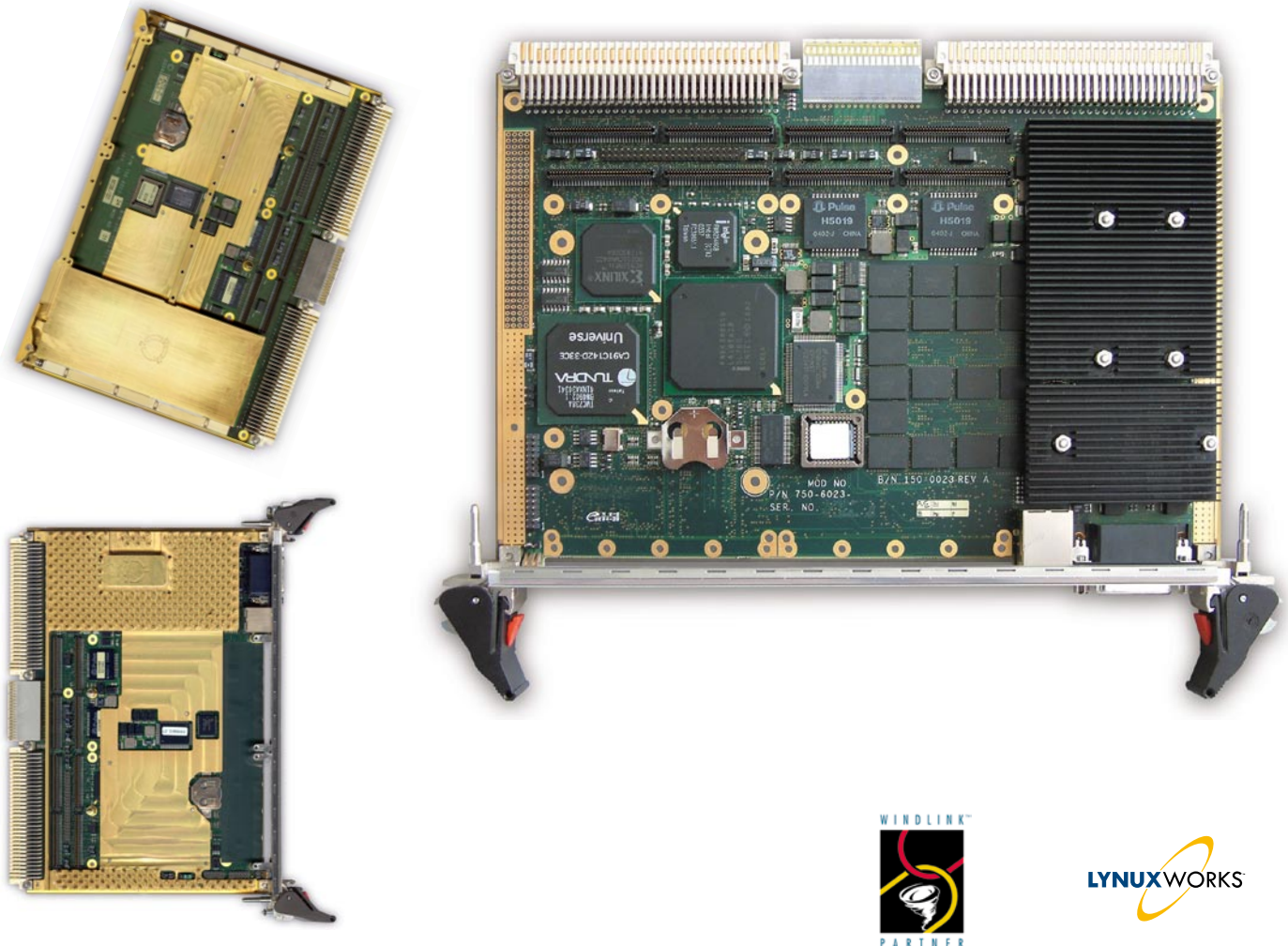# ➤ PENTXM

Low-Power Pentium® M VME Blade PC

- ➤ 1.6 or 1.8 GHz Pentium® M Processor
- ➤ Low-Power Intel® 855GME Host Bridge
- ➤ Two 64-bit/66 MHz PMC Slots
- ➤ Direct Memory Access (DMA) Graphics Controller
- ➤ Available in Four Ruggedization Levels

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Product Overview

The PENTXM is a PC-compatible high-performance, high-functionality VMEbus processor board utilizing the 1.6 GHz or 1.8 GHz Intel Pentium M. The single-slot board features 2 PMC sites, 1 GB of soldered synchronous SDRAM and a variety of interfaces including an option for an onboard hard disk drive, CompactFlash™ or IBM®/Hitachi MicroDrive™.

The PENTXM is suitable for a range of demanding embedded applications within the industrial control, telecommunications, telemetry, scientific, and aerospace markets. Popular industry-standard operating systems are supported to simplify integration.

➤ 1.8 GHz Pentium M processor 745
  - 64 KB L1 Cache
  - 2 MB L2 Cache
  - No CPU Fan Needed
or
➤ 1.6 GHz Pentium M processor
  - 64 KB L1 Cache
  - 1 MB L2 Cache
  - No CPU Fan Needed
➤ Low-Power Intel 855GME Host Bridge
➤ 1 GB 266 MHz DDR ECC SDRAM
➤ High-Performance EIDE Interfaces with Optional Onboard Disk Drive or Optional CompactFlash or MicroDrive (In a Single Slot)
➤ Two 64-bit/66 MHz PMC Interfaces
➤ PMC Expansion Board Available for Two or More Additional PMC Sites
➤ Intel 6300ESB I/O Controller Hub
➤ Two 10/100/1000BASE-T Ethernet Interfaces
➤ VME64 Interface
➤ Packet Switching Backplane (VITA 31.1)
➤ 64 MB Application Flash EPROM
➤ 512 KB BIOS Flash EPROM
➤ High-Resolution Graphics Interface
➤ Keyboard and Mouse Interface
➤ Up to 3 Serial Channel Interfaces
➤ Up to 2 USB Interfaces
➤ Watchdog Timer
➤ Long Duration Timer
➤ PMC I/O Carrier Boards Available
➤ OS Support of VxWorks, Linux, and Windows XP
➤ Available in Convection- and Conduction-Cooled Versions

Pentium M Processor

The PENTXM uses the low-power first-generation 1.6 GHz Pentium M processor or the 1.8 GHz Pentium M processor 745. Both feature 64 kB of primary on-die cache and a 400 MHz Front Side Bus (FSB). The on-die secondary cache is 1 MB on the 1.6 GHz Pentium M processor and 2 MB on the 1.8 GHz Pentium M Processor 745.

Both are low power dissipating processors, thus they do not need a CPU fan. The Intel Pentium M processor is upwardly code-compatible with the other members of the x86 family of microprocessors. The processor has a built-in floating point coprocessor for compatibility with 486 and 386/387 designs. Utilizing the 64-bit Intel 855GME host bridge, the Pentium M supports a 400 MHz bus frequency.

A JTAG-compatible debug port on the Pentium M is accessible via the optional In-Target Probe (ITP) 26-pin connector. The Intel Thermal Monitor allows system designers to lower the cost of thermal solutions without compromising system integrity. By using a factory-tuned on-die temperature sensor and a fast-acting thermal control circuit (TCC), the Pentium M processor, without the aid of any additional software or hardware, can restrict its die temperature to remain within factory specifications under typical realworld operating conditions.

Processor Clock Frequency

Depending on the build option, the processor is able to be clocked at up to 1.6 GHz or 1.8 GHz. The onboard BIOS allows the customer to either fix the clock rate of the processor to a defined value or let the processor determine its frequency according to the die temperature. By default on the commercial versions, the CPU-controlled timing mode is set. In extended-temperature versions, WA or the rugged air-cooled and conduction-cooled versions, the core frequency is locked on a fixed value which allows the card to work without damage over the whole temperature range. Nevertheless, such a frequency mode can be changed by the user. The factory default clock frequency for rugged versions is 1.2 GHz.

System Memory

1 GB of 266 MHz DDR ECC SDRAM is soldered on the board and is accessible from the processor on the VMEbus. Double-bit error detection and single-bit error correction are supported.

The PENTXM has 64 MB application Flash EPROM and 512 KB BIOS Flash EPROM.

EIDE Hard Disk Interfaces

Two EIDE hard disk interfaces support up to Ultra DMA 100 for highperformance drives. The primary channel, accessible via P2, connects to an optional hard/floppy/flash/CD-ROM drive board. The secondary channel can be used for an onboard disk drive or dual CompactFlash or a MicroDrive Type II drive carrier.

PMC Interface

The PCI bus is a 3.3V signalling only, 33/66 MHz, 32/64-bit bus that meets the requirements for PCI specification, revision 2.2. The PENTXM supports two PMC sites. Front panel I/O is available for both sites, via P2 for PMC #1 and optionally via P0 for PMC #2. Expansion to an optional dual PMC carrier board is available using a 32-bit 33 MHz expansion connector or one of the 64-bit 66 MHz PMC sites.

VME Interface

Implemented using the Tu n d r a® Un i v e r s e I I™ device, the VME interface provides fast hardware byte swapping as well as full interrupter/interrupt handler support. The interface automatically detects the system controller and allows the PENTXM to function as a VME master or slave.

Ethernet

Two 10/100/1000BASE-T Ethernet channels are implemented by the Intel 82546GB LAN Controller via the 64-bit PCI bus. One Ethernet channel may be routed to the front panel RJ-45. VITA 31.1 Gigabit Ethernet for VME backplanes is supported.

Serial Interface

The PENTXM has up to three 16550-compatible UART serial channel interfaces. One EIA-232 serial port is accessible on the front panel via a 26-pin high-density connector. Two EIA-232/422/485 serial ports are accessible from the rear panel via P2.

I/O Controller Hub

The Intel 6300ESB I/O Controller Hub features low power dissipation and provides port 60/64 emulation, a two-stage watchdog timer, GPIOs, as well as two of the PENTXM's three UARTs. In addition, an LPC interface is provided for the Firmware Hub.

Graphics Interface

The Intel 855GME host bridge provides resolutions up to 2048 x 1536 @ 75 Hz and up to 16M colors. The graphics interface is accessed via a 26-pin high-density front-panel connector. As an alternate, analog graphics are switchselectable to P0.

Additional Interfaces

The PENTXM supports up to two USB 2.0 ports. A PC-compatible Real-Time Clock (RTC) is supported as well as a watchdog timer and a 32-bit Long Duration Timer with processor interrupt capability. Front-panel access to keyboard and mouse interfaces is supported with alternate access via P0.

PENTXM Block Diagram and Front Panel
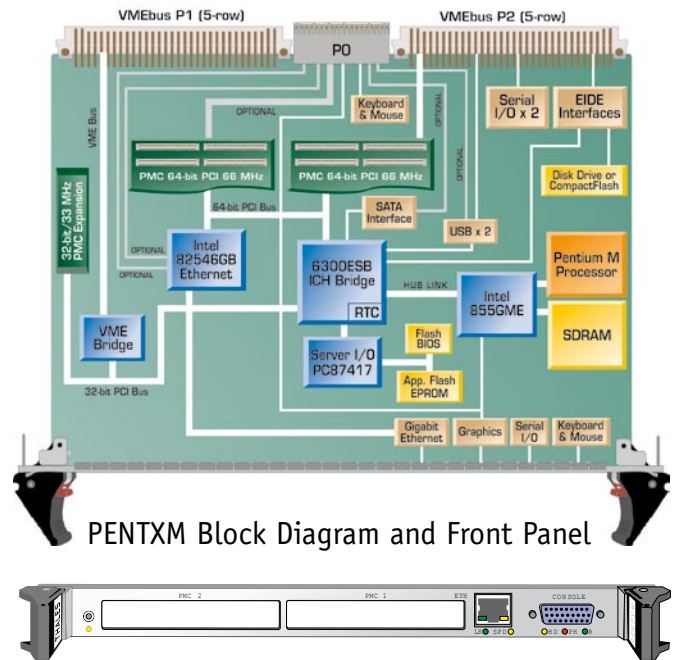
Phoenix BIOS

The Phoenix ServerBIOS™ 3 is provided with the PENTXM board. The BIOS contains a comprehensive Power-On Self-Test (POST), and LAN boot firmware is included. With the BIOS Setup Program you can modify BIOS settings and control the special features using options menus.

Board Support Packages

BSPs are available for VxWorks, Linux, Windows XP and Windows 2000.

Built in Test Option

Kontron diagnostics tools for Pentium-based SBCs provide a comprehensive set of Built-In Test (BIT) routines to verify the integrity of the underlying hardware. Designed for use with mission-critical software with hard real-time constraints, they simplify integration with applications running COTS software.

Three test set definitions are available in Flash: cold start, warm start, and forced start. These definitions can be tailored to achieve the appropriate test coverage/starting run time ratio. The Kontron Power-on BIT (PBIT) routines run automatically at power-on, and the test results are stored in onboard Flash memory for later use by the operating system or application.

Order Code : PBIT-PENTXM

➤ Technical Information

Rear Panel Connections

P0 Build Options
Two P0 build options are available on the PENTXM.

Build Option I/O routing on P0 & P2 type 1:
- ➤ Ethernet channel 0
- ➤ PMC site 2 I/O signals P24 1-64
- ➤ Keyboard and mouse
- ➤ Analog graphics
- ➤ GPIO1

Build Option I/O routing on P0 & P2 type 2:
- ➤ Ethernet channel 0
- ➤ Ethernet channel 1
- ➤ USB channel 2
- ➤ PMC site 2 I/O signals P24 33-64
- ➤ Keyboard and mouse
- ➤ Analog graphics
- ➤ GPIO1
- ➤ GPIO2

P2 I/O Connections
The following I/O connections are routed to P2 on the PENTXM:
- ➤ EIDE Bus
- ➤ Two serial ports
- ➤ PMC site 1 I/O signals P14 1-64
- ➤ One USB 2.0 channel

Product Warranty and Services
- ➤ All of Kontrons' hardware products are covered by a two-year return-to-factory warranty.
- ➤ Several service programs are available, including update services, hotline access, product repair and exchange services, and online, remote, or on-site technical assistance.

Finally, in addition to its standard support services, Kontron offers customized consultation to system integrators.

Miscellaneous
- ➤ Board size: VME double Eurocard (6U: 233.3 mm x 160 mm)
- ➤ Single VME slot
- ➤ All Kontron boards are EC-compliant.
- ➤ Conduction-cooled version of the PENTXM is IEEE 1101.2-1992-compliant.

Add-Ons & Accessories

Paddle Boards
A variety of paddle boards providing P2 and P0 backplane breakout are available for the PENTXM.

VITA 36 Paddle Board, I/O routing on P0 & P2 type 1 (PBV36-P0-PXM00-01):
- ➤ 40-pin IDC EIDE header
- ➤ High-density 26-pin connector for keyboard, mouse, analog graphics, and one serial port
- ➤ One USB 2.0 connector
- ➤ RJ-45 Ethernet connector
- ➤ Two PIM locations
- ➤ One 10-pin IDC header for the second serial port (EIA-232/422/485)
- ➤ Header for a GPIO signal
- ➤ VITA 36-compatible

VITA 36 Paddle Board, I/O routing on P0 & P2 type 2 (PBV36-P0-PXM00-02):
- ➤ 40-pin IDC EIDE header
- ➤ High-density 26-pin connector for keyboard, mouse, analog graphics, and one serial port
- ➤ Two USB 2.0 connectors
- ➤ Two RJ-45 Ethernet connectors
- ➤ One PIM location
- ➤ One 10-pin IDC header for the second serial port (EIA-232/422/485)
- ➤ Header for two GPIO signals
- ➤ VITA 36-compatible

AD VP2/011-10, I/O routing on P0 & P2 type 1:
- ➤ 40-pin IDC EIDE header
- ➤ PS/2 combined keyboard and mouse connector
- ➤ One USB 2.0 connector
- ➤ RJ-45 Ethernet connector
- ➤ VGA connector
- ➤ Two 68-pin sockets for PMC I/O
- ➤ Two 10-pin IDC header for serial ports (EIA-232/422/485)
- ➤ Headers for GPIO

AD VP2/012-10, I/O routing on P0 & P2 type 2:
- ➤ 40-pin IDC EIDE header
- ➤ PS/2 combined keyboard and mouse connector
- ➤ One USB 2.0 connector
- ➤ Two RJ-45 Ethernet connectors
- ➤ VGA connector
- ➤ One 68-pin socket for PMC I/O
- ➤ 34-pin IDC header for PMC2
- ➤ Two 10-pin IDC header for serial ports (EIA-232/422/485)
- ➤ Headers for GPIO

Other Add-Ons & Accessories

AD CR2/PMC 01
PMC Carrier for PENTXM with P0; Supports two single-width 32-bit PMCs; 5V and 3.3V PCI signaling.

AD CR2/PMC 10
PMC Carrier for PENTXM without P0; Supports two single-width 32-bit PMCs; 5V and 3.3V PCI signaling.

CFD-1024-00
1 GB CompactFlash Disk.
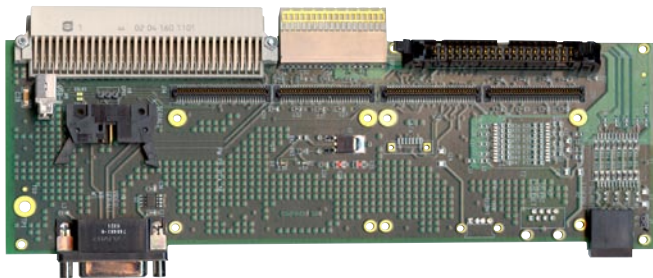
AD 200/001-01 Dual
CompactFlash carrier module for PENTXM; Provides two CompactFlash sites which also support the IBM/Hitachi MicroDrive hard disks; Uses one PMC slot; Kit includes cable and applicable hardware.

ICHD-PENTXM040
40 GB, 2.5" EIDE Disk Drive; Uses one PMC slot; Kit includes cable and applicable hardware.

CB 26D/124-00
Serial line, VGA, keyboard, mouse, breakout cable for PENTXM.

PBV36-P0-PXM00-01

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Technical Information

CPU

1.6 GHz Pentium M Processor or 1.8 GHz Pentium M Processor 745

Support Chip Sets

Graphics & Memory	
Controller	Intel 855GME
I/O Hub	Intel 6300ESB
PCI-VME	Tundra Universe II

Memory

SDRAM	1 GB
Cache	64 KB Primary, 1 MB Secondary
Flash EPROM	512 KB of BIOS
Application Flash	64 MB

Standard Compliance

- ➤ PCI Specification, Rev 2.2
- ➤ VITA 20-200x, CCPMC Draft Standard, Draft 1.15
- ➤ VITA 36-199x, PMC I/O Module Draft Standard, Draft 0.1
- ➤ IEEE P1386 Common Mezzanine Card Family: CMC
- ➤ IEEE P1386.1 Physical/Environmental Layer for PMCs
- ➤ IEEE 1101.2-1992 Mechanical Core Specifications for Conduction-Cooled Eurocards

VMEbus

Interface	A32/A24/A16 D08 (EO)/D16/D16BLT D32/D64/D32BLT/D64BLT (MBLT)
Arbiter	4-level priority or round robin arbiter and Auto-SYSCON
Requester	Fair, ROR, or RWD

Miscellaneous

PMC Interface	64-bit 66 MHz, 3.3V signaling only
Video	Up to 16M colors, 2048 x 1536 @ 75 Hz
Ethernet	Two 10/100/1000BASE-T channels
USB	One or two USB 2.0 interfaces
External IDE	Primary & secondary IDE interfaces
Serial Ports	Three: one EIA-232 and two EIA-232/422/485
Keyboard & Mouse	PS/2 (with breakout cable)
Real-time Clock	DS1287-compatible/MC146818B
Voltage	+5V: 5A typical
Requirements	+5V; +12V/-12V for PMC site only
Battery Backed Options	Onboard battery and/or 5V standby

Environmental Specifications

	SA Standard Commercial	WA Extended Temperature	RA Rugged Air-Cooled	RC Rugged Conduction-Cooled
Conformal Coating	Optional	Standard	Standard	Standard
Airflow 1.6 GHz	1.2 m/s	-	3.1 m/s	NA
1.8 GHz	1.2 m/s	-	-	NA
Temperature	VITA 47-Class AC1	VITA 47-Class AC2	VITA 47-Class AC3	VITA 47-Class CC4
Cooling Method	Convection	Convection	Convection	Conduction
Operating	0° to +55°C	-20° to +65°C	-40° to +75°C	-40° to +85°C
Storage	-45° to +85°C	-45° to +85°C	-45° to +100°C	-45° to +100°C
Vibration Sine (Operating)	20/500 Hz: 2g	20/500 Hz: 2g	20/2,000 Hz: 3g	20/2,000 Hz: 5g
Random	VITA 47-Class V1	VITA 47-Class V1	VITA 47-Class V2	VITA 47-Class V3
Shock (Operating)	20g/11 ms Half Sine	20g/11 ms Half Sine	40g/20 ms Half Sine	40g/20 ms Half Sine
Altitude (Operating)	-1,640 to 15,000 ft	-1,640 to 33,000 ft	-1,640 to 33,000 ft	-1,640 to 50,000 ft
Relative Humidity	90% without condensation	95% without condensation	95% without condensation	95% without condensation

➤ Ordering Information

		SA	WA	RA	RC						00			
Environnement Class	Standard (Air)	X				SA								
	Extended Temperature (Air)		X			WA								
	Rugged Convection-Cooled (Air)			*		RA								
	Rugged Conduction-Cooled				X	RC								
Processor	1.6 GHz Pentium M	X	X	X	X		3							
	1.8 GHz Pentium M 745	X					4							
SDRAM	1.0 GB	X	X	X	X			2						
Flash	64MB	X	X	X	X				3					
I/O Routing	on PO & P2: Type 1	X	X	X	X					10				
	on PO & P2: Type 2	X	X	X	X					20				
Reserved											00			
PO Connector	Yes	X	X	X	X							0		
	No	X	X	X	X							N		
Coating	Default		X	X	X									
	Option	X											V	
RoHS	Default on SA	X												U

Add code V only when not default

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