SVME/DMV-192

Pentium® II Single Board Computer

Features

- *Pentium II® processor*
- *Harsh environment, military and commercial applications*
- *VME64 ANSI/VITA-1-1994 compliant for master or slave applications*
- *PCI local bus and PCI mezzanine card (PMC) Interface*
- *Supports Windows NT®, MS-DOS®, and other PC/AT™ compatible applications*
- *512 Kbytes of level 2 cache memory*
- *Up to 128 Mbytes of DRAM and 2 Mbytes of Flash EPROM*
- *Solid state disk expansion option*
- *Two IEEE P1386 PCI/PMC module sites for flexible I/O expansion*
- *SVGA video, with display resolution up to 1280 x 1024 pixels*
- *Ethernet™ (10Base-T/100Base-TX), Fast SCSI-2, Ultra EIDE, 2 USB, and 4 serial channel interfaces*
- *Three programmable timers and hardware watchdog*
- *Real-time clock with battery backup via +5 VDC standby*

The SVME/DMV-192 single board computer (SBC) provides all the features of a fully configured PC/AT motherboard, along with additional features such as a built-in Ethernet™ interface, PMC interface, Fast SCSI-2 interface, Video RAM, Flash EPROM with BIOS code, SVGA graphics controller and full VME64 interface. Additionally, it provides a complement of standard I/O, including one parallel and four serial I/O ports, as well as keyboard, and mouse interface. Built-in hardware extensions enable the card to be used as a VMEbus master/slave component. The SVME/DMV-192 incorporates Intel®'s Pentium II® in the embedded module package which offers low power consumption, low profile, and high reliability with extended component life (see Figure 1: SVME/DMV-192 Block Diagram).

Designed for harsh environments, the DMV version meets the physical dimensions required by the IEEE 1101.2 specification for conduction-cooled VMEbus modules.

Incorporating many non-PC features, the SVME/DMV-192 can be configured with embedded software to support such interfaces as VMEbus, Disk-On-Chip®, SCSI-2 and Ethernet.

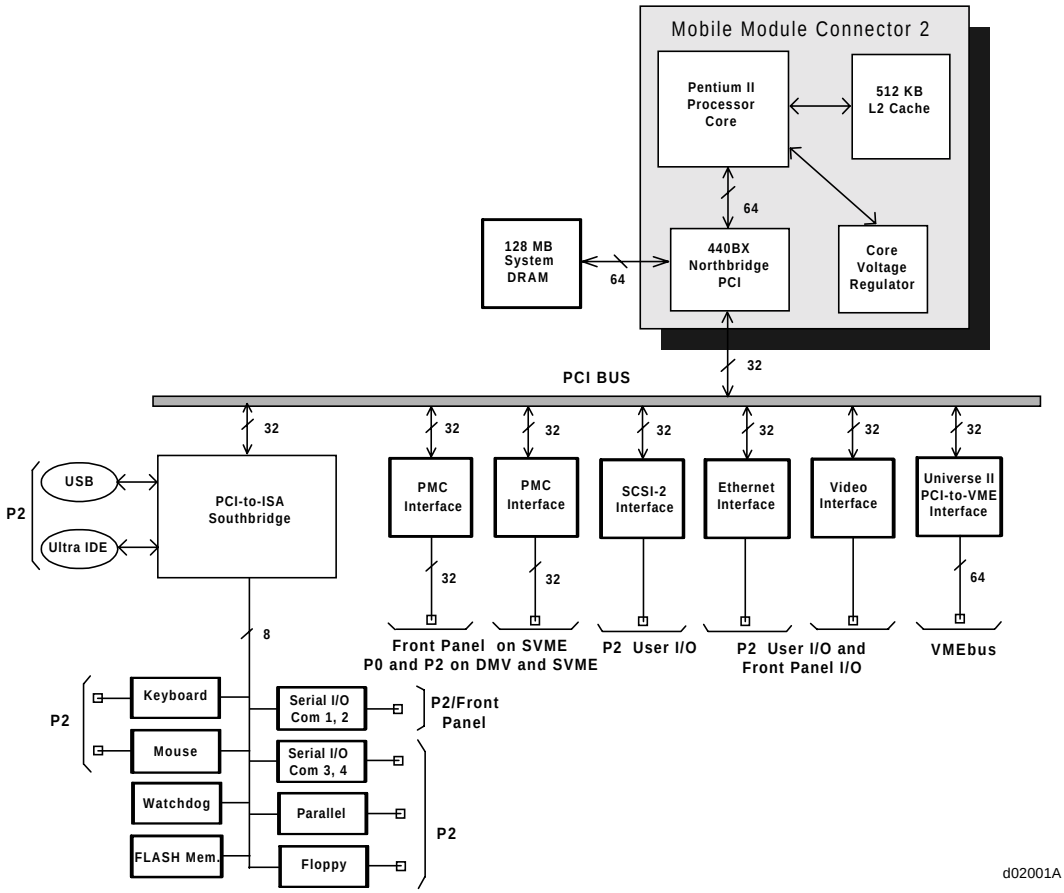

Figure 1: SVME/DMV-192 Functional Block Diagram

Software Compatibility

The SVME/DMV-192 SBC allows designers to take advantage of COTS software. It is compatible with a wide variety of off-the-shelf operating systems and applications available for Pentium-based computers. Examples of operating systems include Microsoft® MS-DOS®, and Windows NT®.

CPU

Intel's Pentium II processor embedded module is a small, highly integrated assembly containing:

- a Pentium II processor and its immediate system level support
- a power supply for the processor's unique voltage requirements
- 512 Kbytes system Level 2 cache memory
- the Northbridge logic required to bridge the processor to the standard system buses.

The embedded module supports both a 266 MHz and planned 333 MHz processor core with a 66.66 MHz Host (CPU) bus clock.

For optimal heat dissipation in extended temperature environments, the module's thermal transfer plate has been integrated with both the convection and conduction cooled versions of the SVME/DMV-192.

Memory

The SVME/DMV-192 can be configured to support 64 or 128 Mbytes of SDRAM system memory. The SDRAM supports Error Control and Correction (ECC) providing 1-bit error detection and correction and 1 or multiple bit error detection. The Pentium II processor embedded module provides 512 Kbytes L2 cache of pipeline burst SRAM.

The card comes with a memory bank of 2 Mbytes of Flash EPROM that provides for the high-performance code execution of both boot and BIOS firmware. The first 1 Mbyte of Flash is reserved by the BIOS while the application has read and write access to the second 1 Mbyte.

Solid State Disk Option

The SVME/DMV-192 card supports extensions to the on-card Flash by allowing for a socket-based Disk-On-Chip which can boost available Flash memory to as much as 72 Mbytes. The SVME/DMV-192 relies on the M-Systems MD-2200 Flash Disk-On-Chip. This component was selected because it is ideal for embedded applications that need more than the standard 2 Mbytes of ROM, yet cannot use a conventional rotating disk drive. This memory resides at the same location as the system Boot device and provides the same ISA bus interface as the Boot memory. The MD-2200 contains PC ROM expansion code which automatically loads TrueFFS drivers into memory and installs the Disk-On-Chip as a system disk.

I/O Configurations

The I/O connector configurations differ for the SVME and DMV versions of the ‘192.

SVME Version

The SVME version provides I/O on the front panel connectors and on the card’s VMEbus P2 and P0 connectors. Specifically:

- P1 connector for VMEbus signals
- P2 connector for extended VMEbus signals
- P0 connector with I/O signals mapped from the PMC interfaces
- Front panel connector supports Ethernet, video, COM-1, mouse and keyboard
- PMC-1 I/O signals are available through the front panel and on the P0 connector
- PMC-2 I/O signals are available through the front panel and on the P2 connector

DMV Version

The DMV version provides I/O on the VMEbus P2 and P0 connectors only. Specifically:

- P1 connector for VMEbus signals
- P2 connector for extended VMEbus signals
- P0 and P2 connector with I/O signals mapped from the PMC interfaces

Pin-out Configuration Options

I/O pin-count on the VMEbus P0 and P2 connectors limits the number of signals available on the backplane. For this reason, the ‘192 is offered with four optional, factory defined, pin-out configurations as described in Table 1.

Table 1: Pin-out Configuration Options

	Available	Not Available
Option 1	EIDE and Parallel/ Printer Port	PMC-2 I/O signals 30 to 57, COM3, COM4, USB signals
Option 2	EIDE and COM3, COM4, USB Signals	PMC-2 I/O signals 30 to 57, Parallel/Printer Port
Option 3	PMC-2 I/O signals 30 to 57, and COM3, COM4, USB signals	EIDE and Parallel/ Printer Port
Option 4	PMC-2 I/O signals 30 to 57, Parallel/Printer Port	EIDE and COM3, COM4, USB signals

Disk Interfaces

For the storage of data on hard disks and other mass storage media such as tapes, the SVME/DMV-192 provides Ultra IDE and SCSI-2 interfaces. This allows the choice of data storage peripherals that are best suited for the application.

The industry standard IDE interface is common on desktop PCs and allows the use of widely available low-cost IDE disk drives. The SVME/DMV-192 uses the PIIX4 Southbridge to provide the IDE interface with I/O signals accessible on the P2 connector.

The SCSI-2 interface is generally more flexible and supports a number of peripherals such as CD-ROM drives, high-performance computer workstations, and servers. The SCSI-2 interface is provided by the SYM53C885, a single-ended interface accessible on the P2 connector.

The SVME/DMV-192 is also capable of controlling a floppy disk drive with a data storage capability of 2 Mbytes. The FDC37C937 Ultra I/O controller provides the 82077 compatible floppy device with signals accessible on the P2 connector.

Universal Serial Bus (USB)

The SVME/DMV-192 PIIX4 Southbridge device provides two USB serial bus interfaces available through configuration at the P2 connector. USB is a serial bus with a standard cable that is ideal for connecting low and medium-speed devices, such as monitors, keyboards/ mice and modems. Its support for hot-swapping and a tree topology allows the system integrator to extend the number of peripheral connections without the expense of changing the P2 wiring.

Video Interface

The video interface can be configured for many types of standard screen displays including VGA and Super VGA. The SVME/DMV-192 uses 2 Mbytes of video RAM in order to enhance the display capability. The 2 Mbytes of video RAM enable the display of 16.7 million colors at a resolution of 800 x 600, and 256 colors at a resolution of 1280 x 1024, non-interlaced.

The SVME/DMV-192 contains the Chips and Technologies Inc. 69000 HiQVideo™ Accelerator. The Red, Green, and Blue video analog video outputs are available on the P2 connector on both the DMV-192 and the SVME-192, and on the front panel of the SVME-192.

VMEbus Interface

The SVME/DMV-192 VMEbus interface uses a high-performance 64-bit Tundra Universe II™ PCI/VME bridge chip. The Universe II deals with system functions that are ideally suited for CPU cards acting as both master and slave in the VMEbus system, particularly appropriate for PCI local systems. Being a PCI resident device, the VMEbus interface allows high-speed data transfers to and from the VMEbus. The SVME/DMV-192 supports master and slave block transfers on 16-, 32-, or 64-bit data paths for fast VMEbus data transmission.

As a VMEbus slave, the SVME/DMV-192 allows VMEbus masters to access onboard resources such as the system SDRAM. Programmable “slave images” dictate what local devices are made available to the VMEbus and at what VMEbus address they will appear. As such, VME access to critical regions and devices can be disallowed.

To make integration of the Pentium II microprocessor-based SVME/DMV-192 into the traditionally 68000-oriented VMEbus easier, the Windows NT Support Package providing VMEbus drivers is available.

PMC Mezzanine Card Interface

The SVME/DMV-192 provides two PCI Mezzanine Card (PMC) expansion slots compatible with P1386.1/Draft 2.0 04-APR-1995, Draft Standard Physical and Environmental Layers for PCI Mezzanine Cards. The two PMC sites, PMC slot 1 and PMC slot 2, provide front panel I/O on the air-cooled version of the card. Additionally, I/O from PMC slot 1 is accessible at the P0 connector while the card can be configured to bring I/O from PMC slot 2 through a combination of the P0 and P2 connectors.

Ethernet™ Interface

To support local area networking (LAN), the SVME/DMV-192 has an IEEE 802.3 (10Base-T/100Base-TX Ethernet) compatible interface that is accessible via the P2 connector and by a connector attached to the front panel of the air-cooled version of the card. The SVME/DMV-192 Ethernet controller is the SYMBIOS SYM53C885.

SCSI-2 Interface

The SVME/DMV-192 provides a single-ended, 8-bit wide Fast SCSI-2 interface that supports SCSI-2 bus speeds of 5 Mbytes/second (asynchronous) or 10 Mbytes/second (synchronous). The SCSI-2 interface is provided by the SYM53C885, a single-ended SCSI-2 interface accessible on the P2 connector on the DMV-192 and the SVME-192.

Timers

The SVME/DMV-192 PIIX4 Southbridge chip provides a real-time clock, three countdown timers and a hardware watchdog.

The three timers are 16-bit pre-settable/cascadable/readable count-down timers with a resolution of 1µs. Each timer is capable of being selected to provide an interrupt to the CPU on timeout. Three 8-bit registers are provided to load the initial count value by write operation and read back the current count value by read operation.

The SVME/DMV-192 also provides a hardware watchdog with a resolution of 100 ms. The hardware watchdog is a built-in safety mechanism that will cause a hardware-reset when the timer expires. The ‘192 simplifies application software integration by providing Windows NT software to access these timers.

Parallel Port

The SVME/DMV-192 Ultra I/O controller (FDC37C935) supports a standard LPT1 parallel port. The parallel port I/O signals can be routed to the P2 connector as a factory configured option.

Serial I/O

The Ultra I/O controller (FDC37C935) provides two NS16C550 compatible EIA-232 serial I/O devices that support COM1 and COM2 ports. COM1signals are routed to the front panel on the SVME-192 and to the P2 connector on both the SVME-192 and the DMV-192. COM2 signals are routed to the P2 connector only.

The SMVE/DMV-192 provides two software selectable EIA-232/EIA-422 serial lines via a ST16C554 Quad UART supporting COM3 and COM4 I/O. COM3 and COM4 signals are routed to the P2 connector on the SVME/DMV-192 as a factory configured option.

Keyboard and Mouse

Keyboard and mouse I/O are provided by the Ultra I/O controller. Signals for the keyboard and mouse are routed to the front panel on the SVME-192 and to the P2 on both SVME-192 and DMV-192.

System Status Signals

The SVME/DMV-192 provides one system status signal that is connected to the front panel LED indicator. The System Fail Status (SYSFAIL) is asserted in the event of the card failure and its status corresponds to the card front panel red LED indicator.

Card Configuration

An on-card SEEPROM device is used for system configuration information so that default settings are maintained in the absence of a battery or backup power. Though the SVME/DMV-192 contains a socket site for a battery, default configurations of the card do not include a battery. Rugged versions of the ‘192 assume a battery is not present. Additionally, installation of a battery is incompatible with use of the second PMC site. See Table 2 for a list of the SVME/DMV-192 configurable options.

Table 2: SVME/DMV-192 Configurable Options

Options	Configurations	Notes
SDRAM Size	64 Mbytes	
	128 Mbytes	
CPU Speed	266 MHz Pentium II	Please consult DY 4 for availablity of 333 MHz processor.
DOC-2000	None	No solid state file system.
	12 Mbytes	
	24 Mbytes	24 Mbytes DOC-2000 is currently the largest extended temperature part available.
P2 Pin-out	190 compatible: IDE/Printer port	Missing PMC-2 I/O signals 30 to 57. No COM3, COM4 or USB signals.
	IDE, COM3, COM4, USB	Missing PMC-2 I/O signals 30 to 57. No printer port
	PMC-2 I/O, COM3, COM4, USB	No printer port. No IDE drive signals.
	PMC-2 I/O, printer port	Missing PMC-2 I/O signals 30 to 57. No IDE drive signals
Battery	Not populated	Without a battery and without 5 V standby source the Real-time clock value is lost when the card is powered down.
	Populated	Incompatible with population of PMC-2
PMC-1	Consult factory	
PMC-2	Consult factory	

Software Packages and Peripherals

The Windows NT Support Package, which provides VMEbus extensions, is also available for the ‘192.

Table 3: Specifications

RUGGEDIZATION LEVELS*		
SVME card	Available in levels 0, 50 and 100	
DMV card	Available in level 100	
POWER REQUIREMENTS		
+5 V +12 V -12 V	3.4 A (typical) 0 A 0 A	5 A (max) 0 A 0 A
+5 V (STDBY)	1 to 1.168 mA (typical)	0 to 0.25 mA (max)
DIMENSIONS		
	Size	**Weight**
SVME card	per ANSI/VITA 1-1994	<590 g (<1.3 lbs.)
DMV card	per IEEE 1101.2 - 1992	<900 g (<2.0 lbs.)

*Refer to Ruggedization Guidelines in the Appendix.

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References to other documents of the exact issue, or if not shown, the issue in effect at the time of publication form a part of this specification to the extent referenced herein. In the event of a conflict, this specification will be considered a superseding requirement.

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