

# VTM4140PKG

## MULTIFORMAT MODULAR ON-SCREEN MONITOR



**HARRIS**®  
assuredcommunications®

VTM4140 packages are pre-defined groupings of modules designed to quickly get you the monitoring package you need. Select among 3 Gb/s, HD/SD-SDI, SD-SDI, analog composite and ASI monitoring applications with advanced physical jitter, Dolby and advanced audio, and lip sync monitoring options to build a system customized to your requirements.

### FEATURES

- User-configurable hardware
- Dual auto-detecting inputs for 3 Gb/s-HD/SD-SDI, HD/SD-SDI, SD-SDI, or analog composite
- Single-input ASI monitoring option
- Standards: SMPTE 424M, SMPTE 292M, SMPTE 259M-C, NTSC/PAL
- Multiple reference inputs
- Capability of displaying up to four different inputs simultaneously
- Customizable display functions, screen location, multiple displays
- Patented video relative timing display
- Patented gamut display
- Pixel locator/data word analyzer
- Picture thumbnail
- A/B parade and overlay
- 608, 708 closed-caption detect, alarm, display
- Teletext detect, alarm, display
- Comprehensive alarm set, peak level report
- 16 direct-access user presets
- Illuminated controls and indicators

- DVI-I output
- USB ports front and back for data transfer
- Bypass function enable
- 10/100Base-T Ethernet, SNMP agent, Web server,
- SpyderWeb II
- GPI and router control

## **SELECTABLE OPTIONS CATEGORIES**

- Selectable video input modules
  - Dual HD/SD-SDI input
    - Dual SD-SDI input (can be upgraded to HD/SD later)
    - Dual SD-SDI input with eye pattern (can be upgraded to HD/SD later)
      - Dual HD/SD-SDI input with eye pattern
      - Dual HD/SD-SDI input with eye pattern and jitter
      - RGB dual link
      - Dual 3 Gb/s HD/SD-SDI input
      - Dual ASI input module
      - Dual composite analog input
- Selectable audio options
  - Meter and monitor up to eight channels of analog, AES/EBU or embedded
  - Dolby® Digital, Dolby® Surround EX™, Dolby®-E, Pro-Logic I formats
  - Dolby® decoded outputs
  - "Loudness" metering and alarm
  - Multiple audio Lissajous display

## **PRODUCT DETAILS**

All VTM4140PKG base models offer waveform, vector, gamut, audio, picture, timing, and data Analyzer screens via the patented Harris® Q-SEE™ technology, which enhances the performance of this product when viewed on any common XGA monitor.

As a part of the Harris Videotek® VTM Series™, the VTM4140PKG features the world's first user-configurable, field-upgradeable, multiformat test and measurement console. The innovative modular platform makes the VTM Series™ fully customizable and affords broadcasters unprecedented flexibility to choose exactly how they'll apply the award-winning Videotek technology. This is the perfect solution for today's multiformat environment.

Start with the number of signals that can be monitored. When fully equipped, the VTM Series is the only test instrument of its kind that monitors and displays as many as four inputs simultaneously. The Harris proprietary graphic display engines enable multiple input configurations to accommodate any environment. 3 Gb/s, HD/SD, SD-only, DVB-ASI/SMPTE 310M and composite analog inputs are available. Users can mix and match the appropriate options, such as eye-pattern with jitter display and audio packages featuring Dolby® decoding, to create the ideal instrument for their specific need. A further benefit is a clear upgrade path for when those needs change.

The VTM Series is also loaded with features designed to enhance the user's experience: illuminated controls, simple and intuitive navigation and a compact 1RU console. Favorite display configurations are instantly recalled using the assignable one-touch presets. Whether customized with specially selected options or preconfigured by Harris experts, the VTM Series is the optimal choice for any facility.



### Q-SEE™ DISPLAY TECHNOLOGY

The VTM Series console is easily configured via direct access to display functions, selectable screen location and context-sensitive pop-up menus. The intuitive navigation system enables easy access to all functions for even the most inexperienced users.

Q-SEE™, Harris Corporation's patented display technology, enables users to configure their screen for any specific need. Whether 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.

Q-SEE™ is just one more way the VTM Series proves it is the most versatile instrument in its class. When equipped with the proper input options, the VTM Series can output four different waveforms to the Q-SEE display, from four distinct signals — in essence, handling a job that used to require four separate monitoring instruments.

## SPECIFICATIONS

Specifications and designs are subject to change without notice.

### VIDEO

#### HD/SD-SDI INPUT MODULE (VTM-VTM-SDI-H)

Two dual-standard inputs accepting standard-definition SMPTE 259M-C formats or high-definition 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	Four BNCs, Hi-Z passive looping
Level	800 mV, nominal
Input EQ	270 Mb/s: 250 meters of 8281 1.485 Gb/s: 100 meters 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

### SD-SDI INPUT MODULE (TVM-VTM-SDI-S)

Two SMPTE 259M-C inputs, auto detect 525/59.94, 625/50

Input Impedance	Hi-Z, looping
Input EQ	Up to 250 meters of 8281 at 270 Mb/s
Return Loss	≤-25 dB 5 MHz to 270 MHz

### 3 Gb/s HD/SD-SDI INPUT MODULE (TVM-VTM-3GB)

Two dual-standard inputs accepting 3 Gb/s SMPTE 424M inputs, standard definition SMPTE 259M-C formats or high definition 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 meters of 8281 at 270 Mb/s, 100 meters of 8282 at 1.485 Gb/s or 100 meters of 1694A at 2.97 Gb/s
Return Loss	≤-25 dB 5 MHz to 270 MHz, ≤-15 dB 270 MHz to 1.5 GHz, ≤-10 dB 1.5 GHz to 2.97 GHz
Connector	BNC

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

Two dual-standard 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

Input Data Rate	DVB-ASI: 270 Mb/s, max payload 120 Mb/s SMPTE 310M: 19.393 Mb/s, or 38.785 Mb/s
Input Connectors	Four BNCs, Hi-Z passive looping
Input Level	800mV, nominal
Input EQ	250 meters of 8281
Return Loss	≤-15 dB 5 MHz to 270 MHz
Monitor Output	Follows the selected digital input
Output Level	800 mV, nominal
Output Data Rate	DVB-ASI: 270 Mb/s, max payload 120 Mb/s SMPTE 310M: 19.393 Mb/s, or 38.785 Mb/s
Output Connector	BNC

ATSC/DVB Display Tables

#### **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-JEM)**

Two dual inputs accepting standard-definition SMPTE 259M-C formats or high-definition SMPTE 292M formats

Data Rate	270 Mb/s, 1.485 Gb/s, auto-detect
Connectors	Four BNCs, Hi-Z active-looping
Level	800 mV, nominal
Input EQ	270 Mb/s: 250 meters of 8281 1.485 Gb/s: 80 meters of 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 peak-to-peak jitter as a bar graph and numeric readout, jitter waveform or frequency spectrum
Bar Graph	0 –1 UI or 0 – 0.2 UI with numeric readout
Filter	10 Hz ± 2 Hz 1 kHz ± 5% 10 kHz ± 5% 100 kHz ± 5%
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 MHz 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)

Two NTSC/PAL composite video, auto detect

Signal Level	1V 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 Pres. 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 60Hz Attenuation	
Slow	$\leq$ 5%
Fast	$\geq$ 90%
Maximum Input Amplitude	(AC +DC) +2.5V to -1.5V, DC restorer off, $\pm$ 3.0 V, DC restorer on

### REFERENCE

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

Levels	286 mV pk-pk $\pm$ 6 dB (blackburst NTSC) 300 mV pk-pk $\pm$ 6 dB (PAL sync and burst) 600mV 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

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%
Display Accuracy	$\pm$ 1% waveform

	±1° vector
	±37 ns Timing Digital
	±300 ns Timing Analog
Connector	29-pin DVI-I, female

### AUDIO OPTIONS

Inputs (Analog)	Eight monophonic or four stereo channels, balanced or unbalanced
Maximum Input Level	+24 dBu
Input Connector	37-pin D-sub, male
Impedance	>20k ohms
Inputs (Digital)	16 embedded audio channels. Four or eight AES/EBU serial digital pairs, (option dependent) Optional Dolby® E or AC-3 stream.
Input Connectors	Four or eight, BNC, female
Impedance	75 ohms
Outputs (Analog)	Eight monophonic or four stereo channels, balanced or unbalanced, follows selected audio input. Dolby inputs produce a two-channel mix down and/or full eight-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	Four BNC, female shared with input
Impedance	75 ohms

### CONTROL

GPI	Nine total with four input and five preset recall selections or individually user configured
GPO	Two 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 @30VDC
External Router Control	One RJ-11 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	RJ-45 Ethernet female

### TIMECODE

Input	LTC, Ancillary Time Code (HD only), DVITC extracted from SD inputs
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**DISPLAY**

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 with VTM-OPT 40
Waveform	Composite, YC <sub>B</sub> C <sub>R</sub> or RGB, parade/overlay of like formats
Sweep Time Base	1H or 2H, with x1, x5 and x10 horizontal magnification 1V or 2V 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
SD	±0.5% to 5.75 MHz Y ±0.5% to 2.50 MHz C <sub>B</sub> , C <sub>R</sub>
HD	±0.5% to 30 MHz Y ±0.5% to 15 MHz C <sub>B</sub> , C <sub>R</sub>
Eye (Optional)	
Sweep Time Base	Overlay (3 Eye) or 10 Eye (SD), 20 Eye (HD)
Filters	10 Hz, 100 Hz, 1 kHz
Display Accuracy	±1%
Measurement Analog Bandwidth	250 kHz to 2250 MHz, -3 to +1 dB relative to 750 MHz
Jitter Overshoot	≤20% for all frequencies up to 300 kHz
Intrinsic Jitter	<70 ps for HD <150 ps for SD
Intrinsic Wander	<150 ps for HD <300 ps for SD
Jitter	Bar graph showing jitter magnitude
Display Range	0 UI to 1.0 UI
Vector	R - Y vs. B - Y for Analog CB vs. CR for HD or SD
Vector Accuracy	≤1°
Gamut	Encoded or RGB Gamut displays with upper and lower limit selection
Audio (Optional)	2, 4, 6 or 8 channels displayed simultaneously

**POWER REQUIREMENTS**

Power Input	90 to 260 VAC, 50/60 Hz
Power Consumption	180 VA

**MECHANICAL DIMENSIONS**

Height	1.75 in. (4.5 cm)
Width	19.0 in. (48.3 cm)



Depth 19.0 in. (48.3 cm)

**ENVIRONMENTAL**

Operating Temperature 0° to 50°C

Storage Temperature -40° to 65°C

Humidity 85% maximum (non-condensing)

Operating Altitude To 10,000 feet (3,050 m) above sea level

**STANDARD ACCESSORIES**

Operator's manual on CD

GPI/LTC Breakout Terminal Board

DVI to VGA Adapter

Rackmount Kit

Power Cord\*

\*North America cord supplied unless optional cord selected at time of order