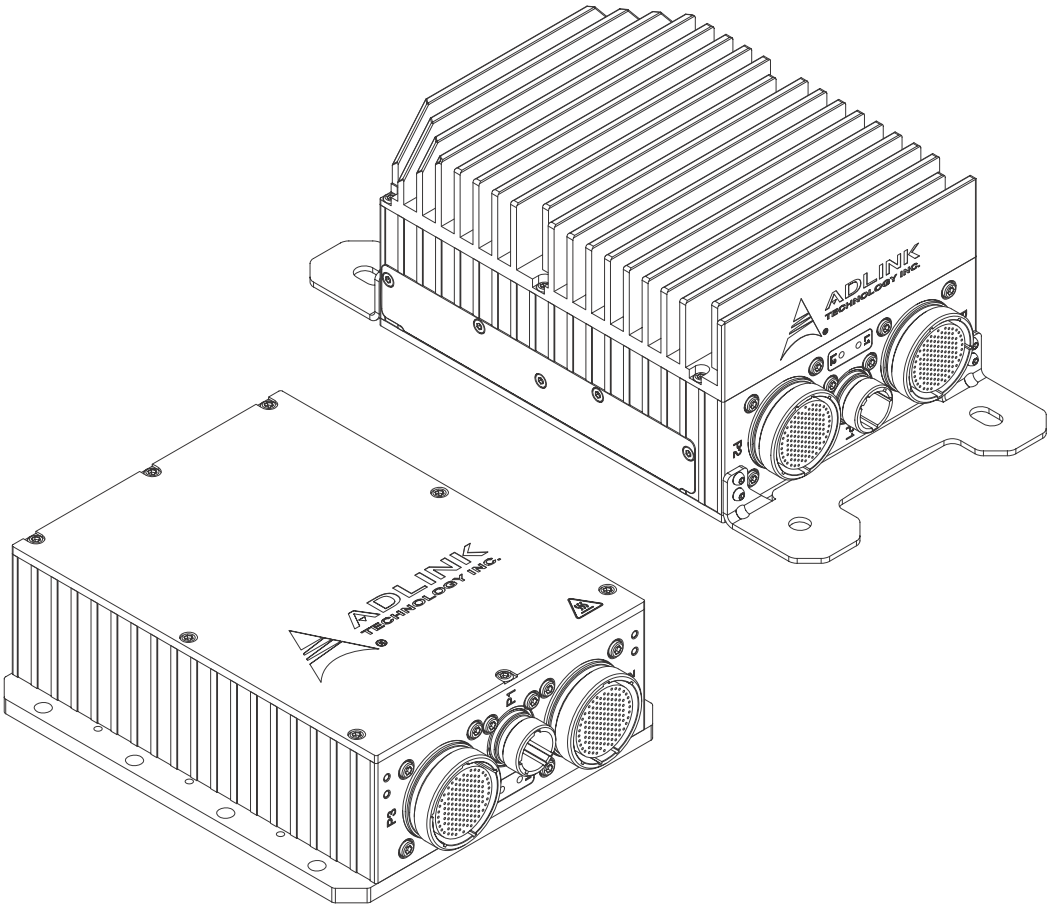
HPERC-IBR-MC/MH

High Performance Extreme Rugged Computer System

User's Manual



Manual Rev.: 1.00

Revision Date: December 20, 2016

Part No: 50-1Z178-1000

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Revision History

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1.00	Initial release	20-12-2016

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Preface

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Audience

This manual provides reference only for computer design engineers, including but not limited to hardware and software designers and applications engineers. ADLINK Technology, Inc. assumes you are qualified to design and implement prototype computer equipment.

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1 HPERC-IBR-M Setup

1.1 About the HPERC-IBR-M

The HPERC products are intended for users of embedded systems requiring long life-cycles, configuration control, and ruggedness in hardened military packages. HPERC models feature Extreme Rugged™ computer boards available with varieties of processors and memory. An optional operating system (OS) can be pre-loaded onto an optional internal storage device (two 2 ½" Solid State Drives (SSDs). Board Support Packages (BSPs) are provided on the optional Support Software QuickDrive™ to support additional OSs. Just use a USB memory to load your application software and you are ready to use your system.

1.2 Using this Guide

This guide provides the most efficient way to set up your HPERC-IBR-M with your desired OS. The instructions provided in this guide include:

- Removing the HPERC-IBR-M from the shipping container and inspecting the accessories
- Connecting peripherals to the HPERC-IBR-M
- Powering up the HPERC-IBR-M

Information not provided in this User's Guide includes:

- Board or Module specifications
- Board or Module header signals and descriptions
- Operating system programming or operating instructions

> **NOTE**: Refer to OS manufacturers' manuals for instructions when using OS software.

1.3 Requirements

The following peripherals and devices are needed to make full use of the HPERC-IBR-M.

- Peripherals (user-provided):
  - USB or PS/2 keyboard
  - USB or PS/2 mouse
  - Display monitor

> **NOTE**: The items listed above are not available from ADLINK.

- Power Supply (optional):
  - AC Adapter (with plug-type mating cord)

1.4 Device/Peripheral Connections

- Ethernet (LAN) connections
- USB device connections
- At least one PCI/104-Express expansion module

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1.5 Specifications

VITA Standards	VITA 75
Mechanical	**MC:** • Form Factor: VITA-75.22 Conductive Coldplate • Dimension: 223.38(L) x 177.8(W) x 68.7(H) mm (with mounting brackets) • Weight: 3.12 kg
	MH: • Form Factor: VITA-75 Finned Passive Convection • Dimension: 304.8(L) x 150(W) x 101.95(H) mm (with mounting brackets) • Weight: 3.91 kg
Processor	22nm FCBGA Intel® Core™ i7 Processor • 4-core Intel® Core™ i7-3612QE Processor, 2.1 GHz, 6MB L3 cache, TDP 35W • 2-core Intel® Core™ i7-3517UE Processor, 1.7 GHz, 4MB L3 cache, TDP 17W
Chipset	Intel® BD82QM77 Platform Controller Hub (PCH)
Host Memory	Dual channel DDR3-1066/1333 SDRAM with ECC, total up to 16GB One channel in SODIMM sockets up to 8GB One channel soldered onboard to 8GB
BIOS	AMI EFI BIOS, 64Mbit SPI flash memory
Graphics	Integrated in processor One VGA, two DVI and one HDMI
GPGPU	General-purpose GPU via MXM slot (PCIe x16 Gen3) • GT745M with 2 GB GDDR5 128-bit RAM • GTX950M with 2 GB GDDR5 128-bit RAM
Gigabit Ethernet	Four Intel® I210 10/100/1000BASE-T ports
Serial Port	Seven RS-232/RS-422 serial ports
USB 2.0	Six USB 2.0 ports routed
PS/2	One PS/2 Keyboard port One PS/2 Mouse port
GPIO	Eight digital IO
Audio Port	One amplified stereo output One stereo input
TPM	Atmel AT97SC3204-U1A190 TPM
Storage Interface	Two SATA 6 Gb/s direct connector for 2.5” onboard drive SLC/MLC SSD on SATA 6 Gb/s (up to 1 TB) One removable SDIO socket supports up to 64GB SDHC on panel
RAID	Supports RAID 0/1
I/O Connecter	MIL-DTL-38999 (uniquely-keyed)
Expansion Busses	MXM (3rd Generation PCIe x16) PCI/104 Express® Type 2 (PCIe Gen2) PCI Express Mini Card (PCIe Gen2)
OS Compatibility	Microsoft Windows 7 64-bit Microsoft WES7 x86/x64 Wind River VxWorks 6.9.3.1 BSP Other OS support on request

Table 1-1: HPERC-IBR-M Specifications

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Operating Temperature	**MC:** • Baseplate Point Extreme Rugged • -40°C to +85°C (i7-3517UE) • -40°C to +80°C (i7-3612QE) • Coldplate conduction • VITA 75.22 mount
	MH: • Ambient:40°C to +70°C at 1 atm air • Heatsink (free air convection) • VITA 75.21 mount
Storage Temperature	-55°C to 85°C
Power	Input: +10 to +36VDC input Performance: • P-State 0-16 (Speedstep & Turbo) • S-State: S3, S4
Relative Humidity	95% at +60°C non-condensing
Immersion	IEC60529 Edition 2.2: 2013; IP67
Shock	MIL-STD-810G, 516.6 Procedure I (Functional Shock) • Table 516.6-I (40 G for Ground Equipment) MIL-STD-810G, 516.6 Procedure V (Crash Hazard) • Table 516.6-I (75 G for Crash Hazard Shock)
Vibration	MIL-STD-810G, Table 514.6C-X. Category 9- Helicopter vibration exposure (General) MIL-STD-810G, Figure 514.6C-10 Category 11 - Rail cargo vibration exposure. MIL-STD-810G, Figure 514.6D-9. Category 21 -Shipboard random vibration exposure MIL-STD-810G Table 514.6C-VI Category 4- Composite wheeled vehicle vibration exposure
EMC Compliance	MIL-STD-461F certification Test Item Ground Army, Aircraft, Navy compliance • CE101: Navy ASW aircraft & Army aircraft (incl. flight line, below 28V) • CE102: Ground Army, Aircraft, Navy • CS101: Ground Army, Aircraft, Navy • CS115: Ground Army, Aircraft, Navy • RE102: Air & space(fixed Wing External and Helicopters) • RS101: Ground Army • RS103: 100V/m (Ground Army, Ground Navy) • RE101: Ground Navy • CS106: Ground Army, Aircraft, Navy (Vpeak=400V) • CS114: Aircraft (External or safety critical) -Curve5 • CS116: Ground Army, Aircraft, Navy (Imax=10A) FCC EN55022 Class A

Table 1-1: HPERC-IBR-M Specifications

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1.6 Block Diagram

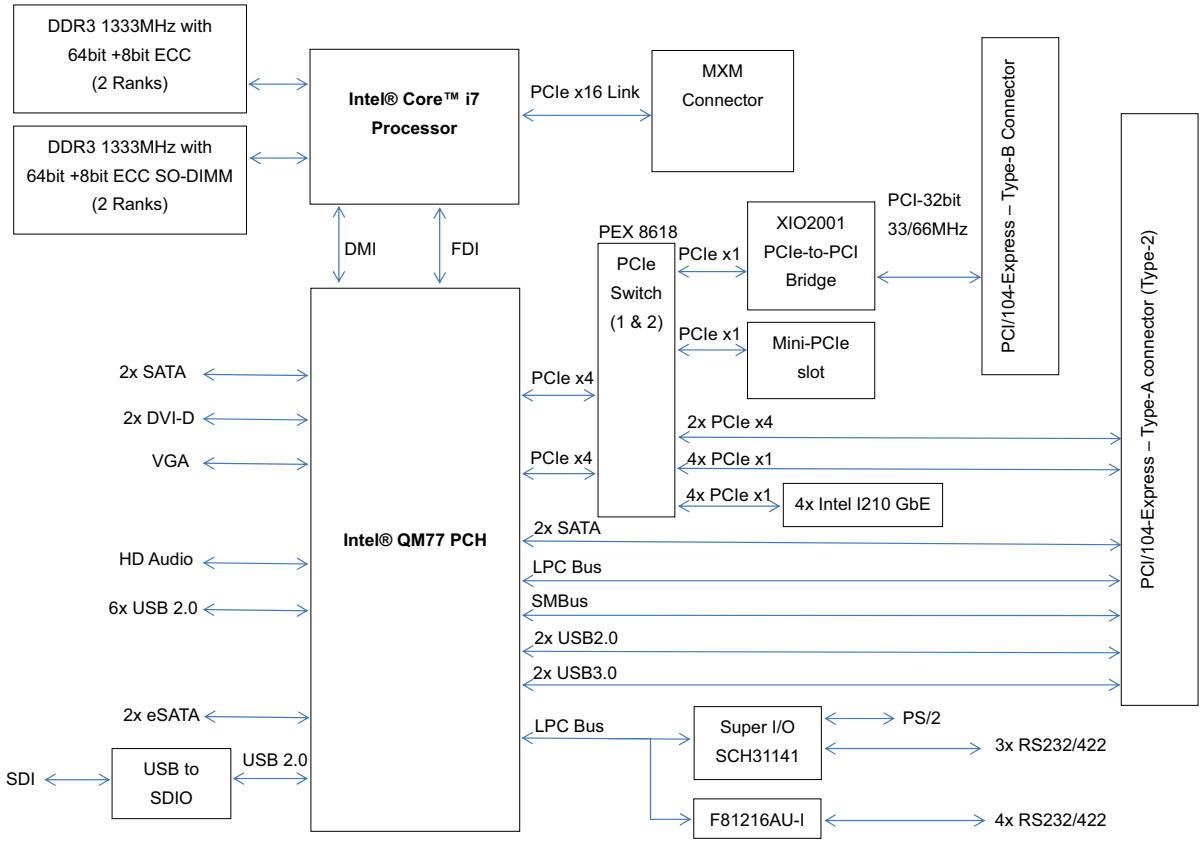


Figure 1-1: HPERC-IBR-M Block Diagram

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1.7 Power Specifications (without GPGPU)

Table 1-2 defines the current draw values of the HPERC-IBR-M, featuring either the 3517UE, or 3612QE i7 CPUs. The table captures In-Rush, Idle, and Burn-In-Test (BIT) currents.

Table 1-2 lists the current draw values of the HPERC-IBR-M.

Parameter	1.7GHz CPU (i7-3517UE)	2.1GHz CPU (i7-3612QE)
Input Type	+28 VDC Regulated DC	+24 VDC Regulated DC
In-Rush Peak Current and Duration	See Figure 1-2	Not yet measured
Idle Current and Power (Windows 7)	0.79A (22.22W)	0.89A (21.5W)
BIT Current and Power	1.18A (32.96W)	2.17A (52.05W)

Table 1-2: System Power Requirements (without GPGPU)

Operating configurations:

- In-rush operating configuration includes one VGA monitor and 8GB DDR3-1333L RAM.
- Idle operating configuration includes the In-rush configuration as well as one SATA 2.5" HDD with Windows 7 and one USB keyboard and mouse.
- BIT (Burn-In-Test) operating configuration is the same as the Idle configuration

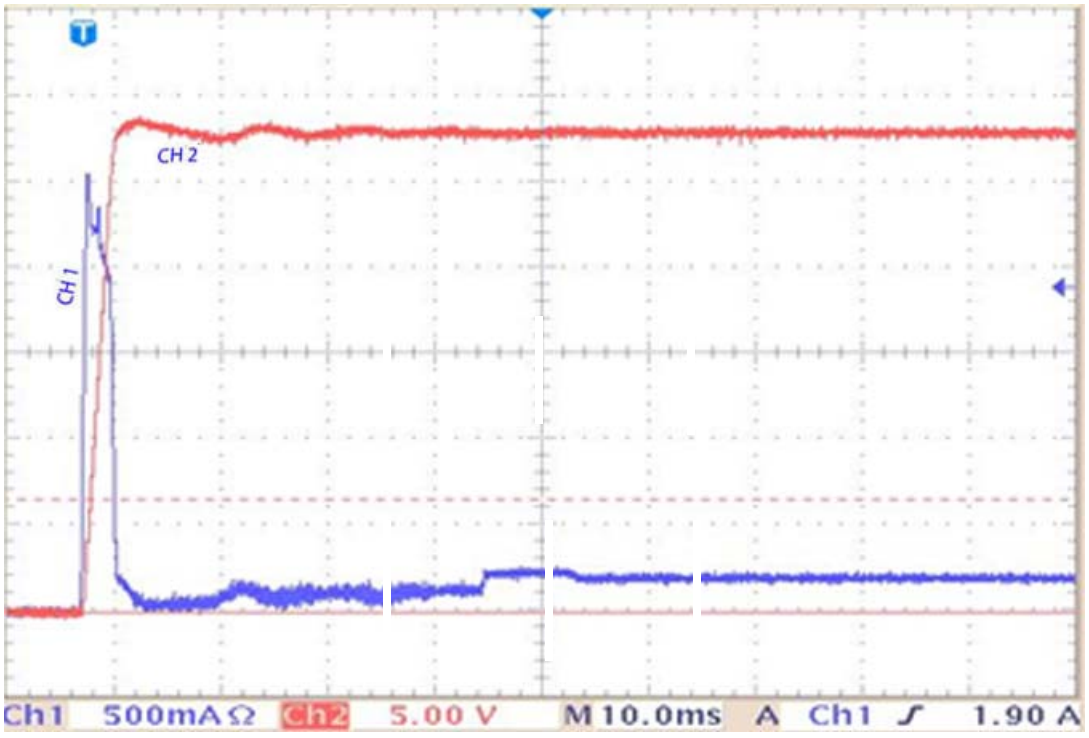


Figure 1-2: i7-3517UE Peak In-Rush Current and Duration (without GPGPU)

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1.8 Power Specifications (with GPGPU)

Table 1-3 defines the current draw values of the HPERC-IBR-M, 3612QE i7 CPUs. The table captures Idle, and Burn-In-Test (BIT) currents.

Table 1-3 lists the current draw values of the HPERC-IBR-M

Configuration

- CPU: Intel® Core™ i7-3612QE Processor (6M cache, up to 2.10 GHz, Max Turbo Frequency 3.1GHz)
- Memory: Micro PC3-10700 DDR3 1600 8G x2 (onboard and slot), total 16GB
- Storage: Transcend 256G TS256GSSD370I 2.5" x2 (6GB/S) x2
- GPGPU: NVIDIA GeForce GT 745M - X3N745M-FN
- Mini PCIe: Innodisk_MiniPCIeDOM_1ME 64G (Gen1)

Parameter	2.1GHz CPU (i7-3612QE)
Input Type	+24 VDC Regulated DC
Windows Idle mode	24V, 1.27A, 30.48W ESIT disabled: 24V, 1.33A, 31.92W
Windows typical mode (Burn in test 100% loading)	24V, 2.50A, 60W ESIT disabled: 24V, 2.25A, 54W
Windows MAX mode (Intel® Thermal Analysis Tool 100% loading)	24V, 2.88A, 69.1W ESIT disabled: 24V, 2.79A, 66.96W

Table 1-3: System Power Requirements (with GPGPU)

1.9 Environmental Specifications

Table 1-4 provides the most efficient operating and storage condition ranges required for this system.

Temperature		Humidity	
Operating	**Storage**	**Operating**	**Non-operating**
HPERC-MC (conduction coo) -40° to +85°C (Core™ i7-3517UE 17W) -40° to +80°C (Core™ i7-3612QE 35W) (temp. of hottest/coldest point on baseplate)	–55° to +85°C	5% to 90% relative humidity, non-condensing	5% to 95% relative humidity, non-condensing
HPERC-MH (air cooled) -40°C to +70°C at 1 atm air (required airflow TBD)			

Table 1-4: Environmental Requirements

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1.10 What's in the Box

The Contents List identifies the items in the shipping box for the HPERC-IBR-M Unit and HPERC-IBR-M Accessories (sold separately.) See Figure 1-3.

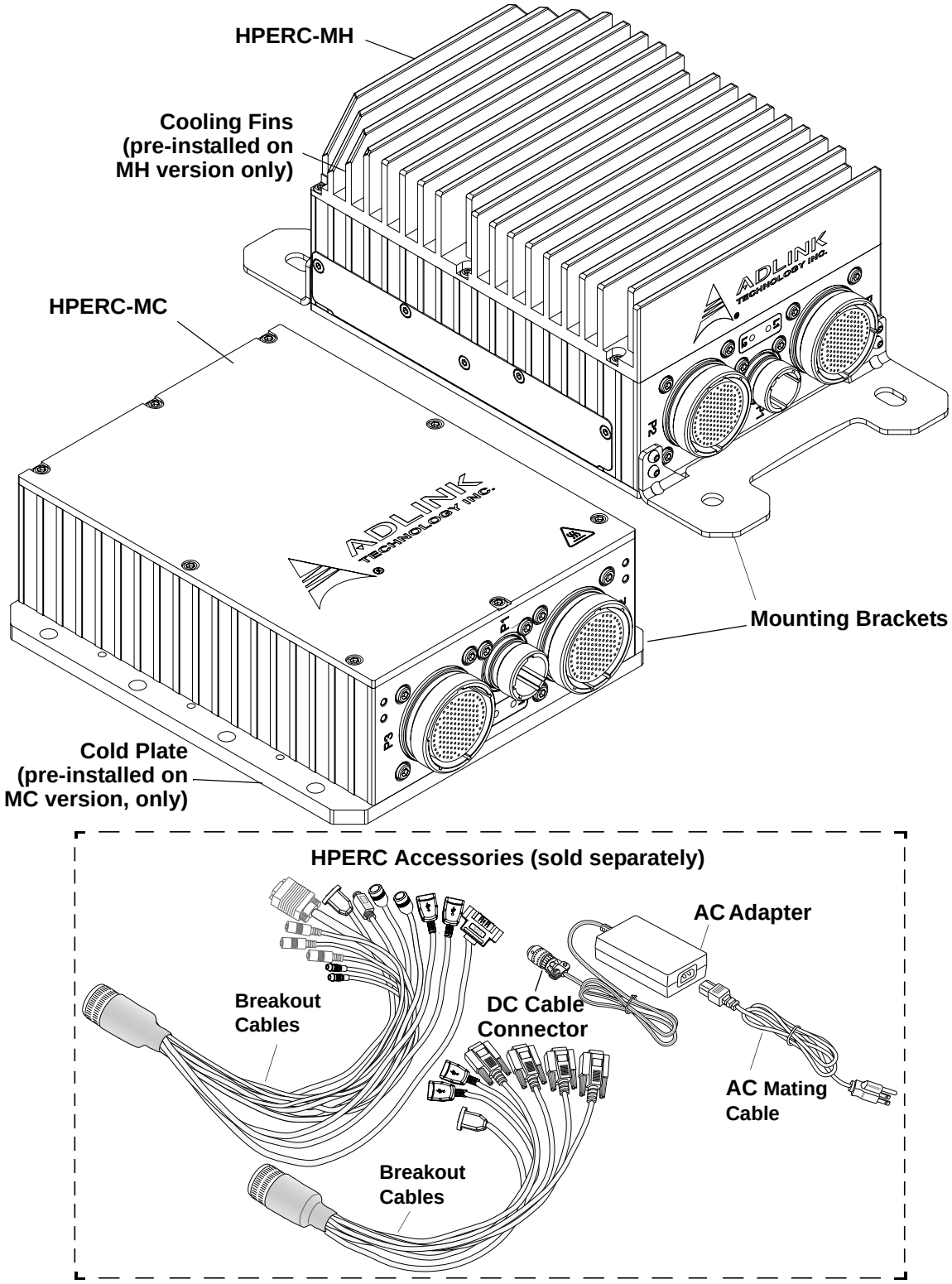


Figure 1-3: HPERC-IBR-M Unit with Accessories

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1.11 Setup Steps

Follow the setup steps in this section in the order listed. Skip any steps that do not apply to your application.

Open shipping box.	• Locate the HPERC-IBR-M Contents List. • Unpack the contents of the shipping box.
Verify contents.	• Verify the contents of the shipping box against the Contents List included with your HPERC-IBR-M. • If anything is missing or damaged, call your sales representative. Refer to the ADLINK web page at www.adlinktech.com for contact information.

1.12 Setting Up the Work Space

CAUTION: To prevent damage to the HPERC-IBR-M, ensure sufficient clearance exists around the cooling solution for unrestricted airflow.
The air temperature inside the enclosure could rise above the specified operating temperature limits if the airflow through the cooling solution is restricted.

Select workbench location.	• The workbench location should be a flat clean surface for setup and operation (including the connection of any external peripherals and optional devices). • Ensure sufficient airflow clearance exists around the complete enclosure.
Unpack HPERC-IBR-M.	• Remove the HPERC-IBR-M from its shipping container and place it on a flat work surface. • The HPERC-IBR-M enclosure combined with CPU, storage (SSD), and the desired OS form a complete system, ready for operation.

1.13 Installing Mounting Screws

Install mounting screws.	• Install mounting screws (not included) for surface or wall mounting to the mounting brackets of the HPERC-IBR-M. See Figure 1-4 and Figure 1-5.

Torque Values

Nominal Diameter	Material: Stainless Steel A2-70 and A4-70	Material: Stainless Steel A2-80 and A4-80	Material: SCM3 (SCM435) Strength Grade: 12.9
M6 (HPERC-IBR-MC)	7.6 Nm	11.1 Nm	13.83 Nm
M8 (HPERC-IBR-MH)	18.4 Nm	26.7 Nm	33.34 Nm

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HPERC-IBR-MH

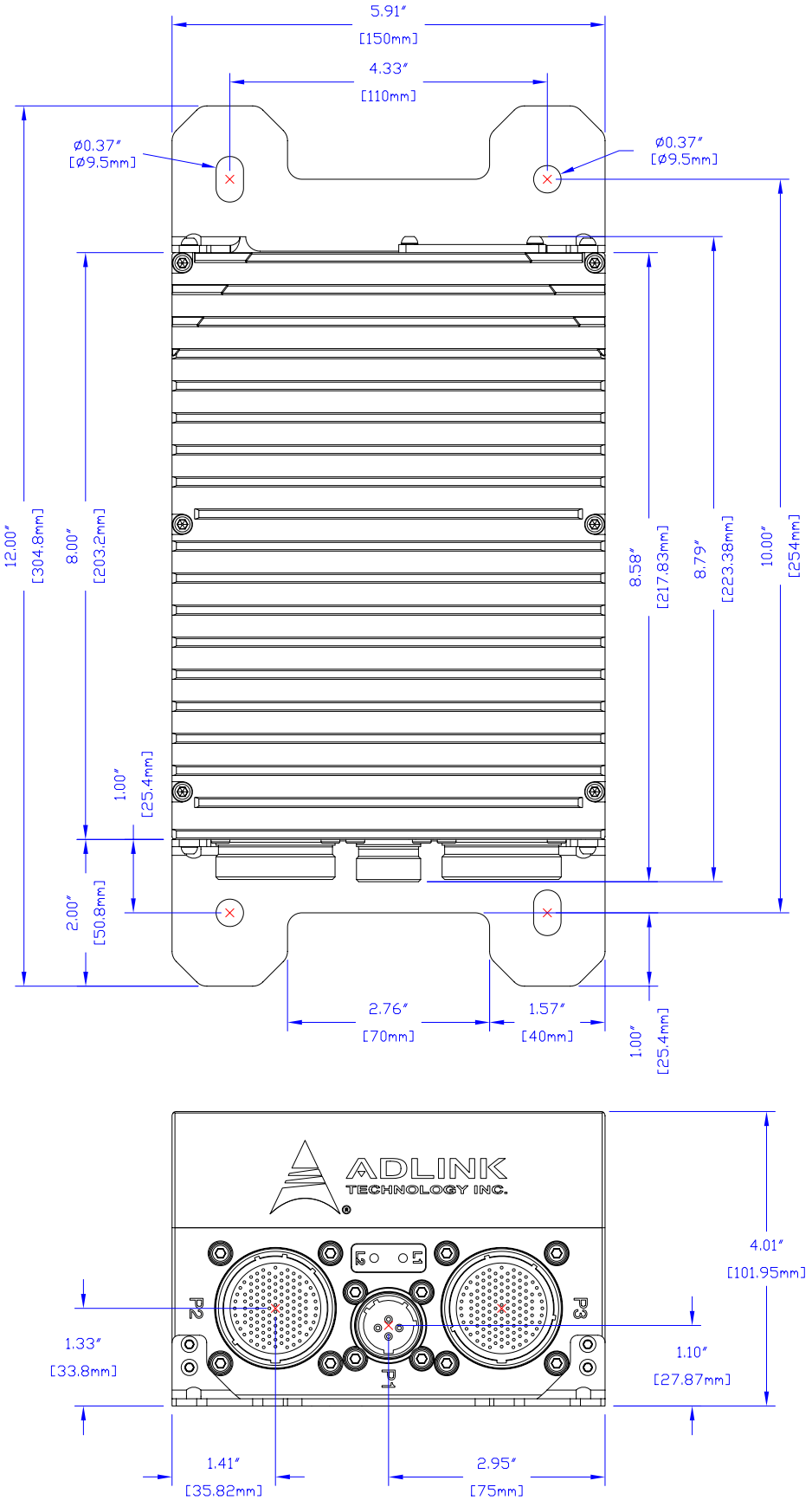


Figure 1-4: Top and Front Views of "MH" Enclosure with Mounting Dimensions

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HPERC-IBR-MC

- The HPERC-IBR-MC unit coldplate is flat to a tolerance of ±0.1 mm across the diagonal. It is recommended that the surface on which the HPERC-IBR-MC will be mounted is flat to a tolerance of ±0.15 mm across the diagonal.

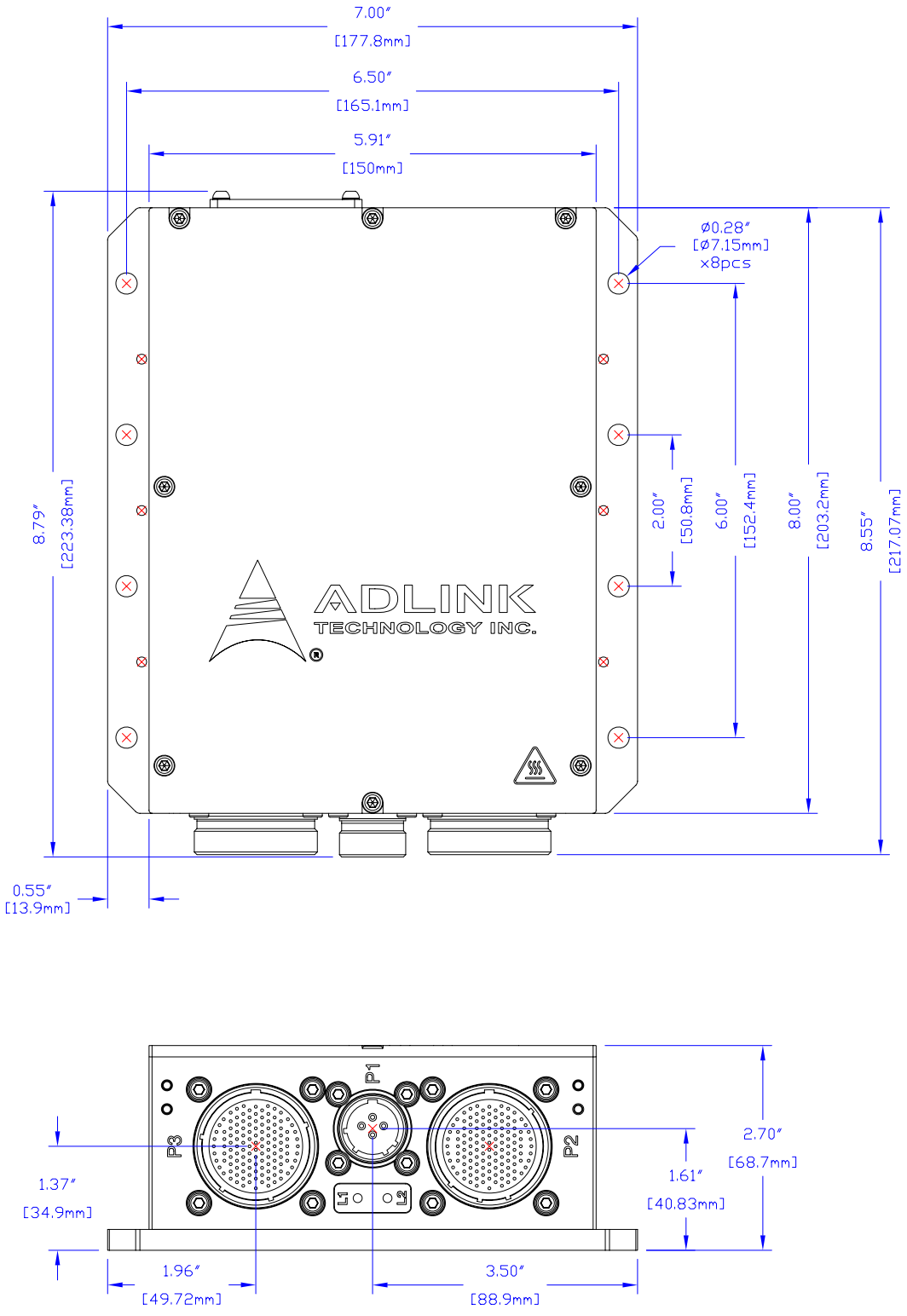


Figure 1-5: Top and Front Views of “MC” Enclosure with Mounting Dimensions

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Optional mounting points for surface/wall mounting or heat sink (HPERC-IBR-MC only	• Mounting holes “A” and “B” are shown below in Figure 1-6. Note the recommended torque values and maximum depth of hole “B”.

Mounting Hole “A” Size: M4 threaded
Maximum Torque: 30 Kgf-cm (2.85 N-m)

Mounting Hole “B” Size: M4 threaded, max. depth 7mm
Maximum Torque: 41 Kgf-cm (4 N-m)

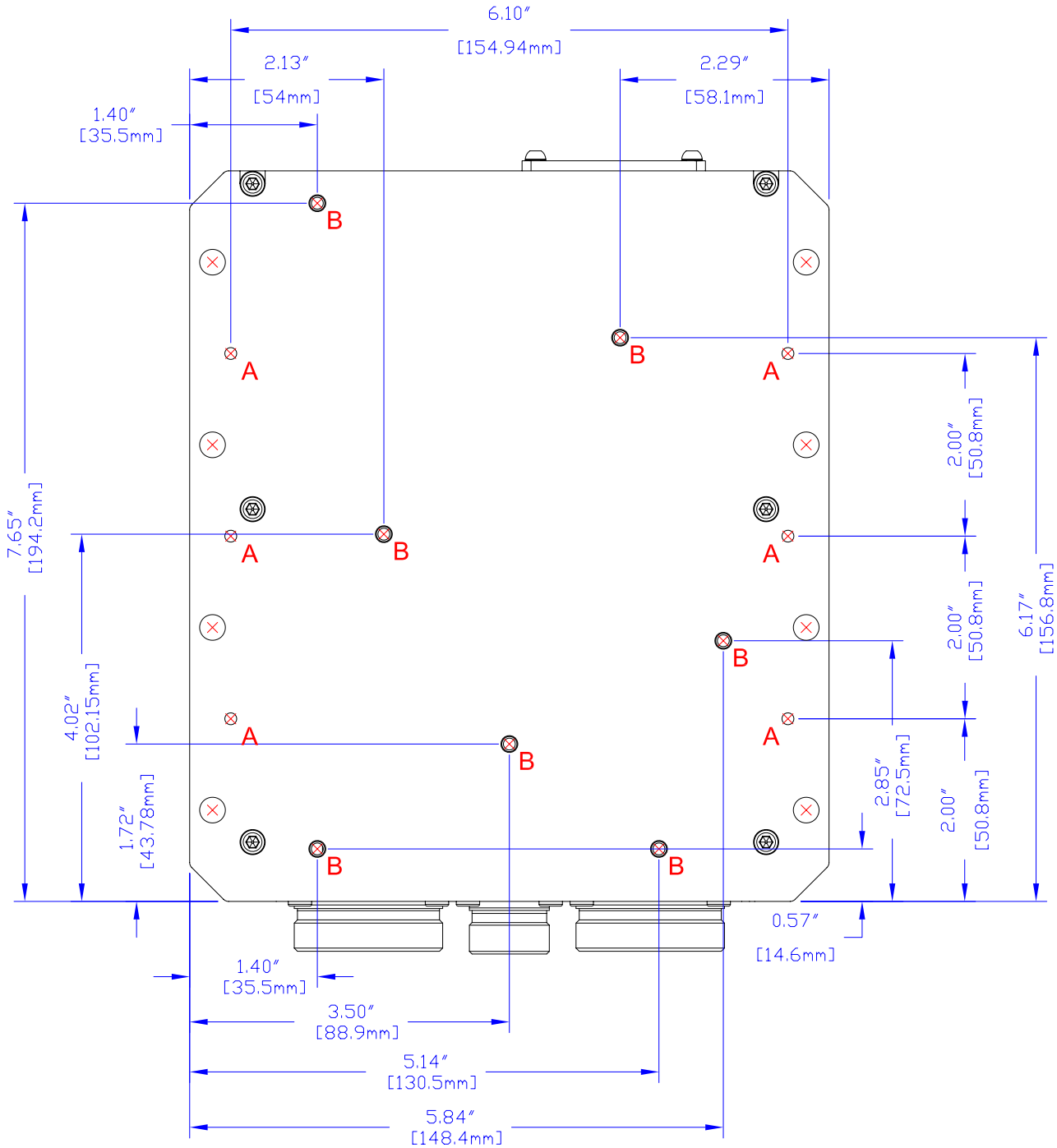
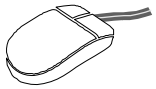


Figure 1-6: Bottom View of “MC” Enclosure with Mounting Holes

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1.14 Connecting Peripherals

Connect the appropriate military breakout cable to the corresponding HPERC-IBR-M military connector. See Figure 1-3 for illustrations of cables. See Figure 1-7 for locations of the HPERC-IBR-M military connectors.	• Refer to Figure 1-7 for locations and descriptions of the connectors before making connections or powering on the HPERC-IBR-M.
	• Connect the USB or PS2 keyboard to the corresponding connector on the appropriate breakout cable.
	• Connect the USB or PS2 mouse to the appropriate connector on the corresponding breakout cable.
	• Connect the VGA or LCD display to the appropriate connector on the corresponding breakout cable.

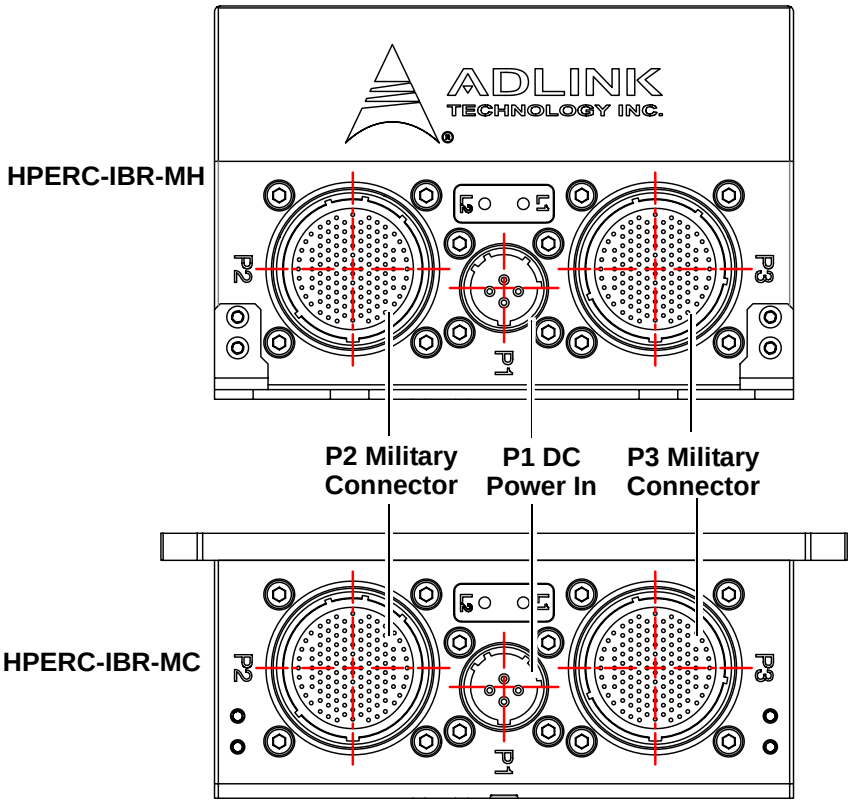


Figure 1-7: Front View of HPERC-IBR-M I/O Panel

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Control/Connector	Description
P1 DC Power In	This Military Power connector accepts DC voltages from an external source. **NOTE**: This connector is manufactured by Amphenol.
P2 Military Connector	This military connector provides signals for Ethernet Ports, USB 2.0, Serial Ports, Reset Switch, Ethernet LEDs, Power LED, SATA Activity LED, UNDIO, Power Switch, Audio In/Out.
P3 Military Connector	This military connector provides signals for VGA, Ethernet LEDs, Ethernet Ports, Serial Ports, PS/2 Keyboard and Mouse, DVI, USB 2.0.
L1/L2 LEDs	Both LEDs light amber to indicate that the system is powered on (programmable functionality is reserved for future revisions).

Table 1-5: I/O Panel Connectors (Refer to Figure 1-7 for connector locations.)

NOTE: To connect an external Hard Disk Drive (HDD) or CD-ROM to the HPERC-IBR-M, use one of the USB or SATA ports to connect the device.

1.15 P1 Military DC Power In Connector

The following diagram and table define the signals and signal maps of the P1 military DC power in connector.

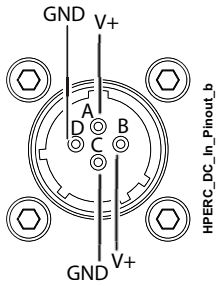


Figure 1-8: P1 Military DC Power In Connector Pin Locations

P1 Pin	Signal
A	V+
B	V+
C	Ground
D	Ground

Table 1-6: P1 Military DC Power In Connector Signals

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1.16 P2 and P3 Military Connector

The following two tables define the signals and signal maps of the two military I/O connectors (P2 and P3) on the HPERC-IBR-M. Each table lists the P2 or P3 pin numbers, the signal names and descriptions and the corresponding pins of the internal IO boards (HIBR and Interface Board.) Figure 1-9 provides the number and location of each pin on the two military connectors.

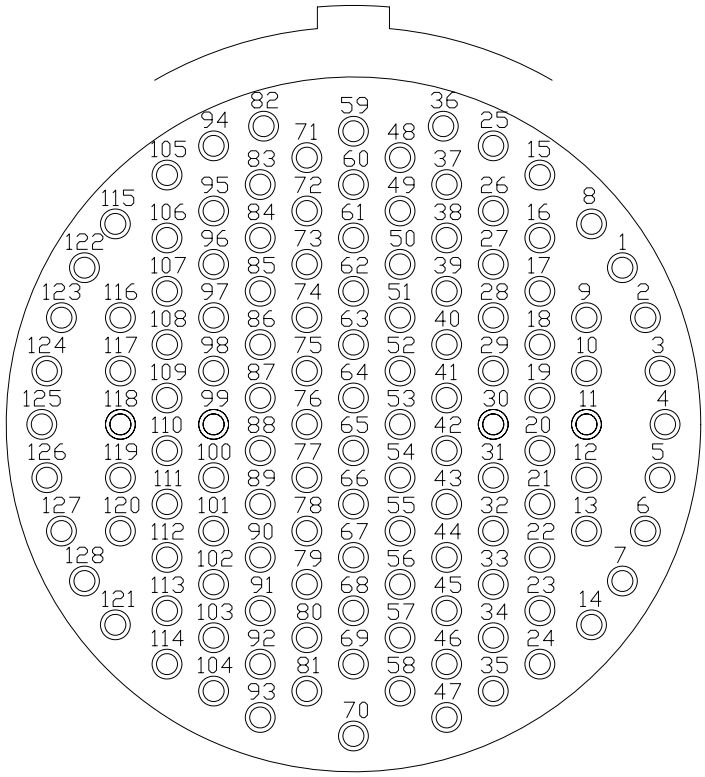


Figure 1-9: P2 and P3 Military Interface Connector Pin Locations

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1.16.1 P2 Pin Definitions

Table 1-7 Provides the pin definitions and signal maps for the P2 Military Connector.

P2 Pin	Interface	Signal	Signal Description
1	Gigabit Ethernet 1	GbE2_MDI0_P	Ethernet1 MDI0 Positive
2	Gigabit Ethernet 1	GbE2_MDI1_N	Ethernet1 MDI1 Negative
3	Gigabit Ethernet 1	GbE2_MDI1_P	Ethernet1 MDI1 Positive
4	Ground	GND	Ground
5	Gigabit Ethernet 1	GbE2_MDI2_N	Ethernet1 MDI2 Negative
6	Gigabit Ethernet 1	GbE2_MDI2_P	Ethernet1 MDI2 Positive
7	Gigabit Ethernet 1	GbE2_MDI3_N	Ethernet1 MDI3 Negative
8	Gigabit Ethernet 1	GbE2_MDI0_N	Ethernet1 MDI0 Negative
14	Gigabit Ethernet 1	GbE2_MDI3_P	Ethernet1 MDI3 Positive
9	USB 2.0, Port 4	USB_P4	Data Positive
10	USB 2.0, Port 4	USB_N4	Data Negative
11	USB 2.0, Port 4	USB_GND4	Ground
12	USB 2.0, Port 5	USB_P5	Data Positive
13	USB 2.0, Port 5	USB_N5	Data Negative
27	USB 2.0, Port 5	USB_GND5	Ground
15	USB 2.0, Port 4	P5V_USB4	+5 Volts Power
16	USB 2.0, Port 5	P5V_USB5	+5 Volts Power
17	Serial 4	RS422_TX4_N	Transmit Data Negative
18	Serial 4	RS422_TX4_P	Transmit Data Positive
19	Serial 4	RS422_RX4_N	Receive Data Negative
20	Serial 4	RS422_RX4_P	Receive Data Positive
21	Serial 6	RS422_RX6_N	Receive Data Negative
22	Serial 6	RS422_RX6_P	Receive Data Positive
23	Serial 6	RS422_TX6_N	Transmit Data Negative
24	Serial 6	RS422_TX6_P	Transmit Data Positive
25	Power	P5V	+5 Volts Power
26	Power	P5V	+5 Volts Power
27	Ground	GND	Ground
28	USB 2.0, Port 8	USB_PWR8	USB 2.0 +5V Power
30	USB 2.0, Port 8	USB_P8	USB 2.0 Data Positive
31	USB 2.0, Port 8	USB_N8	USB 2.0 Data Negative
32	USB 2.0, Port 8	USB_GND8	USB 2.0 Ground
29	Reset Switch	RESET#_HDR	Resets the system
38	Ground	GND	Ground
33	Control/Indicator	PWR_LED	Power LED (330ohm to +5V)
44	Ground	GND	Ground
34	Control/Indicator	PCIe_ETH_2/5_LED1	Ethernet LED
44	Ground	GND	Ground
35	NC	NC	Not Connected
44	Ground	GND	Ground
36	Control/Indicator	HPOUT_R	Audio Right
37	Control/Indicator	HPOUT_L	Audio Left

Table 1-7: P2 Military Connector Signals

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P2 Pin	Interface	Signal	Signal Description
38	Ground	GND	Ground
39	Power	PV5	+5 Volts Power
40	Power	PV5	+5 Volts Power
38	Ground	GND	Ground
41	Ground	GND	Ground
42	User Defined IO	UDNIO11	User Input/Output Port 11
43	User Defined IO	UDNIO12	User Input/Output Port 12
38	Ground	GND	Ground
44	Ground	GND	Ground
45	User Defined IO	UDNIO13	User Input/Output Port 13
46	User Defined IO	UDNIO14	User Input/Output Port 14
38	Ground	GND	Ground
47	Ground	GND	Ground
48	User Defined IO	UDNIO15	User Input/Output Port 15
49	User Defined IO	UDNIO16	User Input/Output Port 16
50	Ground	GND	Ground
51	User Defined IO	UDNIO17	User Input/Output Port 17
52	User Defined IO	UDNIO18	User Input/Output Port 18
53	Ground	GND	Ground
54	User Defined IO	UDNIO19	User Input/Output Port 19
55	User Defined IO	UDNIO20	User Input/Output Port 20
56	Ground	GND	Ground
57-81	NC	NA	NA
71	User Defined IO	UDNIO5	User Input/Output Port 5
72	User Defined IO	UDNIO6	User Input/Output Port 6
73	Ground	GND	Ground
74	User Defined IO	UDNIO7	User Input/Output Port 7
75	User Defined IO	UDNIO8	User Input/Output Port 8
76	Ground	GND	Ground
77	User Defined IO	UDNIO9	User Input/Output Port 9
78	User Defined IO	UDNIO10	User Input/Output Port 10
79	Ground	GND	Ground
82	Control/Indicator	LINE_IN_R	Audio In Right Channel
83	Control/Indicator	LINE_IN_L	Audio In Left Channel
84	NC	NC	NC
85	Ground	AGND	Analog Ground
86	Ground	AGND	Analog Ground
87	Ground	GND	Ground
88	User Defined IO	UDNIO1	User Input/Output Port 1
89	User Defined IO	UDNIO2	User Input/Output Port 2
90	Ground	GND	Ground
91	User Defined IO	UDNIO3	User Input/Output Port 3
92	User Defined IO	UDNIO4	User Input/Output Port 4
93	Ground	GND	Ground
94	Power	P3V3_S	+3.3 Volts Standby

Table 1-7: P2 Military Connector Signals (Continued)

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P2 Pin	Interface	Signal	Signal Description
95	Power	P3V3_S	+3.3 Volts Standby
96	Ground	GND	Ground
98	Power Switch	PWERBTN_HDR	Powers on the system
97	USB 2.0, Port 9	USB_PWR9	USB 2.0 +5V Power
99	USB 2.0, Port 9	USB_N9	USB 2.0 Data Negative
100	USB 2.0, Port 9	USB_P9	USB 2.0 Data Positive
101	Ground	GND	Ground
102	Control/Indicator	SATA_LED#	SATA LED
101	Ground	GND	Ground
103	NC	NC	NC
101	Ground	GND	Ground
104	Control/Indicator	ERASE- L	GPIO Signal for SSD Secure Erase
101	Ground	GND	Ground
105	Power	P3V3_S	+3.3 Volts Standby
106	Power	P3V3_S	+3.3 Volts Standby
107	Serial 5	RS422_TX5_N	Transmit Data Negative
108	Serial 5	RS422_TX5_P	Transmit Data Positive
109	Serial 5	RS422_RX5_N	Receive Data Negative
110	Serial 5	RS422_RX5_P	Receive Data Positive
111	Serial 7	RS422_TX7_N	Transmit Data Negative
112	Serial 7	RS422_TX7_P	Transmit Data Positive
113	Serial 7	RS422_RX7_N	Receive Data Negative
114	Serial 7	RS422_RX7_P	Receive Data Positive
116-120	NC	NA	NA
115	Serial 0	RS422_TX0_N	Transmit Data Negative
122	Serial 0	RS422_TX0_P	Transmit Data Positive
123	Serial 0	RS422_RX0_N	Receive Data Negative
124	Serial 0	RS422_RX0_P	Receive Data Positive
125	Ground	GND	Ground
126	Serial 2	RS422_TX2_N	Transmit Data Negative
127	Serial 2	RS422_TX2_P	Transmit Data Positive
128	Serial 2	RS422_RX2_N	Receive Data Negative
121	Serial 2	RS422_RX2_P	Receive Data Positive

Table 1-7: P2 Military Connector Signals (Continued)

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1.16.2 P3 Pin Definitions

Table 1-8 Provides the pin definitions and signal maps for the P3 Military Connector.

P3 Pin	Interface	Signal	Signal Description
1	VGA	VGA_VSYNC	Vertical Sync
2	Ground	GND	Ground
33	Ground	GND	Ground
3	VGA	VGA_DDC_SCL	Display Data Channel - Serial Clock
4	VGA	VGA_DDC_SDA	Display Data Channel - Serial Data
5	Ground	GND	Ground
6	VGA	RED	Red Analog Output
18	Ground	GND	Ground
7	VGA	GREEN	Green Analog Output
21	Ground	GND	Ground
14	VGA	BLUE	Blue Analog Output
30	Ground	GND	Ground
8	VGA	HSYNC	Horizontal Sync
9	Power	P3V3_S	+3.3 Volts Standby
10	Power	P3V3_S	+3.3 Volts Standby
11	Ground	GND	Ground
12	Power	P3V3_S	+3.3 Volts Standby
13	Power	P3V3_S	+3.3 Volts Standby
15	Power	P3V3_S	+3.3 Volts Standby
38	Ground	GND	Ground
24	Control/Indicator	PCIe_ETH_5/5_LED1	Ethernet LED
99	Ground	GND	Ground
114	Control/Indicator	PCIe_ETH_4/5_LED1	Ethernet LED
99	Ground	GND	Ground
121	Control/Indicator	PCIe_ETH_3/5_LED1	Ethernet LED
99	Ground	GND	Ground
16	Gigabit Ethernet 4	GbE5_MDI0_N	Ethernet4 MDI0 Negative
17	Gigabit Ethernet 4	GbE5_MDI0_P	Ethernet4 MDI0 Positive
18	Ground	GND	Ground
19	Gigabit Ethernet 4	GbE5_MDI1_N	Ethernet4 MDI1 Negative
20	Gigabit Ethernet 4	GbE5_MDI1_P	Ethernet4 MDI1 Positive
21	Ground	GND	Ground
22	Gigabit Ethernet 4	GbE5_MDI2_N	Ethernet4 MDI2 Negative
23	Gigabit Ethernet 4	GbE5_MDI2_P	Ethernet4 MDI2 Positive
100	Gigabit Ethernet 4	GbE5_MDI3_N	Ethernet4 MDI3 Negative
101	Gigabit Ethernet 4	GbE5_MDI3_P	Ethernet4 MDI3 Positive
25	Serial 1	RS422_TX1_N	Transmit Data Negative
26	Serial 1	RS422_TX1_P	Transmit Data Positive
27	Serial 1	RS422_RX1_N	Receive Data Negative
28	Serial 1	RS422_RX1_P	Receive Data Positive
29	NC	NA	NA

Table 1-8: P3 Connector Pin Signals

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P3 Pin	Interface	Signal	Signal Description
108	Ground	GND	Ground
36	Gigabit Ethernet 2	GbE3_MDI2_N	Ethernet2 Negative
37	Gigabit Ethernet 2	GbE3_MDI2_P	Ethernet2 Positive
38	Ground	GND	Ground
39	Gigabit Ethernet 2	GbE3_MDI3_N	Ethernet3 Negative
40	Gigabit Ethernet 2	GbE3_MDI3_P	Ethernet3 Positive
41	NA	GND	Ground
42	Gigabit Ethernet 2	GbE3_MDI1_N	Ethernet1 Negative
43	Gigabit Ethernet 2	GbE3_MDI1_P	Ethernet1 Positive
44	Ground	GND	Ground
45	Gigabit Ethernet 2	GbE3_MDI0_N	Ethernet0 Negative
46	Gigabit Ethernet 2	GbE3_MDI0_P	Ethernet0 Positive
47	Ground	GND	Ground
48	DVI 1	DDIB_P2	Digital Display Interface Port B, TMDS Data 0 Positive
49	DVI 1	DDIB_N2	Digital Display Interface Port B, TMDS Data 0 Negative
50	Ground	GND	Ground
51	DVI 1	DDIB_P1	Digital Display Interface Port B, TMDS Data 1 Positive
52	DVI 1	DDIB_N1	Digital Display Interface Port B, TMDS Data 1 Negative
53	Ground	GND	Ground
54	DVI 1	DDIB_P0	Digital Display Interface Port B, TMDS Data 2 Positive
55	DVI 1	DDIB_N0	Digital Display Interface Port B, TMDS Data 2 Negative
56	Ground	GND	Ground
57	DVI 1	DDIB_P3	Digital Display Interface Port B, TMDS Clock Positive
58	DVI 1	DDIB_N3	Digital Display Interface Port B, TMDS Clock Negative
59	DVI 1	DDIB_CLK_AUXP	Digital Display Interface Port B, DDC Serial Clock
60	DVI 1	DDIB_DAT_AUXN	Digital Display Interface Port B, DDC Serial Data
61	DVI 1	DDPB_HPD	Digital Display Port B Hot Plug Detect
94	DVI 1	DDPB_AUX_SEL	Digital Display Port B Auxiliary Select
62	DVI 2	DDIC_CLK_AUXP	Digital Display Interface Port C, DDC Serial Clock
63	DVI 2	DDIC_DAT_AUXN	Digital Display Interface Port C, DDC Serial Data
64	DVI 2	DDPC_HPD	Digital Display Port C Hot Plug Detect
71	DVI 2	DDIC_P2	Digital Display Interface Port C, TMDS Data 0 Positive

Table 1-8: P3 Connector Pin Signals (Continued)

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P3 Pin	Interface	Signal	Signal Description
72	DVI 2	DDIC_N2	Digital Display Interface Port C, TMDS Data 0 Negative
76	Ground	GND	Ground
73	Ground	GND	Ground
74	DVI 2	DDIC_P1	Digital Display Interface Port C, TMDS Data 1 Positive
75	DVI 2	DDIC_N1	Digital Display Interface Port C, TMDS Data 1 Negative
76	NC	NA	NA
77	DVI 2	DDIC_P0	Digital Display Interface Port C, TMDS Data 2 Positive
78	DVI 2	DDIC_N0	Digital Display Interface Port C, TMDS Data 2 Negative
76	Ground	GND	Ground
79	Ground	GND	Ground
80	DVI 2	DDIC_P3	Digital Display Interface Port C, TMDS Clock Positive
81	DVI 2	DDIC_N3	Digital Display Interface Port C, TMDS Clock Negative
95	DVI 2	DDPC_AUX_SEL	DisplayPort C Auxiliary Select
65	PS/2 Mouse	CLK_MS_CON	Mouse Clock
66	PS/2 Mouse	DAT_MS_CON	Mouse Data
76	NC	NA	NA
67	PS/2 Keyboard	CLK_KBD_CON	Keyboard Clock
68	PS/2 Keyboard	DAT_KBD_CON	Keyboard Data
79	Ground	GND	Ground
69	PS/2 Mouse Keyboard	POWER	POWER
70	RCA Jack	COMPOSITE_OUT	Composite Out
82-84	NC	NA	NA
87-89	NC	NA	NA
103	USB 2.0, Port 2	USB_P2	USB 2.0 Data Positive, TMDS_P2_SDA
104	USB 2.0, Port 2	USB_N2	USB 2.0 Data Negative, TMDS_P2_SCL
125	USB 2.0, Port 2	P5V_USB2_P2	USB 2.0 +5VDC
126	NC	NA	NA
85-86, 90-93	NC	NA	NA
34	USB 2.0, Port 3	USB_P3	Data Positive, LVDS Display Data Channel - Data
35	USB 2.0, Port 3	USB_N3	Data Negative, LVDS Display Data Channel - Clock
127	USB 2.0, Port 3	P5V_USB2_P3	USB 2.0 +5VDC
128	NC	NA	NA
96	Power	PV5	+5 Volts Power, DisplayPort D Auxiliary Select
97	Power	PV5	+5 Volts Power, High Definition Control Run

Table 1-8: P3 Connector Pin Signals (Continued)

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P3 Pin	Interface	Signal	Signal Description
98	Power	PV5	+5 Volts Power, PCIe_ETH_2/5_LED2
99	Ground	GND	Ground
102	Ground	GND	Ground
106	Gigabit Ethernet 3	GbE4_MDI1_N	Ethernet1 Negative
107	Gigabit Ethernet 3	GbE4_MDI1_P	Ethernet1 Positive
109	Gigabit Ethernet 3	GbE4_MDI0_N	Ethernet0 Negative
110	Gigabit Ethernet 3	GbE4_MDI0_P	Ethernet0 Positive
111	Ground	GND	Ground
112	Gigabit Ethernet 3	GbE4_MDI2_N	Ethernet2 Negative
113	Gigabit Ethernet 3	GbE4_MDI2_P	Ethernet2 Positive
30	Ground	GND	Ground
31	Gigabit Ethernet 3	GbE4_MDI3_N	Ethernet3 MDI3 Negative
32	Gigabit Ethernet 3	GbE4_MDI3_P	Ethernet3 MDI3 Positive
115	Power	PV5	+5 Volts Power, TV OUT Color
122	Ground	GND	Ground
123	Power	PV5	+5 Volts Power, TV OUT Luminance)
124	Ground	GND	Ground
116	NC	NA	NA
117	NC	NA	NA
118	NC	NA	NA
119	NC	NA	NA
120	NC	NA	NA

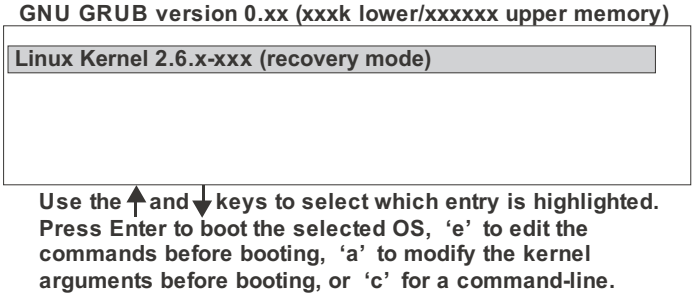
Table 1-8: P3 Connector Pin Signals (Continued)

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1.17 Applying Power to the HPERC-IBR-M

1) Follow these steps to apply power to the HPERC-IBR-M.	• Connect the AC Mating Cable to the AC Adapter (options.) See Figure 1-3. • Plug in the DC Cable Connector from the AC Adapter (option) to the DC IN jack onthe HPERC-IBR-M. See Figure 1-7. **CAUTION**: Power supplied to the unit must be within the allowed range depending on the model of the unit: • +10VDC to +36VDC **CAUTION**: Failure to provide proper power may damage the system and void the warranty. • Plug in the VGA or LCD monitor's power cord to an AC outlet and turn on the monitor. • Plug in the AC Mating cable to an AC outlet. • Press the HPERC-IBR-M Power On button on the breakout cable to power on the HPERC-IBR-M.
2) Verify the HPERC-IBR-M satisfactorily powers on.	• To enter the BIOS Setuppress the <Del> key during power-on self test (POST). Use BIOS Setup during the initial boot to set the desired options. • You should see POST complete successfully before the system starts loading the operating system (optional.) If you are using Linux, the boot loader will appear first, similar to the one shown below with the corresponding OS name displayed.

(The Linux x.x OS is shown as an example.)



3) Using the Operating System (OS)	• You should see a prompt on the monitor screen indicating the OS is loading, or has loaded. • Refer to the respective OS manual (not supplied by ADLINK.)

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2 Internal Components

The HPERC-IBR-M enclosure allows installation and removal of components including Solid State Drives (SSDs), SD memory card, PCI/104-Express expansion module, SODIMM memory, and Mini PCIe Card.

Opening and resealing any of the openings on the HPERC-IBR-M enclosure may compromise the IP67 ingress rating performance of the system. It is strongly recommended to return the system to ADLINK for servicing.

If you wish to attempt access of any of the HPERC-IBR-M's internal components, ADLINK cannot guarantee that the IP67 rating will be maintained. Please contact your ADLINK representative for instructions on how to access the internal components of the HPERC-IBR-M.

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3 BIOS Setup

This chapter provides information on how to read information from and configure the BIOS Setup utility of the HPERC-IBR-M.

3.1 Menu Structure

This section presents the primary menus of the BIOS Setup Utility. Use the following table as a quick reference for the contents of the BIOS Setup Utility. The subsections in this section describe the submenus and setting options for each menu item. The default setting options are presented in **bold**, and the function of each setting is described in the right hand column of the respective table.

Main	Advanced	Security	Security	Boot	Save & Exit
BIOS Information Processor Information IGFX VBIOS Version Total Memory PCH Information ME Information System Language System Management ► System Date System Time	Watch Dog Timer Intel PXE option ROM ACPI Settings ► Trusted Computing ► CPU Configuration ► SATA Configuration ► Intel(R) Rapid Start Technology ► Intel TXT(LT) Configuration ► PCH-FW Configuration ► Intel(R) Anti-Theft Technology Configuration ► USB Configuration ► F81216 Second Super IO Configuration ► Super IO Configuration ► H/W Monitor ► Serial Port Console Redirection ► AMI Graphic Output Protocol Policy ► MXM 3.0/Hybrid Graphics ► Intel RC Drivers Version Detail ► CPU PPM Configuration ►	PCH-IO Configuration ► System Agent (SA) Configuration ►	• Setup prompt Timeout • Bootup NumLock State • Quiet Boot • Fast Boot • Boot Option Priorities ► • CSM Parameters ►	• Administrator Password • User Password • Secure Boot menu ►	• Save Options ► • Default Options ► • Boot Override ►

Note:
► indicates a submenu

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3.2 Main Menu

The Main Menu provides read-only information about your system and also allows you to set the System Date and Time. Refer to the tables below for details of the submenus and settings.

3.2.1 BIOS Information

Feature	Options	Description
BIOS Vendor	Info only	Vendor
Core Version	Info only	Version
Compliancy	Info only	Compliancy Information
Project Version	Info only	Project Version
Build Data and Time	Info only	Data and Time
Access Level	Info only	Level type

3.2.2 Processor Information

Feature	Options	Description
Name	Info only	Chipset String.
CPU brand string	Info only	CPU Brand String.
Frequency	Info only	Standard CPU frequency.
Processor ID	Info only	CPUID.
Stepping	Info only	CPU Stepping.
CPU Signature	Info only	Signature
Number of Processors	Info only	Cores number.
Microcode Revision	Info only	Microcode revision.
GT Info	Info only	Internal Graphics Frequency.
IGFX VBIOS version	Info only	IGFX VBIOS version.
Memory RC version	Info only	Memory RC version.
Total Memory	Info only	Total memory size.
Emory Frequency	Info only	memory Frequency.

3.2.3 PCH Information

Feature	Options	Description
Name	Info only	PCH String.
Stepping	Info only	PCH Stepping.
ME FW Version	Info only	ME FW Version.

3.2.4 System Language

Feature	Options	Description
System Language	English	Choose the system default language

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3.2.5 System Date and Time

Feature	Options	Description
System Date	Weekday, MM/DD/YYYY	Requires the alpha-numeric entry of the day of the week, day of the month, calendar month, and all 4 digits of the year, indicating the century and year (Fri XX/XX/20XX)
System Time	HH/MM/SS	Presented as a 24-hour clock setting in hours, minutes, and seconds

3.3 Advanced Menu

This menu contains the settings for most of the user interfaces in the system

3.3.1 ACPI and Power Management

Feature	Options	Description
Enable ACPI Auto Configuration	**Disabled** Enabled	Enable/Disable BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled **Enabled**	Enable/Disable System ability to hibernate. This option may be not effective with some OS.
ACPI Sleep State	**S3 only (Suspend to RAM)** Suspend Disabled	Select ACPI sleep state the system will enter when the SUSPEND button is pressed.

3.3.2 Trusted Computing

Feature	Options	Description
Security Device Support	**Disabled** Enabled	Enable/Disable Security Device. NOTE: Your Computer will reboot during restart in order to change State of the Device..

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3.3.3 CPU

Feature	Options	Description
CPU	Info only	
CPU Signature	Info only	Display CPU Signature
Microcode Patch	Info only	Display CPU Microcode version
Max CPU Speed	Info only	Display CPU Max frequency
Min CPU speed	Info only	Display CPU Min frequency
CPU Speed	Info only	Display CPU frequency
Processor Cores	Info only	Display number of processor
Intel HT Technology	Info only	Display Intel HT technology support
Intel VT-x Technology	Info only	Display Intel VT-x technology support
Intel SMX Technology	Info only	Display Intel SMX technology support
64-bit	Info only	Display 64-bit support
L1 Data Cache	Info only	Display L1 data cache size
L1 Code Cache	Info only	Display L1 code cache size
L2 Cache	Info only	Display L2 cache size
L3 Cache	Info only	Display L3 cache size
Hyper-threading	Disabled **Enabled**	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled..
Active Processor Cores	**All** 1 2 3	Number of cores to enable in each processor package.
Limit CPUID Maximum	**Disabled** Enabled	Enabled/Disabled CPUID Maximum limit.
Execute Disable Bit	Disabled **Enabled**	XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, Red Hat Enterprise 3 Update 3.).
Intel Virtualization Technology	**Disabled** Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool technology.
Hardware Prefetcher	Disabled **Enabled**	To turn on/off the Mid Level Cache (L2) streamer prefetcher.

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3.3.4 SATA

Feature	Options	Description
SATA	Info only	
SATA Mode Selection	IDE **AHCI** RAID	Determines how SATA Controller(s) operate.
SATA Test Mode	Disabled **Enabled**	Test mode **Enabled /** Disabled
SATA Controller Speed	**Default** Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.
SATA Port Configuration	SATA Device Options Settings	
Serial ATA Port 0-6		
Port #	Disabled **Enabled**	Enable or Disable SATA Port
Hot Plug	Disabled **Enabled**	Designates this port as Hot Pluggable
External SATA	Disabled **Enabled**	External SATA Support.

3.3.5 Intel Rapid Start Technology

Feature	Options	Description
Intel Rapid Start technology	Info only	
Intel(R) Rapid Start	**Disabled** Enabled	Enable or disable Intel(R) Rapid Start Technology.
Entry on S3 RTC Wake	Disabled **Enabled**	iFFS invocation upon S3 RTC wake.
Entry on After	Immediately 1 minute 2 minute 5 minute **10 minute** 15 minute 30 minute 1 hour 1hour	Enable RTC wake timer at S3 entry.
Active Page Threshold Support	**Disabled** Enabled	Support RST with small partition.
iFFS Display Save/Restore	**Disabled** Enabled	iFFS Display Save/Restore.

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3.3.6 Intel TXT(LT) Technology

Feature	Options	Description
Intel TXT(LT) Configuration	Info only	
Intel TXT(LT) Support	**Disabled** Enabled	Enables or Disables Intel(R) TXT(LT) support.

3.3.7 PCH-FW Configuration

Feature	Options	Description
ME FW Version	Info only	
ME FW Mode	Info only	
ME FW Type	Info only	
ME FW SKU	Info only	

3.3.8 Intel Anti-Theft Technology Configuration

Feature	Options	Description
Intel(R) Anti-Theft Technology Configuration	Info only	
Intel(R) Anti-Theft Technology	**Disabled** Enabled	Enable/Disable Intel(R) AT in BIOS for testing only.
Intel(R) Anti-Theft Technology Recovery	**1-64**	Set the number of times Recovery attempted will be allowed.

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3.3.9 USB

Feature	Options	Description
USB Module version	Info only	
USB Devices:	Info only	
Legacy USB Support	**Enabled** Disabled	Enables Legacy USB support.
XHCI Hand-off	**Enabled** Disabled	This is a workaround for OSes without XHCI hand-off support.
EHCI Hand-off	Enabled **Disabled**	This is a workaround for OSes without EHCI hand-off support.
USB Mass Storage Driver Support	**Enabled** Disabled	Enable/Disable USB Mass Storage Driver Support.
USB Configuration	PCH USB Configuration	
USB transfer time-out	1 sec 5 sec 10 sec **20 sec**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec **20 sec** 30 sec 40 sec	USB mass storage device start unit command time-out.
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the host controller.

3.3.10 F81216 Second Super IO

Feature	Options	Description
I81216 Super IO Configuration	Info only	
Serial Port 0 Configuration	Submenu	Set Parameters of Serial Port 0.
Serial Port 1 Configuration	Submenu	Set Parameters of Serial Port 1.
Serial Port 2 Configuration	Submenu	Set Parameters of Serial Port 2.
Serial Port 3 Configuration	Submenu	Set Parameters of Serial Port 3.

F81216 Second Super IO > Serial Port 0-3 Configuration

Feature	Options	Description
Serial Port 0 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Setting	Info only	
Change Setting	**Auto** IO=260;IRQ=11; IO=260;IRQ=10,11,12 IO=268;IRQ=10,11,12 IO=270;IRQ=10,11,12 IO=278;IRQ=10,11,12	Select an optimal settings for Super IO Device.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

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3.3.11 Super IO

Feature	Options	Description
SCH3114 Super IO Configuration	Info only	
Serial Port 0 Configuration	Submenu	Set Parameters of Serial Port 0.
Serial Port 1 Configuration	Submenu	Set Parameters of Serial Port 1.
Serial Port 2 Configuration	Submenu	Set Parameters of Serial Port 2.

Super IO > Serial Port 0-2 Configuration

Feature	Options	Description
Serial Port 1 Configuration	Info only	
Serial Port	**Disabled** Enabled	Enable or Disable Serial Port (COM)
Device Setting	Info only	
Change Setting	**Auto** IO=3F8;IRQ=4; IO=3F8;IRQ=3,4,5,6,7,9,10,11,12 IO=2F8;IRQ=3,4,5,6,7,9,10,11,12 IO=3E8;IRQ=3,4,5,6,7,9,10,11,12 IO=2E8;IRQ=3,4,5,6,7,9,10,11,12	Select an optimal settings for Super IO Device.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.12 H/W Monitor

Feature	Options	Description
PC Health Status	Info only	
Internal Diode Temper	Info only	
+2.5V	Info only	
Vccp	Info only	
VCC	Info only	
+5.0V	Info only	
+12V	Info only	
VTR	Info only	

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3.3.13 Serial Port Console

Feature	Options	Description
Serial Port Console	Info only	
COM0	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
COM1	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
COM2	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
COM3	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
COM4	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
COM5	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
COM6	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

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Serial Port Console > Console Redirection Settings

Feature	Options	Description
COM0 Console Redirection Settings	Info only	
Terminal Type	VT100 **VT100+** VT-UTF8 ANSI	VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. ANSI: Extended ASCII char set.
Bits per second	9600 19200 38400 57600 **115200**	Selects serial port transmission speed. The speed must be matched on the remote computer. Long or noisy lines may require lower speeds.
Data Bits	7 **8**	Select data bits.
Parity	**None** Even Odd Mark Space	Select parity.
Stop Bits	1 **2**	Select number of stop bits.
Flow Control	**None** Hardware RTS/CTS	Select flow control.
VT-UTF8 Combo Key Support	Disabled **Enable**	Enable VT-UTF8 combination key support for ANSI/VT100 terminals.
Recorder Mode	**Disabled** Enable	With this mode enabled only text will be sent. This is to capture terminal data.
Resolution 100x31	**Disabled** Enable	Enables or disables extended terminal resolution
Legacy OS Redirection	**80x24** 80x25	On legacy OSes, the number of rows and columns supported by redirection
Putty Keypad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select Function Key and Keypad on Putty.
Redirection After BIOS Post	**Always Enabled** BootLoader	The Settings specify if BootLoader is selected, then legacy console redirection is disabled before booting to legacy OS.

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3.3.14 AMI Graphic Output Protocol Policy

Feature	Options	Description
Output Select	Info only	Output interface
Output Select	Info only	Output interface
Output Select	Info only	Output interface
Output Select	Info only	Output interface
Output Select	Info only	Output interface
Output Select	Info only	Output interface
Output Select	Info only	Output interface
Output Select	Info only	Output interface
Brightness setting	Info only	Output interface

3.3.15 MXM/3.0 Hybrid Graphics

Feature	Options	Description
MXM 3.0 Support	Disabled **Enable**	Enable/Disable the MXM 3.0 support

3.3.16 Intel RC Drivers Version Detail

Feature	Options	Description
Intel CPU RC Version	Info only	Output interface
Intel SA RC Version	Info only	Output interface
Intel PCH RC Version	Info only	Output interface
Intel PPM RC Version	Info only	Output interface
Intel ACPI RC Version	Info only	Output interface
Intel ME RC Version	Info only	Output interface
Intel TXT RC Version	Info only	Output interface
Intel DTS RC Version	Info only	Output interface
Intel iFFS RC Version	Info only	Output interface
Intel DPTF RC Version	Info only	Output interface

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3.3.17 CPU PPM Configuration

Feature	Options	Description
CPU PPM Configuration	Info only	
EIST	**Enabled** Disabled	Enable/Disable Intel SpeedStep.
Turbo Mode	**Enabled** Disabled	Enable/Disable Turbo Mode.
CPU C3 Report	**Enabled** Disabled	Enable/Disable CPU C3(ACPI C2) report to OS.
CPU C6 Report	**Enabled** Disabled	Enable/Disable CPU C6(ACPI C3) report to OS.
CPU C7 Report	**Enabled** Disabled	Enable/Disable CPU C7(ACPI C3) report to OS.

3.4 Chipset

3.4.1 PCH-IO Configuration

Feature	Options	Description
PCH LAN Controller	Disabled **Enable**	Enable or Disable onboard NIC
PCI Express Configuration	Submenu	PCI Express options settings
USB Configuration	Submenu	USB options settings
PCH Azalia Configuration	Submenu	PCH Azalia options settings

PCH-IO Configuration > PCI Express Configuration

Feature	Options	Description
Subtractive Decode	**Disabled** Enable	Enable or disable PCI Express Subtractive Decode.

PCH-IO Configuration > PCI Express Configuration->PCI Express Root Port

Feature	Options	Description
PCI Express Root Port	Disabled **Enable**	Control the PCI Express Root Port.

PCH-IO Configuration > USB Configuration

Feature	Options	Description
EHCI1	Disabled **Enable**	Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.
EHCI2	Disabled **Enable**	Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.

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PCH-IO Configuration > PCI Azalia Configuration

Feature	Options	Description
Azalia	Disabled **Enable**	Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled Enabled = Azalia will be unconditionally Enabled Auto = Azalia will be enabled if present, disabled otherwise.

3.4.2 System Agent Configuration

Feature	Options	Description
VT-d	Disabled **Enable**	Check to enable VT-d function on MCH
Graphics Configuration	Submenu	Graphics options settings
NB PCIE Configuration	Submenu	NB PCIE options settings
Memory Configuration	Submenu	Memory options settings

System Agent Configuration > Graphics Configuration

Feature	Options	Description
Graphics	Info only	
IGFX VBIOS version	Info only	
Primary Display	Auto **IGFX** PEG PCIE	Select which of Auto/IGFX/PEG/PCIE Graphics device should be Primary Display.
Internal Graphics	**Enabled** Disabled	Keep IGD enabled based on the setup options.
GTT Size	1MB **2MB**	Select the GTT Size.
Aperture Size	128MB **256MB** 512MB	Select the Aperture Size.
DVMT Pre-Allocated	**32MB** 64MB 96MB 128MB 160MB 192MB 224MB 256MB 288MB 320MB 352MB 384MB 416MB 448MB 480MB 512MB	Select DVMT 5.0 Pre-Allocated Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128M **256M** MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
LCD Control	Submenu	LCD Control options settings

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System Agent Configuration > Graphics Configuration > LCD Control

Feature	Options	Description
Primary IGFX Boot Display	Vbios Default **CRT** EFP LFP EFP3 EFP2 LFP2	Select the Video Device which will be activated during POST.
DDI Function choose	Display Port **HDMI**	DDI function choose to Display Port or HDMI.
Spread Spectrum clock Chip	**Off** Hardware Software	>>Hardware: Spread is controlled by chip; >>Software: Spread is controlled by BIOS.

System Agent Configuration > NB PCIE Configuration

Feature	Options	Description
PEG0	Info only	
PEG0 – Gen X	**Auto** Gen1 Gen2 Gen3	Configure PEG0 B0:D1:F0 Gen1-Gen3.

System Agent Configuration > Memory Configuration

Feature	Options	Description
Memory RC Version	Info only	Display memory RC Version
Memory Frequency	Info only	Display memory frequency
Total Memory	Info only	Display total system memory size
Memory Slot0	Info only	Display Slot 0 memory size
Memory Slot1	Info only	Display Slot 1 memory size
CAS Latency (tCL)	Info only	Memory Timing
CAS to RAS (tRCDmin)	Info only	Memory Timing
Row Precharge (tRPmin)	Info only	Memory Timing
Active to Precharge (tRASmin)	Info only	Memory Timing

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3.5 Boot

3.5.1 Boot Configuration

Feature	Options	Description
Boot Configuration	Info only	
Setup Prompt Timeout	**6**	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	**On** Off	Select the keyboard NumLock state.
Quiet Boot	**Disabled** Enabled	Enable or disables Quiet Boot option.
Fast Boot	**Disabled** Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect on BBS boot options.
New Boot Option Policy	Default Place First Place Last	Controls the placement of newly detected UEFI boot options
CSM16 Configuration	Submenu	CSM16 configuration: Enable/Disable, Option ROM execution settings, etc.
CSM Configuration	Submenu	CSM configuration: Enable/Disable, Option ROM execution settings, etc.

Boot Configuration > CSM16 Configuration

Feature	Options	Description
CSM16 Module Version	Info only	
GateA20 Active	Upon Request Always	UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Option ROM Messages	**Force BIOS** Keep Current	Set display mode for Option ROM.
INT19 Trap Response	**Immediate** Postponed	BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.

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Boot Configuration > CSM Configuration

Feature	Options	Description
Launch CSM	**Enabled** Disable	Enable/Disable CSM Support.
Boot option filter	**UEFI and Legacy** Legacy only UEFI only	This option controls Legacy/UEFI ROMs priority.
Launch PXE OpROM policy	Do not launch UEFI only **Legacy only**	Controls the execution of UEFI and Legacy PXE OpROM
Launch Storage OpROM policy	Do not launch UEFI only **Legacy only**	Controls the execution of UEFI and Storage PXE OpROM
Launch Video OpROM policy	Do not launch UEFI only **Legacy only**	Controls the execution of UEFI and Video PXE OpROM
Other PCI device	Do not launch **UEFI only** Legacy only	Determines OpROM execution policy for devices other than Network, Storage, or Video.

3.6 Security

3.6.1 Password Description

Feature	Options	Description
Administrator Password	Enter password	
User Password	Enter password	

3.6.2 Save & Exit

Feature	Options	Description
Save Changes and Exit	Yes No	Exit system setup after saving the changes.
Discard Changes and Exit	Yes No	Exit system setup without saving any changes.
Save Changes and Reset	Yes No	Reset the system after saving the changes.
Discard Changes and Reset	Yes No	Reset system setup without saving any changes.
Save Changes	Yes No	Save Changes done so far to any of the setup options.
Discard Changes	Yes No	Discard Changes done so far to any of the setup options.
Default Options	Info only	
Restore Defaults	Yes No	Restore/Load Default values for all the setup options.
Save as User Defaults	Yes No	Save the changes done so far as User Defaults.
Restore User Defaults	Yes No	Restore the User Defaults to all the setup options.
Boot Override	Info only	

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Safety Instructions

For user safety, please read and follow all instructions, **WARNINGS**, **CAUTIONS**, and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

1. Read these safety instructions carefully.
2. Keep this user's manual for future reference.
3. Read the specifications section of this manual for detailed information on the operating environment of this equipment.
4. When installing/mounting or uninstalling/removing equipment:
   - ▷ Turn off power and unplug any power cords/cables.
   - ▷ To avoid electrical shock and/or damage to equipment:
   - ▷ Keep equipment away from high heat or high humidity;
   - ▷ Make sure to use recommended voltage and power source settings;
   - ▷ Always install and operate equipment near an easily accessible electrical socket-outlet;
   - ▷ Secure the power cord (do not place any object on/over the power cord);
   - ▷ Only install/attach and operate equipment on stable surfaces and/or recommended mountings;
   - ▷ If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
5. Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
6. A Lithium-type battery may be provided for uninterrupted, backup or emergency power.
7. CAUTION! Risk of explosion if battery is replaced with one of an incorrect type. Please dispose of used batteries appropriately.
8. Equipment must be serviced by authorized technicians when:
   - ▷ The power cord or plug is damaged;
   - ▷ Liquid has penetrated the equipment;
   - ▷ It has been exposed to high humidity/moisture;
   - ▷ It is not functioning or does not function according to the user’s manual;
   - ▷ It has been dropped and/or damaged; and/or,
   - ▷ It has an obvious sign of breakage.

Please pay strict attention to all warnings and advisories appearing on the device, to avoid injury or damage.

The equipment may have more than one power supply input. To reduce the risk of electrical shock, trained personnel should disconnect all power supply inputs before servicing.

CAUTION! Disconnect all power supply inputs before servicing.

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