DIGITAL-AUDIO COMPONENTS

XDED DOLBY E[®] Decoder Board

DOLBY INPUT BOARD

- Decodes Dolby E[®]/D signals from AES/EBU D-Sub (15-pin, female) or TOSLINK optical inputs
- Decodes up to 8 separate signals from a Dolby E[®]/D data stream plus a stereo output for downmix signals (configurable downmix)
- Decodes metadata for output as XTI signals or via the XDEM optical interface board
- 2 audio channels for forwarding unencoded audio from the NEXUS system or from AES/EBU inputs with optional delay and gain
- Video-sync input (BNC) for bi-level and tri-level sync signal
- Direct connectivity to SDI boards for cascading 2 XDED boards (option)
- Sample-rate converters on all audio channels
- External inputs and XDEM metadata outputs with galvanic isolation

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The XDED (NE**X**US **D**olby \mathbf{E}^{\otimes} **D**ecoder) board is a slide-in board for decoding Dolby \mathbf{E}^{\otimes} and Dolby D (AC-3) signals on NEXUS systems. The board comprises a base plate with two module slots that can be populated with Dolby OEM modules. Thus, the board allows for decoding up to two encoded audio streams to linear PCM.

In addition, it provides two audio channels for un-encoded audio that can be used either for carrying an accompanying stereo signal or as commentary channel.

Sources

The XDED physical ports provide maximum flexibility, rendering extra converters unnecessary. Input signals may originate from three different sources:



- From the NEXUS bus. Since NEXUS is certified for transparent routing of Dolby E[®] signals, a Dolby E[®] encoded signal can be applied to a mobile NEXUS Base Device and then be routed over the NEXUS network to the OB van where it is decoded using an XDED.
- From AES/EBU (or S/PDIF) inputs on the XDED. The XDED includes physical ports for feeding external signals. Encoded audio can be applied either using AES/EBU inputs or TOSLINK optical inputs (which is important for Dolby D, AC3). This mode also provides for decoding asynchronous audio.
- From a direct link to the XHDI SDI board. The XDED incorporates a special port enabling signals to be applied directly from an SDI board, thus bypassing the NEXUS bus. An SDI connects to up to two XDED boards at the same time. This mode also provides for decoding asynchronous audio.

The user determines which of the three input sources is utilised using the control software.

VIDEO SYNC

In addition to inputs for Dolby E^{\circledast} encoded audio, the XDED features a video-sync input required for decoding Dolby E^{\circledast} signals. The sync signal is either be fed to an on-board BNC port or can be applied directly using the SDI direct link, as appropriate.

Metadata

A standard feature of Dolby E^{\otimes} and Dolby D encoded audio is the accompanying metadata. This is used to describe the encoded signal and to control the decoding process. During decoding, the metadata is also extracted from the data stream. It can afterwards be routed as XTI signals on the NEXUS.

In addition, metadata can be extracted directly on the XDED and be output in RS422 or RS232 format using the optional XDEM module. This module incorporates 9-pin D-Sub ports with Dolby-compliant pinout.

Routing metadata as XTI signals allows for them to be forwarded to the XDEE Dolby encoder board or the XHDI SDI metadata embedder. Of course, an XTI board can also be used to output the signal in the desired format.

The metadata encoded in the Dolby E[®] stream is transparently routed on the NEXUS network. The metadata embedded in the Dolby E[®] bit stream is transparently forwarded on the NEXUS network, routed with the signal, and displayed for verification purposes on the NEXUS. Of course, it can also be edited.

DELAY AND GAIN

The XDED allows the delay and gain settings of input signals to be adjusted. For example, when the signals are used for sound reinforcement, the level balance between the various surround signals can be adapted to the specific situation. An even more important benefit is the option of compensating a video-audio offset directly using the delay function of the Dolby E^{\otimes} board. In addition, the new generation of SDI boards also provides video-delay functionality.

APPLICATIONS

The XDED is particularly useful in large HD-enabled OB vans and also in TV-production studios and main switch rooms—i.e. everywhere where surround broadcasting has become standard.

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NEXUS Digital Audio Routing and Interconnect System

XDEM METADATA MODULE

The XDEM is an optional module used to output the metadata produced by the XDED to external ports.

In simple terms, the XDEM is an interface converter transforming the TTL signals produced by the XDED to output signals (RS422 or RS232). The type of external signal and the pin out are jumper-configurable. The external interfaces are implemented as two 9-pin D-Sub ports (female) as the board provides two identical audio channels for interface conversion; thus, an XDEM enables both metadata streams generated by an XDED to be output. The XDEM connects to the XDED using a short ribbon cable.

The external ports are isolated galvanically using a DC-DC converter.



XDEDoi Specifications	
Data formats	Dolby D/E [®] : as specified for Dolby modules(CAT No. 552); Linear PCM inputs: compliant with AES3, IEC958; Container format of the encoded data stream: SMPTE 337M-compliant
Audio input	Dolby E: 16, 20, 24 bits; Dolby D: 16, 32 bits
Audio data to NEXUS	24 bit
AES/EBU inputs	Comply with AES3, IEC958, S/PDIF
	Balanced, galvanically isolated input ports
	BNC terminal: D-Sub, 15-pin
	Impedance: 110/75 ohm (adjustable using a jumper)
	Input voltage: 0.25 (min.) 7 (max.) $\rm V_{pp}~(R_L=110~or~75~ohm)$
	Maximum cable length: 100 m (for lines with appropri- ate impedance and termination)
TOSLINK inputs	S/PDIF-compliant format
	Wavelength: typ. 650 nm
	Optical power: -27 (min.)14.5 (max.) dBm (APF 970/1000 $\mu m)$
	Cable length: 0.2 10 (max.) m (APF 970/1000 $\mu m)$
Sample-rate converters	(applies to NEXUS converters, not to the Dolby deco- ders)
	Word resolution: 24-bit (typ.)
	Up/down-sampling ratio: 1:8 (up), 7:1 (down)
	Latency: 1 (typ.), 2 (max.) ms @ nom. 48kHz
	Dynamic range: 132 (min.), 140 (typ.) dB (-60 dB input, A weighted)
	THD+N: -117 (min.), -120 (typ.) dB (20HzF $_{\rm SOUT}$, full-scale input)
	Pass-band ripple: max. $\pm 0.016 \text{ dB} (0.4535 \text{ F}_{_{\text{SOUT}}} \text{ max.})$
	Stop-band attenuation: typ120 dB (0.5465 $\rm F_{_{SOUT}}$ min.)
Sync input	Supported video formats:
	 NISC: 525i, 59.94/60; 525p, 59.94/60 PAL: 625i, 50: 625p, 50
	 HD: 720p, 5060; 1035i, 59.94/60; 1080i, 5060; 1080p, 23.9860
	Supported frame rate: 23.975 (min.), 60 fps (max.) BNC terminal: BNC
	Impedance: 100 Kohm/75 ohm (adjustable using a jumper)
	Input voltage: 0.52 V_{DD} on R_{L} = 75 ohm)
Sample rates	44.1, 48 KHz (nom.)
Power supply	Voltage: +4.755.25 V
	Current: 540 750 mA (typ.) (with 1 Dolby module) 830 1,200 mA (typ.) (with 2 Dolby modules)
Operating conditions	Temperature range: 0+50°C / 32 to 122 °F
	Humidity: 90% (max.), non-condensing
Storage conditions	Temperature range: -20+70°C / -4 to 158 °F
	Humidity: 90% (max.), non-condensing
Physical Specifications	General: Plug-in board for 19", module frame; 3 U, 340 mm
	Front panel: 4 HP (20.02 mm x 128.5 mm)
	Weight: 0.32 kg (with 2 Dolby modules)

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NEXUS Digital Audio Routing and Interconnect System