Tektronix®

PRISM
Media Analysis Platform
Specifications and Performance Verification

Technical Reference

077-1291-04

PRISM
Media Analysis Platform
Specifications and Performance Verification

Technical Reference

Warning

The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

www.tek.com

077-1291-04

Contacting Tektronix

Tektronix, Inc.
14150 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077
USA

For product information, sales, service, and technical support:
- In North America, call 1-800-833-9200.
- Worldwide, visit www.tek.com to find contacts in your area.

Warranty

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

[W2 – 15AUG04]

Table of Contents

List of Figures

List of Tables

Important safety information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition.

To safely perform service on this product, additional information is provided at the end of this section. (See page vi, *Service safety summary*.)

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

Comply with local and national safety codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

Before use, always check the product with a known source to be sure it is operating correctly.

This product is not intended for detection of hazardous voltages.

Use personal protective equipment to prevent shock and arc blast injury where hazardous live conductors are exposed.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

When incorporating this equipment into a system, the safety of that system is the responsibility of the assembler of the system.

To avoid fire or personal injury

Use proper power cord. Use only the power cord specified for this product and certified for the country of use.

Do not use the provided power cord for other products.

Use proper AC adapter. Use only the AC adapter specified for this product.

Ground the product. To avoid electric shock, the grounding conductor must be connected to earth ground.

Power disconnect. The power cord disconnects the product from the power source. See instructions for the location. Do not position the equipment so that it is difficult to operate the power cord; it must remain accessible to the user at all times to allow for quick disconnection if needed.

Observe all terminal ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

Do not operate without covers. Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

Avoid exposed circuitry. Do not touch exposed connections and components when power is present.

Do not operate with suspected failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Before use, inspect voltage probes, test leads, and accessories for mechanical damage and replace when damaged. Do not use probes or test leads if they are damaged, if there is exposed metal, or if a wear indicator shows.

Examine the exterior of the product before you use it. Look for cracks or missing pieces.

Use only specified replacement parts.

Do not operate in wet/damp conditions. Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere.

Keep product surfaces clean and dry. Remove the input signals before you clean the product.

Provide proper ventilation. Refer to the installation instructions in the manual for details on installing the product so it has proper ventilation.

Slots and openings are provided for ventilation and should never be covered or otherwise obstructed. Do not push objects into any of the openings.

Provide a safe working environment. Always place the product in a location convenient for viewing the display and indicators.

Avoid improper or prolonged use of keyboards, pointers, and button pads.

Be sure your work area meets applicable ergonomic standards. Consult with an ergonomics professional to avoid stress injuries.

Use care when lifting and carrying the product.

Use only the Tektronix rackmount hardware specified for this product.

Service safety summary

The *Service safety summary* section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this *Service safety summary* and the *General safety summary* before performing any service procedures.

To avoid electric shock. Do not touch exposed connections.

Do not service alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect power. To avoid electric shock, switch off the product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

Use care when servicing with power on. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

Verify safety after repair. Always recheck ground continuity and mains dielectric strength after performing a repair.

Terms in this manual

These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Symbols and terms on the product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

The following symbol(s) may appear on the product:

Preface

This manual provides the specifications and performance verification procedures for the PRISM Media Analysis Platform. This manual is divided into two sections:

- *Specifications* provides physical and electrical characteristics
- *Performance verification* provides procedures to verify the warranted characteristics of the PRISM monitor

Product description

The PRISM Media Analysis Platform provides flexible options and field-installable upgrades to monitor a diverse variety of IP statistics as well as video and audio content. The comprehensive feature set, along with an intuitive and simplified graphical presentation of IP statistics, including video quality and diagnostic information, enables engineers to ensure the delivery of superior QoS levels in an increasingly complex broadcast environment involving compressed / uncompressed video transmission through SDI/IP signal paths. PRISM is an ideal solution for monitoring SDI/IP hybrid environments including master control rooms, production studios, OB vans, and signal contribution/distribution centers.

Figure i: PRISM Media Analysis Platform shown with the optional portable cabinet

Product documentation

The full **User Manual**, **Release Notes**, and other information about your product are available for download at www.tek.com/downloads. The following table lists all the documentation for the PRISM Media Analysis Platform.

Table i: Product documentation

Document	Manual type	Part number	Description
User Manual	Primary User	077-1290-xx	Provides detailed operating information.
Release Notes	Release Notes	077-1293-xx	Describes the new features, improvements, and limitations of the instrument firmware.
Installation and Safety Instructions	User	071-3500-xx	Describes how to install a PRISM MPI instrument and provides basic safety and operating information (included with instrument).
	User	071-3549-xx	Describes how to install a PRISM MPX instrument and provides basic safety and operating information (included with instrument).
Specifications and Performance Verification	Performance Verification	077-1291-xx	Lists the product specifications and provides procedures for verifying product performance.
MPI Dual Rack Cabinet and Extender Installation Instructions	Field Install Instructions	071-3577-xx	Describes how to install a MPI instrument in a 19" equipment rack using the optional MPI-RACK-MM or MPI-RACK-MW dual rack cabinet.
MPX Rackmount Slides and Rails Installation Instructions	Field Install Instructions	071-2746-xx	Describes how to install a MPX instrument in a 19" equipment rack
Field Upgrade Kit Instructions	Field Install Instructions	075-1095-xx	Describes how to install post-purchase field upgrades in the instrument.
API commands	NA	NA	The PRISM API Documentation Web page lists GET and POST commands that can be used to configure the signal inputs and select the active input. See the *Remote control via API commands* section of the User Manual (077-1290-xx) for access instructions.

Specifications

The following tables list the specifications for the Tektronix PRISM Media Analysis Platform. Items listed in the Performance Requirement column are generally quantitative and can be tested by the *Performance Verification* procedure in Section 2 of this manual. Items listed in the Reference Information column are useful operating parameters that have typical values; information in this column is not guaranteed.

The specifications listed in the Electrical Specifications portion of these tables apply over an ambient temperature range of +0 °C to +40 °C. The rated accuracies are valid when the instrument is calibrated in an ambient temperature range of +20 °C to +30 °C.

Electrical specifications

Table 1: SDI input waveform vertical characteristics

Characteristic		Performance requirement	Reference information
Vertical Measurement Accuracy		± 0.5% of 700 mV full scale mode	Using graticule or cursor. Measure in YPbPr mode.
Frequency Response (HD)	Luminance Channel (Y)	50 kHz to 30 MHz, ± 0.5%	50 kHz to 60 MHz for 1080P 60/59.94/50 formats (148.5 MHz interface sampling frequency)
	Chrominance Channels (Pb, Pr)	50 kHz to 15 MHz, ± 0.5%	50 kHz to 30 MHz for 1080P 60/59.94/50 formats (148.5 MHz interface sampling frequency)
Step Response (HD), Typical			Sine-squared bars
	Preshoot		≤ 0.5% peak (2T30 bar) (2T60 bar for 148.5 MHz 1080p formats)
	Overshoot		≤ 0.5% peak (2T30 bar) (2T60 bar for 148.5 MHz 1080p formats)
	Ringing		≤ 0.8% peak-peak (2T30 bar) (2T60 pulse for 148.5 MHz 1080p formats) Most of the error seen on the display comes from the inherent ringing in the digital data. The response of the monitor is close to the theoretical limit of a perfect sinx/x reconstruction filter.

Table 1: SDI input waveform vertical characteristics (cont.)

Characteristic		Performance requirement	Reference information
Pulse Response (HD), Typical			Blackman pulse
	Baseline Ringing		≤ 0.7% peak-peak (2T30) (2T60 pulse for 148.5 MHz 1080p formats) Pulse-to-bar ratio 0.995:1 to 1.005:1 on appropriate Sine Squared or Blackman 2T pulse A sine-squared pulse near Nyquist is not band-limited and so inherently has ringing much larger than the waveform monitor filter. A three term Blackman pulse with the same HAD has much less inherent ringing, so it is a better choice for most testing. See *Digital to Analog Conversion, Data and Filter Requirements*, SMPTE Journal Mar 1995, Vol. 104, Fibush, Baker, Penny.
Tilt	Field Rate	0.1%	
	Line Rate	0.1%	
Off Screen Recovery		0.1% variation in baseline of a 5 MHz modulated pulse when positioned anywhere on screen at any gain setting	

Table 2: Waveform sweep (horizontal) deflection

Characteristic		Performance requirement	Reference information
Sweep	Accuracy	± 0.5%, all rates	Fully digital system
	Linearity	0.2% of time displayed on screen	Fully digital system

Table 3: Picture mode

Characteristic	Performance requirement	Reference information
Format (HD)		Allows viewing picture in all formats In Low Frame Rate formats, frames are repeated as needed to achieve XGA frame rate; similar to 3:2 pull-down on some frame rates
Synchronization		Picture mode always uses internal timing; it is not affected by external sync
Aspect Ratio		Allows choice of 16:10, 16:9 or 4:3 for SD to support widescreen

Table 4: Serial digital video inputs

Characteristic		Performance requirement	Reference information
Format			270 Mb/s: compatible with SMPTE 259M 1.5 Gb/s: compatible with SMPTE 292M/BTA-S004A 3 Gb/s: compatible with SMPTE 424/M and SMPTE 425M
Input Type			75 Ω BNC, internally terminated 4 inputs, only one active at a time
Cable Loss Accommodation		With 1/SQRT(f) characteristic at ½ of serial rate	
		Attenuation:	Equivalent to approximately:
	270 Mb/s	0 to 22 dB	303 m of Belden 1694A at 270 Mb/s
	1.5 Gb/s	0 to 28 dB	171 m of Belden 1694A at 1.5 Gb/s
	3 Gb/s		117 m of Belden 1694A at 3 Gb/s
	12 Gb/s	0 to 22 dB	52 m of Belden 1694A at 12 Gb/s
Launch Amplitude Accommodation, Typical	For Full Specification		800 mV ± 10%
	Up to 20 dB Cable Loss		800 mV ± 30%
Jitter Tolerance, Typical		0.35 UI_{p-p} above Fx. Increases proportional to 1/f below Fx. Fx depends on bit rate.	■ 270 Mb/s: 0.5 MHz ■ 1.5 Gb/s: 1.5 MHz ■ 3 Gb/s: 3 MHz ■ 12 Gb/s: 12 MHz
Return Loss, Typical			> 15 dB to 1.5 GHz > 10 dB to 3 GHz > 6 dB to 12 GHz
Isolation Between Inputs			> 45 dB to 1 GHz
SDI Input Bitrate Range			>± 50 ppm

Table 5: Eye pattern display

Characteristic	Performance requirement	Reference information
Signal Bandwidth, Typical		100 kHz to 15 GHz at -3 dB point
Rise time 20% to 80%, Typical		≤ 25 ps
Eye Clock Bandwidth Settings		Menu selectable: 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz
Display Modes		3 EYE: Overlays all bits to form each eye opening, useful for observing peak jitter. 10 EYE (SD), 20 EYE (HD): Displays eye relative to typical parallel clock, useful for observing jitter correlated to word clock.
Eye Amplitude Measurement Accuracy	SD, HD, 3G: 800 mV ± 5% with an 800 mVp-p input 12G: 800 mV ± 10% with an 800 mVp-p input	Operating ambient temperature between 15 °C and 35 °C, calibrated at ambient temperature between 20 °C and 30° C.
Horizontal Scale Accuracy, Typical		Indicated time per division ± 1%.

Table 6: Jitter display

Characteristic	Performance requirement	Reference information
Display type		Displays the Jitter waveform with numerical and graphical readouts of peak-to-peak jitter. Jitter is derived from demodulated recovered clock as described in SMPTE RP192.
High Pass Filter Settings		10 Hz, 100 Hz, 1 kHz, 10 kHz, or 100 kHz high pass filter applied to demodulated jitter before peak detection.
High Pass Filter Attenuation Accuracy, Typical		Frequency where the response is -3 dB is within 10% of HPF setting.
High End Frequency Response, Typical		-3 dB Jitter Bandwidth SD: 300 kHz HD: 1.5 MHz 3G: 2 MH 12G: 2 MHz
Jitter Noise Floor, Typical		12G, 1 kHz setting: 18 ps, variation with relock: ± 6 ps 3 Gbps, 1 kHz setting: 15 ps 1.5 Gbps, 1 kHz setting: 15 ps 270 Mbps,1 kHz setting: 200 ps
Jitter Measurement Accuracy, Typical		12 Gbps @ 100 Hz to 100 kHz HPF: Within 0.2 UI + 10% of reading for jitter frequencies from 5 times HPF setting to 2 MHz. 3 Gbps and 1.5 Gbps @ 10 Hz HPF: Within 0.3 UI + 10% of reading for jitter frequencies from 50 Hz to 2 MHz (1 MHz for 1.5 Gbps). 1.5 Gbps @ 100 Hz to 100 kHz HPF: Within 0.05 UI + 10% of reading for jitter frequencies from 5 times HPF setting to 1 MHz. 270 Mbps @ 10 Hz to 10 kHz HPF: Within 0.05 UI + 10% of reading for jitter frequencies from 5 times HPF setting to 200 kHz.

Table 7: Serial video output (AUX Out)

Characteristic	Performance requirement	Reference information
Format		Same as selected input
Content		Equals selected input
Output Level, Typical		800 mV ± 10% into 75 Ω load
Rise and Fall Time (HD), Typical		135 ps maximum, 20% to 80%
Rise and Fall Time (12G), Typical		45 ps maximum, 20% to 80%
Return Loss, Typical		> 15 dB to 1.5 GHz > 10 dB to 3.0 GHz > 6 dB to 12 GHz

Table 8: External reference

Characteristic	Performance requirement	Reference information
Input Type	75 Ω; compensated	For future use
Output Type	75 Ω; nominal	
1 PPS Output		The REF OUT connector outputs a 1 PPS (Pulse Per Second) signal when the instrument is locked to a PTP reference.
Signal Amplitude		–0.8 V to 3 V open circuit –0.4 V to 1.5 V terminated into 75 Ω

Table 9: Audio bar displays

Characteristic	Performance requirement	Reference information
Channel mode		Any 16 channels configured into 8 pairs and 8 channels configured into 4 pairs.
Audio Source		Monitoring digital audio either from SDI or IP sources.
Level Meter Resolution		0.056 dB steps at 30 dB scale, from full scale to –20 dB FS
Metering Ballistic Types		PPM Type 2
Peak Program Meter (PPM) Ballistic Response		PPM Type II (IEC Type II, the same as IEEE std. 152-1991). Attack time and return time, 2.8 seconds to fall 20 dB.
True Peak Ballistic Response		PPM Type II decay characteristics, no attack delay, factory default ballistic.
Peak Hold		True peak indicator remains at the most recent peak for 1 second.
Clip Indication Delay Count		A FS sample asserts Clip Indication.

Table 9: Audio bar displays (cont.)

Characteristic	Performance requirement	Reference information
Mute Indication Delay Count		Consecutive ten "0" samples assert Mute indication.
Clip/Mute Error Readout Hold Time		2 seconds
Silence Indication Threshold		Audio level below which the signal will be considered “silent”. Used to trigger on-screen indication and alarms.
Silence Indication Delay		Indication and alarm will not be asserted until signal stays below the silence threshold for a consecutive 10 second.
Over Indication Threshold		Audio level above which the signal will be considered “over”. Used to trigger on-screen indication and alarms.
Over Indication Delay		Indication and alarm will not be asserted until signal stays above the Over Indication Threshold for this delay for a consecutive 2 seconds.

Table 10: Embedded audio extraction

Characteristic	Performance requirement	Reference information
Embedded Audio Formatting (HD)		24-bit Embedded audio is not supported (no AUX bits are extracted), only 20 most significant bits will be extracted. Supports SMPTE 272M Operation Level B only (48 kHz audio sampling rate synchronized with video). Extract 20 or 24 bit audio formatting according to SMPTE299M.
Channel Numbering		Channel numbers per SMPTE 272M (1 through 16) will be correctly shown on all displays.
Audio Rates		Supports 48 kHz audio sample rate
Number of Channels Monitored for Presence		16 channels are monitored for presence.
Maximum Number of Channels Monitored for Activity		Can only monitor channels set up for display
Audio levels		Bars display signals up to 0 dBFS

Table 11: LCD display (MPI only)

Characteristic		Performance requirement	Reference information
Display Area	Horizontal		19.8 cm
	Vertical		11.2 cm
Resolution			1920 (H) x 1080 (V) pixels
Color Palette			8 bits per component
Pixel Defects		≤ 6 bad pixels	

Table 12: External display output (EXT DISPLAY)

Characteristic	Performance requirement	Reference information
Content		Identical to front-panel LCD display
Display Format		1920 (H) x 1080 (V) pixels at 60 Hz (HD)
Digital Output Format		Display Port. DVI-D (single link) (MPX only)
Analog Output Format		RGB
Analog Connector		Standard (blue insert) HD-15 DSUB connector
Hot Plug Detection		Supported
DDC Function		Supported
Color Palette		8 bits per component

The Control IP port (Ethernet LAN) on the rear panel is identified by the  symbol stamped into the chassis above the port.

Table 13: Control IP port (Ethernet LAN connector)

Characteristic	Performance requirement	Reference information
IP Address Mode		Supports manual and DHCP
Rates	1000 Base-T, 100 Base-Tx, and 10 Base-T	
SNMP		For instrument control and feedback of status. Complies with SNMP version 2.
Connector Type		RJ-45 LAN connector supporting 10/100 Base-T.

Table 14: USB

Characteristic	Performance requirement	Reference information
Type		Host
Speed		Complies with USB 1.1 and USB 2.0 Full and Low-Speed specification

Table 15: Power source

Characteristic	Performance requirement	Reference information
Electrical Rating		MPI: 48 VDC @ 200 W max MPX: 100–240VAC @ 200 W max
Supply Connection		Detachable cord set
Power Consumption, Typical		100 W
Surge, Typical		40 A peak for <5 msec

Table 16: Miscellaneous

Characteristic	Performance requirement	Reference information
Real-time Clock Battery Life		>10 year

Physical specifications

Table 17: MPI physical characteristics

Characteristic		Standard
Dimensions	Height (at bezel)	13.34 cm (5.250 in.)
	Width (at bezel)	21.91 cm (8.625 in.)
	Depth	30.48 cm (12.000 in.)
Weight	Net	3.4 kg (7.45 lbs.)
	Shipping	7.6 kg (16.75 lbs.); approximate, excluding options and accessories

Table 18: MPX physical characteristics

Characteristic		Standard
Dimensions	Height (at bezel)	4.45 cm (1.75 in.)
	Width (at bezel)	48.26 cm (19.00 in.)
	Depth	45.72 cm (18.000 in.)
Weight	Net	3.9 kg (8.7 lbs.)
	Shipping	10.2kg (22.5 lbs.); approximate, excluding options and accessories

Table 19: Environmental performance

Category		Standards or description
Temperature	Operating	0 °C to +40 °C
	Non Operating	–20 °C to +60 °C

Table 19: Environmental performance (cont.)

Category		Standards or description
Humidity	Operating	20% to 80% relative humidity (% RH) at up to +40 °C, non-condensing
	Non Operating	5% to 90% RH (relative humidity) at up to +40 °C,derating linearly to 45% at +60 °C, non-condensing
Altitude	Operating	Up to 9,842 feet (3,000 meters)
	Non Operating	Up to 40,000 feet (12,192 meters)
Cooling		The variable fans provide forced air circulation. Do not block ventilation openings.
	Bare instrument (no optional sleeves)	To ensure proper airflow, there must be at least 2 inches of clearance on both sides of the instrument, at least 2 inches of clearance from the rear of the instrument, and at least a 0.5 inch of clearance from the top of the instrument.
	Portable cabinet	Use only the Tektronix portable cabinet (MPI-PTBL) to ensure proper airflow with this instrument. When using the portable cabinet, the same minimum clearances as the Bare Instrument apply (see above).
	Rack cabinet	Use only the Tektronix rackmount adapter (MPI-RACK-MM, MPI-RACK-MW or MPX RACK) for this instrument. To ensure proper airflow when installing the Dual Rack Adapter in a closed rack with solid walls, there must be at least 2 inches of clearance from both sides of the rack adapter frame to the rack side walls, at least 3 inches of clearance from the rear of the rack adapter frame to the rack's back wall, and at least a 0.5 inch of clearance from the top of the rack adapter to another rack adapter or installed instrument. The rack intake air to the side vents must not exceed 40 °C.

Supported formats

Table 20: Supported IP formats

Format	Description	Required product option
SMPTE 2022-6, SMPTE 2022–7		MP-IP-STD
SMPTE 2110-20, SMPTE 2110-30, SMPTE 2110-40 [1]		MP-IP-STD
ASPEN (video content only) [1]	SMPTE RDD-37	MP-IP-STD
PTP	IEEE1588, SMPTE2059-2 (Multicast, Mixed SMPTE w/o negotiation)	MP-IP-STD

[1] No AUX SDI output is available for this format.

Table 21: Supported SDI formats

Link	Format	Sample structure	Bits	Frame/field rates	Required product option
SD-SDI	525i	4:2:2 YCbCr	10b	59.94	Base instrument
	625i	4:2:2 YCbCr	10b	50	Base instrument
HD-SDI	1920×1080	4:2:2 YCbCr	10b	50/59.94/60i	Base instrument
	1280×720	4:2:2 YCbCr	10b	50/59.94/60p	Base instrument
3G-SDI Level A	1920×1080	4:2:2 YCbCr	10b	50/59.94/60p	Base instrument
3G-SDI Level B	1920×1080	4:2:2 YCbCr	10b	50/59.94/60p	Base instrument
Quad Link 3G-SDI Level A, Square Division [1]	3840×2160	4:2:2 YCbCr	10b	50/59.94/60p	MP-FMT-4K
Quad Link 3G-SDI Level B, Square Division [1]	3840×2160	4:2:2 YCbCr	10b	50/59.94/60p	MP-FMT-4K
Quad Link 3G-SDI Level A, Two Sample Interleave [1]	3840x2160	4:2:2 YCbCr	10b	50/59.94/60p	MP-FMT-4K
Quad Link 3G-SDI Level B, Two Sample Interleave [1]	3840x2160	4:2:2 YCbCr	10b	50/59.94/60p	MP-FMT-4K
12G-SDI Mode 1 [2]	3840×2160	4:2:2 YCbCr	10b	50/59.94/60p	MP-FMT-4K [3]

[1] No AUX SDI output is available for this format.

[2] 12G-SDI support is available in SDI 1 and SDI 3 inputs.

[3] Eye and Jitter displays of 12G-SDI also require MPI option PHY-12G or MPX option PHY-12G.

Table 22: Supported video formats in SMPTE 2022-6 streams

Link	Format	Sample structure	Bits	Frame/field rates	Required product option
SD-SDI	525i	4:2:2 YCbCr	10b	59.94	MP-IP-STD
	625i	4:2:2 YCbCr	10b	50	MP-IP-STD
HD-SDI	1920×1080	4:2:2 YCbCr	10b	50/59.94/60i	MP-IP-STD
	1280×720	4:2:2 YCbCr	10b	50/59.94/60p	MP-IP-STD
3G-SDI Level A	1920×1080	4:2:2 YCbCr	10b	50/59.94/60p	MP-IP-STD
3G-SDI Level B	1920×1080	4:2:2 YCbCr	10b	50/59.94/60p	MP-IP-STD

Table 23: Supported video formats in SMPTE 2110-20 streams

Link	Format	Sample structure	Bits	Frame/field rates	Required product option
ST2110-20 [1]	1920x1080	4:2:2 YCbCr	10b	50/59.94/60i	MP-IP-STD
	1280x720	4:2:2 YCbCr	10b	50/59.94/60p	MP-IP-STD
	1920x1080	4:2:2 YCbCr	10b	50/59.94/60p	MP-IP-STD
	525i	4:2:2 YCbCr	10b	59.94i	MP-IP-STD
	625i	4:2:2 YCbCr	10b	50i	MP-IP-STD

[1] No AUX SDI output is available for this format

Table 24: Receiver conformance level in SMPTE 2110-30 streams

Conformance level	Description
Conformance level B	Reception of 48 KHz streams with 1 to 8 channels at packet times of 1 ms or 1 to 8 channels at packet times of 125 µs

Table 25: Supported video formats in ASPEN video

Link	Format	Sample structure	Bits	Frame/field rates	Required product option
ASPEN [1]	1920x1080	4:2:2 YCbCr	10b	50/59.94/60i	MP-IP-STD
	1280x720	4:2:2 YCbCr	10b	50/59.94/60i	MP-IP-STD
	1920x1080	4:2:2 YCbCr	10b	50/59.94/60p	MP-IP-STD

[1] No AUX SDI output is available for this format.

Performance verification

This section contains a collection of manual procedures for verifying that the PRISM monitor and installed options performs as warranted

This chapter is divided into two sections: *Functional test procedures* and *Video performance test procedures*. The test procedures in this chapter provide for an extensive confirmation of performance and functionality.

Warm-up period

Before performing any of the procedures and tests in this manual, the waveform monitor must have been operating for a warm-up period of at least 20 minutes and be installed in a location meeting the required environmental conditions. (See Table 19 on page 10.)

Test records

Use the following tables to record the measured performance or Pass/Fail status for each step of the specified test procedure. In cases where a measurement is made in different units than specified in the manual, the actual measured values that correspond to the specification limits are shown in parentheses.

Test record – functional tests

Table 26: PRISM monitor functional test record

Instrument Serial Number:	Certificate Number:		
Temperature:	RH %:		
Date of Calibration:	Technician:		
Functional test (incoming inspection)	**Incoming**	**Outgoing**	**Comments**
LCD Pixel and Defects			
Fan Test			
USB Port Test			
SDI Serial Output (AUX Out)			
SDI Input to SFP+ Loop Output Operation			
BNC Input 1 to SFP+ Output 1			
BNC Input 2 to SFP+ Output 2			
BNC Input 3 to SFP+ Output 3			
BNC Input 4 to SFP+ Output 4			
Headphone Functionality			
Ethernet SFP+ IP Video Operation			
10 GbE SFP+ 1			
10 GbE SFP+ 2			
Ethernet Functionality			

Test record – video and general performance tests

The following test record applies to all instruments.

Table 27: PRISM monitor video and general performance test record

Instrument Serial Number:		Certificate Number:		
Temperature:		RH %:		
Date of Calibration:		Technician:		
Performance test	**Minimum**	**Incoming**	**Outgoing**	**Maximum**
SDI Input Equalization Range				
SDI In 1 (1.5 Gb/s)	28 dB			
SDI In 2 (1.5 Gb/s)	28 dB			
SDI In 3 (1.5 Gb/s)	28 dB			
SDI In 4 (1.5 Gb/s)	28 dB			
SDI In 1 (3 Gb/s)	28 dB			
SDI In 2 (3 Gb/s)	28 dB			
SDI In 3 (3 Gb/s)	28 dB			
SDI In 4 (3 Gb/s)	28 dB			
SDI Serial Output Amplitude (AUX Out)				
SDI Out (1.5 Gb/s)	720 mV			880 mV
SDI Out (3 Gb/s)	720 mV			880 mV

Test record - 12G-SDI functional tests

The following test record applies to instruments with Option PHY-12G installed. Software option MP-FMT-4K is required to support 12G-SDI signals.

Table 28: 12G-SDI functional test record

Instrument Serial Number:	Certificate Number:		
Temperature:	RH %:		
Date of Calibration:	Technician:		
Functional test (incoming inspection)	**Incoming**	**Outgoing**	**Comments**
SD Eye waveform			
SD Jitter waveform			
HD Eye waveform			
HD Jitter waveform			
3G Eye waveform			
3G Jitter waveform			
12G-SDI Eye waveform			
12G-SDI Jitter waveform			

Test record - 12G-SDI video and general performance

The following test record applies to instruments with Option PHY-12G installed. Software option MP-FMT-4K is required to support 12G-SDI signals.

Table 29: 12G-SDI video and general performance test record

Instrument Serial Number:		Certificate Number:		
Temperature:		RH %:		
Date of Calibration:		Technician:		
Performance test	**Minimum**	**Incoming**	**Outgoing**	**Maximum**
SDI Input Equalization Range				
SDI In 1 (270 Mb/s)	22 dB			
SDI In 2 (270 Mb/s)	22 dB			
SDI In 3 (270 Mb/s)	22 dB			
SDI In 4 (270 Mb/s)	22 dB			
SDI In 1 (1.5 Gb/s)	28 dB			
SDI In 2 (1.5 Gb/s)	28 dB			
SDI In 3 (1.5 Gb/s)	28 dB			
SDI In 4 (1.5 Gb/s)	28 dB			
SDI In 1 (3 Gb/s)	28 dB			
SDI In 2 (3 Gb/s)	28 dB			
SDI In 3 (3 Gb/s)	28 dB			
SDI In 4 (3 Gb/s)	28 dB			
Eye Amplitude SD	760 mV			840 mV
Eye Amplitude HD	760 mV			840 mV
Eye Amplitude 3G	760 mV			840 mV

Functional tests

This section contains functional/operational checks appropriate to an incoming inspection.

The instrument must have been operating for a warm-up period of at least 20 minutes. (See Table 19 on page 10.)

Required equipment

The following equipment is required to perform the incoming inspection procedure.

Table 30: Required equipment – functional tests

Test equipment	Requirements	Example
Video test signal generator	1080p 59.94 3 Gb/s HD signals (required for option 3G) ■ 100% color bars ■ 4 CH embedded audio (Group 1)	Tektronix TG8000 with HD3G7 module or equivalent (TG700, SPG8000 or SPG8000A)
	1080i 59.94 1.5 Gb/s HD signals ■ 100% color bars ■ 10-bit shallow ramp ■ 100% sweep 1-15 MHz ■ 8 CH embedded audio (Groups 1&2) ■ Audio channels 1-8, set frequency to 1 kHz and amplitude to -20 dBFS	Tektronix TG8000 with SDI7 or HDVG7 modules or equivalent (TG700, SPG8000 or SPG8000A)
HD-BNC to BNC adapter or cable	75 Ω	
75 Ω coaxial cables (2 required)	RG-6 type coaxial cable with male BNC connectors, 1 to 2 meters long, suitable for use to 1500 MHz.	Belden 8281 or 1694A. Tektronix part numbers 012-0159-XX or 012-0159-01.
Precision 75 Ω terminator	75 Ω ±0.025% to 6 MHz, male BNC connector	Tektronix part number 011-0102-03 or Canare BCP-TA
SFP+ dual output SDI module		
SFP+ 10 GbE module	Customer owned source of 2022-6 IP video must be available	Alternatively, use an Embrionix EB22HDRT-LM-0513-02 SDI to 2022-6 encoder
Waveform Monitor	1.5 / 3 Gb/s input with CRC checking	Tektronix WFM8300 or equivalent (WFM7200, WFM5200, WFM2200A, WFM2300)
Voltmeter	0 V to 5 V range, 2% or better accuracy.	Fluke model 87
Computer and Ethernet Cable	Computer with Web browser and Ethernet port; appropriate length Ethernet cable (8 conductor RJ-45 terminations, either straight through or crossover).	Used for Ethernet test.
Mouse with USB interface	Any standard USB computer mouse	

Functional test procedures

Use the following procedures to check the basic functionality of the PRISM monitor and installed options. In general, you should test in the order presented, since later tests might depend on items checked in the earlier tests.

Instrument power-on

1. For the MPI, connect the DC Output of the external power supply to the rear panel DC input on the instrument.
2. Connect one end of the AC line cord to either the power supply of the MPI or the back panel AC input of the MPX.
3. Connect the other end of the AC line cord to a 100 to 240 VAC source.
4. Press the **Power** button to turn the instrument on.
5. After about 45 seconds, the initialization process should be complete.

Save the current instrument configuration as a preset

It is recommended that you save your configuration as a preset before recalling the factory preset. Perform the following steps to save a preset:

1. Touch the **Presets** ( ) icon to open the Preset selection controls at the bottom of the PRISM display.
2. Locate the Preset button icon you want to use for the current instrument configuration. Use the and arrow buttons or swipe left/right to navigate to the desired preset group (A–F).

NOTE. *When a preset has no content,* ***<empty>*** *is displayed on the preset button icon.*

3. When you have located the desired preset group, touch and hold the preset button to assign the current instrument configuration. The selected preset button will highlight and a confirmation box will appear.
4. Touch **OK** to assign the preset or touch **Cancel** to cancel the operation.
5. When you select OK, the preset name changes from **<empty>** to **Preset<number>**, where the number is the preset position within the preset group.
6. Touch the **Home** icon ( ) or touch anywhere within an application tile to close the Preset selection controls.

Restore the factory preset

1. Touch the **Settings** icon to open the Settings menu.
2. Touch **Presets**, and then touch **Recall Factory Preset**.

3. Touch **OK** in the confirmation dialog to confirm the recall.
4. Touch the **X** or **Home** icon ( ) to close the Settings menu.

LCD pixel defects test (MPI only)

1. Set the TG8000 video test signal generator to output a 3 Gb/s 3G Level A, 1080p 59.94, YCbCr 10 bit, Flat White test signal:
   a. Press the **MODULE** button until SDI7 OR HDVG7 appears.
   b. Press the **FORMAT** button until 1080 59.94p appears, and then press **ENTER**.
   c. Press **BACK** (TG8000) or **CANCEL** (TG700).
   d. Repeatedly press the **FLAT FIELD** button until **100% Flat Field (White)** appears, then press **ENTER**.
2. Connect the SDI signal output from the TG8000 generator to the **SDI IN 1** input of the PRISM monitor.
3. On the PRISM monitor, double tap the **Picture** application in tile 3 to display the application full screen.
4. Count any pixels stuck low (not white).
5. While the screen is all white, inspect for visible defects that exceed the limits. (See Table 31.)

NOTE. *Inspection should be done from 18″ away from the display, under normal room lighting. Loose dust on the front of the screen does not constitute a defect.*

6. Set the TG8000 video test signal generator to output a 3 Gb/s 3G Level A, 1080p 59.94, YCbCr 10 bit, Flat Black test signal:
   a. Repeatedly press the **FLAT FIELD** button until **0% Flat Field (Black)** appears.
   b. Press **ENTER** to confirm the selection.
7. Count any pixels stuck high (not black).
8. Check that the total number of pixels counted in steps 4 and 7 is less than six.
9. Record **Pass** or **Fail** in the test record for **LCD Pixel and Defects**.
10. On the PRISM monitor, double tap the **Picture** tile to return to the 4-tile display.

Table 31: LCD visual defects

Defect type [1]	Allowable defect	
Circular Defect [2]	>0.020″	None
	0.015″ to 0.020″	Maximum of two allowed within a 2I circle
Black Defect (opaque)	>0.005″	None
Linear Defect (Scratches)	>0.004″ width	None
	0.003″ to 0.004″wide	Max length 0.500″
	0.0021″ to 0.0030″wide	Max length 1.000″
	0.0010″ to 0.0020″wide	Max length 1.500″
Stains, discolorations, streaks, scuffs	Allowed if they fade when backlit	

1 Defects should be visible from 18" under normal lighting. If you have to hold it closer or use special lighting to see the defect, it is not a rejectable defect.

2 For irregular defects, use (LengthxWidth)/2.

Fan test

1. You should be able to hear the fans and feel air coming out the back of the instrument. At low temperatures the fans will turn slowly and be very quiet.
2. Record **Pass** or **Fail** in the test record for **Fan Test**.

USB port test

1. On the PRISM monitor, plug a USB mouse into any one of the available USB ports and verify that the mouse controls the cursor on the display.
2. Repeat for each USB port.
3. Record **Pass** or **Fail** in the test record for **USB Port Test**.

SDI input / Loop output operation test

1. Set the TG8000 video test generator to output a 3 Gb/s 3G Level A, 1080p 59.94, YCbCr 10 bit, 100% Color Bars, Group 1 embedded audio on SDI test signal:
   a. Press the **MODULE** button until SDI7 or HDVG7 appears.
   b. Press the **FORMAT** button until 1080 59.94p appears and then press **ENTER**.
   c. Press **BACK** (TG8000) or **CANCEL** (TG700).
   d. Press the up/down arrows until Audio (Embedded) appears. If Group 1 is not indicated then press the right/left arrows until Group 1 appears. Press **ENTER**.
   e. Use the right/left arrows until Status: Enable appears, then press **ENTER**.
   f. Repeatedly press the **COLOR BAR** button until 100% Color Bars appears.
2. Connect the color bar signal from the TG8000 generator to the **SDI IN 1** input on the PRISM monitor.
3. Connect the **SDI OUT** on the PRISM monitor to the SDI input of a waveform monitor that has CRC check capability.
4. On the PRISM monitor, a 4-tile display consisting of the Waveform, Video Session, Picture, and Audio applications should appear. Check that:
   a. The Waveform application shows a stable YPbPr parade, with all three components present and each being 700 mVp-p.
   b. The Video Session application indicates  for CRC STATUS.
   c. The Picture application shows a full field color bar waveform.
   d. The Audio application shows level bars for Channels 1-4 (nominally at –20 dBFS).
   e. The Status Bar **INPUT** readout indicates the correct signal format coming from the TG8000 generator.
5. On the waveform monitor, check that a color bar signal is being received and that no EDH/CRC errors are present.
6. Record **Pass** or **Fail** in the test record for **SDI Serial Output (AUX Out)**.
7. On the PRISM monitor, move the cable from SDI OUT to the **SDI SFP+ 1** connector using an HDBNC adapter or cable.
8. Repeat steps 4 and 5.
9. Record **Pass** or **Fail** in the test record for **BNC Input 1 to SFP+ Output 1**.

10. On the PRISM monitor:
    a. Move the cable from SDI IN 1 to **SDI IN 2**.
    b. Move the cable from SDI SFP+ 1 to **SDI SFP+ 2**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 2** to view the SDI IN 2 input.
    e. Touch anywhere outside the Input menu to close the menu.
11. Repeat steps 4 and 5.
12. Record **Pass** or **Fail** in the test record for **BNC Input 2 to SFP+ Output 2**.
13. On the PRISM monitor:
    a. Move the cable from SDI IN 2 to **SDI IN 3**.
    b. Move the cable from SDI SFP+ 2 to **SDI SFP+ 3**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 3** to view the SDI IN 3 input.
    e. Touch anywhere outside the Input menu to close the menu.
14. Repeat steps 4 and 5.
15. Record **Pass** or **Fail** in the test record for **BNC Input 3 to SFP+ Output 3**.
16. On the PRISM monitor:
    a. Move the cable from SDI IN 3 to **SDI IN 4**.
    b. Move the cable from SDI SFP+ 3 to **SDI SFP+ 4**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 4** to view the SDI IN 4 input.
    e. Touch anywhere outside the Input menu to close the menu.
17. Repeat steps 4 and 5.
18. Record **Pass** or **Fail** in the test record for **BNC Input 4 to SFP+ Output 4**.

Headphone functional test

1. Set the TG8000 video test generator to output a 3 Gb/s 3G Level A, 1080p 59.94, 100% Color Bars, Group 1 embedded audio on SDI test signal:
   a. Press the **MODULE** button until SDI7 or HDVG7 appears.
   b. Press the **FORMAT** button until 1080 59.94p appears, and then press **ENTER**.
   c. Press **BACK** (TG8000) or **CANCEL** (TG700).
   d. Press the up/down arrows until **Audio (Embedded)** appears. If Group 1 is not indicated, then press the right/left arrows until Group 1 appears. Press **ENTER**.
   e. Use the right/left arrows until **Status: Enable** appears, and then press **ENTER**.
   f. Press the up/down arrows until **Channel 1** is selected, and then press **ENTER**.
   g. Press the up/down arrow until the Frequency setting is shown, and then select 1000.0 Hz.
   h. Press the up/down arrow until the **Amplitude** selection is active, and then select -20 dBFS.
2. Connect the color bar signal from the TG8000 generator to the **SDI IN 1** input on the PRISM monitor.
3. Plug in a pair of headphones into either the 3.5 mm line out port on the back of the instrument, the 1/4" headphone jack on the front of the MPX, or the 3.5 mm headphone jack on the MPI rackmount option.

4. Listen for a 1 kHz tone on both channels. If necessary, adjust the volume as follows:

   a. Touch the **Volume** icon to open the audio controls.

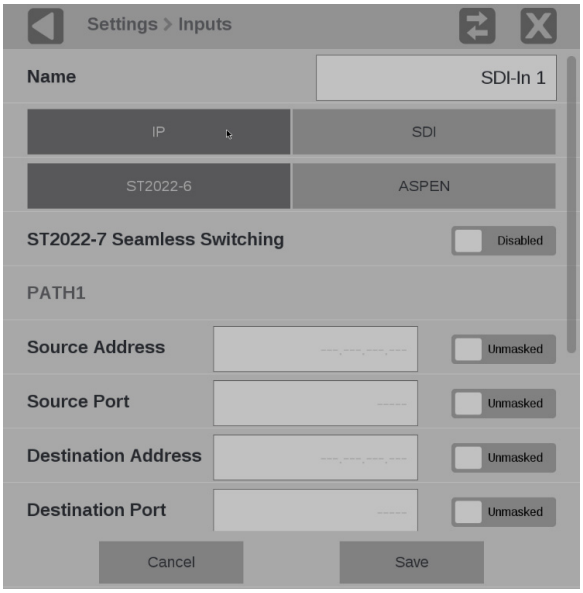
   b. Touch and move the slider control to adjust the volume.

   c. Touch anywhere on the screen to close the audio controls.

5. Record **Pass** or **Fail** in the test record for **Headphone Functionality**.

Ethernet SFP+ IP video operation test

1. On the PRISM monitor, install the 10 GbE SFP+ module (if a customer owned source of 2022-6 IP video is available) or an SDI-to-2022-6 converter module into the **10 GbE SFP+ 1** port.
2. Apply an appropriate video source to the 10 GbE SFP+ module.
3. On the PRISM monitor, select to display the IP input:
   a. Touch the **Settings** icon to open the Settings menu.
   b. Touch **Inputs** to open the Inputs submenu.
   c. Touch **SDI-In 1** to open the SDI-In 1 submenu.
   d. Touch **IP** to configure the SDI-In 1 input for an IP stream.
   e. For each of the IP input parameters (Source Address, Source Port, Destination Address, Destination Port), touch **Unmasked** to toggle the setting to **Masked** as shown below.



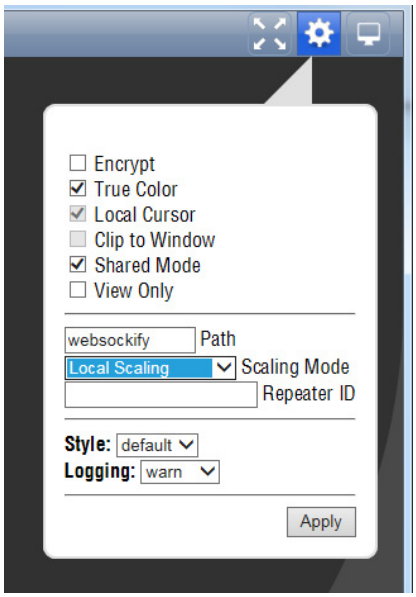
   f. Touch **Save** to confirm the changes.
   g. Touch the **X** or **Home** icon to close the Settings menu.
4. Verify that the displayed format and picture match the applied video signal.
5. Record **Pass** or **Fail** in the test record for **10 GbE SFP+ 1**.
6. Repeat steps 1 and 2 for the 10 GbE SFP+ 2 port.
7. Verify that the displayed format and picture match the applied video signal.
8. Record **Pass** or **Fail** in the test record for **10 GbE SFP+ 2**.

Ethernet test

1. Connect the instrument's Ethernet port to a computer that has a Web browser installed. You can use a Local Area Network (LAN) to interconnect the instrument and computer, or directly connect the instrument and computer Ethernet ports. A LAN interconnection is recommended as this simplifies setting the IP address.
2. On the PRISM monitor, open the **Settings** > **Network** page to view the **Control IP Port** address of the instrument to which you are going to connect.
3. Open a Web browser on the computer.
4. Enter the IP address of the PRISM monitor into the Web browser address line as shown below, adding **:6080/vnc.html** to the end of the address. The default IP address of the instrument is 192.168.1.2. Note that leading zeros are deleted in the address line.

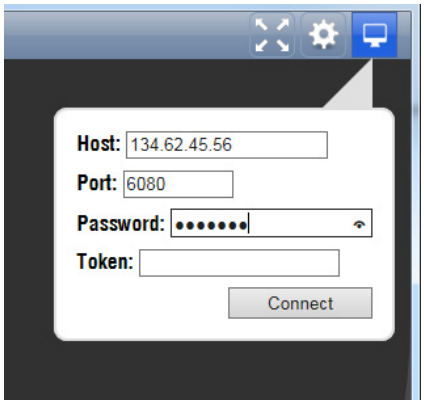
   `http://192.168.1.2:6080/vnc.html`
5. This opens a login Web page as shown below.

6. In the Control bar, click the **Settings** icon to open the Settings dialog.
7. In the Settings dialog, use the Scaling Mode drop-down list to select **Local Scaling**, and then click **Apply**.



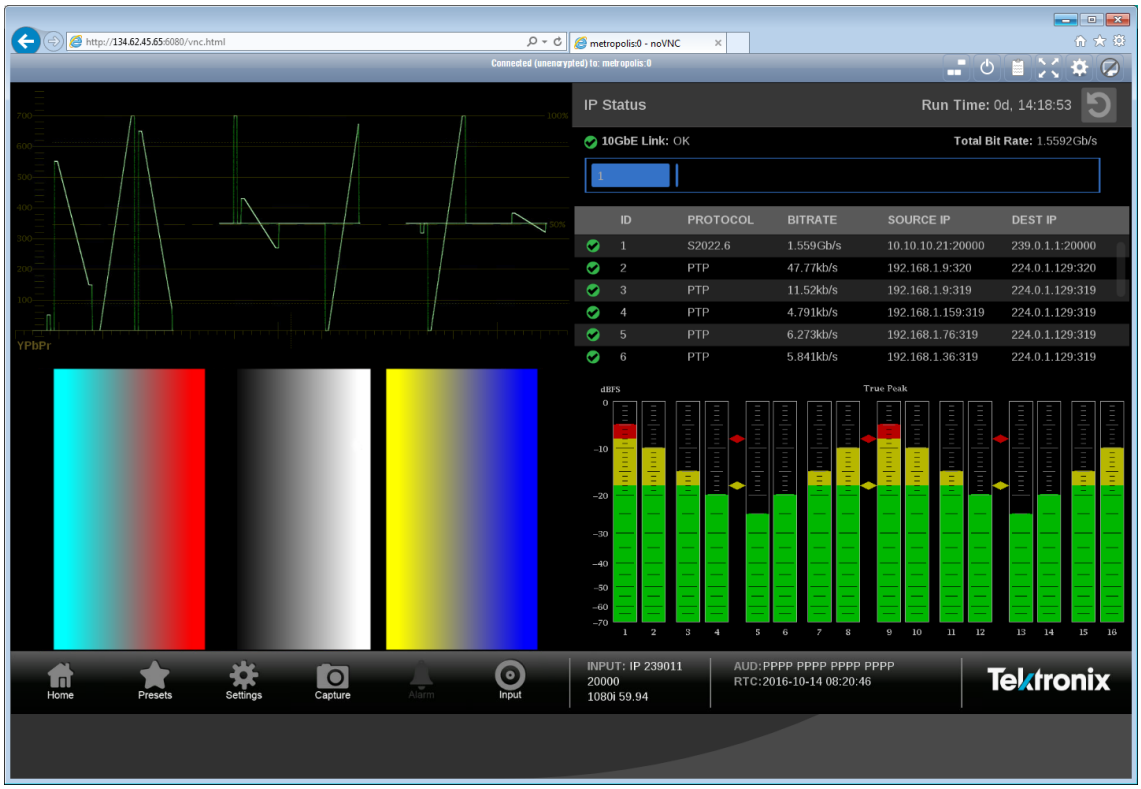
8. In the Control bar, click the **Connect** icon to open the Connect dialog.
9. In the Settings dialog, enter the default password **PRISM** (case sensitive), and then click **Connect**.

NOTE. *You can use the WEB REMOTE tab of the PRISM Settings > Network menu to change the default password for the remote Web connection.*



10. The Web browser connects to the instrument with the browser display appearing exactly like the instrument display as shown below.

11. Record **Pass** or **Fail** in the test record for **Ethernet Functionality**.



Video and general performance tests

This performance verification includes procedures that verify standard and option-equipped instruments.

Required equipment

Table 32: Required test equipment – video and general performance tests

Test equipment	Requirements	Example
Video test signal generator	1080p 59.94 3 Gb/s HD signals ■ 100% color bars ■ SDI Matrix Split Field Pathological Signal	Tektronix TG700 or TG8000 with HD3G7 module
	1080i 59.94 1.5 Gb/s HD signals ■ 100% color bars ■ SDI Matrix Split Field Pathological Signal	Tektronix TG700 or TG8000 with HDVG7 module
HD “Cable Clone” cable simulator	Simulate 0 to 150 meters of Belden 8281 equivalent in 10 meter steps, 300 kHz to 1.5 GHz range.	Faraday FFC010A075, FFC020A075, FFC040A075, and FFC080A075 (available as a boxed set of 4).
3G “Cable Clone” cable simulator	Simulate 0 to 150 meters of Belden 1694A equivalent in 10 meter steps, 0.3 MHz to 3 GHz range.	Faraday FFE010D075, FFE020D075, FFE040D075, and FFE080D075 (available as a boxed set of 4).
75 Ω coaxial cables (3 required)	RG-6 type coaxial cable with male BNC connectors, 1 to 2 meters long, suitable for use to 1500 MHz.	Belden 8281 or 1694A. Tektronix part numbers 012-0159-XX or 012-0159-01.
Test Oscilloscope	>12 GHz bandwidth with 75 Ω input, >20 dB input return loss to 12 GHz, ±3.5% or better vertical gain accuracy.	Tektronix DPO72004C with TCA75 Impedance Conversion Adapter.

General performance tests

The following procedures apply to all instruments except where labeled for specific models. Do all tests except those that exclude your model.

Instrument power-on

1. Refer to the Instrument power-on steps from the functional test procedures (See page 21.)
2. After about 45 seconds, the initialization process should be complete.

Save the current instrument configuration as a preset

It is recommended that you save your configuration as a preset before recalling the factory preset. Perform the following steps to save a preset:

1. Refer to the Save the current instrument configuration as a preset steps from the functional test procedures (See page 21.)
2. Touch the **Home** icon ( ) or touch anywhere within an application tile to close the Preset selection controls.

Restore the factory preset

1. Refer to the Restore the factory preset steps from the functional test procedures (See page 21.).
2. Touch the **X** or **Home** icon ( ) to close the Settings menu.

SDI input equalization range

This test uses a cable clone to simulate cable. This verifies that the PRISM monitor can receive signals that have passed through long cables.

270 Mb/s checks.

(requires Belden 8281 100 m test cable)

1. Connect the TG8000 SDI7 module SIGNAL 1 output to the SDI IN 1 input.

NOTE. *The DVG7 module can be used in place of the SDI7 module in general performance steps below.*

2. Set the SDI7 module to SD 525 59.94i format using the following steps:
   a. On the TG8000, press the front-panel **MODULE** button until the SDI7 module main menu appears.
   b. Press the down (▼) arrow button to access the output mode menu.
   c. Use the left (◄) or right (►) arrow button to scroll through the available output modes.

d. Select the SD output and press the **ENTER** button.

NOTE. *The dot will appear in front of the output mode on the display, to indicate that it is now the selected output mode.*

e. To select the signal format, press the **FORMAT** button.

f. Use the left (◄) or right (►) arrow button, or press the **FORMAT** button repeatedly, to select the 1080 59.94i signal format.

g. Press the **ENTER** button to confirm the selection.

NOTE. *The dot will appear at the left of the second line to indicate that the format was selected.*

h. Press the **BACK** button to exit FORMAT mode.

3. Select the 100% Color Bars signal using the following steps:

a. On the TG8000, press the front-panel **BARS** test signal button.

b. Use the left (◄) or right (►) arrow button, or press the **BARS** test signal button repeatedly to select 100% Color Bars.

NOTE. *100% Color Bars is the factory default signal.*

4. On the PRISM monitor, a Color Bar signal should be displayed.

5. Disconnect the SDI7 module from the SDI IN 1 input.

6. Connect the 100 m Belden 8281 test cable from the SDI7 module to the 80 m HD Cable Clone Input (FFC model, Belden 8281, 300 kHz to 1.5 GHz).

7. Using a 75 Ω female-to-female BNC adapter and a second cable, connect the Cable Clone Output to the SDI IN 1 input.

NOTE. *The 75 Ω BNC adapter should be included with the cable clone set.*

8. Select the SDI Matrix signal from the TG8000 SDI7 module by repeatedly pressing the **SDI** button until **SDI Matrix** is displayed and then press **ENTER**.

9. You should see a stable picture and waveform on the PRISM monitor display.

10. Connect or remove additional sections of the HD Cable Clone into the signal path to find the longest length that has stable waveform and picture displays and where the SDI FORMAT and CRC STATUS indicators remain green.

11. The HD Cable Clone set described in the Required Equipment List simulates up to 150 m of Belden 8281 when all four sections are connected. Added to the 100 m test cable, a total of 250m of equivalent cable is available. If your PRISM monitor does not show errors at this simulated cable length, observe the Video Session screen for 60 second to verify error-free operation.
12. No errors observed in 60 seconds indicates that the Cable Accommodation range is ≥250 m of Belden 8281.

NOTE. *If additional HD Cable Clone sections or known lengths of Belden 8281 cable are available, the test may be continued to find the point where CRC errors occur.*

---

13. Add the HD Cable Clone section to the actual cable lengths to get the total length in meters of Belden 8281 cable. Divide by 10 to calculate attenuation in dB at 135 MHz.
14. Record the calculated value in the test record for **SDI In 1 (270 Mb/s)**. Acceptable performance is 22 dB or greater.
15. On the PRISM monitor:
    a. Remove the HD Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 1 to **SDI IN 2**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 2** to view the SDI IN 2 input.
    e. Touch anywhere outside the Input menu to close the menu.
16. Repeat steps 9 through 13 to test the SDI In 2 input.
17. Record the calculated value in the test record for **SDI In 2 (270 Mb/s)**. Acceptable performance is 22 dB or greater.
18. On the PRISM monitor:
    a. Remove the HD Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 2 to **SDI IN 3**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 3** to view the SDI IN 3 input.
    e. Touch anywhere outside the Input menu to close the menu.
19. Repeat steps 9 through 13 to test the SDI In 3 input.
20. Record the calculated value in the test record for **SDI In 3 (270 Mb/s)**. Acceptable performance is 22 dB or greater.

21. On the PRISM monitor:
    a. Remove the HD Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 3 to **SDI IN 4**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 4** to view the SDI IN 4 input.
    e. Touch anywhere outside the Input menu to close the menu.
22. Repeat steps 9 through 13 to test the SDI In 4 input.
23. Record the calculated value in the test record for **SDI In 4 (270 Mb/s)**. Acceptable performance is 22 dB or greater.

1.5 Gb/s checks.

1. Connect the TG8000 SDI7 or HDVG7 SIGNAL 1 output to the **SDI IN 1** input.
2. Set the HDVG7 to 1080 59.94i format. Select the "100% Color Bars" signal.
3. On the PRISM monitor, a Color Bar signal should be displayed.
4. Disconnect the SDI7 or HDVG7 from the SDI IN 1 input.
5. Connect the cable from the SDI7 or HDVG7 to the 80 m HD Cable Clone Input (FFC model, Belden 8281, 300 kHz to 1.5 GHz).
6. Using a 75 Ω female-to-female BNC adapter and a second cable, connect the Cable Clone Output to the SDI IN 1 input.

NOTE. *The 75 Ω BNC adapter should be included with the cable clone set.*

7. Select the SDI Matrix signal from the TG8000 SDI7 or HDVG7 by repeatedly pressing the SDI button until **SDI Matrix** is displayed and then press **ENTER**.
8. You should see a stable picture and waveform on the PRISM monitor display. The Y Chan and C Chan CRC Error Status on the Video Session screen should both read **OK**.
9. Connect additional sections of the HD Cable Clone into the signal path to find the longest length of "cable" that does not generate any CRC errors in a 10-second period.

10. The HD Cable Clone set described in the Required Equipment List simulates up to 150 m of Belden 8281 when all four sections are connected. If your PRISM monitor does not appear to show CRC errors at this simulated cable length, reset the CRC Err Secs readout to zero by touching the  icon in the Video Session application display.

11. After 60 seconds, check the CRC Err Secs readouts. A "0" reading for both CRCs indicates that the Cable Accommodation range is ≥150 m of Belden 8281.

NOTE. *If additional HD Cable Clone sections are available, the test may be continued to find the point where CRC errors occur.*

---

12. Add the HD Cable Clone section lengths to get the total length in meters of Belden 8281 cable. Divide by 4 to calculate attenuation in dB at 750 MHz.

13. Record the calculated value in the test record for **SDI In 1 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.

14. On the PRISM monitor:

    a. Remove the HD Cable Clone sections from the signal input.

    b. Move the cable from SDI IN 1 to **SDI IN 2**.

    c. Touch the **Input** icon to open the Input menu.

    d. Touch **SDI-In 2** to view the SDI IN 2 input.

    e. Touch anywhere outside the Input menu to close the menu.

15. Repeat steps 2 through 12 to test the SDI In 2 input.

16. Record the calculated value in the test record for **SDI In 2 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.

17. On the PRISM monitor:

    a. Remove the HD Cable Clone sections from the signal input.

    b. Move the cable from SDI IN 2 to **SDI IN 3**.

    c. Touch the **Input** icon to open the Input menu.

    d. Touch **SDI-In 3** to view the SDI IN 3 input.

    e. Touch anywhere outside the Input menu to close the menu.

18. Repeat steps 2 through 12 to test the SDI In 3 input.

19. Record the calculated value in the test record for **SDI In 3 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.

20. On the PRISM monitor:
    a. Remove the HD Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 3 to **SDI IN 4**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 4** to view the SDI IN 4 input.
    e. Touch anywhere outside the Input menu to close the menu.
21. Repeat steps 2 through 12 to test the SDI In 4 input.
22. Record the calculated value in the test record for **SDI In 4 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.

3 Gb/s checks.

1. On the PRISM monitor:
    a. Remove the HD Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 4 to **SDI IN 1**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 1** to view the SDI IN 1 input.
    e. Touch anywhere outside the Input menu to close the menu.
2. Connect the TG8000 SDI7 or HD3G7 SIGNAL 1 output to the **SDI IN 1** input.
3. Set the SDI7 or HD3G7 to 1080 59.94p format. Select the "100% Color Bars" signal.
4. On the PRISM monitor, a Color Bar signal should be displayed.
5. Disconnect the SDI7 or HD3G7 from the SDI IN 1 input.
6. Connect the cable from the SDI7 or HD3G7 to the 80 m 3G Cable Clone Input (FFE model, Belden 1694A, 0.3 MHz to 3 GHz).
7. Using a 75 Ω female-to-female BNC adapter and a second cable, connect the 3G Cable Clone Output to the **SDI IN 1** input.

NOTE. *The 75 Ω BNC adapter should be included with the cable clone set.*

8. Select the SDI Matrix signal from the TG8000 SDI7 or HD3G7 by repeatedly pressing the SDI button until **SDI Matrix** is displayed and then press **ENTER**.
9. You should see a stable picture and waveform on the PRISM monitor display. The Y Chan and C Chan CRC Error Status on the Video Session screen should both read OK.

10. Connect additional sections of the 3G Cable Clone into the signal path to find the longest length of "cable" that does not generate any CRC errors in a 10-second period.
11. The 3G Cable Clone set described in the Required Equipment List simulates up to 150 m of Belden 1694A when all four sections are connected. If your instrument does not appear to show CRC errors at this simulated cable length, reset the CRC Err Secs readout to zero (refresh the active display by pressing a different display icon and then returning to the current display).
12. After 60 seconds, check the CRC Err Secs readouts. A "0" reading for both CRCs indicates that the Cable Accommodation range is ≥150 m of Belden 1694A.

NOTE. *If additional HD Cable Clone sections are available, the test may be continued to find the point where CRC errors occur.*

---

13. Add the 3G Cable Clone section lengths to get the total length in meters of Belden 1694A cable. Divide by 4 to calculate attenuation in dB at 1500 MHz.
14. Record the calculated value in the test record for **SDI In 1 (3 Gb/s)**. Acceptable performance is 28 dB or greater.
15. On the PRISM monitor:
    a. Remove the 3G Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 1 to **SDI IN 2**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 2** to view the SDI IN 2 input.
    e. Touch anywhere outside the Input menu to close the menu.
16. Repeat steps 3 through 13 to test the SDI In 2 input.
17. Record the calculated value in the test record for **SDI In 2 (3 Gb/s)**. Acceptable performance is 28 dB or greater.
18. On the PRISM monitor:
    a. Remove the 3G Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 2 to **SDI IN 3**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 3** to view the SDI IN 3 input.
    e. Touch anywhere outside the Input menu to close the menu.

19. Repeat steps 3 through 13 to test the SDI In 3 input.
20. Record the calculated value in the test record for **SDI In 3 (3 Gb/s)**. Acceptable performance is 28 dB or greater.
21. On the PRISM monitor:
    a. Remove the 3G Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 3 to **SDI IN 4**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 4** to view the SDI IN 4 input.
    e. Touch anywhere outside the Input menu to close the menu.
22. Repeat steps 3 through 13 to test the SDI In 4 input.
23. Record the calculated value in the test record for **SDI In 4 (3 Gb/s)**. Acceptable performance is 28 dB or greater.

SDI serial output amplitude (AUX Out)

This test measures the SDI Output signal amplitudes.

All instruments have an SDI OUT signal output on the rear panel. The signal output is equivalent to the selected input.

Serial output check (all models).

1. Set the PRISM monitor back to the Factory Preset. (See page 21, *Restore the factory preset*.)
2. Connect the TG8000 SDI7 SIGNAL 1 output to the **SDI IN 1** input on the PRISM monitor.
3. Set the SDI7 to provide a 1.5 Gb/s 100% color bar signal.
4. On the PRISM monitor, you should see a stable color bar picture and waveform display.
5. Install the TCA75 adapter in the test oscilloscope CH 1 input.

NOTE. *After connecting the adapter to the oscilloscope, run the Probe Calibration Routine to ensure accurate measurements.*

6. Connect the PRISM monitor SDI OUT to the oscilloscope CH 1 input.
7. Set the test oscilloscope as follows:

Parameter	Setting
CH 1 Vertical	Scale: 200 mV/div
	Position: 0.0 div
	Offset: 0.0 div
	Coupling: DC
	Bandwidth: 50.0 GHz
Horizontal:	Mode: Automatic
	Scale: 2 ns/div
	Delay mode: Off
FastAcq:	On/DPX
Trigger: A Event	Trigger Type: Glitch
	Source: CH 1
	Level: 0.0 V
	Width: 6.7 ns
	Glitch Width: Greater Than
	Polarity: Either
	Trigger if Glitch: Occurs
Trigger: A>B Seq	A only

8. Activate the test oscilloscope “H Bars” cursors. Set Cursor 1 to the middle of the bottom trace and Cursor 2 to the middle of the upper trace. Use the 7 ns wide region that does not contain transitions to align the cursors. Outside of the 7 ns region, check that the eye is open between transitions. See the following figure.

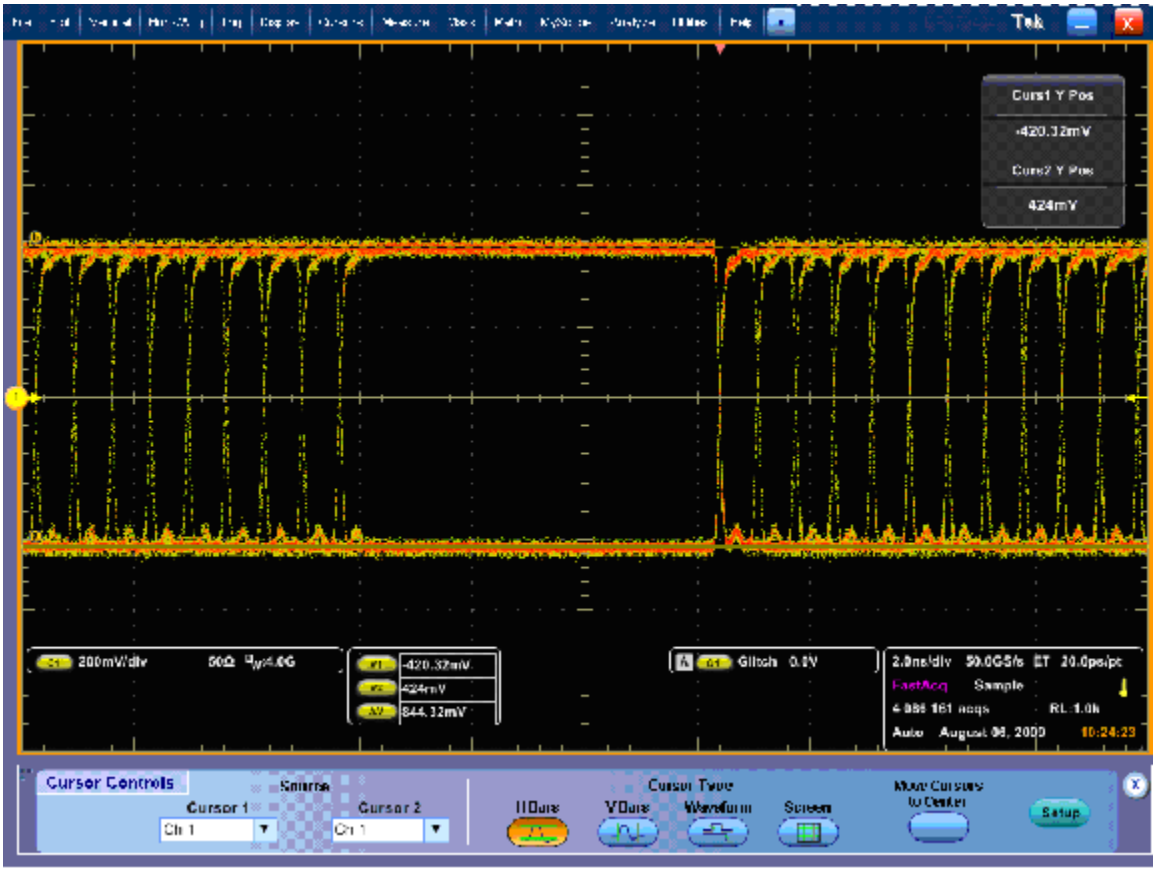


Figure 1: Serial output at 1.5 Gb/s, using Glitch Trigger mode

9. Record the measured amplitude (ΔV) in the test record for **SDI Out (1.5 Gb/s)**.

10. Set the SDI7 to provide a 3 Gb/s 100% color bar signal.

11. Check the signal amplitude, using the 7 ns wide region without transitions. The amplitude should be very similar to that observed in step 8. Outside of the 7 ns region, check that the eye is open between transitions. See the following figure.

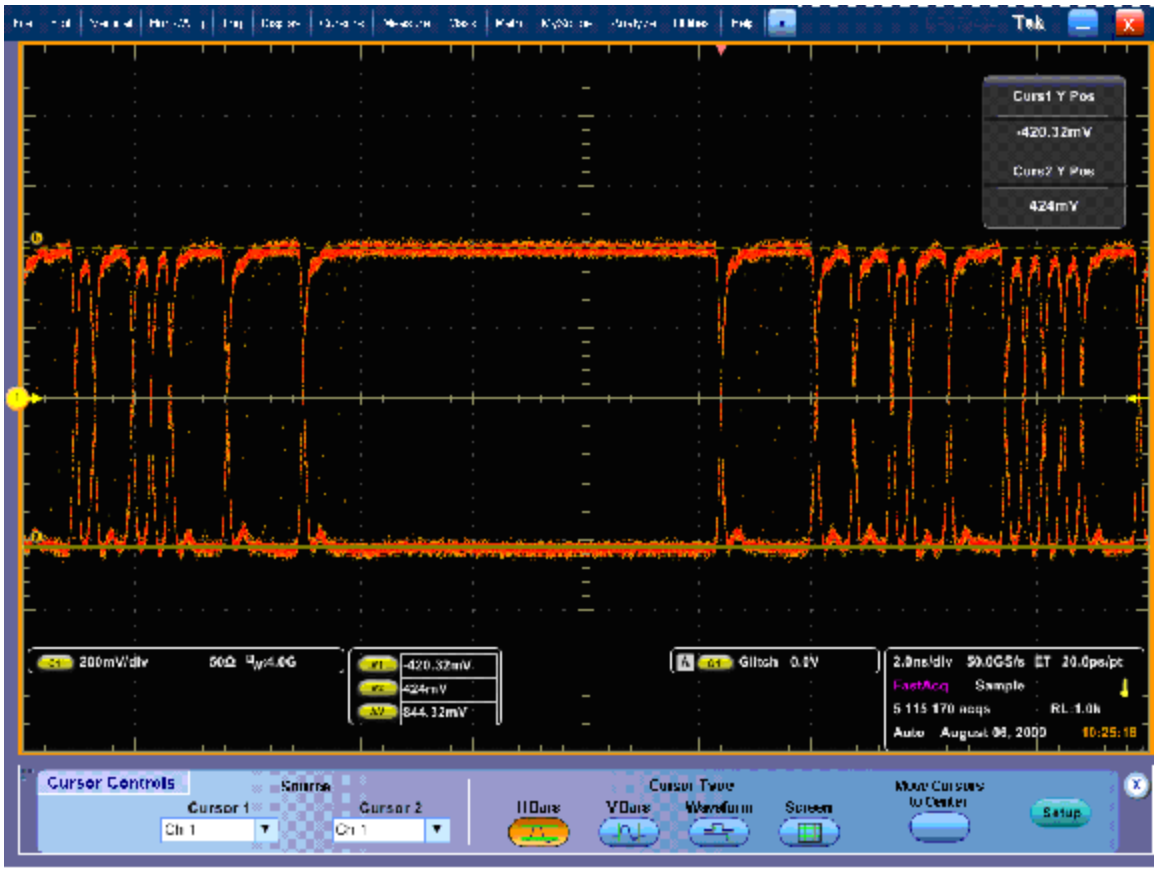


Figure 2: Serial output at 3 Gb/s, using Glitch Trigger mode

12. Record the measured amplitude (ΔV) in the test record for **SDI Out (3 Gb/s)**.

12G-SDI functional tests

This section contains functional/operational checks appropriate to an incoming inspection.

The 12G performance verification procedures apply to instruments with Option PHY-12G installed. Software option MP-FMT-4K is required to support 12G-SDI signals.

The instrument must have been operating for a warm-up period of at least 20 minutes. (See Table 19 on page 10.)

Required equipment

The following equipment is required to perform the incoming inspection procedure.

Table 33: Required equipment – 12G-SDI Eye functional tests

Test equipment	Requirements	Example
Video test signal generator	SD 525 59.94i signals HD 1080 59.94i 3G 1080 59.94p ■ 100% color bars	Tektronix TG8000 with SDI7 module
12G SDI Source	12G-SDI Mode 1 3480 x 2160 4:2:2 YCbCr 10b 50/59.94/60p	User provided 12G signal source
75 Ω coaxial cables	RG-6 type coaxial cable with male 75 Ω BNC connectors, 1 to 2 meters long, suitable for use to 6000 MHz.	1694A. Tektronix part number 012-0159-XX.
Computer monitor and cable (for use with MPX)	Any standard 1080-capable monitor with Display Port connector and cable	
Mouse with USB interface (for use with MPX)	Any standard USB computer mouse	

12G-SDI functional test procedures

Use the following procedures to check the 12G-SDI Eye functionality of the PRISM instrument. In general, you should test in the order presented, since later tests might depend on items checked in the earlier tests.

Instrument power-on

1. Refer to the Instrument power-on steps from the functional test procedures (See page 21.)
2. After about 45 seconds, the initialization process should be complete.

Save the current instrument configuration as a preset

It is recommended that you save your configuration as a preset before recalling the factory preset. Perform the following steps to save a preset:

1. Refer to the Save the current instrument configuration as a preset steps from the functional test procedures (See page 21.)
2. Touch the **Home** icon ( ) or touch anywhere within an application tile to close the Preset selection controls.

Restore the factory preset

1. Refer to the Restore the factory preset steps from the functional test procedures (See page 21.).
2. Touch the **X** or **Home** icon ( ) to close the Settings menu.

Eye and Jitter displays, SD, HD, 3G and 12G-SDI (Option PHY-12G only)

1. Connect the TG8000 SDI7 module output to the SDI 1 IN input on the PRISM monitor.
2. Set the SDI7 module to SD 525 59.94i format using the following steps:
   a. On the TG8000, push the front-panel **MODULE** button until the SDI7 module main menu appears.
   b. Push the down (▼) arrow button to access the output mode menu.
   c. Use the left (◄) or right (►) arrow button to scroll through the available output modes.
   d. Select the SD output and push the **ENTER** button.

   NOTE. *The dot will appear in front of the output mode on the display, to indicate that it is now the selected output mode.*

   e. To select the signal format, push the **FORMAT** button.
   f. Use the left (◄) or right (►) arrow button, or push the **FORMAT** button repeatedly, to select the 1080 59.94i signal format.

g. Push the **ENTER** button to confirm the selection.

NOTE. *The dot will appear at the left of the second line to indicate that the format was selected.*

h. Push the **BACK** button to exit FORMAT mode.

3. Select the 100% Color Bars signal using the following steps:

a. On the TG8000, push the front-panel **BARS** test signal button.

b. Use the left (◄) or right (►) arrow button, or push the **BARS** test signal button repeatedly to select 100% Color Bars.

NOTE. *100% Color Bars is the factory default signal.*

4. Select SDI 1 using the following steps:

NOTE. *The Eye and Jitter displays are only provided for SDI 1.*

a. Touch the **Input** icon ( ) from the Status bar at the bottom of the PRISM monitor.

b. Select **SDI-In 1** from the list of SDI Inputs.

c. Touch the **Home** icon ( ) or touch anywhere within an application tile to close the Input selection controls.

5. Double-tap any tile to display it full screen.

6. Press and hold anywhere on screen to display the application banner. Select Eye Display from the drop-down list.

7. Press and hold anywhere on screen to display the application banner. Touch the Tool icon and select Align from the Jitter HP Filter drop-down list.

8. Check for a stable eye diagram. Eye Amplitude and the actual wave shape depend on the generator signal. Eye Amplitude is typically 720 mV to 880 mV. Eye Rise time and Eye Fall time are typically 500 ps to 1500 ps.

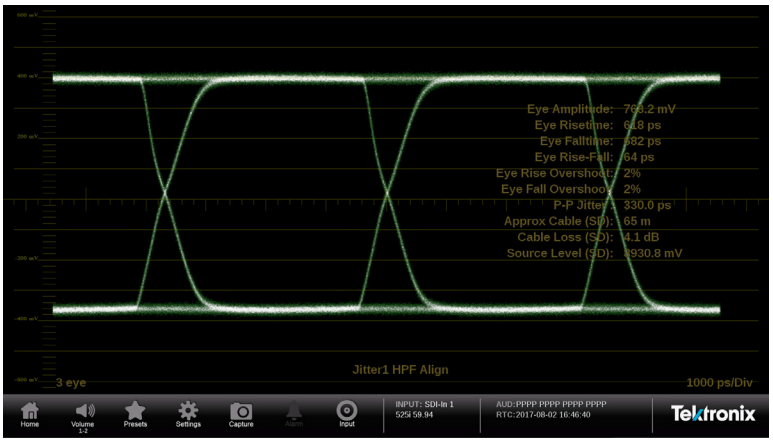


Figure 3: SD Eye waveform

9. Record Pass or Fail for SD Eye waveform in the test record.

10. Press and hold anywhere on screen to display the application banner. Select Jitter Display from the drop-down list.

11. Check that an active Jitter waveform appears. The P-P (Peak-to-Peak) Jitter measurement will depend on the generator signal, but will typically be less than 700 ps from a high quality source.

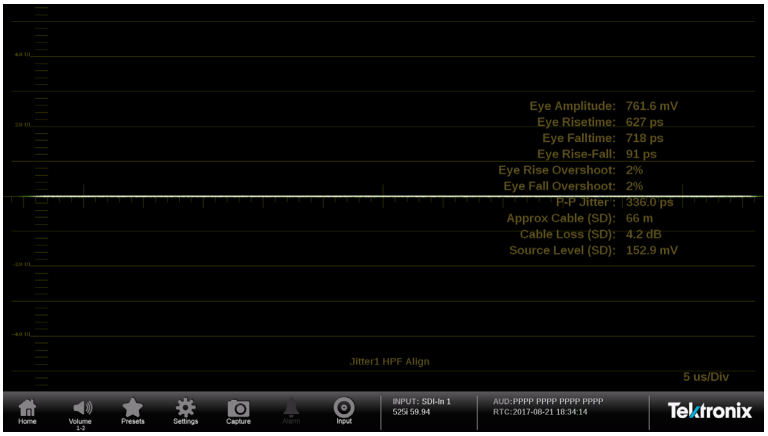


Figure 4: SD Jitter waveform

12. Record Pass or Fail for SD Jitter waveform in the test record.

13. Set the SDI7 module to HD 1080 59.94i using the following steps:

    a. On the TG8000, press the right arrow button (►) repeatedly to display HD (1920 x 1080) in the second line of the display.

    b. Press **ENTER** to activate HD (1920 x 1080) mode and display the format at the end of the first line. 1080 59.94i is the default.

14. Press and hold anywhere on screen to display the application banner. Select Eye Display from the drop-down list.

15. Check for a stable eye diagram. Eye Amplitude and the actual wave shape depend on the generator signal. Eye Amplitude is typically 720 mV to 880 mV. Eye Rise time and Eye Fall time are typically less than 270 ps.

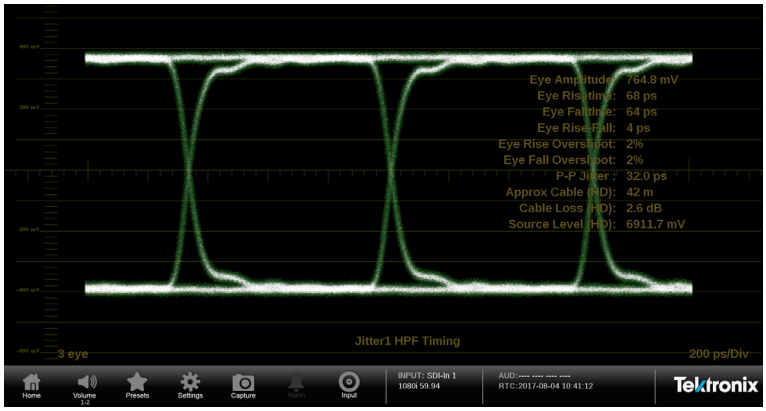


Figure 5: HD Eye waveform example

16. Record Pass or Fail for HD Eye waveform in the test record.

17. Press and hold anywhere on screen to display the application banner. Select Jitter Display from the drop-down list.

18. Check that an active Jitter waveform appears. The P-P Jitter measurement will depend on the generator signal, but will typically be less than 130 ps from a high quality source.

Figure 6: HD Jitter waveform

19. Record Pass or Fail for HD Jitter waveform in the test record.

20. Set the SDI7 module to 3G 1080 59.94p using the following steps:

    a. On the TG8000, press the right arrow button (►) repeatedly to display 3G-Level A (1920 x 1080) in the second line of the display.

    b. Press **ENTER** to activate 3G-Level A (1920 x 1080) mode and display the format at the end of the first line. 1080 59.94i is the default.

21. Press and hold anywhere on screen to display the application banner. Select Eye Display from the drop-down list.

22. Check for a stable eye diagram. Eye Amplitude and the actual wave shape depend on the generator signal. Eye Amplitude is typically 720 mV to 880 mV. Eye Rise time and Eye Fall time are typically less than 135 ps.

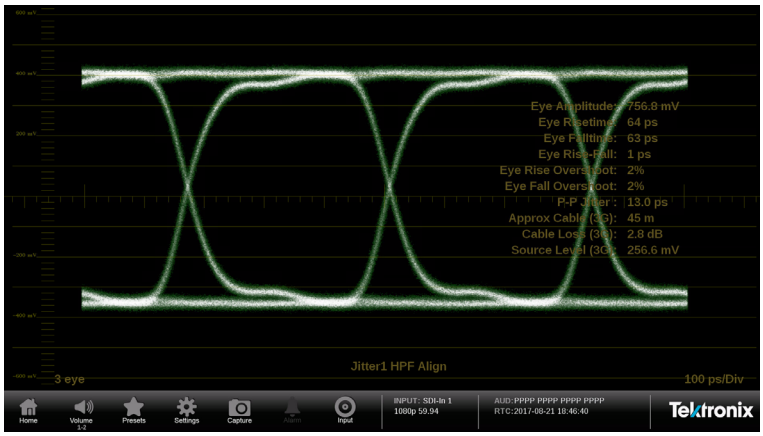


Figure 7: 3G Eye waveform

23. Record Pass or Fail for 3G Eye waveform in the test record.

24. Press and hold anywhere on screen to display the application banner. Select Jitter Display from the drop-down list.

25. Check that an active Jitter waveform appears. The P-P Jitter measurement will depend on the generator signal but will typically be less than 65 ps from a high quality source.

Figure 8: 3G Jitter waveform

26. Record Pass or Fail for 3G Jitter waveform in the test record.

27. Remove the cable from the SDI7 module output on the TG8000 and connect it to a user provided 12G SDI signal source.

NOTE. *The 12G-SDI Eye and Jitter displays are only available with Option PHY-12G.*

28. Press and hold anywhere on screen to summon the application banner. Select Eye Display from the drop-down list.

29. Check for a stable eye diagram. Eye Amplitude and the actual wave shape depend on the generator signal. Eye Amplitude is typically 720 mV to 880 mV.

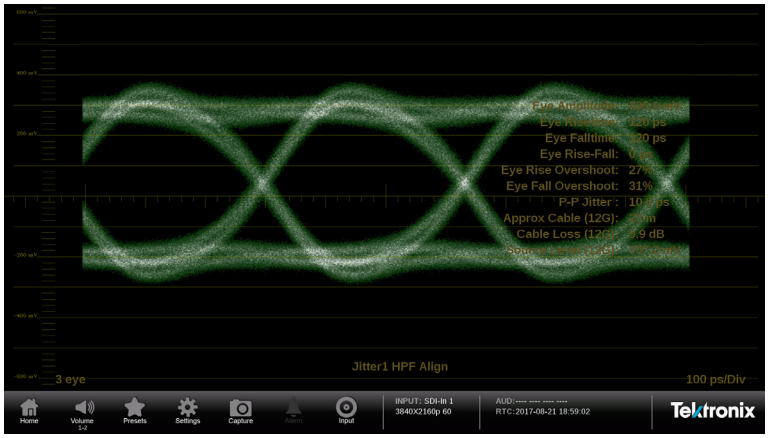


Figure 9: 12G-SDI Eye waveform

30. Record Pass or Fail for 12G-SDI Eye waveform in the test record.

31. Press and hold anywhere on screen to display the application banner. Select Jitter Display from the drop-down list.

32. Check that an active jitter waveform appears. The P-P Jitter measurement will depend on the generator signal.

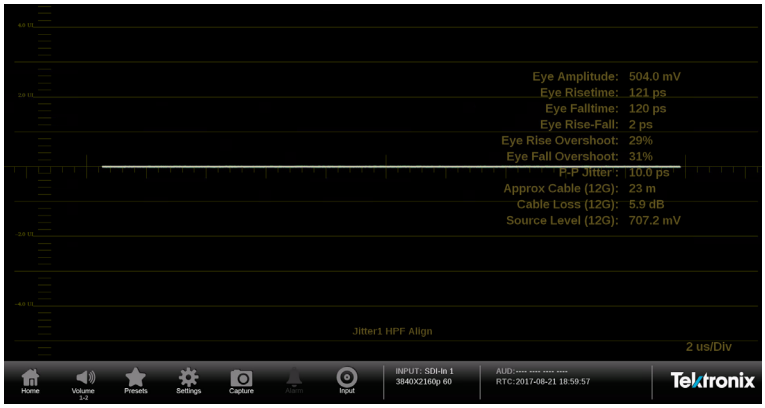


Figure 10: 12G-SDI Jitter waveform

33. Record Pass or Fail for 12G-SDI Jitter waveform in the test record.

12G-SDI general performance tests

This performance verification includes procedures that verify standard and option-equipped instruments.

The 12G-SDI performance verification procedures apply to instruments with Option PHY-12G installed. Software option MP-FMT-4K is required to support 12G-SDI signals.

Required equipment

Table 34: Required test equipment – 12G-SDI general performance tests

Test equipment	Requirements	Example
Video test signal generator	SD 525 59.94i signals HD 1080 59.94i 3G 1080 59.94p ■ 100% color bars ■ SDI Matrix	Tektronix TG8000 with SDI7 Optional modules: DVG7, HDVG7, and HD3G7
HD “Cable Clone” cable simulator	Simulate 0 to 150 meters of Belden 8281 equivalent in 10 meter steps, 300 kHz to 1.5 GHz range.	Faraday FFC010A075, FFC020A075, FFC040A075, and FFC080A075 (available as a boxed set of 4).
3G “Cable Clone” cable simulator	Simulate 0 to 150 meters of Belden 1694A equivalent in 10 meter steps, 0.3 MHz to 3 GHz range.	Faraday FFE010D075, FFE020D075, FFE040D075, and FFE080D075 (available as a boxed set of 4).
75 Ω coaxial cables (2 required)	RG-6 type coaxial cable with male BNC connectors, 1 to 2 meters long, suitable for use to 6000 MHz.	1694A. Tektronix part number 012-0159-01
HD test cable (for SD cable length accommodation test)	Belden 8281 with 75 Ω connector, length 100m ± ½ m	

12G-SDI general performance tests

The following procedures apply to all instruments except where labeled for specific models. Do all tests except those that exclude your model.

Instrument power-on

1. Refer to the Instrument power-on steps from the functional test procedures (See page 21.)
2. After about 45 seconds, the initialization process should be complete.

Save current instrument configuration as a preset

It is recommended that you save your configuration as a preset before recalling the factory preset. Perform the following steps to save a preset:

1. Refer to the Save current instrument configuration as a preset steps from the functional test procedures (See page 21.)
2. Touch the **Home** icon ( ) or touch anywhere within an application tile to close the Preset selection controls.

Restore the factory preset

1. Refer to the Restore the factory preset steps from the functional test procedures (See page 21.).
2. Touch the **X** or **Home** icon ( ) to close the Settings menu.

SDI input equalization range

This test uses a cable clone to simulate cable. This verifies that the PRISM monitor can receive signals that have passed through long cables.

270 Mb/s checks.

(requires Belden 8281 100 m test cable)

1. Connect the TG8000 SDI7 module SIGNAL 1 output to the SDI IN 1 input.

NOTE. *The DVG7 module can be used in place of the SDI7 module in general performance steps below.*

2. Set the SDI7 module to SD 525 59.94i format using the following steps:
   a. On the TG8000, press the front-panel **MODULE** button until the SDI7 module main menu appears.
   b. Press the down (▼) arrow button to access the output mode menu.
   c. Use the left (◄) or right (►) arrow button to scroll through the available output modes.

d. Select the SD output and press the **ENTER** button.

NOTE. *The dot will appear in front of the output mode on the display, to indicate that it is now the selected output mode.*

e. To select the signal format, press the **FORMAT** button.

f. Use the left (◄) or right (►) arrow button, or press the **FORMAT** button repeatedly, to select the 1080 59.94i signal format.

g. Press the **ENTER** button to confirm the selection.

NOTE. *The dot will appear at the left of the second line to indicate that the format was selected.*

h. Press the **BACK** button to exit FORMAT mode.

3. Select the 100% Color Bars signal using the following steps:

a. On the TG8000, press the front-panel **BARS** test signal button.

b. Use the left (◄) or right (►) arrow button, or press the **BARS** test signal button repeatedly to select 100% Color Bars.

NOTE. *100% Color Bars is the factory default signal.*

4. On the PRISM monitor, a Color Bar signal should be displayed.

5. Disconnect the SDI7 module from the SDI IN 1 input.

6. Connect the 100 m Belden 8281 test cable from the SDI7 module to the 80 m HD Cable Clone Input (FFC model, Belden 8281, 300 kHz to 1.5 GHz).

7. Using a 75 Ω female-to-female BNC adapter and a second cable, connect the Cable Clone Output to the SDI IN 1 input.

NOTE. *The 75 Ω BNC adapter should be included with the cable clone set.*

8. Select the SDI Matrix signal from the TG8000 SDI7 module by repeatedly pressing the **SDI** button until **SDI Matrix** is displayed and then press **ENTER**.

9. You should see a stable picture and waveform on the PRISM monitor display.

10. Connect or remove additional sections of the HD Cable Clone into the signal path to find the longest length that has stable waveform and picture displays and where the SDI FORMAT and CRC STATUS indicators remain green.

11. The HD Cable Clone set described in the Required Equipment List simulates up to 150 m of Belden 8281 when all four sections are connected. Added to the 100 m test cable, a total of 250m of equivalent cable is available. If your PRISM monitor does not show errors at this simulated cable length, observe the Video Session screen for 60 second to verify error-free operation.
12. No errors observed in 60 seconds indicates that the Cable Accommodation range is ≥250 m of Belden 8281.

NOTE. *If additional HD Cable Clone sections or known lengths of Belden 8281 cable are available, the test may be continued to find the point where CRC errors occur.*

---

13. Add the HD Cable Clone section to the actual cable lengths to get the total length in meters of Belden 8281 cable. Divide by 10 to calculate attenuation in dB at 135 MHz.
14. Record the calculated value in the test record for **SDI In 1 (270 Mb/s)**. Acceptable performance is 22 dB or greater.
15. On the PRISM monitor:
    a. Remove the HD Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 1 to **SDI IN 2**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 2** to view the SDI IN 2 input.
    e. Touch anywhere outside the Input menu to close the menu.
16. Repeat steps 5 through 13 to test the SDI In 2 input.
17. Record the calculated value in the test record for **SDI In 2 (270 Mb/s)**. Acceptable performance is 22 dB or greater.

1.5 Gb/s checks.

1. Connect the TG8000 SDI7 module SIGNAL 1 output to the SDI IN 1 input.
2. Set the SDI7 module to HD 1080 59.94i format using the following steps:
    a. On the TG8000, press the right arrow button (►) repeatedly to display HD (1920 x 1080) in the second line of the display.
    b. Press **ENTER** to activate HD (1920 x 1080) mode and display the format at the end of the first line. 1080 59.94i is the default.

NOTE. *The HDVG7 module can be used in place of the SDI7 module in general performance steps below.*

---

3. Select the 100% Color Bars signal
4. On the PRISM monitor, a Color Bar signal should be displayed.
5. Disconnect the SDI7 module from the SDI IN 1 input.
6. Connect the cable from the SDI7 module to the 80 m HD Cable Clone Input (FFC model, Belden 8281, 300 kHz to 1.5 GHz).
7. Using a 75 Ω female-to-female BNC adapter and a second cable, connect the Cable Clone Output to the SDI IN 1 input.

NOTE. *The 75 Ω BNC adapter should be included with the cable clone set.*

8. Select the SDI Matrix signal from the TG8000 SDI7 module by repeatedly pressing the **SDI** button until **SDI Matrix** is displayed and then press **ENTER**.
9. You should see a stable picture and waveform on the PRISM monitor display. The Y Chan and C Chan CRC Error Status on the Video Session screen should both read **OK**.
10. Connect additional sections of the HD Cable Clone into the signal path to find the longest length of "cable" that does not generate any CRC errors in a 10-second period.
11. The HD Cable Clone set described in the Required Equipment List simulates up to 150 m of Belden 8281 when all four sections are connected. If your PRISM monitor does not appear to show CRC errors at this simulated cable length, reset the CRC Err Secs readout to zero by touching the  icon in the Video Session application display.
12. After 60 seconds, check the CRC Err Secs readouts. A "0" reading for both CRCs indicates that the Cable Accommodation range is ≥150 m of Belden 8281.

NOTE. *If additional HD Cable Clone sections are available, the test may be continued to find the point where CRC errors occur.*

13. Add the HD Cable Clone section lengths to get the total length in meters of Belden 8281 cable. Divide by 4 to calculate attenuation in dB at 750 MHz.
14. Record the calculated value in the test record for **SDI In 1 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.
15. On the PRISM monitor:
    a. Remove the HD Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 1 to **SDI IN 2**.

c. Touch the **Input** icon to open the Input menu.

d. Touch **SDI-In 2** to view the SDI IN 2 input.

e. Touch anywhere outside the Input menu to close the menu.

16. Repeat steps 2 through 13 to test the SDI In 2 input.

17. Record the calculated value in the test record for **SDI In 2 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.

18. On the PRISM monitor:

a. Remove the HD Cable Clone sections from the signal input.

b. Move the cable from SDI IN 2 to **SDI IN 3**.

c. Touch the **Input** icon to open the Input menu.

d. Touch **SDI-In 3** to view the SDI IN 3 input.

e. Touch anywhere outside the Input menu to close the menu.

19. Repeat steps 2 through 13 to test the SDI In 3 input.

20. Record the calculated value in the test record for **SDI In 3 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.

21. On the PRISM monitor:

a. Remove the HD Cable Clone sections from the signal input.

b. Move the cable from SDI IN 3 to **SDI IN 4**.

c. Touch the **Input** icon to open the Input menu.

d. Touch **SDI-In 4** to view the SDI IN 4 input.

e. Touch anywhere outside the Input menu to close the menu.

22. Repeat steps 2 through 13 to test the SDI In 4 input.

23. Record the calculated value in the test record for **SDI In 4 (1.5 Gb/s)**. Acceptable performance is 28 dB or greater.

3 Gb/s checks.

1. On the PRISM monitor:
   a. Remove the HD Cable Clone sections from the signal input.
   b. Move the cable from SDI IN 4 to **SDI IN 1**.
   c. Touch the **Input** icon to open the Input menu.
   d. Touch **SDI-In 1** to view the SDI IN 1 input.
   e. Touch anywhere outside the Input menu to close the menu.
2. Connect the TG8000 SDI7 module SIGNAL 1 output to the **SDI IN 1** input.

NOTE. *The HD3G7 module can be used in place of the SDI7 module in general performance steps below.*

3. Set the SDI7 module to 3G 1080 59.94p format.
   a. On the TG8000, press the right arrow button (►) repeatedly to display 3G-Level A (1920 x 1080) in the second line of the display.
   b. Press **ENTER** to activate 3G-Level A (1920 x 1080) mode and display the format at the end of the first line. 1080 59.94p is the default.
4. Select the 100% Color Bars signal.
5. On the PRISM monitor, a Color Bar signal should be displayed.
6. Disconnect the SDI7 module from the SDI IN 1 input.
7. Connect the cable from the SDI7 module to the 80 m 3G Cable Clone Input (FFE model, Belden 1694A, 0.3 MHz to 3 GHz).
8. Using a 75 Ω female-to-female BNC adapter and a second cable, connect the 3G Cable Clone Output to the **SDI IN 1** input.

NOTE. *The 75 Ω BNC adapter should be included with the cable clone set.*

9. Select the SDI Matrix signal from the TG8000 SDI7 module by repeatedly pressing the SDI button until **SDI Matrix** is displayed and then press **ENTER**.
10. You should see a stable picture and waveform on the PRISM monitor display. The Y Chan and C Chan CRC Error Status on the Video Session screen should both read OK.
11. Connect additional sections of the 3G Cable Clone into the signal path to find the longest length of “cable” that does not generate any CRC errors in a 10-second period.

12. The 3G Cable Clone set described in the Required Equipment List simulates up to 150 m of Belden 1694A when all four sections are connected. If your instrument does not appear to show CRC errors at this simulated cable length, reset the CRC Err Secs readout to zero (refresh the active display by pressing a different display icon and then returning to the current display).
13. After 60 seconds, check the CRC Err Secs readouts. A "0" reading for both CRCs indicates that the Cable Accommodation range is ≥150 m of Belden 1694A.

NOTE. *If additional HD Cable Clone sections are available, the test may be continued to find the point where CRC errors occur.*

14. Add the 3G Cable Clone section lengths to get the total length in meters of Belden 1694A cable. Divide by 4 to calculate attenuation in dB at 1500 MHz.
15. Record the calculated value in the test record for **SDI In 1 (3 Gb/s)**. Acceptable performance is 28 dB or greater.
16. On the PRISM monitor:
    a. Remove the 3G Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 1 to **SDI IN 2**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 2** to view the SDI IN 2 input.
    e. Touch anywhere outside the Input menu to close the menu.
17. Repeat steps 3 through 14 to test the SDI In 2 input.
18. Record the calculated value in the test record for **SDI In 2 (3 Gb/s)**. Acceptable performance is 28 dB or greater.
19. On the PRISM monitor:
    a. Remove the 3G Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 2 to **SDI IN 3**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 3** to view the SDI IN 3 input.
    e. Touch anywhere outside the Input menu to close the menu.
20. Repeat steps 3 through 14 to test the SDI In 3 input.
21. Record the calculated value in the test record for **SDI In 3 (3 Gb/s)**. Acceptable performance is 28 dB or greater.

22. On the PRISM monitor:
    a. Remove the 3G Cable Clone sections from the signal input.
    b. Move the cable from SDI IN 3 to **SDI IN 4**.
    c. Touch the **Input** icon to open the Input menu.
    d. Touch **SDI-In 4** to view the SDI IN 4 input.
    e. Touch anywhere outside the Input menu to close the menu.
23. Repeat steps 3 through 14 to test the SDI In 4 input.
24. Record the calculated value in the test record for **SDI In 4 (3 Gb/s)**. Acceptable performance is 28 dB or greater.

Eye Pattern Vertical Gain Accuracy

This test uses an 800 mV standard SDI signal generated by an SDI7 module to check the Eye Gain.

1. Set the PRISM monitor back to the Factory Preset. (See page 21, *Restore the factory preset*.)
2. Connect the TG8000 SDI7 module SIGNAL 1 output to the **SDI IN 1** input on the PRISM monitor.
3. Set the SDI7 module to SD 525 59.94i format format using the following steps:
    a. From SDI7 CH1 top menu, press down arrow button (▼) once to display **OUTPUT MODE**.
    b. On the TG8000, press the left arrow button (◄) once to display SD in the second line of the display.
    c. Press **ENTER** to activate SD mode and display the format at the end of the first line. The default format is 525 59.94i.
4. Select the 100% Color Bars signal
5. On the PRISM monitor, touch and hold in tile 1 to display the toolbar. Select Eye Display from the drop-down list.
6. Double-tap tile 1 to make it full screen.
7. Check that the Eye Amplitude reading is between 760 mV and 840 mV. Record this level in the test record Eye Amplitude SD.
8. Set the SDI7 module to HD 1080 59.94i format using the following steps:
    a. On the TG8000, press the right arrow button (►) repeatedly to display HD (1920 x 1080) in the second line of the display.
    b. Press **ENTER** to activate HD (1920 x 1080) mode and display the format at the end of the first line. The default format is 1080 59.94i.

9. Check that the Eye Amplitude reading is between 760 mV and 840 mV. Record this level in the test record Eye Amplitude HD.

10. Set the SDI7 module to 3G 1080 59.94p format.

    a. On the TG8000, press the right arrow button (►) repeatedly to display 3G-Level A (1920 x 1080) in the second line of the display.

    b. Press **ENTER** to activate 3G-Level A (1920 x 1080) mode and display the format at the end of the first line. The default format is 1080 59.94p.

11. Check that the Eye Amplitude reading is between 760 mV and 840 mV. Record this level in the test record Eye Amplitude 3G.