



Computer

6U VMEbus Series

CM-SD-40 / CM-DS-40 / CM-SDS-40

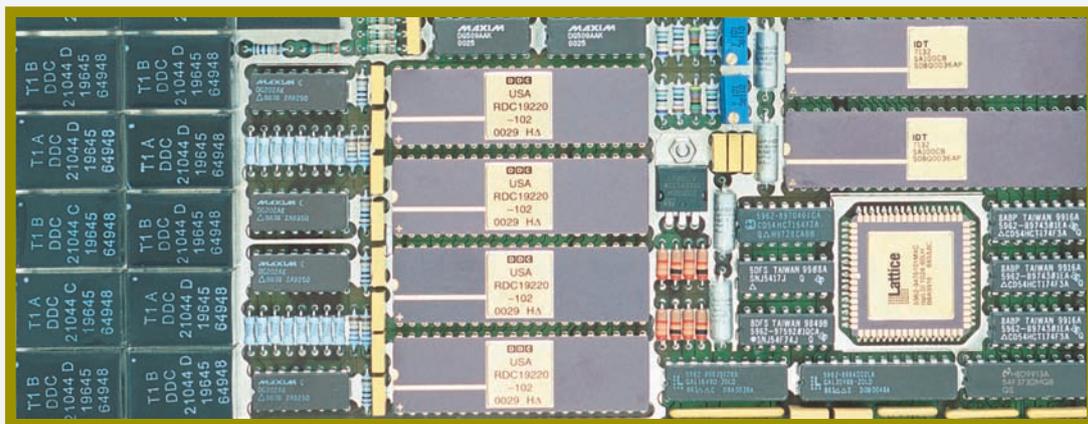


Synchro/Resolver I/O Modules

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

DESCRIPTION

- ❑ The CM line of high performance Synchro/Resolver I/O modules comprises three general purpose boards designed to cover a wide range of applications.
- ❑ The CM-SD-40 is a high density input board that incorporates 16 Synchro/Resolver channels.
- ❑ The CM-DS-40 is an eight channel S/R output module.
- ❑ The CM-SDS-40 is ideal for applications requiring a mixed I/O board with 4 input + 4 output S/R channels.
- ❑ These modules incorporate features most demanded in first class military and industrial applications.
- ❑ Extensive Built-In-Test fitted on all models is based on wraparound loops that disconnect external S/R signals and connect internal test signals in order to verify correct module operation.
- ❑ Input channels incorporate auto-conversion circuitry that fills a DPRAM with the latest conversion data.
- ❑ All I/O channels support most common S/R voltage ranges used in military and avionics equipment.
- ❑ These boards offer a highly flexible I/O cabling solution using connectors on the front panel and P2.
- ❑ Military versions fitted with conduction cooled PCB greatly improve capability to withstand shock/vibration.
- ❑ The metallic layer in the PCB benefits heat dissipation & allows all components to work within homogeneous temperatures, thus increasing module MTBF.
- ❑ All temperature versions are 100% compatible at the functional level, allowing software development to proceed with low cost Industrial versions.



FEATURES

- ❑ 16 bit resolution in all models.
- ❑ High integration of I/O channels per board.
- ❑ Independent S/R voltage configuration per channel.
- ❑ Full galvanic isolation on all I/O channels.
- ❑ Overvoltage & shortcircuit protection on all channels.
- ❑ 2 VA output power per channel.
- ❑ Automatic input channel multiplexing, A/D sampling and data storage capability.
- ❑ 4 KB Dual Port RAM for input conversion storage.
- ❑ Simple programming through the MCR.
- ❑ Built-In-Test wraparound circuitry allows testing of all S/R converters, analog and TTL chips.
- ❑ VMEbus Interrupter indicates end of BIT cycle.
- ❑ Operation under wide range of frequency & voltage.
- ❑ Synchro/Resolver I/O signals via cannon connectors on front panel and VME64x connector on P2.
- ❑ P0 connector intended for key slot purposes.
- ❑ Industrial, Military Rugged & 883 versions.
- ❑ Available in Industrial IEC-297 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.
- ❑ Excellent price/performance ratio.
- ❑ Two year guarantee.

MILITARY DESIGN

- ❑ -55 to +125 °C ceramic military ICs.
- ❑ MIL-STD-883 Analog and TTL chips.
- ❑ MIL-C-55302 Class I Connectors.
- ❑ Military Class V Printed Circuit Board with no signal tracks in external layers.
- ❑ MIL-E-5400 for avionics equipment class 1B.
- ❑ MIL-STD-810 E Temperature (Methods 501.3 & 502.3).
- ❑ MIL-STD-810 E Shock and Vibration (Methods 516.4 & 514.4).
- ❑ MIL-STD-810 E Humidity & Salt Fog (Methods 507.3 & 509.3).

TECHNICAL SPECIFICATIONS

CM-SD-40

Input Channels: 16 SR/D channels, 16 bit resolution.	VME Interrupter: I (3-7). Informs the VMEbus master at the end of a BIT cycle.
R/D Converter: 4 x RDC-19220 with input multiplexer.	Built-In-Test: A 12 bit D/R converter generates internal test signals. 100% coverage.
Accuracy: 4 arc minutes ± 1 LSB.	Power Consumpt: 3 Watts. +5VDC @ 275 mA, +12 VDC @ 7 mA, -12 VDC @ 67 mA.
Control Register: Enable/disable VMEbus IRQs, select R/D converter resolution and set the module in BIT mode.	Weight: 550 gr. (I version), 640 gr. (R+ & 883 version).
Dual Port RAM: 4 KB of DPRAM, 16 bit wide.	

CM-DS-40

Output Channels: 8 D/SR channels, 16 bit resolution.	Built-In-Test: A 16 bit R/D converter test all output signals. 100% coverage.
D/R Converter: 8 x CMX-7538 with 16 bit latches.	Power Consumpt: 4 W (unloaded), +5VDC @ 250 mA, ± 12 VDC @ 100 mA.
Accuracy: 4 arc minutes ± 1 LSB.	Weight: 800 gr. (I version), 880 gr. (R+ & 883 version).
Control Register: Set the module in BIT mode.	
Output Power: 2 VA per channel.	

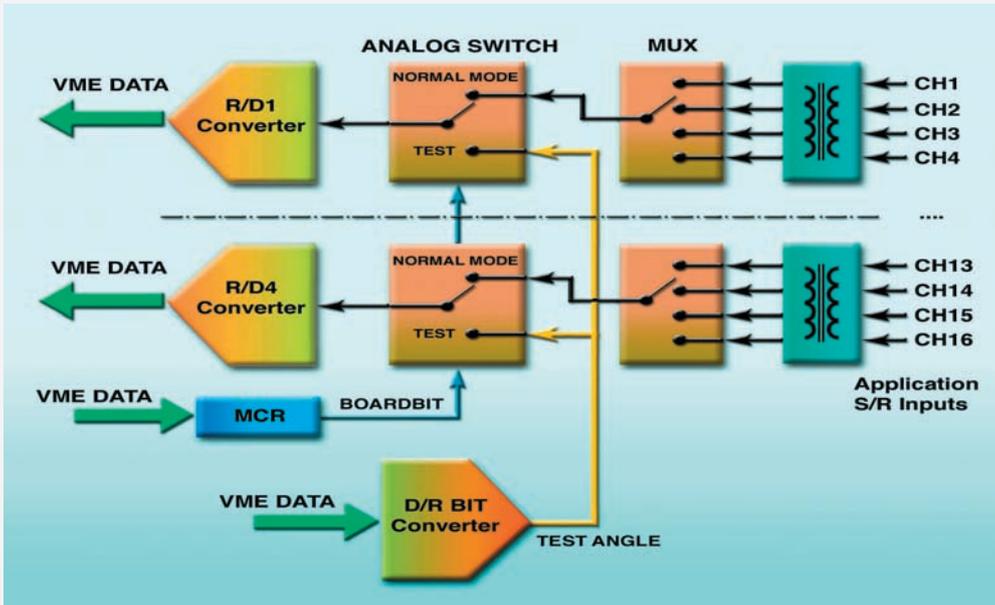
CM-SDS-40

Input Channels: 4 SR/D channels, 16 bit resolution.	Dual Port RAM: 4 KB of DPRAM, 16 bit wide.
Output Channels: 4 D/SR channels, 16 bit resolution.	VME Interrupter: I (3-7). Informs the VMEbus master on the end of a BIT cycle.
R/D Converter: RDC-19220 with input multiplexer.	Built-In-Test: A Resolver switch connects module outputs to inputs. 100% coverage.
D/R Converter: 4 x CMX-7538 with 16 bit latches.	Power Consumpt: 4 W (unloaded), +5VDC @ 265 mA, +12 VDC @ 50 mA, -12 VDC @ 70 mA.
Accuracy: 4 arc minutes ± 1 LSB.	Weight: 700 gr. (I version), 790 gr. (R+ & 883 version).
Control Register: Enable/disable VMEbus IRQs, select R/D converter resolution and set the module in BIT mode.	
Output Power: 2 VA per channel.	

CM-XXX-40 COMMON SPECIFICATIONS

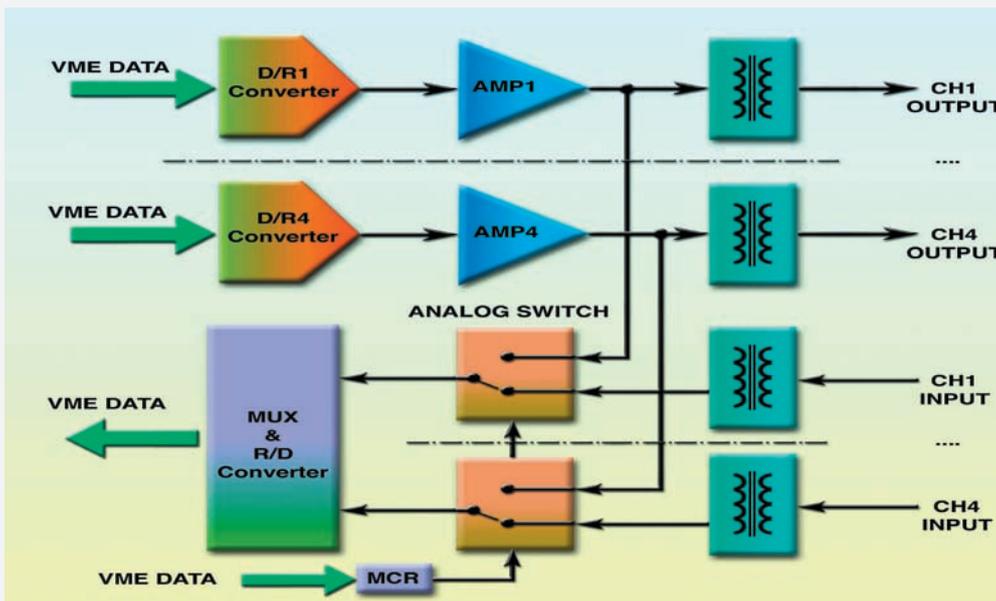
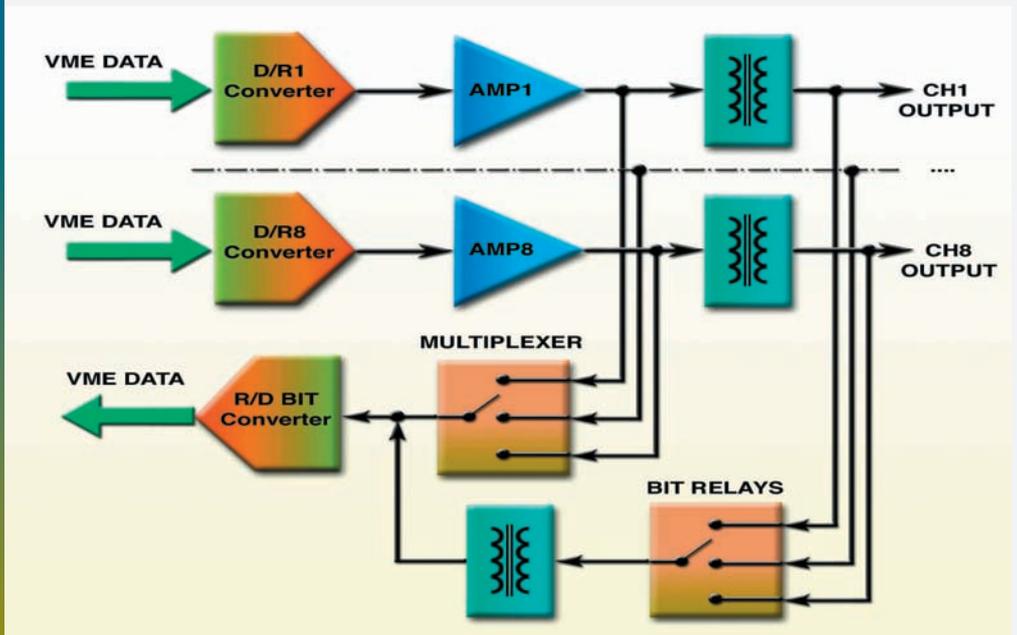
Synchro I/O: 3 wire standard per MIL-S-20708.	VME Addressing: Two jumper blocks provide 256 mapping options.
Resolver I/O: 4 wire sine/cos per MIL-R-21530.	Mechanical Size: Single slot 6U (233.35x160 mm).
Galvanic Isolation: > 1000 Vp or 400 VDC.	Mechanical Format:
I/O Transformers: Scott-T pair per channel with 2 arc minutes angular accuracy.	CM-XXX-40/A Classic IEC-297 mechanics for 19" racks with I/O on front panel.
I/O Voltage Ranges: 11.8, 26 or 90 VRMS line-line.	CM-XXX-40/B Military IEEE P1101.2 wedge-lock mechanics for ATR enclosures.
Input Ref. Voltage: 26 or 115 VRMS $\pm 20\%$.	Humidity: Up to 95% RH non-condensing.
Input Frequency: 400 Hz nominal $\pm 40\%$.	Altitude: Sea level up to 15 Km (50,000 ft).
VMEbus Interface: A24/D16 Standard slave interface.	





**BUILT-IN-TEST DIAGRAM
CM-SD-40**

**BUILT-IN-TEST DIAGRAM
CM-DS-40**



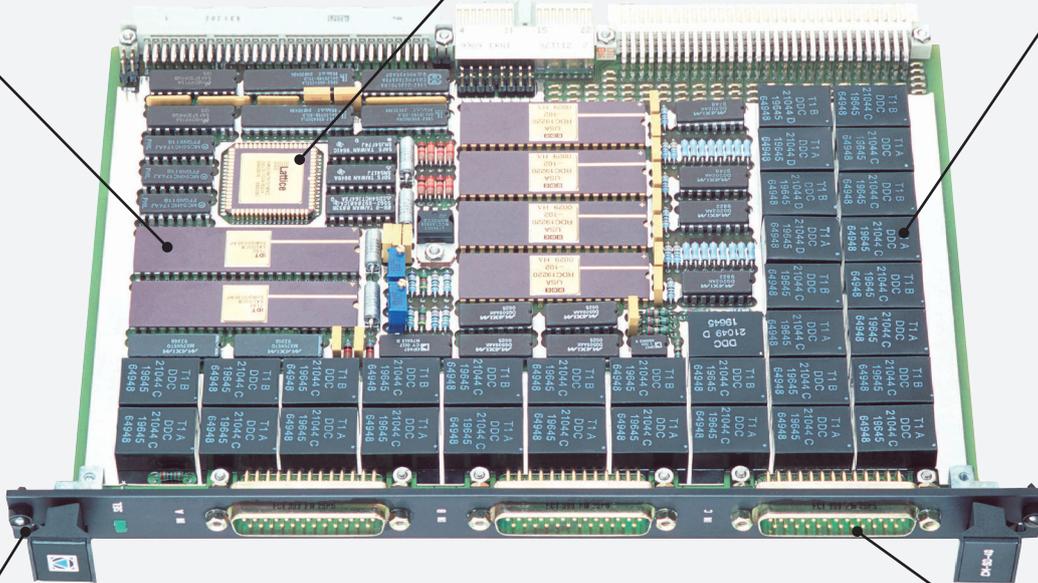
**BUILT-IN-TEST DIAGRAM
CM-SDS-40**

16 CHANNEL SYNCHRO-RESOLVER INPUT MODULE

DUAL PORT RAM
stores R/D conversions
and BIT results

MODULE CONTROL REGISTER
enables IRQ's, generates BIT cycles and
programs the R/D converter sampling rate

INPUT TRANSFORMERS
provides galvanic isolation and
reduces high input voltages to
small signal levels



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

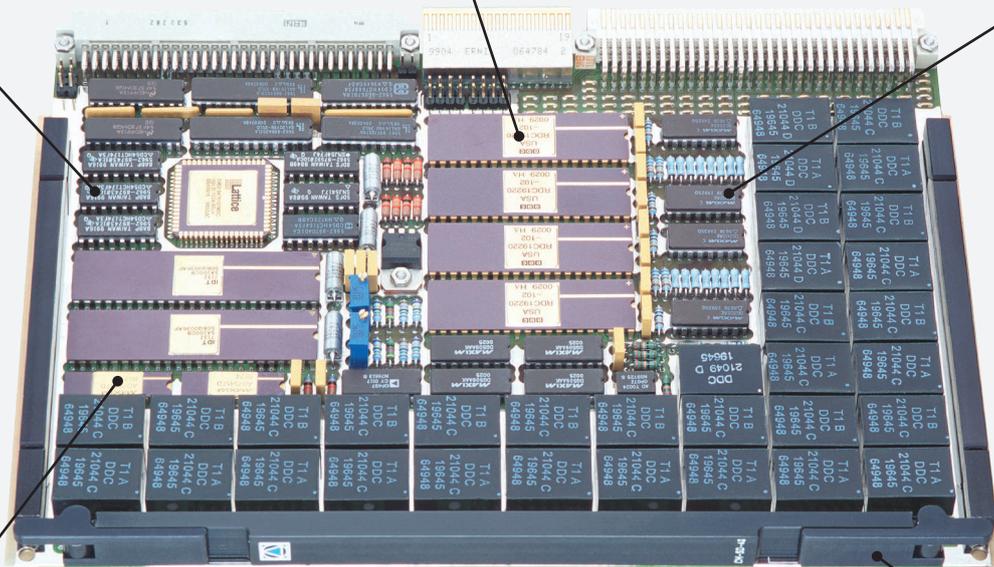
IEC-297 6U MECHANICS
allows module insertion in 19"
6U VME racks

FRONT PANEL CANNON
wires the channel S/R
input signals

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

RESOLVER-TO-DIGITAL CONVERTER
provides 16 bit conversions in real time

THERMAL PASTE
behind IC's improves
heat dissipation with
the thermal overlay



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

BUILT-IN-TEST
Digital-to-Resolver converter
allows testing the module

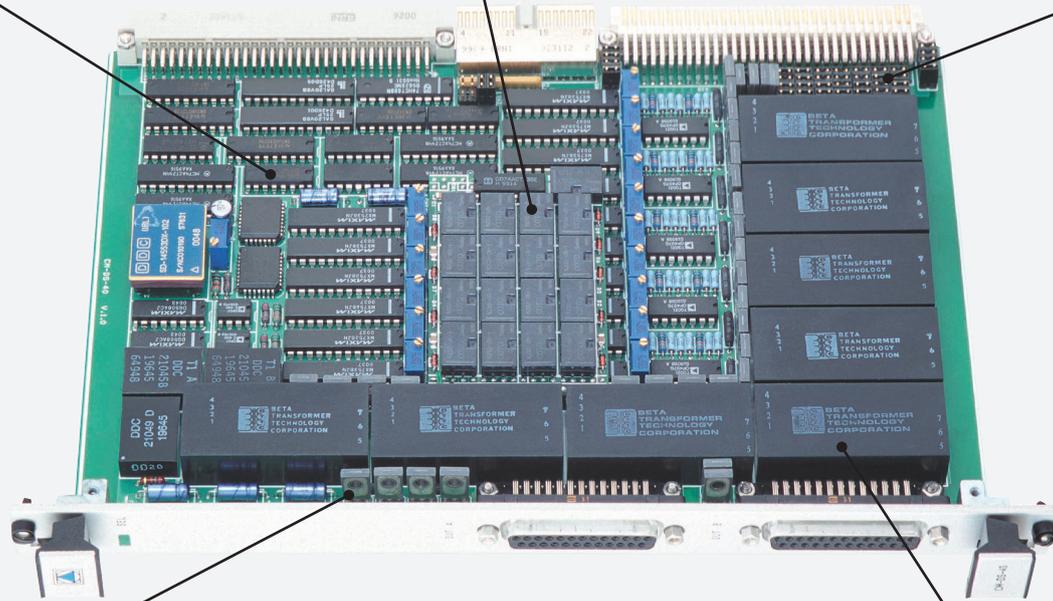
FRONT PANEL
with extraction handlers
improves mechanical
performance

8 CHANNEL SYNCHRO-RESOLVER OUTPUT MODULE

BUILT-IN-TEST Multiplexer
switches internal Resolver signals during self testing cycles

BUILT-IN-TEST Relays
allows checking all channel output transformers

JUMPER BLOCK
wire-removes all output signals from P2



CM-DS-40/I/A INDUSTRIAL VERSION

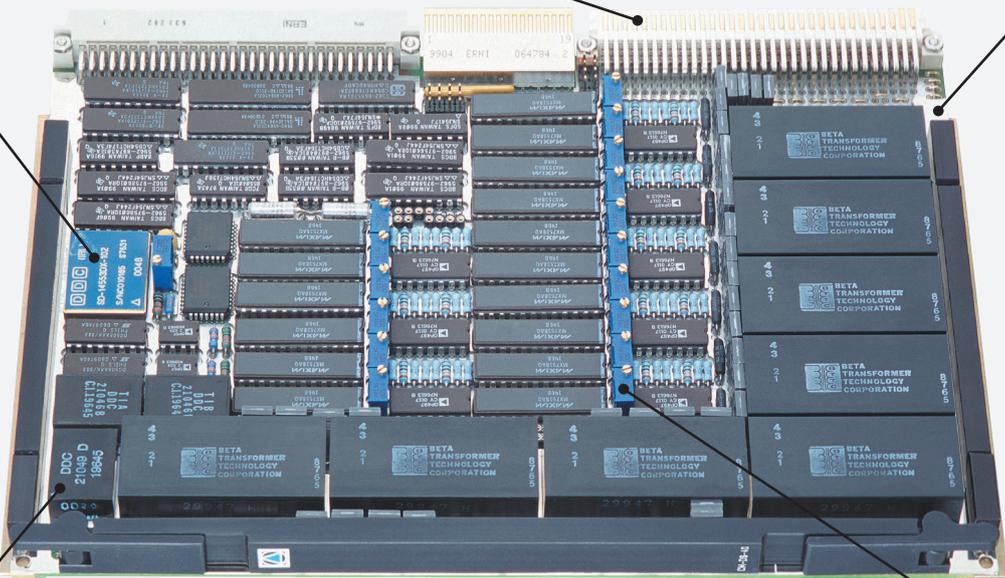
POWER AMPLIFIERS
deliver up to 2 VA of output power per channel

OUTPUT TRANSFORMERS
provides isolation and increases internal low voltage signals up to application levels

R/D BIT CONVERTER
allows testing all output channels in real time

P2 CONNECTOR
wires all application output signals through the VMEbus backplane

CONDUCTION COOLED
thermal overlay PCB



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

INPUT TRANSFORMER
isolate the system voltage reference signal

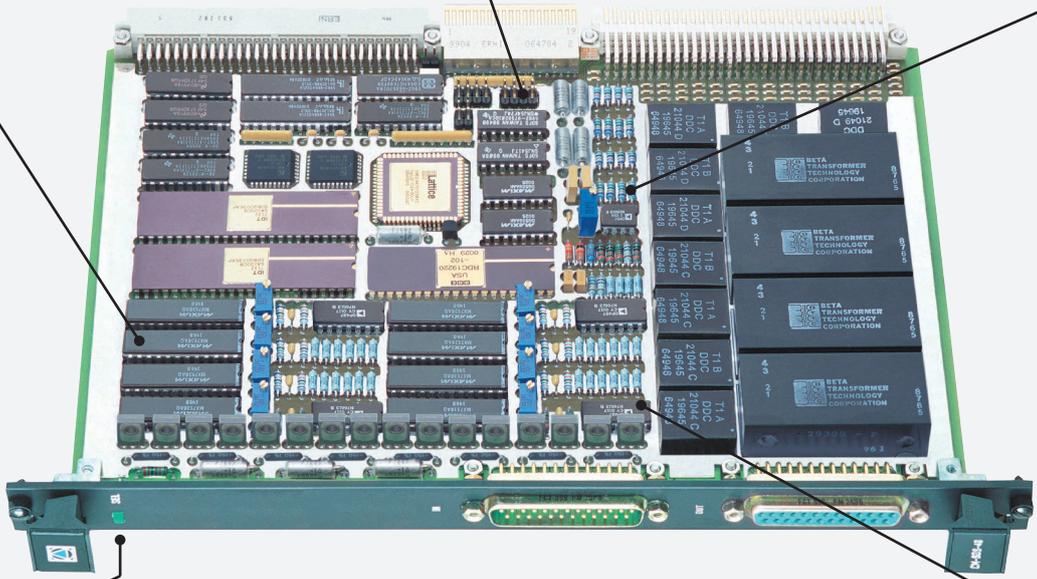
CHANNEL ADJUSTMENT
provides finer accuracy for sine-cosine critical points

4 + 4 I/O CHANNEL SYNCHRO-RESOLVER MODULE

DIGITAL/RESOLVER CONVERTER
latches 16 bit input data words and provides analog sine/cosine resolver outputs

JUMPER BLOCK
allows 256 addressing options in the VME A24 range

HIGH PRECISION RESISTORS
fixes Resolver-to-Digital converter accuracy without requiring external adjustment



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

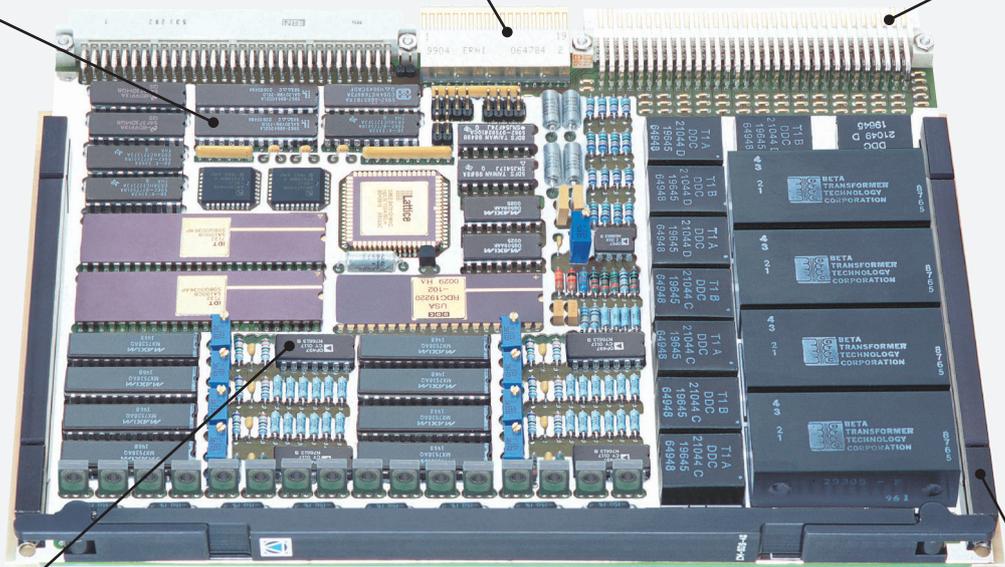
FRONT PANEL LED
is illuminated when the VME master accesses the module

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

VME INTERRUPTER
asserts IRQs at the end of a Built-In-Test cycle

P0 CONNECTOR
can be optionally used for keying-slot purposes

CLASS I MIL-C-55302
P2 connector withstand > 500 insertion cycles



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

BUILT-IN-TEST SWITCHES
wire the module SR outputs to the SR inputs

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



DOCUMENTATION

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

LEVEL 2, CM-XXX-40 MMT: Maintenance manual. Extended description intended for failure location in the module.



SOFTWARE SUPPORT



Wind River System VxWorks Tornado: All modules are 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.

Generic "C" Language Driver: A generic "C" language driver is also available in source code. The user may freely adapt this driver for any application, operating system or ANSI standard "C" compiler.

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



ORDERING INFORMATION

CM-SD-40/V/T/M

Board Version (V):

1 = 8 S/D or R/D input channels, 16 bit resolution, full isolation > 1000 Vp., Built-In-Test capability.

2 = 16 S/D or R/D input channels, 16 bit resolution, full isolation > 1000 Vp., Built-In-Test capability.

CM-SDS-40/V/T/M

Board Version (V):

1 = 4 SR/D input channels, 16 bit resolution, full isolation > 1000 Vp.

2 = 4 D/SR output channels, 16 bit resolution, full isolation > 1000 Vp.

3 = 4 SR/D input plus 4 D/SR output channels, 16 bit resolution, full isolation > 1000 Vp., BIT capability.

Board Temperature Range (T):

I = Industrial range (-20 to +70 °C operating). Only available with fiberglass PCB.

R+ = Military Rugged+ range (-40 to +85 °C operating). Only available with conduction cooled PCB.

883 = Full Military 883 range (-50 to +90 °C operating). Only available with conduction cooled PCB.

PCB Mechanical Version (M):

A = IEC 297 Standard Mechanics with front panel. J2 and front panel I/O connectors.

B = IEEE P1101.2 Military Mechanics with wedge-locks and dummy front panel. J2 I/O connector.

IMPORTANT

The user must fully specify the I/O range requirements when ordering any module. The basic ordering parameters are:

- Input channel type Synchro or Resolver.

- Output channel type Synchro or Resolver.

- Channel nominal line-line I/O voltage (VIN/VOUT).

- Board phase input reference voltage (VREF).

CM-DS-40/V/T/M

Board Version (V):

1 = 4 D/S or D/R output channels, 16 bit resolution, full isolation > 1000 Vp., no Built-In-Test capability.

2 = 8 D/S or D/R output channels, 16 bit resolution, full isolation > 1000 Vp., no Built-In-Test capability.

3 = 4 D/S or D/R output channels, 16 bit resolution, full isolation > 1000 Vp., BIT capability through Multiplexer.

4 = 8 D/S or D/R output channels, 16 bit resolution, full isolation > 1000 Vp., BIT capability through Multiplexer.

5 = 4 D/S or D/R output channels, 16 bit resolution, full isolation > 1000 Vp., Dual Built-In-Test capability through Multiplexer and Relays module.

6 = 8 D/S or D/R output channels, 16 bit resolution, full isolation > 1000 Vp., Dual Built-In-Test capability through Multiplexer and Relays module.



Computer

European Headquarters:

Edificio Congressos, 3-14.
C/ Alcalde Luis Uruñuela s/n.
41020 Sevilla (SPAIN)
Tel: +34 954253116
Fax: +34 954253119

WebSite: www.cmcomputer.com
E-mail: cm@cmcomputer.com

For more extensive information, contact CM Computer or your representative.

Your local representative: