Ultra XR

SDI/IP 4K/UHD Waveform Analyser

meeting today's needs for 4K/UHD production,
*post production and grading in HDR and WCG*

Key Features

Omnitek's new Ultra XR is a Video Waveform Rasterizer that addresses the demanding requirements of SD and HD through to 4K post-production grading and extended resolution production QC.

- True 4K Waveform with flat frequency response
- Additional Status, Vectorscope, Gamut and Audio PPM displays
- High-quality, native-resolution Picture display on SDI, HDMI or DisplayPort monitor
- Comprehensive SDI and HDMI standards support up to Quad 3G and Dual 6G, extended to 12G-SDI with VIDEO_12G option
- Support for both 2 Sample Interleave and Square Division 4K formats
- Support for 12-bit 4:4:4 in Digital Levels and Nits luminance scales, Y'Cb'Cr', R'G'B' and X'Y'Z'
- High Dynamic Range input (ST2084 / PQ) and Hybrid Log Gamma support with HDR option
- Wide Colour Gamut RGB: ITU-R BT.2020.
- CIE Colour Chart and Histograms (ADV_COL option)
- Analysis of user-selectable Region of Interest
- Pixel data and ANC packet analysis with
- DATA option
- Basic line pattern generator as standard.

User Interface

The User Interface can be displayed on an HDMI, DisplayPort or SDI monitor at 1920x1080. Alternatively it can be displayed remotely via a web browser (subject to restrictions).
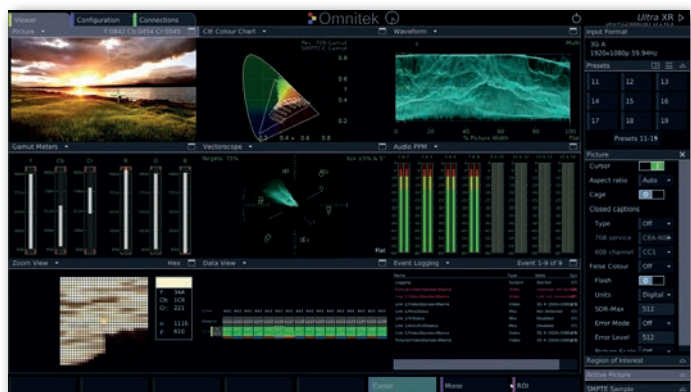
Instruments can be displayed as multi-tile (up to 9 on screen) or full screen.

Automated Control

The Ultra is highly suited to use in routine monitoring applications through its support for remote control using the SNMP protocol. Both parameter values and system controls are available for read and write access across a network potentially covering many Ultra systems, allowing the development of dedicated systems to carry out standardised test procedures and freeing engineers to concentrate on fixing issues.

Video Format and Colour Space Support

The Ultra XR supports all video formats from SD up to 4K/UHD, at frame rates up to 60Hz. DCI (Digital Cinema Initiative, SMPTE RP 431), Rec.709 (ITU-R Recommendation BT.709), EBU (ITU-R BT.470 standardized RGB colour space), SMPTE C (SMPTE RP 145) and Rec. 2020 (ITU-R Recommendation BT.2020) colour spaces are supported.

Support for PQ, HLG and S-Log high dynamic range with HDR Option.

Standard Features

Picture Monitor

The Picture monitor gives confidence that video is present and correct.
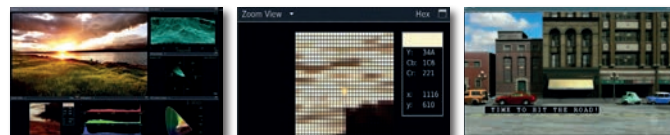

Picture	High quality display SD up to 4K, Closed Captions display, Safe area cages, Full frame video capture up to 4K, Pixel value at cursor position.
Zoom View	31x31 or 15x15 array at cursor, 10bit, 8+2bit or Decimal data.
Captions	OP-47, EIA/CEA 608-B and 708-B captions overlaid on display and logged.
Timecode	Display of VITC, ANC VITC 1, ANC VITC 2 or ANC LTC
ROI	Region of Interest focus selection for instruments.

Displays such as the Waveform View and the Vectorscope can be set to show a particular 'Region of Interest'. This can be setup by selecting an area on the Picture display or selected numerically.

Waveform Monitor

The waveform monitor is an essential tool for anyone working in the video industry for level alignment, quality control and grading.
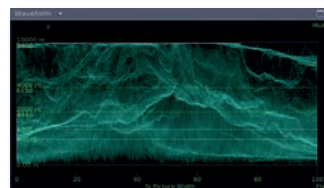
YCbCr, YRGB or XYZ display
Horizontal & vertical zoom
High Dynamic Range
Full frame or ROI
Digital, mV, IRE & Nits graticules

The Waveform offers high resolution displays of the video components as YCbCr, RGB or XYZ. For R'G'B' and Y'Cb'Cr' input, SMPTE range (decimal 64 – 940/960) or Full Range 0 – 1023 are supported. Graticules are provided for Digital Levels, % IRE, mV or Nits.

Waveforms can be shown either for a single line or for all the lines in the current frame/in the current Region of Interest, and arbitrary combinations of colour components may be displayed simultaneously.

Vectorscope

The Vectorscope display is the traditional tool for checking primary colour alignment and assessment of the actual image 'colour'.

BT.601, 709, 2020 compliant
100% and 75% graticules
Choice of magnification
Full frame or ROI

Gamut Meters

Colour Gamut checking is essential to ensure that the colour component levels are within legal limits.

EBU RP 103 compliant
6-bar YCbCr & RGB check
Gamut errors highlighted
Full frame or ROI

Audio Analysis

The Audio analysis gives confidence that audio is present and correct.

|	
Audio Meters	16 audio channels, -60dB to 0dB range, Industry standard ballistics and scales.
Loudness Meter	EBU RP 128, ITU-R BS.1770-1, 2, 3, ATSC A/85, ARIB TR-B32 and OP-59 with user-adjustable parameters.
Lissajous	Stereo pair and surround Lissajous displays.
Audio Status	Audio format and Status parameters.
Status Viewer	Audio channel level monitoring / warning and out of service AV delay measurement using a TSA sequence.

Timing

Video Timing is essential in any installation, especially when using dual link to ensure that links are correctly timed against studio ref.
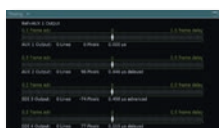
SDI and IP video timing against reference.
Single, DL or HDMI Timing against link or ref.
Graphical display with numerical timing values.

Status Monitor

Status monitoring ensures that the underlying data structure is correct.
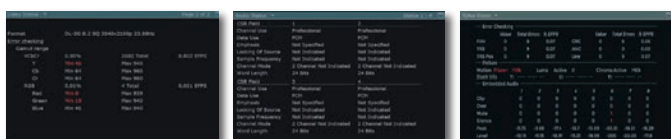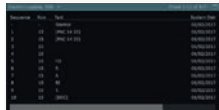

Video Status	Video format and Status parameters.
Audio Status	Audio format and Status parameters.
Status Viewer	Displays video and audio status in as single tile.

Line Pattern Generator

The built-in line pattern generator allows the generation of simple test signals in all SD, HD, 3G, 6G and 12G-SD video standards.
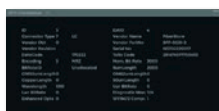

Event and Closed Caption Logging

Individual Event and Caption logs.
Logging against source timecode.
User-selectable columns.

Optional Features

IP / SFP (SMPTE 2110 / 2022-6)

The IP and SPF options provide connectivity into a SMPTE 2110 IP or SMPTE 2022-6 video over IP environment to allow the video, audio and metadata content to be monitored and analysed.

SFP Information tile details the status of the MSA SPF device that is fitted.

Advanced Colour Analysis (ADV_COL)

The Advanced Colour option provides CIE Charts and Histograms displays, for the full image or region of interest. The CIE Chart gives a real-time display of the true chromaticity for the chosen colour primaries.
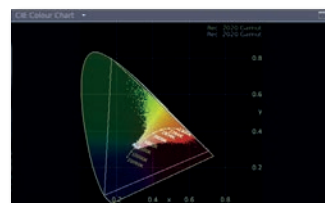
CIE Display
Real-time display
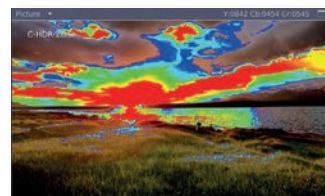WCG True chromaticity
Configurable colour primaries
Full frame or ROI
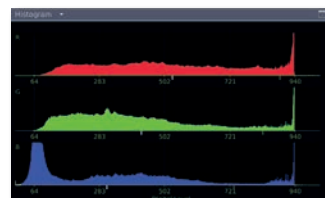
Histogram Display
YCbCr or RGB display
Stack, parade & overlay
Linear & logarithmic scale
Full Frame or ROI

High Dynamic Range option (HDR)

The HDR option allows system wide selection of HDR profiles that are reflected in the Waveform monitor, CIE Chart and other instruments.

Omnitek's O-Zone™ false colour display for SDR / HDR production is also included.

Data Analysis (DATA)

To ensure that the right source video data sample is ending up in the right place in the destination, the data and cable views allow individual pixel values to be traced whichever physical interface is being used.
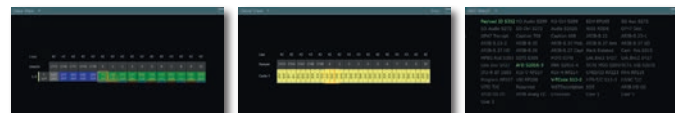
The DATA option provide a number of instruments that allow the data to be analysed with short cuts to SAV and EAV packets.

Data View	10bit, 8+2bit or Decimal display of assembled data, identified by SMPTE colour coded virtual images.
Cable View	10bit, 8+2bit or Decimal data display of cable data, identified by SMPTE colour coded virtual images..
Data Waveform	31 or 15 pixel YUV waveform at cursor position 10bit, 8+2bit or Decimal data display
Ancillary Viewer	showing 53 common ANC packets, 3 user-defined packets with automatic decode and status pages.
Ancillary Watch	Monitoring common ANC & user-defined packets providing colour-coded status and packet error count

Dolby Decode (DOLBY and Metadata (META) options

The DOLBY option provides full decoding of compressed audio inputs. The META option allows detailed metadata analysis and display of guard band timing, dialogue norm, mix down values, etc. Dolby content can be embedded or via an AES/EBU connection (AUDIO HW).

Audio Hardware Option (AUDIO HW)

The Audio Hardware provides Dolby D and E Metadata extraction and Dolby D and E decode. It supports AES/EBU Audio input / output connection as well as analogue monitoring.

Ultra XR Technical Overview

Video Bidirectional I/O

3x SDI	3G/HD/SD
Connection	"SDI 1", "SDI 2", "SDI 3" - BNC, 75Ω input impedance

Video Inputs

3x SDI	12G/6G/3G/HD/SD
Connection	"Eye", "AUX 1" & "AUX 2" - BNC, 75Ω input impedance
HDMI	Supports up to 1080p60

Video Outputs

3x SDI	12G/6G/3G/HD/SD
Connection	"SDI 4", "AUX 3" & "AUX 4" - BNC, 75Ω output impedance
HDMI	Supports up to 1080p60
DisplayPort	Supports up to 4Kp60

Audio I/O (AUDIO HW Option)

Audio I/O	Embedded SDI & HDMI
AES Audio I/O	15-way D-type (AES3-4-2009 Annex D, 48kHz)

Reference

Sync Input	Analogue Black (0.3V p-p) or Tri-level (0.6V p-p)
Connection	"Composite" - BNC, 75Ω input impedance

Communications, Control & file I/O

Ethernet	1Gb/s
Connection	RJ45
2x USB	USB 2.0 (supporting FAT32 & exFAT media)

User Interface

Display	SDI, HDMI, DisplayPort or HTML over IP
Control	USB keyboard and mouse/tracker ball or via browser

Options

VIDEO_12G	I/O support for 12G-SDI
IP / SFP	SMPTE 2110 & SMPTE 2022-6 Connectivity
ADV_COL	CIE Colour chart and Histograms
VIDEO_HDR	ST2084 / PQ and Hybrid Log Gamma
DATA	Ancillary analysis package
DOLBY	Dolby E /D Decode
META	Dolby E /D Metadata analysis
AES	AES Audio Input/Output
AUDIO_HW	AES/EBU Dolby Mezzanine Board
ULTRA_RACK	19 inch rack mount kit

SDI Video Formats (SMPTE Standards)

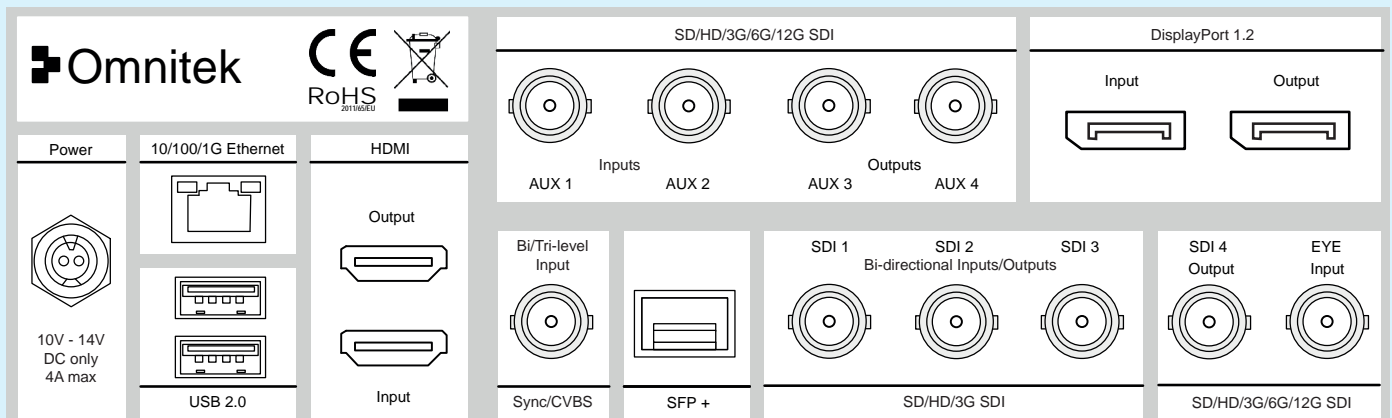|	
4096x2160p	23.98/24/25/29.97/30/47.952/48/50/59.94/60Hz
3840x2160p	23.98/24/25/29.97/30/50/59.94/60Hz
2048x1080p	23.98/24/25/29.97/30/47.952/48/50/59.94/60Hz
1920x1080p	23.98/24/25/29.97/30/50/59.94/60Hz
2048, 1920x1080sF	23.98/24/25/29.97/30Hz
2048, 1920x1080i	50/59.94/60Hz
1280x720p	23.98/24/25/29.97/30/50/59.94/60Hz
720x486i	59.94, 576i - 50Hz
UHDTV1 50/60	12G-SDI ST 2082-10 (2SI)
	Dual-link 6G-SDI ST 2081-11 (2SI)
	Quad-link 3GA-SDI/3GB-SDI ST 425-5 (2SI and SQ)
UHDTV1 25/30	6G-SDI ST 2081-10 (2SI)
	Dual-link 3GB-SDI ST 425-3 (2SI and SQ)
	Quad-link HD-SDI (SQ)
HD 1080p	3GA-SDI/3GB-SDI/3GB-DS-SDI/Dual-link HD-SDI ST 425-1, 372
HD/SD	HD-SDI/SD-SDI ST 2048-2, 274, 296, 259
	2SI = 2 Sample Interleaved, SQ = Square Division
Sampling	4:2:2, 4:4:4 Y'Cb'Cr', R'G'B', X'Y'Z' : 8, 10, 12 bits
Colour spaces	EBU (ITU-R BT.470 standardized RGB), ITU-R BT.601, ITU-R BT.709, ITU-R BT.2020, DCI (SMPTE RP 431), SMPTE C (SMPTE RP 145)

HDMI Video Formats

1280x720p	50/60Hz
1920x1080p	50/60Hz
2048x1080p	50/59.98/60Hz

DisplayPort Video Formats

1280x720p	50/60Hz
1920x1080p	50/60/120Hz
2048x1080p	50/60Hz
2560x1600p	60Hz
2560x3200p	60Hz
3840x2160p	30/50/60Hz
4096x2160p	50/60Hz

Environmental

Power	12V DC 60W. PSU 100-240V AC 50-60Hz
Size/Weight	215mm x 233mm x 42mm, 1.7Kg
Temperature	Operational: +5 to +35C, Storage: -20 to +50C
Humidity	<95% non-condensing

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CE RoHS 2011/65/EU

Power	10/100/1G Ethernet	HDMI
10V - 14V DC only 4A max	USB 2.0	Output / Input

SD/HD/3G/6G/12G SDI

Inputs: AUX 1, AUX 2
Outputs: AUX 3, AUX 4

DisplayPort 1.2 — Input, Output

Bi/Tri-level Input — Sync/CVBS

SFP +

SDI 1, SDI 2, SDI 3 — Bi-directional Inputs/Outputs — SD/HD/3G SDI

SDI 4 Output, EYE Input — SD/HD/3G/6G/12G SDI

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About Omnitek

Omnitek is a leading broadcast and AV T&M equipment manufacturer, who through association with industry, develop 'state of the art' products. Omnitek is also a leading independent consultancy company specializing in the design of video products and IP for the broadcast, post-production, digital film, AV, medical, aerospace/defence, automotive and consumer industries.

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