



PH14ADI

Version 1.0

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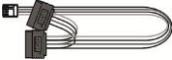
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Before you begin...

Check the box contents!

The retail motherboard package should contain the following:

	<p>1 x PH14ADI Motherboard</p>
	<p>1 x SATA Cable</p>
	<p>1 x SATA Power Cable</p>
	<p>1 x Rear IO Full height Shield 1 x Rear IO half height Shield</p>

IMPORTANT NOTE:

Sales sample may not come with the accessory listed above.

Please contact your sales representative to help order accessory for your evaluation.

Chapter 1: Instruction

1.1 Congratulations

You have purchased the powerful PH14ADI motherboard, based on the Intel® H610 Chipset. The PH14ADI is designed to support single Intel® 12th Gen. Core i9/i7/i5/i3 Processor, and up to 64GB of SO-DIMM DDR4 3200 memory. Leveraging advanced technology from Intel®, the PH14ADI is capable of offering scalable 32 and 64-bit computing, high-bandwidth memory design, and lightning-fast PCI-E bus implementation.

The PH14ADI not only empowers you in today's demanding IT environment but also offers a smooth path for future application upgradeability. All of these rich feature sets provides the PH14ADI with the power and flexibility to meet demanding requirements for today's IT environments.

Remember to visit the MITAC website at <https://www.mitacmct.com/>. There you can find all the information on all MITAC products as well as all the supporting documentation, FAQs, Drivers and BIOS upgrades.

1.2 Hardware Specifications

MITAC PH14ADI

Processor	Q'ty / Socket Type	(1) LGA1700
	Supported CPU Series	Intel Core i9/i7/i5/i3 Processors / 12 Gen.
	Thermal Design Power Wattage	Max up to 65W (TDP)
Chipset	PCH	Intel H610
	Super I/O	NCT6126D
Memory	Supported DIMM Qty	(2) DIMM slots
	DIMM Type / Speed	DDR4 SO-DIMM 3200
	Capacity	Up to 64GB
	Memory channel	2 Channels per CPU
	Memory voltage	1.2V
Expansion Slots	PCIe	(1) PCIe Gen.4 x16 slot
LAN	Q'ty / Port	(1) GbE + (1) 2.5GbE
	Controller	Intel I219-LM (Intel AMT support) / Intel I225V
Storage SATA	Connector	(1) SATA-DOM / (2) SATA
	Controller	Intel H610
	Speed	6Gb/s
Storage	Connector (M.2)	(1) 2280 (by PCIe 4 interface)

NVMe		
Storage (Optional)	VROC Support	No
Graphic Display Port	Connector type	(2) Display ports 1.4
	Resolution	Up to 4096X2304 @60Hz
	Chipset	Intel H610
Input /Output	USB	(2) USB2.0 ports (via cable) / (2) USB2.0 ports (@ rear) / (2) USB3.2 Gen.1 ports (via cable) / (2) USB3.2 Gen.2 ports (@rear)
	COM	(2) headers
	RJ-45	(1) GbE port + (1) 2.5GbE port
	SATA	(2) SATA-III connectors / (1) SATA-DOM connectors
	Power	DC12V / ATX 4-pin
	Display port	(2) Display ports 1.4
TPM (Optional)	TPM Support	Please refer to our TPM supported list.
	Interface	SPI
System Monitoring	Chipset	NCT6126D
	Fan	Total (2) 4-pin headers
	Temperature	Monitors temperature for CPU & system environment
	Voltage	Monitors voltage for CPU, memory, chipset & power supply
	LED	Processor fail LED indicator
	AMT Feature	Support Power on/ Power off/ Restart at remote side
	Others	Watchdog timer support
BIOS	Brand / ROM size	AMI / 32MB
	Feature	Hardware Monitor / Console Redirection / User Configurable FAN PWM Duty Cycle / SMBIOS 3.0/PnP/Wake on LAN / ACPI 6.1 / ACPI sleeping states S5
Physical Dimension	Form Factor	Thin Mini-ITX
	Board Dimension	6.69" x 6.69" (170 x 170mm)
Regulation	FCC (SDoC)	Class B
	CE (DoC)	Class B
Operating Environment	Operating Temp.	0° C ~ 60° C (32° F~ 140° F)
	Non-operating Temp.	- 40° C ~ 85° C (-40° F ~ 185° F)
	In/Non-operating Humidity	90%, non-condensing at 35° C
RoHS	RoHS 6/6 Compliant	Yes
Operating System	OS supported list	Ubuntu 22.04 / Windows® 10 64bit, / Linux (support by request)

Package Contains	Motherboard	(1) PH14ADI Motherboard
	Manual	(1) Quick Installation Guide
	I/O Shield	(2) I/O Shield (Full height and Half height)
	Cable SATA	(1) SATA power cable / (1) SATA signal cables

1.3 Software Specifications

For OS (operation system) support, please check with MITAC support for latest information.

Chapter 2: Board Installation

You are now ready to install your motherboard.

How to install our products right... the first time

The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

- (1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, MITAC recommends wearing a static safety wrist strap.
- (2) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
- (3) Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
- (4) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
- (5) Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.



Caution!

1. To avoid damaging the motherboard and associated components, use torque force within the range **5~7 kgf/cm (4.35 ~ 6.09 lb/in)** on each mounting screw for motherboard installation.
2. Do not apply power to the board if it has been damaged.

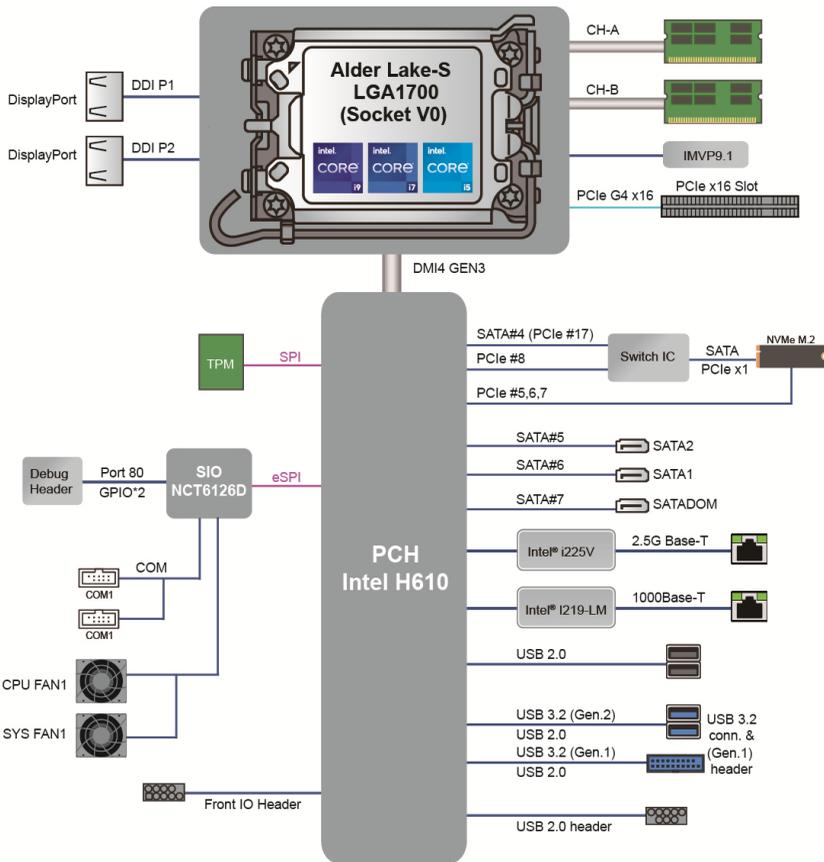
2.1 Board Image



PH14ADI

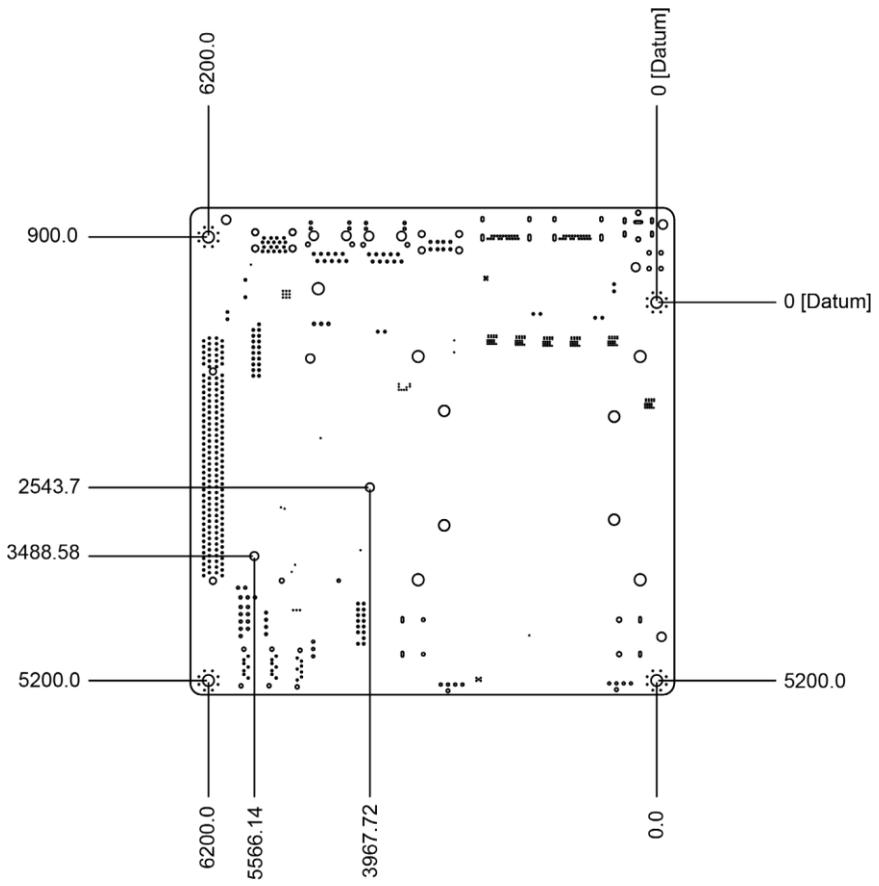
This picture is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above picture.

2.2 Block Diagram

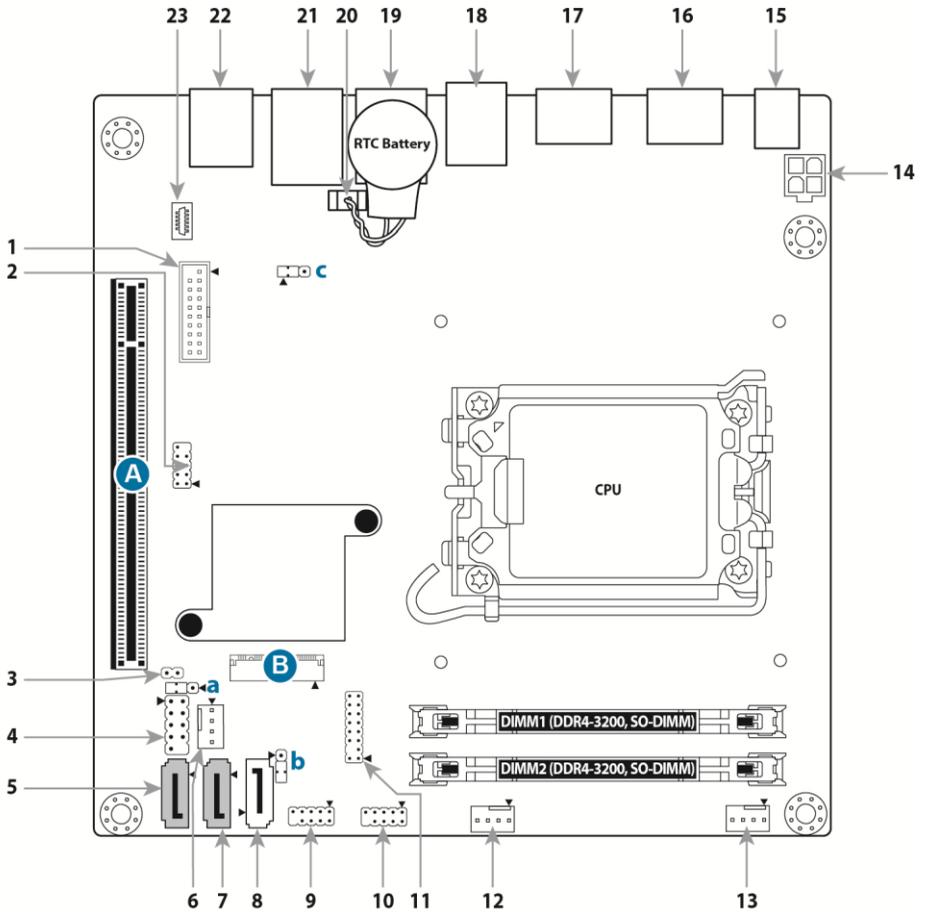


PH14ADI Block Diagram

2.3 Mainboard Mechanical Drawing



2.4 Board Parts, Jumpers and Connectors



This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram. But for the DIMM number please refer to the above placement for memory installation. For the latest board revision, please visit our web site at <https://www.mitacmct.com/>.

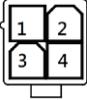
Jumpers & Connectors

Connector	
1 USB3.2 Gen1 Header (USB3_HR1)	13 SYS_FAN Header (SYS_FAN1)
2 USB2.0 Header (USB2_HR1)	14 ATX Power INPUT (ATX4P)
3 INTRUDER Header (INTRUD1)	15 DC_12V INPUT (DC12IN1)
4 Front IO_PANEL Header (FIO_PANEL1)	16 Display port_2 (DP_J2)
5 SATA Header (SATA2)	17 Display port_1 (DP_J1)
6 SATA POWER Header (SATAPWR1)	18 USB2.0 Rear Port (USB2_J1)
7 SATA Header (SATA1)	19 RJ45_2.5G (LAN225_J1)
8 SATA DOM Header (SATADOM1)	20 RTC Battery Header (XBT1)
9 COM1 Header_RS232 (COM1)	21 RJ45_1.0G (LAN219_J1)
10 COM2 Header_RS232 (COM2)	22 USB3.2 Gen2 Rear Port (USB3_J1)
11 P2398 Card_Header (DEBUG1)	23 TPM Card Header (TPM1)
12 CPU_FAN Header (CPU_FAN1)	
Jumpers	Slots
a CMOS Clear Header (CMOS1)	A PCIEX16 Header (PCIEX16_1)
b AT/ATX Select Header (AT1)	B M.2 Key_M Header (M2M)
c PEX8_16 Select Header (PEX8_16)	

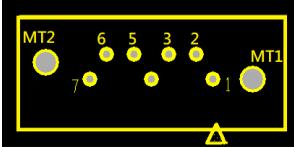
Jumper Legend

	OPEN - Jumper OFF	Without jumper cover
	CLOSED - Jumper ON	With jumper cover

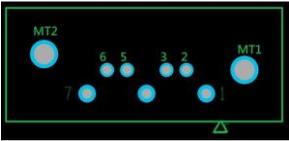
ATX4P: ATX Power Input Header

	Pin	Signal	Pin	Signal
	1	GND	2	DC12V_IN
	3	GND	4	DC12V_IN

SATADOM1: SATA DOM Header

	Pin	Signal
	MT1	GND
	1	GND
	2	TX+
	3	TX-
	4	GND
	5	RX-
	6	RX+
	7	GND
	MT2	VCC

SATA1/SATA2: SATA Header

	Pin	Signal
	MT1	GND
	1	GND
	2	TX+
	3	TX-
	4	GND
	5	RX-
	6	RX+
	7	GND
	MT2	GND

M2M: M.2 key-M Header (Slot)



Signal	Pin	Pin	Signal
GND	1	2	3.3V
GND	3	4	3.3V
PERN3	5	6	N/C

PERP3	7	8	N/C
GND	9	10	LED
PETN3	11	12	3.3V
PETP3	13	14	3.3V
GND	15	16	3.3V
PERN2	17	18	3.3V
PERP2	19	20	N/C
GND	21	22	N/C
PETN2	23	24	N/C
PETP2	25	26	N/C
GND	27	28	N/C
PERN1	29	30	N/C
PERP1	31	32	N/C
GND	33	34	N/C
PETN1	35	36	N/C
PETP1	37	38	M2_DEVSLP
GND	39	40	N/C
PERN0 / SATA-B+	41	42	N/C
PERP0 / SATA-B-	43	44	N/C
GND	45	46	N/C
PETN0 / SATA-A-	47	48	N/C
PETP0 / SATA-A+	49	50	M2_PERST#
GND	51	52	CLKREQ5#
PE_CLK_N	53	54	M2_PE_WAKE#
PE_CLK_P	55	56	N/C
GND	57	58	N/C
	59	60	
	61	62	

	63	64	
	65	66	
NC	67	68	SUSCLK
PEDER_OC-PCIE/GND-SATA	69	70	3.3V
GND	71	72	3.3V
GND	73	74	3.3V
GND	75		

PCIEX16_1: PCIEX16 Header (Slot)



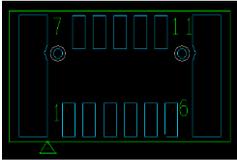
Signal	Pin	Pin	Signal
12V	B1	A1	PRSNT1#
12V	B2	A2	12V
12V	B3	A3	12V
GND	B4	A4	GND
SMCLK	B5	A5	JTAG2
SMDAT	B6	A6	JTAG3
GND	B7	A7	JTAG4
3V3	B8	A8	JTAG5
JTAG1	B9	A9	3V3
V3AUX	B10	A10	3V3
WAKE#	B11	A11	PERST#
RSVD_1	B12	A12	GND
GND	B13	A13	REFCLK+
PETp0	B14	A14	REFCLK-
PETn0	B15	A15	GND

GND	B16	A16	PERp0
PRSENT2#	B17	A17	PERn0
GND	B18	A18	GND
PETp1	B19	A19	RSVD_4
PETn1	B20	A20	GND
GND	B21	A21	PERp1
GND	B22	A22	PERn1
PETp2	B23	A23	GND
PETn2	B24	A24	GND
GND	B25	A25	PERp2
GND	B26	A26	PERn2
PETp3	B27	A27	GND
PETn3	B28	A28	GND
GND	B29	A29	PERp3
RSVD_2	B30	A30	PERn3
PRSENT2#_2	B31	A31	GND
GND	B32	A32	RSVD_5
PETp4	B33	A33	RSVD_6
PETn4	B34	A34	GND
GND	B35	A35	PERp4
GND	B36	A36	PERn4
PETp5	B37	A37	GND
PETn5	B38	A38	GND
GND	B39	A39	PERp5
GND	B40	A40	PERn5
PETp6	B41	A41	GND

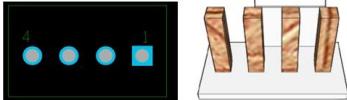
PETn6	B42	A42	GND
GND	B43	A43	PERp6
GND	B44	A44	PERn6
PETp7	B45	A45	GND
PETn7	B46	A46	GND
GND	B47	A47	PERp7
PRSENT2#_3	B48	A48	PERn7
GND	B49	A49	GND
PETp8	B50	A50	RSVD_7
PETn8	B51	A51	GND
GND	B52	A52	PERp8
GND	B53	A53	PERn8
PETp9	B54	A54	GND
PETn9	B55	A55	GND
GND	B56	A56	PERp9
GND	B57	A57	PERn9
PETp10	B58	A58	GND
PETn10	B59	A59	GND
GND	B60	A60	PERp10
GND	B61	A61	PERn10
PETp11	B62	A62	GND
PETn11	B63	A63	GND
GND	B64	A64	PERp11
GND	B65	A65	PERn11
PETp12	B66	A66	GND
PETn12	B67	A67	GND
GND	B68	A68	PERp12

GND	B69	A69	PERn12
PETp13	B70	A70	GND
PETn13	B71	A71	GND
GND	B72	A72	PERp13
GND	B73	A73	PERn13
PETp14	B74	A74	GND
PETn14	B75	A75	GND
GND	B76	A76	PERp14
GND	B77	A77	PERn14
PETp15	B78	A78	GND
PETn15	B79	A79	GND
GND	B80	A80	PERp15
PRSNT2#_4	B81	A81	PERn15
RSVD_3	B82	A82	GND

TPM1: TPM Card Header

	Signal	Pin	Pin	Signal
	SPI_CLK	1	7	3VSB
	PLTRST_N	2	8	TPM_DET
	SPI_MOSI	3	9	TPM_PIRQ_N
	SPI_MISO	4	10	VCC3_TPM
	SPI_CS2_N	5	11	GND
	NC	6		

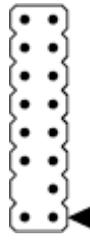
SYS_FAN1/CPU_FAN1: System FAN Header, CPU FAN Header

	Pin	Signal
	1	GND
	2	12V
	3	FAN TACH
4	FAN Control (PWM)	

COM1/COM2: RS-232 COM Port Header

	Signal	Pin	Pin	Signal
	DCD (Data Carrier Detect)	1	2	RXD# (Receive Data)
	TXD# (Transmit Data)	3	4	DTR (Data Terminal Ready)
	GND	5	6	DSR (Data Set Ready)
	RTS (Request To Send)	7	8	CTS (Clear To Send)
	RI (Ring Indicator)	9	10	Key (no pin)

DEBUG1: P2398 Card Header

	Signal Name	Pin	Pin	Signal Name
	GND	1	2	VCC (5V)
	Power Button	3	X	KEY
	PORT80_A	5	6	3VSB
	PORT80_B	7	8	PORT80_E
	PORT80_C	9	10	PORT80_F
	PORT80_D	11	12	PORT80_G
	PORT80_DGH	13	14	PORT80_DGL
	Dip switch_GPIO42	15	16	Dip switch_GPIO43

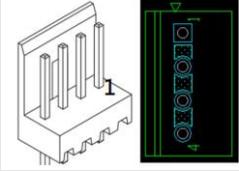
AT1: AT/ATX Mode Selection Header

The Jumper setting is to select Normal power button on, or always power on while DC-IN.

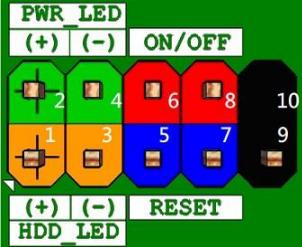
Pin	Signal Name
1	AT1_RSMRST
2	AT1_PWRBT_N
3	NC

	Pins 1&2: jumper position for AT mode (always power on)
	Pins 2&3: jumper position for Normal mode (Default)

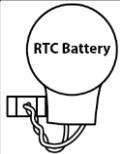
SATAPWR1: SATA POWER Header

	Pin	Signal Name
	1	12V
	2	GND
	3	GND
	4	VCC(5V)

FIO_PANEL1: Front IO Panel Header

					
Pin	Signal	Description	Pin	Signal	Description
1	HDD_POWER_LED	Pull-up resistor (510Ω) to +5V	2	POWER_LED_MAIN	[Out] Front panel LED (main color)
3	HDD_LED#	[Out] Hard disk activity LED	4	POWER_LED_ALT	[Out] Front panel LED (alt color)
5	GROUND	Ground	6	POWER_SWITCH#	[In] Power switch
7	RESET_SWITCH#	[In] Reset switch	8	GROUND	Ground
9	VCC(+5V)	Power	10	KEY	No pin

XBT1: RTC Battery Header

	Pin	Signal Name
	1	Battery Anode
	2	GND

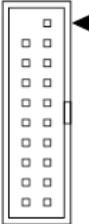
INTRUD1: INTRUDER Header

	Pin	Signal
	1	INTRUDER_N
	3	GND

USB2_HR1: Internal USB2.0 Header

	Signal	Pin	Pin	Signal
	5V_USB2_FP	1	2	5V_USB2_FP
	USB2_HR1_1N	3	4	USB2_HR1_2N
	USB2_HR1_1P	5	6	USB2_HR1_2P
	GND	7	8	GND
			10	NC

USB3_HR1: Internal USB3.2 Gen1 Header

	Signal	Pin	Pin	Signal
	5V_USB3_FP	1		
	USB3P4_RXN	2	19	5V_USB3_FP
	USB3P4_RXP	3	18	USB3P3_RXP
	GND	4	17	USB3P3_RXP
	USB3P4_1XN_C	5	16	GND
	USB3P4_1XP_C	6	15	USB3P3_TXN_C
	GND	7	14	USB3P3_1XP_C
	USB_PCH_C_DN5	8	13	GND
	USB_PCH_C_DP5	9	12	USB_PCH_C_DN6
	NC	10	11	USB_PCH_C_DP6

CMOS1: Clear CMOS Header

You can reset the CMOS settings by using this jumper. This can be useful if you have forgotten your system/setup password, or need to clear the system BIOS setting.

1. Power off system and disconnect power connectors from the motherboard.
2. Move the jumper cap from Default setting (Pin_1 and Pin_2 closed) to Pin_2 and Pin_3 closed for several seconds to Clear CMOS.
4. Put jumper cap back to Pin_1 and Pin_2 (Default setting).
5. Reconnect power connectors to the motherboard and power on system.



Pins 1&2 closed: Normal **(Default)**



Pins 2&3 closed: Jumper for CMOS Reset

PEX8_16: PEX8 or PCIEX16 Select Header

Pin	Signal Name
1	Pull High
2	DFG[5]: PCI Express Bifurcation High: 1 x16 PCI Express* (Default) Low: 2 x8 PCI Express
3	Pull Low

	Pins 1&2 closed: High: 1 x16 PCI Express* (Default)
	Pins 2&3 closed: Low: 2 x8 PCI Express

2.5 Installing the Processor and Heat sink

The PH14ADI supported Intel® processors are listed in section **1.2 Hardware Specifications** on page 5. Check our website at <https://www.mitacmct.com/> for latest processor support.

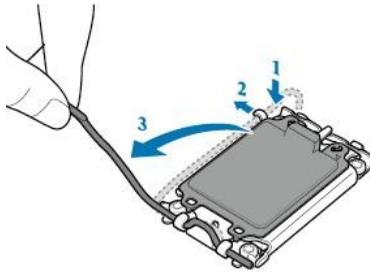
NOTE: MITAC MITAC is not liable for damage as a result of operating an unsupported configuration.

Processor Installation

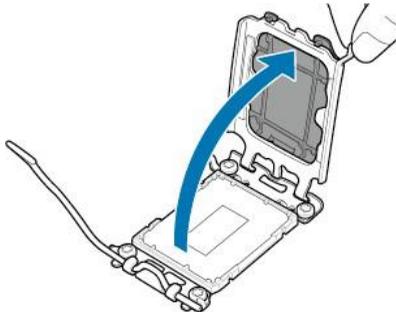
Follow the steps below to install the processors and heat sinks.

NOTE: Please save and replace the CPU protection cap when returning for service.

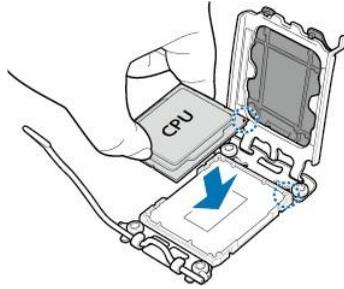
1. Open the ILM lever.



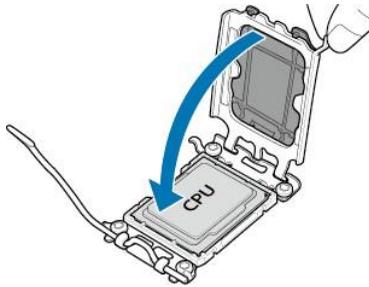
2. Open the load plate using the finger tab.



3. Align and seat the processor package on the socket. Make sure the gold arrow is located in the right direction.



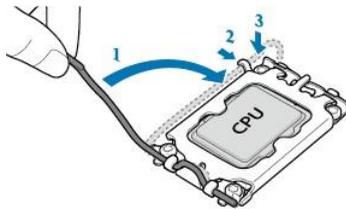
4. Close the load plate.



5. Remove and save the ILM cover.

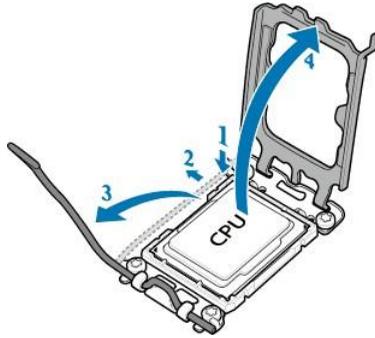


6. Close the ILM lever and latch.

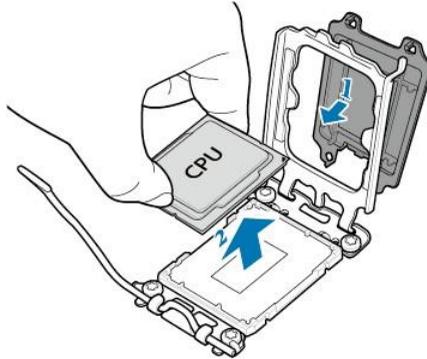


Processor Uninstallation

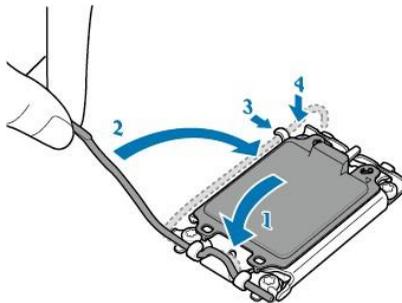
1. Open the ILM lever and then the load plate using the finger tab.



2. Place the ILM cover and then carefully remove the processor package.



3. Close the load plate and latch the ILM lever.



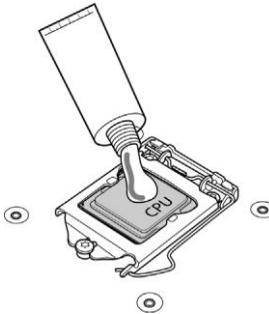
Heat sink Installation

After installing the processor, you should proceed to install the heat sink. The CPU heat sink will ensure that the processor do not overheat and continue to operate at maximum performance for as long as you own them. The overheated processor is dangerous to the motherboard.

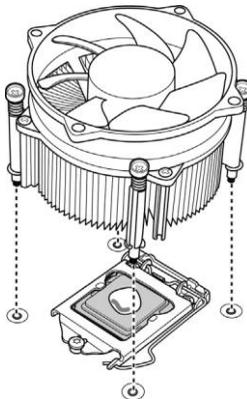
For the safest method of installation and information on choosing the appropriate heat sink, using heat sinks validated by Intel®. Please refer to the Intel® website: <http://www.intel.com>

The following diagram illustrates how to install the heat sink.

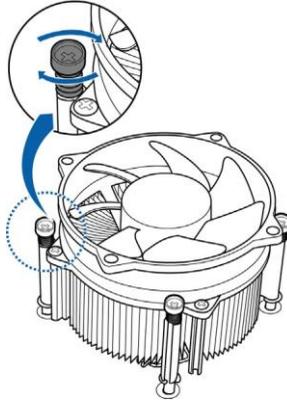
1. Apply the thermal grease.



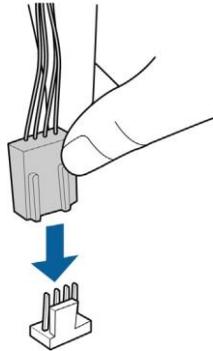
2. Place the heat sink on top of the CPU and push the 4 latches in a diagonal pattern to lock it in place.



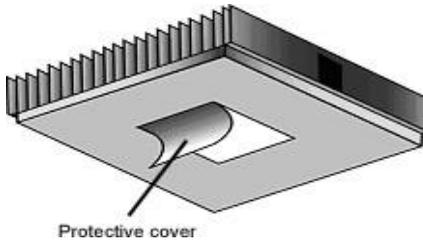
3. Secure the heat sink screws.



4. Connect the fan cable to complete the installation.

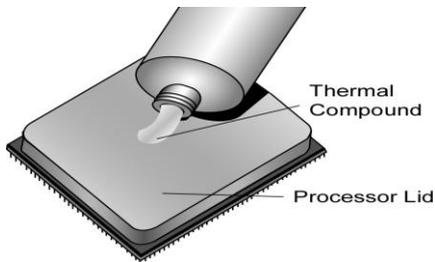


2.6 Thermal Interface Material



There are two types of thermal interface materials designed for use with the processors.

The most common material comes as a small pad attached to the heat sink at the time of purchase. There should be a protective cover over the material. Take care not to touch this material. Simply remove the protective cover and place the heat sink on the processor.

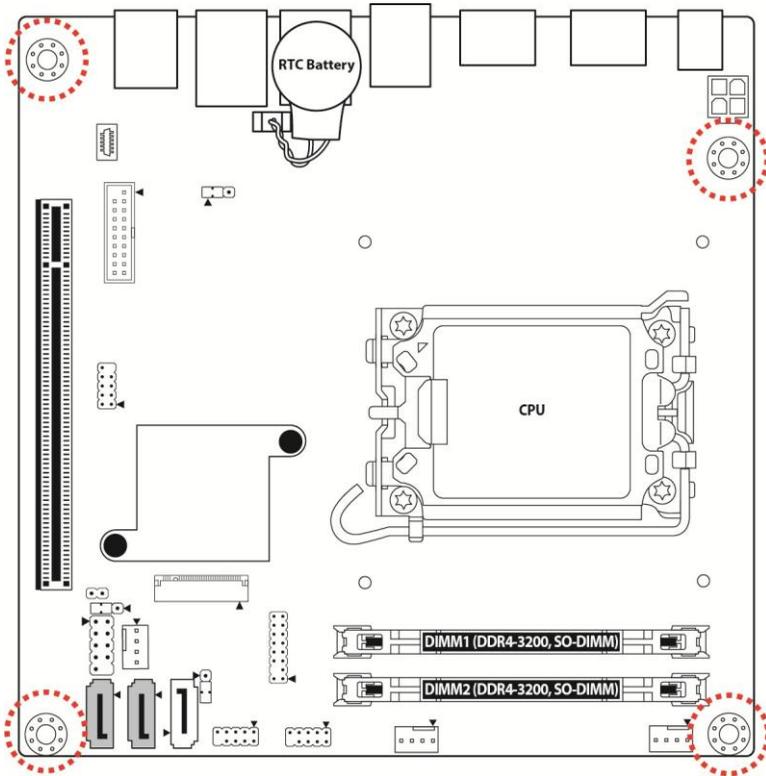


The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).

NOTE: Always check with the manufacturer of the heat sink & processor to ensure that the thermal interface material is compatible with the processor and meets the manufacturer's warranty requirements.

2.7 Tips on Installing Motherboard in Chassis

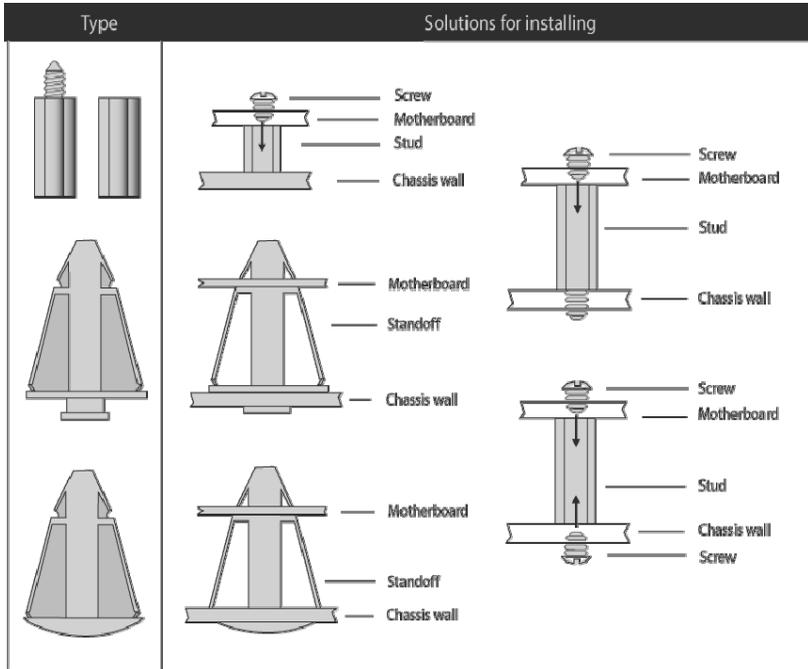
Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs. If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case. If there are any studs missing, you will know right away since the motherboard will not be able to be securely installed.



Some chassis include plastic studs instead of metal. Although the plastic studs are usable, MITAC recommends using metal studs with screws that will fasten the motherboard more securely in place.

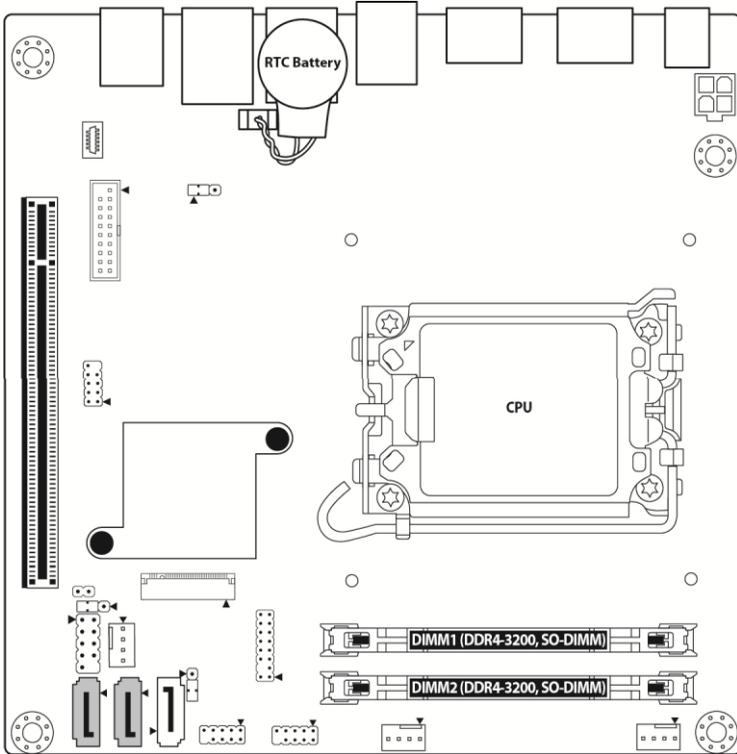
Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

Mounting the Motherboard



2.8 Installing the Memory

Before installing memory, ensure that the memory you have is compatible with the motherboard and processor. Check the MITAC Web site at <https://www.mitacmct.com/> for details of the type of memory recommended for your motherboard.



- Support (1) DIMM slots per channel
- Support (2) memory channels per CPU
- Support (2) DIMM slots per CPU
- Support DDR4-3200, non-ECC SO-DIMM

Recommended Memory Population Table

Single CPU Installed	Quantity of memory installed	
	1	2
DIMM1	√	√
DIMM2		√

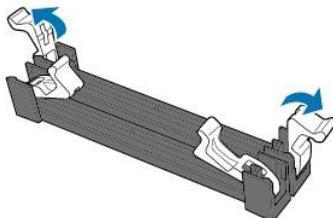
NOTE:

1. √ indicates a populated DIMM slot.
2. Use paired memory installation for max performance.
3. Populate the same DIMM type in each channel, specifically
 - Use the same DIMM size
 - Use the same # of ranks per DIMM

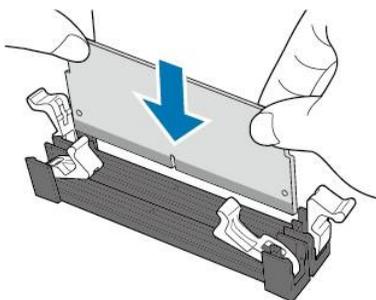
Memory Installation Procedure

Follow these instructions to install memory modules into the PH14ADI.

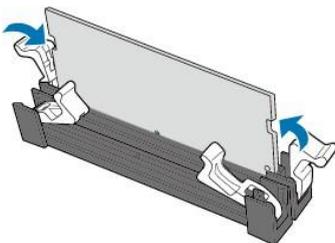
1. Unlock the clips.



2. Insert the memory module.



3. Lock the clips.



2.9 Attaching Drive Cables

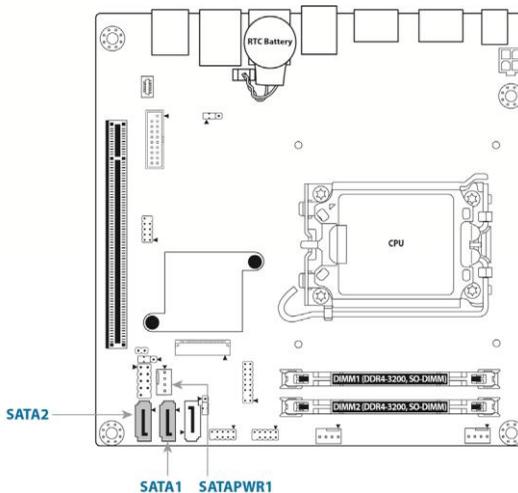
Attaching Serial ATA Cables

The following illustrates how to make a SATA Cable connection. If you are in need of SATA/SAS cables or power adapters please contact your local sales representative.

Attaching SATA Power Cable



Attaching SATA Cable



2.10 Installing Add-In Cards

Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the slots that may appear on your motherboard.



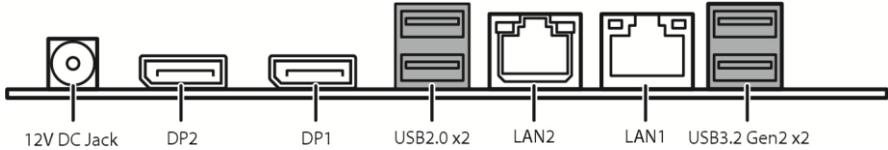
Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

TIP: It's a good practice to install add-in cards in a staggered manner rather than making them directly adjacent to each other. Doing so allows air to circulate within the chassis more easily, thus improving cooling for all installed devices.

NOTE: You must always unplug the power connector from the motherboard before performing system hardware changes to avoid damaging the board or expansion device.

2.11 Connecting External Devices

Connecting external devices to the motherboard is an easy task. The motherboard supports a number of different interfaces through connecting peripherals. See the following diagrams for the details.



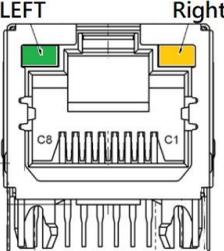
Onboard LAN LED Color Definition

The **two (2)** onboard Ethernet ports have **green** and **Yellow** LEDs to indicate LAN status. The chart below illustrates the different LED states.

2.5G RJ45 Connector (LAN2)

Diagram	LED	Color	State	Condition
	Link	N/A	Off	LAN link is not established
		Green	On	LAN link is established
			Blinking	LAN activity occurring
	Speed	N/A	Off	10 M/100M b/s data rate
		Orange	On	1000 M data rate
		Green	On	2500 Mb/s data rate

1G RJ45 Connector (LAN1)

Diagram	LED	Color	State	Condition
 <p>The diagram shows a top-down view of a 1G RJ45 connector. It features two LEDs: a green one on the left and a yellow one on the right. The connector has eight pins, with the top two labeled C8 and C1. The connector is shown in a perspective view, highlighting its physical structure and the placement of the LEDs.</p>	Link	N/A	Off	LAN link is not established
		Green	On	LAN link is established
			Blinking	LAN activity occurring
	Speed	N/A	Off	10 Mb/s data rate
		Green	On	100 Mb/s data rate
		Orange	On	1000 Mb/s data rate

2.12 Installing the AC/DC Adaptor

There is **one (1)** power connector on your PH14ADI motherboard. The PH14ADI supports DC Input 12V/90W DC Adaptor. Please check power adaptor models from MITAC website.



2.13 Finishing Up

Congratulations on making it this far! You have finished setting up the hardware aspect of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly. You may have difficulty powering on your system if the motherboard jumpers are not set correctly.

In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by calling your vendor's support line.

Chapter 3: BIOS Setup

3.1 About the BIOS

The BIOS is the basic input/output system, the firmware on the motherboard that enables your hardware to interface with your software. The BIOS determines what a computer can do without accessing programs from a disk. The BIOS contains all the code required to control the keyboard, display screen, disk drives, serial communications, and a number of miscellaneous functions. This chapter describes the various BIOS settings that can be used to configure your system.

The BIOS section of this manual is subject to change without notice and is provided for reference purposes only. The settings and configurations of the BIOS are current at the time of print and are subject to change, and therefore may not match exactly what is displayed on screen.

This section describes the BIOS setup program. The setup program lets you modify basic configuration settings. The settings are then stored in a dedicated, battery-backed memory (called NVRAM) that retains the information even when the power is turned off.

To start the BIOS setup utility:

1. Turn on or reboot your system.
2. Press or <F2> during POST (**Del** on remote console) to start the BIOS setup utility.

3.1.1 Setup Basics

The table below shows how to navigate in the setup program using the keyboard.

Key	Function
Left/Right Arrow Keys	Change from one menu to the next
Up/Down Arrow Keys	Move between selections
Enter	Open highlighted section
PgUp/PgDn Keys	Change pages
+/-	Change options
ESC	Exit

3.1.2 Getting Help

Pressing [F1] will display a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press [ESC] or the [Enter] key again.

3.1.3 In Case of Problems

If you have trouble booting your computer after making and saving the changes with the BIOS setup program, you can restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS.

The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are absolutely sure of what you are doing. The Chipset defaults have been carefully chosen either by MITAC or your system manufacturer for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

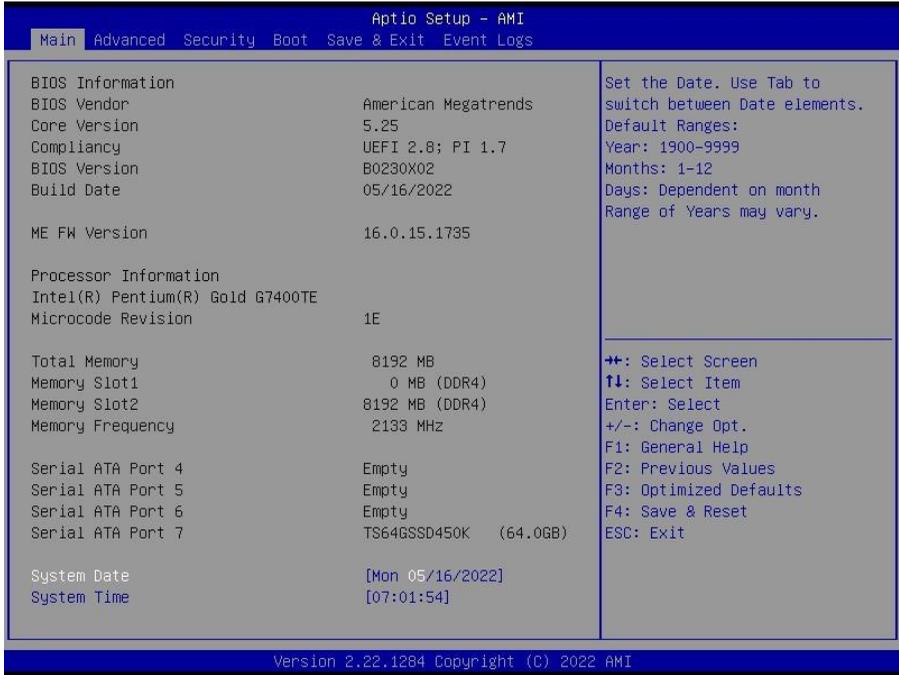
3.1.4 Setup Variations

Not all systems have the same BIOS setup layout or options. While the basic look and function of the BIOS setup remains more or less the same for most systems, the appearance of your Setup screen may differ from the charts shown in this section. Each system design and chipset combination requires a custom configuration. In addition, the final appearance of the Setup program depends on the system designer. Your system designer may decide that certain items should not be available for user configuration, and remove them from the BIOS setup program.

NOTE: The following pages provide the details of BIOS menu. Please be noticed that the BIOS menu are continually changing due to the BIOS updating. The BIOS menu provided are the most updated ones when this manual is written. Please visit MITAC's website at <https://www.mitacmct.com/> for the information of BIOS updating.

3.2 Main Menu

In this section, you can alter general features such as the date and time. Note that the options listed below are for options that can directly be changed within the Main Setup screen.



BIOS Information

It displays BIOS related information.

ME FW Version

ME Firmware Version.

Processor Information

Display the installed CPU brand.

Memory Information

This displays the installed memory size, installed memory size of Slot 1 & Slot2, and the installed memory frequency.

Serial ATA Port 4/5/6/7

Display the installed SATA device model/size of port 4/5/6/7.

System Date

Set the Date. Use Tab to switch between Date elements. Default Ranges:

Year: 1998-9999

Months: 1-12

Days: dependent on month. Range of Years may vary.

System Time

Set the Time. Use Tab to switch between Time elements.

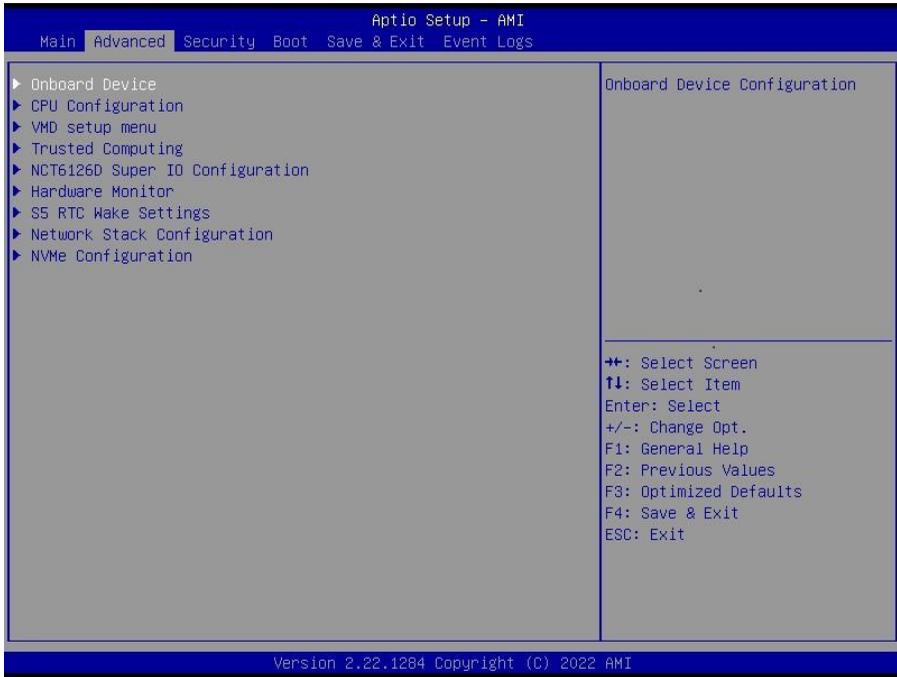
hh: 0-23

mm: 0-59

ss: 0-59

3.3 Advanced Menu

This section facilitates configuring advanced BIOS options for your system.



Onboard Device

Onboard Device Configuration.

CPU Configuration

CPU Configuration Parameters.

VMD Setup Menu

VMD Configuration Settings.

Trusted Computing

Trusted Computing Settings.

NCT6126D Super IO Configuration

System Super IO Chip Parameters.

Hardware Monitor

Monitor Hardware Status.

S5 RTC Wake Settings

Enable system to wake from S5 using RTC alarm.

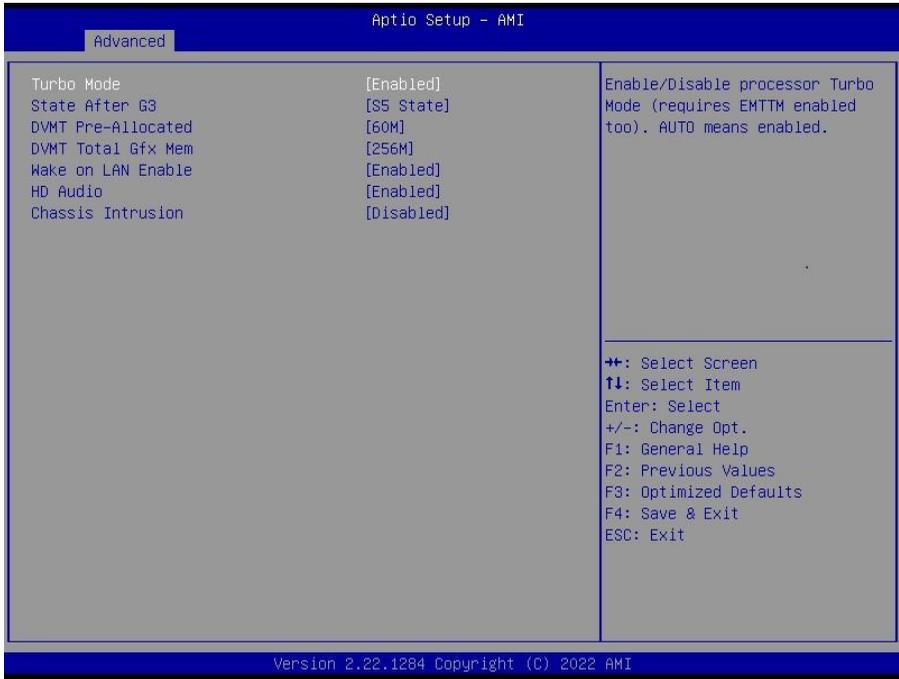
Network Stack Configuration

Network Stack Settings.

NVMe Configuration

NVMe Device Options Settings.

3.3.1 Onboard Device



Turbo Mode

Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).

Disabled / **Enabled**

State After G3

Specify what state to go to when power is re-applied after a power failure (G3 state).

S0 State / **S5 State**

DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

32M/F7 / 36M / 40M / 44M / 48M / 52M / 56M / 60M / **64M**

DVMT Total Gfx Mem

Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

128M / **256M** / MAX

Wake on LAN Enable

Enable/Disable integrated LAN to wake the system.

Disabled / **Enabled**

HD Audio

Control Detection of the HD-Audio device.

Disabled: HDA will be unconditionally disabled.

Enabled: HDA will be unconditionally enabled.

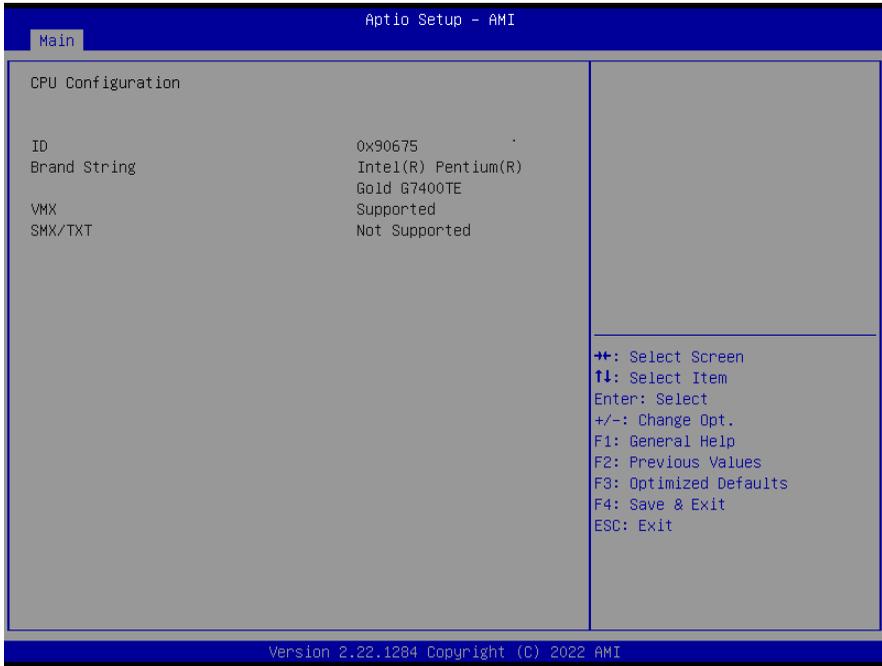
Disabled / **Enabled**

Chassis Intrusion

Configure Chassis Intrusion.

Disabled / Enabled / Reset

3.3.2 CPU Configuration



ID

Displays CPU Signature.

Brand String

Displays the CPU brand string.

VMX

VMX Supported or Not.

SMX/TXT

SMX/TXT Supported or Not.

3.3.3 VMD Setup Menu



Enable VMD Controller

Enable/Disable to VMD controller.

Disabled / Enabled

3.3.4 Trusted Computing



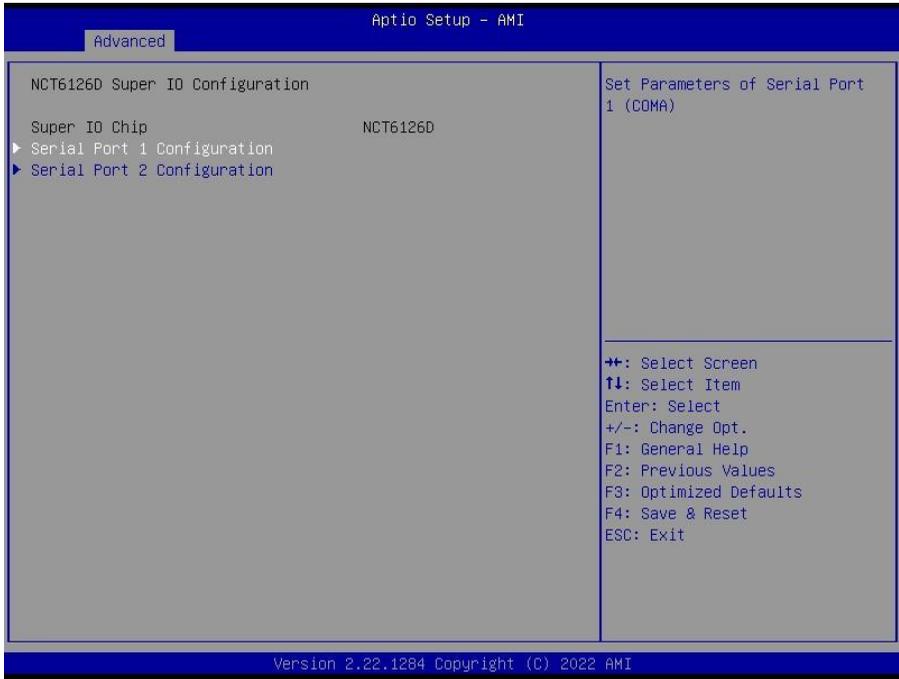
Security Device Support

Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Disabled / **Enabled**

Pending Operation

Schedule an Operation for the ecurity Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
None / TPM Clear

3.3.5 NCT6126D Super IO Configuration



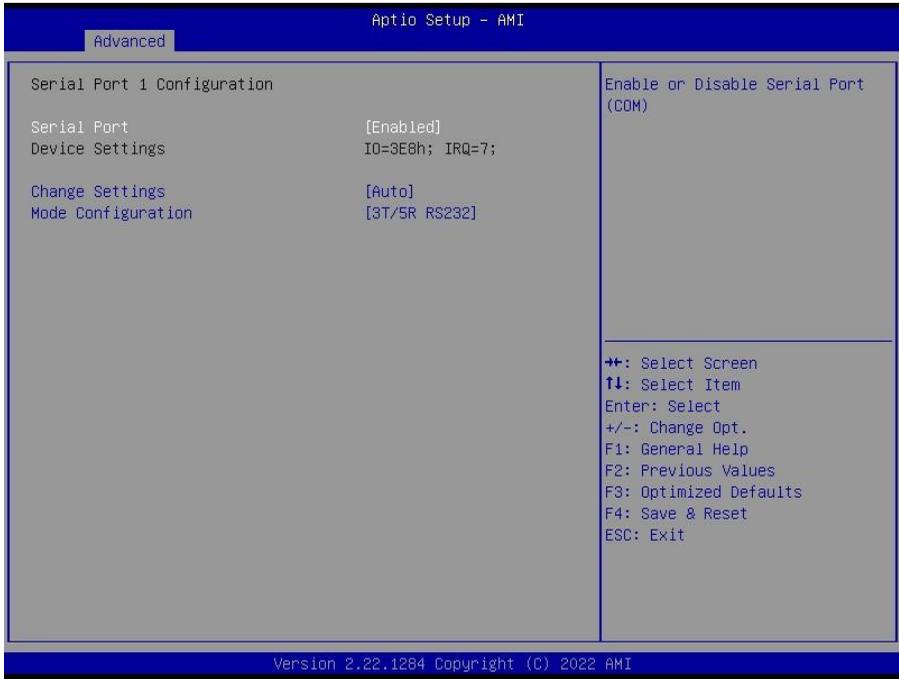
Serial Port 1 Configuration

Set Parameters of Serial Port 1 (COMA).

Serial Port 2 Configuration

Set Parameters of Serial Port 2 (COMB).

3.3.5.1 Serial Port 1 Configuration



Serial Port

Enable or Disable Serial Port (COM).

Disabled / **Enabled**

Device Settings

Device Super IO COM1 Address and IRQ. Read only.

Change Settings

Select an optimal setting for Super IO Device.

Auto / IO=3E8h; IRQ=7;

/ IO=3E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

/ IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

/ IO=220h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

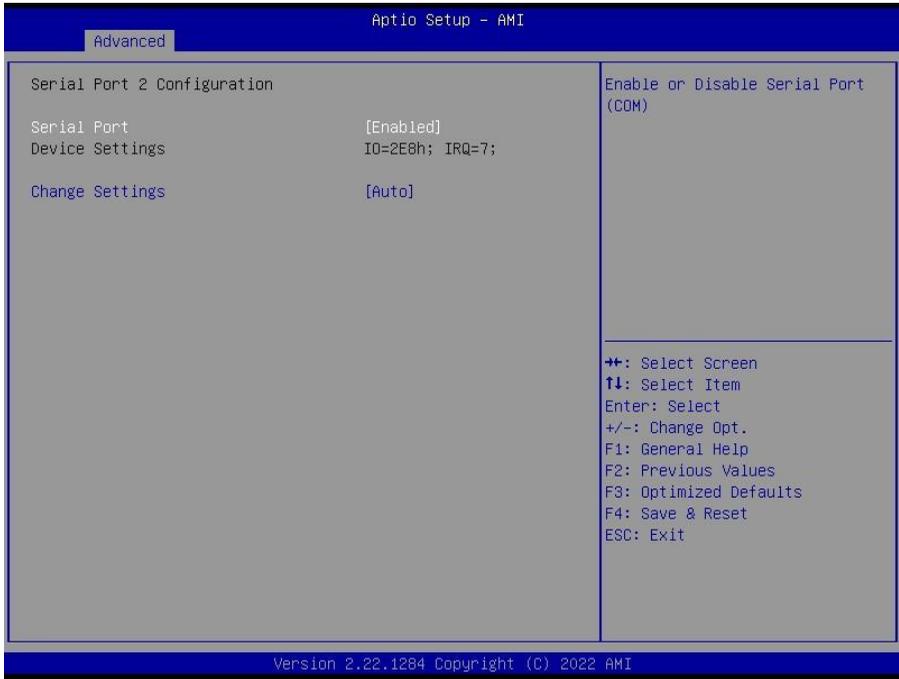
/ IO=228h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

Mode Configuration

Configure serial port as RS232/RS422/RS485.

1T/1R RS422 / **3T/5R RS232** / 1T/1R RS485 TX ENABLE Low Active /
1T/1R RS422 with termination resistor / 1T/1R RS485 with termination
resistor TX ENABLE Low Active / Disabled

3.3.5.2 Serial Port 2 Configuration



Serial Port

Enable or Disable Serial Port (COM).
Disabled / **Enabled**

Device Settings

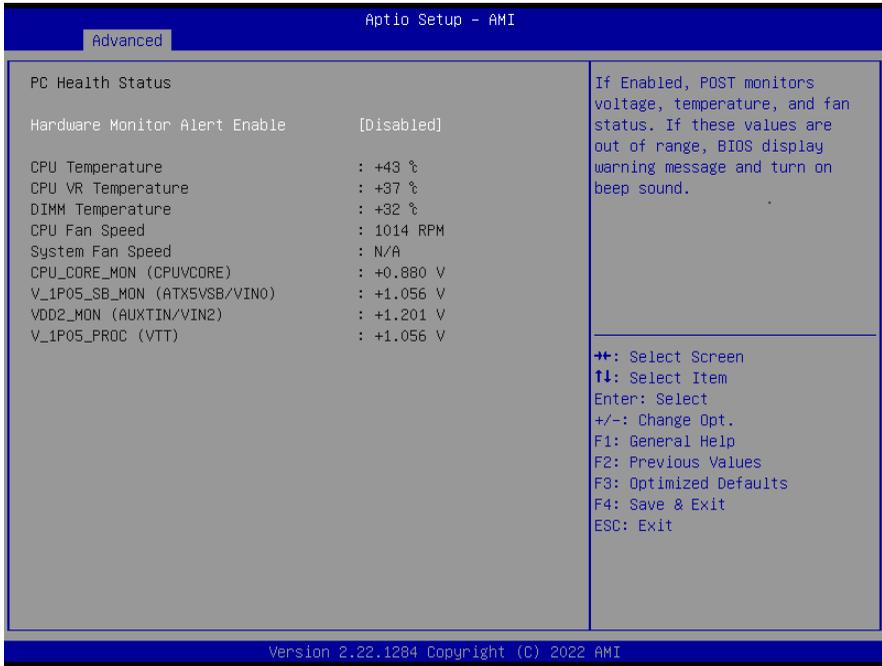
Device Super IO COM1 Address and IRQ. Read only.

Change Settings

Select an optimal setting for Super IO Device.

Auto / IO=2E8h; IRQ=7;
/ IO=3E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
/ IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
/ IO=220h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
/ IO=228h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

3.3.6 Hardware Monitor



Hardware Monitor Alert Enable

If Enabled, POST monitors voltage, temperature, and fan status. If these values are out of range, BIOS display warning message and turn on beep sound.

Disabled / Enabled

System Fan Enable (suppressed if Hardware Monitor Alert is Disabled)

If Enabled, POST monitors system fan status. If this value is out of range, BIOS display warning message and turn on beep sound.

Disabled / Enabled

3.3.7 S5 RTC Wake Settings



Wake system from S5

Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr:min:sec specified.

Disabled / Fixed Time

Wake system from S5 (show when Wake system from S5 set to [Fixed time])

Wake up hour

Select 0-23. For example enter 3 for 3am and 15 for 3pm.

0

Wake up minute

Select 0-59 for Minute.

0

Wake up second

Select 0-59 for Second.

0

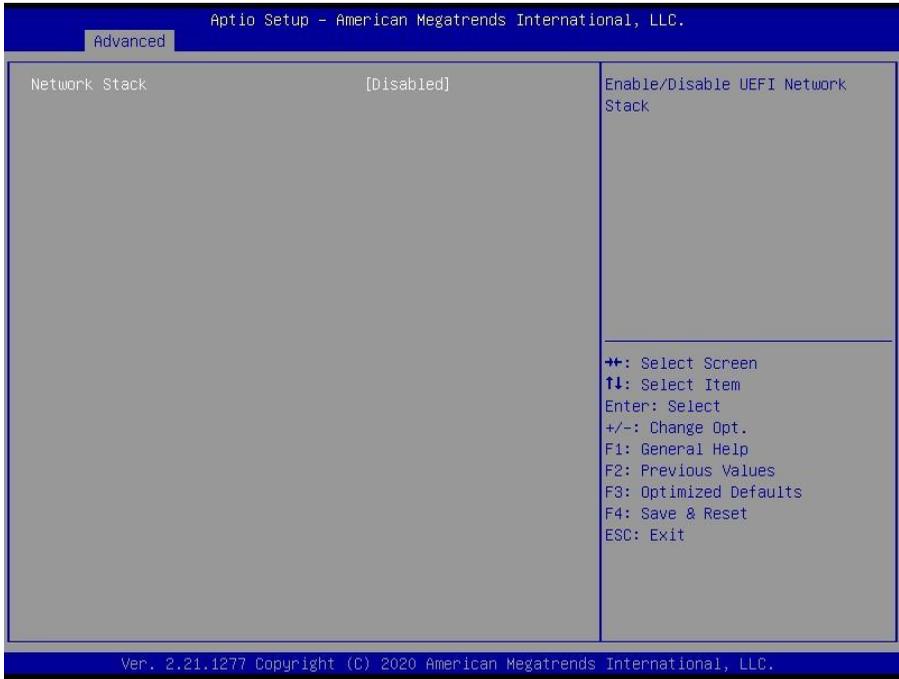
Wake system from S5 (when set to [Dynamic time])

Wake up minute increase

Select 1-5.

1

3.3.8 Network Stack Configuration



Network Stack

Enable/Disable UEFI Network Stack.

Disabled / Enabled

Ipv4 PXE Support **(Available when Network Stack Enabled)**

Enable/Disable Ipv4 PXE Boot Support. If disabled IPV4 PXE boot option will not be created.

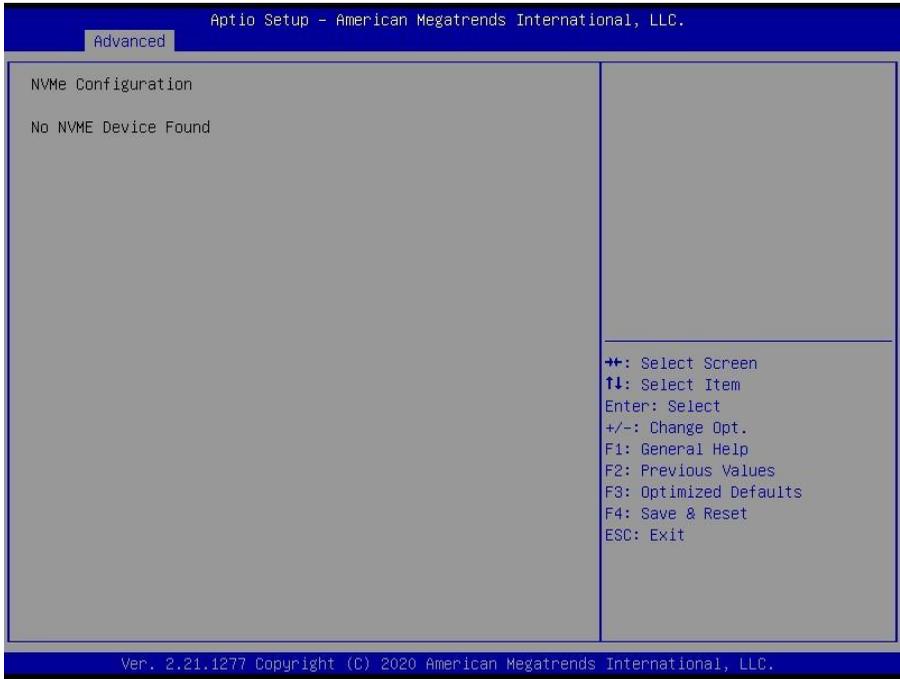
Disabled / Enabled

Ipv6 PXE Support **(Available when Network Stack Enabled)**

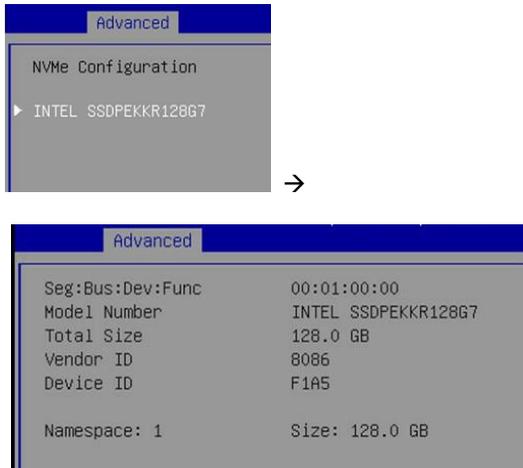
Enable/Disable Ipv6 PXE Boot Support. If disabled IPV6 PXE boot option will not be available.

Disabled / Enabled

3.3.9 NVMe Configuration



Here shows the Device Name you installed. A sample screenshot shows below.



3.3.1 HDD Security Configuration

Aptio Setup - American Megatrends International, LLC.

Security

HDD Password Description :

Allows Access to Set, Modify and Clear
Hard Disk User Password
User Password is mandatory to Enable HDD Security.
If the 'Set User Password' option is hidden,
do power cycle to enable the option again.

HDD PASSWORD CONFIGURATION:

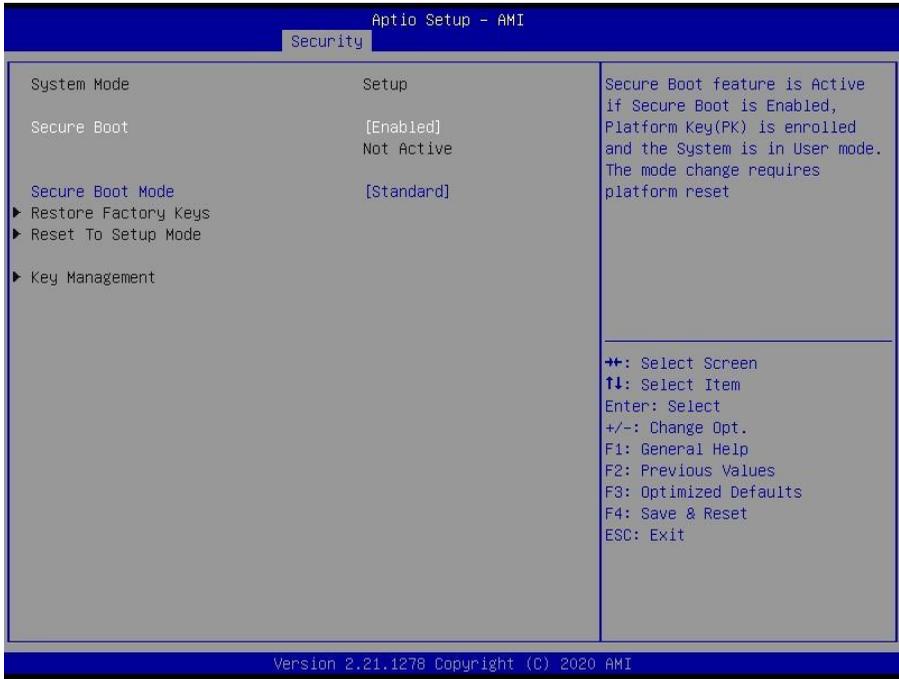
Security Supported :	Yes
Security Enabled :	No
Security Locked :	No
Security Frozen :	Yes
HDD User Pwd Status:	NOT INSTALLED

←+: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit

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Read only.

3.3.2 Secure Boot



Secure Boot

Secure Boot feature is Active if Secure Boot is Enabled. Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Disabled / **Enabled**

Secure Boot Mode

Secure Boot mode options: Standard or Custom.
In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

Custom / **Standard**

Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases.

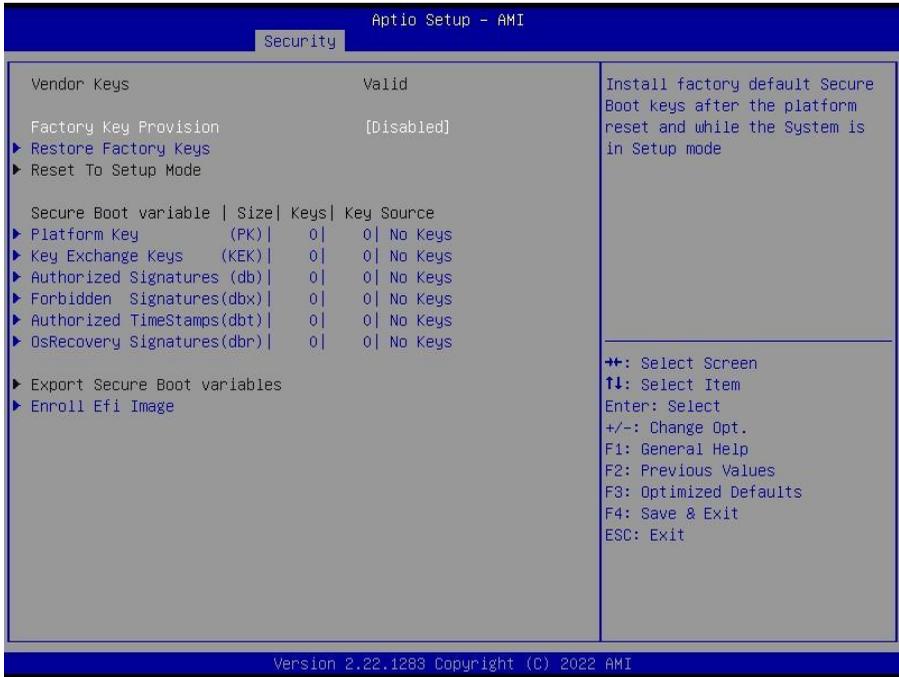
Reset to Setup Mode

Delete all Secure Boot key databases from NVRAM.

Key Management

Enables expert users to modify Secure Boot Policy variables without full authentication.

3.3.2.1 Key Management



Factory Key Provision

Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

Disabled / Enabled

Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases.

Reset to Setup Mode

Deleting all Secure Boot key databases from NVRAM.

Platform Key (PK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
 - a) EFI_SIGNATURE_LIST
 - b) EFI_CERT_X509 (DER)
 - c) EFI_CERT_RSA2048 (bin)
 - d) EFI_CERT_SHAXXX
 2. Authenticated UEFI Variable
 3. EFI PE/COFF Image (SHA256)
- Key source: Factory, External, Mixed

Key Exchange Keys

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
 - a) EFI_SIGNATURE_LIST
 - b) EFI_CERT_X509 (DER)
 - c) EFI_CERT_RSA2048 (bin)
 - d) EFI_CERT_SHAXXX
 2. Authenticated UEFI Variable
 3. EFI PE/COFF Image (SHA256)
- Key source: Factory, External, Mixed

Authorized Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
 - a) EFI_SIGNATURE_LIST
 - b) EFI_CERT_X509 (DER)
 - c) EFI_CERT_RSA2048 (bin)
 - d) EFI_CERT_SHAXXX
 2. Authenticated UEFI Variable
 3. EFI PE/COFF Image (SHA256)
- Key source: Factory, External, Mixed

Forbidden Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
 - a) EFI_SIGNATURE_LIST
 - b) EFI_CERT_X509 (DER)
 - c) EFI_CERT_RSA2048 (bin)
 - d) EFI_CERT_SHAXXX
 2. Authenticated UEFI Variable
 3. EFI PE/COFF Image (SHA256)
- Key source: Factory, External, Mixed

Authorized TimeStamps

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
 - a) EFI_SIGNATURE_LIST
 - b) EFI_CERT_X509 (DER)
 - c) EFI_CERT_RSA2048 (bin)
 - d) EFI_CERT_SHAXXX
 2. Authenticated UEFI Variable
 3. EFI PE/COFF Image (SHA256)
- Key source: Factory, External, Mixed

OsRecovery Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
 - a) EFI_SIGNATURE_LIST
 - b) EFI_CERT_X509 (DER)
 - c) EFI_CERT_RSA2048 (bin)
 - d) EFI_CERT_SHAXXX
 2. Authenticated UEFI Variable
 3. EFI PE/COFF Image (SHA256)
- Key Source: Factory, External, Mixed

Export Secure Boot variables

Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.

Enroll Efi Image

Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

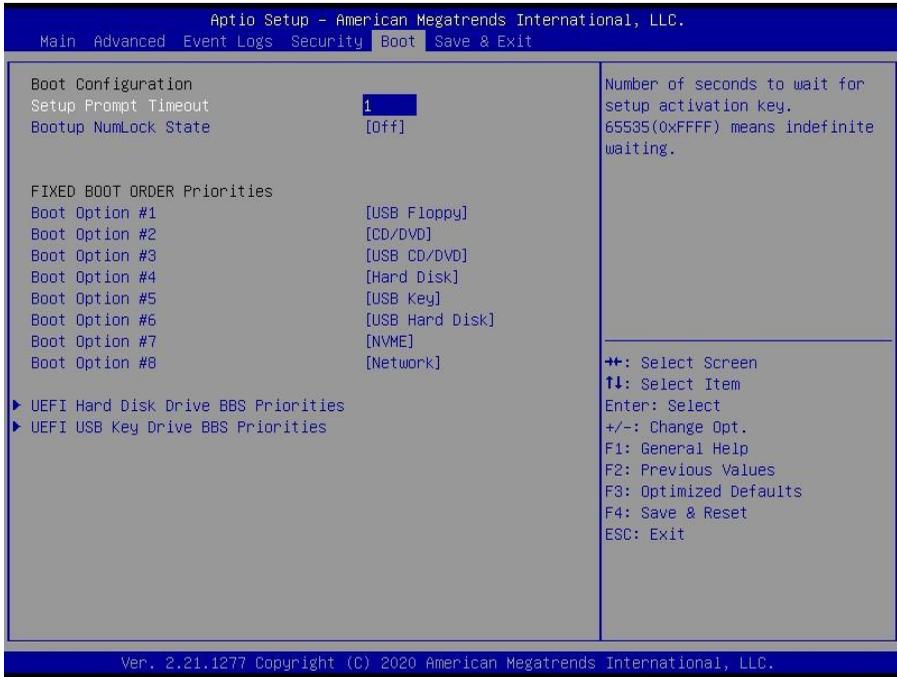
3.3.3 BIOS Update



Path for ROM Image

Enter the path to the BIOS update option.

3.4 Boot



Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.

1

Bootup NumLock State

Select the keyboard NumLock state.

On / **Off**

Boot Option #1 ~ Boot Option #8

Sets the system boot order.

Device Name / Disabled

UEFI Hard Disk Drive BBS Priorities

Specifies the Boot Device Priority sequence from available Hard Disk Drives.

UEFI USB KEY Drive BBS Priorities

Specifies the Boot Device Priority sequence form available USB Key Drives.

3.4.1 Drive BBS Priorities

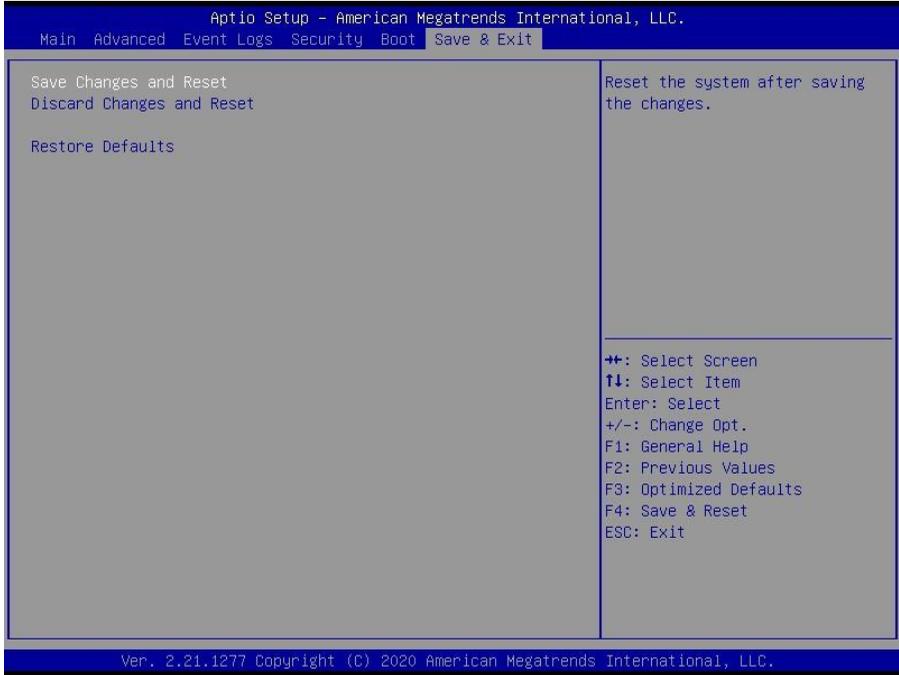


Boot Option #1

Sets the system boot order.

Boot Device Name #1 of this type / Disabled

3.5 Save & Exit



Save Changes and Exit

Reset the system after saving the changes.

Discard Changes and Exit

Reset system setup without saving any changes.

Restore Defaults

Restore/Load Default values for all the setup options.

3.6 Event Logs



Change Smbios Event Log Settings

Press <Enter> to change the Smbios Event Log configuration.

View Smbios Event Log

Press <Enter> to view the Smbios Event Log records.

3.6.1 Change Smbios Event Log Settings



Smbios Event Log

Change this to enable or disable all feature of Smbios Event Logging during boot.
Disabled / **Enabled**

Erase Event Log

Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.

No / Yes, next reset / Yes, every reset

When Log is Full

Choose options for reactions to a full Smbios Event Log.

Do Nothing / Erase Immediately

3.6.2 View Smbios Event Log

Aptio Setup - AMI					
Event Logs					
DATE	TIME	ERROR CODE	SEVERITY	COUNT	DESCRIPTION
06/04/20	06:35:10	Smbios 0x16	N/A	N/A	Log Area Reset and Count is applicable only for Multi-Events

↑↑: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit

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DATE / TIME / ERROR CODE / SEVERITY / COUNT

Description: Log Area Reset and Count is applicable only for Multi-Events. By Events.

MM/DD/YY HH:MM:SS Smbios 0x16 N/A N/A

Chapter 4: Diagnostics

NOTE: if you experience problems with setting up your system, always check the following things in the following order:

Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the MITAC website at <https://www.mitacmct.com/>.

4.1 Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the MITAC web site at <https://www.mitacmct.com/>

NOTE: Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. MITAC does not have a policy for replacing BIOS chips directly with end users. In no event will MITAC be held responsible for damages done by the end user.

4.2 AMIBIOS Post Code (Aptio)

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint Ranges

Status Code Range	Description
0x01 – 0x0B	SEC execution
0x0C – 0x0F	SEC errors
0x10 – 0x2F	PEI execution up to and including memory detection
0x30 – 0x4F	PEI execution after memory detection
0x50 – 0x5F	PEI errors
0x60 – 0x8F	DXE execution up to BDS
0x90 – 0xCF	BDS execution
0xD0 – 0xDF	DXE errors
0xE0 – 0xE8	S3 Resume (PEI)
0xE9 – 0xEF	S3 Resume errors (PEI)
0xF0 – 0xF8	Recovery (PEI)
0xF9 – 0xFF	Recovery errors (PEI)

Standard Checkpoints

SEC Phase

Status Code	Description
0x00	Not used
Progress Codes	
0x01	Power on. Reset type detection (soft/hard).
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading
0x05	OEM initialization before microcode loading
0x06	Microcode loading
0x07	AP initialization after microcode loading
0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading
0x0A	OEM initialization after microcode loading
0x0B	Cache initialization

SEC Error Codes

0x0C – 0x0D	Reserved for future AMI SEC error codes
0x0E	Microcode not found
0x0F	Microcode not found

SEC Beep Codes

None

PEI Phase

Status Code	Description
Progress Codes	
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-Memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-Memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other)
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode(SMM) initialization
0x37	Post-Memory North Bridge initialization is started

Status Code	Description
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F – 0x4E	OEM post memory initialization codes
0x4F	DXE IPL is started
PCI Error Codes	
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error
0x55	Memory not installed
0x56	Invalid CPU type or speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU microcode is not found or microcode update is failed
0x5A	Internal CPU error
0x5B	Reset PPI is not available
0x5C – 0x5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
0xE0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4 – 0xE7	Reserved for future AMI progress codes
S3 Resume Error Codes	
0xE8	S3 Resume Failed
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0xEC – 0xEF	Reserved for future AMI error codes

Recovery Progress Codes	
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (Forced recovery)
0xF2	Recovery process started
0xF3	Recovery firmware image is found
0xF4	Recovery firmware image is loaded
0xF5 – 0xF7	Reserved for future AMI progress codes
Recovery Error Codes	
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found
0xFA	Invalid recovery capsule
0xFB – 0xFF	Reserved for future AMI error codes

PEI Beep Codes

# of Beeps	Description
1 (repeatedly)	Memory not installed
1	Memory was installed twice (InstallPEIMemory routine in PEI Core called twice)
2	Recovery started
3	DXE IPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

DXE Phase

Status Code	Description
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)

Status Code	Description
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x73	South Bridge DXE initialization (South Bridge module specific)
0x74	South Bridge DXE initialization (South Bridge module specific)
0x75	South Bridge DXE initialization (South Bridge module specific)
0x76	South Bridge DXE initialization (South Bridge module specific)
0x77	South Bridge DXE initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A – 0x7F	Reserved for future AMI DXE codes
0x80 – 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller initialization
0x94	PCI Bus Enumeration
0x95	PCI BUS Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console Input devices connect
0x99	Super IO initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E -0x9F	Reserved for future AMI codes
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started

Status Code	Description
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)
0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 – 0xBF	Reserved for future AML codes
0xC0 – 0xCF	OEM BDS initialization codes
DXE Error Codes	
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available

DXE Beep Codes

# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

ACPI/ASL Checkpoints

Status Code	Description
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

Appendix I: How to recover UEFI BIOS

Important Notes:

The emergency UEFI BIOS Recovery process is only used to rescue a system with a failed or corrupted BIOS image that fails to boot to an OS. It is not intended to be used as a general purpose BIOS flashing procedure and should not be used as such. Please do not shutdown or reset the system while the BIOS recovery process is underway or there is risk of damage to the UEFI recovery bootloader that would prevent the recovery process itself from working. In no event shall MiTAC be liable for direct, indirect, incidental, special or consequential damages arising from the BIOS update or recovery.

The BIOS Recovery file is named xxxx.cap, where the 'xxxx' portion is the motherboard model number. Examples: 5630.cap, 7106.cap, 7109.cap, etc. Please make sure that you are using the correct BIOS Recovery file from MiTAC's web site.

BIOS Recovery Process

1. Place the recovery BIOS file (xxxx.cap) in the root directory of a USB disk.
2. Ensure that the system is powered off.
3. Insert the USB disk to any USB port on the motherboard or chassis.
4. Power the system on while pressing "Ctrl" and "Home" simultaneously on the keyboard. Continue to hold these keys down until the following splashscreen is displayed on the monitor.

5. The system will boot to BIOS setup. A new menu item will appear at the far right of the screen. Scroll to the 'Recovery' tab, move the cursor to "Proceed with flash update" and press the "Enter" key on the keyboard to start the BIOS recovery process.

```
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Main Advanced Platform Configuration Socket Configuration Recovery >
-----
Please select blocks you want to update
Reset NVRAM [Enabled]
Boot Block Update [Enabled]

> Proceed with flash update

Select this to start
flash update

-----
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimize Defaults
F4: Save & Exit
ESC: Exit

-----
DXE-USB hot plug 2.19.1268. Copyright (C) 2017 American Megatrends, Inc. B4
```

6. IMPORTANT: Do not power off or reboot the server during the BIOS recovery process. This can damage the BIOS recovery bootloader and prevent it from loading a subsequent time.

7. Wait for the BIOS recovery procedure to complete. Completion is signified with the message "Flash update completed. Press any key to reset the system" displayed on screen.

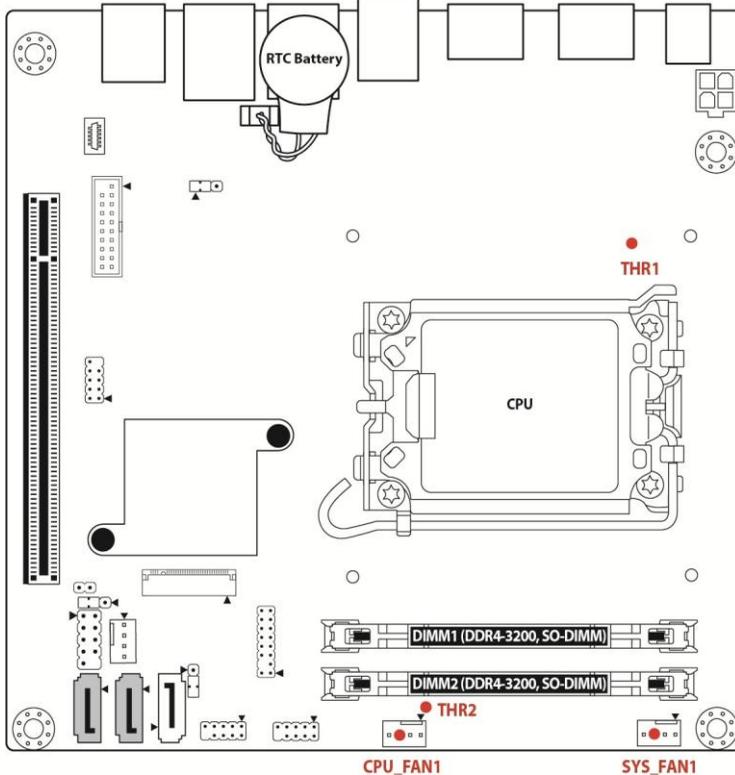
8. Remove the USB disk and reboot.

If your system does not have video output or the POST code halts at "FF" on the right-lower portion of the screen, please contact MiTAC representatives for RMA service.

Appendix II: Fan and Temp Sensors

This section aims to help readers identify the locations of some specific FAN and Temp Sensors on the motherboard. A table of BIOS Temp sensor name explanation is also included for readers' reference.

Figure 1: Sensor Location



NOTE: The red mark indicates the sensor.

Fan and Temp Sensor Location:

1. Fan Sensor: It is located in the **third** pin of the fan connector, which detects the fan speed (rpm).
2. Temp Sensor: refer to Figure 1: Sensor Location. They detect the system temperature around.

BIOS Temp Sensor Name Explanation:

Aptio Setup - AMI

Advanced

PC Health Status		If Enabled, POST monitors voltage, temperature, and fan status. If these values are out of range, BIOS display warning message and turn on beep sound.
Hardware Monitor Alert Enable	[Disabled]	
CPU Temperature	: +43 %	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
CPU VR Temperature	: +37 %	
DIMM Temperature	: +32 %	
CPU Fan Speed	: 1014 RPM	
System Fan Speed	: N/A	
CPU_CORE_MON (CPUVCORE)	: +0.880 V	
V_1P05_SB_MON (ATX5VSB/VIN0)	: +1.056 V	
VDD2_MON (AUXTIN/VIN2)	: +1.201 V	
V_1P05_PROC (VTT)	: +1.056 V	

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BIOS Temp Sensor	Name Explanation
CPU Temperature	Temperature of the CPU Area
CPU VR Temperature	Temperature of the CPU VR Area
DIMM Temperature	Temperature of DIMM Slot
CPU Fan Speed	Fan Speed of CPU_FAN1
System Fan Speed	Fan Speed of System_FAN1

