# AES16e
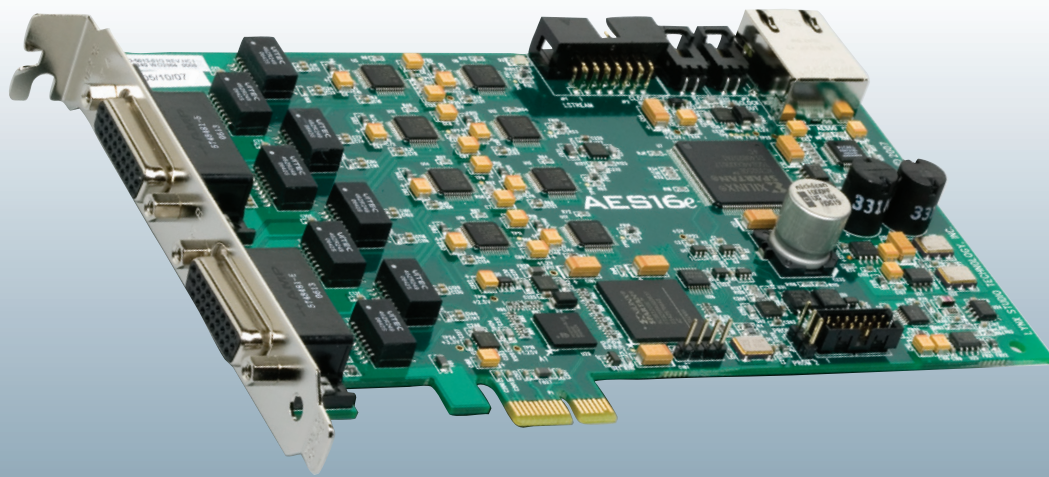
## 16 channel 24 bit / 192kHz AES/EBU pci express audio card

**AES16e PCI Express AES/EBU Interfaces:**

**AES16e**          Sixteen channel AES/EBU PCI Express Card
**AES16e-SRC**   AES16e with sixteen channels of sample rate conversion
**AES16e-50**     AES16e with 32 channels of AES50 I/O
                         sixteen channels of sample rate conversion

The AES16e offers 16 channels of 192 kHz AES/EBU I/O. In addition to the base model, the AES16e-SRC includes sixteen channels of sample rate conversion and AES16e-50 will provide up to 32 additional digital inputs/outputs via AES50 technology.

The AES16e builds on the capabilities of our industry-standard AES16 with an updated feature set and the benefits of the PCI Express interface. The architecture and higher bandwidth of PCI Express reduces bottlenecks and overhead, which provides higher performance for computer-based high end audio.

The AES16e x1 PCI Express card provides 16 channels of 24-bit AES/EBU digital audio at a 192 kHz sample rate in both single-wire and dual-wire AES modes. Designed to integrate digital consoles, multi-channel A/D and D/A converters, hard disk recorders, digital audio workstations and other digital audio equipment, the AES16e is compatible with Windows and Macintosh operating systems.

The AES16e-SRC provides 16 channels of sample rate conversion, which may be switched on for any or all of the 8 digital inputs.

The third model, the AES16e-50, adds up to 32 digital I/O channels using AES50 technology, carrying the digital signal on standard CAT5e or CAT6 cable.

## AES16e-50

The AES16e-50 offers 16 channels of 192 kHz AES/EBU I/O with up to 32 additional digital inputs/outputs via AES50 technology and 16 ADAT channels via the card's LStream port. AES50 multi-channel I/O in conjunction with Lynx's exclusive SynchroLock™ sample clock technology provide a practical solution where cable runs up to 100 meters are required for permanent installation, portable live sound and multiroom recording and production facilities.

New Firmware for the AES16e-50 optimizes performance with the PRO Series consoles that feature the AES50 interface. In this application, the AES16e-50 provides 24 channels of 96 kHz digital I/O for use with ProTools and Logic software. Up to 72 channels (3 AES16e-50) are supported with this new firmware.

The AES16e-50's software mixer provides a total of 80 input channels that can be routed to any of the 32 record streams or monitor outputs. Each of the 32 outputs allows mixing of 32 recording monitor sources and 32 playback streams for true 64 x 32 mixing. These extensive routing capabilities are well-suited for patchbay functionality and format conversion between AES/EBU, AES50 and ADAT.

- x1 PCI Express interface works with Macintosh or Windows PCs with PCI Express slots (x1 - x16).

- Eight stereo inputs and eight stereo outputs (16 mono I/O), AES/EBU format, 24-bit, single wire and dual wire, transformer coupled.

- Extensive 32 x 32 on-board digital mixer.

- Optional sixteen channels of Sample Rate Conversion. Support for conversion ratios up to 16:1 with 144 dB dynamic range and -140dB THD+N.

- Optional AES50 interface.

- All relevant settings, such as sample rate selection, sync source selection, channel routing, and buffer size are enabled, controlled and monitored from the host computer.

- Multi-channel support of 5.1 and 7.1 surround playback formats.

- Includes Lynx-exclusive SynchroLock™ sample clock generator for 3000:1 jitter rejection on external clock sources.

- Windows: 32-bit and 64-bit support for Windows XP/Windows Vista/Windows 7/Windows 8: ASIO 2.0, WDM, MME, DirectSound, Direct Kernel Streaming.

- Macintosh OSX: CoreAudio (through Mavericks 10.9)

# SPECIFICATIONS

## 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 Rate Conversion
Sixteen channels available with support for
conversion ratios up to 16:1.
Dynamic range: 142 dB. AES16e-SRC and AES16e-50
models only.

## AES50 DIGITAL I/O (AE16e-50 ONLY)

### Number / Type
One AES50 port, 24-bit audio, 100 Mbit/second
data rate on Cat5e or Cat6 cabling

### 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 contains 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
on BNC, internal word clock on header,
on-board low-jitter crystal oscillator,
AES50 port (AES16e-50 only)

### 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 EXPANSION 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 internal connector.

## CONNECTIONS

### I/O Ports
Two bracket-mounted 26-pin high-density female
D-sub connectors for AES/EBU.

### Board mounted
RJ45 jack and accessory RJ45 bracket for AES50.

### External Clock
75-ohm BNC word clock input and output provided
on XLR breakout cables

### Internal Clock
Two 75-ohm board mounted 2-pin headers
for word clock input and output

## SOFTWARE

### Windows Drivers
Windows XP / Vista / 7 / 8 / Server 2008 R2
with SP1 platforms: MME, ASIO 2.0, WDM,
and DirectSound

### Macintosh Drivers
Core Audio for up to 10.9 (Mavericks).

### 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 one female BNC's (word clock I/O). Six- foot,
110-ohm shielded twisted pair cabling. Two required.

### 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,

### For AES50 Port
CAT5e or CAT6 cabling with 8-pin RJ45 connectors