

Ultra 4K Tool Box



4K/UHD Analyser / Generator / Converter
*addressing the needs of manufacturers, with 12G PHY analysis,
 generation, & conversion of SD to 4K*

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.

Automation 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 resolving issues.

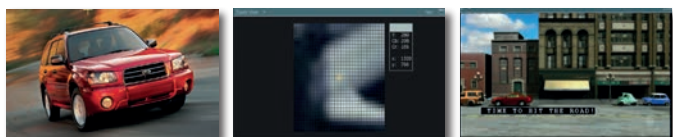
Analysis (ANALYSE)

The built-in analyser provides a comprehensive range of displays analysing the input video stream. Other features include:

- Analysis of over 1700 SMPTE video formats (link types, image size, frame rate, colour space, bit depth, etc) from SD-SDI to 4Kp60.
- Automatic and manual video format selection.
- Selection of colour primaries and input range.
- User-configurable with user-defined global presets.
- High quality, full-frame rate, native resolution display.
- Status monitoring of video and audio content, plus physical layer analysis (with PHY option).
- Ultra low noise floor for accurate / repeatable jitter measurement.
- Pixel data displays.
- Ancillary Data monitoring including 'ANC Watch'.
- Point of Interest selection by cursor position or coordinate entry.

Picture Monitor

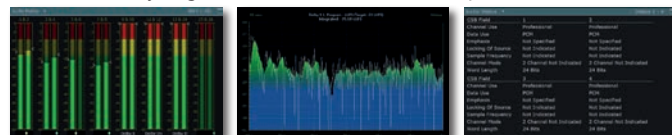
The Picture monitor gives confidence that video is present and correct.



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	OP47, EIA/CEA 608-B and 708-B caption overlay.
Timecode	Display of VITC, ANC VITC 1, ANC VITC 2 or ANC LTC.
Capture	Still and sequence capture of full SDI frame or image.

Audio Analysis

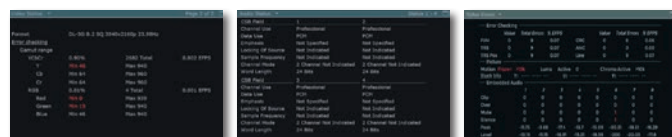
The Audio analysis gives confidence that audio is present and correct.



PPM Meters	16 audio channels, -60dB to 0dB range, Industry standard ballistics and scales.
Loudness Meter	ITU-R BS.1770, EBU RP 128, adjustable timing windows and gating factors
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.

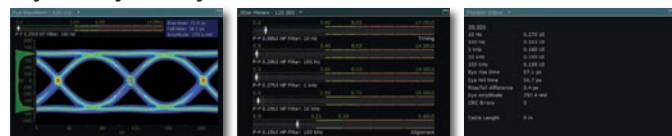
Status Monitoring

Status monitoring ensures that the underlying data structure is correct.



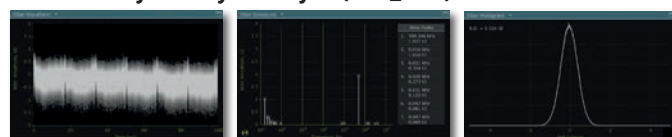
Video Status	Video format and Status parameters.
Audio Status	Audio format and Status parameters.
Status Viewer	Displays video and audio status in as single tile.

Physical Layer Analysis (PHY)



Eye Waveform	SD, HD, 3G, 6G & 12G. Automatic measurement, Rise and fall time cursors, Amplitude histograms, Single or multiple Eyes.
Jitter Meters	SD, HD, 3G, 6G & 12G. Five live jitter meters (SMPTE compliant), Persistent jitter cursors, Jitter-level markers.
Physical Status	SD, HD, 3G, 6G & 12G.

Advanced Physical Layer Analysis (PHY_ADV):



Jitter Waveform	SD, HD, 3G, 6G & 12G-SDI (10Hz to 20MHz spectrum) Live jitter display and User-selected ranges.
Jitter Spectrum	SD, HD, 3G, 6G & 12G-SDI (10Hz to 20MHz spectrum) Peak jitter table, Log / linear scales User-selected ranges.
Jitter Histogram	SD, HD, 3G, 6G & 12G-SDI (10Hz to 20MHz spectrum) Peak jitter table, Log / linear scales User-selected ranges.



Data Analysis (DATA)

The only real way to ensure that the right source video data sample is ending up in the right place in the destination is to have data and cable views that allow individual pixel values to be traced through to the destination image via 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.

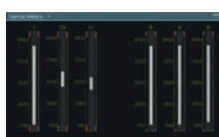
Data View	10bit, 8+2bit or Decimal display of assembled data, identified by SMPTE colour coded virtual images.
Cable View	10bit, 8+2bit or Decimal data display of cable data, identified by SMPTE colour coded virtual images.
Data Waveform	YUV waveform at cursor position 10bit, 8+2bit or Decimal data display.
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.

Timing



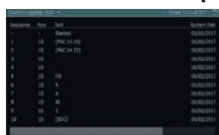
Single, dual, quad link or HDMI Timing against link or locking reference, Graphical display, Numerical timing values.

Gamut Meters



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

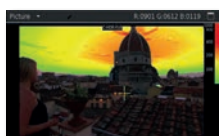
Event and Closed Caption Logging



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

High Dynamic Range option (HDR)

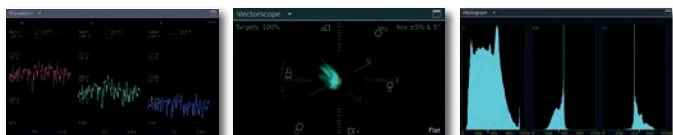
The HDR option allows system wide selection of HDR profiles that are reflected in the Picture display.



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

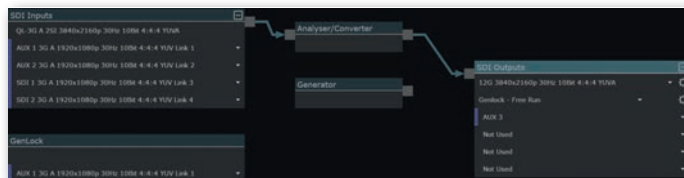
Ultra XR Support (XR)

All of the options available with the Ultra XR can be included in the Ultra 4K Tool Box which can be 'booted' in Ultra XR mode. This supports high resolution waveforms up to 4K60, Vectorscope, CIE colour chart and Gamut Histogram displays.



Format Conversion (CONVERT)

The Ultra 4K Tool Box offers a variety of connection formats – multi-rate SDI, HDMI and DisplayPort – for both video source and display, and supports standard video standards from SD up to 4K p60.

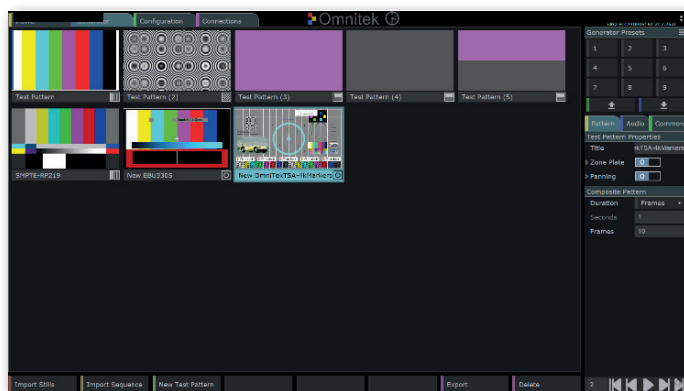


The built-in converter allows up/down/cross conversion between all supported input and output standards.

- SDI Input and Output supported from SD to 12G-SDI (with VIDEO_12G option).
- HDMI Input and Output supported up to 1080p60.
- DisplayPort output to 4Kp60.
- Conversion between SQ and 2SI, and between different link structures.
- Simple and intuitive Connections menu.
- User defined image sharpening/softening.
- Bit depth and colour space conversion.

Test Pattern Generation (GENERATE)

The built-in generator allows the generation of test signals in all video standards up to 4Kp60 from the SDI, HDMI and DisplayPort outputs.



- Generation of over 1700 SMPTE video formats.
- Generation of video from stills or image sequences held in a range of standard formats from SD-SDI to 4Kp60.
- Play-back of video held in RVF full-raster format.
- Preset or user-defined simple or complex test patterns.
- Preset or user-defined static and moving Zone plate patterns.
- Combined Zone plate patterns with images or colour bar pattern.
- Omnitek TSA and other pre-defined test sequences.
- Omnitek 4K TSA including quadrant and cable identifiers for testing multi-link 4K standards.
- 6G & 12G-SDI Pathological test signals.
- Patterns loaded from internal SSD, USB or LAN.
- Generator lockable to video, ext ref or free run.
- SDI link timing delay for QL 3G and DL 6G-SDI.
- SDI Output level & slew-rate control, and jitter insertion to RP184 (with PHY_ADV option).
- Up to 16 simultaneously generated audio tones.



Ultra 4K Tool Box 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 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
PHY_ADV Advanced Physical Layer Analysis
VIDEO_HDR ST2084 / PQ and Hybrid Log Gamma
DATA Ancillary analysis package
ULTRA_RACK 19 inch rack mount kit

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

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

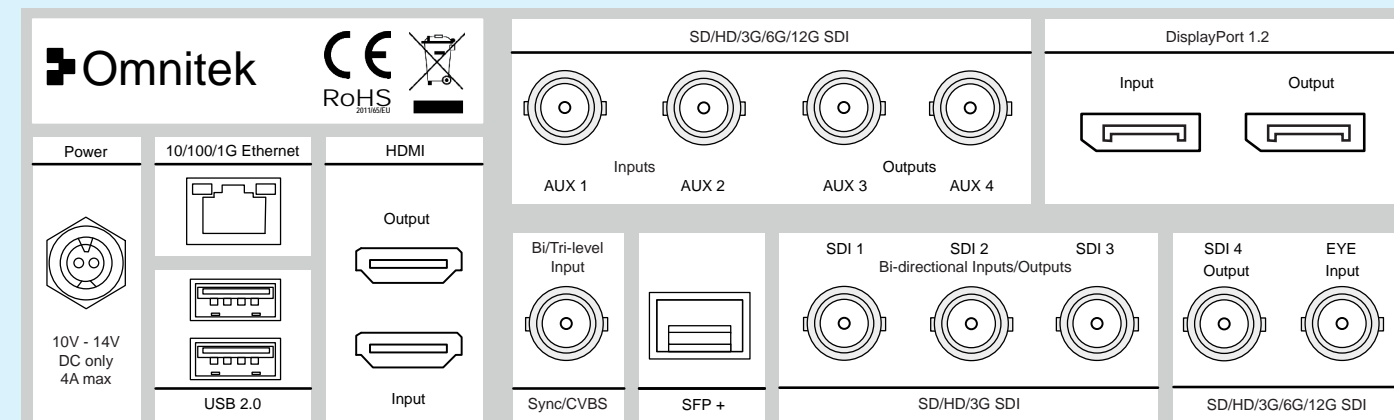
1280x720p	50/60Hz
1920x1080p	50/60Hz
2048x1080p	50/59.98/60Hz

DisplayPort Video Formats

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

* SFP + Cage

Reserved for future use



UK Head Office

Intec 3, Level 1
Wade Road
Basingstoke
Hampshire
RG24 8NE

Tel: +44 (0)1256 345900

Fax: +44 (0)1256 345901

Email: sales@omnitek.tv

US Head Office

8177 Talliho Drive
Indianapolis
IN 46256

Tel: +1 (0)317-437-9696

Email: us-sales@omnitek.tv

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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