➤ PENTXM4

Twin Dual-Core Intel® Xeon® Processor-based VME Blade

(intel) Xeon® inside™
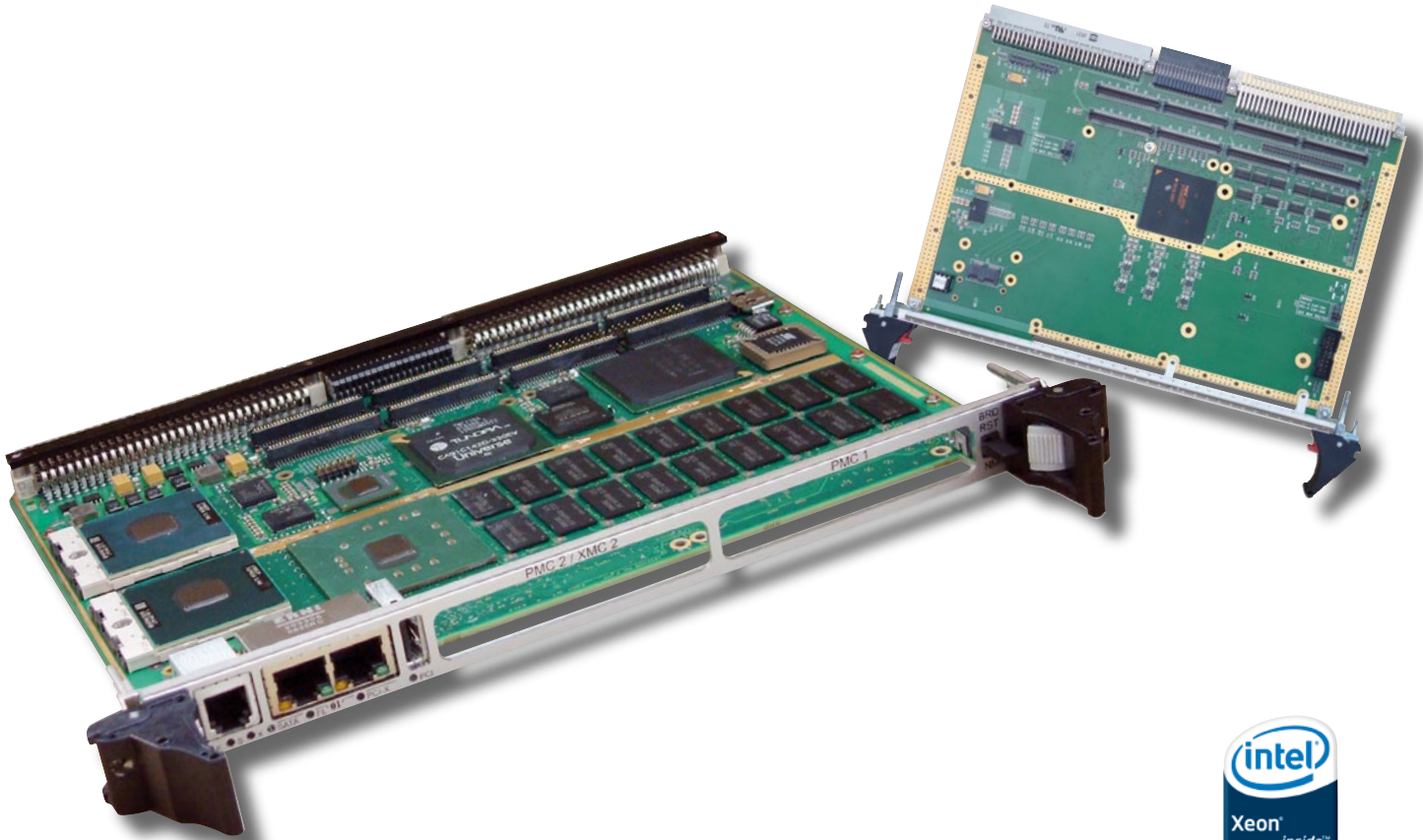
Powerful
- ➤ Two 1.67 GHz Dual-Core Intel® Xeon® ULV Processors
- ➤ Up to 4 GB DDR2-400 SDRAM

Versatile
- ➤ x8 PCI-Express XMC Mezzanine Slot
- ➤ x4 PCI-Express Expansion Port
- ➤ Dual PMC 64-bit/66 MHz Slots
- ➤ PMC Carrier available

Scalable
- ➤ IPMI VITA 38 System Management
- ➤ VITA 31.1 Backplane Networking

Application Enabling
- ➤ 4 GB Solid State Flash Disk
- ➤ EFI Open Standard Firmware
- ➤ Linux 2.6, VxWorks, LynxOS, Windows and QNX Neutrino

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➤ Product Overview

The Kontron PENTXM4 family of single-board computers (SBCs) uses the latest Low Power Dual-Core Intel Xeon processor and E7520 chipset and offers high speed, server-class performance for advanced embedded applications. The single slot PENTXM4 SBC is ideal for thermally constrained environments and includes all the up to date I/O standard interfaces required in a server blade PC. Furthermore, the PENTXM4 product supports the Intelligent Platform Management Interface (IPMI) specification for easy integration in complex systems.

The Kontron PENTXM4 is therefore ideal for bandwidth intensive applications both in a standalone or in a complex cluster configuration.

PENTXM4 Block Diagram and Front Panel

The PENTXM4 is a 6U VME SBC which features a twin 1.67 GHz Dual-Core Intel Xeon processor (Codenamed Sossaman) combined with the Intel E7520 server class Memory Controller Hub (MCH). It handles server-like data throughput and provides next generation PCI-Express I/O bandwidth capabilities.

Greater Performance/Watt

The Dual-Core Intel Xeon Low Voltage processor is a member of Intel's growing product line of multi-core processors. The dual-core technology allows approximately twice the performance at similar power consumption as previous single core products.

The user application will also benefit from the use of high bandwidth data interfaces:
➤ 667 MHz Front Side Bus (FSB)
➤ 6.4 GB/s peak memory access to DDR2-400 SDRAM
➤ PCI-Express interfaces to network, mezzanine and external devices

Unique Versatility

The PENTXM4 supports all the up-to-date standard interfaces required for a modern communicant server:
➤ Dual Gigabit ports, configurable either on front or on rear P0 in order to support VITA 31.1 backplane networking
➤ High speed serial storage and data I/O interfaces: SATA-150 and USB 2.0
➤ x8 PCI-Express mezzanine interface to tailor the supported features with high performance COTS ANSI/ VITA 42 XMC such as Dual Head 3D-graphics or multi-ports Gigabit Ethernet cards.

➤ x4 PCI-Express interface on the enhanced performance P0 connector to expand I/O capabilities via the use of a PMC carrier or any other PCI Express device. The PENTXM4 features an onboard legacy EIDE interface to plug-on a 2"5 disk or compact-flash kit.
A rich set of LEDs at the frontpanel report disk activity on EIDE and SATA buses.

Longterm Availability

The Dual-Core Intel Xeon processor and Intel E7520 chipset are members of the Embedded Intel Applications products range which feature extended life cycle.

Associated with Kontron´s experienced long term support offering (LTS Protect), customer's investment is protected from frequent re-design and maintenance costs.

Warranty and Services

➤ All of Kontron´s hardware products are covered by a two-year return-to-factory warranty.
➤ Several service programs are available, including hardware and software update services, product repair and exchange services, and either on-site or remote technical assistance. In addition to its standard support services, Kontron offers customized consultation to system integrators.
➤ ISO 9001: Kontron´s ISO 9001 certification is just another way for us to back our commitment to quality products and customer service.

➤ Technical Information

Twin Dual-Core Intel Xeon
- ➤ Low voltage (ULV) dual-core processor
- ➤ One thread per core
- ➤ Upwardly code-compatible with x86 family microprocessors.
- ➤ Integrated 2 MB L2 cache
- ➤ 1.67 GHz max. processor frequency
- ➤ Software control of the operating frequency
- ➤ 667 MHz Front Side Bus (FSB)

Memory Controller Hub
- ➤ Intel E7520 Server Class MCH
- ➤ Two channel DDR2 SDRAM memory
- ➤ Support of ECC memory
- ➤ Peak bandwidth of each DDR2 branch channel is 3.2 GB/s with DDR2 400
- ➤ Independent high-speed links to I/O Controller Hub (ICH), dual gigabit Ethernet controller, XMC mezzanine port and enhanced performance P0 connector

DDR2 SDRAM Memory
- ➤ 1, 2 or 4 GB of DDR2 SDRAM clocked at 400 MHz with ECC

User Flash Disk
- ➤ 4 GB of User NAND-Flash on secondary EIDE interface as build option
- ➤ A LED indicates disk activity

I/O Controller Hub
- ➤ Intel 6300ESB ICH
- ➤ 3* "8254-type" timer/counters which have fixed uses and are clocked by a 14.31818 MHz source
- ➤ Watchdog timer facility

Serial ATA interfaces
- ➤ Two independent serial ATA (SATA-150) interfaces are provided, both of which route to the P0 connector
- ➤ Each interface is supported by its own DMA Controller
- ➤ A LED indicates disk activity

USB Ports
- ➤ Three USB 2.0 interfaces are provided on this board by the 6300ESB
- ➤ One channel is available on the front panel connector
- ➤ Two channels are connected to the P0 connector
- ➤ All channels can operate at 1.5 Mb/s, 12 Mb/s or 480 Mb/s

Dual Gigabit Ethernet Ports
- ➤ Intel 82571EB Gigabit Ethernet Controller
- ➤ x4 PCI-Express Gigabit Ethernet Controller-MCH interface
- ➤ 10/100/1000 operation
- ➤ Every port is software configurable either on front panel (RJ-45) or rear P0
- ➤ The P0 Ethernet routing supports VITA 31.1 backplane networking

Serial Lines
- ➤ 2* "16550-style" serial communications ports, SP0/COM1 and SP1/COM2
- ➤ Supplied by the 6300ESB ICH
- ➤ SP0/COM1 available either via the front or via the VMEbus P2 connector
- ➤ SP1/COM2 available via the VMEbus P2 connector
- ➤ Each serial port may be configured as EIA-232, EIA-422 or EIA-485

VMEbus
- ➤ Tundra® Universe II - PCI to VME bridge
- ➤ The board can act as system controller when in the first VMEbus slot
- ➤ Geographical addressing and Autoslot ID are both supported

System Synchronization Timer
The Software Synchronization Timer is a 32-bit timer clocked by the VMEbus SYSCLK signal. It allows high accuracy software synchronization for multi-processor-based systems.

Dual Real Time Clock (RTC)
- ➤ **RTC#1**

  The 6300ESB ICH provides a RTC. This includes a PC-AT clock, calendar, and 242 bytes of CMOS RAM for BIOS configuration functions. The clock and configuration RAM functions are maintained from a temporary power failure of up to 10 hours using a super cap.

- ➤ **RTC#2**

  The PENTXM4 also features an industrial grade RTC with -40°C to +85°C Lithium battery. This battery provides more than ten years of power backup under normal operation.

Optional Mass storage
- ➤ Onboard 44-pin header EIDE interface for use by the optional Hard Disk or CompactFlash Mass Storage Kits in place of one PMC
- ➤ Holes in the board allow for secure a 2"5 disk drive mounting
- ➤ Up to two EIDE peripherals may be connected to this interface
- ➤ A LED indicates disk activity

I/O Expansion Ports
- ➤ **Two PMC sites:** 64-bit/66MHz, 3.3V signaling only PCI bus interface. The Pn4 I/O of the PMC#1 and PMC#2 are routed respectively onto P2 (VITA 35-64ac) and P2 (VITA 35-32dz) and P0 (P0 PICMG 2.17)
- ➤ **XMC site:** x8 PCI-Express link usable as dual x4 links in concurrence of PCI bus interface of PMC#2
- ➤ x4 PCI-Express on P0: a x4 PCIExpress link is available on the 5Gbps enhanced performance P0 connector of the PENTXM4 for interfacing any PCI-Express device or the V2PMC2 dual PMC 64-bit/66 MHz carrier board
- ➤ PENTXM4 + V2PMC2 Carrier: 4 PMC 64-bit/66 MHz in only two slots. The PCI V2PMC2 uses a transparent PCIe-PCI bridge   and is able to host one 5V signaling mezzanine.

System Management
The PENTXM4 is the first VME Blade computer which features a baseboard to Management Controller (BMC) as outlined in the VITA 38/PICMG 2.9 recommendation. The enabling or disabling of the BMC is an hardware build option. The BMC, which draws less than a Watt, complies with the Intelligent Platform Management Interface (IPMI) rev. 1.5. This allows control the PENTXM4 while the main processor is off-line.

EFI BIOS/Firmware
The PENTXM4 supports a BIOS/Firmware which complies with Extensible Firmware Interface (EFI) specification. The EFI specification defines a new model for the interface between operating systems and platform firmware. The interface consists of data tables that contain platform-related information, plus boot and runtime service calls that are available to the operating system and its loader. Together, these provide a standard environment for booting an operating system and running pre-boot applications. Written in C, the EFI firmware can easily be tailored to fit customers' application. Please, contact Kontron.

Built in Test Option
Kontron diagnostics tools for Intel-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.

Board Support Packages
BSPs are available for Linux 2.6, VxWorks, LynxOS, Windows and QNX Neutrino.

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CPU

Processor	Two Dual-Core Intel Xeon Low Voltage
Clock Frequency	1.67 GHz
Front Side Bus	667 MHz

Memory

SDRAM	2 or 4 GB soldered Double bank 400 MHz DDR2-400 - ECC support
Flash	4 GB NAND-Flash
Optional	EIDE port, 2"5 slot

VME Interface

Tundra Universe II
5-row connector
Enhanced Performance P0 connector

PMC#1

64-bit/66 MHz PCIBus - 3.3V PCI signaling only
x8 PCI-Express

XMC/PMC#2

64-bit/66 MHz PCIBus - 3.3V PCI signaling only
x8 PCI-Express
Configurable in dual x4 links

I/O

Dual Ethernet 10/100/1000 ports (Front/P0)
Dual SATA-150 ports on P0
Triple USB 2.0 ports
Dual EIA-232/422/485 serial lines

Power Requirements

5V - 6A / 3.3V - 7A under BIOS activity

Miscellaneous

➤ Board size: 6U: 233.3 mm x 160 mm
➤ Conduction-cooled version is IEEE 1101.2-1992 compliant and is a single VME slot solution.
➤ Electromagnetic compatibility:
  NF EN 55022 Class B
  NF EN 50082-2
➤ All Kontron boards are EC-compliant

Real Time Clocks

RTC#1:	6300ESB integrated PC-AT clock with calendar 10-hour ride-through capacitor
RTC#2:	Industrial grade RTC with integrated battery 10-year lifetime typical

Environmental Specifications

	SA Standard Commercial	RC Rugged Conduction-Cooled
Conformal Coating	Optional	Standard
Airflow	2.7 m/s without throttling at 55°C	NA
Temperature	VITA 47-Class AC1	VITA 47-Class CC4
Cooling Method	Convection	Conduction
Operating	0° to +55°C	-40° to +85°C
Storage	-45° to +85°C	-45° to +100°C
Vibration Sine (Operating)	20/500 Hz: 2g	22/2,000 Hz: 5g
Random	VITA 47-Class V1	VITA 47-Class V3
Shock (Operating)	20g/11 ms Half Sine	40g/20 ms Half Sine
Altitude (Operating)	-1,640 to 15,000 ft	-1,640 to 50,000 ft
Relative Humidity	90% without condensation	95% without condensation

➤ # Ordering Information

		SA	RC	PENTXM4- ☐ ☐ ☐ S-1 ☐ ☐ 0 ☐ ☐						
Environnement Class	Standard Air-Cooled	X		SA						
	Rugged Conduction-Cooled		Contact Kontron	RC						
Processor	Twin 1.67 GHz Dual-Core	X	X		3					
DDR2-400-SDRAM	1 GB	Contact Kontron			4					
	2 GB	X	X		6					
	4 GB	X	Contact Kontron		8					
VITA 38 IPMI Board Management	Disabled	X	X			0				
	Enabled	X	X			1				
User Flash Disk	4 GB	X	X				0			
	No Flash	X	X				N			
Reserved								0		
Manufacturing	Leaded	X	X						0	
	RoHS	Contact Kontron							U	
Coating		X	Default							V

Add Code V for SA only

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