

# IO [io] 8000/8001 Audio Video En/Decoder

Designed for 24/7 operation, its embedded realtime OS guarantees solid, reliable operation in low latency applications (>250 ms "end-to-end")



MAYAH's new IO [io] series en/decoders are taking MPEG 4 to the next level in terms of picture quality and line cost efficiency with full D1 PAL/NTSC resolution starting at 1-2 Mbit/s and going down progressively for PDA/mobile applications. The MPEG 4 ISMA-compliant stream is a "universal stream" covering broadcast, enterprise and webcasting applications.

Supporting MPEG 4 SP, ASP and AVC (H.264), IO [io] audio video en/decoders cover the requirements of mid-range broadcasting and corporate applications covering DVB-H, UMTS/3G, SNG, reporting, distribution, inhouse-streaming and ipTV.

Best of all, the IO [io] series combination of MPEG 4 AVC and IP, achieves dramatic reductions on investment and monthly costs.

With ISMA compliant streams – supported by QuickTime, Windows Media, Real, VLC, and various PDAs, mobiles, DVB-H receivers and set-top boxes – full inter-operability is obtained. And with full D1 at 768 x 576/480 for PAL/NTSC and up to 25/30 fps IO's, MPEG 4 is challenging MPEG 2, but with less than half the bit rate. This allows huge cost reductions for the network lines – E1/T1, IP over satellite, ATM etc. – and a possible return on investment in weeks or months instead of years.

Key features include:

- Auto reboot after power down in 20 secs
- Auto reconnect after IP/Ethernet down,
- SAP, session announcement protocol

IO [io] 8000 running as a decoder allows a permanent "stand by" mode and starts decoding once the IO [io] 8000 encoder e.g. in an OB van starts streaming.

Applications for IO [io] products are:

- Broadcast quality
- Unicast and multicast
- Audio & Video over IP challenging MPEG 2
- SNG
- Outside Broadcast Units
- Remote Studio Link
- Back-Haul
- Talk-Back
- Confidence Monitoring
- Web Casting
- Corporate Communications/ Journalist Previewing.



## BROADCAST

SNG, satellite news gathering, re-broadcasting in high audio & video quality using low cost links



Back-haul applications, journalist previewing, remote studio link using existing IT infrastructures



DVB-H Digital Video Broadcasting for Handhelds, UMTS/3G for mobiles



## IP-TV

Next generation TV reaching billion of households via Internet with push and on-demand services



## WEBCASTING

ISMA-compliant corporate/business streaming reaching Quick-time, VLC, Windows Media and Real Player as well as PDAs and Setop-Boxes

## MPEG 4 part 10 AVC (H.264) – bringing video transmission to the next level

MPEG 4 part10, also known as H.264 or AVC is the state-of-the-art new compression standard.

As with MPEG 4 part 2, MAYAH supports ISMA 2.0, a worldwide standard for IP-based streaming, allowing seamless integration and interoperability with other hardware-decoders, set-top boxes or software players offering the same "multiple use" of a stream created by an IO [io] 8000.

## MPEG 4 part 2 – proven technology in the IO [io] range

MPEG 4 part 2 is a mature, worldwide adopted standard for applications ranging from video contribution (e.g. SNG) and corporate streaming down to web casting using feature-sets of the new MPEG 4 part 10, H.264/AVC compression standard.

The bandwidth used by MPEG 2 can be "cut by half" when using MPEG 4, allowing savings on transmission costs on satellite links, or by going to IP/DSL lines or E1/T1 lines.

The beauty of MPEG 4 part 2 ISMA compliant streaming is the interoperability with "any" ISMA compliant device such as set-top boxes or software players like QuickTime, Real10, Windows Media Player\*, VLC and many more.

In multicast mode one single stream created by the IO [io] 8000 can be played back via the IO [io] 8000 as a decoder for broadcast quality video and at the same time plays back on any of the above mentioned software players or set-top boxes for e.g. monitoring applications or journalist previewing.

MAYAH's MPEG 4 part 2 implementation is optimized for "low latency" up to full D1 SD-resolution video in the range of 500 ms for "end to end" transmissions.

# IO [io] 8000/8001 – a powerful, audio video product family introducing high quality, cost efficiency and interoperability



IP-based  
E1/T1, Satellite,  
ISDN, ATM,  
etc.



Order number	IO [io] 5000	IO [io] 4500	IO [io] 8000 A IO [io] 8001 A	IO [io] 8000 AD IO [io] 8001 AD	MAYAH PD-WLAN Personal Decoder	Windows Media	QuickTime	Real
Application	enterprise, webcast	enterprise	broadcast	broadcast	enterprise			
Software								
Operating system	Real-Time embedded	Linux	Real-Time embedded	Real-time embedded	Pocket PC >2002	> Vers. 9	> Ver. 6.5 Mac/Win	> Ver. 10 Mac/Win
Custom. Software Engineering		■			■			
Remote Software / Telnet	Win remote Telnet		Win remote Telnet	Win remote Telnet				
Audio Video Coding								
Encoder / Decoder	Encoder	Decoder	Encoder / Decoder	Encoder / Decoder	SW-Decoder	SW-Decoder	SW-Decoder	SW-Decoder
Video formats	PAL / NTSC	PAL / NTSC	PAL / NTSC	PAL / NTSC	progressive	progressive	progressive	progressive
Max. video resolution	384 x 288	720 x 576 480	720 x 576 480	720 x 576 480	depending on PDA			
MPEG 4 simple profile	■	■	■	■	■	■ (plug-in)	■	■
MPEG 4 adv. simple profile	■		■	■	■	■ (plug-in)		
MPEG 4 AAC (audio)	■	■	■	■	■	■	■	■
H.264			■	■				■
Quality of Service Diff. Serv.	■		■	■				
Latency	≥ 250 ms	approx. 3 sec.	≥ 250 ms	≥ 250 ms	approx. 3 sec.	approx. 3 sec.	approx. 3 sec.	approx. 3 s.
Automatic decoder resync			■	■				
Auto scene change detection	■		■	■				
HSS Horizontal Sub Sampling			■	■				
Audio Video I/O								
Composite video	RCA video in	RCA video out	BNC video in & out	BNC video in & out				
S-Video	in		in & out	in & out				
SDI			in & out	in & out				
VGA		out	out	out	dep. on PDA	out / PC	out / Mac/PC	out / Mac/PC
Bit rates	30 kbps – 15 mbps	< 1,600 kbps	30 kbps – 15 mbps	30 kbps – 15 mbps	dep. on PDA	>30 kbps	>30 kbps	>30 kbps
Stereo, analog	RCA, unbalanced	RCA, unbalanced	XLR, balanced	XLR, balanced	dep. on PDA	PC or Mac	PC or Mac	PC or Mac
Stereo, AES/EBU								Sub-D, 9-Pin
Stereo, SDI embedded								BNC, embedded audio
Size	19", 2U	desk top model	19", 2U	19", 2U				



MPEG 4  
H.264 PAL  
AVC & NTSC  
@ 2 Mbit/s

## IO [io] 8000 A

IO [io] 8000 A is an audio and video encoder and decoder offering MPEG 4 SP/ASP and AVC / H.264 encoding, including automatic scene change detection as well as HSS. Drawing on MAYAH's long experience in IP-based solutions we also support QoS / Diff. Serv. in order to give a stream the highest prioritization possible in a LAN/WAN or "IP over satellite" scenario.

The IO [io] 8000 can also run as a decoder thus offering high flexibility as well as a saving on investment. The IO [io] 8000's extremely low latency in the range ≥ 250 ms for "end to end" IP-based connections makes it the ideal tool for "live" situations. Whenever changes are applied to the encoder settings the IO [io] 8000 running as a decoder will automatically re-sync to the encoder. Using MAYAH's control software or Telnet/ SNMP it is therefore possible to remote control the units from anywhere in the world.

## IO [io] 8000 AD Pro

Containing all the features of the IO [io] 8000 A, the IO [io] 8000 AD Pro also offers SDI with embedded audio in an "all in one" system, making it the ideal broadcast solution. Regardless of video source, the IO [io] 8000 AD Pro can handle the job. Although it supports SDI embedded audio you might want to use the IO [io] 8000 AD Pro's analog and AES/EBU audio Inputs and Outputs in parallel with "SDI video only" thus allowing you to use your current equipment infrastructure and avoiding the need to invest in costly audio de/embder cards for monitors etc. Just

like the IO [io] 8000 A the IO [io] 8000 AD Pro is an ISMA compliant system allowing you to stream to Mac/PC desktops using QuickTime, Real10, WindowsMedia9 or even PDA's and smart phones. If PCs are not applicable the stream can also be displayed by the extremely cost effective set-top box, the IO [io] 4500.

## IO [io] 5000

MAYAH's new IO [io] 5000 is an affordable solution targeted at enterprise communications and web streaming solutions with support for resolutions up to CIF (384 x 288). The IO [io] 5000 is an ISMA compliant encoder offering MPEG 4 SP/ASP and a proven interoperability with players like QuickTime, Real and WindowsMedia9, PDA's, smart phones and MPEG 4 set-top boxes such as the IO [io] 4500 driving Plasma displays or a TV set.

## IO [io] 4500

MAYAH's IO [io] 4500 set-top box comes with a MAYAH software implementation for plug & play MPEG 4 streaming. The IO [io] 4500 hooks up directly to your TV set offering resolutions up to Full D1 PAL/ NTSC. The IO [io] 4500 VGA OUT can be used for computer screens or Plasma displays. Operation using the IR remote couldn't be simpler. The IO [io] 4500 offers extensive, customizable options such as:

- DVB-S support – reception of DVB FTA and IP encapsulated streams and recording to HDD
- DVB-T support – recording of DVB-T programs to HDD. VOD Support for ISMA compliant VOD streaming server
- HTML Browsing interface supporting video overlays
- Implementation of a playlist parser for time and event controlled XML based playlists
- Support for complete, device remote control via commands on UDP ports
- User Interface integration and customization
- Support for WLAN on USB or PCI
- Windows Desktop Access via VNC



IO [io] 8001



IO [io] 8000

## IO [io] 8000/8001 comes in 2 versions:

- IO [io] 8000/8001 A analog – audio & video in/out
- IO [io] 8000/8001 AD Pro – same as analog – + SDI in/out