

# Shortfin-PCI

Dual ADSP-21065L PCI DSP Board

## Preliminary Technical Data

### SHARC Power, PCI Platform

The Shortfin-PCI is a PCI DSP board based on Analog Devices' low-cost ADSP-21065L SHARC® DSP. It combines two SHARC DSPs, which provide 400 MFLOPS of processing power, with 16 MB of SDRAM, 2 MB FLASH memory, and a 32-bit, 33 MHz PCI interface.

### ADSP-21065L Processors

The Shortfin-PCI is configured with one or two 66 MHz ADSP-21065L processors, each providing 200 MFLOPS. Each SHARC processor also has 544 Kbits of dual-ported SRAM, two programmable timers, two serial ports, an integrated I/O Processor (IOP), and twelve flags. The ADSP-21065L processors share a common 32-bit processor bus, which gives them access to the 4M×32 (16MB) bank of SDRAM, 2M×8 (2MB) bank of FLASH memory, and PCI bus interface.

### SharcFIN™ ASIC for SHARC DSPs

The Shortfin-PCI incorporates BittWare's SharcFIN ASIC, which flexibly interfaces the ADSP-21065L DSPs to the 32-bit, 33 MHz PCI bus, the SDRAM, the FLASH memory, and a peripheral bus. It also provides a feature-rich set of DMA functions and interrupt options to support very high-speed, real-time data flow with minimum processor overhead.

### I/O Support

The Shortfin-PCI offers a variety of user I/O options in addition to the 32-bit, 33 MHz PCI interface: external serial ports, an RS-232 interface, a digital I/O port, and a PMC+ site. One serial port on each SHARC processor is a dedicated external, 4-channel (2 in/2 out) serial port. The remaining serial port on each SHARC processor goes off-board to an external connector via a global serial bus that can be configured as either TDM or I<sup>2</sup>S.

The board's UART allows the ADSP-21065L processors to communicate with external serial devices via an RS-232 port, facilitating remote debugging, command, and control. The digital I/O port provides 24 bits of digital I/O to the PMC+ site, 24 bits of digital I/O to top edge user I/O, and one interrupt to each processor. A timer I/O port provides two general-purpose timers per DSP. The Shortfin-PCI's PMC+ site has back-panel access and allows you to attach any standard PMC module to the board. The PMC+ site also functions as a proprietary interface that allows you to attach BittWare's PMC+ I/O modules for low-latency, high-performance I/O.

### Available Development Tools

BittWare offers a complete software development kit that allows you to easily develop application code and integrate the Shortfin-PCI into your system. The software tools include a comprehensive host interface library (HIL), a standard I/O library, and diagnostic utilities. The board is fully compatible with Analog Devices' VisualDSP® code development tools and supports in-circuit emulation. It is also compatible with SpeedDSP, BittWare's highly-optimized C-callable runtime libraries, and with SharcLAB, BittWare's interface to MATLAB Simulink® and Real-Time Workshop®.

### Features

- Dual ADSP-21065L SHARC DSPs (200 MFLOPS each)
- Low-cost, high-performance (400 MFLOPS total processing power)
- 16 MB of SDRAM
- 2 MB of FLASH memory with optional boot loading
- 2 external serial ports @ 133 Mbits/s each
- External global TDM/I<sup>2</sup>S serial bus
- RS-232 UART
- Digital I/O port (24 bits to PMC+, 24 bits to top-edge I/O, and 1 interrupt per processor)
- Timer I/O port provides 4 general-purpose timers (2 per DSP)
- PCI interface or standalone operation
- PMC+ mezzanine site for standard PMC modules or for PMC+ low-latency, tightly coupled I/O modules



# Specifications

## BOARD ARCHITECTURE

### Processors

- One or two 66 MHz Analog Devices ADSP-21065L SHARC DSPs (200 MFLOPS per SHARC)

### On-Board Memory

- 4M words × 32 SDRAM (16 MB total) available to the ADSP-21065L at 66 MHz (264 MB/s)
- 2M words × 8 (2MB) FLASH RAM for hostless boot or non-volatile storage
- 544 Kbits of dual-ported SRAM on each DSP

### Serial Ports

- Two external serial port connectors, one per processor; each SHARC serial port has 4 channels (2 in/2 out) @ 33 MHz
- Global serial bus to external connector at 66 Mbits/s that can be configured as either TDM or I<sup>2</sup>S
- Global UART provides RS-232 port (10-pin IDC Header)

### Digital I/O Interface

- 12 bits of digital I/O from each DSP (24 total) to the PMC+
- 12 bits of digital I/O from each DSP (24 total) to top-edge user I/O
- 1 interrupt from each DSP to top-edge user I/O
- Timer I/O port provides two timers per DSP

### SharcFIN ASIC

- 32/33 MHz PCI rev. 2.2 compliant interface (528 burst; 400 MB/s sustained)

## Ordering Information

SFPC-23-X  
Processors = 2 | X = Processor Speed  
2 DSPs = 2 | 0 = 60 MHz (180 MFLOPs/DSP)  
SDRAM = 3 | 6 = 66 MHz (200 MFLOPs/DSP)  
16 MB = 3

- Programmable interrupt multiplexer: 10 inputs, 7 outputs (supports hardware interrupts in both directions)
- All ADSP-21065L IOP registers are mapped to PCI memory space
- Supports host- and FLASH-based booting of ADSP-21065L DSPs
- 8-bit, 25 MHz peripheral bus

### PMC+ Site

- Provides connection to standard PMC modules
- Provides TDM serial bus and digital I/O connection to BittWare's PMC+ I/O modules for high-performance low-latency I/O

### Power

- 6W @ 3.3V worst case sustainable
- 1W @ 5V worst case sustainable

### Size

- 6.875" × 4.075" half-length PCI

## SOFTWARE SUPPORT

### Host Interface

- BittWare's software development kit for Windows® 95/98/NT/2000 and Linux contains a C-callable library of board control and communications routines
- Porting kit available for other operating system platforms

### Development Tools

- Analog Devices' VisualDSP tools: C compiler, assembler, linker, simulator, and debugger
- VisualDSP Target for on-board debugging from host without an ICE
- White Mountain DSP ICE emulators
- Eonic Systems' Virtuoso™ operating system
- BittWare SharcLAB interface to MATLAB Simulink® and Real-Time Workshop®
- BittWare SpeedDSP function library

