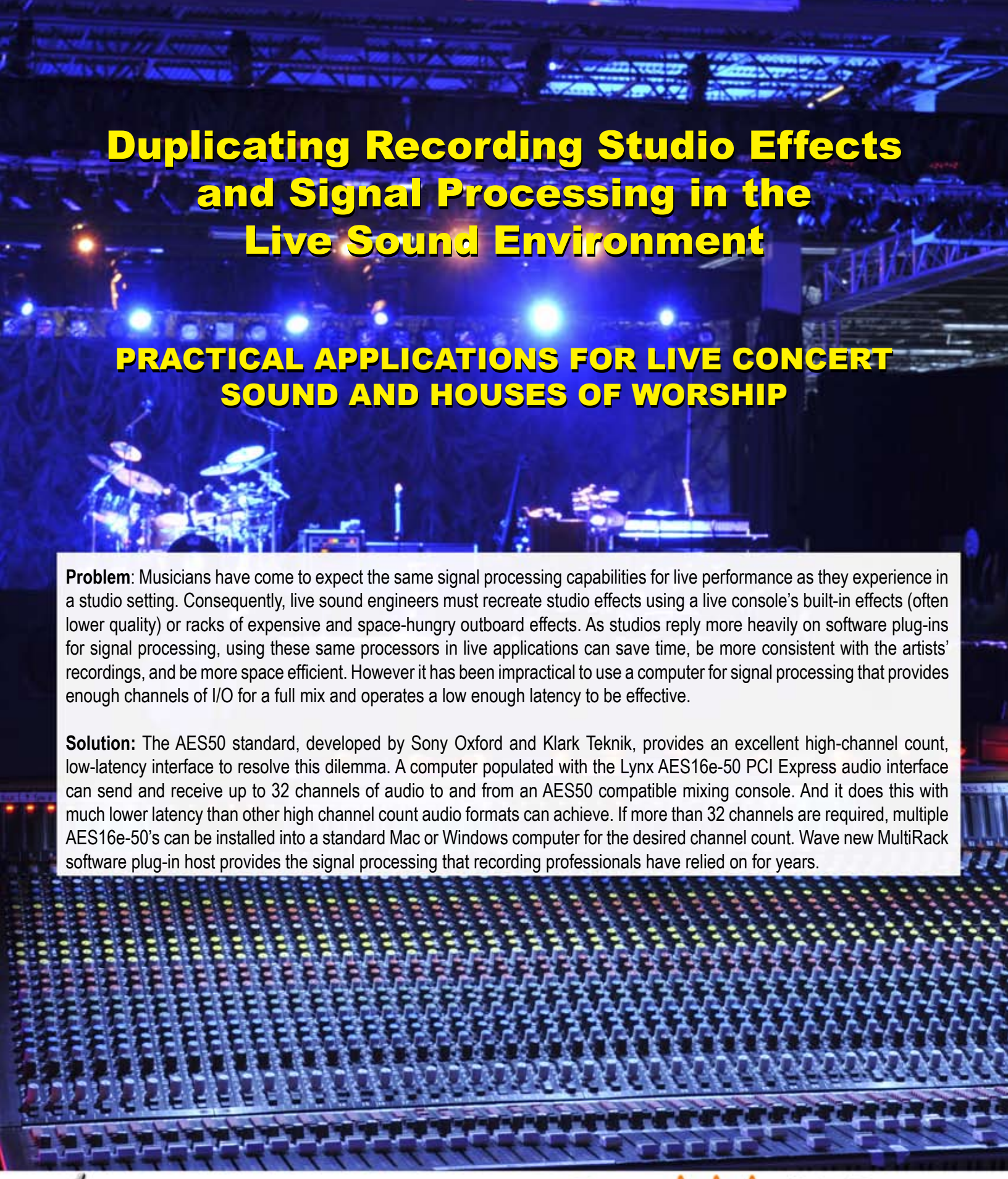
Duplicating Recording Studio Effects and Signal Processing in the Live Sound Environment

PRACTICAL APPLICATIONS FOR LIVE CONCERT SOUND AND HOUSES OF WORSHIP



Problem: Musicians have come to expect the same signal processing capabilities for live performance as they experience in a studio setting. Consequently, live sound engineers must recreate studio effects using a live console's built-in effects (often lower quality) or racks of expensive and space-hungry outboard effects. As studios reply more heavily on software plug-ins for signal processing, using these same processors in live applications can save time, be more consistent with the artists' recordings, and be more space efficient. However it has been impractical to use a computer for signal processing that provides enough channels of I/O for a full mix and operates a low enough latency to be effective.

Solution: The AES50 standard, developed by Sony Oxford and Klark Teknik, provides an excellent high-channel count, low-latency interface to resolve this dilemma. A computer populated with the Lynx AES16e-50 PCI Express audio interface can send and receive up to 32 channels of audio to and from an AES50 compatible mixing console. And it does this with much lower latency than other high channel count audio formats can achieve. If more than 32 channels are required, multiple AES16e-50's can be installed into a standard Mac or Windows computer for the desired channel count. Wave new MultiRack software plug-in host provides the signal processing that recording professionals have relied on for years.

Lynx STUDIO TECHNOLOGY

MIDAS DESIGNED FOR A PURE PERFORMANCE

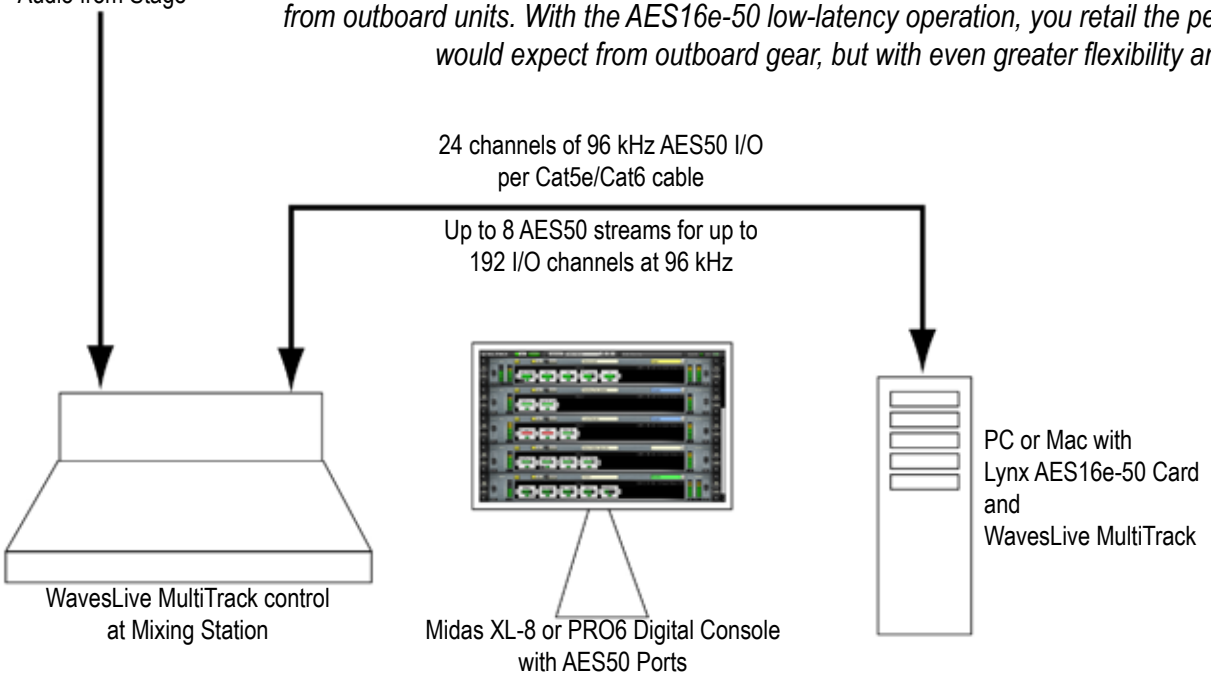
AuviTran

WAVES

AES50 TRADE ASSOCIATION

For Live Sound Reinforcement

Mics and Line sources from the stage are connected to the Midas console's inputs. Each AES50 port on the console is connected to a PC or Mac with WavesLive MultiTrack software using a Lynx AES16e-50 card, Up to 24 channels of audio can be sent to and from the computer on a single network cable at the Midas default sample rate of 96 kHz. Configure the Midas console inserts and aux busses to route signals to the computer for processing: EQ; Reverb; Compression; Delay; Pitch Correction - any of the processes that you would normally rely on from outboard units. With the AES16e-50 low-latency operation, you retail the performance you would expect from outboard gear, but with even greater flexibility and ease of use.



Compact and easy to transport

The entire Effects and Signal processing system is now handled by one or more Macs or PCs. Part of one road case can be dedicate to the system. Ease of interface is also a plus, as you hook up the computer, plug in the CAT5e or CAT6 cables, and call up the presets.

Allows duplication of exact studio effects

The same Waves effects that were used in studio recording can now be stored and recalled for live use. Each source can have its own presets ready to go for each selection. There is no limit to the number of presets, scenes and combinations of effects. Finally, expensive hardware does not need to be purchased for just one or two moments in a concert.

Replaces racks of separate effects

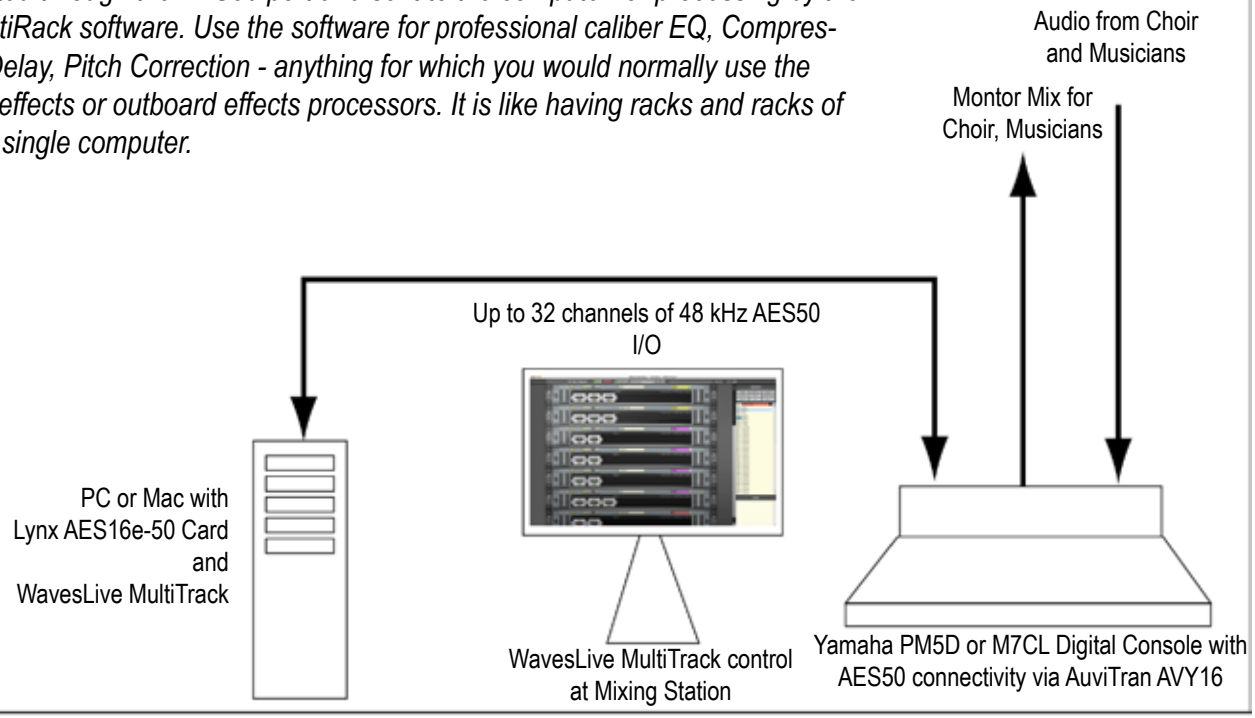
The Waves/Lynx system can replace rack-mount hardware for reverb, digital delay, equalization, compression, limiting, amp simulation, pitch correction and other effects. This saves money, not only on the initial purchases, but also in set up time, less weight to transport, and less gear to move. And with up to 24 channels on one network cable, there's no need for expensive XLR cabling and snakes.

Utilizes AES50 ports on Midas Consoles for 96 kHz digital audio

All effects are managed in the digital domain, 96 kHz AES50. Each Midas AES50 port inputs and outputs 24 channels of audio, plus word clock data and control information. The Lynx SynchroLock™ wordclock on the AES16e-50 features very low-jitter performance with connected equipment, insuring pristine clock integrity, even with long cable runs.

For Houses of Worship

Audio from the choir and musicians is sent to the Yamaha digital console's inputs. With an AuviTran AVY16 AES50 Expansion Card installed in the mixer, up to 32 channels of audio at 48 kHz can be sent and received via the AES50 Protocol. The mixer is connected by a single CAT5e/CAT6 network cable from the mixer's AES50 port to a Mac or PC with the Lynx AES16e-50 card installed. The Yamaha console's inserts and aux busses are routed through the AES50 port and sent to the computer for processing by the WavesLive MultiRack software. Use the software for professional caliber EQ, Compression, Reverb, Delay, Pitch Correction - anything for which you would normally use the mixer's built-in effects or outboard effects processors. It is like having racks and racks of equipment in a single computer.



Expandable as the needs increase

Start out with 32 channels of processing and expand as your congregation and audio requirements increase. Multiple AES16e-50 cards can be added to a single computer for more channels or multiple computers can be added for endless processing possibilities.

Easy to get started

The WavesLive MultiTrack software and Lynx AES16e-50 PCI Express card can be installed and configured quickly in almost any current computer system. You can set up racks of virtual processors and save settings for instant recall within minutes of installation.

Easy set up

AES50 allows 32 channels of audio input and output using standard CAT5e or CAT6 network cables. Simply set up the computer, connect it to the mixer using network cables, call up your presets and you are ready.

No need to purchase and move racks of gear

For mobile churches, you want fewer pieces of gear that must be transported and set up. A single 40 pound computer can replace 300 pounds of equipment racks effortlessly. Not to mention taking up less space, requiring less power, and leaving more money for other needs.

Works with Yamaha Digital Mixers

Yamaha digital mixers have become the go-to mixers for houses of worship. The AuviTran

AURORA SPECIFICATIONS

ANALOG I/O

Aurora 8	Eight inputs and eight outputs
Aurora 16	16 Sixteen inputs and sixteen outputs
Type	Electronically balanced or unbalanced,
Level	+4 dBu nominal / +20 dBu max. or
	-10 dBV nominal / +6 dBV max
	VT Model continunously variable from +8.5 dBu to +24 dBu
Input Impedance	Balanced mode: 24k Ω
	Unbalanced mode: 12k Ω
Output Impedance	Balanced mode: 100 Ω
	Unbalanced mode: 50 Ω
Output Drive	600 Ω impedance, 0.2 µF capacitance
A/D and D/A Type	24-bit multi-level, delta-sigma

ANALOG IN PERFORMANCE

Frequency Response	20 Hz - 20 kHz, +0/-0.1 dB
Dynamic Range	117 dB, A-weighted
Channel Crosstalk	-120 dB maximum, 1 kHz signal, -1 dBFS
THD + N	-108 dB (0.0004%) @ -1 DBFS
	-104 dB (0.0006%) @ -6 DBFS
	1 kHz signal, 22 Hz - 22 kHz BW

ANALOG OUT PERFORMANCE

Frequency Response	20 Hz - 20 kHz, +0/-0.1 dB
Dynamic Range	117 dB, A-weighted
Channel Crosstalk	-120 dB max., 1 kHz signal, -1 dBFS
THD + N	-107 dB (0.00045%) @ -1 DBFS
	-106 dB (0.00050%) @ -6 DBFS
	1 kHz signal, 22 Hz - 22 kHz BW

DIGITAL I/O

Number / Type	Aurora 8: 8 inputs and 8 outputs
	Aurora 16: 16 inputs and 16 outputs
	24 bit AES/EBU format, transformer coupled
Channels	Aurora 8: 8 in/out in single-wire mode
	4 in/out in dual-wire mode
	Aurora 16: 16 in/out in single-wire mode
	8 in/out in dual-wire mode
Sample Rates	All standard rates and variable rates up to
	192 kHz in both single-wire and dual-wire modes

ON-BOARD DIGITAL MIXER (VIA AES16 / AES16e)

Type	Hardware-based, low latency
Routing	Ability to route any input to any or multiple outputs
Mixing	Up to 16 input or playback signals mixed to any
	output, 40-bit precision
Status	Peak levels to -114 dB on all inputs and outputs

CONNECTIONS

Digital I/O Ports	I/O Ports 25-pin female D-sub connectors
	Port A: channels 1-8 I/O
	Port B: channels 9-16 I/O (Aurora 16 only)
	Yamaha pinout standard
Analog I/O Ports	25-pin female D-sub connectors.
	Analog In 1-8; Analog In 9-16 (Aurora 16 only)
	Analog Out 1-8; Analog Out 9-16 (Aurora 16 only)
	Tascam pinout standard
External Clock	75-ohm BNC word clock input and output
MIDI	I/O Standard 5-pin female DIN connectors

REMOTE CONTROL OPTIONS

Function	Controls all I/O, levels, monitoring, routing and
	setting recall
Method	AES16/AES16e: With PC or Macintosh
	MIDI: Selected MIDI devices

GENERAL

AC Power	110 / 115 / 230 VAC, 70 watts
Size	1.75" H x 19" W x 9" D
Shipping Weight	12 pounds
Certifications	CE and FCC Class B EMI, CE Product Safety

LSLOT™ EXPANSION PORT

Compatibility	Supports Lynx LSlot expansion cards
Channels	Up to 16 input and 16 output simultaneously at
	up to 192 kHz sample rate

OPTIONAL LSLOT CARDS

LT-ADAT	16-channel at 48 kHz, 8-channel at 96 kHz,
	4-channel at 192 kHz ADAT Optical I/O
LT-HD	Interface for Digidesign® ProTools|HD® systems
LT-FW	Up to 16 channels of I/O using FireWire 400 port
LT-MADI	Provides up to 64 channels of MADI I/O using
	Optical or Coaxial cablng

AES16e-50 SPECIFICATIONS

MODEL

AES16e-50	Standard PCI Express model with 16 AES/EBU Channels
	Includes 16 channels of Sample Rate Conversion, AES50 Port

DIGITAL I/O

Number / Type	Eight inputs and eight outputs
	24-bit AES/EBU format, transformer coupled
Channels	16 in/out in single-wire mode, 8 in/out in dual-wire mode
Sample Rates	All standard rates and variable rates up to 192 kHz in both
	single wire and dual-wire modes
Sample Rate Conversion	Sixteen channels available with support for conversion ratios up
	to 16:1. Dynamic range: 142 dB

AES50 DIGITAL I/O

Number / Type	One AES50 port, 24-bit audio, 100 Mbit/second data rate.
	Cat5e or Cat6
Channels	48kHz / 44.1kHz: 48 inputs available to 32 record channels,
	32 outputs
	96kHz / 88.2kHz: 24 inputs, 24 outputs
	192kHz / 176.4kHz: 12 inputs, 12 outputs

ARCHITECTURE

Core	FPGA-based core with custom PCI Express bi-directional interface,
	data routing and formatting, device/stream control, digital mixing,
	clock routing and control, and DMA engine
	Support for field upgrades of firmware
Audio Devices	Card is visible to host applications as sixteen record devices and
	sixteen play devices. Each device has two channels and can be
	used independently for multi-client functionality.

CLOCKING

Sources	Any AES/EBU digital input, external word clock (XLR model only)
	on BNC, internal word clock on header, on-board low-jitter crystal
	oscillator, AES50 port
SynchroLock™	Multi-stage, VCXO-based clock generation system with high
	jitter attenuation. Wide mode tracks off-frequency clocks, narrow
	mode generates ultra-low jitter output for standard frequencies

ON-BOARD DIGITAL MIXER

Type	Hardware-based, low-latency
Routing	Ability to route any input to any or multiple outputs
Mixing	64 X 32 @ 48kHz and 96kHz, 34 X 32 @ 192kHz
Status	Peak levels to -114 dB on all inputs and outputs.

LSTREAM EXP PORT

Compatibility	Supports Lynx LStream expansion cards including the LS-ADAT
	16-Channel ADAT I/O card
Type	High-speed serial, up to 16 channels @ 24-bits. 14-pin connector.

CONNECTIONS

I/O Ports	Two bracket-mounted 26-pin high-density female D-sub connectors
	Board mounted RJ45 jack and accessory RJ45 bracket for AES50.
External Clock	75-ohm BNC word clock I/P provided on XLR breakout cables
Internal Clock	Two 75-ohm board mounted 2-pin headers for word clock I/O

SOFTWARE

Windows Drivers	Windows XP / Vista / 7: MME, ASIO 2.0, WDM, and DirectSound
Macintosh Drivers	Core Audio for OS X 10.4; 10.5 and 10.6 (Snow Leopard).
Mixer Application	Multi-window GUI provides complete control of digital mixer and
	all hardware settings.

GENERAL

PCI Express Bus	x1 connection compatible with x1 to x16 PCIe slots.
	Version 1.1 compliant
Data Transfers	Up to 250 Mbytes/sec using custom 32-channel, zero-wait state,
	scatter-gather DMA engine.
	Bus mastering bi-directional PCIe transfers.
Size	5.0" H X 7.4" W X 0.75" D (standard half-size PCI Express card)

CABLES

CBL-AES1604	26-pin high-density male D-sub to four female XLR's (AES inputs),
	four male XLR's (AES outputs), and two female BNC's (word
	clock I/O). Six- foot, 110-ohm shielded twisted pair cabling.
CBL-AES1605	26-pin high-density male D-sub to 25-pin male D-sub. Supports
	4 channels of input and output. Compatible with devices with
	standard Yamaha digital I/O pinout for Aurora converters, Yamaha,
	and others. 12- foot, 110-ohm shielded twisted pair cabling.
For AES50 Port	Cat5e or Cat6 cabling with 8-pin RJ45 connectors