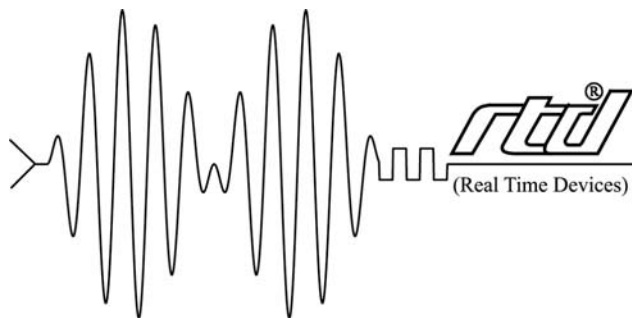


CMT6104

IDE Controller and Hard Drive Carrier utilityModule

User's Manual



RTD Embedded Technologies, Inc.

"Accessing the Analog World"®

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Rev. A

ISO9001 and AS9100 Certified

CMT6104
IDE Controller and Hard Drive Carrier
utilityModule
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RTD Embedded Technologies, INC.

103 Innovation Blvd.
State College, PA 16803-0906

Phone: +1-814-234-8087

FAX: +1-814-234-5218

E-mail

sales@rtd.com

techsupport@rtd.com

web site

<http://www.rtd.com>

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Chapter 1 INTRODUCTION

This manual gives information on the CMT6104 IDE Controller and Hard Disk Carrier utilityModule. This module converts PCMCIA/ATA hard drives and Flash Drives that can operate in IDE mode to a standard IDE interface.

CMT6104 IDE and Hard Drive Carrier utilityModule

The CMT6104 utilityModule was designed to provide an IDE hard drive or Flash drive in the PC/104 stack to support the Real Time Devices family of cpuModules and other standard PC/104 processor modules.

Features

The following are major features of the CMT6104 utilityModule.

Allows up to four drives in the PC/104 stack. Supports PCMCIA/ATA drives such as the Integral Viper series and Flash drives such as SanDisk

Jumper selection of bus or cabled operation

- Bus mode -- decodes IDE interface through the PC/104 bus for cableless operation
- IDE mode -- attaches drive to a cpuModules IDE interface and to attach a slave to a master drive

Jumper selection of primary or secondary IDE interface in bus mode

- Primary -- IDE Interface at 1F0-1F7h
- Secondary -- IDE Interface at 170-177h

Jumper selection of master or slave drive

- Master -- for the first drive on each interface
- Slave -- for the second drive on each interface

Connectors

Connectors provided are:

- CN1: PC/104 Bus (XT)
- CN2: PC/104 Bus (AT)
- CN3: IDE hard drive
- CN4: PCMCIA/ATA connector

Recommended Cables

- 40-pin IDE cable which can be used to connect a master CMT6104 to a slave CMT6104.

General Specifications

- Dimensions: 3.8 x 3.9 x 0.6" (97 x 100 x 16 mm)
- Weight (mass): 3.0 ounces (85 grams)
- 4-layer PCB
- Operating conditions: (not including drive)
 - temperature: -40 - +85 degrees C
 - relative humidity: 0 - 95%, non-condensing
 - Storage temperature: -55 to +85 degrees C

Chapter 2 CONFIGURING THE UTILITYMODULE

The following sections contain information on configuring the utilityModule.

Please read this entire section before attempting to use the utilityModule!

Jumpers

Jumper JP1 configures the following functions:

- Master/Slave
- Bus/Cabled
- Primary/Secondary

Default Settings

The utilityModule is delivered from the factory configured according to the following table.

Setting	Function
A with Integral Drive	Master Drive
B with Integral Drive	Slave Drive
A with SanDisk Drive	Slave Drive
B with SanDisk Drive	Master Drive

BUS	Decode IDE Through PC/104 bus
IDE	Use CN3 for IDE interface

If BUS mode is selected then:

PRI	Primary IDE interface
SEC	Secondary IDE interface

-
- Notes:**
1. You must select only one of A or B.
 2. You must select only one of BUS or IDE.
 3. If you have selected BUS, you must select only one of PRI or SEC.
-

Jumper Locations

The figure below shows jumper locations.

Jumper JP1



Chapter 3 INSTALLING THE UTILITYMODULE

Since the utilityModule uses a PC/104 stackthrough bus, the only hardware installation you will do is placing the module to the PC/104 stack. To do this, you will connect the PC/104 bus connector with the matching connector of another module.

Recommended Procedure

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

- Turn off power to the PC/104 system or stack.
- Select and install standoffs to properly position the utilityModule on the PC/104 stack.
- Touch a grounded metal part of the stack to discharge any buildup of static electricity.
- Remove the utilityModule from its anti-static bag.
- Check that keying pins in the PC/104 bus connector are properly positioned.
- Check the stacking order: make sure an XT bus card will not be placed between two AT bus cards, or it will interrupt the AT bus signals.
- Hold the utilityModule by its edges and orient it so the bus connector pins line up with the matching connector on the stack.
- Gently and evenly press the utilityModule onto the PC/104 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 CONNECTING THE UTILITYMODULE

The following sections describe connectors of the utilityModule.

Finding Pin 1 of Connectors

A white area silk-screened on the PC board indicates the pin 1 end of connectors. A square solder pad visible on the bottom of the PC board also indicates it.

Please make certain you have correctly identified pin 1 of a connector before you connect to it and attempt to use the utilityModule.

Connector Locations

The figure below shows connector locations.



Connector Locations

<i>Connectors</i>		
Connector	Function	Size
CN1	PC/104 XT Bus	64 pin
CN2	PC/104 AT Bus	40 pin
CN3	IDE Connector	40 pin
CN4	PCMCIA/ATA Connector	68 pin
JP2	IDE Activity LED Connector	2 pin

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. The signals on CN1 and CN2 conform to the IEEE P966 standard for the PC/104 bus.

The following tables list the connector pinouts:

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

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	DACK7*
15	SD12	DRQ7
16	SD13	+5V
17	SD14	MASTER*
18	SD15	0V
19	(KEYING PIN)	0V

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.

IDE Connector, CN3

CN3 is a 40-pin 0.1" DIL connector is the IDE input connector in IDE mode and the IDE output in BUS mode. The pinout of this connector is shown below.

IDE Hard Drive Connector, CN3			
Pin	Signal	Function	in/out
1	RESET*	Reset HD	out
2	GND	Ground signal	--
3	HD7	HD data 7	in/out
4	HD8	HD data 8	in/out
5	HD6	HD data 6	in/out
6	HD9	HD data 9	in/out
7	HD5	HD data 5	in/out
8	HD10	HD data 10	in/out
9	HD4	HD data 4	in/out
10	HD11	HD data 11	in/out

11	HD3	HD data 3	in/out
12	HD12	HD data 12	in/out
13	HD2	HD data 2	in/out
14	HD13	HD data 13	in/out
15	HD1	HD data 1	in/out
16	HD14	HD data 14	in/out
17	HD0	HD data 0	in/out
18	HD15	HD data 15	in/out
19	GND	Ground signal	--
20	n.c.		--
21	AEN	Address Enable	out
22	GND	Ground signal	--
23	IOW*	I/O Write	out
24	GND	Ground signal	--
25	IOR*	I/O Read	out
26	GND	Ground signal	--
27	IOCHRDY	I/O Channel Ready	in
28	BALE	Bus Address Latch Enable	out
29	n.c.		
30	GND	Ground signal	--
31	IRQ	Interrupt Request	in
32	IOCS16*	16 bit transfer	in
33	A1	Address 1	out
34	GND	Ground signal	--
35	A0	Address 0	out
36	A2	Address 2	out
37	HCS0*	HD Select 0	out
38	HCS1*	HD Select 1	out
39	LED	HDD activity LED (-)	in
40	GND	Ground signal	--

PCMCIA/ATA, CN4

The 68 pin PCMCIA/ATA connector is to connect hard drives and Flash ATA cards. This is not a full PCMCIA interface and only works with ATA drives like the Integral Viper series and the SanDisk Flash Drives with "True IDE" mode.

Chapter 5 USING THE UTILITYMODULE

IDE Hard Disk

In general, IBM-PC computers support two IDE interfaces. Each interface can support a master and a slave IDE drive which allows up to 4 drives in a computer (assuming that the CPU BIOS supports 4 drives).

The CMT6104 operates as a drive carrier to convert the PCMCIA connector to the standard 40 pin IDE connector and provide a master/slave jumper. It can also be an IDE controller for computers without an IDE interface or to add a secondary IDE interface to a computer that only has one. These two modes of operation are selected by installing one of the IDE or BUS jumpers.

The hard drive controller of the utilityModule appears as a standard PC IDE hard drive controller. It will support standard IDE drives (less than 528MB) and enhanced IDE drives (over 528MB).

You may need to run the setup program for your cpuModule or computer to configure the correct hard drive type.

IDE Mode

This mode duplicates the operation of previous versions of the CMT6104. The PC/104 bus only provides power to the drive. The board performs a physical interface between the 68 pin PCMCIA connector and the 40 pin IDE connector. The A or B jumpers select master or slave mode for the drive.

BUS Mode

This mode decodes the PC/104 bus to create an IDE interface. This interface can be the primary or secondary interface and the drive can be a master or slave as per the jumpers. The 40 pin IDE connector is used to connect a second drive to this interface. The second drive can be a standard 3.5" drive or another CMT6104 operating in IDE mode.

Power Protection Circuitry

To reduce the risk of damage due to power-supply problems, the utilityModule includes several protective components.

Module Power-Supply Protection

The utilityModule includes components to help prevent damage due to problems with the +5Vdc power supply from the PC/104 bus or power-supply connector. Protection is provided for:

- Over-current
- Reversed polarity
- Excessive voltage

This protection is only for the utilityModule, and will not protect other devices in a PC/104 stack or any of the Flat Panel power supplies.

The protective fuse is replaceable and is available from electronics suppliers. Its description and part number are:

Littelfuse Nano² SMF 1.0 amp, R451-001

Caution: Replace fuses only with parts of identical current and voltage rating.

Chapter 6 INTERFACING IDE DRIVES

The utilityModule can be configured in several methods.

Connecting the CMT6104 to a computer with an IDE controller as the only IDE drive

- Install IDE jumper
- Remove BUS jumper
- Install PRI jumper (Not used since in IDE mode)
- Remove SEC jumper (Not used since in IDE mode)
- Connect a 40 pin cable from CPU's IDE connector to the CMT6104 IDE connector CN3, be careful to observe pin 1 orientation
- Install jumper A select master for Integral drives or install jumper B to select master for SanDisk drives
- Use the CPU's setup utility to configure the heads, cylinders and sectors for the drive

Connecting the CMT6104 to a computer without an IDE controller as the only IDE drive

- Install BUS jumper
- Remove IDE jumper
- Install PRI jumper
- Remove SEC jumper
- Install jumper A select master for Integral drives or install jumper B to select master for SanDisk drives
- Use the CPU's setup utility to configure the heads, cylinders and sectors for the drive

Connecting the CMT6104 to a computer as the secondary IDE drive controller

- Install BUS jumper
- Remove IDE jumper
- Install SEC jumper
- Remove PRI jumper
- Install jumper A select master for Integral drives and install jumper B to select master for SanDisk drives
- Use the CPU's setup utility to configure the heads, cylinders and sectors for the drive

Using a CMT6104 as a slave drive

- Install IDE jumper
- Remove BUS jumper
- Install PRI jumper (Not used since in IDE mode)
- Remove SEC jumper (Not used since in IDE mode)
- Connect a three connector 40 pin cable from CPU's IDE connector to the master drive and to the CMT6104 IDE connector CN3, be careful to observe pin 1 orientation
- Install jumper B select slave for Integral drives or install jumper A to select slave for SanDisk drives
- Use the CPU's setup utility to configure the heads, cylinders and sectors for the drive

Chapter 7 RETURN POLICY AND WARRENTY

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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