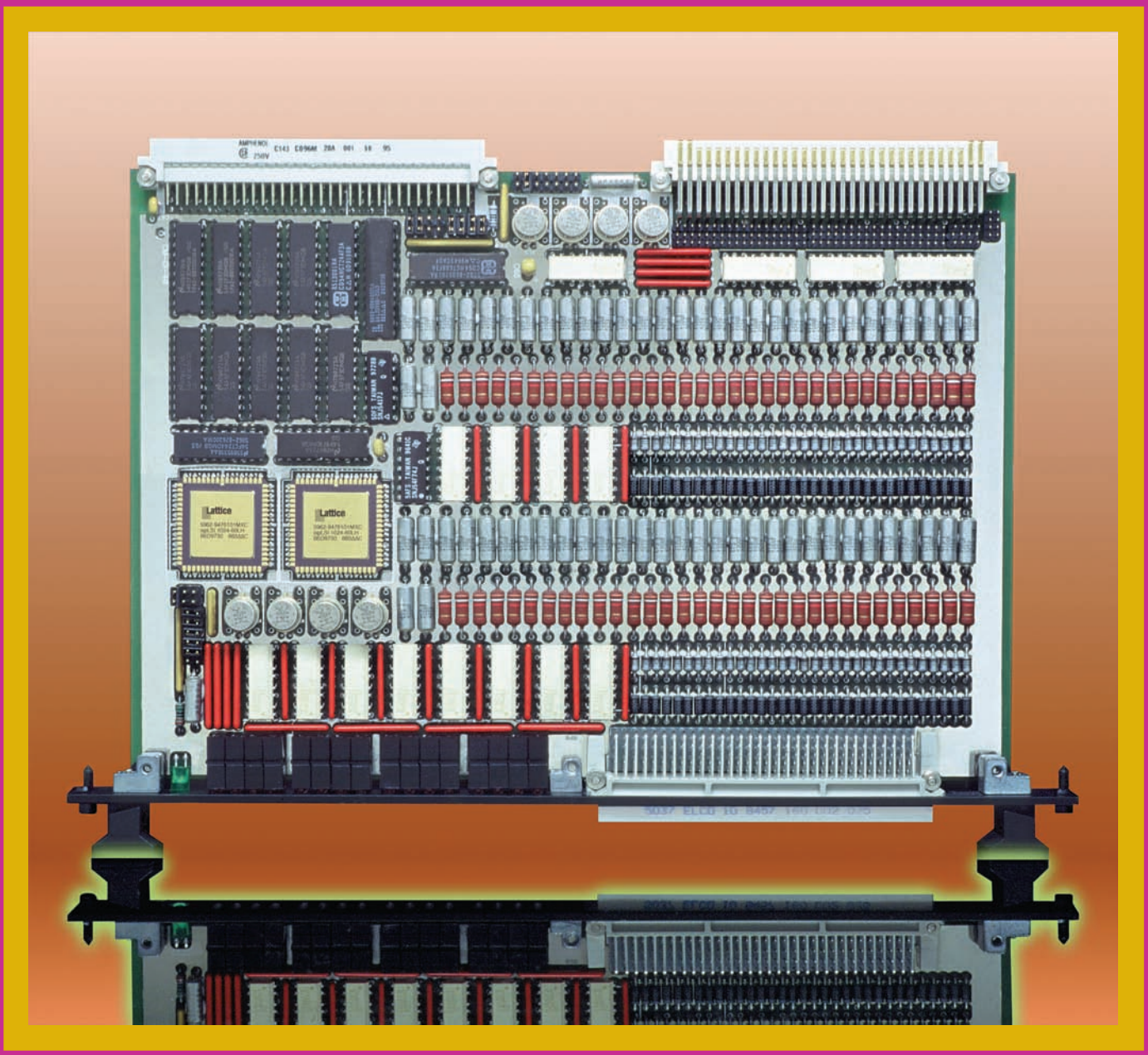
Computer

6U VMEbus Series

CM-DI-40

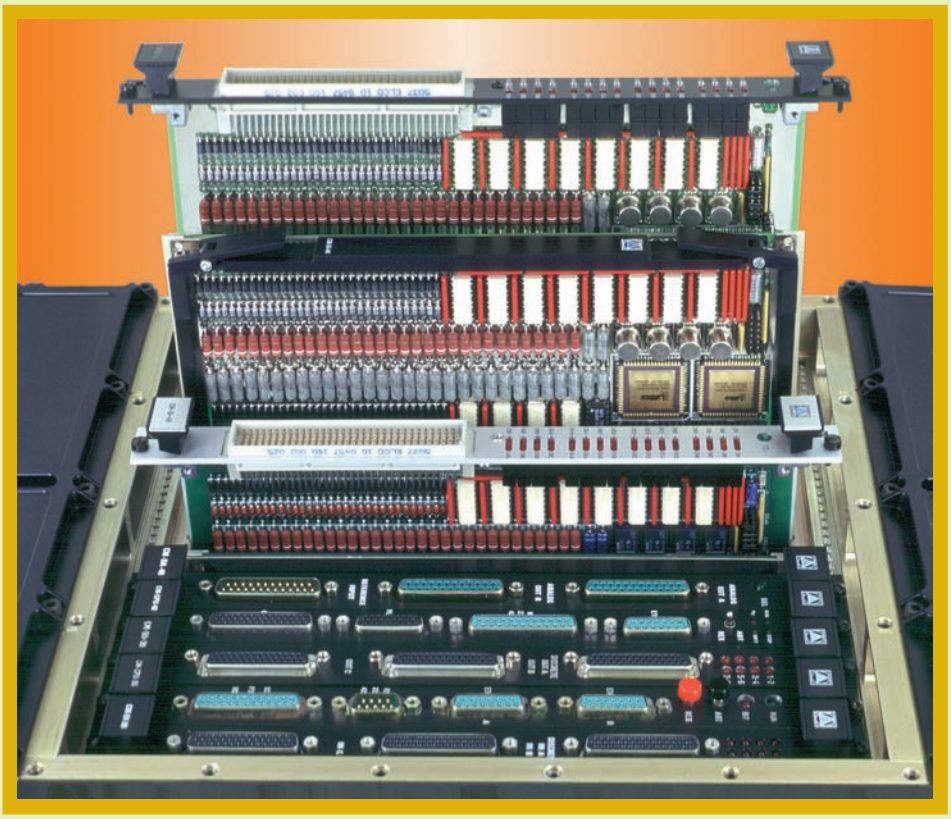


64 Channel Optocoupled Input Module

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

FEATURES

- 64 optoisolated input channels per board.
- 3 to 300 VRMS AC/DC input range.
- Full galvanic isolation > 1000 V per channel.
- Overvoltage input protection per channel.
- 64 LED indicators on front panel show input channel ON-OFF status.
- Discrete input signals via 160 pin VME64x connectors on front panel and P2.
- Input Change Detector samples and compares all input channels and asserts interrupts on any change. I (1-7) VMEbus Interrupter.
- Low power CMOS design (2 Watts).
- On board Built-In-Test capability allows testing all module TTL chips.
- Industrial, MIL-Rugged & MIL-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-STD-883 FPGAs and TTL chips.
- MIL-C-55302 Class I Connectors.
- MIL-R-39016 Built-In-Test relays.
- 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 Vibration (Methods 514 & 516).
- MIL-STD-810 D Saline Fog and Dust (Methods 507 & 509).
- Military Class V Printed Circuit Board.

DESCRIPTION

❑ The **CM-DI-40** is a general purpose 64 channel optocoupled input VMEbus board. This professional module offers an outstanding design which incorporates features most demanded in today´s first class military and industrial applications.

❑ It incorporates specific Built-In-Test circuitry which allows testing all on board TTL chips. Wraparound loops disconnect external application signals and connect internal test signals in order to verify correct module operation.

❑ The board implements a complete input voltage stage per channel, featuring overvoltage protection, galvanic isolation, rectifier & filter and easy configuration to accept a wide range of AC/DC voltage levels.

❑ The **CM-DI-40** offers a highly flexible I/O cabling solution using VME64x connectors on both front panel and P2. Both connectors have identical pin-outs.

❑ Military versions, provided with conduction cooled thermal overlay, greatly improve capability to withstand shock and vibration.

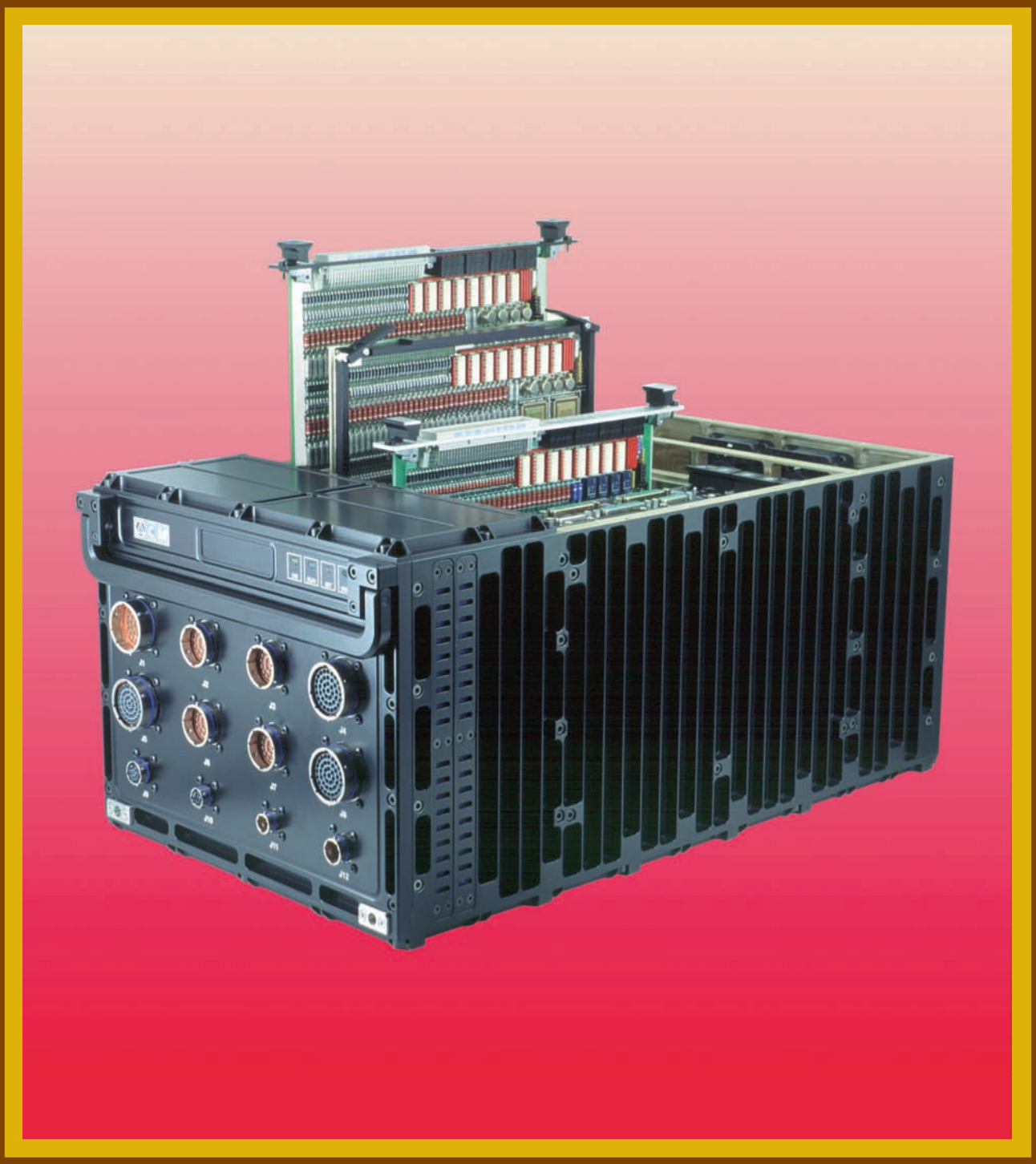
❑ The metallic layer in the PCB also benefits heat dissipation and allows all components to work within homogeneous temperatures, thus greatly increasing component longevity and module MTBF.

❑ All **CM-DI-40** versions are 100% compatible at the functional level, allowing software development to proceed with low cost Industrial versions.

FRONT PANEL

TECHNICAL SPECIFICATIONS

Input channels:	64 independent input channels each one fitted with optocoupler.
Channel protection:	1 W resistor & 1 W zener diode.
Input overvoltage:	Up to 30% nominal for extended periods. 300% for transitory peaks.
Galvanic isolation:	Full galvanic isolation > 1000 V on all channels with respect to the VMEbus power & TTL lines.
Input voltage ranges:	Can be factory fitted for any range from 3 to 300 VAC/DC.
Input current (ON):	3 to 5 mA per channel.
Optocoupler frequency:	DC to 10 KHz.
Input Change Detector:	Programmable input sampling rate from 62.5KHz to 122Hz.
Control Register:	Manages BIT and enables IRQs.
Front panel LEDs:	64 LEDs. Illuminated when the associated channel is driven by nominal voltage (ON).
Power consumption:	+5VDC @ 450 mA.
Weight:	
Military R+ & 883	565 grams.
Industrial	430 grams.
Mechanical size:	Single slot 6U (233.4x160 mm).
Mechanical format:	
CM-DI-40/A	Classic IEC-297 mechanics for 19" racks with I/O on front panel.
CM-DI-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 Interrupter:	I (1-7). Asserts IRQs to the VME master on channel input changes.
VMEbus addressing:	Two jumper blocks provide 256 mapping options in the A24 range.

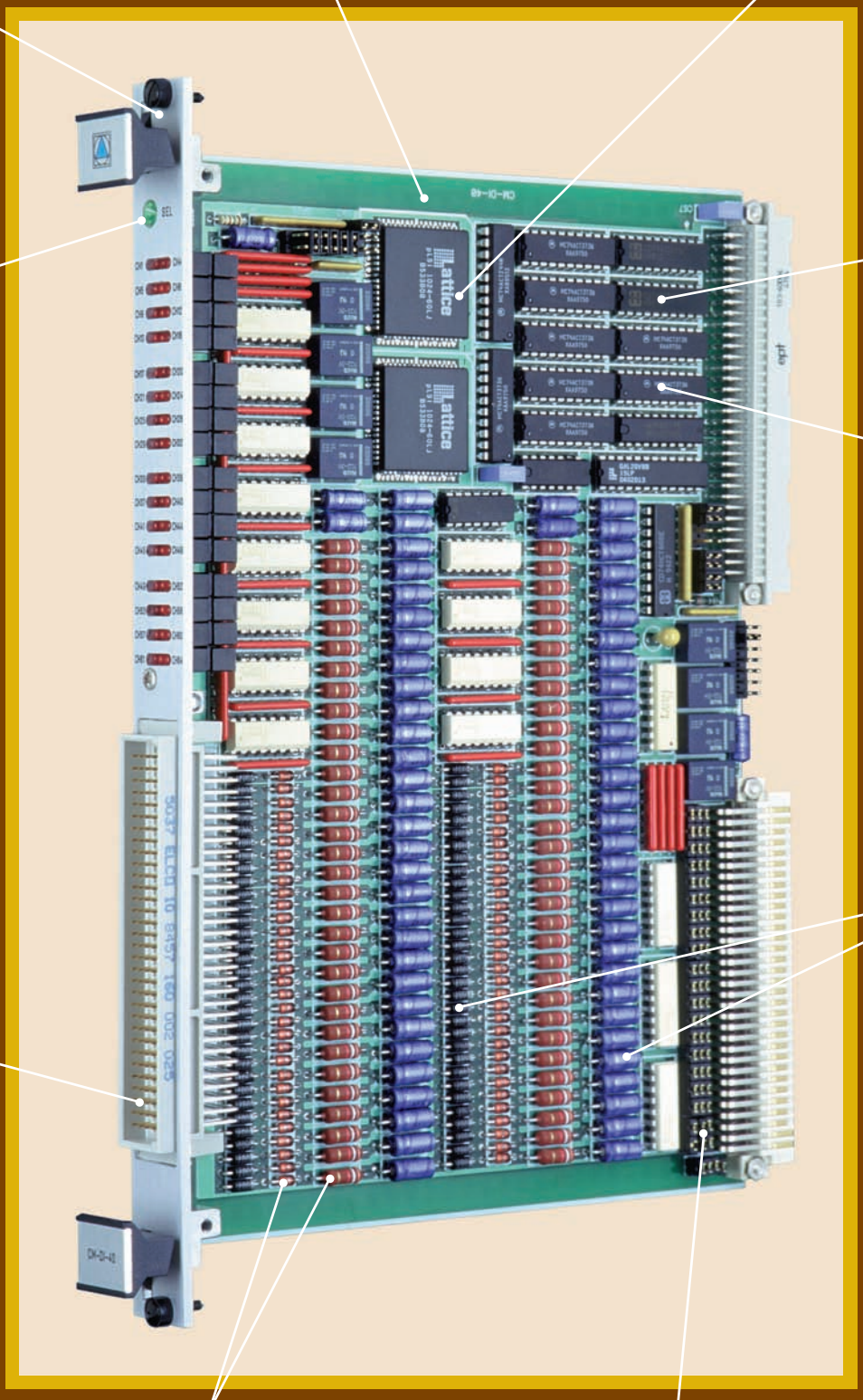


CM-DI-40 Modules inserted in CM-RA-40/AV ATR Avionics Enclosure

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

FIBERGLASS PCB
in Industrial version

INPUT CHANGE DETECTOR asserts IRQs on either Low-to-High or High-to-Low transitions on any input channel



A24/D16 VMEbus slave interface

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

INDUSTRIAL ICs
in plastic package and -25 to +85 ºC range

RECTIFIER & FILTER
per channel converts AC input signals to DC prior to driving optocouplers

FRONT PANEL
VME64x connector wires the 64 input signals (128 pins)

INPUT PROTECTION
Resistor and Zener prevents channel overvoltage damage

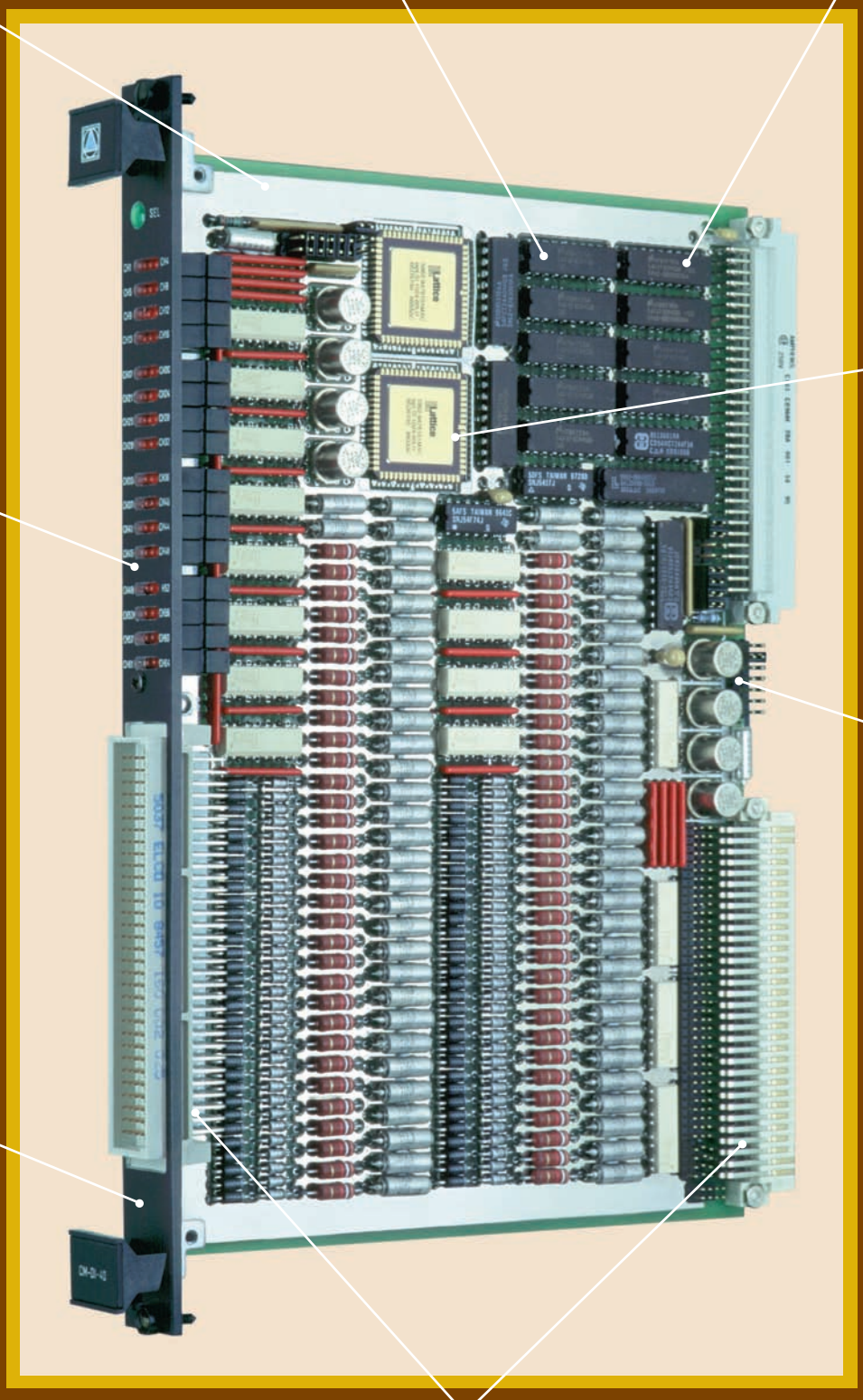
JUMPER BLOCK
wire-removes all input signals from P2

CM-DI-40/I INDUSTRIAL VERSION

CONDUCTION COOLED
thermal overlay PCB

MODULE CONTROL REGISTER
enables IRQs, generates BIT cycles
and programs the ICD sampling rate

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



VME INTERRUPTER
offers programable level
and supplies a unique
ID-vector for each group
of 16 input channels

64 CHANNEL LEDs
on front panel show
all input signals
ON/OFF status

JUMPER BLOCK
allows 256 addressing
options in the VME
A24 range

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

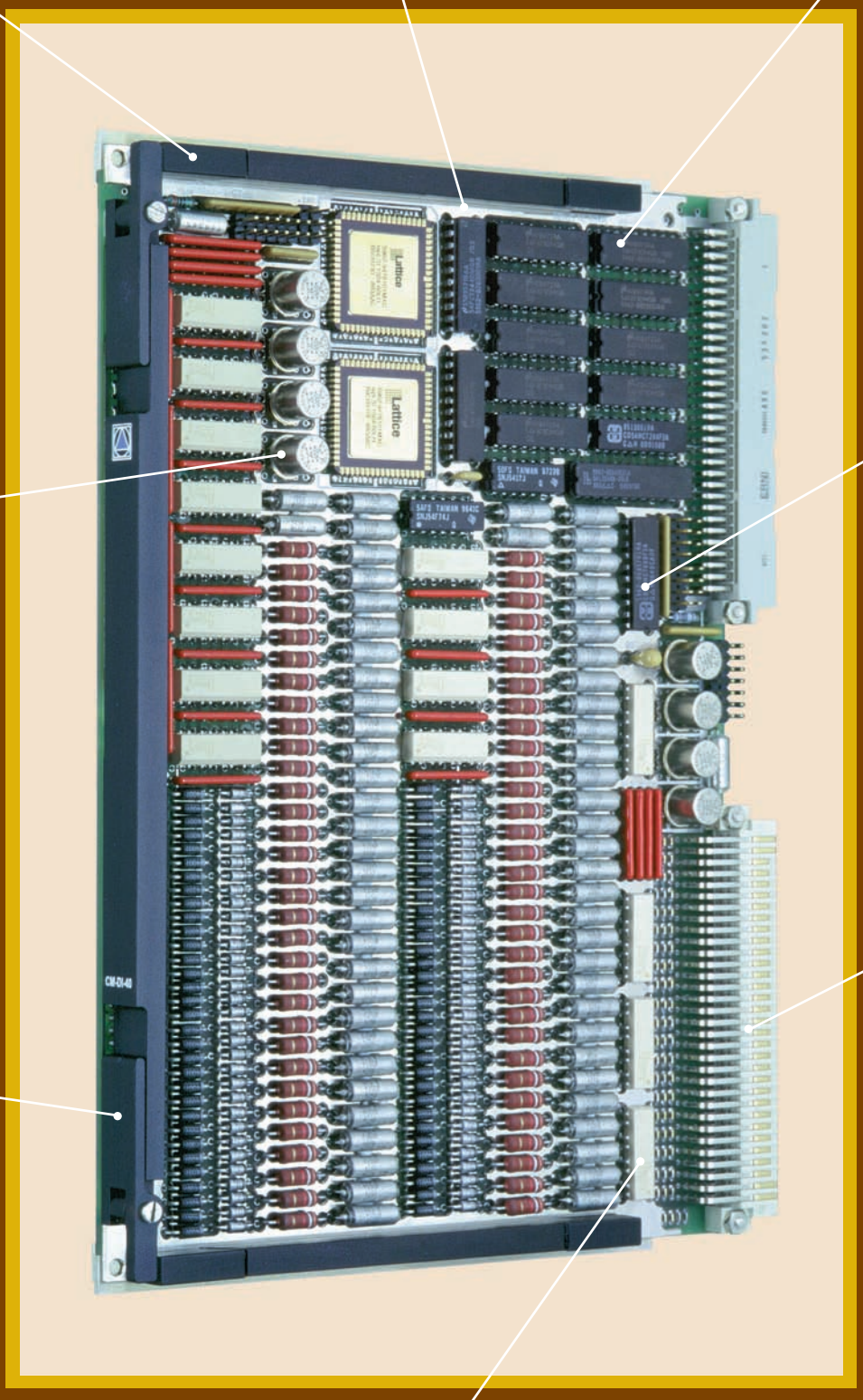
CLASS I MIL C-55302 & MIL C-24308 CONNECTORS
withstand > 500 insertion cycles

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

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

CONDUCTION COOLED
thermal overlay PCB

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



THERMAL PASTE
behind ICs improves heat dissipation with the thermal overlay

BUILT-IN-TEST
relays allow testing the module circuitry

P2 CONNECTOR
wires all application discrete input signals

FRONT PANEL with extraction handlers improves mechanical performance

INPUT OPTOCOUPLERS
provide complete isolation while only requiring 3 mA of external current

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

BOARD RANGE

INDUSTRIAL (I):

Manufactured with Industrial range plastic or ceramic IC's rated for -40 (-25) to +85 ºC. Continuous module operation from -20 to +75 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 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-DI-40 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.

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

ORDERING INFORMATION

CM-DI-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
- 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: 64 channel optocoupled input board. Voltage range specified by the customer.
- 2: 64 channel optocoupled input board. Voltage range 0-5 VDC
- 3: 64 channel optocoupled input board. Voltage range 0-12 VDC
- 4: 64 channel optocoupled input board. Voltage range 0-28 VDC
- 5: 64 channel optocoupled input board. Voltage range 0-48 VDC
- 6: 64 channel optocoupled input board. Voltage range 0-115 VAC RMS @ 60 Hz sine.
- 7: 64 channel optocoupled input board. Voltage range 0-220 VAC RMS @ 50 Hz sine.
- 8: 64 channel optocoupled input board. Voltage range 0-26 VAC RMS @ 400 Hz sine.
- 9: 64 channel optocoupled input board. Voltage range 0-32 VAC RMS @ 60 Hz sine.

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