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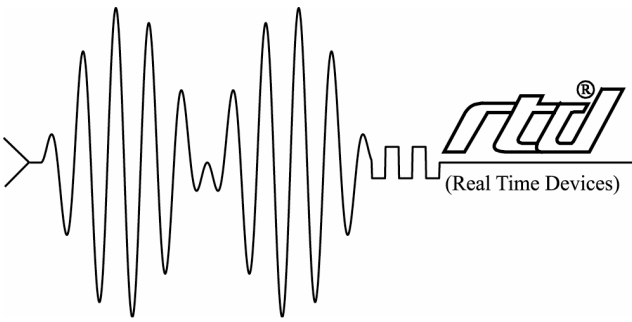
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CM17215HR 100MB/s Fiber
CM17212HR 10/100MB/s UTP
PC/104-*Plus* Dual Ethernet
utilityModule™

User's Manual



RTD Embedded Technologies, Inc.
"Accessing the Analog World"®

BDM-610020066
Rev. A

CM17215HR 100MB/s Fiber
CM17212HR 10/100MB/s Twisted Pair
PC/104-*Plus* Dual Ethernet utilityModule™
User's Manual



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Table of Contents

CHAPTER 1 INTRODUCTION....1

ELECTRICAL SPECIFICATIONS....1
MECHANICAL SPECIFICATIONS....1
ENVIRONMENTAL....1

CHAPTER 2 CM172XXHR LAYOUT....3

FINDING PIN 1 OF CONNECTORS....3
COMPONENT LOCATIONS....3
LIST OF CONNECTORS AND SWITCHES....5
PC/104 BUS CONNECTORS, CN1 AND CN2....6
PC/104-PLUS PCI CONNECTOR, CN3....8
PC/104-Plus PCI Bus Signals....9
MT-RJ FIBER ETHERNET, CN6 AND CN9....11
PCI BOARD SELECTOR ROTARY SWITCH, SW1....12
FIBER LED INDICATORS....12

CHAPTER 3 INSTALLING THE UTILITYMODULE™....13

RECOMMENDED PROCEDURE:....13

CHAPTER 4 RETURN POLICY AND WARRANTY....14

RETURN POLICY....14
LIMITED WARRANTY....15

Table of Tables

TABLE 1: LIST OF CONNECTORS AND SWITCHES 5
TABLE 2: PC/104 XT BUS CONNECTOR 6
TABLE 3: PC/104 AT BUS CONNECTOR 7
TABLE 4: PC/104-*PLUS* BUS SIGNAL ASSIGNMENTS 8
TABLE 7: MT-RJ LED INDICATORS 12

Table of Figures

FIGURE 1: COMPONENT LOCATIONS ON CM17215 3
FIGURE 2: COMPONENT LOCATIONS ON CM17212 4
FIGURE 3: PCI SELECTOR ROTARY SWITCH 12

Chapter 1 INTRODUCTION

This manual gives information on the CM17215 PC/104-*Plus* Dual 100MB/s Fiber Ethernet utilityModule™ and the CM17212 PC/104-*Plus* Dual 10/100MB/s Fast Ethernet utilityModule™.

This module provides two (2) Independent Ethernet connections (Fiber – CM17215, UTP – CM17212) while utilizing the resources of only one slot on a PC/104-*Plus* stack. Each channel is capable of operating through a MT-RJ fiber connector (CM17215) or a standard RJ-45 connector.

Each channel of the CM172xx utilityModule™ operates using its own Intel 82551IT PCI Ethernet Controller and Intel LXT973 2-Port Ethernet PHY Transceiver.

Electrical Specifications

- Compatible with *PCI Local Bus Specification Revision 2.1*
- Compatible with PC/104-*Plus* Specification Revision 1.2
- 1.6 W @ +5 VDC typical (CM17212)
- 4.9 W @ +5 VDC typical (CM17215)

Mechanical Specifications

- Dimensions: 3.6 x 3.8 x 0.6" (90 x 96 x 16 mm)
- Weight (mass): 0.22 lbs. (0.10 Kg)

Environmental

- Operating Temperature: -40° to 85° C
- Storage Temperature: -40° to +85° C
- Non-Condensing Relative Humidity: < 95% at 40°C

WARNING!

Like all equipment using CMOS devices, the CM172xxHR must be protected from static discharge. Never touch any of the parts except at static-free workstation. Use anti-static bag shipped with the CM17215HR to handle the board

Software

The 82551IT is supported by DOS, Windows 2000/XP/2003 and Linux. For DOS and Windows drivers are provided on the companion CD that is shipped with the board. Linux drivers are included in most modern 2.4 and 2.6 kernels. Please contact the vendor of your Linux distribution for more information. Always check the RTD website for the latest drivers and documentation.

Chapter 2 CM172XXHR LAYOUT

Finding Pin 1 of Connectors

The three possible ways to determine pin 1 on the connectors are:

1. A square white area silk-screened on the PC board
2. A square solder pad visible on the bottom of the PC board
3. A numeral 1 silk-screened near pin 1 on the top of the PC board

Component Locations

The figures below shows switch and connector locations.

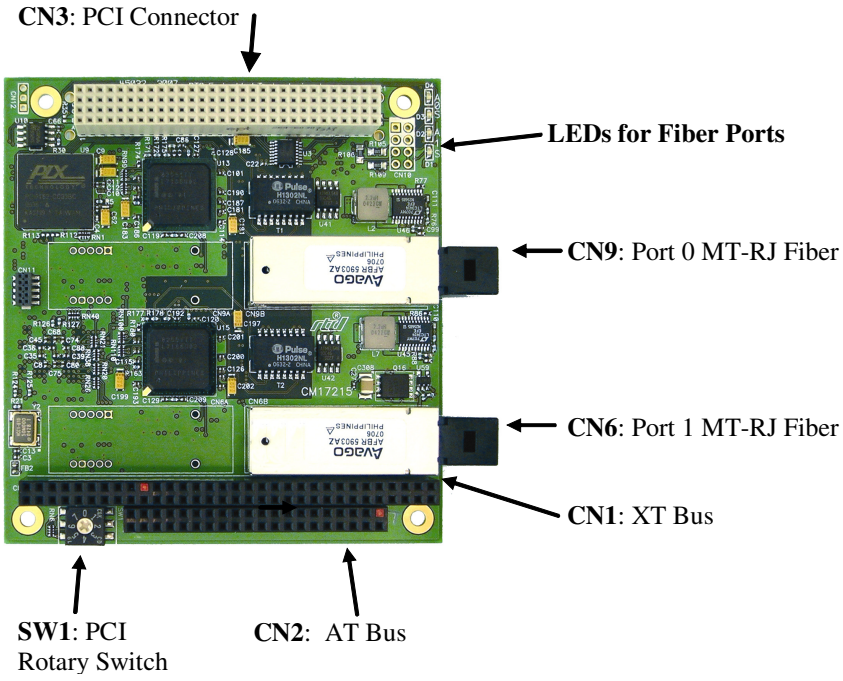


Figure 1: Component Locations on CM17215

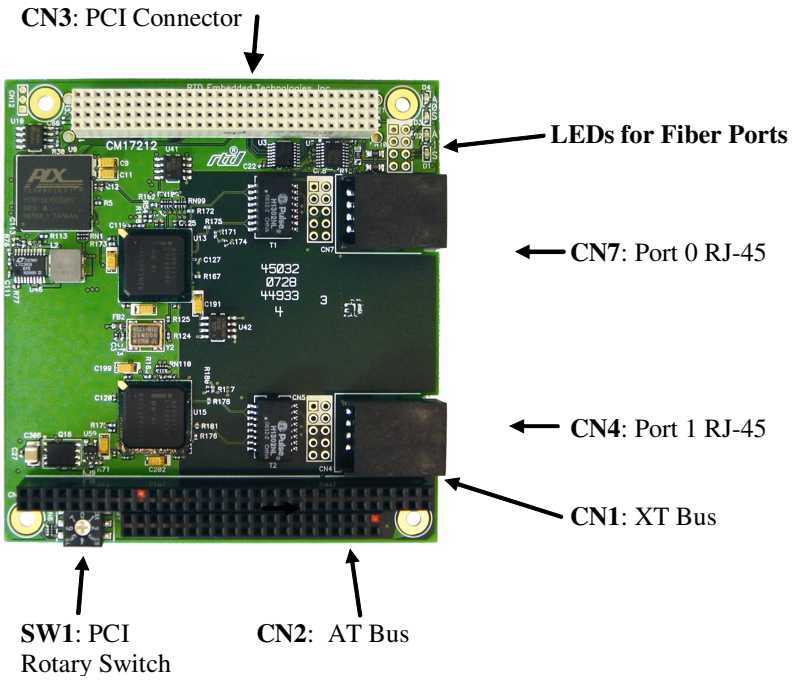


Figure 2: Component Locations on CM17212

List of Connectors and Switches

Connector	Function	Dimension
CN1, CN2	XT/AT Bus Connector	64 + 32 pins
CN3	PCI Bus Connector	120 pins
CN9	Port 0 Fiber Connector (CM17215 only)	MT-RJ
CN6	Port 1 Fiber Connector (CM17215 only)	MT-RJ
CN7	Port 0 UTP (CM17212 only)	RJ-45
CN4	Port 1 UTP (CM17212 only)	RJ-45
SW1:	PCI Board Selector Rotary Switch	Rotary Switch

Table 1: List of Connectors and Switches

PC/104 Bus Connectors, CN1 and CN2

Connectors CN1 and CN2 provide PC/104 bus connections. CN1 carries XT bus signals, and CN2 carries additional signals for the AT bus.

PC/104 XT Bus Connector, CN1		
Pin	**Row A**	**Row B**
1	IOCHCHK*	0V
2	SD7	RESETDRV
3	SD6	+5V
4	SD5	IRQ9
5	SD4	-5V
6	SD3	DRQ2
7	SD2	-12V
8	SD1	ENDXFR*
9	SD0	+12V
10	IOCHRDY	(KEYING PIN)
11	AEN	SMEMW*
12	SA19	SMEMR*
13	SA18	IOW*
14	SA17	IOR*
15	SA16	DACK3
16	SA15	DRQ3
17	SA14	DACK1*
18	SA13	DRQ1
19	SA12	REFRESH
20	SA11	SYSCLK
21	SA10	IRQ7
22	SA9	IRQ6
23	SA8	IRQ5
24	SA7	IRQ4
25	SA6	IRQ3
26	SA5	DACK2*
27	SA4	TC
28	SA3	BALE
29	SA2	+5V
30	SA1	OSC
31	SA0	0V
32	0V	0V

Table 2: PC/104 XT Bus Connector

* indicate active low

PC/104 AT Bus Connector, CN2		
Pin	**Row C**	**Row D**
0	0V	0V
1	SBHE*	MEMCS16*
2	LA23	IOCS16*
3	LA22	IRQ10
4	LA21	IRQ11
5	LA20	IRQ12
6	LA19	IRQ15
7	LA18	IRQ14
8	LA17	DACK0*
9	MEMR*	DRQ0
10	MEMW*	DACK5*
11	SD8	DRQ5
12	SD9	DACK6*
13	SD10	DRQ6
14	SD11	DRQ6
15	SD12	DRQ7
16	SD13	+5V
17	SD14	MASTER*
18	SD15	0V
19	(KEYING PIN)	0V

Table 3: PC/104 AT Bus Connector

* indicate active low

Note: Two locations on the bus have mechanical keying pins to help prevent misconnection of the PC/104 bus. These keying pins are a part of the PC/104 standard, and we strongly recommend you leave them in place.

If you have other modules without keying pins, we suggest you modify them to include keying.

PC/104-Plus *PCI connector, CN3*

Connector CN3 carries the signals of the PC/104-*Plus* PCI bus. These signals match definitions of the PCI Local Bus specification Revision 2.1. The following tables list the pinouts of the PC/104-*Plus* bus connector.

Pin	A	B	C	D
1	GND/5.0V KEY[1]	Reserved	+5V	AD00
2	VI/O	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0*	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1*	AD15	+3.3V
9	SERR*	GND	SB0*	PAR
10	GND	PERR*	+3.3V	SDONE
11	STOP*	+3.3V	LOCK*	GND
12	+3.3V	TRDY*	GND	DEVSEL*
13	FRAME*	GND	IRDY*	+3.3V
14	GND	AD16	+3.3V	C/BE2*
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3*	VI/O	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0*	GND	REQ1*	VI/O
24	GND	REQ2*	+5V	GNT0*
25	GNT1*	VI/O	GNT2*	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD*	+5V	RST*
29	+12V	INTA*	INTB*	INTC*
30	-12V	Reserved	Reserved	GND/3.3V KEY[1]

Table 4: PC/104-*Plus* Bus Signal Assignments

*** indicate active low**

Note: The KEY pins are to guarantee proper module installation. Pin-A1 will be removed and the female side plugged for 5.0V I/O signals and Pin-D30 will be modified in the same manner for 3.3V I/O. It is recommended that both KEY pins (A1 and D30) be electrically connected to GND for shielding.

PC/104-*Plus* PCI Bus Signals

The following text contains brief descriptions of the PC/104-*Plus* PCI bus signals.

Address and Data

AD[31:00] -- Address and Data are multiplexed. A bus transaction consists of an address cycle followed by one or more data cycles.

C/BE[3:0]* -- Bus Command/Byte Enables are multiplexed. During the address cycle, the command is defined. During the Data cycle, they define the byte enables.

PAR -- Parity is even on AD[31:00] and C/BE[3:0]* and is required.

Interface Control Pins

FRAME* -- Frame is driven by the current master to indicate the start of a transaction and will remain active until the final data cycle.

TRDY* -- Target Ready indicates the selected devices ability to complete the current data cycle of the transaction. Both IRDY* and TRDY* must be asserted to terminate a data cycle.

IRDY* -- Initiator Ready indicates the master's ability to complete the current data cycle of the transaction.

STOP* -- Stop indicates the current selected device is requesting the master to stop the current transaction.

DEVSEL* -- Device Select is driven by the target device when its address is decoded.

IDSEL -- Initialization Device Select is used as a chip-select during configuration.

LOCK* -- Lock indicates an operation that may require multiple transactions to complete.

Error Reporting

PERR* -- Parity Error is for reporting data parity errors.

SERR* -- System Error is for reporting address parity errors.

Arbitration (Bus Masters Only)

REQ* -- Request indicates to the arbitrator that this device desires use of the bus.

GNT* -- Grant indicates to the requesting device that access has been granted.

System

CLK -- Clock provides timing for all transactions on the PCI bus.

RST* -- Reset is used to bring PCI-specific registers to a known state.

Interrupts

INTA* -- Interrupt A is used to request Interrupts.
INTB* -- Interrupt B is used to request Interrupts only for multi-function devices.
INTC* -- Interrupt C is used to request Interrupts only for multi-function devices.
INTD* -- Interrupt D is used to request Interrupts only for multi-function devices.

Power Supplies and VIO

+5V -- +5 volt supply
+12V -- +12 volt supply
-12V -- -12 volt supply
+3.3V -- +3.3 volt supply
VIO -- This signal typically is the I/O power to the bus drivers on a PCI bus card.

MT-RJ Fiber Ethernet, CN6 and CN9

The fiber connectors on the CM17215 are MT-RJ fiber transceivers. The transmitter transmits using a 1300 nm surface emitting InGaAsP LED and the receiver receives using an InGaAs PIN photodiode.

Before installing a MT-RJ fiber into the connector, remove the protection plug from the connector.

	Test Method	Performance
Eye Safety	IEC 825 Issue 1 1993:11 Class 1 CENELEC EN60825 Class 1	Complient per Agilent testing under single fault conditions TUV Certification: LED Class 1

PCI Board Selector Rotary Switch, SW1

Since the utilityModule™ uses stack through buses, the only hardware installation you will need to do is to place the module onto the PC/104-*Plus* or PCI-104 stack. To do this, you will connect the PCI and/or ISA bus connectors on the CM17215 to the respective connectors of your stack.

Before you can use this module you have to set the PCI board selector rotary switch located on the module (SW1). If this module is the first module from the CPU module select '0,' if it is the second module select '1,' etc.

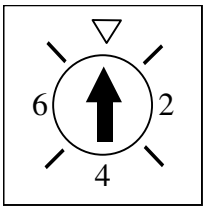


Figure 3: PCI Selector Rotary Switch

Fiber LED Indicators

The LEDs on the board are used to indicate various operations ocuring through the fiber ports. They do not indicate anything about the Tristed Pair channels. The LEDs for the Twisted Pair channels are found on the RJ45 connectors. Listed below are the LEDs.

Port	DESCRIPTION	Diode #
Port 0	Speed	D3
Port 0	Link/Activity	D4
Port 1	Speed	D1
Port 1	Link/Activity	D2

Table 5: MT-RJ LED Indicators

Chapter 3 INSTALLING THE UTILITYMODULE™

WARNING!

Like all equipment using CMOS devices, the CM172xxHR must be protected from static discharge. Never touch any of the parts except at static-free workstation. Use anti-static bag shipped with the CM172xxHR to handle the board

The following sections contain information on configuring the CM172xxHR PC/104-*Plus* Ethernet utilityModule™. **Please read the entire section** before attempting to use the utilityModule™!

Recommended procedure:

We recommend you follow the procedure below to ensure the stacking of the modules does not damage connectors or electronics.

0 Turn off power to the PC/104-*Plus* system or stack.

1 Select and install standoffs to properly position the utilityModule™ on the PC/104-*Plus* stack.

2 Touch a grounded metal part of the stack to discharge any buildup of static electricity.

3 Remove the utilityModule™ from its anti-static bag.

4 Check to see if the keying pins in the PCI bus connector are properly positioned.

5 Check the stacking order and set the PCI Board Selector Rotary Switch, RSW1 (see Section 2.13).

6 Hold the utilityModule™ by its edges and orient it so that the bus connector pins line up with the matching connector pins on the stack.

7 Gently and evenly press the utilityModule™ onto the PC/104-*Plus* stack.

CAUTION: Do not force the module onto the stack! Wiggling the module or applying too much force may damage it. If the module does not readily press into place, remove it, check for bent pins or out-of-place keying pins, and try again.

Chapter 4 RETURN POLICY AND WARRANTY

Return Policy

If you wish to return a product to the factory for service, please follow this procedure:

Read the Limited Warranty to familiarize yourself with our warranty policy.

Contact the factory for a Return Merchandise Authorization (RMA) number.

Please have the following available:

- Complete board name
- Board serial number
- A detailed description of the board's behavior

List the name of a contact person, familiar with technical details of the problem or situation, **along with their phone and fax numbers, address, and e-mail address** (if available).

List your shipping address!!

Indicate the shipping method you would like used to return the product to you.
We will not ship by next-day service without your pre-approval.

Carefully package the product, using proper anti-static packaging.

Write the RMA number in large (1") letters on the outside of the package.

Return the package to:

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State College PA 16803-0906
USA

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RTD Embedded Technologies, Inc. warrants the hardware and software products it manufactures and produces to be free from defects in materials and workmanship for one year following the date of shipment from RTD Embedded Technologies, INC. This warranty is limited to the original purchaser of product and is not transferable.

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