Rugged TVME5106/7-R Single Board Computers

The TVME5106/7-R are extended temperature Motorola Power Plus II Single Board Computers enhanced to withstand shock, vibration and temperature extremes in excess of the original Motorola SBC specification. Conformally coated, this rugged solution is designed for use in critical embedded systems deployed in the most demanding military and industrial environments.

Key Environmental Features:

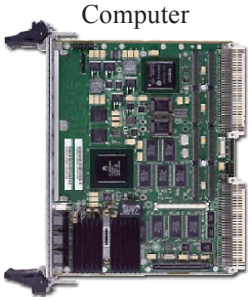
- **Qualified to environmental standards of MIL STDs 810F, 901D and 167, and 461**
- **Shock: MIL STD 810F, 45g's at half- sine 20 ms**
- **Vibration: MIL STD 167, 5g's at 50 to 500Hz sine and .05g²/Hz at 15Hz to 2KHz random**
- **Conformal Coating per MIL STD I-46508, urethane**
- **Operating temperature: -40°C to +71°C**
- **Altitude: -1,500 ft to 11,000 ft**
- **Humidity: 5% to 95% non-condensing with resistance to salt fog**
- ***Ask about our extensions to any environmental standards***

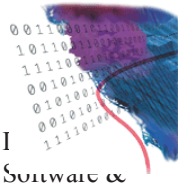
TVME5106-R and 5107-R Features:

- MPC755 microprocessor with 32KB/32KB L1 cache
- 1MB of secondary backside cache
- 100 MHz front-side bus
- Up to 512MB of on-board ECC SDRAM—expandable up to 1GB with optional RAM500 memory expansion modules
- 17MB Flash memory
- Dual IEEE P1386.1 compatible 32/64-bit PMC expansion slots
- 64-bit PCI expansion mezzanine connector allowing up to four more PMCs
- Dual 16550 compatible async serial ports
- Dual 10BaseT/100BaseTX Ethernet
- 32KB NVRAM and time-of-day clock with replaceable battery backup
- Four 32-bit timers and one watchdog timer
- On-board debug monitor
- Single VME slot even when fully configured with two PMC modules and both add-on memory mezzanines

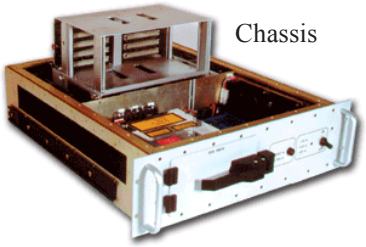
COTS Systems By Design

Single Board Computer





I Software & Documentation



Chassis

Storage

I/O

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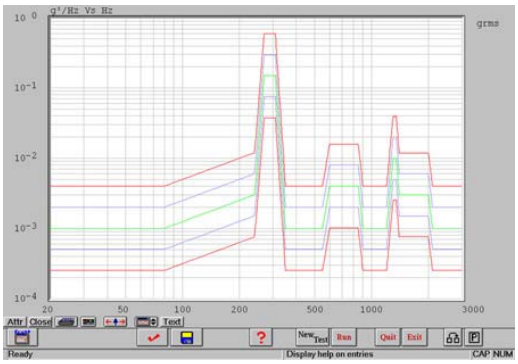
SBCs built with surface mount technology can often meet the demands of rugged environments. Motorola SBCs can be modified to meet environmental conditions as specified by MIL-STD-810. The boards are physically modified to pass 810 Shock and Vibration testing and electrically modified to meet front panel isolation requirements. ACT/Technico's PMC Modules can also be modified to meet the same specifications.

ACT/Technico can help you extend the application of Motorola® COTS hardware by making mechanical enhancements and providing test services and qualification data.

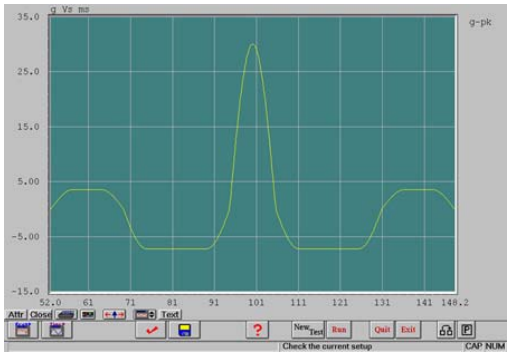
Board Description

The rugged TVME5106/7 delivers high levels of computing power with Motorola's PowerPlus II architecture. This rugged solution offers superior shock and vibration protection and is conformal coated. The TVME 5106/7-01xx can provide excellent performance in a wide array of military applications including fixed ground installations such as radar, communications, and artillery support equipment in facilities with limited protection from the elements. Mobile ground applications include vehicle mounted equipment supporting mission critical communications, tactical artillery support, radar, ground penetrating



Sample random vibration test profile

radar and data collection. In ground applications, suitably applied conformal coatings resist the effects of dust, sand and other contaminments. Ship borne applications for the rugged TVME5106/7 expose equipment to the combined effects of shock, vibration, and atmospheric contaminants — including salt mist. In addition to the day-to-day pounding a ship propulsion control system endures, ship borne applications must survive shock levels resulting from the effects of conventional or nuclear weaponry. Rotary winged aircraft can rely on the rugged TVME5106/7 to perform mission critical tasks in demanding environments.

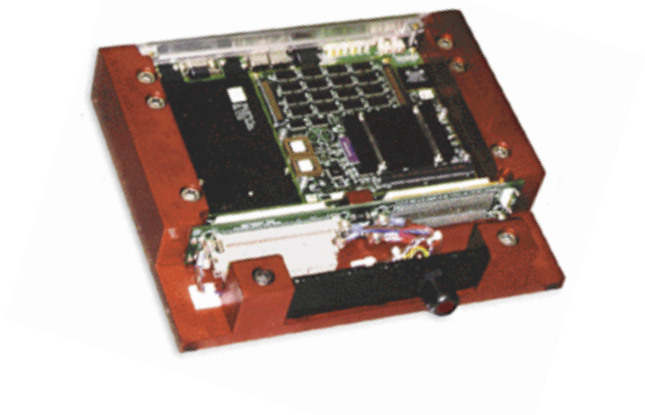


Sample shock test profile

ACT/Technico Temperature Cycle Chamber

Testing

ACT/Technico's ruggedized SBC products are tested according to MIL-STDs 810F, 883, 467, 901D and 167; NEBS, and others as applicable. Complete documentation packages address product qualification, validation and manufacturing processes. ACT/Technico warrants all ruggedized products and specification extensions for use in the target application environment.



Baseline Motorola MME5106/7 Specifications

MVME5100 Processor Module

Processors

Microprocessor:	MPC755 class
Clock Frequency:	400 MHz (5106) or 500 MHz (5107)
On-chip Cache (I/D):	32K/32K
Secondary Cache:	1MB

Main Memory

Type: PC100 ECC SDRAM with 100 MHz bus
Capacity: Up to 512MB on-board, expandable to 1GB with RAM500 memory mezzanines

Single Cycle Accesses:	10 Read/5 Write
Read Burst Mode:	7-1-1-1 idle; 2-1-1-1 aligned page hit
Write Burst Mode:	4-1-1-1 idle; 2-1-1-1 aligned page hit
Architecture:	64-bit, single interleave

Flash Memory

Type: EEPROM, on-board programmable
Capacity: 1MB via two 32-pin PLCC/CLCC sockets; 16MB surface mount

Read Access (16MB port):	70 clocks (32-byte burst)
Read Access (1MB port):	262 clocks (32-byte burst)

NVRAM

Capacity: 32KB (4KB available for users)

Cell Storage Life:	50 years at 55° C
Cell Capacity Life:	5 years at 100% duty cycle, 25°C
Removable Battery:	Yes

VMEbus ANSI/VITA 1-1994 VME64 (IEEE STD 1014)
Controller: Tundra Universe
DTB Master: A16–A32; D08–D64, BLT
DTB Slave: A24–A32; D08–D64, BLT, UAT
Arbiter: RR/PRI
Interrupt Handler/Generator: IRQ 1–7/Any one of seven IRQs
System Controller: Yes, jumperable or auto detect
Location Monitor: Two, LMA32

Counters/Timers
TOD Clock Device: M48T37V
Real-Time Timers/Counters: Four, 32-bit programmable
Watchdog Timer: Time-out generates reset

Ethernet Interface
Controller: Two Intel 82559ER
Interface Speed: 10/100Mb/s
PCI Local bus DMA: Yes, with PCI burst
Connector: One routed to front panel RJ-45, one routed to front panel RJ-45 or optionally routed to P2, RJ-45 on MVME761

Asynchronous Serial Ports
Controller: 16C550C UART
Number of Ports: Two, 16550 compatible
Configuration: EIA-574 DTE
Async Baud Rate, bps max.: 38.4K EIA-232, 115Kbps raw
Connector: One routed to front panel RJ-45, one on planar for development use

Dual IEEE P1386.1 PCI Mezzanine Card Slots (PMC)
Address/Data: A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors
PCI Bus Clock: 33 MHz
Signaling: 5V
Power: +3.3V, +5V, ±12V; 7.5 watts maximum per PMC slot
Module Types: Two single-wide or one double-wide, front panel or P2 I/O

PCI Expansion Connector
Address/Data: A32/D32/D64
PCI Bus Clock: 33 MHz
Signaling: 5V
Connector: 114-pin connector located on the planar of the MVME5106/7

Power Requirements (not including power required by PMC or IMPC modules): 3.0 A typ @ +5 V; +12 V @ 8.0 mA typ.; –12 V @ 2.0 mA typ.

Board Size
Height: 233.4 mm (9.2 in.)
Depth: 160.0 mm (6.3 in.)
Front Panel Height: 261.8 mm (10.3 in.)
Width: 19.8 mm (0.8 in.)
Max. Component Height: 14.8 mm (0.58 in.)

Operating Systems and Kernels
MVME5100 supports booting a variety of operating systems:
Wind River Systems: VxWorks
Green Hills: Integrity
Multiple Partners: Linux

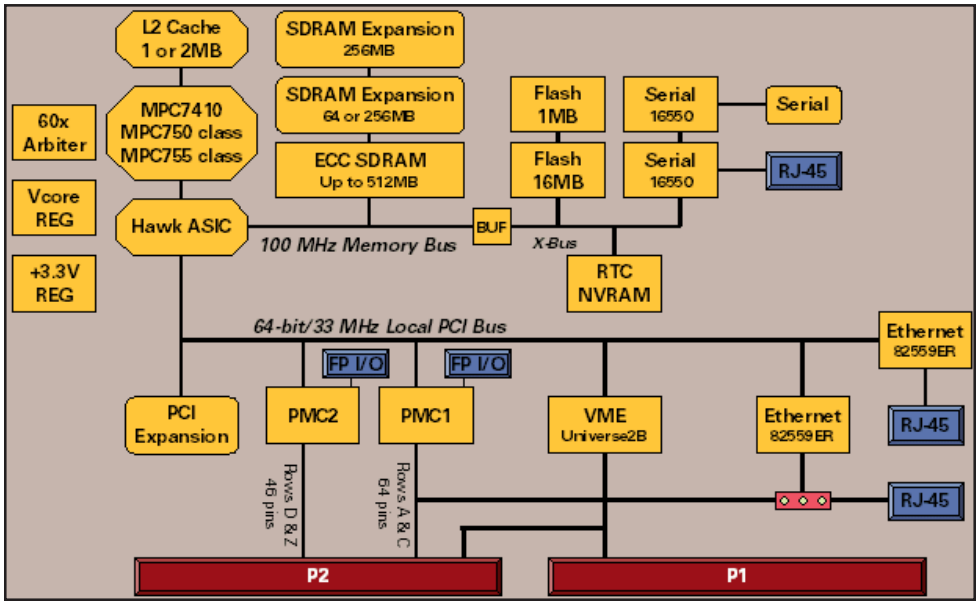
Firmware Monitor
Firmware must fulfill the traditional functions of test and initialization and provide operating system boot support. TheMVME5106/7 firmware monitor exceeds these requirements with a proven monitor from the embedded VME leader. It expands features like power-up tests with extensive diagnostics, as well as a powerful evaluation and debug tool for simple checkout or when high-level development debuggers require additional support. All this is included with the MVME5100 firmware; plus it supports booting both operating systems and kernels.

Electromagnetic Compatibility (EMC)
Intended for use in systems meeting the following regulations:
U.S.: FCC Part 15, Subpart B, Class A (non-residential)
Canada: ICES-003, Class A (non-residential)
This product was tested in a representative system to the following standards: CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class B; Immunity: EN55024

Safety
All printed wiring boards (PWBs) are manufactured with a flammability rating of 94V-0 by UL recognized manufacturers.

Demonstrated MTBF
(based on a sample of eight boards in accelerated stress environment)
Mean: 190,509 hours
95% Confidence: 107,681 hours

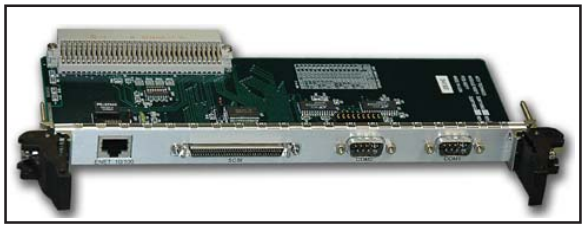
MVME5106/7 Block Diagram



Transition Modules

ACT/Technico offers single slot rear transition module solutions compatible with both 3-row and 5-row connectors.The following features are standard:

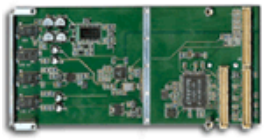
- 6U x 80mm form factor integral SCSI connector
- Four serial ports via RJ45 connectors (DTE/DCE jumpers on-board and modem support)
- Parallel port header
- Locking front panel-mount AUI connector
- SCSI Centronics connector, with removable SCSI termination resistor networks
- On-boardCentronics parallel port header
- LED indicators for SCSI termination and Ethernet power



PMC Modules

We offer a wide selection of PMC Modules. Some models can be modified to meet the above ruggedization specifications, such as the PMCStor and PMCDisk, Audio, SCSI, and various communications controllers.

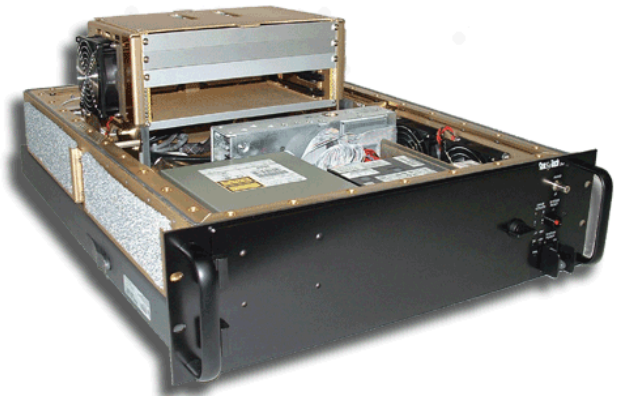
Solid State PMCDisk



Audio PMC

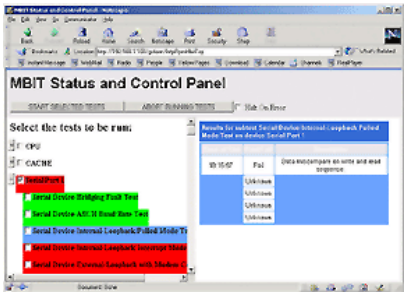
Complete Rugged System Solutions

ACT/Technico offers a complete line of rugged supporting products in form factors ranging from mezzanines to rear I/O to 3U and 6U boards. System level ruggedization and qualification services are available as pre-defined rugged systems. Specification extensions can be tailored for specific environments on all products. Visit www.acttechnico.com for additional information



MBIT GUI Web Based Diagnostics

This Built-In self-Test (BIT) tool provides a Web based control of Motorola's Built-in Test Diagnostic Software. It also provides a GUI based point and click test selection, and color coded test status with an automatic update. It is compatible with Netscape and Internet Explorer.



Order Information

Please use the part numbers below to order your rugged TVME5106/7-R. Standard part number includes conformal coating. available with either VME Scanbe front panel (-xxx1) or IEEE 1101 compatible front panel (-xxx3). For additional configurations, Transition Modules, PMCs, and any additional products, please refer to their datasheets, or call us for assistance.

Part Number	Description
TVME5106-114x-R	400 MHz MPC755, 128MB ECC SDRAM, 17MB Flash and 1MB L2 cache
TVME5106-115x-R	400 MHz MPC755, 256MB ECC SDRAM, 17MB Flash and 1MB L2 cache
TVME5106-116x-R	400 MHz MPC755, 512MB ECC SDRAM, 17MB Flash and 1MB L2 cache
TVME5107-214x-R	500 MHz MPC7410, 128MB ECC SDRAM, 17MB Flash and 2MB L2 cache
TVME5107-215x-R	500 MHz MPC7410, 256MB ECC SDRAM, 17MB Flash and 2MB L2 cache
TVME5107-216x-R	500 MHz MPC7410, 512MB ECC SDRAM, 17MB Flash and 2MB L2 cache
Documentation	
V510XA/IH	MVME510x-01xx Installation and Use
V510XA/PG	MVME510x-01xx Programmer's Reference Guide

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