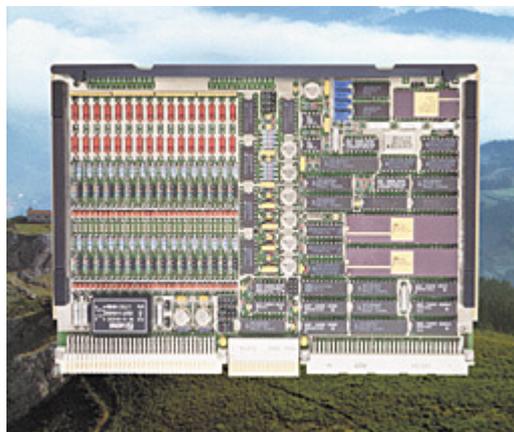


FEATURES

- 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.
- 4 KB DPRAM for conversion data storage.
- VMEbus Interrupter indicates end of current sample cycle or RAM data buffer full.
- 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, MIL-Rugged & MIL-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.



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:

$\pm 2.5V$, $\pm 5V$, $\pm 10V$, $\pm 25V$, $\pm 50V$, $\pm 100V$.

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 K Ω default. Up to 5 M Ω 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 (233.35 x 160 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.).

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.

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.

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.

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).

ORDERING INFORMATION

CM-AD-45 /V /T /M

PCB Mechanical Version

- A: IEC-297 Standard mechanics with 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.

Part Number Example:

CM-AD-45/2/R+/B

- 32 single-ended channel (16 differential) A/D board, 100 kps, 4KB dual port RAM, with input attenuator.
- Military Rugged+ range (-40 to +85 °C operating).
- IEEE P1101.2 Military mechanics with wedge-locks.

CM COMPUTER

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