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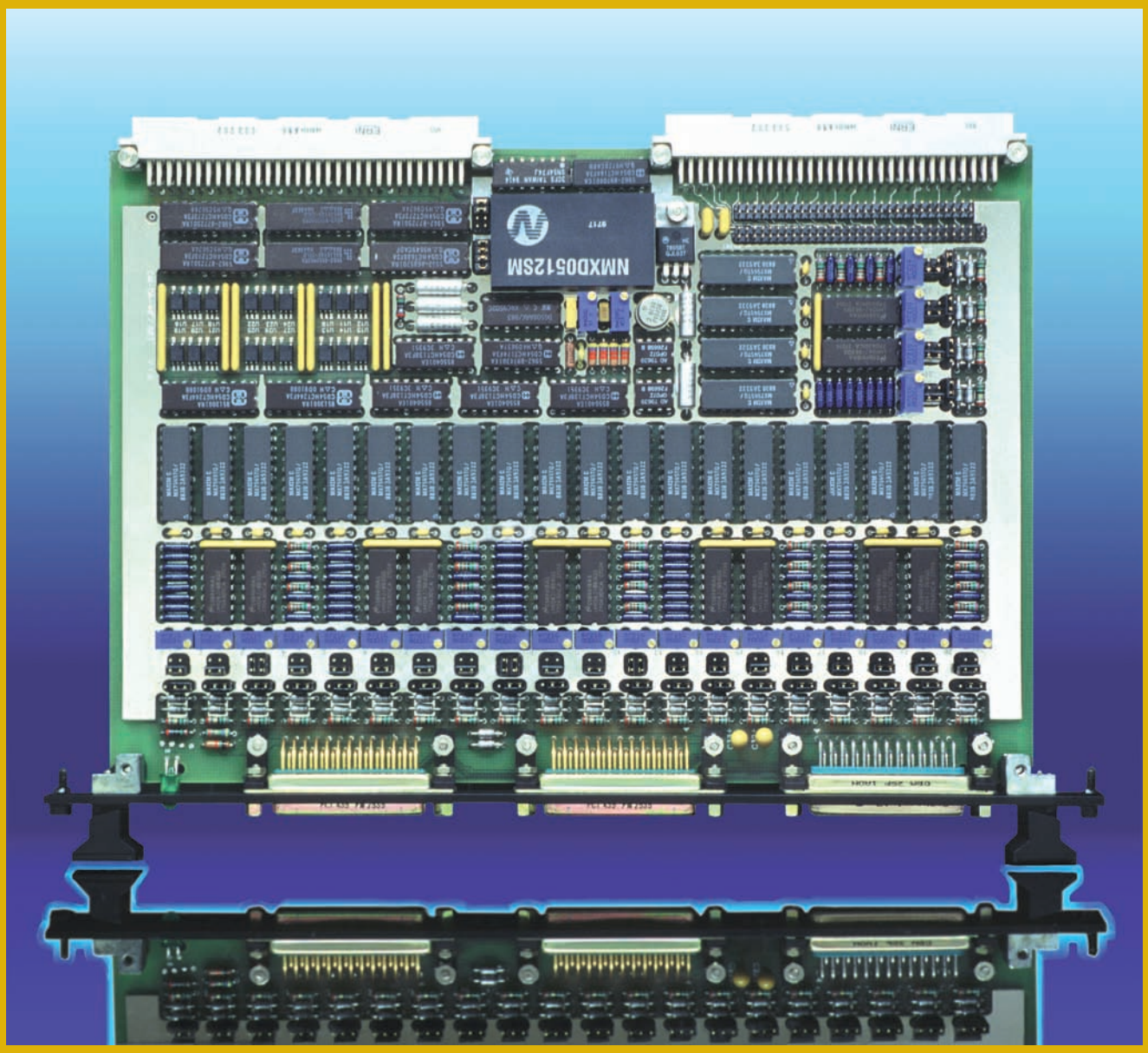
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Find the *CM Computer CM-DA-40/1/C* at our website: *Click HERE*

Computer

6U VMEbus Series

CM-DA-40



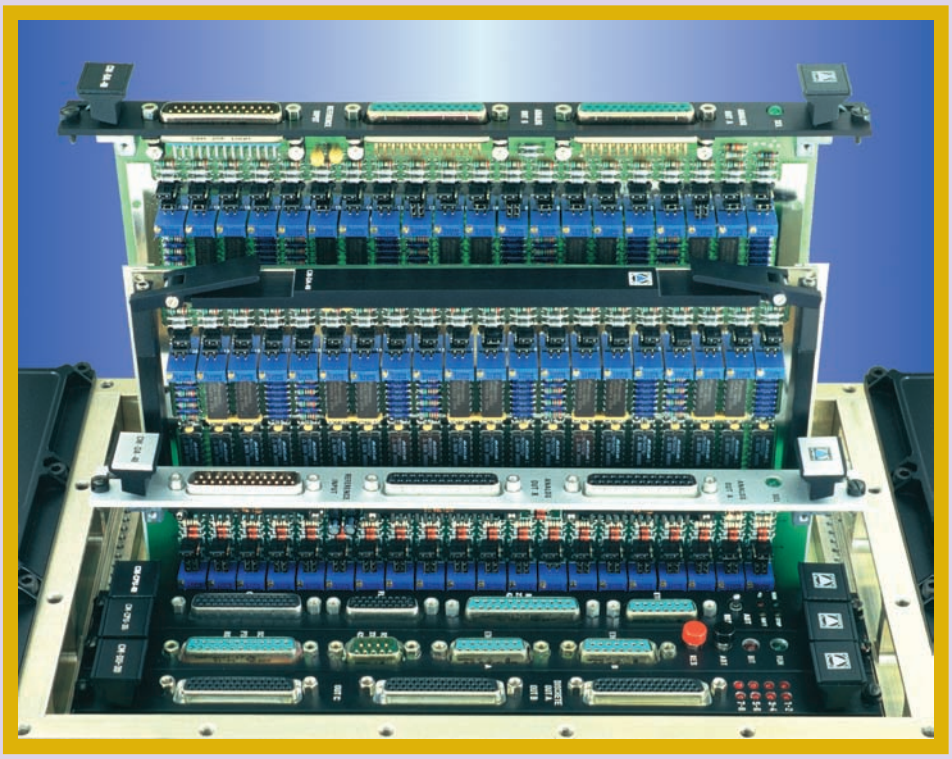
24 Channel Optoisolated D/A Module

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

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FEATURES

- 24 D/A output channels per board.
- 12 bit industry-standard converters.
- Full galvanic isolation.
- Analog I/O signals via three front panel cannon connectors or P2 connector.
- On-board precision voltage reference for standard unipolar & bipolar ranges.
- Selection of common or individual external input voltage reference per channel.
- Independent channel calibration.
- Low power CMOS design.
- Commercial, Industrial, MIL-Rugged and MIL-STD-883 versions.
- Available in IEC-297 mechanics with I/O via front panel and military P1101.2 mechanics with wedge-locks.
- Conduction cooled PCB with thermal overlay in MIL-Rugged and 883 versions.
- Extensive software support.
- Extremely simple programming.
- Excellent price/performance ratio.
- Two year guarantee.



MILITARY DESIGN

- -55 to +125 ºC ceramic military ICs.
- MIL-C-24308 & MIL-C-55302 Class I Connectors.
- Thin film 0.1% precision Resistors.
- No PCB tracks in external layers.
- MIL-E-5400 for avionics equipment class 1B (Temperature and Altitude).
- MIL-STD-810 D Temperature (Methods 501.2 & 502.2).
- MIL-STD-810 D Shock and Vibrations (Methods 514 & 516).
- MIL-STD-810 D Saline Fog and Dust (Methods 507 & 509).
- Military Class V Printed Circuit Board.

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DESCRIPTION

❑ The **CM-DA-40** is a general purpose Digital-to-Analog VMEbus board. This professional module offers an outstanding design which incorporates features most demanded in today´s first class military and industrial applications.

❑ This board implements industry-standard TTL chips with easily obtainable D/A converters supplied by several leading vendors in all temperature ranges. This insures availability of the module for long term aplications.

❑ Due to its individual external reference per channel, this module is well suited for applications requiring special voltage ranges or a wide variations in channel ranges to be supplied by a single board.

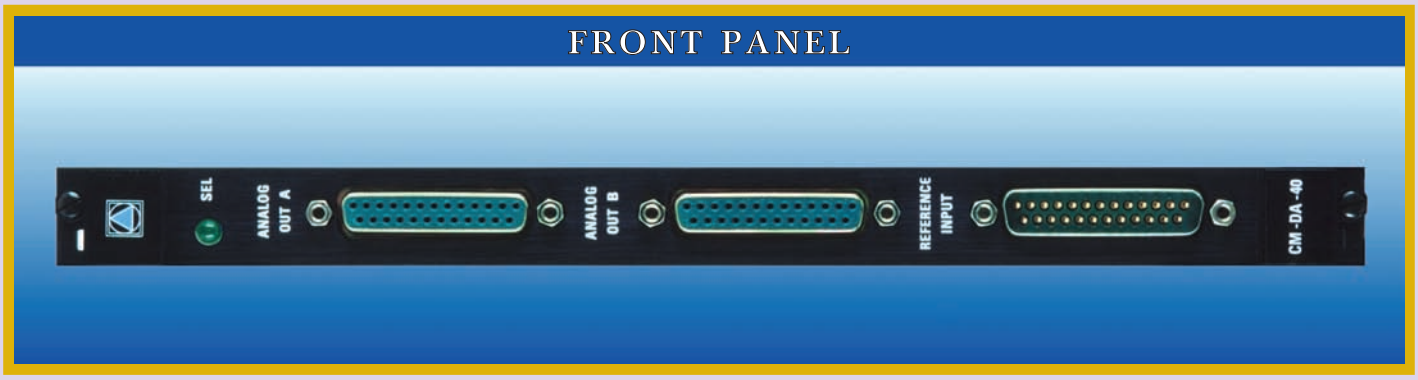
❑ The **CM-DA-40** offers a highly flexible I/O cabling solution using both the front panel and P2.

❑ 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 highly increasing component longevity and module MTBF.

❑ All **CM-DA-40** versions are 100% compatible at the functional and programming levels, allowing software development to proceed with low cost commercial versions.

FRONT PANEL



TECHNICAL SPECIFICATIONS

D/A converter:	12 bit multiplying AD-7545. On-chip 12 bit data latch.
Channel accuracy:	< 0.05 % typ. (2 mV in 0-5 VDC)
Accuracy derating:	Better than 5 ppm/ºC in all ranges.
Output impedance:	0.1 Ω for output loads < 5 mA.
Output protection:	All channel current is limited to 20 mA against output short circuits.
Galvanic isolation: (only on CM-DA-40/2)	Full galvanic isolation > 1000 V on all analog I/O signals with respect the VMEbus power & TTL lines.
DC standard ranges:	0-5, 0-10, ±5 or ±10 VDC using the on-board voltage reference.
External references:	One common external voltage reference is applied to all channels. Jumper selectable individual external voltage reference per channel.
External reference range:	References can be any AC/DC voltage in the range of ±10 Volts.
External reference input protection:	Protection up to ±25 Volts on all external input references.

Power consumption:	
CM-DA-40/1 (3 Watts)	+5VDC @ 150 mA, +12VDC @ 150 mA, -12VDC @ 50 mA.
CM-DA-40/2 (4 Watts)	+5VDC @ 800 mA.
Weight:	
Military R+ & 883	670 grams.
Commercial & Industrial	470 grams.
Mechanical size:	Single slot 6U (233.4x160 mm).
Mechanical format:	
CM-DA-40/A	Classic IEC-297 mechanics for 19" racks with I/O on front panel.
CM-DA-40/B	Military IEEE P1101 wedgelocks mechanics for ATR enclosures.
Humidity:	Up to 95% RH non-condensing.
Altitude:	Sea level up to 15 Km (50,000 ft.).
VMEbus interface:	A24/D16 Standard slave interface.
VMEbus addressing:	Two jumper blocks provide 256 mapping options in the A24 range.

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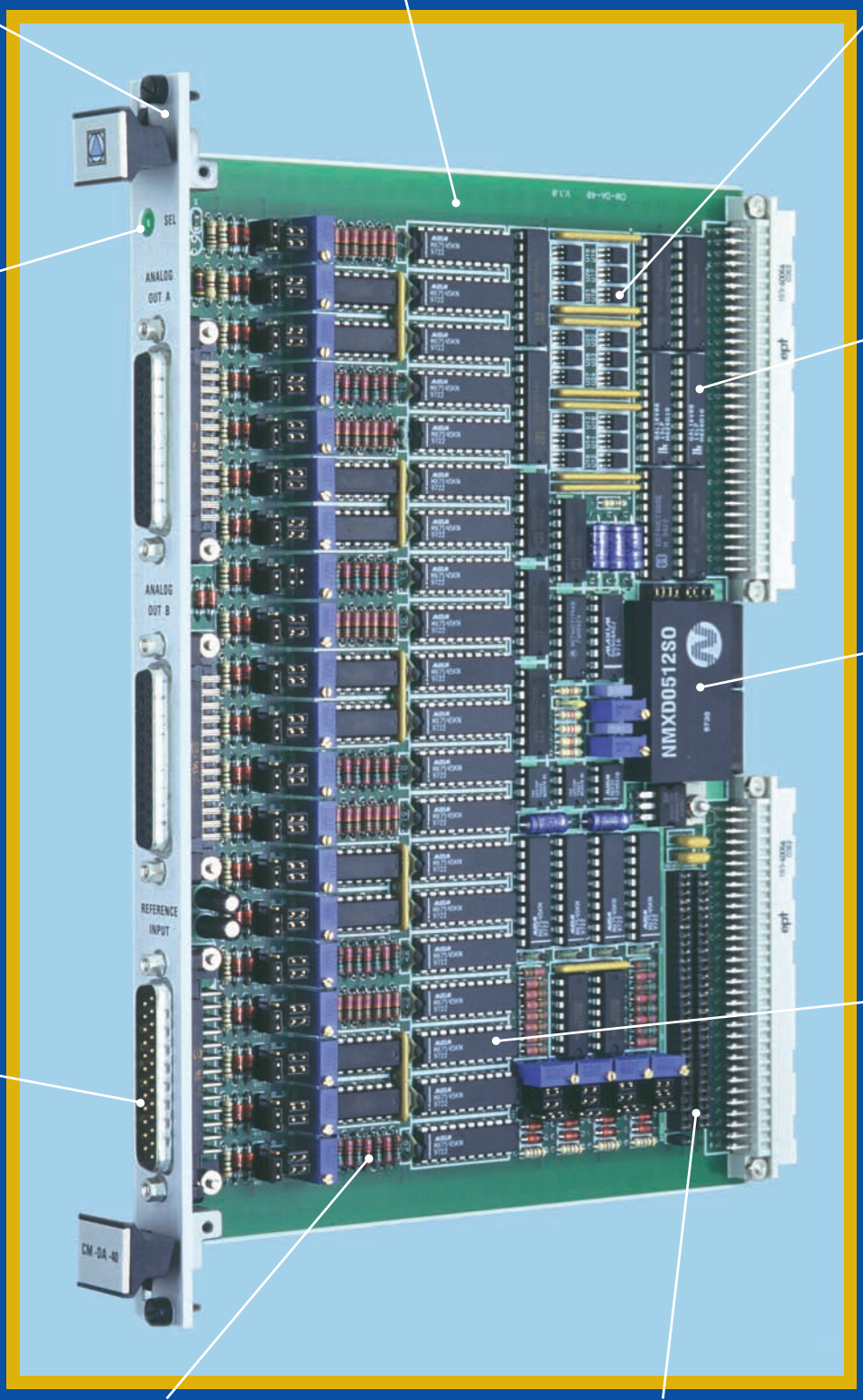
CM-DA-40 Modules inserted in CM-RA-30/AV ATR Avionics Enclosure

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

FIBERGLASS PCB
in commercial and industrial versions

FAST TTL DATA ISOLATORS
maintains 100% D/A converter accuracy



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

A24/D16 VMEbus
slave interface

DC/DC CONVERTER
provides isolated power to all D/A channels

INPUT REFERENCE CONNECTOR
provides individual external voltage reference per channel

COMMERCIAL ICs
in plastic package and 0-70 ºC range

THIN FILM 0.1% RESISTORS
improve converter accuracy

JUMPER BLOCK
wire-removes all analog I/O signals to-from P2

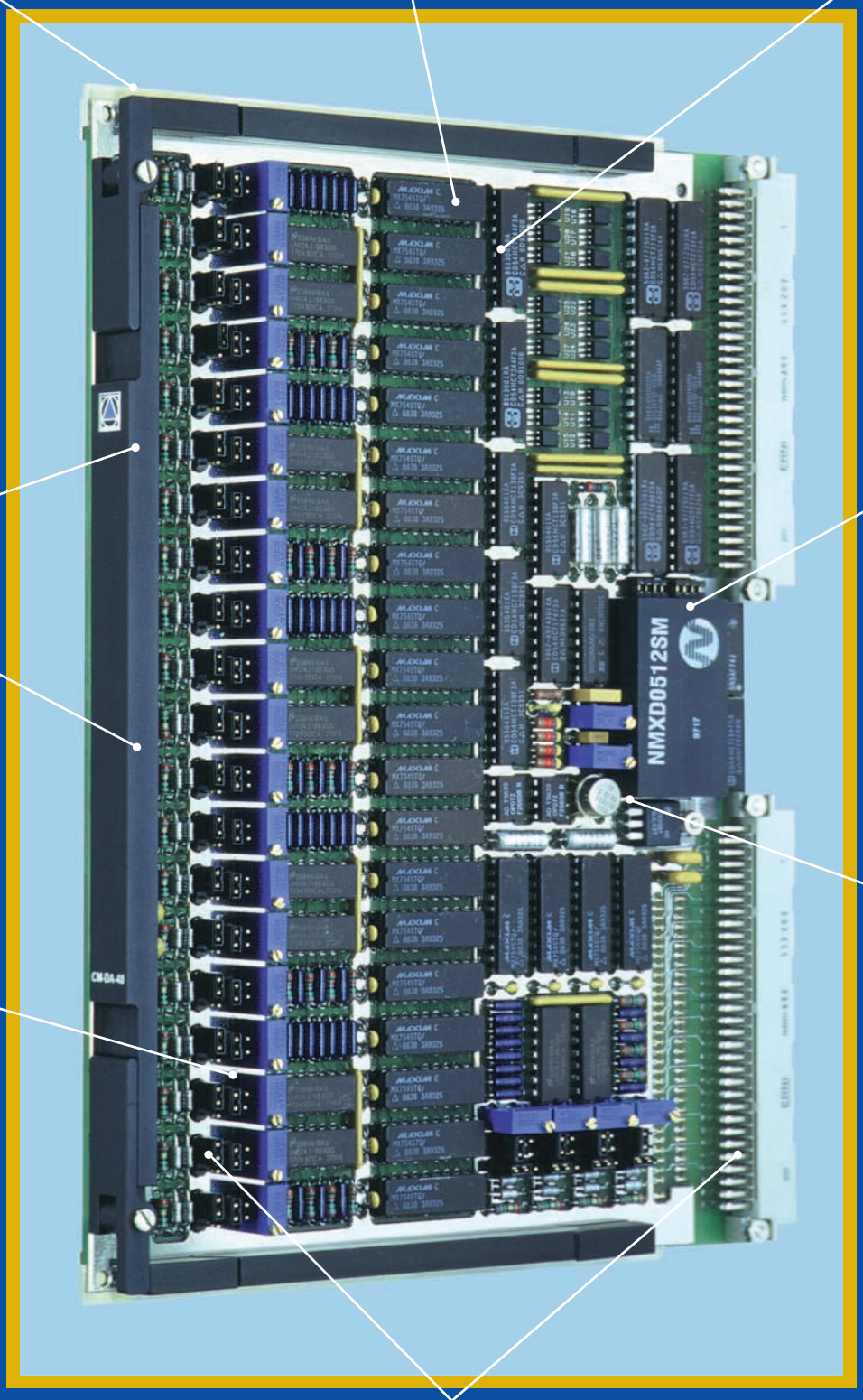
CM-DA-40/C COMMERCIAL VERSION

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

CONDUCTION COOLED
thermal overlay PCB

MILITARY ICs
in ceramic package and -55 to +125 ºC range



JUMPER BLOCK
allows 256 addressing options in the VMEbus A24 range

ANALOG OUTPUT
connectors provide 24 analog D/A channels

INPUT REFERENCE PROTECTION
networks avoid damage to D/A converters

ON-BOARD VOLTAGE REFERENCE generates standard 5 & 10 VDC output ranges

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

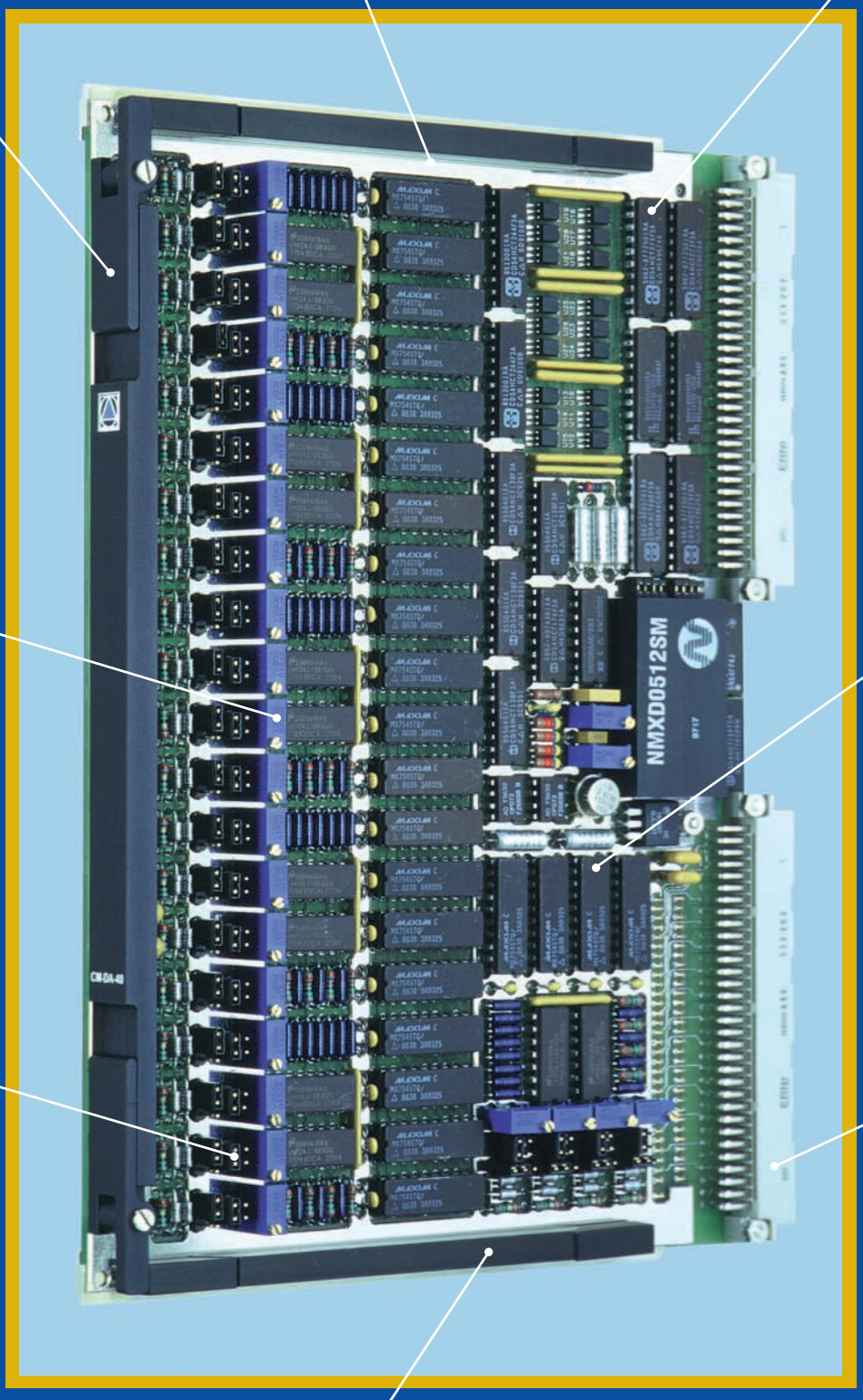
CM-DA-40/R+/A MILITARY RUGGED+ VERSION

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FRONT PANEL with extraction handlers improves mechanical performance

CONDUCTION COOLED thermal overlay PCB

QUALIFIED MIL-STD-883 ICs in ceramic package and -55 to +125 ºC range



TRIMMER RESISTOR per channel allows optimum accuracy adjustment

THERMAL PASTE behind ICs improves heat dissipation with the thermal overlay

JUMPER BLOCK per channel configures unipolar or bipolar voltage range

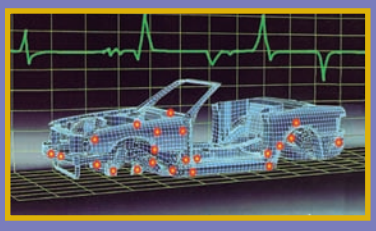
P2 CONNECTOR outputs all D/A signals and inputs all external reference voltages

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

CM-DA-40/883/B MILITARY 883 VERSION

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BOARD RANGE





COMMERCIAL (C):
Implements low cost, Commercial plastic IC's rated for 0 to +70 ºC. Continuous board operation temperature 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. Continuous module operation from -20 to +75 ºC. Class II industrial quality connectors.

MILITARY-RUGGED (R+):
Implements 100% 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 military connectors qualified per MIL-C-55302. Continuous board operation range from -50 to +90 ºC. Storage from -55 to +125 ºC.

SOFTWARE SUPPORT





Wind River Systems VxWorks Tornado
The CM-DA-40 is supported by VxWorks Tornado. This operating system is ideal for developing real time software under UNIX environments. A complete "C" language driver in source code is available at low cost. Drivers include a floppy-disk and user´s manual.

Microware Systems OS-9
Low cost drivers for the real time OS-9 Operating System are available in "C" language. This driver is supplied with its descriptive user´s manual and source code floppy-disk.

Microtec Research MCC-68K Drivers
A "C" language source code driver written for the popular MCC-68K cross-compiler from Microtec Research is also available. This low cost option is intended for using a PC as host.

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

DOCUMENTATION

LEVEL 1, CM-DA-40 MAP: User´s manual. Module hardware functional description oriented toward software development.
LEVEL 2, CM-DA-40 MMT: Maintenance manual. Extended description intended for failure location in the module.

ORDERING INFORMATION

CM-DA-40 /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. Only available with fiberglass PCB.
- I: Industrial range. Only available with fiberglass PCB.
- R+: Military Rugged+ range. Only available with conduction cooled PCB.
- 883: Military 883 range. Only available with conduction cooled PCB.

Board Version
- 1: 24 D/A channels, 12 bit, without galvanic isolation.
- 2: 24 D/A channels, 12 bit, full galvanic isolation.

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