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CM4

3U CompactPCI® Single Board Computer with Conduction Cooling

Single Board Computers

Features

- PowerPC MPC7410™ (500 MHz), MPC755™ (400 MHz)
- L2 Cache—1 MB, (MPC755), 2 MB (MPC 7410)
- Up to 256 MB SDRAM with ECC (100 MHz)
- 64 MB extended flash
- 8 MB Boot flash
- Two DMA channels
- PMC Expansion interface
- Four serial channels
- Five digital I/O channels
- Four timers
- 32 kB NVRAM
- 10/100 Mb/s Ethernet
- Conduction-Cooling (-40° C to +85° C), Convection cooling (0° C to +70° C)
- RTC, Watchdog, Processor temperature sensor
- Five Digital I/O channels w/interrupt capability
- System controller or peripheral operation
- Conformal coating available
- Shock/Vibration immunity



Convection-cooled version with front panel

CM4 CompactPCI® is an all-in-one 3U single board computer designed to meet the needs of application developers addressing such markets as industrial automation, medical, scientific, imaging, telecommunications (high bandwidth, broadband data or intelligent network switching), military and aerospace industries. The CM4 will operate as a CompactPCI system controller or peripheral card.

The ultra compact single-slot, all-in-one design offers increased flexibility with multiple processor and RAM configurations options, and an array of on-board peripherals including Fast Ethernet, four serial channels and digital I/O.

The CM4 addresses rugged and military applications with conduction cooling that extends the operating temperature range up to -40°C to +85°C. With increased shock and vibration immunity, using stiffener bars and wedge locks, and conformal coating for high humidity environments, the CM4 can be configured to handle the most demanding environments.

Special features include four serial channels with RS-232 and RS-422/485 interfacing, two DMA controllers, four timers, 32KB non-volatile SRAM, RTC, watchdog, temperature sensor and IIO intelligent IO support. The CM4 also includes five discrete digital I/O channels, each with interrupt capability process-control capability.

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Specifications

Processor - BGA
- Scaleable processing power with flexible processor design
- Motorola PowerPC 755, 400 MHz
- Motorola PowerPC 7410, 500 MHz with AltiVec™ technology
- High efficiency on-board switching regulator (DC/DC)

Cache	Level 1	Level 2
MPC755	64 KB	1 MB
MPC7410	64 KB	2 MB

Level 2 peak bandwidth 1.6 BG/sec at 200MHz

Tsi107 Host Bridge (replaces MPC107 PCI Bridge chip)
- 100 MHz, 64-bit system bus
- PCI burst mode transfers faster than 110 MB/sec
- 32-bit, 33 MHz PCI bus
- Two DMA controllers for concurrent memory and PCI bus data transfers
- Four 32-bit timers for system timing or periodic interrupts
- I2O intelligent I/O support with message and door bell registers

System Memory
- High-speed 100 MHz SDRAM
- 128–256 MB, 72-bit with error correction (ECC)
- Rugged design with soldered chips

Flash Memory
- 64-bit, 64 MB, direct memory mapped Flash memory with software selected write-protection
- 8-bit, 8 MB Boot Flash
- Boot-Select via rear I/O

PCI 6254 PCI/PCI Bridge (formerly HB6)
- PICMIG 2.0 R3.0 compliant cPCI local bus standard
- 32-bit 33 MHz PCI/PCI bridge for up to 8 slots

NVRAM - STK14C88
- 32 kB non volatile SRAM
- Automatic data transfer to/from EEPROM on power-up/down meets safety and reliability

Fast Ethernet - 82559ER
- 10/100 Mbits/sec controller with PCI local bus DMA
- 3 kB Transmit FIFO and 3 kB Receive FIFO
- 10BaseT and 100BaseTX auto-negotiation interface

PMC Expansion Slot
- IEEE P1386/1386.1-compliant
- 32-bit PCI bus interface with 32-bit user lines direct to rear I/O
- Supports CCPMC Draft Standard VITA 20 - 199x with N-style

Four Serial I/O Channels - ST16C2550
- Two asynchronous 16550 compatible full-duplex serial RS-232 channels
- Two asynchronous 16550 compatible full-duplex serial RS-422/485 channels

COM1:	RS-232	RxD, TxD
COM2:	RS-232	RxD, TxD
COM3:	RS-422/485	RxD, TxD, CTS, RTS
COM4:	RS-422/485	RxD, TxD, CTS, RTS

Digital I/O
- Five digital I/O channels
- Each channel interrupt-capable (edge-sensitive)
- Read/write by X-bus interface

PBIT
- Power-Up-Bit (PBIT) checks hardware integrity

Real-time clock
- RTC 146818-compatible backup via rear I/O

Watchdog Timer
- Activates reset and interrupt under software control

Temperature Sensor
- Remote temperature (CPU case) software-readable from 0° C to +127° C, in 4° C increments

Status LED
- Card fail (User programmable) at rear I/O

COP Interface
- Debug interface for external emulator

Power Requirements

- +5 V, +3.3 V: Required
- ±12 V: For installed PMC module only

Power Consumption

CPU	Measured Power*	Calculated Power Typical	Max
MPC755 (400 MHz)	9.5 W	15.4 W	19.5 W
MPC7410 (500 MHz)	11.3 W	15.3 W	23.4 W

* Power measured at nominal temperature, BSP idle 128 MB SDRAM, 32 MB flash memory, and no PMC module installed.

Power Allowances - PMC Slot

- +5 V, +3.3 V: Total power max. = 7 W
- ±12 V: 50 mA each

Temperature - (excluding N-style)

The highest achievable operating temperature depends on processor type, speed and ambient conditions (airflow). All values represent typical conditions w/o PMC module.

An installed PMC module reduces the temperature range.

	Operating	Storage
Standard	0° C to +70° C	-40° C to +85° C
Extended	-40° C to +85° C	-40° C to +85° C

Temperature - (N-style)

The highest achievable operating temperature depends on processor type, speed and ambient conditions (card edge temp.). All values under typical conditions w/o PMC module. An installed PMC module reduces the temperature range.

	Operating	Storage
Extended	-40° C to +85° C	-55° C to +105° C

CPU	Max Card Edge Temp.*
MPC755 (400 MHz)	85° C
MPC7410 (500 MHz)	85° C

A complete thermal report is available upon request.

Humidity

- Operating: 5 - 95% @ 40° C
- Storage: 5 - 95% @ 40° C

Altitude

- Operating: 15,000 ft. (4.5 km)
- Storage: 40,000 ft. (12 km)

Shock/Vibration

Style	Shock	Vibration
C-Style	12 g/6 ms	2 g rms/5–100 Hz
N-Style	100 g/6 ms	14 g rms/5 Hz–2 KHz*

* 30 minutes each axis

MTBF

- Calculations in accordance with MIL-HDBK-217. Please contact SBS Technologies for details.

Safety

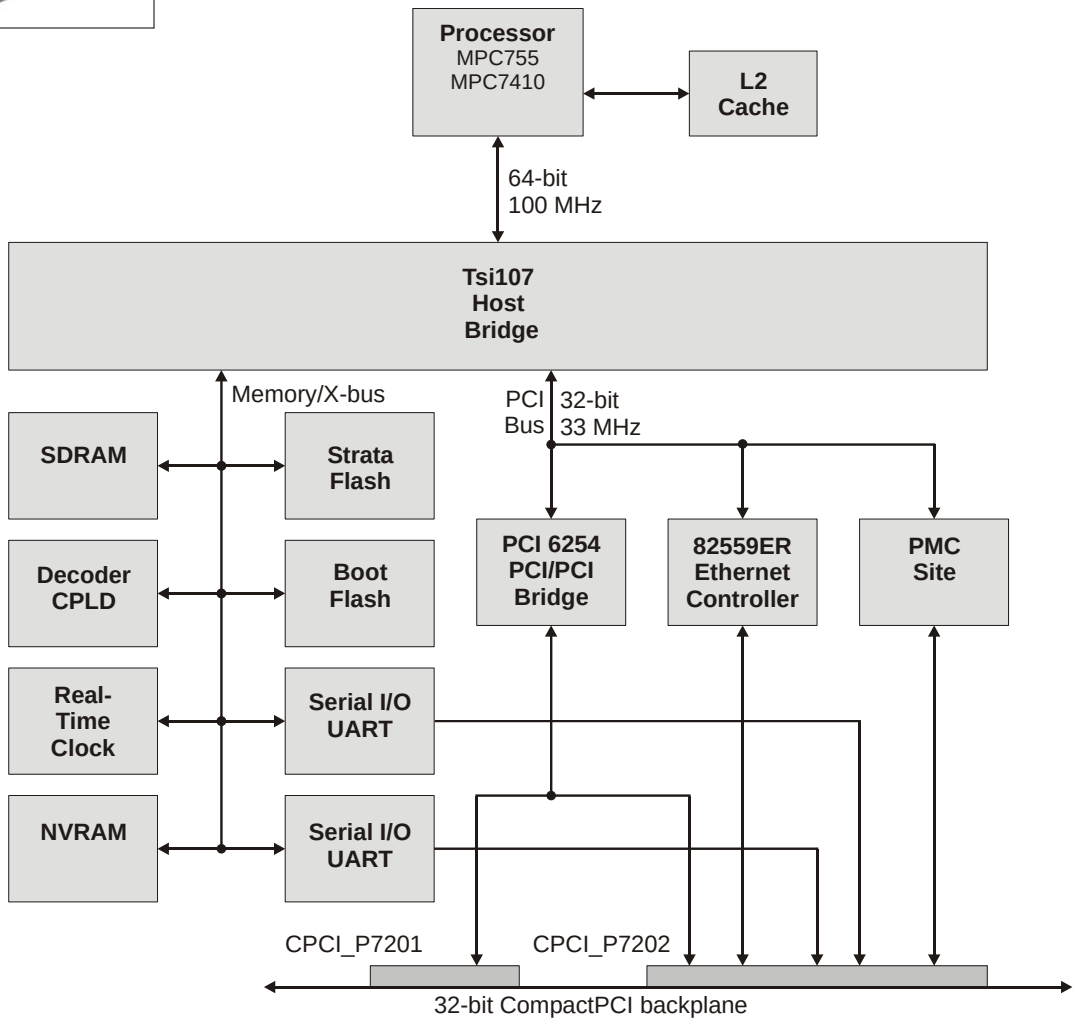
- PWBs manufactured to flammability rating of 94V-0 by UL recognized manufacturer

Styles:	C	N
Front Panel	x	-
Front stiffener	-	x
Middle stiffener	-	x
Wedge locks	-	x
Parts soldered	x	x
Extended temp.	-	x
Conformal coating	-	x
Conduction cooled	-	x



CM4

Block Diagram



Ordering Information

Hardware Accessories

- CM4-TM—I/O Transition Module for CompactPCI backplane.
- Flat cable for Two COM, 3U/4HP front panel. Order number—YLBCOM304A
- Reset/LED Order number—YLB-RLTM
- RJ-45 Connector Order number—YLB-LAN-A + front panel

Operating Systems

SBS supports various operating systems. Please contact SBS for current offerings.

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