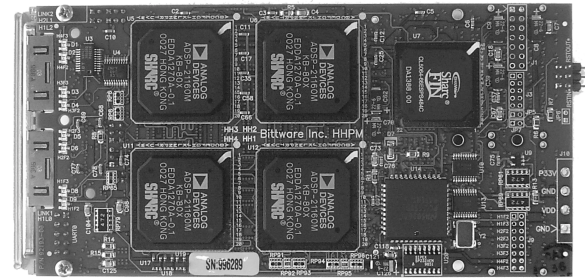# HHPM: Hammerhead-PMC+

Quad ADSP-21160 64-bit, 66 MHz PCI Mezzanine Card

ADSP-21160 SHARC Power - Versatile PMC Form-factor

The Hammerhead-PMC+ (HHPM) packs the processing power of four ADSP-21160 SHARC® DSPs and the speed of a 64-bit, 66 MHz PCI interface onto a single-width PMC module. You can use the Hammerhead-PMC+ to add I/O or additional processors and memory on any standard PMC or PMC+ capable carrier board. The board also features 64-512 MB of SDRAM for general-purpose code and data storage and a 2MB bank of FLASH memory.

SharcFIN™ ASIC for SHARC DSPs

The HHPM incorporates BittWare's SharcFIN ASIC, which flexibly interfaces the ADSP-21160 DSPs to the 64-bit, 66 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.

ADSP-21160 Processors

The HHPM is configured with four 100 MHz ADSP-21160 DSPs, each with 4 Mb of on-chip, dual-ported SRAM. The ADSP0-21160 processors are code-compatible with the ADSP-2106x SHARC DSPs, making it easier to integrate existing code. The four ADSP-21160 processors share a common 50 MHz, 64-bit cluster bus, which gives them access to the board's SDRAM, the PCI bus interface, and the other three SHARC processors. For additional I/O, each processor also has four flags, three interrupts, six link ports, and two serial ports.

PMC+ Interface

The PMC+ interface consists of four connectors: three standard PMC connectors to provide the PCI interface and an additional PMC+ connector that provides four 100 MB/s link ports and a serial TDM bus from the ADSP-21160 DSPs to the carrier board. The HHPM attaches to any PMC capable carrier board, and when attached to one of BittWare's PMC+ capable carrier boards, it can use the PMC+ link and serial port connections for low-latency, tightly-coupled I/O.

Available Development Tools

BittWare offers a complete software development kit that allows you to easily develop application code and integrate the HHPM 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® software development tools, and it 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

- Four ADSP-21160 SHARC DSPs running at 100 MHz (2400 MFLOPS)

- 64-bit, 66 MHz PCI interface

- 64 to 512 MB SDRAM (standard 144-pin SODIMM)

- Four 100 MB/s link ports and a TDM serial port extend off-module to the front panel

- Four link ports and a TDM serial port for integrating to PMC+ carrier boards

- RS-232 UART

- PMC (PCI Mezzanine Card) form-factor

- 2 MB FLASH RAM

BittWare

Specifications

BOARD ARCHITECTURE

Processors
- 4 Analog Devices ADSP-21160 SHARC DSPs
- 600 MFLOPs per DSP
- 4 Mb of on-chip dual-ported SRAM per DSP
- Integrated I/O processor with fourteen-channel DMA controller, six 100 Mbyte/sec link ports, and two 100 Mbit/sec serial ports

External Memory
- 64-512 MB SDRAM (standard 144-pin SODIMM) available to the ADSP-21160s at 50 MHz
- 2 MB FLASH memory available on 8-bit peripheral bus

Link Ports
- 4 link ports extend from the ADSP-21160s to PMC+ interface
- 4 link ports extend from the ADSP-21160s to the front panel
- 16 link ports are dedicated to interprocessor communication
- Entire board is link-bootable via PMC+ interface

Serial Ports
- 1 TDM bus extends from the ADSP-21160s to PMC+ interface
- TDM serial port extends from the ADSP-21160s to the front panel
- Front panel RS-232 port connected to UART
- RS-232 port connected to UART on external connector

SharcFIN ASIC
- 64/66 MHz PCI rev. 2.2 compliant interface (528 burst; 400 MB/s sustained)
- SDRAM controller on SHARC bus; supports up to 512 MB
- SDRAM mapped into PCI memory space
- Programmable interrupt multiplexer: 10 inputs, 7 outputs (supports hardware interrupts in both directions)
- All ADSP-21160 IOP registers and internal SRAM are mapped to PCI memory space
- Supports host- and FLASH-based booting of ADSP-21160 DSPs
- 8-bit, 25 MHz peripheral bus
- Downward compatible with 32-bit, 33 MHz PCI interfaces

Optional Front Panel I/O Card
- 2 link ports, RS-232, or TDM serial port available via expansion connector card

Power
- 18W @ 3.3V worst case sustainable
- 1W @ 5V worst case sustainable

Size
- 149mm × 74mm (5.9" × 2.9")

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
- BittWare 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 libraries

Ordering Information

HHPM-XY-ZZ

Processors = X
- 1 DSP =1
- 2 DSPs =2
- 4 DSPs =4

ZZ=Speed*
- 08= 80 MHz
- 10= 100 MHz

SDRAM= Y
- 64 MB =5
- 128 MB =6
- 256 MB =7
- 512 MB =8

* Only available with 80 MHz

HHPM-FPIO-XY

Connector 1 =X
- TDM =1
- RS-232 =2
- Link Port 3 =3
- Link Port 4 =4

Y= Connector 2
- 1= TDM
- 2= RS-232
- 3= Link Port 3
- 4= Link Port 4

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