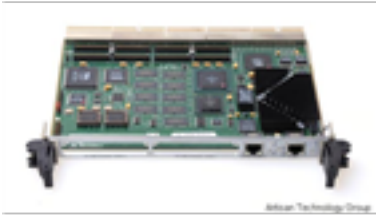
Motorola MCPN750

cPCI Single Board Computer



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Datasheet

MCPN750

CompactPCI
Peripheral Processor

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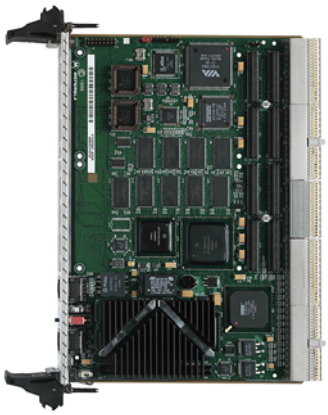
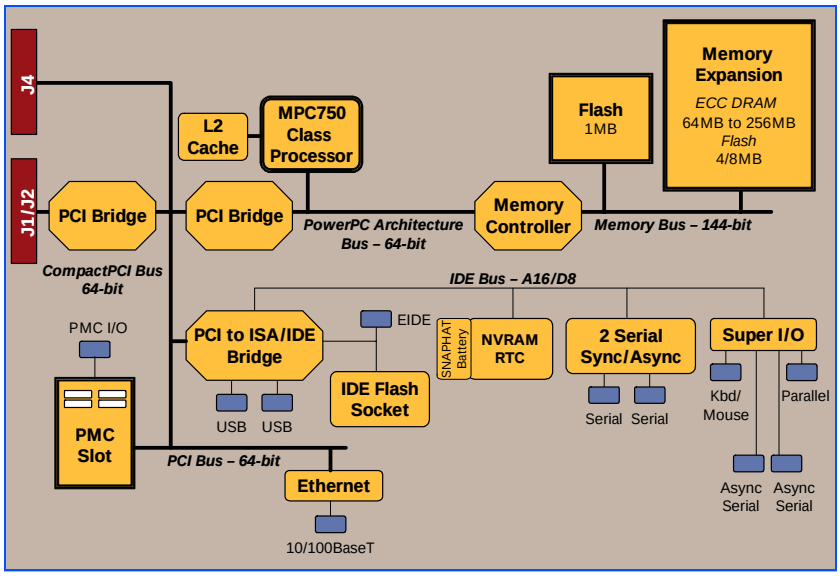


Low-power, high-performance CompactPCI board

The MCPN750 series of CompactPCI® boards provides the performance of Motorola's PowerPlus Architecture and the ability to be fully customized with two PCI mezzanine cards (PMCs).

Utilizing Motorola's low-power, high-performance MPC750 class microprocessors, 64-bit local peripheral component interconnect (PCI) bus for the on-board peripherals, processor/memory bus to PCI bus bridge, and a 64-bit bridge to the CompactPCI interface, the MCPN750 offers maximum performance and flexibility in just a single CompactPCI slot. It is also fully compliant to the PICMG® 2.1 Hot Swap Specification, making it the ideal choice for high availability applications.

- MPC750 class microprocessor
- 32KB/32KB L1 cache; 1MB L2 cache
- 64 to 256MB of ECC DRAM
- Up to 5MB on-board Flash memory
- Optional CompactFlash memory card socket
- 10/100Mb/s Ethernet interface
- Two 32/64-bit PMC expansion slots with front-panel or backplane I/O
- Two universal serial bus (USB) ports
- Four asynchronous serial ports
- On-board debug monitor with self-test diagnostics
- 8K x 8 NVRAM and time-of-day clock with replaceable battery backup
- Four 32-bit timers, one watchdog timer
- 64-bit CompactPCI interface
- Single CompactPCI slot, even when fully configured
- Compliant with PICMG 2.1 Hot Swap Specification



MCPN750 DETAILS

Transition Modules

The TM-PIMC-0001 transition module provides one RJ-45 Ethernet connector, two RJ-45 serial connectors and two headers (providing access to the asynchronous serial ports configured as EIA DTE), one socket for an optional CompactFlash memory card, and two PIM slots.

The TMCPN710 transition module provides industry-standard connector access to the two USB Series A receptacles, two RJ-45 connectors and two headers (providing access to the asynchronous serial ports configured as EIA DTE), and two sockets for optional CompactFlash memory cards. Also, on the TMCPN710-002 model there are two HD-68 connectors available to provide access to the PMC backplane I/O.

Firmware Monitor

Firmware must fulfill the traditional functions of test and initialization, in addition to operating system boot support. The MCPN750 firmware monitor exceeds these requirements plus expands features like power-up tests with extensive diagnostics, as well as a powerful evaluation and debug tool for simple checkout or when high-level development debuggers require additional support. All this is included with the MCPN750 firmware, plus it supports booting both operating systems and kernels.

IEEE P1386.1 Compliant PMC Slots

The MCPN750 features dual PMC ports with support for both front-panel and backplane I/O. In addition to providing high performance expansion I/O, the IEEE P1386.1 compliant PMC ports form a common architecture for future generations of products. Changing I/O requirements can be satisfied by simply replacing PMCs while reusing the same base platform and software, reducing the long-term cost of ownership.

PowerPlus Architecture

The PowerPlus Architecture is a processor and bus architecture fully optimized to get the maximum performance from the PowerPC architecture-compatible microprocessor family, the PCI bus, and the CompactPCI interface. The outstanding performance of processor boards based on the PowerPlus Architecture is not due to a single factor. A number of elements in the design of the PowerPlus Architecture contribute to its outstanding performance including the processor/memory subsystem, high-speed local bus, optimally decoupled architecture, decoupling the processor from PCI, and the advanced CompactPCI interface, which reduces PCI delays. Contact your sales representative for details.

Operating Systems and Kernels

MCPN750 supports booting a complete range of real-time operating systems and kernels, which may be purchased from the following companies:

Integrated Systems, Inc.:	pSOSystem
Monte Vista Software:	Linux
Wind River Systems, Inc.:	VxWorks

SPECIFICATIONS

Processor

Microprocessor:	366/466 MHz MPC750 class
On-chip Cache (I/D):	32K/32K

Memory

Main Memory:	Dynamic RAM
Capacity (60ns):	256MB
Capacity (50ns):	64MB, 128MB, or 256MB
Single Cycle Accesses:	9 read/4 write
Read Burst Mode (60ns):	9-1-2-1 idle; 3-1-2-1 aligned page hit
Read Burst Mode (50ns):	8-1-1-1 idle; 2-1-1-1 aligned page hit
Write Burst Mode:	4-1-1-1 idle; 3-1-1-1 aligned page hit
Architecture:	128-bit, 2 way interleaved
Parity/ECC:	No/Yes
L2 Cache:	1MB
Cache Bus Clock Frequency:	Processor clock divided by 2.5 (366 MHz) or divided by 3.0 (466 MHz)
Flash:	On-board programmable
Capacity:	1MB via two 32-pin PLCC/CLCC sockets; 4MB surface mount
Read Access (4MB port):	68 clocks (32 byte burst)
Read Access (1MB port):	260 clocks (8 byte burst)
Write Access (1MB/4MB):	19 clocks (2 bytes/8 bytes)
NVRAM:	8KB, 4KB available for users
Cell Storage Life:	50 years at 55° C
Cell Capacity Life:	10 years at 100% duty cycle
Removable Battery:	Yes

CompactPCI Interface

Controller:	Intel 21554
Address/Data:	A32/D32/D64
PCI Bus Clock:	33 MHz
Signaling:	3.3V output; input defined by VIO

Ethernet Interface

Controller:	Intel 21143
Interface Speed:	10/100Mb/s
PCI Local bus DMA:	Yes, with PCI burst
Connector:	RJ-45 on front panel (optionally to J5)

Counters/Timers

TOD Clock Device:	M48T559; 8KB NVRAM
Real-Time Timers/Counters:	Four 32-bit programmable
Watchdog Timer:	Time-out generates reset

Asynchronous Serial Ports

Controller:	16C550C UART
Number of Ports:	Four
Configuration:	EIA-574-DTE
Async Baud Rate, b/s max.:	38.4K EIA-232, 115Kb/s raw
Connector (COM1):	Front panel; also RJ-45 on TMCPN710 and TM-PIMC-0001
Connector (COM2):	Routed to J3; also RJ-45 on TMCPN710 and TM-PIMC-0001
Connector (COM3/4):	Routed to J3; two headers on TMCPN710

USB

Controller:	82C586
Connectors:	Two Series A receptacles on front panel; also routed to J3 for optional use of two Series A receptacles on TMCPN710

IEEE P1386.1 PCI Mezzanine Card Slot

Address/Data:	A32/D32/D64, PMC JN1, JN2, JN3, JN4 connectors
PCI Bus Clock:	33 MHz
Signaling:	5V
Power:	+3.3V, +5V, ±12V, 7.5 watts maximum per PMC slot
Module Types:	Two single-wide or one double-wide, front panel I/O or J3 and J5 I/O

Note: Due to high component density, uninsulated traces and vias are located in the MCPN750 I/O keepout area. If installed, PMC modules having conductive I/O connectors could contact these traces and vias. If full IEEE 1386-2001 compliance is required, an insulating shield (for example, Kapton tape) should be installed.

Hot Swap

Compliant with PICMG Hot Swap Specification, Revision 1.0

Power Requirements (entry model)

(not including power required by PMC or transition module)

	+3.3V ±5%	**+5V ±5%**	**+12V ±5%**	**–12V ±5%**
MCPN750:	2.1 A typ. 2.8 A max.	2.0 A typ. 2.6 A max.	4.0 mA typ. 6.0 mA max.	1.0 mA typ. 2.0 mA max.

Demonstrated MTBF

(based on a sample of eight boards in accelerated stress environment)

Mean:	214,323 hours
95% Confidence:	76,816 hours

Board Size

Height:	233.4 mm (9.2 in.)
Depth:	160.0 mm (6.3 in.)
Front Panel Height:	261.8 mm (10.3 in.)
Width:	19.8 mm (0.8 in.)
Max. Component Height:	14.8 mm (0.58 in.)

Miscellaneous

Reset/Abort switch on front panel; three LEDs for FAIL, CPU, and hot swap

Transition Modules

I/O Connectors

	TMCPN710	TM-PIMC-0001
Asynchronous Serial Ports:	Two RJ-45 connectors labeled as COM1 and COM2; Two 26-pin headers as COM3 and COM4	Two RJ-45 connectors labeled as COM1 and COM2; Two 26-pin headers as COM3 and COM4
USB:	Two 4-pin Series A receptacles	None
PMC I/O:	Two HD-68	Two PMC sites/slots
Ethernet:	Optional, one RJ-45 connector	One RJ-45 connector

CompactFlash Memory Card Interface

Controller: 82C586

Interface: ATA, true IDE mode

CompactFlash Cards (optional): Motorola CFLASH-xxx series

Connector: One or two standard 50-pin sockets

Board Size

Height: 233.4 mm (9.2 in.)

Depth: 80.0 mm (3.1 in.)

Front Panel Height: 261.8 mm (10.3 in.)

Width: 19.8 mm (0.8 in.)

All Modules

Environmental

	Operating	Nonoperating
Temperature:	0° C to +55° C, forced air cooling exit air	–40° C to +85° C
Humidity (NC):	10% to 80%	10% to 90%
Vibration:	0.5 G RMS, 20–2000 Hz random	6.0 Gs RMS, 20–2000 Hz random

Safety

All printed wiring boards (PWBs) are manufactured with a flammability rating of 94V-0 by UL recognized manufacturers.

Electromagnetic Compatibility (EMC)

Intended for use in systems meeting the following regulations:

U.S.: FCC Part 15, Subpart B, Class A (non-residential)

Canada: ICES-003, Class A (non-residential)

This product was tested in a representative system to the following standards:

CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class B; Immunity: EN55024

ORDERING INFORMATION

Part Number	Description
MCPN750-1342	366 MHz MPC750, 64MB DRAM, front Ethernet
MCPN750-1352	366 MHz MPC750, 128MB DRAM, front Ethernet
MCPN750-1362	366 MHz MPC750, 256MB DRAM, front Ethernet
MCPN750-2342	366 MHz MPC750, 64MB DRAM, rear Ethernet
MCPN750-2352	366 MHz MPC750, 128MB DRAM, rear Ethernet
MCPN750-1442	466 MHz MPC750, 64MB DRAM, front Ethernet
MCPN750-1452	466 MHz MPC750, 128MB DRAM, front Ethernet
MCPN750-1462	466 MHz MPC750, 256MB DRAM, front Ethernet
Related Products	
TM-PIMC-0001	One RJ-45 Ethernet, two RJ-45 async serial ports, two headers for async serial ports, CompactFlash socket, two PIM slots
TMCPN710-001	Two RJ-45 async serial port connectors, two headers for async serial ports, two CompactFlash sockets
TMCPN710-002	Two RJ-45 async serial port connectors, two headers for async serial ports, two HD-68 connectors providing access to PMC backplane I/O, two CompactFlash sockets
CFLASH-xxx	CompactFlash memory card (where xxx = number of MB

Part Number	Description
Documentation	
MCPN750A/IH	MCPN750 Installation and Use Manual
MCPN750A/PG	MCPN750 Programmer's Reference Guide
TMCPN710A/IH	TMCPN710 Transition Module Installation and Use
TMPIMCA/IH	TM-PIMC-0x01 Transition Module Installation and Use
PPCBUGA1/UM and PPCBUGA2/UM	PPCBug Firmware Package User's Manual
PPCDIAA/UM	PPCBug Diagnostics Manual
Documentation is available for online viewing and ordering at http://www.motorola.com/computer/literature	

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