RSA6100A Series
Real-Time Spectrum Analyzers

Quick Start User Manual

www.tektronix.com
071-1909-04

Tektronix

Copyright © Tektronix. All rights reserved. Licensed software products are owned by Tektronix or its subsidiaries or suppliers, and are protected by national copyright laws and international treaty provisions.

Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specifications and price change privileges reserved.

TEKTRONIX and TEK are registered trademarks of Tektronix, Inc.

Contacting Tektronix

Tektronix, Inc.
14200 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077
USA

For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

Warranty 2

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Table of Contents

General Safety Summary iii
Environmental Considerations v
Preface vi
- Key Features vi
- Documentation vi
- Software Upgrades vii
- Conventions Used in This Manual vii

Installation 1
- Before Installation 1
- Standard Accessories 1
- Optional Accessories 2
- Options 3
- Operating Considerations 3
- Connecting to the Instrument 4
- Powering On the Instrument 5
- Powering Off the Instrument 5
- Removing the Power 5
- Adding an External Monitor 6
- Inspecting the Instrument 10
- User Maintenance 11
- Creating Operating System Restore CDs 11

Operation 13
- Getting Acquainted with Your Instrument 13
- Basic Concepts 21
- Navigating Displays 23
- Selecting Displays 23
- Connecting a Signal 28
- Starting and Stopping Acquisitions 29
- Markers 30
- Touchscreen Actions 33
- Printing 34
- Saving Data 36
- Recalling Data 37
- Advanced Techniques 38

Index

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury

Use Proper Power Cord. Use only the power cord specified for this product and certified for the country of use.

Ground the Product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

The inputs are not rated for connection to mains or Category II, III, or IV circuits.

Power Disconnect. The power cord disconnects the product from the power source. Do not block the power cord; it must remain accessible to the user at all times.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Do Not Operate With Suspected Failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Replace Batteries Properly. Replace batteries only with the specified type and rating.

Use Proper Fuse. Use only the fuse type and rating specified for this product.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Provide Proper Ventilation. Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

Terms in this Manual

These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Symbols and Terms on the Product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

The following symbol(s) may appear on the product:

Environmental Considerations

This section provides information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling an instrument or component:

Equipment Recycling. Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.

The symbol shown below indicates that this product complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). For information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).

Mercury Notification. This product uses an LCD backlight lamp that contains mercury. Disposal may be regulated due to environmental considerations. Please contact your local authorities or, within the United States, the Electronics Industries Alliance (www.eiae.org) for disposal or recycling information.

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2002/95/EC RoHS Directive.

Preface

This manual describes the installation and basic operation of the RSA6100A Series of real-time spectrum analyzers. For more detailed information, see the online help for your instrument.

Key Features

The RSA6100A Series is a family of high-performance real-time spectrum analyzers. Key features include:

- Easy event-based capture of transient RF signals by triggering on changes in the frequency domain using Tektronix-exclusive Frequency Mask Triggering
- Digital Phosphor Spectrum analysis, which greatly reduces the amount of time to recognize and identify a fault
- Seamless capture of signals in up to 110 MHz spans
- Multi-domain displays that provide an intuitive understanding of time-varying RF signals
- Display of signal instabilities and transients that are difficult or impossible for other signal analyzers to catch
- Search compares Spectrum traces to user-defined limit lines and masks for pass/fail testing

Documentation

The following documentation is available with your Tektronix RSA6100A Series Spectrum Analyzer. For the most current documentation, refer to the Tektronix Web site.

To read about	Use these documents
Installation and operation (overviews)	*RSA6100A Series Real-Time Spectrum Analyzers Quick Start User Manual.* The quick start user manual contains general information about how to put your instrument into service and guides to user interface controls.
In-depth operation and user interface help	*RSA6100A Series Real-Time Spectrum Analyzers Online help*. The online help contains detailed information about how to operate the instrument.
Application examples	*RSA6100A Series Real-Time Spectrum Analyzers Application Examples Manual*. This manual provides practical examples of using the analyzer to accomplish tasks.
Programming commands	*RSA6100A Series Real-Time Spectrum Analyzers Programmer Manual.* The programming commands for the RSA6100A Series are located in a PDF file located on the RSA6100A hard disk and on the product software CD.
Specifications and performance verification	*RSA6100A Series Real-Time Spectrum Analyzers Specifications and Performance Verification Manual*. This manual contains the instrument specifications and a procedure to check instrument performance against warranted characteristics. This manual is in a PDF file located on the RSA6100A hard disk and on the product software CD.
User service	*RSA6100A Series Real-Time Spectrum Analyzers Service Manual.* An optional manual that provides a list of replaceable parts, care and maintenance information, and information for servicing the instrument to the module level.

Software Upgrades

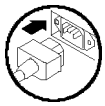
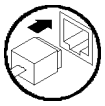
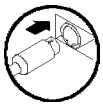
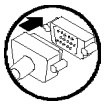
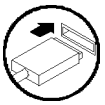
Software upgrades are available. Software upgrades become operational only after you enter a valid option key for the specific spectrum analyzer model and serial number.

To check for upgrades:

1. Go to the Tektronix Web site (www.tektronix.com).
2. Select **Software and Drivers** to link to the **Software and Firmware Finder** Web page.
3. Enter the product name (RSA6100A) to find available software upgrades.

Conventions Used in This Manual

The following icons are used throughout this manual:

Sequence Step	Front panel power	Connect power	Network	PS2	SVGA	USB
						

Installation

Before Installation

Unpack the instrument, and check that you received all items listed as *Standard Accessories*. Optional accessories and instrument options are also listed in this section. Check the Tektronix Web site (www.tektronix.com) for the most current information.

Standard Accessories

Your instrument comes with the following accessories: quick start user manual (languages are listed below), programmer manual (on CD), specifications and performance verification manual (on CD), service manual (on CD), power cord, BNC-N adapter, USB keyboard, USB mouse, and instrument pouch.

Documents

- *RSA6100A Series Real-Time Spectrum Analyzers Quick Start User Manual* is available in the following languages:
  - English, Tektronix part number 071-1909-XX.
  - Simplified Chinese, Tektronix part number 071-1910-XX.
  - Japanese , Tektronix part number 071-1911-XX.
  - Russian, Tektronix part number 071-1912-XX.
- *RSA6100A Series Real-Time Spectrum Analyzers Documents CD*, Tektronix part number 063-3930-XX. The Documents CD contains PDF versions of the following manuals:
  - *RSA6100A Series Real-Time Spectrum Analyzers Quick Start User Manual*, in English, Japanese, Russian and Simplified Chinese.
  - *RSA6100A Series Real-Time Spectrum Analyzers Application Examples Manual*, Tektronix part number 071-2590-XX.
  - *RSA6100A Series Real-Time Spectrum Analyzers Printable Online Help*, Tektronix part number 077-0169-XX.
  - *RSA6100A Series Real-Time Spectrum Analyzers Programmer Manual*, Tektronix part number 071-1913-XX.
  - *RSA6100A Series Real-Time Spectrum Analyzers Service Manual.*, Tektronix part number 071-1914-XX.
  - *RSA6100A Series Real-Time Spectrum Analyzers Specifications and Performance Verification Manual*, Tektronix part number 071-1915-XX.
  - *RSA6100A Series Real-Time Spectrum Analyzers Declassification and Security Instructions*, Tektronix part number 071-2056-XX.

Power Cords

The RSA6100A Series Real-Time Spectrum Analyzers are shipped with one of the following power cord options. Power cords for use in North America are UL listed and CSA certified. Cords for use in areas other than North America are approved by at least one authority acceptable in the country to which the product is shipped.

International Power Plugs

- Opt. A0 - North America power
- Opt. A1 - Universal EURO power
- Opt. A2 - United Kingdom power
- Opt. A3 - Australia power
- Opt. A4 - 240 V, North America power
- Opt. A5 - Switzerland power
- Opt. A6 - Japan power
- Opt. A10 - China power
- Opt. A11 - India power
- Opt. A99 - No power cord

Optional Accessories

- *RSA6100A Series Real-Time Spectrum Analyzers Service Manual*, Tektronix part number 071-1914-XX.
- RSA61RHD - Provides an additional removable hard disk drive for use with Option 06
- 065-0765-XX - Additional removable solid-state hard drive for use with Option 08 (Windows XP and instrument SW pre-installed)

Options

You can add the following options to your spectrum analyzer:

- Option 01 - Adds 10 MHz to 3 GHz Pre-Amplifier
- Option 02 - Adds frequency mask triggering and RAM expansion
- Option 05 - Adds digital IQ output and 500 MHz analog IF output
- Option 06 - Adds a removable hard disk drive (not compatible with Option 07 or Option 08)
- Option 07 - Adds a DVD±RW drive, no-cost option (not compatible with Option 06 or Option 08)
- Option 08 - Adds a removable solid-state hard drive (not compatible with Option 06 or Option 07)
- Option 11 - Adds Phase Noise and Jitter Measurement
- Option 20 - Adds advanced signal analysis (including pulse measurements)
- Option 21 - Adds general-purpose digital modulation analysis
- Option 110 - Adds 110 MHz real-time capture bandwidth
- Option 1R - Adds Rackmount Kit

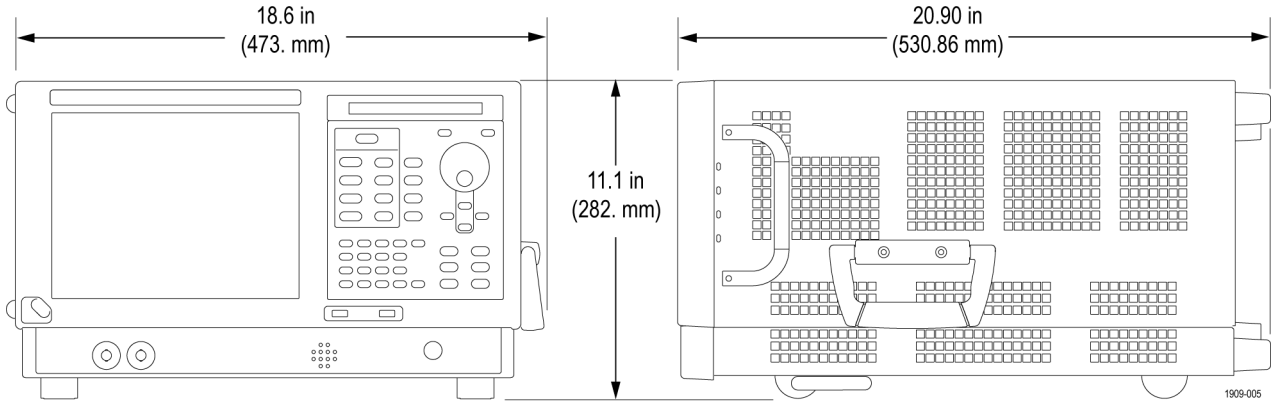
Operating Considerations

Power supply requirements

Source voltage and frequency	Power consumption
100 – 240 V_{RMS}, 50/60 Hz 115 V_{RMS}, 400 Hz	600 W maximum

Environmental requirements

Characteristic	Description
Operating temperature	+5 °C to +50 °C (+5 °C to +40 °C; when accessing the DVD drive or optional removable hard-disk drive)
Non-operating temperature	-20 °C to +60 °C
Humidity	90% at 30 °C (non-condensing) 80% maximum when accessing the DVD drive Maximum wet-bulb temperature 29 °C
Altitude:	
Operating	Up to 3000 m (9843 ft)
Non-operating	12190 m (40,000 ft)
Cooling clearance	
Bottom	20 mm (0.79 in)
Sides and back	50 mm (1.97 in)



CAUTION. *To ensure proper cooling, do not operate the instrument on its side. Operate the instrument only when it is resting on its feet, located on the bottom of the case. Maintain at least 2 inches (5 cm.) clearance around ventilation openings.*

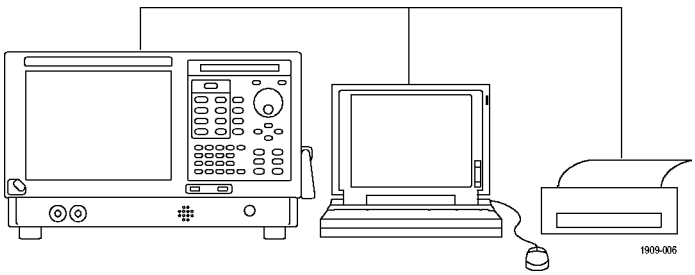
WARNING. *To avoid personal injury, take extra care when lifting or moving the spectrum analyzer. The instrument is somewhat heavy and requires extra care when moving it.*

Connecting to the Instrument

Connecting to a Network

Connect your keyboard, mouse, printer, and other accessories to your instrument before applying power. (Accessories with USB connectors can be connected before or after applying power.)

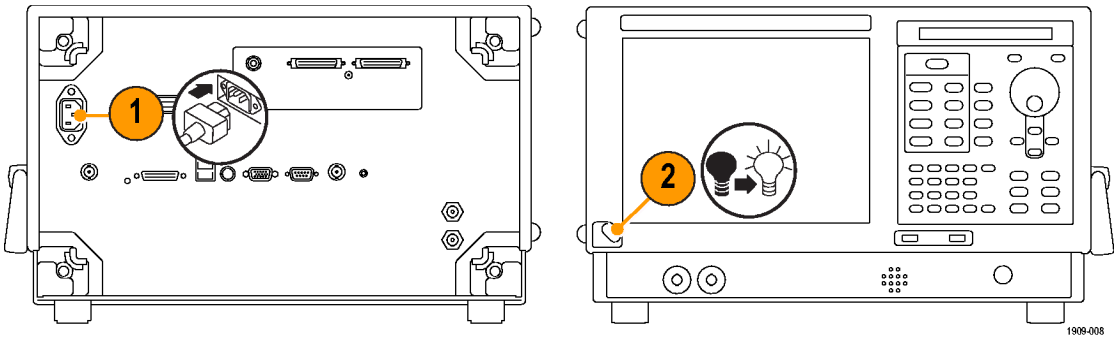
You can connect your instrument to a network for printing, file sharing, Internet access, and other functions. Consult your network administrator and use the standard Windows utilities to configure the instrument for your network.



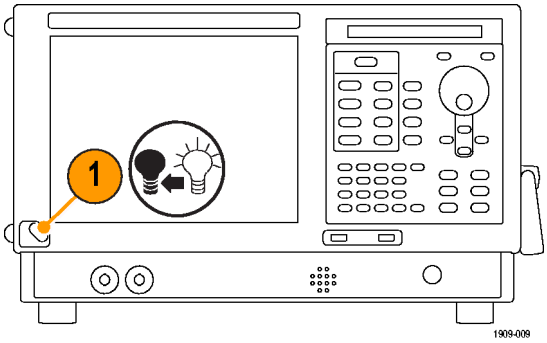
Quick Tip

- If you connect your instrument to a network, you should protect your instrument by using an internet firewall, installing regular approved operating system updates, and using up-to-date antivirus software.

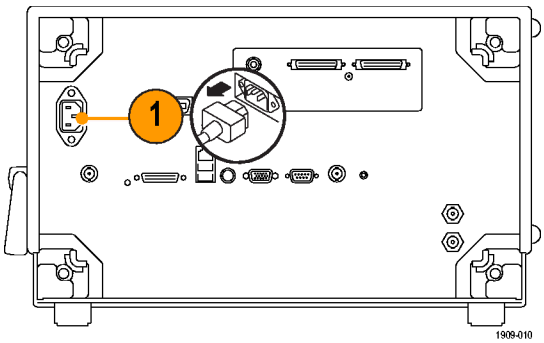
Powering On the Instrument



Powering Off the Instrument



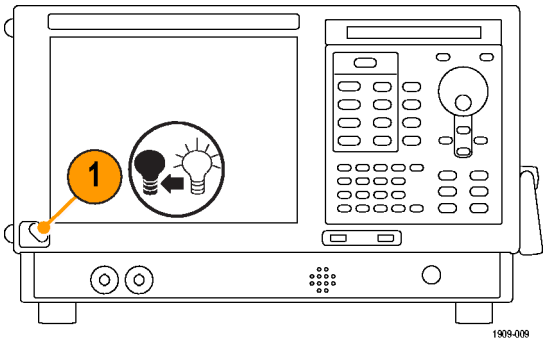
Removing the Power



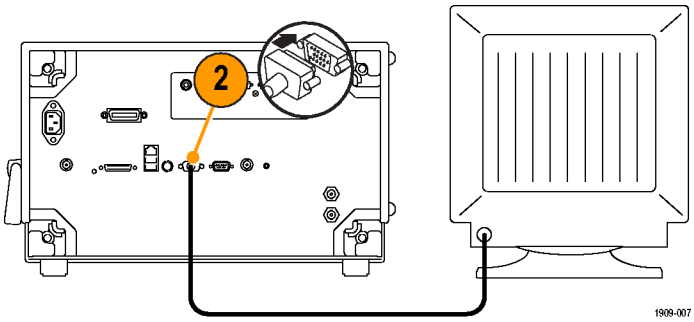
Adding an External Monitor

Use the following procedure to add an external monitor for dual monitor configuration. Both the spectrum analyzer and the second monitor must have the color set to True Color.

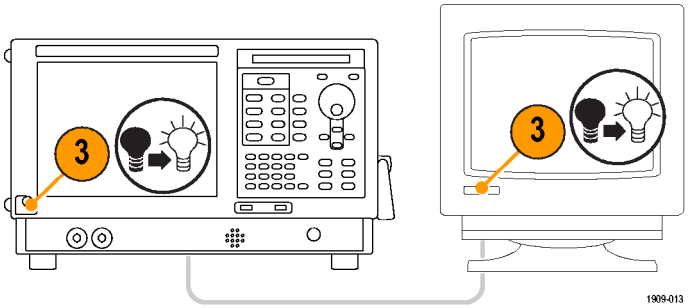
1. Power off the spectrum analyzer and the external monitor.



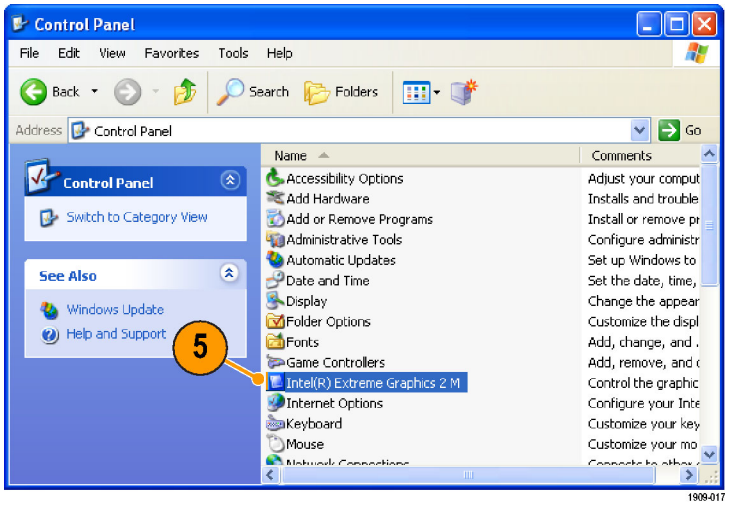
2. Connect the external monitor to the spectrum analyzer.



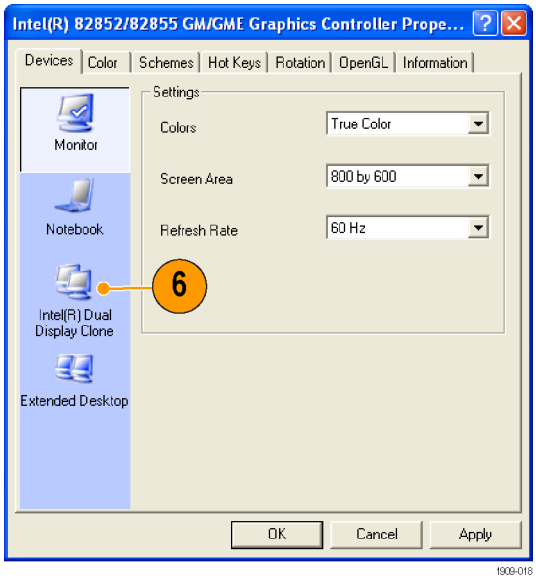
3. Power on the spectrum analyzer and the external monitor.



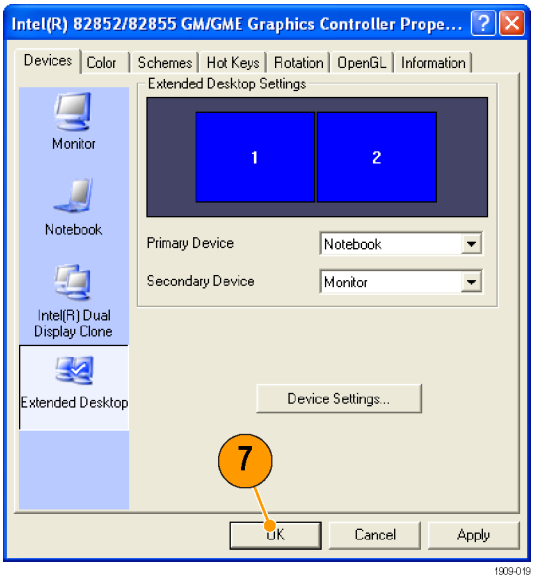
4. Open the Windows Control Panel.
5. Double-click **Intel(R) Extreme Graphics 2 M** to open the properties page.



6. Click **Intel(R) Dual-display Clone** to show internal screen (Notebook) content on an external monitor (Monitor).



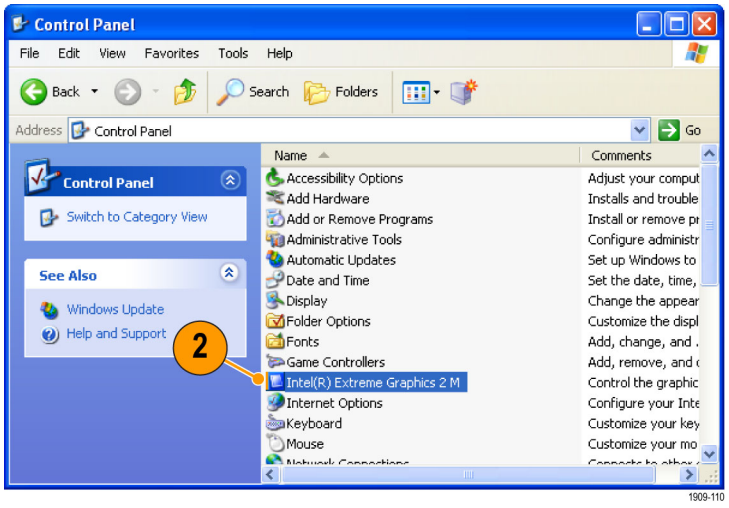
7. Adjust the settings as necessary and then click **OK** to apply the settings and to close the properties page.



Adjusting the Windows Display Settings

To change the instrument display settings, use the Intel Graphics Driver instead of the default Windows display properties. The Intel Graphics Driver provides additional capabilities that are not accessible from the Windows display properties dialog box.

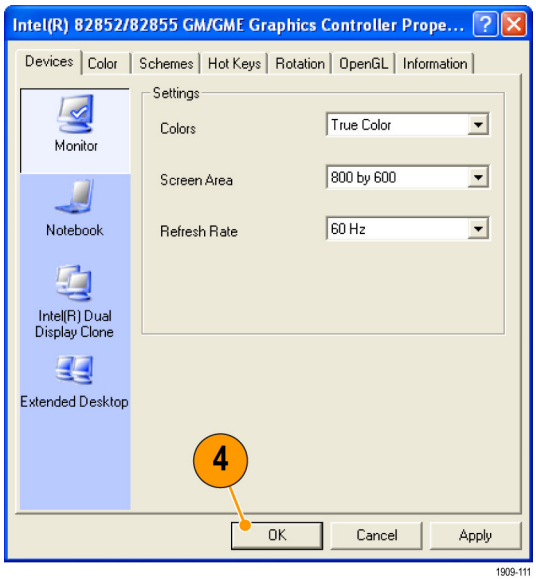
1. Open the Windows Control Panel.
2. Double-click **Intel(R) Extreme Graphics 2 M** to open the properties page.



3. Adjust the settings as necessary.

NOTE. *Not all of the selections in the property page will be available if there is no external monitor connected to the instrument.*

4. Click **OK** to apply the settings and to close the properties page.

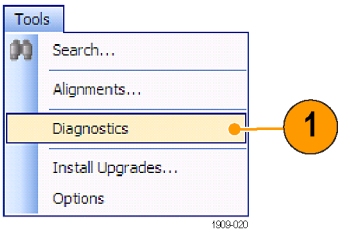


NOTE. *Although it is not recommended, you can attach a second monitor after the spectrum analyzer is powered on; however, after connecting, you will still need to enable the Extended Desktop from the Intel Extreme Graphics 2M control panel.*

Inspecting the Instrument

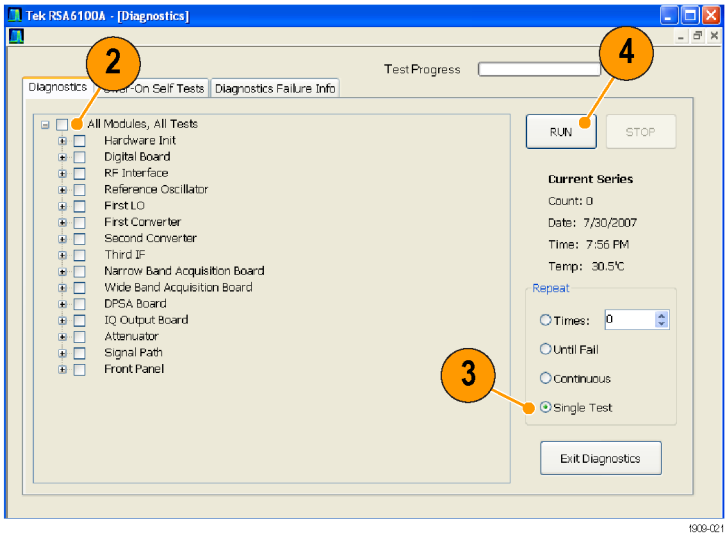
Launch the diagnostics application (Tools > Diagnostics). If failures occur, perform the following steps to get more information about them. You can also use the following steps as a detailed incoming inspection to verify the functionality of your instrument. If you want to check the accuracy specifications of your instrument, see the *RSA6100A Series Real-Time Spectrum Analyzers Specifications and Performance Verification Technical Reference* manual PDF (Tektronix part number 071-1915-00) located on the Documents CD.

1. Select **Tools > Diagnostics**.



2. On the Diagnostics tab, click **All Modules, All Tests**.
3. Click **Single Test**.
4. Click **RUN**.

   The instrument will run through the tests one at a time. A check mark or X icon will appear to the right of each check box as that test is completed. The check icon means the test was passed. The X means the test was failed.
5. For tests that require manual intervention, follow the on-screen instructions to complete the tests.



NOTE. *Select the Diagnostics Failure Information tab to see basic diagnostic failure information. Use the Windows Event Viewer (a subset of the Administrative tools in the Windows Control Panel) to view failure history and nondiagnostic failures reported by the application.*

User Maintenance

Cleaning Your Instrument

Clean the exterior surfaces of the chassis with a dry lint-free cloth or a soft-bristle brush. If any dirt remains, use a cloth or swab dipped in a 75% isopropyl alcohol solution. Use a swab to clean narrow spaces around controls and connectors. Do not use abrasive compounds on any part of the instrument because they might damage the instrument.

CAUTION. *Avoid getting moisture inside the instrument during exterior cleaning; use just enough moisture to dampen the cloth or swab. Do not wash the front-panel On/Standby switch. Cover the switch while washing the instrument. Use only deionized or distilled water when cleaning. Use a 75% isopropyl alcohol solution as a cleanser and rinse with deionized or distilled water. Do not use chemical cleaning agents; they might damage the chassis. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.*

CAUTION. *To prevent damage to the flat panel display, do not use improper cleaning agents or methods. Avoid using abrasive cleaners or commercial glass cleaners to clean the display surface. Avoid spraying liquids directly on the display surface. Avoid scrubbing the display with excessive force.*

Clean the display surface by gently rubbing the display with a clean-room wipe. If the display is very dirty, moisten the wipe with distilled water or a 75% isopropyl alcohol solution and gently rub the display surface. Avoid using excess force; this might damage the display surface.

Upgrading the Instrument Software

Software upgrades are available from Tektronix. They can either be downloaded from the Tektronix Web site or they can be ordered from your local Tektronix representative. To add additional software options or features, you will need an option key from Tektronix. When you receive the software from Tektronix, install it on your instrument. When prompted, enter the option key, and then follow the online instructions to complete the upgrade.

Returning Your Instrument

If you return your instrument to Tektronix:

- Back up any user software on the hard disk. You may need to reinstall the software after your instrument is returned.
- When repacking the instrument for shipment, use the original packaging. If the packaging is unavailable or unfit for use, contact your local Tektronix representative to obtain new packaging.
- Seal the shipping carton with an industrial stapler or strapping tape.

Creating Operating System Restore CDs

In keeping with industry trends, operating system restore disks are not available for this product. To restore the operating system on the instrument without returning the instrument to Tektronix, you should create operating system restore disks before placing the instrument into service. Follow the procedure in the *Restoring the Operating System* section of the *RSA6100A Series Real-Time Spectrum Analyzers Service Manual* to create a set of disks that you can use to restore the operating system if it becomes corrupted. The product service manual is available on the Product Documentation CD (Tektronix part number 063-3930-XX) and can be downloaded from www.tektronix.com/manuals.

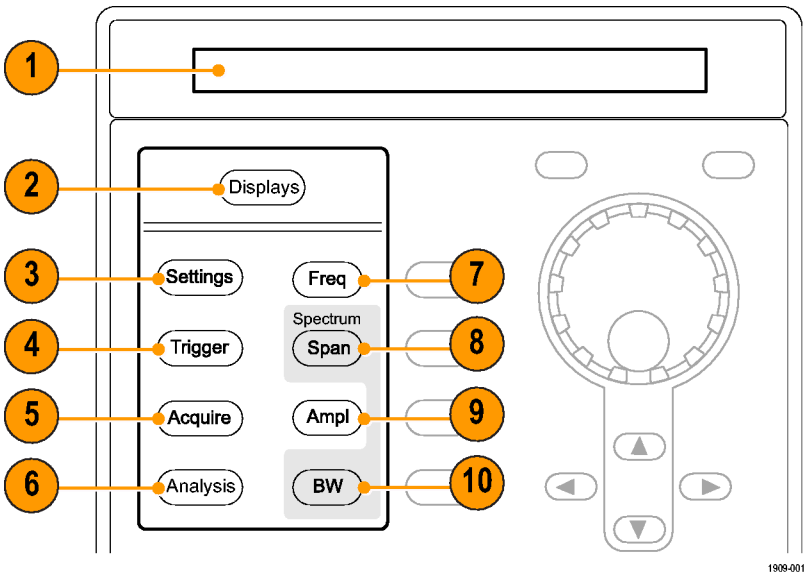
Operation

Getting Acquainted with Your Instrument

Controls and display elements are shown in the following illustrations and tables.

Front Panel Controls

Most front panel controls are shortcuts for opening control panels.

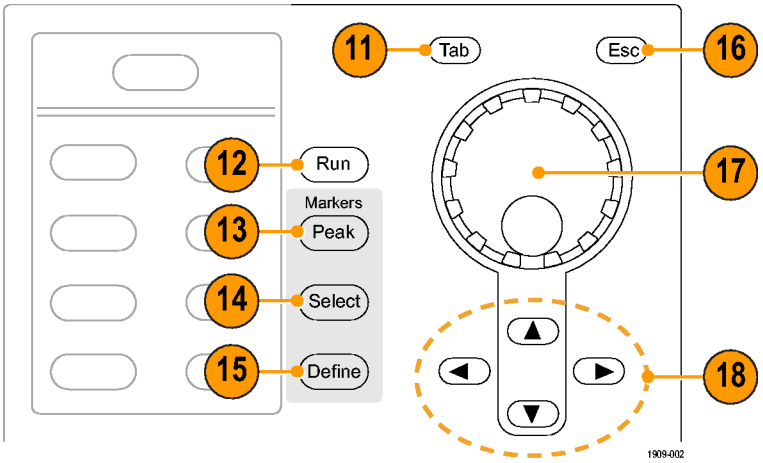


Ref number	Item	Description	Menu equivalent
1	Media	DVD±RW drive, removable hard disk drive, or removable solid-state hard drive	
2	Displays	Opens the Displays dialog box to select measurement displays.	Setup > Displays
3	Settings	Opens the Settings control panel for the selected display.	Setup > Settings
4	Trigger	Opens the Trigger control panel.	Setup > Trigger
5	Acquire	Opens the Acquire control panel.	Setup > Acquire
6	Analysis	Opens the Analysis control panel.	Setup > Analysis
7	Freq	Adjusts the measurement frequency.	Setup > Analysis > Frequency tab [2]
8	Span (Spectrum)	Adjusts the span or frequency range shown in the Spectrum display. [1]	Setup > Settings > Freq & Span [1] [2]
9	Amplitude	Adjusts the reference level.	Setup > Amplitude [2]

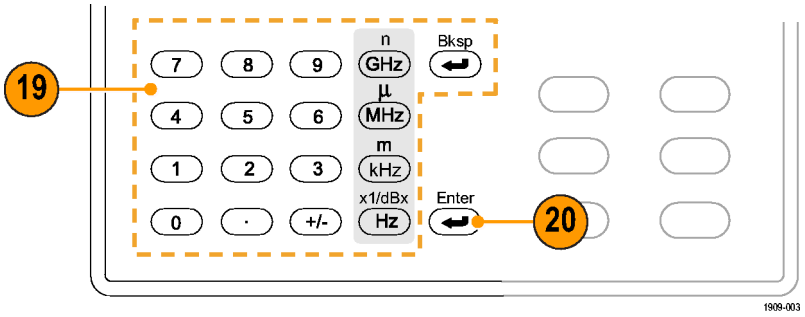
Ref number	Item	Description	Menu equivalent
10	BW (Spectrum)	Adjust the resolution bandwidth (RBW). [1]	Setup > Settings > BW tab [1] [2]

1 Applicable only when the selected display is Spectrum, DPX Spectrum, or Spectrogram.

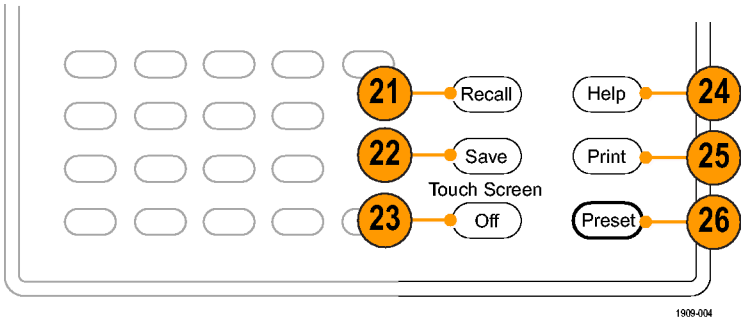
2 Press and hold for one second to open the associated control panel.



Ref number	Item	Description	Menu equivalent
11	Tab	Moves the cursor to the next entry in the dialog box or control panel. Same as pressing the Tab key on an external keyboard.	
12	Run (Stop)	Push to start and stop acquisitions.	Run > Run
13	Markers, Peak	Moves the active marker to the maximum peak of the trace in the selected display. If markers are turned off, the MR (marker reference) marker will appear at the maximum peak.	
14	Markers, Select	Selects the next marker.	
15	Markers, Define	Opens the Markers control panel.	
16	Esc	Exits dialog boxes without saving changes.	
17	Control knob	Changes values in numeric and list controls. Pressing the knob (clicking it) is the same as pressing the Enter key on a keyboard.	
18	Arrow keys	Move the Markers. The Up arrow moves the selected marker 10 trace points to the right. The down arrow moves the selected marker 10 trace points to the left. The left and right arrows move the selected marker to the next peak. (Turning the knob moves the marker one trace point left or right.)	

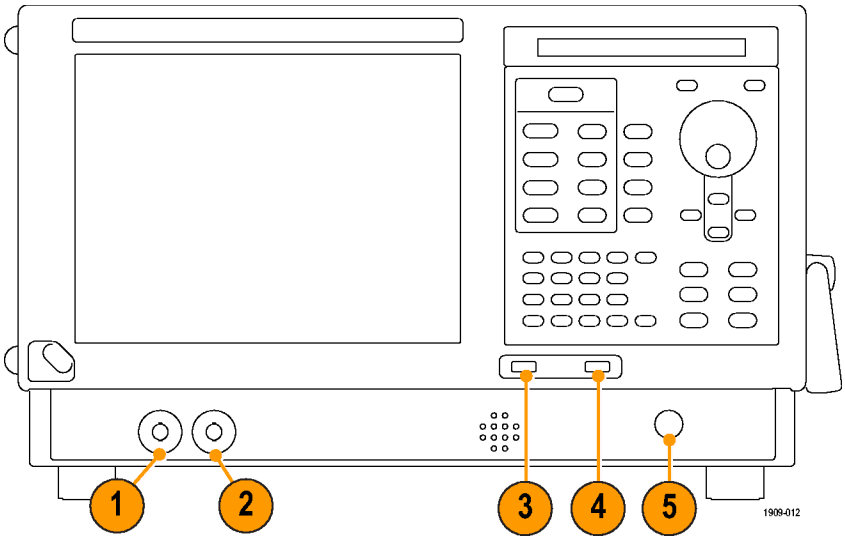


Ref number	Item	Description	Menu equivalent
19	Keypad	Enters values in controls.	
20	Enter	Completes the data entry in controls. Same as pressing the Enter key on the keyboard.	



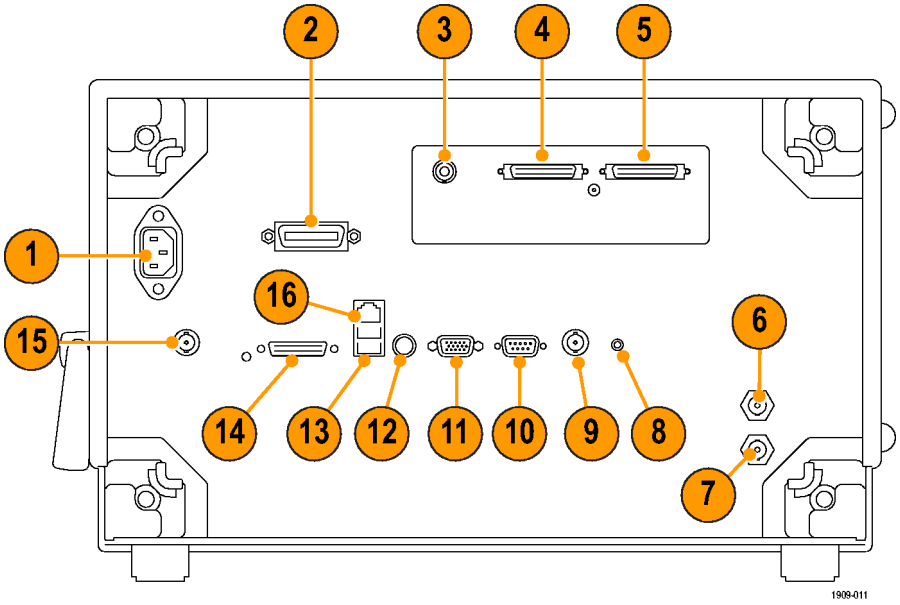
Ref number	Item	Description	Menu equivalent
21	Recall	Opens the Recall dialog box.	File > Recall...
22	Save	Saves working file using the same user selections as for the previous Save action.	File > Save
23	Touch Screen On/Off	Turns the touch screen on and off.	
24	Help	Displays the online help.	Help > User Manual
25	Print	Opens the Print dialog box. Printouts are a screen capture of the RSA6100A application window.	File > Print
26	Preset	Returns the instrument to its default or preset values. After a Preset action, the Spectrum Analyzer display is the only open window.	Setup > Preset

Front Panel Connectors



Ref number	Item	Description
1	Trig Out	Trigger output connector. 50 Ω, BNC, High > 2.0 V, Low < 0.4 V, (output current 1 mA)
2	Trig In	External Trigger input connector, –2.5 V to +2.5 V range, trigger level is user configurable
3	USB 1.1	USB 1.1 mouse connector
4	USB 2.0	USB 2.0 connector
5	RF Input	RF input connector 50 Ω

Rear Panel



Ref number	Connector, Description
1	AC Input, main power connector
2	GPIB
3	IF output (Option 05)
4, 5	Real Time IQ Out (Option 05)
6	Ref In, reference frequency input
7	Ref Out, reference frequency output
8	Headphone, audio output connector
9	External Trigger 2 Input
10	COM 2, serial port for connecting peripherals
11	VGA, external monitor output (resolution not limited to VGA)
12	PS2 Keyboard input
13	USB2 ports for mouse and other USB2 devices
14	TekLink, reserved for future use
15	+28 VDC Output, (switched)
16	LAN, Ethernet network connector

Interface and Display Elements

Commonly-used buttons and controls are located in the tool bar. Most of the buttons open control panels for changing the instrument setups. The contents of the control panels vary depending on the selected display. You can also access the control panels from the front panel buttons or from the keyboard.

Ref number	Item	Description
1	Displays	Opens the Select Displays dialog box so that you can select measurement displays.
2	Markers	Opens or closes the Marker toolbar at the bottom of the window.
3	Settings	Opens the Settings control panel for the selected display. Each display has its own control panel.
4	Trigger	Opens the Trigger control panel so that you can define the trigger settings.
5	Acquire	Opens the Acquire control panel so that you can define the acquisition settings.
6	Analysis	Opens the Analysis control panel so that you can define the analysis settings such as frequency, analysis time, and units.
7	Center Frequency	Displays the Center Frequency. To change the value, click the text and use the front panel knob to dial in a frequency. You can also enter a frequency with the front panel keypad or use the front panel up and down buttons.

Ref number	Item	Description
8	Reference Level	Displays the reference level. To change the value, click the text and enter a number from the keypad or use the front panel up and down buttons.
9	Amplitude	Opens the Amplitude control panel so that you can define the Reference Level, configure internal attenuation, and enable/disable the (optional) Preamplifier.
10	Replay	Runs a new measurement cycle on the existing acquisition data record using any new settings.
11	Run	Starts and stops data acquisitions. When the instrument is acquiring data, the button label has green lettering. When stopped, the label has black lettering. You can specify the run conditions in the Run menu. For example, if you select Single Sequence in the Run menu, when you click the Run button, the instrument will run a single measurement cycle and stop. If you select Continuous, the instrument will run continuously until you stop the acquisitions.
12	Check Mark indicator	The check mark indicator () in the upper, left-hand corner of the display indicates the display for which the acquisition hardware is optimized.

Display-Specific Controls

Most displays have commonly-used controls arranged around the graph. They provide quick access to common settings; the full control set for the display is in the Settings control panel. The following illustration and table show some of the common icons that appear in most displays.

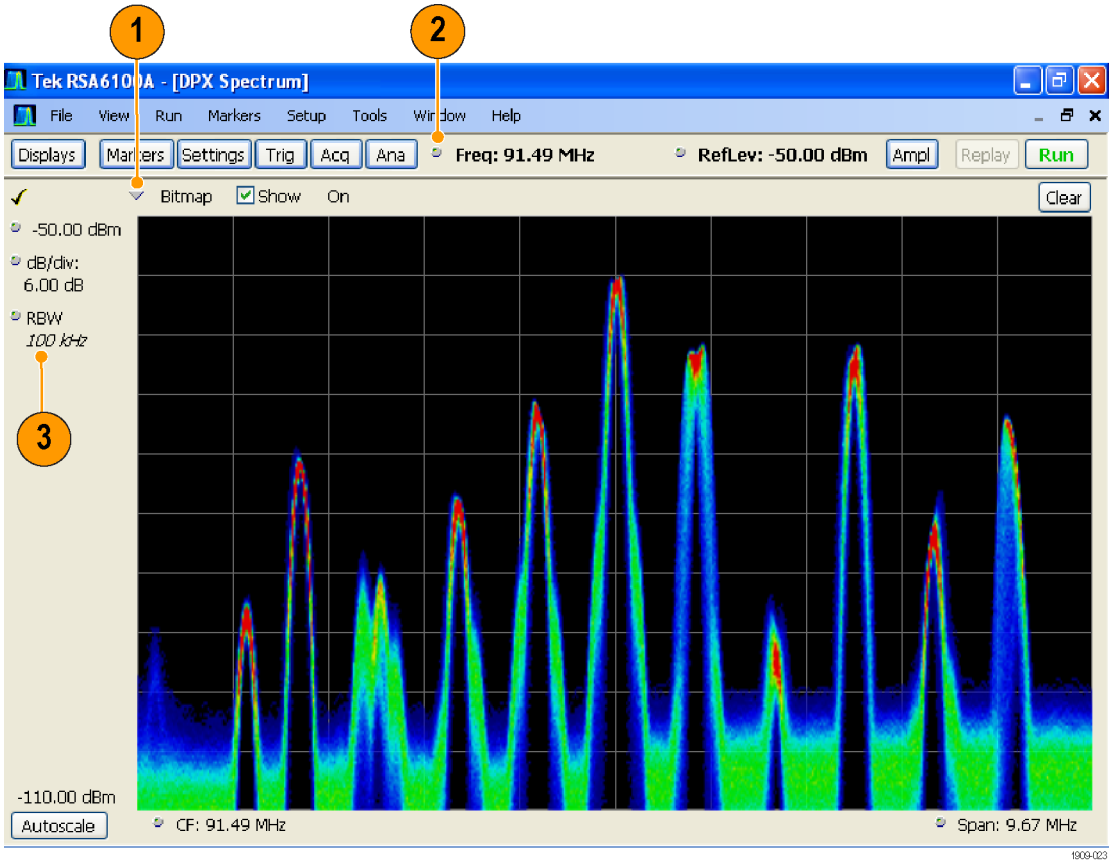


Table 1: Common Icons

Ref number	Control icon	Description
1		**Drop-down List.** Click to select a value from the drop-down list.
2		**Knob.** Click anywhere on the icon or on the text readout to select the control. You can then change the value with the front panel control knob or arrow keys, or enter a value from the keypad.
3	*6.337µs*	**Italicized numbers.** These indicate automatically selected control values. Several controls in the instrument (for example, RBW and Analysis Length) allow you to select an Auto mode. In Auto mode, the instrument software automatically sets the value. You can change the control to Manual mode by changing the value. To return to Auto mode, clear the value, and then press the Enter key.

Basic Concepts

Real Time Spectrum Analyzers

Tektronix Real-Time spectrum analyzers, such as the RSA6100A Series Spectrum Analyzers, have an optional, patented frequency mask trigger. The frequency mask trigger allows you to set up a spectral mask to capture a signal when a spectral anomaly occurs. This allows the real time spectrum analyzer to check 100% of the input signal before acquiring, and then capture precisely the intermittent RF event of interest.

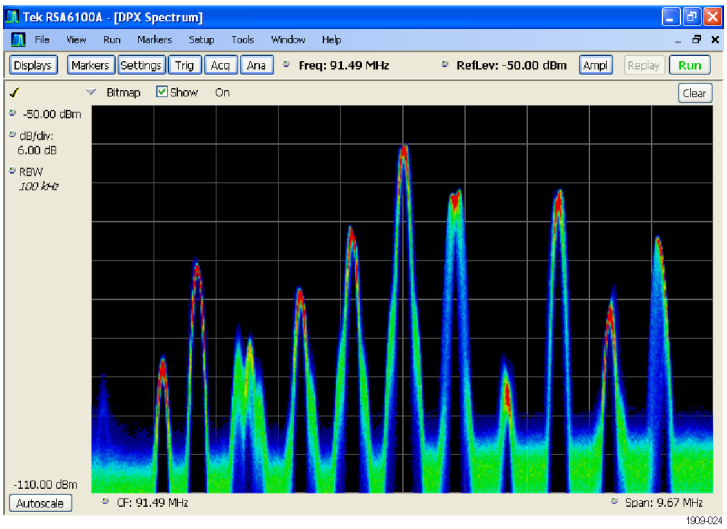
DPX™ technology allows you to view the RF signal as a live display. You can view very short transient signals, multilevel signals, and time-varying events.

The RSA6100A Series Spectrum Analyzers allow you to view the captured signals in a wide variety of time-correlated displays. This is useful for device troubleshooting and signal characterization applications. All of the measurements are based on the same underlying set of time domain sample data.

Measurement Displays

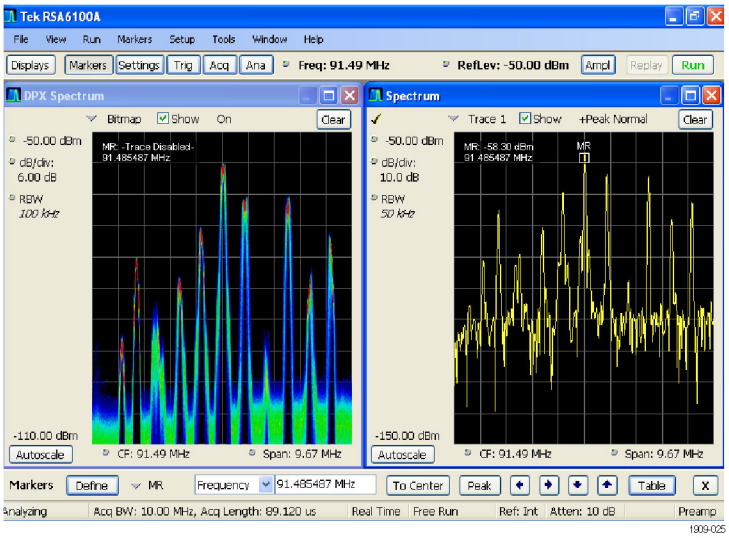
The RSA6100A window can show one or any combination of general purpose and application-specific displays.

This example shows a single DPX Spectrum display within the window.

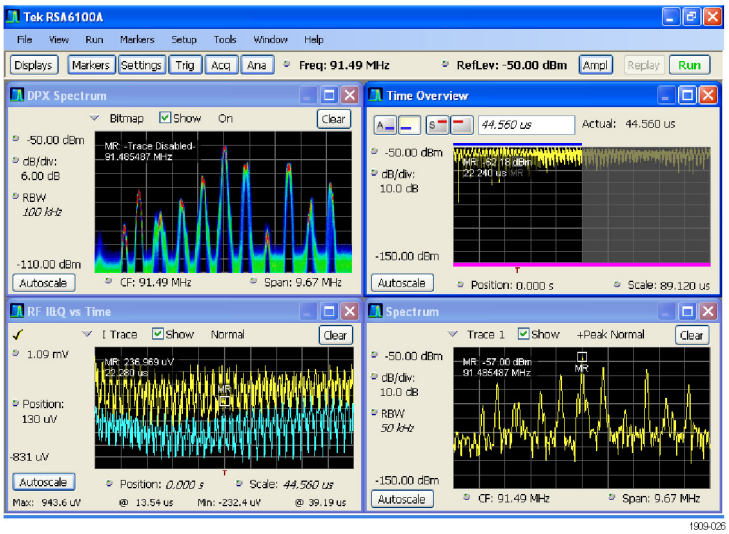


This example shows the window with two displays, a Spectrum display and a DPX spectrum display.

When you have more than one display open, the display with the check mark icon has control over the acquisition hardware. To give a display priority over any others, click its title bar.



This example shows four displays in the window.



The acquisition data source can be a live acquisition or a saved acquisition data file. The sharing of acquisition data between displays allows you to view the same data in multiple ways. For example, you can display a power versus frequency (spectrum) display and a spectrogram diagram at the same time. Because the data source is shared among the different displays, the displays are correlated. That is, a point or set of points within one display is associated with a point or set of points in every other display in the application window.

Navigating Displays

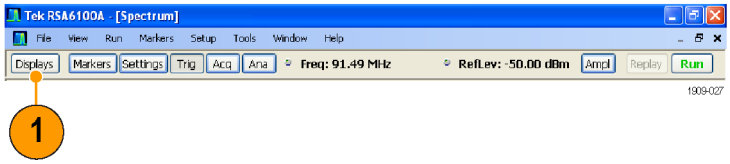
The RSA6100A uses multiple displays to keep operations simple, and yet provide advanced functionality when needed. Some of the display categories include:

- **General Signal Viewing displays.** These displays show graphs for basic signal parameters such as amplitude, phase, and frequency plotted against frequency or time. Examples of these displays include: Spectrum, DPX, Spectrogram, Time Overview, and Phase vs Time.
- **General Purpose Digital Modulation displays.** *Available with Option 21, General Purpose Modulation Analysis.* These displays show the results of demodulating signals and analyzing them in multiple domains. Examples of these displays include: Constellation, Symbol Table, and EVM vs Time.
- **RF Measurements displays.** These displays show the results of automated measurements on RF signals. Examples of these displays include: ACPR, MCPR, and CCDF.
- **Pulsed RF displays.** *Available with Option 20, Advanced Signal Analysis.* These displays show the results of advanced analysis for pulsed RF signals. Examples of these displays include: Pulse Statistics, Pulse Table, and Pulse Trace.

Selecting Displays

The spectrum analyzer provides an easy way of selecting displays.

1. Click **Displays** to open the Select Displays dialog box.



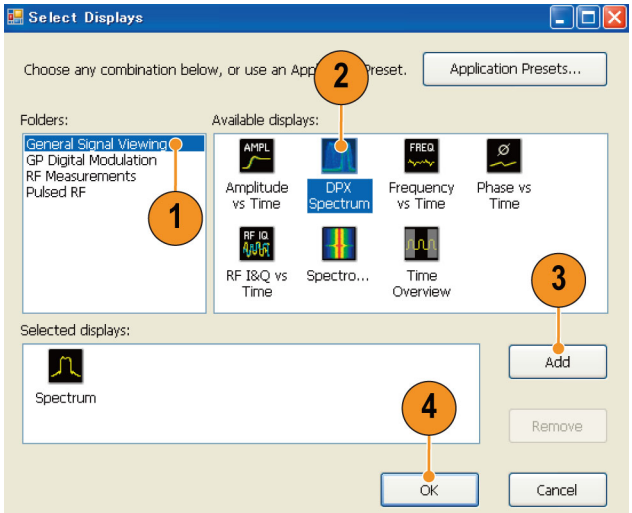
There are two ways to select displays: choose any combination of displays or use an Application Preset.

Choose any Combination of Displays.

Select displays one by one as needed.

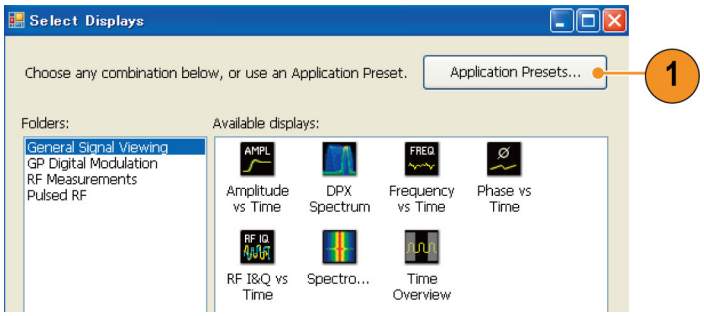
1. Click the desired application folder in the Select Displays dialog box.

   The available displays for each folder are listed in the Available Displays pane.
2. Click one of the display icons.
3. Click **Add** (or double-click the icon) to add the selected display to the Selected displays list. Repeat the procedure to add other displays.
4. Click **OK** to close the dialog box. The selected displays will open.



Use an Application Preset. Select displays from the presets for your application.

1. Click **Application Presets...** in the Select Displays dialog box



2. Select one of the presets.
3. Click **OK** to close the dialog box. The preset displays will open. (See Table 2.)

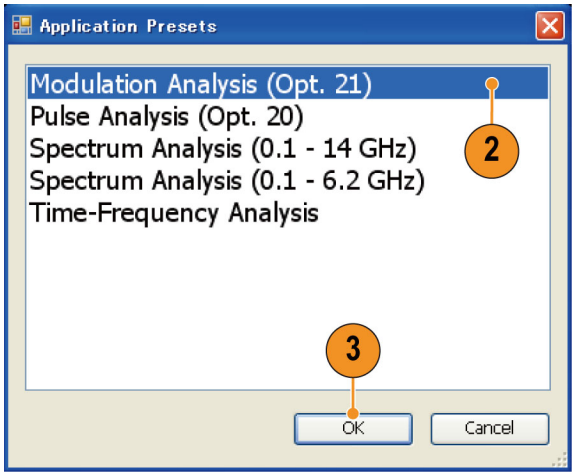


Table 2: Application presets

Presets	Displays
Modulation Analysis (Option 21 only)	Constellation, DPX Spectrum, Signal Quality, Symbol Table
Pulse Analysis (Option 20 only)	DPX Spectrum, Pulse Table, Pulse Trace, Time Overview
Spectrum Analysis (0.1 - 14 GHz or 0.1 - 6.2 GHz)	Spectrum (center frequency of 7.05 GHz or 3.15 GHz)
Time-Frequency Analysis	Frequency vs Time, Spectrogram, Spectrum, Time Overview

Quick Tips

- Push the Displays button on the front panel to open the Select Displays dialog box.
- To add a display, double-click the icon.
- To remove displays, do one of the following:
  - Select a display icon in the Selected Displays list, and then click **Remove**.
  - Double-click a display icon in the Selected Displays list.
  - Click the Close button in the upper right hand corner of the selected display.
- You can mix displays from multiple application folders.

Common Information Messages

The following table lists some of the common information messages that might appear during normal operation.

Table 3: Common information messages

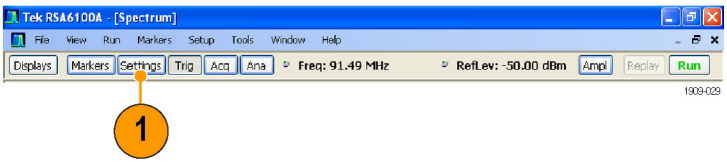
Message	Explanation and recommended action
Acq BW too small for current setup	The display needs a wider acquisition bandwidth than the current data record contains. This can be due to any of the following reasons: ■ A display other than the one you intended has been selected. The selected display has requested a smaller acquisition bandwidth to achieve a better accuracy or dynamic range for its particular measurement. Select the display that contains the message. Click **Run** if the instrument is not already acquiring data. ■ Acquisitions are not running and the measurement now requests a wider bandwidth than the last acquisition. Click **Run** to perform a new acquisition with a wider bandwidth. ■ The data is from a recalled file. There is no way to increase the acquisition bandwidth for saved data. You must adjust the measurement settings so that less bandwidth is required.
Need swept acq or larger Acq BW	When any display requires a swept acquisition, the other displays are unable to process the swept data. This is because the swept data is customized for the selected display. Select the display that you are interested in and the acquisition settings will automatically change to meet the requirements of the selected display.
RBW increased to 100 kHz	The current Spectrum Length or Analysis Length is not long enough to allow a narrower RBW filter. If the Length control is set to Manual, try increasing it or setting it to Auto so that the Analysis Length will increase to the required value.

Changing Measurement Settings

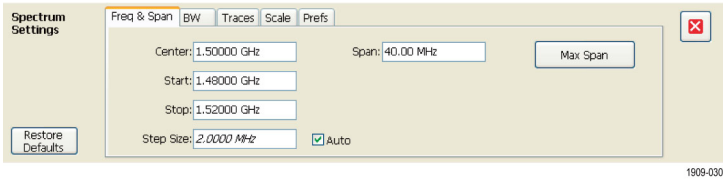
The displays have settings that control how signals are acquired and processed. The settings that you can change depend on the selected display.

To access the settings (in this case, for the Spectrum display):

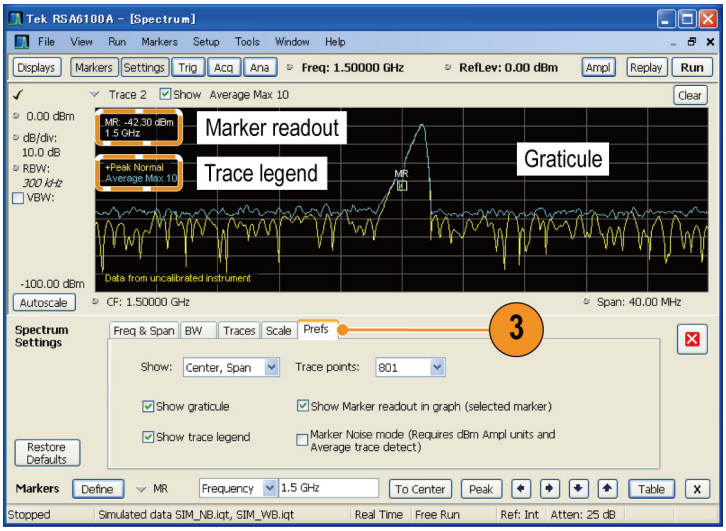
1. Click **Settings** to open the Settings control panel.



2. Adjust the controls as needed for your signal or test. For example, use the Freq & Span tab to set frequency and span. Most of the control panels have tabs that provide easy access to other related controls.



3. You can change the appearance of the display screen in the Prefs tab.
   - To turn on or off the graticule, select the **Show graticule** check box.
   - To turn on or off the marker readout, select the **Show Marker readout in graph** check box.
   - *Spectrum display only*. To turn on or off the trace legend, select the **Show trace legend** check box.



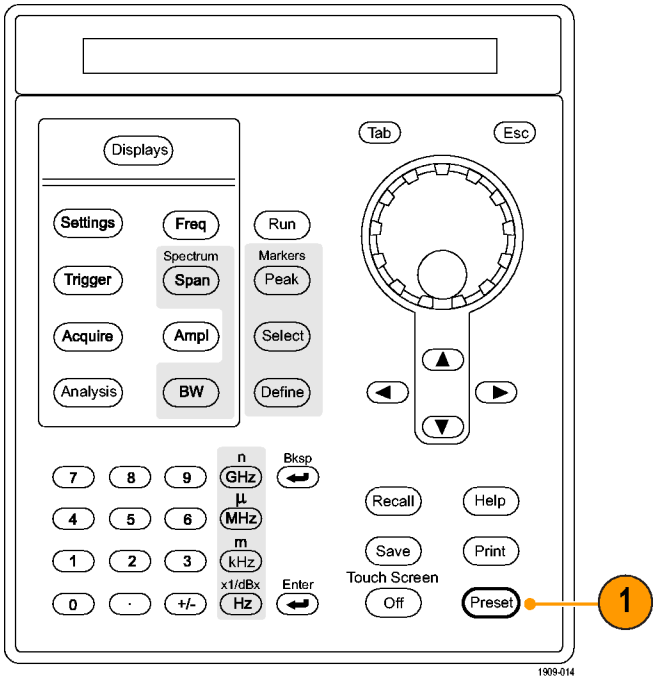
Quick Tip

- If you have multiple displays on the screen, click anywhere inside one of the other displays to change to the control panel for that display.

Presetting the Instrument

You can preset the instrument to restore the setups to their default values.

1. To start with the default instrument settings, push the Preset button on the front panel or select **Preset** from the Setup menu.



Quick Tip

- Preset does not change any of the settings specified from the Config In/Out control panel or from the Tools menu, such as GPIB address, Save/Export preferences, or the Auto Alignment setting.

Connecting a Signal

The spectrum analyzer has a single RF signal input located on the front panel. Make sure that you observe the input signal requirements before connecting a signal to the input.

CAUTION. *To prevent static damage to the instrument or to any instrument accessories, discharge to ground any electrostatic charge that may be present on the center and outer conductors of cables, before attaching the cables to the instrument inputs. Do not create an ESD (electrical static damage) antenna by leaving cables attached to the instrument with the other ends of the cables open.*

Required Signal Levels

The following table shows the input signal levels over which the Real Time Spectrum Analyzer can be used for measurements. The accuracy is guaranteed at a signal amplitude and frequency (normalization point). Measurements can be made on signals within the entire range of allowable inputs, but the accuracy of the measurement is affected by the frequency and amplitude of the signal to be measured (see the RSA6100A data sheet for more information).

RF signal input range (CW or peak envelope power)

Modulation measurement requirement	Spectral display requirement
-50 dBm to +30 dBm	DANL to +30 dBm

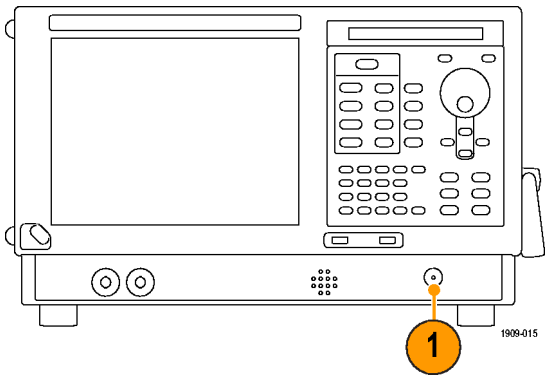
Input signal requirements

Characteristic	Description
Input impedance	50 Ω
Input frequency range	
RSA6106A	9 kHz to 6.2 GHz
RSA6114A	9 kHz to 14 GHz
Maximum measurable continuous input power	1 W (+30 dBm)
Maximum voltage rating	±40 V DC, AC coupled

CAUTION. *To prevent damage to the instrument, do not connect CW signals greater than 1 Watt (+30 dBm). The maximum voltage rating is ±40 V DC. The maximum pulse specifications are 75 W peak, 10 µs pulse width, 0.001 duty cycle, and ≥30 dB attenuation.*

To connect an RF signal:

1. Connect the signal to the RF INPUT connector on the front panel.



Quick Tip

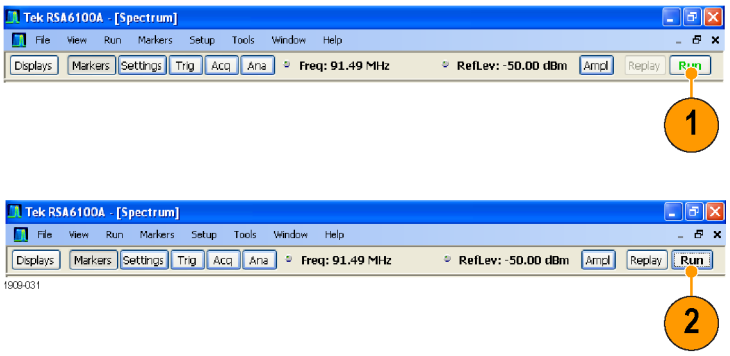
- If the source signal is greater than 1 Watt (+30 dBm), connect the source signal to an attenuator. Connect the attenuator output to the RF Input connector.

Starting and Stopping Acquisitions

1. Click the Run button to start an acquisition.

   While acquiring data, the button label has green lettering.

2. Click the Run button again to stop an acquisition. If an analysis is in process, it will finish its sequence and then stop. The button label changes from green lettering to black lettering to indicate that the instrument has stopped.



Quick Tip

- Push the front panel Run button to start and stop acquisitions.

Run Control

The Run menu provides access to commands that control the acquisition and the measurement sequence. Refer to the online help for information on all of the Run menu selections. Continuous is the default selection. When you select Continuous, the instrument will continuously acquire data until you stop the acquisitions. Select Single Sequence to run a single acquisition every time you click **Run** or push the Run button on the front panel.

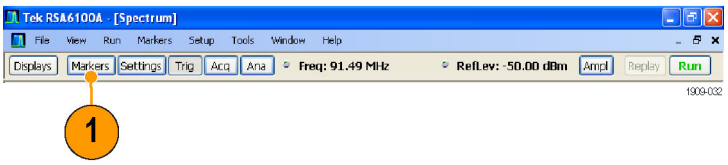
Markers

Use markers to measure time, frequency, power and other results. Markers measure absolute values and can also measure the difference between markers.

Using Markers to Measure Frequency and Power

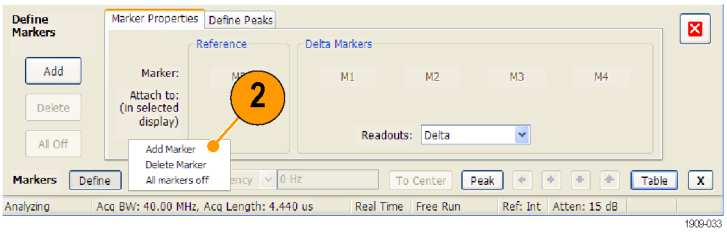
The following procedure shows how to use markers in the Spectrum display to measure frequency and power. The example assumes that all markers are turned off and that a signal is on the screen.

1. Click **Markers** to open the Marker toolbar at the bottom of the Analysis window.



2. Select **Add Marker** from the drop-down list on the Marker Toolbar.

   The first marker is designated the marker reference (MR).

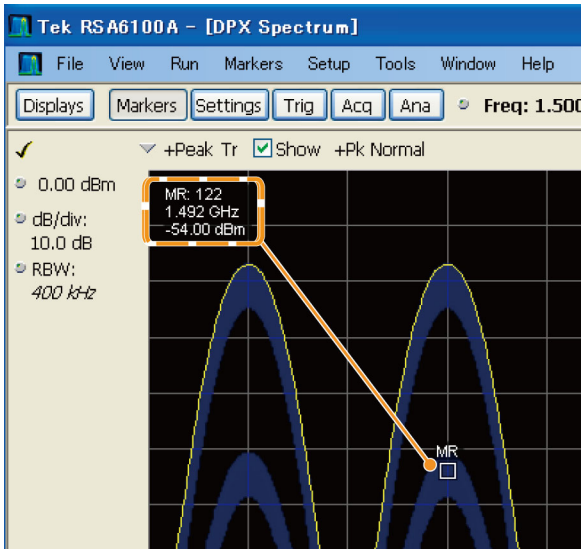


3. Position the marker on the screen using the arrow buttons in the Marker toolbar. You can also drag the marker to the desired position using the touch screen or the mouse.

4. Read the frequency and power level from the marker readout on the display.

Markers Display

- Rectangular markers show absolute values in the readout. The readout of the selected marker appears in the upper left corner of the display and in the Marker toolbar.
- Diamond markers show delta values (relative to the reference marker). The delta readout of the selected marker appears in the upper right corner of the display and in the Marker toolbar.
- When you drag markers along a trace with either the touch screen or the mouse, the marker will seek the high points. The marker stays within 20 trace points of the mouse position. If there are no peaks within the current range of trace points, the marker finds the highest point.
- When you attach the marker to the bitmap trace in the DPX spectrum display, the marker readout indicates the hit count for pixels (maximum 65,536) along with frequency and power (see the following figure). You can position the marker at any point in the graph.



Quick Tips

- If markers are turned off, click **Peak** in the Marker toolbar or on the front panel to add the marker reference (MR) and to position it on the maximum peak level on the trace in the selected display.
- Click **Table** in the Marker toolbar to open a tabular display showing the marker information.

Marker Toolbar

The Marker toolbar has several controls to work with markers. (See Table 4.) Some of these controls are similar to those on the front panel.

Table 4: Marker toolbar

Icon	Description
	Opens the Define Markers control panel. Use the control panel to add and remove markers and to set marker parameters.
	Sets the Measurement Frequency of the instrument to the frequency of the selected marker. This button is only present when the selected display has frequency on the horizontal axis.
	Moves the marker to the maximum peak level on the trace. The maximum peak can be either the highest or the lowest point in displays with both positive and negative values on their vertical axis (such as Frequency Error or Phase).
	Moves the selected marker to the next peak to the left of the current position.
	Moves the selected marker to the next peak to the right of the current position.
	Moves the selected marker to the next lower peak value. The peak value refers to the absolute value of the peak amplitude. When repeatedly moving the marker, it can move in any direction depending on the location of the next peak.
	Moves the selected marker to the next higher peak value. The peak value refers to the absolute value of the peak amplitude. When repeatedly moving the marker, it can move in any direction depending on the location of the next peak.
	Opens or closes the marker table in the display.

Adding Markers

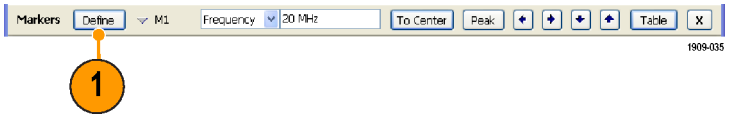
You can have up to five markers. The first marker (MR) is a reference marker. The other markers (M1, M2, M3, and M4) can show absolute values or can show both absolute values and the difference values between them and the reference marker.

To add another marker, select **Add Marker** from the drop-down list in the toolbar.

Defining Markers

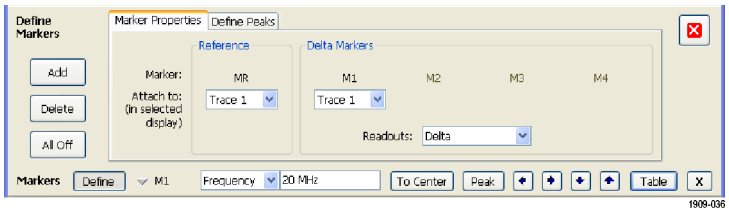
Use the Define Markers control panel to define the marker settings.

1. Click **Define** to open the Define Markers control panel.



Use the control panel to:

- Add or delete markers.
- Turn markers off.
- Assign markers to specific traces.
- Set the marker readouts to absolute or delta.
- Define the threshold and excursion values.



Quick Tip

- You can add or delete markers from the drop-down list next to Define in the Marker toolbar.

Touchscreen Actions

You can use the touchscreen to change marker settings and how waveforms are displayed by using the Touchscreen Actions menu. To use the Touchscreen Actions menu, touch the display and hold for one second, then remove your finger. You can also use a mouse to display the Touchscreen Action menu by clicking the right mouse button.

Some selections in the Touchscreen Actions menu are selectable only when a marker is defined.

Touchscreen Actions menu

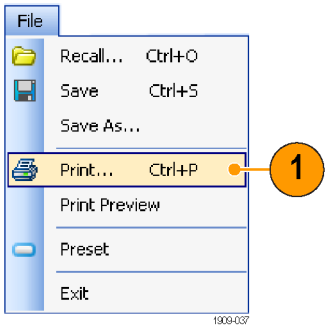
Table 5: Touchscreen actions menu

Icon	Menu item	Description
	Select	Selects markers and adjusts their position.
	Span Zoom	Zooms the graph area about the selected point. Touch the graph display at a point of interest and drag to increase or decrease the span about the point of interest. Span Zoom adjusts the span control and can affect the acquisition bandwidth.
	CF Pan	Adjusts the Center Frequency according to horizontal movement.
	Zoom	Adjusts horizontal and vertical scale of the graph. The first direction with enough movement becomes the primary scale of adjustment. Adjustment in the secondary direction does not occur until a threshold of 30 pixels of movement is crossed. Dragging to the left or down zooms out and displays a smaller waveform (increases the scale value). Dragging to the right or up zooms in and displays a larger waveform (decreases the scale value).
	Pan	Adjusts horizontal and vertical position of the waveform. The first direction with enough movement becomes the primary direction of movement. Movement in the secondary direction does not occur until a threshold of 30 pixels of movement is crossed.
—	Reset Scale	Returns the horizontal and vertical scale and position settings to their default values.
—	Marker to peak	Moves the selected marker to the highest peak. If no marker is turned on, this control automatically adds a marker.
—	Next Peak	Moves the selected marker to the next peak. Choices are Next left, Next right, Next lower (absolute), and Next higher (absolute).
—	Add marker	Defines a new marker located at the horizontal center of the graph.
—	Delete marker	Removes the last added marker.
—	All markers off	Removes all markers.

Printing

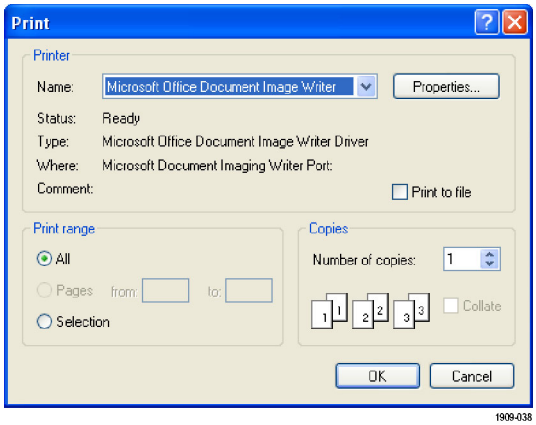
You can print a copy of the screen and its contents (a screen shot) to a printer or a file.

1. Push the Print button on the front panel or select **Print** from the File menu.



2. Fill out the details in the Print dialog box, and then click **OK**.

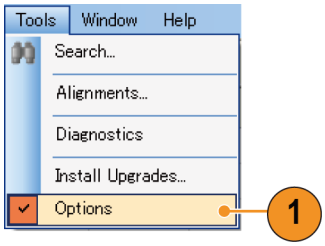
   The Print dialog box is the standard Microsoft Windows Print dialog box. The printer controls are dependent on your printer.



Ink Saver Mode

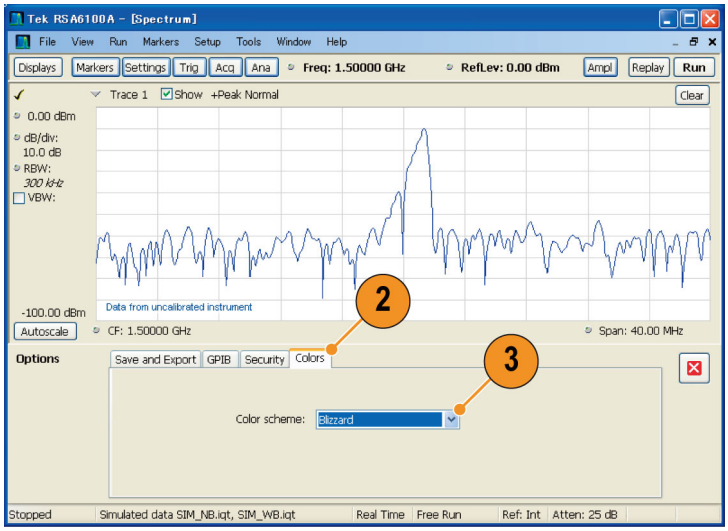
You can print screen images with a white background.

1. Select **Options** from the Tools menu.



2. Select the Colors tab in the control panel.
3. Set the Color Scheme to **Blizzard**.

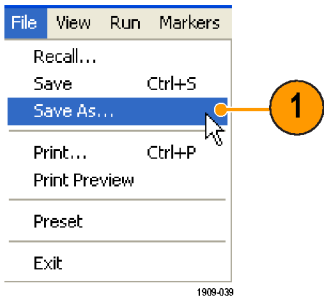
   The background color changes from black to white.



Saving Data

You can save different types of data for future use.

1. Select **Save As. . .** from the File menu to open the Save As dialog box.



2. Navigate to the folder where you want to save the setups, or use the default location.
3. Enter a file name.
4. Select the type of file to save. (See Table 6.)
5. Click **Save**.

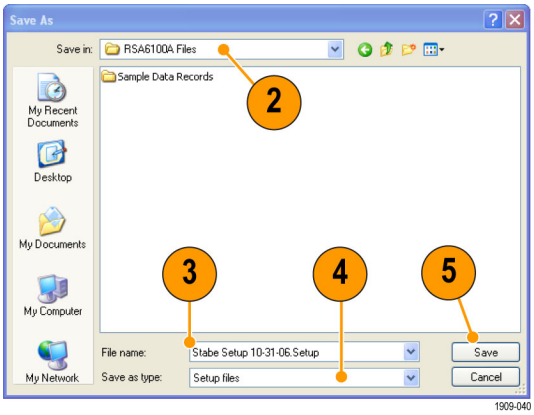


Table 6: File types for save

File types	Description
Setup files	Saves all of the setup information for all settings displays, except those settings that are specified under the Tools menu (Alignments and Options) or in the Config In/Out control panel.
Results Export files	Saves the trace and numeric data for the selected display. The trace and numeric data are saved in CSV format as text files.
Picture (PNG/JPG/BMP)	Saves a graphical representation of the screen in the specified format. This option is useful for including the graphic in reports or other applications. Marker readouts and other information are included.
Selected Trace	Saves a trace for later recall back into the display from which it was saved.
Data (acquisition data and acquisition data export)	Saves data for reanalysis by the RSA6100A Series Real-Time Spectrum Analyzers or as CSV (comma-separated value) data to use with external software.

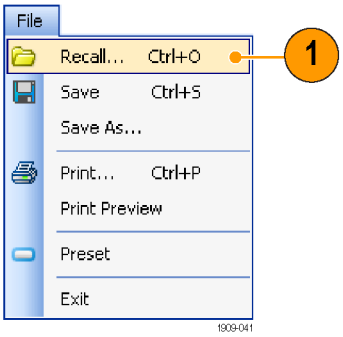
Quick Tips

- Select **File > Save** or press the Save button to save the information to a file using the same name, path, and data type as the last time that you saved. If the file already exists, the file name suffix number will increment if you previously selected that option in the Tools > Options > Auto Filename control panel tab.
- Select **File > Save As** to open the standard Windows Save dialog box where you can edit the file name, choose what data type to save, and select a folder for storing the file.

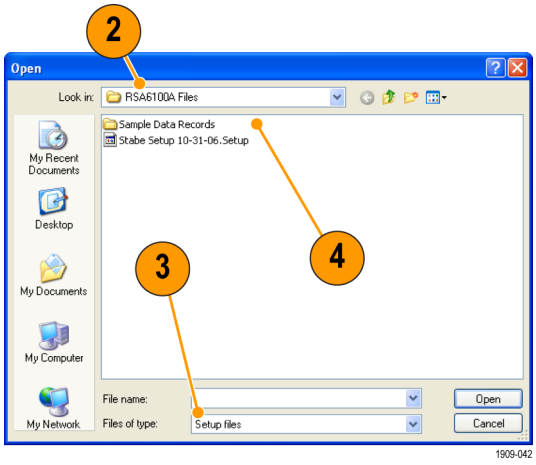
Recalling Data

You can recall acquisition data and setup files previously saved by the RSA6100A Series Real-Time Spectrum Analyzers.

1. Push the Recall button on the front panel or select **Recall** from the File menu.



2. In the Open dialog box, browse to the location of the file.
3. If you do not see the file, select the type of file under Files of Type.
4. Double click the file name to load the file.



Quick Tip

If you recall a trace that has an x-axis range that does not fall within the x-axis range of the current graph, the trace will not be visible. A small arrow will point off-screen in the direction of the recalled trace. Use the Frequency and Span (or Span and Offset) controls to bring the trace on the screen in the Spectrum display. In other displays, use Horizontal Scale and Offset (which can also be used in the Spectrum display). These controls are on the Settings > Scale tab.

Advanced Techniques

This section contains advanced operating techniques. For examples of practical applications, see the *RSA6100A Series Real-Time Spectrum Analyzers Application Examples Manual*.

Setting Up Triggering

The RSA6100A Series Real-Time Spectrum Analyzer offers real-time frequency domain triggering (option 02) in addition to power-level triggers, line trigger, and external triggers. It uses a trigger event as a reference point in time for the seamless acquisition of the signal. This allows the spectrum analyzer to store both pretrigger and post-trigger information.

The spectrum analyzer has two triggering modes:

Free Run mode. In Free run mode, the instrument initiates acquisitions without considering any trigger conditions. It is a fast and easy way to see the signals. Free Run is usually adequate for the Spectrum display unless you need to specify a particular time at which to collect the data record.

Triggered mode. In Triggered mode, the instrument initiates an acquisition when a trigger event is recognized. The conditions that define a trigger event depend on the selected trigger source. There are several source selections available for choosing the signal to monitor for a trigger event.

Once you select the Triggered mode, you must select the source. The trigger sources are:

- RF Input
- Trig In
- Trig 2 In
- Gated
- Line

Once you select the trigger source, you can set additional parameters to specify the trigger event. If you specify the RF Input as the trigger source, you can chose from two trigger types:

Frequency Mask Triggering. Frequency Mask Triggering allows you to trigger the instrument when a signal in the frequency domain violates the mask. You can draw a mask to define the conditions within the real-time bandwidth that will generate the trigger event. It allows you to trigger on weak signals in the presence of strong signals. This triggering is also useful for capturing intermittent signals.

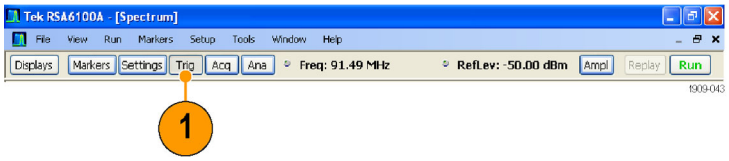
Power Triggering. Power triggering triggers the instrument on time-domain signal characteristics. The incoming data is compared to a user-selected level in dBm. You can select the time-domain bandwidth and trigger on the rising or falling edge.

In addition to defining the trigger event, you can define the following parameters by selecting the appropriate tab in the Trigger control panel:

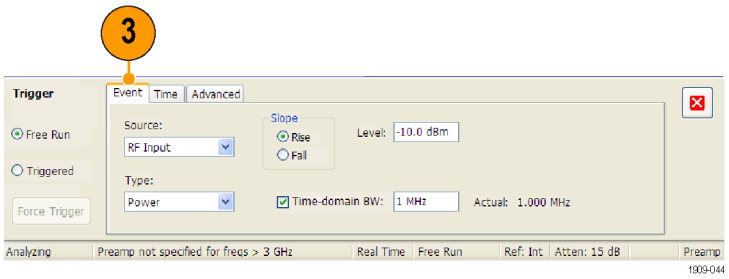
- Time parameters that define where a trigger occurs within the acquired data record and whether to delay the trigger for a set amount of time.
- An Advanced parameter that triggers each segment in swept acquisition mode.

Accessing Trigger Parameters

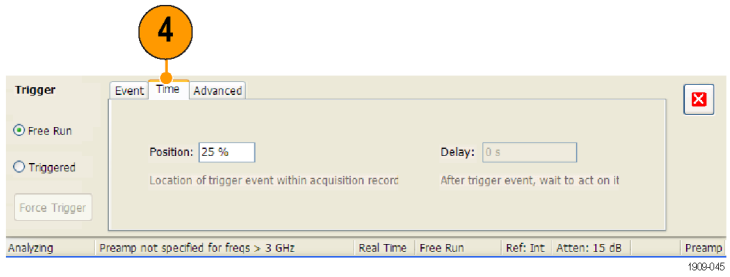
1. Click **Trig** to open the Trigger control panel.



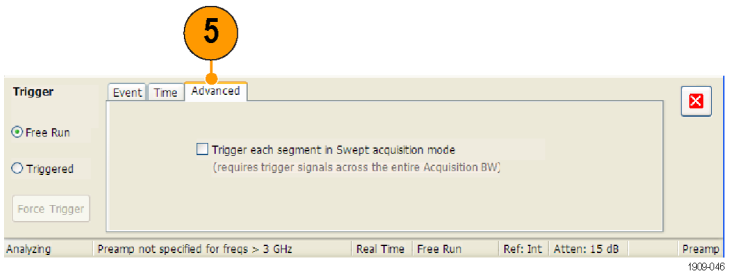
2. As shown in the following steps, click one of the tabs in the Trigger control panel to define the trigger parameters.
3. Use the Event tab to set parameters that define trigger events. The parameters vary depending on the trigger Source and Type selections.



4. Use the Time tab to set parameters that control the position of the trigger event.



5. Use the Advanced tab to select whether to trigger on each segment in Swept acquisition mode.



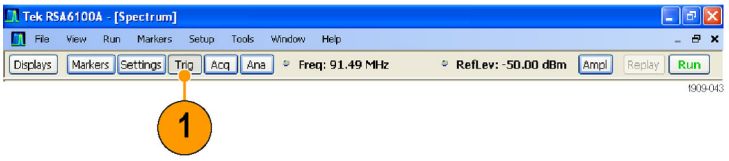
Quick Tip

- Other ways to access the Trigger control panel:
  - Push the Trigger button on the front panel.
  - Select **Trigger . . .** from the Setup menu.

Creating a Frequency Mask

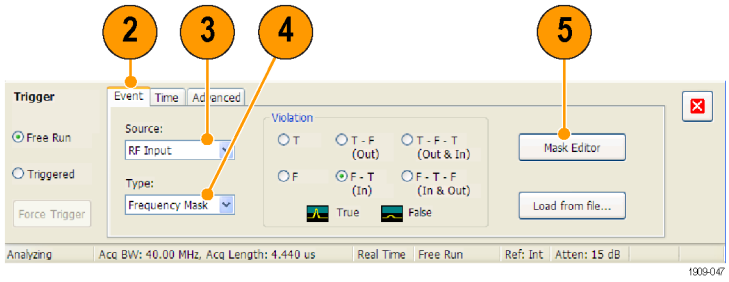
Use the Mask Editor to create a Frequency Mask. The mask is a set of points defined by frequency and amplitude. Access the Mask Editor from the Trigger control panel. (This procedure uses the Spectrum display.)

1. Click **Trig** to open the Trigger control panel.

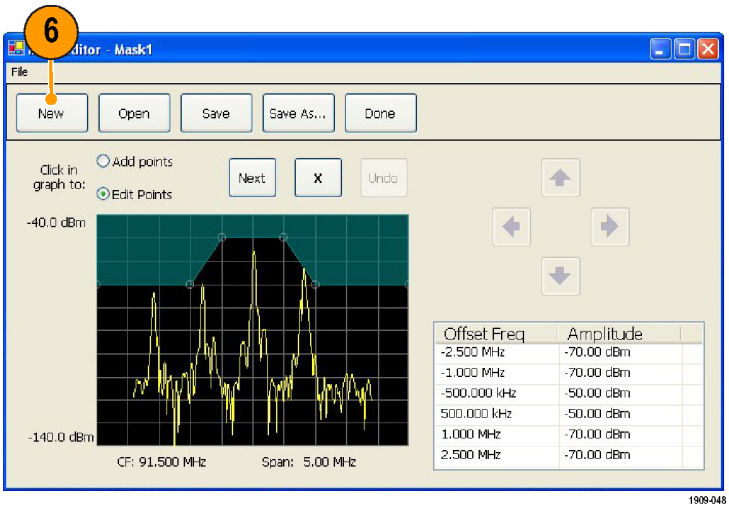


2. Select the Event tab in the control panel.
3. Set the Source to **RF Input**.
4. Set the Type to **Frequency Mask**.
5. Click **Mask Editor** to open the Mask Editor.

   The Mask Editor opens with the traces of the Spectrum display in the graph.



6. Click **New** in the tool bar. This removes the existing mask and then creates a default 6-point mask.

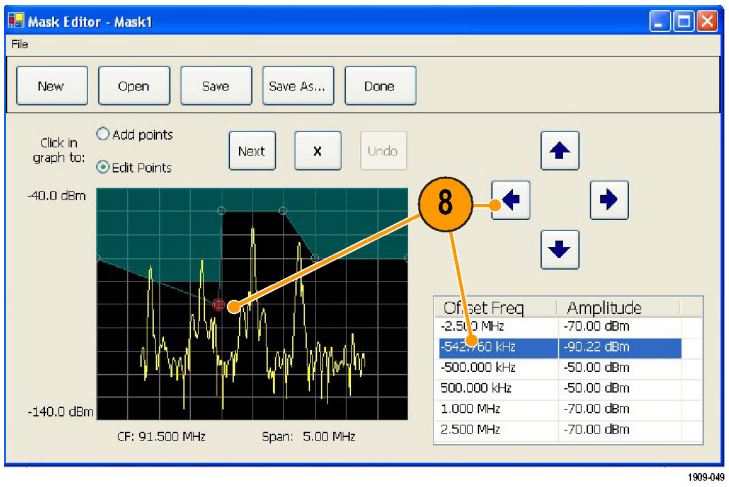


7. Click any point in the mask to select it.

   The frequency and amplitude of the selected point are highlighted in the graph.

8. Edit the point by doing one of the following:

   - Drag and drop the point with the mouse.
   - Enter the frequency and amplitude in the table.
   - Adjust amplitude with the up/down arrow keys and frequency with the left/right arrow keys.



Quick Tips

- Right click on the display screen to add a new point.
- Click **Add Points** and then click on the graph to add a new point in the graph.
- Click **Next** to select the next point in the graph.
- Click the **X** (delete button) to delete the selected mask point.
- Click **Save** to save the mask file and continue working with the mask editor.
- Click **Open** to load and edit a previously saved mask file.

Defining Trigger Conditions

After you have set up the mask, you can select whether to trigger on the presence or absence of mask violations.

1. Select a condition.

   The choices are described in the following table. (See Table 7.) The icons at the bottom of the control panel identify what is considered true or false.

2. Click **Triggered**.

   The instrument will trigger when the trigger conditions are met.

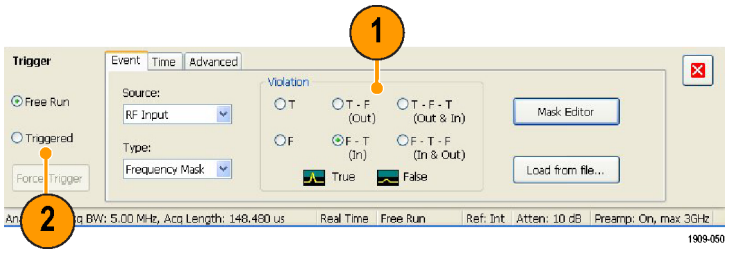


Table 7: Trigger violations

Violation	Description
T	The instrument triggers whenever the signal violates the mask (above the line).
F	The instrument triggers whenever the signal has no points in the mask.
T > F	One transition defines the trigger event. The signal must go out of the mask (no violation) after being inside of the mask (violation).
F > T	One transition defines the trigger event. The signal must go into the mask after being outside of the mask.
T > F > T	Two transitions define the trigger event. The signal must start inside of the mask, cross outside of the mask, and then cross back into the mask.
F > T > F	Two transitions define the trigger event. The signal must start outside of the mask (no violation), cross into the mask, and then cross back outside of the mask.

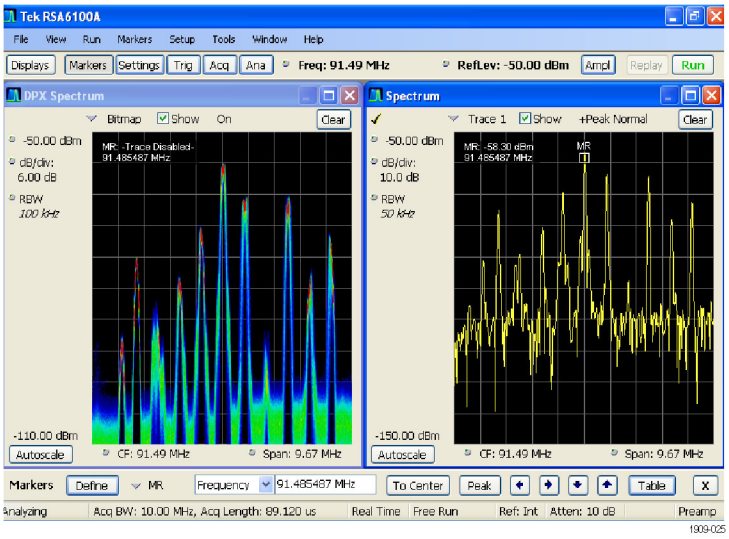
Controlling Acquisitions

When two or more displays are open, one display controls the acquisition system. The acquisition requirements for the selected display set the acquisition hardware parameters. While the acquisition parameters are optimized for the selected display, they might not be ideal for other displays. In this case, the other displays might be unable to maintain optimum performance and consequently might be unable to produce results. (This also happens when you analyze recalled data: measurements attempt to deliver results, but may not be able to comply with all their settings.)

You can specify which display controls the hardware acquisition parameters by clicking anywhere in that display. When there are multiple displays, the highlighted display controls the hardware acquisition parameters.

In this example, there are two displays, a Spectrum display and a DPX Spectrum display. The highlighted title bar on the DPX Spectrum display indicates that it is the selected display.

The check mark indicator in the upper left corner of the display indicates that acquisition hardware is optimized for the Spectrum display.



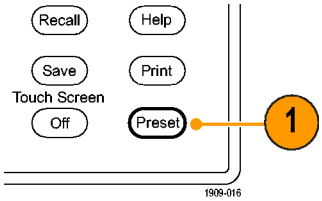
Some displays do not control the acquisition hardware. These displays just show the captured data. Some displays share the same parameters. If any of one of these displays in such a family controls the acquisition hardware, then the acquisition parameters are optimized for all of the displays in that family.

Measurements with Conflicting Acquisition Requirements

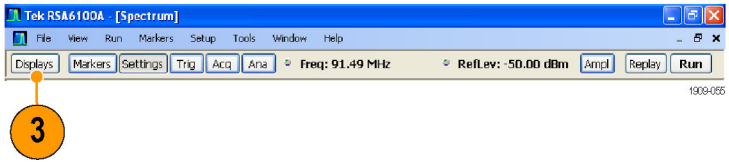
The RSA6100A Series Real-Time Spectrum Analyzer lets you open any combination of measurements. You can select the displays that you are interested in and the instrument will automatically set up the appropriate analysis and acquisition parameters.

If measurements place conflicting requirements on the acquisition parameters, the current selected display takes priority. The following example shows incompatible measurement settings when one display needs real-time data (such as the Amplitude vs Time measurement) while another display requires swept data (such as a Spectrum graph with a very wide span).

1. Push the Preset button on the front panel to set the instrument to the default settings.
2. Tune the instrument to the frequency of your signal and then set the span.



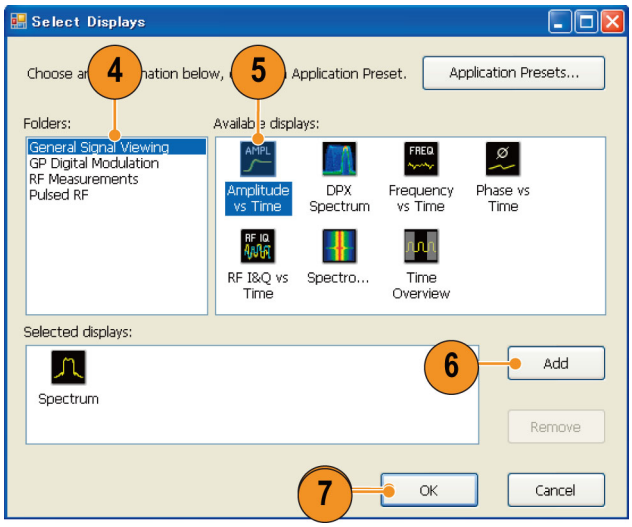
3. Click **Displays** to open the Select Displays dialog box.



4. Select the General Signal Viewing folder.
5. Select the Amplitude vs Time icon.
6. Click **Add** to add the icon to the Selected Displays list.

NOTE. *Add the Spectrum display if it is not already in the Selected Displays list.*

7. Close the dialog box.



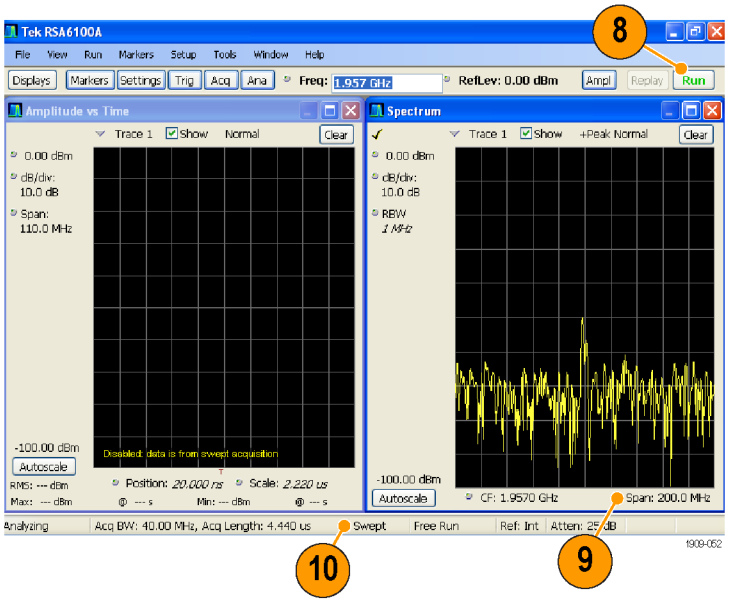
8. Click **Run** to start acquiring data.

9. Increase the span in the Spectrum display to 200 MHz.

   Because Spectrum is the selected display, the acquisition parameters adjust automatically to meet the needs of the display. The 200 MHz span exceeds the real-time bandwidth of the instrument. As a result, the instrument will change to swept mode.

10. Look at the Status bar. The readout "Swept" indicates when acquisitions are swept.

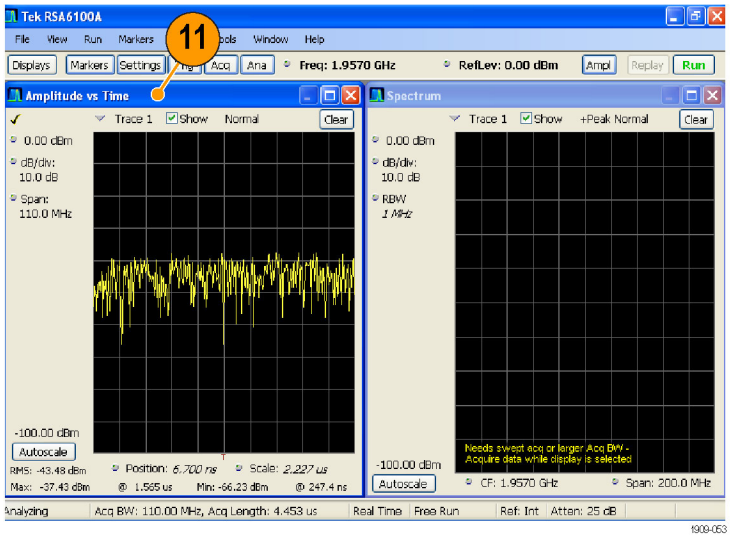
    When the acquisitions are in "Real Time," all measurements usually run. If the acquisitions are swept, only the selected display can run.



11. Click the Amplitude vs Time display to make it the active display.

    The acquisition switches back to real-time because the selected display requires real-time. The data is now suitable for the Amplitude vs Time display but doesn't contain the full range of frequencies needed by the Spectrum display.

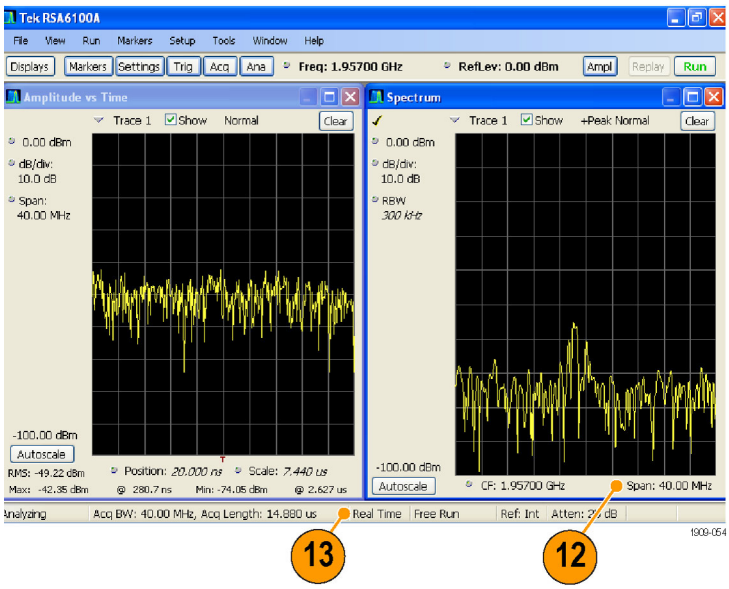
    In this case, the Spectrum is unable to run.



12. Decrease the span to 40 MHz in the Spectrum display. Now the acquisitions are real-time again.

13. Check the status bar readout to verify that the acquisition is real-time.

    Both of the displays can run now.

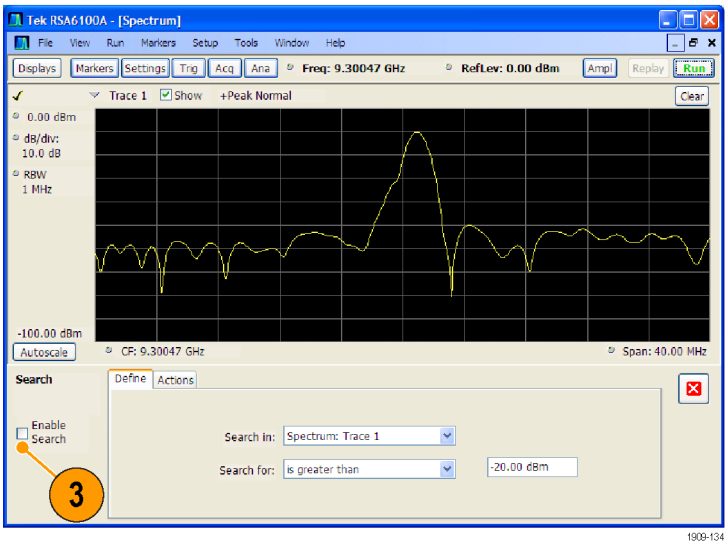


Searching Signals

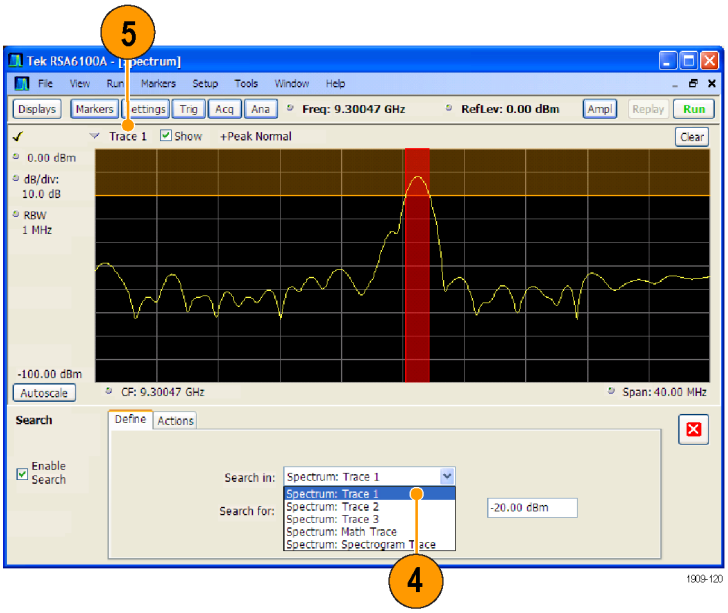
The RSA6100A Real-Time Spectrum Analyzer lets you search signals for changes in power level. You can identify matches as crossing a power level or you can create a mask that specifies power level and frequency range limits. You can select which trace to search and specify an action to take when a search match occurs.

To search a trace:

1. Open the Spectrum display or select the Spectrum display if it is already open.
2. Select **Tools** > **Search**.
3. Select the **Enable Search** check box.



4. Select the trace you wish to search from the **Search in** drop-down list box.
5. Verify that the trace you selected in the **Search in** list is the selected trace and that the **Show** box is checked.

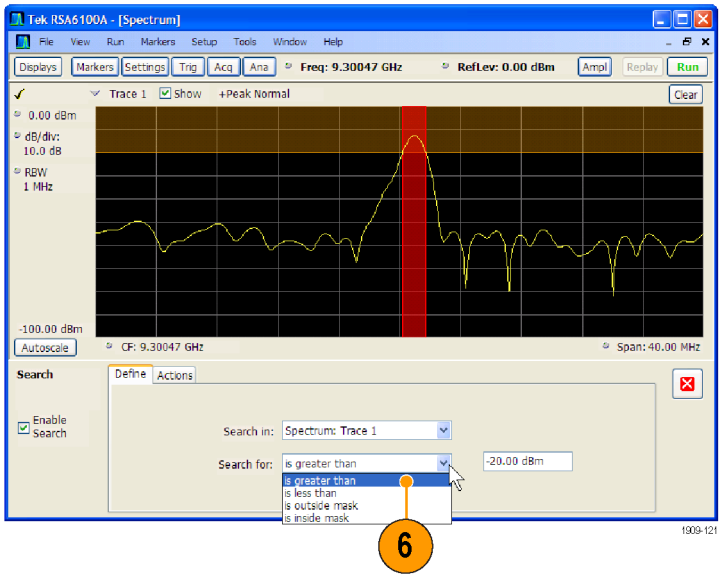


6. Specify what to search for by making a selection from the **Search for** drop-down list.

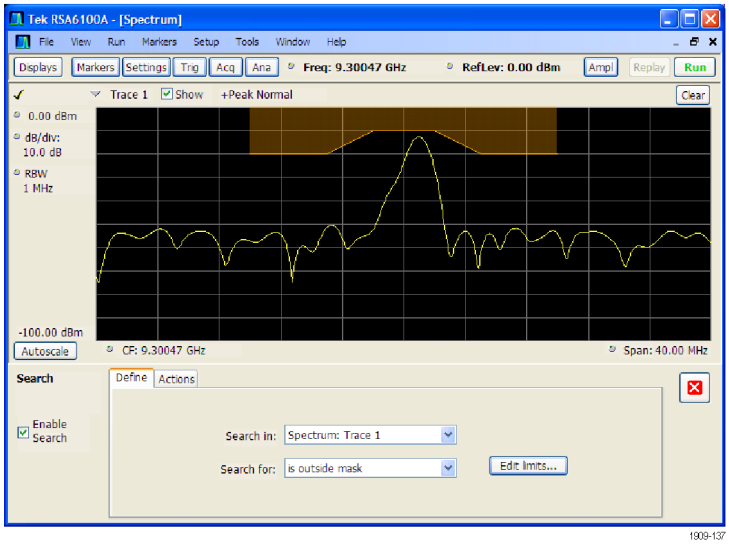
   To search for signal levels above or below a specified level, select either **is greater than** or **is less than**.

   To search for signal levels that vary with frequency, select either **is outside mask** or **is inside mask**. To specify the limits in the search mask, click the **Edit limits** button.

   The orange shaded area in the graph display shows the levels which, if occupied by the signal, will constitute a match.



Display with greater than search selected



Display with outside mask search selected

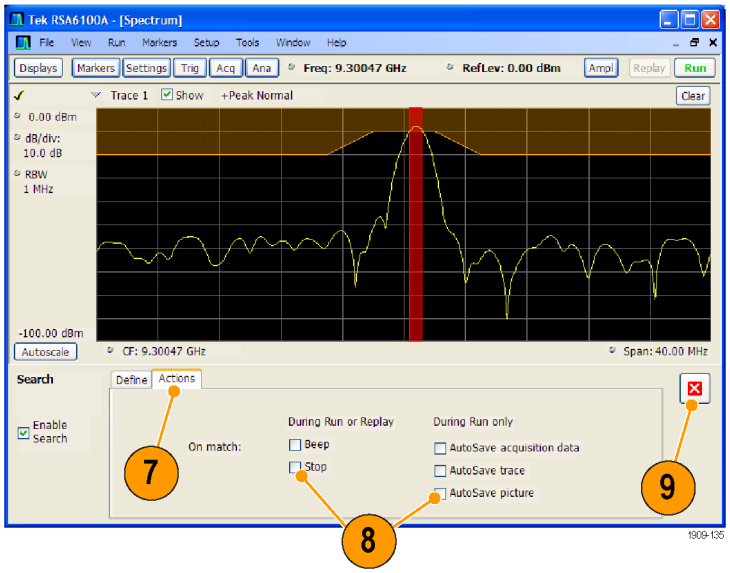
7. Click the **Actions** tab to specify what actions the spectrum analyzer should take when a match occurs.

   The spectrum analyzer can take up to five actions when a match occurs, depending on the run mode. In Run mode, the spectrum analyzer can sound a beep, stop acquisitions, save acquisition data, save trace data, and save a picture of the display. In Replay mode, it can sound a beep and stop analyzing.

8. To have the spectrum analyzer take an action when a match occurs, select the desired action.

   You can select any combination of actions to perform on a match. If you select all actions, they will all occur when a match is found (in Run mode).

9. Click the close box to remove the Search control panel.



10. Press the **RUN** button to initiate a search.

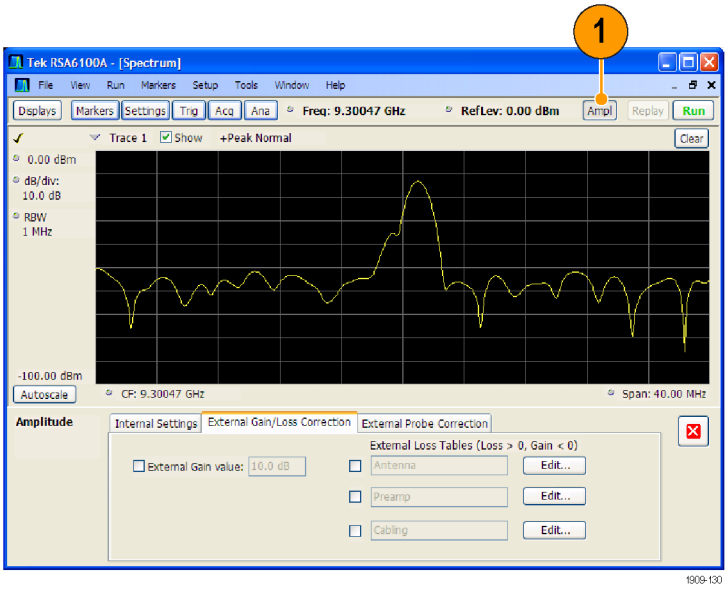
    Red lines appear in the graph display when there is a match on incoming data. Click the **Replay** button on the toolbar to initiate a search on the current data record.

Using Correction Tables

The RSA6100A Real-Time Spectrum Analyzer lets you correct the signal displays and measurement results to account for gains and losses in external equipment. You can specify a single gain value or you can use an external loss table to adjust the gain/loss value based on frequency.

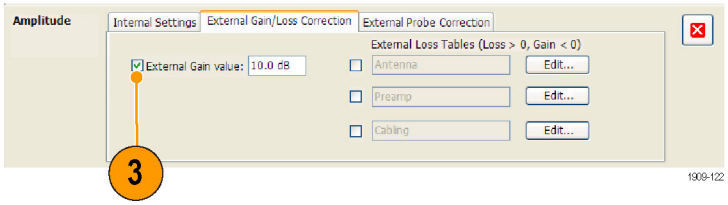
To specify external gain/loss corrections:

1. Press the **Ampl** button to display the Amplitude control panel.
2. Select the External Gain/Loss Correction tab.



3. To apply a constant correction factor, select the **External Gain value** check box. Enter a value into the text entry box.

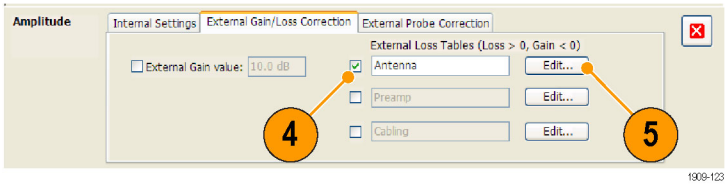
NOTE. *You can enter either positive or negative gain values. Positive values represent a gain. Negative values represent a loss.*



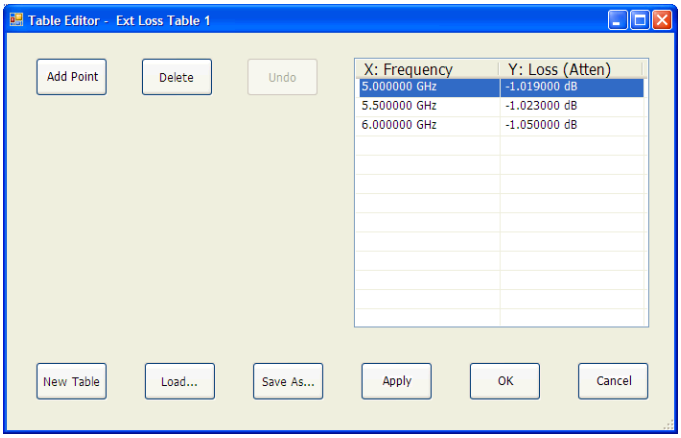
4. To use a table that corrects for gain/loss values depending on frequency, click a check box under **External Loss Tables**.

   You can enable all three external loss tables at the same time. Thus, you could use different external loss tables for an antenna, a preamplifier, and for cabling.

5. To edit the contents of an external loss table, click the **Edit** button for the table you want to edit.



6. Edit the contents of the table to match the loss characteristics of the equipment you are correcting for. Click **OK** when you are finished.



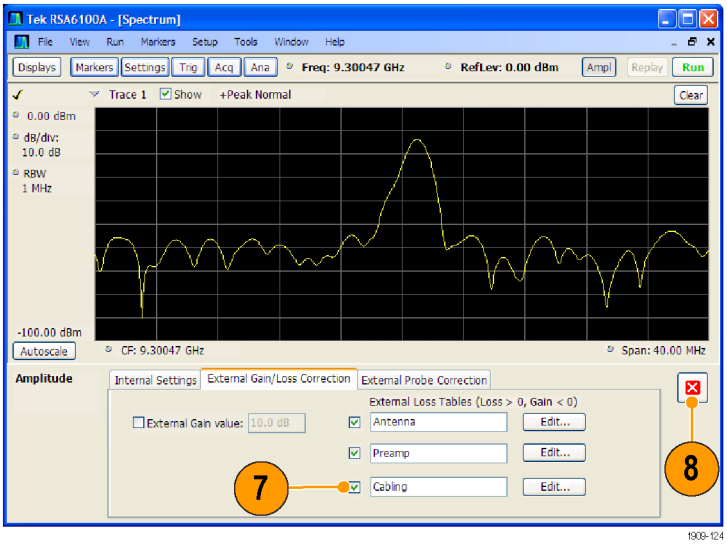
NOTE. *You can enter either positive or negative values into the table. But in contrast to the External Gain value setting, positive values represent a loss and negative values represent a gain.*

For detailed information on using the Table Editor, select **Help** > **User Manual** and look in the Index for *External Loss Tables*.

7. You can change the title for each external loss table. Select the title box and type in a new title.

   Note that the title is only a label. It is not tied to the file name of any table you have loaded or saved.

8. Click the close box to remove the Amplitude control panel when you are finished making changes.

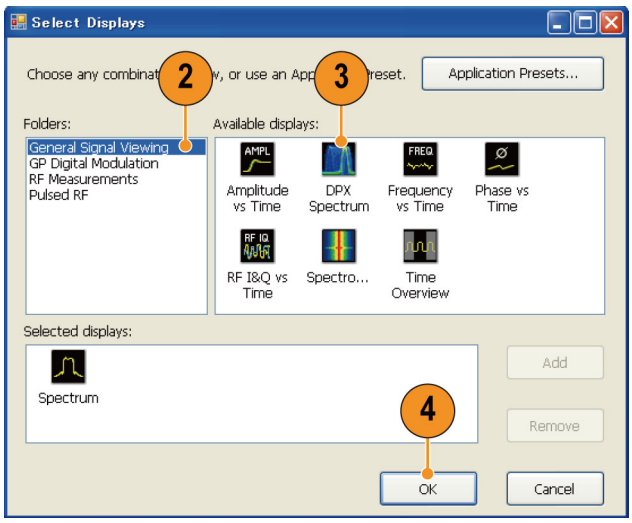


Using Audio Demodulation

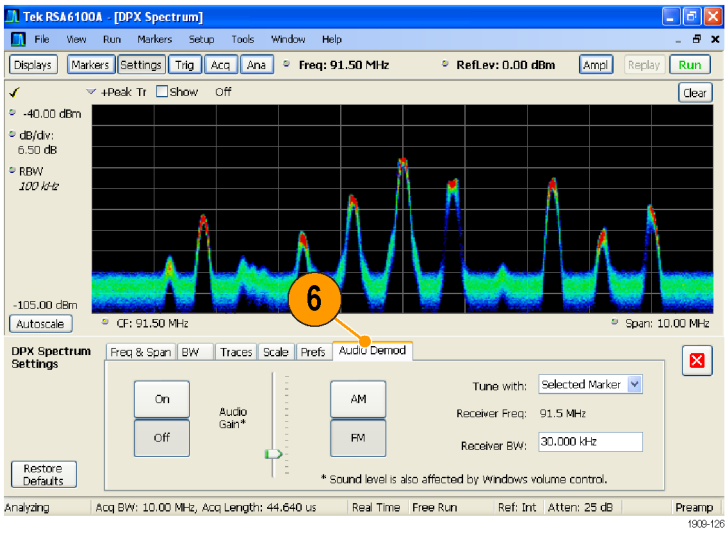
The RSA6100A Real-Time Spectrum Analyzer can demodulate audio signals which can help you to identify unknown radio signals. You access the Audio Demod tab from the Settings control panel of the DPX Spectrum display.

To demodulate an audio signal:

1. Press the **Displays** button to display the Select Displays dialog box.
2. Select the **General Signal Viewing** folder.
3. Double-click the **DPX Spectrum** icon to add it to the Selected Displays list.
4. Click **OK** to close the dialog box. The DPX Spectrum display will open.



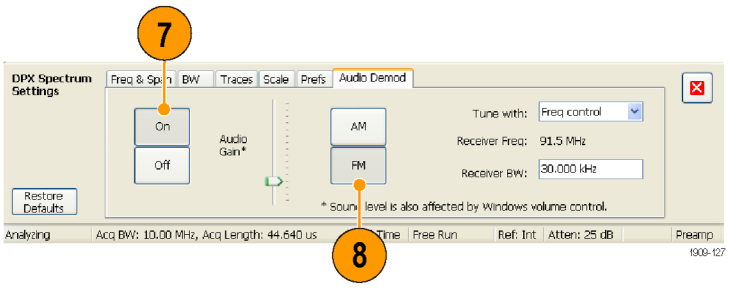
5. Press the **Settings** front-panel button to display the DPX Spectrum Settings control panel.
6. Click the **Audio Demod** tab to display the Audio Demod control panel.



7. Click the **On** button to enable audio demodulation.

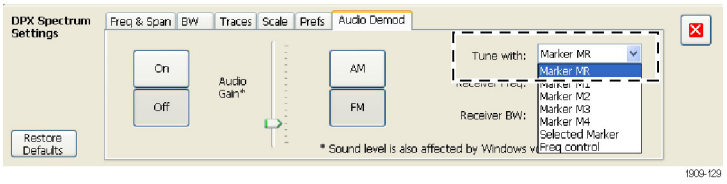
8. To specify the demodulation type, click either the **AM** or **FM** button.

NOTE. Note that the AM and FM buttons select only the demodulation type; they do not specify a frequency band.



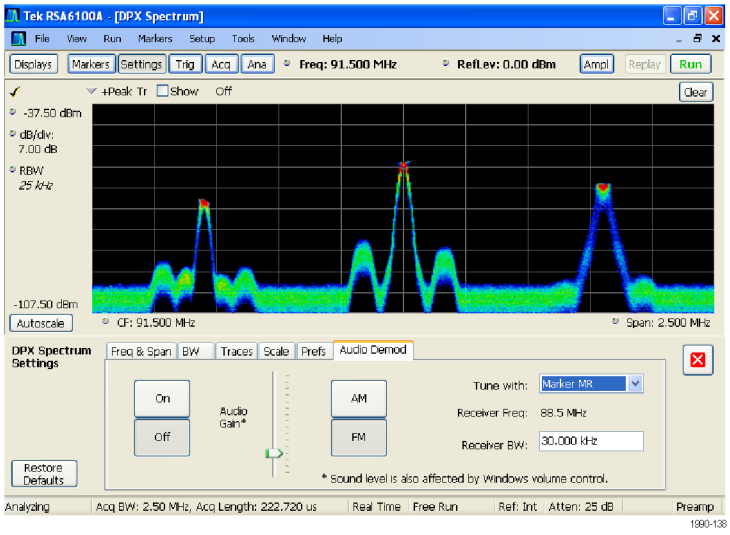
9. Set the center frequency as needed.

   The receiver frequency (frequency to be demodulated) is specified with either markers or the frequency control (the front panel Frequency button or the Freq control in the toolbar). Use the **Tune with** setting to specify whether markers or the frequency control is used to specify the receiver frequency.

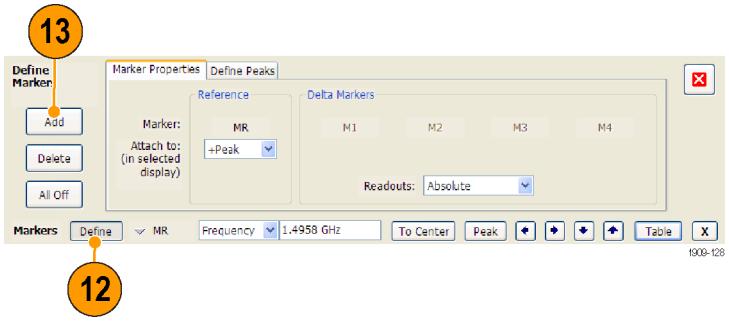


10. Select either a marker or frequency control from the **Tune with** drop-down list.

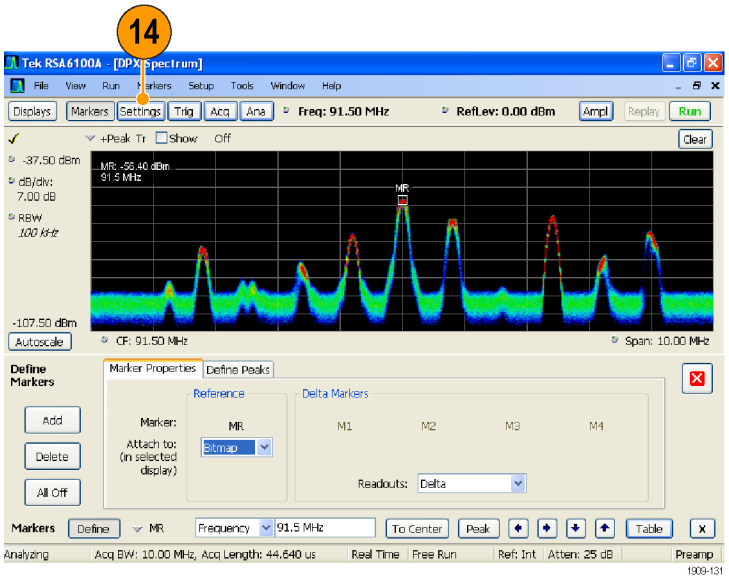
11. If the marker you select is not enabled (it will be visible in the display if it is enabled), click the **Markers** button in the toolbar to display the Markers toolbar.



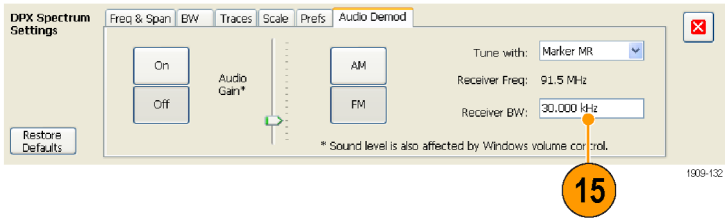
12. Click the **Define** button in the Marker toolbar to display the Define Markers control panel.
13. Click **Add** to add markers as needed.



14. Click the **Settings** button to return to the Audio Demod control panel.



15. Set the required receiver bandwidth by entering a value into the **Receiver BW** value entry box.

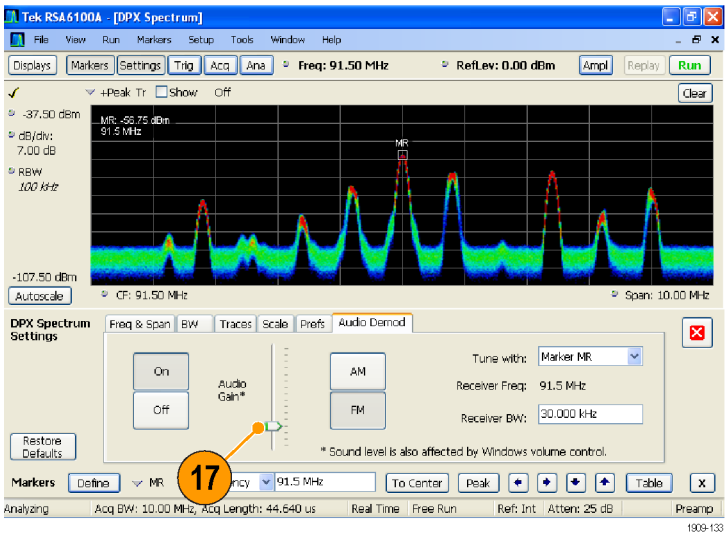


16. Set the receiver frequency.

    If you specified a marker with the **Tune with** setting, drag the marker to the required frequency. Fine tune the marker position with the front-panel knob or your mouse wheel. If you selected **Frequency control** in the **Tune with** setting, press the front-panel **FREQ** button, then turn the front-panel knob or use the **Freq** setting in the toolbar to set the required frequency.

    The receiver frequency is displayed as **Receiver Freq** between the Tune with and Receiver BW settings.

17. Adjust the **Audio Gain** setting so you can hear the demodulated signal. Note that the sound level is also affected by the setting of the Windows volume control.



Index

A

Accessories
- documents, 1
- optional, 2
- power cords, 2
- standard, 1

Acquisition
- conflicts, 43
- controlling, 42
- data source, 22
- starting, 29
- stopping, 29

Analysis window, 21, 23
Application presets, 24
audio demodulation, 51

C

CF Pan
- Touchscreen actions menu, 33

check mark indicator, 19, 42
Cleaning procedures, 11
Conflicts
- measurement, 43

Connectors
- front panel, 16
- rear panel, 17
- RF signal input, 28, 29

Controlling acquisitions, 42
Controls
- display-specific, 20
- front panel, 13
- interface, 18

Cooling clearances, 3
correction tables, 49

D

Data
- recalling, 37
- saving, 36

Default settings, 27
Diagnostics, 10
Digital demodulation displays, 23
Display
- conflicts, 43

Display properties
- changing, 9

Display settings
- changing, 26

Displays
- general signal viewing, 23
- GP digital modulation, 23
- printing, 34
- Pulsed RF, 23
- RF measurement, 23
- selecting, 23

Documentation, vi
- Tektronix part numbers, 1

E

Environmental specifications, 3
- altitude, 3
- cooling clearances, 3
- humidity, 3
- temperature, 3

Extended desktop, 6
external gain/loss correction, 49
External monitor, 6

F

Features, vi
File types, 36
Free Run trigger mode, 38
Frequency mask
- Mask Editor, 40
- triggering, 38

Front panel
- connectors, 16
- controls, 13

G

General signal viewing displays, 23
Graphics driver, 9

I

Incoming inspection, 10
Information messages, 25
Ink saver mode, 35
Input requirements
- frequency range, 28
- input impedance, 28
- power, 28
- RF signal range, 28
- voltage, 28

Installation, 1
- network connections, 4

Italicized numbers, 20

K

Key features, vi

M

Maintenance
- cleaning procedures, 11
- repackaging, 11

Marker toolbar, 32
Markers, 30
- absolute, 31
- adding, 32
- defining, 33
- delta, 31
- DPX bitmap trace, 31
- shapes, 31

Mask Editor
- adding points, 40
- editing points, 41

Measurement
- conflicts, 43

Mechanical specifications, 3
Messages
- on-screen, 25

MR, 31

N

Network connections, 4

O

Optional accessories, 2
Options, 3
- Power cords, 2

P

Pan
  Touchscreen actions menu, 33
Part numbers, manuals, 1
Power cord options, 2
Power level triggering, 38
Power supply, 3
Preset, 27
  selecting displays, 24
  system settings, 27
Printing, 34
  ink saver mode, 35
Product features, vi
Pulsed RF displays, 23

R

Real-Time spectrum analyzer, 21
Rear panel connectors, 17
Recalling data, 37
Repackaging, 11
Reset scale
  Touchscreen actions menu, 33
Returning the instrument, 11
RF measurement displays, 23
RF signal connections, 28, 29
RF signal input range, 28
Run control, 29
Run menu, 29

S

Safety Summary, iii
Save options, 36
Saving data, 36
Screens, printing, 34
Search, 46
Select
  Touchscreen actions menu, 33
Selected window, 42
Selecting displays, 23
Settings
  changing, 26
  default, 27
  preset, 27
Setups
  recalling, 37
  saving, 36
Software upgrades, vii
  installing, 11
Span Zoom
  Touchscreen actions menu, 33
Specifications
  altitude, 3
  cooling clearances, 3
  environmental, 3
  humidity, 3
  input requirements, 28
  mechanical, 3
  power supply, 3
  product dimensions, 3
  temperature, 3
Spectrum analyzer
  real-time concepts, 21
Standard accessories, 1
  documents, 1
  power cord, 2
Starting acquisitions, 29
Stopping acquisitions, 29

T

touchscreen actions menu, 33
Trace legend, 26
Trigger
  control panel, 39
  mask, 40
  violations, 42
Trigger Event parameters, 38
  accessing, 39
Triggered trigger mode, 38
Triggering
  free run, 38
  frequency mask, 38
  parameters, 38
  power level, 38
  triggered, 38

U

Upgrades
  software, vii, 11

V

Violations
  trigger mask, 42

W

Window
  analysis, 21
  selected, 42

Z

Zoom
  Touchscreen actions menu, 33