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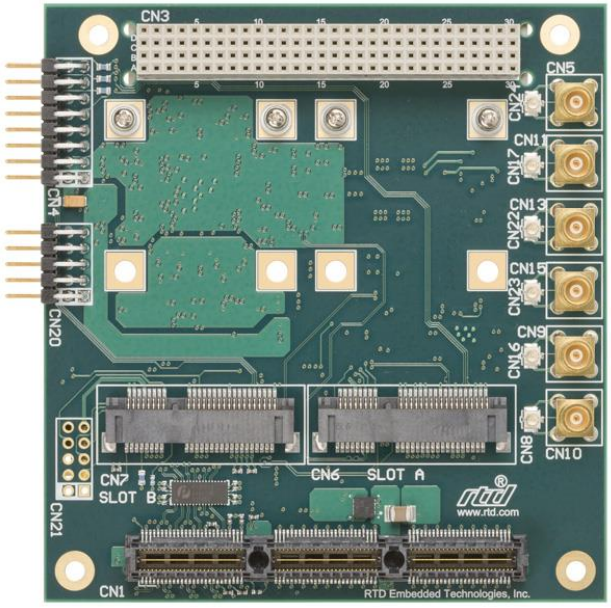
IM25100HR

IM35100HR

Mini-PCI Express Card Carrier Module

User's Manual

BDM-610020086 Rev. D



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AS9100 and ISO 9001 Certified

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Revision History

Rev A	Initial Release
Rev B	Added “HR” to end of part number. Added IM35100HR to title page. Updated Electrical Specifications.
Rev C	Complete overhaul of manual; restructured and reworded for improved clarity Added 6th antenna pair Added W_DISABLE# inputs for each socket to I/O connector CN4 Added WAKE# signal support for each socket and true +3.3V auxiliary power Added table of I/O connectors and improved bus connector table to shows function, size & pitch, and mating connectors Added pinouts for the Mini PCI Express socket connectors Added image of bottom-side of board to show SIM card socket Added description of LED current limiting resistors Added a diagram to explain lane repopulation Added link to PCI Express Mini Card specification Added IDAN dimensional drawings Added IDAN external I/O pinouts Improve pinout tables to indicate pin connection to Mini PCI Express sockets Updated power figures to reflect latest version of PCB Updated board photo to reflect latest version of PCB Updated physical dimensions drawing Removed mention of Half-Mini card standoffs Removed mention of BRG2210
Rev D	Add IDAN cable kit, IDAN-XKCM54, which includes six SMA Jack (female) to Reverse Polarity (male) SMA adapters Correct IDAN connectors to indicate standard polarity SMA Update Table 11 to show board connector for each IDAN SMA connector Add note to indicate "This board does not support Coexistence Pins or Tunable Antenna Pins" Correct CN10 label on Figure 3 Update isometric drawing of IDAN ordering option (Figure 7)

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1 Introduction

1.1 Product Overview

RTD's IM25100HR and IM35100HR modules offer dual Mini PCI Express sockets, designed to permit integration of third party Mini PCI Express modules into rugged PCIe/104 and PCI/104-Express systems and enclosures. Mini PCI Express (also referred to as PCI Express Mini Card, Mini PCIe, mPCIe, and PEM) is a form factor for devices which supports both PCI Express and USB 2.0 connectivity.

An onboard PCIe Gen 2 switch provides a x1 PCI Express connection to each of the dual sockets on the IM25100HR and IM35100HR, using only one upstream x1 PCI Express link from the bus. Similarly, an onboard USB 2.0 hub generates a USB 2.0 link for each of the dual sockets using only one USB 2.0 link from the bus. Additional links on the PCIe Gen2 switch and USB 2.0 hub are utilized to repopulate the x1 PCI Express link and USB link these devices use from the host, making these links available to the next x1 PCI Express or USB peripheral in the system.

For devices installed in the dual mini PCI Express sockets of the IM25100HR or IM35100HR-- referred to as Sockets A and B throughout this hardware manual (or designators CN6 and CN7, respectively) – a set of three U.FL antennae connectors are available per socket, permitting easy wiring and breakout to a corresponding set of MCX antennae connectors on the board edge.

The dual sockets on the IM25100HR and IM35100HR permit mounting of full and half-length Mini PCI Express modules, allowing maximum flexibility with the specification.



NOTE: The IM25100HR is a PCI/104-Express module, and includes a pass-through PCI connector. The IM35100HR is PCIe/104, and does not include a pass-through PCI connector. Throughout the remainder of this manual, "IM25100HR" refers to both boards unless otherwise noted.

1.2 Board Features

- PCI Express Universal Connector
  - Permits compatibility with PCIe/104 Type 1 and Type 2 cpuModules
  - CPU_DIR pin permits stacking above or below the CPU
  - +5V-only operation
- Pass-through PCI Connector (IM25410HR only)
- Onboard PCIe Gen 2 Switch and USB 2.0 hub
  - Dual sockets require only one x1 PCI Express link and/or one USB 2.0 link for operation
  - Full x1 PCI Express link and USB 2.0 link repopulation
- Dual Mini PCI Express Card Sockets
  - Each socket supports three modes of operation
    - Single x1 PCIe link **and** single USB 2.0 link
    - Single x1 PCIe link
    - Single USB 2.0 link
  - Mounting holes permit installation of Full-Mini and Half-Mini sized Mini PCI Express modules
  - I/O connector provides external access to W_DISABLE# input and LED status outputs on both Mini PCI Express sockets
  - 6 external antennae connectors for use with Wifi/GPS/GSM cards
  - WAKE# signal support for each socket
  - UIM / SIM card connections for each Mini PCI Express card slot



NOTE: This board does not support Coexistence Pins or Tunable Antenna Pins

1.3 Ordering Information

The IM25100HR and IM35100HR are available with the following options:

Table 1: Ordering Options

Part Number	Description
IM25100HR	PCI/104-Express Mini PCI Express Card add-on board
IM35100HR	PCIe/104 Mini PCI Express Card add-on board
IDAN-IM25100HR	PCI/104-Express Mini PCI Express Card add-on board in IDAN enclosure
IDAN-IM35100HR	PCIe/104 Mini PCI Express Card add-on board in IDAN enclosure
IDAN-XKCM54	Six SMA Jack (female) to Reverse Polarity Plug (male) SMA adapters

The Intelligent Data Acquisition Node (IDAN™) building block can be used in just about any combination with other IDAN building blocks to create a simple but rugged 104™ stack. For more information, see *IDAN Connections* on page 18.

This module can also be incorporated in a custom-built RTD HiDAN™ or HiDANplus High Reliability Intelligent Data Acquisition Node. Contact RTD sales for more information on our high reliability systems.

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 you 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 Board Operating Conditions

Table 2: Operating Environment and Storage Conditions

Symbol	Parameter	Test Condition	Min	Max	Unit
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	30C	3200565		Hours



NOTE: The Operating Environment and Storage Conditions listed in Table 2 apply to the IM25100HR and IM35100HR boards only. For recommended operating conditions of third party Mini PCI Express modules, refer to documentation from the manufacturer.

2.2 Board Electrical Characteristics

The bus connectors on the IM25100HR and IM35100HR offer several voltage inputs. Only +5V is required for operation, and is used to generate the voltage requirements for both Mini PCI Express sockets. All other bus connector supply voltages are pass-through and unused by the IM25100HR and IM35100HR.

Table 3: Supply Voltage Requirements

Symbol	Parameter	Note	Min	Max	Unit
V_{cc5}	5 V Supply Voltage		4.75	5.25	V
$V_{cc5\text{-}STBY}$	5 V Stand-by Supply Voltage		n/a	n/a	V
V_{cc3}	3.3 V Supply Voltage		n/a	n/a	V
V_{cc12}	12 V Supply Voltage		n/a	n/a	V
$V_{cc\text{-}12}$	-12 V Supply Voltage	IM25100HR only	n/a	n/a	V

Supply current and power consumption for the IM25100HR and IM35100HR are listed in the table below.

Table 4: Power Ratings

Symbol	Parameter	Test Condition	Min	Max	Unit
P	Power Consumption	V_{cc5} = 5.0 V, Typical		1.5	W
I_{cc5}	5 V Input Supply Current	Active		300	mA
Mini PCI Express – Peak Current per Socket					
$I_{cc3.3\text{-}AB\text{-}PK}$	3.3 V Input Supply Current	Peak current; Socket A or B		2.750	A
$I_{cc1.5\text{-}AB\text{-}PK}$	1.5 V Input Supply Current	Peak current; Socket A or B		0.500	A
Mini PCI Express – Combined Current (Sockets A and B)					
$I_{cc3.3}$	3.3 V Input Supply Current	Combined current; Socket A + B		4.000	A
$I_{cc1.5}$	1.5 V Input Supply Current	Combined current; Socket A + B		1.000	A



NOTE: Power measurements were recorded with no devices installed in the Mini PCI Express sockets.

2.3 PCI Express Mini Card Operating Conditions

Each Mini PCI Express module has its own individual operating conditions which will vary from one manufacturer's device to another. Installing third party Mini PCI Express modules on the IM25100HR can affect the overall operating temperature of the system. Make sure to verify the operating conditions of third party Mini PCI Express modules before using the IM25100HR in extreme conditions.

2.4 Physical Characteristics

- Weight: Approximately 55 g (0.12 lbs.)
- Dimensions: 90.17 mm L x 95.89 mm W (3.550 in L x 3.775 in W)

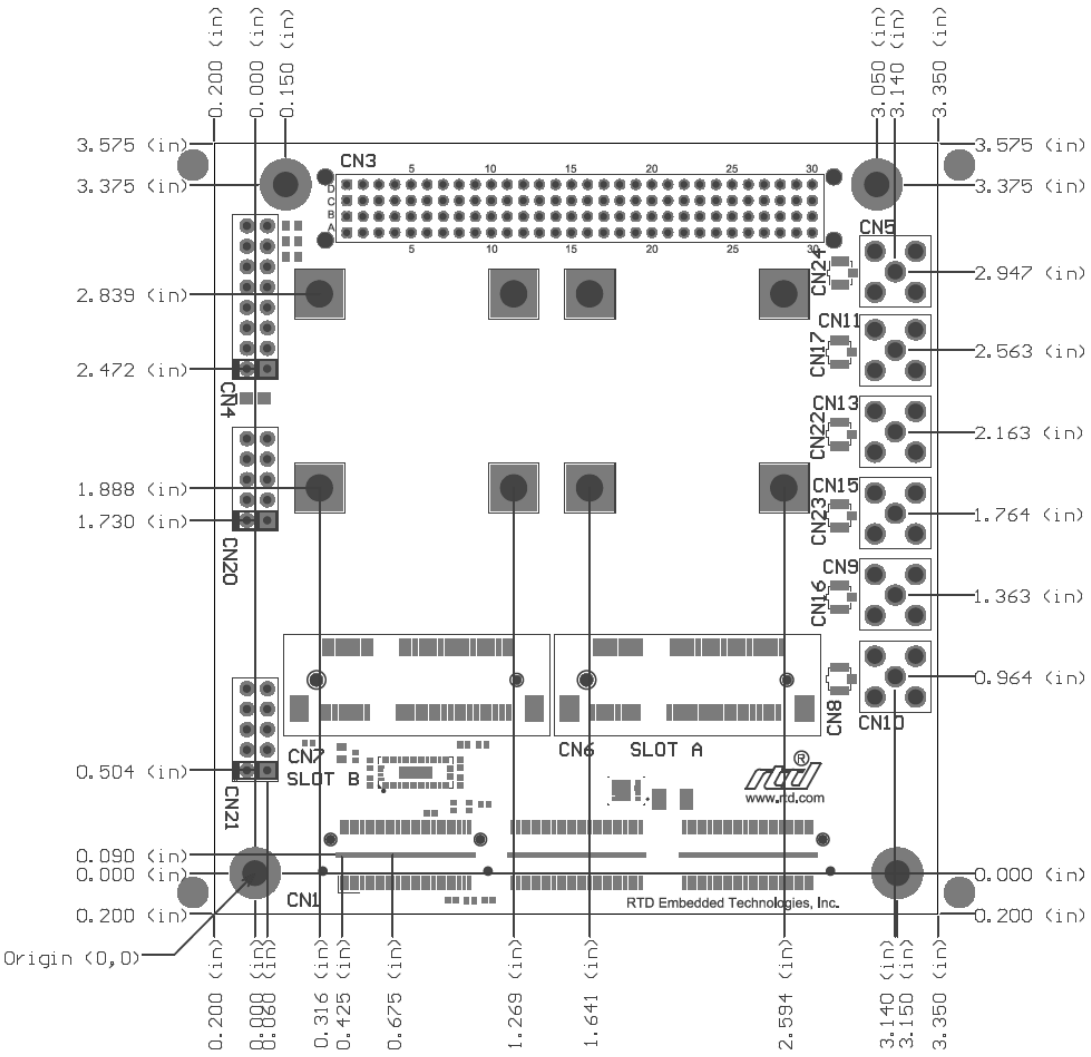


Figure 1: Board Dimensions

3 Board Connections and Functionality

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 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.

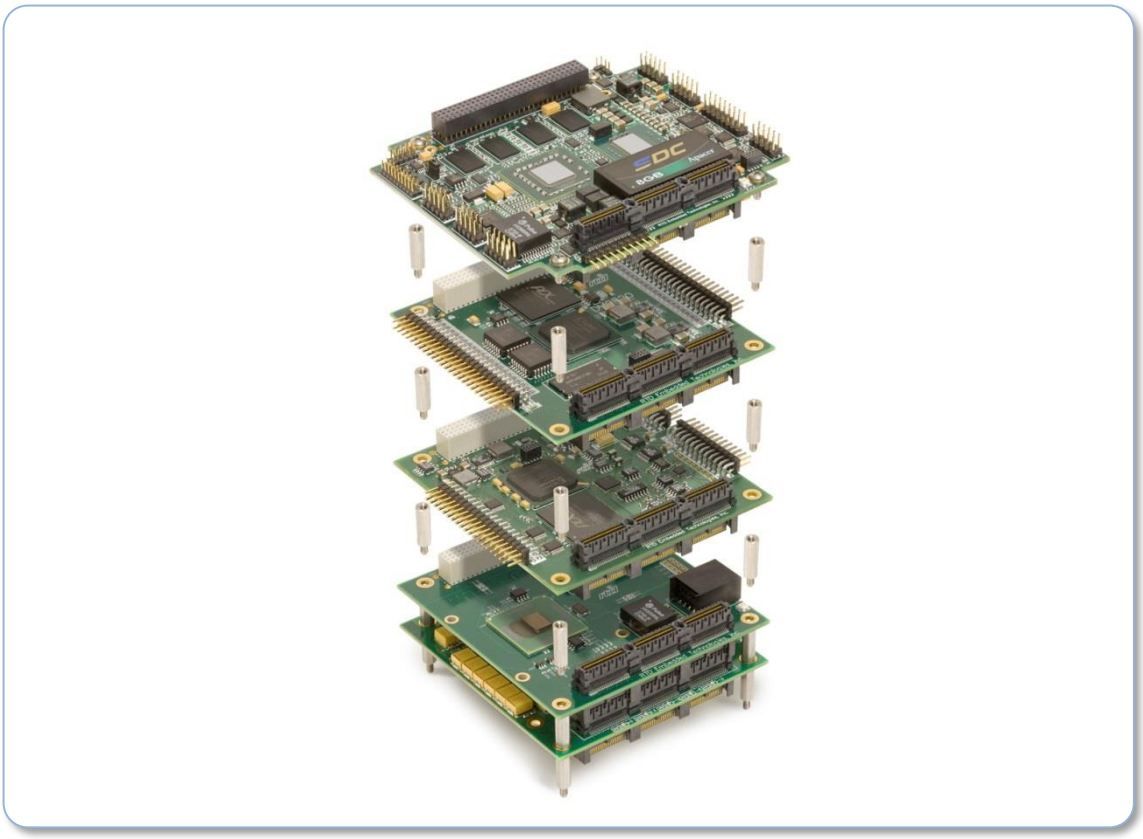


Figure 2: Example 104™ Stack

3.3 Connector and Jumper Locations

The tables in this section list designator callouts for the various functions of the bus connectors, I/O connectors, and jumpers found on the IM25100HR and IM35100HR. Also included are the size and pitch of each connector as well as mating connector information. The following top-side photo provides a reference for designators and their locations.

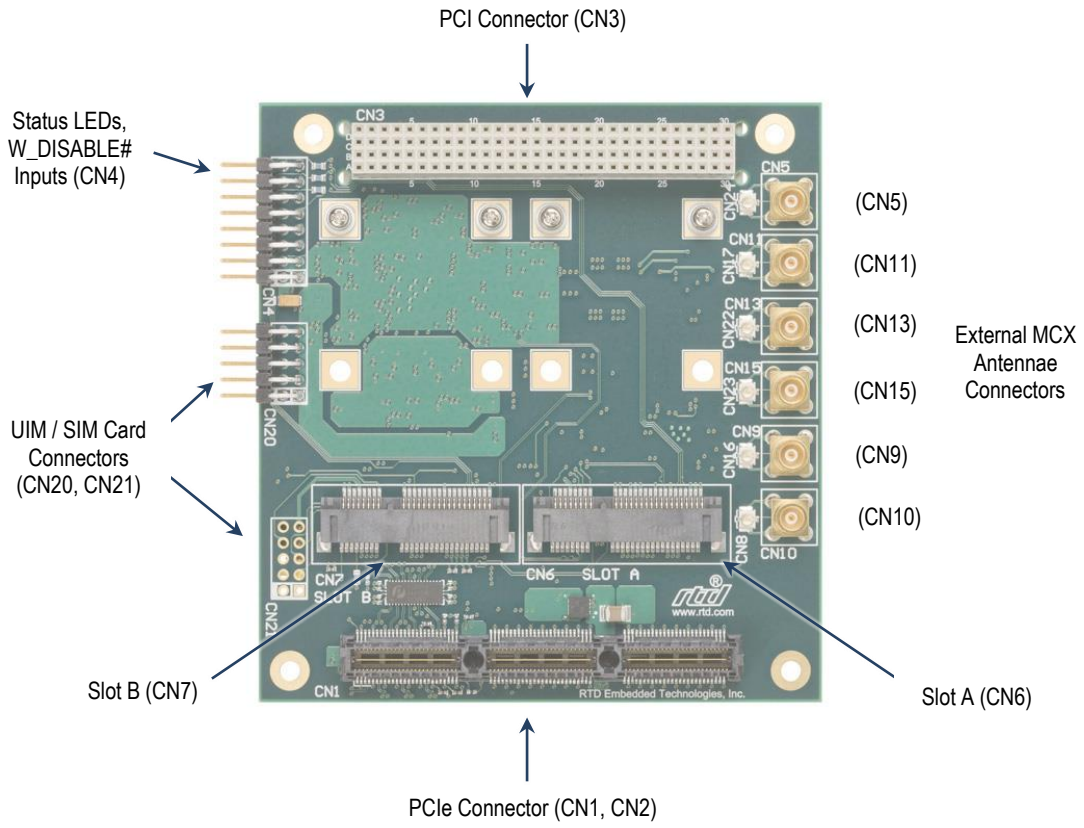


Figure 3: Board Connections

3.4 Functional Diagram

The Figure below shows the functional block diagram of the IM25100HR.

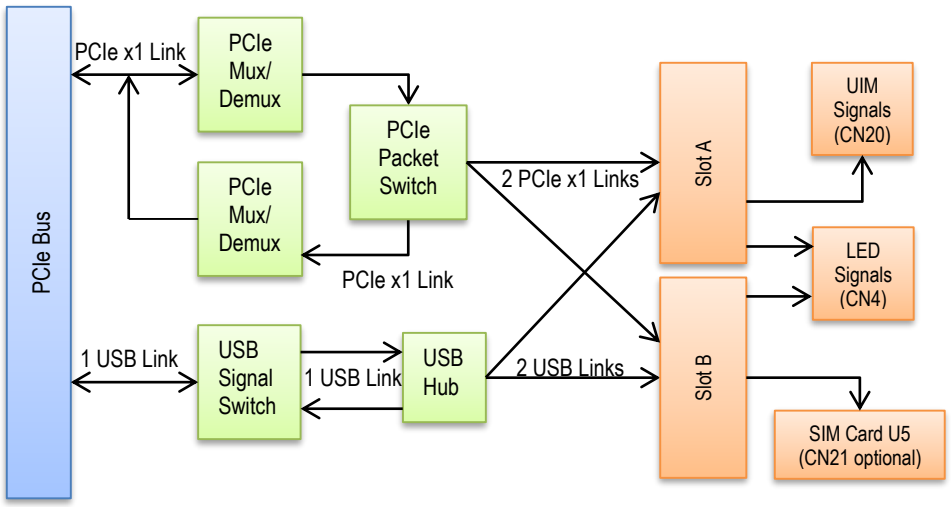


Figure 4: IM25100HR Block Diagram

3.5 Connector and Jumper Functionality

3.5.1 Bus Connectors

Table 5: IM25100HR Bus Connectors

Connector	Function	Size and Pitch	Mating Connector
CN1	PCIe/104 Universal Bus (Top)	156-pin, 0.635mm	Samtec ASP-129646-03
CN2	PCIe/104 Universal Bus (Bottom)	156-pin, 0.635mm	Samtec ASP-129637-03
CN3	PCI-104 (PCI) Bus *(IM25100HR only)*	120-pin, 2mm	Samtec ESQT-130-02-G-Q-368

PCIe Connectors (CN1 – Top, CN2 - Bottom)

The IM25100HR is a "Universal" board, and can connect to either a Type 1 or Type 2 connector of a PCIe/104 or PCI-104 Express system. The position and pin assignments are compliant with the *PCI/104-Express Specification*. (See PC/104 Specifications on page 23)

PCI Connector (CN3) - IM25100HR only

The PCI connector is the connection to PCI peripheral modules. This connector is used on this board as a pass through connector only.

3.5.2 INTERNAL AND EXTERNAL I/O CONNECTORS

The IM25100HR offers two sockets for installing a third party Mini PCI Express module, Socket A (CN6) and Socket B (CN7). For each socket, three onboard U.FL antennae connectors are offered to easily bring out any connections from the installed module to the IM25100HR, allowing the user to easily interface to these connections using a rugged MCX connector.

Several additional external I/O connectors allow external interfacing to auxiliary signaling on the Mini PCI Express sockets connectors.

Table 6: IM25100HR I/O Connectors

Socket A	**Function**	**Size and Pitch**	**Mating Connector**
CN6	Mini PCI Express, Socket A	*(Refer to PCI Express Mini Card Electromechanical Specification)*	
CN20	Socket A: UIM / SIM connection	2x5, 0.1", right angle	3M 89110-0001
Socket B	**Function**	**Size and Pitch**	**Mating Connector**
CN7	Mini PCI Express, Socket B	*(Refer to PCI Express Mini Card Electromechanical Specification)*	
CN21, U5	Socket B: UIM / SIM connection	2x5, 0.1", right angle	3M 89110-0001
Socket A / B	**Function**	**Size and Pitch**	**Mating Connector**
CN4	Socket A & Socket B LED signals	2x6, 0.1", right angle	AMP 87456-8
CN8, CN16, CN17, CN22, CN23, CN24	Socket A & Socket B U.FL connector receptacle	Hirose Connectors, U.FL-R-SMT	*(Various; refer to Hirose Connectors product datasheet)*
CN5, CN9, CN10, CN11, CN13, CN15	Socket A & Socket B MCX 50-ohm straight jack receptacle	Johnson Components, 133-3701-211	*(Various)*

Mini PCI Express Sockets A and B (CN6, CN7)

The IM25100HR offers two soldered-down connectors that support third party Mini PCI Express modules.

Sockets A and B on the IM25100HR (or designators CN6 and CN7) each offer one downstream x1 PCI Express Gen 2 link and one downstream USB 2.0 link from the host cpuModule to the Mini PCI Express device installed in the socket. For maximum flexibility, the IM25100HR provides mounting holes for cards designed to both the Full-Mini and Half-Mini card Mini PCI Express form factors.

The pinout for each Mini PCI Express connector is shown below.

Table 7: CN6 and CN7 Pin Assignments

Pin Name	#	#	Pin Name
(Reserved)	51	52	3.3 V
(Reserved)	49	50	GND
(Reserved)	47	48	1.5 V
(Reserved)	45	46	LED_WPAN#
GND	43	44	LED_WLAN#
3.3 V	41	42	LED_WWAN#
3.3 V	39	40	GND
GND	37	38	USB_D_P
GND	35	36	USB_D_N
PET0_P	33	34	GND
PET0_N	31	32	SMB_DATA
GND	29	30	SMB_CLK
GND	27	28	1.5 V
PER0_P	25	26	GND
PER0_N	23	24	3.3 V
GND	21	22	PERST#
(Reserved)	19	20	W_DISABLE#
(Reserved)	17	18	GND
Pin Name	**#**	**#**	**Pin Name**
GND	15	16	UIM_VPP
REFCLK_P	13	14	UIM_RESET
REFCLK_N	11	12	UIM_CLK
GND	9	10	UIM_DATA
CLKREQ#	7	8	UIM_PWR
(Not Connected)	5	6	1.5 V
(Not Connected)	3	4	GND
WAKE#	1	2	3.3 V

MCX Connectors (CN5, CN9, CN10, CN11, CN13, CN15)

The MCX connectors allow the user to connect external antennas to an installed GSM/GPS/Wi-Fi card. Mini-PCIe wireless cards typically use U.FL connectors, which must be adapted to MCX connectors to interface with common antenna cables. The onboard U.FL connectors facilitate this. The following table shows the mapping relationship between the onboard U.FL connectors and MCX connectors.

Table 8: MCX to U.FL Connector Mapping

U.FL Connector	MCX Connector
CN8	CN10
CN16	CN9
CN17	CN11
CN22	CN13
CN23	CN15
CN24	CN5

LED Status Indicators and Socket W_DISABLE# Inputs (CN4)

Connector CN4 brings out the LED_WPAN#, LED_WLAN#, and LED_WWAN# signals on the Mini PCI Express sockets and also provides access to the socket W_DISABLE# inputs.

Each LED signal on the Mini PCI Express sockets CN6 and CN7 is current limited with a 110 ohm (1%) resistor. Connect the LED cathode to the odd pins, and the LED anode to the signal's corresponding even pin.

Table 9: Pinout of LED Status and W_DISABLE# Connector (CN4)

CN4 Pin #	Function	Slot A (CN6) Pin Number	Slot B (CN7) Pin Number
1	Ground	–	–
2	Slot B, W_DISABLE#	–	20
3	Ground	–	–
4	Slot A, W_DISABLE#	20	–
5	Slot B, LED_WWAN#	–	42
6	+3.3V	–	–
7	Slot B, LED_WLAN#	–	44
8	+3.3V	–	–
9	Slot B, LED_WPAN#	–	46
10	+3.3V	–	–
11	Slot A, LED_WWAN#	42	–
12	+3.3V	–	–
13	Slot A, LED_WLAN#	44	–
14	+3.3V	–	–
15	Slot A, LED_WPAN#	46	–
16	+3.3V	–	–

The LED signals and W_DISABLE# inputs are directly connected to the Mini PCI Express slots. The behavior of these signals will depend on the card installed. For more information, refer to the PCI Express Mini Card Electromechanical specification.

CN4 is a 2x8 0.1" DIL connector. Pin 1 is indicated with a square solder pad. Pins are numbered as follows.

16	15
14	13
12	11
10	9
8	7
6	5
4	3
2	1

User Identity Module connection for Slot A (CN20)

CN20 is the User Identity Module (UIM) signal connection for Mini PCI Express card Slot A (CN6). Pin functions are as follows:

Table 10: Pinout of UIM Connector (CN20)

CN20 Pin #	Slot A Function	Slot A (CN6) Pin Number
1	UIM_RESET	14
2	GND	–
3	UIM_DATA	10
4	GND	–
5	UIM_CLK	12
6	GND	–
7	UIM_VPP	16
8	GND	–
9	UIM_PWR	8
10	GND	–

The UIM signals are directly connected to the Mini PCI Express slot. The behavior of these signals will depend on the card installed. For more information, refer to the PCI Express Mini Card Electromechanical specification.

CN20 is a 2x5 0.1" DIL connector. Pin 1 is indicated a square solder pad. Pins are numbered as follows.

10	9
8	7
6	5
4	3
2	1

User Identity Module connection for Slot B (CN21, U5)

The SIM Card socket (U5) on the bottom side of the board provides the UIM signal connection for Slot B (CN7). The SIM card socket accepts a standard SIM card. As an alternative to the SIM card socket, the board may be built with a 2x5 0.1" DIL connector (CN21). The standard board configuration comes with U5 installed and CN21 not populated. Contact RTD if you are interested in changing this configuration. The pinout of CN21 matches CN20.

The SIM card socket (U5) is shown in the figure below.

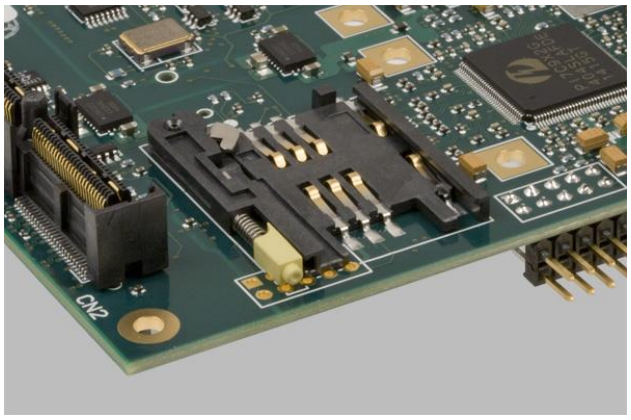


Figure 5: SIM Card Socket (U5) for Slot B

3.6 Repopulation of PCI Express and USB Links

The Mini PCI Express sockets on the IM25100HR each operate using a x1 PCI Express link and/or USB 2.0 link. To relieve some of the stress on the system, the IM25100HR has an onboard PCI-Express Gen 2 switch and a USB 2.0 hub to generate these links, reducing the number of resources needed from the host cpuModule for the IM25100HR to operate.

These components are also used to generate one PCI Express Gen 2 link and one USB 2.0 link on the "downstream" side of the IM25100HR, repopulating the used links making them available for other peripherals up or down the stack. This allows each Mini PCI Express socket on IM25100HR to operate without consuming any PCI Express link or USB link on the bus.

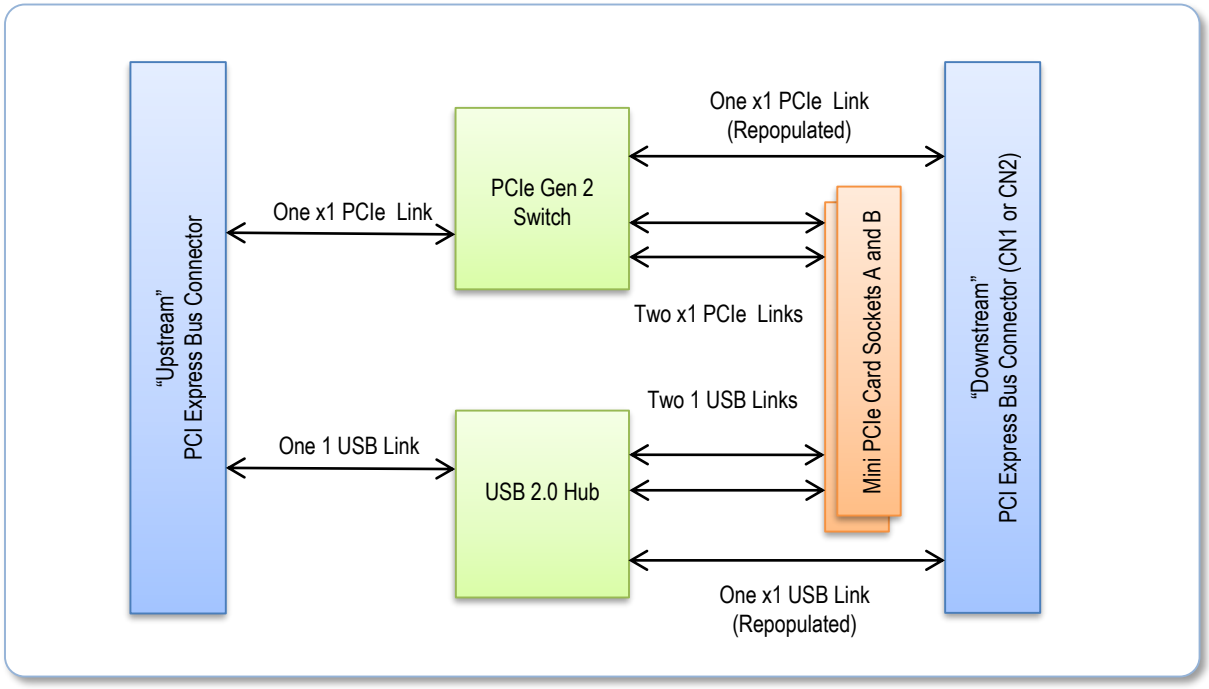


Figure 6: IM25410HR Link Repopulation Diagram (I/O Connectors Not Shown)

4 IDAN Connections

4.1 Module Handling Precautions

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

4.2 Physical Characteristics

- Weight: Approximately 0.24 Kg (0.54 lbs.)
- Dimensions: 152.0 mm L x 130.0 mm W x 17.0 mm H (5.98 in L x 5.12 in W x 0.67 in H)

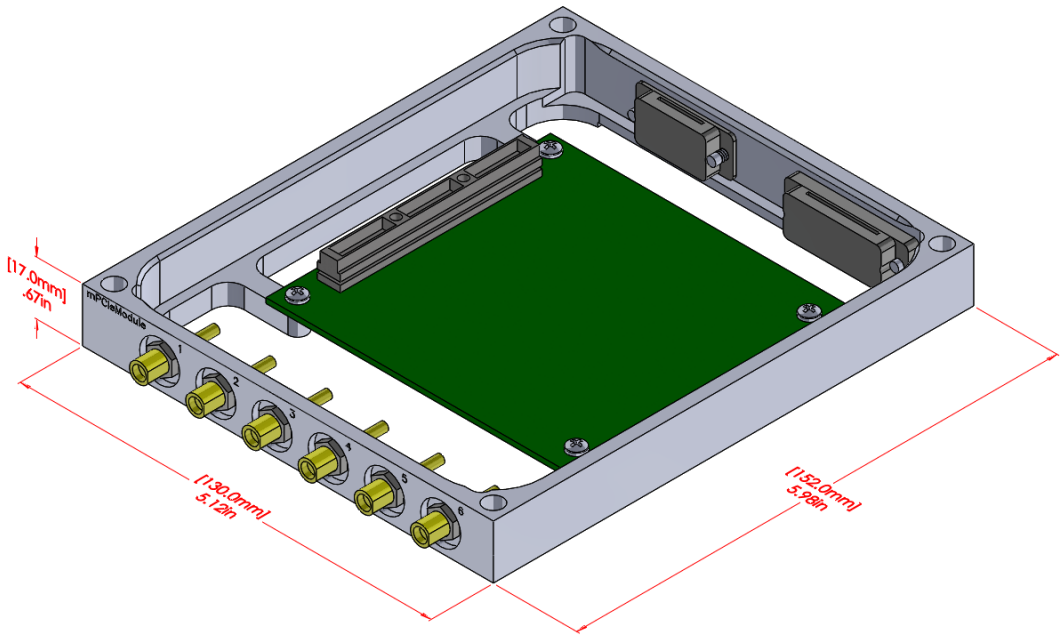


Figure 7: IDAN Dimensions – L x W x H

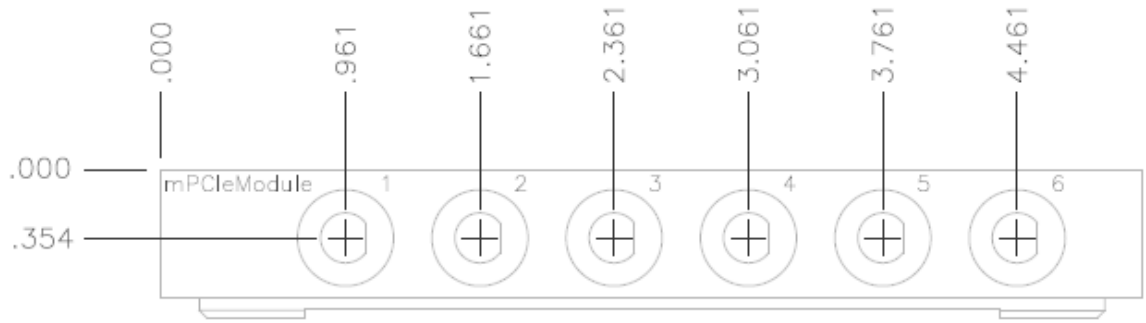


Figure 8: IDAN Front Panel Drawing

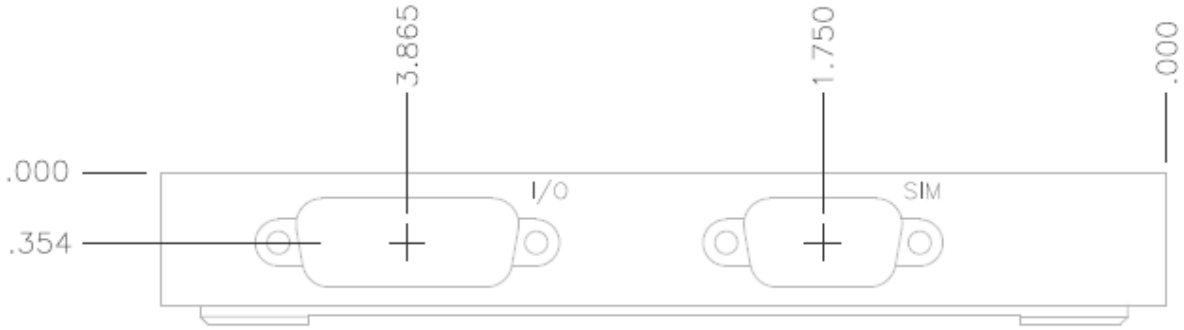


Figure 9: IDAN Back Panel Drawing

4.3 External I/O Connectors

This section describes the pinout for each connector on the IDAN-IM25100, and shows how the IDAN connector pins correspond to the pins of each I/O header on the IM25100.

4.3.1.1 SMA Antennae Connectors

For improved signal transmission, six SMA connectors on the IDAN frame (labeled: 1, 2, 3, 4, 5, 6) allow the user to connect external antennae to GSM, GPS, and/or Wi-Fi Mini PCIe modules installed on the IM25100HR and IM35100HR. This connection is accomplished via the onboard MCX connectors (CN5, CN9, CN10, CN11, CN13, CN15). For more information on the MCX connectors, see page 13.

If Reverse Polarity SMA adapters are desired, RTD offers the IDAN-XKCM54 cable kit, which includes six SMA Jack (female) to Reverse Polarity Plug (male) SMA adapters.

The following table lists all connectors on the IDAN-IM25100 frame as well as their mating connectors.

Table 11: IDAN Connectors and Mating Connectors

IDAN Designator	Board Designator	IDAN Connector Type	Module Part Number	Mating Part Number
1	CN10	SMA Jack	Pomona Electronics, 72956	Pomona Electronics, 72943
2	CN9	SMA Jack	Pomona Electronics, 72956	Pomona Electronics, 72943
3	CN15	SMA Jack	Pomona Electronics, 72956	Pomona Electronics, 72943
4	CN13	SMA Jack	Pomona Electronics, 72956	Pomona Electronics, 72943
5	CN11	SMA Jack	Pomona Electronics, 72956	Pomona Electronics, 72943
5	CN5	SMA Jack	Pomona Electronics, 72956	Pomona Electronics, 72943

4.3.1.2 LED Status Indicators and Socket W_DISABLE# Inputs

A 15-pin female DSUB connector labeled "I/O" allows access to LED status indicators on the Mini PCI Express cards installed on the IM25100HR and IM35100HR, and also provides access to the W_DISABLE# input of each socket. For more information on the LED status indicators and socket W_DISABLE# input, see page 15.

The pin mapping of the 15-pin DSUB connector to connector CN4 on the IM25100HR and IM35100HR is shown in the following table:

Table 12: IDAN Pinout of LED Status and W_DISABLE# Connector (CN4)

15-pin female DSUB Pin #	CN4 Pin #	Function
1	1	Ground
2	3	Ground
3	5	Slot B LED_WWAN#
4	7	Slot B LED_WLAN#
5	9	Slot B LED_WPAN#
6	11	Slot A LED_WWAN#
7	13	Slot A LED_WLAN#
8	15	Slot A LED_WPAN#
9	2	Slot B W_DISABLE#
10	4	Slot A W_DISABLE#
11	6	+3.3V
12	8	+3.3V
13	10	+3.3V
14	12	+3.3V
15	14	+3.3V
--	16	+3.3V

The LED signals and W_DISABLE# inputs are directly connected to the Mini PCI Express slots. The behavior of these signals will depend on the card installed. For more information, refer to the PCI Express Mini Card Electromechanical specification.

4.3.1.3 SIM Connector for Slot A

A 9-pin female DSUB connector on the IDAN frame labeled "SIM" provides access to the User Identity Module (UIM) connector (CN20) for Mini PCI Express card Slot A (CN6) on the IM25100HR or IM35100HR. For more information on the UIM connector, see page 16.

The pin mapping of the 9-pin DSUB connector to connector CN20 on the IM25100HR and IM35100HR is shown in the following table:

Table 13: IDAN Pinout of UIM Connector (CN20)

9-pin female DSUB Pin #	CN20 Pin #	Function
1	1	Slot A UIM_RESET
2	3	Slot A UIM_DATA
3	5	Slot A UIM_CLK#
4	7	Slot A UIM_VPP
5	9	Slot A UIM_PWR
6	2	GND
7	4	GND
8	6	GND
9	8	GND
--	10	GND

4.4 Steps for Installing

1. Always work at an ESD protected workstation, and wear a grounded wrist-strap.
2. Turn off power to the IDAN system.
3. Remove the module from its anti-static bag.
4. Check that pins of the bus connector are properly positioned.
5. Check the stacking order; make sure all of the busses used by the peripheral cards are connected to the cpuModule.
6. Hold the module by its edges and orient it so the bus connector pins line up with the matching connector on the stack.
7. Gently and evenly press the module onto the IDAN system.
8. If any boards are to be stacked above this module, install them.
9. Finish assembling the IDAN stack by installing screws of an appropriate length.
10. Attach any necessary cables to the IDAN system.
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.

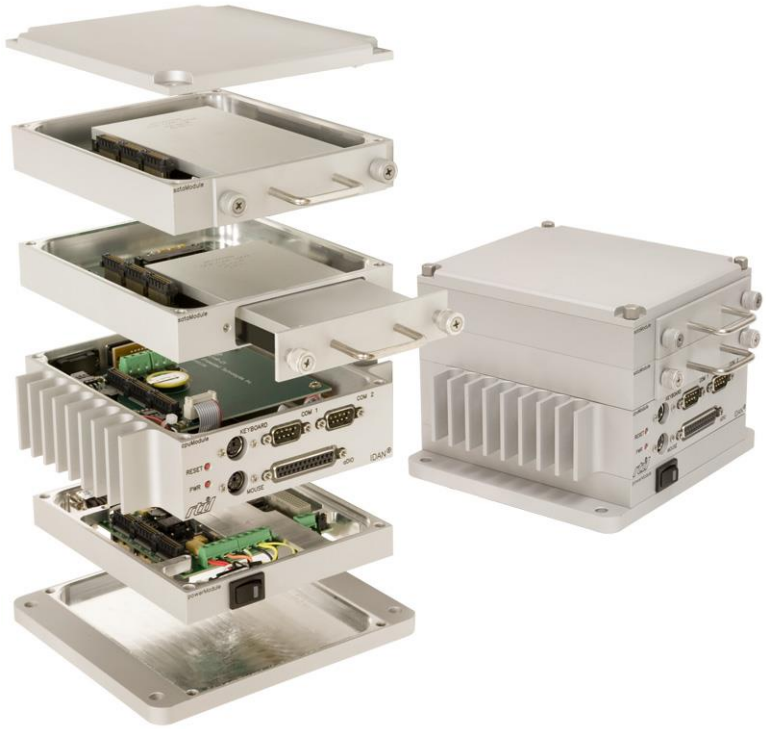


Figure 10: Example IDAN System

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

6.3 PCI Express Mini Card Electromechanical Specification

A copy of the latest PCI Express Mini Card Electromechanical Specification can also 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.

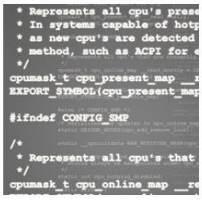
This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

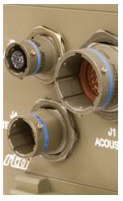
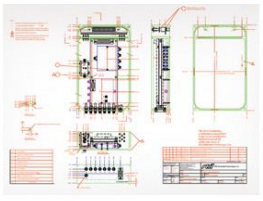
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