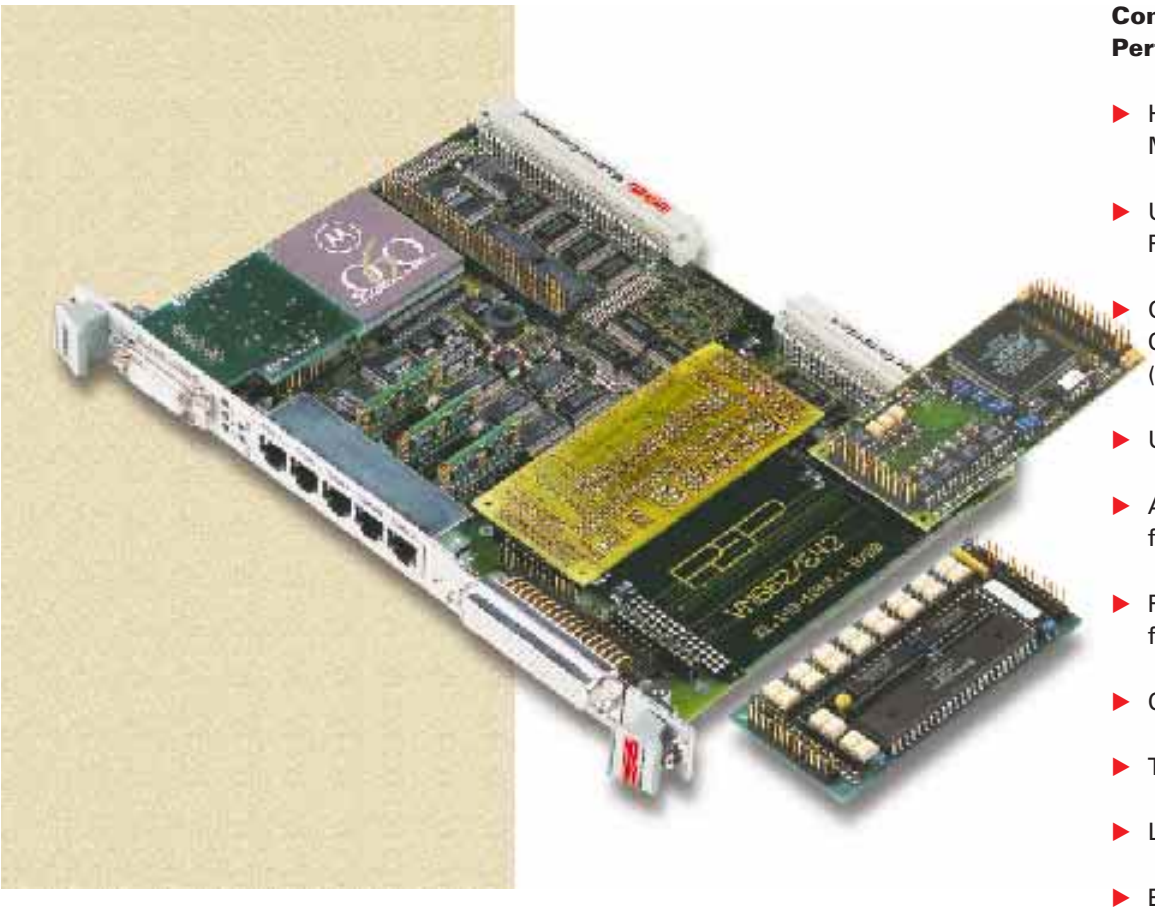
HIGH-PERFORMANCE CPUs
SINGLE-BOARD COMPUTERS

VM642/662

VMEbus Single-Board Computer with ModPack Support



Computation and Communications Performance

- High-performance Motorola MC68040/MC68060 CPU
- Up to 64 Mbyte DRAM & 4 MByte FLASH
- QUad-channel Integrated Communications Controller (QUICC)
- Up to six serial interfaces
- All serial interfaces accessible by front-panel and CXC
- Flexible front-panel options for network and serial I/O
- CXC interface
- Two industrial ModPack interfaces
- Low power consumption
- Extended operating temperature range capability (-40°C to +85°C)
- Extensive board support
- CE conformance

PROFI PROCESS FIELD BUS

A scalable VMEbus single-board computer featuring 2 independent Industrial ModPack Interfaces and incorporating the MC68040/060 and MC68EN360 QUad-channel Integrated Communications Controller.

CERTIFIED DIN ISO 9001 QUALITY SYSTEM
Reg. No. 0548 - 02

Modular Computers®

Ordering Information

VM642/662

Product	Description	Order No.
VM662-BASE	VMEbus single-board computer comprising MC68060 @ 66MHz, MC68EN360 @ 33 MHz, 256 kByte dual-ported SRAM (with Goldcap for back-up), six serial interfaces (five available on the front panel as RS232 (RJ45) and one available from the choice of SI6-networking piggybacks), CXC interface and PEPbug	16637
VM662-BASE	Same as order no. 16637 but with 1 MByte dual-ported SRAM	16638
VM662-BASE	Same as order no. 16637 but with MC68060 @ 50 MHz and MC68EN360 & 25 MHz	15187
VM662-BASE	Same as order no. 15187 but with 1 MByte dual-ported SRAM	15057
VM642-BASE	VMEbus single-board computer comprising MC68040 @ 33MHz, MC68EN360 @ 33 MHz, 256 kByte dual-ported SRAM (with Goldcap for back-up), six serial interfaces (five available on the front panel as RS232 (RJ45) and one available from the choice of SI6-networking piggybacks), CXC interface and PEPbug	15049
VM642-BASE	Same as order no. 15049 but with MC68040V @ 33 MHz (3.3V technology & without FPU)	15055
VM642-BASE	Same as order no. 15049 but with 1 MByte dual-ported SRAM	15050
DM600	Memory Piggyback with 4 MByte DRAM and 1 MByte FLASH memory for VM642/662	11852
DM600	Memory Piggyback with 4 MByte DRAM and 4 MByte FLASH memory for VM642/662	11853
DM601	Memory Piggyback with 16 MByte DRAM and 1 MByte FLASH memory for VM642/662	11854
DM601	Memory Piggyback with 16 MByte DRAM and 4 MByte FLASH memory for VM642/662	11855
DM602	Memory Piggyback with 1 MByte DRAM and 1 MByte FLASH memory for the VM642/662	12765
DM603	Memory Piggyback with 32 MByte DRAM and 512 kByte FLASH memory for the VM642/662	13027
DM603	Memory Piggyback with 32 MByte DRAM and 2 MByte FLASH memory for the VM642/662	13627
DM604	Memory Piggyback with 8 MByte DRAM and 1 MByte FLASH memory for the VM642/662	15911
DM604	Memory Piggyback with 8 MByte DRAM and 4 MByte FLASH memory for the VM642/662	15912
DM605	Memory Piggyback with 64 MByte DRAM and 1 MByte FLASH memory for the VM642/662	16369
DM605	Memory Piggyback with 64 MByte DRAM and 4 MByte FLASH memory for the VM642/662	16368
SI6-10B2	10Base2 Thin Ethernet interface piggyback with RG58 coax. connector & 50-Pin D-Sub for ModPack signal I/O	15058
SI6-10B5	10Base5 Ethernet (AUI) interface piggyback with 15-pin D-Sub connector & 50-Pin D-Sub for ModPack signal I/O	15059
SI6-10BT	10BaseT Twisted pair Ethernet interface piggyback with RJ45 connector & 50-Pin D-Sub for ModPack signal I/O	15060
SI6-DUMMY	Front panel without networking interface(s) & 50-Pin D-Sub for ModPack signal I/O	15061
SI6-PB485-ISO	Optoisolated RS485 interface piggyback with 9-Pin D-Sub connector & 50-Pin D-Sub for ModPack signal I/O	15064
SC-232I	Optoisolated RS232 interface piggyback with TxD, RxD, DTR and CTS signals and Baud rate up to 38.4 kBaud	12919
SC-485I	Optoisolated RS485 interface piggyback for half-duplex communication at a Baud rate up to 38.4 kBaud	13468
CABLE-RS232	3 metre RS232 Serial interface cable with RJ45 to 9-Pin D-Sub (male) for terminal connection	15191

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Important : The VM642 and VM662 must be ordered with a memory module (DM60x) and a front-panel with integrated SI6- piggyback module.

For different memory configurations or products requiring the mini D-Sub front-panel connectors instead of the standard RJ45 connectors for improved EMI protection, please contact the nearest PEP sales office for further information.

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CXC Overview
VM642/662

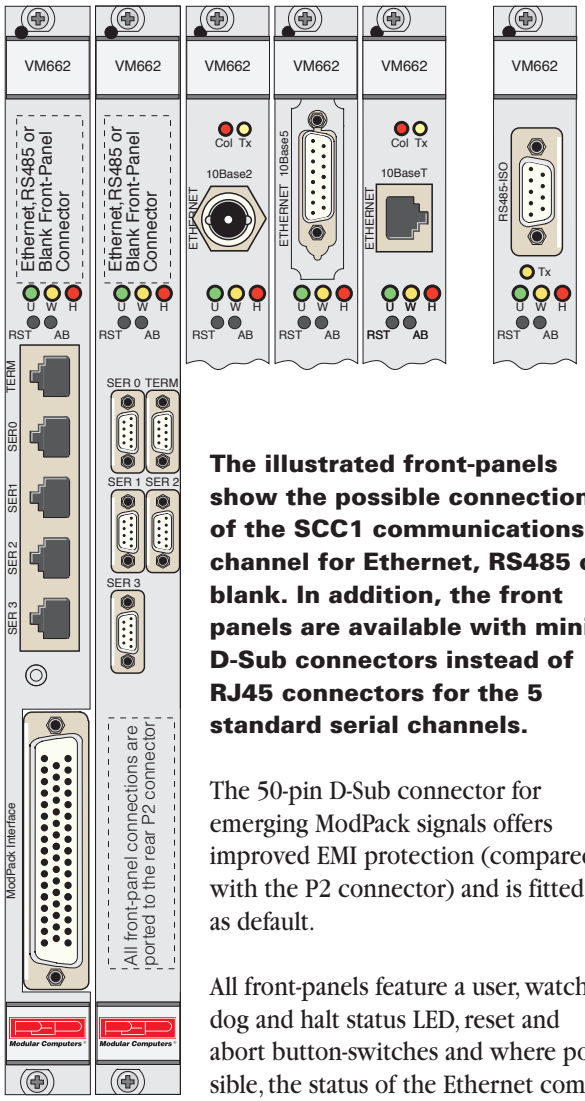
Although the VM642/662 adds a new dimension to computer architecture with its direct ModPack interface, it is also a continuation of the successful range of PEP's CPU boards with communication processors and CXC capability. The CXC extends the already abundant industrial I/O capability of the CPU and also allows custom design according to the guidelines laid down in the CXC specification.

PEP has named these mezzanine plug-in modules Controller eXtension Modules (CXM). These 96-pin CXMs are designed to operate with CXC based host modules like the VM642/662.

Designed primarily to operate in harsh industrial environments, this versatile modularity provides not only a cost-effective engineering solution but also allows customers a near exhaustive selection of system configurations through a selection of over 30 CXMs providing analog, digital and other I/O extensions such as SCSI and fieldbus connection (PROFIBUS, CAN, LON and Bitbus). Hence, a feature of the VM462/662 is that the 'raw' serial signals from the 'QUICC' SCC2, SCC3 and SCC4 channels being internally wired to the CXC interface may be used by dedicated signal translation modules.

Network interfacing is provided if required by ordering the relevant front-panel which comes complete with the appropriate SI6-piggyback, serial port connectors and the standard 50-pin D-Sub ModPack connector. Naturally, to cater for those customers who merely wish to take advantage of the computing power and CXC capablility that the VM662 offers, blank front-panels without the networking options have been devised.

Front-Panel & I/O Connection
VM642/662



The illustrated front-panels show the possible connections of the SCC1 communications channel for Ethernet, RS485 or blank. In addition, the front panels are available with mini-D-Sub connectors instead of RJ45 connectors for the 5 standard serial channels.

The 50-pin D-Sub connector for emerging ModPack signals offers improved EMI protection (compared with the P2 connector) and is fitted as default.

All front-panels feature a user, watchdog and halt status LED, reset and abort button-switches and where possible, the status of the Ethernet communication.

SC and SI6 Piggybacks adapt the multi-protocol serial channels of the 'QUICC' to the physical interfaces provided on the VM642/662's front-panel and CXC:

SCC1 channel supports:

SI6-10B5	Ethernet 10base5 (AUI)
SI6-10B2	Ethernet 10base2 (Thin)
SI6-10BT	Ethernet 10baseT (Twisted Pair)
SI6-PB485-ISO	Optoisolated RS485

SCC2 to SCC4 channels support:

SC-232I	Optoisolated RS232 Modem module
SC-485I	Optoisolated RS485 piggyback

Product Overview

VM642/662

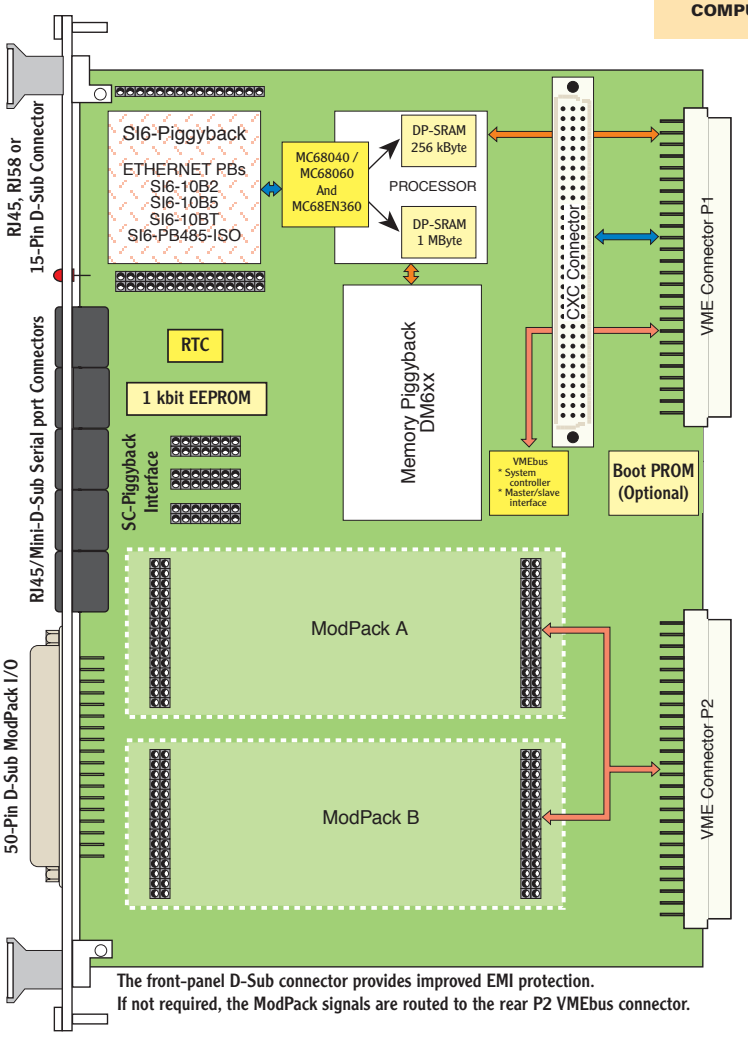
HIGH-PERFORMANCE CPUs SINGLE-BOARD COMPUTERS

PEP's VM642/662 combines high computational performance and flexible I/O requirements through its twin ModPack and single CXC interface with excellent communication ability afforded by the Motorola 'QUICC' controller.

A combination of high-performance CPUs (Motorola MC68040/MC68060) and the Quad Integrated Communications Controller chip, the Motorola MC68EN360, 'QUICC' not only enable computational performances from approximately 35 MIPs to over 100 MIPs, but dispense with the usual restrictions associated with serial communication. Application-specific tailoring is assured through versatile interface options which, together with PEP's CXC interface, makes this 6U VMEbus CPU ideally suited for communication and automation applications. With up to 6 serial interfaces resident within the same real-estate and support for standard LAN or WAN interfaces provided, communicational versatility is guaranteed. Space has been reserved for a piggyback interface supporting the PEP invented, Motorola manufactured AutoBahn Spanceiver technology for accelerated transfer rates over pins b21/b22 of the VMEbus P1 connector.

The PEP VM662/642 package includes support for several popular real-time operating systems: OS-9, VxWorks, VRTX/OS and pSOS+ and includes driver support for all available ModPacks.





The front-panel D-Sub connector provides improved EMI protection.
If not required, the ModPack signals are routed to the rear P2 VMEbus connector.

ModPack Flexibility

Fully integrated within the VM642 and VM662 CPU boards are two versatile industrial I/O ModPack carrier interfaces.

Each interface accesses an 8 or 16-bit data-bus, supports 8 address and extended control (IRQ) lines and provides separate interrupt lines.

Any two industrial I/O ModPacks from an ever expanding range may be fitted to cater for the needs of digital, analog, communication or counter functions. PEP's open piggyback specification is documented also for custom solutions and is currently undergoing the process of standardisation through the VITA organisation.

These industrial ModPacks provide a cost-effective solution for a wide variety of applications, tailoring the CPU to precisely fit a particular input/output requirement while at the same time satisfying a broad operating temperature spectrum (-40°C to +85°C).

Processed piggyback signals surface on either the front-panel or the rear P2 connector. Those applications not requiring the 1.5kV isolation inherent within the 50-pin D-Sub connector should opt for the front panel without this connector.

Specifications

VM642/662

CPUs

MC68040(V) @ 33 MHz
MC68060 @ 50 MHz or 66 MHz

Communications Controller

MC68EN360 @ 25/33 MHz for network support on SI6 piggybacks

Memory

1/4/8/16/32/64 MByte (32-bit access) DRAM†
1/4 MByte (32-bit access) FLASH†
256 kByte or 1 MByte dual-ported SRAM with data retention via Goldcap
2 kbit serial EEPROM for applications
512 kbit boot ROM (optional)

Real-Time Clock

V3021 with (year, month, week, day, hour, min., sec.)

Tick

Built-in on MC68EN360 providing a programmable periodic interrupt

Timer

4x16, 2x32-bit resolution built-in timers on the MC68EN360

Time-Out

On-board BERR* time-out fixed at 8µs and 128µs VMEbus BERR* both with software enable/disable

Watchdog

Enabled by software with front-panel LED

Interrupts

IRQ1* - IRQ7* interrupts, enable/disable; SYSFAIL* and ACFAIL* handlers

System Autovectors

Abort switch	level 7 autovector
ACFAIL*	level 7 autovector
TICK	level 6 vector prog.
SYSFAIL*	level 5 autovector
Mailbox IRQ	level 3 autovector
ModPack	level 3 vector prog.
CXC	level & vector prog.

System Controller

Single-level (BR3*), daisy-chain logic
fair RWD (Release When Done)
Automatic First-Slot Detection

† Available on DM60x Memory Piggyback

Address Modifier

A32 Access Code	: HEX 09/0A/0D/0E
A24 Access Code	: HEX 39/3A/3D/3E
A16 Access Code	: HEX 29/2D
User Defined	: HEX 10-17/18-1F

Slave Functions

Dual-ported SRAM;
up to 16 software selectable base addresses

ModPack Interface

Two card holders with I/O ported to 50-pin D-Sub connector on front-panel or VME-P2 connector

CXC Interface

DIN 41612 (C), 96-pin, 3 NMSI ports, DMA

VMEbus Interface

DIN 41612 (C), 96-pin P1/P2 connector
A32:D32/D16/D8 master/slave

Networking

All Ethernet interfaces conform to IEEE 802-3 and are available on SI6-xx piggybacks

SC-Interface

Serial interface from MC68EN360 (ports SCC2, SCC3 and SCC4) with standard RS232 configuration

Power Consumption#

VM662 with MC68060 ≈ 5.5W @ 50 MHz
VM642 with MC68040V ≈ 5.5W @ 33 MHz
VM642 with MC68040 ≈ 7.5W @ 33 MHz

Common

Temperatures:	0ºC to +70ºC (standard)
	-40ºC to +85ºC (extended)
	-55ºC to +85ºC (storage)
Humidity:	0 to 95% non-condensing
Weight:	450 g (with 10BaseT and DM600 PB)
6U Dimensions:	233mm x 160mm; single-slot (4HP)

Front Panel Functions

3 LEDs:	red:	Halt
	yellow:	Watchdog enabled
	green:	General purpose user
2 Switches:	AB:	Abort function (NMI)
	RST:	Reset (CPU & VMEbus)

(with 4 MByte DRAM, 256 kByte SRAM and 1 MByte FLASH memory)

Features

VM642/662

CPU Options

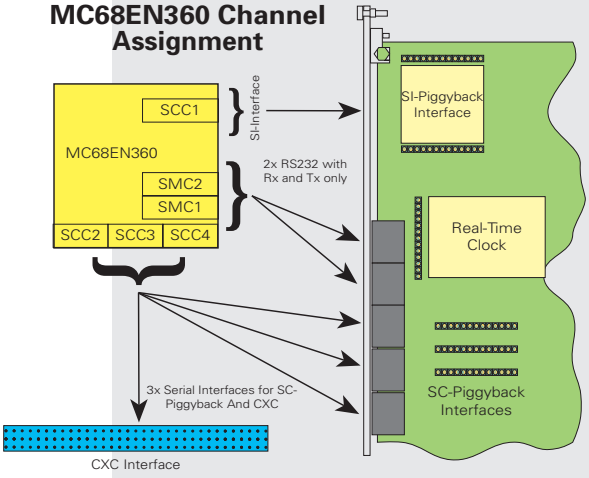
The 68060 processor operating at up to 66 MHz provides the highest performance while the 68040(V) at 33 MHz sets the standard in the Motorola CISC portfolio.

68EN360

25/33 MHz - the 'QUICC' chip working as an I/O and communication controller, provides 6, high-speed serial channels, timers clocks and Time Slot Assignment (TSA).

Serial Channels

All high-speed SCC channels are equipped with hardware handshaking and are available for a variety of applications. SCC1 can be configured for either ethernet or RS485 use by fitting the appropriate SI6- piggyback. SCC2 - SCC4 are configured by default for RS232 operation. SMC1 and SMC2 interfaces provide simple RS232 interfaces for console/debug operations.



RS485 Interfaces

This is a fully optoisolated RS485 SI6-interface piggyback with a 9-pin D-Sub connector.

CXC Interface

The 96-pin interface allows other I/O possibilities to be realised by utilising PEP's plug-in cards such as the CXM-CAN, CXM-LON or CXM-SCSI.

Ethernet Interface

Three different SI6 piggybacks complete with all the associated control logic are available providing 10Base2, 10Base5 or 10BaseT interfaces.

ModPack Interface

Any two industrial I/O ModPacks from an ever expanding range may be fitted to cater for the needs of digital, analog, communication or counter functions.

SC-Interface

Three RS232 SC-Piggybacks are fitted as standard for serial communication. Thee can be replaced by optoisolated RS232 or RS485 piggybacks as required.

DMA Channels

2 independent channels are provided by the 'QUICC' chip for use by applications requiring data transfer between VMEbus, CXC-modules, DRAM, FLASH memory and dual-ported SRAM.

DRAM/FLASH

This memory, complete with a 32 bit-wide access bus is placed on a piggyback with addressing capability for up to two memory banks of 64 MByte each. The on-board +5V FLASH memory allows the user to produce low cost upgrades by over-writing existing stored data and may also be configured as a boot device.

SRAM

This is a dual-ported battery-backed (Goldcap) memory area with a 16 bit- wide access bus. Users of the VMEbus and CPU both have access to this memory.

EEPROM

A 2 kbit EEPROM is provided on-board, 1 kbit has been pre-programmed with PEP production data leaving the remaining available space for user application code.

Boot ROM/FLASH

2 DIL sockets supporting up to 1 MByte of 16-bit ROM/FLASH memory are available for use as main memory or as a boot device if the FLASH appearing on the DM60x piggyback is not required.