Tektronix®

WVR8RFP
Remote Front Panel

Instructions

www.tek.com

071-2804-01

Contacting Tektronix

Tektronix, Inc.
14150 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.tek.com to find contacts in your area.

Warranty

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.

[W2 – 15AUG04]

Table of Contents

Important safety information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition.

To safely perform service on this product, additional information is provided at the end of this section. (See page iii, *Service safety summary*.)

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

This product shall be used in accordance with local and national codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

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.

When incorporating this equipment into a system, the safety of that system is the responsibility of the assembler of 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.

Do not use the provided power cord for other products.

Power disconnect. The power cord disconnects the product from the power source. See instructions for the location. Do not position the equipment so that it is difficult to operate the power cord; it must remain accessible to the user at all times to allow for quick disconnection if needed.

Use proper AC adapter. Use only the AC adapter specified for this product.

Do not operate without covers. Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

Do not operate with suspected failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly.

Do not operate in wet/damp conditions. Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere.

Keep product surfaces clean and dry. Remove the input signals before you clean the product.

Provide a safe working environment. Always place the product in a location convenient for viewing the display and indicators.

Use only the Tektronix rackmount hardware specified for this product.

Service safety summary

The *Service safety summary* section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this *Service safety summary* and the *General safety summary* before performing any service procedures.

To avoid electric shock. Do not touch exposed connections.

Do not service alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect power. To avoid electric shock, switch off the product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

Use care when servicing with power on. Disconnect power, before removing protective panels, soldering, or replacing components.

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.

When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

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

CAUTION
Refer to Manual

Compliance information

This section lists the EMC (electromagnetic compliance), safety, and environmental standards with which the instrument complies. This product is intended for use by professionals and trained personnel only; it is not designed for use in households or by children.

Questions about the following compliance information may be directed to the following address:

Tektronix, Inc.
PO Box 500, MS 19-045
Beaverton, OR 97077, USA
www.tek.com

EMC compliance

EU EMC Directive

Meets intent of Directive 2014/30/EU for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 55032. Electromagnetic compatibility of multimedia equipment - Emission requirements [1] [2]

Class A radiated and conducted emissions

EN 55103-2. Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 2 Immunity. [2]

Environment E2 – commercial and light industrial

- IEC 61000-4-2. Electrostatic discharge immunity
- IEC 61000-4-3. RF electromagnetic field immunity
- IEC 61000-4-4. Electrical fast transient / burst immunity
- IEC 61000-4-5. Power line surge immunity
- IEC 61000-4-6. Conducted RF Immunity
- IEC 61000-4-11. Voltage dips and interruptions immunity
- EN 55103-2 Annex A. Radiated magnetic field immunity

EN 61000-3-2. AC power line harmonic emissions

EN 61000-3-3. Voltage changes, fluctuations, and flicker

Voltage changes, fluctuations, and flicker

1 This product is intended for use in nonresidential areas only. Use in residential areas may cause electromagnetic interference.

2 For compliance with the EMC standards listed here, high quality shielded interface cables that incorporate low impedance connection between the cable shield and the connector shell should be used.

Australia / New Zealand EMC

Complies with the EMC provision of the Radiocommunications Act per the following standard, in accordance with ACMA:

- EN 55032. Radiated and conducted emissions, Class A.

Safety compliance

This section lists the safety standards with which the product complies and other safety compliance information.

Equipment type

Test and measuring equipment.

Pollution degree descriptions

A measure of the contaminants that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated.

- Pollution degree 1. No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.
- Pollution degree 2. Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.
- Pollution degree 3. Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.
- Pollution degree 4. Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.

Pollution degree rating

Pollution degree 2 (as defined in IEC 61010-1). Rated for indoor, dry location use only.

Measurement and overvoltage category descriptions

Measurement terminals on this product may be rated for measuring mains voltages from one or more of the following categories (see specific ratings marked on the product and in the manual).

- Category II. Circuits directly connected to the building wiring at utilization points (socket outlets and similar points).
- Category III. In the building wiring and distribution system.
- Category IV. At the source of the electrical supply to the building.

NOTE. *Only mains power supply circuits have an overvoltage category rating. Only measurement circuits have a measurement category rating. Other circuits within the product do not have either rating.*

Mains overvoltage category rating

Overvoltage category II (as defined in IEC 61010-1).

Environmental considerations

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

Restriction of hazardous substances

Complies with RoHS2 Directive 2011/65/EU.

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. 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.

This symbol indicates that this product complies with the applicable European Union requirements according to Directives 2012/19/EU and 2006/66/EC on waste electrical and electronic equipment (WEEE) and batteries. For information about recycling options, check the Tektronix Web site (www.tek.com/productrecycling).

Preface

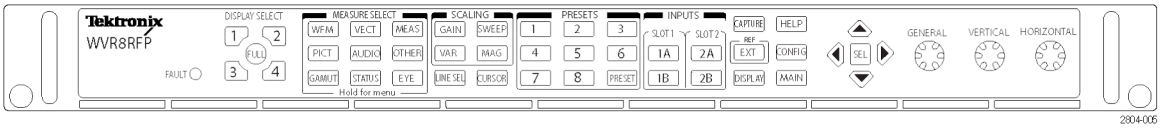
The WVR8RFP is a remote front panel that lets you control WVR8200 and WVR8300 Waveform Rasterizers from a remote location.

The WVR8RFP connects directly to the **Front Panel** connector on the rear panel of the Waveform Rasterizer using the remote cable.

Using an Ethernet connection, the WVR8RFP can control the WVR8200 and WVR8300 Waveform Rasterizers and the WFM8200 and WFM8300 Waveform Monitors.

NOTE. *Ethernet connection requires the WVR8RFP AC-DC Power Adapter, an RS422-to-Ethernet converter, and a custom cable to interface between the WVR8RFP D9-type connector and RS422-to-Ethernet converter.*

The RS422-to-Ethernet converter and custom interface cable are not available from Tektronix.



Installation

This section provides a list of accessories and how to install the WVR8RFP Remote Front Panel.

Standard accessories

Quantity	Description	Part Number
1 ea.	WVR8RFP module	WVR8RFP
1 ea.	25-foot remote cable	012-1721-xx
1 ea.	Instructions	071-2804-xx

Optional accessories

Description	Part Number
100-foot remote cable	012-1720-xx
AC-DC power supply (requires AC power cord)	119-8729-xx
AC power cords	
North America	161-0066-00
Universal Euro	161-0066-09
United Kingdom	161-0066-10
Australia	161-0066-13
Switzerland	161-0154-00
Japan	161-0298-00
China	161-0304-00
India	161-0400-00

Instrument options

Your WVR8RFP may have been ordered with one or more options.

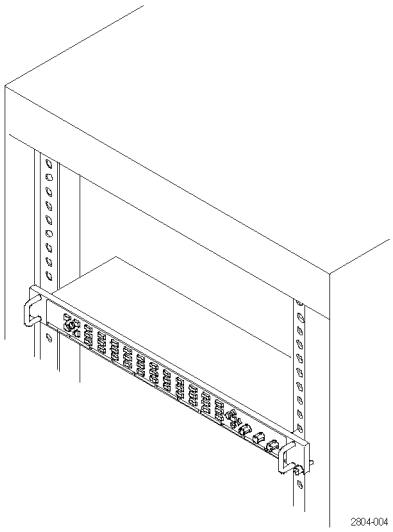
Item	Description	
Option 01	Includes 100-foot remote cable.	
Option PWR	Includes AC-DC power supply. Option PWR includes one of the following power cord options. Power cords for use in North America are UL listed and CSA certified. Cords for use in areas other than North America are approved by at least one authority acceptable in the country to which the product is shipped.	
	North America	A0
	Universal Euro	A1
	United Kingdom	A2
	Australia	A3
	Switzerland	A5
	Japan	A6
	China	A10
	India	A11

Hardware installation

The WVR8RFP installs in a standard equipment rack.

1. Choose a suitable remote location, which must be within reach by the connecting cable. The WVR8RFP includes a 25-foot remote cable to connect to a WVR8200 or WVR8300 Waveform Rasterizer. Should you want to use a different cable, it must meet the specific cable requirements. (See page 11, *Remote cable requirements*.)
2. Mount the WVR8RFP by inserting it in the rack and tightening the front panel retaining screws.

NOTE. *Rackmount rails are not required. The WVR8RFP mounts using the front-panel retaining screws only.*



Connections

The WVR8RFP connects directly to the **Front Panel** D9-type connector on the rear panel of a WVR8200 or WVR8300 Waveform Rasterizer (with a remote cable). Control signals and power is passed through the remote cable; no additional cabling is required.

Using an Ethernet connection, the WVR8RFP can connect to WVR8200 and WVR8300 Waveform Rasterizers or WFM8200 and WFM8300 Waveform Monitors.

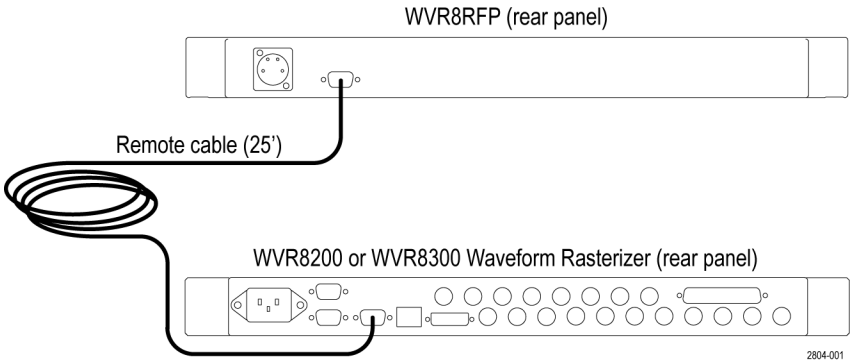
Connecting using the remote cable

Use a remote cable to connect the WVR8RFP directly to a WVR8200 or WVR8300 Waveform Rasterizer. A 25-foot cable is provided for this connection.

NOTE. *An optional 100-foot cable is available. Should you want to build a longer remote cable, it must meet specific cable requirements. (See page 11, Remote cable requirements.)*

NOTE. *WFM8200 and WFM8300 Waveform Monitors cannot be controlled with the remote cable. They require an Ethernet type connection.*

Connect the remote cable from the WVR8RFP 9-pin D-type connector to the **Front Panel** connector on the rear of the Waveform Rasterizer.



The Waveform Rasterizer provides power to the WVR8RFP through the remote cable.

When power is first applied to the remote panel, the remote panel buttons light in sequence until the instrument has established a connection to the remote panel. When a connection is established, the remote panel buttons light identically to those on the front panel of the Waveform Rasterizer.

Connecting using an ethernet cable

You can use an Ethernet connection to expand the remote connection possibilities to include:

- Remote control of WVR8200 and WVR8300 Waveform Rasterizers.
- Remote control of WFM8200 and WFM8300 Waveform Monitors.
- Controlling an instrument with up to four WVR8RFP Remote Front Panels through a local area network.
- Connecting through a network, remote panel to instrument separation is only limited by the network.

You need the following items to make an Ethernet connection:

- RS422-to-Ethernet converter (with IP address and Port number) to convert Ethernet to a D9-pin connector.
- A custom-built cable to interface between the 9-pin D-type connector on the WVR8RFP and the RS422-to-Ethernet converter. (See page 12, *Building a custom interface cable*.)
- AC-DC Power Adapter (optional accessory) for the WVR8RFP.
- Ethernet cables.

Connecting through a local area network. Follow these steps to connect the WVR8RFP to an instrument through a Local Area Network. (See Figure 1.)

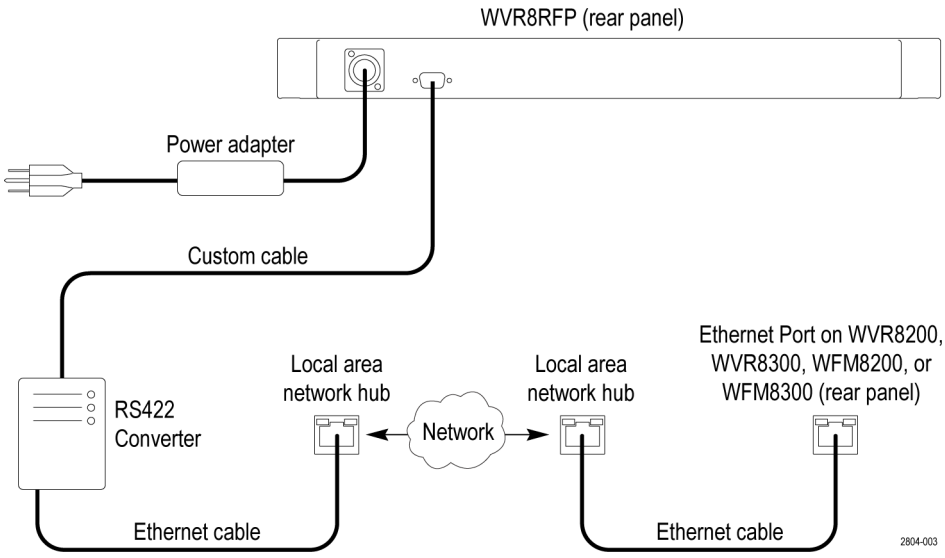


Figure 1: Ethernet connection using LAN

1. Connect the instrument (Waveform Rasterizer or Waveform Monitor) to the network using the Ethernet port on the rear of the instrument.
2. Verify the Waveform Rasterizer or Waveform Monitor is connected to the local area network. (See page 11, *Connecting the instrument to a network*.)
3. Connect the WVR8RFP to your RS422-to-Ethernet converter. You need to use a custom-built cable. (See page 12, *Building a custom interface cable*.)
4. Use an Ethernet cable to connect the RS422-to-Ethernet converter to the local area network.
5. Connect the auxiliary power adapter to the WVR8RFP. The buttons sequentially light while waiting for a remote connection to an instrument.
6. On the instrument you want to control, do the following to enter the IP address and the Port number of the RS422-to-Ethernet converter:

NOTE. *The IP address and Port number are device dependent. See the documentation provided with your device or your system administrator.*

   a. Press the **CONFIG** button on the instrument (not the WVR8RFP) to display the configuration menu.
   b. Use the arrow buttons to navigate to **Network Settings** > **Network Front Panel** > **FP 1 Address** (or any of the four address locations) and press the **SEL** button.
   c. In the Network FP Address menu, enter the IP address and Port number of the RS422-to-Ethernet converter.

NOTE. *The instrument can support any valid IP address and port number combination if it matches the network configuration of the RS422-to-Ethernet converter. The IP address should be assigned by a network administrator. While you can use DHCP to automatically assign IP addresses, DHCP servers may also reassign addresses.*

RS422-to-Ethernet controllers typically require configuration through a web interface. To make sure that the converter will remain accessible on the network, static IP addresses are preferred. (See page 13, RS422-to-Ethernet converter configuration.)

   d. Select **Accept**.
   e. Use the up or down arrow buttons to navigate to **FP Enable**. Press **SEL** button to set to **On**.

7. Watch the lights on the WVR8RFP. The buttons continue to light in sequence until communication between the WVR8RFP and instrument is established.

   Once a connection is established, the lit buttons on the WVR8RFP will match those on the instrument. This can take several seconds, depending on the network.

8. Repeat steps 3 through 7 for each WVR8RFP (up to four) that you want to connect to the instrument.

Connecting without a local area network. Follow these steps to connect the WVR8RFP to the Ethernet port on the rear panel of the instrument. (See Figure 2.)

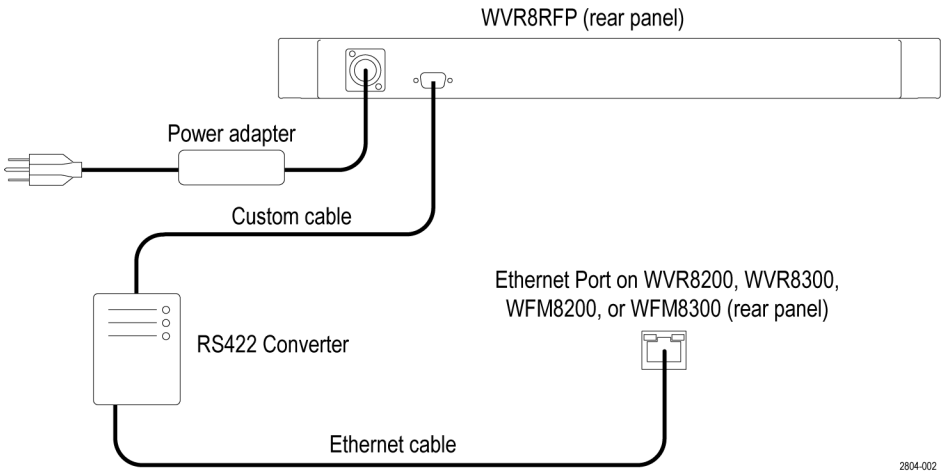


Figure 2: Ethernet connection directly to instrument

1. Connect the WVR8RFP to your RS422-to-Ethernet converter. You need to use a custom-built interface cable. (See page 12, *Building a custom interface cable*.)

2. Use an Ethernet cable to connect the RS422-to-Ethernet converter to the Ethernet port on the rear of the instrument. The instrument has an auto-crossover feature so a crossover Ethernet cable is not required.

3. Connect the AC-DC power adapter to the WVR8RFP. The buttons sequentially light while waiting for a remote connection to an instrument.

4. On the instrument you want to control, enter the IP address and the Port number of the RS422-to-Ethernet converter.

NOTE. *The IP address and Port number are device dependent. See the documentation provided with your device or your system administrator.*

   a. Press the **CONFIG** button on the instrument (not the WVR8RFP) to display the configuration menu.

   b. Use the arrow buttons to navigate to **Network Settings** > **Network Front Panel** > **FP 1 Address** (or any of the four address locations) and press the **SEL** button.

   c. In the Network FP Address menu, enter the IP address and Port number of the RS422-to-Ethernet converter.

NOTE. *The instrument can support any valid IP address and port number combination if it matches the network configuration of the RS422-to-Ethernet converter. When connected directly to the instrument, the IP address of the RS422-to-Ethernet converter must be in the subnet defined by the IP address and netmask of the instrument net configuration.* *(See page 13, RS422-to-Ethernet converter configuration.)*

   d. Select **Accept**.

   e. Use the up or down arrow buttons to navigate to **FP Enable**. Press **SEL** button to set to **On**.

5. Watch the lights on the WVR8RFP. The buttons continue to light in sequence until communication between the WVR8RFP and instrument is established.

   Once a connection is established, the lit buttons on the WVR8RFP will match those on the instrument.

Operation

Operating the instrument from the WVR8RFP remote front panel is the same as operating the front panel of the instrument. If remotely controlling an instrument from several WVR8RFP remote front panels, each remote panel operates in parallel with the front panel of the instrument.

See the documentation for your instrument for operating details about each control.

Fault conditions. The FAULT light on the WVR8RFP lights for detected hardware faults of the instrument it is controlling. If lit, check to see if the fault light on the instrument under control is also lit. If the instrument fault light is on, refer to your user documentation for the instrument.

If the FAULT light is lit on the WVR8RFP but the fault light on the instrument under control is not lit, there is a low voltage condition to the WVR8RFP. Check the remote cable connections and if using, the AC-DC Power Adapter.

Reference

Tips and notes

- Presets do not store network settings.
- When connected to a WFM8200 or WFM8300 Waveform Monitor, pressing the **PRESET** button on the Waveform Monitor causes the **WFM**, **VECTOR**, **PICT**, **AUDIO**, **GAMUT**, **STATUS**, **MEAS**, and **EYE** buttons to light on the WVR8RFP. This is because the **PRESET** button on a Waveform Monitor enables these buttons to function as presets. This does not impact the function of the WVR8RFP.

Remote cable requirements

The WVR8RFP ships with a 25-foot remote cable. An optional 100-foot cable is available.

The WVR8RFP supports longer remote cable lengths under the following conditions:

- The WVR8RFP supports up to 1000-feet of remote cable length without auxiliary power (using the AC-DC Power Adapter). The actual cable length is limited by the DC resistance between the power and ground lines of the cable. The maximum total resistance for power to ground loop is 9 Ω.
- The WVR8RFP supports up to 4000-feet of remote cable length with auxiliary power from the AC-DC Power Adapter. The actual cable length is limited by the cable bandwidth.

When using remote cables over 100 feet, it's recommended that the Rx and Tx differential pair signal lines be carried on the twisted pair wires in the cable. The Front Panel connector table provides the functions of each pin. (See Table 1 on page 12.)

Connecting the instrument to a network

To connect a WVR8200, WVR8300, WFM8200, or WFM8300 to a local area network, you must set the IP address. Network addresses are assigned either automatically (DHCP) or manually. If your network does not use DHCP, you will have to manually enter the address for the instrument. To get an address, talk to your LAN administrator.

1. Press **CONFIG** to display the Configuration menu.
2. Select **Network Settings** > **Web Enable**. Press **SEL** to select **On**.
3. Set the **IP Config Mode** to Manual or DHCP, depending on your network setup.
4. If you cannot use DHCP, set the subnet mask and gateway address network parameters in this menu; see your LAN administrator for required values. (Be sure to use compatible addresses between network devices and the instrument.) You can also set the instrument name and view the MAC Address.

5. Press **CONFIG** to close the Configuration menu.
6. From a PC, use a web browser to verify you can connect to the instrument by entering the IP address in the Address bar of the web browser.

Building a custom interface cable

To connect the WVR8RFP using Ethernet, you need to use an RS422-to-Ethernet converter. To connect the WVR8RFP to your RS422-to-Ethernet converter, you need to build an interface cable that connects from the 9-pin D-Type connector of the WVR8RFP to your RS422-to-Ethernet converter.

Use the following table to identify the function of each pin of the WVR8RFP connector. Map the necessary functions to your RS422-to-Ethernet converter.

Table 1: WVR8RFP D9 connector pin descriptions

Pin	Description
1	RX+ (RS422 input from RFP, Terminated)
2	RX– (RS422 input from RFP, Terminated)
3	Not used for Ethernet connection. +12 V DC power to RFP
4	Not used for Ethernet connection. Ground (chassis and 12 V DC return)
5	Not used for Ethernet connection. Ground (chassis and 12 V DC return)
6	Not used for Ethernet connection. +12 V DC power to RFP
7	TX+ (RS422 output to RFP)
8	TX– (RS422 output to RFP)
9	Not used for Ethernet connection. Fault output (5 K pull up to 12 V indicates fault, ground indicates OK)

RS422-to-Ethernet converter configuration

The WVR8RFP uses an RS422 interface. The RS422 interface is similar to RS232, but uses differential pairs of wires for transmitting and receiving data. The WVR8RFP requires a dedicated, point-to-point, RS422, 4-wire interface. The WVR8RFP is not capable of sharing the serial connection with any other device.

The serial port settings for the RS422 are 38400 8N1 (38400 baud, 8 data bits, no parity, and 1 stop bit).

NOTE. *The serial interface does not support either hardware or software flow control. The serial interface is full-duplex (simultaneous send and receive).*

An RS422-to-Ethernet converter encapsulates the serial communications on the RS422 interface into a Transport Control Protocol (TCP) connection. The instrument initiates contact with the WVR8RFP by establishing a TCP connection to the RS422-to-Ethernet converter. Once connected, the instrument maintains a continuous connection with the WVR8RFP.