

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

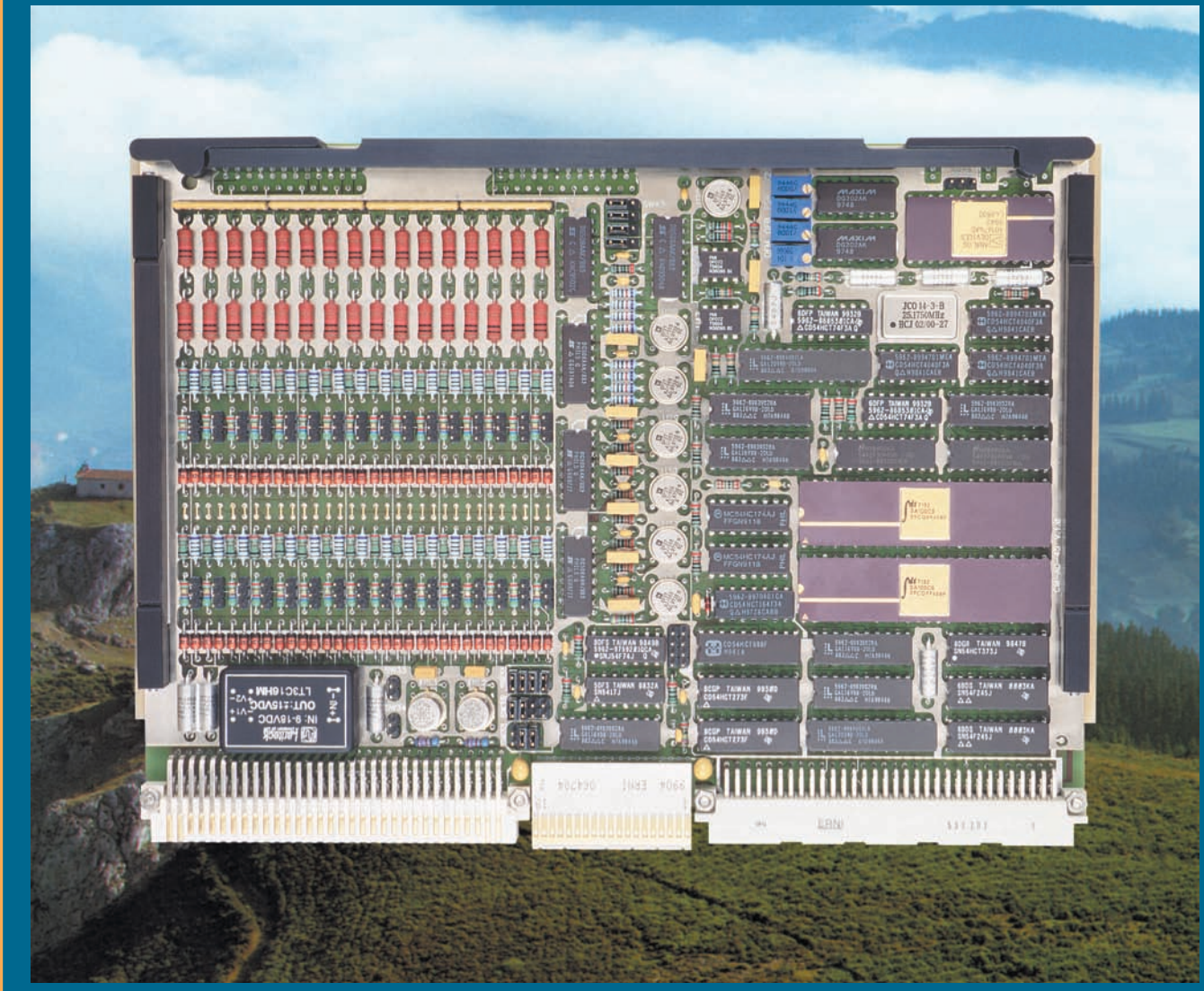
All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

Computer

6U VMEbus Series

CM-AD-45

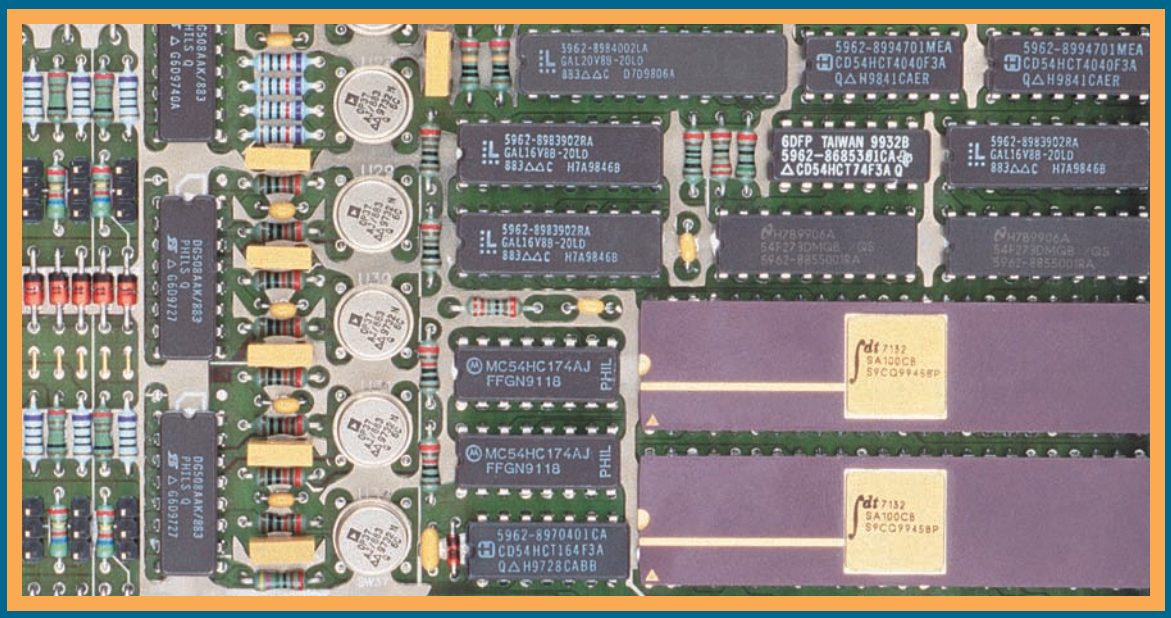


32 Input Channel A/D Module

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 ºC 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.

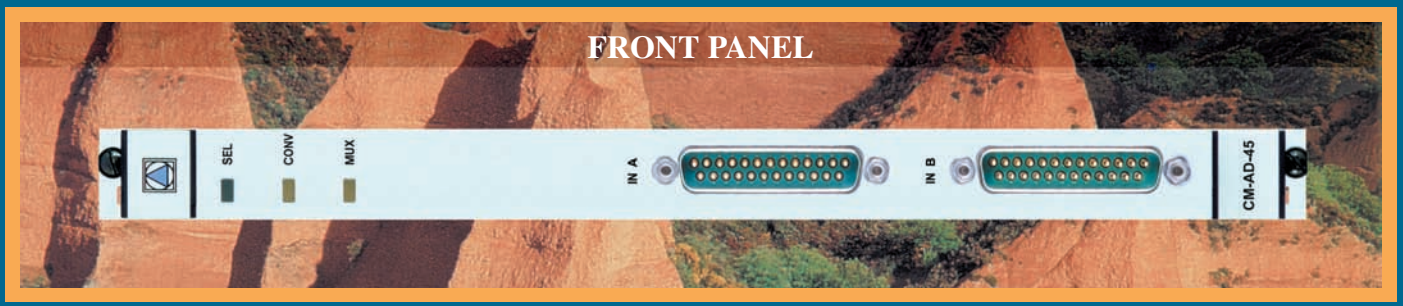
❑ Extensive Built-In-Test per channel is based on a wraparound loop that disconnects external analog input signals and connects internal test signals in order to verify correct module operation.

❑ 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.

A/D converter: 12 bit industry standard Analog Devices A/D 1674. On chip Sample & Hold.

Sampling speed: Programmable sampling speeds: 12.5, 25, 50 and 100 Ksps.

DC Unipolar range: 0-5V, 0-10V, 0-50V, 0-100V.

DC Bipolar range: ±2.5V, ±5V, ±10V, ±25V, ±50V, ±100V.

AC ranges: 0-5V, 0-10V, 0-50V, 0-100V.

Ranges in mA DC: 0-50 mA (0-20 mA, 4-20 mA).

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.

Input protection: All analog inputs are protected against external over voltages up to 120 VDC.

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.

Sampling cycles: All channels are converted and stored in RAM thus freeing the master CPU.

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.

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.

Accuracy: 0.05% for non attenuated input ranges. 0.2% for attenuated input ranges.

Signal bandwidth: DC to 50 KHz.

Input impedance: 470 KΩ default. Up to 5 MΩ optional.

VMEbus access time: 300 nsec. per RAM word transfer.

VMEbus Interrupter: I(2-7). Indicates SRAM buffer filled with last converted data.

VMEbus Interface: A24/D16 Standard slave interface.

VME Addressing: Two jumper blocks provide 256 mapping options in the A24 range.

Power consumption: +5VDC @ 350 mA. +12 VDC @ 135 mA.

Weight: 570 gr. C & I ver.; 770 gr. R+ & 883 ver.

Mechanical size: Single slot 6U (233.35x160 mm.).

Mechanical format:

CM-AD-45/A Classic IEC-297 mechanics for 19 inch racks with I/O on front panel.

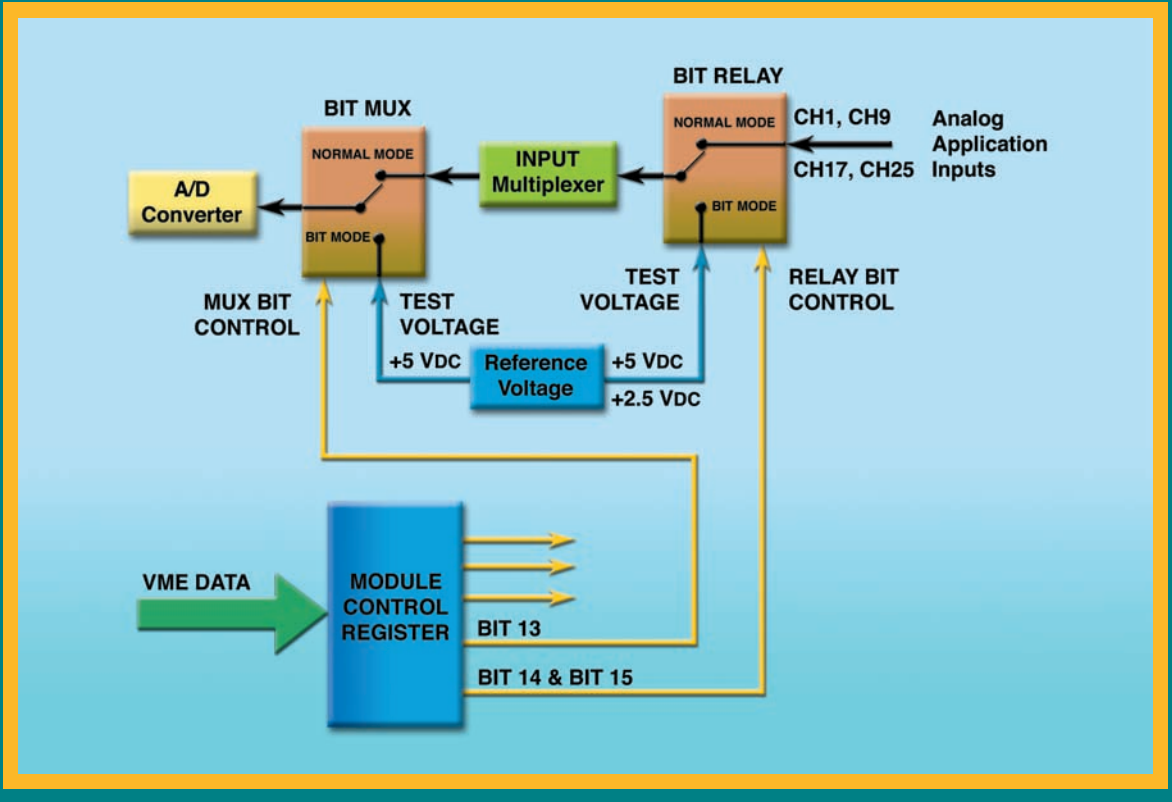
CM-AD-45/B Military IEEE P1101.2 wedge-lock mechanics for ATR enclosures.

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	CM-AD-45/2
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		
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

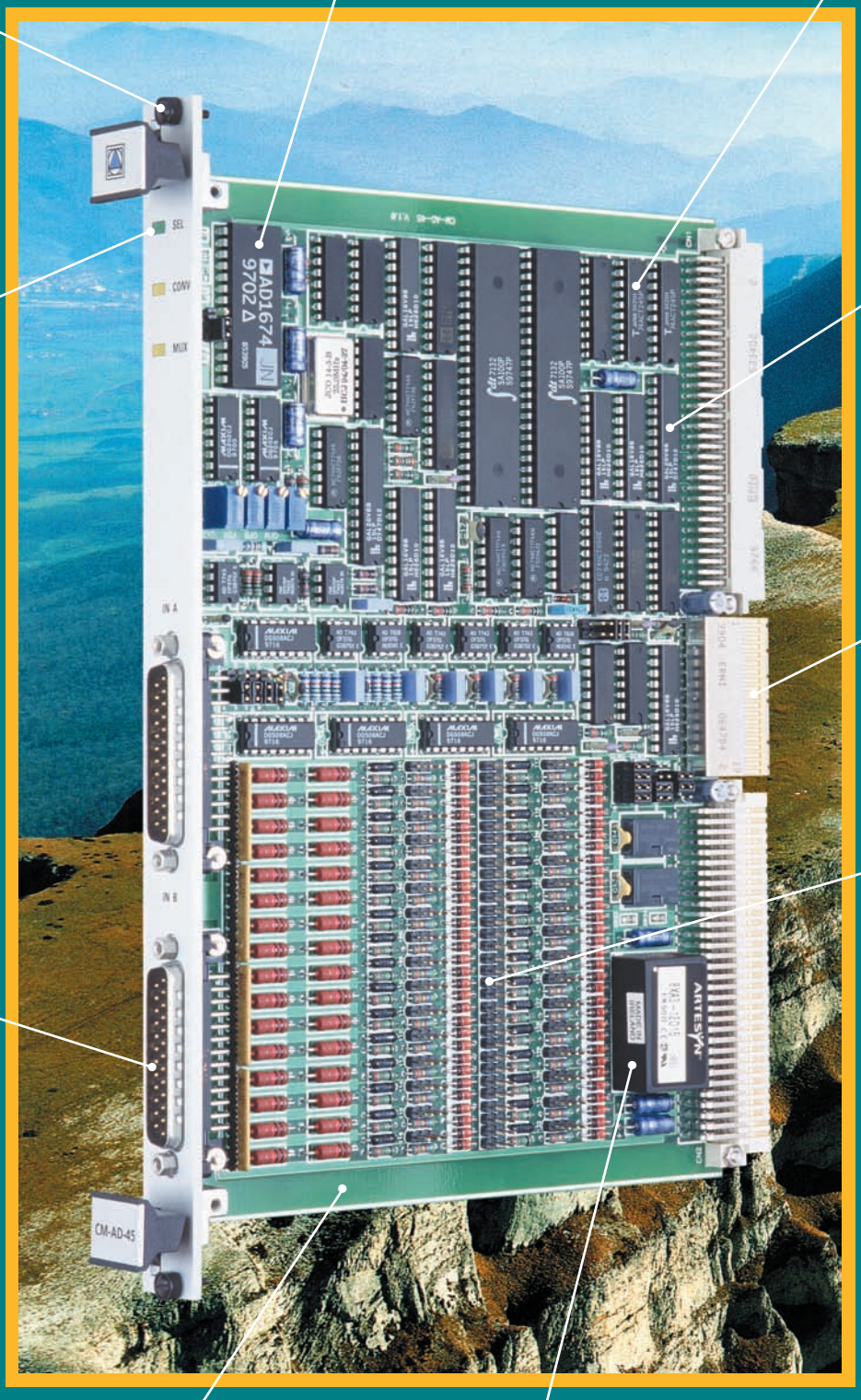


ANALOG SECTION BUILT-IN-TEST DIAGRAM

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

JUMPER BLOCK
connects-disconnects
input signals to P2

FRONT PANEL Cannon
connectors wire the 32
input analog signals

FIBERGLASS PCB
in Commercial version

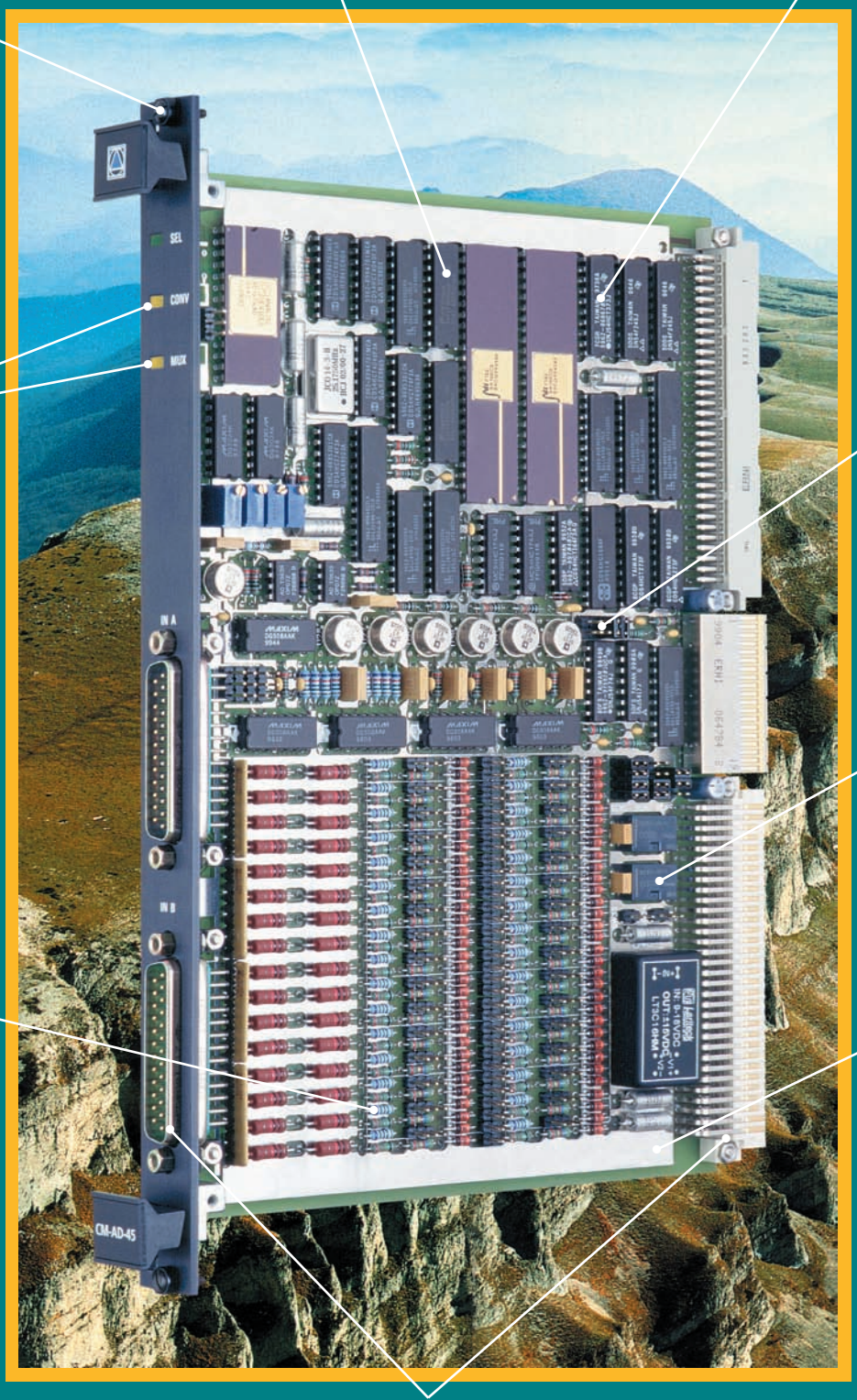
DC/DC CONVERTER
provides low noise power
to the analog section

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



JUMPER BLOCK
allows 256 addressing options in the VME A24 range

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

BIT RELAYS
provide testing of all onboard chips

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

CONDUCTION COOLED
thermal overlay PCB

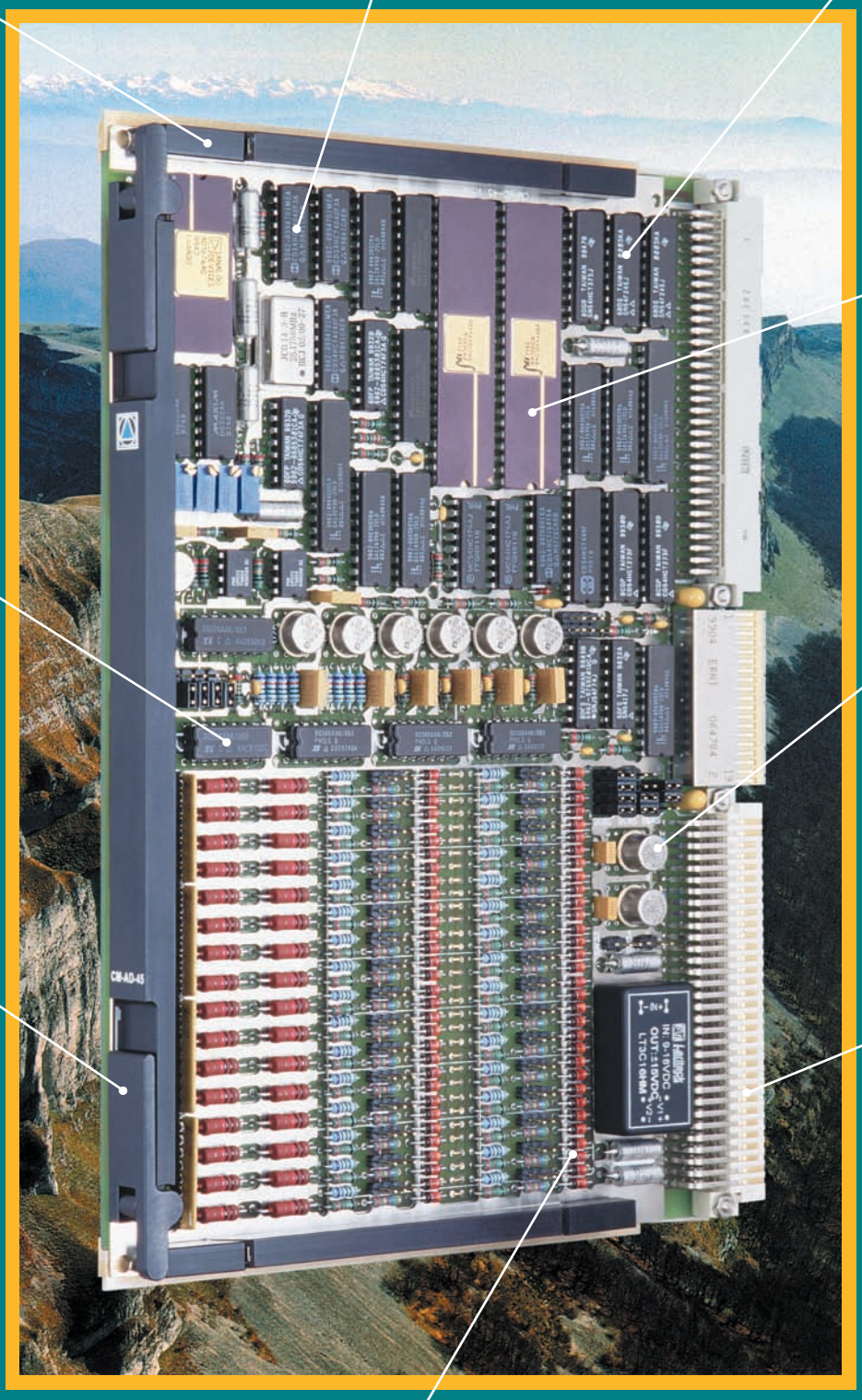
CLASS I MIL C-55302 & MIL C-24308 CONNECTORS
withstand > 500 insertion cycles

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 packages.

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 ºC. Continuous board operation range from 0 to +60 ºC. Class II industrial quality connectors.

INDUSTRIAL (I):

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



MILITARY-RUGGED (R+):

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

MILITARY-STD-883 (883):

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

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

PCB Mechanical Version
- **A:** IEC-297 Standard mechanics with front panel. J2 and front panel I/O connectors
- **B:** P1101.2 Military mechanics with dummy front panel & wedge-locks.

Board Temperature Range
- **C:** Commercial range. Available only with fiberglass PCB.
- **I:** Industrial range. Available only with fiberglass PCB.
- **R+:** Military Rugged+ range. Available only with conduction cooled PCB.
- **883:** Military 883 range. Available only with conduction cooled PCB.

Board Version
- **1:** 32 single-ended channel (16 differential) A/D board, 100 Ksps, 4 KB dual port RAM, *without* input 10:1 attenuator and current resistor per channel.
- **2:** 32 single-ended channel (16 differential) A/D board, 100 Ksps, 4 KB dual port RAM, *with* input 10:1 attenuator and current resistor per channel.

CM 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:

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