

# **User Manual**

# **ARK-3534**

**Fanless Embedded Box PC** 



# **Attention!**

Please note:

This package contains a hard-copy user manual in Chinese for China CCC certification purposes. There is an English user manual that can be downloaded from the Advantech website. Please disregard the Chinese hard copy user manual if the product is not to be sold and/or installed in China.

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# **Product Warranty (2 Years)**

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For outof-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

- 1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
- 2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
- If your product is diagnosed as defective, obtain an return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
- 4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
- 5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

# **Declaration of Conformity**

#### FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

# **Technical Support and Assistance**

- 1. Visit the Advantech website at www.advantech.com/support where you can find the latest information about the product.
- 2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

# Warnings, Cautions, and Notes

Warning! Warnings indicate conditions, which if not observed, can cause personal injury!





**Caution!** Cautions are included to help you avoid damaging hardware or losing data, e.g.,



There is danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.



Notes provide optional additional information.



# Packing List

Before installation, please ensure the following items have been shipped:

- 1 x ARK-3534 Unit
- 1 x User Manual (Simplified Chinese)
- 1 x China RoHS
- 1 x Desk mounting kit
- 1 x WISE-DeviceOn
- 1 x McAfee Application Control Lite / Acronis Backup 11.7 for Windows PC

# **Ordering Information**

Part No.	CPU	DDR5	LAN	HDMI	Optional 3rd display module	RS-232	RS-232/ 422/485	USB	M.2 B-Key	SIM	M.2 E- Key	DC Input	Expansion
ARK-3534B- 00A1	LGA1700 Socket Type	Up to 64GB	2	2	1	2	4	8	1	1	1	9-36V DC	PCI ex4+PCI ex16
ARK-3534C- 00A1	LGA1700 Socket Type	Up to 64GB	2	2	1	2	4	8	1	1	1	9-36V DC	PCI ex16+2PCI
ARK-3534D- 00A1	LGA1700 Socket Type	Up to 64GB	4	2	1	2	4	8	1	1	1	9-36V DC	PCI ex4+2PCI+ P CI ex16

#### Note!

*CPU/Memory/Storage and operating system included by request.* 

# **Optional Items for the Default SKU**

Part Number	Description
96PSA-A230W24P4-3	AC to DC adapter, DC 24V 230W, -20 ~ 60°C (-4 ~ 140°F)
1702002600	Power cable 3-pin 183 cm (6 ft), USA type
1702002605	Power cable 3-pin 183 cm (6 ft), EU type
1702031801	Power cable 3-pin 183 cm (6 ft), UK type
170000237	Power cable 3-Pin 183 cm (6 ft), PSE type

# **Safety Instructions**

- 1. Read these safety instructions carefully.
- 2. Retain this user manual for future reference.
- 3. Disconnect the equipment from all AC outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergent.
- 4. For pluggable equipment, the power outlet should be near the equipment and easily accessible.
- 5. Protect the equipment from humidity.
- 6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
- 7. The power outlet sockets should have grounded connections.
- 8. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
- 9. All cautions and warnings on the equipment should be noted.
- 10. If the equipment is not used for a long time, disconnect the equipment from the power source to avoid damage from transient over-voltage.
- 11. Never pour liquid into an opening as this can cause fire or electrical shock.
- 12. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
- 13. If one of the following occurs, have the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment is malfunctioning or does not operate according to the user manual.
  - The equipment has been dropped and damaged.
  - The equipment shows obvious signs of breakage.
- 14. Do not leave the equipment in an environment with a storage temperature of below -40°C (-40°F) or above 85°C (185°F) as this may cause damage. The equipment should be stored in a controlled environment.
- 15. Any unverified component may cause unexpected damage. To ensure correct installation, always use the components (e.g., screws) provided in the accessory box.
- 16. CAUTION: The equipment is equipped with a battery-powered real-time clock circuit. There is a risk of explosion if a battery is incorrectly replaced. Replace only with same or equivalent type as recommended by the manufacturer. Discard all used batteries according to the manufacturer's instructions.
- 17. Always disconnect the power cord from the chassis before manually handling the hardware. Do not implement connections or configuration changes while the device is powered on. Sudden power surges may damage sensitive electronic components.
- 18. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position should not exceed 70 dB (A).
- 19. DISCLAIMER: These instructions are provided according to IEC 704-1 specifications.

Advantech disclaims all responsibility for the accuracy of any statements contained herein.

- 20. Use a power cord connected to a socket-outlet with a grounded connection.
- 21. This product is intended to be supplied by a UL-listed power supply suitable for use at minimum Tma 60°C (140°F) whose output meets ES1 (or SELV) and out-

put is rated: 9-36Vdc, 25.5-6.3A. Please contact Advantech for further information.

22. RESTRICTED ACCESS AREA: The equipment should only be installed in a Restricted Access Area.

# **Consignes de Sécurité**

- 1. Veuillez lire attentivement ces instructions de sécurité.
- 2. Veuillez conserver ce manuel de l'utilisateur pour référence ultérieure.
- Veuillez débrancher cet équipement de la prise secteur avant le nettoyage. Utilisez un chiffon humide. Ne pas utiliser de détergent liquide ou pulvérisé pour le nettoyage. Utilisez une feuille ou un chiffon humide pour le nettoyage.
- 4. Pour les équipements enfichables, la prise de courant doit être à proximité de l'équipement et doit être facilement accessible.
- 5. S'il vous plaît garder cet équipement de l'humidité.
- 6. Posez cet équipement sur une surface fiable lors de l'installation. Une chute ou une chute pourrait causer des blessures.
- 7. La prise de courant doit avoir une connexion mise à la terre.
- 8. Placez le cordon d'alimentation de sorte que personne ne puisse marcher dessus.

Ne placez rien sur le cordon d'alimentation.

- 9. Tous les avertissements et mises en garde sur l'équipement doivent être notés.
- 10. Si l'appareil n'est pas utilisé pendant une longue période, débranchez-le du secteur pour ne pas être endommagé par une surtension transitoire.
- 11. Ne jamais verser de liquide dans les ouvertures de ventilation; Cela pourrait provoquer un incendie ou un choc électrique.
- 12. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, seul le personnel de maintenance qualifié doit ouvrir l'équipement.
- 13. Si l'une des situations suivantes se présente, faites vérifier le matériel par le personnel de service:
  - Le cordon d'alimentation ou la fiche est endommagé.
  - Un liquide a pénétré dans l'appareil.
  - L'équipement a été exposé à l'humidité.
  - L'équipement ne fonctionne pas bien ou vous ne pouvez pas le faire. fonctionner conformément au manuel d'utilisation.
  - Equipment L'équipement est tombé et a été endommagé.
  - Equipment L'équipement présente des signes évidents de rupture.
- 14. Ne laissez pas cet équipement dans un environnement où la température de stockage peut être inférieure à -40°C (-40°F) ou supérieure à 85°C (185°F). Cela pourrait endommager l'équipement. L'équipement doit être dans un environnement contrôlé.
- 15. Tout composant non vérifié peut causer des dommages inattendus. Pour garantir une installation correcte, veuillez toujours utiliser les composants (ex. Vis) fournis avec la boîte d'accessoires.
- 16. ATTENTION: L'ordinateur est équipé d'un circuit d'horloge temps réel alimenté par batterie. Il y a un risque d'explosion si la batterie est remplacée de manière incorrecte. Remplacez uniquement avec le même type ou un type équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant.
- 17. Débranchez toujours complètement le cordon d'alimentation de votre châssis lorsque vous utilisez du matériel. Ne faites pas de connexion quand l'appareil

est sous tension. Les composants électroniques sensibles peuvent être endommagés par des surtensions soudaines.

- 18. Niveau de pression acoustique au poste de l'opérateur selon la norme CEI 704-1: 1982 n'est pas supérieur à 70 dB (A).
- 19. AVERTISSEMENT: Cet ensemble d'instructions est donné conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce.
- 20. Au moyen d'un cordon d'alimentation connecté à une prise de courant avec mise à la terre.
- 21. Ce produit est destiné à être alimenté par un bloc d'alimentation homologué UL adapté à une utilisation à Tma 60 degrés C min. dont la sortie est conforme à ES1 (ou SELV) et dont la sortie est nominale: 9-36Vdc, 25.5-6.3A, si besoin d'aide supplémentaire, veuillez contacter Advantech pour plus d'informations.
- 22. ZONE D'ACCÈS RESTREINT: L'équipement ne doit être installé que dans une zone d'accès restreint.

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# **General Introduction**

This chapter details background information on the ARK-3534 series.

# 1.1 Introduction

Advantech's ARK-3534 is an intelligent, high-performance, fanless desktop system powered by 12/13th Gen. Intel® Core<sup>TM</sup> LGA1700 and Core i3/i5/i7/i9 65W processors. ARK-3534 supports a maximum 65W processor and broad temperature ranges (-20 ~ 60°C / -4 ~ 140°F). It also provides multiple I/O — up to 8 x COM, 4 x GbE, 4 x USB 3.2, 4 x USB 3.0, 2 x CAN bus (optional), 1 x M.2 (B-Key), 1 x M.2 (E-Key), 1 x Line-Out, TPM 2.0 (optional) and 3 x 2.5" SATA III hard drive bays.

#### **Rugged Multi-Functional Design**

ARK-3534 adopts an advanced thermal design for its desktop processor solution. All models are fanless and deliver several unique features. These include wide operating temperatures (-20 ~  $60^{\circ}$ C / -4 ~  $140^{\circ}$ F), diverse expandability options, and structural strengthening. It supports diverse I/O interfaces — up to 4 x Intel® GbE, 4 x USB 3.2, 4 x USB 3.0, 2 x CAN bus (optional), 3 x 2.5" HDD, 1 x M.2 (B-Key), 1 x M.2 (E-Key) 4 x RS-232/422/485, and 4 x RS-232 COM ports.

# Built-in Intelligent Management Tools — Advantech SUSI API and WISE-DeviceOn

Advantech SUSI API provides a valuable suite of programmable APIs such as multilevel watchdog, hardware monitoring, system restoration, and other user-friendly interfaces.

SUSI API is an intelligent self-management cross platform tool that monitors the system's status for problems and takes action in the event of abnormalities. SUSI API offers a boot-up guarantee in critical, low-temperature environments so systems can automatically recover when voltages dip. SUSI API makes the entire system more reliable and intelligent. ARK-3534 also supports Advantech's own WISE-DeviceOn software which provides easy remote management so users can monitor, configure, and control a large number of terminals to make maintenance and system recovery simpler.

# **1.2 Product Features**

# 1.2.1 General

- CPU: 12th Gen. Intel® Xeon® W (support by R680E PCH) and Core™ i3/i5/i7/ i9 (LGA1700) desktop processor (up to 65W)
- System Chipset: Intel® R680E, H610E
- BIOS: AMI EFI 256 Mbit
- System Memory: DDR5 4800MHz up to 64GB
- Watchdog Timer: Single-chip watchdog 255-level interval timer, set up by software
- I/O Interface: 4 x RS232/422/485, 2 x RS232 (2 x RS-232 optional)
- **USB:** 4 x USB 3.2, 4 x USB 3.0 (R680E); 4 x USB 3.2, 4 x USB 2.0 (H610E)
- Audio: High Definition Audio (HD), and Line-out/Mic-in
- Storage: 3 x 2.5" HDD drive bays (15mm/ 0.59 in height) and 1 x M.2 B-Key NVME (PCIe x2)
- Expansion Interface:
  - 1 x M.2 (B-Key for NVME, SATA, LTE/5G modules)
  - 1 x M.2 (E-Key for Wi-Fi, suggested installation at Advantech manufacturing)
  - Add-on Card Slot: 3534B for 1 x Slot PCIe x4 + 1 x Slot PCIe x16, 3534C for 1 x Slot PCIe x16 + 2 Slot PCI, 3534D for 1 x Slot PCIe x4 + 2 x Slot PCI + 1 x Slot PCIe x16
- **TPM:** TPM 2.0 (optional)

### 1.2.2 Display

- **Controller:** According to customer-specified CPU selection
- Resolution:
  - 2 x HDMI: supports HDMI 2.0, 4096 x 2160 @ 60 Hz
- Triple Displays:
  - 2 x HDMI + DVI-D
  - 2 x HDMI + DP
  - 2 x HDMI + HDMI

### 1.2.3 Ethernet

- Chipset:
  - LAN1 Intel® i219LM
  - LAN2 Intel® i225V (H610E); LAN2/3/4 Intel® i225LM (R680E)

# 1.3 Chipset

# **1.3.1 Functional Specifications**

### 1.3.1.1 Processor

- Processor Supports 12th Gen. Intel® LGA1700 processor (up to 65W)
- Memory Supports DDR5 4800 MHz up to 64GB
- 2 x 262-pin SODIMM socket type

### 1.3.1.2 Chipset

#### Internal Graphics Features

- DirectX 12, OpenGL 4.5
- HDMI + HDMI
- Intel® Display Power Saving Technology 6.0

#### Video Accelerator

- HW-Accelerated Media Decode: H.265/HEVC, H.264/MPEG-4 AVC, MPEG-2, VC-1/WMV9, JPEG/MJPEG, VP8, and VP9
- HW-Accelerated Media Encode: H. H.265/HEVC, H.264/MPEG-4 AVC, MPEG-2, JPEG/MJPEG, and VP8

#### SATA Interface

- Supports several optional selections of Serial ATA III
- Supports SATA data transfer rates of up to 6 Gb/s
- Integrated AHCI controller

#### **USB** Interface

- 1 x XHCI Host Controller, supporting SuperSpeed USB 3.2 Gen1/Gen2
- 1 x EHCI Host Controllers, supporting HighSpeed USB 2.0 ports
- Supports wake-up from sleep states S3
- USB1/2 Maximum 1.9A

#### **Power Management**

- Supports ACPI
- ACPI-defined power states (processor driven C states)
- ACPI Power Management Timer
- SMI# generation

#### 1.3.1.3 Others

### Serial Ports

- Up to 8 x serial ports
- Supports IRQ Sharing among serial ports under Microsoft
- COM3, COM4, COM5, COM6: RS-232/422/485
- COM1, COM2 (Optional COM7, COM8): RS-232

### Ethernet

### LAN1 Intel i219LM, LAN2 Intel i225-V (H610E), LAN2/3/4 Intel i225-LM (R680E)

- I219LM Support up to 10/100/1000 Mbps
- I225V/I225LM Support up to 10/100/1000/2500Mbps
- LAN Connectors: Phone Jack RJ-45 8P 90D (F)

### Audio

### Audio Codec: ALC888S-VD2-GR

- Compliant with HD Audio specifications
- Supports 16-/20-/24-bit DAC and 16-/20-/24-bit ADC resolution
- Supports: Speaker-out, Mic-in
- Audio Connectors: 1 x headphone jack \*

Battery Backup Battery 3V/210 mAh with wire x 1

**TPM** TPM 2.0

## 1.3.2 SUSI 4.0

- SUSI API
- Sequence Control Supported
- DIO 16-bit programmable DIO
- Watchdog Timer Multi-level WDT
- Programmable 1-255 sec/min
- Hardware Monitor CPU Temperature / input Current / input Voltage
- System Information Running HR / Boot record
- 2 x CAN bus supported

# **1.4 Mechanical Specifications**

# 1.4.1 Dimensions

### ARK-3534B/ARK-3534C

(W x H x D) 156 x 204 x 230 mm / 6.14 x 8.03 x 9.05 in









### ARK-3534D

(W x H x D) 197.2 x 204 x 230 mm / 7.7 x 8.03 x 9.05 in







## 1.4.2 Weight

ARK-3534B/ARK-3534C: 5.7 kg (12.5 lb) ARK-3534D: 6.41 kg (14.1 lb)

# **1.5 Power Requirements**

# 1.5.1 System Power

- Minimum Power Input: 9 ~ 36VDC
- Optional Adapter:
  - 150W @19V/7.89A power adapter (optional)
  - 230W @ 24V/9.58A power adapter (optional)

# **1.6 Operating Environment Specifications**

# **1.6.1 Operating Temperature**

■ With extended peripherals: -20 ~ 60°C (-4 ~ 140°F) with 0.7m/s air-flow

# 1.6.2 Relative Humidity

■ 95% @ 40°C (104°F) (non-condensing)

### **1.6.3 Storage Temperature**

■ -40 ~ 85°C (-40 ~ 185°F)

### 1.6.4 Safety

UL, CB, CCC, BSMI

### 1.6.5 **EMC**

CE/FCC Class B, CCC, BSMI



Hardware Configuration

# 2.1 Introduction

The following sections show the internal jumper settings and the external connector pin assignments for different applications.

# 2.2 Jumpers

# 2.2.1 Jumper Description

You may configure ARK-3534 to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, you connect the pins with the clip. To open a jumper, remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



The jumper settings are schematically depicted in this manual as follows.



A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

## 2.2.2 Jumper List

Table 2.1: Jumper List					
CN22	Auto Power On Setting (MB)				
CLCMOS1	Clear CMOS (MB)				
ERP1	Power saving mode (MB)				
CN20	M.2 B-Key Power select (MB)				
J_CFG5	PCIe x16 Bifurcation Setting (MB)				
J1(AMO-I028)	COM3 RI power setting (on AMO-I028)				

# 2.2.3 Jumper Locations



Figure 2.1 Jumper Layout

# 2.2.4 Jumper Settings

# 2.2.4.1 Auto Power On Settings for CN22

CN22 Auto Power On Setting					
Part Number	1653004101				
Footprint	HD_4x1P_79_D				
Description	PIN HEADER 4x1P 2.0mm 180D(M) DIP 21N12050				
Setting	Function				
(3-4)	Auto Power On				
(1-2)	Power Button for Power On (Default)				

# 2.2.4.2 Clear CMOS Settings for CLCMOS1

CLCMOS1 Clear CMOS Setting				
Part Number	1653003101			
Footprint	HD_3x1P_79_D			
Description	PIN HEADER 3x1P 2.0 mm 180D(M) DIP 2000-13 WS			
Setting	Function			
(1-2)	Normal Operation (Default)			
(2-3)	Clear CMOS			

1 00 2 3

### 2.2.4.3 M.2 B-Key Power Settings for CN20

CN20 Power Setting	
Part Number	1653008215-01
Footprint	HD_2X1P_79_161X79_D
Description	PH 1x2P/2.0/NY6T/G-FL/VA/D/BK/H3.9/L2.8/W K
Setting	Function
NC	3.3V (Default)
(1-2)	3.8V for 5G module

	1
0	2

### 2.2.4.4 Power Saving Mode Settings for ERP1

ERP1 Power saving mode setting				
Part Number	1653000014			
Footprint	HD_2x2P_79			
Description	PIN HEADER 2x2P 2.00mm 180D(M) SMD 21N22050			
Setting	Function			
(3-4)	Power saving mode			
(1-2)	Normal operating (Default)			



### 2.2.4.5 PCIe x16 Bifurcation Settings for J\_CFG5

J_CFG5 PCIE X16 Bifurcation Setting				
Part Number	1653003101			
Footprint	HD_3x1P_79_D			
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS			
Setting	Function			
(1-2)	1 (Default)			
(2-3)	0			



CFG[5]: PCI Express\* Bifurcation

0 = 2 x8 PCI Express\*

1 = 1 x16 PCI Express\* (Default)

### 2.2.4.6 COM3 RI Power Settings J1 (AMO-I028) on AMO-I028 Card

J1 (AMO-I028) RI Power Settings		
Part Number	1653003201	
Footprint	HD_3x2P_79_D	
Description	PIN HEADER 3x2P 2.0mm 180D(M) DIP 21N22050	
Setting	Function	
(1-2)	Normal (default)	
(3-4)	+5V	
(5-6)	+12V	





# 2.3 Connectors

# 2.3.1 ARK-3534 External I/O Locations



Figure 2.2 ARK-3534 Front and Rear I/O Connector Diagram

#### 2.3.1.1 COM Connector

ARK-3534 provides up to 6 D-sub 9-pin connectors, which offers RS-232/422/485 serial communication interface ports. The default setting is RS-232, the mode RS-422/ 485 of ARK-3534 COM3/4/5/6 can be supported via the BIOS settings. COM1/2 supports RS-232.

#### COM3~COM6

Figure 2.3 COM Connector

Table 2.2: COM Connector Pin Assignments			
	RS-232	RS-422	RS-485
Pin	Signal Name	Signal Name	Signal Name
1	DCD	Tx-	DATA-
2	RxD	Tx+	DATA+
3	TxD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

Note! NC represents "No Connection".



### COM1~COM2/COM7~COM8(Optional)



Table 2.3: COM Connector Pin Assignments		
	RS-232	
Pin	Signal Name	
1	DCD	
2	RxD	
3	TxD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

### 2.3.1.2 Ethernet Connector (LAN)

ARK-3534 is equipped with up to 4 x (LAN3/4 are optional by TPN support) Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. These Ethernet ports provide a standard RJ-45 jack connector with LED indicators on the front side that demonstrate its Active/Link status (Green LED) and Speed status (Green/Orange LED).



### Figure 2.4 Ethernet Connector

Table 2.4: Ethernet Connector Pin Assignments		
Pin	10/100/1000BaseT Signal Name	
1	TX+	
2	TX-	
3	RX+	
4	MDI2+	
5	MDI2-	
6	RX-	
7	MDI3+	
8	MDI3-	

### 2.3.1.3 HDMI Connector

An integrated, 19-pin receptacle connector HDMI Type A Interface is provided. The HDMI link supports resolutions up to 4096 x 2160 @ 60 Hz.



Figure 2.5 HDMI Receptacle Connector

Table 2.5: HDMI Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	TMDS Data 2+	2	TMDS Data 2 shield	
3	TMDS Data 2-	4	TMDS Data 1+	
5	TMDS Data 1 shield	6	TMDS Data 1-	
7	TMDS Data 0+	8	TMDS Data 0 shield	
9	TMDS Data 0-	10	TMDS clock+	
11	TMDS clock shield	12	TMDS clock-	
13	CEC	14	Reserved	
15	SCL	16	SDA	
17	DDC/CEC Ground	18	+5V	
19	Hot Plug Detect			

### 2.3.1.4 DIO Connector (by Optional Cable)



Figure 2.6 DIO Connector

Table 2.6	: DIO Connector Pin Assig	nments	
Pin	Signal Name	Pin	Signal Name
1	GND	14	GND
2	Port0 D0	15	Port1 D8
3	Port0 D1	16	Port1 D9
4	Port0 D2	17	Port1 D10
5	Port0 D3	18	Port1 D11
6	Port0 D4	19	Port1 D12
7	Port0 D5	20	Port1 D13
8	Port0 D6	21	Port1 D14
9	Port0 D7	22	Port1 D15
10	+5V	23	+5V
11	NC	24	NC

Table 2.6	: DIO Connector Pin Assig	nments	
12	NC	25	NC
13	NC		

Note! NC represents "No Connection".



#### 2.3.1.5 Power On/Off Button

ARK-3534 has a Power On/Off button with LED indicators on the front side that show "On" (Green LED) and "Off/Suspend" statuses (Orange LED). The power button supports dual functions: Soft Power - On/Off (Instant off or Delay 4 Seconds then off), and Suspend.



#### Figure 2.7 Power ON/OFF Button

#### 2.3.1.6 Audio Connector

ARK-3534 features one phone jack connector that supports stereo Line-Out or Mic-In audio ports. The audio chip is controlled by ACL888S and compliant with the Azalea standards.



#### 2.3.1.7 LED Indicators

There are four LEDs on the front panel that indicate the system's status: The HDD LED is for HDD status.



Figure 2.8 LED Indicators

#### 2.3.1.8 USB 2.0

ARK-3534 (H610E) provides four USB 2.0 interface connectors. The USB interface supports plug-and-play functionality.



Table 2.7: USB 2.0 Pin Definitions	
Pin	Signal Name
1	VCC
2	USB_data
3	USB_data+
4	GND

#### 2.3.1.9 USB 3.2 - Gen2 and Gen1

ARK-3534 supports 4 x USB 3.2 (Gen2,10G), 2 x USB 3.2 (Gen1, 5G), and 2 x Independent USB 3.2 (Gen1, 5G) interfaces. The USB interfaces comply with USB UHCI, Rev. 3.0 standards. Please refer to Table 2.5 for its pin assignments. USB 3.2 Gen1/2 connectors contain legacy pins to interface with USB 2.0 devices, and a new set of pins for USB 3.2 Gen1/2 connectivity.



Figure 2.9 USB 3.2 Gen 1/2 Connector

Table 2.8: USB 3.2 Gen1/2 Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	+5V	2	USB_data-	
3	USB_data+	4	GND	
5	SSRX-	6	SSRX+	
7	GND	8	SSTX-	
9	SSTX+			

### 2.3.1.10 Remote Switch Connector

ARK-3534 provides the remote switch connector for power on/off with an external cable. From the left to the right are WDT, Power Switch, GND, and Reset.



#### Figure 2.10 Remote Switch Connector

#### 2.3.1.11 Phoenix Terminal Connector

ARK-3534 supports one 4-pin Phoenix terminal power input connector. Connect the positive and negative power cables to the terminals in the power distribution connector correctly at the same time.



### Figure 2.11 Phoenix Terminal Connector



- 1. For supply connections use wires suitable for at least 105°C.
- 2. The terminal block is suitable for 14 AWG. Torque value is 7lb-in. Use copper conductors only. It must be installed by a skilled person.
- 3. The terminal block uses two sets of interfaces to be installed at the same time to make it split to meet the maximum current limit, and a single pin will be limited below 16A.

Table 2.9: Phoenix Terminal Connector		
Pin	Signal Name	
-	GND	
+	V-in	

# 2.4 Installation

# 2.4.1 CPU/Memory Installation



1. Unscrew the 4 screws on the top cover, and remove the top cover.





- 2. Install the CPU (LGA1151) and memory into the system.
- 3. Replace the top cover.

# 2.4.2 External HDD/SSD Installation



- 1. Unscrew the 2 x screws on the hard drive bay.
- 2. Install the HDD/SSD with 4 x screws on the HDD/SSD tray.
- 3. Push back the hard drive bay into the system and secure it using the same screws.

# 2.4.3 Mounting Kit Installation



1. Take the mounting kit and 4 screws (M4x6L) out of the accessory box.

Sortez le kit de montage et les 4 vis (M4x6L) de la boîte d'accessoires.

2. Screw each of the 2 screws (M4x6L) on the left and right sides and fix the system horizontally on a table.

Vissez chacune 2 vis (M4x6L) sur les côtés gauche et droit et fixez le système horizontalement sur une table.

# 2.4.4 M.2 Module / Mini PCIe Module / Internal SIM Card Slot Installation





# 2.4.5 Attaching the Thermal pad

- 1. Take the thermal pad from the accessory box.
- 2. Paste the 30 x 30 x 0.2 mm thermal pad to the CPU (as illustrated above).
- 3. Paste the 46 x 46 x 1 mm piece to the copper block (as illustrated below).




**BIOS Settings** 

# 3.1 Introduction

AMIBIOS has been integrated into motherboards for over two decades. With the AMIBIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the ARK-3534 BIOS setup screens.

Main Advanced Chipset S	Aptio Setup – AMI Security Boot Save & Exit MEBx	
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level Project Board Version Power Type	American Megatrends 5.0.2.6 0.14 x64 UEFI 2.8; PI 1.7 3534000R060X019 12/07/2022 11:30:42 Administrator ARK-3534 ATX	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.
Memory Information Total Memory Memory Frequency System Date System Time	16384 MB 4800 MHz [Mon 12/12/2022] [10:36:53]	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.22.1286 Copyright (C) 202	2 AMI

AMI's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This information is stored in flash ROM so it retains the setup information when the power is turned off.

# 3.2 Entering the Setup

Turn on the computer and check for the patch code. If there is a number assigned to the patch code, it means that BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter Setup.

# 3.2.1 Main Setup

When users first enter the BIOS Setup Utility, they will enter the Main setup screen. Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit MEBx	
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level Project Board Version Power Type	American Megatrends 5.0.2.6 0.14 x64 UEFI 2.8; PI 1.7 3534000R060X019 12/07/2022 11:30:42 Administrator ARK-3534 ATX	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.
Memory Information Total Memory Memory Frequency System Date System Time	16384 MB 4800 MHz [Mon 12/12/2022] [10:36:53]	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. 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.

#### System Time / System Date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

# 3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ARK-3534 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub-menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub-menus are described on the following pages.

#### 3.2.2.1 CPU Configuration

Aptio Setup – AMI Main <mark>Advanced </mark> Chipset Security Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>	CPU Configuration Parameters
<ul> <li>Tls Auth Configuration</li> <li>Driver Health</li> </ul>	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

Advanced		
CPU Configuration		Displays the P-core Information
· Performance–core Information		
ID Record Strains	0x90672 13th Con Intel(P)	
brand String	Core(TM) i9-12900E	
Microcode Revision	23	
VMX	Supported	
SMX/TXT	Supported	
TXT Crash Code	0x0000000	
TXT SPAD	0x9040000000000000	
Boot Guard Status	0×C0008000	Mar Onland, Oranger
Boot Guard ACM Policy Status	0x0000000000000000	++: Select Screen
BOOL GUARD SHUM INTORNALION	0x00000110000000	Foten: Select
CEDRAM	[Enabled]	+/-: Change Ont
CPU Flex Ratio Override	[Disabled]	E1: General Help
CPU Flex Ratio Settings	23	F2: Previous Values
Hardware Prefetcher	[Enabled]	F3: Optimized Defaults
Adjacent Cache Line Prefetch	[Enabled]	F4: Save & Exit
Intel (VMX) Virtualization	[Enabled]	ESC: Exit
Technology		
PECI	[Enabled]	
AVX	[Enabled]	▼

	Aptio Setup – AMI	
Advanced		
		When enabled, Pressing the
C6DRAM	[Enabled]	scroll lock key will toggle
CPU Flex Ratio Override	[Disabled]	the Efficient-cores between
CPU Flex Ratio Settings	23	being parked when Scroll Lock
Hardware Prefetcher	[Enabled]	LED is on and un-parked when
Adjacent Cache Line Prefetch	[Enabled]	LED is off.
Intel (VMX) Virtualization	[Enabled]	
Technology		
PECI	[Enabled]	
AVX	[Enabled]	
Active Performance-cores	[A11]	
Active Efficient-cores	[A11]	
Hyper-Threading	[Enabled]	
BIST	[Disabled]	++: Select Screen
AP threads Idle Manner	[MWAIT Loop]	†↓: Select Item
AES	[Enabled]	Enter: Select
MachineCheck	[Enabled]	+/-: Change Opt.
MonitorMWait	[Enabled]	F1: General Help
Intel Trusted Execution Technology	[Disabled]	F2: Previous Values
Alias Check Request	[Disabled]	F3: Optimized Defaults
DPR Memory Size (MB)	4	F4: Save & Exit
Reset AUX Content	[no]	ESC: Exit
CPU SMM Enhancement		
Total Memory Encryption	[Disabled]	
Legacy Game Compatibility Mode	[Disabled]	

#### Performance-core Information

Displays the P-core Information

#### C6DRAM

Enable/Disable moving of DRAM contents to PRM memory when CPU is in C6 state.

CPU Flex Ratio Override
 Enable/Disable CPU Flex Ratio Programming.

#### CPU Flex Ratio Settings

This value must be between Max Efficiency Ratio (LFM) and Maximum non-turbo ratio set by Hardware (HFM).

- Hardware Prefetcher
   To turn on/off the MLC streamer prefetcher.
- Adjacent Cache Line Prefetch To turn on (off prefetching of adjacent)

To turn on/off prefetching of adjacent cache lines.

# Intel (VMX) Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

# PECI

Enable/Disable PECI.

# AVX

Enable/Disable the Avx 2 Instructions. This is applicable for Performance-core only

# Active Performance-Cores

Number of cores to enable in each processor package.

# Active Efficient-cores

Enable/Disable Per Core Disable. When Per Core Disable Configuration is enabled, selection of Active Cores and Active Efficient-cores will be disabled.

#### Hyper-Threading

Enable or Disable Hyper-Threading Technology.

#### BIST

Enable/Disable BIST (Built-in Self Test) on reset

#### AP threads Idle Manner

AP threads Idle Manner for waiting signal to run.

#### AP threads Idle Manner

AP threads Idle Manner for waiting signal to run.

#### AES

Enable/Disable AES (Advanced Encryption Standard)

# MachineCheck

Enable/Disable Machine Check.

#### MonitorMWait

Enable/Disable MonitorMWait, if Disable MonitorMwait, the AP threads Idle Manner should not set in MWAIT Loop

#### Intel Trusted Execution Technology

Enables utilization of additional hardware capabilities provided by Intel® Trusted Execution Technology.

#### Alias Check Request

Enables Txt Alias Checking capability.

#### DPR memory size (MB)

Reserve DPR memory size (0-255) MB

#### Reset AUX Content

Reset TPM Aux content. Txt may not functional after AUX content gets reset.

#### Total Memory Encryption

Configure Total Memory Encryption (TME) to protect DRAM data from physical attacks.

#### Legacy Game Compatibility Mode

When enabled, Pressing the scroll lock key will toggle the Efficient-cores between being parked when Scroll Lock LED is on and un-parked when LED is off.

Advanced	Aptio Setup - AMI	
Huvanceu		
		CPU SMM Enhancement
C6DRAM	[Enabled]	
CPU Flex Ratio Override	[Disabled]	
CPU Flex Ratio Settings	23	
Hardware Prefetcher	[Enabled]	
Adjacent Cache Line Prefetch	[Enabled]	
Intel (VMX) Virtualization	[Enabled]	
Technology		
PECI	[Enabled]	
AVX	[Enabled]	
Active Performance-cores	[A11]	
Active Efficient-cores	[A11]	
Hyper-Threading	[Enabled]	
BIST	[Disabled]	↔: Select Screen
AP threads Idle Manner	[MWAIT Loop]	↑↓: Select Item
AES	[Enabled]	Enter: Select
MachineCheck	[Enabled]	+/−: Change Opt.
MonitorMWait	[Enabled]	F1: General Help
Intel Trusted Execution Technology	[Disabled]	F2: Previous Values
Alias Check Request	[Disabled]	F3: Optimized Defaults
DPR Memory Size (MB)	4	F4: Save & Exit
Reset AUX Content	[no]	ESC: Exit
• CPU SMM Enhancement		
Total Memory Encryption	[Disabled]	
Legacy Game Compatibility Mode	[Disabled]	

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Advanced	Aptio Setup — AMI	
CPU SMM Enhancement SMM Use Delay Indication SMM Use Block Indication SMM Use SMM en-US Indication	[Enabled] [Enabled] [Enabled]	Enable/Disable usage of SMM_DELAYED MSR for MP sync in SMI
		<pre> ++: Select Screen  14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- SMM Use Delay Indication Enable/Disable usage of SMM\_DELAYED MSR for MP sync in SMI.
- SMM Use Block Indication Enable/Disable usage of SMM\_BLOCKED MSR for MP sync in SMI.
- SMM Use en-US Indication
   Enable/Disable usage of SMM\_ENABLE MSR for MP sync in SMI

# **3.2.2.2** Power and Performance – CPU Power Management Control

Aptio Setup – AMI Main <mark>Advanced Chipset Security Boot Save &amp; Exit MEB</mark> x	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super ID Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NWMe Configuration</li> </ul>	Power & Performance Options
<ul> <li>NVMe Configuration</li> <li>T1s Auth Configuration</li> <li>Driver Health</li> </ul>	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Advanced	Aptio Setup - AMI
Power & Performance ▶ CPU – Power Management Control ▶ GT – Power Management Control	CPU – Power Management Control Options
	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup – AMI	
CPU – Power Management Control		▲ Select the performance state
Boot performance mode Intel(R) SpeedStep(tm) Race To Halt (RTH) Intel(R) Speed Shift Technology Per Core P State OS control mode HwP Autonomous Per Core P State HwP Autonomous EPP Grouping EPB override over PECI HwP Lock HDC Control	[Turbo Performance] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Disabled] [Enabled] [Enabled]	starting from reset vector.
View/Configure Turbo Options CPU VR Settings Platform PL1 Enable Platform PL1 Power Platform PL2 Enable Platform PL2 Enable Platform PL2 Power Power Limit 4 Override Power Limit 4 Lock C states Thermal Monitor	[Enabled] 0 [0] [Enabled] 100000 [Enabled] 100000 [Disabled] [Disabled] [Enabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

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Advanced	Aptio Setup – AMI	
HwP Lock	[Enabled]	CPU Lock Configuration
HDC Control	[Enabled]	
Turbo Mode	[Enabled]	
View/Configure Turbo Options		
▶ CPU VR Settings		
Platform PL1 Enable	[Enabled]	
Platform PL1 Power	0	
Platform PL1 Time Window	[0]	
Platform PL2 Enable	[Enabled]	
Platform PL2 Power	100000	
Power Limit 4 Override	[Enabled]	
Power Limit 4	100000	
Power Limit 4 Lock	[Disabled]	
C states	[Disabled]	↔+: Select Screen
Thermal Monitor	[Enabled]	†↓: Select Item
Interrupt Redirection Mode	[Fixed Priority]	Enter: Select
Selection		+/-: Change Opt.
Timed MWAIT	[Disabled]	F1: General Help
Custom P-state Table		F2: Previous Values
Energy Performance Gain	[Disabled]	F3: Optimized Defaults
EPG DIMM Idd3N	26	F4: Save & Exit
EPG DIMM Idd3P	11	ESC: Exit
Power Limit 3 Settings		
▶ CPU Lock Configuration		
Dual Tau Boost	[Disabled] 🔹 🔻	
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#### Boot Performance

Select the performance state that the BIOS will set before OS hand-off.

#### Intel® Speedstep™

Allows more than two frequency ranges to be supported.

#### Race to Halt (RTH)

Enable/Disable the Race To Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power. (RTH is controlled through MSR 1FC bit 20).

#### Intel® Speed Shift Technology

Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

#### Per core P state OS control mode

Enable/Disable Per Core P state OS control mode. Disabling will set Bit 31 = 1 command 0x06. When set, the highest core request is used for all other core requests.

#### Hwp Autonomous Per core P state

Disable Autonomous PCPS (Bit 30 = 1, command 0x11) Autonomous will request the same value for all cores all the time. Enable PCPS (default Bit 30 = 0, command 0x11).

#### Hwp Autonomous EPP grouping

Enable EPP grouping (default Bit 29 =0, command 0x11) Autonomous will request the same values for all cores with same EPP. Disable EPP grouping (Bit 29 =1, command 0x11) autonomous will not necessarily request same values for all cores with same EPP.

#### EPB override over PECI

Enable/Disable EPB override over PECI. Enable by sending pcode command 0x2b, subcommand 0x3 to 1. This will allow OOB EPB PECI override control

#### HWP Lock

Enable/Disable HWP Lock support in Misc Power Management MSR.

#### HDC Control

This option allows HDC configuration.

#### Turbo Mode

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

#### Platform PL1 Enable

Enable/Disable Platform Power Limit 1 programming.

#### Platform PL1 Power

Platform Power Limit 1 Power in milliwatts.

#### Platform PL1 Time Window

Platform Power Limit 1 Time Window value in seconds.

# Platform PL2 Enable

Enable/Disable Platform Power Limit 2 programming.

# Platform PL2 Power

Platform Power Limit 2 Power in Milli Watts.

# Power Limit 4 Override

Enable/Disable Power Limit 4 override.

# Power Limit 4

Power Limit 4 in milliwatts.

# Power Limit 4 Lock

Power Limit 4 MSR 601h Lock. When enabled PL4 configurations are locked during OS. When disabled PL4 configuration can be changed during OS.

#### C states

Enable/Disable CPU Power Management.

- Thermal Monitor Enable/Disable Thermal Monitor
- Interrupt Redirection Mode Selection Interrupt Redirection Mode Select for Logical Interrupts
- Timed MWAIT
  - Enable/Disable Timed MWAIT Support

#### Energy Performance Gain

Enable/disable Energy Performance Gain.

	Aptio Setup – AMI	
Advanced		
CPU – Power Management Control		View/Configure Turbo Options
Boot performance mode Intel(R) SpeedStep(tm) Race To Halt (RTH) Intel(R) Speed Shift Technology Per Core P State OS control mode HwP Autonomous Per Core P State HwP Autonomous EPP Grouping EPB override over PECI HwP Lock HDC Control Turbo Mode View/Configure Turbo Options OPU VR Settings Platform PL1 Enable Platform PL1 Time Window Platform PL2 Enable Platform PL2 Power Power Limit 4 Override Power Limit 4 Lock C states Thermal Monitor	[Turbo Performance] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] 0 [0] [Enabled] 100000 [Enabled] 100000 [Disabled] [Disabled] [Disabled] [Enabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

Advanced	Aptio Setup – AMI	
Current Turbo Settings		View/Configure Turbo Ratio
Max Turbo Power Limit	4095.875	LIMIC OPCIONS
Min Turbo Power Limit	0.0	
Package TDP Limit	65.0	
Power Limit 1	45.0	
Power Limit 2	100.0	
▶ Turbo Ratio Limit Options		
Energy Efficient P-state	[Enabled]	
Package Power Limit MSR Lock	[Disabled]	
Power Limit 1 Override	[Enabled]	
Power Limit 1	45000	
Power Limit 2 Overnide	[V] [Enabled]	1: Select Item
Power Limit 2	100000	Enter: Select
Energy Efficient Turbo	[Disabled]	+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC. EXIC
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- Energy Efficient P-state
   Enable/Disable Energy Efficient P-state feature.
- Package Power Limit MSR Lock
   Enable/Disable locking of Package Power Limit settings.
- Power Limit 1 Override
   Enable/Disable Power Limit 1 override.
- Power Limit 1
   Power Limit 1 in milliwatts.
- Power Limit 1 Time Window
   Power Limit 1 Time Window value in seconds.
- Power Limit 2 Override Enable/Disable Power Limit 2 override.
- Power Limit 2
   Power Limit 2 value in milliwatts.

 Energy Efficient Turbo Enable/Disable the Energy Efficient Turbo feature. This feature will opportunistically lower the turbo frequency to increase efficiency.

	Aptio Setup – AMI	
Advanced		
CPU – Power Management Control		▲ CPU VR Settings
Boot performance mode Intel(R) SpeedStep(tm) Race To Halt (RTH) Intel(R) Speed Shift Technology Per Core P State OS control mode HwP Autonomous Per Core P State HwP Autonomous EPP Grouping EPB override over PECI HwP Lock HDC Control Turbo Mode View/Configure Turbo Options OPU VR Settings Platform PL1 Enable Platform PL1 Time Window Platform PL2 Enable Platform PL2 Power	[Turbo Performance] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] 0 [O] [Enabled] 100000 [Enabled]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F4: Save & Exit
Power Limit 4 Override Power Limit 4 Power Limit 4 Lock C states Thermal Monitor	100000 [Disabled] [Disabled] [Enabled]	▼
Power Limit 4 Override Power Limit 4 Power Limit 4 Lock C states Thermal Monitor Version	100000 [Disabled] [Disabled] [Enabled] 2.22.1285 Copyright (C) 2 Aptio Setup - AMI	•022 AMI
Power Limit 4 Override Power Limit 4 Power Limit 4 Lock C states Thermal Monitor Version	100000 [Disabled] [Disabled] [Enabled] 2.22.1286 Copyright (C) 2 Aptio Setup - AMI	• ESC: EXIC

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- PSYS Slope

PSYS Slope defined in 1/100 increments. The range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x9.
PSYS Offset

PSYS Offset defined in 1/1000 increments. The range is 0-63999. For an offset of 25.348, enter 25348. PSYS Uses BIOS VR mailbox command 0x4. PSYS prefix

Sets the offset value as positive or negative.

PSYS PMax Power

PSYS PMax power, defined in 1/8-Watt increments. Range 0-8191. For a PMax of 125W, enter 1000. 0 = AUTO. Uses BIOS VR mailbox command 0xB.

- Min Voltage Override
   Min Voltage Override. Enable to override minimum voltage for runtime and for C8.
- VccIn Aux Icc Max
   Sets the Max Icc VccIn Aux value defined in 1/4A increments. Range is 0-512. For an IccMax 32A, enter 128(32\*4).
- VccIn Aux IMON Slope

VccIN Aux IMON Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x18.

- VccIn Aux IMON Offset
   VccIN Aux IMON Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. IMON Uses BIOS VR mailbox command 0x18.
- VccIN Aux IMON Prefix
   Sets the offset value as positive or negative.
- Vsys Critical
   Vsys Critical Enable or disable.
- VR Power Delivery Design
   Specifies the ADL Desites heard design

Specifies the ADL Desktop board design used for the VR settings override values. By default, BIOS will override the default Desktop VR settings based on the board design. A value of AUTO(0) will use the board ID to determine the board design. Any other value will override the board ID logic to provide a custom VR Power Delivery Design value. This is intended primarily for validation.

Advanced	Aptio Setup – AMI	
Advanced		
CPU VR Settings		Configure Acoustic Noise Settings for IA, GT and SA
Current VccIn Aux Icc Max PSYS Slope PSYS Offset PSYS Prefix PSYS PMax Power Min Voltage Override VccIn Aux Icc Max VccIn Aux IMON Slope VccIN Aux IMON Offset VccIN Aux IMON Prefix Vsys Critical VR Power Delivery Design Acoustic Noise Settings Core/IA VR Settings GT VR Settings RFI Settings	132 0 0 [+] 0 [Disabled] 0 100 0 [+] [Disabled] [AUT0]	domains ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	arsion 2 22 1286 Conuright (C	) 2022 AMT

Advanced	Aptio Setup – AMI	
Acoustic Noise Settings		Enabling this option will help
Acoustic Noise Mitigation	[Disabled]	certain SKUs when the CPU is
Pre Wake Time	0	in deeper C state
Ramp Up Time	0	
Ramp Down Time	0	
TA VR Domain		
Disable Fast PKG C State Ramp for	[FALSE]	
IA Domain		
Slow Slew Rate for IA Domain	[Fast/2]	
GT VR Domein		
Disable Fast PKG C State Ramp for	[FALSE]	↔+: Select Screen
GT Domain		†↓: Select Item
Slow Slew Rate for GT Domain	[Fast/2]	Enter: Select
		+/-: Change Opt.
		F1: General Help F2: Previous Values
		F3: Ontimized Defaults
		F4: Save & Exit
		ESC: Exit
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- Acoustic Noise Mitigation
   Enabling this option will help mitigate acoustic noise on certain SKUs when the CPU is in a deeper C state.
- Pre Wake time
   Set the maximum Pre Wake randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.

Ramp Up Time

Set the maximum Ramp Up randomization time in micro ticks. The range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.

Ramp Down Time

Set the maximum Ramp Down randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.

- Disable Fast PKG C State Ramp for IA Domain
   This option needs to be configured to reduce acoustic noise during deeper C states. False: Don't disable Fast ramp during deeper C states; True: Disable Fast ramp during deeper C states.
- Slow Slew Rate for IA Domain
   Set VR IA Slow Slew Rate for Deep Package C State ramp time; Slow slew rate equals to Fast divided by number, the number is 2, 4, 8, 16 to slow down the slew rate to help minimize acoustic noise
- Disable Fast PKG C State Ramp for GT Domain This option needs to be configured to reduce acoustic noise during deeper C states. False: Don't disable Fast ramp during deeper C states; True: Disable Fast ramp during deeper C states.
- Slow Slew Rate for GT Domain

Set VR GT Slow Slew Rate for Deep Package C State ramp time; Slow slew rate equals to Fast divided by number, the number is 2, 4, 8 to slow down the slew rate to help minimize acoustic noise; divide by 16 is disabled.

Advanced	Aptio Setup – AMI	
CPU VR Settings		Core/IA VR Settings
Current VccIn Aux Icc Max PSYS Slope PSYS Offset PSYS Prefix PSYS PMax Power Min Voltage Override VccIn Aux Icc Max VccIn Aux IMON Slope VccIN Aux IMON Offset VccIN Aux IMON Prefix Vsys Critical VR Power Delivery Design Acoustic Noise Settings Core/IA VR Settings GT VR Settings RFI Settings	132 0 0 [+] 0 [Disabled] 0 100 0 [+] [Disabled] [AUT0]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Advanced	Aptio Setup — AMI	
Huvanceu		
Core/IA VR Domain		▲ VR Config Enable
VR Config Enable	[Enabled]	
Current AC Loadline	110	
Current DC Loadline	110	
Current Psi1 Threshold	80	
Current Psi2 Threshold	20	
Current Psi3 Threshold	4	
Current Imon Slope	0	
Current Imon Offset	1	
Current VR Current Limit	960	
Current Tdc Current Limit	1280	
Current Voltage Limit	1740	
AC Loadline	0	↔: Select Screen
DC Loadline	0	↑↓: Select Item
PS Current Threshold1	80	Enter: Select
PS Current Threshold2	20	+/-: Change Opt.
PS Current Threshold3	4	F1: General Help
PS3 Enable	[Enabled]	F2: Previous Values
PS4 Enable	[Enabled]	F3: Optimized Defaults
TMON_Slope	0	E4: Save & Exit
TMON Offset	0	ESC: Exit
IMON Prefix	[+]	
VR Current Limit	0	
VR Voltage Limit	0	
III IOLIAGO ELINEC		

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	Antio Setur - AWT	
Advanced	прії0 зеіцр — плі	
navanceu		
Current Psi1 Threshold	80	▲ Enable/Disable IRMS – Current
Current Psi2 Threshold	20	root mean square
Current Psi3 Threshold	4	
Current Imon Slope	0	
Current Imon Offset	1	
Current VR Current Limit	960	
Current Tdc Current Limit	1280	
Current Voltage Limit	1740	
AC Loadline	0	
DC Loadline	0	
PS Current Threshold1	80	
PS Current Threshold2	20	
PS Current Threshold3	4	
PS3 Enable	[Enabled]	++: Select Screen
PS4 Enable	[Enabled]	↑↓: Select Item
IMON Slope	0	Enter: Select
IMON Offset	0	+/-: Change Opt.
IMON Prefix	[+]	F1: General Help
VR Current Limit	0	F2: Previous Values
VR Voltage Limit	0	F3: Optimized Defaults
TDC Enable	[Enabled]	F4: Save & Exit
TDC Current Limit	0	ESC: Exit
TDC Time Window	[1 sec]	
TDC Lock	[Disabled]	
	[Disabled]	T
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- VR Config Enable
   VR Config Enable
- PS3 Enable
   PS3 Enable/Disable. 0 Disabled, 1 Enabled. Uses BIOS VR mailbox command 0x3.

- PS4 Enable

PS4 Enable/Disable. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command 0x3.

IMON Prefix

Sets the offset value as positive or negative.

Advanced	Aptio Setup - AMI	
Advanced CPU VR Settings Current VccIn Aux Icc Max PSYS Slope PSYS Offset PSYS Prefix PSYS PMax Power Min Voltage Override VccIn Aux ICC Max VccIn Aux IMON Slope VccIN Aux IMON Slope VccIN Aux IMON Prefix Vsys Critical VR Power Delivery Design Acoustic Noise Settings Core/IA VR Settings Core/IA VR Settings RFI Settings	Aptio Setup - AMI 132 0 0 [+] 0 [Disabled] 0 100 0 [+] [Disabled] [AUTO]	GT VR Settings ++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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	Antio Setup - AMT	
Advanced	nptio setup ini	
GT Domain		▲ VR Config Enable
VR Config Enable	[Enabled]	
Current AC Loadline	400	
Current DC Loadline	400	
Current Psi1 Threshold	80	
Current Psi2 Threshold	20	
Current Psi3 Threshold	4	
Current Imon Slope	0	
Current Imon Offset	1	
Current VR Current Limit	120	
Current Tdc Current Limit	176	
Current Voltage Limit	1519	
AC Loadline	0	++: Select Screen
DC Loadline	0	↑↓: Select Item
PS Current Threshold1	80	Enter: Select
PS Current Threshold2	20	+/-: Change Opt.
PS Current Threshold3	4	F1: General Help
PS3 Enable	[Enabled]	F2: Previous Values
PS4 Enable	[Enabled]	F3: Optimized Defaults
IMON Slope	0	F4: Save & Exit
IMON Offset	0	ESC: Exit
IMON Prefix	[+]	
VR Current Limit	0	
VR Voltage Limit	0	▼
	<ul> <li>Version 2.22.1286 Copyright (C)</li> </ul>	) 2022 AMI

Advanced	Aptio Setup – AMI	
Current DC Loadline Current Psil Threshold Current Psil Threshold Current Psil Threshold Current Psil Threshold Current Imon Slope Current Imon Offset Current VR Current Limit Current VC Current Limit Current Voltage Limit AC Loadline DC Loadline PS Current Threshold1 PS Current Threshold2 PS Current Threshold3 PS3 Enable PS4 Enable IMON Slope IMON Slope IMON Prefix VR Current Limit VR Voltage Limit TDC Enable TDC Current Limit TDC Time Window TDC Lock	400 80 20 4 0 1 120 176 1519 0 0 80 20 4 [Enabled] [Enabled] 0 0 [+] 0 0 [t+] 0 0 0 [t] 5 15 15 15 15 15 15 15 15 15 15 15 15 1	<ul> <li>TDC Lock</li> <li>TDC Lock</li> <li>**: Select Screen 11: Select Item Enter: Select +/-: Change Opt.</li> <li>F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</li> </ul>
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- VR Config Enable
   VR Config Enable
- PS3 Enable
   PS3 Enable/Disable. 0 Disabled, 1 Enabled. Uses BIOS VR mailbox command 0x3.
- PS4 Enable
   PS4 Enable/Disable. 0 Disabled, 1 Enabled. Uses BIOS VR mailbox command 0x3.

Advanced	
CPU VR Settings Current VccIn Aux Icc Max 132 PSYS Slope 0 PSYS Offset 0 PSYS Prefix [+] PSYS PMax Power 0 Min Voltage Override [Disabled] VccIn Aux Icc Max 0 VccIn Aux IMON Slope 100 VccIN Aux IMON Offset 0 VccIN Aux IMON Prefix [+] Vsys Critical [Disabled] VR Power Delivery Design [AUT0] Acoustic Noise Settings Core/IA VR Settings Core/IA VR Settings RFI Settings	RFI Settings ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup — AMI	
RFI Domain RFI Current Frequency RFI Frequency FIVR Spread Spectrum RFI Spread Spectrum	139.200MHz 0 [Enabled] [1.5%]	Set desired RFI frequency, in increments of 100KHz. (For a frequency of 100.6MHz, enter 1006.)
		<pre>fl: Select Scheen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- FIVR Spread Spectrum
   Enable or Disable the FIVR Spread Spectrum.
- RFI Spread Spectrum
   Set the Spread Spectrum.

Advanced	Aptio Setup – AMI	
HUVAILED HUP LOCK HDC Control Turbo Mode View/Configure Turbo Options CPU VR Settings Platform PL1 Enable Platform PL1 Power Platform PL2 Enable Platform PL2 Enable Platform PL2 Power Power Limit 4 Override Power Limit 4 Lock C states Thermal Monitor Interrupt Redirection Mode Selection Timed MWAIT Custom P-state Table Energy Performance Gain EPG DIMM Idd3N EPG DIMM Idd3P Power Limit 3 Settings CPU Lock Configuration Dual Tau Boost	[Enabled] [Enabled] [Enabled] 0 [Enabled] 0 [Enabled] 100000 [Enabled] 100000 [Disabled] [Enabled] [Enabled] [Enabled] [Fixed Priority] [Disabled] 26 11 [Disabled]	Add Custom P-state Table  Add Custom P-state Table  ++: Select Screen  1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Number of P states

Sets the number of custom P-states. At least 2 states must be present.

	Aptio Setup — AMI	
Advanced		
HwP Lock	[Enabled]	Power Limit 3 Settings
HDC Control	[Enabled]	
Turbo Mode	[Enabled]	
View/Configure Turbo Options		
▶ CPU VR Settings		
Platform PL1 Enable	[Enabled]	
Platform PL1 Power	0	
Platform PL1 Time Window	[0]	
Platform PL2 Enable	[Enabled]	
Platform PL2 Power	100000	
Power Limit 4 Override	[Enabled]	
Power Limit 4	100000	
Power Limit 4 Lock	[Disabled]	
C states	[Disabled]	↔+: Select Screen
Thermal Monitor	[Enabled]	†∔: Select Item
Interrupt Redirection Mode	[Fixed Priority]	Enter: Select
Selection		+/-: Change Opt.
Timed MWAIT	[Disabled]	F1: General Help
Custom P-state Table		F2: Previous Values
Energy Performance Gain	[Disabled]	F3: Optimized Defaults
EPG DIMM Idd3N	26	F4: Save & Exit
EPG DIMM Idd3P	11	ESC: Exit
▶ Power Limit 3 Settings		
CPU Lock Configuration		
Dual Tau Boost	[Disabled]	

- Power Limit 3 Override
   Enable/Disable Power Limit 3 override.
- Power Limit 3
  - Power Limit 3 in milliwatts.
- Power Limit 3 Time Window
   Power Limit 3 Time Window value in milliseconds.

Power Limit 3 Duty Cycle

Specify the duty cycle in percentage that the CPU is required to maintain over the configured time window. The range is 0-100.

 Power Limit 3 Lock
 Power Limit 3 MSR 615h Lock. When enabled PL3 configurations are locked during OS operation. When disabled, PL3 configuration can be changed during OS operation.



Advanced	Aptio Setup – AMI	
CFG Lock Overclocking Lock	[Enabled] [Enabled]	Configure MSR OxE2[15], CFG Lock bit
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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CFG Lock

Configure MSR 0xE2[15], CFG Lock bit.

Overclocking Lock
 Enable/Disable Overclocking Lock (BIT 20) in FLEX\_RATIO(194) MSR.

Aptio Setup – AMI Advanced	
Power & Performance	GT – Power Management Control
▶ CPU – Power Management Control ▶ GT – Power Management Control	
	<pre>++: Select Screen t1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Advanced	Aptio Setup — AMI	
GT – Power Management Control		Check to enable render standby
RC6(Render Standby) Maximum GT frequency Disable Turbo GT frequency	[Enabled] [Default Max Frequency] [Disabled]	
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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RC6 (Render Standby)
 Check to enable render standby support.

- Maximum GT frequency Maximum GT frequency limited by the user.
- Disable Turbo GT frequency Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

#### 3.2.2.3 PCH-FW Configuration



Advanced	Aptio Setup – AMI	
ME Firmware Version ME Firmware Mode ME Firmware SKU ME Firmware Status 1 ME Firmware Status 2 ME Firmware Status 3 ME Firmware Status 4 ME Firmware Status 5 ME Firmware Status 6 ME State Manageability Features State	16.1.25.1885 Normal Mode Corporate SKU 0x90000255 0x89108106 0x00000030 0x00004000 0x0000103 0x80400002 [Enabled] [Enabled]	▲ When Disabled ME will not be unconfigured on RTC Clear
AMT BIOS Features ME Unconfig on RTC Clear Comms Hub Support JHI Support Core Bios Done Message	[Enabled] [Enabled] [Disabled] [Disabled] [Enabled]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. E1: General Help
<ul> <li>Firmware Update Configuration</li> <li>PTT Configuration</li> <li>FIPS Configuration</li> <li>Unique Platform Id Configuration</li> <li>ME Debug Configuration</li> <li>Anti-Rollback SVN Configuration</li> <li>DEM Key Revocation Configuration</li> </ul>		F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup – AMI	
ME Firmware Mode	Normal Mode	▲ Configure Management Engine
ME Firmware SKU	Corporate SKU	Technology Parameters
ME Firmware Status 1	0×90000255	
ME Firmware Status 2	0x89108106	
ME Firmware Status 3	0x00000030	
ME Firmware Status 4	0x00004000	
ME Firmware Status 5	0x00000103	
ME Firmware Status 6	0x80400002	
ME State	[Enabled]	
Manageability Features State	[Enabled]	
AMT BIOS Features	[Enabled]	
ME Unconfig on RTC Clear	[Enabled]	
Comms Hub Support	[Disabled]	→+: Select Screen
JHI Support	[Disabled]	↑↓: Select Item
Core Bios Done Message	[Enabled]	Enter: Select
		+/-: Change Opt.
▶ Firmware Update Configuration		F1: General Help
PTT Configuration		F2: Previous Values
FIPS Configuration		F3: Optimized Defaults
Unique Platform Id Configuration		F4: Save & Exit
ME Debug Configuration		ESC: Exit
Anti-Rollback SVN Configuration		
OEM Key Revocation Configuration		
Extend CSME Measurement to TPM-PCR	[Disabled]	
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# ME State

When Disabled, ME will be put into ME Temporarily Disabled Mode.

# Manageability Features State

Enable/Disable Intel Manageability features.

# AMT BIOS Features

When disabled, AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.

ME Unconfig on RTC Clear
 When Disabled, ME will not be unconfigured on RTC Clear.

#### Comms hub support

Enables/Disables support for Comms Hub.

 JHI support Enable/Disable Intel(R) DAL Host Interface Service (JHI)

#### Core BIOS Done Message

Enable/Disable Core Bios Done message sent to ME

Advanced	Aptio Setup — AMI	
ME Firmware Mode ME Firmware SKU ME Firmware Status 1 ME Firmware Status 2 ME Firmware Status 3 ME Firmware Status 4 ME Firmware Status 5 ME Firmware Status 6 ME State Manageability Features State AMT BIOS Features	Normal Mode Corporate SKU 0x90000255 0x89108106 0x0000030 0x00004000 0x00000103 0x80400002 [Enabled] [Enabled] [Enabled] [Enabled]	Configure Management Engine Technology Parameters
Comms Hub Support JHI Support Core Bios Done Message Firmware Update Configuration PTT Configuration FIPS Configuration Unique Platform Id Configuration ME Debug Configuration Anti-Rollback SVN Configuration DEM Key Revocation Configuration Extend CSME Measurement to TPM-PCR	[Disabled] [Disabled] [Enabled] [Disabled]	<pre>++: Select Screen  ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

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Advanced	Aptio Setup – AMI	
Me FW Image Re-Flash FW Update	[Disabled] [Enabled]	Enable/Disable Me FW Image Re–Flash function.
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version	n 2.22.1286 Copyright (C) 20	22 AMI

- Me FW Image Re-Flash Enable/Disable Me FW Image Re-Flash function.
- FW Update Enable/Disable ME FW Update function.

	Aptio Setup — AMI	
Advanced		
ME Firmware Mode ME Firmware SKU ME Firmware Status 1 ME Firmware Status 2 ME Firmware Status 3	Normal Mode Corporate SKU 0x90000255 0x89108106 0x00000030	▲ Configure PTT
ME Firmware Status 4 ME Firmware Status 5 ME Firmware Status 6	0x00004000 0x00000103 0x80400002	
ME State Manageability Features State AMT BIOS Features ME Unconfig on RTC Clear Comms Hub Support JHI Support Core Bios Done Message	[Enabled] [Enabled] [Enabled] [Enabled] [Disabled] [Disabled] [Enabled]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt.
<ul> <li>Firmware Update Configuration</li> <li>PTT Configuration</li> <li>FIPS Configuration</li> <li>Unique Platform Id Configuration</li> <li>ME Debug Configuration</li> <li>Anti-Rollback SVN Configuration</li> <li>OEM Key Revocation Configuration</li> </ul>		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Extend CSME Measurement to TPM-PCR	[Disabled]	•



 TPM Device Selection Configure TPM device.

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Advanced	Aptio Setup – AMI	
ME Firmware Mode	Normal Mode	▲ FIPS Mode help
ME Firmware SKU	Corporate SKU	
ME Firmware Status 1	0×90000255	
ME Firmware Status 2	0×89108106	
ME Firmware Status 3	0x00000030	
ME Firmware Status 4	0x00004000	
ME Firmware Status 5	0x00000103	
ME Firmware Status 6	0x80400002	
WE State	[Epobled]	
Menogoobility Ecotypes State	[Endpieu]	
AMIAGEAUTITY FEATURES STATE	[Enabled]	
MF Unconfig on PTC Clean	[Enabled]	
Comme Hub Support	[Displed]	++ · Select Screen
THI Support	[Disabled]	1: Select Item
Core Bios Done Message	[Fnahled]	Enter: Select
	[Endbied]	+/-: Change Ont
Einmware Undate Configuration		F1: General Heln
<ul> <li>PTT Configuration</li> </ul>		E2: Previous Values
FIPS Configuration		F3: Ontimized Defaults
Inique Platform Id Configuration		F4: Save & Evit
ME Debug Configuration		ESC: Exit
► Anti-Rollback SVN Configuration		
▶ OEM Key Revocation Configuration		
Extend CSME Measurement to TPM-PCR	[Disabled]	<b>T</b>
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Advanced	Aptio Setup – AMI	
FIPS Mode Select Current FIPS mode Crypto driver FIPS version	[Disabled] Disabled 16.1.1885.25	FIPS Mode configuration ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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FIPS mode select
 FIPS Mode configuration.

Advanced		
ME Firmware Mode ME Firmware SKU ME Firmware Status 1	Normal Mode Corporate SKU	Configure ME debug options NOTE:
ME Firmware Status 2	0x89108106	testing purposes. It is
ME Firmware Status 3	0x00000030	recommended to leave the
ME Firmware Status 4	0x00004000	options in their default states
ME Firmware Status 5	0x00000103	
ME Firmware Status 6	0X80400002	
ME State	[Enabled]	
Manageability Features State	[Enabled]	
AMT BIOS Features	[Enabled]	
ME Unconfig on RTC Clear	[Enabled]	
Comms Hub Support	[Disabled]	++: Select Screen
JHI Support	[Disabled]	î↓: Select Item
Core Bios Done Message	[Enabled]	Enter: Select
		+/-: Change Opt.
Firmware Update Configuration		F1: General Help
PTT Configuration		F2: Previous Values
FIPS Configuration		F3: Uptimized Defaults
Unique Platform 1d Configuration		F4: Save & Exit
ME Debug configuration Noti Delibert SVN Configuration		ESU: EXIT
<ul> <li>Hnti-Kollback SVN Configuration</li> <li>NEW Kow Reveastion Configuration</li> </ul>		
Evident Revolution Configuration	[Dicoblod]	
Extend CSME Measurement to IPM-PCK	[DIS9DIG0]	

# Unique platform ID configuration Configure Unique Platform ID Feature.

	antin Ontron ANT	
Advanced	Hptio Setup – HMI	
navaneca		
HECI Timeouts Force ME DID Init Status	[Enabled] [Disabled]	This menu allows changing SMBIOS type 130 OEM capabilities
HECI Message check Disable	[Disabled] [Disabled]	
HECI2 Interface Communication	[Disabled] [Enabled]	
End Of Post Message DOI3 Setting for HECI Disable	[Send in DXE] [Disabled]	
MCTP Broadcast Cycle ▶ SMBIOS type 130 DEM capabilities	[Disabled]	
		++: Select Screen  11: Select Item
		Enter: Select +/-: Change Opt.
		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup — AMI	
BIOS Reflash Capability State BIOS Boot to Setup Capability State	[Enabled] [Enabled]	Change BIOS Reflash Capability State
BIOS Pause Before Booting Capability State	[Disabled]	
BIOS Secure Boot Capability Exposure to FW State	[Enabled]	
vPro TBT Dock Support	[Enabled]	
		++: Select Screen ↑↓: Select Item
		<pre>Enter: Select +/-: Change Opt. 54: Compose Note</pre>
		F1: General Help F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit
		ESC, EXIL
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- HECI Timeouts
   Unique platform ID configuration.
- Force ME DID Init Status
   Unique platform ID configuration.
- CPU Replaced Polling Disable
   Setting this option disables CPU replacement polling loop.
- HECI Message check Disable
   Setting this option disables message check for Bios Boot Path when sending.
- MBP HOB Skip Setting this option will skip MBP HOB.
- HECI2 Interface Communication Adds and Removes HECI2 Device from PCI space.
- KT Device
   Enable/Disable KT Device.
- End Of Post Message
   Enable/Disable End of Post message sent to ME.
- D0I3 Settings for HECI Disable Setting this option disables setting D0I3 bit for all HECI devices.
- MCTP Broadcast Cycle
   Enable/Disable Management Component Transport Protocol Broadcast
   Cycle and Set PMT as Bus Owner.
- BIOS Reflash Capability State Change BIOS Reflash Capability State.
- BIOS Boot to Setup Capability State Change BIOS Boot to Setup Capability State.
- BIOS Pause Before Booting Capability State Change BIOS Pause Before Booting Capability State.

- BIOS Secure Boot Capability Exposure to FW State Change BIOS Secure Capability Exposure State to FW. This does not affect SecureBoot as such.
- vPro TBT Dock Support Enable/Disable vPro TBT Dock Support. Note: for the change to take effect, need to put system into G3 state then resume.

Advanced	
ME Firmware Mode Normal	Mode ▲ Configure Anti-Rollback SVN
ME Firmware SKU Corpora	e SKU
ME Firmware Status 1 0x90000	255
ME Firmware Status 2 0x89100	106
ME Firmware Status 3 0x0000	030
ME Firmware Status 4 0x00004	000
ME Firmware Status 5 0x00000	103
ME Firmware Status 6 0x80400	002
NE Obete	u and a state of the
ME State [Enable Menogeophility Festures State [Enable	1j ri
AMT BIOS Features State [Enable	
ME Unconfig on RTC Clean [Enable	4] 4]
Comme Hub Support	dl ++• Select Screen
THI Support [Disab.	ad] 11: Select Item
Core Bios Done Message [Fnable	1 Enter: Select
	+/-: Change Ont.
Firmware Update Configuration	E1: General Help
▶ PTT Configuration	F2: Previous Values
▶ FIPS Configuration	F3: Optimized Defaults
Unique Platform Id Configuration	F4: Save & Exit
ME Debug Configuration	ESC: Exit
Anti-Rollback SVN Configuration	
DEM Key Revocation Configuration	
Extend CSME Measurement to TPM-PCR [Disab.	ed] 🔹 🔻

Advanced	f	Aptio Setup – AMI	
Minimal Allowed Anti-Rollback Executing Anti-Rollback SVN Automatic HW-Enforced Anti-Rollback SVN Set HW-Enforced Anti-Rollback Current SVN	SVN 0 4 [(	Disabled] Disabled]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- Automatic HW-Enforced Anti-Rollback SVN
   When enabled, hardware-enforced Anti-Rollback mechanism is automatically activated: once ME FW was successfully run on a platform, FW with lower ARB-SVN will be blocked from execution.
- Set HW-Enforced Anti-Rollback for Current SVN
   Enable hardware-enforced Anti-Rollback mechanism for current ARB-SVN
   value. FW with lower ARB-SVN will be blocked from execution. The value will be restored to disable after the command is sent.



Advanced	Aptio Setup – AMI	
Automatic OEM Key Revocation Invoke OEM Key Revocation	[Disabled] [Disabled]	<pre>When enabled, BIOS will automatically send HECI command to revoke OEM keys.  ++: Select Screen 11: Select Item Enter: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Levens.	ion 2.22.1286 Copyright	(C) 2022 AMI

- Automatic OEM Key Revocation When enabled, BIOS will automatically send HECI command to revoke OEM keys.
- Invoke OEM Key Revocation
   A Heci command will be sent to revoke the OEM key.

	Aptio Setup – AMT		
Advanced	hptio cotap hili		
ME Firmware Mode	Normal Mode	Enable/Disable Extend CSME	
ME Firmware SKU	Corporate SKU	Measurement to TPM-PCR[0] and	
ME Firmware Status 1	0x90000255	AMT Config to TPM-PCR[1]	
ME Firmware Status 2	0x89108106		
ME Firmware Status 3	0x00000030		
ME Firmware Status 4	0x00004000		
ME Firmware Status 5	0x00000103		
ME Firmware Status 6	0x80400002		
ME State	[Enabled]		
Manageability Features State	[Enabled]		
AMT BIOS Features	[Enabled]		
ME Unconfig on RTC Clear	[Enabled]		
Comms Hub Support	[Disabled]	++: Select Screen	
JHI Support	[Disabled]	†↓: Select Item	
Core Bios Done Message	[Enabled]	Enter: Select	
		+/-: Change Opt.	
Firmware Update Configuration		F1: General Help	
PTT Configuration		F2: Previous Values	
<ul> <li>FIPS Configuration</li> </ul>		F3: Optimized Defaults	
▶ Unique Platform Id Configuration		F4: Save & Exit	
ME Debug Configuration		ESC: Exit	
Anti-Rollback SVN Configuration			
DEM Key Revocation Configuration			
Extend CSME Measurement to TPM-PCR	[Disabled]		
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Extend CSME Measurement to TPM-PCR
 Enable/Disable Extend CSME Measurement to TPM-PCR[0] and AMT Config to TPM-PCR[1].

# 3.2.2.4 ACPI Settings

Aptio Setup – AMI Main Advanced Chipset Security Boot Save & Exit M	1EBx
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Make Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> <li>T1s Auth Configuration</li> <li>Driver Health</li> </ul>	System ACPI Parameters. **: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup – AMI	
ACPI Settings		Enables or Disables BIOS ACPI
Enable ACPI Auto Configuration	[Disabled]	Huto configuration.
Enable Hibernation ACPI Sleep State	[Enabled] [S3 (Suspend to RAM)]	
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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# Enable ACPI Auto Configuration

Enables or Disables BIOS ACPI Auto Configuration.

# Enable Hibernation

Enables or Disables System's ability to Hibernate (OS/S4 Sleep State).

# ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

# 3.2.2.5 NCT61260 Super I/O Configuration

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> <li>TIS Auth Configuration</li> </ul>		System Super IO Chip Parameters. ++: Select Screen 11: Select Item
▶ Driver Health		Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup – AMI	
NCT6126D Super IO Configuration	NOTCODE	Set Parameters of Serial Port 1 (COMA)
<ul> <li>Super 10 Chip</li> <li>Serial Port 1 Configuration</li> <li>Serial Port 2 Configuration</li> <li>Serial Port 3 Configuration</li> <li>Serial Port 4 Configuration</li> <li>Serial Port 5 Configuration</li> <li>Serial Port 6 Configuration</li> </ul>	NC16126D	++: Select Screen 11: Select Item
		Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.22.1286 Copyright (C) 2022 AMI		
Advanced	Aptio Setup — AMI	
--------------------------------	------------------------------	---
Serial Port 1 Configuration		Enable or Disable Serial Port
Serial Port Device Settings	[Enabled] IO=3F8h; IRQ=4;	(600)
Change Settings	[Auto]	
		↔: Select Screen ↑↓: Select Item
		Enter: Select +/-: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults
		ESC: Exit
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Serial Port

Enable or Disable Serial Port.

- Change Settings
   Select optimal settings for a super IO Device.
- COM3~6 Mode COM Mode Select.

### 3.2.2.6 iManager Configuration



- Serial Port 7 Configuration Set Parameters of Serial Port 7.
- Serial Port 8 Configuration Set Parameters of Serial Port.
- Hardware Monitor
   Monitor hardware status.
- Watch Dog Timer Configuration
   Watch Dog Timer Configuration Page.
- ACPI Report Method Configuration Select ACPI Reporting Method for EC Devices.
- Digital I/O Configuration
   Configure the digital I/O pins.

# Chapter 3 BIOS Settings

### 3.2.2.7 NCT7802Y HW Monitor

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit MEBx
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super ID Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>NEWORK Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> <li>T1s Auth Configuration</li> <li>Driver Health</li> </ul>	Monitor hardware status ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup – AMI	
NCT7802Y Health Status		Enable or Disable Smart Fan
System temperature SYS Fan1 Speed SYS Fan2 Speed	: +30°C : N/A : 2146 RPM	
Smart Fan Function ▶ Smart Fan Function	[Enabled]	
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Advanced	Aptio Setup – AMI	
Smart Fan Mode Configuration		Fan1 Mode Select.
Fan1 Mode FAN1 Temperature 1 FAN1 DC/PWM 1 FAN1 Temperature 2 FAN1 DC/PWM 2 FAN1 Temperature 3 FAN1 DC/PWM 3 FAN1 DC/PWM 4 FAN1 DC/PWM 4 FAN1 Dcitical Temperature	[SMART FAN IV Mode] 15 100 50 120 57 180 65 255 65	
Fan2 Mode FAN2 Temperature 1 FAN2 DC/PWM 1 FAN2 Temperature 2 FAN2 DC/PWM 2 FAN2 Temperature 3 FAN2 DC/PWM 3 FAN2 DC/PWM 3 FAN2 DC/PWM 4 FAN2 DC/PWM 4 FAN2 Critical Temperature	[SMART FAN IV Mode] 15 100 50 120 57 180 65 255 65	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Vers.	ion 2.22.1286 Copyright (C) 2	2022 AMI

## Smart Fan Function

Enable or Disable Smart Fan.

- Fan Mode
   Fan Mode Select.
- FAN Temperature 1 Input the System Smart Fan IV Temperature 1.

FAN DC/PWM 1
Input the System Smart Fan IV DC/PWM 1 Value
FAN Temperature 2

Input the System Smart Fan IV Temperature 2.

- FAN DC/PWM 2 Input the System Smart Fan IV DC/PWM 2 Value.
- FAN Temperature 3 Input the System Smart Fan IV Temperature 3.
- FAN DC/PWM 3 Input the System Smart Fan IV DC/PWM 3 Value.
- FAN Temperature 4
   Input the System Smart Fan IV Temperature 4.
- FAN DC/PWM 4 Input the System Smart Fan IV DC/PWM 4 Value.
- FAN Critical Temperature
   Input the System Smart IV Critical Temperature.

### 3.2.2.8 S5 RTC Wake Settings

Aptio Setup – AMI Main <mark>Advanced</mark> Chipset Security Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> </ul>	Enable system to wake from S5 using RTC alarm
<ul> <li>NVME Configuration</li> <li>Tis Auth Configuration</li> <li>Driver Health</li> </ul>	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help E2: Decision Volume
	F3: Optimized Defaults F4: Save & Exit ESC: Exit
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### Wake system from S5

Enable or Disable system wake on alarm event.

### 3.2.2.9 Serial Port Console Redirection

Main Advanced Chipset Securit	Aptio Setup – AMI y Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> <li>TIs Auth Configuration</li> <li>Driver Health</li> </ul>		Serial Port Console Redirection ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup - AMI	
COM1 Console Redirection ► Console Redirection Settings COM1(Pci Bus0,Dev0,Func0) (Disabled) Console Redirection Legacy Console Redirection ► Legacy Console Redirection	(Disabled) Port Is Disabled	Console Redirection Enable or Disable.
<ul> <li>Legacy console Rediffection Settings</li> <li>Serial Port for Out-of-Band Management Windows Emergency Management Services Console Redirection EMS</li> <li>Console Redirection Settings</li> </ul>	nt∕ s (EMS) [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

Console Redirection Console Redirection Enable or Disable.

- Legacy Console Redirection Settings Legacy Console Redirection Settings.
- Console Redirection EMS
   Console Redirection Enable or Disable.

### 3.2.2.10 USB Configuration

Aptio Setup – AMI Main Advanced Chipset Security Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVM Configuration</li> <li>NVM Configuration</li> </ul>	USB Configuration Parameters
<ul> <li>Tls Auth Configuration</li> <li>Driver Health</li> </ul>	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Advanced	Aptio Setup – AMI	
USB Configuration		Enables Legacy USB support.
USB Module Version	28	support if no USB devices are connected. DISABLE option will
USB Controllers: 1 XHCI		keep USB devices available only for EFI applications.
USB Devices: 1 Drive, 1 Keyboard, 1 Mouse, :	1 Hub	
Legacy USB Support XHCI Hand-off USB Mass Storage Driver Support	[Enabled] [Enabled] [Enabled]	
USB hardware delays and time-outs: USB transfer time-out Device reset time-out	[20 sec] [20 sec]	++: Select Screen 14: Select Item Foter: Select
Device power-up delay	[Auto]	+/-: Change Opt. F1: General Help
Mass Storage Devices: JetFlashTS4GJFV30 8.07	[Auto]	F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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# Legacy USB Support Enables Legacy USB support.

- XHCI Hand-off This is a workaround for OS without XHCI hand-off support.
- USB Mass Storage Device Configuration

Configure the USB Mass Storage Devices.

- USB transfer time-out
   The time-out value for Control, Bulk, and Interrupt transfers.
- Device reset time-out
   USB mass storage device Start Unit command time-out.
- Device power-up delay Maximum time the device will take before it properly reports itself to the Host Controller.

### 3.2.2.11 Network Stack Configuration





### Network Stack

Enable/Disable UEFI Network Stack.

### 3.2.2.12 CSM Configuration



Advanced	Aptio Setup – AMI	
Compatibility Support Module Config	uration	Enable/Disable CSM Support.
CSM Support	[Disabled]	
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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### 

**CSM Support** Enable/Disable CSM Support.

# 3.2.2.13 NVMe Configuration

Aptio Setup – AMI Main <mark>Advanced</mark> Chipset Security Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> <li>T1s Auth Configuration</li> <li>Driver Health</li> </ul>	NVMe Device Options Settings ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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### 3.2.2.14 TIs Auth Configuration

Main Advanced Chipset Securi	Aptio Setup - AMI y Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>IManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> <li>T1s Auth Configuration</li> <li>Driver Health</li> </ul>		Press <enter> to select Tls Auth Configuration.</enter>
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- Sever CA Configuration
   Press <Enter> to configure Server CA.
- Client Cert Configuration
   Client cert configuration is unsupported currently.

### 3.2.2.15 Driver Health

Aptio Setup – AMI Main Advanced Chipset Security Boot Save & Exit MEBx	
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>ACPI Settings</li> <li>NCT6126D Super IO Configuration</li> <li>iManager Configuration</li> <li>NCT7802Y HW Monitor</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NYME Configuration</li> </ul>	Provides Health Status for the Drivers/Controllers
<ul> <li>Tls Auth Configuration</li> <li>Driver Health</li> </ul>	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Denvious Noluce
	F2: Frevious values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Advanced	Aptio Setup – AMI	
<ul> <li>Intel(R) Gigabit 0.0.29</li> <li>Intel(R) Gigabit 0.9.03</li> <li>Intel(R) Gigabit 0.9.03</li> <li>Intel(R) Gigabit 0.9.03</li> </ul>	Healthy Healthy Healthy Healthy	Provides Health Status for the Drivers/Controllers ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Provides Health Status for the Drivers/Controllers

# 3.2.3 Chipset Configuration

Select the Chipset tab from the ARK-3534 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

### 3.2.3.1 System Agent Configuration

	Main	Advanced	Chipset	Security	Apt Boot	io Setup – AM Save & Exit	I MEBX	
•	System PCH-IO	Agent (SA Configura	) Configu tion	ration	BUUL	Save & Exit	MEDX	System Agent (SA) Parameters ++: Select Screen fl: Select Item Enter: Select
				Version	2 22 4	296. Papus iekt		ANT
				Version	2.22.1	286 Copyright	(C) 2022	F4: Save & Exit ESC: Exit AMI

### Memory Configuration Options

Chipset	Aptio Setup — AMI	
System Agent (SA) Configuration		Memory Configuration Parameters
VT-d	Supported	
<ul> <li>Memory Configuration</li> <li>Graphics Configuration</li> <li>DMI/OPI Configuration</li> <li>VMD setup menu</li> <li>PCI Express Configuration</li> </ul>		
VT-d Control Iommu Pre-boot Behavior Above 4GB MMIO BIOS assignment	[Enabled] [Disable IOMMU] [Enabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- VT-d
  - VT-d capability.
- Control Iommu Pre-boot Behavior
- Above 4GB MMIO BIOS assignment Enable/Disable above 4GB Memory Mapped I/O BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

Chipset	Aptio Setup – AMI	
<ul> <li>Memory Thermal Configuration</li> <li>Memory Configuration</li> </ul>		Memory Thermal Configuration Options
Memory RC Version Memory Frequency tCL-tRCD-tRP-tRAS MC O Ch O DIMM O Size Number of Ranks Manufacturer MC 1 Ch O DIMM O SAM Overlaoding	0.0.4.6 4800 MHz 40-39-39-77 Populated & Enabled 16384 MB (DDR5) 1 Advantech Co Ltd Not Populated / Disabled [Disabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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 SAM Overloading Enable/Disable SAM Overloading.

### Memory Thermal Configuration

Chipset	Aptio Setup — AMI	
Memory Thermal Configuration		
Memory Power and Thermal Throttling Memory Thermal Management PECI Injected Temperature EXTTS# via TS-on-Board EXTTS# via TS-on-DIMM Virtual Temperature Sensor (VTS)	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled]	<pre>++: Select Screen t1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- Memory Thermal Management Enable/Disable Memory Thermal Management.
- PECI Injected Temperature Enable/Disable memory temperatures to be injected to the processor via PECI.
- EXTTS# via TS-on-Board
   Enable/Disable routing TS-on-Board's ALERT# and THERM# to EXTTS# pins on the PCH.
- EXTTS# via TS-on-DIMM Enable/Disable routing TS-on-DIMM's ALERT# to EXTTS# pin on the PCH.
- Virtual Temperature Sensor (VTS)
   Enable/Disable Virtual Temperature Sensor (VTS).

### Memory Power and Thermal Throttling

Chipset	Aptio Setup — AMI	
Memory Power and Thermal Throttling		BIOS: BIOS is in control of
DDR PowerDown and idle counter For LPDDR Only: DDR PowerDown and idle counter REFRESH_2X_MODE SelfRefresh Enable SelfRefresh IdleTimer Throttler CKEMin Defeature Throttler CKEMin Timer Allow Opp Ref Below Write Threhold Write Threshold	[BIOS] [BIOS] [Disabled] [Enabled] 512 [Enabled] 0 [Disabled] 0	value. PCODE: pcode will manage the modes.
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- DDR PowerDown and idle counter
   BIOS: BIOS is in control of DDR CKE mode and idle timer value. PCODE:
   pcode will manage the modes.
- For LPDDR only: DDR PowerDown and idle counter
   For LPDDR Only: BIOS: BIOS is in control of DDR CKE mode and idle timer
   value. PCODE: pcode will manage the modes.
- REFRESH\_2X\_MODE
   0- Disabled 1-iMC enables 2xRef when Warm and Hot 2- iMC enables 2xRef when Hot.
- SelfRefresh Enable
   Enable, Disable(Enable= Def)
- SelfRefresh IdleTimer Range [64K-1;512]in DLCK800s, (512= Def)
- Throttler CKEMin Defeature On, Off
- Throttler CKEMin Timer
   Timer value for CKEMin, range[255;0]. Req'd min of SC\_ROUND\_T +
   BYTE\_LENGTH (4)
- Allow Opp Ref Below Write Threhold Allow opportunistic refreshes without exiting power down.
- Write Threshold Number of writes that can be accumulated while CKE is low before CKE is asserted.

### Graphics Configuration

Chipset	Aptio Setup — AMI	
System Agent (SA) Configuration		Graphics Configuration
VT-d	Supported	
<ul> <li>Memory Configuration</li> <li>Graphics Configuration</li> <li>DMI/OPI Configuration</li> <li>VMD setup menu</li> <li>PCI Express Configuration</li> </ul>		
VT-d Control Iommu Pre-boot Behavior Above 4GB MMIO BIOS assignment	[Enabled] [Disable IOMMU] [Enabled]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Chipset	Aptio Setup – AMI	
Graphics Configuration Graphics Turbo IMON Current Skip Scaning of External Gfx Card	<mark>31</mark> [Disabled]	Graphics turbo IMON current values supported (14–31)
<ul> <li>Primary Display</li> <li>External Gfx Card Primary Display C Internal Graphics</li> <li>GTT Size</li> <li>Aperture Size</li> <li>PSMI SUPPORT</li> <li>DVMT Pre-Allocated</li> <li>Intel Graphics Pei Display Peim</li> <li>VDD Enable</li> <li>Configure GT for use</li> <li>RC1p Support</li> <li>PAVP Enable</li> <li>Cdynmax Clamping Enable</li> <li>Cd Clock Frequency</li> </ul>	[Auto] onfiguration [Enabled] [8MB] [256MB] [Disabled] [60M] [Disabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Max CdClock freq based on Reference C1k]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- Graphics Turbo IMON current Graphics turbo IMON current values supported (14-31).
- Skip Scanning of External Gfx Card If Enabled, it will not scan for External Gfx Card on PEG and PCH PCIE Ports.

Primary Display

Select which (of IGFX/PEG/PCI) Graphics device should be the Primary Display or select SG for Switchable Gfx.

- External Gfx Card Primary Display Configuration Select the card used on the platform.
- Internal Graphics Keep IGFX enabled based on the setup options.
- GTT Size Select the GTT Size.
- Aperture Size
   Select the Aperture Size.
- PSMI SUPPORT
   PSMI Enable/Disable.
- DVMT Pre-Allocated
   Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
- Intel Graphics Pel Display Peim Enable/Disable Pei (Early) Display.
- VDD Enable Enable/Disable forcing of VDD in the BIOS.
- Configure GT for use Enable/Disable GT configuration in BIOS.
- RC1p Support
   Enable/Disable RC1p support. If RC1p is enabled, send a RC1p frequency request to PMA based other conditions being met.
  - PAVP Enable
  - Enable/Disable PAVP
  - Cdynmax Clamping Enable Enable/Disable Cdynmax Clamping
- Cd Clock Frequency Select the highest Cd Clock frequency supported by the platform.

# Chapter 3 BIOS Settings

### DMI/OPI Configuration

Chipset	Aptio Setup - AMI	
System Agent (SA) Configuration		Control various DMI functions.
VT-d	Supported	
<ul> <li>Memory Configuration</li> <li>Graphics Configuration</li> <li>DMI/OPI Configuration</li> <li>VMD setup menu</li> <li>PCI Express Configuration</li> </ul>		
VT-d Control Iommu Pre-boot Behavior Above 4GB MMIO BIOS assignment	[Enabled] [Disable IOMMU] [Enabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Chipset	Aptio Setup — AMI	
DMI/OPI Configuration		Set DMI Speed Gen1/Gen2/Gen3
DMI	X8 Gen4	
DMI Max Link Speed CDR Relock for CPU DMI DMI ASPM DMI Gen3 L1 Exit Latency New FOM for CPU DMI ▶ DMI Advanced Menu	[Gen4] [Disabled] [ASPM L1] 4 [Disabled]	++: Select Screen 14: Select Item Enter: Select
		+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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- DMI Max Link Speed Set DMI Speed Gen1/Gen2/Gen3.
- CDR Relock for CPU DMI Enable/Disable CDR Relock.

- DMIASPM
  - DMI ASPM Support
- DMI Gen3 L1 Latency
   DMI Gen3 L1 Exit Latency.
- New FOM for CPU DMI Enable/Disable New FOM.

Chipset	Aptio Setup – AMI	
DMI Advanced Menu		▲ DMI Gen4 EQ Mode
DMI Gen4 EQ Mode DMI Gen4 RTCO Cpre Lane0 DMI Gen4 RTCO Cpre Lane0 DMI Gen4 RTCO Cpre Lane1 DMI Gen4 RTCO Cpost Lane1 DMI Gen4 RTCO Cpre Lane2 DMI Gen4 RTCO Cpre Lane2 DMI Gen4 RTCO Cpre Lane3 DMI Gen4 RTCO Cpre Lane3 DMI Gen4 RTCO Cpre Lane4 DMI Gen4 RTCO Cpre Lane5 DMI Gen4 RTCO Cpre Lane5 DMI Gen4 RTCO Cpre Lane5 DMI Gen4 RTCO Cpre Lane6 DMI Gen4 RTCO Cpre Lane6 DMI Gen4 RTCO Cpre Lane7 DMI Gen4 RTCO Cpre Lane7 DMI Gen3 RTCO Cpre Lane0 DMI Gen3 RTCO Cpre Lane0 DMI Gen3 RTCO Cpre Lane1 DMI Gen3 RTCO Cpre Lane1 DMI Gen3 RTCO Cpre Lane1 DMI Gen3 RTCO Cpre Lane1 DMI Gen3 RTCO Cpre Lane2 DMI Gen3 RTCO Cpre Lane2 DMI Gen3 RTCO Cpre Lane2 DMI Gen3 RTCO Cpre Lane2 DMI Gen3 RTCO Cpre Lane2	[Fixed EQ] 10 6 10 6 10 6 10 6 10 6 10 6 10 6 10	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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# Chapter 3 BIOS Settings

### VMD Setup Menu

Chipset	Aptio Setup — AMI	
System Agent (SA) Configuration		VMD Configuration settings
VT-d	Supported	
<ul> <li>Memory Configuration</li> <li>Graphics Configuration</li> <li>DMI/OPI Configuration</li> <li>VMD setup menu</li> <li>PCI Express Configuration</li> </ul>		
VT-d Control Iommu Pre-boot Behavior Above 4GB MMIO BIOS assignment	[Enabled] [Disable IOMMU] [Enabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Chipset	Hptio Setup – HMI	
VMD Configuration		Enable/Disable to VMD
Enable VMD controller	[Disabled]	Controller
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Enable VMD Controller
 Enable/Disable to VMD controller.

# MXM 3.1 (3D) Controller

	Chipset	Aptio Setup — AMI	
Γ	System Agent (SA) Configuration		PCI Express Configuration
	VT-d	Supported	Sectings
	Memory Configuration Graphics Configuration DMI/OPI Configuration VMD setup menu PCI Express Configuration		
	VT-d Control Iommu Pre-boot Behavior	[Enabled] [Disable IOMMU]	
	Above 468 MMIU BIUS assignment	[Enabled]	++: Select Screen
			Enter: Select
			F1: General Help
			F2: Frevious values F3: Optimized Defaults
			ESC: Exit
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Aptio Setup – AMI Chipset	
PCI Express Configuration	PCI Express Root Port Settings.
▶ MXM 3.1 (3D) Controller ▶ CPU PCI Express Root Port 3	
	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Chipset	Aptio Setup — AMI	
Connection Type PCI Express Clock Gating PCI Express Power Gating ASPM L1 Substates Gen3 Eq Phase3 Method Gen4 Eq Phase3 Method ACS PTM DPC FOM Scoreboard Control Policy Multi-VC EDPC URR FER NFER CER CTO SEFE SENFE SECE PME SCI Advanced Error Reporting PCIe Speed Enable ClockReq Messaging	[Slot] [Enabled] [Enabled] [Disabled] [Disabled] [Hardware] [Hardware] [Enabled] [Enabled] [Disabled] [Enabled] [Enabled] [Auto] [Disabled]	<ul> <li>Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.</li> <li>**: Select Screen         **: Select Screen          </li> <li>**: Select Item         Enter: Select          </li> <li>**: General Help         F2: Previous Values          F3: Optimized Defaults      </li> <li>F4: Save &amp; Exit      </li> </ul>

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- PCI Express Clock Gating
   PCI Express Clock Gating Enable/Disable for each root port.
- PCI Express Power Gating PCI Express Power Gating Enable/Disable for each root port.
- ASPM
  - PCI Express Active State Power Management settings.
- L1 Substates
   PCI Express L1 Substates settings.L1SS cannot be enabled when CLKREQMSG is disabled.
- Gen3 EQ Phase3 Method
   PCIe Gen3 Equalization Phase 3 Method.
- Gen4 EQ Phase3 Method
   PCIe Gen4 Equalization Phase 3 Method.
- ACS
   Enable/Disable Access Control S
  - Enable/Disable Access Control Services Extended Capability.
- PTM
  - Enable/Disable Precision Time Measurement.
- DPC

Enable/Disable Downstream Port Containment.

- FOM Scoreboard Control Policy Select the FOM Scoreboard Control Policy, when set to Auto, speed is based on TLS.
- Multi-VC

Enable/Disable Multi Virtual Channel.

- EDPC

Enable/Disable Rootport extensions for Downstream Port Containment.

- URR

PCI Express Unsupported Request Reporting Enable/Disable.

– FER

PCI Express Device Fatal Error Reporting Enable/Disable.

### – NFER

- PCI Express Device Non-Fatal Error Reporting Enable/Disable.
- CER
  - PCI Express Device Correctable Error Reporting Enable/Disable.
- CTO
- PCI Express Device Correctable Error Reporting Enable/Disable.
- SEFE
  - Root PCI Express System Error on Fatal Error Enable/Disable.
- SENFE
- Root PCI Express System Error on Non-Fatal Error Enable/Disable. - SECE
- Root PCI Express System Error on Correctable Error Enable/Disable.
- PME SCI PCI Express PME SCI Enable/Disable.
- Advanced Error Reporting Advanced Error Reporting Enable/Disable.
- Cle Speed
   Configure PCIe Speed
- Enable ClockReq Messaging
   Enable or Disable ClockReq Messaging.

Chipset	Aptio Setup – AMI	
Transmitter Half Swing Detect Timeout P2P Support CPU PCIE FuncO Link Disable	[Disabled] O [Disabled] [Disabled]	▲ Downstream Port Transmitter Preset
SA PCIE LTR Configuration LTR Snoop Latency Override Non Snoop Latency Override Force LTR Override	[Enabled] [Auto] [Auto] [Disabled]	
CPU PCTe Gen3 HWED Config	[D1Sabled]	++: Select Screen
UPTP DPTP	7 7	14: Select Item Enter: Select +/-: Change Ont
CPU PCIe Gen4 HWEQ Config UPTP DPTP	7 5	F1: General Help F2: Previous Values F3: Optimized Defaults
CPU PCIe Gen5 HWEQ Config UPTP DPTP	5 7	ESC: Exit
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- Transmitter Half Swing
   Transmitter Half Swing Enable/Disable.
- P2P Support
   Program P2P Support Registers according to setup option.
   CPU PCIe Func0 Link Disable

CPU PCIE Func0 Link Disable while Device attached into Port having Func0 and FuncN.

Chapter 3 BIOS Settings

- LTR
  - SA PCIE Latency Reporting Enable/Disable.
- Snoop Latency Override
   Snoop Latency Override for SA PCIE.
- Non Snoop Latency Override
   Non Snoop Latency Override for SA PCIE.
- Force LTR Override
   Force LTR Override for SA PCIE.
- LTR Lock
   PCIE LTR Configuration Lock.
- UPTPUpstream Port Transmitter Preset.DPTP
  - Downstream Port Transmitter Preset.

### CPU PCI Express Root Port 3



Chipset	Aptio Setup – AMI	
PCI Express Root Port 3 Connection Type PCI Express Clock Gating PCI Express Power Gating ASPM L1 Substates Gen3 Eq Phase3 Method Gen4 Eq Phase3 Method ACS PTM DPC FOM Scoreboard Control Policy Multi-VC EDPC URR FER NFER CER CTO SEFE SENFE SEOE PME SCI Advanced Error Reporting PCIE Speed	[Enabled] [Slot] [Enabled] [Disabled] [Disabled] [Disabled] [Hardware] [Hardware] [Enabled] [Disabled] [Enabled] [Enabled] [Auto]	<ul> <li>Control the PCI Express Root Port.</li> <li>++: Select Screen</li> <li>11: Select Item Enter: Select</li> <li>+/-: Change Opt.</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> <li>ESC: Exit</li> </ul>

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Chipset	Aptio Setup – AMI	
Enable ClockReq Messaging Transmitter Half Swing Detect Timeout P2P Support	[Disabled] [Disabled] O [Disabled]	▲ Downstream Port Transmitter Preset
SA PCIE LTR Configuration LTR Snoop Latency Override Non Snoop Latency Override Force LTR Override	[Enabled] [Auto] [Auto] [Disabled]	
LTR Lock	[Disabled]	
CPU PCIe Gen3 HWEQ Config UPTP DPTP	7 7	++: Select Screen 14: Select Item Enter: Select +/-: Change Ont
CPU PCIe Gen4 HWEQ Config UPTP DPTP	7 5	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
CPU PCIe Gen5 HWEQ Config UPTP DPTP	5 7	ESC: Exit
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 PCH-PCI Express Root Port 3 Control the PCI Express Root Port.

## 3.2.3.2 PCH-IO Configuration

Aptio Setup – Al Main Advanced <mark>Chipset</mark> Security Boot Save & Exit	MI MEBX
<ul> <li>System Agent (SA) Configuration</li> <li>PCH-IO Configuration</li> </ul>	PCH Parameters PCH Parameters **: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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PCH-IO Configuration	PCI Express Configuration settings
<ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> <li>USB Configuration</li> <li>Security Configuration</li> <li>HD Audio Configuration</li> </ul>	
LANI Controller [Enabled] LANI PXE OpROM [Disabled] Wake on LAN Enable [Disabled] LAN2 Controller [Enabled] LAN2 PXE OpROM [Disabled] LAN3 Controller [Enabled] LAN3 PXE OpROM [Disabled] LAN4 Controller [Enabled] LAN4 PXE OpROM [Disabled] PCIE Wake [Disabled] PCIE Wake [Disabled] PCIE Device Initial Delay 0 Legacy ID Low Latency [Disabled] Flash Protection Range Registers [Disabled] (FPRR)	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

Chipset	Aptio Setup — AMI	
LAN1 Controller LAN1 PXE OpROM Wake on LAN Enable LAN2 Controller LAN2 PXE OpROM LAN3 Controller LAN3 PXE OpROM LAN4 Controller LAN4 PXE OpROM	[Enabled] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Disabled]	<ul> <li>Enable/Disable USB ports power in S4/S5</li> </ul>
PCIE Wake Restore AC Power Loss PCIE Device Initial Delay Legacy IO Low Latency Flash Protection Range Registers (FPRR) SPD Write Disable M.2 Key B function select USB9 function select USB Port1/2 Power USB Port3/4 Power USB Port5/6 Power USB Port7/8 Power	[Disabled] [Power Off] O [Disabled] [Disabled] [TRUE] [PCIe x2] [Pin Header] [Enabled] [Enabled] [Enabled] [Enabled]	<pre> ++: Select Screen  14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit </pre>

### ■ LAN1~4 Controller

Enable/Disable onboard NIC.

### LAN1~4 PXE OpROM

Enable or disable boot option for LAN1 Controller.

### Wake on LAN Enable

Enable/Disable integrated LAN to wake the system.

### PCIE Wake

Enable or disable PCIE to wake the system from S5.

### Restore AC Power Loss

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

### PCIE Device Initial Delay

The PCIE device initial delay 0~30 seconds.

### Legacy IO Low Latency

Set to enable low latency of legacy IO. Some systems require lower IO latency irrespective of power. This is a tradeoff between power and IO latency.

### Flash Protection Range Registers (FPRR) Enable Flash Protection Range Registers.

### SPD Write Disable

Enable/Disable setting SPD Write Disable. For security recommendations, SPD write disable bit must be set.

# M.2 Key B Function Select

M.2 B-Key function select.

### USB Port Power

Enable/Disable USB port power in S4/S5.

### PCI Express Configuration

Chipset	Aptio Setup - AMI	
PCI Express Configuration		The control of Active State
DMI Link ASPM Control PCIe function swap ▶ PCIe EQ settings	[L1] [Enabled]	Link.
▶ M.2 B-Key ▶ PCI Express Root Port 3 ▶ M.2 E-Key ▶ PCI Express Root Port 5(x4)		
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- DMI Link ASPM Control The control of Active State Power Management of the DMI Link.
- PCIe function swap Enable/Disable PCIe function swap.

Chipset	Aptio Setup – AMI	
PCIe EQ override	[Disabled]	Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process ++: Select Screen 14: Select Item
		Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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- PCIe EQ override

Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process.

### M.2 B-Key

Chipset	Aptio Setup — AMI	
PCI Express Configuration		PCI Express Root Port Settings.
DMI Link ASPM Control PCIe function swap ▶ PCIe EQ settings	[L1] [Enabled]	
<ul> <li>M.2 B-Key</li> <li>PCI Express Root Port 3</li> <li>M.2 E-Key</li> <li>PCI Express Root Port 5(x4)</li> </ul>		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Chipset	Aptio Setup – AMI	
Chipset M.2 B-Key Connection Type ASPM L1 Substates L1 Low ACS PTM DPC EDPC URR FER NFER CER SEFE SENFE SECE PME SCI Hot Plug Advanced Error Reporting PCIe Speed Transmitter Half Swing Detect Timeout Extra Bus Reserved	Aptio Setup - AMI [Enabled] [Slot] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Disabled] [Disabled] [Enabled] [Disabled]	<ul> <li>Control the PCI Express Root Port.</li> <li>++: Select Screen</li> <li>++: Select Item Enter: Select</li> <li>+/-: Change Opt.</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> <li>ESC: Exit</li> </ul>
Reserved Memory Reserved I/O	10 4	▼
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	Aptio Setup – AMI	
Chipset		
EDPC	[Enabled]	A Peer Memory Write
URR	[Disabled]	Enable/Disable
FER	[Disabled]	
NFER	[Disabled]	
CER	[Disabled]	
SEFE	[Disabled]	
SENFE	[Disabled]	
SECE	[Disabled]	
PME SCI	[Enabled]	
Hot Plug	[Disabled]	
Advanced Error Reporting	[Enabled]	
PCIe Speed	[Auto]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	→+: Select Screen
Extra Bus Reserved	0	↑↓: Select Item
Reserved Memory	10	Enter: Select
Reserved I/O	4	+/-: Change Opt.
		F1: General Help
PCH PCIe LTR Configuration		F2: Previous Values
LTR	[Enabled]	F3: Optimized Defaults
Snoop Latency Override	[Auto]	F4: Save & Exit
Non Snoop Latency Override	[Auto]	ESC: Exit
LTR Lock	[Disabled]	
Peer Memory Write Enable	[Disabled]	▼

### - ASPM

PCI Express Active State Power Management settings.

L1 Substates

PCI Express L1 Substates settings.L1SS cannot be enabled when CLKREQMSG is disabled.

– L1 Low

PCI Express L1 Low Substate Enable/Disable.

- ACS

Enable/Disable Access Control Services Extended Capability.

– PTM

Enable/Disable Precision Time Measurement.

– DPC

Enable/Disable Downstream Port Containment.

– EDPC

Enable/Disable Rootport extensions for Downstream Port Containment.

– URR

PCI Express Unsupported Request Reporting Enable/Disable.

– FER

PCI Express Device Fatal Error Reporting Enable/Disable.

– NFER

PCI Express Device Non-Fatal Error Reporting Enable/Disable.

- CER

PCI Express Device Correctable Error Reporting Enable/Disable.

- SEFE

Root PCI Express System Error on Fatal Error Enable/Disable.

- SENFE

Root PCI Express System Error on Non-Fatal Error Enable/Disable.

- SECE

Root PCI Express System Error on Correctable Error Enable/Disable.

- PME SCI
  - PCI Express PME SCI Enable/Disable.
- Hot Plug
   PCI Express Hot Plug Enable/Disable.
- Advanced Error Reporting Advanced Error Reporting Enable/Disable.
- PCIe Speed
  - Configure PCIe Speed
- Transmitter Half Swing Transmitter Half Swing Enable/Disable.
- LTR
  - SA PCIE Latency Reporting Enable/Disable.
- Snoop Latency Override
   Snoop Latency Override for SA PCIE.
- Non Snoop Latency Override
   Non Snoop Latency Override for SA PCIE.
- LTR Lock
- PCIE LTR Configuration Lock
- Peer Memory Write Enable.
   Peer Memory Write Enable/Disable.

### PCI Express Root Port 3

PCI Express Configuration	PCI Express Root Port Settings.
DMI Link ASPM Control [L1] PCIe function swap [Enabled] ▶ PCIe EQ settings	
▶ M.2 B-Key ▶ PCI Express Root Port 3 ▶ M.2 E-Key ▶ PCI Express Root Port 5(x4)	
	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Chipset	Aptio Setup – AMI	
PRT Europace Boot Boot 9	[Epoblod]	A Control the RCI Eveness Rest
Connection Tune	[Ellabled]	Pont
леры	[Dicphlod]	Tort.
norn 11 Substates	[Disabled]	
L1 Jow	[Enabled]	
	[Enabled]	
PTM	[Enabled]	
DPC	[Disabled]	
EDEC	[Enabled]	
LIRR	[Disabled]	
FER	[Disabled]	
NEER	[Disabled]	
CER	[Disabled]	
SEE	[Disabled]	++: Select Screen
SENEE	[Disabled]	14: Select Item
SECE	[Disabled]	Enter: Select
PME_SCT	[Enabled]	+/-: Change Opt.
Hot Plug	[Disabled]	F1: General Help
Advanced Error Reporting	[Enabled]	F2: Previous Values
PCIe Speed	[Auto]	F3: Optimized Defaults
Transmitter Half Swing	[Disabled]	F4: Save & Exit
Detect Timeout	0	ESC: Exit
Extra Bus Reserved	0	
Reserved Memory	10	
Reserved I/O	4	▼

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EDPC URR FER NFER CER SEFE SENFE SECE PME SCI Hot Plug Advanced Error Reporting PCIe Speed	[Enabled] (Disabled) [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Auto]	Peer Memory Write Enable∕Disable
Transmitter Half Swing Detect Timeout Extra Bus Reserved Reserved Memory Reserved I/O PCH PCIE LTR Configuration LTR Snoop Latency Override Non Snoop Latency Override LTR Lock Peer Memory Write Enable	(Disabled) 0 10 4 [Enabled] [Auto] [Auto] [Disabled] [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

### M.2 E-Key

Chipset	Aptio Setup — AMI	
PCI Express Configuration		PCI Express Root Port Settings.
DMI Link ASPM Control PCIe function swap ▶ PCIe EQ settings	[∟1] [Enabled]	
▶ M.2 B-Key ▶ PCI Express Root Port 3 ▶ M.2 E-Key ▶ PCI Express Root Port 5(x4)		
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Chipset	Aptio Setup – AMI	
M.2 E-Key Connection Type ASPM L1 Substates L1 Low ACS PTM DPC EDPC URR FER NFER CER SEFE SENFE SECE PME SCI Hot Plug Advanced Error Reporting PCIe Speed Transmitter Half Swing Detect Timeout Extra Bus Reserved Reserved Memory Reserved I/O	[Enabled] [Slot] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Auto] [Disabled] 0 0	Control the PCI Express Root Port. ++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Aptio Setup – AMI	
----------------------------	-------------------	------------------------
Chipset		
EDPC	[Enabled]	▲ Peer Memory Write
URR	[Disabled]	Enable/Disable
FER	[Disabled]	
NFER	[Disabled]	
CER	[Disabled]	
SEFE	[Disabled]	
SENFE	[Disabled]	
SECE	[Disabled]	
PME SCI	[Enabled]	
Hot Plug	[Disabled]	
Advanced Error Reporting	[Enabled]	
PCIe Speed	[Auto]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	↔: Select Screen
Extra Bus Reserved	0	↑↓: Select Item
Reserved Memory	10	Enter: Select
Reserved I/O	4	+/-: Change Opt.
		F1: General Help
PCH PCIe LTR Configuration		F2: Previous Values
LTR	[Enabled]	F3: Optimized Defaults
Snoop Latency Override	[Auto]	F4: Save & Exit
Non Snoop Latency Override	[Auto]	ESC: Exit
LTR Lock	[Disabled]	
Peer Memory Write Enable	[Disabled]	•

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#### PCI Express Root Port 5(x4)



Chinese	Aptio Setup – A	IMI
Unipse		
PCI Express Root Port 5 Connection Type ASPM L1 Substates L1 Low ACS PTM DPC EDPC URR FER NFER CER SEFE SENFE SECE PME SCI Hot Plug Advanced Error Report. PCIe Speed Transmitter Half Swing Detect Timeout Extra Bus Reserved Reserved Memory Reserved I/O	[Enabled] [Slot] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Disable	<ul> <li>▲ Control the PCI Express Root Port.</li> <li>★+: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</li> </ul>

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Chipset	Aptio Setup — AMI	
EDPC URR FER NFER CER SEFE SENFE SECE PME SCI Hot Plug Advanced Error Reporting PCIe Speed	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Enabled] [Auto]	▲ Peer Memory Write Enable/Disable
Detect Timeout Extra Bus Reserved Reserved Memory Reserved I/O PCH PCIE LTR Configuration LTR Snoop Latency Override Non Snoop Latency Override LTR Lock Peer Memory Write Enable	(DISABled) 0 10 4 [Enabled] [Auto] [Auto] [Disabled] [Disabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

#### SATA Configuration

Chipset	Aptio Setup – AMI	
PCH-IO Configuration		SATA Device Options Settings
<ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> <li>USB Configuration</li> <li>Security Configuration</li> <li>HD Audio Configuration</li> </ul>		
LAN1 Controller LAN1 PXE OpROM Wake on LAN Enable LAN2 Controller LAN2 PXE OpROM LAN3 Controller LAN3 PXE OpROM LAN4 Controller LAN4 PXE OpROM	[Enabled] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Disabled] [Enabled] [Disabled]	<pre> ++: Select Screen  1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help E2: Breurious Values </pre>
PCIE Wake Restore AC Power Loss PCIE Device Initial Delay Legacy IO Low Latency Flash Protection Range Registers (FPRR)	[Disabled] [Power Off] O [Disabled] [Disabled]	F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Chipset	Aptio Setup – AMI	
SATA Configuration		▲ Enable/Disable SATA Device.
SATA Configuration SATA Controller(s) SATA Mode Selection Aggressive LPM Support SATA Controller Speed SATA Port 1 Software Preserve Port 1 Hot Plug Configured as eSATA SATA Port 1 DevSlp SATA Port 2 Software Preserve	(Enabled) [AHCI] [Enabled] [Default] Empty Unknown [Enabled] [Disabled] Hot Plug supported [Disabled] Empty Unknown	▲ Enable/Disable SATA Device. ++: Select Screen 1+: Select Trem
Port 2 Hot Plug Configured as eSATA SATA Port 2 DevSlp SATA Port 3 Software Preserve Port 3 Hot Plug Configured as eSATA SATA Port 3 DevSlp	[Enabled] [Disabled] Hot Plug supported [Disabled] Empty Unknown [Enabled] [Disabled] Hot Plug supported [Disabled]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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	Antio Setun – AMT	
Chinset	nptio setup nni	
		▲ Enable/Disable SATA Port 7
SATA Port 1	Empty	DevSlp. For DevSlp to work,
Software Preserve	Unknown	both hard drive and SATA port
Port 1	[Enabled]	need to support DevS1p
Hot Plug	[Disabled]	function, otherwise an
Configured as eSATA	Hot Plug supported	unexpected behavior might
SATA Port 1 DevSlp	[Disabled]	happen. Please check board
SATA Port 2	Empty	design before enabling it.
Software Preserve	Unknown	
Port 2	[Enabled]	
Hot Plug	[Disabled]	
Configured as eSATA	Hot Plug supported	
SATA Port 2 DevS1p	[Disabled]	
SATA Port 3	Empty	++: Select Screen
Software Preserve	Unknown	î∔: Select Item
Port 3	[Enabled]	Enter: Select
Hot Plug	[Disabled]	+/-: Change Opt.
Configured as eSATA	Hot Plug supported	F1: General Help
SATA Port 3 DevSlp	[Disabled]	F2: Previous Values
mSATA	Empty	F3: Optimized Defaults
Software Preserve	Unknown	F4: Save & Exit
mSATA	[Enabled]	ESC: Exit
Hot Plug	[Disabled]	
Configured as eSATA	Hot Plug supported	
mSATA DevS1p	[Disabled]	•

- SATA Controller(s)
   Enable/Disable SATA Device.
- SATA Mode Selection
   Determines how SATA controller(s) operate.
- Aggressive LPM Support Enable PCH to aggressively enter link power state.
- SATA Controller Speed-Indicates the maximum speed the SATA controller can support.
- Port 1~4/mSATA
   Enable or Disable SATA/mSATA Port.
- Hot Plug
   SATA Hot Plug Enable/Disable.
- SATA Port 1 DevSlp
   Enable/Disable SATA Port 1 DevSlp. For DevSlp to work, both hard drive and
   SATA ports need to support the DevSlp function, otherwise an unexpected

SATA ports need to support the DevSlp function, otherwise an unexpected behavior might occur. Please check the board design before enabling it.

#### USB Configuration

Chipset	Aptio Setup – AM:	I
PCH-IO Configuration		▲ USB Configuration settings
<ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> <li>USB Configuration</li> <li>Security Configuration</li> <li>HD Audio Configuration</li> </ul>		
LAN1 Controller LAN1 PXE OpROM Wake on LAN Enable LAN2 Controller LAN2 PXE OpROM LAN3 Controller LAN3 PXE OpROM LAN4 Controller LAN4 PXE OpROM	[Enabled] [Disabled] [Disabled] [Enabled] [Disabled] [Enabled] [Enabled] [Disabled] [Disabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help E2: Previous Values</pre>
PCIE Wake Restore AC Power Loss PCIE Device Initial Delay Legacy IO Low Latency Flash Protection Range Reg (FPRR)	[Disabled] [Power Off] O [Disabled] isters [Disabled]	F2: Previous values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Chipset	Aptio Setup — AMI	
USB Configuration		Enable/Disable xDCI (USB OTG Device).
xDCI Support	[Disabled]	
USB PDO Programming USB Overcurrent USB Overcurrent Lock USB Audio Offload Enable HSII on XHCI USB3.1 Speed Selection USB Port Disable Override	[Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Gen 2] [Dischled]	
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- xDCI Support Enable/Disable xDCI (USB OTG Device).
- USB PD0 Programming Select 'Enabled' if Port Disable Override functionality is used.

USB Overcurrent

Select 'Disabled' for pin-based debug. If pin-based debug is enabled but USB overcurrent is not disabled, USB DbC will not work.

- USB Overcurrent Lock
   Select 'Enabled' if Overcurrent functionality is used. Enabling this will make xHCI controller consume the Overcurrent mapping data.
- USB Audio Offload Enable/Disable USB Audio Offload functionality.
- Enable HSII on xHCI
   Enable/Disable HSII feature. It may lead to increased power consumption.
   USB3.1 Speed Selection
- USB3.1 Speed selection; Gen1 or Gen2.
- USB Port Disable Override Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.

#### Security Configuration

Chipset	Aptio Setup – AMI	
PCH-IO Configuration		Security Configuration settings
<ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> <li>USB Configuration</li> <li>Security Configuration</li> <li>HD Audio Configuration</li> </ul>		
LAN1 Controller LAN1 PXE OpROM Wake on LAN Enable LAN2 Controller LAN2 PXE OpROM LAN3 Controller LAN3 PXE OpROM LAN4 Controller LAN4 PXE OpROM PCIE Wake Restore AC Power Loss	[Enabled] [Disabled] [Disabled] [Enabled] [Disabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Evit
PCIE Device Initial Delay Legacy IO Low Latency Flash Protection Range Registers (FPRR)	[Disabled] [Disabled]	ESC: Exit
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Chipset	Aptio Setup — AMI	
Security Configuration RTC Memory Lock BIOS Lock Force unlock on all GPIO pads	[Enabled] [Enabled] [Disabled]	Enable will lock bytes 38h–3Fh in the lower/upper 128–byte bank of RTC RAM
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- RTC Memory Lock Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
- BIOS Lock Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
- Force unlock on all GPIO pads
   If Enabled, BIOS will force all GPIO pads to be in unlocked state.

### HD Audio Configuration

Chipset	Aptio Setup – AMI	
PCH—IO Configuration	Â	HD Audio Subsystem Configuration Settings
<ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> </ul>		
<ul> <li>USB Configuration</li> <li>Security Configuration</li> </ul>		
► HD Audio Configuration		
LAN1 Controller	[Enabled]	
Wake on LAN Enable	[Disabled]	
LAN2 Controller	[Enabled]	
LAN2 PXE OpROM	[Disabled]	++: Select Screen
LAN3 Controller	[Enabled]	†↓: Select Item
LAN3 PXE OpROM	[Disabled]	Enter: Select
LAN4 Controller	[Enabled]	+/-: Change Opt.
LAN4 PXE OpROM	[Disabled]	F1: General Help F2: Previous Values
PCIE Wake	[Disabled]	F3: Optimized Defaults
Restore AC Power Loss	[Power Off]	F4: Save & Exit
PCIE Device Initial Delay	0	ESC: Exit
Legacy IO Low Latency	[Disabled]	
Flash Protection Range Registers	[Disabled]	
(FPRR)	•	
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HD Audio Subsystem Configuration Settings     Control Detection of the HD-Audio device.       HD Audio     [Enabled]	
HD Audio [Enabled] Disabled = HDA will be	
unconditionally disabled Enabled = HDA will be unconditionally enabled.	
++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
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#### - HD Audio

Control Detection of the HD-Audio device.

# 3.2.4 Security

Aptio Setup – AMI Main Advanced Chipset <mark>Security</mark> Boot Save & Exit MEBx		
Password Description		Set Administrator Password
If ONLY the Administrator's pa then this only limits access t only asked for when entering S If ONLY the User's password is is a power on password and mus boot or enter Setup. In Setup have Administrator rights. The password length must be in the following range: Minimum length	assword is set, o Setup and is setup. s set, then this it be entered to the User will	
Maximum length Administrator Password User Password ▶ Secure Boot	20	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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- Administrator Password Set Administrator Password.
- User Password
   Set User Password.

Aptio Setup – AMI Main Advanced Chipset <mark>Security</mark> Boot Save & Exit MEBx		
Password Description		Secure Boot configuration
If ONLY the Administrator's password then this only limits access to Setu only asked for when entering Setup. If ONLY the User's password is set, is a power on password and must be e boot or enter Setup. In Setup the Us have Administrator rights. The password length must be in the following range: Minimum length	is set, p and is then this ntered to er will	
Maximum length	20	++: Select Screen
Administrator Password User Password		<pre>T4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults</pre>
▶ Secure Boot		F4: Save & Exit ESC: Exit

	Aptio Setup – AMI Security	
System Mode	Setup	Secure Boot feature is Active if Secure Boot is Enabled,
Secure Boot	[Enabled] Inactive	Platform Key(PK) is enrolled and the System is in User mode. The mode change requires
Secure Boot Mode ▶ Restore Factory Keys ▶ Reset To Setup Mode	[Standard]	platform reset
▶ Key Management		
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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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.

Secure Boot Mode
 Secure Boot mode options: Standard or Custom.

# 3.2.5 Boot



Setup Prompt Timeout

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

- Bootup NumLock State
   Select the keyboard NumLock state.
- Quiet Boot Enables or Disables the Quiet Boot option.

## 3.2.6 Save & Exit

Aptio Setup – AMI Main Advanced Chipset Security Boot <mark>Save &amp; Exit</mark> MEBx	
Save Options Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Changes Discard Changes Default Options Restore Defaults	Exit system setup after saving the changes.
Restore User Defaults Boot Override UEFI: JetFlashTS4GJFV30 8.07, Partition 1 (JetFlashTS4GJFV30 8.07)	<pre>++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Save Changes and Exit
Exit system setup after saving the changes.
Discard Changes and Exit
Exit system setup without saving any changes.
Save Changes and Reset
Reset the system after saving the changes.
Discard Changes and Reset
Reset system setup without saving any 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 Defaults
Restore/Load default values for all the setup options.
Save as User Defaults

### Restore User Defaults

Restore the User Defaults to all the setup options.

### 3.2.7 MEBx



MEBx

Set ME configuration.



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