Computer

6U VMEbus Series

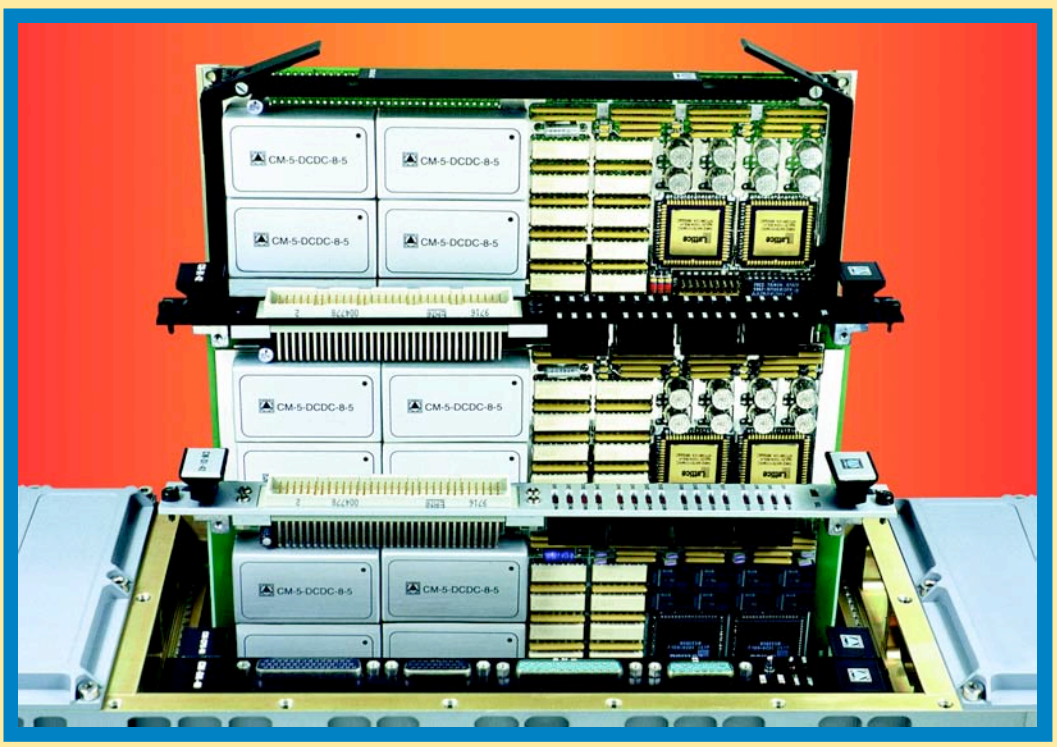
# CM-DI-42


## 64 Channel Optocoupled Input Module

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

# FEATURES

- 64 optoisolated input channels per board.
- On board DC/DC converter per channel.
- No power required from external application.
- Accepts any external DC switching device.
- 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 (3 Watts).
- On board Built-In-Test capability allows testing all module TTL chips.
- Industrial, MIL-Rugged & MIL-883 versions.
- Available in IEC-297 standard mechanics and military P1101.2 mechanics with wedge-locks.
- Conduction cooled PCB with thermal overlay in MIL-Rugged and 883 versions.
- Connectors pin-out compatible with CM-DI-40.
- 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-42** is a 64 channel, non externally powered, optocoupled input VMEbus board. This professional module offers an outstanding design which incorporates features most demanded in today´s first class military & industrial applications.

❑ No external AC or DC voltages need be supplied by the application. 64 galvanically isolated DC/DC converters provide the input voltage required by the channel isolators.

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

❑ The **CM-DI-42** 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-42** versions are 100% compatible at the functional level, allowing software development to proceed with low cost Industrial versions.

**FRONT PANEL**


# TECHNICAL SPECIFICATIONS

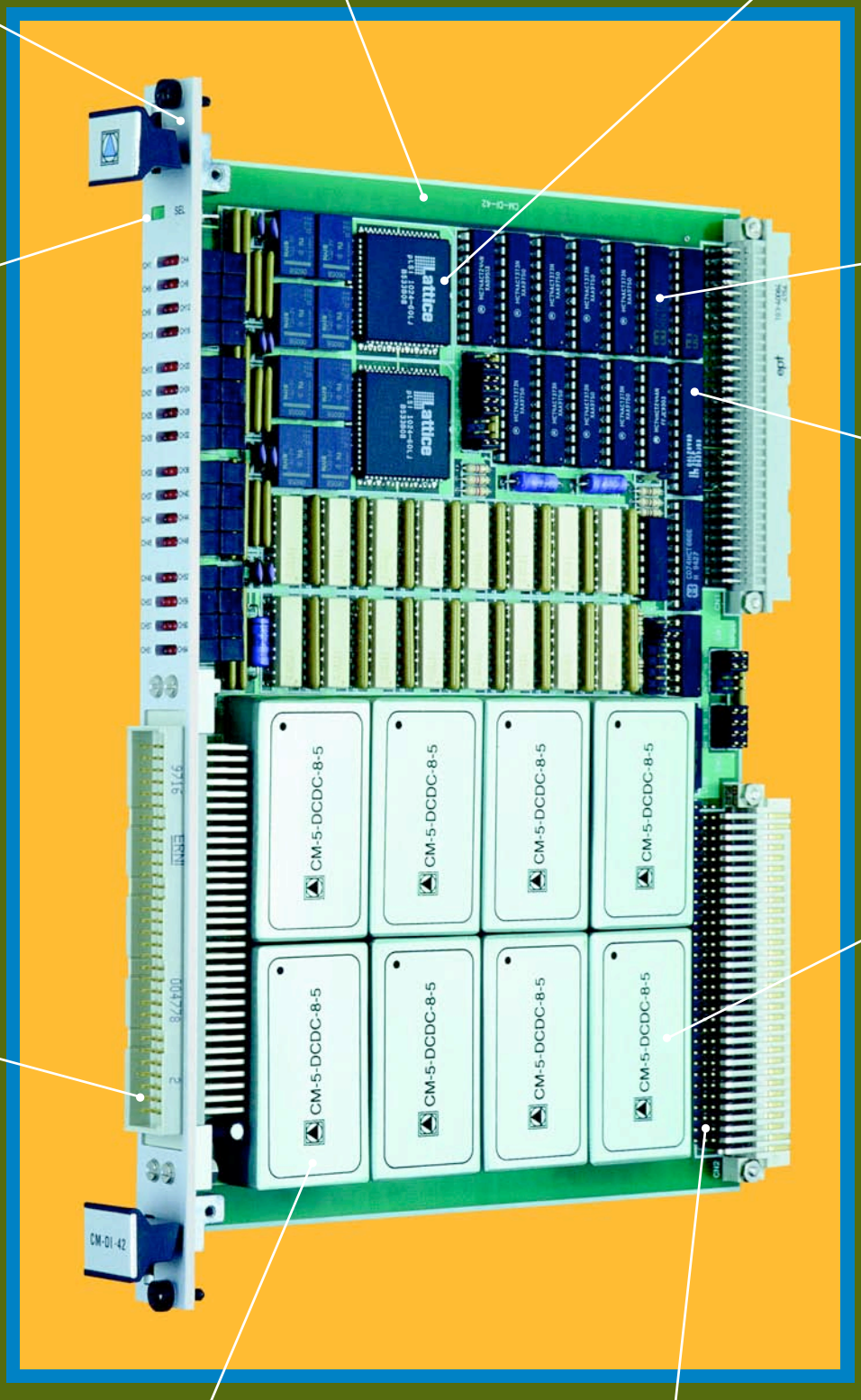
| | |
|---|---|
| **Input channels:** | 64 independent floating channels each one fitted with optocoupler. |
| **Board function:** | Reads status of 64 application external switching devices. |
| **External switching devices:** | Any type of ON/OFF metallic or solid state device, such as relays, push-buttons, optocouplers, TTL, FETs, switches, transistors, etc. |
| **DC/DC converters:** | One DC/DC converter per channel supplies 3V@5mA to the input optocoupler when the external switching device is in ON status. |
| **Galvanic isolation:** | Full galvanic isolation > 1000 V on all channels with respect to the VMEbus power & TTL lines. |
| **Input Change Detector:** | Programmable input sampling rate from 122Hz to 62.5KHz. |
| **Control Register:** | Manages BIT and enables IRQs. |
| **Front panel LEDs:** | 64 LEDs. Illuminated when the associated channel is ON. |
| **Optocoupler frequency:** | DC to 10 KHz. |
| **Power consumption:** | +5VDC @ 650 mA. |
| **Weight:** | |
| **Military R+ & 883** | 820 grams. |
| **Industrial** | 710 grams. |
| **Mechanical size:** | Single slot 6U (233.4x160 mm). |
| **Mechanical format:** | |
| **CM-DI-42/A** | Classic IEC-297 mechanics for 19" racks with I/O on front panel. |
| **CM-DI-42/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-42 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

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

DC/DC CONVERTERS
supply 64 floating
voltages needed for
driving optocouplers

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

CUSTOM HYBRID IC
contains 8 DC/DC
converters per chip

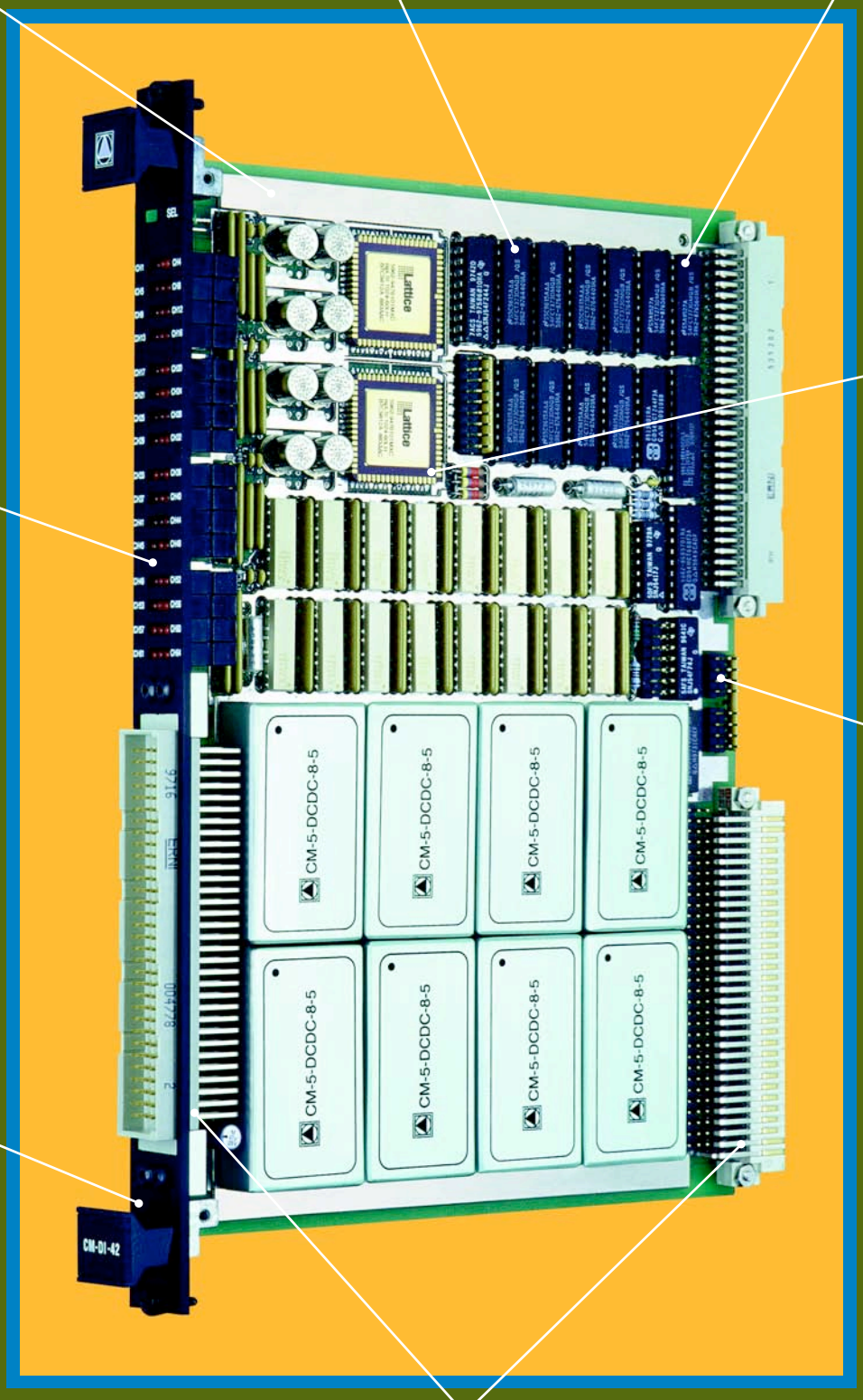
JUMPER BLOCK
wire-removes all input
signals from P2

# CM-DI-42/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 devices 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**

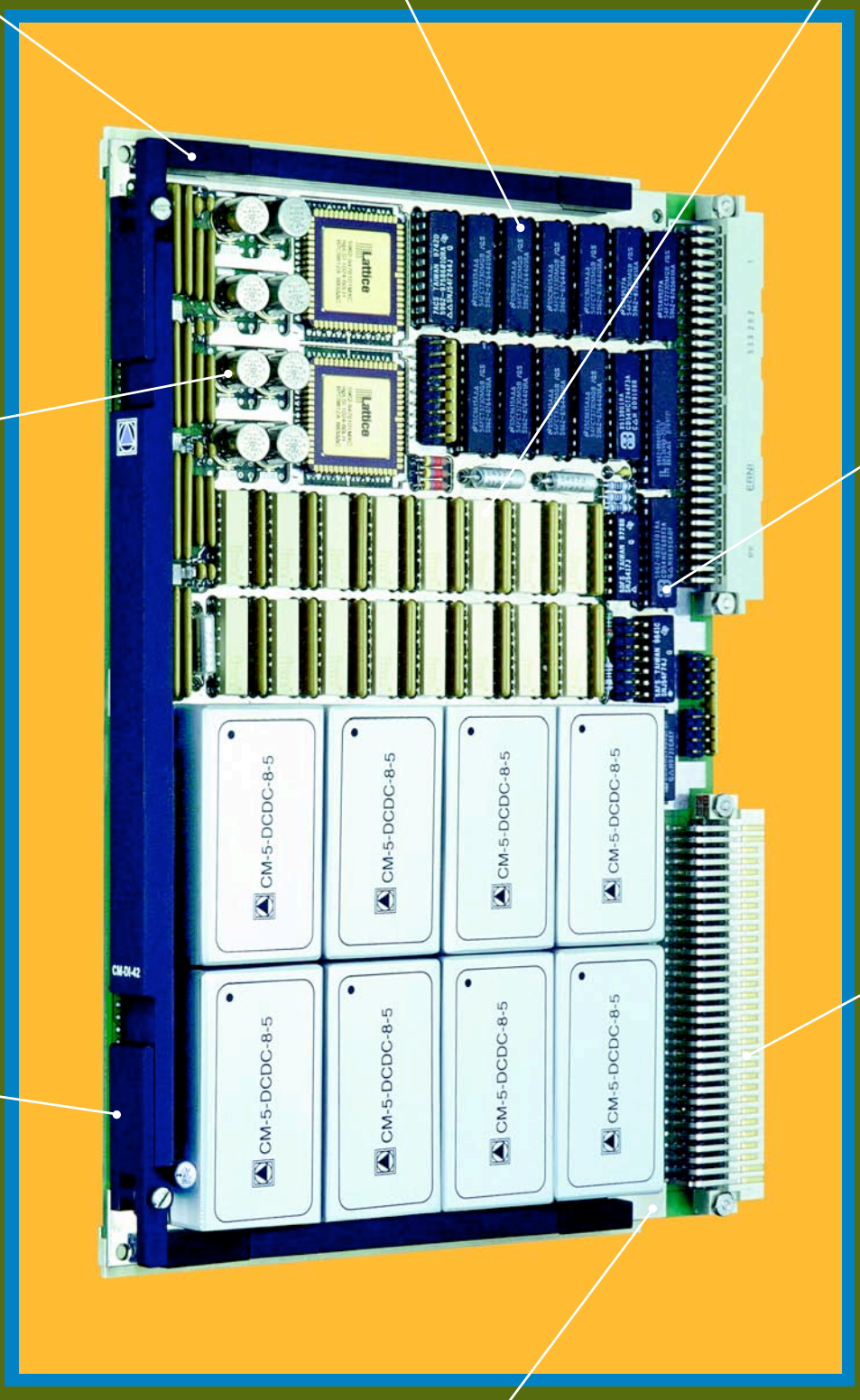
**CLASS I MIL C-55302 CONNECTORS**
**withstand > 500 insertion cycles**

# CM-DI-42/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 °C range

**INPUT OPTOCOUPLERS** provide complete isolation while not requiring external current




**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 switching devices

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

**CONDUCTION COOLED** thermal overlay PCB

# CM-DI-42/883/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 +70 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 IC's (-55 to +125 ºC ). Class I military connectors qualified per MIL-C-55302. Continuous board operation range from -55 to +90 ºC. Storage from -55 to +125 ºC.

## SOFTWARE SUPPORT

### Wind River Systems VxWorks Tornado

The CM-DI-42 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-DI-42 MAP: User´s manual. Module hardware functional description oriented toward software development.
LEVEL 2, CM-DI-42 MMT: Maintenance manual. Extended description intended for failure location in the module.

## APPLICATIONS

Industrial control of chemical plants, factories, etc.
Traffic and Railway control.
Power stations and electrical grid control.
Telephone and Telecommunication equipment.
Radar and Sonar systems.
Navigation and Flight computers.
Intelligent Weapon systems.
Electronic warfare. Datalinks.

## ORDERING INFORMATION

**CM-DI-42 /V /T /M**

- /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.
- /T — 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.
- /V — Board Input Version.
  - 1: 64 Channel optocoupled input board. No external voltage required.
    Note: No other input versions are available.

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