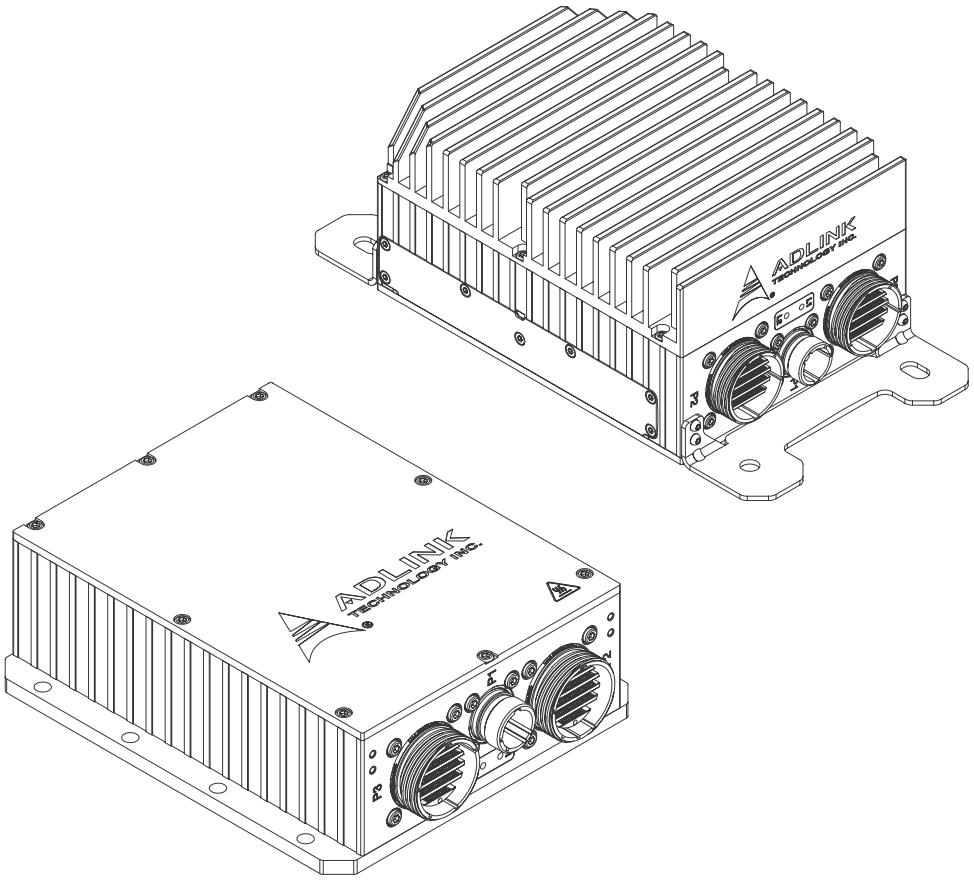
HPERC-IBR-HC/HH

High Performance Extreme Rugged Computer System

User's Manual



Manual Rev.: 1.0

Revision Date: July 6, 2018

Part Number: 50-1Z179-1000

Leading **EDGE COMPUTING**

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Revision History

Revision	Description of Changes	Release Date
1.0	Initial release	July 6, 2018

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Preface

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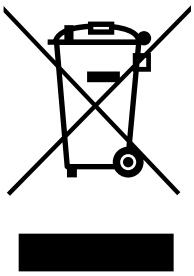
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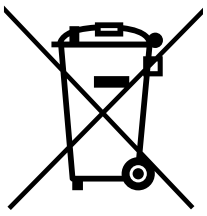
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Battery Labels (for products with battery)









California Proposition 65 Warning

WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Trademarks

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



Additional information, aids, and tips that help users perform tasks.



Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 HPERC-IBR-H Setup

1.1 About the HPERC-IBR-H

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-H with your desired OS. The instructions provided in this guide include:

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

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

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-H.

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

The items listed above are not available from ADLINK.

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

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1.4 Device/Peripheral Connections

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

1.5 Specifications

Table 1-1: HPERC-IBR-H Specifications

VITA Standards	VITA 75
Mechanical	**HC:** • 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
	HH: • 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	Four USB 2.0 ports routed (500 mA)
USB 3.0	Two USB 3.0 ports routed (900 mA)
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 TPM
Storage Interface	Two SATA 6 Gb/s direct connector for 2.5” onboard drive (removable) Two SATA 3 Gb/s eSATA ports (non-powered) One removable SDIO socket supports up to 64GB SDHC on panel

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Table 1-1: HPERC-IBR-H Specifications

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
Power States	S0, S1, S3, S4
Operating Temperature	**HC:** • Baseplate Point Extreme Rugged • -40°C to +85°C (i7-3517UE) • -40°C to +80°C (i7-3612QE) • Coldplate conduction • VITA 75.22 mount
	HH: • 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	+10 to +36VDC input
Relative Humidity	95% at +60°C non-condensing
Immersion	IEC60529 Edition 2.2: 2013; IP67
Shock	• MIL-STD-810G, Method 516.6, Procedure I (Functional Shock), Table 516.6-I (40 G for Ground Equipment) • MIL-STD-810G, Method 516.6, Procedure V (Crash Hazard), Table 516.6-I (75 G for Crash Hazard Shock)
Vibration	• MIL-STD-810G, Method 514.6, Table 514.6C-X, Category 9 - Helicopter vibration exposure (General) • MIL-STD-810G, Method 514.6, Figure 514.6C-10, Category 11 - Rail cargo vibration exposure. • MIL-STD-810G, Method 514.6, Figure 514.6D-9, Category 21 - Shipboard random vibration exposure • MIL-STD-810G, Method 514.6, Table 514.6C-VI, Category 4 - Composite wheeled vehicle vibration exposure
EMC Compliance	MIL-STD-461F Certification: 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 (V_{peak}=400V) • CS114: Aircraft (external or safety critical) -Curve5 • CS116: Ground Army, Aircraft, Navy (I_{max}=10A) FCC EN55022 Class A

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1.6 Block Diagram

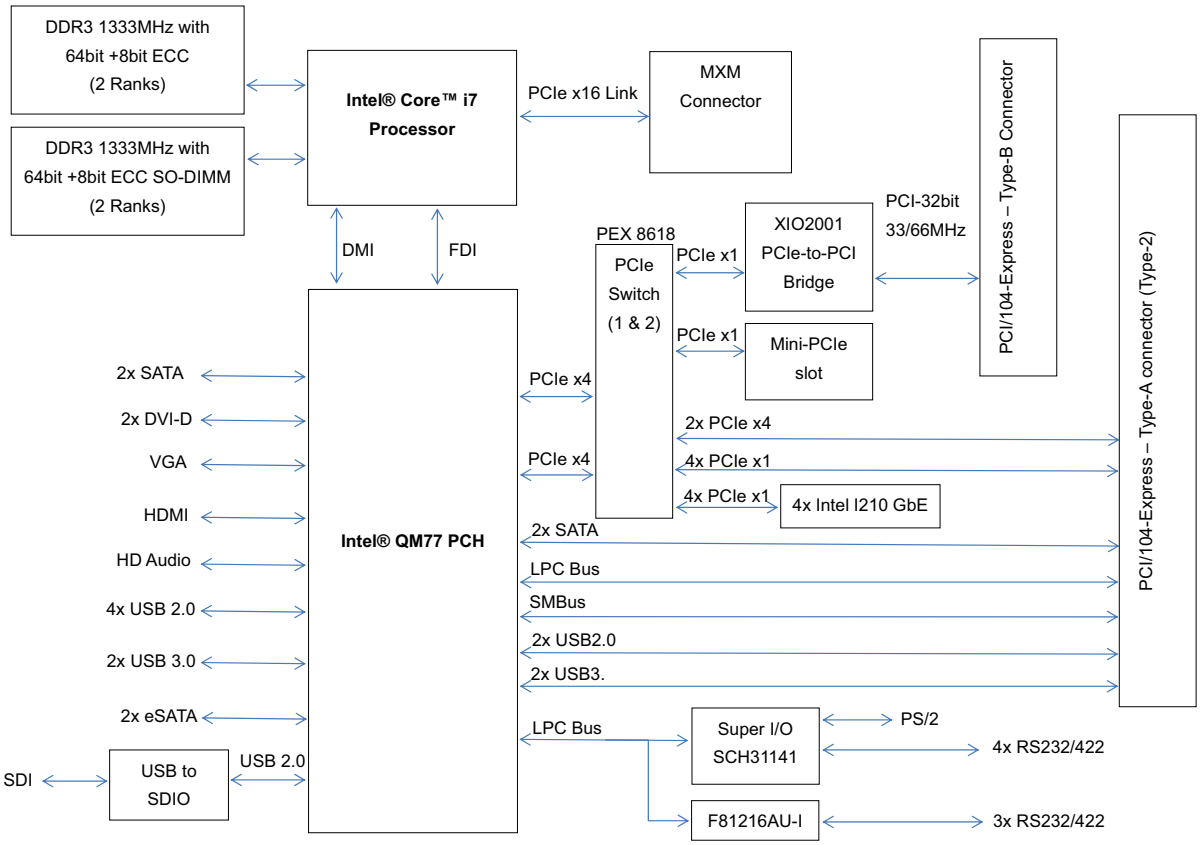


Figure 1-1: HPERC-IBR-H Block Diagram

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1.7 Power Specifications

Table 1-2 defines the current draw values of the HPERC-IBR-H, featuring either the Intel® Core™ i7-3517UE or i7-3612QE 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-H

Table 1-2: System Power Requirements

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)

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

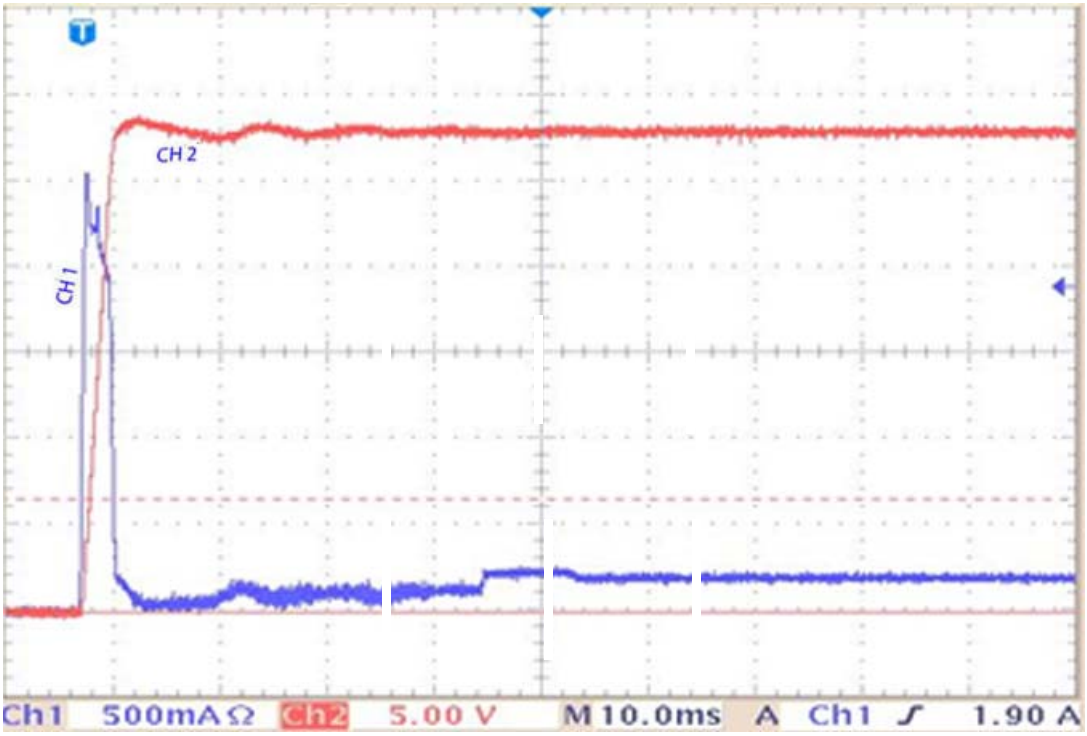


Figure 1-2: Intel® Core™ i7-3517UE Peak In-Rush Current and Duration

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1.8 Environmental Specifications

Table 1-3 provides the most efficient operating and storage condition ranges required for this system.

Table 1-3: Environmental Requirements

Temperature		Humidity	
Operating	**Storage**	**Operating**	**Non-operating**
HPERC-HC (conduction cooled) –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-HH (air cooled) -40°C to +70°C at 1 atm air (required airflow TBD)			

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1.9 What's in the Box

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

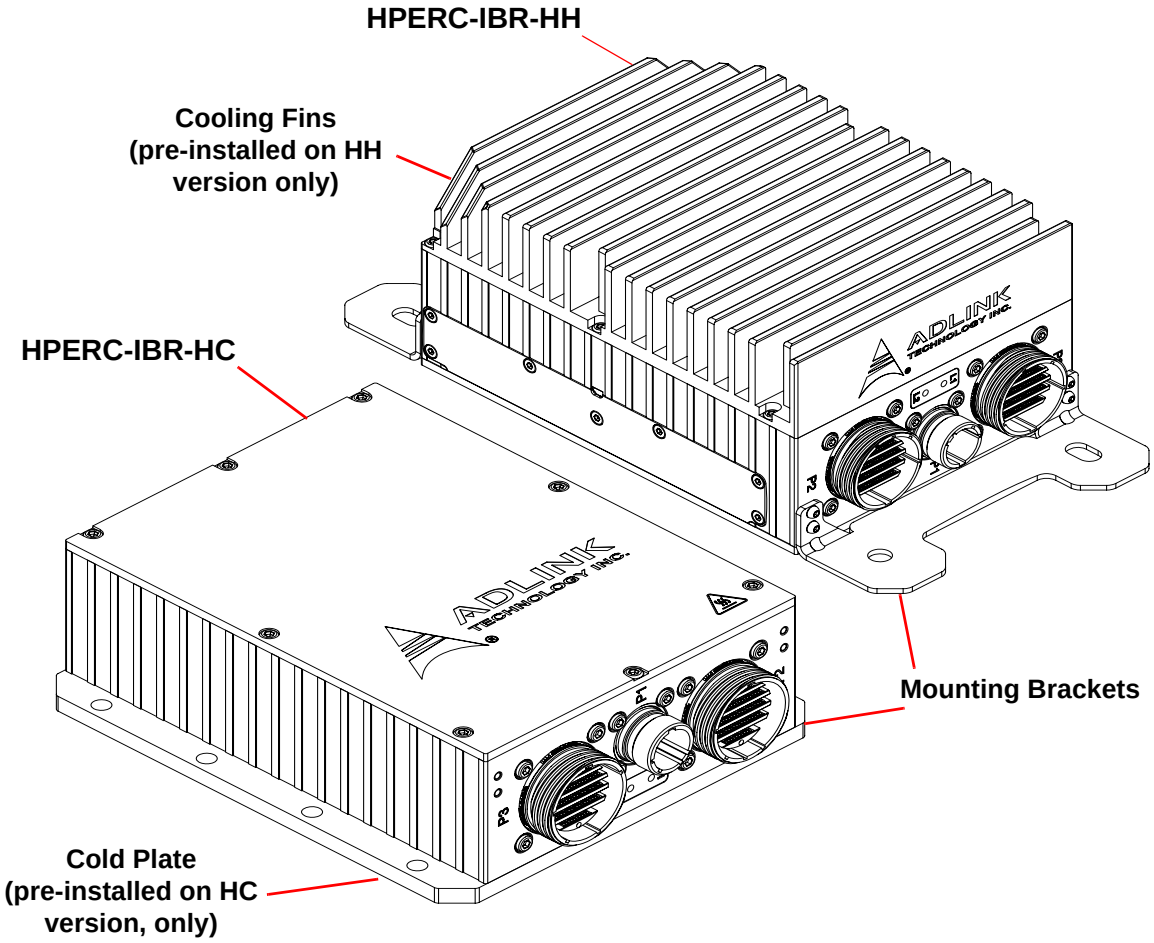


Figure 1-3: HPERC-IBR-H Unit with Accessories

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1.10 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-H 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-H. • If anything is missing or damaged, call your sales representative. Refer to the ADLINK web page at www.adlinktech.com for contact information.

1.11 Setting Up the Work Space

NOTE:

To prevent damage to the HPERC-IBR-H, 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-H.	• Remove the HPERC-IBR-H from its shipping container and place it on a flat work surface. • The HPERC-IBR-H enclosure combined with CPU, storage (SSD), and the desired OS form a complete system, ready for operation.

1.12 Installing Mounting Screws

Install mounting screws.	• Install mounting screws (not included) for surface or wall mounting to the mounting brackets of the HPERC-IBR-H. 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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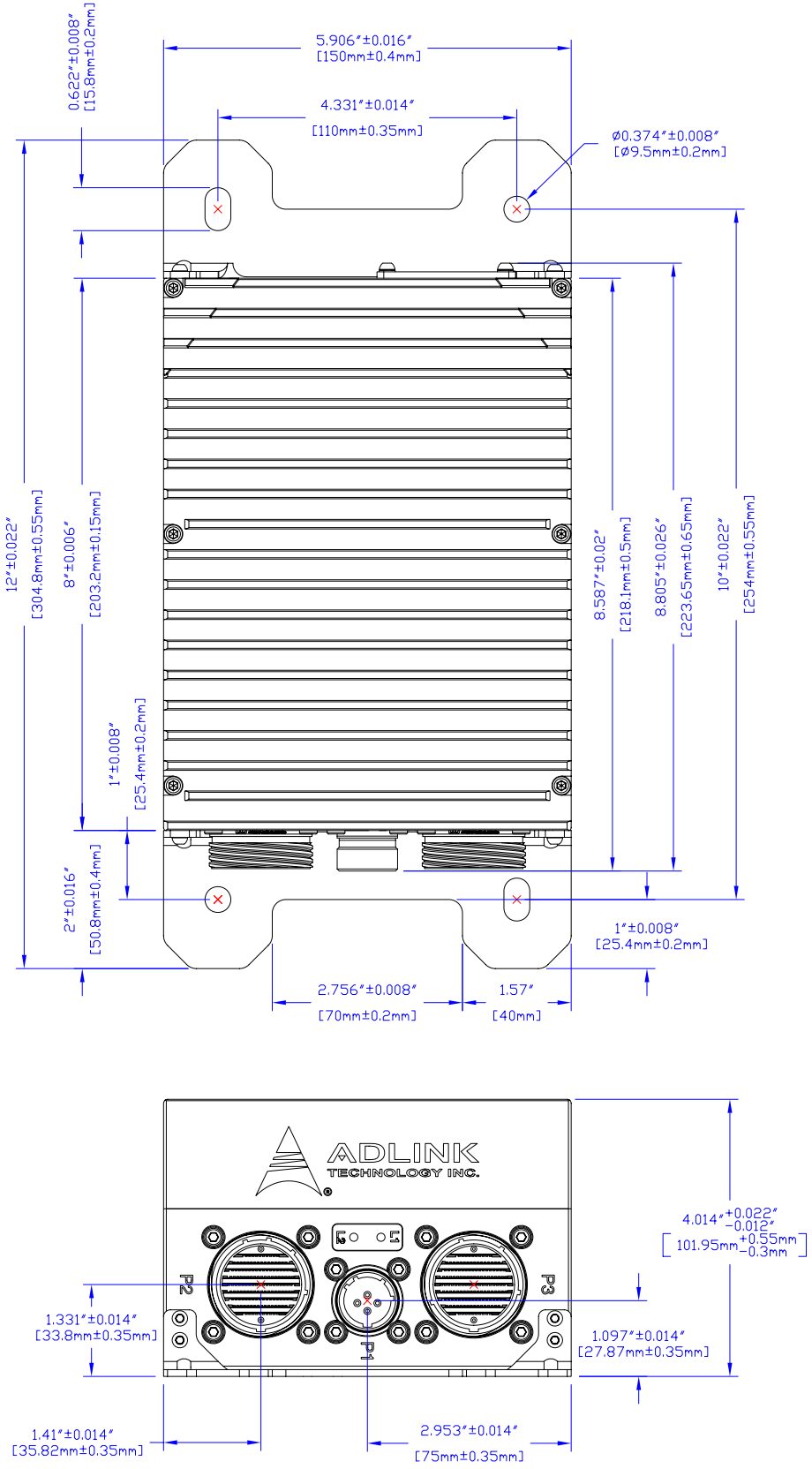


Figure 1-4: Top and Front Views of “HH” Enclosure with Mounting Dimensions

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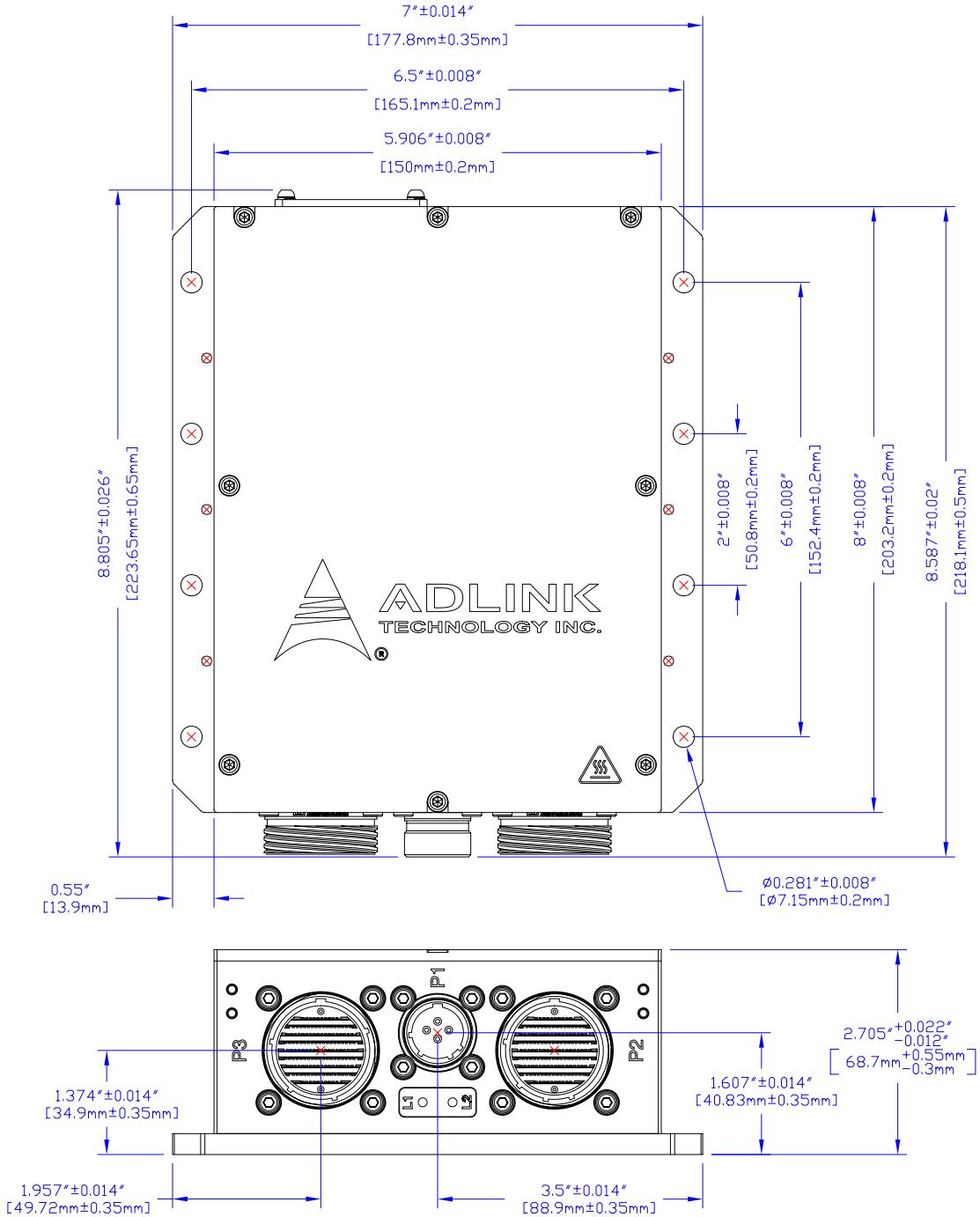


Figure 1-5: Top and Front Views of “HC” Enclosure with Mounting Dimensions

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Optional mounting points for surface/wall mounting or heat sink (HPERC-IBR-HC 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
Recommended Torque: 30 Kgf-cm (2.85 N-m)
Mounting Hole “B” Size: M4 threaded, max. depth 7mm
Recommended Torque: 41 Kgf-cm (4 N-m)

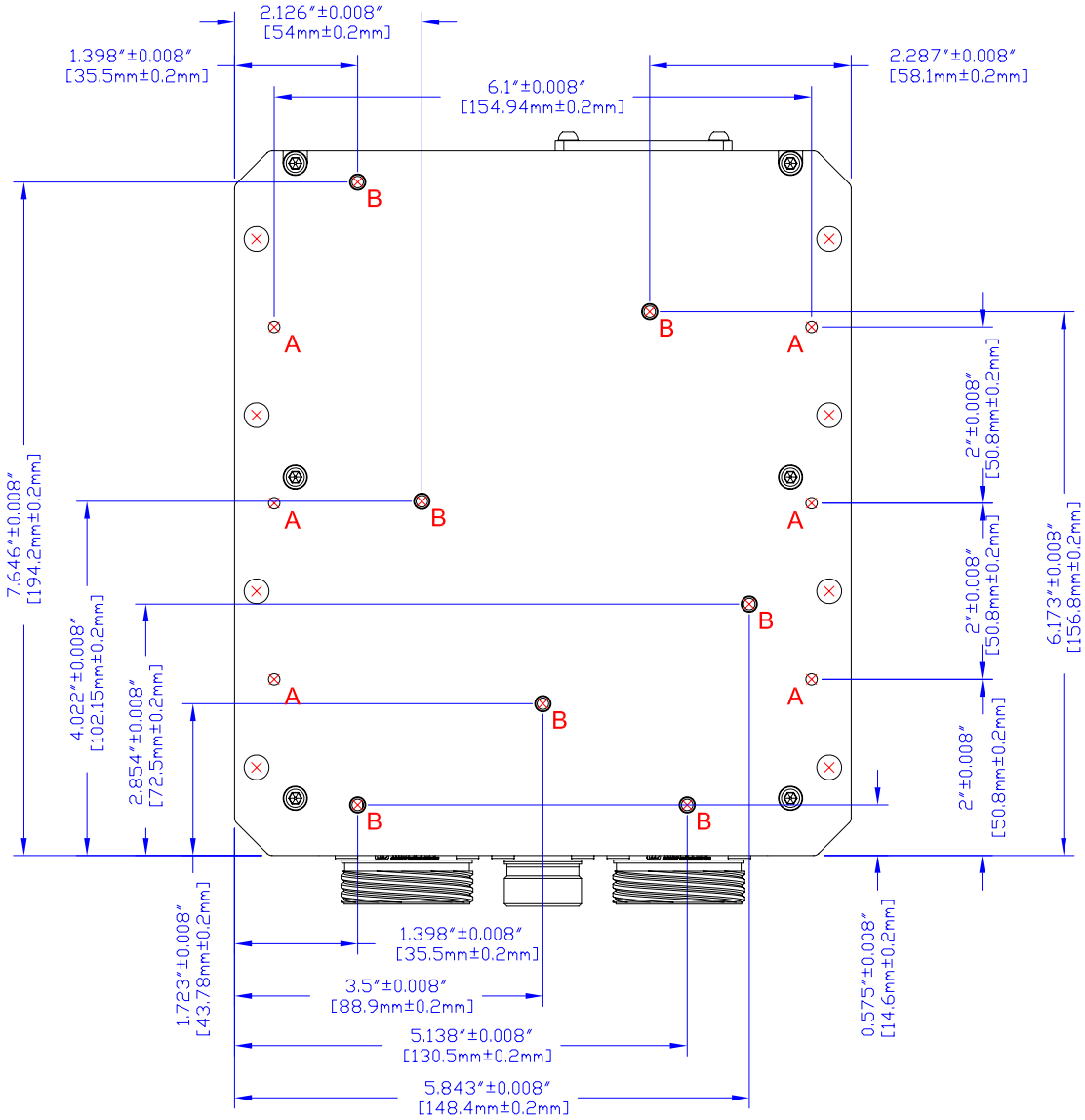
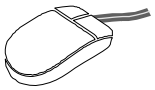


Figure 1-6: Bottom View of “HC” Enclosure with Mounting Holes

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1.13 Connecting Peripherals

Connect the appropriate military breakout cable to the corresponding HPERC-IBR-H military connector. See Figure 1-3 for illustrations of cables. See Figure 1-7 for locations of the HPERC-IBR-H military connectors.	• Refer to Figure 1-7 for locations and descriptions of the connectors before making connections or powering on the HPERC-IBR-H.
	• 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.

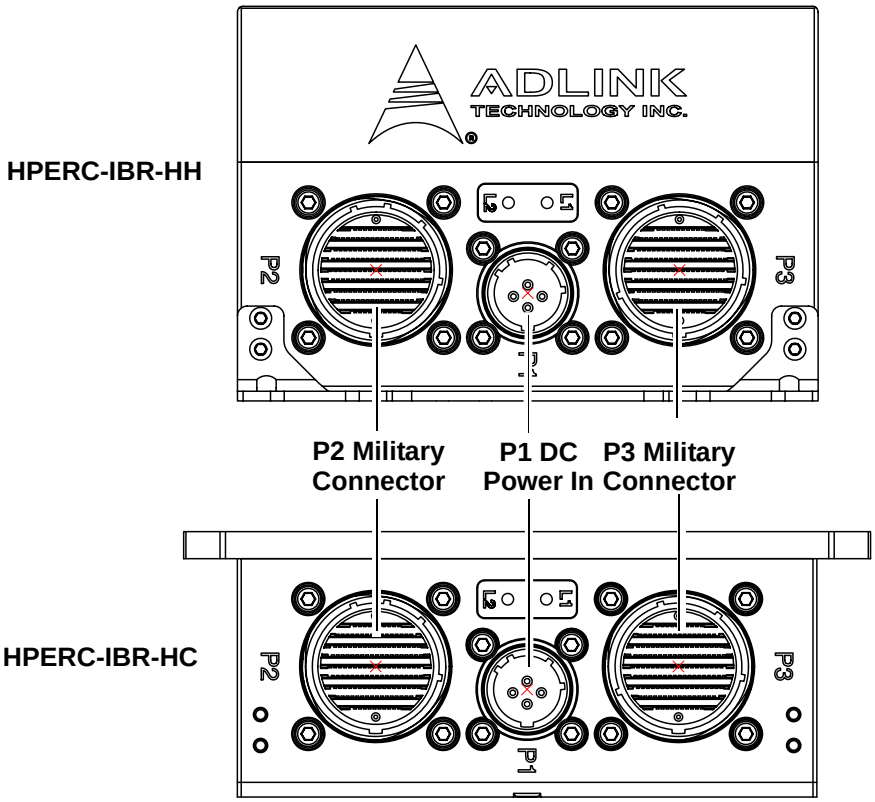
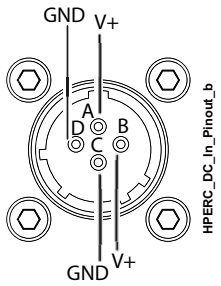


Figure 1-7: Front View of HPERC-IBR-H I/O Panel

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Table 1-4: I/O Panel Connectors (Refer to Figure 1-7 for connector locations.)

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, and UNDIO.
P3 Military Connector	This military connector provides signals for VGA, Ethernet LEDs, Ethernet Ports, Serial Ports, PS/2 Keyboard and Mouse, and RCA Jack.
L1/L2 LEDs	Both LEDs light amber to indicate that the system is powered on (programmable functionality is reserved for future revisions).

NOTE:

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

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1.14 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-H. 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 1-8 provides the number and location of each pin on the two military connectors.

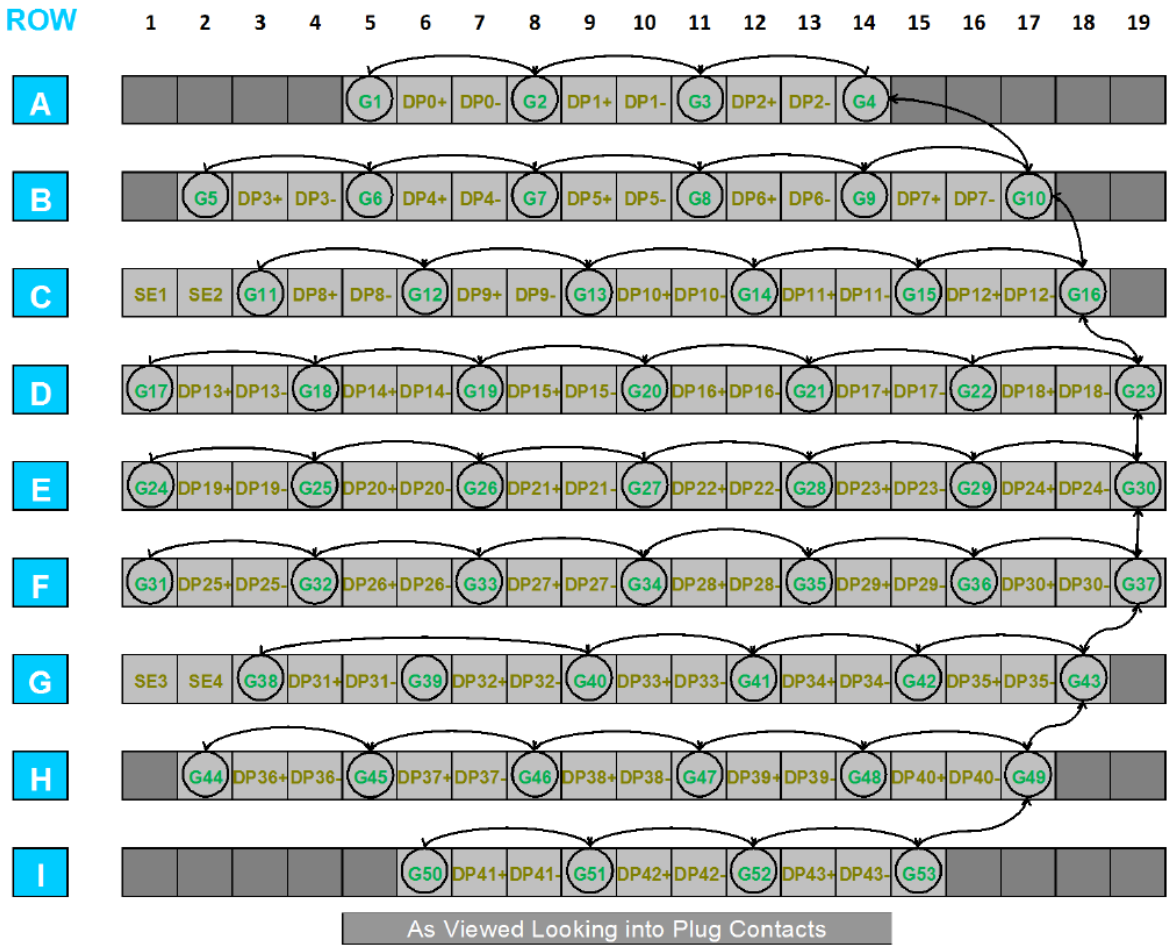


Figure 1-8: P2 and P3 Military Interface Connector Pin Locations

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1.14.1 P2 Pin Definitions

Table 1-5: Pin definitions and signal maps for the P2 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
A5			Bussed	N/C
A6	USB 2	USB 3.0 Port2	USB3_TX2P	9
A7			USB3_TX2N	8
A8			Ground	7
A9			USB3_RX2P	6
A10			USB3_RX2N	5
A11			Ground	4
A12		USB 2.0 Port2	USB_N2	2
A13			USB_P2	3
A14			Bussed	N/C
B2			Bussed	N/C
B3	USB 3	USB 3.0 Port3	USB3_TX3N	8
B4			USB3_TX3P	9
B5			Ground	7
B6			USB3_RX3P	6
B7			USB3_RX3N	5
B8			Ground	4
B9		USB 2.0 Port3	USB_N3	2
B10			USB_P3	3
B11			Bussed	N/C
B12	USB 2	USB 3.0 Port2 Power	P5V_USB3_P2	1
B13			P5V_USB3_P2	1
B14	Audio In	Audio In	GND_A-Sleeve	1
B15			Right-Ring	4
B16			Left-Tip	2
B17			GND_A-Sleeve	1
C1	RJ-45 2 LED	LAN Port2	PCIE_ETH_2/5_LED1	LAN_Port2_LED+
C2	RJ-45 3 LED	LAN Port3	PCIE_ETH_3/5_LED1	LAN_Port3_LED+
C3			Ground	LAN_Port3_LED-
C4	USB 3	USB 3.0 Port3 Power	P5V_USB3_P3	1
C5			P5V_USB3_P3	1
C6	DB9 6	RS -422 Port6	Ground	5
C7			RS422_RX6_N	8
C8			RS422_RX6_P	2
C9			Bussed	N/C
C10	DB9 5	RS422 Port5	RS422_TX5_P	3
C11			RS422_TX5_N	7
C12	DB9 4	RS-422 Port4	Ground	5
C13			RS422_RX4_N	8
C14			RS422_RX4_P	2

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Table 1-5: Pin definitions and signal maps for the P2 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
C15	Audio Out	Audio Out	GND_A	1
C16			Right	4
C17			Left	2
C18			GND_A	1
D1	RJ-45 2 LED	LAN Port2	Ground	LAN_Port2_LED-
D2	DB9 6	RS-422 Port6	RS422_TX6_N	7
D3			RS422_TX6_P	3
D4	DB9 5	RS-422 Port5	Ground	5
D5			RS422_RX5_N	8
D6			RS422_RX5_P	2
D7			Bussed	N/C
D8			ERASE-L	N/C
D9			HDC_RUN-L	N/C
D10	DB9 2	RS-422 Port2	Ground	5
D11			RS422_RX2_N	8
D12			RS422_RX2_P	2
D13			Bussed	N/C
D14	DB9 4	RS-422 Port4	RS422_TX4_N	7
D15			RS422_TX4_P	3
D16			Bussed	N/C
D17	HDMI B	HDMI Port B	TMDS Clock-	12
D18			TMDS Clock+	10
D19			TMDS Clock Shield	11
E1	eSATA 1	eSATA Port1	Ground	1
E2			ESATA_TX-P1	2
E3			ESATA_TX-N1	3
E4			Ground	4
E5			ESATA_RX-P1	6
E6			ESATA_RX-N1	5
E7			Ground	7
E8	DB9 7	RS-422 Port7	RS422_TX7_P	3
E9			RS422_TX7_N	7
E10			Bussed	N/C
E11	DB9 2	RS422 Port2	RS422_TX2_P	3
E12			RS422_TX2_N	7
E13			Bussed	N/C
E14	Diff.	Twisted Pair-3	UDNIO16	
E15			UDNIO15	
E16			Bussed	N/C
E17	HDMI B	HDMI Port B	TMDS Data 0+	7
E18			TMDS Data 0-	9
E19			TMDS Data 0 Shield	8
F1			Bussed	N/C

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Table 1-5: Pin definitions and signal maps for the P2 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
F2	HDMI B	HDMI PortB Power	P5V	18
F3			Bussed	N/C
F4	DB9 7	RS422 Port7	Ground	5
F5			RS422_RX7_P	2
F6			RS422_RX7_N	8
F7	Reset Switch	RESET SWITCH	Ground	RESET SWITCH-
F8			RESET#_HDR	RESET SWITCH+
F9	Power Switch	Power Switch	PWERBTN_HDR	POWER SWITCH+
F10		Power Switch	Ground	POWER SWITCH-
F11	RJ-45 2	LAN Port2	GBE2_MDI0_0_P	1
F12			GBE2_MDI0_0_N	2
F13			Bussed	N/C
F14		LAN Port2	GBE2_MDI0_1_N	6
F15			GBE2_MDI0_1_P	3
F16	HDMI B	HDMI PortB	Reserved	N/C
F17			CEC	N/C
F18			Hot Plug Detect	19
F19			Bussed	N/C
G1	Power LED	Power LED	PWR_LED	POWER LED+
G2	SATA LED	SATA LED	SATA_LED#	SATA LED+
G3			Ground	SATA LED-
G4	Keyboard	Keyboard	DAT_KBD_CON	1
G5			CLK_KBD_CON	5
G6			Ground	3
G7	Diff.	Twisted Pair-4	UDNIO18	
G8			UDNIO17	
G9			Bussed	N/C
G10	RJ-45 2	LAN Port2	GBE2_MDI0_2_N	5
G11			GBE2_MDI0_2_P	4
G12			Bussed	N/C
G13			Bussed	N/C
G14	KB/MS	KB/MS Power	KM_VCC	4 & 4
G15			Bussed	N/C
G16	HDMI B	HDMI PortB	TMDS Data 1+	4
G17			TMDS Data 1-	6
G18			TMDS Data 1 Shield	5
H2	Power LED	Power LED	Ground	POWER LED-
H3	RJ-45 3	LAN Port3	GBE3_MDI0_0_P	1
H4			GBE3_MDI0_0_N	2
H5			Bussed	N/C
H6		LAN Port3	GBE3_MDI0_1_N	6
H7			GBE3_MDI0_1_P	3

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Table 1-5: Pin definitions and signal maps for the P2 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
H8			Bussed	N/C
H9		LAN Port3	GBE3_MDI0_3_P	7
H10			GBE3_MDI0_3_N	8
H11			Bussed	N/C
H12		LAN Port3	GBE3_MDI0_2_N	5
H13			GBE3_MDI0_2_P	4
H14			Bussed	N/C
H15	HDMI B	HDMI PortB	TMDS Data 2+	1
H16			TMDS Data 2-	3
H17			TMDS Data 2 Shield	2
I6			Bussed	N/C
I7	Mouse	Mouse	CLK_MS_CON	5
I8			DAT_MS_CON	1
I9			Ground	3
I10	HDMI B	HDMI PortB	SCL	15
I11			SDA	16
I12			DDC/CEC Ground	17
I13	RJ-45 2	LAN Port2	GBE2_MDI0_3_N	8
I14			GBE2_MDI0_3_P	7
I15			Bussed	N/C

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1.14.2 P3 Pin Definitions

Table 1-6: Pin definitions and signal maps for the P3 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
A5			Bussed	N/C
A6			Bussed	N/C
A7			Bussed	N/C
A8			Bussed	N/C
A9	DVI D	DVI PortD	TMDS Clock-	24
A10			TMDS Clock+	23
A11			TMDS Clock Shield	22
A12			Hot Plug Detect	16
A13			Bussed	N/C
A14			Bussed	N/C
B2	RJ-45 4 LED	LAN Port4	Ground	LAN_Port4_LED-
B3	DVI C	DVI PortC	TMDS Data 2-	1
B4			TMDS Data 2+	2
B5			TMDS Data 2/4 Shield	3
B6			DDC data	7
B7			DDC clock	6
B8			Bussed	N/C
B9	DVI C	DVI PortC	Hot Plug Detect	16
B10			Bussed	N/C
B11			Bussed	N/C
B12	DVI D	DVI PortD	TMDS Data 0-	17
B13	DP		TMDS Data 0+	18
B14	DP		TMDS Data 0/5 Shield	19
B15	DP		TMDS Data 1-	9
B16	DP		TMDS Data 1+	10
B17	DP		TMDS Data 1/3 Shield	11
C1	RJ-45 4 LED	LAN Port4	PCIE_ETH_4/5_LED1	LAN_Port4_LED+
C2		LAN Port5	PCIE_ETH_5/5_LED1	LAN_Port5_LED+
C3			Ground	LAN_Port5_LED-
C4	DVI C	DVI PortC	TMDS Data 1-	9
C5	DP		TMDS Data 1+	10
C6	DP		TMDS Data 1/3 Shield	11
C7	Diff.	Twisted Pair-8	UDNIO9	
C8	DIFF.		UDNIO10	
C9			Bussed	N/C
C10	Diff.	Twisted Pair-1	UDNIO12	
C11			UDNIO11	
C12			Bussed	N/C
C13	RJ-45 4	LAN Port4	GBE4_MDI0_0_P	1
C14			GBE4_MDI0_0_N	2
C15			Bussed	N/C

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Table 1-6: Pin definitions and signal maps for the P3 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
C16	DVI D	DVI PortD	TMDS Data 2-	1
C17	DP		TMDS Data 2+	2
C18	DP		TMDS Data 2/4 Shield	3
D1			Bussed	N/C
D2	DVI C	DVI PortC	TMDS Data 0-	17
D3	DP		TMDS Data 0+	18
D4	DP		TMDS Data 0/5 Shield	19
D5	DB9 1	RS422 Port1	RS422_RX1_P	2
D6			RS422_RX1_N	8
D7			Bussed	N/C
D8	RJ-45 5	LAN Port5	GBE5_MDI0_1_P	3
D9			GBE5_MDI0_1_N	6
D10			Bussed	N/C
D11	USB 4	USB 2.0 Port4 Power	P5V_USB4_CON	1
D12	USB 5	USB 2.0 Port5 Power	P5V_USB5_CON	1
D13			Bussed	N/C
D14	RJ-45 4	LAN Port4	GBE4_MDI0_3_P	7
D15			GBE4_MDI0_3_N	8
D16			Bussed	N/C
D17	DVI D	DVI PortD	DDC data	7
D18			DDC clock	6
D19			Bussed	N/C
E1			Bussed	N/C
E2	DVI C	DVI PortC	TMDS Clock+	23
E3	DP		TMDS Clock-	24
E4	DP		TMDS Clock Shield	22
E5	DB9 1	RS422 Port1	RS422_TX1_N	7
E6			RS422_TX1_P	3
E7			Bussed	5
E8	RJ-45 5	LAN Port5	GBE5_MDI0_2_N	5
E9			GBE5_MDI0_2_P	4
E10			Bussed	N/C
E11	RJ-45 4	LAN Port4	GBE4_MDI0_1_P	3
E12			GBE4_MDI0_1_N	6
E13			Bussed	N/C
E14	RJ-45 4	LAN Port4	GBE4_MDI0_2_N	5
E15			GBE4_MDI0_2_P	4
E16			Bussed	N/C
E17	USB 8	USB 2.0 Port8	USB_N8_CONN	2
E18			USB_P8_CONN	3
E19			Ground	4

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Table 1-6: Pin definitions and signal maps for the P3 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
F1	VGA	VGA	GREEN_CONN_Return	7
F2			CRT_GREEN_CONN	2
F3			CRT_BLUE_CONN	3
F4			BLUE_CONN_Return	8
F5			CRT_DDC_CLK_CONN	15
F6			CRT_DDC_DATA_CON N	12
F7			Bussed	N/C
F8	Diff.	Twisted Pair-5	UDNIO20	
F9	DIFF.		UDNIO19	
F10			Bussed	N/C
F11	DB9 0	RS422 Port0	RS422_TX0_N	7
F12			RS422_TX0_P	3
F13			Bussed	N/C
F14	Diff.	Twisted Pair-6	UDNIO6	
F15	DIFF.		UDNIO5	
F16			Bussed	N/C
F17	Diff.	Twisted Pair-9	UDNIO2	
F18	DIFF.		UDNIO1	
F19			Bussed	N/C
G1	VGA	VGA	CRT_RED_CONN	1
G2			CRT_HSYNC	13
G3			Ground (HSYNC)	5
G4			CRT_VSYNC	14
G5		VGA & DVI C/D Power	P5V	9 & 14/14
G6	DVI C/D	DVI PortC/D	Analog Ground	C5 & 15/C5 & 15
G7	Diff.	Twisted Pair-2	UDNIO14	
G8	DIFF.		UDNIO13	
G9	DB9 0	RS422 Port0	Ground	5
G10			RS422_RX0_P	2
G11			RS422_RX0_N	8
G12			Bussed	N/C
G13	USB 5	USB 2.0 Port5	USB_N5_CONN	2
G14			USB_P5_CONN	3
G15			Ground	4
G16	USB 9	USB 2.0 Port9	USB_N9_CONN	2
G17			USB_P9_CONN	3
G18			Ground	4
H2	VGA	VGA	RED_CONN_Return	6
H3	RJ-45 5	LAN Port5	GBE5_MDI0_0_N	2
H4			GBE5_MDI0_0_P	1
H5	VGA	VGA	Ground (VSYNC, DDC)	10

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Table 1-6: Pin definitions and signal maps for the P3 Military Connector

MIL-DTL-38999 Pin	Function	Port	Signal	Breakout Connector Pin #
H6	RJ-45 5	LAN Port5	GBE5_MDI0_3_P	7
H7			GBE5_MDI0_3_N	8
H8			Bussed	N/C
H9	Diff.	Twisted Pair-7	UDNIO8	
H10	DIFF.		UDNIO7	
H11			Bussed	N/C
H12	Diff.	Twisted Pair-10	UDNIO4	
H13	DIFF.		UDNIO3	
H14			Bussed	N/C
H15	USB 9	USB 2.0 Port9 Power	P5V_USB9_CON	1
H16	USB 8	USB 2.0 Port8 Power	P5V_USB8_CON	1
H17			Bussed	N/C
I6	eSATA 0	eSATA Port0	Ground	1
I7			ESATA_RX-P0	6
I8			ESATA_RX-N0	5
I9			Ground	4
I10			ESATA_TX-P0	2
I11			ESATA_TX-N0	3
I12			Ground	7
I13	USB 4	USB 2.0 Port4	USB_N4_CONN	2
I14			USB_P4_CONN	3
I15			Ground	4

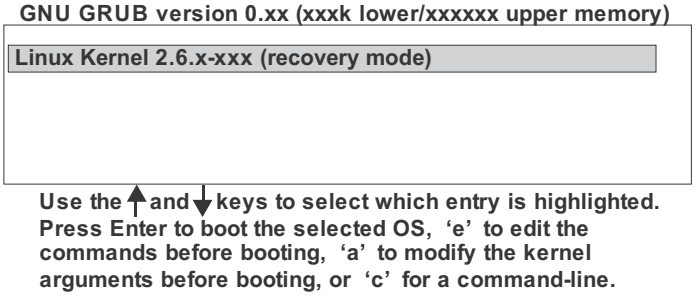
1.15 Applying Power to the HPERC-IBR-H

1) Follow these steps to apply power to the HPERC-IBR-H.	• 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 on the HPERC-IBR-H. 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-H Power On button on the breakout cable to power on the HPERC-IBR-H.

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2) Verify the HPERC-IBR-H satisfactorily powers on.	• To enter the BIOS Setup, press 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	• 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-H 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-H 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-H'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-H.

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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-H.

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	Chipset	Boot	Security	Save & Exit
BIOS Information Processor Information IGFX VBIOS Version Memory RC Version Total Memory Memory Frequency PCH Information ME FW Version ME Firmware SKU SPI Clock Frequency System Language System Date System Time Access Level	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 ►	Boot Configuration Quiet Boot Fast Boot Boot Option Priorities Hard Drive BBS Priorities CSM16 Parameters ► CSM Parameters	Administrator Password User Password	Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Options Restore Defaults Save as User Defaults Restore User Defaults Default Options Boot Override

Note: ► indicates a submenu

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3.2 Main

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 Date and Time	Info only	Date and Time

3.2.2 Processor Information

Feature	Options	Description
Name	Info only	Processor codename
Brand String	Info only	CPU Brand String.
Brand String2	Info only	CPU Brand String
Frequency	Info only	Standard CPU frequency.
Processor ID	Info only	CPUID.
Stepping	Info only	CPU Stepping.
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.
Memory Frequency	Info only	Memory Frequency.

3.2.3 PCH Information

Feature	Options	Description
Name	Info only	Processor codename
Stepping	Info only	PCH Stepping.
TXT Capability of Platform/PCH	Info only	Supported
LAN PHY Revision	Into only	N/A

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3.2.4 ME FW Version

Feature	Options	Description
ME FW Version	Info only	Version

3.2.5 ME Firmware SKU

Feature	Options	Description
ME Firmware SKU	Info only	SKU

3.2.6 SPI Clock Frequency

Feature	Options	Description
DOFR Support	Info only	Supported
Read Status Clock Frequency	Info only	Frequency
Write Status Clock Frequency	Info only	Frequency
Fast Read Status Clock Frequency	Info only	Frequency

3.2.7 System Language

Feature	Options	Description
System Language	English	Choose the system default language

3.2.8 System Date and Time

Feature	Options	Description
System Date	Day, MM/DD/YYYY	Set the date. Use Tab to switch between Date elements
System Time	HH/MM/SS	Set the Time. Use Tab to switch between Time elements

3.2.9 Access Level

Feature	Options	Description
Access Level	Info only	Administrator

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3.3 Advanced

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

3.3.1 Watch Dog Timer

Feature	Options	Description
Watch Dog Timer	**Disabled** 30 Sec. 60 Sec. 120 Sec. 150 Sec.	Watch Dog Function Configuration

3.3.2 Intel PXE OptionROM

Feature	Options	Description
Intel PXE OptionROM	**Disabled** Enabled	Intel PXE OptionROM

3.3.3 ACPI Settings

Feature	Options	Description
Enable ACPI Auto Configuration	**Disabled** Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled **Enabled**	Enables or Disables System ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Suspend Disabled S1 only (CPU Stop Clock) **S3 only (Suspend to RAM)** Both S1 and S3 available for OS to choose from	Select ACPI sleep state the system will enter when the SUSPEND button is pressed.

3.3.4 Trusted Computing

Feature	Options	Description
Security Device Support	**Disabled** Enabled	Enables or Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Current Status Information	Info only	Displays current security device support status

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3.3.5 CPU Configuration

Feature	Options	Description
Intel® Core™		
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 cores
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	Disabled for Windows XP
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, RedHat 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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3.3.6 SATA Configuration

Feature	Options	Description
SATA Controller(s)	**Enabled** Disabled	Enable or Disable SATA Device
SATA Mode Selection	IDE **AHCI** RAID	Determines how SATA Controller(s) operate.
SATA Test Mode	Disabled **Enabled**	Enable or Disable Test mode
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 0~5		
Serial ATA port #	Info only	Device name
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.

3.3.7 Intel® Rapid Start technology

Feature	Options	Description
Intel(R) Rapid Start Technology	**Disabled** Enabled	Enable or disable Intel(R) Rapid Start Technology.

3.3.8 Intel TXT(LT) Configuration

Feature	Options	Description
Secure Mode Extensions (SMX)	Info only	Enabled
Intel TXT(LT) Support	**Disabled** Enabled	

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3.3.9 PCH-FW Configuration

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

3.3.10 Intel® Anti-Theft Technology Configuration

Feature	Options	Description
Intel(R) Anti-Theft Technology	**Disabled** Enabled	Enable/Disable Intel(R) AT in BIOS for testing only.
Intel(R) Anti-Theft Technology Rec	3	Set the number of times recovery attempt will be allowed.
Enter Intel® AT Suspend Mode	**Disabled** Enabled	

3.3.11 USB Configuration

Feature	Options	Description
USB Module version	Info only	
USB Devices:	Info only	
Legacy USB Support	**Enabled** Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	**Enabled** Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
EHCI Hand-off	**Disabled** Enabled	This is a workaround for OSes without EHCI hand-off support. The ECHI ownership change should be claimed by EHCI driver.
USB Mass Storage Driver Support	**Disabled** Enabled	Enable/Disable USB Mass Storage Driver Support.
USB hardware delays and time-outs		
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.

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Feature	Options	Description
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the host controller. “Auto’ uses default values: for a Root port it is 100 ms, for a Hub port the delay is taken from hub descriptor.
Mass Storage Devices:		
Generic Ultra HS-COMBO	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage devices emulation type. ‘AUTO’ enumerates devices according to their media format. Optical drives are emulated as ‘CDROM’, drives with no media will be emulated according to a drive type.

3.3.12 F81216 Second Super IO Configuration

Feature	Options	Description
F81216 Second Super IO Chip	Info only	F81216 Second IO
Serial Port 0 Configuration	Submenu	Set Parameters of Serial Port 0 (COMA)
Serial Port 1 Configuration	Submenu	Set Parameters of Serial Port 1 (COMB)
Serial Port 2 Configuration	Submenu	Set Parameters of Serial Port 2 (COMC)
Serial Port 3 Configuration	Submenu	Set Parameters of Serial Port 3 (COMD)

3.3.12.1 F81216 Second Super IO > Serial Port 0 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Setting	Info only	
Change Setting	Auto **IO=260h;IRQ=5;** IO=260h;IRQ=5,7,10,11 IO=268h;IRQ=5,7,10,11 IO=270h;IRQ=5,7,10,11 IO=278h;IRQ=55,7,10,11	Select an optimal settings for Super IO device.
Device Mode	**Serial Port Function Mode** IR Mode,Pulse 1.6us, Full Duplex IR Mode,Pulse 1.6us, Half Duplex IR Mode,Pulse 3/16 Bit Time, Full Duplex IR Mode,Pulse 3/16 Bit Time, Half Duplex	

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Feature	Options	Description
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.12.2 F81216 Second Super IO > Serial Port 1 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Setting	Info only	
Change Setting	Auto IO=260h;IRQ=5; IO=260h;IRQ=5,7,10,11 **IO=268h;IRQ=5,7,10,11** IO=270h;IRQ=5,7,10,11 IO=278h;IRQ=55,7,10,11	Select an optimal settings for Super IO device.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.12.3 F81216 Second Super IO > Serial Port 2 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Setting	Info only	
Change Setting	Auto IO=260h;IRQ=5; IO=260h;IRQ=5,7,10,11 IO=268h;IRQ=5,7,10,11 **IO=270h;IRQ=5,7,10,11** IO=278h;IRQ=55,7,10,11	Select an optimal settings for Super IO device.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.12.4 F81216 Second Super IO > Serial Port 3 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Setting	Info only	
Change Setting	Auto IO=260h;IRQ=5; IO=260h;IRQ=5,7,10,11 IO=268h;IRQ=5,7,10,11 IO=270h;IRQ=5,7,10,11 **IO=278h;IRQ=55,7,10,11**	Select an optimal settings for Super IO device.

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Feature	Options	Description
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.13 Super IO Configuration

Feature	Options	Description
Super IO Chip	Info only	
Serial Port 0 Configuration	Submenu	Set Parameters of Serial Port 0 (COMA)
Serial Port 1 Configuration	Submenu	Set Parameters of Serial Port 1 (COMB)
Serial Port 2 Configuration	Submenu	Set Parameters of Serial Port 2 (COMC)

3.3.13.1 Super IO > Serial Port 0 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Settings	Info only	
Change Setting	Auto **IO=3F8h;IRQ=4;** IO=3F8h;IRQ=3,4,5,6,7,10,11,12 IO=2F8h;IRQ=3,4,5,6,7,10,11,12 IO=3E8h;IRQ=3,4,5,6,7,10,11,12 IO=2E8h;IRQ=3,4,5,6,7,10,11,12	Select an optimal settings for Super IO device.
Device Mode	**Normal** High Speed	Change the Serial Port mode. Select <High Speed> or <Normal> mode
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.13.2 Super IO > Serial Port 1 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Settings	Info only	

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Feature	Options	Description
Change Setting	Auto **IO=2F8h;IRQ=3;** IO=3F8h;IRQ=3,4,5,6,7,10,11,12 IO=2F8h;IRQ=3,4,5,6,7,10,11,12 IO=3E8h;IRQ=3,4,5,6,7,10,11,12 IO=2E8h;IRQ=3,4,5,6,7,10,11,12	Select an optimal settings for Super IO device.
Device Mode	**Normal** High Speed	Change the Serial Port mode. Select <High Speed> or <Normal> mode
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.13.3 Super IO > Serial Port 2 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Settings	Info only	
Change Setting	Auto **IO=3E8h;IRQ=6;** IO=3F8h;IRQ=3,4,5,6,7,10,11,12 IO=2F8h;IRQ=3,4,5,6,7,10,11,12 IO=3E8h;IRQ=3,4,5,6,7,10,11,12 IO=2E8h;IRQ=3,4,5,6,7,10,11,12	Select an optimal settings for Super IO device.
Device Mode	**Normal** High Speed	Change the Serial Port mode. Select <High Speed> or <Normal> mode
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.14 H/W Monitor

Feature	Options	Description
PC Health Status		
Internal Diode Temperature	Info only	
+2.5V	Info only	
Vccp	Info only	
VCC	Info only	

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Feature	Options	Description
+5.0V	Info only	
+12V	Info only	
VTR	Info only	

3.3.15 Serial Port Console Redirection

Feature	Options	Description
COM0		
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		
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		
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		
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		
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		
Console Redirection	**Disabled** Enabled	Console Redirection Enable or Disable.

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Feature	Options	Description
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		
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.
Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)		
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.

3.3.15.1 Serial Port Console Redirection > Console Redirection Settings

Feature	Options	Description
COM0-6 Console Redirection Settings		
Terminal Type	VT100 VT100+ VT-UTF8 **ANSI**	Emulation: ANSI: Extended ASCII char set. 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.
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**	Data Bits.
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection.

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Feature	Options	Description
Stop Bits	**1** 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	**None** Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
VT-UTF8 Combo Key support	Disabled **Enable**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enable	On 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 Resolution	**80x24** 80x25	On legacy OS, 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 Enable** BootLoader	The Settings specify if BootLoader is selected then legacy console redirection is disabled before booting to legacy OS. Default value is Always Enable which means Legacy console Redirectioin is enabled for Legacy OS.

3.3.15.2 Serial Port Console Redirection > EMS Console Redirection Settings

Feature	Options	Description
Out-of-Band Mgmt Port	**COM0** COM1 COM2 COM3 COM4 COM5 COM6	Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
Terminal Type	[VT-UTF8]	VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
Bits per second	[115200]	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

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Feature	Options	Description
Flow Control	[None]	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
Data Bits	8	Info only
Parity	None	Info only
Stop Bits	1	Info only

3.3.16 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	Set Gop Brightness value

3.3.17 MXM3.0/Hybrid Graphics

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

3.3.18 Intel RC Drivers Version Detail

Feature	Options	Description
Intel CPU RC Version	Info only	
Intel SA RC Version	Info only	
Intel PCH RC Version	Info only	
Intel PPM RC Version	Info only	
Intel ACPI RC Version	Info only	
Intel ME RC Version	Info only	
Intel TXT RC Version	Info only	

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Feature	Options	Description
Intel DTS RC Version	Info only	
Intel iFFS RC Version	Info only	
Intel DPTF RC Version	Info only	

3.3.19 CPU PPM Configuration

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

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3.4 Chipset

3.4.1 PCH-IO Configuration

Feature	Options	Description
Intel PCH RC Version	Info only	
Intel PCH SKU Name	Info only	
Intel PCH Rev ID	Info only	
PCI Express Configuration	Submenu	PCI Express Configuration Settings
USB Configuration	Submenu	USB Configuration settings
PCH Azalia Configuration	Submenu	PCH Azalia Configuration settings
PCH LAN Controller	**Enable** Disabled	Enable or Disable onboard NIC

3.4.1.1 PCH-IO Configuration > PCI Express Configuration

Feature	Options	Description
Subtractive Decode	**Disabled** Enable	Enable or disable PCI Express Subtractive Decode.
PCI Express Root Port 1	Submenu	PCI Express Root Port 1 Settings.
PCI Express Root Port 2	Submenu	PCI Express Root Port 2 Settings.
PCI Express Root Port 3	Submenu	PCI Express Root Port 3 Settings.
PCI Express Root Port 4	Submenu	PCI Express Root Port 4 Settings.
PCI Express Root Port 5	Submenu	PCI Express Root Port 5 Settings.
PCI Express Root Port 6	Submenu	PCI Express Root Port 6 Settings.
PCI Express Root Port 7	Submenu	PCI Express Root Port 7 Settings.
PCI Express Root Port 8	Submenu	PCI Express Root Port 8 Settings.

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

Feature	Options	Description
PCI Express Root Port 1-8	Disabled **Enable**	Control the PCI Express Root Port.

3.4.1.2 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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3.4.1.3 PCH-IO Configuration > PCI Azalia Configuration

Feature	Options	Description
Azalia	Disabled **Enable** Auto	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 (SA) Configuration

Feature	Options	Description
System Agent Bridge Name	Info only	
System Agent RC Version	Info only	
VT-d Capability	Info only	
VT-d	Disabled **Enable**	Check to enable VT-d function on MCH
Graphics Configuration	Submenu	Configure Graphics Settings
NB PCIe Configuration	Submenu	Configure NB PCI Express settings
Memory Configuration	Submenu	Memory Configuration Parameters

3.4.2.1 System Agent Configuration > Graphics Configuration

Feature	Options	Description
IGFX VBIOS version	Info only	
IGfx Frequency	Info only	
Primary Display	Auto **IGFX** PEG PCIE	Select which of IGFX/PEG/PCIE Graphics device should be Primary Display Or select SG for Switchable Gfx.
Internal Graphics	Auto Disabled **Enabled**	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.

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Feature	Options	Description
DVMT Pre-Allocated	32MB **64MB** 96MB 128MB 160MB 192MB 224MB 256MB 288MB 320MB 352MB 384MB 416MB 448MB 480MB 512MB 1024MB	Select DVMT 5.0 Pre-Allocated (Fixed) 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

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. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display
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.

3.4.2.2 System Agent Configuration > NB PCIe Configuration

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

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3.4.2.3 System Agent Configuration > Memory Configuration

Feature	Options	Description
Memory RC Version	Info only	
Memory Frequency	Info only	
Total Memory	Info only	
DIMM#0	Info only	
DIMM#1	Info only	
CAS Latency (tCL)	Info only	
Minimum delay time		
CAS to RAS (tRCDmin)	Info only	
Row Precharge (tRPmin)	Info only	
Active to Precharge (tRASmin)	Info only	

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3.5 Boot

3.5.1 Boot Configuration

Feature	Options	Description
Setup Prompt Timeout	**1**	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 for BBS boot options.
Boot Option Priorities		
Boot Option #1	**Generic Ultra HS-COMBO** UEFI: Built-in EFI Shell Disabled	Set the system boot order
Boot Option #2	Generic Ultra HS-COMBO **UEFI: Built-in EFI Shell** Disabled	Set the system boot order
Hard Drive BBS Priorities	Submenu	Set the order of the legacy devices in this group
CSM16 Configuration	Submenu	CSM16 configuration: Enable/Disable, Option ROM execution settings, etc.
CSM Configuration	Submenu	OpROM execution, boot uptions filter, etc.

3.5.1.1 Boot Configuration > Hard Drive BBS Priorities

Feature	Options	Description
Boot option #1	**Generic Ultra HS-COMBO** Disabled	Sets the system boot order

3.5.1.2 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.

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Feature	Options	Description
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.

3.5.1.3 Boot Configuration > CSM Configuration

Feature	Options	Description
Launch CSM	**Enabled** Disable	This option controls if CSM will be launched
Boot option filter	**UEFI and Legacy** Legacy only UEFI only	This option controls what devices system can boot to
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 Legacy Storage OpROM
Launch Video OpROM policy	Do not launch UEFI only **Legacy only** Legacy first UEFI first	Controls the execution of UEFI and Legacy Video OpROM
Other PCI device ROM priority	**UEFI OpROM** Legacy OpROM	For PCI devices other than Network, Mass storage, or video defines which OpROM to launch

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3.6 Security

3.6.1 Password Description

If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.

The password length must be in the following range:

- Minimum length 3
- Maximum length 20

Feature	Options	Description
	Info only	
Administrator Password	Enter password	Set Administrator Password
User Password	Enter password	Set User Password

3.7 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 Options	Info only	
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.
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	
All available boot devices	Make selection based on available choices	

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Important 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.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- 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 water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - 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; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- 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.

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Getting Service

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ADLINK Technology, Inc.

9F, No.166 Jian Yi Road, Zhonghe District, New Taipei City 235, Taiwan
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.

5215 Hellyer Avenue, #110, San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free:+1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.

300 Fang Chun Rd., Zhangjiang Hi-Tech Park, Pudong New Area, Shanghai, 201203, China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH

Hans-Thoma-Straße 11, D-68163 Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: germany@adlinktech.com

Please visit the Contact page at **www.adlinktech.com** for information on how to contact the ADLINK regional office nearest you.

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