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A GE Fanuc Company

VMIVME-7658
Dual Pentium® III FC-PGA/PGA2 Processor Based VMEbus Single Board Computer

- Dual slot, dual Pentium® III processor based VMEbus controller
  - — Based on ServerWorks LE chipset with 133 MHz system bus
- Special features for embedded applications
  - — Up to 1 GB bootable flash on secondary IDE (optional)
  - — Software selectable Watchdog timer with reset
  - — Two programmable 16-bit timers and two programmable 32-bit timers
  - — Remote Ethernet booting
  - — Supports VMEbus P2 connection to HD/floppy drive
  - — 64-bit, 66 MHz PMC mezzanine expansion site (IEEE-P1386 common mezzanine card standard, 3.3 V)
  - — VME64 modes supported: A32/A24/D32/D16/D08(EO)/MBLT64/BLT32
  - — VMEbus interrupt handler, interrupter and system controller
  - — Includes real-time endian conversion hardware for little-endian and big-endian data interfacing (patent no. 6,032,212)
  - — Enhanced bus error handling
  - — Passive heat sink
- Standard features include
  - — Dual Pentium III processors (up to 1.26 GHz) with advanced transfer cache
  - — Up to 2 GB PC133 registered SDRAM with ECC
  - — 64-bit PCI SVGA controller with 4 MB internal/SDRAM
  - — 133 MHz system bus
  - — Two Fast Ethernet controllers supporting 10BaseT and 100BaseTX interfaces
  - — Ultra DMA/66 hard drive and floppy drive controllers (use VMEbus P2 for connection to IDE/floppy)
  - — PCI-X Ultra320 SCSI interface
  - — Two high performance 16550-compatible serial ports
  - — Enhanced parallel port with ECP/EPP modes supported
  - — Shared PS/2-style keyboard and mouse port on front panel
  - — Real-time clock and miniature speaker included
  - — Two front panel universal serial bus (USB) connections
- Operating system support available:
  - — Windows® XP/Windows 2000
  - — Linux®

APPLICATIONS

- Telecommunications
- Simulation
- Instrumentation
- Industrial control
- Process control and monitoring
- Factory automation
- Intelligent networked PLC controllers
- Automated test
- Data acquisition

MICROPROCESSOR — The VMIVME-7658 brings dual Intel® Pentium III processors to VMEbus. The Pentium III processors have 32-bit addressing and a 64-bit data bus. Its superscalar architecture allows three instructions to be executed per clock cycle. A dynamic branch prediction unit, separate instruction and data caches, MMX™ technology, and streaming SIMD extensions with 70 new instructions also increase the Pentium III processor's performance. The Pentium III processors have advanced transfer cache (ATC). ATC is an L2 cache integrated on the same die as the processor core. At 1.26 GHz, the ATC is 512 KB.

DRAM MEMORY — The VMIVME-7658 accepts two PC133 registered SDRAM modules with ECC for a maximum memory capacity of 2 GB. The DRAM is dual ported to the VMEbus.

BIOS — System BIOS, video BIOS, LAN Boot BIOS, and SCSI BIOS are provided in reprogrammable flash memory.

PHOTO NOT AVAILABLE

Ordering Options								
July 7, 2003 800-007658-000 A		A	B	C	–	D	E	F
VMIVME-7658	–				–			

A = Processor
1 = Reserved
2 = 1.26 GHz Pentium III Processor (FC-PGA2)
B = SDRAM ECC Memory
1 = 512 MB
2 = 1 GB
3 = 2 GB
C = Compact Flash Memory
0 = No Flash
1 = 64 MB
2 = 256 MB
3 = 512 MB
4 = 1 GB

		A	B	C	–	D	E	F
VMIVME-7452	–	4			–			

A = 4
BC = Indicates Disk Module Configuration
(See the VMIVME-7452 specification for details on disk module configuration options.)

IDE/Floppy Transition Board

VMIACC-0562

The VMIACC-0562 converts P2 IDE/Floppy signals to 40- and 34-pin headers for use at the rear of the VMEbus backplane. This accessory is sold separately.

Connector Adapter Kit

VMIACC-0045

An accessory kit is available that adapts the product's front panel 9-pin serial and 25-pin parallel port Micro-D connectors to Standard-D size 9-pin and 25-pin connectors. The connector adapter kit contains two 9-pin Micro-D to Standard-D serial port adapters and one 25-pin Micro-D to Standard-D parallel port adapter. Individual connector adapters: 360-010050-000 Micro-DB9 to DB9 and 360-010051-000 Micro-DB25 to DB25. **These adapters and accessory kit are sold separately.**

Ultra320 SCSI Connector Data

68-pin VHDCI external (1)

Cable Specifications

6 ft. 8 mm Ultra SCSI to standard wide 68, 132 Ω External Cable
VMICBL-001-68-006, CS Electronics PN# - . 88 mm-HD68T/6FT-132U.
Cable sold separately.

For Ordering Information, Call:
1-800-322-3616 or 1-256-880-0444 • FAX (256) 882-0859
E-mail: info@vmic.com Web Address: www.vmic.com
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SUPER VGA CONTROLLER — High resolution graphics and multimedia quality video are supported on the VMIVME-7658 by a PCI graphics adapter. The adapter is complemented by 4 MB synchronous internal DRAM with a high bandwidth 64-bit data interface. Video resolutions supported by the graphics adapter are shown in the following table.

Video Resolutions Supported

Screen Resolution	Colors (bpp)*	Refresh Rate (Hz)
640 x 480	24	60, 75, 85
800 x 600	24	60, 75, 85
1,024 x 768	24	60[1], 75[1], 85[1]
1,280 x 1,024	24	60[1], 75[1], 85[1]
1,600 x 1,200	16	60[1]

*bpp = bits per pixel.
1. May exhibit objectionable ghosting.

Ultra320 SCSI CONTROLLER — Ultra320 SCSI connectivity is provided through an external female 68-pin High Density connector on the front panel. The VMIVME-7658 leverages the LSI53C1020 PCI-X Ultra320 SCSI controller to support both LVD and single-ended SCSI operations and connects directly to a 64-bit, 133 MHz PCI-X bus, and is backward compatible with 32-/64-bit, 66 or 33 MHz PCI bus. Included with the VMIVME-7658 is an easy-to-use configuration utility, which allows the viewing and changing of default configuration settings for the SCSI devices.

The independent SCSI controller supports wide Ultra320 SCSI synchronous transfer rates up to 320 MB/s on a Low-Voltage Differential (LVD) SCSI bus. The SCSI controller supports Fast SCSI, UltraSCSI, Ultra2 SCSI and Ultra160 SCSI. The SCSI controller features Cyclic Redundancy Check (CRC), which exceeds most methods for detecting errors during high speed data transfers. CRC is a proven international standard that checks all transferred data and adds significantly to data reliability. The SCSI controller supports RAID Level 1 Integrated Mirroring (IM). The Integrated Mirroring feature provides data protection for the system boot volume to safeguard critical information such as the operating system on servers and high performance workstations. This new Integrated Mirroring feature gives customers a robust, high performance, fault tolerant solution that is less expensive than a dedicated RAID controller.

The IM feature provides simultaneous physical mirroring of two disk drives, to assure fault tolerant, high availability data. If a disk drive fails, the hot swap capability allows the system to be easily restored by simply swapping drives. The system then automatically re-mirrors the swapped drive. Additionally, the hot spare feature allows a third drive to automatically replace a failed drive in the volume, which makes the system even more fault tolerant.

Ethernet CONTROLLER — The VMIVME-7658 supports Ethernet LANs with two Intel 82559ER PCI Ethernet controllers. 10BaseT and 100BaseTX options are supported via two RJ-45 connectors.

REMOTE Ethernet BOOTING — The VMIVME-7658 utilizes a Boot ROM BIOS that provides you with the ability to remotely boot the VMIVME-7658 using NetWare, TCP/IP, or RPL network protocols.

Boot ROM BIOS Features:

- NetWare, TCP/IP, RPL network protocol support
- Unparalleled boot sector virus protection
- Detailed boot configuration screens
- Comprehensive diagnostics
- Optional disabling of local boots
- Dual boot option lets users select network or local booting

UNIVERSAL SERIAL BUS (USB) — The VMIVME-7658 provides two front panel single connection hub host controllers for the USB. Supported USB features include: isochronous data transfers, asynchronous messaging, self-identification and configuration of peripherals, and dynamic (hot) attachment.

SERIAL PORTS — Two 16550-compatible serial ports are featured on the VMIVME-7658 front panel. Each serial channel has an independent 16-byte FIFO to support baud rates up to 56 kHz. Requires VMIACC-0045 or individual connector adapter.

ENHANCED PARALLEL PORT — The VMIVME-7658 provides a Centronics-compatible, fully bidirectional parallel port meeting all IEEE-1284 standards (Compatibility, Nibble, EPP, and ECP). The parallel port contains a 16-byte FIFO to allow data rates up to 2 MB/s in ECP mode. Requires VMIACC-0045 or individual connector adapters.

KEYBOARD AND MOUSE PORTS — The VMIVME-7658 has a combined PS/2 keyboard and mouse connector for peripherals. An adapter cable is provided.

FLASH MEMORY — The VMIVME-7658 provides up to 1 GB of Flash memory accessible through the secondary IDE port. The VMIVME-7658 BIOS includes an option to allow the board to boot from the Flash memory.

PROGRAMMABLE TIMERS — The VMIVME-7658 provides the user with two 16-bit timers and two 32-bit timers that are independently programmable. These timers are

mapped in PCI memory space, and are capable of generating PCI interrupts.

WATCHDOG TIMER — The VMIVME-7658 provides a software programmable Watchdog timer. The Watchdog timer is enabled under software control. Once the Watchdog timer is enabled, software must access the timer within the specified timer period, or a timeout will occur. Software can also enable the Watchdog timeout to cause a Nonmaskable Interrupt (NMI) or a VMEbus SYSFAIL.

RESET SWITCH AND ANNUNCIATORS — A small push-button switch on the front panel will reset the VMIVME-7658. If the System Controller is enabled, a SYSRESET* will also be generated on the VMEbus. Seven LEDs are visible on the front panel: power, status of VMEbus SYSFAIL, IDE activity, LAN activity, and LAN Mode (10 or 100 MHz mode). A small speaker is also included on the VMIVME-7658 to provide PC/AT sound output.

PMC EXPANSION SITE — The VMIVME-7658 supports IEEE P1386 common mezzanine card specification with a 3.3 V, 64-bit, 66 MHz capable PCI mezzanine card expansion site. This expansion capability allows third-party devices to be used with the VMIVME-7658.

Contact VMIC for more information concerning third-party PMC modules and compatibility.

VMEbus INTERFACE — The VMIVME-7658 VMEbus interface is based on the Universe IIB high-performance PCI-to-VMEbus interface from Newbridge/Tundra.

SYSTEM CONTROLLER — The VMEbus system controller capabilities allow the board to operate as a slot 1 controller, or it may be disabled when another board is acting as the system controller. The system controller may be programmed to provide the following modes of arbitration:

Round Robin (RRS)
Single Level (SGL)
Priority (PRI)

The system controller provides a SYSCLK driver, IACK* daisy-chain driver, and a VMEbus access timeout timer. The system controller also provides an arbitration timeout if BBSY* is not seen within a specified period after a BGOUT* signal is issued. This period is programmable for 16 or 256 µs.

VMEbus REQUESTER — The microprocessor can request and gain control of the bus using any of the VMEbus request lines (BR3* to BR0*) under software control. The requester can be programmed to operate in any of the following modes:

Release-On-Request (ROR)
Release-When-Done (RWD)
VMEbus Capture and Hold (BCAP)

MAILBOXES — The VMEbus interface provides four 32-bit mailboxes, which are accessible from both the microprocessor and the VMEbus providing interprocessor communication. The mailboxes have the ability to interrupt the microprocessor when accessed by VMEbus.

INTERRUPT HANDLER — The interrupt handler monitors, and can be programmed to respond to any or all VMEbus IRQ* lines. All normal process VMEbus related interrupts can be mapped to PCI INTA# or SERR# interrupts.

These include:

Mailbox interrupts
VMEbus interrupts
VMEbus interrupter IACK cycle (acknowledgment of VMIVME-7658 VMEbus-issued interrupts)

All error processing VMEbus-related interrupts can be mapped to PCI INTA# or SERR#. Note: PCI SERR# initiates a CPU NMI. These include:

ACFAIL* interrupt
BERR* interrupt
SYSFAIL* interrupt

The interrupt handler has a corresponding STATUS/ID register for each IRQ* interrupt. Once the handler receives an IRQ*, it requests the VMEbus and, once granted, it performs an IACK cycle for that level. Once the IACK cycle is complete and the STATUS/ID is stored in the corresponding ID register, an appropriate interrupt status bit is set in an internal status register, and a PCI interrupt is generated. The PCI interrupt can be mapped to PCI INTA# or SERR#.

INTERRUPTER — Interrupts can be issued under software control on any or all of the seven VMEbus interrupt lines (IRQ7* to IRQ1*). A common ID register is associated with all interrupt lines. During the interrupt acknowledge cycle, the interrupter issues the ID to the interrupt handler.

The interrupter can be programmed to generate a PCI INTA# or SERR# interrupt when a VMEbus interrupt handler acknowledges a software-generated VMEbus interrupt.

BYTE SWAPPING — The Intel 80x86 family of processors uses little-endian format. To accommodate other VMEbus modules that transfer data in big-endian format such as the 680x0 processor family, the VMIVME-7658 incorporates byte-swapping hardware. This provides independent byte swapping for both the master and slave interfaces. Both master and slave interface byte swapping are under software control.

MASTER INTERFACE — MA32:MBLT32:MBLT64 (A32:A24:A16:D32:D16:D8 (EO):BLT32)

The VMEbus master interface provides nine separate memory windows into VMEbus resources. Each window has separate configuration registers for mapping PCI transfers to the VMEbus (that is, PCI base address, window size, VMEbus base address, VMEbus access type, VMEbus address/data size, etc.). The maximum/minimum window sizes for the five windows are as follows:

Window	Minimum Size	Maximum Size
0, 4	4 KB	4 GB
1 to 3, 5 to 7	64 KB	4 GB
Special Cycle	64 MB	64 MB

SLAVE INTERFACE — Memory Access SAD032:SD32:SBLT32:SBLT64 (A32:A24:A16:D32:D16:D8 (EO): BLT32)

The VMEbus slave interface provides eight separate memory windows into PCI resources. Each window has separate configuration registers for mapping VMEbus transfers to the PCI bus (that is, VMEbus base address, window size, PCI base address, VMEbus access type, VMEbus address/data size, etc.). The maximum/minimum window sizes for the four windows are as follows:

Window	Minimum Size	Maximum Size
0, 4	4 KB	4 GB
1 to 3, 5 to 7	64 KB	4 GB

In addition, each window can be programmed to operate in coupled or decoupled mode. In decoupled mode, the window utilizes a write-posting FIFO and/or a read prefetching FIFO for increased system performance. In coupled mode, the FIFOs are bypassed and VMEbus transactions are directly coupled to the PCI bus (that is, transfers on VMEbus are not completed until they are completed on the PCI bus).

ENHANCED BUS ERROR HANDLING — Enhancements over the Universe chip's bus error handling features are provided. A latch and register are provided to allow the CPU to read the VMEbus address that caused the bus error in all modes. The Universe chip's support is limited to decoupled mode.

Support for bus cycle timeout and assertion of bus error is provided. The board may be configured to assert bus error upon timeout regardless of its status as system controller. The Universe chip asserts bus error only if it is system controller. In addition, this board may be configured to assert an interrupt upon bus cycle timeout.

OPERATING SYSTEM AND SOFTWARE SUPPORT — The VMIVME-7658 provides embedded features beyond PC/AT functionality. These features are supported by VMIC software products aimed at developers who are incorporating VMIC SBCs, I/O boards, and workstations into systems. Windows XP/Windows 2000 and Linux are the most common operating systems supported by VMIC software products.

VMISFT-9420 VMEbus Access™ for Windows XP/Windows 2000 — The VMEbus Access product is specifically designed for accessing the advanced VMEbus architecture of the VMIVME-7658. Running on Windows XP/Windows 2000, VMEbus Access is both sophisticated and easy to use.

VMEbus Access manipulates the hardware behind the scenes. With VMEbus Access, you can develop applications in or use existing applications developed in most programming environments. For example, VMEbus Access enables your VMEbus to recognize applications developed in these popular programming environments:

- IOWorks Manager™
- LabVIEW
- Citect
- Wonderware InTouch
- Visual IOWorks®
- Visual Basic®
- Visual C++®

I/O SUPPORT

VMISFT-9450 IOWorks BOARD DRIVERS — This driver supports VMIC's extensive line of VME I/O boards, and is available for Windows XP/Windows 2000. IOWorks board drivers take advantage of all the key benefits and features of each supported I/O board, and new I/O boards are constantly being added.

IOWorks board drivers contain both a C++ class library and a C function library that provide a common interface to VMIC I/O products for reading, writing, and configuring. You do not need to know the details of how an individual board is programmed. For instance, you can use the SetAttributes function on any supported VMIC board; the WriteAnalog function controls the output from any VMIC analog output board; or the GetScanMode function retrieves the scan mode for any VMIC analog board.

SPECIFICATIONS

6U two Eurocard format, two slots

Height	9.2 in. (233.4 mm)
Depth	6.3 in. (160 mm)
Thickness	1.6 in. (20.3 mm)

Power Requirements:
+5 VDC (±5 percent), 10 A (typical), 14 A maximum
+12 VDC (±5 percent), 100 mA (typical), 500 mA maximum
-12 VDC (±5 percent), 50 mA (typical), 100 mA maximum
Note: The currents at +12 and -12 VDC are specified with the serial connectors open.

Operating Temperature:
0 to 45 °C for 733 MHz and 866 MHz options.
0 to 40 °C for 1 GHz and 1.26 GHz options.
A minimum of 450 LFM of forced air cooling (measured at the outlet top of the heatsink) is required to operate over the above temperature ranges.

Relative Humidity: 10 to 90 percent, noncondensing

VMEbus Interface:

DTB Master:	BLT32/BLT64, A32/D32, A24/D32, A16/D32
DTB Slave:	BLT32/BLT64, A32/D32, A24/D32, A16/D32
Requester:	Programmable, BR(3 to 0), ROR, RWD, BCAP
Interrupt Handler:	IH(1 to 7) D8(O)
Interrupter:	Programmable, IRQ7* to IRQ1*
Arbiter:	SGL, PRI, RRS
BTO:	Programmable (4 to 1,024 µs)
Compliance:	Rev. C.1

MTBF: 91,242 hours (Bellcore)

PMC Expansion Site Connector:
3.3 V signaling, types 1 and 2
64-bit PCI bus, 66 MHz maximum

CE and FCC Standards:
EN 61000-3-2 Harmonic Emissions
EN 61000-3-3 Voltage Flicker
EN 61000-4-2 Electrostatic Discharge
EN 61000-4-3 Radiated Immunity & ENV 50140 RF Susceptibility
EN 61000-4-4 Electrical Fast Transient/Burst
EN 61000-4-5 Voltage Surge
EN 61000-4-6 Conducted RF Immunity
EN 61000-4-11 Voltage Dips & Interrupt
EN 55011/EN 55022/47 CFR 15 Class B Conducted Emissions
EN 55011/EN 55022/47 CFR 15 Class B Radiated Emissions

COMPATIBLE PRODUCTS

The VMIVME-7658 can be used with a number of VMIC PMC and VMEbus products.

Floppy/Hard Disk: VMIC produces floppy/hard drive modules to support the built-in IDE and floppy controller ports.

The VMIVME-7452 provides up to 18.0 GB of hard disk storage and a 3.5-inch 1.44 MB floppy drive. The unit fits into a standard VMEbus 6U single slot form factor. The VMIACC-0562 converts P2 IDE/floppy signals to 40- and 34-pin headers for use at the rear of the VMEbus backplane.

PMC Capability: VMIC supports PMC via the PMC expansion site. This expansion site allows the VMIVME-7658 to take advantage of the many commercially available PMC boards.

CD-ROM Support: Since much of today's advanced software is delivered on CD-ROM, the VMIVME-7455 provides CD-ROM capability within a single 6U VMEbus slot. Also, the SCSI port can be used with an external CD-ROM drive.

VMEbus: The VMIVME-7658 enables access to VMIC's wealth of VMEbus products. If you have real-world control, monitoring and real-time networking requirements, VMIC has a solution for you. Today's system requirements demand state-of-the-art solutions. Our advanced I/O features such as Built-in-Test, self-test, isolation, digital autocalibration, and intelligent DSP processing give our customers those solutions.

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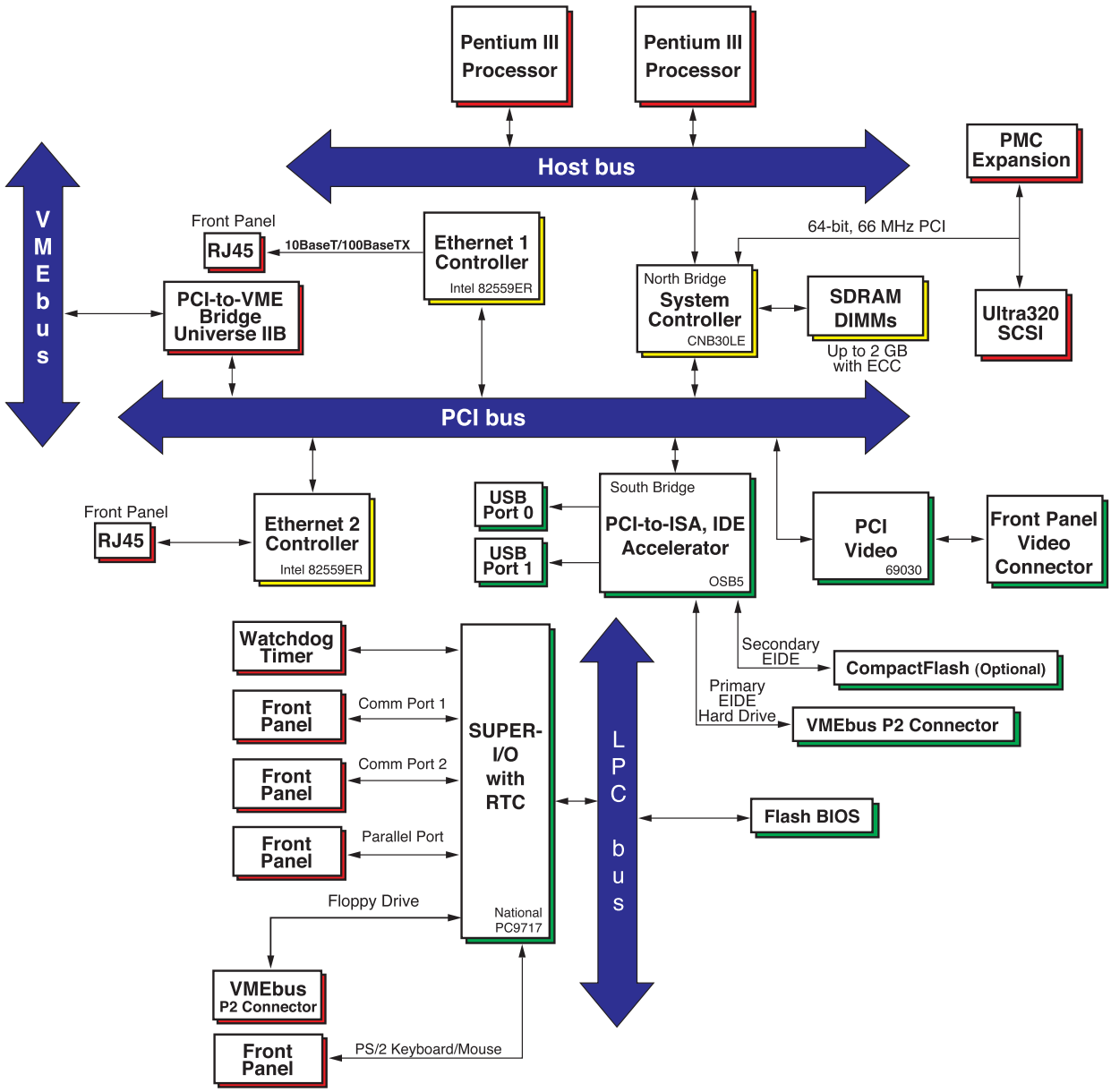


Figure 1. VMIVME-7658 Block Diagram

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