Rugged TVME5500-R Single Board Computer

The TVME5500-R is a Motorola PowerPC Single Board Computer enhanced to withstand shock and vibration 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: 0°C to +55°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***

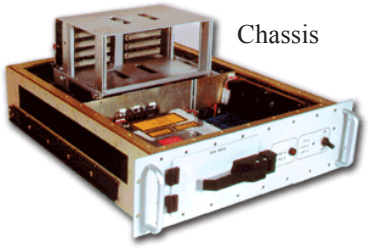
TVME5500-R Features:

- MPC7455 PowerPC® processor at 1 GHz
- 256KB of on-chip L2 cache and 2MB of L3 cache
- AltiVec™ coprocessor for high-performance computational applications
- 512MB of on-board 133 MHz SDRAM ECC memory and 512MB additional memory via a memory mezzanine card for a total of 1GB of memory
- Two banks of soldered Flash memory, 32MB and 8MB
- Dual independent 64-bit PCI buses and PMC sites with a bus speed of up to 66 MHz
- Gigabit Ethernet interface plus an additional 10/100BaseTX Ethernet interface
- 64-bit PCI expansion mezzanine connector allowing up to four more PMCs
- I/O compatibility with MVME51xx family
- Single VME slot even when fully configured with two PMC modules or one PMC module and an add-on memory mezzanine
- Support for processor PMCs (PrPMCs)

COTS Systems By Design

Single Board Computer

Design, Software & Documentation



Chassis

Storage

I/O

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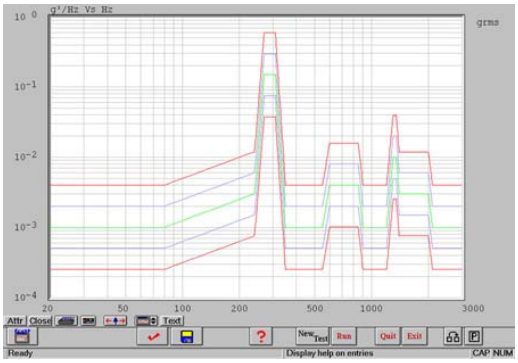
SBCs built with surface mount technology can often meet the demands of rugged environments. The Motorola SBCs can be modified to meet environmental conditions as specified by MIL-STD-810. The boards are physically modified to pass 810 Shock and Vibration testing and electrically modified to meet front 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

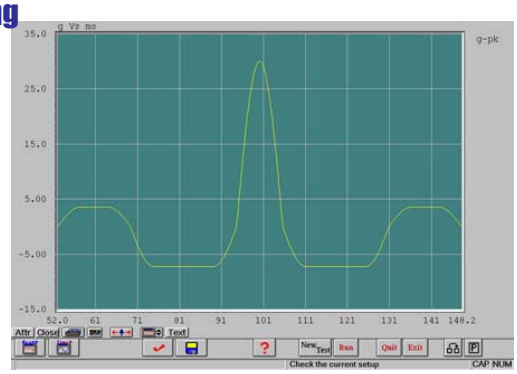
The TVME5500-R delivers high levels of computing power with Motorola's PowerPC architecture. This rugged solution offers superior shock and vibration protection and is conformal coated. The TVME5500-R can provide excellent performance in a wide array of military applications including fixed ground installations 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



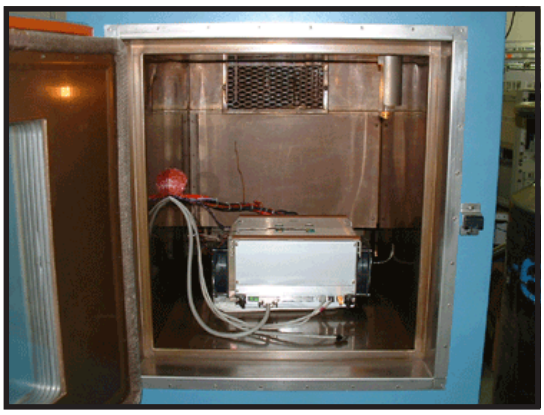
Sample random vibration test profile

radar and data collection. In ground applications, suitably applied conformal coatings resist the effects of dust, sand and other containments. Ship borne applications for the TVME5500-R 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 TVME5500-R to perform mission critical tasks in demanding environments.

Testing

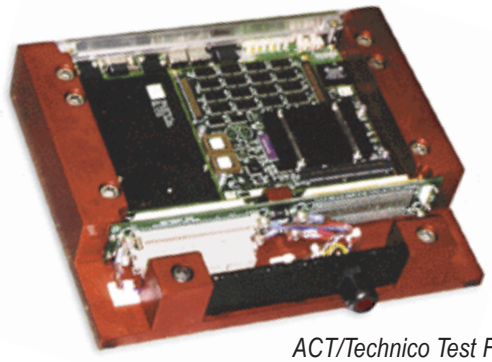


Sample shock test profile



ACT/Technico Temperature Cycle Chamber

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.



ACT/Technico Test Fixture

Baseline Motorola MVME5500 Specifications

MVME5100 Processor Module

Processors

Microprocessor:	MPC7455
Clock Frequency:	1 GHz
On-chip Cache (I/D):	32K/32K
On-chip L2 Cache:	256K
Secondary Cache:	2MB

System Controller: Marvell GT-64260B

Main Memory

Type: PC133 ECC SDRAM with 133 MHz bus
Capacity: Up to 512MB on-board, expandable to 1GB with add-on memory mezzanine. Note: If a PMC module is plugged into PMC slot 1, the memory mezzanine card cannot be used because the PMC module covers the memory mezzanine connector

Flash Memory

Type: EEPROM, on-board programmable
Capacity: 40MB total in two banks of 32MB and 8MB, both soldered
Write Protection: 32MB of surface-mount Flash is write-protectable via jumper

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 II
DTB Master:	A16–A32; D08–D64, SCT, BLT
DTB Slave:	A24–A32; D08–D64, BLT, UAT
Arbiter:	RR/PRI
Interrupt:	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 Interfaces

Port 1 Controller:	Two Intel 82544EI Gigabit Ethernet
Interface Speed:	10/100/1000 Mb/s
Connector:	Routed to front panel RJ-45
Port 2 Controller:	Controller integrated into GT-64260B system controller
Interface Speed:	10/100 Mb/s
Connector:	Routed to front panel RJ-45 or optionally routed to P2,RJ-45 on MVME761

Synchronous Serial Ports

Controller:	85230/8536
Number of Ports:	Two (IPMC761); one (IPMC712)
Configuration:	IPMC761: TTL to P2 (both ports), SIM configurable on MVME761;IPMC712: EIA-232 to P2
Baud Rate, bps max.:	2.5M sync, 38.4K async
Oscillator Clock Rate (PCLK):	10 MHz/5 MHz

Asynchronous Serial Ports

Controller:	Two 16C550C UARTs
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

Parallel Port

Controller:	PC97307
Configuration:	8-bit bi-directional, full IEEE 1284 support; Centronics compatible (minus EPP and ECP on MVME712M)
Modes:	Master only

Dual IEEE P1386.1 PCI Mezzanine Card Slots (PMC)

Address/Data:	A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors
PCI Bus Clock:	33/66 MHz
Signaling:	3.3V or 5V, configurable with keying pin
Power:	+3.3V, +5V, ±12V
Module Types:	Two single-wide or one double-wide, front panel or P2 I/O, PMC and PrPMC support

PCI Expansion Connector

Address/Data:	A32/D32/D64
PCI Bus Clock:	33 MHz
Signaling:	5V
Power:	3.3V, +5V, ±12V (16-bit mode)
Note:	16-bit SCSI operation precludes the use of some PMC slot 2 signals.

Power Requirements	**+5V ± 5%**
MVME5500-0163:	6.7 A typ., 8.0 A max.
MVME5500-0163 with memory mezzanine:	7.5 A typ., 9.0 A max.
MVME5500-0163 with IPMC712/761:	7.6 A typ., 9.2 A max.

Note: In a 3-row chassis, PMC current should be limited to 19.8 watts (total of both PMC slots). In a 5-row chassis, PMC current should be limited to 46.2 watts (total of both PMC slots).

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

MVME5500 supports booting a variety of operating systems:

Wind River Systems:	VxWorks
Green Hills:	Integrity
Multiple Partners:	Linux

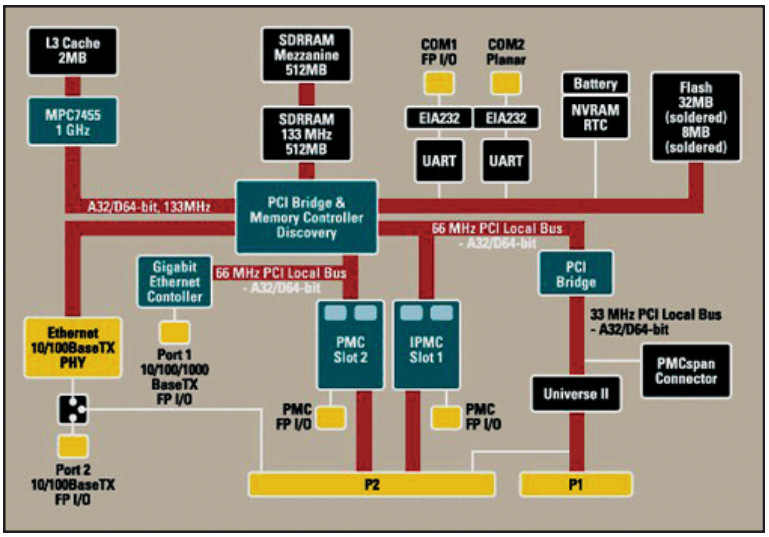
Electromagnetic Compatibility (EMC)

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.

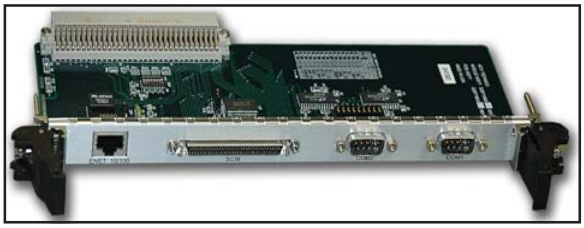
MVME5500 Block Diagram



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

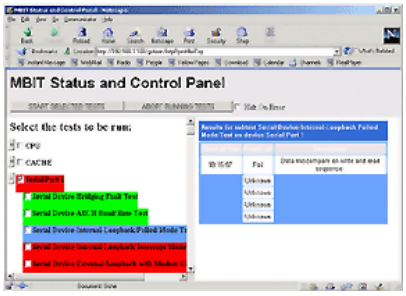
Audio PMC

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 TVME5500-R. Standard part number includes conformal coating. Choose between Scanbe or IEEE handles. For additional configurations, Transition Modules, PMCs, and any additional products, please refer to their datasheets, or call us for assistance.

Part Number	Description
TVME5500-0161-R	1 GHz MPC7455 PowerPC processor, 512MB SDRAM, Scanbe handles
TVME5500-0163-R	1 GHz MPC7455 PowerPC processor, 512MB SDRAM, IEEE handles

Documentation

Documentation is available for online viewing and ordering at http://www.motorola.com/computer/literature

www.acttechnico.com

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Printed in USA - TVME5500R-PDF-05/05