

WFM6100, WFM7000, and WFM7100 Waveform Monitors System Integration Technical Reference

Revision A

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

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Tektronix

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

Table of Contents

General Safety Summary	ii
Service Safety Summary	iv
Preface	v
Related User Documents	v
Related Reference Documents	vi
System Integration	1
Installation Considerations	5
Power and Environmental Specifications	6
Connector Specifications	8
Rackmount Installation	17
Network Operation	21

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.

Connect and Disconnect Properly. Do not connect or disconnect probes or test leads while they are connected to a voltage source.

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



WARNING
High Voltage



Protective Ground
(Earth) Terminal

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 is provided as an aid for system integrators who are designing systems for high-definition (HD) and standard-definition (SD) digital video content where the Tektronix WFM6100, WFM7000, and WFM7100 Waveform Monitors are to be deployed.

Tektronix provides many products designed to test, measure, and monitor analog and digital video/audio signals. These products include waveform monitors, audio monitors, signal generators, and video measurement sets. For MPEG video signals, Tektronix also provides test systems, transport stream monitors, players/recorders, and portable analyzers.

Related User Documents

The following table lists the related user documents for the WFM6100, WFM7000, and WFM7100 Waveform Monitors. The table also indicates whether the document is printed, and whether the PDF of the document is available only on the Tektronix Web site (www.tektronix.com) or also on the User Documents CD that accompanies the printed Quick Start User Manual.

Table i: Related user documents

Document	Tektronix part number	Description	Availability		
			Print	Web	CD
Release Notes	071-1895-XX	Describes any known problems or behaviors that you might encounter while using the waveform monitor.	✓	✓	✓
Quick Start User Manual	020-2705-XX (English) 020-2706-XX (Japanese) 020-2707-XX (Chinese)	This document is a printed Quick Start User Manual and contains the basic operating information for the instrument. Included in the manual is a CD-ROM containing PDFs of the user documents.	✓	✓	✓
User Technical Reference	071-1894-XX	Contains the detailed operating information for the instrument.		✓	✓
Specifications and Performance Verification Technical Reference	071-1897-XX	Contains the complete published specifications for the instrument and the performance verification procedure.		✓	✓
Service Manual	071-1896-XX	Provides servicing information for the instrument and is intended for qualified service personnel only.	✓	✓	
Management Information Base (MIB) Technical Reference	071-1592-XX	Contains information about using the Management Information Base (MIB) to control the instrument.		✓	✓

Related Reference Documents

The following table lists the related reference documents for the WFM6100, WFM7000, and WFM7100 Waveform Monitors. The table also indicates whether the PDF of the document is available only on the Tektronix Web site (www.tektronix.com) or also on the User Documents CD that accompanies the printed Quick Start User Manual.

Table ii: Related reference documents

Document	Description	Availability	
		Web	CD
Preventing Illegal Colors	This 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.	✓	✓
Understanding Colors and Gamut	This 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.	✓	
A Guide to Standard and High Definition Digital Video Measurements	This book is a primer for understanding the basics for making standard and high-definition, digital-video measurements.	✓	✓
Analog and Digital Audio Monitoring	This 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.	✓	
Audio Monitoring	This 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.	✓	
Monitoring Surround Sound Audio	This 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.	✓	
NTSC Video Measurements	This book is a primer for understanding the basics for making NTSC video measurements.	✓	✓
PAL Systems Television Measurements	This book is a primer for understanding the basics for making PAL video measurements.	✓	✓

System Integration

The WFM6100, WFM7000, and WFM7100 Waveform Monitors offer the monitoring capabilities needed in the production, post-production, distribution, and transmission of high-definition (HD) and standard-definition (SD) digital video content. With available digital audio monitoring support, you can expand the capabilities to monitor both digital video and audio in a single instrument.

The following table lists the available waveform monitor models. The illustrations on the following pages show the front panel of the waveform monitor, and also show the rear panel of the waveform monitor when Option EYE or PHY is not installed and when one of the two options is installed. The location of the SDI video connectors changes when Option EYE or PHY is installed.

Table 1: Waveform monitor models

Model	Usage	Features
WFM6100	For quality assessment and control in video production, distribution and broadcast systems using SD digital video	<ul style="list-style-type: none"> ■ Extended event logging and video/audio session screens ■ Triggered data capture ■ Automated quality checking with Tektronix certification of quality ■ Optional digital and analog audio monitoring
WFM7000	For basic quality assessment in video production and post-production applications using HD digital video formats or in mixed SD/HD environments	<ul style="list-style-type: none"> ■ Two SDI video inputs compatible with SMPTE292M (with available support for SMPTE259M formats), loop-through external reference, switched video outputs, picture monitor output ■ Fault monitoring, alarm generation, and basic event logging ■ Waveform, vector, gamut, picture and timing displays, including Split Diamond, Arrowhead, and Lightning ■ Standard graticules and time/voltage cursors ■ Ancillary data detection, including decoding of closed caption information ■ Optional digital and analog audio monitoring
WFM7100	For quality assessment and control in video production, distribution, and broadcast systems using HD digital video formats or in mixed SD/HD environments	<p>WFM7000 capabilities plus:</p> <ul style="list-style-type: none"> ■ Extended event logging and video/audio session screens ■ Triggered data capture ■ Automated quality checking with Tektronix certification of quality ■ Tektronix quality dashboard with Red light/Green light status displays

NOTE. You can locate copies of some of the illustrations from this document in JPEG format on the Tektronix Web site (www.tektronix.com) and on the User Documents CD that accompanies the WFM6100, WFM7000, and WFM7100 Quick Start User Manual.

The following illustrations are available: Figure 1, Figure 2, Figure 3, Figure 10, Figure 11, and Figure 12.

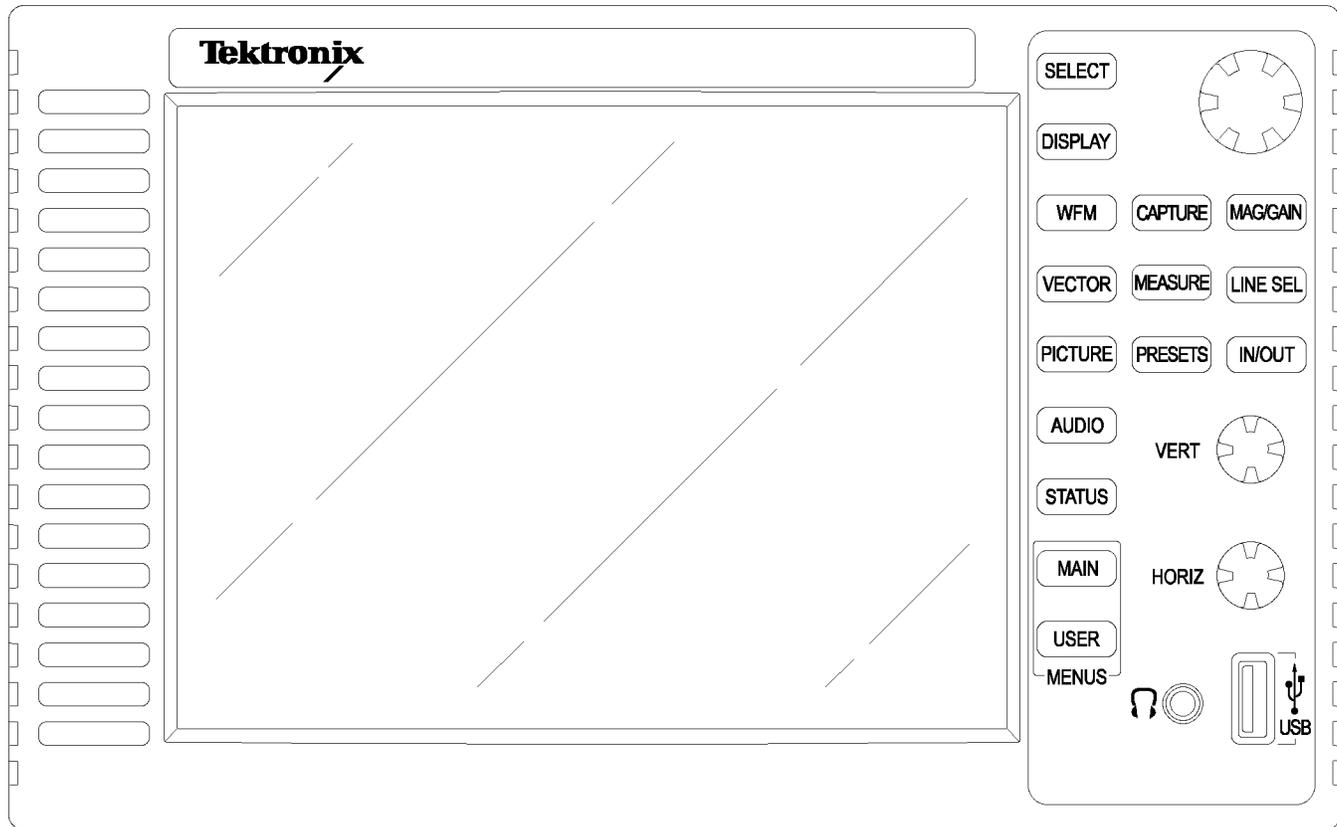


Figure 1: Front panel

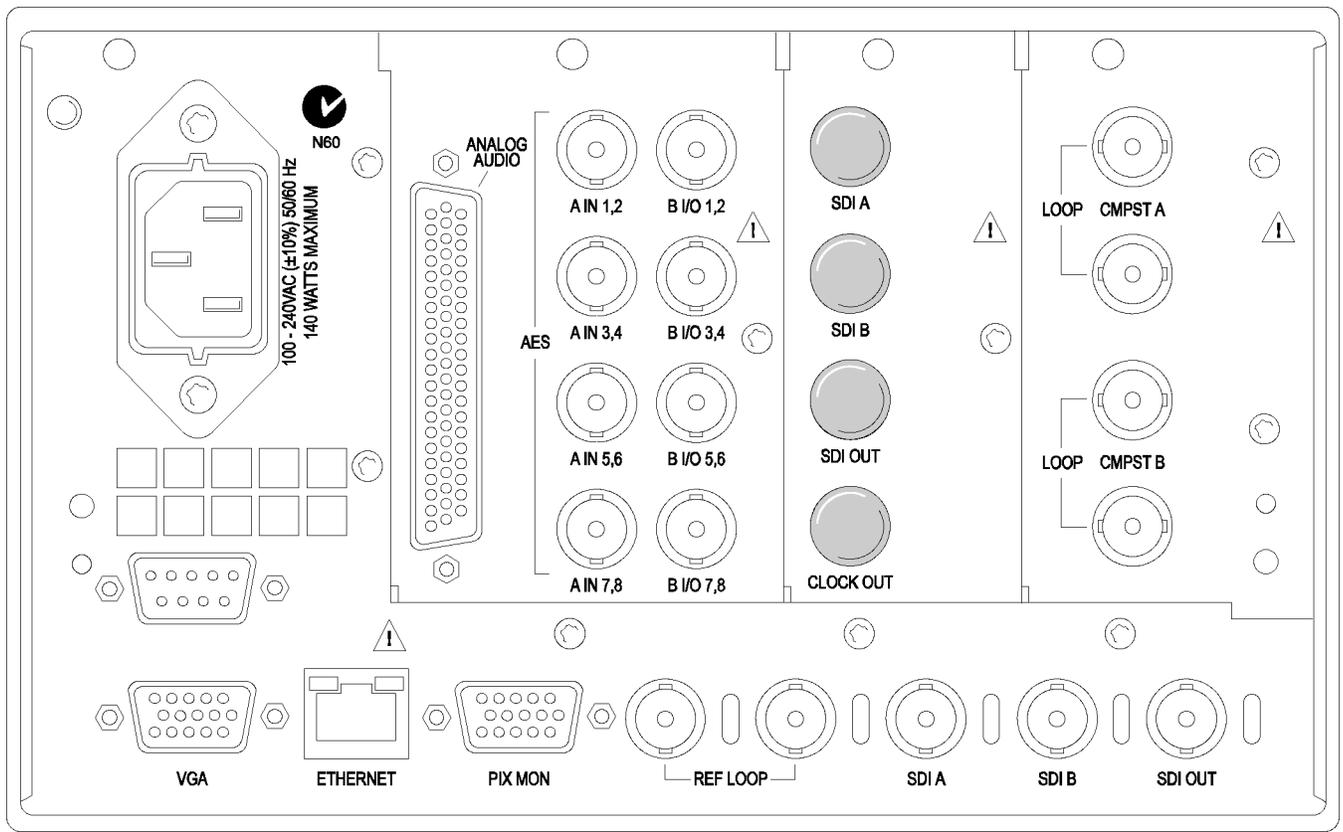


Figure 2: Rear panel without Option EYE or PHY installed

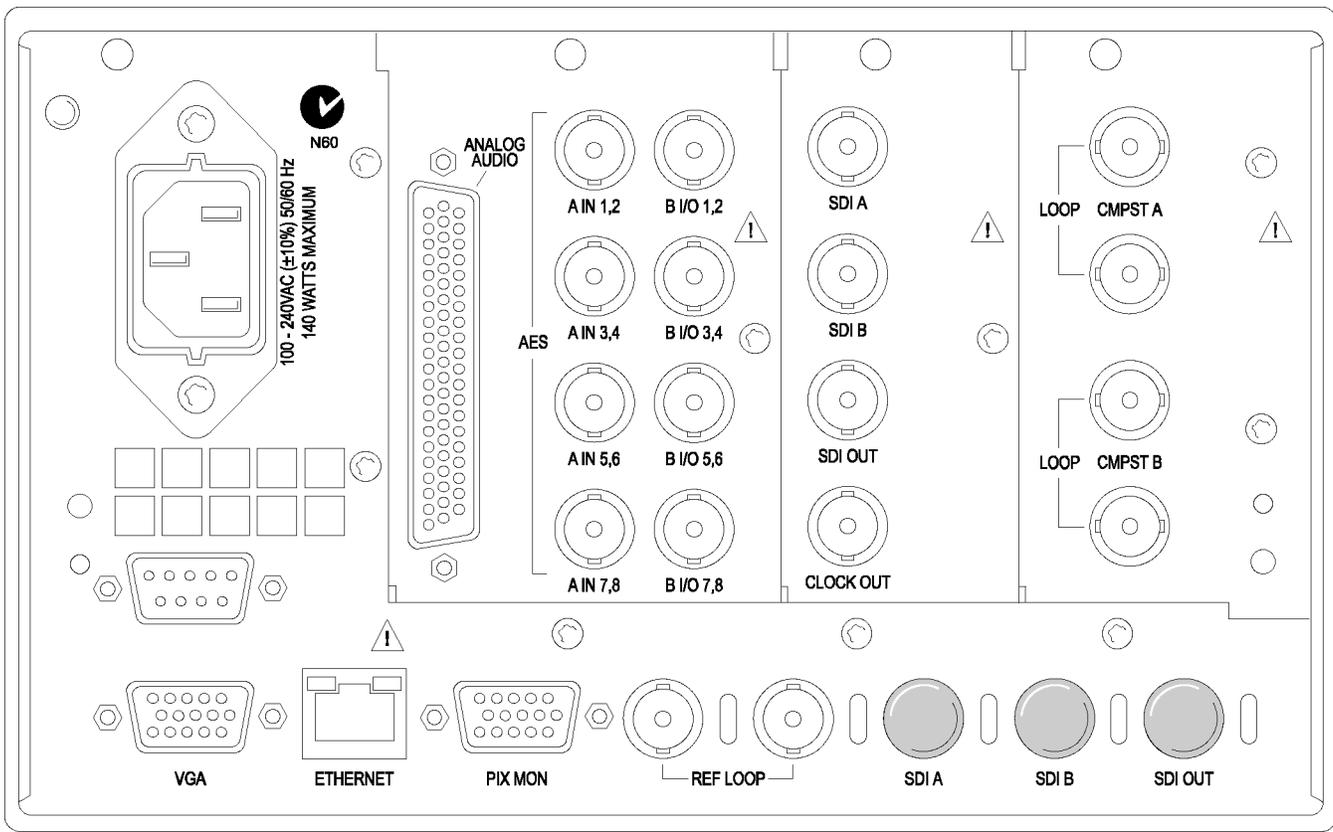


Figure 3: Rear panel with Option EYE or PHY installed

Installation Considerations

The waveform monitor is shipped in a wrap-around chassis that covers the instrument bottom and two sides. A cover is installed on the chassis, and the rear panel is made up of the module rear panels.

You can operate the waveform monitor in the instrument chassis (be sure the top cover is on) or installed in an approved portable cabinet or rack adapter. (See page 17, *Rackmount Installation*.) You can also install the waveform monitor in a custom installation, such as a console.



CAUTION. *To prevent damage to the waveform monitor and the cabinet, do not install the waveform monitor in any cabinet except those that are approved by Tektronix, such as the WFM7F02 and WFM7F05.*

If you install the waveform monitor in a custom application, such as a console, be sure to provide adequate airflow. Follow these guidelines:

- Do not block the ventilating holes.
- Adhere to the clearance requirements. (See Table 2 on page 7.)

System Installation

The waveform monitor can operate almost anywhere in the video distribution system. To monitor the video bitstream of a serial receiver, route the incoming serial signal into one of the waveform monitor SDI inputs.

To monitor serial digital signals around a routing switcher, connect your serial sources through a patch panel to a serial router. Connect the output of the serial router to an SDI input for comparison.

Line Termination

The waveform monitor uses passive loop-through analog and reference inputs. Accordingly, the loop-through must be terminated externally. It is important that this external termination meet accuracy and return loss requirements.

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

In cases where the waveform monitor is placed at the end of a link, a BNC termination must be installed on one side of the loop-through analog or reference connector. The termination must be 75 Ω and DC coupled (good return loss extends to DC). Return loss should exceed 40 dB from DC to 6 MHz for composite. An appropriate terminator would be Canare part number BCP-TA. It is a 75 Ω , 1%, BNC, 26 dB return loss to 2 GHz, end-of-line termination.

Compatibility of BNC Center Pins

Most video equipment BNC connectors, 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 waveform monitor are designed to work with the 50 Ω standard (large diameter) center pins.



CAUTION. *To prevent intermittent signal connections, do not use connectors or terminators with the smaller diameter center pins.*

Power and Environmental Specifications

The waveform monitor 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.

NOTE. *Power 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.*

The waveform monitor does not need any power configuration, except for using the proper power cord for your installation site. Refer to the *WFM6100*, *WFM7000*, and *WFM7100 Waveform Monitors Quick Start User Manual* for a list of the available power cords.

To connect power to the waveform monitor, insert the supplied power cord into the rear-panel power connector. There is no power switch on the waveform monitor, so the instrument will turn on as soon as you apply power.

The following table lists the power and environmental specifications for installing the waveform monitor. Refer to the *WFM6100, WFM7000, and WFM7100 Waveform Monitors Specifications and Performance Verification Technical Reference* for additional information on power and environmental requirements.

Table 2: Power and environmental specifications

Characteristic	Description	
Power	Input Voltage	100 to 240 VAC \pm 10%
	Input Power Frequency	50/60 Hz
	Power Consumption, typical	50 to 110 VA at 110 or 240 VAC
Temperature	Operating	0 °C to +40 °C
	Non-operating	-20 °C to +60 °C
Humidity	Operating	20% to 80% relative humidity (% RH) at up to +40 °C, non-condensing
	Non Operating	5% to 90% RH (relative humidity) at up to +60 °C, non-condensing
Altitude	Operating	3,000 m (9,842 ft)
	Non-operating	12,192 m (40,000 ft)
Pollution Degree	2, Indoor use only	
Dimensions	Height	133.4 mm (5.25 in)
	Width	215.9 mm (8.5 in)
	Depth (front to back including handles and BNCs)	460.4 mm (18.125 in)
Weight	Net	5.5 kg (12 lbs)
	Shipping	9.6 kg (21 lbs) approximately
Required Clearances	Top	None
	Bottom	None
	Left side	2 in (51 mm)
	Right side	2 in (51 mm)
	Front	None
	Rear	2 in (51 mm)

Connector Specifications

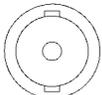
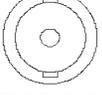
The waveform monitor has connectors on the front and rear panels. The following pages describe the connector types, pin numbering, and associated signal requirements.

SDI Video Connectors

Use the SDI A and SDI B inputs to connect a serial digital video signal to the instrument. The SDI Out signal is the switched output of the selected SDI A or SDI B input signal and has the same data rate as the input signal. Use the IN/OUT menu to configure the SDI Out signal to be either the looped-through input signal or the Pix Mon signal output, which contains configurable error brightups.

The Clock Out connector (Option EYE or PHY only) outputs the data rate of the selected SDI input signal. You can connect the Clock Out signal to a spectrum analyzer to view jitter frequency components in the video signal. The following table lists the characteristics of the SDI video connectors.

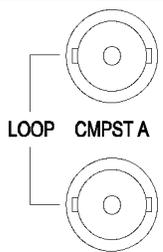
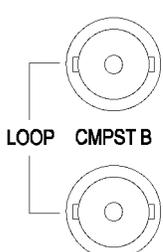
Table 3: SDI video connector specifications

Connector	Characteristic	Description
 <p>SDI A</p>	Input Type	BNC, 75 Ω internally terminated
	Input Level	800 mV ± 10%
	Cable Loss Accommodation: SD	0 to 30 dB attenuation Equivalent to approximately 300 m of Belden 8281 at 270 Mb/s With 1/SQRT(f) characteristic at 1/2 of serial rate
 <p>SDI B</p>	Cable Loss Accommodation: HD	0 to 20 dB attenuation Equivalent to approximately 80 m of Belden 8281 at 1.485 Gb/s. Typical performance to 110 m With 1/SQRT(f) characteristic at 1/2 of serial rate
	Output Type	BNC, 75 Ω internally terminated
	Output Level	800 mV ± 10% into 75 Ω load
 <p>SDI OUT</p>	Output Type (Option EYE/PHY only)	Reference clock; BNC, 1 V p-p into 75 Ω load
	Output Frequency	SD = 27 MHz HD = 74.25 or 74.17852 MHz
 <p>CLOCK OUT</p>		

Composite Video Connectors

Use the CMPST A and CMPST B inputs to connect an NTSC or PAL, composite video signal to the instrument. The following table lists the signal characteristics of the composite video connectors.

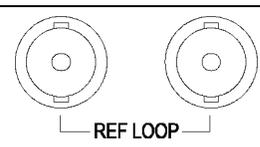
Table 4: Composite video connector specifications

Connector	Characteristic	Description
	Input Type; Quantity	BNC, passive loop-through, 75 Ω compensated; 2 inputs (Composite A and Composite B)
	Maximum Operating Amplitude with Clamping Off (DC Coupled)	-1.8 V to +2.2 V, DC + peak AC
	Maximum Absolute Input Voltage	-6.0 V to +6.0 V, DC + peak AC
		

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

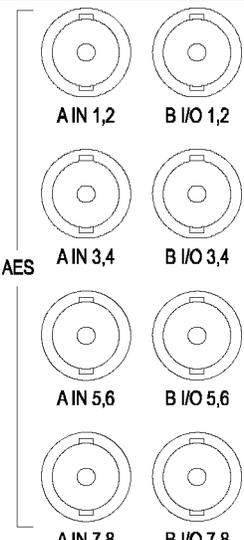
Connector	Characteristic	Description
	Input Type	BNC, passive loop-through, 75 Ω compensated
	Input Level	-6 to +6 dB
	Maximum Input Voltage Level	± 5 V, DC
	Maximum Absolute Input Voltage	± 5 V, DC

AES Digital Audio Connectors

Use the AES audio connectors to input or output digital audio signals. The "A" connectors are input only. You can configure the "B" connectors to function as an additional input or as an output of the audio signal being input on the "A" connectors. Use the Audio Settings menu to configure the channel mapping in the audio displays.

The following table lists the signal characteristics of the AES Audio connectors.

Table 6: AES digital audio connector specifications

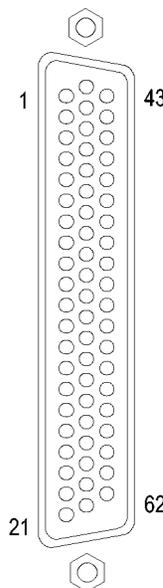
Connector	Characteristic	Description
	Input Type (A and B connectors)	BNC, 75 Ω terminated, unbalanced (meets requirements of AES 3-ID and SMPTE 276M-1995)
	Input Amplitude Range (A and B connectors)	0.1 V _{p-p} to 2 V _{p-p}
	Output Type (B connectors only)	BNC, 75 Ω terminated, unbalanced (meets requirements of AES 3-ID and SMPTE 276M-1995)
	Output Amplitude Range (B connectors only)	0.9 V to 1.1 V Pk-Pk into 75 Ω

Analog Audio Connector

Use the ANALOG AUDIO connector to input or output analog audio signals. Use the Audio Settings menu to configure the channel mapping in the audio displays. The following table lists the signal characteristics of the Analog Audio connector.

For all audio options except Option DS, use the supplied 62-pin DSUB connector to attach analog-audio signals to the instrument. Solder wires to the connector as needed to accommodate the desired audio inputs and outputs. Audio signals can be connected as either balanced or unbalanced. Be sure to use a suitable cable when you are wiring balanced audio. An example of a suitable cable is Belden 8451, which is a shielded twisted pair cable. Alternatively, you can purchase an audio breakout cable (Tektronix part number 012-1688-00), which provides a two meter cable with XLR connectors for all twelve inputs and eight outputs.

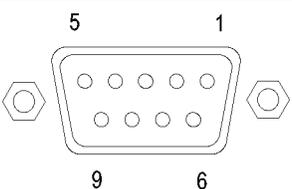
Table 7: Analog audio connector specifications

Connector	Pin	Description	Pin	Description
	1	Ch. 1 input, line A, positive	22	Ch. 1 input, line A, negative
	2	Ch. 1 input, line B, positive	23	Ch. 1 input, line B, negative
	3	Ch. 2 input, line A, positive	24	Ch. 2 input, line A, negative
	4	Ch. 2 input, line B, positive	25	Ch. 2 input, line B, negative
	5	Ch. 3 input, line A, positive	26	Ch. 3 input, line A, negative
	6	Ch. 3 input, line B, positive	27	Ch. 3 input, line B, negative
	7	Ch. 4 input, line A, positive	28	Ch. 4 input, line A, negative
	8	Ch. 4 input, line B, positive	29	Ch. 4 input, line B, negative
	9	Ch. 5 input, line A, positive	30	Ch. 5 input, line A, negative
	10	Ch. 5 input, line B, positive	31	Ch. 5 input, line B, negative
	11	Ch. 6 input, line A, positive	32	Ch. 6 input, line A, negative
	12	Ch. 6 input, line B, positive	33	Ch. 6 input, line B, negative
	13	Ground	34	Ground
	14	Ch. 1 output, positive	35	Ch. 1 output, negative
	15	Ch. 2 output, positive	36	Ch. 2 output, negative
	16	Ch. 3 output, positive	37	Ch. 3 output, negative
	17	Ch. 4 output, positive	38	Ch. 4 output, negative
	18	Ch. 5 output, positive	39	Ch. 5 output, negative
	19	Ch. 6 output, positive	40	Ch. 6 output, negative
	20	Ch. 7 output, positive	41	Ch. 7 output, negative
	21	Ch. 8 output, positive	42	Ch. 8 output, negative
		43-62	Not Used	
Characteristic	Description			
Input Type	62 pin, 3 row, DSUB, balanced, unterminated			
Maximum Input Level	+24 dBu \pm 0.3 dBu			
Output Type	62 pin, 3 row, DSUB, balanced, unterminated; ground negative output to support unbalanced mode			
Maximum Output Level	+24 dBu \pm 0.5 dBu (designed to drive a \geq 600 Ω load)			

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.

Table 8: Remote connector pin assignments and specifications

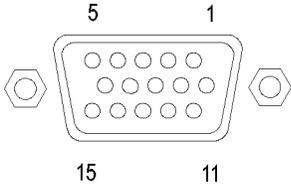
Connector	Pin	Description	Direction	Notes
	1	Ground	Out	
	2	Time Code+	In	LTC time code input
	3	Time Code-	In	LTC time code input
	4	Ground	Out	
	5	Ground Closure Output	Out	Open collector output
	6	Preset Recall A1	In	Ground this pin to select preset A1
	7	Preset Recall A2	In	Ground this pin to select preset A2
	8	Preset Recall A3	In	Ground this pin to select preset A3
	9	Preset Recall A4	In	Ground this pin to select preset A4
Characteristic	Description			
LTC Input Connector	9 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			

PIX MON Connector

Use the PIX MON connector to output the instrument display, which includes configurable error brightups, to an external monitor. Use the IN/OUT menu to configure the output as a composite signal. For HD and SD input signals, use the IN/OUT menu to configure the output signal to be RGB, YPbPr, or off.

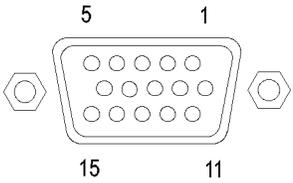
The following table lists the signal characteristics of the PIX MON connector.

Table 9: Picture Monitor connector pin assignments and specifications

Connector	Pin	Description	Pin	Description
	1	Red output	9	Not used
	2	Green output	10	Ground
	3	Blue output	11	Not used
	4	Not used	12	Not used
	5	Ground	13	Horizontal sync output
	6	Ground	14	Vertical sync output
	7	Ground	15	Not used
	8	Ground		
Characteristic	Description			
Output Connector	VGA DSUB			
Output Format	Y, Pb, Pr with sync on Y; RGB with sync on all			
Active Video Accuracy	700 mV _{p-p} ± 5% (Y-Pb-Pr mode)			
Composite Amplitude	1 V ± 5% including sync and 100% white video			

VGA Connector Use the VGA connector to output the instrument display to an external monitor. The following table lists the signal characteristics of the VGA connector.

Table 10: VGA connector specifications

Connector	Pin	Description	Pin	Description
	1	Red output	9	Not used
	2	Green output	10	Ground
	3	Blue output	11	Not used
	4	Not used	12	Not used/SDA
	5	Ground	13	Horizontal sync output
	6	Ground	14	Vertical sync output
	7	Ground	15	Not used/SCL
	8	Ground		
Characteristic	Description			
Output Connector	VGA DSUB			
Output Levels	Selectable for 0.7 V or 1 V for RGB signals; fixed 5 V for H and V sync signals			

Ethernet Connector

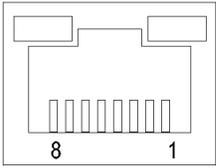
Use the Ethernet connector to connect the waveform monitor to your local network. A network connection is required for remote control, software upgrades, and enabling some instrument options.

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 11: 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 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 12: 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 13: USB connector specifications

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

Rackmount Installation

To install the waveform monitor in a 19-inch equipment rack, you must use the WFM7F05 Rack Adapter kit. The WFM7F05 is designed to house two half-rack instruments side-by-side in a rack. (See Figure 4 on page 18.)

To accommodate different products, two types of sleeves are available. The two sleeves types are designed to properly fit only the products listed below.



CAUTION. *Be sure to use the correct sleeve for your product. If you use the wrong sleeve, it could damage the instrument and cause overheating problems.*

The ventilation holes and EMI shielding on the sleeves are specially designed to meet the requirements of the instruments for which they were intended.

The type of sleeve(s) included with the rack adapter kit is configured when you order the adapter. You can also install a sleeve in one side of the rack adapter and a blank panel (1700F06) or an accessory drawer (1700F07) in the other side of the adapter to improve airflow and appearance.

Table 14: Rack adapter sleeves and supported products

Sleeve type	Tektronix part number	Supported products
WFM7F00	390-1210-XX	WFM6100, WFM7000, and WFM7100 WFM700A, WFM700HD, and WFM700M MTX100A, RTX100A, and RTX130A
1700F00A	390-1211-XX	1700 Series instruments WFM601 Series instruments Older half rack instruments 760A and 764

Rack Adapter Installation

Install the rack adapter into the equipment rack before you install an instrument into the adapter. During installation, be aware of the following:

- The rack adapter is marked with the word "TOP" to indicate which side of the adapter should face up. (See Figure 4 on page 18.)
- You can adjust the position of the handle brackets to mount the adapter flush with other equipment in the rack. (See rack adapter instructions.)
- Press the sleeve release buttons to remove the instrument from the rack adapter. (See Figure 4 on page 18.)

After you install the rack adapter, install the instrument(s) into the rack adapter following the instructions that accompany the WFM7F05 Rack Adapter Kit.

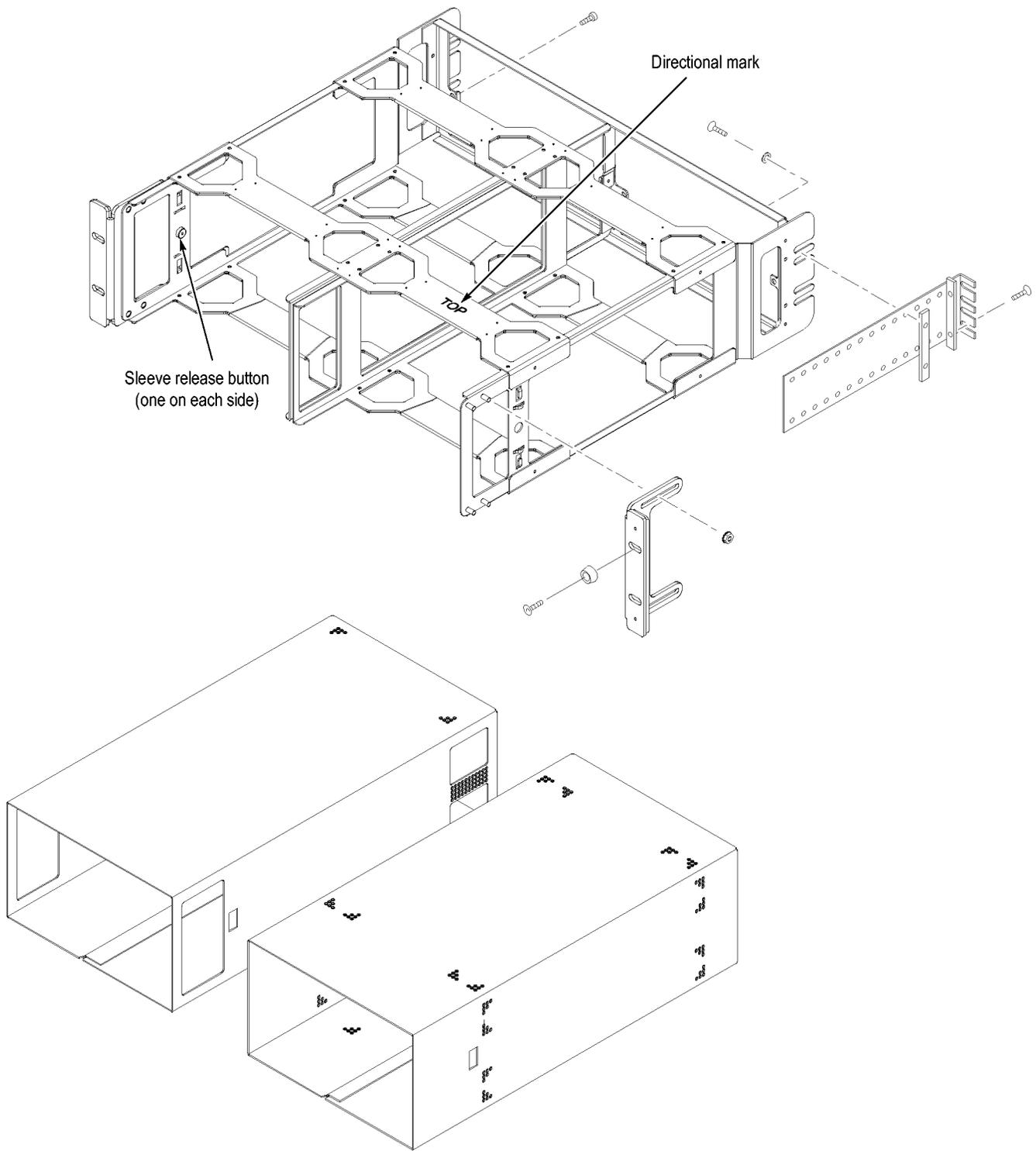


Figure 4: WFM7F05 exploded view

WFM7F05 Dimensions

The following three figures show the dimensions of the WFM7F05 rack adapter hardware and the sleeves.

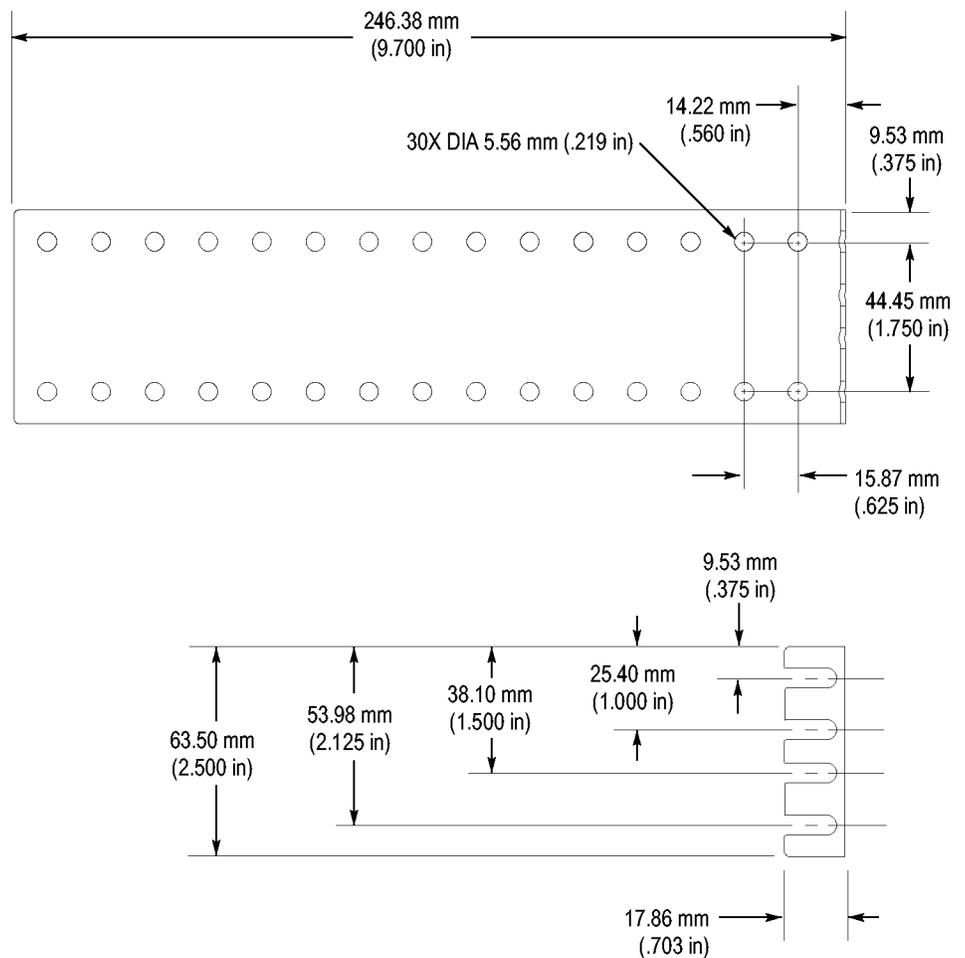


Figure 5: WFM7F05 rear-bracket guide dimensions

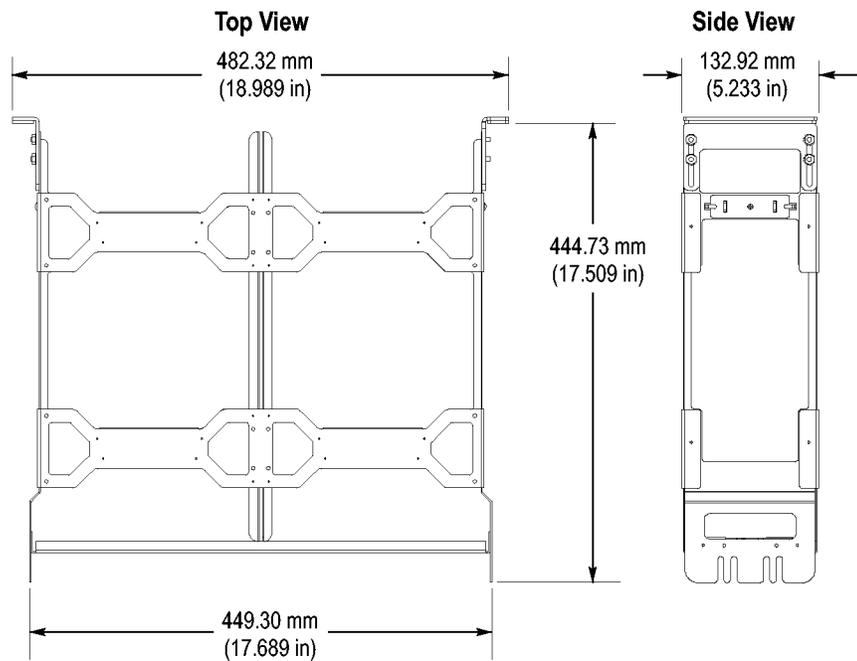


Figure 6: WFM7F05 rack adapter dimensions

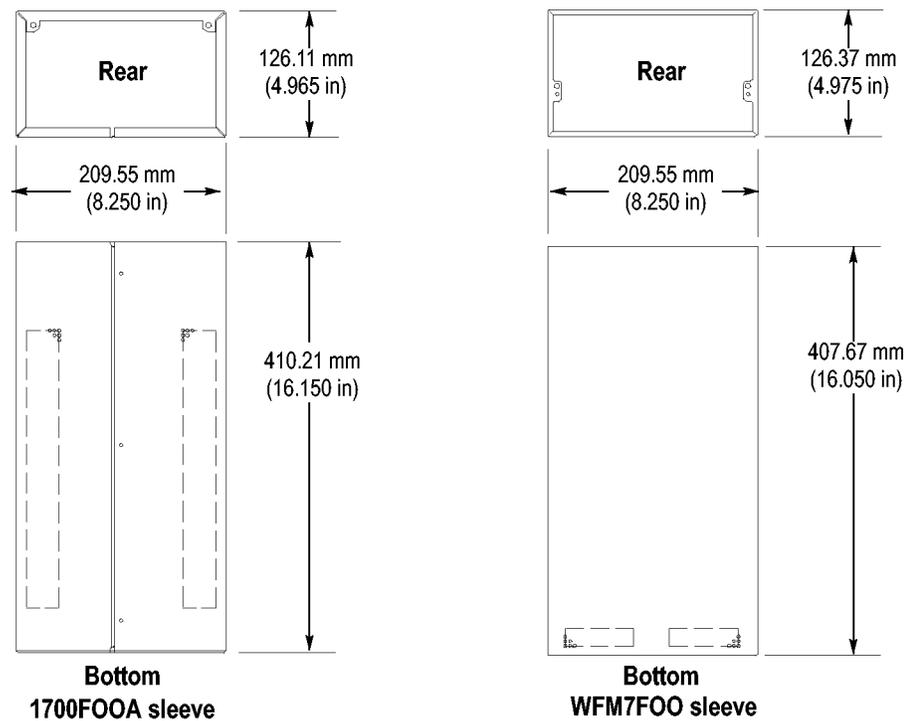


Figure 7: WFM7F05 sleeve dimensions

Network Operation

This section provides the following information for operating the waveform monitor 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

IP Settings Configuration

To allow network access to the instrument, you need to set the IP address. Network addresses can be 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 obtain a valid IP address, contact your LAN administrator.

Perform the following steps to configure the IP settings on the waveform monitor:

1. Press the MAIN button to display the Main menu.
2. Touch Config to display the Configuration menu, and then touch Utilities.
3. Touch Communications to display the Communications submenu.
4. Touch Config Mode, and then select Manual or DHCP, depending on your network setup. Touch Close Config Mode to close the submenu.
5. If you selected Manual mode, touch Network Setup to open the Network Setup dialog box.

NOTE. *If you cannot use DHCP mode, you will have to set the Subnet Mask and Gateway Address parameters in this menu; contact your LAN administrator for required values. (Be sure to use compatible addresses between the PC and the waveform monitor.)*

6. If desired, touch Instrument Name to assign the waveform monitor a network name.
7. Press the MAIN button to close the 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 071-1592-XX) for information about using the MIB to control the waveform monitor.*

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 Mode. Use this setting to configure the remote access to the instrument via SNMP. You can select enabled, disabled, or read only.
- 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 a waveform monitor 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 waveform monitor using a Web browser:

1. Verify that the waveform monitor has been configured for IP network operation. (See page 21, *IP Settings Configuration*.)
2. Open the Network Setup dialog box and note the IP address assigned to the waveform monitor.
3. Set the Remote Web Interface mode to Enabled.
4. Touch OK to close the Network Setup dialog box.
5. Press the MAIN button to close the Configuration menu.
6. On your PC, start your Web browser and enter the network address of the waveform monitor 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 waveform monitor. To make a selection, click the desired link.