Errata

Title & Document Type: HP 8566AB Retrofit Kit

Manual Part Number: 08566-90151

Revision Date: January 1991

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.

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Installation Note

HP 8566AB Retrofit Kit

HP Part No. 08566-90151 Supersedes: None
Printed in USA January 1991

HP 8566AB Retrofit Kit

INSTRUMENTS AFFECTED:	HP 8566A Spectrum Analyzers
SERIAL NUMBERS:	0000A00000/2924A03721
APPLICABLE SERVICE NOTES:	8566A-20C
TO BE PERFORMED BY:	Customer or HP-Qualified Personnel
PARTS REQUIRED:	HP 8566AB Retrofit Kit (See Table 1 for contents)

Situation

An HP 8566A Spectrum Analyzer may be upgraded to the performance of an HP 8566B Spectrum Analyzer by installing the HP 8566AB Retrofit Kit. Enhancements of the HP 8566B over the HP 8566A include faster remote operation, numerous additional HP-IB functions, and downloadable program and HP-IB controller capabilities.

Note

The HP 8566A-to-8566B conversion should be performed only on fully functioning HP 8566A Spectrum Analyzers. Allow 4 to 6 hours to install a retrofit kit and test the modified instrument with the HP 8566B Operation Verification software. Required test equipment needed to run the operation verification test is listed in the *HP 8566B Installation and Verification Manual* contained in this kit.

Proper conversion of an HP 8566A Spectrum Analyzer to an HP 8566B should in no way impact its ability to meet published specifications. Customers whose applications require optimum swept frequency response (that is, swept measurements without repeated use of preselector peaking) are advised to perform "Frequency Response Adjustments" from the *HP 8566B Performance Tests and Adjustments Manual*. This adjustment procedure, which optimizes YTX tracking, requires extensive equipment and takes a trained technician approximately 6 to 10 hours to perform.

The contents of the HP 8566AB Retrofit Kit are warranted against defects in material and workmanship for a period of 1 year from date of shipment.

HP 85662A IF-Display Sections with serial number 2237A04427 or below may not have the rear-panel BNC connectors necessary for use with the HP 85650A Quasi-Peak Adapter. If HP 85650A compatibility is desired for HP 8566A Spectrum Analyzers without these rear-panel connectors, the Quasi-Peak Adapter Kit, HP part number 85650-60050, can be installed. Refer to Service Notes 8566A-15 and 8568A-40.

HP 85660A RF Sections with serial prefix 1950A or below may not have external mixing capability (321.4 MHz IF jumper on front panel). If external mixing capability is desired for HP 8566A Spectrum Analyzers that have not yet been modified, the External Mixer

Modification Kit, HP part number 85660-60143, can be installed (except on RF Sections with serial prefix 1827A and below). Refer to Service Note 8566A-06.

Solution/Action

The HP 8566AB Retrofit Kit has all the necessary parts and documentation needed to upgrade the performance of the HP 8566A to the HP 8566B Spectrum Analyzer. Refer to Table 1 for the contents of the kit.

Table 1. HP 8566AB Retrofit Kit

Qty	Description	HP Part Number	CD
1	*HP 8566B Operating and Programming Manual*	08566-90040	9
1	Controller Cover	85660-00074	0
1	A15 Controller Assembly	85660-60245	3
1	Rear Support Assembly	85660-60225	9
	includes		
	Cable Assembly, 50-wire bus	5062-1920	2
	Cable Assembly, HP-IB	5061-5481	6
	Support PC Brd Rear	85660-20207	3
1	A5A1 Keyboard Assembly	85660-60210	2
1	A12 Front-Panel Interface Assembly	85660-60246	4
1	Label, HP 8566B	85660-80060	2
1	Installation Note	08566-90151	6
1	Disk Tray, 3.5″ × 4″	1540-0986	9
1	*HP 8566B Installation and Verification Manual*	08566-90169	7
1	*HP 8566B Performance Tests and Adjustments Manual*	08566-90168	5
1	3-1/2″ Operation Verification Software Disk	08566-10032	0
1	14.7 V Zener Diode	1902-3203	6
1	10 kΩ Resistor	0757-0442	9
1	56.2 kΩ Resistor	0757-0459	2
2	Gold Pins	1251-5177	6
1	0.01 μF Capacitor	0160-4832	4
2	0.33 μF Capacitor	0180-4225	1
3	0.22 μF Capacitor	0180-3627	5
1	0.15 μF Capacitor	0180-4278	4
1	0.10 μF Capacitor	0180-3622	0
1	*HP 8566B Quick Reference Guide*	5955-8970	9

Note

Component-level troubleshooting and repair information for the assemblies contained this kit is covered in the *HP 85660B RF Section Troubleshooting and Repair Manual*, HP part number 85660-90210.

Installation Procedure

Caution Electrostatic discharge (ESD) can damage or destroy electronic components. For further information regarding ESD precautions, see the paragraph on ESD in the Service Manual for your instrument.

1. Remove power cords and interconnect cables from the rear of the HP 8566A Spectrum Analyzer.
2. Loosen lock feet and separate top and bottom boxes. Set the HP 85662A IF-Display Section aside.
3. Remove the four rear feet from the HP 85660A RF Section.
4. Remove the top cover by loosening the rear center Pozidriv screw.
5. Place the RF Section topside down and remove the bottom cover by loosening the rear center Pozidriv screw.
6. Locate the controller cover (Ⓖ, Figure 1). Remove the Pozidriv screw (Ⓔ, Figure 1) and save for later use. Remove and discard the controller cover.
7. Remove A14 Memory Assembly (brown/yellow extractors) and A15 Processor Assembly (brown/green extractors).
8. On A16 Scan Generator Assembly, disconnect the red coax cable from A16J2 and route away from controller area.
9. Lift A16 Scan Generator Assembly (brown/blue extractors) and disconnect orange, yellow, and brown coax cables from A16J3, A16J4, and A16J1, respectively. Remove A16 Scan Generator and save for later use.

Note If applicable, ensure that the HP-IB adapter has been removed from the rear-panel HP-IB connector before proceeding.

10. Remove A13 HP-IB Assembly (brown/orange extractors).
11. Remove A12 Front-Panel Interface Assembly (brown/red extractors). Note that parts from this A12 Front-Panel Interface will be removed for later use.
12. Remove two screws (Ⓑ and Ⓒ, Figure 1) and flat spring (Ⓐ, Figure 1), and save for later use.
13. Place RF Section on its right side.
14. Remove two screws (Ⓒ and Ⓓ, Figure 2) and save for later use.
15. Carefully remove the fan assembly from the RF Section, leaving wires connected.
16. Remove two screws (Ⓐ and Ⓑ, Figure 2) and save for later use.
17. Remove two screws (Ⓓ and Ⓕ, Figure 1) and save for later use.
18. Remove two screws (Ⓐ and Ⓑ, Figure 3) and save for later use. This might require an offset screwdriver.
19. Remove the rear circuit board support casting (Ⓒ, Figure 3).

20. Slide the new rear support assembly (HP part number 85660-60225) into the rear-panel frame. (The rear support assembly includes connectors and ribbon cables.) Be sure that the assembly is properly oriented.
21. Replace six screws (Ⓐ and Ⓒ, Figure 2; Ⓓ and Ⓕ, Figure 1; Ⓐ and Ⓑ, Figure 3).
22. Replace the fan assembly. Replace screw and flat spring (Ⓑ and Ⓐ, Figure 1) and three remaining screws (Ⓒ, Figure 1; Ⓑ and Ⓓ, Figure 2).
23. On the RF Section front panel, remove the 1ST LO OUTPUT termination.
24. On RF Sections with serial-number prefixes 2007A and above, remove IF front-panel coaxial jumper (A6W22).
25. Remove three screws from the top of the front frame (Ⓖ, Ⓕ, and Ⓔ, Figure 2).
26. Remove three screws from the bottom of the front frame (Ⓙ, Ⓘ, and Ⓗ, Figure 1).
27. Slide the front-panel assembly from the front frame.
28. Disconnect the 50-pin ribbon cable (A23W7) and 16-pin ribbon cable (A23W5).
29. On the back of A5A1 Keyboard Assembly, remove the 11 push-on connectors.
30. Remove the 14 screws fastening A5A1 Keyboard Assembly to the RF Section front bezel. Carefully remove A5A1 Keyboard.
31. Install the new A5A1 Keyboard Assembly included in kit (HP part number 85660-60210).
32. Replace the 14 screws fastening A5A1 Keyboard to the RF Section front bezel.
33. Reconnect 11 wires to A5A1 Keyboard as listed in Table 2.

Table 2. A5A1 Keyboard Assembly Wiring (HP Part Number 85660-60210)

Wire Color	Connector
White/Red (92)	5 V
Black (0)	GND
White/Black/Red (902)	RPG1
White/Black/Brown (901)	RPG2
White/Orange (93)	CHECK LED 2
White/Blue (96)	
White/Yellow (94)	CHECK LED 1
White/Green (95)	
Black (0)	GND
White/Black/Yellow (904)	STBY LED
White/Black/Orange (903)	PWR CNTRL

34. Remove four screws from A10A9 Battery Pack Assembly (Figure 4).
35. Disconnect the two battery leads and properly dispose of battery pack.
36. Reconnect 50-wire ribbon cable (A23W7) and 16-wire ribbon cable (A23W5) to A5A1 Keyboard.
37. Reinsert the front-panel assembly into the RF Section front frame and fasten front panel with six screws (Ⓙ, Ⓘ, and Ⓗ, Figure 1; Ⓖ, Ⓕ, and Ⓔ, Figure 2).

38. Replace front-panel 1ST LO OUTPUT termination. Replace IF coaxial jumper (A6W22) as appropriate.

39. Place the RF Section topside down.

40. Remove A12U8 (attenuator calibration ROM) from the original A12 and install on the new A12 Front-Panel Interface Assembly included in this kit (HP part number 85660-60246).

41. Insert the new A12 Front-Panel Interface into circuit board position designated by the red circuit board guide.

42. Locate HP-IB address switches A15SW1 on new A15 Controller Assembly (HP part number 85660-60245). The six switches, A1 through A6, should all be open (toggled down towards the white dot) to select a logic "1". These switches are "read" by main microprocessor A15U26 at power-up. Change the setting of switches A2 through A6 only if a fixed HP-IB address at power-up is desired (see below).

    Switch A1 must be open (logic "1") for standard A15 Controllers to function properly. If A1 is closed, the HP 8566B will not complete its power-on pretest. Five switches, A2 through A6, determine the HP 8566B HP-IB address at power-up. Switch A2 is HP-IB address LSB and A6 is HP-IB address MSB. With all five switches open (factory setting), special HP-IB address 31 (1 + 2 + 4 + 8 + 16 = 31) is selected. A15 Controller checks nonvolatile memory (CMOS RAM) for the previous HP-IB address setting, and selects default address 18 if none is found.

43. Connect 50-wire bus ribbon cable and HP-IB 16-wire ribbon cable to A15 Controller, routing ribbon cables carefully under the circuit board (see Figure 5).

Caution

When inserting the A15 Controller Assembly, care should be taken to avoid permanently damaging or pinching the ribbon cables.

44. Carefully insert A15 Controller into the circuit board position designated by the green circuit board guide.

45. Reconnect cables to A16 Scan Generator as listed in Table 3.

Table 3. A16 Scan Generator Assembly Connections

Wire Color	Connector
Brown (1)	A16J1
Yellow (4)	A16J4
Orange (3)	A16J3

46. Reinsert A16 Scan Generator into the RF motherboard circuit board position designated by the blue circuit board guide. Reconnect red coax cable to A16J2.

47. Locate A17 Positive Regulator Assembly and remove from RF Section.

48. On A17 Positive Regulator, locate and remove A17VR7 and A17R47 (Figure 6).

49. Replace A17VR7 with 14.7 V zener diode included in kit (HP part number 1902-3203).

50. Solder gold pins included in kit (HP part number 1251-5177) in A17R47 eyelets.

51. Solder A17R47 included in kit (HP part number 0757-0442) and A17C16 included in kit (HP part number 0160-4832) to gold pins at A17R47 eyelets (Figure 6).
52. Reinsert A17 Positive Regulator into RF Section.
53. Locate and remove A6 RF Module Cover from RF Section.
54. Locate A16A12 YTX Driver Assembly and remove from A6 RF Module.
55. Locate A6A12C1, C2, C3, C11, and C23, and remove from A6A12 YTX Driver (Figure 7).
56. Replace A6A12C1 with 0.33 μF capacitor included in kit (HP part number 0180-4225).
57. Replace A6A12C11 with 0.22 μF capacitor included in kit (HP part number 0180-3627).
58. Adjust A6A12R24 D3 and A6A12R25 D2 45° from full counterclockwise.

Note Adjustment of A6A12R26 D1 has no effect on HP 8566B Spectrum Analyzers.

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59. Reinsert A6A12 YTX Driver into RF Section.
60. Locate A6A9 Phase Lock Assembly in A6 RF Module. If A6A9 Phase Lock has HP part number 85660-60098, proceed to step 68.
61. Disconnect all cables from A6A9 Phase Lock and remove from RF Section.
62. Remove top cover from A6A9 Phase Lock (save screws with cover).
63. Remove bottom cover from A6A9 Phase Lock (save screws with cover).
64. Locate and remove A6A9A1R27 from A6A9 Phase Lock (Figure 8).
65. Replace A6A9A1R27 with 56.2K resistor included in kit (HP part number 0757-0459).
66. Replace A6A9 Phase Lock top and bottom covers.
67. Reinsert A6A9 Phase Lock into RF Section and reconnect all cables.
68. Replace A6 RF Module Cover in RF Section.
69. Locate A19 Digital-Analog Converter (DAC) Assembly and remove from RF Section.
70. If A19 DAC does not have HP part number 85660-60212, proceed to step 72.
71. Locate positions for A19C25 and A19C26 in A19 DAC. If capacitors are installed, remove A19C25 and A19C26 from A19 DAC (Figure 9).
72. Reinsert A19 DAC into RF Section.
73. Replace RF Section top cover.
74. Carefully place front-panel label included in kit (HP part number 85660-80060) over the existing HP model number to change "8566A" to "8566B."
75. Replace two top rear feet on RF Section.
76. Position IF-Display Section on RF Section, and tighten lock feet. Place the HP 8566B on its left side.
77. Reconnect interconnect cables and power cords.

78. Connect a jumper wire between A15 Controller test points A15TP1-8 T3 and A15TP1-9 ST (to erase and initialize A15 Controller nonvolatile memory).

79. Set LINE switch to ON. A15 Controller LEDs A15DS1 through A15DS14 should all turn on, then turn off, sequentially, indicating that A15 Controller has successfully executed self-test (if they do not, A15 Controller might be damaged or improperly installed). In addition, all front-panel LEDs should turn on momentarily, indicating that the HP 8566B has performed its power-on pretest (POP).

    In addition to normal HP 8566B power-up HP-IB address and firmware revision information, a `BATTERY` flag should appear on the CRT, indicating that information previously stored in A15 Controller nonvolatile memory has been lost or erased. Normally, the `BATTERY` flag appears after several years of use to indicate that lithium battery A15BT1 requires replacement.

80. Remove jumper wire between A15TP1-8 T3 and A15TP1-9 ST.

81. Set LINE switch to STANDBY and then ON. The HP 8566B should power up normally, without any flags displayed on CRT.

82. Set LINE switch to STANDBY and remove power cord from rear of RF Section.

83. Install new controller cover included in kit (HP part number 85660-00074). Use Pozidriv screw saved in step 6.

84. Replace RF Section bottom cover and two remaining rear feet.

85. Place HP 8566B upright and reconnect power cord to RF Section.

86. Set LINE switch to ON and allow a 2-hour warm-up.

87. Connect RF OUTPUT of synthesized sweeper to RF INPUT of spectrum analyzer.

88. Key in the following settings on the spectrum analyzer:

    (INSTR PRESET)
    (START FREQ) ..... 12.5 GHz
    (STOP FREQ) ..... 18.6 GHz
    (SWEEP TIME) ..... 1 second

89. Set the synthesized sweeper to a clockwise signal of 13.100 GHz at −10 dBm.

90. On the spectrum analyzer, press (PEAK SEARCH), (SHIFT), (GHz/+dBm/dB).

91. On the spectrum analyzer, press (PRESEL PEAK). Wait for the `PEAKING!` message to disappear. Record the preselector DAC value in Table 4 in the "1-Second Sweep" column.

Table 4. Preselector Delay Compensation DAC Values

Trial #	Preselector DAC Value	
	1-Second Sweep	Auto Sweep
1		
2		
3		
4		
5		
Average value		

92. Repeat step 91 to complete entries in the first column of Table 4 (trials 1—5).
93. On the spectrum analyzer, press SWEEP TIME (AUTO) (PEAK SEARCH). Repeat step 92 to complete entries (trials 1—5) in the "Auto Sweep" column of Table 4.
94. Calculate average Preselector DAC value of the "1-Second Sweep" entries and record as Average Value in Table 4.
95. Calculate average Preselector DAC value of the "Auto Sweep" entries and record as Average Value in Table 4.
96. Subtract the average "1-Second Sweep" from average "Auto Sweep." Refer to Table 5 to determine final capacitor values to install for A6A12C1, C2, C11, and C23.
97. Perform HP 8566B Operation Verification, using software and documentation included in this kit.
98. As required, perform HP 8566B Frequency Response Adjustments for optimum swept frequency response (refer to the *HP 8566B Performance Tests and Adjustments Manual*).

Table 5. A6A12 YTX Driver Assembly Capacitor Values

Preselector DAC Values	Capacitor Values (μF)*			
Avg Auto Sweep – Avg 1-Second Sweep	A6A12C2	A6A12C23	A6A12C1	A6A12C11
−8	0.22	0.33	0.33	0.22
−7	0.22	0.22	0.33	0.22
−6	0.22	0.22	0.33	0.22
−5	—	0.33	0.33	0.22
−4	—	0.33	0.33	0.22
−3	—	0.22	0.33	0.22
−2	—	0.15	0.33	0.22
−1	—	0.10	0.33	0.22
0	—	—	0.33	0.22
1	—	—	0.33	0.22
2	—	—	0.33	0.22
3	—	—	0.33	0.10
4	—	—	0.15	0.22
5	—	—	0.33	—
6	—	—	—	0.22
7	—	—	—	0.22
8	—	—	—	0.15

*The dash (—) signifies that no capacitor is used.

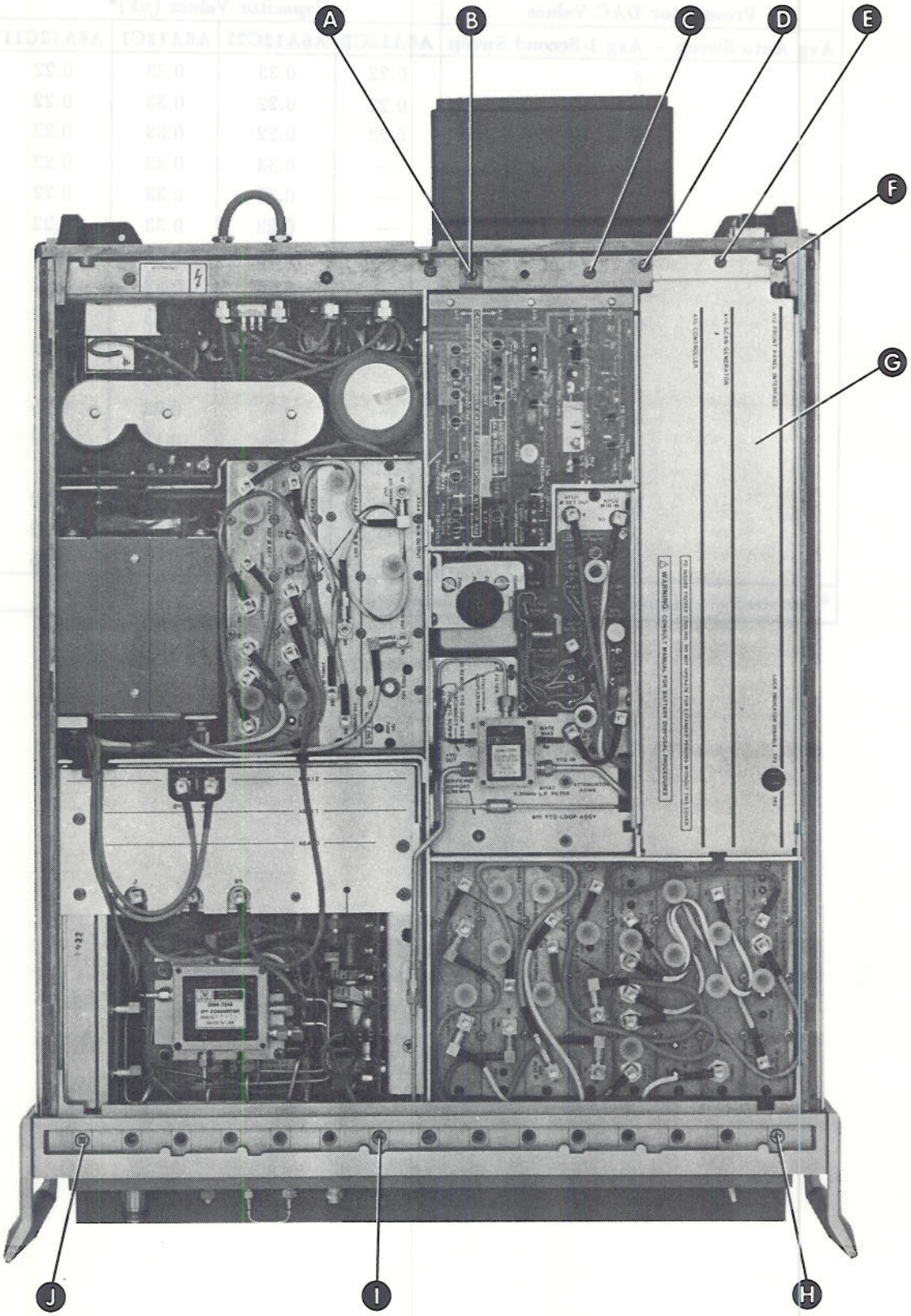

Figure 1. RF Section, Bottom View

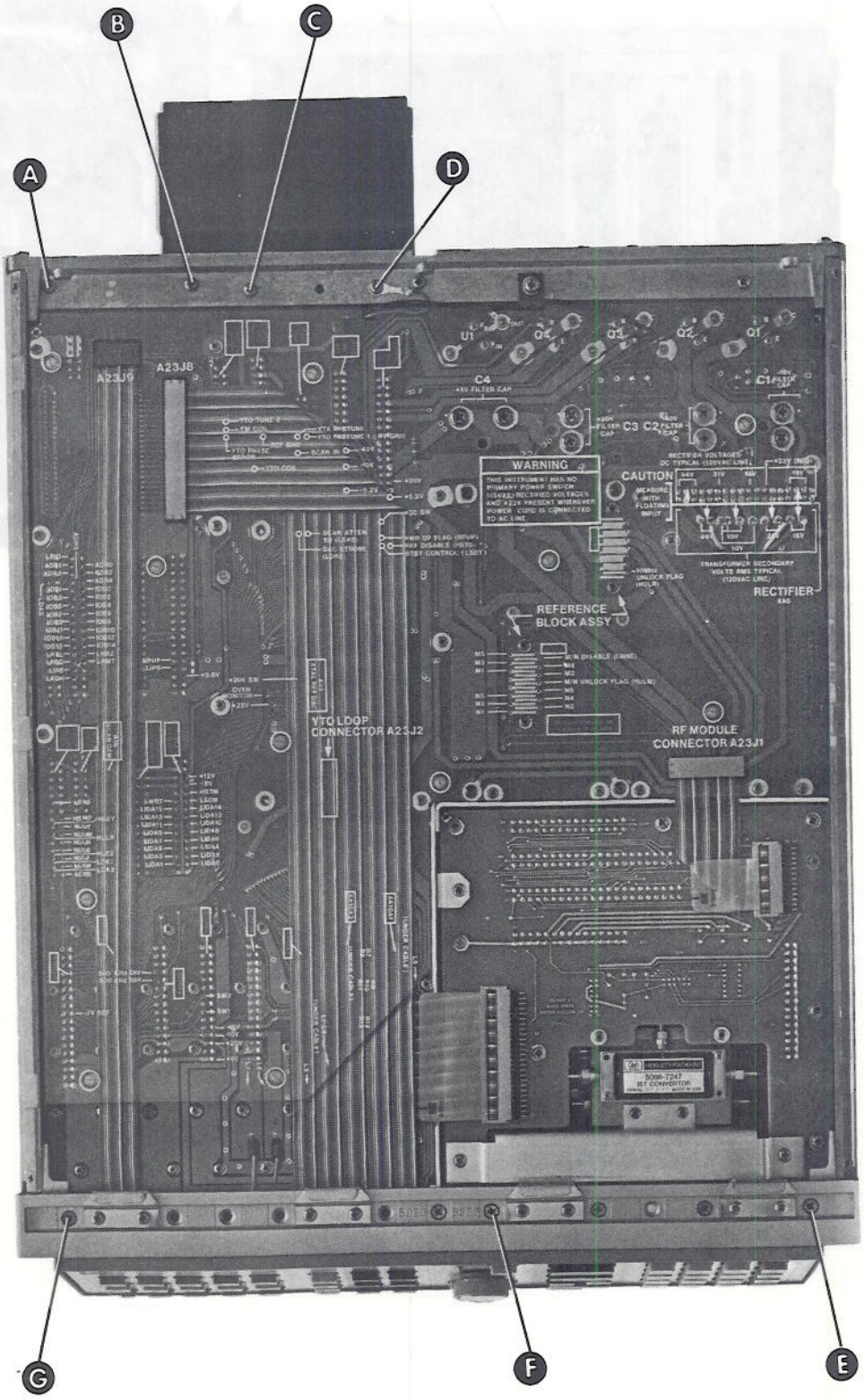

Figure 2. RF Section, Top View

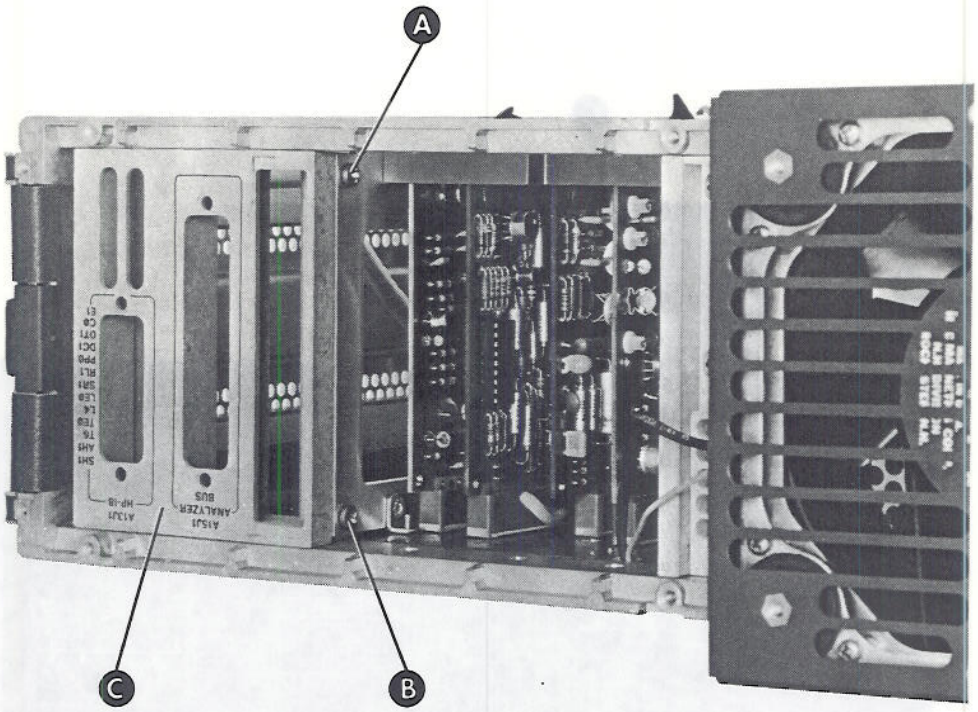

Figure 3. RF Section Rear Panel with Fan Removed

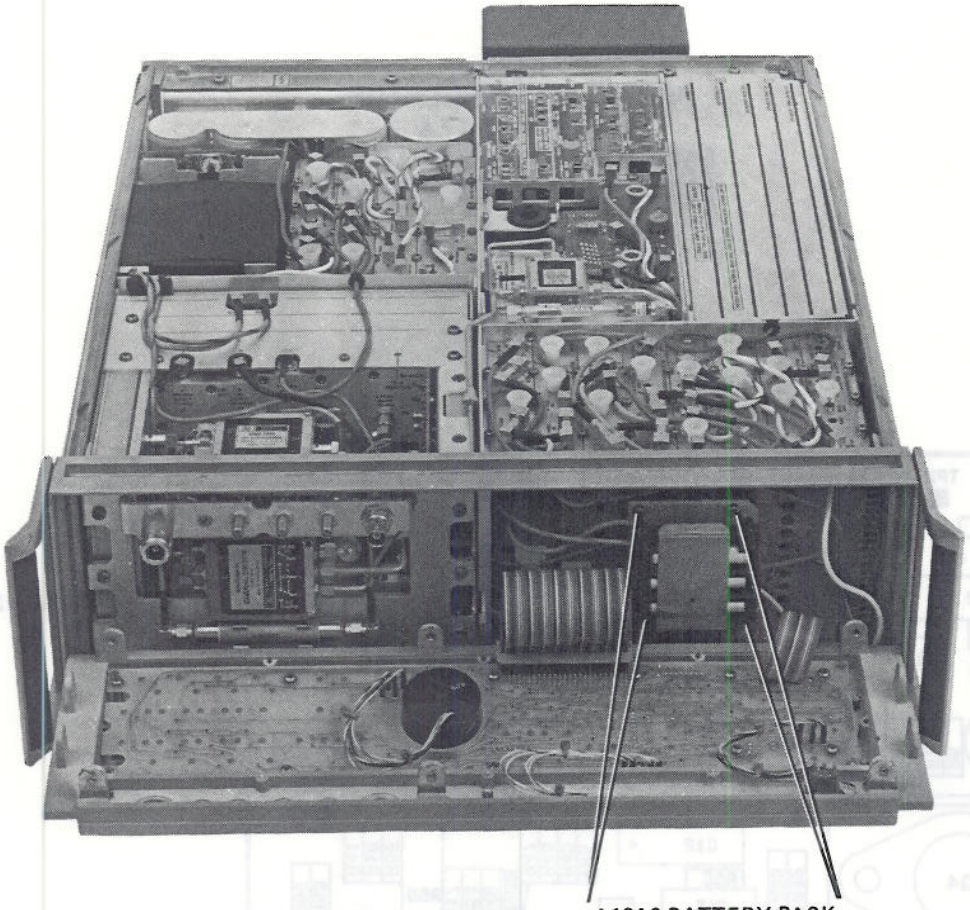

Figure 4. RF Section with Front Panel Tilted Down

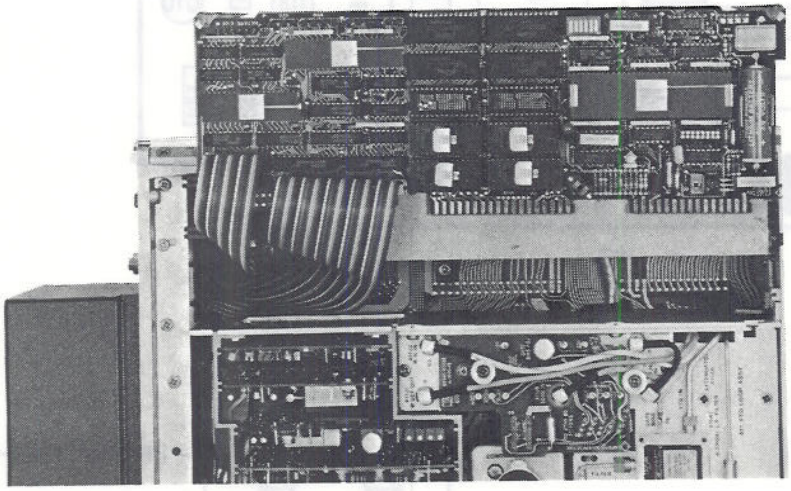

Figure 5. RF Section Cable Routings for A15 Controller Assembly (50-Wire Bus and HP-IB Wire Ribbon Cable)

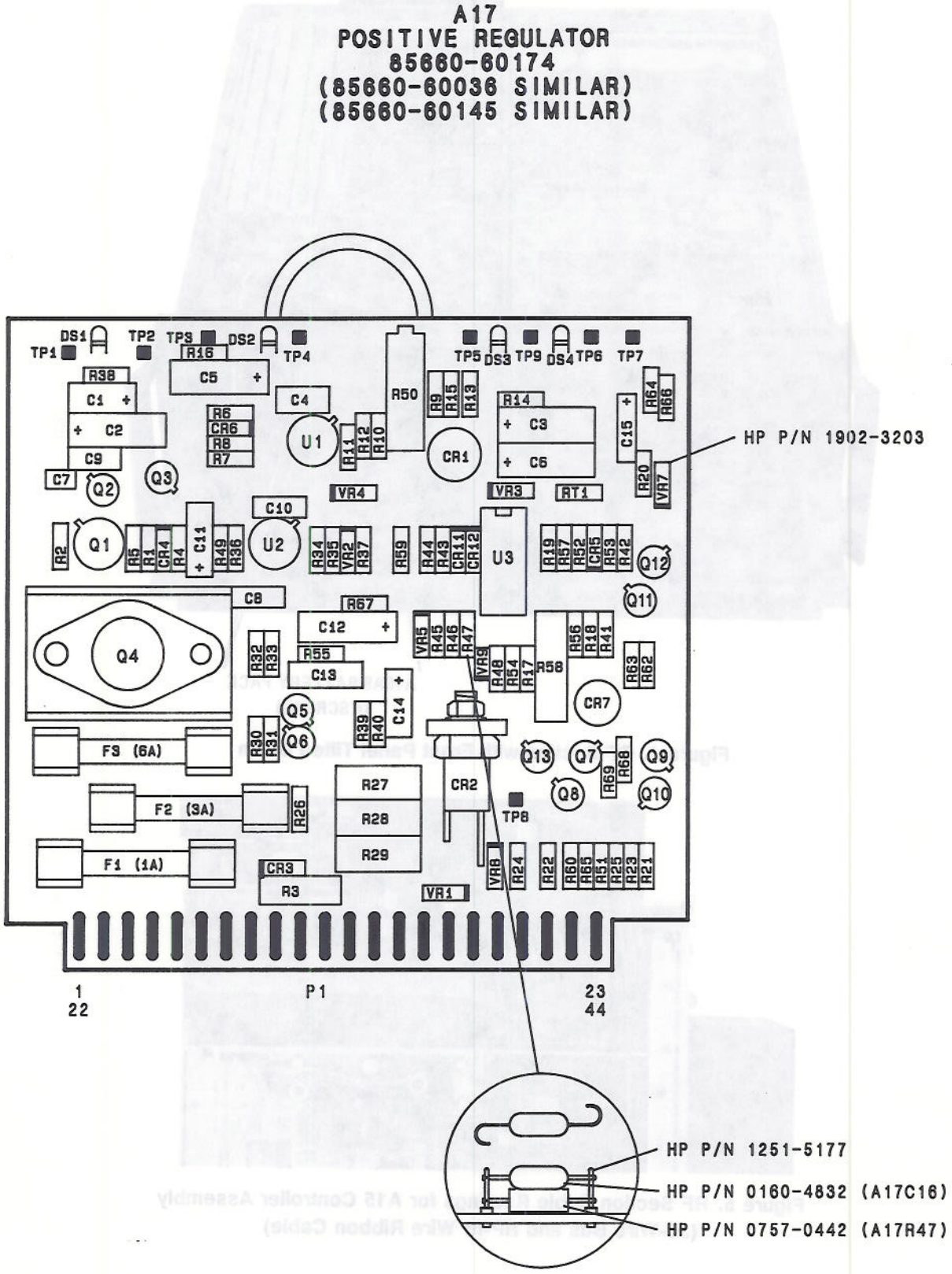

Figure 6. A17 Positive Regulator (A17VR7 and A17R47 Location)

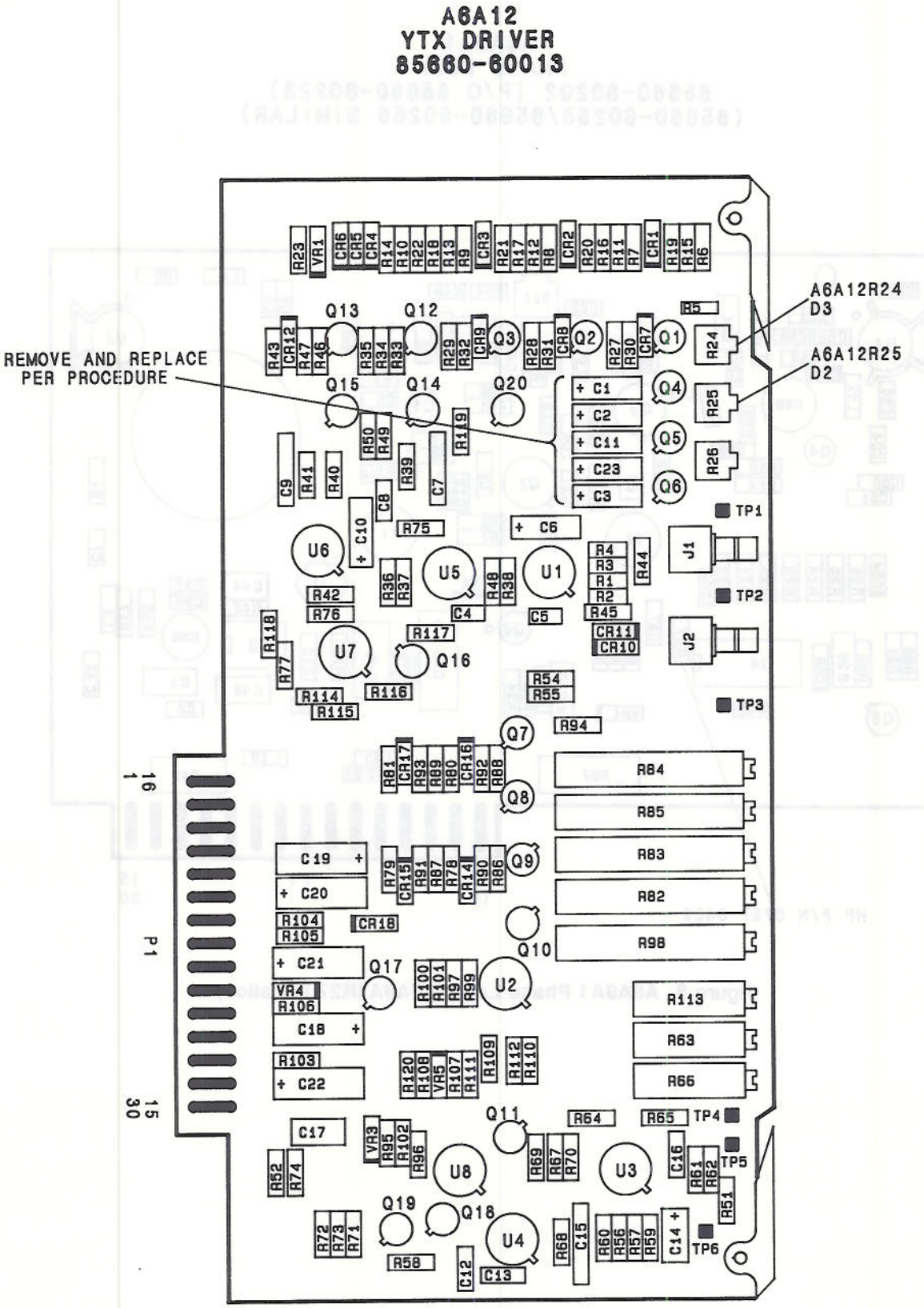

Figure 7. A6A12 YTX Driver (Delay Compensation Capacitor Locations)

A6A9A1
PHASE LOCK
85660-60202 (P/O 85660-60226)
(85660-60253/85660-60256 SIMILAR)

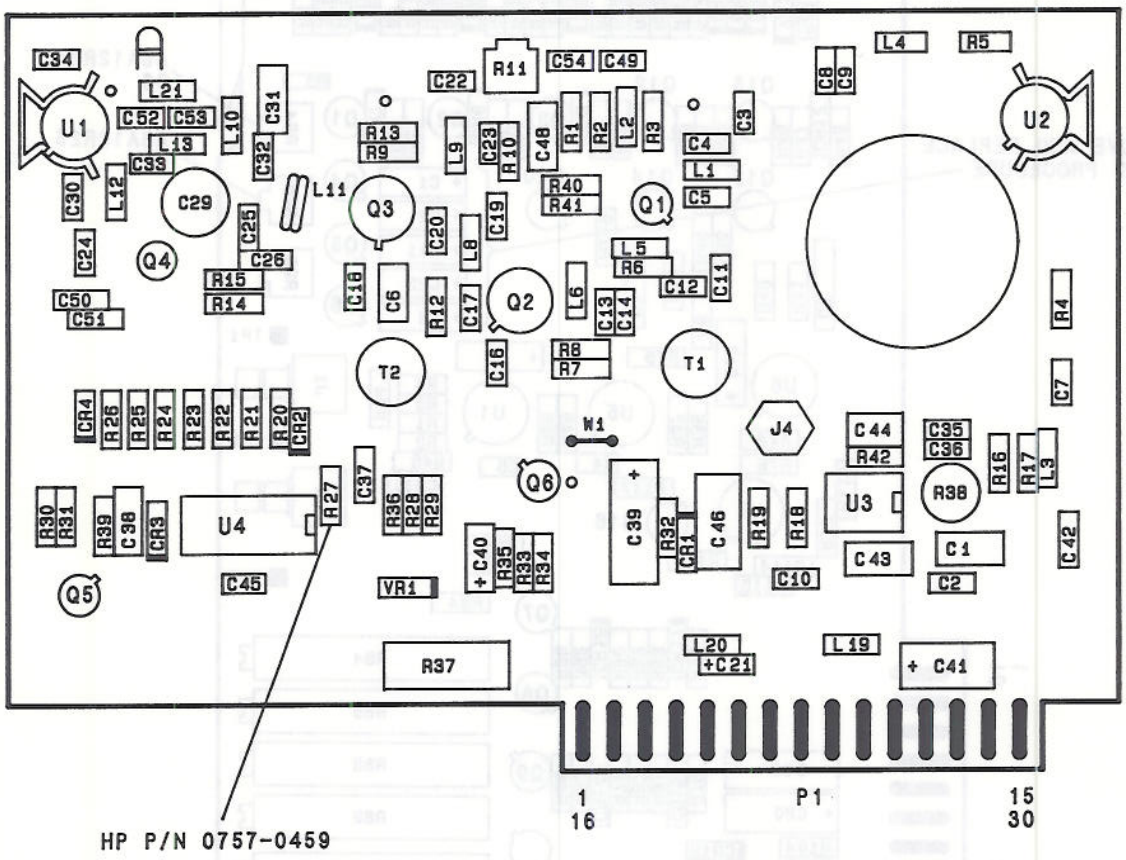

Figure 8. A6A9A1 Phase Lock (A6A9A1R27 Location)

A19
DIGITAL-TO-ANALOG CONVERTER
85660-60212

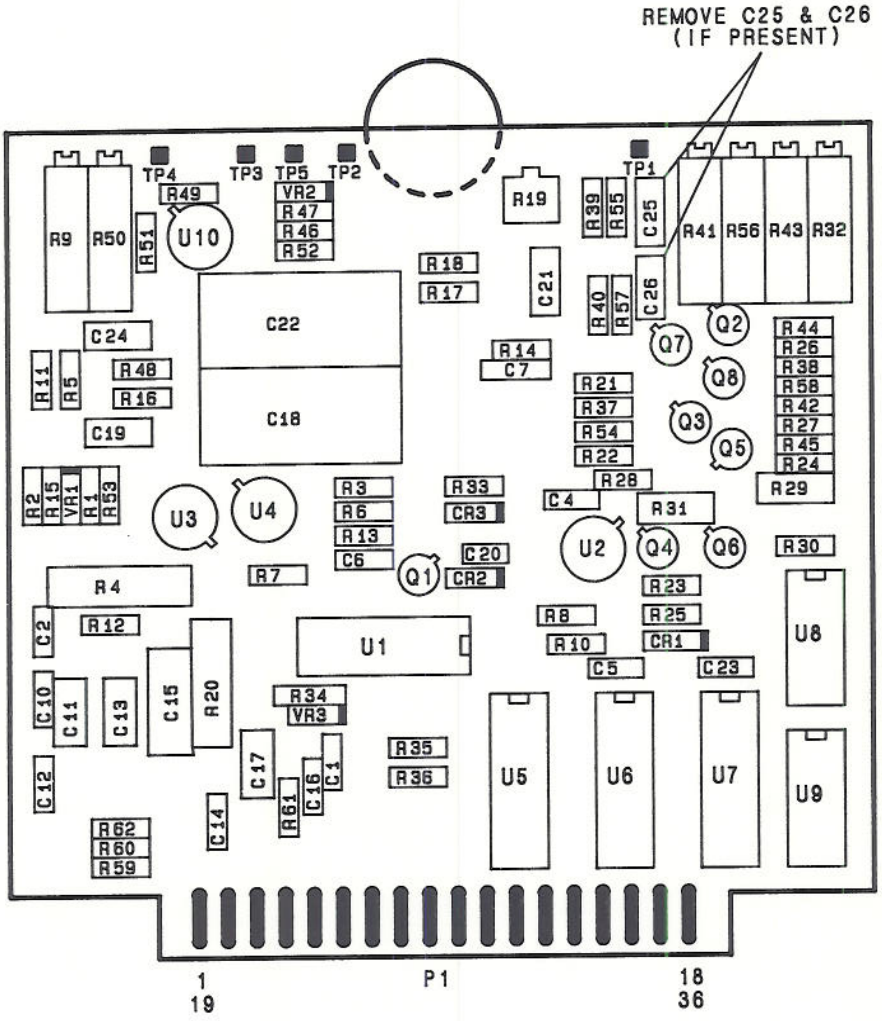

Figure 9. A19 Digital-to-Analog Converter (A19C25 and A19C26 Locations)