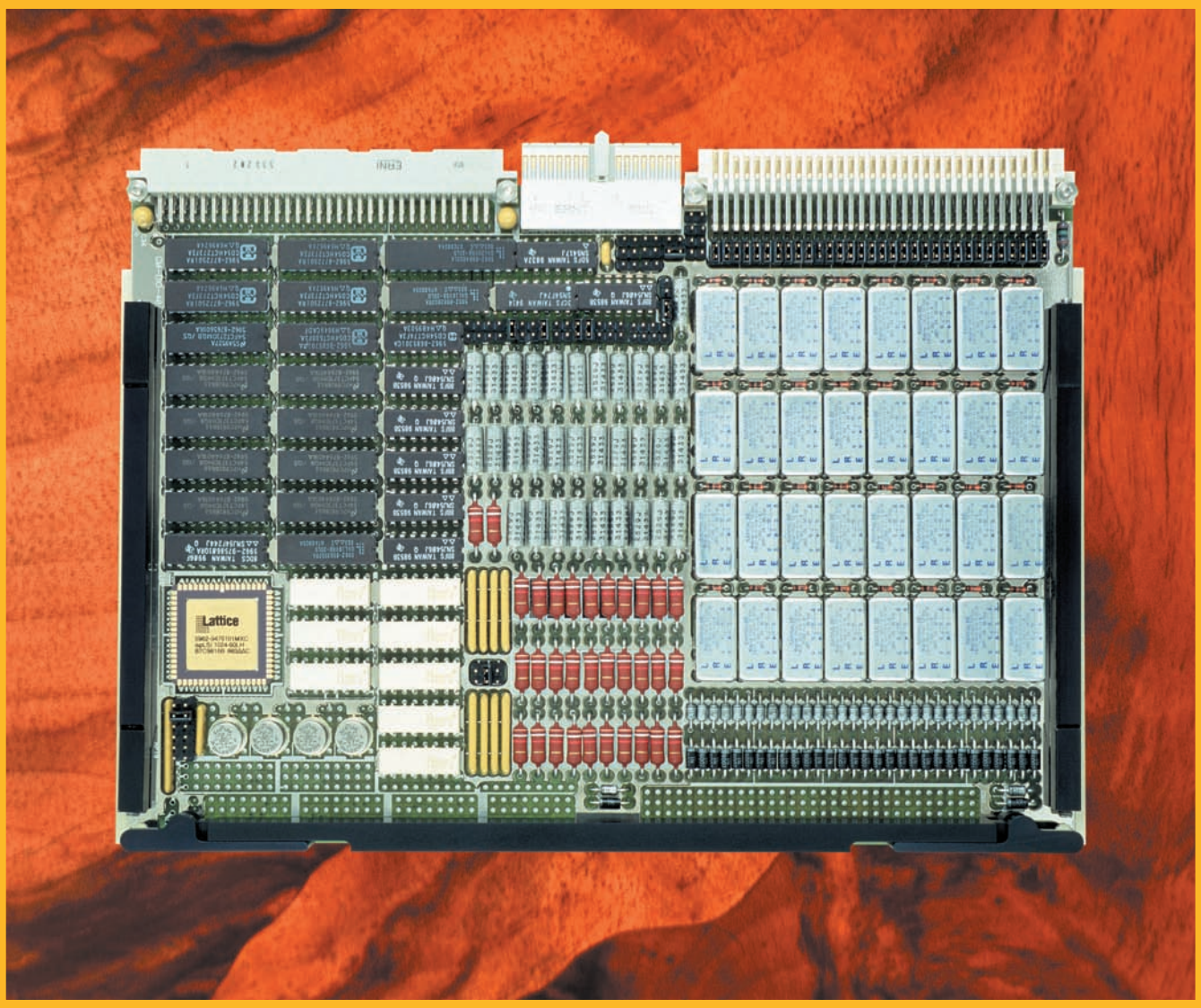
Computer

6U VMEbus Series

CM-DIO-40

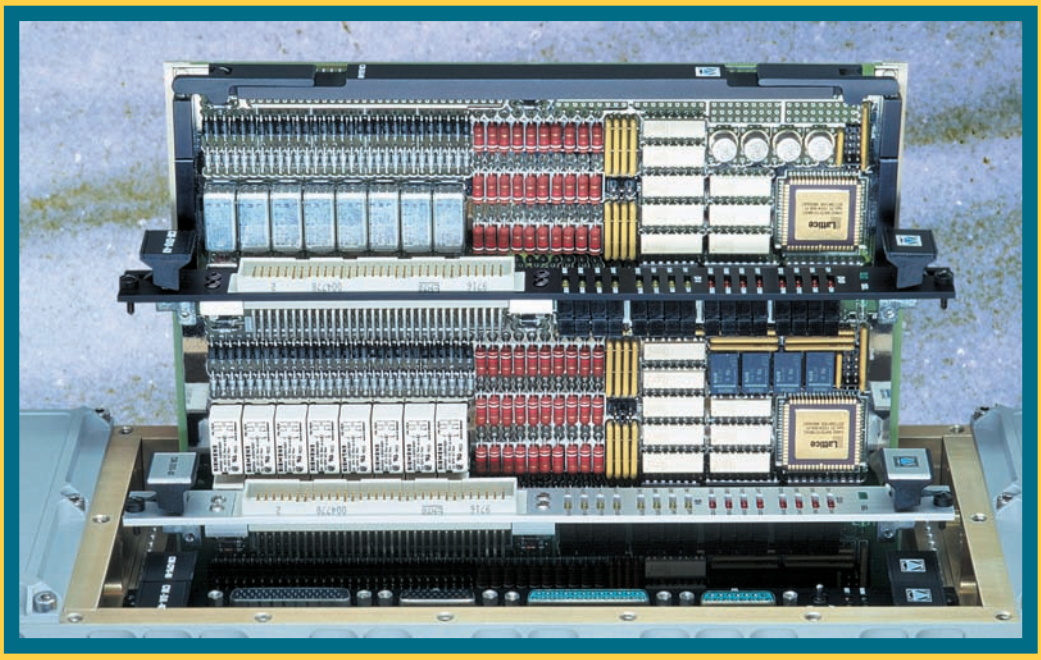


32 Input + 32 Output Optocoupled Module

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

FEATURES

- 32 input plus 32 output channels per board.
- 3 to 300 VRMS AC/DC input range.
- AC/DC output levels up to 400 V @ 1 Amp.
- Supports 11 different output devices: Relays, Optocouplers, Photo-MOS, SSRs, Power MOSFET, Triacs, Thyristor, TTL, etc.
- Full galvanic isolation > 1000 V on all inputs.
- Four galvanic isolated output device versions.
- Overvoltage input protection per channel.
- 64 LED indicators on front panel show all I/O channel ON-OFF status.
- Input Change Detector samples and compares input channels and asserts interrupts on any level change. I (1-7) VMEbus Interrupter.
- Discrete I/O signals via 160 pin VME64x connectors on front panel and P2.
- Input/Output channel Built-In-Test capability allows testing all module TTL chips.
- 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.
- Low power CMOS design.
- 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 Relays in MIL-883 version.
- 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-DIO-40** is a universal 32 input plus 32 output discrete VMEbus board. This professional module incorporates features most demanded in first class military and industrial applications.

❑ All input channels feature overvoltage protection, galvanic isolation, rectifier & filter and easy configuration for a wide range of AC/DC voltage levels.

❑ All output channels can be factory fitted to support a choice of 11 different device configurations. Relay, Optocoupler, PhotoMOS & SSR versions are isolated.

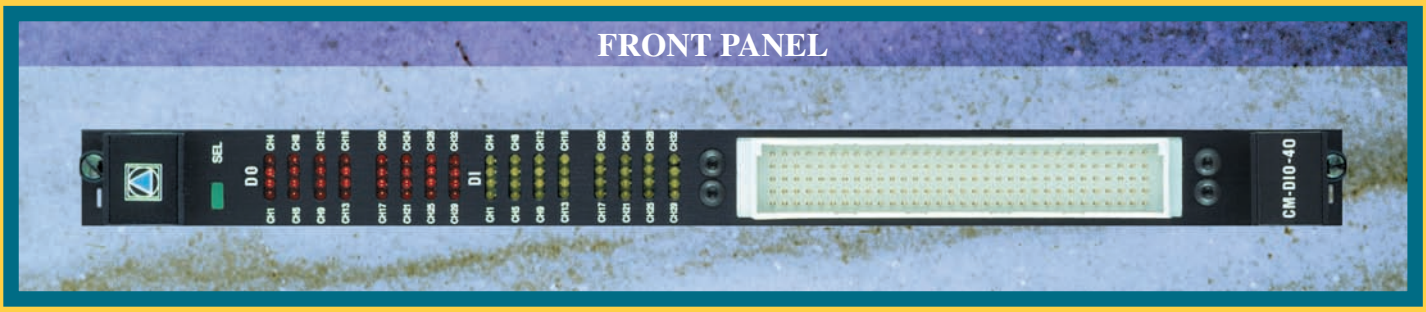
❑ Built-In-Test is based on wraparound loops that disconnect external signals and connect internal test signals in order to verify correct module operation.

❑ The **CM-DIO-40** offers a highly flexible I/O cabling solution using VME64x connectors on the 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.

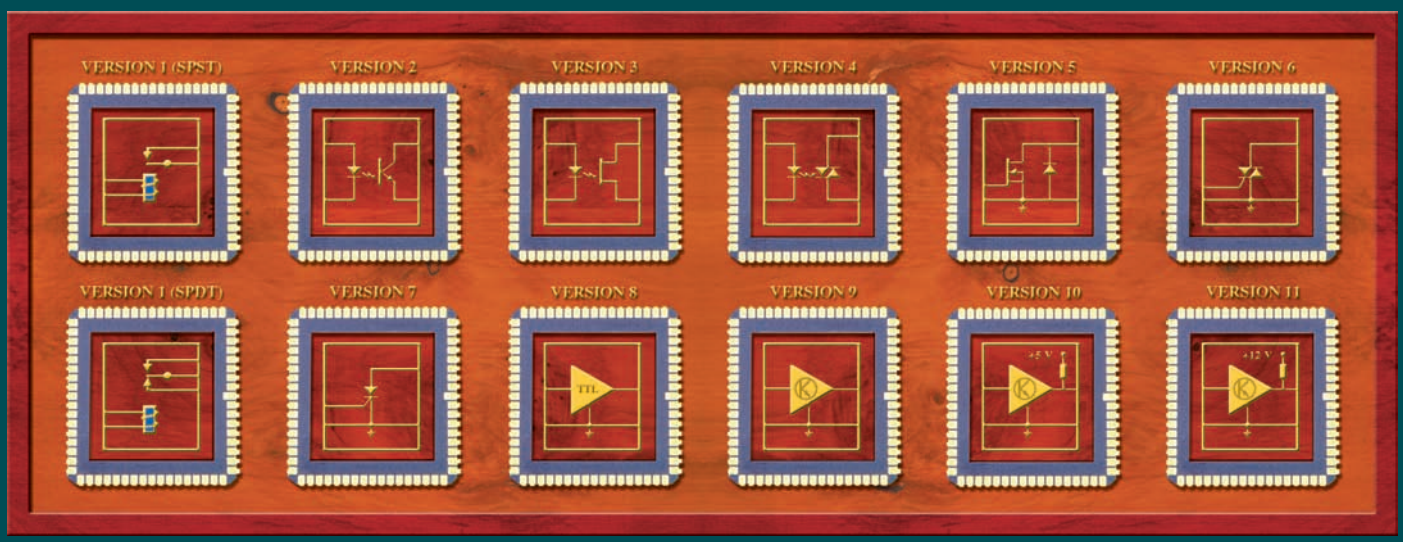
❑ The metallic layer in the PCB also benefits heat dissipation and allows all components to work within homogeneous temperatures, thus greatly increasing component longevity and module MTBF.

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

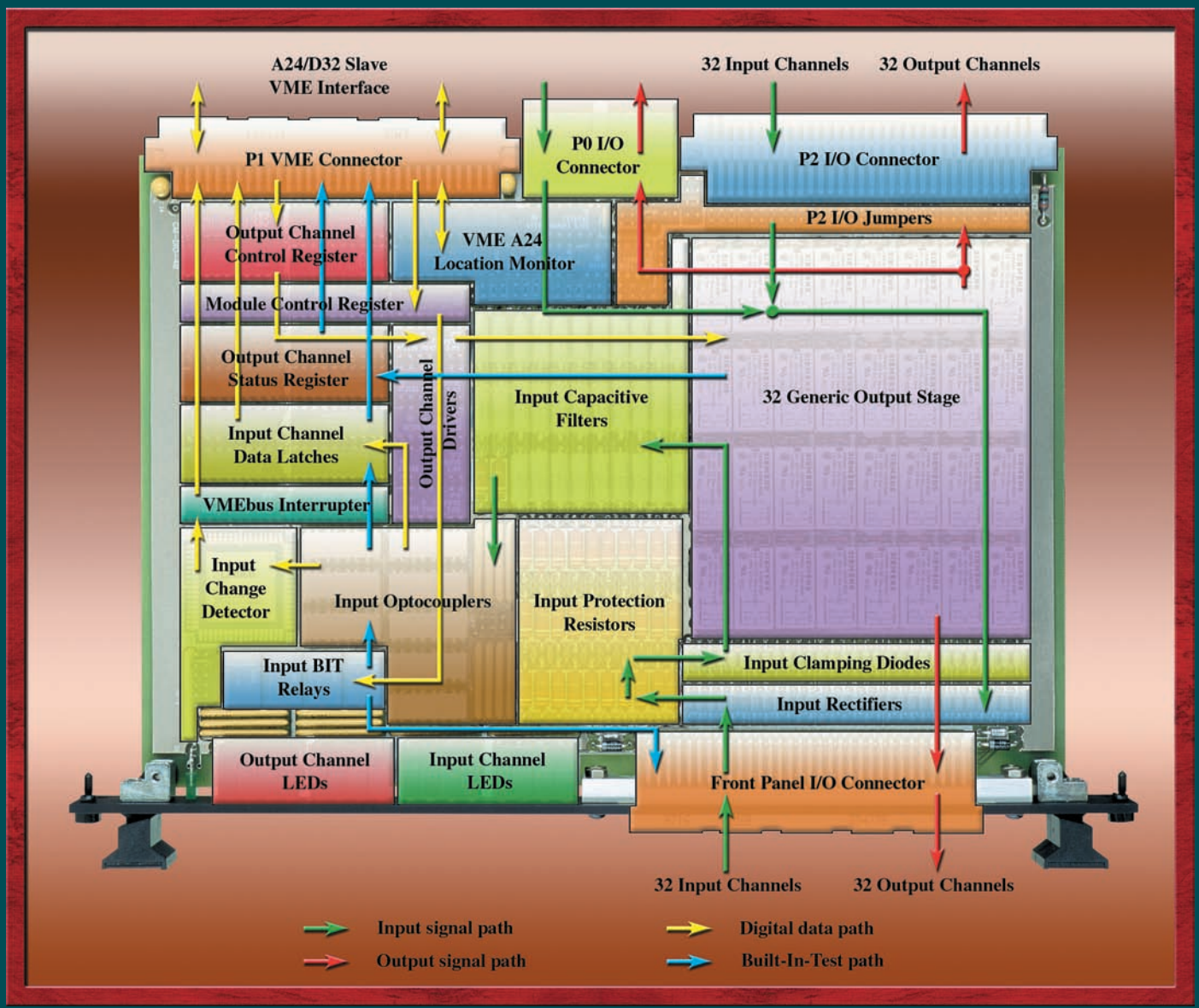


TECHNICAL SPECIFICATIONS

32 Input channels:	Each one fitted with optocoupler.
Channel protection:	1 W resistor & 1 W zener diode.
Input overvoltage:	Up to 30% of nominal voltage for extended periods. Up to 300% for transitory peaks.
Galvanic isolation:	> 1000 V on all inputs with respect to the VMEbus power & TTL lines.
Input voltage ranges:	Can be factory fitted for any range from 3 to 300 VAC or VDC.
Input current (ON):	3 to 5 mA per channel.
Optocoupler frequency:	DC to 10 KHz.
Input Change Detector:	Programmable input sampling rate of 31.25 KHz or 244 Hz.
Relay Output version: (isolated)	32 sealed relays. SPST & SPDT contacts up to 300 V @ 1 Amp.
Optocoupler version: (isolated)	32 optocouplers with 50 VDC @ 100 mA output phototransistors.
Photo-MOS version: (isolated)	32 photoMOS FETs. 400 VDC/AC @150 mA bidirectional switch.
SSR version: (isolated)	32 Solid State Relays. Outputs rated for 10-280 VAC @ 1 Amp.
Power MOSFET version: (common source)	32 N-channel open drain power MOSFETs. 400 VDC @ 1 Amp.
Triac version:	32 triacs rated for 400 VAC @ 1A.
Thyristor version:	32 P-gate SCRs. 400 VAC @ 1 A.
TTL totem-pole version:	32 output gates. 60 mA sink. High speed FAST TTL compatible.
Open Collector version:	32 TTL gates with open collector transistors up to 30 VDC @ 50 mA.
Open Collector version: (+5 or +12 VDC pull-up)	32 open collector transistors with 1 K (+5 V) or 2K2 (+12V) pull-ups.
Output Status Register:	Returns output channel status and closes BIT wraparound loop.
Module Control Register:	Manages BIT and enables IRQs.
Front panel LEDs:	64 LEDs. Illuminated when the associated channel is driven ON.
Power consumption:	+5VDC @ 400 mA (channels OFF).
Weight:	
Industrial	550 gr. relays; 430 other.
Military R+ & 883	700 gr. relays; 560 other.
Mechanical size:	Single slot 6U (233.4x160 mm).
Mechanical format:	
CM-DIO-40/A	Air cooled IEC-297 mechanics.
CM-DIO-40/B	IEEE P1101 wedgelock mechanics.
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.
VMEbus Interrupter:	Assert IRQs on input changes.



CM-DIO-40 Output Device Options

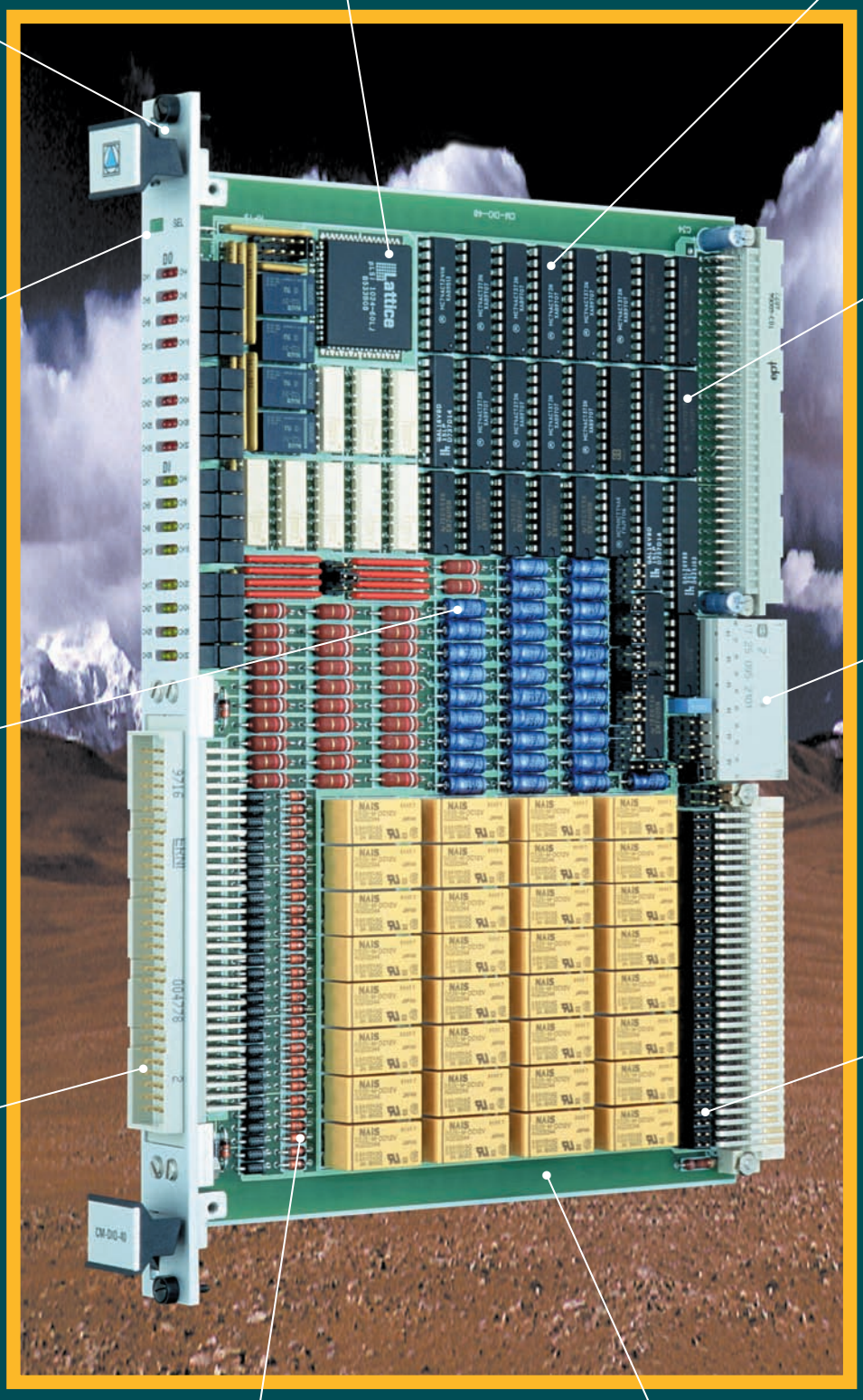


CM-DIO-40 Block Diagram

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

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

CHANNEL STATUS REGISTER monitors the current ON/OFF status of the 32 output channels



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

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

P0 CONNECTOR
improves I/O capability and allows key slot configuration

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

JUMPER BLOCK
connect-disconnects I/O signals to-from P2

FRONT PANEL VME64x
connector wires the 64 I/O channels (160 pins)

INPUT PROTECTION
Resistor and Zener prevents channel overvoltage damage

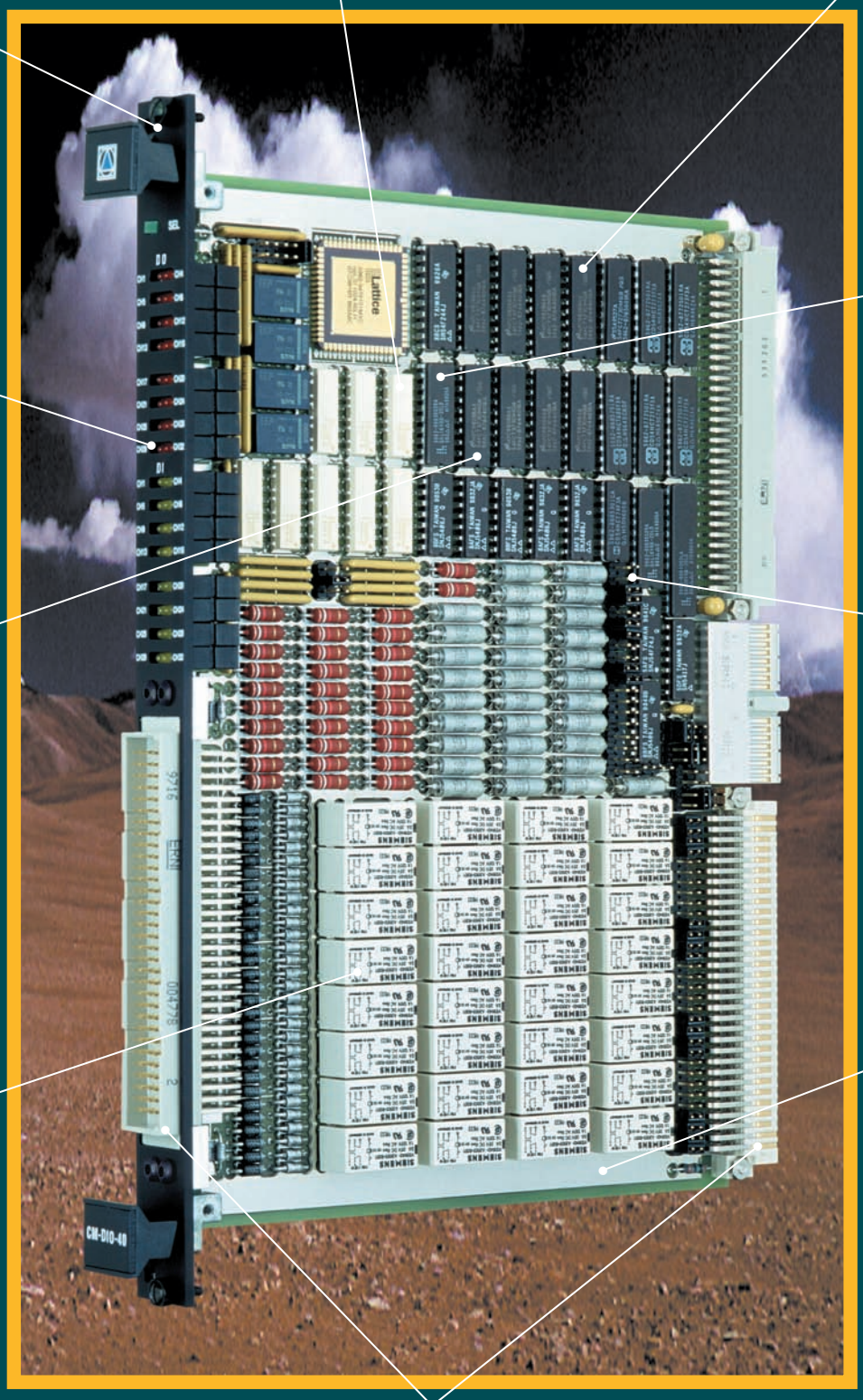
FIBERGLASS PCB
in Industrial version

CM-DIO-40/I INDUSTRIAL VERSION

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

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

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



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

64 CHANNEL LEDs on front panel show I/O signal ON/OFF status

LOW POWER
CMOS IC’s improve power consumption and increases module MTBF

JUMPER BLOCK
allows 256 addressing options in the VME A24 range

CONDUCTION COOLED
thermal overlay PCB

ISOLATED RELAYS
provide SPST & SPDT floating output contacts

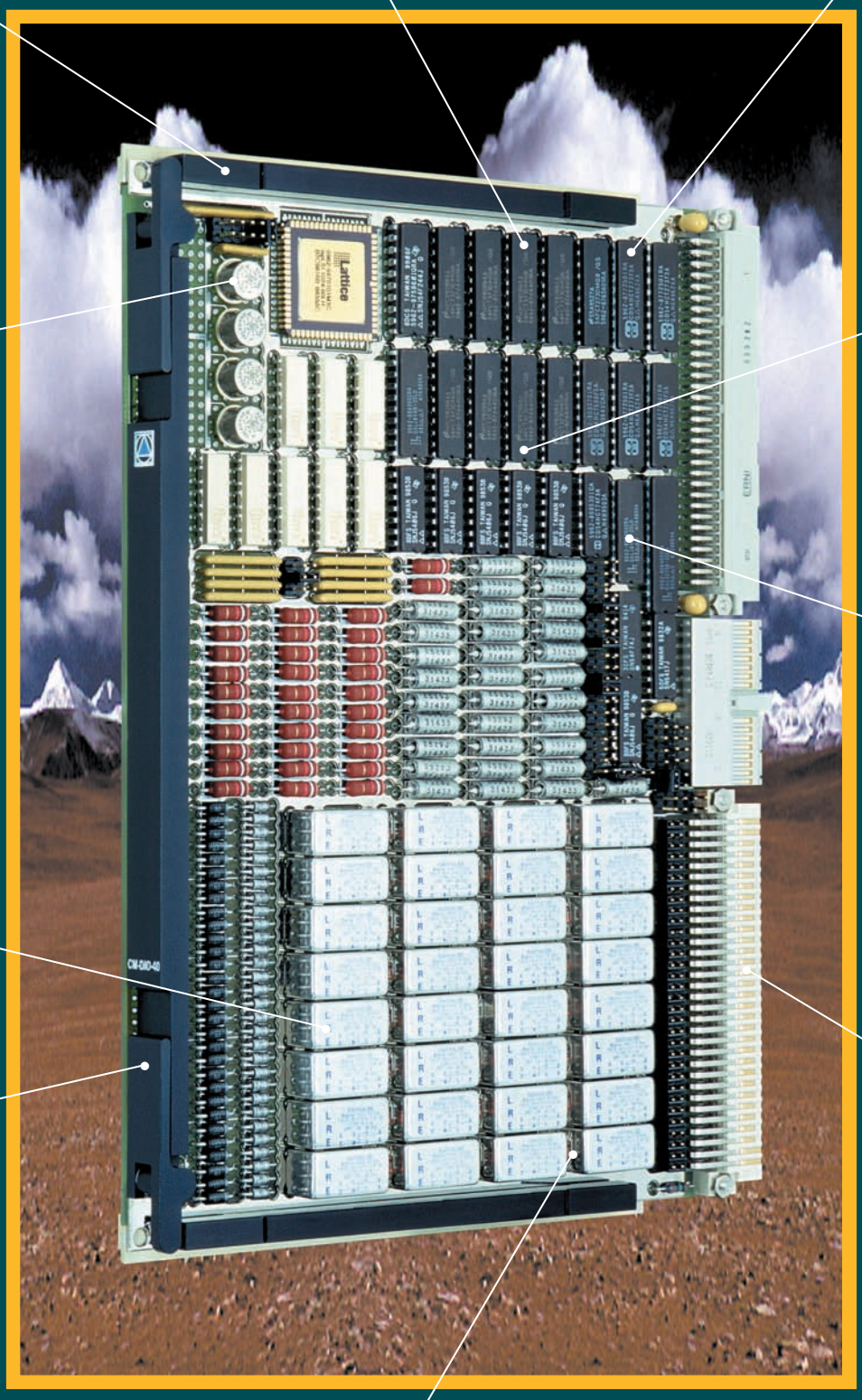
CLASS I MIL C-55302 & MIL C-24308 CONNECTORS
withstand > 500 insertion cycles

CM-DIO-40/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 package
and -55 to +125 ºC range

CHANNEL PROGRAMMING
REGISTER programs ON/OFF
output status of the 32 channels



BUILT-IN-TEST
Status Register
allows testing the
32 output channels

BUILT-IN-TEST
relays allow testing
the input channels

THERMAL PASTE
behind ICs impro-
ves heat dissipation
with the thermal

FLEXIBLE OUTPUT
STAGE per channel can
be factory fitted with
any industry standard
output device

P2 CONNECTOR
wires all application
discrete I/O signals

FRONT PANEL with
extraction handles
improves mechanical
performance

400 V @ 1 Amp PCB TRACK
capacity cover virtually all medium
and low power applications

CM-DIO-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 MIL-C-55302 military connectors. MIL-R-39016 Relays. Continuous board operation range from -50 to +90 ºC. Storage from -55 to +125 ºC.

SOFTWARE SUPPORT

Wind River Systems VxWorks Tornado

The **CM-DIO-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.

Microtec MCC-68K Drivers

A "C" language source code driver written for the popular MCC-68K cross-compiler from Microtec 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 upon request.

DOCUMENTATION

LEVEL 1, CM-DIO-40 MAP: User´s manual. Module hardware functional description oriented toward software development.

ORDERING INFORMATION

CM-DIO-40 /I /O /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 Input Version
- **1:** Input voltage range specified by the customer.
- **2:** Input voltage range 0-5 VDC.
- **3:** Input voltage range 0-12 VDC.
- **4:** Input voltage range 0-28 VDC.
- **5:** Input voltage range 0-48 VDC.
- **6:** Input voltage range 0-115 VAC RMS @ 60 Hz sine.
- **7:** Input voltage range 0-220 VAC RMS @ 50 Hz sine.

Board Output Version ("*" available with Direct or Inverted output configuration)
- **1:** 32 Relays with 32 SPDT plus 32 SPST contacts.
- **2:** 32 Optocouplers with 50 VDC @ 100 mA open-collector phototransistors.
- **3:** 32 Photo-MOSFETs up to 400 Volts AC/DC @ 150 mA.
- **4:** 32 Solid State Relays (SSR) from 10 to 280 VAC @ 1 Amp.
- **5:** 32 Open-Drain power MOSFETs up to 400 VDC @ 1 Amp.
- **6:** 32 Triacs up to 400 VAC @ 1 Amp.
- **7:** 32 Thyristor (SCR) up to 400 VAC @ 1 Amp.
- **8:** 32 Totem-pole FAST TTL outputs (*).
- **9:** 32 Open-Collector TTL gates up to 30 VDC @ 50 mA (*).
- **10:** 32 Open-Collector TTL gates with on-board 1K pull-up resistors to +5 VDC (*).

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