

# Qx Series

IP/12G-SDI, 4K/UHD, HDR/WCG GENERATION,  
ANALYSIS & MONITORING

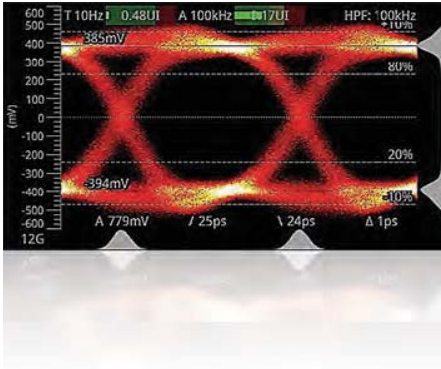
Advanced, Hybrid IP/SDI Test and Measurement



# Qx Series

## IP/12G-SDI, 4K/UHD, HDR/WCG Generation, Analysis & Monitoring

The Qx range brings together all the advanced Test & Measurement tools required for transitioning to the next generation of video formats. The instrument set includes tools for rapid fault diagnosis, compliance monitoring and product development.



### Fast, automated 12G physical layer analysis

Qx offers the fastest 12G-SDI physical layer testing, with its RTE™ (Real-time Eye) technology instantly highlighting any SMPTE compliance issues, including eye under/overshoot.

Additional 12G/6G/3G/HD-SDI physical layer tools include Jitter analysis with monitoring across five specified frequency bands, as well as UHD/HD pathological test patterns. Built-in automation control allows testing to be performed faster, more reliably and at lower cost.

An advanced 12G-STRESS option is available for stress testing and evaluation of SDI interfaces up to 12Gbit/s.



### Hybrid IP/SDI

The introduction of 4K/UHD, HDR/WCG and IP has led to a proliferation of new standards and formats. With the Qx platform you can operate in next generation Hybrid IP/SDI environments that require 4K/UHD (12G/6G/3G-SDI) and HD-SDI as well as SMPTE ST 2110\* and ST 2022-6 formats.

The high performance Qx 12G offers 4K/UHD-SDI generation, analysis and video/audio monitoring as standard. The IP Toolset provides tools for generation and analysis of IP video and audio traffic and IP Packet Interval Timing.



### Advanced HDR visualization & analysis toolset

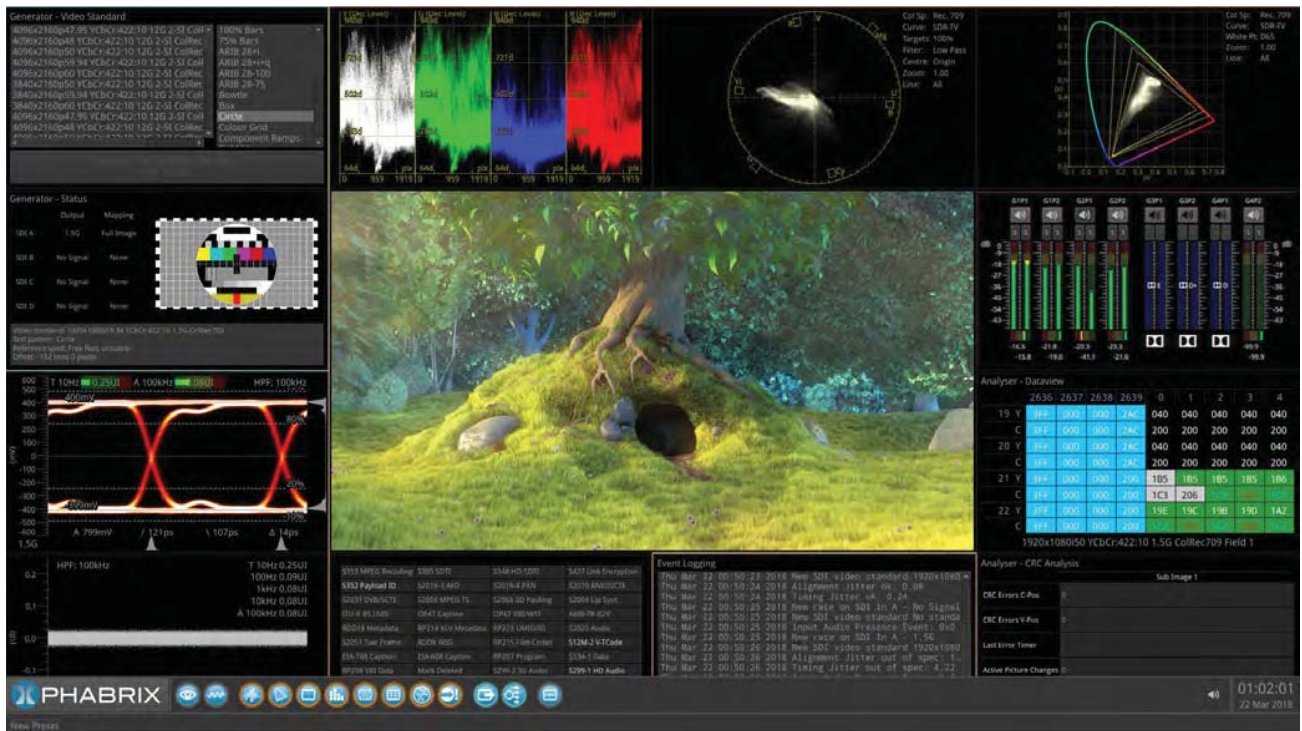
The Qx's comprehensive High Dynamic Range and Wide Color Gamut toolset offers new instruments to enhance the visualization and analysis of 4K/UHD and HD-SDI content to speed workflows.

The HDR/WCG tools include a signal generator, CIE chart, luminance heat-map, vectorscope and waveform, all supporting BT. 2100 HLG, PQ and Sony S-Log3 and S-Log3 (HDR Live).

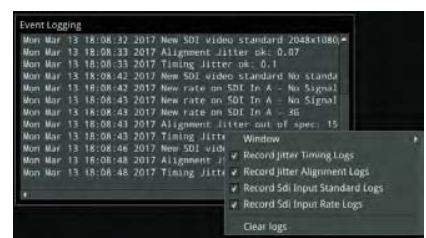
\*Upcoming software release

# User-defined Instrument Display Layout

Optimized instrument display with scalable windows to suit individual operators



## Control and Logging



### REST API

- The Qx can be controlled remotely over a network via a REST API
- Integrated broadcast control and monitoring and automated manufacturer testing

### VNC and Instrument Screenshots

- Remote interface employs VNC technology to deliver 16 simultaneous scalable instrument windows over a network
- SFTP and Browser network access to event logs, screenshots and user presets

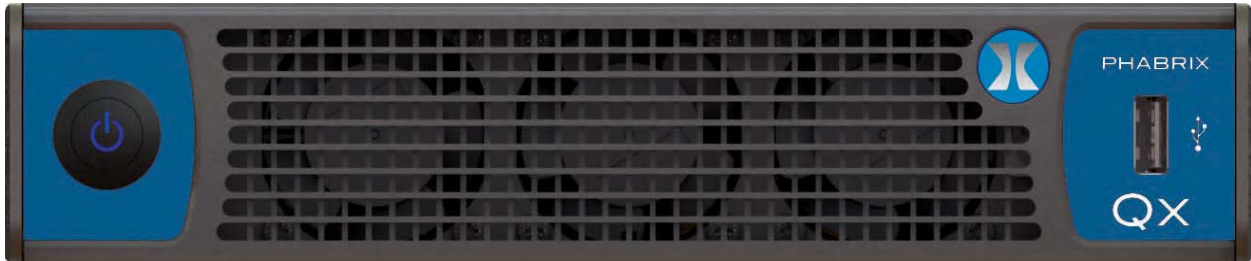
### Event Logger

Configurable event log file:

- SDI Input standard/status
- SDI physical layer timing and alignment jitter
- Rest API requests
- IP-Tx, IP-Rx, Flow and SFP records
- Reference Locking
- Audio input presence

# Qx IP

## IP, 3G-SDI + HDR Generation, Analysis & Monitoring



▶ REAL-TIME EYE

The advanced Qx IP offers hybrid IP/SDI generation, analysis and video/audio monitoring for SMPTE 2110\* and 2022-6 plus 3G/HD-SDI environments. Designed for IP network traffic analysis and stress testing, the solution is also available with RTE™ (Real-time Eye) 3G/HD-SDI physical layer testing. Qx IP can be upgraded with a comprehensive HDR/WCG analysis toolset, signal generator and even 12G/6G-SDI performance. An advanced 12G-STRESS option is available for stress testing and evaluation of SDI interfaces up to 12G.

### Key Features

#### IP Generation & Analysis

- SMPTE ST 2110\* and ST 2022-6 decapsulation / encapsulation
- Packet Interval Timing (PIT) analysis histogram for monitoring network traffic
- PIT Logging\* offers effective longer-term network monitoring
- Packet Profile Generator for stress testing video networks
- Stream & network analysis tools
- Network management multicast support (IGMP2,3)

#### 3G-SDI Generation & Analysis

- Simultaneous 3G/HD-SDI generation and analysis
- Waveform monitor for YRGB/YUV monitoring
- Vectorscope for checking color bias / conformity
- Test pattern generation, including Pathological and moving patterns
- 32 channel audio signal generation and embedding
- Video and audio monitoring
- REF locking and timing analysis

#### HDR / WCG Generation & Analysis (option)

- Support for BT. 2100 HLG PQ and Sony S-Log3 and S-log3 (HDR Live)
- CIE chart (Rec. 709, Rec. 2020, ST 2086)
- HDR Heat-map highlights signals beyond SDR
- HDR test pattern generator
- Waveform with code value and Nits

- Vectorscope with Graticules / Targets for HDR, SDR and Wide Color Gamut

#### Physical Layer Testing (option)

- HD/3G/6G/12G-SDI RTE™ (Real-Time Eye) options for testing SMPTE compliance issues, including under/overshoot
- Jitter analysis in five specified frequency bands

#### 12G-SDI STRESS (option)

- Advanced Generator tools with PRBS generation, control of SDI driver amplitude and jitter insertion
- Jitter FFT\*
- PRBS Analyzer
- Pathological Detector

#### System Features

- Logging
- Configuration presets

#### Control

- Remote interface employing VNC technology providing up to 16 simultaneous instrument windows
- TCP/IP interface for remote control and automated testing

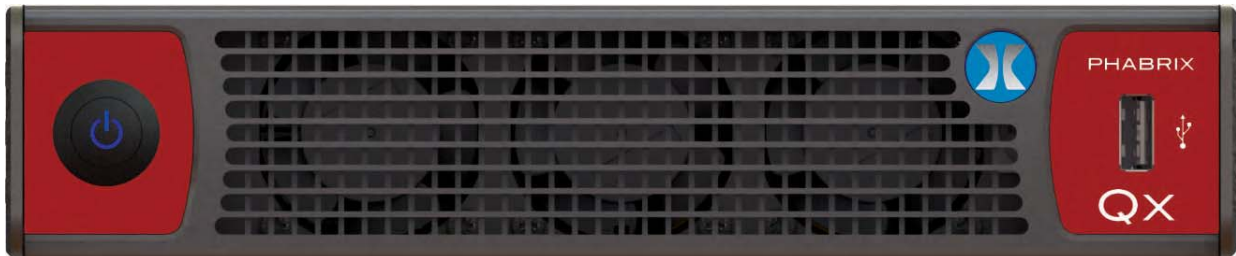
#### Form Factor

- Compact ½ 1 RU

\*Upcoming software release

# Qx 12G

## IP, 4K/UHD (12G-SDI) + HDR Generation, Analysis & Monitoring



### REAL-TIME EYE

The top of the range Qx 12G is designed for next generation, hybrid IP/SDI environments using 4K/UHD (12G/6G/3G-SDI) and HD-SDI plus SMPTE 2110\* and 2022-6. The high performance Qx 12G offers 4K/UHD-SDI generation, analysis and video/audio monitoring as standard. It's available with ultra-responsive, 12G/6G/3G/HD RTE™ (Real-time Eye) physical layer testing, and can be upgraded to offer HDR instruments plus advanced IP traffic analysis and stress testing. An advanced 12G-STRESS option is available for stress testing and evaluation of SDI interfaces up to 12G.

### Key Features

#### 4K/UHD (12G/6G/3G/HD-SDI) Generation & Analysis

- Simultaneous generation and analysis
- 12-bit YRGB/YUV waveform monitor with H,V zoom
- Vectorscope for checking colour bias / conformity
- Test pattern generation, including Pathological and moving patterns
- 32 channel audio signal generation and embedding
- Video and audio monitoring
- REF locking and timing analysis

#### IP Generation & Analysis (option)

- SMPTE ST 2110\* and ST 2022-6 decapsulation / encapsulation
- Packet Interval Timing (PIT) analysis histogram for monitoring network traffic
- PIT Logging\* offers effective longer-term network monitoring
- Packet Profile Generator for stress testing video networks
- Stream & network analysis tools
- Network management multicast support (IGMP2,3)

#### HDR / WCG Generation & Analysis (option)

- Support for BT. 2100 HLG PQ and Sony S-Log3 and S-log3 (HDR Live)
- CIE chart (Rec. 709, Rec. 2020, ST 2086)
- HDR Heat-map highlights signals beyond SDR
- HDR test pattern generator
- Waveform with code value and Nits

- Vectorscope with Graticules / Targets for HDR, SDR and Wide Color Gamut

#### Physical Layer Testing (option)

- HD/3G/6G/12G-SDI RTE™ (Real-time Eye) option for testing SMPTE compliance issues, including under/overshoot
- Jitter analysis in five specified frequency bands

#### 12G-SDI STRESS (option)

- Advanced Generator tools with PRBS generation, control of SDI driver amplitude and jitter insertion
- Jitter FFT\*
- PRBS Analyzer
- Pathological Detector

#### System features

- Logging
- Configuration presets

#### Control

- Remote interface employing VNC technology providing up to 16 simultaneous instrument windows
- TCP/IP interface for remote control and automated testing

#### Form factor

- Compact ½ 1 RU

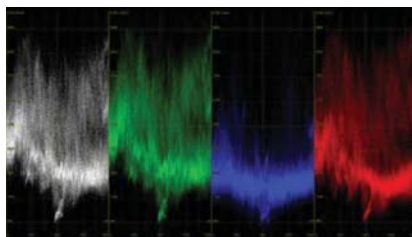
\*Upcoming software release

# Core Toolset



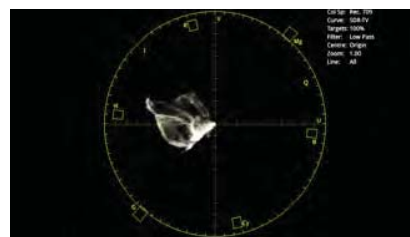
## Analyzer - Picture

- Scaling from 1/16 to Full Screen
- Cursors linked to Waveform and Data View
- Tooltip display of pixel location in the image



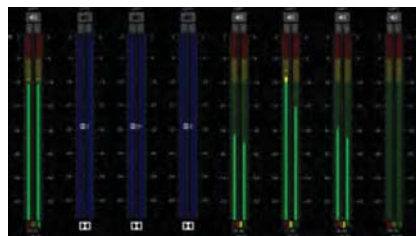
## Analyzer - Waveform

- Cursor linked to Picture and Data View
- Single line mode linked to Picture Cursor
- Configurable H and V Graticules
- Parade, Single line, H & V Mag, Brightness, Persistence and Monochrome controls
- A wide selection of YCbCr, YGBR and GBR parade modes
- Tooltip display of Waveform data with mouse



## Analyzer - Vectorscope

- 12 bit processing
- 0.5x to 4x Magnification
- 75% and 100% Targets for ITU-R Rec. 709, Rec. 2020 and HDR formats
- Single line mode linked to Picture Cursor
- Tooltip display of Cb, Cr and Hue Angle
- IQ axis on/off



## Analyzer - Audio Meters

- Metering of up to 32 channels of embedded audio
- Metering Ballistics: PPM-I, PPM-II, Vu, Vu-Fr
- Scales: dBFS, dBu -18, dBu -20, BBC, DIN45406, NordicN9
- Adjustable Peak Hold times from Off, 0.1 s to Inf
- Audio Pair Phase Meters
- Detection of Dolby DE, DD, DD+
- Tooltip display of Numerical Value, SDI group and pair, Dolby type



## Analyzer - Data View

- Allows analysis of complex faults particularly in an R&D environment
- Detailed view of data words in the SDI stream with tooltip hint
- Navigate function for rapid access to a required line, pixel or TRS word
- Color coding to help identification
- Cursor linked to Picture and Waveform

SDI1 SMPTE Ancillary	SDI2 SMPTE	SDI3 SMPTE	SDI4 SMPTE	SDI5 SMPTE
SDI1-A SPD	SDI1-A PPM	SDI1-A AUDIO	SDI1-A VIDEO	SDI1-A VIDEO
SDI1-B SPD	SDI1-B PPM	SDI1-B AUDIO	SDI1-B VIDEO	SDI1-B VIDEO
SDI1-C SPD	SDI1-C PPM	SDI1-C AUDIO	SDI1-C VIDEO	SDI1-C VIDEO
SDI1-D SPD	SDI1-D PPM	SDI1-D AUDIO	SDI1-D VIDEO	SDI1-D VIDEO
SDI1-E SPD	SDI1-E PPM	SDI1-E AUDIO	SDI1-E VIDEO	SDI1-E VIDEO
SDI1-F SPD	SDI1-F PPM	SDI1-F AUDIO	SDI1-F VIDEO	SDI1-F VIDEO
SDI1-G SPD	SDI1-G PPM	SDI1-G AUDIO	SDI1-G VIDEO	SDI1-G VIDEO
SDI1-H SPD	SDI1-H PPM	SDI1-H AUDIO	SDI1-H VIDEO	SDI1-H VIDEO
SDI1-I SPD	SDI1-I PPM	SDI1-I AUDIO	SDI1-I VIDEO	SDI1-I VIDEO
SDI1-J SPD	SDI1-J PPM	SDI1-J AUDIO	SDI1-J VIDEO	SDI1-J VIDEO
SDI1-K SPD	SDI1-K PPM	SDI1-K AUDIO	SDI1-K VIDEO	SDI1-K VIDEO
SDI1-L SPD	SDI1-L PPM	SDI1-L AUDIO	SDI1-L VIDEO	SDI1-L VIDEO
SDI1-M SPD	SDI1-M PPM	SDI1-M AUDIO	SDI1-M VIDEO	SDI1-M VIDEO
SDI1-N SPD	SDI1-N PPM	SDI1-N AUDIO	SDI1-N VIDEO	SDI1-N VIDEO
SDI1-O SPD	SDI1-O PPM	SDI1-O AUDIO	SDI1-O VIDEO	SDI1-O VIDEO
SDI1-P SPD	SDI1-P PPM	SDI1-P AUDIO	SDI1-P VIDEO	SDI1-P VIDEO
SDI1-Q SPD	SDI1-Q PPM	SDI1-Q AUDIO	SDI1-Q VIDEO	SDI1-Q VIDEO
SDI1-R SPD	SDI1-R PPM	SDI1-R AUDIO	SDI1-R VIDEO	SDI1-R VIDEO
SDI1-S SPD	SDI1-S PPM	SDI1-S AUDIO	SDI1-S VIDEO	SDI1-S VIDEO
SDI1-T SPD	SDI1-T PPM	SDI1-T AUDIO	SDI1-T VIDEO	SDI1-T VIDEO
SDI1-U SPD	SDI1-U PPM	SDI1-U AUDIO	SDI1-U VIDEO	SDI1-U VIDEO
SDI1-V SPD	SDI1-V PPM	SDI1-V AUDIO	SDI1-V VIDEO	SDI1-V VIDEO
SDI1-W SPD	SDI1-W PPM	SDI1-W AUDIO	SDI1-W VIDEO	SDI1-W VIDEO
SDI1-X SPD	SDI1-X PPM	SDI1-X AUDIO	SDI1-X VIDEO	SDI1-X VIDEO
SDI1-Y SPD	SDI1-Y PPM	SDI1-Y AUDIO	SDI1-Y VIDEO	SDI1-Y VIDEO
SDI1-Z SPD	SDI1-Z PPM	SDI1-Z AUDIO	SDI1-Z VIDEO	SDI1-Z VIDEO

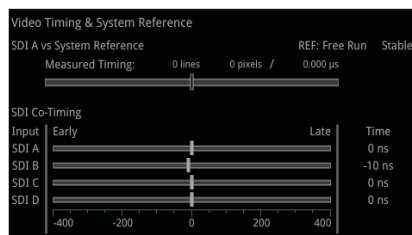
## Analyzer - Ancillary Status

- Simple grid layout for rapid visual checking of VANC/ANC ancillary data packets
- Tooltip hints for ANC Data types
- Packet type display: Present, Absent or Fault

Input	Payload Identifiers (SMPTE ST 352)
SDI A (3G)	Y-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet) C-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet)
SDI B (3G)	Y-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet) C-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet)
SDI C (3G)	Y-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet) C-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet)
SDI D (3G)	Y-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet) C-pos: 1920x1080p50 YCbCr422:10 3G A HLG ColRec2020 (from ST 352 packet)

## Analyzer - Video Standard

- Display of detected SMPTE S352 Payload ID for each SDI Link and Subframe
- Manual Over-ride of S352 ID
- Selection of SMPTE Video Format
- Indication of S352 errors



## Video Timing & System Reference

- Measurement of the timing of inputs against reference
- Indication of Reference status and stability
- Indication of the relative co-timing of input SDI channels
- Graphical and Numeric display

Interface	Up
MAC Address	00:1F:7F:00:4E:93
IP Addressing Mode	Dynamic
IP Address	192.168.0.62
Gateway	192.168.0.1
DNS Server	192.168.0.10
mDNS Hostname	qx-020115.local
REST API	Listening on port 8080
VNC Server	Disabled

## Network & Automation

- Reporting of Qx Management/Control Port information and Interface Status
- Reporting of IP and MAC Address and mDNS Hostname
- Reporting of REST API and VNC Server Status and user control enable/disable
- Configuration of Static IP address/Mask, Gateway and DNS Server

# IP Toolset



SFP IP Network		
	SFP A (Media Rx)	SFP B (Media Tx)
SFP Module	Present	Present
Carrier Signal	Present	Present
Interface	Up	Up
MAC Addr	00:1F:7F:01:4E:93	00:1F:7F:02:4E:93
IP Addressing Mode	Static	Static
IP Addr	192.168.1.20 / 24	192.168.1.30 / 24
Gateway	192.168.1.1	192.168.1.1
Total Tx pkts	624	17736650032
Total Rx pkts	9185408695	4796

## SFP IP Network

- Reporting of presence of SFPs, SFP MAC and IP addresses (flow source IP address), and interface status
- Tx and Rx packet counters for indication of traffic activity
- User configuration of SFP IP Addresses, Masks and Gateway Addresses

SFP Information		
	SFP A (Media Rx)	SFP B (Media Tx)
Vendor	Intel	Intel
Part Number	8000000000000000	8000000000000000
Serial Number	0000000000000000	0000000000000000
Wavelength	1550nm	1550nm
Power	0dBm	0dBm
Length	0m	0m

## SFP Information

- SFP Status information for monitoring the physical network connection
- Indication of SFP Vendor part and laser characteristics
- Rx and Tx power for debug of fibre connectivity
- Optical link length indicator

IP Receive		
	SFP A (Media Rx)	SFP B (Media Tx)
IP Addr	192.168.1.20	192.168.1.30
Port	80	80
Protocol	TCP	TCP
Sequence	1000000000	1000000000
CRC	0	0

## IP Receive

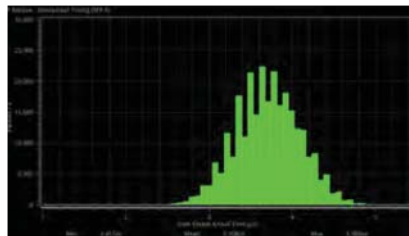
- Reporting of the IP Flows available to the receiver and user selection of the required flow
- Indication of Qx locked status, Protocol, Src and Dst IP and Port Numbers, SSRC, Packet Counts, Sequence and CRC errors
- Configuration of Multicast Destination IP address and subsequent Multicast Join request

## Network Traffic Analysis (Option)

SFP A Network Statistics		
	Rx Cumulative	Tx Cumulative
Packets	212	3222048118
Good Packets	212	3222048118
Bytes	18000	8000000000000
Bad Pkts	0	0
Multicast	0	0
Unicast	0	0
Broadcast	0	0
VLAN	0	0

## SFP A Network Statistics

- Reporting of SFP cumulative Receive traffic
- Indication of Packet types : Multicast, Unicast, Broadcast, VLAN
- Indication of Packet sizes and Cumulative number of packets for each size



## IP Receive - Inter-packet Timing

- Stream health reporting using histogram to visualise the distribution of inter-packet arrival times
- Packet counts mapped against arrival times (us)
- Easy diagnosis of congestion with Max, Mean and Min inter-packet arrival times
- Log or Linear scales

Stats - IP Receive (SFP A)		
	Sub Image 1	1.5G Signal - Clock Divisor 1.000
Counters Stable	True	
Active Samples Per Line	1920	
Active Lines Per Field	540	
Total Samples Per Line	2640	
Total Lines Frame/Field1	563	
Total Lines Field2	562	
Payload ID Y-Pos	85 05 00 01	
Payload ID C-Pos	unnecessary	

## IP Receive Statistics

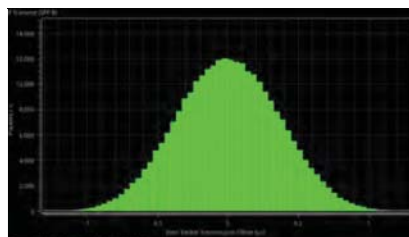
- Reporting of Receiver flow video statistics and stability
- Total and Active Samples per Line and Lines per Frame
- Indication of SMPTE ST 352 Payload ID

## Network Traffic Generation (Option)

SFP B Network Statistics		
	Rx Cumulative	Tx Cumulative
Packets	212	3222048118
Good Packets	212	3222048118
Bytes	18000	8000000000000
Bad Pkts	0	0
Multicast	0	0
Unicast	0	0
Broadcast	0	0
VLAN	0	0

## SFP B Network Statistics

- Reporting of SFP cumulative Transmit traffic
- Indication of Packet types : Multicast, Unicast, Broadcast, VLAN
- Indication of Packet sizes and Cumulative number of packets for each size



## IP Transmit

- Configuration of Transmission Flow Unicast or Multicast destination addresses, Port Numbers and SSRC
- Automatic calculation of Multicast Destination MAC address from Destination IP Address
- Flow Control On/Off

Packet Profile Generator		
	SFP A (Media Rx)	SFP B (Media Tx)
Distribution Range	212	3222048118
IP Addr	192.168.1.20	192.168.1.30
Port	80	80
Protocol	TCP	TCP
Sequence	1000000000	1000000000
CRC	0	0

## Packet Profile Generator

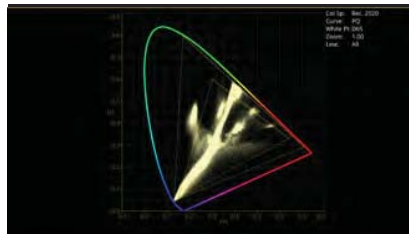
- Injection of Inter-packet jitter onto outgoing flow
- Gaussian or Uniform distribution
- Log or Linear scales

## HDR Toolset (Option)



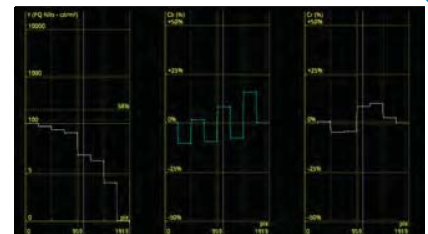
### Picture - False Color Highlighting

- Programmable 'Heat Map' to highlight luminance zones providing quick identification of shadows, skin or mid-tones or specular highlights
- 7 simultaneous programmable color overlay bands
- Presets for HDR and SDR ranges plus User Custom



### Analyzer - CIE Chart

- CIE 1931 x,y display
- Single line mode linked to picture cursor
- Pan and Zoom
- ITU-R BT. 709, BT. 2020 and ST 2086 gamut overlays
- Tooltip co-ordinate display
- Support for BT. 1886, BT. 2100 HLG and PQ, Sony S-Log3, S-Log3 (HDR Live)



### HDR Waveform and Generator

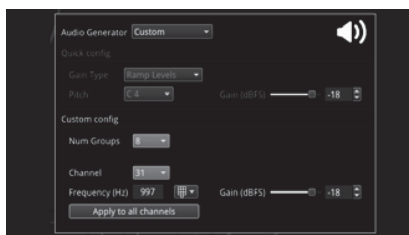
- Waveform HDR gratitudes with Nits/Cd/m<sup>2</sup>
- BT. 2408 diffuse white markers
- SDR patterns mapped to HDR Rec. BT. 2020 containers – useful for like for like set-up of HDR and SDR monitors and line checks
- Full Rec. 2020 patterns
- Support for BT. 1886, BT. 2100 HLG and PQ, Sony S-Log3, S-Log3 (HDR Live)

## Generator Toolset (option)



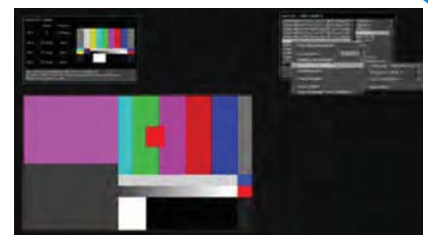
### Video Generation

- 12G/6G/3G/1.5G 4K/UHD and 2K/HD SDI signal generation
- Support for Single, Dual and Quad links with single, square and 2SI sub-images, Level A and B
- Moving test patterns
- 422, 444, 4224 and 4444, YCbCr and RGB Formats
- Locked to reference with control of output timing



### Audio Generation

- 32 channels of embedded audio generation
- Choice of Fixed Tones or Chromatic Scale – to help with channel identification
- Choice of Fixed or Ramp levels – to help with channel identification
- Custom config of number of active audio groups and channels and fully variable frequency
- Master Gain control



### Pathological Generation

- SDI pathological - SDI Stress patterns, Eq, PLL and CheckField
- User definable combination of SDI stress and conventional patterns up to Full Frame

# 12G-SDI Stress Toolset (Option)



## Advanced Generator Tools

- Generation of PRBS-7, 9, 15, 23, 31
- SDI Scrambler and Sync Bit Insertion on/off
- Control of SDI Driver amplitude +/-10%
- Control of jitter insertion frequency, amplitude and type
- Control of pre-emphasis\*

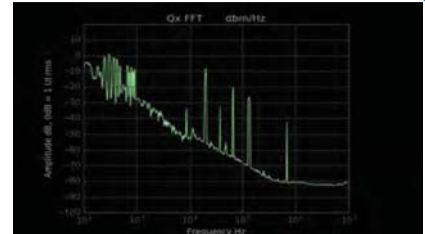
PRBS - Analysis

	Clock Rate	Total Rx (Gb)	Total Errors	BER
SDI A	385	3	1.9315e-10	
SDI B	385	3	1.9315e-10	
SDI C	385	3	1.9315e-10	
SDI D	385	3	1.9315e-10	

PRBS-31

## PRBS Analyzer

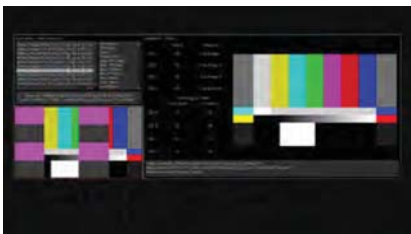
- Indication of PRBS cumulative received data and PRBS type
- Reported cumulative errors
- Calculated Bit Error Rate (BER)



## Jitter FFT\*

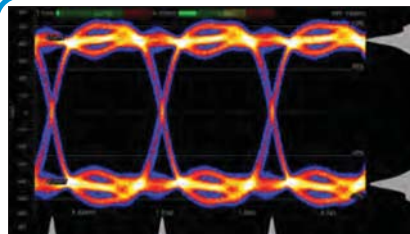
- Spectral analysis of SDI Jitter
- Easy identification of jitter harmonic components

# Physical Layer Toolset (Option)



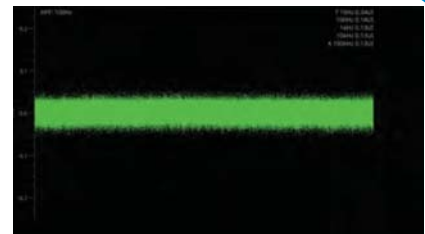
## Pathological Detector

- Generator Status indication of rate at which the Video pattern generator is creating SDI pathological conditions
- Indication of PLL and EQ pathological rates/second
- Detection on each active SDI link
- Real time GPI outputs of Pathological Detect for external equipment triggering



## SDI EYE Analysis

- Real-Time Eye (RTE) for testing SMPTE compliance
- DC Coupled and Automatic Measurements of: Amplitude, Rise and Fall time, Jitter and Under/Overshoot
- Amplitude and Time Histograms
- Single or Multiple Eyes with choice of color and Heat-Map Overlay
- Infinite Persistence modes



## SDI Jitter Analysis

- Real-Time SMPTE Jitter measurements down to 10Hz
- 10Hz, 100Hz, 1kHz, 10kHz, 100kHz filters
- H, 2H, F, 2F, V Trigger
- Infinite Persistence modes
- +/- 0.25 to +/- 8 UI vertical scale adjustment

\*Upcoming software release

# Specifications



## Qx IP

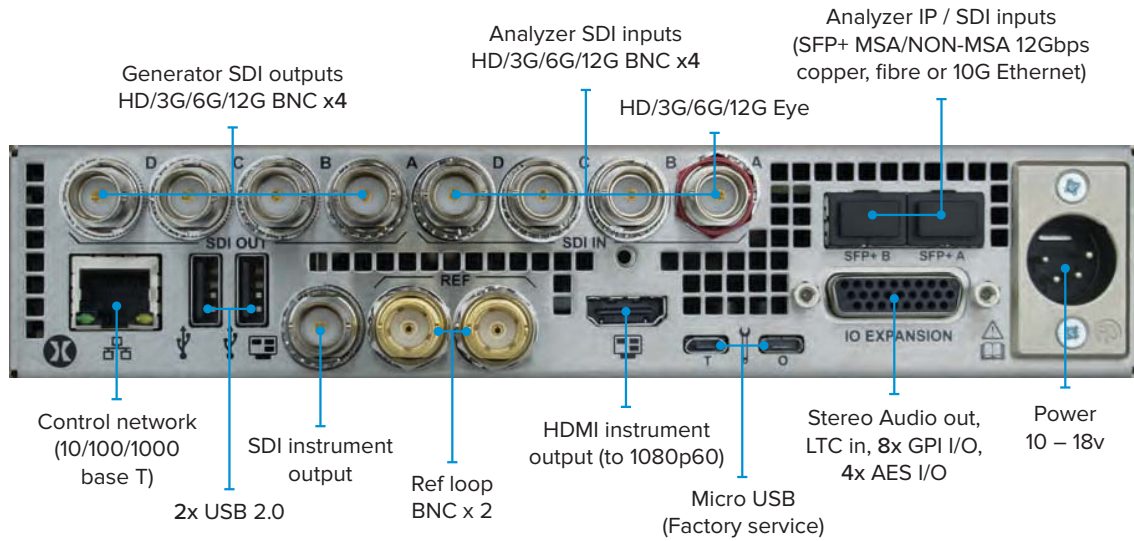
## Qx 12G

Formats supported (generation, analysis & monitoring)		
IP SMPTE 2022-6	●	○
IP SMPTE 2110*	○	○
3G/HD-SDI	●	●
12G/6G-SDI	○	●
Video inputs / outputs		
4 x SDI for HD, 3G, 6G, 12G 75 Ohm terminated BNC Inputs	○	●
4 x SDI for HD, 3G, 75 Ohm terminated BNC Inputs	●	N/A
4 x SDI for HD, 3G, 6G, 12G 75 Ohm BNC Outputs	○	●
4 x SDI for HD, 3G, 75 Ohm BNC Outputs	●	N/A
RTE Real-time Eye input (12G/6G/3G/HD-SDI) x 1 (SDI input A) BNC	○	○
SFP+ MSA/NON-MSA 12 Gbps copper or fibre SDI, 10 G Ethernet	○	○
Audio inputs / outputs		
4 x 75 Ohm AES selectable I/O (26 pin high density 'D' Type socket)	●	●
1 x Stereo analog audio output (26 pin high density 'D' Type socket)	●	●
8 channel 48kHz PCM audio on HDMI and SDI Instrument output	●	●
User interface		
HDMI 1.4 instrument output, 1920 x 1080, 4:4:4 RGB, Type A	●	●
Reference		
2 x 75 Ohm BNC high impedance looping reference input, tri-level or B&B with cross lock	●	●
Networking & control		
10/100/1000 BASE-T	●	●
8 x bi-directional GPI (26 pin high density 'D' Type socket)	●	●
Monitoring		
Internal Beeper	●	●
Form factor		
253 x 44 x 211 mm (width x height x depth) excluding projections	●	●
1.9 kg weight	●	●
Electrical		
Power consumption 50W typical, 70W max	●	●
4 Pin XLR power connector, 12V nominal (10V-18V)	●	●
AC Power adapter (included), 90-264VAC, 120W	●	●
Warranty		
Warranty (1 year standard increased to 3 - 5 years with Extended Warranty package)	●	●

\*Upcoming software release

● Standard  
○ Optional

# Rear panel



# Ordering

## Qx IP

PHQX01-IP	Qx IP hybrid IP/SDI analyzer for ST 2022-6 (Decapsulator) and 3G/HD-SDI (1RU, ½ rack)
PHQX01E-IP	Qx IP hybrid IP/SDI analyzer for ST 2022-6 (Decapsulator) and 3G/HD-SDI with Eye / Jitter toolset (1RU, ½ rack)

10G Ethernet SFPs must be ordered separately for Encap and Decap, see PHSFP-10GE-SR

### Options

PHQX0-IP-ENC	IP license for ST 2022-6 Encapsulator+
PHQX0-IP-NAT	IP network traffic analysis toolset
PHQX0-IP-NGT	IP network traffic generation toolset (Packet Profile Generator) – requires Video signal generator (PHQXO-GEN)
PHSFP-10GE-SR	10G Ethernet SFP+, short range up to 300m (Qx IP supports 2 x SFP+)
PHQXO-HDR	HDR/WCG toolset with CIE 1931 chart, HDR Heat-map
PHQXO-GEN	Video signal generator for IP and SDI
PHQXO-UHD	UHD (12G/6G-SDI) support
PHQXM-01E	Eye / Jitter toolset upgrade for PHQX01-IP (return to factory upgrade)
PHQXO-12G-STRESS	Advanced 12G-SDI Stress Toolset [requires PHQXO-GEN, PHQXO-UHD and PHQXM-01E]
PHQXK1	19" rack mount kit for 1x Qx IP
PHQXK2	19" rack mount kit for 2x Qx IP
PHQXK3	9.5" rack mount kit for 1x Qx IP
PHQXK4	10.5" rack mount kit for 1x Qx IP

### Extended Warranty

PHQX-3YEAR	3 Year Warranty for Qx IP*
PHQX-5YEAR	5 Year Warranty for Qx IP*

## Qx 12G

PHQX01	Qx 12G UHD/HD-SDI analyzer / generator (1RU, ½ rack)
PHQX01E	Qx 12G UHD/HD-SDI analyzer / generator with Eye / Jitter toolset (1RU, ½ rack)

### Options

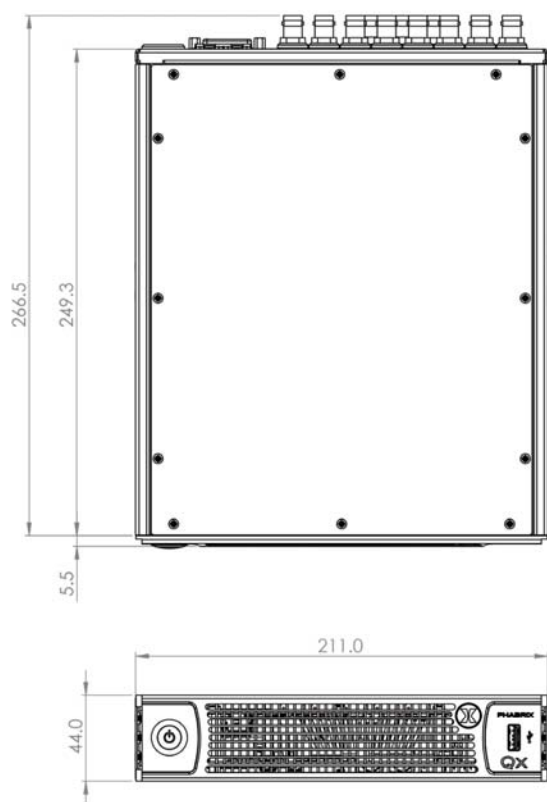
PHQX0-IP-DEC	IP license for ST 2022-6 Decapsulator+
PHQX0-IP-ENC	IP license for ST 2022-6 Encapsulator+
PHQX0-IP-NAT	IP network traffic analysis toolset
PHQX0-IP-NGT	IP network traffic generation toolset (Packet Profile Generator)
PHSFP-10GE-SR	10G Ethernet SFP+, short range up to 300m (Qx 12G supports 2 x SFP+)
PHQXO-HDR	HDR/WCG toolset with CIE 1931 chart, HDR Heat-map
PHQXM-01E	Eye / Jitter toolset upgrade for PHQX01 (return to factory upgrade)
PHQXO-12G-STRESS	Advanced 12G-SDI Stress Toolset [requires PHQXM-01E]
PHQXK1	19" rack mount kit for 1x Qx 12G
PHQXK2	19" rack mount kit for 2x Qx 12G
PHQXK3	9.5" rack mount kit for 1x Qx 12G
PHQXK4	10.5" rack mount kit for 1x Qx 12G

### Extended Warranty

PHQX-3YEAR	3 Year Warranty for Qx 12G*
PHQX-5YEAR	5 Year Warranty for Qx 12G*

\* One year warranty included as standard  
+ Requires 10G Ethernet SFP+ module (PHSFP-10GE-SR)

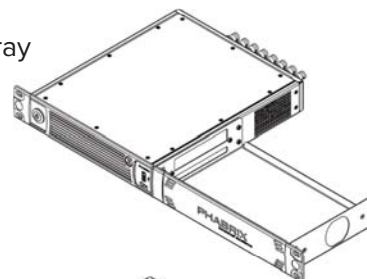
# Dimensions & Installation



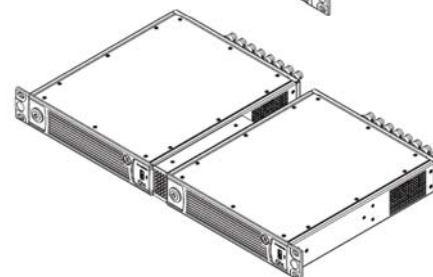
Desktop



Single Rack mount tray  
with cover  
PHQXK1



Dual Rack mount  
PHQXK2



**PHABRIX®**

For more information about IP,  
4K/UHD and HDR contact:

**PHASE Engenharia Ind. e Com. Ltda.**

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Version a3