Installation Note

Agilent Technologies 8712ET and 8714ET Step Attenuator Upgrade Kit Kit Numbers 08714-60043 (Option 1E1) and 08714-60044 (Option UNE)

Agilent Technologies

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Products Affected:	8712ET and 8714ET RF Network Analyzers
Serial Numbers:	All
To Be Performed By:	(X) Agilent Technologies Service Center (X) Customer or Personnel Qualified by Agilent Technologies (X) Agilent Technologies Personnel On-site
Estimated Installation Time:	1.5 hours
Estimated Adjustment and Test Time:	90 minutes

Description

This kit allows you to install the 60 dB step attenuator option (Option 1E1 for 50Ω or Option UNE for 75Ω) into an analyzer that currently does not have this capability.

You may choose to have this kit installed by personnel qualified by Agilent Technologies. If so, be sure to reference Service Note 8712ET-01 when you order the installation.

The installation consists of the following steps which are explained in detail beginning on the page indicated:

Installation Kit Parts List

Quantity	Description	Item Number (Refer to Figure 4)	Part Number
9	Screws, #8	N/A	0515-0372
9	Screws, #6	N/A	0515-0430
4	Screws, #22	N/A	0515-3007
1	Brace for attenuator PC board	25	08714-00005
1	Cable, J3 (A) to A coupler	19	08714-20014
1	Cable, R coupler to attenuator	9	08714-20016
1	Cable, A coupler to attenuator	22	08714-20022
1	Cable, RF IN to RF IN limiter	14	08714-20047
1	Cable, J4 (B) to RF IN limiter	20	08714-20048
1	Cable, J6 to SOURCE IN limiter	13	08714-20055
1	Cable, R coupler to adapter, SMA f to f	24	08714-20056
1	Attenuator PC board	23	08714-60170
1	Adapter, angled SMA m to m	12	1250-2189
1	Plastic clamp for limiter	N/A	1400-1209
1	RF step attenuator	8	33321-60044
1	Directional coupler (R), 50Ω	10	5087-7028
1	Directional coupler (A), 50Ω or 75Ω	17	5087-7028 (for 50Ω analyzers) 5087-7029 (for 75Ω analyzers)
1	Ribbon Cable, control and power for attenuator	7	8120-8741
1	Ribbon Cable, attenuator board to receiver board	6	8120-8742
1	Special 7/32-inch wrench	N/A	08714-20172

Tools Required

- #10 TORX driver
- #15 TORX driver
- 5/16-inch wrench
- 5/8-inch deep-socket nut driver
- Test equipment required for adjustments and performance tests (see Chapter 3 in the analyzer's *Service Guide*).
- Your analyzer's *Service Guide*

Equipment Required

See your analyzer's *Service Guide* for equipment required to perform the necessary adjustments.

Safety Considerations

WARNING **Before you disassemble the instrument, turn the power switch OFF and unplug the instrument. Failure to unplug the instrument can result in personal injury.**

CAUTION Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Refer to the documentation that pertains to your instrument for information about static-safe workstations and ordering static-safe accessories.

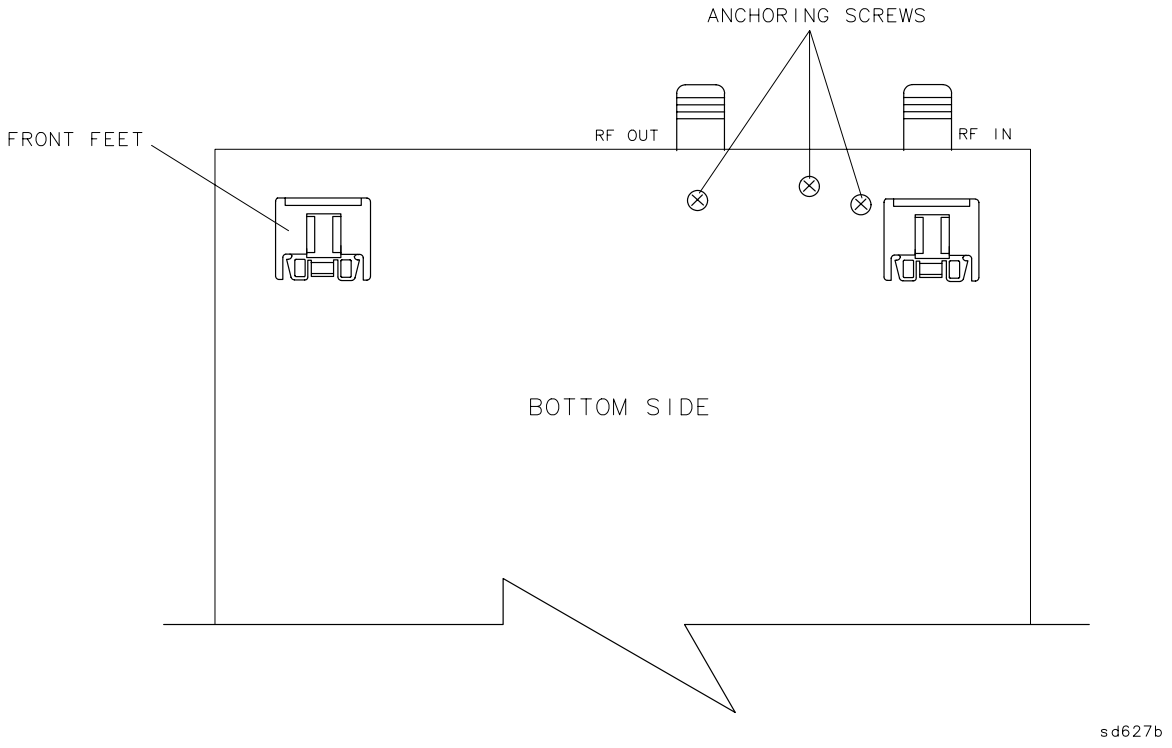
Installation Procedure

NOTE For convenience, disassembly instructions are also listed on a label attached to the bottom of each analyzer. If necessary, more complete documentation and illustrations are contained in the analyzer's *Service Guide*.

Removing the Receiver Assembly

1. Disconnect any cables from the EXT DET X-input, EXT DET Y-input, and AUX INPUT rear panel BNC connectors.
2. Remove nuts and washers from the AUX INPUT BNC connector.
3. Remove the three anchoring screws on the bottom of the analyzer. See Figure 1.

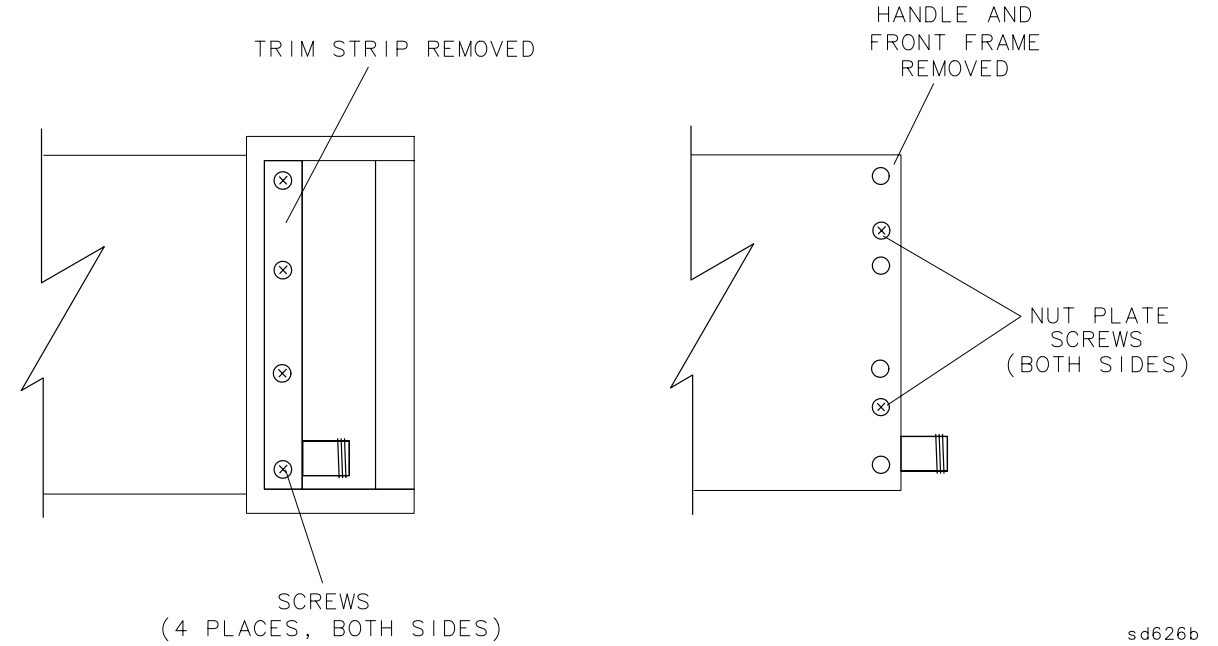
Figure 1 Location of the A5 Receiver Anchoring Screws



4. Remove the front panel assembly:

   a. Remove the trim strip and the front handles. See Figure 2.

Figure 2 Removing the Handles and Front Panel Assembly



   b. Pull the center top of the front panel up slightly and pull the center bottom down slightly to release the two centered catches.

   c. Pull the front panel several inches away from the cabinet.

   d. Disconnect the ribbon cable from the circuit board. Remove the handle nut plate on the right side.

   e. To remove the front panel knob, gently pull it off its shaft.

   f. To remove the knob, disconnect the five-wire cable from A1J2. Remove the knob, hex nut, and washer.

5. Two semirigid cables connect the A5 assembly to the A4 assembly. Completely loosen one nut on each cable where it connects to the A4 assembly, then separate the cable from the A4 assembly.

6. Grasp the handle tab and pull forward to release the assembly. Once released, the assembly will easily slide out of its cavity.

Disassembling the Receiver Assembly

For the following disassembly procedure, refer to Figure 3.

NOTE When working with a nut that is connected to a limiter, use the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. Using the wrench will prevent the limiter from rotating while the nut is adjusted.

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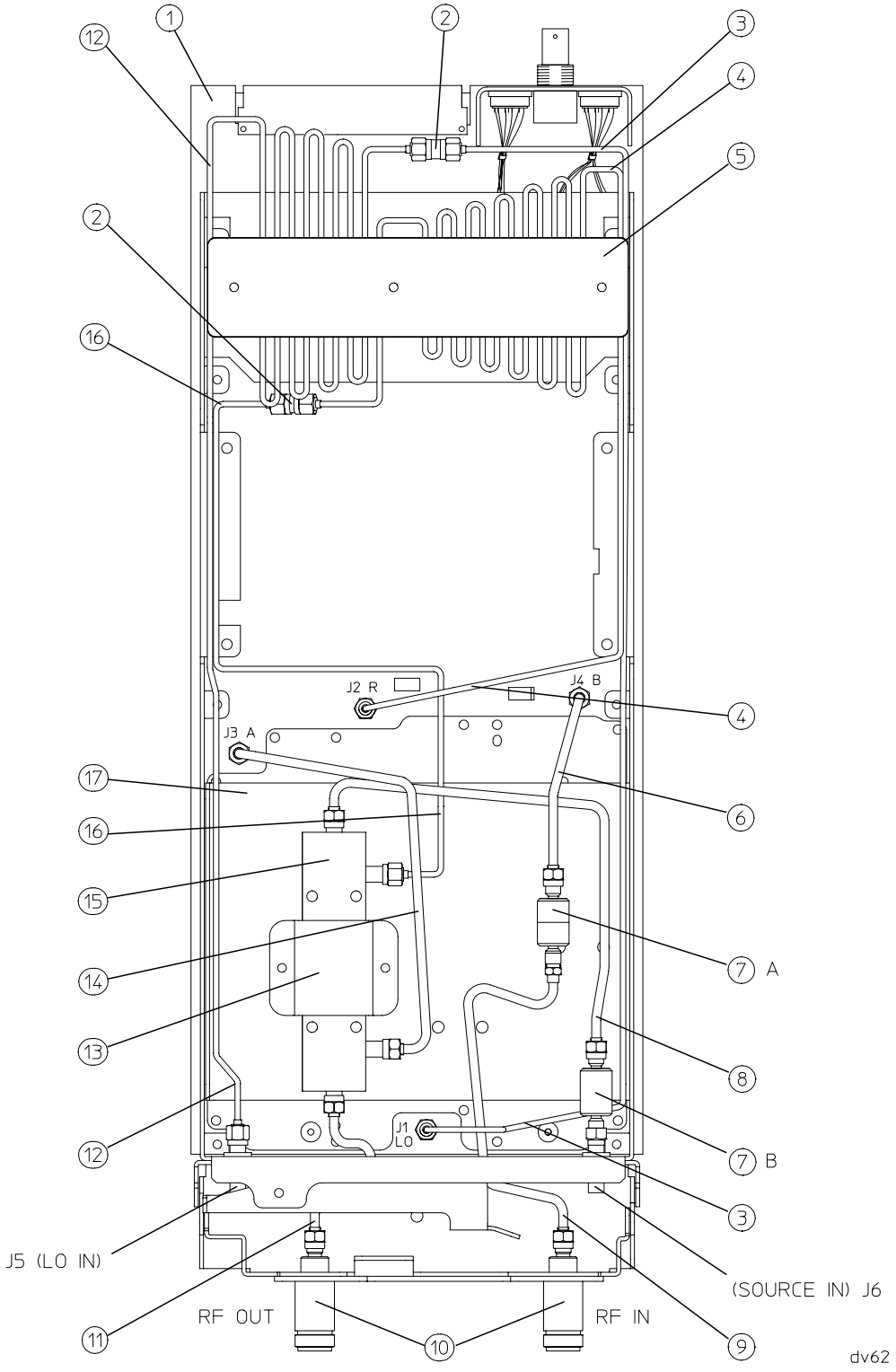
1. Remove the cable (item 6) between J4 B and the RF IN limiter (item 7A). Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.) Loosen the nut on the limiter about one turn. Next, completely remove the nut on J4 B, and then finish removing the nut from the limiter.
2. Remove the cable (item 9) between RF IN (item 10) and the RF IN limiter (item 7A). Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.)
3. Remove the RF IN limiter (item 7A). The limiter is secured by a plastic clamp that has two arms that snap open and closed. To open the clamp, pull up on the end of the arm on top. Save the limiter because it will be reinstalled later.
4. Remove the cable (item 8) between the coupler (item 15) and the SOURCE IN limiter (item 7B). Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.)
5. Remove the SOURCE IN limiter (item 7B) from J6. Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.) Save the limiter because it will be reinstalled later.
6. Remove the cable (item 14) between J3 A and the coupler (item 15).
7. Remove the cable (item 16) between the coupler (item 15) and the SMA f-to-f adapter (item 2).
8. Loosen completely the nut on the cable (item 11) where it connects to the coupler (item 15).
9. Remove the bracket (item 13) that secures the coupler (item 15).
10. Remove the coupler (item 15) by sliding it away from the remaining connection.
11. Remove the plastic clamp used to secure the RF IN limiter (item 7A). Remove any thick pieces of adhesive that may remain after the clamp is pried off of the metal deck, and make sure that all screw holes are free of adhesive. (It isn't necessary to remove *all* of the adhesive from the metal deck.)

NOTE All of the parts that were just disassembled, with the exception of the two limiters, should be discarded now to assure that they will not be confused later with new parts in the upgrade kit.

Figure 3 Receiver Assembly (before installing the upgrade kit)



Installing the Attenuator Assembly

For the following assembly procedure, refer to Figure 4.

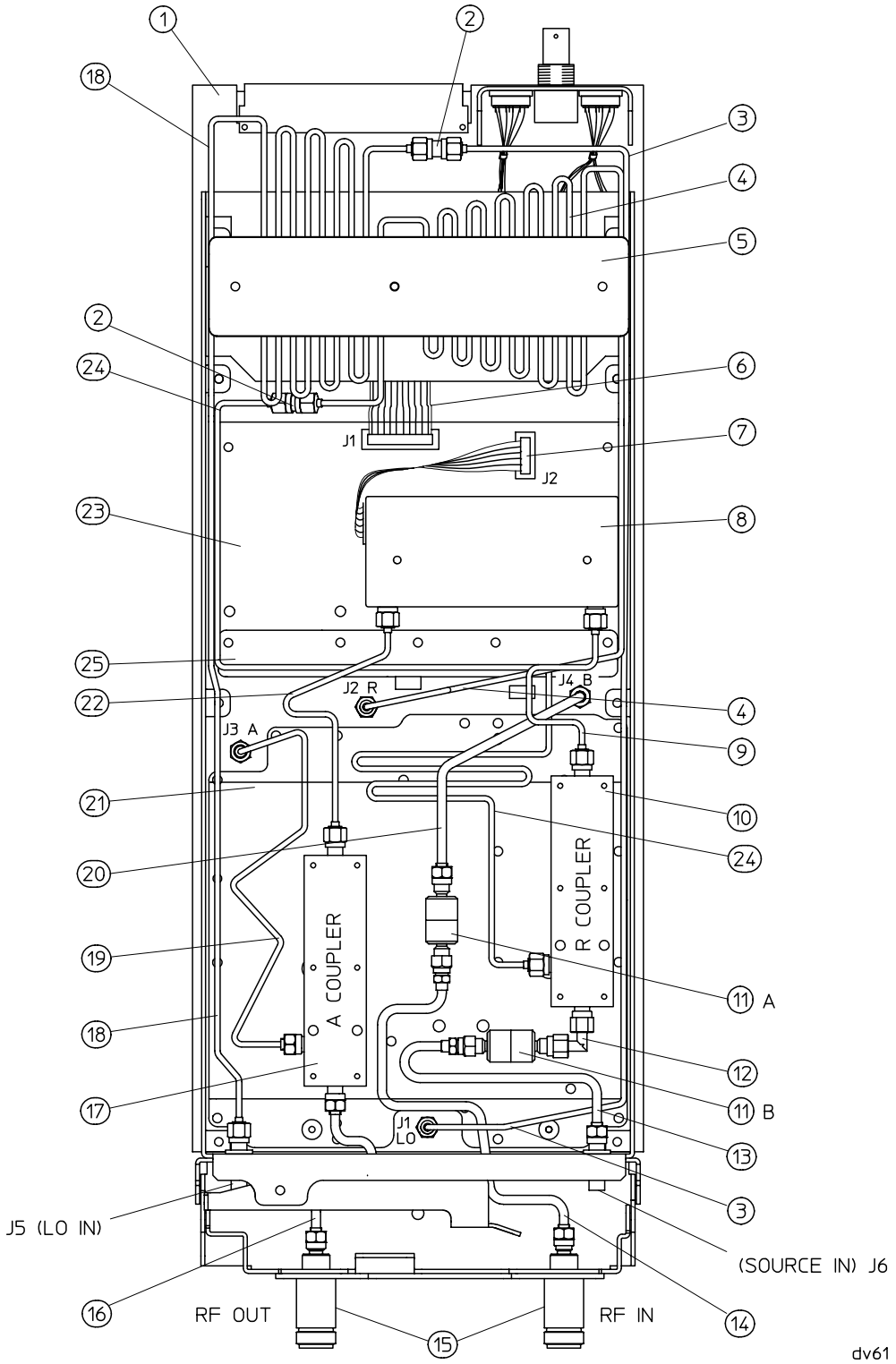
CAUTION Be very careful when connecting the semirigid cables. They are not interchangeable. Ensure that one cable is not confused with the other. It is possible to force the wrong cable onto the wrong connector, resulting in damage to the connectors/cables. Tighten to 10 in-lb of torque.

NOTE When working with a nut that is connected to a limiter, use the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. Using the wrench will prevent the limiter from rotating while the nut is adjusted.

1. Place the RF step attenuator (item 8) on the attenuator PC board (item 23). Lay the board with the attenuator on a flat surface. Install the two screws (0515-0372) that fasten the attenuator to the bottom of the board. Orient the attenuator as shown in Figure 4.
2. Install the brace (item 25) for the attenuator PC board. Position the brace so that its bent edge drops down over the edge of the PC board. Install the screws (0515-0430) loosely in the three middle positions on the brace.
3. Connect the smaller ribbon cable (item 7) to the attenuator. Plug it in so that the ribbon cable exits the connector horizontal to the PC board (rather than exiting the connector vertical to the PC board). Connect the other end of the ribbon cable to J2 on the attenuator PC board.
4. Lay the attenuator PC board on the receiver assembly. Install a 0515-0372 screw in each of the two corners of the board covered by the brace. Install a 0515-0430 screw in each of the other two corners. Tighten the three screws in the center of the brace.
5. On the receiver PC board, loosen and lift the two semirigid cables off the connectors J1 LO, and J2 R.
6. Remove the six screws that connect the outer frame to the main PC board. These screws are located just inside of the long metal frame. There are three screws on each side.
7. Carefully lift the frame off of the receiver PC board.
8. Connect the larger ribbon cable (item 6) to J13 on the receiver PC board.
9. Reinstall the frame onto the receiver PC board by reversing steps 5–7 above. Be careful to thread the end of the ribbon cable between the frame and the attenuator PC board.
10. Connect the ribbon cable to J1 on the attenuator PC board.
11. Set the R coupler (item 10) into its approximate position, but don't use the screws to hold it in place at this time.
12. Connect the cable (item 24) between the SMA f-to-f adapter (item 2) and the R coupler (item 10). Use the special 7/32-inch wrench to hold the adapter secure. Regardless of the impedance of your analyzer, you must use the 50Ω R coupler (5087-7028).
13. Connect the angled SMA m-to-m adapter (item 12) to the SOURCE IN limiter (item 11B). Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.)

14. Connect the angled SMA m-to-m adapter (item 12) to the R coupler.
15. Connect the cable (item13) between the SOURCE IN limiter (item 11B) and J6. Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.)
16. Set the A coupler (item 17) into its approximate position, but don't use screws to hold it in place at this time. The impedance of your analyzer must match the impedance of the A coupler (50Ω is 5087-7028; 75Ω is 5087-7029).
17. Connect the A coupler (item 17) to the RF OUT cable (item 16).
18. Connect the cable (item 19) between J3 A and the A coupler (item 17).
19. Connect the cable (item 22) between the attenuator (item 8) and the A coupler (item 17).
20. Connect the cable (item 14) to the RF IN limiter (item 11A). Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.)
21. Connect the cable (item 14) to the RF IN connector (item 15).
22. Connect the cable (item 20) loosely (finger tight) to J4 B. Next, connect the other end of the cable (item 20) to the RF IN limiter (item 11A). Begin by using the special 7/32-inch wrench to secure the end of the limiter where the nut is connected. (The limiter *must* be prevented from rotating.)
23. Connect the cable (item 9) between the attenuator (item 8) and the R coupler (item 10). Position the cable so that the longer straight-section of cable connects with the attenuator. Connect the cable loosely, then rotate it so that it doesn't stick up.
24. Secure both limiters (item 11A and item 11B) by fastening two 0515-3007 screws to each limiter.
25. Tighten the connectors on the cable (item 9) between the attenuator (item 8) and the R coupler (item 10).
26. Open the plastic clamp if it is closed (pull up on the end of the arm on top), remove the cover from the adhesive, and carefully slide the opened clamp underneath the RF IN limiter (item 11A). Press the clamp onto the sheet metal deck so the adhesive sticks securely. Place the more narrow arm of the clamp against the body of the limiter. Then press the second arm over the first arm until its end snaps securely onto the first arm.

Figure 4 Receiver Assembly (after installing the upgrade kit)



Installing the Receiver Assembly

1. Before inserting the receiver assembly into the chassis, be sure to inspect all cabling to make sure it is below the level of the top of the couplers.
2. To install the receiver assembly into the analyzer, reverse the steps of the "Removing the Receiver Assembly" on page 6.

Performing the Adjustments and Tests

Once the hardware installation is complete, it will be necessary to readjust the analyzer's correction constants and check performance. To do so, complete all adjustments and performance tests associated with replacing the A5 Receiver Assembly. Refer to Chapter 3 in the analyzer's *Service Guide* for more information.

For Additional Information

For more information refer to your analyzer's *Service Guide*, or contact your nearest Agilent Technologies sales and service office. See the table on the next page.

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