

WVR5200
Waveform Rasterizers
System Integration
Technical Reference



077-0549-00

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Technical Reference

Warning

The service instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

www.tektronix.com

077-0549-00

Tektronix

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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.tektronix.com to find contacts in your area.

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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.

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.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

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.

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:



CAUTION
Refer to Manual



Standby

Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

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 instrument power, then disconnect the power cord from the mains power.

Use Care When Servicing With Power On. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

Preface

This document provides information for system integrators who are designing systems for high-definition (HD), standard-definition (SD), and 3 Gb/s SDI digital video content where the Tektronix WVR5200 Waveform Rasterizer is to be deployed.

Where to Find More Information

The following tables list the documentation that is available for the product and shows where you can find it: in a printed manual, on the product documentation CD-ROM, or on the Tektronix Web site.

Table i: Product documentation

Item	Purpose	Location
Installation and Safety Instructions	Provides safety and compliance information along with hardware installation instructions to present the associated safety warnings. This manual is available in English, Japanese, and Simplified Chinese.	Printed manual and also available in electronic format at www.tektronix.com/manuals
User Manual	Provides operation and application information.	Product Documentation CD and available at www.tektronix.com/manuals
Online Help	In-depth instrument operation and UI help.	On the instrument
Specifications and Performance Verification Technical Reference	Specifications and procedures for checking instrument performance.	Product Documentation CD and available at www.tektronix.com/manuals
WFM and WVR Series Management Information Database (MIB) Programmer Manual	SNMP command reference for remotely controlling the instrument.	Product Documentation CD and available at www.tektronix.com/manuals
Service Manual	Provides information about adjustments, repair, and replaceable parts.	Available at www.tektronix.com/manuals

Table ii: Related reference documents

Item	Purpose	Location
Top 10 Application-Based Presets	Describes useful presets and how to set them up.	Product Documentation CD and available at www.tektronix.com
Preventing Illegal Colors (application note)	Describes how the Diamond, Arrowhead, and Lightning displays can be used to help prevent the undesired impact of color gamut violations and to simplify the assessment of proper gamut compliance.	Product Documentation CD and available at www.tektronix.com/manuals
Understanding Colors and Gamut (poster)	Provides a large visual display of how the Diamond, Arrowhead, and Lightning displays can be used to help prevent the undesired impact of color gamut violations.	Available at www.tektronix.com/manuals
A Guide to Standard and High Definition Digital Video Measurements (primer)	This book explains the basics of making standard and high-definition, digital-video measurements.	Product Documentation CD and available at www.tektronix.com/manuals
Analog and Digital Audio Monitoring (application note)	Describes how to monitor analog and digital audio signals. Also discussed are specific differences in the methods used to monitor analog audio versus digital audio, and how to plan the transition from monitoring analog audio to monitoring digital audio.	Available at www.tektronix.com/manuals
Audio Monitoring (application note)	Describes balanced and unbalanced audio signals, and explains the physical and electrical characteristics and the specific strength and weaknesses of the different digital audio signal formats.	Available at www.tektronix.com/manuals
Monitoring Surround Sound Audio (application note)	Describes the basics of 5.1-channel surround sound audio and tells how to use the Surround Sound display to visualize key audio-level and phase relationships in this audio format.	Available at www.tektronix.com/manuals
NTSC Video Measurements (primer)	This book explains the basics of making NTSC video measurements.	Product Documentation CD and available at www.tektronix.com/manuals
PAL Systems Television Measurements (primer)	This book explains the basics of making PAL video measurements.	Product Documentation CD and available at www.tektronix.com/manuals

Table iii: Graphics and photos for system integrators

Item	Purpose	Location
Front and rear panel photos of the WVR5200	These photos might be useful if you need to present information to your customer	Product Documentation CD
Front and rear panel line art	This line art might be useful if you need to present information to your customer	Product Documentation CD and this manual

Physical, Environmental, and Power Specifications

The physical, environmental, and power specifications apply to all instrument models. Use this information to ensure proper ventilation and clearance when installing an instrument into a rack.

Table 1: Physical specifications

Characteristic	Description	
Dimensions	Height	1.71 in (43.4 millimeters)
	Width	8.12 inches (206.3 millimeters)
	Depth (front to back including handles and BNCs)	4.75 inches (120.7 millimeters)
Weight	Net	1.8 pounds (0.82 kilograms)
	Shipping	12 pounds (5.4 kilograms), approximate, excluding options and accessories
Required Clearances	Bare Instrument (no optional sleeves)	Do not block more than half the vent holes on the sides.
	Rack	Use only the VTSRACK-S2, VTSRACK-L1, or VTSRACK-L2 rackmount adapters for this instrument. The rack intake air to the side vents must not exceed 40 °C.

Table 2: Power specifications

Characteristic	Description	
Power	Input Voltage	100 to 240 VAC, continuous
	Input Power Frequency	50 or 60 Hz
	Power Consumption, typical	50 to 110 VA at 110 or 240 VAC

NOTE. More information about the power connector is available in this document. (See page 5, Power Connector.) You can also read about the power-on and power-off procedures. (See page 14.)

Table 3: Environmental specifications

Characteristic	Description	
Temperature	Operating	0 °C to +40 °C
	Nonoperating	-20 °C to +60 °C
Humidity	Operating	20% to 80% RH (relative humidity) at up to +40 °C, noncondensing
	Nonoperating	5% to 90% RH (relative humidity) at up to +60 °C, noncondensing

Table 3: Environmental specifications (cont.)

Characteristic	Description	
Altitude	Operating	9,842 feet (3,000 meters)
	Nonoperating	40,000 feet (12,192 meters)
Cooling	The variable fans provide forced air circulation. Do not block ventilation openings. The intake air vents in the front of the instrument must not be blocked and the rear exhaust vents requires at least 1 inch of clearance. No clearance is required above or below the instrument.	

Rack Installation

You can install your instrument into a standard 19-inch instrument rack with one of the following rackmount kits:

- VTSRACK-S2: Full rack (19"), short depth, 1RU adapter (with zero clearance mounting) to fit one or two (side by side) WVR5200 instruments.
- VTSRACK-L1: Full rack (19"), full depth, 1RU adapter (with 1.75" rack space) to fit one instrument.
- VTSRACK-L2: Full rack (19"), full depth, 1RU adapter (with zero clearance mounting) to fit one or two (side by side) instruments.

See the instruction manual that is included with the rack adapter kit for installation procedures.

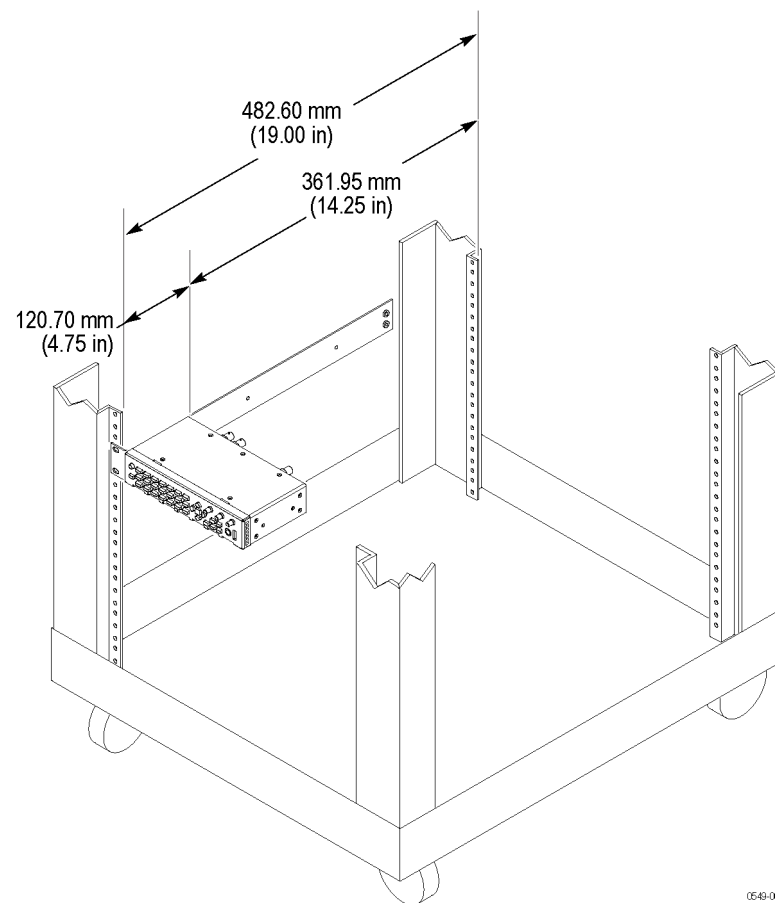


Figure 1: Depth dimensions of WVR5200 in a standard 19 inch rack.

Instrument Connectors

The instrument has connectors on the front and rear panels. The following pages describe the connector types, pin numbering, and associated signal requirements.

NOTE. More illustrations and photographs of these instruments are available in JPEG format on the Tektronix Web site (www.tektronix.com) and on the Product Documentation CD that was shipped with your instrument.

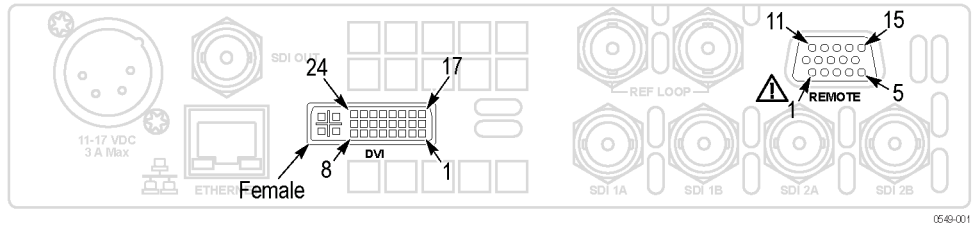
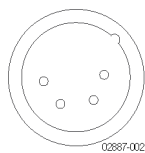


Figure 2: Rear panel

Power Connector



NOTE. *If you ordered a power cord, it will come with a ferrite core. Install the ferrite core as shown in the instructions with which it was shipped.*

The instrument operates from an external AC adapter and has the following power requirements:

- A single-phase power source with one current-carrying conductor at or near earth-ground (the neutral conductor).
- The power source frequency must be 50 or 60 Hz, and a operating voltage range must be from 100 to 240 VAC, continuous.



WARNING. *To reduce risk of fire and shock, make sure the mains supply voltage fluctuations do not exceed 10% of the operating voltage range.*

- Systems with both current-carrying conductors live with respect to ground (such as phase-to-phase in multiphase systems) are not recommended as power sources.

NOTE. *Only the line conductor is fused for over-current protection. The fuse is internal and not user replaceable. Do not attempt to replace the fuse. If you suspect the fuse has blown, return the unit to an authorized service center for repair.*

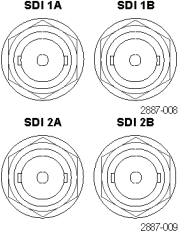

SDI Video Connectors

SDI inputs are self-terminating inputs. Use the SDI 1A, 1B, and SDI 2A and 2B inputs to connect serial digital video signals to the instrument.

The SDI OUT can be selected to output either the looped-through input signal or a test signal that contains configurable error brightups. This is done from the Config > Outputs > SDI Output menu.

The following table lists the characteristics of the SDI video connectors.

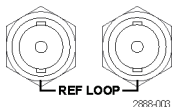
Table 4: SDI video connector specifications

Connector	Characteristic	Description
 <p>SDI 1A SDI 1B SDI 2A SDI 2B</p>	Input Type	BNC, 75 Ω internally terminated
	Input Level	800 mV ± 10%
	Cable Loss Accommodation: 270 Mb/s	0 to 30 dB attenuation at ½ of serial rate Equivalent to approximately 300 m of Belden 8281 at 270 Mb/s
	Cable Loss Accommodation: 1.5 Gb/s, 3 Gb/s	0 to 20 dB attenuation at ½ of serial rate Equivalent to approximately 80 m of Belden 8281 at 1.485 Gb/s. Typical performance to 110 m
 <p>SDI OUT</p>	Output Type	BNC, 75 Ω internally terminated
	Output Level	800 mV ± 10% into 75 Ω load

Video External Reference Connector

Use the REF LOOP connector to input a composite Black Burst signal or a tri-level sync signal for use as a sync timing reference for the selected video input signal. The following table lists the signal characteristics of the external reference connectors.

Table 5: External reference connector specifications

Connector	Characteristic	Description
 <p>REF LOOP</p>	Input Type	BNC, passive loop-through, 75 Ω compensated
	Input Level	-6 to +6 dB
	Maximum Input Voltage Level	± 5 V, DC
	Maximum Absolute Input Voltage	± 5 V, DC

Remote Connector

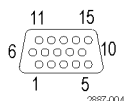
The Remote connector is a 15-pin, female, D-type connector with socket contacts. It uses ground closures for remote control and sending indications to external equipment when alarms have occurred. The input of LTC is through the REMOTE connector.

Use the Remote connector to input LTC time code signals, and to remotely select one of the first four instrument presets in group “A” using ground closure. The following table lists the signal characteristics of the Remote connector.

NOTE. For more information on Preset recall, refer to the user manual on the Product Documentation CD that was shipped with your instrument.

Table 6: Remote connector pin assignments and specifications

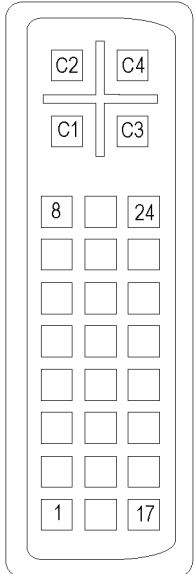
Characteristic	Pin out	Preset functions			
Connector Pin Assignments	1 GND (In)	<i>Hex</i>	<i>Binary</i>	<i>Direct mode selection</i>	<i>Encoded mode selection</i>
	2 Reserved (I/O)		<i>Pins 15, 14, 13, 12, 11, 10</i>		
	3 Reserved (I/O)				
	4 Reserved (In)				
	5 Reserved (In)	F	111111	none	No action
	6 GND (In)	E	XX1110	Preset 1	No action
	7 Time Code Positive (LTC In)	D	XX1101	Preset 2	No action
	8 Time Code Negative (LTC In)	C	XX1100		SDI 2A/2B
	9 Ground Closure (Alarm Out)	B	XX1011	Preset 3	SDI 1A/2A
	10 Preset 1 (In)	A	XX1010		No action
	11 Preset 2 (In)	9	XX1001		No action
	12 Preset 3 (In)	8	XX1000		Preset 8
	13 Preset 4 (In)	7	XX0111	Preset 4	Preset 7
	14 Preset 5 (In)	6	XX0110		Preset 6
	15 Preset 6 (In)	5	XX0101		Preset 5
	4	XX0100		Preset 4	
	3	XX0011		Preset 3	
	2	XX0010		Preset 2	
	1	XX0001		Preset 1	
	0	XX0000		Unused	
	N/A	101111	Preset 5	N/A	
	N/A	011111	Preset 6	N/A	
Characteristic	Description				
LTC Input Connector	15-pin DSUB, balanced, unterminated				
LTC Input Signal	Longitudinal Time Code per IEC Publication 461				
LTC Signal Amplitude Range	0.2 V _{p-p} to 5.0 V _{p-p} balanced differential or single-ended				
Ground Closure Input Signal	TTL thresholds, 5 V max input, -0.5 min input; pull low to assert				
Ground Closure Output Signal	One open collector output				



EXT DISPLAY Connector

The EXT DISPLAY connector is a female DVI-I connector with socket contacts. This is the external display monitor output. The display resolution is 1024 x 768. The output supports DVI monitors directly and analog PC (RGB) monitors with the use of a DVI-I to VGA adapter.

Table 7: EXT DISPLAY connector specifications

Connector	Pin	Description	Pin	Description	
 <p style="text-align: center; font-size: small;">0392-017</p>	1	TMDS Data 2– Red – (Link 1)	13	TMDS Data 3+ Blue + (Link 2)	
	2	TMDS Data 2+ Red + (Link 1)	14	Ground	
	3	TMDS Data 2/4 shield	15	+ 5 V Power for monitor when in standby	
	4	TMDS Data 4– Green – (Link 2)	16	Hot plug detect	
	5	TMDS Data 4+ Green + (Link 2)	17	TMDS Data 0– Blue – (Link 1) and digital sync	
	6	DDC clock	18	TMDS Data 0+ Blue + (Link 1) and digital sync	
	7	DDC data	19	TMDS data 0/5 shield	
	8	Analog vertical sync	20	TMDS Data 5– Red – (Link 2)	
	9	TMDS Data 1– Green – (Link 1)	21	TMDS Data 5+ Red + (Link 2)	
	10	TMDS Data 1+ Green + (Link 1)	22	TDMS clock shield	
	11	TMDS Data 1/3 shield	23	TDMS clock + Digital clock + (Links 1 and 2)	
	12	TMDS Data 3– Blue – (Link 2)	24	TDMS clock – Digital clock – (Links 1 and 2)	
	C1	Analog red	C4	Analog horizontal sync	
	C2	Analog green	C5	Analog ground Return for R, G, B signals	
	C3	Analog blue			
	Characteristic	Description			
	Output Connector	DVI-I (integrated, digital and analog)			

Ethernet Connector

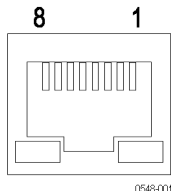
Use the Ethernet connector to connect the waveform monitor to your local network. A network connection is required for remote control, software upgrades, and enabling some instrument options.

The Ethernet connector includes built-in green and yellow LEDs to indicate signal status as indicated below:

- Lit green LED indicates connection is active
- Lit yellow LED indicates a 100 MB transmission rate
- Unlit yellow LED indicates a 10 MB transmission rate


The following table lists the signal characteristics of the Ethernet connector.

Table 8: Ethernet connector pin assignments

Connector	Pin/LED	Name	Description
	1	TX_D1+	Transceive Data+
	2	TX_D1-	Transceive Data-
	3	RX_D2+	Receive Data+
	4		Not used
	5		Not used
	6	RX_D2-	Receive Data-
	7		Not used
	8		Not used
Characteristic	Description		
Ethernet connector	RJ-45 LAN supporting 10/100/1000 BaseT; supports manual and DHCP address modes		

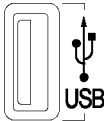
Headphone Jack Use the headphone jack, located on the front panel, to listen to the audio associated with the selected video input signal. The following table describes the signal characteristics of the headphone jack.

Table 9: Headphone jack specifications

Connector	Characteristic	Description
	Output Type	Standard 1/4-inch stereo phone jack, capable of driving a 6.25 dBu sine wave into 32 Ω or 16 Ω

USB Connector Use the USB connector, located on the front panel, to save and restore instrument presets and captured data using a USB memory drive. The following table describes the signal characteristics of the USB connector.

Table 10: USB connector specifications

Connector	Characteristic	Description
	Type	Host
	Speed	Complies with USB 1.1 and 2.0 Full Speed Specification (12 Mb/s)

Video System Installation

The instrument can operate almost anywhere in the distribution system.

NOTE. See the *Specifications and Performance Verification manual on the Product Documentation CD for maximum-allowed cable lengths.*

Connect a Monitor

This instrument can be used with or without a monitor. For setup purposes, you will want to connect the instrument to a monitor as follows.

1. Connect a monitor to the DVI port on the rear-panel of the instrument.
2. Connect the appropriate power cord to the monitor and then to a power source.
3. Turn on the monitor. You will not see a waveform until you have connected a signal to the instrument and turned on the power. (See page 15, Install in a Video System.) (See page 17, Power-On and Power-Off Procedure.)

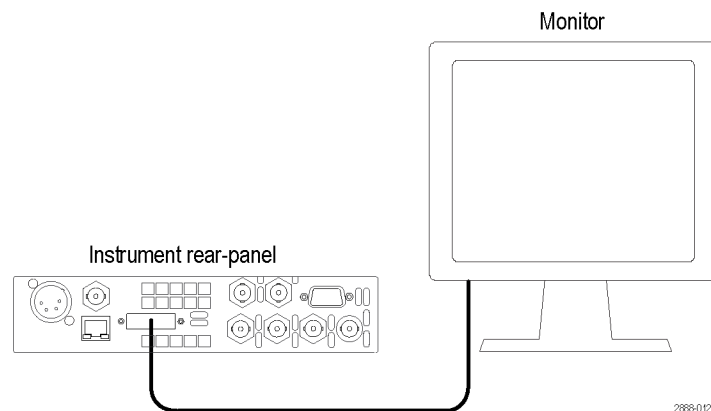


Figure 3: Connecting a monitor to the instrument

Install in a Video System

The instrument can operate almost anywhere in the distribution system where serial digital system monitoring is needed.

For Monitoring the Video Bit Stream of a Serial Receiver. Route one or more incoming serial signals into the SDI inputs on the rear-panel of the instrument.

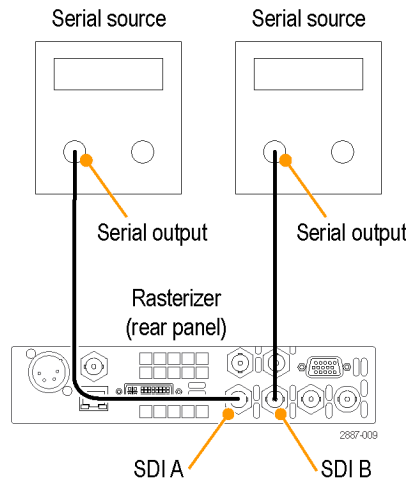


Figure 4: Connecting SD, HD, or 3 Gb/s SDI signals

NOTE. See the *Specifications and Performance Verification manual on the Product Documentation CD* for maximum-allowed cable lengths.

For Monitoring the Embedded Audio Signal in a Serial Digital Video Stream

Route the incoming serial signal into one of the instrument SDI inputs.

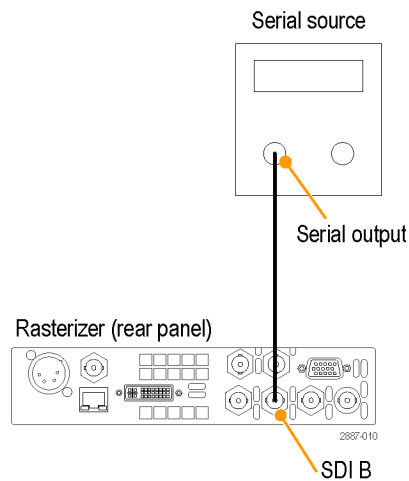


Figure 5: Connecting an SD, HD, or 3 Gb/s signal with embedded audio

For Monitoring the External Reference Signal

Route the incoming reference signal into one of the instrument REF inputs and terminate the other connector with a 75 Ω terminator to ensure a closed loop.

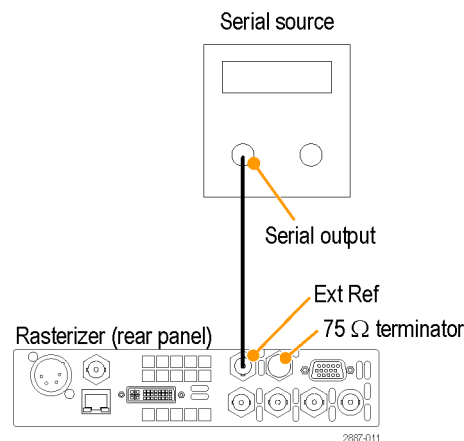


Figure 6: Connecting an external reference signal

Line Termination

Your instrument uses a passive loop-through reference input. Accordingly, the loop-through input must be terminated externally. It is important that this external termination meets accuracy and return loss requirements.

If the instrument is installed to monitor an operating link, the destination receiver and the connecting cable serve as the termination. This monitoring connection checks the performance of the entire path. The return loss of the instrument is sufficiently high that, in most cases, the destination receiver sets the system return loss.

In cases where the instrument is placed at the end of a link, a BNC termination must be installed on one side of the loop-through reference connector. The termination must be 75 Ω and DC coupled (good return loss extends to DC). An appropriate termination for the EXT REF connector is Tektronix part number 011-0102-00; this is a 75 Ω , End-of-Line termination.

Compatibility of BNC Center Pins

Most BNC connectors for video equipment, whether 50 Ω or 75 Ω , use a 50 Ω standard center pin. Some laboratory 75 Ω BNC connectors use a smaller diameter center pin. The BNC connectors on the instrument are designed to work with the 50 Ω standard (large diameter) center pins.

Do not use connectors or terminators with the smaller center pins. They could cause intermittent connections.

Power-On and Power-Off Procedure

This instrument operates from a single-phase power source with the neutral conductor at or near earth ground. The line conductor is fused for over-current protection. A protective ground connection through the grounding conductor in the power cord is essential for safe operation.

AC Power Requirements

The instrument operates from an external AC adapter with a line frequency of 50 or 60 Hz, over the range of 100-240 Volts, without the need for configuration, except the power cord. (See page 2, International power cords.) The typical power draw is 22 Watts. Refer to the WVR5200 Specifications and Performance Verification Technical Reference on the Product Documentation CD for additional information on power and environmental requirements.

Power-On

1. Connect the supplied power cord to the rear-panel power connector.
2. Press the power button on the instrument front-panel and the instrument will turn on.

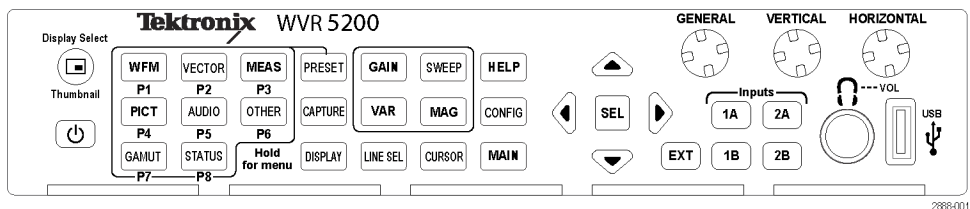


Figure 7: Front panel

NOTE. The Standby button on the front-panel does not disconnect mains power. Only the power cord at the rear of the product can disconnect mains power.

Make sure that the power cord is accessible when the product is operating.

Power-Off

1. Press the power button on the instrument front-panel to turn the instrument off.
2. To remove power completely, disconnect the power cord from the rear-panel of the instrument

Network Operation

This section provides the following information for operating the instrument on a local LAN network:

- How to configure the instrument for operation on an IP network
- How to configure the instrument to send and/or receive SNMP remote commands
- How to use a Web browser to start a remote application to enable control of the instrument, or to download the Event and Diagnostic log files, or to capture images of the instrument display

Ethernet Connection

Connect the instrument to your network using an Ethernet cable. You can connect it directly to the instrument or through a HUB, as shown below.

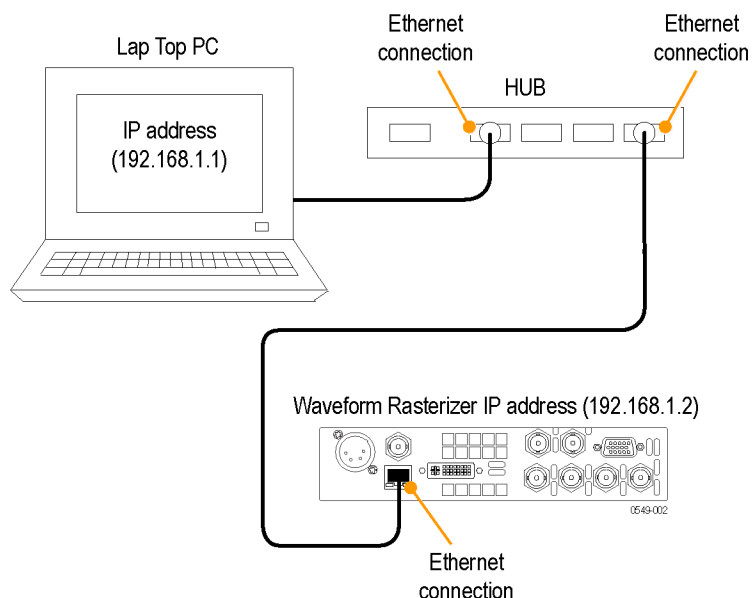


Figure 8: Connecting Ethernet

IP Settings Configuration

To allow network access to the instrument, you need to set the IP address. Assign Network addresses either automatically (DHCP) or manually. If your network does not use DHCP, you need to manually enter the address for the instrument. To obtain a valid IP address, contact your LAN administrator.

Perform the following steps to configure the IP settings on the instrument:

1. Press the **CONFIG** button to display the Configuration menu.
2. Use the General knob to navigate to **Network Settings**.
3. Press the right arrow key to select **IP Config Mode**.
4. Press the **SEL** button to select between **DHCP** and **Manual**.
5. If you selected DHCP, you are finished.
6. If you selected Manual mode, you need to set the Subnet Mask and Gateway Address parameters. Contact your LAN administrator for these values. (Be sure to use compatible addresses between the PC and the instrument.)
7. Press the down arrow key to select **IP Address**.
8. Press the right arrow key. A dialog box will appear that allows you to enter the IP address.
9. Repeat steps 7 and 8 for the Subnet Mask and the Gateway Address.
10. If desired, select **Instrument Name** and then press the right arrow button to assign the instrument a network name.
11. Press the **CONFIG** button to close the configuration menu.

SNMP Remote Control Configuration

SNMP remote control is primarily intended for instrument access using automated systems. If you intend to use SNMP commands to control the instrument, you must first configure the SNMP settings on the waveform monitor.

NOTE. *The SNMP commands are contained in a MIB (Management Information Base). Refer to the WFM Series Waveform Monitors and WVR Series Waveform Rasterizers Management Information Base Technical Reference (Tektronix part number 077-0261-XX) for information about using the MIB to control the instrument.*

The procedure to configure SNMP settings is similar to that previously described for configuring the IP settings. Touch SNMP Setup in the Communication submenu of the Main menu to configure the following SNMP parameters:

- Remote SNMP Enable. Use this setting to configure the remote access to the instrument via SNMP. You can select Off or On.
- SNMP Traps. Use this setting to enable or disable the SNMP traps that are sent from the instrument when error conditions are detected.
- Trap Destination Address. Use these settings to enter up to four different IP addresses to which SNMP traps will be sent when error conditions are detected.

NOTE. *A value of all zeroes for the IP address will disable that trap output.*

- Private Community String. Use this menu setting to enter the Private Community string, which effectively is a password. Without this string, SNMP commands cannot change values in the waveform monitor.

NOTE. *Use the Private Community String to control the ability of SNMP commands to make changes to the waveform monitor. Use the Public Community String to control the ability of SNMP commands to read information from the waveform monitor.*

- Public Community String. This menu entry allows you to set the Public Community string. This string is effectively a password. Without this string, SNMP commands cannot read information from the instrument.

Web Browser Operation

You can connect to an instrument installed on an Ethernet IP network without installing any software and using only a Web browser. Using the Web browser, you can perform the following functions:

- Start a remote application to enable control of the instrument
- Download the Event and Diagnostic log files
- Capture images of the instrument display

Perform the following steps to connect to the instrument using a Web browser:

1. Verify that the instrument is configured for IP network operation and note the IP address. (See page 16, *IP Settings Configuration*.)
2. Press the **CONFIG** button.
3. Use the General knob to navigate to **Network Settings**.
4. Press the right arrow key and then use the General knob to navigate to **Web Enable**.
5. Press the **SEL** button to select **On**.
6. On your PC, start your Web browser and enter the network address of the instrument into the URL entry box like this:

`http://123.123.123.123/`

NOTE. Many Web browsers do not correctly interpret IP addresses with leading zeros. If the IP address shown in the Configuration menu contains leading zeros, remove any leading zeros when you enter the address in the browser.

For example, the IP address 124.161.038.092 should be entered as follows:

124.161.38.92

7. The Web browser will display the remote interface for the instrument. To make a selection, click the desired link.