

## SHARC® Power, 96 kHz Audio

The Spinner is an audio OEM board based on Analog Devices' low-cost ADSP-21065L SHARC DSP. Combining 180 MFLOPS of processing power with analog and digital 24-bit 96 kHz audio interfaces, the PCI format Spinner is ideal for professional audio applications that require a high-quality audio interface and a high-performance 32-bit processor.

#### Audio Interfaces

The Spinner's digital audio interface consists of a single differential AES/EBU input and output channel. A digital audio transmitter and receiver transport AES/EBU signals to and from the ADSP-21065L processors via I<sup>2</sup>S format serial ports.

Using the latest high-quality audio converters from AKM Semiconductor, the Spinner's analog audio interface consists of two or four differential channels of A/D and two or four single-ended channels of D/A. An A/D and a D/A converter transmit the analog audio signals to and from the ADSP-21065L processors via I<sup>2</sup>S format serial ports.

## ADSP-21065L Processors

The Spinner is configured with one or two 60 MIPS ADSP-21065L processors, each with two bi-directional timers. Each processor also has twelve flags, eight of which are available for digital I/O via a digital I/O connector. The ADSP-21065L processors share a common 32-bit processor bus, which gives them access to the Spinner's 4M (16MB) bank of SDRAM, 1MB bank of FLASH memory, dual UART, and PCI bus interface.

# Host or Standalone Operation

The ADSP-21065L processors can boot from the host computer via the PCI interface or operate standalone with the Spinner's on-board boot FLASH. The Spinner's bus-mastering-capable PCI bus interface gives the host computer direct access to the ADSP-21065L processors' IOP registers, allowing the host to reset and boot the processors.

# **Dual UART Access**

The Spinner's dual UART allows the ADSP-21065L processors to communicate with external serial devices via RS-232 ports.

# **Available Development Tools**

BittWare offers a complete software development kit that allows you to easily integrate the Spinner into your system. The software tools include a comprehensive host interface library, a standard I/O library, and diagnostic utilities. The Spinner audio board is also fully compatible with Analog Devices' VisualDSP® software development tools and supports incircuit emulation.

# **Features**

- Single or dual 180 MFLOPS ADSP-21065L SHARC DSPs
- 2 or 4 channels of 24-bit, 96 kHz A/D and D/A
- 96 kHz AES/EBU digital audio interface
- 16 MB SDRAM
- 1 MB FLASH memory with optional boot loading
- Dual 16550-type UART
- PCI interface or standalone operation
- Digital I/O port



# Specifications

# **BOARD ARCHITECTURE**

## **Processors**

 One or two Analog Devices ADSP-21065L SHARC DSPs

# **External Memory**

- 4M words x 32 SDRAM (16 MB total) available to the ADSP-21065L at 60 MHz
- 1MB FLASH RAM for hostless boot or nonvolatile storage

## **Serial Ports**

- Two external serial ports
- One I<sup>o</sup>S serial port per processor is routed to AES/EBU transmit and receive serial ports
- One I<sup>o</sup>S serial port per processor is routed to the A/D and D/A converters

#### **Dual UART**

 Two RS-232 ports are connected to a 16550 dual UART

# **Analog Audio Interface**

- Two 24-bit, 96 kHz A/D converters (AKM 5393) with two differential input channels
- Two 24-bit, 96 kHz D/A converters (AKM 4393) with two differential output channels
- Two DB-9 connectors, each with two inputs and two outputs

## **Digital Audio Interface**

- 24-bit, 96 kHz audio transmitter supports single differential AES/EBU output channel
- 24-bit, 96 kHz audio receiver supports single differential AES/EBU input channel
- Four-pin Phoenix connector for AES/EBU I/O

## **PCI Interface**

- Provides 32-bit master/slave (120 MB/s peak transfer rate) access to the SHARC processors
- All ADSP-21065L IOP registers are mapped to PCI memory space
- Supports hardware interrupts in both directions and host-based booting of the ADSP-21065L processors

# Digital I/O Interface

 34-pin IDC connector provides 8 bits of digital I/O to each processor

# **Debug Port**

- 14-pin IDC header for IEEE JTAG 1149.1 boundary scan with extensions for in-circuit emulation
- Supports White Mountain DSP ICE emulators

## **Clocking Options**

- On-board oscillator
- AES receive stream
- PLL output word clock

#### **Power**

- +5V @ 2A
- +12V @ 200 mA
- -12V @ 100 mA

#### Size

● 10" × 4.2" PCI bus format

#### ADSP-21065L SHARC DSPs

## **Processing Rate**

 60 MHz, 180 MFLOPS peak, 60 MIPS

## **Arithmetic**

 32/40-bit floating point, 32-bit fixed point arithmetic

## **On-Chip Memory**

• 544 Kbits dual-ported, on-chip SRAM

# Off-Chip Addressing

- 64M words external address range
- SDRAM controller for glueless interface to external memory at 60 MHz

#### I/O

 Integrated I/O processor with four-channel DMA controller, twelve programmable I/O pins, two bi-directional timers, and two 30-Mb/s serial ports with I<sup>o</sup>S support

## SOFTWARE SUPPORT

### **Host Interface**

- BittWare's software development kit for Windows® 95, Windows 98, and Windows NT contains a C-callable library of board control and communications routines
- Porting kit available for other operating system platforms
- Linux port available

## **Development Tools**

 Analog Devices' VisualDSP tools include C compiler, assembler, linker, simulator, and debugger

