2012 Product Catalog

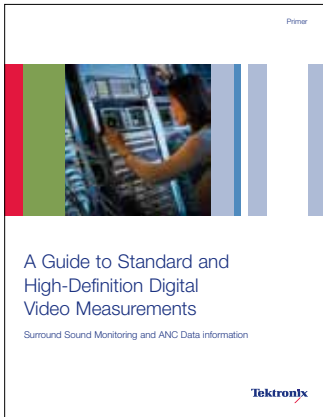## Video Test and Monitoring Solutions

Tektronix®

Solving today's digital video delivery and quality challenges

Digital technology is quickly replacing analog technology at every level in the video industry, enabling entirely new classes of products and services. This transformation is fundamentally changing how video content is created, stored, managed, distributed and enjoyed. The digital video ecosystem is comprised of companies in the business of creating and distributing content as well as the designers and manufacturers of professional and consumer electronics. The new competitive landscape reflects the pace and scope of technology-driven change and Tektronix continues to provide the most comprehensive range of solutions across the entire ecosystem.

| Video Test and Monitoring Product Selection Guide								
	Waveform Monitors & Rasterizers	Sync Pulse Generators	Signal Generators	Picture Quality Analyzers	MPEG Generators & Analyzers	File-Based Content Analysis	RF Video Monitors	Digital Content Monitors
Camera setup and alignment including OB Vans	■	■						
Color grading and color space compliance	■							
3D Video Content Monitoring	■							
Quality Assurance	■					■		
Quality control of file-based Archiving workflows						■		
Quality control of file-based Ingest workflows						■		
Quality control of file-based Playout workflows						■		
Facility Distribution & Routing	■	■				■		
Monitoring Playout	■					■		
Audio Loudness Monitoring	■				■	■	■	■
RF Transmission Monitoring - Satellite					■		■	
RF Transmission Monitoring - Transmitter							■	■
Headend Ingest Monitoring					■		■	■
Multi-stream IP Video Monitoring								■
Video & Audio Quality of Experience (QoE)					■	■	■	■
tru2way / OCAP Monitoring								■
EBIF Monitoring								■
Ad Insertion Monitoring					■			■
DVB Carousel Monitoring					■			
Ad Content Encode/Transcode Verifications						■		■
VoD Asset Verification						■		
Headend Troubleshooting & Diagnostics					■		■	■
Video Semiconductor Design & Evaluation	■		■		■			
Encoder/Transcoder Evaluation & Field Test			■	■	■			
Consumer Electronics Design & Evaluation			■	■	■			
Professional Broadcast Equipment Design & Evaluation	■		■	■	■			
See Page	5	14	13	15	16	19	28	22

Order Your Free Technology Primers and Posters Online Today

A Guide to Standard and High-Definition Digital Video Measurements

This primer offers a wealth of information on video test and monitoring. It now includes surround sound monitoring and ANC data information.
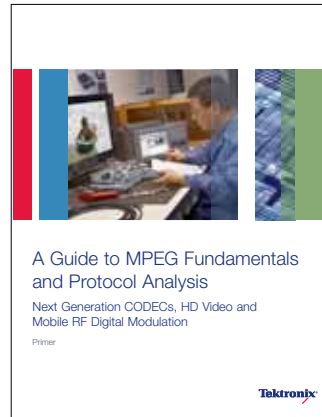
To order your free copy of this primer visit:
www.tektronix.com/sd_hd_measurements
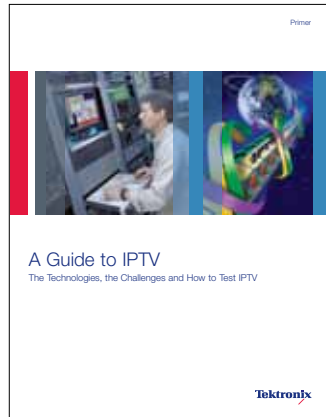
A Guide to IPTV

This primer offers a wealth of information on the technologies and challenges, along with how to test IPTV.

To order your free copy of this primer visit:
www.tektronix.com/iptv_guide

A Guide to MPEG Fundamentals and Protocol Analysis

This primer is the reference for MPEG fundamentals and protocol analysis, including educational information on next generation CODECs, high definition video and mobile RF digital modulation.
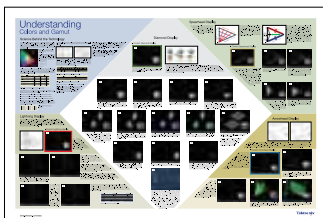
To order your free copy of this primer visit:
www.tektronix.com/mpeg_fundamentals
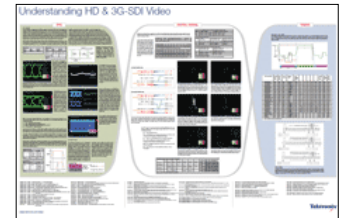
Understanding HD and 3G-SDI Video Poster

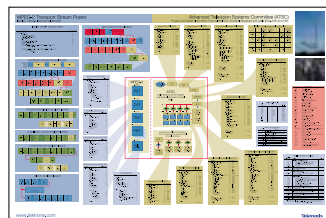This poster provides a graphical reference to understanding HD and 3G-SDI video.

To order your free copy of this poster visit:
www.tektronix.com/video/hdposter

Understanding Color and Gamut Poster

This poster provides a quick graphical reference to understanding gamut and how to correct gamut problems within the video signal.
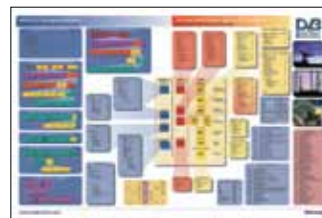
To order your free copy of this poster visit:
www.tektronix.com/video/cgposter

ATSC Standard Poster

This poster provides a reference to the Advanced Television System Committee (ATSC) A/65 standard and MPEG-2 transport stream - ISO/IEC 13818-1 International Standard.

To order your free copy of this poster visit:
www.tektronix.com/mpegposter

DVB (Digital Video Broadcasting) Standard Poster

This poster provides a reference to the DVB standard. Service Information (SI) in DVB systems and MPEG 2 Transport stream - ISO/IEC 13818 International Standard.
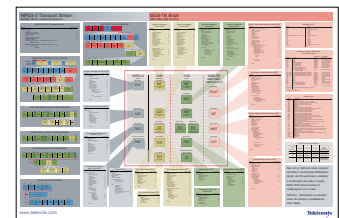
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ISDB-Tb Standard Poster

This poster provides a reference to the DVB, ARIB and ISDB-Tb ABNT NBR service information tables.

To order your free copy of this poster visit:
www.tektronix.com/mpegposter

Waveform Monitor Selection Guide							
	1741C	WFM6120	WFM7020	WFM7120	WFM7200	WFM8200	WFM8300
SD Digital		■	■	■	■	■	■
HD Digital			Opt HD	Opt HD	■	■	■
NTSC/PAL	■	Opt CPS	Opt CPS	Opt CPS	Opt CPS	Opt CPS	Opt CPS
Dual Link			Opt DL	Opt DL	■	■	■
3G-SDI Single Link (Level A & Level B)			Opt 3G	Opt 3G	Opt 3G	Opt 3G	Opt 3G
2 Simultaneous inputs: HD/SD SDI or 1 HD/SD SDI and 1 CPS			Opt SIM	Opt SIM	Opt SIM or 3D	■	
4 x SDI Input Monitoring (incl. 3G with Opt. 3G) Camera Balance Mode					Opt 2SDI	Opt 2SDI	Opt 2SDI
In-depth Data and ANC Data Analysis		Opt DAT		Opt DAT	Opt DAT	Opt DAT	■
Closed Captions / Subtitles Decoding	■	■	■	■	■	■	■
Advanced Gamut Monitoring (Spearhead, LQV)					Opt PROD	Opt PROD	Opt PROD
3D Video Content Monitoring					Opt S3D	Opt 3D	■
Embedded Audio		Opt AD	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE
Discrete AES/EBU Digital Audio		Opt AD	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE
Analog Audio		Opt AD	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE
Dolby Digital (AC-3) / E / DD+			Opt DPE	Opt DPE	Opt DPE	Opt DPE	Opt DPE
Audio Loudness Monitoring		■	■	■	■	■	■
Out-of-Service Audio-Video Delay		Opt AVD		Opt AVD	Opt AVD	Opt AVD	■
Eye Diagrams, Jitter & Cable Parameter Measurements		Opt EYE / PHY		Opt EYE / PHY	Opt PHY3	Opt EYE / PHY3	Opt PHY
Jitter Waveform and Automated Eye measurements		Opt PHY		Opt PHY	Opt PHY3	Opt PHY3	Opt PHY
3G Jitter Waveform and Jitter measurement				OPT JIT & 3G	Opt PHY3 & 3G	Opt PHY3 & 3G	Opt PHY & 3G
Basic Test Signal Generation				OPT JIT & 3G	Opt GEN	Opt GEN	Opt PHY
See Page	13	7	7	7	7	8	8

Rasterizer Selection Guide						
	WVR6020	WVR7020	WVR7120	WVR7200	WVR8200	WVR8300
SD Digital	■	■	■	■	■	■
HD Digital		Opt HD	Opt HD	■	■	■
NTSC/PAL	Opt CPS	Opt CPS	Opt CPS	Opt CPS	Opt CPS	Opt CPS
Dual Link		Opt DL	Opt DL	■	■	■
3G-SDI Single Link (Level A & Level B)				Opt 3G	Opt 3G	Opt 3G
2 Simultaneous inputs: HD/SD SDI or 1 HD/SD SDI and 1 CPS			Opt SIM	Opt SIM	Opt SIM or 3D	■
4 x SDI Input Monitoring (incl. 3G with Opt. 3G) Camera Balance Mode				Opt 2SDI	Opt 2SDI	Opt 2SDI
In-depth Data and ANC Data Analysis				Opt DAT	Opt DAT	■
Closed Captions / Subtitles Decoding	■	■	■	■	■	■
Advanced Gamut Monitoring (Spearhead, LQV)				Opt PROD	Opt PROD	Opt PROD
3D Video Content Monitoring				Opt S3D	Opt 3D	■
Embedded Audio	Opt AD	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE
Discrete AES/EBU Digital Audio	Opt AD	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE
Analog Audio	Opt AD	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE	Opt AD or DPE
Dolby Digital (AC-3) / E / DD+		Opt DPE	Opt DPE	Opt DPE	Opt DPE	Opt DPE
Audio Loudness Monitoring	■	■	■	■	■	■
Out-of-Service Audio-Video Delay			Opt AVD	Opt AVD	Opt AVD	■
Eye Diagrams, Jitter & Cable Parameter Measurements			Opt EYE / PHY	Opt PHY3	Opt EYE / PHY3	Opt PHY
Jitter Waveform and Automated Eye measurements			Opt PHY	Opt PHY3	Opt PHY3	Opt PHY
3G Jitter Waveform and Jitter measurement				Opt PHY3 & 3G	Opt PHY3 & 3G	Opt PHY & 3G
Basic Test Signal Generation				Opt GEN	Opt GEN	Opt PHY
See Page	10	10	10	11	12	12

Portable Waveform Monitors & Rasterizers					
	WFM2200	WFM5000	WVR5000	WFM5200	WVR5200
SD Digital	■	■	■	■	■
HD Digital	■	■	■	■	■
Dual Link	■			■	■
3G-SDI Single Link (Level A & Level B)	Opt 3G			Opt 3G	Opt 3G
Simultaneous input monitoring				Opt CAM	Opt CAM
4 x SDI Input Monitoring (incl. 3G with Opt. 3G) Camera Balance Mode				Opt CAM	Opt CAM
In-depth Data and ANC Data Analysis	Opt DATA			Opt DATA	Opt DATA
Closed Captions / Subtitles Decoding	Opt DATA			Opt DATA	Opt DATA
Advanced Gamut Monitoring (Spearhead, LQV)				Opt PROD	Opt PROD
Embedded Audio	■	■	■	Opt AUD	Opt AUD
Discrete AES/EBU Digital Audio	■	■	■		
Audio Loudness Monitoring				Opt LOUD	Opt LOUD
Basic Test Signal Generation	■			Opt GEN	Opt GEN
See Page	5	6	9	6	9

WFM2200 Multi-format, Multi-standard Portable Waveform Monitor

The WFM2200 SD/HD waveform monitor is an ideal tool for field applications offering uncompromised monitoring quality with sharp CRT-like trace on a large LED back-lit display and a replaceable/rechargeable battery system. It weighs in at less than 4lbs/1.8kg.

Applications

- Field Production Setup and Troubleshooting
- System Check Tool in Distribution and Broadcast
- Portable Engineering Tool in Manufacturing

Features and Benefits

- Ability to Display Waveform of External Reference Signal and LTC Signal for Quick Diagnosis of the Potential Issues in Sync and Time Distribution System
- Two SDI Inputs with Multi-format, Multi-standard Support
  - Auto-detection of HD/SD-SDI and multiple Dual Link video formats
  - Upgradeable to include 3G-SDI (Level A and Level B) format support with the purchase of an upgrade key (Option 3G)
- 3G/HD/SD Color Bar and Pathological Signal Generator for Troubleshooting Signal Paths and Equipment
- Audio Monitoring with up to 16-channel Embedded AES/EBU Audio Simultaneous Monitoring Support with Multichannel Surround Sound[1] Display and Flexible Lissajous Display
- Independent AES Input and Output for Audio Facility Testing
- Tektronix-patented Diamond and Arrowhead Displays for Color Gamut Compliance Monitoring

- Comprehensive Data Monitoring helps to Quickly Resolve Difficult Content Quality and Reliability Issues (Option DATA)
  - 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
  - ANC Data Inspector and SDI Data Analysis display helps troubleshoot ANC data and SDI data problems
- Wide Range of Monitoring Displays
  - Tektronix-patented Timing and Lightning displays makes facility and inter-channel timing easy
  - Waveform display of external reference (Black Burst or Tri-Level Sync)
  - Extensive alarms, status reporting, and error logging for 10,000 events simplifies error correction tasks
  - Voltage and Timing Cursor for precise measurement
  - User-definable Safe Area Graticules and AFD Graticule facilitate editing and format conversion tasks

- Unmatched Display Versatility
  - Flexible Quad Tile display tailored to various application needs to increase productivity
  - Full Screen mode that maximizes display size for precise adjustments
  - Thumbnail Picture for content verification
- Unmatched Usability
  - 32 instrument presets for quick recall of commonly used configurations tailored to colorists, editors, or operators
  - USB port enables easy transfer of presets, screenshots, and error log
  - Internal speaker and headphone port for easy monitoring of audio channels
- High-brightness display with crisp, high-resolution LED backlight, ideal for indoor and outdoor usage
  - Operates with Internal, Rechargeable, and Replaceable Battery Unit; External Recharger Kit and a Battery Unit for Replacement is Available as an Option Super lightweight and low power consumption design for portable, battery-powered applications

For further details visit:
www.tek.com/waveform-monitor/wfm2200

WFM4000/WFM5000 Series Multi-standard, Multi-format, Portable Waveform Monitors

The WFM5000 is for HD and SD Serial Digital Video Monitoring and HD/SD format auto-detection. The WFM4000 is for SD Serial Digital Video Monitoring. Both units provide Digital audio monitoring for 16 embedded channels and 2 AES/EBU channels.

Applications

- Camera level setup including camera shading
- Quality control and fault detection of outgoing video and audio content (control rooms and mobile trucks)
- Basic content verification during field production
- Content processing (including content edit, color adjustment, format conversion, and addition of promos and /or station IDs)
- Quality control and fault detection of incoming or outgoing video and audio content
- Tape or File QC

Features and Benefits

- Quad Tile display allows more display combinations to suit specific applications
- TandemVu™ enables Wavform/Vector (or Waveform Lightning) Display with Picture Thumbnail in a full-size single tile display
- Tektronix patented Timing Display simplifies facilities timing
- Short-depth integrated waveform monitor (WFM5000 / WFM4000) form factor for space-critical environments
- High-resolution, LED backlit display provides bright, readable instrument display - even under sunlight
- Easy to learn with intuitive user interface and online help
- Exclusive Tektronix Gamut displays (Diamond, Split Diamond, and Arrowhead) ensure compliant content
- Captured screen display downloadable to USB storage device in bitmap file format for easy documentation
- Picture Thumbnail in all modes for quick identification of source content

- Audio Bars and Lissajous displays let Audio Editors and Operators verify compliance of digital audio signals, without the need for an additional piece of equipment
- Front panel headphone port for easy identification and monitoring of audio channels
- Passive loop-throughs for HD-SDI (WFM5000 and WVR5000 only) and SD-SDI inputs allow for monitoring the true signal in the path and ensuring signal integrity, even if instrument power is off
- 32 instrument Presets for quick recall of commonly used configurations
- Front panel USB device for easy transfer of instrument Presets
- SNMP Support

For further details visit:
www.tektronix.com/wfm4000_5000

WFM5200 Multi-format, Multi-standard Compact Waveform Monitor

The WFM5200 waveform monitor offers uncompromised monitoring quality with sharp CRT-like traces, SD/HD monitoring, a range of software options, and an upgrade path to 3G-SDI.

Applications

- Camera Monitoring (Camera Shading) in Mobile Trucks (OB Vans) and Production Studio Control Rooms
- Color Correction and Manipulation
- Content Editing and Special Effects
- Content Quality Control (QC) in Production and Post Production
- Field Production Setup and Troubleshooting
- Compliance Checking in Distribution and Broadcast

Features and Benefits

- Four SDI Inputs with Multiformat, Multistandard Support
  - Auto-detection of HD/SD-SDI and multiple Dual Link video formats
  - Monitor up to four SDI inputs simultaneously for multiple camera monitoring applications (Option CAM)
  - Upgradeable to include 3G-SDI with the purchase of an upgrade key (Option 3G)
  - 16-channel embedded AES/EBU audio simultaneous monitoring support with Multichannel Surround Sound[1] display and flexible Lissajous display (Option AUD)
  - Audio Loudness monitoring (Option LOUD, requires Option AUD to be installed)
- Diamond and Arrowhead Displays for Color Gamut Compliance Monitoring
- Spearhead and Luma Qualified Vector (LQV™) Displays Facilitate Precise Color Adjustment for Post Production Applications (Option PROD)

- Comprehensive Data Monitoring (Option DATA) helps to Quickly Resolve Difficult Content Quality and Reliability Issues
  - 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
  - ANC Data Inspector and SDI Data Analysis display helps troubleshoot ANC data and SDI data problems
- Simple 3G/HD/SD Color Bar and Pathological Signal Generator (Option GEN) for Troubleshooting Signal Paths and Equipment (3G capability requires option 3G)
- Range of Monitoring Displays
  - Timing and Lightning displays simplify facility and inter-channel timing
  - Waveform display of external reference (Black Burst or Tri-Level Sync)
  - Black Picture and Tektronix-patented Frozen Picture Detection
  - Extensive alarms, status reporting, and error logging for 10,000 events simplifies error correction tasks
  - Voltage and Timing Cursor for precise measurement
  - User-definable Safe Area Graticules and AFD Graticule facilitate editing and format conversion tasks
- Unmatched Usability & Display Versatility
  - 32 instrument presets for quick recall of commonly used configurations tailored to colorists, editors, or operators
  - Super lightweight and low power consumption design for portable, battery-powered applications
  - Flexible Quad Tile Display increases productivity
  - TandemVu® Display for efficient camera adjustments of luma and chroma
  - Full Screen mode that maximizes display size for precise adjustments

For further details visit:
www.tektronix.com/wfm5200

WFM6000/WFM7000 Series Multi-standard, Multi-format Waveform Monitors

This series of waveform monitors boosts your productivity, allowing you to accurately monitor and analyze content at a glance with Tektronix See and Solve™ displays, powerful error reporting and the most advanced timing and alignment jitter measurements. Unique capabilities such as support for 3 Gb/s, Dual Link, Simultaneous Input monitoring and Audio-Video Delay measurements help you solve challenging problems faster and efficiently.

Applications

- Monitoring and Compliance Checking in Video Distribution and Broadcasting
- Quality Control in Video Production and Post-production
- Equipment Qualification and Troubleshooting in the Installation and Maintenance of Video Facilities and Systems
- Combine with the TG700 for A/V Delay measurements

Features and Benefits

- Analog, SD, and HD-SDI formats
- Full Dual Link Support for High-End Production, Post Production and Manufacturing Applications (DL Option)
- Numerical and Graphical Display of A/V Delay (AVD Option)
- Extensive Fault Monitoring, Status Reporting, and Error Logging Simplify Content Quality Control
- Simultaneous A/B Input Support Extends Monitoring Functions (SIM Option)
- Exclusive Tektronix Gamut Displays Help Ensure Compliant Content
- Exceptional Audio Monitoring Available, (Option AD) with support for Dolby Audio Formats (Option DDE) and a Front-panel Headphone Connector, Reduces Time and Effort in Verifying Multi-channel Audio Content
- Measure audio loudness and true peak of combination of discrete audio channels as well as Dolby Digital, Dolby Digital Plus, and Dolby E audio program as per ITU-R BS.1770-2 / 1771, EBU R128 and ATSC A/85 recommendations
- Dolby Digital Plus Metadata display

- Audio Control Packet provides a decoded display of the embedded audio information
- Dolby E Audio/Video Timing and Synchronization measurement
- CEA708 Closed Caption decoding
- Settable Dolby Guard Band Limits
- VANC Dolby Metadata Display
- Selectable Time Code- for ANC VITC or LTC; selectable VITC selectable line number
- ANC Data Inspector simplifies ANC Data Monitoring and Helps Quickly Resolve Difficult Quality and Reliability Issues (DAT Option)
- 3G single link SDI interface (3G Option)
- 3G single link jitter measurements (JIT Option)
- Available High-Performance SDI Physical Layer Measurements (PHY Option) is Available for Eye and Jitter Displays
- FlexVu™ XGA Display Increases Productivity with the Ability to Create Hundreds of Custom Multiple-view Displays Tailored to Specific Work Practices
- CaptureVu™ Video Frame Capture Improves Efficiency in Troubleshooting and Equipment Setup (WFM6120 & WFM7120)
- The Patented Tektronix Lightning Display is Ideal for Maintaining Correct Inter-channel Timing
- Black Picture and Frozen Frame Detection for monitoring signal path continuity
- Standard and User-definable Safe Area Graticules Help Avoid Errors and Rework in Editing and Format Conversion
- Active Format Description (AFD), Video Index and Wide Screen Signaling (WSS) decoding
- Teletext Subtitle decoding
- Infinite Persistance Mode for trace displays
- Front-panel USB Port For Easy Storage and Transfer of Instrument Settings and Video Data

For further details visit:
www.tek.com/waveform-monitor/wfm7000-6000

WFM7200 Multi-format, Multi-standard Compact Rasterizer

The monitoring and measurement capabilities of the WFM7200 provide a comprehensive suite of options and configurations to suit a variety of applications. For monitoring applications Tektronix-patented gamut displays simplify color adjustments for camera balancing and color correction applications. Get information about the signal at a glance from the audio session and video session displays that assist in ensuring quality control of the image.

Applications

- Post-production Edit Suite and Color Correction Monitoring
- Quality Control in Content Production and Post-production
- Monitoring and Compliance Checking in Content Distribution and Broadcast transmission
- Equipment/System Qualification and Troubleshooting for Installation and Maintenance of Content Creation and Distribution Facilities

Features and Benefits

- Simultaneous monitoring of 2 HD/SD-SDI inputs or 1 HD/SD-SDI input and 1 CPS input. Option 3G is required for 3G-SDI format support (Opt. SIM)
- Auto-detection of HD/SD-SDI and multiple Dual Link video formats
- Composite analog (PAL/NTSC) video support (Opt. CPS)
- Multiple Input Mode allows monitoring of 2 to 4 SDI inputs simultaneously (4-input mode requires Opt. 2SDI)
- Upgradeable to 3G-SDI (Level A and Level B) format support (Opt. 3G)
- Comprehensive Audio Monitoring
- Stereoscopic 3D Video Displays for Camera Alignment and Production/Post-production Applications (Opt. S3D)
- Black Picture and Tektronix-patented Frozen Picture Detection
- Advanced ANC Data Monitoring including In-depth Digital Data Analysis (Opt. DAT)
- Standard and User-definable Safe Area Graticules Facilitate Editing and Format Conversion Tasks, Reducing the Need for Reworks
- Active Format Description (AFD) Detection, Decode, and Automatically Adjusted Graticule in Picture Display enable Easy Identification of Aspect-ratio Related Issues
- Superior Physical Layer Signal Measurement including high-performance real-time eye pattern display, jitter measurements, and patented cable length measurement (Opt. PHY3)
- Most comprehensive eye pattern measurements including eye amplitude, rise/fall time, and overshoot/undershoot measurements as well as Tektronix jitter waveform display (Opt. PHY3)

For further details visit:
www.tektronix.com/wfm7200

WFM8300/WFM8200 Advanced Multi-standard, Multi-format Waveform Monitors

Ideal for multi-format environments, the WFM8200 and WFM8300 advanced waveform monitors provide flexible options and field-installable upgrade kits to monitor diverse video types including 3G-SDI, Dual Link, HD/SD SDI, and Composite Analog Video. Both WFM8200 and WFM8300 come standard with 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.

These instruments allow for monitoring of Link A, Link B, or the combined Dual Link input with a comprehensive set of displays and status reporting tools. The Tektronix-patented Timing Display (measures timing between Link A and Link B of the Dual Link signal) proves invaluable to maintaining correct timing between the two links. Both instruments Decode and monitor Dolby Digital Plus audio, display Dolby Digital Plus Metadata, and monitor 16-channel embedded audio simultaneously.

Applications

- Monitoring and compliance checking in video distribution and broadcasting
- Quality control in the video production and post-production
- Equipment qualification and troubleshooting in the installation and maintenance of video facilities and systems
- Stereoscopic 3D Video Monitoring

WFM8300

The measurement and monitoring capabilities of the WFM8300 provide precision capabilities such as Physical Layer Measurements, Digital Data Analysis (including ANC Data Inspector), A/V Delay Measurement, and in-depth Simultaneous Input Monitoring which makes Tektronix the brand of choice for applications that require deep signal and content analysis with unquestionable accuracy.

The WFM8300 features the complete range of options of the product family and comes standard with HD/SD-SDI and Dual Link video formats support. It provides high-performance monitoring and measurement for applications for a wide range of formats from Composite Analog to SD-SDI, HD-SDI, Dual Link video formats, and 3G-SDI video signals. The WFM8300 offers support for a variety of audio formats for analog, digital AES/EBU, digital embedded, Dolby Digital, and Dolby E.

Features and Benefits

- Video Monitoring Standards and Formats
  - 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
  - 4 SDI Input Monitoring – Option 2SDI
- 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
  - Measure audio loudness and true peak of combination of discrete audio channels as well as Dolby Digital, Dolby Digital Plus, and Dolby E audio program as per ITU-R BS.1770-2 / 1771, EBU R 128 and ATSC A/85 recommendations
  - Analog, Digital AES/EBU, Digital Embedded – Option AD
  - Analog & Digital plus Dolby Digital and Dolby E – Option DDE
- Stereoscopic 3D Video Monitoring
  - Difference Map Display
  - Red/Cyan Anaglyph Display
  - Green/Magenta Anaglyph Display
  - Checkerboard Display
  - Disparity Grid and Disparity Cursors
- Measurement and Analysis
  - Eye Pattern & Jitter Waveform Measurements Option PHY
  - Color Bar & Pathological Signal Generation – Option PHY
  - Digital Data Analysis – Standard
  - ANC Data Inspector – Standard
  - Simultaneous Input Monitoring – Standard
  - Audio / Video Delay Measurement – Standard
- Combine with the TG700 HD3G7 module for 3G-SDI Physical Layer measurements

WFM8200

The WFM8200 provides an ideal solution for advanced monitoring of Analog, Digital, High Frame-rate Digital Video, and multiple Audio formats. This flexible solution comes standard with HD/SD-SDI and Dual Link video monitoring and can be equipped with options and upgrades to monitor 3Gb/s SDI and/or Composite Analog video. The WFM8200 is an intelligent choice that prepares you for format transitions and growing monitoring needs. Available audio options include support for analog, digital AES/EBU, digital embedded, Dolby Digital, and Dolby E formats.

Features and Benefits

- Video Monitoring Standards and Formats
  - 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
  - 4 SDI Input Monitoring – Option 2SDI
- 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
  - Measure audio loudness and true peak of combination of discrete audio channels as well as Dolby Digital, Dolby Digital Plus, and Dolby E audio program as per ITU-R BS.1770-2 / 1771, EBU R 128 and ATSC A/85 recommendations
  - Analog, Digital AES/EBU, Digital Embedded – Option AD
  - Analog & Digital plus Dolby Digital and Dolby E – Option DDE
- Measurement and Analysis
  - Eye Pattern Display & Jitter Readouts – Option EYE
  - Digital Data Analysis – Option DAT
  - ANC Data Inspector - Option DAT
- Stereoscopic 3D Video Monitoring - Option 3D
  - Difference Map Display
  - Red/Cyan Anaglyph Display
  - Green/Magenta Anaglyph Display
  - Checkerboard Display
  - Disparity Grid and Disparity Cursors

Both WFM8300 and WFM8200 support flexible combinations of options and field upgrades, providing an excellent solution for multi-format environments while protecting your investment.

For further details visit:
www.tektronix.com/wfm8000

WVR4000/5000 Series Waveform Rasterizers

The WVR5000 is a compact Waveform Rasterizer for HD and SD Serial Digital Video Monitoring with HD/SD format auto-detection. The WVR4000 is a compact Waveform Rasterizer for SD Serial Digital Video Monitoring. Both units provide Digital audio monitoring for 16 embedded channels and 2 AES/EBU channels.

Applications

- Camera level setup including camera shading
- Quality control and fault detection of outgoing video and audio content (control rooms and mobile trucks)
- Basic content verification during field production
- Content processing (including content edit, color adjustment, format conversion, and addition of promos and /or station IDs)
- Quality control and fault detection of incoming or outgoing video and audio content
- Tape or File QC

Features and Benefits

- Quad Tile display allows more display combinations to suit specific applications
- Half-rack 1RU Rasterizer (WVR5000/WVR4000) form factor for space-critical environments
- TandemVu enables Waveform/Vector (or Waveform Lightning) Display with Picture
- Patented Tektronix Timing Displays simplies facilities timing
- Exclusive Tektronix Gamut displays (Diamond, Split Diamond, and Arrowhead) ensure compliant content
- Picture Thumbnail in all modes for quick identification of source content
- Audio Bars and Lissajous displays let Audio Editors and Operators verify compliance of digital audio signals, without the need for an additional piece of equipment
- Passive loop-throughs for HD-SDI (WFM5000 and WVR5000 only) and SD-SDI inputs allow for monitoring the true signal in the path and ensuring signal integrity, even if instrument power is off

For further details visit:
www.tektronix.com/wvr4000_5000

WVR5200 Multi-format, Multi-standard Compact Rasterizer

The WVR5200 waveform rasterizer offers uncompromised monitoring quality with sharp CRT-like traces, SD/HD monitoring, a range of software options, and an upgrade path to 3G-SDI.

Applications

- Camera Monitoring (Camera Shading) in Mobile Trucks (OB Vans) and Production Studio Control Rooms
- Color Correction and Manipulation
- Content Editing and Special Effects
- Content Quality Control (QC) in Production and Post Production
- Field Production Setup and Troubleshooting
- Compliance Checking in Distribution and Broadcast

Features and Benefits

- Four SDI Inputs with Multiformat, Multistandard Support
  - Auto-detection of HD/SD-SDI and multiple Dual Link video formats
  - Monitor up to four SDI inputs simultaneously for multiple camera monitoring applications (Option CAM)
  - Upgradeable to include 3G-SDI with the purchase of an upgrade key (Option 3G)
  - 16-channel embedded AES/EBU audio simultaneous monitoring support with Multichannel Surround Sound[1] display and flexible Lissajous display (Option AUD)
  - Audio Loudness monitoring (Option LOUD, requires Option AUD to be installed)
- Diamond and Arrowhead Displays for Color Gamut Compliance Monitoring
- Spearhead and Luma Qualified Vector (LQV™) Displays Facilitate Precise Color Adjustment for Post Production Applications (Option PROD)

- Comprehensive Data Monitoring (Option DATA) helps to Quickly Resolve Difficult Content Quality and Reliability Issues
  - 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
  - ANC Data Inspector and SDI Data Analysis display helps troubleshoot ANC data and SDI data problems
- Simple 3G/HD/SD Color Bar and Pathological Signal Generator (Option GEN) for Troubleshooting Signal Paths and Equipment (3G capability requires option 3G)
- Range of Monitoring Displays
  - Timing and Lightning displays simplify facility and inter-channel timing
  - Waveform display of external reference (Black Burst or Tri-Level Sync)
  - Black Picture and Tektronix-patented Frozen Picture Detection
  - Extensive alarms, status reporting, and error logging for 10,000 events simplifies error correction tasks
  - Voltage and Timing Cursor for precise measurement
  - User-definable Safe Area Graticules and AFD Graticule facilitate editing and format conversion tasks
- Unmatched Usability & Display Versatility
  - 1RU height, Half-rack Width, Short-depth (5.5 in. or 14 cm) Instrument, Ideal for Space-constrained Environments
  - 4-pin XLR DC Power Input with AC Power Adapter for both AC/DC Operation
  - DVI-I external display output for easy connection to digital or analog XGA display
  - SNMP and Ethernet remote interface capabilities and GPI control facilitate centralized monitoring and control
  - 32 instrument presets for quick recall of commonly used configurations tailored to colorists, editors, or operators
  - Flexible Quad Tile Display increases productivity
  - TandemVu® Display for efficient camera adjustments of luma and chroma
  - Full Screen mode that maximizes display size for precise adjustments

For further details visit:
www.tektronix.com/wvr5200

WVR6000/WVR7000 Series Waveform Rasterizers

The WVR6020 / WVR7020 / WVR7120 help video content producers verify content quality and make precision content adjustments. In video delivery systems, they help operations staff verify content quality and system reliability, and help engineering staffs qualify, install, and maintain video systems. Ideal for multi-format environments, these Rasterizers offer performance and flexibility needed for demanding video applications. These instruments offer options to monitor SDI and Analog Composite Video, as well as Audio Signals, all from a single, convenient 1RU instrument.

The WVR7120 and WVR7020 feature the most powerful Dual-Link monitoring capability compliant with SMPTE 372M. These instruments provide selectable display of Alpha Channel and automatic format detection on signals with 352M Video Payload Identifier (VPID). The WVR7120 features advanced monitoring and measurement tools such as CaptureVu™ and provides options for A/V delay measurement and simultaneous input monitoring.

Applications

- Monitoring and compliance checking in video distribution and broadcasting
- Quality control in the video production and post-production
- Equipment qualification and troubleshooting in the installation and maintenance of video facilities and systems
- Combine with the TG700 for A/V Delay measurements

Features and Benefits

- Active Format Description (AFD), Video Index and Wide Screen Signaling (WSS) decoding
- Black Picture and Frozen Frame Detection for monitoring signal path continuity
- Selectable Time Code- for ANC VITC or LTC; selectable VITC selectable line number
- Infinite Persistance Mode for trace displays
- Numerical and Graphical Display of A/V Delay
- Simultaneous A/B Input Support extends monitoring functions
- CaptureVu™, allows you to store and compare diverse views of the reconstituted signal (standard in WVR7120)
- High-performance Eye, Jitter and Physical Layer Measurements help quickly resolve difficult quality and reliability problems
- Passive loop-through inputs allow for transparent monitoring at any point of the signal path
- Exceptional Audio Monitoring, with options for Analog, Digital and Dolby audio formats reduce time and effort in verifying multi-channel audio content
- Instrument Presets for Quick Recall of Commonly Used Configurations
- Digital Cursors for Precise Time, and Amplitude monitoring
- Closed Caption (CC) decode and display capability helps operators quickly verify and correct CC errors

- Standard and User-definable Safe Area Graticules Facilitate Editing tasks and reduce the need for format conversions
- VANC Dolby Metadata Display
- CEA 708 & CEA 608 Closed Caption decoding
- Teletext Subtitle decoding
- Measure audio loudness and true peak of combination of discrete audio channels as well as Dolby Digital, Dolby Digital Plus, and Dolby E audio program as per ITU-R BS.1770-2 / 1771, EBU R 128 and ATSC A/85 recommendations
- Infinite and short term loudness measurements using techniques as per ITU-R BS.1770-1 specifications and display both values simultaneously (user-selectable integration time in increment of seconds will be available for short term measurement)
- Simultaneously display Dialnorm value from Dolby Metadata and the measured loudness value on the same display
- Loudness meter on the audio level meter/bar display with loudness measurement value in LKFS per ITU-R BS.1770-2 / 1771.
- Loudness Trend Chart with adjustable display window
- Decode and monitor Dolby Digital Plus audio

For further details visit:
www.tektronix.com/wvr6000_7000

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

WVR7200 Multi-format, Multi-standard Compact Rasterizer

The monitoring and measurement capabilities of the WVR7200 provide a comprehensive suite of options and configurations to suit a variety of applications. For monitoring applications Tektronix-patented gamut displays simplify color adjustments for camera balancing and color correction applications. Get information about the signal at a glance from the audio session and video session displays that assist in ensuring quality control of the image.

Applications

- Post-production Edit Suite and Color Correction Monitoring
- Quality Control in Content Production and Post-production
- Monitoring and Compliance Checking in Content Distribution and Broadcast transmission
- Equipment/System Qualification and Troubleshooting for Installation and Maintenance of Content Creation and Distribution Facilities
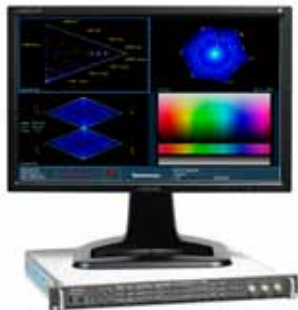
Features and Benefits

- Simultaneous monitoring of 2 HD/SD-SDI inputs or 1 HD/SD-SDI input and 1 CPS input. Option 3G is required for 3G-SDI format support (Opt. SIM)
- Auto-detection of HD/SD-SDI and multiple Dual Link video formats
- Composite analog (PAL/NTSC) video support (Opt. CPS)

- Multiple Input Mode allows monitoring of 2 to 4 SDI inputs simultaneously (4-input mode requires Opt. 2SDI)
- Upgradeable to 3G-SDI (Level A and Level B) format support (Opt. 3G)
- Comprehensive Audio Monitoring
- Stereoscopic 3D Video Displays for Camera Alignment and Production/Post-production Applications (Opt. S3D)
- Black Picture and Tektronix-patented Frozen Picture Detection
- Advanced ANC Data Monitoring including In-depth Digital Data Analysis (Opt. DAT)
- Standard and User-definable Safe Area Graticules Facilitate Editing and Format Conversion Tasks, Reducing the Need for Reworks
- Active Format Description (AFD) Detection, Decode, and Automatically Adjusted Graticule in Picture Display enable Easy Identification of Aspect-ratio Related Issues
- Superior Physical Layer Signal Measurement including high-performance real-time eye pattern display, jitter measurements, and patented cable length measurement (Opt. PHY3)
- Most comprehensive eye pattern measurements including eye amplitude, rise/fall time, and overshoot/undershoot measurements as well as Tektronix jitter waveform display (Opt. PHY3)

For further details visit:
www.tektronix.com/wvr7200

WVR8300/WVR8200 Advanced Analog/ SD/ HD/3G-SDI Waveform Rasterizer

The WVR8300 features the complete range of options of the product family and comes standard with HD/SD-SDI and Dual Link video formats support. It provides high-performance monitoring and measurement for applications for a wide range of formats from Composite Analog to SD-SDI, HD-SDI, Dual Link video formats, and 3G-SDI video signals. 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.

The measurement and monitoring capabilities of the WVR8300 provide precision capabilities such as Physical Layer Measurements, Digital Data Analysis (including ANC Data Inspector), A/V Delay Measurement, and in-depth Simultaneous Input Monitoring which makes Tektronix the brand of choice for applications that require deep signal and content analysis with unquestionable accuracy.

The WVR8200 provides an ideal solution for advanced monitoring of analog, digital, high frame-rate digital video, and multiple audio formats. This flexible solution comes standard with HD/SD-SDI and Dual Link video monitoring and can be equipped with options and upgrades to monitor 3G-SDI and/or composite analog video. The WVR8200 is an intelligent choice that prepares you for format transitions and growing monitoring needs. Available audio options include support for analog, digital AES/EBU, digital embedded, Dolby Digital, Dolby Digital Plus, and Dolby E formats.

Applications

- Monitoring and Compliance Checking in Content Distribution and Broadcast
- Quality Control in Content Production and Post Production
- Equipment/System Qualification and Trouble-shooting for Installation and Maintenance of Content Creation and Distribution Facilities
- Research and Development of Professional Video Equipment
- Stereoscopic 3D Video Monitoring

Features & Benefits - WVR8300

- 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
- 4 SDI Input Monitoring – Option 2SDI 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
  - Measure audio loudness and true peak of combination of discrete audio channels as well as Dolby Digital, Dolby Digital Plus, and Dolby E audio program as per ITU-R BS.1770-2 / 1771, EBU R 128 and ATSC A/85 recommendations
  - 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
  - Automated Eye Pattern and Jitter Measurements - Option PHY
  - Color Bar and Pathological Signal Generation - Option PHY
  - Digital Data Analysis - Standard
  - ANC Data Inspector - Standard
  - Simultaneous Input Monitoring - Standard
  - Audio/Video Delay Measurement - Standard
- Stereoscopic 3D Video Monitoring - Standard
  - Difference Map Display
  - Red/Cyan Anaglyph Display
  - Green/Magenta Anaglyph Display
  - Checkerboard Display
  - Disparity Grid and Disparity Cursors
  - Quad Diamond Display

Features & Benefits - WVR8200

- 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
- 4 SDI Input Monitoring – Option 2SDI
- 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
  - Measure audio loudness and true peak of combination of discrete audio channels as well as Dolby Digital, Dolby Digital Plus, and Dolby E audio program as per ITU-R BS.1770-2 / 1771, EBU R 128 and ATSC A/85 recommendations
  - 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
  - Eye Pattern Display and Jitter Readouts - Option EYE
  - Digital Data Analysis – Option DAT
  - ANC Data Inspector – Option DAT
- Stereoscopic 3D Video Monitoring – Option 3D
  - Difference Map Display
  - Red/Cyan Anaglyph Display
  - Green/Magenta Anaglyph Display
  - Checkerboard Display
  - Disparity Grid and Disparity Cursors
  - Quad Diamond Display

For further details visit:
www.tektronix.com/wvr8000

1741C Analog Dual-Standard Waveform Monitor

The 1741C analog waveform monitor features user interface tools to simplify operations. Its precise displays provide high-quality monitoring for traditional analog composite (PAL and NTSC) or component systems. This instrument supports four analog composite signal inputs with waveform, vector, SCH, and picture functions. The input ports can also be used for RGB signals. For camera alignment, the user can display one, two, three, or four waveforms simultaneously and overlay just as many vector displays, thus facilitating monitoring of multiple cameras during content acquisition. Powerful tools such as timing display, VITC, or LTC decode, freeze capture, video session, alarm status, and error log allow for deeper signal inspection to enable superior video production and delivery quality.

Applications

- Camera Alignment and Analog Video Equipment Setup
- Compliance Checking in Distribution and Broadcast
- Content QA of Composite and Component Video in Production and Postproduction

Features & Benefits

- Four Passive Loop through Analog Composite Signal Inputs
- Waveform Display Supports Composite or Component Video for White and Black Balance and Level Checking
- Vector Display for Analog Composite Signal Allows System Setup to Specific Chroma Values
- SCH Display for Color Subcarrier-to-Horizontal Sync Timing and Color Framing Matching among Edit Sources
- Timing Display for Measuring Signal Timing between Each Input and the Reference
- Screen Capture for Pictures and Traces Facilitate Reference Setting, Troubleshooting, and Documentation Tasks
- Video Session, Alarm Status, and Error Logging for Quick Identification and Easier Correction of Problems
- XGA Display with Full-screen Picture Display and Picture Thumbnail for Easy Signal Source Verification

For further details visit:
www.tektronix.com/1741C

TG700 Signal Generator

Designed with the changing needs of the video industry in mind, the TG700 offers test signal generation for a wide array of digital and analog formats.

Applications

- Design verification and quality assurance for video equipment manufacturers
- Evaluation and acceptance testing for broadcast networks
- Calibration and maintenance
- Signal integrity analysis when combined with WFM series waveform monitors

Features and Benefits

- Modular platform provides system configuration flexibility. Choose up to 4 output modules.
- Supports SDI digital video formats from SD to HD and beyond. The HD3G7 module supports all 720 and 1080 line HD-SDI formats at 1.485 Mb/s per SMPTE 292, making the module a dual-rate SDI generator for both HD-SDI and 3G-SDI formats with the same functionality for HD-SDI formats and test signals as was previously available for 3G-SDI.
- The HDLG7 module supports all SMPTE 372M dual link formats, including Digital Cinema 2K formats with the XYZ color space.
- Analog test signal generation is supported for composite NTSC and PAL formats, and for SD/HD component GBR and YPbPr formats.
- A wide variety of test signals is available for each generator module, including color bars, ramps and staircases, flat fields, multiburst and frequency sweeps, and SDI stress patterns. Most modules support downloadable frame pictures, for arbitrary user-defined test patterns.
- An Ethernet interface allows you to download custom test signals and firmware updates. Remote control over the network via a command interface makes it easy to integrate the TG700 into test automation systems.
- User-defined ancillary data generation on the HD3G7 module can be used to test standards such as AFD and VPID.
- The HD3G7 module supports all 720 line formats for 3G-SDI from SMPTE 425, including 4:4:4 RGB/YCbCr formats of 3G Level A and 2x720p formats of 3G Level B
- The SDI7 module is a test signal generator that provides two independent channels of SD/HD/3G-SDI video test signal generation in a variety of formats with 2 outputs for test and test/black signal generation per channel (3G-SDI signal generation is optionally available).

For further details visit:
www.tektronix.com/tg700

TG700 SD/HD Sync Pulse Generator

The TG700 is a modular multi-format sync pulse and test signal generator, supporting all standard analog sync and serial digital video signals.

Applications

- Sync reference system for broadcast, production, and post-production facilities
- Master and slave configurations for fixed and mobile installations
- SD/HD/3G-SDI reference test signals for facility verification and equipment calibration

Features and Benefits

- Modular platform holds up to 4 modules – configure each system to match the needs of your facilities' architecture
- Synchronize to GPS-based timing. The GPS7 module has an integrated GPS receiver and uses an external off-the-shelf antenna to provide a stable, accurate system clock and a real-time source for LTC and VITC timecode outputs
- Slave systems utilize the Tektronix "Stay GenLock™" algorithm to ensure high stability. The AGL7 and GPS7 modules can genlock to a variety of black burst and HD tri-level formats. The GPS7 module can operate either as a master, locked to GPS timing, or as a slave, genlocked to another master, making it ideal for OB van applications that are configured differently for each production.
- Support for genlock to a 720p50 tri-level sync input signal

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- Schedule a recurring Daylight Savings Time (DST) adjustment, based on calendar rules.
- Timecode can be distributed by VITC on black burst outputs, multiple LTC outputs, and ATC on HD-SDI test signals. Individual outputs can generate accurate time-of-day timecode obtained from the GPS system, or elapsed program timecode under editor control.
- The ECO422D Changeover Unit can be used to configure a redundant SPG system using primary and backup TG700 units, for high-reliability applications.
- SD, HD, and 3G-SDI modules can be used to generate standard test signals such as color bars, SDI stress patterns, and digital black. Embedded audio tones can be added, including an AV Delay test sequence. ID text and logo image overlays can be added to the active picture.
- An Ethernet interface allows you to download test signals, full-frame pictures, station or network logos, and firmware updates. Configuration settings can be backed up, restored, and duplicated to another TG700.
- The SDI7 module is a test signal generator that provides two independent channels of SD/HD/3G-SDI video test signal generation in a variety of formats with 2 outputs for test and test/black signal generation per channel (3G-SDI signal generation is optionally available).

For further details visit:
www.tektronix.com/tg700

SPG300/600 SD Sync Pulse Generators

Cost effective Sync Pulse Generators for analog, digital and analog digital mixed facilities with "Stay GenLock™", a unique, robust genlock architecture that provides stable synchronization signals for digital and traditional broadcast facilities.

Applications

- Master sync/signal generators for standard definition post production and broadcast facilities
- SD-SDI reference test signals for facility verification and equipment calibration

Features and Benefits

- Choice of form factors; full rack width - SPG600, or half rack width - SPG300
- Stay GenLock™ – Unique, robust Genlock mode for analog or digital production facilities
- All signal output channels are configurable with black burst or test signal outputs
- SNMP and Web-based remote control for easy integration into any operational environment
- ECO422D Automatic Changeover unit for fully redundant sync system design

For further details visit:
www.tektronix.com/spg300_600

Picture Quality Analyzers

Based on the concepts of the human vision system, the PQA600 and new PQASW Picture Quality Analysis PC software provide a suite of repeatable, objective quality measurements that closely correspond with subjective human visual assessment.

These measurements provide valuable information to engineers working to optimize video compression and recovery, and maintaining a level of common carrier and distribution transmission service to clients and viewers. The PQA600 and PQASW share some common functions - please refer to the Selection Guide.

Applications

- Codec and Transcoder Design, Optimization and Verification
- Conformance Testing, Transmission Equipment and System Evaluation
- Digital Video Mastering
- Video Compression Services
- Digital Consumer Product Development and Manufacturing

Features and Benefits

- Fast, Accurate, Repeatable, and Objective Picture Quality Measurement
- Predicts DMOS (Differential Mean Opinion Score) Measurement Based on Human Vision System Model
- Picture Quality Measurements Can be Made on a Variety of HD Video Formats (1080i, 720p) and
- SD Video Formats (525 or 625)
- Makes Picture Quality Comparison across Different Resolutions from HD to SD, or HD/SD to CIF
- User-Configurable Viewing Condition and Display Models for Reference and Comparison

- Attention/Artifact Weighted Measurement
- Automatic Temporal and Spatial Alignment
- Region Of Interest (ROI) on Measurement Execution and Review
- Easy Regression Testing and Automation using XML Scripting with "Export/Import" File from GUI
- Multiple Results View Options
- Pre-Installed Sample Reference and Test Sequences
- Optional SD/HD SDI Interface for Generating and Capturing Video Sequences, including Simultaneous Video Generation and Capture of up to 2 SDI Signals
- SD/HD SDI Interface Includes Instant Output Channel Swapping for Easier Subjective Evaluation
- User-configurable Viewing Condition and Display Models for Reference and Comparison (Option ADV)
- Attention/Artifact Weighted Measurement (Option ADV)
- Region Of Interest (ROI) on Measurement Execution and Review
- Easy Regression Testing and Automation using XML Scripting (Option ADV) with "Export/Import" File from GUI
- IP Interface with Simultaneous Generation/ Capture and 2-Ch Capture (Option IP)
- Embedded Sample Reference and Test Sequences

For further details visit:
www.tektronix.com/pqa600

PQA Analysis Selection Guide		
	PQASW	PQA600
PSNR, PQR, DMOS Preconfigured Measurements	Yes	Yes
Multi-resolution/ Frame-rate Support	Yes	Yes
Multi-results View Options	Yes	Yes
Embedded Reference Decoder	Yes	Yes
Automatic Temporal and Spatial Alignment	Yes	Yes
IP Generation/Capture	Opt. IP	Yes
User-configurable Measurements	Opt. ADV	Yes
Attention/Artifact Weighted Measurements	Opt. ADV	Yes
Script Execution (Batch processing)	Opt. ADV	Yes
Multiple Simultaneous Application Executions	Opt. ADV	Yes
SD/HD SDI Generation and Capture	No	Opt. SDI
Cross Video Interface	No	Opt. SDI
Code Optimization Designated to the Platform	No	Yes

MTS4000 MPEG Test System

Targeting a range of design, validation and test, field diagnostics and troubleshooting applications, the MTS4000 MPEG Test System offers unparalleled analysis to examine the video and audio quality of IP and RF Video services. Cross layer and cross domain analysis of the video and audio quality is possible through an extensive software suite that includes real-time video and audio QoE analysis, human vision model based picture quality analysis, and advanced Elementary Stream Analysis. Network interface options include 1G IP, 10G IP, ATSC 8-VSB, DVB-C, DVB-S2, and a Quad port ASI interface.

Applications

- Complex Timing Problems in Video over IP and IPTV Network equipment
- Flexible Test Stream Creation and Modification
- Confirm Functionality and Compliance to Standards
- Set-top Box Buffer Testing and Verification
- Codec Design and Optimization
- Device Design Optimization and Fault Diagnosis
- Broadcast System Troubleshooting at any Point in the Network
- Isolation of Intermittent Network Problems that other Analyzers would not be Capable of Isolating
- Distinguish between Impairments Resulting from Network Distribution versus Artifacts Resulting from Compression
- Evaluating Different Vendors' Compression Equipment and Diagnosing Faults

MPEG Analyzer Selection Guide			
Capability	MTS4000	IPM400A	MTS4SA
TS Player and Recorder	■		Option
Real Time TS Analyzer with Triggering Recording	■	■	Option
Real Time Video over IP	■	■	Option
Real Time Video over NIC: Generation	■		Option
Deferred Time Analyzer	■		Option
Transport Stream Editing including Multiplexer, TS Editor, DVB Carousel Generator, and Tclips Test Streams	Option		Option
Electrical Interface Output: ASI	Option (up to 4)		
Electrical Interface Input: ASI Monitor	2	1	
Electrical Interface Input/Output: 1000BaseT NIC RJ-45	■	■	■
IP Interfaces Input: IPTV GigE interface	Option	■	
IP Interfaces Input/Output: IPTV 10GigE	Option		
RF Interfaces Input: 8VSB or QAM-B	Option		
RF Interface Input: DVB-S/S2 Interface supporting QPSK, 8PSK, 16APSK and 32APSK Demodulation	Option		
PES & T-STD Buffer Analyzer	Option		Option
DVB Carousel Analyzer	■		Option
DVB Carousel Generator	Option		Option
MTS4EAB ES Analyzer	Option		Option
MTS4CC ES Analyzer	Option		Option
MPEG-2 ES Analyzer (includes AC-3 and 608/708 Closed Captioning and DVB Subtitles)	Option		Option
Picture Quality Analysis Software, Single and Double Ended. Includes PQASW with IP option	Option		
Video and Audio QoE software, Single Ended. Includes VQS1000 with all options	Option	Option	
See Page	16	17	19

Features and Benefits

- Industry's Fastest Analysis Engine enables Reduced Time to Insight, Rapid Development, Evaluation, Deployment, and Diagnostics of Next-generation DTV and IPTV Systems and Services
- A Wide Range of DTV Standards are Supported, including MPEG, DVB, ATSC, ISDB, and ISDB-TB (Brazil). Specific SI for Terrestrial, Cable, and Satellite, plus Regional Variations of these Standards are also Supported
- Range of Interfaces and Analysis Capabilities provide the Necessary Connectivity to Diagnose Problems Anywhere in the Network
- Environment, whether that be Transmission Links (RF or IP Layer) or Content Processing (TS Layer)
- Connect to both IP Version 4 and 6 Networks, including those using IGMP and MLD Multicast Protocols Respectively
- Analyze both Constant and Variable Bit Rate Streams (CBR and VBR)

- Integrated Cross-layer Fault Analysis and Logging provides One-box Solution for Fault Diagnosis, Reducing Time to Insight when Troubleshooting
- Playout Functionality provides Stimulus with Parametric Capabilities and IP Multisession Replication to Characterize Behavior of Network or Device Under Test
- CaptureVu™ Technology Captures and Analyzes System Events in Real Time and Deferred Time to Debug the Intermittent and Complex Problems that Traditional Analyzers Miss
- H.264 Buffer Analysis, Multiplexing, and ES Compliance Checking provide the Most Powerful Suite of Tools for Creation and Analysis of Transport Streams containing H.264 Content
- Video and Audio Quality Analysis that Helps Distinguish between Impairments Resulting from Network Distribution versus Artifacts Resulting from Compression

For further details visit:
www.tek.com/datasheet/mpeg-test-systems-0
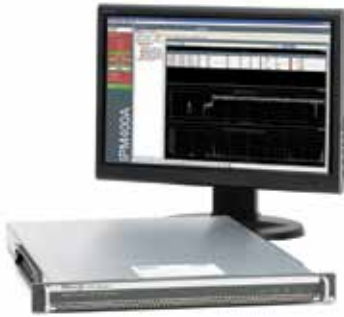
IPM400A IP Video Remote Analyzer

The IPM400A helps video network operators efficiently deliver superior quality of service (QoS) levels by providing an intuitive and simplified representation of video quality and diagnostic information. Simultaneously verify IP and TS integrity on all IP Video sessions on a GbE link, for monitoring networks which carry either single program, or multi-program transport streams.

Applications

- Diagnostic monitoring of IP Video contribution and primary distribution (Cable head-end monitoring, Terrestrial distribution and DTH or network operator satellite uplink monitoring)
- IPTV ingest and head-end monitoring

Features and Benefits

- Ensure IP and TS integrity for all services on a GbE link by monitoring up to 500 IP sessions including all essential parameters, such as continuity count, sync byte, and packet inter-arrival time (PIT).
- Analyze program utilization over time to determine if overwhelmed routers are dropping packets
- In-depth analysis of transport stream, syntax, timing and content to support root-cause analysis of system errors with comprehensive TR 101 290 Priority 1, 2 & 3 MPEG measurements
- Filter and display only errors that require immediate attention from the SCTE-142 five distinct levels of importance
- Analyze and diagnose "splice" advertising and other local content from SCTE 35 DPI monitoring
- Feed back actual content to a central monitoring point to see and hear the actual content being broadcast with the Video/Audio backhaul
- Use the QoE Dashboard to detect Video impairments and artifacts like Stuck Frame, Black Frame, Blockiness, as well as Visible Compression Artifacts.
- Provide early visibility of problems to predetermined, key individuals, supporting quicker corrective action with the simultaneous connection of multiple remote users and network management systems (NMS)

For further details visit:
www.tektronix.com/ipm400a

MTX100B MPEG Recorder and Player

The MTX100B MPEG Recorder and Player reduces product development expense and time-to-market by offering a flexible, portable, player and recorder for quick design verification, standards compliance and determination of operating margins. The new real time/deferred time transport stream analyses, together with the IP generation, bring the power of lab evaluation to the field in a small, portable package.

Applications

- IRD/STB design and manufacturing test
- Evaluation of professional MPEG and MPEG/IP equipment
- Performance verification of MPEG and MPEG/IP systems
- Portable, field analysis tool for system installation, commissioning and debug of
- MPEG and MPEG/IP transmission systems
- Combine with the MTM400A for triggered recording of live streams up to 100 GB.

Features and Benefits

- High capacity storage and high data rate recording and playout of MPEG transport streams lets you build, maintain and use your own local library of test streams
- A Tclips test stream library is provided which includes over 300 video and 50 audio test Transport Streams. Encoded as H.264 and MPEG-2, HD and SD, these streams provide a source of reference material that can be used to test decoders in video equipment. Combined with the Multiplexer option, reference test streams can be created and manipulated to include DVB and ATSC Service Information.
- Add option MX to create deferred time multiplexed Transport Streams for generating known good test streams or streams with known repeatable errors for compliance and stress testing
- Real-time updating of timestamps and time tables for error-free looping
- PCR jitter insertion to help you fully stress your product or system design
- New IP layer packet jitter and packet error insertion combined with continuous time stamping for seamless looping provide a repeatable source of errored and non-errored IP streams to stress test network or consumer equipment
- ASI, SMPTE310M and Ethernet/IP interface options
- Add software options to provide TS analysis, PES and buffer analysis, elementary stream analysis, and data broadcast analysis and generation

For further details visit:
www.tektronix.com/mtx100b

RTX100B ISDB-T and ISDB-Tb RF Signal Generator

The RTX100B ISDB-TbRF Signal Generator offers a flexible, affordable solution for design evaluation and conformance testing of digital video products conforming to the Integrated Service Digital Broadcasting- Terrestrial (ISDB-T and ISDB-Tb) standard for digital terrestrial TV systems. The RTX100B provides the capability to record and play out MPEG-2 transport streams, and modulate the up converted RF signal.

Applications

- ISDB-T and ISDB-Tb consumer receiver design and manufacturing test
- Evaluation of professional ISDB-T and ISDB-Tb equipment
- Performance verification of ISDB-T and ISDB-Tb systems
- Simulation of digital terrestrial broadcasting transmission
- Scheduling of stream playout and recording for broadcast and production line applications

Features and Benefits

- Rapid setup using automatic detection of parameters from the broadcast stream, to modulate the RF output accordingly
- The RTX100B can be used as a simple ISDB-Tb modulator as it can modulate the stream from ASI directly without the need to store the stream

  Real-time Updating of Timestamps, Time Tables, and ISDB-Tb Reed Solomon FEC for Error-free Looping
- IEEE1394b, USB2.0, and GbE interface download of Transport Streams for optimum flexibility in storing and managing Transport Stream Libraries
- IP layer packet jitter and packet error insertion combined with continuous time stamping for seamless looping provide a repeatable source of errored and non-errored IP streams to stress test network or consumer equipment
- Create deferred time multiplexed Transport Streams for generating known good test streams or streams with known repeatable errors for compliance and stress testing
- Add software options to provide TS analysis, PES and buffer analysis, elementary stream analysis, and data broadcast analysis and generation
- The Test Stream Library includes over 300 video and 50 audio test Transport Streams. Encoded as H.264 and MPEG-2, HD and SD, these streams provide a source of reference material that can be used to test decoders in video equipment. Combined with the Multiplexer option, reference test streams can be created and manipulated to include DVB and ATSC Service Information.

For further details visit:
www.tektronix.com/rtx100b

MPEG Software Selection Guide				
Capability	MTS4SA	MTS4EAB	VQS1000	PQASW
TS Analysis	■			
Formats: MPEG-2 & H.264	■	■	■	■
Quality assessment method		Single or Double stimulus	Single stimulus	Double stimulus
Video syntax testing		■		
Audio syntax testing		■		
Audio level/loudness testing			Option	
Real Time Video Analysis (IP input)	■		■	
Deferred Time Analysis	■	■	■	■
Video artifact testing			■	■
Triggered stream capture	■		■	
Video Bandwidth testing	■		■	
IP Generation/Capture	■			■
PSNR measurements		■		■
PQR and DMOS measurements				■
See Page	19	20	21	15

MTS4SA PC based MPEG Analysis

The MTS4SA can be purchased as a bundle or as individual software tools to run on stand alone PCs running Microsoft Windows. This provides a flexible and cost-effective way to purchase only those tools required for the job. These tools operate on file-based streams. A real-time version of the Transport Stream analyzer (TSCA) is also available for analyzing streams received through the PC's Ethernet (IP) interface.

Applications

Equipment Manufacturers - Research & Development

- Multiplexer/Re-Multiplexer allows test stream creation and modification for transmissions not yet on-air. Create custom streams for Set Top Box and Multiplexer testing offline.
- In-depth analysis of selected elements of transport streams to confirm functionality and compliance to standards
- Set Top Box buffer testing and verification
- Codec design and optimization

Broadcasters and Network Operators

- Encoder and other equipment fault diagnosis and evaluation
- Analysis of transport streams to confirm correct system operation and isolate faults during installation and commissioning

Summary of MTS4SA Options

Transport Stream Compliance Analyzer (TSCA)
The TSCA enables monitoring and interpretation of the contents of real-time or previously recorded or synthesized transport streams using the latest ATSC, DVB, ISDB-S, ISDB-T, ISDB-Tb and MPEG standards. The analyzer is optimized to quickly locate and identify problems within a transport stream with minimum intervention. The TSCR is a real-time version of the TSCA analyzer operating on Transport Streams received through the PC's Ethernet port. The real-time analysis also includes Cross Layer time-correlated IP and TS measurements, alarms and error logging together with stream recording. A batch mode operation allows for inclusion in an automated test system.

Multiplexer
Use the Multiplexer/Re-multiplexer/De-multiplexer application to create and modify multi-program Transport Streams with custom SI/PSI/PSIP information for DVB, ATSC, ISDB, and MPEG compliant Transport Streams. Video and audio Elementary Streams may also be multiplexed into a Transport Stream.

T-STD Buffer Analyzer
Determines adherence to the buffer model used by the receiver which is signaled within the Elementary Stream itself. The T-STD method is based upon the DTS values within the PES header and can be used for any contained CODEC type. Additionally, certain video CODECs such as MPEG-2 and H.264/AVC may signal buffer parameters within the ES. The Buffer Analyzer verifies conformance of a stream to the T-STD model. (Refer to the MTS4EA for verification of the H.264/AVC HRD method).

Packetized Elementary Stream (PES) Analyzer
The PES Analyzer analyzes the header associated with each PES packet, as it contains the decode and presentation timestamps (DTS and PTS) for the contained Elementary Stream. Additionally it can verify conformance of the PES header contents to the MPEG, DVB and ATSC standards.

MPEG-2 Elementary Stream (ES) Analyzer
Analyzes and views the moving picture from within a PES stream and carry out a whole range of sophisticated tests on the lower layers of an elementary stream within a Transport Stream. In addition, it both analyses and displays a range of extended media formats, including ATSC Closed Captions, DVB Subtitles and Teletext associated with video Elementary Streams.
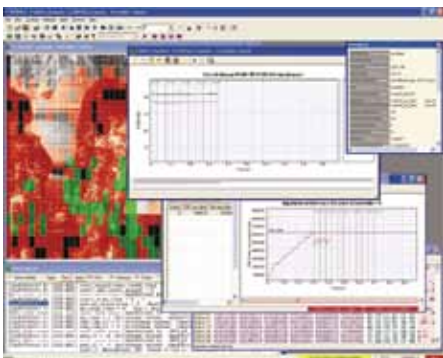
Carousel Analyzer
Analyses carousels compliant with MPEG-2 DSM-CC, DVB (including MHP), DTT (MHEG-5) or ARIB standards.

Carousel Generator
Creates object carousel contents within an output Transport Stream conforming to the MPEG-2, DVB, DTT (MHEG-5) or MHP standards.

For further details visit:
www.tek.com/datasheet/mpeg-test-systems-1

MTS4EAB Next Generation Compressed Video Elementary Stream Analyzer

MTS4EAB Elementary Stream Analyzer is a powerful PC-based software package for the deferred time analysis of encoded audio and video elementary streams. Supported video standards include H.264/AVC, VC-1, MPEG-2 , MPEG-4 part 2 and H.263. Supported audio standards include MPEG-2 audio, AAC and AC-3.

Applications

Equipment Manufacturers

- Semiconductor device designers & manufacturers
- Video codec software and hardware developers
- STB, PVR, DVD consumer electronics developers for cable, satellite, terrestrial, and IP
- Video conferencing & communications equipment developers
- Mobile video infrastructure and handset developers

Video Content Delivery

- CODEC and equipment evaluation and comparison in cable, satellite, terrestrial, and Video over IP applications

Features and Benefits

- Next Generation (VC-1, H.264/AVC, MPEG-4 & 3GPP) and Legacy (MPEG-2, H.261, H.263) CODEC support
- Frame-by-Frame and Block-by- Block analysis to allow easy CODEC comparison

- Easy-to-Interpret Detailed Graphical Displays (requires user installed Microsoft Excel)
- Comprehensive semantic trace file output to determine Block-by- Block encoder decision making
- Real-time and non real-time decoding and analysis of compressed video streams (dependent on PC performance)
- Elementary Stream Editing
- Extraction of Elementary Stream from Transport Stream
- Batch mode operation allows for inclusion in an automated test system.
- The AV Delay Measurement Option can be used to analyze, measure and characterize the delay or lead between audio and video in the encoded stream and report it to the user graphically to an accuracy of 1 mS
- The Audio Analysis Option checks for compliance to the standards and quickly provides full analysis of all aspects of the performance of the compression used
- H.264/AVC Intra profiles, High10, High422, High444 and CALVC at Levels 1 to 5.1
- H.264/AVC Scalable Video Coding (SVC) extensions - Baseline, High and High Intra Profiles at Levels 1 to 5.1

MTS4CC Compliance Checker

MTS4CC is a PC-based software package capable of displaying and analyzing encoded audio and video streams for the VC-1, H.264/AVC, MPEG-4, MPEG-2, and H.263 video compression standards. The MTS4CC is intended as a more cost-effective solution for those customers who do not require the advanced diagnostic capabilities of the MTS4EA ES Analyzer.

**For further details visit:
www.tek.com/datasheet/mts4eab-elementary-stream-analyzer**

VQS1000 Video Quality Software

The Video Quality Software is for single ended QoE analysis of video and audio content. It is used with Tektronix IP & RF Video monitoring probes to stream back live video, or with MPEG Analyzers for time deferred analysis of captured video files.
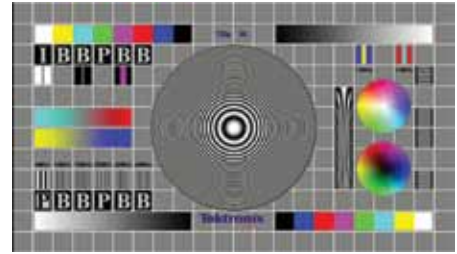
Applications

- Affordable QoE Monitoring - live monitoring.
- Network performance optimization - in service tuning of network.
- Network diagnostics - in service troubleshooting.

Features and Benefits

- Reliable and sophisticated analysis algorithms applied to decoded MPEG 2 or H.264 video to identify stuck, black, macro-blocking and blocky compression artifacts. This enables operators to distinguish between impairments resulting from network distribution versus artifacts resulting from over-compression.
- Industry First unique visualization tool with innovative impairment displays highlights the location and severity of video defects enabling engineers to clearly see and validate the presence of impairments on the image.
- User defined graticule area of visual interest to exclude unwanted areas of the screen, such as news tickers, so as to focus QoE analysis on area of the frame that will be of highest interest to the human eye.
- Measurements on the fully decoded live or file-based video gives reliable, objective impairment and artifact detection while eliminating false alarms.
- Triggered capture with pre-trigger buffer enables archive of impairments or offline video quality analysis to be performed.
- QoE measurements can be correlated to problems at the Transport Stream and IP or RF Transmission Layers at each location, and across the network,
- Can be used as stand alone PC analysis software for offline file analysis on Multi or Single Program Transport Streams.
- Analysis of decoded MPEG-2, AC-3, MPEG-2 AAC and MPEG-4 AAC audio in accordance with ITU-R BS.1770/1771 and ATSC A/85 allows operators to analyze audio loudness related problems
- Connect directly to an Ethernet switch using IGMP v3 support for analysis of multicast streams beyond the local router

For further details visit:
www.tek.com/datasheet/video-quality-analysis-software

Tclips

Tclips is a range of MPEG-2 Transport Streams designed to test receivers across a broad range of video and audio formats.

Applications

- Development and verification of receivers such as Set Top Boxes, Integrated Digital TVs (iDTV), and Personal Computers
- Use with the Multiplexer to produce a library of regression test streams

Features and Benefits

- Broad range of MPEG-2 transport streams designed to test receivers across a broad range of video and audio formats
- Contains compliant service information (SI) conforming to the MPEG, DVB, and ATSC standards
- Standard and high-definition video encoded with both MPEG-2 and H.264/AVC
- Broad range of video resolutions, aspect ratios, frame rates, profile and levels, and bit rates
  Test patterns for verifying luminance and chrominance amplitudes, chrominance phase, and frequency response
- MPEG-1 and AC-3 encoded audio content using stereo and 5.1 channels

For further details visit:
www.tektronix.com/tclips

Sentry QoS/QoE Monitoring Selection Guide				
	Sentry (ASI & GigE)	Sentry Verify	Sentry Assure	Sentry Edge
Comprehensive MPEG Quality of Service (QoS) Monitoring				
Transport Stream QoS Monitoring	■	■	■	■
IP statistics	■	■	■	
Closed captioning (708, 608, SCTE-20), DVB Subtitle, Teletext reporting	■	■	■	■
Error Seconds and Program Availability Reporting	■	■	■	■
GOP length reporting	■	■	■	■
Video and Audio PID metadata	■	■	■	■
Program/PID discontinuity	■	■	■	■
Program/PID/Transport Stream/Program Group bandwidth graphing	■	■	■	■
PCR interval & jitter	■ ASI Only			
MPEG-PSI, DVB-SI, ATSC-PSIP table detect, bit rate, cycle time	■	■	■	■
TR 101 290 (priority 1, 2, 3) reporting	■	■	■	■
Scalable RF Monitoring (64/256QAM / 8VSB)				■
Comprehensive MPEG Quality of Experience (QoE) Monitoring				
Video QoE real time monitoring	■			Option
Video eMOS/PVQ real time monitoring	Option			Option
Audio QoE real-time monitoring	■			Option
Audio loudness & AC-3 Dialnorm (ITU-R BS.1770) monitoring	■		■	■
Video freeze detection	■			Option
Audio silence detection	■			Option
Software Options				
QoE Monitoring	■			Option
Carousel monitoring (tru2way / OCAP/MHP / DSM-CC)	Option	Option	Option	Option
Ad Insertion/Digital Program Insertion	Option	Option	■	Option
EBIF Monitoring	Option	Option	Option	Option
SA-BFS Monitoring	Option	Option	Option	Option
Perceptual Video Quality (eMOS) on MPEG-2 & H.264	Option			Option
Audio Loudness Monitoring (includes CALM Compliance)	■		■	Option
Video & Audio				
Video: HD, SD, MPEG-2, MPEG-4 AVC (H.264), VC1	■	■	■	■
Audio: Dolby AC-3, MPEG-1 Layer II, AAC, HE-AAC, and HE-AAC v2	■	■	■	■
Interfaces				
ASI	■			
GigE	■	■	■	
8VSB & QAM-B				■
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Sentry

Sentry is a comprehensive and scalable monitoring solution that enables multichannel service providers to deliver services with optimum quality and to reduce operational expenditures.

Sentry automatically & continuously evaluates all video programs in real time, and provides alerts on hundreds of SD/HD programs simultaneously. Monitoring up to 250 Transport Streams at full line rate provides more monitoring bandwidth in the same chassis, especially for SPTS monitoring. Sentry identifies anomalies in the network at the IP and MPEG layers, as well as in quality of experience (QoE), identifying issues including frozen video, tiling/ macro-blocking, black screen and audio disruptions or audio level issues, which represent the bulk of trouble calls from subscribers. Sentry's multi- threshold-based alerting capability enables a flexible alert configuration from subscribers. In addition, Sentry includes a video artifact detection capability. This makes Sentry the only solution that detects video and audio errors in MPEG-2 and H.264 digital programs while generating metrics that correlate to Mean Opinion Scores (MOS). Sentry uses this approach for alerting, because it is effective in detecting problems in their developing stages before a subscribers experience is impacted. This capability, combined with detailed root-cause troubleshooting information appended in the actual alert, allows engineers to resolve problems quickly and often before subscribers experience any quality deterioration or outage.

Applications

- Audio and Video Quality of Experience Scoring System
- IP Network Impairment Analysis
- Alert Filtering and Resolution Tracking
- Carousel Monitoring (SA-BFS, DSM-CC, tru2way
- Digital Program Insertion Monitoring
- EBIF Monitoring
- Program Statistics and Availability Reporting

Features and Benefits

- Audio and Video Quality of Experience Scoring (1 to 100) with reason codes for quality degradations. Scores QoE independently from transmission errors to avoid missing events or false alarming
- Audio Silence and Audio Level Issue Detection (supports ITU-R BS.1770)
- Detect Black Video, Frozen Video, Tiling / Macro-blocking
- Detect artefacts due to over compression with Perceptual Video Quality (eMOS) monitoring on MPEG-2 Elementary Streams
- HD/SD programs, SPTS or MPTS, multicast (IGMP v3) & unicast
- MPEG-PSI, DVB-SI, ATSC-PSIP table support
- GOP length reporting (avg, min, max)
- Error Second and Program Availability Reporting
- Triggered Alert Stream Capture
- 60-day historical graphing with real time alerting capability
- Transport Stream Bandwidth Graphing
- Program Group Bandwidth Graphing
- IP Network Impairment Analysis
- Alert Filtering and Resolution Tracking
- Carousel Monitoring (SABFS, DSM-CC, tru2way™)
- Digital Program Insertion SCTE-35 (local ads)
- Software Add-Ons for Ad Insertion (DPI), tru2way™, EBIF Monitoring, SA-BFS Monitoring, Carousels (MHP / DSM-CC)
- TR 101 290 (priority 1,2,3) reporting
- Compliant with RTP network protocols

Specifications

- Video: MPEG-2, MPEG-4 AVC (H.264), VC-1
- Audio: Dolby AC-3 (5.1 Surround), MPEG audio, AAC, HE-AAC, HE-AAC v2
- Carousels: tru2way™ (OCAP), SA-BFS, MHP / DSM-CC
- Interfaces: GigE (1000BASE-T Ethernet) and ASI
- Browser support: Firefox, Safari, and IE

For further details visit:
www.tektronix.com/sentry

Sentry Verify

Sentry Verify™ enables video service providers to accurately determine the health of the MPEG/IP transport network. Sentry Verify provides alerts and generates useful reports in the same fashion as our flagship product, Sentry Verify detects subscriber impacting events during MPEG-over-IP transport and offers a historical database to assist with troubleshooting and trending analyses. Sentry Verify also offers a multiple alert trigger capture capability to quickly identify and visualize issues as they arise.

Sentry Verify is specially designed for operational staff and is a cost-effective solution for large-scale deployments to hub sites and other remote locations. It provides necessary, accurate and timely information to assist in the identification of faults within the IP network and has been integrated with industry leading management solutions to accelerate troubleshooting and root cause analysis.

Sentry Verify is part of the S2E (Source-to-Edge) monitoring solution, which provides the most comprehensive, 24/7 real-time monitoring system with a 60-day historical database, executive reports and trending analysis capabilities. It can be easily integrated with Medius to provide a seamless monitoring package.

Applications
- Monitor and validate MPEG transport stream quality at hub sites

Features and Benefits
- QoS Monitoring
- HD/SD programs, SPTS or MPTS, multicast (IGMP v3) & unicast
- MPEG-PSI, DVB-SI, ATSC-PSIP table support
- Historical Reporting and Graphing
- Triggered Alert Stream Capture
- Real-time Detection and Alerting
- Transport Stream Bandwidth Graphing
- Program Group Bandwidth Graphing
- IP Video Network Impairment Analysis
- Alert Filtering and Resolution Tracking
- Software Add-Ons for Ad Insertion (DPI)

Specifications
- Video: MPEG-2, MPEG-4 AVC (H.264), VC-1
- Audio: Dolby AC-3 (5.1 Surround), MPEG audio, AAC, HE-AAC, HE-AAC v2
- Interfaces: GigE (1000BASE-T Ethernet)
- Browser support: Firefox, Safari, and IE

For further details visit:
www.tektronix.com/sentryverify

Sentry Assure

Sentry Assure offers Sentry Verify functionality with Digital Program Insertion (DPI) monitoring and Audio Loudness Monitoring (ALM) options included in the base product and serves as a last line of defense before modulation and encryption.

Sentry Assure is cost effective and future proofed for large-scale post-splice monitoring deployments. It has been optimized to help cable television operators and other providers of multichannel video services comply with the Commercial Advertising Loudness Mitigation (CALM) Act, which requires that ads be no louder than the programs they accompany.
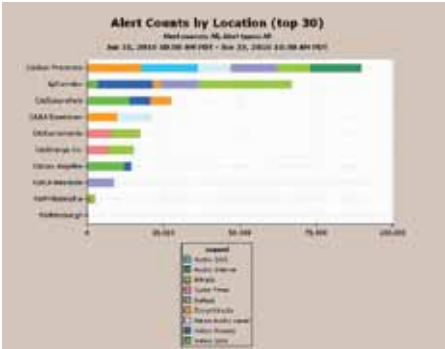
Applications
- Post-splice Monitoring
- QoS Monitoring
- Audio Loudness Monitoring
- Digital Program Insertion Monitoring
- EBIF Monitoring
- CALM Compliance Monitoring
- Regulatory Compliance Monitoring

Features and Benefits
- Digital Program Insertion Validation
- CALM Compliance Monitoring
- Regulatory Compliance Monitoring
- Detect MPEG and IP Issues
- Historical Reporting and Graphing
- Error Seconds and Program Availability Reporting
- Program Group Bandwidth Graphing
- Triggered Alert Stream Capture
- Real-time Detection and Alerting

For further details visit:
www.tek.com/datasheet/digital-content-monitors-9

Sentry Edge

Sentry Edge provides critical monitoring at the edge of your network, providing specific reporting and alerting capabilities for services in the RF domain. Sentry Edge detects transport stream and RF modulation errors. Transport stream errors are typically related to the bandwidth/bit rate, embedded data, applications or video and audio. The RF modulation errors include those related to the Signal-to-Noise Ratio (SNR) and signal strength.

Applications

- Scalable RF Monitoring (64/256QAM / 8VSB)
- Historical Reporting and Graphing
- Designed for Large Deployments
- Intelligent Tuning including RF parking
- Alert Filtering and Resolution Tracking
- Integration with Sentry, Sentry Verify, and Medius Units provides Comprehensive View of Network Health
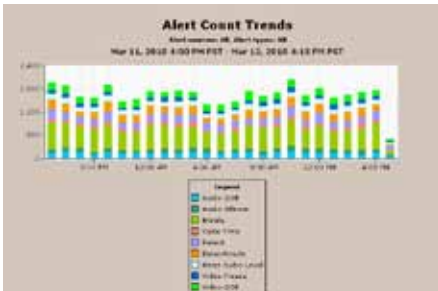- Dual Tuner Configuration to Monitor All RF Channels Efficiently

Features and Benefits

- Monitor Linear Broadcast Programs
- Be Alerted to RF and TS Errors
- Generate Historical and Trending Reports

**For further details visit:
www.tektronix.com/sentryedge**

Medius

Medius is ideal for Network Operation Centers (NOCs) and provides a single interface for consolidated status, alerts and reports from multiple Sentry and/or Sentry Verify, and Sentry Edge units across the network. Medius is designed to be flexible, so operators won't experience any limitations as their network evolves and grows. For example, Medius program grouping allows operators to group programs (e.g., logically by content provider or physically by location) from any or all connected Sentry, Sentry Verify and Sentry Edge units for alerting, problem isolation and trending analysis. The alert configuration on Medius allows you to apply alerts to multiple programs and get an aggregated status from Sentry, Sentry Verify and Sentry Edge units to rapidly drill down to specific problem areas.

Medius offers an advanced reporting package that is particularly helpful in capturing detailed QoE information that quickly highlights the top offending programs and/or locations. The reporting capabilities allow each user to generate customized reports that provide as much or as little detail as required, from monthly high level reports for executive staff to immediate notices for technicians as incidents occur.

Applications

- Consolidation of status, alerts and reports from multiple Sentry and/or Sentry Verify, and Sentry Edge units across the network.

Features and Benefits

- QoE Reporting
- Customizable Dashboard Display
- Centralized Alarm Reporting
- Historical Reporting and Graphing
- Alert Filtering and Resolution Tracking
- User-defined Reporting Template
- Ability to Upgrade Multiple Sentry Units
- Automated Report Generation and Email
- GigE (1000BASE-T Ethernet) interface

**For further details visit:
www.tektronix.com/medius**

Consul

Consul™ aggregates reports and trending data from multiple Medius units and offers video service providers an effective way of utilizing monitoring data in large-scale monitoring deployments. Consul can be used by service providers to gain a quick understanding of the quality of experience they are providing on a local, regional or national level. Key features of Consul include its ability to provide an understanding of the video quality degradation from location to location and identifying the top offending programs at each location.

Capturing detailed QoE (Quality of Experience) information is a function of Consul's advanced reporting package. The reporting capabilities allow each user (i.e., a national NOC/operation center) to generate customized reports that provide as much or as focused detail as required, from monthly high level reports for executive staff to immediate notices for technicians as incidents occur.

Users can create a schedule template so that reports can be generated automatically and emailed to designated recipients. Examples of the reports include alert counts by location, trending reports and distributions by alert type.

Applications

- Network Operation Center (NOC) based correlation and data management from Medius units located throughout the network.

Features and Benefits

- Supports multiple Medius Units
- Generates Alert analysis reports with roll-up data collected from multiple Medius
- Automatic report generation and email in PDF file format per user defined schedule
    GigE (1000BASE-T Ethernet) interface

For further details visit:
www.tektronix.com/consul

Sentry Support Services

World-Class Support When You Need It

Tektronix best practices, specialized competencies and industry-leading expertise ensure your success. Tektronix system architecture and integration teams help design and deploy your monitoring solution, train your staff, and reduce your exposure to failure risks. We are experts at integrating systems that incorporate multiple technologies and our goal is simple: deliver world-class monitoring without extending your resources.

Support Contract

A support contract from Tektronix provides you with all of the tools you need to make sure your monitoring deployment becomes more of a success for your organization over time. Support is provided to upgrade the core software with new features in intermediate releases. Tektronix field technicians are experts in all of the disciplines required to configure, test and operate our monitoring solutions in real-world settings. Our support team is thoroughly trained in the real-world performance characteristics of Tektronix equipment, as well as those of many other vendors, and offers extensive experience in digital networks.

Simply put, the level of support provided in a Tektronix support contract is unmatched by any other company.

Our standard agreement includes the following:

- Hardware warranty
- Software warranty
- Intermediate releases and enhancements
- Pre-deployment engineering support
- Installation
- Configuration of system
- On-site training
- Phone support
- Email support
- On-site support

Professional Services

Tektronix field technicians and engineering teams are experts in MPEG infrastructure, monitoring, NOC procedures and troubleshooting. Take advantage of our expertise when you are planning your next short-term or long-term project. Tektronix offers professional services for items such as, but not limited to, monitoring assessments, issue/problem resolution, tru2way™ or EBIF deployment and bandwidth management.

For further details visit:
www.tek.com/digital-content-monitor

MTM400A Transport Stream Monitor

The MTM400A Transport Stream Monitor is a scalable solution that detects Digital TV system degradation, and enables operators to easily perform diagnostics and rapidly pinpoint problems, ensuring an error-free network and minimal downtime.

FlexVuPlus™ is a browser enabled, user definable interface that is powerful, personal and enables improved productivity. Up to four panels can be displayed in the UI window and can be sized and repositioned based on operational needs. FlexVuPlus provides a user definable "button strip," "historical views," and "short-cuts" that intuitively guide a user to key areas of interest to accelerate video delivery fault root cause analysis. Thumbnail displays with performance indicators show overall program status in addition to video PID status.

Applications

- Terrestrial distribution
- Contribution and primary distribution
- Cable headend monitoring
- DTH or network operator satellite uplink monitoring
- Combine with the Opt. TSCL (DVB/ATSC/ARIB TS Compliance Analyzer Software) for off-line analysis of recorded TS files to 192 Mb

RF Monitoring Features and Benefits

- Monitor key measurements according to DVB standard with real-time monitoring of key TR 101 290 parameters
- Embedded real time operating system provides a high-reliability system for unattended 24x7 operation
- User-defined template monitoring option to ensure right content at the right place at the right time
- Confidence monitoring at the RF layer with optional QPSK, COFDM, Turbo 8PSK, and DVB-S2 interfaces
- RF diagnostic mode enables measurements on signals where lock cannot be achieved
- Critical RF Measurements, MER, and EVM provide early indication of signal degradation before any picture impairment is visible to the end customer, without additional costly RF test equipment

RF Video Selection Guide				
	MTM400A	**RFM300**	**RFM220**	**QAM400A**
Measurements				
Advanced RF measurements	■	■	■	■
MPEG Transport Stream Analysis	■	■		■
Video/Audio content checking for MPEG-2 and H.264/AVC	■	■		■
PSIP and EPG Analysis	■	■		■
Dual-level alarming and seven day trending	■	■	■	■
TR-101-290 tests and results	■	■		■
ATSC A/78 Monitoring modes	■	■		■
ISDB-Tb 204 Byte TS analysis	■			■
Interfaces				
DVB-S/S2	Option S2			
Turbo 8PSK/QPSK Interface	Option EP			
8VSB		■		
QAM A				Option QA
QAM B				Option QB2
QAM C				Option QC
ISDB-Tb			■	
DVB-T	Option CF			
ASI Input	■	■	■	■
ASI Output	■	■	■	■
Options				
Diagnostics*1	Option DIAG	Option DIAG		Option DIAG
Complementary Products				
DVB/ATSC/ARIB TS Compliance Analyzer Software (TS file size limited to 192 MB)	MTS4SA Opt. TSCL	MTS4SA Opt. TSCL		MTS4SA Opt. TSCL
QoE Analysis (using optional VQS1000)	■	■	■	■
VQNet Network Element Manager	■	■	■	
See page	27	28	28	29

Legend:

■ Included as standard
   Works with complementary product

*1 Deep-dive MPEG diagnostic analysis. Includes: Triggered recording capability up to 160 MB, Template testing (for user-defined service plan testing), In-depth PCR analysis with graphical result views, Bit rate testing functionality, Service logging, RF polling functionality

- Video and Audio backhaul for content checking and verification allows viewing transmitted content in the native, uncompressed format
- Use the QoE Dashboard to detect Video impairments and artifacts like Stuck Frame, Black Frame, Blockiness, as well as Visible Compression Artifacts.

By monitoring the quality of the broadcast video at any network access point, broadcasters and network operators can improve network performance and deliver superior quality of service to customers.

For further details visit:
www.tek.com/datasheet/digital-tv-monitor-0

RFM220 ISDB-T/Tb Measurement Demodulator

The RFM220 RF Channel Analyzer is ideally suited for ISBD-Tb broadcasters who manage Digital TV services and need tools to remotely monitor broadcast network QoS with capabilities to remotely diagnose network issues. With both RF and ASI inputs, the RFM220 can monitor a transmitter before and after modulation.

Applications

- RF performance monitoring of local and remote ISDB-Tb transmitter sites
- Off-air monitoring at local and national operation centers and headends

Features and Benefits

- Comprehensive ISDB-Tb RF measurement and monitoring capabilities including overall and separate MER per layer (one for HDTV, one for the 1-seg),
- TMCC information monitoring, and Channel Impulse Response display with SFN window measurements
- Constellation and Spectrum displays with shoulder measurements help to identify degradations in transmitter performance and efficiency before viewers are impacted
- High-performance tuner/demodulator with MER measurement performance to 36 dB typ. offers the flexibility needed for use in both transmitter monitoring and off-air ISDB-Tb broadcast applications
- Remote access to monitoring functionality with user-configurable alarm reporting, event logs, and 7-day trending enables remote notification and reporting to engineers and operators of transmission system problems
- Transport Stream output enables connection to MPEG TS monitoring products, offering a flexible and affordable monitoring solution to quickly identify and isolate problems in either the Transport Stream or the RF signal
- Transport Stream output enables connection to the VQS1000 Video Quality software, enabling real time analysis of the program QoE

For further details visit:
www.tek.com/datasheet/rfm220-isdb-tb-measurement-demodulator-0

RFM300 ATSC DTV Monitor

The RFM300 provides a complete solution for real-time DTV monitoring. The comprehensive RF and PSIP confidence-monitoring capability provides a powerful and cost-effective solution for monitoring DTV transmitter sites along with contribution and distribution feeds at local and national operation centers for FCC compliance.

Applications

- Monitoring DTV transmitter sites along with off-air monitoring, as well as contribution and distribution monitoring at local and national operation centers and head-ends

Features and Benefits

- Comprehensive confidence monitoring at the 8VSB modulated layer. This includes monitoring of the symbol distribution waterfall chart and MER, BER and SNR measurements for continuous monitoring of signal quality.
- PSIP analysis and repetition-rate graphing allows broadcasters to determine whether the system information is present and correct in the transport stream, ensuring FCC compliance
- Detect errors that impact viewer's video quality according to ATSC A/78, including Closed Captioning (CC) and Regional Ratings Table (RRT)
- Multilayer, multi-channel, remote monitoring and measurements at the RF, and MPEG transport stream layers, to ATSC A/65 standards
- Service logging supports verification of service-level agreements to ensure that all contractual obligations are met

- Unique dual-level alarming and seven-day trend information proactively identifies impending problems before they become visible to the viewer without additional costly RF test equipment
- Video and Audio backhaul for content checking and verification allows a broadcaster to view transmitted content in the native, uncompressed format
- Use the QoE Dashboard to detect Video impairments and artifacts like Stuck Frame, Black Frame, Blockiness, as well as Visible Compression Artifacts.
- Unique learning capability creates a true "monitor by exception" mode of operation. This reduces operational expenditure by eliminating non-customer-impacting alarms to focus resources only on critical activities.
- FlexVuPlus™ uniquely empowers operations staff with the simplest information necessary to prove their service is delivering above their defined thresholds for FCC compliance

For further details visit:
www.tektronix.com/rfm300

QAM400A QAM Video Monitor

The QAM400A QAM Digital TV Monitor is a scalable solution that detects system degradation, and enables operators to easily perform diagnostics and rapidly pinpoint problems, ensuring an error-free network and minimal downtime. FlexVuPlus™ is a browser enabled, user definable interface that is powerful, personal and enables improved productivity. Up to four panels can be displayed in the UI window and can be sized and repositioned based on operational needs. FlexVuPlus provides a user definable button strip, historical views, and short-cuts that intuitively guide a user to key areas of interest to accelerate video delivery fault root cause analysis.

Applications

- Monitoring digital video services at the output of the QAM modulator

Features and Benefits

- Verify RF and TS integrity on a QAM channel with the ability to tune to any QAM channel for verification and diagnostics
- Ideal for monitoring the output of headend SEM or EdgeQAM devices at the RF combiner, with support for both MPEG-2 and H.264 at either constant bit rate (CBR) or variable bit rate (VBR)
- In-depth, real-time MPEG analysis option allows diagnostics to be performed on live payload without always having to use labor-intensive deferred-time analysis of captured streams
- Filter and display only errors that require immediate attention from the SCTE-142 five distinct levels of importance.
- No additional analysis software is required - all confidence and diagnostic analysis can be carried out with the QAM400A

For further details visit:
www.tektronix.com/qam400a

VQNet Service Assurance Manager

The VQNet video service assurance manager is an Element Management System for Tektronix RF and IP Video probes to alert, locate and diagnose video network problems. It provides alarms, logs, trending and reporting of key performance metrics from a system of distributed probes. It identifies services impacted and enables engineers to drill down for rapid root-cause analysis of video service delivery issues.

Applications

- Network-wide diagnostics for video/network operations centers and head-end operations teams responsible for video delivery through their networks
- Cable, Telco, Terrestrial and Satellite video delivery networks required to maintain quality of service and ensure signal integrity, reducing subscriber dissatisfaction and protect subscriber and advertiser revenues

Features and Benefits

- Identify and resolve real-time video network errors with facility and network-wide views, and view thumbnails or backhaul video content from any probe within the network
- Identify the location and root cause of underlying systemic service delivery problems across a head-end network with statistical logging, report generation and trending analysis
- Provides an integrated network view of multiple network elements into Network Management Systems and to existing DataMiner Network Management Systems (including encoders, multiplexers, routers, STB's etc) enables
- Install, configure and maintain your own monitoring system with automatic discovery of probe availability, configuration and diagnostic capabilities

For further details visit:
**www.tektronix.com/vqnet**

- Details of Cerify results are displayed in levels
- The amount of detail increases as you "drill down" to lower levels

Test summary for each file in "job"

"Job" details for each file

Alert LED

Alerts for each media stream within the file

Video thumbnails and audio waveform shown in frames surrounding the alert

Error details

Thumbnail of error frame with problem highlighted

Cerify Content Validation System

Cerify automatically verifies Content Interchange - the quality of file-based, compressed digital audio & video content, metadata, & ancillary data. Cerify can help you deal with your content explosion by checking content at the input of your workflow, and ensure that the quality and integrity of the content being sent to your transmission system meets your quality standards. Cerify fully tests all aspects of the video and audio elements to make certain it meets quality and compliance for video and audio standards, and can automatically verify and validate that the file content is ready and adheres to user-defined format templates. Cerify's industry proclaimed video quality measurement fidelity means that you can maintain the QoE for your viewers that you have set as your organization's standard. Automated, repeatable, objective testing of your content library ensures that you can efficiently process all your content in a 24X7 operation with minimal human intervention and without any of the subjectivity of human QC.

Backed by the Cerify Developer Community (CDC), Cerify supports the widest range of Video Server and Broadcast Management System vendors, reducing your system integration complexity. Cerify is a software solution that is based on Tektronix industry leading video compression testing technologies. Interfacing to 3rd party automation or asset management systems, Cerify provides automated, 24x7, unattended content verification that is seamlessly integrated into your workflow.

Applications

- Checking that post production content has been correctly encoded and is compliant with the broadcaster's content quality agreement. Checking audio and video after encoding, at ingest, after editing, and before playout for terrestrial, satellite, cable, internet/Content-on-Demand and VoD. Checking integrity before and after archiving.
- Ensuring that the audio and video quality of VoD/TSTV content meets QoS guidelines prior to distribution across all video servers
- Validate the encode/transcode quality of all ad spots at the encode location prior to distribution to ad servers
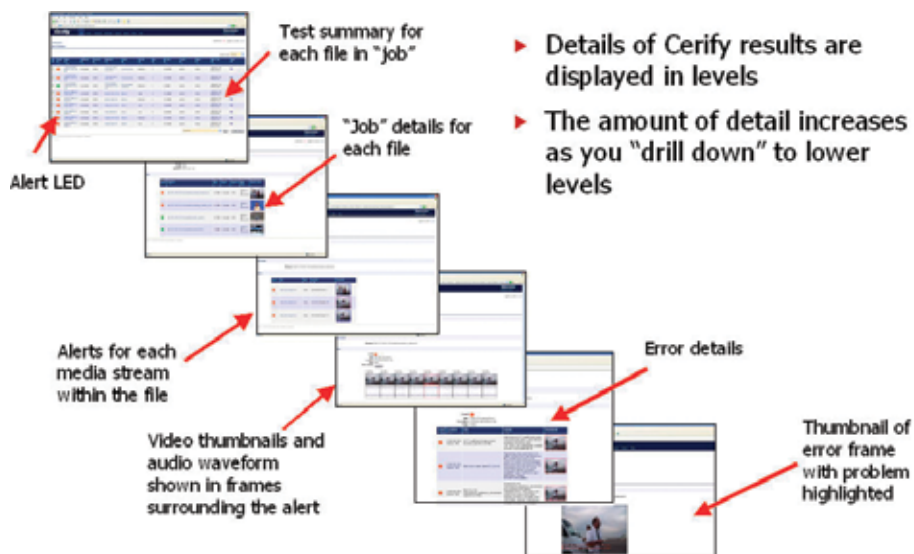
Features and Benefits

- Runs automatically 24/7 to perform consistent and thorough checks of incoming video files against user defined content templates
- All aspects are checked, including encoding, compliance/correctness to video and audio standards, video formats, resolutions, bitrates, adherence to transmission system limits, and also video and audio quality (including the presence of faults such as black frames, blockiness, audio silence/incorrect levels, audio loudness and true peak levels)
- Simultaneous testing of multiple files ensures the workflow does not get backed up because of QC operations
- Logs errors, informs automation systems, plus programmable actions such as email user alert, and file quarantine
- Web-browser user interface and control provides the flexibility of command and control from anywhere and the ability to allow required personnel/partner access to check compliance from anywhere
- CeriTalk API for integration with broadcast management systems allows workflow integration
- Multi-track audio testing reduces the amount of time it would take to process assets with multiple audio tracks by efficiently processing all audio tracks with a single pass QC
- Flexible audio loudness test duration allows different groups of channels to be tested against different loudness thresholds
- Ensures presence and compliance of Ancillary Data: Closed captions, Teletext, DVB Subtitles, & Timecode
- Ensures regulatory and legal compliance to Photosensitive Epilepsy (PSE) standards by detecting flash/pop sequence in video that might trigger epileptic seizures
- Workflow efficiency technologies built in ensure that time-sensitive materials are QC'ed in parallel to other operations such as ingest thus removing serialized operations and reducing overall workflow time

Video Formats:
All frame format sizes, bit rates and resolutions for SD/HD and mixed workflows (including QCIF, CIF, D1, 720p, 1080i, 1080p)

Resolutions:
QCIF, CIF, SD, D1, 720p, 1080i/50, 1080i/60, 1080p (and non-standard sizes from 16X16 to HD+)

Wrappers:
MPEG-2 Transport Stream, MPEG-2 Program Stream, MPEG-4 Parts 1, 14 & 15, 3GPP, MOV, ASF, GXF, MXF, QuickTime and AVI

Video:
MPEG-2, IMX 30/50, D10, XDCAM, MPEG-4 AVC (H.264), AVC-Intra (All profiles), VC-1/WMV9, MPEG-4 Part 2, H.263, DV/DVCPro25, DV/DVCPro50, DVCPro100/HD, Apple ProRes, JPEG-2000[1], DNxHD[1], raw YUV and RGB

Audio:
MPEG–1, MPEG–2, MPEG–2 AAC, AAC-Plus (MPEG-4 AAC) , HE–AAC, PCM, WMA, Dolby E, AC3

With Tektronix' Cerify, you can be assured that your content conforms to your standards for quality, and know that your content is correct before it is distributed to your customers, broadcasted to your viewers, or streamed to your subscribers.

For further details visit:
www.tektronix.com/cerify

[1] There are no syntax checks for these codecs

Cerify Services: Assurance of Quality Output

Installation & System Support

Installation services are available with all Cerify products. Installation services are defined in a Statement of Work and include system design, configuration, implementation, test and trouble shooting, and documentation. The installation service deliverables are:

- Service Initiation
- System Design
- Design Implementation
- System Test
- Documentation
- Acceptance and Sign-off

Cerify System Support

Annual maintenance agreement options are available for your Cerify products. A system support maintenance agreement includes:

- Software maintenance that includes all software maintenance releases and bug fixes
- Telephone technical support during regular business hours

Professional Services

Knowing that file based video and the test systems approach required to efficiently operate the workflows and extract the most value out of your Cerify system might leave some overwhelmed, Tektronix has put together some professional services to help:

- Design templates relevant to your application
- Fine tune Audio/Video measurements to your QoS
- Customize Cerify notification to fit your escalation policies

Training

Recognizing that file-based QC systems are still new to most, Tektronix has constructed on-site training classes to:

- Train system administrators on set up and configuration
- Train Master Control personnel to use the QC results for actionable activities

Your Tektronix Service Advantage

You can trust Tektronix to offer unequalled engineering expertise and a customer-centric approach to ensure the optimal performance of your Tektronix products and maximize the lifetime value of your Tektronix investment.

Summary of Service Plans

Repair Service Extended Coverage	Calibration Service Coverage	Multi-Vendor Calibration Services
■ Save money with multi-year coverage ■ Priority service ■ Covers equipment, parts, labor and transportation ■ Applicable software, safety and reliability updates	■ Accredited calibration ■ Traceable calibration ■ Functional verification ■ Applicable software, safety and reliability updates ■ Calibration records retention	■ Single point of contact for all of your calibration needs ■ Simplify your operations and reduce administrative costs ■ On-site delivery for convenience and reduced downtime.

Tektronix Factory Experts

Access to the engineering expertise that designed and built your products to ensure they are in peak performance. Over 20 man years of training per support engineer.

Comprehensive and Thorough Treatment

Software updates, safety and reliability modifications, and cosmetic enhancements are included if applicable. Products are returned to you in a "like new" condition. Worldwide support is available through the Tektronix network.

Efficiency and Convenience

Team of professionals focused on getting your instruments back to you as soon as possible to keep your downtime to a minimum and your service management easy.

Flexible Repair and Calibration Service

Choice of cost effective, flexible options and service packages to meet your needs.

For further details visit:
www.tektronix.com/service

Glossary of Terms

Download our free Glossary of Video Terms & Acronyms. This comprehensive reference book has been compiled from material gathered over time and from numerous sources.

To download your free copy of this glossary, please visit: www.tektronix.com/video/glossary

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Did you know that downloadable manuals for many products are available on our web site free of charge?

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Ask the Experts

Our group of video experts has more than 140 combined years of experience in the industry. Send them your video questions and they will get back to you within one business day.

You can find them on our web site at: www.tektronix.com/videoexperts

For Further Information
Tektronix 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.tektronix.com**

02/12   EA/POD-FCA   25W-19328-11

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