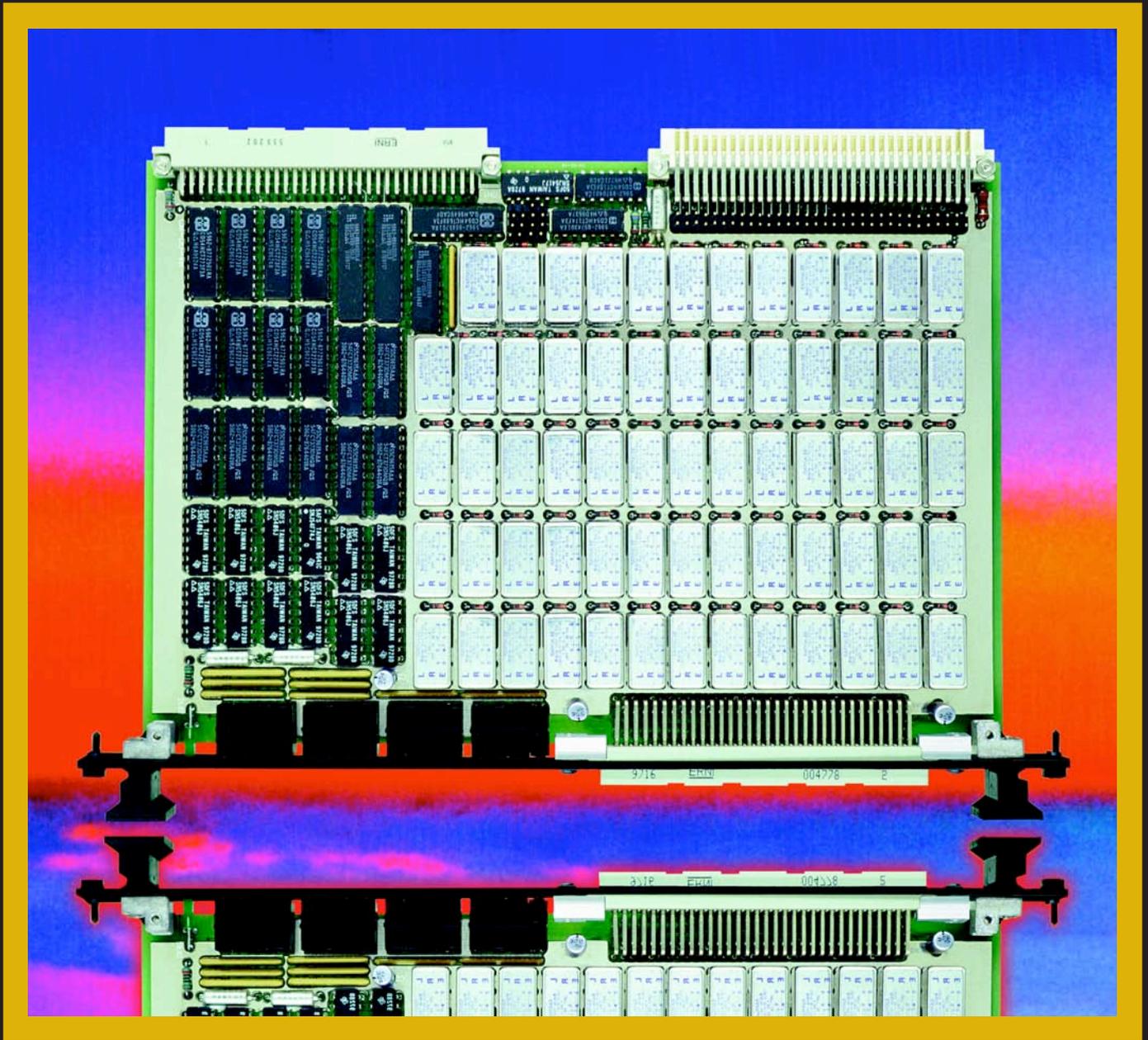




Computer

6U VMEbus Series

# CM-DO-40

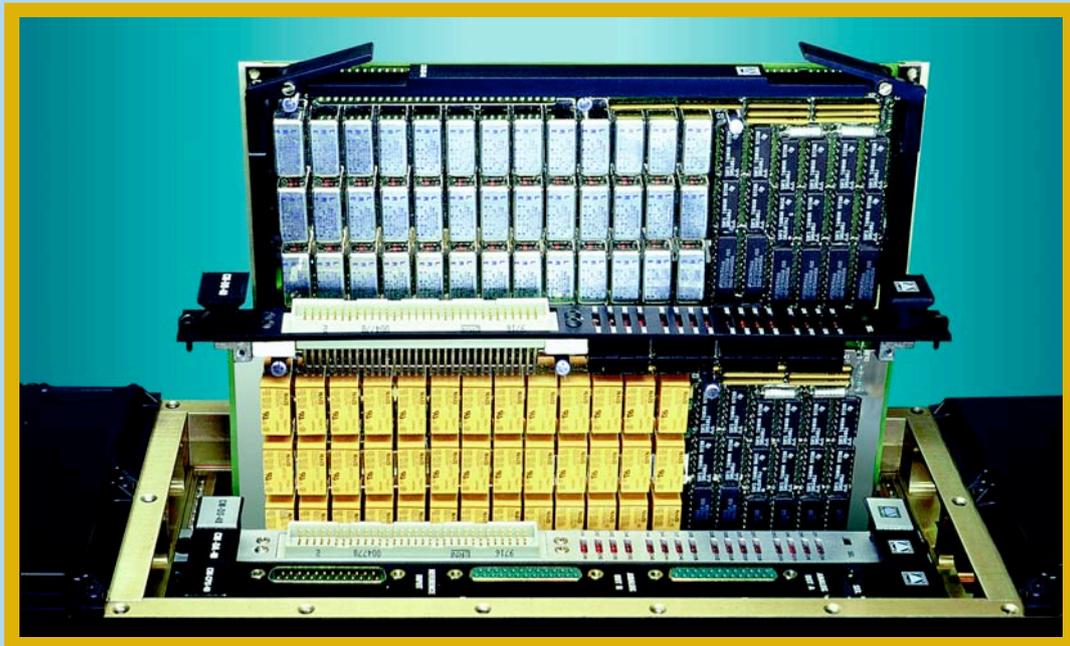


## 64 Channel Discrete Output Module

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

## FEATURES

- ❑ 64 discrete output channels per board.
- ❑ AC/DC output levels up to 400 V @ 1 Amp.
- ❑ Supports 11 different output devices:  
Relays, Optocouplers, Photo-MOS, SSRs,  
Power MOSFET, Triacs, Thyristors, TTL, etc.
- ❑ Four output device versions are galvanically isolated.
- ❑ Discrete output signals via 160 pin VME64x connectors on front panel and P2.
- ❑ 64 LED indicators on front panel show all output channels ON-OFF status.
- ❑ Low power CMOS design.
- ❑ On board Built-In-Test capability allows testing all the 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 MIL-883 versions.
- ❑ Extensive software support.
- ❑ Extremely simple programming.
- ❑ Excellent price/performance ratio.
- ❑ Two year guarantee.

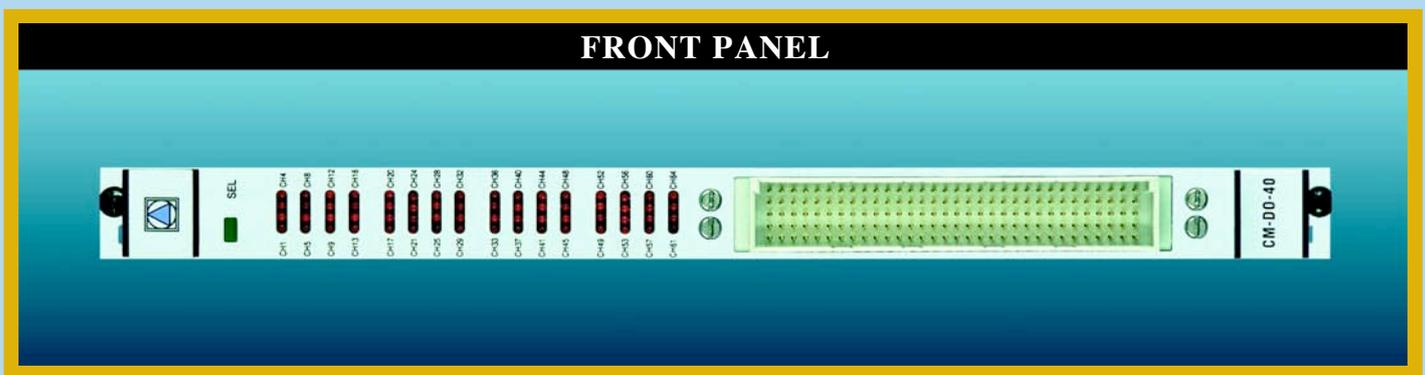


## MILITARY DESIGN

- ❑ -55 to +125 °C ceramic military ICs.
- ❑ MIL-STD-883 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 Vibrations (Methods 514 & 516).
- ❑ MIL-STD-810 D Saline Fog and Dust (Methods 507 & 509).
- ❑ Military Class V Printed Circuit Board.

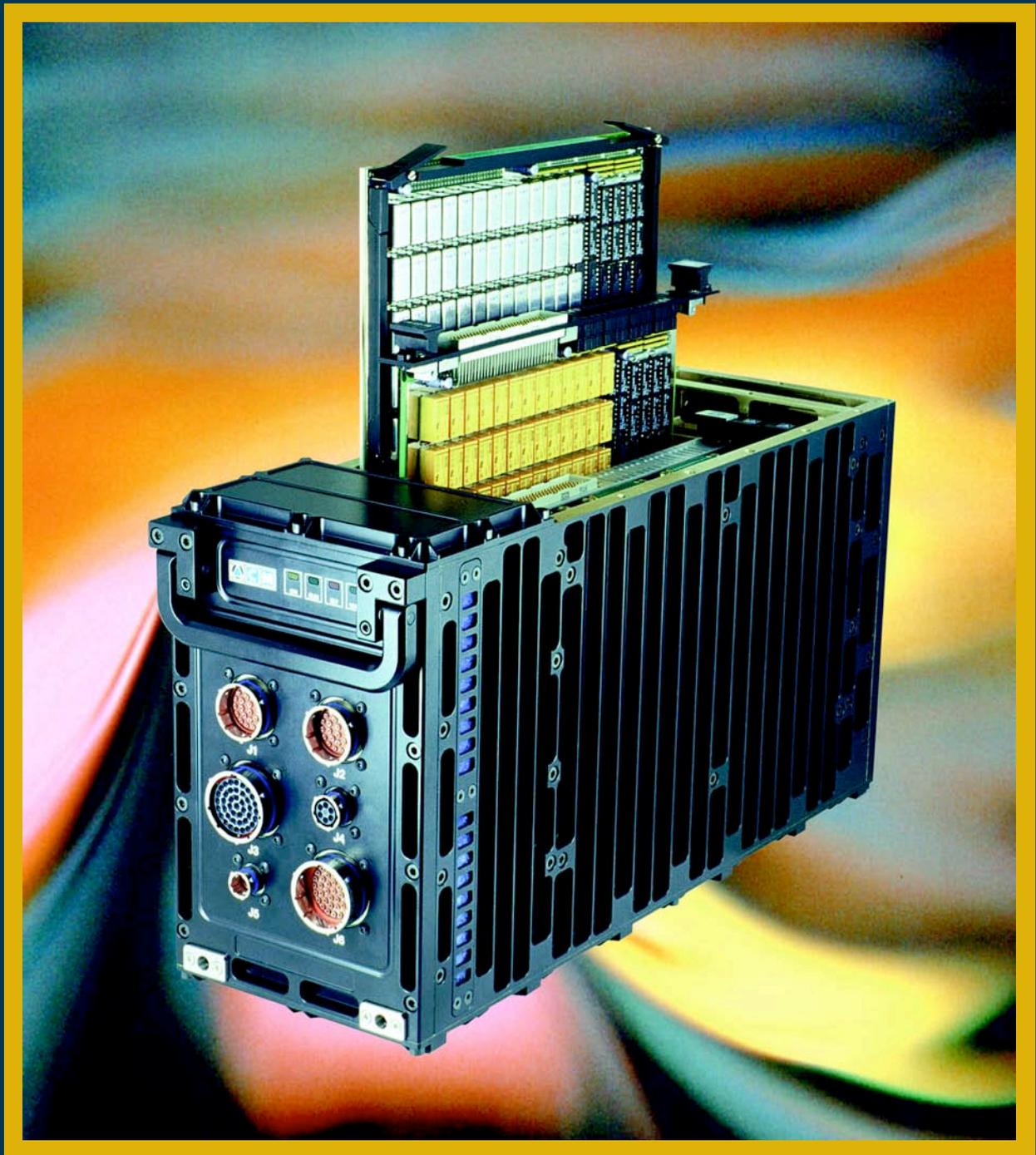
## DESCRIPTION

- ❑ The **CM-DO-40** is a universal 64 channel discrete output 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 by means of wraparound loops which read-back the channel status in order to verify correct module operation.
- ❑ Its flexible output stage per channel can be factory fitted to support a choice of eleven different output device configurations.
- ❑ Relay, Optocoupler, Photo-MOS and SSR versions offer galvanically isolated floating outputs (>1000 V).
- ❑ The **CM-DO-40** offers a highly flexible I/O cabling solution using VME64x connectors on both front panel and P2. Both connectors have identical pin-out.
- ❑ 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-DO-40** temperature and output device versions are 100% compatible at the functional level, allowing software development to proceed with low cost Industrial versions.



## TECHNICAL SPECIFICATIONS

<b>Relay version:</b> (isolated)	64 sealed relays. SPST & SPDT contacts up to 300 V @ 1 Amp.	<b>Front panel LEDs:</b>	64 LEDs. Illuminated when the associated channel is driven ON.
<b>Optocoupler version:</b> (isolated)	64 optocouplers with 50VDC @ 100 mA output phototransistors.	<b>Channel Program Reg.:</b>	Programs channel output status.
<b>Photo-MOS version:</b> (isolated)	64 photo-MOS FETs. 400VDC/AC @ 150 mA bidirectional switch.	<b>Channel Status Reg.:</b>	Returns channel status and closes Built-In-Test wraparound loop.
<b>SSR version:</b> (isolated)	64 Solid State Relays. Outputs rated for 10-280 VAC @ 1 Amp.	<b>Power consumption:</b>	+5VDC @ 400 mA (channels OFF)
<b>Power MOSFET ver.:</b> (common source)	64 N-channel open drain power MOSFETs. 400 VDC @ 1Amp.	<b>Weight (grams):</b>	
<b>Triac version:</b> (common MT1)	64 general purpose Triacs rated for 400 VAC @ 1 Amp.	<b>Military R+ &amp; 883 Industrial</b>	800 gr. relays; 580 gr. other. 510 gr. relays; 430 gr. other.
<b>Thyristor version:</b> (common cathode)	64 P-gate SCRs rated for 400 VAC @ 1 Amp.	<b>Mechanical format:</b>	
<b>TTL totem-pole version:</b>	64 output gates. 60 mA sink. High speed FAST TTL compatible.	<b>CM-DO-40/A</b>	Classic IEC-297 mechanics for 19" racks with I/O on front panel.
<b>Open Collector version:</b>	64 TTL gates with open collector transistors up to 30 VDC @ 50 mA.	<b>CM-DO-40/B</b>	Military IEEE P1101 wedgelocks mechanics for ATR enclosures.
<b>Open Collector version:</b> (+5 or +12 VDC pull-up)	64 open collector transistors with 1 K (+5 V) or 2K2 (+12V) pull-ups.	<b>Humidity:</b>	Up to 95% RH non-condensing.
		<b>Altitude:</b>	Sea level up to 15 Km (50,000 ft.).
		<b>VMEbus interface:</b>	A24/D16 Standard slave interface.
		<b>VMEbus addressing:</b>	Two jumper blocks provide 256 mapping options in the A24 range.

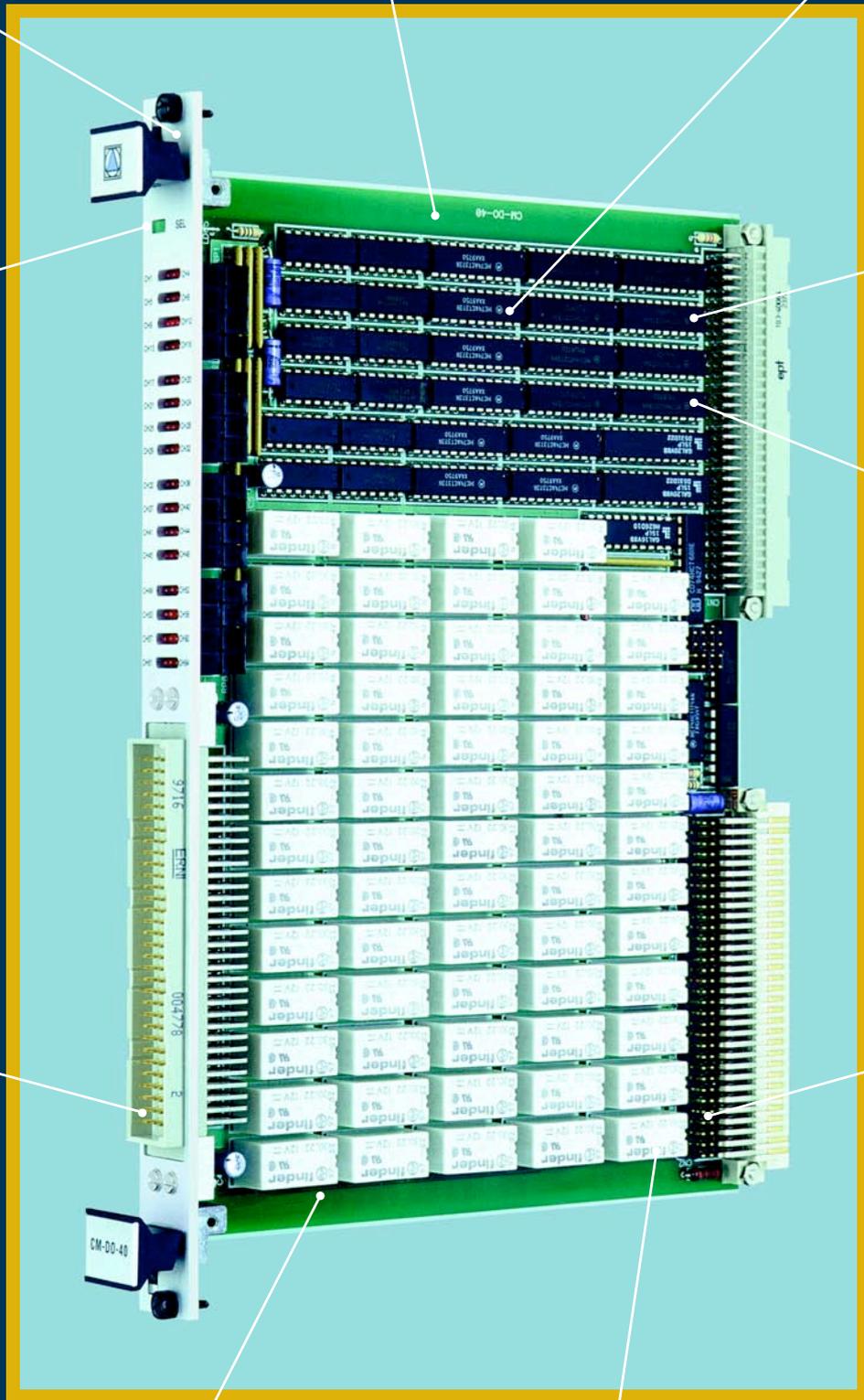


**CM-DO-40 Modules inserted in CM-RA-20/AV ATR Avionics Enclosure**

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

**FIBERGLASS PCB**  
in Industrial version

**CHANNEL STATUS REGISTER**  
monitors the current ON/OFF status  
of the 64 output channels



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

**A24/D16 VMEbus**  
slave interface

**INDUSTRIAL ICs**  
in plastic package and  
-25 to +85 °C range

**FRONT PANEL**  
160 pin VME64x  
connector wires the  
64 output signals

**JUMPER BLOCK**  
connect-disconnects  
all output signals  
to-from P2

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

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

## **CM-DO-40/I INDUSTRIAL VERSION**

**CONDUCTION COOLED**  
thermal overlay PCB

**CHANNEL PROGRAMMING REGISTER**  
programs ON/OFF output status of the 64  
channels

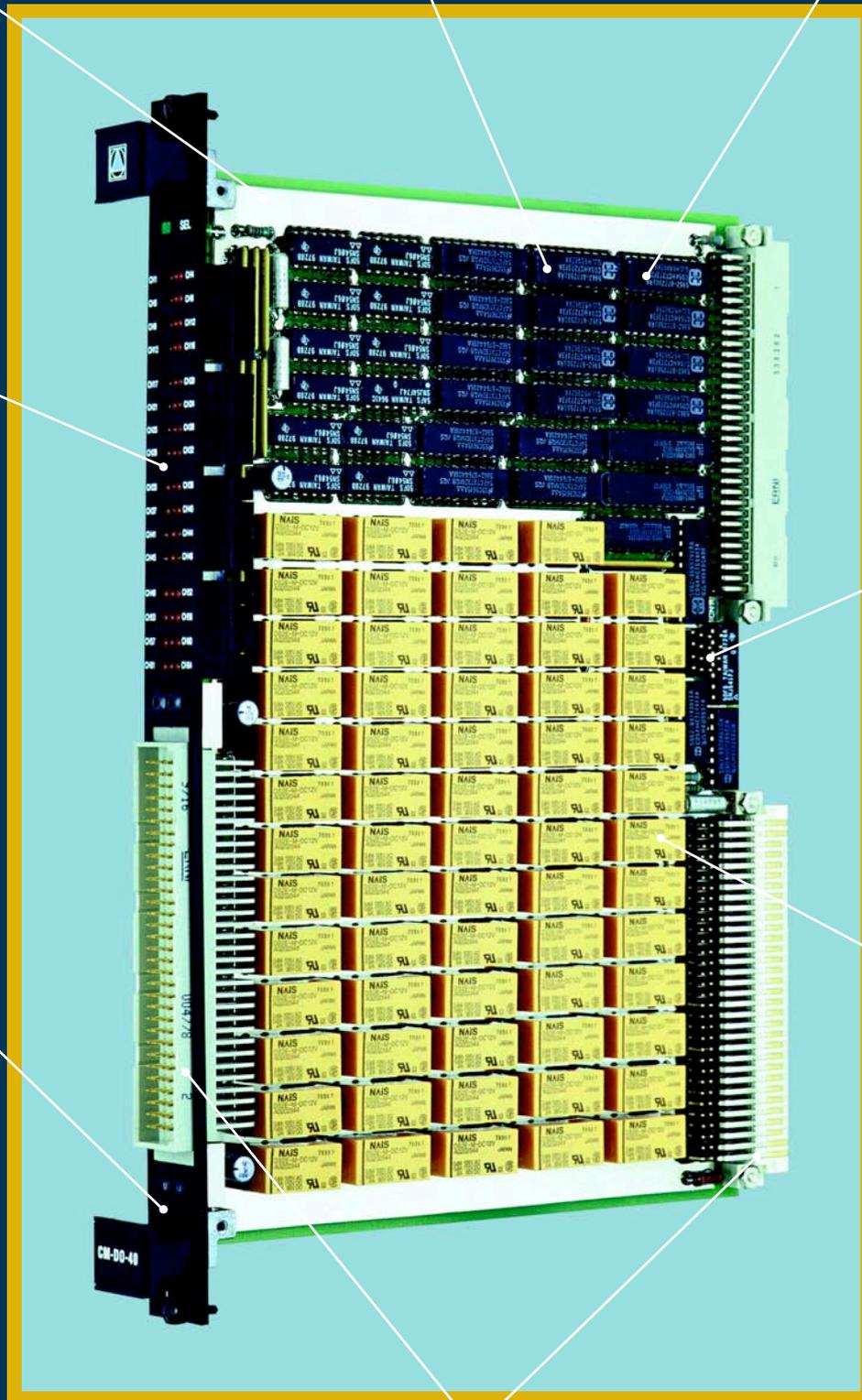
**MILITARY ICs**  
in ceramic package and  
-55 to +125 °C range

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

**JUMPER BLOCK**  
allows 256 addressing  
options in the VME  
A24/D16 range

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

**ISOLATED RELAYS**  
provide SPST & SPDT  
floating output contacts



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

**CM-DO-40/R+/A MILITARY RUGGED+ VERSION**

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

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

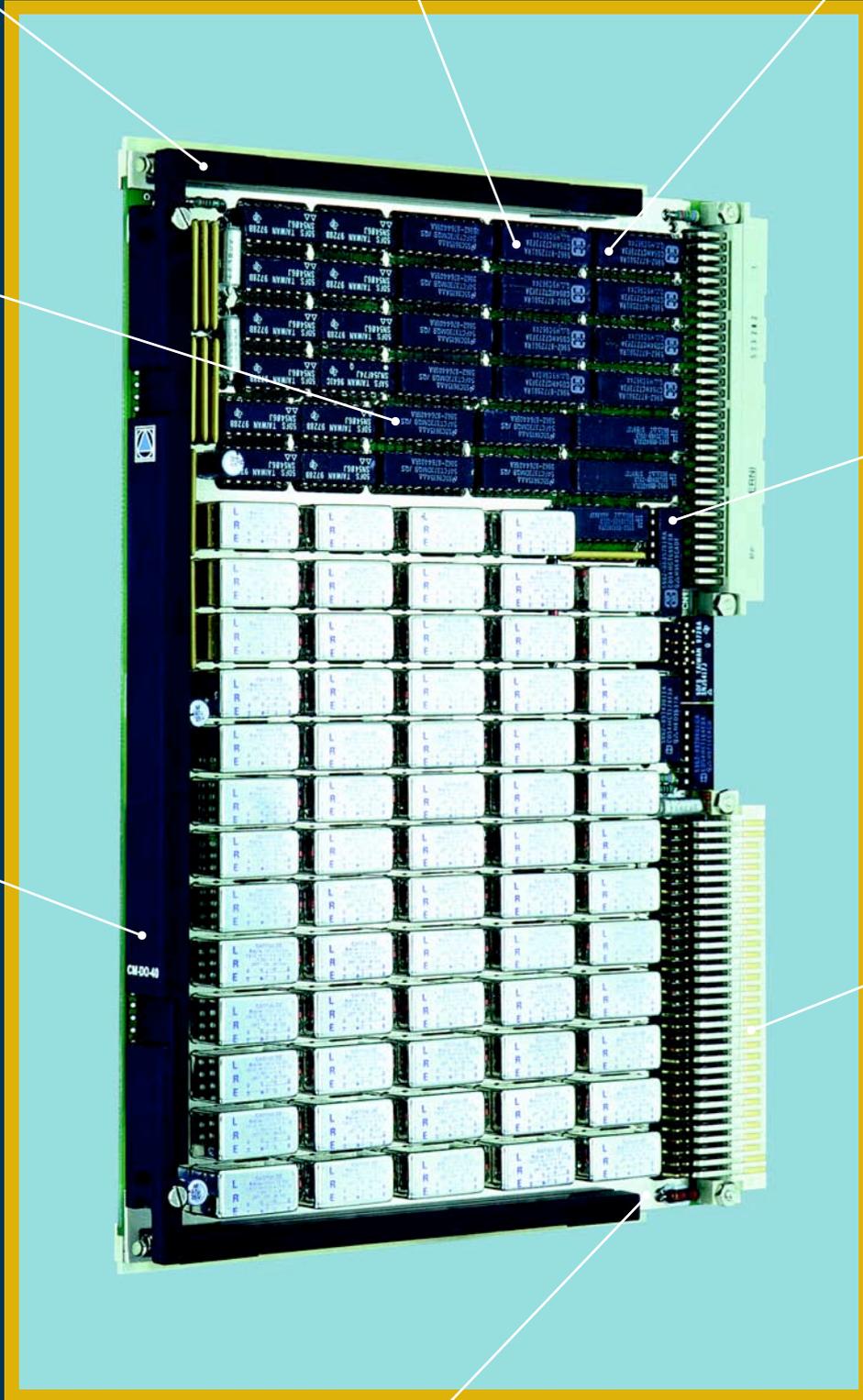
**QUALIFIED MIL-STD-883 ICs**  
in ceramic package and -55 to  
+125 °C range

**BUILT-IN-TEST**  
Registers allow testing  
the module circuitry

**THERMAL PASTE**  
behind ICs improves  
heat dissipation with  
the thermal overlay

**FRONT PANEL** with  
extraction handlers  
improves mechanical  
performance

**P2 CONNECTOR**  
wires all application  
discrete output signals



**CONDUCTION COOLED**  
thermal overlay PCB

## CM-DO-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 °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 military ceramic IC's (-55 to +125 °C). MIL-R-39016 Relays. Class I military connectors MIL-C-55302 qualified. Continuous board operation range from -55 to +90 °C. Storage from -55 to +125 °C.



## SOFTWARE SUPPORT



### Wind River Systems VxWorks Tornado

The CM-DO-40 is supported by VxWorks Tornado. 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-DO-40 MAP: User's manual. Module hardware functional description oriented toward software development.  
LEVEL 2, CM-DO-40 MMT: Maintenance manual. Extended description intended for failure location in the module.



## ORDERING INFORMATION

### CM-DO-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. ( "\*" means available with Direct or Inverted output configuration)

- 1: 64 Relays with 32 SPDT plus 32 SPST contacts.
- 2: 64 Optocouplers with 50 VDC @ 100 mA open-collector phototransistors.
- 3: 64 Photo-MOSFETs up to 400 Volts AC/DC @ 150 mA.
- 4: 64 Solid State Relays (SSR) from 10 to 280 VAC @ 1 Amp.
- 5: 64 Open-Drain power MOSFETs up to 400 VDC @ 1 Amp.
- 6: 64 Triacs up to 400 VAC @ 1 Amp.
- 7: 64 Thyristor (SCR) up to 400 VAC @ 1 Amp.
- 8: 64 Totem-pole FAST TTL outputs (\*).
- 9: 64 Open-Collector TTL gates up to 30 VDC @ 50 mA (\*).
- 10: 64 Open-Collector TTL gates with on-board 1K pull-up resistors to +5 VDC (\*).
- 11: 64 Open-Collector TTL gates with on-board 2K2 pull-up resistors to +12 VDC (\*).



## Computer

### European Headquarters:

Edificio Congressos, 3-14.  
Avda. Montesierra, s/n  
41020 Sevilla (SPAIN)  
Tel: +34 954253116  
Fax: +34 954253119

Your local representative: