SERVICE NOTE

Supersedes:
8566A-16

HP 8566A AND 8566B SPECTRUM ANALYZER

All Serials

REPLACEMENT RF ATTENUATOR RETROFIT KIT WITH CALIBRATION PROM

A new programmable RF Step Attenuator is now available for use with the HP 8566A/B Spectrum Analyzer. The new attenuator features several design improvements and enhancements which have led to typical life expectancies in excess of 10 million cycles per section (an order-of-magnitude increase over earlier programmable RF Step Attenuator versions).

The RF Attenuator Retrofit Kit,HP Part Number 85660-60336, includes all parts and instructions required to install the new RF Attenuator into any HP 8566A/B Spectrum Analyzer. Each RF Attenuator is accompanied by a customized Calibration PROM which provides data necessary to achieve specified HP 8566A/B amplitude accuracy. Each RF Attenuator is individually characterized, so replacement PROMs are not separately available. The PROM (A12U8) installs into a 16-pin DIP socket on the A12 RF Interface Assembly when the RF Attenuator is replaced.

The new step attenuator features solid-state solenoid switching circuits, which replace mechanical Y-contacts used in previous versions. Extra care should be taken during handling and installation of the new attenuator; the internal digital circuitry is susceptible to permanent damage from both electrostatic discharge (ESD) and incorrect electrical connection.

E/NS/WN

11/87-53/DC

HEWLETT PACKARD

FOR MORE INFORMATION, CALL YOUR LOCAL HP SERVICE OFFICE at East (201) 265-5000 ● Midwest (312) 255-9800 ● South (404) 955-1500 ● West (213) 970-7500 or (415) 968-9200 **OR WRITE,** Hewlett-Packard, 1820 Embarcadero, Palo Alto, California 94303. **IN EUROPE, CALL YOUR LOCAL HP SALES or SERVICE OFFICE OR WRITE,** Hewlett-Packard S.A., 7, rue du Bois-du-Lan Case Postale 365 CH 1217 Meyrin 1 - Geneva, Switzerland. **IN JAPAN,** Yokogawa-Hewlett-Packard Ltd., 27-15, Yabe, 1 Chrome, Sagamihara City, Kanagawa Prefecture, Japan 229.

Printed in U.S.A.

Table 1. RF Attenuator Retrofit Kit
HP Part Number 85660-60336 (CD=3)

Qty	Description	HP Part Number	CD
1	22 GHz Programmable RF Step Attenuator includes: 1 ea. Programmable RF Step Attenuator (A6A2) 1 ea. Programmed Calibration PROM (A12U8)	85660-60304	5
	1 ea. Service Note	8566B-19	1
	1 ea. RF Attenuator Ribbon Cable (A6A2W1)	5062-0701	5
1	CAPACITOR-FXD .001 uF 100VDC CER (A6A10C16)	0160-3878	6
1	RESISTOR 10K 1% .05W F (A6A10R85)	0698-7260	7

The 85660-60304 Programmable RF Step Attenuator is warranted against defects in material and workmanship for a period of one year from date of shipment.

PROCEDURE:

CAUTION

When performing the following procedure, use an approved static-free workstation to avoid component damage caused by electrostatic discharge (ESD).

1. Remove power cords and interconnect cables from rear of HP Model 8566A/B Spectrum Analyzer.

2. Loosen lock feet (A), Figure 1, and separate instrument halves. Set IF-Display Section aside.

3. Remove four rear feet from RF Section (B), Figure 1.

4. Remove RF Section top cover by loosening rear center pozi-drive screw (C), Figure 1.

5. Remove three screws holding A5 Front Panel Assembly to RF Section Front Frame (E), Figure 2.

6. Place RF Section on its side and remove bottom cover by loosening rear center pozi-driver screw (D), Figure 1.

7. Remove remaining three screws holding A5 Front Panel to Front Frame (F), Figure 3, and remove A5 Front Panel from RF Section to provide access to A6A2 RF Attenuator semi-rigid cable.

8. Disconnect two semi-rigid attenuator cable (I), Figure 5, from A6A2 RF Attenuator, being careful to loosen both ends of each cable to prevent cable damage.

NOTE

HP 85660A RF Sections with serial number prefix 1950A and below might require removal of entire A6 RF Module from RF Section chassis to provide access to semi-rigid cable connected to A6J3 RF INPUT Connector.

9. Remove two screws (J), Figure 6, used to attach Attenuator Bracket to A6A13 RF Module Motherboard Assembly.

10. Remove two screws (K), Figure 6, used to attach Attenuator Bracket to A6 RF Module "Totem Pole" Assembly.

11. For HP 85660A/B RF Sections which are directly compatible with new RF Attenuator HP Part Number 85660-60304 (HP 85660A/B RF Sections with serial number prefix 2747A and above, and other HP 85660 A/B RF Sections that have previously been modified for compatibility):

    a. Disconnect A6A2 RF Attenuator from A6A2 RF Attenuator Ribbon Cable, and remove A6A2 RF Attenuator from RF Section.

    b. Remove Attenuator Bracket from A6A2 RF Attenuator by removing two screws (O), Figure 9.

    c. Install Attenuator Bracket on new A6A2 RF Attenuator using two screws removed in previous step (O), Figure 9.

    d. Connect new A6A2 RF Attenuator to A6A2W1 RF Attenuator Ribbon Cable. Note that new A6A2W1 RF Attenuator Ribbon Cable, capacitor, and resistor included in RF Attenuator Retrofit Kit are extra and need not be installed in compatible HP 85660A/B RF Sections.

CAUTION

Overtightening of A6 RF Module semi-rigid cables can cause significant HP 8566A/B Frequency Response degradation.

    e. Carefully align both A6A2 RF Attenuator SMA connectors with semi-rigid cables (I), Figure 5, and tighten cables using 6 in-lbs. of torque.

    f. Tighten remaining ends of both semi-rigid cables using 10 in-lbs. of torque.

12. For HP 85660A/B RF Sections with A6A10 Miscellaneous Bias/Relay Driver Assembly HP Part Number 85660-60011, 85660-60127 or 85660-60180 (HP 85660A/B RF Sections with serial number prefix 2729A and below) that have not previously been modified for compatibility with new RF Attenuator HP Part Number 85660-60304:

    a. Remove A6 RF Module Cover by removing six screws (L), Figure 7, and five cables (M), Figure 7.

CAUTION

A6A10 Miscellaneous Bias/Relay Driver Assembly circuits can potentially hold a slight residual charge and might be damaged if placed directly onto a conductive work surface.

    b. Remove A6A10 Miscellaneous Bias/Relay Driver Assembly from RF Section. Using 10K resistor included in RF Attenuator Retrofit Kit, momentarily short leads of capacitor A6A10C8 (Figure 11) to drain off residual +22 Vdc charge before setting assembly aside.

    c. Partially remove A6A9 Phase Lock Assembly from RF Section, leaving remaining cables attached.

    d. Disconnect A6A2 RF Attenuator Ribbon Cable from A6A13J5 on RF Module Motherboard Assembly (N), Figure 8, and remove A6A2 RF Attenuator from RF Section.

    e. Remove Attenuator Bracket from A6A2 RF Attenuator by removing two screws (O), Figure 9.

    f. Install Attenuator Bracket on new A6A2 RF Attenuator using two screws removed in previous step (O), Figure 9.

    g. Connect new A6A2W1 RF Attenuator Ribbon Cable to new A6A2 RF Attenuator.

    h. Position new A6A2 RF Attenuator (with bracket and ribbon cable attached) loosely into RF Section, routing A6A2W1 RF Attenuator Ribbon Cable appropriately.

CAUTION

Permanent damage to new A6A2 RF Attenuator circuitry can result if A6A2W1 RF Attenuator Ribbon Cable is incorrectly plugged into DIP socket A6A13J5 on RF Module Motherboard Assembly (plug either misaligned or backwards in socket).

    i. Noting proper plug orientation, plug new A6A2W1 RF Attenuator Ribbon Cable into DIP socket A6A13J5 on RF Module Motherboard (Figure 10). Cable will route towards

A6A3 Last Converter Assembly (away from center of RF Section chassis) when correctly installed with pin 1 aligned with corresponding A6A13J5 pin 1 position.

CAUTION

Overtightening of A6 RF Module semi-rigid cables can cause significant HP 8566A/B Frequency Response degradation.

j. Carefully align both A6A2 RF Attenuator SMA connectors with semi-rigid cable (I), Figure 5 and tighten cables using 6 in-lbs. or torque.

k. Tighten remaining ends of both semi-rigid cables using 10 in-lbs. of torque.

l. Replace A6A9 Phase Lock Assembly in RF Section.

m. As shown in Figure 11, remove and discard capacitor A6A10C7 (HP Part Number 0160-3879, CAPACITOR-FXD .01 uF 100 VDC CER) from A6A10 Miscellaneous Bias/Relay Driver Assembly.

n. Carefully remove solder from around pins 7 and 11 of A6A10U1 (HP Part Number 1820-1538, IC GATE CMOS NAND QUAD 2-INP). As shown in Figure 12, clip and dress leads of capacitor A6A10C16 supplied in Retrofit Kit (HP Part Number 0160-3878, CAPACITOR-FXD .001 uF 100 VDC CER) and install between pins 7 and 11 of A6A10U1. Make sure that capacitor lies flat against board and does not short other signal traces.

o. As shown in Figure 13, clip and dress leads of resistor A6A10R85 supplied in Retrofit Kit (HP Part Number 0698-7260, RESISTOR 10K 1% .05W F) and install across leads of capacitor A6A10C8 (HP Part Number 0180-0097, CAPACITOR-FXD 47 uF 35 VDC TA), using heat-shrink tubing as necessary to ensure that resistor does not short to traces on board. Resistor A6A10R85 provides a bleed-down path for residual charge on +22 Vdc filter capacitor A6A10C8, which prevents possible circuitry damage during any subsequent A6A10 Miscellaneous Bias/Relay Driver Assembly troubleshooting or repair.

p. Replace A6A10 Miscellaneous Bias/Relay Driver Assembly in RF Section.

q. Replace A6 RF Module Cover using six screws (L), Figure 7. Reconnect five cables to RF Module (M), Figure 7.

13. Replace two screws (K), Figure 6, used to attach Attenuator Bracket to A6 RF Module "Totem Pole" Assembly.

14. Replace two screws (J), Figure 6, used to attach Attenuator Bracket to A6A13 RF Module Motherboard Assembly.

15. Replace A5 Front Panel Assembly in RF Section Front Frame using six screws (E), Figure 2 and (F), Figure 3. Make sure that ribbon cables A23W5 and A23W7 are properly connected to A5A1 Keyboard Assembly sockets, as shown in Figure 4.

16. Locate Controller Cover (G), Figure 3. Remove pozi-drive screw (H), Figure 3 and Controller Cover.

17. Remove A12 Front Panel Interface Assembly (brown/red extractors) from RF Section.

18. Locate 16-pin DIP socket (A12U8) on A12 Front Panel Interface Assembly (Figure 14). Remove and discard RF Attenuator Calibration PROM A12U8 (some boards might not have socket installed, HP Part Number 1200-0812).

CAUTION

Permanent damage to new RF Attenuator Calibration PROM A12U8 could result if it is improperly installed in the 16-pin DIP socket of A12 Front Panel Interface Assembly (which would destroy calibration data for A6A2 RF Attenuator).

19. Carefully install new RF Attenuator Calibration PROM A12U8 into 16-pin DIP socket on A12 Front Panel Interface Assembly Figure 14.

20. Replace A12 Front Panel Interface into A23 RF Motherboard circuit board position designated by red circuit board guide.

21. Replace Controller Cover using pozi-drive screw (G) and (H), Figure 3.

22. Replace RF Section top and bottom covers and four rear feet.

23. Install IF-Display Section onto RF Section. Reconnect interconnect cables and power cords to rear of instrument.

24. Turn instrument ON and allow a few minutes for warmup.

25. Connect HP 8566A/B CAL OUTPUT signal to RF INPUT and perform Front Panel Calibration using [RECALL] 8 and [RECALL] 9 settings.

26. Press [SHIFT] [FREQUENCY SPAN] to activate HP 8566A/B Error Correction routine. After routine has completed (about 30 seconds), press [SHIFT] [LINE] TRIGGER to display error correction data. Bottom six data lines on CRT display correspond to RF Attenuator calibration data; entries of -0.02 dB for all six lines indicate defective (or improperly installed) RF Attenuator Calibration PROM A12U8.

27. With [RECALL] 8 settings selected, switch RF Attenuator manually through entire 0 dB to 70 dB range to confirm proper operation; displayed signal should remain visible on CRT display.

28. Perform HP 8566A/B Operation Verification to confirm instrument operation, noting in particular ATTENUATOR CHECK and FREQUENCY RESPONSE test results.

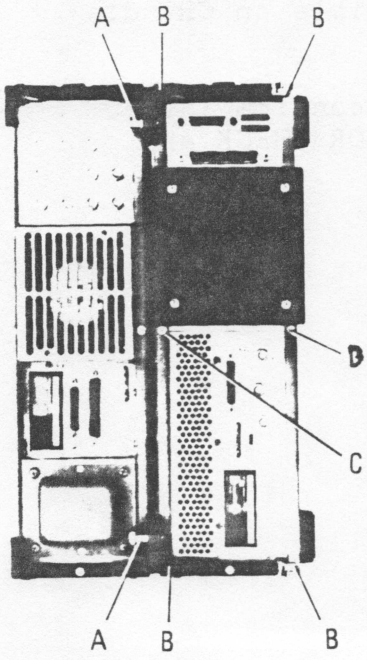

Figure 1. HP 85660A/B Rear View

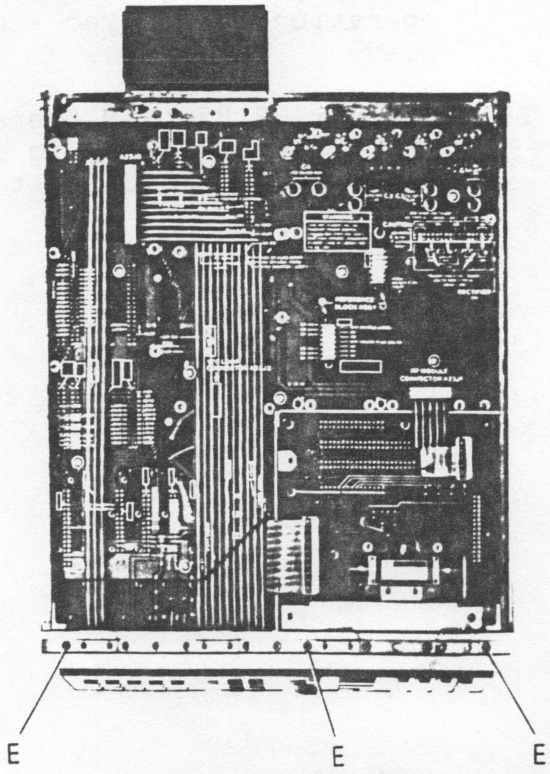

Figure 2. HP 85660A/B Top View

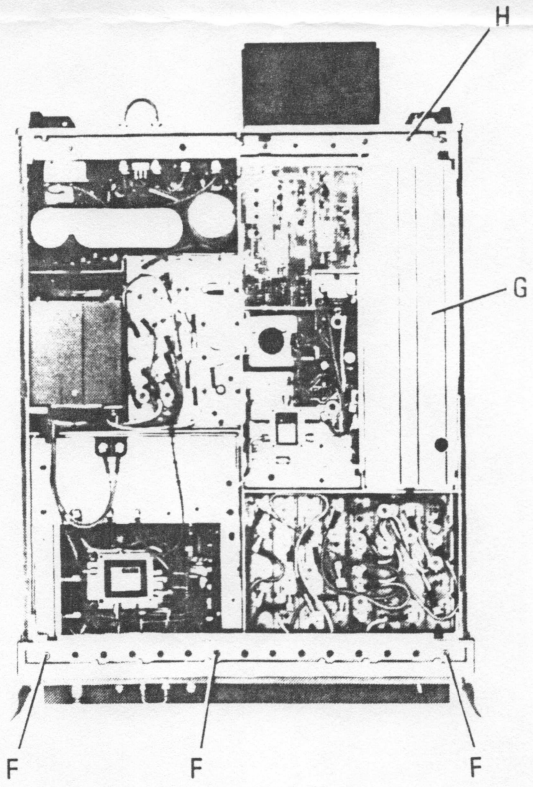

Figure 3. HP 85660A/B Bottom View

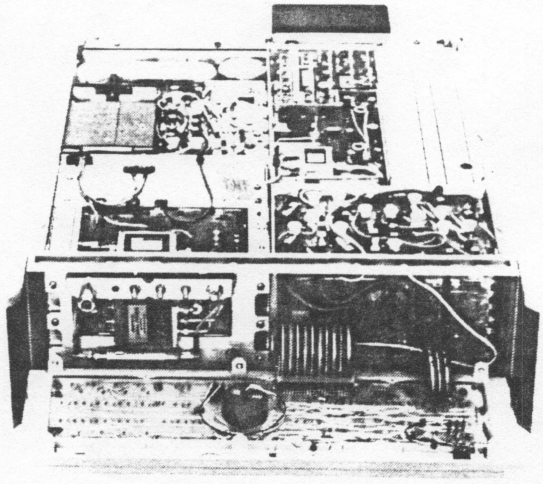

Figure 4. HP 85660A/B Front View (Partially Disassembled)

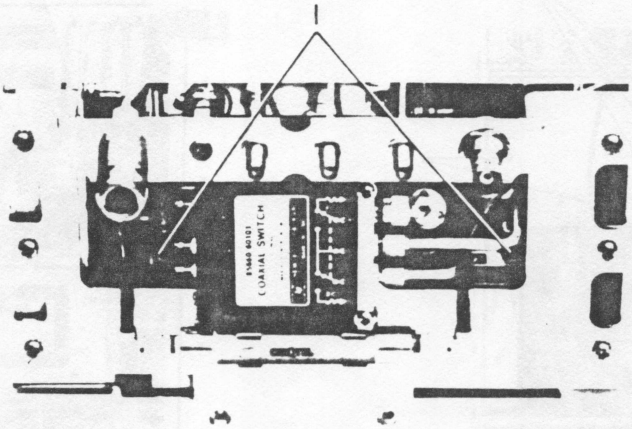

Figure 5. HP 85660A/B RF Attenuator Connections

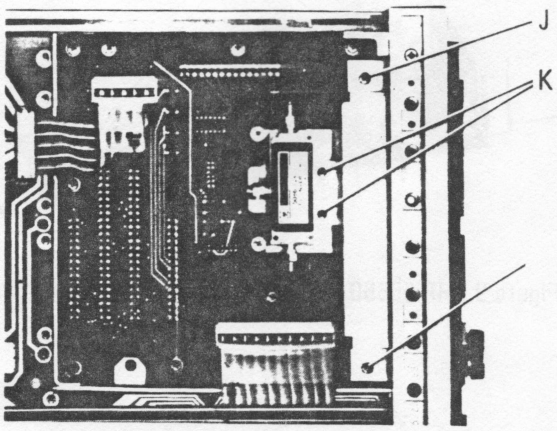

Figure 6. HP 85660A/B RF Attenuator Mounting Screws

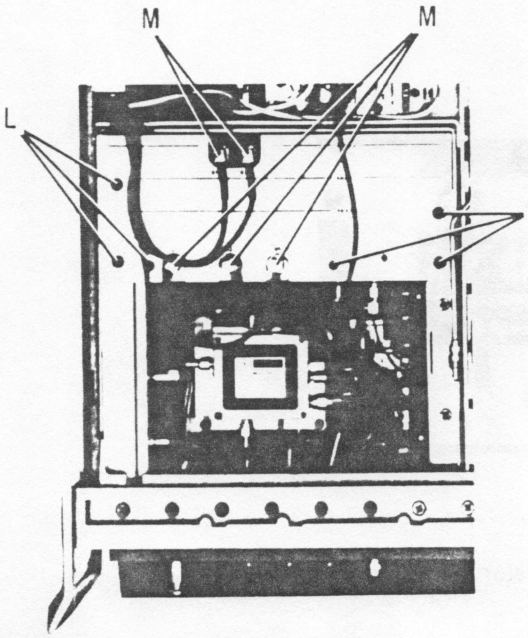

Figure 7. HP 85660A/B RF Module

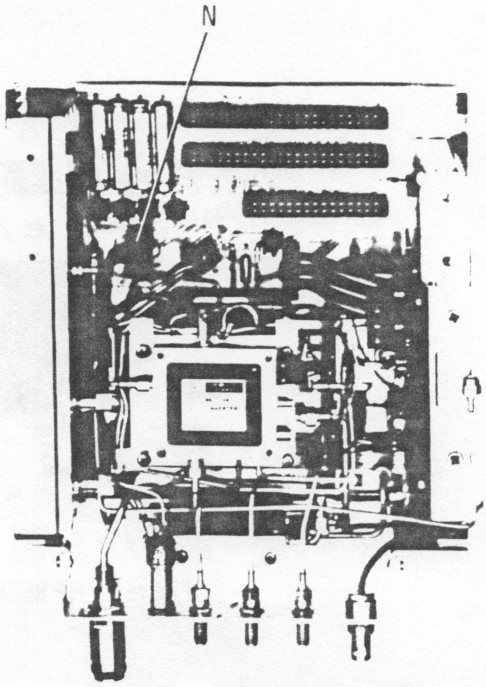

Figure 8. HP 85660A/B RF Module (Partially Disassembled)

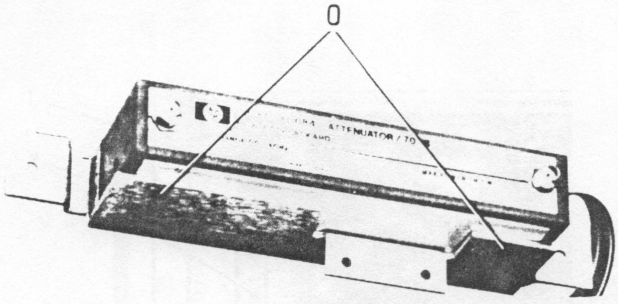

Figure 9. HP 85660A/B RF Attenuator Mounting Bracket

A6A13
RF MODULE MOTHERBOARD
85660-60014

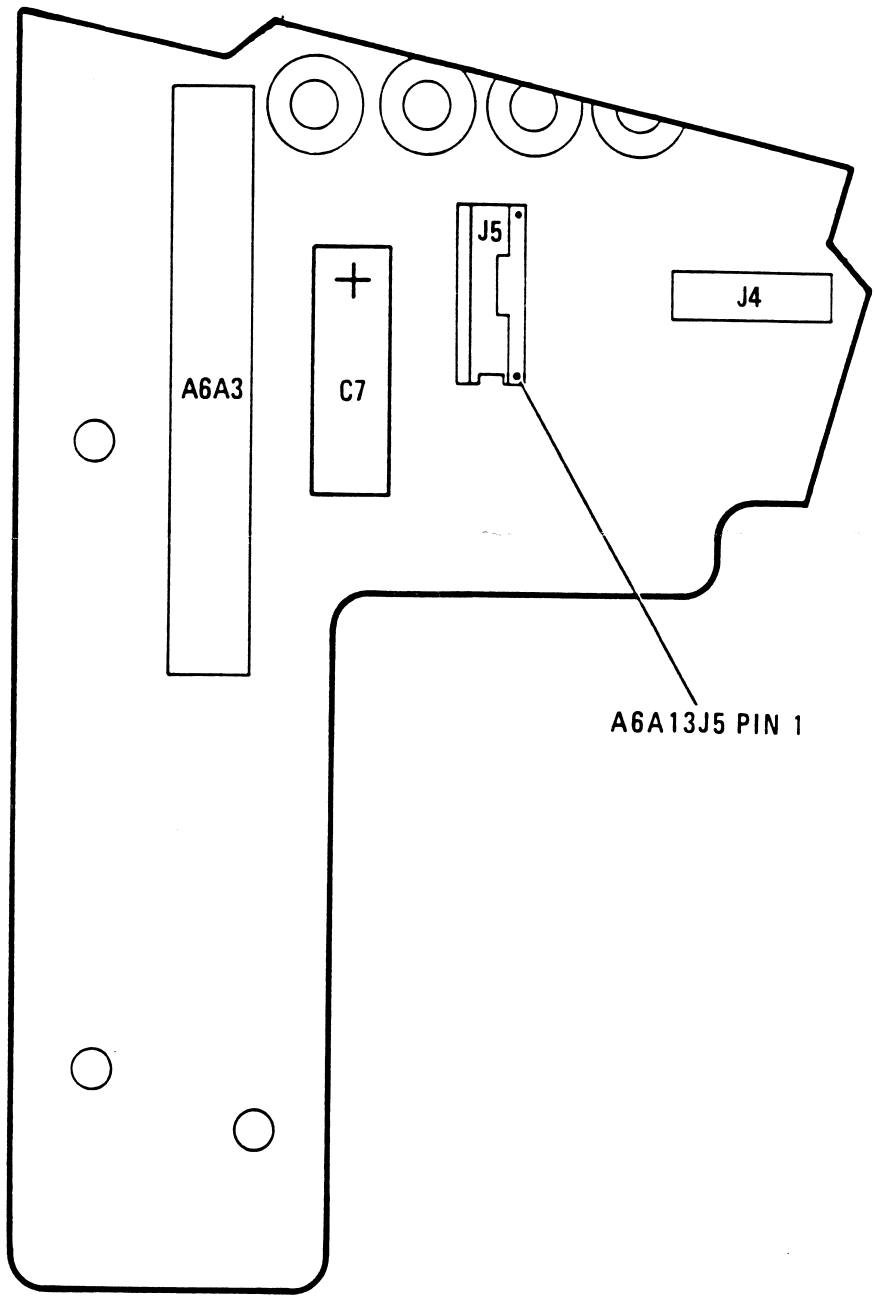

Figure 10. A6A13J5 RF Attenuator Cable Socket, Partial Component Locations

A6A10
MISCELLANEOUS BIAS/RELAY DRIVER
85660-60180

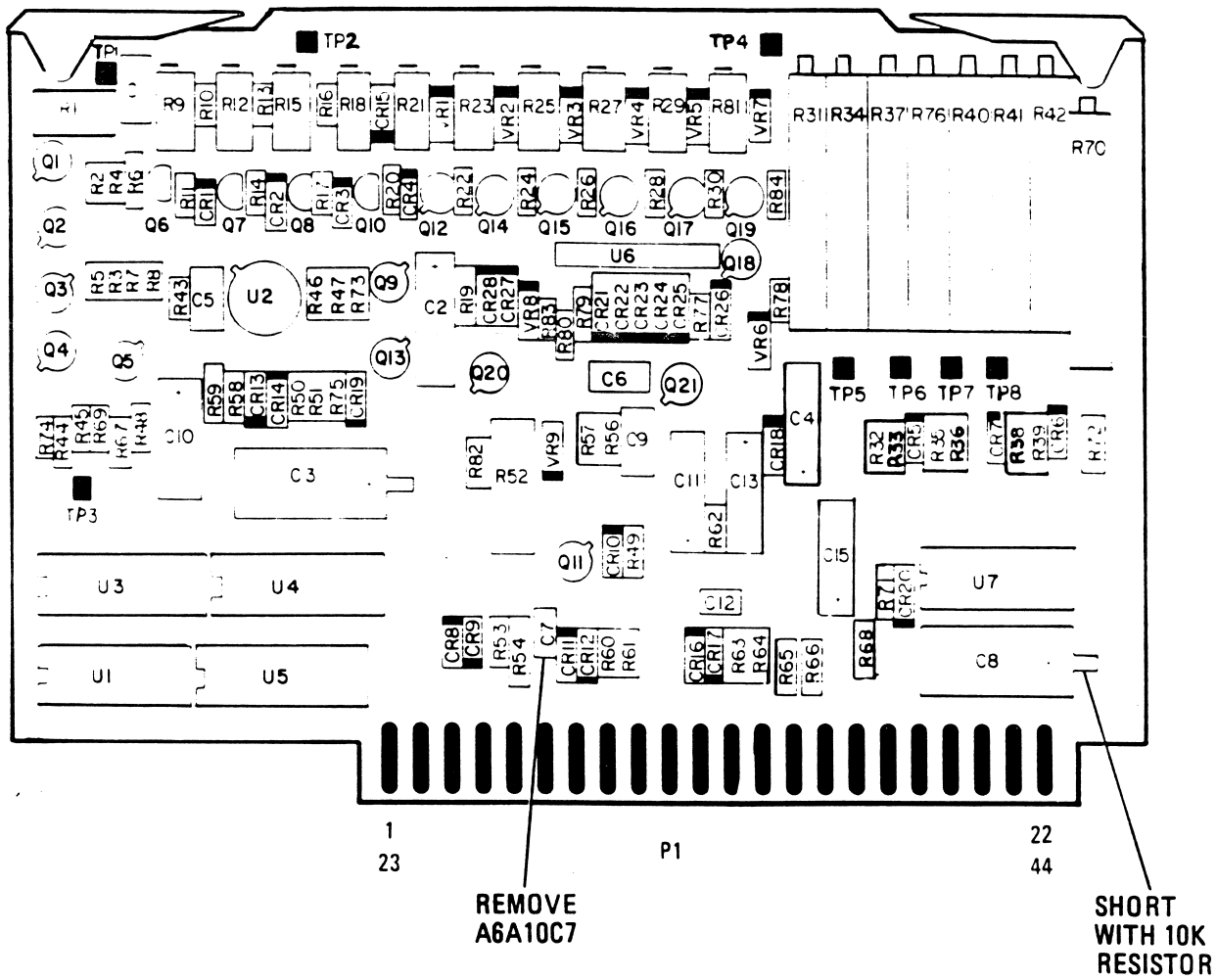

Figure 11. A6A10 Miscellaneous Bias/Relay Driver, Component Locations

A6A10
MISCELLANEOUS BIAS/RELAY DRIVER
85660-60180

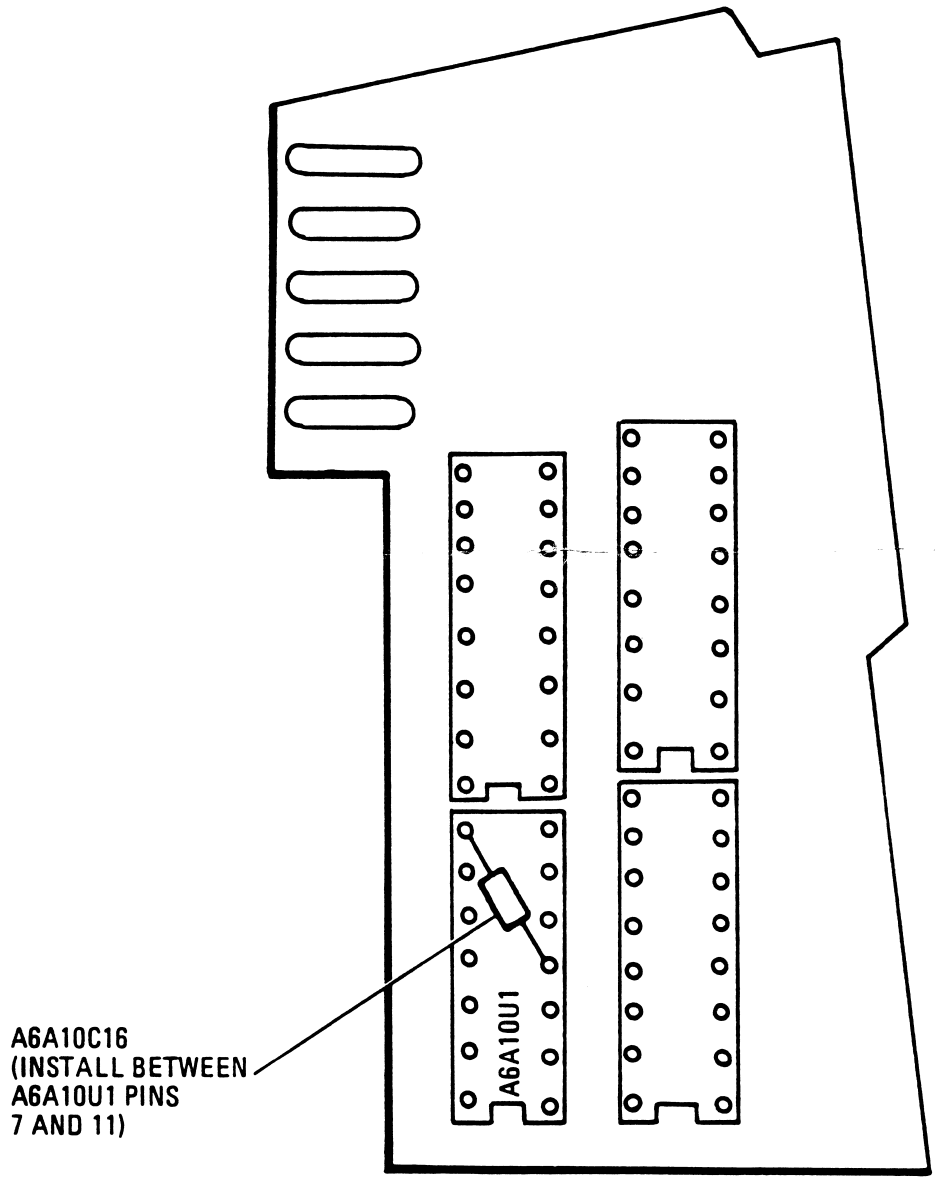

Figure 12. Proper Installation of A6A10C16, Partial Component Locations - Trace Side

A6A10
MISCELLANEOUS BIAS/RELAY DRIVER
85660-60180

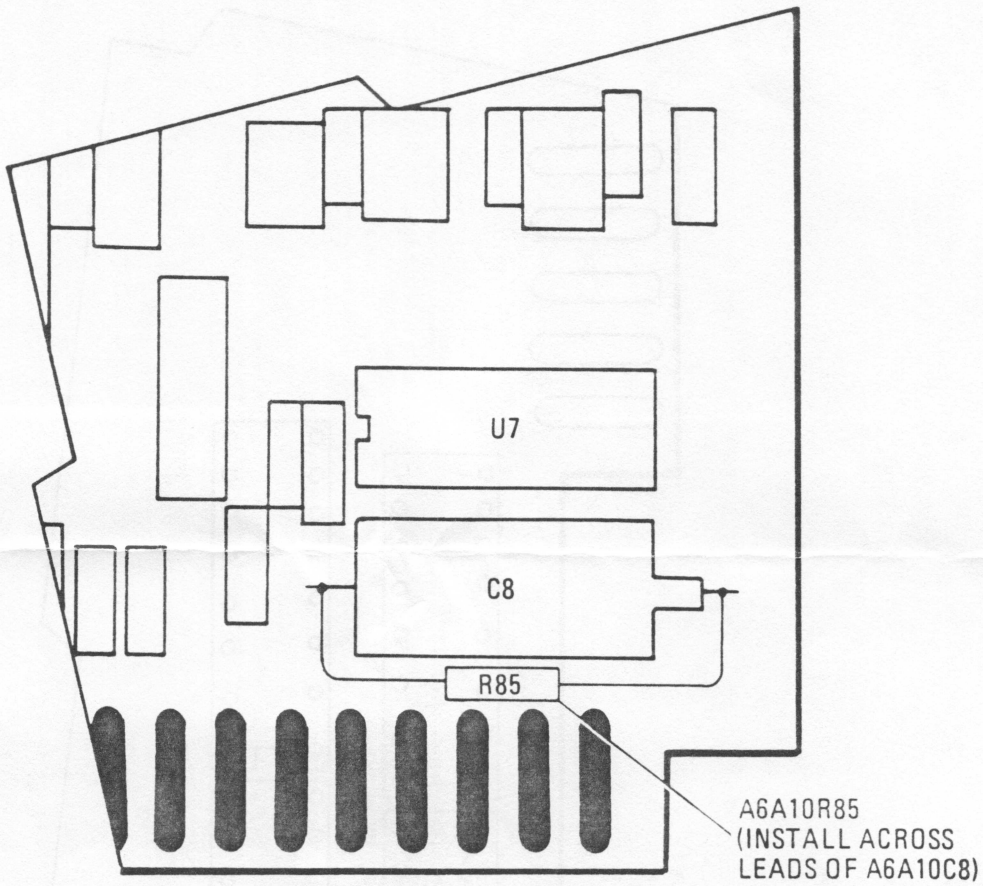

Figure 13. Proper Installation of A6A10R85, Partial Component Locations - Component Side

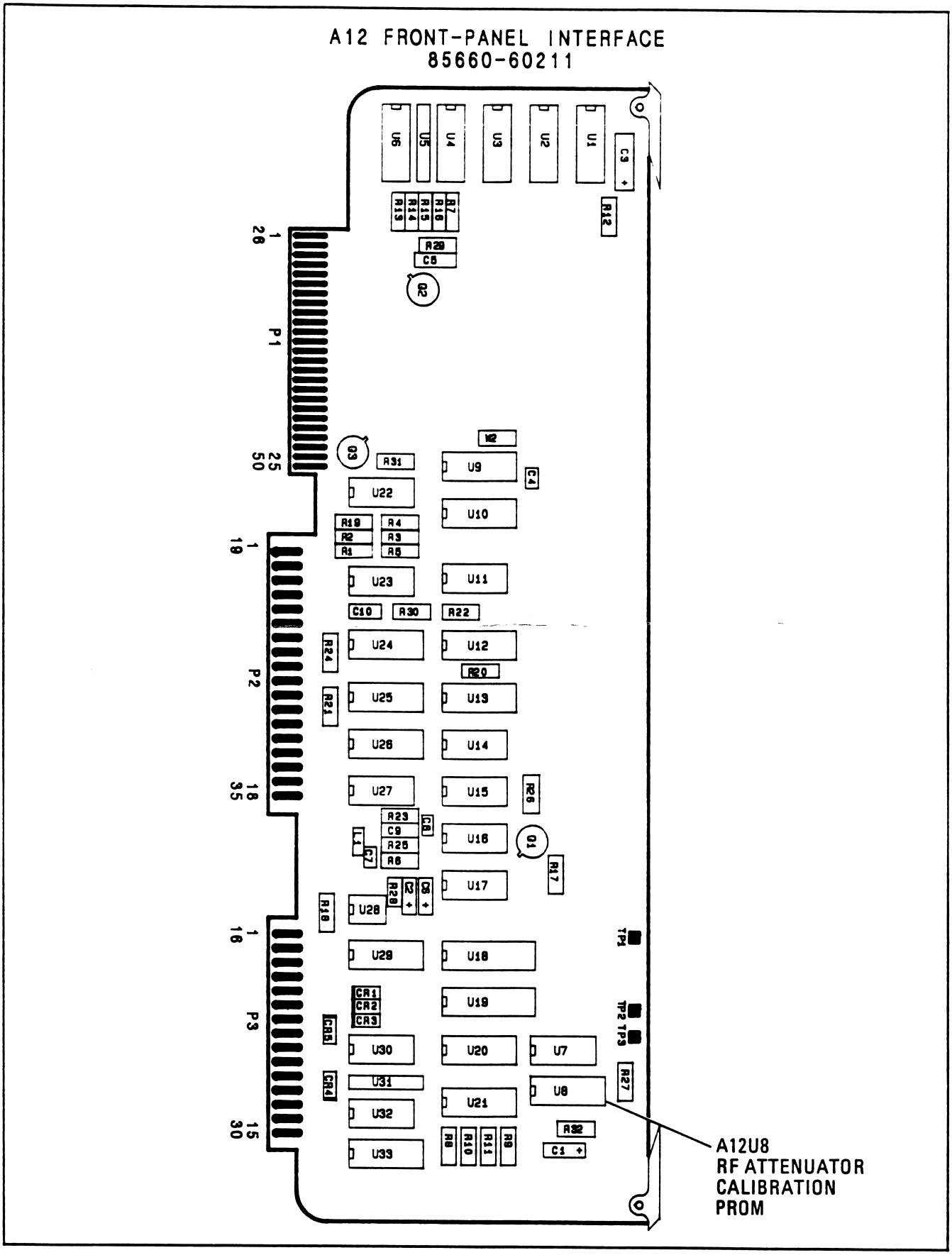

Figure 14. A12 Front-Panel Interface, Component Locations