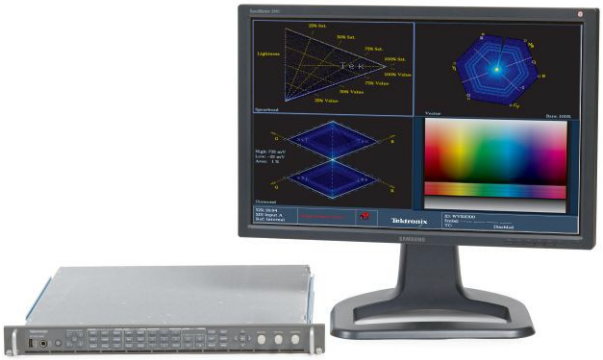
Advanced 3G/HD/SD-SDI Monitoring with 4K Support

WVR8300 Product Replaced by PRISM MPP Series (100, 200, 300)

More information at www.telestream.net/video/prism.htm



This video/audio/data monitor and analyzer all-in-one platform provides flexible options and field installable upgrades to monitor a diverse variety of video and audio formats. Support for video formats includes 4K/UHDTV1 (4096×2160 and 3840×2160), 3G-SDI, Dual Link, HD-SDI and composite analog. Support for audio formats includes Dolby E, Dolby Digital Plus, Dolby Digital, AES/EBU, embedded audio and analog audio.

Key features

- Video/audio/data monitor and analyzer – all-in-one platform
  - WVR8300 comes standard with auto-detection of HD/SD-SDI and multiple Dual Link video formats
  - Square Division and 2-Sample Interleave 4K/UHDTV1 format support (requires Options 4K, 3G and 2SDI)
  - Optional capabilities include 3G-SDI (Level A and Level B) formats support (Option 3G), composite analog video support (Option CPS), as well as analog and digital audio (Option AD) and Dolby E, Dolby Digital Plus, and Dolby Digital audio (Option DPE) decoding and monitoring
  - WVR8300 also comes standard with Simultaneous Input Monitoring capability, ANC Data Inspector, and numerical/graphical display of A/V delay for analog, digital audio (Option AD), and Dolby (Option DPE)
  - Multiple Input Mode allows monitoring of 2 to 4 SDI inputs simultaneously (4-input mode requires Option 2SDI)
- Black picture and patented frozen picture detection (3G/HD/ SD-SDI formats)
- Patented Timing display with inter-channel timing of Quad Link signals in 4K mode
- HDR graticules and HDR zebra overlay for HDR content creation (Option PROD)
- Patented Spearhead display and Luma Qualified Vector (LQV™) display facilitate precise color adjustment for post production applications (Option PROD)
- Patented Diamond and Arrowhead displays for gamut monitoring
- Colorimetry support for ITU-R BT.2020 (4K/UHDTV1) or ITU-R BT.709 (HD) colorspaces within the waveform, vector, and gamut displays
- Most comprehensive audio monitoring (Option AD or DPE)
  - Multichannel Surround Sound [1] display and flexible Lissajous display with audio level readouts
  - Audio Loudness monitoring to ITU-R BS.1770-3 with audio trigger start/stop functions via GPI or Timecode (Option AD or DPE)
  - Comprehensive Dolby metadata decode and display (Option DPE)
  - Dolby E Guard Band meter with user-defined limits (Option DPE)
- Most comprehensive ANC data monitoring
  - Simultaneous CEA708/608 Closed Caption, ARIB STD-B37 Closed Caption, Teletext, SMPTE 2031, and OP47 subtitle decode and 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

[1] Audio Surround Sound Display licensed from RTW (RTW GmbH & Co. KG).

- Most in-depth digital data analysis helps quickly resolve difficult content quality and reliability issues (standard on WVR8300)
- Unmatched display versatility
  - FlexVu™, the most flexible four-tile display, tailors to various application needs to increase productivity
  - Standard and user-definable Safe Area Graticules facilitate editing and format conversions tasks, reducing the need for rework
  - Active Format Description (AFD) detect, decode, and automatically adjusted graticule on picture display enable easy identification of aspect-ratio related issues
- Unmatched usability
  - CaptureVu® advanced video frame data capture simplifies troubleshooting and equipment setup
  - 32 instrument presets for quick recall of commonly used configurations tailored to engineers or operators
  - Front-panel USB port enables easy transfer of presets, captured video frame data, screenshots, and error log
  - Front-panel headphone port enables quick verification of selected audio pair
  - Intuitive menu structure and context-sensitive help
  - Extensive alarms, status reporting, and error logging
  - SNMP and Ethernet remote interface capabilities and GPI control facilitate centralized monitoring and control

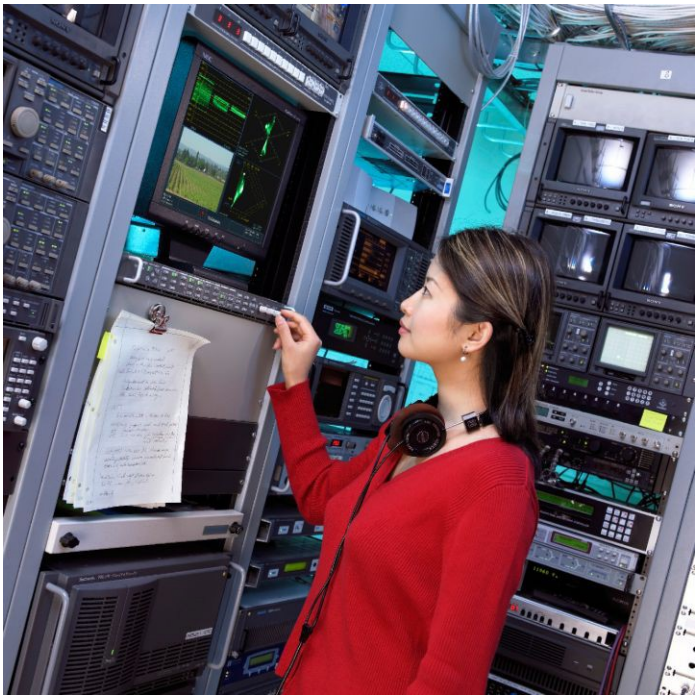
Applications

- Monitoring and compliance checking in content distribution and broadcast
- Quality control in content production and post production
- Equipment/system qualification and troubleshooting for installation and maintenance of content creation and distribution facilities
- Research and development of professional video equipment

WVR8300 waveform rasterizer

The measurement and monitoring capabilities of the WVR8300 provide precision capabilities such as digital data analysis (including ANC Data Inspector), A/V delay measurement, and in- depth simultaneous input monitoring, making it the brand of choice for applications that require deep signal and content analysis with unquestionable accuracy.

The WVR8300 features the complete range of product family options and comes standard with HD/SD-SDI and Dual Link video format support. It provides high-performance monitoring and measurement for applications for a wide range of formats from Composite Analog to SD-SDI, HD-SDI and 3G-SDI video signals in single, dual and quad-link video formats. The WVR8300 offers support for a variety of audio formats for analog, digital AES/EBU, digital embedded, Dolby Digital, Dolby Digital Plus, and Dolby E.



- Video monitoring standards and formats
  - 4K (4096×2160) and UHDTV1 (3840×2160) format - Options 4K, 3G and 2SDI
  - 3G-SDI (Level A and Level B) - Option 3G
  - High Definition SDI - Standard
  - Standard Definition SDI - Standard
  - Dual Link (4:2:2, 4:4:4, alpha channel, 10 bit, 12 bit) - Standard
  - Composite Analog Video - Option CPS
  - Multiple Input Mode 2 SDI inputs - Standard
  - Multiple Input Mode 4 SDI inputs - Option 2SDI

- HDR content creation
  - HDR graticules - Option PROD
  - HDR zebra overlay - Option PROD
  - Graticule range selection (Narrow 64d-940d, Full 0d-1019d) - Option PROD
- Color gamut monitoring
  - Arrowhead display - Standard
  - Diamond and Split Diamond displays - Standard
  - Spearhead display - Option PROD
  - Luma Qualified Vector (LQV™) - Option PROD
- Audio monitoring standards and formats
  - Analog, digital AES/EBU, digital embedded - Option AD
  - Analog and digital including Dolby Digital, Dolby Digital Plus, and Dolby E - Option DPE
- Measurement and analysis
  - Digital data analysis - Standard
  - ANC Data Inspector - Standard
  - Simultaneous input monitoring - Standard
  - 3D video monitoring - Standard
  - Audio/video delay measurement - Standard

WVR8RFP remote front panel

The WVR8300 can be controlled by the remote front panel (WVR8RFP), which has the same control button and knob configuration as the front panel on the instrument. The new WVR8RFP allows operators to access and control the WVR8300 from a distance of up to 1000 ft. with power supplied from the base instrument through the cable. Users can also choose to connect the WVR8RFP with an external 12 V DC power source which can extend the distance of the cable run to 4000 ft.

Unmatched measurement and monitoring performance for content creation and content distribution

From composite analog to 4K/UHDTV1 digital video – all-in-one platform

These instruments come standard with Dual Link SMPTE 372M compliant monitoring, SMPTE 352M automatic format detection, and selectable display of Alpha Channel, as well as 2K Dual Link monitoring with XYZ Color Space.

To support the latest production trends for 4K/UHDTV1 content as well as DCI 2K content, these instruments provide optional capabilities to monitor the 3G-SDI format and 4K/UHDTV1 format. Option 3G enables monitoring of SMPTE 425M Level A (directly mapped) and Level B (mapped from Dual Link) signals and DCI 2K formats. Option 4K along with Option 3G and Option 2SDI add additional formats for applications that require Quad HD-SDI link, Dual 3G-SDI link and Quad 3G-SDI link support.

For multi-link signals, these instruments allow for monitoring of each single link or the combined Dual or Quad Link (Option 4K with Options 3G and 2SDI) input with a comprehensive set of displays and status reporting tools. The patented Timing display, which measures timing between links of the Dual or Quad Link signal, provides a valuable tool to maintain correct timing between the links. Monitoring display modes such as Waveform, Vector, Gamut, Timing, Status, Picture, and Audio, as well as in-depth data analysis are available for 3G-SDI and other input formats. In Quad Link mode, the combination of SDI signals means that only Link 1 and Link 2 ancillary data (including embedded audio) is available in this mode.

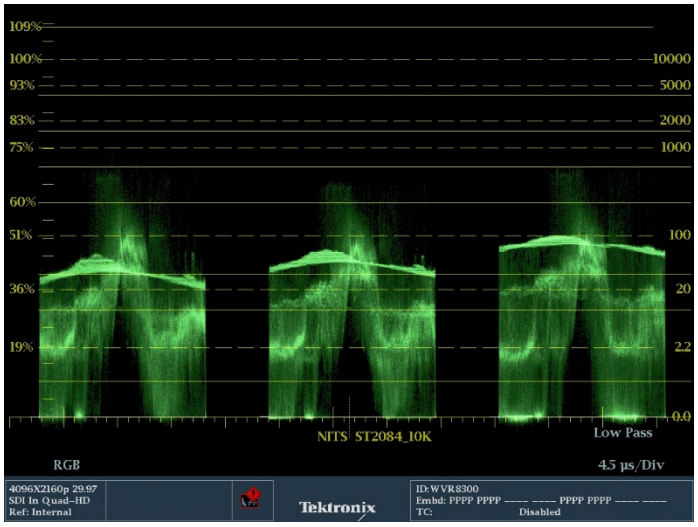
Both instrument models support any combination of video and audio format options, so these instruments excel in multiformat environments and evolve with your needs to protect your investment.

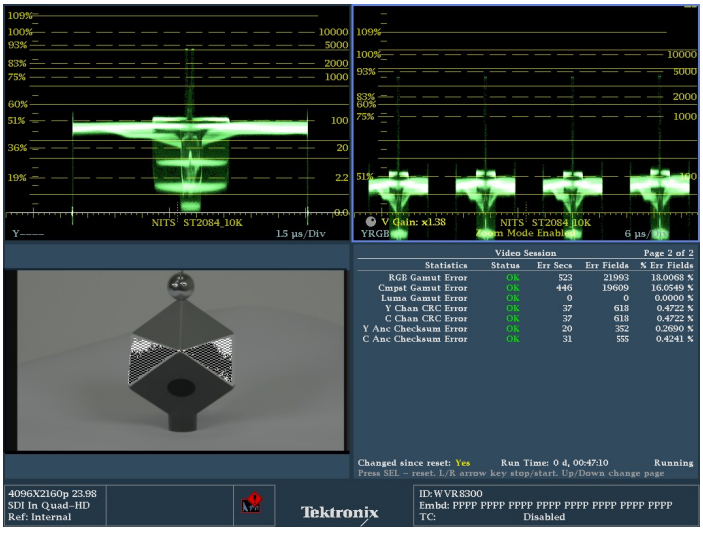
HDR tool set for content creators

The WVR8300 monitors offer an HDR tool set (Option PROD) for assisting camera operators and editors adjust their content to the correct levels. HDR graticules are available for Hybrid Log Gamma (HLG), SMPTE ST 2084 PQ and Camera log (S-Log1, S-Log2, S-Log3,
C Log, Log C, BT.709). ST 2084 HDR is available in Narrow (64d-940d) for 1K, 2K, 4K, 5K and 10K or Full (4d-1019d) for 1K and 10K. Reflectance, Nits, Stops and Code Value are available in HDR modes.

Camera operators can use the graticule lines at 2%, 18% or 90% Reflectance to properly setup camera exposure with a camera test chart of 2% black, 18% gray and 90% white.

Color editors in post-production can use the Specular highlight magnification feature to quickly balance the color in specular highlights and ensure the detail in the objects with specular highlights. The magnification is called Zoom Mode for 1K and 10K ST.2084 HDR. Amplitude cursors allow users to set the cursor at a specific level to make the scene have the desired look. HDR zebra highlighting in the Picture display allows users to verify the location and the size of the specular highlights.

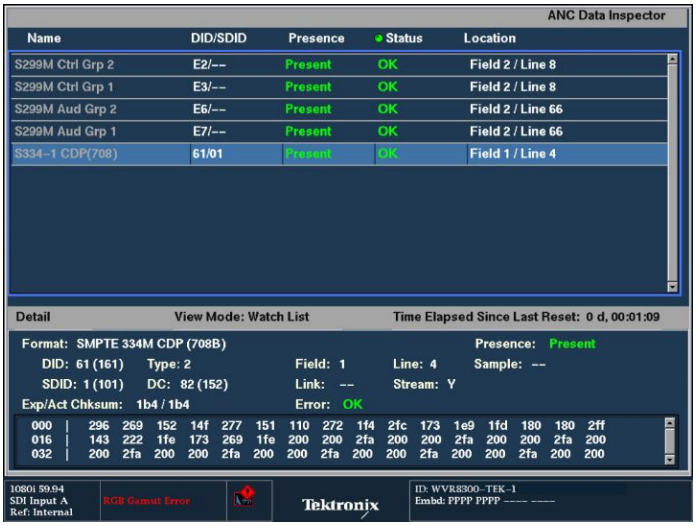


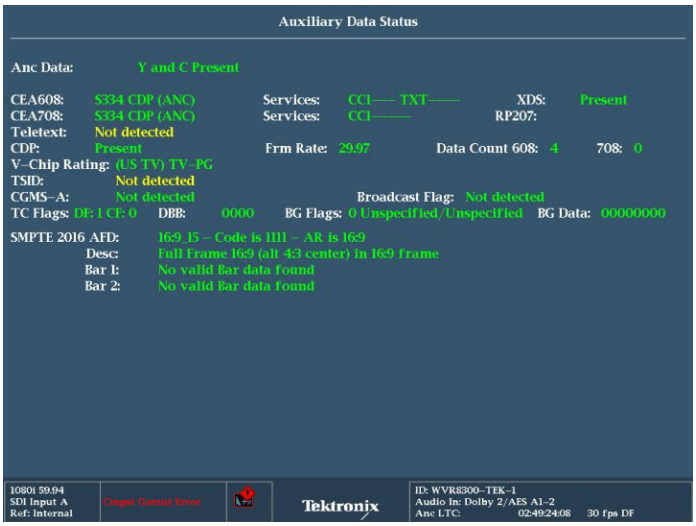


Superior data analysis capabilities for engineers and operators

The new ANC Data Inspector (standard on WVR8300) provides an industry-leading solution to help broadcasters easily and accurately ensure that all required VANC data is present and correctly configured through an intuitive ANC data display.

In contrast to other solutions, the ANC Data Inspector enables operators to easily and quickly ensure that the VANC data is present and free of errors. When errors are detected, engineers are quickly guided to a more detailed view of the data packet content for further analysis.



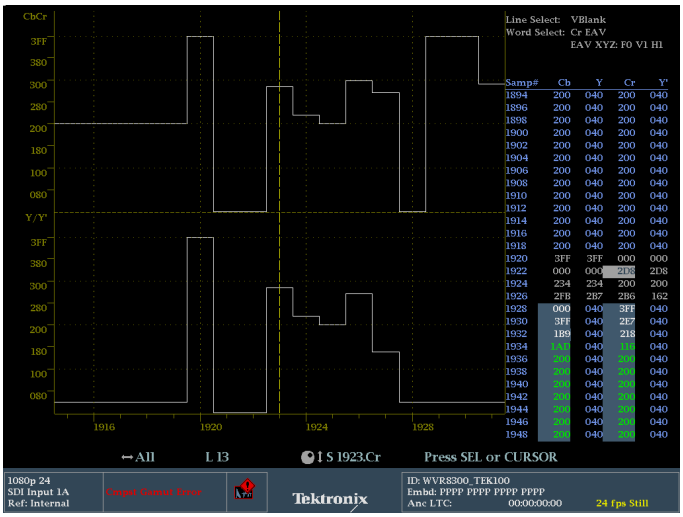


With FlexVu™, each picture display tile can display different CEA708/608 Closed Caption and individual Teletext subtitles. Teletext subtitle pages can be decoded in either WST or OP47 format.

The Auxiliary Data Status display (standard on the WVR8300) provides summary information on Active Format Description (AFD) per SMPTE 2016, Video Index Aspect Ratio, Wide Screen Signaling (WSS), V-Chip, TSID, CGMS-A, Broadcast Flag, CEA708/608 Closed Caption, Teletext, and Time Code information.

Today there is a wide array of metadata that provides information to a variety of equipment through the processing chain. Monitoring of this metadata is critical to ensure that the processing equipment correctly handles the signal. For instance, correct format of the AFD ensures that the aspect ratio on the display is correctly formatted and the automated AFD graticule is available for the picture display of the WVR8300 along with the binary data and text description for easy monitoring.

The WVR8300 can also monitor Dolby metadata embedded in the Vertical Ancillary (VANC) data space per SMPTE 2020.



The Datalist display, available as standard on the WVR8300, provides detailed information on the actual data values in HD/SD-SDI and 3G-SDI (with Option 3G) input signals. Users can easily use this display to locate protocol errors in the input signals.

The right side of the display shows the data values in hexadecimal, decimal, or binary format and uses the following color coding for easy identification of data types and errors:

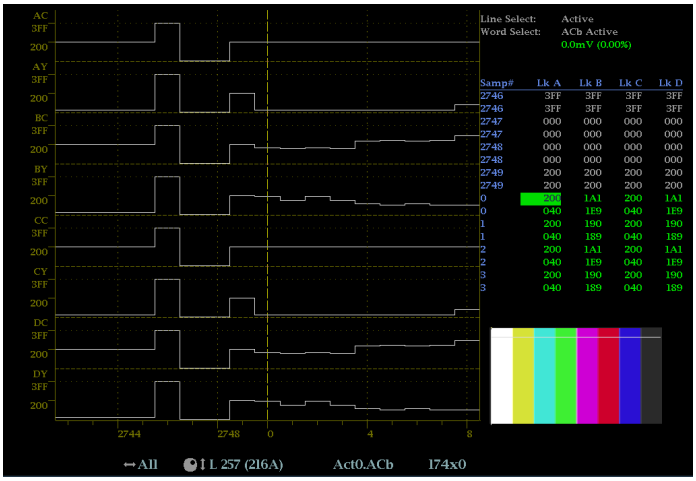
- Green - Active video data
- Blue - Data in horizontal or vertical blanking intervals
- White - EAV, SAV, and other reserved words
- Yellow - Data outside nominally allowed values
- Red - Data with illegal values
- Gold - Switch line
- Blue Background - Ancilllary Data Packet

The left side of display shows un-interpolated digital values plotted against sample numbers as a digital waveform. You can configure this unique display in either Video mode or Data mode.

In Video mode, the display shows the Y, Cb, Cr values aligned temporally, but offset vertically. Like the waveform display, you can configure the display to show 1, 2, or all 3 components.

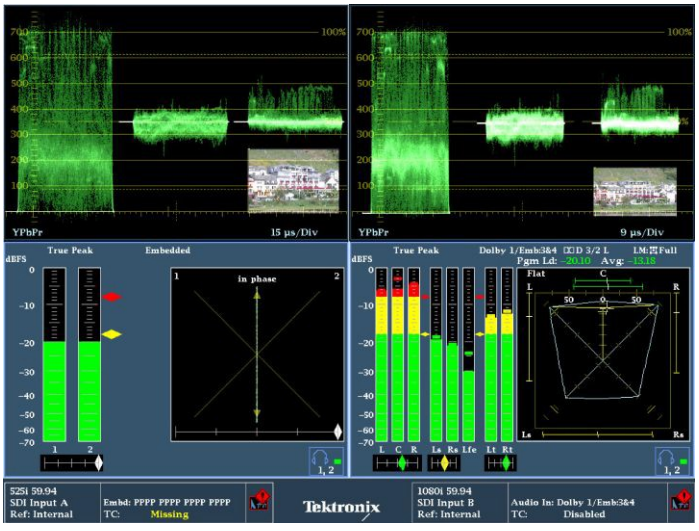
Data values with a blue background represent Ancillary data with indication of DID, SDID/DBN, DC, UDW and Checksum.

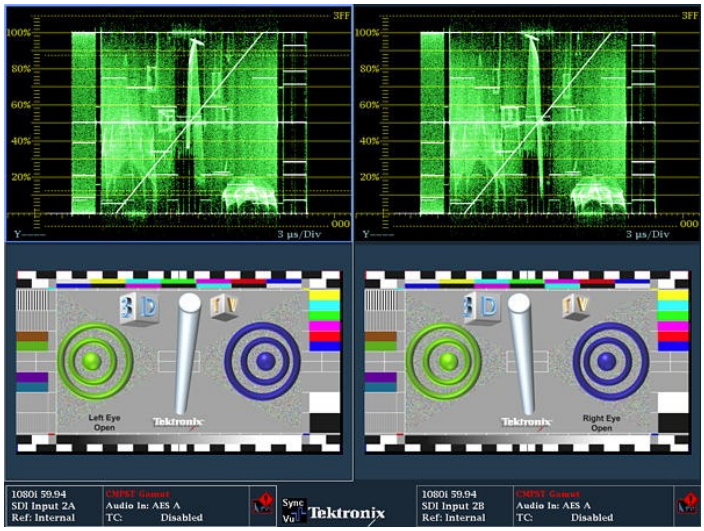
In 4K mode, the Datalist display can be used to view all Quad Link signals simultaneously or to view individual links.



Full-featured Simultaneous Input Monitoring boosts versatility (3G/HD/SD-SDI)

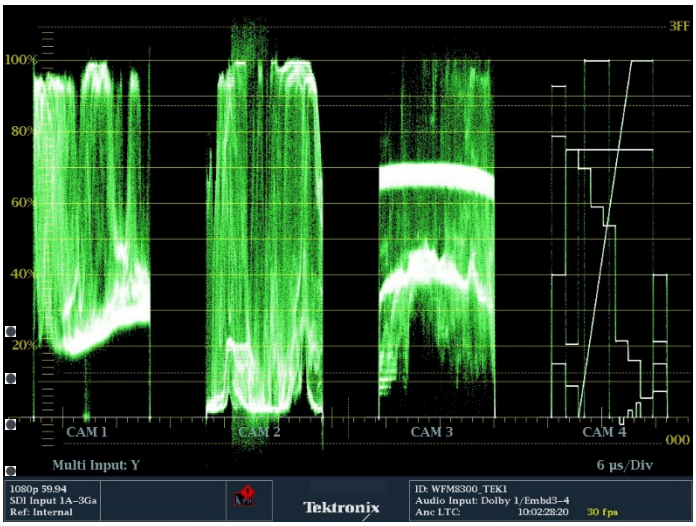
The Simultaneous Input Monitoring (SIM) capability (standard on the WVR8300) takes multiformat monitoring to a new level. This capability helps operational staff quickly determine if a video quality problem existed in the input signal or arose in their facility. It enables engineering staff to quickly detect, diagnose, and resolve technical problems introduced in a piece of video equipment by comparing the input and output signals at each point in the chain. This feature is also especially helpful when checking for transparency during format conversion.





FlexVu™ enables flexible and intuitive configuration of displays from two monitored inputs. User can display simultaneous fault detection, status reporting, alarm generation, and error logging. SIM is ideal for transmission monitoring of simultaneous HD and SD programs. It is also ideal for monitoring stereoscopic 3D content in production and post production applications by simultaneously monitoring the Left Eye signal and the Right Eye signal.

SyncVu™ is used in conjunction with SIM mode for 3D applications when input A is used for the Left Eye and input B is used for the Right Eye. When SyncVu is enabled, the Left and Right Tile displays are synchronized, so that if a Picture Tile is selected for Tile 1, automatically Tile 2 displays a Picture Tile in exactly the same mode as Tile 1. This enables the user to quickly configure the instrument identically for Left and Right Eye 3D monitoring.



Multiple Input mode can be used to monitor up to 4 SDI inputs simultaneously when in Full Screen mode (4-input mode requires Option 2SDI). This type of display is ideal for camera balance applications where the user wishes to check the video level across multiple inputs. This Multiple Input mode is available within Waveform, Vector, Lightning, Diamond, Arrowhead, and Spearhead (with Option PROD) display modes, allowing for the comparison of video inputs across a wide variety of these displays.

The instrument can also be set to either BT.709 or BT.2020 colorimetry for all of these display modes.

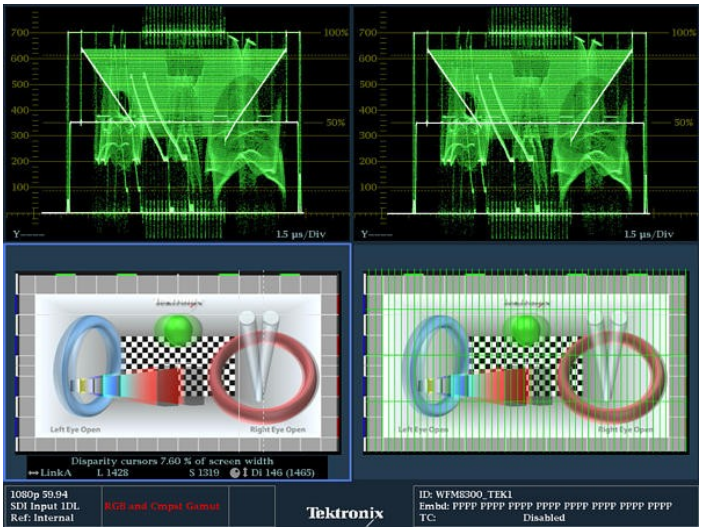
3D measurement and monitoring

The 3D measurements and displays are standard on the WVR8300. A 3D image is comprised of a Left Eye and Right Eye view feed as two separate HD-SDI signals or combined within a 3G Level B format. Additionally, a 3D signal can be carried within a single SDI signal as a left and right image Side by Side, Top/Bottom, or Field Interlace. Within the instrument a variety of different 3D monitoring modes are available to assist the user in determining the difference between the Left Eye and Right Eye views. From this disparity difference between the two left and right images the depth of an object within the image can be determined.

For monitoring purposes a variety of displays can be set up within the Picture mode:

- Difference Map display
- Red/Cyan Anaglyph display
- Green/Magenta Anaglyph display
- Checkerboard display

These modes help the user compare the disparity between the left and right images and can assist in interpreting the depth of the objects within the image.



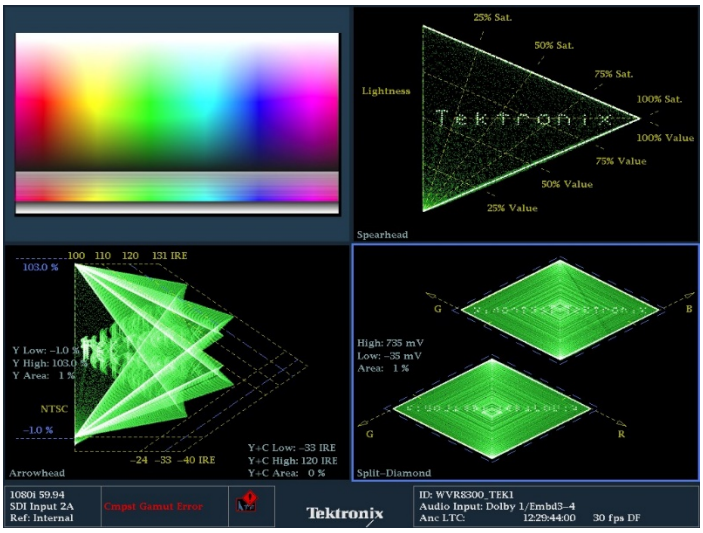
For measurement of the depth of an object within the image a Disparity Grid can be overlaid over the picture with a horizontal disparity between 1 and 15% of screen width and a vertical disparity of 50%, 25%, or 10% that can be selected by the user. The horizontal and vertical position controls allow the Disparity Grid to be moved around within the picture display to gauge the depth of objects within the image.

A set of Disparity Cursors are also available for precise measurement of horizontal disparity of an object between the Left and Right Eye images. Readout is given of the pixel difference between the cursors and the percentage of disparity of an object.

See and Solve™ displays

See and Solve™ displays simplify video monitoring tasks such as calibration, error detection, and content correction allowing users to detect errors at a glance and troubleshoot them efficiently.

Specialized Session and Status displays provide summarized yet comprehensive reports of conditions and measurements of content parameters.



The Black and Frozen frame detection can be used to alert the operator to a problem in the transmission chain. These and other errors can automatically be logged in the Error Log and provided as a report.

The powerful Error Log is configurable and provides detailed reports for up to 10,000 events that can be downloaded using a web browser or saved through a front panel connection to a USB flash drive. Alarms can also activate ground closures and SNMP traps simplifying centralized monitoring of multiple programs.

The FlexVu™ four-tile display provides maximum flexibility to increase your productivity. Unlike instruments with predetermined view combinations or limited choices, FlexVu™ lets you create a multiview display tailored to your specific needs and work practices. Each tile can be configured to enable easy signal analysis such as multiple alarm and status screens, different Safe Area Graticules and cursors on each tile, and more.

The familiar video waveform display can show SD/HD/3G-SDI signals in RGB, YPbPr, YRGB, or composite formats. Signal components can be displayed in either Parade or Overlay mode. For composite analog video, NTSC and PAL signals can be displayed with luma, chroma, and luma +chroma filtering. The vector display offers user-selectable graticules, color targets (75% or 100%), and color axis.

The patented Diamond, Split Diamond, and Arrowhead gamut displays simplify the process of verifying gamut compliance.

The Diamond and Split Diamond displays help easily identify and correct RGB gamut errors in digital video signals. The Arrowhead display saves time in verifying composite gamut compliance for digital video signals. These various trace displays can be displayed in either ITU-R BT.709 (HD) or ITU-R BT2020 (4K/UHDTV1) allowing a user to use the same displays as they transition from HD to 4K/UHD.

User-selectable gamut thresholds let you tailor these displays and the associated gamut alarms to your particular compliance standards.

You can also select bright-up conditions to see the location of gamut errors on the picture display.

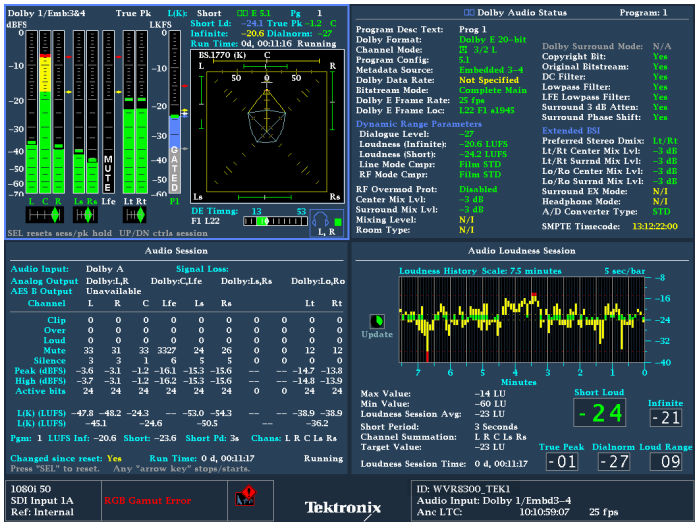
These instruments also feature new optional advanced color gamut monitoring capabilities including the patented Luma Qualified Vector (LQV™) display and Spearhead display which, when used in conjunction with the proprietary Diamond and Split Diamond gamut displays, provide the most comprehensive color gamut monitoring tools available for precise color gamut adjustments (Option PROD).

The picture display can simultaneously detect and decode CEA708/608 Closed Caption. Teletext subtitle pages can also be decoded in either 625 formats or using OP47 Ancillary data. Flexible Safe Area Graticules allow for quick placement of graphics, titles, or logos. Using FlexVu™, users can see two or more pictures with different graticules.

The CaptureVu® feature, which is available in single or simultaneous mode, allows users to capture, store, and download the data of a video frame to recreate displays and compare the live signal to captured data for easy troubleshooting of intermittent errors or for analyzing fault conditions at remote sites.

Complete monitoring tool set for optimum sound quality

The WVR8300 provides high-quality digital filtering and oversampling to ensure precise, reliable, and repeatable audio measurements. For easy monitoring, audio options provide format auto- detection and flexible mapping of audio inputs to analog or digital audio outputs for connection to external devices.



The Surround Sound [2] display provides intuitive graphical representation of channel interaction in a system. The Bars display provides indicators for faults, audio levels with direct level readouts, and Dolby format information. The flexible Lissajous display allows the selection of any two audio channels. Loudness measurements are made to ITU-R BS.1770-3. A Loudness meter is available within the Audio display that provides Short and Infinite Loudness measurements. Within the configuration menu there are simple Loudness presets for the various standards such as ATSC A/ 85 2013 (1770-3), EBU R128 2014, ARIB TR-B32, Free TV OP59, and Brazil Ord 354.

The Loudness session display graphically plots Loudness measurement over time, from 90 seconds to 30 hours. The Loudness measurements can be downloaded through the network or saved to USB for further analysis. To help simplify monitoring, the Audio Loudness session can be started, stopped or reset using GPI or Timecode.

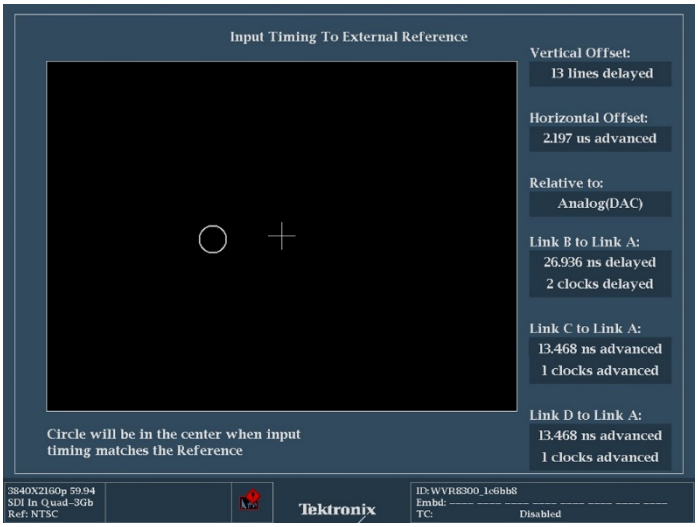
Specialized audio displays provide deeper inspection of the signal and make the WVR8300 Series instruments the most comprehensive waveform and audio monitors available. The audio session displays summarize levels, faults, and number of active bits for each channel. These instruments also feature Audio Control Packet Data and Channel Status displays.

The Dolby Status display (in Option DPE) gives an in-depth view of integrated or VANC metadata and Dolby E Guard Band timing and synchronization.

User-configurable thresholds for the Dolby E Guard Band timing measurement (in Option DPE) are available as well as Dolby E Guard Band timing and trigger alarms based on their specific guard band parameters.

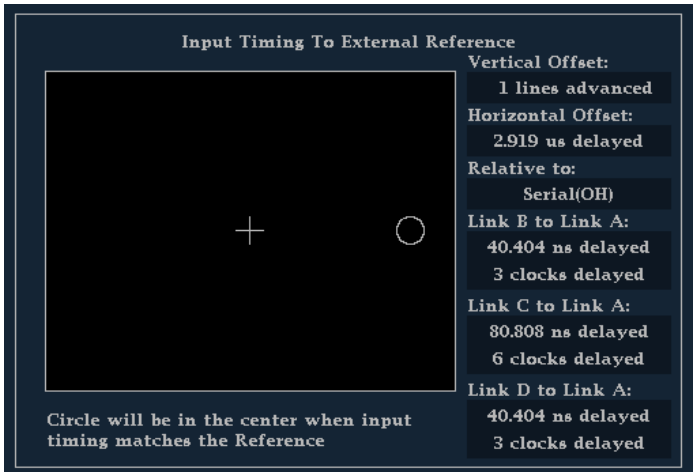
Facility timing made easy

Audio/Video synchronization is an important challenge in the processing of video signals. The WVR8300 displays the A/V delay on a graphical bar indicator. The measurement readout gives facility engineers the necessary tools to ensure system integrity and facilitate A/V delay compliance. This feature provides out-of-service measurement of A/V delay for analog or digital audio and video formats. A TG8000 or SPG8000 is required to generate the SDI signal which contains the audio and video sequence that can be distributed through the system and measured by the WVR8300.



2 Audio Surround Sound Display licensed from RTW (RTW GmbH & Co. KG).

The patented SMPTE RP168 compliant Timing display makes facility timing easy through a simple graphical representation which shows the relative timing of the input signal and the reference signal (or a saved offset reference) on an X-Y axis. The display also shows the timing difference between links on Dual link and Quad link signals to make sure there is reliable multi-link signal transmission. Limits can be set by the user to warn when the inter-channel timing of the Dual Link or Quad link exceeds the threshold.



The Lightning display shows luma and chroma amplitudes and helps users verify component timing using a color bar signal. The patented Bowtie display (standard on the WVR8300) 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 interchannel amplitude and timing. The SCH Phase display helps quickly verify this critical timing parameter of composite analog video signals.

Formats

Video input and external reference formats supported

These instruments perform automatic detection of a wide range of signal formats and accept a wide variety of external references. They will automatically detect the signal format and establish the appropriate settings for the various displays.

		External reference inputs											
		Bi-level sync		Tri-level 720p			Tri-level 1080p		Tri-level 1080i			Tri-level 1080 SF	
Input signal		**NTSC**	**PAL**	**50 Hz**	**59.94 Hz**	**60 Hz**	**23.98 Hz**	**24 Hz**	**50 Hz**	**59.94 Hz**	**60 Hz**	**23.98 Hz**	**24 Hz**
Analog	NTSC	x											
	PAL		x										
SD	59.94i	x			x					x			
	50i		x	x					x				
HD/UHDTV1	60p					x		x			x		x
	60i					x		x			x		x
	59.94p	x			x					x			
	59.94i	x			x					x			
	50p		x	x					x				
	50i		x	x					x				
	30p					x					x		
	30psF					x					x		
	29.97p	x			x					x			
	29.97psF	x			x					x			
	25p		x	x					x				
	25psF		x	x					x				
	24p					x		x			x		x
	24psF					x		x			x		x
	23.98p	x			x		x			x		x	
	23.98psF	x			x		x			x		x	

Supported SDI formats

Link	Format	Sample structure		Bits	Frame/field rates
SD-SDI (525i)	720×486	4:2:2	YCbCr	10b	59.94i
SD-SDI (625i)	720×576	4:2:2	YCbCr	10b	50i
HD-SDI	1920×1080	4:2:2	YCbCr	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	2048×1080	4:2:2	YCbCr	10b	23.98/24/25/29.97/30p and psF
	1280×720	4:2:2	YCbCr	10b	50/59.94/60p, 23.98/24/25/29.97/30p and psF

Link	Format	Sample structure		Bits	Frame/field rates
Dual Link HD-SDI	1920×1080	4:2:2	YCbCr	10b	50/59.94/60p
	1920×1080	4:4:4	YCbCr	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4:4	YCbCrA	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4	GBR	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4:4	GBRA	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4	YCbCr	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4	GBR	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:2:2	YCbCr	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:2:2:4	YCbCrA	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	2048×1080	4:2:2	YCbCr	10b	47.95/48/50/59.94/60p
	2048×1080	4:4:4	YCbCr	10b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	GBR	10b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	YCbCr	12b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	GBR	12b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	XYZ	12b	23.98/24/25/29.97/30p and psF
	2048×1080	4:2:2	YCbCr	12b	23.98/24/25/29.97/30p and psF
3G-SDI Level A (Option 3G)	1920×1080	4:2:2	YCbCr	10b	50/59.94/60p
	2048×1080	4:2:2	YCbCr	10b	47.95/48/50/59.94/60p
	1920×1080	4:4:4	GBR	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	GBR	10b	23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4	GBR	12b	50/59.94/60i, 23.98/24/25/29.97/30p
	2048×1080	4:4:4	GBR	12b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	XYZ	12b	24/25/30p and psF
3G-SDI Level B (Option 3G)	1920×1080	4:2:2	YCbCr	10b	50/59.94/60p
	1920×1080	4:4:4	YCbCr	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4:4	YCbCrA	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4	GBR	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4:4	GBRA	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4	YCbCr	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:4:4	GBR	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:2:2	YCbCr	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	1920×1080	4:2:2:4	YCbCrA	12b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	2048×1080	4:2:2	YCbCr	10b	47.95/48/50/59.94/60p
	2048×1080	4:4:4	YCbCr	10b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	GBR	10b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	YCbCr	12b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	GBR	12b	23.98/24/25/29.97/30p and psF
	2048×1080	4:4:4	XYZ	12b	23.98/24/25/29.97/30p and psF
	2048×1080	4:2:2	YCbCr	12b	23.98/24/25/29.97/30p and psF
	2× 1080 HD	4:2:2	YCbCr	10b	50/59.94/60i, 23.98/24/25/29.97/30p and psF
	2× 720 HD	4:2:2	YCbCr	10b	50/59.94/60p, 23.98/24/25/29.97/30p

Link	Format	Sample structure		Bits	Frame/field rates
Quad Link HD-SDI, Square Division (Option 4K, 3G, 2SDI)	3840×2160	4:2:2	YCbCr	10b	23.98/24/25/29.97/30p and psF
	4096×2160	4:2:2	YCbCr	10b	23.98/24/25/29.97/30p and psF
Dual Link 3G-SDI Level B (Option 4K, 3G, 2SDI)	3840×2160	4:2:2	YCbCr	10b	23.98/24/25/29.97/30p and psF
	4096×2160	4:2:2	YCbCr	10b	23.98/24/25/29.97/30p and psF
Quad link 3G-SDI Level A, Square Division (Option 4K, 3G, 2SDI)	3840×2160	4:2:2	YCbCr	10b	50/59.94/60p
	3840×2160	4:4:4	GBR	10b	23.98/24/25/29.97/30p and psF
	3840×2160	4:4:4	GBR	12b	23.98/24/25/29.97/30p and psF
	4096×2160	4:2:2	YCbCr	10b	50/59.94/60p
	4096×2160	4:4:4	GBR	10b	23.98/24/25/29.97/30p and psF
	4096×2160	4:4:4	GBR	12b	23.98/24/25/29.97/30p and psF
Quad link 3G-SDI Level B, Square Division (Option 4K, 3G, 2SDI)	3840×2160	4:2:2	YCbCr	10b	50/59.94/60p
	3840×2160	4:4:4	YCbCr	10b	23.98/24/25/29.97/30p and psF
	3840×2160	4:4:4	GBR	10b	23.98/24/25/29.97/30p and psF
	3840×2160	4:4:4	YCbCr	12b	23.98/24/25/29.97/30p and psF
	3840×2160	4:4:4	GBR	12b	23.98/24/25/29.97/30p and psF
	3840×2160	4:2:2	YCbCr	12b	23.98/24/25/29.97/30p and psF
	4096×2160	4:2:2	YCbCr	10b	50/59.94/60p
	4096×2160	4:4:4	YCbCr	10b	23.98/24/25/29.97/30p and psF
	4096×2160	4:4:4	GBR	10b	23.98/24/25/29.97/30p and psF
	4096×2160	4:4:4	YCbCr	12b	23.98/24/25/29.97/30p and psF
	4096×2160	4:4:4	GBR	12b	23.98/24/25/29.97/30p and psF
	4096×2160	4:2:2	YCbCr	12b	23.98/24/25/29.97/30p and psF
Quad link 3G-SDI Level A, Two sample Interleave (Option 4K, 3G, 2SDI)	3840×2160	4:2:2	YCbCr	10b	50/59.94/60p
	4096×2160	4:2:2	YCbCr	10b	50/59.94/60p
Quad link 3G-SDI Level B, Two sample Interleave (Option 4K, 3G, 2SDI)	3840×2160	4:2:2	YCbCr	10b	50/59.94/60p
	4096×2160	4:2:2	YCbCr	10b	50/59.94/60p

Specifications

All specifications apply to all models unless noted otherwise.

Composite video interface characteristics (Option CPS)

Formats supported	NTSC, NTSC no setup, PAL
Inputs	Two, only one active at a time
Input type	Passive loopthrough BNC, 75 Ω compensated
Input dynamic range	±6 dB (typical)
Maximum operating amplitude	–1.8 V to +2.2 V, DC + peak AC (typical)
Absolute maximum input voltage	–6.0 V to +6.0 V, DC + peak AC
DC input impedance	20 kΩ, nominal
Return loss	>40 dB to 6 MHz, power on (typical) >40 dB to 10 MHz (typical) >46 dB to 6 MHz (typical) 35 dB, power off (standard amplitude video)
Crosstalk between channels	>60 dB to 6 MHz (typical)
Loopthrough isolation	>70 dB to 6 MHz (typical)
DC offset with restore off	<20 mV (typical)
DC restore	50 Hz and 60 Hz
Attenuation	Fast mode >95% attenuation Slow mode <10% attenuation <10% peaking
Slow mode	Typical peaking 8% at 50 Hz and 60 Hz
Lock range	±50 ppm remains locked

External reference characteristics

Input type	Passive loopthrough BNC, 75 Ω compensated
DC input impedance	15 kΩ (typical)
Return loss	>40 dB to 6 MHz (typical) >35 dB to 30 MHz (typical)

Serial digital waveform vertical characteristics

Vertical measurement accuracy	
At X1	±0.5%
At X5	±0.2% of 700 mV full-scale mode
Gain	X1, X2, X5, and X10

Frequency response characteristics

HD	
Luminance channel (Y)	50 kHz to 30 MHz ±0.5%
Chrominance channels (Pb, Pr)	50 kHz to 15 MHz ±0.5%
SD	
Luminance channel (Y)	50 kHz to 5.75 MHz ±0.5%
Chrominance channels (Pb, Pr)	50 kHz to 2.75 MHz ±0.5%

Analog composite waveform vertical characteristics (Option CPS)

Vertical measurement accuracy	±1% all gain settings
Gain	X1, X2, X5, and X10
Frequency response	Flat to 5.75 MHz, ±1%

Waveform horizontal sweep characteristics

Sweep timing accuracy	±0.5%, all rates, fully digital system
Sweep linearity	0.2% of time displayed on screen, fully digital system

Vector characteristics

Vector amplitude accuracy	±2%
Vector phase accuracy	±2°

Audio characteristics (optional capability)

Level meter resolution	0.056 dB steps at 30 dB scale, from full scale to -20 dBFS
User selectable scales	
Analog	dBu, din, nordic, VU, IEEE PPM, BBC scale, and user definable
Digital	dBFS, din, nordic, VU, IEEE PPM, BBC scale, and user definable
Meter ballistics	Selectable from true peak, PPM type 1, PPM type 2, and Extended Vu
Defined/programmable level detection	Mute, clip, user-programmable silence, over

Digital audio characteristics (Option DPE and AD)

Inputs	Two sets with 8 channels each, 32-192 kHz, 24 bit; meets requirements of AES 3-ID and SMPTE276M-1995
Characteristics	BNC, 75 Ω terminated, unbalanced, 0.2 V_{p-p} to 2 V_{p-p}
Return loss	>25 dB relative to 75 Ω from 0.1 to 6 MHz (typical)
Outputs	Up to 8 channels, AES 3-ID output, 48 kHz 20 bit for SD embedded, 48 kHz 24 bit for HD embedded, 48 kHz 24 bit for analog to AES. For AES to AES loopthrough, output format equals input format. Meets requirements of SMPTE 276M-1995 (AES 3-ID). For decoded Dolby Digital, output is 24 bits at a rate of 32, 44.1, or 48 kHz for any one decoded pair. For decoded Dolby E, the output is 24 bits at 48 kHz or 47.952 kHz for up to four pairs.
Characteristics	BNC, 75 Ω terminated, unbalanced, 0.9 V_{p-p} to 1.1 V_{p-p} into 75 Ω
Return loss (typical)	>25 dB relative to 75 Ω from 0.1 to 6 MHz
Jitter (typical)	3.5 ns, peak, with 700 Hz high-pass filter per AES specification
Level meter accuracy over frequency	+0.1 dB from 20 Hz to 20 kHz 0 to –40 dBFS, sine wave Peak ballistic mode (except for within 5 Hz of some submultiples of the sampling frequency)

Analog audio characteristics (Option DPE and AD)

Inputs	Two sets of six channels each
Characteristics	Balanced, unterminated through to rear panel connector
Outputs	8 channels
Characteristics	Balanced, unterminated through the rear-panel connector
Output level, balanced	+24 dBu ±0.5 dB
Crosstalk	<90 dB
Input impedance	24 k (typical)
Digital input to analog output gain accuracy over frequency	±0.5 dB, 20 hz to 20 kHz, –40 dBFS, 20 or 24 bit inputs
Analog input to analog output gain accuracy over frequency	+0.8 dB, 20 Hz to 20 kHz, 24 dBu to –16 dBu
Output impedance	50 Ω nominal

Power characteristics

Power consumption	100 W, maximum
Voltage range	100 to 240 VAC ±10%; 50/60 Hz

Physical characteristics

WVR8300 dimensions	
Height	44 mm (1.725 in.)
Width	483 mm (19 in.)
Depth, overall	498 mm (19.625 in.)
WVR8RFP dimensions	
Height	44 mm (1.725 in.)
Width	483 mm (19 in.)
Depth	114 mm (4.5 in.)
WVR8300 weight	
Net	4.3 kg (9.5 lb.)
Shipping	8.5 kg (18.5 lb.)
WVR8RFP weight	
Net	0.79 kg (1.75 lb.)
With 25 ft. cable, power supply and power cord	1.9 kg (4.1 lb.)

Ordering information

Models

WVR8300 The WVR8300 advanced 3G/HD/SD waveform rasterizer has 2 SDI inputs (3G-SDI, HD-SDI, and SD-SDI support on the same inputs – auto detect). The base unit includes HD-SDI, SD-SDI, dual link signal formats, simultaneous input monitoring (SIM), advanced data analysis, 3D video monitoring, and audio/video delay measurement (requires an audio option). Option 3G is required for 3G-SDI support.

WVR8RFP The WVR8RFP is a remote front panel for the WVR8xxx Series Waveform Rasterizer (includes 25 foot cable).

WVR830UP This field upgrade allows you to upgrade your existing WVR8300 with any of the available WVR8300 options.

Feature capability and option selection guide

Feature capability	WVR8300
Video formats and inputs	
HD-SDI / Dual Link / SD-SDI	Standard
3G-SDI (Level A and Level B)	Option 3G
4K/UHDTV1	Option 4K (requires Options 3G and 2SDI)
4 SDI input monitoring	Option 2SDI [3]
Composite PAL/NTSC	Option CPS [3]
Audio formats and inputs	
Embedded and AES digital audio	Option AD or DPE
Analog audio	Option AD or DPE
Dolby E / Dolby Digital Plus / Dolby Digital	Option DPE
Other advanced capabilities	
HDR tool set (HDR graticules, HDR Zebra overlay)	Option PROD
Advanced color gamut (Spearhead/LQV)	Option PROD
Simultaneous Input Monitoring (SIM)	Standard
3D video monitoring	Standard
ANC Data Inspector	Standard
Digital data analysis	Standard
Out-of-service AV delay measurement	Standard

[3] Option 2SDI and Option CPS cannot be installed on the same instrument.

WVR8300 and WVR830UP options

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 inputs – auto detect). Option 3G required for 3G-SDI support. This option cannot be installed on an instrument with option CPS installed.
3G	Adds support for 3G-SDI signal formats (Level A and Level B). (Upgrades are available by a software option key.)
4K	Adds support for 4K/UHDTV1 signal formats (requires Options 3G and 2SDI).
AD	Adds analog audio monitoring (2 sets of 6-channel analog audio inputs and 8-channel analog audio outputs) plus 16 channels, embedded or AES/EBU digital audio support (8 channels at a time), including loudness monitoring.
CPS	Adds support for composite analog video monitoring; 2 composite analog inputs; passive loopthrough. This option cannot be installed on an instrument with option 2SDI installed.
DPE	Adds option AD capabilities (analog and digital audio – embedded or external AES) plus support for decoding and monitoring Dolby E, Dolby D, and Dolby Digital Plus including loudness monitoring.
PROD	Advanced gamut monitoring package (Spearhead Gamut display and Luma Qualified Vector display) and HDR tool set (HDR graticules, HDR Zebra overlay).
4K-PRODPAC	A bundle of 4K options that includes product options 4K, 2SDI, 3G, and PROD.
62	Analog audio breakout cable, 6 feet, male 62-pin connectors to 8 XLR male output connectors and 12 XLR female input connectors.

WVR8RFP options

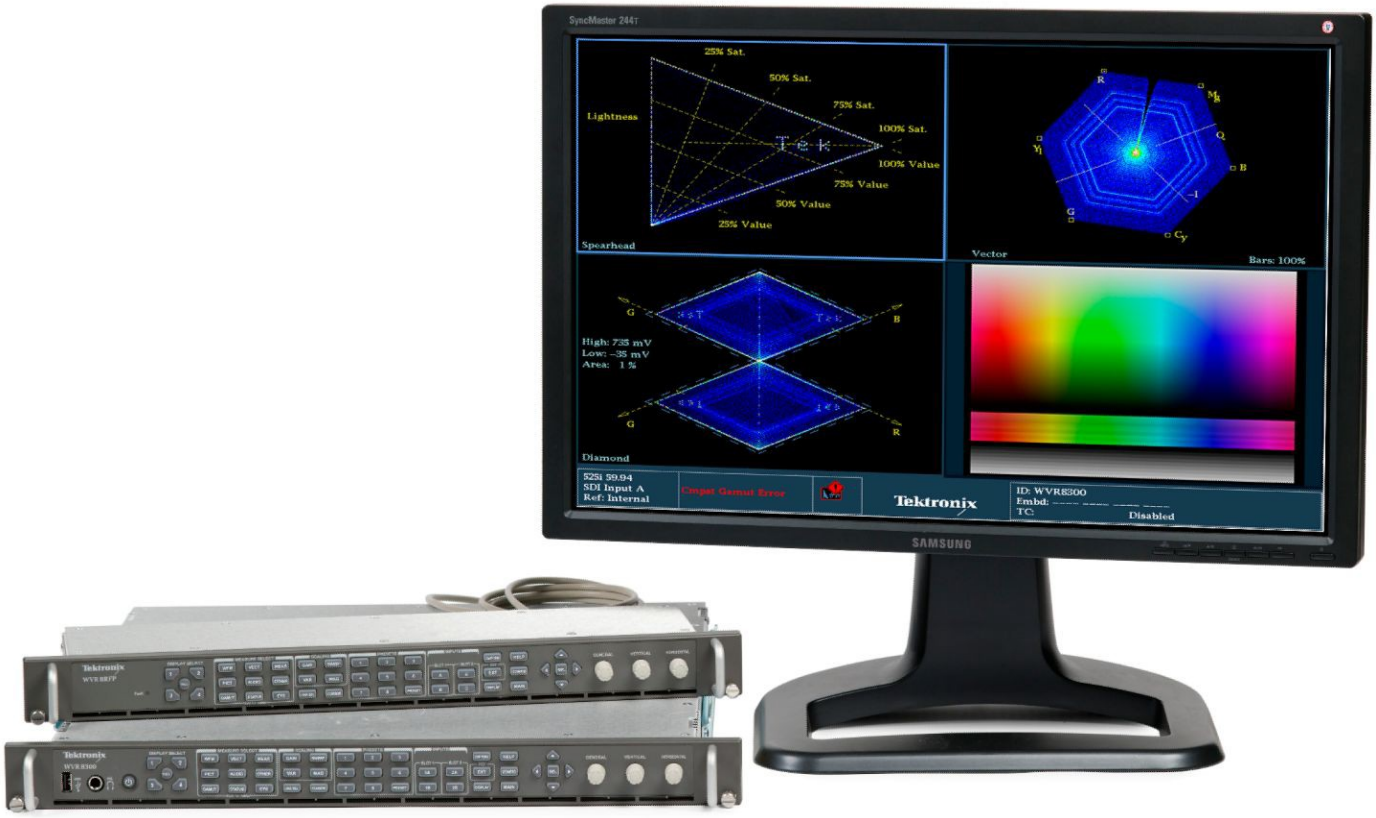
01	100 foot cable for WVR8RFP Rasterizer Remote Front Panel

International power plugs

Opt. A0	North America power plug (115 V, 60 Hz)
Opt. A1	Universal Euro power plug (220 V, 50 Hz)
Opt. A2	United Kingdom power plug (240 V, 50 Hz)
Opt. A3	Australia power plug (240 V, 50 Hz)
Opt. A5	Switzerland power plug (220 V, 50 Hz)
Opt. A6	Japan power plug (100 V, 50/60 Hz)
Opt. A10	China power plug (50 Hz)
Opt. A11	India power plug (50 Hz)
Opt. A12	Brazil power plug (60 Hz)
Opt. A99	No power cord

Service options

There are many service and repair options, and several lengths of service, available for this product. Contact Telestream for details.



WVR8300 with WVR8RFP

WVR8300 Datasheet

WVR8300 rear panel with Option CPS

WVR8300 rear panel with Option 2SDI

CE

telestream

For Further Information. Telestream maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit www.telestream.net/video for sales and support contacts.

15 Dec 2020, D00013343A