Service Guide

Agilent Technologies
N9039A RF Preselector

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Safety Information

The following safety notes are used throughout this manual. Familiarize yourself with each of the notes and it's meaning before operating this instrument.

WARNING **Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.**

CAUTION Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

WARNING **This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protected earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.**

WARNING **The power cord is connected to internal capacitors that may remain live for 5 seconds after disconnecting the plug from it's power supply.**

WARNING **The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch (disconnecting device).**

WARNING **The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the product from all voltage sources before starting to open.**

WARNING **These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.**

Lithium Battery Disposal

The N9039A RF Preselector uses an internal 3.0 VDC battery that contains Lithium/Manganese Dioxide (Li/MnO_2). The battery is located on the A4 CPU assembly to power the instrument clock and back up data in SRAM. When the battery is exhausted and ready for disposal, dispose of it according to your country's requirements. The Agilent part number is 1420-0356. The manufacturer's part number is CR2032. You can return the battery to your nearest Agilent Technologies Sales and Service office for disposal, if required. Refer to "Contacting Agilent Technologies" on page 26 for a list of Agilent Technologies Sales and Service offices.

DO NOT THROW BATTERIES AWAY BUT
COLLECT AS SMALL CHEMICAL WASTE.

Warranty

This Agilent Technologies instrument product is warranted against defects in material and workmanship for a period of one year from date of shipment. During

the warranty period, Agilent Technologies Company will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Agilent Technologies. Buyer shall prepay shipping charges to Agilent Technologies and Agilent Technologies shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent Technologies from another country.

Agilent Technologies warrants that its software and firmware designated by Agilent Technologies for use with an instrument will execute its programming instructions when properly installed on that instrument. Agilent Technologies does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error-free.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

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Is your product software up-to-date?

Periodically, Agilent releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Agilent Technical Support website at:

www.agilent.com/find/techsupport

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1 Overview

What You Will Find in This Chapter

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Agilent N9039A RF Preselector Overview

The Agilent N9039A RF Preselector has been specifically designed to enable an Agilent PSA Spectrum Analyzer to function as a high-performance test receiver for making CISPIR 16 compliant commercial EMI (Electro-Magnetic Interference) measurements. Throughout this document the phrase EMI Measurement Receiver will refer to an Agilent PSA used with an Agilent N9039A RF Preselector.

N9039A and PSA work together to form an EMI Measurement Receiver that is fully compliant to the receiver standards described in CISPR (Special Committee on Radio Interference) Publication 16, C.I.S.P.R. Specification for Radio Interference Measuring Apparatus and Measurement Methods. This type of receiver is used for making measurements according to various governmental standards, such as FCC (U.S.A.), EN (Europe), and VCCI (Japan) regulations.

The Agilent N9039A RF Preselector and the Agilent PSA are connected together via several cables on the front and rear panels to form a single instrument. All control for both units is handled by the PSA. N9039A is used to prevent overload conditions of the PSA input mixer caused by broadband, impulse signals. This improves the sensitivity of the EMI Measurement Receiver and reduces the amount of input attenuation needed.

The N9039A has Windows XP Pro built in as the operating system, which expands the usability of the instrument.

The service strategy for the N9039A is assembly level repair, not component level.

N9039A Options

Front Panel RF Connectors

The N9039A RF Preselector can be configured with two different front panel RF connectors.

The standard N9039A RF Preselector configuration has Type-N female (7 mm) connectors for its RF input and output connectors. Option N9039A-BAB configures N9039A RF input and output connectors as 3.5 mm male, however the Cal Source In connector will always be a Type-N female connector. N9039A-BAB can be purchased and installed at the time of sale, or as a post-sale upgrade. For information about ordering or installing N9039AK-BAB refer to

http://www.agilent.com/find/N9039A_upgrades

N9039A/EMI Measurement Receiver Accessories

A number of accessories are available from Agilent Technologies to help you configure your EMI Measurement Receiver for your specific applications. They can be ordered through your local Agilent Sales and Service Office and are listed below.

The documentation can be accessed anytime via the web at http://www.agilent.com/find/N9039A_manuals.

The User's Guide provides installation, setup and configuration details for the N9039A hardware and Windows XP Pro operating system. It also gives details about connecting N9039A to an Agilent PSA spectrum analyzer and documents specifications, safety, and regulatory information.

NOTE For information about EMI Receiver programming and measurements refer to the Agilent PSA EMC Personality Guide (PSA Option 239 E4440-90330)

NOTE Service documentation is *not* included in the standard documentation set.
Refer to http://www.agilent.com/find/N9039A_manuals

Close Field Probes

- The 11940A is a hand held close field probe specially designed to measure magnetic field radiation from surface currents from 30 MHz to 1 GHz.
- The 11941A is a hand held close field probe specially designed to measure magnetic field radiation from surface currents from 9 kHz to 30 MHz.
- Close Field Probe Kit 11945A contains both 11940A and 11941A.

Preamplifier

A preamplifier can be used with your EMI Measurement Receiver to enhance measurements of very low-level signals.

The 11909A low noise preamplifier provides a minimum of 32 dB gain from 9 kHz to 1 GHz and a typical noise figure of 1.8 dB.

RF and Transient Limiter

The Agilent 11947A Transient Limiter protects the instrument input circuits from damage due to signal transients. It specifically is needed for use with a line impedance stabilization network (LISN). It operates over a frequency range of 9 kHz to 200 MHz, with 10 dB of insertion loss.

Static Safe Accessories

9300-1367	Wrist-strap, color black, stainless steel. Four adjustable links and a 7 mm post-type connection.
9300-0980	Wrist-strap cord 1.5 m (5 ft.)

Before You Start Troubleshooting

Before troubleshooting, complete the following tasks:

- Familiarize yourself with the safety symbols marked on the instrument and read the general safety considerations in the front of this guide.
- Read the ESD information below.
- Familiarize yourself with the troubleshooting information in Chapter 2, "Troubleshooting", and how it relates to information on troubleshooting the other assemblies.

WARNING **These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.**

WARNING **The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the product from all voltage sources while it is being opened.**

WARNING **The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch (disconnecting device).**

CAUTION Always position the instrument for easy access to the disconnecting device (detachable power cord).

WARNING **To prevent electrical shock, disconnect the instrument from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.**

WARNING **This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.**

CAUTION Always use the three-prong ac power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage.

CAUTION This instrument has an autoranging line voltage input; be sure the supply voltage is within the specified range.

CAUTION Since the N9039A is running a Windows operating system, do not shut it down by removing the AC power to the instrument either by pulling the power cord out from the rear panel of the instrument or, if being used in a test equipment rack, by turning off the rack power supply. Instead turn the instrument off by one of the following methods:

1. Use the front panel power switch and allow the instrument the needed time for it to close all running software applications and shut-down the operating system before it turns the power off.
2. Manually close all running software applications and then shut the instrument down by selecting **Start**, **Shutdown**.

ESD Information

Protection from Electrostatic Discharge

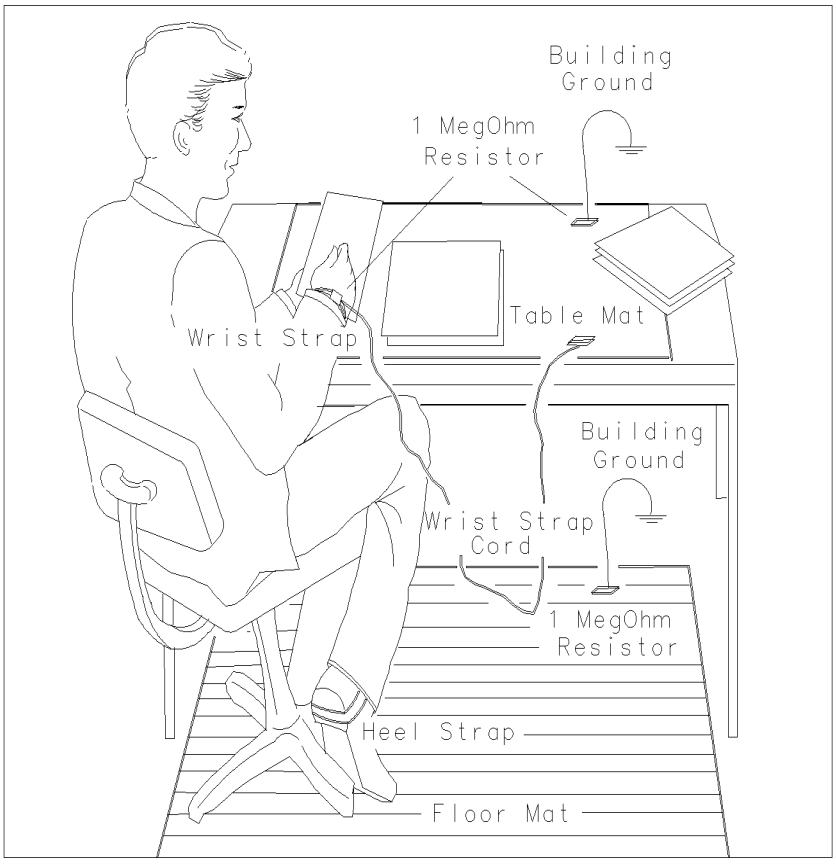
Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Figure 1-1 shows an example of a static-safe workstation using two types of ESD protection:

- Conductive table-mat and wrist-strap combination.
- Conductive floor-mat and heel-strap combination.

Both types, when used together, provide a significant level of ESD protection. Of the two, only the table-mat and wrist-strap combination provides adequate ESD protection when used alone. To ensure user safety, the static-safe accessories must provide at least 1 megohm of isolation from ground.

WARNING **These techniques for a static-safe workstation should not be used when working on circuitry with a voltage potential greater than 500 volts.**

Figure 1-1 **Example of a Static-Safe Workstation**



Handling of Electronic Components and ESD

The possibility of unseen damage caused by ESD is present whenever components are transported, stored, or used. The risk of ESD damage can be greatly reduced by paying close attention to how all components are handled.

- Perform work on all components at a static-safe workstation.
- Keep static-generating materials at least one meter away from all components.
- Store or transport components in static-shielding containers.

CAUTION Always handle printed circuit board assemblies by the edges. This will reduce the possibility of ESD damage to components and prevent contamination of exposed plating.

Test Equipment Usage and ESD

- Before connecting any coaxial cable to an instrument connector, momentarily short the center and outer conductors of the cable together.
- Personnel should be grounded with a 1 megohm resistor-isolated wrist-strap before touching the center pin of any connector and before removing any assembly from the instrument.
- Be sure that all instruments are properly earth-grounded to prevent build-up of static charge.

For Additional Information about ESD

For more information about preventing ESD damage, contact the Electrical Over Stress/Electrostatic Discharge (EOS/ESD) Association, Inc. The ESD standards developed by this agency are sanctioned by the American National Standards Institute (ANSI).

Service Equipment You Will Need

There are certain things that will be required to troubleshoot, adjust, and test the N9039A RF Preselector. They include the following:

- Calibration Application Software
- RF Type-M Troubleshooting Cables
- USB Keyboard and Mouse
- USB Storage Device
- Test Equipment

Calibration Application Software

Information regarding the Agilent N7817A RF Preselector Calibration Application Software can be found at the following web site:

www.agilent.com/find/calibrationsoftware

RF Type-M Troubleshooting Cables

The RF Type-M troubleshooting cables are required to verify the RF signal paths to the Input and Filter Boards.

Agilent Part	Agilent Part Number	Recommended Quantity
Cable, BNC (m) to M-Type (m)	N9039-60034	2
Adapter, BNC (f) to BNC (f)	1250-0080	1

USB Keyboard and Mouse

A USB keyboard and mouse will be needed to accomplish many of the different troubleshooting tasks, as well as updating the instrument software. Any standard USB keyboard and mouse should work.

USB Storage Device

The main reason why a USB storage device will be needed is to backup calibration data when the disk drive in an instrument needs to be replaced. Most any size of storage device can be used, as the size of the file to be backed up is approximately 10 Mega bytes.

Required Test Equipment List

Refer to Table 10-1 on page 244 to identify the equipment recommended for troubleshooting, adjusting, and verifying the performance of the instrument.

After an Instrument Repair

If any instrument assemblies have been repaired or replaced, perform the related adjustments and performance verification tests. These tests are done using the Agilent N7817A RF Preselector Calibration Application Software. Refer to Chapter 8 , “Post-Repair Procedures” for a list of post-repair adjustments and performance tests based on which assembly has been serviced.

Information regarding the Agilent N7817A RF Preselector Calibration Application Software can be found at

http://www.agilent.com/find/calibrationsoftware

Contacting Agilent Technologies

If you have a problem with your instrument, see Chapter 2, “Troubleshooting”. This section contains a checklist that will help identify some of the most common problems.

There is also support on the world-wide web. The address is:

http://www.agilent.com/find/N9039A_support

FAQs, instrument software updates, documentation, and other support information can be accessed from this site.

To obtain servicing information or to order replacement parts, contact the nearest Agilent office listed in Table 1-1. In any correspondence or telephone conversations, refer to the instrument by its model number (N9039A) and full serial number (ex. MY49250887). With this information, the Agilent representative can also quickly determine whether your unit is still within its warranty period.

By internet, phone, or fax, get assistance with all your test and measurement needs.

Table 1-1 Contacting Agilent

Online assistance: `www.agilent.com/find/assist`

United States
(tel) 1 800 829-4444

Japan
(tel) (+81) 426 56 7832
(fax) (+81) 426 56 7840

New Zealand
(tel) 0 800 738 378
(fax) (+64) 4 495 8950

Europe
(tel) (+31) 20 547 2323
(fax) (+31) 20 547 2390

Canada
(tel) 1 877 894 4414
(fax) (905) 282 6495

Latin America
(tel) (305) 269 7500
(fax) (305) 269 7599

Australia
(tel) 1 800 629 485
(fax) (+61) 3 9210 5947

Asia Call Center Numbers

Country	Phone Number	Fax Number
Singapore	1-800-375-8100	(65) 836-0252
Malaysia	1-800-828-848	1-800-801664
Philippines	(632) 8426802 1-800-16510170 (PLDT Subscriber Only)	(632) 8426809 1-800-16510288 (PLDT Subscriber Only)
Thailand	(088) 226-008 (outside Bangkok) (662) 661-3999 (within Bangkok)	(66) 1-661-3714
Hong Kong	800-930-871	(852) 2506 9233
Taiwan	0800-047-866	(886) 2 25456723
People’s Republic of China	800-810-0189 (preferred) 10800-650-0021	10800-650-0121
India	1-600-11-2929	000-800-650-1101

Instrument Serial Numbers

Agilent makes frequent improvements to its products enhancing performance, usability, or reliability. Agilent service personnel have access to complete records of design changes to each type of instrument, based on the instrument's serial number and option designation.

Whenever you contact Agilent about your instrument, have the complete serial number available. This will ensure that you obtain accurate service information.

A serial number label is attached to the rear of the instrument. This label has two instrument identification entries: the first provides the identification number for each option built into the instrument and the second provides the instrument's serial number.

The serial number has two parts: the prefix (two letters and the first four numbers), and the suffix (the last four numbers). Refer to Figure 1-2.

Figure 1-2 Example Serial Number

The first two letters of the prefix identify the country in which the unit was manufactured. The remaining four numbers of the prefix identify the date of the last major design change incorporated in your instrument. The four digit suffix is a sequential number and, coupled with the prefix, provides a unique identification for each unit produced. Whenever you list the serial number or refer to it in obtaining information about your instrument, be sure to use the complete number, including the full prefix and the suffix.

The serial number is located on the rear panel serial sticker or when the instrument is power up, press **System**, **Show, System**. The system information can be very useful for updates and post-sale upgrades.

How to Return Your Instrument for Service

Service Order Number

If an instrument is being returned to Agilent for servicing, the phone numbers are mentioned in Table 1-1, “Contacting Agilent,” on page 27. In order for Agilent to expedite the repair please be as specific as possible about the nature of the failure.

Helpful failure descriptions:

- Signal Level Measures 10 dB too low at 1 GHz
- Preselector can not switch to the bypass path
- N9039A will not complete boot up sequence

Failure descriptions that will most likely increase repair time:

- N9039A Broken
- EMI Receiver will not make accurate Measurements
- Signal Drifts

If you have recorded any error messages that appeared on the instrument display, or have completed a Performance Test Record, or have any other specific data on the performance of the instrument, please send a copy of this information with the instrument.

Original Packaging

Before shipping, pack the unit in the original factory packaging materials if they are available. If the original materials were not retained, see “Other Packaging” on page 30.

Other Packaging

CAUTION Instrument damage can result from using packaging materials other than those specified. Never use styrene pellets in any shape as packaging materials. They do not adequately cushion the equipment or prevent it from shifting in the carton. They cause equipment damage by generating static electricity and by lodging in the instrument louvers, blocking airflow.

You can repackage the instrument with commercially available materials, as follows:

1. Protect the control panel with cardboard.
2. Wrap the instrument in antistatic plastic to reduce the possibility of damage caused by electrostatic discharge.
3. Use a strong shipping container. A double-walled, corrugated cardboard carton with 159 kg (350 lb) bursting strength is adequate. The carton must be both large enough and strong enough to accommodate the instrument. Allow at least 3 to 4 inches on all sides of the instrument for packing material.
4. Surround the equipment with three to four inches of packing material and prevent the equipment from moving in the carton. If packing foam is not available, the best alternative is S.D.-240
   Air Cap™ from Sealed Air Corporation, Hayward, California, 94545.

   Air Cap looks like a plastic sheet filled with 1-1/4 inch air bubbles. Use the pink-colored Air Cap to reduce static electricity. Wrapping the equipment several times in this material should both protect the equipment and prevent it from moving in the carton.
5. Seal the shipping container securely with strong nylon adhesive tape.
6. Mark the shipping container “FRAGILE, HANDLE WITH CARE” to assure careful handling.
7. Retain copies of all shipping papers.

2 Troubleshooting

What You Will Find in This Chapter

This chapter provides information that is useful when starting to troubleshoot an RF Preselector. It includes procedures for troubleshooting common failures and provides information on isolating problems in the instrument.

The following sections are found in this chapter:

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Check the Basics

Before calling Agilent Technologies or returning the instrument for service, please make the following checks:

1. Is there power at the power outlet? At the power receptacle on the instrument?
2. Is the instrument turned on? Check to see if the front panel LED is green, which indicates the power supply is on.
3. If other equipment, cables, and connectors are being used with the instrument, make sure they are connected properly.
4. Review the procedure for the measurement being performed when the problem appeared. Are all the settings correct?
5. If the instrument is not functioning as expected, return the unit to a known state by pressing the **Preset** key.
6. Is the measurement being performed, and the results that are expected, within the specifications and capabilities of the instrument? Refer to the specifications book for specifications.
7. Check to see if the instrument has the latest firmware before starting the troubleshooting procedure. Press **System**, **Show System**. The firmware revision is listed under **Firmware Revision**. For more information, refer to Chapter 9 , “Instrument Software”.

Instrument Boot Up Process

This section describes the N9039A RF Preselector boot up process from initial AC power through the loading of the N9039A RF Preselector application software. The boot process time from start to finish should take ~2 minutes.

Typical instrument boot-up process flow

1. Plug in the AC power cord from a known good AC power source into the rear panel of the instrument.
2. The yellow Standby LED illuminates on the instrument front panel to the left-hand side of the On/Off button. If the yellow Standby LED is not illuminating refer to the "Yellow Standby LED Does Not Illuminate" section in this chapter.
3. To turn the instrument on, press the On/Off button. The yellow Standby LED should turn off and the green Power On LED should illuminate. A green Power On LED indicates that the power supply has received an "On" command from the A4 Processor assembly. If the green Power On LED is not illuminating refer to the "Green Power On LED Does Not Illuminate" section in this chapter.

NOTE If the instrument AC power source was removed by the operator by pulling the power cord or by turning off the instrument via a power main switch on a test rack, the instrument will automatically power on without having to press the On/Off button on the front panel.

4. All three instrument fans should start running. The fans are mounted on the left-hand side of the instrument and draw air into the instrument to cool the internal circuitry. If all fans are not running refer to the "Fan(s) Are Not Operating" section in this chapter.
5. The Agilent Technologies splash screen is displayed in white font on a dark background for ~5-10 seconds after the instrument is turned on. If the Agilent Technologies logo is not displayed refer to the "No Agilent Splash Screen Displayed" section in this chapter. If the instrument hangs at the Agilent Technologies splash screen refer to the "Instrument Hangs at the Agilent Splash Screen" section in this chapter.
6. Verify text is displayed on screen where the user has the option of booting Windows XP or running the Agilent Recovery System. The default selection is to boot Windows XP. If a recovery is required, press the Down Arrow key on the front panel of the instrument within 5 seconds to highlight "Agilent Recovery System" and press the Enter key on the instrument, otherwise Windows XP will begin to boot. If the Windows XP boot screen is not displayed within a few seconds refer to the "Instrument Cannot Completely Load or Run the Operating System" section in this chapter.

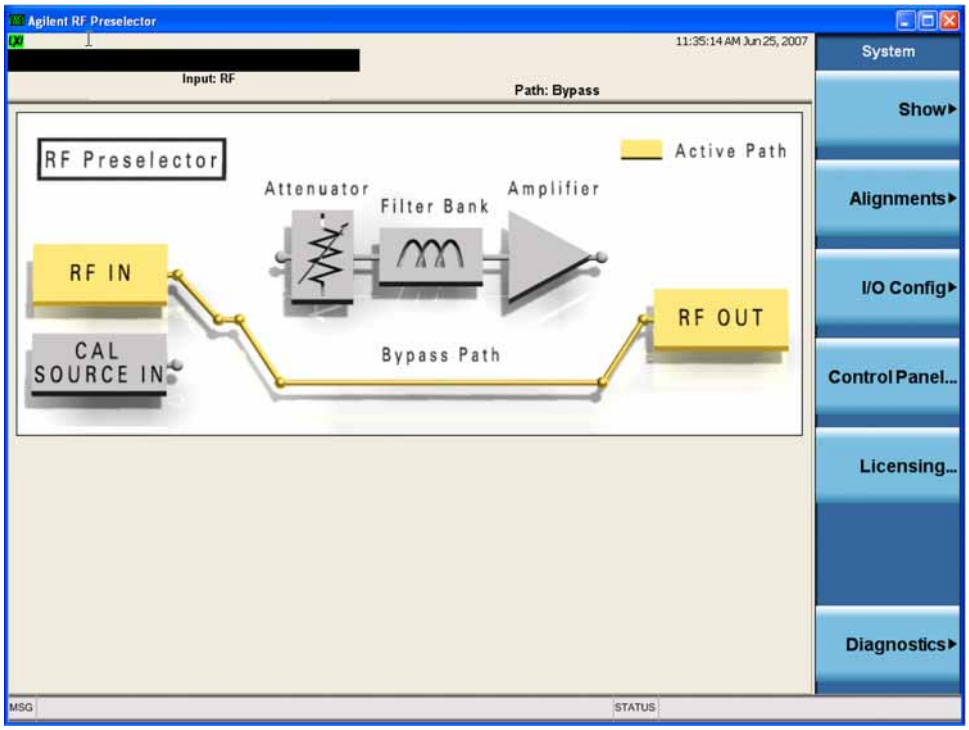
7. If the recovery system is not selected the Windows XP Professional operating system will begin to boot up. This will take ~20-30 seconds.

NOTE If a recovery was selected follow the on-screen instructions and perform a system recovery. Additional information about performing a system recovery can be found in the "A5 Disk Drive Assembly" section in this chapter.

8. Agilent Technologies logo is displayed in white font on a blue background while Windows finishes loading user preferences. If this does not occur refer to the "Instrument Cannot Completely Load or Run the Operating System" section in this chapter.
9. By default, the initialization process of the N9039A RF Preselector application begins loading. If any of the initializing processes did not complete, refer to the "Initializations Did Not Complete" section in this chapter.

Once the N9039A RF Preselector application is fully initialized and aligned, the display should resemble Figure 2-1. This completes the boot process from initial AC power through the loading of the N9039A RF Preselector application software.

Figure 2-1 Instrument Display at Power-up



Potential Problems During Boot Process

This section describes potential problems that may occur if there is an internal hardware issue that prohibits the N9039A from completing a full boot up to the RF Preselector application.

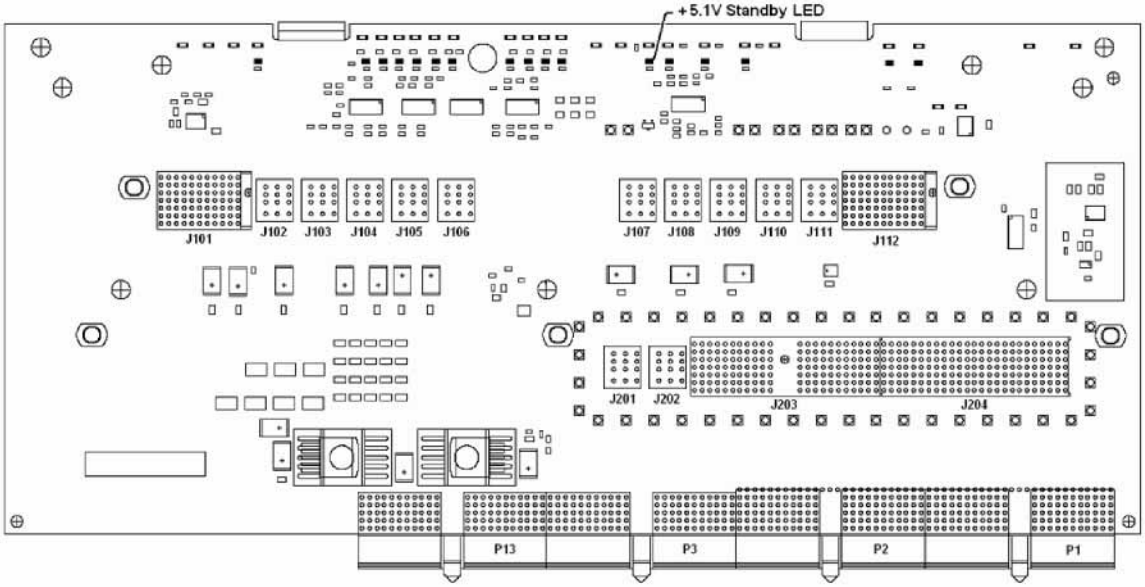
Yellow Standby LED Does Not Illuminate

Control of the yellow front panel Standby LED comes from the A4 Processor board assembly. This signal is routed through the A7 Midplane board and is then buffered on the A8 Motherboard before being sent to the A1A2 Front Panel Interface board through W1. Of course, the power for this all originates with the A6 Power Supply Assembly. When the Standby LED does not come on it could be due to any one of these assemblies. This procedure will help to determine which one is the cause.

If the instrument turns on and operates properly but the yellow Standby LED does not work then all that will need to be done is to trace where the control signal for the LED is being lost using the routing information in the preceding paragraph.

1. The Standby LED will only turn on when the instrument is connected to an AC source that has a voltage level and frequency of that specified for the instrument. Before proceeding verify that these requirements are being met. Refer to the instrument rear panel for these requirements.
2. Remove the AC power cord and then remove the instrument cover. Refer to the Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.
3. Referring to Figure 2-2, verify the +5.1V Standby LED on the A7 Midplane board is on (green).

Figure 2-2 A7 Midplane Board +5.1V Standby LED



NOTE Most DC power supplies come from the A6 Power Supply assembly. However, the most convenient measurement location for all the DC supplies is the A7 Midplane. All power supply LED's are accessible once the instrument cover has been removed.

Is the +5.1V Standby LED on the A7 Midplane board on?

If yes:

After verifying that the connections from the yellow front panel Standby LED back to the A4 Processor board are not at fault, replace the A4 Processor board.

If not:

Replace the A6 Power Supply assembly.

NOTE Before replacing the power supply, verify the midplane and motherboard interconnects are mechanically secure.

Green Power On LED Does Not Illuminate

Control of the green front panel Power On LED comes from the A4 Processor board assembly. This signal is routed through the A7 Midplane board and is then buffered on the A8 Motherboard before being sent to the A1A2 Front Panel Interface board through W1. Of course, the power for this all originates with the A6 Power Supply Assembly. When the Power On LED does not come on it could be due to any one of these assemblies. This procedure will help to determine which one is the cause.

This procedure assumes that the yellow Standby LED does turn on when the AC power is connected to the rear panel of the instrument. If it doesn't, refer to the "Yellow Standby LED Does Not Illuminate" section before proceeding.

If the instrument turns on and operates properly but the green Power On LED does not work then all that will need to be done is to trace where the control signal for the LED is being lost using the routing information in the preceding paragraph.

1. The Power On LED will only turn on when the instrument is connected to an AC source that has a voltage level and frequency of that specified for the instrument and the front panel On/Off button has been pressed. Before proceeding verify that these requirements are being met. Refer to the instrument rear panel for these requirements.
2. Remove the AC power cord and then remove the instrument cover. Refer to Chapter 7, "Assembly Replacement Procedures," on page 161 in this manual.
3. Remove the MP7 Top Brace. Refer to Chapter 7, "Assembly Replacement Procedures," on page 161 in this manual.
4. With AC power connected to the rear of the instrument but without turning it on, leaving it in standby mode, measure the voltage at Test Point 518 (POWER_ON) of the A7 Midplane board assembly. See Figure 2-3 for Test Point 518 location.

Does the voltage at Test Point 518 measure 5 VDC?

If yes:

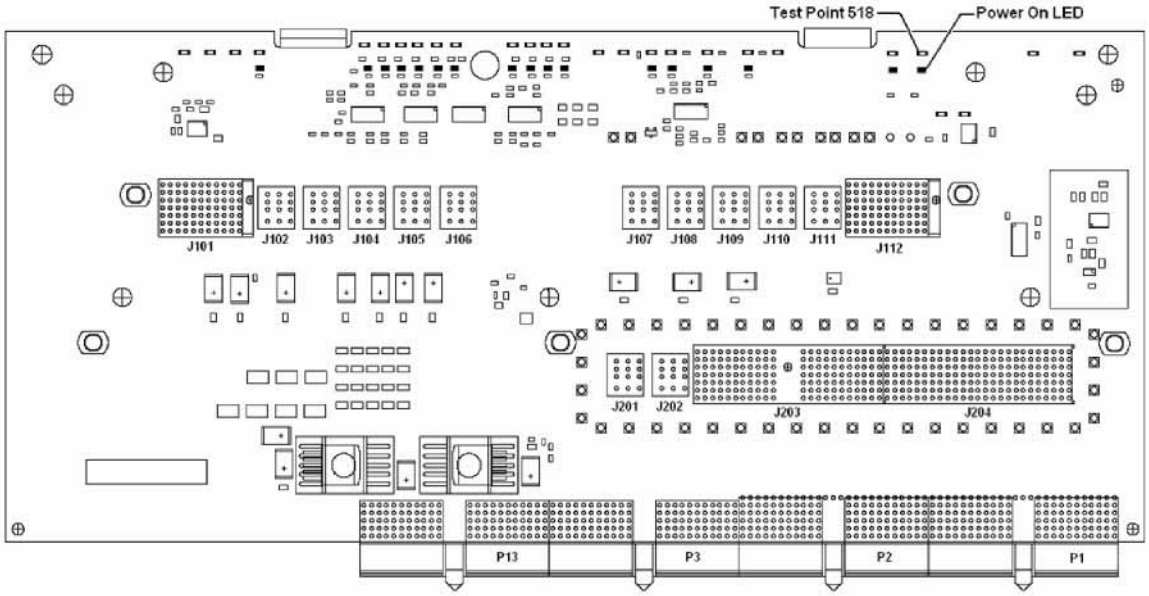
Proceed to step 5.

If not:

Replace the A6 Power Supply assembly.

NOTE Before replacing the power supply, verify the midplane and motherboard interconnects are mechanically secure.

Figure 2-3 A7 Midplane Board - Test Point 518/Power_On LED



5. Turn the instrument power on from the front panel On/Off button and view the status of the Power_On LED, as shown in Figure 2-3.

   Does the Power_On LED come on? (Test Point 518 should also go to 0 VDC)

   If yes:

   Proceed to step 6.

   If not:

   After verifying that the connections from the front panel On/Off button back to the A4 Processor board are not at fault, replace the A4 Processor board.

6. Do all of the red power supply LEDs along the top of the A7 Midplane board go off when the power is turned on?

   If yes:

   After verifying that the connections from the front panel On/Off button back to the A4 Processor board are not at fault, replace the A4 Processor board.

   If not:

   Replace the A6 Power Supply assembly.

NOTE Before replacing the power supply, verify the midplane and motherboard interconnects are mechanically secure.

Fan(s) Are Not Operating

Control of the instrument fans comes from the A6 Power Supply assembly. This signal is routed from the A6 Power Supply through the A7 Midplane board, where there is a test point and LED to monitor the level, and is then routed to the A8 Motherboard where it is filtered before being sent to the Fans. When the Fans do not come on it could be due to any one of these assemblies. This procedure will help to determine which one is the cause.

This procedure assumes that the green Power On LED on the front panel does turn on when the instrument is turned on. If it doesn't, refer to the "Green Power On LED Does Not Illuminate" section before proceeding.

1. The instrument fans will only turn on when the instrument is connected to an AC source that has a voltage level and frequency of that specified for the instrument and the front panel On/Off button has been pressed. Before proceeding verify that these requirements are being met. Refer to the instrument rear panel for these requirements.
2. Remove the AC power cord and then remove the instrument cover. Refer to the Chapter 7, "Assembly Replacement Procedures," on page 161 in this manual.
3. Are all three fans not spinning?

   If yes:

   Proceed to step 4.

   If not:

   Proceed to step 6.
4. Remove the MP7 Top Brace. Refer to Chapter 7, "Assembly Replacement Procedures," on page 161 in this manual.
5. Referring to Figure 2-4, verify that the Fan Supply Failure LED on the A7 Midplane board is off.

   Is the Fan LED off?

   If yes:

   Measure the voltage level at Test Point 522 on the A7 Midplane board.

   Is the Test Point 522 voltage between +7 and +15 VDC?

   If yes:

   Proceed to step 6.

   If not:

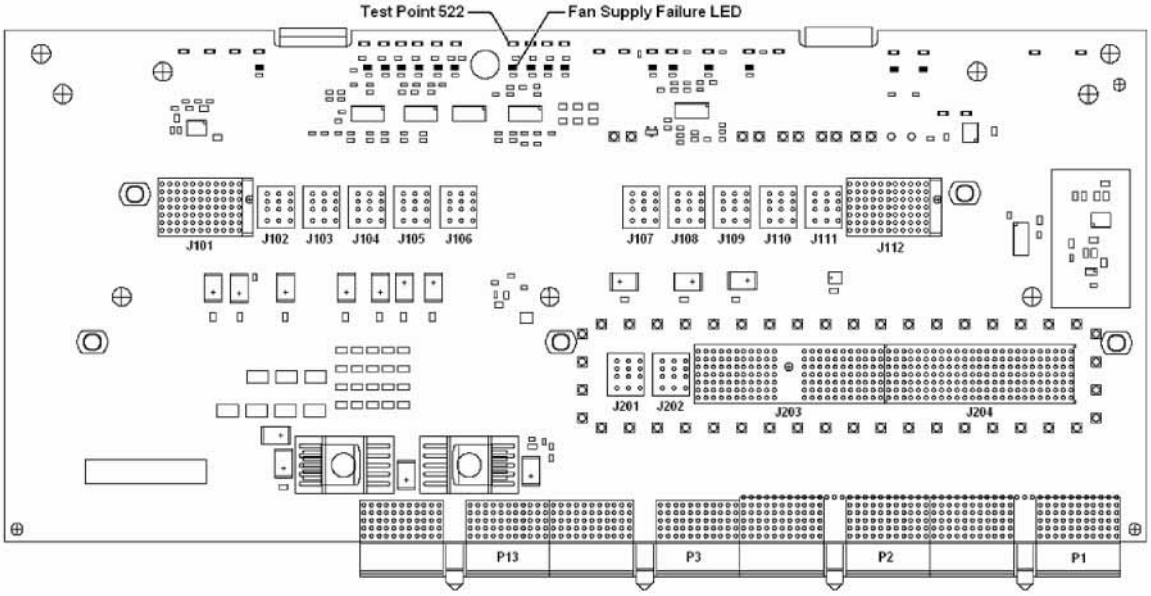
   Replace the A6 Power Supply assembly.

If not:

Replace the A6 Power Supply assembly.

NOTE Before replacing the power supply, verify the midplane and motherboard interconnects are mechanically secure.

Figure 2-4 A7 Midplane Board - Fan Supply Failure LED / Test Point 522



6. With the instrument turned off, and the AC power cord removed, remove the Fan Assembly including unplugging all fans from the A8 Motherboard. Refer to Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.

7. Turn the instrument power back on and measure the fan voltage at all three of the fan connectors (J6, J7, & J8) on the A8 Motherboard.

   Each connector has three pins. The outer conductors on all connectors are the FAN_P supply and the center conductors are FAN_N. The voltage between FAN_P and chassis ground should be between +7 and +15 VDC on all three connectors.

Does the A8 Motherboard fan connector for the fan(s) that do not work have the required voltage level?

If yes:

Replace the fan(s) that is not working

If not:

After verifying that the connections between the A7 Midplane board and the A8 Motherboard are mechanically and electrically secure replace the A8 Motherboard.

No Agilent Splash Screen Displayed

(Black background with white “Agilent Technologies” text)

A problem of not displaying the Agilent splash screen could be caused by many different things. It could be due to a down power supply, a processor hardware problem, an instrument boot-up process error, a display section failure, etc.

This procedure assumes that the green Power On LED on the front panel does turn on when the instrument is turned on. If it doesn't, refer to the “Green Power On LED Does Not Illuminate” section before proceeding.

1. Remove the AC power cord and then remove the instrument cover. Refer to Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.
2. Remove the MP7 Top Brace. Refer to Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.
3. With the AC power applied and the On/Off button turned on, verify that all of the power supply voltages are at their proper level. This can easily be done by viewing the power supply LEDs on the back side of the A7 Midplane board. See the “A7 Midplane Board Assembly” section in this chapter.

   Are all of the power supply voltages at the proper level?

   If yes:

   Proceed to step 4.

   If not:

   After verifying that the connections between the A6 Power Supply, the A7 Midplane board, and the A8 Motherboard are all mechanically and electrically secure, replace the A6 Power Supply assembly.
4. Connect an external VGA monitor to the rear panel display output.

   Does the external monitor display the correct information?

   If yes:

Proceed to the "Troubleshooting a Blank Display" section in this chapter.

If not:

Replace the A4 Processor Board assembly.

Instrument Hangs at the Agilent Splash Screen

A problem of the instrument hanging at the Agilent splash screen could be caused by many different things. It could be due to a down power supply, a processor hardware problem, an instrument boot-up process error, etc.

1. Remove the AC power cord and then remove the instrument cover. Refer to Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.
2. Remove the MP7 Top Brace. Refer to Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.
3. With the AC power applied and the On/Off button turned on, verify that all of the power supply voltages are at their proper level. This can easily be done by viewing the power supply LEDs on the back side of the A7 Midplane board. See the “A7 Midplane Board Assembly” in this chapter.

   Are all of the power supply voltages at the proper level?

   If yes:

   After verifying that the connections from the A7 Midplane board to the A4 Processor board are not at fault, replace the A4 Processor board.

   If not:

   After verifying that the connections between the A6 Power Supply, the A7 Midplane board, and the A8 Motherboard are all mechanically and electrically secure, replace the A6 Power Supply assembly.

PCI Enumeration Error

When the instrument is first booting up it runs some BIOS level self tests, one of which is that of the devices on the PCI bus. If there is a problem with a device on the PCI bus a “PCI enumeration” error may be seen on the boot screen. Since the only assembly connected to the PCI bus, other than the A4 Processor board, is the A3 Digital I/O assembly, try removing this assembly and rebooting the instrument to see if the error goes away. Of course, you will have other error messages due to this assembly being missing, but this will allow you to isolate this particular error.

Instrument Cannot Completely Load or Run the Operating System

A problem of the instrument not loading the operating system can be caused by a few different things. It could be due to a down power supply, a processor hardware problem, an instrument boot-up process error, corrupt disk drive, etc.

This procedure assumes that the instrument can get past the Agilent splash screen at power on. If it doesn't, refer to the “Instrument Hangs at the Agilent Splash Screen” section before proceeding.

1. Verify that there are no external USB storage devices connected to the instrument.
2. Does the instrument get far enough along in the boot process to run the “Agilent Recovery System”?

   If yes:

   Run the Agilent Recovery System by referring to the “Disk Drive Recovery Process” section in this chapter. If this does not correct the problem replace the A5 Disk Drive.

   If not:

   Replace the A5 Disk Drive.

Troubleshooting a Blank Display

This section is intended to troubleshoot a display system problem that would cause the internal LCD to be blank. It is assumed that the rest of the instrument is booting up and functioning properly. To determine if the problem is an internal display issue only, connect an external VGA monitor to the rear panel display output. If the rear panel display output is also not working go to the “No Agilent Splash Screen Displayed” section in this chapter.

Once it has been determined that the rest of the instrument appears to be functioning properly there are a few possible problems that could be causing the display to be blank. They are:

- An LCD Backlight inverter problem
- A video signal path integrity problem
- A video controller / LCD problem

Verify LCD Backlight Functionality

There are two backlights within the LCD assembly, one across the top and one across the bottom. If only one of the backlights has burnt out, the other will still function. Considering this fact, as well as the fact that the expected life span of the backlights is much longer than the LCD itself, it is not very likely that the backlights themselves would cause a completely blank display.

To determine if a blank display problem is backlight related:

1. Remove the AC power cord and then remove the instrument cover. Refer to Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.
2. Remove the MP7 Top Brace. Refer to Chapter 7, “Assembly Replacement Procedures,” on page 161 in this manual.
3. Turn the instrument on and allow enough time for it to completely boot-up.
4. Shine a bright light at the display and look closely for the expected information (a large flashlight should work). Since most of the display section of the screen has a black background you will need to look at either the area next to the softkeys or the area across the top of the screen, since these sections will have the largest areas of lighter information in them.
5. Can the expected display information now be seen?

   If yes:

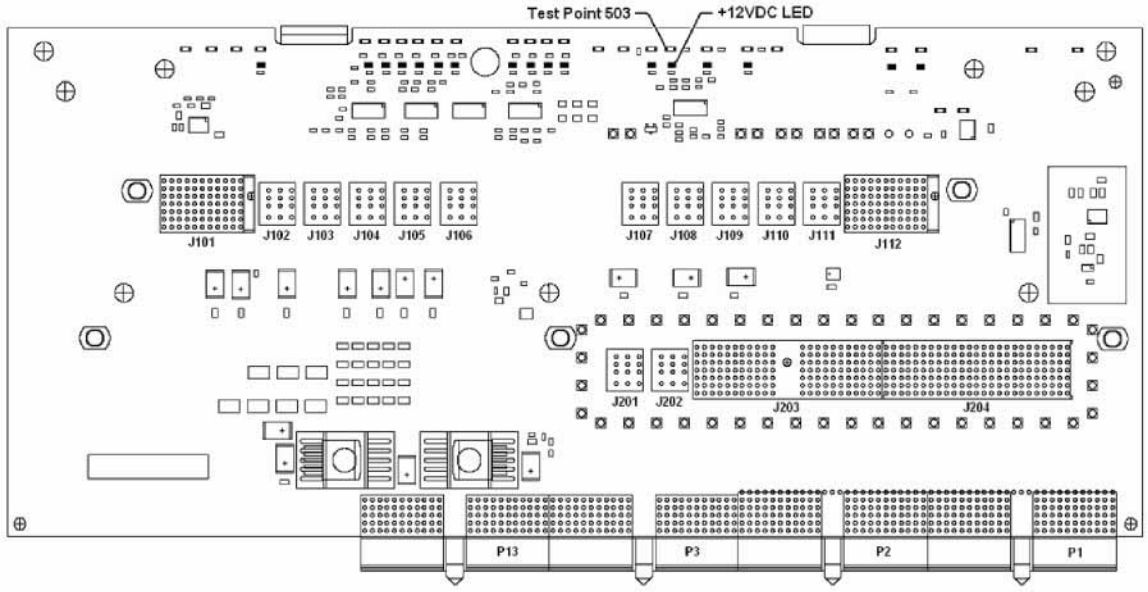
   The problem is backlight related. Proceed to step 6.

   If not:

   The problem is not backlight related. Skip to “Verify Video Signal Path Integrity”.

6. Referring to Figure 2-5, verify that the red +12D VDC LED is off.

Figure 2-5 A7 Midplane Board +12D VDC LED/Test Point 503



Is the red +12D VDC backlight supply voltage fault LED off?

If yes:

Proceed to step 7.

If not:

Replace the A6 Power Supply assembly.

7. With the instrument turned off remove the screws that attach the front panel assembly to the instrument chassis.
8. Without disconnecting any of the cables carefully lay the front panel assembly face down on the work surface.
9. Referring to Figure 2-6, verify the 3 voltage levels listed in Table 2-1 are correct.

NOTE The instrument does have a screen saver which can disable the display backlight after a predefined period of time. If there is any question as to whether or not this has been set by the user prior to the current failure, and the “Inverter Enable” voltage measures too low, press a front panel key and see if the voltage level increases to the expected level.

Figure 2-6 A1A2 Front Panel Interface Board LCD Backlight Inverter Control Voltages

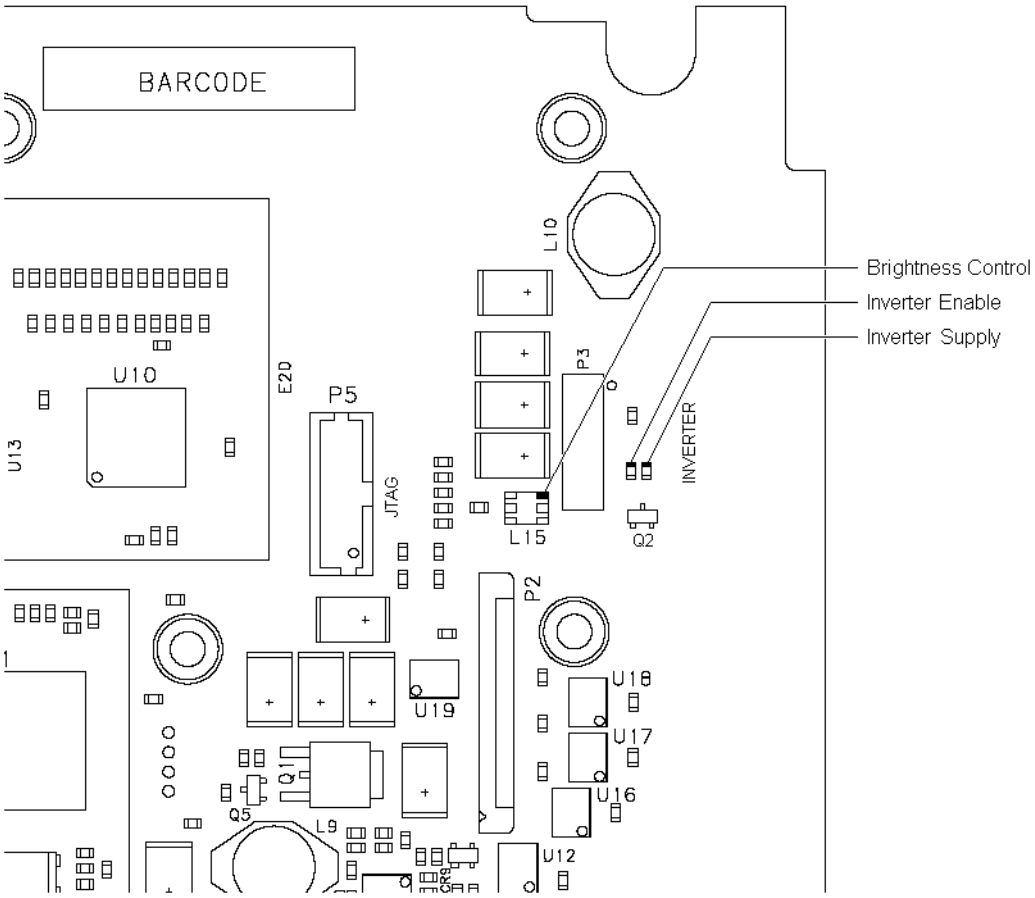


Table 2-1 Expected Backlight Inverter Control Voltage Levels

Signal	Expected Voltage
Brightness Control	0 to 3 VDC
Inverter Enable	>6 VDC
Inverter Supply	+12 VDC

10. Are all of the 3 voltage levels within their expected ranges?

If yes:

Replace the A1A4 LCD Inverter board.

If not:

Replace the A1A2 Front Panel Interface board.

Verify Video Signal Path Integrity

The video controller is located on the A4 Processor assembly and is routed to the front panel LCD through a few interconnections. These interconnections are:

- A4 Processor assembly to A7 Midplane Board
- A7 Midplane Board to A8 Motherboard assembly
- A8 Motherboard assembly to A1A2 Front Panel Interface assembly via W1 ribbon cable
- A1A2 Front Panel Interface to A1A3 LCD via A1W1 flex-circuit

If all of these connections are properly made and none of the cables are damaged proceed to “Video Controller / LCD Troubleshooting”.

Video Controller / LCD Troubleshooting

The video controller is located on the A4 Processor assembly. The video signals that the controller outputs are LVDS. As described above, these signals are routed to the LCD via the A7 Midplane Board, A8 Motherboard, and A1A2 Front Panel Interface board.

On the A1A2 Front Panel Interface board the LVDS signals are buffered and then sent to the LCD via the A1W1 Flex circuit.

The most likely cause for a video problem is the A4 Processor assembly; however it could be the result of a defective LCD.

Initializations Did Not Complete

During the initialization of the N9039A RF Preselector Application the following messages will be displayed on the application splash screen:

- Checking for required services.... (1 of 7)
- Initializing License Services.... (2 of 7)
- Initializing Hardware.... (3 of 7)
- Initializing Hardware2.... (4 of 7)
- Initializing Data Service.... (5 of 7)
- Initializing Message Service.... (6 of 7)
- Initializing Front Panel EEPROM HDR.... (7 of 7)

If there is a problem with any of these initializations not completing or causing an error message to be displayed refer to the instrument Event Log. This can be accessed by using an external USB keyboard and mouse and selecting Start, Run, enter Eventvwr.exe, and select OK.

Once the Event Viewer comes up, look under SA for the latest error entries. Double-click on the entries to view further details, which should give you some idea of what the problem is.

A3 - Digital I/O Board Assembly

The A3 Digital I/O board assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”.

The A3 Digital I/O board assembly performs two important functions:

1. System synchronization
2. RF Preselector Filter hardware control

System Synchronization

There are two synchronization pulses generated on this assembly that are required for the PSA EMI Measurement Receiver system to trigger properly when the N9039A RF Preselector is being used in the Filter mode. These are rear panel connections labeled:

External Trigger Out

Triggers a new sweep of the PSA

Pulse Trigger 2 Out

Gates the sweep of the PSA by providing a trigger pulse when the filter being used is properly tuned to the frequency required.

There is no way to control these signals for troubleshooting purposes, nor are they active, with the instrument by itself. The only way to measure these signals is to have the instrument under control of a PSA in EMC Analyzer mode with the Preselector Path being set to Filter. See the PSA EMI Measurement Receiver Guide (Option 239) for details on how this is done.

With the N9039A RF Preselector configured properly in a PSA EMI Measurement Receiver the two trigger outputs can be seen. To do this place a BNC tee in both trigger lines, one end of each going to the correct PSA trigger input and the other going to an oscilloscope input. If the system is configured with the following settings you should see signals on the oscilloscope similar to those seen in Figure 2-7, where channel 1 is the External Trigger Out and channel 2 is Pulse Trigger 2 Out.

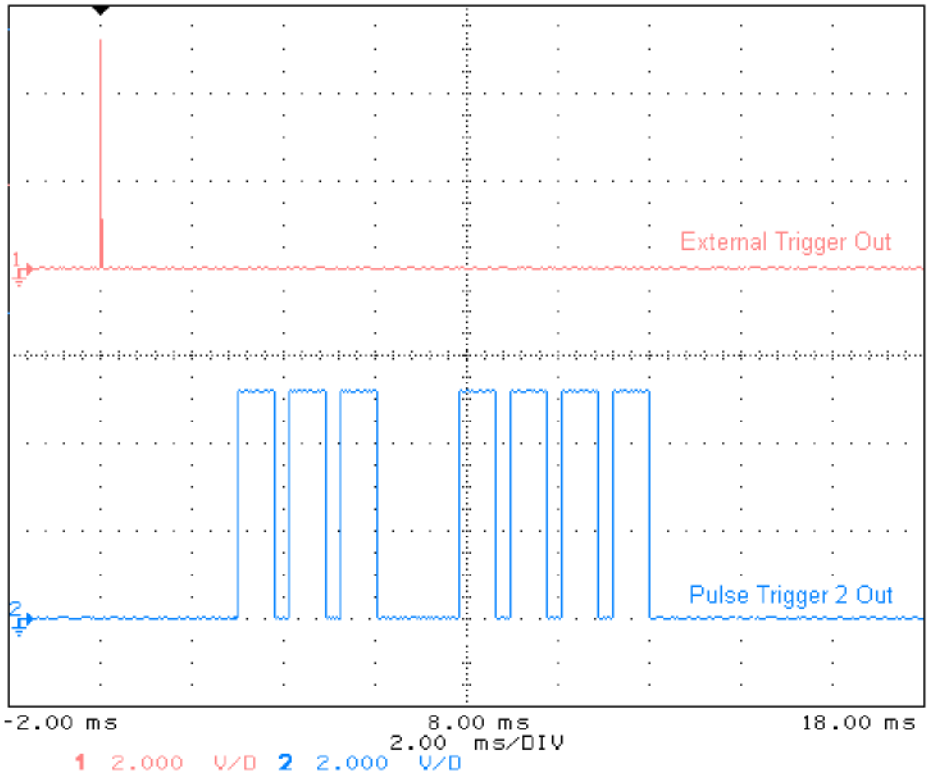
Use Presel = **Yes**

Presel Path = **Filter**

Center Frequency = **100 MHz**

Frequency Span = **2 MHz**

Figure 2-7 Trigger Output Timing Example



RF Preselector Filter Hardware Control

The A3 Digital I/O board assembly provides all of the communication to the four RF input and filter boards via the Instrument Local Bus (ILB), which it is the controller of. If the instrument is powered-up and appears to be running, but there is a problem with the control of the filter boards, the A3 Digital I/O board assembly would be the suspect assembly.

FPGA Code

The A3 Digital I/O board assembly also contains FPGA program code stored on it that is loaded at boot up. This code is updated, if necessary, when the instrument software is updated. Interruption of the FPGA update process can result in an A3 Digital I/O board being rendered non-functional, requiring a replacement board assembly. For more information on updating the N9039A instrument software see Chapter 9 , “Instrument Software”.

If the FPGA code has loaded properly at instrument power-up there will be three LEDs on the bottom side of the board on, two of which will be flashing.

PCI Enumeration Error

When the instrument is first booting up it runs some BIOS level self tests, one of

which is that of the devices on the PCI bus. If there is a problem with a device on the PCI bus a “PCI enumeration” error may be seen on the boot screen. Since the only assembly connected to the PCI bus, other than the A4 Processor board, is the A3 Digital I/O board assembly, try removing this assembly and rebooting the instrument to see if the error goes away. Of course, you will have other error messages due to this assembly being missing, but this will allow you to isolate this particular error.

A4 Processor Board Assembly

The A4 Processor board assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”.

Boot-Up or Initialization Problems

Typical failures of the A4 Processor board assembly will cause the instrument to not boot-up or initialize properly. Of course, these types of failures can also be caused by a variety of other assemblies as well. In order to determine whether a problem such as this is being caused by a defective A4 Processor board assembly, first see the section in this chapter titled “Instrument Boot Up Process” to eliminate other possibilities.

BIOS Settings

As with other types of PC processor board assemblies the N9039A A4 Processor board assembly has a number of settings particular to the hardware on the board. These settings are saved in a separate memory location on the board and accessed by the BIOS (Basic Input Output System) Setup Utility. If these settings are changed from those that the instrument was initially shipped with this could cause a problem with the booting and/or functionality of the instrument.

If the instrument is having a problem booting up, but is functional enough to enter the BIOS Setup Utility you will want to verify that the BIOS settings have not been changed. The instrument was originally shipped with the settings shown in Figure 2-9 through Figure 2-13.

Accessing BIOS Setup Utility

To access the BIOS Setup Utility you will need to have an external USB keyboard connected to the instrument. Then, when the initial Agilent Technologies splash screen is displayed at power-up, press F2 on the keyboard. Once this is pressed you should see a display like that of Figure 2-8 just prior to entering the BIOS Setup Utility.

If you select to use the “Load Setup Defaults” function found on the BIOS Exit menu (Figure 2-13) you will then need to reset two settings. They are:

- “CK-408 Spread Spectrum” to “Enabled” (Figure 2-11)
- “IDE 2:” under “Boot priority order:” to position “1” (Figure 2-12)

Figure 2-8 F2 at Instrument Boot-Up

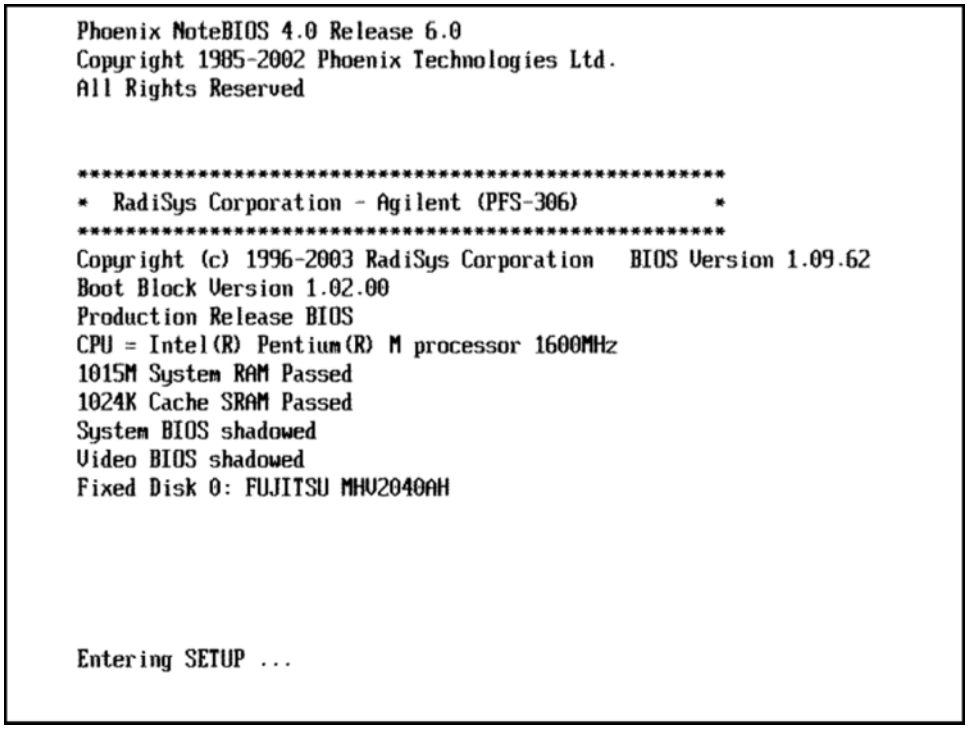


Figure 2-9 BIOS Main Menu

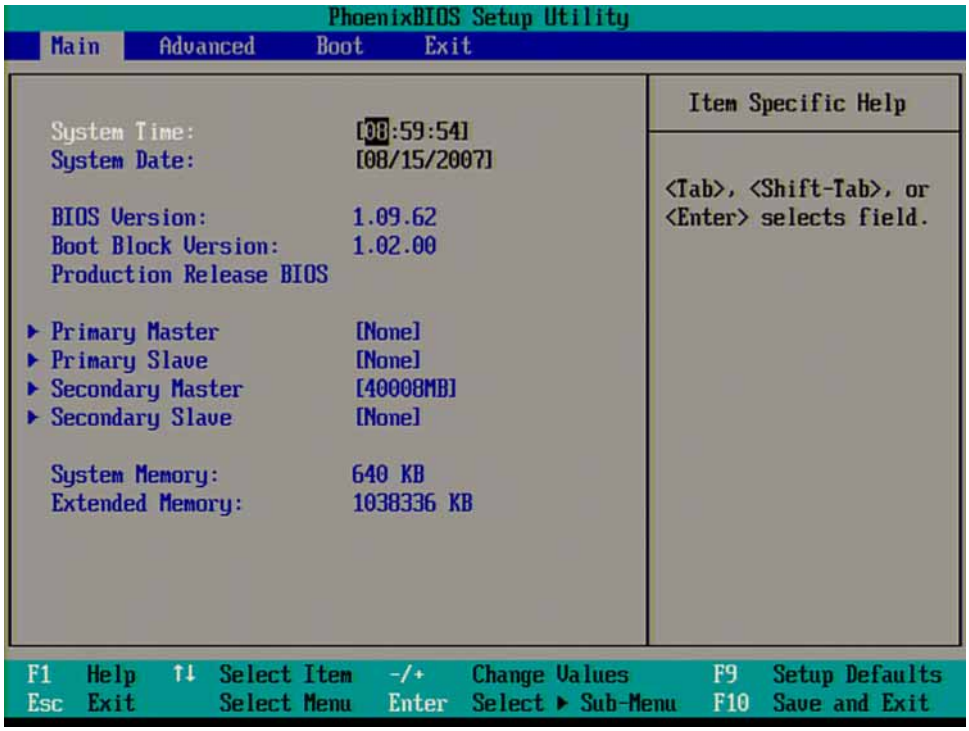


Figure 2-10 BIOS Secondary Master Menu

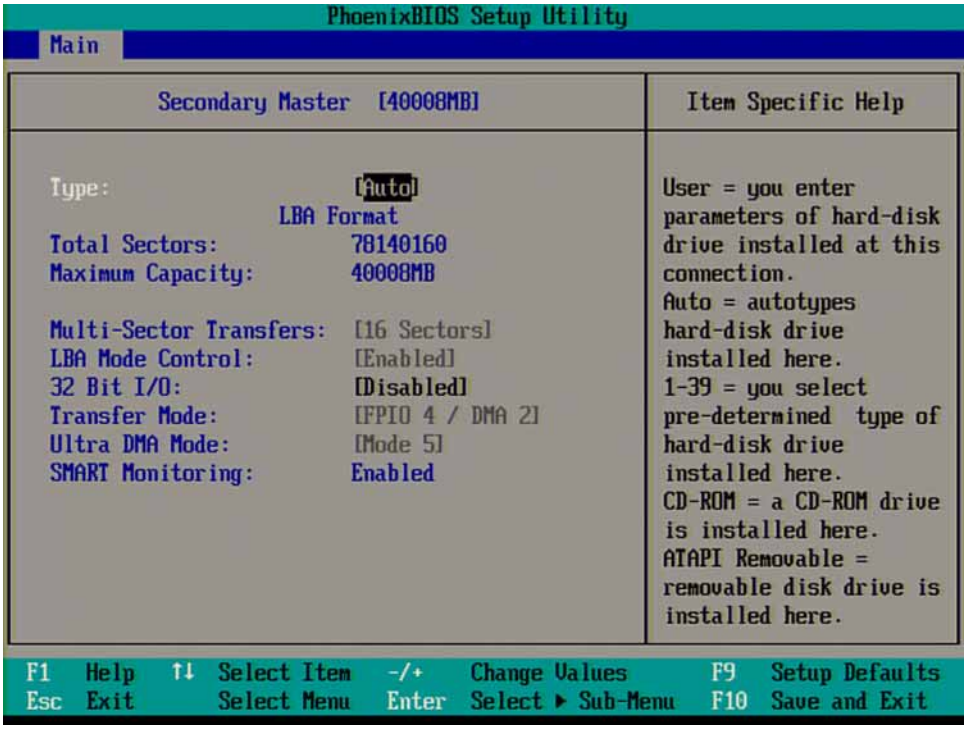


Figure 2-11 BIOS Advanced Menu

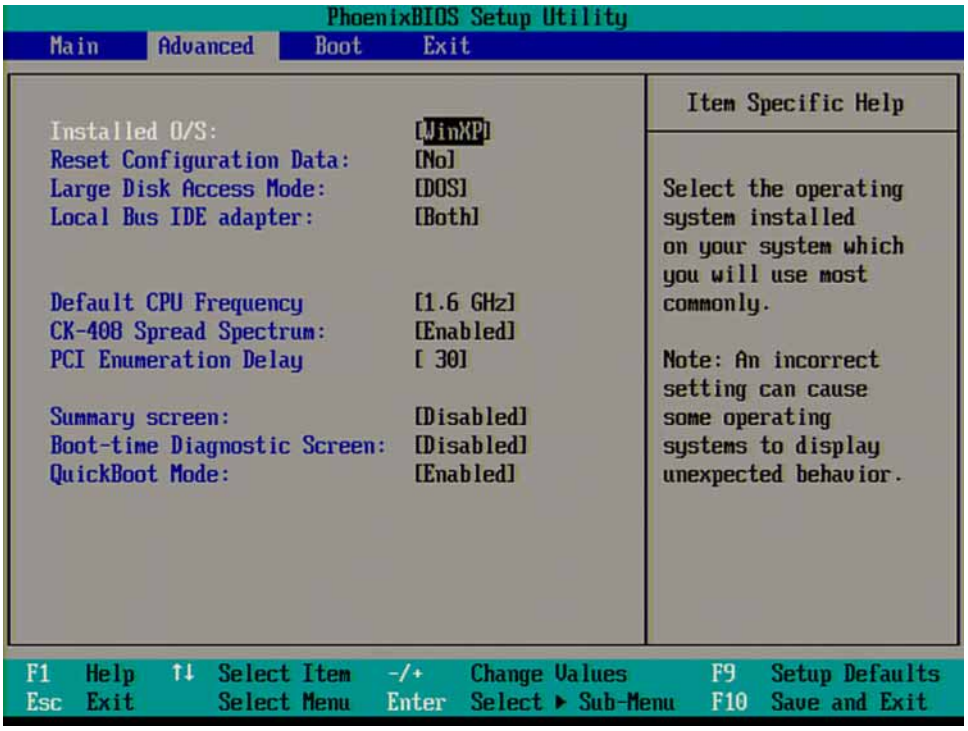


Figure 2-12 BIOS Boot Menu

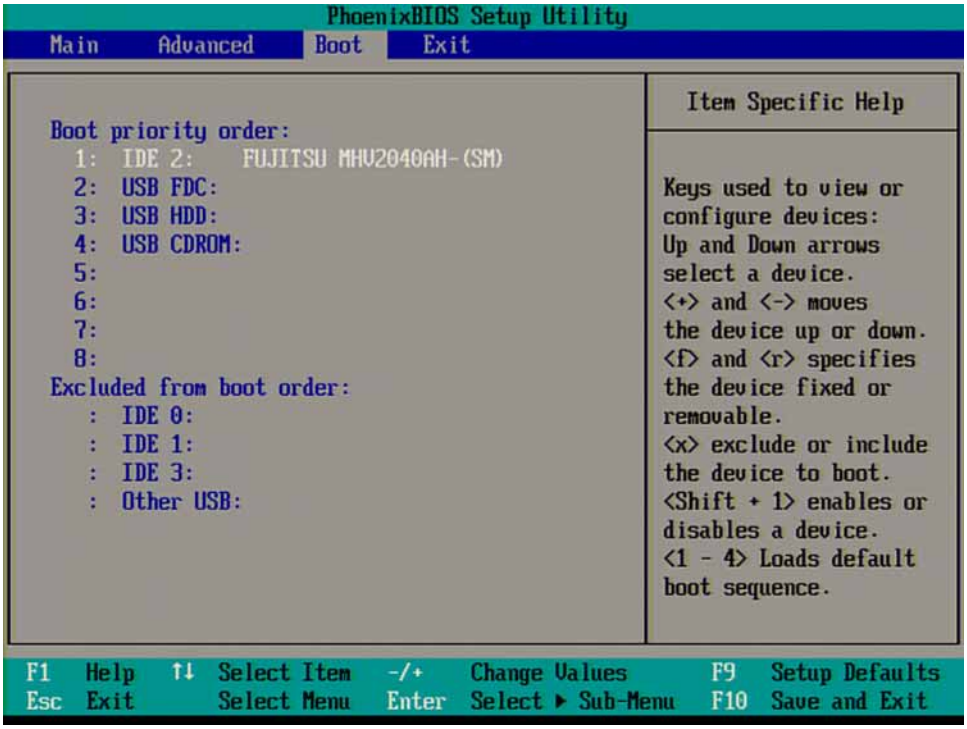
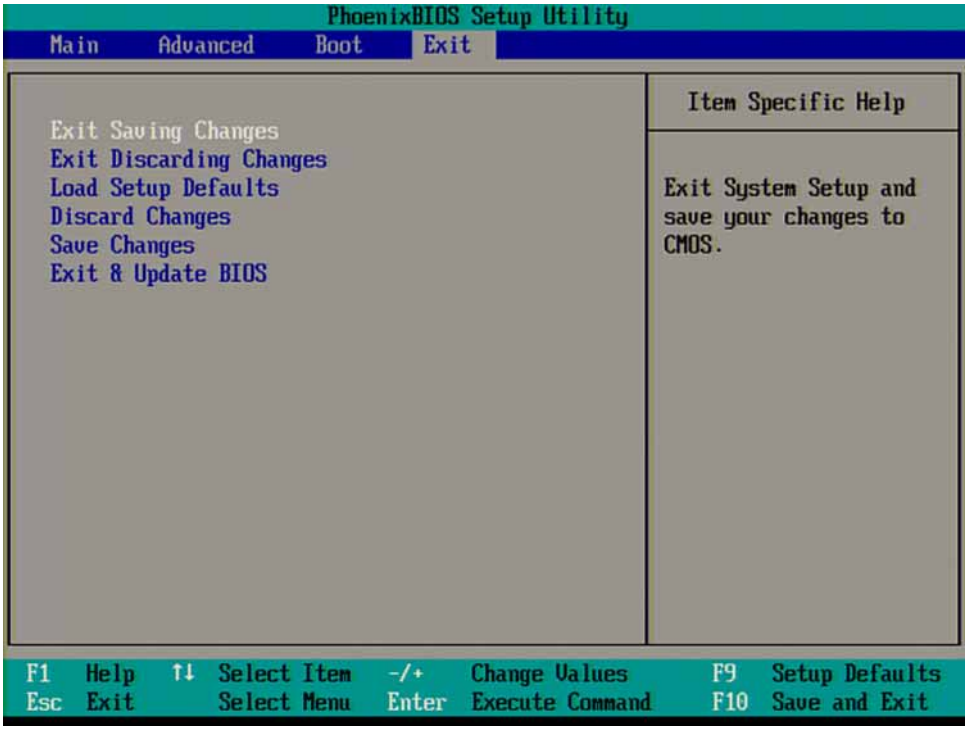


Figure 2-13 BIOS Exit Menu



A5 Disk Drive Assembly

For details on the portioning and instrument use of this assembly see Chapter 3, “Assembly Descriptions”.

Failures of the A5 Disk Drive assembly can be either hardware or software related. The first step would be to determine if the failure is software related; as all hardware related failures will require the replacement of the assembly.

Typical failures of the A5 Disk Drive assembly will cause the instrument to not boot-up or initialize properly. Of course, these types of failures can also be caused by a variety of other assemblies as well. In order to determine whether a problem such as this is being caused by a defective A5 Disk Drive assembly, first see the section in this chapter titled “Instrument Boot Up Process” to eliminate other possibilities.

NOTE While the disk drive in this instrument may appear to be a standard off the shelf 2.5” drive DO NOT replace a defective disk drive with anything other than the one listed in Chapter 6 , “Replaceable Parts”. Only the drive specified has been qualified by Agilent Technologies to function properly under all of the instruments specified environmental operating conditions.

Software Viruses

If it is suspected that either the operating system or the N9039A application software has been infected by a software virus it is recommended that either a virus protection software program be installed and run to eliminate the virus, or the “Disk Drive Recovery Process” be run to return the instrument software to the point that it was when the instrument was initially shipped from the factory

NOTE The N9039A RF Preselector does not ship with virus protection software pre-installed. It is recommended that a virus protection software package be installed prior to the instrument being connected to a Local Area Network (LAN). For a list of third party software that has been verified by Agilent Technologies to work properly in this instrument see the “Customer Installation of Software” section in Chapter 4 - Instrument Configuration of the N9039A RF Preselector User's and Programmer's Guide.

Data Backup

Since all calibration and user data files are stored on the A5 Disk Drive assembly they will be lost when the drive is replaced. If possible, backing up these files before replacing the A5 Disk Drive, so that they can be restored afterwards, is highly recommended. Of course, if the drive is completely nonfunctional this cannot be done.

Calibration File

Backing up the calibration file will typically eliminate the need to run all of the instrument adjustments once the drive is replaced. To do this you will need to connect a USB mouse to the instrument and do the following:

- From the Start menu select “My Computer”
- Select the E: Drive (Calibration E:) by double-clicking on it
- Enter the AlignDataStorage folder by double-clicking on it
- Save a copy of the **N9039ACurrentDataSet.mdb** file onto a USB storage device

Once a new A5 Disk Drive assembly is installed, copy the **N9039ACurrentDataSet.mdb** file from the USB storage device to the AlignDataStorage folder on the E: drive.

If for some reason this file cannot be backed up, all of the instrument adjustments will need to be run once the A5 Disk Drive assembly has been replaced. Refer to Chapter 8 , “Post-Repair Procedures” for a list of the required adjustments.

User Data

Since the N9039A RF Preselector does not have the ability to save instrument state, setups, screen images, etc. backing up of user data for this instrument prior to replacing the A5 Disk Drive should not be required. If the user has stored other data in the instrument they would also be expected to have backed this data up prior to sending the instrument in for repair.

As the instrument ships from the factory it is configured to save all of the user data to the D: drive (User Data D:). The My Documents folders are all mapped to the D: drive as well.

Disk Drive Recovery Process

The Agilent Recovery System will restore the contents of the C: drive to the condition it was in when it originally left the factory. The Agilent Recovery System is stored in a separate hidden disk drive partition.

Running the Agilent Recovery System will result in loss of all data and files that have been saved by the user on the C: drive. However, any data or programs saved on the D: or E: drives will be retained as the Agilent Recovery Process will not affect either of these drives. Since the instrument calibration data resides on the E: drive it will not be affected during the recovery process.

Restoring the disk drive to the original factory software and settings does not restore or preserve any of the following items:

- Windows system configurations that were made after the instrument was shipped from the factory. For example, Windows and Service Pack updates, user accounts, and windows configuration settings. After a recovery, these configurations will have to be redone by the end user.

- Additional software that was installed after the instrument was shipped from the factory. After a recovery, that software will need to be re-installed by the end user.
- Any updates that were made to the N9039A RF Preselector application software.

Using the Agilent Recovery System

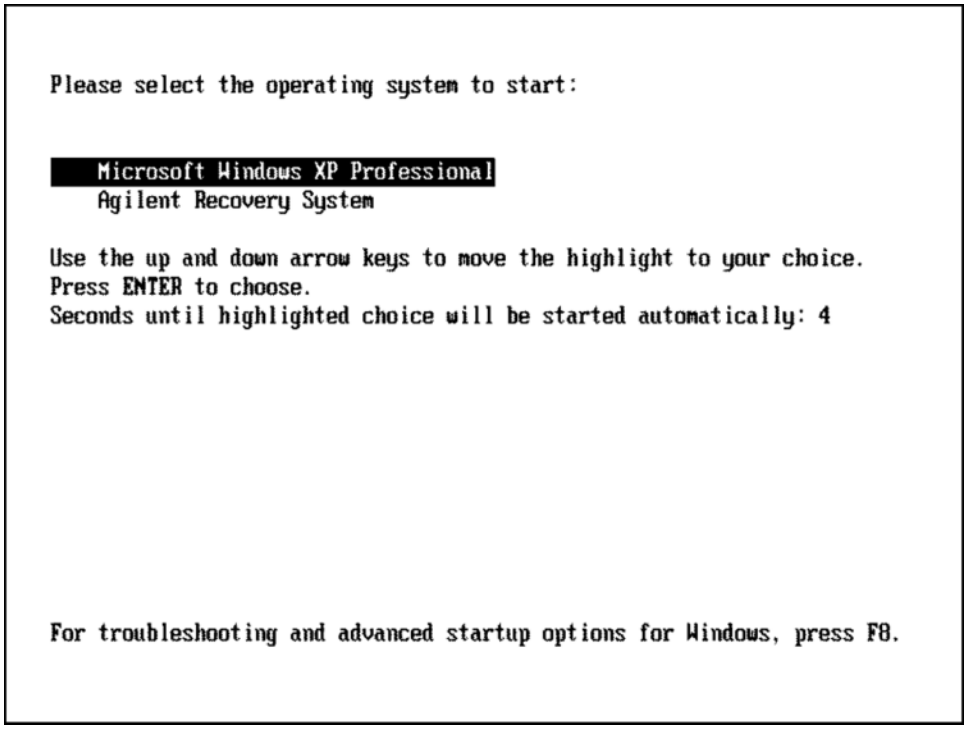
To run the Agilent Recovery System on the instrument perform the following procedure:

1. Make sure the instrument is turned off.
2. Turn on the instrument.
3. After the “Agilent Technologies” splash screen is displayed you will be presented with a screen as seen in Figure 2-14. You will have 5 seconds to make a selection as outlined in step 4.
4. Press the down arrow key to move the highlight to “Agilent Recovery System” and press the **Enter** key.
5. When the Agilent Recovery System has booted, follow the on-screen instructions to recover the C drive.
6. After exiting the Agilent Recovery System, the instrument will reboot a few times, during which time you will be asked to accept the End User License Agreement.
7. Once the Agilent Recovery System has completed, update the N9039A RF Preselector application software to the latest version by downloading it from:

   www.agilent.com/find/N9039A_software

NOTE The latest version of the N9039A RF Preselector application software needs to be installed after an A5 Disk Drive is replaced, even if the replacement drive already has the latest version on, as this is the only way to update the FPGA code on the A3 Digital I/O board assembly, which might have had an older version prior to the drive replacement.

Figure 2-14 Agilent Recovery System Selection



A6 Power Supply Assembly

The A6 Power Supply assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”.

NOTE The A6 Power Supply has no user replaceable fuse. While there is a fuse internal to the supply this is not meant for field replacement. If the internal fuse is blown, the power supply has experienced a major failure and should be replaced.

If the instrument will not boot up properly, or the display is not turning on, refer to the Instrument Boot-Up Process section in this chapter before further A6 Power Supply troubleshooting to rule out any other assembly as the cause of the failure.

While there are no test points or status LEDs accessible for troubleshooting on the A6 Power Supply assembly, there are both test points and status LEDs for all of the different power supply voltages, as well as other power supply status lines, on the A7 Midplane Board assembly. See the A7 Midplane Board Assembly section in this chapter for detailed information on the location of each.

Supply Voltages

The following voltage levels are produced by the A6 Power Supply assembly:

Table 2-2 A6 Power Supply Voltages

Voltage Level	Ground Reference	Voltage Level	Ground Reference
+15V STBY	ACOM	+12V D	DCOM
+5.1V STBY	DCOM	+5.1V D	DCOM
+32V A	ACOM	+3.35V D	DCOM
+15V A	ACOM	-15V A	ACOM
+9V A	ACOM	-7V A	ACOM
+5.1V A	ACOM	FAN POS	FAN NEG
		FAN NEG	FAN POS

Control Inputs

There are a number of control inputs for the A6 Power Supply assembly. The main one that we need to be concerned with is:

POWER_ON

POWER_ON is a signal that when pulled low tells the A6 Power Supply assembly to turn on all of its outputs. This signal comes from the A4 Processor board assembly and is initiated by pressing the front panel power button.

If the instrument will not turn on be sure that this line is being pulled low by either measuring a TTL Low voltage at Test Point 518 or verifying that the POWER_ON LED is lit on the A7 Midplane Board (See Figure 2-3).

Internal Protection Circuitry

There are a couple of other possible reasons for the A6 Power Supply assembly not coming on when the instrument is turned on. These are due to the different protection circuits built into the supply. They are:

- Over Current Protection
- Thermal Protection

Over Current Protection

The A6 Power Supply assembly has built in over current protection that will shut down the supply if current draw from the instrument is too great. The power supply will remain on in over current state for a minimum of 1 second. The power supply shall turn off no later than 5 seconds after the beginning of the over current state. The power supply shall remain off until the line voltage is removed and then reconnected or the front panel power switch is cycled. Over current shut down does not apply to the standby supplies, the fan voltage, and the +32V A supply.

If an over current condition is suspected remove the AC power cord from the rear panel of the instrument and disconnect other assemblies in the instrument that are suspected of possibly causing this condition before trying to power the instrument back on.

Thermal Protection

The A6 Power Supply assembly will protect itself by shutting down if it overheats. It will also reset itself with no user interaction after the temperature is reduced by approximately 10 degrees C.

If an overheating condition is suspected let the instrument cool down and then see if it will power on once again. If this condition persists verify that all three of the instrument fans are working properly and that there are no obstructions to the instrument airflow.

A7 Midplane Board Assembly

The A7 Midplane board assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”.

In addition to providing electrical connection between some of the different assemblies within the instrument there are a few other functions that the A7 Midplane board assembly provides, that if not functioning properly, could cause a failure in the instrument. They are:

- Instrument Power Supply LEDs and Test Points
- Additional Power Supply Regulation
- Instrument Secure Storage
- Power supply dithering

Instrument Power Supply LEDs and Test Points

While the A6 Power Supply assembly has no user accessible LEDs or test points the A7 Midplane board assembly does provide these for all of the different instrument power supplies as well as many of the power supply status lines. A complete list of these can be found in the Table 2-3 and the location of each can be seen in Figure 2-15.

Additional Power Supply Regulation

There are two analog power supply regulators on the A7 Midplane board assembly. They are the +3.3V_A and -5.2V_A supplies.

The +3.3V_A supply is regulated down from the instrument +5.1V_A supply while the -5.2V_A supply is regulated down from the -7V_A instrument supply.

Both of these supply voltages have test points and LEDs on the A7 Midplane board assembly as seen in Figure 2-15.

Instrument Secure Storage

This is Non-volatile storage of instrument model number, serial number, and software license keys. While the license keys are also contained on the C: drive of the instrument, the model and serial numbers are only saved in this secure memory. There is no way for the user to access this memory in any way. This is reserved for the factory and field software when needed for instrument adjustments, as well as the instrument software when installing an option license key. If for some reason any of these cannot be remembered by the instrument there could be a problem with this memory and the A7 Midplane board assembly would need to be replaced.

Power Supply Dithering

A triangle wave of approximately 100 Hz is generated and goes directly to the A6

Power Supply assembly. This is used to frequency modulate the power supply switching frequency for the purpose of lowering any power supply related interference.

If for some reason the level of the power supply related interference is higher than normal this circuitry, or the A6 Power Supply assembly, could be suspect.

Table 2-3 A7 Midplane Board LEDs and Test Points

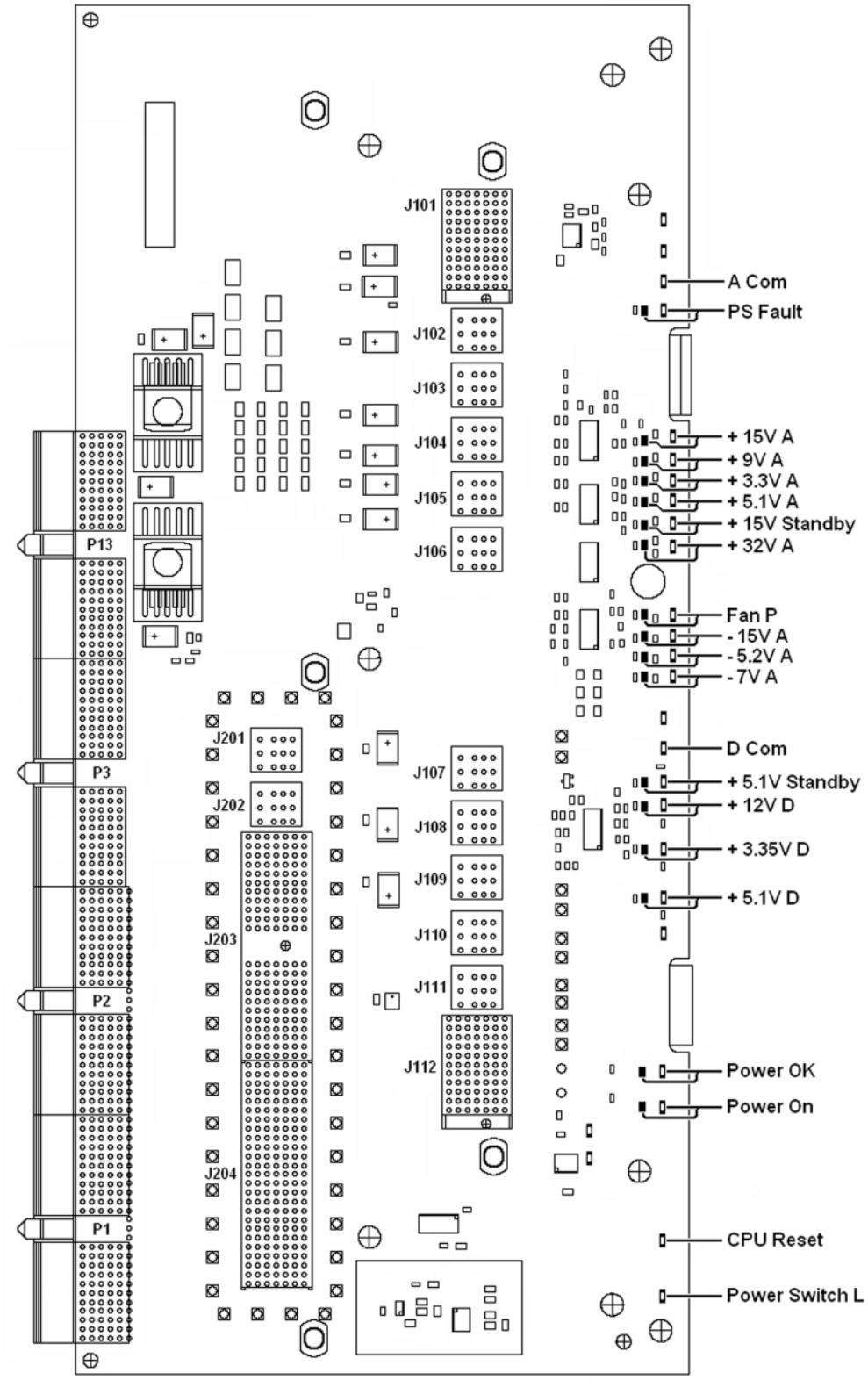
LED	Description	Reference Point	Regulated On	Expected Status			
				Power Off[a]		Power On	
				LED	Test Point (VDC)	LED	Test Point (VDC)
+32V A	+32 Volt Analog Supply	ACOM	A6	Red	0	Off	+32 ± 2.0
+15V A	+15 Volt Analog Supply	ACOM	A6	Red	0	Off	+15 ± 1.0
+15V STBY	+15 Volt Standby Supply	ACOM	A6	Green	+15 ± 1.0	Green	+15 ± 1.0
+12V D	+12 Volt Digital Supply	DCOM	A6	Red	0	Off	+12 ± 1.0
+9V A	+9 Volt Analog Supply	ACOM	A6	Red	0	Off	+9 ± 1.0
+5.1V A	+5.1 Volt Analog Supply	ACOM	A6	Red	0	Off	+5.1 ± 0.75
+5.1V D	+5.1 Volt Digital Supply	DCOM	A6	Red	0	Off	+5.1 ± 0.75
+5.1V STBY	+5.1 Volt Standby Supply	DCOM	A6	Green	+5.1 ± 0.75	Green	+5.1 ± 0.75
+3.35V D	+3.35 Volt Digital Supply	DCOM	A6	Red	0	Off	+3.35 ± 0.75
-7V A	-7 Volt Analog Supply	ACOM	A6	Red	0	Off	-7 ± 1.0
-15V A	-15 Volt Analog Supply	ACOM	A6	Red	0	Off	-15 ± 1.0
Fan P	Fan Positive Voltage	ACOM	A6	Red	0	Off	9.2 - 14.5
+3.3V A	+3.3 Volt Analog Supply	ACOM	A7	Red	0	Off	+3.35 ± 0.75
-5.2V A	-5.2 Volt Analog Supply	ACOM	A7	Red	0	Off	-5.2 ± 0.75

Table 2-3 A7 Midplane Board LEDs and Test Points

LED	Description	Reference Point	Regulated On	Expected Status			
				Power Off[a]		Power On	
				LED	Test Point (VDC)	LED	Test Point (VDC)
PS Fault	Power Supply Fault	ACOM	A6	Off	TTL High	Off	TTL High
Power OK	Digital Supplies OK	DCOM	A6	Red	TTL Low	Off	TTL High
Power On	Power Supply Enable	DCOM	A4	Off	TTL High	Green	TTL Low

a. With AC mains connected to the instrument

Figure 2-15 **A7 Midplane Board Assembly Power Supply LEDs and Test Points**



A8 Motherboard Assembly

The A8 Motherboard assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”.

While the main function of the A8 Motherboard assembly is to provide the electrical interconnections between the different electrical assemblies within the instrument, it also provides buffering for the front panel power status LEDs and the temperature sensitive cooling fan speed control. While failures due to the A8 Motherboard will be very infrequent it is possible that a failure in one of these areas could be related to it.

If there is a problem with the operation of the instrument cooling fans see the section titled “Fan(s) Are Not Operating” in this chapter.

Potential RF Signal Problems

The RF section is designed to route and filter RF input signals. The RF section is comprised of the following major assemblies.

SW1 RF Input Relay Switch

SW2 RF Output Relay Switch

A21 Radiated Input Board Assembly

A22 Radiated Filter Board Assembly

A23 Conducted Input Board Assembly

A24 Conducted Filter Board Assembly

The RF input signal can be routed through three different front end signal paths.

RF input frequencies from 9 kHz to 30 MHz are routed though the conducted filter path. Refer to Chapter 4 , “Block Diagrams” for details.

RF input frequencies from 30 MHz to 1000 MHz are routed though the radiated filter path. Refer to Chapter 4 , “Block Diagrams” for details.

There is also a filter bypass path.

SW1 and SW2 - Input Relay Switch Troubleshooting

For details on the functionality of these assemblies see Chapter 3, “Assembly Descriptions”.

Troubleshooting the Input relay switches is a two step process. First verify that the switches are functioning correctly. If switches are not functioning correctly then verify the switch control signal from the A23 Conducted Input Board. This will allow possible mechanical problems to be isolated from possible control signal problems.

The functionality of the Input Relay Switches can be verified by using the service menu to switch between the “RF” and “Source” inputs and the “Bypass” and “Filtered” signal paths along with a signal source and a signal analyzer.

The “RF”, “Source”, “Bypass” and “Filtered” RF signal relay switch paths can be verified from the front panel connectors and by breaking the filtered RF signal path by removing the end of Cable W7 and measuring the signal that is being routed to the A21 Radiated Input Board Assembly

To access the service menu login as “advanceduser” and press **System**, **Service**. The Service Code is -2061

NOTE The service and diagnostics menus can only be accessed by the Windows Login “advanceduser”. For more information on accessing the service menu refer to Chapter 5 , “Service and Diagnostics Menus”.

Refer to Chapter 4 , “Block Diagrams” for details.

Figure 2-16 SW1 and SW2 Connectors

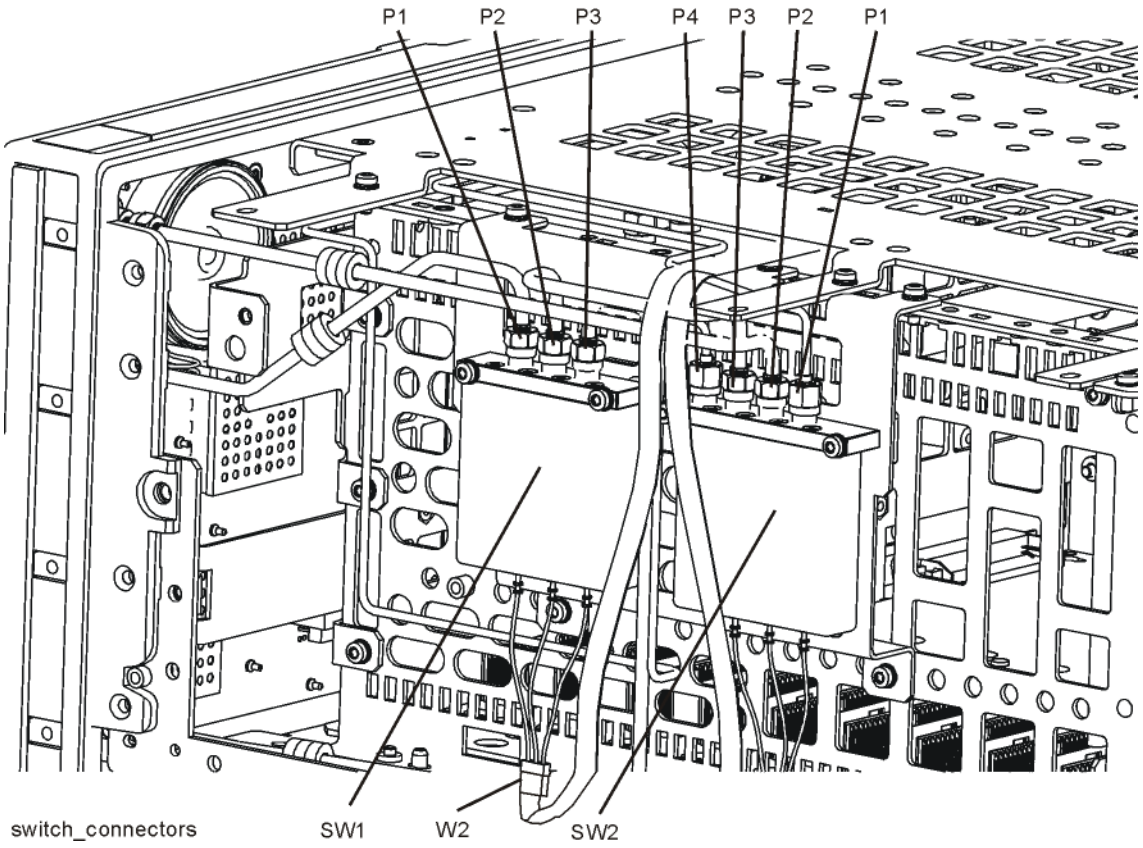


Table 2-4 SW1 Relay Switch Truth Table

Input	SW1
RF	P3 closed to P2, P1 terminated
Source	P1 closed to P2, P3 terminated

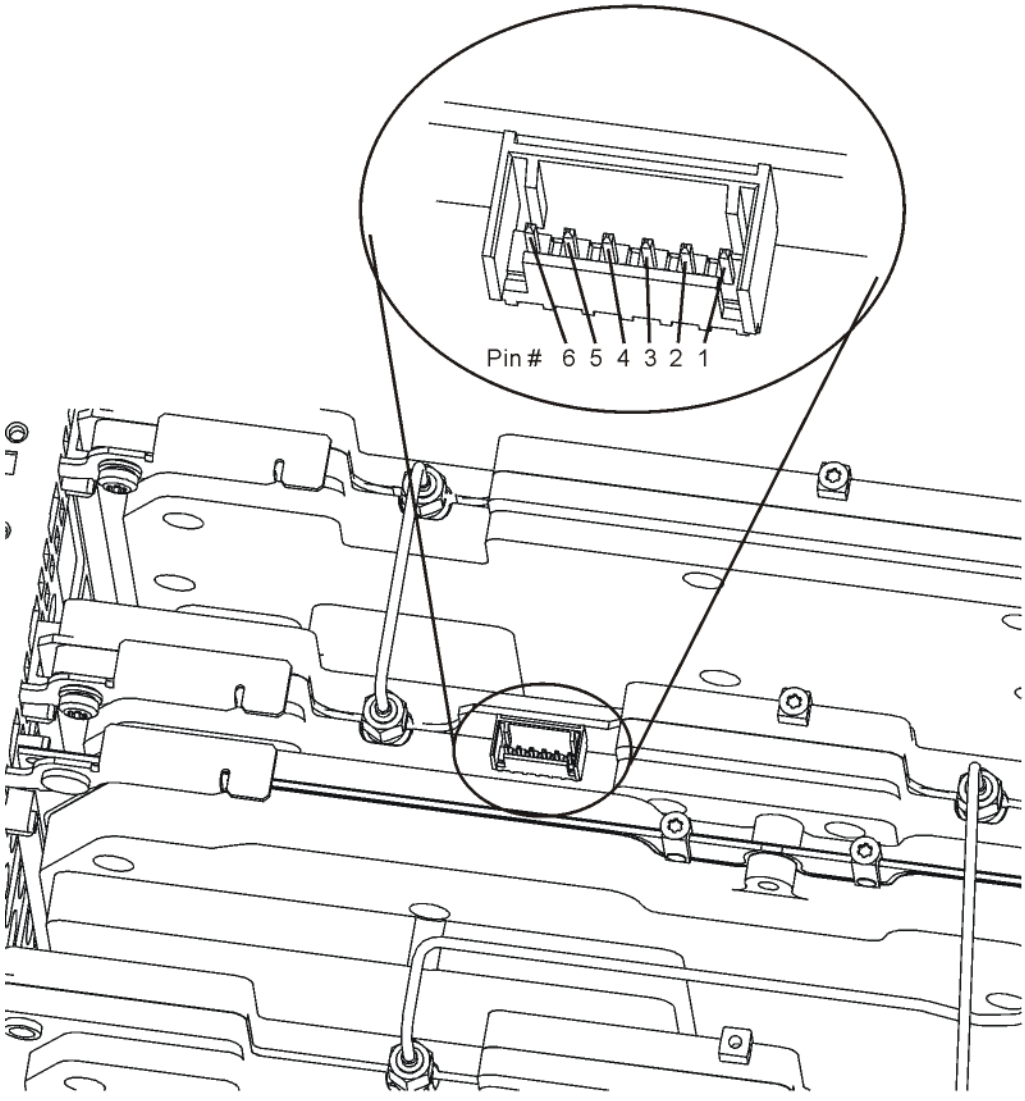
Table 2-5 SW2 Relay Switch Truth Table

Input	SW1
Bypass	P3 closed to P2, Port 1 terminated, Port 4 open
Filtered	P3 closed to P4, P1 closed to P2

Table 2-6 Input Relay Switch Control Signals from A23 Conducted Input Board Assembly

Input	Path	J8 Pin 1	J8 Pin 2	J8 Pin 3	J8 Pin 4	J8 Pin 5	J8 Pin 6
RF	Bypass	+15 V	+15 V	0 V	0 V	+15 V	+15 V
RF	RF Filter Path	0 V	+15 V	+15 V	0 V	+15 V	+15 V
Source	Bypass	+15 V	+15 V	0 V	+15 V	+15 V	0 V
Source	RF Filter Path	0 V	+15 V	+15 V	+15 V	+15 V	0 V

Figure 2-17 Conducted Input Board J8 Pins



A21 Radiated Input Board Assembly Troubleshooting

The A21 Radiated Input Board Assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”. Refer to Chapter 4 , “Block Diagrams” for details.

There are a few functions that the A21 Radiated Input Assembly provides, that if not functioning properly, could cause a failure in the instrument. They are:

- Routes RF Signals to other boards
- RF Gain
- Step Attenuation

Routes RF Signals to other boards

When in “Filtered” mode the A21 Radiated Input Board Assembly receives its input from SW1 Relay Switch. The A21 Radiated Input Board Assembly then routes RF signals above 30 MHz to the A22 Radiated Filter Board Assembly, and signals below 30 MHz to the A23 Conducted Input Board Assembly. The A21 Radiated Input Board Assembly also routes filtered RF Output signals to SW2 Relay Switch.

Refer to Figure 2-18 and Figure 2-19 for connector locations.

Connector Name	Signal Description
A21-J3	Filtered RF Output Signal (Radiated and Conducted) to N9039A Output
A21-J4	Unfiltered Conducted Signal Output
A21-J5	Unfiltered Radiated Signal Output
A21-J6	Filtered Radiated Signal Input
A21-J7	Filtered Conducted Signal Input
A21-J8	Unfiltered RF Input Signal (Radiated and Conducted) from N9039A Input

Figure 2-18 A21, A22, A23, and A24 Board Connectors

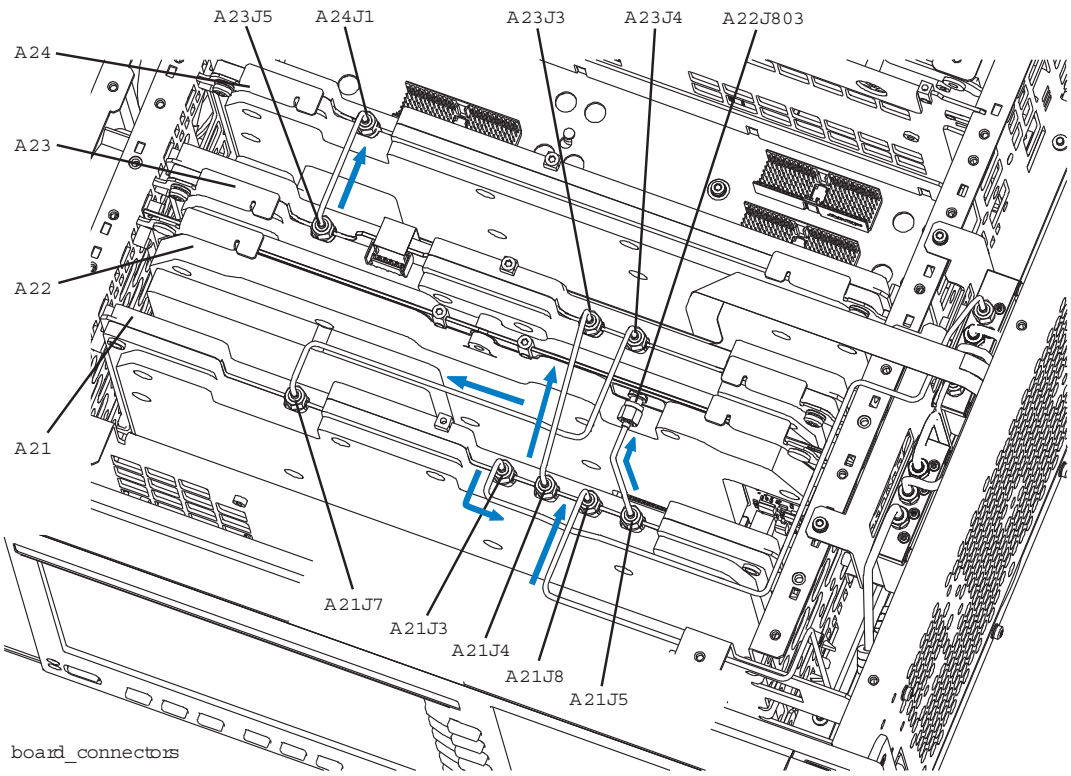
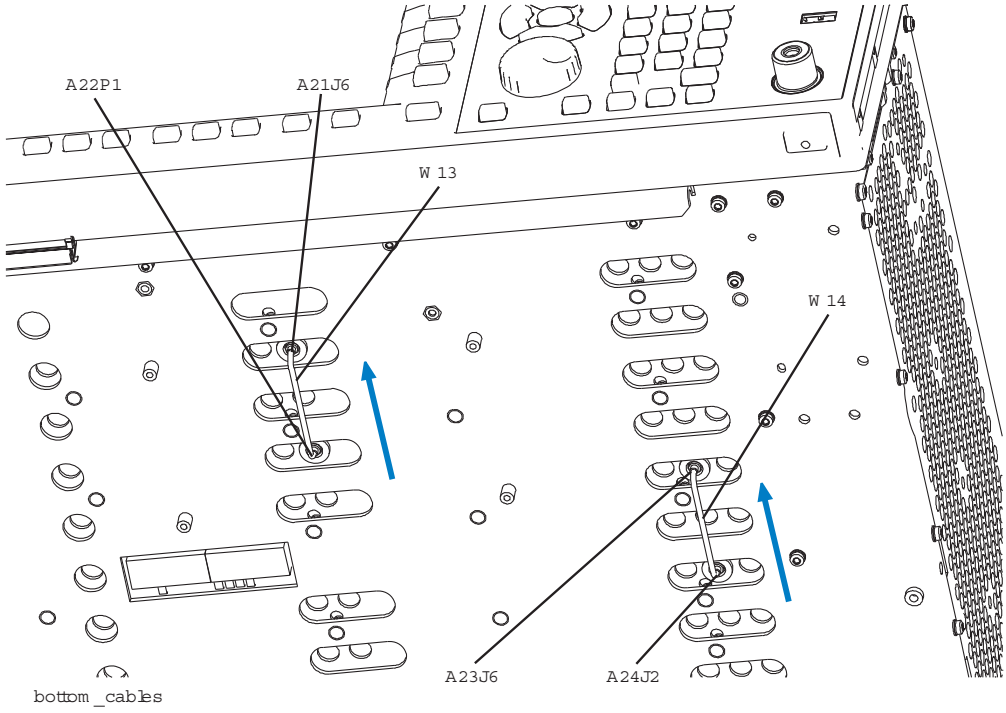


Figure 2-19 Instrument Bottom View



RF Gain

The A21 Radiated Input Board Assembly provides 15 dB of step gain for filtered signals above 30 MHz. The step gain may be turned on and off in the service menu.

A21 Radiated Input Board Assembly also provides some additional variable gain to compensate for the loss of the RF signal path. If the instrument has a variable gain problem it may be corrected by running the instrument adjustments.

Step Attenuation

The A21 Radiated Input Board Assembly provides step attenuation for filtered signals above 30 MHz. The step gain may be set to 0 dB and 10 dB and then from 12.5 dB to 57.5 dB in 2.5 dB steps. The step gain may be set in the service menu.

A22 Radiated Filter Board Assembly Troubleshooting

The A22 Radiated Filter Board Assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”. Refer to Chapter 4 , “Block Diagrams” for details.

RF Filtering above 30 MHz

The main function of the A22 Radiated Filter board assembly is to provide filtering for signals above 30 MHz. Low signal levels and bad filter shapes may be corrected by running one or more of the instrument adjustments.

To measure the RF filter shapes connect either a network analyzer or a signal analyzer with a tracking generator from the RF INPUT to the RF OUTPUT of the instrument.

Filter selection and tuning can be controlled through the use of the instrument Service menu. See Chapter 5 , “Service and Diagnostics Menus,” on page 121 for details.

If further fault isolation is needed the response can also be measured directly on the A22 Radiated Filter board, from A22-J803 to A22-P1. (Refer to Figure 2-18 and Figure 2-19) In order to measure the signal in this manner first remove the A21 Radiated Input board assembly and the A21 Radiated Filter board assembly and then remove cable W13. Replace the A21 Radiated Input board assembly and the A21 Radiated Filter board assembly. Using one of the Type-M troubleshooting cables (N9039-60034) connected to A22-J803, you may now measure the frequency response from A22-J803 to A22-P1.

Refer to Figure 2-20 through Figure 2-30 for filter shape examples.

Figure 2-20 Typical Filter Shape Radiated Band 0

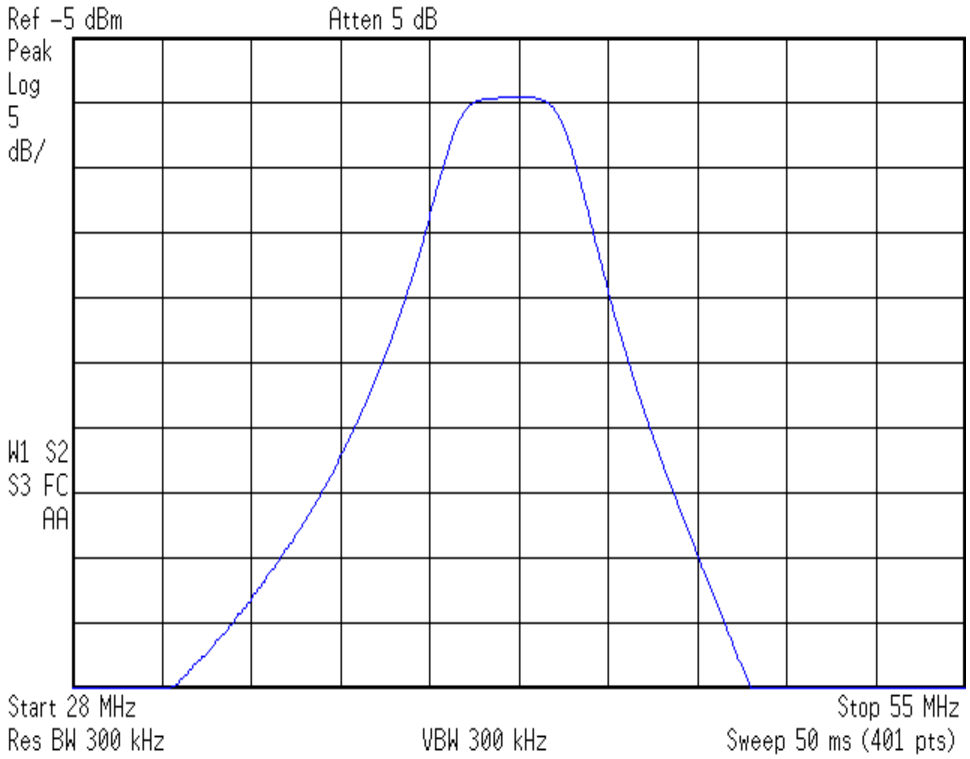


Figure 2-21 Typical Filter Shape Radiated Band 1

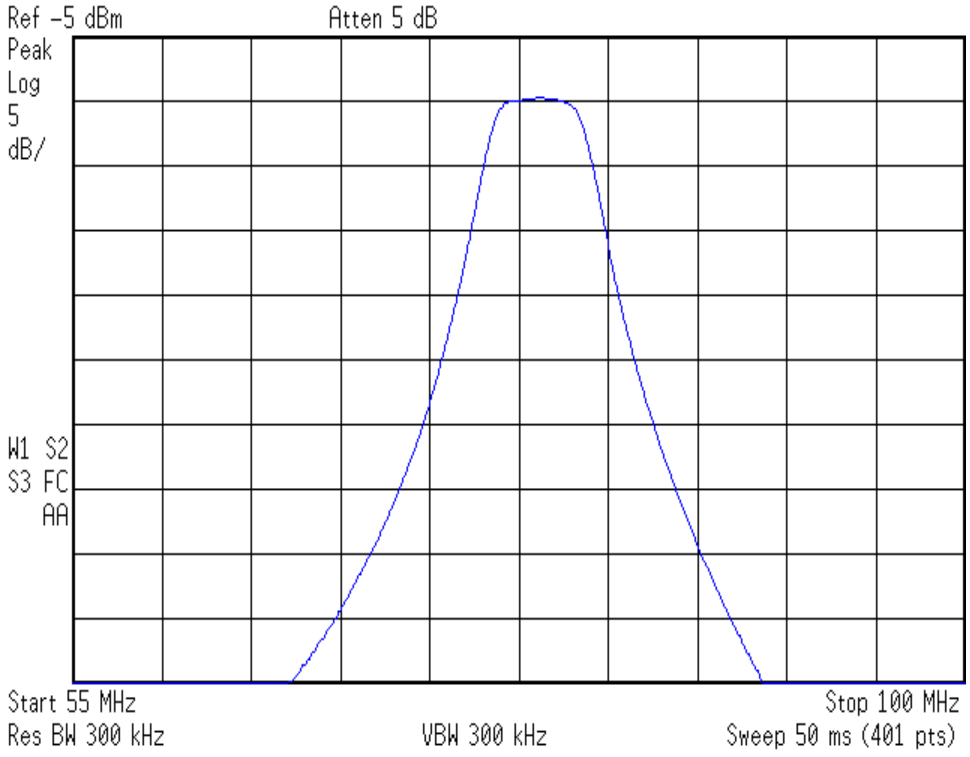


Figure 2-22 Typical Filter Shape Radiated Band 2

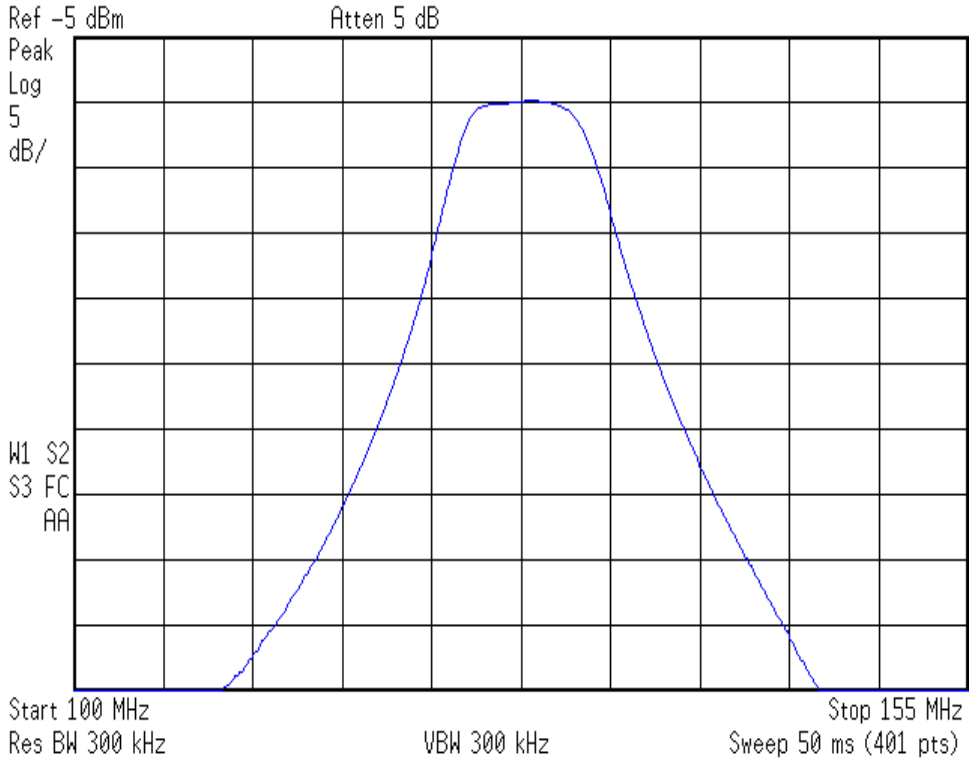


Figure 2-23 Typical Filter Shape Radiated Band 3

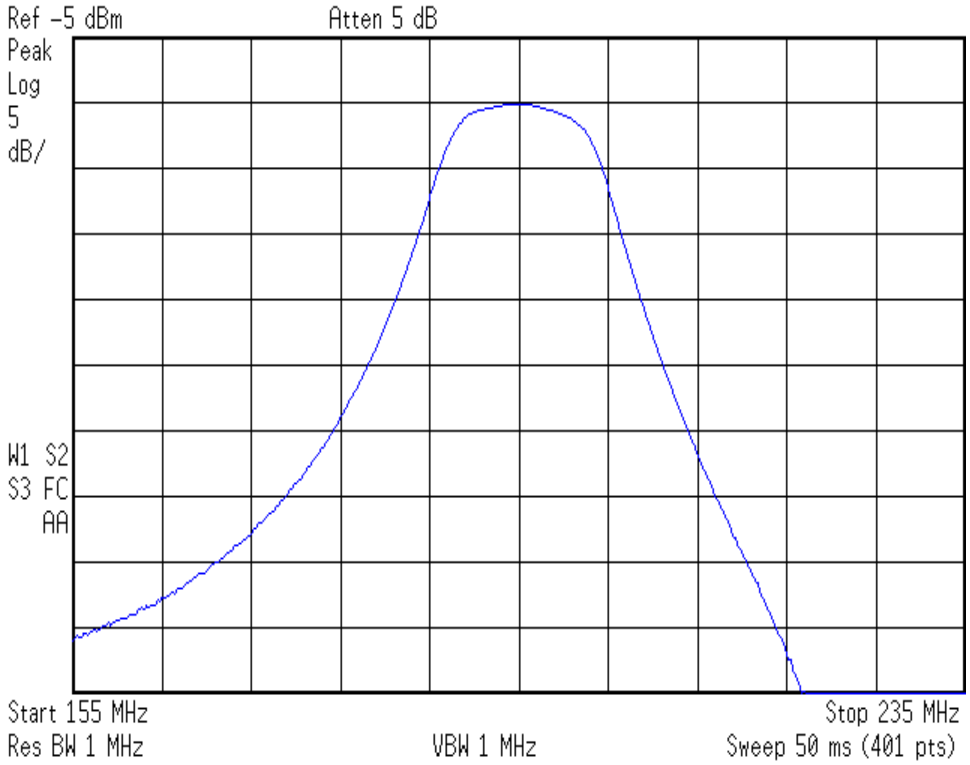


Figure 2-24 Typical Filter Shape Radiated Band 4

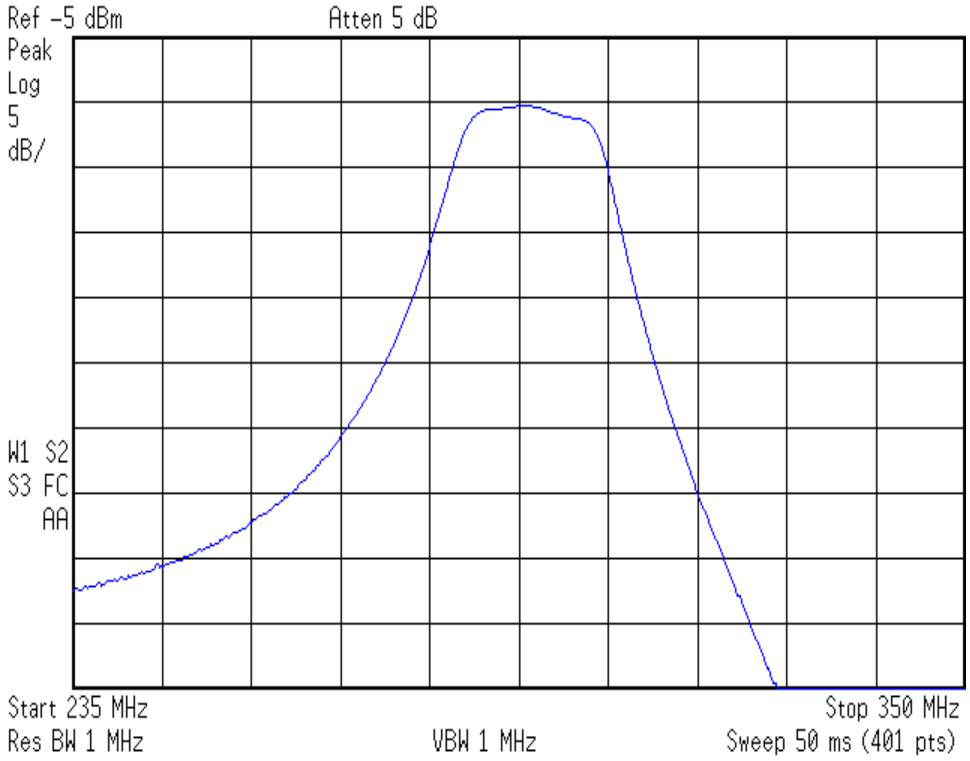


Figure 2-25 Typical Filter Shape Radiated Band 5

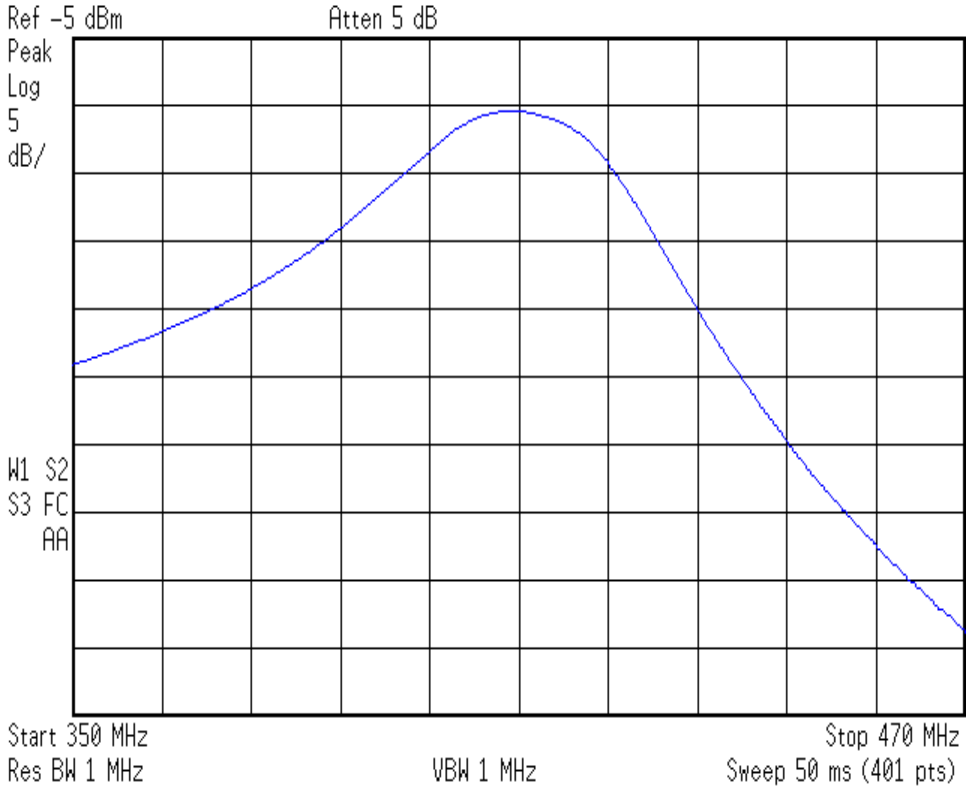


Figure 2-26 Typical Filter Shape Radiated Band 6

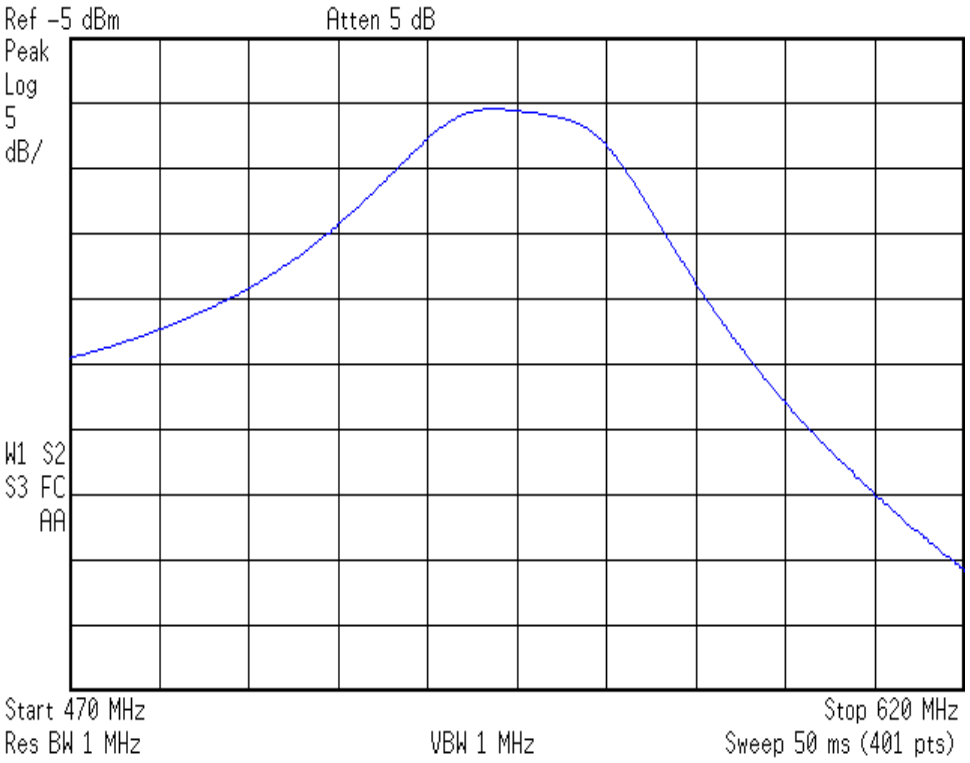


Figure 2-27 Typical Filter Shape - Radiated Band 7

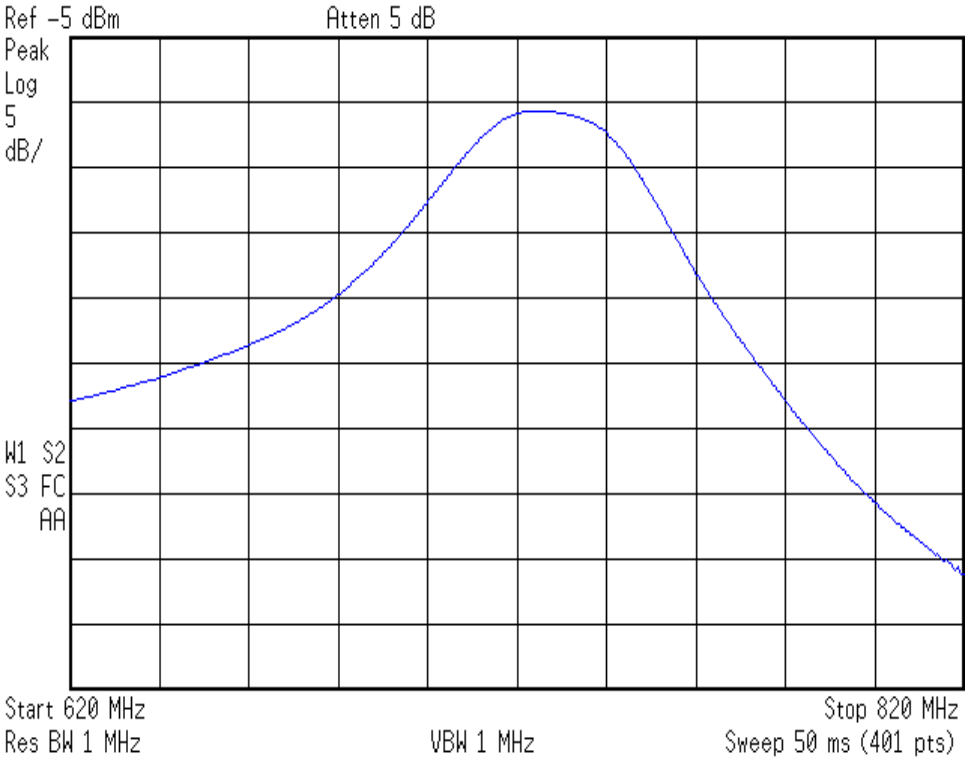
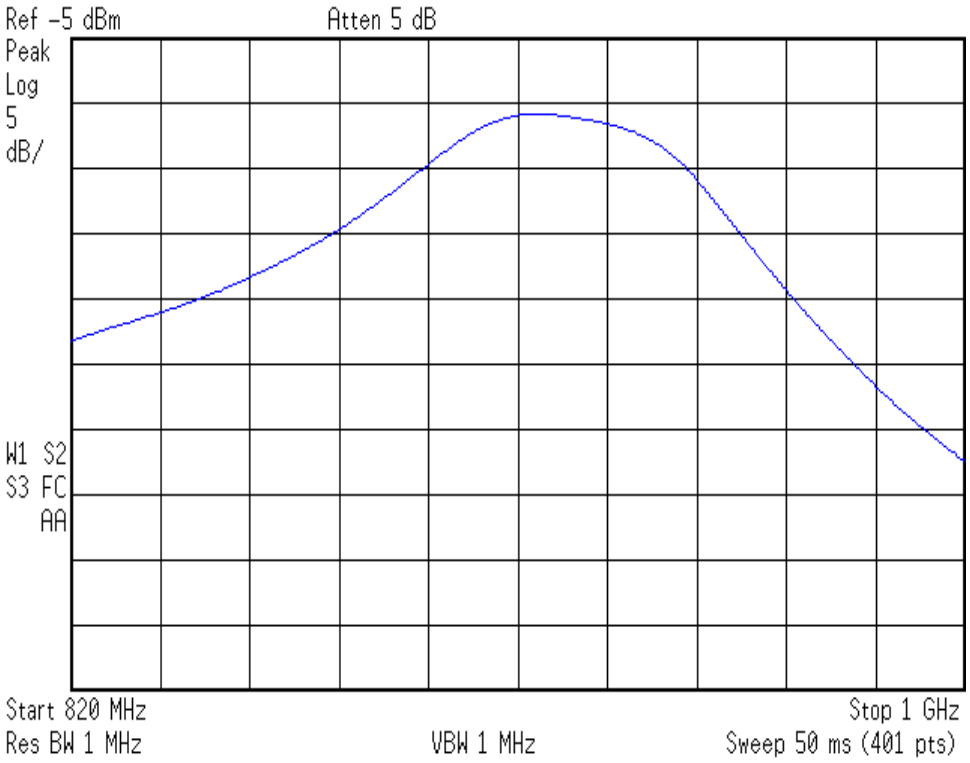


Figure 2-28 Typical Filter Shape - Radiated Band 8



NOTE The center frequency for each of the filter bands can also be turned with the use of the Center Freq setting under the Service Menu.

A23 Conducted Input Board Assembly Troubleshooting

The A23 Conducted Input Board Assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”. Refer to Chapter 4 , “Block Diagrams” for details.

There are a few functions that the A23 Conducted Input Assembly provides, that if not functioning properly, could cause a failure in the instrument. They are:

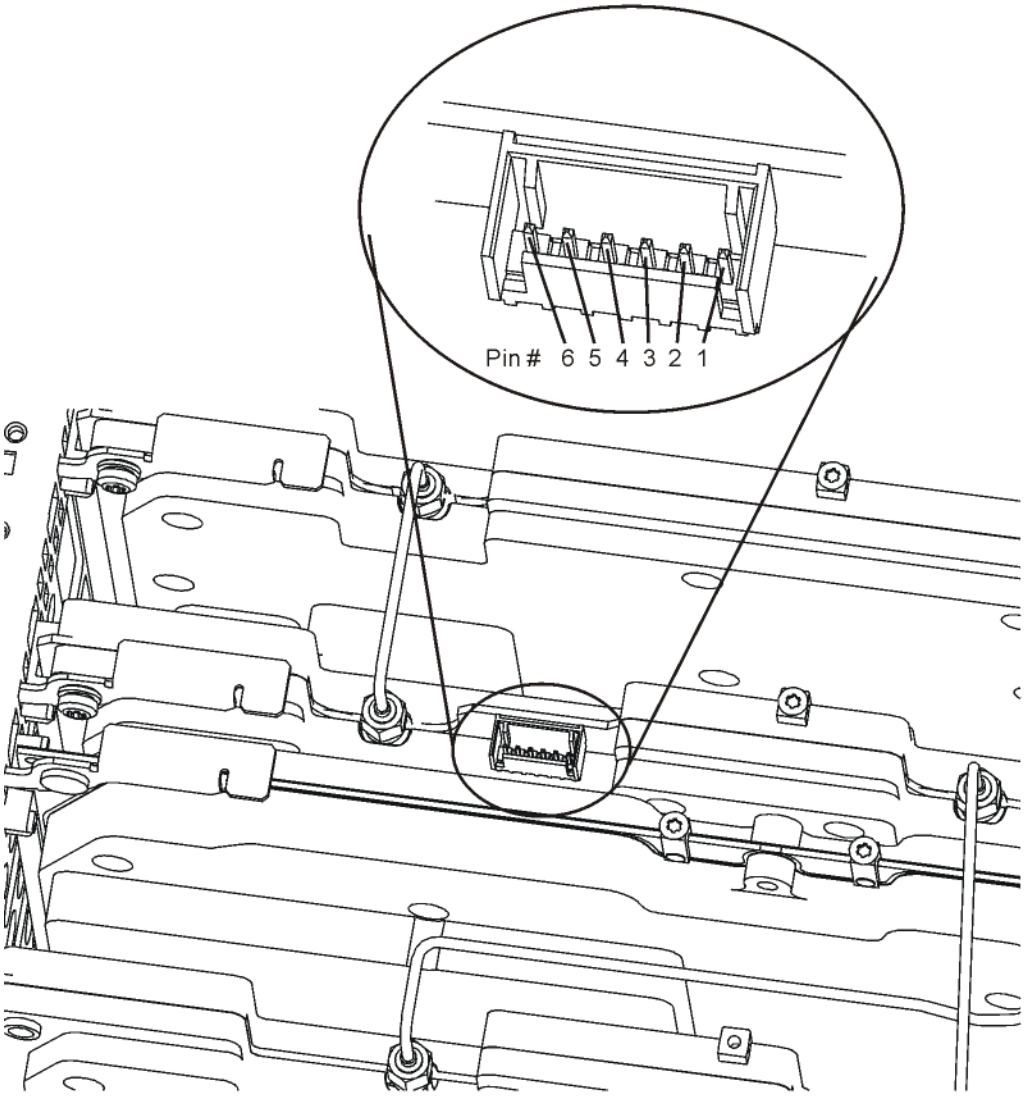
- Relay Switch Control
- Routes RF Signal to A24 Conducted Filter Bd Assy
- RF Gain
- Step Attenuation

Relay Switch Control

Table 2-7 Input Relay Switch Control Signals from A23 Conducted Input Board Assembly

Input	Path	J8 Pin 1	J8 Pin 2	J8 Pin 3	J8 Pin 4	J8 Pin 5	J8 Pin 6
RF	Bypass	+15 V	+15 V	0 V	0 V	+15 V	+15 V
RF	RF Filter Path	0 V	+15 V	+15 V	0 V	+15 V	+15 V
Source	Bypass	+15 V	+15 V	0 V	+15 V	+15 V	0 V
Source	RF Filter Path	0 V	+15 V	+15 V	+15 V	+15 V	0 V

Figure 2-29 Conducted Input Board J8 Pins



Routes RF Signal to A24 Conducted Filter Bd Assy

When in “Filtered” mode the A23 Conducted Input Board Assembly receives its input from A21 Radiated Input Board Assembly. The A23 Conducted Input Board Assembly then routes RF signals below 30 MHz to the A24 Conducted Filter Board Assembly. The A23 Conducted Input Board Assembly also routes filtered RF Output signals back to the A21 Radiated Input Board Assembly.

Refer to Figure 2-18 and Figure 2-19 for connector locations.

Connector Name	Signal Description
A23-J3	Filtered RF Output Signal
A23-J4	Unfiltered RF Input Signal
A23-J5	Unfiltered Conducted Signal Output
A23-J6	Filtered Conducted Signal Input

RF Gain

The A23 Conducted Input Board Assembly provides 15 dB of step gain for filtered signals below 30 MHz. The step gain may be turned on and off in the service menu.

A23 Conducted Input Board Assembly also provides some additional variable gain to compensate for the loss of the RF signal path. If the instrument has a variable gain problem it may be corrected by running the instrument adjustments.

Step Attenuation

The A23 Conducted Input Board Assembly provides step attenuation for filtered signals below 30 MHz. The step gain may be set to 0 dB and 10 dB and then from 12.5 dB to 57.5 dB in 2.5 dB steps. The step gain may be set in the service menu.

A24 Conducted Filter Board Assembly Troubleshooting

The A24 Conducted Filter Board Assembly is serviced as an assembly only; no component level repair is supported. For details on the functionality of this assembly see Chapter 3, “Assembly Descriptions”. Refer to Chapter 4 , “Block Diagrams” for details.

RF Filtering below 30 MHz

The main function of the A24 Conducted Filter board assembly is to provide filtering for signals below 30 MHz. These filters are fixed, so while low signal levels may be corrected by running one or more of the instrument adjustments, bad filter shapes cannot.

To measure the RF Filter shapes connect either a network analyzer or a signal analyzer with a tracking generator from the RF INPUT to the RF OUTPUT of the instrument.

Filter selection can be controlled through the use of the instrument Service menu. See Chapter 5 , “Service and Diagnostics Menus,” on page 121 for details.

If further fault isolation is needed the response can also be measured directly on the A24 Conducted Filter board, from A24-J1 to A24-J2. (Refer to Figure 2-18 and Figure 2-19) In order to measure the signal remove the A23 Conducted Input board assembly and the A24 Conducted Filter board assembly and then remove cable W14. Replace the A23 Conducted Input board assembly and the A24 Conducted Filter board assembly. Using one of the Type-M troubleshooting cables (N9039-60034) connected to A24-J2, you may now measure the frequency response from A24-J1 to A24-J2.

Refer to Figure 2-20 through Figure 2-30 for filter shape examples.

Figure 2-30 Typical Filter Shape Conducted Band 0

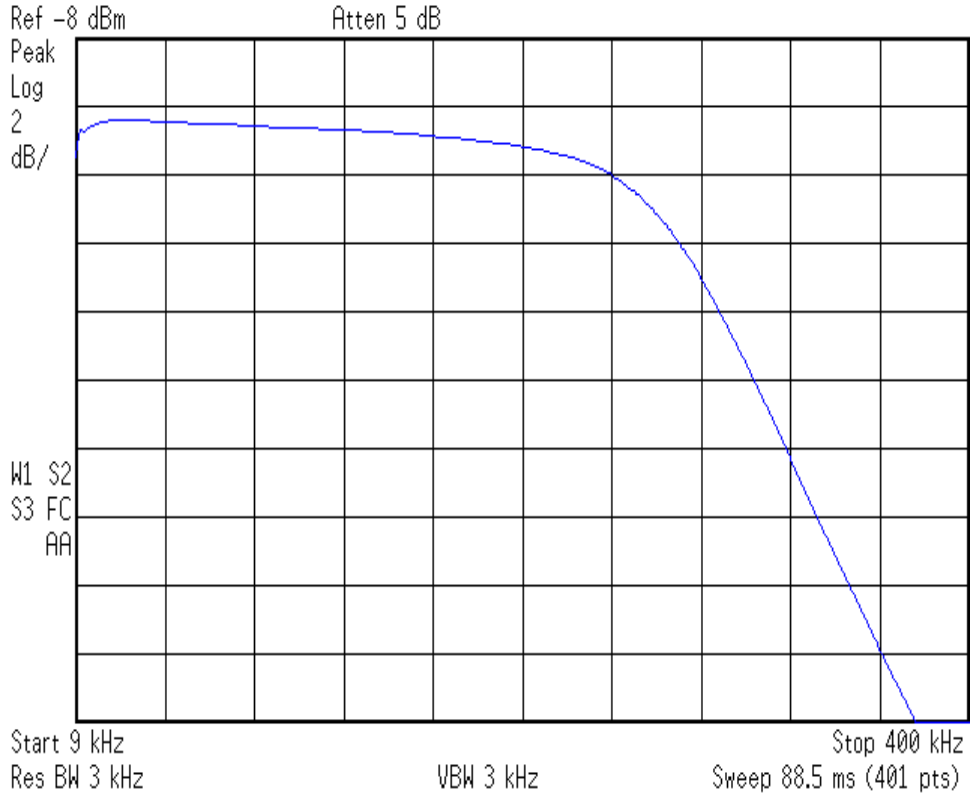


Figure 2-31 Typical Filter Shape Conducted Band 1

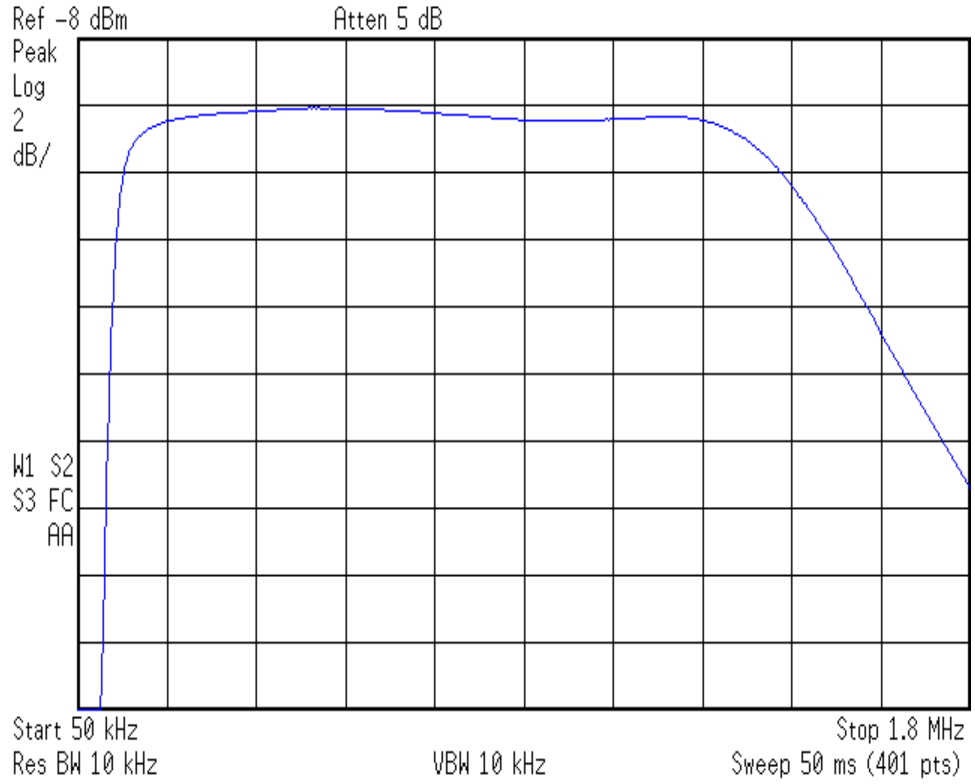


Figure 2-32 Typical Filter Shape Conducted Band 3

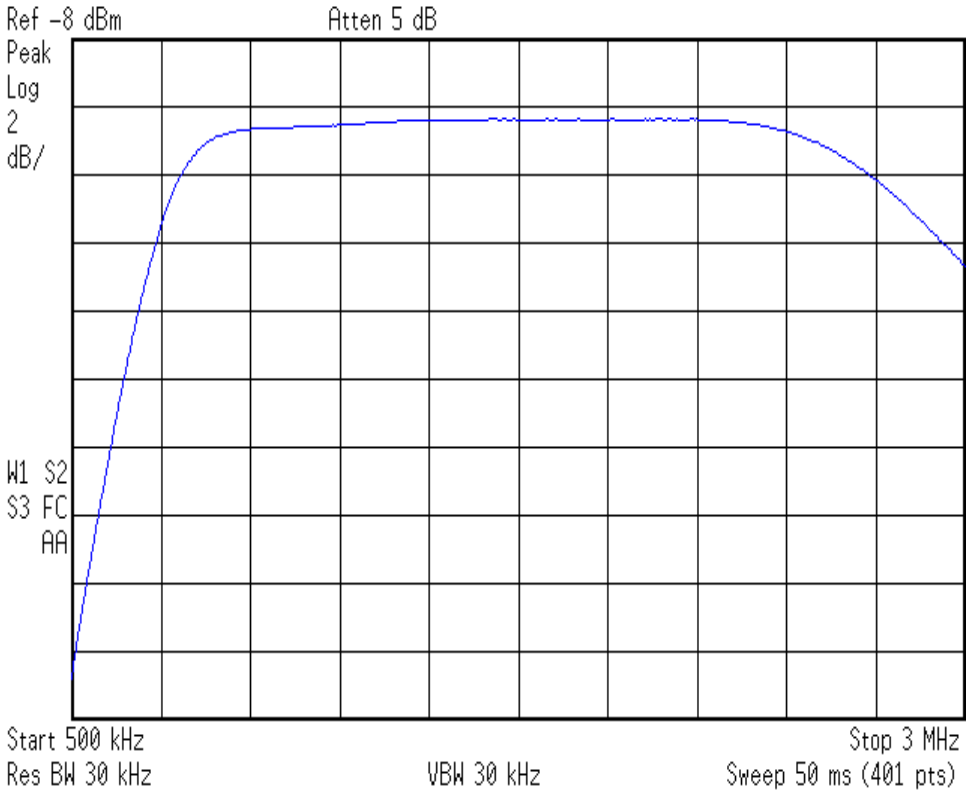


Figure 2-33 Typical Filter Shape Conducted Band 2

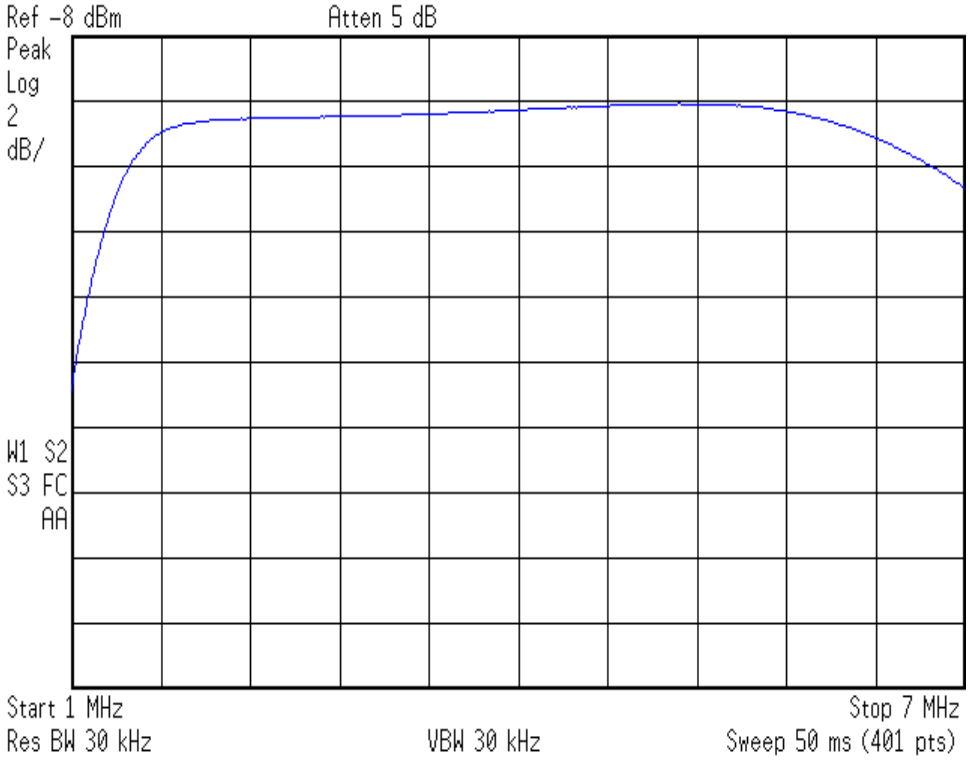


Figure 2-34 Typical Filter Shape Conducted Band 4

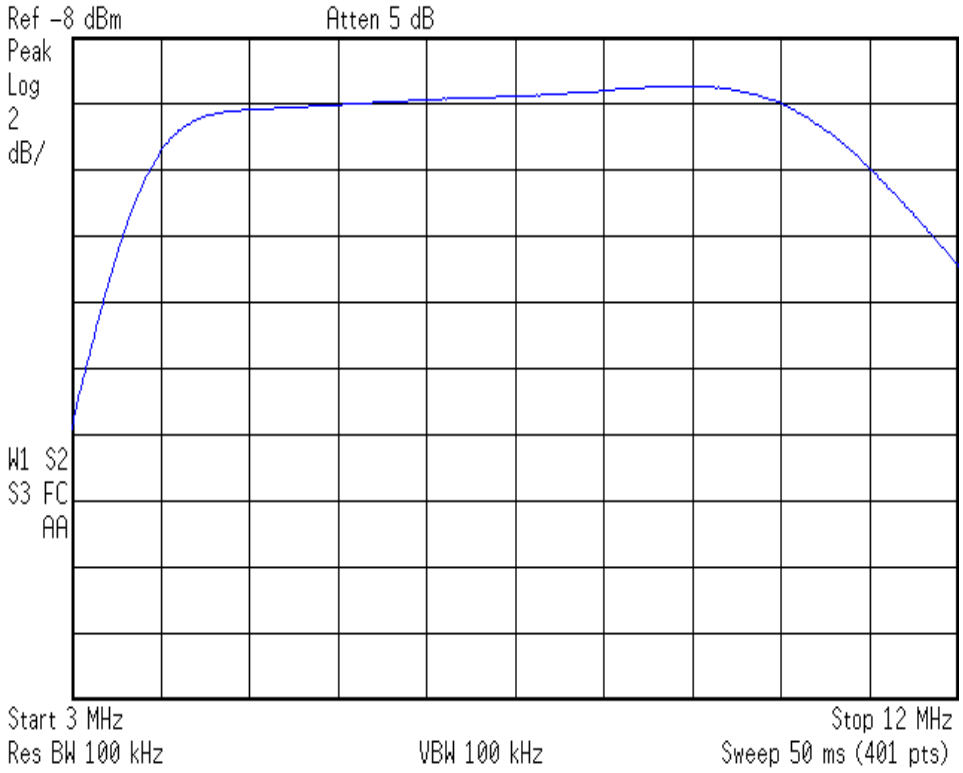


Figure 2-35 Typical Filter Shape - Conducted Band 5

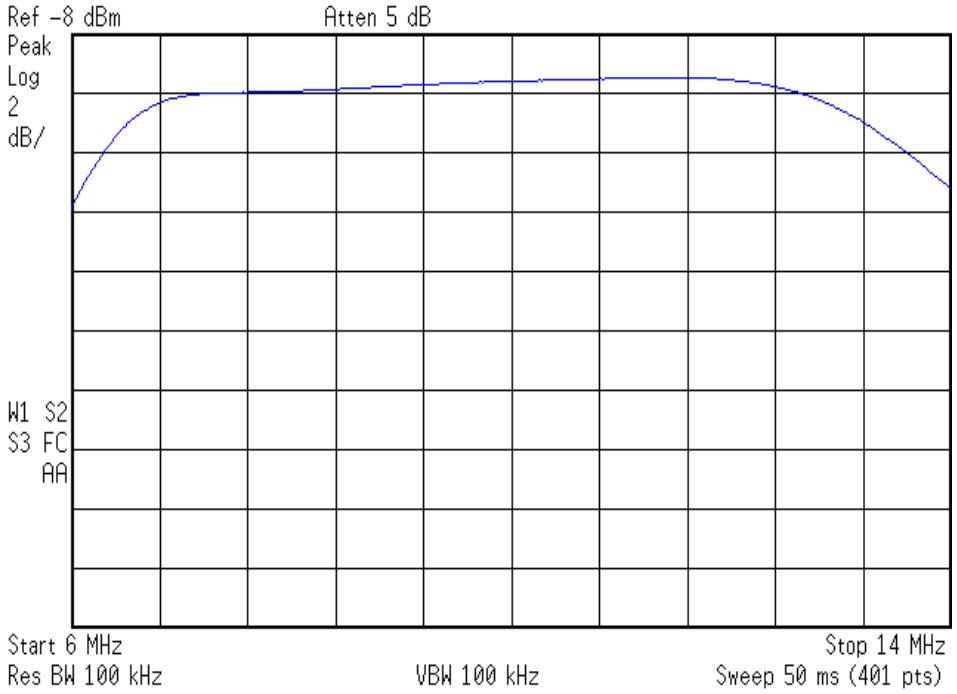


Figure 2-36 Typical Filter Shape - Conducted Band 6

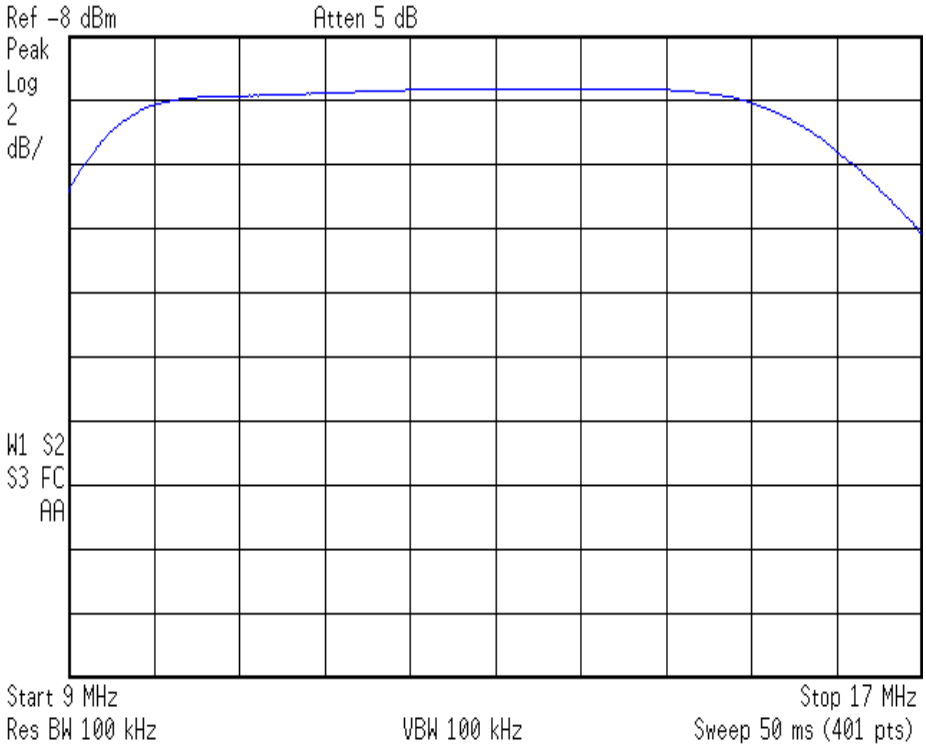


Figure 2-37 Typical Filter Shape - Conducted Band 7

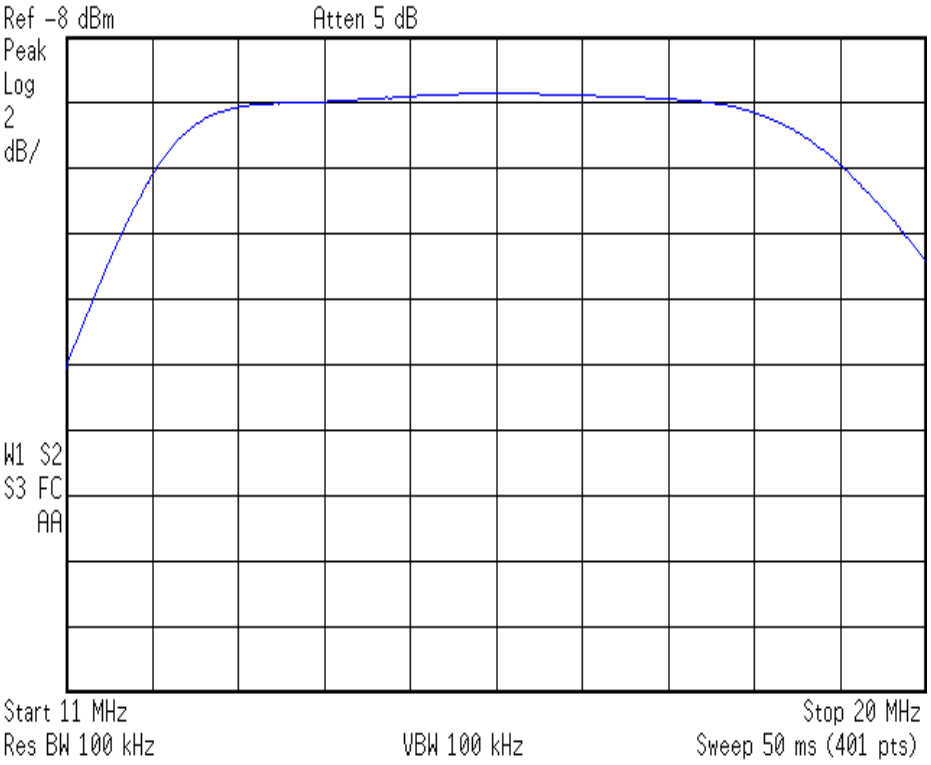


Figure 2-38 Typical Filter Shape - Conducted Band 8

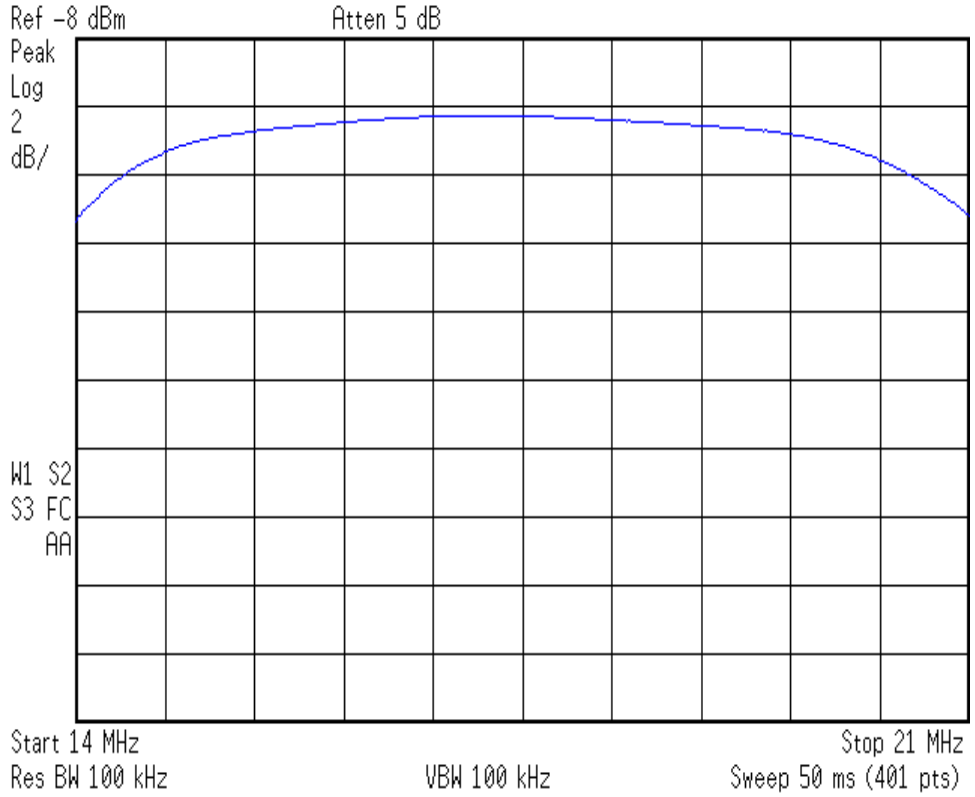


Figure 2-39 Typical Filter Shape - Conducted Band 9

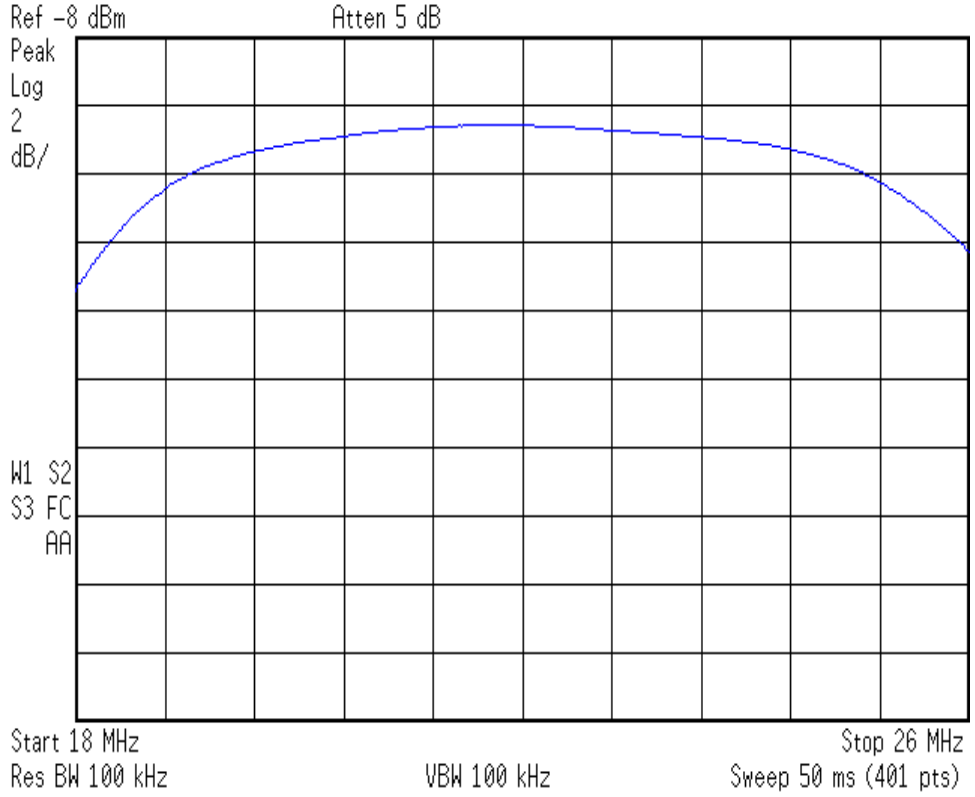


Figure 2-40 Typical Filter Shape - Conducted Band 10

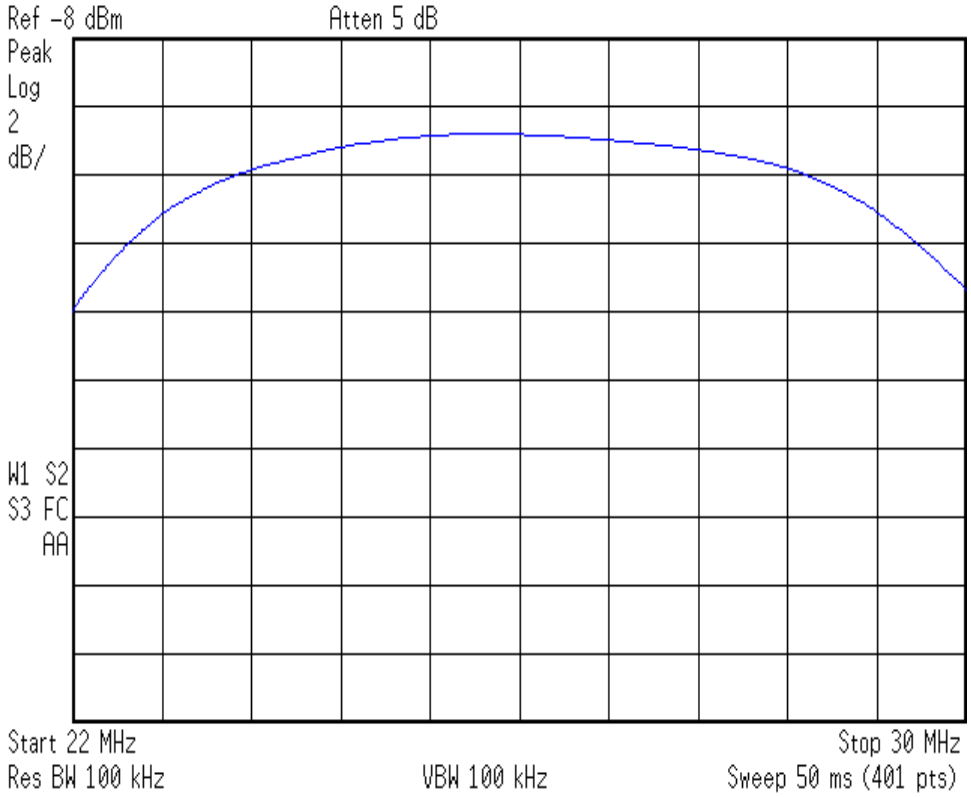
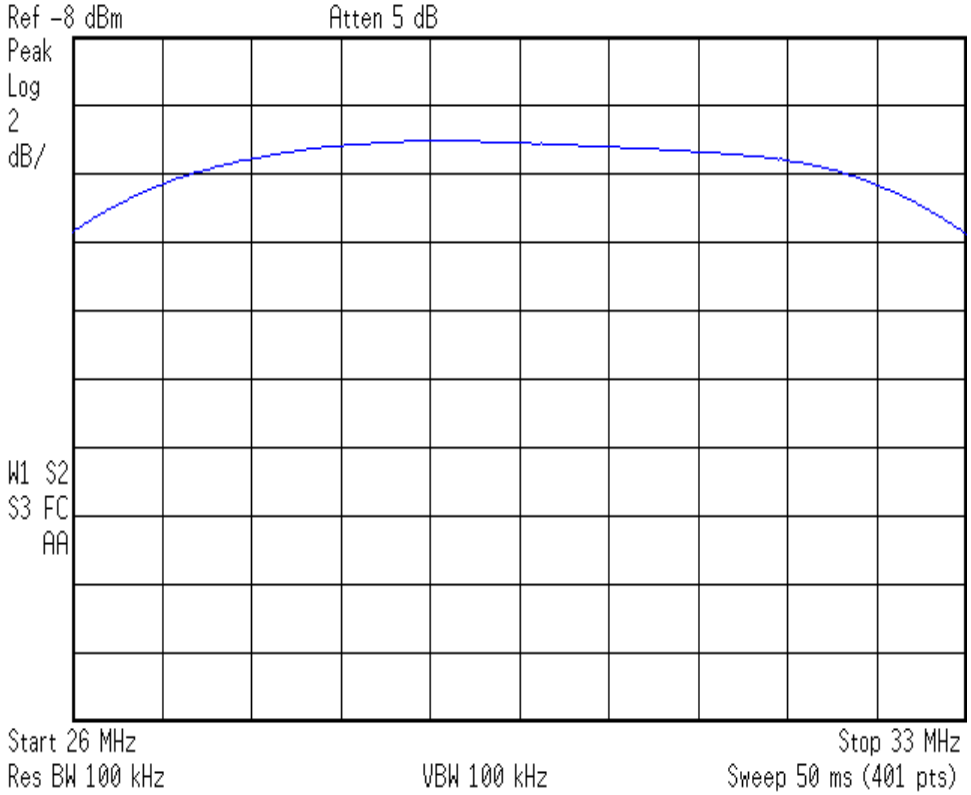


Figure 2-41 Typical Filter Shape - Conducted Band 11



3 Assembly Descriptions

What You Will Find in This Chapter

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A1A3 LCD ..... page 94
A1A4 LCD Inverter Board ..... page 94
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A1 Front Frame Assembly

The major components of the A1 Front Frame Assembly are the A1A2 Front Panel Interface Board, A1A3 LCD, A1A4 LCD Inverter Board, and the A1A5 Front Panel USB Interface Board, all of which are serviceable as individual components.

The A1 assembly is used to display the measurement results, accept user input via the keyboard, and connect USB peripheral devices.

A1A2 Front Panel Interface Board

The A1A2 Front Panel Interface board is serviced as an assembly only; no component level repair is supported.

The Front Panel Interface Board contains LCD control, Inverter drive, audio amplifiers, internal speaker, a 4 port USB hub, and a USB keyboard microcontroller.

The two different front panel rubber keypads attach to the back side of the board, which has the keyboard contacts printed on the reverse side.

The 4 ports from the USB hub contained on this board go to the 2 front panel USB connectors, the keyboard microcontroller, and the fourth port is unused.

A1A3 LCD

The LCD used is an 8.4inch XGA TFT display, which has a resolution of 1024 x 768. It has two backlights that are not individually replaceable.

A1A4 LCD Inverter Board

The Inverter Board provides the high voltage required by the LCD backlights.

A1A5 Front Panel USB Interface Board

The Front Panel USB Interface Board provides the front panel USB connections.

A3 - Digital I/O Board Assembly

The A3 Digital I/O Board assembly is serviced as an assembly only; no component level repair is supported.

The A3 Digital I/O board assembly performs two important functions:

1. System synchronization
2. RF Preselector Filter hardware control

The A3 Digital I/O board assembly also contains FPGA program code stored on it that is loaded at boot up. This code is updated, if necessary, when the instrument software is updated. Interruption of the FPGA update process can result in an A3 Digital I/O board being rendered non-functional, requiring a replacement board assembly. For more information on updating the N9039A instrument software see Chapter 9 , “Instrument Software”.

System Synchronization

There are two synchronization pulses generated on this assembly that are required for the PSA EMI Measurement Receiver system to trigger properly when the N9039A RF Preselector is being used in the Filter mode. These are rear panel connections labeled:

- External Trigger Out
- Pulse Trigger 2 Out

These pulsed output signals are used when more than one filter in the N9039A is used during a given sweep of the PSA. These triggers allow the N9039A to control the sweep of the PSA in such a way that when the N9039A switches from one filter to the next the PSA will hold the sweep until the N9039A is properly tuned to the next filter frequency.

RF Preselector Filter Hardware Control

The A3 Digital I/O board assembly is the only assembly in the N9039A, other than the A4 Processor board, that is connected to the PCI bus. The A4 Processor board assembly communicates with the A3 Digital I/O board assembly via the PCI bus, which in turn communicates with the rest of the RF preselector filter hardware in the instrument via the Instrument Local Bus (ILB), which the A3 Digital I/O board assembly contains the controller for.

A4 Processor Board Description

Disk Drive

The A5 Disk Drive assembly is contained within the A4 Processor board assembly and is replaced as an individual assembly. Also, when the A4 Processor board assembly is replaced the existing A5 Disk Drive assembly will be used.

Front Panel Interface

The instrument USB bus is the electrical interface to the instrument front panel. One of the USB ports on the host controller hub located on the A4 Processor board assembly is routed to the A1A2 Front Panel Interface board for this use. The port is a High Speed USB (2.0) compliant port.

Graphics Controller

The entire graphics subsystem is contained within a single chip, along with the interface logic to map memory from main system memory for the video RAM. There are two outputs of the graphics controller that are used by the instrument. One provides the LCD video data to drive the internal instrument LCD display and the other supplies the rear panel VGA output.

Power Supply Control

The power control line from the front panel momentary power switch connects to the A4 Processor board assembly. When the front panel power switch is turned on the A4 Processor board assembly pulls the POWER_ON line to the A6 Power Supply assembly to a TTL low level, which tells the power supply to turn on. Once the +12V D, +5.1V D, and +3.35V D supplies are all on and within specification the A6 Power Supply assembly pulls the POWER_OK line to a TTL high state, which then causes the A4 Processor board to come out of reset and boot-up.

Outputs from the A4 Processor board assembly also drive the two front panel power state LEDs.

Provisions have also been made to allow the processor board to remember which power state it was in when a power failure occurs. The instrument will return to the same power state after a power failure.

Rear Panel Connectivity

The A4 Processor board assembly has direct access to the rear panel of the instrument. The external connections provided on the A4 Processor board assembly include:

- External VGA
- LAN (RJ45) 10/100 based-T Ethernet port

- USB
  - 4 x Type-A ports (USB 2.0 compatible)
  - 1 x Type-B port (USB 2.0 compatible)
- GPIB

System Memory

There are two DIMM memory slots on the A4 Processor board assembly. Both slots accept 184-pin DDR SDRAM DIMM memory modules. While the memory controller chip itself does supports a wide range of DDR memory types, only memory fully qualified by Agilent Technologies is supported. Full qualification includes mechanical vibration and shock, thermal and power dissipation and the basic electrical characteristics.

While the A4A1 SRAM Module system memory can be obtained separate from the A4 Processor board assembly, it is also included with a replacement A4 Processor board assembly.

System Processor

The A4 Processor board assembly uses an Intel Pentium-M series processor chip.

A5 Disk Drive Assembly

The A5 Disk Drive assembly is located inside of the A4 Processor board assembly.

Partitioning

The A5 Disk Drive assembly has been divided up into four different partitions. They are:

C This partition contains the operating system and software installed by Agilent. This is an open system which means you can install additional software, which should be installed on the C: drive. However, only a limited set of software applications are tested for use with the instrument software. The installation and/or use of other software is not warranted, and could interfere with the operation of the instrument software. If the Agilent Recovery process is ever run, the original version of the C: drive, as shipped from the factory, will be restored. The user will need to reload any other software that was previously installed into the instrument.

Do not save any user data to the partitions, as any data saved in this partition will be lost if the Agilent Recovery process is run.

D This partition is reserved for data storage. The User Accounts that are preconfigured by Agilent and their My Documents folder are mapped to the D: drive. This is for the convenience of backing-up the user data. You should always back-up the data on the D: drive. This allows you to restore the data if the A5 Disk Drive assembly ever needs to be replaced.

Data saved in this partition will not be lost if the Agilent Recovery process is run.

E This partition is reserved for Agilent's use. The primary use of the E: drive is for storing of the instrument Calibration and Alignment data. Do not change or overwrite the files on this drive. This could cause your instrument to not meet specifications, or even to stop functioning correctly. It is also recommended that you back up the contents of this drive. This allows you to restore the data if the A5 Disk Drive assembly ever needs to be replaced, which could otherwise require that all instrument adjustments be performed.

While data saved in this partition will not be lost if the Agilent Recovery process is run, do not use this drive for data storage.

In addition, a hidden recovery partition is located on the drive. This partition contains an image of the C: drive as it was when the instrument was shipped from the factory. To restore the C: drive using the image stored in this recovery partition see the section titled “Disk Drive Recovery Process” in Chapter 2, “Troubleshooting”.

A6 Power Supply Description

The A6 Power Supply assembly is serviced as an assembly only; no component level repair is supported.

The A6 Power Supply assembly provides most all of the necessary DC voltages for the N9039A RF Preselector. If any of the power supplies are not within their operating voltages, the instrument will not function properly.

The A6 Power Supply assembly is a switching supply that operates at a frequency of ~120 kHz.

The A6 Power Supply assembly is an auto ranging supply, requiring no user selection of the input voltage. The input AC voltage and frequency requirements for the A6 Power Supply assembly are printed on the rear panel of the instruments as well as on the power supply itself.

While there are no test points or status LEDs accessible for troubleshooting on the A6 Power Supply assembly, there are both test points and status LEDs for all of the different power supply voltages, as well as other power supply status lines, on the A7 Midplane Board assembly. See the "A7 Midplane Board Assembly" section in Chapter 2, "Troubleshooting" for detailed information on the location of each.

Supply Voltages

The following voltage levels are produced by the A6 Power Supply assembly:

Voltage Level	Ground Reference	A7 Midplane Connector
+15V STBY	ACOM	J101
+5.1V STBY	DCOM	J111 / J112
+32V A	ACOM	J101
+15V A	ACOM	J103 / J104
+9V A	ACOM	J104
+5.2V A	ACOM	J102

Voltage Level	Ground Reference	A7 Midplane Connector
+12V D	DCOM	J111
+5.1V D	DCOM	J109 / J110
+3.35V D	DCOM	J107 / J108
-15V A	ACOM	J105
-7V A	ACOM	J105
FAN POS	FAN NEG	J101
FAN NEG	FAN POS	J101

Control Inputs

There are a number of control inputs for the A6 Power Supply assembly. They are:

- **POWER_ON** is a signal that when pulled low tells the A6 Power Supply assembly to turn on all of its outputs. This signal comes from the A4 Processor board assembly and is initiated by pressing the front panel power button.
- **DITHER** is an AC coupled analog signal going to the supply that is used to frequency modulate the power supply switching frequency for the purpose of lowering any power supply related interference.
- **OFFn** is an input that is to be used only as a “Panic Stop”. This signal can be used for such functions as an emergency over temperature shut down. This type of shut down is a last resort and does not perform the recommended operating system shut down of the instrument.

Control/Status Outputs

There are a number of control and status outputs for the A6 Power Supply assembly. They are:

- **POWER_OK** is used to verify that the +12V D, +5.1V D, and +3.35V D are all on and within specification. A TTL high level on this output brings the CPU out of reset and initiates the instrument boot up process.
- **LSYNC** is a TTL level signal that is synchronous to the AC line input. While it is unused in this application, this type of a signal is typically used to trigger an instrument sweep synchronous to the AC power line.
- **PS_TEMP** is a read out of the internal temperature of the power supply.
- **PS_FAULT** will be a TTL low level signal to indicate that the supply is experiencing an over voltage, over current, or over temperature condition.

Fuse

The A6 Power Supply has no user replaceable fuse. While there is a fuse internal to the supply this is not meant for field replacement. If the internal fuse is blown, the power supply has experienced a major failure and should be replaced.

Standby Supplies

The A6 Power Supply assembly has two standby supplies that should always on if the AC input voltage requirements are met. These are the +15V STBY and the +5.1V STBY supplies. These supplies are used to by the instrument to keep certain circuits alive even when the power is turned off.

Over Current Protection

The A6 Power Supply assembly has built in over current protection that will shut down the supply if current draw from the instrument is too great. The power supply will remain on in over current state for a minimum of 1 second. The power supply shall turn off no later than 5 seconds after the beginning of the over current state. The power supply shall remain off until the line voltage is removed and then reconnected or the front panel power switch is cycled. Over current shut down does not apply to the standby supplies, the fan voltage, and the +32V A supply.

Thermal Protection

The A6 Power Supply assembly will protect itself by shutting down if it overheats. It will also reset itself with no user interaction after the temperature is reduced by approximately 10 degrees C.

A7 Midplane Board Assembly

The A7 Midplane board assembly is used to connect the A4 Processor board assembly and the A6 Power Supply assembly to the A8 Motherboard, and thus the rest of the instrument electrical assemblies.

In addition, the A7 Midplane board also provides the following functions:

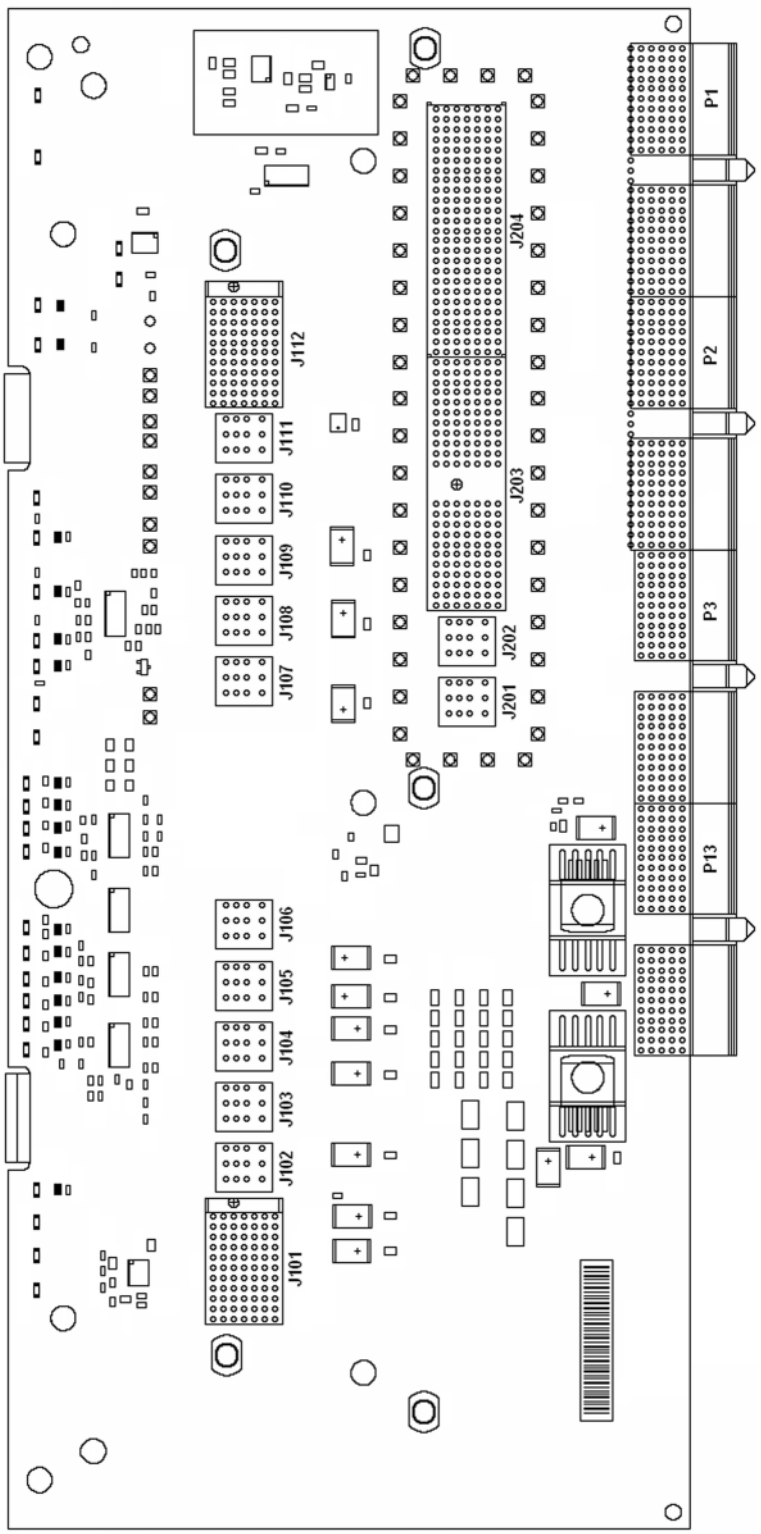
- Instrument power supply voltage test points and status LEDs
- +3.3V analog linear power supply regulation (+3.3V_A)
- -5.2V analog linear power supply regulation (-5.2V_A)
- Non-volatile memory for storage of the instrument model number, serial number, and software license keys (Secure Storage).
- Power supply dithering. A triangle wave of approximately 100 Hz is generated and goes directly to the A6 Power Supply assembly. This is used to frequency modulate the power supply switching frequency for the purpose of lowering any power supply related interference.

Midplane Board Connections

Connector	Connects To
J101	A6 Power Supply Assembly
J102	A6 Power Supply Assembly
J103	A6 Power Supply Assembly
J104	A6 Power Supply Assembly
J105	A6 Power Supply Assembly
J106	A6 Power Supply Assembly
J107	A6 Power Supply Assembly
J108	A6 Power Supply Assembly
J109	A6 Power Supply Assembly
J110	A6 Power Supply Assembly

Connector	Connects To
J111	A6 Power Supply Assembly
J112	A6 Power Supply Assembly
J201	A4 Processor Assembly
J202	A4 Processor Assembly
J203	A4 Processor Assembly
J204	A4 Processor Assembly
P1	A8 Motherboard Assembly
P2	A8 Motherboard Assembly
P3	A8 Motherboard Assembly
P13	A8 Motherboard Assembly

Figure 3-1 A7 Midplane Board Assembly Connections



A8 Motherboard Description

The A8 Motherboard assembly is serviced as an assembly only; no component level repair is supported.

The main functions that the A8 Motherboard assembly provides are:

- Assembly interconnections

  Provides connections for all major assemblies

- Signal Routing

  Routes all signals between major assemblies

- Fan Speed Controller

  Controls the speed of the instrument fan to maintain the internal temperature within operating parameters

- Option Slots

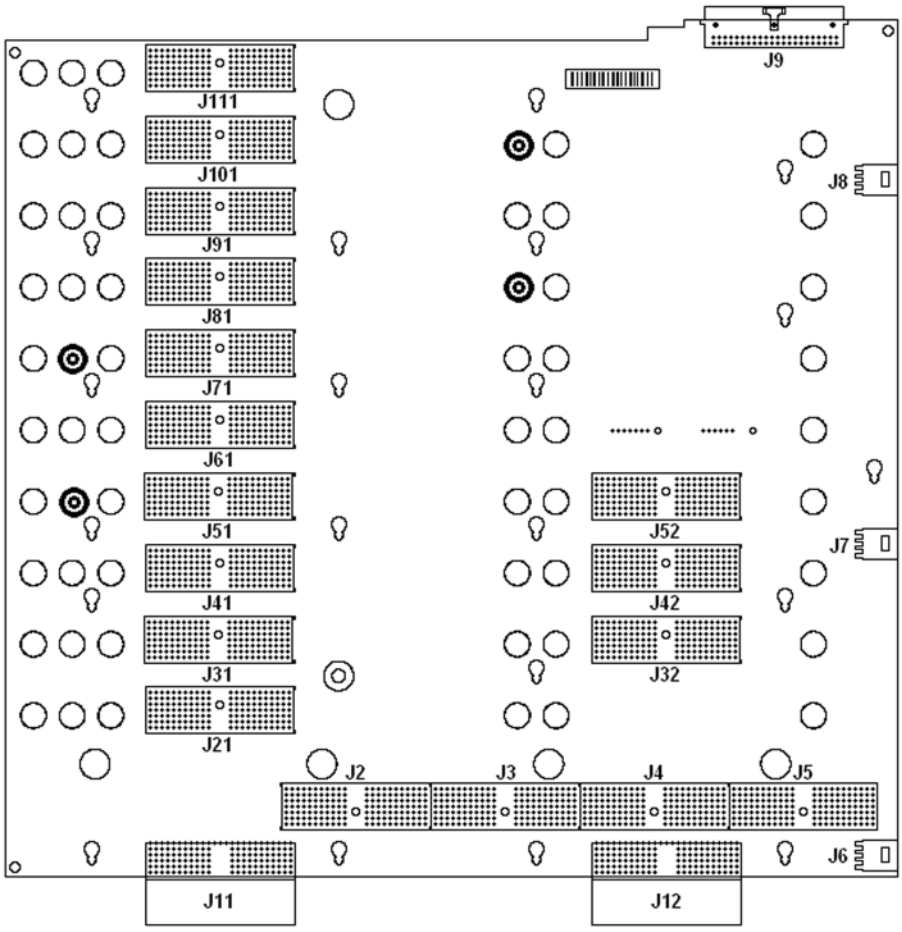
  Expansion capability for hardware options

Motherboard Connections

Connector	Connects To
J2	A7 Midplane Board Assembly
J3	A7 Midplane Board Assembly
J4	A7 Midplane Board Assembly
J5	A7 Midplane Board Assembly
J6	B3 Fan Assembly
J7	B2 Fan Assembly
J8	B1 Fan Assembly
J9	W1 Front Panel Ribbon Cable
J11	A3 Digital I/O Board Assembly
J12	A3 Digital I/O Board Assembly
J21	Unused
J31	Unused

Connector	Connects To
J32	Unused
J41	Unused
J42	Unused
J51	Unused
J52	A24 Conducted Filter Assembly
J61	Unused
J71	A23 Conducted Input Assembly
J81	A22 Radiated Filter Assembly
J91	Unused
J101	A21 Radiated Input Assembly
J111	Unused

Figure 3-2 A8 Motherboard Assembly Connectors



SW1 & SW2 - Input Relay Assemblies

The SW1 and SW2 Relay Switches determine which N9039A RF Input connector is routed to the N9039A RF Output connector and if a filtered path or the bypass path is used.

SW1 & SW2 are DC to 26.5 GHz 50 ohm SPDT switches. Both switches are controlled by internal TTL signals via a 6 pin ribbon cable from the A23 Conducted Input Board Assembly.

Relay Switch SW1 determines if the signal input of the Preselector will be from the RF Input front panel connector or the Calibration Source Input connector.

Relay Switch SW2 determines if the signal output of the Preselector that is routed to the RF Output Front Panel connector will be from the bypass path or the filtered path.

All Relay Switch ports are terminated when open to reduce reflected signals and crosstalk

A21 - Radiated Input Board Assembly

The A21 Radiated Input Board Assembly is serviced as an assembly only; no component level repair is supported.

The A21 Radiated Input Board Assembly functions in a frequency range of 30 MHz to 1 GHz and has a 30 MHz High Pass Filter to provide a clean input signal to the A22 Radiated Filter Board Assembly.

Refer to Figure 3-3 and Figure 3-4. A21 Radiated Input Board Assembly contains 6 I/O ports.

Connector	Description	Connects To
J3	RF Main output	SW2 Switch Assembly
J4	RF Conducted output	A23 Conducted Input Assembly
J5	RF Radiated output	A22 Radiated Filter Assembly
J6	RF Radiated input	A22 Radiated Filter Assembly
J7	RF Conducted input	A23 Conducted Input Assembly
J8	RF Main input	SW2 Switch Assembly

The assembly consists of two pin switches for selecting either the conducted or radiated filter paths.

- If the Conducted filter path is selected, pin switches on the A21 - Radiated Input Board Assembly pass the input RF signal though to the A23 - Conducted Input Board Assembly. Then additional pin switches on the A21 - Radiated Input Board Assembly pass the filtered RF signal through from the A23 - Conducted Input Board Assembly to the instrument output.
- If the Radiated filter path is selected, pin switches on the A21 - Radiated Input Board Assembly route the input RF signal from the RF Main Input connector to the A22 - Radiated Filter Board Assembly from the RF Radiated Output connector. Then additional pin switches route the filtered RF signal from the A23 - Conducted Input Board Assembly from the RF Radiated Input connector to the Main RF Output Connector.

In addition, the A21 Radiated Input Board Assembly also provides the following functions for the radiated path:

- Variable gain amplifier
- 15 dB step gain amplifier
- Thermistor to protect against power surges
- Limiter to protect against over voltage conditions
- Step attenuator to protect against Overload
- Overload detector to warn the user if an overload condition exists

Figure 3-3 A21, A22, A23, and A24 Board Connectors

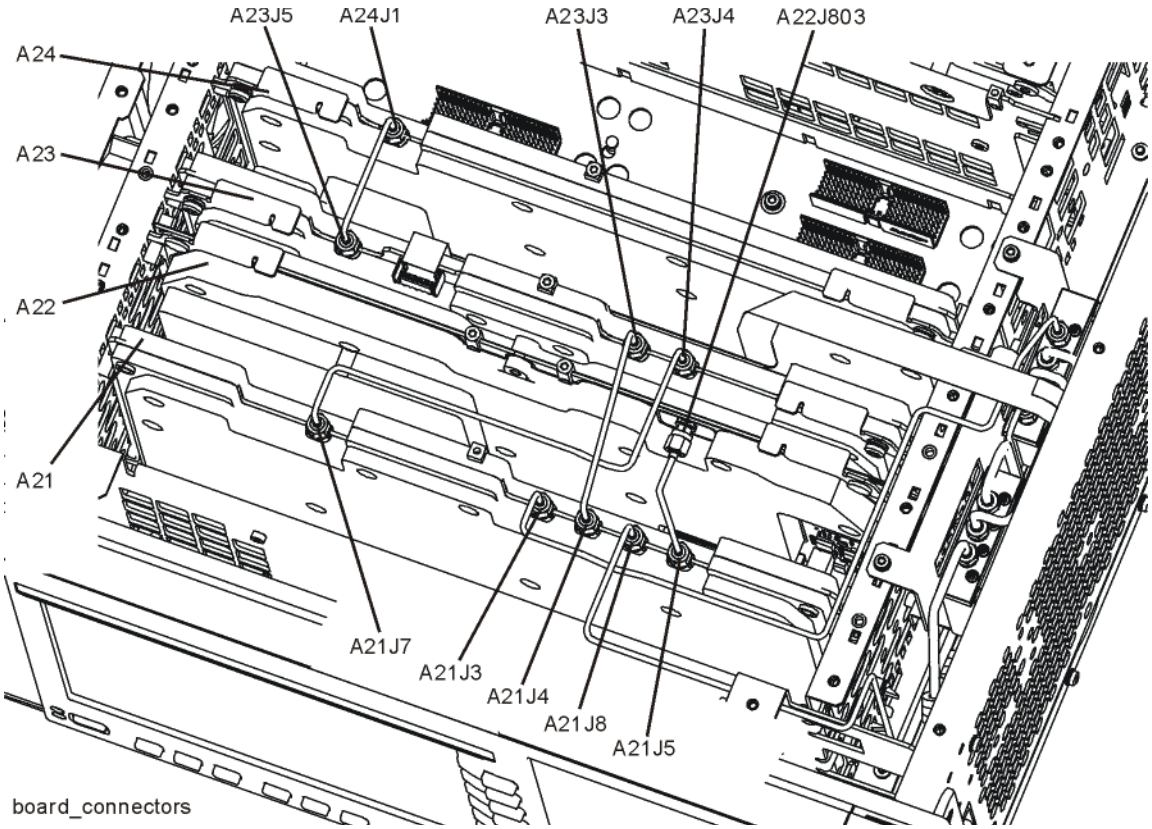
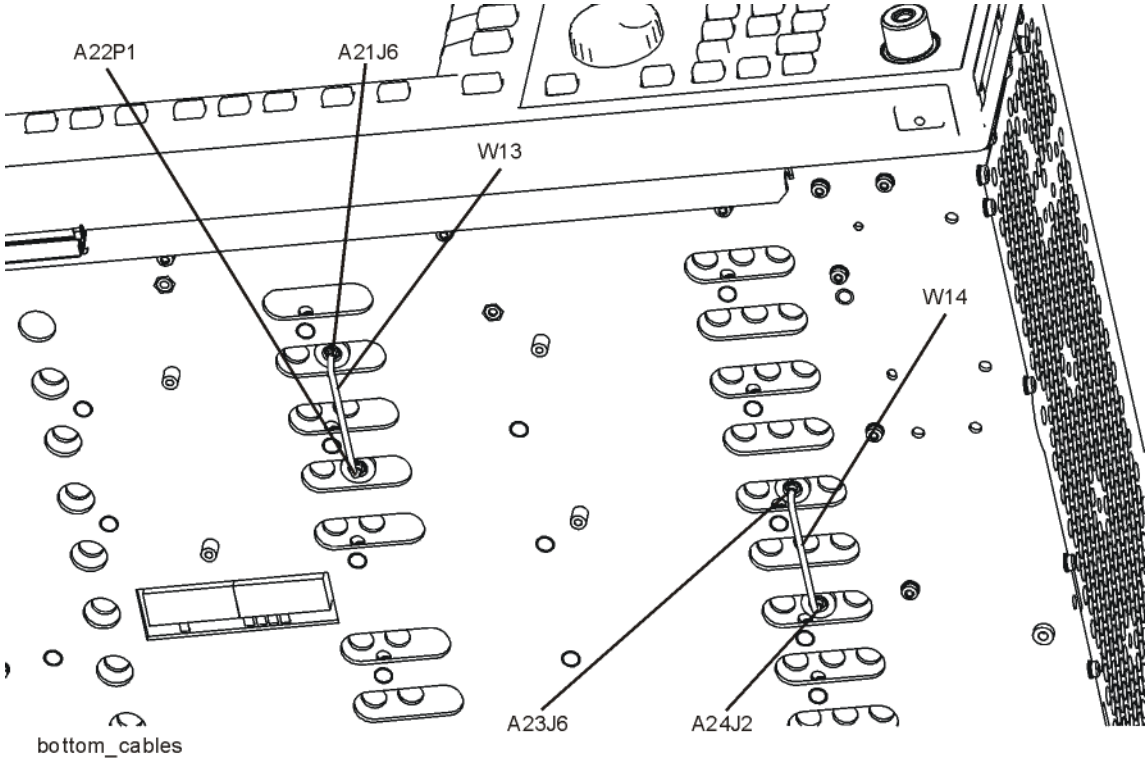


Figure 3-4 Instrument Bottom View



A22 - Radiated Filter Board Assembly

The A22 Radiated Filter Board Assembly is serviced as an assembly only; no component level repair is supported.

Refer to Figure 3-3 and Figure 3-4. The A22 Radiated Filter Board Assembly provides preselection to the CISPR bands C and D from 30 MHz to 1 GHz. It contains 2 I/O ports.

Connector	Description	Connects To
J803	RF input	A21 Radiated Input Assembly
P1	RF output	A21 Radiated Input Assembly

The board consists of input pin switches for selecting the desired filter path. The filters on this assembly are all varactor tuned filters, the tuning voltages for these filters come from the A21 Radiated Input Board Assembly.

Radiated Bands	A22 BPF Frequency Ranges
Band 0	28 MHz - 55 MHz
Band 1	55 MHz - 100 MHz
Band 2	100 MHz - 155 MHz
Band 3	155 MHz - 235 MHz
Band 4	235 MHz - 350 MHz
Band 5	330 MHz - 470 MHz
Band 6	470 MHz - 620 MHz
Band 7	620 MHz - 820 MHz
Band 8	820 MHz - 1000 MHz

A23 - Conducted Input Board Assembly

The A23 Conducted Input Board Assembly is serviced as an assembly only; no component level repair is supported.

The A23 Conducted Input Board Assembly functions in a frequency range of 9 kHz to 30 MHz and has input filters to provide a clean input signal to the A24 Conducted Filter Board Assembly.

Refer to Figure 3-3 and Figure 3-4. A23 Conducted Input Board Assembly contains 5 I/O ports.

Connector	Description	Connects To
J8	Switch Control output	SW1 & SW2 Switch Assembly
J3	RF Main input	A21 Radiated Input Assembly
J4	RF Main output	A21 Radiated Input Assembly
J5	RF Conducted output	A24 Conducted Filter Assembly
J6	RF Conducted input	A24 Conducted Filter Assembly

When the conducted filter path is selected, the A21 Radiated Input Board Assembly passes the input RF signal through to the A23 Conducted Input Board Assembly where it is then routed to the A24 Conducted Filter Assembly. Then the filtered RF signal is routed back to the A23 Conducted Input Board Assembly and then to the A21 Radiated Input Board Assembly.

In addition, the A23 Conducted Input Board Assembly also provides the following functions for the conducted path:

- Variable gain amplifier
- 15 dB step gain amplifier
- Generates the Switching Control Signals for SW1 & SW2 Relay Switches
- Thermistor to protect against power surges
- Limiter to protect against over voltage conditions
- Step attenuator to protect against Overload
- Overload detector to warn the user if an overload condition exists
- Digital temperature sensor to monitor internal temperature changes

A24 - Conducted Filter Board Assembly

The A24 Conducted Filter Board Assembly is serviced as an assembly only; no component level repair is supported.

Refer to Figure 3-3 and Figure 3-4. The A24 Conducted Filter Board Assembly provides preselection for CISPR bands A and B from 9 kHz to 30 MHz. The board consists of input pin switches for selecting the desired filter path. It contains 2 I/O ports.

Connector	Description	Connects To
J1	RF input	A23 Conducted Input Assembly
J2	RF output	A23 Conducted Input Assembly

There are a total of 12 band pass filters in the conducted filter board. All of the filters on this assembly are fixed filters, with no tuning or adjustments required.

Conducted Bands	A24 BPF Frequency Ranges
Band 0	9 kHz - 150 kHz
Band 1	150 kHz - 1MHz
Band 2	1 MHz - 2 MHz
Band 3	2 MHz - 5 MHz
Band 4	5 MHz - 8 MHz
Band 5	8 MHz - 11 MHz
Band 6	11 MHz - 14 MHz
Band 7	14 MHz - 17 MHz
Band 8	17 MHz - 20 MHz
Band 9	20 MHz - 24 MHz
Band 10	24 MHz - 28 MHz
Band 11	28 MHz - 32 MHz

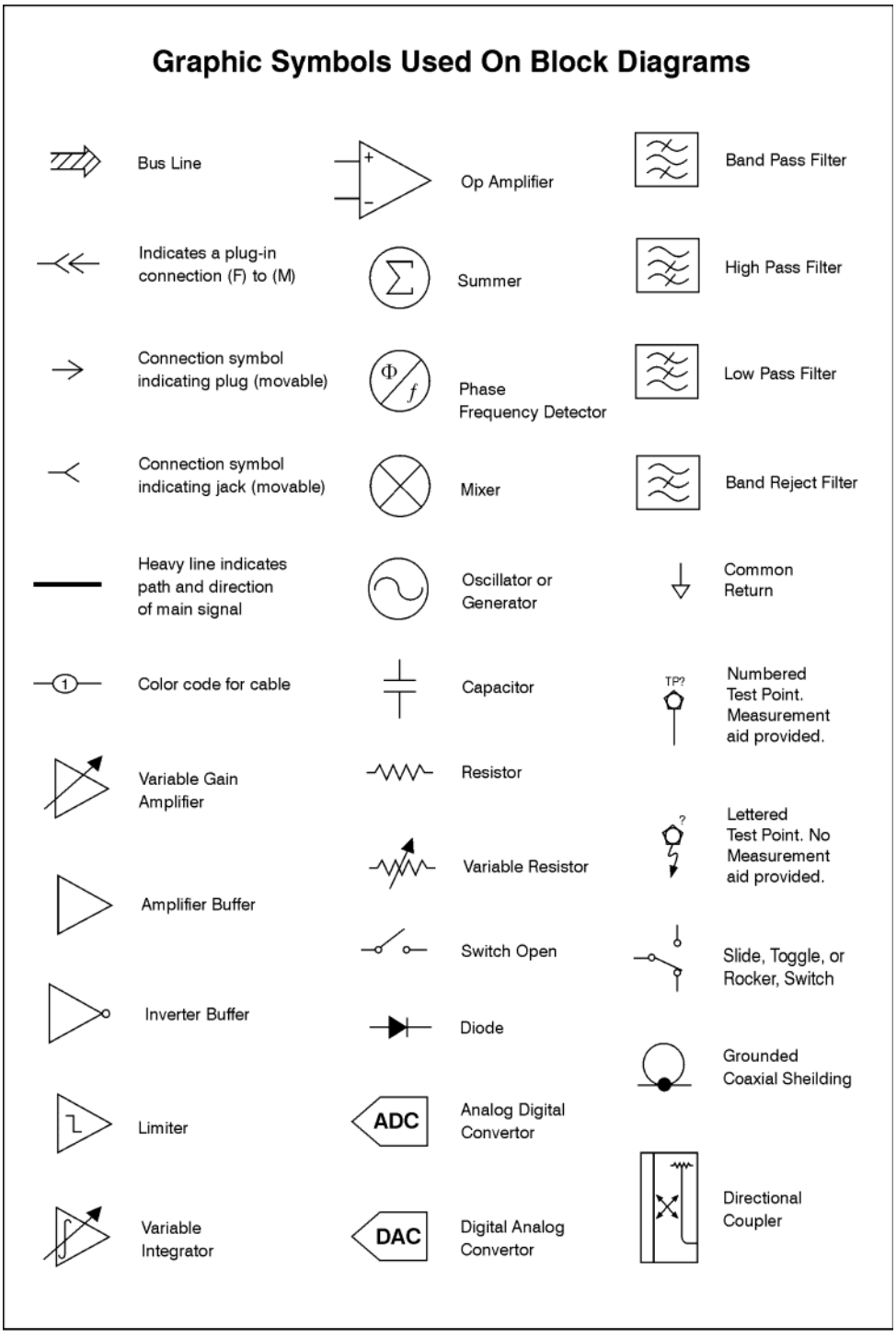
4 Block Diagrams

What You Will Find in This Chapter

The following sections are found in this chapter:

N9039A RF Preselector RF Block Diagram ..... page 117
N9039A Conducted Band Filter Path Block Diagram ..... page 118
N9039A Radiated Band Filter Path Block Diagram ..... page 119
N9039A Computer Block Diagram ..... page 120

Block Diagrams



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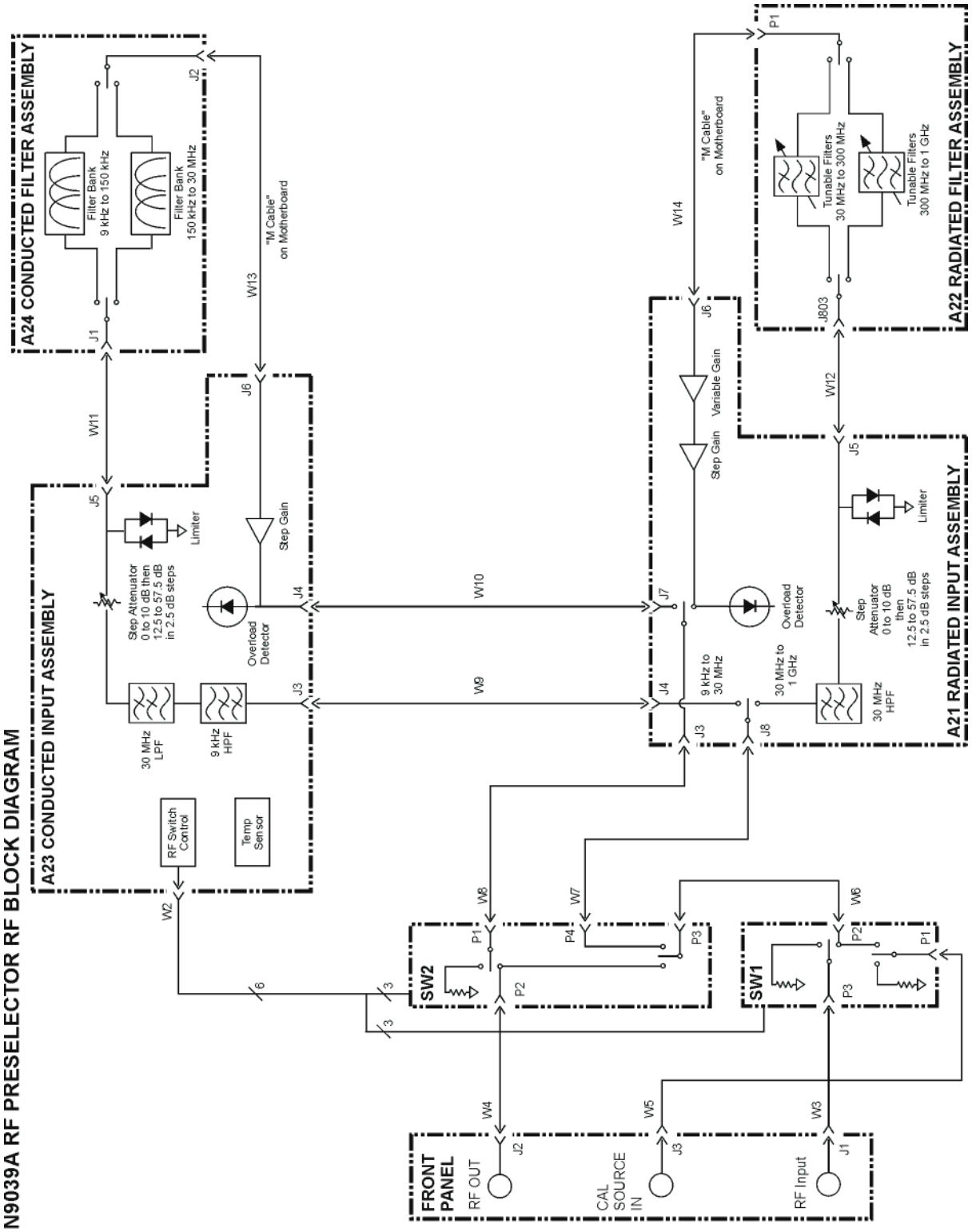
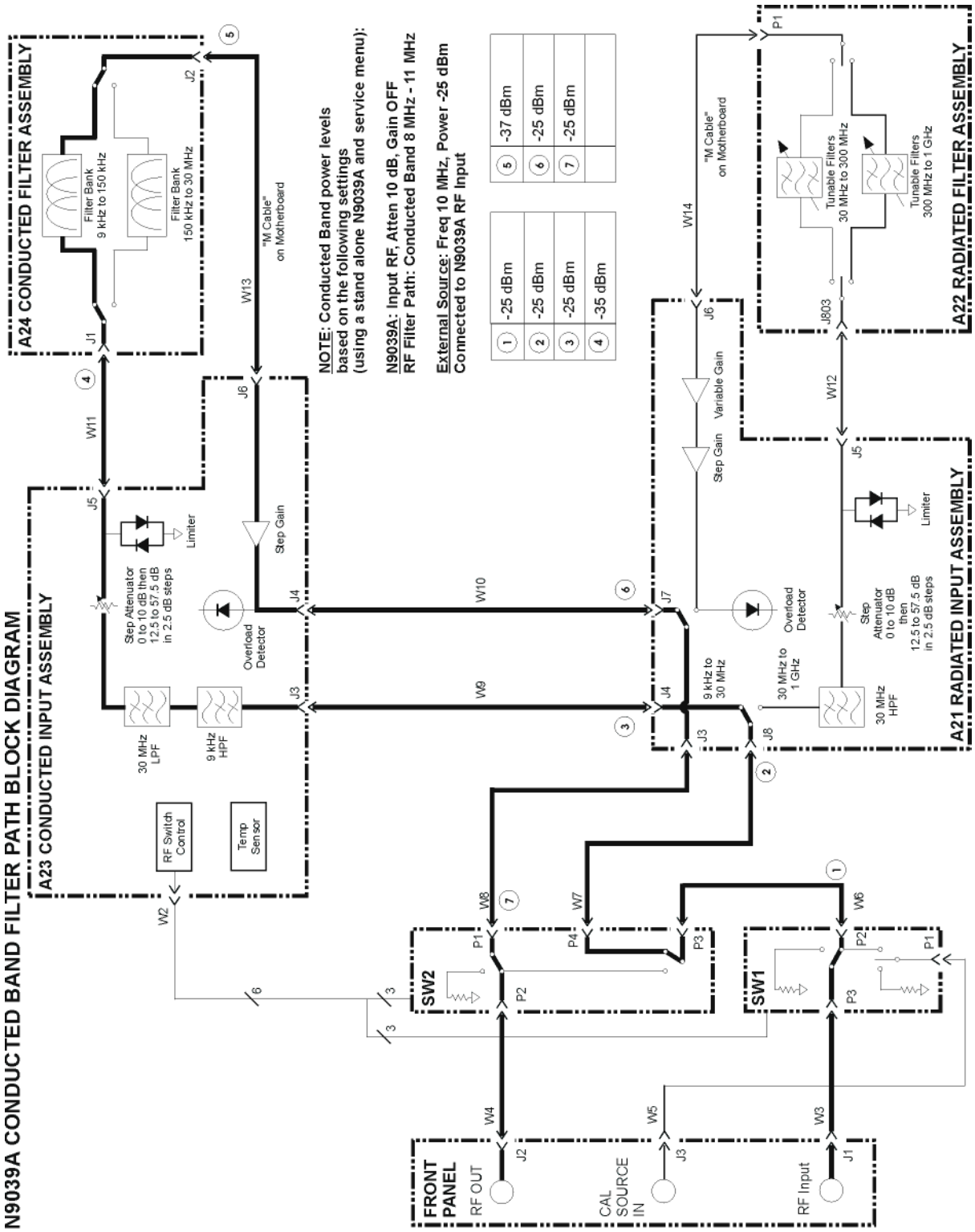
Block Diagrams

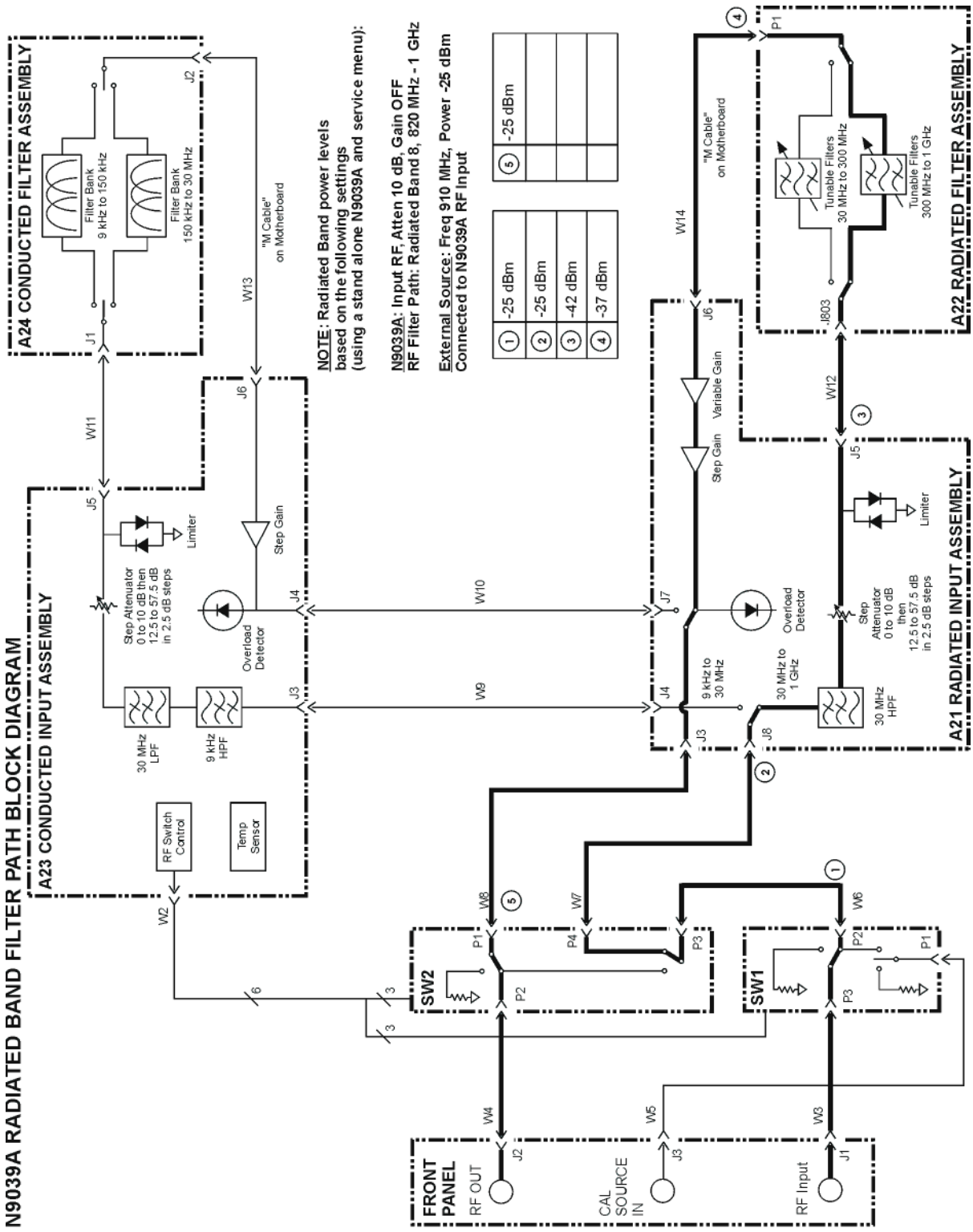
N9039A RF Preselector RF Block Diagram



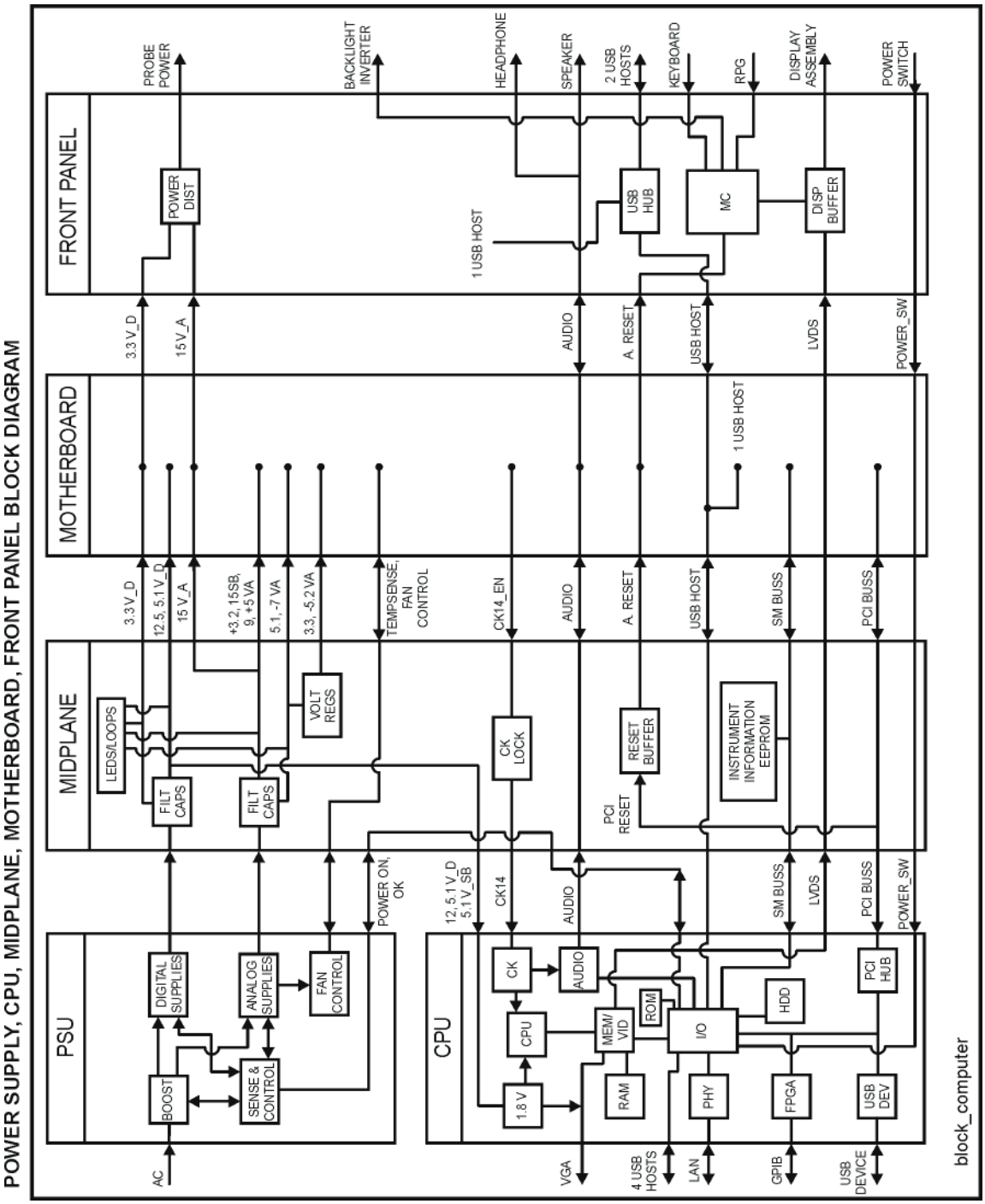
N9039A Conducted Band Filter Path Block Diagram



N9039A Radiated Band Filter Path Block Diagram



N9039A Computer Block Diagram



5 Service and Diagnostics Menus

What You Will Find in This Chapter

Overview ..... page 123

Controlling Access ..... page 123
Secure Service Access ..... page 124
Service Menus ..... page 125

Service Key Descriptions ..... page 128

Service ..... page 128
RF Filter Path ..... page 130
Bypass Path ..... page 132
Input ..... page 132
Attenuation ..... page 132
Gain ..... page 132
Center Freq ..... page 133

Diagnostics Key Descriptions ..... page 134

Diagnostics ..... page 134
Show Hdwr Statistics ..... page 134

Overview

The Service capabilities described below are accessed via the Service and Diagnostic menus in the System menu. The Service capabilities are intended for field service technicians. These technicians may be at an Agilent Service Center or at a self-maintaining customer site.

There are two types of Service capabilities:

1. Diagnostics - These are available to any user and will assist in initial troubleshooting of instrument malfunctions. Examples are the ability to read the mechanical relay cycles.
2. Service Functions - These are for use by the factory or field repair technicians, access is controlled. Examples are the ability to select a specific RF Filter Path.

Controlling Access

There are two levels of service and diagnostics capabilities:

"Unrestricted access" - Access to the Diagnostics menu is allowed for everyone. Care may be required to use a feature appropriately. This is the "Diagnostic" type of Service capability defined above.

"Secure Service Access" - Access to the Service menu is restricted to the service technician. This prevents the casual user from accessing and using these features. The intention is to provide this access to Agilent Service Centers as well as any self-maintaining customer who purchases the Service Guide. This is the "Service Functions" type of Service capability defined above.

Access to secured service capabilities is gained via a specific user name through the Window® Authentication (login). In addition, the service technician is also required to enter a specific numeric Service Code. The Service Code is designed to be easily entered via the front panel; an external keyboard or mouse is not required.

Once access has been gained, it will persist within the current instance of the instrument application. If the user exits the instrument application, the Service Code will need to be entered again in order to gain access to the Service Menu.

Secure Service Access

Secure Service Access is gained only with the Windows® Login of “advanceduser”. The “advanceduser” must be a member of the “Power Users” group. This account has not been pre-configured on the instrument. The administrator must create the login (refer to Windows XP Help and Support Center). The recommended password for the “advanceuser” account is “service4u”.

Once logged in as “advanceduser” the Service Menu can be accessed with a Service Code of “**-2061”.**

Summary of Requirements for Service Menu Access:

- User login name: **advanceduser**
- Recommended account password: **service4u**
- User is member of “**Power Users**” group
- Service Code: **-2061**

Service Menus

Figure 5-1 Main Service Menus

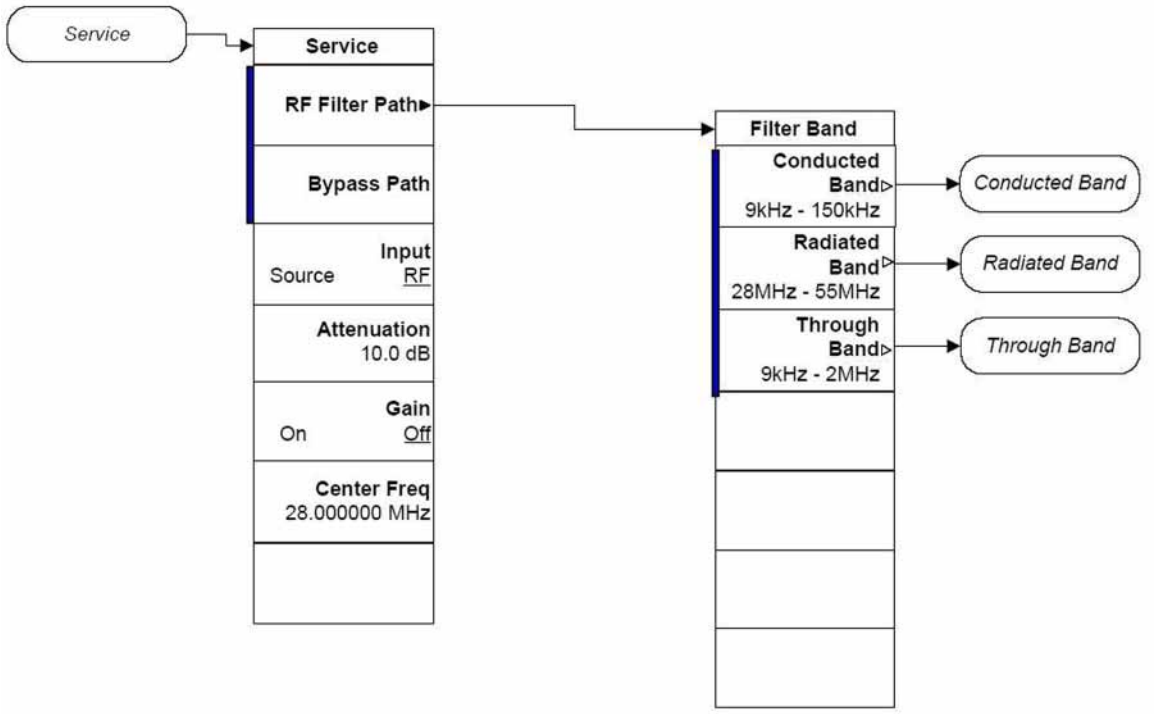


Figure 5-2 Conducted Band Menus

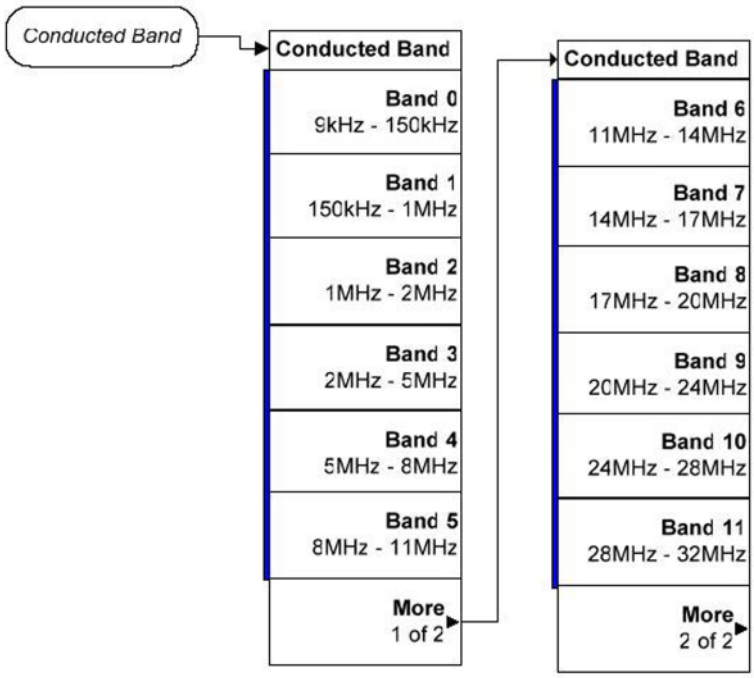


Figure 5-3 Radiated Band Menus

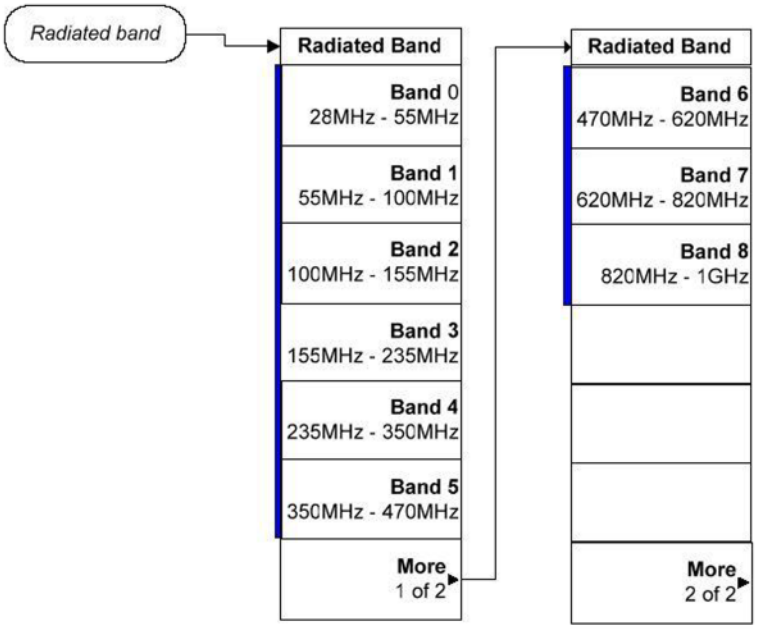


Figure 5-4 Through Band Menu

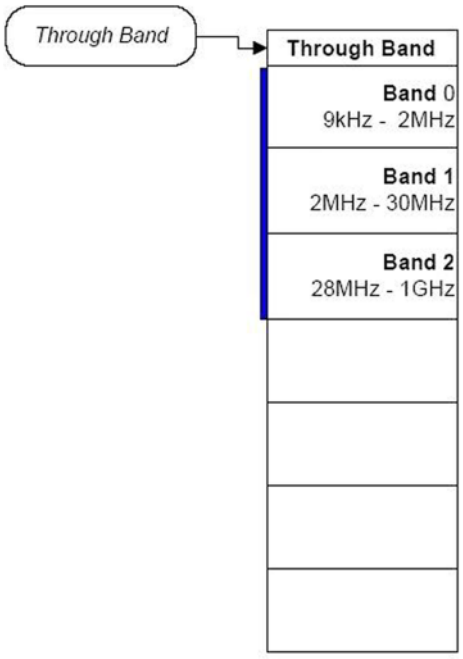
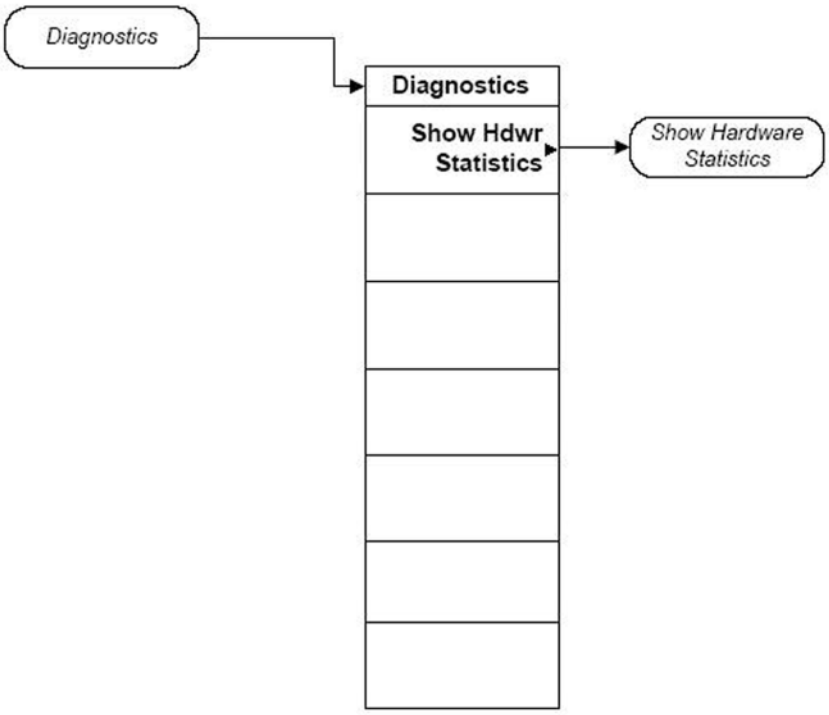


Figure 5-5 Diagnostics Menu



Service Key Descriptions

Service

The Service menu key (System menu) is only available when the logged-in user is “advanceduser”. The first access to the Service Menu after invoking the instrument application will require an authentication, which is to enter the Service Code, as shown in Figure 5-6. Subsequent accesses to the Service Menu are unimpeded.

Figure 5-6 **Service Code Entry**

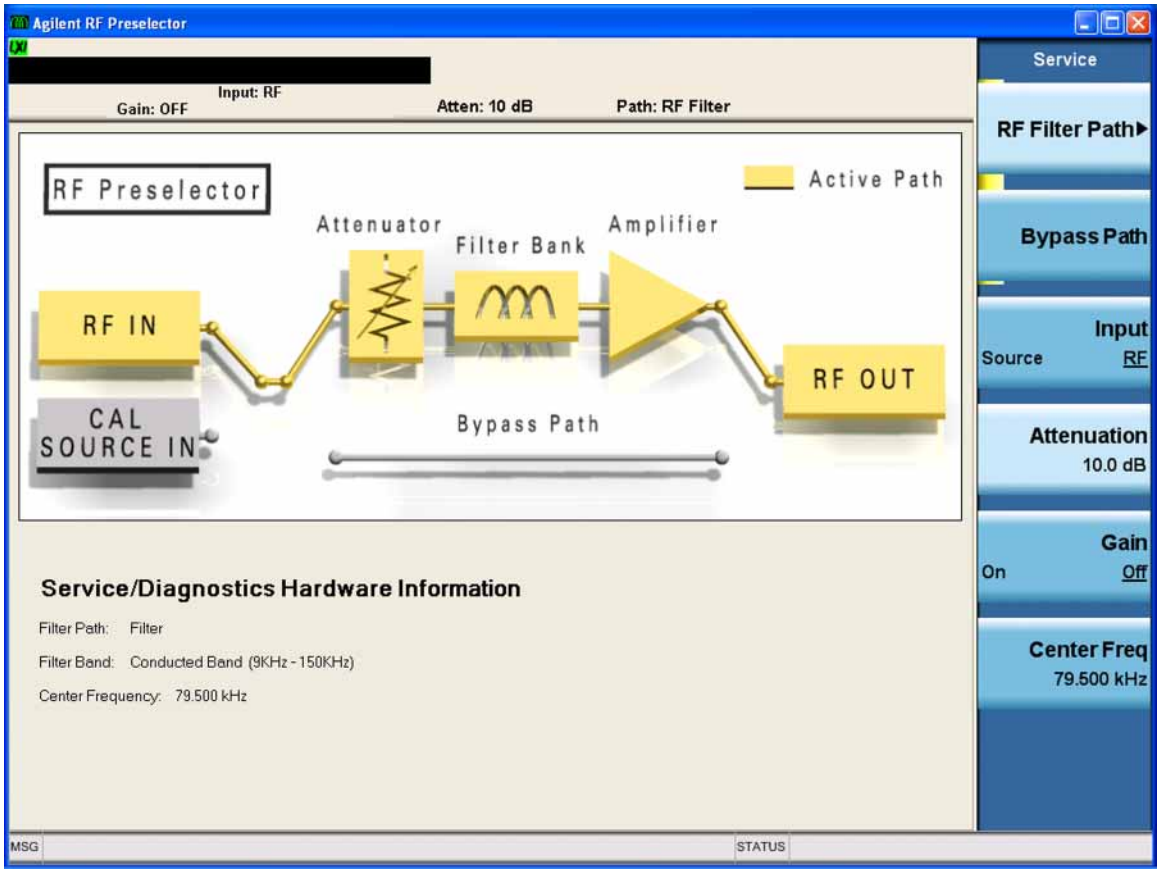
You can use the numeric keypad to enter the Service Code, which is -2061, and since “Login” is the default highlighted key, the Enter key can be used to complete the entry.

If an invalid Service Code is entered access will not be granted and you will see the message shown in Figure 5-7. You will need to accept this prompt and press the Service key again to re-enter the Service Code correctly.

Figure 5-7 **Incorrect Service Code Entry**

When the Service Menu is entered the current hardware status will be displayed in the “Service / Diagnostics Hardware Information” area of the instrument screen as shown in Figure 5-8.

Figure 5-8 Service/Diagnostics Hardware Information Screen



RF Filter Path

Allows the service technician to select one of the individual filter paths for troubleshooting purposes.

Conducted Path

Selects the conducted filter path. Once selected the service technician can then select one of the 12 different conducted filter paths.

Band 0

Selects the 9 kHz to 150 kHz filter path

Band 1

Selects the 150 kHz to 1 MHz filter path

Band 2

Selects the 1 MHz to 2 MHz filter path

Band 3

Selects the 2 MHz to 5 MHz filter path

Band 4

Selects the 5 MHz to 8 MHz filter path

Band 5

Selects the 8 MHz to 11 MHz filter path

Band 6

Selects the 11 MHz to 14 MHz filter path

Band 7

Selects the 14 MHz to 17 MHz filter path

Band 8

Selects the 17 MHz to 20 MHz filter path

Band 9

Selects the 20 MHz to 24 MHz filter path

Band 10

Selects the 24 MHz to 28 MHz filter path

Band 11

Selects the 28 MHz to 32 MHz filter path

Radiated Path

Selects the radiated filter path. Once selected the service technician can then select one of the 9 different radiated filter paths.

Band 0

Selects the 28 MHz to 55 MHz filter path

Band 1

Selects the 55 MHz to 100 MHz filter path

Band 2

Selects the 100 MHz to 155 MHz filter path

Band 3

Selects the 155 MHz to 235 MHz filter path

Band 4

Selects the 235 MHz to 350 MHz filter path

Band 5

Selects the 350 MHz to 470 MHz filter path

Band 6

Selects the 470 MHz to 620 MHz filter path

Band 7

Selects the 620 MHz to 820 MHz filter path

Band 8

Selects the 820 MHz to 1 GHz filter path

Through Path

Selects the internal through path. Once selected the service technician can then select one of the 3 different internal through paths. These are different than the Bypass Path in that the Through Bands are internal to the filter boards, unlike the Bypass Path which does not route the input signal to the filter boards at all.

Band 0

Selects the 9 kHz to 2 MHz through path

Band 1

Selects the 2 MHz to 30 MHz through path

Band 2

Selects the 28 MHz to 1 GHz through path

Bypass Path

Allows the service technician to select the bypass path for troubleshooting purposes.

This will bypass the filter boards entirely, routing the input signal through the RF switch assembly only. The Attenuation, Gain, and Center Freq settings, as well as the previously selected filter path, will have no affect on the input signal when the Bypass Path is selected.

Input

Allows the service technician to select between either the standard RF Input or the Source Input for troubleshooting purposes.

The input can be selected when going through either an RF Filter Path or the Bypass Path

Attenuation

Allows the service technician to select the attenuation level being used for troubleshooting purposes.

There are two different attenuators in the instrument; one in the Conducted Filter Path and one in the Radiated Filter Path. When the attenuation level is adjusted by the user it will only change the attenuator for the path currently being used. If you were then to switch to a band that uses the other attenuator it will be synchronized to the currently displayed attenuation level before the path is switched.

This setting will have no affect on the signal level when the Bypass Path is being used.

Gain

Allows the service technician to select to use the internal fixed gain amplifier or not for troubleshooting purposes.

There are two different amplifiers in the instrument; one in the Conducted Filter Path and one in the Radiated Filter Path. When the gain is turned on or off by the user it will only change the state of the amplifier in the path currently being used. If you were then to switch to a band that uses the other amplifier it will be synchronized to the currently displayed gain state before the path is switched.

This setting will have no affect on the signal level when the Bypass Path is being used.

Center Freq

Allows the service technician to set the center frequency of the filter being used for troubleshooting purposes.

When a filter band is selected the Center Frequency value will be automatically changed to center frequency of the selected filter band.

Conducted Bands

Since the filters in the conducted bands are fixed the Center Frequency value will have no affect when a conducted band filter is selected, even though it can be set.

Radiated Bands

Since the filters in the radiated band are tunable, changing the Center Frequency will tune the frequency of the filter being used.

The range for the Center Frequency settings will always be that of the currently used filter band.

This setting will have no affect when either one of the Through Bands or the Bypass Path is being used.

Diagnostics Key Descriptions

Diagnostics

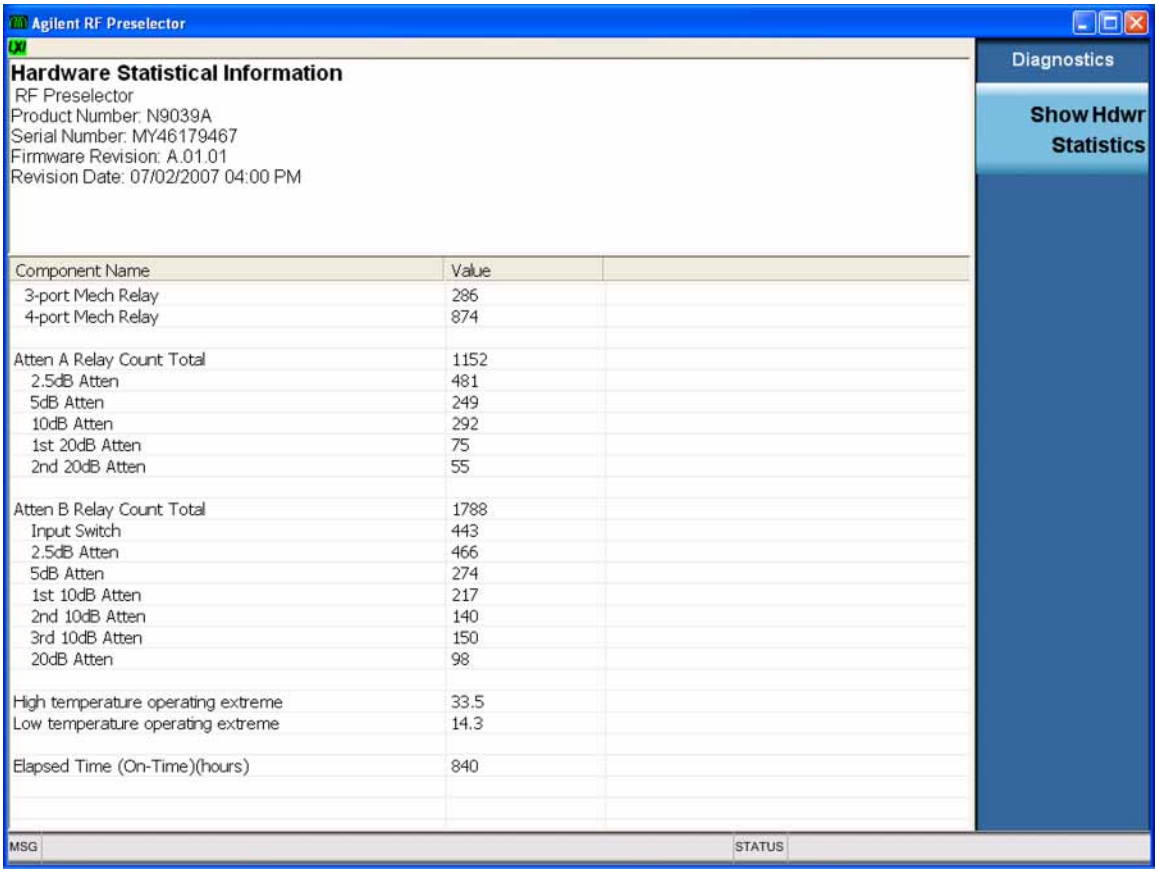
The Diagnostics menu key (System menu) is always available. It will contain system level diagnostics that can be either viewed or run by any user.

Show Hdwr Statistics

As shown in Figure 5-9, this will display the following instrument hardware statistics:

- Mechanical relay switch counts
- Mechanical attenuator switch counts
- Instrument temperature extremes
- Elapsed instrument on-time

Figure 5-9 Hardware Statistical Information



6 Replaceable Parts

What You Will Find in This Chapter

The following information is found in this chapter:

1. Part number tables for assemblies, mechanical parts, cables, front panel connectors, and labels.
2. Part location diagrams for the following:

Fig. 6-1 Major Assemblies	page 145
Fig. 6-2 External Hardware	page 146
Fig. 6-3 Processor Assembly Components	page 147
Fig. 6-4 Top Braces	page 148
Fig. 6-5 RF Switch Area	page 149
Fig. 6-6 Top Cables	page 150
Fig. 6-7 Chassis	page 152
Fig. 6-8 Motherboard Bottom	page 153
Fig. 6-9 Motherboard Top	page 154
Fig. 6-10 Fan Hardware	page 155
Fig. 6-11 Input and Output Connectors	page 156
Fig. 6-12 Front Frame Parts	page 157
Fig. 6-13 Front Frame Exploded View	page 158

How to Order Parts

To order an assembly or mechanical part listed in this chapter, go to:

www.parts.agilent.com

If you do not have web access, or the parts you are interested in cannot be found in the parts list provided, contact your local Agilent Technologies sales and service office with the following information:

- Product model number
- Product serial number
- Description of where the part is located, what it looks like, and its function (if known)
- Quantity required

For a list of Agilent Technologies sales and service office locations, refer to "Contacting Agilent Technologies" on page 26.

Replaceable Parts

Some of the assemblies listed in the following table are related to options that are available with the N9039A RF Preselector.

Table 6-1 All Replaceable Parts

Reference Designator	Description	Part Number
A1A1	Front Frame Assembly	N9039-60024
A1A1MP1	Front Frame	N9039-40200
A1A1MP2	Main Keypad Overlay	N9039-88000
A1A1MP3	Connector Overlay	E4410-80109
A1A1MP4	Front Frame Ground Spring	W1312-00021
A1A1MP5	Braided Gasket	8160-0660
A1A1MP6	Chromeric Gasket	8160-1104
A1A1MP7	Nameplate Label	N9039-80001
A1A1MP8	Front Frame Top Trim Strip	W1312-40019
A1A1MP9-10	Front Frame Side Trim Strip	W1312-40005
A1A2	Front Panel Interface Board Assembly	E4410-60113
A1A2MP1	Speaker	9164-0453
A1A2MP2	Speaker Mounting Foam	W1312-40016
A1A3	Liquid Crystal Display	2090-0911
A1A4	Display Backlight Inverter Board	0950-4635
A1A5	Front Panel USB Interface Board Assembly	N9039-63018
A1MP1	Main Keypad	N9039-40001
A1MP2	Display Keypad	E4410-40101
A1MP7	LCD Glass Filter	1000-1435
A1MP8	LCD Lens Gasket	W1312-40006
A1MP9	RPG Knob	W1312-40017
A1MP10-13	LCD Backlight Cable Clamp	1400-1439
A1MP14	Display Bracket	W1312-00023
A1MP15	Inverter Board Shield	W1312-00024
A1MP16-17	Vinyl Side Trim	5041-9172

Table 6-1 All Replaceable Parts

Reference Designator	Description	Part Number
A1W1	LCD Control Flex Circuit	W1312-60010
A1W2	LCD Inverter Control Cable	W1312-60011
A3	Digital I/O Board Assembly	N9039-60005
A4	Processor Board Assembly (does not include disk drive)	N9039-60025
A4A1	SRAM Module - 1 GB	1819-0329
A4BT1	Processor Board Battery	1420-0356
A5	Programmed Hard Disk Drive	N9039-60026
A5W1	Disk Drive Ribbon Cable	8121-1611
A6	Power Supply	0950-4900
A7	Midplane Board Assembly	W1312-63002
A8	Motherboard Assembly	E4449-63100
A21	Radiated Input Board Assembly	N9039-60004
A22	Radiated Filter Board Assembly	N9039-60002
A23	Conducted Input Board Assembly	N9039-60003
A24	Conducted Filter Board Assembly	N9039-60001
B1-B3	Fan	3160-4199
J1	RF Input Connector Assembly - Type N RF Input Connector Assembly - 3.5mm (Option BAB)	N9039-60030 N9039-60027
J1MP1	O-ring, Front Panel RF Connector	8160-1637
J2	RF Output Connector Assembly - Type N RF Output Connector Assembly - 3.5mm (Option BAB)	N9039-60028 N9039-60029
J2MP1	O-ring, Front Panel RF Connector	8160-1637
J3	Cal Source Input Connector Assembly - Type N	N9039-60028
J3MP1	O-ring, Front Panel RF Connector	8160-1637
MP1	Chassis Base	E4449-00102
MP2	Chassis Side, Right (inner)	W1312-00050
MP3	Chassis Side, Left (inner)	W1312-00051
MP4	Midplane Bracket	W1312-00048

Table 6-1 All Replaceable Parts

Reference Designator	Description	Part Number
MP5	Chassis Front Bracket	W1312-00049
MP6	Fan Bracket	W1312-00058
MP7	Top Brace	N9039-60031
MP8	Top Brace, Power Supply	W1312-00062
MP9	Chassis Side, Right (Outer)	E4449-00101
MP10	Rear Panel Assembly	N9039-60007
MP11	Dress Cover	W1312-00060
MP12-15	Rear Feet	5041-9611
MP16-17	Strap Handles	E8251-60067
MP18	Switch Bracket	N9039-01201
MP19	Chassis Gusset	W1312-00093
MP20-22	Fan Guard	3160-0281
MP23-34	Rivet, Fan Mounting	0361-1272
MP35-38	Cable Retainer - Motherboard Lower	E8251-40001
MP39-42	Cable Retainer - Motherboard Upper	E8251-40007
MP43-50	PC Board Plastic Guides	W1312-40001
MP51-60	CPU & Power Supply Guide Pin Grommets	0400-0353
SW1	RF Switch Assembly - 3 Port	N9039-60021
SW2	RF Switch Assembly - 4 Port	N9039-60022
W1	Ribbon Cable Assembly, Front Panel Interface Board to Motherboard	E4410-60171
W2	Ribbon Cable Assy, Switch Control	N9039-60020
W3	RF Cable Assy, RF Input (J1) to 3-Port Switch (SW1) P3 RF Cable Assy, RF Input (J1) to 3-Port Switch (SW1) P3 (Option BAB)	N9039-21310 N9039-21312
W4	RF Cable Assy, RF Output (J2) to 4-Port Switch (SW2) P2 RF Cable Assy, RF Output (J2) to 4-Port Switch (SW2) P2 (Option BAB)	N9039-21307 N9039-21311
W5	RF Cable Assy, Cal Input (J3) to 3-Port Switch (SW1) P1	N9039-21308
W6	RF Cable Assy, 3-Port Switch (SW1) P2 to 4-Port Switch (SW2) P3	N9039-21306

Table 6-1 All Replaceable Parts

Reference Designator	Description	Part Number
W7	RF Cable Assy, 4-Port Switch (SW2) P4 to Radiated Input (A21) J8	N9039-21305
W8	RF Cable Assy, Radiated Input (A21) J3 to 4-Port Switch (SW2) P1	N9039-21304
W9	RF Cable Assy, Radiated Input (A21) J4 to Conducted Input (A23) J3	N9039-21302
W10	RF Cable Assy, Conducted Input (A23) J4 to Radiated Input (A21) J7	N9039-21309
W11	RF Cable Assy, Conducted Input (A23) J5 to Conducted Filter (A24) J1	N9039-21301
W12	RF Cable Assy, Radiated Input (A21) J5 to Radiated Filter (A22) J803	N9039-21303
W13-14	RF Cable Assy, Motherboard RF Interconnect	N9039-21300

Table 6-2 Installation Options

Option Number	Description	Part Number
1CM	Rack Mount Kit - w/o Handles	5063-9215
1CP	Rack Mount Kit - w/ Handles	5063-9222
Std	Stacking Support Bracket Kit	N9039-00002
Std	Bottom Feet	5041-9167
Std	Tilt Stands	1460-1345
Std	Bottom Feet Key Locks	5021-2840
010	Shielded CAT 5E LAN Cable - 3 ft	8121-1597

Table 6-3 External System Cables

PSA Input	Description	Part Number
Type N	EMI system Type-N Semi Rigid Cable, Stacked (Option 019)	N9039-21315
	EMI system Type-N Semi Rigid Cable, Rack Mounted (Option 019)	N9039-21317
3.5 mm	EMI system SMA Semi Rigid Cable, Stacked (Option 027)	N9039-21316
	EMI system SMA Semi Rigid Cable, Rack Mounted (Option 027)	N9039-21318
2.4 mm	EMI system SMA Semi Rigid Cable, Stacked (Option 030)	N9039-21319
	EMI system SMA Semi Rigid Cable, Rack Mounted (Option 030)	N9039-21320
	2.4mm to 3.5mm Adapter	11901B

Table 6-4 Attaching Hardware

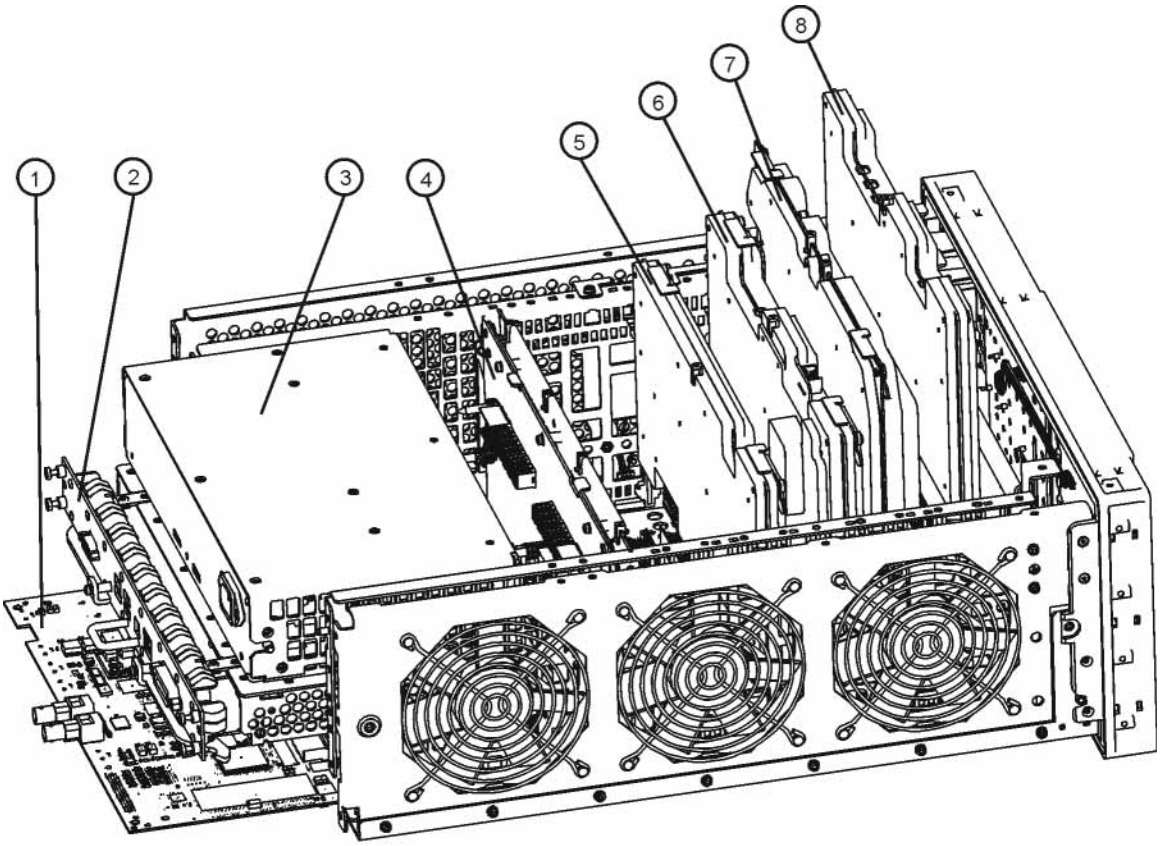
Attach	To	Qty	Part Number	Type	Tool	Torque	Thread	Length
Cal Input Connector Assy (J3)	Chassis Side, Right Outer (MP9)	2	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Chassis Front Bracket (MP5)	Chassis Assembly	9	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Chassis Gusset (MP19)	Chassis (MP1)	4	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Chassis Side, Left Inner (MP3)	Chassis Assembly	6	0515-0372	Pan Head	Torx T-10	21 in-lbs	M3.0	8 mm
Chassis Side, Right Inner (MP2)	Chassis Assembly	6	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Chassis Side, Right Outer (MP9)	Chassis (MP1)	6	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Fan (B1-B3)	Fan Bracket (MP6)	12	0361-1272	Rivet	n/a	n/a	n/a	n/a
Fan Bracket (MP6)	Chassis Assembly	8	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Front Frame (A1A1)	Chassis Assembly	8	0515-1035	Flat Head	Torx T-10	5 in-lbs	M3.0	8 mm
Front Panel Interface Board (A1A2)	Front Frame (A1A1)	13	0515-1521	Flat Head	Torx T-10	5 in-lbs	M3.0	5 mm
Front Panel USB Board (A1A5)	Front Frame (A1A1)	2	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Inverter Board (A1A4)	LCD Bracket (A1MP14)	2	0515-0372	Pan Head	Torx T-10	n/a	M3.0	8 mm
LCD (A1A3)	LCD Bracket (A1MP14)	4	0515-0367	Pan Head	Torx T-8	6 in-lbs	M2.5	8 mm
LCD Bracket (A1MP14)	Front Frame (A1A1)	4	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Midplane Board (A7)	Midplane Bracket (MP4)	6	0515-0375	Pan Head	Torx T-10	9 in-lbs	M3.0	16 mm
Midplane Bracket (MP4)	Chassis (MP1)	8	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Motherboard (A8)	Chassis (MP1)	4	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Power Supply Top Brace (MP8)	Chassis Assembly	4	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Power Supply Top Brace (MP8)	Power Supply Assembly (A6)	3	0515-1227	Flat Head	Torx T-10	9 in-lbs	M3.0	6 mm
Processor Board Assembly (A4)	Chassis Assembly	6	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Rear Feet	Rear Panel (MP10)	4	0515-1619	Pan Head	Torx T-20	21 in lbs.	M4.0	25 mm
Rear Feet	Rear Panel (MP10)	4	3050-0893	Washer	n/a	n/a	n/a	n/a

Table 6-4 Attaching Hardware

Attach	To	Qty	Part Number	Type	Tool	Torque	Thread	Length
Rear Panel (MP10)	Chassis Assembly	15	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Rear Panel BNC Connectors	Rear Panel (MP10)	4	2190-0068	Lock Washer	n/a	n/a	n/a	n/a
Rear Panel BNC Connectors	Rear Panel (MP10)	2	2940-0256	Hex Nut	9/16”	21 in-lbs	n/a	n/a
RF Input Connector Assembly (J1)	Chassis (MP1)	2	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
RF Output Connector Assembly (J2)	Chassis Side, Right Outer (MP9)	2	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
RF Switch (SW1)	Switch Bracket (MP18)	2	0515-1410	Pan Head	Torx T-10	9 in-lbs	M3.0	20 mm
RF Switch (SW2)	Switch Bracket (MP18)	2	0515-1410	Pan Head	Torx T-10	9 in-lbs	M3.0	20 mm
Switch Bracket (MP18)	Chassis Side, Right Inner (MP2)	5	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Top Brace (MP7)	Chassis Assembly	12	0515-0372	Pan Head	Torx T-10	9 in-lbs	M3.0	8 mm
Top Brace (MP7)	Chassis Assembly	14	0515-1227	Flat Head	Torx T-10	9 in-lbs	M3.0	6 mm

Hardware

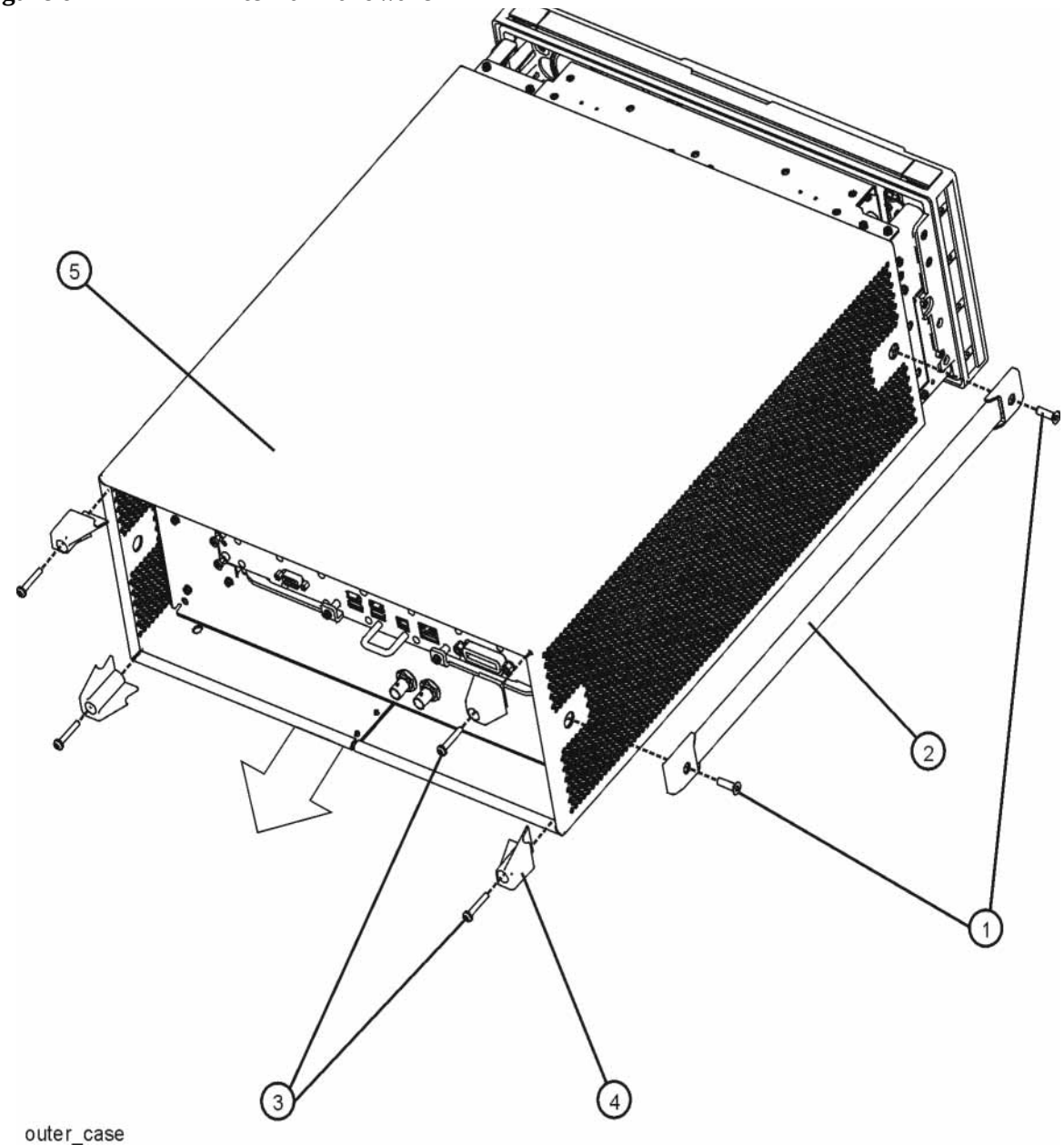
Figure 6-1 Major Assemblies



major_assy

Item	Description	Agilent Part Number
1	A3 Digital I/O Board Assembly	N9039-60005
2	A4 Processor Board Assembly	N9039-60025
3	A6 Power Supply	0950-4900
4	A7 Midplane Board Assembly	W1312-63002
5	A24 Conducted Filter Board Assembly	N9039-60001
6	A23 Conducted Input Board Assembly	N9039-60003
7	A22 Radiated Filter Board Assembly	N9039-60002
8	A21 Radiated Input Board Assembly	N9039-60004

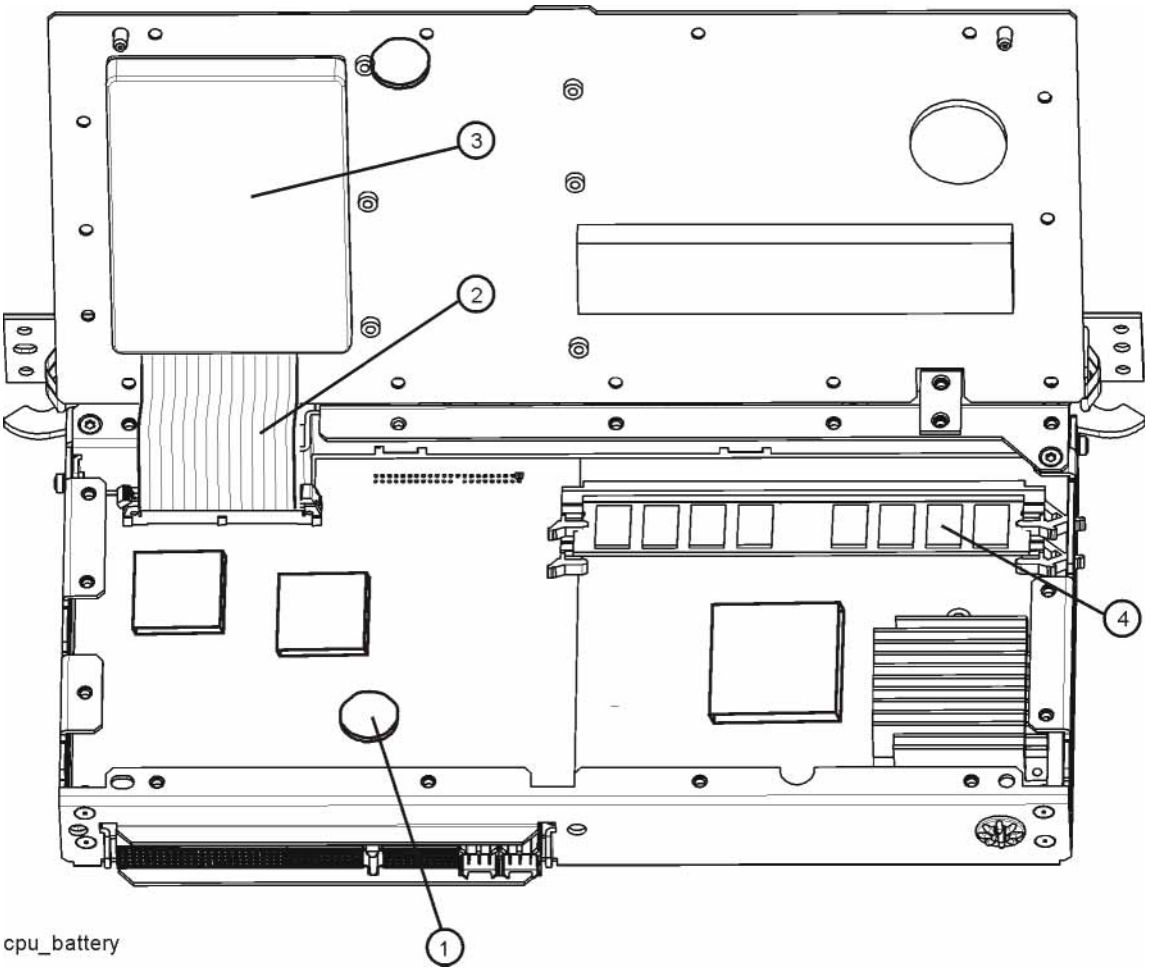
Figure 6-2 External Hardware



outer_case

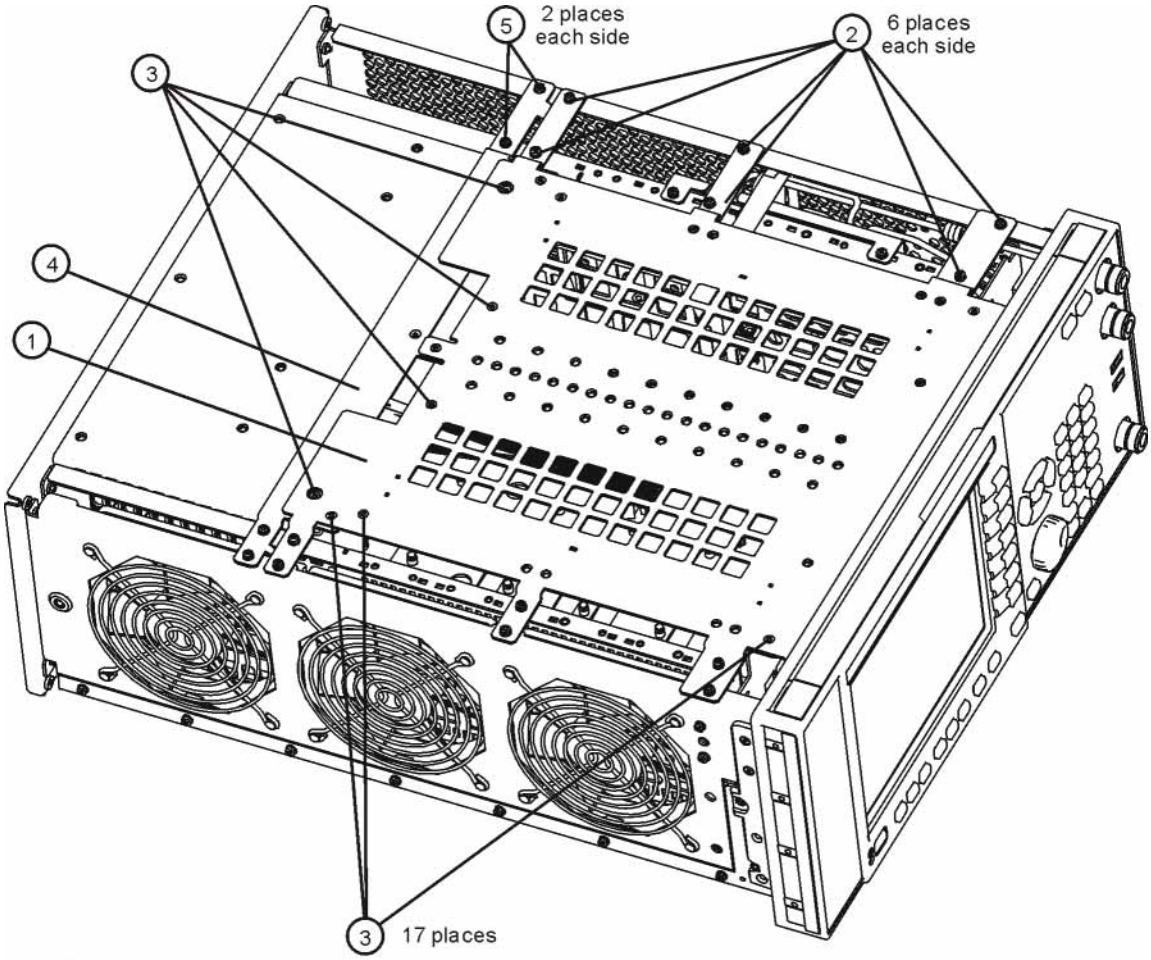
Item	Description	Agilent Part Number
1	Screw, Strap Handle	0515-0710
2	MP16-17 Strap Handles	E8251-60067
3	Screw, Pan Head M4.0 25 mm	0515-1619
4	MP12-15 Rear Feet	5041-9611
5	MP11 Dress Cover	W1312-00060

Figure 6-3 Processor Assembly Components



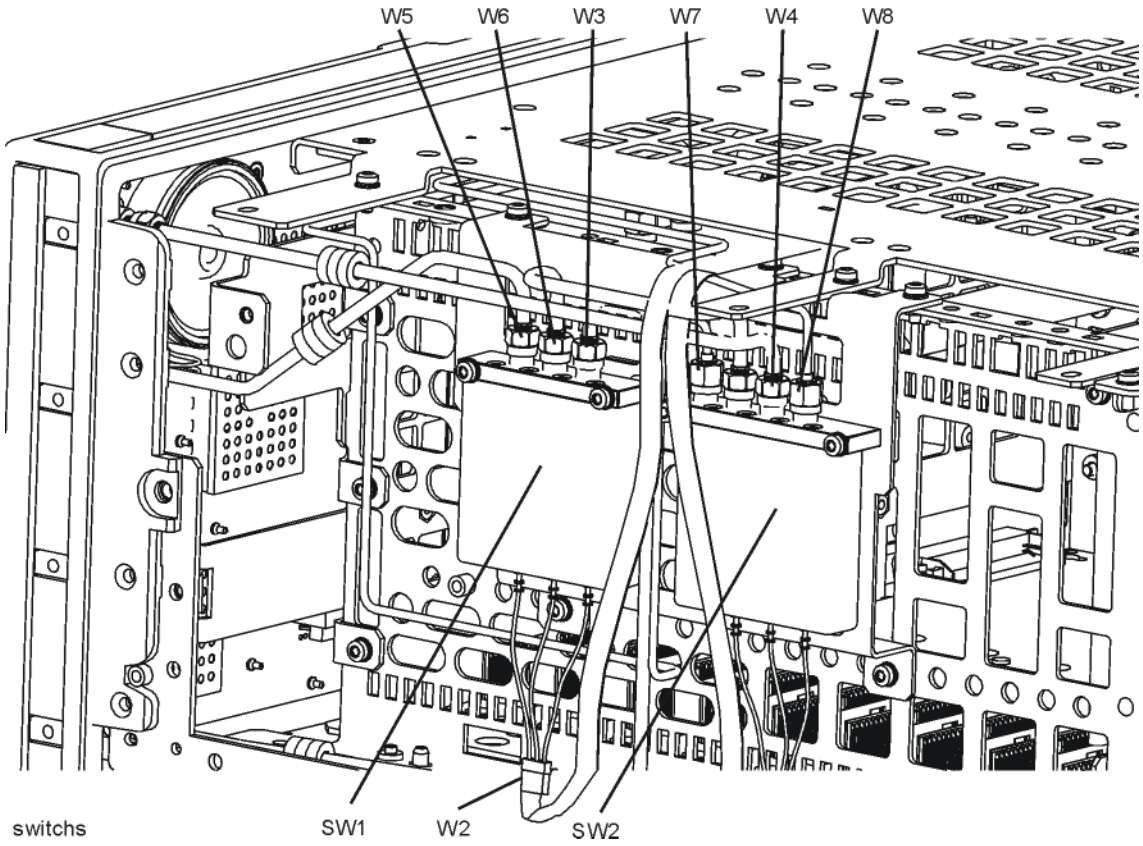
Item	Description	Agilent Part Number
1	A4BT1 Processor Board Battery	1420-0356
2	A5 W1 Disk Drive Ribbon Cable	8121-1611
3	A5 Programmed Hard Disk Drive	N9039-60026
4	A4A1 SRAM Module - 1 GB	1819-0329

Figure 6-4 Top Braces



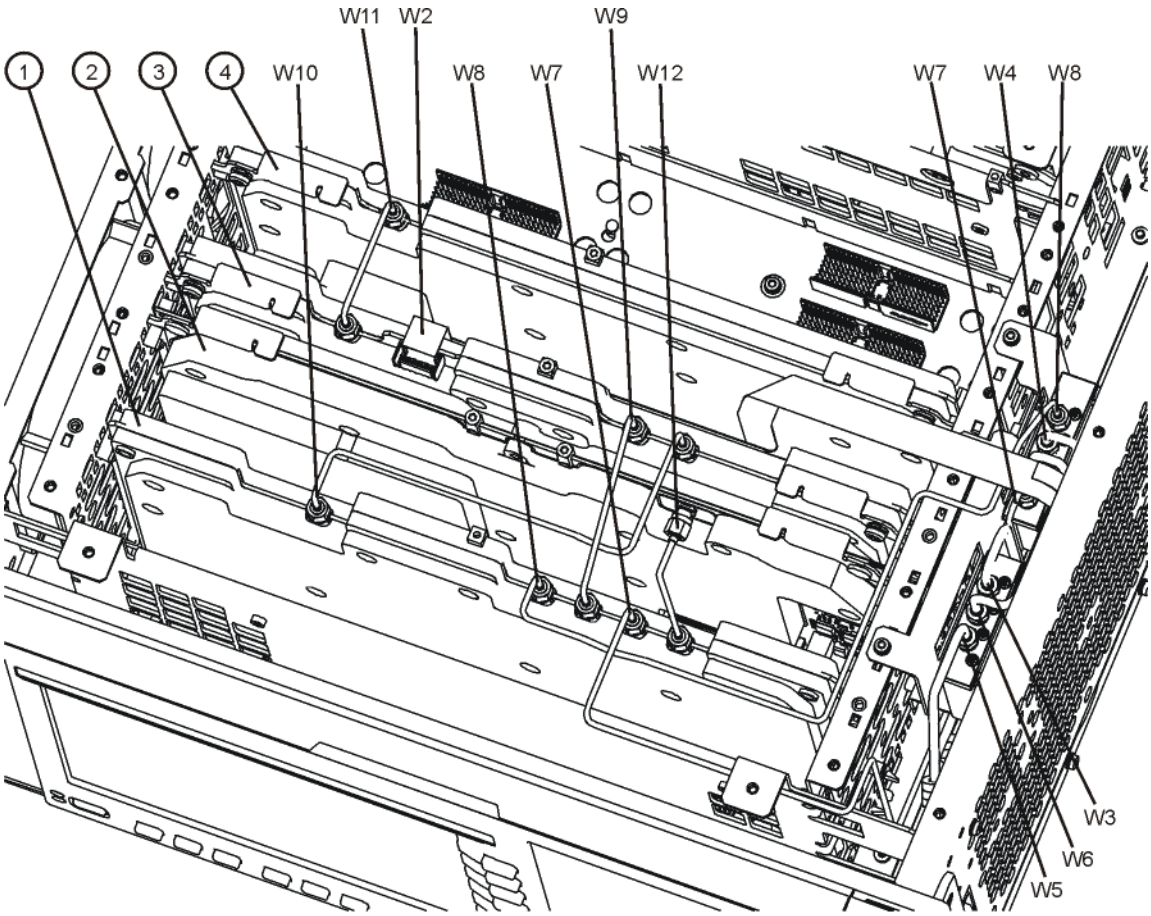
Item	Description	Agilent Part Number
1	MP7 Top Brace	N9039-60031
2	Screw, Pan Head M3.0 8 mm	0515-0372
3	Screw, Flat Head M3.0 6 mm	0515-1227
4	MP8 Top Brace, Power Supply	W1312-00062
5	Screw, Pan Head M3.0 8 mm	0515-0372

Figure 6-5 RF Switch Area



Item	Description	Agilent Part Number
SW1	RF Switch Assembly - 3 Port	N9039-60021
SW2	RF Switch Assembly - 4 Port	N9039-60022
W2	Ribbon Cable Assy, Switch Control	N9039-60020
W3	RF Cable Assy, RF Input (J1) to 3-Port Switch (SW1) P3	N9039-21310
W4	RF Cable Assy, RF Output (J2) to 4-Port Switch (SW2) P2	N9039-21307
W5	RF Cable Assy, Cal Input (J3) to 3-Port Switch (SW1) P1	N9039-21308
W6	RF Cable Assy, 3-Port Switch (SW1) P2 to 4-Port Switch (SW2) P3	N9039-21306
W7	RF Cable Assy, 4-Port Switch (SW2) P4 to Radiated Input (A21) J8	N9039-21305
W8	RF Cable Assy, Radiated Input (A21) J3 to 4-Port Switch (SW2) P1	N9039-21304

Figure 6-6 Top Cables

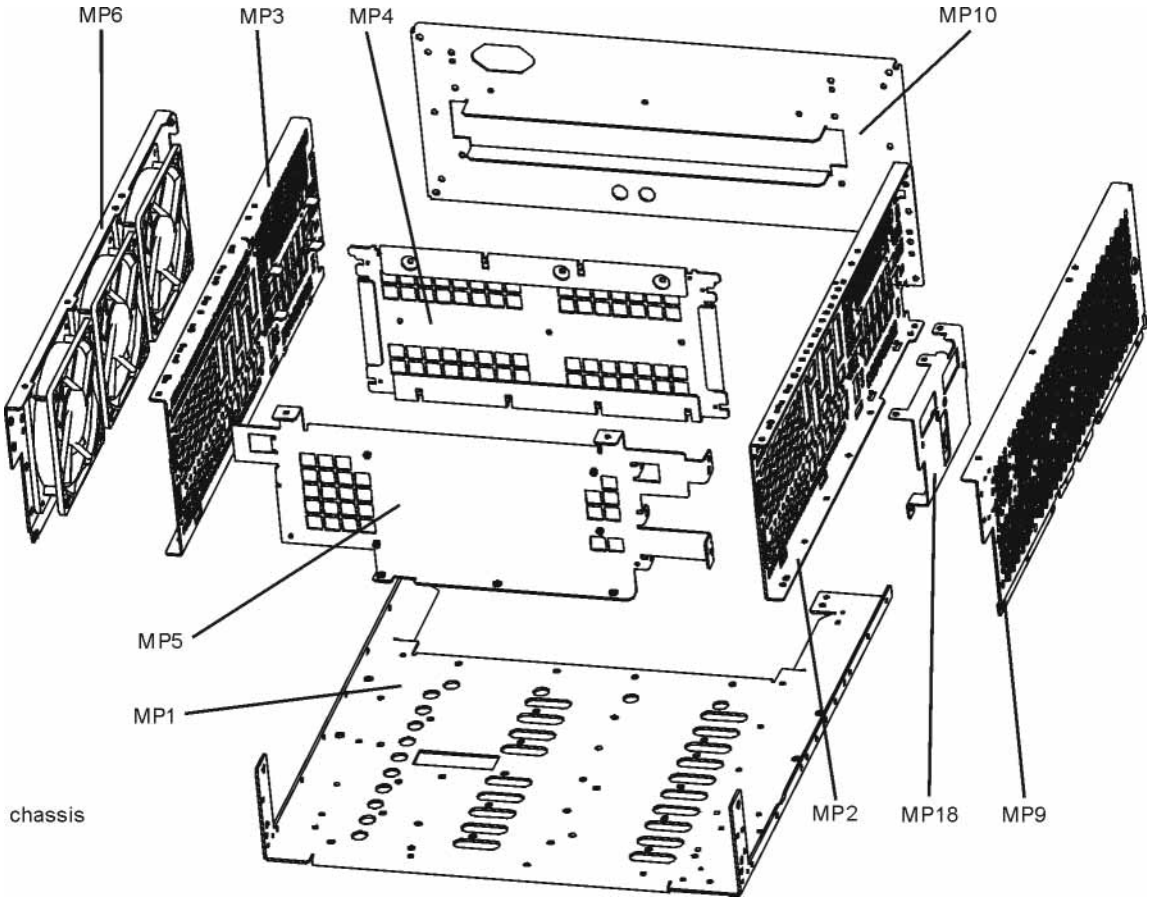


top_cables

Item	Description	Agilent Part Number
1	A21 Radiated Input Board Assembly	N9039-60004
2	A22 Radiated Filter Board Assembly	N9039-60002
3	A23 Conducted Input Board Assembly	N9039-60003
4	A24 Conducted Filter Board Assembly	N9039-60001
W2	Ribbon Cable Assy, Switch Control	N9039-60020
W3	RF Cable Assy, RF Input (J1) to 3-Port Switch (SW1) P3	N9039-21310
W4	RF Cable Assy, RF Output (J2) to 4-Port Switch (SW2) P2	N9039-21307
W5	RF Cable Assy, Cal Input (J3) to 3-Port Switch (SW1) P1	N9039-21308
W6	RF Cable Assy, 3-Port Switch (SW1) P2 to 4-Port Switch (SW2) P3	N9039-21306
W7	RF Cable Assy, 4-Port Switch (SW2) P4 to Radiated Input (A21) J8	N9039-21305
W8	RF Cable Assy, Radiated Input (A21) J3 to 4-Port Switch (SW2) P1	N9039-21304

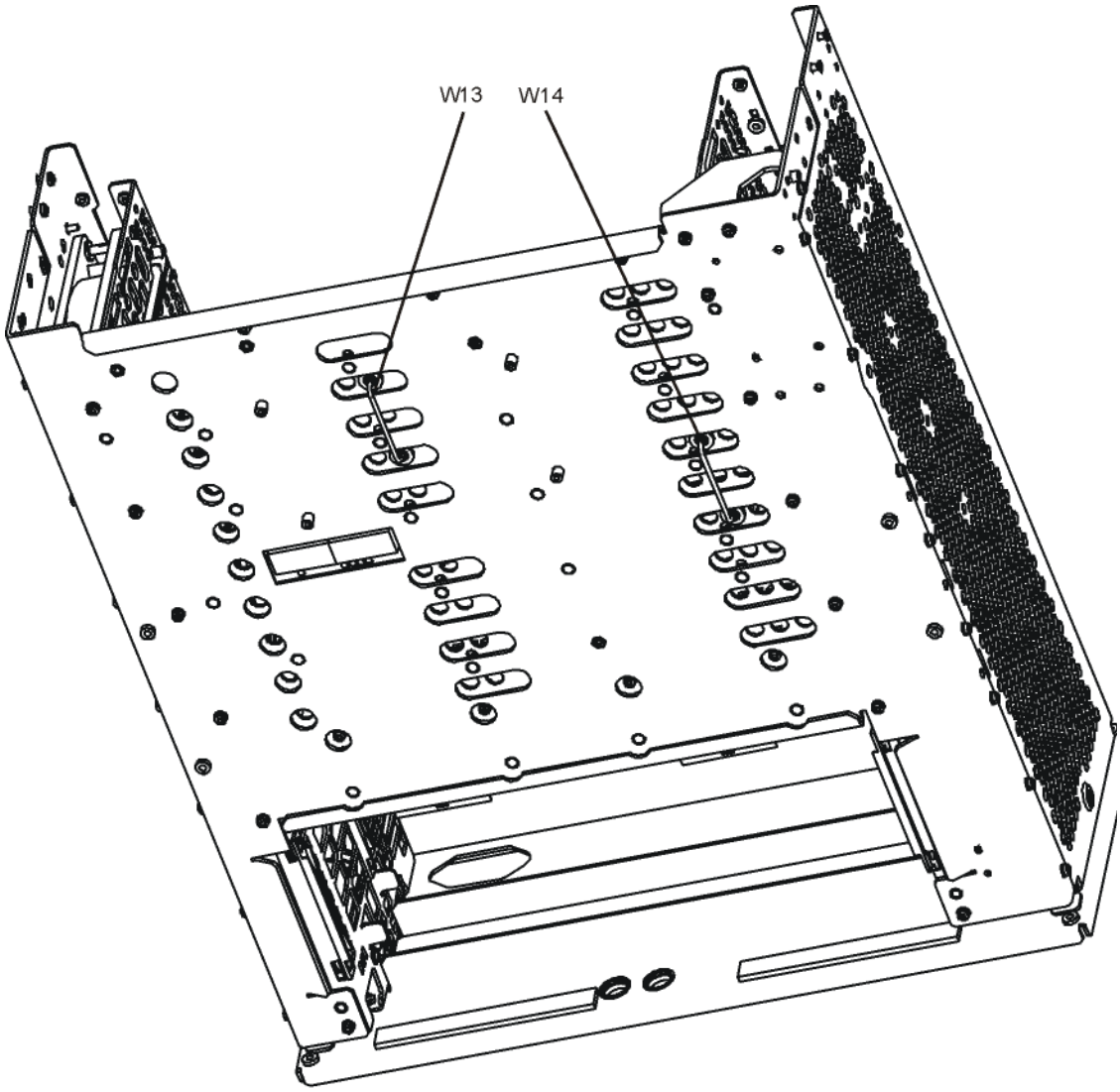
Item	Description	Agilent Part Number
W9	RF Cable Assy, Radiated Input (A21) J4 to Conducted Input (A23) J3	N9039-21302
W10	RF Cable Assy, Conducted Input (A23) J4 to Radiated Input (A21) J7	N9039-21309
W11	RF Cable Assy, Conducted Input (A23) J5 to Conducted Filter (A24) J1	N9039-21301
W12	RF Cable Assy, Radiated Input (A21) J5 to Radiated Filter (A22) J803	N9039-21303

Figure 6-7 Chassis



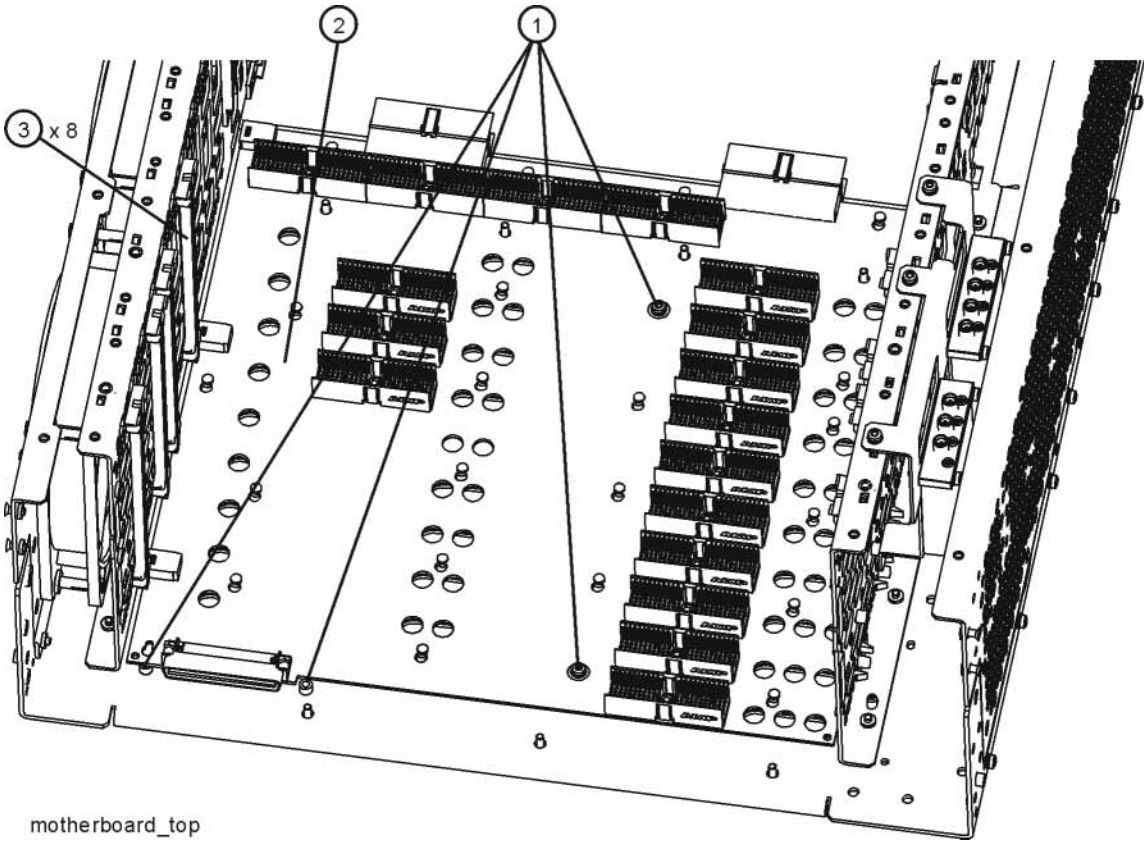
Item	Description	Agilent Part Number
MP1	Chassis Base	E4449-00102
MP2	Chassis Side, Right (inner)	W1312-00050
MP3	Chassis Side, Left (inner)	W1312-00051
MP4	Midplane Bracket	W1312-00048
MP5	Chassis Front Bracket	W1312-00049
MP6	Fan Bracket	W1312-00058
MP9	Chassis Side, Right (Outer)	E4449-00101
MP10	Rear Panel Assembly	N9039-60007
MP18	Switch Bracket	N9039-01201

Figure 6-8 Motherboard Bottom



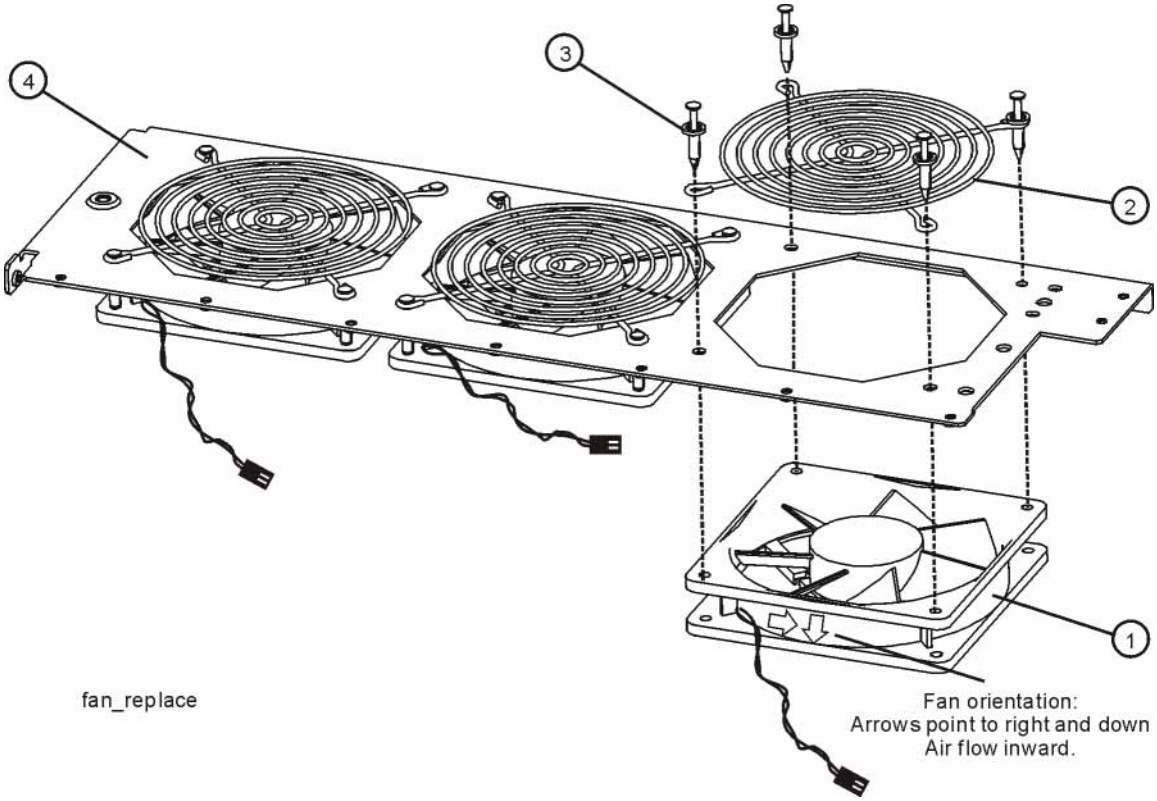
motherboard_bottom

Figure 6-9 Motherboard Top



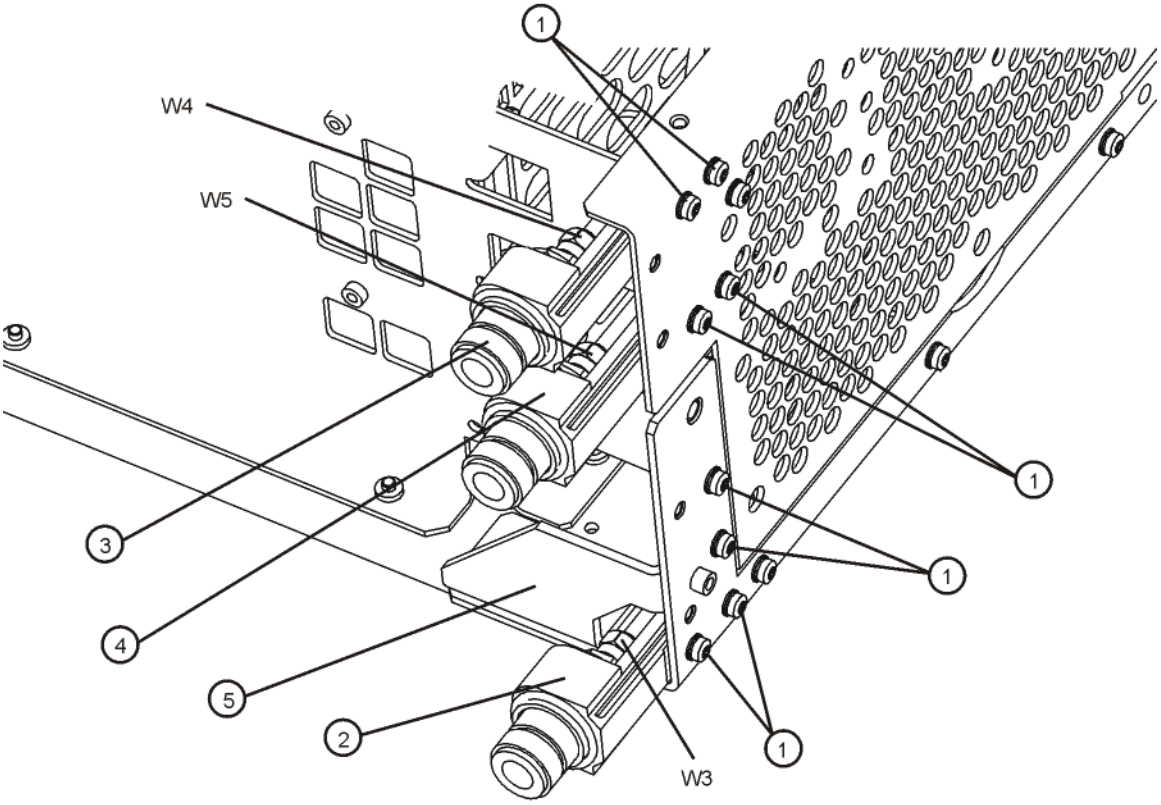
Item	Description	Agilent Part Number
1	Screw, Pan Head M3.0 8 mm	0515-0372
2	A8 Motherboard Assembly	E4449-63100
W13-14	RF Cable Assy, Motherboard RF Interconnect	N9039-21300
3	MP43-50 PC Board Plastic Guides	W1312-40001

Figure 6-10 Fan Hardware



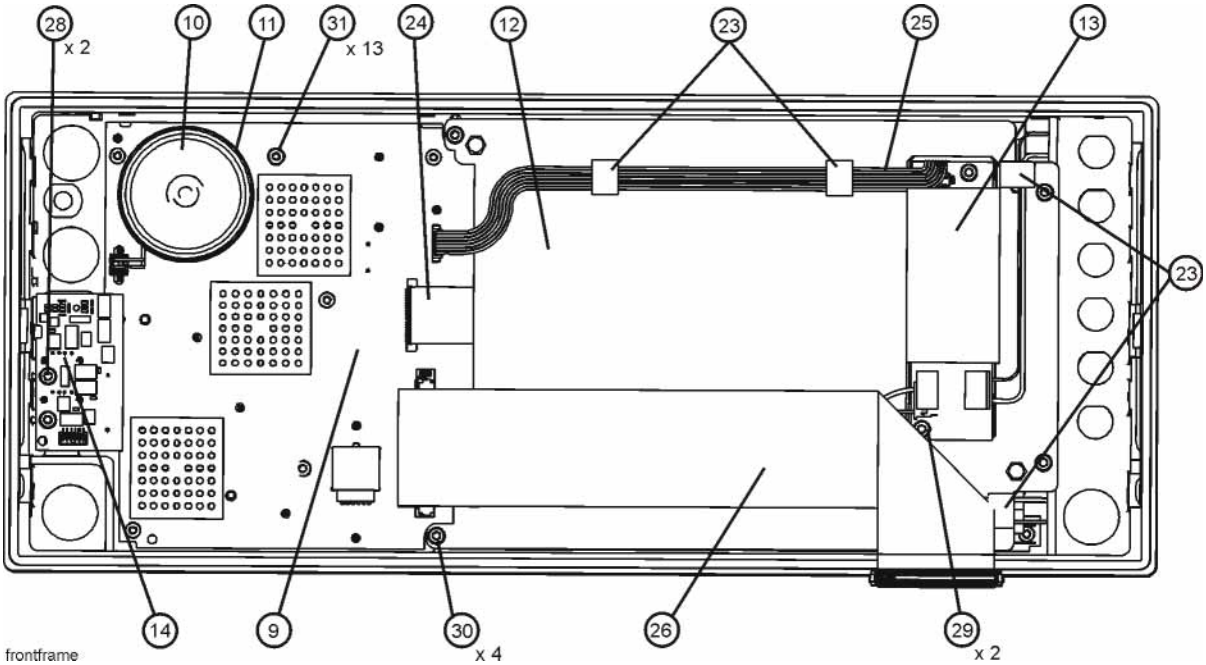
Item	Description	Agilent Part Number
1	B1-B3	3160-4199
2	MP20-22 Fan Guard	3160-0281
3	MP23-34 Rivet, Fan Mounting	0361-1272
4	MP6 Fan Bracket	W1312-00058

Figure 6-11 Input and Output Connectors



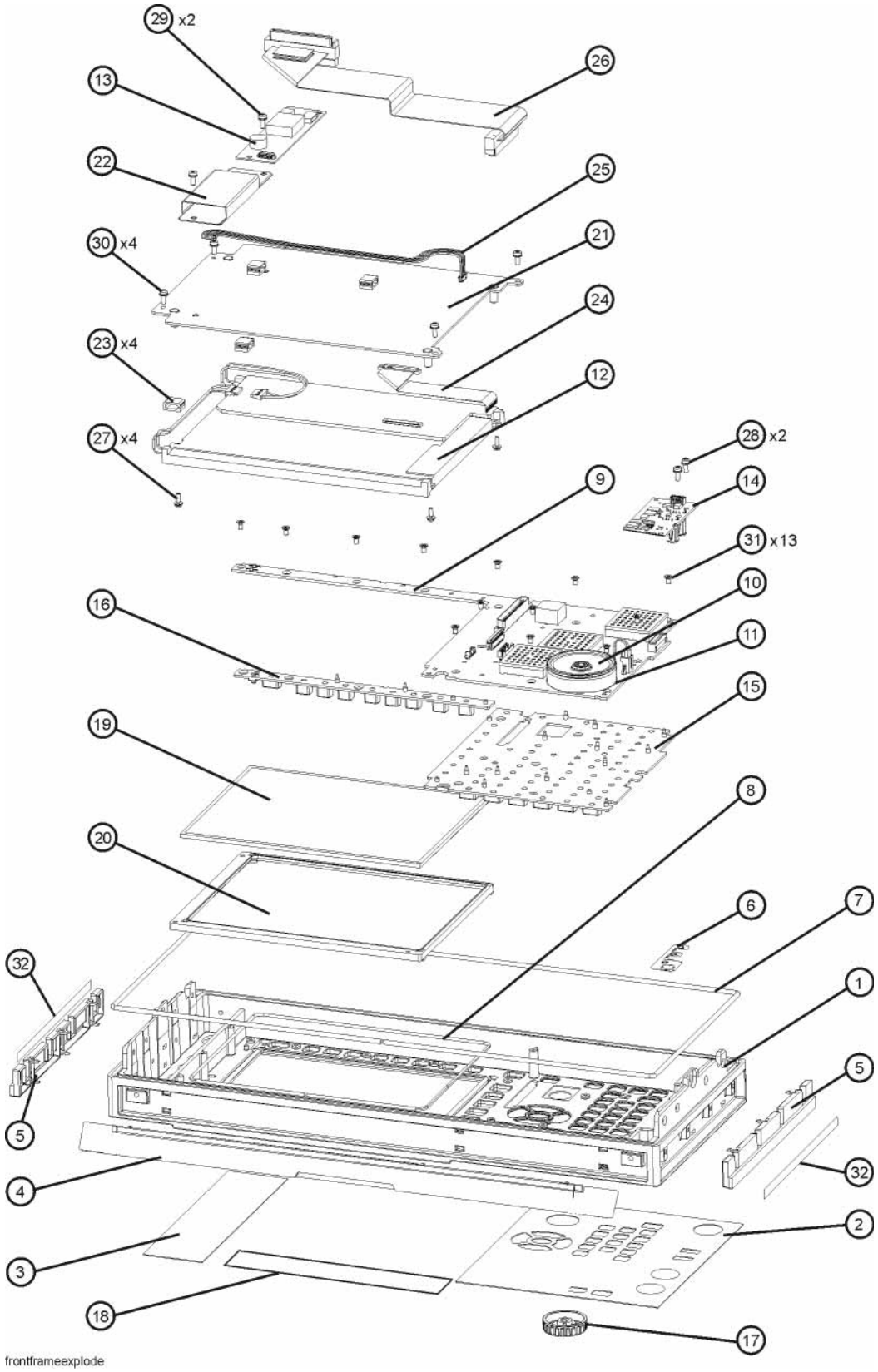
Item	Description	Agilent Part Number
1	Screw, Pan Head M3.0 8mm	0515-0372
2	J1 RF Input Connector Assembly - Type N	N9039-60030
3	J2 RF Output Connector Assembly - Type N	N9039-60028
4	J3 Cal Source Input Connector Assembly - Type N	N9039-60028
5	MP19 Chassis Gusset	W1312-00093
W3	RF Cable Assy, RF Input (J1) to 3-Port Switch (SW1) P3	N9039-21310
W4	RF Cable Assy, RF Output (J2) to 4-Port Switch (SW2) P2	N9039-21307
W5	RF Cable Assy, Cal Input (J3) to 3-Port Switch (SW1) P1	N9039-21308

Figure 6-12 Front Frame Parts



Item	Description	Agilent Part Number
9	A1A2 Front Panel Interface Board Assembly	E4410-60113
10	A1A2MP1 Speaker	9164-0453
11	A1A2MP2 Speaker Mounting Foam	W1312-40016
12	A1A3 Liquid Crystal Display	2090-0911
13	A1A4 Display Backlight Inverter Board	0950-4635
14	A1A5 Front Panel USB Interface Board Assembly	N9039-63018
23	A1MP10-13 LCD Backlight Cable Clamp	1400-1439
24	A1W1 LCD Control Flex Circuit	W1312-60010
25	A1W2 LCD Inverter Control Cable	W1312-60011
26	W1 Ribbon Cable Assembly, Front Panel Interface Board to Motherboard	E4410-60171
28, 29, 30	Screw Pan Head	0515-0372
31	Screw Flat Head	0515-1521

Figure 6-13 Front Frame Exploded View



Item	Description	Agilent Part Number
1	A1A1MP1 Front Frame	N9039-40200
2	A1A1MP2 Main Keypad Overlay	N9039-88000
3	A1A1MP3 Connector Overlay	E4410-80109
4	A1A1MP8 Front Frame Top Trim Strip	W1312-40019
5	A1A1MP9-10 Front Frame Side Trim Strip	W1312-40005
6	A1A1MP4 Front Frame Ground Spring	W1312-00021
7	A1A1MP5 Braided Gasket	--
8	A1A1MP6 Chromeric Gasket	--
9	A1A2 Front Panel Interface Board Assembly	E4410-60113
10	A1A2MP1 Speaker	9164-0453
11	A1A2MP2 Speaker Mounting Foam	W1312-40016
12	A1A3 Liquid Crystal Display	2090-0911
13	A1A4 Display Backlight Inverter Board	0950-4635
14	A1A5 Front Panel USB Interface Board Assembly	N9039-63018
15	A1MP1 Main Keypad	N9039-40001
16	A1MP2 Display Keypad	E4410-40101
17	A1MP9 RPG Knob	W1312-40017
18	A1A1MP7 Nameplate Label	N9039-80001
19	A1MP7 LCD Glass Filter	1000-1435
20	A1MP8 LCD Lens Gasket	W1312-40006
21	A1MP14 Display Bracket	W1312-00023
22	A1MP15 Inverter Board Shield	W1312-00024
23	A1MP10-13 LCD Backlight Cable Clamp	1400-1439
24	A1W1 LCD Control Flex Circuit	W1312-60010
25	A1W2 LCD Inverter Control Cable	W1312-60011
26	W1 Ribbon Cable Assembly, Front Panel Interface Board to Motherboard	E4410-60171
27	Screw Pan Head	0515-0367
28, 29, 30	Screw Pan Head	0515-0372
31	Screw Flat Head	0515-1521
32	A1MP16-17 Vinyl Side Trim	5041-9172

7 Assembly Replacement Procedures

What You Will Find in This Chapter

Procedures in this chapter enable you to locate, remove, and replace the following major assemblies in your instrument.

Refer to Chapter 6 , “Replaceable Parts” for part numbers, assembly descriptions, and ordering information.

- Instrument Outer Case ..... page 166
- Top Brace ..... page 168
- RF Area ..... page 169
- Rear Panel ..... page 174
- Power Supply Assembly ..... page 176
- Processor Assembly ..... page 178
- Digital I/O Board Assembly ..... page 179
- Disk Drive ..... page 181
- Midplane Board Assembly ..... page 187
- Conducted Filter Board Assembly ..... page 196
- Conducted Input Board Assembly ..... page 191
- Radiated Filter Board Assembly ..... page 193
- Radiated Input Board Assembly ..... page 194
- Motherboard Assembly ..... page 195
- Fan Assembly ..... page 200
- Input and Output Connectors ..... page 203
- Front Frame Assembly ..... page 205
- Display Assembly ..... page 209
- USB Board, Interface Board and Keypad ..... page 212

Before Starting

Before starting to disassemble the instrument:

- Check that you are familiar with the safety symbols marked on the instrument. And, read the general safety considerations and the safety note definitions given in the front of this guide.
- The instrument contains static sensitive components. Read the section entitled "ESD Information" on page 21.

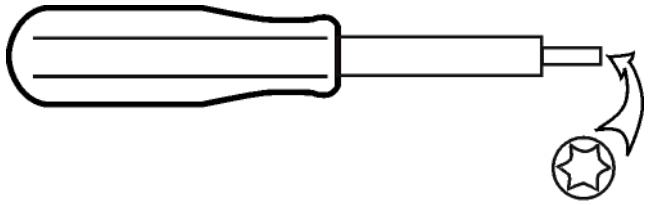
Safety

WARNING **The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the product from all voltage sources while it is being opened.**

WARNING **The instrument contains potentially hazardous voltages. Refer to the safety symbols on the instrument and the general safety considerations at the beginning of this service guide before operating the unit with the cover removed. Failure to heed the safety precautions can result in severe or fatal injury.**

Tools you will need

Figure 7-1 **TORX Tool**



sl736a

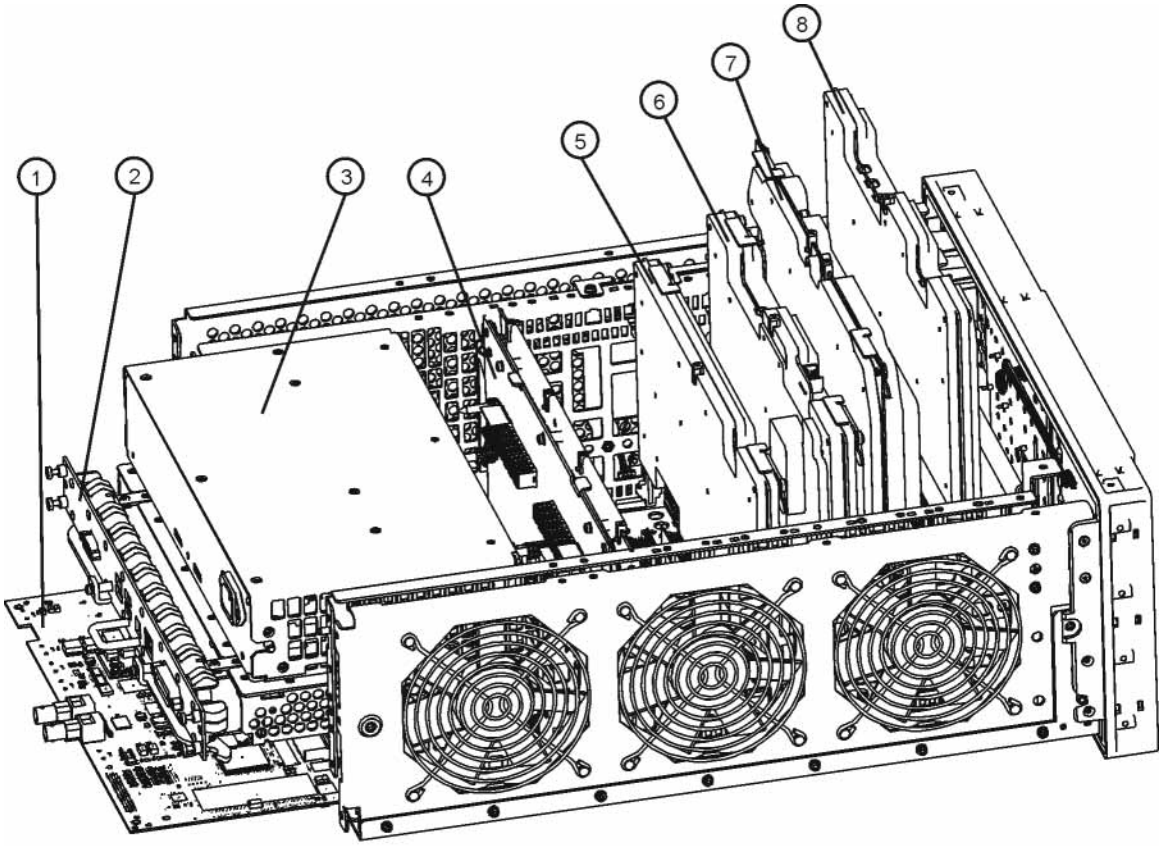
Description	Agilent Part Number
TORX Hand Driver - Size T-10	8710-1623
TORX Hand Driver - Size T-20	8710-1615
9/16 inch nut driver	8720-0008
5/16 inch open-end wrench	source locally

Adjustments Tests after an instrument repair

Refer to Table 8-1 on page 216 for information about post-repair procedures. If one or more instrument assemblies have been repaired or replaced, perform the related adjustments and performance verification tests.

Major Assembly Locations

Figure 7-2 Major Assemblies



major_assy

Item	Description	Agilent Part Number
1	A3 Digital I/O Board Assembly	N9039-60005
2	A4 Processor Board Assembly	N9039-60025
3	A6 Power Supply	0950-4900
4	A7 Midplane Board Assembly	W1312-63002
5	A24 Conducted Filter Board Assembly	N9039-60001
6	A23 Conducted Input Board Assembly	N9039-60003
7	A22 Radiated Filter Board Assembly	N9039-60002
8	A21 Radiated Input Board Assembly	N9039-60004

Instrument Outer Case

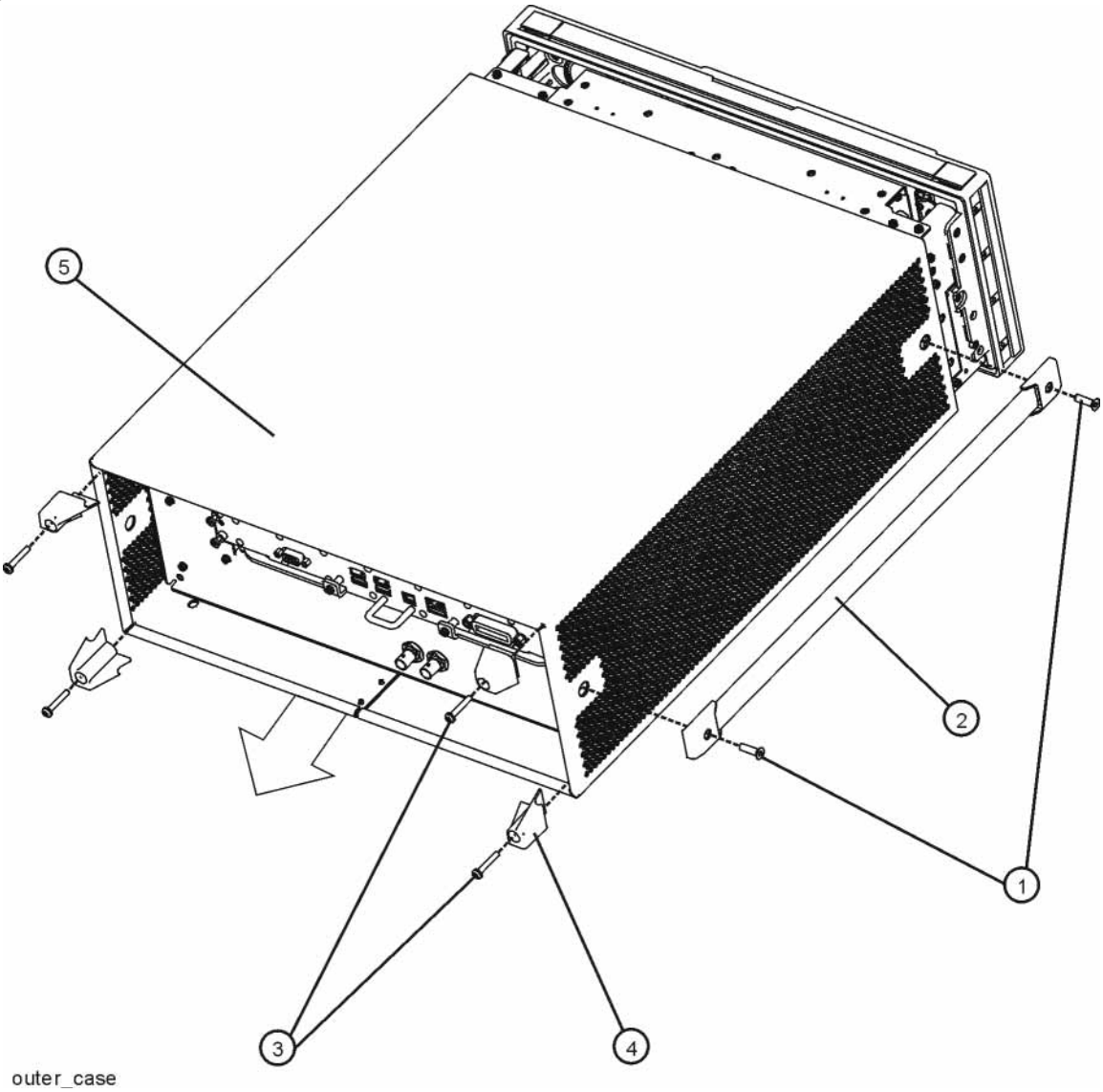
CAUTION If the instrument is placed on its face during any of the following procedures, be sure to use a soft surface or soft cloth to avoid damage to the front panel, keys, or input connector.

Standard Instrument

Removal

1. Disconnect the instrument from ac power.
2. Refer to Figure 7-3. Using the T-20 driver, remove the four screws (two on each side) **(1)** that attach the handle strap **(2)** on each side of the instrument.
3. Using the T-20 driver, remove the four screws (including washers) **(3)** that hold the rear feet **(4)** in place.
4. Pull the instrument cover **(5)** off towards the rear of the instrument.

Figure 7-3 Instrument Outer Case Removal



Replacement

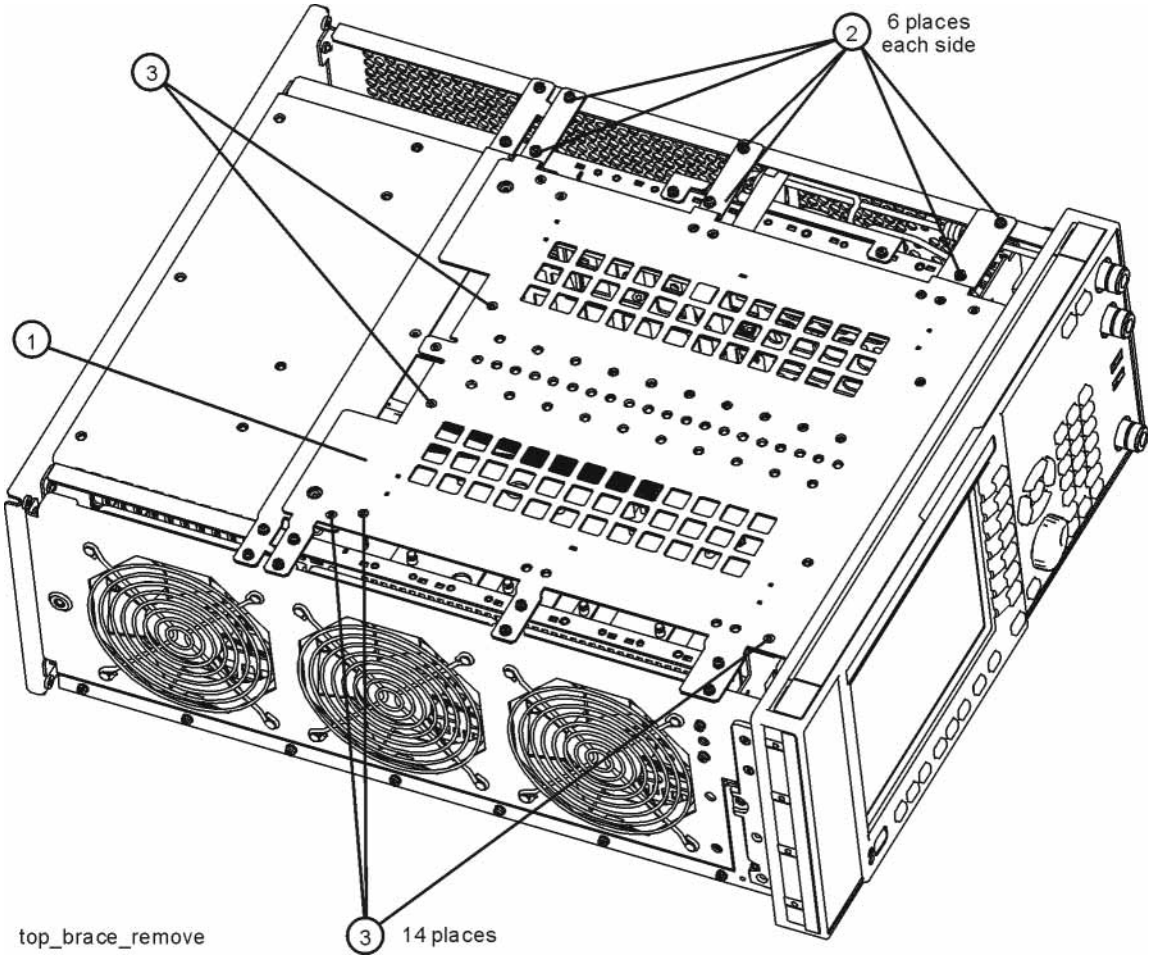
1. Disconnect the instrument from ac power.
2. Slide the instrument cover back onto the deck from the rear. The seam on the cover should be on the bottom. Be sure the cover seats into the gasket groove in the Front Frame Assembly.
3. Replace the four rear feet to the rear of the instrument. Torque the rear feet screws to 21 inch pounds.
4. Replace the handle straps on both sides of the instrument. Torque the handle strap screws to 21 inch pounds.

Top Brace

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Refer to Figure 7-4. To remove the top brace **(1)**, use the T-10 driver to remove the twelve screws **(2)** (0515-0372) attaching the top brace to the chassis and the fourteen screws **(3)** (0515-1227) attaching the top brace to the boards.

Figure 7-4 Top Brace Removal



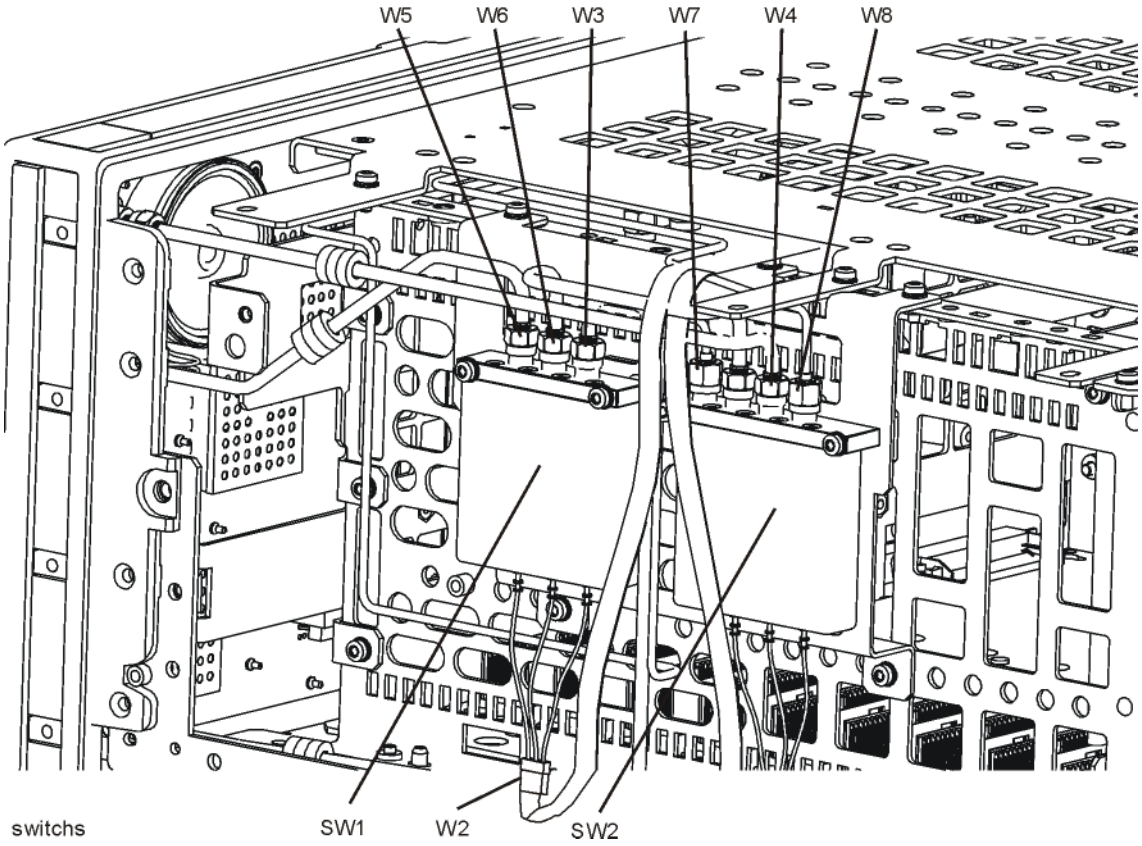
Replacement

1. Refer to Figure 7-4. To replace the top brace, place it into the correct position and attach the appropriate screws. Torque to 9 inch-pounds.

RF Area

Refer to Figure 7-5. The RF area consists of the two RF Switch assemblies, SW1 **(1)** and SW2 **(2)**.

Figure 7-5 **RF Area Components and Cables**

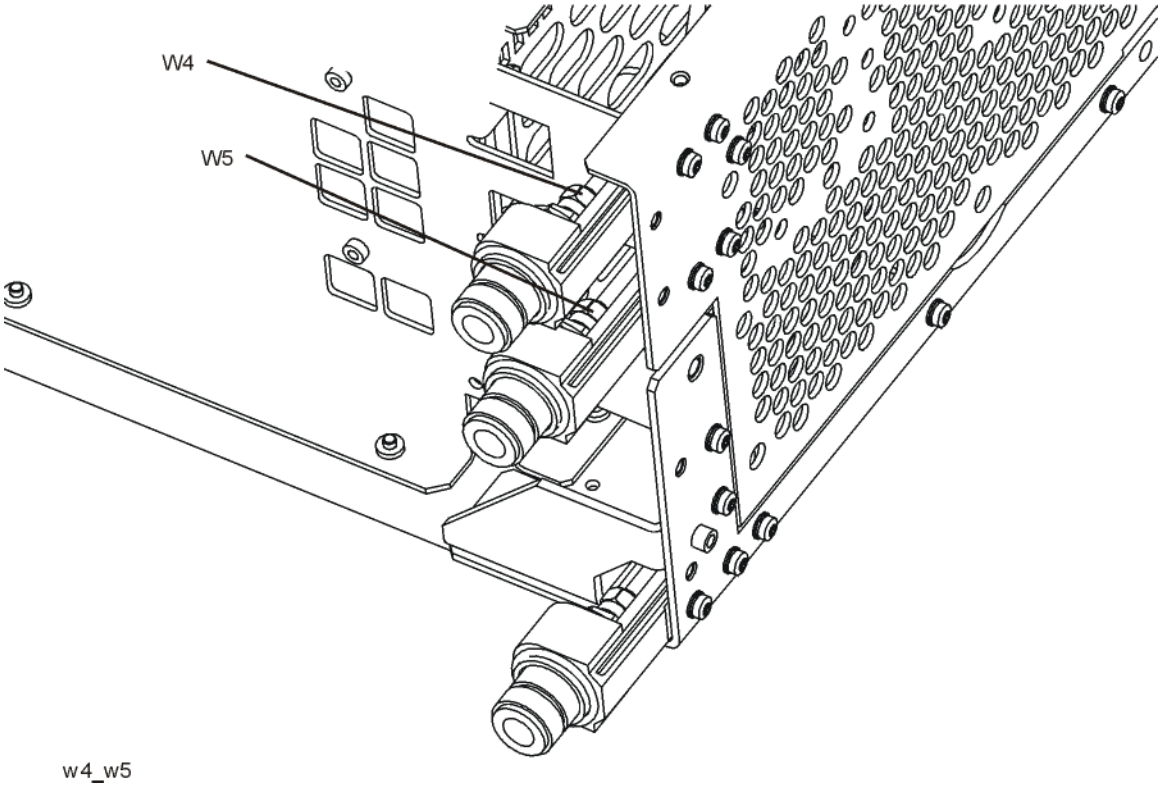


To gain access to the RF Switch assemblies, follow these steps:

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the Front Frame Assembly. Refer to the Front Frame Assembly removal procedure.

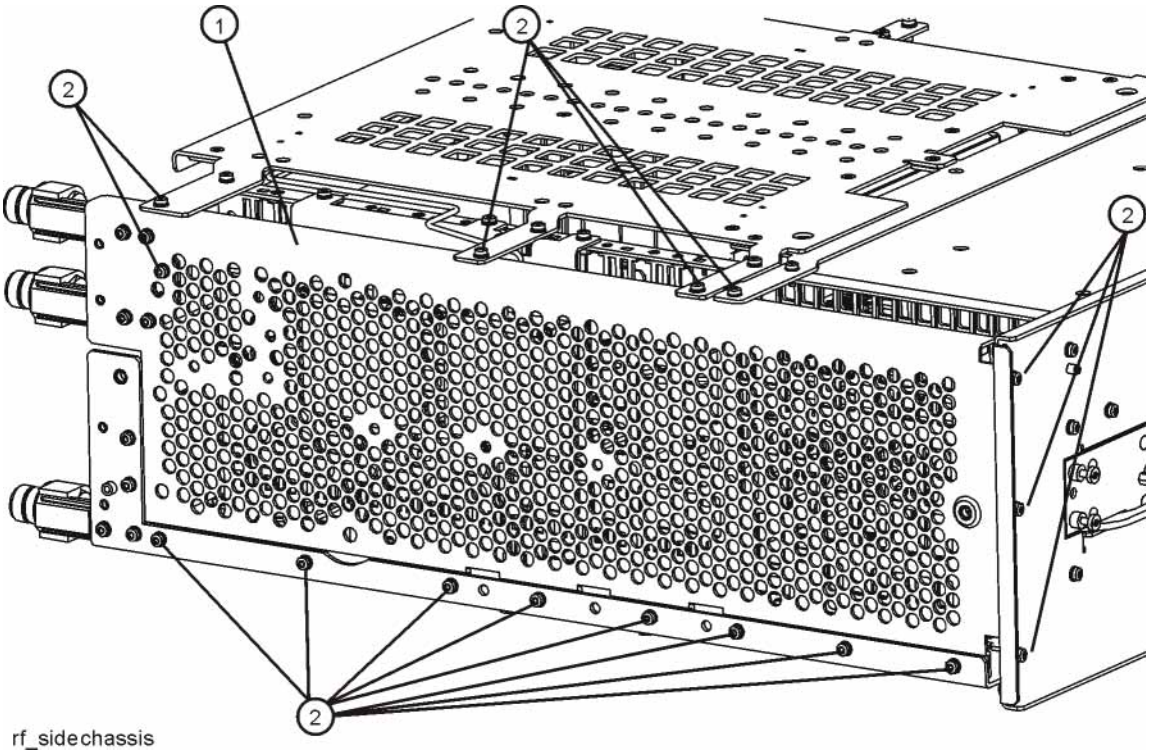
3. Refer to Figure 7-6. Remove W4 and W5 semi-rigid cables from the front panel connectors.

Figure 7-6 W4 and W5 Cables



4. Refer to Figure 7-7. Remove the chassis side right (outer) **(1)** by removing the screws **(2)** using the T-10 driver.

Figure 7-7 RF Side Chassis Removal

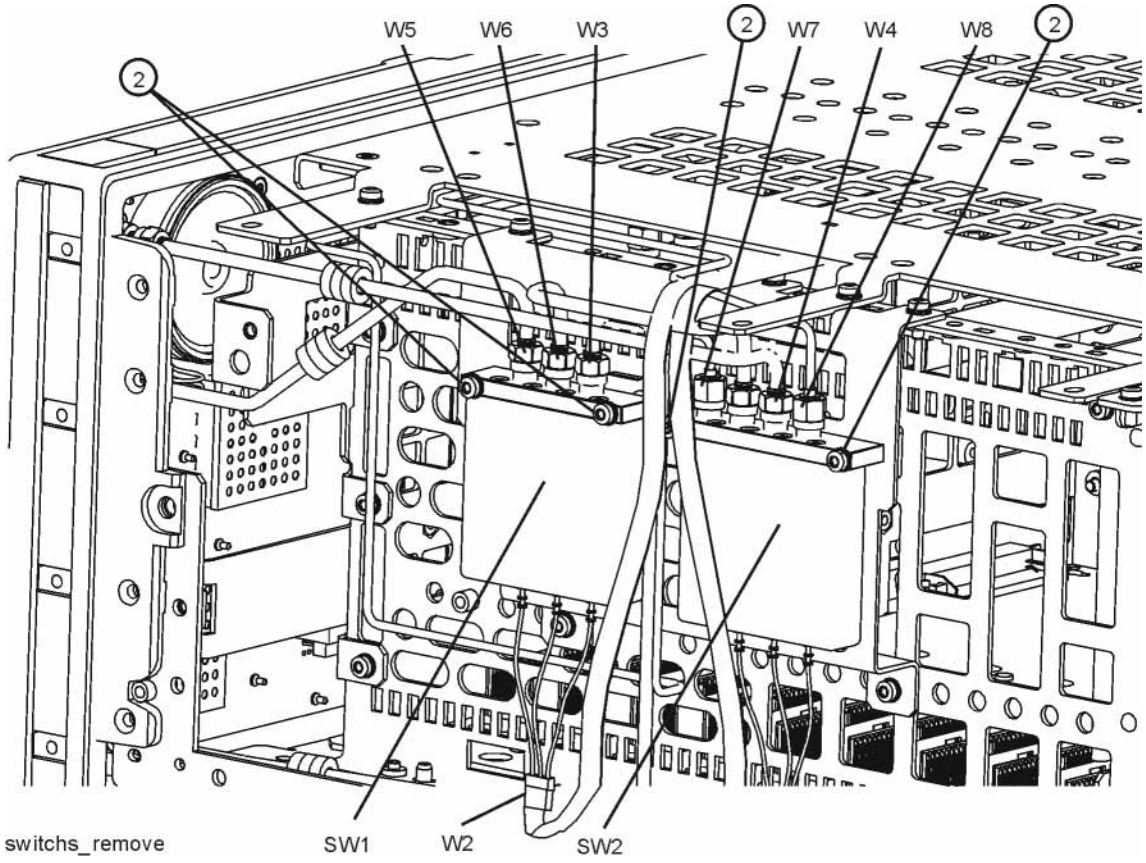


Switch SW1 or SW2

Removal

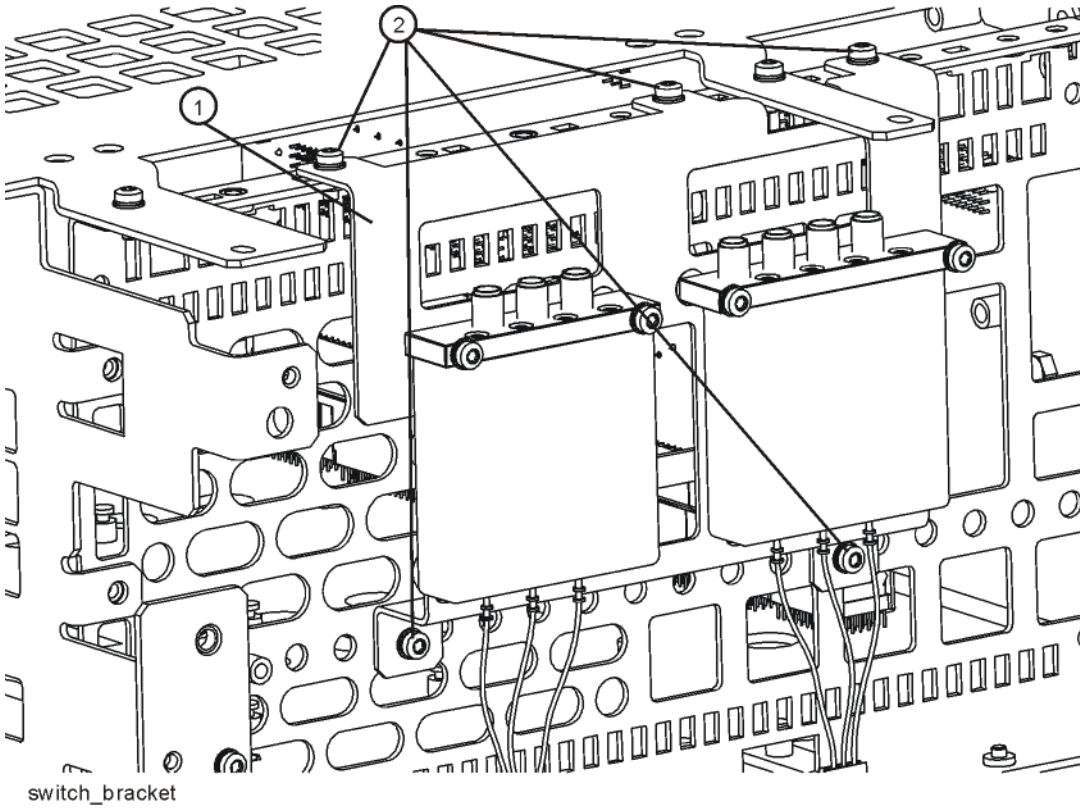
1. Refer to Figure 7-8. Separate the ribbon cable W2 from the switch wires.
2. Remove the semi-rigid cables W3, W4, W5, W6, W7 and W8 using the 5/16 inch wrench.
3. To remove either the SW1 or SW2 switch, remove the two associated screws **(2)** using the T-10 driver. The switch can now be removed from the chassis.

Figure 7-8 Switch Removal



4. Refer to Figure 7-9. To remove the switch bracket **(1)**, remove the five screws **(2)** using the T-10 driver.

Figure 7-9 Switch Bracket Removal



Replacement

1. Refer to Figure 7-9. To replace the switch bracket, place the bracket into place into the chassis and replace the five screws **(2)**. Torque to 9 inch-pounds.
2. Refer to Figure 7-8. To replace the switch, place the switch onto the bracket and replace the two screws **(2)**. Torque to 9 inch-pounds.
3. Replace the semi-rigid cables W3, W4, W5, W6, W7, and W8. Torque to 10 inch-pounds.
4. Reconnect ribbon cable W2 to the switch wires connector.
5. Refer to Figure 7-7. Carefully position the chassis side **(1)** onto the chassis, taking care to align W4 and W5 into J2 and J3. Replace the screws **(2)**. Torque to 9 inch-pounds.
6. Torque W4 and W5 to 10 inch-pounds.
7. Replace the front panel. Refer to the Front Frame Assembly replacement procedure.
8. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

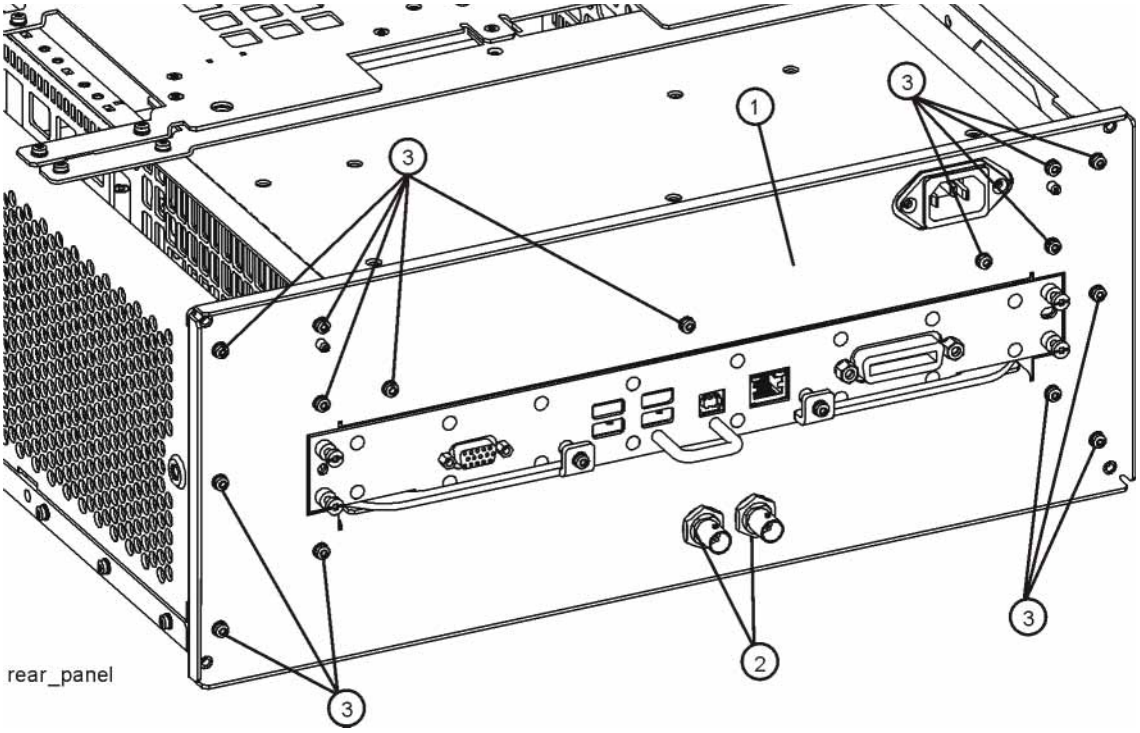
Rear Panel

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Refer to Figure 7-10. Remove the two nuts and washers **(2)** from the Digital I/O board connectors.
3. Using the T-10 driver, remove the screws **(3)** attaching the rear panel **(1)** to the chassis and to the power supply. The rear panel can now be removed.

NOTE There is also a washer on each of the rear panel connectors on the inside of the instrument. When the rear panel is removed be sure that these are not lost.

Figure 7-10 Rear Panel Removal



Replacement

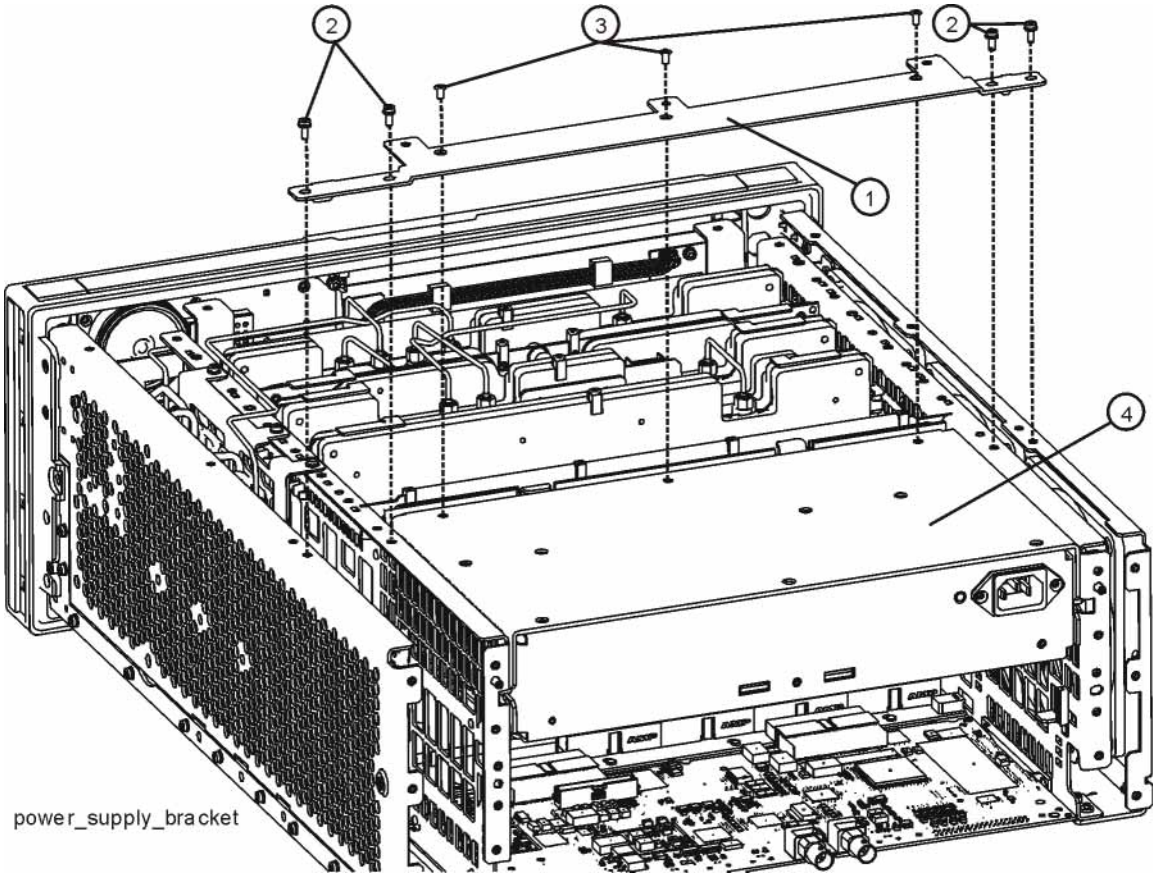
1. Verify that there is a washer on each of the two rear panel connectors before the rear panel is installed.
2. Refer to Figure 7-10. Place the rear panel **(1)** into position in the chassis. Replace the screws **(3)** to attach the rear panel to the chassis. Torque to 9 inch-pounds.
3. Replace the two nuts and washers to the Digital I/O board connectors **(2)**. Torque to 21 inch-pounds.
4. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Power Supply Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the rear panel. Refer to the Rear Panel removal procedure.
3. Remove the top brace. Refer to the Top Brace removal procedure.
4. Refer to Figure 7-11. Remove the screws **(2)** and **(3)** attaching the power supply brace **(1)** to the chassis and power supply **(4)**.
5. Remove the processor assembly. Refer to the Processor Assembly removal procedure.
6. The power supply assembly can be removed from the chassis by pulling straight out the back.

Figure 7-11 Power Supply Assembly Removal



Replacement

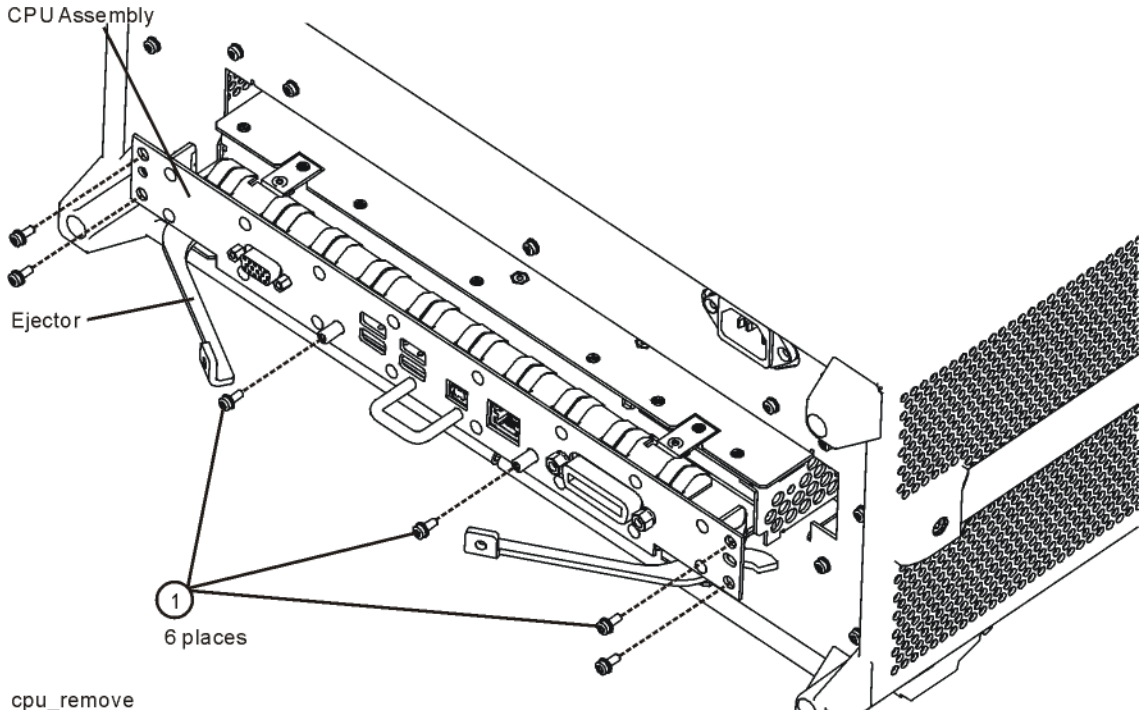
1. Slide the power supply assembly into the slot at the rear of the instrument and push on the assembly to mate the connectors to the midplane assembly.
2. Refer to Figure 7-11. Replace the screws **(2)** and **(3)** through the power supply bracket **(1)** and into the power supply **(4)** and chassis. Torque to 9 inch-pounds.
3. Replace the top brace. Refer to the Top Brace replacement procedure.
4. Replace the rear panel. Refer to the Rear Panel replacement procedure.
5. Replace the processor assembly. Refer to the Processor Assembly replacement procedure.
6. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Processor Assembly

Removal

1. Refer to Figure 7-12. Remove the six screws **(1)** attaching the processor assembly to the chassis.
2. The processor assembly can be removed from the chassis by pulling straight out the back. Use the two ejectors to pull the processor assembly out from the chassis.

Figure 7-12 **Processor Assembly Removal**



Replacement

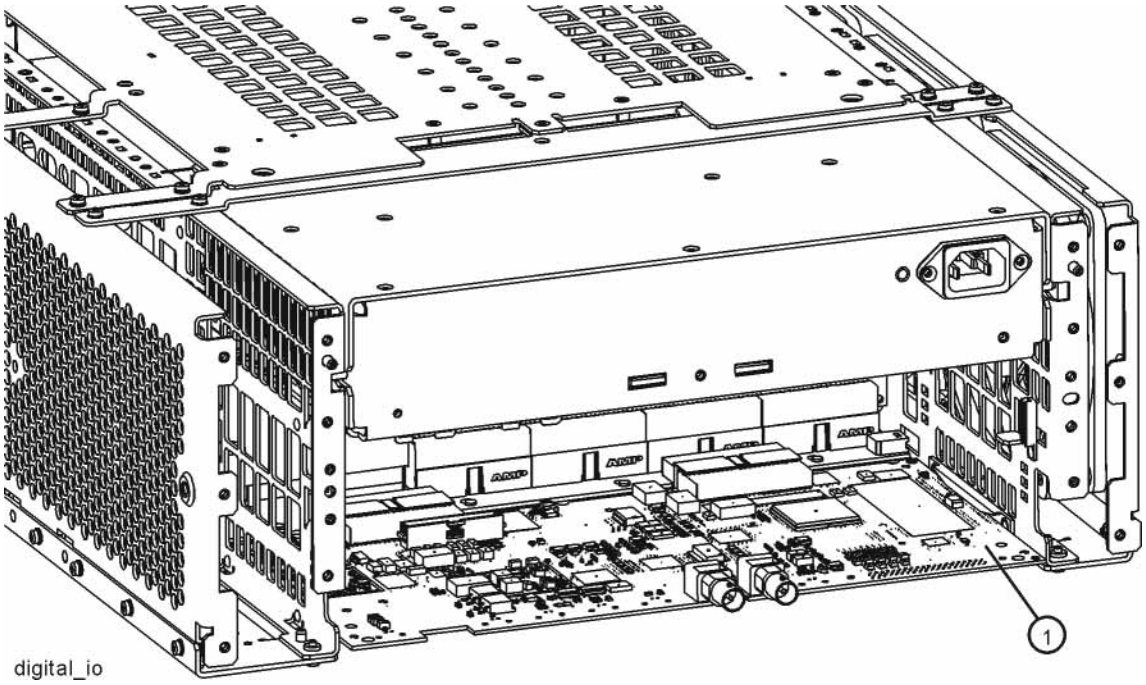
1. Slide the processor assembly into the slot at the rear of the instrument and push on the assembly to mate the connectors to the midplane assembly. Secure the board with the ejectors.
2. Refer to Figure 7-12. Replace the six screws **(1)** that attach the processor assembly to the chassis. Torque to 9 inch-pounds.

Digital I/O Board Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the rear panel. Refer to the Rear Panel removal procedure.
3. Refer to Figure 7-13. The digital I/O board assembly **(1)** can be removed by pulling straight out the back.

Figure 7-13 Digital I/O Board Assembly Removal



Replacement

1. Slide the digital I/O board assembly into the slot at the rear of the instrument and push on the assembly to mate the connectors to the motherboard assembly.
2. Replace the rear panel. Refer to the Rear Panel replacement procedure.
3. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Disk Drive

Removal

IMPORTANT

Calibration File Backup

If possible, backing up the calibration file before changing the A5 Disk Drive is highly recommended. To do this you will need to connect a USB mouse and follow the steps below:

a. Right click on the Start Menu.
b. Left click “Explore”.
c. Navigate to the E:\ drive (Calibration E:).
d. Click on the E:\ drive.
e. Double click on the AlignDataStorage folder.
f. Save the N9039ACurrentDataSet.mdb file onto a USB storage device.

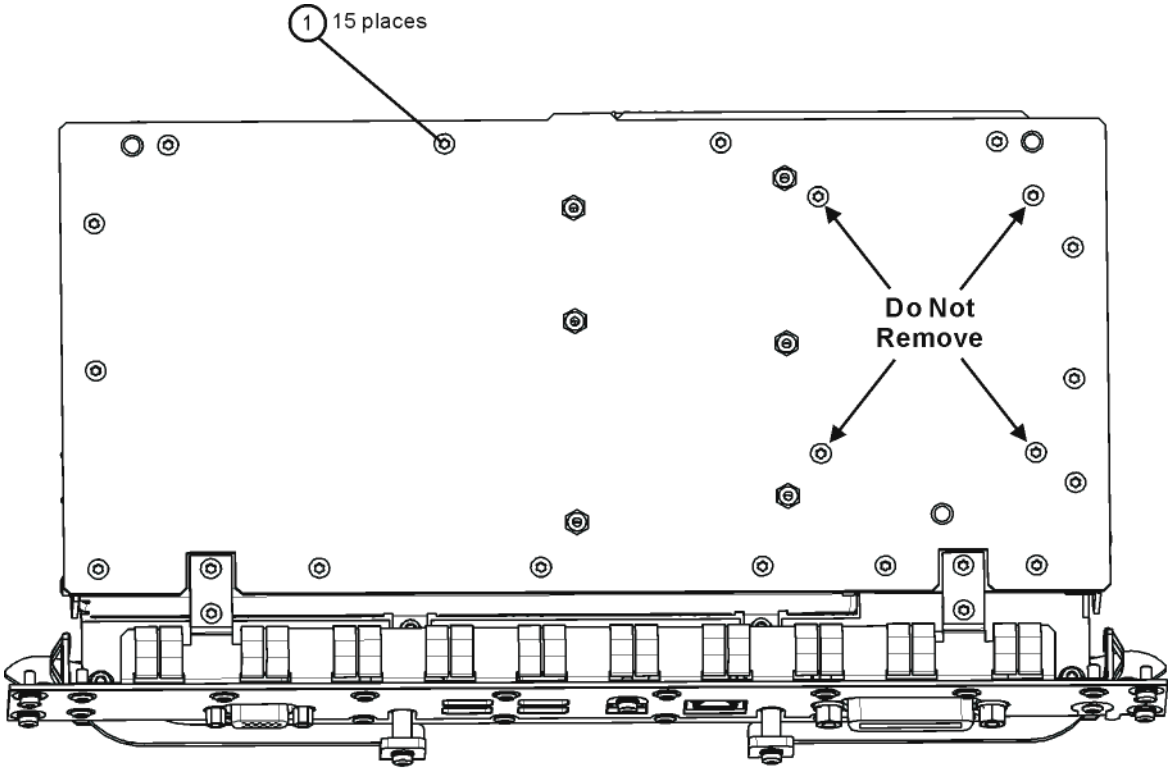
Once the new A5 Disk Drive is installed, copy the N9039ACurrentDataSet.mdb file from the USB storage device to the AlignDataStorage folder on the E:\ drive

If this file cannot be backed up because the instrument will not fully boot, go ahead and change the A5 Disk Drive and perform all adjustments listed in Chapter 8 , “Post-Repair Procedures” for the A5 assembly.

1. Remove the processor assembly. Refer to the Processor Assembly removal procedure.
2. Refer to Figure 7-14. Remove and discard the 15 pre-coated machine screws **(1)** from the processor assembly. The screws need to be discarded because dried coating can cause cross threading.

NOTE Do not remove the 4 Disk Drive screws yet.

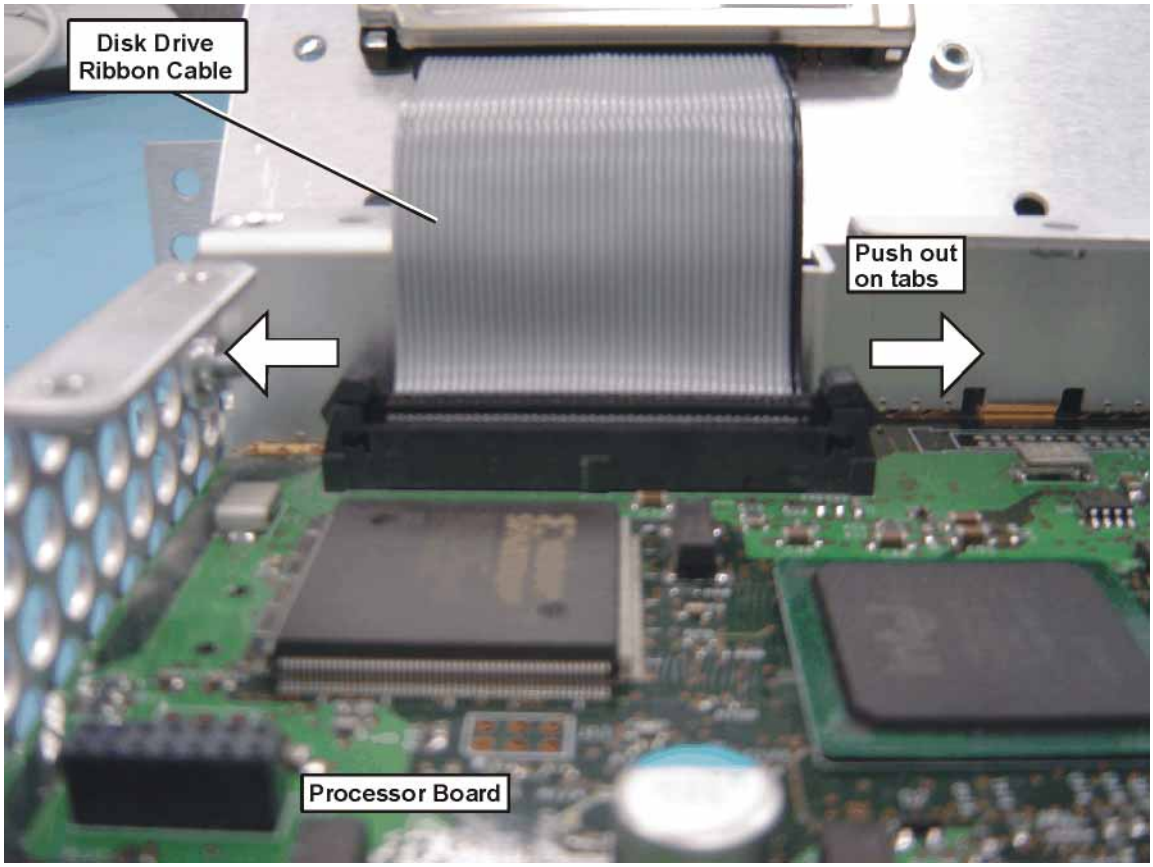
Figure 7-14 Processor Top Shield Screws



cpu_topscrews

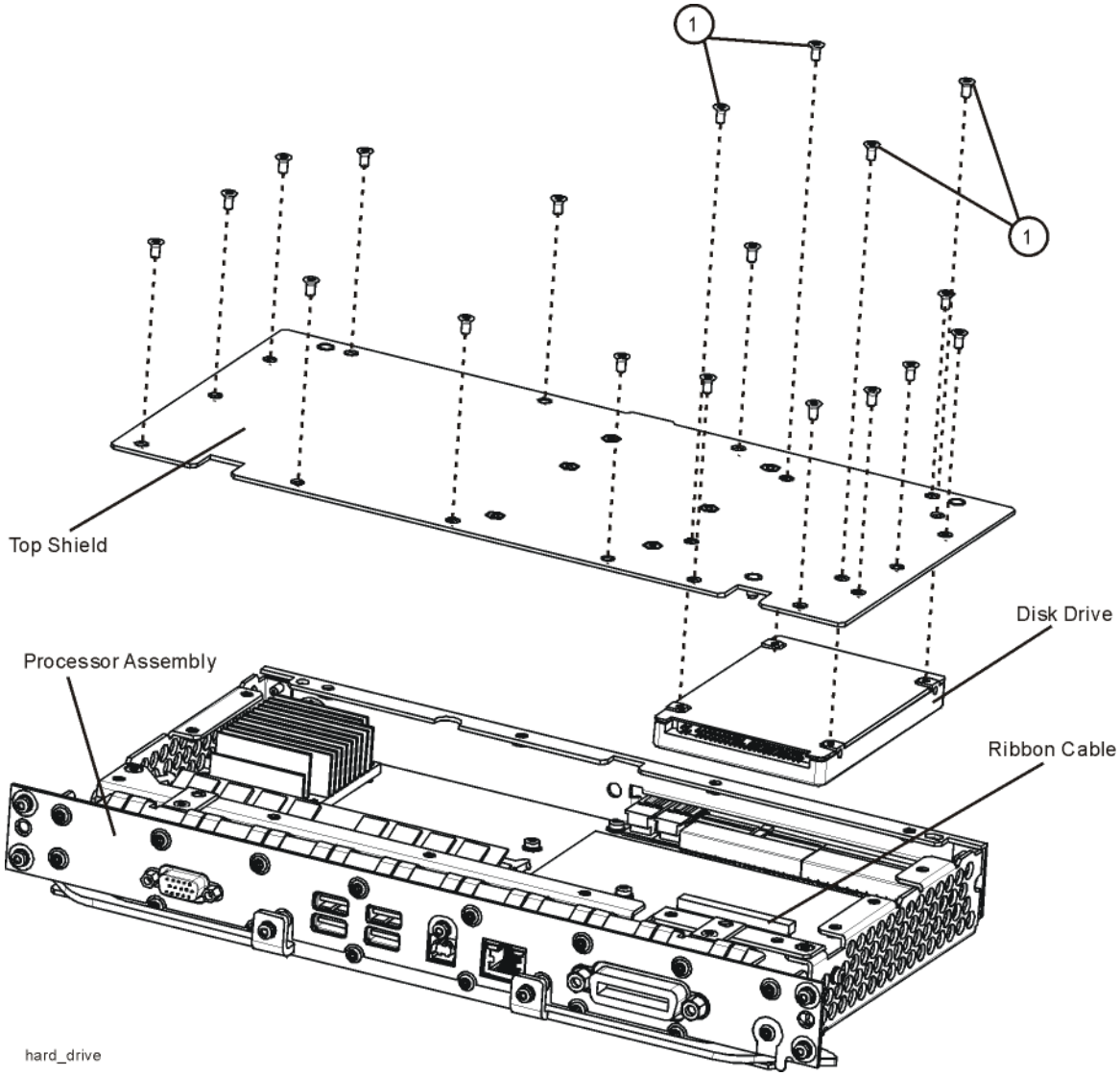
3. Refer to Figure 7-15. Carefully lift up the processor top shield and unlock the Disk Drive ribbon cable from the processor board by pressing down and out on the two locking tabs located on the sides of the connector as shown.

Figure 7-15 Disk Drive Ribbon Cable



4. Refer to Figure 7-16. Uninstall the existing Disk Drive from the Top Shield by removing and discarding the 4 pre-coated machine screws **(1)** from the processor assembly. Screws need to be discarded because dried coating can cause cross threading.

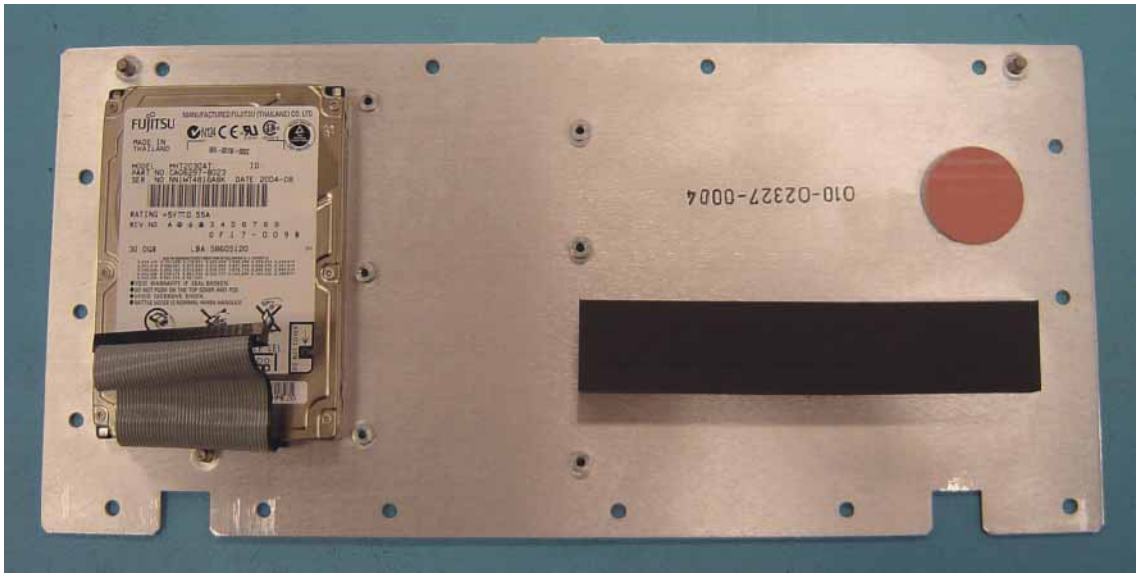
Figure 7-16 Processor/Disk Drive Parts



5. Remove the ribbon cable from the Disk Drive and set the ribbon cable aside. Discard the defective Disk Drive.
6. Locate the Programmed Disk Drive.
7. Connect the Disk Drive ribbon cable to the Programmed Disk Drive.

8. Attach the Programmed Disk Drive to the Top Shield using 4 pre-coated, self-locking machine screws (0515-1227) as shown in Figure 7-17. Torque screws to 9 inch-pounds.

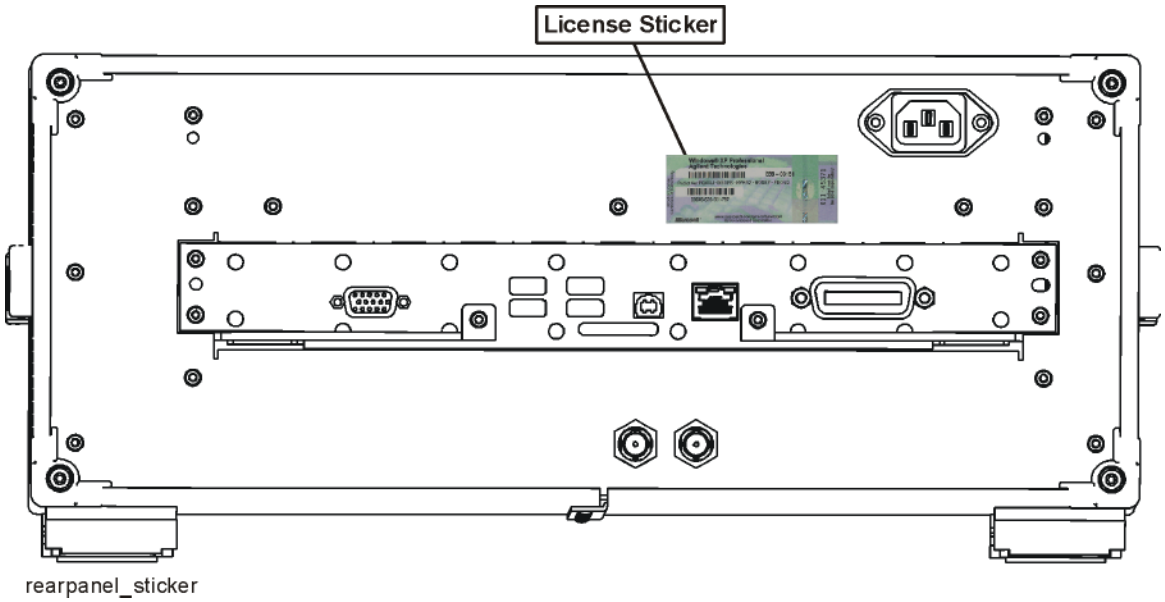
Figure 7-17 Top Shield/Disk Drive Assembly



9. Connect the Disk Drive ribbon cable from the Top Shield/Disk Drive/Ribbon Cable assembly to the processor assembly. When the ribbon cable is fully seated the two locking tabs will grip the sides of the ribbon cable connector.
10. Install the Top Shield/Disk Drive/Ribbon Cable assembly to the processor assembly using 15 new pre-coated, self-locking machine screws (0515-1227). Torque screws to 9 inch-pounds.
11. Replace the processor assembly. Refer to the Processor Assembly replacement procedure.

12. Locate the Windows Vista License Sticker that came with the replacement disk drive and apply the sticker to the rear of the instrument as shown in Figure 7-18, covering the existing sticker if present.

Figure 7-18 Windows License Sticker Rear Panel Location



Midplane Board Assembly

Removal

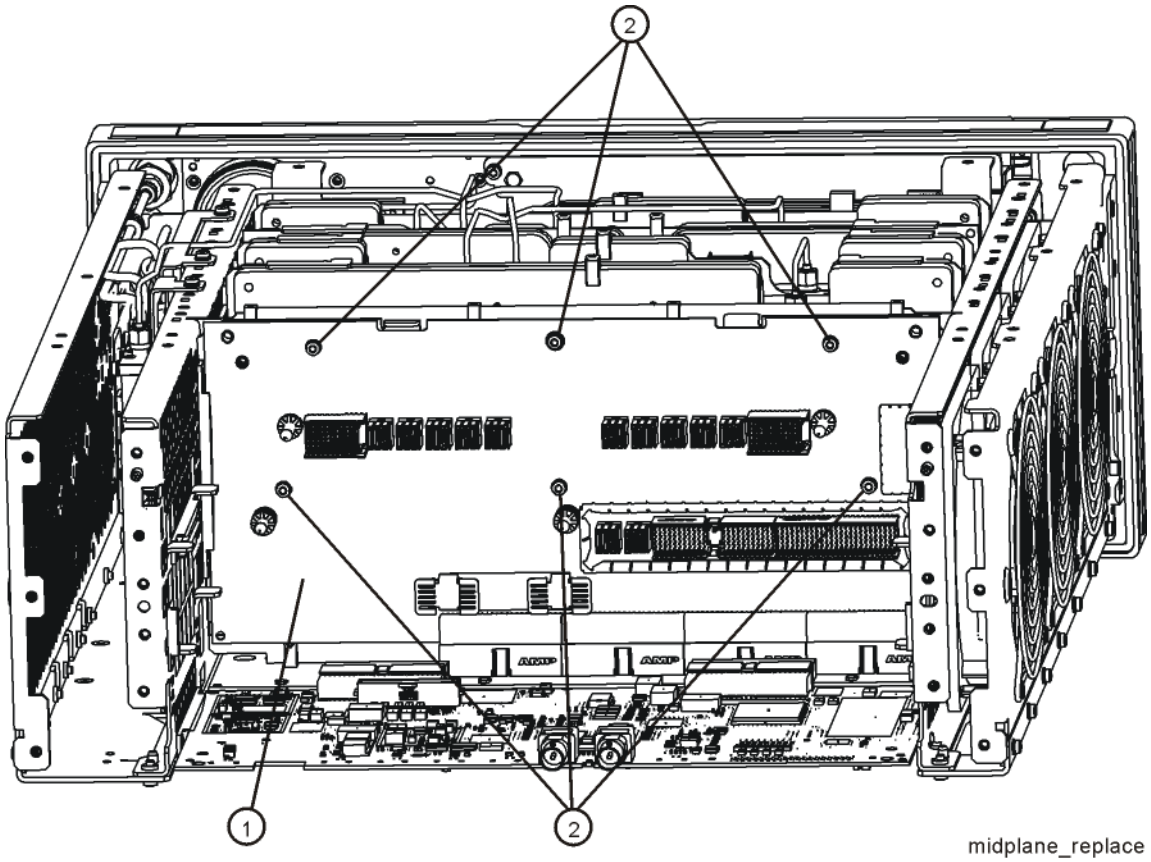
When the A7 Midplane board assembly is replaced all installed instrument license keys will be lost. So, if at all possible, backup the installed license keys before replacing the assembly. If the license keys are not backed up prior to replacing the board they will need to be retrieved from the Agilent Software Licensing website once the board is replaced and programmed with the correct instrument model and serial numbers.

For instructions on backing up the instrument license keys see “License Key Backup and Restoring” in Chapter 8 , “Post-Repair Procedures”.

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the processor assembly. Refer to the Processor Assembly removal procedure.
3. Remove the rear panel. Refer to the Rear Panel removal procedure.
4. Remove the top brace. Refer to the Top Brace removal procedure.
5. Remove the power supply assembly. Refer to the Power Supply Assembly removal procedure.

6. Refer to Figure 7-19. Remove the six screws **(2)** attaching the midplane board assembly **(1)** to the midplane bracket. The midplane board assembly can now be pulled up from the chassis by use of the ejectors.

Figure 7-19 Midplane Board Assembly Removal

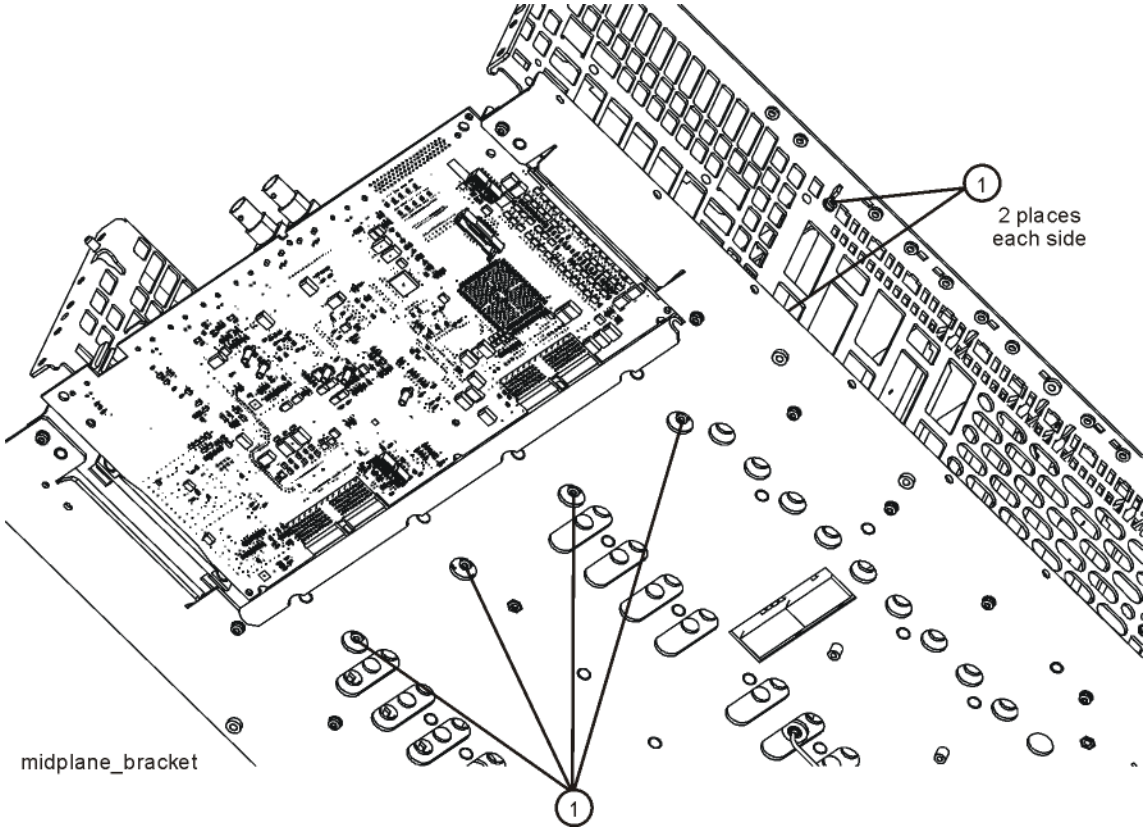


Midplane Bracket

Removal and Replacement

1. To remove the midplane bracket at this point, refer to Figure 7-20. Remove the screws **(1)** attaching the midplane board assembly to the chassis.
2. To replace the midplane bracket, position it into the chassis and reattach the screws, refer to Figure 7-20. Torque to 9 inch-pounds.

Figure 7-20 Midplane Bracket Removal (bottom view)



Midplane Board Replacement

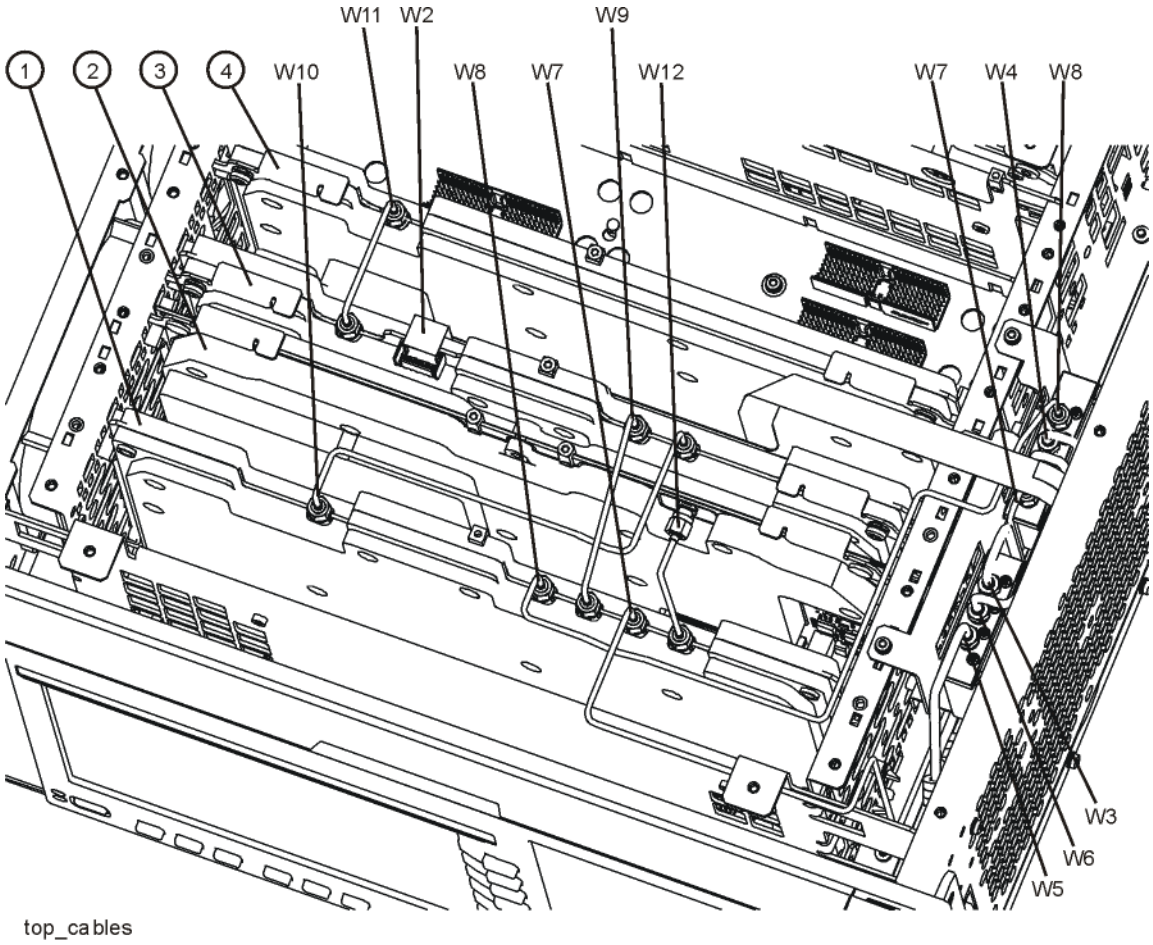
1. Refer to Figure 7-19. Install the midplane assembly into the chassis and attach to the midplane bracket using the six screws **(2)** removed earlier. Torque to 9 inch-pounds.
2. Replace the power supply assembly and it's support bracket. Refer to the Power Supply Assembly replacement procedure.
3. Replace the top brace. Refer to the Top Brace replacement procedure.
4. Replace the rear panel. Refer to the Rear Panel replacement procedure.
5. Replace the processor assembly. Refer to the Processor Assembly replacement procedure.
6. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Conducted Filter Board Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the top brace. Refer to the Top Brace removal procedure.
3. Refer to Figure 7-21. Remove W11.
4. The Conducted Filter Board assembly **(4)** can be removed from the chassis by pulling straight up using the extractors.

Figure 7-21 Semi-Rigid Cable Removal



Replacement

1. Slide the Conducted Filter Board assembly **(4)** into the slot as shown in Figure 7-21, using the extractors to secure the board to the connectors on the motherboard assembly.
2. Replace W11. Torque to 10 inch-pounds.
3. Replace the top brace. Refer to the Top Brace replacement procedure.
4. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Conducted Input Board Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the top brace. Refer to the Top Brace removal procedure.
3. Refer to Figure 7-21. Remove W2, W9, W10, and W11.
4. The Conducted Input Board assembly `(3)` can be removed from the chassis by pulling straight up using the extractors.

Replacement

1. Slide the Conducted Input Board assembly `(3)` into the slot as shown in Figure 7-21, using the extractors to secure the board to the connectors on the motherboard assembly.
2. Replace W2, W9, W10, and W11. Torque to 10 inch-pounds.
3. Replace the top brace. Refer to the Top Brace replacement procedure.
4. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Radiated Filter Board Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the top brace. Refer to the Top Brace removal procedure.
3. Refer to Figure 7-21. Remove W9, W10, and W12.
4. The Radiated Filter Board assembly **(2)** can be removed from the chassis by pulling straight up using the extractors.

Replacement

1. Slide the Radiated Filter Board assembly **(2)** into the slot as shown in Figure 7-21, using the extractors to secure the board to the connectors on the motherboard assembly.
2. Replace W9, W10, and W12. Torque to 10 inch-pounds.
3. Replace the top brace. Refer to the Top Brace replacement procedure.
4. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Radiated Input Board Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the top brace. Refer to the Top Brace removal procedure.
3. Refer to Figure 7-21. Remove W7, W8, W9, W10, and W12.
4. The Radiated Input Board assembly **(1)** can be removed from the chassis by pulling straight up using the extractors.

Replacement

1. Slide the Radiated Input Board assembly **(1)** into the slot as shown in Figure 7-21, using the extractors to secure the board to the connectors on the motherboard assembly.
2. Replace W7, W8, W9, W10, and W12. Torque to 10 inch-pounds.
3. Replace the top brace. Refer to the Top Brace replacement procedure.
4. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Motherboard Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the processor assembly. Refer to the Processor Assembly removal procedure.
3. Remove the rear panel. Refer to the Rear Panel removal procedure.
4. Remove the top brace. Refer to the Top Brace removal procedure.
5. Remove the power supply assembly. Refer to the Power Supply Assembly removal procedure.
6. Remove the digital I/O board assembly. Refer to the Digital I/O Board Assembly removal procedure.
7. Remove the Conducted Filter Board assembly. Refer to the Conducted Filter Board Assembly removal procedure.
8. Remove the Conducted Input Board assembly. Refer to the Conducted Input Board Assembly removal procedure.
9. Remove the Radiated Filter Board assembly. Refer to the Radiated Filter Board Assembly removal procedure.
10. Remove the Radiated Input Board assembly. Refer to the Radiated Input Board Assembly removal procedure.
11. Remove the Midplane Board assembly and bracket. Refer to the Midplane Board Assembly removal procedure.
12. Remove the Front Frame Assembly. Refer to the Front Frame Assembly removal procedure.
13. Remove the Fan Assembly. Refer to the Fan Assembly removal procedure.
14. Refer to Figure 7-22. Remove W13 and W14 from the motherboard bottom side by carefully squeezing on the tabs of the top cable retainer as shown in Figure 7-23 and removing the top retainer. The tabs can then be squeezed again to remove the cable from the motherboard.

Figure 7-22 W13 and W14 Location (bottom view)

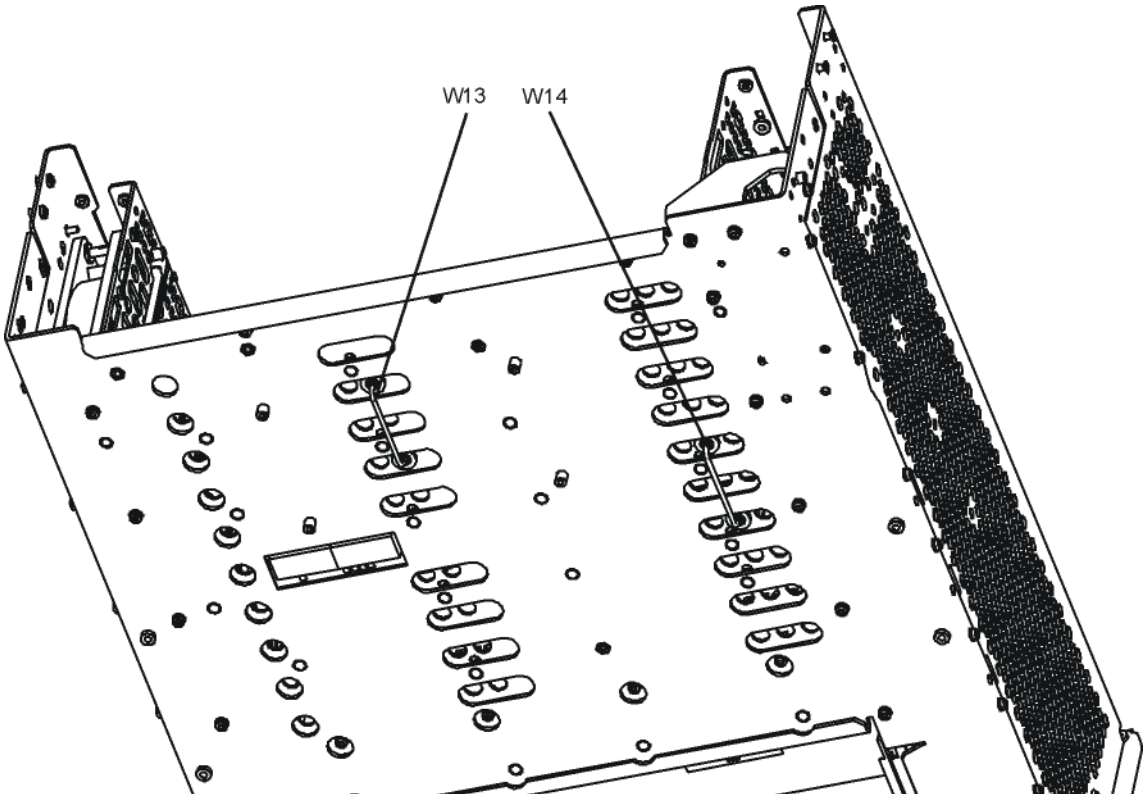
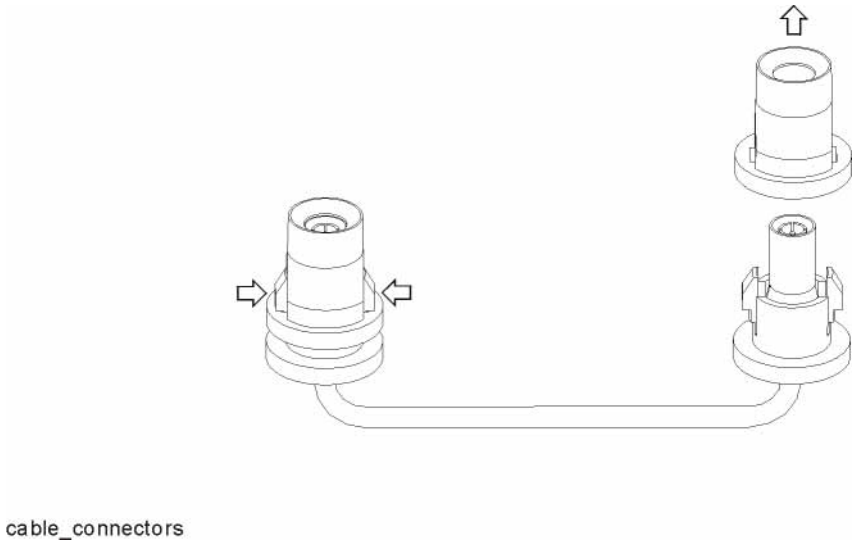
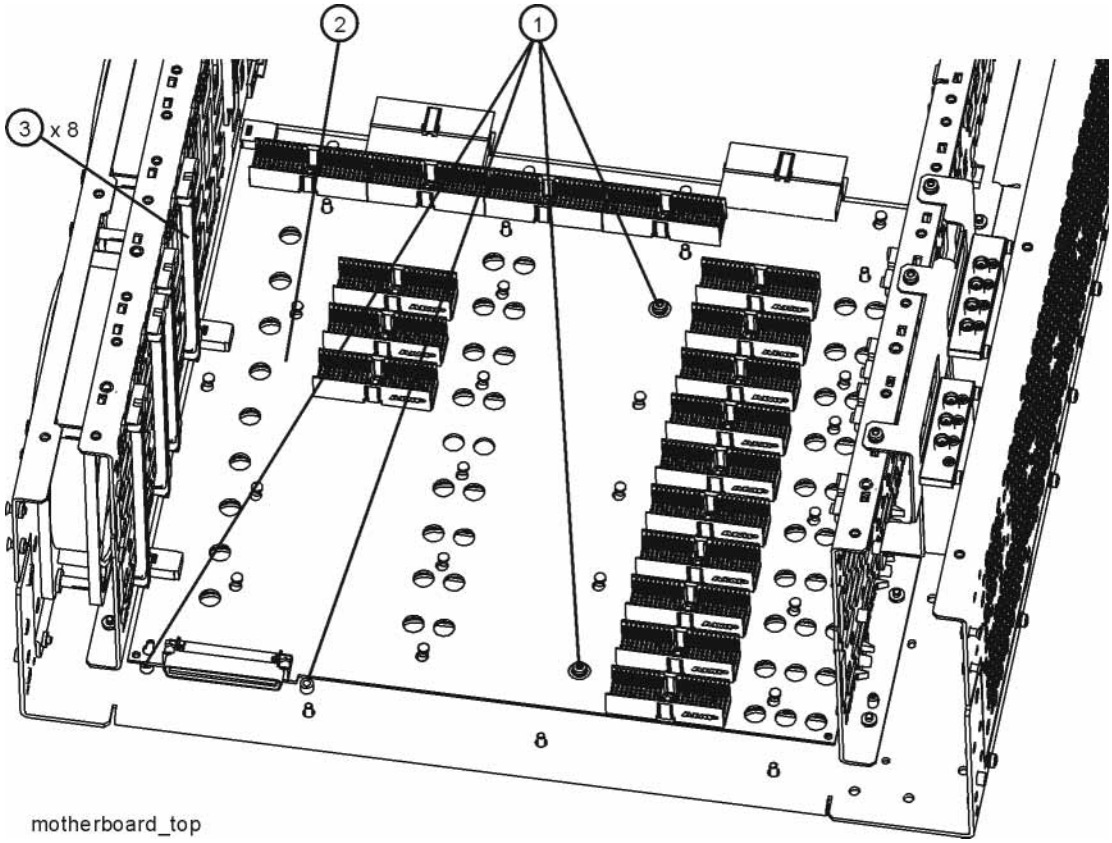


Figure 7-23 W13 and W14 Removal



15. Refer to Figure 7-24. Remove the motherboard **(2)** by removing the four screws **(1)**.

Figure 7-24 Motherboard Assembly Removal



Replacement

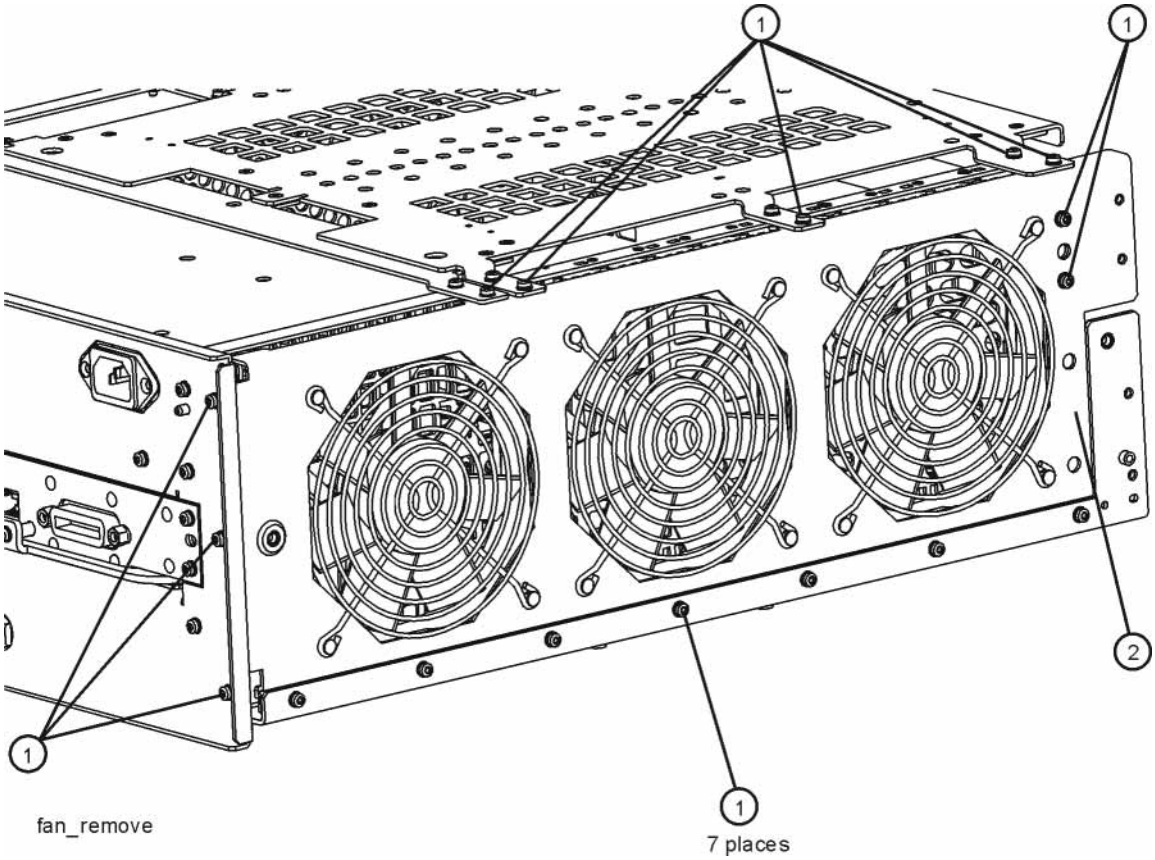
1. Refer to Figure 7-24. Place the motherboard **(2)** into position in the chassis and replace the four screws **(1)**. Torque to 9 inch-pounds.
2. Refer to Figure 7-22. Place W13 and W14 through the motherboard bottom side by carefully pushing the cable from below until the tabs of the bottom retainer click into place. Refer to Figure 7-23. The top retainer can then be placed carefully over the bottom retainer from the top side. Press down on the top retainer until the tabs click into place.
3. Replace the Fan assembly. Refer to the Fan Assembly replacement procedure.
4. Replace the Midplane assembly and bracket. Refer to the Midplane Board Assembly replacement procedure.
5. Replace the digital I/O board assembly. Refer to the Digital I/O Board Assembly replacement procedure.
6. Replace the power supply assembly. Refer to the Power Supply Assembly replacement procedure.
7. Replace the Conducted Filter Board assembly. Refer to the Conducted Filter Board Assembly replacement procedure.
8. Replace the Conducted Input Board assembly. Refer to the Conducted Input Board Assembly replacement procedure.
9. Replace the Radiated Filter Board assembly. Refer to the Radiated Filter Board Assembly replacement procedure.
10. Replace the Radiated Input Board assembly. Refer to the Radiated Input Board Assembly replacement procedure.
11. Replace the Front Frame Assembly. Refer to the Front Frame Assembly replacement procedure.
12. Replace the top brace. Refer to the Top Brace replacement procedure.
13. Replace the rear panel. Refer to the Rear Panel replacement procedure.
14. Replace the processor assembly. Refer to the Processor Assembly replacement procedure.
15. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Fan Assembly

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the Front Frame Assembly. Refer to the Front Frame Assembly removal procedure.
3. Refer to Figure 7-25. Remove the screws **(1)** that attach the fan assembly **(2)** to the chassis.

Figure 7-25 Fan Assembly Removal

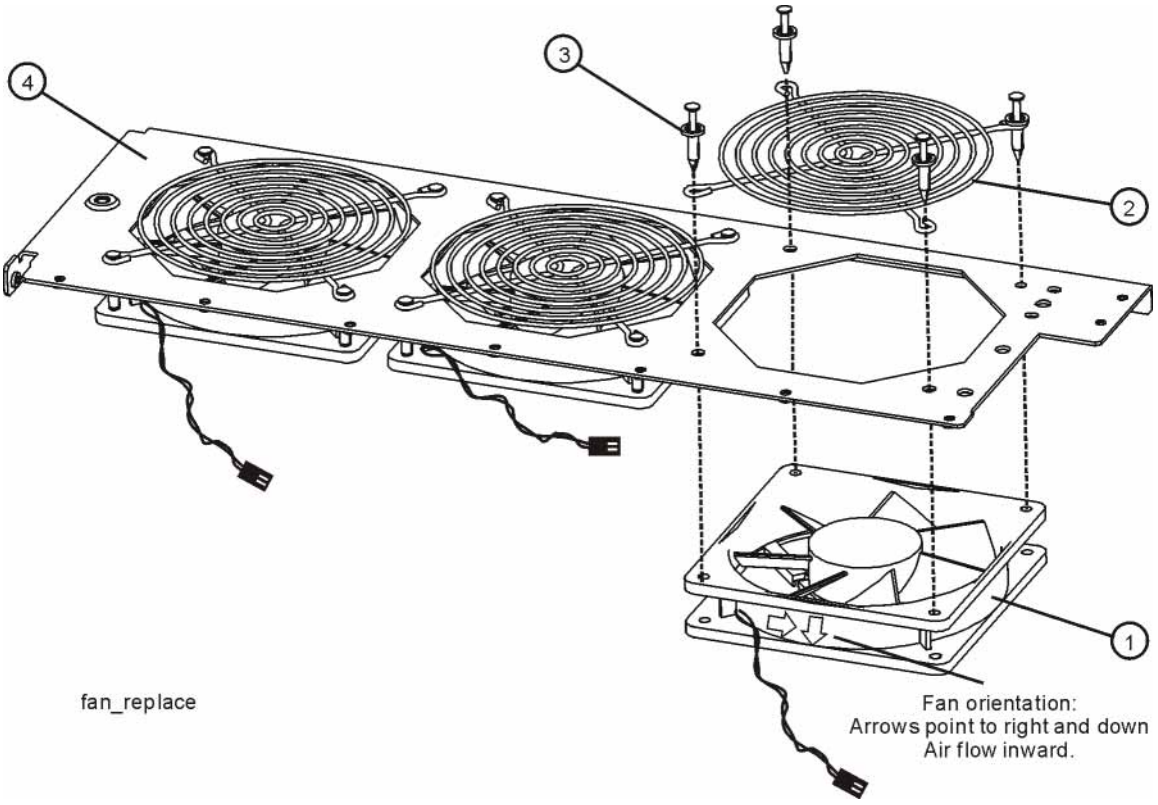


4. After carefully tilting the fan assembly away from the chassis, unplug the fan wires from the motherboard. The fan assembly can now be lifted from the chassis.

Replacing a Fan

1. Refer to Figure 7-26. To replace a fan, it is necessary to remove the 4 plastic rivets **(3)** that attach the fan **(1)** and guard **(2)** to the fan bracket **(4)**. To do this use a small screwdriver to unscrew the rivet and remove it from the bracket.

Figure 7-26 Fan Replacement



2. Position the new fan on the work surface with the arrows pointing to the right and down.
3. Orient the fan guard so that the rings are on the outside, and that the “V” of the support legs are pointing to the neighboring fan.
4. With the rivets center posts raised, snap the rivets into place through the fan grill and fan bracket and into the fan. Screw the center posts into place.

Replacement

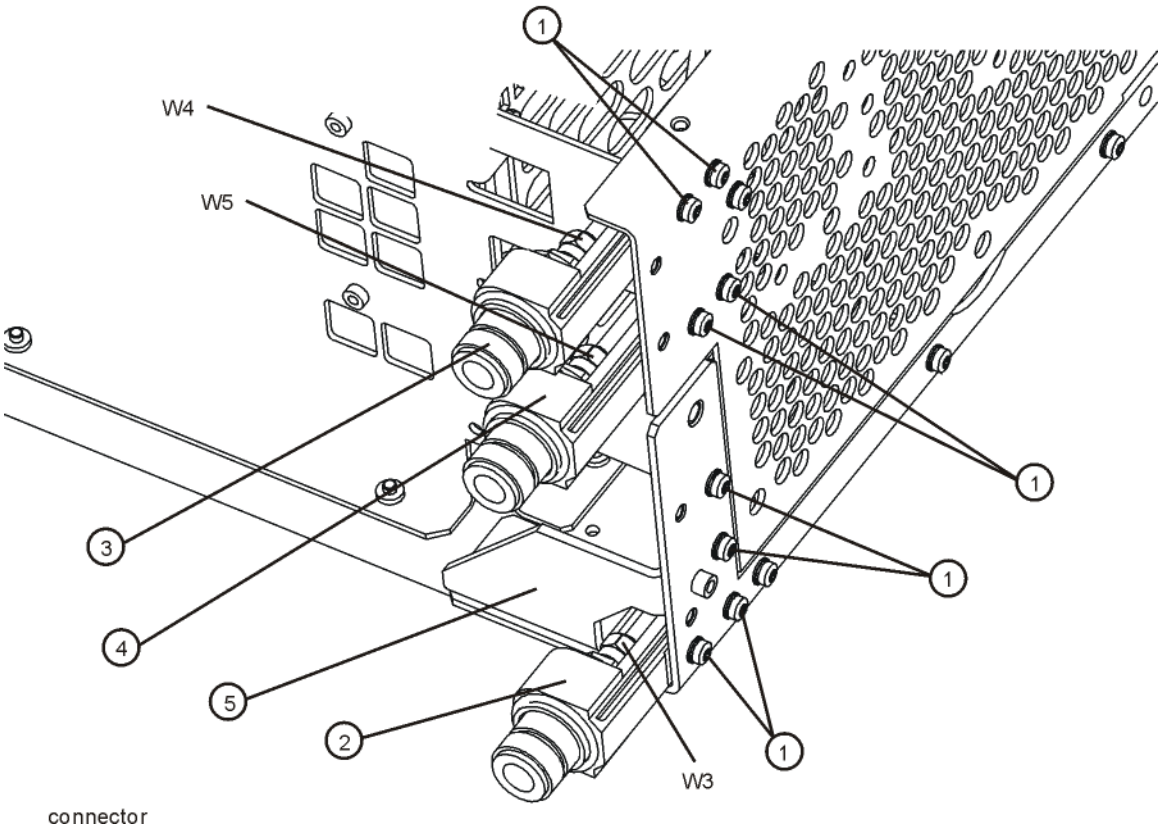
1. Plug the fan wires into the motherboard.
2. Refer to Figure 7-25. Place the fan assembly into position in the chassis. Replace the screws **(1)** to attach the fan assembly to the chassis. Torque to 9 inch-pounds.
3. Replace the Front Frame Assembly. Refer to the Front Frame Assembly replacement procedure.
4. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Input and Output Connectors

Removal

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Remove the Front Frame Assembly. Refer to the Front Frame Assembly removal procedure.
3. Refer to Figure 7-27. Disconnect the semi-rigid cable from the connector you are going to remove.

Figure 7-27 Connector Assembly Removal



4. Remove the two screws **(1)** that attach the connector assembly to the chassis. The connector assembly can now be lifted from the chassis.

Replacement

1. Refer to Figure 7-27. Place the connector assembly into position in the chassis. Replace the two screws **(1)** to attach the connector assembly to the chassis. Torque to 9 inch-pounds.
2. Reconnect the semi-rigid cable to the connector. Torque to 10 inch-pounds.
3. Replace the Front Frame Assembly. Refer to the Front Frame Assembly replacement procedure.
4. Replace the instrument outer case. Refer to the Instrument Outer Case replacement procedure.

Front Frame Assembly

Removal

NOTE Make sure any connectors on the front panel are removed.

1. Remove the instrument outer case. Refer to the Instrument Outer Case removal procedure.
2. Refer to Figure 7-28. Using the T-10 driver, remove the eight screws **(1)**, four on each side, to detach the Front Frame Assembly from the chassis.
3. Refer to Figure 7-29. Pull the Front Frame Assembly carefully away from the chassis. Remove the ribbon cable W1 from the mother board.

Figure 7-28 Front Frame Assembly Removal

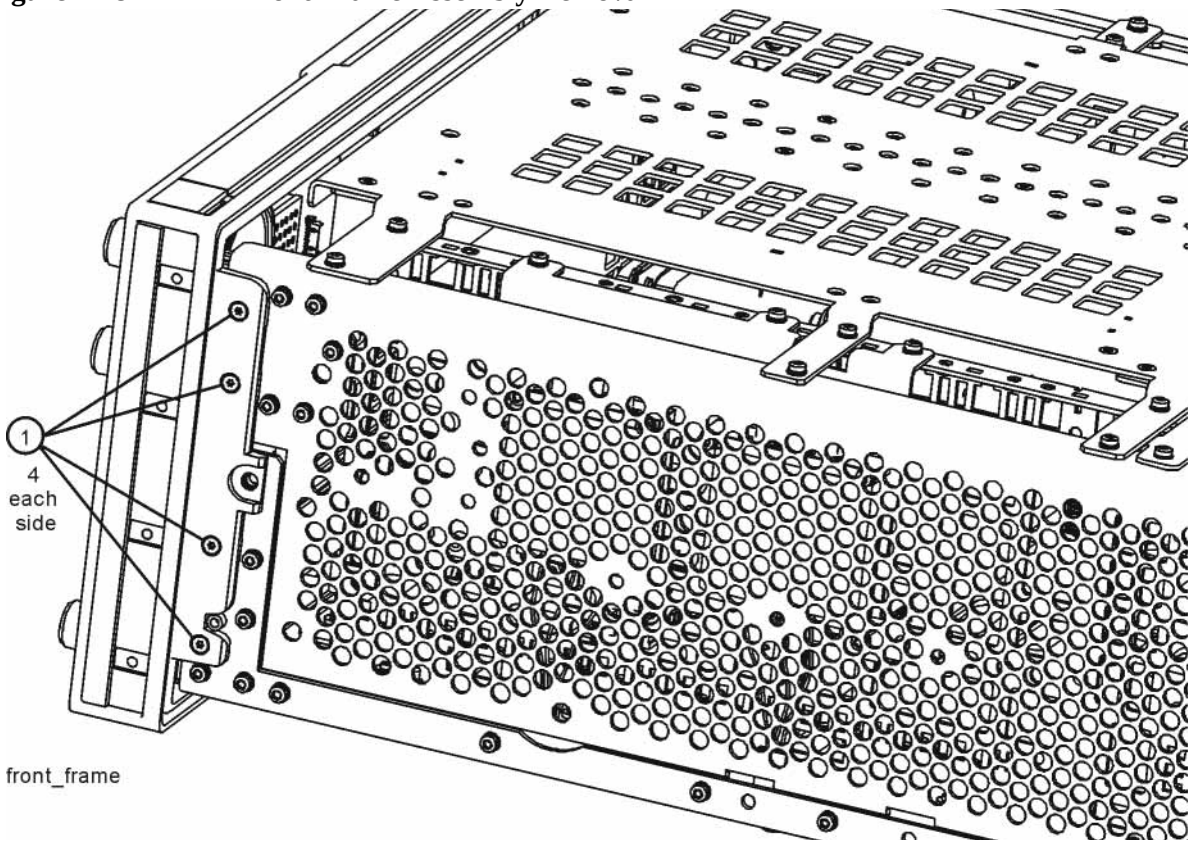
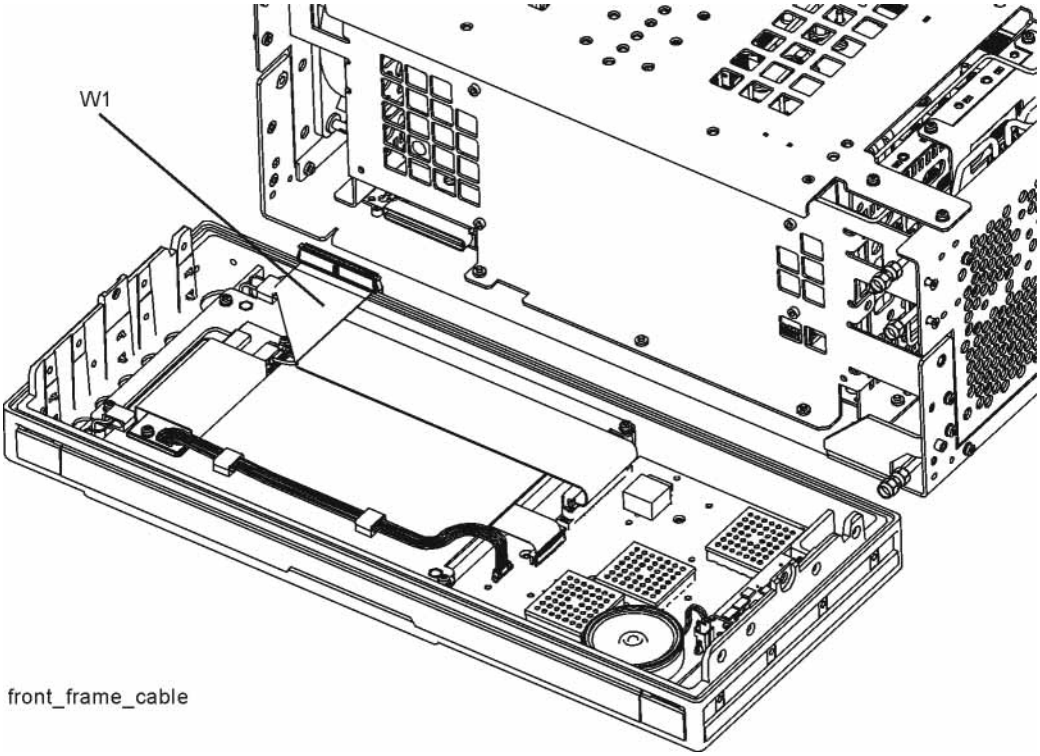


Figure 7-29 Front Panel Cable



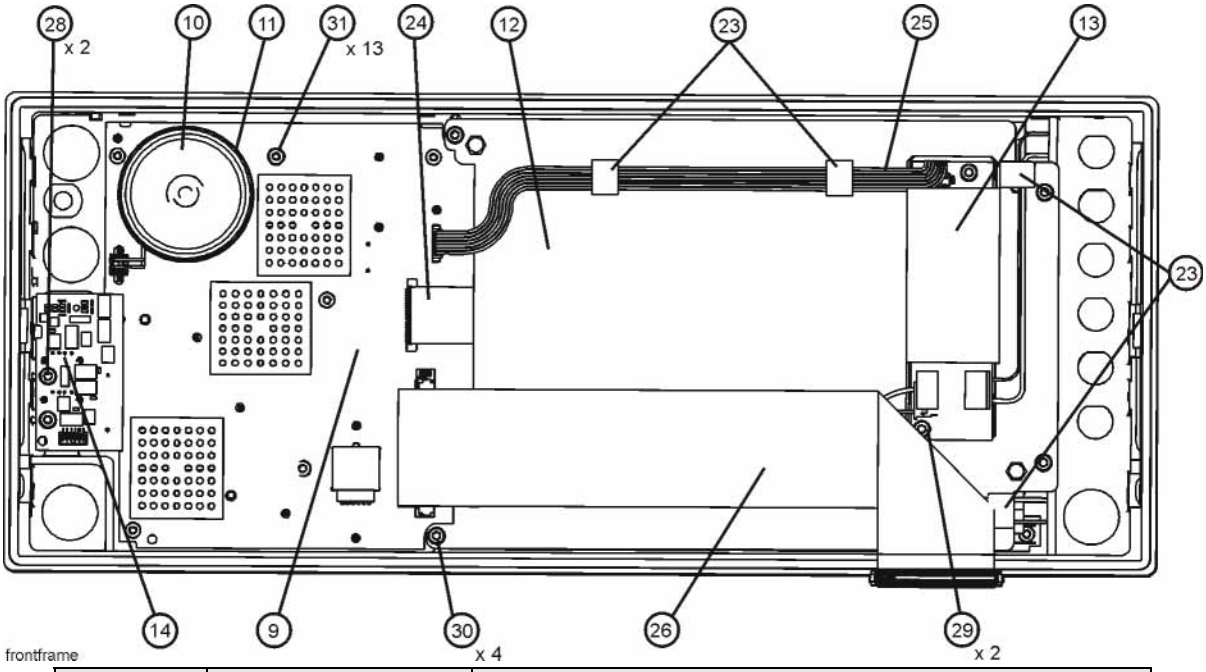
Replacement

1. Reattach the ribbon cable W1.
2. Refer to Figure 7-28. Carefully position the Front Frame Assembly onto the chassis. Ensure no cables are crushed. Replace the eight screws **(1)**, four on each side of the chassis. Torque to 9 inch pounds.
3. Replace the outer case. Refer to the Instrument Outer Case replacement procedure.

Front Frame Assembly Components

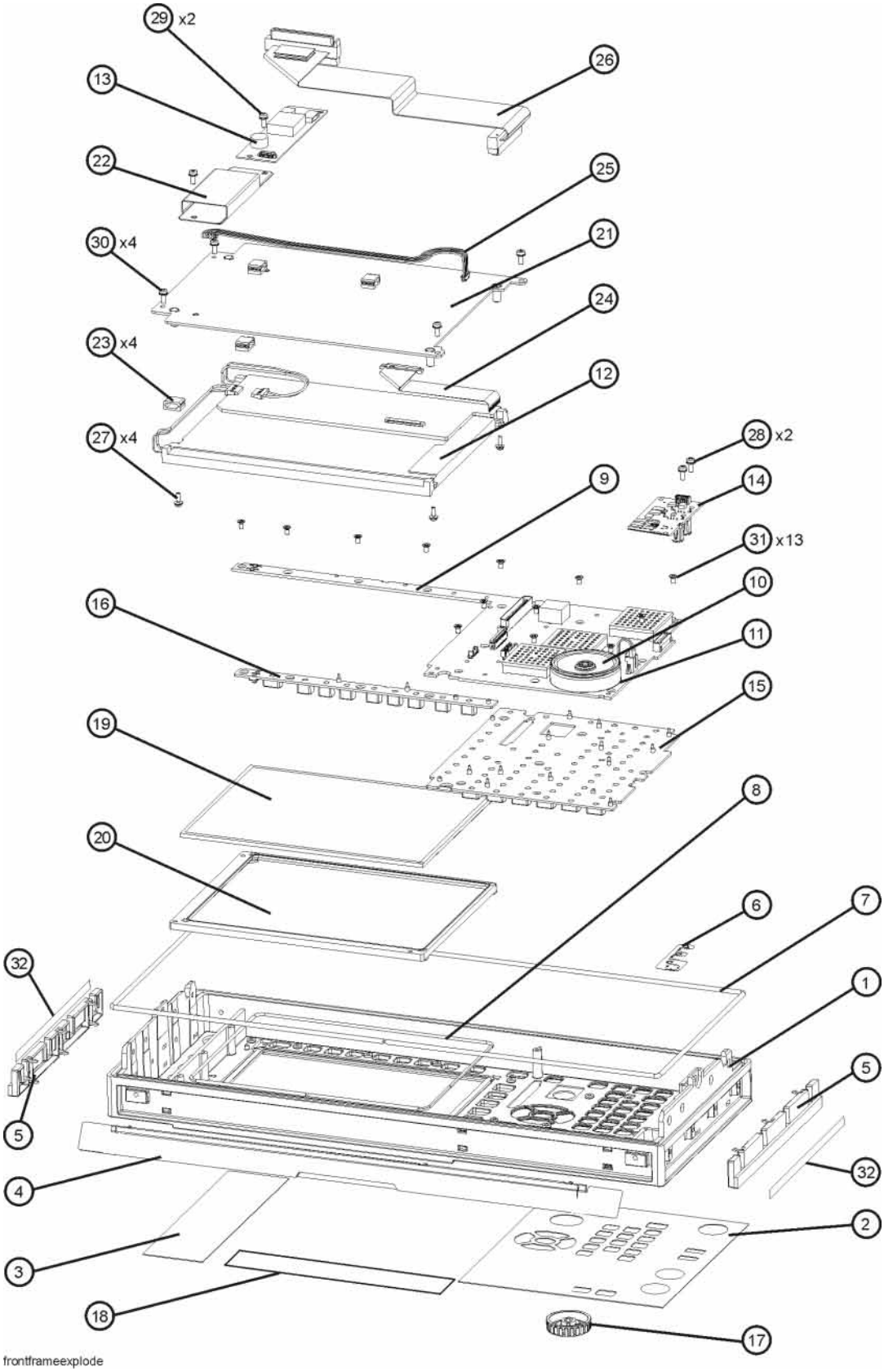
NOTE Access to any of the Front Frame assemblies requires removal of the Front Frame Assembly from the chassis.

Figure 7-30 Front Frame Assembly Parts Locator



Item	Reference Designator	Description
9	A1A2	Front Panel Interface Board Assembly
10	A1A2MP1	Speaker
11	A1A2MP2	Speaker Mounting Foam
12	A1A3	Liquid Crystal Display
13	A1A4	Display Backlight Inverter Board
14	A1A5	Front Panel USB Interface Board Assembly
23	A1MP10-13	LCD Backlight Cable Clamp
24	A1W1	LCD Control Flex Circuit
25	A1W2	LCD Inverter Control Cable
26	W1	Ribbon Cable Assembly, Front Panel Interface Board to Motherboard
28, 29, 30	-	Screw - M3 X 8 mm (TORX Pan Head)
31	-	Screw - M3 X 5 mm (TORX Flat Head)

Figure 7-31 Front Frame Assembly Exploded View



Item	Reference Designator	Description
1	A1A1MP1	Front Frame
2	A1A1MP2	Main Keypad Overlay
3	A1A1MP3	Connector Overlay
4	A1A1MP8	Front Frame Top Trim Strip
5	A1A1MP9-10	Front Frame Side Trim Strip
6	A1A1MP4	Front Frame Ground Spring
7	A1A1MP5	Braided Gasket
8	A1A1MP6	Chromeric Gasket
9	A1A2	Front Panel Interface Board Assembly
10	A1A2MP1	Speaker
11	A1A2MP2	Speaker Mounting Foam
12	A1A3	Liquid Crystal Display
13	A1A4	Display Backlight Inverter Board
14	A1A5	Front Panel USB Interface Board Assembly
15	A1MP1	Main Keypad
16	A1MP2	Display Keypad
17	A1MP9	RPG Knob
18	A1A1MP7	Nameplate Label
19	A1MP7	LCD Glass Filter
20	A1MP8	LCD Lens Gasket
21	A1MP14	Display Bracket
22	A1MP15	Inverter Board Shield
23	A1MP10-13	LCD Backlight Cable Clamp
24	A1W1	LCD Control Flex Circuit
25	A1W2	LCD Inverter Control Cable
26	W1	Ribbon Cable Assembly, Front Panel Interface Board to Motherboard
27	-	Screw - M2.5 X 8 mm (TORX Pan Head)
28	-	Screw - M3 X 8 mm (TORX Pan Head)
29	-	Screw - M3 X 8 mm (TORX Pan Head)
30	-	Screw - M3 X 8 mm (TORX Pan Head)
31	-	Screw - M3 X 5 mm (TORX Flat Head)
32	A1MP16-17	Vinyl Side Trim

Display Assembly

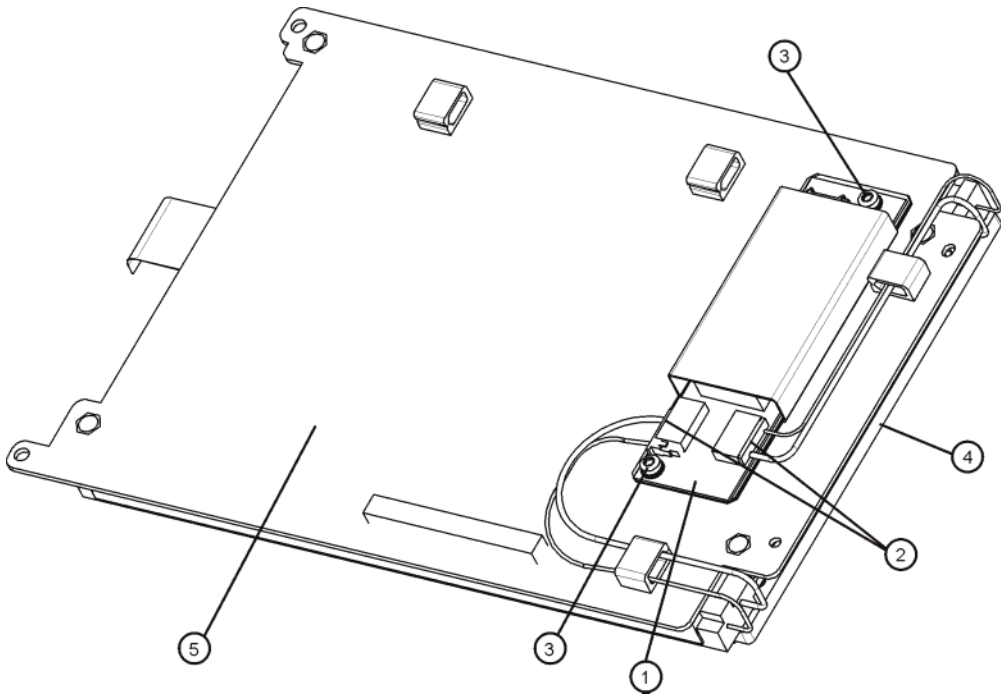
Removal

1. Refer to Figure 7-30. Ribbon cable W1 **(26)** must be separated from the display by pulling up to separate the velcro that is used to adhere the cable to the bracket.
2. Disconnect the cable A1W2 **(25)** from the LCD Inverter board **(13)** and unclip the cable from the cable clamps.
3. Disconnect the flex circuit A1W1 **(24)** from the front panel interface board **(9)**.
4. Remove the four screws **(30)** securing the display bracket **(12)** to the Front Frame Assembly. The display can now be removed from the Front Frame Assembly.

CAUTION Once the display assembly has been removed from the Front Frame Assembly, the glass filter is no longer secured. DO NOT tip the assembly in such a manner that would cause it to fall out of place, as this may cause injury and/or damage to the glass.

5. Refer to Figure 7-32. Disconnect the backlight wires **(2)** from the inverter board.

Figure 7-32 Inverter Board Removal



6. To remove the A1A4 LCD Backlight Inverter board **(1)**, remove the two screws **(3)** securing the inverter board to the display bracket **(5)** and unplug the two backlight wire harnesses **(2)**.
7. To remove the A1A3 LCD **(4)**, flip the assembly over and remove the four screws securing the LCD to the display bracket **(5)**.

Replacement

1. To replace the A1A3 LCD **(4)**, place it on the display bracket **(5)** and replace the four screws. Torque to 9 inch pounds.
2. To replace the A1A4 Inverter board **(1)**, place it on the display bracket **(5)** and replace the two screws **(3)**. Torque to 9 inch pounds.
3. Reattach the backlight wires **(2)** onto the inverter board.
4. Refer to Figure 7-30. Place the display bracket into position in the Front Frame Assembly. Reconnect the flex circuit A1W1 **(24)** to the front panel interface board.
5. Replace the four screws **(30)** that secure the display bracket to the Front Frame Assembly. Torque to 9 inch pounds.
6. Reconnect the cable A1W2 **(25)** to the Inverter board **(13)**. Reclip the cable into the cable clamps.
7. Adhere the velcro on ribbon cable W1 to the display.

USB Board, Interface Board and Keypad

Removal

1. Refer to Figure 7-31. Remove the RPG knob **(17)** by carefully pulling it off.
2. Remove the display. Refer to the Display Assembly removal procedure.
3. Refer to Figure 7-30. Remove the A1A5 Front Panel USB Interface **(14)** by removing the two screws **(28)** and unplugging it from the front panel interface board.
4. Remove the thirteen screws **(31)** securing the A1A2 Front Panel Interface board to the Front Frame Assembly. The Front Panel Interface board with the keypad attached can now be lifted from the Front Frame Assembly.
5. To separate the keypad from the Front Panel Interface board, use a push tool or pliers to carefully separate the pull through tabs.

Replacement

1. Install the keypad onto the Front Panel Interface board using the pull through tabs and alignment holes. Use a push tool or pliers to ensure that all of the pull through tabs are properly captive on the board.
2. Install the A1A2 Front Panel Interface board/keypad assembly into the Front Frame Assembly, and replace the thirteen screws **(31)** to secure. Torque to 9 inch pounds.
3. Replace the A1A5 Front Panel USB Interface board **(14)** by plugging it into the Front Panel Interface board using the board to board connectors and secure it with the two screws **(28)**. Torque to 9 inch pounds.
4. Replace the display. Refer to the Display Assembly replacement procedure.
5. Replace the RPG knob by firmly pressing it on.

8 Post-Repair Procedures

What You Will Find in This Chapter

This chapter provides information that will enable you to return an instrument to full operation following the replacement or repair of any instrument assembly. This information includes a table that shows which adjustments and/or performance tests must be executed after replacing an assembly, as well as instructions for performing a few manual post-repair procedures.

The following sections are located in this chapter:

Before Starting ..... page 215
Required Test Equipment ..... page 215
Post-Repair Procedures ..... page 216
Calibration File Backup ..... page 218
BIOS Setup Changes ..... page 219
Changing BIOS Settings ..... page 219
Accept End-User License Agreement (EULA) ..... page 225
Programming Model and Serial Numbers ..... page 231
License Key Backup and Restoring ..... page 232

To determine which Performance Verification/Adjustment Software tests to perform, refer to Table 8-1 in this chapter.

NOTE If one or more instrument assemblies have been replaced, related adjustment or configuration procedures must be performed prior to verifying that the instrument meets specifications. Refer to Table 8-1 to determine which procedures to perform after replacing an assembly.

NOTE Never perform adjustments as routine maintenance. Adjustments should only be performed after a repair or a performance test failure.

NOTE If the indications received during a procedure execution do not agree with the normal conditions given in the procedure, a fault exists in the instrument. The fault should be repaired before proceeding with any further procedures. Refer to the troubleshooting information in Chapter 2 of this guide.

Before Starting

There are four things you should do before starting any of the procedures listed or described in this chapter:

- Familiarize yourself with the safety symbols marked on the device under test (DUT), and read the general safety considerations and the safety note definitions in the front of this guide, before you begin the procedures in this chapter.
- Check that the DUT has been turned on and allowed to warm up.
- Ensure that the DUT is operating within a temperature range of 20 °C to 30 °C.
- Read the rest of this section.

Required Test Equipment

Refer to the required equipment table on page 244 of Chapter 10 , for a list of recommended equipment and critical test equipment specifications for the adjustments and performance verification tests.

Post-Repair Procedures

Table 8-1 lists the adjustments and performance verification tests needed after an assembly replacement or repair.

After an assembly is replaced or repaired, find the assembly in the left-hand column, and then perform the recommended adjustment and/or performance verification test. Making the recommended adjustments and/or performance verification tests does not guarantee all published specifications are being met. Only a full instrument calibration will do this.

NOTE Refer to the instrument user's guide for information on instrument warm-up before performing any of the procedures listed in this chapter.

Table 8-1 Post-Repair Testing Requirements

Assembly	Adjustment to Perform (in the order listed)[a]	Performance Verifications to Perform After Adjustments [a]
A1A2 Front Panel Interface	None	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A1A3 Liquid Crystal Display	None	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A3 Digital I/O Assembly	Install latest instrument software[b]	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A4 Processor Assembly	BIOS setup changes[c]	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A4BT1 Processor Battery	BIOS setup changes[c]	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A5 Disk Drive Assembly	Accept End-User License Agreement Install latest instrument software[b] All instrument adjustments[d]	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A6 Power Supply	None	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A7 Midplane board	Program Model and Serial Numbers[e] Restore Instrument License Keys[f]	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses
A8 Motherboard	None	• RF Preselector Alignment • Displayed Average Noise Level • Spurious Responses

Table 8-1 Post-Repair Testing Requirements (Continued)

Assembly	Adjustment to Perform (in the order listed)[a]	Performance Verifications to Perform After Adjustments [a]
A21 Radiated Input Board	• Hardware Statistical Reset[g] • Overload Detector • C-Band Bypass Abs Amp • R-Band Bypass Abs Amp • R-Band Step Gain Linearity • R-Band Nominal Gain • R-Band Abs Amp 0 and 10 dB • R-Band Abs Amp Versus Atten	• RF Preselector Alignment • Displayed Average Noise Level • Conducted Band Absolute Amplitude Accuracy • Radiated Band Absolute Amplitude Accuracy • Spurious Responses • Third Order Intercept • Conducted Band VSWR • Radiated Band VSWR
A22 Radiated Filter Board	• C-Band Bypass Abs Amp • R-Band Bypass Abs Amp • R-Band Filter Tuning • R-Band Step Gain Linearity • R-Band Nominal Gain	• RF Preselector Alignment • Displayed Average Noise Level • Radiated Band Absolute Amplitude Accuracy • Spurious Responses • Third Order Intercept • Radiated Band VSWR
A23 Conducted Input Board	• Hardware Statistical Reset[g] • Overload Detector • C-Band Bypass Abs Amp • R-Band Bypass Abs Amp • C-Band Abs Amp 0 and 10 dB • R-Band Abs Amp Versus Atten	• RF Preselector Alignment • Displayed Average Noise Level • Conducted Band Absolute Amplitude Accuracy • Spurious Responses • Third Order Intercept • Conducted Band VSWR
A24 Conducted Filter Board	• C-Band Bypass Abs Amp • R-Band Bypass Abs Amp • C-Band Abs Amp 0 and 10 dB	• RF Preselector Alignment • Displayed Average Noise Level • Conducted Band Absolute Amplitude Accuracy • Spurious Responses • Third Order Intercept • Conducted Band VSWR
Sw1 or SW2 Switch Assemblies	• Hardware Statistical Reset[g] • C-Band Bypass Abs Amp • R-Band Bypass Abs Amp • C-Band Abs Amp 0 and 10 dB • R-Band Abs Amp 0 and 10 dB	• RF Preselector Alignment • Displayed Average Noise Level • Conducted Band Absolute Amplitude Accuracy • Radiated Band Absolute Amplitude Accuracy • Spurious Responses • Conducted Band VSWR • Radiated Band VSWR

a. Calibration Application Software is required to run the required performance tests and adjustments. For details go to http://www.agilent.com/find/calibrationsoftware.
b. The instrument application software must be updated to the latest version for certain repairs to keep the software synchronized with the hardware. See Chapter 9 , “Instrument Software”.
c. See “BIOS Setup Changes” in this chapter.
d. Before replacing the A5 Disk Drive assembly see “Calibration File Backup” in this chapter.
e. See “Programming Model and Serial Numbers” in this chapter.
f. See “License Key Backup and Restoring” in this chapter.
g. Can be found on the Utilities menu of the Performance Verification and Adjustment Software.

Calibration File Backup

Since all calibration and user data files are stored on the A5 Disk Drive assembly they will be lost when the drive is replaced. If possible, backing up these files before replacing the A5 Disk Drive, so that they can be restored afterwards, is highly recommended. Of course, if the drive is completely nonfunctional this cannot be done.

Backing up the calibration file will typically eliminate the need to run all of the instrument adjustments once the drive is replaced. To do this you will need to connect a USB mouse to the instrument and do the following:

1. From the Start menu select “My Computer”
2. Select the E: Drive (Calibration E:) by double-clicking on it
3. Enter the AlignDataStorage folder by double-clicking on it
4. Save a copy of the **N9039ACurrentDataSet.mdb** file onto a USB storage device

Once a new A5 Disk Drive assembly is installed, copy the **N9039ACurrentDataSet.mdb** file from the USB storage device to the AlignDataStorage folder on the E: drive of the new A5 Disk Drive assembly.

If for some reason this file cannot be backed up, all of the instrument adjustments will need to be run once the A5 Disk Drive assembly has been replaced. Refer to Chapter 10 , “Performance Verification and Adjustment Software”.

BIOS Setup Changes

There are two setting in the instrument processor BIOS that need to be changed/verified whenever the A4 Processor board assembly or the A4BTI Processor battery is changed. They are:

- “CK-408 Spread Spectrum” to “Enabled” (Figure 8-4)
- “IDE 2:” under “Boot priority order:” to position “1” (Figure 8-6)

Changing and saving these BIOS settings requires an external USB keyboard.

Changing BIOS Settings

1. With the instrument turned off connect an external USB keyboard to one of the instrument's USB ports.
2. Turn on instrument power.
3. Confirm Agilent Technologies splash screen comes up within a few seconds as shown in Figure 8-1.

Figure 8-1 Agilent Splash Screen

4. While the splash screen is still on the screen press “F2” on the external keyboard. Once this is pressed you should see a display like that of Figure 8-2 just prior to entering the BIOS Setup utility as shown in Figure 8-3.

Figure 8-2 F2 at Instrument Boot-Up

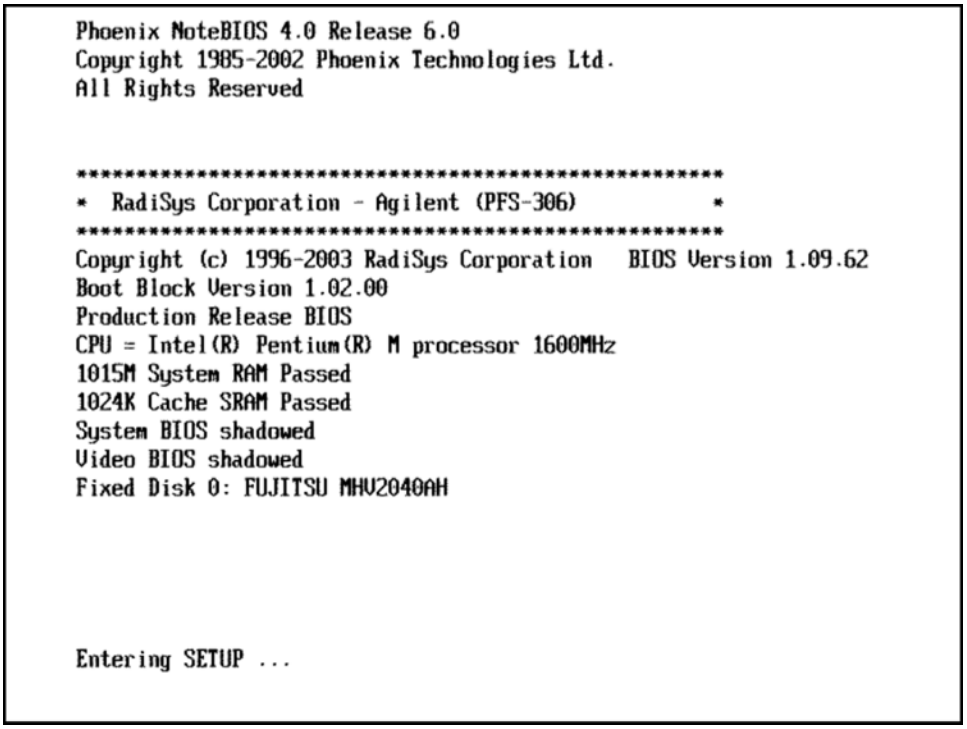
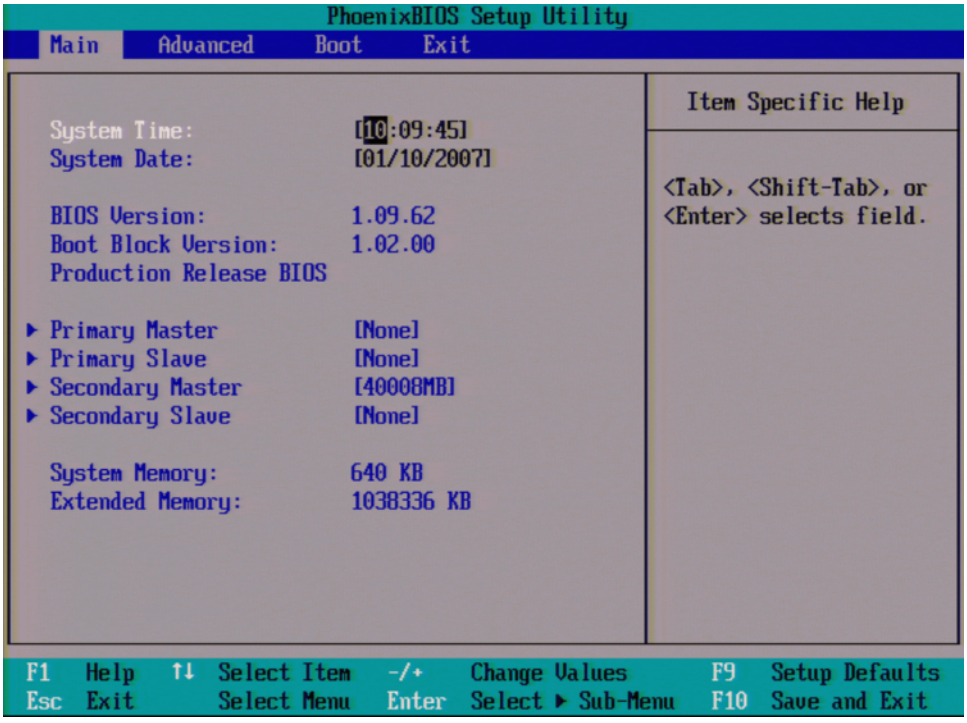
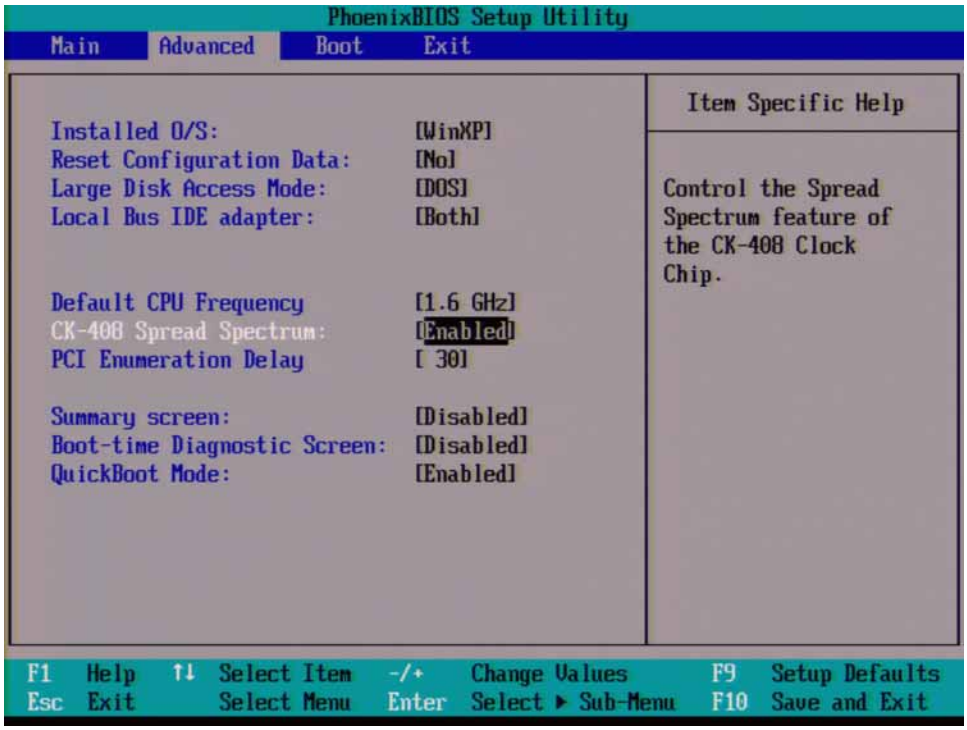


Figure 8-3 BIOS Main Menu



5. Once in the BIOS Setup Utility press the Right Arrow on the external keyboard to highlight the “Advanced” tab, as shown in Figure 8-4.

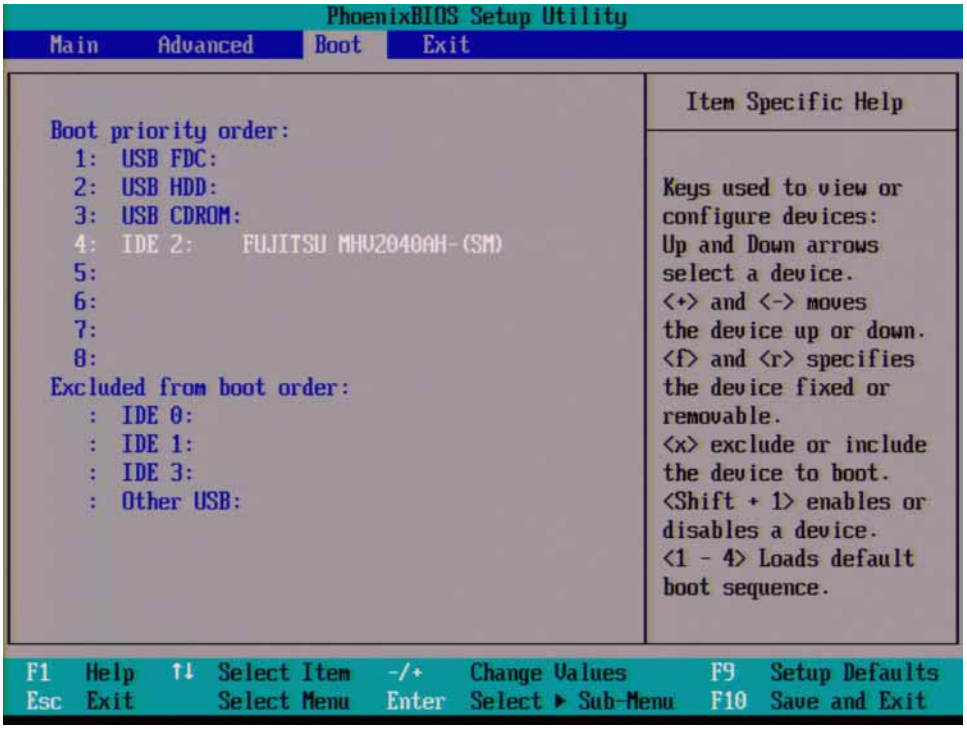
Figure 8-4 BIOS Advanced Menu



6. Press the Down Arrow on the external keyboard to highlight “CK-408 Spread Spectrum”
7. Use the “+” key on the external keyboard to change the setting from [Disabled] to [Enabled]

8. Press the Right Arrow on the external keyboard to highlight the “Boot” tab, as shown in Figure 8-5.

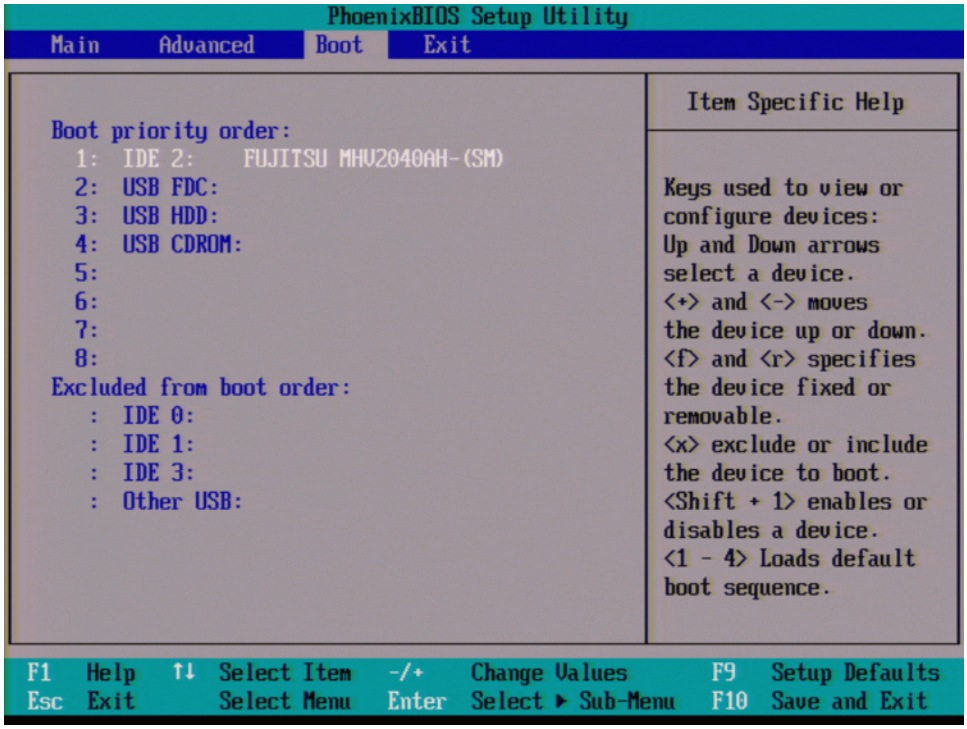
Figure 8-5 BIOS Boot Menu



9. If “IDE 2” is not listed first in the boot priority, press the Down Arrow on the external keyboard to highlight “IDE 2” as shown in Figure 8-5.

10. Press the “+” key on the external keyboard to bring “IDE 2” to the top of the list as shown in Figure 8-6.

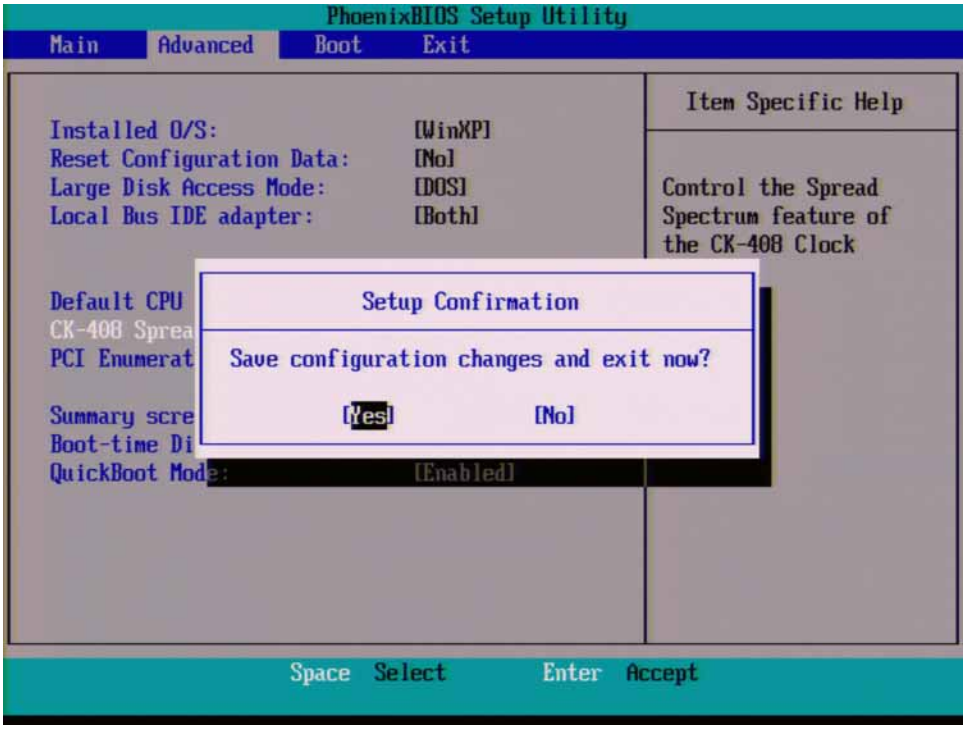
Figure 8-6 Correct Boot Order



11. Press “F10” on the external keyboard to save the changes and exit.

12. Press the “Enter” key on the external keyboard to confirm the BIOS configuration changes as per Figure 8-7.

Figure 8-7 Confirm BIOS Changes



The instrument will now reboot and the required changes will have been saved.

For more complete information on the instrument BIOS settings see “BIOS Settings” in Chapter 2, “Troubleshooting” of this manual.

Accept End-User License Agreement (EULA)

When the A5 Disk Drive assembly is replaced a new operating system license is issued for the instrument. This will require that the End-User License Agreement be accepted.

The license agreement must be accepted for the operating system installation and configuration to complete. If you do not accept this agreement the required instrument adjustments and performance verification testing cannot be run and the instrument will shut down. The setup wizard will again run from the beginning the next time the instrument is turned on.

The following procedure will guide you through the process of accepting the End-User License Agreement when an A5 Disk Drive is replaced:

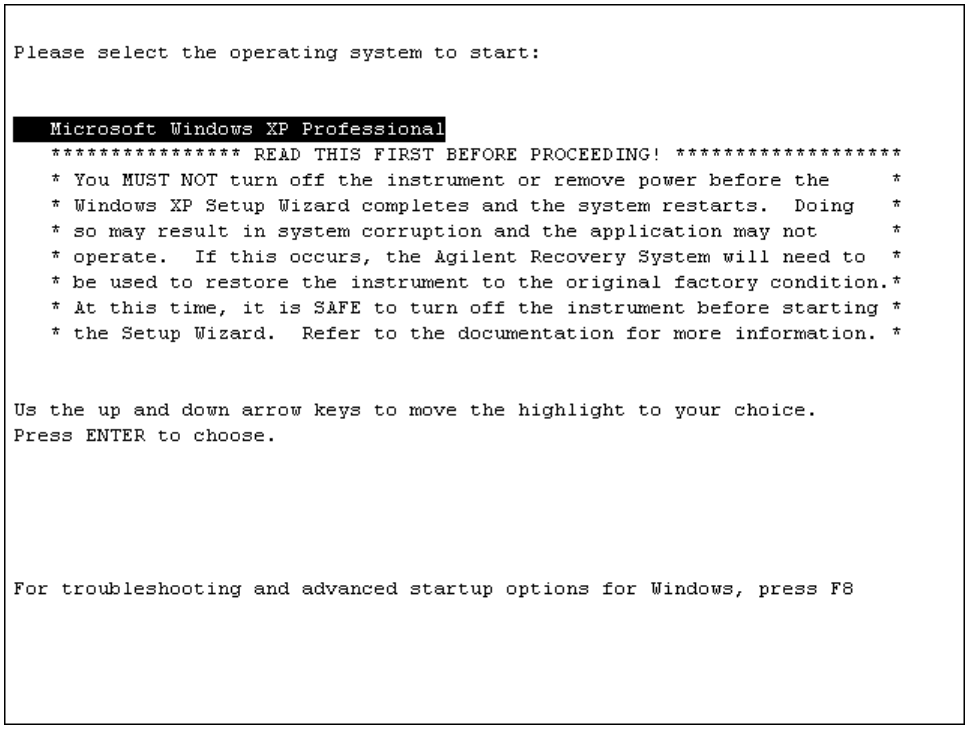
NOTE This procedure outlines how to accept the End-User License Agreement, as well as other screens that need to be accepted when the instrument is first turn on, assuming that you do not have a USB mouse or keyboard connected to the instrument. If you do have a USB mouse and keyboard connected to the instrument you can use them to perform the same task much easier.

1. With the A5 Disk Drive replacement completed plug the instrument power cord into an appropriate AC power source.
2. Turn the instrument on.
3. After a few seconds the Agilent Welcome screen as shown in Figure 8-8 will be displayed.

   If you would like to turn off the instrument and proceed at a later time you will want to do so at this point, before proceeding with the Step 4.

NOTE Once the operating system Setup Wizard has been started it cannot be interrupted. If it is interrupted the operating system may become corrupt, requiring that the Agilent Recovery System process be run, which would then require that this process be run again from the start.

Figure 8-8 Agilent Welcome Screen



4. With “Microsoft Windows XP Professional highlighted press **Enter** to boot from the pre-installed operating system.
5. During this initial boot process the operating system End-User License Agreement will need to be accepted in order to perform the required adjustments and performance verification tests.
6. When the End User License Agreement is displayed as shown in Figure 8-9 use the following front panel instrument keys in the following order:
   a. Use the arrow keys to scroll through the user agreement text
   b. Use the tab keys to move the highlight to the agreement acknowledgement checkboxes
   c. Use the arrow keys to make a user agreement selection as shown in Figure 8-10
   d. Use the tab keys to move the highlight to the navigation buttons
   e. Use the arrow keys to highlight the “Next” button
   f. Use the **Enter** key to press the “Next” button

Figure 8-9 End-User License Agreement

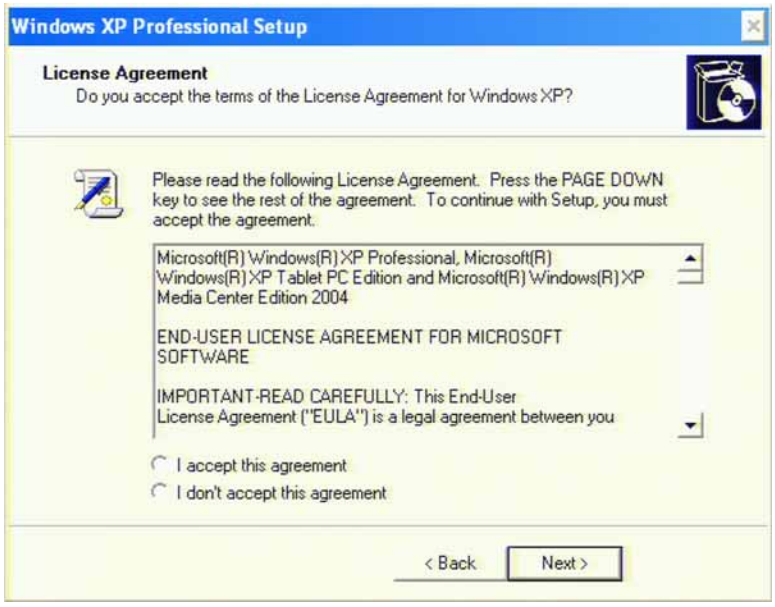
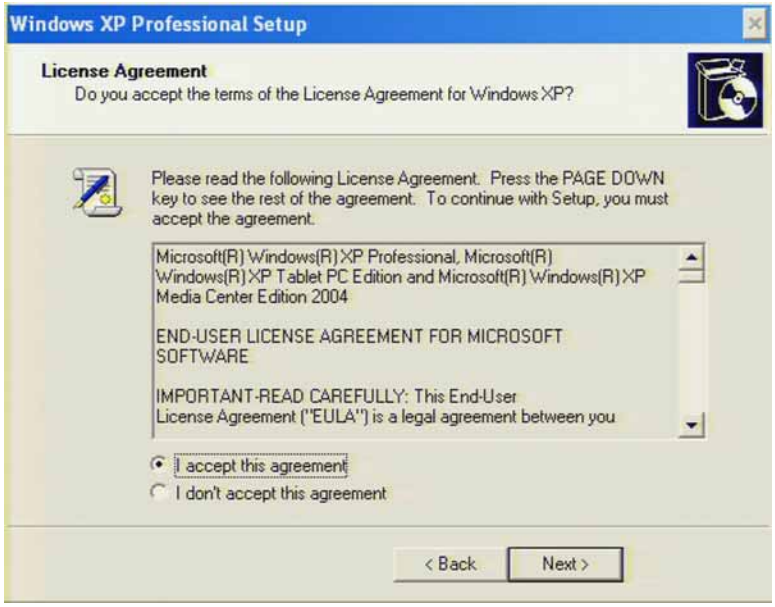
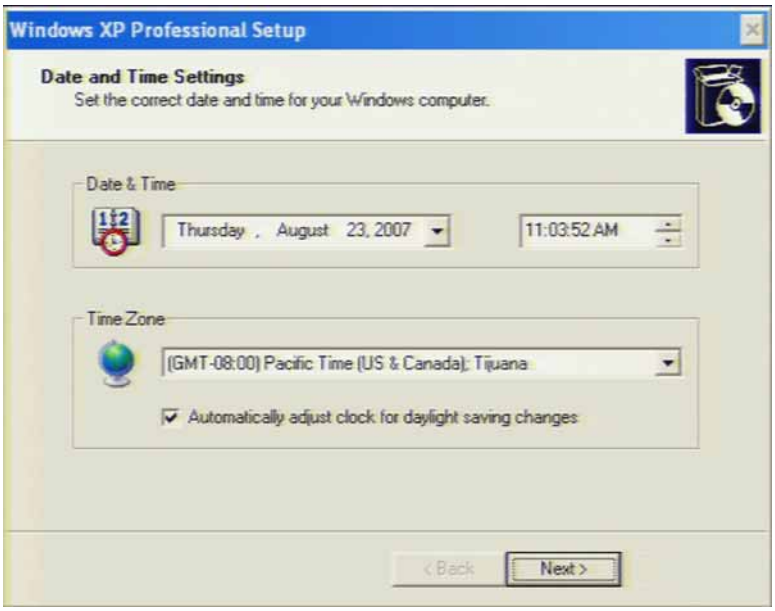


Figure 8-10 Accept the End-User License Agreement



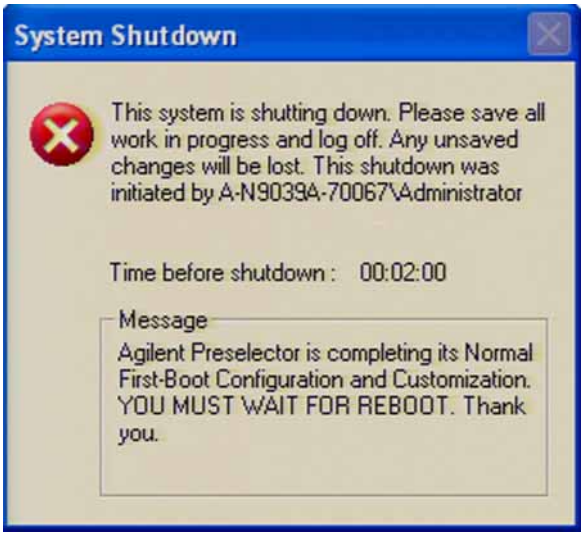
7. When the Date and Time Settings screen come up as shown in Figure 8-11 simply press the **Enter** key to select the time that is displayed, as this will not have changed from what the end user has set it to be with an A5 Disk Drive replacement.

Figure 8-11 Accept the Time Date Screen



8. After accepting the time and date screen the instrument will reboot a couple of times. Just prior to the instrument rebooting for the last time a window will appear on-screen as seen in Figure 8-12 asking for you to wait for 2 minutes for the instrument to shutdown and reboot.

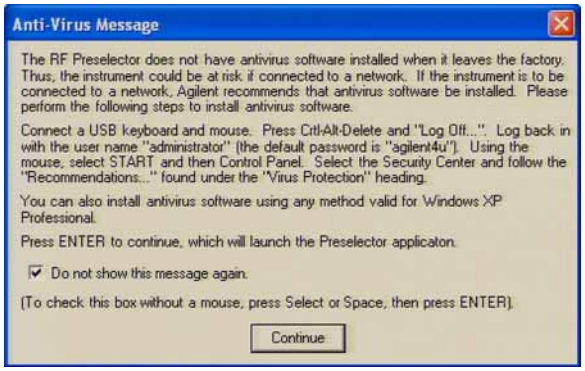
Figure 8-12 Instrument Reboot Message



9. When the instrument has rebooted for the last time a window stating the fact

that the instrument is not shipped with virus protection software as shown in Figure 8-13 will be displayed. You will want be sure to check the box titled "Do not show this message again" by pressing the **Select** key and then **Enter**.

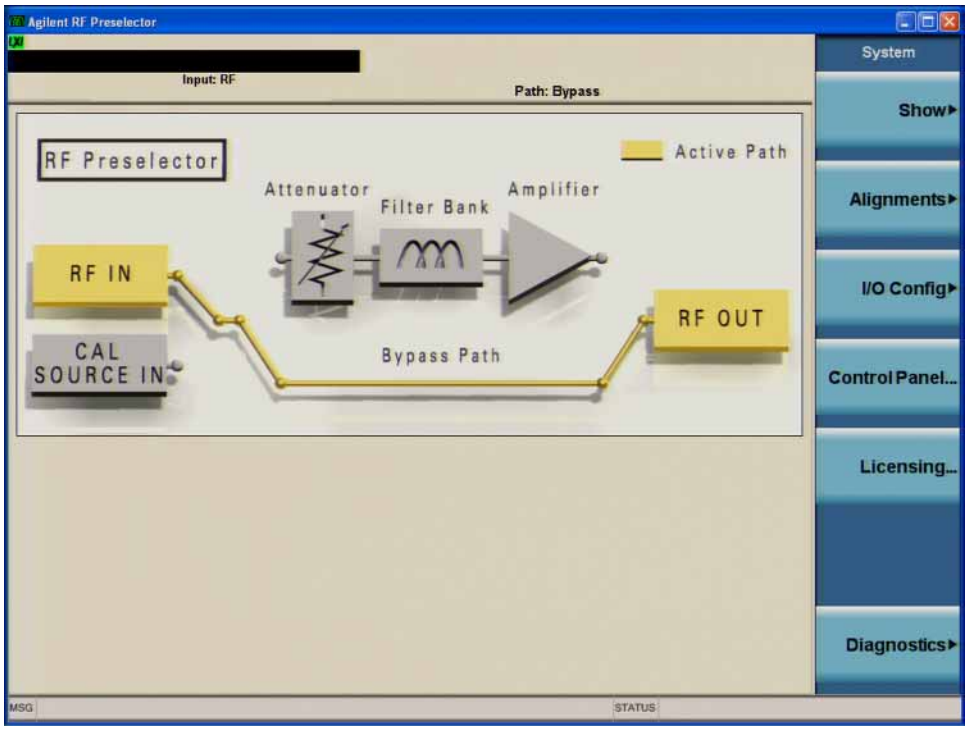
Figure 8-13 Anti-Virus Message



NOTE If you do not check the box titled "Do not show this message again" in the Anti-Virus Message window before continuing this same message will be displayed each time the instrument is powered on. While this message is displayed the RF Preselector application will not start. This will cause the instrument to not respond to the test software after turning it on without further user attention since it will only respond when the RF Preselector application is running.

10. Once the RF Preselector application has loaded the instrument display will be like that shown in Figure 8-14. Once this is seen this process has completed.

Figure 8-14 Process Complete



Programming Model and Serial Numbers

When the A7 Midplane board assembly is replaced the instrument model and serial numbers must be reprogrammed into the instrument. To program the instrument with this information a software utility must be downloaded from the following internet site:

http://sa.tm.agilent.com/N9039A/midplane/

Information on the instrument software requirements as well as instructions for using this utility can be found on this web site as well.

This utility will only allow the writing of the instrument model and serial numbers into an instrument that does not already have valid numbers in it. Since the instrument model and serial numbers are stored on the A7 Midplane board assembly, this should only happen when this assembly has been replaced with a new one.

License Key Backup and Restoring

Whenever the A7 Midplane board assembly is replaced all instrument license keys will be lost. To easily recover from this it is highly recommended that all installed instrument license keys be backed up prior to replacing the assembly, if possible. Use the following procedures to both backup the license before the assembly replacement as well as restore them once the assembly has been replaced.

Backup

1. Insert a USB storage device into one of the instrument USB ports.
2. Using either My Computer or the Windows Explorer navigate to the following folder:

   C:\Program Files\Agilent\licensing

3. Copy the entire contents of the licensing folder to the root directory of the USB storage device.
4. Remove the USB storage device from the instrument and set it aside for future use.

Restore

NOTE After an A7 Midplane board replacement, be sure to write the instrument model and serial number back into the instrument before restoring the instrument license keys. If the instrument does not have the correct model and serial number in it prior to attempting to restore the license keys it will not accept the licenses. (See the "Programming Model and Serial Numbers" on page 231 of this chapter.)

1. Once the replacement A7 Midplane board assembly has been installed and programmed with the correct instrument model and serial number insert the USB storage device that the instrument license key files were copied onto into one of the instrument USB ports.
2. The instrument will automatically see the license key files in the root directory of the drive and will install them.
3. Once all of the instrument license keys have been reinstalled remove the USB storage device from the instrument.
4. Cycle the instrument power for the reinstalled license keys to take affect.
5. Verify that all of the instrument license keys have been restored by viewing the **System -> Show -> System screen**
6. Once you are satisfied that all of the original license keys have been reinstalled insert the USB storage device into a PC and remove the license key files from it so that further insertions of the drive into the same or other instruments will not re-initiate the license key installation.

9 Instrument Software

What You Will Find in This Chapter

- Instrument Software Overview ..... page 235
- Software Licensing ..... page 236
- Software Updates ..... page 237

Instrument Software Overview

Every N9039A RF Preselector comes with the N9090A Preselector Application software installed. While this software is standard and required for all instruments it does require a valid license key.

To view the status of the currently licensed software application press System, Show, System. In addition to listing the application model number and description you will also see the revision of the software. However, the complete package itself also has a revision associated with it, which can also be found on this screen as the “Firmware Revision”.

Software Licensing

All application software needs to have a valid license in order to be available for use. This also includes the RF Preselector Application (N9090A).

A license key for the N9090A RF Preselector Application comes standard with all N9039A instruments, and this license will never expire.

Software Updates

Updates are installed much like most other types of commercial software packages. The latest revision of the software, along with complete installation instructions, can be obtained by the following method:

Web Download:

The latest revision of the software can be downloaded from:

www.agilent.com/find/N9039A_software

10 Performance Verification and Adjustment Software

What You Will Find in This Chapter

Instrument Software Overview ..... page 241
Performance Verification Tests ..... page 242
Adjustments ..... page 243
Required Test Equipment ..... page 244

Instrument Software Overview

The Agilent Technologies test software is designed to verify the performance of the N9039A RF Preselector and ensure that it meets published specifications.

To download a copy of the Performance Verification & Adjustment software as well as find information on software licensing, visit the Agilent RF & Microwave Instrument Calibration Software web site at:

http://www.agilent.com/find/calibrationsoftware

Performance Verification Tests

Performance verification tests are tests designed to provide the highest level of confidence that the instrument being tested conforms to published, factory-set specifications. The tests are supplied in an automated test software package. The automatic execution of the full set of performance tests will take between three and four hours to complete. Performance tests are designed to test an instrument operating within the operational temperature range defined by the instrument specifications.

If the instrument is unable to pass any of the performance tests, adjustments or further repairs are needed.

The following is a list of the performance verification tests:

- RF Preselector System Alignment
- Displayed Average Noise Level
- Conducted Band Absolute Amplitude Accuracy
- Radiated Band Absolute Amplitude Accuracy
- Spurious Responses
- Third Order Intercept
- Conducted Band VSWR
- Radiated Band VSWR

Adjustments

Adjustments, sometimes incorrectly referred to as calibrations, are procedures designed to reset various circuit parameters. In addition, some of the adjustments reset or calculate correction values associated with some measurements. The adjustments are supplied in an automated test software package accessory. The software is designed to adjust an instrument operating within the operational temperature range defined by the instrument specifications.

Never perform adjustments as routine maintenance. Adjustments should be performed only after a repair or a performance test failure.

The following is a list of the adjustments:

- Overload Detector
- C-Band Bypass Abs Amp
- R-Band Bypass Abs Amp
- C-Band Abs Amp 0 and 10 dB
- C-Band Abs Amp Versus Atten
- R-Band Filter Tuning
- R-Band Step Gain Linearity
- R-Band Nominal Gain
- R-Band Abs Amp 0 and 10 dB
- R-Band Abs Amp Versus Atten

Required Test Equipment

The following table identifies the equipment required for verifying the performance of the N9039A RF Preselector as a stand alone instrument. Only the recommended and alternate equipment is compatible with the performance verification testing. Some tests can use various models of a particular equipment type. The “Recommended Agilent Model” is the preferred equipment. However, the “Alternative Agilent Model” is an acceptable substitute.

Table 10-1 Required Test Equipment for N9039A RF Preselector Performance Tests

Instrument	Critical Specifications	Recommended Agilent Model Number	Alternative Agilent Model Number	Use[a]
Signal Sources				
DC Pulse Generator	Frequency: 9 kHz to 1.0 GHz	Schwarzbeck IGUU2916		P
EMC System Source	Frequency: 100 kHz to 1.0 GHz Spectral Purity SSB Phase Noise @ 1 GHz: −145 dBc at 100 kHz offset −158 dBc at 1 MHz offset −160 dBc at 6 MHz offset −160 dBc at 10 MHz offset Harmonics: −30 dBc @ ≤ +10 dBm output	E8257D	E4438C N5181A	P
Microwave Source 1	Frequency: 10 MHz to 1.0 GHz Frequency Resolution: 1 Hz Harmonic level: < –40 dBc Amplitude range: –20 dBm to +13 Amplitude resolution: 0.02 Harmonic level: < 2 GHz, < -30 dBc VSWR: < 1 GHz: 1.6:1	PSG[b]	83630A/B, 83640A/B, 83650A/B (Option 001,008) E8241A, E8244A, E8251A, E8254A, E8247C, E8257C (Opt. H31 or 540, 1E1, 1EA) E8247C, E8257C (Opt. 1E1, 1EA, 520) E8257D (Options 1EA, 567) E8267C (Option 520) E8267D (Option 544 or 532 or 520)	P

Table 10-1 Required Test Equipment for N9039A RF Preselector Performance Tests

Instrument	Critical Specifications	Recommended Agilent Model Number	Alternative Agilent Model Number	Use[a]
Microwave Source 2 (only required for Third Order Intermodulation)	Frequency: 10 MHz to 26.5 GHz Frequency Resolution: 1 Hz Harmonic level: < –40 dBc Amplitude range: –20dBm to +13 Amplitude resolution: 0.02 Harmonic level: < 2 GHz, < -30 dBc ≥ 2 GHz & < 26.5 GHz, < -50 dBc VSWR: < 20 GHz: 1.6:1 ≤ 31 GHz: 1.8:1	PSG[b]	83630A/B, 83640A/B, 83650A/B (Option 001,008) E8241A, E8244A, E8251A, E8254A, E8247C, E8257C (Opt. H31 or 540, 1E1, 1EA) E8247C, E8257C (Opt. 1E1, 1EA, 520) E8257D (Options 1EA, 567) E8267C (Option 520) E8267D (Option 544 or 532 or 520)	P
RF Source 3	Frequency: 100 kHz to 1.0 GHz Amplitude = 0 dBm	PSG[b]		P
Function Generator 1	Frequency: 9 kHz to 30 MHz Amplitude Resolution: 0.1 mv Harmonic Distortion: -35 dBc	33250A		P
Network Analyzers				
Network Analyzer 1	Frequency: 30 MHz to 1.0 GHz Directivity: 48 dB Source Match: 40 dB Reflection Tracking: ±0.003 dB	N5230A	8753E	P
Network Analyzer 2	Frequency: 9 kHz to 30 MHz Directivity: 40 dB Source Match: 25 dB Reflection Tracking: ±0.83 dB	4395A		P
Reflection Test Set	Used with 4395A	87512A		P
Calibration Kit 1	50 ohm Type-N (f) Frequency: 9 kHz to 1.0 GHz	85032B	85032E. 85032F	
Calibration Kit 2	50 ohm 3.5 mm (m) Frequency: 9 kHz to 1.0 GHz	85033E		

Table 10-1 Required Test Equipment for N9039A RF Preselector Performance Tests

Instrument	Critical Specifications	Recommended Agilent Model Number	Alternative Agilent Model Number	Use[a]
Meters				
Power Meter	Dual Channel Absolute Accuracy: ± 0.5% Resolution: 0.01 dB Power Reference Accuracy: 1.2% (± 0.9% rss) Compatible with 8480 series power sensors dB relative mode	E4419B	E4419A N1912A	P
RF Power Sensor	Frequency Range: 9 kHz to 1.0 GHz Amplitude Range: –60 to +20 dBm VSWR: 9 kHz to 1.0 GHz: ≤ 1.15:1 Input Connector: Type-N (m)	E9304A		P
Microwave Power Sensor	Frequency Range: 50 MHz to 1.0 GHz Amplitude Range: -30 to +20 dB VSWR: 50 MHz to 100 MHz: 1.15:1 100 MHz to 2 GHz: 1.10:1 Input Connector: 3.5 mm (m)	8485A		P
Spectrum Analyzers				
Spectrum Analyzer	Frequency: 9 kHz to 1.0 GHz Flatness: ±0.38 dB Absolute Amplitude @ 50 MHz: ±0.24 dB Display Scale Fidelity: ±0.07 dB Marker Amplitude Accuracy: ±0.01 dB	E4440A with Option 239	E4443A, E4445A, E4446A, E4448A: with Option 239	P
Terminations				
Type-N (m)	50 Ω Frequency: 9 kHz to 1.0 GHz VSWR: 4 GHz ≤ 1.05:1	909A (Option 012)		P
Miscellaneous Devices				
RF Power Splitter	Frequency: 9 kHz to 1.0 GHz VSWR: ≤ 1.10:1 Connector: Type-N (f)	11667A		P
Microwave Power Splitter	Frequency: 9 kHz to 1.0 GHz VSWR: 9 kHz to 1.0 GHz: < 1.06:1 Insertion Loss: 9 kHz to 1.0 GHz: 6.5 dB Connector: 3.5 mm (f)	11667B		P
Directional Bridge	Frequency Range: 50 MHz to 1.0 GHz Directivity: ≤ 5 MHz: 30 dB 5 MHz to 1.0 GHz: 40 dB VSWR: ≤ 1 GHz: ≤ 1.15:1 Insertion Loss: ≤ 1.5, +0.1 dB/GHz Coupling (nominal): 16 dB Connector: Type N (f)	86205A		P
LAN Switch	Shielded 8 Port Switch		Linksys SD208	P

Table 10-1 Required Test Equipment for N9039A RF Preselector Performance Tests

Instrument	Critical Specifications	Recommended Agilent Model Number	Alternative Agilent Model Number	Use[a]
Cables				
3.5 mm (m) to 3.5 mm (m) *(2 required)*	Frequency: 9 kHz to 1.0 GHz Length: ≤ 92 cm (36 in) Insertion Loss: ~2 dB VSWR: 9 kHz to 1.0 GHz: ≤ 1.25:1	8120-4921	11500E	P
Interconnect Cable (for Type-N models)	Type-N (m) to Type-N (m)	N9039-21315		P
Interconnect Cable (for Option BAB models)	3.5 mm (f) to 3.5 mm (f)	N9039-21316		P
Interconnect Cable (for 2.4 mm PSA)	3.5 mm (f) to 2.4 mm (f)	N9039-21319		P
Type-N	Frequency: 9 kHz to 1.0 GHz Precision Type-N (m), both ends 62 cm (24 in.) VSWR: ≤ 18 GHz: 1.4:1 Insertion Loss: 1.5 dB	11500C		P
BNC *(4 required)*	Frequency: 9 kHz to 30 MHz 50 Ω Coax BNC (m), both ends 120 cm (48 in.)	10503A		P
LAN *(3 required)*	Shielded CAT5	8121-1597		P
Filters				
50 MHz Low Pass	Cutoff Frequency: 50 MHz Rejection at 65 MHz: > 40 dB Rejection at 75 MHz: > 60 dB Insertion Loss: ~1 dB VSWR: ≤ 1.5:1 BNC (m) to BNC (f)	0955-0306	Telonic Berkeley TLA 50-5AB2	P
300 MHz Low Pass	Cutoff Frequency: 300 MHz Rejection at > 435 MHz: > 45 dB VSWR: ≤ 1.5:1 BNC (m, f)	0955-0455	Telonic Berkeley TLP 300-4AB4	P
1.0 GHz Low Pass	Cutoff frequency: 1.0 GHz Rejection at > 13 MHz: > 50 dB	0955-0487	RLC Electronics L-1621	P
Adapters				
Type-N (m) to Type-N (m)	Frequency: DC to 18 GHz VSWR: ≤ 1.13:1	1250-1475		P
Type-N (m) to 3.5 mm (m) *(3 required)*	Frequency: DC to 18 GHz VSWR: ≤ 1.08:1	1250-1743		P
Type-N (m) to BNC (f)	Frequency: DC to 1.3 GHz VSWR: ≤ 1.13:1	1250-1476		P
3.5 mm (f) to 3.5 mm (f) *(2 required for 3.5 mm source)*	Frequency: DC to 26.5 GHz VSWR: ≤ 1.05:1	83059B	1250-1749	P

Table 10-1 Required Test Equipment for N9039A RF Preselector Performance Tests

Instrument	Critical Specifications	Recommended Agilent Model Number	Alternative Agilent Model Number	Use[a]
3.5 mm (f) to Type-N (f)	Frequency: DC to 18 GHz VSWR: ≤ 1.08:1	1250-1745		P
3.5 mm (f) to 2.4 mm (f) *(2 required for 2.4 mm source)*	Frequency: DC to 26.5 GHz VSWR: ≤ 1.05:1	11901B		P
BNC (m) to SMA(f)	Frequency: DC to 1.3 GHz VSWR: ≤ 1.13:1	1250-1700		P
Type-N (m) to 3.5 mm (f)	Frequency: DC to 18 GHz VSWR: ≤ 1.08:1	1250-1744		P
Type-N (f) to 2.4 mm (f)	Frequency: DC to 18 GHz VSWR: ≤ 1.08:1	11903B		P
Type-N (m) to 2.4 mm (f)	Frequency: DC to 18 GHz VSWR: ≤ 1.08:1	11903D		P
3.5 mm (f) to Type-N (m)	Shipped with the 8485 for adapting to the Power Reference. Only to be used for power sensor cal.	08485-60005		P

a. P = Performance Testing
b. Supported PSG models:

E8244A
E8254A
E8257C Option H31 or 540
E82578D
E8267D Option H31 or 540
E8267D

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