΔF to 2000.000 MHz
    MKRS to OFF (initialized to 3,6,9,12, and 15 GHz)
    SWEEP MODE to OFF
    STEP to 100 steps (20.000 MHz)
    DWELL to 20 ms
    TUNE knob to ON

12. Press SHIFT STO 1 then RCL 1 and observe the MESSAGE key. If the MESSAGE key is flashing, an error is indicated, proceed as directed in step 9.

The following steps check the two-way communication lines between the Front Panel and the DCU. The first test verifies that the DCU can light all the front panel indicators that are controlled by the DCU (all except OVEN COLD and STANDBY). The remaining tests verify that the Front Panel keys communicate with the DCU.

Table 8-4. Front Panel Status Annunciators

Annunciator Name	Location	Purpose
STANDBY	A4	Indicates that the LINE switch is set to STBY.
OVEN COLD	A4	Monitors the reference oven in the A3 Assembly. Indicates oven temperature is not stable or is in the warm-up stage.
EXT REF	A4	Indicates that the rear panel FREQ REF switch is set to EXT.
UNLEVELED	A4	Indicates that the ALC (leveling) circuit is not providing a leveled output or that an attempt was made to program the instrument to a power level below its range.
ϕUNLOCKED	A4	Indicates that one or more of the loops is not phase-locked. Refer to Phase Lock Loop Status Annunciators on A2A7.
FM OVERMOD	A4	Indicates that maximum FM index is exceeded.
OFFSET	A4	Indicates that a frequency offset other than zero is entered.
MULTIPLIER	A4	Indicates that a frequency multiplier other than one is entered.
RMT,LSN,TLK,SRQ	A4	Indicates HP-IB conditions.

13. Set up the front panel indicator test as follows:
    a. Set LINE switch to STBY.
    b. Connect the MPU Test Connector (HP Part Number 11726-60001) to the connectors on top of Microprocessor Assembly A2A8.
    c. Set the diagnostic switch to "1" and install a shorting clip between A2A8TP5 and A2A8TPGND.
    d. Set the LINE switch to ON and verify that all indicators and annunciators (except OVEN COLD and STANDBY, these are hardware controlled) are turned on and the displays indicate the following:

       RANGE dBm +110
       FREQUENCY MHz .1.0.1.0.1.0.1.0.1.0.1

    e. In addition, verify that the AUTO SWEEP key LED is blinking.

f. If any of the above indications are incorrect, proceed to the troubleshooting procedures associated with BD8 to isolate the problem.

The following checks verify that the DCU is receiving inputs from the front-panel controls. If any indication cannot be verified, proceed to BD8 to isolate the problem.

14. MTR Key Checks

a. Set the LINE switch to STBY, then remove the DCU test connector and the shorting clip.

b. Set the LINE switch to ON, press RCL 0, and set the OUTPUT LEVEL meter to midrange using the VERNIER control.

c. Verify that the LVL key LED is on.

d. Press the AM key and verify that:

The METER drops to zero
The LVL key LED turns off
The AM key LED turns on

e. Press the FM key and verify that:

The METER does not change
The AM key LED turns off
The FM key LED turns on

f. Press the LVL key and verify that:

The METER returns to midrange
The FM key LED turns off
The AM key LED turns on

15. MESSAGE Key Check

Press and hold the MESSAGE key and verify that the FREQUENCY MHz display shows 00 (the MESSAGE key LED will not light). Release the MESSAGE key and verify that the FREQUENCY MHz display returns to 3000.000.

16. RF OUTPUT ON/OFF key check.

a. Press RF OUTPUT ON/OFF key and verify that:

The RF OUTPUT key LED turns off
The METER drops to zero
The UNLEVELED and ϕUNLOCKED annunciators turn on

b. Press RF OUTPUT ON/OFF key again and verify that the display returns to normal.

17. ALC Key Checks

    a. Press ALC DIODE key and verify that:

       The INTERNAL key LED turns off
       The DIODE key LED turns on
       The OUTPUT LEVEL meter goes to zero
       The UNLEVELED annunciator turns on

    b. Press ALC PWR MTR key and verify that:

       The INTERNAL key LED stays off
       The DIODE key LED turns off
       The PWR MTR key LED turns on
       The UNLEVELED annunciator stays on
       The OUTPUT LEVEL meter remains at zero

    c. Press ALC INTERNAL key and verify that:

       The PWR MTR key LED turns off
       The INTERNAL key LED turns on
       The UNLEVELED annunciator turns off
       The OUTPUT LEVEL meter returns to midrange

18. RANGE Key Checks

    a. Press the RANGE (down arrow) key repeatedly and verify that the RANGE dBm display decreases in increments of 10 dB, to a minimum of −90 dBm, each time the RANGE (down arrow) key is pressed.

    b. Press the RANGE (up arrow) key repeatedly and verify that the RANGE dBm display increases in increments of 10 dB, to a maximum of +10 dBm, each time the RANGE (up arrow) key is pressed.

    c. Press RCL 0 to return RANGE dBm to −70.

19. AUTO PEAK Key Checks

    a. Press the AUTO PEAK key and verify that the AUTO PEAK key LED turns off.

    b. Press the AUTO PEAK key again and verify that the AUTO PEAK key LED turns on.

20. AM Key Checks

    a. Press the 30% key and verify that its LED turns on.

    b. Press the 100% key and verify that its LED turns on and the 30% key LED turns off.

    c. Press the OFF key and verify that the 100% key LED turns off.

21. FM DEVIATION MHz Key Checks

    a. Press the .03 key and verify that its LED turns on.

    b. Press the .1 key and verify that its LED turns on and the .03 key LED turns off.

    c. Press the .3 key and verify that its LED turns on and that the .1 key LED turns off.

    d. Press the 1 key and verify that its LED turns on and the .3 key LED turns off.

    e. Press the 3 key and verify that its LED turns on and the 1 key LED turns off.

    f. Press the 10 key and verify that its LED turns on and the 3 key LED turns off.

    g. Press the OFF key and verify that the 10 key LED turns off.

22. PULSE Key Checks

    a. Press the AUTO PEAK key to turn off its LED.

    b. Press the NORM key and verify the following:

        The AUTO PEAK key LED turns on
        The OUTPUT LEVEL meter immediately starts climbing slowly toward maximum deflection
        The UNLEVELED annunciator turns on

    c. Press the AUTO PEAK key to turn of its LED.

    d. Press the COMPL key and verify the following:

        The AUTO PEAK key LED turns on
        The OUTPUT LEVEL meter returns to midrange
        The UNLEVELED annunciator goes off

    e. Press the PULSE OFF key and verify that the PULSE COMPL key LED goes off, and the AUTO PEAK key LED stays on.

23. SWEEP FREQ Key Checks

    a. Press RCL 0 then press and hold the START key and verify that the FREQUENCY MHz display indicates 2000.000.

    b. Press and hold the STOP key and verify that the FREQUENCY Mhz display indicates 4000.000.

    c. Press and hold the ΔF key and verify that the FREQUENCY MHz display indicates 2000.000.

    d. Press and hold the MKR key and verify that the FREQUENCY MHz display goes blank.

24. SWEEP MODE Key Checks

    a. Press the AUTO key and verify the following:

       AUTO key LED turns on
       FREQUENCY MHz display indicates 2000 4000

    b. Press the OFF key and verify the following:

       AUTO key LED turns off
       FREQUENCY MHz display returns to 3000.000

    c. Press the MANUAL key and verify the following:

       The MANUAL key LED turns on
       The FREQUENCY MHz display indicates 2000.00

    d. Press the FREQ INCREMENT (down arrow) key and verify that the FREQUENCY MHz display does not change.

    e. Press the FREQ INCREMENT (up arrow) key and verify that the FREQUENCY MHz display increases by 20 MHz each time it is pressed.

    f. Press the FREQ INCREMENT (down arrow) key to return FREQUENCY MHz display to 2000.000, then turn the TUNE control counterclockwise and verify that the FREQUENCY MHz display does not change.

    g. Turn the TUNE control clockwise and verify that the FREQUENCY MHz display increases in 20 MHz steps.

    h. Press the OFF key and verify that the MANUAL key LED turns off.

    i. Press the SINGLE key and verify that the SINGLE key LED turns on and the FREQUENCY MHz display indicates 2000.000.

    j. Press the SINGLE key again and verify the the FREQUENCY MHz display indicates a single sweep of the frequency from 2000.00 to 4000.00 and returns to 2000.00.

    k. Press the OFF key and verify that the SINGLE key LED turns off and the FREQUENCY MHz display returns to 3000.000.

25. SWEEP RATE Key Checks

    a. Press and hold the STEP key and verify that the FREQUENCY MHz display indicates 100 20.000.

    b. Press and hold the DWELL key and verify that the FREQUENCY MHz display indicates 20 ms.

26. LOCAL Key Check

    a. Press the following keys in the order given:

9 SHIFT STO LOCAL. Then press and hold the LOCAL key. Verify that the FREQUENCY MHz display indicates 9.

b. Press the following keys in the order given:
1 9 SHIFT STO LOCAL. Then press and hold the LOCAL key. Verify that FREQUENCY MHz display indicates 19.

27. Numeric Key Checks

a. Press the following keys in the order given: ., 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Verify that the FREQUENCY MHz display indicates .0123456789.

b. Press the delete (left arrow) key 11 times and verify that, starting at the right side of the FREQUENCY MHz display, one numeral is blanked each time the delete key is pressed, and that the display returns to 3000.000 after the decimal point is blanked.

28. FREQUENCY Key Checks

a. Press the following keys in sequence: FREQUENCY, 5, 0, 0, 0, 0, 0, 0, kHz. Verify that the FREQUENCY MHz display indicates 5000.000.

b. Press the following keys in sequence: FREQUENCY, 5, 0, 0, 0, MHz. Verify that the FREQUENCY MHz display indicates 5000.000.

c. Press the following keys in sequence:

FREQUENCY, 5, GHz. Verify that the FREQUENCY MHz display indicates 5000.000.

29. FREQ INCR Key Checks

a. Press RCL 0 to put the Signal Generator to 3000.00 MHz.

b. Press the following keys in sequence: FREQ INCR, 1, kHz.

c. Press the FREQ INCREMENT (up arrow) key several times and verify that the FREQUENCY MHz display increases by 1 kHz each time it is pressed.

d. Press the following keys in sequence: FREQ INCR, 1, MHz.

e. Press the FREQ INCREMENT (up arrow) key several times and verify that the FREQUENCY MHz display increases by 1 MHz each time the key is pressed.

f. Press the following keys in sequence:

FREQ INCR, 1, GHz.

g. Press the FREQ INCREMENT (up arrow) key several times and verify that the FREQUENCY MHz display increases by 1 GHz each time it is pressed.

30. STEPS/ms Key Check
    a. Press the following keys in sequence: SWEEP RATE STEP, 1, 5, STEP/ms.
    b. Press STEP/ms and verify that the FREQUENCY MHz display indicates 15 133.333.
    c. Press the following keys in sequence: SWEEP RATE DWELL, 1, 5, STEP/ms.
    d. Press STEP/ms and verify that the FREQUENCY MHz display indicates 15 ms.
31. TUNE ON/OFF Key Check
    a. Press the TUNE ON/OFF key and verify that its LED turns off.
    b. Rotate the TUNE knob clockwise and counterclockwise and verify that the FREQUENCY MHz display does not change.
    c. Press the TUNE ON/OFF key and verify that its LED turns on.
    d. Rotate the TUNE knob clockwise and counterclockwise and verify that the FREQUENCY MHz display increases and then decreases.
32. If all of the above Front Panel Checks were performed with no failures, proceed with the Base Band Checks beginning with step 33.

Base Band Checks

YTO Loop Frequency Check ($\sqrt{4}$)

Note 

For this check be sure to disconnect the green ALC cable (A1W13) from the Pre-Amplifier Assembly.

33. Disconnect the semi-rigid coax from the Pre-Amplifier Assembly output A3A9A8U1J5 (BD1 TPH), and connect the frequency counter in its place (frequency counter should be connected as in figure 8-20). Refer to BD1, top and bottom view drawings for test point locations.
34. Set FREQ to 2.000000 GHz and FREQ INCR to 111.111 MHz.
35. Tune the Signal Generator from 2.000000 GHz to 6.600000 GHz. in 111.111 MHz steps using smaller frequency increments as necessary.

    The frequency on the counter should agree with the FREQ MHz display ±1 count.

If the frequency is not correct, proceed with "Reference Loop Check", step 36. Otherwise, proceed with step 41, "YTO Power Checks".

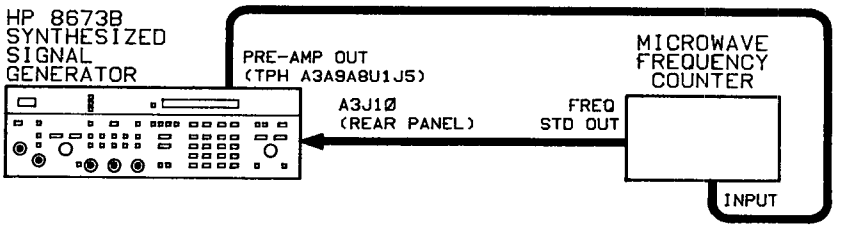


Figure 8-20. HP 8673B Baseband Frequency Test Setup

Reference Loop Checks (√4a)

36. With frequency counter standard output connected as shown in figure 8-20, measure the frequency at the following test points:

Test Point	Frequency
TPA	100 MHz
TPB	10 MHz
TPD	10 MHz
TPE	400 MHz
TPC	20 MHz

If any of the above frequencies are not correct within ±1 count, proceed to BD2 to isolate the problem.

If the frequencies are correct, proceed with Step 37, LFS Loop Check.

LFS Loop Checks (√4b)

37. Disconnect the green cable from A2A3J1 (BD1 TPF) and connect the counter in its place.

38. Set FREQ to 2.000000 GHz and FREQ INCR to 1.111 MHz. Step through the frequencies shown below and ensure that the counter reading agrees ±1 count.

Signal Generator Frequency	Frequency Counter Reading
2.000000 GHz	30.000000 MHz
2.001111 GHz	28.889000 MHz
2.002222 GHz	27.778000 MHz
2.003333 GHz	26.667000 MHz
2.004444 GHz	25.556000 MHz
2.005555 GHz	24.445000 MHz
2.006666 GHz	23.334000 MHz
2.007777 GHz	22.223000 MHz

2.008888 GHz	21.112000 MHz
2.009999 GHz	20.001000 MHz

If the frequencies are correct, proceed with Step 39, M/N Loop Check.

If one or more of the frequencies are incorrect, proceed to BD3 to isolate the problem in the LFS loop.

M/N Loop Checks (√4c)

39. Reconnect the green cable to A2A3J1 and disconnect the white/orange cable from A3A1A5J2 (TPG).

40. Connect the frequency counter to A3A1A5J2. Set FREQ to 2.100000 GHz and FREQ INCR to to 210 MHz.

    Step through the frequencies shown below and check corresponding frequency counter reading for each frequency.

    The counter reading should agree ±1 count.

Signal Generator Frequency	Frequency Counter Reading
2.100000 GHz	177.500000 MHz
2.310000 GHz	180.000000 MHz
2.520000 GHz	182.142857 MHz
2.730000 GHz	184.000000 MHz
2.940000 GHz	185.625000 MHz
3.150000 GHz	187.058824 MHz
3.360000 GHz	188.333333 MHz
3.570000 GHz	189.473684 MHz
3.780000 GHz	190.500000 MHz
3.990000 GHz	191.428571 MHz
4.200000 GHz	192.272727 MHz
4.410000 GHz	193.043478 MHz
4.620000 GHz	194.750000 MHz
4.830000 GHz	195.400000 MHz
5.040000 GHz	195.000000 MHz
5.250000 GHz	195.555556 MHz
5.460000 GHz	196.071429 MHz
5.670000 GHz	196.551724 MHz
5.880000 GHz	197.000000 MHz
6.090000 GHz	197.419355 MHz
6.300000 GHz	191.818182 MHz
6.510000 GHz	192.352941 MHz

If the frequencies are correct, the problem is in the YTO loop. Proceed to BD4 to isolate.

If any frequency is not correct, proceed to BD3 to isolate the problem in the M/N loop.

When the problem has been corrected, repeat the procedure from step 1.

YTO Loop Power Checks (√5)

Note

For this check be sure to disconnect the green ALC cable (A1W13) from the Pre-Amplifier Assembly.

41. Initial conditions: FREQ set to 2.000000 GHz FREQ INCR set to 111.111 MHz
42. Ground A3A6TP1.
43. Disconnect the frequency counter and connect the power meter to BD1 TPH.
44. Tune the Signal Generator from 2.000000 GHz to 6.444440 GHz, in 111.111 MHz steps and record the power level for each step.

    Power should be greater than +10 dBm for all frequencies.

    If the power is low at any or all points, proceed to BD4 to isolate the problem. Otherwise, proceed to step 45.

YTO/FM Checks (√6).

45. Press the AM OFF and verify that both AM % LEDs are off.
46. Press FM DEVIATION MHz .3 and MTR FM pushbuttons and verify both LEDs light.
47. Connect the test equipment as shown in figure 8-21.

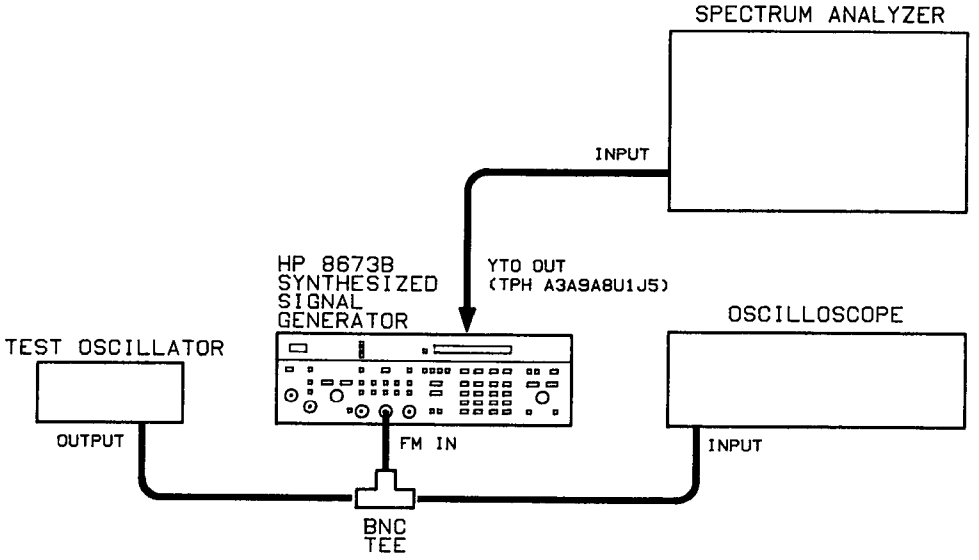


Figure 8-21. HP 8673B FM Test Setup

48. Set the test oscillator to 100 kHz and adjust the output level of the test oscillator to obtain the first carrier null (modulation

index = 2.404). Verify the voltage applied is 0.567±0.049 Vrms and the front panel meter indicates 240±30 kHz.

If the voltage applied is incorrect, proceed to BD4 to further isolate the problem.

If only the front panel meter indication is incorrect, the problem is most likely in the metering control assembly (service sheet 21).

If both indications are correct, the FM circuits are probably working properly. If any doubt exists perform the FM adjustment procedures in Chapter 5. Otherwise, proceed with step 49, "Output Level Checks".

Output Level Checks (√7)

49. Connect the test equipment as shown in figure 8-22.

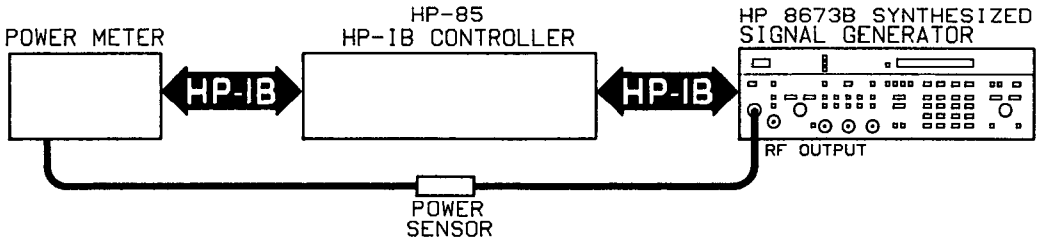


Figure 8-22. HP 8673B Power Output Test Setup

50. Press RCL 0 then ALC DIODE. Verify that the RF OUTPUT, and ALC DIODE indicators, and the UNLEVELED annunciator are on.
51. Insert HP 8673A/B adjustment cassette P/N 11726-10002 REV. B or higher, into the HP-85.
52. Load and run the program "EXEC." A more complete description of this software is given in the Adjustment Procedures, chapter 5, of this manual.
53. From the main menu select K6=MAX POWER & OTHER UTILITIES.
54. From the MAX POWER & UTILITY menu select K1=MAX Power Test.
55. Select AUTO PEAKER ON when asked by the program. The program will now run the plot.
56. Compare the plot taken in step 55 with the corresponding plot in figure 8-23. There are three possible results:

a. The plot taken in step 55 is essentially the same as the corresponding plot in figure 8-23. If this is the case, proceed with "ALC/AM Check".

b. The power at one or more of the frequencies in the plot taken in step 55 drops significantly below the Typical Performance limit line. This would indicate an output power problem. Proceed to BD5 to further isolate the problem.

Note

BD5 troubleshooting includes procedures to isolate the problem to BD6.

c. The power at one or more of the frequencies in the plot taken in step 55 is significantly lower than the power for the corresponding frequency in figure 8-23, but not below the Typical Performance limit line. This would not necessarily indicate an output power problem but could affect AM or ALC operation. Proceed with the AM/ALC check.

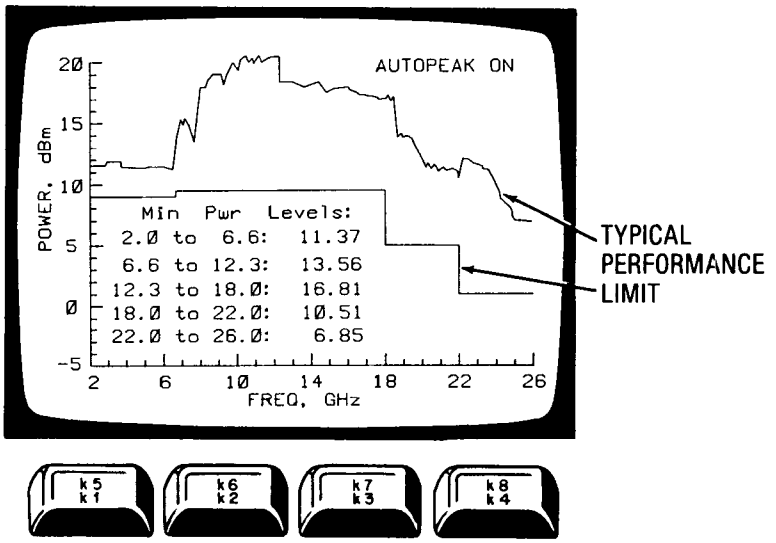


Figure 8-23. HP 8673B Power Plot

ALC/AM Check ($\sqrt{8}$).

57. Press RCL0, then connect 10 kHz at 0.707 Vrms to the AM IN connector. Press the AM 30% and MTR AM keys and verify that their LEDs turn on. Connect the Spectrum Analyzer to the RF OUTPUT connector. Set the Signal Generator output power level to −10 dBm.

    The Front Panel meter should indicate 30% ±3% and the first sidebands displayed on the spectrum analyzer should be about 16.5 dB below the carrier.

    If both readings are correct, continue with step 58.

If either or both indications are incorrect, proceed to BD6 to further isolate the problem.

58. Press the AM 100% key and verify that its LED turns on. Adjust the input voltage to obtain sidebands 12 dB below the carrier level.

    The input voltage should be 0.354±0.018 Vrms and the Front Panel meter should indicate between 40% and 60%.

    If both indications are correct, the AM circuits are probably working properly. If any doubt exists, perform the AM adjustment procedure in Chapter 5. Otherwise proceed with Pulse Modulation Checks.

    If either or both indications are incorrect, proceed to BD6 to further isolate the problem.

Pulse Modulation Checks (√9).

If the Signal Generator has a pulse modulation problem, and if the unit passes all of the above checks, the problem is in the pulse modulation board. Proceed to BD7 to isolate the problem.

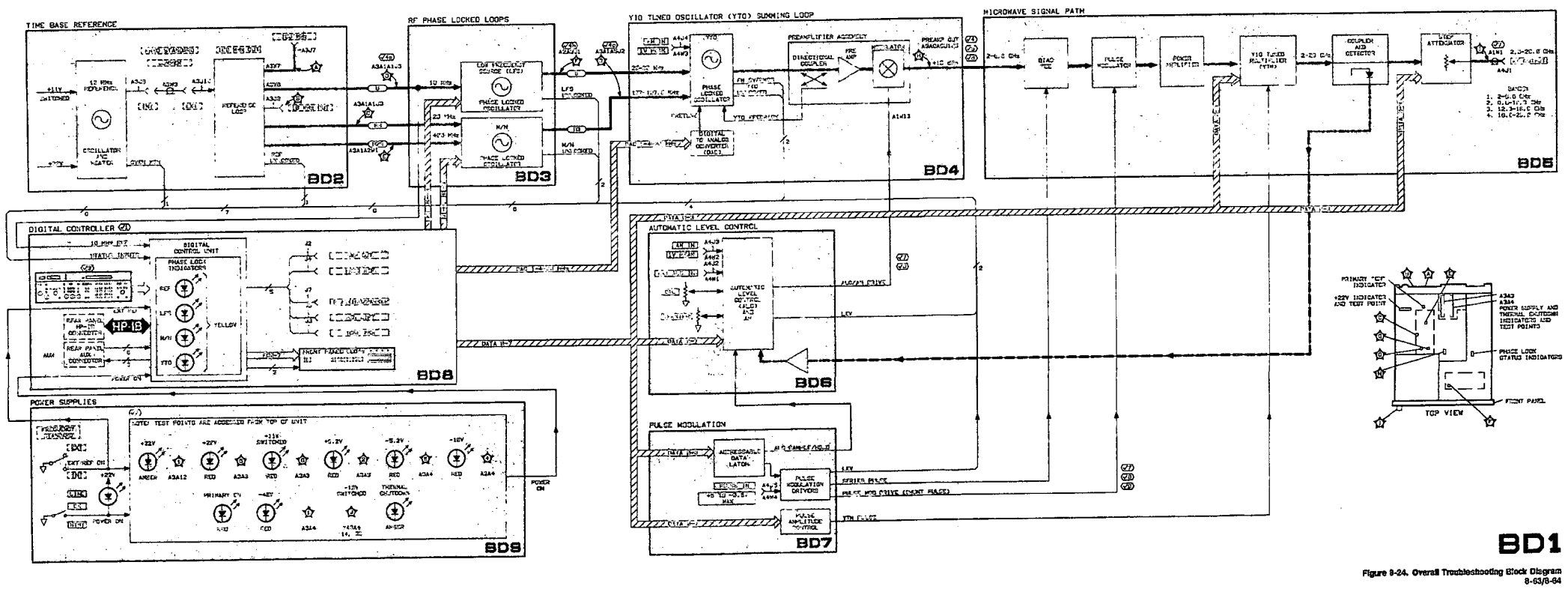


Figure 8-24. Overall Troubleshooting Block Diagram
8-63/8-64

BD2 Time Base Reference

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet BD1
Interior Views ..... Service Sheet B
Replaceable Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

The Time Base Reference generates precise time base reference signals of 10, 20, 100 and 400 MHz. These frequencies are generated from an internal, 10 MHz crystal oscillator, or from an external 5 or 10 MHz oscillator. The 10, 20, and 400 MHz time base reference signals are used as references for the M/N Loop, the Low Frequency Source (LFS) Loop, and the Digital Controller. The 100 MHz signal is available on the rear panel.

The Time Base Reference consists of two sections:

- Reference Loop Phase Detector, service sheet 1
- Reference Loop Oscillator and Frequency Multiplier, service sheet 2

The Reference Loop Oscillator and Frequency Multiplier section contains a 100 MHz voltage controlled crystal oscillator (VCXO) that is phase locked to the 10 MHz Reference Oscillator by phase lock circuits in the Reference Loop Phase Detector. The 100 MHz output from the VCXO goes three places:

- It is fed back to the Reference Phase Detector where it is divided by 10 ($\div 5$ and $\div 2$) and compared to the 10 MHz Reference Oscillator output to generate the Tune Voltage that keeps the 100 MHz VCXO phase locked to the 10 MHz reference. The output of the $\div 5$ circuit is buffered to become the internal 20 MHz reference and the output of the $\div 2$ circuit is routed to three separate buffers to become the three internal 10 MHz references.
- It is routed to the quadrupler to produce the 400 MHz reference output.
- It is routed to the rear panel as the 100 MHz reference.

Troubleshooting

General

It is assumed that the troubleshooting information associated with service sheet BD1 has been used to isolate a malfunction to the Time Base Reference BD2. The following troubleshooting procedure can be used to further isolate the problem to one of the following:

10 MHz Reference Oscillator
Reference Phase Detector
100 MHz VCXO

Equipment

Frequency Counter	HP 5343A
Variable Power Supply	HP 6200B
Digital Voltmeter	HP 3456A or HP 3455A
Spectrum Analyzer	HP 8566B

Troubleshooting Procedure

This procedure is divided into two checks, as follows:

Reference Oscillator Check ($\surd$1)

100 MHz VCXO Check ($\surd$2)

If the reference Oscillator and the 100 MHz VCXO are operating normally, then, by default, the problem must be with the Reference Phase Detector.

Reference Oscillator Check ($\surd$1)

1. Remove the gray jumper (8) from A3J9 on the rear panel and connect the spectrum analyzer in its place.

   The spectrum analyzer should show a 10 MHz ±30 Hz signal at a power level of at least +8 dBm.

   If the frequency or power is incorrect, try to adjust the reference oscillator. If the reference oscillator cannot be adjusted, it is defective and should be replaced.

   If the frequency and power are correct, remove the spectrum analyzer, replace the jumper, and proceed with 100 MHz VCXO Check ($\surd$2), beginning with step 2.

100 MHz VCXO Check ($\surd$2)

2. Remove A3A1A1. This opens the reference phase lock loop and allows testing of the 100 MHz VCXO.
3. Remove the grey/orange/white (839) cable from A3A1A2J1 and connect the spectrum analyzer in its place.

4. Using the DVM, set the variable power supply for −8.0 volts and turn the power supply off. Connect the power supply positive lead to chassis ground and the negative lead to A3A1A2TP1.

Caution



Do not connect a positive voltage at this point. To do so would damage the 100 MHz VCXO.

5. Turn the power supply on and observe the spectrum analyzer.

   The frequency should be 100 MHz ±1 MHz at a power level of at least +3 dBm.

   If a signal is present but the frequency and/or power is not as indicated, go to the Reference Loop VCXO Adjustment procedure in chapter 5 and attempt to adjust the 100 MHz VCXO.

   If there is no signal or if the 100 MHz VCXO cannot be properly adjusted, either the 100 MHz VCXO or the 100 MHz Buffer is defective, go to service sheet 2.

   If the signal is as indicated, leave the power supply connected to TP1, replace the gray/ orange/white (839) cable and proceed with step 6.

6. Connect the spectrum analyzer to rear panel connector A3J7.

   The spectrum analyzer display should show a 100 ±1 MHz signal at a power level of at least 0 dBm.

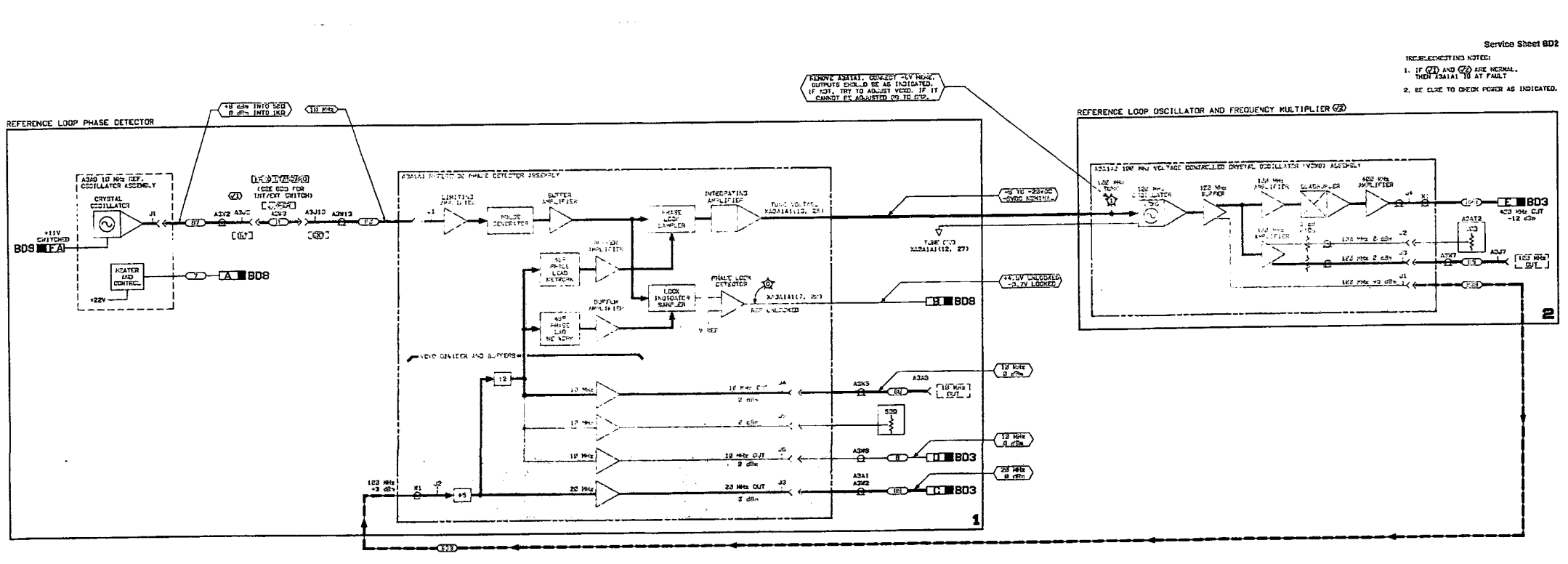
   If the signal is not as indicated, the 100 MHz amplifier is defective. Go to service sheet 2. Otherwise, continue with step 7.

7. Remove the gray/red/white (829) cable from A3A1A3J1 and connect it to the spectrum analyzer.

   The spectrum analyzer should show a 400 ±4 MHz signal at a power level of at least −12 dBm.

   If the indication is not correct, the quadrupler or associated circuitry is defective. Go to service sheet 2.

   If the indication is correct, A3A1A2 is operating normally. If the Reference Oscillator is operating normally per ($\surd$1), the problem is in Reference Phase Detector A3A1A1. Replace the gray/red/white (829) cable, remove the power supply from TP1, and go to service sheet 1.



BD2

Figure 8-25. Timebase Reference Block Diagram
8-69/8-70

BD3 RF Phase Locked Loops

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet BD1
YTO Loop Assembly ..... Service Sheet A
Interior Views ..... Service Sheet B
Replaceable Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

General

The RF Phase Locked Loops, under control of the Digital Control Unit (DCU), control the YTO output frequency. Two RF Phase Locked Loops are used to accomplish this:

- The Low Frequency Source (LFS) Loop, which controls YTO frequencies of 9.999 MHz and less in 1 kHz steps, and
- The M/N Loop, which controls YTO frequencies of 10 MHz to 6.6 GHz in 10 MHz steps.

Each is discussed separately below.

Low Frequency Source (LFS) Loop

The LFS loop synthesizes the 1 MHz, 100 kHz, 10 kHz and 1 kHz digits in the YTO output frequency. This is done by generating an output signal whose frequency varies from 20.001 MHz to 30.000 MHz. To do this the DCU decodes the four least significant bits of the selected frequency and sends it to the LFS loop as the 16-bit, LFS 1K—8M signal. This signal controls the LFS loop output frequency which is then used as a reference input signal to the YTO. The LFS Loop output frequency is given by the following equation:

$f_{LFS} = 30 - x.xxx$ MHz

where:

f_{LFS} = the LFS Loop output frequency, and $x.xxx$ signifies the four least significant digits of the YTO frequency.

The YTO frequency can be calculated from the Signal Generator output frequency by using the following formulas for each band:

Band 1 $f_{YTO} = f_{OUT}$
Band 2 $f_{YTO} = f_{OUT}/2$
Band 3 $f_{YTO} = f_{OUT}/3$
Band 4 $f_{YTO} = f_{OUT}/4$

where:

f_{YTO} = the YTO output frequency, and
f_{OUT} = the Signal Generator Output frequency.

The LFS Loop consists of:

- 20/30 MHz Divider,
- 20/30 Phase Detector,
- 160—240 MHz VCO

Inputs to the 20/30 MHz Divider are the 10-MHz reference signal from the Reference Loop in A3, and 16 bits of digital information (LFS 1K—8M) from the Frequency Output-HP-IB assembly. A 160—240 MHz feedback signal, from the 160—240 MHz VCO Assembly portion of the Low Frequency Source, is also input to the 20/30 MHz Divider Assembly.

The divide by 10/11 prescaler output, in conjunction with a programmable divider, generates a nominal 80 kHz output when the LFS loop is phase locked. In the Phase Detector Assembly, this signal is compared to the 80 kHz reference signal (10 MHz divided by 125) to generate a pulse whose width is determined by the phase difference between the two signals. This pulse is integrated to obtain a dc tuning voltage, which will always drive the VCO frequency in the correct direction to maintain phase lock. If the loop unlocks, a one shot multivibrator is continuously retriggered and the ϕUNLOCKED status annunciator will light.

The 160—240 MHz VCO Assembly contains a voltage controlled oscillator that is controlled by the TUNE OUT signal from the 20/30 Phase Detector. It is tuned, based on the LFS 1K—8M inputs, in discrete steps from 160.008 MHz to 240 MHz. The oscillator output has two paths. One is a filtered feedback path to the 20/30 MHz Divider Assembly. In the other path the signal is divided by eight and filtered to obtain a relatively clean signal between 20.001 MHz and 30.000 MHz. This signal goes to the YTO Loop in A3.

M/N Loop

The M/N Loop consists of the M/N Phase Detector, the M/N VCO and M/N Output, and generates a 177 to 197.5 MHz signal at +3 dBm. This signal controls the four most significant digits of the YTO frequency. The loop is phase locked to the 400 MHz and 20 MHz reference signals from the Reference Loop. Two binary numbers (M and N), generated by the DCU, are used to control the M/N Loop frequency. The DCU generates the M and N numbers by decoding the most significant digits (10 MHz to 10 GHz) of the selected front panel frequencies. The ratio of M/N determines the M/N OUT frequency.

For each valid M/N OUT frequency change, a 10 MHz step occurs in the YTO output. This step complements the LFS Loop whose tuning range is 10 MHz in 1 kHz steps. Together, the M/N Loop, YTO pretuning, and the LFS Loop, tune the YTO from 2000.000 to 6599.999 MHz in 1 kHz steps.

Phase offsets between divider outputs are constant when the M/N Loop is phase locked. If the M/N Loop unlocks, the front panel ϕUNLOCKED status annunciator turns on.

The relationship between M/N loop output frequency and the M and N numbers is shown by the equation:

$$f_{M/N} = [200 - 10\ (M/N)]\ \text{MHz}$$

where:

$f_{M/N}$ = M/N frequency out
M = M number
N = N number

Table 8-5 lists the M and N numbers, M/N output frequencies and YTO frequencies.

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (1 of 13)

Freq. MHz	M	N	M/N MHz
2000	17	11	184.545455
2010	16	11	185.454545
2020	15	11	186.363636
2030	14	11	187.272727
2040	13	11	188.181818
2050	12	11	189.090909
2060	11	11	190.000000
2070	10	11	190.909091
2080	9	11	191.818182
2090	8	11	192.727273
2100	27	12	177.500000
2110	26	12	178.333333
2120	25	12	179.166667
2130	24	12	180.000000
2140	23	12	180.833333
2150	22	12	181.666667
2160	21	12	182.500000
2170	20	12	183.333333
2180	19	12	184.166667
2190	18	12	185.000000
2200	17	12	185.833333
2210	16	12	186.666667
2220	15	12	187.500000
2230	14	12	188.333333
2240	13	12	189.166667
2250	12	12	190.000000
2260	11	12	190.833333
2270	10	12	191.666667
2280	9	12	192.500000
2290	8	12	193.333333
2300	27	13	179.230769
2310	26	13	180.000000
2320	25	13	180.769231
2330	24	13	181.538462
2340	23	13	182.307692
2350	22	13	183.076923

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (2 of 13)

Freq. MHz	M	N	M/N MHz
2360	21	13	183.846154
2370	20	13	184.615385
2380	19	13	185.384615
2390	18	13	186.153846
2400	17	13	186.923077
2410	16	13	187.692308
2420	15	13	188.461538
2430	14	13	189.230769
2440	13	13	190.000000
2450	12	13	190.769231
2460	11	13	191.538462
2470	10	13	192.307692
2480	9	13	193.076923
2490	8	13	193.846154
2500	27	14	180.714286
2510	26	14	181.428571
2520	25	14	182.142857
2530	24	14	182.857143
2540	23	14	183.571429
2550	22	14	184.285714
2560	21	14	185.000000
2570	20	14	185.714286
2580	19	14	186.428571
2590	18	14	187.142857
2600	17	14	187.857143
2610	16	14	188.571429
2620	15	14	189.285714
2630	14	14	190.000000
2640	13	14	190.714286
2650	12	14	191.428571
2660	11	14	192.142857
2670	10	14	192.857143
2680	9	14	193.571429
2690	8	14	194.285714
2700	27	15	182.000000
2710	26	15	182.666667

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (3 of 13)

Freq. MHz	M	N	M/N MHz
2720	25	15	183.333333
2730	24	15	184.000000
2740	23	15	184.666667
2750	22	15	185.333333
2760	21	15	186.000000
2770	20	15	186.666667
2780	19	15	187.333333
2790	18	15	188.000000
2800	17	15	188.666667
2810	16	15	189.333333
2820	15	15	190.000000
2830	14	15	190.666667
2840	13	15	191.333333
2850	12	15	192.000000
2860	11	15	192.666667
2870	10	15	193.333333
2880	9	15	194.000000
2890	8	15	194.666667
2900	27	16	183.125000
2910	26	16	183.750000
2920	25	16	184.375000
2930	24	16	185.000000
2940	23	16	185.625000
2950	22	16	186.250000
2960	21	16	186.875000
2970	20	16	187.500000
2980	19	16	188.125000
2990	18	16	188.750000
3000	17	16	189.375000
3010	16	16	190.000000
3020	15	16	190.625000
3030	14	16	191.250000
3040	13	16	191.875000
3050	12	16	192.500000
3060	11	16	193.125000
3070	10	16	193.750000

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (4 of 13)

Freq. MHz	M	N	M/N MHz
3080	9	16	194.375000
3090	8	16	195.000000
3100	27	17	184.117647
3110	26	17	184.705882
3120	25	17	185.294118
3130	24	17	185.882353
3140	23	17	186.470588
3150	22	17	187.058824
3160	21	17	187.647059
3170	20	17	188.235294
3180	19	17	188.823529
3190	18	17	189.411765
3200	17	17	190.000000
3210	16	17	190.588235
3220	15	17	191.176471
3230	14	17	191.764706
3240	13	17	192.352941
3250	12	17	192.941176
3260	11	17	193.529412
3270	10	17	194.117647
3280	9	17	194.705882
3290	8	17	195.294118
3300	27	18	185.000000
3310	26	18	185.555556
3320	25	18	186.111111
3330	24	18	186.666667
3340	23	18	187.222222
3350	22	18	187.777778
3360	21	18	188.333333
3370	20	18	188.888889
3380	19	18	189.444444
3390	18	18	190.000000
3400	17	18	190.555556
3410	16	18	191.111111
3420	15	18	191.666667
3430	14	18	192.222222

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (5 of 13)

Freq. MHz	M	N	M/N MHz
3440	13	18	192.777778
3450	12	18	193.333333
3460	11	18	193.888889
3470	10	18	194.444444
3480	9	18	195.000000
3490	8	18	195.555556
3500	27	19	185.789474
3510	26	19	186.315789
3520	25	19	186.842105
3530	24	19	187.368421
3540	23	19	187.894737
3550	22	19	188.421053
3560	21	19	188.947368
3570	20	19	189.473684
3580	19	19	190.000000
3590	18	19	190.526316
3600	17	19	191.052632
3610	16	19	191.578947
3620	15	19	192.105263
3630	14	19	192.631579
3640	13	19	193.157895
3650	12	19	193.684211
3660	11	19	194.210526
3670	10	19	194.736842
3680	9	19	195.263158
3690	8	19	195.789474
3700	27	20	186.500000
3710	26	20	187.000000
3720	25	20	187.500000
3730	24	20	188.000000
3740	23	20	188.500000
3750	22	20	189.000000
3760	21	20	189.500000
3770	20	20	190.000000
3780	19	20	190.500000
3790	18	20	191.000000

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (6 of 13)

Freq. MHz	M	N	M/N MHz
3800	17	20	191.500000
3810	16	20	192.000000
3820	15	20	192.500000
3830	14	20	193.000000
3840	13	20	193.500000
3850	12	20	194.000000
3860	11	20	194.500000
3870	10	20	195.000000
3880	9	20	195.500000
3890	8	20	196.000000
3900	27	21	187.142857
3910	26	21	187.619048
3920	25	21	188.095238
3930	24	21	188.571429
3940	23	21	189.047619
3950	22	21	189.523810
3960	21	21	190.000000
3970	20	21	190.476190
3980	19	21	190.952381
3990	18	21	191.428571
4000	17	21	191.904762
4010	16	21	192.380952
4020	15	21	192.857143
4030	14	21	193.333333
4040	13	21	193.809524
4050	12	21	194.285714
4060	11	21	194.761905
4070	10	21	195.238095
4080	9	21	195.714286
4090	8	21	196.190476
4100	27	22	187.727273
4110	26	22	188.181818
4120	25	22	188.636364
4130	24	22	189.090909
4140	23	22	189.545455
4150	22	22	190.000000

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (7 of 13)

Freq. MHz	M	N	M/N MHz
4160	21	22	190.454545
4170	20	22	190.909091
4180	19	22	191.363636
4190	18	22	191.818182
4200	17	22	192.272727
4210	16	22	192.727273
4220	15	22	193.181818
4230	14	22	193.636364
4240	13	22	194.090909
4250	12	22	194.545455
4260	11	22	195.000000
4270	10	22	195.454545
4280	9	22	195.909091
4290	8	22	196.363636
4300	27	23	188.260870
4310	26	23	188.695652
4320	25	23	189.130435
4330	24	23	189.565217
4340	23	23	190.000000
4350	22	23	190.434783
4360	21	23	190.869565
4370	20	23	191.304348
4380	19	23	191.739130
4390	18	23	192.173913
4400	17	23	192.608696
4410	16	23	193.043478
4420	15	23	193.478261
4430	14	23	193.913043
4440	13	23	194.347826
4450	12	23	194.782609
4460	11	23	195.217391
4470	10	23	195.652174
4480	9	23	196.086957
4490	8	23	196.521739
4500	27	24	188.750000
4510	26	24	189.166667

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (8 of 13)

Freq. MHz	M	N	M/N MHz
4520	25	24	189.583333
4530	24	24	190.000000
4540	23	24	190.416667
4550	22	24	190.833333
4560	21	24	191.250000
4570	20	24	191.666667
4580	19	24	192.083333
4590	18	24	192.500000
4600	17	24	192.916667
4610	16	24	193.333333
4620	15	24	193.750000
4630	14	24	194.166667
4640	13	24	194.583333
4650	12	24	195.000000
4660	11	24	195.416667
4670	10	24	195.833333
4680	9	24	196.250000
4690	8	24	196.666667
4700	27	25	189.200000
4710	26	25	189.600000
4720	25	25	190.000000
4730	24	25	190.400000
4740	23	25	190.800000
4750	22	25	191.200000
4760	21	25	191.600000
4770	20	25	192.000000
4780	19	25	192.400000
4790	18	25	192.800000
4800	17	25	193.200000
4810	16	25	193.600000
4820	15	25	194.000000
4830	14	25	194.400000
4840	13	25	194.800000
4850	12	25	195.200000
4860	11	25	195.600000
4870	10	25	196.000000

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (9 of 13)

Freq. MHz	M	N	M/N MHz
4880	9	25	196.400000
4890	8	25	196.800000
4900	27	26	189.615385
4910	26	26	190.000000
4920	25	26	190.384615
4930	24	26	190.769231
4940	23	26	191.153846
4950	22	26	191.538462
4960	21	26	191.923077
4970	20	26	192.307692
4980	19	26	192.692308
4990	18	26	193.076923
5000	17	26	193.461538
5010	16	26	193.846154
5020	15	26	194.230769
5030	14	26	194.615385
5040	13	26	195.000000
5050	12	26	195.384615
5060	11	26	195.769231
5070	10	26	196.153846
5080	9	26	196.538462
5090	8	26	196.923077
5100	27	27	190.000000
5110	26	27	190.370370
5120	25	27	190.740741
5130	24	27	191.111111
5140	23	27	191.481481
5150	22	27	191.851852
5160	21	27	192.222222
5170	20	27	192.592593
5180	19	27	192.962963
5190	18	27	193.333333
5200	17	27	193.703704
5210	16	27	194.074074
5220	15	27	194.444444
5230	14	27	194.814815

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (10 of 13)

Freq. MHz	M	N	M/N MHz
5240	13	27	195.185185
5250	12	27	195.555556
5260	11	27	195.925926
5270	10	27	196.296296
5280	9	27	196.666667
5290	8	27	197.037037
5300	27	28	190.357143
5310	26	28	190.714286
5320	25	28	191.071429
5330	24	28	191.428571
5340	23	28	191.785714
5350	22	28	192.142857
5360	21	28	192.500000
5370	20	28	192.857143
5380	19	28	193.214286
5390	18	28	193.571429
5400	17	28	193.928571
5410	16	28	194.285714
5420	15	28	194.642857
5430	14	28	195.000000
5440	13	28	195.357143
5450	12	28	195.714286
5460	11	28	196.071429
5470	10	28	196.428571
5480	9	28	196.785714
5490	8	28	197.142857
5500	27	29	190.689655
5510	26	29	191.034483
5520	25	29	191.379310
5530	24	29	191.724138
5540	23	29	192.068966
5550	22	29	192.413793
5560	21	29	192.758621
5570	20	29	193.103448
5580	19	29	193.448276
5590	18	29	193.793103

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (11 of 13)

Freq. MHz	M	N	M/N MHz
5600	17	29	194.137931
5610	16	29	194.482759
5620	15	29	194.827586
5630	14	29	195.172414
5640	13	29	195.517241
5650	12	29	195.862069
5660	11	29	196.206897
5670	10	29	196.551724
5680	9	29	196.896552
5690	8	29	197.241379
5700	27	30	191.000000
5710	26	30	191.333333
5720	25	30	191.666667
5730	24	30	192.000000
5740	23	30	192.333333
5750	22	30	192.666667
5760	21	30	193.000000
5770	20	30	193.333333
5780	19	30	193.666667
5790	18	30	194.000000
5800	17	30	194.333333
5810	16	30	194.666667
5820	15	30	195.000000
5830	14	30	195.333333
5840	13	30	195.666667
5850	12	30	196.000000
5860	11	30	196.333333
5870	10	30	196.666667
5880	9	30	197.000000
5890	8	30	197.333333
5900	27	31	191.290323
5910	26	31	191.612903
5920	25	31	191.935484
5930	24	31	192.258065
5940	23	31	192.580645
5950	22	31	192.903226

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (12 of 13)

Freq. MHz	M	N	M/N MHz
5960	21	31	193.225806
5970	20	31	193.548387
5980	19	31	193.870968
5990	18	31	194.193548
6000	17	31	194.516129
6010	16	31	194.838710
6020	15	31	195.161290
6030	14	31	195.483871
6040	13	31	195.806452
6050	12	31	196.129032
6060	11	31	196.451613
6070	10	32	196.774194
6080	9	31	197.096774
6090	8	31	197.419355
6100	27	32	191.562500
6110	26	32	191.187500
6120	25	32	192.187500
6130	24	32	192.500000
6140	23	32	192.812500
6150	22	32	193.125000
6160	21	32	193.437500
6170	20	32	193.750000
6180	19	32	194.062500
6190	18	32	194.375000
6200	17	32	194.687500
6210	16	32	195.000000
6220	15	32	195.312500
6230	14	32	195.625000
6240	13	32	195.937500
6250	12	32	196.250000
6260	11	32	196.562500
6270	10	32	196.875000
6280	9	32	197.187500
6290	8	32	197.500000
6300	27	33	191.818182
6310	26	33	192.121212

Table 8-5.
Listing of all M and N Numbers and Resulting Frequencies (13 of 13)

Freq. MHz	M	N	M/N MHz
6320	25	33	192.424242
6330	24	33	192.727273
6340	23	33	193.030303
6350	22	33	193.333333
6360	21	33	193.636364
6370	20	33	193.939394
6380	19	33	194.242424
6390	18	33	194.545455
6400	17	33	194.848485
6410	16	33	195.151515
6420	15	33	195.454545
6430	14	33	195.757576
6440	13	33	196.060606
6450	12	33	196.363636
6460	11	33	196.666667
6470	10	33	196.969697
6480	9	33	197.272727
6490	8	33	197.575758
6500	27	34	192.058824
6510	26	34	192.352941
6520	25	34	192.647059
6530	24	34	192.941176
6540	23	34	193.235294
6550	22	34	193.529412
6560	21	34	193.823529
6570	20	34	194.117647
6580	19	34	194.411765
6590	18	34	194.705882

Troubleshooting

General

It is assumed that the troubleshooting information associated with service sheet BD1 was used to isolate the problem to either or both of the following:

- Low Frequency Source (LFS) Loop
- M/N Loop

The following troubleshooting procedures can be used to further isolate the problem to one of the following subassemblies:

LFS Loop
- 20/30 Divider
- 20/30 Phase Detector
- VCO 160—240 MHz

M/N Loop

M/N Phase Detector
M/N VCO
M/N Output

Equipment

Frequency Counter	HP 5343A
Oscilloscope	HP 1980B/19860A
Digital Voltmeter	HP 3456A or 3455A
Signal Generator	HP 8340B or HP 8640B
Spectrum Analyzer	HP 8566B
Power Meter	HP 436A
Power Sensor	HP 8485A

Troubleshooting Procedures

The following procedures are divided into nine checks:

LFS Loop Checks
10 MHz Reference Check ($\surd$1)
20/30 Divider Check ($\surd$2)
160—240 MHz VCO Check ($\surd$3)
20/30 Phase Detector Check ($\surd$4)

M/N Loop Checks

20 MHz Reference Check ($\surd$5)
400 MHz Reference Check ($\surd$6)
M/N Phase Detector Checks ($\surd$7)
M/N VCO Checks ($\surd$8)
M/N Output Checks ($\surd$9)

LFS Loop Checks

10 MHz Reference Check ($\surd$1)

1. Remove blue cable (6) from J1 of A2A13 motherboard and connect it to the counter.

   The frequency should be 10 MHz ±30 Hz.

   If the frequency is correct, proceed with step 2. If the frequency is not correct, the Reference Loop is faulty. Proceed to service sheet BD2 to troubleshoot the Reference Loop.

20/30 Divider Check ($\surd$2)

2. Replace the blue cable on A2A13J1 and connect the oscilloscope to A2A5TP2, 80 kHz REF.

   The waveform should be as shown in figure 8-26.

   If the waveform is as shown, proceed with step 3.

   If the waveform is not as shown, the divide by 125 divider chain on A2A5 is faulty. Proceed to service sheet 6 for troubleshooting.

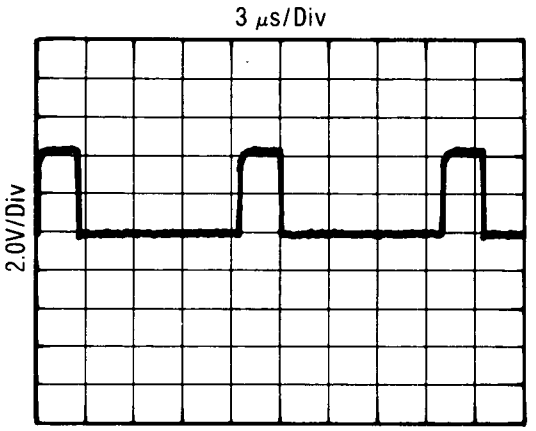


Figure 8-26. 80 kHz Reference, A2A5TP2

3. Remove A2A3, set the Test Switch to TEST HIGH FREQ, and replace A2A3. This opens the LFS loop by placing a fixed voltage on the VCO input.
4. Press RCL 0 and connect the oscilloscope to A2A5TP3. The waveform should be as shown in figure 8-27.

   If the waveform is as shown, proceed with step 9.

   If the waveform is not as shown, proceed with step 5 to see if the problem is with 20/30 Divider A2A5 or with faulty inputs from the DCU.

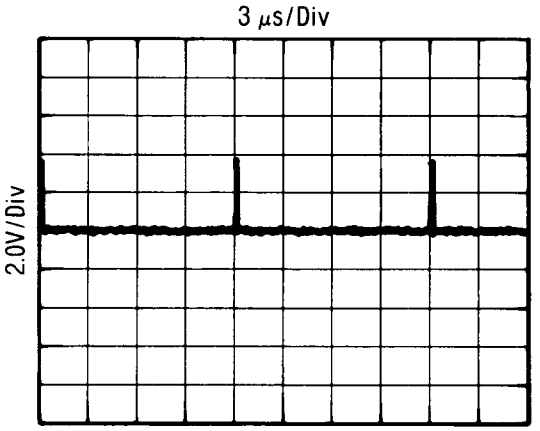


Figure 8-27. A2A5TP3, A2A3 Test Switch HIGH

5. Remove A2A5 and replace it on an extender board.
6. Set the Signal Generator to the Frequencies shown in table 8-6, and check the input pins for the logic levels given.

   If all the input pins are correct, then 20/30 Divider A2A5 is defective. Go to service sheet 6 to isolate the problem.

If any of the pins are incorrect, the appropriate output pins on Frequency Output-HP-IB Card A2A9 should be checked to insure that the problem is not on the motherboard. Proceed with step 7.

7. Remove A2A9 and replace it on the special extender card (P/N 11726-60002). (Two 36 pin and one 30 pin extender card may be used if the special card is not available.)

8. Set the Signal Generator to the frequencies shown in table 8-7 and check the input pins for the logic levels given.

   If all the pins are correct, there is a problem in the motherboard between A2A9 and A2A5. If any of the pins are incorrect, the problem is in A2A9. Proceed to service sheet 29 to isolate the problem.

Table 8-6. LFS 1K—8M Inputs

XA2A5 Pin No.→	11	12	13	14	15	16	17	18	29	30	31	32	33	34	35	36
3.339999 GHz	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
3.336666 GHz	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0

Table 8-7. LFS 1K—8M Outputs

	XA9B Pin No.										XA9A Pin No.					
	2	3	4	5	6	11	20	21	22	23	21	22	31	32	33	34
3.339999 GHz	0	0	1	0	1	1	1	0	0	1	1	0	1	0	0	1
3.336666 GHz	1	1	0	1	0	0	0	1	1	0	0	1	0	1	1	0

160-240 MHz VCO Check ($\sqrt{3}$)

Initial Conditions: A2A3 Test Switch set to TEST HIGH FREQ.

9. Disconnect the red cable (2) from A2A3J2 160—240 MHz OUTPUT (TPA) and connect the frequency counter in its place.

   The frequency should be greater than 240 MHz.

   If the frequency is correct, proceed with step 10.

   If the frequency is not correct, A2A3 is faulty. Go to service sheet 8 to isolate the problem.

10. Remove A2A3, set the Test Switch to TEST LO FREQ, and replace A2A3, then recheck the counter display.

    The frequency should be less than 160 MHz.

    If the frequency is correct, reconnect the red cable (2) to A2A3J2 and proceed with step 11.

    If the frequency is not correct, A2A3 is faulty. Go to service sheet 8 to isolate the problem.

11. Disconnect the green cable (5) from A2A3J1 (TPG) and connect the frequency counter in its place.

    The frequency should be less then 20 MHz.

    If the frequency is correct, proceed with step 12.

    If the frequency is not correct, A2A3 is faulty. Go to service sheet 8 to troubleshoot.

12. Remove A2A3, set the Test Switch to TEST HIGH FREQ, and replace A2A3, then recheck the counter display.

    The frequency should be greater than 30 MHz.

    If the frequency is correct, reconnect the green cable and proceed with 20/30 Phase Detector Check ($\surd$4), beginning with step 13.

    If the frequency is not correct, A2A3 is faulty. Go to service sheet 8 to troubleshoot.

20/30 Phase Detector Checks ($\surd$4)

Initial conditions: A2A3 Test Switch to TEST LO FREQ.

13. Connect the DVM to TP4 of A2A4.

    The voltage should be greater than +14V.

    If the voltage is correct, proceed with step 14. If the voltage is not correct, A2A4 is faulty. Go to service sheet 7 to troubleshoot.

14. Remove A2A3, set the Test Switch to TEST HIGH FREQ, and replace A2A3, then recheck the DVM indication.

    The voltage should be less than +4 volts.

    If the voltage is correct, the LFS Loop is working normally. Remove A2A3, set the Test Switch to NORMAL, replace A2A3, and proceed with M/N Troubleshooting.

    If the voltage is not correct, A2A4 is faulty. Go to service sheet 7 to troubleshoot.

M/N Loop Checks

20 MHz Reference Check ($\surd$5)

1. Connect the frequency standard output from the spectrum analyzer to A3J10 on the rear panel of the Signal Generator. Set the Frequency Standard Switch A3S1 on the rear panel of the Signal Generator to the EXT position.
2. Disconnect A3A1A3W2 (89) cable (TPF) from A3A1A1J3 20 MHz Out and connect the spectrum analyzer to A3A1A1J3. The indicated frequency should be 20 MHz at at a power level of 0 dBm ±2 dBm on the spectrum analyzer.

If the 20 MHz output is not as indicated, the problem is in the Time Base Reference Loop. Proceed to BD2 to isolate the problem.

If the indicated Frequency is correct, reconnect cable A3A1A3W2 (89) to A3A1A1J3 and proceed with step 3.

400 MHz Reference Check (√6)

3. Disconnect cable A3A1A2W1 (829) from A3A1A3J1 400 MHz In (TPE) and connect the output of the cable to the spectrum analyzer. The frequency indicated on the analyzer should be 400 MHz at a power level of −12 dBm ±2 dBm.

   If the frequency and/or power level indicated on the spectrum analyzer is not correct, the problem is in the Time Base Reference Loop. Proceed to BD2 to further isolate the problem.

   If the frequency and power level indicated on the spectrum analyzer are correct, connect cable A3A1A2W1 (829) to A3A1A3J1 and proceed with step 4.

M/N Phase Detector Check (√7)

4. Disconnect cable A3A1A3W1 (92) from A3A1A5J1 (TPD). Connect the voltmeter to A3A1A4TP1.

   The voltage measured at A3A1A4TP1 should be approximately −1V.

   If the voltage is correct, proceed with step 5.

   If the voltage is not correct, proceed with step 7.

5. Reconnect cable A3A1A3W1 (92) to A3A1A5J1 and disconnect cable A3A1A3W2 (89) from the 20 MHz Out connector (A3A1A1J3).

6. If the M/N Loop unlocks only at some frequencies, go to step 7.

   If the M/N Loop unlocks at all frequencies, do the following:

   Connect the voltmeter to A3A1A4TP1. The voltage should be approximately −38V.

   If the voltage is correct, proceed with the M/N VCO Checks.

   If the voltage is not correct, proceed with step 7.

7. Remove A3A1A3 (M/N Phase Detector Assembly) and place it on an extender board. Connect the voltmeter to pin 21 of XA3A1A3.

8. Disconnect or, if already disconnected in step 5, leave disconnected cable A3A1A3W2 (20 MHz OUT). The voltage should be approximately −8.0V.

   If the voltage is not as indicated, go to service sheet 3.

   If the voltage is as indicated, proceed with step 9.

9. Reconnect cable A3A1A3W2 (89) and disconnect cable A3A1A2W1 (400 MHz IN).

10. Connect the voltmeter to pin 6 on XA3A1A3, the voltage should be approximately −8.0V.

    If the voltage is not as indicated, go to service sheet 3.

    If the voltage is as indicated, proceed with step 11.

11. Set the Signal Generator to each frequency shown in table 8-8 and check the corresponding logic level on each A3A1A3 edge connector pin shown.

    If all of the logic levels are correct, A3A1A3 is at fault. Proceed to service sheet 3 to further isolate the problem.

    If any of the logic levels are incorrect, proceed with step 12 to determine if the problem is with the A2A9 Frequency/HP-IB Output assembly or the interconnects between the A3A1A3 and A2A9 assemblies.

12. Set the Signal Generator to each frequency shown in table 8-9 and check for the corresponding logic level on each edge connector pin shown.

    If all of the logic levels are correct, there is then a problem with the interconnects between the A3A1A3 and A2A9 Assemblies.

    Go to service sheets 3 and service sheet 29 to further isolate the faulty interconnect.

    If any of the logic levels are not correct, the problem is on the A2A9 Frequency/HP-IB. Go to service sheet 29 to isolate the problem.

Table 8-8. M1—M5 and N1—N6 Inputs

XA3A1A3 Pin No.	M5 15	M4 29	M3 14	M2 28	M1 13	N6 24	N5 9	N4 25	N3 10	N2 23	N1 8
6.180 GHz	1	0	0	1	1	1	0	0	0	0	0
6.050 GHz	0	1	1	0	0	0	1	1	1	1	1

Table 8-9. A2A9 M1—M5 and N1—N6 Outputs

XA2A9A Pin No.	M5 1	M4 3	M3 2	M2 5	M1 4	N6 7	N5 6	N4 9	N3 8	N2 10	N1 11
6.180 GHz	1	0	0	1	1	1	0	0	0	0	0
6.050 GHz	0	1	1	0	0	0	1	1	1	1	1

M/N VCO Check (√8)

Initial conditions: Cable A3A1A3W1 (92) connected to the 20 MHz Out connector (A3A1A1J3) and cable A3A1A3W2 (89) is disconnected.

13. Place A3A1A5 on an extender board and disconnect cable A3A1A4A2W2 (9) VCO Output from A3A1A5J3 (TPB).

14. Connect the spectrum analyzer to the output of cable A3A1A4A2W2 (9).

    The frequency should be approximately 396 MHz at a level of −2 dBm.

    If the frequency and power level are correct, leave cable A3A1A4A2W2 (9) connected to the spectrum analyzer and proceed with the next step.

    If the frequency and/or power level are not correct, the VCO is either defective or requires adjustment. Proceed to the M/N adjustment procedure in Chapter 5 and attempt to adjust the VCO. If it cannot be adjusted, replace it.

15. Disconnect cable A3A1A3W1 (92) from the 20 MHz Output (A3A1A1J3) and connect cable A3A1A3W2 (89) in its place. This should tune the VCO to its lowest frequency.

    The spectrum analyzer should indicate a signal with a frequency of approximately 342 MHz at a power level of 0 dBm.

    If the frequency and power level are correct, reconnect cable A3A1A4A2W2 (9) to A3A1A5J3 and proceed to the M/N Output Check beginning with step 16.

    If the frequency and/or power level are not correct, the VCO is either defective or requires adjustment. Proceed to the M/N adjustment procedure in Chapter 5 and attempt to adjust the VCO. If the VCO cannot be adjusted, replace it.

M/N Output Check ($\sqrt{9}$)

Initial conditions: Cable A3A1A3W2 (89) is connected to the 20 MHz Output (A3A1A1J3) and cable A3A1A3W1 (92) is disconnected from A3A1A5J1 (355—395 MHz Output).

16. Disconnect cable A3W8 (93) from A3A1A5J2 (M/N OUT, TPC) and connect the spectrum analyzer to A3A1A5J2 (M/N OUT, TPC).

    The indicated frequency on the spectrum analyzer should be approximately 171 MHz at a power level of 0 dBM.

    If the indicated frequency and power level are correct, proceed with step 17.

    If the indicated frequency is the same as noted in step 15, the divide by two circuit on A3A1A5 is at fault or the M/N VCO output is too low. Verify that the M/N VCO output level is at least −2 dBm (see preceding M/N VCO Checks steps 13 through 15).

If the indicated level is correct, proceed to service sheet 5 to troubleshoot the divide by two circuit and the output amplifier.

17. Leave cable A3A1A3W1 (92) disconnected from 355—395 MHz Out (A3A1A5J1) and connect the spectrum analyzer to the 355—395 MHz Out connector (A3A1A5J1, TPD).

    The frequency indicated on spectrum analyzer should be approximately 347 MHz at a power level of +3 dBm ±6 dBm.

    If the indicated frequency and level are correct, the M/N Phase Locked Loop is functioning correctly.

    If the indicated frequency and/or power level are not correct, then A3A1A5 is at fault. Proceed to service sheet 5 to further isolate the faulty component.

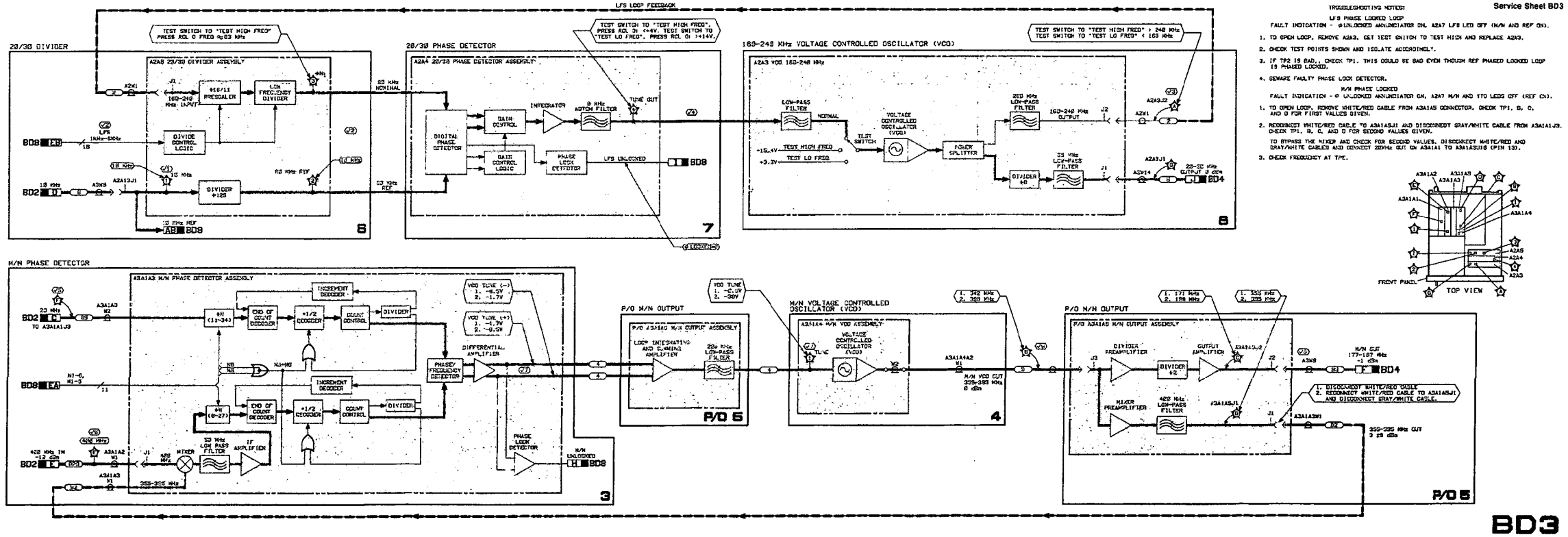


Figure 8-29. RF Phase Locked Loops Block Diagram

BD4 YTO Summing Loop

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet BD1
YTO Loop Assembly ..... Service Sheet A
Interior Views ..... Service Sheet B
Repl Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

General

The YTO Summing Loop generates the Signal Generator's baseband frequencies from 2.0—6.6 GHz. The baseband signal is multiplied to produce the other Signal Generator frequencies.

The YTO Summing Loop consists of the following:

- Digital to Analog Converter (DAC), service sheet 9
- YIG Tuned Oscillator (YTO) Driver, service sheet 10
- YTO Loop
  - Sampler, service sheet 11
  - YTO Phase Detector, service sheet 12
- YTO/FM Coil Driver, service sheet 13
- FM Subsystem
  - Meter Board, P/O Service Sheet 21
  - P/O DAC and Enable, P/O Service Sheet 22
  - P/O YTO Phase Detector Assembly, Service Sheet 12
  - P/O YTO/FM Coil Driver, Service Sheet 13

Each is discussed separately below.

Digital to Analog Converter

The Digital to Analog Converter (DAC) receives the DAC 1—4800 MHz signal from the DCU to tune the YTO to about 2 MHz of the selected frequency. The DAC output, YTO PRETUNE, is routed to the YIG Tuned Oscillator Driver.

Yig Tuned Oscillator (YTO) Driver

This circuit receives the YTO PRETUNE signal from the DAC and the YTO TUNE 2 signal from the YTO/FM Coil Driver, sums the two and routes them to the YTO Assembly. The 100 MHz low pass filter routes only the DC and low frequency (less than 100 Hz) components of the YTO TUNE 2 signal to the YTO.

YTO Loop

Sampler. This circuit receives the M/N Loop output and the sampled output of the YTO. The M/N output is applied to a harmonic generator. The output of the hamonic generator is then mixed with the YTO sampled output. Since the YTO has been pretuned to within 2 MHz of the desired frequency, one of the IF frequencies from the mixer will be close to the 20—30 MHz signal from the LFS Loop. This IF signal is routed to the YTO Phase Detector.

YTO Phase Detector. This circuit receives the 20—30 MHz signal from the LFS Loop and the selected IF signal from the Sampler. These two signals are compared in a phase/frequency detector. Each output of the phase/frequency detector corresponds to an error in the YTO frequency. One output is used to indicate the YTO frequency is too low and the other output indicates the YTO frequency is too high. An incorrect YTO frequency will produce a pulse on the phase/frequency detector output corresponding to the YTO frequency being too high or too low. The width of the pulse is proportional to the phase error between the two inputs to the phase/frequency detector.

The differential amplifier combines the two phase/frequency detector outputs to generate a single error signal for the Loop Integrators. When the YTO frequency is correct, there is no error signal at the input to the Loop Integrators so the YTO Tune 1 signal does not change. When the YTO frequency is too high or too low, the error signal at the input of the Loop Integrators causes the output of the Loop Integrators to increase or decrease until the error signal returns to zero.

The FM elements of the YTO phase detector are discussed under FM subsystem below.

YTO/FM Coil Driver

This circuit receives the YTO Tune 1 signal from the YTO Phase Detector, amplifies it and routes it to a crossover network consisting of a 100 Hz high pass filter in the YTO/FM Coil Driver Assembly and a 100 Hz low pass filter in the YTO Driver Assembly. The FM signal (100 Hz to 2 MHz) is routed to to the YTO main coil. The FM elements of this circuit are discussed under FM Subsystem below.

FM Subsystem

Metering Control. This circuit receives the FM input directly from the front panel, and control signals from the DCU. The FM signal is first applied to the FM Band Select circuit and the FM Metering Circuit. The FM Band select circuit adjusts the FM signal level for the frequency band that has been selected. The FM Metering Circuit converts the FM signal to a dc level that is proportional to the level of the FM input signal. This level is routed to the front panel meter, through the Meter Selection Switch, and to the FM Overmod Circuit

that drives the FM OM signal active if the input signal level is too high. The FM Overmod circuit also receives an input from the overmodulation detector in the YTO Summing Loop.

The output of the FM Band Select circuit is applied to the FM Amplifier whose gain is controlled by the DCU through the FM Range Select circuit.

YTO/FM Coil Driver. In the YTO/FM Coil Driver, the FM Signal from the Metering Control takes two paths: one is through a 0/40 dB attenuator and an FM amplifier and shaping network to the FM Coil Driver. The second path is through an integrator and a 0/40 dB attenuator to the Loop Integrator in the YTO Phase Detector. The first path directly modulates the YTO. The second path cancels the error signal produced by the phase/frequency detector so that FM can occur within the bandwidth of the YTO Summing Loop.

Troubleshooting

General

It is assumed that the troubleshooting information associated with service sheet 1 was used to isolate a YTO Summing Loop malfunction. The following troubleshooting information can be used to further isolate the problem to one of the following YTO Summing Loop assemblies:

- Digital to Analog Converter Assembly
- YTO Driver Assembly
- YTO/FM Coil Driver Assembly
- Sampler Assembly
- YTO Phase Detector Assembly
- Meter Board Assembly

Equipment

Frequency Counter	HP 5343A
Digital Voltmeter	HP 3456A or 3455A
Oscilloscope	HP 1980B/19860A
Test Oscillator	HP 8116A

Troubleshooting Procedures

The following procedures are divided into eleven checks:

YTO Summing Loop Checks

- YTO Check (√1)
- DAC Check (√2)
- YTO Driver Check (unlocked) (√3)
- YTO Power Check (√4)
- Sampler Input Check (√5)
- Sampler Output Check (√6)
- YTO Phase Detector Check (√7)
- Coil Driver Check (√8)
- YTO Driver Check (locked) (√9)

FM Checks

- FM Amplifier Check (√10)
- FM 40 Check (√11)

YTO Summing Loop Checks

YTO Check (√1)

Note

For this check be sure to disconnect the green ALC cable (A1W13) from the Pre-Amplifier Assembly.

1. Press RCL 0 and ground A3A6TP1. This opens the YTO loop to facilitate troubleshooting.
2. Disconnect cable A1W11 from J5 of the Pre-Amplifier Microcircuit A3A9A8U1 (TPA) and connect the frequency counter in its place.

   The frequency should be within about 2 MHz of 3000 MHz.

   If the frequency is correct proceed with step 7.

   If the frequency is not correct, continue with step 3.

DAC Check (√2)

3. Connect the DVM to A3A5TP3 and set the Signal Generator to the frequencies shown below and record the DVM indication for each frequency. The voltages should be as follow:

−6.00V	2.000 GHz
−19.8V	6.599 GHz

   If the voltages are correct, proceed with step 7.

If the voltages are not correct, A3A5 is either faulty or needs adjustment, or the DAC 1—4800 MHz input from the DCU is faulty. Proceed with step 4 to check the DAC inputs.

4. Set the Signal Generator to the frequencies shown in table 8-10 and check the input pins for the indicated logic level.

   If all the input levels are as indicated, then DAC A3A5 is defective. Go to service sheet 9 to isolate the problem.

   If any of the levels are not as indicated, proceed with step 5 to check the output pins on Frequency Output-HP-IB A2A9 to ensure that the problem is not on the motherboard.

5. Remove Frequency Output-HP-IB card A2A9 and replace it on the special extender card (P/N 11726-60002).

6. Set the Signal Generator to the frequencies shown in table 8-11 and check the output pins for the logic levels given.

   If all the levels are as indicated, there is a problem on the mother board between A2A9 and A3A5.

   If any of the levels are not as indicated, the problem is in A2A9. Proceed to service sheet 29 to isolate the problem.

Table 8-10. DAC 1—4800 MHz Inputs

XA3A5 Pin No.→	7	8	9	10	11	12	13	25	26	27	28	29	30	31
5.698 GHz	1	0	1	0	0	0	1	0	0	0	1	0	0	0
3.977 GHz	0	1	0	1	1	1	0	1	1	1	0	1	1	1

Table 8-11. A2A9 DAC 1—4800 MHz Outputs

XA9A Pin No.→	23	24	25	26	27	28	29	30	31	32	33	34	35	36
5.688 GHz	0	1	0	0	0	1	0	1	0	0	0	1	0	0
3.977 GHz	1	0	1	1	1	0	1	0	1	1	1	0	1	1

YTO Driver Check (Unlocked) ($\sqrt{3}$)

7. Connect the DVM to A3A6TP2 and set the Signal Generator to the frequencies shown below and record the DVM indication for each frequency.

   The voltages should be as follow:

   −37.5 Vdc ±10% 2.0 GHz
   −32.0 Vdc ±10% 6.599 GHz

   If the voltages are correct and the YTO Loop Power Check in BD1 failed, continue with step 8.

   If the voltages are correct and the YTO Loop Power Check in BD1 passed, continue with step 12.

If the voltages are not correct, the YTO Driver Assembly is defective or requires adjustment. Perform the YTO Driver Adjustments in chapter 5. If A3A6 cannot be properly adjusted, proceed to service sheet 10 for troubleshooting.

YTO Power Check (√4)

Note

Before proceeding, verify that you have done YTO Loop Power Check in BD1, and be sure to disconnect green ALC cable A1W13 from Pre-Amplifier Assembly connector A3A9A8J1.

8. Disconnect the frequency counter from A3A9A8U1J5 (TPA).
9. Disconnect semi-rigid cable A3A9W1 from Pre-Amplifier Assembly A3A9A8U1J3 (TPB) and connect the power meter to A3A9W1.
10. Set the Signal Generator frequency to 2.000 000 GHz and the frequency increment to 100 MHz.
11. Tune from 2.0 to 6.599 999 GHz while observing the power meter. Use smaller frequency increments as necessary. Power should not drop below +10.0 dBm at any frequency.

    If the power is correct, Pre-Amplifier Assembly A3A9A8 is defective. Go to service sheet 13.

    If the power is not correct, the YTO is defective. Go to service sheet 13.

Sampler Input Check (√5)

12. Disconnect semirigid coaxial cable A3A9W2 from attenuator A3A9A6 (TPC) and connect the frequency counter in its place.

    The frequency should be within about 2 MHz of the frequency displayed on the front panel.

    If the frequency is correct, proceed with step 13.

    If the frequency is not correct, either Pre-Amplifier Assembly A3A9A8, low pass filter A3A9A7 or attenuator A3A9A6 is defective. Proceed to service sheet 13 to troubleshoot.

Sampler Output Check (√6)

13. Reconnect A3A9W2, then disconnect the black cable (A3A9W4) from A3A9J2 (TPF) and connect the counter in its place. Press RCL 0.

    The frequency should be greater than 30 MHz.

    If the frequency is correct, replace the black cable and proceed with step 15.

    If the frequency is not correct, proceed with step 14.

14. Disconnect the white/orange cable from M/N IN connector A3A9J5 (TPD) and connect the cable to the counter.

    The frequency should be 189.375 MHz ±1 count.

    If the frequency is correct, the Sampler Assembly is faulty. Go to service sheet 11 for troubleshooting.

    If the frequency is not correct, the M/N Loop is defective. Go to BD3 for troubleshooting.

15. Reconnect the white/orange cable to A3A9J5. Disconnect green cable A3W14 from 20—30 MHz connector A3A9J3 (TPE), and connect cable A3W14 to the counter.

    The frequency should be 30.000 MHz ±1 count.

    If the frequency is correct, leave green cable A3W14 disconnected and continue with step 16.

    If the frequency is not correct, the LFS Loop is defective. Proceed to BD3 for troubleshooting.

YTO Phase Detector Check (√7)

16. Remove ground from A3A6TP1 and connect the DVM to A3A7TP2.

    The voltage should be greater than +5V.

    If the voltage is correct, continue with step 17.

    If the voltage is not correct, A3A9A4 is defective, proceed to service sheet 12 for troubleshooting.

17. Disconnect the black cable from A3A9J1 and recheck the DVM indication.

    The voltage should be less than −5V.

    If the voltage is correct, proceed with step 18.

    If the voltage is not correct, A3A9A4 is defective. Proceed to service sheet 12 for troubleshooting.

Coil Driver Check (√8)

Initial Conditions: Green cable A3W14 disconnected from A3A9J3 (TPE); black cable disconnected from A3A9J1 (TPF)

18. Connect the DVM to A3A7TP1.

    The voltage should be less than −5.3V. If the voltage is correct, proceed with step 19.

    If the voltage is not correct, the phase lock amplifier of A3A7 is defective. Proceed to service sheet 13 for troubleshooting.

19. Reconnect the black cable to A3A9J1 (TPF) and recheck the DVM indication.

The voltage should be greater than 6.7V.

If the voltage is correct, proceed with step 20.

If the voltage is not correct, the phase lock amplifier of A3A7 is defective. Proceed to service sheet 13 for troubleshooting.

YTO Driver Check (Locked) (√9)

Initial Conditions: Green cable A3W14 disconnected from A3A9J3 (TPE); black cable connected to A3A9J1 (TPF).

20. Connect the DVM to A3A6TP2. Reconnect green cable A3W14 to A3A9J3 and record the DVM indication. Disconnect green cable A3W14 from A3A9J3 and record the new DVM indication.

    The DVM indication should increase by about 0.02 volts when the cable is removed.

    If the voltage change is correct, reconnect green cable A3W14 to A3A9J3 (TPE), disconnect the black cable from A3A9J1 (TPF) and proceed with step 21.

    If the voltage change is not correct, A3A6 is defective or requires readjustment. Perform the YTO Driver Adjustment procedure in chapter 5. If A3A6 cannot be adjusted, proceed to service sheet 10 for troubleshooting.

21. Connect the DVM to A3A6TP2. Reconnect the black cable to A3A9J1 (TPF) and record the DVM indication. Disconnect the black cable from A3A9J1 (TPF) and record the new DVM indication.

    The DVM indication should decrease by about 0.02 volts when the cable is removed.

    If the voltage change is indicated, replace the black cable and green ALC cable A1W13. Proceed with step 22.

    If the voltage change is not as indicated, A3A6 is defective or requires readjustment. Perform the YTO Driver Adjustment procedure in chapter 5. If A3A6 cannot be adjusted, proceed to service sheet 10 for troubleshooting.

FM Checks

FM Amplifier Check (√10)

22. On front panel press RCL 0 and set FM deviation to 10 MHz.

23. Connect the test equipment as shown in figure 8-29.

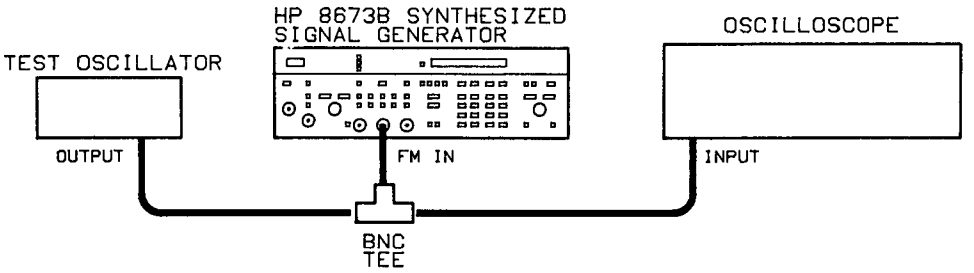


Figure 8-29. FM Amplifier Check, Initial Test Setup

24. Set the test oscillator for 10 MHz at an output level of 0V.
25. Connect oscilloscope to A3A7TP5.
26. Adjust the Test Oscillator output level for 1V peak display on the oscilloscope.

    If the Test Oscillator output level cannot be adjusted to produce the indicated oscilloscope display, the FM amplifier in A1A6 is defective. Proceed to service sheet 21 for Troubleshooting.

    Otherwise, continue with step 27.
27. Press the following keys in sequence and check for the corresponding signal level on the oscilloscope:

Keys	Signal Level
3	0.3 V peak
1	0.1 V peak
.3	0.03 V peak

    If any or all of the above indications are incorrect, the gain control of the FM amplifier is defective. Proceed to service sheet 21 for troubleshooting.

    Otherwise, continue with step 28.

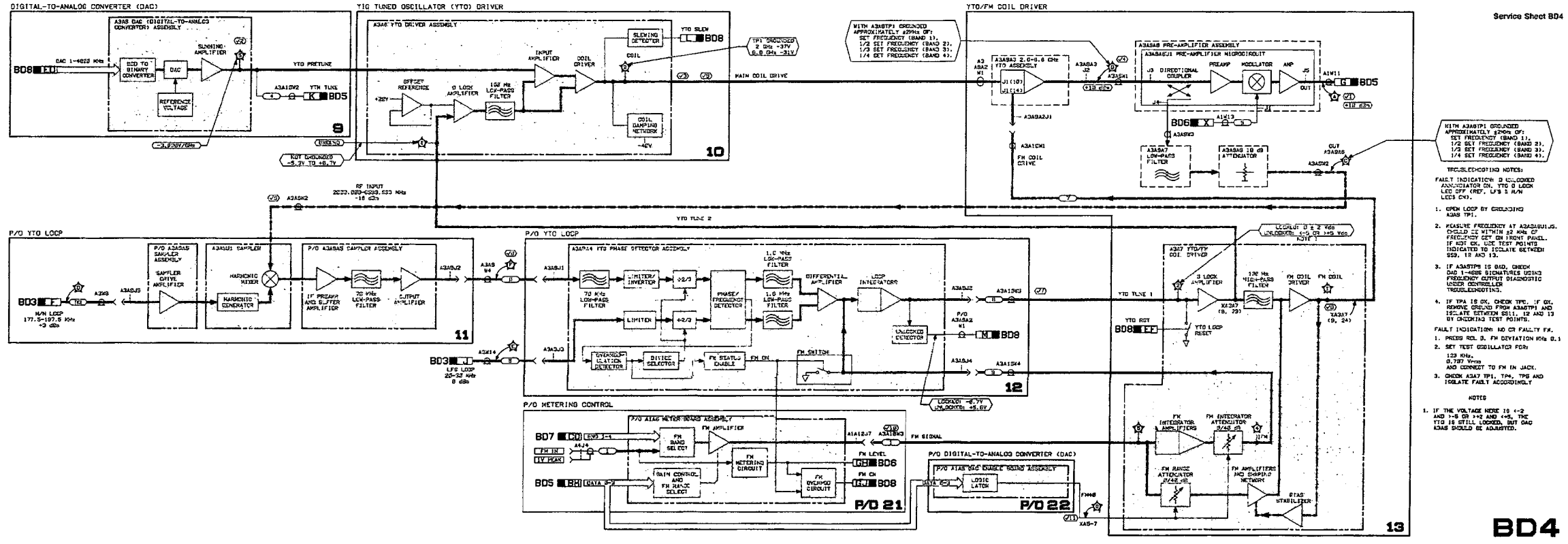
FM 40 Check ($\sqrt{11}$)

28. Remove A1A5 and install it on an extender board. Connect the DVM to XA5-7 (TPG) and observe the voltage, then press the FM DEVIATION MHz .1 key.

    The voltage should jump from zero volts to +4.5 volts.

    If the voltage does not change as indicated, the logic latch or associated circuitry on A1A5 is defective. Go to service sheet 22.

    If the voltage does change as indicated, and if the indications in steps 26 and 27 are correct, the FM circuitry of A3A7 is at fault. Go to service sheet 13.



BD4

Figure 8-30. YTO Summing Loop Block Diagram
8-107/8-108

BD5 Microwave Signal Path

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet BD1
YTO Loop Assembly ..... Service Sheet A
Interior Views ..... Service Sheet B
Replaceable Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

General

The Microwave Signal Path multiplies the 2—6.6 GHz YTO output to 2—26 GHz.

The Microwave Signal Path is functionally divided into the following assemblies:

- ALC Modulator, part of the Detector/ALC Assembly, service sheet 14
- Pulse Modulator, part of the Pulse Driver Processing Assembly, service sheet 15
- Peaker Digital To Analog Converter (DAC), part of the DAC and Enable Assembly, service sheet 22
- Step Recovery Diode (SRD) Assembly, service sheet 19
- YIG Tuned Multiplier (YTM) Driver Assembly, service sheet 16
- Detector Amplifier Circuits Assembly, service sheet 17
- Attenuator Driver Assembly, service sheet 18

The ALC modulator is driven by the ALC circuits to maintain the RF output signal at a constant level. This is discussed more fully under ALC operation, service sheet BD6.

The Pulse Modulator is driven by the pulse modulation circuits to pulse modulate the RF signal. This is discussed more fully under pulse modulation operation, service sheet BD7.

The Peaker DAC is used by the DCU to peak the YTM output signal for optimum performance. The YTM's YIG filter is adjusted so that the RF signal is centered in the passband of the filter to maximize available power and minimize the effects of the narrow passband on modulation.

Step Recovery Diode Control changes the SRD bias of the YTM Assembly, under DCU control, to adjust for different bias requirements at different frequencies.

In band 1, the step recovery diode (SRD) is forward biased to a low impedance to allow the input signal to pass through the filter. No significant harmonic generation occurs. In the multiplying bands (2—4) the SRD is biased to act as a charge controlled switch. This biasing produces a very narrow, harmonically rich pulse when the

diode switches from forward to reverse bias. The pulse width is determined by the circuit inductance and the diode capacitance. Narrow pulsewidths of 40 ps are required to obtain high conversion efficiency to 26 GHz. The proper timing of the switching action is controlled by the dc voltage bias level. The YIG tuned filter in the YTM selects the desired harmonic from the harmonically rich pulse to recover the desired multiple of the input frequency.

Optimum RF conversion efficiency requires that the appropriate dc bias levels be established for the SRD. These bias levels are achieved using a variable resistance FET to control the self bias conditions of the SRD. A blocking capacitor prevents the dc current from flowing through the driving source. The resistance of the FET is controlled by varying the gate voltage.

The Step Recovery Diode Control assembly also provides, under DCU control, frequency band adjustment signals to the YIG Driver Board.

YIG Tuned Multiplier

The YIG Tuned Multiplier (YTM) is a broadband multiplier. It's output range is divided into four bands which correspond to the frequency multiplication factors of 1 through 4. The four bands and their input and output frequency ranges are listed in table 8-12.

Table 8-12. Band Numbers and Frequencies

Band	Input Frequency Range (GHz)	Output Frequency Range (GHz)
1	1.95 to 6.6	1.95 to 6.6
2	>3.3 to 6.15	>6.6 to 12.3
3	>4.1 to 6.2	>12.3 to 18.6
4	>4.65 to 6.625	>18.6 to 26.5

The YTM is a standard step recovery diode (SRD) multiplier that produces a harmonic rich comb spectrum (see figure 8-31). The input frequency from the YIG tuned oscillator (YTO) is tunable. The output frequency is chosen by selecting a single harmonic component through the YIG filter. The multiplier is inherently broadband in that the comb spectrum, generated by the SRD, extends from the input frequency to an upper limit above 30 GHz. The required output frequency is obtained by tuning the YIG filter to a specific harmonic. The YIG filter suppresses all other frequencies. An input low pass filter prevents the output signal from being absorbed by the driving source.

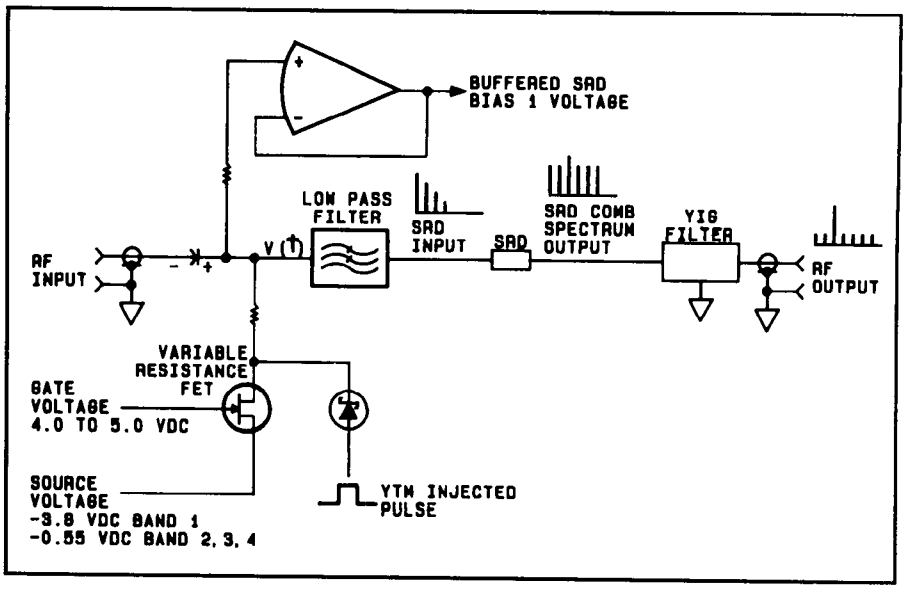


Figure 8-31. YTM Simplified Block Diagram

The Attenuator Driver Assembly decodes inputs from the DCU to control the output attenuator. The signals from the DCU are based on the front panel RANGE settings.

Troubleshooting

General

It is assumed that the troubleshooting procedures associated with BD1 have been used to isolate a problem to the Microwave Signal Path, illustrated on BD5.

The following procedure is designed to:

1. Check the microwave signal path of the Signal Generator, and
2. Isolate any problems encountered.

Some of the following steps may be skipped, but only if you have experience with the HP 8673B, and with these procedures. For anyone lacking this experience, all steps should be performed.

Equipment

Power Meter and Sensor	HP 436A and HP 8485A
Digital Voltmeter	HP 3456A or HP 3455A
Oscilloscope	HP 1980B/19860A
10dB Attenuator	HP 8491B/010
Adjustment Cassette	HP 11726—10002 REV B or higher
HP-IB Controller	HP 85B/82937A/82936A/00085—15002, 4, 5

Troubleshooting Hints

Squegging. Squegging is an unstable YTM output caused by too much power being applied to the YTF input (within the YTM). See figure 8-32 for an example of squegging. This condition can occur in Band 1 because the RF signal itself (rather than some harmonic of the RF signal) is applied to the YTF. To prevent squegging in Band 1, the RF signal is clamped to a safe power level before it is applied to the YTF. Therefore, if squegging occurs, first try to readjust the clamp circuit.

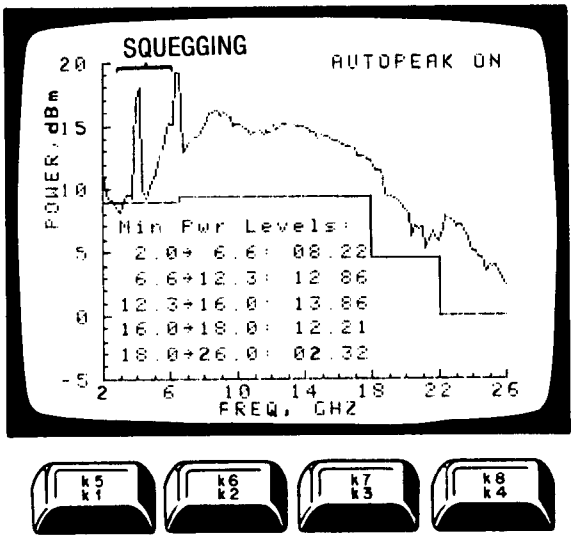


Figure 8-32. Squegging

Programmable Attenuator. When the power plots are run using the adjustment cassette, the programmable attenuator is set for zero attenuation. Therefore, if you seem to be having power problems but the plots are normal, suspect the programmable attenuator.

Troubleshooting Procedure

The troubleshooting procedure is divided into the following checks:

Baseband Power Check ($\surd$1)

YTM Output Power Check ($\surd$2)

Final Output Power Check ($\surd$3)

Programmable Attenuator Check ($\surd$4)

If a check is faulty, procedures are provided to isolate the problem to a service sheet.

Note

For all power checks on this block diagram, be sure to disconnect the green ALC cable (A1W13) from the Pre-Amplifier Assembly A3A9A8.

Block Diagram Checks

Baseband Power Check (√1)

Note

The maximum power plot described under YTM Output Power Check (√2) can be used in this check also.

1. Disconnect A1W13 from A3A9A8J1.
2. Remove cable A1W4 from A1A11.
3. Connect power meter to the output of A1W4 (TPA).
4. Set the Signal Generator frequency to 2.000 000 GHz and the frequency increment to 100 MHz.
5. Tune from 2.0 to 6.59999 GHz while observing the power meter.

   Power should not drop below +9.0 dBm at any frequency.

   If the power is correct, proceed with step 6, "YTM Output Power Check".

   If the power is not correct, go to service sheet 15 to troubleshoot the Bias Tee and Pulse Modulator.

YTM Output Power Check (√2)

6. To measure power at TPB, connect the equipment as shown in figure 8-33.

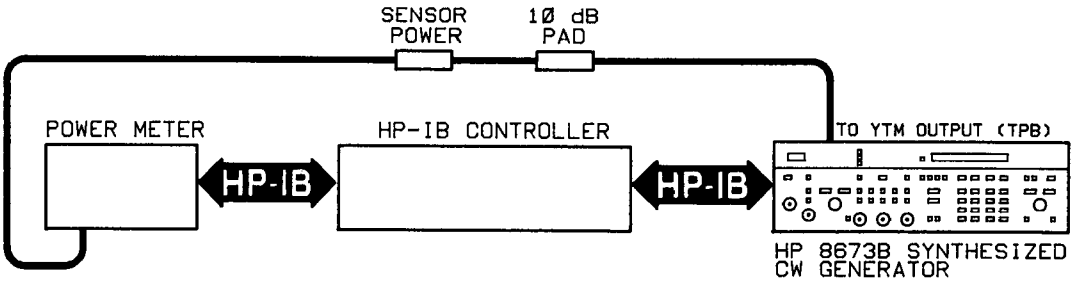


Figure 8-33. YTM Power Output Power Check Test Setup

7. To connect the power sensor to the YTM Output, remove the cable from the YTM Output and connect the 10 dB pad to the YTM output. Then connect the cable from the power sensor to the 10 dB pad.
8. Place the adjustment cassette into the HP-IB controller then load and run "EXEC".

9. Select MAX POWER & OTHER UTILITIES then MAX POWER TEST.
10. Run a power plot of the Signal Generator's full frequency range. Figure 8-34 shows a typical power plot.

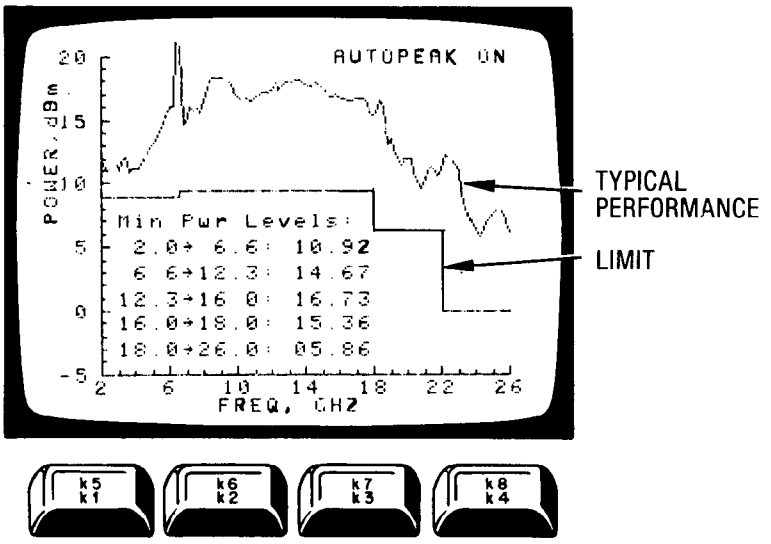


Figure 8-1. YTM Power Output Plot

If the power is above the typical limits shown on the plot, proceed with Final Output Power check beginning with step 18.

If the power is below the typical limit anywhere, reconnect A1W3 and proceed with step 11, SRD Bias Board checks.

SRD Bias Board Checks (√2a), (√2b)

In the following steps the inputs and outputs of SRD Bias Board A1A8 are checked.

11. Refer to the SRD BIAS label on the front of the A2 bulkhead (see figure 8-35). Using a DVM, check the voltages at test points 2 and 3 of A1A8 against this label. On the label, the voltage listed to the right of the band number is the Source Bias voltage (TP3), which does not vary across the band. The voltage below the band number is the Gate Bias voltage at the low end of the band, and the remaining voltage is the Gate Bias voltage at the high end of the band.

    If the voltages are not as shown on the label, ±1mV, proceed to service sheet 19 to isolate the problem on the SRD Bias Board.

    If the voltages are as shown, proceed with step 12.

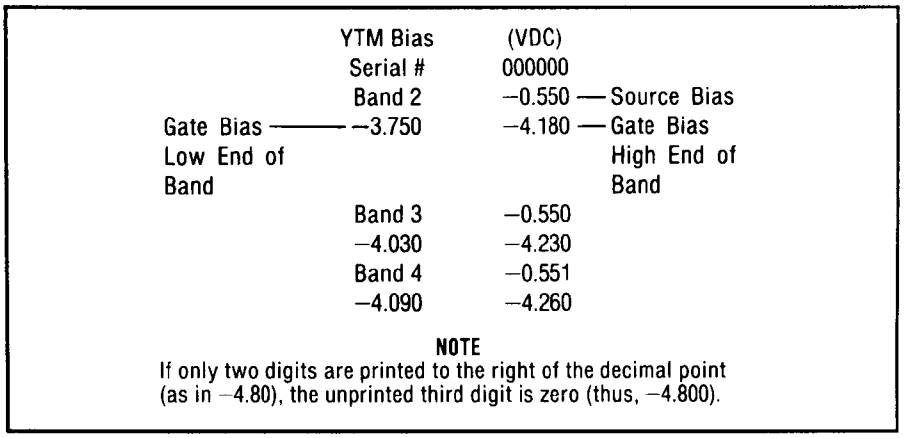


Figure 8-2. YTM Bias Label

12. Remove SRD Bias Board A1A8 and replace it on a 36 pin extender card. Using a DVM, measure the voltages at TPD (XA8 pins 17 and 18) for bands 2, 3,and 4.

    The indications should be as shown in table 8-13.

    If any indication is abnormal, proceed to service sheet 19 to isolate the problem.

    Otherwise, proceed with step 13.

Table 8-1. SRD Bias Voltages

Signal	XA8-	Band			
		1	2	3	4
G2	17	L	H	L	L
G3	18	L	L	H	L
G4	35	L	L	L	H
L ≈ −29V H ≈ −1V					

13. Press RCL 0 and AUTO sweep on the Signal Generatora. Set the oscilloscope to 0.2V and 10 μs per division. Using a 10:1 probe, verify that data lines 0—7 at TPE (XA8 pins 20—23 and 31—34) are pulsing. The pulses should meet minimum TTL levels.

    If all of the data lines pulse as indicated, proceed to step 14.

    If a data line fails to toggle, place I/O assembly A2A7 on extender boards. Under the same sweep conditions, verify TTL pulses on the corresponding output pin of A2A7. (See service sheet 30 for pin numbers.)

If the data line still fails to toggle, proceed to the troubleshooting for A2A7 on service sheet BD8.

If the data line toggles correctly, check the cables, connectors, and traces between the A2A7 and A1A8 assemblies.

14. Change the oscilloscope time per division to 5 ms and increase the intensity. The signals on enable lines EN3 and NEN14 should be as follows:

    EN3 (pin 16), positive pulses
    NEN14 (pin 10), negative pulses

    If the enable lines do not pulse as indicated, proceed to service sheet 22 to determine the cause.

    If the enable lines pulse as indicated and all previous measurements on A1A8 are correct, A1A8 is functioning normally. Proceed with Peaker DAC check beginning with step 15.

Peaker DAC Check ($\sqrt{2}$c)

15. On Microprocessor Board A2A8 set the diagnostic switch to position 5, and install the MPU Test Board (P/N 11726-60001) on top of Microprocessor Board A2A8.
16. Install a shorting clip between A2A8TP5 and A2A8TPGND.

Caution

Do not leave the Signal Generator in this mode for more than a few minutes at a time. To do so would cause excessive wear to several relays that are heavily exercised in this mode.

17. Connect the oscilloscope to TP4 on A1A5.

    The oscilloscope display should show a waveform similar to the one in figure 8-36.

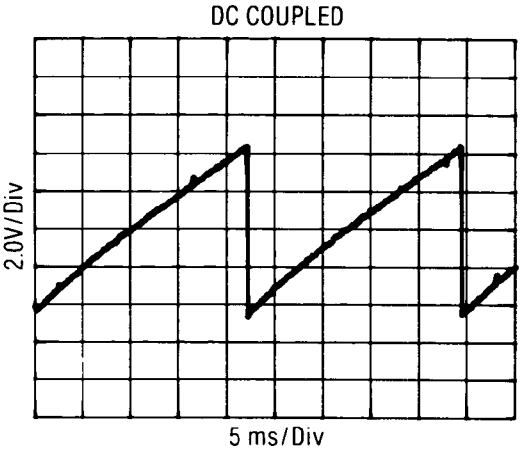


Figure 8-3. Peaker DAC Ramp Output

If the waveform is incorrect, there is a problem with the DAC & Enable board. Go to service sheet 22.

If the waveform is correct and if all of SRD Bias Board A1A8 checks were correct, the problem is with power amplifier A1A11, Isolator A1A12, YTM assembly A1A10 or YIG Driver Board A1A7. Proceed to service sheet 16 to isolate the problem.

Final Output Power Check ($\sqrt{3}$)

This procedure checks for problems in the directional coupler. A power plot is run to identify either the directional coupler or the programmable attenuator as the cause of power failure.

18. Connect equipment as shown in figure 8-37.

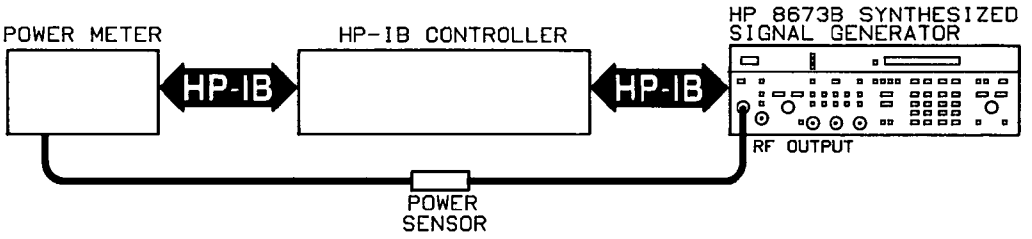


Figure 8-4. Final Output Power Check Test Setup

19. With the Adjustment Cassette still installed, (see step 8) run a power plot, then compare the plot to the one shown in figure 8-38.

    If the plot just run is substantially the same as that shown in figure 8-38, the Programmable Attenuator is faulty. Proceed to service sheet 18 to isolate the problem.

    If the plot just run is not substantially the same as that in figure 8-38 (the power drops below the limit line at one or more points) the directional coupler is attenuating the signal.

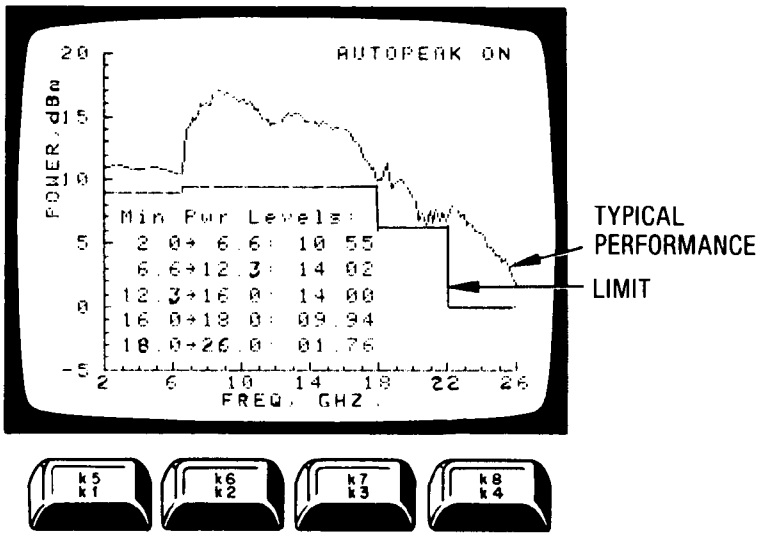
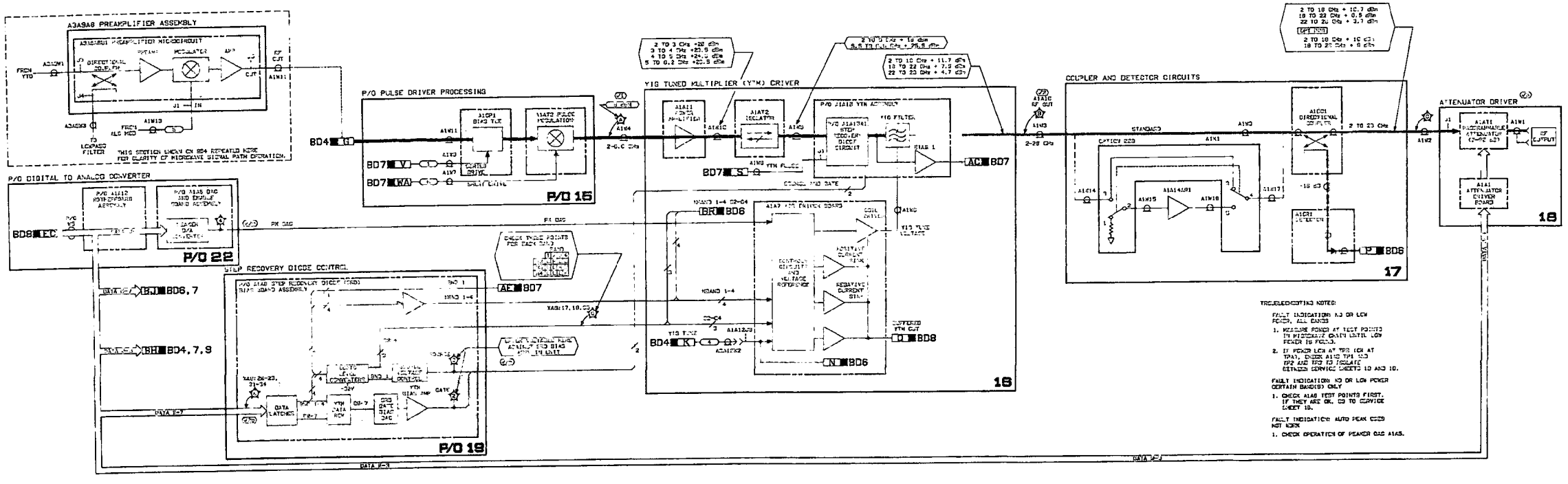


Figure 8-5. Power Output Plot

Programmable Output Attenuator Check (√4)

All the power plots run through the HP-IB controller set this attenuator for zero attenuation. Therefore, if you seem to be having power problems but the plots are OK, it is possible that the programmable attenuator is defective. To thoroughly check this attenuator perform the Low Level accuracy portion of the OUTPUT LEVEL test in "Performance Tests" in chapter 4.



BD5

Figure 8-39. Microwave Signal Path Block Diagram

BD6 ALC Loop

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet Bd1
YTO Loop Assembly ..... Service Sheet A
Interior Views ..... Service Sheet B
Replaceable Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

The primary functions of the ALC loop are to provide accurately calibrated output power and wideband linear AM capability. In addition, an extenal ALC input makes it possible to level the power actually delivered to a remote load.

To accurately control the output power of the Signal Generator in the internal ALC mode, a portion of the RF output is fed to the detector by means of a broad band directional coupler. The logarithmically amplified detector output is summed with the reference voltage at the ALC summing junction. The summing junction is the input to the integrator. The output of the integrator is routed through an exponentiator and applied to the ALC modulator to control the RF output power. The AM signal is summed into the summing junction during AM operation.

During internal ALC operation in local mode, the active inputs to the Reference Amplifier on ALC Board A1A2 are:

- F Correct
- ALC reference

The F Correct input compensates for the variations of RF power with increasing frequency due to losses in the detector, the coupler, the attenuator and connecting hardware.

The ALC Reference input is the reference voltage from the front panel VERNIER control. The output of the Reference amplifier is summed with the other active inputs at the ALC summing junction.

The detector output is directly proportional to the output power in watts. To make the detector output proportional to output power in dB, the detector output is routed through a logarithmic amplifier prior to being applied to the ALC summing junction. This conversion provides a linear reference voltage to control power out in dB.

During AM operation the AM input signal is routed through a log amplifier prior to being applied to the ALC summing junction. This provides linear, calibrated AM independent of RF output level and modulation depth.

External ALC operation is essentially the same as internal ALC. Note, however, that the EXT ALC signal is routed through an

absolute value amplifier prior to being applied to the log amplifier. The output of this amplifier is negative regardless of the input polarity. This allows any type of external reference, regardless of polarity, to be used and still get the necessary negative input required by the ALC circuitry.

In external ALC, the detector output is ac coupled into the external ALC summing junction. This serves the dual function of speeding up the external ALC response and of stabilizing the external ALC loop. When operating in band 1 in external ALC, a clamp circuit limits the power applied to the YTM to prevent spurious response.

Troubleshooting

General

It is assumed that the troubleshooting procedures associated with BD1 and BD5 have been used to isolate a problem to the ALC circuits on BD6. The following procedures can be used to further isolate the problem to one of the following assemblies.

DAC and Enable Board Assembly—Service Sheet 22
Function Board Assembly—Service Sheet 20
YIG Driver Board Assembly—Service Sheet 16
SRD Bias Board Assembly—Service Sheet 19
Detector/ALC Board Assembly—Service Sheets 14, 17

Equipment

Oscilloscope	HP 1980B/19860A
Digital Voltmeter (DVM)	HP 3456A or HP 3455A
Test Oscillator	HP 8116A
Variable Power Supply	HP 6200B
Power Meter	HP 436A
Power Sensor	HP 8485A

Troubleshooting Procedure

The following troubleshooting procedure is divided into the following checks:

F CORRECT Check ($\surd$1)

ALC Reference Check ($\surd$2)

Detector Check ($\surd$3)

ALC Modulator Drive Check ($\surd$4)

LVL and AM Meter Checks ($\surd$5)

Troubleshooting Hints

AM and External ALC Problems. If the unit has AM or external ALC problems, and the internal ALC circuits are working properly (see "ALC Key Checks ($\sqrt{3}$)", step 17 and Output Level Checks ($\sqrt{7}$) of BD1) the problem is with Function Board A1A3, service sheet 20.

ALC in Remote Mode. If the ALC reference level cannot be controlled in remote mode (but works normally in local mode) the problem is with the Level Control DAC, Local/Remote Switch, or the Level Comparator on the DAC & Enable Board, service sheet 22.

Level Meter. If the ALC and AM circuits seem to be working normally, but the level meter does does not track the VERNIER control and/or does not track AM input level changes, proceed directly to Level Meter Checks beginning with step 19.

Internal ALC Checks

This procedure first checks the F CORRECT and ALC REF inputs to the ALC Board and provides troubleshooting procedures to isolate any problems encountered.

Next the ALC loop feedback is removed by disconnecting the detector from the Detector/ALC Board input. A variable DC voltage is then applied to this input. TPB and TPD are then checked to isolate the problem to the Detector/ALC Board or the ALC/AM Modulator.

F CORRECT Checks ($\sqrt{1}$)

1. Remove A1A8 and replace it on a 36 pin extender card. Set the Signal Generator frequency to 2.0 GHz and then to 6.5 GHz. Check the voltage at XA8-15 (TPA) at each frequency.

   The voltages should be as shown below:

Frequency	Voltage
2.0 GHz	−0.003 ±0.002V
6.5 GHz	+0.2 ±0.1V

   If the voltages are correct, proceed with step 3.

   If the voltages are not correct, proceed with step 2.

2. Connect the DVM to A1A7TP2 and set the Signal Generator frequency to 2.0 GHz and then to 6.5 GHz, and observe the voltage at each frequency.

   The voltages should be as shown below.

Frequency	Voltage
2.0 GHz	−1.8V
6.5 GHz	−3.5V

   If the voltages are as shown, A1A8 is at fault. Proceed to service sheet 19 to isolate the problem.

If the voltages are not as shown, A1A7 is at fault. Proceed to service sheet 16 to isolate the problem.

ALC Reference Checks (√2)

Local ALC Reference Check.

3. Connect the DVM to A1A5TP10, ALC REF, and turn the Vernier control fully CW then fully CCW while observing the DVM.

   The voltages should be as follows:

Vernier Position	Voltage
fully CW	0.0V
fully CCW	−7.5V (typical)

   If the voltages are as shown, A1A5 is working normally, proceed with step 4.

   If the voltages are not as shown, proceed with step 5.

Remote ALC Reference Check.

4. Connect the DVM to A1A5TP8 and turn the Vernier control fully CW then fully CCW while observing the DVM.

   The voltages should be as follows:

Vernier Position	Voltage
fully CW	0.0V
fully CCW	+5.8V (typical)

   If the voltages are as shown, A1A5 is working normally. Proceed with step 6.

   If the voltages are not as shown, proceed with step 5.

5. Connect the signature analyzer as directed in DAC and Enable Board A1A5 Test of BD8. Verify the signatures of the input signals NSTRB, address lines BA0—3, data lines DATA0—7 as shown in Table 8-37 of BD8.

   If the signatures are not correct, go to BD8 for troubleshooting.

   If the signatures are correct, A1A5 is defective. Go to service sheet 22 for troubleshooting.

Detector Checks (√3)

6. If the ALC problem occurs at certain frequencies only, set the Signal Generator to one of these frequencies, otherwise set it to any frequency. Set the output power to 0 dBm or less.

7. Connect the DVM to center conductor A1A2J2 on the back of A1A2, then turn the VERNIER control fully counterclockwise.

The voltage should be as indicated below:

Vernier Position	Voltage
CCW	0.002V
CW	0.033V

If the voltage is as indicated in both cases, the coupler and detector are functioning normally, proceed with step 10 to check Detector/ALC Board Assembly A1A2.

If either of the voltages is not as indicated, proceed with step 8 to isolate the problem.

8. With the Signal Generator still set to the frequency set in step 5, remove cable A1W2 from the output of coupler A1DC1 and connect the power meter in its place. Record the power meter reading.

9. Remove Detector A1CR1 from the −16 dB port of the coupler and connect the power meter in its place. Do not reconnect A1W2 at this time.

   The power should be 16 dB below the power recorded in step 8.

   If the power is correct, Detector A1CR1 is defective.

   If the power is not as indicated, coupler A1DC1 is defective.

10. Press RCL 0 and turn RF power off. Adjust A1A2R88 (INT OS) for a voltage reading at A1A2C6 (TPD) of −0.92V.

11. Remove detector A1CR1 from A1A2J2.

12. Set the variable power supply to zero volts and connect the positive output to the center conductor of A1A2J2 and the negative output to ground.

13. Turn RF OUTPUT ON and turn the VERNIER fully ccw.

14. Connect the DVM to A1A2C6 (TPD) and gradually increase the power supply output voltage while observing the DVM.

    The voltage at TPD should vary as shown below.

Power Supply Voltage	TPD Voltage
0.005	−0.09V
0.010	+0.01V
0.015	+0.07V
0.020	+0.10V

If the voltages are correct, the Detector/ALC Board is operating normally, proceed with step 15.

If the voltages are not correct, the Detector/ALC Board A1A2 is at fault. Proceed to service sheet 17 to isolate the problem.

ALC Modulator Drive Checks (√4)

15. Remove A1A2 and replace it on a 36 pin extender card.
16. Remove the cable from A1A2J1 (TPB) and connect a tee in its place.
17. Connect a 50 ohm load and the DVM to the remaining legs of the tee.
18. With the power supply still connected to A1A2J2, set the voltage to zero and gradually increase it. The voltage at TPB should vary as shown below:

Power Supply Voltage	TPB Voltage
0.000	<-3.0V
0.0075	$\approx +0.9$V
0.0225	$\approx +9.0$V

If the voltages are correct, the ALC modulator is at fault. Replace it.

If the voltages are not correct, Detector/ALC board A1A2 is at fault. Go to service sheet 14 to isolate the problem.

LVL and AM Meter Checks (√5)

19. These procedures are used if the ALC circuitry seems to be working normally (e.g., output level varies with VERNIER rotation) but the meter does not respond at all or responds improperly to the VERNIER control or to variations in AM input levels, or the UNLEVELED annunciator lights.

For LVL meter faults the problem could be one of the following:

Defective error amp on A1A2, Service Sheet 14

Defective meter level circuit on A1A3, Service Sheet 20

Defective FET switch on A1A6, Service Sheet 21

For AM meter faults the problem could be:

Defective AM metering circuit or FET switch on A1A6, service sheet 21.

LVL Meter Checks

20. Remove A1A2 and replace it on a 36 pin extender board.
21. Connect DVM to A1A2TP5, and, while observing the DVM, press the front panel RF OUTPUT key to turn off its LED.

The DVM should initially indicate +0.15 volts then drop to about −4.5 volts when RF OUTPUT is pressed, and immediately begin increasing toward zero volts.

If the DVM indication is normal, proceed with step 22.

If the DVM indication is not normal, the Error Amplifier is defective. Go to service sheet 14 to isolate the problem.

22. Remove A1A3 and replace it on a 44 pin extender board.

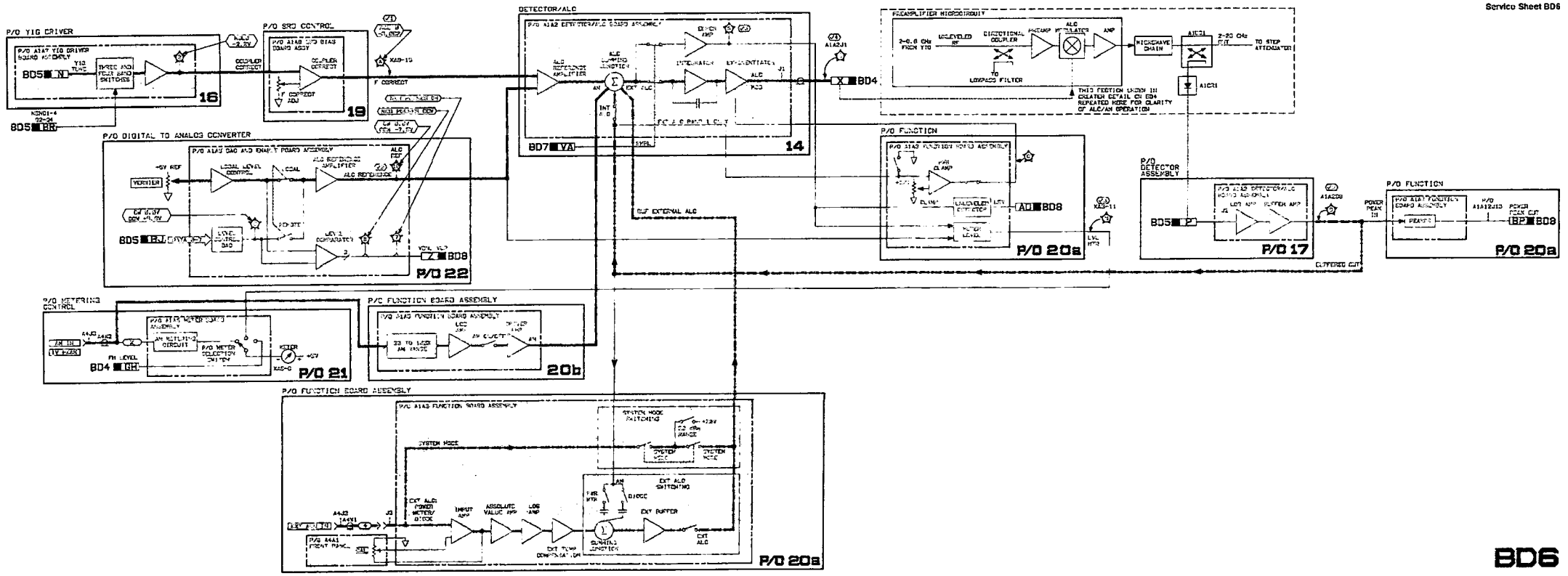
23. Connect the DVM to XA3-11 (TPN) and observe the DVM display while turning the VERNIER control from full CW to full CCW.

    The voltage at the two extreme points should be as follows:

Vernier	**TPN Voltage**
Fully CW	3.5V
Fully CCW	9.0V

    If the voltages are as indicated, A1A6 is defective; go to service sheet 21 to isolate the problem.

    If the voltages are not as indicated, the meter level circuit is defective, go to service sheet 20 to isolate the problem.



BD6

Figure 8-40. ALC Loop Block Diagram
8-129/8-130

BD7 Pulse Modulation

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet BD1
YTO Loop Assembly ..... Service Sheet A
Interior Views ..... Service Sheet B
Replaceable Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

The pulse modulation circuits provide pulse modulation in the 2—26 GHz frequency range.

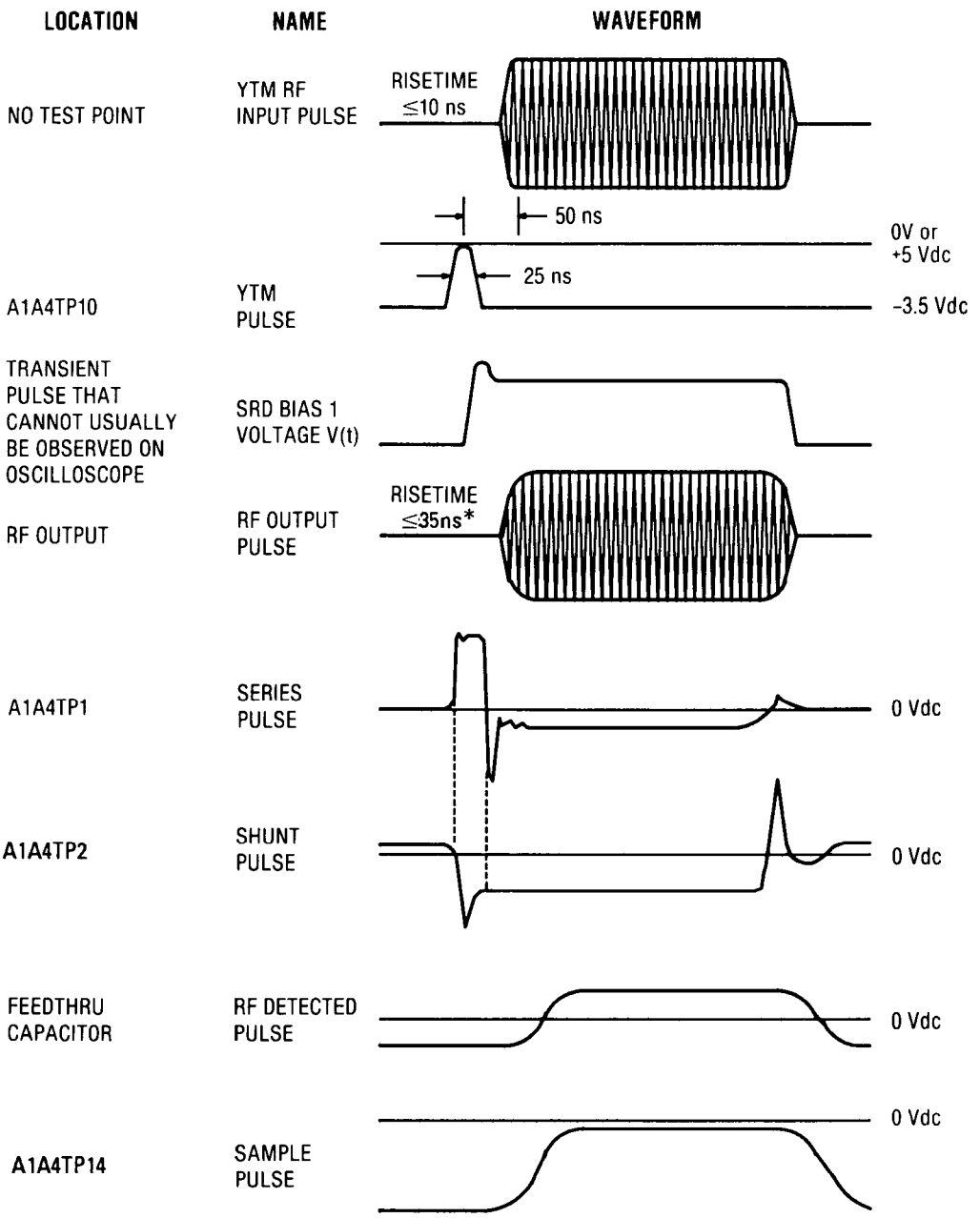
To achieve the specified risetime of <35 ns in bands 2—4, a YTM injected pulse is used to speed up the step recovery diode self bias response time. Band 1 does not require the YTM injected pulse to meet this specification because the YTM internal step recovery diode is forward biased in this band.

The series and shunt pulse drivers on the Pulse Driver Processing board turn the RF signal on and off by controlling the series and shunt diodes in the pulse modulator. To turn the RF signal off, the shunt diodes in the pulse modulator are turned on and the series diode is turned off. In this configuration, the RF signal is directed to ground through a 50 ohm resistor and the shunt diodes. To turn the RF signal on, the shunt diodes are turned off and the series diode is turned on. In this configuration, the RF bypasses the 50 ohm resistor through the series diode and is routed through the modulator. The timing of the series and shunt pulses controlling the pulse modulator is critical.

The pulse driver board also generates the YTM injected pulse. This pulse is necessary because between RF pulses the step recovery diode loses part of its bias. If the RF pulse from the pulse modulator is applied to the YTM in this condition, the pulse risetime would suffer. The YTM injected pulse is applied to the step recovery diode 50 ns before the RF pulse arrives. Thus the YTM is properly biased when the RF pulse arrives, and the pulse risetime is degraded only by the band-width of the YIG filter in the YTM.

The YTM injected pulse amplitude must be varied with changes in RF power and frequency. For example, the required amplitude can change significantly if the frequency is changed by more than 50 MHz or if the power is changed by 0.4 dB or more.

To maintain the correct amplitude of the YTM injected pulse, the controller compares the steady-state step recovery diode BIAS 1 voltage to the BIAS 2 voltage generated by the pulse amplitude control (PAC) DAC and adjusts the PAC DAC to make the two equal.



* For option 008, rise time is ≤40 ns.

Figure 8-41. Pulse Modulation Waveforms

The output of the PAC DAC drives an amplifier that provides a slope and an offset voltage adjustment for each band. The dc output voltage of this amplifier controls the peak amplitude of the YTM injected pulse. The slope and offset adjustments are used to optimize the YTM pulse peak amplitude for bands 2, 3, and 4 at all output vernier levels.

Also included in the pulse modulation system is an ALC sample and hold circuit. This circuit is used during pulse modulation (in conjunction with the ALC loop previously discussed) to maintain the correct peak pulse power level. During each pulse, the sample gate driver turns the FET Sample Switches on. Thus, during pulse modulation operation, the ALC loop is operating only when the RF pulse is present. The integrating capacitor in the ALC integrator holds the proper dc leveling voltage during the time that the RF pulse is absent. The parameters of the sample gate pulse are adjusted for minimum error in pulse level accuracy. See figure 8-41.

A minimum pulse width detector is included to light the ALC UNLEVELED annunciator if the pulse width is too narrow. The specified peak level accuracy at 100 ns pulse width is ±1 dB relative to the CW level. Pulse widths of less than 80 ns are available if unleveled power output is acceptable. The maximum pulse repetition frequency for specified level accuracy is 1 MHz. Typically, specified level accuracy is maintained for repetition rates up to 5 MHz.

Troubleshooting

General

It is assumed that the troubleshooting procedures with Service Sheets BD1 and BD5 were used to isolate the problem to the pulse modulation circuity. The following procedures may be used to further isolate the problem to one of the following.

- A1 Pulse Driver Processing Assembly—Service Sheet 15
- DAC and Enable Assembly—Service Sheet 22
- SRD Control Assembly—Service Sheet 19
- Bias Tee/Pulse Modulator—Service Sheet 15

Troubleshooting Hints

Pulse Modulation can be divided into two modes of operation, each with its own failure modes:

Band 1(2—6.6 GHz). In this band, the frequency is not multiplied, therefore the SRD is forward biased and no YTM injection pulse is required. In this band there are three failure modes:

1. The Signal Generator works in CW mode but there is no pulse output. This indicates a complete failure in one of the pulse modulation circuits, probably the shunt pulse generator.

2. Inaccurate power levels. If the power level is correct in CW mode, the problem is most likely in the sample gate circuit or the sample and hold circuit on the ALC board.
3. Incorrect operation at minimum pulse width. Performing the adjustment procedures will usually correct this problem.

   Bands 2—4 (6.6—26 GHz). In these bands the frequency is multiplied and the YTM injection pulse is critical to proper operation, especially at high end of each band. There are four failure modes in these bands. The first three are the same as the Band 1 failure modes, the fourth is:
4. Poor pulse shape. This problem can usually be corrected by performing the pulse modulation adjustment procedures in chapter 5. If adjustment does not correct the problem, the YTM circuitry must be checked.

Troubleshooting Procedures

The following procedures is divided into checks as follows:

Initial Checks

Band 1 Checks

Shunt Pulse Check ($\sqrt{1}$)

Series Pulse Check ($\sqrt{2}$)

Bias Tee/Pulse Modulator Check ($\sqrt{3}$)

Sample Gate Check ($\sqrt{4}$)

Level Check ($\sqrt{5}$)

Band 2 — 4 Checks

YTM Pulse Check ($\sqrt{6}$)

PAC DAC Check ($\sqrt{7}$)

PAC Check ($\sqrt{8}$)

Perform the initial checks first to determine the nature of the pulse modulation failure, then proceed to the indicated procedure.

Initial Checks

The purpose of these initial checks is to determine the failure mode of the unit under test. Once the failure mode is determined, the reader will be referred to the appropriate troubleshooting procedures.

1. Connect the equipment as shown in figure 8-42. The shunt adapter can easily be fabricated using 2 BNC connectors and a 147 ohm resistor as shown in figure 8-43.

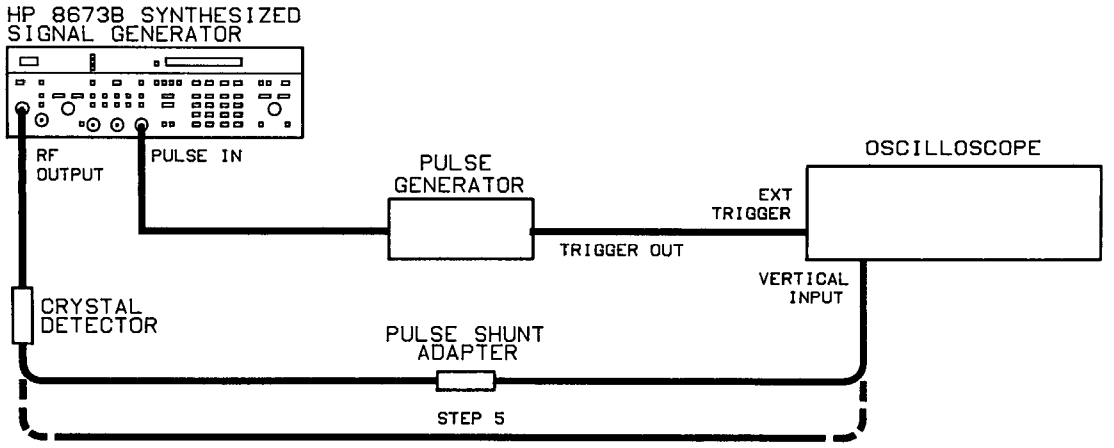


Figure 8-42. Pulse Modulation Initial Check Test Setup

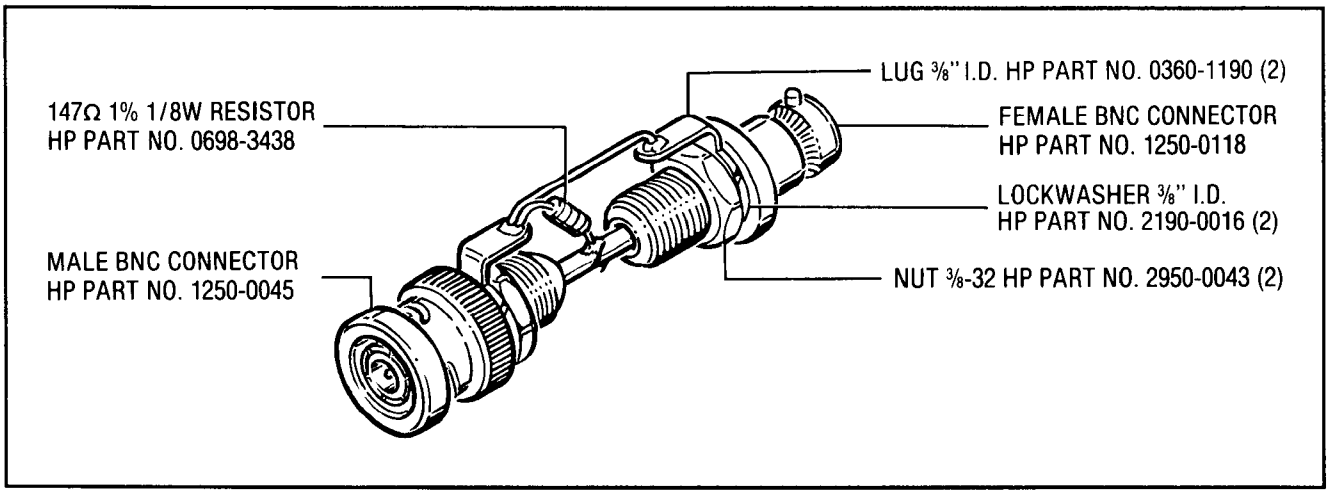


Figure 8-43. Pulse Shunt Adapter

2. Set the pulse generator for a 1 MHz pulse rate with a pulse width of 300 ns and pulse height of 3 volts peak. Set the variable attenuator for 10 dB attenuation.
3. On the Signal Generator press RCL 0 and PULSE NORM. Set Output Level to 0 dBm.
4. Observe the detected pulse on the oscilloscope.

   If the pulse is absent or seriously distorted, there is a problem with the shunt or series pulse circuits, go to ($\sqrt{1}$) "Shunt Pulse Check" and/or ($\sqrt{2}$) "Series Pulse Check" under "Band 1 Checks".

If the detected pulse looks good, go to step 5.

5. Bypass the Pulse Shunt Adapter as shown in figure 8-42. Adjust the oscilloscope vertical position and sensitivity controls so that the pulse base line is one division from the bottom graticule line and approximately 5 divisions high in peak amplitude. (The Signal Generator output level may have to be increased to +8 dBm.)
6. Switch Signal Generator to CW mode.

   Adjust the oscilloscope vertical sensitivity for a display 5 divisions above the pulse base line. The peak of the CW signal is not the CW peak reference level.

Note Do not touch the vertical position controls after the reference pulse base line has been set.

7. Switch back to PULSE NORM.
8. Without touching the vertical sensitivity controls, measure the difference between the CW peak reference level and the average peak pulse level excluding any over/undershoot.

   The difference should be within +0.61/−0.45 division on the oscilloscope.

   If the difference is not in the range indicated, proceed with ($\surd$4) "Sample Gate Check", step 20. Otherwise, proceed with step 9.
9. Reduce the pulse width from the pulse generator 100 ns and repeat steps 5 through 7.

   If the difference is not as indicated in step 8, proceed with "Sample Gate Check ($\surd$4)", step 20. Otherwise, proceed with step 10.
10. Set the pulse from the pulse generator to 300 ns.
11. Set the Signal Generator to each of the frequencies shown below, and for each frequency check the detected pulse rise time, fall time, and overshoot and ringing.

Frequencies
12.0 GHz
18.0 GHz
26.0 GHz

In each case the rise and fall time should be less than 35 ns (40 ns for Option 008), and the overshoot and ringing should be less than 20%.

If the rise and fall time and overshoot and ringing are not as indicated, proceed with ($\surd$6) YTM Pulse Check, step 24.

Shunt Pulse Check (√1)

12. Connect test equipment as shown in figure 8-44.

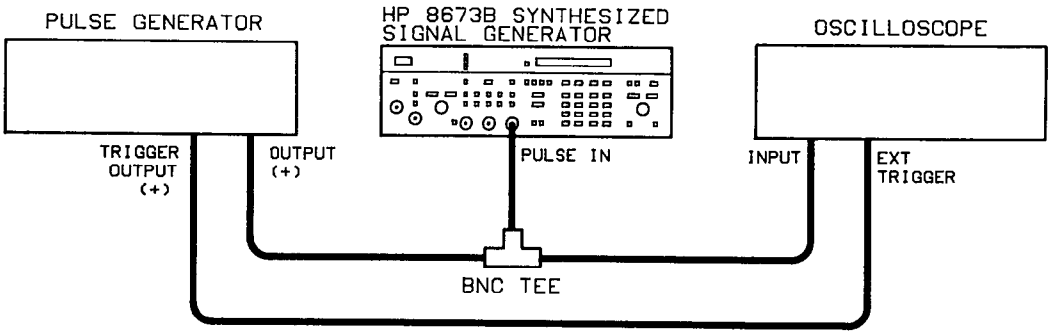


Figure 8-44. Pulse Modulation Check Setup

13. Set the pulse generator for 1 pulse per microsecond (1 MHz PRF) and a pulse width of 200 ns.

14. Connect channel 1 of the oscilloscope to A1A4TP3 and Channel 2 to A1A4TP2. Set Channel 1 display at top of screen. Set oscilloscope controls as shown in Figure 8-45 and compare the display to the figure.

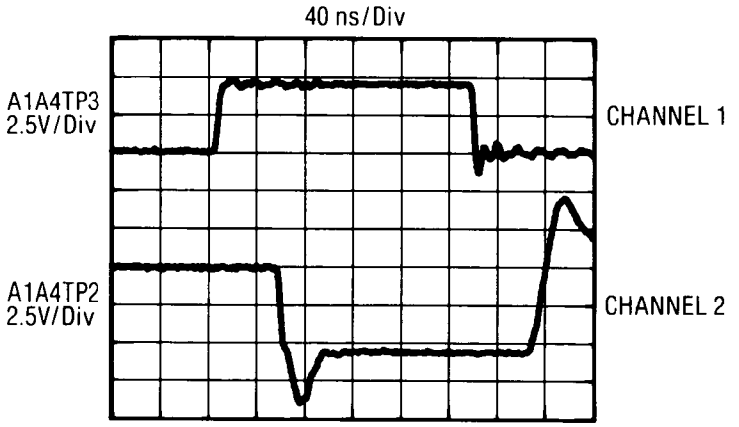


Figure 8-45. Pulse Driver Board Input and Shunt Pulses

If both channels are incorrect or absent entirely, the problem is most likely in the input control section of A1A4. Go to step 15 to check input.

If Channel 1 (TP3) is ok but channel 2 (TP2) is not correct, the problem is in the Shunt Pulse Delay and driver section of A1A4. Go to service sheet 15 to further isolate the problem.

If both channels are correct, go to step 18, "Series Pulse Check".

15. Connect the oscilloscope to A1A4TP7. The oscilloscope should show a 200 ns pulse width and PRF of 1 MHz.

    If the display is correct, proceed with step 16. If the display is not correct, the problem is between the pulse input connector and A1A4.

16. Remove A1A4 and replace it on a 36 pin extender board.

17. Connect the DVM to XA4-26 (TPB). The DVM should show a TTL logic high.

    If the DVM indication is not correct, there is a problem with the logic latch or associted circuitry on the DAC and Enable Board. Go to service sheet 22 to isolate the problem.

    If the indication is correct, there is a problem in the input control or addressable data latch on the pulse driver board. Go to service sheet 15 to isolate the problem.

Series Pulse Checks ($\sqrt{2}$)

18. Connect Channel 1 of the oscilloscope to A1A4TP3 and Channel 2 of the oscilloscope to A1A4TP1. Adjust the oscilloscope as shown in figure 8-46 then compare the oscilloscope display to the figure.

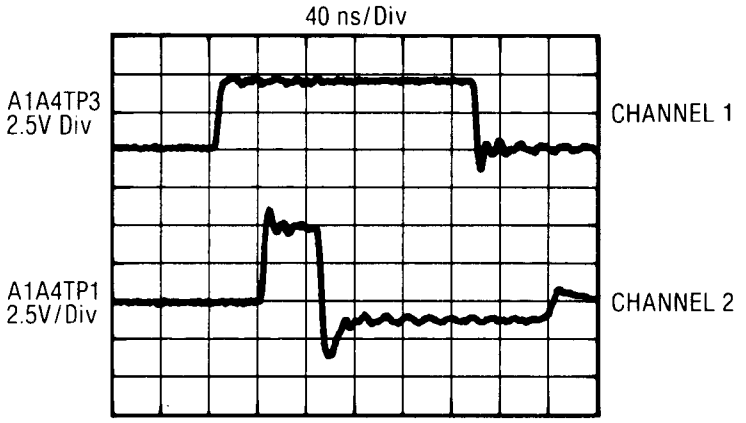


Figure 8-46. Pulse Driver Board Input and Series Pulses

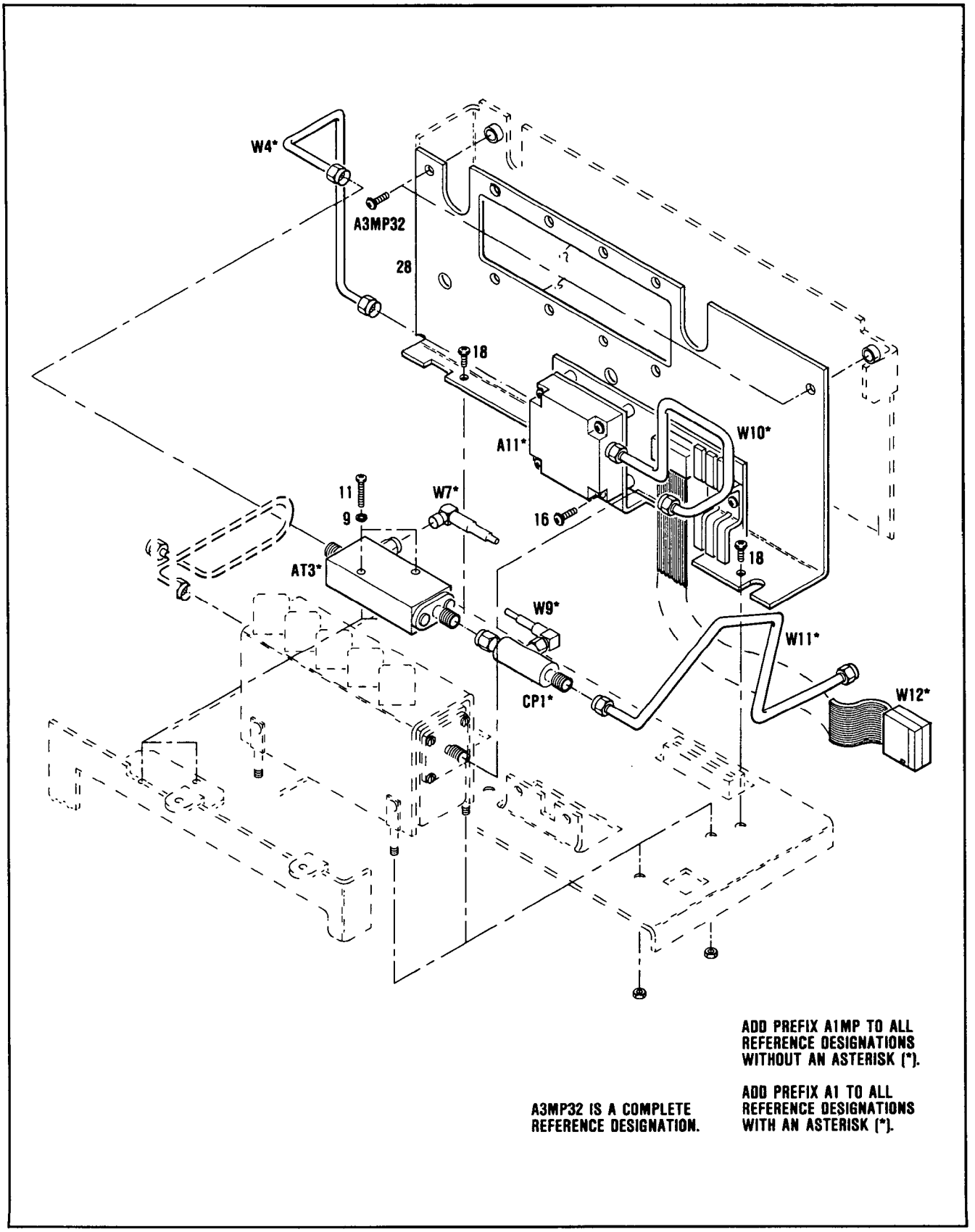


Figure 8-47. Bias Tee

If the oscilloscope display is not as shown in the figure, there is a problem in the Series Pulse Delay and one shot circuit. Go to service sheet 15 to isolate the problem.

If the oscilloscope display is as shown in the figure, proceed with step 19, "Bias Tee/Pulse Modulator Check".

Bias Tee/Pulse Modulator Check (√3)

19. Set the LINE switches to OFF then remove the bias tee A1CP1 (see figure 8-47). Using the DVM, measure the resistance between:

Port	Resistance
Output port and TEE	0.1 ±0.05 ohms
Input port and TEE	open
Input port and output port	open

If the resistances are not as shown above, the bias tee is defective and should be replaced.

If the resistances are as shown above, pulse modulator A1AT3 is defective and should be replaced.

Sample Gate Checks (√4)

If the pulse level accuracy is correct with a 300 ns pulse but fails with a 100 ns pulse, adjustment of the leading and trailing edge (L.E. and T.E.) one shots may be all that is necessary. Proceed to the "ALC Sample Pulse Adjustment" procedure in chapter 5 (part of "Pulse Modulation Adjustment"). If this adjustment does not correct the problem, proceed with step 20.

If the pulse level accuracy is not within specification with a 300 ns pulse, either the Sample Pulse circuitry is defective or the Sample and hold circuitry on the ALC board is defective. Proceed with step 20 below.

20. Connect channel 1 of the oscilloscope to A1A4TP3 and Channel 2 to A1A4TP14. Adjust the oscilloscope as shown in figure 8-48 and compare the oscilloscope display to the figure.

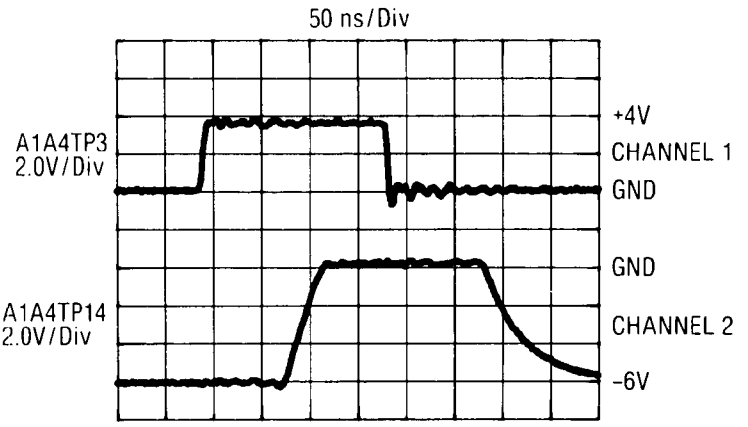


Figure 8-48. Pulse Driver Board Input Pulse and Sample Pulse

If the oscilloscope display is not like the figure, the Sample Gate circuitry is defective. Go to service sheet 15 to isolate the problem.

If the oscilloscope display is like the figure, the fault is probably in the Sample and Hold circuitry of the ALC Board. Go to service sheet 14 to isolate the problem.

Level Check ($\sqrt{5}$)

This check is to see if the minimum Pulse Width Detector of A1A4 is working normally.

21. Set the pulse generator for a pulse width of 300 ns.
22. Connect the DVM to A1A4TP5.

    The DVM should indicate a TTL logic high (>3V).

    If the DVM indication is not correct, the minimum Pulse Width Detector is defective. Go to service sheet 15 to isolate the problem. If the DVM indication is correct, proceed with step 23.
23. Gradually reduce the pulse width to 50 ns while observing the DVM display.

    The DVM display should suddenly drop to 0 volts after the pulse width is reduced to 80 ns but before it reaches 50 ns.

    If the indication is not normal, go to the "Minimum Pulse Width Indicator Adjustment" in chapter 5 (part of "Pulse Modulation Adjustment"). If the adjustment does not correct the problem go to service sheet 15 to isolate the problem.

    If the indication is normal, the minimum pulse width detector is working normally.

Band 2—4 Checks

Pulse modulation in the high bands (above 6.6 GHz) requires that a YTM pulse be injected into the YTM to compensate for bias lost when the pulse is off. Without a properly adjusted YTM pulse, the pulse modulation specification cannot be met.

It is assumed that pulse modulation in the high bands does not meet the rise time, fall time and/or overshoot and ringing specs.

The following procedures check the circuits that control the YTM pulse in order to isolate the fault to a service sheet.

YTM Pulse Check ($\surd$6)

24. Remove SRD Bias Board A1A8 and replace it with a 36 pin extender board (do not install A1A8 on the extender board).
25. Set the variable power supply voltage to 0 volts, then connect the positive output to XA8-16 and ground to XA8-1 or XA8-19.
26. Set the pulse generator for a 300 ns pulse and the Signal Generator to 10 GHz.
27. Connect the oscilloscope to A1A4TP10 (YTM PUL).
28. While observing the oscilloscope display, gradually increase the power supply voltage (maximum +10V).

    The peak amplitude of the YTM pulse on the oscilloscope display should be equal to the power supply output voltage at all levels.

    If the YTM pulse peak level does not track the power supply voltage, or is absent altogether, the YTM Pulse one shot is defective. Go to service sheet 15 to isolate the problem.

    If the YTM pulse peak level does track the power supply voltage, proceed with step 29.

PAC DAC Check ($\surd$7)

29. Remove A1A5 and replace it on a 44 pin extender board.
30. Set both channels of the oscilloscope for 0.5 volt per division and DC input.
31. Connect channel 1 of the oscilloscope to A1A5 U7-3 (TPA) and Channel 2 to A1A5TP2.

32. Set the Signal Generator to 6.7 GHz and FREQ INCR to 100 MHz and gradually increase the frequency to 12 GHz while observing the oscilloscope display.

    The Channel 1 and Channel 2 displays should track each other up the display as the frequency is increased.

    If the two signals do not track, there is a problem with the Pulse Amplitude Control (PAC) DAC or the comparator on DAC and Enable Board A1A5. Go to service sheet 22 to isolate the problem.

    If the two signals track, proceed with step 33.

PAC Check ($\sqrt{8}$)

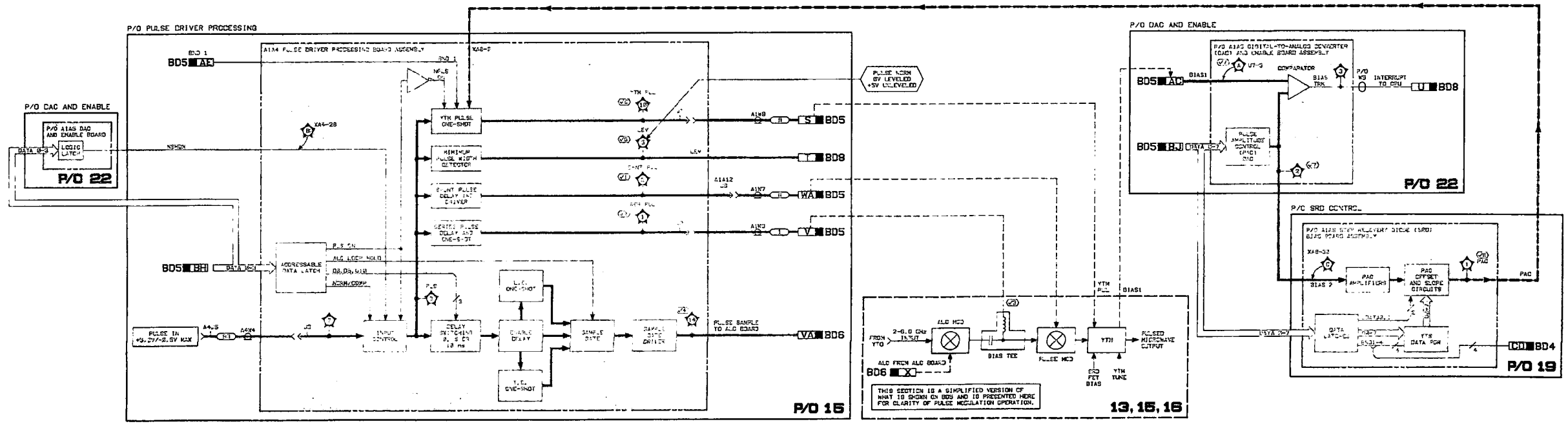
33. Install A1A8 on the extender board installed in step 24.

34. Connect the DVM to XA8-30 (TPC) and adjust the Signal Generator frequency to obtain the following voltages at XA8-30 (TPC) then check for the corresponding voltages at A1A8TP1.

XA8-30 (TPC) Voltage	A1A8TP1 Voltage
4	2
8	5
12	9

    If any of the voltages at A1A8TP1 were incorrect, the Pulse Amplitude Control Circuit of A1A8 is defective, go to service sheet 19 to isolate the problem.

    If the voltage at A1A8TP1 was correct, the YTM is defective and should be replaced.



BD7

Figure 8-49. Pulse Modulation Block Diagram
8-145/8-146

BD8 Digital Control Unit (DCU)

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet BD1
YTO Loop Assembly ..... Service Sheet A
Interior Views ..... Service Sheet B
Replaceable Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

The Digital Control Unit (DCU) consists of the following:

- A Digital Controller consisting of a Microprocessor Assembly A2A8 and Memory/Interface Assembly A2A10.
- A Control Section consisting of a Frequency Output/HP-IB Assembly A2A9, an Input/Output Assembly A2A7, a Key Code Assembly A2A2, a Panel Driver Assembly A2A1 and a Front Panel Assembly A4.

The function of the Digital Control Unit is to control the operation of the Signal Generator. The DCU responds to data inputs from the Signal Generator's front panel as well as data and instructions from the rear panel AUX connector and the HP-IB bus. The DCU communicates with the A3 RF Source Assembly, the A1 RF Output Assembly, and the A4 Front Panel Assembly.

The Microprocessor Assembly continually executes programs stored in ROM (Read Only Memory) and uses the RAM (Random Access Memory) to store front panel information and intermediate data calculations. In order to preserve the information stored in RAM when power is removed from the instrument, a battery back up system is used to maintain power to the RAM.

The Microprocessor Assembly communicates with other assemblies via a bidirectional data bus, an address bus and various control lines. Information is sent and received on the data bus, the address bus controls where the information is coming from or being sent to and the control lines provide a means of controlling data flow and communication between the Microprocessor Assembly and other assemblies.

Digital Controller (A2A8, A2A10)

The Digital Controller is responsible for generating and processing data for the phase locked loops, ALC circuitry and pulse circuitry. The programs that enable the Controller to accomplish these functions are stored in Read Only Memory in the Memory/Interface Assembly. These programs are also called Firmware and are not lost when the ROM is not powered.

The RAM on the Memory/Interface Assembly A2A10 is used by the Microprocessor to store frequency values, front panel settings (including the data for the RCL 1-9 function), intermediate numerical values needed by the Microprocessor Assembly and return addresses when sub-routines are executed.

Control Section (A2A9, A2A7, A2A2, A2A1, A4)

The Control Section is the interface between the Digital Controller and the instrument. The Control Section can be divided into two smaller assemblies:

1. An internal interface consisting of Frequency Output/HP-IB A2A9 (only the frequency output portion) and Input/Output Assembly A2A7.
2. An external interface consisting of a Key Code Assembly A2A2, Panel Driver A2A1, Front Panel Assembly A4 and Frequency Output/HP-IB A2A9 (only the HP-IB portion).

The internal interface actually controls the instrument operation. The Frequency Output/HP-IB Assembly receives frequency data from the Digital Controller and generates the data needed by the YTO, M/N and LFS phase locked loops. This data is used differently by each phase locked loop. The data lines to the YTO phase locked loop are used to pretune the YTO frequency so that the YTO will not phase lock to the wrong frequency.

The data sent to the M/N phase locked loop is used to tune the M/N VCO to a specific frequency that will allow a harmonic of the M/N phase locked loop output to generate a 20-30 MHz difference frequency when mixed with the YTO phase locked loop output.

The data that go to the LFS phase locked loop are used to set the LFS phase locked loop to a frequency between 20 and 30 MHz with a resolution of 1 KHz.

The Input/Output Assembly A2A7 enables the Microprocessor Assembly to read the status of various circuits, output data to circuits and allows data to be read from the Key Code Assembly A2A2.

The external interface allows external inputs to be read by the Microprocessor Assembly. The external inputs can come from the HP-IB bus (in remote mode), the front panel keys or the AUX connector on the back panel of the instrument. The results of the entry are displayed on the Front Panel A4 display. The Microprocessor Assembly communicates directly with the Panel Driver Assembly A2A1 and the Front Panel A4 display to display the current control settings.

The Key Code Assembly A2A2 accepts inputs from the Front Panel A4 keys and encodes the information. When a key is pressed, a key down (KDN-L) signal is generated by the Key Code Assembly which tells the Digital Controller section of the DCU that a key has been pressed. The Microprocessor Assembly then reads the input from the Key Code Assembly via the Input/Output Assembly. When the data is read, an acknowledgement signal is sent to the Key Code Assembly that resets the circuit and allows another entry to be made. The Key Code Assembly also processes inputs from the AUX connector in the same manner as a front panel key input.

Inputs in remote mode are processed in the HP-IB portion of the Frequency Output/HP-IB Assembly A2A9. The HP-IB circuits contain eight registers (status registers) that can be read by the Digital Controller section of the DCU and eight registers (control registers) that the Digital Controller section can write data into. All communications with the HP-IB bus are done via the HP-IB circuits on the Frequency Output/HP-IB Assembly A2A9.

Troubleshooting

General

Cautions



MOS and CMOS ICs can be damaged by static charges and circuit transients. Do not remove any A2 Controller assembly from the Signal Generator while power is applied. Discharge the board and replacement IC to the same potential. (Use a conductive pad, HP part Number 4208-0094). When unplugging ICs, place the board on a conductive pad. When the IC is unplugged, insert it into the pad also.

The A2A7 I/O Assembly uses the +22 Vdc power supply which is not switched. Therefore, disconnect the power cord before removing or installing A2A7.

Several ICs in the A2 Controller Assembly are held in high-grip sockets. Both the socket and the IC can be damaged if an attempt is made to remove the IC with an IC extraction tool. The recommended procedure is to first ground the tip of a small blade-type screwdriver. Then slide the tip between the IC and the socket and slowly pry up the IC, one set of pins at a time on alternate ends, until the IC is loose.

If the Signal Generator powers up correctly, it is a strong indication that the DCU is operating correctly. In most cases, the two most common indications of a Digital Control Unit failure are that the instrument fails to power up correctly, or that the instrument behaves erratically. Erratic behavior is generally indicated by an unexpected front panel display or incorrect responses to valid keyboard entries.

In addition, keep the following points in mind when troubleshooting the Digital Control Unit:

1. The edge connectors of all assemblies must be clean and properly seated in the motherboard connectors.
2. The proper operation of the clock circuits for the Digital Control Unit is critical.
3. The Digital Control Unit operation depends on a long sequence of instructions and events. Even a single bit of information that is incorrect can change an entire sequence.
4. Data on the buses is often unstable or meaningless because of multiplexing or switching transients. A signature analyzer can determine when the data is valid but other test instruments such as a logic probe or an oscilloscope cannot differentiate between stable data and transients. These other instruments, however, can still be used to examine qualitative factors such as general bus activity, logic levels, waveform timing and bus conflicts.
5. The bus structure makes it possible to connect many devices to the same node. Finding a single bad device on a multi-device node can be extremely difficult.

Equipment

Signature Analyzer..... HP 5005A/B, HP 5006A
Digital Voltmeter..... HP 3456A or HP 3455A

Troubleshooting Procedure

To facilitate troubleshooting the Digital Control Unit, each type of failure has a specific troubleshooting procedure associated with it. The types of failures are categorized as:

- Power-up Failures
- Front Panel Display, Annunciator and Switch Failures
- Data Problems for Internal Circuitry

Power-Up Failures

When the instrument is first turned on, a series of tests are performed to check internal operation. If any of these self-diagnostic tests find a failure, a message will be displayed and can be observed by pressing the front panel MESSAGE key. Table 8-14 lists the error message numbers and the procedure to be followed to locate the source of the failure.

Table 8-14. Power-Up Tests and Error Messages

Error Message Number	Test	Fault Location Procedure
90	AUTO PEAK MALFUNCTION	Refer to service sheet 20
92	RECALL CHECKSUM ERROR	Repeat the STORE and RECALL that caused the error. If error persists, perform RAM Verification (A2A10).
95	LOSS OF DATA ON POWER UP	Reapply power. If trouble persists, check battery and replace if necessary. Re-enter data and restart.
96	MEMORY TEST FAILURE	Reapply power. If trouble persists, perform RAM Verification (A2A10) and, if necessary, ROM Diagnostic (A2A10) and ROM Assembly Check (A2A10).
97	ROM TEST FAILURE	Reapply power. If trouble persists, perform ROM tests
98	RAM TEST FAILURE	Same as 92 above.
99	RAM NOT FUNCTIONAL AT POWER UP	Same as for 98 above.

Front Panel Display, Annunciator and Switch Failures

A simplified block diagram of the front panel keys and display circuitry is shown in figure 8-50. Faults in the front panel keys or Key Code circuitry can be isolated using the keyboard status indicators on the Key Code Assembly A2A2 and the front panel keys.

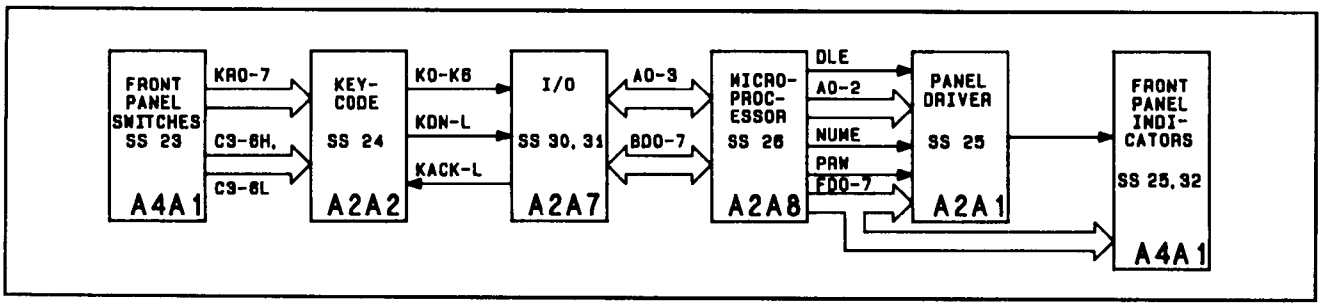


Figure 8-50. Front Panel Keyboard and Indicator Block Diagram

Press the function keys listed in table 8-15 and verify that the pattern of lighted keyboard status indicators on the Key Code Board are as indicated. If the pattern does not change or changes only once, check KDN-L and KACK-L signals on the Key Code Assembly.

If a pattern is incorrect, press the alternate keys to isolate the problem to a row or column fault.

Table 8-15. Key-Code Patterns

Function Key	Key-Code Pattern							Input Pair Verified		IF Key-Code Pattern Incorrect	
										Key To Be Depressed To Verify:	
	K6	K5	K4	K3	K2	K1	K0	Row	Column	Row	Column
1		L	L				L	KR1	C3L	9	2
ΔF		L	L	L		L		KR2	C3H	2	9
TUNE	L				L			KR3	C4L	3	LOCAL
ALC INT	L			L				KR0	C4H	0	RF ON/OFF
FREQ INCR	L		L		L			KR4	C5L	4	START
MESSAGE	L		L	L	L			KR4	C5H	4	
PWR MTR	L			L	L		L	KR5	C4H	5	AUTO PEAK
PULSE OFF	L		L	L	L		L	KR5	C5H	5	FM3
FM3	L	L			L	L		KR6	C6L	6	FM1
MHz	L	L		L	L	L		KR6	C6H	6	GHz
SERVICE FUNC.	L	L		L	L	L	L	KR7	C6H	7	SINGLE

Table 8-16 shows the required signal conditions between circuit elements for proper operation of the instrument. Examination of table 8-16 reveals that functioning of circuitry and interconnects can be verified by depressing alternate keys which use the same circuitry and/or interconnects as the one under investigation. As an example, suppose the Auto key is depressed and the corresponding front panel LED is not lit and the function not performed. Depress any key but the numeral keys to verify the enable signals DLE and PRW from the microprocessor to the Panel Driver. Depress the Manual key to verify the address bit A2. By depressing the RF ON/OFF key, the data bit FD4 can be verified. No failures found when the alternate keys are depressed, indicates the fault of the AUTO function is located on the Front Panel Circuit Card. A failure, found when the alternate keys are depressed is then located between the Key Code Circuit Card output and the Front Panel Card. By performing the Front Panel Display and Driver Diagnostic, a fault condition between the output of the Microprocessor A2A8 and the Front Panel may be determined. Faults which occur between the output of the Key-Code Circuit Card and the output of the Microprocessor Circuit Card may be caused by any of the assemblies on the data bus, therefore, the fault location procedure consists of performing the Diagnostic Tests in the order in which they are listed.

Table 8-16. Signal Conditions for Keyboard to Front Panel Indicators Operation

FUNCTION	FRONT PANEL OUTPUT														KEY-CODE OUTPUT							μP OUTPUT TO PANEL DRIVER												PANEL DRIVER OUTPUT
	KR0	KR1	KR2	KR3	KR4	KR5	KR6	KR7	C3L	C3H	C4L	C4H	C5L	C5H	C6L	C6H	K6	K5	K4	K3	K2	K1	K0	NUME	DLE	PRM	A0	A1	A2	FD0	FD1	FD2	FD3	FD4	FD5	FD6	FD7	
0	L								L									L	L																			
1		L							L									L	L				L														
2			L						L									L	L			L															
3				L					L									L	L			L	L														
4					L				L									L	L		L																
5						L			L									L	L		L		L														
6							L		L									L	L		L	L															
7								L	L									L	L		L	L	L														
8	L									L								L	L	L																	
9		L								L								L	L	L			L														
ΔF			L							L								L	L	L		L															
AUTO				L						L								L	L	L		L	L		H	L			L					L			DL3-4
MKR					L					L								L	L	L	L																
SWEEP OFF						L				L								L	L	L			L														
MANUAL							L			L								L	L	L		L	L		H	L			L						L		DK3-5
UNUSED								L		L								L	L	L		L	L														
LOCAL	L										L						L																			
DWELL		L									L						L						L													
FREQ INCR DW			L								L						L					L														
FREQ INCR UP				L							L						L					L	L													
TUNE ON/OFF					L						L						L				L				L		L	L								DL4-6
STEPS						L					L						L				L		L													
←							L				L						L				L	L														
								L			L						L				L	L	L													
ALC INT	L											L					L			L							L	L	L	L						DL1-0
RF ON/OFF		L										L					L			L			L		L			L	L			L				DL1-4
UNUSED			L									L					L			L		L														
RANGE				L								L					L			L		L	L													
DIODE					L							L					L			L	L				L			L	L							DL1-1
PWR METER						L						L					L			L	L		L		L			L	L							DL1-2
RANGE							L					L					L			L	L	L														
AUTO PK								L				L					L			L	L	L	L		L			L	L			L				DL1-3
START	L												L				L		L																	
STOP		L											L				L		L				L													
NORM			L										L				L		L			L			L		L		L	L						DL2-0
FREQUENCY				L									L				L		L			L	L													
FREQ INCR					L								L				L		L		L															
COMPL						L							L				L		L		L		L		L		L		L							DL2-1
STO							L						L				L		L		L	L														
RCL								L					L				L		L		L	L	L													
AM OFF	L													L			L		L	L																
MTR AM		L												L			L		L	L			L			L	L	L		L						DL4-1
MTR FM			L											L			L		L	L		L					L	L	L			L				DL4-2
FM OFF				L										L			L		L	L		L	L													
MESSAGE KEY					L									L			L		L	L	L				L	L								L			DL4-4
PULSE OFF						L								L			L		L	L	L		L													
UNUSED							L							L			L		L	L	L	L														
MTR LVL								L						L			L		L	L	L	L	L		L	L				L							DL4-0
FM 0.3	L														L			L	L						L		L	L						L			DL2-4
FM 0.1		L													L			L	L				L		L		L	L				L					DL2-3
FM 0.03			L												L			L	L			L			L		L	L									DL2-2
AM 30%				L											L			L	L			L	L		L			L	L								DL1-6
AM 100%					L										L			L	L		L				L			L	L								DL1-7
FM 1						L									L			L	L		L		L		L			L						L			DL2-5
FM 3							L								L		L	L			L	L			L			L							L		DL2-6
FM 10								L							L			L	L		L	L	L		L			L								L	DL2-7
SINGLE	L															L	L	L	L	L					L				L						L		DL3-6
STEP		L														L	L	L	L	L																	
GHz			L													L	L	L	L	L		L															
MHz				L												L	L	L	L	L		L	L														
UNUSED					L											L	L	L	L	L	L																
UNUSED						L										L	L	L	L	L		L															
KHz							L									L	L	L	L	L		L	L														
SERVICE SWITCH								L								L	L	L	L	L		L	L	L													
∅ UNLOCKED										NOT APPLICABLE														L	H	L	L	L	L	L							DL0-0
UNLEVELED										NOT APPLICABLE														L	H	L	L	L	L		L						DL0-1
FM OVERMOD										NOT APPLICABLE														L	H	L	L	L	L			L					DL0-2
EXT REF										NOT APPLICABLE														L	H	L	L	L	L				L				DL0-3

Faulty Data to M/N Phase Detector, LFS Loop DAC or 20/30 Divider

Figure 8-51 shows the circuitry involved in the generation of frequency information to the M/N Phase Detector Circuit Card A3A1A3, the DAC Circuit Card A3A5, and the 20/30 Divider Circuit Card A2A5. It is assumed that the front panel to the Key-Code Circuit Card A2A2 has already been verified. If not, this should be done using the procedures delineated herein. Fault Location should then follow the controller signature analysis troubleshooting procedures in the order in which they are listed.

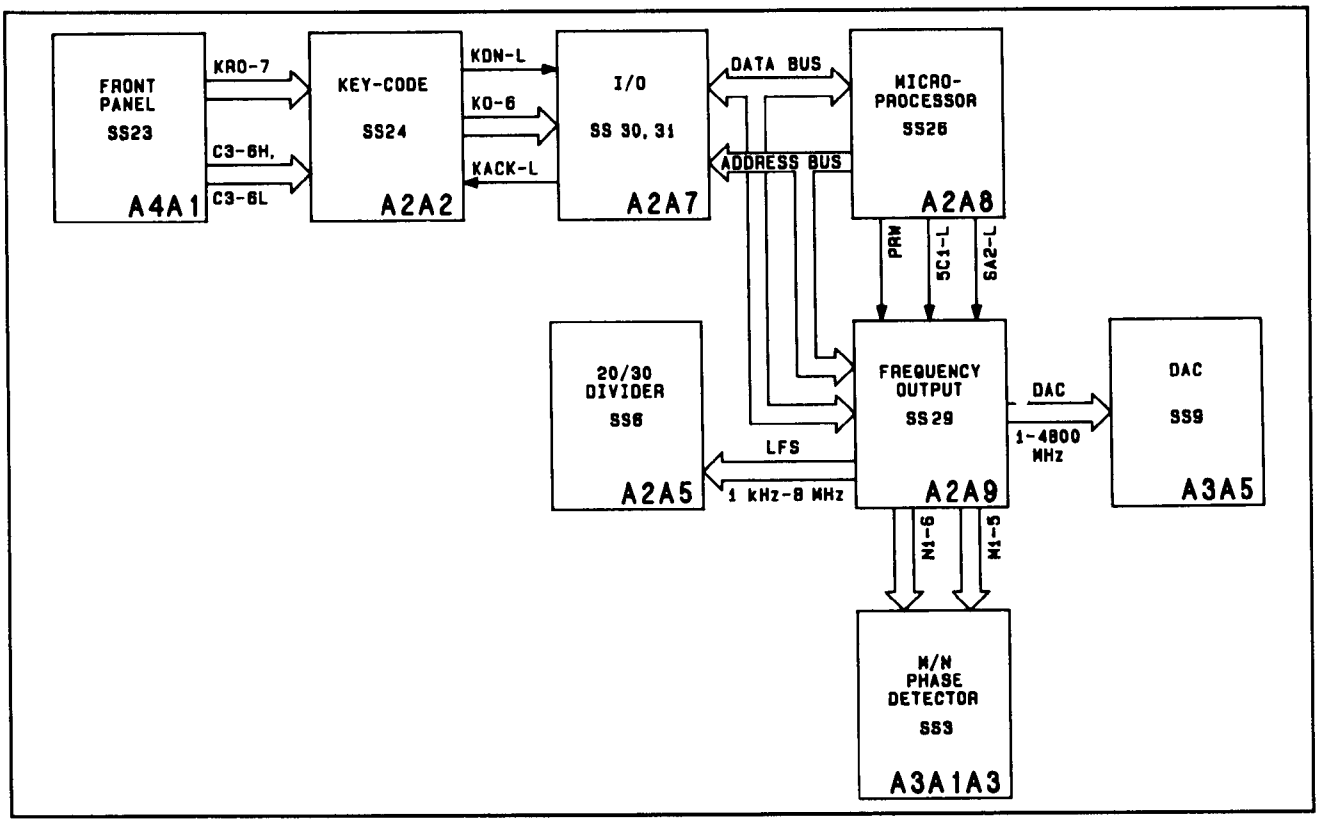


Figure 8-51. M/N Phase Detector, DAC, 20/30 Divider, and Front Panel Interface Block Diagram

Diagnostic Test Procedures

General

The diagnostic test procedures use the controller as a custom function generator to stimulate the digital circuitry in the Signal Generator. Except for the MPU Free Run Diagnostic, the microprocessor is controlled by the diagnostic ROM. This ROM contains special routines that stimulate the circuit under test. It is connected to the controller by the MPU test connector. Shorting A2A8TP5 to the adjacent GND testpoint prevents the microprocessor from reading data from anything except diagnostic switch A2A8S1 and diagnostic ROM A2A8U3. The front panel FREQUENCY MHz display indicates the switch setting followed by

"−1". In this setting, the microprocessor repeatedly loops through a sequence of instructions so that "digital signatures" can be taken to verify proper performance or to locate defective components. When the shorting clip is removed from A2A8TP5, in certain tests, the microprocessor reads data from the circuit under test and displays a test indication on the front panel.

The signature analyzer is a special counter circuit. It monitors the pulses present on its test probe at each clock pulse, between the start and stop signals. For most of these diagnostic tests, the clock lead is connected to the microprocessor clock. The start and stop leads are connected to the most significant address line, A15. This address line is not used in most of the Signal Generator address decoding circuits. Programming in the diagnostic ROM causes the microprocessor to jump between two address blocks to signal the beginning and end of the test period to the signature analyzer. This eliminates the requirement for a special circuit to generate the signature analyzer start and stop clock.

Signature analysis examines the stream of logic 0's and 1's at the node being probed. A change of the position of even one pulse out of a long stream causes a new signature to be displayed. There is no quantitative information in the value of a signature. A signature is either correct or incorrect. If a signature is incorrect, probe other points to determine whether the circuit driving that node is faulty or is receiving faulty inputs from another circuit.

In the following procedures, do not install an assembly until directed to do so by the procedure. It is possible to obtain a wrong signature in one procedure that is caused by an assembly that should not be installed at that time.

The following diagnostic tests are built into the Signal Generator to aid in troubleshooting the Controller:

- The MPU Free Run Diagnostic. This test is run before the individual diagnostics controlled by the Diagnostic Switch (A2A8S1) are activated. It checks the MPU kernel (A2A8) to establish that the minimum operating circuits required to run the other diagnostics are functional.
- Other tests. See table 8-17.

Table 8-17. Diagnostic Tests

Diagnostic Switch Position (A2A8S1)	Test
0	MPU Timer and IRQ Encoder (A2A8)
1	Front Panel Display and Driver (A2A1)
2	HP-IB (A2A9)
3	Frequency Latches and M/N Encoder (A2A9)
4	I/O Assembly (A2A7)
5	Output Section (A2A9)
6	ROM, continuous with errors displayed (A2A10)
7	ROM, halt on first error (A2A10)
8	RAM, halt on first error or after first pass (A2A10)
9	RAM, halt on first error (A2A10)
A	RAM Divide-by-Three Circuit (A2A10)
B	Date code for diagnostic ROM (A2A8U3)

In addition, a typical program and procedure for an HP-IB talk-only diagnostic is presented after the built-in diagnostic procedures.

Note



To ensure that the required circuits are operational, perform the diagnostic tests in the order they are presented. If an error condition is indicated, check the related schematic to determine the faulty component. Perform the Diagnostic ROM Date Code Check first to determine if the signatures listed in the diagnostics are valid. The date codes for the diagnostic ROM (A2A8U3) must match that listed in step 5 for the listed signatures to be valid.

Diagnostic ROM Date Code Check

Caution



When taking signatures, it is possible to alter the diagnostic program by inadvertently shorting pins together with the probe. When this occurs, false signatures may be obtained. The diagnostic program can be returned to normal by setting the LINE switch to STBY and back to ON.

Note

If the date code checks procedure cannot be run, try to perform the MPU free run diagnostic to determine if at least the MPU kernal circuits are working. If the signatures are correct, continue performing the diagnostics until an error is found. However, if the procedures can be run but the date codes are incorrect, it is possible to run the diagnostics with the following restriction:

Any signature that matches a signature in the following procedures is a good indication that the associated circuits are working properly (but it is not an absolute check).

1. Set LINE switch to STBY.

Caution

If the A2A8 Microprocessor Assembly is not on an extender, care must be taken when installing the MPU test connector. Because of the width of the connector it is possible to damage adjustment resistors on the A2A7 I/O Assembly.

2. Connect the MPU test connector (HP Part Number 11726-60001) to the test connectors on top of the A2A8 Microprocessor Assembly.
3. Set diagnostic switch to B and install a shorting clip between A2A8TP5 and the adjacent TP GND.
4. Set LINE switch to ON.
5. Verify the FREQUENCY MHz display indicates 2324 11-1 (the diagnostic ROM date code).

MPU Free Run Diagnostic (A2A8)

In this test, the controller cycles through all combinations of the 16 address lines attempting to read data or instructions. However, the data actually reaching the controller should always be from A2A8U9, the test switch buffer. This setup allows verification of the address decoder circuits and part of the functions internal to microprocessor A2A8U6.

1. Set the LINE switch to STBY, remove the power cord, and remove all circuit board assemblies from the A2 Controller Assembly except A2A1, A2A3, A2A4, and A2A5.
2. Install the A2A8 Microprocessor Assembly in the A2 Controller on an extender.
3. Install a shorting clip between A2A8TP5 and the adjacent TP GND.
4. Remove the MPU test connector from the A2A8 Assembly.
5. Connect the signature analyzer as follows:

Signature Analyzer Timing Pod	A2A8 Microprocessor
START	TP4
STOP	TP4
CLOCK	TP3
GND	TP GND

6. Set the signature analyzer pushbuttons as follows:

START	OUT (positive edge)
STOP	IN (negative edge)
CLOCK	IN (negative edge)
HOLD	OUT (not activated)
SELF-TEST	OUT (not activated)

7. Reconnect the power cord, then Set the LINE switch to ON.
8. Use the signature analyzer probe to verify clocking activity on A2A8TP3.
9. Verify the signature is 0001. This signature indicates the free run mode is running correctly. If this signature is incorrect, make sure the signature analyzer is properly connected and the START, STOP, and CLOCK pushbuttons are in the correct positions (see steps 5 and 6). Be very sure that the equipment is correctly setup because any deviation can cause a different verification signature.
10. The signatures listed in table 8-18 verify the operation of the MPU, the address lines, and the address decoders.
11. The signatures listed in table 8-19 verify the operation of the Diagnostic ROM (U3).
12. If any of the signatures are incorrect, the signatures listed in table 8-20 can be used to aid in the isolation of the faulty part.

Table 8-18.
MPU Address Line and Address Decoder Signatures

Pin No.	Signature	Mnemonic
A2A8B 8	HAP7	A11
11	0001	A15
12	CCCC	A1
14	3827	A13
15	5P18	SA3-L
16	3C96	A12
18	5H21	A3
29	5555	A0
30	F488	SCO-L
32	956C	SB4-L
33	2828	SA2-L
34	755U	A14
35	7F7F	A2
36	0AFA	A4
A2A8C 1	1293	A10
2	HPP0	A9
3	2H70	A8
4	52F8	A6
17	U68U	SC1-L
18	HC89	A7
20	04P6	SC2-L
22	UPFH	A5
29	16HH	DLE
30	CHOH	NUME

Table 8-19. Diagnostic ROM (A2A8U3) Signatures

Pin No.	Signature	Mnemonic
A2A8J1–3	8C25	DB-A4
4	FCPP	DB-A7
5	FAPC	DB-A3
6	78P0	DB-A2
9	2395	DB-A5
10	PC1A	DB-A6
11	FAPC	DB-A8
12	C5AA	DB-A1

Table 8-20. MPU Signatures (1 of 3)

Pin No.	Signature	Mnemonic
U3-9	C5AA	DB-A1
10	78P0	DB-A2
11	FAPC	DB-A3
13	8C25	DB-A4
14	2395	DB-A5
15	PC1A	DB-A6
16	FCPP	DB-A7
17	FAPC	DB-A8
U6-9	5555	BA0
10	CCCC	BA1
11	7F7F	BA2
12	5H21	BA3
13	OAFA	BA4
14	UPFH	BA5
15	52F8	BA6
16	HC89	BA7
17	2H70	BA8
18	HPP0	BA9
19	1293	BA10
20	HAP7	BA11
22	3C96	BA12
23	3827	BA13
24	755U	BA14
25	0001	BA15
U6-28	0000	D5
29	0001	D4
30	0001	D3
31	0000	D2
32	0001	D1
33	0001	D0
U7-3	5919	
4	UPFH	
6	OPHU	
8	C479	
9	9840	
10	8P4P	
11	A277	
U8-10	5555	A1
11	CCCC	A2
12	7F7F	A0
15	A277	C50
U12-8	5P19	
U13-4	HPPO	SB4-L

Table 8-20. MPU Signatures (2 of 3)

Pin No.	Signature	Mnemonic
U14-13	04P6	SC2-L
14	U68U	SC1-L
15	F488	SC0-L
U15-3	160U	
8	0PHP	
9	0PHU	
11	160P	
U15-12	8P4P	
13	9840	
U16-3	C479	
U17-4	ACH0	
12	C478	
13	C479	
U21-9	A277	
10	9840	
11	8P4P	
12	5P18	SA3-L
13	2828	SA2-L
15	3APF	
U22-2	CCCC	BA1
3	CCCC	A1
4	5555	BA0
5	5555	A0
6	0001	BA15
7	0001	A15
U22-8	HAP7	BA11
9	HAP7	A11
11	3827	A13
12	3827	BA13
13	755U	A14
14	755U	BA14
15	3C96	A12
16	3C96	BA12
U22-17	7F7F	A2
18	7F7F	BA2
U23-2	HC89	BA7
3	HC89	A7
4	1293	A10
5	1293	A10
6	0AFA	BA4
7	0AFA	A4
8	5H21	BA3
9	5H21	A3
11	HPP0	A9
12	HPP0	BA9

Table 8-20. MPU Signatures (3 of 3)

Pin No.	Signature	Mnemonic
U23-13	2H70	A8
14	2H70	BA8
15	52F8	A6
16	52F8	B-A6
17	UPFH	A5
18	UPFH	BA5
U25-1	0PHP	
11	0PHP	BD0
U26-2	0PHP	BD9
XA2A8B-8	HAP7	A11
11	0001	A15
12	CCCC	A1
14	3827	A13
15	5P18	SA3-L
XA2A8B-16	3C96	A12
18	5H21	A3
29	5555	A0
30	F488	SC0-L
32	956C	SB4-L
33	2828	SA2-L
34	755U	A14
35	7F7F	A2
36	0AFA	A4
XA2A8C-1	1293	A10
2	HPP0	A9
3	2H70	A8
4	52F8	A6
17	U68U	SC1-L
18	HC89	A7
20	04P6	SC2-L
22	UPFH	A5
29	16HH	DLE
30	CH0H	NUME
XA2A8J1-3	8C25	DB-A4
4	FCPP	DB-A7
5	FAPC	DB-A8
6	78P0	DB-A2
9	2395	DB-A5
10	PC1A	DB-A6
11	FAPC	DB-A8
12	C5AA	DB-A1

MPU Timer and IRQ Encoder Diagnostic (A2A8)

In this diagnostic, the controller turns timer A2A8U8 on and off. The timer generates inputs to interrupt priority encoder A2A8U24. This diagnostic also verifies operation of the data bus on Microprocessor Assembly A2A8.

1. Set the LINE switch to STBY.
2. Connect the MPU test connector (HP Part Number 11726-60001) to the test connectors on top of the A2A8 Microprocessor Assembly.

Note

Always check the front panel indications and the verification signature for each diagnostic. If they are not correct, reset diagnostic switch A2A8S1. The switch might not make firm contact when switching positions.

3. Set diagnostic switch A2A8S1 to 0.

Note

Steps 4 and 5 require that the A2A1 Front Panel Driver be installed. This assumes that A2A1 is operational. If it is suspected of malfunctioning, continue the test if the displayed information is erratic. Note however, that a display of 15-1 or 02-1 is a strong indication that diagnostic switch A2A8S1 is not positioned correctly.

4. Set the LINE switch to ON. Verify that the FREQUENCY MHz display indicates 00-1.
5. Remove the short from A2A8TP5. Verify that the FREQUENCY MHz display indicates 00.
6. Touch the logic probe to +5V and verify the signature is 6FC9.
7. The signatures listed in table 8-21 verify the operation of the timing and interrupt circuits.
8. If any of the signatures are incorrect, the signatures listed in table 8-22 can be used to aid in the isolation of the faulty part.

Table 8-21.
Timing, Interrupt and Buffered Data Circuits Signatures

Pin No.	Signature	Mnemonic
A2A8B-6	2256	VMA
7	6FC9	IRQA-L
24	6FC9	IRQB-L
25	6FC9	IRQIB-L
27	F637	PRW
A2A8C-5	6700	BD2
6	AA8P	E-PIA
7	6FC9	PHE-H
8	98P1	BD4
9	2U5F	BD6
15	7H31	BD0
19	AA8P	E-HPIB
21	P054	BD1
23	810P	BD3
24	944C	BD5
25	2U5F	BD7

Table 8-22.
MPU Timer and IRQ Encoder Signatures (1 of 2)

Pin No.	Signature	Mnemonic
U8-10	7758	A1
11	5CPA	A2
12	42C3	A0
13	F637	PRW
16	9U10	
17	AA8P	E-HPIB
18	P9C7	D7
19	AAU1	D6
20	9CPP	D5
21	25AF	D4
22	HFP0	D3
23	5HU3	D2
24	FUF0	D1
25	8593	D0
U24-1	CCAU	
2	6FC9	IRQA-L
3	6FC9	IRQIB-L
6	CCAU	
7	6FC9	
9	6FC9	

Table 8-22.
MPU Timer and IRQ Encoder Signatures (2 of 2)

Pin No.	Signature	Mnemonic
U24-12	6FC9	VTI-L
13	6FC9	IRQB-L
14	CCAU	IRQ
U25-1	3316	
11	7H31	BD0
13	P054	BD1
14	6FC9	
U25-15	81OP	BD3
16	6FC9	
17	6700	BD2
XA2A8B-7	6FC9	IRQA-L
8	592A	A11
11	6FC9	A15
12	5CPA	A1
14	0000	A13
16	H347	A12
18	5U90	A3
24	6FC9	IRQB-L
25	6FC9	IRQIB-L
29	7758	A0
34	0000	A14
35	42C3	A2
36	44H4	A4
XA2A8C-1	5UAU	A10
2	0000	A9
3	H5PU	A8
XA2A8C-4	2F4P	A6
5	6700	BD2
6	AA8P	E-PIA
8	98P1	BD4
9	2U5F	BD6
10	6FC9	VTI-L
16	7H31	BD0
21	P054	BD1
22	C1U5	A5
23	810P	BD3
24	944C	BD5
25	2U5F	BD7

Front Panel Display and Driver Diagnostic (A2A1)

In this test, the controller turns all indicators and annunciators on and off so rapidly that only a logic probe or signature analyzer can detect the change. If the signatures are correct, the controller can probably select any required front panel display.

1. Set the LINE switch to STBY.
2. Install the A2A1 Front Panel Driver Assembly, if not previously installed.
3. Install a shorting clip between A2A8TP5 and TP GND and MPU Connector on A2A8.
4. Set diagnostic switch A2A8S1 to position 1.
5. Set LINE switch to ON.
6. Touch the logic probe to +5V and verify the signature is CA4A.
7. Verify that all indicators and annunciators except OVEN COLD and STANDBY are lit and the displays indicate the following:

RANGE dBm	+110.0
FREQUENCY MHz	.1.0.1.0.1.0.1.0.1.0.1

   In addition, the AUTO SWEEP key light is blinking.
8. If the front panel display differs from step 7, place A2A1 on an extender board. The signatures listed in table 8-23 verify the operation of the frequency data circuits. The signatures listed in table 8-24 can be used to aid in the isolation of faulty parts.

Table 8-23. Frequency Data Signatures

Pin No.	Signature	Mnemonic
A2A1A-34	U5P4	FD0
36	PCFP	FD5
A2A1B-4	932C	FD6
19	A3H2	FD1
25	U92H	FD2
26	H886	FD7
27	2599	FD3
28	0977	DLE
29	3U2F	NUME
31	0371	FD4

Table 8-24.
Front Panel Driver Assembly Signatures (1 of 5)

Pin No.	Signature	Mnemonic
U1-2	9691	BDL3-1
3	9691	BDL3-4
6	2FHC	
9	2FHC	
U3-4	CA4A	
5	07PF	BDL4-4
U4-1	HA9P	BDL4-5
U5-1	8F11	PRW
2	548H	
3	A3H2	FD1
4	0371	FD4
6	0798	
7	U5P4	FD0
8	PCFP	FD5
11	4UP2	U5-11
13	H886	FD7
14	932C	FD6
16	9H89	
17	2599	FD3
18	U92H	FD2
19	2UF3	

Table 8-24.
Front Panel Driver Assembly Signatures (2 of 5)

Pin No.	Signature	Mnemonic
U6-1	8F11	PRW
2	965F	
3	A3H2	FD1
4	0371	FD4
5	672F	
6	5624	
7	U5P4	FD0
8	PCFP	FDS
11	C1PA	U6-11
12	9453	
13	H886	FD7
14	932C	FD6
15	FFA9	
16	A381	
17	2599	FD3
18	U92H	FD2
19	98C1	
U7-1	8F11	PRW
2	8F05	
3	A3H2	FD1
4	0371	FD4
5	FP43	
6	47CF	
7	U5P4	
8	PCFP	FD5
9	U72U	
U7-11	U1F9	U7-11
12	F68C	
13	H886	FD7
14	932C	FD6
15	9886	
16	FA45	
17	2599	FD3
18	U92H	FD2
19	774P	
U8-1	8F11	PRW
3	A3H2	FD1
4	0371	FD4
5	9691	
7	U5P4	FD0
8	PCFP	FD5
9	9751	

Table 8-24.
Front Panel Driver Assembly Signatures (3 of 5)

Pin No.	Signature	Mnemonic
11	P31P	U8-11
13	H886	FD7
14	932C	FD6
15	0CF6	
17	2599	FD3
18	U92H	FD2
U9-1	8F11	PRN
2	F842	
3	A3H2	FD1
4	0371	FD4
5	07PF	
6	8F99	FD0
7	U5P4	FD0
8	PCFP	FD5
9	HA9P	
11	F024	U9-11
12	5F35	
13	H886	FD7
14	932C	FD6
15	8P77	
17	2599	FD3
18	U92H	FD2
19	P611	
U10-1	8F11	PRW
2	30F8	
3	A3H2	FD1
4	0371	FD4
5	0HC5	
6	9C3P	DL5-0
7	U5P4	FD0
8	PCFP	FD5
9	47C2	
11	2P78	U10-11
12	9CA4	
13	H886	FD7
14	932C	FD6
15	0C5C	
16	69H7	
17	2599	FD3
18	U92H	FD2
19	0149	

Table 8-24.
Front Panel Driver Assembly Signatures (4 of 5)

Pin No.	Signature	Mnemonic
U11-1	8F11	PRW
2	H774	
3	A3H2	FD1
4	0371	FD4
5	C8U9	U13-5
6	49H7	U13-18
7	U5P4	FD0
8	PCFP	FD5
9	5PFF	U13-8
11	C94F	U11-11
12	0HA6	U12-9
13	H886	FD7
14	932C	FD6
15	37H0	U13-6
16	UU7P	U12-3
17	2599	FD3
18	U92H	FD2
19	F111	U12-17
U12-2	CA4A	U12-2
3	UU7P	U12-3
8	0HA6	U12-8
17	F111	U12-17
U13-6	37H0	U13-6
8	5PFF	U13-8
U14-1	PA88	A0
2	FP44	A1
3	HH57	A2
4	8F11	PRW
9	4UP2	U5-11
10	2P78	U10-11
11	FO24	U9-11
12	P31P	U8-11
13	U1F9	U7-11
14	C1PA	U6-11
15	C94F	U11-11

Table 8-24.
Front Panel Driver Assembly Signatures (5 of 5)

Pin No.	Signature	Mnemonic
U15-1	PA88	A0
2	FP44	A1
3	HH57	A2
4	8F11	PRW
6	3U2F	NUME
9	UAPU	A-L
10	1UC3	F10-L
11	50A7	F89-L
12	6861	F67-L
13	HP11	F45-L
14	FFHF	F23-L
15	4A31	F01-L
P1A-18	0HC5	DL5-4
20	UAPU	A-L
22	CA4A	DL5-5
25	CA4A	DL5-6
28	5F35	DL4-7
34	U5P4	FD0
36	PCFP	FD5
P18-1	30F8	DL5-1
4	932C	FD6
5	CA4A	+5V
6	0000	GND
A2A18-14	HP11	F45-L
15	FFHF	F23-L
16	4A31	F01-L
17	6861	F67-L
18	9C3P	DL5-0
19	A3H2	FD1
P1B-23	CA4A	+5V
24	0000	GND
25	U92H	FD2
26	H886	FD7
27	2599	FD3
28	0977	DLE
29	3U2F	NUME
30	1UC3	F10-L
31	0371	FD4
32	50A7	F89-L
33	PA88	A0
34	8F11	PRW
35	HH57	A2
36	FP44	A1

RAM Verification (A2A10)

In this diagnostic, the controller writes and verifies data on Memory/Interface Assembly A2A10. The FREQUENCY MHz display gives pass or fail indications.

1. Set LINE switch to STBY.
2. Install the MPU test connector (HP Part Number 11726-60001) to the test connectors on top of A2A8 Microprocessor Assembly.
3. Connect the signature analyzer as shown under MPU Free Run Diagnostic (A2A8) paragraph 5.
4. Install a shorting clip between A2A8TP5 and TP GND.
5. Verify test switch A2A10S1 is set to NORM. Install the Memory/Interface assembly (A2A10).
6. Set diagnostic switch A2A8S1 to position 8.
7. Set LINE switch to ON.
8. Verify the FREQUENCY MHz display indicates 08-1. Remove the shorting clip.
9. Touch the logic probe to +5V and verify the signature flickers between 0003 and 0001.
10. Verify the following on the front panel:
    a. The right side of the FREQUENCY MHz display cycles between 08 and 0800.
    b. The RANGE dBm display indicates 0.
    c. All red LEDs and all white annunciators, except OVEN COLD and STBY, cycle on and off.
11. If an error is detected, the displays stop cycling and an error code is displayed.

Divide-By-Three Diagnostic (P/O A2A10)

1. Verify conditions are as in paragraphs 1 through 4 of RAM Verification (A2A10) above.
2. Install the Memory/Interface Assembly (A2A10) on an extender.
3. Set diagnostic switch A2A8S1 to position A and both switches (S1A and S1B) of NORM/TEST switch A2A10S1 to NORM position.
4. Set LINE switch to ON.
5. Verify the FREQUENCY MHz display indicates 10-1.
6. Touch the RESET probe to +5V and verify the signature is U45H.
7. The signatures listed in table 8-25 verify the operation of the divide-by-three circuits.

8. If any of the signatures are incorrect, the signatures listed in table 8-26 can be used to isolate the faulty part.

Note Switch A2A10S1 to TEST position when using table 8-26.

9. Set the LINE switch to STBY.
10. Set NORM/TEST switch A2A10S1 to NORM position.
11. Remove the Memory/Interface Assembly from the extender and install it in the instrument.

Table 8-25. Divide-by-Three Circuit Signatures

Pin No.	Signature	Mnemonic
A2A10B 27	CC55	PRW
29	4UOH	A0
33	PPA7	SA2-L
A2A10C 11	U45H	PHE-H
13	PPA7	BD6
16	H9A2	BD0
22	6820	BD2
23	3248	BD1
24	8698	A5
25	C4UU	BD3
26	3CP7	BD4
27	8C35	BD5
28	PPA7	BD7

Table 8-26.
Memory/Interface Assembly Signatures (1 of 2)

Pin No.	Signature	Mnemonic
U4-1	4U0H	A0
2	CC55	PRW
3	U45H	PHE-H
5	PPA7	SA2-L
6	8698	A5
10	CCH4	
11	U4HF	
U5-1	CC55	PRW
2	CC55	PRW
3	4U08	R/W
4	4U08	R/W
5	U45H	PHE-H
6	CC55	WE
11	4U08	OE
12	CC55	PRW
13	U45H	PHE-H
U6-1	0000	A14
2	0000	A13
3	70C7	A12
4	42U2	VMA
5	84PA	A11
6	8698	A5
7	70C7	A6
8	0000	A7
9	70C7	A10
10	70C7	A9
11	0000	A8
23	U4H5	PHE-H
U7-6	4A48	A4
7	A9P9	A3
8	63CC	A2
9	2PFF	A1
10	4U0H	A0
22	4U08	OE

Table 8-26.
Memory/Interface Assembly Signatures (2 of 2)

Pin No.	Signature	Mnemonic
U10-2	0U19	D7
3	PPA7	BD7
4	OU19	D6
5	PPA7	BD6
6	OU19	D5
7	8C35	BD5
8	5FH2	D4
9	3CP7	BD4
11	C4UU	BD3
12	0U19	D3
13	0U32	BD2
14	AUU1	D2
15	3248	BD1
16	572H	D1
17	H9A2	BD0
18	09A5	D0
U11-1	5A6P	
5	AP83	
6	H564	
9	3149	
12	169U	
15	H946	
16	0000	
19	0000	
U12-9	6738	D0
10	UHUU	D1
11	H98P	D2
13	F928	D3
14	324U	D4
15	AH74	D5
16	725F	D6
17	725F	D7
U8-21	CC55	WE

ROM Diagnostic (A2A10)

This diagnostic verifies the correct checksum in the ROM. A similar diagnostic is run every time the Signal Generator is turned on. In this test, the backup copy of the program (in the diagnostic ROM) is used. In addition, the diagnostic ROM checksum is tested.

1. Set LINE switch to STBY.
2. Install the Memory\Interface Assembly (A2A10).

3. Install a shorting clip between A2A8TP5 and TP GND.
4. Install the MPU test connector to the test connectors on top of A2A8 Microprocessor Assembly.
5. Set diagnostic switch A2A8S1 to position 6.
6. Verify the signature analyzer is connected as shown under "MPU Free Run Diagnostic (A2A8)", paragraph 5.

Note

Position 7 is similar to position 6. The only difference is that in position 7 the ROM diagnostic halts on the first error. Use switch position 7 for detecting intermittent problems. Position 6 resumes testing after each error to detect multiple errors.

7. Set LINE switch to ON.
8. Verify the FREQUENCY MHz display indicates 06-1. Remove the shorting clip from A2A8TP5.
9. Verify the FREQUENCY MHz display indicates 0600. If no errors are detected, 00 blinks on and off. If an error is detected, the last two digits of the displayed number indicate which ROM failed. Multiple failures are indicated by a succesion of error numbers. The error numbers and the corresponding failed ROM are shown in table 8-27.

Table 8-27. ROM Error Codes

Error Code	Defective ROM
06 — 01	A2A10U7
06 — 02	A2A10U7
06 — 03	A2A10U7
06 — 04	A2A8U3

Memory/Interface Assembly Check

This diagnostic checks the interconnections between the Memory\Interface Assembly (A2A10) and the microprocessor assembly.

1. Set LINE switch to STBY.
2. Install A2A10 on an extender and install extender cable (HP Part No. 08673-60022) between A2A10J1 and J2.
3. Set A2A8S1 to position C.
4. Install shorting clip between A2A8TP5 and TP GND.
5. Set LINE switch to ON.
6. Verify the FREQUENCY MHz display indicates 12-1.
7. Remove shorting clip from TP GND.

8. Frequency MHz display should indicate 1200 if no faults are present. If the indication is 1201 a fault has occurred which probably is in the connections between the microprocessor assembly and A2A10U1. If the indication is 1203, a fault has occurred which is probably in the interconnections of the data lines or buffers. If the indication is 1202, a fault has occurred which is probably associated with A2A10U1 and its interconnections.
9. If any of the displays show a fault has occurred, the signatures shown in table 8-28 can be used to aid in the isolation of the failed part.
10. Replace the shorting clip and proceed to take the signatures listed in table 8-28.

Table 8-28.
Memory/Interface and Converter Signatures (1 of 2)

Pin No.	Signature	Mnemonic
U1-1	07CU	PB1
12	3539	PB2
13	950C	PB3
14	7PUF	PB4
15	F951	PB5
16	2HF7	PB6
17	5C23	PB7
19	A1U9	CB2
21	49U2	READ/WRITE
24	8077	CS1
25	F985	CS-2
34	8077	RESET
35	689P	A1
36	20PP	A0
38	8077	NMI-L
U2-2	07CU	PB1
3	07CU	DA1
4	950C	PB3
5	950C	DA3
6	F951	PB5
7	F951	DA5
8	2HF7	PB6
9	2HF7	DA6
11	5C23	DA7
12	5C23	PB7
13	444P	ACK1
14	444P	CA2
15	7PUF	DA4
16	7PUF	PB4
U3-11	A1U9	RD1
12	A1U9	CB2
17	P6C3	DA0
18	P6C3	PB0

Table 8-28.
Memory/Interface and Converter Signatures (2 of 2)

Pin No.	Signature	Mnemonic
U6-1	2HH5	A14
2	2HH5	A13
3	A1CA	A12
4	92C6	VMA
5	0F18	A11
6	C53C	A5
7	FF68	A6
8	836P	A7
9	A1C1	A10
10	A1CA	A9
11	2HH5	A8
23	8077	A15
U7-6	32HA	A4
7	854F	A3
8	C3A8	A2
9	689P	A1
10	20PP	A0
XA10C13	U2UA	BD6
C16	6190	BD0
C22	14P1	BD2
C23	16U2	BD1
C25	7197	BD3
C26	H59H	BD4
C27	610P	BD5
U5-1	49U2	PRW
2	49U2	PRW
3	F985	R/W
4	F985	R/W
5	8077	PHE-H
6	49U2	WE
11	F985	OE
12	49U2	PRW
13	8077	PHE-H

Frequency Output Diagnostic (A2A9)

This diagnostic verifies proper operation of the frequency latches and M and N encoder circuits. A special connection to the signature analyzer clock is needed because some of these circuits are too slow to generate stable signatures with the controller clock.

Note

In addition to this diagnostic, the operation of the frequency output section of the A2A9 Assembly can be checked using the special extender (HP Part Number 11726-60003). Note that all boards must be installed in the instrument if the special extender is being used. Refer to table 8-5 for listings of the M/N numbers and the related frequencies.

1. Set LINE switch to STBY.
2. Verify that A2A1, A2A3, A2A4, A2A5 and A2A8 are the only circuit board assemblies of the A2 Controller that are installed.
3. Install the Frequency Output-HP-IB Assembly (A2A9) on an extender. Do not use the special extender (HP Part Number 11726-60003) as this extender may cause different signatures to be displayed.
4. Set the diagnostic switch A2A8S1 to position 3.
5. Connect the signature analyzer as follows:

Signature Analyzer Lead	Terminal
START	A2A8TP4
STOP	A2A8TP4
CLOCK	A2A9TP2
GND	A2A8TP GND

6. Set the signature analyzer pushbuttons as follows:

START	OUT (positive edge)
STOP	IN (negative edge)
CLOCK	IN (negative edge)
SELF-TEST	OUT (not activated)

7. Install a shorting clip between A2A8TP5 and TP GND.
8. Connect the MPU test connector to the test connectors on the top of the A2A8 Microprocessor asssembly.
9. Set LINE switch to ON and verify the FREQUENCY MHz display indicates 03-1.
10. Press the logic probe RESET and verify the signature is A52A.
11. The signatures listed in table 8-29 verify the operation of the output lines of the frequency output section of A2A9. If an incorrect output line signature is found, check the input line signatures listed in table 8-30.
12. If incorrect signatures show a fault has occurred, the signatures of table 8-31 can be used to isolate the source of the fault.

Table 8-29.
Frequency Diagnostic Output Lines Signatures

Pin No.	Signature	Mnemonic
A2A9A-1	413H	M5
2	0FP0	M3
3	P101	M4
4	7378	M1
5	994A	M2
6	0H32	N5
7	95H0	N6
8	5AFU	N3
9	F813	N4
10	6876	N2
11	693P	N1
21	1H63	800K
22	758P	200K
23	UA07	DAC3200
24	468C	DAC800
25	C253	DAC400
26	H6F1	DAC200
27	1AH5	DAC100
28	1U41	DAC80
29	839U	DAC20
30	PH1A	DAC4800
31	0PC1	1 MHZ
32	8758	2 MHZ
33	F3AF	4 MHZ
34	61H6	8 MHZ
35	H652	DAC 10 MHz
36	912C	DAC 40 MHz
A2A9B-2	C1HP	20K
3	58PU	40K
4	63CH	10K
5	3AF7	400K
6	PC1H	100K
11	AF77	80K
20	3CHU	1K
21	8PU7	4K
22	1HPU	2K
23	F77C	8K
25	A52A	IRQ1B-L

Table 8-30. Frequency Diagnostic Input Lines Signatures

Pin No.	Signature	Mnemonic
A2A9B-12	A52A	A1
16	A52A	A2
26	A52A	RESET-L
27	0000	PRW
29	0000	A0
33	0000	SA2-L
34	A52A	E-HPIB
35	0000	SC1-L
36	0000	A4
A2A9C-5	0000	BD2
6	A52A	BD1
8	A52A	BD4
9	A52A	BD6
16	A52A	BD0
23	0000	BD3
24	0000	BD5
25	0000	BD7

Table 8-31.
Frequency Output — HP-IB Assembly Diagnostic (1 of 4)

Pin No.	Signature	Mnemonic
U1-2	H46U	
3	872F	
4	A52A	
5	F680	
6	H46U	
7	92P4	
10	468C	
11	UA07	
12	4830	
U2-1	UA07	
3	468C	
5	C253	
7	H6F1	
9	1AH5	
10	693P	
11	6876	
12	5AFU	
13	F813	
14	P028	

Table 8-31.
Frequency Output — HP-IB Assembly Diagnostic (2 of 4)

Pin No.	Signature	Mnemonic
U3-1	PH1A	
2	CUUU	
3	1UF3	
5	P101	
6	1AH5	
7	5PUP	
10	442C	
11	P417	
13	0H32	
14	95H0	
U4-3	1U41	
4	CUUU	
5	912C	
7	839U	
9	1AH5	
10	3F60	
11	A95A	
12	5PUP	
13	P101	
14	1UF3	
15	1AH5	
U5-2	0H80	
3	8UF3	
4	F794	
5	PH44	
6	0H80	
7	HC41	
10	H6F1	
11	C253	
12	93P4	
13	F680	
14	872F	
15	F794	

Table 8-31.
Frequency Output — HP-IB Assembly Diagnostic (3 of 4)

Pin No.	Signature	Mnemonic
XA9A-1	413H	M5
2	0FP0	M3
3	P101	M4
4	7378	M1
5	994A	M2
6	0H32	N5
7	95H0	N6
8	5AFU	N3
9	F813	N4
10	6876	N2
11	693P	N1
21	1H63	800K
22	758P	200K
23	UA07	DAC 3200 MHz
24	468C	DAC 800 MHz
25	C253	DAC 400 MHz
26	H6F1	DAC 200 MHz
27	1AH5	DAC 100 MHz
28	1U41	DAC 80 MHz
29	839U	DAC 20 MHz
30	PH1A	DAC 4800 MHz
31	OPC1	DAC 1 MHz
32	8758	DAC 2 MHz
33	F3AF	DAC 4 MHz
34	61H6	DAC 8 MHz
35	H652	DAC 10 MHz
36	912C	DAC 40 MHz

Table 8-31.
Frequency Output — HP-IB Assembly Diagnostic (4 of 4)

Pin No.	Signature	Mnemonic
XA9B-2	C1HP	20K
3	58PU	40K
4	63CH	10K
5	3AF7	400K
6	PC1H	100K
11	AF77	80K
12	A52A	A1
16	A52A	A2
20	3CHU	1K
21	8PU7	4K
22	1HPU	2K
23	F77C	8K
25	A52A	IRQ1B-L
29	0000	A0
33	0000	SA2-L
35	0000	SC1-L
36	0000	A4
XA9C-5	0000	BD2
6	A52A	BD1
8	A52A	BD4
9	A52A	BD6
16	A52A	BD0
23	0000	BD3
24	0000	BD5
25	0000	BD7

HP-IB Diagnostic (A2A9)

This diagnostic verifies that most of the HP-IB circuits are nominally working. It does not verify that the Signal Generator can listen or respond to some of the signals that are tested in the "Operator's Checks" in chapter 3. The front panel HP-IB status indicators are not programmed for this diagnostic.

Note



In addition to this diagnostic, there are two other methods to check the HP-IB. The first is to perform the "Remote Operator's Check" in chapter 3 and troubleshoot the specific lines that do not respond correctly. (Affected lines are identified in chapter 3 text that describes each of the tested messages.) The other is to perform the External Controller HP-IB Diagnostic Procedure that is located after these diagnostics. It is sometimes more convenient to use more than one method to isolate a fault.

1. Set LINE switch to STBY.
2. Set HP-IB address switch A2A9S1 to 0011 0011. This is the factory setting for the switch and is required to run this diagnostic correctly.
3. Disconnect HP-IB connector on rear panel.
4. Install a shorting clip between A2A8TP5 and TP GND and the MPU connector on top of A2A8.
5. Set diagnostic switch A2A8S1 to position 2.
6. Connect the clock input of the signature analyzer to A2A8TP3.
7. Set LINE switch to ON and verify the FREQUENCY MHz display indicates 02-1.
8. Remove the shorting clip from A2A8TP5 and verify the FREQUENCY MHz indicates 00110011 (the setting of A2A9S1).
9. Set the LINE switch to STBY. Install a shorting clip between A2A8TP5 and TP GND. Set LINE switch to ON.
10. Press the logic probe RESET and verify the signature is CA25.
11. The signatures listed in table 8-32 verify the operation of the output lines of the HP-IB section of A2A9. If one or more of the signatures are incorrect, check the input lines signatures listed in table 8-33.
12. If any incorrect signatures occur, table 8-34 can be used to isolate the source of the fault.
13. Remove the A2A9 Assembly from the extender and install it in the instrument.

Note 

If necessary, return the HP-IB address switch to its previous setting.

Table 8-32. HP-IB Diagnostic Output Lines Signatures

Connector	Signature	Mnemonic
A2A9B-14	7CH9	DIO6
A2A9C-7	CA25	EOI
11	CU22	DIO1
12	F8U4	DIO2
13	8888	DIO3
14	U21P	DIO4
15	U890	DIO5
17	4A65	DIO7
18	FUFH	DIO8
19	CA25	ATN
20	CA25	SRQ
26	CA25	REN
27	CA25	IFC
28	CA25	NRFD
29	CA25	NDAC
30	CA25	DAV

Table 8-33. HP-IB Diagnostic Input Lines Signatures

Connector	Signature	Mnemonic
A2A9B-12	P4AC	A1
15	3F76	SA3-L
16	P270	A2
26	CA25	RESET-L
27	0UF9	PRW
29	3C25	A0
33	CU0U	SA2-L
34	C5PF	E-HPIB
35	CH1A	SC1-L
36	PU59	A4
A2A9C-5	H8F1	BD2
6	6P92	BD1
8	9509	BD4
9	45H1	BD6
16	A40F	BD0
23	15FU	BD3
24	U5C7	BD5
25	6FH1	BD7

Table 8-34. HP-IB Diagnostic Signatures (1 of 2)

Connector	Signature	Mnemonic
U6-8	0UF9	
10	0UF9	PRW
11	3FU7	
13	3F76	SA3-L
U7-1	CA25	RESET-L
2	CA25	RESET-L
3	0000	
4	86H2	
5	C5PF	
6	0UF9	
8	891C	
9	0UF9	PRW
10	86H2	
11	CA25	
12	0UF9	PRW
13	C5PF	E-HPIB
U8-1	3C25	A0
2	P4AC	A1
3	P270	A2
4	CH1A	SC1-L
5	CU0U	SA2-L
12	A52A	80B
13	A52A	80A
14	A52A	809
15	A52A	808
U9-1	PU59	A4
2	557F	
5	C5PF	E-HPIB
6	0UF9	
10	C5PF	
11	0UF9	
12	86H2	
13	3FU7	
U10-1	7FH7	
2	7FH7	
3	C5PF	E-HPIB
4	0000	
8	3FU7	
9	CA25	
10	0UF9	

Table 8-34. HP-IB Diagnostic Signatures (2 of 2)

Connector	Signature	Mnemonic
U10-12	CA73	
13	FU7P	
14	92A9	
15	9U8F	
16	FC36	
17	5763	
18	7C58	
19	3171	
21	3C25	
22	P4AC	
23	P270	A4
24	CA25	IFC
25	CA25	REN
26	CA25	ATN
27	CA25	SRQ
28	CU22	IB1
29	F8U4	IB2
30	8888	IB3
31	U21P	IB4
32	U890	IB5
33	7CH9	IB6
34	4A65	IB7
35	FUFH	IB8
36	FUFH	IB8
37	CA25	NRFD
38	CA25	NDAC
39	CA25	E01
U11-1	7FH7	
2	CU22	DI01
3	F8U4	DI02
4	8888	DI03
5	U21P	DI04
6	U890	DI05
7	7CH9	DI06
8	4A65	DI07
9	FUFH	DI08
10	7FH7	

HP-IB Diagnostic — Talk Only Mode

In this test, the controller reads the address switch on top of the A2A8 Microprocessor Assembly and displays the switch setting on the FREQUENCY MHz display. It then puts the instrument into the talk only mode and transmits data on the HP-IB. All 8 bit values from 0 to 255 are sent continuously. This data can be read and analyzed by an external controller.

1. Set the LINE switch to STBY.
2. Set test switch A2A8S1 on the Microprocessor Assembly to position 2.
3. Connect the MPU test connector (HP Part Number 11726-60001) to the test connectors on top of the A2A8 assembly.
4. Install a shorting clip between A2A8TP5 and the adjacent TP GND.
5. Set the LINE switch to ON.
6. Remove the short from A2A8TP5. Verify the FREQUENCY MHz display indicates the HP-IB address switch setting. If a Signal Generator addressing problem is suspected, change the address switch to several positions and check that each setting appears in the FREQUENCY MHz display as it is changed.

Note Disregard the front panel HP-IB annunciators for this diagnostic.

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7. Figure 8-52 is a sample program for the HP 9825A (HPL) or the HP 85 (BASIC) computing controllers. It reads the data the Signal Generator is sending on the HP-IB and checks that it is correct. Connect the HP-IB cable to the Signal Generator and run the program. If operation is normal, the controller display will contain "PASSED".
8. If the program is running for more than about 5 seconds on the HP 9825A or more than 20 seconds on the HP 85F, it is likely that the program is not reading data but is waiting because the Signal Generator is not "handshaking" properly. In this case the program will stay hung-up and the problem is most likely the HP-IB interface (A2A9U10) or transceiver (A2A9U22). Check the "handshaking" lines to find the cause.

DESCRIPTION	SAMPLE PROGRAMS	
	HP 9825A (HPL)	HP 85F (BASIC)
Reserve space in memory for arrays A and A$. Display "PROGRAM RUNNING" (BASIC only).	0: dim A[300],A$[8];fxd 0	10 OPTION BASE 1 20 DIM A(300),A$[8] 25 DISP "PROGRAM RUNNING"
Reads 300 values from the HP-IB into array A.	1: for I=1 to 300 2: rdb(700)→A[I] 3: next I	30 FOR I=1 TO 300 40 ENTER 700 USING "#,B" ; A(I) 60 NEXT I
Display "ALMOST DONE" (BASIC only). Check that each reading increases by 1. When the reading is 0, the sequence starts over.	4: for J=1 to 256 5: if A[J+1]=0;gto +2 6: if A[J]+1≠A[J+1];gto "error" 7: next J	65 DISP "ALMOST DONE" 70 FOR J=1 TO 256 90 IF A(J+1)=0 THEN 110 100 IF A(J)+1<>A(J+1) THEN 140 110 NEXT J
Print or display "Passed" or "Error".	8: prt "PASSED";stp 9: "error": 10: prt "ERROR"	120 DISP "PASSED" 130 STOP 140 PRINT "ERROR"
If an error was detected, start printing 5 readings before the error occurred.	11: J-5→K 12: if K<1;1→K	150 K=J-5 160 IF K<1 THEN K=1
Print 20 readings.	13: for L=K to K+20	170 FOR L=K TO K+20
Convert the numeric value of the reading to binary and store in string array A$.	14: A[L]→V 15: for M=1 to 8 16: 2^(8-M)→B 17: "0"→A$[M,M] 18: if V>=B;"1"→A$[M,M];V-B→V 19: next M	180 V=A(L) 190 FOR M=1 TO 8 200 B=2^(8-M) 210 A$[M,M]="0" 220 IF V<B THEN 250 230 A$[M,M]="1" 240 V=V-B 250 NEXT M
Print the reading in Binary (Array A$) and decimal form.	20: prt A$,A[L] 21: next L	260 PRINT A$,A(L) 270 NEXT L
	22: stp	280 END

Figure 8-52. HP 9825A and HP 85F Sample Program Listing

9. If the data is read but is not correct, an error printout occurs. A sample error printout is shown in the figure 8-53. The 8 bit data bytes received are on the left and their decimal equvalents are on the right. The data go from 0 to 255 and repeat. The controller starts reading anywhere in the cycle and reads 256 values. After reading all the values, the data is analyzed and data values near where the error was detected are printed. Analyzing the printout can often detect a bit stuck high or low. The sample printout shows the DIO7 line stuck in the one state.

Error	
Binary	**Decimal**
11111010	250
11111011	251
11111100	252
11111101	253
11111110	254
11111111	255
01000000	64
01000001	65
01000010	66
01000011	67
01000100	68
01000101	69
01000110	70
01000111	71
01001000	72
01001001	73
01001010	74
01001011	75
01001100	76
01001101	77
01001110	78

Figure 8-53. Sample Error Printout

I/O Assembly Talk-Around Diagnostic (A2A7)

1. Install the I/O Assembly on an extender.
2. Set the Options Configuration Switches A2A7S1 to the OFF position.
3. Install the MPU Connector on top of A2A8 and a shorting clip between A2A8TP5 and TP GND.

4. Set the diagnostic switch A2A8S1 to 4.
5. Connect the power cord and set the LINE switch to ON.
6. Table 8-35 can be used to isolate the source of the malfunction. A recommended procedure is to first, verify the signatures at the edge connectors and second, locate the malfunction associated with the faulty line.
7. Disconnect the power cord.
8. Disconnect the MPU test connector, the shorting clip and the signature analyzer from A2A8.
9. Restore the Options Configuration Switches so that only switch G is closed. For options 001 and 005 switch H should also be closed, and for option 008 switch F should be closed.
10. Install A2A7 in the instrument.

Table 8-35. I/O Assembly Diagnostic Signatures (1 of 10)

Pin	Signature	Mnemonic
U1-1	0000	
2	H6A6	LFS UNLOCKED
3	0000	M/N UNLOCKED
4	H6A6	TP2
5	0000	REF UNLOCKED
7	0000	GND
14	H6A6	+5V
U2-1	P604	A3
2	5659	
3	1F3F	
4	5659	
5	P604	A3
6	CUPH	
7	0000	GND
8	8U97	CB2
9	H6A6	
10	5931	
11	289U	
12	1F3F	
13	3485	PRW
14	H6A6	+5V
U3-1	0000	GND
2	0000	GND
3	289U	
5	H6A6	+5V
6	5931	
7	0000	GND
9	H6A6	+5V
11	0000	GND
14	H6A6	+5V
U4-1	289U	
7	0000	GND
8	H6A6	
9	0000	VUP
10	H6A6	VDN
14	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (2 of 10)

Pin	Signature	Mnemonic
U5-1	75U2	A0
2	224H	A1
3	P198	
4	C380	SA2-L
5	F9FU	SC2-L
U5-6	H6A6	+5V
7	0A90	817
8	0000	GND
9	H6A6	816
13	7810	812
14	PA05	811
15	HP14	810
16	H6A6	+5V
U6-1	0U42	
2	H6A6	+5V
3	P223	E-PIA
4	H6A6	TP3
5	0U42	
6	H9P4	
7	0000	GND
9	H6A6	NSTRB
10	H6A6	STRB DIS
11	P223	E-P1A
12	0U42	
13	H6A6	+5V
14	H6A6	+5V
U7-1	3485	PRW
2	1C8F	
3	U0U9	BD0
4	UP98	BD1
5	8UUC	
6	98U5	
8	43AA	BD3
9	7058	END SWP
10	0000	GND
11	7810	812
12	44A1	TRIGGER OUTPUT
13	8UP7	BD4
14	0A71	BD5
15	1O1F	
17	1A8A	BD6
19	3UCA	
20	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (3 of 10)

Pin	Signature	Mnemonic
U9-1	UP39	
2	289U	
7	0000	GND
8	H6A6	
9	0000	LEV
12	H6A6	UNLOCK
13	0000	
14	H6A6	+5V
U10-1	0000	FM OM
3	0000	P82
4	UNSTABLE	CB2
5	H6A6	PB0
7	H6A6	UNLOCK
8	0000	GND
9	H6A6	
11	H6A6	PB1
12	UNSTABLE	CB2
13	0000	P83
15	0000	EXT REF
16	H6A6	+5V
U11-1	0000	GND
2	H6A6	K0
3	H6A6	K1
4	H6A6	K2
5	H6A6	K3
6	H6A6	K4
7	H6A6	K5
8	H6A6	K6
9	0000	GND
10	H6A6	PB0
11	H6A6	PB1
12	0000	PB2
13	0000	PB3
14	U004	PB4
15	06UU	PB5
16	9HA2	PB6
17	37P6	PB7
18	H6A6	CB1
19	UNSTABLE	CB2
20	H6A6	+5V
21	3485	PRW

Table 8-35. I/O Assembly Diagnostic Signatures (4 of 10)

Pin	Signature	Mnemonic
22	7568	VMA
23	80UU	SA3-L
24	P604	A3
25	P223	E-PIA
26	3CHH	D7
27	H7A3	D6
28	A67U	D5
29	05H2	D4
30	UU91	D4
31	13U5	D2
33	144U	D0
34	H6A6	RESET-L
35	224H	A1
36	75U2	A0
37	H6A6	IRQB-L
38	H6A6	IRQA-L
39	9638	KACK-L
40	H6A6	KDN-L
U12-1	CUPH	
2	U0U9	BD0
3	144U	D0
4	UP98	BD1
5	C670	D1
7	13U5	D2
8	43AA	BD3
9	UU91	D3
10	0000	GND
11	43AA	BD3
12	UU91	D3
14	13U5	D2
15	22AP	BD1
16	C670	D1
17	U0U9	BD0
18	144U	D0
19	1F3F	
20	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (5 of 10)

Pin	Signature	Mnemonic
U13-1	CUPH	
2	8UP7	BD4
3	05H2	D4
4	0A71	BD5
5	A67U	D5
6	1A8A	BD6
7	H7A3	D6
9	3CHH	D7
10	0000	GND
12	3CHH	D7
13	1A8A	BD6
14	H7A3	D6
15	0A71	BD5
16	A67U	D5
17	8UP7	BD4
18	05H2	D4
U14-1	0000	
2	0000	GND
3	0000	
4	25PF	
5	3960	
6	C172	
7	P825	
8	9P79	
9	93FF	
10	59CC	
11	6677	
12	04U8	
13	85AA	
14	H6A6	+5V
15	0000	GND
U15-2	U0U9	BD0
3	PA05	811
5	3960	
7	0000	GND
9	25PF	
11	PA05	811
12	22AP	BD1
14	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (6 of 10)

Pin	Signature	Mnemonic
U16-2	4P43	BA1
4	224H	A1
5	75U2	A0
7	U6F2	BA0
8	0000	GND
9	0U42	
10	0606	BA3
12	P604	A3
13	P198	A2
15	12FF	BA2
16	H6A6	+5V
U19-1	0000	PB3
2	0000	GND
3	H6A6	+5V
4	0000	GND
6	UP39	
8	0000	GND
9	H6A6	PB0
10	U004	PB4
11	H6A6	PB1
12	06UU	PB5
13	9HA2	PB6
14	0000	PB2
15	37PC	PB7
16	H6A6	+5V
U20-1	0A90	817
2	H6A6	VDN
3	U0U9	BD0
4	0000	VUP
5	22AP	BD1
8	H6A6	STOP SWEEP
9	43AA	BD3
10	0000	GND
11	8UP7	BD4
12	0000	BIAS TRK
13	0A71	BD5
14	H6A6	CB1
15	1A8A	BD6
16	8U97	CB2
19	0A90	817
20	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (7 of 10)

Pin	Signature	Mnemonic
U21-1	0000	GND
2	2143	DATA 7
4	1A8A	BD6
5	0070	DATA 6
6	59AP	DATA 5
7	0A71	BD5
8	8UP7	BD4
9	9142	DATA 4
10	0000	GND
11	0U42	
12	67FH	DATA 0
13	U0U9	BD0
14	AP	BD1
15	P5AA	DATA 1
16	91CU	DATA 2
18	43AA	BD3
19	A3A3	DATA 3
20	H6A6	+5V
U22-1	0000	GND
2	59CC	
3	43AA	BD3
5	6677	
6	04U8	
7	22AP	BD1
8	U0U9	BD0
9	85AA	
10	0000	GND
11	HP14	810
12	93FF	
13	8UP7	BD4
14	0A71	BD5
15	9P79	
16	P825	
17	1A8A	BD6
19	C172	
20	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (8 of 10)

Pin	Signature	Mnemonic
U24-1	0000	GND
2	0000	GND
3	3485	PRW
4	3485	PRW
5	3485	PRW
6	H9P4	
7	0000	GND
8	0000	
9	1P3C	SC0-L
10	A453	SC1-L
11	A453	SC1-L
12	0U42	SB4-L
13	0U42	SB4-L
14	H6A6	+5V
U26-1	H6A6	816
2	H6A6	S1H
3	U0U9	BD0
4	H6A6	S1F
5	22AP	BD1
6	H6A6	S1D
8	H6A6	S1B
9	43AA	BD3
10	0000	GND
11	8UP7	BD4
12	H6A6	S1A
13	0A71	BD5
14	H6A6	S1C
15	1A8A	BD6
16	H6A6	S1E
18	H6A6	S1G
19	H6A6	816
20	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (9 of 10)

Pin	Signature	Mnemonic
XA7A-1	0000	M/N UNLOCKED
2	0000	EXT REF OVEN
4	H6A6	MONITOR LFS
7	H6A6	UNLOCKED
8	H6A6	K0
9	H6A6	K2
10	H6A6	K4
11	H6A6	K6
12	0000	VUP
13	H6A6	KDN-L
15	2143	DATA 7
16	59AP	DATA 5
17	A3A3	DATA 3
18	P5AA	DATA 1
20	0000	REF UNLOCKED
22	0000	BIAS TRK
26	9638	KACK-L
27	H6A6	K1
28	H6A6	K3
29	H6A6	K4
30	0000	BUFFERED YIG OUT
31	0000	LEV
32	0000	FM OM
33	0070	DATA 6
34	9142	DATA 4
35	91CU	DATA 2
36	67FH	DATA 0
XA7B-1	H6A6	+5V
2	46F2	BA0
3	0000	GND
4	H6A6	OVEN OK
5	H6A6	NSTRB
6	7568	VMA
7	H6A6	IRQA-L
8	H6A6	VDN
10	0000	GND
12	224H	A1
15	80UU	SA3-L
18	P604	A3
19	H6A6	+5V

Table 8-35. I/O Assembly Diagnostic Signatures (10 of 10)

Pin	Signature	Mnemonic
20	12FF	BA2
22	0606	BA3
23	4P43	BA1
24	H6A6	IRQB-L
26	H6A6	RESET-L
27	3485	PRW
28	0000	GND
29	75U2	A0
30	1P3C	SC0-L
31	0000	SB4-L
35	P198	A2
XA7C-2	A453	SC1-L
4	F9FU	SC2-L
5	22AP	BD1
7	8UP7	BD4
8	1A8A	BD6
9	0000	VTI-L
12	4P53	PEN LIFT TRIGGER
13	U4A1	OUTPUT
14	H6A6	STOP SWEEP
16	U0U9	BD0
20	P223	E-PIA
21	H6A6	BD3
22	0A71	BDS
29	7058	END SWP

Key Code Assembly (A2A2) Checks

1. Set LINE switch to STBY.
2. Install the A2A2 Key-Code Assembly in the instrument.
3. Set LINE switch to ON.
4. Verify all seven keyboard status indicators on top of the Key-Code Assembly are lit when no front panel keys are pressed.
5. Depress the keys indicated in table 8-36 and verify the indicator pattern.
6. If a pattern of step 5 cannot be verified, install the Key-Code Assembly on an extender card, replace it in the instrument and check the appropriate input pair.
7. If, after the second key is depressed, no further keys when depressed will cause instrument changes, check to see that KACK-L at XA2-24 goes low after a key is depressed. If KACK-L does go low or is low after a key is depressed, there is a fault in the input to the Key Code Card. If KACK-L does not go low, then there is a fault in the I/O Assembly A2A7.

Table 8-36. Key-Code Patterns

Function Key	Key-Code Pattern							Input Pair Verified		If Key-Code Pattern Incorrect	
										Key To Be Depressed To Verify:	
	K6	K5	K4	K3	K2	K1	K0	Row	Column	Row	Column
1		L	L				L	KR1	C3L	9	2
ΔF		L	L	L		L		KR2	C3H	2	9
TUNE	L				L			KR3	C4L	3	LOCAL
ALC INT	L			L				KR0	C4H	0	RF ON/OFF
FREQ INCR	L		L		L			KR4	C5L	4	START
MESSAGE	L		L	L	L			KR4	C5H	4	
PWR MTR	L			L	L		L	KR5	C4H	5	AUTO PEAK
PULSE OFF	L		L	L	L		L	KR5	C5H	5	FM3
FM3	L	L			L	L		KR6	C6L	6	FM1
MHz	L	L		L	L	L		KR6	C6H	6	GHz
SERVICE FUNC.	L	L		L	L	L	L	KR7	C6H	7	SINGLE

DAC and Enable Assembly (A1A5)

This test verifies performance of the digital portions of the DAC and Enable Board Assembly. The three DACs on the board are programmed in ramps covering their full output range. An oscilloscope can be used to verify monotonicity and adjustment of their output voltages.

1. Set the line switch to STBY and disconnect the power cord.
2. Set Diagnostic Switch (A2A8S1) to position 5.
3. Connect the MPU connector (HP Part No. 11726-60001) to the test connectors on top of the A2A8 assembly.
4. Install a shorting clip between A2A8TP5 and the adjacent TP GND.
5. Install power cord and set line switch to ON.
6. Verify the FREQUENCY MHz display indicates 05-1.
7. Touch the signature probe to +5V and verify the signature is C37F.
8. Table 8-37 lists the signatures for the DAC and Enable Board Assembly.

Table 8-37.
DAC and Enable Diagnostic Signatures (1 of 5)

Pin	Signature	Mnemonic
U1-1	0000	GND
2	8958	DATA 0
3	U194	DATA 1
4	9F1C	DATA 2
5	39P1	DATA 3
6	H551	DATA 4
7	6H90	DATA 5
8	71A2	DATA 6
9	8F48	DATA 7
10	8958	DATA 0
11	U194	DATA 1
12	2079	NEN12
13	A90C	NEN13
14	C37F	
15	C37F	
16	0000	GND
17	C37F	
19	0000	−15V
20	5P61	
21	C37F	+5V
22	0000	
23	0000	
24	0000	GND
U2-1	0000	GND
2	8958	DATA 0
3	U194	DATA 1
4	9F1C	DATA 2
5	39P1	DATA 3
6	H551	DATA 4
7	6H90	DATA 5
8	71A2	DATA 6
9	8F48	DATA 7
10	1603	NEN10
12	C37F	
13	C37F	
14	C37F	
15	0000	
16	0000	
17	0000	−15V

Table 8-37.
DAC and Enable Diagnostic Signatures (2 of 5)

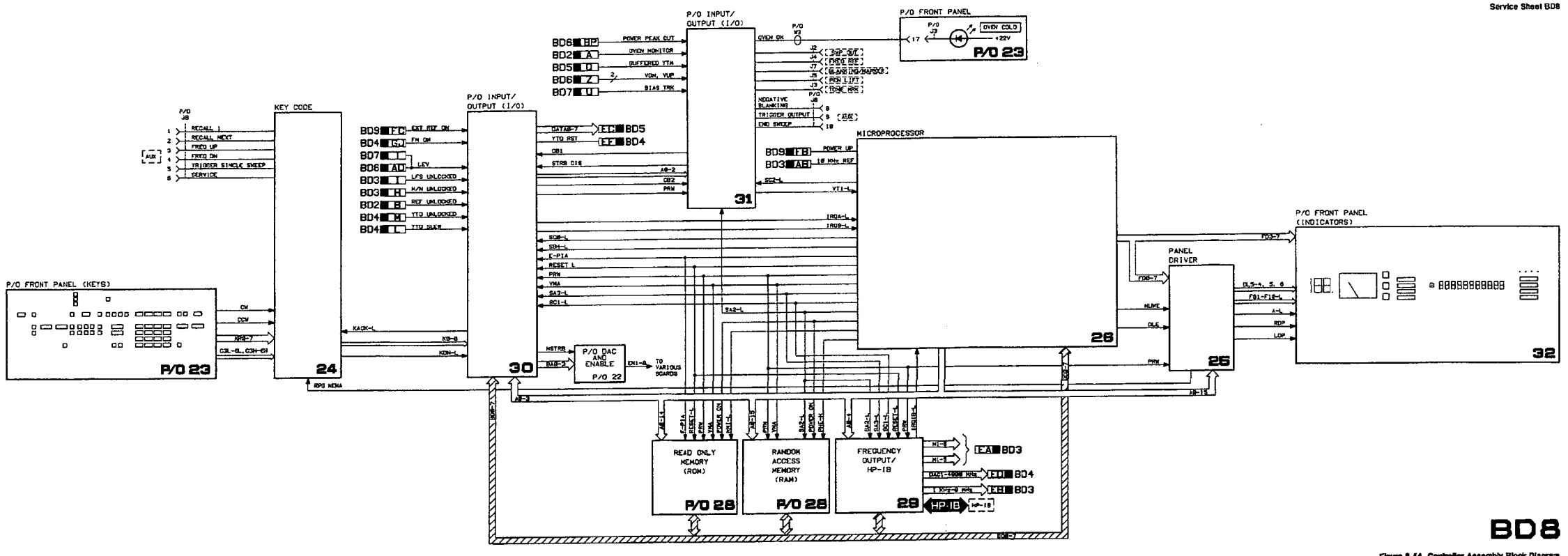
Pin	Signature	Mnemonic
18	UNSTABLE	PK DAC
19	C37F	+15V
20	0000	
21	0000	
22	0000	GND
U3-1	8958	DATA 0
2	075P	LOCAL
3	C422	REMOTE
4	HA66	EN11
5	9A20	FM40
7	U194	DATA 1
8	0000	GND
9	9F1C	DATA 2
11	A7PC	
12	HA66	EN11
14	40U2	NSHDN
15	39P1	DATA 3
16	C37F	+5
U4-1	0000	GND
2	8958	DATA 0
3	U194	DATA 1
4	9F1C	DATA 2
5	39P1	DATA 3
6	H551	DATA 4
7	6H90	DATA 5
8	71A2	DATA 6
9	8F48	DATA 7
10	U2FP	NEN9
12	0000	
13	C37F	+5V REF
14	C375	+5V REF
16	0000	
17	0000	−15V
18	252P	TP8
19	C37F	+15V
20	0000	
21	0000	
22	0000	GND

Table 8-37.
DAC and Enable Diagnostic Signatures (3 of 5)

Pin	Signature	Mnemonic
U8-1	1641	NEN1
2	AC53	NEN2
3	3065	NEN3
4	U867	NEN4
5	CAFA	NEN5
6	8C64	NEN6
7	A5CU	NEN7
8	802P	NEN8
9	U2FP	NEN9
10	1603	NEN10
11	691A	NEN11
12	0000	GND
13	2079	NEN12
14	A90C	NEN13
18	658A	NSTRB
19	0000	GND
20	1H0F	BA3
21	PAH6	BA2
22	PU34	BA1
23	1PP5	BA0
24	C37F	+5V
U9-1	0000	GND
2	1641	NEN1
3	182U	EN2
4	3065	NEN3
5	4C1C	EN4
6	CAFA	NEN5
7	3818	EN6
8	A5CU	NEN7
9	3352	EN8
10	0000	GND
11	802P	NEN8
12	16F3	EN7
13	8C64	NEN6
14	09C6	EN5
15	U867	NEN4
16	8319	EN3
17	AC53	NEN2
18	A53H	EN1
19	0000	GND
20	C37F	+5V

Table 8-37.
DAC and Enable Diagnostic Signatures (4 of 5)

Pin	Signature	Mnemonic
U12-1	P281	
2	C422	REMOTE
5	C422	REMOTE
7	0000	GND
8	C37F	
9	C37F	
10	C37F	
11	C37F	
12	C37F	
13	C37F	
14	C37F	+5V
XA5-1	0000	GND
2	C37F	+5V
6	0000	GND
7	9A20	FM40
8	C37F	PWR UP
9	0000	ALC REF
10	0000	ALC REF GND
11	A53H	EN1
12	182U	EN2
13	8319	EN3
14	4C1C	EN4
15	09C6	EN5
16	3818	EN6
17	16F3	EN7
18	3352	EN8
19	0000	B1A51
20	40U2	NSHDN
22	C37F	+5V REF
23	0000	GND
24	C37F	+5V



BD8

Figure 8-54. Controller Assembly Block Diagram
8-213/8-214

Table 8-37.
DAC and Enable Diagnostic Signatures (5 of 5)

Pin	Signature	Mnemonic
XA5-28	658A	NSTRB
29	1PP5	BA0
30	PU34	BA1
31	PAH6	BA2
32	1H0F	BA3
33	H9CF	RF ON
35	8958	DATA 0
36	U194	DATA 1
37	951C	DATA 2
38	39P1	DATA 3
39	H551	DATA 4
40	6H90	DATA 5
41	71A2	DATA 6
42	8F48	DATA 7
43	910U	BIAS 2

BD9 Power Supplies

References

BD1 Overall Block Diagram and
Troubleshooting ..... Service Sheet BD1
YTO Loop Assembly ..... Service Sheet A
Interior Views ..... Service Sheet B
Replaceable Parts List ..... Chapter 6
Illustrated Parts Breakdown (IPB) . Chapter 6
Post Repair Adjustments ..... Chapter 5

Principles of Operation

Power supplies in A3 RF Source Assembly generate all dc operating voltages for the instrument. Voltages provided are as follow:

+22 Vdc	−5.2 Vdc
+20 Vdc	−10 Vdc
+10 Vdc	−40 Vdc
+5.2 Vdc	

The power supply section consists of four parts:

- Mainframe Components
- Rectifier Assembly A3A12
- Positive Regulator Assembly A3A3
- Negative Regulator Assembly A3A4

Mainframe components consist of the input filter, power transformer, series pass transistors, filter capacitors, fan and power-on relay. These components serve to filter and regulate input power. The relay applies ac to the fan when the instrument ac line is ON. An indicator, located on the motherboard on the bottom of the instrument, is turned on whenever ac voltages are present on the A3 motherboard.

Rectifier Assembly A3A12 rectifies all ac secondary voltage inputs to the power supplies. Unregulated dc is then routed to the appropriate regulator assemblies. Regulated +22 Vdc is generated on this assembly.

Positive Regulator Assembly A3A3 contains the +20 Vdc regulator, its overvoltage protection circuit, the front panel shutdown circuit, 10 MHz oscillator power supply, power up/down detector, the +5.2 Vdc regulator and its overvoltage protection circuit. The oscillator power supply is controlled by the rear panel INT/EXT switch.

Negative Regulator Assembly, A3A4, contains the −10 Vdc regulator, −5.2 Vdc Regulator, Switched −10 Vdc output and the −40 Vdc regulator and its associated overvoltage protection circuits.

Troubleshooting

General

It is assumed that the troubleshooting procedures associated with BD1 have been used to isolate a problem to one of the power supplies. The following troubleshooting procedures can be used to further isolate the problem to one of the following:

- Front Panel Assembly — Service Sheet 23
- Rectifier Assembly — Service Sheet 33
- Positive Regulator Assembly — Service Sheet 34
- Negative Regulator Assembly — Service Sheet 35

Equipment

Digital Voltmeter (DVM)	HP 3456A or HP 3455A

Troubleshooting Procedures

The following procedures are divided into checks as follow:

Rectifier Assembly Check

+22 Volt Check (√1)

Positive Regulator Assembly Checks

+20 Volt Check (√2)
+5.2 Volt Check (√3)
+11 Volt Switched Check (√4)

Negative Regulator Assembly Checks

−10 Volt Check (√5)
−5.2 Volt Check (√6)
−40 Volt Check (√7)
−10 Volt Switched Check (√8)

Block Diagram Checks

Rectifier Assembly Check

Rectifier Assembly A3A12 provides a regulated +22 volts as well as the unregulated voltages for the Positive and Negative Regulators. This procedure checks the +22 Volt regulated output.

+22 Volt Checks (√1).

1. Connect the DVM to A3A12TP1.

   The DVM should indicate +22 ±0.02 Vdc

   If the indication is incorrect, attempt to adjust the voltage to +22.00 volts using A3A12R2.

   If the indication is correct, or if the voltage can be adjusted to +22.00 volts, proceed with the next check.

If the indication is incorrect and cannot be adjusted to +22.00 volts, the Rectifier Assembly is defective. Go to service sheet 33 to isolate the problem.

Positive Regulator Assembly Checks

Positive Regulator Assembly A3A3 provides the following voltages:

+20 Vdc
+5.2 Vdc
+11 Vdc Switched

Each is checked separately.

+20 Volt Check (√2).

2. Connect the DVM to A3A3TP5.

   The DVM should indicate +20 ±0.002 Vdc.

   If the indication is not correct, attempt to adjust the voltage to +20.000 Vdc using A3A3R50.

   If the voltage is correct, or if it can be adjusted, proceed with step 4.

   If the voltage cannot be adjusted, proceed with step 3 to isolate the problem.

3. Connect the DVM to A3A3TP4.

   The DVM should indicate between 27 and 33 Vdc.

   If the DVM indication is not correct, the Rectifier Assembly is defective. Go to service sheet 33 to isolate the problem.

   If the DVM indication is correct, the +20 Volt Regulator is defective. Go to service sheet 34 to isolate the problem.

+5.2 Volt Check (√3).

4. Connect the DVM to A3A3TP2.

   The DVM should indicate +5.2 ±0.01 Vdc.

   If the DVM indication is correct, proceed with step 6.

   If the DVM indication is not correct, proceed with step 5.

5. Connect the DVM to A3A3TP1.

   The DVM should indicate between 10 and 15 Vdc.

   If the DVM indication is correct, the +5.2 Volt Regulator is defective. Go to service sheet 34 to isolate the problem.

   If the DVM indication is not correct, the Rectifier Assembly is defective. Go to service sheet 33 to isolate the problem.

+11 Volts Switched Check (√4).

6. Ensure that the rear panel INT/EXT switch is set to INT.
7. Connect the DVM to A3A3TP6.

   The DVM should indicate +11 ±1.1 Vdc.

   If the DVM indication is correct, proceed with step 11.

   If the DVM indication is not correct, proceed with step 8.
8. Remove A3A3 and replace it on a 36 pin extender board.
9. Using the DVM, check for continuity (0 ohms) between XA3A3-18 (TPA) and ground.

   If there is continuity, the Oscillator Power Supply is defective. Go to service sheet 34 to isolate the problem.

   If there is no continuity, Switch A3S1 or the wiring to it is defective.

Negative Regulator Assembly Checks

Negative Regulator Assembly A3A4 provides the following voltages:

−10 Volts
−5.2 Volts
−40 Volts

Each is checked separately.

−10 Volt Check (√5).

10. Connect the DVM to A3A4TP4.

    The DVM should indicate −10 ±0.2 Vdc.

    If the DVM indication is correct, proceed with step 12.

    If the DVM indication is not correct, proceed with step 11.
11. Leave the DVM connected to A3A4TP4 but connect the DVM common lead to A3A4TP3.

    The DVM should indicate between −15 and −22 volts.

    If the indication is correct, the −10 Volt Regulator is defective. Go to service sheet 35 to isolate the problem.

    If the indication is not correct, the Rectifier Assembly is defective. Go to service sheet 33 to isolate the problem.

−5.2 Volt Check (√6).

12. Connect the DVM to A3A4TP5 with COMMON lead to ground.

    The DVM should indicate −5.2 ±0.05 Vdc.

    If the indication is correct, proceed with step 13.

    If the indication is not correct, the −5.2 volt regulator is defective. Go to service sheet 35 to isolate the problem.

−40 Volt Check (√7).

13. Connect the DVM to A3A4TP1 with the COMMON lead to ground.

    The DVM should indicate −39.0 to − 41.6 Vdc.

    If the DVM indication is correct, proceed with step 15.

    If the DVM indication is not correct, proceed with step 14.

14. Remove the DVM COMMON lead from ground and connect it to A3A4TP2.

    The DVM should indicate between −48 and −63 Vdc.

    If the indication is correct, the −40 volt regulator is defective. Go to service sheet 35 to isolate the problem.

    If the indication is not correct, the Rectifier Assembly is defective. Go to service sheet 33.

−10 Volt Switched Check (√8).

15. Remove Negative Regulator A3A4 and replace it on an extender board.

16. Connect the DVM to XA3A4-14 or -32 (TPD), and observe that the DVM reads −10 volts.

17. While observing the DVM, press the front panel RF OUTPUT ON/OFF key (key indicator off).

    The DVM indication should drop from −10 volts to zero volt when the RF OUTPUT ON/OFF key is pressed.

    If the voltage does drop to zero, proceed with step 18.

    If the voltage does not drop to zero, proceed with step 20.

18. Press the front panel RF OUTPUT ON/OFF key (key indicator on) and observe that the DVM indication returns to −10 volts.

19. While observing the DVM, short A3A3TP2 to ground.

    The DVM indication should drop to zero volt.

    If the voltage does drop to zero, the power supplies are working properly.

    If the voltage does not drop to zero, proceed with step 22.

20. Press the front panel RF OUTPUT ON/OFF key (key indicator on).

21. Connect the DVM to XA3A4-18 (TPC), and, while observing the DVM, press the front panel RF OUTPUT ON/OFF key (key indicator off).

    The DVM indication should drop from +5 volts to zero volt when the key is pressed.

    If the voltage does drop, relay A3A4K1 or associated components are defective. Go to service sheet 35 to isolate the problem.

    If the voltage does not drop, there is a problem with the logic latch, the switch or associated circuitry on DAC and ENABLE board A1A5. Go to service sheet 22 to isolate the problem.

22. Remove the ground from A3A3TP2, connect the DVM to XA3A4-18 (TPC), and, while observing the DVM, ground A3A3TP2.

    The voltage should drop from +5 volts to zero volts when A3A3TP2 is grounded.

    If the indication is incorrect, relay A3A4K1 is defective. Go to service sheet 35 to isolate the problem.

    If the indication is correct, proceed with step 23.

23. Remove the ground from A3A3TP2, connect the DVM to XA3A3-35 (TPB), then, while observing the DVM, ground A3A3TP2.

    The voltage should drop from +5 volts to zero volts when A3A3TP2 is grounded.

    If the indication is correct, there is a problem with the switch or associated components on DAC and Enable Board A1A5. Go to service sheet 22 to isolate the problem.

    If the indication is not correct, there is a problem with the Power Up/Down Detector on Positive Regulator A3A3. Go to service sheet 34 to isolate the problem.

BD9

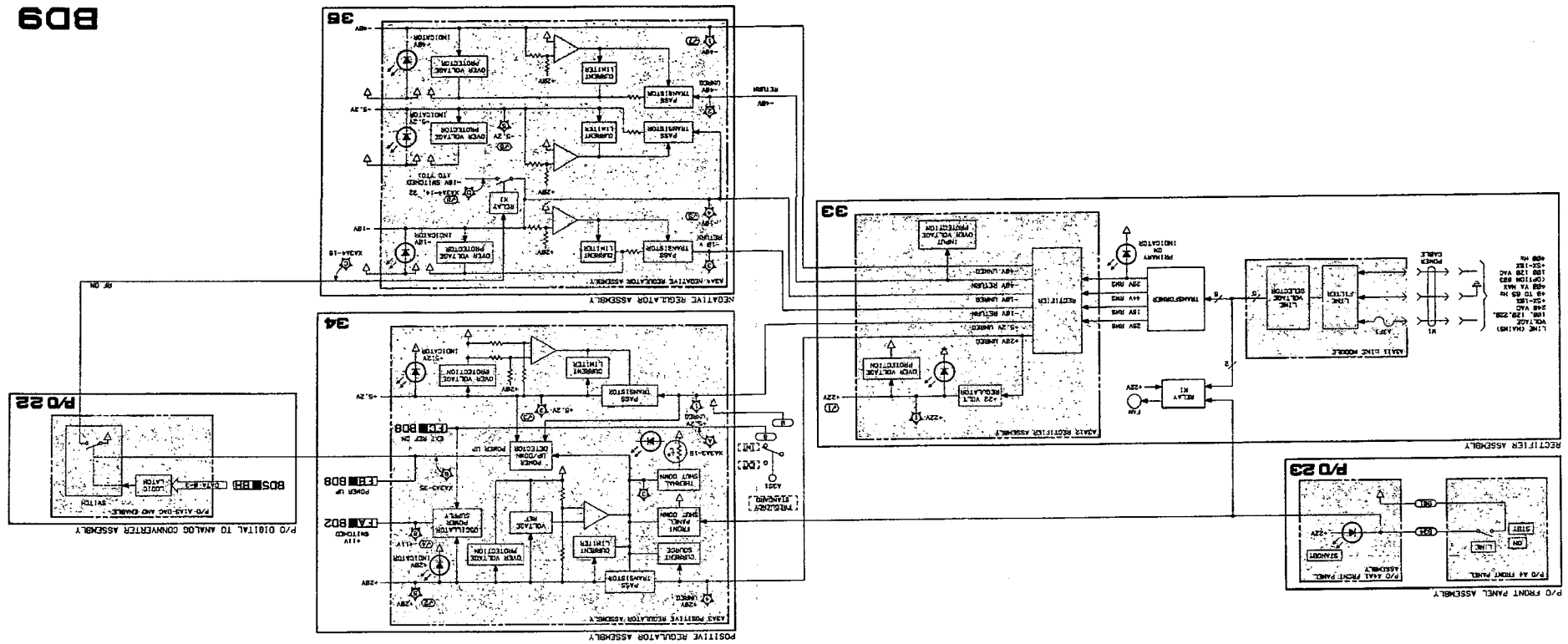


Figure 8-56. Power Supply Block Diagram
8-221/8-222

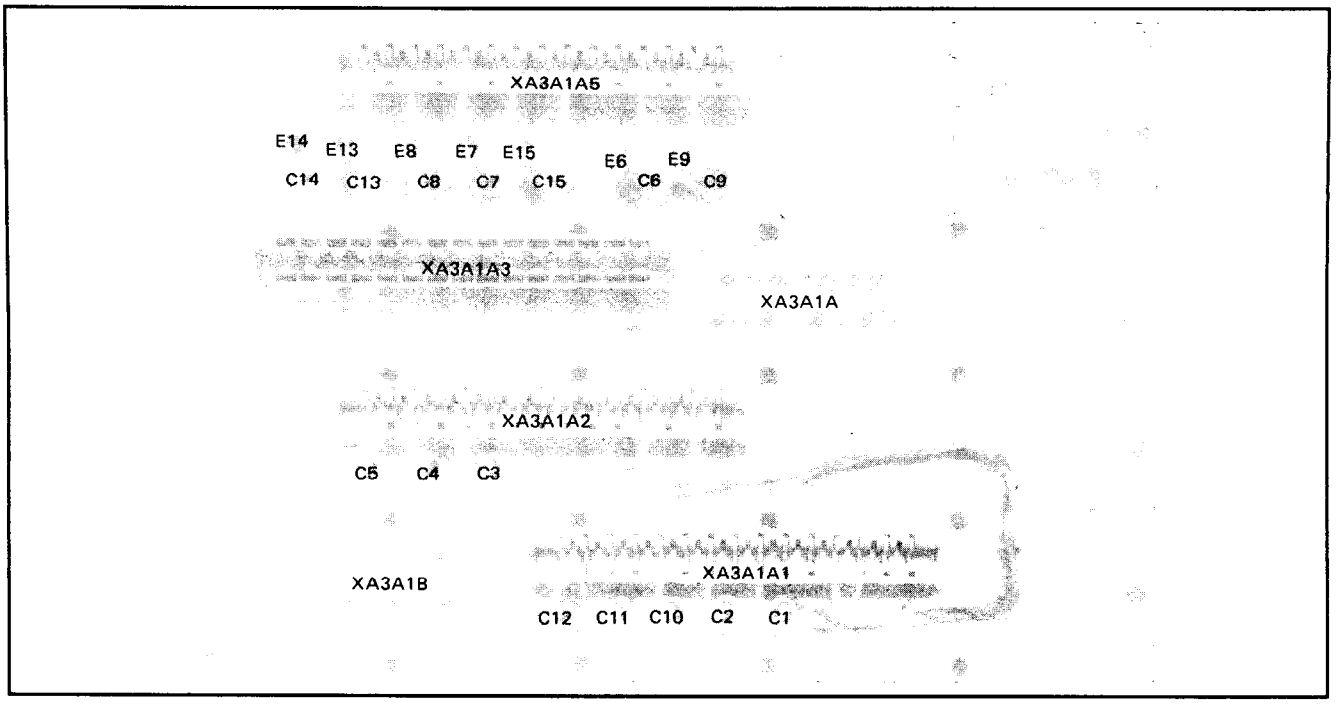


Figure 8-56. A3A1A6 Reference and M/N Motherboard Assembly Component Locations (Top View)

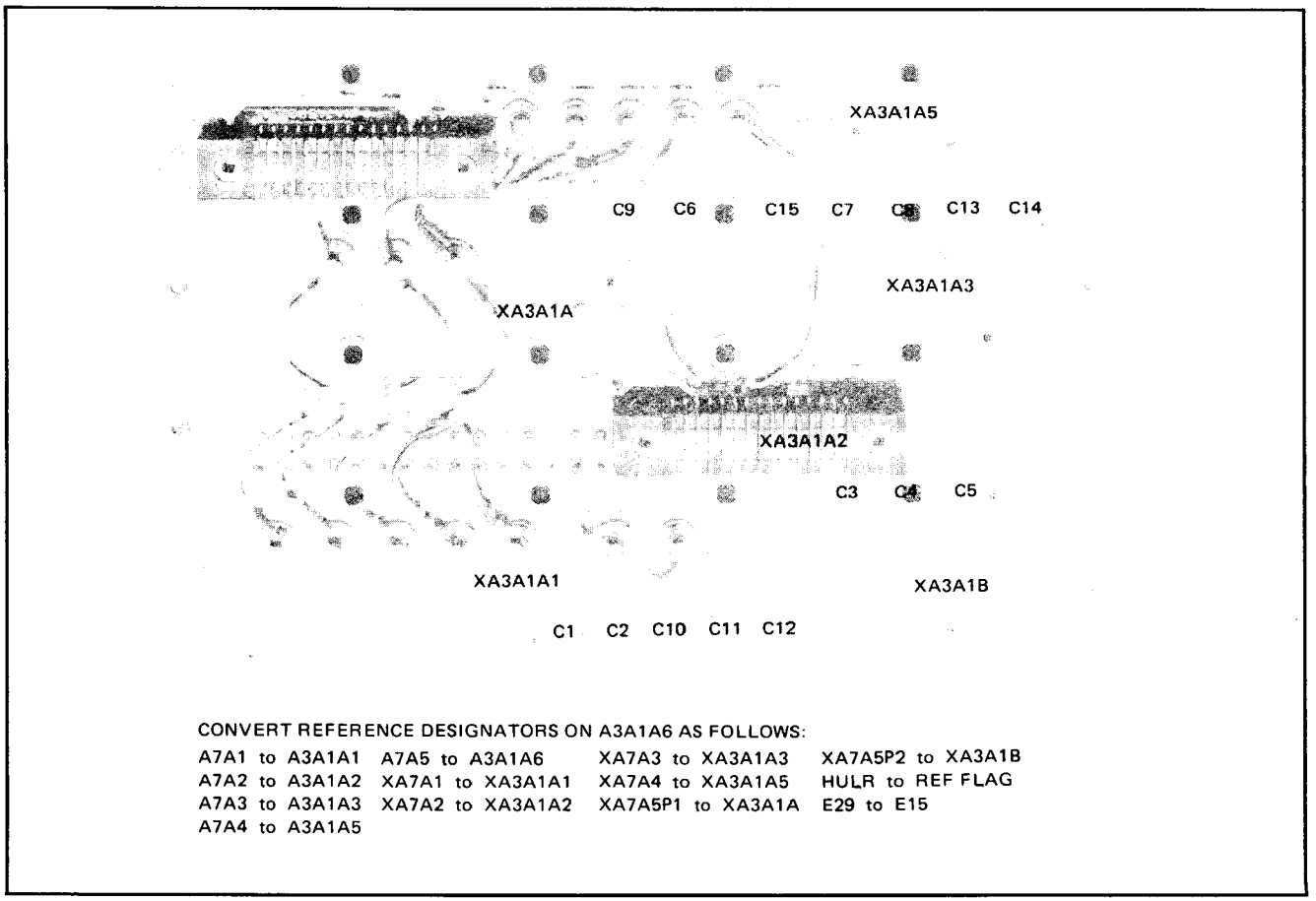


Figure 8-57. A3A1A6 Reference and M/N Motherboard Assembly Component Locations (Bottom View)

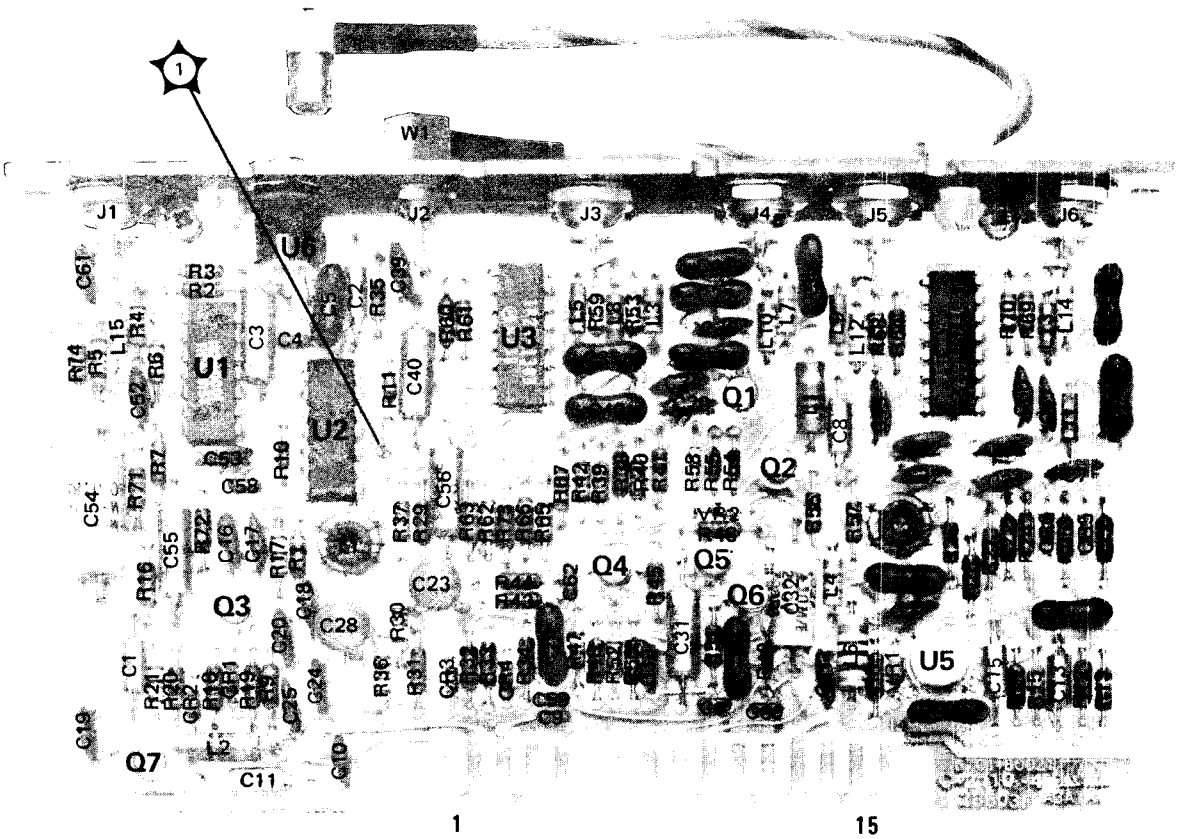
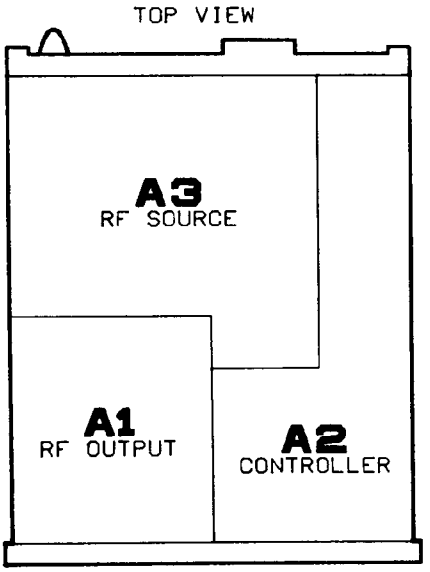


Figure 8-58. A3A1A1 Reference Phase Detector Assembly Component and Test Point Locations

Index To Service Sheets by Assembly



MAJOR ASSEMBLIES

Assembly	Description	Service Sheet
A1A1	Attenuator Driver Board	18
A1A2	Detector/ALC Board	14,17
A1A3	Function Board	20
A1A4	Pulse Driver Board	15
A1A5	DAC and Enable Board	22
A1A6	Meter Board	21
A1A7	YTM Driver Board	16
A1A8	SRD Bias Board	19
A1A9	Not Assigned	
A1A10	Yig-Tuned Multiplier	16
A1A10A1	YIG Heater Control	16
A1A11	Power Amplifier	16
A1A12	RF Output Motherboard	14–16, 18–22, 30,31
A1A13	Not Assigned	
A1A14	26 GHz Amplifier	17
A1A14A1	26 GHz Amp Bias Board	17
A2A1	Panel Driver Board	25
A2A2	Key Code Board	24
A2A3	160–240 MHz VCO	8
A2A4	20/30 MHz Phase Detector	7
A2A5	20/30 MHz Divider	6
A2A6	Not Assigned	
A2A7	I/O Board	30,31
A2A8	Microprocessor Board	26
A2A9	Frequency/HP-IB Board	29
A2A10	Memory/Interface	28
A2A11	Not Assigned	
A2A12	Not Assigned	
A2A13	Controller Motherboard	6–8,10, 20–32
A2A14	Rear Interconnect Board	24,29,31
A2A15	HP-IB Connector Board	29
A3A1	Reference and M/N	
A3A1A1	Reference Phase Detector	1
A3A1A2	100 MHz VCXO	2
A3A1A3	M/N Phase Detector	3
A3A1A4	M/N VCO	4
A3A1A4A1	VCO Resonator	4
A3A1A4A2	VCO Board	4
A3A1A5	M/N Output	5
A3A1A6	M/N Reference Motherboard	1–3,5
A3A1A7	Reference and M/N Housing	
A3A2	Not Assigned	
A3A3	Positive Regulator	34
A3A4	Negative Regulator	35
A3A5	DAC	9
A3A6	YTO Driver	10
A3A7	YTO/FM Coil Driver	13
A3A8	10 MHz Reference Oscillator	1
A3A9	YTO Loop	11,12
A3A9A1	Not Assigned	
A3A9A2	YTO Interconnect	11–13
A3A9A3	2.0–6.6 GHz YTO	13
A3A9A4	YTO Phase Detector	12
A3A9A5	Sampler	11
A3A9A6	Attenuator	13
A3A9A7	6.6 GHz Low Pass Filter	13
A3A9A8	Preamplifier	13
A3A10	RF Source Motherboard	1,3,4, 6,10,12–14,21–23,26, 29–31,33–35
A3A11	Line Module	33
A3A12	Rectifier Assembly	33
A4A1	Front Panel Board	20,22, 23,25,32

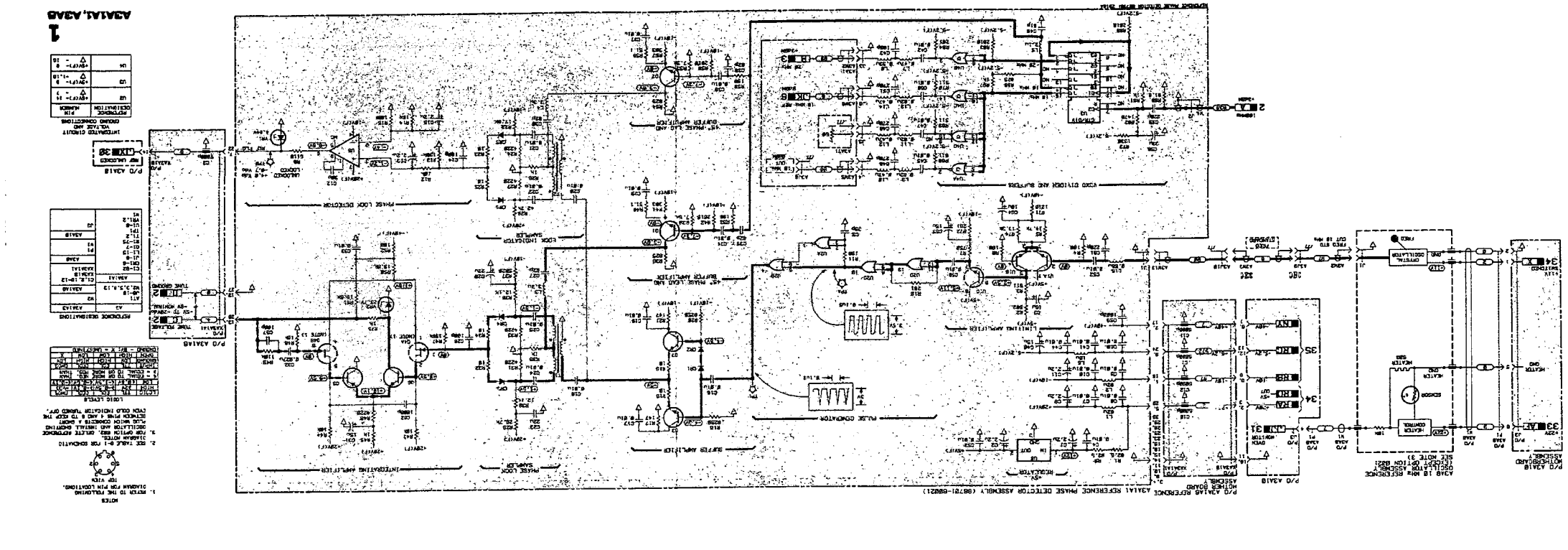


Figure 8-39. Reference Phase Detector Assembly Schematic Diagram
8-223/8-224

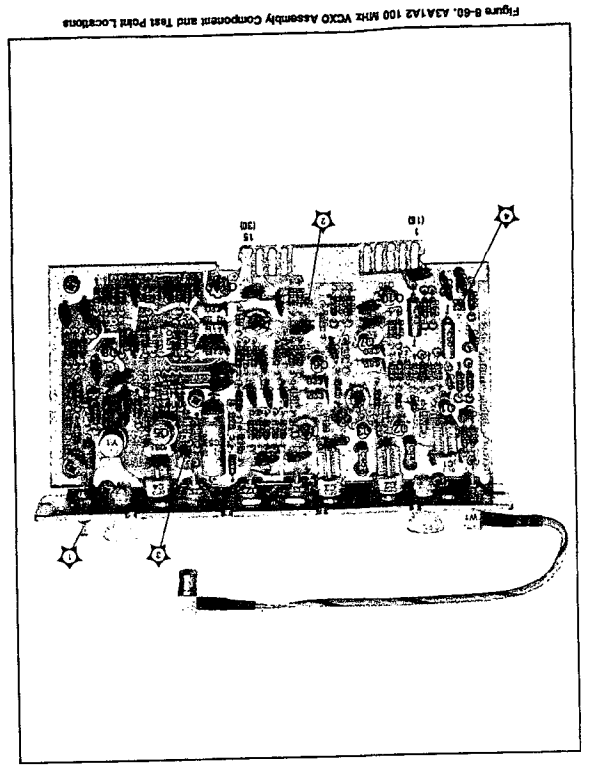


Figure 8-60. 5A1A2 100 MHz VCXO Assembly Component and Test Point Locations

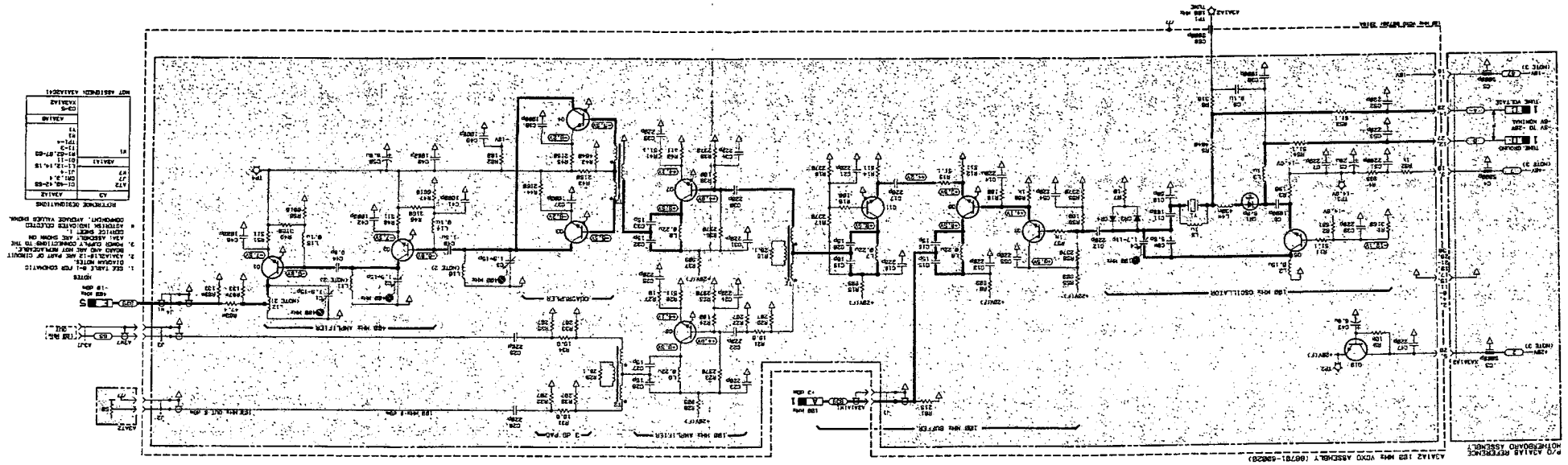


Figure 8-61. 100 MHz VCXO Assembly Schematic Diagram
8-227/8-228

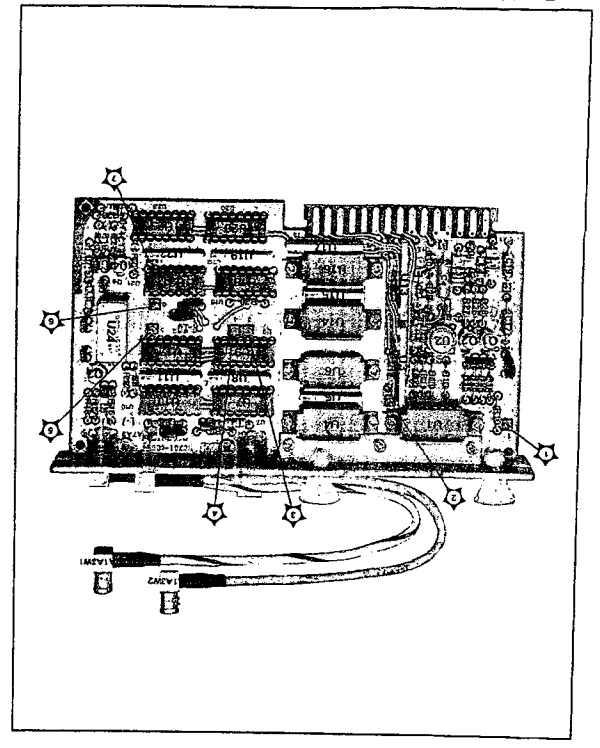


Figure 9-62. A3A1A3 M/N Phase Detector Assembly Component and Test Point Locations

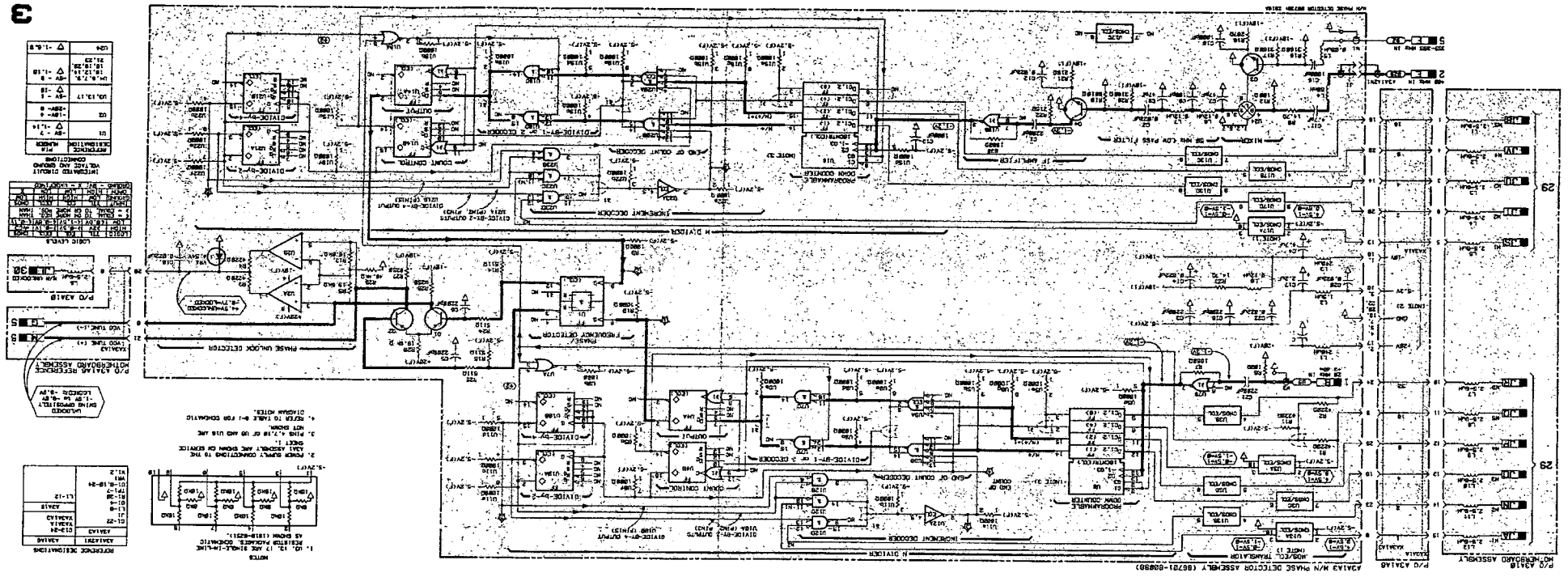


Figure 9-63. M/N Phase Detector Assembly Schematic Diagram

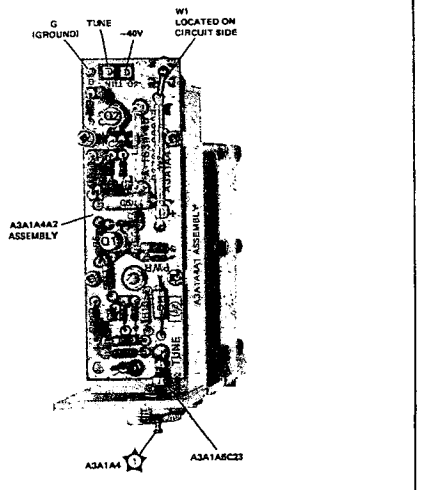
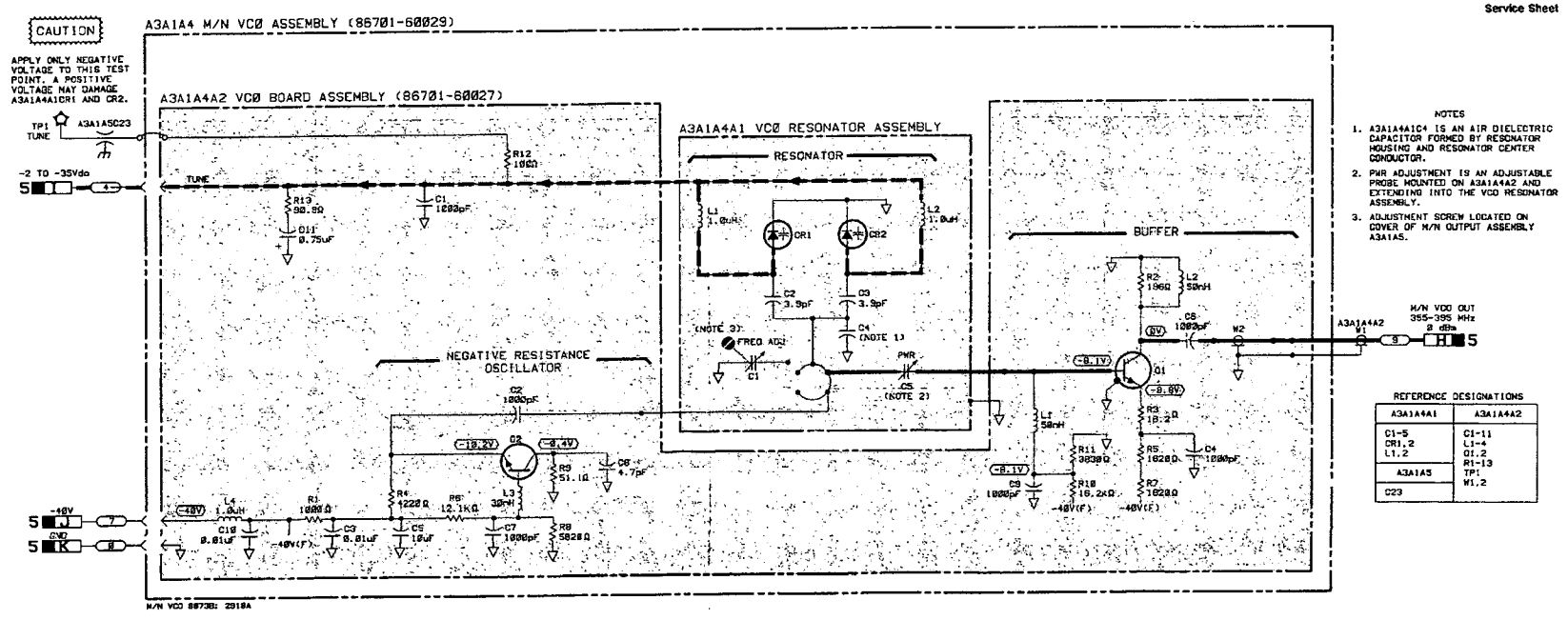


Figure 8-84. A3A1A4A2 M/N VCO Assembly Component and Test Point Locations



NOTES

1. A3A1A4A1C4 IS AN AIR DIELECTRIC CAPACITOR FORMED BY RESONATOR HOUSING AND RESONATOR CENTER CONDUCTOR.
2. PWR ADJUSTMENT IS AN ADJUSTABLE PROBE MOUNTED ON A3A1A4A2 AND EXTENDING INTO THE VCO RESONATOR ASSEMBLY.
3. ADJUSTMENT SCREW LOCATED ON DOWER OF M/N OUTPUT ASSEMBLY A3A1A5.

Figure 8-85. M/N VCO Assembly Schematic Diagram
8-231/8-232

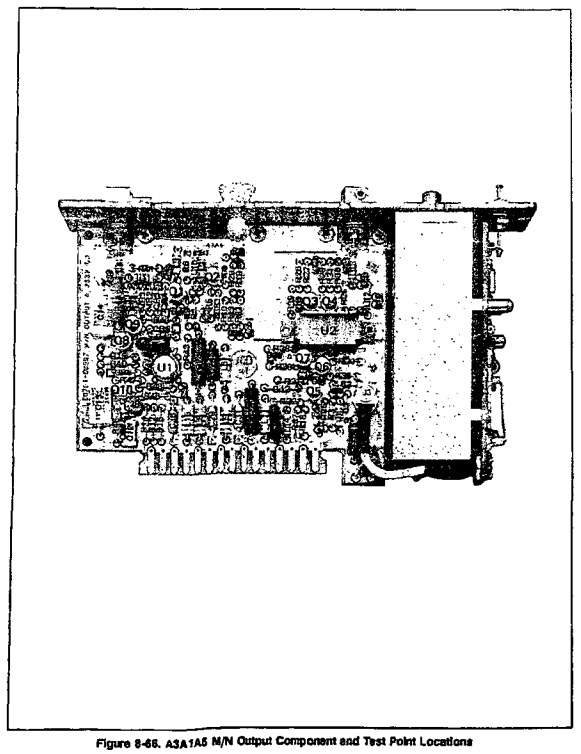
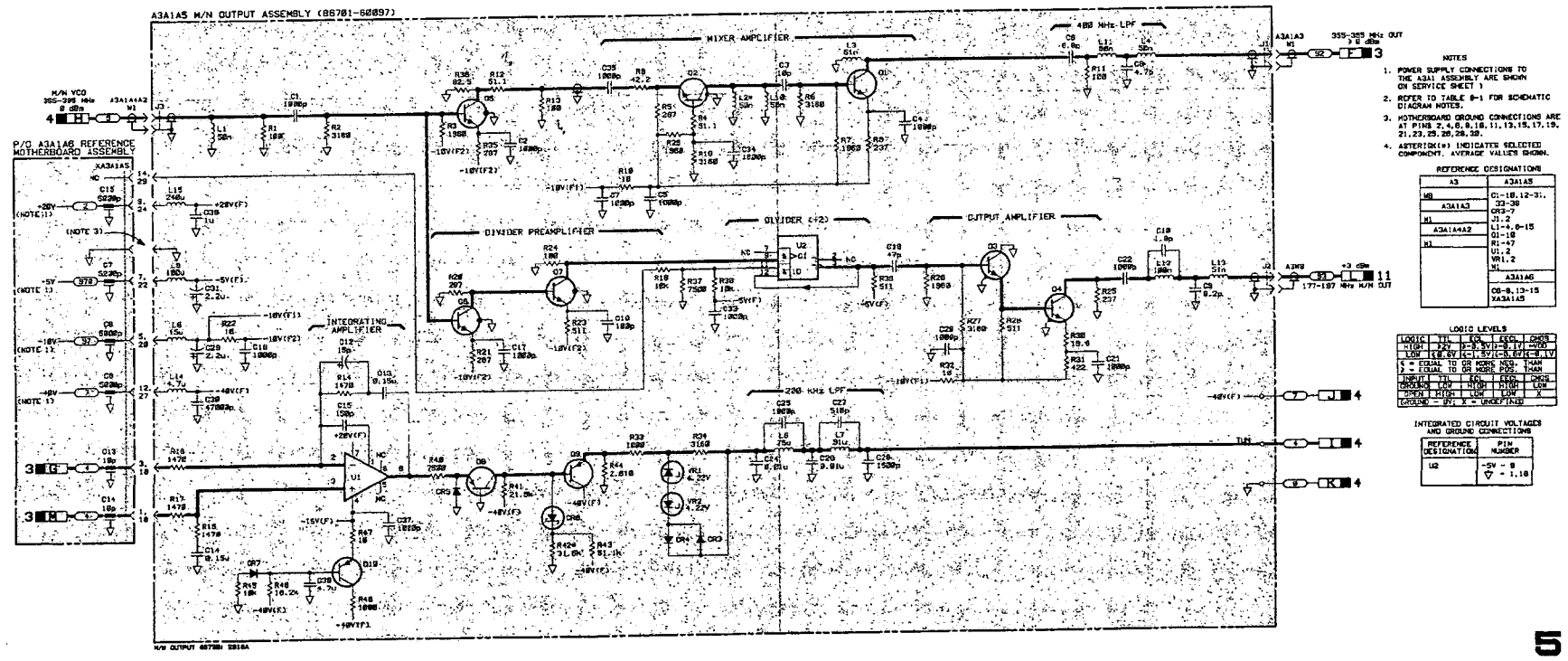


Figure 8-66. A3A1A5 M/N Output Component and Test Point Locations



5
A3A1A5

Figure 8-67. M/N Output Assembly Schematic Diagram
8-233/8-234

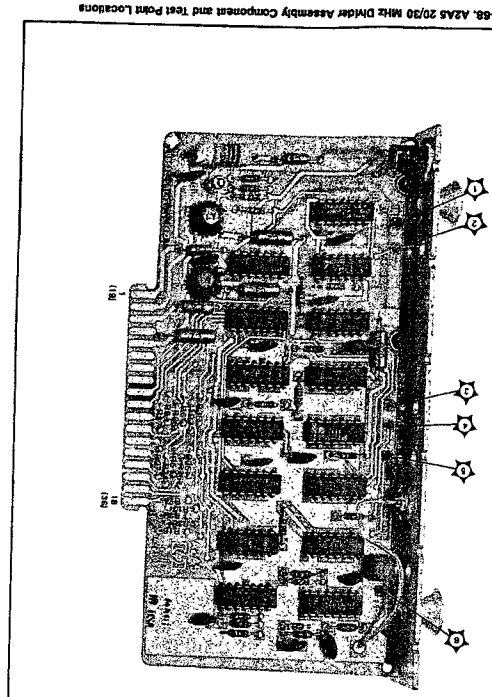


Figure 8-68. A24A 20/30 MHz Divider Assembly Component and Test Point Locations

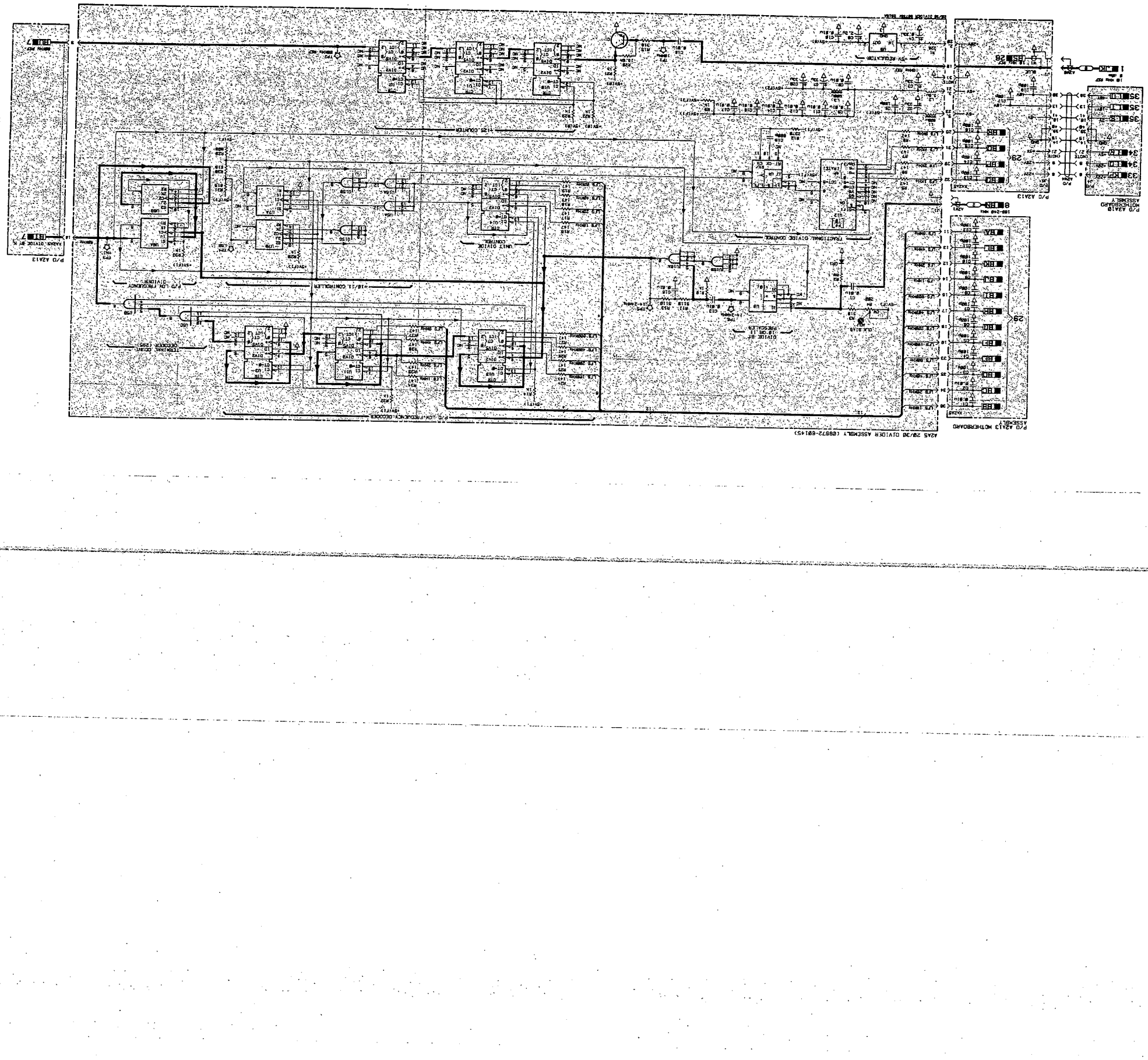


Figure 8-69. 20/30 MHz Divider Assembly Schematic Diagram

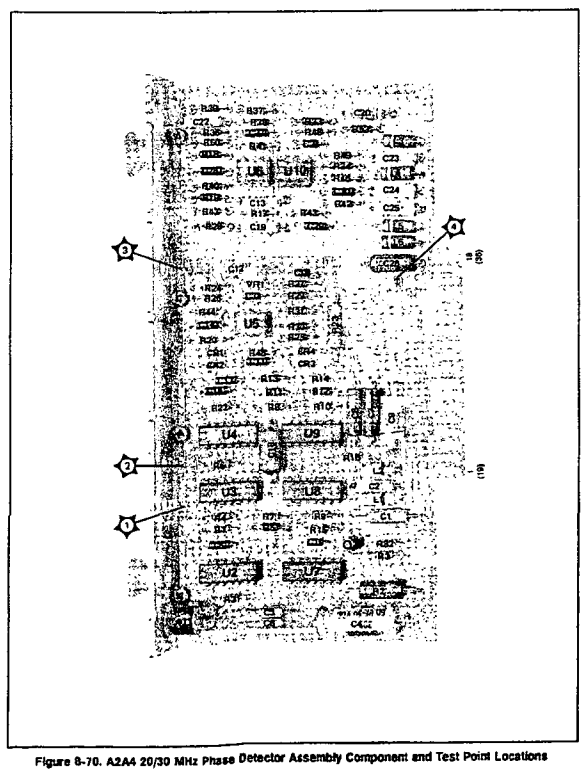


Figure 8-70. A2A4 20/30 MHz Phase Detector Assembly Component and Test Point Locations

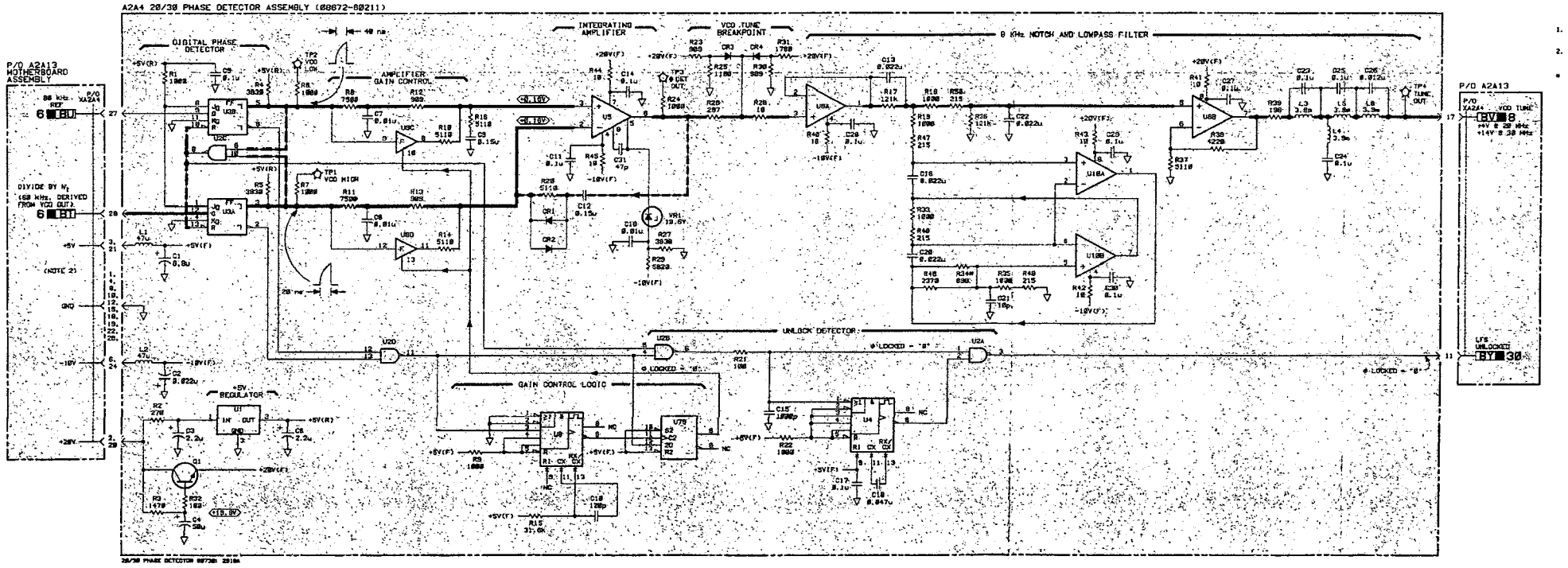


Figure 8-71. 20/30 MHz Phase Detector Assembly Schematic Diagram
8-237/8-238

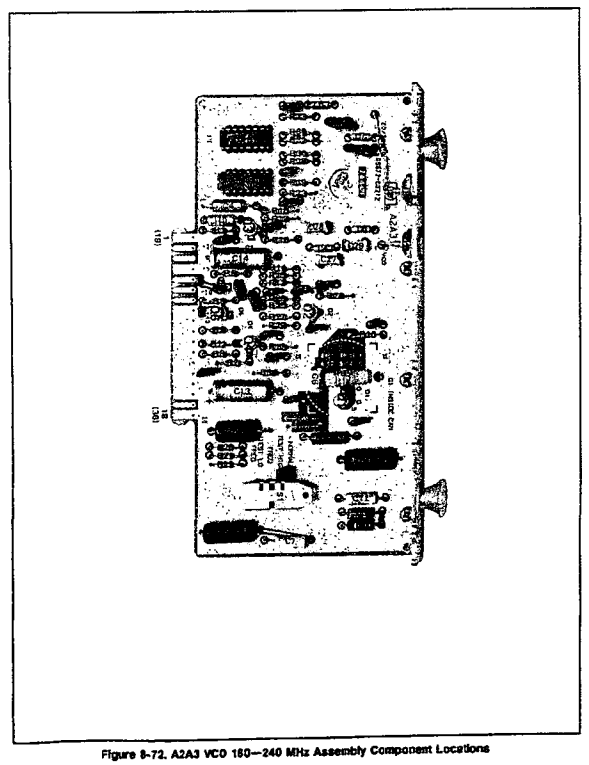
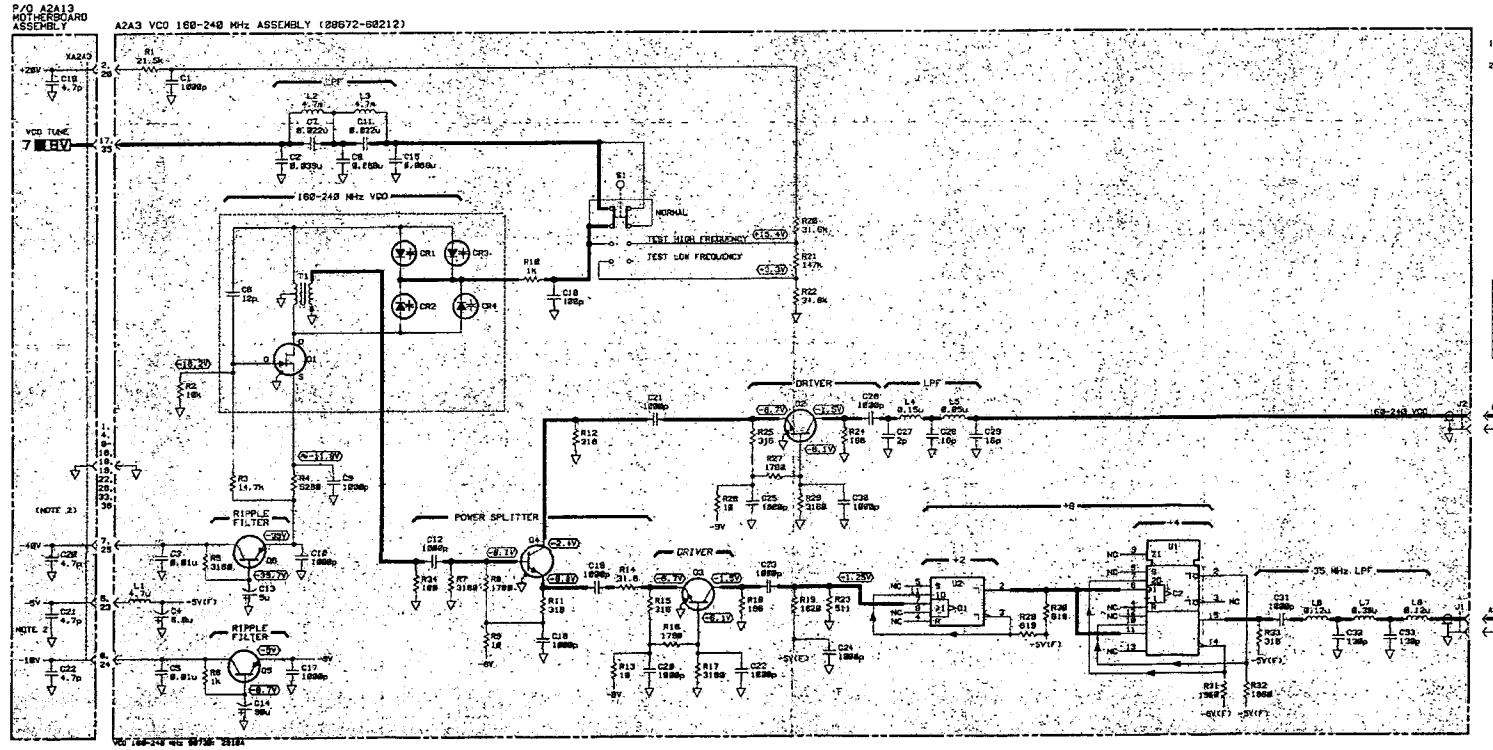


Figure 8-72. A2A3 VCO 160—240 MHz Assembly Component Locations



Service Sheet

NOTES
1. SEE TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
2. POWER SUPPLY CONNECTIONS TO THE A2 ASSEMBLY ARE SHOWN ON SHEET 8.

REFERENCE DESIGNATIONS

A2	A2A3
W1	C1-33
	CR1-4
A2A13	J1,2
XA2A3	L1-8
	Q1-6
A3	R1-34
	S1
W14	T1
	U1,2

LOGIC LEVELS

LOGIC	TTL	CMOS	ECL	GaAs
HIGH	2.4V	3.5V(5-8.5V)	-0.7V(-5V)	
LOW	+0.8V(+5)	+0.5V(+5)	-1.5V(-5V)	+0.1V

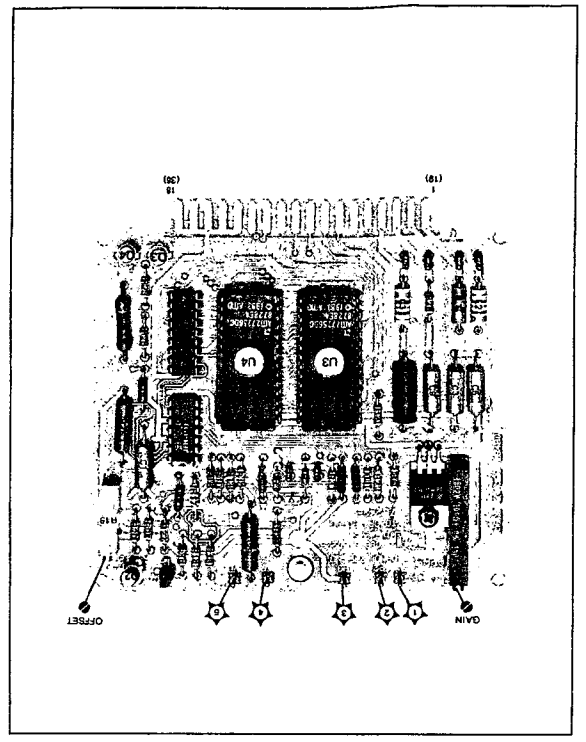
1 = EQUAL TO OR MORE POS. THAN
0 = EQUAL TO OR MORE NEG. THAN

INPUT	TTL	CMOS	ECL	GaAs
CURRENT	1mA	0.01μA	0.5μA	0.5μA
IMPED.	810Ω	10MΩ	50Ω	50Ω

GROUND = 0V; 1 = LOGIC HIGH

8
A2A3

Figure 8-73. VCO 160—240 MHz Assembly Schematic Diagram
8-238/8-240



P/O A34A10
MOTHERBOARD ASSEMBLY

Figure 8-74. A34A Comparator and Test Point Locations

HP 86738

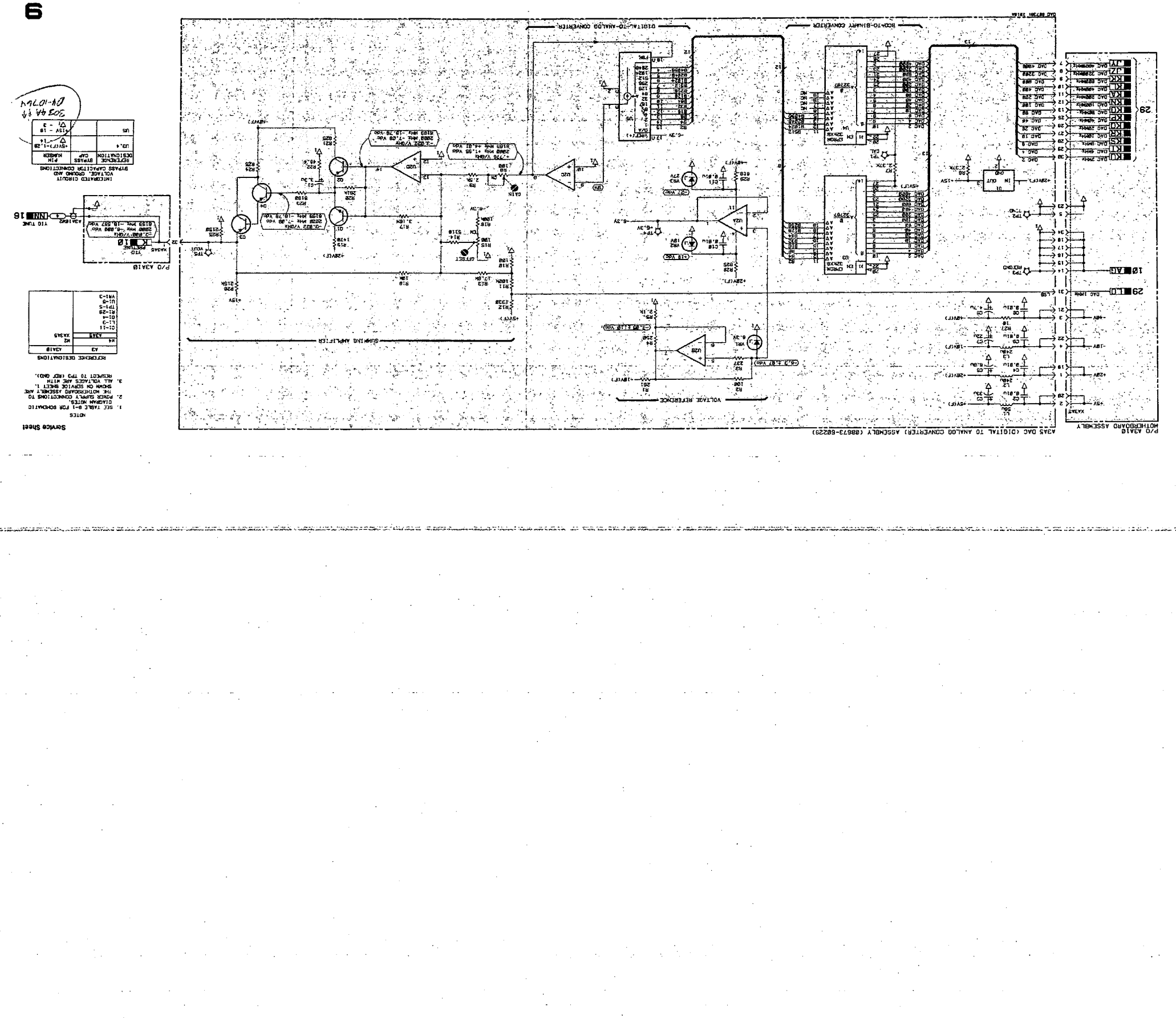


Figure 8-75. Digital-to-Analog Converter Assembly Schematic Diagram

8-241/8-242

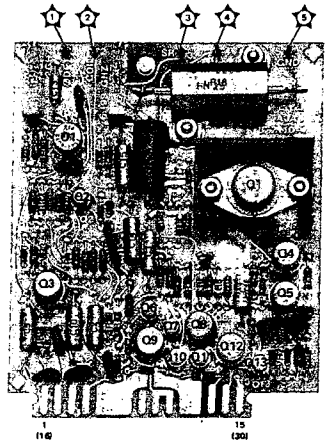
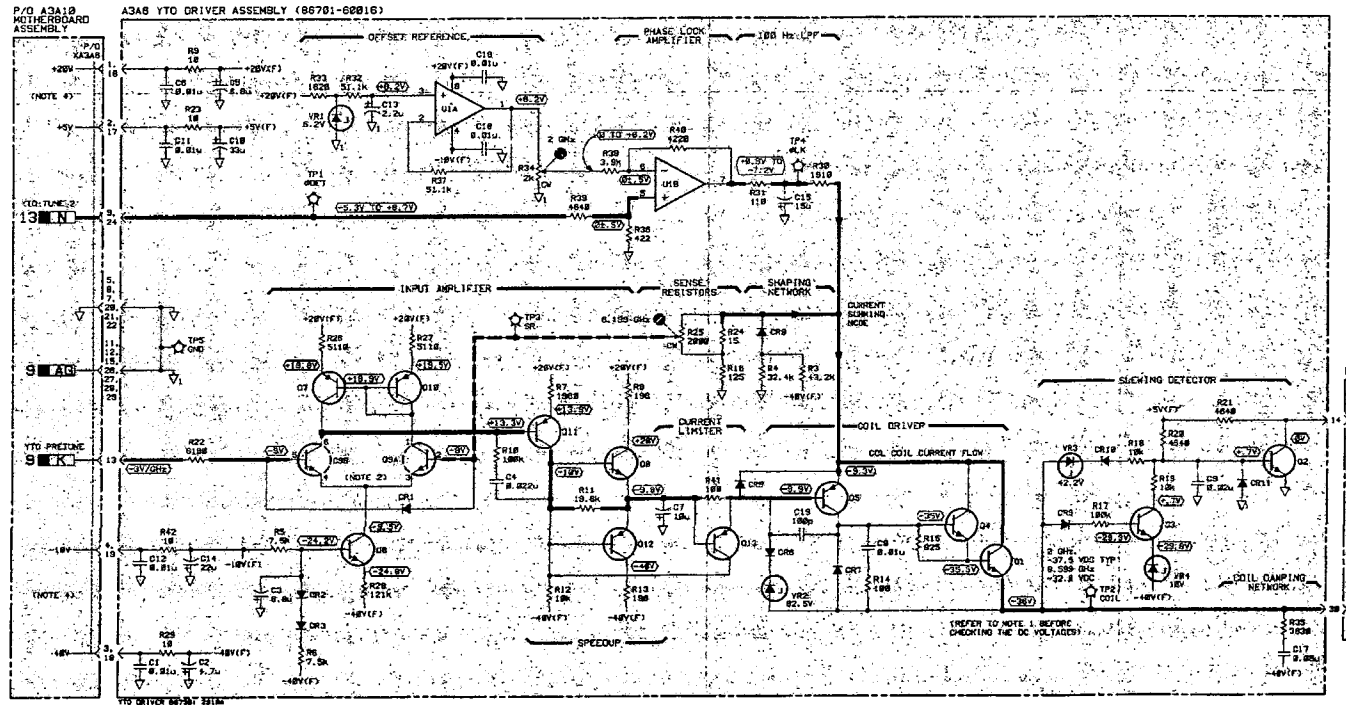


Figure 8-76. A3A6 YTO Driver Assembly Component and Test Point Locations



NOTES

1. THE DC VOLTAGES SHOWN ARE FOR A CARRIER FREQUENCY OF 3 GHz.
2. REFER TO THE FOLLOWING DIAGRAM FOR PIN LOCATIONS.

TOP VIEW



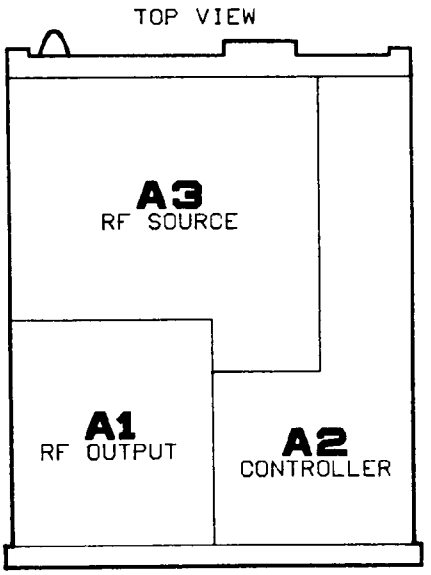
3. SEE TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
4. POWER SUPPLY CONNECTIONS TO THE MOTHERBOARD ASSEMBLY ARE SHOWN ON SERVICE SHEET 1.

REFERENCE DESIGNATIONS

A3A6	A3A18
Q1-10 CR1-3,5-11 Q11-12 R34-42 TP1-5 U1 VR1-4	J4 XA3A6 NO PREFACE A2W4 A2A13 J8

Figure 8-77. YTO Divider Assembly Schematic Diagram
8-243/8-244

Index To Service Sheets by Assembly



MAJOR ASSEMBLIES

Assembly	Description	Service Sheet
A1A1	Attenuator Driver Board	18
A1A2	Detector/ALC Board	14,17
A1A3	Function Board	20
A1A4	Pulse Driver Board	15
A1A5	DAC and Enable Board	22
A1A6	Meter Board	21
A1A7	YTM Driver Board	16
A1A8	SRD Bias Board	19
A1A9	Not Assigned	
A1A10	Yig-Tuned Multiplier	16
A1A10A1	YIG Heater Control	16
A1A11	Power Amplifier	16
A1A12	RF Output Motherboard	14–16, 18–22, 30,31
A1A13	Not Assigned	
A1A14	26 GHz Amplifier	17
A1A14A1	26 GHz Amp Bias Board	17
A2A1	Panel Driver Board	25
A2A2	Key Code Board	24
A2A3	160–240 MHz VCO	8
A2A4	20/30 MHz Phase Detector	7
A2A5	20/30 MHz Divider	6
A2A6	Not Assigned	
A2A7	I/O Board	30,31
A2A8	Microprocessor Board	26
A2A9	Frequency/HP-IB Board	29
A2A10	Memory/Interface	28
A2A11	Not Assigned	
A2A12	Not Assigned	
A2A13	Controller Motherboard	6–8,10, 20–32
A2A14	Rear Interconnect Board	24,29,31
A2A15	HP-IB Connector Board	29
A3A1	Reference and M/N	
A3A1A1	Reference Phase Detector	1
A3A1A2	100 MHz VCXO	2
A3A1A3	M/N Phase Detector	3
A3A1A4	M/N VCO	4
A3A1A4A1	VCO Resonator	4
A3A1A4A2	VCO Board	4
A3A1A5	M/N Output	5
A3A1A6	M/N Reference Motherboard	1–3,5
A3A1A7	Reference and M/N Housing	
A3A2	Not Assigned	
A3A3	Positive Regulator	34
A3A4	Negative Regulator	35
A3A5	DAC	9
A3A6	YTO Driver	10
A3A7	YTO/FM Coil Driver	13
A3A8	10 MHz Reference Oscillator	1
A3A9	YTO Loop	11,12
A3A9A1	Not Assigned	
A3A9A2	YTO Interconnect	11–13
A3A9A3	2.0–6.6 GHz YTO	13
A3A9A4	YTO Phase Detector	12
A3A9A5	Sampler	11
A3A9A6	Attenuator	13
A3A9A7	6.6 GHz Low Pass Filter	13
A3A9A8	Preamplifier	13
A3A10	RF Source Motherboard	1,3,4, 6,10,12–14,21–23,26, 29–31,33–35
A3A11	Line Module	33
A3A12	Rectifier Assembly	33
A4A1	Front Panel Board	20,22, 23,25,32

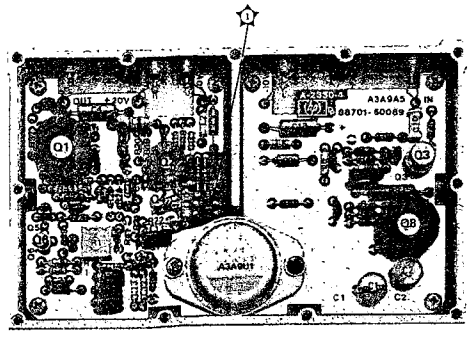


Figure 8-78. A3A9A5 Sampler Assembly Component and Test Point Locations

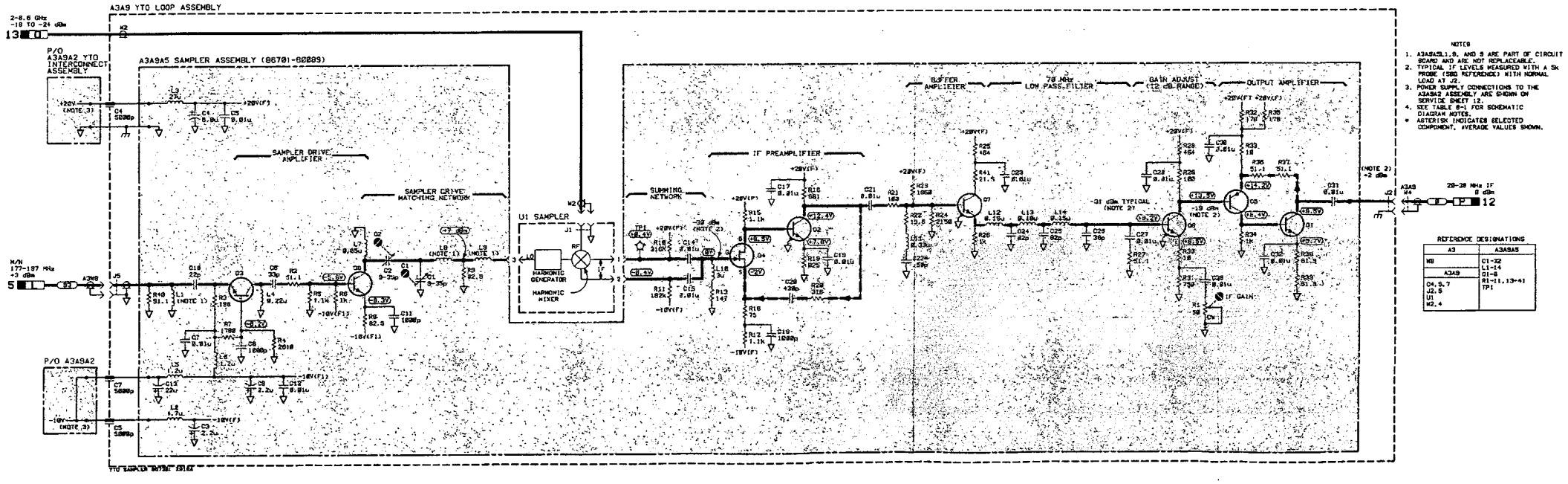


Figure 8-79. P/O YTO Loop Assembly Schematic Diagram
8-245/8-248

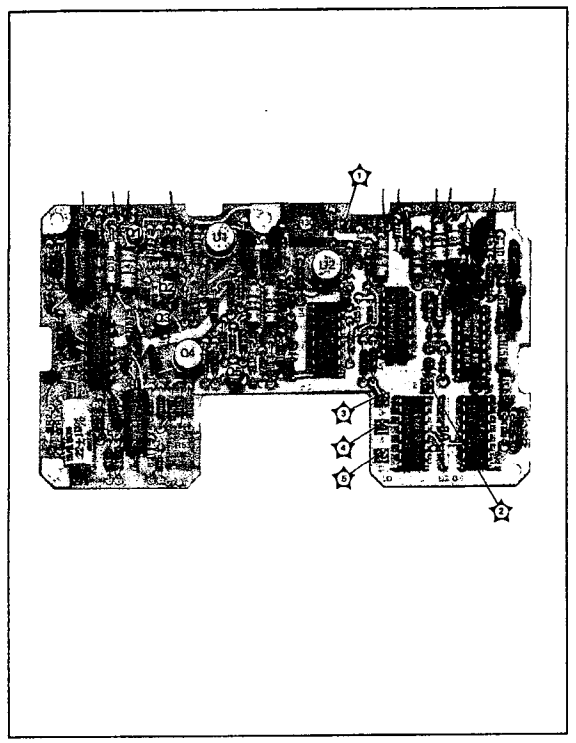


Figure 8-80. A3A9A4 YTO Phase Detector Assembly Component and Test Point Locations

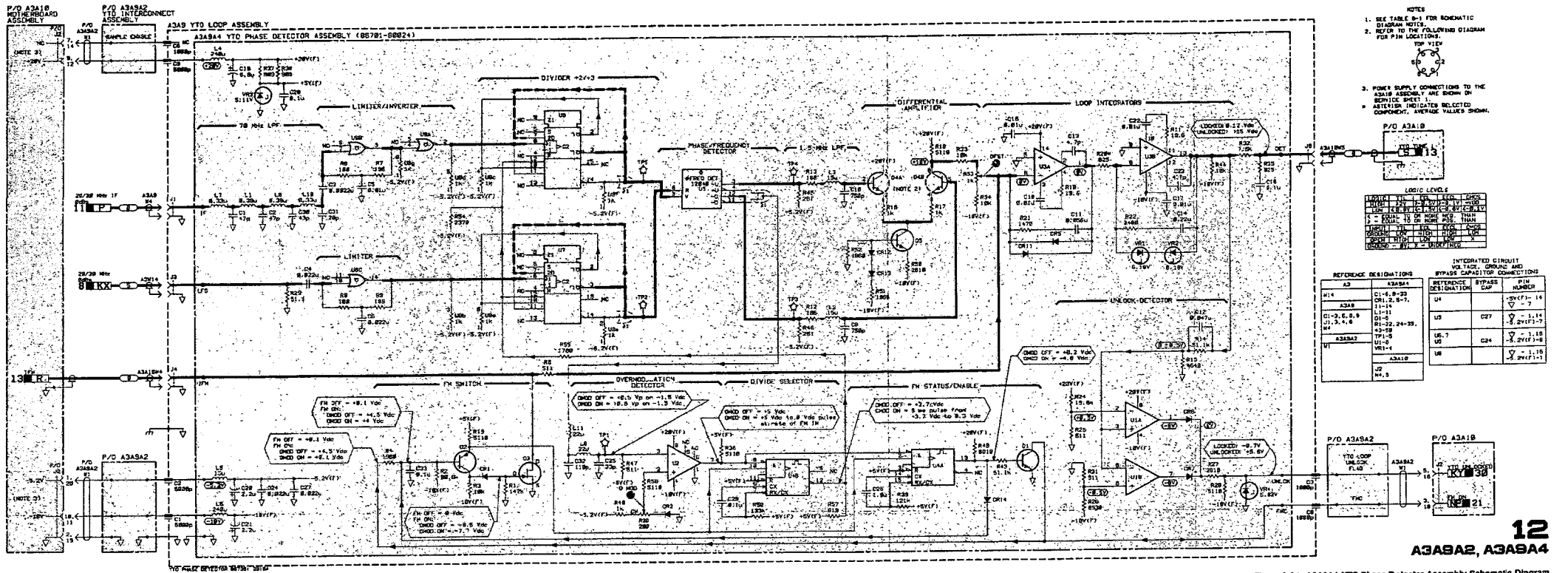


Figure 8-81. A3A9A4 YTO Phase Detector Assembly Schematic Diagram
8-247/8-248

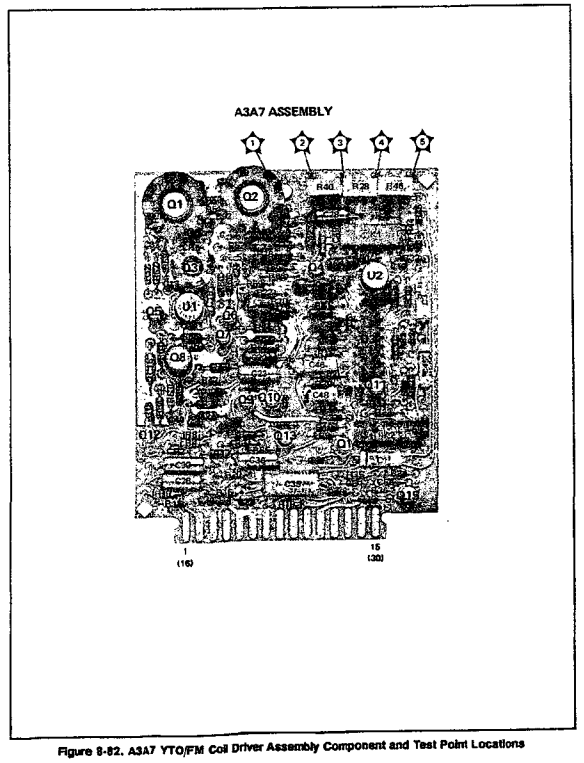
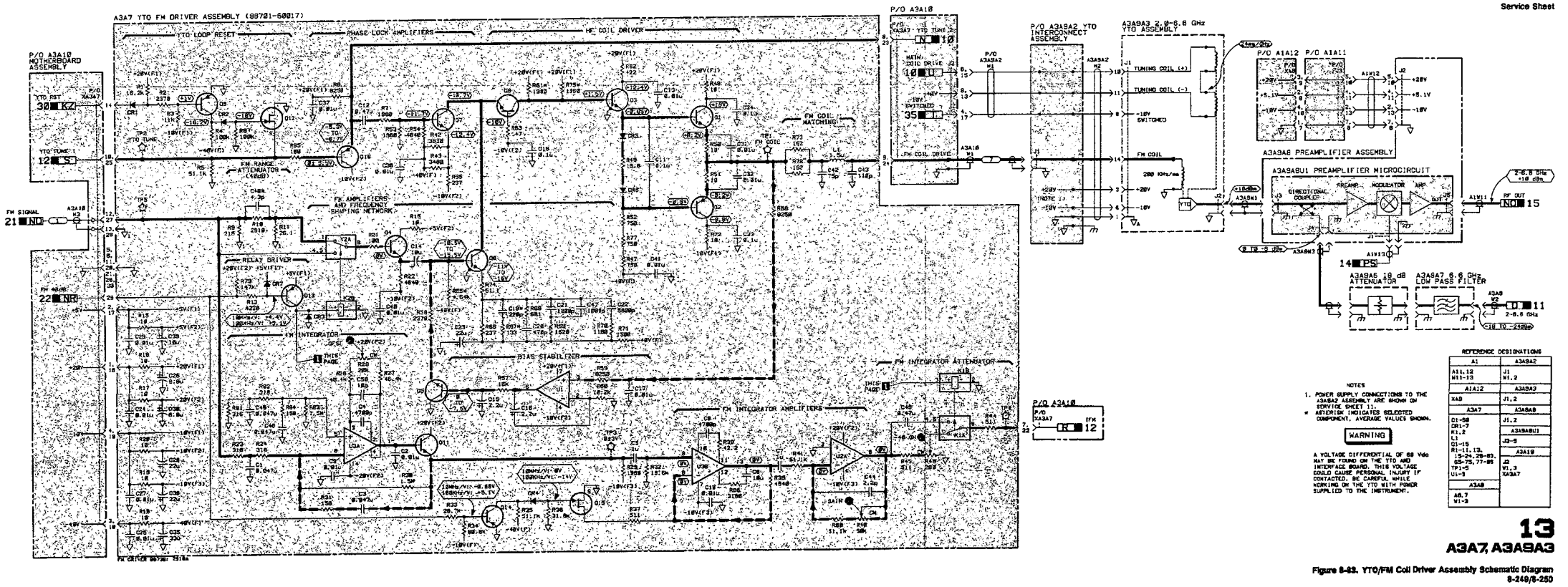


Figure 8-82. A3A7 YTO/FM Coil Driver Assembly Component and Test Point Locations



NOTES

1. POWER SUPPLY CONNECTIONS TO THE A3A9A2 ASSEMBLY ARE SHOWN ON SERVICE SHEET 13.
* ASTERISK INDICATES SELECTED COMPONENT. AVERAGE VALUES SHOWN.

WARNING

A VOLTAGE DIFFERENTIAL OF 68 Vdc MAY BE FOUND ON THE YTO AND INTERFACE BOARD. THIS VOLTAGE COULD CAUSE PERSONAL INJURY IF CONTACTED. BE CAREFUL WHILE WORKING ON THE YTO WITH POWER SUPPLIED TO THE INSTRUMENT.

REFERENCE DESIGNATIONS

A1	A3A9A2
A11-12	J1
A13-13	W1,2
A1A12	A3A9A3
XA8	J1,2
A3A7	A3A9A6
C1-58	J1,2
CR1-7	A3A9A6U1
K1,2	
L1	J3-5
Q1-5	A3A19
R1-11,13, 15-28,77-80	J5
TP1-5	W1,3
U1-3	A3A7
A3A8	
A8,7	
W1-3	

13

A3A7, A3A9A3

Figure 8-83. YTO/FM Coil Driver Assembly Schematic Diagram

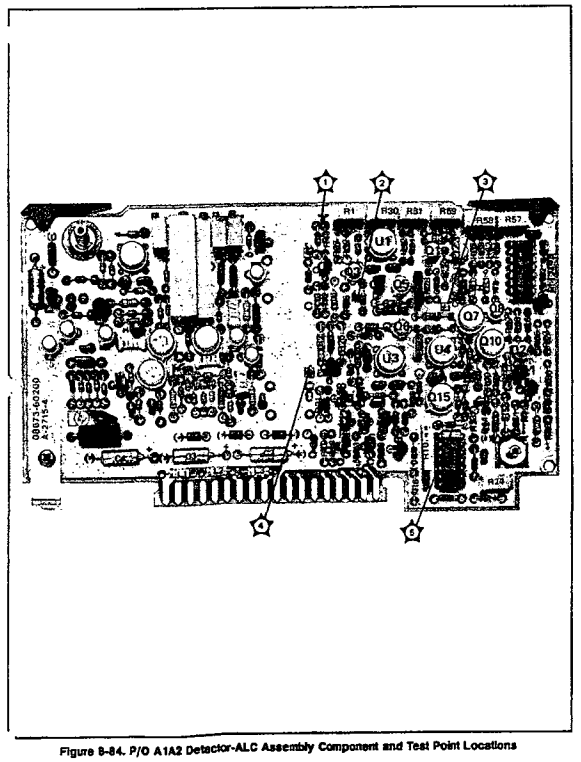


Figure 8-84. P/O A1A2 Detector-ALC Assembly Component and Test Point Locations

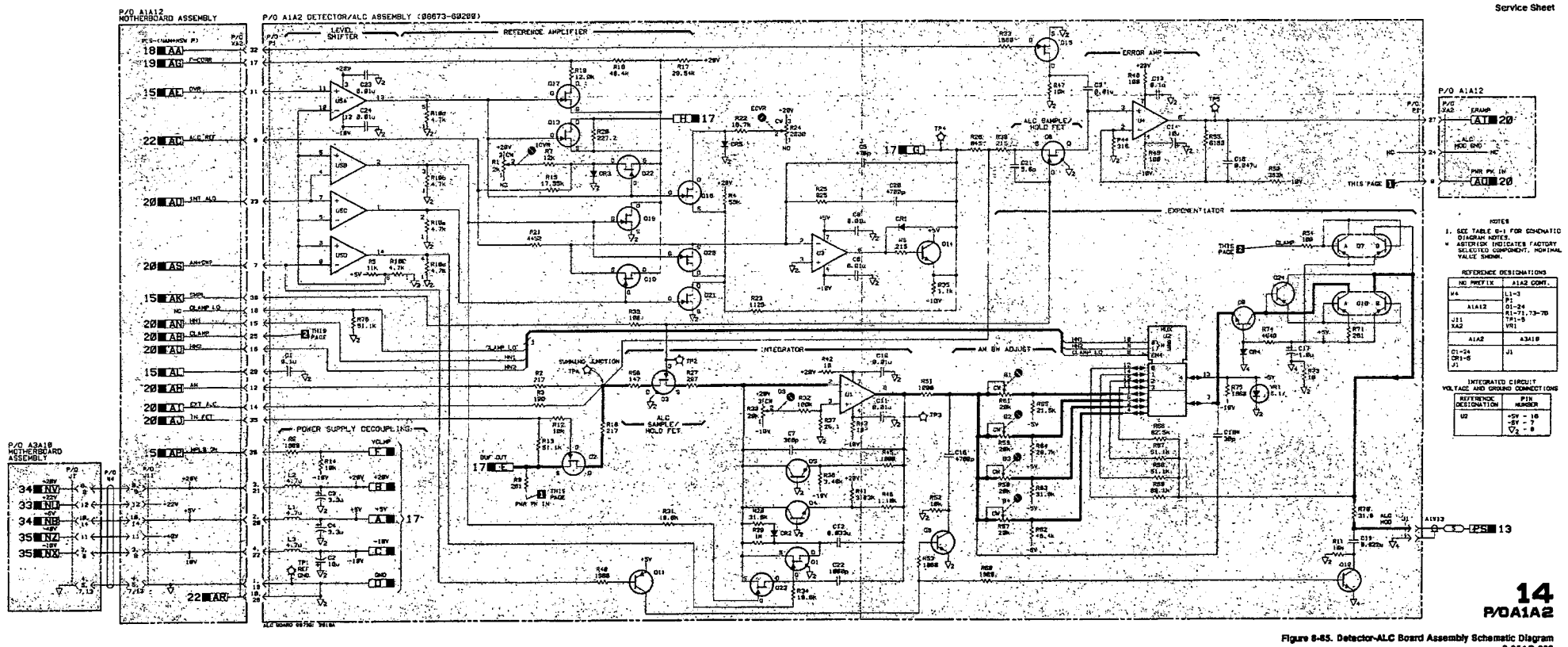


Figure 8-85. Detector-ALC Board Assembly Schematic Diagram
8-251/8-252

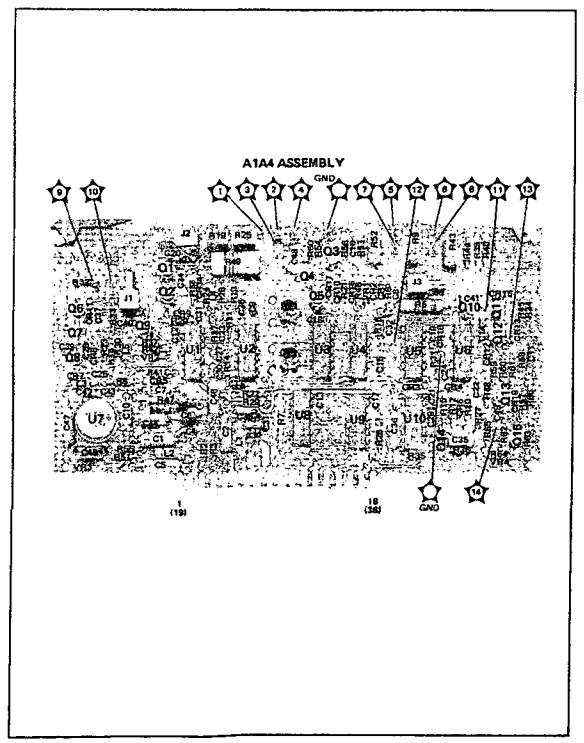


Figure 8-86. A1A4 Pulse Driver Processing Assembly Component and Test Point Locations

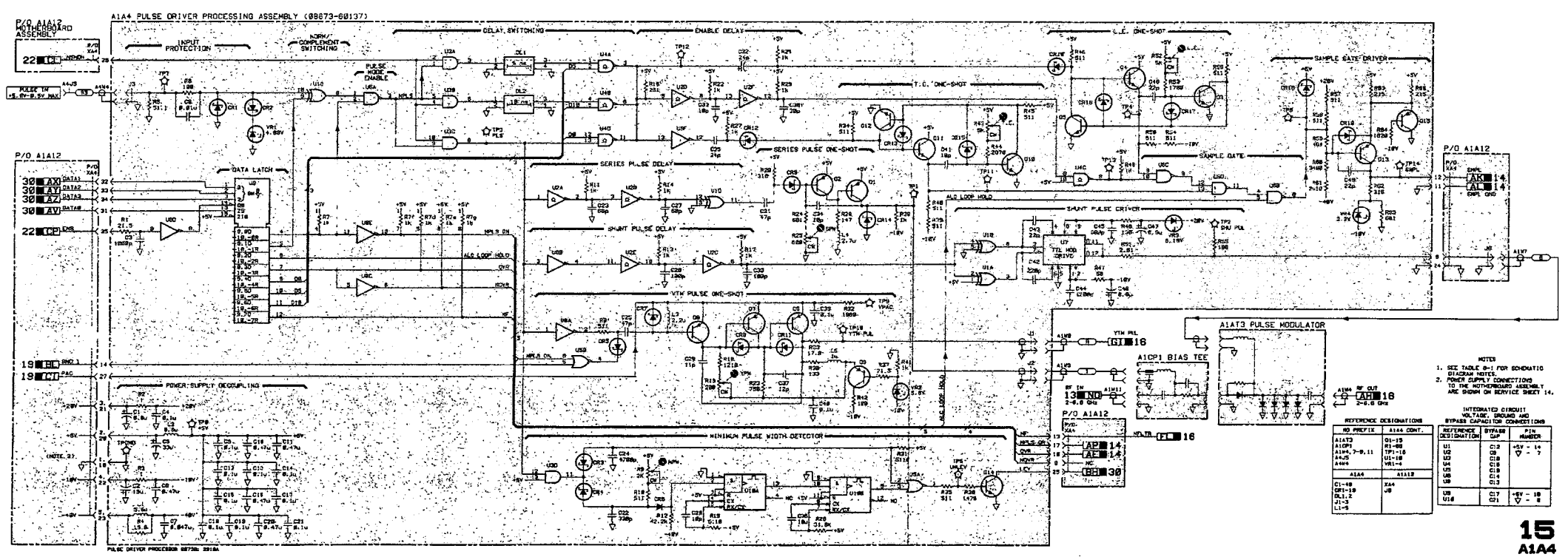


Figure 8-87. Pulse Driver Processing Assembly Schematic Diagram
8-253/8-254

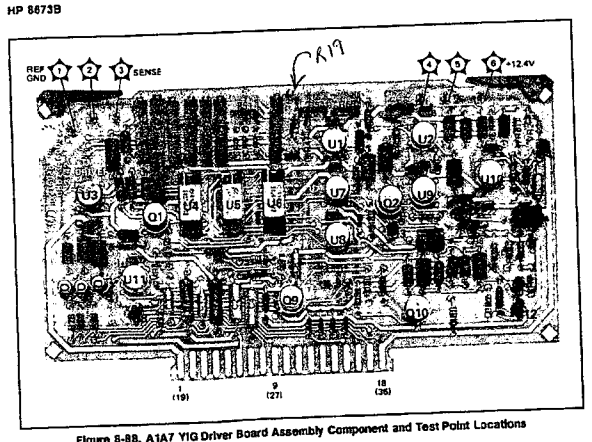


Figure 8-88. A1A7 YIG Driver Board Assembly Component and Test Point Locations

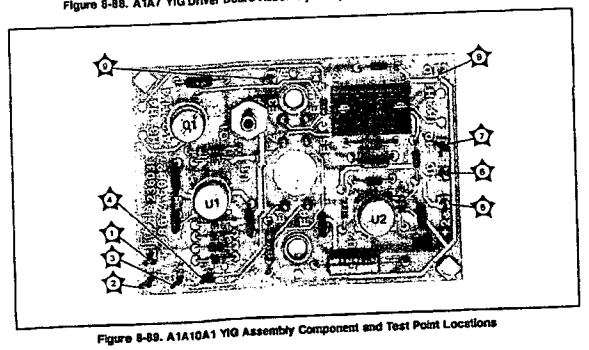
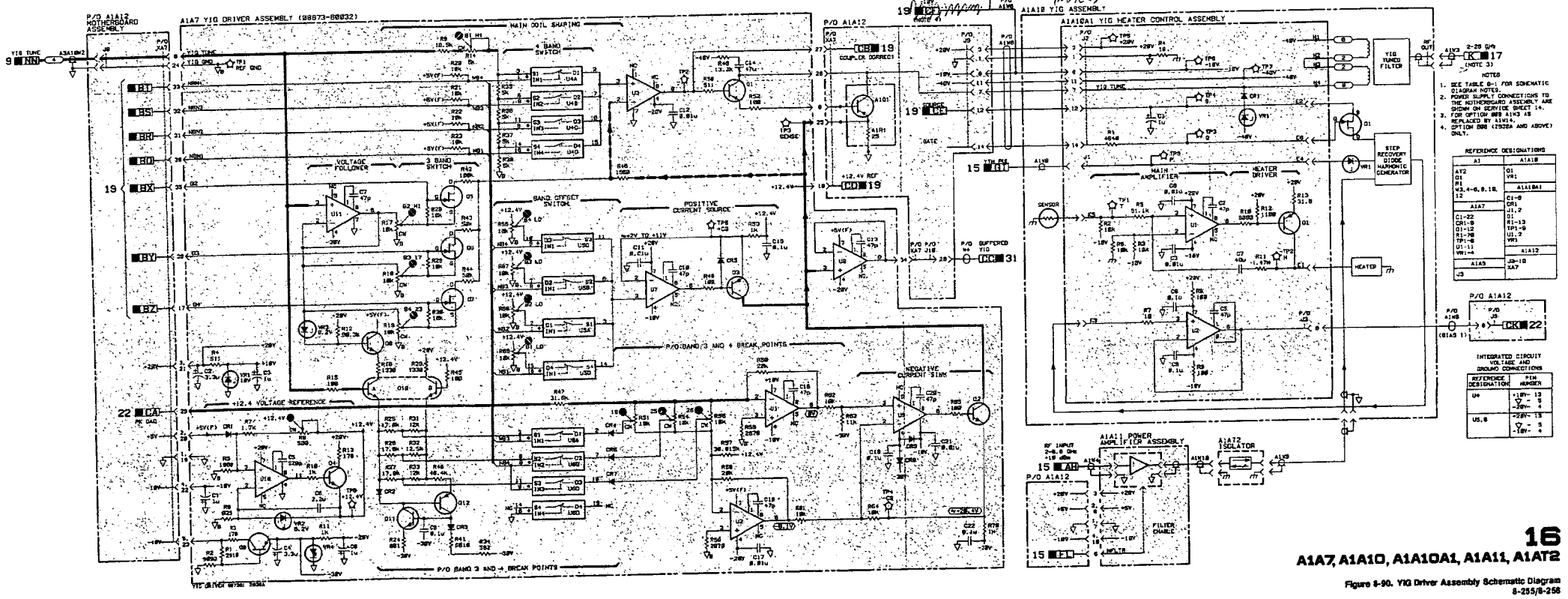


Figure 8-89. A1A10A1 YIG Assembly Component and Test Point Locations



NOTES

1. SEE TABLE 6-1 FOR SCHEMATIC DIAGRAM NOTES.
2. POWER SUPPLY CONNECTIONS TO THE MOTHERBOARD ASSEMBLY ARE SHOWN ON SERVICE SHEET 14.
3. FOR OPTION 089 A1A3 IS REPLACED BY A1A14.
4. OPTION 089 (2520A AND ABOVE) ONLY.

Figure 8-90. YIG Driver Assembly Schematic Diagram
8-255/8-256

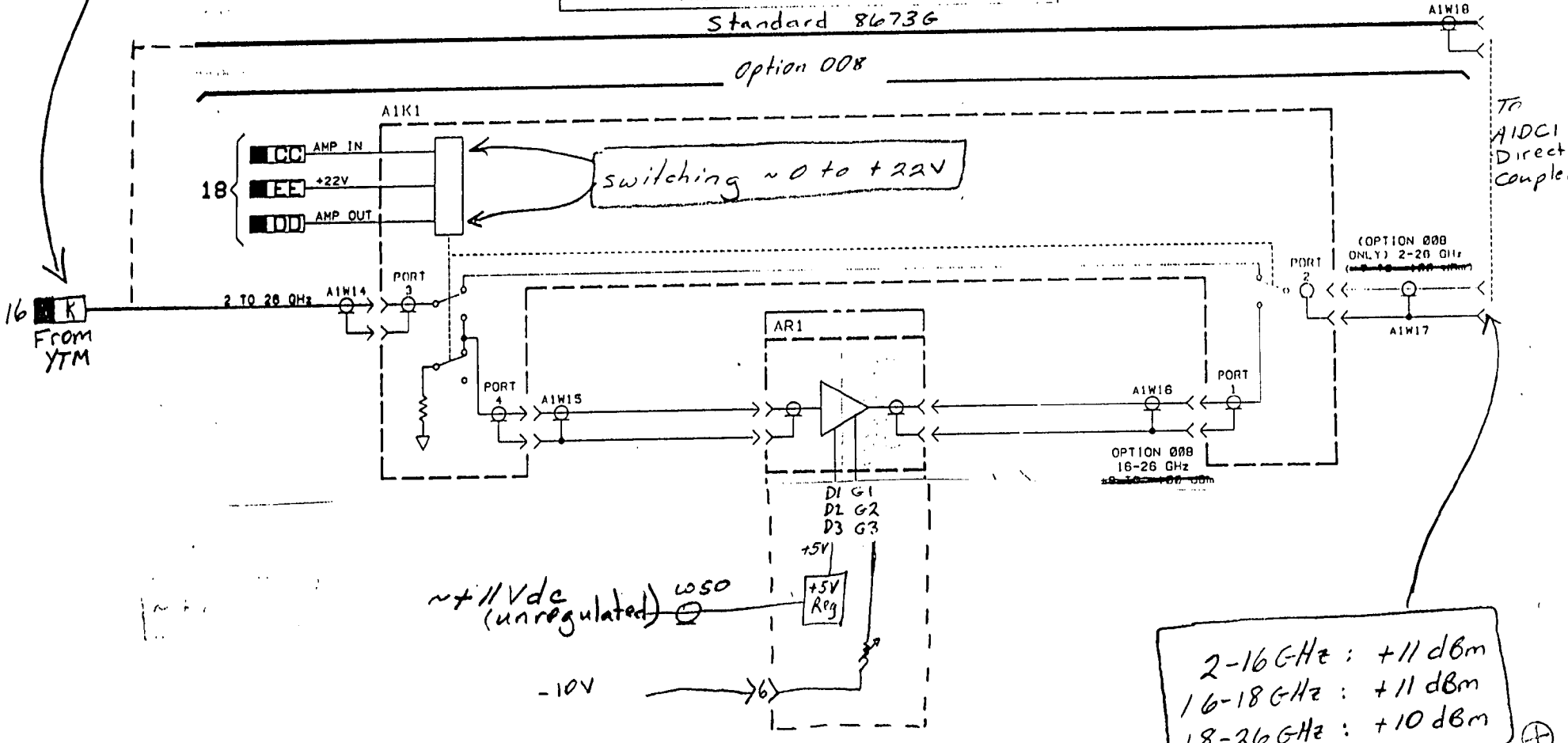
2-18 GHz : +11.7dBm
18-22 GHz : +7.5dBm
22-26 GHz : +4.7dBm

2930A AND ABOVE

THE PARTIAL SCHEMATIC SHOWN (SERVICE SHEET 17) DOCUMENTS INSTRUMENTS WITH SERIAL NUMBERS PREFIXED 2930A AND ABOVE.

Standard 8673G

Option 008



2-16 GHz : +11 dBm
16-18 GHz : +11 dBm
18-26 GHz : +10 dBm

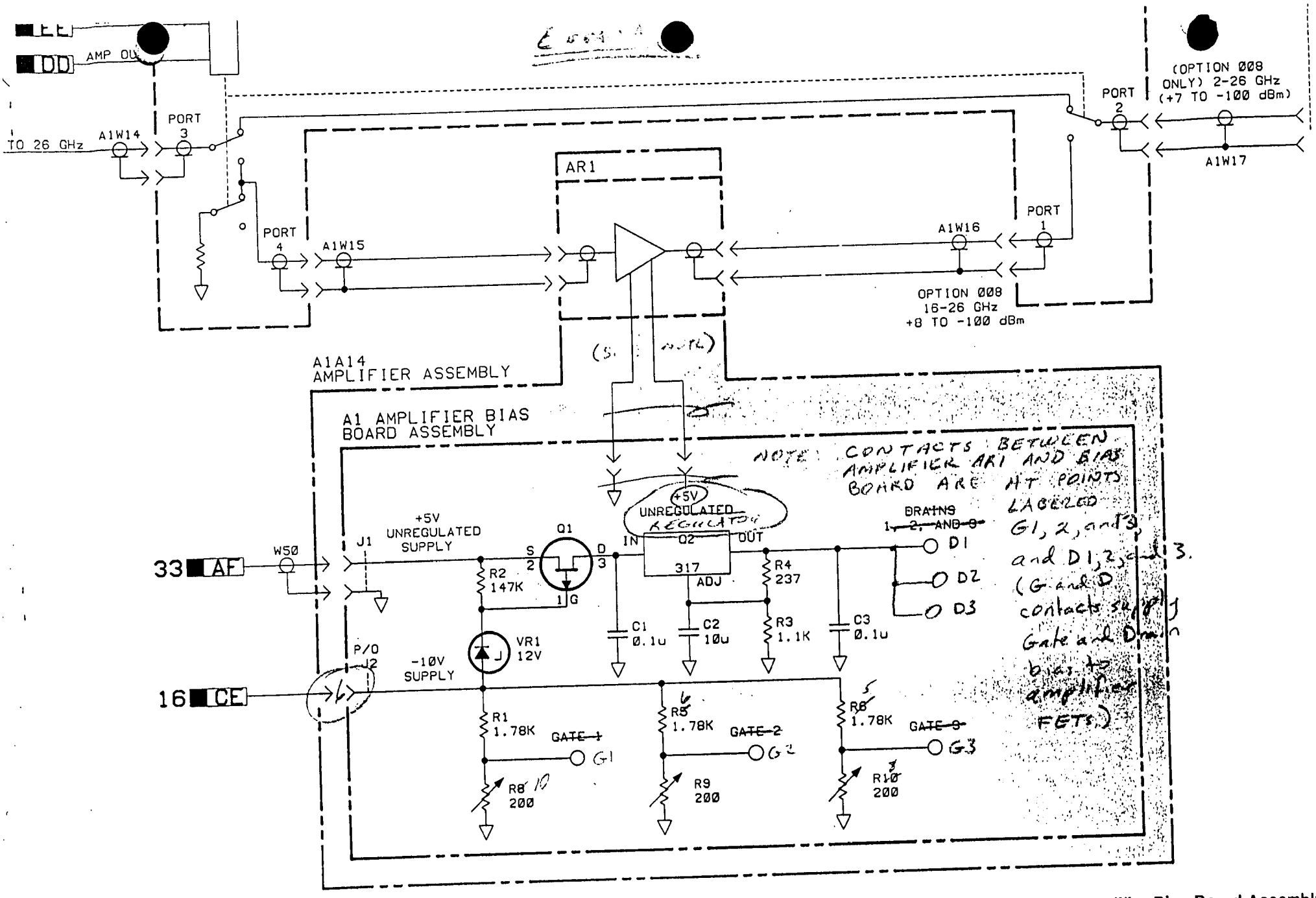


Figure 8-238b. A1A14A1 Amplifier Bias Board Assembly and Circuits Schematic Diagram
8-311/8-312

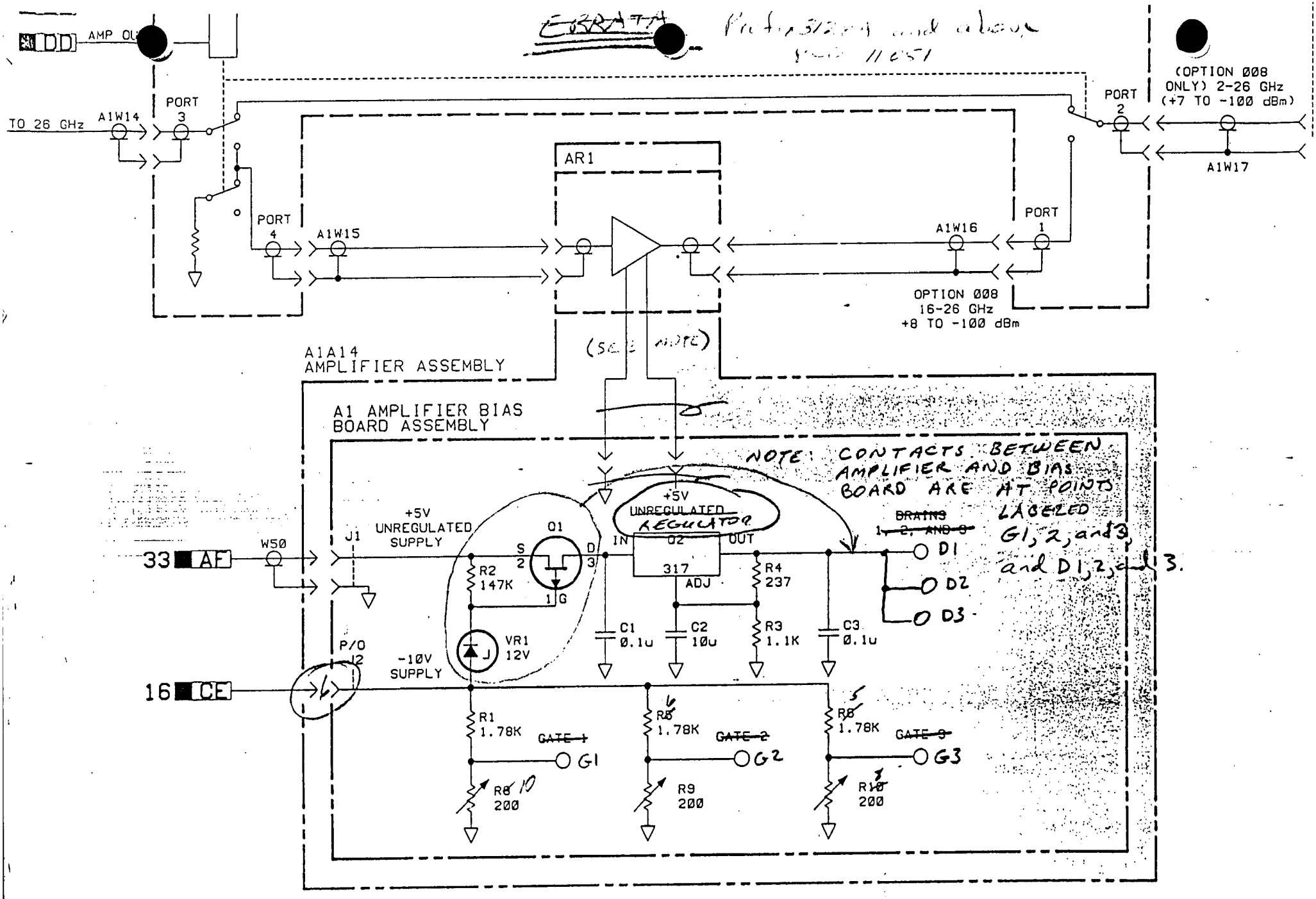


Figure 8-238b. A1A14A1 Amplifier Bias Board Assembly and Circuits Schematic Diagram
8-311/8-312

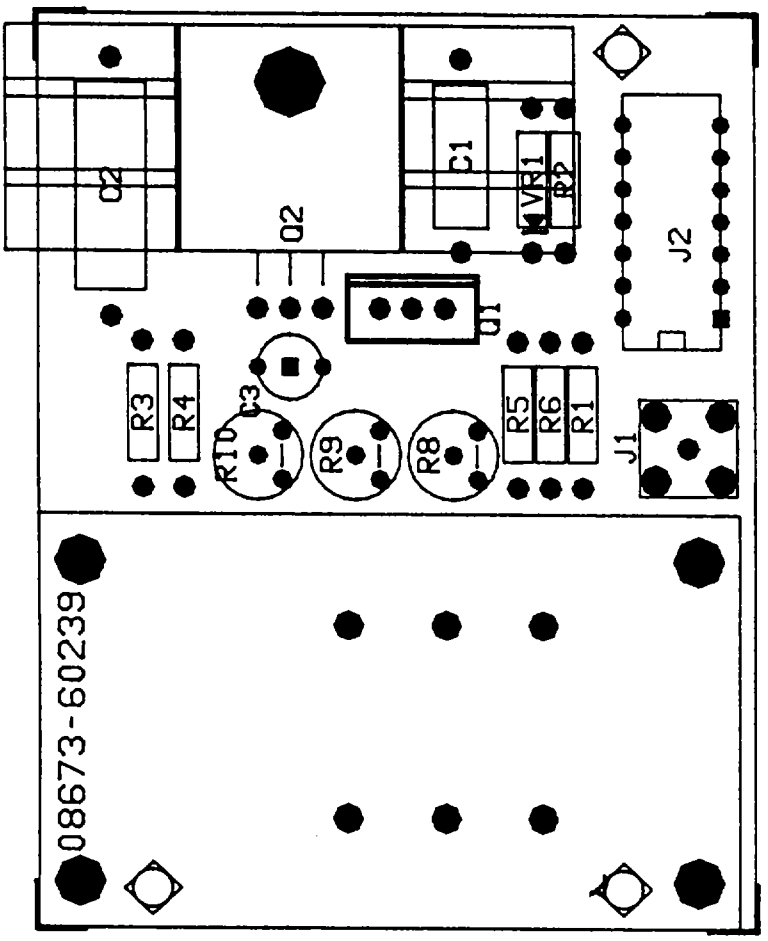


Figure 8-91. A1A14A1 Amplifier Bias Board Assembly Component Locations (2930A and Above)

2930A AND ABOVE

THE SCHEMATIC ON PAGE 8-259, ALONG WITH THESE CHANGES, DOCUMENTS INSTRUMENTS WITH SERIAL NUMBERS PREFIXED 2930A AND ABOVE.

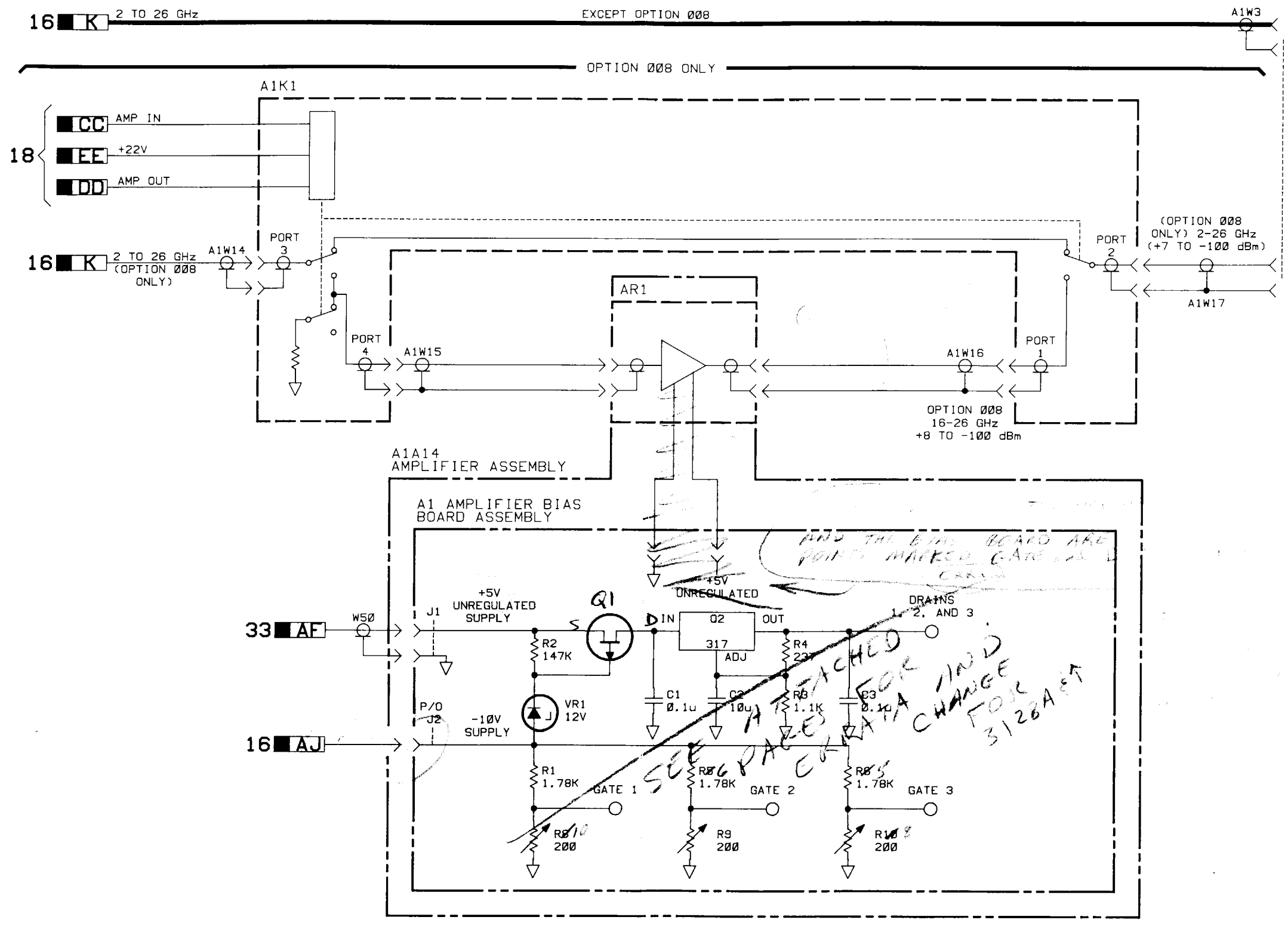
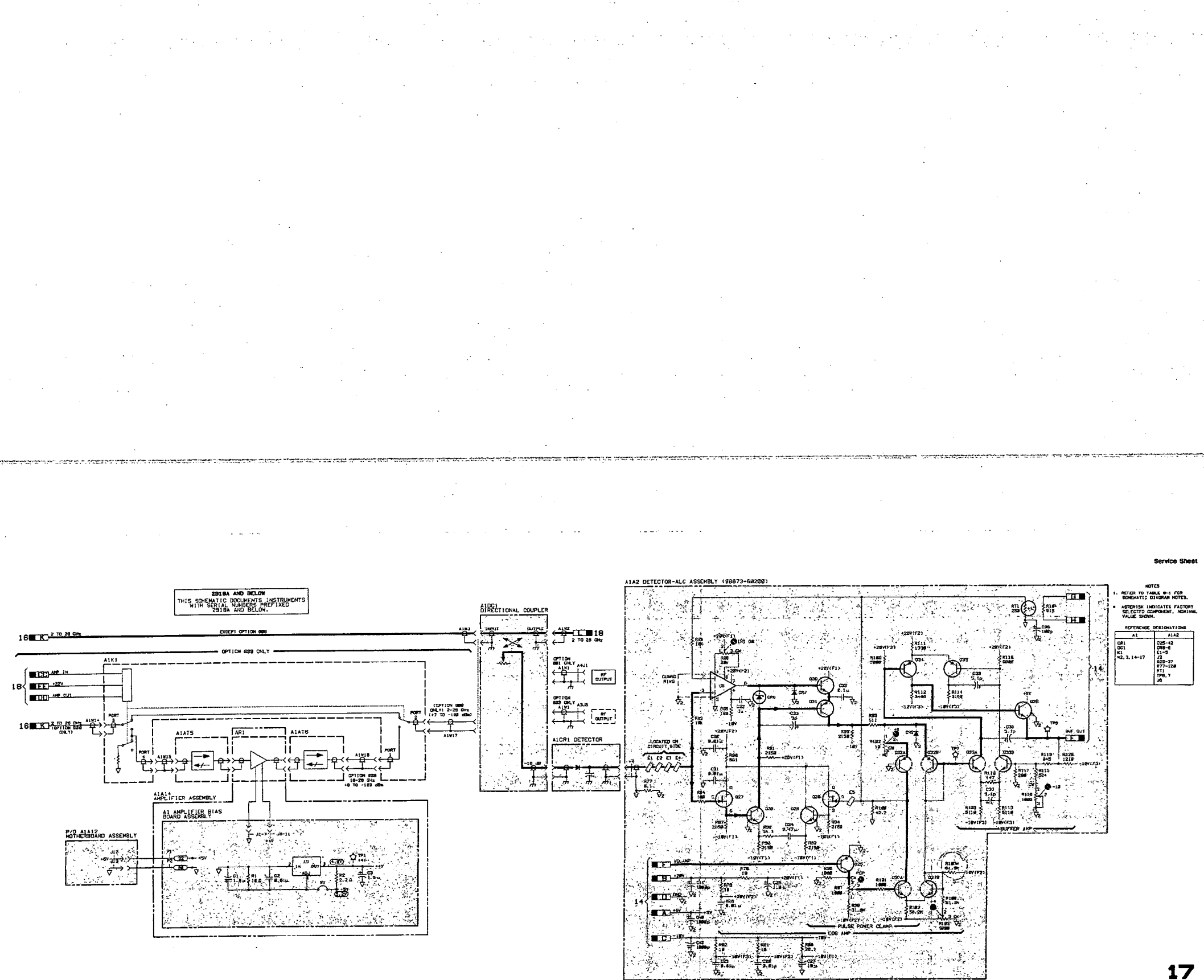


Figure 8-92. Option 008 (2930A and Above)



Figure 8-93. A1A14A1 Amplifier Bias Board Assembly Component Locations (2518A And Below)

Figure 8-94. A1A2 Detector-ALC Assembly Component and Test Point Locations

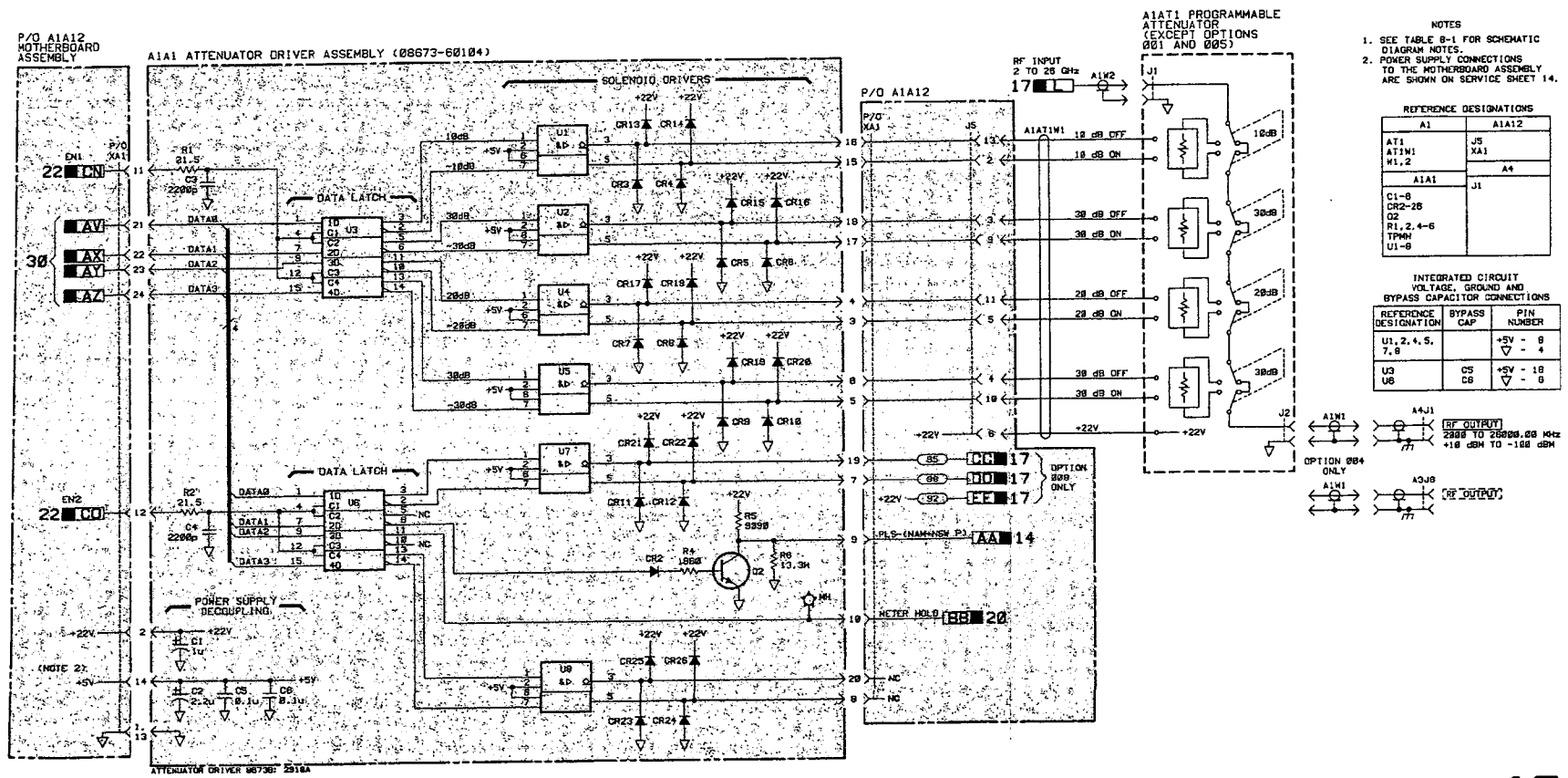


17
P/O A1A2, A1CR1, A1DC1

Figure 8-95. Detector-ALC Assembly Schematic Diagram
8-259/8-260



Figure 8-96. A1A1 Attenuator Driver Board Assembly Component and Test Point Locations



NOTES

1. SEE TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
2. POWER SUPPLY CONNECTIONS TO THE MOTHERBOARD ASSEMBLY ARE SHOWN ON SERVICE SHEET 14.

REFERENCE DESIGNATIONS

A1	A1A12
AT1 AT1W1 W1,2	J5 XA1
	A4
A1A1	J1
C1-8 CR2-26 Q2 R1,2,4-6 TP#/ U1-8	

INTEGRATED CIRCUIT VOLTAGE, GROUND AND BYPASS CAPACITOR CONNECTIONS

REFERENCE DESIGNATION	BYPASS CAP	PIN NUMBER
U1,2,4,5,7,8		+5V - 8 ▽ - 4
U3 U6	CS CB	+5V - 16 ▽ - 8

Figure 8-97. Attenuator Driver Assembly Schematic Diagram
8-261/8-262

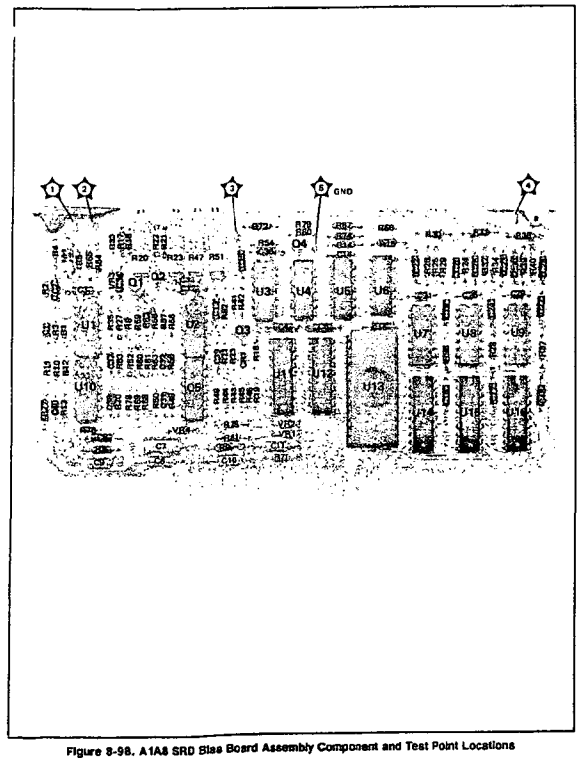


Figure 8-98. A1A8 SRD Bias Board Assembly Component and Test Point Locations

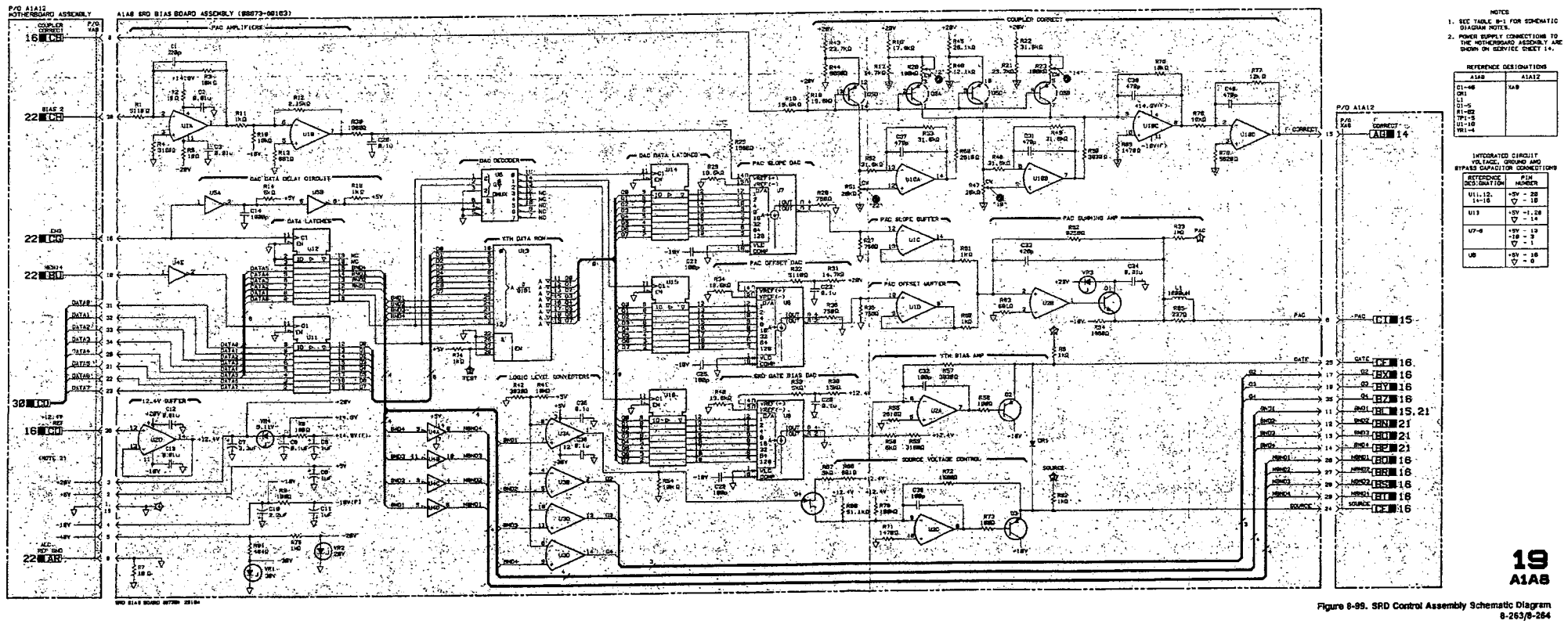


Figure 8-99. SRD Control Assembly Schematic Diagram
8-263/8-264

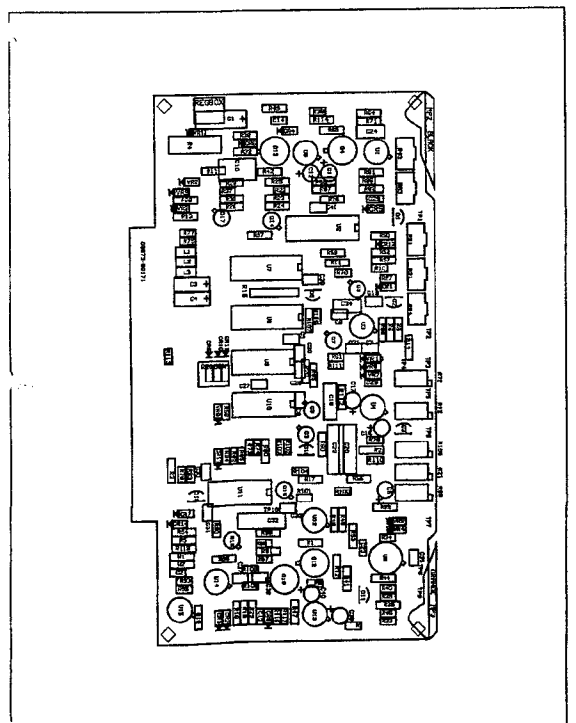
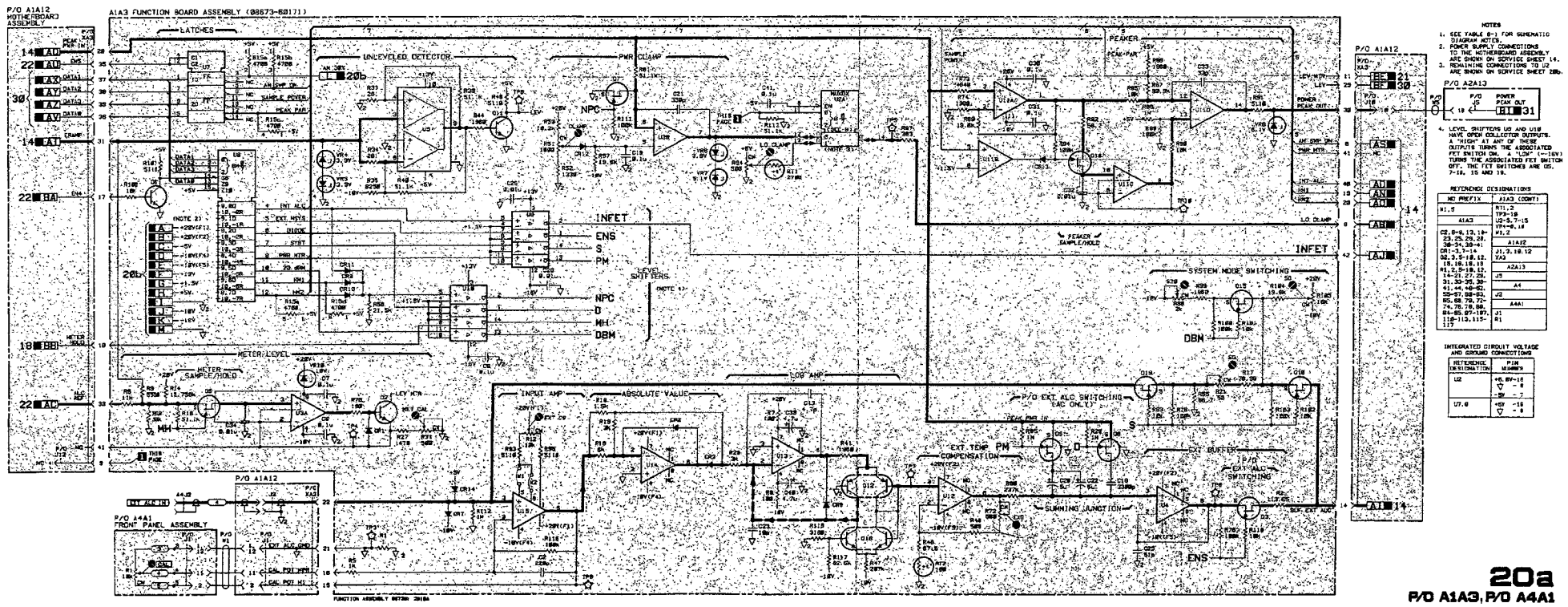


Figure 8-100. A1A3 Function Board Assembly Component and Test Point Locations



NOTES

1. SEE TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
2. POWER SUPPLY CONNECTIONS TO THE MOTHERBOARD ASSEMBLY ARE SHOWN ON SERVICE SHEET 14.
3. MOTHERBOARD CONNECTIONS TO J2 ARE SHOWN ON SERVICE SHEET 19B.
4. LEVEL SHUTTERS U9 AND U10 HAVE OPEN COLLECTOR OUTPUTS. A "HIGH" AT ANY OF THESE OUTPUTS TURNS THE ASSOCIATED FET SWITCH ON. A "LOW" (−15V) TURNS THE ASSOCIATED FET SWITCH OFF. THE FET SWITCHES ARE U0, 7-10, 15 AND 19.

REFERENCE DESIGNATIONS

RD PREFIX	A1A3 (CONT)
W1,5	W11,3 TP3-10
A1A3	U2-5,7-15 Y1-4,16
C2,8-6,13,16- 20,25,26,28- 30,34-36,38- 40,42-44,46- 51,53,54,56, 58,60,62,64, 66,68,70,72, 74-77,79,80, 84-85,87-197, 110-113,115- 117	R1,2 A1A12 J1,7,10,12 TA3 A2A13 J5 A4 J2 A4A1 J1 R1

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATION	PIN NUMBER
U2	+15.8V=16 GND=1 V−=7 28=7
U7,8	+15V=16 V−=4

Figure 8-101. Function Assembly Schematic Diagram
8-265/8-266

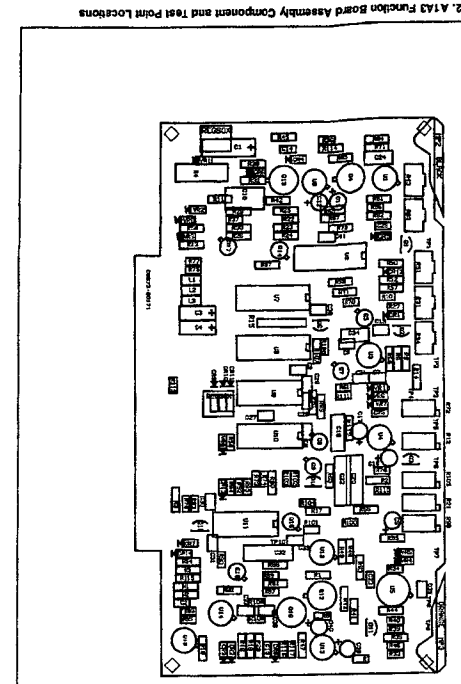


Figure 8-102. A1A3 Function Board Assembly Component and Test Point Locations

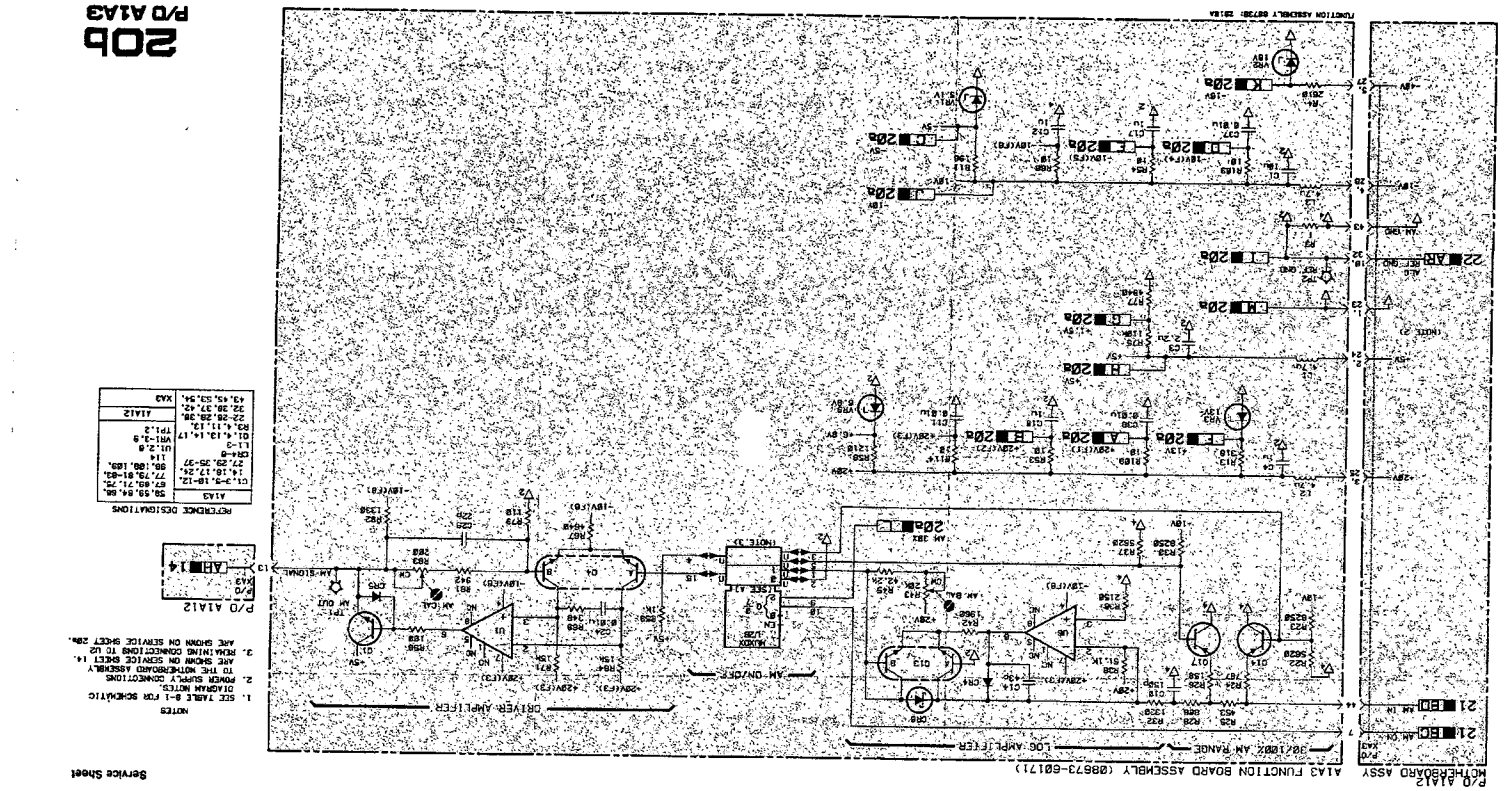
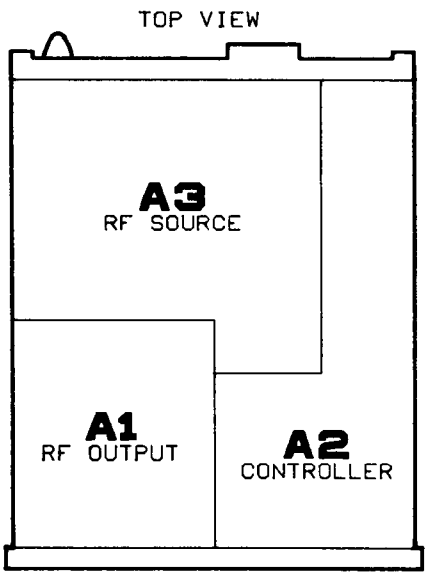


Figure 8-103. Function Assembly Schematic Diagram, Part 2

Index To Service Sheets by Assembly



MAJOR ASSEMBLIES

Assembly	Description	Service Sheet
A1A1	Attenuator Driver Board	18
A1A2	Detector/ALC Board	14,17
A1A3	Function Board	20
A1A4	Pulse Driver Board	15
A1A5	DAC and Enable Board	22
A1A6	Meter Board	21
A1A7	YTM Driver Board	16
A1A8	SRD Bias Board	19
A1A9	Not Assigned	
A1A10	Yig-Tuned Multiplier	16
A1A10A1	YIG Heater Control	16
A1A11	Power Amplifier	16
A1A12	RF Output Motherboard	14–16, 18–22, 30,31
A1A13	Not Assigned	
A1A14	26 GHz Amplifier	17
A1A14A1	26 GHz Amp Bias Board	17
A2A1	Panel Driver Board	25
A2A2	Key Code Board	24
A2A3	160–240 MHz VCO	8
A2A4	20/30 MHz Phase Detector	7
A2A5	20/30 MHz Divider	6
A2A6	Not Assigned	
A2A7	I/O Board	30,31
A2A8	Microprocessor Board	26
A2A9	Frequency/HP-IB Board	29
A2A10	Memory/Interface	28
A2A11	Not Assigned	
A2A12	Not Assigned	
A2A13	Controller Motherboard	6–8,10, 20–32
A2A14	Rear Interconnect Board	24,29,31
A2A15	HP-IB Connector Board	29
A3A1	Reference and M/N	
A3A1A1	Reference Phase Detector	1
A3A1A2	100 MHz VCXO	2
A3A1A3	M/N Phase Detector	3
A3A1A4	M/N VCO	4
A3A1A4A1	VCO Resonator	4
A3A1A4A2	VCO Board	4
A3A1A5	M/N Output	5
A3A1A6	M/N Reference Motherboard	1–3,5
A3A1A7	Reference and M/N Housing	
A3A2	Not Assigned	
A3A3	Positive Regulator	34
A3A4	Negative Regulator	35
A3A5	DAC	9
A3A6	YTO Driver	10
A3A7	YTO/FM Coil Driver	13
A3A8	10 MHz Reference Oscillator	1
A3A9	YTO Loop	11,12
A3A9A1	Not Assigned	
A3A9A2	YTO Interconnect	11–13
A3A9A3	2.0–6.6 GHz YTO	13
A3A9A4	YTO Phase Detector	12
A3A9A5	Sampler	11
A3A9A6	Attenuator	13
A3A9A7	6.6 GHz Low Pass Filter	13
A3A9A8	Preamplifier	13
A3A10	RF Source Motherboard	1,3,4, 6,10,12–14,21–23,26, 29–31,33–35
A3A11	Line Module	33
A3A12	Rectifier Assembly	33
A4A1	Front Panel Board	20,22, 23,25,32

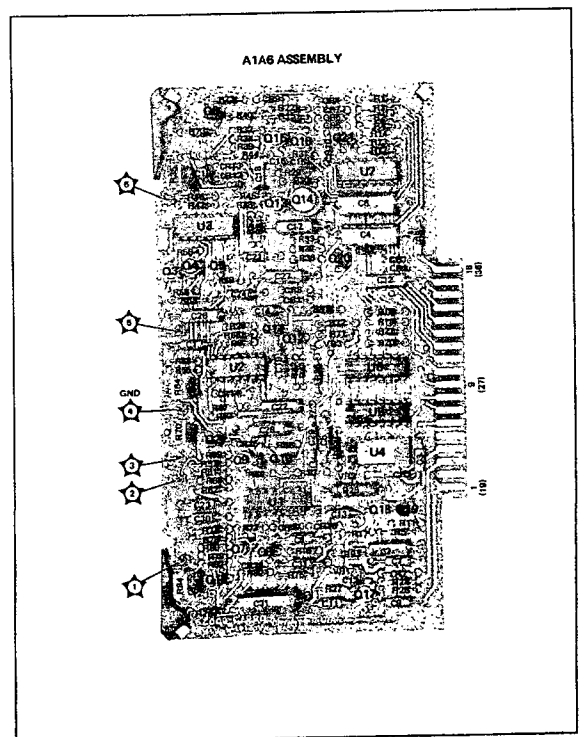
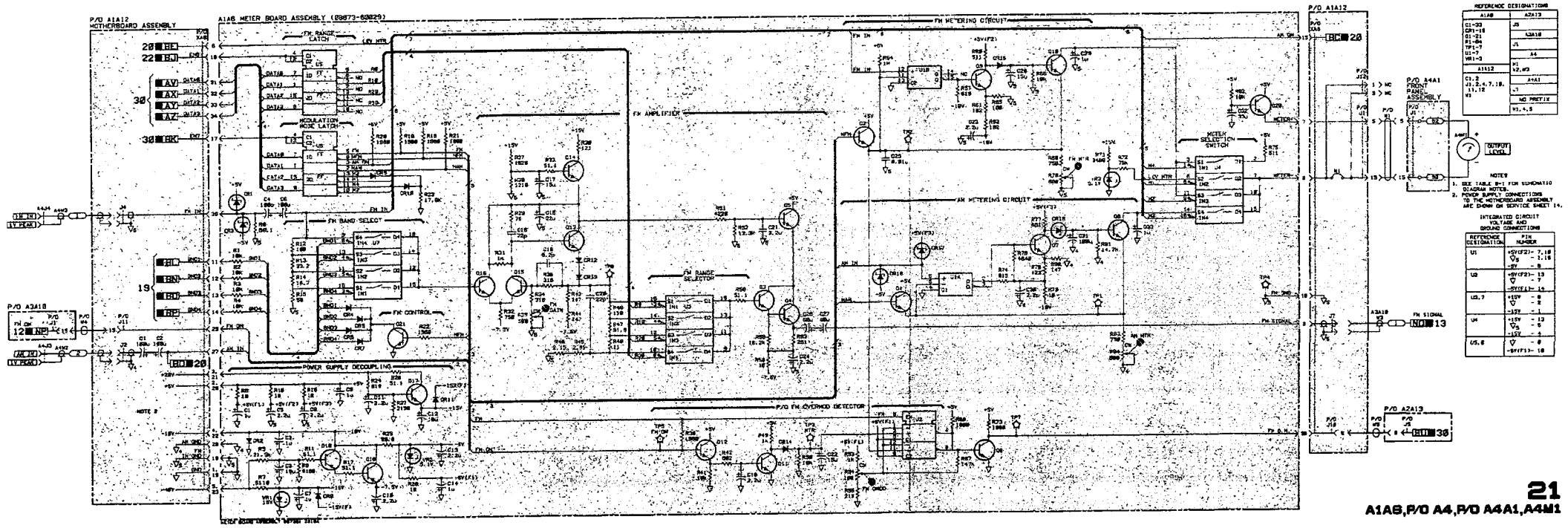


Figure 8-104. A1A6 Meter Board Assembly Component and Test Point Locations



21

A1A6,P/O A4,P/O A4A1,A4M1

Figure 8-105. Meter Board Assembly Schematic Diagram
8-269/8-270

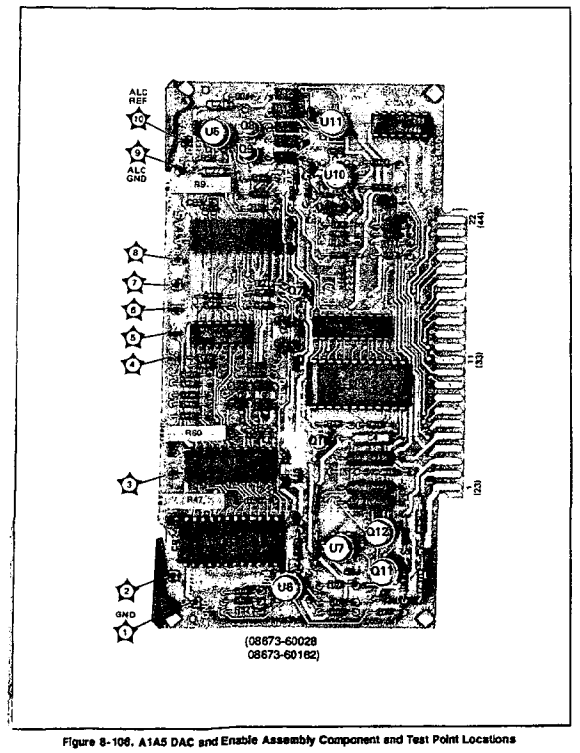
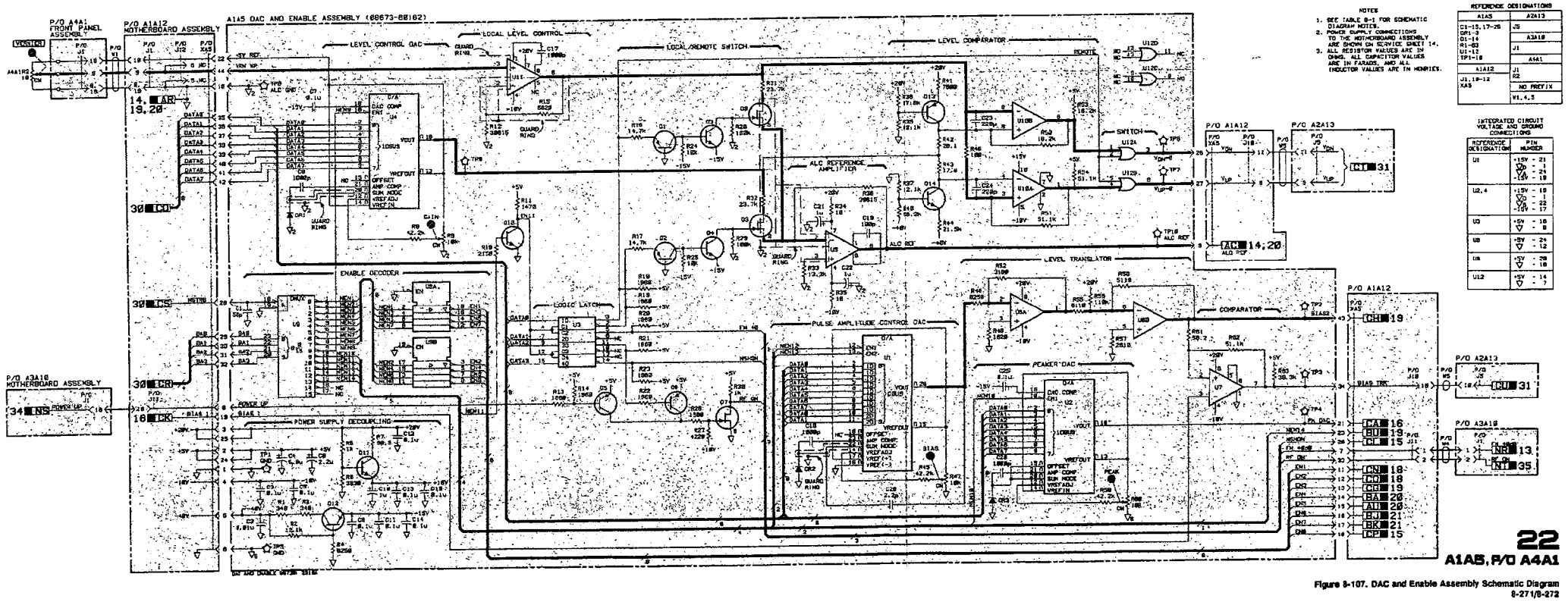


Figure 8-106. A1A5 DAC and Enable Assembly Component and Test Point Locations



22
A1A5, P/O A4A1

Figure 8-107. DAC and Enable Assembly Schematic Diagram
8-271/8-272

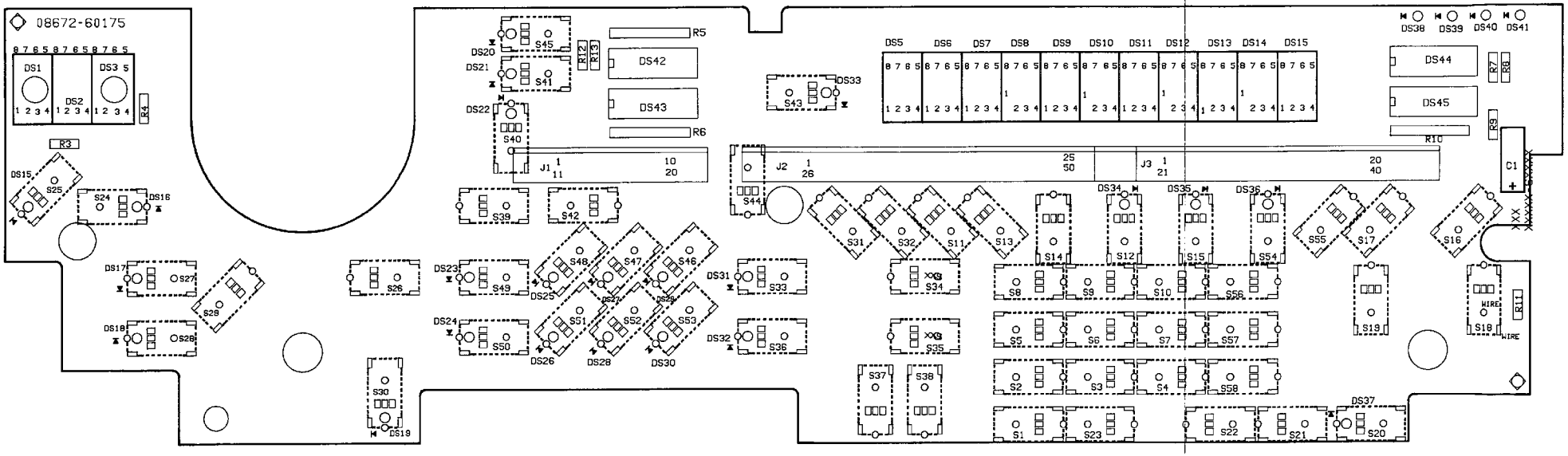
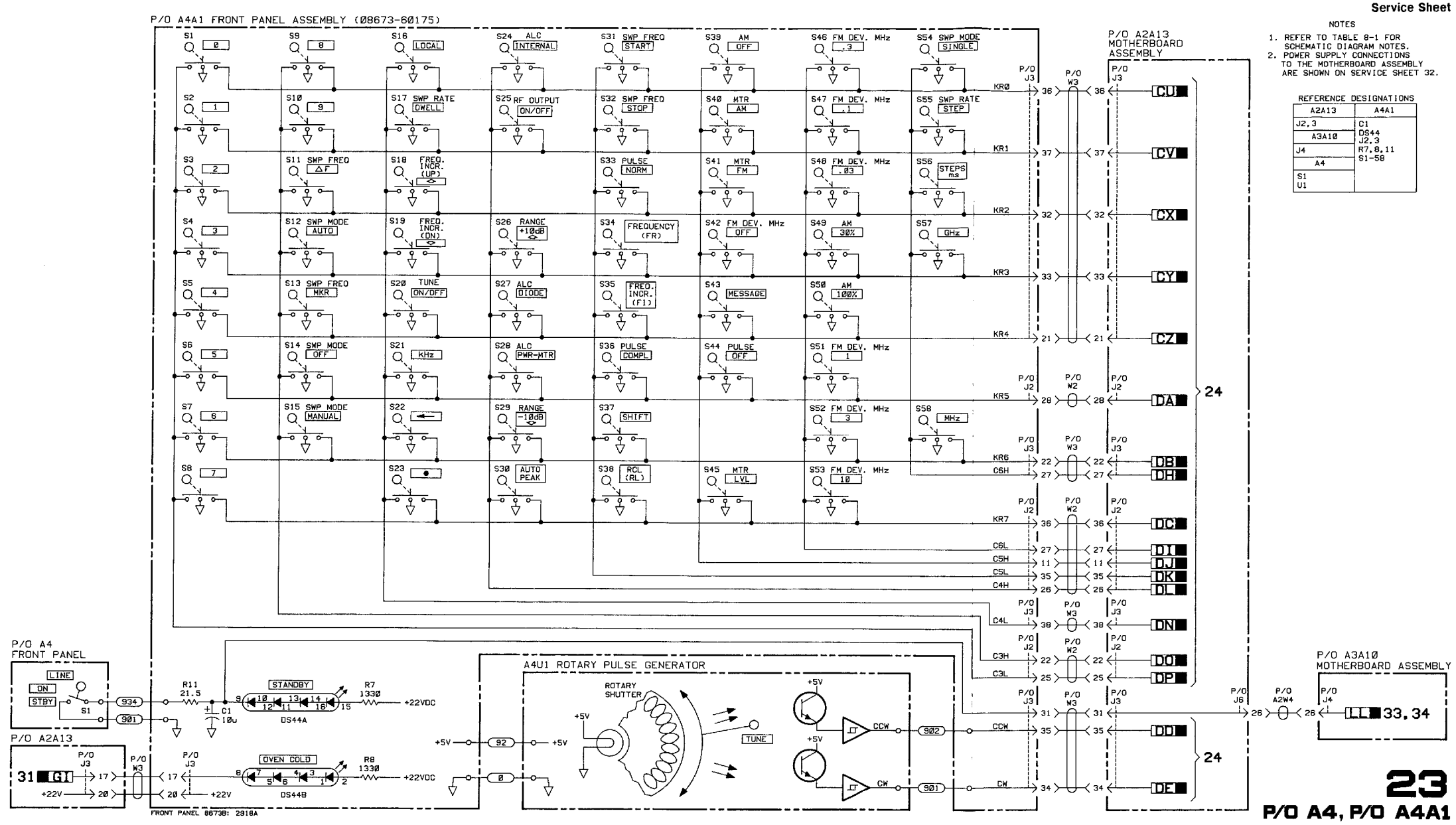


Figure 8-108. A4A1 Front Panel Assembly Component Locations 8-273/8-274



NOTES

1. REFER TO TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
2. POWER SUPPLY CONNECTIONS TO THE MOTHERBOARD ASSEMBLY ARE SHOWN ON SERVICE SHEET 32.

REFERENCE DESIGNATIONS

A2A13	A4A1
J2,3	C1
A3A10	DS44 J2,3
J4	R7,8,11
A4	S1-58
S1	
U1	

Figure 8-109. P/O A4A1 Front Panel Keyboard Schematic Diagram

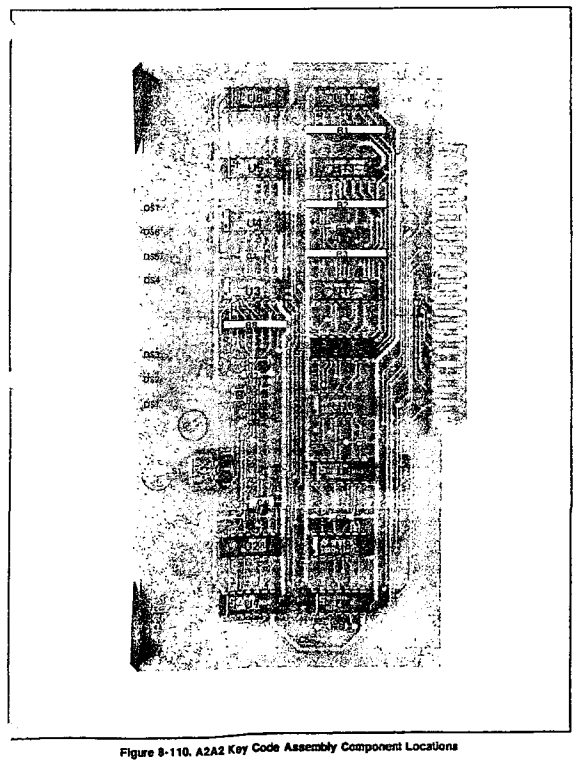
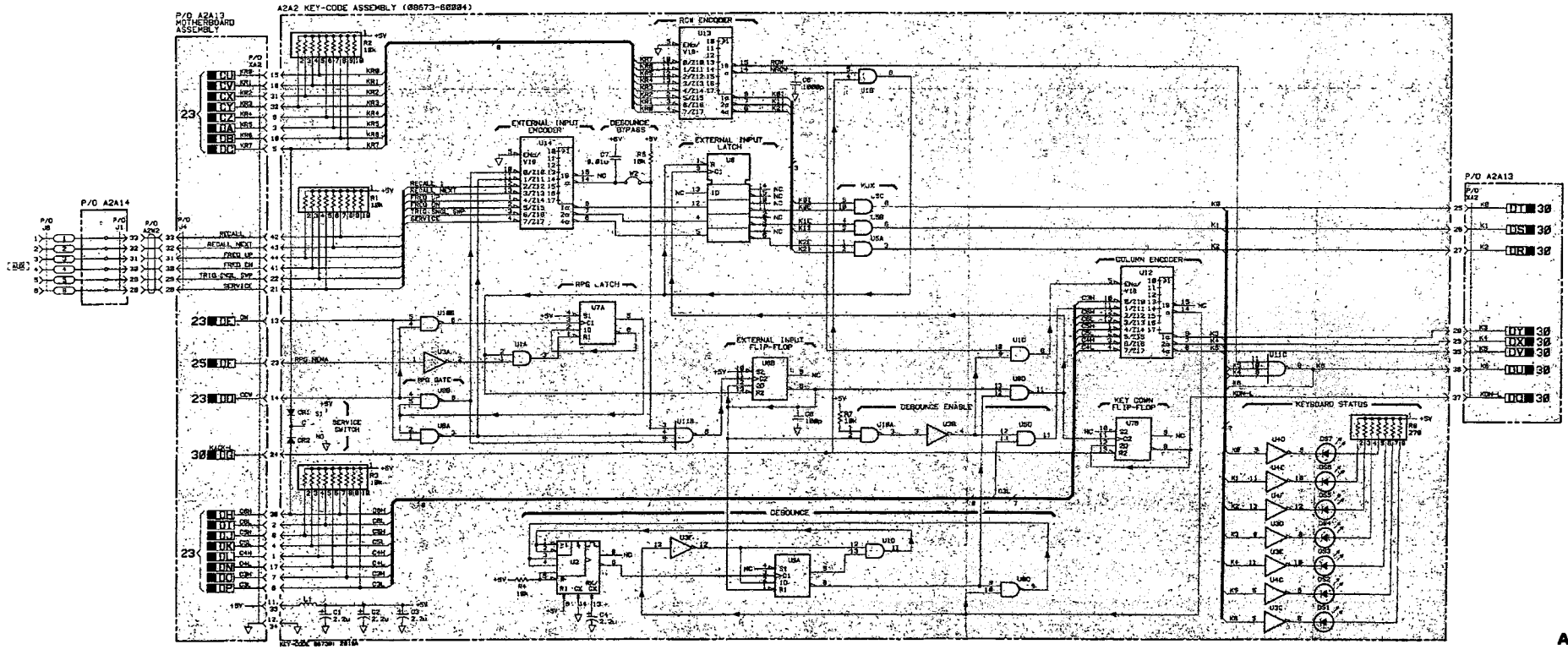


Figure 8-110. A2A2 Key Code Assembly Component Locations



Service Sheet

NOTES

1. SEE TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
2. POWER SUPPLY CONNECTIONS TO THE MOTHERBOARD ASSEMBLY ARE SHOWN ON SERVICE SHEET 8.

REFERENCE DESIGNATIONS

A2	A2A13
XJ	J4
	XA2
A2A2	A2A14
C1-6	J1,6
DR1,2	
DS1-7	
L1	
R1-6	
S1	
U11-14	
Y1,2	

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATION	PIN NUMBER
U1-5,7-11	+5V = 14 GND = 7
U6,12-14	+5V = 16 GND = 8

Figure 8-111. Key Code Assembly Schematic Diagram
8-277/8-278

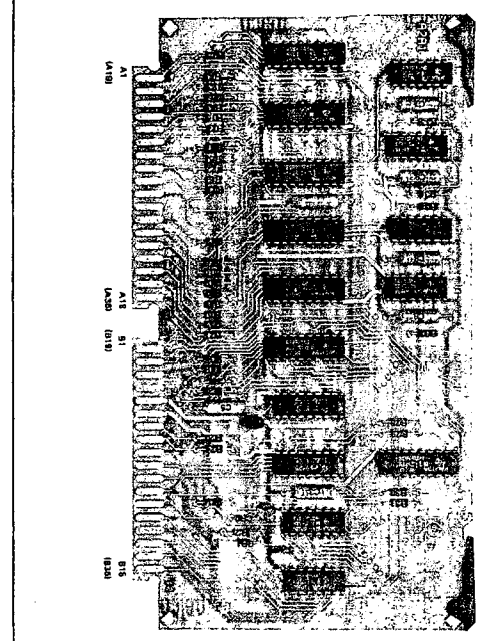


Figure 8-112. A2A1 Panel Driver Assembly Component Locations

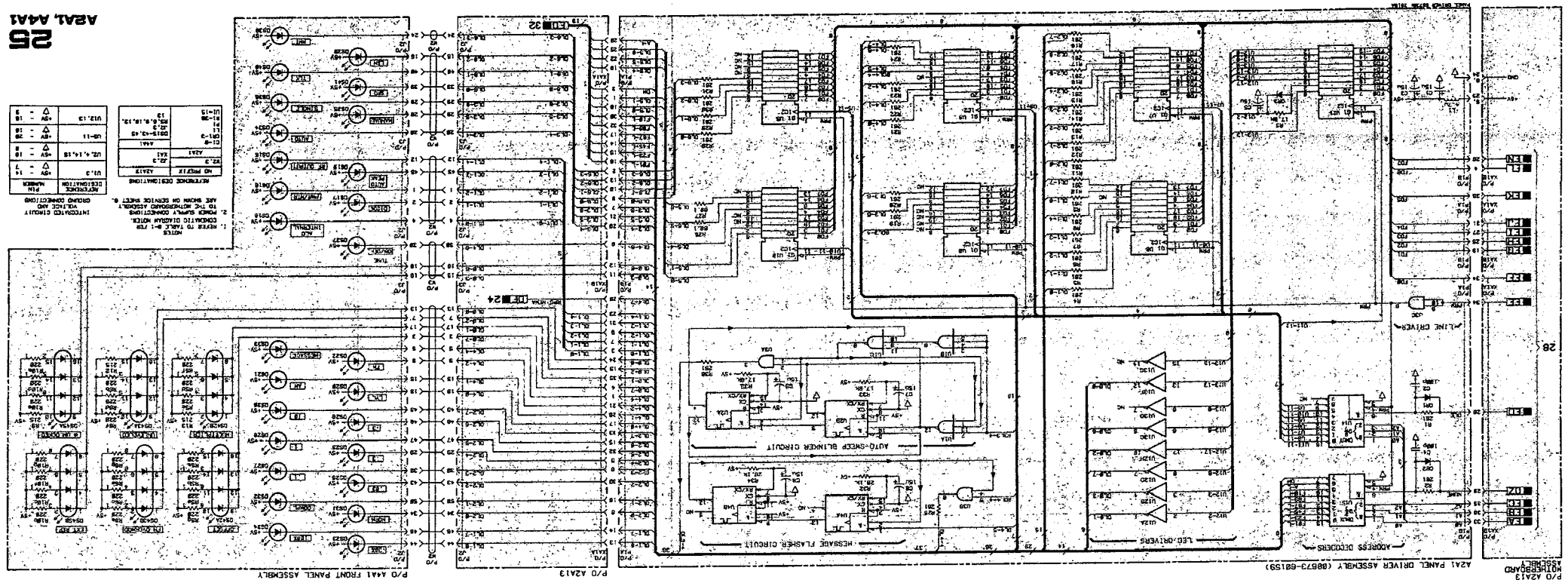


Figure 8-113. Panel Driver Assembly Schematic Diagram
8-279/8-280

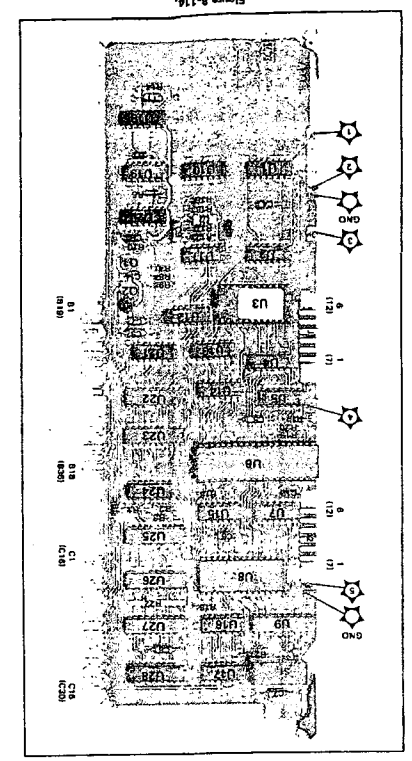


Figure 8-114.
A24A Microprocessor Assembly Component and Test Point Locations

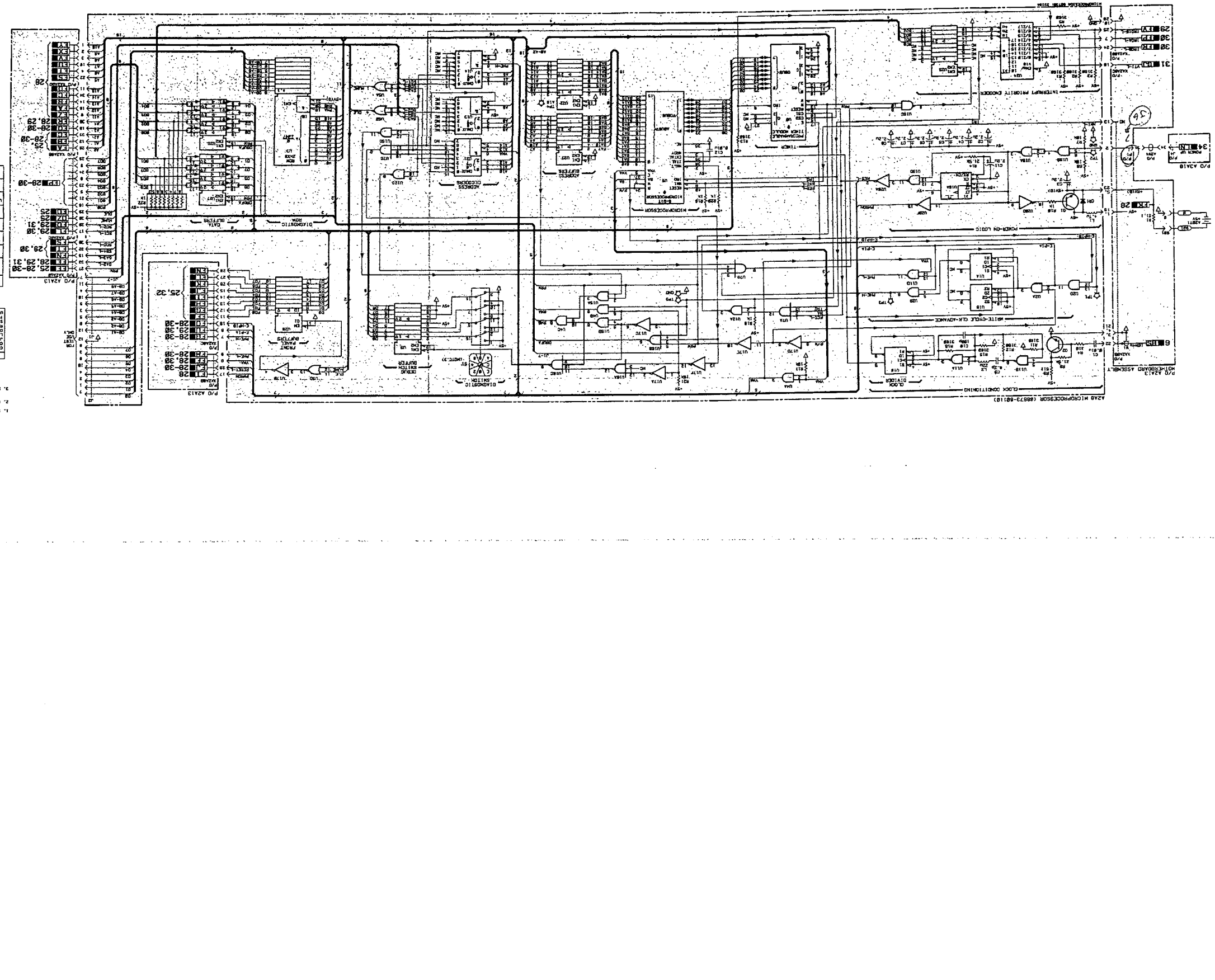


Figure 8-115. Microprocessor Assembly Schematic Diagram
8-281/8-282

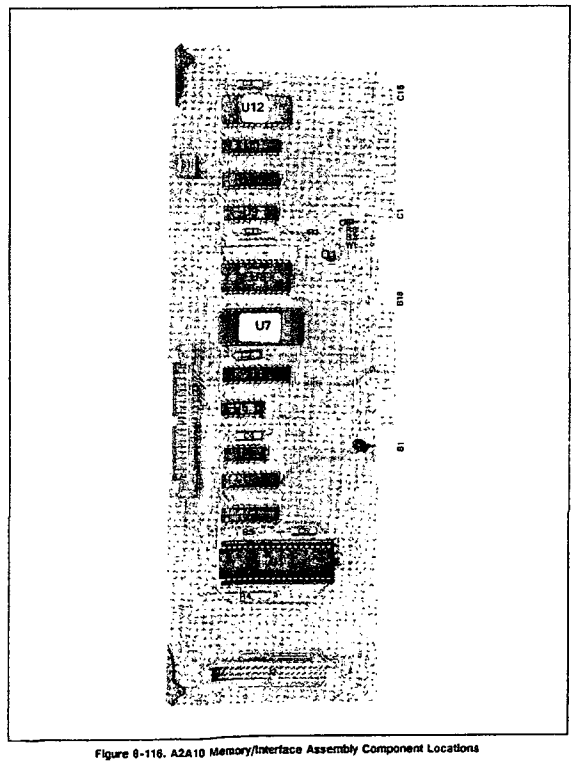


Figure 8-116. A2A10 Memory/Interface Assembly Component Locations

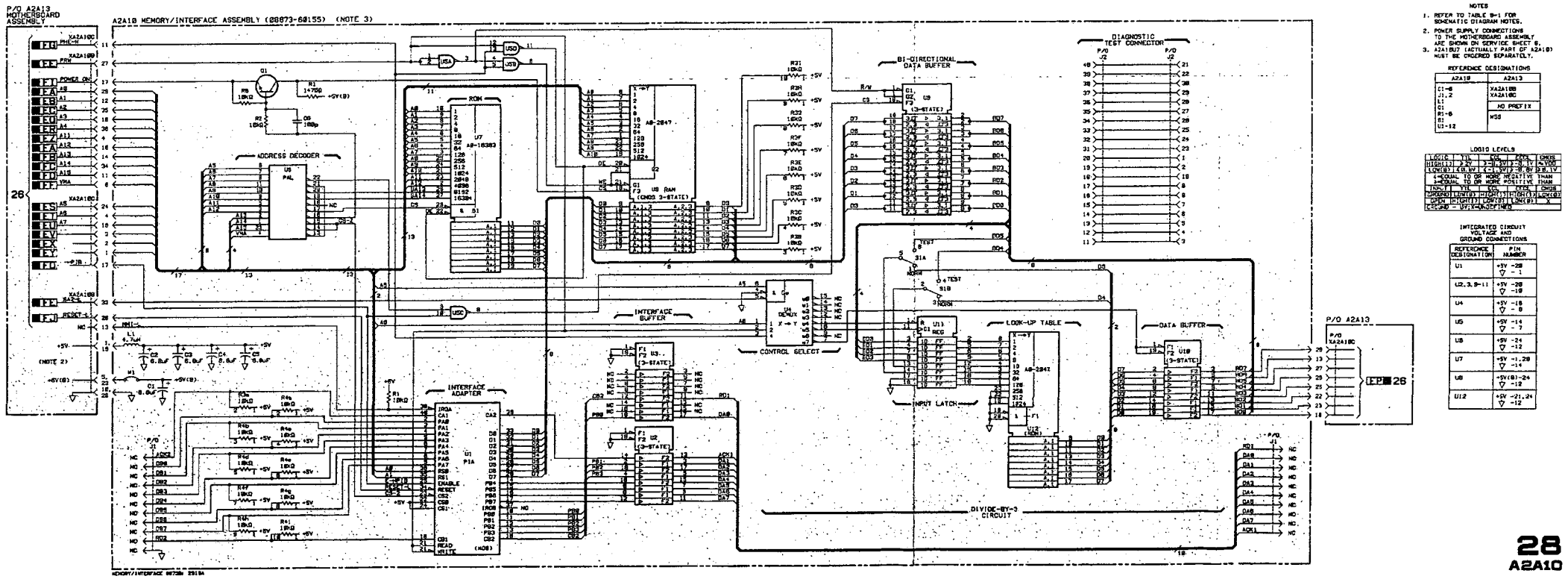


Figure 8-117. Memory/Interface Assembly Schematic Diagram 8-283/8-284

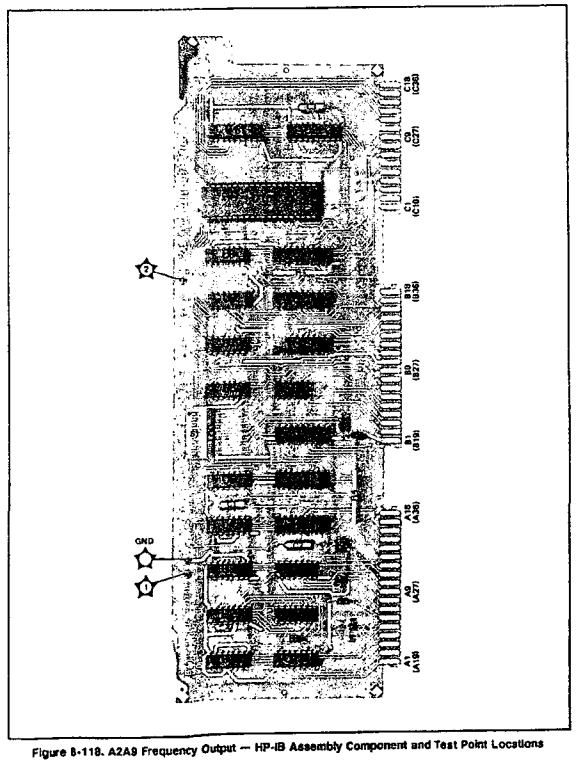


Figure 8-118. A2A9 Frequency Output — HP-IB Assembly Component and Test Point Locations

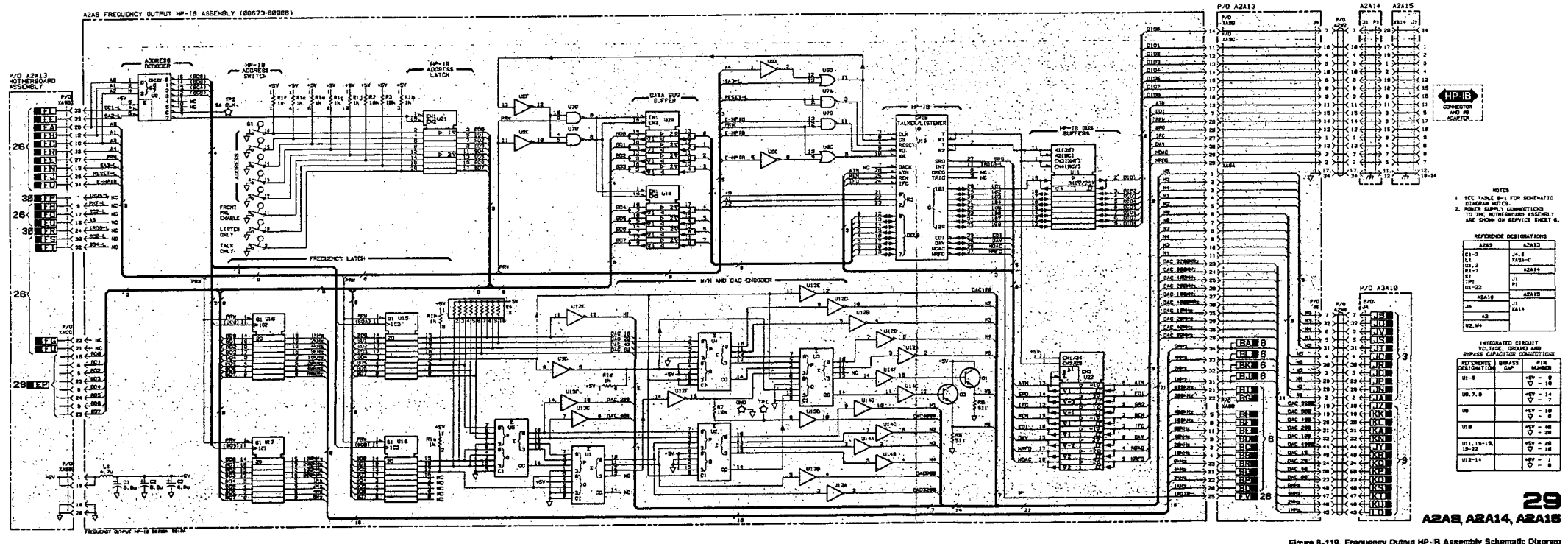


Figure 8-119. Frequency Output HP-IB Assembly Schematic Diagram
8-285/8-286

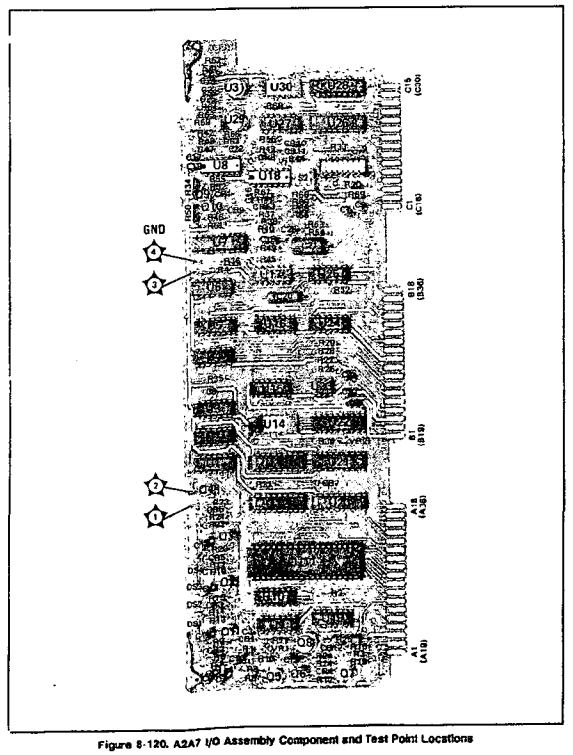


Figure 8-120. A2A7 I/O Assembly Component and Test Point Locations

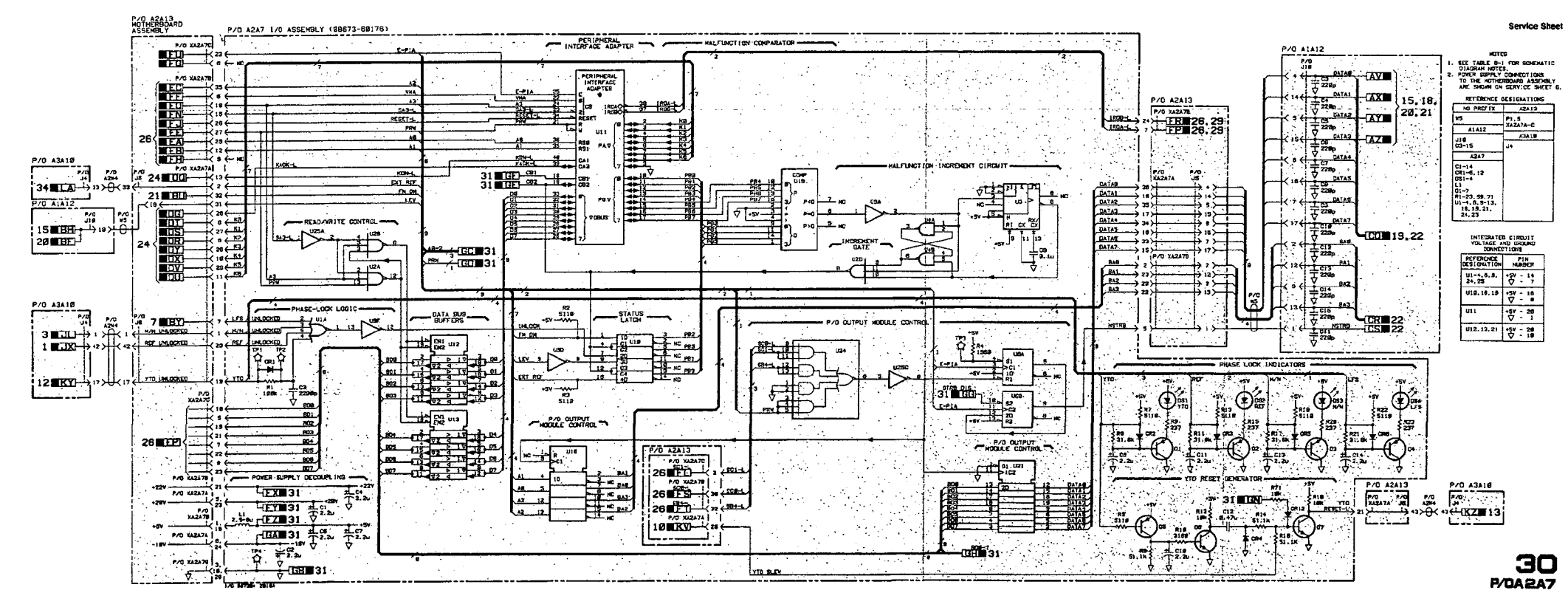
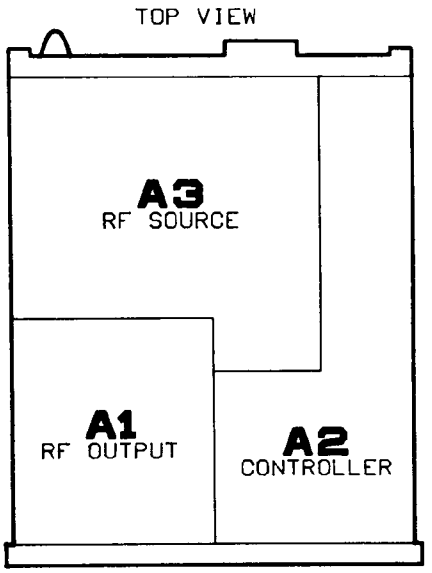


Figure 8-121. I/O Assembly Schematic Diagram, Part 1

Index To Service Sheets by Assembly



MAJOR ASSEMBLIES

Assembly	Description	Service Sheet
A1A1	Attenuator Driver Board	18
A1A2	Detector/ALC Board	14,17
A1A3	Function Board	20
A1A4	Pulse Driver Board	15
A1A5	DAC and Enable Board	22
A1A6	Meter Board	21
A1A7	YTM Driver Board	16
A1A8	SRD Bias Board	19
A1A9	Not Assigned	
A1A10	Yig-Tuned Multiplier	16
A1A10A1	YIG Heater Control	16
A1A11	Power Amplifier	16
A1A12	RF Output Motherboard	14–16, 18–22, 30,31
A1A13	Not Assigned	
A1A14	26 GHz Amplifier	17
A1A14A1	26 GHz Amp Bias Board	17
A2A1	Panel Driver Board	25
A2A2	Key Code Board	24
A2A3	160–240 MHz VCO	8
A2A4	20/30 MHz Phase Detector	7
A2A5	20/30 MHz Divider	6
A2A6	Not Assigned	
A2A7	I/O Board	30,31
A2A8	Microprocessor Board	26
A2A9	Frequency/HP-IB Board	29
A2A10	Memory/Interface	28
A2A11	Not Assigned	
A2A12	Not Assigned	
A2A13	Controller Motherboard	6–8,10, 20–32
A2A14	Rear Interconnect Board	24,29,31
A2A15	HP-IB Connector Board	29
A3A1	Reference and M/N	
A3A1A1	Reference Phase Detector	1
A3A1A2	100 MHz VCXO	2
A3A1A3	M/N Phase Detector	3
A3A1A4	M/N VCO	4
A3A1A4A1	VCO Resonator	4
A3A1A4A2	VCO Board	4
A3A1A5	M/N Output	5
A3A1A6	M/N Reference Motherboard	1–3,5
A3A1A7	Reference and M/N Housing	
A3A2	Not Assigned	
A3A3	Positive Regulator	34
A3A4	Negative Regulator	35
A3A5	DAC	9
A3A6	YTO Driver	10
A3A7	YTO/FM Coil Driver	13
A3A8	10 MHz Reference Oscillator	1
A3A9	YTO Loop	11,12
A3A9A1	Not Assigned	
A3A9A2	YTO Interconnect	11–13
A3A9A3	2.0–6.6 GHz YTO	13
A3A9A4	YTO Phase Detector	12
A3A9A5	Sampler	11
A3A9A6	Attenuator	13
A3A9A7	6.6 GHz Low Pass Filter	13
A3A9A8	Preamplifier	13
A3A10	RF Source Motherboard	1,3,4, 6,10,12–14,21–23,26, 29–31,33–35
A3A11	Line Module	33
A3A12	Rectifier Assembly	33
A4A1	Front Panel Board	20,22, 23,25,32

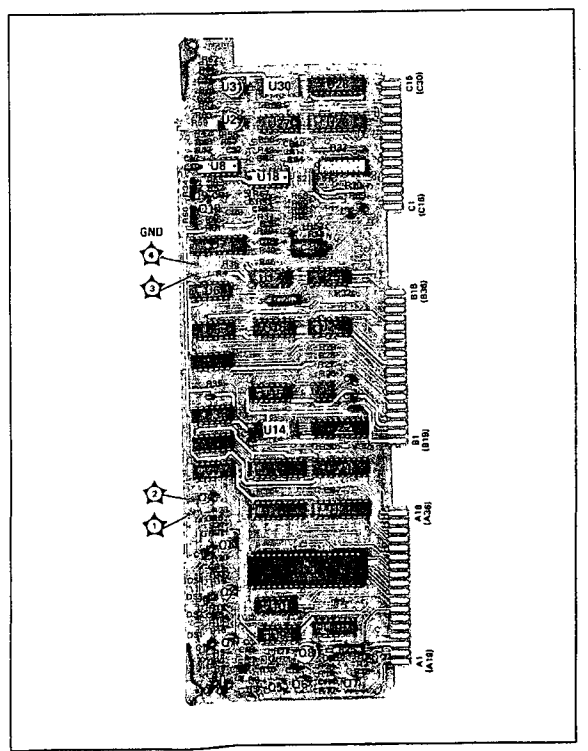
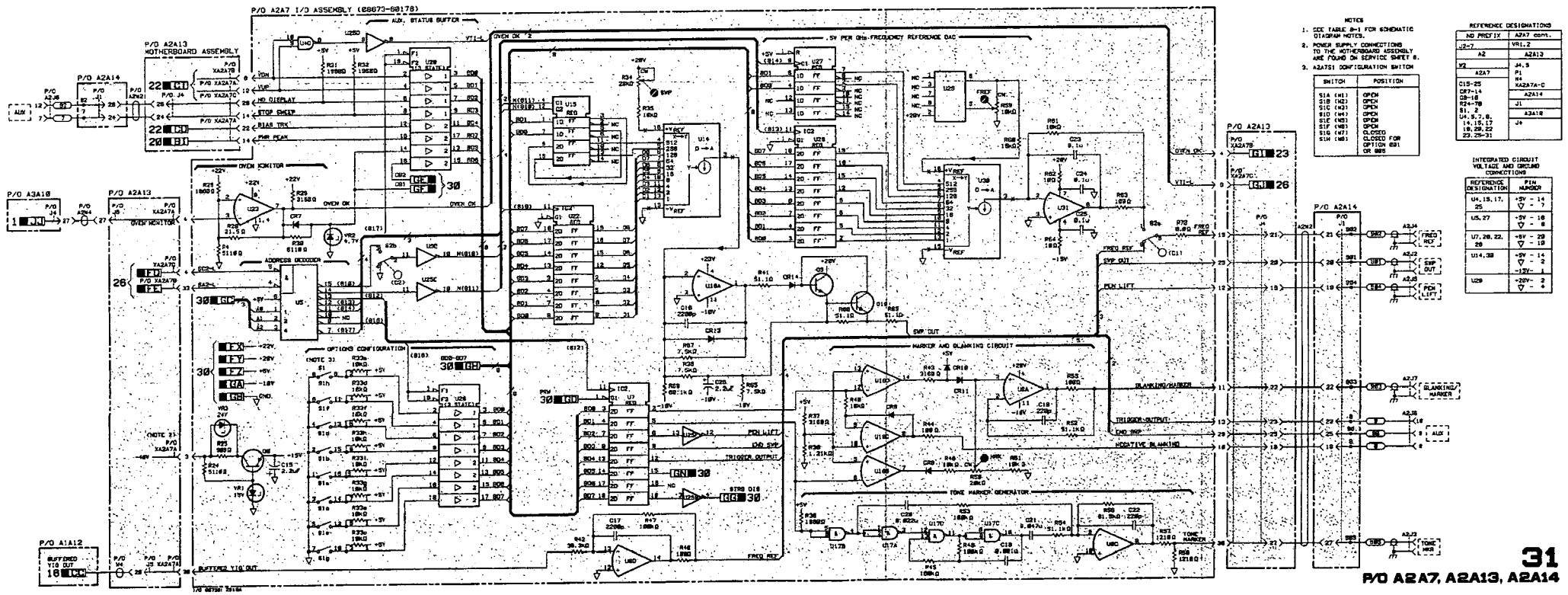


Figure 8-122. A2A7 I/O Assembly Component and Test Point Locations



NOTES

1. SEE TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
2. POWER SUPPLY CONNECTIONS TO THE MOTHERBOARD ASSEMBLY ARE FOUND ON SERVICE SHEET 8.
3. A2A7S1 CONFIGURATION SWITCH

SWITCH	POSITION
S1A (NO)	OPEN
S1B (NO)	OPEN
S1C (NO)	OPEN
S1D (NO)	OPEN
S1E (NO)	OPEN
S1F (NO)	OPEN
S1G (NO)	CLOSED CLOSED FOR OPTION 001 OR 005
S1H (NO)	OPEN

REFERENCE DESIGNATIONS

NO PREFIX	A2A7 comp.
-(2-7	VR1,2
A2	A2A13
W2	J4, 5 P1 W4 A2A7A-C
C13-25	A2A14
C27-14	J1
28-18	
P24-78	A2A18
S1, 2	J9
U4,5,7,8, 14,15,17 18,20,22 23,25-31	

INTEGRATED CIRCUIT VOLTAGE AND GROUND CONNECTIONS

REFERENCE DESIGNATION	PIN NUMBER
U4,18,17, 25	+5V - 14 ▽ - 7
U5,27	+5V - 18 ▽ - 9
U7,20,22, 28	+5V - 20 ▽ - 10
U14,30	+5V - 14 ▽ - 7 -15V- 3
U29	+20V- 2 ▽ - 8

Figure 8-123. I/O Assembly Schematic Diagram, Part 2
8-283/8-290

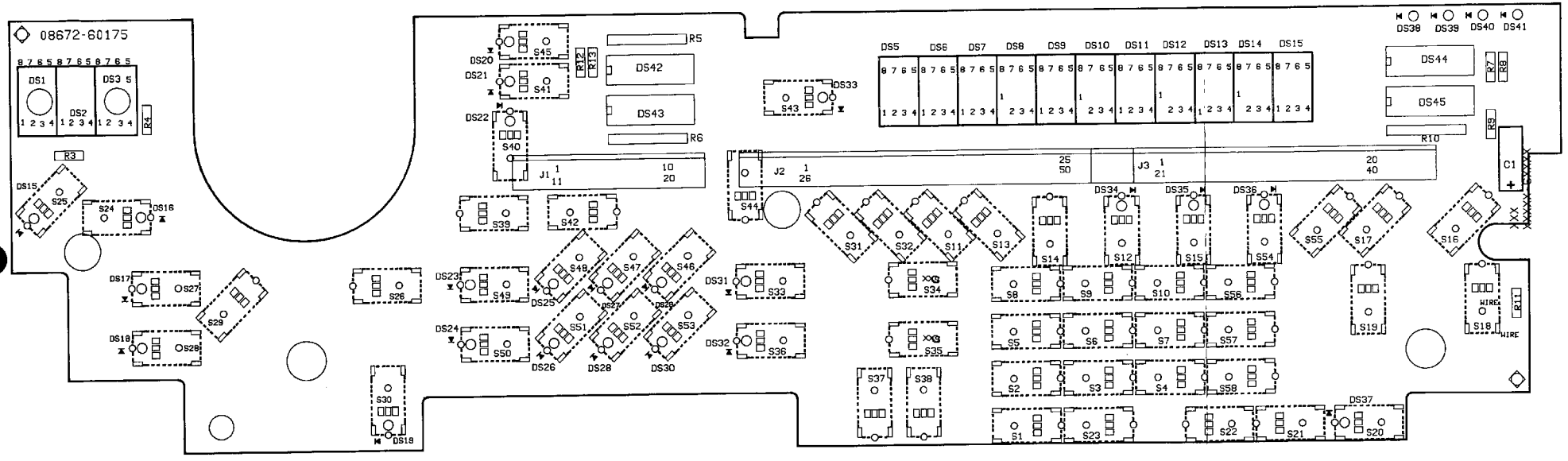
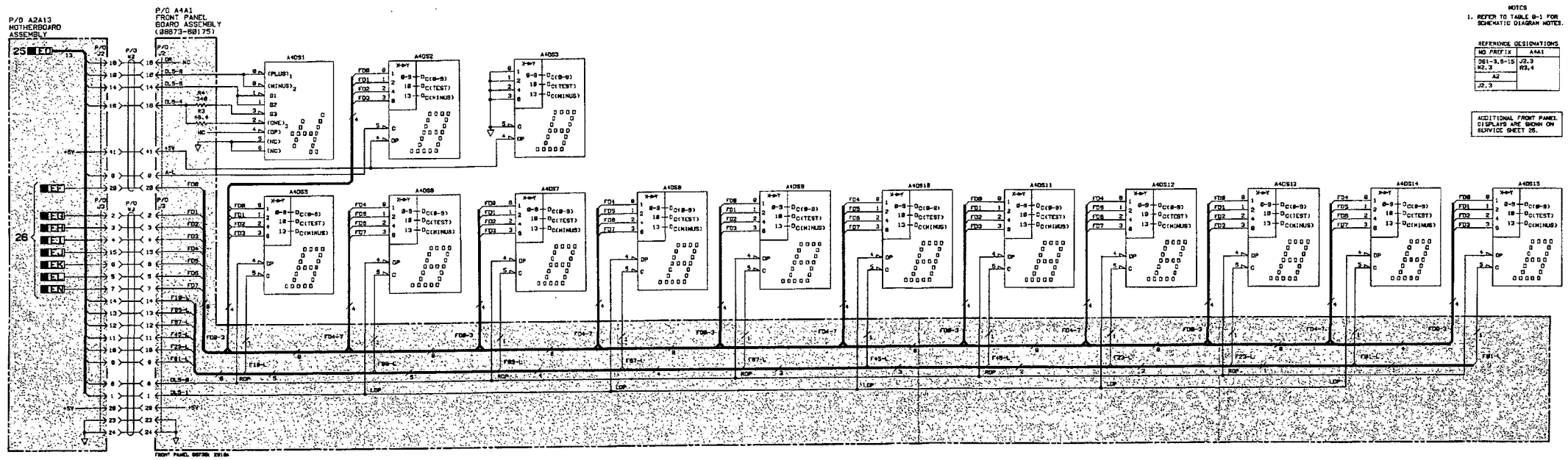


Figure 8-124. A4A1 Front Panel Assembly Component Locations



32
P/O A4A1

Figure 8-125. P/O A4A1 Front Panel Display Schematic Diagram
8-293/8-294

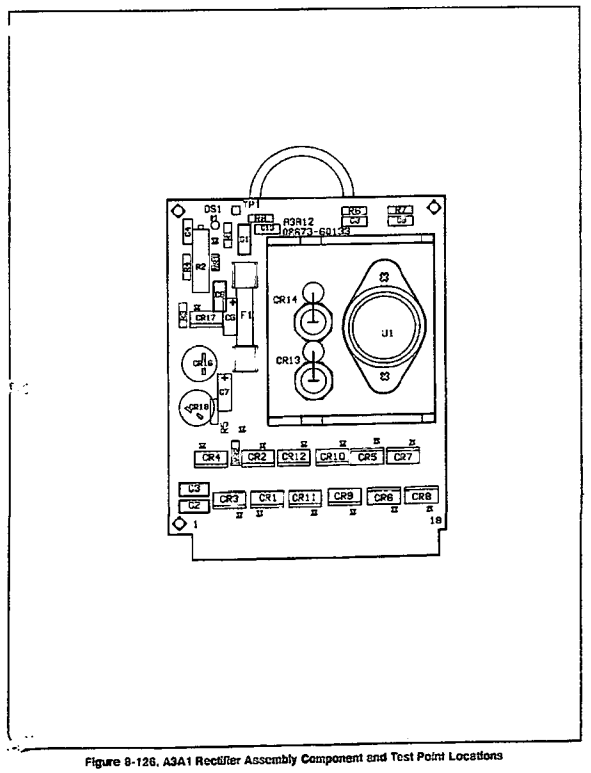


Figure 8-126. A3A1 Rectifier Assembly Component and Test Point Locations

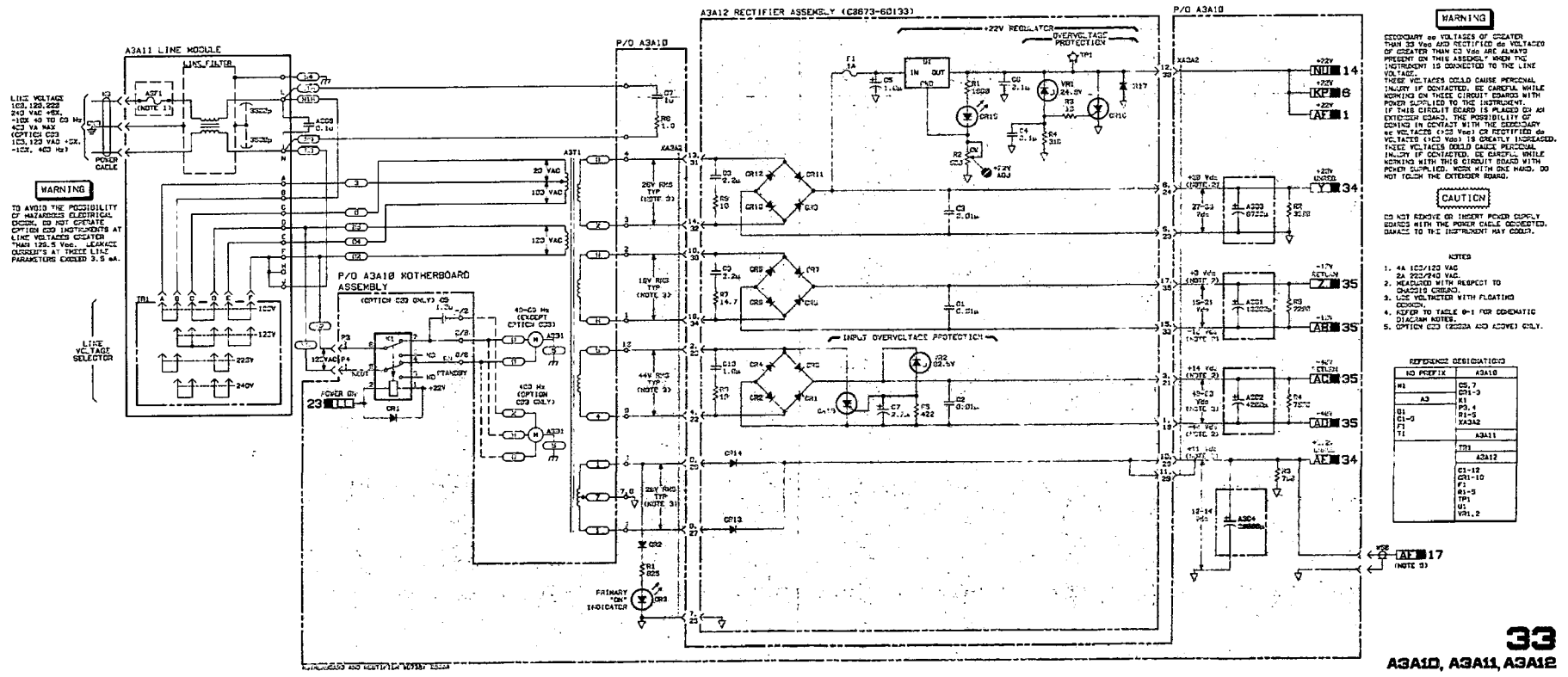


Figure 8-127. Rectifier Assembly Schematic Diagram
8-293/8-298

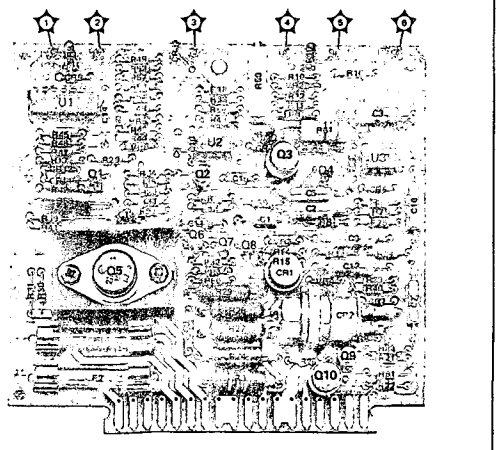
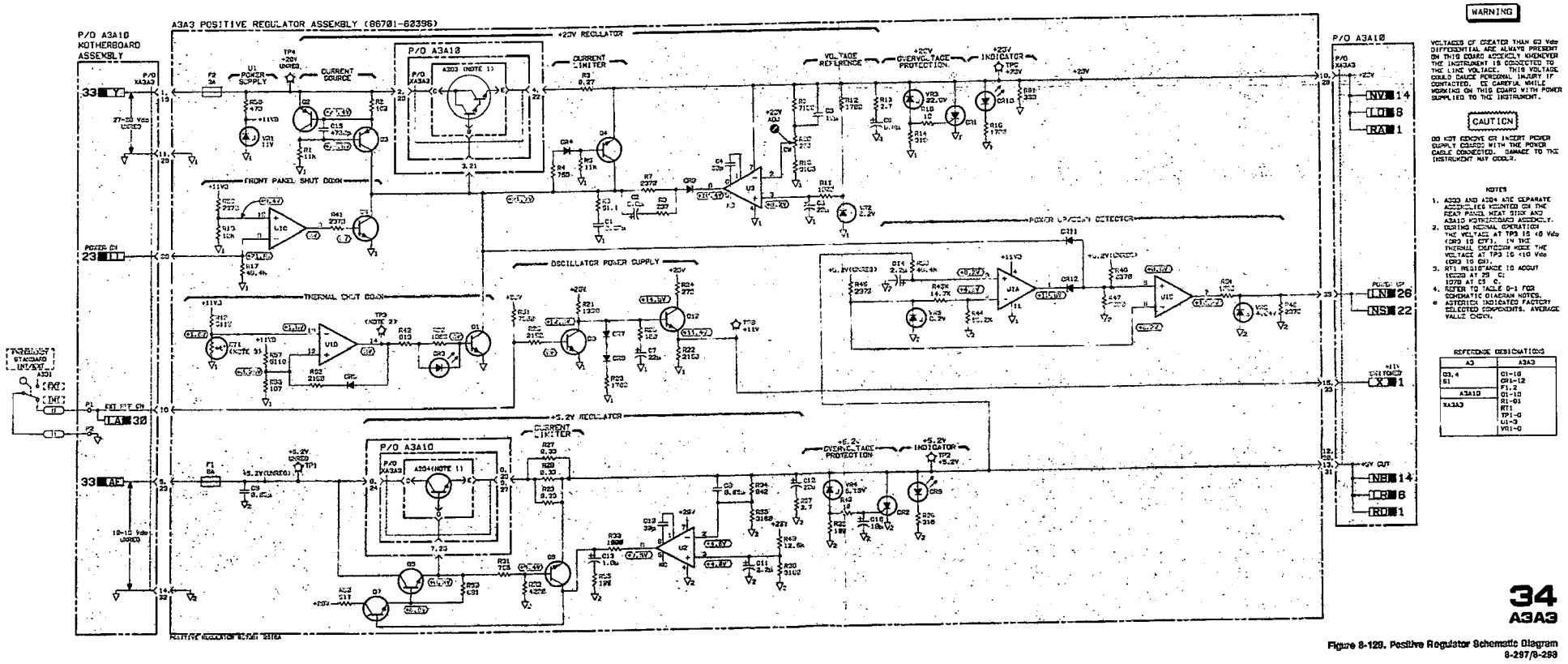


Figure 8-128. A3A3 Positive Regulator Assembly Component and Test Point Locations



WARNING

VOLTAGES OF GREATER THAN 60 Vdc DIFFERENTIAL ARE ALWAYS PRESENT ON THIS BOARD WHENEVER WHENEVER THE INSTRUMENT IS CONNECTED TO THE LINE VOLTAGE. THIS VOLTAGE COULD CAUSE PERSONAL INJURY IF CONTACTED. BE CAREFUL WHILE WORKING ON THIS BOARD WITH POWER SUPPLIED TO THE INSTRUMENT.

CAUTION

DO NOT REMOVE OR INSERT POWER SUPPLY BOARDS WITH THE POWER CABLE CONNECTED. DAMAGE TO THE INSTRUMENT MAY OCCUR.

NOTES

1. A3A3 AND A3A4 ARE SEPARATE ASSEMBLIES MOUNTED ON THE HEAT PIPES, HEAT SINK AND A3A10 MOTHERBOARD ASSEMBLY.
2. EXISTING NORMAL OPERATION THE VOLTAGE AT TP5 IS +0 Vdc (OR3 IS OFF). IN THE INTERNAL OVERZOOM MODE THE VOLTAGE AT TP5 IS +10 Vdc (OR3 IS ON).
3. RT1 RESISTANCE IS ACCURATE TO 0.02Ω AT 25 °C; 0.07Ω AT 65 °C.
4. REFER TO TABLE 8-1 FOR SCHEMATIC DIAGRAM NOTES.
- ASTERICS INDICATED FACTORY SELECTED COMPONENTS. AVERAGE VALUE SHOWN.

REFERENCE DESIGNATIONS

A3	A3A3
Q3,4	Q1=10
R1	Q2=12
	R1=
A3A10	Q1=10
A3A3	Q2=01
	RT1=
	TP1=9
	U1=3
	VR1=9

Figure 8-129. Positive Regulator Schematic Diagram
8-297/8-298

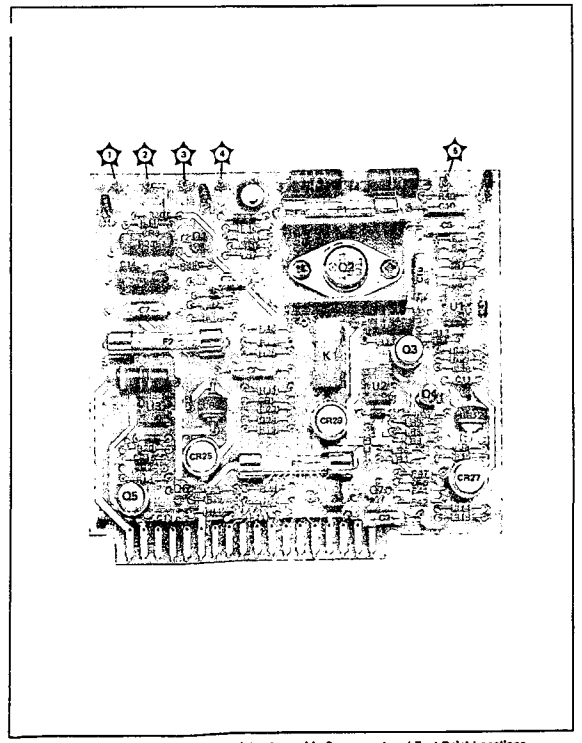
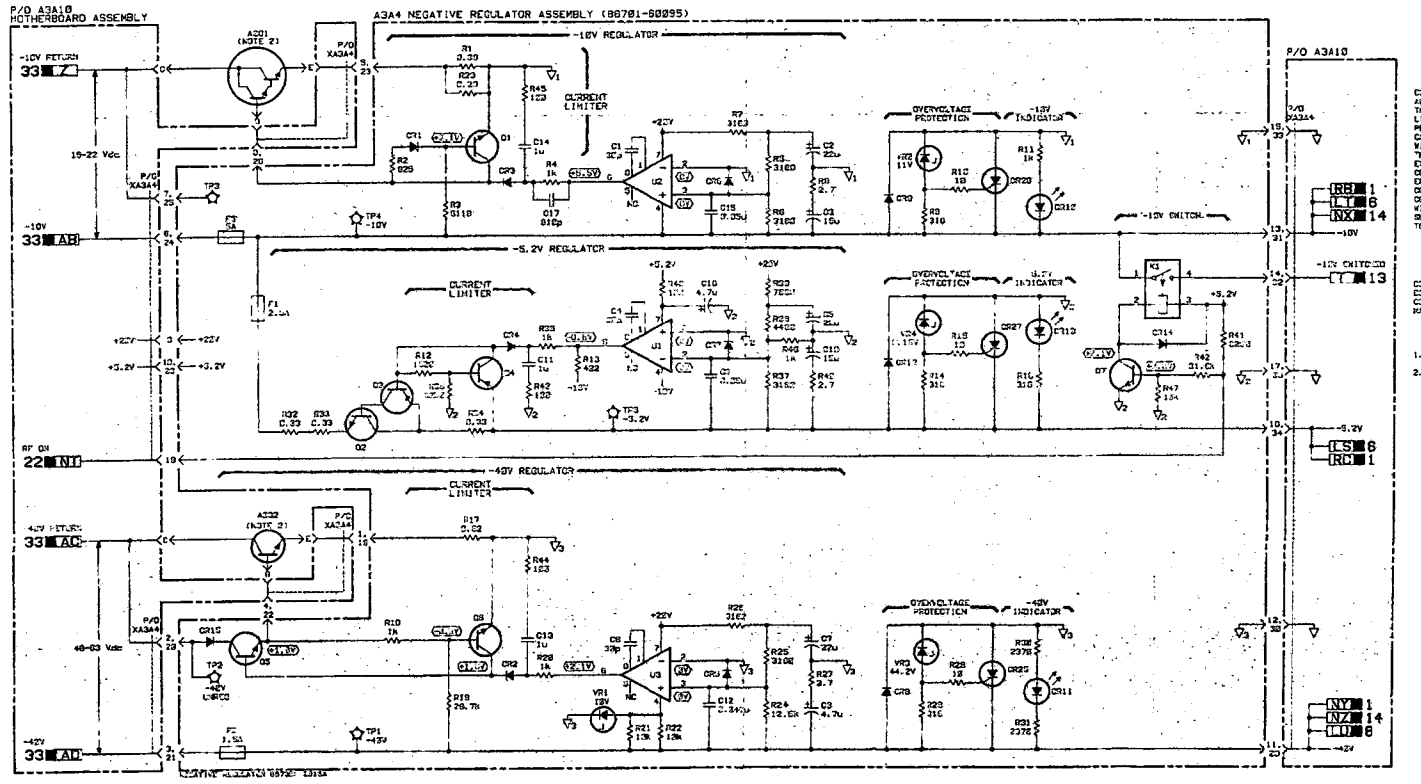


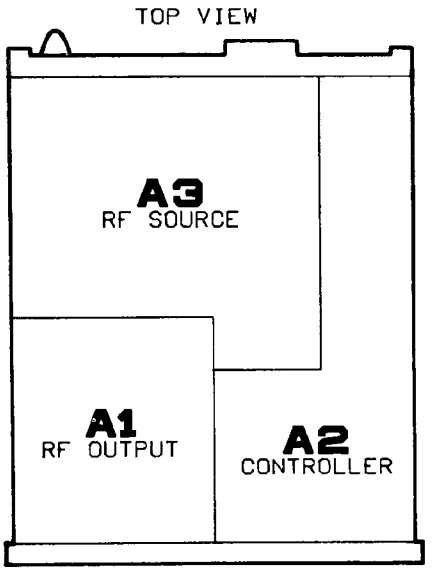
Figure 8-130. A3A4 Negative Regulator Assembly Component and Test Point Locations



Service Sheet

Figure 8-131. Negative Regulator Assembly Schematic Diagram 8-299/8-300

Index To Service Sheets by Assembly



A4 FRONT PANEL
MAJOR ASSEMBLIES

Assembly	Description	Service Sheet
A1A1	Attenuator Driver Board	18
A1A2	Detector/ALC Board	14,17
A1A3	Function Board	20
A1A4	Pulse Driver Board	15
A1A5	DAC and Enable Board	22
A1A6	Meter Board	21
A1A7	YTM Driver Board	16
A1A8	SRD Bias Board	19
A1A9	Not Assigned	
A1A10	Yig-Tuned Multiplier	16
A1A10A1	YIG Heater Control	16
A1A11	Power Amplifier	16
A1A12	RF Output Motherboard	14–16, 18–22, 30,31
A1A13	Not Assigned	
A1A14	26 GHz Amplifier	17
A1A14A1	26 GHz Amp Bias Board	17
A2A1	Panel Driver Board	25
A2A2	Key Code Board	24
A2A3	160–240 MHz VCO	8
A2A4	20/30 MHz Phase Detector	7
A2A5	20/30 MHz Divider	6
A2A6	Not Assigned	
A2A7	I/O Board	30,31
A2A8	Microprocessor Board	26
A2A9	Frequency/HP-IB Board	29
A2A10	Memory/Interface	28
A2A11	Not Assigned	
A2A12	Not Assigned	
A2A13	Controller Motherboard	6–8,10, 20–32
A2A14	Rear Interconnect Board	24,29,31
A2A15	HP-IB Connector Board	29
A3A1	Reference and M/N	
A3A1A1	Reference Phase Detector	1
A3A1A2	100 MHz VCXO	2
A3A1A3	M/N Phase Detector	3
A3A1A4	M/N VCO	4
A3A1A4A1	VCO Resonator	4
A3A1A4A2	VCO Board	4
A3A1A5	M/N Output	5
A3A1A6	M/N Reference Motherboard	1–3,5
A3A1A7	Reference and M/N Housing	
A3A2	Not Assigned	
A3A3	Positive Regulator	34
A3A4	Negative Regulator	35
A3A5	DAC	9
A3A6	YTO Driver	10
A3A7	YTO/FM Coil Driver	13
A3A8	10 MHz Reference Oscillator	1
A3A9	YTO Loop	11,12
A3A9A1	Not Assigned	
A3A9A2	YTO Interconnect	11–13
A3A9A3	2.0–6.6 GHz YTO	13
A3A9A4	YTO Phase Detector	12
A3A9A5	Sampler	11
A3A9A6	Attenuator	13
A3A9A7	6.6 GHz Low Pass Filter	13
A3A9A8	Preamplifier	13
A3A10	RF Source Motherboard	1,3,4, 6,10,12–14,21–23,26, 29–31,33–35
A3A11	Line Module	33
A3A12	Rectifier Assembly	33
A4A1	Front Panel Board	20,22, 23,25,32

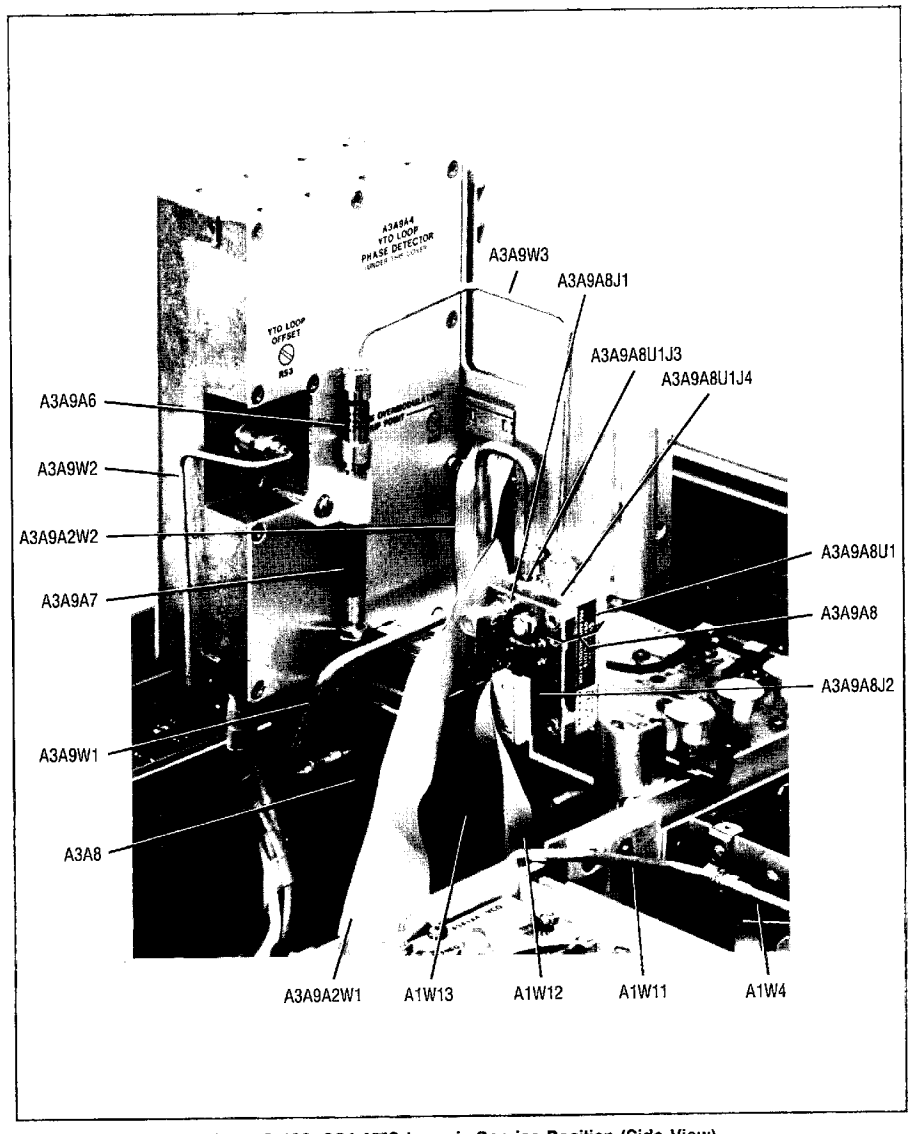


Figure 8-132. SSA YTO Loop in Service Position (Side View)

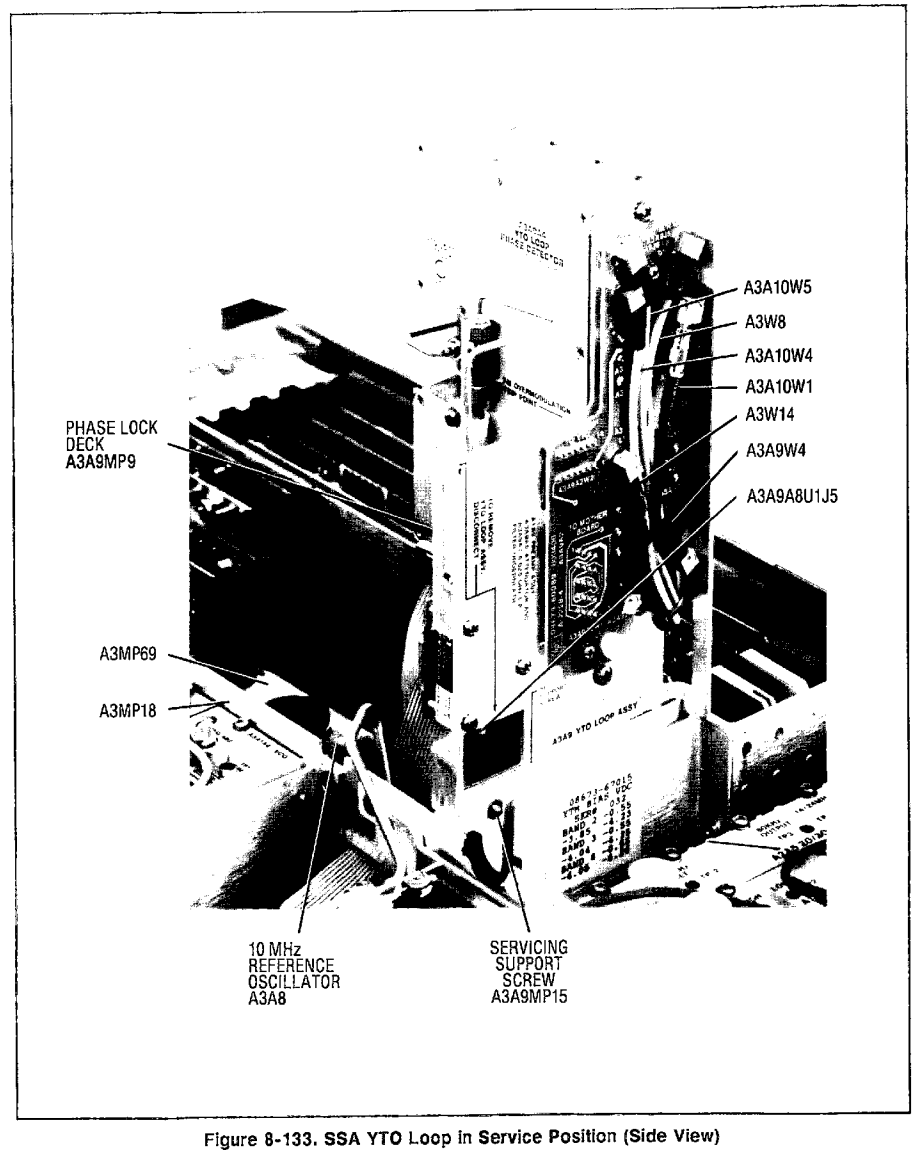


Figure 8-133. SSA YTO Loop in Service Position (Side View)

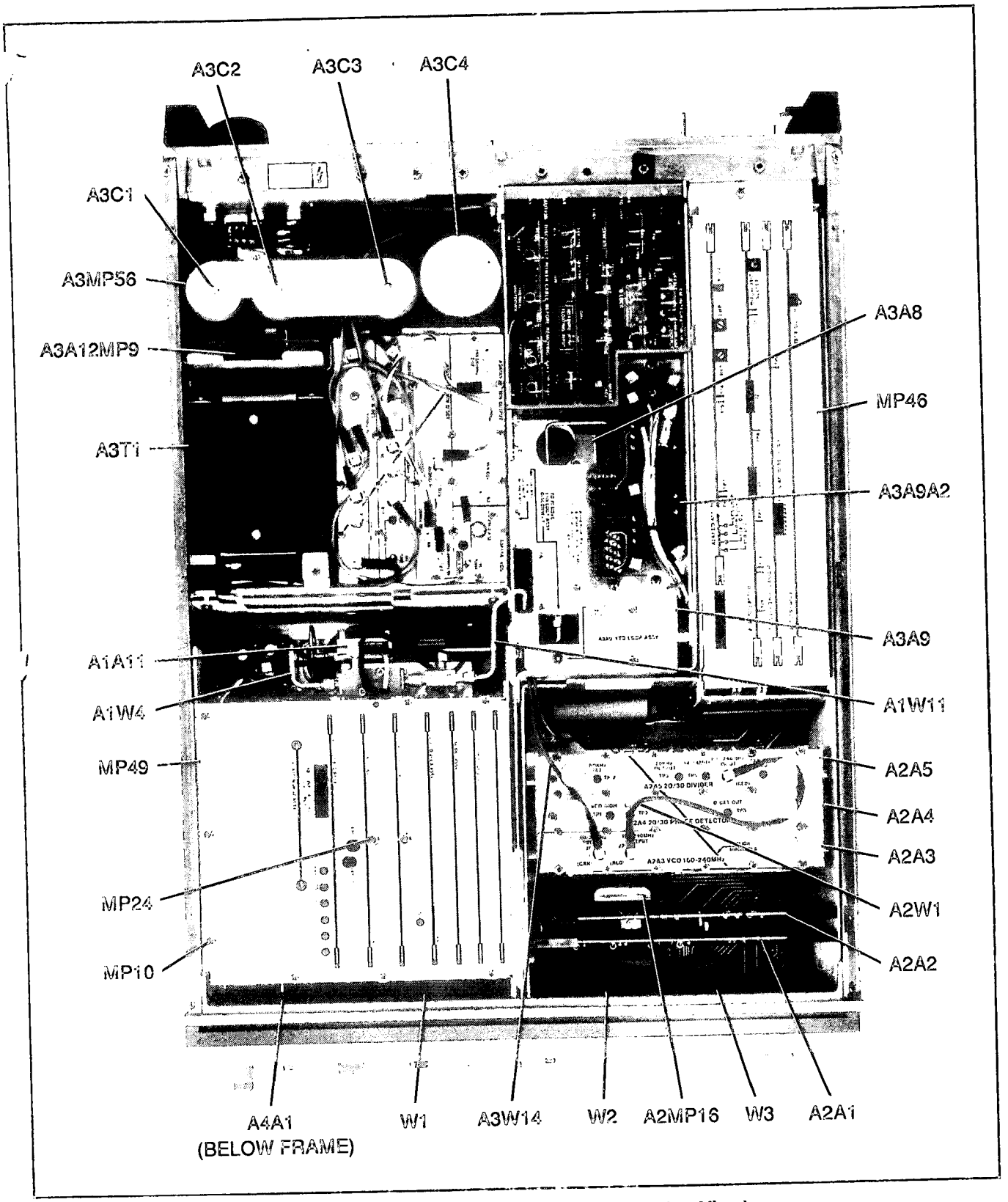


Figure 8-134. SSB Component Location (Top View)

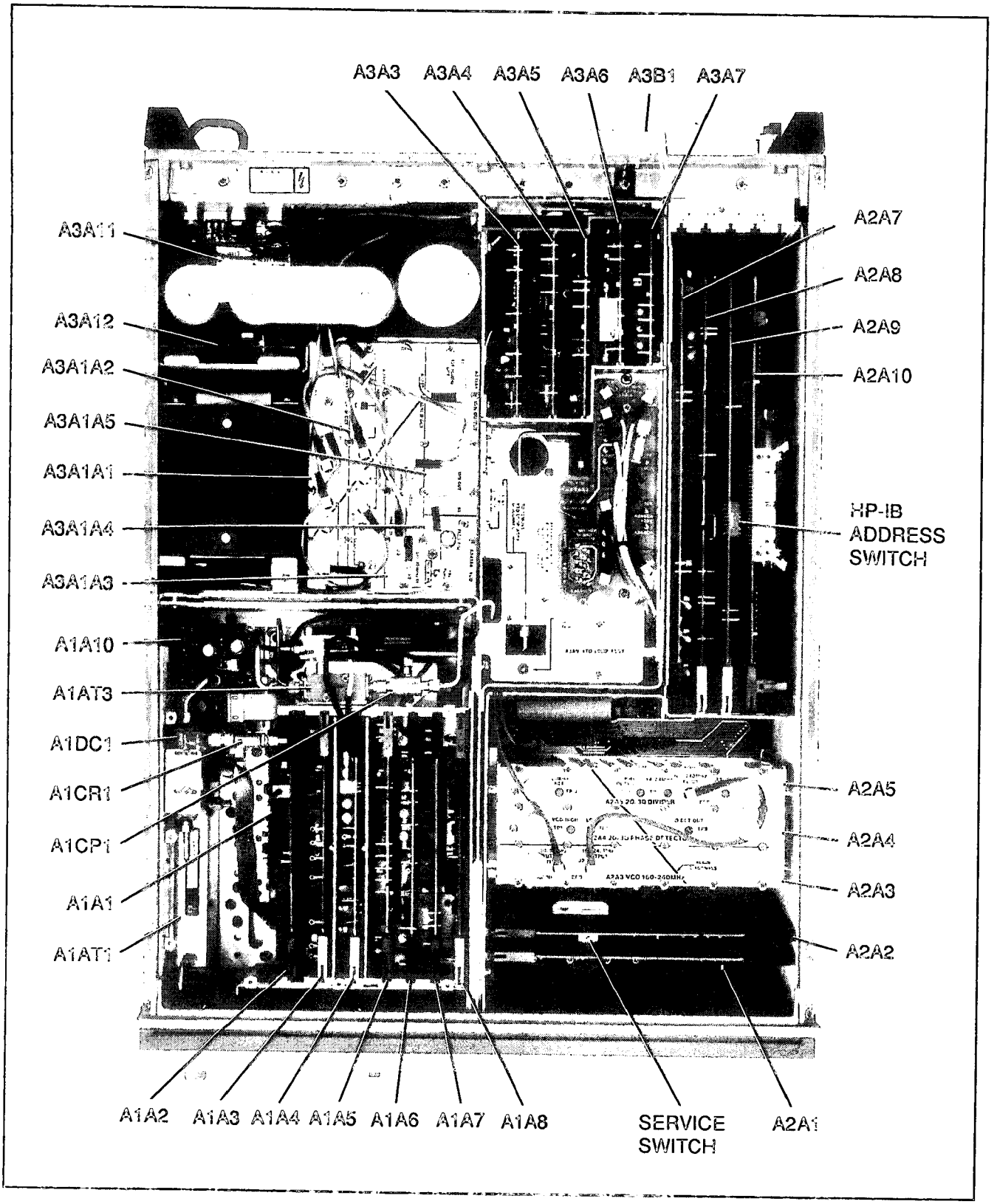


Figure 8-135. SSB Assembly Location, Covers Removed (Top View)

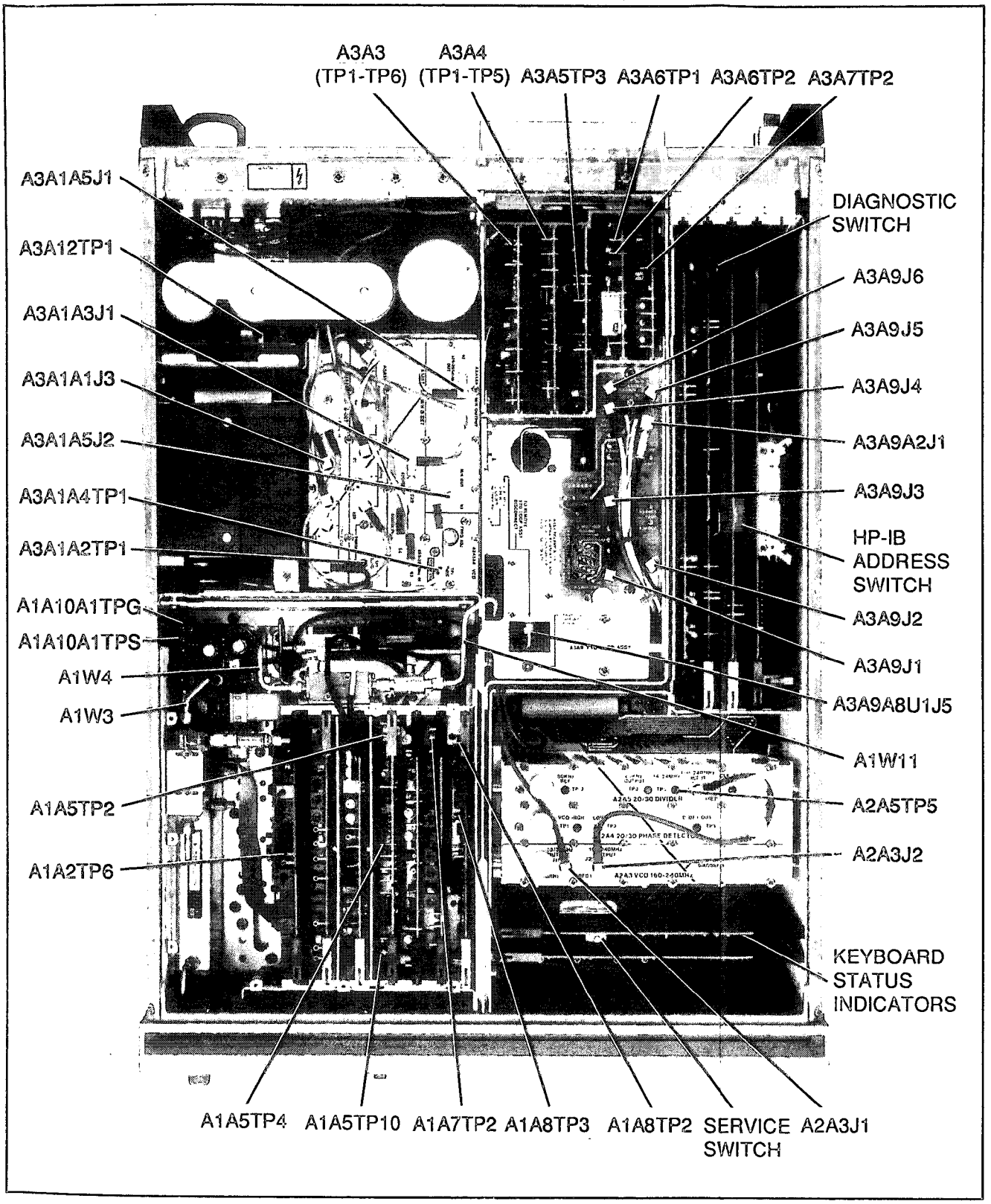


Figure 8-136. SSB Test Point Location (Top View)

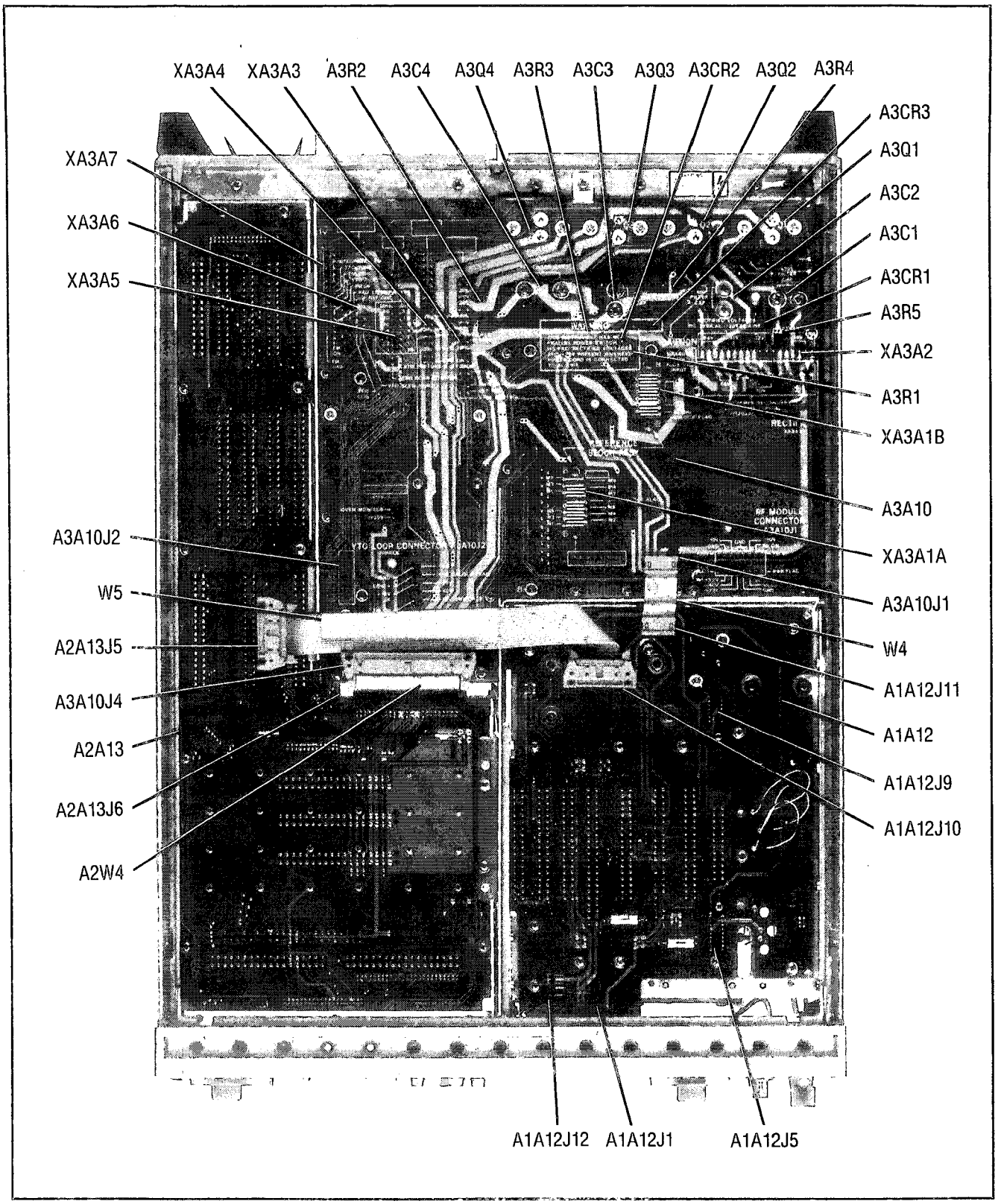


Figure 8-137. SSB Component Location (Bottom View)

HP 8673B
Synthesized Signal Generator
Service Manual

MANUAL IDENTIFICATION

Manual Part Number: 08673-90116
Manual Title: HP 8673B Synthesized Signal Generator Service Manual (For Serial Number Prefixes 2332A Through 2823A)

Manual Part Number: 08673-90134
Manual Title: HP 8673B Synthesized Signal Generator Service Manual (For Serial Number Prefixes 2918A and Above)

INSTRUCTIONS

This update package contains a complete chapter 5 for the manuals identified above. This updated chapter 5 contains instructions for adjusting all configurations of the signal generators that are covered by the manual.

Several adjustments can be performed with computer assistance using the HP-85 computer. However, for every computer assisted procedure there is a corresponding manual procedure for those who do not have the HP-85 computer. (The computer, its required ROM package, its software, and specified test equipment are described in the chapter 5 text.)

To use this update package, simply remove and discard the old chapter 5. Then insert the new chapter 5 in place of the old material.

Please ignore any chapter 5 change instructions in the manual's yellow change sheet. These changes have been incorporated into the new chapter 5.

Chapter 5 Update Package Part No. 08673-90176