

Videotek® TVM9150PKG

Multiformat 3G/HD/SD Video Waveform Monitor and Audio Signal Analyzer



The Videotek® TVM9150PKG multiformat video waveform monitor and audio signal analyzer with integral XGA TFT color LCD display is the most advanced and intuitive test instrument available in a half-rack scope package. Versatile and modular, the TVM9150PKG is ideal for all 3G/HD/SD-SDI, analog composite and ASI video and audio applications.

Users can display and evaluate up to four input sources, in up to four formats, simultaneously. One hundred percent digital signal processing enables precision presentation of waveform, vector, gamut, audio, picture, timing and data analyzer screens, each of which can be viewed in any quadrant. With full-screen, multiple pictures, thumbnails and powerful MULTI mode, complete display flexibility is a reality.

TVM9150 packages are predefined module groupings designed to quickly deliver the monitoring solution you need. The unit can be rackmounted or used in the field, and integrates seamlessly into any broadcast, post-production, telecine, satellite or cable facility, making the TVM9150 the ultimate choice for quality control, troubleshooting and compliance-check applications. Select among 3 Gb/s, HD/SD-SDI, SD-SDI, analog composite and ASI video monitoring with advanced physical jitter, Dolby®, advanced audio and lip sync monitoring options to build a system customized to your requirements.

Features

- Dual, auto-detecting SDI input for 3 Gb/s, HD or SD
- Dual, auto-detecting NTSC/PAL analog composite option
- Single-input ASI monitoring option
- 3D analysis upgrade with multiple 3D formats and displays
- Standards: SMPTE 424M, SMPTE 292M, SMPTE 259M-C, NTSC/PAL
- Multiple reference inputs
- Simultaneous display of up to four different inputs
- Customizable display functions, including screen location and multiple displays
- Patented video relative timing display
- Patented gamut display
- Ancillary data processing (including AFD, WSS, SourceID, VITC, LTC, and ANC TC)
- Pixel locator/data word analyzer
- Multiple-picture thumbnail
- A/B parade and overlay
- 608, 708 closed-caption detect, alarm, display
- Teletext and OP-47 detect, alarm, display
- Comprehensive alarm set with peak level report
- 16 direct-access user presets
- Integral high-brightness XGA TFT color LCD display
- Illuminated controls and indicators
- DVI-I output
- USB port for control and data transfer
- 10/100Base-T Ethernet, SNMP agent
- Web server
- SpyderWeb II remote control and logging software
- GPI control

Selectable Options

- Video inputs
 - Dual HD/SD-SDI
 - Dual HD/SD-SDI with eye pattern and jitter waveform and spectrum display
 - Dual 3G/HD/SD-SDI
 - Dual ASI
 - Dual composite analog

- Audio
 - Metering and monitoring of up to eight channels of analog, AES/EBU and embedded audio
 - Dolby® Digital, Dolby Surround EX, Dolby E, Dolby Pro-Logic® I formats
 - Dolby decoded outputs
 - Loudness metering and alarm
 - Multiple audio Lissajous displays

Details

The TVM9150PKG has impressive features, including illuminated controls; a modular platform for easy upgrades; HD/SD-SDI auto-detect; passive looping inputs that accept 1080i, 1080p and 720p formats at popular frame rates, including SD-525/625; real-time alarms (with time stamp, adjustable limits and peak value report); frame capture/transfer; EIA 608 and 708 closed caption; Teletext; OP-47 HD subtitles; XDS; and alarm status and metadata displays.

Options include dual HD/SD-SDI eye pattern with jitter display, dual 3G/HD/SD-SDI, dual HD/SD-SDI, dual SD-SDI, dual ASI and dual analog composite inputs, advanced audio analysis with CineSound® Surround display and comprehensive Dolby decoding.

The TVM9150PKG features Imagine Communication's patented Q-SEE™ display technology, which enables users to configure their screen for any specific need. Whether the desire is for full screen, quadrant with picture thumbnail or the convenient MULTI mode, Q-SEE can make it happen. Choose from waveform, vector, gamut, audio, picture and timing displays, and place each in any quadrant on the screen.

The TVM9150PKG can be quickly and easily configured, with direct access to display functions, selectable screen location and context-sensitive pop-up menus, as well as the industry's most intuitive navigation system. Complete presentation changes can be instantly applied with any of the 16 front-panel preset selections.

Specifications

Specifications and designs are subject to change without notice

| VIDEO | |
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| HD/SD-SDI Input Module (TVM-VTM-SDI-H-F) | |
| Two passive looping inputs accepting SD SMPTE 259M-C formats or HD SMPTE 292M formats, including: 525/59.94, 625/50, 1080i/60, 1080i/59.94, 1080i/50, 1080p/30, 1080p/29.97, 1080p/25, 1080p/24, 1080p/23.98, 1080p/30sF, 1080p/29.97sF, 1080p/25sF, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.94, 720p/50, 720p/30, 720p/29.97, 720p/24 and 720p/23.98 | |
| Data Rate | 270 Mb/s, 1.485 Gb/s, auto-detect |
| Connectors | 4 BNCs, Hi-Z passive looping |
| Level | 800 mV, nominal |
| Input EQ | 270 Mb/s: 250 m of 8281 1.485 Gb/s: 100 m of 8281 |
| Return Loss | ≤-15 dB, 5 MHz to 1.485 GHz |
| SDI Monitor Output | Follows the selected digital input |
| Data Rate | 270 Mb/s and 1.485 Gb/s |
| Connector | BNC |
| Level | 800 mV, nominal |
| 3G/HD/SD-SDI INPUT MODULE (TVM-VTM-3GB-F) | |
| Two passive looping inputs accepting 3 Gb/s SMPTE 424M inputs, SD SMPTE 259M-C formats or HD SMPTE 292M formats, including: 525/59.94, 625/50, 1080i/60, 1080i/59.94, 1080i/50, 1080p/60, 1080p/59.94, 1080p/50, 1080p/30, 1080p/29.97, 1080p/25, 1080p/24, 1080p/23.98, 1080p/30sF, 1080p/29.97sF, 1080p/25sF, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.94, 720p/50, 720p/30, 720p/29.97, 720p/24 and 720p/23.98 | |
| Data Rate | 270 Mb/s, 1.485 Gb/s, 2.97 Gb/s, auto-detect |
| Input Impedance | 75 ohms, active looping |
| Input EQ | Up to 250 m, Belden 8281 at 270 Mb/s, 100 m, Belden 8281 at 1.485 Gb/s or 80 m, Belden 1694A at 2.97 Gb/s |
| Return Loss | ≤-25 dB, 5 to 270 MHz; ≤-15 dB, 270 MHz to 1.5 GHz; ≤-10 dB, 1.5 to 2.97 GHz |
| Connector | BNC |

ASI INPUT MODULE (TVM-VTM-ASI-F)

Two passive looping inputs accepting DVB-ASI or SMPTE 310M signals, auto-detect. Monitoring of ATSC PSIP or DVB PSI tables. ETSI TR 101-290 priority 1, 2 and 3 alarms including buffer errors

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| Input Data Rate | DVB-ASI: 270 Mb/s, maximum payload 120 Mb/s SMPTE 310M: 19.393 Mb/s, or 38.785 Mb/s |
| Input Connectors | 4 BNCs, Hi-Z passive looping |
| Input Level | 800 mV, nominal |
| Input EQ | 250 m, Belden 8281 |
| Return Loss | ≤-15 dB, 5 to 270 MHz |
| Monitor Output | Follows the selected digital input |
| Output Level | 800 mV, nominal |
| Output Data Rate | DVB-ASI: 270 Mb/s SMPTE 310M: 19.393 Mb/s, or 38.785 Mb/s |
| Output Connector | BNC |
| ATSC Display Tables | PAT (Program Association Table) INFO (from the Program and System Information Protocol (PSIP)) PMT (Program Map Table) MGT (Master Guide Table) VCT (Virtual Channel Table) RRT (Region Rating Table) STT (System Time Table) EIT (Event Information Table) EPG (Electronic Program Guide) BW (Bandwidth) |
| DVB Display Tables | PAT (Program Association Table) INFO (from the Program and Information Table (SI)) PMT (Program Map Table) EIT (Event Information Table) CAT (Conditional Access Table) NIT (Network Information Table) SDT (Service Description Table) BW (Bandwidth) |

JITTER EVALUATION INPUT MODULE (TVM-VTM-JEM3-F)

Two passive looping inputs accepting HD SMPTE 292M or SD SMPTE 259M-C formats

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|-----------------------|---|
| Data Rate | 270 Mb/s, 1.485 Gb/s, auto-detect |
| Connectors | 4 BNCs, Hi-Z active-looping |
| Level | 800 mV, nominal |
| Input EQ | 270 Mb/s: 250 m, Belden 8281 1.485 Gb/s: 80 m, Belden 8281 |
| Return Loss | ≤-15 dB 5 MHz to 1.485 GHz |
| SDI Monitoring Output | Follows the selected digital input |
| Output Data Rate | 270 Mb/s and 1.485 Gb/s |
| Output Connector | BNC |
| Output Level | 800 mV, nominal |
| Jitter Demod | Displays pk-pk jitter as a bar graph and numeric readout, jitter waveform or frequency spectrum |
| Bar Graph | 0 to 1 UI or 0 to 0.2 UI with numeric readout |
| Filter | 10 Hz ±2 Hz 1 kHz ±5% 10 kHz ±5% 100 kHz ±5% |

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| Waveform | Synchronized with video 1 H, 2 H, 1 V or 2 V sweep rate Line-select may be applied |
| Frequency Plot | Displays a frequency histogram from the filter setting up to a maximum frequency of 1 or 5 MHz |
| Eye Parameter Measurement | Amplitude, rise time, fall time |
| Measurement Bandwidth | 250 kHz to 2250 MHz -3 to 1 dB relative to 750 MHz |
| Filters | 10 Hz \pm 2 Hz 100 Hz \pm 10 Hz 1 kHz \pm 100 Hz |
| Amplitude | \pm 2% with a displayed waveform of 800 mV |
| Overshoots | \pm 2% with a displayed overshoot of 10% 20% maximum |
| Rise and Fall Time | Within 2% of the displayed rise/fall time |

ANALOG INPUT MODULE (TVM-VTM-ACV-2-F)

2 passive looping NTSC/PAL composite video, auto-detect

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| Signal Level | 1 V pk-pk |
| Input Impedance | Hi-Z, looping |
| Return Loss | \leq -45 dB 100 kHz to 5 MHz |
| DC Restore Clamp Time | Back Porch |
| DC Restorer Level Shift Due to Presence or Absence of Burst | \leq 1 IRE/ Unit |
| DC Restorer Level Shift with Change from 50% APL to 10% APL or to 90% APL | \leq 1 IRE/ Unit |
| DC Restorer 60 Hz Attenuation Slow Fast | \leq 5% \geq 90% |
| Maximum Input Amplitude | (AC+DC) +2.5 to -1.5 VDC restorer off, \pm 3.0 VDC restorer on |

Analog blackburst, NTSC/PAL composite video, tri-level sync auto-detect (per SMPTE 274M)

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| Levels | 286 mV pk-pk \pm 6 dB (blackburst NTSC) 300 mV pk-pk \pm 6 dB (PAL sync and burst) 600 mV pk-pk \pm 3 dB (tri level Sync) |
| Impedance | Selectable Hi-Z looping or 75 ohms terminating |
| Return Loss | \leq -40 dB, 100 kHz to 5 MHz |
| Connectors | BNC |

DVI-I OUTPUT

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|-------------------|---|
| Digital Levels | Per DDWG DVI rev1 |
| R, G, B Levels | Selectable 0.7 or 1 V pk-pk, nominal |
| Pixel Rate | 65 Mp/s |
| R, G, B Impedance | 75 ohms |
| Horizontal Sync | Negative TTL pulse @ 48,363 Hz \pm 1% |
| Vertical Sync | Negative TTL pulse @ 60.004 Hz \pm 1% |

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| Display Accuracy | ±1% waveform ±1° vector ±37 ns timing digital ±300 ns timing analog |
| Connector | 29-pin DVI-I, female |

AUDIO OPTIONS

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|------------------------------------|---|
| Inputs (Analog) | 8 monophonic or four stereo channels, balanced or unbalanced |
| Maximum Input Level | +24 dBu |
| Input Connector | 37-pin D-sub, male |
| Impedance | >20 k ohms |
| Inputs (Digital) | 16 embedded audio channels. 4 or 8 AES/EBU serial digital pairs, (option dependent) Optional Dolby® E or AC-3 stream |
| Input Connectors | 4 or 8, BNC, female |
| Impedance | 75 ohms |
| Outputs (Analog) | 8 monophonic or 4 stereo channels, balanced or unbalanced, follows selected audio input. Dolby® inputs produce a 2-channel mix down and/or full 8-channel decode |
| Output Level | 24 dBu max +6 to -50 dB adjustable For digital audio, -20 dBFS produces a +4 dBu analog output level |
| Output Connector | 37-pin D-sub, male, shared with inputs |
| Impedance | 10 ohms unbalanced or 20 ohms balanced, nominal |
| Signal To Noise: Outputs (Digital) | 100 dB (relative to signal level out of +24 dBu), typical 4 AES/EBU and one Dolby® Digital, Dolby® E, or AES stream embedded in the selected digital video source |
| Output Connector | 4 BNC, female shared with input |
| Impedance | 75 ohms |

CAPTIONING

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| CC608 | EIA/CEA-608-E |
| CC708/DTVCC | EIA/CEA-708-D |
| Teletext | EN 300 706 Presentation Level 1 teletext and subtitles |
| HD Teletext | OP-47 delivery of EN 300 706 teletext and subtitles |

CONTROL

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| GPI | 9 total with 4 input and 5 preset recall selections, or individually user configured |
| GPO | 2 alarms, user-configured |
| Connector | 26-pin HD (high-density) D-sub, female |
| Input Impedance | 10 k ohms returned to 5 VDC |
| Alarm Output | Relay closure |
| Maximum Relay Current | 350 mA @30 VDC |
| External Router Control | 1 RJ11 female, for use with Videotek RS-12A router for input expansion |
| Peripheral Interface | USB 1.1 supporting storage devices, and keyboard |
| Connector | USB 1.1, Type A, female |
| Communications | Ethernet port - 10/100Base-T |
| Connector | RJ45 Ethernet female |

| TIMECODE | |
|----------|--|
| Input | LTC, Ancillary Time Code (HD only), DVITC extracted from SD inputs |

| DISPLAY | |
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| General | A quadrant display for viewing an input on up to four different displays as picture, waveform, vector, audio, alarm status, timing, optional eye pattern, simultaneously or individually as a full-screen display of each separately. Additional data analyzer display for pixel analysis. Also view multiple waveform and vectors of the same or different inputs |
| Waveform | Composite, YC _B C _R or RGB, parade/overlay of like formats |
| Sweep Time Base | 1 or 2 H, with x1, x5 and x10 horizontal magnification 1 or 2 V with x1, x5 and x25 horizontal magnification |
| Waveform Accuracy | ≤1% |
| Waveform Frequency Response | Analog: 25 Hz to 5.75 MHz within ±1% of amplitude at 50 kHz HD: ±0.5% to 30 MHz Y ±0.5% to 15 MHz C _B , C _R SD: ±0.5% to 5.75 MHz Y ±0.5% to 2.50 MHz C _B , C _R |

| POWER REQUIREMENTS | |
|------------------------|---|
| Power Input | 90 to 260 VAC, 50/60 Hz |
| Power Consumption | 180 VA |
| Dimensions (H x W x D) | 5.25 x 8.2 x 16.6 in. (13.34 x 21.6 x 42.24 cm) |

| ENVIRONMENTAL | |
|--|---------------------------------------|
| Operating Temperature | 32° to 113° F (0° to 45° C) |
| Storage Temperature | -40° to 149° F (-40° to 65° C) |
| Humidity | 85% maximum (non-condensing) |
| Operating Altitude | To 6,562 ft (2,000 m) above sea level |
| Pollution Degree | 2 |
| Standard Accessories: Operator's manual on CD GPI/LTC breakout terminal board DVI to VGA adapter Spyderweb II Software on CD Power cord (North America cord supplied unless optional cord selected at time of order) | |

Ordering Information

| PACKAGE DESCRIPTIONS | |
|----------------------|---|
| TVM9150PKG | TVM Series waveform monitor package supporting 4 picture display with HD/SD-SDI inputs |
| TVM9150PKG-3GB | TVM Series waveform monitor package supporting 4 picture display with 3Gb/HD/SD-SDI inputs |
| TVM9150PKG-EJ3 | TVM Series waveform monitor package, supporting 4 picture display with 3G/HD/SD advanced jitter eye pattern input |

VIDEO OPTIONS

NOTE: ORDERING OPTIONS FOR FIELD UPGRADE ADD '-F' TO THE OPTIONS LISTED BELOW:

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| TVM-VTM-3GB-F | 2 active looping SMPTE 424M (3 Gb/s), SMPTE 372 (dual line), SMPTE 292M (HD-SDI) and SMPTE 259M-C (SD-SDI) inputs, auto detect and monitor output |
| TVM-VTM-JEM3-F | 2 active-looping triple-rate SMPTE 424M (3 Gb/s), SMPTE 372 (dual line), SMPTE 292M (HD-SDI) and SMPTE 259M-C (SD-SDI) input signals for display and analysis. It also supplies additional support for dual-link HD-SDI 12-bit YCBCR and RGB video formats. One triple-rate SDI monitor output follows the selected SDI video input, or an internal Test Signal Generator can be selected. The internal Test Signal Generator can display color bars, pathological checkfield, or color bars with motion, and is free-running (no genlock capability). The Test Signal Generator allows jitter to be deliberately injected into the output signal. Embedded audio and Video Payload ID per SMPTE ST352-2002 ancillary data insertion is also supported, as is EYE pattern with advanced jitter analysis. |
| TVM-VTM-SDI-H-F | Provides two passive looping SMPTE 292M (HD-SDI) and SMPTE 259M-C (SD-SDI) inputs, auto detect, line select, internal, blackburst or tri-level references. Field upgrade. |
| TVM-VTM-ACV-2-F | 2 passive looping analog composite video inputs for NTSC or PAL format, auto detect |
| TVM-VTM-ASI-F | Dual DVB-ASI/SMPTE 310 input module with MPEG data analysis. Provides single transport stream program information and bandwidth measurements. Monitors MPEG and ATSC tables for errors and repetition rates. Alarms for ETSI TR-101-290 first, second and third priority errors |

ADVANCED AUDIO OPTIONS

NOTE: ALL OPTIONS APPLY FOR FACTORY INSTALL OR FIELD UPGRADE USE 'F' OR '-F':

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|-------------------------------|---|
| TVM-A ³ -OPT 2-F | Advanced audio analysis option; bar graphs and CineSound®; view up to 8 audio channels; includes 4 analog stereo inputs, 4 AES/EBU shared input/output pairs and 16 channels of embedded audio; analog monitoring outputs of up to 8 channels simultaneously |
| TVM-A ³ -OPT 3TLF | Advanced audio analysis option; bar graphs and CineSound®; view up to 8 audio channels; includes 4 analog stereo inputs, 8 AES/EBU inputs with 4 shared outputs and 16 channels of embedded audio; analog monitoring outputs of up to 8 channels simultaneously; loudness monitoring and audio true peak metering to ITU-R BS.1770-3. Pre-configured for ARIB TR-B32, ATSC A/85 EBU R128 regional standards |
| TVM-A ³ -OPT 5TLF | Advanced audio analysis option; bar graphs and CineSound®; view up to 8 audio channels; includes 4 analog stereo inputs, 8 AES/EBU inputs with 4 shared outputs and 16 channels of embedded audio; analog monitoring outputs of up to 8 channels simultaneously; custom meter labels; full decoding of Dolby® D or Dolby® E with up to 8 analog outputs and Dolby® metadata display; loudness monitoring and audio true peak metering to ITU-R BS.1770-3. Pre-configured for ARIB TR-B32, ATSC A/85 and EBU R128 regional standards |
| TVM-A ³ -OPT 3TO5F | Adds Dolby® D or Dolby® E decoding and Dolby® metadata display to TVM-A ³ -OPT 3 or TVM-A ³ -OPT 3TL |

REMOTE CONTROL OPTIONS

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| RCU-1000 | Remote control panel for TVM Series, VTM Series and AVM-717 |
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MOUNTING OPTIONS

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| PTC-2 | Portable case with handle and folding stand |
| DRC-2A | Double rackmount case |
| BLK-1 | Blank panel for DRC-2A |

POWER OPTIONS

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| EPC | Euro power cord |
| EPC-AA | Australia power cord |
| EPC-UK | United Kingdom power cord |

NOTE: North America power cord supplied unless otherwise specified at time of order