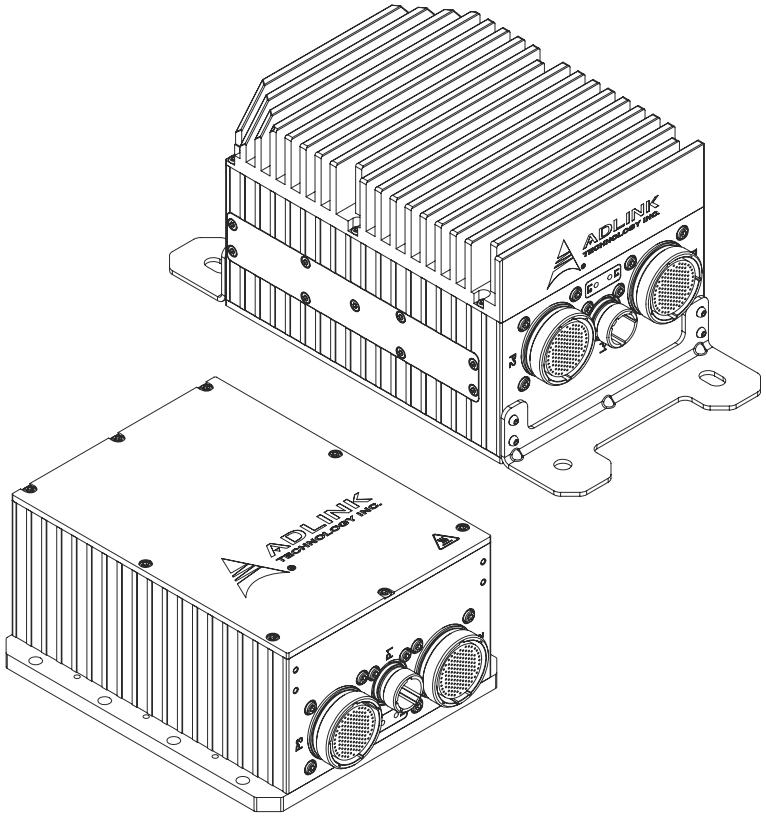
HPERC-KBL-MC/MH

High Performance Extreme Rugged Computer System

User's Manual



Manual Rev.: 1.2

Rev. Date: October 17, 2022

Part Number: 50M-00048-1020

Leading **EDGE COMPUTING**

Revision History

Revision	Description of Changes	Release Date
1.0	Initial release	2020-03-02
1.1	Add MXM-T1000 MXM module; update specifiations and pin definitions	2021-09-28
1.2	Update/correct specifications; add serial console configuration info	2022-10-17

Preface

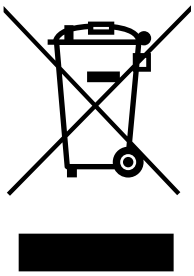
Disclaimer

The information in this document is subject to change without prior notice in order to improve reliability, design, and function and does not represent a commitment on the part of the manufacturer.

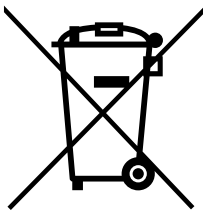
In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Environmental Responsibility

ADLINK is committed to fulfill its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.



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.

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 Introduction

1.1 About the HPERC-KBL-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 2.5" SSDs).

1.2 Using this Guide

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

- Preparing to use the HPERC-KBL-M and inspecting the accessories
- Connecting peripherals to the HPERC-KBL-M
- Powering up the HPERC-KBL-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

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-KBL-M.

- 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)

1.4 Specifications

Table 1-1: HPERC-KBL-M Specifications

VITA Standards	VITA 75
Mechanical	**MC:** • Form Factor: VITA-75.22 Conductive Cold Plate • Dimensions: 223.65(L) x 177.80(W) x 98.70(H) mm (with mounting brackets) • Weight: 4.7kg
	MH: • Form Factor: VITA-75 Finned Passive Convection • Dimensions: 304.80(L) x 150.00(W) x 129.95(H) mm (with mounting brackets) • Weight: 5.6kg
Processor	**Intel® Xeon® Processor E3-1505M v6** • 4C/8T Intel® Xeon® Processor E3-1505M v6, 3.00 GHz, 8MB Cache, TDP 45W
Chipset	Intel® CM238 Chipset
Host Memory	16GB dual channel DDR4-2400 DRAM with ECC, soldered onboard
BIOS	AMI EFI BIOS, 64Mbit SPI flash memory
Graphics	Intel® HD Graphics P630 • 2x DVI and 1x VGA (3 simultaneous display outputs)
GPGPU	Optional: • NVIDIA Quadro P1000/P2000 w/ 4GB GDDR5 memory in MXM slot • NVIDIA Quadro T1000 w/ 4GB GDDR6 memory in MXM slot
Gigabit Ethernet	Four Intel® i210 10/100/1000 Ethernet ports
Serial Port	Seven RS-232/RS-422 serial ports
USB 2.0	Six USB 2.0 ports (500 mA)
PS/2	One PS/2 Keyboard port One PS/2 Mouse port
SMBus	SMBus 2.0 supported
GPIO	Eight GPIO
Audio	High Definition Audio Controller (ALC262) • 1x amplified stereo output • 1x stereo input
TPM	Infineon SLB9665XT2.0 Module
Storage Interface	Two SATA 6 Gb/s ports for 2.5” onboard drives (removable) One SDHC slot supports up to 32GB SDHC
RAID	Supports RAID 0/1 via Intel chipset
I/O Connector	MIL-DTL-38999 (uniquely-keyed)
Expansion Busses	MXM (PCIe x16 Gen3) PCI/104 Express® Type 2 (PCIe Gen2) PCI Express Mini Card (PCIe Gen2)
OS Compatibility	Microsoft Windows 10 RHEL 7.0, RHEL 8.3, Ubuntu 14.04-4 Other OS support by request
Power States	S0, S1, S3, S4

Table 1-1: HPERC-KBL-M Specifications

Operating Temperature	**MC:** Cold plate conduction, VITA 75.22 mount • **CPU Only:** -40°C to +85°C at cold plate* • **With MXM-P1000/P2000:** -40°C to +74°C at cold plate* • **With MXM T1000:** -40°C to +71°C at cold plate* *Note: Dependent on an external thermal solution design that maintains the temperature at any point on the cold plate surface within the indicated temperature range.
	MH: Top-cover heatsink cooled (free air convection), VITA 75.21 mount • **CPU Only:** -40°C to +75°C ambient* • **With MXM-P1000/P2000:** -40°C to +70°C ambient (with 30 CFM airflow) • **With MXM T1000:** -40°C to +69°C ambient (with 43.6 CFM airflow)
Storage Temperature	-40°C to +85°C
Power	18 to 36VDC input
Relative Humidity	95% at +60°C non-condensing
Certifications	
Temperature	• MIL-STD-810G - 501.5 Procedure II • MIL-STD-810G - 502.5, Procedure 1 and 2
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
EMI/EMC	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)
Power	• MIL-STD-704F • MIL-STD-1275E

1.5 Block Diagram

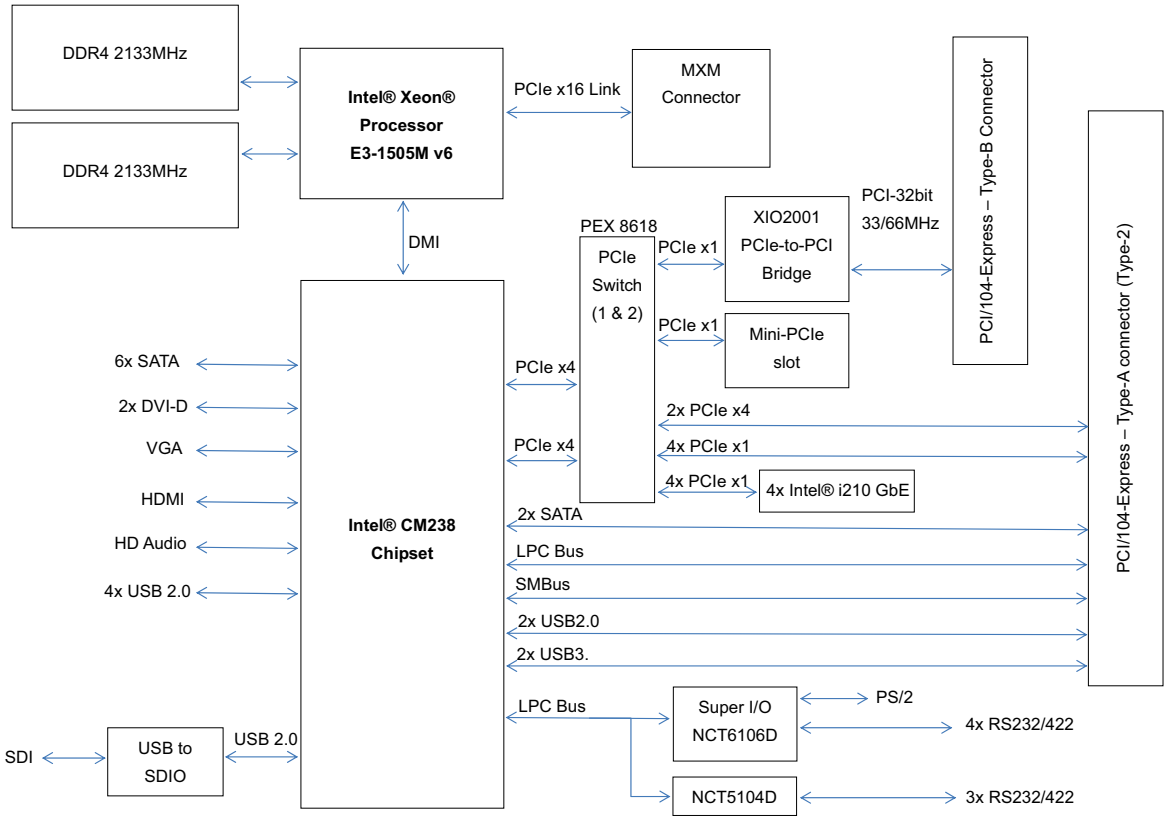


Figure 1-1: HPERC-KBL-M Block Diagram

1.6 Power Specifications

Table 1-2 lists the current and power draw of the HPERC-KBL-M, featuring the Intel® Xeon® Processor E3-1505M v6 (3.00GHz). Input power is +24 VDC regulated.

Table 1-2: System Power Requirements

Parameter	Current (Power)
Idle (Windows 10)	1.1A (26.4W)
Intel TA tool @100% (Windows 10)	3.16A (75.9W)
Inrush Current	1.5A (36W)

1.7 What's in the Box

Check the items in the shipping box for the HPERC-KBL-M Unit and optional accessories (sold separately).

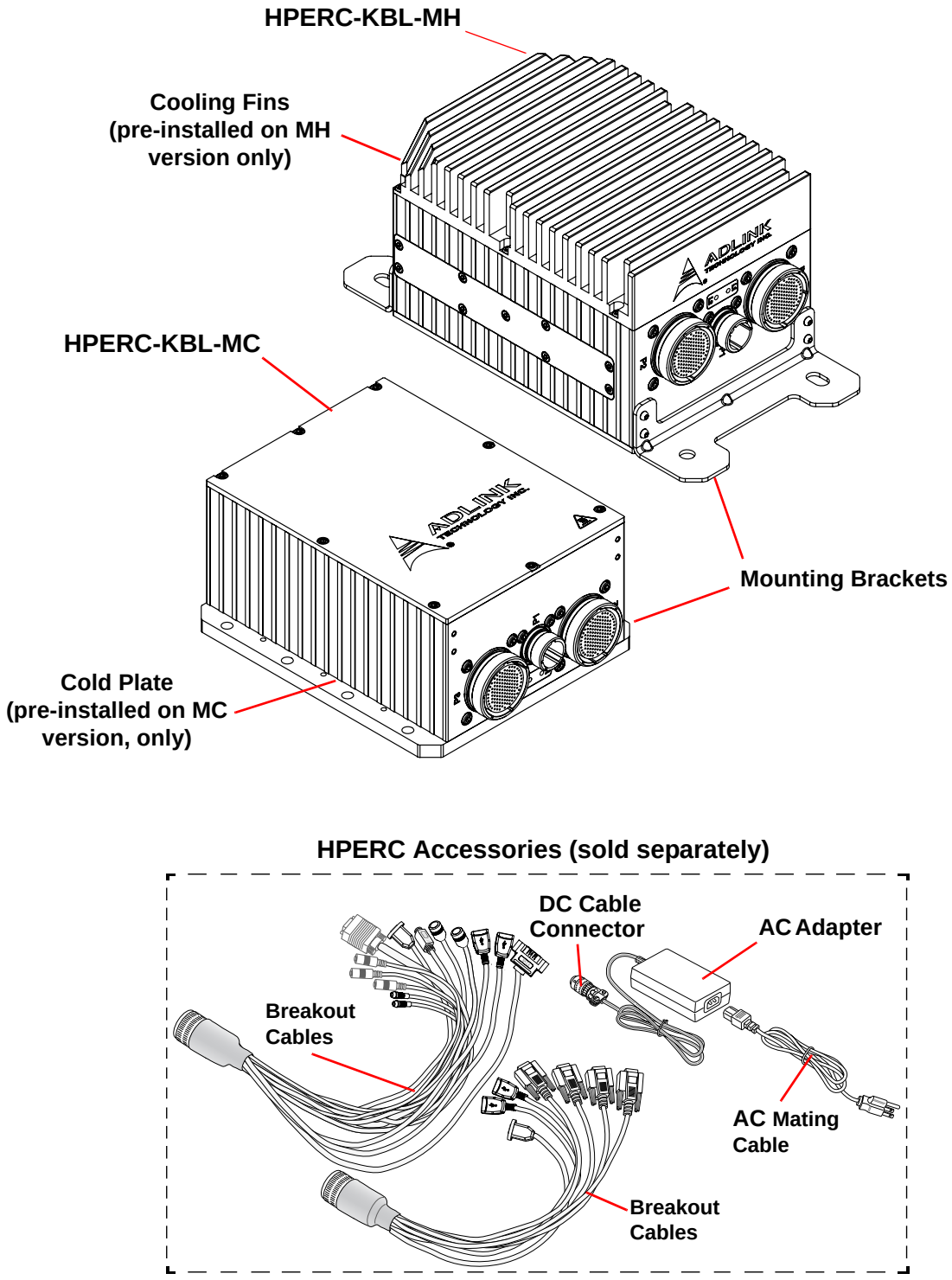


Figure 1-2: HPERC-KBL-M Unit with Optional Accessories

2 Getting Started

2.1 Preparation

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

- Verify the contents of the shipping box are the same as your HPERC-KBL-M order.
- If anything is missing or damaged, call your sales representative. Refer to the **Getting Service** chapter for contact information.

2.2 Setting Up the Work Space

NOTE:

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

2.3 Mounting the Enclosure

Install mounting screws (not included) for surface or wall mounting to the mounting brackets of the HPERC-KBL-M. Refer to Figure 2-1 and Figure 2-2 for the mounting hole locations of your model.

NOTE:

There are no limitations to the mounting orientation of the device.

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-KBL-MC)	7.6 Nm	11.1 Nm	13.83 Nm
M8 (HPERC-KBL-MH)	18.4 Nm	26.7 Nm	33.34 Nm

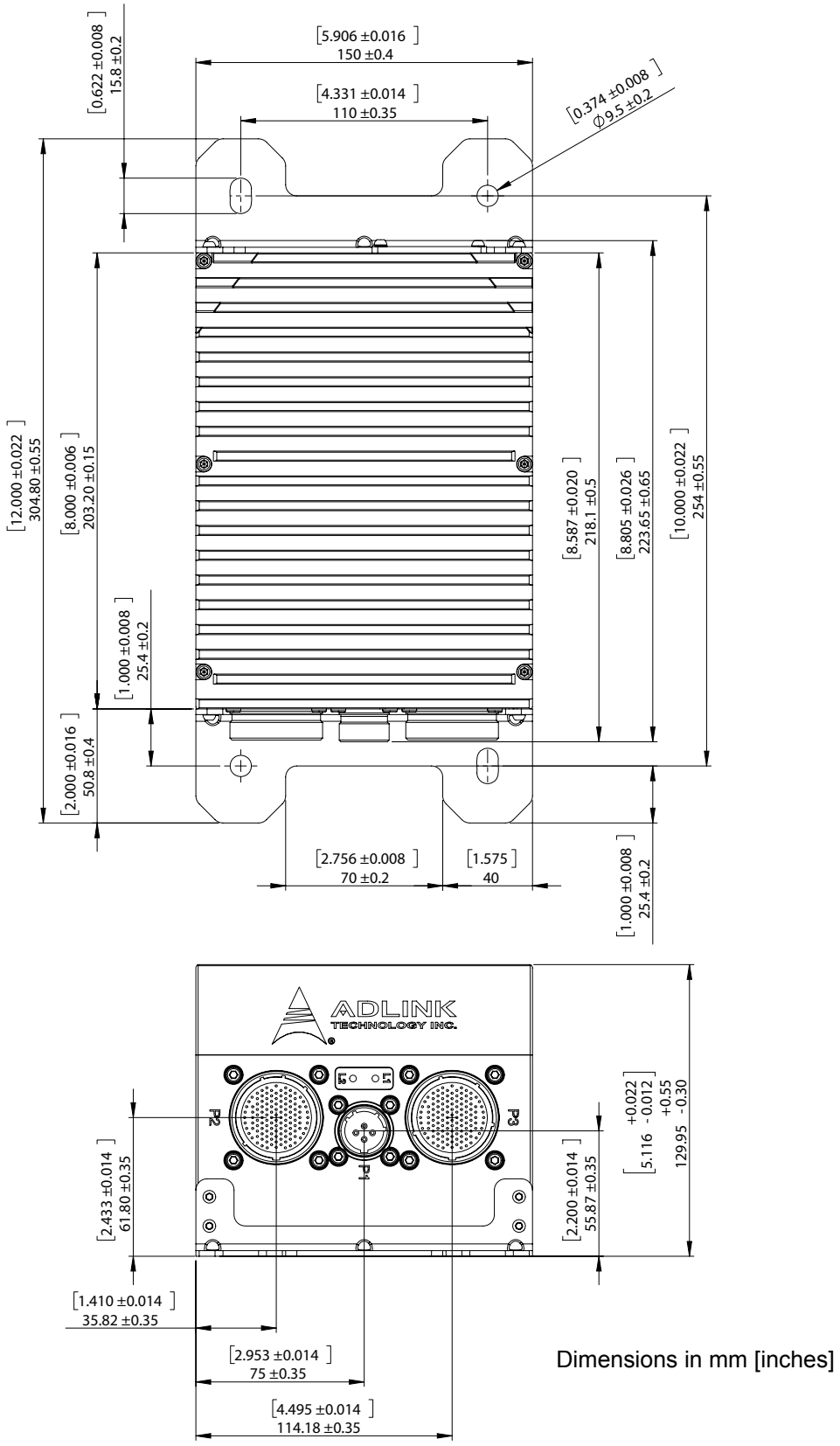


Figure 2-1: Top and Front Views of “MH” Enclosure with Mounting Dimensions

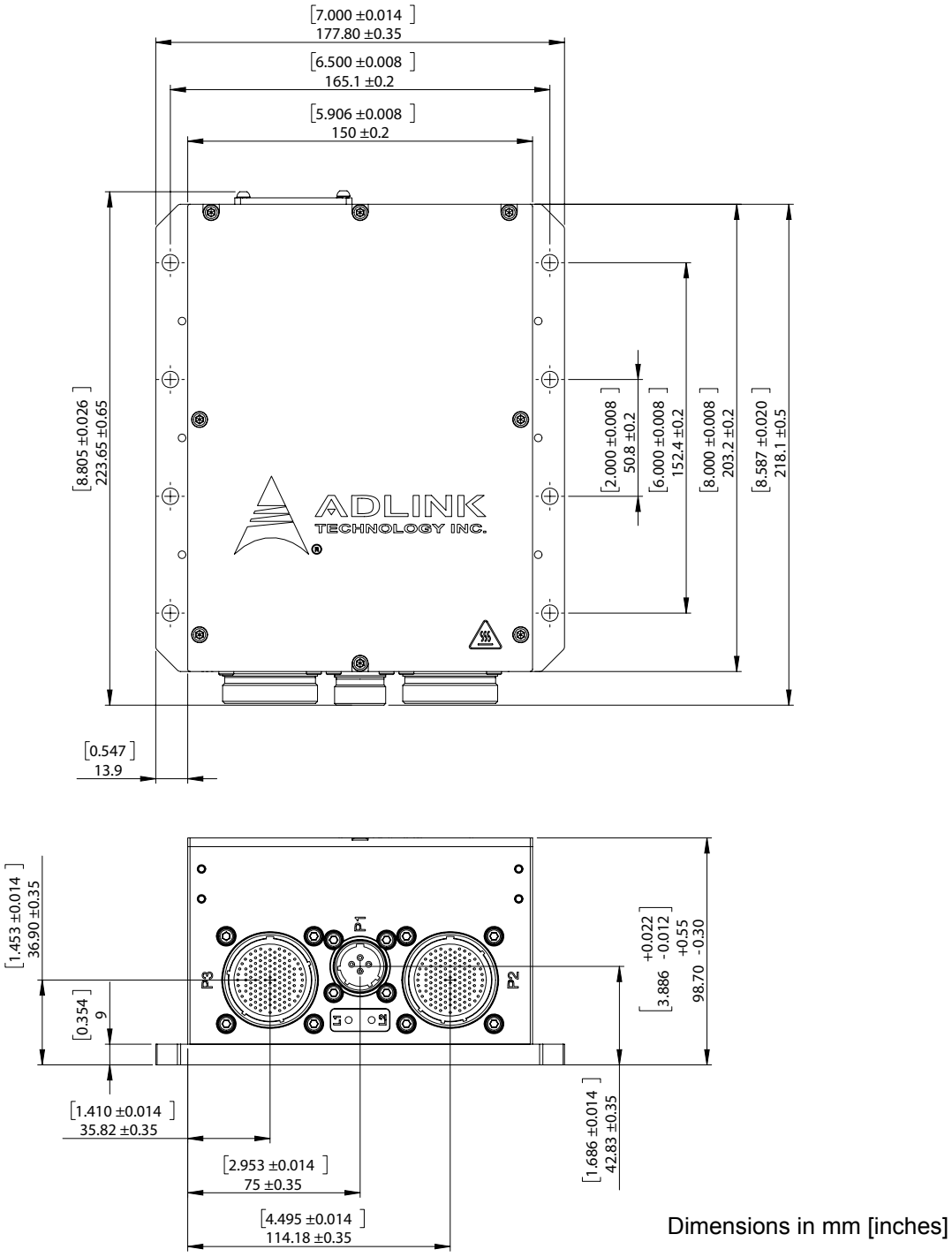


Figure 2-2: Top and Front Views of “MC” Enclosure with Mounting Dimensions

Optional mounting points for surface/wall mounting or heat sink (HPERC-KBL-MC only)	• Mounting holes “A” and “B” are shown below in Figure 2-3. 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)

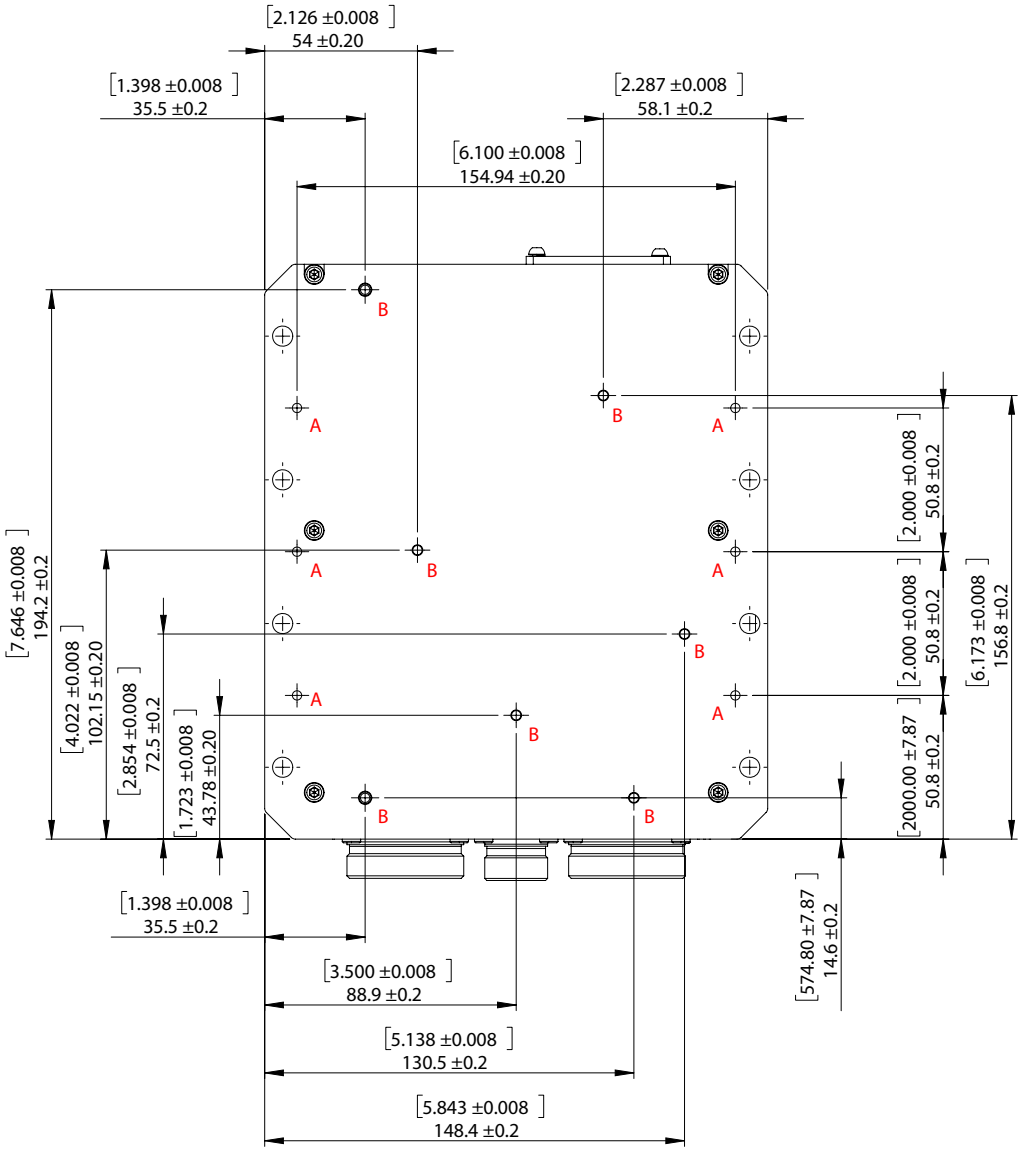
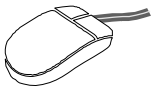


Figure 2-3: Bottom View of “MC” Enclosure with Mounting Holes

2.4 Connecting Peripherals

Connect the appropriate military breakout cable to the corresponding HPERC-KBL-M military connector. See Figure 1-2 for illustrations of cables. See Figure 2-4 for locations of the HPERC-KBL-M military connectors.	• Refer to Figure 2-4 for locations and descriptions of the connectors before making connections or powering on the HPERC-KBL-M.
	• Connect the USB or PS2 keyboard to the corresponding connector on the corresponding breakout cable.
	• Connect the USB or PS2 mouse to the appropriate connector on the corresponding breakout cable.
	• Connect the display to the appropriate connector on the corresponding breakout cable.

NOTE:

To connect an external storage or CD drive to the HPERC-KBL-M, use one of the USB or SATA ports to connect the device.

2.5 Front Panel Connectors & LEDs

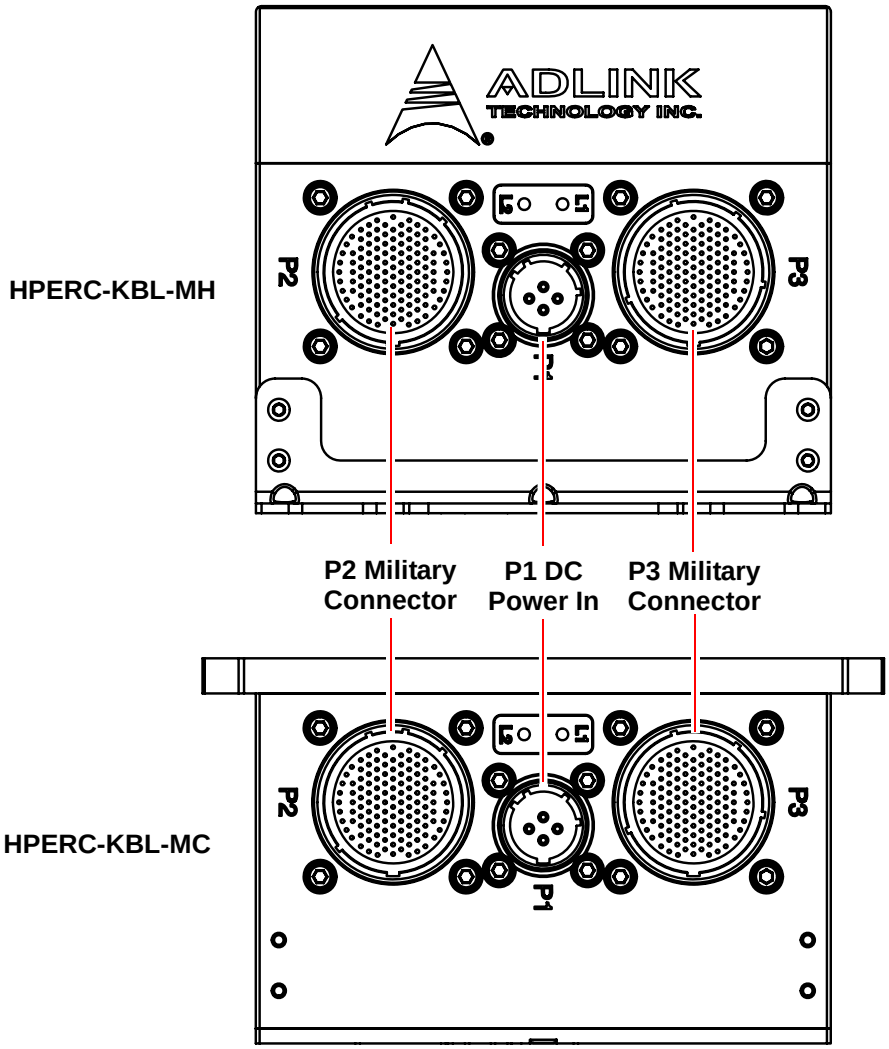
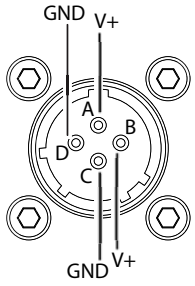


Figure 2-4: Front View of HPERC-KBL-M I/O Panel

Connector & LED Descriptions

Refer to Figure 2-4 for connector locations.

Table 2-1: I/O Panel Connectors

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: Status LEDs	The functionality of the status LEDs is described in the table below

Status	L1 LED	L2 LED
Power On	Steady orange, then steady red	Steady orange, then steady green
Hardware Reset Button Pressed	No change (steady red)	Blinking orange, then steady green
Hardware Power Button Pressed	Orange to steady red	Steady green
OS Power Off	Red to steady orange	Steady green

2.6 Breakout Cable Descriptions

RS-232/RS-422 Serial Ports

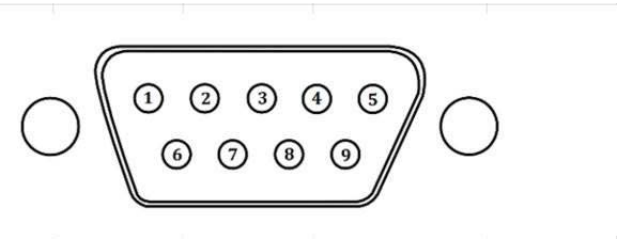


Table 2-2: DB9 Male Connector Pin Definition

Pin #	RS232	RS422
1	NC	NC
2	—	RXp
3	—	TXp
4	NC	NC
5	NC	NC
6	NC	NC
7	TX	TXn
8	RX	RXn
9	NC	NC

GPIO

Table 2-3: GPIO Breakout Wires

Function/Label	Pin	Signal
GPIO1	P2-45	UDNIO13
GPIO2	P2-46	UDNIO14
GPIO3	P2-48	UDNIO15
GPIO4	P2-49	UDNIO16
GPIO5	P2-51	UDNIO17
GPIO6	P2-52	UDNIO18
GPIO7	P2-54	UDNIO19
GPIO8	P2-55	UDNIO20

2.7 P2 and P3 Military Connectors

The following two tables define the signals and signal maps of the two military I/O connectors (P2 and P3) on the HPERC-KBL-M. Each table lists the P2 or P3 pin numbers, the signal names and descriptions. Figure 2-5 provides the number and location of each pin on the two military connectors.

2.7.1 P2 and P3 Connector Locations

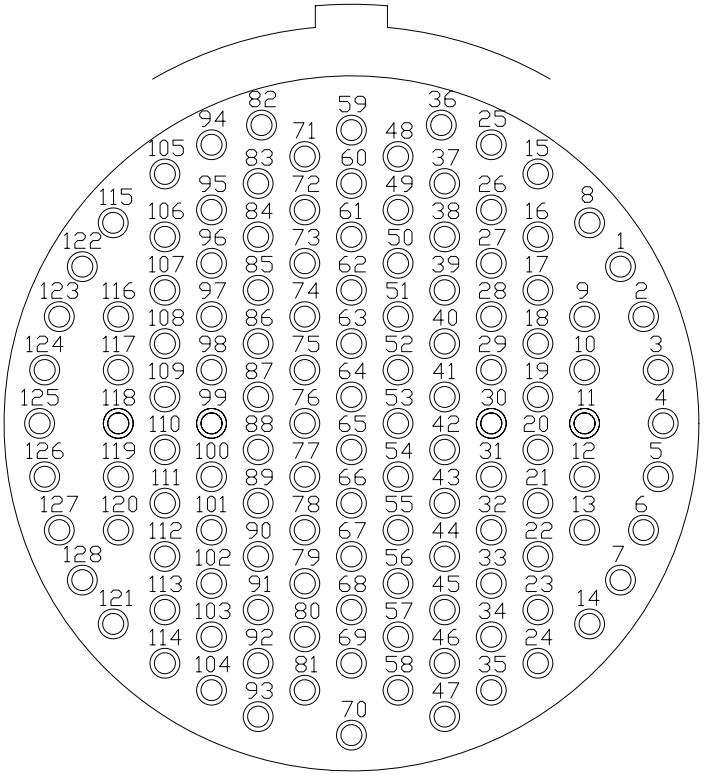


Figure 2-5: P2 and P3 Military Interface Connector Pin Locations

2.7.2 P2 Pin Definitions

Table 2-4: P2 Connector Pin Definitions and Signal Maps

P2 Pin	Interface	Signal	Signal Description
1	Gigabit Ethernet 1	GbE2_MDI0_P	Ethernet10 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	NC	NC	Not Connected
26	NC	NC	Not Connected
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_LED 1	Ethernet LED
44	Ground	GND	Ground
35	NC	NC	Not Connected
44	Ground	GND	Ground
36	Control/Indicator	HPOUT_R	Audio Right

Table 2-4: P2 Connector Pin Definitions and Signal Maps

P2 Pin	Interface	Signal	Signal Description
37	Control/Indicator	HPOUT_L	Audio Left
38	Ground	GND	Ground
39	NC	NC	Not Connected
40	NC	NC	Not Connected
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

Table 2-4: P2 Connector Pin Definitions and Signal Maps

P2 Pin	Interface	Signal	Signal Description
92	User Defined IO	UDNIO4	User Input/Output Port 4
93	Ground	GND	Ground
94	NC	NC	Not Connected
95	NC	NC	Not Connected
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

2.7.3 P3 Pin Definitions

Table 2-5: P3 Connector Pin Definitions and Signal Maps

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	NC	NC	Not Connected
10	NC	NC	Not Connected
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
114	Control/Indicator	PCIe_ETH_4/5_LED1	Ethernet LED
121	Control/Indicator	PCIe_ETH_3/5_LED1	Ethernet LED
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
108	Ground	GND	Ground

Table 2-5: P3 Connector Pin Definitions and Signal Maps

P3 Pin	Interface	Signal	Signal Description
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

Table 2-5: P3 Connector Pin Definitions and Signal Maps

P3 Pin	Interface	Signal	Signal Description
71	DVI 2	DDIC_P2	Digital Display Interface Port C, TMDS Data 0 Positive
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

Table 2-5: P3 Connector Pin Definitions and Signal Maps

P3 Pin	Interface	Signal	Signal Description
128	NC	NA	NA
96	Power	PV5	+5 Volts Power, DisplayPort D Auxiliary Select
97	Power	PV5	+5 Volts Power, High Definition Control Run
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

2.8 Powering Up the HPERC-KBL-M

Apply power to the HPERC-KBL-M

- Connect the AC Mating Cable to the AC Adapter (see Figure 1-2).
- Plug in the DC Cable Connector from the AC Adapter to the DC IN jack on the HPERC-KBL-M. See Figure 2-4.

CAUTION:

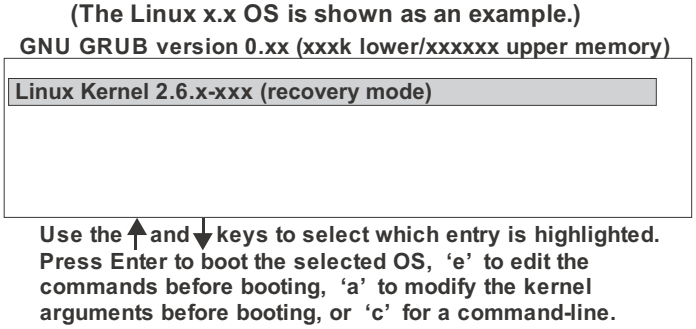
Power supplied to the unit must be within 18-36VDC.

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-KBL-M Power On button on the breakout cable to power on the HPERC-KBL-M.

Verify the HPERC-KBL-M powers on properly

- 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.



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).

2.9 Internal Components

The HPERC-KBL-M enclosure allows installation and removal of components including solid state drives (SSDs), SD memory card, PCI/104-Express expansion module, and Mini PCIe Card.

Opening and resealing any of the openings on the HPERC-KBL-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-KBL-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-KBL-M.

3 BIOS Setup

This chapter provides information on how to read information from and configure the BIOS Setup utility of the HPERC-KBL-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	Chipset	Security	Boot	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 Management System Date System Time	CPU configuration ► Power & Performance ► PCH-FW Configuration ► Trusted Computing ► NCT6106D Super IO Configuration ► NCT5104DSEC Super IO Configuration ► Serial Port Console Redirection ► Network Stack Configuration ► CSM Configuration ► USB Configuration ►	System Agent (SA) Configuration ► PCH-IO Configuration ►	Administrator Password User Password	Boot Configuration Quiet Boot Fast Boot Boot Option Priorities Hard Drive BBS Priorities	Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Changes Discard Changes Restore Defaults Save as User Defaults Restore User Defaults Boot Override

Note: ► indicates a submenu

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
Access Level	Info only	Administrator

3.2.2 Processor Information

Feature	Options	Description
Name	Info only	Processor codename
Name	Info only	CPU Brand String.
CPU Signature	Info only	CPU Brand String
CPU Speed	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.
eDRAM Size	Info only	N/A
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
PCH SKU	Info only	PCH SKU
Stepping	Info only	PCH Stepping.
LAN PHY Revision	Into only	N/A

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 Hardware Version

Feature	Options	Description
Hardware Version	Info only	Version

3.2.8 System Management

3.2.8.1 Version

Feature	Options	Description
Version	Info only	Version

3.2.8.2 Board Information

Feature	Options	Description
SEMA Firmware	Info only	Display SEMA Firmware.
Build Date	Info only	Display SEMA firmware build date.
SEMA Boot loader	Info only	Display SEMA boot loader.
Build Date	Info only	Display SEMA boot loader build date.
Hardware Version	Info only	Display SEMA hardware Version.
Serial Number	Info only	Display SEMA serial Number.
Manufacturing Date	Info only	Display SEMA manufacturing date.
Last Repair Date	Info only	Display SEMA last repair date.
MAC ID	Info only	Display SEMA MAC ID
SEMA Features	Info only	Display features info

3.2.8.3 Temperatures

Feature	Options	Description
CPU Temperature		
Current	Info only	Display CPU current temperature.
Startup	Info only	Display CPU startup temperature.
Min	Info only	Display CPU min temperature.
Max	Info only	Display CPU max temperature.

3.2.8.4 Power Consumption

Feature	Options	Description
VCORE	Read only	Display actual voltage of the VCORE
VCC_GT	Read only	Display actual voltage of the VCC_GT
VCC_SA	Read only	Display actual voltage of the VCC_SA
1V2_VDDQ	Read only	Display actual voltage of the 1V2_VDDQ
2v5_VPP	Read only	Display actual voltage of the 2v5_VPP
0V95_VCCIO	Read only	Display actual voltage of the 0V95_VCCIO
1V0_A	Read only	Display actual voltage of the 1V0_A
1V8_S	Read only	Display actual voltage of the 1V8_S
V1v5	Read only	Display actual voltage of the V1v5

Feature	Options	Description
P_+3V3_A	Read only	Display actual voltage of the P_+3V3_A
3V3	Read only	Display actual voltage of the 3V3
VPTC	Read only	Display actual voltage of the VPTC
5V0	Read only	Display actual voltage of the 5V0
VIN(12V)	Read only	Display actual voltage of the VIN(12V)
P_+5V_ATX	Read only	Display actual voltage of the P_+5V_ATX

3.2.8.5 Runtime Statistics

Feature	Options	Description
Runtime Statistics	Info only	
Total Runtime	Read only	The returned value specifies the total time in minutes the system is running in S0 state.
Current Runtime	Read only	The returned value specifies the time in seconds the system is running in S0 state. This counter is cleared when the system is removed from the external power supply.
Power Cycles	Read only	The returned value specifies the number of times the external power supply has been shut down
Boot Cycles	Read only	The Bootcounter is increased after a HW- or SW-Reset or after a successful power-up.
Boot Reason	Read only	The boot reason is the event which causes the reboot of the system.

3.2.8.6 Flags

Feature	Options	Description
Flags	Info only	
BMC Flags	Read only	
BIOS Select	Read only	Display the selection of current BIOS ROM.
ATX/AT-Mode	Read only	Display ATX/AT-Mode.
Exception Code	Read only	System exception reason.

3.2.9 System Language

Feature	Options	Description
System Language	**English**	Choose the system default language

3.2.10 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

3.3 Advanced

3.3.1 CPU Configuration

Feature	Options	Description
CPU Signature	Info only	Display CPU Signature
Processor Cores	Info only	Display number of processor cores
CPU Speed	Info only	Display CPU frequency
L1 Data Cache	Info only	Display L1 data cache size
L1 Instruction Cache	Info only	Display L1 Instruction cache size
L2 Cache	Info only	Display L2 cache size
L3 Cache	Info only	Display L3 cache size
L4 Cache	Info only	Display L4 cache size
Intel VMX Technology	Info only	Display Intel VMX technology support
Intel SMX/TXT Technology	Info only	Display Intel SMX / TXT technology support
Intel (VMX) Virtualization Technology	**Disabled** Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool technology.
Active Processor Cores	**All** 1 2 3	Number of cores to enable in each processor package.
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.

3.3.2 Power & Performance

3.3.2.1 CPU-Power Management Control

Feature	Options	Description
Intel(R) SpeedStep(TM)	**Enabled** Disabled	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	**Enabled** Disabled	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Disabled **Enabled**	Enable/Disable processor Turbo Mode (requires EMTTM enabled). AUTO means enabled, unless max turbo ratio is bigger than 16 - SKL A0 W/A.
Config TDP Configurations	Submenu	

Config TDP Configurations

Feature	Options	Description
Configurable TDP Boot Mode	**Nominal** Down Deactivate	Configure TDP Mode as Nominal/Down/Disabled. Disabled option will set MSR to Nominal and MMIO to Zero.
Configurable TDP Lock	**Disabled** Enabled	Configurable TDP Mode Lock sets the Lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL. Note: When CTDP Lock is enabled Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot Index will be forced to 0.

3.3.3 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	
ME File System Integrity Value	Info only	
ME Firmware Status 1	Info only	
ME Firmware Status 2	Info only	
NFC Support	Info only	

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
SHA-1 PCR Bank	**Enabled** Disabled	Enable or Disable SHA-1 PCR Bank
SHA256 PCR Bank	**Enabled** Disabled	Enable or Disable SHA256 PCR Bank
Pending operation	**None** TPM Clear	Pending operation
Platform Hierarchy	**Enabled** Disabled	Enable or Disable Platform Hierarchy
Storage Hierarchy	**Enabled** Disabled	Enable or Disable Storage Hierarchy
Endorsement Hierarchy	**Enabled** Disabled	Enable or Disable Endorsement Hierarchy
TPM2.0 UEFI Spec Version	**TCG_1_2** TCG_2	Select the TCG2 Spec Version Support, TCG_1_2: the Compatible mode for Win8/Win10, TCG_2: Support new TCG2 protocol and event format for Win10 or later
Physical Presence Spec Version	**1.2** 1.3	Select to tell the OS to support PPI Spec Version 1.2 or 1.3. Note: some HCK tests might not support 1.3.
TPM 20 InterfaceType	**TIS**	Select the Communication Interface to TPM 20 Device.

Feature	Options	Description
Device Select	TPM 1.2 TPM 2.0 **Auto**	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated

3.3.5 NCT6106D Super IO Configuration

Feature	Options	Description
Super IO Chip	Info only	
Serial Port 1 Configuration	Submenu	Set Parameters of Serial Port 1 (COMA)
Serial Port 2 Configuration	Submenu	Set Parameters of Serial Port 2 (COMB)
Serial Port 3 Configuration	Submenu	Set Parameters of Serial Port 3 (COMC)
Serial Port 4 Configuration	Submenu	Set Parameters of Serial Port 4 (COMD)

3.3.5.1 NCT6106D 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=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.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.5.2 NCT6106D Super IO > Serial Port 2 Configuration

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

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.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.5.3 NCT6106D 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=3E8h;IRQ=7; IO=3E8h;IRQ=3,4,5,6,7,10,11,12 IO=2E8h;IRQ=3,4,5,6,7,10,11,12 IO=2F0h;IRQ=3,4,5,6,7,10,11,12 IO=2E0h;IRQ=3,4,5,6,7,10,11,12	Select an optimal settings for Super IO device.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.5.4 NCT6106D Super IO > Serial Port 4 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Setting	Info only	
Change Setting	**Auto** IO=2E8h;IRQ=7; IO=3E8h;IRQ=3,4,5,6,7,10,11,12 IO=2E8h;IRQ=3,4,5,6,7,10,11,12 IO=2F0h;IRQ=3,4,5,6,7,10,11,12 IO=2E0h;IRQ=3,4,5,6,7,10,11,12	Select an optimal settings for Super IO device.

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

3.3.6 NCT5104DSEC Super IO Configuration

Feature	Options	Description
Super IO Chip	Info only	NCT5104DSEC
Serial Port 1 Configuration	Submenu	Set Parameters of Serial Port 1 (COMA)
Serial Port 2 Configuration	Submenu	Set Parameters of Serial Port 2 (COMB)
Serial Port 3 Configuration	Submenu	Set Parameters of Serial Port 3 (COMC)

3.3.6.1 NCT5104DSEC Super IO > Serial Port 1Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Settings	Info only	
Change Setting	**Auto** IO=240h;IRQ=7; IO=240h;IRQ=3,4,5,7,10,11,12; IO=248h;IRQ=3,4,5,7,10,11,12; IO=250h;IRQ=3,4,5,7,10,11,12; IO=258h;IRQ=3,4,5,7,10,11,12	Select an optimal settings for Super IO device.
RS232/RS422	**RS232** RS422	RS232/RS422 selection

3.3.6.2 NCT5104DSEC 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=248h;IRQ=7; IO=240h;IRQ=3,4,5,7,10,11,12; IO=248h;IRQ=3,4,5,7,10,11,12; IO=250h;IRQ=3,4,5,7,10,11,12; IO=258h;IRQ=3,4,5,7,10,11,12	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

3.3.6.3 NCT5104DSEC Super IO > Serial Port 3 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Settings	Info only	
Change Setting	**Auto** IO=250h;IRQ=7; IO=240h;IRQ=3,4,5,7,10,11,12; IO=248h;IRQ=3,4,5,7,10,11,12; IO=250h;IRQ=3,4,5,7,10,11,12; IO=258h;IRQ=3,4,5,7,10,11,12 ;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

3.3.7 Serial Port Console Redirection


NOTE:

Refer to “Serial Console Configuration” on page 50 for information on serial console settings.

Feature	Options	Description
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.

Feature	Options	Description
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.
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.
COM7		
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.
Legacy Console Redirection		
Legacy Console Redirection Settings	Submenu	Legacy Console Redirection 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.

3.3.7.1 Serial Port Console Redirection > Console Redirection Settings

Feature	Options	Description
COM1-7 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.

Feature	Options	Description
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.
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
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.

3.3.7.2 Serial Port Console Redirection > Legacy Console Redirection Settings

Feature	Options	Description
Redirection COM Port	**COM1** COM2 COM3 COM4 COM5 COM6 COM7	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
Legacy OS Redirection Resolution	**80x24** 80x25	On legacy OS, the number of rows and columns supported by redirection
Redirect After POST	**Always Enable** BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

3.3.7.3 Serial Port Console Redirection > EMS Console Redirection Settings

Feature	Options	Description
Out-of-Band Mgmt Port	**COM1** COM2 COM3 COM4 COM5 COM6 COM7	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.
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

3.3.8 Network Stack Configuration

Feature	Options	Description
Network Stack	**Disabled** Enabled	Enable/Disable UEFI network stack.
Ipv4 PXE Support	**Disabled** Enabled	Enable/Disable Ipv4 PXE Boot Support. If disabled, IPV4 PXE boot support will not be available.
Ipv4 HTTP Support	**Disabled** Enabled	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
Ipv6 PXE Support	**Disabled** Enabled	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
Ipv6 HTTP Support	**Disabled** Enabled	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
IP6 Configuration Policy	**Automatic** Manual	Set IP6 Configuration Policy
PXE boot wait time	**0S**	Wait time to press ESC key to abort the PXE boot
Media detect count	**1**	Number of times presence of media will be checked

3.3.9 CSM Configuration

Feature	Options	Description
CSM Support	**Enabled** Disabled	Enable/Disable CSM Support.
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.
Boot option filter	**UEFI and Legacy** Legacy only UEFI only	This option controls Legacy/UEFI ROMs priority
Option ROM execution	Info only	
Network	**Do not launch** UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do not launch UEFI **Legacy**	Controls the execution of UEFI and Legacy Storage OpROM

Feature	Options	Description
Video	Do not launch UEFI **Legacy**	Controls the execution of UEFI and Legacy Video OpROM
Other PCI device	Do not launch UEFI **Legacy**	Determines OpROM execution policy for devices other than Network, Storage, or Video

3.3.10 USB Configuration

Feature	Options	Description
USB Module version	Info only	
USB Controllers	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.
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.

3.4 Chipset

3.4.1 System Agent (SA) Configuration

Feature	Options	Description
System Agent Bridge Name	Info only	
SA PCIe Code Version	Info only	
VT-d	Disabled **Enable**	VT-d capability
Memory Configuration	Submenu	Memory Configuration Parameters
PEG Port Configuration	Submenu	PEG Port Options

3.4.1.1 System Agent Configuration > Memory Configuration

Feature	Options	Description
Memory RC Version	Info only	
Memory Frequency	Info only	
Total Timings (tCL-tRCD-tRP-tRAS)	Info only	
Channel 0 Slot 0	Info only	
Size	Info only	
Number of Ranks	Info only	
Manufacturer	Info only	
Channel 1 Slot 1	Info only	
Size	Info only	
Number of Ranks	Info only	
Manufacturer	Info only	

3.4.1.2 System Agent Configuration > PEG Port Configuration

Feature	Options	Description
PEG 0:1:1	Info only	
Enable Root Port	Disabled Enabled **Auto**	Enable or Disable the Root Port
Max Link Speed	**Auto** Gen1	Configure PEG 0:1:1 Max Speed

3.4.2 PCH-IO Configuration

Feature	Options	Description
PCI Express Configuration	Submenu	PCI Express Configuration Settings
SATA and RST Configuration	Submenu	SATA Device Options Settings
HD Audio Configuration	Submenu	HD Audio Subsystem Configuration settings

3.4.2.1 PCH-IO Configuration > PCI Express Configuration

Feature	Options	Description
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 11	Submenu	PCI Express Root Port 11 Settings.
PCI Express Root Port 12	Submenu	PCI Express Root Port 12 Settings.
PCI Express Root Port 13	Submenu	PCI Express Root Port 13 Settings.
PCI Express Root Port 19	Submenu	PCI Express Root Port 19 Settings.
PCI Express Root Port 20	Submenu	PCI Express Root Port 20 Settings.

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

Feature	Options	Description
PCI Express Root Port 1-20	Disabled **Enabled**	Control the PCI Express Root Port.

3.4.2.2 PCH-IO Configuration > SATA and RST Configuration

Feature	Options	Description
SATA Controller	Disabled **Enable**	Enable/Disable SATA Device.
SATA Mode Selection	**AHCI** Intel RST Premium	Determines how SATA controller(s) operate.
Software Feature Mask Configuration	Submenu	
SATA Controller Speed	**Default** Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.
Serial ATA Port 0		
Software Preserve		

Feature	Options	Description
Port 0	Disabled **Enabled**	Enable/Disable SATA Port.
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 1		
Software Preserve		
Port 0	Disabled **Enabled**	Enable/Disable SATA Port.
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 2		
Software Preserve		
Port 0	Disabled **Enabled**	Enable/Disable SATA Port.
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 3		
Software Preserve		
Port 0	Disabled **Enabled**	Enable/Disable SATA Port.
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 4		
Software Preserve		
Port 0	Disabled **Enabled**	Enable/Disable SATA Port.
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 5		
Software Preserve		
Port 0	Disabled **Enabled**	Enable/Disable SATA Port.
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.

3.4.2.3 SATA And RST Configuration > Software Feature Mask Configuration

Feature	Options	Description
HDD Unlock	**Enabled** Disabled	If enabled, indicates that the HDD password unlock in the OS is enabled.
LED Locate	**Enabled** Disabled	If enabled, indicates that the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.

3.4.2.4 PCH-IO Configuration > HD Audio Configuration

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

3.5 Security

3.5.1 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
Administrator Password	Enter password	Set Administrator Password
User Password	Enter password	Set User Password

3.6 Boot

3.6.1 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
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
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.
Hard Drive BBS Priorities	Submenu	Set the order of the legacy devices in this group

3.6.1.1 Boot Configuration > Hard Drive BBS Priorities

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

3.7 Save & Exit

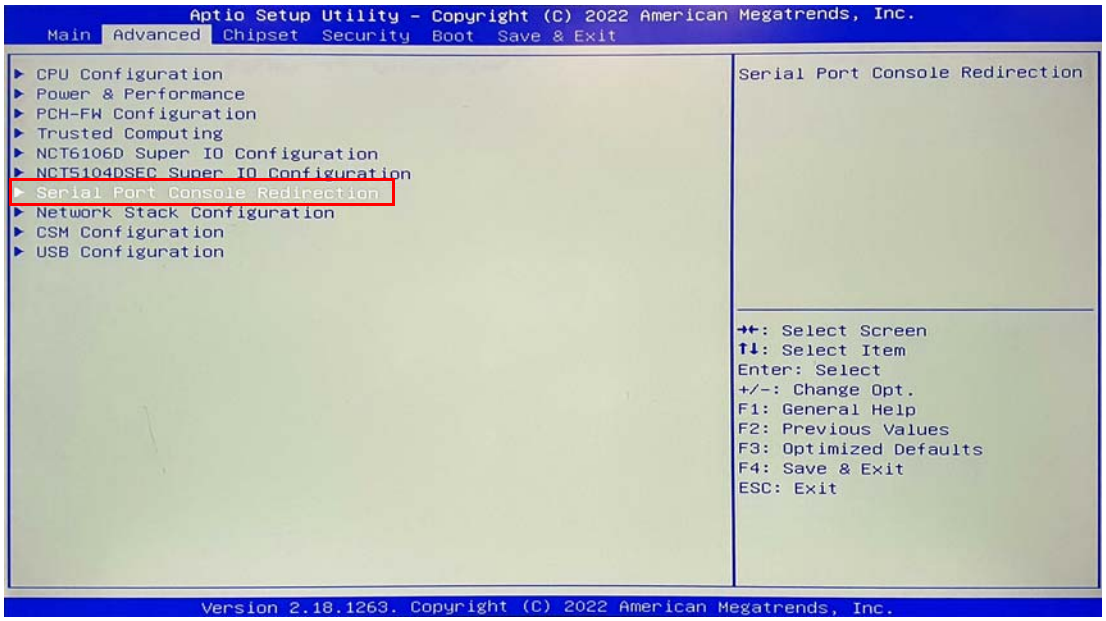
Feature	Options	Description
Save Changes and Exit	Yes No	Exit system setup after saving the changes.
Discard Changes and Exit	Yes No	Exit system setup without saving any changes.
Save Changes and Reset	Yes No	Reset the system after saving the changes.
Discard Changes and Reset	Yes No	Reset system setup without saving any changes.
Save 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.
Defaults 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	

3.8 Serial Console Configuration

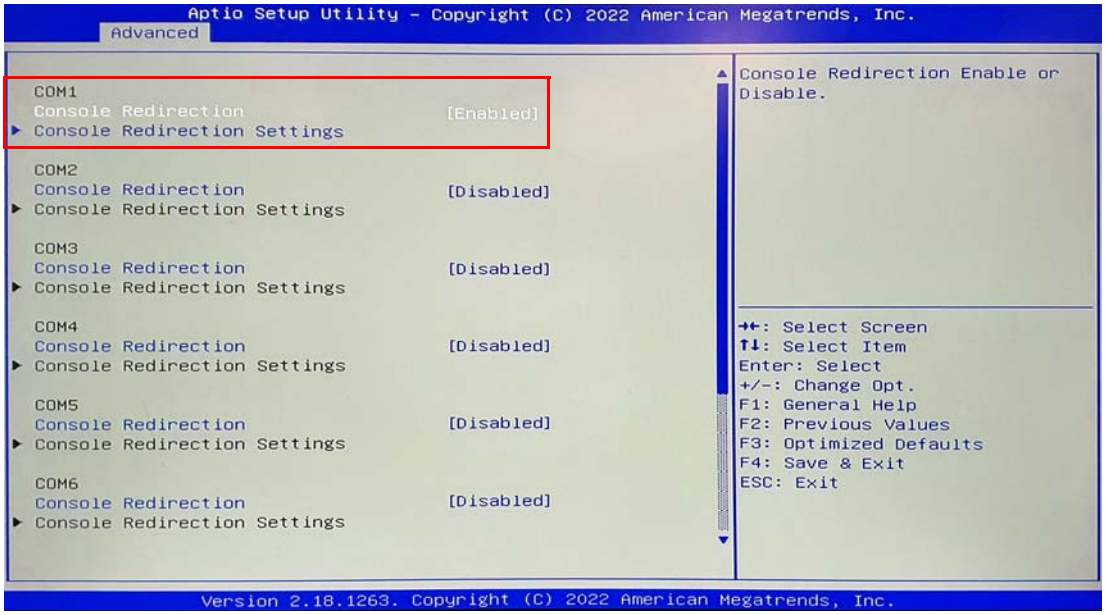
NOTE:

The serial console supported by Serial Port Console Redirection only displays the BIOS settings and Linux CLI environments. It does not support GUI applications.

In the BIOS settings, go to "Advanced" ' "Serial Port Console Redirection".



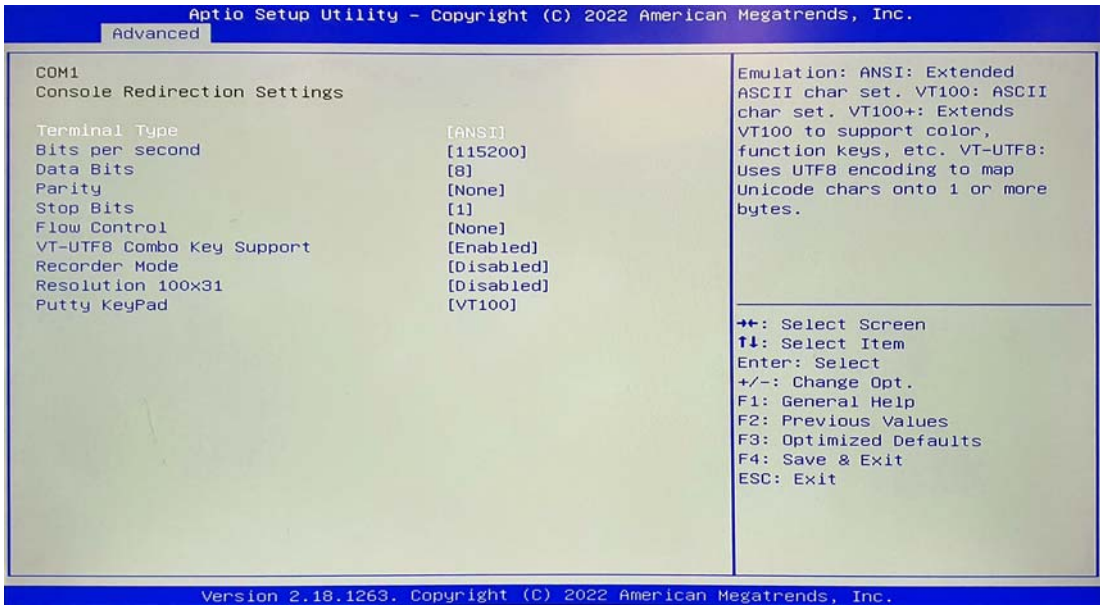
To enable console redirection for COM1, set COM1 Console Redirection to "Enabled".



Super I/O COM Port Legend

Super I/O	COM Port
NCT5104	COM1
	COM2
	COM3
NCT6106	COM4
	COM5
	COM6
	COM7

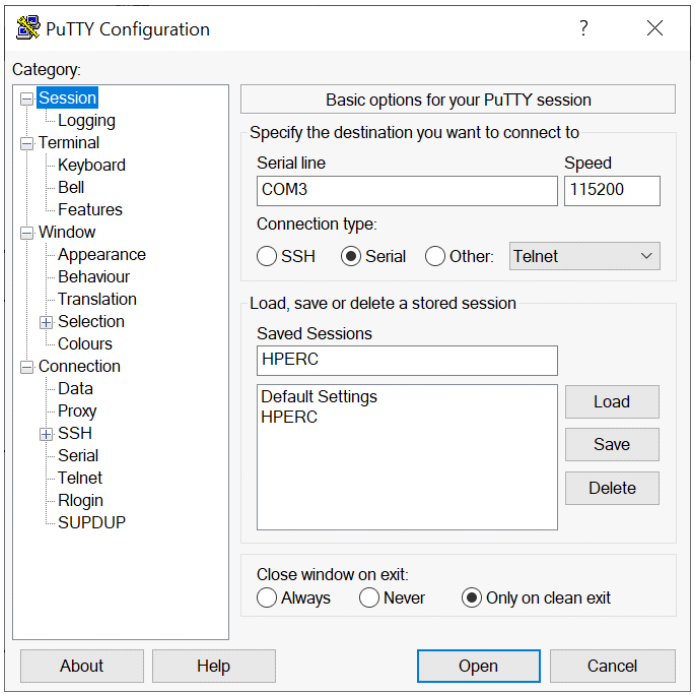
Unless necessary, do not change the default console redirection settings.

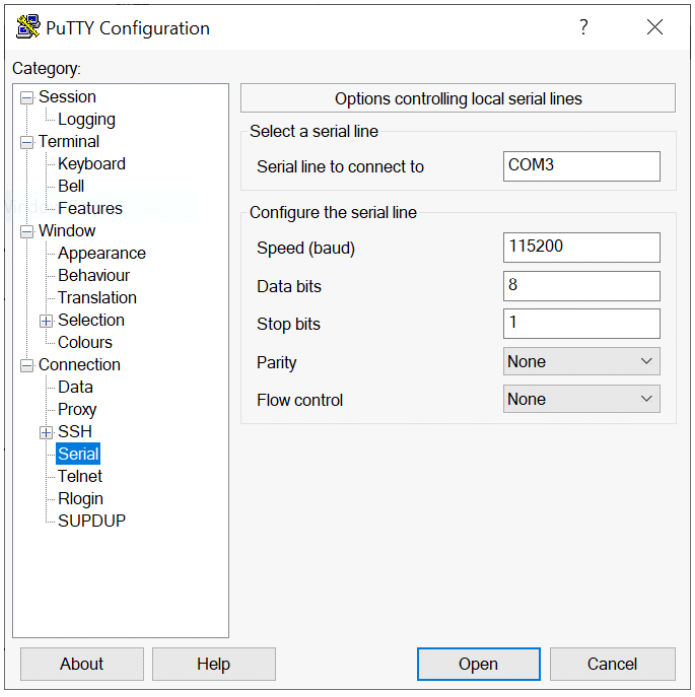


Save and exit the BIOS configuration page. Reboot the system for the changes to take effect.

Open a serial console utility such as Putty (https://www.putty.org/).

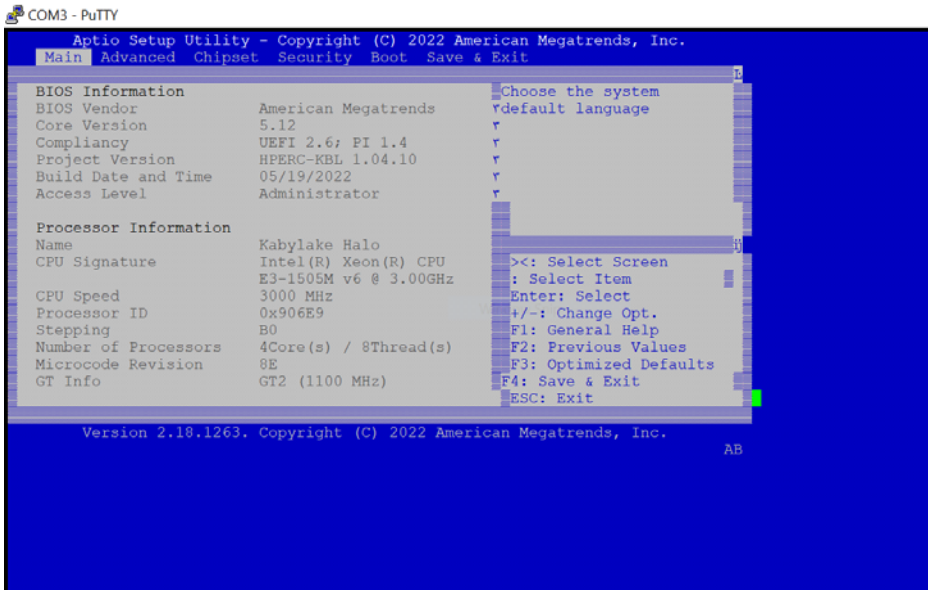
- Set the COM port to match your hardware
- Ensure BAUD rate, parity, and flow control are set in sync with BIOS settings





Click "Open" to establish serial console connection, then power on HPERC system.

Once HPERC powers on, press "delete" and wait for the BIOS menu to appear.



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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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