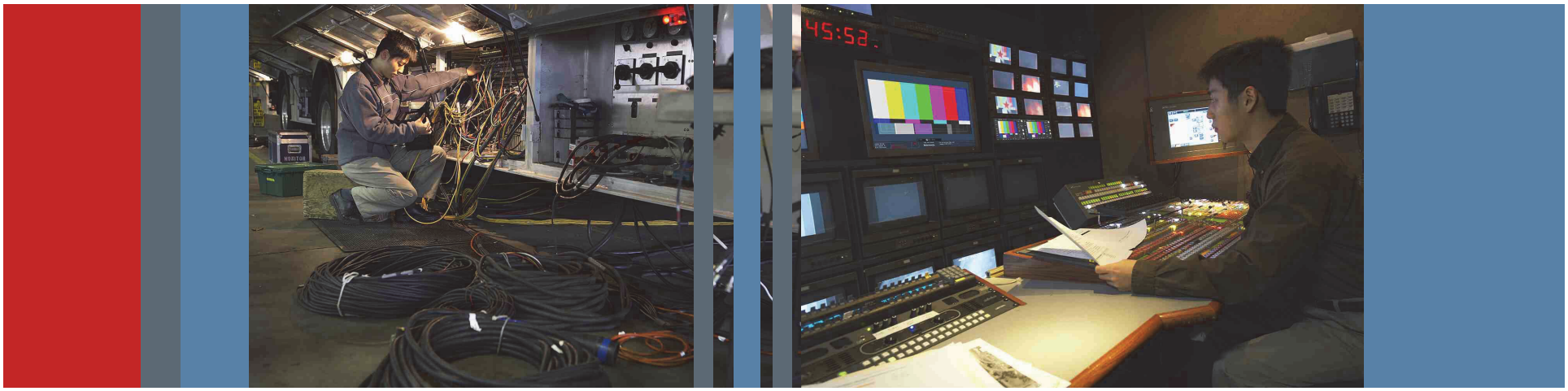
Tektronix Video Products for System Integrators



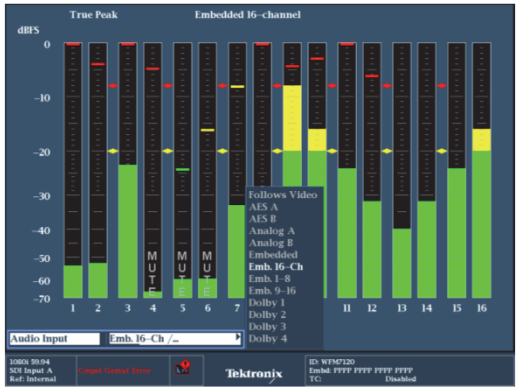
2014 Reference Guide

Tektronix®

Audio

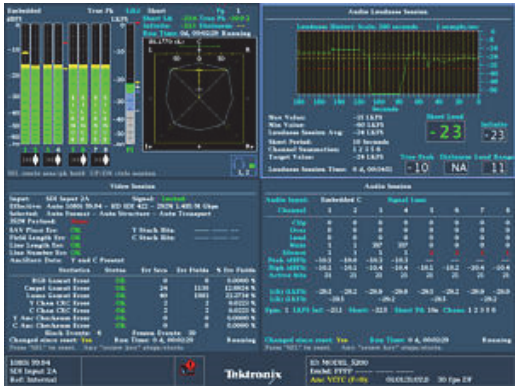
WFM/WVR5200 Audio Capabilities

Tektronix audio monitoring solutions cover the technology spectrum from analog audio to the most sophisticated multi-channel surround sound digital audio monitoring, including associated meta data and extends to file-based content verification. The WFM/WVR5200 Series offers support for embedded audio up to 16 channels.



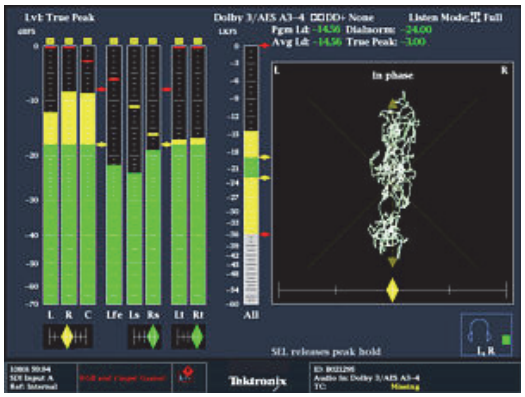
16 Channel Embedded Audio

- Embedded AES/EBU audio monitoring (up to 16 channels simultaneously) with bars, Lissajous, or Surround Sound[1] display
- Allows operators to verify audio levels and provides alarms for clips, mute, silence and overs.



Audio Loudness

- Variation in audio loudness between materials is a problem for viewers.
- ITU-R BS 1770-3, ATSC RP A/85 and EBU R 128 Audio Loudness metering can be added with Option LOUD (Requires audio option AUD).



Monitoring Multi-channel audio

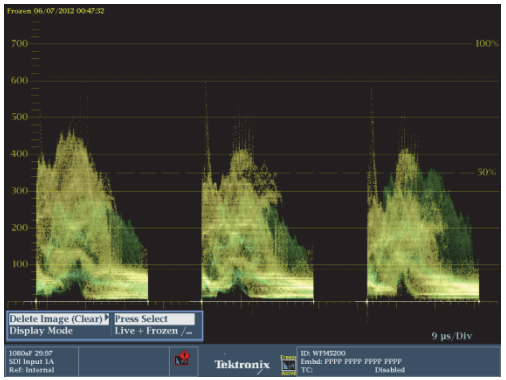
- Monitor multi-channel audio quickly
- See interactions of 5.1 multichannel audio

2 http://www.tek.com/industry/content-creation-post-production

Video

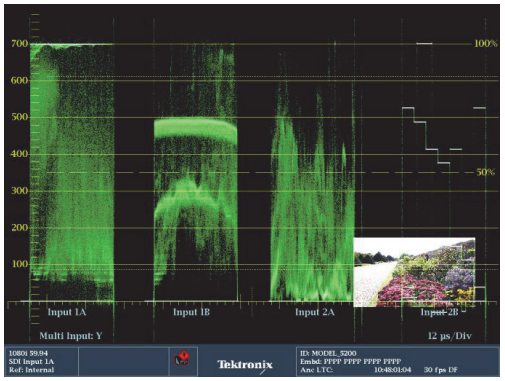
WFM/WVR5200 and WFM/WVR5250 Video Capabilities

For many, the HD-SDI implementation will be part of a hybrid environment, adding complexity to the process of measurement, monitoring and analysis. Tektronix tools are designed for multi-format, multi-standard support and provide familiar user interfaces. Tektronix test & measurement tools and technical content will help guide you through the transition process of bringing HD services on line and ensuring operational efficiency.



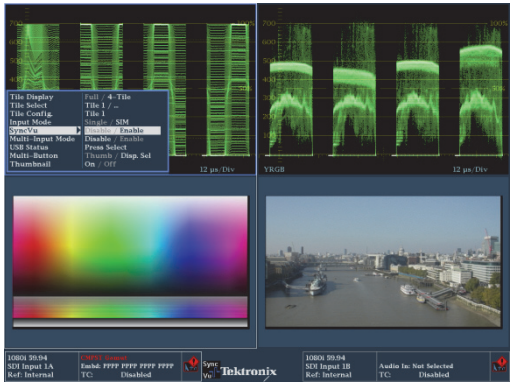
Capture and Compare Signals

- The captured “Trace” function allows the current waveform displays to be frozen on the screen and is basically a simple image capture of the current available display.
- In the waveform displays (waveform, vector, and gamut) the trace from the captured data appears in yellow.
- CaptureVu stores the complete video frame of data can then be used to reconstruct any display.



Multi-Input Mode for Camera Balancing

- Up to 4 SDI inputs (WFM/WVR5200 only)
- Ideal for camera balancing
- 4Y traces Parade or Overlay
- Overlays available in traces displays
  - WFM, VECTOR, GAMUT



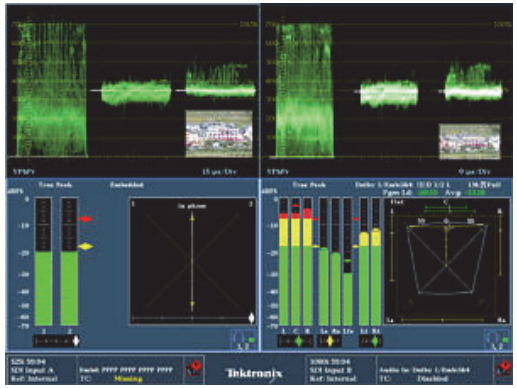
Simple Simultaneous Monitoring

- Ability to monitor two channels simultaneously
- Ideal for camera balancing with waveform and picture display for 2 inputs
- Camera Tally mode - Alerts operator to channel on air
- HDMI interface with HDCP and Status Screens (WFM/WVR5250 only)

Production

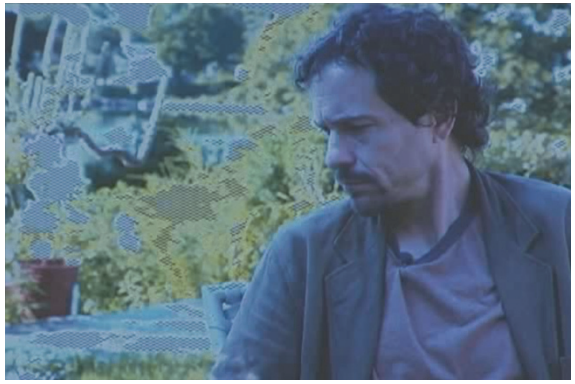
WFM/WVR8300 Video Capabilities

Waveform monitors and rasterizers help video content producers verify content quality and make precision content adjustments. Choose a basic waveform monitoring platform or a fully field upgradeable waveform monitor that will allow you to extend your monitoring and measurement capabilities as your business requires. Start with High Definition (HD-SDI) with Digital and Dolby® audio formats with an upgrade path to 3G-SDI and 3D video.



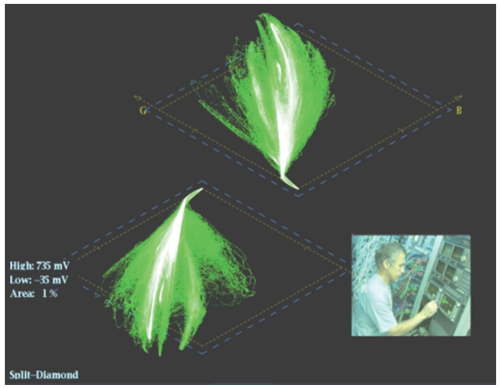
Simultaneous Inputs and SyncVu

- Quickly determine if a video quality problem exists in the input signal or arose in your facility
- Quickly detect, diagnose, and resolve technical problems introduced in a piece of video equipment by comparing the input and output signals
- Check for transparency during format conversion



Picture Bright Ups

- Picture Bright Ups quickly highlight signal violations on the Picture display
- Less technical operations staff can be notified to action on gamut violations

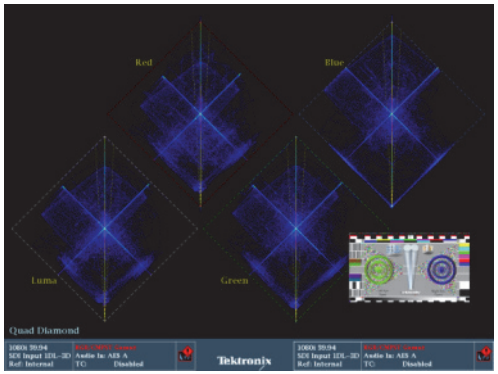


Troubleshooting Gamut Problems

- Patented Displays
  - Arrowhead - Composite
  - Diamond - RGB Gamut
- Simplified Displays
  - Easy to understand
  - Quickly to adjust

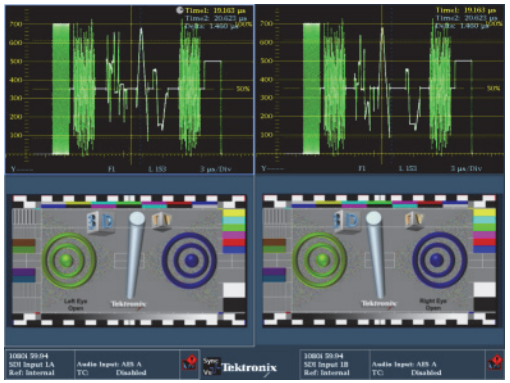
3D Video Camera Balancing and Alignment

To produce 3D content, a range of new 3D production equipment is required to combine images from the two cameras, representing the Left Eye and Right Eye. One of the key monitoring elements is to ensure that the two cameras are well balanced and matched to create good quality 3D effects without causing viewers' discomfort. Tektronix has introduced several new displays for 3D production work that assist production teams who are determining the differences between the Left Eye and Right Eye images.



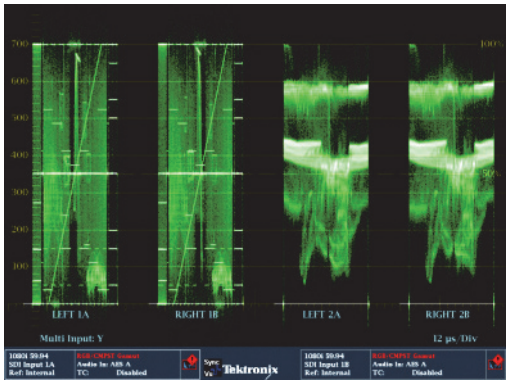
Quad Diamond Display

- Ideal for camera matching of the two left and right signal for 3D applications.
- Quickly isolate the component in error and make adjustments to the left or right camera to correct the imbalance.
- Increases the trace display brightness with increasing L-R channel disparity



Dual Stream 3D Mode

- CH-1 & CH-2 Left Eye & Right Eye
- SyncVu™ allows simultaneous changes of channels
- Any measurement displays can be configured
- Timing Measurement
- Multiple line selects



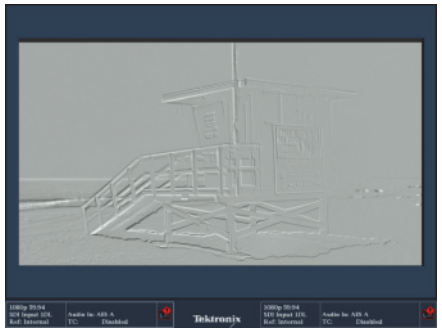
Video Level Adjustments for Multiple Inputs

- Multiple Input in full screen mode to view paraded display of luma traces for left and right eye.
- With OPT 2 SDI up to four inputs can be viewed simultaneously allowing the output from two left and right camera to be displayed.

3D Video Camera Balancing and Alignment

Checkerboard Display

- Left Eye and Right Eye blocks form 16x9 checkerboard
- Ideal for checking color balance and brightness between Left and Right Eye Signals

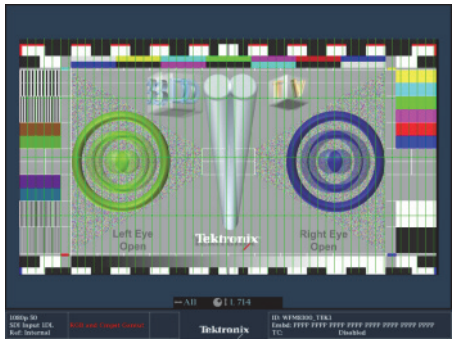


Difference Map

- Left Eye minus Right Eye blocks
- Ability to check Disparity between images
- If 50% grey, the image is identical between the left and right image.

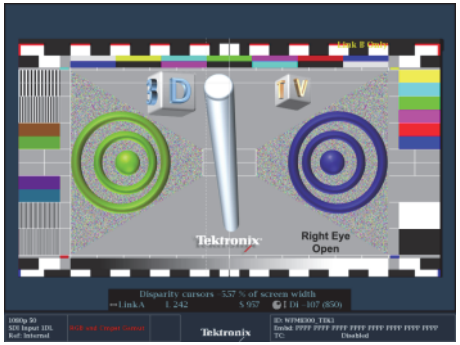
Anaglyph Modes

- Selectable either as Green / Magenta or Red / Cyan
- Monochrome image when left and right images are identical.
- Allows user to view 3D image with the use of appropriate colored anaglyph glasses.



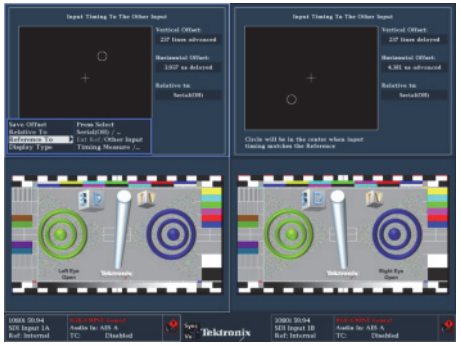
Disparity Grid

- Horizontal Disparity grid of 1-10% of screen width
- Vertical Disparity grid of 50%,25% or 10%
- Ideal for camera setups



Disparity Cursor

- Measure Horizontal Disparity of Object between left and right eye signals.



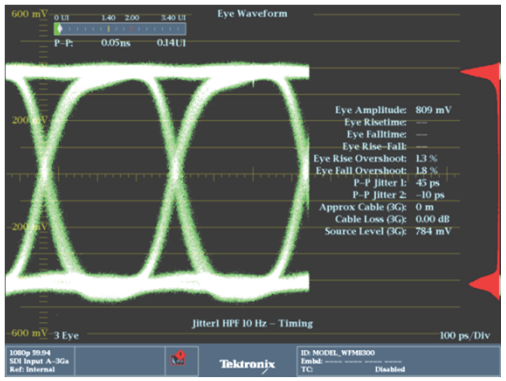
4-SDI Input Monitoring

- Reference to External or Other Input
- Allows Frame Timing between inputs

Engineering

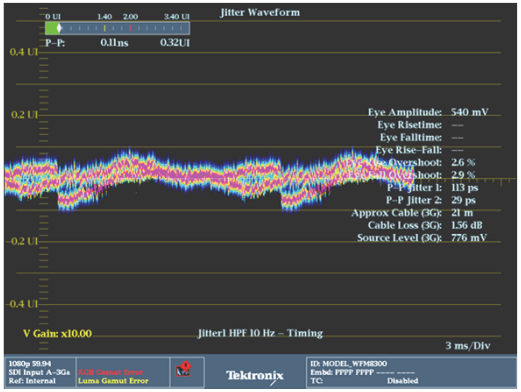
WFM/WVR8300 Video Capabilities

The WFM/WVR8300 provide advanced capabilities to troubleshoot your timing, format and cable length problems. It can perform 3G-SDI eye pattern display, jitter measurements, and cable length measurements. Options PHY and EYE provide unique capabilities such as reporting jitter levels above 1 UI and providing various jitter filters from 10 Hz to 100 kHz for SD/HD/3G-SDI signals. The Lightning display shows luma and chroma amplitudes and helps users verify component timing using a color bar signal. The Tektronix-patented Bowtie display complements the timing measurement capability of the Lightning display. Using a special Bowtie test signal in component format, this display helps make precise and accurate measurements of inter-channel amplitude and timing.



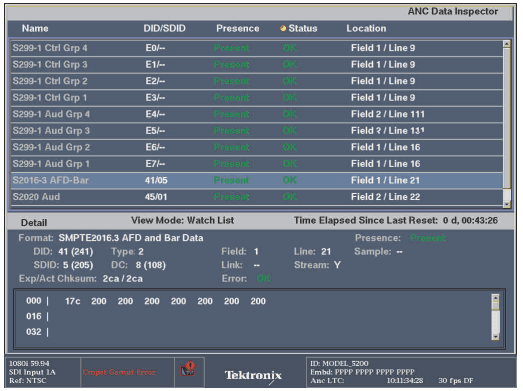
3G-SDI Eye Pattern Measurements

- Automated eye amplitude, automated rise/fall time, automated overshoot/undershoot measurements
- Key signal parameters such as signal strength, cable loss, and estimated cable length measurements



3G-SDI Jitter Characterization

- Unique capabilities such as reporting jitter levels above 1 UI and providing various jitter filters from 10 Hz to 100 kHz for SD/HD/3G-SDI signals
- Easy-to-interpret gauge provides direct readout for jitter measurements
- Configure timing jitter and alignment jitter readouts to be displayed simultaneously to effectively isolate the sources of jitter
- Jitter waveform display to view jitter related to line and field rates



Closed Captioning and ANC Data Inspector

- Automatically detect all ANC data types and display presence, absence and status.
- Simultaneous CEA708/608 Closed Caption monitoring; Teletext and OP47 subtitle monitoring
- Detect and decode ANC data including AFD, WSS, Video Index, TSID, V-Chip, Broadcast Flag/CGMS-A, VITC, LTC, and ANC TC ARIB STD-B35/B37/B39, TR-B22, and TR-B23 support

Engineering

SPG8000 Master Clock and Master Sync Pulse Generator

- Master sync pulse generator with multiple video reference outputs
- Master clock generator with multiple time code outputs
- SNMP enables integration into network management systems
  - Read-only MIB objects for system status and input signal status
  - Trap messages for alarm conditions (GPS signal loss, loss of genlock, power supply failure, etc.)
- Front-panel USB makes it easy to backup and restore configuration settings, for “cloning” SPG pairs when used with the ECO8000 or ECO8020
- General Purpose Interface provides ground-closure alarms and preset selection
- NTP server function provides accurate time-of-day from the GPS source to any network-attached NTP clients, such as file server
- Options
  - GPS-based synchronization
  - SD/HD/3G test signal generation
  - AES audio tones and DARS outputs
  - Backup power supply

Engineering

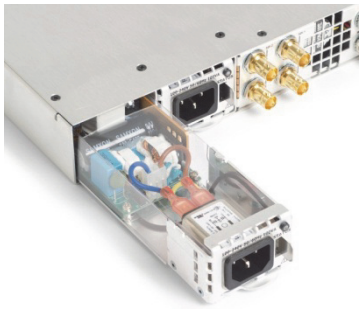
SPG8000 Master Clock and Master Sync Pulse Generator

Video and Time Reference Sources

- Master SPG options:
  1. GPS-based synchronization
     - 10 MHz frequency reference output from internal GPS receiver
     - Time-of-day and PPS signal
  2. Internal oven-controlled crystal oscillator
     - Also used by Stay GenLock® and GPS Holdover when the genlock or GPS input signal is lost
- Slave SPG options:
  1. Genlock input from NTSC/PAL black burst or HD tri-level sync
  2. Timecode input from LTC or from VITC on NTSC/PAL black burst

Reliability is critical

- Backup supply is seldom used (daily load test) to ensure that it does not age at the same rate as the primary supply
- Status is reported on front-panel LED and failures can be reported by SNMP trap messages
- Each supply is hot-swappable for replacement with no system downtime
- Locking power cable prevents accidental removal



Engineering

ECO8000 & 8020 Automatic Changeover Units for the SPG8000

- Modular architecture
  - ECO8000: 3, 6, or 9 channels (standard BNC connectors)
  - ECO8020: 5, 10, 15 or 20 channels (high density BNC connectors)
  - Factory-installed, not user-upgradable
- Two channel options
  1. Electronic Fast Switch + relay backup
  2. Relay only
- LTC channels
- Expansion option to link a second unit (to double channel capacity)
- Hot-swappable dual power supplies, front-panel access
- Front panel user interface (no more DIP switches!)
- Network interface for configuration and SNMP monitoring
- General Purpose Interface, including signaling from SPG8000

Engineering

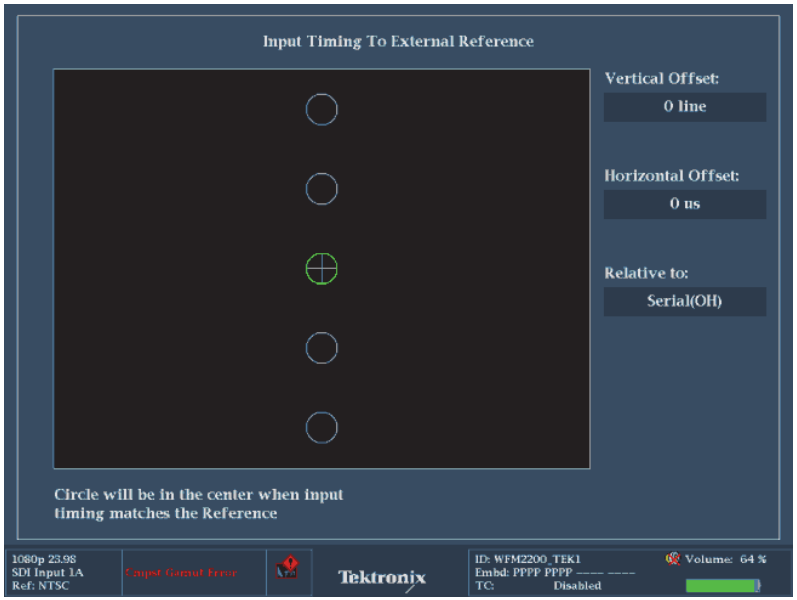
ECO8000 & 8020 Automatic Changeover Units for the SPG8000

- Electronic Fast Switch, with relay backup
  - Standard for base configuration, REF option for additional channels
  - Much faster switching speed for “near glitchless” switch on black burst
  - 50 MHz bandwidth limit—cannot use for SDI test signals
  - When ECO loses all power, keeps the current input switched to output
- Relay only
  - HREF option for additional channels
  - Slight glitch (~2ms) on outputs when relay is switched
  - > 3 Ghz bandwidth, suitable for SDI up to 3G and almost all other signal types (cannot use for 5V word clock)
- LTC channels
  - Software option for base configuration (4 channels)
  - Uses 15-pin D-sub connector for balanced signals from SPG8000/GPS7
  - Use adapter cable from output to XLR

Engineering Summary

- Key SPG8000 + ECO8000
  - Primary SPG + Backup SPG with automatic changeover for high-reliability applications
  - Dual power supplies for high uptime
  - Alarms and status monitoring via SNMP and GPI

- Key Waveform Monitor Functions
  - Tektronix Timing Display



Tektronix Timing Display

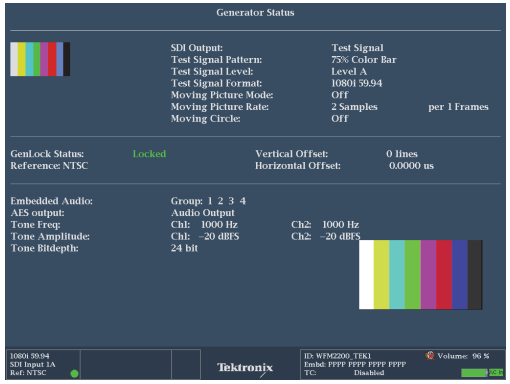
Troubleshooting

WFM2200 and WFM2300 Video and Audio Capabilities

This portable waveform monitor provides an array of basic monitoring tools for video (SD, HD, Dual Link and optional 3G), and audio (Embedded, AES) monitoring that can be configured in Full and Quad Tile display to allow you to see all the necessary signal information at a glance. ANC Data Inspector, Data list and closed caption decode are invaluable for troubleshooting problems within the ancillary data space. A video and audio generator aids in fault finding signals problems and an external reference waveform display can assist in ensuring correct video timing along with the Tektronix patented Timing display. A range of options and accessories expand the versatility of the WFM2200 & WFM2300 for field operations including a new optical input for SMPTE 297 SDI signals.

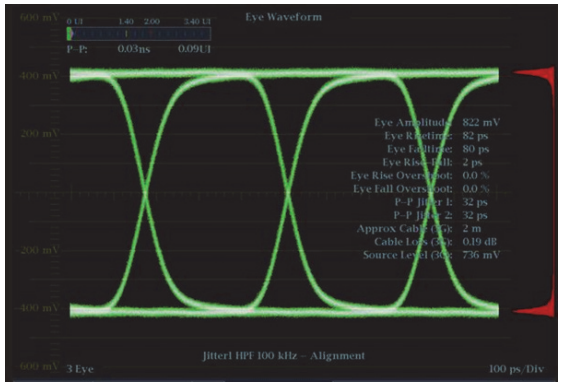
Content Verification

- Comprehensive overview of the video content and alarm status
- Tektronix-patented Diamond, Split Diamond, and Arrowhead displays simplify the process of verifying gamut compliance and are ideal for colorists, editors, and operators to visualize whether the content is RGB or Composite Gamut compliant with a single glance.
- Error log of 10,000 events facilitates the detection and correction of problems with entries recorded with date, time of day, and time code (VITC, LTC, ANC).



Signal Generation

- Generate a 100% or 75% color bars along with pathological test signals with the ability to Genlock the test signal output to the External Reference Input.
- Audio test tones can be generated at the AES output or embedded in the SDI test signal output.
- Change the test signal patterns, video format, whether the test signal is moving or static, audio test tone, and audio level.
- The moving circle allows the user to easily identify whether the test signal is active “live” or still and helps determine problems within the signal path that haves been caused by equipment freezing on the last frame.



Physical Layer & ANC Data Testing

- Jitter measurements with Eye pattern display and automated measurements
- Cable simulation and stress test s ensure physical layer health of the system and assist in determining limits
- CRC error counts show the gradual degradation of the signal before reaching the “digital cliff”.
- ANC Data Inspector enables operators to quickly and easily ensure that the VANC data is present and free of errors
- Closed Caption (CEA708/608) and individual Teletext subtitles can be simultaneously decoded and displayed.

Product Details

Waveform Monitor Selection Guide

Description	WFM2200	WFM2300	WFM5200	WFM5250	WFM7200	WFM8300
NTSC/PAL					Opt CPS	Opt CPS
SD Digital	■	■	■	■	■	■
HD Digital	■	■	■	■	■	■
Dual Link	■	■	■	■	■	■
3G-SDI Single Link (Level A & Level B)	Opt 3G	Opt 3G	Opt 3G	Opt 3G	Opt 3G	Opt 3G
SMPTE 297 SDI Optical Interface		Opt SFP				
2 inputs: HD/SD SDI or 1 HD/SD SDI and 1 CPS					Opt SIM	■
2 HDMI & 2 SDI inputs with one output for each				■		
Simultaneous monitoring			Opt CAM	Opt SIM	Opt 2SDI	Opt 2SDI
In-Depth Data and ANC Data Analysis	Opt DATA	Opt DATA	Opt DATA	Opt DATA	Opt DAT	■
Closed Caption / Teletext Subtitle & AFD Decoding	Opt DATA	Opt DATA	Opt DATA	Opt DATA	■	■
Advanced Gamut Monitoring			Opt PROD	Opt PROD	Opt PROD	Opt PROD
3D Video Content Monitoring			Opt S3D	Opt S3D	Opt S3D	■
Embedded Audio	■	■	Opt AUD	Opt AUD	Opt AD or DPE	Opt AD or DPE
Discrete AES/EBU Digital Audio	■	■			Opt AD or DPE	Opt AD or DPE
Analog, Embed, AES/EBU Audio					Opt AD or DPE	Opt AD or DPE
Dolby AC-3/E/DD+					Opt DPE	Opt DPE
Dolby E Meta Data Monitor		Opt DBE				
Audio Loudness Monitoring		Opt LOUD**	Opt LOUD	Opt LOUD	Opt AD or DPE	Opt AD or DPE
Out-of-Service Audio Video Delay					Opt AVD	■
Eye Diagrams, Jitter & Cable Parameter Measurements		■			Opt PHY3	Opt PHY
Jitter Waveform and Automated Eye measurements		■			Opt PHY3	Opt PHY
3G Jitter Waveform and Jitter measurement		■			* Opt PHY3/3G	* Opt PHY3/3G
Basic Test Signal Generation	■	■	Opt GEN	Opt GEN	* Opt GEN	Opt PHY
Cable Simulator/Cable Margin Test Loop		■				

* Option 3G is required for JIT and it is mutually exclusive of EYE/PHY
** Does not include a trend graph for audio loudness

Legend: Not available ■ **Included as standard** **Opt = Option required**

WFM2200 & WFM2300 Compact Waveform Monitors

Key Specifications and Ordering Information

Ordering Information	
WFM2200	3G/HD/SD-SDI Waveform Monitor
WFM2300	3G/HD/SD-SDI Waveform Monitor. Includes Jitter Measurements, EYE Pattern Display and EYE Pattern Automated Measurements
3G	Add support for 3G-SDI signal formats (Level A and Level B)
DATA	Add Ancillary Data monitoring (including decoding of 708 and 608 Closed Captions, Teletext and OP47 Subtitles, AFD, and CGMS-A), ANC Data Inspector, and advanced Data Analysis capabilities
LOUD	Audio Loudness Meter (WFM2300 only)
SFP	3G SDI optical interface (WFM2300 only)

Physical Characteristics (WFM 2200A)			
Weight	Height	Width	Depth
1.5 kg	133 mm	233 mm	140 mm
3.3 lbs	5.25 in.	8 3/8 in.	5 1/2 in

Accessories	
WFM200BA	Rechargeable battery pack for replacement
WFM200BC	External Battery Recharge Unit
WFM200FSC	Soft Carrying Case for WFM2200

WFM200BA

WFM200BC

WFM200FSC

Key Applications	Benefits
Installation & Maintenance	Physical layer testing and connectivity to a variety of sources and equipment.
ENG & Mobile Applications	Light-weight, short-depth, battery-power capable with built-in color bar and pathological signal generation capability for quick setup and troubleshooting
Facility Timing	Tektronix patented Timing display simplifies Video timing of SDI signal to analog reference. With ability to view waveform display of analog reference to aid in troubleshooting timing problems
Signal Quality Verification	Quickly see at a glance the status of the signal with a variety of waveform, status and picture display using Quad Tile.
Troubleshoot ANC Data problems	ANC Data Inspector allows the user to see all ANC Data packets present within the signal.

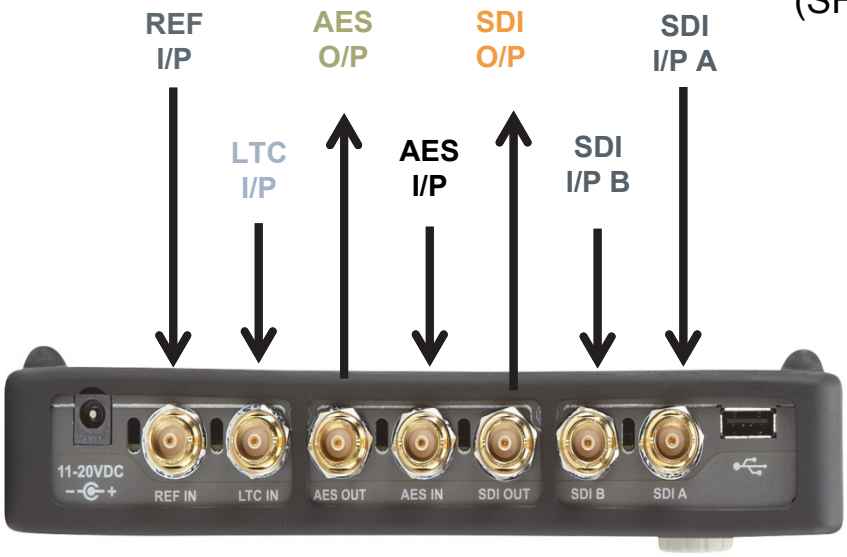
Service Option Description	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
G3	Complete Care 3 Years
G5	Complete Care 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

*1 Audio Surround Sound Display licensed from Radio Technische Werksütten GmbH and Co. KG (RTW)

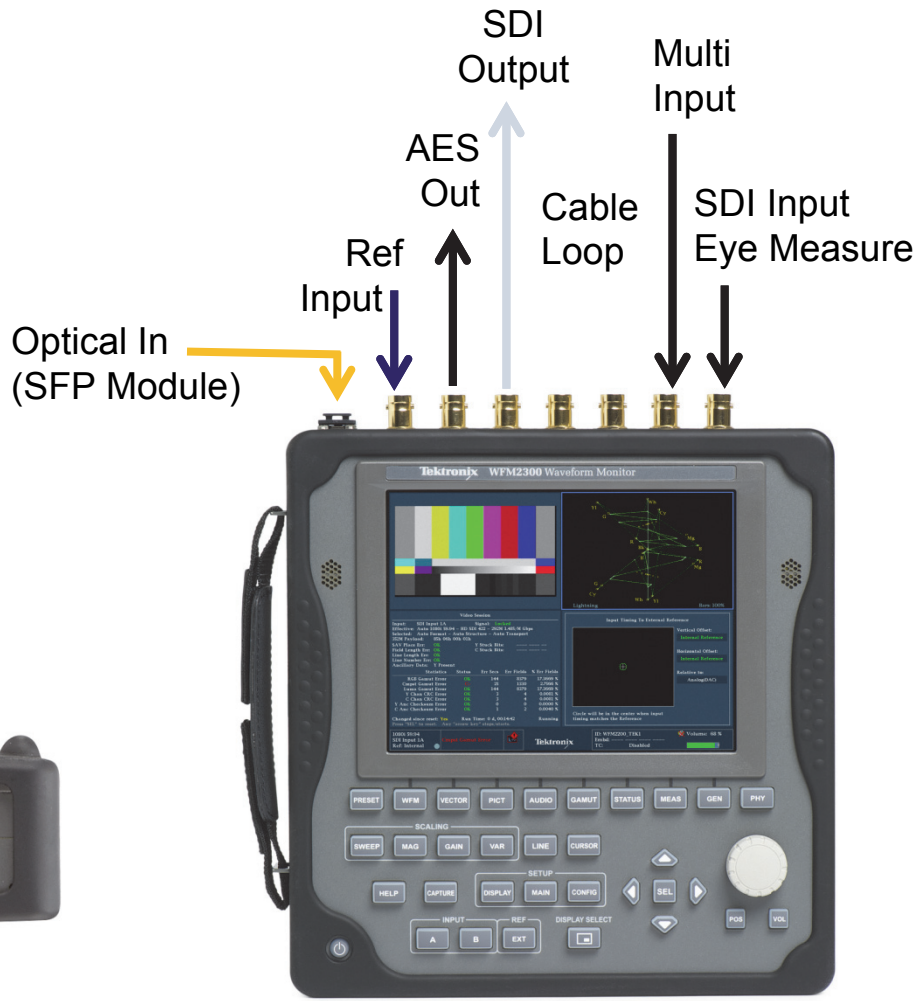
Tektronix

WFM2200 and WFM2300 Compact Waveform Monitors

Top and Rear Panel



WFM2200



WFM2300

WFM5200 Compact Waveform Monitor

Key Specifications and Ordering Information

Ordering Information	
WFM5200	Compact 3G/HD/SD Waveform Monitor, 4 SDI Inputs (3G, HD and SD-SDI support on the same inputs-auto detect)
3G	Add support for 3G-SDI signal formats (Level A and Level B)
CAM	Add multiple cameras (up to 4 cameras) simultaneous monitoring capability
PROD	Add Advanced Gamut Monitoring Package (including Spearhead Display and Luma Qualified Vector Display)
AUD	Add 16-Channel Embedded AES Audio Monitoring
LOUD	Add Audio Loudness monitoring capabilities including Loudness Meter, Loudness Trend Chart, and Loudness Data Logging capabilities (Requires audio option AUD)
DATA	Add Ancillary Data monitoring (including decoding of 708 and 608 Closed Captions, Teletext and OP47 Subtitles, AFD, and CGMS-A), ANC Data Inspector, and advanced Data Analysis capabilities
GEN	Add 3G/HD/SD-SDI Color Bar and Pathological Signal generation capability Option 3G required for 3G-SDI signal generation capability
S3D	Add monitoring support for SDI stereoscopic 3D video

Accessories	
WFM50FGM	Battery Adapter Plate – Anton Bauer Gold-Mount
WFM50FVM	Battery Adapter Plate – Sony / IDX V-Mount
WFM50F01	Portable Cabinet
WFM50FSC	Soft carrying case to accompany the WFM5200, portable cabinet (WFM50F01) is required
WFMRACK-NN	Dual Rack Cabinet for a combination of any WFM5000, WFM6000, WFM7000, or WFM8000 Series
WFM50F06	Filler Panel for Dual Rack Cabinet

Physical Characteristics (WFM only)			
Weight	Height	Width	Depth
1.5 kg	133 mm	233 mm	140 mm
3.3 lbs	5.25 in.	8 3/8 in.	5 1/2 in

Power supplied with the unit

Key Applications	Benefits
Multi-Input mode for Camera Alignment (OB Van / Production Studio)	Enable quick setup of multiple cameras and easy real-time monitoring of camera levels during production to ensure content quality
Color Correction and Manipulation	Minimize costly rework in Post Production by ensuring color gamut compliance
Content Editing and Special Effects	Verify content quality quickly and easily prior to distribution or ingest
Content Quality Control (QC) in Production, Post Production, Distribution, and Broadcast	Ensure compliance of video, audio, and ancillary data content to prevent costly rework, government penalties, advertising revenue loss, or subscriber loss
ENG & Mobile Applications	Light-weight, short-depth, battery-power capable with build-in color bar and pathological signal generation capability for quick setup and troubleshooting

Service Option Description			
C3	Calibration Service 3 Years	G5	Complete Care 5 Years
C5	Calibration Service 5 Years	R3	Repair Service 3 Years
G3	Complete Care 3 Years	R5	Repair Service 5 Years

*1 Audio Surround Sound Display licensed from Radio Technische Werksütten GmbH and Co. KG (RTW)

WFM5200 Compact Waveform Monitor

Rear Panel

WFM5250 Compact Waveform Monitor with SDI and HDMI

Key Specifications and Ordering Information

Ordering Information	
WFM5250	Compact 3G/HD/SD Waveform Monitor, 2 SDI Inputs (3G, HD and SD-SDI support on the same inputs-auto detect), 2 HDMI Inputs.
SIM	Add simultaneous monitoring of 2 HD/SD-SDI inputs or one HD/SD-SDI input and one HDMI input; Option 3G required for 3G-SDI formats support
3G	Add support for 3G-SDI signal formats (Level A and Level B)
PROD	Add Advanced Gamut Monitoring Package (including Spearhead Display and Luma Qualified Vector Display)
AUD	Add 16-Channel Embedded AES Audio Monitoring
LOUD	Add Audio Loudness monitoring capabilities including Loudness Meter, Loudness Trend Chart, and Loudness Data Logging capabilities (Requires audio option AUD)
DATA	Add Ancillary Data monitoring, ANC Data Inspector, and advanced Data Analysis capabilities
GEN	Add 3G/HD/SD-SDI Color Bar and Pathological Signal generation capability. Option 3G required for 3G-SDI signal generation capability
S3D	Add monitoring support for SDI stereoscopic 3D video

Accessories	
WFM50FGM	Battery Adapter Plate – Anton Bauer Gold-Mount
WFM50FVM	Battery Adapter Plate – Sony / IDX V-Mount
WFM50F01	Portable Cabinet
WFM50FSC	Soft carrying case to accompany the WFM5200, portable cabinet (WFM50F01) is required
WFMRACK-NN	Dual Rack Cabinet for a combination of any WFM5000, WFM6000, WFM7000, or WFM8000 Series
WFM50F06	Filler Panel for Dual Rack Cabinet

Physical Characteristics (WFM only)			
Weight	Height	Width	Depth
1.5 kg	133 mm	233 mm	140 mm
3.3 lbs	5.25 in.	8 3/8 in.	5 1/2 in

Power supplied with the unit

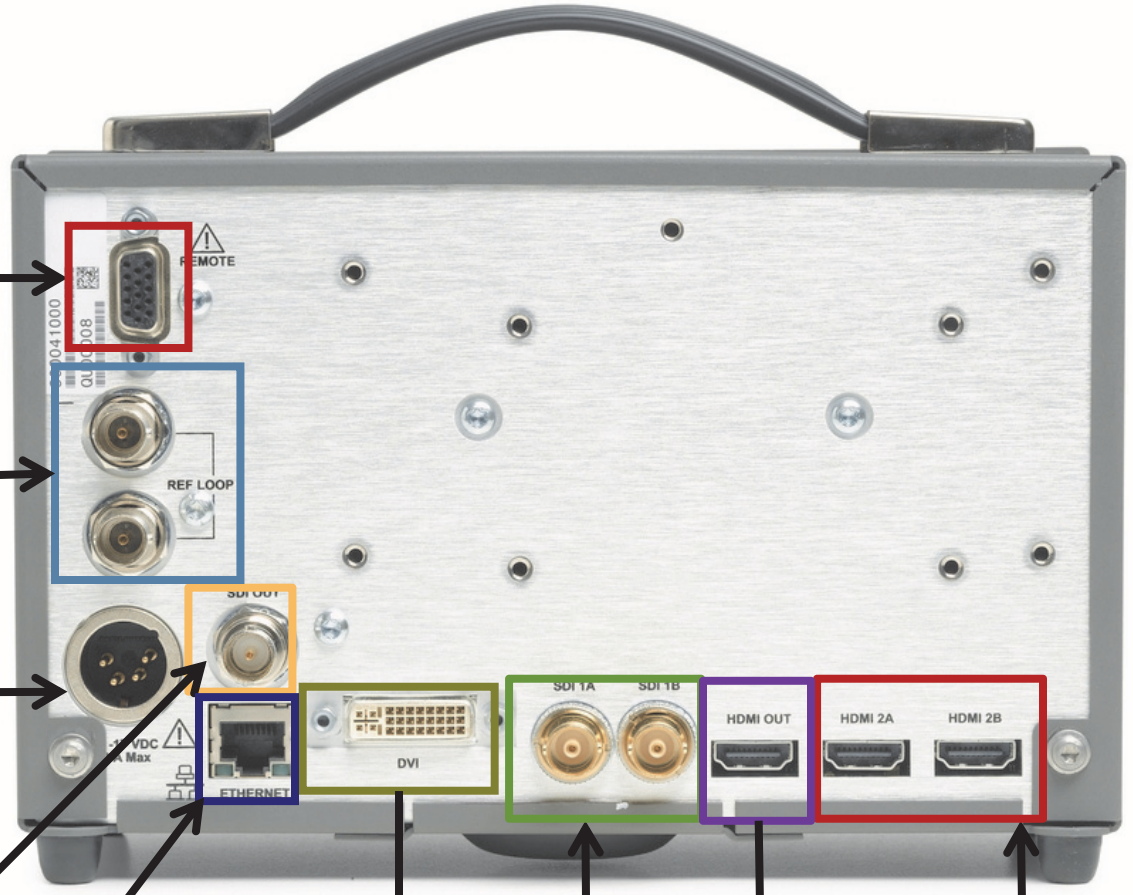
Key Applications	Benefits
Multi-Input mode for Camera Alignment (OB Van / Production Studio)	Enable quick setup of multiple cameras and easy real-time monitoring of camera levels during production to ensure content quality
Color Correction and Manipulation	Minimize costly rework in Post Production by ensuring color gamut compliance
Content Editing and Special Effects	Verify content quality quickly and easily prior to distribution or ingest
Content Quality Control (QC) in Production, Post Production, Distribution, and Broadcast	Ensure compliance of video, audio, and ancillary data content to prevent costly rework, government penalties, advertising revenue loss, or subscriber loss
ENG & Mobile Applications	Light-weight, short-depth, battery-power capable with build-in color bar and pathological signal generation capability for quick setup and troubleshooting

Service Option Description			
C3	Calibration Service 3 Years	G5	Complete Care 5 Years
C5	Calibration Service 5 Years	R3	Repair Service 3 Years
G3	Complete Care 3 Years	R5	Repair Service 5 Years

*1 Audio Surround Sound Display licensed from Radio Technische Werksütten GmbH and Co. KG (RTW)

WFM5250 Compact Waveform Monitor for SDI & HDMI

Rear Panel



Remote Port
GPI/O, Preset recall

Reference
Input Supports
Black Burst
Or Tri-level Sync

DC Power
Input

1 SDI output
(switched)

Ethernet Port

DVI External Display
Output 1024x768

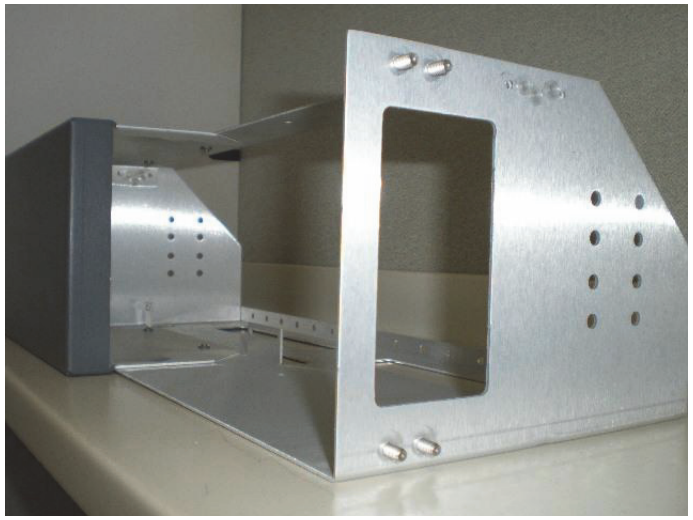
2 SDI inputs
SD/HD-SDI
Dual Link
Option 3G
Supports 3Gb/s

1 HMDI Output
(switched)

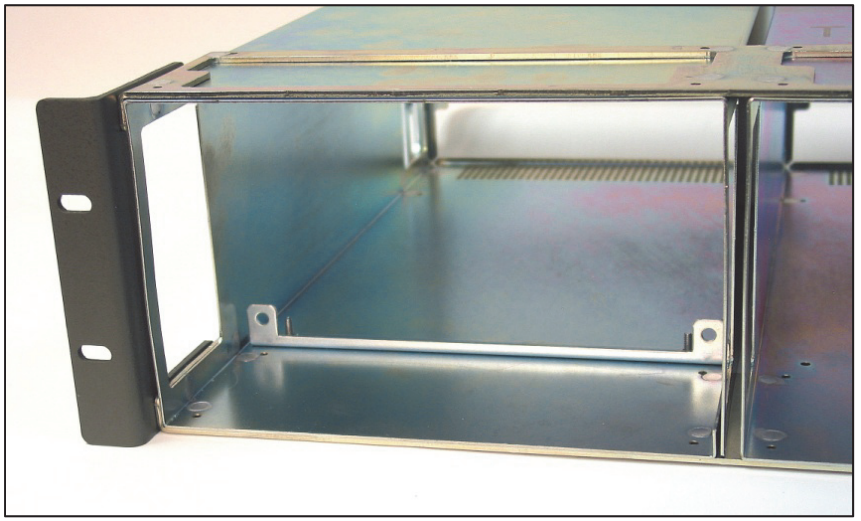
2 HDMI inputs

WFM5000 Series Multi-Format Waveform Monitors

Rack Mount Ordering Information



Part No. 407535601
Short depth rack mount
Accommodates Two WFM5250/5200/5000 or WFM4000



WFMRACK-NN
Accommodates Two WFM8xxx, WFM7xxx, or WFM6xxx.

Also includes Two short depth adaptors to accommodate Two WFM5250/5200/5000 or WFM4000

WFM5000 Series Multi-format Waveform Monitors

Power Accessories

146-0156-xx 12 V DC
Anton Bauer Battery

016-2005-xx 12 V DC
Anton Bauer Battery Charger

WFM50FSC Soft Carrying Case
(WFM50F01 is required)

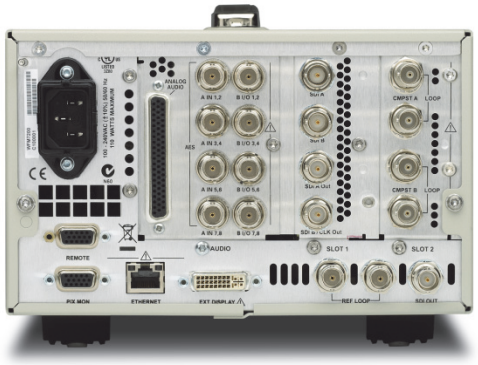
WFM50FGM Battery Adapter Plate on a WFM5000
(Anton Bauer Gold-Mount)

WFM7200 Waveform Monitor

Key Specifications and Ordering Information

Ordering Information	
WFM7200	Full featured Waveform Monitor, 2 SDI Inputs (3G, HD and SD-SDI support on the same inputs-auto detect) Base unit includes HD, SD and Dual-Link signal formats support. Opt. 3G required for 3G-SDI support.
3G	Adds support for 3G-SDI signal formats (Level A and Level B)
2SDI*2	Adds multiple cameras (up to 4 cameras) simultaneous monitoring capability
CPS*2	Adds support for composite analog video monitoring
SIM	Adds advanced simultaneous monitoring of 2 inputs.
PROD	Adds Advanced Gamut Monitoring Package (including Spearhead Display and Luma Qualified Vector Display)
AD	Adds Analog and Digital audio monitoring with 16-Channel Embedded AES Audio Monitoring (including Multi-Channel Surround Sound Display[1])
DPE	Dolby E / Dolby Digital Plus / Dolby Digital, along with Embedded & AES Digital Audio/ Analog Audio
DAT	Adds Ancillary Data monitoring (including decoding of 708 and 608 Closed Captions, Teletext and OP47 Subtitles, AFD, and CGMS-A), ANC Data Inspector, and advanced Data Analysis capabilities
PHY3	Physical Layer Measurement Package (includes HD-SDI, and SD-SDI eye pattern and jitter waveform displays; automated measurements of eye pattern parameters, jitter, and cable parameters) Option 3G required for 3G-SDI support
GEN	Adds 3G/HD/SD-SDI Color Bar and Pathological Signal generation capability. Option 3G required for 3G-SDI signal generation capability
AVD	Adds support for out-of-service A/V delay measurements; An audio option must also be ordered
S3D	Adds Monitoring Support for Stereoscopic 3D Video (including Simultaneous Input Monitoring Capability)

***1 Audio Surround Sound Display licensed from Radio Technische Werksütten GmbH and Co. KG (RTW)**
***2 Option 2SDI and Option CPS cannot be installed in the same instrument**



Key Applications	Benefits
Color Correction Toolset for Editors and Colorists	Tektronix provides a variety of patented gamut displays that simplify video adjustments
Content QA and compliance checking for Distribution Chain	Errors that occur within the program material can be logged against time code, allowing an operator to quickly investigate problems within the material.
Complete Monitoring Tool Set for Optimum Sound Quality	Provides a variety of display configurations for audio levelphase, and loudness monitoring

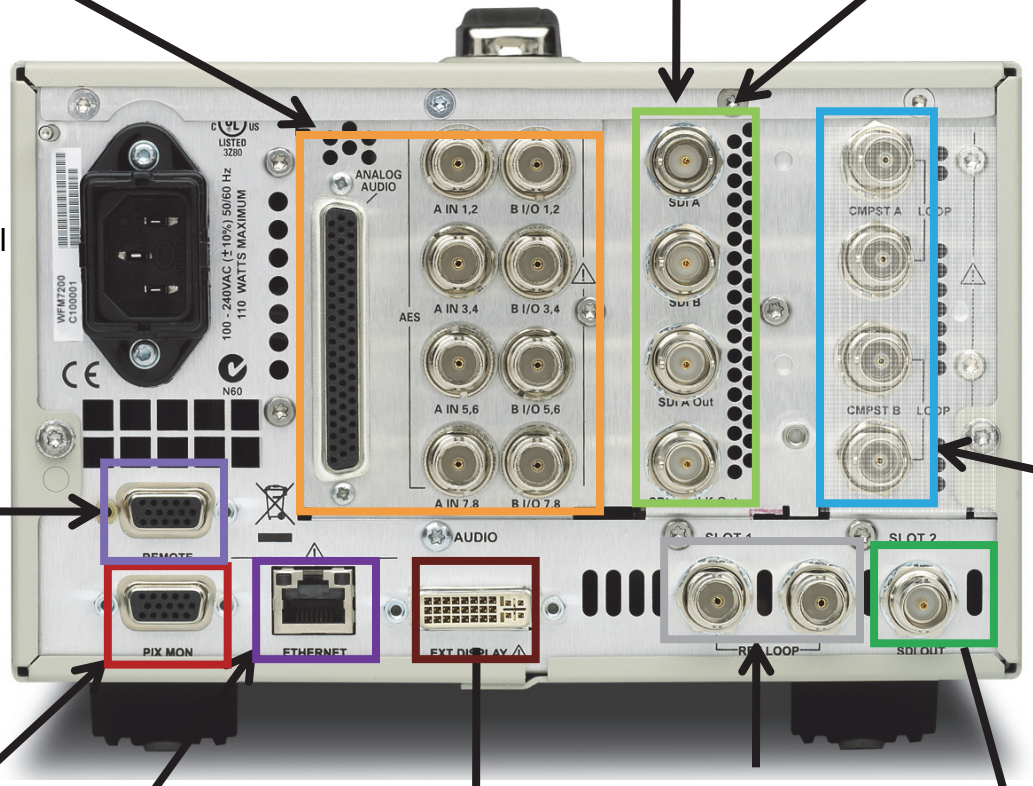
Accessories	
WFM7F02	Portable cabinet includes handle, feet, tilt bail and front panel cover
WFMRACK-NN	Dual Rack Cabinet for a combination of any WFM5000, WFM6000, WFM7000, or WFM8000 Series
WFMRACK-0N	Dual Rack Cabinet Old-New for a combination of any WFM5000, WFM6000, WFM7000, or WFM8000 Series with older-style 1700 Series, WFM601, 764 or 760 products
WFM50F06	Filler Panel for Dual Rack Cabinet
Option 62	Analog Audio Breakout Cable, 6 feet, male 62-pin connectors to 8 XLR male output connectors and 12 XLR female input connectors

Service Option Description	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

Physical Characteristics (WFM7200)			
Weight	**Height**	**Width**	**Depth**
8.5lb 3.9kg	5.3in 133mm	8.4in 213mm	18.4in 464mm

WFM7200 Waveform Monitor

Rear Panel



Audio Option
Option AD supports
Embedded / Discrete
AES/EBU Digital Audio
Analog Audio

Option DPE adds
Additional support for
Dolby Digital, Dolby Digital Plus & Dolby E

Option PHY3
(WFM7200)

2 SDI inputs
Standard Supports
SD-SDI
HD-SDI
Dual Link

Option 3G
Supports 3Gb/s
1080p 50,59.94,60
YCbCr Level A & B

SDI outputs (active loop through)

Remote Port
GPI/O, Preset recall

Option CPS
Adds support for 2 Composite inputs with passive loop through

OR

Option 2SDI
Adds 2 additional SDI inputs (4 SDI Multi-Input Mode)

Analog Pix Mon
RGB or YPbPr

Ethernet Port

DVI External Display
Output 1024x768

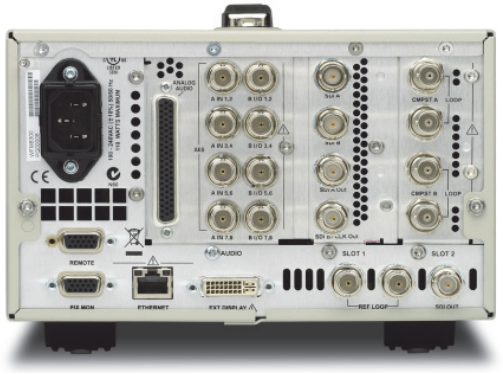
Reference Input
Supports Black Burst
Or Tri-level Sync

1 SDI output (switched)

WFM8300 Advanced Waveform Monitor

Key Specifications and Ordering Information

Options Availability		WFM8200	WFM8300
Video			
SD	SD Video Monitoring	Standard	Standard
HD	HD Video Monitoring	Standard	Standard
3G[1]	3Gb/s Monitoring	Opt 3G	Opt 3G
DL	Dual-Link Video Monitoring	Standard	Standard
CPS	Composite Analog Video Monitoring	Opt CPS	Opt CPS
Audio			
AD or DPE	Analog / Digital Audio	Opt AD	Opt AD
DPE	Dolby E / Dolby Digital Plus / Dolby Digital	Opt DPE	Opt DPE
Physical Layer Measurement			
EYE	Eye pattern display, cable length and Jitter measurements	Opt EYE/PHY3	Opt PHY
PHY	Eye Option plus automated Eye measurements and Jitter waveform display; HD/SD and 3Gb/s (with Opt 3G) SDI color bar and pathological signal generation capability	PHY3	PHY
Measurement & Analysis			
SIM	Simultaneous A/B Input	Option SIM	Standard
AVD[2]	Audio-Video Delay Measurement	Opt AVD	Standard
DAT	In-depth Video Data and ANC Data Analysis	Option DAT	Standard
PROD	Advanced Gamut Monitoring Package (Spearhead Gamut display and Luma Qualified Vector Display)	Opt PROD	Opt PROD
2SDI	Adds additional SDI module (in Slot 2) to support up to 4 SDI inputs within Multi-mode displays	Opt 2SDI	Opt 2SDI
3D	3D Video Monitoring	Option 3D	Standard



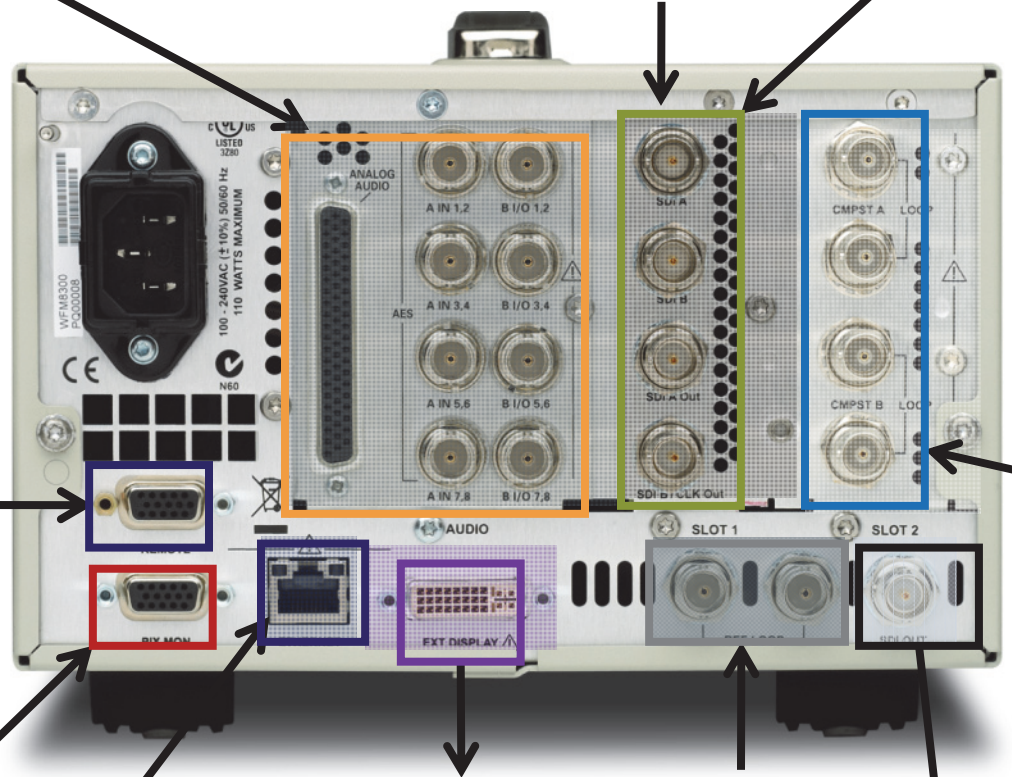
Models	Key Applications
WFM8300	▪ Advanced 3G/HD/SD Waveform Monitor, 2 SDI Inputs (3G SDI,HD SDI and SD SDI support on the same inputs-auto detect) ▪ Base unit includes HD, SD, Dual Link, SIM, DAT, and AVD (requires an audio option) ▪ Option 3G required for 3G SDI Support

[1] Requires Option 3G
[2] An Audio Option is required for AV Delay Measurements

	Service Option Description
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

WFM8300 Advanced Waveform Monitor

Rear Panel



Audio Option
Option **AD** supports
Embedded
AES/EBU Digital Audio
Analog Audio

Option **DDE** adds
Additional support for
Dolby Digital & Dolby E

Option EYE (WFM8200)

Option PHY (WFM8300)

2 SDI inputs
Standard Supports
SD-SDI, HD-SDI &
Dual Link

Option **3G**
Supports 3 Gb/s
1080p 50,59.94,60
YCbCr Level A & B

SDI outputs (active loop through)

Remote Port
GPI/O, Preset recall

Option **CPS**
Adds support for 2
Composite inputs with
passive loop through

Or Option 2SDI
Adds support for 2
additional SDI inputs
with 4 SDI inputs in
total

Analog Pix Mon
RGB or YPbPr

DVI External Display
Output 1024x768

Reference Input
Supports Black Burst
Or Tri-level Sync

Ethernet Port

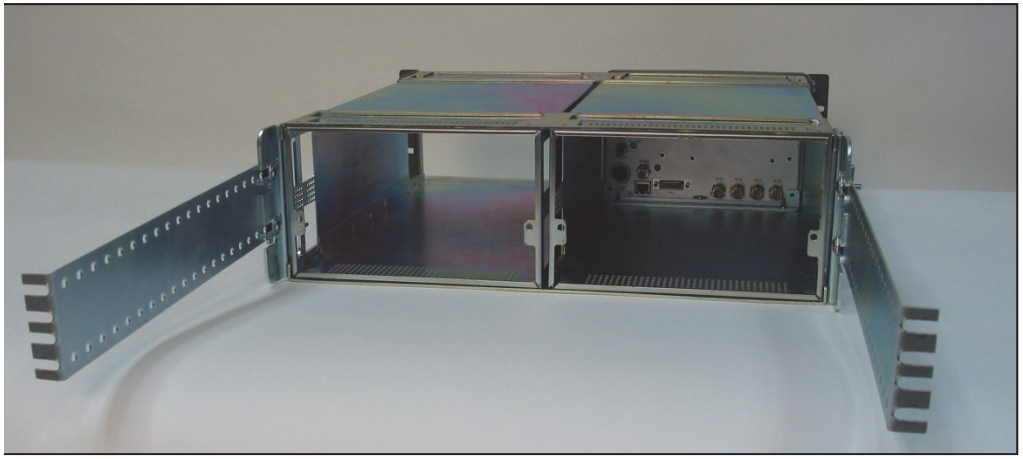
1 SDI output (switched)

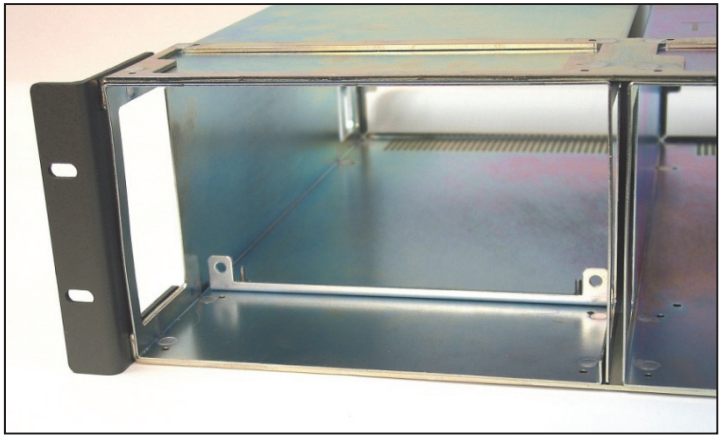
WFM5000/7000/8000 Waveform Monitors

Rack Mount Ordering Information

WFMRACK-NN
Accommodates Two WFM8xxx, or WFM7xxx.

Also includes Two short depth adaptors to accommodate Two WFM5xxx or WFM4000





Waveform Rasterizer Selection Guide

Description	WVR5200	WVR5250	WVR7200	WVR8300
NTSC/PAL			Opt CPS	Opt CPS
SD Digital	■	■	■	■
HD Digital	■	■	■	■
Dual Link	■	■	■	■
3G-SDI Single Link (Level A & Level B)	Opt 3G	Opt 3G	Opt 3G	Opt 3G
2 inputs: HD/SD SDI or 1 HD/SD SDI and 1 CPS			Opt 3D	■
2 HDMI & 2 SDI inputs with one output for each		■		
Simultaneous monitoring	Opt CAM	Opt SIM	Opt 2SDI	Opt 2SDI
In-Depth Data and ANC Data Analysis	Opt DATA	Opt DATA	Opt DAT	■
Closed Caption / Teletext Subtitle & AFD Decoding	Opt DATA	Opt DATA	■	■
Advanced Gamut Monitoring	Opt PROD	Opt PROD	Opt PROD	Opt PROD
3D Video Content Monitoring	Opt S3D	Opt S3D	Opt S3D	■
Embedded Audio	Opt AUD	Opt AUD	Opt AD or DPE	Opt AD or DPE
Discrete AES/EBU Digital Audio			Opt AD or DPE	Opt AD or DPE
Analog, Embed, AES/EBU Audio			Opt AD or DPE	Opt AD or DPE
Dolby AC-3/E/DD+			Opt DPE	Opt DPE
Audio Loudness Monitoring	Opt LOUD	Opt LOUD	Opt AD or DPE	Opt AD or DPE
Out-of-Service Audio Video Delay			Opt AVD	■
Eye Diagrams, Jitter & Cable Parameter Measurements			Opt PHY3	Opt PHY
Jitter Waveform and Automated Eye measurements			Opt PHY3	Opt PHY
3G Jitter Waveform and Jitter measurement			* Opt PHY3/3G	* Opt PHY3/3G
Basic Test Signal Generation	Opt GEN	Opt GEN	Opt GEN	Opt PHY

* Option 3G is required for JIT and it is mutually exclusive of EYE/PHY
** Does not include a trend graph for audio loudness

Legend: Not available ■ **Included as standard** **Opt = Option required**

WVR5200 Compact Waveform Rasterizer

Key Specifications and Ordering Information

Ordering Information	
WVR5200	Compact 3G/HD/SD Waveform Rasterizer, 4 SDI Inputs. Base unit includes HD, SD and Dual-Link signal formats support. Option 3G required for 3G-SDI.
3G	Add support for 3G-SDI signal formats (Level A and Level B)
CAM	Add multiple cameras (up to 4 cameras) simultaneous monitoring
PROD	Add Advanced Gamut Monitoring Package (including Spearhead Display and Luma Qualified Vector Display)
AUD	Add 16-Channel Embedded AES Audio Monitoring (including Multi-Channel Surround Sound Display[1])
LOUD	Add Audio Loudness monitoring capabilities including Loudness Meter, Loudness Trend Chart, and Loudness Data Logging capabilities (Requires audio option AUD)
DATA	Add Ancillary Data monitoring, ANC Data Inspector, and advanced Data Analysis capabilities
GEN	Add 3G/HD/SD-SDI Color Bar and Pathological Signal generation.
S3D	Add monitoring support for SDI stereoscopic 3D video

Key Applications	Benefits
Multi-Input mode for Camera Alignment (OB Van / Production Studio)	Enable quick setup of multiple cameras and easy real-time monitoring of camera levels during production to ensure content quality
Color Correction and Manipulation	Minimize costly rework in Post Production by ensuring color gamut compliance
Content Editing and Special Effects	Verify content quality quickly and easily prior to distribution or ingest
Content Quality Control (QC) in Production, Post Production, Distribution, and Broadcast	Ensure compliance of video, audio, and ancillary data content to prevent costly rework, government penalties, advertising revenue loss, or subscriber loss

Accessories	
VTSRACK-S2	Short-Depth 1RU rack to fit one or two WVR5200 side by side
VTSRACK-L1	Full-Depth 1RU rack to fit a single WVR5200
VTSRACK-L2	Full-Depth 1RU rack to fit one or two side by side WVR5200 or WVR5000 or SPG300

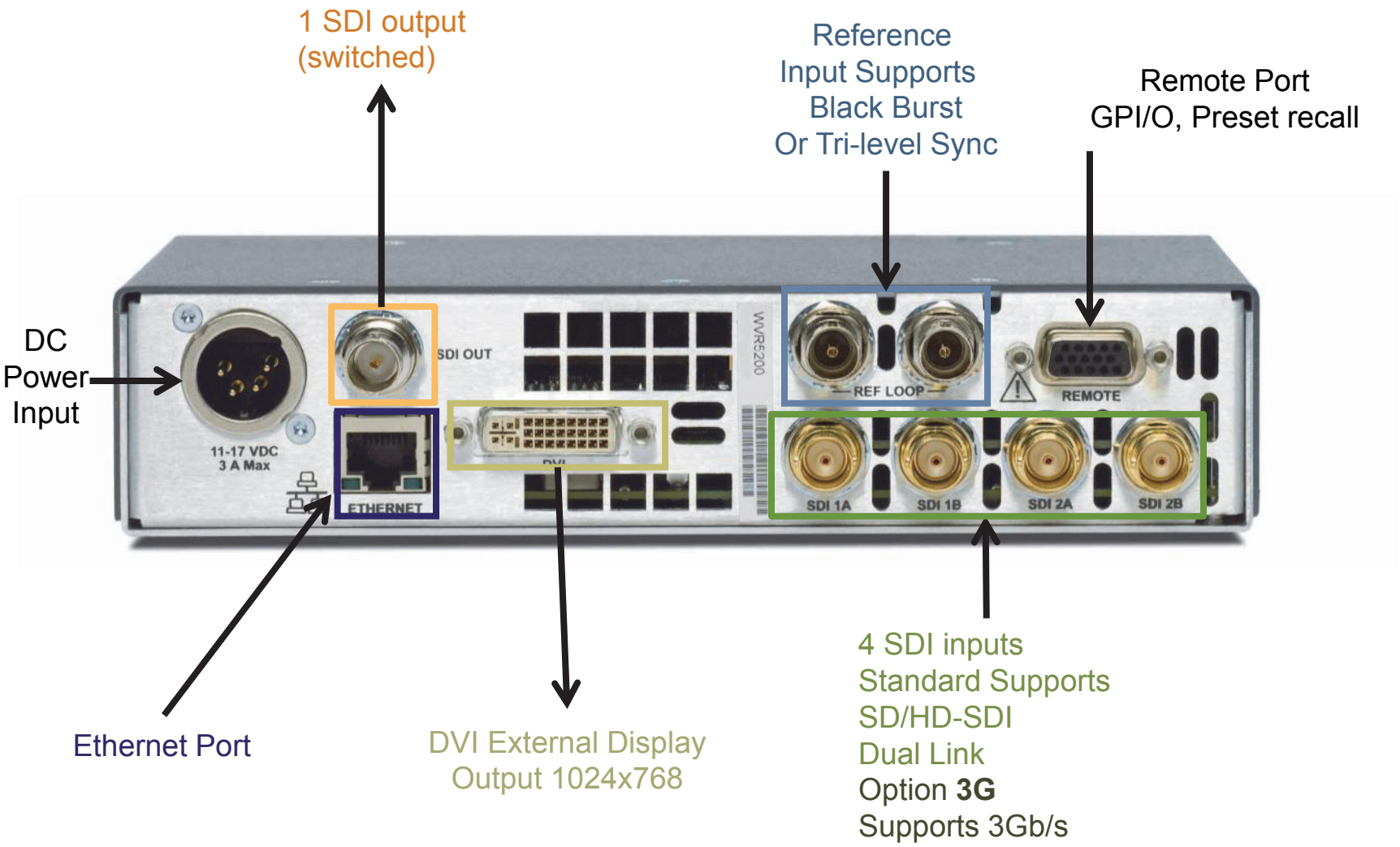
Physical Characteristics (WFM only)			
Weight	Height	Width	Depth
0.82 kg	44 mm	213 mm	140 mm
1.8 lbs	1.7 in.	8 3/8 in.	5 1/2 in

Service Option Description	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
G3	Complete Care 3 Years
G5	Complete Care 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

Power supplied with the unit

WVR5200 Compact Waveform Rasterizer

Rear Panel



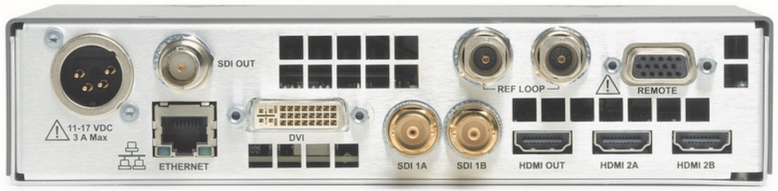
WVR5250 Compact Waveform Rasterizer

Key Specifications and Ordering Information

Ordering Information	
WVR5250	Compact 3G/HD/SD Waveform Rasterizer, 2 SDI Input., 2 HDMI inputs. Base unit includes HD, SD and Dual-Link signal formats support.
SIM	Add simultaneous monitoring of 2 HD/SD-SDI inputs or one HD/SD-SDI input and one HDMI input; Option 3G required for 3G-SDI formats support
3G	Add support for 3G-SDI signal formats (Level A and Level B)
PROD	Add Advanced Gamut Monitoring Package (including Spearhead Display and Luma Qualified Vector Display)
AUD	Add 16-Channel Embedded AES Audio Monitoring (including Multi-Channel Surround Sound Display[1])
LOUD	Add Audio Loudness monitoring capabilities including Loudness Meter, Loudness Trend Chart, and Loudness Data Logging capabilities (Require audio option AUD)
DATA	Add Ancillary Data monitoring, ANC Data Inspector, and advanced Data Analysis capabilities
GEN	Add 3G/HD/SD-SDI Color Bar and Pathological Signal generation Option 3G required for 3G-SDI signal generation capability
S3D	Add monitoring support for SDI stereoscopic 3D video

Accessories	
VTSRACK-S2	Short-Depth 1RU rack to fit one or two WVR5200 side by side Full-Depth 1RU rack to fit a single WVR5200 Full-Depth 1RU rack to fit one or two side by side WVR5200 or WVR5000 or SPG300
VTSRACK-L1	Full-Depth 1RU rack to fit a single WVR5200
VTSRACK-L2	Full-Depth 1RU rack to fit one or two side by side WVR5200 or WVR5000 or SPG300

Physical Characteristics (WFM only)			
Weight	Height	Width	Depth
0.82 kg	44 mm	213 mm	140 mm
1.8 lbs	1.7 in.	8 3/8 in.	5 1/2 in



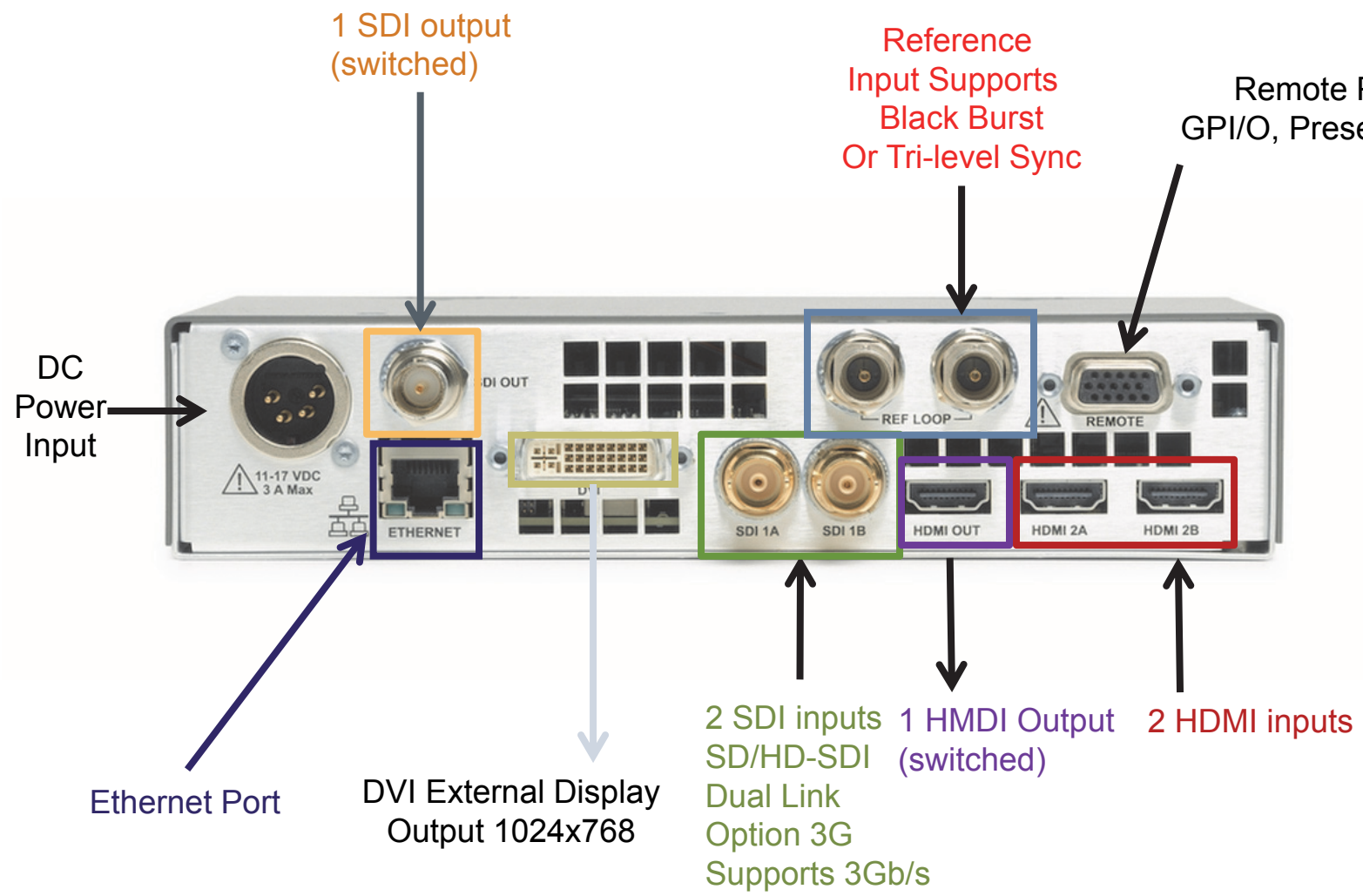
Key Applications	Benefits
Multi-Input mode for Camera Alignment (OB Van / Production Studio)	Enable quick setup of multiple cameras and easy real-time monitoring of camera levels during production to ensure content quality
Color Correction and Manipulation	Minimize costly rework in Post Production by ensuring color gamut compliance
Content Editing and Special Effects	Verify content quality quickly and easily prior to distribution or ingest
Content Quality Control (QC) in Production, Post Production, Distribution, and Broadcast	Ensure compliance of video, audio, and ancillary data content to prevent costly rework, government penalties, advertising revenue loss, or subscriber loss

Service Option Description	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
G3	Complete Care 3 Years
G5	Complete Care 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

Power supplied with the unit

WVR5250 Compact Waveform Rasterizer for SDI & HDMI

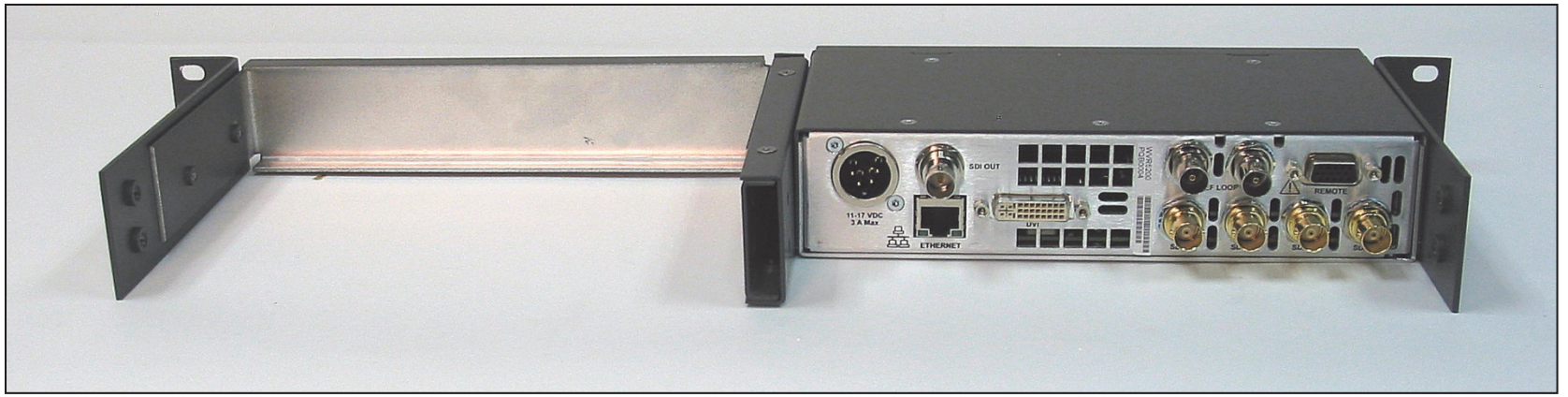
Rear Panel



WVR5200/5250 Series Compact Waveform Rasterizer

Rack Mount Ordering Information

VTSRACK-S2 Short-Depth 1RU rack to fit one or two WVR5200 side by side



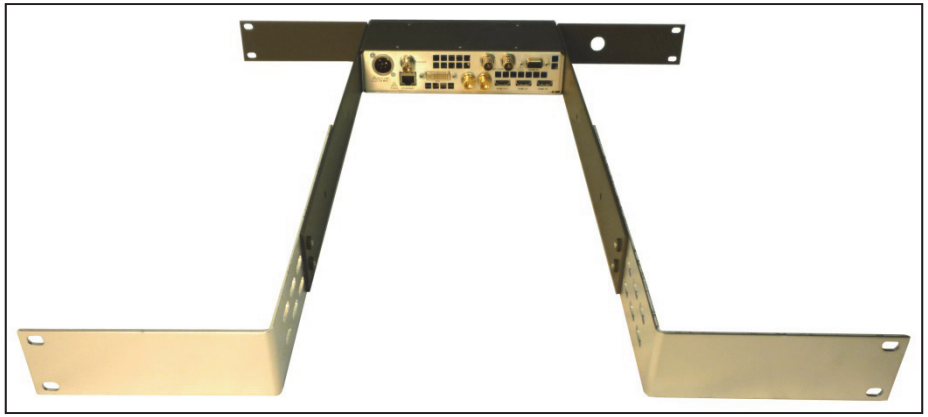
WVR5200/5250 Series Compact Waveform Rasterizer

Rack Mount Ordering Information

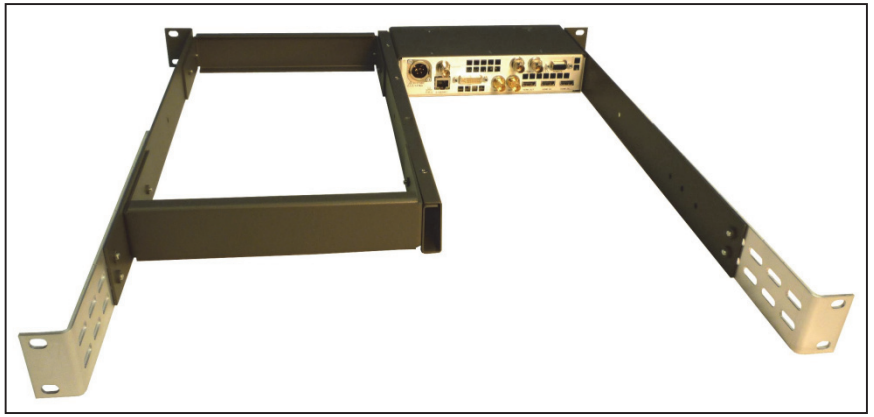
VTSRACK-L1 Long-Depth 1RU rack to fit one WVR5200
VTSRACK-L2 Long-Depth 1RU rack to fit one or two WVR5200s side by side

L1 Front View

L2 Front View



L1 Rear View



L2 Rear View

WVR7200 Waveform Rasterizer

Key Specifications and Ordering Information

Ordering Information	
WVR7200	Full featured Waveform Rasterizer, 2 SDI Inputs (3G, HD and SD-SDI support on the same inputs-auto detect) Base unit includes HD, SD and Dual-Link signal formats support. Option 3G required for 3G-SDI support.
3G	Adds support for 3G-SDI signal formats (Level A and Level B)
2SDI[*2]	Adds multiple cameras (up to 4 cameras) simultaneous monitoring capability
CPS[*2]	Adds support for composite analog video monitoring
SIM	Adds advanced simultaneous monitoring of 2 inputs.
PROD	Adds Advanced Gamut Monitoring Package (including Spearhead Display and Luma Qualified Vector Display)
AD	Adds Analog and Digital audio monitoring with 16-Channel Embedded AES Audio Monitoring (including Multi-Channel Surround Sound Display[1])
DPE	Dolby E / Dolby Digital Plus / Dolby Digital, along with Embedded & AES Digital Audio/ Analog Audio
DAT	Adds Ancillary Data monitoring (including decoding of 708 and 608 Closed Captions, Teletext and OP47 Subtitles, AFD, and CGMS-A), ANC Data Inspector, and advanced Data Analysis capabilities
PHY3	Physical Layer Measurement Package (includes HD-SDI, and SD-SDI eye pattern and jitter waveform displays; automated measurements of eye pattern parameters, jitter, and cable parameters) Option 3G required for 3G-SDI support
GEN	Adds 3G/HD/SD-SDI Color Bar and Pathological Signal generation capability Option 3G required for 3G-SDI signal generation capability
AVD	Adds support for out-of-service A/V delay measurements; An audio option must also be ordered
S3D	Adds Monitoring Support for Stereoscopic 3D Video (including Simultaneous Input Monitoring Capability)

Key Applications	Benefits
Color Correction Toolset for Editors and Colorists	Tektronix provides a variety of patented gamut displays that simplify video adjustments
Content QA and compliance checking for Distribution Chain	Errors that occur within the program material can be logged against time code, allowing an operator to quickly investigate problems within the material.
Complete Monitoring Tool Set for Optimum Sound Quality	Provides a variety of display configurations for audio level, phase and loudness monitoring

Accessories	
WVR8RFP	Remote front panel allows control of WVR7200 front panel at up to a distance of 1000 ft. An external 12 V DC power supply allows control up to 4000 ft.
Option 62	Analog Audio Breakout Cable, 6 feet, male 62-pin connectors to 8 XLR male output connectors and 12 XLR female input connectors

Physical Characteristics (WVR7200)			
Weight	**Height**	**Width**	**Depth**
9.5lb 4.3kg	1.725in 44mm	19in 483mm	19.625in 498mm

*1 Audio Surround Sound Display licensed from Radio Technische Werksütten GmbH and Co. KG (RTW)

*2 Option 2SDI and Option CPS cannot be installed in the same instrument

Service Option Description	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

WVR7200 Waveform Rasterizer

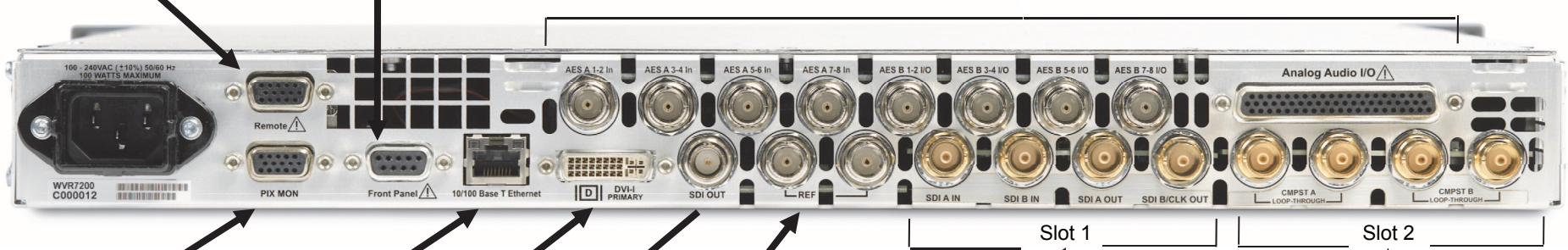
Rear Panel

Audio Option
Option AD supports Embedded & Discrete AES/EBU Digital Audio and Analog Audio

Option DPE adds Additional support for Dolby Digital, Dolby Digital Plus, and Dolby E Audio

Remote Port GPI, Preset recall

Remote Front Panel



Analog Pix Mon RGB or YPbPr

Ethernet Port

DVI-I External Display Output 1024x768

1 SDI Output (switched)

Reference Input Supports Black Burst Or Tri-level Sync

2 SDI inputs Standard Supports HD-SDI, Dual Link, SD-SDI

Option 3G Adds support for 3Gb/s 1080p 50,59.94,60 YCbCr Level A & B

SDI outputs (active loop through)

Option PHY3 (WVR7200)

Option CPS Adds support for 2 Composite inputs with passive loop through

OR

Option 2SDI Adds 2 Additional SDI Inputs 4 SDI Multi-input mode

WVR8300 Advanced Waveform Rasterizer

Key Specifications and Ordering Information

Options Availability		WVR8200	WVR8300
Video			
SD	SD Video Monitoring	Standard	Standard
HD	HD Video Monitoring	Standard	Standard
3G[1]	3Gb/s Monitoring	Opt 3G	Opt 3G
DL	Dual-Link Video Monitoring	Standard	Standard
CPS	Composite Analog Video Monitoring	Opt CPS	Opt CPS
Audio			
AD or DPE	Embedded & AES Digital Audio/ Analog Audio	Opt AD	Opt AD
DPE	Dolby E / Dolby Digital Plus / Dolby Digital	Opt DPE	Opt DPE
Physical Layer Measurement			
EYE	Eye pattern display, cable length and Jitter measurements	Opt EYE/PHY3	Opt PHY
PHY	Eye Option plus automated Eye measurements and Jitter waveform display; HD/SD and 3Gb/s (with Opt 3G) SDI color bar and pathological signal generation capability	PHY3	PHY
Other Advanced Capabilities			
SIM	Simultaneous A/B Input	Option SIM	Standard
AVD[2]	Audio-Video Delay Measurement	Opt AVD	Standard
DAT	In-depth Video Data and ANC Data Analysis	Option DAT	Standard
PROD	Advanced Gamut Monitoring Package (Spearhead Gamut display and Luma Qualified Vector Display)	Opt PROD	Opt PROD
2SDI	Adds additional SDI module (in Slot 2) to support up to 4 SDI inputs within Multi-mode displays	Opt 2SDI	Opt 2SDI
3D	3D Video Monitoring	Option 3D	Standard

WVR8RFP Remote Front Panel with WVR8300

WVR8RFP Models	Key Applications
WVR8200	▪ 3G/HD/SD Waveform Monitor, 2 SDI Inputs (3G-SDI, HD-SDI and SD-SDI support on the same inputs-auto detect) ▪ Base unit includes HD-SDI, SD-SDI , and Dual-Link signal formats support ▪ Option 3G required for 3G-SDI support ▪ Option 2SDI Adds additional SDI module (in Slot 2) to support up to 4 SDI inputs within Multi-mode displays (3G-SDI, HD-SDI, and SD-SDI support on the same input – auto detect) –Option 3G required for 3G-SDI support ▪ 3D Video Monitoring (Left Eye/Right Eye Side by Side Simultaneous Monitoring with SyncVu™)
WVRM8300	▪ Advanced 3G/HD/SD Waveform Rasterizer and Analyzer, 2 SDI Inputs ▪ (3G-SDI, HD-SDI and SD-SDI support on the same inputs-auto detect) ▪ Base unit includes HD-SDI, SD-SDI, Dual-Link signal formats, simultaneous input monitoring (SIM), advanced data analysis, and audio/video delay measurement (requires an audio option) ▪ Option 3G required for 3G-SDI support
WVR8RFP	Remote Front Panel for WVR8xxx Series Waveform Rasterizer (includes 25 ft cable)

Option	Service Option Description
CA1	Provides a single calibration event or coverage for the designated calibration interval, whichever comes first
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R3	Repair Service 3 Years
D1[1]	Calibration Data Report
D3[1]	Calibration Data Report 3 years (with Option C3)
D5[1]	Calibration Data Report 5 years (with Option C5)
R3	Repair Service 3 years (including warranty)
R5	Repair Service 5 years (including warranty)

WVR8300 Advanced Waveform Rasterizer

Rear Panel

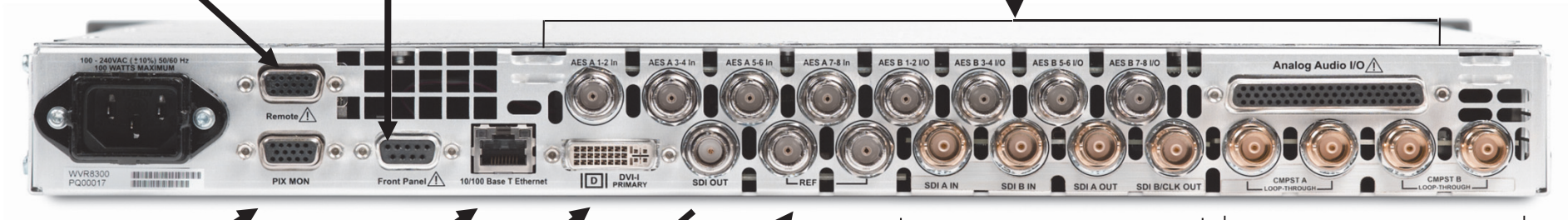
Audio Option

Option **AD** supports Embedded & External AES/EBU Digital Audio and Analog Audio

Option DPE adds Additional support for Dolby Digital, Dolby Digital Plus, and Dolby E Audio

Remote Port GPI, Preset recall

Remote Front Panel



Slot 1

Slot 2

Analog Pix Mon RGB or YPbPr

Ethernet Port

DVI-I External Display Output 1024x768

1 SDI Output (switched)

Reference Input Supports Black Burst Or Tri-level Sync

2 SDI inputs Standard Supports HD-SDI, Dual Link, SD-SDI

Option **3G** Adds support for 3Gb/s 1080p 50,59.94,60 YCbCr Level A & B

SDI outputs (active loop through, switched)

Option **CPS** Adds support for 2 Composite inputs with passive loop through

Option **EYE** (WVR8200)

Option **PHY** (WVR8300)

WVR7200/8300 Advanced Waveform Rasterizers

Accessories

WVR8RFP - Remote Front Panel

Option 62 - Analog Audio Breakout Cable

SPG8000 Master Sync / Clock Reference Generator

Key Specifications and Ordering Information

Ordering Information	
SPG8000	Master Sync / Master Clock Reference Generator base unit **Includes:** Genlock input with loop-through output, three analog composite black or HD tri-level sync outputs, LTC input/outputs (4 out or 1 in/3 out), 48 kHz word clock output; general purpose interface, 10/100/1000 Ethernet interface with Web UI support, SNMP error reporting.
Options (must be added at time of order)	
GPS	Add GPS master clock synchronization capability, including internal GPS receiver and NTP server support
BG	Add 2 channels of composite NTSC/PAL black or HD tri-level outputs plus 2 channels of composite NTSC/PAL test signal outputs
SDI	Add 2 channels of SD/HD SDI test signal generation
3G	Add 3G SDI format support (Opt. SDI required)
AG	Add DARS output (2 AES/EBU channels) plus 4 audio tone outputs (8 AES/EBU channels)
DPW	Add a second redundant (backup) power supply
XLR	D-sub to XLR/BNC adapter cable (6 feet long)
ANT	GPS rooftop antenna that works with the integrated internal GPS receiver of a SPG8000 with Option GPS
Upgrades	
DPW	Add a second, hot-swappable, Redundant (backup) Power Supply (a power cord option required)
3G	Add 3G SDI format support (software option key upgrade); required Option SDI has already been installed in the base unit
IF	Upgrade Installation Service
IFC	Service Installation and Calibration

Key Applications	Benefits
Broadcast	▪ Long-term stability for reference signals, Stay GenLock™ to GPS-based or external source ▪ Availability of all necessary reference signals ▪ High-availability systems using two SPG8000 units and one ECO8000 or ECO8020 ▪ SNMP error report, Web user interfaces for centralized control / monitoring system ▪ Use the NTP server as a master clock unit distributing the time information to video server unit as well as reference timing signal generator for conventional video instruments. ▪ Hot swappable dual power supply allows you to operate the unit even while replacing the power supply module.

Service Options	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

SPG8000 Master Sync / Clock Reference Generator

Rear Panel

- Black Burst / HD Tri-Level Sync
  - 3 outputs in base configuration
  - 2 more outputs with option BG
  - 2 more composite outputs in option BG can be black burst
- Genlock Input
  - Passive loop-through
- Linear Time Code (LTC)
  - 4 outputs or 3 outputs + 1 input
- GPS antenna Input (Option GPS)
- Hot-swappable Power Supplies
  - Option DPW for backup supply
- General Purpose Interface
- SD/HD/3G SDI Test Signals
  - Option SDI for SD/HD, plus option 3G for 3 Gb/s SDI
  - Two channels of two outputs each
- Composite analog (NTSC/PAL) Test Signals
  - 2 outputs with option BG
  - Can use as additional black burst
- Word Clock (48 kHz)
- AES Audio (Option AG)
  - 4 pairs (8 channels) of tones
  - 1 pair (2 channels) DARS
- 10/100/1000 Base-T Ethernet

ECO8000 Automatic Changeover Unit

Key Specifications and Ordering Information

Ordering Information	
ECO8000	ECO (automatic changeover) base unit - 3 x BNC channels (black burst, HD tri-level sync, AES/DARS, word clock)
Options (must be added at time of order)	
DPW	Add a second hot-swappable redundant (backup) power supply (a second power cord option is required)
REF	Add 3 x BNC channels (black burst, HD tri-level sync, AES/DARS, word clock)
HREF	Add 3 x high bandwidth BNC channels (3G-SDI, HD-SDI, SD-SDI, as well as black burst, HD tri-level sync, AES/DARS, word clock)
LTC	Add 4 x LTC channels
XLR	Adapter cable (6 feet long) from 15-pin D-sub LTC OUT connector on the ECO8000 to 4 XLR male connectors (for LTC outputs) and BNC male connectors (for General Purpose Interface outputs)
RACK	Rack mount slides and rails kit for ECO8000 (1 RU height, standard full depth)
Upgrades	
DPW	Add a second hot-swappable redundant (backup) power supply (a power cord option must also be specified)
LTC	Add 4 x LTC channels (software upgrade option)
XLR	Adapter cable (6 feet long) from 15-pin D-sub LTC OUT connector on the ECO8000 to 4 XLR male connectors (for LTC outputs) and BNC male connectors (for General Purpose Interface outputs)
RACK	Rack mount slides and rails kit for ECO8000

Key Applications	Benefits
Broadcast	• Hot-swappable redundant dual power supply system ensures near-zero downtime, and 24/7 availability of timing and synchronization signal sources from the SPG system. • SNMP error reporting and Web UI support remotely monitors the status of the SPG system and easily integrates into automation and central monitoring and control systems • 3G-SDI capabilities helps you be prepared for the future and protect your infrastructure investment. • The scalable architecture of the ECO8000 and the ECO8020 allow you to configure your SPG systems to fit their particular needs without paying more for the extra ECO channels that they don't need.

Service Options	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

ECO8020 Automatic Changeover Unit

Key Specifications and Ordering Information

Ordering Information	
ECO8020	ECO (automatic changeover) base unit - 5 x high-density BNC channels (black burst, HD tri-level sync, AES/DARS, word clock)
Options (must be added at time of order)	
DPW	Add a second redundant (backup) power supply (a second power cord option is required)
REF	Add 5 x high-density BNC channels (black burst, HD tri-level sync, AES/DARS, word clock)
HREF	Add 5 x high bandwidth, high-density BNC channels (3G-SDI, HD-SDI, SD-SDI, as well as black burst, HD tri-level sync, AES/DARS, word clock)
LTC	Add 4 x LTC channels
XLR	6 ft. Adapter cable from 15-pin D-sub LTC OUT connector on the ECO8020 to 4 XLR male connectors (for LTC outputs) and BNC male connectors
RACK	1 RU Rack mount slides and rails kit for ECO8020
CBL	Add high-density male BNC to standard male BNC connectors coaxial cables (a set of 10 cables, 75 ohm, 18 inches long)
Upgrades	
DPW	Add a second redundant (backup) power supply
LTC	Add 4 x LTC channels (software upgrade option)
XLR	Adapter cable (6 feet long)
RACK	Rack mount slides and rails kit for ECO8020
CBL	Add high-density male BNC to standard male BNC connectors coaxial cables (a set of 10 cables, 75 ohm, 18 inches long)

Key Applications	Benefits
Broadcast	• Hot-swappable redundant dual power supply system ensures near-zero downtime, and 24/7 availability of timing and synchronization signal sources from the SPG system. • SNMP error reporting and Web UI support remotely monitors the status of the SPG system and easily integrates into automation and central monitoring and control systems • 3G-SDI capabilities helps you be prepared for the future and protect your infrastructure investment. • The scalable architecture of the ECO8000 and the ECO8020 allow you to configure your SPG systems to fit their particular needs without paying more for the extra ECO channels that they don't need.

Service Options	
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
R3	Repair Service 3 Years
R5	Repair Service 5 Years

ECO8000 & 8020 Automatic Changeover Units

Rear Panel

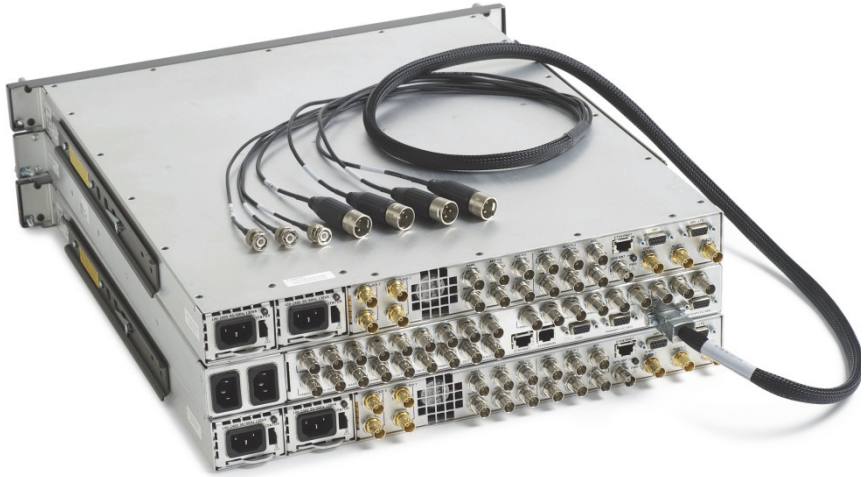
- 50 MHz Electronic Fast Switch Channels
  - 3 channels standard in base configuration (ECO8000)
  - 5 channels standard in base configuration (ECO8020)
  - 3 or 6 more additional channels maximum (with 1 x option REF or 2 x option REF) for ECO8000
  - 5, 10, or 15 more additional channels maximum (with 1 x option REF or 2 x option REF or 3 x option REF) for ECO8020
  - can be used for black burst, HD tri-level sync, AES/DARS, word clock
  - with latching relay backups that engage on loss of power
- 3 GHz Relay Switch Channels
  - 3 or 6 channels maximum (with 1 x option HREF or 2 x option HREF) for ECO8000
  - 5, 10, or 15 channels maximum (with 1 x option HREF or 2 x option HREF or 3 x option HREF) for ECO8020
  - can be used for 3G/HD/SD-SDI as well as black burst, HD tri-level sync, AES/DARS, word clock
- ECO8020 utilize high-density BNC connectors to increase channel density
- Linear Time Code (LTC) Channels
  - 4 channels (option LTC)
  - standard D-SUB connectors for inputs from Primary and Backup SPG8000 units
  - optional XLR breakout cable for LTC outputs of all 4 LTC channels
- Expansion Connection
  - tie 2 ECO8000 or ECO8020 together as one single system
  - doubles the channel capacity of the ECO8000 or ECO8020
- General Purpose Interface (GPI)
  - allows SPG8000 to trigger a changeover on certain error conditions such as loss of genlock
- Hot-swappable Power Supplies
  - Option DPW for backup supply
- 10/100/1000 Base-T Ethernet
  - for SNMP error reporting or Web User Interface for monitoring or channel configurations

ECO8000/8020 Automatic Changeover Unit

Integration

Option RACK: Rack mount slides and rails kit

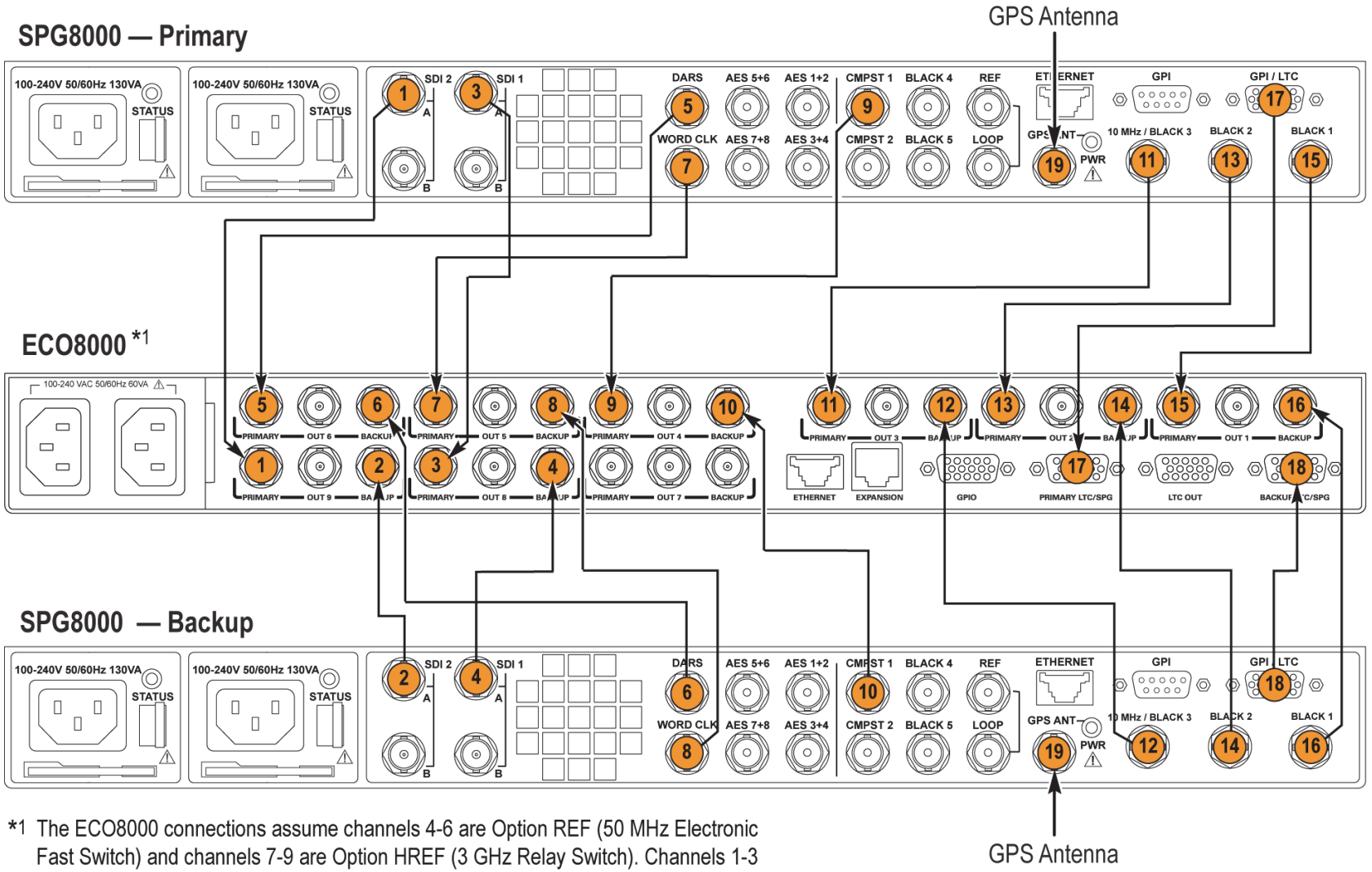
Option CBL: High-density BNC to standard BNC adapter cables



Option XLR: Adapter cable

Option DPW: Backup power supply

Configuring the SPG8000 and ECO8000



*1 The ECO8000 connections assume channels 4-6 are Option REF (50 MHz Electronic Fast Switch) and channels 7-9 are Option HREF (3 GHz Relay Switch). Channels 1-3 come standard with the base unit with 50 MHz Electronic Fast Switch functionality.

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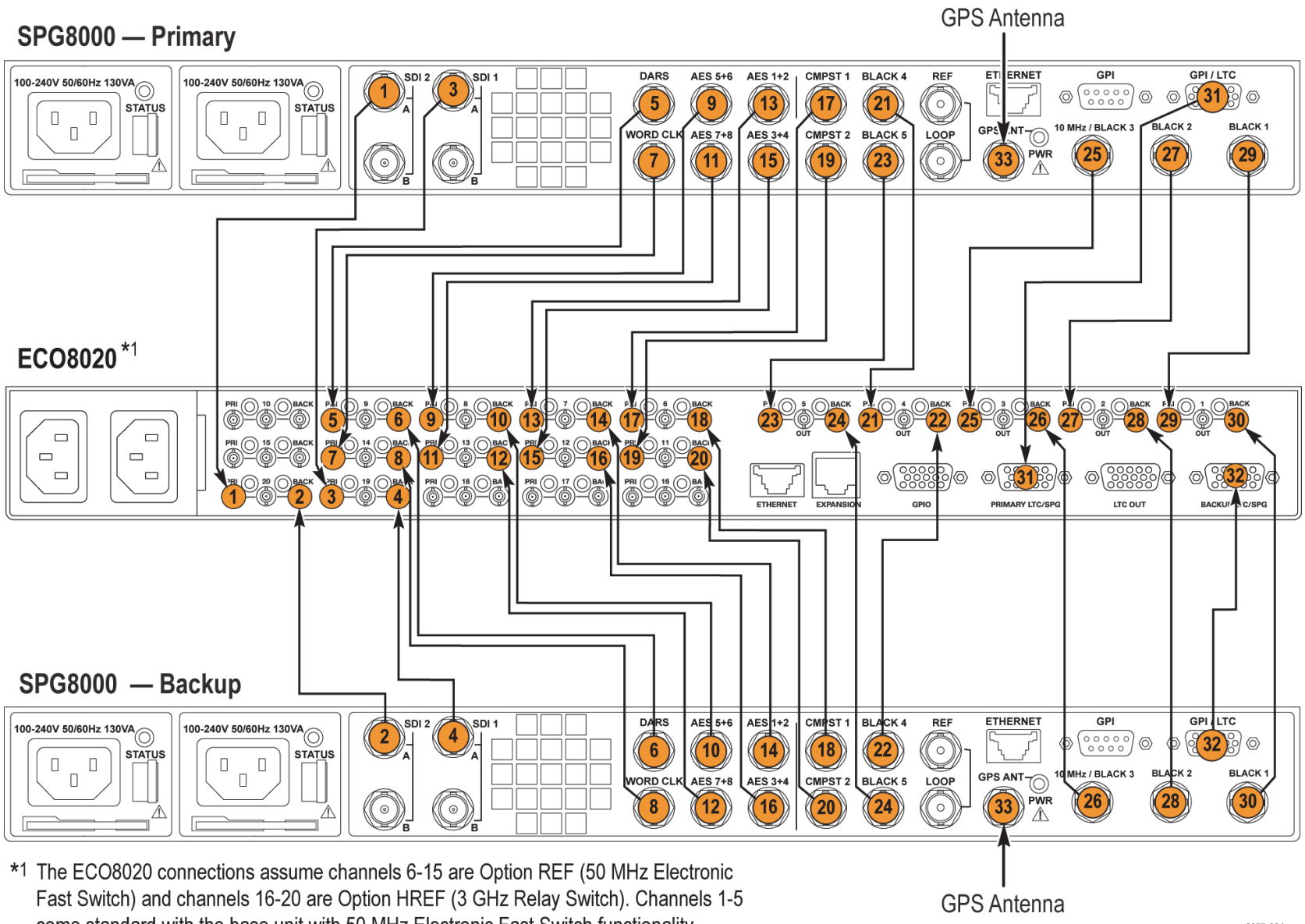
Configuring the SPG8000 and ECO8000

(see previous figure)

Connection Number	External Signal	SPG8000 Primary Connector	SPG8000 Backup Connector	ECO8000 Connector
1		SDI 2		PRIMARY 9
2			SDI 2	BACKUP 9
3		SDI 1		PRIMARY 8
4			SDI 1	BACKUP 8
5		DARS		PRIMARY 6
6			DARS	BACKUP 6
7		WORD CLK		PRIMARY 5
8			WORD CLK	BACKUP 5
9		CMPST 1		PRIMARY 4
10			CMPST 1	BACKUP 4

Connection Number	External Signal	SPG8000 Primary Connector	SPG8000 Backup Connector	ECO8000 Connector
11		10 MHz/ BLACK 3		PRIMARY 3
12			10 MHz/ BLACK 3	BACKUP 3
13		BLACK 2		PRIMARY 2
14			BLACK 2	BACKUP 2
15		BLACK 1		PRIMARY 1
16			BLACK 1	BACKUP 1
17		GPI/LTC		PRIMARY LTC/SPG
18			GPI/LTC	BACKUP LTC/SPG
19	GPS Signal	GPS ANT	GPS ANT	NA

Configuring the SPG8000 and ECO8020



*1 The ECO8020 connections assume channels 6-15 are Option REF (50 MHz Electronic Fast Switch) and channels 16-20 are Option HREF (3 GHz Relay Switch). Channels 1-5 come standard with the base unit with 50 MHz Electronic Fast Switch functionality.

Configuring the SPG8000 and ECO8020

(see previous figure)

Connection Number	External Signal	SPG8000 Primary Connector	SPG8000 Backup Connector	ECO8020 Connector
1		SDI 2		PRI 20
2			SDI 2	BACK 20
3		SDI 1		PRI 19
4			SDI 1	BACK 19
5		DARS		PRI 9
6			DARS	BACK 9
7		WORD CLK		PRI 14
8			WORD CLK	BACK 14
9		AES 5+6		PRI 8
10			AES 5+6	BACK 8
11		AES 7+8		PRI 13
12			AES 7+8	BACK 13
13		AES 1+2		PRI 7
14			AES 1+2	BACK 7
15		AES 3+4		PRI 12
16			AES 3+4	BACK 12

Connection Number	External Signal	SPG8000 Primary Connector	SPG8000 Backup Connector	ECO8020 Connector
17		CMPST 1		PRI 6
18			CMPST 1	BACK 6
19		CMPST 2		PRI 11
20			CMPST 2	BACK 11
21		BLACK 4		PRI 4
22			BLACK 4	BACK 4
23		BLACK 5		PRI 5
24			BLACK 5	BACK 5
25		10 MHz/ BLACK 3		PRI 3
26			10 MHz/ BLACK 3	BACK 3
27		BLACK 2		PRI 2
28			BLACK 2	BACK 2
29		BLACK 1		PRI 1
30			BLACK 1	BACK 1
31		GPI/LTC		PRIMARY LTC/SPG
32			GPI/LTC	BACKUP LTC/SPG
33	GPS Signal	GPS ANT	GPS ANT	NA

Integration Resources

Document	Number
WFM7200, WFM8200 and WFM8300 Waveform Monitors System Integration Technical Reference	077-0391-01
WVR7200, WVR8200 and WVR8300 Waveform Rasterizers System Integration Technical Reference	077-0392-01
SPG8000/ECO8000 & 8020 System Integration Technical Reference	077-0877-00
SPG8000 & ECO8000/8020 front and back panel outline drawings in .dwg and .dxf formats	On request

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