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## ***PT-VME151A/151AE Extensible 68040***

### **Product Overview**

The Model PT-VME151A/151AE SBC is a highly integrated 68040/68EC040 MPU based VMEbus platform designed to offer the user significant flexibility in meeting specific architectural requirements. The base module supports all standard VMEbus data and operating modes including the newly defined VME64 mode pioneered by Performance Technologies. Operating in VME64 mode, the PT-VME151A can burst data over the VMEbus at rates up to 60 MBytes/sec. This high speed transfer capability makes the 151A ideal for applications that require maximum VMEbus utilization. The base module provides many I/O features tightly coupled to the MPU. These features include DRAM capacities from four to 64 Mbytes, a Fast SCSI-2 interface with DMA support for direct flexible/hard disk interconnect and dual serial I/O ports for asynchronous communication connectivity.

In addition to the standard base module features, the PT-VME151A/ 151AE SBC provides an option for further extending the single VMEbus slot functionality through its "EPAK" extension interface. This interface provides for optional plug-in daughterboards (EPAKs) with selectable I/O option to meet current or future needs. Performance Technologies offers "off-the-shelf" EPAKs which support Ethernet, high speed synchronous communications, additional asynchronous serial I/O, etc. The user can also engineer a custom design based upon an available wire wrap prototyping EPAK and supplied interface documentation. Contact Performance Technologies for custom EPAK design quotations.

### **Features**

- Advanced Thirty-Two Bit Microprocessor 25Mhz
- 4, 8, 16, 32 or 64 MBytes of Shared Dynamic Random Access Memory (DRAM)
- Two 32 Pin JEDEC Sockets (Byte Wide Port)
- SCSI-2 Single-Ended Based on Emulex FAS216
- 68681 DUART Based Functions
- Highly Flexible E-PAK Interface Extension Capability
- VME/VME64 Interface
- Time of Day Clock
- Timers
- User Interface (Front Panel) Features

### **Microprocessor**

Both the PT-VME151A and PT-VME151AE modules are based upon the popular Motorola 680xx Microprocessor Family. The PT-VME151A incorporates a thirty-two bit 68040 MPU with integral memory management for sophisticated operating system support, a cache memory architecture for maximizing processor execution speed and a FPP for optimum numerical computation capability. A variant of the 68040 without memory management or FPP, the 68EC040 MPU, is utilized in the PT-VME151AE.

## Memory

Application requirements for local memory are supported by a combination of a DRAM array, two 32 pin JEDEC standard sockets compatible with byte wide memory devices and a nonvolatile 1Kbit EEPROM.

The DRAM array utilizes 4 Mbit or 16 Mbit DRAM technology configured as one or two 32 bit wide banks. Its shared memory architecture also supports VMEbus slave access, SCSI interface direct memory access DMA and optional EPAK based DMA. Array control logic is optimized to support 68040/68EC040 4 MPU cache burst fill requests with 3-2-2-2 clock timing. Random MPU read/write cycles are executed in 120 nsecs without contention. Capacity options of 4, 8, 16, 32, or 64 MBytes are available as factory options. Parity protection is provided on the 16, 32 and 64 MByte models.

The module's JEDEC compatible sockets support a variety of user supplied byte wide memory types with capacities up to 512 KBytes per socket. Specific configurations and choice of 28 or 32 pin devices are implemented via jumper options. One socket is dedicated to ROM/PROM/ EPROM/Flash EPROM devices.

## Base I/O

The PT-VME151A/151AE provides base I/O functions independent of any I/O capabilities that may be provided via the addition of an EPAK module. These functions include a SCSI-2 interface, dual Serial I/O ports and several timer functions.

A single-ended Narrow/FAST SCSI-2 compatible interface is implemented using an Emulex FAS216 Fast SCSI processor. The FAS216 maximizes transfer rates by sustaining asynchronous data rates of up to 7.0 MBytes/sec, and fast synchronous transfer rates of up to 10.0 MBytes/sec. Integral DMA capabilities of the FAS216 provide very efficient SCSI to local DRAM array data transfers. This architecture yields a performance oriented SCSI interface in contrast to alternate implementations that require direct MPU data handling. Straightforward, mass terminated interconnection is supported via the "P2" VMEbus connector. An onboard regulator provides active SCSIbus termination, to compensate for voltage drops and always maintains stable voltage to the terminating resistors. Jumper configurable termination power options and a replaceable termpower fuse are also provided.

The module's two Serial I/O ports are based on the 68681 DUART supporting full-duplex asynchronous serial communication at rates up to 38.4 Kbaud. One port provides four modem control lines for general purpose asynchronous connectivity. The second port is considered a utility port for software development/debug and implements a basic transmit and receive data interface. Both ports utilize RS-232C compatible line drivers and receivers and are interconnected via a 14 pin connector on the module front panel (breakout cable

provided).

## **VMEbus Interface**

The PT-VME151A/151AE offers a robust, high performance 32/64 bit VMEbus interface compatible with the IEEE 1014 VMEbus Specification. The interface is implemented via an Advanced VMEbus Interface Chip Set (AVICS), consisting of a 144 pin ACC (Architecture Control Circuit) logic element and a 240 pin DARF64 (64 bit Data/Address Register File) logic element.

The ACC primarily supports VMEbus control and utility functions. A complete System Controller implementation handles VMEbus arbitration, IACK daisy chain and SYSCLK drivers and SYSRESET generation. System Controller operation is automatically selected when the module is installed in VMEbus slot 1. The ACC also provides VMEbus Requester, Interrupter and Interrupt Handler logic and a unique "Auto-Identification" mode which dynamically informs operating software of the specific VMEbus slot in which the module is installed.

The DARF64 supports BLT (standard block transfer), MBLT (VME64, multiplexed block transfer), and all standard VMEbus data and address transfers and their related timing. As a VMEbus master, using the DMA features of the DARF64, the PT-VME151A can provide high performance bus bandwidth capabilities to 60 MBytes/sec in D64MBLT and A32/A24:D64MBLT/ D32BLT/D16BLT/ D32/D16/D08(E0), UAT and RMW interfacing. A Location Monitor and associated message queue offers excellent support for VMEbus inter-element (mailbox) communications. An integral 32 bit DMA controller coordinates local MPU bus to VMEbus data transfers. Programmable slave address mapping and access protection is also provided.



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