

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*







Data Sheet

SVME/DMV-184

VME Freescale™ Power Architecture® MPC8640-based Single Board Computer



COTS continuum

Features

- Dual-core Freescale™ Power Architecture® MPC8640 CPU
  - Single or Dual e600 processor cores
  - Each core has 64KB L1 cache
  - Each core has 1MB L2 cache with ECC
  - 19.2GFLOPs @1.25GHz (dual-core) using AltiVec™
- Freescale MPC8640 additional features
  - Two DDR2 memory controllers with ECC
  - Four Gigabit Ethernet controllers
  - Serial I/O controller
  - Two I2C channels
  - Two PCI Express® interfaces
  - One Serial RapidIO® interface
  - Integrated DMA controllers
- Up to 2GB DDR2 SDRAM with ECC
  - Dual-channel memory controllers
- 256 or 512MB flash with write protection
- Permanent Alternate Boot Site (PABS) provides backup boot capability
- 128KB AutoStore nvSRAM with hardware write protection
- Up to three Gigabit Ethernet interfaces
- Two asynchronous EIA-232 serial ports
- Up to four HDLC/SDLC-capable sync/async EIA-232/422/485 serial channels
- Up to 14 LVTTL discrete I/O signals
- Up to 16 EIA-422/485 differential discrete signals (eight in, eight out)
- Two channel MIL-STD-1553 option
- 8-bit or 16-bit SCSI interface option
- Two PMC mezzanine sites one with VITA 42.3 XMC capability
  - One XMC/ PMC mezzanine site
    - 100MHz PCI-X PMC or 8-lane PCIe XMC (PN5 only)
    - 64-bits of I/O to P2 routed with controlled-impedance and controlled-length pairs
  - One PMC mezzanine site
    - 66MHz PCI-X PMC
    - 64-bits of I/O to P0 routed with controlled-impedance and controlled-length pairs
- Two channel SATA 1.0 option
- Two USB 2.0 ports
- Six general-purpose 32-bit timers in core functions FPGA
- Four general-purpose DMA controllers
- Eight 31-bit OS timers (864x MPIC), four per processor core
- Two avionics-style watchdog timers
- Real-time Clock with VBAT switchover
- Four temperature sensors
- Supports 5V-only operation
- Continuum Software Architecture firmware with extensive diagnostics
- Wind River® VxWorks® 6.x Workbench® 2.x/3.x support
- Wind River® GPP Linux® 3.0 BSP
- Continuum Vector™ DSP library
- INTEGRITY® from Green Hills® (consult factory)
- LynxOS® 5.0 from LynuxWorks™ (consult factory)
- Range of air- and conduction-cooled ruggedization levels available

Learn More
Web / sales.cwcembedded.com
Email / sales@cwcembedded.com

ABOVE & BEYOND

CURTISS WRIGHT Controls
Embedded Computing
cwcembedded.com



Overview

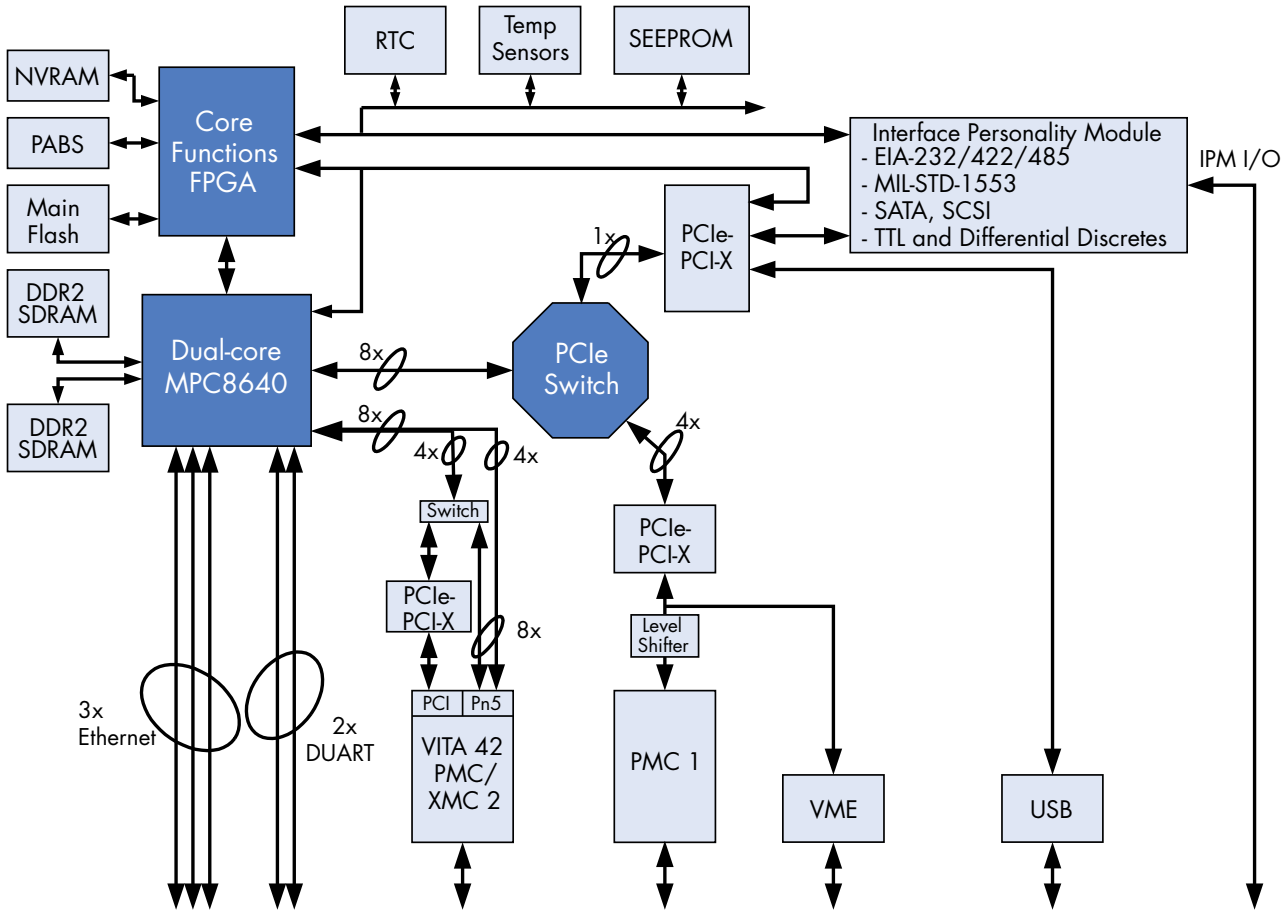
Curtiss-Wright Controls Embedded Computing's SVME/DMV-184 combines the performance and the advanced I/O capabilities of the MPC8640 processor with an extensive I/O complement, resulting in a highly capable processing platform for a wide range of embedded military/aerospace applications.

The SVME/DMV-184 is based on the MPC8640 processor. Available in single-core and dual-core versions with AltiVec™ and up to 2GB of high-bandwidth DDR2 SRAM, the SVME/DMV-184 provides high-performance processing, and a long list of features and I/O interfaces to satisfy the most demanding requirements of embedded computing.

Available in a full range of environmental build grades, the SVME/DMV-184 is targeted to the challenging data- and digital signal-processing needs of tactical aircraft, armored vehicles and harsh environment naval systems. For retrofit and technology insertion applications, the SVME/DMV-184 offers a superset of the I/O features of earlier generations of Curtiss-Wright Controls VME 18x PowerPC® Single Board Computers (SBC). As a member of Curtiss-Wright Controls' continuously evolving lineup of PowerPC SBCs including the SVME/DMV-179, 181, 182, 183 (pinout compatibility) the SVME/DMV-184 supports the life-cycle model of successive technology insertions throughout a platform's lifetime.

The SVME/DMV-184 occupies a standard 0.8" slot and may be used for upgrading existing VME systems in the same footprint.

Figure 1: SVME/DMV-184 Core Processing Architecture





Dual-Core Power Architecture Freescale MPC8640 PowerPC

The processing function of the SVME/DMV-184 is provided by the MPC8640. The MPC8640 features in a single package one or two e600 cores, dual DDR2 memory controllers with ECC, a Serial RapidIO® (SRIO) interface, two PCI Express® (PCIe) interfaces, Gigabit Ethernet controllers and serial I/O controllers.

The e600 core and AltiVec units of the MPC8640 processor are based on the proven internals of the MPC7448 processor, offering a large 1MB internal L2 cache. Existing C, assembly and AltiVec assembly code will run on the MPC8640 without change.

The MPC8640 processor integrates controller functions that previously required the use of an external bridge. In addition to the benefit of reduced size and higher reliability, the integrated dual memory controllers of the MPC8640 provide a much higher level of performance and reduced latency. Table 1 compares the key characteristics (and performance gains) of the MPC8640 to a previous generation VME-183 SBC based on the MPC7448 processor.

Table 1: VME-183 to VME-184 Comparison

	183	184
Processor (AltiVec)	Dual 1.2GHz MPC7448	Dual-core 1.25GHz MPC8640D
GFLOPS	19.2 @ dual 1.2GHz	19.2 @ dual 1.2GHz
CPU bandwidth to memory	1GB/s (MPX bus @133MHz)	8.6GB/s (DDR250)
Memory banks	1	2
Memory bandwidth	2GB/s (DDR 133)	8.6GB/s (DDR250)
SDRAM read latency (TS to TA)	~105ns	~55ns
I/O fabric	Integral VME ~40MB/s StarFabric (PMC) ~400MB/s	Integral VME ~40MB/s (2eSST capable) StarFabric (PMC) ~400MB/s 2eSST - 320MB/sec

Dual Data Rate (DDR2) SDRAM

The SVME/DMV-184 has two independent DDR2 memory controllers supporting DDR2 SDRAM. The SVME/DMV-184 may be fitted with 512MB, 1GB, or 2GB of SDRAM (the 512MB option uses one bank/controller). The DDR2 interface operates at a rate up to 500MHz resulting in a peak bandwidth of 4.3GB/s per memory bank, and 8GB/s in total.

To preserve data integrity, the SDRAM is provided with ECC circuitry that detects and corrects all single-bit data errors, detects all double-bit errors, and detects all three and four-bit errors within the same nibble. The SDRAM is accessible from the processor and from the PCIe interfaces. Subject to the configuration of BSP settings controlling the memory management of the MPC8640 processor, the memory can be accessed from other boards via the VME bus or local XMC/PMC devices.

Flash Memory

The SVME/DMV-184 is configurable with 256 or 512MB of flash memory. The flash will retain data for 20 years at +85°C, assuming the sector containing the data has less than 1,000 erase cycles. The data retention drops as erase cycle count increases. After 10,000 cycles, data retention is for 10 years. After 100,000 cycles, data corruption will likely be noticeable in one year. Read performance of the flash array is optimized in order to minimize system boot up time for applications such as avionics mission computers where fast restarts after power interruptions are critical.

For absolute security against inadvertent flash programming or corruption, a hardware jumper is provided to disable writing to flash. The CSA firmware of the SVME/DMV-184 provides flash programming functions with support for downloading flash images over Ethernet. See the separate CSA firmware data sheet for details. See the Non-Volatile Memory Security section for more information on write protection and scrub features.



Permanent Alternate Boot Site (PABS)

PABS provides a backup boot capability in the event that the firmware in the main flash becomes corrupted. This can occur because of an error during reprogramming or an incorrect image being loaded. PABS provides users with a convenient mechanism to recover from corruption of the main flash without removing the card from the system in which it is installed. An on-board jumper and a backplane signal (ALT_BOOT) are provided to cause the card to boot from PABS, thus allowing a user to reinstall the standard firmware load. The PABS feature guarantees that a card will never need to be removed from a system to perform flash updates.

nvSRAM

A Simtek 14CA8N AutoStore nvSRAM provides fast, nonvolatile storage, for mission state data that must not be lost when power is removed. During normal operation, application software reads and writes the AutoStore nvSRAM just like standard SRAM, with no special programming algorithm required. Upon detecting a power loss, an Autostore cycle is performed and all 128KB are automatically transferred from the on-chip SRAM to the on-chip EEPROM using energy stored in an on-board capacitor. At the next power-up a recall cycle is performed to transfer the EEPROM contents back to the SRAM, where the application code can now utilize the stored data to continue normal operation. The number of recall cycles is unlimited: the maximum number of store cycles is 1,000,000 and the data retention period is 100 years. For security against inadvertent writes to nvSRAM, a hardware jumper is provided to disable writes to the device. Cards are configured for shipment with nvSRAM reprogramming enabled in hardware.

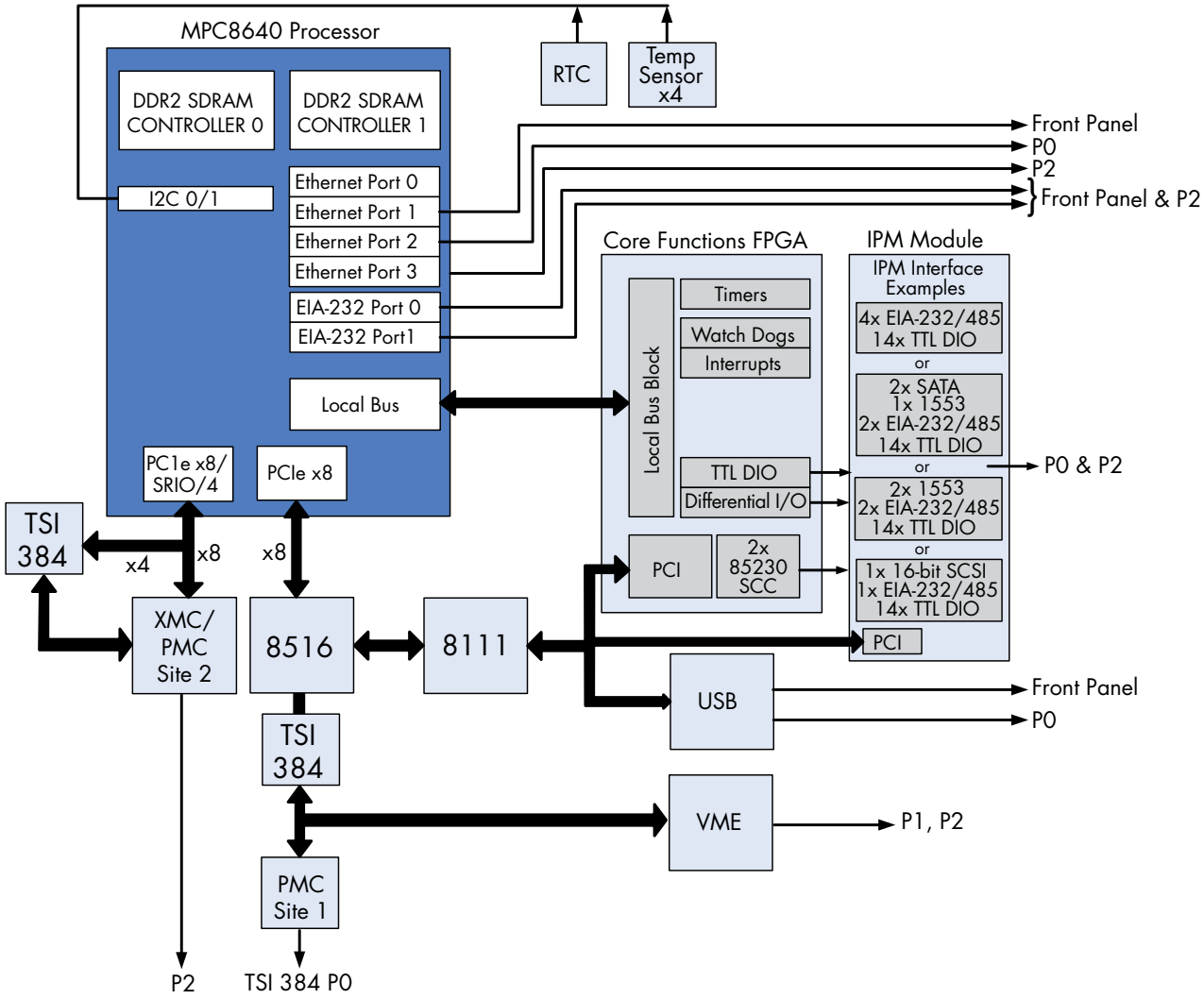
Non-volatile Memory Security

The SVME/DMV-184, as well as other Curtiss-Wright Controls Continuum Architecture products, provides for the management of non-volatile memory devices in classified circumstances. All of the non-volatile devices, flash, PABS flash, nvSRAM and FPGA PROM may be individually write-protected by a hardware jumper. The jumpers may be visually inspected to conform to security procedures.

The CSA firmware of the SVME/DMV-184 provides non-volatile scrub functions to perform a secure erase per NISPOM requirements.



Figure 2: I/O Subsystem Diagram



The SVME/DMV-184 I/O System

The SVME/DMV-184 features a large number of I/O interfaces including EIA-232, EIA-422/485 serial, USB, Ethernet, MIL-STD-1553, SATA, SCSI, TTL and differential discrete I/O. The details of the I/O interfaces are described in the following paragraphs.

The SVME/DMV-184 provides for an I/O expansion facility with the inclusion of the Interface Personality Module (IPM). The IPM concept, carried forward from the VME-182 and 183 SBCs, is a connectorized subassembly that can either simply provide physical-level transceivers for controller devices implemented in the core functions FPGA, or it can host PCI peripherals such as a SATA interface device. Some of the optional I/O features are implemented with IPM modules. Refer to Table 2 for a summary of the I/O configurations that are configurable on the SVME/DMV-184.

Three Gigabit Ethernet Interfaces

The SVME/DMV-184 can provide up to three 10/100/1000Base-T Ethernet interfaces, all implemented within the MPC8640. One port is factory configured to be present on the front panel connector (air-cooled cards). The second Ethernet port is routed to the P0 backplane connector. The third Ethernet port is dependent on the IPM fitted on the SVME/DMV-184, and can be either Gigabit Ethernet or a 10/100BT. The Ethernet controllers integrate a number of features designed to minimize processor loading due to Ethernet traffic. These include dedicated DMA engines, support for jumbo packets up to 9KB, efficient buffer management schemes, checksum calculation for IP, TCP, and UDP, and interrupt coalescence.



8/16-Bit SCSI-2 Interface Option

The SVME/DMV-184 optionally provides a single-ended, 8-bit or 16-bit Ultra SCSI (SCSI-2) interface, based on the LSI Logic 53C875 SCSI controller. The 53C875 is a highly autonomous device and transfers data to and from PCI via an internal SCSI DMA controller and an associated DMA FIFO, minimizing the loading of the main PowerPC processors. As a PCI master the 53C875 is capable of zero wait-state data bursts at 132MB/s, conserving both PCI bus and main memory bandwidth. In 16-bit mode the device supports peak transfer rates of 40MB/s synchronous and 14MB/s asynchronous. In 8-bit mode peak transfer rates on the SCSI bus are 20MB/s in synchronous mode and 7MB/s asynchronous. See Table 2 for configurations that include SCSI.

Dual SATA Interface Option

The SVME/DMV-184 optionally provides two SATA 1.0 (1.5Gb/s) interfaces based on the Silicon Image 3124 device. Each interface incorporates several performance-enhancing features such as:

- Independent DMA channel with 2K FIFO
- Independent command fetch, scatter/ gather, and command execution

See Table 2 for configurations that include SATA.

Two EIA-232 Serial Ports

All SVME/DMV-184 configurations have a minimum of two EIA-232 serial channels. The EIA-232 serial ports (Channels 1, 2) support asynchronous communications with one transmit and one receive signal. The two ports are connected to both a front panel connector and the backplane connector. One serial port supports the use of the DTR signal to automatically detect the connection of a data terminal and can be used to control the boot-up sequence of the card if desired. The two ports utilize the MPC8640 DUART. The baud rate of all two ports can be set independently from 300 to 115200.

Four EIA-232/422/485 Serial Port Option

The SVME/DMV-184 is available in configurations with one, two or four additional serial ports (channel numbers 3-6). These additional serial ports are implemented with 85230 Serial Communication Controller (SCC) cores in both the core functions FPGA and mode 6 IPM. All of the serial ports support asynchronous communication with baud rates of 300 to 115200. All of the serial ports support synchronous HDLC/SDLC communications at up to 2.0Mb/s. In synchronous mode a full range of data encoding schemes are supported. (NRZ, NRZI Mark, NRZI Space, FM0, FM1, Manchester, and Differential Manchester). The synchronous ports support separate transmit and receive clock signals and can use internal or external clocking, or clock encoded schemes. All of the serial ports support software selection of either EIA-232 (async only) or EIA-442/485 (sync or async) signal levels. See the Differential Discrete I/O section below for information on how the SVME/DMV-184 provides the capability to control each of the EIA-422/485 drivers and receivers as differential-mode discrete signals for use as serial control signals or general purpose I/O. See Table 2 for configurations that include the optional 232/422/485 serial channels.

LVTTL Discrete Digital I/O Option

The SVME/DMV-184 optionally provides 14-bits of LVTTL compatible discrete digital I/O. Each bit is individually programmable to be an input or output. Each I/O bit is capable of generating an interrupt upon a change of state, programmable to detect either edge. Each bit has a 10K pull-up resistor to 5V. The output drive current is 24mA. See Table 2 for configurations that include the optional DIO signals.

Differential Discrete Digital I/O

The SVME/DMV-184 provides the capability to control each of the EIA-422/485 drivers and receivers as differential-mode discrete signals via registers in the core functions FPGA. This allows flexibility in how the drivers and receivers are used. The choice of whether the drivers and receivers are attached to serial ports or used as discrete differential I/O is software selectable on a per-serial channel basis. When configured as discrete differential I/O, the drivers and receivers can be used as serial-line control signals (RTS, CD, etc.) in conjunction with another serial channel, or used as general-purpose differential mode control signals unrelated to serial I/O requirements. Differential discrete inputs can generate an interrupt upon a change of state, with programmable edge direction. Note that if the serial channel physical levels are set to EIA-232, then discrete digital I/O at EIA-232 levels is obtained.





Table 2: Summary of I/O Options

Mode	Front Panel (air-cooled only)	P0 Connector	P2 Connector
0 (standard product)	• Serial 1, EIA-232 • Serial 2, EIA-232 • USB port 2 • Card reset push button	• PMC site #1 I/O • ENETP0 (GbE) • USB 2 • Carfail status out • Card reset input • ALT_BOOT input • No TTL discrete I/)	• PMC site 2 I/O (rows A & C) • ENETP2 (10/100) • Serial 1, EIA-232 • Serial 2, EIA-232
1 (standard product)	Same	• PMC site #1 I/O • ENETP0 (GbE) • 14 TTL discrete I/O • USB 2 • Carfail status out • Card reset input • ALT_BOOT input	• PMC site 2 I/O (rows A & C) • ENETP2 (10/100) • 8-bit SCSI • Serial 1, EIA-232 • Serial 2, EIA-232 • Serial 3, EIA-232/422/485 • Serial 4, EIA-232/422/485
4 (by customer specific request)	Same	Same as Mode 1	• PMC site 2 I/O (rows A & C) • ENETP2 (10/100) • 16-bit SCSI • Serial 1, EIA-232 • Serial 2, EIA-232 • Serial 3, EIA-232/422/485
6 (standard product)	Same	Same as Mode 1	• PMC site 2 I/O (rows A & C) • ENETP2 (10/100) • Serial 1, EIA-232 • Serial 2, EIA-232 • Serial 3, EIA-232/422/485 • Serial 4, EIA-232/422/485 • Serial 5, EIA-232/422/485 • Serial 6, EIA-232/422/485
8 (by customer specific request)	Same	Same as Mode 1	• Same as Mode 9 but only MIL-STD-1553 #1
9 (standard product)	Same	Same as Mode 1	• PMC site 2 I/O (rows A & C) • ENETP2 (GbE) • Serial 1, EIA-232 • Serial 2, EIA-232 • Serial 3, EIA-232/422/485 • Serial 4, EIA-232/422/485 • MIL-STD-1553 #1 • MIL-STD-1553 #2
10 (standard product)	Same	Same as Mode 1	• Same as Mode 9 but only no MIL-STD-1553
11 (standard product)	Same	Same as Mode 1	• PMC site 2 I/O (rows A & C) • ENETP2 (GbE) • Serial 1, EIA-232 • Serial 2, EIA-232 • Serial 3, EIA-232/422/485 • Serial 4, EIA-232/422/485 • MIL-STD-1553 #1 • SATA #1 • SATA #2
12 (standard product)	Same	Same as Mode 1	• Same as Mode 11 but without MIL-STD-1553





Two USB 2.0 Ports

The SVME/DMV-184 incorporates a Phillips ISP1562 to provide two USB 2.0 ports. Each port can handle high-speed (480MB/s), full-speed (12MB/s), and low-speed (1.5MB/s) operation. When operating at low-speed or full-speed, each port is managed by independent OHCI-compliant controllers internal to the device. One EHCI compliant controller manages any ports operating in high-speed mode.

One USB port is accessible on the front panel connector and the other is accessible on the P0 connector. Each port provides a +5V output to power external USB devices such as keyboards.

Two Channel MIL-STD-1553 Option

The SVME/DMV-184 provides through IPMs up to two MIL-STD-1553 channels implemented with DDC 65864 micro-ACE TE devices, offering the following:

- Support for MIL-STD-1553A, MIL-STD-1553B Notice 2, and STANAG 3838 protocols
- BC, RT, MT modes independently selectable for each channel
- Choice of transformer-coupled (standard) or direct-coupled outputs (on a special order basis)
- MIL-STD-1760 amplitude compliant
- 64K words of RAM per channel, with parity
- PCI interface is 33MHz, 32-bit and supports burst writes with a FIFO for up to one complete MIL-STD-1553 message
- Transmit Inhibit input for each channel
- Bus Controller features:
  - Highly autonomous bus controller with built-in message sequence control engine for multi-frame message scheduling, branching, and asynchronous message insertion
  - Programmable inter-message gap size
  - Single frame or auto-repeat modes
  - Automatic retries
  - Time-tag can be transmitted with Synchronize with Data mode code
  - External Trigger input for each channel
- Remote Terminal features
  - Programmable illegalization of RT commands
  - Busy bit programmable on a sub-address basis
  - 16-bit time-tag option with options of 2, 4, 8, 16, 32, or 64µsec/LSB based on internal clock
  - External time-tag clock input
  - Time-tag can be set via Synchronize with Data mode code
  - External Subsystem Flag input
- Monitoring Terminal features
  - Selective message monitor mode, use for selecting monitoring based on RT address, Transmit/Receive bit, and Sub-address
  - Simultaneous RT and monitor modes The RT address for each channel can be set by software

A backplane configuration input is provided for each channel that can cause the RT address to be set by subset of the TTL discrete digital I/O lines. To meet the MIL-STD-1760 First Response requirement of an RT response within 150 msec, one of the MIL-STD-1553 channels initializes as an RT with the Busy status word bit set. This requires that the MIL-STD-1553 channel be configured to set the RT address in hardware.

Curtiss-Wright Controls' driver software for the SVME/DMV-184's MIL-STD-1553 channels provides a flexible, easy to use, and robust application programming interface (API). The driver supports BC, RT, and MT modes of operation, and offers a high degree of compatibility to the proven software driver provided for Curtiss-Wright Controls' popular PMC-601 MIL-STD-1553 module. Source code is provided for user reference. The MIL-STD-1553 driver for the SVME/DMV-184 is sold separately from the hardware and the SVME/DMV-184 BSP. See separate data sheet for details.



Table 3: 184 Timing Resources

Timer	Implementation	Type	Size	Tick Rate / Period	Maximum Duration
PowerPC Time Base Register	One per CPU	Free Running Counter	64-bit	125MHz/8nsec	4,676 yrs
PowerPC Decrementer	One per CPU	Presettable, Readable Downcounter	32-bit	125MHz/8nsec	34.35 sec
General Purpose #0-7	8640 MPIC	Presettable, Readable Downcounter with auto-read and stop options	31-bit	62.5MHz/16nsec	34.36 sec
RTC Alarm	Real-time Clock	Alarm Interrupt	-	-	-
Watchdog Timers (1 per CPU)	Core functions FPGA	Presettable, Readable Downcounter with interrupt or reset on terminal count	25-bit	1MHz/1usec	33.55 sec
System Timers #1-6	Core functions FPGA	Presettable, Readable Downcounter with interrupt on terminal count	32-bit	50MHz/20nsec	85.9 sec

Real-Time Clock (RTC)

A Maxim/Dallas Semiconductor DS3231 RTC chip provides the RTC function. It contains registers for century, year, month, day, hours, minutes, and seconds. The RTC is capable of generating alarm interrupts. The RTC draws its power from an on-board power supply. In the event of loss of backplane +5V power, the RTC will automatically switch over to draw power from the +5 standby.

Extensive Timing Resources

The SVME/DMV-184 provides a large number of timing resources to facilitate precise timing and control of system events. See Table 3 for a list of available timers.

Avionics Watchdog Timers

The SVME/DMV-184 provides a watchdog timer for each of the two processor cores. Each watchdog timer is a pre-settable down-counter with a resolution of 1µsec. Time-out periods from 1msec to 32 seconds can be programmed. Initialization software can select whether a watchdog exception event causes a software interrupt, a processor reset, a card reset or a system reset. Once enabled to cause a reset, the watchdog cannot be disabled. For development and maintenance purposes, a backplane signal can be asserted to disable all watchdog interrupts. A watchdog event indicator discrete signal is output to the backplane.

The watchdog timer can be used in two ways. As a standard watchdog timer, a single time period is programmed which defines a maximum interval between writes to the watchdog register. For increased system integrity, the watchdog can optionally be configured to operate in "Avionics" mode whereby a minimum interval between writes to the watchdog register is also enforced in other words (writing to the watchdog register) too soon or too late causes an exception event.

General Purpose DMA Controllers

The MPC8640 provides a four-channel DMA controller that is available for general purpose use. The DMA controller can be used for transferring blocks of data between the SDRAM, flash memory, device bus peripherals and the PCI busses. The DMA controllers support direct and descriptor-driven chained operation, and can support source and destination striding. The DMA controllers also feature a bandwidth management feature to allow the user to control the distribution of bandwidth between the four DMA channels.

For transferring data over VME at high-speeds, the optional Tundra® Tempe VME interface chip provides a two-channel DMA engine that can be programmed to employ VME 2eSST block transfer cycles.

VME Interface

The SVME/DMV-184 is equipped with a VME master/slave interface that supports the VME64x, 2eVME, and 2eSST protocols. The interface is implemented with the Tundra Tsi148 PCI/X to VME bridge. The Tsi148 supports the newest 2eSST VMEbus transfer protocol offering the maximum possible VME performance, while retaining full backwards compatibility with legacy VME systems. The VMEbus can be mapped into the memory space of the MPC8640, and similarly transfers from VME can be destined for the SVME/DMV-184 local SDRAM. The Tsi148 features internal DMA engines to move data between local memory and the VMEbus.





Table 4: 184 PMC/XMC Specifications

Function	Site 1	Site 2
Location	Top of card	Bottom of card
PCI Interface	PCI-X 64-bit 66MHz via 4-lane PCIe/PCI bridge	PCI-X 64-bit 100MHz via 4-lane PCIe/PCI bridge
PCIe interface	N/A	Up to 8-lane per VITA 42.3 2GB/s peak simultaneous transmit and receive
Differential Routing	100 Ohm differential on selected pairs, 50 Ohm nominal	
VIO	Jumper select for 3.3V or 5V	3.3V operation only
3.3V Power	Configuration option for power to be provided from on-board PSU. Standard product variants - power is routed from backplane 3.3V. On-board PSU, 13W maximum to any one site. 20W total maximum. The 3.3V is sequenced with the main board power.	
5.0V Power	Drawn from backplane 5.0V 20W maximum to any one site, 30W maximum total. The 5V is sequenced with the main board power.	

Note:
The 184 is specified with two 10W PMCs for level 100 air-cooled and level 200 conduction-cooled running with the maximum processor and memory configuration. Consult factory for other configurations.

XMC/PMC Sites

The SVME/DMV-184 is equipped with two mezzanine sites, with one capable of supporting IEEE 1386 PMC or VITA 42.3 XMC modules. The two PMC sites interface to other system elements via 64-pins of back panel I/O per site. The placement of the PMC sites allows the use of single width PMC modules.

PMC site 2 (closer to bottom of card) is served by its own dedicated 64-bit, 100MHz-capable PCI-X bus providing a peak bandwidth to memory of 800MB/s. High-performance PMC modules such as networking or graphics modules can operate at 100Mhz independent of the speed at which the PMC module in PMC site 2 operates. This PMC site also supports the XMC PN5 connector and has a x8 lane PCIe connection to the MPC8640.

PMC site 1 (closer to top of card) is served by a 64-bit, 66MHz PCI-X bus providing a peak bandwidth to memory of 533MB/s.

I/O routing is done in accordance with ANSI/VITA 35-2000 specification, such that I/O of PMC site 1 is routed to the P0 connector, while that of PMC site 2 is routed to A and C rows of the P2 connector. Front panel I/O is supported as a standard feature on air-cooled cards and, on a special order basis, for conduction-cooled cards.

The SVME/DMV-184 conforms to the IEEE 1386/1386.1 requirement for a component keep-out area at the front of the PMC site for connectors or high components. Each PMC site uses 3.3V signaling, with PMC site 1 being 5V tolerant and PMC site 2 being 3.3V tolerant only. No PMC keying is provided. The VIO voltage to PMC site 1 is selectable via pushon jumpers.

PMC Power Routing

The PMC sites are provided with 5V, 3.3V, +12V, and -12V power from the VMEbus backplane. The SVME/DMV-184 provide the option to power PMC sites from the on-board 3.3V power supplies (consult factory).

Conduction-cooled PMC Modules

To support the industry drive to open standards on conduction-cooled cards, the PMC site mechanical interfaces follow the VITA 20- 2001(R2005) conduction-cooled PCI Mezzanine Card (PMC) standard. To optimize the thermal transfer from PMC modules to the base card the standard SVME/DMV-184 thermal frame incorporates both the Primary and Secondary thermal interfaces as defined by VITA 20-2001.

The combination of the secondary thermal interfaces, the mid-plane thermal shunt, and Curtiss-Wright Controls' TherMax™ thermal frame design provides optimum cooling for conduction-cooled PMC modules, allowing for higher power PMCs and/or increased long-term reliability through lower component temperatures.

Status Indicators and Controls

The SVME/DMV-184 SBC provides run/fail status by asserting a backplane signal and illuminating a red front panel LED in the event the diagnostics detect a card failure. There are also two software controlled green LEDs that the application can use to indicate status of each CPU core independently. A card reset signal is available on the backplane connectors and on the front panel connector on air-cooled cards. The front panel cable for the



SVME/DMV-184 includes a push button switch that interfaces to this signal to allow the card to be reset without doing a full system reset.

COP Emulator Interfaces

The SVME/DMV-184 can be optionally fitted with a connector on the rear of the PWB to provide access to the MPC8640 COP interface. This is a low profile connector that when installed intrudes into the keep-out space between cards.

Temperature Sensors

The SVME/DMV-184 provides temperature sensors to measure board and processor temperatures. There is a sensor at each edge of the card, one sensor in close proximity to the processor and one sensor to directly measure the die temperature of the MPC8640 using its thermal diode feature. The sensors can be read by software, and they may be configured to generate an interrupt in case of an over temperature condition.

Designed for Harsh Environments

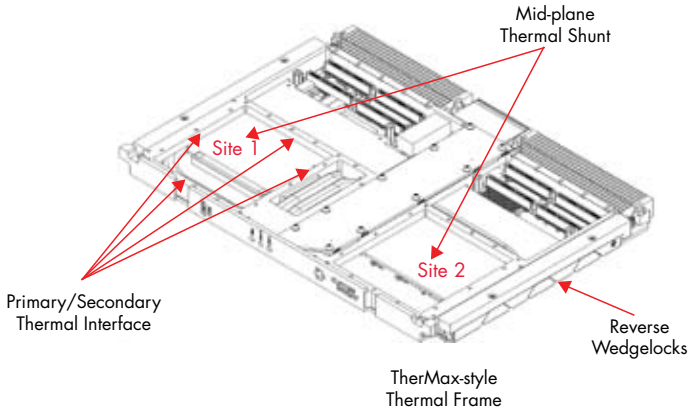
To cost-effectively address a diverse range of military/aerospace applications, the SVME/DMV-184 is available in a range of ruggedization levels, both air- and conduction-cooled. All versions are functionally identical, with air-cooled versions (SVME) available in Curtiss-Wright Controls ruggedization levels 0 and 100, and conduction-cooled versions (DMV) in levels 100 and 200. Air-cooled level 200 is available on a special order basis. Curtiss-Wright Controls' standard Ruggedization Guidelines define the environmental tolerance of each ruggedization level (see Curtiss-Wright Controls Ruggedization Guidelines factsheet for more information).

Enhanced Thermal Management for Conduction-Cooled Applications

For those demanding application environments that require conduction-cooling, the SVME/DMV-184 uses a combination of thermal management layers within the Printed Wiring Board (PWB) and an aluminum thermal frame that provides a cooling path for the PMC sites and for high-power components such as the processors, caches, and bridge device. The DMV-184 thermal frame employs a number of innovative design techniques to keep the temperature rise of the electronic components to a minimum, thus increasing the long-term reliability of the product:

- Heat-pipe transfers processor heat to both card edges
- Provision of both primary and secondary thermal interfaces on PMC sites
- Mid-plane thermal shunts for mezzanine sites
- TherMax design approach
- Full-width thermal interface to chassis slot wall

Figure 3: Representative Thermal Frame



Mid-plane Thermal Shunts for PMCs

To optimize the conduction-cooling of high-performance, high-power PMC modules such as graphics or networking PMCs, the DMV-184 thermal frame incorporates mid-plane thermal shunts for the PMC sites. High-power PMCs can include a mating cooling surface on the PMC module to contact the mid-plane thermal shunt. By taking advantage of the thermal shunt, suitably designed PMC modules can significantly lower the heat rise from the DMV-184 card edge to the PMC components. The midplane thermal shunt does not impinge on the VITA 20- allowed component height.

Note: The mezzanine site 1 keep-out area is restricted due to the heat pipe used to cool the 864x processor.

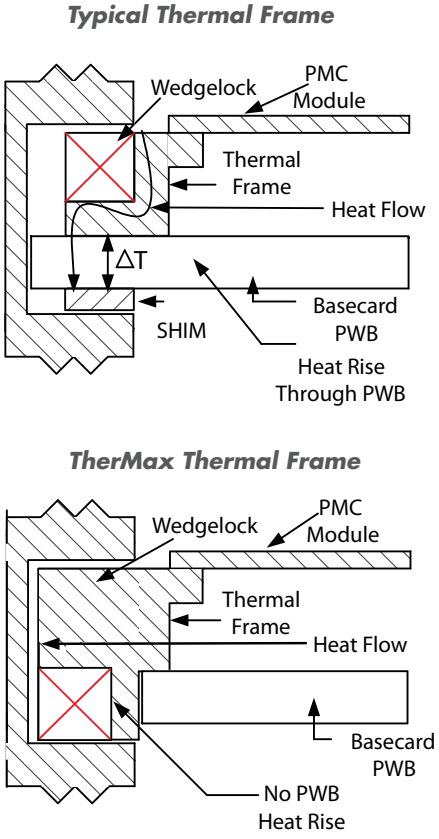


TherMax-style Thermal Frame

A TherMax thermal frame provides an unbroken metallic path from the PMC sites and shunted components to the back- side cooling surface of the card therefore minimizing the temperature rise to these devices. In comparison, a typical thermal frame simply sits on top of the PWB and forces heat to flow through the PWB, which has a high thermal resistance compared to aluminum.

Figure 4: TherMax diagram

A TherMax thermal frame eliminates the PWB heat rise inherent in a standard thermal frame

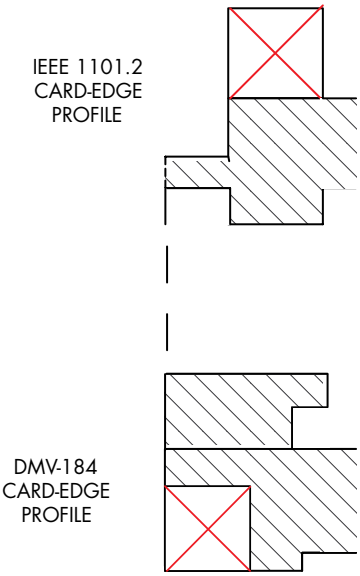


Full-width Thermal Interface to Back-side Slot Wall

To minimize the temperature rise from the mating slot wall of conduction-cooled enclosures to the back-side thermal interface region of the DMV-184, the DMV-184 thermal frame maximizes the thermal interface area by extending the frame to the full width of the card, as illustrated in Figure 9. This deviation from the IEEE 1101.2 standard, which calls for the thermal frame to be notched for compatibility with card guides in standard air-cooled chassis, has the benefit of lower card operating temperatures and increased long term reliability. During test and integration activities where it may be desirable to install a conduction-cooled SVME/DMV-184 into an air-cooled card-cage, this can normally be accomplished simply by removing the card guides.

Figure 5: Card-edge Profile Deviates from IEEE 1101.2

DMV-184 Card-Edge Profile is Optimized to Provide a Full-width Thermal Interface to the Back-side Slot Wall





Software Support

Continuum Software Architecture (CSA)

The SVME/DMV-184 is supported by a suite of firmware, RTOS BSPs, communication libraries and signal processing libraries. The CSA is Curtiss-Wright Controls' suite of firmware and BSP APIs common to SBCs (VME, ConpactPCI and VPX) and multi-processor boards. Developers of mixed systems will find a common set of features and software interfaces for all future processing products from Curtiss-Wright Controls.

Continuum Firmware Monitor

The monitor provides a command line interface over a serial port or Ethernet to allow a user to perform a variety of system integration activities with the card. The monitor provides debug and display commands, diagnostic results display and exerciser controls, non-volatile memory programming and declassification and programming of parameters used to control boot-up and diagnostics.

Continuum Built-in Test (BIT)

BIT is a library of diagnostic routines to support Power-up BIT (PBIT), Initiated BIT (IBIT), and Continuous BIT (CBIT), designed to provide 95% fault coverage.

Operating System Software

The SVME/DMV-184 is supported with an extensive array of software, which cover all facets of developing application code for the board. Users have the option of choosing to develop with a variety of operating systems and development tools. The following operating systems are supported or planned for the SVME/DMV-184:

- Wind River® VxWorks® 6.x, Workbench® 2.x from Wind River® (Part number DSW-184-006-CD)
- Wind River® GPP Linux® 3.0 BSP from Curtiss-Wright Controls (Part number DSW-184-6300-LNX)
- INTEGRITY® from Green Hills®. Consult factory for availability.
- LynxOS® 5.0 from LynuxWorks™. Consult factory for availability.

Continuum Inter-Processor Communications (IPC) Library

The IPC Library is a library of functions designed to enable high-performance, low-latency message passing. IPC allows processors to communicate task-to-task, on the same card over local interconnect or between boards over a system level interconnect. IPC supports several transport mechanisms including PCI/PCIe and StarFabric. Applications developed on CHAMP-AV2/3/4/6 or SVME/DMV-183/184/185 will port to the SVME/DMV-184 with no changes related to the IPC layer.

Continuum IPC™ provides low-overhead block data transfers, segmented block data transfers and signaling between processors to assist in high-bandwidth data movement.

See the Continuum IPC Library data sheet for more details.

Continuum Vector™ Library

The SVME/DMV-184 derives its floating-point performance from the pair of AltiVec Vector processing units within the MPC8460D processor. The Continuum Vector Library provides over 200 functions optimized for the AltiVec unit, providing the foundation for most signal processing applications. Continuum Vector provides the user with a choice of APIs with support for the Vector Signal Image Processing Library (VSIPL, Core Lite) standard and the popular API established by Floating Point Systems Inc.

See the Continuum Vector data sheet for detailed information.



Cables

To gain access to the I/O signals of the SVME/DMV-184, the following cable sets can be used.

Table 5: SVME/DMV-184 Cable Set

Cable Number	Connects To	Description
CBL-184-FPL-000	Front panel in all pin-out modes	Front panel break-out cable for SVME-184 providing two 9-pin D connectors for EIA-232 ports, one RJ-45 jack for GbE, one USB type A receptacle, and one push-button reset switch.
CBL-182-P0-000	P0 in all pin-out modes	P0 break-out cable for 182/183/184 in all pin-out modes. Provides RJ-45 Jack for 10/100/1000Base-T Ethernet interface, 25-pin female D connector for TTL discretes, USB type A receptacle for USB port 2, and PMC I/O on 78-way connector. Also includes reset switch.
CBL-183-P2-000	P2 in pin-out Mode 0 (no IPM)	P2 break-out cable for 182/183/184 in pin-out Mode 0. Provides separate branches and connectors for two 9-pin D connectors for EIA-232 ports, RJ45 jack for Ethernet, and 18x-standard 78-way connector for PMC I/O.
CBL-SBC-P2-000	P2 in pin-out Mode 1	P2 break-out cable for 179/181/182/183/184 in pin-out Mode 1 with separate branches and connectors for 8-bit SCSI interface (using 68-way 16-bit SCSI connector), two EIA-232 ports, EIA-422/485 ports 3 and 4, and PMC I/O on 78-way connector. (Note - no Ethernet branch)
CBL-SBC-P2-002	P2 in pin-out Mode 4	P2 break-out cable for 179/181/182/183/184 in pin-out Mode 4 with separate branches and connectors for 16-bit SCSI interface (using 68-way 16-bit SCSI connector), two EIA-232 ports, EIA-422/485 port 3, and PMC I/O on 78-way connector. (Note - no Ethernet branch)
CBL-183-P2-006	P2 in pin-out Mode 6	P2 breakout connector for 181/182/183/184 in pin-out Mode 6. Provides two 9-pin D connectors for EIA-232 ports, four 25-pin D connectors for EIA-422/485 ports, RJ45 jack for Ethernet, and 18x-standard 78-way connector for PMC I/O.
CBL-183-P2-009	P2 in pin-out Mode 8 and 9	P2 break-out for 182/183/184 in Mode 8 (single MIL-STD-1553) and Mode 9 (dual MIL-STD-1553). Provides separate branches and connectors for the transformer-coupled MIL-STD-1553 signals, MIL-STD-1553 configuration inputs, two EIA-232 ports, two EIA-232/422/485 ports, RJ-45 jack for Ethernet, and PMC I/O on 18x-standard 78-way connector. Connectors for MIL-STD-1553 signals are 3-lug Twinax bulkhead jack connectors, Trompeter part number BJ79-47.
CBL-182-P2-010	P2 in pin-out Mode 10	P2 break-out for 182/183/184 in Mode 10. Provides separate branches and connectors for two EIA-232 ports, two EIA-232/422/485 ports, GbE, and PMC I/O on 78-way connector.
CBL-183-P2-011	P2 in pin-out Mode 11	P2 break-out cable for 183/184 in Mode 11. Provides separate branches and connectors for one MIL-STD-1553 channel, MIL-STD-1553 configuration inputs, two EIA-232 ports, two EIA-232/422/485 ports, GbE, two SATA ports, and PMC I/O on 78-way connector. Connectors for MIL-STD-1553 signals are 3-lug Twinax bulkhead jack connectors, Trompeter part number BJ79-47.
CBL-183-P2-012	P2 in pin-out Mode 12	P2 break-out cable for 183/184 in Mode 12. Provides separate branches and connectors for two EIA-232 ports, two EIA-232/422/485 ports, GbE, two SATA ports, and PMC I/O on 78-way connector.
CBL-183-P2-236	P2 in pin-out Mode 6 and with StarLink PMC	P2 breakout cable for 182/183/184 in pin-out Mode 6 with PMC-230/233 StarLink module. Separate branches and connectors for two EIA-232 ports, four EIA-422/485 ports, one 10/100MB/s Ethernet branch terminating in an RJ-45 bulkhead-mount plug, and eight branches with StarFabric connections (4x Tx, 4x Rx) terminating in RJ-45 bulkhead-mount plugs. All branches a minimum length of 18".
CBL-183-P2-2310	P2 in pin-out Mode 10 and with StarLink PMC	P2 breakout cable for 182/183/184 in pin-out Mode 10 with PMC-230/233 StarLink module. Separate branches and connectors for two EIA-232 ports, two EIA-422/485 ports, 1GbE branch terminating in an RJ-45 bulkhead-mount jacks, and eight branches with StarFabric connections (4x Tx, 4x Rx) terminating in RJ-45 bulkhead-mount jacks. All branches a minimum length of 18".
CBL-184-JTAG	184 test connector	Connects to 184 test connector and provides standard 2x8 .1" pitch header for JTAG/COP emulators



Power Consumption

See Table 6 for power consumption figures for the SVME/DMV-184 standard product variant basecards. Power consumption increases as operating temperature rises. Table 6 figures are for the highest rated operating temperature while executing a test application generating CPU processing loads and data traffic representative of a typical customer application. The SVME/DMV-184 is designed to require only 5V for normal operation. It does not require 3.3V or +/-12V for normal operation. These voltages are routed to the PMX/XMC sites

Table 6: Variant Power Requirements

Ruggedization Level	Part Number	Reference Configuration	Typical Power (W)
Level 0 Air-cooled	SVME-184-0300	MPC8640 @ 1.25GHz, 1GB DDR2	33
	SVME-184-0500	MPC8640D @ 1.0GHz, 2GB DDR2	39
	SVME-184-0900	MPC8640D @ 1.25GHz, 2GB DDR2	46
Level 100 Air-cooled	SVME-184-1300	MPC8640 @ 1.25GHz, 1GB DDR2	37
	SVME-184-1500	MPC8640D @ 1.0GHz, 2GB DDR2	43
	SVME-184-1900	MPC8640D @ 1.25GHz, 2GB DDR2	53
Level 200 Conduction-cooled	DMV-184-2300	MPC8640 @ 1.25GHz, 1GB DDR2	37
	DMV-184-2500	MPC8640D @ 1.0GHz, 2GB DDR2	43
	DMV-184-2900	MPC8640D @ 1.25GHz, 2GB DDR2	53

Notes:
1. Typical power is measured power while running stress test software that exercises CPU and board functions including AltiVec. The actual power consumption observed will vary by application.
2. For thermal design considerations, Curtiss-Wright Controls recommends adding 5% to the typical power consumption figures. For power supply sizing, Curtiss-Wright recommends adding 20% to the typical power consumption figures.

See Table 7 for power consumption figures for the IPMs available with the SVME/DMV-184.

Table 7: IPM Power Requirements

Ruggedization Level		Typical Power (W)
All	Mode 1 IPM	2
All	Mode 4 IPM	2
All	Mode 6 IPM	2
All	Mode 9 IPM with both MIL-STD-1553 channels at 50% Tx time	5
All	Mode 9 IPM with both MIL-STD-1553 channels at 25% Tx time	3
All	Mode 10 IPM	1
All	Mode 11 IPM with MIL-STD-1553 channel at 50% Tx time	4
All	Mode 11 IPM with MIL-STD-1553 channel at 25% Tx time	3
All	Mode 12 IPM	2

Note:
1. For thermal design considerations, Curtiss-Wright Controls recommends adding 5% to the typical power consumption figures. For power supply sizing, Curtiss-Wright Controls recommends adding 20% to the typical power consumption figures.

Table 8: Voltage Requirements

Ruggedization Level	Voltage	Typical Power (W)
All	+5V	See Table
All	+/- 12V, routed to PMC sites	0
All	+5V Standby	50ma

Note:
1. For thermal design considerations, Curtiss-Wright Controls recommends adding 5% to the typical power consumption figures. For power supply sizing, Curtiss-Wright Controls recommends adding 20% to the typical power consumption figures.





Specifications

The tables below show the power, dimensions and weight characteristics of the card.

Table 9: SVME/DMV-184 Dimensions and Weight

Dimensions and Weight		
Option	Dimensions	Weight (grams)
Air-cooled (SVME)	per ANSI/VITA 1-1994	500
Conduction-cooled (DMV)	per IEEE 1011 .2**	750
IPM		39 (max)

Notes:
1. The air-cooled format is designed to fit chassis with 0.8" slot pitch.
2. Air-cooled cards available in temperature ranges 0 and 1.*
3. Conduction-cooled cards available in temperature ranges 1 and 2.
4. Refer to Ruggedization Guidelines factsheet for more information.

Table 10: SVME/DMV-184 Cooling Requirements

Cooling Air Requirements		
Configuration	Temperature Range	Air-Flow
Dual-core 1.25GHz	-40°C to 71°C	15 CFM

Note:
1. Air-flow is specified for sea-level conditions. The temperature refers to the inlet temperature at the card. The air-flow specifications are for worst case (highest power) conditions, without any PMC/XMCs installed. Curtiss-Wright Controls can supply additional recommendations for specific power/temperature/altitude scenarios and pressure drop characteristics of the SVME/DMV-184 support the design and testing of cooling subsystems.

Ruggedization Levels

Air-cooled cards are available in levels 0, 100.

Conduction-cooled cards are available in levels 100 and 200. Note that level 200 is a standard product option, where level 100 is via customer specific request.

See the Curtiss-Wright Controls Ruggedization Guidelines factsheet for more information.



Ordering Information

SVME/DMV - 184 - xyzz

- I/O Mode IPM options: 0, 1, 6, 9, 10, 11, 12
- Core Processing:
  - 3: SC @ 1.25GHz, 1GB SDRAM, 512MB flash
  - 5: DC @ 1.0GHz, 2GB SDRAM, 512MB flash
  - 8: Custom configuration
  - 0-2, 6, 7: Reserved
  - 9: DC @ 1.25GHz, 2GB SDRAM, 512MB flash
  - SC = Single-core
  - DC = Dual-core
- Ruggedization Level:
  - 0: 0° to 50°C
  - 1: -40° to 71°C (only for air-cooled)
  - 2: -40° to 85°C
  - 4: Custom environment
- Model Number: 184
- Cooling Method:
  - SVME – air-cooling
  - DMV – conduction-cooling

Notes:
- Contact factory for other variants
- All others available as customer specific variants with CM Service
- Level 100 conduction-cooled will be available as customer specific variants

Warranty

This product has a one year warranty.

Contact Information

To find your appropriate sales representative, please visit:

Website: www.cwcembedded.com/sales

Email: sales@cwcembedded.com

Technical Support

For technical support, please visit:

Website: www.cwcembedded.com/support1

Email: support1@cwcembedded.com

The information in this document is subject to change without notice and should not be construed as a commitment by Curtiss-Wright Controls Embedded Computing. While reasonable precautions have been taken, Curtiss-Wright Controls assumes no responsibility for any errors that may appear in this document. All products shown or mentioned are trademarks or registered trademarks of their respective owners.

© Copyright 2008, Curtiss-Wright Controls
All Rights Reserved. MKT-DS-EC-SVME/DMV-184-030210v6

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP