Penguin Edge™ MVME5500

NXP® MPC7457 VME SBC

- MPC7457 PowerPC processor at 1GHz
- 512KB of on-chip L2 cache and 2MB of L3 cache
- AltiVec coprocessor for high-performance computational applications
- Two banks of soldered flash memory (32MB and 8MB)
- Dual independent 64-bit PCI buses and PMC sites with a bus speed of up to 66MHz
- Gigabit Ethernet interface plus an additional 10/100BaseTX Ethernet interface
- 64-bit PCI expansion mezzanine connector allowing up to four more PMCs
- I/O compatibility with MVME51xx family
- Support for processor PMCs (PrPMCs)

The Penguin Edge™ MVME5500 the NXP® MPC7457 PowerPC® processor running at 1GHz, balanced with memory, dual independent local buses and I/O subsystems.

The powerful Marvell system controller, with support for a 133MHz host bus and a 133MHz SDRAM memory bus, is well matched to the high speed processor.

To match the system I/O to the outstanding processor performance, the MVME5500 provides dual 64-bit, 33/66MHz PCI buses. Each PCI bus has a PMC site supporting cards running at 33 or 66MHz. The Universe II VME interface and PMCspan connector are isolated from the PMC sites on a dedicated 33MHz PCI bus segment so that both PMC sites are capable of 66MHz operation.

The MVME5500 also offers a Gigabit Ethernet interface, a 10/100BaseTX Ethernet interface and two serial ports. All of this adds up to a set of well-balanced, high-performance subsystems for unparalleled performance.

The MVME5500 series is designed to meet the needs of OEMs including those in defense and aerospace, industrial automation and transportation. Customers looking for a technology refresh for their application while maintaining backward compatibility with their existing VMEbus infrastructure can upgrade to the MVME5500 series and take advantage of the enhanced performance features.

MVME5500 Block Diagram
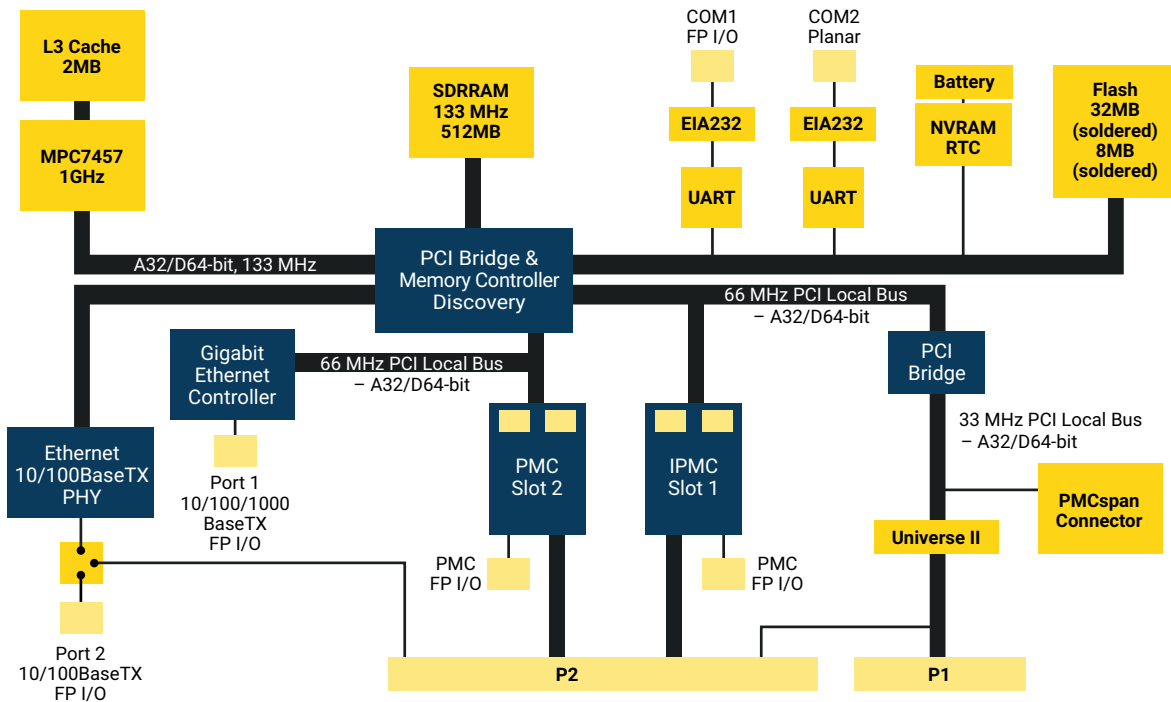
Backwards Compatibility

The MVME5500 continues the direction started with the MVME5100 series of providing a migration path from the Penguin Edge embedded controllers and single-board computers (SBCs) to a single platform. This migration path enables OEMs to support varying I/O requirements with the same base platform, simplifying part number maintenance, technical expertise requirements and sparing.

The MVME5500 series offers customers a migration path from the MVME2300, MVME2400, MVME2600, MVME2700 and MVME5100 boards to allow them to take advantage of features such as the MPC7455 processor, Gigabit Ethernet and dual independent 33/66MHz PMC sites.

Transition Modules

The MVME761 transition module provides industry standard connector access to the IEEE 1284 parallel port, a 10BaseT or 100BaseT port via an RJ-45 connector, two DB-9 connectors providing access to the asynchronous serial ports configured as EIA-574 DTE and two HD-26 connectors providing access to the sync/async serial ports. These serial ports, labeled as Serial 3 and Serial 4 on the faceplate of the MVME761, are individually user-configurable as EIA-232, DCE or DTE via the

installation of Penguin Edge Serial Interface Modules (SIMs). A P2 adapter board provides interface signals to the MVME761 transition module.

Two separate P2 adapter boards are available: one for 3-row backplanes and one for 5-row backplanes. The 3-row P2 adapter board provides connection for 8-bit SCSI. A 5-row P2 adapter board supports 16-bit SCSI and PMC I/O.

Software Support

Firmware Monitor

Firmware must fulfill the traditional functions of power-on self-test (POST), initialization, low-level setup and debug, and operating system booting. The Penguin Edge innovative firmware (known as MOTLoad) that is resident on the MVME5500 exceeds these requirements with expanded features such as interrupt driven I/O, more comprehensive power-up tests and extensive diagnostics with new scripting capability. And of course, MOTLoad provides a debugger interface similar to the time proven "bug" interface on previous Penguin Edge VMEbus boards.

Operating Systems and Kernels

VxWorks (available through Wind River)

Specifications

Processor

- Microprocessor: MPC7457
- Clock Frequency: 1GHz
- On-chip L1 Cache (I/D): 32KB/32KB
- On-chip L2 Cache (I/D): 512KB
- L3 Cache: 2MB

System Controller

- Marvell GT-64260B

Main Memory

- Type: PC133 ECC SDRAM
- Speed: 133MHz
- Configurations: 512MB in two banks

Flash Memory

- Type: EEPROM, on-board programmable
- Capacity: 40MB total in two banks of 32MB and 8MB, both soldered
- Write Protection: 32MB of surface-mount flash is write protectable via jumper

NVRAM

- Capacity: 32KB (4KB available for users)
- Cell Storage Life: 50 years at 55°C
- Cell Capacity Life: Five years at 100% duty cycle, 25°C
- Removable Battery: Yes

Counters/Timers

- TOD Clock Device: M48T37V
- Real-Time Timers/Counters: Eight, 32-bit programmable
- Watchdog Timer: Time-out generates reset

VMEbus Interface: ANSI/VITA 1-1994 VME64 (IEEE STD 1014)

- Controller: Tundra Universe II
- DTB Master: A16-A32; D08-D64, SCT, BLT
- DTB Slave: A24-A32; D08-D64, BLT, UAT
- Arbiter: RR/PRI
- Interrupt Handler/Generator: IRQ 1-7/Any one of seven IRQs
- System Controller: Yes, jumperable or auto detect
- Location Monitor: Two, LMA32

Ethernet Interfaces

- Port 1
  - Controller: Intel® 82545GM Gigabit Ethernet controller
  - Interface Speed: 10/100/1000 Mbps
  - Connector: Routed to front panel RJ-45
- Port 2
  - Connector: Controller integrated into GT-64260B system controller
  - Interface Speed: 10/100Mbps
  - Connector: Routed to front panel RJ-45 or optionally routed to P2, RJ-45 on MVME761

Asynchronous Serial Ports

- Controller: Two TL16C550C UARTs
- Number of Ports: Two, 16550 compatible
- Async Baud Rate, bps max.: 38.4K EIA-232, 115Kbps raw
- Connector: Routed to front panel RJ-45; one on planar for development use

Dual IEEE P1386.1 PCI Mezzanine Card Slots

- Address/Data: A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors
- PCI Bus Clock: 33/66MHz
- Signaling: 3.3V or 5V, configurable with keying pin
- Power: +3.3V, +5V, ±12V
- Module Types: Two single-wide or one double-wide, front panel or P2 I/O, PMC and PrPMC support

PCI Expansion Connector

‣ Address/Data: A32/D32/D64
‣ PCI Bus Clock: 33MHz
‣ Signaling: 5V
‣ Power: +3.3V, +5V, ±12V
‣ Connector: 114-pin connector located on MVME5500 planar, same location as on MVME5100 planar

Power Requirements

‣ 6.7A typ., 8.0A max. (+5V ±5%)

Note: In a 3-row chassis, PMC current should be limited to 19.8 watts (total of both PMC slots). In a 5-row chassis, PMC current should be limited to 46.2 watts (total of both PMC slots).

Board Size

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

Transition Modules	
I/O Connectors	
	MVME761
Asynchronous Serial Ports	Two, DB-9 labeled as COM1 and COM2
Synchronous Serial Ports	Two, HD-26 labeled as Serial 3 and Serial 4 (user-configurable via installation of SIMs); two 60-pin connectors on MVME761 planar for installation of two SIMs
Parallel Port	HD-36, Centronics compatible
Ethernet	10BaseT or 100BaseT, RJ-45
SCSI	8- or 16-bit, 50- or 68-pin connector via P2 adapter

Transition Module Size

‣ Height: 233.4mm (9.2 in.)
‣ Depth: 80.0mm (3.1 in.)
‣ Front Panel Height: 261.8mm (10.3 in.)
‣ Front Panel Width: MVME761: 19.8mm (0.8 in.)

All Modules

Environmental

	Operating	Non-operating
Temperature	0°C to +55°C (inlet air temp. with forced air cooling*)	−40°C to +85°C
Humidity (NC)	5% to 90%	5% to 90%
Vibration		1G sinusoidal, 5 − 100Hz 2 axes horizontal and vertical (NEBS1)

* Reference cooling requirements section of the user's manual.
Note: Conformal coating these products may result in up to a 2°C reduction in operating temperature limits.

Demonstrated MTBF

Based on field analysis, estimated MTBF is 796,000 hours at 60% confidence level.

Estimated MTBF

MTBF estimated per Telcordia SR-332, issue 2, ground fixed, controlled environment, unit ambient air temperature of 40°C is 702,000 hours. Contact Penguin Solutions for alternative environments or temperatures.

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)
‣ Penguin Edge board products are tested in a representative system to the following standards:
  – CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class A; Immunity: EN55024

Safety

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

Ordering Information

New Part Number	Old Part Number	Description	Weight
MVME55006E-0161R	MVME55006E-0161	1GHz MPC7457 PowerPC processor, 512MB SDRAM, Scanbe handles 6E	0.40 kg
MVME55006E-0163R	MVME55006E-0163	1GHz MPC7457 PowerPC processor, 512MB SDRAM, IEEE handles 6E	0.43 kg

Related Products

PMCSPAN16E-002	Primary PMCSPAN-002 with original VME Scanbe ejector handles 5E

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About Penguin Solutions

Penguin Solutions accelerates customers' digital transformation with the power of emerging technologies in HPC, AI, and IoT with solutions and services that span the continuum of edge, core, and cloud. The company designs highly advanced infrastructure, machines and networked systems that enable the world's most innovative enterprises and government institutions to build the autonomous future, drive discovery and amplify human potential. The Penguin Edge portfolio covers system on modules, single board computers and application-ready platforms that extend insight, intelligence, and analytical capabilities closer to where the data is generated - optimizing a range of use cases across industries and rugged environments.