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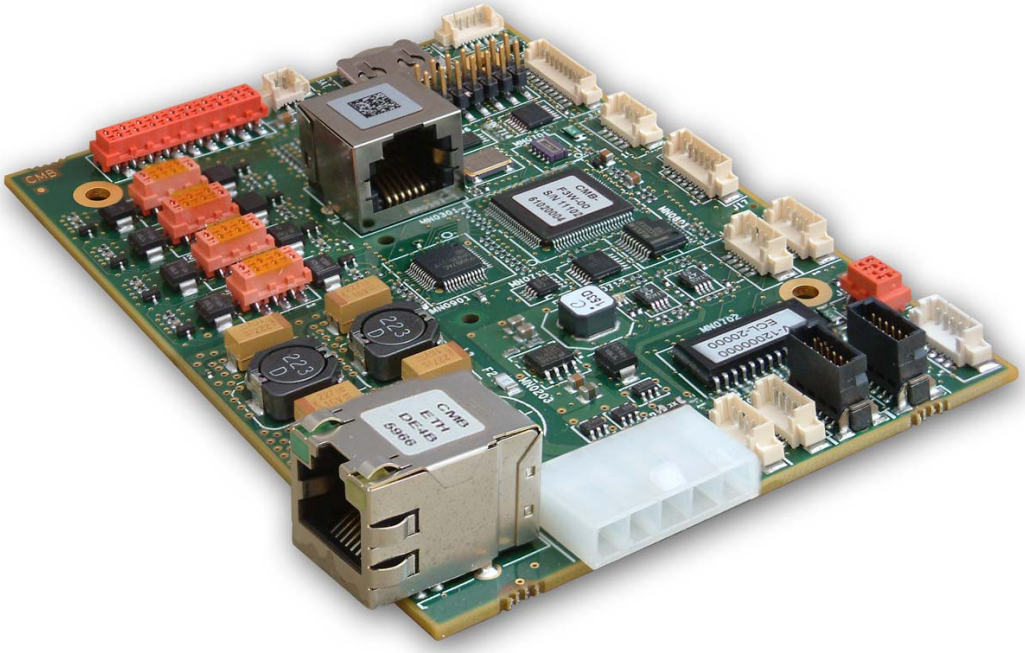
» CMB «



Chassis Monitoring Board
User's Guide

CA.DT.A82-7e - September 2014

Revision History

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5e	Section 3 - Connectors updated	11-2011
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Conventions

This guide uses several types of notice: Note, Caution, ESD.

Note: this notice calls attention to important features or instructions.


Caution: this notice alert you to system damage, loss of data, or risk of personal injury.


ESD: This banner indicates an Electrostatic Sensitive Device.

All numbers are expressed in decimal, except addresses and memory or register data, which are expressed in hexadecimal. The prefix `0x' shows a hexadecimal number, following the `C' programming language convention.

The multipliers `k', `M' and `G' have their conventional scientific and engineering meanings of $*10^3$, $*10^6$ and $*10^9$ respectively. The only exception to this is in the description of the size of memory areas, when `K', `M' and `G' mean $*2^{10}$, $*2^{20}$ and $*2^{30}$ respectively.

When describing transfer rates, `k' `M' and `G' mean $*10^3$, $*10^6$ and $*10^9$ *not $*2^{10}$ $*2^{20}$ and $*2^{30}$.*

In PowerPC terminology, multiple bit fields are numbered from 0 to n, where 0 is the MSB and n is the LSB. PCI and CompactPCI terminology follows the more familiar convention that bit 0 is the LSB and n is the MSB.

Signal names ending with an asterisk (*) or a hash (#) denote active low signals; all other signals are active high.

Signal names follow the PICMG 2.0 R3.0 CompactPCI Specification and the PCI Local Bus 2.3 Specification.

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High Voltage Safety Instructions


Warning!
All operations on this device must be carried out by sufficiently skilled personnel only.


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Special Handling and Unpacking Instructions

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Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the board.

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board, please re-pack it as nearly as possible in the manner in which it was delivered.

Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction.

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Chapter 1 - Introduction

This document introduces the Chassis Monitoring Board (CMB):

- Functionalities,
- Connection guide,
- Software interface.

The chassis monitoring board implements following features:

- Power supply monitoring and control,
- Temperatures monitoring,
- Fan speed monitoring and control,
- Alarm reporting,
- Backplane signals control and monitoring: SYSRESET, ACFAIL, SYSFAIL, Maskable Resets, ….,
- User's GPIO,
- Backplane I²C bus to control and monitor the boards in the backplane,
- Serial lines console interface for debug and control,
- Ethernet interface for remote monitoring and control using Telnet, HTTP or SNMP.

1.1 Acronyms

BDM . . . . . Background Debug Mode
CLI . . . . . Command Line Interface
CMB . . . . . Chassis Monitoring Board
GPIO . . . . . General Purpose Input/Output
PSU . . . . . Power Supply Unit
PWM . . . . . Pulse With Modulation

1.2 Board Identification

A “Board Order Code and Serial Number” labels

B “Board Variant and E.C. Level” label

C “Board Ethernet Numberl” label

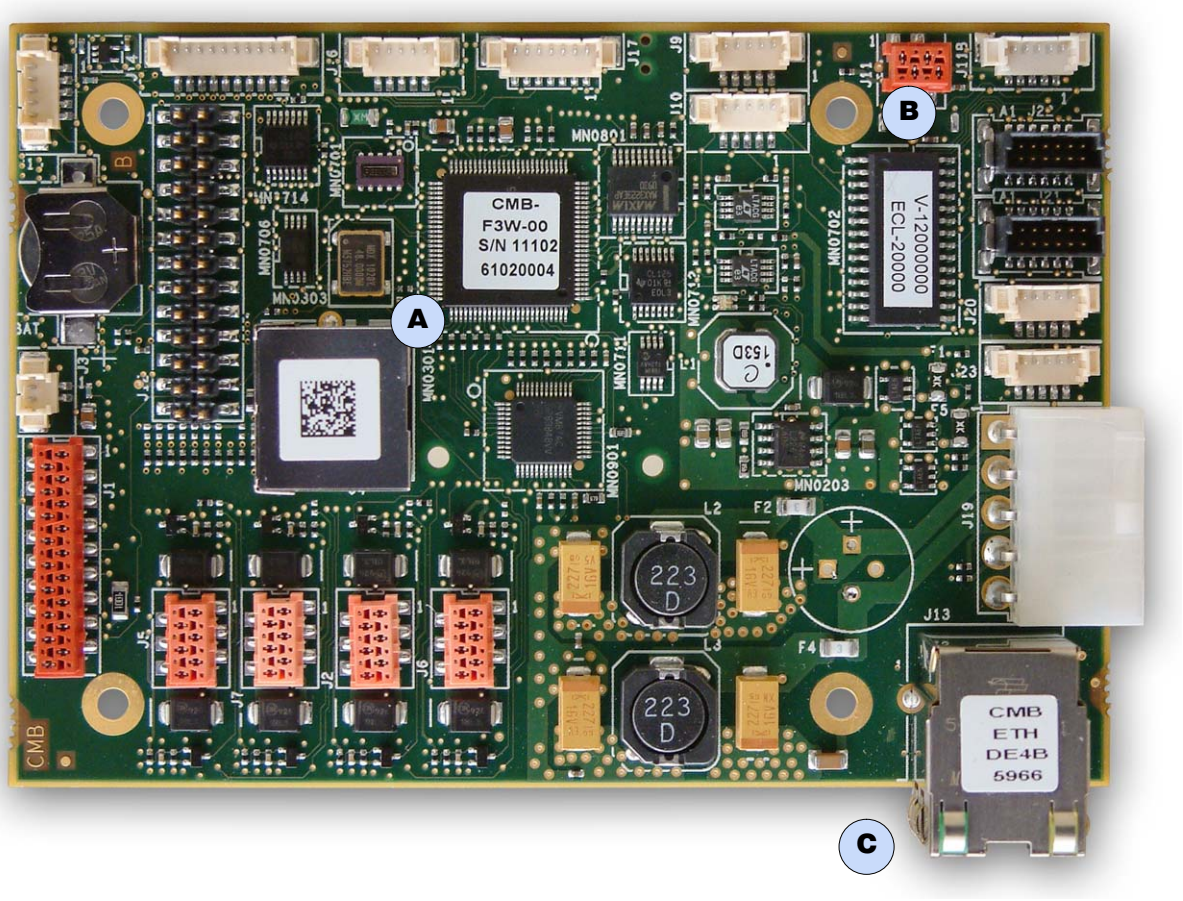


Figure 1: Board Identification (Top View)

Chapter 2 - Functional Description

2.1 CMB Block Diagram

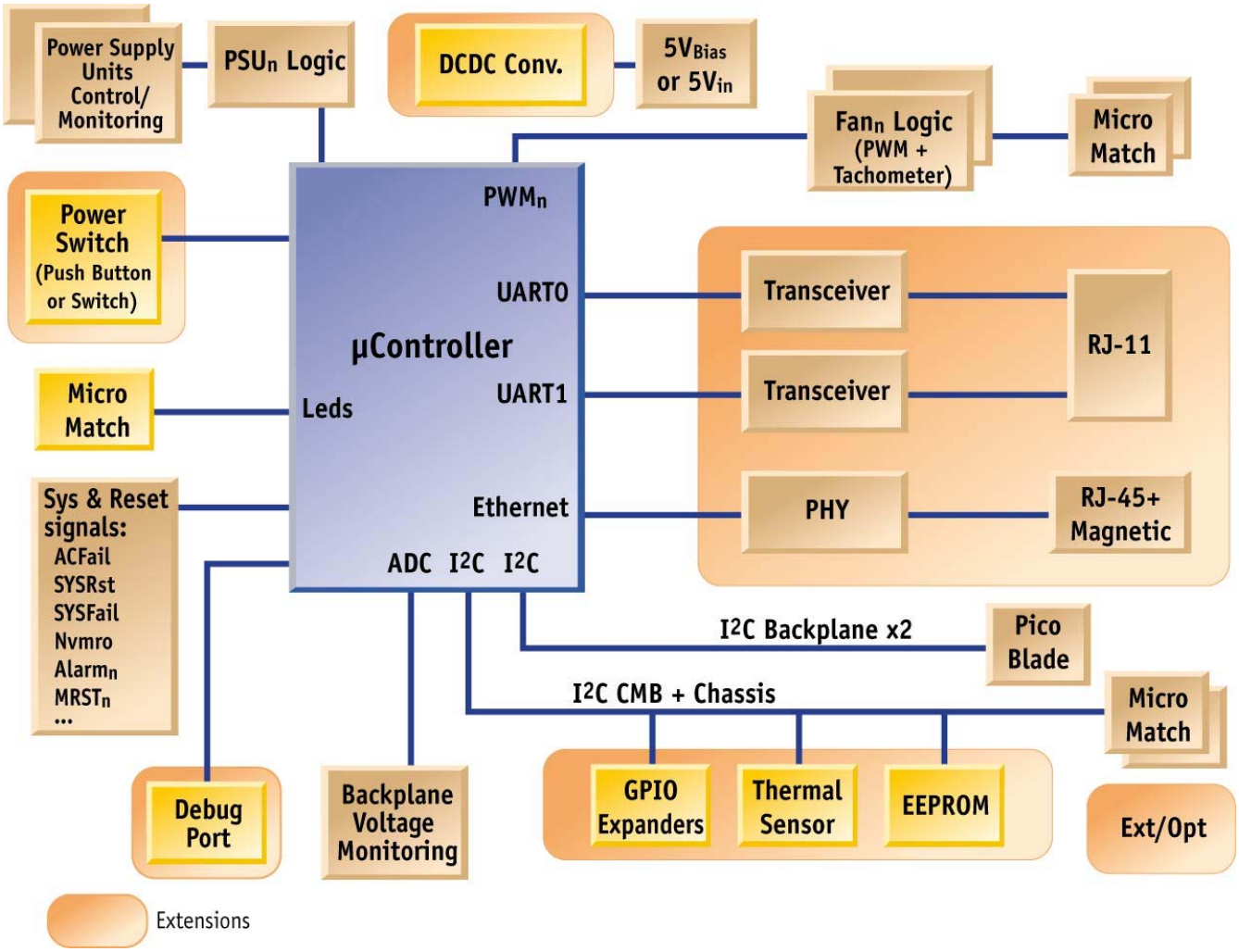


Figure 2: CMB Block Diagram

2.2 Functional Description

All features described below are highly configurable through configuration commands to meet the system requirements.

2.2.1 Power Supply Unit

The CMB is able to control and monitor up to eight power modules via individual Power_Control and Power_Good signals, and also two Global_Enable signals to control up to two power packs containing the power modules.

If one module Power_Good signal is not active, the associated led to its voltage on the chassis front panel is set up in blinking state.

If all the modules providing this voltage are out of order, the associated led is OFF.

2.2.2 Voltage Monitoring

The CMB continuously monitors following voltages outputs provided by the PSU:

- +5V
- +3.3V
- +12V
- -12V

If one of these voltages is out of the limits, the associated LED on the chassis front panel is set up in red state.

- +5VSB (standby)

The CMB should be powered from standby power so that all features are available even when the chassis is powered off.

Two 5V standby power inputs are available for redundancy, if needed.

If the voltage on one of these inputs is not OK, and the input is declared as used, the Stdby LED will blink to report the error.

Voltage tolerance limits are software configurable and set up during the installation stage.

2.2.3 Temperature Monitoring

The CMB continuously monitors the temperature inside the chassis via one local sensor on the CMB, and up to eight sensors in the chassis.

When the temperature exceeds tolerance limits, the temperature red LED on the chassis front panel is activated.

Available temperature sensors and temperature limits are software configurable and set up during the installation stage

The CMB can also be configured to power off the system if temperatures are out of limits. In this case the Sys red LED :

> is switched on when the temperature error occurs

> remains on even if the temperature becomes OK (latched status).

> is switched off at the next powered on requested if the temperature is OK

This can be managed by using one of the following commands :

```
system@CMB> set vpd system overtempoff on
system@CMB> set vpd system overtempoff off
system@CMB> set vpd system undertempoff on
system@CMB> set vpd system undertempoff off
```

A 5°C hysteresis applies to the temperature limits to prevent the temperature status from toggling continuously when temperature is at a limit. This prevents the "temp" LED from blinking.

If the CMB was configured to power-off the system on temperature error, this also prevents the system from beeing immediately restarted by the operator while it is still too hot.

If your CMB is not a CMB-FxW-00, the chassis temperature sensors are powered from the standby power, so all these sensors can be monitored while in standby state.

2.2.4 Fan Monitoring

The CMB can monitor up to eight fans speed.

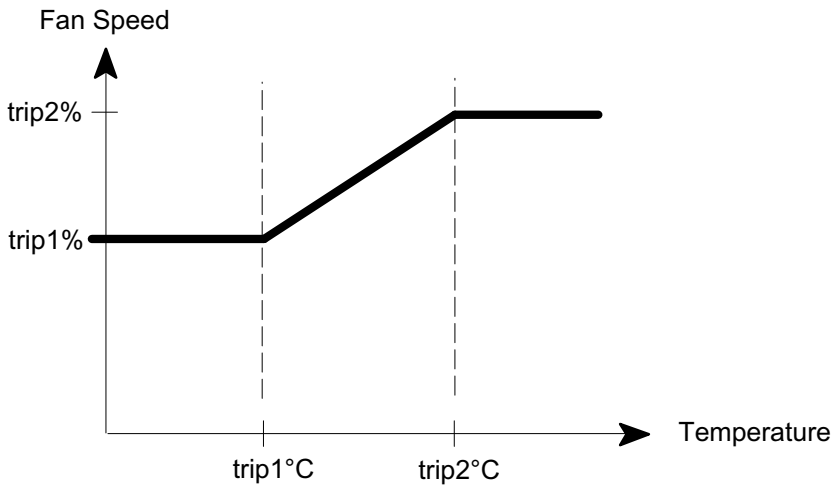
When a fan is not running or when its speed is lower than the lower limit, the fan red LED on the chassis front panel is activated and all fans are configured to full speed.

Fan speed limits are software configurable and set up during the installation stage.

2.2.5 Fan Control

The chassis fans speed is controlled and correlated to the chassis temperature, according to two software configurable trip points trip1 and trip2.

Each trip point defines a fan speed (in % of max) at a given temperature



The chassis temperature used for fans speed is computed as follows :

> max temperature of all chassis sensors if equipped

> the temperature of the CMB sensor if no chassis sensor is equipped

Most fans are unable to operate safely at speeds below 50% of their maximum speed, so be aware of that when setting trip points.

2.2.6 Backplane Signals

VME signals SYSRESET, ACFAIL, SYSFAIL are controlled and monitored by the CMB. SYSFAIL is monitored and drives the sys red LED.

VPX signals SYSRESET, NVMRO, MRST1-MRST8 are controlled by the CMB.

SYSRESET is driven active when the power supplies are off and is driven inactive 250 ms after the powersupplies have been switched on.

2.2.7 Startup Time

When standby power is applied to the CMB (primary power supply is present), the CMB software starts and is ready for monitoring in less than a second.

2.2.8 Self-Tests

When standby power is applied to the CMB, the Power-on Built-In-Tests (PBIT) are executed to check CMB components, configuration and environment.

The status is reported with the *stdby* (standby) green LED :

- OFF: FAIL, the CMB software failed to start
- BLINKING: the CMB software has detected a software error, hardware error, or a standby power voltage out of limits
- ON: OK, system in standby mode or running

When the power supplies are enabled, a LEDs test sequence is performed: all LEDs except stdby are blinking during five seconds.

For power supply bicolor LEDs, the LEDs are blinking between red and green.

2.2.9 Alarms

The CMB can generate alarms through the chassis front panel LEDs.

There are eight LEDs:

- Bicolor red/green for +3.3V
- Bicolor red/green for +5V
- Bicolor red/green for +12V
- Bicolor red/green for -12V
- Green for standby
- Red for Temperature
- Red for fan failure
- Red for SYSFAIL

LEDs behavior is described in following table:

Failure Description	DIagnosis
Temp LED is blinking	The CMB has detected some missing temperature sensors
Temp LED is ON (red) but the temperature is within limits	The CMB has not detected any temperature sensor at start up
Temp LED is ON (red)	At least one temperature is out of limits

Failure Description	DIagnosis
Fan LED is ON (red)	The CMB has detected a fan failure
A power voltage LED is green	The voltage level of this power rail is correct
A power voltage LED is red	The voltage level of this power rail is not correct
A power voltage LED is blinking	The CMB has detected a power-supply failure on this power rail (redundancy failure for example), but the voltage is OK.
A power voltage LED is off	No power on this rail.
Sys LED is ON (red)	VME SYSFAIL signal is currently active or an error condition occured (power off due to temperature out of limits for example)
Sys LED is blinking	An error has been detected on the boards in the backplane
Stby LED is blinking	The CMB software has detected a software error, hardware error, or a standby power voltage out of limits.

Table 1: Alarm Description

2.2.10 Serial Lines

The CMB provides a serial line interface to control and monitor the chassis through a Command Line Interface (CMB shell). This interface can be used by an operator using a console or by a high level software running on another system.

Serial line interface characteristics are:

- Speed 115200 bauds
- 8-bit
- 1Stop bit
- No parity

Two simplified (TX,RX,GND) serial ports are available on the RJ-11 connector :

> the first one is protected by a password login and is to be connected to a console for maintenance by an operator. This can be done using a standard 3 wire null modem cable (DTE to DTE).

> the second one is without login and for optional in-chassis communication with other boards in the chassis. A special cable is needed to connect to the right pins of the RJ-11 connector.

The second serial line can be enabled or disabled by software configuration

2.2.11 Ethernet

This interface provides a way to control and monitor the chassis:

> through Telnet using a Command Line Interface (CMB shell)

> through HTTP using a Web browser

> through SNMP using standard SNMP tools

Chapter 3 - Connectors

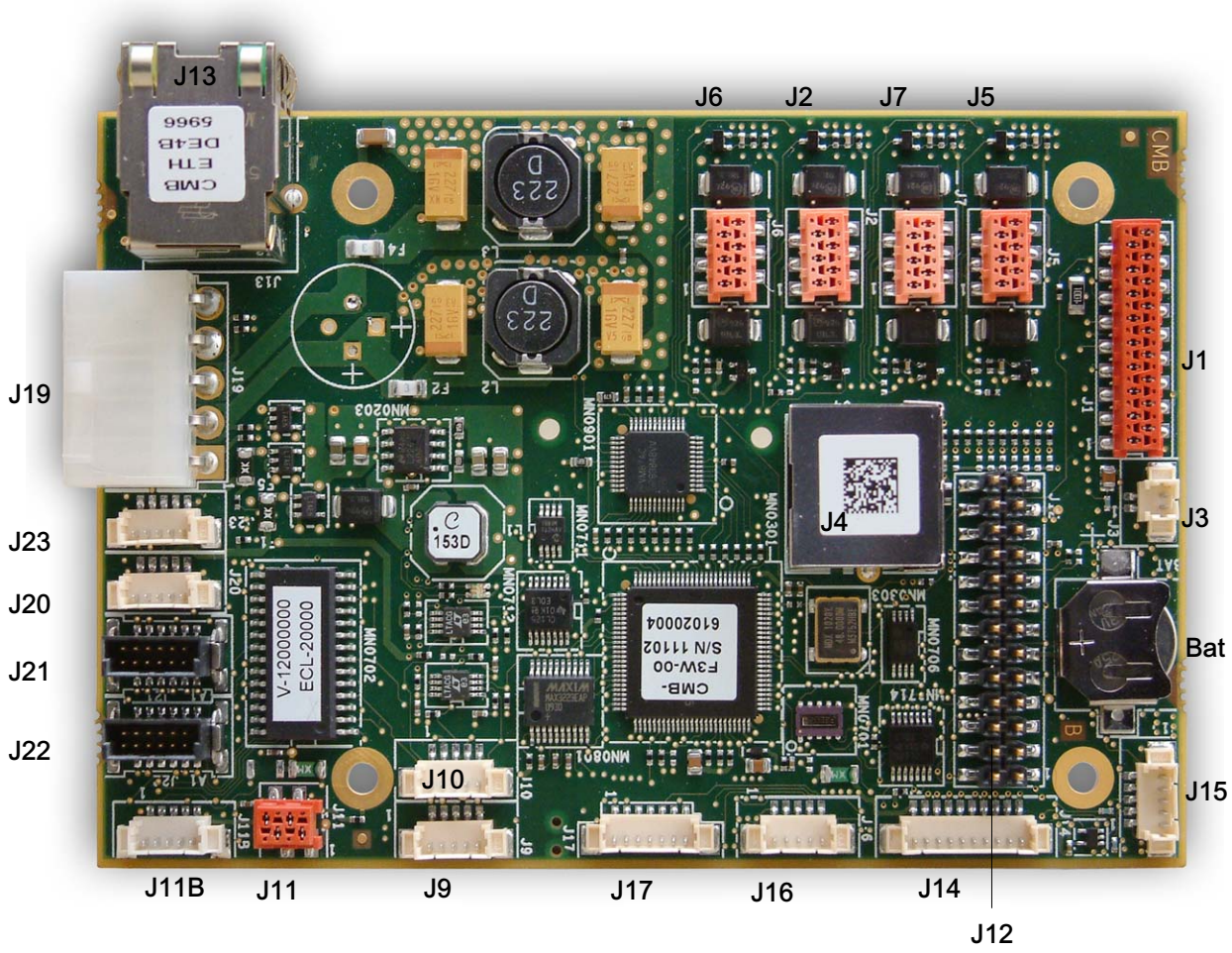


Figure 3: Connectors Location (1/2)

Refer to section 3.1 page 10 for J1 - LEDs Connector Pin Assignment.
Refer to section 3.2 page 12 for J2, J5, J6, J7 - Fans Connectors (3-Wire Configuration) Pin Assignment.
Refer to section 3.3 page 13 for J2, J5, J6, J7 - Fans Connectors (4-Wire Configuration) Pin Assignment.
Refer to section 3.4 page 14 for J11 - I²C Connector Pin Assignment.
Refer to section 3.5 page 14 for J11B - I²C Connector Pin Assignment.
Refer to section 3.6 page 15 for J9, J10 - Backplane I²C Connector Pin Assignment.
Refer to section 3.8 page 17 for J20 - Power Supply Standby Connector Pin Assignment.
Refer to section 3.9 page 18 for J23 - Power Supply Standby Connector Pin Assignment.
Refer to section 3.10 page 18 for J3 - Front Panel Button Connector Pin Assigment.
Refer to section 3.12 page 20 for J21 - PSU and Backplane Monitoring Connector Pin Assignment.
Refer to section 3.14 page 22 for J12 - BDM Connector Pin Assignment.
Refer to section 3.16 page 24 for J14 - GPIO Users Connector Pin Assignment.
Refer to section 3.17 page 25 for J15 - VME System Signal Connector Pin Assignment.
Refer to section 3.18 page 25 for J16 - VPX System Signal Connector Pin Assignment.
Refer to section 3.19 page 26 for J17 - VPX Maskable Reset Signal Connector Pin Assignment.

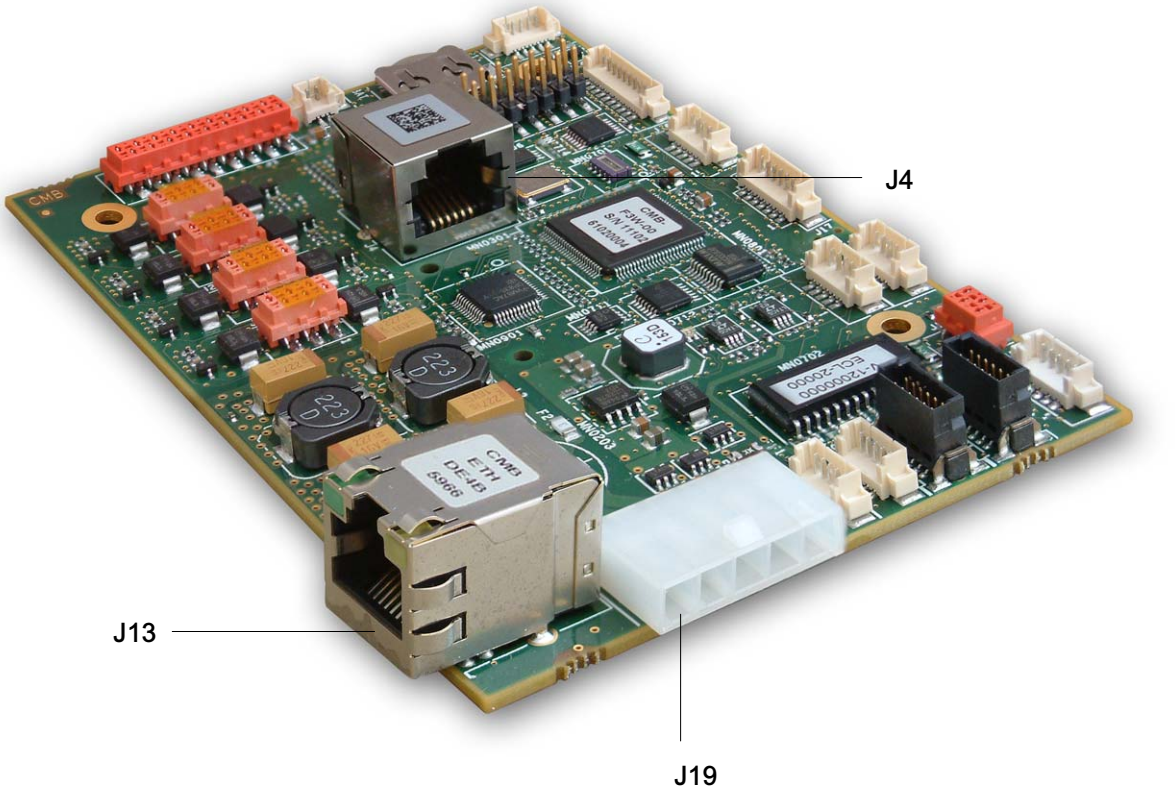


Figure 4: Connectors Location (2/2)

Refer to section 3.7 page 16 for J19 - Power Supply Connector Pin Assigment.

Refer to section 3.11 page 19 for J4 - Serial Lines Connector Pin Assignment.

Refer to section 3.15 page 23 for J13 - Ethernet RJ45 Connector Pin Assignment.

3.1 J1 - LEDs Connector

> Manufacturer: Tyco Micro-MaTch
> Part No: 1-188275-8
> Pin Assignment

Pin	Label	Description
1	LED Green +12V	Anode of the LED
2	LED Red +12V	Anode of the LED
3	LED Green -12V	Anode of the LED
4	-12V	Cathode of LED Green -12V and LED Red -12V
5	LED Red -12V	Anode of the LED
6	LED Green STBY	Anode of the LED
7	LED Green +3.3V	Anode of the LED
8	LED Red +3.3V	Anode of the LED
9	LED Red SYSFAIL	Anode of the LED
10	LED Green +5V	Anode of the LED
11	LED Red +5V	Anode of the LED
12	LED Red FAN	Anode of the LED
13	LED Red TEMP	Anode of the LED
14	RESET_CMB	
15	RESET_CMB	
16	GND	Cathode of a LED
17	GND	Cathode of a LED
18	GND	Cathode of a LED

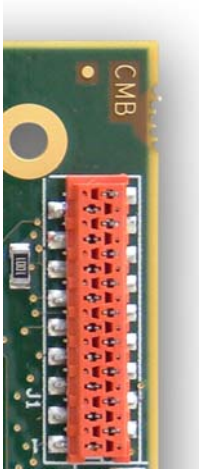


Table 2: Pin Assignment of LEDs Connector

The current in all LEDs is set to approximately 10mA.

To reduce this current, a series resistor can be added to:

- the cathode for power rail LEDs (3V3, 5V, 12V or -12V)
- the cathode or anode for other LEDs (STBY, TEMP, FAN, SYSFAIL)

For power rail LEDs:

- They can be equipped or not.
- Red and Green LEDs are expected to be made of a single bicolor LED with a common cathode, but this is not mandatory
- If using other LED colors, the forward voltage of the LED used in place of the "Red" LED must be lower or equal than the one used in place of the "Green" LED, if not the LED used in place of the "Green" LED may not be fully off when it is set to off.
- Green LED can be removed (only Red LED equipped); in this case any color of LED can be used in place of the "Red" LED.

For other LEDs :

- They can be equipped or not.
- Any other color can be used instead of the suggested color.

The cathode of all LEDs must be connected to GND, except the ones of the -12V Green/Red LEDs that are connected to -12V.

To reduce the current from the standby power:

- All LEDs related to a power rail are powered by this power rail.
- The FAN LED is powered from +12V.
- Only the STBY, TEMP, and SYSFAIL LEDs are powered from the standby power (can be on even when the system is in standby)

3.2 J2, J5, J6, J7 - Fans Connectors (3-Wire Configuration)

3-Wire configuration: +V, GND, SENSE

> Manufacturer: Tyco Micro-MaTch

> Part No: 0-188275-6

> Pin Assignment

Pin	Label	Description
1	FAN1 PWR	Connected to +12V through CMB's internal PWM power stage
2	FAN1 GND	Connected to GND or -12V
3	FAN1 SENSE	Tachometer feedback
4	FAN2 SENSE	Tachometer feedback
5	FAN2 GND	Connected to GND or -12V
6	FAN2 PWR	Connected to +12V through CMB's internal PWM power stage

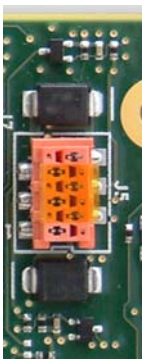


Table 3: Pin Assignment of Fans Connectors for 3-Wire Configuration

For CMB-F3W-XX boards, the FAN1 GND and FAN2 GND are internally connected to GND to use 24V fans between +12V and -12V.

The tachometer inputs (SENSE) have an internal pull-up to +12V and are expected to be driven to GND or -12V at a speed dependant frequency. The number of pulses per revolution (tacho dependant) can be configured by software in VPD rack so that a direct speed measurement in RPMs can be displayed by the CMB.

The power delivered to all fans is protected by a global 3A fuse; each fan having an additional 1,5A fuse on PWR.

The power is drown from the J19 Power Supply Connector.

The CMB software assigns the following fan port numbers to each connector :

- J6: fan 0 and 1
- J7: fan 2 and 3
- J2: fan 4 and 5
- J5: fan 6 and 7

The CMB supports four PWM channels driving up to heigh fans, so the PWM is shared between some fan ports (same speed) as follows:

- fan 0 and 4
- fan 1 and 5
- fan 2 and 6
- fan 3 and 7

The PWM frequency for 3 wire fans is set to 1 KHz.

Eigh independant tachometer inputs are available, so the speed of all fans can be monitored.

3.3 J2, J5, J6, J7 - Fans Connectors (4-Wire Configuration)

4-Wire configuration: +V, GND, SENSE, PWM

> Manufacturer: Tyco Micro-MaTch

> Part No: 0-188275-6

> Pin Assignment

Pin	Label	Description
1	FAN1&2 PWR	Connected to +12V
2	FAN1&2 GND	Connected to GND
3	FAN1 SENSE	Tachometer feedback
4	FAN2 SENSE	Tachometer feedback
5	FAN1 PWM	PWM
6	FAN2 PWM	PWM

Table 4: Pin Assignment of Fans Connectors for 4-Wire Configuration

Compared to the 3-Wire configuration, the power requirement of the fans are no more limited to the maximal current from the CMB:

- It is recommended to connect the fan power directly to the power supplies (+12V). However, if PWR and GND are used, take care that the power delivered to all fans through PWR is protected by a global 3A fuse, and that each connector has an additional 1,5A fuse on PWR.
- It is also recommended to connect the fan ground directly to the power supplies.

Also for the PWM signals:

- The PWM frequency is set to 20kHz.
- These signals are 3V3 push-pull outputs, internally limited to 5 mA.

Do not connect PWM signals to a voltage below 0V or above 3V3.

3.4 J11 - I²C Connector

> Manufacturer: Tyco Micro-MaTch
> Part No: 0-188275-4
> Pin Assignment

Pin	Label	Description
1	I2C_PWR	5V power supply from CMB (standby power)
2	RACK_SCL	I²C clock
3	RACK_SDA	I²C data
4	GND	Ground

Table 5: Pin Assignment of I2C Connector (J11)

I2C_PWR is protected by a 0,5A fuse on the CMB.

Any current drown from this pin will be drown from the standby 5V power.

3.5 J11B - I²C Connector

> Manufacturer: MOLEX
> Part No: 53398-0571
> Pin Assignment

Pin	Label	Description
1	RACK_SCL	I²C clock
2	GND	Ground
3	RACK_SDA	I²C data
4	I2C_PWR	5V power supply
5	N.C.	Not Connected

Table 6: Pin Assignment of I2C Connector (J11B)

The signals on this connector are shared with the ones on J11.

3.6 J9, J10 - Backplane I²C Connector

J9 is the backplane I2C bus having bus number 2 for the CMB shell commands.

J10 is the redundant backplane I2C bus having bus number 3 for the CMB shell commands.

> Manufacturer: MOLEX

> Part No: 53398-0571

> Pin Assignment

Pin	Label	Description
1	BP_SCL	I²C clock
2	GND	Ground
3	BP_SDA	I²C data
4	BP_I2C_PWR	I2C Power Supply from backplane
5	BP_ALERT# (J9) BP_GDISC (J10)	Gdiscrete only routed to J10 according to VPX backplane

Table 7: Pin Assignment of Backplane I2C Connector

BP_I2C_PWR is supplied by the backplane and can be 3V3 or 5V. It should be a standby power so that this bus works in standby mode.

BP_I2C_PWR is connected between J9 and J10 connectors.

An optional equipment on CMB can provide 3V3 or 5V standby power on BP_I2C_PWR if not done by the backplane.

BP_ALERT#: 3V3 input with 10K pull-up to 3V3 internal standby power; NOT 5V tolerant.

BP_GDISC: 3V3 input / open drain output, with 10K pull-up to 3V3 internal standby power; NOT 5V tolerant.

3.7 J19 - Power Supply Connector

This connector is only for backplane voltage measurement, and fan power in case of 3 wire fans (power supplied by the CMB)

If the CMB is not powered from PSU1_5Vstdby nor PSU2_5Vstdby, 5V power supply on this connector is used instead

> Manufacturer: MOLEX

> Part No: 3930-3055

> Pin Assignment

Pin	Label	Description
1	+3.3V	+3.3V power supply
2	+12V	+12V power supply
3	-12V	-12V power supply
4	5V	5V power supply
5	GND	Ground

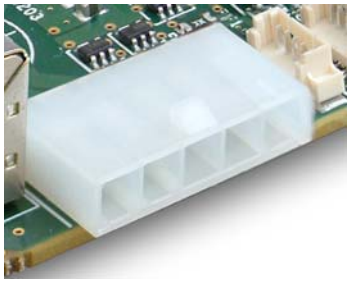


Table 8: Pin Assignment of Power Supply Connector (J19)

> -12V and +12V are protected by a 3A fuse on the CMB

> +3.3V and +5V are protected by a 1A fuse on the CMB

3.8 J20 - Power Supply Standby Connector

PSU1_GLOB_CTL# Global enable or inhibit for power pack #1

> Manufacturer: MOLEX

> Part No: 53398-0571

> Pin Assignment

Pin	Label	Description
1	PSU1_SPARE	Could be used for a fan or a thermal alarm from PSU1
2	PSU1_GLOB_EN#	Driven to 0 to enable PSU1
3	ACFAIL1_IN#	ACFAIL alarm from PSU1
4	PSU1_5Vstdby	+5V stdby from PSU1
5	GND	Ground

Table 9: Pin Assignment of Power Supply Standby Connector (J20)

PSUn_SPARE: 3V3 input with 10K pull-up to 3V3 internal standby power; NOT 5V tolerant

PSUn_GLOB_CTL#: open drain output, -50mA max, not 5V tolerant (3V3 max when open)

ACFAILn_IN#: 3V3 input with 10K pull-up to 3V3 internal standby power; NOT 5V tolerant. 0:OK, 1:FAIL, NC:FAIL.

PSUn_5Vstdby: protected by a 1A fuse on the CMB

An EC level (Engineering Change level) is planned to make PSUn_GLOB_CTL# and ACFAILn_IN# signals 5V tolerant.

PSU1_5Vstdby is redundant with PSU2_5Vstdby to power the CMB but they are not connected together on the CMB (an ideal diode is used)

The CMB can be configured by software (VPD rack) to use PSUn_GLOB_CTL# as global inhibit or global enable signals (inverted logic).

3.9 J23 - Power Supply Standby Connector

Signal characteristics are the same than the ones for J20.

> Manufacturer: MOLEX
> Part No: 53398-0571
> Pin Assignment

Pin	Label	Description
1	PSU2_SPARE	Could be used for a fan or a thermal alarm from PSU2
2	PSU2_GLOB_EN#	Driven to 0 to enable PSU2
3	ACFAIL2_IN#	ACFAIL alarm from PSU2
4	PSU2_5Vstdby	+5V stdby from PSU2
5	GND	Ground

Table 10: Pin Assignment of Power Supply Standby Connector (J23)

3.10 J3 - Front Panel Button Connector

The purpose of the front panel button is to power the chassis on or off.

The CMB can be configured by software (VPD rack) to support a switch (non-fugutive contact) or a push-button (fugitive contact).

> Manufacturer: MOLEX
> Part No: 53398-0271
> Pin Assignment

Pin	Label	Description
1	PB#	Front Panel Button
2	GND	Ground

Table 11: Pin Assignment of Front Pannel Connector

PB# is a 3V3 input NOT 5V compliant, with 4K7 pull-up to internal 3V3 standby power.

3.11 J4 - Serial Lines Connector

> Manufacturer: MOLEX
> Part No: 043860-0026
> Pin Assignment

Pin	Label	Description
1	COM2_TX	Transmit for EIA-232 Port 2
2	COM2_GND	Ground for EIA-232 Port 2
3	COM1_TX	Transmit for EIA-232 Port 1
4	COM1_RX	Receive for EIA-232 Port 1
5	COM1_GND	Ground for EIA-232 Port 1
6	COM2_RX	Receive for EIA-232 Port 2

Table 12: Pin Assignment of Serial Lines Connector

COM1 signals are expected to be connected to a serial console (terminal) for maintenance.

COM2 signals are for chassis internal communication with another board

Both have a CMB shell prompt available; see below.

3.12 J21 - PSU and Backplane Monitoring Connector

> Manufacturer: ERNI
> Part No: 063179
> Pin Assignment

Pin	Label	Description
A1	PWG0	PowerGood channel #0
A2	CTL0	Control channel #0
A3	PWG1	PowerGood channel #1
A4	CTL1	Control channel #1
A5	PWG2	PowerGood channel #2
A6	CTL2	Control channel #2
B1	PWG3	PowerGood channel #3
B2	CTL3	Control channel #4
B3	ACFAIL	VME ACFAIL
B4	SYSFAIL	VME SYSFAIL
B5	SYSRESET	VME SYSRESET
B6	GND	Ground for PWGn, CTLn, and VME signals

Table 13: Pin Assignment of PSU and Backplane Monitoring Connector

CTL signals are for controlling individual power modules, while PSUn_GLOB_CTL# signals on J20/J23 are for driving the power pack(s) containing the modules (global control). Both can be used, or only CTL or only PSUn_GLOB_CTL#, or none depending on requirements.

PWG signals are for monitoring the status of individual power modules. They can be used or not depending if the power modules have such a signal or if this monitoring is required or not.

PWG signals are 3V3 input with internal 4K7 pull-up to 3V3 internal standby power. 5V tolerant. 0:OK, 1:NOK, NC:NOK. Typical application is a power module driving these signals to GND when OK using an optocoupler.

CTL signals are 5V push-pull outputs, +-20mA max. 1: ON. 0: OFF. Typical application is to drive a power module having an internal optocoupler (the optocoupler's LED is driven by the CMB)

The CMB can be configured by software (VPD rack):

- to use CTL signals as enable (enableON = PSU ON) or inhibit (inhibitON = PSU OFF; inverted logic)
- to define for each power module: the power rail (3V3, 5V, 12V, or -12V) including redundancies between modules, the CTL channel (if used), and the PWG channel (if used)

VME signals are also available for convenience on J15 connector.

3.13 J22 - PSU Monitoring Connector

Pin	Label	Description
A1	PWG4	PowerGood channel #4
A2	CTL4	Control channel #4
A3	PWG5	PowerGood channel #5
A4	CTL5	Control channel #5
A5	PWG6	PowerGood channel #6
A6	CTL6	Control channel #6
B1	PWG7	PowerGood channel #7
B2	CTL7	Control channel #7
B3	NC	Not connected
B4	NC	Not connected
B5	NC	Not connected
B6	GND	Ground for PWGn, and CTLn

Table 14: Pin Assignment of PSU Monitoring Connector

See 3.12 for characteristics of PWGn and CTLn signals.

3.14 J12 - BDM Connector

> Manufacturer: SAMTEC
> Part No: TSM-113-01-L-DV-M
> Pin Assignment

Pin	Label	Description
1	N.C.	Not Connected
2	BKPT	
3	GND	Ground
4	DSCLK	
5	GND	Ground
6	N.C.	Not Connected
7	RESET	
8	DSI	
9	VCC	
10	DSO	
11	GND	Ground
12	PST3	Not Connected
13	PST2	Not Connected
14	PST1	Not Connected
15	PST0	Not Connected
16	DDATA3	Not Connected
17	DDATA2	Not Connected
18	DDATA1	Not Connected
19	DDATA0	Not Connected
20	GND	Ground
21	N.C.	Not Connected
23	GND	Ground
24	CLK	
25	N.C.	Not Connected
26	TEA	Not Connected

Table 15: Pin Assignment of BDM Connector

This interface is compatible with the P&E Micro USB-ML-CF Coldfire Multilink probe.

3.15 J13 - Ethernet RJ45 Connector

> Manufacturer: TYCO
> Part No: 5-6605758-1
> Pin Assignment

Pin	Label	Description
1	TXP	Transmit positive
2	TXN	Transmit negative
3	RXP	Receive positive
4	NC	
5	NC	
6	RXN	Receive negative
7	NC	
8	NC	

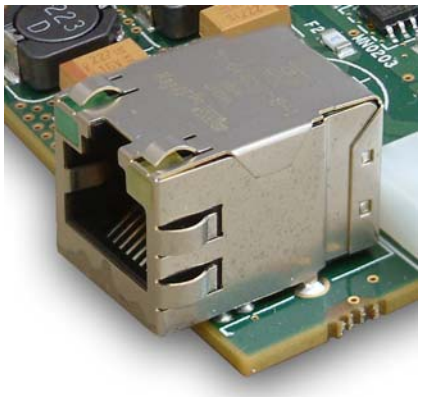


Table 16: Pin Assignment of Ethernet RJ45 Connector

This connector provides a 10/100BASE-T interface

3.16 J14 - GPIO Users Connector

> Manufacturer: MOLEX
> Part No: 53398-1071
> Pin Assignment

Pin	Label	Description
1	VDD	
2	GPIO1	General Purpose I/O 1
3	GPIO2	General Purpose I/O 2
4	GPIO3	General Purpose I/O 3
5	GPIO4	General Purpose I/O 4
6	GPIO5	General Purpose I/O 5
7	GPIO6	General Purpose I/O 6
8	GPIO7	General Purpose I/O 7
9	GPIO8	General Purpose I/O 8
10	GND	Ground

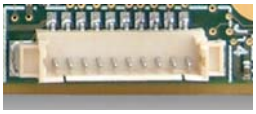


Table 17: Pin Assignment of GPIO Users Connector

All signals are 3V3 general purpose input outputs (not 5V tolerant); +-10mA max for outputs.

3.17 J15 - VME System Signal Connector

> Manufacturer: MOLEX
> Part No: 53398-0571
> Pin Assignment

Pin	Label	Description
1	BP_ACFAIL#	VME ACFAIL
2	BP_SYSRESET#	VME SYSRESET
3	BP_SYSFAIL#	VME SYSFAIL
4	BP_SPARE	Spare
5	GND	Ground

Table 18: Pin Assignment of VME System Signal Connector

BP_ACFAIL#, BP_SYSRESET#, and BP_SYSFAIL# are compliant with VME standard. All I/O are 5V tolerant. Outputs are open drain and capable of sinking the required current.

BP_SPARE is an open drain output; NOT 5V compliant (3V3 max); -50mA max.

3.18 J16 - VPX System Signal Connector

> Manufacturer: MOLEX
> Part No: 53398-0571
> Pin Assignment

Pin	Label	Description
1	BP_SYSRESET#	VPX SYSRESET
2	BP_NVMRO	VPX Non Volatile Memory Read-Only
3	GND	Ground
4	BP_MRST7#	VPX Maskable Reset Slot 7
5	BP_MRST8#	VPX Maskable Reset Slot 8

All signals are compliant with VPX standard.

BP_SYSRESET# also used for VME is a 5V tolerant open drain output.

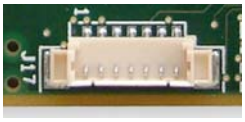
BP_NVMRO is an open drain output, NOT 5V tolerant (max 3V3). When high the non volatile devices on the equipments connected to the backplane are read-only.

BP_MRSTn# are open drain outputs, NOT 5V tolerant (max 3V3). Driven low to reset a device.

3.19 J17 - VPX Maskable Reset Signal Connector

> Manufacturer: MOLEX
> Part No: 53398-0771
> Pin Assignment

Pin	Label	Description
1	BP_MRST1#	VPX Maskable Reset Slot 1
2	BP_MRST2#	VPX Maskable Reset Slot 2
3	BP_MRST3#	VPX Maskable Reset Slot 3
4	GND	Ground
5	BP_MRST4#	VPX Maskable Reset Slot 4
6	BP_MRST5#	VPX Maskable Reset Slot 5
7	BP_MRST6#	VPX Maskable Reset Slot 6



Characteristics of BP_MRSTn# signals are the same than for J16.

Chapter 4 - Specifications

4.1 Technical Information

Power Supply:	5V (4.5V to 6V)
Current Consumption:	200 mA
Weight:	70g
Mechanical Dimensions:	in mm, see Figure 5 below

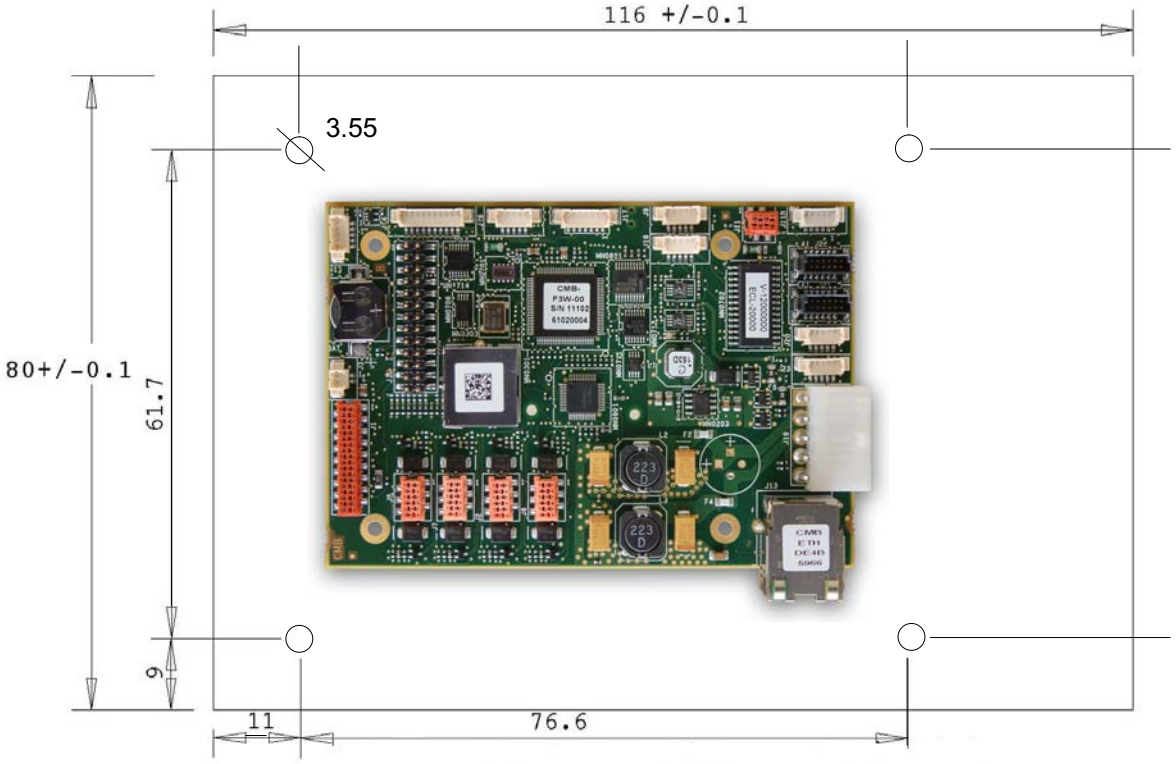


Figure 5: Dimensions of the Board

4.2 Environmental Specifications

Operating Temperature:	-40°C / +85°C
Storage Temperature:	-40°C / +85°C

4.3 MTBF Data

Calculations are made according to the standard MIL-HDBK217F-2 for the following types of environment

- Ground Benign (GB)
- Air Inhabited Cargo (AIC)
- Naval Sheltered (NS)
- Air Rotary Wing (ARW)

GB (Hours)		AIC (Hours)	NS (Hours)		ARW (Hours)
25°C	40°C	40°C	25°C	40°C	55°C
603 005	447 046	89 406	112 235	92 522	20 485

Chapter 5 - Software

The software running on the CMB, called *Monitoring Software*, is made of a monitoring application running on a MQX RTOS (Real Time Operating System) from Freescale.

The monitoring application has been designed to be easily extended, by using several specialized threads reading/changing the state of the system on some specific events.

The monitoring software is burnt to the CMB processor flash memory during manufacturing process, and then supports on-the-field updates from the CMB Shell.

For more information on how to use this software and how to configure the CMB, see the CMB-3U documentation: **CA.DT.B11 - "3U Chassis Monitoring Board User's Guide"**.

However, when reading this document, take into account the CMB specific information listed below :

System Standby

If your CMB is a CMB-FxW-00, the chassis temperature sensors are not powered from the standby power, so the status of these sensors is UNDEFINED when the chassis is in standby state (powered off). The first sensor is located on the CMB and can always be read.

System Power-on

To power-on the system, the CMB supports three kinds of power button management (specific chassis):

- **A power-switch directly connected to power-supplies**: in this case the CMB knows if the system is powered-on by monitoring the Power-Good signals from the power-supplies: if at least one is active, the system is considered as "on".
- **A power-switch connected to the CMB**: in this configuration the CMB enables the power supplies though their enable and/or global enable signals when the switch is on.
- **A power push-button connected to the CMB**: works as with a switch, but as a push-button has a non permanent contact, the system is powered-on if the push-button is pressed more than 200 ms, and is powered-off if pressed again more than 3 seconds. Support for a power-off interrupt when pressed more than 500 ms but less than 3 seconds is supported by:
  - a message displayed on both serial lines: "`POWER SWITCH: short push detected`". This message can be catched by a CPU board to do a clean shutdown of the OS and set off a delayed power off by sending "`set power off <seconds>`" to the CMB.
  - an SNMP notification: as a reply, the CPU board can request an immediate or delayed power off through SNMP.

If the power-on button is directly connected to the power supplies, as the CMB is unable to start the power supplies, the only thing that the command can do is to disable / enable the reset on the backplane; the power supplies remain always on by the switch.

If the power button is a switch connected to the CMB, the power can be set on or off by the command regardless of the current state of the switch (even if the switch is off, the system can be switched on, and also can be switched off even if the switch is on).

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