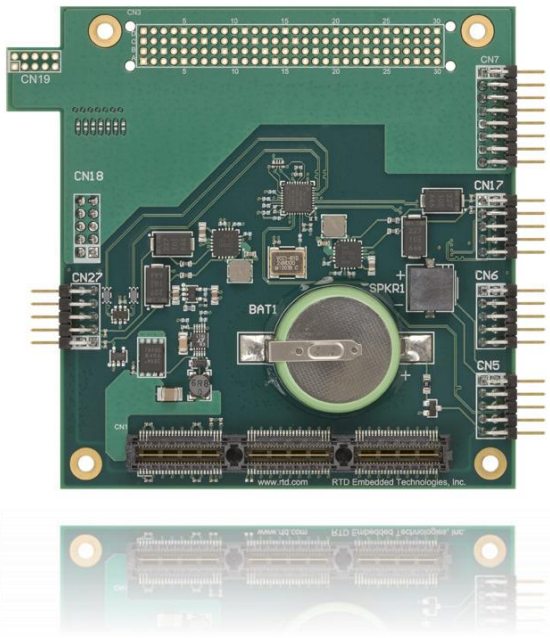
CM25100HR

CM35100HR

PCI Express Utility Board

User's Manual

BDM-610020142 Rev. B



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Revision History

Rev A	Initial Release
Rev B	Various update to reflect the CMx5100HR-BT15 and CMx5100HR-CR22 ordering options: Update cover photo and board connections photo Update dimensional drawing and board dimensions Added connector pinout tables for CN7, CN18, and CN19 Update the functional diagram to include CN7, CN18, and CN19

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Table of Contents

1 Introduction **6**

1.1 Product Overview 6

1.2 Board Features 6

1.3 Ordering Information 6

1.4 Contact Information 7
- 1.4.1 Sales Support 7
- 1.4.2 Technical Support 7

2 Specifications **8**

2.1 Operating Conditions 8

2.2 Electrical Characteristics 8

3 Board Connection **9**

3.1 Board Handling Precautions 9

3.2 Physical Characteristics 9

3.3 Connectors and Jumpers 10
- 3.3.1 External I/O Connectors 11
  - CN5: Utility Port 2.0 Connector 11
  - CN6: Utility Port 2.0 Expansion Connector 11
  - CN17 & CN27: USB Connectors 11
  - CN7, CN18, CN19: VGA Connectors 12
- 3.3.2 Bus Connectors 13
  - CN1 (Top) & CN2 (Bottom): PCIe Connector 13
  - CN3: PCI Connector 13

3.4 Steps for Installing 14

4 Functional Description **15**

4.1 Block Diagram 15

5 Troubleshooting **16**

6 Additional Information **17**

6.1 PC/104 Specifications 17

6.2 PCI and PCI Express Specification 17

7 Limited Warranty **18**

Table of Figures

Figure 1: Board Dimensions 9
Figure 2: Board Connections 10
Figure 3: Example 104™Stack 14
Figure 4: CM25100HR/CM35100HR Block Diagram 15

Table of Tables

Table 1: Ordering Options 6
Table 2: Operating Conditions 8
Table 3: Electrical Characteristics 8
Table 4: CN5 Pin Assignments 11
Table 5: CN6 Pin Assignments 11
Table 6: CN17 Pin Assignments 11
Table 7: CN27 Pin Assignments 12
Table 6: CN7 Pin Assignments 12
Table 6: CN18 & CN19 Pin Assignments 12

1 Introduction

1.1 Product Overview

The CM25100HR/CM35100HR is a utility module for use with PCIe/104 and PCI/104 Express cpuModules. It provides convenient functions which are enabled by connecting to the cpuModule's Utility Port 2.0 connector, including a Real Time Clock battery, speaker, and four USB 2.0 ports.

1.2 Board Features

- Utility Port Breakout
  - Real Time Clock battery
  - Speaker
  - Connections for external Reset and Soft Power button
- Four USB Ports
  - From on-board hub connected to cpuModule's Utility Port 2.0 connector
- Access to the host cpuModule's VGA connector
  - The input VGA connector from the host cpuModule (selectable by ordering number) is routed across the board to an output VGA connector to permit ease of wiring in RTD enclosed systems.

1.3 Ordering Information

The CM25100HR/CM35100HR is available with the following options:

Table 1: Ordering Options

Part Number	Description
CM25100HR	PCI/104 Express Utility Board
CM25100HR-BT15	PCI/104 Express Utility Board for stacking above RTD Intel E3800 cpuModules with 0.600" stack heights
CM25100HR-CR22	PCI/104 Express Utility Board for stacking above RTD Intel Core i7 cpuModules with 22mm stack heights
CM35100HR	PCIe/104 Utility Board
CM35100HR-BT15	PCIe/104 Utility Board for stacking above RTD Intel E3800 cpuModules with 0.600" stack heights
CM35100HR-CR22	PCIe/104 Utility Board for stacking above RTD Intel Core i7 cpuModules with 22mm stack heights

1.4 Contact Information

1.4.1 Sales Support

For sales inquiries, you can contact RTD Embedded Technologies sales via the following methods:

Phone: 1-814-234-8087 Monday through Friday, 8:00am to 5:00pm (EST).
E-Mail: sales@rtd.com

1.4.2 Technical Support

If you are having problems with your system, please try the steps in the Troubleshooting section of this manual.

For help with this product, or any other product made by RTD, you can contact RTD Embedded Technologies technical support via the following methods:

Phone: 1-814-234-8087 Monday through Friday, 8:00am to 5:00pm (EST).
E-Mail: techsupport@rtd.com

2 Specifications

2.1 Operating Conditions

Table 2: Operating Conditions

Symbol	Parameter	Test Condition	Min	Max	Unit
V_{cc5}	5V Supply Voltage		4.75	5.25	V
V_{cc3}	3.3V Supply Voltage		n/a	n/a	V
V_{cc12}	12V Supply Voltage		n/a	n/a	V
V_{cc-12}	-12V Supply Voltage		n/a	n/a	V
T_a	Operating Temperature		-40	+85	C
T_s	Storage Temperature		-55	+125	C
RH	Relative Humidity	Non-Condensing	0	90%	%
MTBF	Mean Time Before Failure	Telcordia Issue 2 30°C, Ground benign, controlled		TBD	Hours

2.2 Electrical Characteristics

Table 3: Electrical Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
P	Power Consumption	V_{cc5} = 5.0V		0.5		W
I_{cc5}	5V Input Supply Current	With upstream USB connection (and no downstream connections)		100		mA
PCIe Bus						
	Differential Output Voltage			0.8	1.2	V
	DC Differential TX Impedance			95.2	116.9	Ω
	Differential Input Voltage			0.175	3.3	V
	DC Differential RX Impedance			92.7	115.8	Ω
	Electrical Idle Detect Threshold			61	173	mV
USB Ports						
V_{PORT}	Port voltage output		4.75		5.25	V
I_{OC}	Overcurrent Limit	Each Port	0.5		5.0	A

3 Board Connection

3.1 Board Handling Precautions

To prevent damage due to Electrostatic Discharge (ESD), keep your board in its antistatic bag until you are ready to install it into your system. When removing it from the bag, hold the board at the edges, and do not touch the components or connectors. Handle the board in an antistatic environment, and use a grounded workbench for testing and handling of your hardware.

3.2 Physical Characteristics

STEP model is available upon request; contact RTD Tech Support for more information.

- Weight: Approximately 73 g (0.16 lbs.)
- Dimensions: 100.79 mm L x 95.89 mm W (3.968 in L x 3.775 in W)

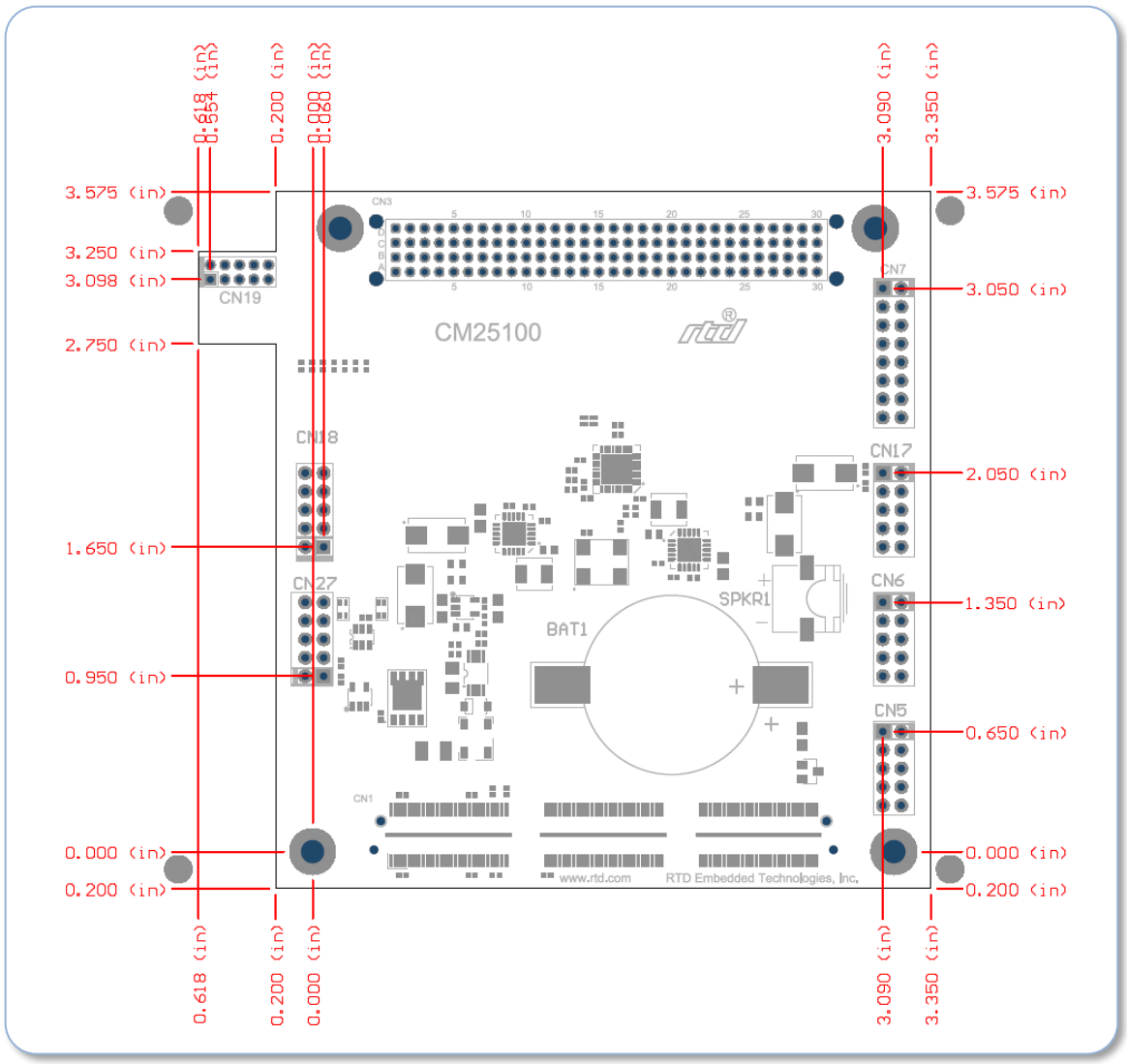

Figure 1: Board Dimensions

3.3 Connectors and Jumpers

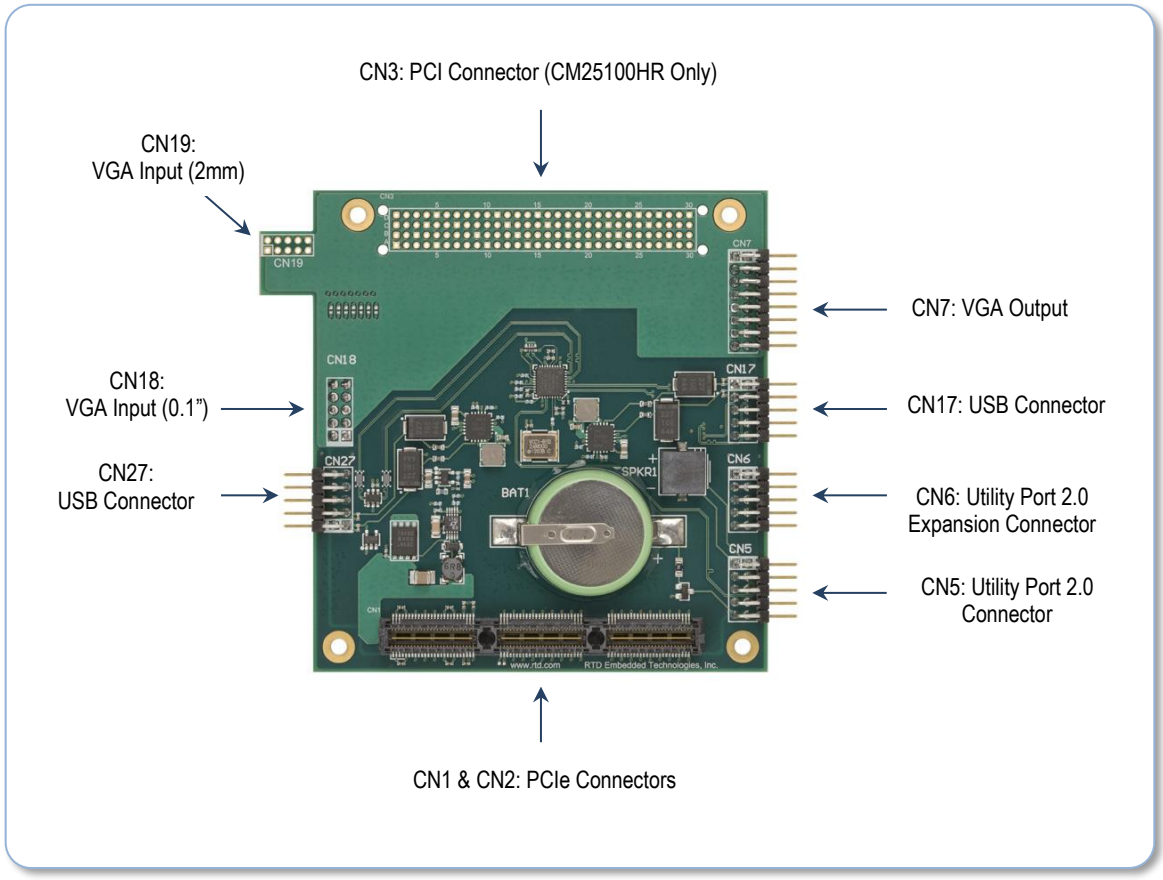

Figure 2: Board Connections

3.3.1 External I/O Connectors

CN5: Utility Port 2.0 Connector

Connector CN5 connects to the Utility Port 2.0 connector of the cpuModule.

Table 4: CN5 Pin Assignments

Pin	Description
1	Speaker Input
2	5V for Speaker
3	Utility Reset Button (output)
4	USB_UPSTREAM-
5	Utility Soft Power Button (output)
6	USB_UPSTREAM+
7	GND
8	GND
9	Utility RTC Battery (output)
10	USB Shield

CN6: Utility Port 2.0 Expansion Connector

Connector CN6 provides access to several of the pins on the CPU's Utility Port 2.0 connector through the cabled connection on CN5.

Table 5: CN6 Pin Assignments

Pin	Description
1	Utility Reset Button (input)
2	GND
3	Utility RTC Battery (input)
4	GND
5	Utility Soft Power Button (input)
6	GND
7	GND
8	GND
9	GND
10	GND

CN17 & CN27: USB Connectors

Connectors CN17 and CN27 each provide two USB 2.0 ports. They are sourced from a USB hub that is on the board. The upstream link of the USB hub comes from the CN5 connection to the Utility Port 2.0 connector on the cpuModule.

Table 6: CN17 Pin Assignments

Pin	Description
1	VCC1
2	VCC2
3	DATA1-
4	DATA2-
5	DATA1+
6	DATA2+
7	GND1
8	GND2
9	SHIELD1
10	SHIELD2

Table 7: CN27 Pin Assignments

Pin	Description
1	VCC3
2	VCC4
3	DATA3-
4	DATA4-
5	DATA3+
6	DATA4+
7	GND3
8	GND4
9	SHIELD3
10	SHIELD4

CN7, CN18, CN19: VGA Connectors

Connector CN7 provides access to the host cpuModule's VGA connection via either input connector CN18 or connector CN19.

Table 8: CN7 Pin Assignments

Pin	Signal	Description	CN7 Direction
1	VSYNC	Vertical Sync	In
2	HSYNC	Horizontal Sync	In
3	DDCSCL	Monitor Communications Clock	In
4	DDCSDA	Monitor Communications Data	Bidirectional
5	PWR	+5 V (may be current limited)	In
6	GND	Ground	-
7	GND	Ground	-
8	RED	Red Analog Output	In
9	GND	Ground	-
10	GREEN	Green Analog Output	In
11	GND	Ground	-
12	BLUE	Blue Analog Output	In
13	GND	Ground	-
14	GND	Ground	-
15	RSVD	*Reserved*	-
16	RSVD	*Reserved*	-

Whether the board has CN18 or CN19 populated depends on the ordering option.

Connector CN18 is a 0.1" pitch connector which stacks above RTD's Intel E3800 cpuModule. Connector CN19 is a 2mm pitch connector which stacks above RTD's Intel Core i7. Resistor options exist on the board to eliminate signal stubs to the unused connector, ensuring that only the source input connector is routed to the output connector, CN7.

Table 9: CN18 & CN19 Pin Assignments

Pin	Signal	Description	CN18 and CN19 Direction	CN7 Direction
1	VSYNC	Vertical Sync	Out	In
2	HSYNC	Horizontal Sync	Out	In
3	DDCSCL	Monitor Communications Clock	Out	In
4	RED	Red Analog Output	Out	In
5	DDCSDA	Monitor Communications Data	Bidirectional	Bidirectional
6	GREEN	Green Analog Output	Out	In
7	PWR	+5 V (may be current limited)	Out	In
8	BLUE	Blue Analog Output	Out	In
9	GND	Ground	-	-
10	GND	Ground	-	-

3.3.2 BUS CONNECTORS

CN1 (Top) & CN2 (Bottom): PCIe Connector

The PCIe connector is the connection to the system CPU. The position and pin assignments are compliant with the *PCI/104-Express Specification*. (See PC/104 Specifications on page 17)

The CM25100HR/CM35100HR is a "Universal" board, and can connect to either a Type 1 or Type 2 PCIe/104 connector.

CN3: PCI Connector

The PCI connector is the connection to PCI peripheral modules. The position and pin assignments are compliant with the *PCI/104-Express Specification*. (See PC/104 Specifications on page 17)

3.4 Steps for Installing

1. Always work at an ESD protected workstation, and wear a grounded wrist-strap.
2. Turn off power to the PC/104 system or stack.
3. Select and install stand-offs to properly position the module on the stack.
4. Remove the module from its anti-static bag.
5. Check that pins of the bus connector are properly positioned.
6. Check the stacking order; make sure all of the busses used by the peripheral cards are connected to the cpuModule.
7. Hold the module by its edges and orient it so the bus connector pins line up with the matching connector on the stack.
8. Gently and evenly press the module onto the PC/104 stack.
9. If any boards are to be stacked above this module, install them.
10. Attach any necessary cables to the PC/104 stack.
11. Re-connect the power cord and apply power to the stack.
12. Boot the system and verify that all of the hardware is working properly.

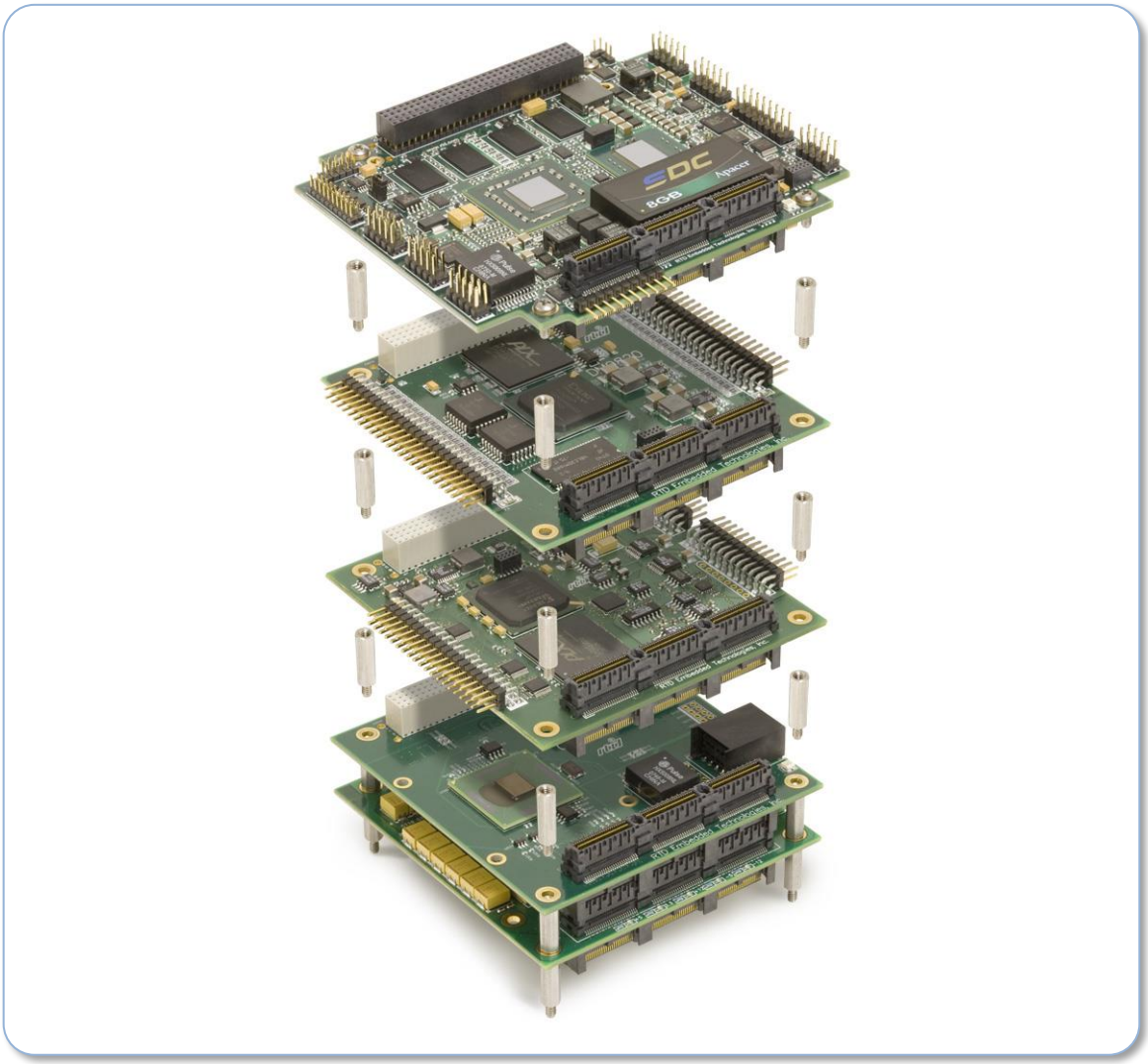

Figure 3: Example 104™ Stack

4 Functional Description

4.1 Block Diagram

The Figure below shows the functional block diagram of the CM25100HR/CM35100HR.

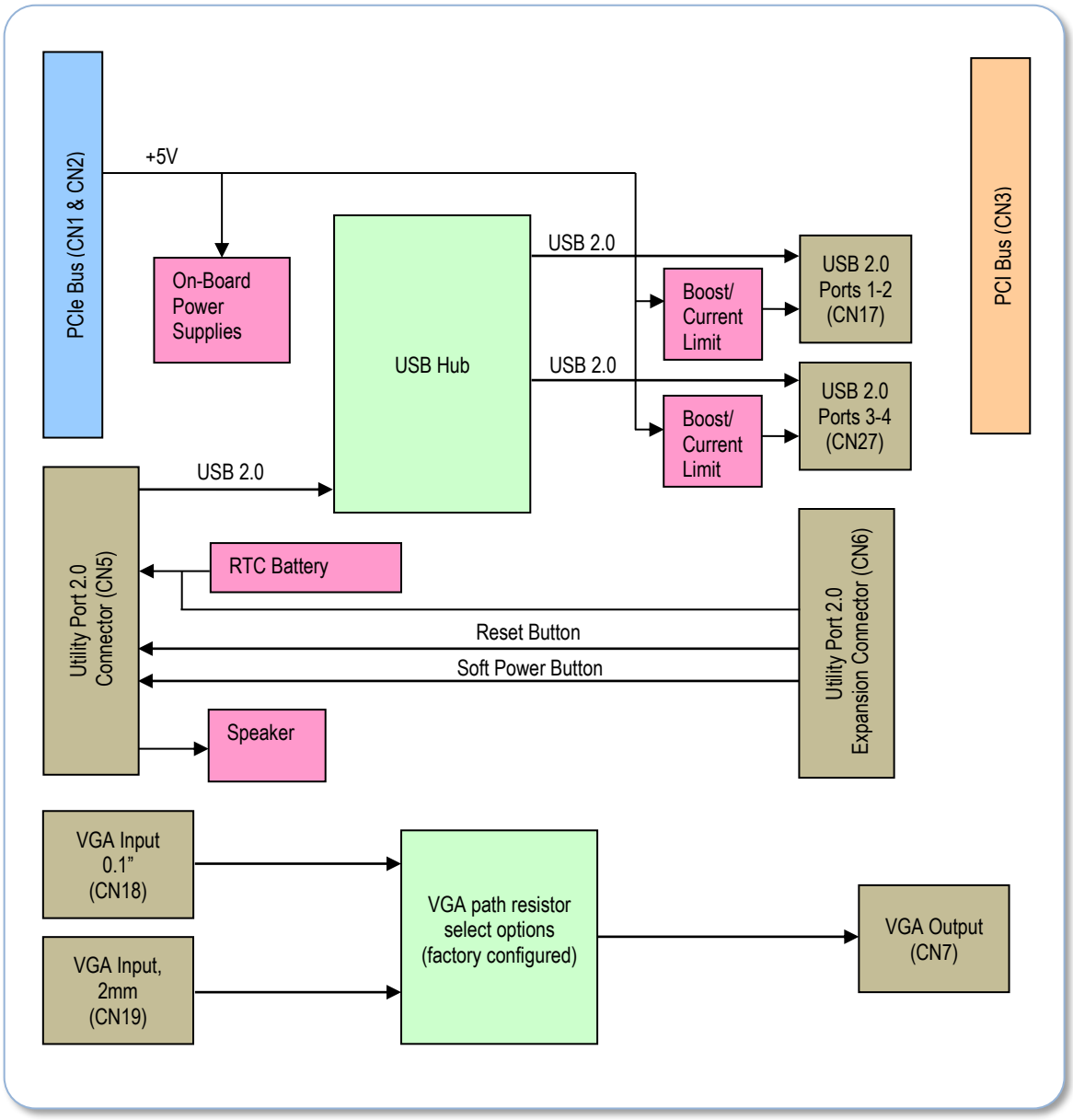

Figure 4: CM25100HR/CM35100HR Block Diagram

5 Troubleshooting

If you are having problems with your system, please try the following initial steps:

- **Simplify the System** – Remove modules one at a time from your system to see if there is a specific module that is causing a problem. Perform you troubleshooting with the least number of modules in the system possible.

- **Swap Components** – Try replacing parts in the system one at a time with similar parts to determine if a part is faulty or if a type of part is configured incorrectly.

If problems persist, or you have questions about configuring this product, contact RTD Embedded Technologies via the following methods:

Phone: +1-814-234-8087
E-Mail: techsupport@rtd.com

Be sure to check the RTD web site (http://www.rtd.com) frequently for product updates, including newer versions of the board manual and application software.

6 Additional Information

6.1 PC/104 Specifications

A copy of the latest PC/104 specifications can be found on the webpage for the PC/104 Embedded Consortium:

www.pc104.org

6.2 PCI and PCI Express Specification

A copy of the latest PCI and PCI Express specifications can be found on the webpage for the PCI Special Interest Group:

www.pcisig.com

7 Limited Warranty

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.

During the one year warranty period, RTD Embedded Technologies 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 RTD Embedded Technologies. All replaced parts and products become the property of RTD Embedded Technologies. Before returning any product for repair, customers are required to contact the factory for a Return Material Authorization (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 RTD Embedded Technologies, “acts of God” or other contingencies beyond the control of RTD Embedded Technologies), or as a result of service or modification by anyone other than RTD Embedded Technologies. 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 RTD Embedded Technologies expressly disclaims all warranties not stated herein. All implied warranties, including implied warranties for merchantability 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 RTD Embedded Technologies 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.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, and some states do not allow limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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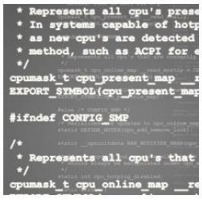

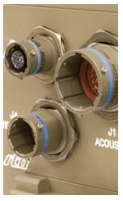
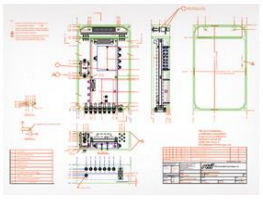

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