CM102-ZIP
IDE and Floppy Controller utilityModule

User's Manual

Hardware Revision 1.0

Real Time Devices USA, Inc.
"Accessing the Analog World"®

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IDE and Floppy utilityModule
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Chapter 1 INTRODUCTION

This manual gives information on the CM102-ZIP IDE Hard Drive and Floppy Controller utilityModule. This module allows you to connect standard IDE hard drives, ZIP-Drives™, CD-ROM's and floppy drives to your PC/104 system. This manual was written primarily for use of the CM102-ZIP with the RTD family of IDAN or HiDAN systems. A power connector is available to connect to the IDE drive or floppy drive.

CM102-ZIP IDE and Floppy Controller utilityModule

The CM102-ZIP utilityModule was designed to provide an IDE drive and floppy drive controller in the PC/104 stack to support the Real Time Devices family of IDAN / HiDAN systems.

Features

The following are major features of the CM102-ZIP utilityModule.

IDE Controller and Drive

- Jumper Enable/Disable mode -- Allows disabling the controller when not connected to IDE drives.
- Jumper selection of primary or secondary IDE interface in bus mode
  - Primary -- IDE Interface at 1F0-1F7h, 3F6-3F7h, Interrupt 14
  - Secondary -- IDE Interface at 170-177h, 376-377h, Interrupt 15

Floppy Controller

- Supports two 360 KB, 1.2MB, 720KB or 1.44MB drives
- Jumper Enable/Disable mode -- Allows disabling the controller when not connected to floppy drives.
- Jumper selection to configure the Floppy interface as primary or secondary mode.

Connectors

Connectors provided are:

- CN1: PC/104 Bus (XT)
- CN2: Reserved
- CN3: IDE cable connector
- CN4: PC/104 Bus (AT)
- CN5: Floppy cable connector
- TB1: +5, +12 Vdc, and ground I/O terminal block

General Specifications

- Dimensions: 3.575 x 3.775 x 0.6" (90.2 x 95.9 x 15 mm)
- Weight (mass): 3.0 ounces (85 grams)
- 6-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
- Power Requirements: 125 mA @ 5 Vdc (typical)

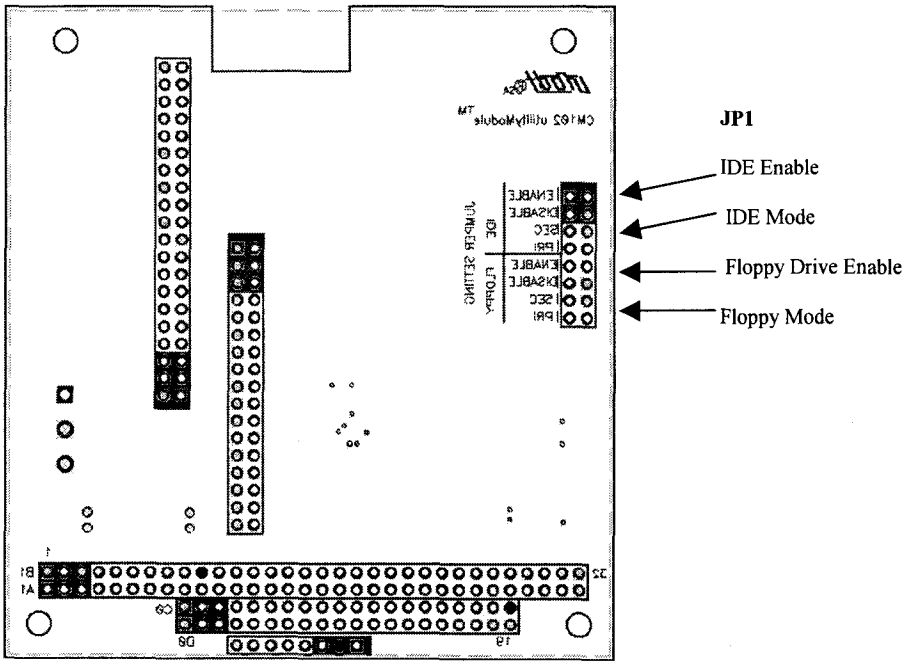
Chapter 2 CONFIGURING THE UTILITYMODULE

The following sections contain information on configuring the utilityModule.

Jumpers JP1

The utilityModule is configured by positioning jumpers. Jumpers are labeled on the board as **"JP"** followed by a number.

The figure below shows jumper locations.



JP1 Settings

- 1-2 IDE enable (default)
- 3-4 IDE disable
- 5-6 IDE primary controller
- 7-8 IDE secondary controller (default)
- 9-10 Floppy enable
- 11-12 Floppy disable
- 13-14 Floppy primary (default)
- 15-16 Floppy secondary

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 a RTD cpuModule.

Recommended Procedure

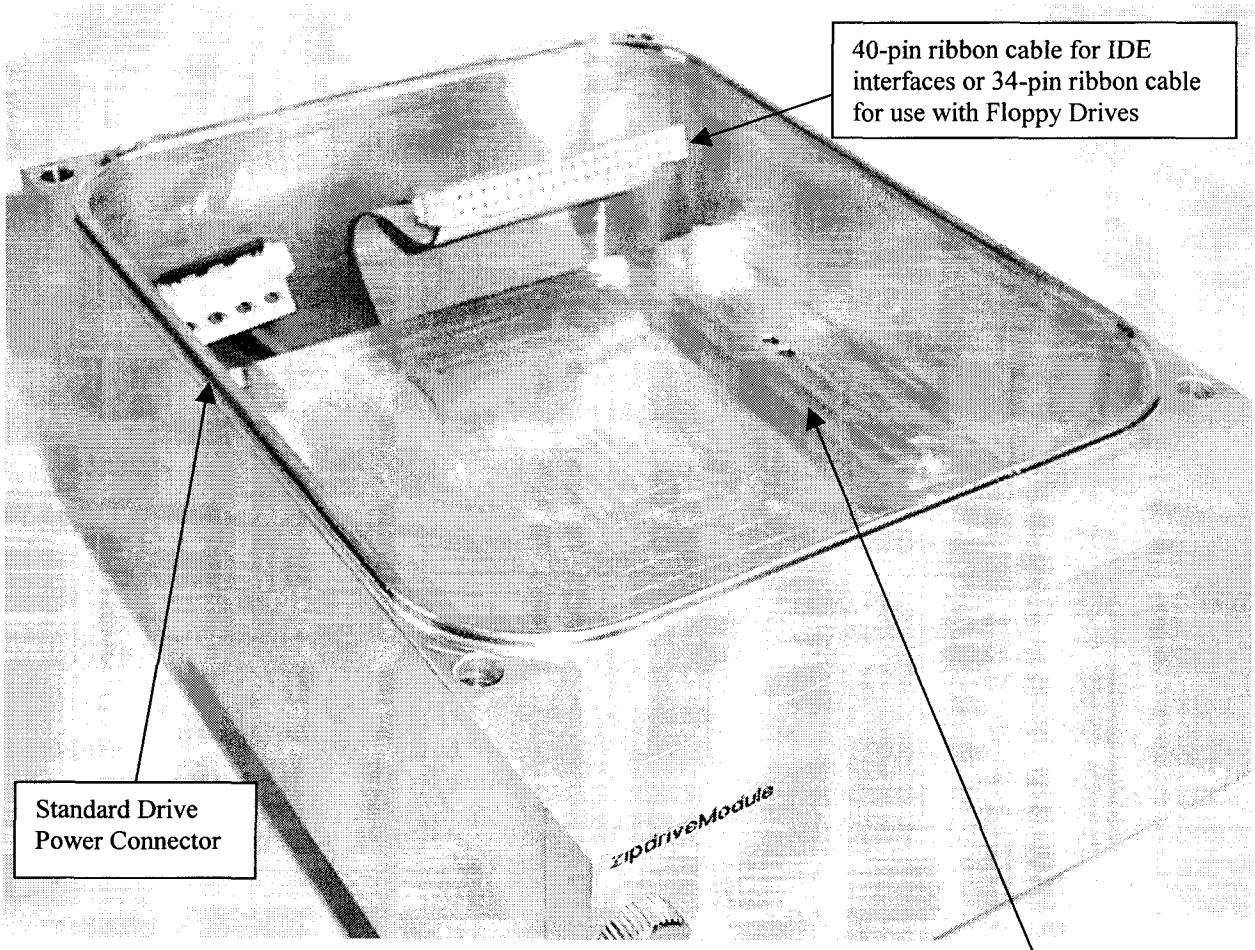
We recommend you follow the procedure below to ensure that stacking of the modules does not damage connectors or electronics.

- 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 3 CONNECTING THE UTILITYMODULE

The IDAN or HiDAN version of the ZIP-Drive™ or Floppy Drive Module is made to easily install the 3 ½ drive of your choice. Two sets of mounting holes are available to secure the drive to the frame. The screw holes are accessible from the bottom side of the frame. Clearance from the board allows the drive to be installed and removed without removing the CM102-ZIP utilityModule.



The following sections describe connectors of the utilityModule.

The figure below shows connector locations.

CN3 - IDE Drive Connector

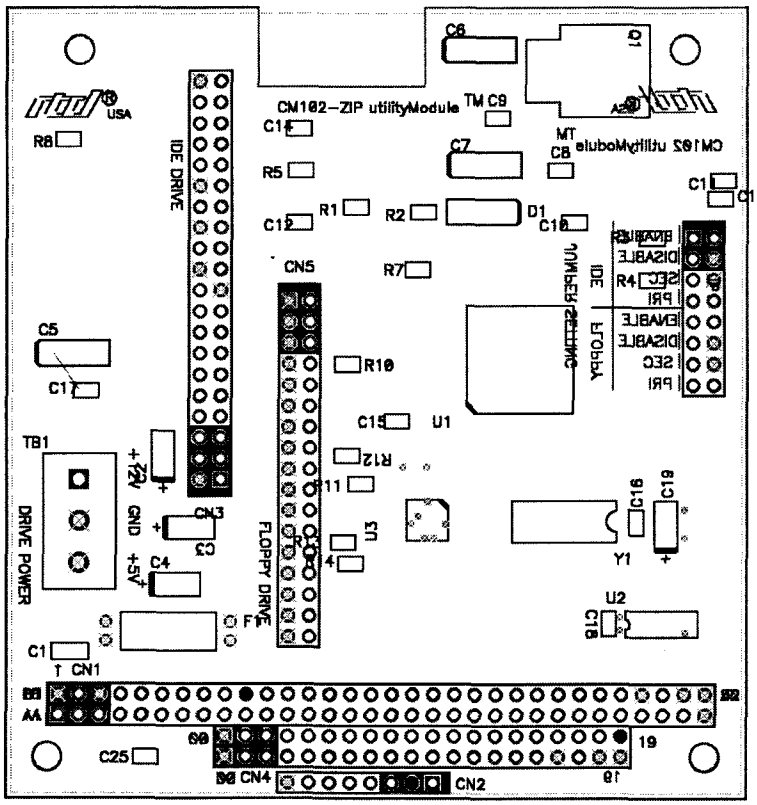
CN5 - Floppy Drive Connector

TB1 - Power Terminal Block

CN1 - XT Bus

CN4 - AT Bus

CN2 - Reserved



JP1 - Jumper Settings

Connector Descriptions

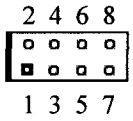
Connectors		
Connector	**Function**	**Size**
CN1	PC/104 XT Bus	64 pin
CN4	PC/104 AT Bus	40 pin
CN2	**Factory use only**	-
CN3	IDE	40 pins
CN5	Floppy	34 pins
TB1 & TB2	+5, +12 Vdc, & Gnd	3 terminals

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.

PIN ASSIGNMENT



PC/104 Bus Connectors, CN1 and CN4

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

Note: Signals marked with (*) are active low

PC/104 AT Bus Connector, CN4		
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.

Signals marked with (*) are active low.

IDE Drive, CN3

CN3 is a 40-pin DIL connector used for connecting the IDE drive. The pinout of this connector is shown below.

IDE 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	Not Connected	--
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	Not Connected	
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	--

Note: Signals marked with (*) are active low

Floppy Drive, CN5

CN5 is a 34-pin DIL connector that provides the standard signals to connect one or two floppy disk drives. The pinout of this connector is shown below.

Floppy Drive Connector, CN5

Pin	Signal	Function	In/out
2	RWC*	write precompensation	out
4	N/C	Not Connected	--
6	N/C	Not Connected	--
8	INDEX*	index pulse	in
10	MOTEN1*	motor 1 enable	out
12	DRVSEL1*	drive select 1	out
14	DRVSEL2*	drive select 1	out
16	MOTEN2*	motor 2 enable	out
18	DIRECTION*	step direction	out
20	STEP*	step pulse	out
22	WRDATA*	write data	out
24	WREN*	write enable	out
26	TRACK0*	track 0 signal	in
28	WRPROT*	write protect	in
30	RDDATA*	read data	in
32	HEADSEL*	head select	out
34	DSKCHG*	disk change	in
ODD PINS	GND	Ground signal	--

Note: Signals marked with (*) are active low

Auxiliary Power TB1

WARNING! If you improperly connect power, the module will almost certainly be *destroyed*. Please verify power connections to the module *before* applying power.

The power supply is conveyed to the utilityModule through the PC/104 bus (CN1 and CN4). The utilityModule only uses +5 VDC and ground. +12 VDC may be required for the Drive..

NOTE

-5 VDC, +12 VDC and -12 VDC voltages are not used by the module, but are connected to the PC/104 bus connectors, CN1 and CN4.

TB1 is a power connector and is used to connect power to the drive. The terminals are marked clearly with the appropriate signal for easy power connections. Use a flat blade screwdriver to tighten the screw against the inserted wire.

Terminal block Connector TB1

Pin	Signal	Function
TB1-1	+12 V	+12 Volts DC
TB1-2	GND	Ground
TB1-3	+5 V	+5 Volts DC

Chapter 4 USING THE UTILITYMODULE

IDE Drive

The CM102-ZIP provides an IDE interface standard IDE Drive. This drive can be set up as the primary or the secondary drive (you must be sure that your CPU BIOS supports both primary and secondary drives).

Since the CM102-ZIP provides the IDE decoding on-board you must be sure to disable any other IDE controllers that might be present in your system or set one of the controllers to ***Secondary*** to prevent controller chip interface conflicts.

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

Floppy Drive

The CM102-ZIP provides a Floppy Drive interface. This drive can be set up as the primary or the secondary (you must be sure that your CPU BIOS supports both primary and secondary drives).

Since the CM102-ZIP provides the Floppy decoding on-board you must be sure to disable any other Floppy controllers that might be in your system or set one of the controllers to ***Secondary*** to prevent controller chip interface conflicts.

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

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 +5 VDC 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 .

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

Littelfuse Nano^2 SMF 1.0 amp, R451-001

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

Chapter 5 RETURN POLICY AND WARRENTY

Return Policy

If the utilityModule requires repair, you may return it to us by following the procedure listed below:

Caution: Failure to follow this return procedure will *almost always* delay repair! Please help us expedite your repair by following this procedure.

1) Read the limited warranty which follows.

2) Contact the factory and request a Returned Merchandise Authorization (RMA) number.

3) On a sheet of paper, write the name, phone number, and fax number of a technically-competent person who can answer questions about the problem.

4) On the paper, write a detailed description of the problem with the product. Answer the following questions:

- Did the product ever work in your application?
- What other devices were connected to the product?
- How was power supplied to the product?
- What features did and did not work?
- What was being done when the product failed?
- What were environmental conditions when the product failed?

5) Indicate the method we should use to ship the product back to you.

- We will return warranty repairs by UPS Ground at our expense.
- Warranty repairs may be returned by a faster service at your expense.
- Non-warranty repairs will be returned by UPS Ground or the method you select, and will be billed to you.

6) Clearly specify the address to which we should return the product when repaired.

7) Enclose the paper with the product being returned.

8) Carefully package the product to be returned *using anti-static packaging!* We will not be responsible for products damaged in transit for repair.

7) Write the RMA number on the outside of the package.

Limited Warranty

Real Time Devices USA, 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 REAL TIME DEVICES USA. This warranty is limited to the original purchaser of product and is not transferable.

During the one-year warranty period, REAL TIME DEVICES USA will repair or replace, at its option, any defective products or parts at no additional charge, provided that the product is returned, shipping prepaid, to REAL TIME DEVICES USA. All replaced parts and products become the property of REAL TIME DEVICES USA. Before returning any product for repair, customers are required to contact the factory for an RMA number.

THIS LIMITED WARRANTY DOES NOT EXTEND TO ANY PRODUCTS WHICH HAVE BEEN DAMAGED AS A RESULT OF ACCIDENT, MISUSE, ABUSE (such as: use of incorrect input voltages, improper or insufficient ventilation, failure to follow the operating instructions that are provided by REAL TIME DEVICES, "acts of God" or other contingencies beyond the control of REAL TIME DEVICES), OR AS A RESULT OF SERVICE OR MODIFICATION BY ANYONE OTHER THAN REAL TIME DEVICES. EXCEPT AS EXPRESSLY SET FORTH ABOVE, NO OTHER WARRANTIES ARE EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND REAL TIME DEVICES EXPRESSLY DISCLAIMS ALL WARRANTIES NOT STATED HEREIN. ALL IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES FOR MECHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS WARRANTY. IN THE EVENT THE PRODUCT IS NOT FREE FROM DEFECTS AS WARRANTED ABOVE, THE PURCHASER'S SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED ABOVE. UNDER NO CIRCUMSTANCES WILL REAL TIME DEVICES BE LIABLE TO THE PURCHASER OR ANY USER FOR ANY DAMAGES, INCLUDING ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, LOST PROFITS, LOST SAVINGS, OR OTHER DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT.

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THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.