ACT TECHNICO

Rugged TVME3100-R Single Board Computer

The TVME3100-R is among the first VMEbus boards to utilize the MPC8540 processor. It offers a growth path for VMEbus users with applications on the previous generation of VME, specifically the MPC8240 and MPC603 family processors. The system-on-chip implementation offers power/thermal, reliability, and lifecycle advantages not typically found in alternative architectures.
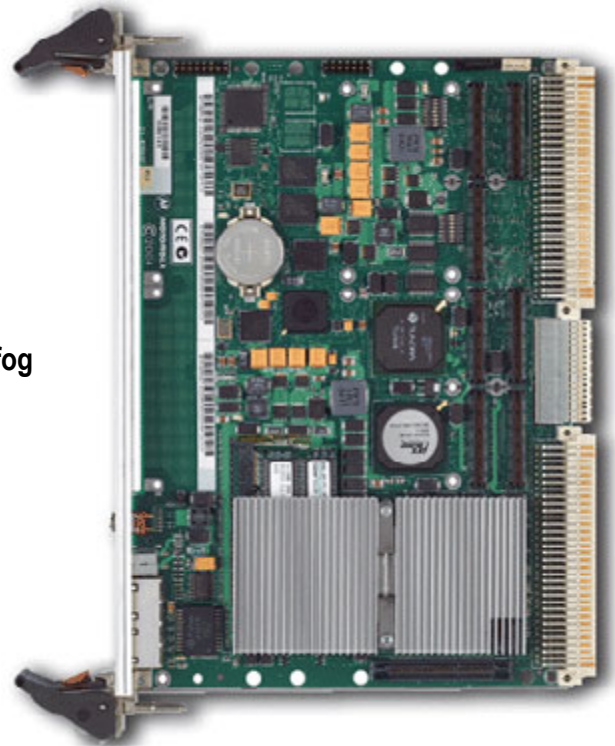
The 2eSST protocol enables up to 320MB/s VMEbus bandwidth for most applications. It is enhanced to withstand shock and vibration extremes in excess of the original Motorola SBC specification. Conformally coated, this rugged solution is designed for use in critical embedded systems deployed in the most demanding military and industrial environments.
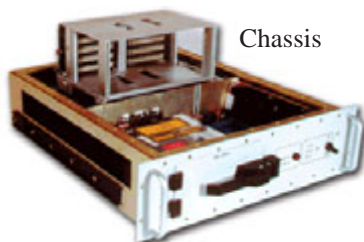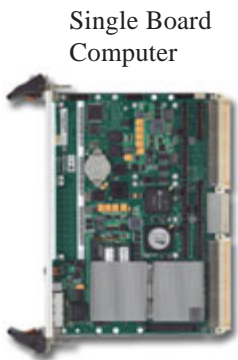
Key Environmental Features:

- Qualified to environmental standards of MIL STDs 810F, 901D and 167; designed to meet MIL STD 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*

TVME3100-R Features:

- Freescale MPC8540 with PowerPC® e500 processor core
- DMA engine
- PCI-X interface
- Two Gigabit Ethernet ports and one 10/100BaseTX port
- Up to 512MB of DDR333 ECC memory
- USB 2.0 and Serial ATA controllers
- 2eSST VMEbus protocol with 320MB/s transfer rate across the VMEbus
- Board support packages for VxWorks, LynxOS, and Linux
- Dual 33/66/100MHz PMC-X
- 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) and rear transition modules (RTM)

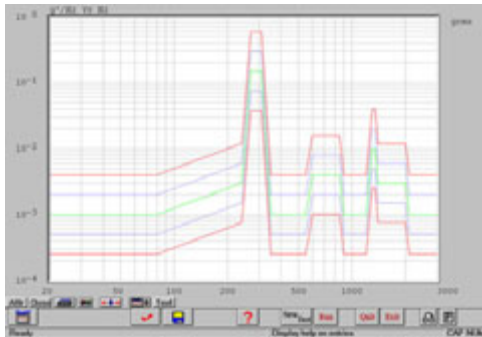## COTS Systems By Design

Single Board Computer

Design, Software & Documentation

Chassis

Storage

I/O

(800) 445-6194 • **www.acttechnico.com**

ACT/Technico • One Ivybrook Blvd., Suite 180 Ivyland, PA 18974 • Tel (215) 957-9071 • Fax (215) 957-9074

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.

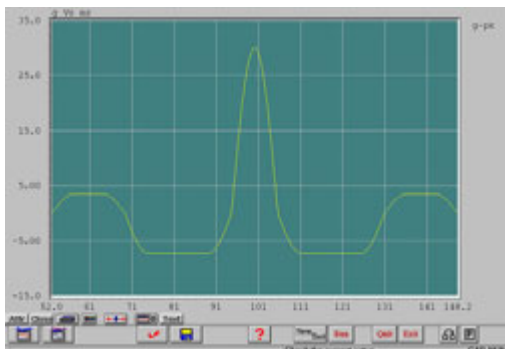*ACT/Technico Temperature Cycle Chamber*

Board Description

The TVME3100-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 TVME3100-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 radar and data collection. In ground applications, suitably applied conformal coatings resist the effects of dust, sand and other contain-

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.

ACT/Technico Test Fixture

Sample random vibration test profile

ments. Ship borne applications for the TVME3100-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 TVME3100-R to perform mission critical tasks in demanding environments. Users requiring a "technology refresh" for their application, while maintaining backwards compatibility with their existing VMEbus infrastructure, can upgrade to the MVME3100 series and take advantage of its enhanced performance features.
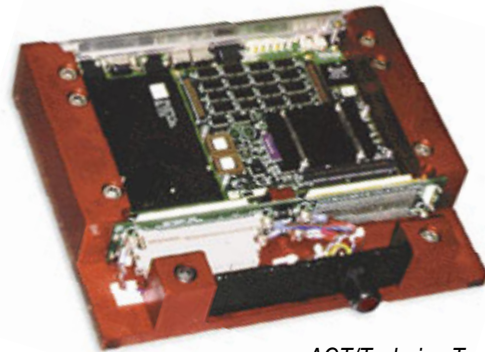
Baseline Motorola MVME3100 Specifications

MVME3100 Processor Module
Processors
Microprocessor: Freescale MPC8540 PowerQUICC III (*PowerPC e500 core*)
Clock Frequency: 667 or 833 MHz
On-chip L1 Cache (I/D): 32K/32K
On-chip L2 Cache: 256KB look-aside

SYSTEM CONTROLLER
Integrated within MPC8540

MAIN MEMORY
Type: Double data rate (DDR1) ECC SDRAM
Speed: DDR333 (166 MHz)
Capacity: Up to 512MB SODIMM
Configurations: One single-bank module; 256MB or 512MB

FLASH MEMORY
Type: Flash, on-board programmable
Capacity: 64MB or 128MB soldered flash options
Write Protection: Hardware via switch, software via register or sector lock

NON-VOLATILE MEMORY
Type: SEEPROM, on-board programmable
Capacity: 128KB (available for users), 8KB baseboard

Sample shock test profile

ANSI/VITA 1-1994 VME64 (IEEE STD 1014), ANSI/VITA 1.1-1997 VME64 Extensions, VITA 1.5-199x 2eSST

Controller:	Tundra Tsi148 PCI-X to VMEbus bridge with support for VME64 and 2eSST protocols
DTB Master:	A16, A24, A32, A64; D08-D64, SCT, BLT, MBLT, 2eVME, 2eSST
DTB Slave:	A16, A24, A32, A64; D08-D64, SCT, BLT, MBLT, 2eVME, 2eSST, UAT
Arbiter:	RR/PRI

Interrupt Handler/Generator: IRQ 1-7/Any one of seven IRQs
System Controller: Yes, switchable or auto detect
Location Monitor: Two, LMA32

COUNTERS/TIMERS

TOD Clock Device: Maxim DS1375 I2C device with battery backup
Removable Battery: Yes
Real-Time Timers/Counters: Four, 32-bit programmable timers in PLD; four, 32-bit programmable/cascadable timers in MPC8540
Watchdog Timer: Internal to MPC8540. Second level time-out can generate reset.

ETHERNET INTERFACE

Controller:	MPC8540 10/100/1000 and 10/100 Controllers
Interface Speed:	Two @ 10/100/1000Mbps, one @ 10/100/Mbps
Connector:	One Gigabit Ethernet port routed to front panel RJ-45, one Gigabit Ethernet port and one 10/100 port routed to VMEbus P2 connector, pin out matching MVME721 RTM
Indicators:	Link status/speed/activity

ASYNCHRONOUS SERIAL PORTS

Port 1 Controller: MPC8540 Duart (second port N/C)
Number of Ports: One 16550 compatible
Configuration: EIA-232 DTE (RxD, TxD, RTS, CTS)
Async Baud Rate, bps max.: 38.4K EIA-232, 115Kbps raw
Connector: One front panel RJ-45

Ports 2-5 Controller: Exar ST16C544D Quart
Number of Ports: Four 16550 compatible
Configuration: EIA-232 (RxD, TxD, RTS, CTS)
Async Baud Rate, b/s max: 38.4K EIA-232, 115Kbps raw
Connector: via VMEbus P2 connector, pinout matching MVME721 RTM

USB Interface (1 port)
Controller: NEC µ720101
Configuration: USB 2.0
Number of ports: One
Connector: One powered port routed to front panel

Serial ATA Interface (2 ports)
Controller: Intel® G31244
Configuration: 1.5Gbps/port, Legacy or DPA mode (switch-selected)
Connectors: One routed to front panel, one header (+ power) on board
Indicators: Planar activity LEDs on board back side

DUAL IEEE P1386.1 PCI MEZZANINE CARD SLOTS

Address/Data: A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors (PN4 for PMC1 only)
PCI Bus Clock: 33 MHz, 66 Hz or 100 MHz PCI/PCI-X
Signaling: 3.3V, 5V tolerant
Power: +3.3V, +5V, ±12V
Module Types: Two single-wide or one double-wide, front panel or P2 I/O, PMC and PrPMC support, PMC1 site Pn4 routed to VMEbus P2 connector rows A and C

PCI EXPANSION CONNECTOR FOR INTERFACE TO PMCSPAN BOARDS

Address/Data: A32/D32/D64
PCI Bus Clock: 33 MHz
Signaling: 5V
Power: +3.3V, +5V, ±12V
Connector: One 114-pin connector located on MVME3100 planar, same location as on MVME5500 planar

MVME3100 Block Diagram
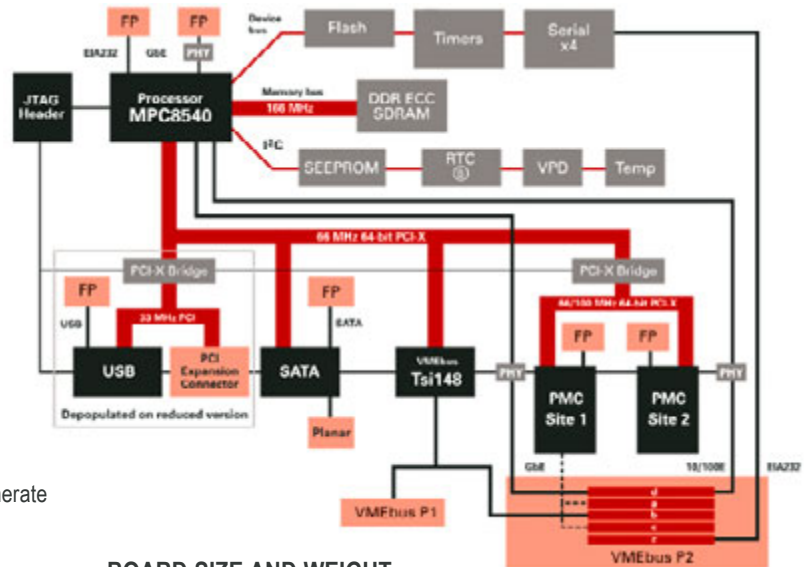
BOARD SIZE AND WEIGHT

Height:	233.4 mm (9.2 in.)
Front Panel Height:	261.8 mm (10.3 in.)
Depth:	160.0 mm (6.3 in.)
Width:	19.8 mm (0.8 in.)
Weight:	468 g/16.5 oz. (IEEE handles)
Max. Component Height:	14.8 mm (0.58 in.)

POWER REQUIREMENTS

(Not including power required by PMC or IPMC modules): **+5V ± 5%**
MVME3100: 4.5 A typ., 5.6 A max.

CALCULATED MTBF

122,480 hours calculated using Mil Std 217

OTHER FEATURES

Planned for RoHS compliance
Jumper-less configuration
On-board temperature sensor (Maxim DS1621)
JTAG header for connection of diagnostic tools

FRONT PANEL

IEEE handles
Connectors for serial, Gigabit Ethernet, USB, and SATA ports
Openings for PMC sites

I/O CONNECTORS

MVME721
Asynchronous Serial Ports: Four, RJ-45, labeled as COM2-5
Ethernet: One 10/100/1000BaseTX and one 10/100BaseTX, RJ-45

ALL MODULES ENVIRONMENTAL

	Operating	Non-operating
Temperature:	0° C to +55° C	–40° C to +85° C (inlet air temp. with forced air cooling)
Humidity (NC):	5% to 90%	5% to 90%
Vibration:	1 G RMS, 5-100 Hz sine	2 G RMS, 15-2000 Hz sine 0.01 g2/Hz (4.5 G RMS); 15-2000 Hz random
Shock:	20 G peak (half sine) 11ms	

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)
Motorola board products are tested in a representative system to the following standards, results pending: 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.

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.

PMCStor with 2 CF sites

Audio PMC

Solid State PMCDisk

Quad Ethernet PMC-X module

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 TVME6100. 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
TVME3100-1152-R	667 MHz MPC8540, 256MB DDR SDRAM, 64MB Flash, Gigabit Ethernet, SATA, IEEE handles
TVME3100-1263-R	833 MHz MPC8540, 512MB DDR SDRAM, 128MB Flash, Gigabit Ethernet, SATA, USB, PCI expansion connector, IEEE handles
TVME3100-xxxx-R	Both above versions available on request with Scanbe handles

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

www.acttechnico.com

760 Veterans Circle, Warminster, PA 18974 • Tel (215) 956-1200 • Fax (215) 956-1201

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