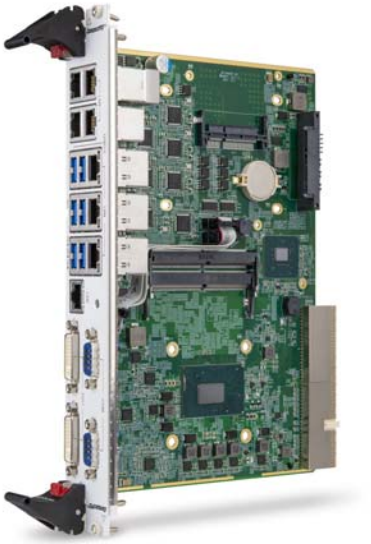
cPCI-6640

Performance 6U CompactPCI®
8th/9th Gen Intel® Core™ i7/i5/i3 Processor Blade

User's Manual



Manual Rev.: 1.0

Revision Date: March 27, 2023

Part Number: 50M-00112-1000

Leading **EDGE COMPUTING**

Revision History

Revision	Release Date	Description of Change(s)
1.0	2023-03-27	Initial release

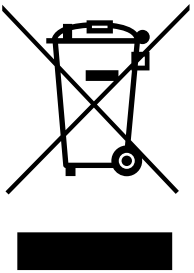
Preface

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.

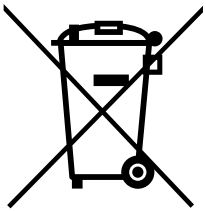
In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

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.

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

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

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

Table of Contents

List of Figures

This page intentionally left blank.

List of Tables

This page intentionally left blank.

1 Introduction

1.1 Overview

The ADLINK cPCI-6640 is a 6U CompactPCI® processor blade featuring an 8th/9th Gen Intel® Core™ (formerly Coffee Lake-H) with Mobile Intel® CM246 Chipset. Dual SO-DIMM slots provide up to 64GB of DDR4-2666 dual-channel memory (2x 32GB modules). ECC memory is also available when paired with a supporting CPU.

The cPCI-6640 processor blade comes in dual-slot (8HP) width form factor. Front panel I/O for the cPCI-6640 includes 2x DVI-D, 8x GbE (2x configurable as PoE ports by BOM option), 6x USB 3.0 ports, and 2x RS232 serial ports.

Graphics support is integrated on the CPU and supports 2 independent displays. Storage includes a CFAST slot and a 22-pin direct connector for 2.5" SATA 6Gb/s drive.

The cPCI-6640 offers outstanding performance provided by the Intel® processor, and is an ideal solution for military, aerospace, transportation and other industrial applications that require best value per watt computing power.

1.2 Features

- 6U CompactPCI blade in 8HP width form factor
- 8th/9th Gen Intel® Core™ with Mobile Intel® CM246 Chipset
- Graphics and memory controllers integrated in processor
- Dual channel DDR4-2666 memory with available ECC up to 64GB
- 32bit/33MHz CompactPCI Interface based on PCI specifications, universal V(I/O)
- Supports host mode operation
- Dual DVI ports on front panel
- Seven RJ45 Gigabit Ethernet ports by Intel® Ethernet Controller I210IT on front panel; two RJ45 ports can optionally support PoE functions (7W per port, 14W total)
- One RJ45 Gigabit Ethernet via Intel® i219LM
- Optional Infineon SLB9672 TPM support

1.3 Package Contents

The cPCI-6640 is packaged with the following components. If any of the following items are missing or damaged, retain the shipping carton and packing material and contact the dealer for inspection. Please obtain authorization before returning any product to ADLINK. The packing contents of cPCI-6640 non-standard configurations will vary depending on customer requests.

CPU module

- The cPCI-6640 Processor Blade
  - CPU and memory specifications will differ depending on options selected
  - Thermal module is assembled on the board
- 2.5” SATA drive accessory pack

Rear Transition Module

- Dependent on the module selected

The contents of non-standard cPCI-6640 configurations may vary depending on the customer’s requirements.

This product must be protected from static discharge and physical shock. Never remove any of the components except at a static-free workstation. Use the anti-static bag shipped with the product when putting the board on a surface. Wear an anti-static wrist strap properly grounded on one of the system's ESD ground jacks when installing or servicing system components.

This page intentionally left blank.

2 Specifications

2.1 cPCI-6640 Processor Blade Specifications

CompactPCI Standards	• PICMG® 2.0 CompactPCI® Rev. 3.0 • PICMG® 2.1 Hot Swap Specification Rev. 2.0 • PICMG® 2.9 System Management (IPMI Rev. 1.5) • PICMG® 2.16 Packet Switching Backplane Rev. 1.0
Mechanical	• Standard 6U CompactPCI® • Board size: 233mm x 160mm • Dual slot (8HP) • CompactPCI® connectors: J1, J2
Processor	• Intel® Core™ i7-9850HE processor, 6-cores/12-threads, 9MB cache, 2.7/4.4GHz, 45/35W by cTDP, Intel® UHD Graphics 630 • Intel® Core™ i7-9850HL processor, 6-cores/12-threads, 9MB cache, 1.9/4.1GHz, 25W TDP, Intel® UHD Graphics 630 • Intel® Core™ i5-8400H processor, 4-cores/8-threads, 8M cache, 2.5/4.2GHz, 45/35W by cTDP, Intel® UHD Graphics 630 • Intel® Core™ i3-9100HL processor, 4-cores/4-threads, 6MB cache, 1.6/2.9GHz, 25W, Intel® UHD Graphics 630
Chipset	• Mobile Intel® CM246 Chipset
Memory	• Dual-channel DDR4-2666 SODIMM sockets, up to 64GB (2x 32GB modules) • ECC memory is available when paired with supporting CPU.
CompactPCI Bus	• One PCIe x1 Pericom PI7C9X113 PCIe-to-PCI bridge • PCI 32-bit/33MHz to J1, J2; universal V I/O • Supports host mode
Gigabit Ethernet	• 7x RJ45 ports via Intel® i210-IT Ethernet controllers (two configurable as PoE by BOM option) • 1x RJ45 port via Intel® i219LM Ethernet controller
Display	• 2x DVI-I ports on front panel
Serial Ports	• 2x RS-232 ports on front panel
USB	• 6x USB 3.0 on front panel
TPM	• TPM 2.0: SLB9672
Storage Interfaces[1]	• 1x onboard 2.5” SATA connector supporting SATA 6Gb/s drive • 1x CFast slot

Table 2-1: cPCI-6640 Processor Blade Specifications

Faceplate I/O	• 8x 10/100/1000BASE-T Ethernet ports • 2x DVI-I ports • 6x USB 3.0 ports • 2x DB9 serial port
OS Compatibility	• Windows 10 Enterprise 2004 64-bit (Please contact ADLINK for other OS support)
Environmental	• Operating Temperature (with forced air flow)[2]: Standard: 0°C to +60°C Extreme temperature: -40°C to +85°C • Storage Temperature: -40°C to +85°C • Humidity: 95% @60°C non-condensing • Shock: 20G peak-to-peak, 11ms duration, non-operating • Vibration[1]: 2Grms, 5-500Hz, each axis, operating (w/o hard drive)
EMI	**EMC:** EN 55032/35 **EMI:** CISPR 32, FCC Part 15B Class A **EMS:** • IEC 61000-4-11 • IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV • IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m • IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV • IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV • IEC 61000-4-6 CS: 1 V • IEC 61000-4-8 PFM

Table 2-1: cPCI-6640 Processor Blade Specifications

1. The storage device limits the operational vibration tolerance. When the application requires higher specification for anti-vibration, it is recommended to use a flash storage device.
2. ADLINK-certified thermal design. The thermal performance is dependent on the chassis cooling design. Sufficient forced air-flow is required. Temperature limits of optional mass storage devices may also affect the thermal specification.

2.2 Block Diagrams

cPCI-6640 Processor Blade

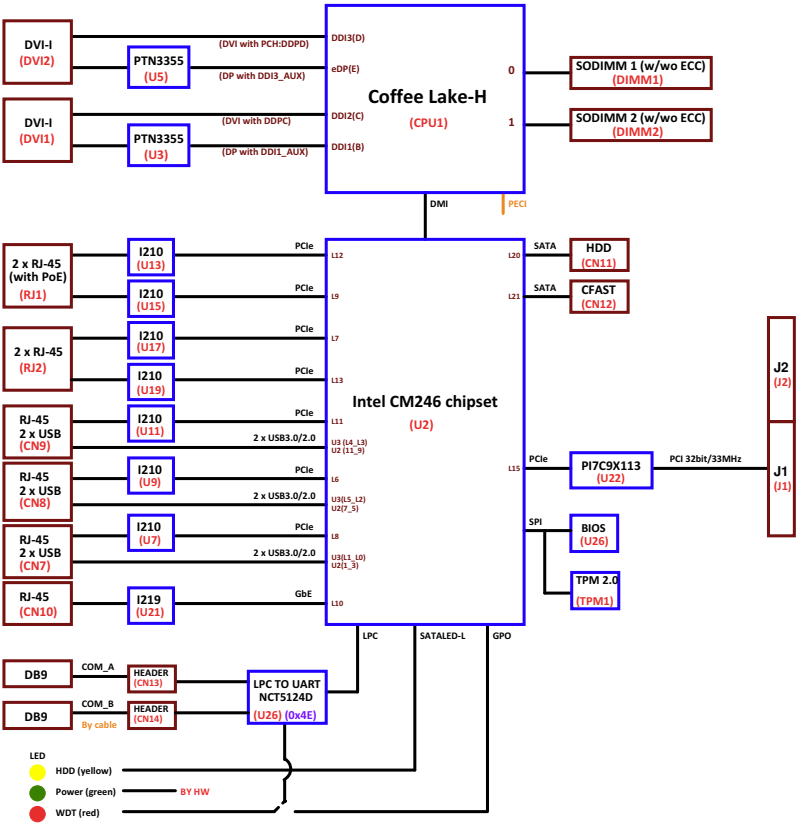


Figure 2-1: cPCI-6640 Processor Blade Functional Block Diagram

2.3 I/O Connectivity Table

Function	cPCI-6640 (8HP)	
	Faceplate	Onboard
GbE	Y (RJ45 x8)	–
COM	Y (DB9 x2)	–
USB 3.0	Y x6	–
DVI	Y x2	–
Serial ATA	–	Y x1
CFast	–	Y x1
LED	Y x3	–
Reset Button	Y	–

Table 2-2: cPCI-6640 I/O Connectivity

2.4 Power Requirements

In order to guarantee a stable functionality of the system, it is recommended to provide more power than the system requires. **An industrial power supply unit should be able to provide at least twice as much power as the entire system requires of each voltage**. An ATX power supply unit should be able to provide at least three times as much power as the entire system requires of each voltage.

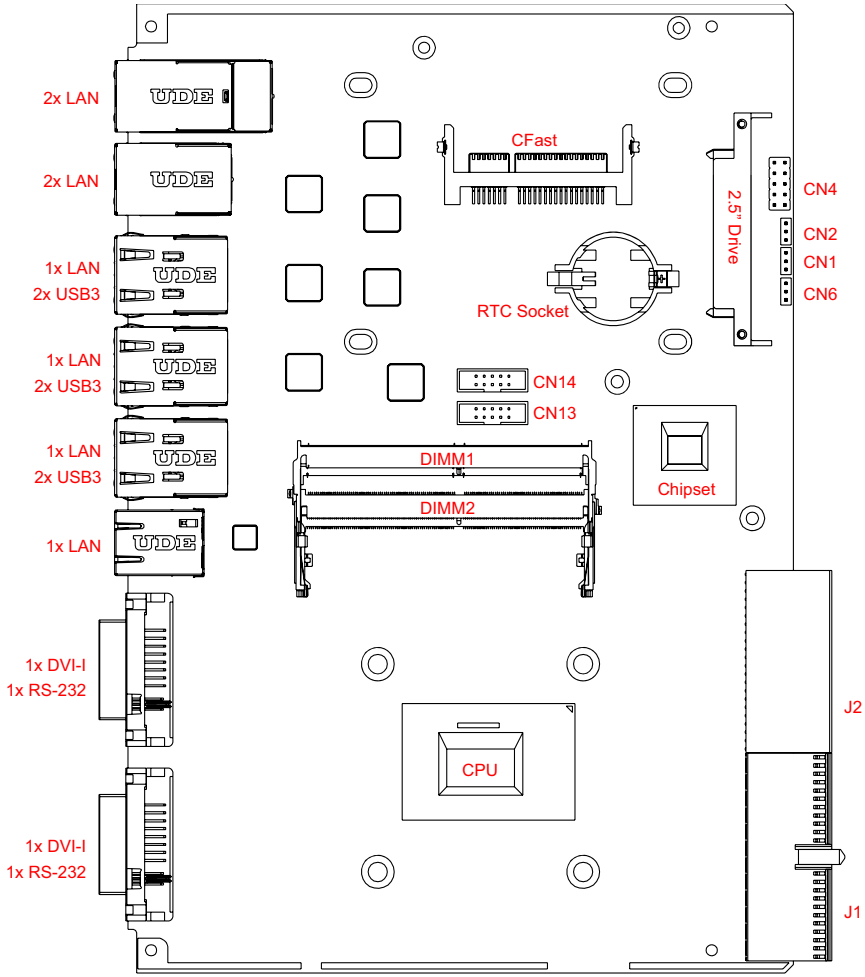
The tolerance of the voltage lines described in the CompactPCI specification (PICMG 2.0 R3.0) is +5%/-3% for 5, 3.3 V and ±5% for ±12V. This specification is for power delivered to each slot and it includes both the power supply and the backplane tolerance.

Voltage	Nominal Value	Tolerance	Max. Ripple (P - P)
5V	+5.0 VDC	+5% / -3%	50 mV
3.3V	+3.3 VDC	+5% / -3%	50 mV
+12V	+12 VDC	+5% / -5%	120 mV
-12V	-12 VDC	+5% / -5%	120 mV
V I/O (PCI I/O Buffer Voltage)	+3.3 VDC or +5 VDC	+5% / -3%	50 mV
GND			

This page intentionally left blank.

3 Board Interfaces

3.1 cPCI-6640 Board Layout



CPU	Intel® Processor	**DVI-I**	DVI-I connectors
Chipset	Intel® CM246 Chipset	**J1-J2**	CompactPCI connectors
CN1	RTC reset jumper	**LAN**	RJ45 Ethernet connectors
CN2/CN4	Debug headers*	**RS-232**	COM port connectors
CN6	ME Lock Jumper	**RTC socket**	RTC battery socket
CN13/14	COM port headers	**USB3**	USB 3.0 connectors
CFast	CFast slot	**2.5” Drive**	2.5” SATA device connector
DIMM1/ DIMM2	Memory sockets		

Figure 3-1: cPCI-6640 Board Layout

NOTE:

Note: Debug Headers (CN2/CN4) are for ADLINK use only and may not be present on all boards.

3.2 cPCI-6640 Front Panel

Front Panel Layout

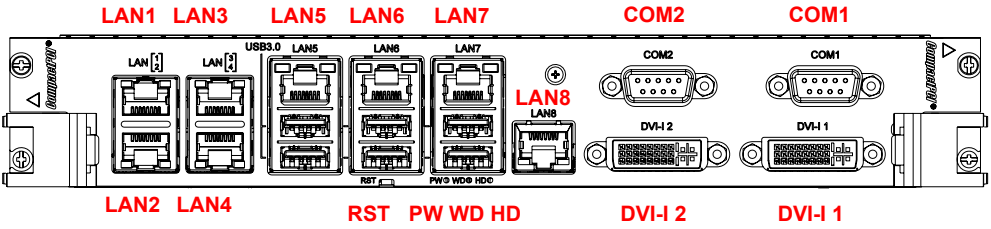


Figure 3-2: cPCI-6640 Front Panel Layout

Note: LAN1 and LAN2 support PoE (by BOM option).

System LEDs

LED	Color	Condition	Indication
Power Status (PW)	Green/ Red	Off	System is off
		Steady On	Post OK
Watchdog (WD)	Red	Off	No Watchdog event
		Steady On	Watchdog event alert
Drive Status (HD)	Yellow	Off	No drive activity
		Blinking	Drive activity

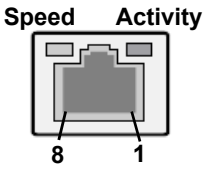
Table 3-1: cPCI-6640 Front Panel System LED Descriptions

3.3 Connector Pin Assignments

RJ-45 Gigabit Ethernet Connectors

Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	LAN_TX0+
2	TX-	LAN_TX0-
3	RX+	LAN_TX1+
4	—	LAN_TX2+
5	—	LAN_TX2-
6	RX-	LAN_TX1-
7	—	LAN_TX3+
8	—	LAN_TX3-

Table 3-2: RJ-45 GbE Pin Definitions



Status		Speed LED (Green/Orange)	Activity LED (Yellow)
Network link is not established or system powered off		OFF	OFF
10 Mbps	Link	OFF	ON
	Active	OFF	Blinking
100 Mbps	Link	Green	ON
	Active	Green	Blinking
1000 Mbps	Link	Orange	ON
	Active	Orange	Blinking

Table 3-3: LAN LED Status Definitions

COM DB-9

Pin #	RS-232
1	DCD-L
2	RXD
3	TXD
4	DTR-L
5	GND
6	DSR-L
7	RTS-L
8	CTS-L
9	RI-L

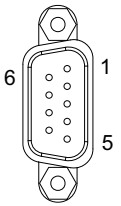


Table 3-4: COM DB-9 Pin Definition

COM Pin Header

Pin #	RS-232
1	DCD-L
2	DSR-L
3	RXD
4	RTS-L
5	TXD
6	CTS-L
7	DTR-L
8	RI-L
9	Ground
10	NC

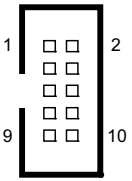


Table 3-5: COM Pin Header Definition

USB 3.0 Connectors

Pin #	Signal Name
1	USB3.0_P5VA
2	USB2_N
3	USB2_P
4	GND
5	USB3A_RXN
6	USB3A_RXP
7	GND
8	USB3A_TXN
9	USB3A_TXP

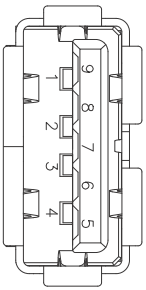


Table 3-6: USB 3.0 Pin Definition

SATA Connector with Power (for 2.5” drive)

Pin #	Signal
S1	GND
S2	TX+
S3	TX-
S4	GND
S5	RX-
S6	RX+
S7	GND
P1	3.3V
P2	3.3V
P3	3.3V
P4	GND
P5	GND
P6	GND
P7	5V
P8	5V
P9	5V
P10	GND
P11	NC
P12	GND
P13~P15	NC

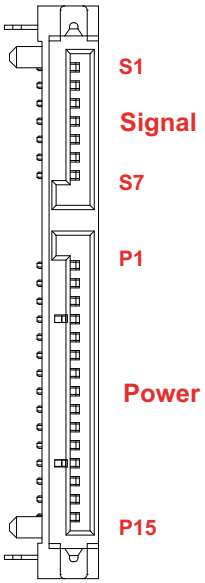


Table 3-7: Serial ATA Connector with Power Pin Definition

CFast Socket

Pin #	Signal Name
S1	Ground
S2	SATA_TX-P
S3	SATA_TX-N
S4	Ground
S5	SATA_RX-N
S6	SATA_RX-P
S7	Ground
P1	NC
P2	Ground
P3	NC
P4	NC
P5	NC
P6	NC
P7	Ground
P8	NC
P9	NC
P10	NC
P11	NC
P12	NC
P13	P3V3
P14	P3V3
P15	Ground
P16	Ground
P17	NC

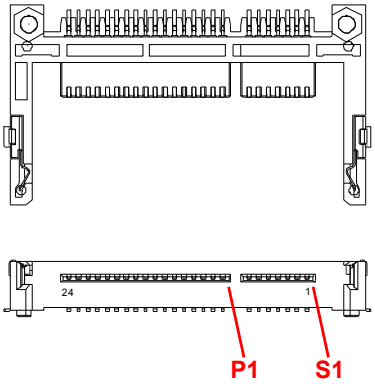
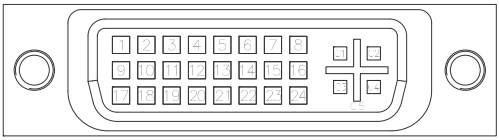


Table 3-8: CFast Socket Pin Definition

DVI-I Connector



Pin #	Signal	Pin #	Signal
1	TMDS Data2-	16	Hot Plug Detect
2	TMDS Data2+	17	TMDS Data0-
3	GND	18	TMDSData0+
4	NC	19	GND
5	NC	20	NC
6	DDC Clock [SCL]	21	NC
7	DDC Data [SDA]	22	GND
8	Analog vertical sync	23	TMDS Clock +
9	TMDS Data1-	24	TMDS Clock -
10	TMDS Data1+	C1	Analog Red
11	GND	C2	Analog Green
12	NC	C3	Analog Blue
13	NC	C4	Analog Horizontal Sync
14	+5 V Power	C5	Analog GND Return
15	GND		

Table 3-9: DVI-I Connector Pin Definition

CompactPCI J1 Connector

Pin	Z	A	B	C	D	E	F
25	GND	+5V	NC, pull 4.7kOhm	NC, pull 10kOhm	P3V3_STB	+5V	GND
24	GND	CPCI_AD1	+5V	CPCI_VIO	CPCI_AD0	NC, pull 4.7kOhm	GND
23	GND	P3V3_STB	CPCI_AD4	CPCI_AD3	+5V	CPCI_AD2	GND
22	GND	CPCI_AD7	GND	P3V3_STB	CPCI_AD6	CPCI_AD5	GND
21	GND	P3V3_STB	CPCI_AD9	CPCI_AD8	CPCI_M66EN	CPCI_CBE-L0	GND
20	GND	CPCI_AD12	GND	CPCI_VIO	CPCI_AD11	CPCI_AD10	GND
19	GND	P3V3_STB	CPCI_AD15	CPCI_AD14	GND	CPCI_AD13	GND
18	GND	CPCI_SERR-L	GND	P3V3_STB	CPCI_PAR	CPCI_CBE-L1	GND
17	GND	P3V3_STB	NC	NC	GND	CPCI_PERR-L	GND
16	GND	CPCI_DEVSEL-L	GND	CPCI_VIO	CPCI_STOP-L	CPCI_LOCK-L	GND
15	GND	P3V3_STB	CPCI_FRAME-L	CPCI_IRDY-L	CPCI_BDSEL#	CPCI_TRDY-L	GND
12-14	Key						
11	GND	CPCI_AD18	CPCI_AD17	CPCI_AD16	GND	CPCI_CBE-L2	GND
10	GND	CPCI_AD21	GND	P3V3_STB	CPCI_AD20	CPCI_AD19	GND
9	GND	CPCI_CBE-L3	CPCI_IDSEL	CPCI_AD23	GND	CPCI_AD22	GND
8	GND	CPCI_AD26	GND	CPCI_VIO	CPCI_AD25	CPCI_AD24	GND
7	GND	CPCI_AD30	CPCI_AD29	CPCI_AD28	GND	CPCI_AD27	GND
6	GND	CPCI_REQ_L0	CPCI_PRESENT-L	P3V3_STB	CPCI_CLK0	CPCI_AD31	GND
5	GND	NC	NC	CPCI_RST-L	GND	CPCI_GNT_L0	GND
4	GND	+5V_IPMB	IPMC_HEALTHY-L	CPCI_VIO	NC, pull 1kOhm	NC, pull 1kOhm	GND
3	GND	CPCI_TCK	CPCI_INTB-L	CPCI_INTC-L	+5V	CPCI_TDI	GND
2	GND	NC	+5V	CPCI_TMS	NC	NC	GND
1	GND	+5V	NC	CPCI_TRST-L	NC	+5V	GND

Table 3-10: CompactPCI J1 Connector Pin Definition

CompactPCI J2 Connector

Pin	Z	A	B	C	D	E	F
22	GND	GA4	GA3	GA2	GA1	GA0	GND
21	GND	CPCI_CLK6	GND	NC	NC	NC	GND
20	GND	CPCI_CLK5	GND	NC	GND	NC	GND
19	GND	GND	GND	NC	NC	NC	GND
18	GND	NC	NC	NC	GND	NC	GND
17	GND	NC	GND	J2_RST-L	CPCI_REQ-L6	CPCI_GNT-L6	GND
16	GND	NC	NC	CPCI_DEG-L	GND	NC	GND
15	GND	NC	GND	CPCI_FAL-L	CPCI_REQ-L5	CPCI_GNT-L5	GND
14	GND	NC	NC	NC	GND	NC	GND
13	GND	NC	GND	CPCI_VIO	NC	NC	GND
12	GND	NC	NC	NC	GND	NC	GND
11	GND	NC	GND	CPCI_VIO	NC	NC	GND
10	GND	NC	NC	NC	GND	NC	GND
9	GND	NC	GND	CPCI_VIO	NC	NC	GND
8	GND	NC	NC	NC	GND	NC	GND
7	GND	NC	GND	CPCI_VIO	NC	NC	GND
6	GND	NC	NC	NC	GND	NC	GND
5	GND	NC	GND	CPCI_VIO	NC	NC	GND
4	GND	CPCI_VIO	NC	NC	GND	NC	GND
3	GND	CPCI_CLK4	GND	CPCI_GNT-L3	CPCI_REQ-L4	CPCI_GNT-L4	GND
2	GND	CPCI_CLK2	CPCI_CLK3	SYSEN-L	CPCI_GNT-L2	CPCI_REQ-L3	GND
1	GND	CPCI_CLK1	GND	CPCI_REQ-L1	CPCI_GNT-L1	CPCI_REQ-L2	GND

Table 3-11: CompactPCI J2 Connector Pin Definition

3.4 Jumpers and Switches

Refer to “cPCI-6640 Board Layout” on page 11 for jumper locations.

RTC Reset Jumper (CN1)

Pin #	Behavior
1-2	Normal operation (default)
2-3	Reset RTC

Table 3-12: RTC Reset

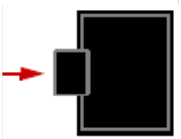
ME Lock Jumper (CN6)

Pin #	Behavior
1-2	ME locked (default)
2-3	ME unlocked

Table 3-13: ME Lock Jumper Settings

System Reset Button

The cPCI-6640 has a system reset button on the front panel. See “cPCI-6640 Front Panel Layout” on page 13 for the button location.



4 Getting Started

This chapter describes the following installation procedures for the cPCI-6640 and rear transition module:

- CPU and Heatsink
- CFast card
- 2.5” SATA drive

4.1 CPU and Heatsink

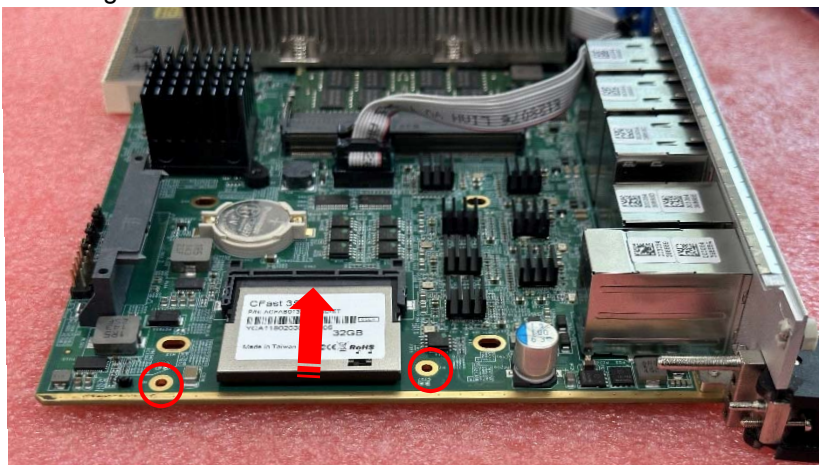
The cPCI-6640 come with CPU and heatsink pre-installed. Removal of heatsink/CPU by users is not recommended. Please contact your ADLINK service representative for assistance.

4.2 CFast Card Installation

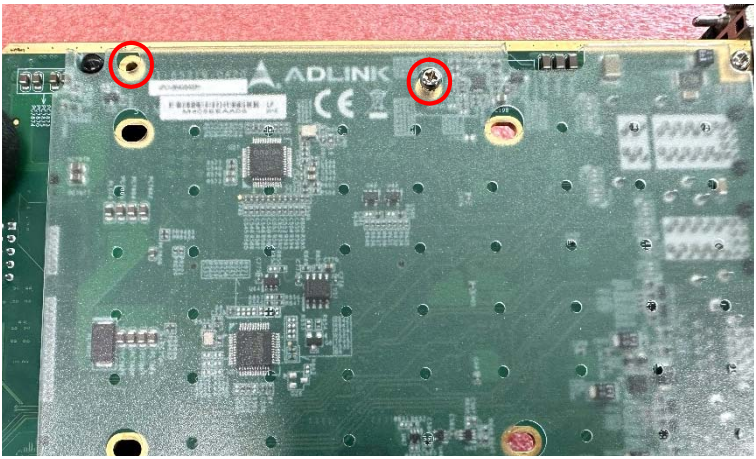
The cPCI-6640 features a CFast card slot. Follow the instructions below to install a CFast card to the cPCI-6640.

1. The mounting hardware for the CFast card includes 1x bracket and 2x M2.5 screws (P/N 58-10442-0000).

2. CFast slot is located at the top edge of the card, below the space for the 2.5" SATA drive. Insert the CFast card as shown below. Place the bracket over the card and align it with the two screw holes indicated



3. While holding the bracket in place, flip the blade over and insert the two screws through the holes as marked. Tighten the screws to secure the CFast card,



4. The CFast card is now ready for use.

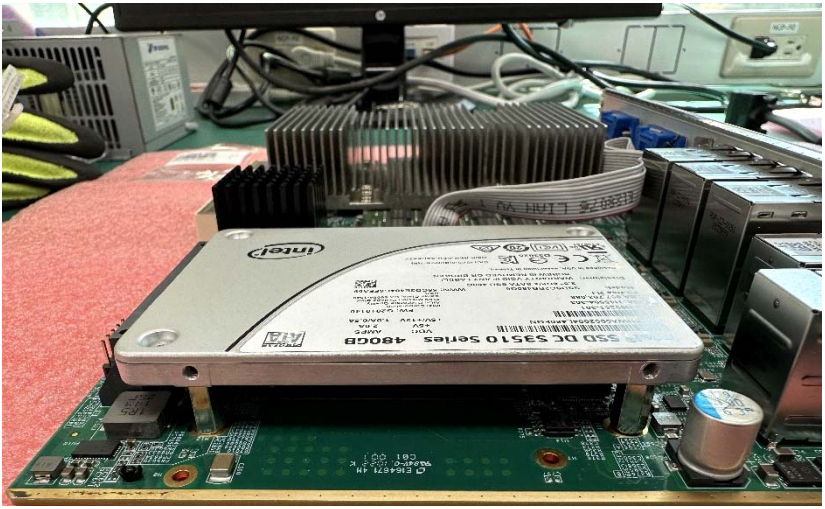
4.3 2.5" SATA Drive Installation

The cPCI-6640 features an onboard 2.5" SATA drive connector.

1. The mounting hardware for the 2.5" SATA drive includes 4x M3 screws and 4x 5.5mm hex standoffs (P/N 58-10331-000E).

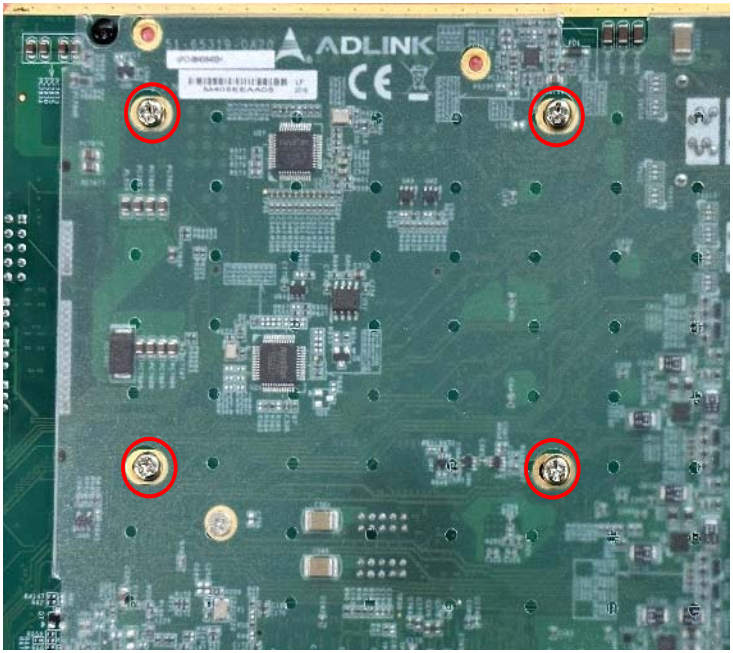
2. Install the 4 standoffs to the bottom of the 2.5" drive as shown below.

3. Install the 2.5” SATA drive into the connector on the blade as shown.



4. Flip the board over, and ensure that the four mounting holes are aligned with the standoffs as shown below.

5. Insert and tighten the four screws to secure the drive.



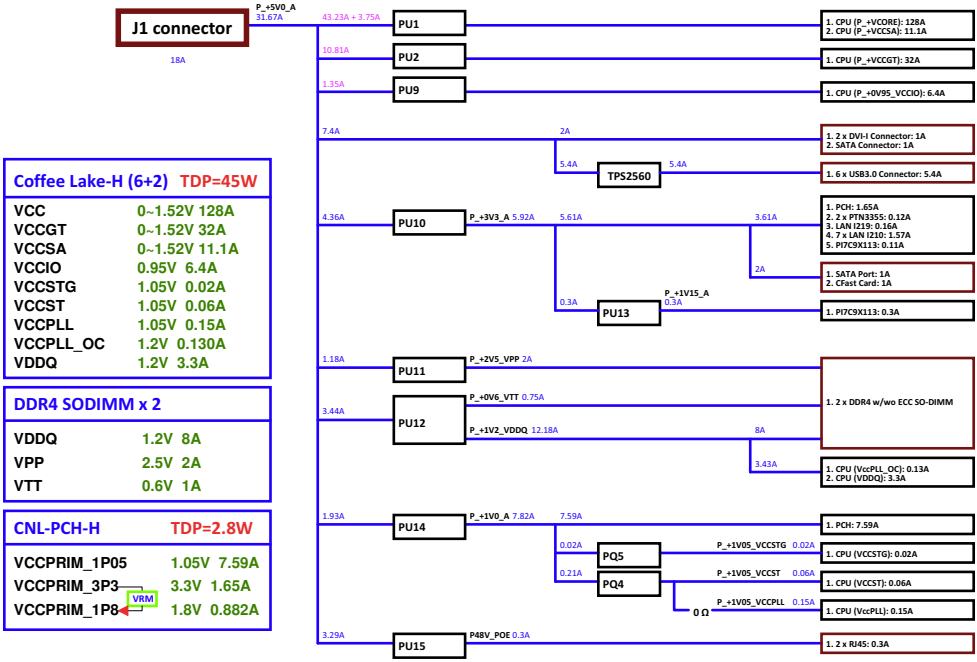
6. The 2.5" SATA drive is now ready for use.

4.4 Installing the cPCI-6640 to the Chassis

The cPCI-6640 must be installed in a system slot of a 6U CompactPCI chassis (host mode only). These instructions are for reference only. Refer to the user guide that comes with the chassis for more information.

1. Be sure to select the correct slot depending on the operational purpose of the module. The system power may now be powered on or off.
2. Remove the blank face cover from the selected slot, if necessary.
3. Press down on the release catches of the cPCI-6640 ejector handles.
4. **Remove the black plastic caps securing the mounting screws to the front panel.**
5. Align the module's top and bottom edges to the chassis card guides, and then carefully slide the module into the chassis. A slight resistance may be felt when inserting the module. If the resistance it too strong, check if there are bent pins on the backplane or if the board's connector pins are not properly aligned with connectors on the backplane. Then push the board until it is completely flush with the chassis.
6. Push the ejector handles outwards to secure the module in place, and then fasten the screws on the module front panel.
7. Connect the cables and peripherals to the board, and then turn the chassis on if necessary.

4.5 Power Sequence

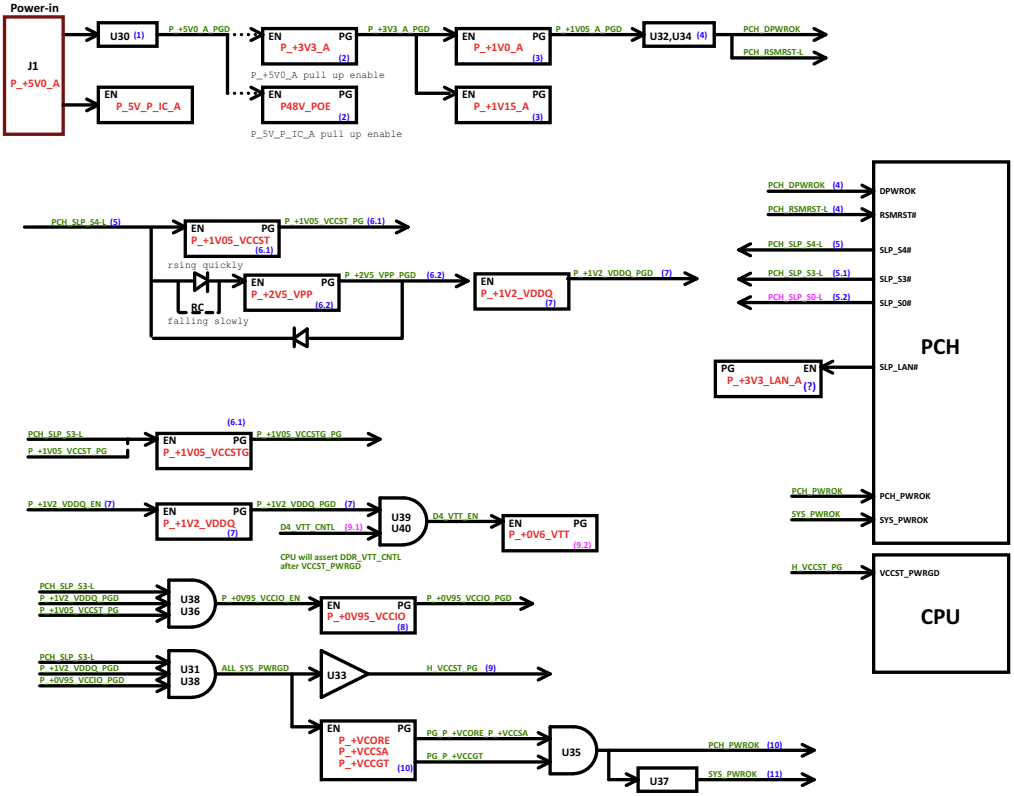


Coffee Lake-H (6+2)	TDP=45W
VCC	0~1.52V 128A
VCCGT	0~1.52V 32A
VCCSA	0~1.52V 11.1A
VCCIO	0.95V 6.4A
VCCSTG	1.05V 0.02A
VCCST	1.05V 0.06A
VCCPLL	1.05V 0.15A
VCCPLL_OC	1.2V 0.130A
VDDQ	1.2V 3.3A

DDR4 SODIMM x 2	
VDDQ	1.2V 8A
VPP	2.5V 2A
VTT	0.6V 1A

CNL-PCH-H	TDP=2.8W
VCCPRIM_1P05	1.05V 7.59A
VCCPRIM_3P3	3.3V 1.65A
VCCPRIM_1P8	1.8V 0.882A

VRM


Power-in
J1
P_+5V0_A
U30 (1)
P_+5V0_A_PGD
EN
P_+3V3_A
PG
(2)
P_+3V3_A_PGD
EN
P_+1V0_A
PG
(3)
P_+1V05_A_PGD
U32,U34 (4)
PCH_DPWROK
PCH_RSMRST-L
P_+5V0_A pull up enable
EN
P_5V_P_IC_A
EN
P48V_POE
PG
(2)
P_5V_P_IC_A pull up enable
EN
P_+1V15_A
PG
(3)
PCH_SLP_S4-L (5)
EN
P_+1V05_VCCST
PG
(6.1)
P_+1V05_VCCST_PG (6.1)
rsing quickly
EN
P_+2V5_VPP
PG
(6.2)
P_+2V5_VPP_PGD (6.2)
EN
P_+1V2_VDDQ
PG
(7)
P_+1V2_VDDQ_PGD (7)
falling slowly
PCH_DPWROK (4)
PCH_RSMRST-L (4)
PCH_SLP_S4-L (5)
PCH_SLP_S3-L (5.1)
PCH_SLP_S0-L (5.2)
DPWROK
RSMRST#
SLP_S4#
SLP_S3#
SLP_S0#
PCH
SLP_LAN#
PG
EN
P_+3V3_LAN_A
(7)
PCH_SLP_S3-L
P_+1V05_VCCST_PG
(6.1)
EN
P_+1V05_VCCSTG
PG
P_+1V05_VCCSTG_PG
P_+1V2_VDDQ_EN (7)
EN
P_+1V2_VDDQ
PG
(7)
P_+1V2_VDDQ_PGD (7)
D4_VTT_CNTL (9.1)
U39
U40
D4_VTT_EN
EN
P_+0V6_VTT
PG
(9.2)
CPU will assert DDR_VTT_CNTL
after VCCST_PWRGD
PCH_PWROK
SYS_PWROK
PCH_PWROK
SYS_PWROK
H_VCCST_PG
VCCST_PWRGD
CPU
PCH_SLP_S3-L
P_+1V2_VDDQ_PGD
P_+1V05_VCCST_PG
U38
U36
P_+0V95_VCCIO_EN
EN
P_+0V95_VCCIO
PG
(8)
P_+0V95_VCCIO_PGD
PCH_SLP_S3-L
P_+1V2_VDDQ_PGD
P_+0V95_VCCIO_PGD
U31
U38
ALL_SYS_PWRGD
U33
H_VCCST_PG (9)
EN
P_+VCORE
P_+VCCSA
P_+VCCGT
PG
(10)
PG_P_+VCORE_P_+VCCSA
PG_P_+VCCGT
U35
PCH_PWROK (10)
U37
SYS_PWROK (11)

This page intentionally left blank.

5 Driver Installation

The cPCI-6640 drivers are available the ADLINK website (https://www.adlinktech.com/Products/CompactPCI/6UCompactPCI2.0Blades/cPCI-6640_Series). ADLINK provides validated drivers for Windows 10 64-bit. We recommend using these drivers to ensure compatibility.

5.1 cPCI-6640 Drivers

The following describes the cPCI-6640 driver installation procedures for Windows 10 64-bit.

1. Install the Windows 10 operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.
2. Install the **chipset driver** by extracting and running the program in **...\Chipset\Intel_Chipset_10.1.17541.8066.zip**.
3. Install the **graphics driver** and utilities by extracting and running the program in **...\Graphics\Intel_Graphics_Driver_win64.zip**.
4. Install the **Intel Rapid Storage Technology Utility** by extracting and running the program in **…\RST\Intel_Rapid_Storage_Technology_16.0.2.1086.zip**.
5. Install the **Intel® Management Engine Interface driver** for Intel® AMT support by extracting and running the program in:
   - ▷ CM Series Chipset supporting Xeon Processors: **...\Intel_ME_Corporate_12.0.3.1091.zip**
     or
   - ▷ QM Series Chipset supporting i7/i5/i3/Celeron Processors **...\Intel_ME_Consumer_12.0.3.1091.zip**
6. Install the Intel Serial Rapid IO driver by extracting and running the program in ...**\SIO\Intel_Serial_IO_30.100.1727.1.zip**.

This page intentionally left blank.

6 BIOS Setup Utility

The following chapter describes basic navigation for the AMI EFI BIOS setup utility.

6.1 Starting the BIOS

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the following text prompt:
   < Press DEL to run Setup >
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu.

In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

Setup Menu

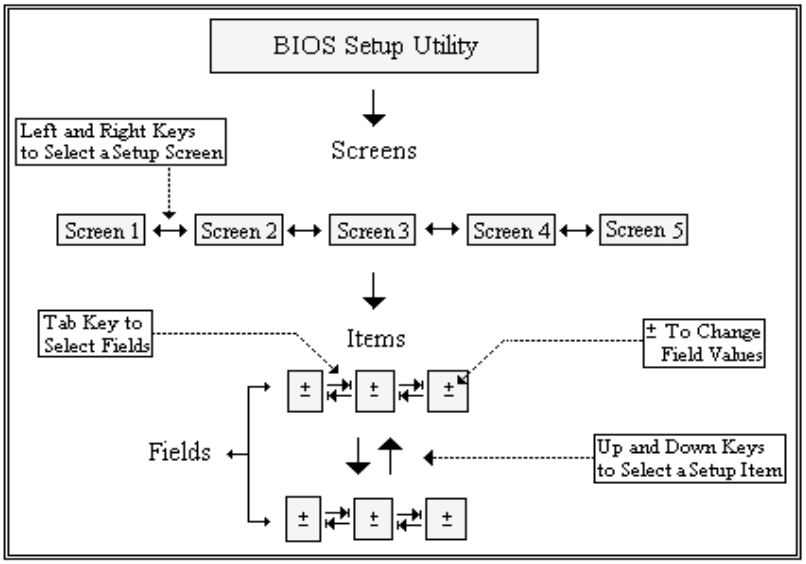
The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.



NOTE: There is a hot key legend located in the right frame on most setup screens.

→←	Left/Right. The Left and Right < Arrow > keys allow you to select a setup screen. For example: Main screen, Advanced screen, Chipset screen, and so on.
↑↓	Up/Down The Up and Down < Arrow > keys allow you to select a setup item or sub-screen.
+-	Plus/Minus The Plus and Minus < Arrow > keys allow you to change the field value of a particular setup item. For example: Date and Time.
Tab	The < Tab > key allows you to select setup fields.
ESC	The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

6.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. The Main BIOS Setup menu is shown below.

Main	Advanced	Chipset	Boot	Security	Save & Exit	Server Mgmt
-BIOS Information -System Information -Stepping -System Date -Access Level	-CPU ► Configuration -USB ► Configuration -AMT ► Configuration -Super IO ► Configuration -Serial Console Redirection ► -Miscellaneous -Network ► Stack Configuration -Intel® i210 Gigabit Network Connection – [MAC address] … -Intel® i210 Gigabit Network Connection – [MAC address]	-System ► Agent (SA) Configuration -PCH-IO ► Configuration	-Password Description -Secure Boot Menu ►	-Boot Configuration	-Save Options -Boot Override	-BMC Self Test Status -BMC Device ID -BMC Device Revision -BMC Firmware Revision -IPMI Version -BMC Intreface(s)


NOTE:

► indicates a submenu
Gray text indicates info only

6.2.1 BIOS Information

Feature	Options	Description
BIOS Vendor	Info only American Megatrends	Display vendor name of system BIOS
BIOS Version	Info only	Display version of booting BIOS
Build Date	Info only	Date the BIOS was built
MRC Version	Info only	Platform MRC Version
GOP Version	Info only	Platform GOP Version
ME FW Version	Info only	Intel Management Engine Version

6.2.2 System Information

Feature	Options	Description
Project Name	Info only	Display Project Name
CPU Board Version	Info only	Display CPU Board Version
CPU Brand String	Info only	Display Intel CPU Brand Information

6.2.3 Stepping

Feature	Options	Description
GT Info	Info only	
CPU Frequency	Info only	
Total Memory	Info only	
Memory Frequency	Info only	
PCH SKU	Info only	
Stepping	Info only	

6.2.4 System Date and Time

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

6.2.5 Access Level

Feature	Options	Description
Access Level	Info only	Displays current user

6.3 Advanced

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

6.3.1 CPU Configuration

Feature	Options	Description
Type	Info only	Manufacturer, model
ID	Info only	Display CPU Information
Microcode Revision	Info only	Display Microcode Revision
Speed	Info only	Display CPU Speed.
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 Data Cache size
L3 Cache	Info only	Display L3 Data Cache size
L4 Cache	Info only	Display L4 Data Cache size
VMX	Info only	
SMX/TXT	Info only	
Boot performance mode	Max Battery **Max Non-Turbo Performance** Turbo Perfromance	Select the performance state that the BIOS will set starting from reset vector.
Hyper-Threading	Disabled **Enabled**	Enabled or Disabled Hyper-Threading Technology
Intel® SpeedStep™	Disabled **Enabled**	Allows more than two frequency ranges to be supported
Intel® Speed Shift Technology	Disabled **Enabled**	Enable/Disable Intel® Speed Shift Technology support.
Turbo Mode	Disabled **Enabled**	Enable/Disable processor Turbo Mode
Configurable TDP Boot Mode	**Nominal** Deactivate	Configurable TDP Mode as Nominal/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero
Platform PL1 Enable	**Disabled** Enabled	When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor

Feature	Options	Description
Platform PL1 Power	0	Platform Power Limit 1 Power in Milli Watts. BIOS will round to the nearest 1/8W when programming. Any value can be programmed between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). For 12.50W, enter 12500. This setting will act as the new PL1 value for the Package RAPL algorithm.
Platform PL1 Time Window	0	Platform Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = default values. Indicates the time window over which Platform TDP value should be maintained.
C state	Disabled **Enabled**	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Package C State Limit	C0/C1 C2 C3 C6 C7 C7S C8 C9 C10 CPU Default **Auto**	Maximum Package C State Limit Setting. CPU Default: Leaves to Factory default value. Auto: Initializes to deepest available Package C State Limit
Active Processor Cores	**All** 1 2 3 4 5	Number of cores to enable in each processor package.
Intel (VMX) Virtualization Technology	Disabled **Enabled**	Enable/Disable VMX capability
VT-d	Disabled **Enabled**	Enable/Disable VT-d capability
DTS SMM	Disabled **Enabled** Critical Temp Reporting (Out of spec)	Disabled: ACPI thermal management uses EC reported temperature values. Enabled: ACPI thermal management uses DTS SMM mechanism to obtain CPU temperature values. Out of Spec: ACPI Thermal Management uses EC reported temperature values and DTS SMM is used to handle Out of Spec.
Intel Trusted Execution Technology	**Disabled** Enabled	Enable/Disable utilization of additional hardware capabilities provided by Intel® Trusted Execution Technology. Changes require a full power cycle to take effect.

6.3.2 USB Configuration

Feature	Options	Description
USB Module version	Info only	
USB Controllers:	Info only	
USB Devices:	Info only	.
XHCI Compliance Mode	Enabled **Disabled**	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
xDCI Support	Enabled **Disabled**	Workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver
USB Port Disable Override	Enabled **Disabled**	Enable/Disable USB Mass Storage Driver Support

6.3.3 AMT Configuration

Feature	Options	Description
AMT BIOS Features	**Enabled** Disabled	When disabled AMT BIOS features are no longer supported and user is no longer able to access MEBx setup Note: This does not disable manageability features in firmware
MEBx Hotkey Pressed	**Disabled** Enabled	Enable it to press Ctrl+P to enter MEBx

6.3.4 Super IO Configuration

Feature	Options	Description
NCT6106D Super IO Configuration	Info only	
Serial Port 1 Configuration	Submenu	
Serial Port 2 Configuration	Submenu	

Super IO Management > Serial Port 1 Configuration

Feature	Options	Description
Serial Port 1 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	
Change Settings	**AUTO** IO=3F8;IRQ=4; IO=3F8;IRQ=3,4,5,7,9,10,11,12 IO=2F8;IRQ=3,4,5,7,9,10,11,12 IO=3E8;IRQ=3,4,5,7,9,10,11,12 IO=2E8;IRQ=3,4,5,7,9,10,11,12	Select an optimal setting for Super IO device

Super IO Management > Serial Port 2 Configuration

Feature	Options	Description
Serial Port 2 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	
Change Settings	**AUTO** IO=3F8;IRQ=4; IO=3F8;IRQ=3,4,5,7,9,10,11,12 IO=2F8;IRQ=3,4,5,7,9,10,11,12 IO=3E8;IRQ=3,4,5,7,9,10,11,12 IO=2E8;IRQ=3,4,5,7,9,10,11,12	Select an optimal setting for Super IO device

6.3.5 Serial Console Redirection

Feature	Options	Description
Serial Console Redirection	Info only	
COM1~2		
Console Redirection	Enabled **Disabled**	Console Redirection enable or disable
Console Redirection Settings	Submenu	

Console Redirection Settings

Feature	Options	Description
Console Redirection Settings	Info only	
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 other side. Long or noisy lines may require lower speeds.
Data Bits	7 **8**	Data Bits.
Parity	**None** Even Odd	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
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 Software	Hardware flow control uses RTC/CTS. Software flow control uses XON/XOFF

Feature	Options	Description
VT-UTF8 Combo Key Support	Disabled **Enable**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
Recorder Mode	**Disabled** Enable	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	**Disabled** Enable	Enables or disables extended terminal resolution
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

6.3.6 Miscellaneous

Feature	Options	Description
Trusted Computing	Submenu	Trusted Computing Settings
Network	**Do not launch** UEFI	Controls the execution of UEFI Network OpROM

Trusted Computing

Feature	Options	Description
Security Device Support	**Disabled** Enabled	

6.3.7 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.
IPSEC Certificate	**Enabled**	Support to Enable/Disable IPSEC certificate for Ikev.
PXE boot wait time	**0**	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	**1**	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

6.3.8 Intel i210 Gigabit Network Connection - [MAC address]

Feature	Options	Description
NIC Configuration	**Submenu**	Configure the network device port
Blink LEDs	**0**	Press “Return” key to identify the physical network port by blinking the associated LED
UEFI Driver	Info only	
Adapter PBA	Info only	
Device Name	Info only	
Chip Type	Info only	
PCI Device ID	Info only	
PCI Address	Info only	
Link Status	Info only	
MAC Address	Info only	
Virtual MAC address	Info only	

NIC Configuration

Feature	Options	Description
Link Speed	**Auto Negotiated** 10 Mbps Half 10 Mbps Full 100 Mbps Half 100 Mbps Full	
Wake on LAN	**Disabled** Enabled	

6.4 Chipset

Feature	Options	Description
System Agent (SA) Configuration	Submenu	System Agent (SA) Parameters
PCH-IO Configuration	Submenu	PCH parameters

6.4.1 System Agent (SA) Configuration

Feature	Options	Description
SA PCIe Code Version	Info only	Displays SA PCIe code revision
VT-d	Info only	Displays VT-d supported or not
Memory Configuration	Submenu	Memory parameters
Graphics Configuration	Submenu	Graphics parameters
PEG Port Configuration	Submenu	PEG port parameters
Above 4GB MMIO BIOS assignment	Enabled **Disabled**	Enable/Disable above 4GB memory mapped BIOS assignment.

Memory Configuration

Feature	Options	Description
Memory RC Version	Info only	Display RC version
Memory Frequency	Info only	Display memory frequency
Memory Voltage	Info only	Display memory voltage
Memory Timings (tCL-tRCD-tRP-tRAS)	Info only	Display memory timing parameters
Channel 0 Slot 0	Info only	Display memory Size
Channel 1 Slot 0	Info only	Display memory Size
Maximum Memory Frequency	**Auto** 1067, 1200…, 6200	Maximum memory frequency selections in MHz. Valid values should match the refclk, i.e. divided by 133 or 100
Max TOLUD	**Dynamic** 1 GB, 1.25GB…3.5GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

Graphics Configuration

Feature	Options	Description
Skip Scaning of External Gfx Card	**Disabled** Enabled	If Enabled, it will not scan for External Gfx card on PEG and PCH PCIE ports
Primary Display	**Auto** IGFX PEG PCIe	Select which IGFX/PEG/PCI Graphics device should be Primary Display.
Select PCIe Card	**Auto** Elk Creek 4 PEG Eval	Select the card used on the platform Auto: Skip GPIO based power enable to dGPU Elk Creek 4: dGPU Power Enable = ActiveLow PEG Eval: dGPU Power Enable = ActiveHigh
Internal Graphics	**Auto** Disabled Enabled	Keep IGFX enabled based on the setup options
GTT Size	2MB 4MB **8MB**	Select the GTT Size
Aperture Size	128MB **256MB** 512MB 1024MB 2048MB	Select the Aperture Size Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM support.
DVMT Pre-Allocated	0M **32M** 64M 4M 8M 12M 16M 20M 24M 28M 32M/F7 36M 40M 44M 48M 52M 56M 60M	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 graphics memory used by the internal graphics device.

PEG Port Configuration

Feature	Options	Description
PEG 0:1:0 / 0:1:1 / 0:1:2 / 0:6:0	Info only	
Enable Root Port	Disabled Enabled **Auto**	Enable or disable this root port
Max Link Speed	**Auto** Gen1 Gen2 Gen3	Configure PEG 0:1:0 max speed
PEG0 Slot Power Limit Value	Info only	
PEG0 Slot Power Limit Scale	**1.0x** 0.1x 0.01x 0.001x	Select the scale used for the Slot Power Limit Value.
PEG0 Physical Slot Number	Info only	
Gen3 RxCTLE Control	Submenu	
PCIe Rx CEM Test Mode	**Disabled** Enabled	Enable/Disable PEG Rx CEM Loopback Mode
PCIe Spread Spectrum Clocking	**Enabled** Disabled	Allows disabling Spread Spectrum Clocking for compliance testing

Gen3 RxCTLE Control

Feature	Options	Description
Bundle0	Info only	Gen3 RxCTLE setting for Bundle0 (Lane0, Lane1)
Bundle1	Info only	Gen3 RxCTLE setting for Bundle1 (Lane2, Lane3)
Bundle2	Info only	Gen3 RxCTLE setting for Bundle2 (Lane4, Lane5)
Bundle3	Info only	Gen3 RxCTLE setting for Bundle3 (Lane6, Lane7)
Bundle4	Info only	Gen3 RxCTLE setting for Bundle4 (Lane8, Lane9)
Bundle5	[Max-Value, Min-Value, Step-Value] = [0x0F, 0x00, 0x01]	Gen3 RxCTLE setting for Bundle5 (Lane10, Lane11)
Bundle6	Info only	Gen3 RxCTLE setting for Bundle6 (Lane12, Lane13)
Bundle7	Info only	Gen3 RxCTLE setting for Bundle7 (Lane14, Lane15)
PEG10 RxCTLE Override	**Disabled** Enabled	When Enabled, it overrides PEG0 RxCTLE adaptive behaviour
PEG11 RxCTLE Override	**Disabled** Enabled	When Enabled, it overrides PEG1 RxCTLE adaptive behavior
PEG12 RxCTLE Override	**Disabled** Enabled	When Enabled, it overrides PEG2 RxCTLE adaptive behavior
DMI RxCTLE Override	**Disabled** Enabled	When Enabled, it overrides DMI RxCTLE adaptive behavior

6.4.2 PCH-IO Configuration

Feature	Options	Description
PCI Express Configuraiton	Submenu	Configure Serial IRQ Mode.
SATA And RST Configuration	Submenu	Enable/Disable SMBus Support.
SerialIO Configuration	Submenu	
PCH LAN Controller	**Enabled** Disabled	Enable/Disable onboard NIC
Wake on LAN For S5 Enable	**Enabled** Disabled	Enable/Disable integrated LAN to wake the system only for S5.
Serial IRQ Mode	Quiet **Continuous**	Configure Serial IRQ Mode
High Precision Timer	**Enabled** Disabled	Enable or Disable the High Precision Event Timer
PCIE PLL SSC	**Auto** 0.0%~2.0%	PCIe PLL SSC percentage. Auto – Keep HW default, no BIOS override. Range is 0.0%-2.0%
SPD Write Disable	**True** False	Enable/Disable setting SPD write disable. For security recommendations, SPD write disable bit must be set.
State After G3	Info only	

PCIe Configuration

Feature	Options	Description
PCIe Configuration	Info only	
PCI Express Clock Gating	Disabled **Enabled**	PCI Express Clock Gating Enable/Disable for each root port
DMI Link ASPM Control	**Disabled** L0s L1 L0sL1 Auto	The control of Active State Power Management of the DMI Link
PCIE Port assigned to LAN	Info only	
Compliance Test Mode	**Disabled** Enabled	Enable when using Compliance Load Board
PCIe-USB Glitch W/A	**Disabled** Enabled	PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG port.
PCIe function swap	Disabled **Enabled**	When Disabled, prevents PCIE root port function swap. If any function other than 0^{th} is enabled, 0^{th} will become visible.
PCIe Root Port X	Submenu	

PCIe Configuration > PCIe Root PortX

Feature	Options	Description
PCIe Root PortX	Disabled **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in **Slot**	Built-In: a built-in device is connected to this root port. Slot Implemented bit will be clear. Slot: this root port connects to user-accessible slot. Slot Implemented bit will be set.
ASPM	**Disable** L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all inks to L0s State Auto – BIOS auto configure Disable – Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 substates settings.
Gen3 Eq Phase3 Method	**Hardware** Static Coeff.	PCIe Gens3 Equalization Phase 3 Method
UPTP	Info only	Upstream Port Transmitter Preset
DPTP	Info only	Downstream Port Transmitter Preset
ACS	**Enabled** Disabled	Enable/Disable Access Control Services Extended Capability
PTM	**Enabled** Disabled	Enable/Disable Precision Time Measurement
DPC	**Enabled** Disabled	Enable/Disable Downstream Port Containment
EDPC	**Enabled** Disabled	Enable/Disable Rootport extensions for Downstream Port Containment
URR	Enabled **Disabled**	PCI Express Unsupported Request Reporting Enable/Disable
FER	Enabled **Disabled**	PCI Express Device Fatal Error Reporting Enable/Disable
NFER	Enabled **Disabled**	PCI Express Device Non-Fatal Error Reporting Enable/Disable
CER	Enabled **Disabled**	PCI Express Device Correctable Error Reporting Enable/Disable
CTO	Enabled **Disabled**	PCI Express Completion Timer TO Enable/Disable.
SEFE	Enabled **Disabled**	Root PCI Express System Error on Fatal Error Enable/Disable
SENFE	Enabled **Disabled**	Root PCI Express System Error on Non-Fatal Error Enable/Disable.

Feature	Options	Description
SECE	Enabled **Disabled**	Root PCI Express System Error on Correctable Error Enable/Disable
PME SCI	**Enabled** Disabled	PCI Express PME SCI Enable/Disable
Hot Plug	Enabled **Disabled**	PCI Express Hot Plug Enable/Disable
Advanced Error Reporting	**Enabled** Disabled	Advanced Error Reporting Enable/Disable
PCIe Speed	**Auto** Gen1 Gen2 Gen3	Configure PCIe Speed
Transmitter Half Swing	**Disabled** Enabled	Transmitter Half Swing Enable/Disable
Detect Timeout	Info only	The number of milliseconds reference code will wait for link to exit Detect State for enabled ports before assuming there is no device and potentially disabling the port.
Extra Bus Reserved	Info only	Extra Bus Reserved (0-7) for bridges behind this Root Bridge
Reserved Memory	Info only	Resreved Memory for this Root Bridge (1-20) MB
Reserved I/O	Info only	Reserved I/O (4K/8K/12K/16K/20K) range for this root bridge
PCH PCIe LTR Configuration		
LTR	**Enabled** Disabled	PCH PCIE Latency Reporting
Snoop Latency Override	Disabled Manual **Auto**	Snoop Latency Override for PCH PCIE. Disabled: Disable override Manual: Manually enter override values. Auto (default): Maintain default BIOS flow.
Non Snoop Latency Override	Disabled Manual **Auto**	Non Snoop Latency Override for PCH PCIE. Disabled: Disable override. Manual: Manually enter override values. Auto (default): Maintain default BIOS flow.
Force LTR Override	**Disabled** Enabled	Force LTR Override for PCH PCIE.
LRT Lock	**Disabled** Enabled	PCIE LTR configuration lock

SATA And RST Configuration

Feature	Options	Description
SATA And RST Configuration	Info only	
SATA Controller(s)	Disabled **Enabled**	Enable/Disable SATA Device
SATA Mode Selection	**AHCI** Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled **Disabled**	Test Mode Enable/Disable (Loop Back)
Software Feature Mask Configuration	Submenu	
Aggressive LPM Support	**Enabled** Disabled	Enable PCH to aggressively enter link power state.
SATA Controller Speed	**Default** Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support
Serial ATA Port X, X = 0-7	Info only	
Software Preserve	Info only	
Port X	**Enabled** Disabled	Enable or Disable SATA Port.
Hot Plug	Enabled **Disabled**	Designates this port as Hot Pluggable
Configured as eSATA	Info only	
External	Enabled **Disabled**	Marks this port as external
Spin Up Device	**Disabled**	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	**Hard Disk Drive** Solid State Drive	Identify the SATA port is connected to solid state drive or hard disk drive
SATA Port X DevSlp	**Disabled** Enabled	Enable/Disable SATA Port X DevSlp. For DevSlp to work, both hard drive and SATA port need to support DevSlp function, otherwise an unexpected behavior might happen. Please check board design before enabling it.
DTTO Configuration	**Disabled** Enabled	Enable/Disable DITO configuration
DITO Value	Info only	Display DITO value
DM Value	Info only	Display DM value

SATA And RST Configuration > Software Feature Mask Configuration

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

Serial IO Configuration

Feature	Options	Description
I2C0 Controller	Disabled **Enabled**	Enables/Disables Serial IO Controller
I2C1 Controller	Disabled **Enabled**	Enables/Disables Serial IO Controller

6.5 Security

6.5.1 Password Description

Feature	Options	Description
Administrator Password	Enter password	Configure/Clear Administrator Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password
User Password	Enter password	Configure/Clear User Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password
Secure Boot Menu	Submenu	

Secure Boot Menu

Feature	Options	Description
System Mode	Info only	
Secure Boot	Info only	Show Secure Boot status.
Secure Boot Control	**Disabled** Enabled	Secure Boot can be enabled if: 1. System running in User mode with enrolled Platform Key (PK) 2. CSM function is disabled.
Secure Boot Mode	**Standard** Custom	Secure Boot mode options: If Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

6.6 Boot

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 after system boot.
Quiet Boot	Disabled **Enabled**	Enabled: will show splash screen during POST. Disabled: will show boot message during POST.
Fast Boot	Disabled **Enabled**	Enable or disabled Fast boot feature. Most probes are skipped to reduce time cost during boot.
SATA Support	**Last Boot SATA Devices Only** All SATA Devices	If Last Boot SATA Devices Only, Only last boot SATA device will be available in Post. If All SATA Devices, all SATA devices will be available in OS and Post.
VGA Support	Auto **EFI Driver**	If Auto, only install Legacy OpRom with Legacy OS and logo will NOT be shown during post. EFI driver will still be installed with EFI OS.
USB Support	Disabled **Full Initial** Partial Initial	If Disabled, all USB devices will NOT be available util after OS boot. If Partial Initial, USB Mass Storage and specific USB port/device will NOT be available before OS boot. If Enabled, all USB devices will be available in OS and Post.
PS2 Deivces Support	Disabled **Enabled**	If Disabled, PS2 devices will be skipped.
Network Stack Driver Support	**Disabled** Enabled	If Disabled, Network Stack Driver will be skipped.
Redirection Support	**Disabled** Enabled	If disable, Redirection function will be disabled.
Boot Configuration	Info only	

6.7 Save & Exit

Feature	Options	Description
Save Changes and Reset	Save changes and reset the system.	Exit system setup after saving the changes.
Discard Changes and Reset	Reset the system without saving any changes.	Exit system setup without saving the changes.
Save Changes and Reset	Reset the system with saving any changes.	Reset the system after saving the changes.
Discard Changes and Reset	Reset the system and discard any changes.	Reset the system after without the changes.
Save Changes		Save Changes done so far to any of the setup options.
Discard Changes		Discard Changes done so far to any of the setup options.
Restore Default		Restore/Load the Default values for all the setup options.
Save as User Default		Save the changes done so far as User Defaults.
Restore User Default		Restore the User Defaults to all the setup options.
Boot Override	Info only	
UEFI: Built-in EFI Shell		
Launch EFI Shell from filesystem device		

This page intentionally left blank.

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.

Getting Service

Ask an Expert: https://www.adlinktech.com/en/Askanexpert

ADLINK Technology, Inc.
No. 66, Huaya 1st Rd., Guishan District
Taoyuan City 333411, Taiwan
Tel: +886-3-216-5088
Fax: +886-3-328-5706
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
6450 Via Del Oro
San Jose, CA 95119-1208, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-600-1189
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: emea@adlinktech.com

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