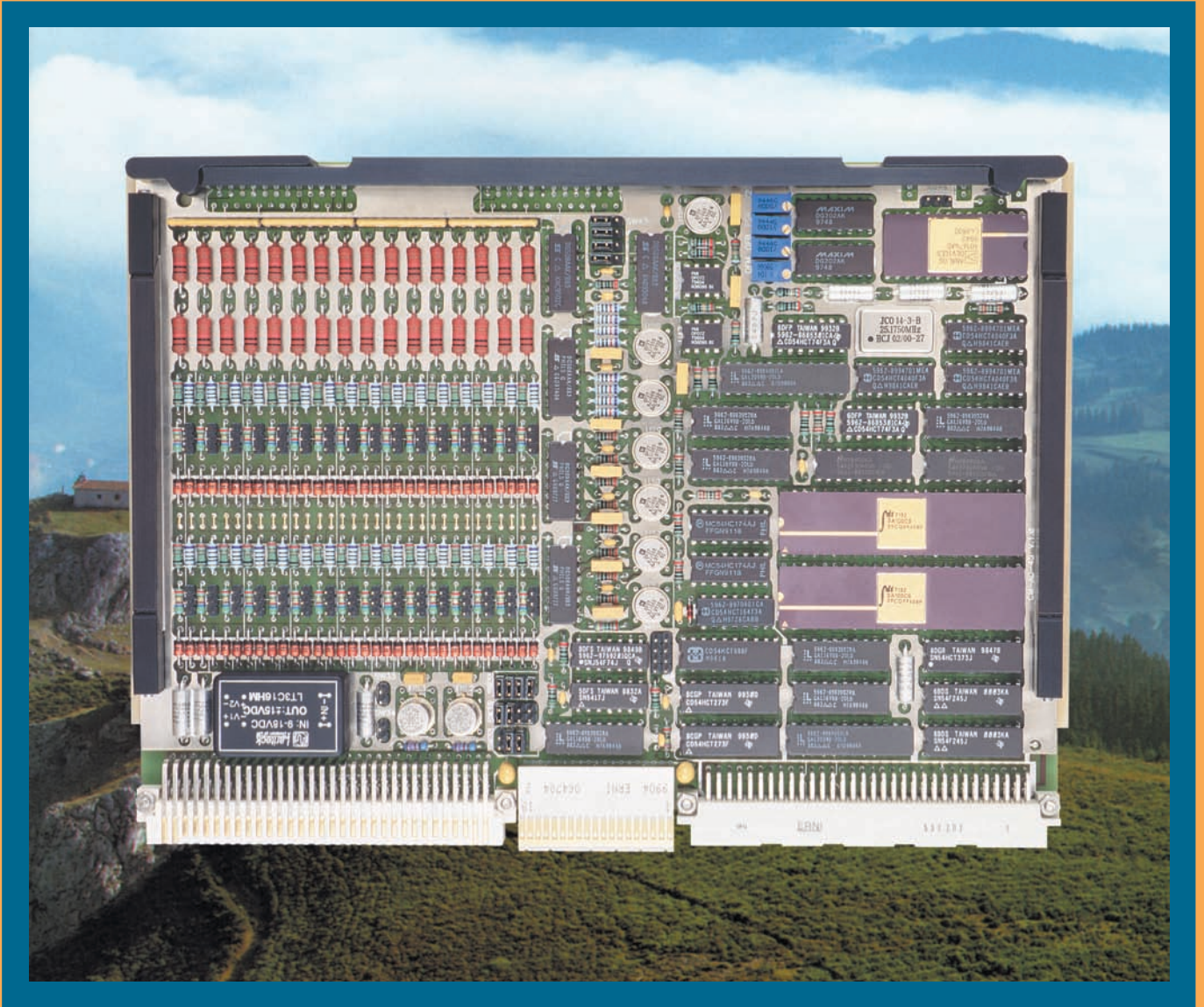




Computer

6U VMEbus Series

CM-AD-45

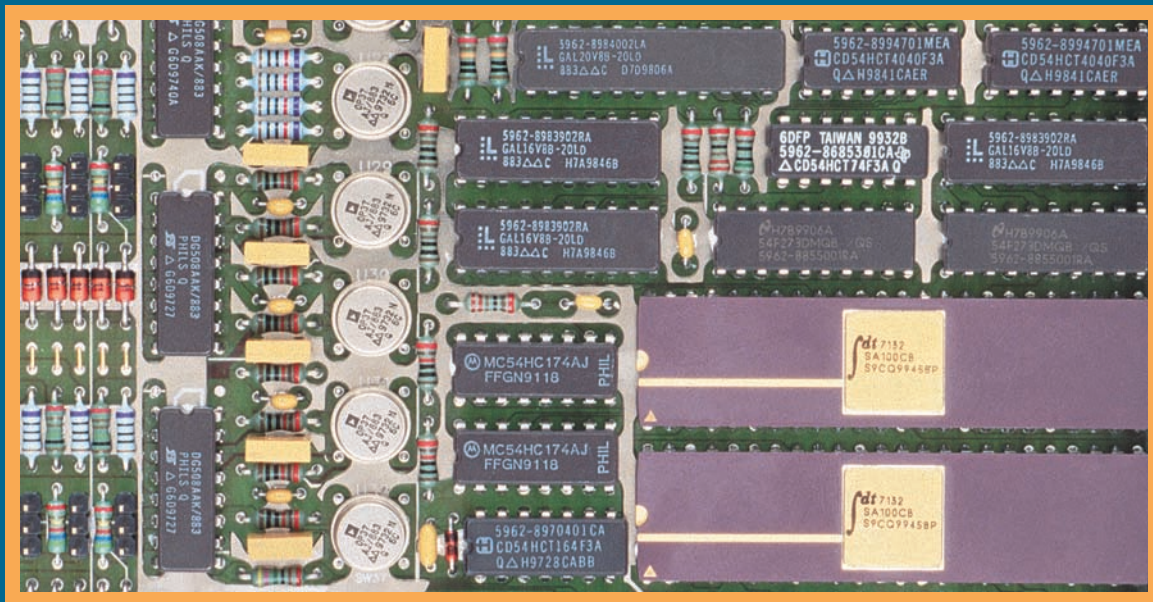


32 Input Channel A/D Module

Commercial, Industrial, MIL-Rugged & MIL-STD-883 Versions

FEATURES

- ❑ 32 single-ended analog channels per board.
- ❑ Channels can also be fitted as 16 differential.
- ❑ High quality AD1674 12 bit converter.
- ❑ Programmable sampling speed (12-100 Ksps).
- ❑ Dual Built-In-Test wraparound loop allows testing of all analog and TTL chips.
- ❑ Wide variety of unipolar-bipolar input ranges.
- ❑ Overvoltage input protection on all channels.
- ❑ High voltage input attenuators per channel.
- ❑ VMEbus Interrupter indicates end of current sample cycle or RAM data buffer full.
- ❑ 4 KB DPRAM for conversion data storage.
- ❑ Automatic channel multiplexing, A/D sampling and data storage capability.
- ❑ Simple programming through the MCR.
- ❑ Input protection per channel up to 120 Volts.
- ❑ Analog signals via cannon connectors on front panel and VME64x connector on P2.
- ❑ P0 connector intended for key slot purposes.
- ❑ Commercial, Industrial, Rugged & 883 versions.
- ❑ IEC-297 mechanics with I/O via front panel and military P1101.2 wedge-lock mechanics.
- ❑ Conduction cooled PCB with thermal overlay in MIL-Rugged and 883 versions.
- ❑ Extensive software support.
- ❑ Excellent price/performance ratio.
- ❑ Low power CMOS design (3 Watts).
- ❑ Two year guarantee.

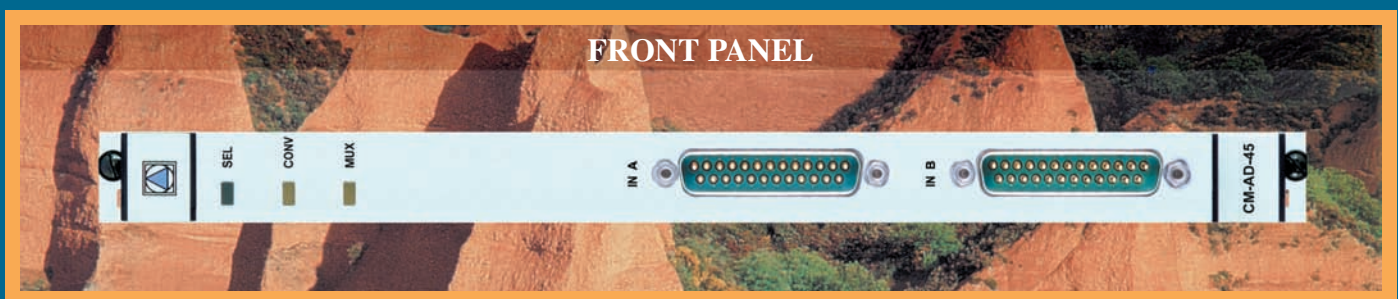


MILITARY DESIGN

- ❑ -55 to +125 °C ceramic military ICs.
- ❑ MIL-STD-883 Analog and TTL chips.
- ❑ MIL-C-55302 Class I Connectors.
- ❑ MIL-R-39016 BIT Relays in 883 version.
- ❑ No signal PCB tracks in external layers.
- ❑ MIL-E-5400 for avionics equipment class 1B (Temperature and Altitude).
- ❑ MIL-STD-810 E Temperature (Methods 501.3 & 502.3).
- ❑ MIL-STD-810 E Shock and Vibration (Methods 516.4 & 514.4).
- ❑ MIL-STD-810 E Humidity & Salt Fog (Methods 507.3 & 509.3).
- ❑ Military Class V Printed Circuit Board.

DESCRIPTION

- ❑ The **CM-AD-45** is a general purpose 32 channel A/D board. It incorporates features most demanded in first class military and industrial applications.
- ❑ On-board auto-conversion circuitry performs all tasks relative to multiplexing, sampling & converting of analog input signals.
- ❑ Dual port RAM acts as a transparent communications device between the A/D converter and the VMEbus.
- ❑ Extensive Built-In-Test per channel is based on a wraparound loop that disconnects external analog input signals and connects internal test signals in order to verify correct module operation.
- ❑ The **CM-AD-45** offers a highly flexible I/O cabling solution using connectors on the front panel and P2.
- ❑ Military versions, provided with conduction cooled thermal overlay, greatly improve capability to withstand shock and vibration.
- ❑ The metallic layer in the PCB also benefits heat dissipation and allows all components to work within homogeneous temperatures, thus greatly increasing component longevity and module MTBF.
- ❑ All **CM-AD-45** versions are 100% compatible at the functional level, allowing software development to proceed with low cost Industrial versions.

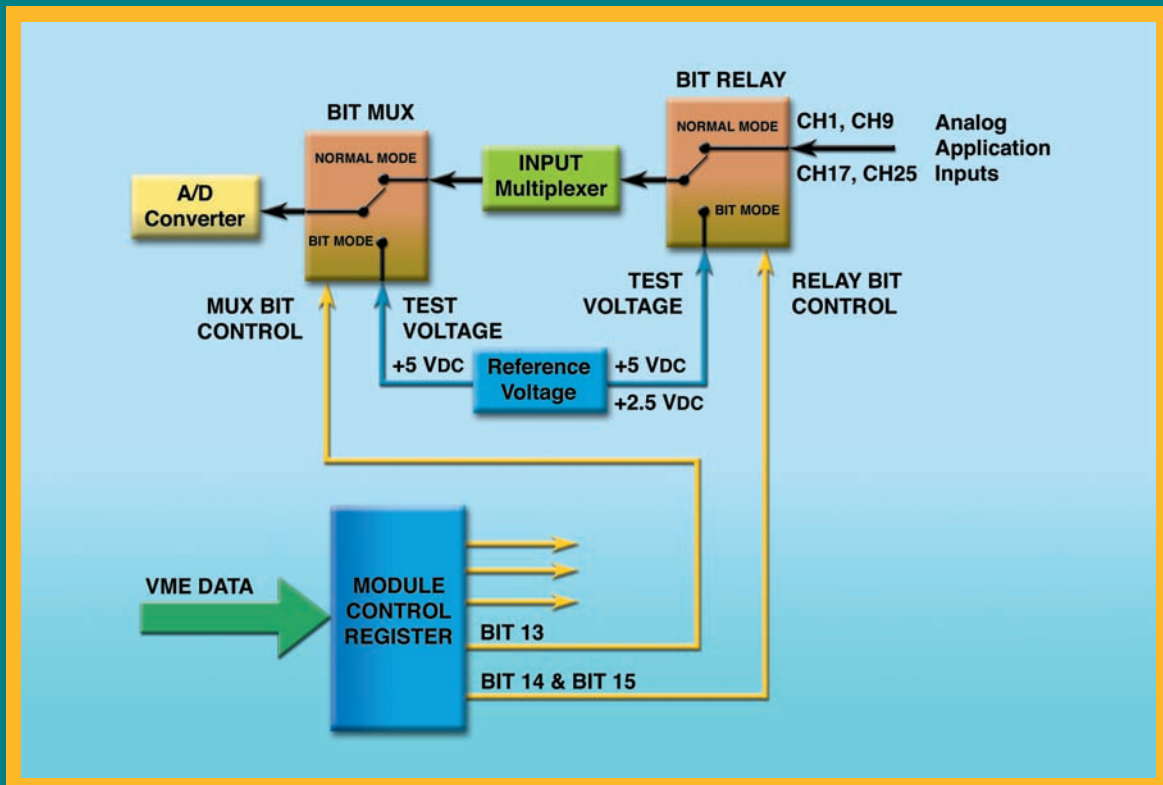


TECHNICAL SPECIFICATIONS

Input channels:	32 independent single-ended channels or 16 independent differential channels.	Built-In-Test:	BIT is based on two voltage references and dedicated relays distributed in such a way as to allow testing all on board analog and TTL devices.
A/D converter:	12 bit industry standard Analog Devices A/D 1674. On chip Sample & Hold.	Accuracy:	0.05% for non attenuated input ranges. 0.2% for attenuated input ranges.
Sampling speed:	Programmable sampling speeds: 12.5, 25, 50 and 100 Ksps.	Signal bandwidth:	DC to 50 KHz.
DC Unipolar range:	0-5V, 0-10V, 0-50V, 0-100V.	Input impedance:	470 K Ω default. Up to 5 M Ω optional.
DC Bipolar range:	$\pm 2.5V$, $\pm 5V$, $\pm 10V$, $\pm 25V$, $\pm 50V$, $\pm 100V$.	VMEbus access time:	300 nsec. per RAM word transfer.
AC ranges:	0-5V, 0-10V, 0-50V, 0-100V.	VMEbus Interrupter:	I(2-7). Indicates SRAM buffer filled with last converted data.
Ranges in mA DC:	0-50 mA (0-20 mA, 4-20 mA).	VMEbus Interface:	A24/D16 Standard slave interface.
Input attenuators:	A 10:1 voltage attenuator is available in board version /2. It must be connected to operate with input ranges above 10 V.	VME Addressing:	Two jumper blocks provide 256 mapping options in the A24 range.
Input protection:	All analog inputs are protected against external over voltages up to 120 VDC.	Power consumption:	+5VDC @ 350 mA. +12 VDC @ 135 mA.
Dual port RAM:	4 KB of dual port SRAM, 16 bits wide. The on board multiplexing/conversion circuitry fills data buffers in RAM with 16/32 or 2048 word size.	Weight:	570 gr. C & I ver.; 770 gr. R+ & 883 ver.
Sampling cycles:	All channels are converted and stored in RAM thus freeing the master CPU.	Mechanical size:	Single slot 6U (233.35x160 mm.).
Control Register:	Defines the RAM storage buffer size, enables/disables VMEbus interrupts, programs the A/D sampling rate and activates the Built-In-Test circuitry.	Mechanical format:	CM-AD-45/A Classic IEC-297 mechanics for 19 inch racks with I/O on front panel. CM-AD-45/B Military IEEE P1101.2 wedge-lock mechanics for ATR enclosures.
		Humidity:	Up to 95% RH non-condensing.
		Altitude:	Sea level up to 15 Km (50,000 ft.).

10:1 Channel Attenuator	A/D Converter Full Scale Range	Gain	Polarity	Voltage Input Range	Board Version
Disabled	0-10 V	x1	Unipolar	0-10V	CM-AD-45/1
Disabled	0-10 V	x1	Bipolar	±5V	
Disabled	0-10 V	x2	Unipolar	0-5V	
Disabled	0-10 V	x2	Bipolar	±2.5V	
Disabled	0-20 V	x1	Unipolar	----	
Disabled	0-20 V	x1	Bipolar	±10V	
Disabled	0-20 V	x2	Unipolar	----	
Disabled	0-20 V	x2	Bipolar	±5V	
Enabled	0-10 V	x0.1	Unipolar	0-100V	CM-AD-45/2
Enabled	0-10 V	x0.1	Bipolar	±50V	
Enabled	0-10 V	x0.2	Unipolar	0-50V	
Enabled	0-10 V	x0.2	Bipolar	±25V	
Enabled	0-20 V	x0.1	Unipolar	----	
Enabled	0-20 V	x0.1	Bipolar	±100V	
Enabled	0-20 V	x0.2	Unipolar	----	
Enabled	0-20 V	x0.2	Bipolar	±50V	
mA		Resistor		Current Range	
Current	0-10 V	100 Ω	Unipolar	0-50 mA	
Current	0-10 V	250 Ω	Unipolar	0-20 mA	

CM-AD-45 CHANNEL INPUT RANGES

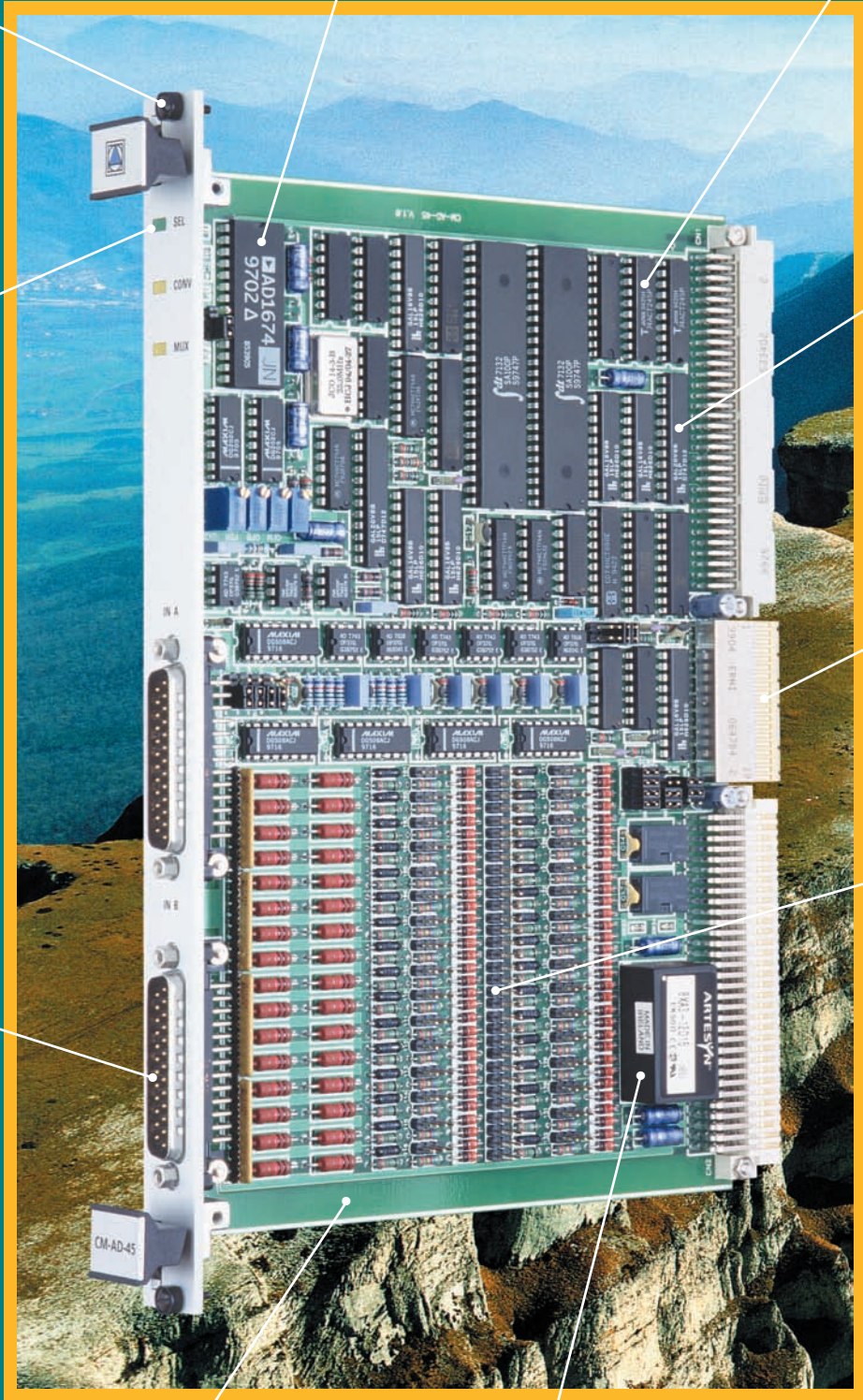


ANALOG SECTION BUILT-IN-TEST DIAGRAM

IEC-297 6U MECHANICS fitted with I/O connectors on front panel

AD1674 INDUSTRY STANDARD CONVERTER includes S/H amplifier and provides 100 Ksps

A24/D16 VMEbus INTERFACE accesses the dual port RAM and Module Control Register



COMMERCIAL ICs in plastic package and 0 to +70 °C range

BOARD SELECT LED is illuminated when the VME master accesses the module

P0 CONNECTOR allows key slot configuration

FRONT PANEL Cannon connectors wire the 32 input analog signals

JUMPER BLOCK connects-disconnects input signals to P2

FIBERGLASS PCB in Commercial version

DC/DC CONVERTER provides low noise power to the analog section

CM-AD-45/C/A COMMERCIAL VERSION

IEC-297 MECHANICS
allows module insertion in
19 inch 6U VME racks

MODULE CONTROL REGISTER
programs all on-board functions

PROGRAMMABLE SAMPLING RATE
reduces VMEbus master dedication to
A/D conversion tasks

FRONT PANEL LEDs
indicate A/D converter
& channel multiplexer
operation

INPUT ATTENUATOR
per channel increases
module input voltage
range up to 100 V

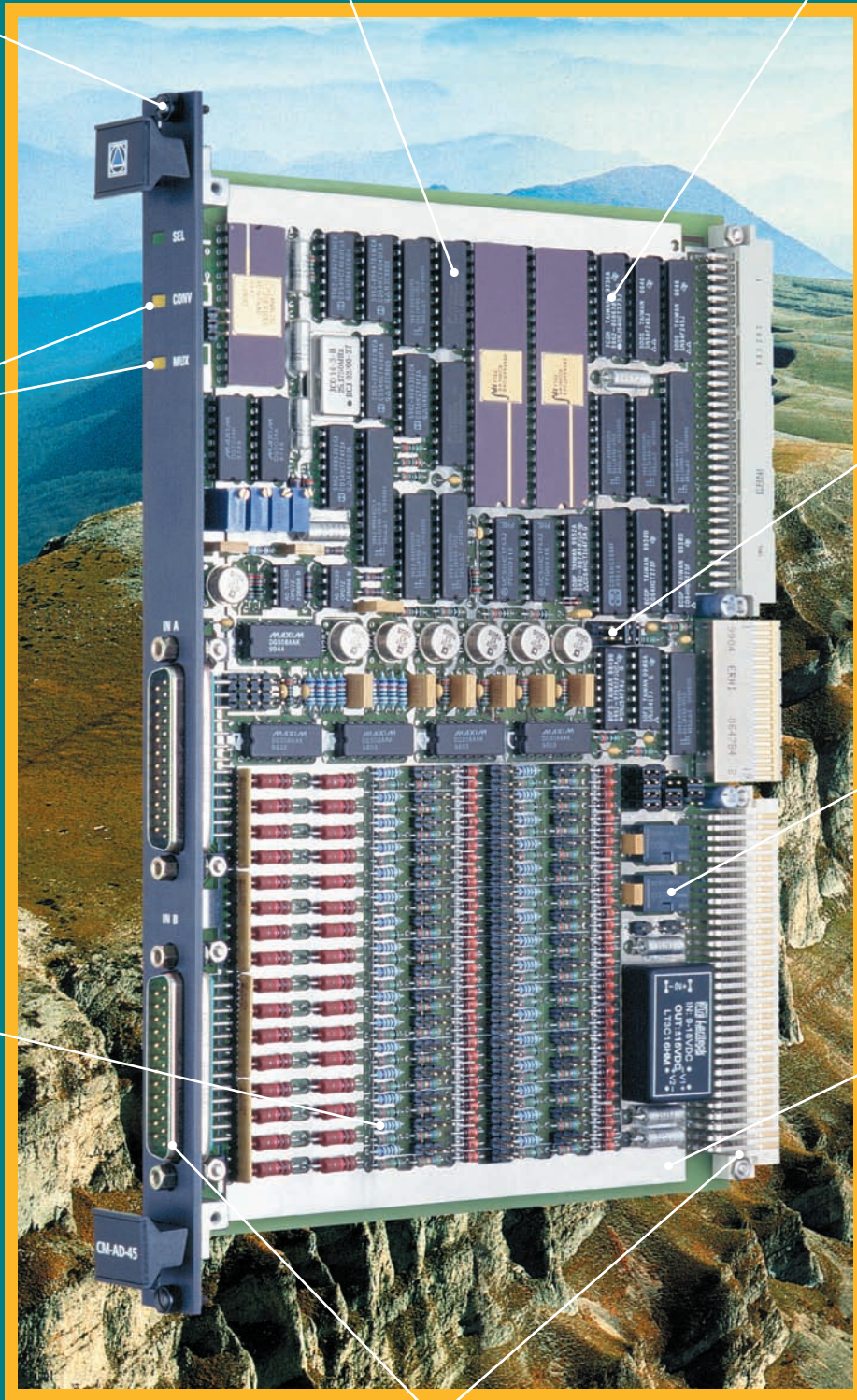
JUMPER BLOCK
allows 256 addressing
options in the VME
A24 range

BIT RELAYS
provide testing of
all onboard chips

CONDUCTION COOLED
thermal overlay PCB

CLASS I MIL C-55302 & MIL C-24308 CONNECTORS
withstand > 500 insertion cycles

CM-AD-45/R+/A MILITARY RUGGED+ VERSION



P1101.2 6U MECHANICS
fitted with wedge-locks for
insertion in ATR enclosures

**QUALIFIED MIL-STD-
883 ICs in ceramic pack-
ages.**

VMEbus INTERRUPTER
offers programmable level and
request attention of the master
when sampling complete

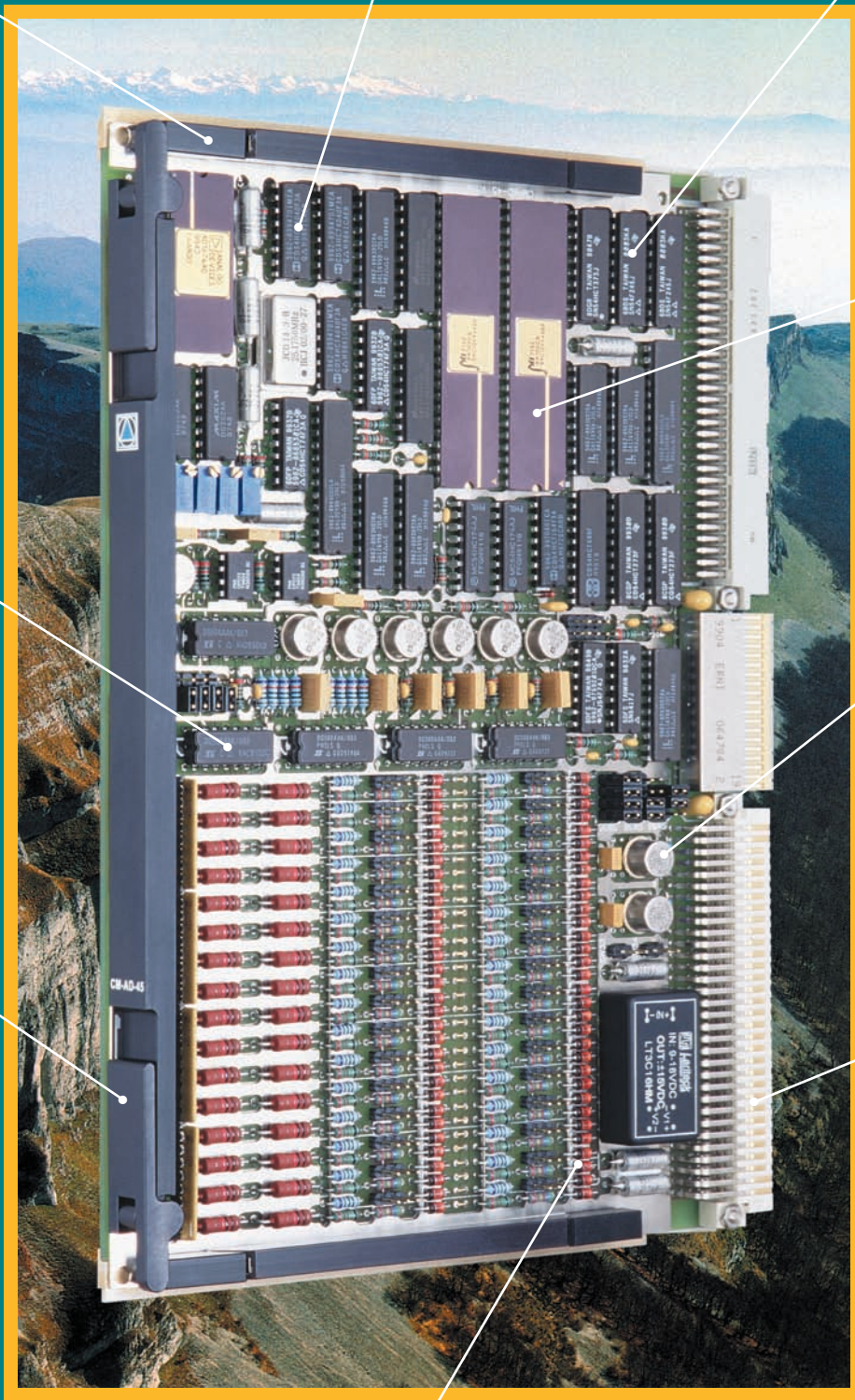
DUAL PORT RAM
stores A/D conversions
and BIT results

THERMAL PASTE
behind ICs improves
heat dissipation with
the thermal overlay

MIL-R-39016 RELAYS
in 883 version

FRONT PANEL with
extraction handles
improves mechanical
performance

P2 CONNECTOR
wires all application
analog signals



INPUT PROTECTION PER CHANNEL
withstands overvoltages up to 120 Volts.

CM-AD-45/883/B MILITARY 883 VERSION



BOARD RANGE



COMMERCIAL (C):

Implements low cost commercial plastic IC's rated for 0 to +70 °C. Continuous board operation range from 0 to +60 °C. Class II industrial quality connectors.

INDUSTRIAL (I):

Manufactured with Industrial range plastic or ceramic IC's rated for -40 (-25) to +85 °C. Continuous module operation from -20 to +70 °C. Class II industrial quality connectors.

MILITARY-RUGGED (R+):

Implements ceramic IC's rated from -55 to +125 °C. Class I MIL-C-55302 connectors. Conduction cooled PCB. Board operation from -40 to +85 °C. Storage from -55 to +125 °C.

MILITARY-STD-883 (883):

Manufactured with conduction cooled PCB and MIL-STD-883 B/C qualified military ceramic parts (-55 to +125 °C). Class I MIL-C-55302 military connectors. MIL-R-39016 BIT Relays. Continuous board operation from -50 to +90 °C. Storage from -55 to +125 °C.



SOFTWARE SUPPORT



Wind River Systems VxWorks Tornado

The CM-AD-45 is supported by VxWorks Tornado. This Operating System is ideal for developing real time software in UNIX environments. A complete "C" language driver in source code is available at low cost. Drivers include a floppy disk and user's manual.

Generic "C" Language Driver

A generic "C" language driver is also available in source code. The user may freely adapt for any application, operating system or ANSI "C" compiler. This code has been successfully compiled with the well established Mentor Graphics toolset.

Note: Drivers for other leading operating systems can be optionally supplied upon request.



DOCUMENTATION

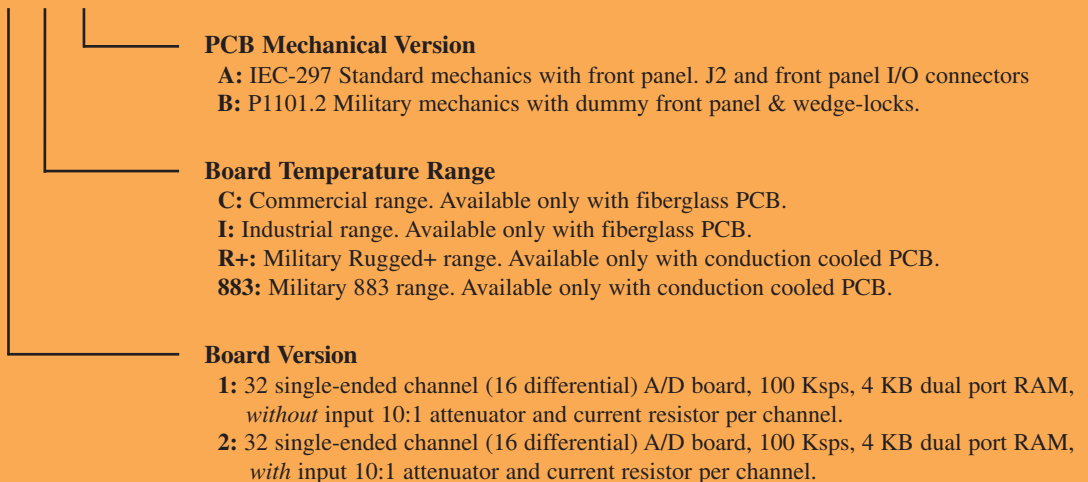
LEVEL 1, CM-AD-45 MAP: User's manual. Module hardware functional description oriented toward software development.

LEVEL 2, CM-AD-45 MMT: Maintenance manual. Extended description intended for failure location in the module.



ORDERING INFORMATION

CM-AD-45 /V /T /M



Computer

European Headquarters:

Edificio Congresos, 3-14.
C/ Alcalde Luis Uruñuela s/n.
41020 Sevilla (SPAIN)
Tel: +34 954253116
Fax: +34 954253119

WebSite: www.cmcomputer.com
E-mail: cm@cmcomputer.com

For more extensive information, contact CM Computer or your representa-

Your local representative: