XR

Extreme Resolution Waveform Monitor and Image Analyzer for Post-Production
The OmniTek **XR** is designed specifically for colorists, post-production editors, and digital intermediates working with very high resolution HDTV and Dual-Link images. In 2003, OmniTek produced the world’s first native Dual-Link waveform monitor, and the **XR** raises the performance of this system to a new standard. Recent additions include support for the XYZ colour space in dual-link mode.

**Waveform Monitor & Data Analyzer**

OmniTek **XR** signal processing technology gives “extreme resolution” waveform and vectorscope displays. The frequency response at 10 bits per pixel is flat to 30MHz and 256 times oversampling is used to ensure the most accurate monitoring.

**Waveform Displays**

Novel waveform generation algorithms give high-quality, user-adjustable displays. Full 1024-pixel high waveforms may be generated, giving true 10-bit resolution. Arbitrary combinations of components may be displayed simultaneously.

A unique region-of-interest control allows continuously-variable H and V magnification and selection of video lines. This enables the user to accurately select different areas of the image to analyse. The zoom works smoothly from a few pixels to a full line, 2 lines, 1 field through to full frame displays. The **XR** also features low-pass, differential and “bowtie” filters, and can generate pseudo-composite SD waveform displays from HD or SD sources in real time.

**Vectorscope**

The **XR** provides a high-resolution vectorscope display, available with 75% or 100% graticule and luma-masking capability. The vectorscope is fully scalable and may also operate on the selected region-of-interest. Graticules are automatically adjusted for the appropriate 601 or 709 colour matrix.

**Colour Gamut Display**

Colour gamut is monitored in each of the different colour spaces. The results are displayed on a custom gamut display, which indicates the total excursion of the signals and also the percentage of pixels that are outside recommended limits (as specified, for example, in EBU Recommendation 103).

**Real-Time Histogram**

The **XR** system provides unique real-time histogram displays in each of the colour spaces it supports. For each display, the mean value is also shown. These displays are invaluable for accurate colour analysis.

**Dual-Link Option**

This option enables 4:4:4 RGB/YCbCr/XYZ inputs and “2k” format images to be monitored. The option also includes programmable input look-up tables that enable real-time conversion of logarithmic or other non-linear data inputs. The system also provides real-time output of 4:2:2 data from 4:4:4 dual-link input or 4:4:4 output from 4:2:2 input.

**XYZ Support**

The Dual-Link option also adds support for XYZ format – both in the colour spaces for which information is displayed, and in the formats in which video can be output.

**Video Status Display**

Input video signals are continuously monitored for errors and changes of state. Transport stream faults such as mistimed TRS words, EDH, CRC, LIN and ANC checksum errors are all reported. The video streams are further examined to ensure pixels conform to valid YCbCr, RGB and PAL/NTSC composite ranges, and structures such as active format descriptions and RP186/ARD video indexes are identified and interpreted. Monochrome, freeze and black video are also detected. Errors are highlighted both in the video status window and in the pixel data display.

**Event Logs**

All the video and embedded audio parameters monitored by the **XR** may be entered into an XML-format event log file, with time-stamping from input timecode or the PC internal clock. In addition, events may be configured to trigger alarms or as SNMP network traps. Thresholds and timeouts for each monitored parameter are adjustable. The **XR** further uses a ‘traffic light’-type system to indicate whether sessions are free from error or errors have occurred.
Audio Monitoring Options

Several audio monitoring options are available for the XR system. The Standard Audio option provides PPM displays for 16 channels of embedded audio, plus input group status. The Advanced Audio option provides 16-channel embedded audio PPMs plus group status, Lissajous and audio phase meter displays. These indicate if any stereo pair contains a mono, inverted mono, or uncorrelated signal. The AES parameters of all groups are presented on the Audio Status display, with per-channel peak-hold, overload, and silence detection. The PPM displays have user-adjustable meter ballistics, the option of surround-sound view, and a choice of graticules including dBFS, DIN, EBU, BBC, and Scandinavian options. A user-selectable channel pair may be routed to the PC audio output for easy monitoring. (Note that 1RU chassis require an external audio output connection.)

Dolby-E and AES Support

The Dolby-E option, when used in conjunction with the Advanced Audio option, provides PPM displays, frame timing checks, and a complete metadata decode display for Dolby-E inputs.

The External Audio option, which may be ordered together with Standard or Advanced options, provides a second PCI card with support for up to 16 channels of external AES/EBU digital audio.

Audio/Video/Reference Delay Measurements

The XR is able to measure SDI loop delay through an external processing path, for both video and embedded audio signals. In addition, the XR can also measure relative audio/video “lip-sync” delay when displaying the standard OmniTek full-motion test sequence. XR can also measure the time delay between SDI input signals and the analog sync reference, between different SDI inputs and between different channels.

Pixel Data Display

The pixel data display shows the exact values present on the SDI input in decimal, hex, or binary format. The different display colours indicate the type of video segment: active picture, blanking, ANC packets, TRS words etc. A red bar indicates an error has been detected at this pixel value.

The display can be extended to provide automatic interpretation of TRS and ANC packets detected in the input video stream. This includes packet types such as EDH/CRC, embedded audio, SMPTE 352M video payload ID, and RP188 ANC timecode. In dual-link input formats, the RGB and XYZ colour space data is assembled into to full pixel values. It is also possible for users to install XML-format descriptor files, for decoding custom ANC packets.
**Video Proxy**

A high-resolution real-time proxy of the SDI input or signal generator source is provided. This 'Mini-Pic' has a real-time update and displays SD images at full resolution and full frame rate. HD images may be displayed at ½ resolution. A “pulse-cross” function allows viewing of the contents of the H & V blanking areas. Timing cursors can be overlaid on the proxy, and there are “burn-in” windows for timecodes (see below). The proxy can also display closed captions and teletext subtitles from OP-47, EIA 608 and 708 closed-caption decoder modules.

**Full-Motion Capture & Playback**

The XR contains a real-time uncompressed video capture and playout system capable of storing up to 45 seconds of SD, or 7 seconds of HD source material. Image sequences may be loaded as individual frames, .avi or .wmv files, or captured from the live SDI input.

**Playlists**

The XR can play out a user-defined sequence of images or motion segments. Each image has programmable duration, and can have different embedded audio tones or engineering settings such as gain or noise. The playlist can be executed in a continuous loop or as a single sequence, and is fully remote-controlled via SNMP network commands.

**System Details**

The OmniTek XR is a PC-based system, comprising a state-of-the-art real time signal processing PCI plug-in card plus application software running under the Microsoft® Windows® 2000 or XP operating systems.

OmniTek can supply the XR system as card-plus-software only, for the user to install in the PC system of their choice, or alternatively XR can be supplied pre-installed in a 1RU rackmount PC chassis, portable PC with integrated screen, or “Magma” laptop expansion chassis.

The application may be used either in a standard “Windows” mode or in a “full screen” mode in which a selection of windows are neatly tiled to give a clear, uncluttered display. All windows are adjustable in size and colour on the graphics display. The user may also customize the selection and position of windows shown in “full screen” displays. To maximize the resolution and clarity of the display, the XR can drive up to two DVI or VGA monitors at resolutions of 1920x1200 and beyond.

The XR features two SDI outputs and an analog component video output for monitoring purposes. Regions of the image with any gamut error may be flashed on the output displays. In addition, cursors and graticules may be shown.

There are a range of options available with the XR system – please contact your local dealer for more information.
Waveforms, gamut display and video status, displayed alongside a high-resolution real-time video proxy.

Full screen display showing a range of monitoring options, together with configuration controls.
OmniTek PCI Card

**Specification**
- PCi revision 2.2
- 32-bit, 33 or 66 MHz bus speed
- Full length (33cm long)
- 15W max. (+12V, +5V and +3.3V supplies required)
- Industry-standard size

**Analog Sync Input**
- Connector: BNC with 75ohm termination
- Return Loss: >20dB up to 30MHz
- Signal: Black with bi-level sync (0.3V pk-pk) or tri-level sync (0.6V pk-pk)

**Serial Digital Inputs/Outputs**
- Connector: BNC with 75ohm termination
- Bit Rates: 1500MHz, 1485Gbit (SMPT 259M, 344M, 292M)
- Jitter: <0.2UI, 10Hz to 100kHz

**Serial Monitor Output**
- Connector: 9-pin mini-DIN
- Video: RGB with bi- or tri-level sync on green, 0.7Vpk-pk video; or YPrPb with bi- or tri-level sync on Y, 0.7Vpk-pk video; or Composite & S-Video (in PAL or NTSC modes) 0.7Vpk-pk video.
- Sync: H & V separate syncs, TTL level, positive-going pulses.

**Computer System**
- Processor: Intel Pentium-M or Core 2 Duo, >1.8GHz
- Main RAM: 512MB/byte
- Graphics: Intel 915 chipset or better. Separate graphics card recommended
- Hard Disk: 80Gbyte minimum
- Software: Microsoft Windows 2000 or XP
- Ethernet: 100Base-T or 100Base-T on RJ45 connector
- SNMP: Protocols conform to SNMP version 1.
- USB: Minimum 1 x Type A connector, USB 2.0
- Serial Port: RS232 on 9-pin 'D' plug
- Keyboard: USB compatible
- Mouse: USB compatible

**Audio Performance**
- Embedded: 4 groups / 16 channels (SMPT 272M, 299M);
- 48kHz synchronous; 20 bits / sample (SDTV), 24 bits / sample (HDTV);
- Dolby E: PPM and metadata monitoring
- External: 16 channels / 8 pairs AES/EBU; 110ohm input impedance, transformer coupled;
- All standard sampling rates up to 192kHz; 16, 20 or 24 bits / sample

**Environmental**
- (Complete systems only)
- Power: 90...250Vac 47...63Hz autodetect. 300W maximum
- Size/Weight: Rack chassis: 440mm x 430mm x 40mm, 8Kg
- Portable: 440mm x 430mm x 40mm, 18Kg
- Temperature: Operable: +5...+35C, humidity <95% non-condensing
- Storage: -20...+50C, humidity <95% non-condensing

**Warranty**
OmniTek systems are warranted for one year from date of purchase. This includes all feature upgrades and bug fixes to the application software, plus repair or replacement of the hardware (at the discretion of OmniTek). Extended warranty agreements are also available, please consult your local dealer.

**System Configurations**
OmniTek products use an advanced PCI signal processing engine plus application software running under the Microsoft Windows XP or 2000 operating systems. The XR system has a number of system configuration options, please consult your local dealer for more information.

* Dual-Link Option
  Provides native support for 4-4:4 RGB and YCbCr/C inputs, plus 2x video formats.

* Motion/Capture Option
  Enables capture, storage, and playout of uncompressed images and sequences.

* Advanced Option (includes Motion/Capture)
  Full-raster capture, storage and playout; "Time-shift" event-based data recording.

* Audio Performance
  16-channel PPM, 4-group status, lineausages, phase meters, output to PC audio system.

* External Audio Input Card
  Supports PPMs and metadata decode only.

* Advanced Audio Option
  8-channels PPM, 4-group audio, audio meters, output to PC audio system.

* Standard Audio Option
  16-channel PPM and 4-group status display.

The OmniTek XR can be supplied in a variety of mechanical configurations:

* PCi Card & Software Only
  For user installation.

* IRU Rack-Mount Chassis
  Display, mouse & keyboard not included.

* Laptop Expander Chassis
  With cardiac interface. Laptop not included.

**Performance**
- Formats: 486i / 59.94 (ITU-R BT.601)
- 576i / 50 (ITU-R BT.601)
- 483p / 59.94 (ITU-R BT.1558)
- 576p / 50 (ITU-R BT.1558)
- 720p / 23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz (SMPT 296M)
- 1035i / 59.94, 60Hz (SMPT 260M)
- 1080i / 23.98, 24Hz (SMPT 274M, RP211)
- 1080i / 50, 59.94, 60Hz (SMPT 274M)
- 1080p / 23.98, 24, 25, 29.97, 50Hz (SMPT 274M)

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