

# **VCOM-1600** **USER**

**COM Express<sup>®</sup> Compact Size Type 6 Module with  
Intel Atom<sup>®</sup> x6000E Processor**

# **Manual**

# Record of Revision

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Version	Date	Page	Description	Remark
1.00	2023/10/24	All	Preliminary Release	

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**FCC** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**CE** The products described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

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## Order Information

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Part Number	Description
VCOM-1600-x6425RE	Compact COM Express Type 6 with Intel Atom® x6425RE (4 core)
VCOM-1600-x6211E	Compact COM Express Type 6 with Intel Atom® x6211E (2 core)

## Optional Accessories

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Part Number	Description
DDR4 32G	Certified DDR4 32GB 2666MHz RAM
DDR4 16G	Certified DDR4 16GB 2666MHz RAM
DDR4 8G	Certified DDR4 8GB 2666MHz RAM
DDR4 4G	Certified DDR4 4GB 2666MHz RAM
ATX Power Supply	ATX Power Supply 250W
Heat Spreader	Heat Spreader for VCOM-1600
Fansink	Fansink for VCOM-1600

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# 1

## GENERAL INTRODUCTION

### 1.1 Overview

Vecow COM Express® product portfolio is designed in a compact size and provides power-efficient, enhanced graphics performance, and flexibility capabilities to empower AIoT applications. The VCOM-1600 is based on the Intel Atom® x6000E processor, delivering speeds of up to 3.0 GHz and featuring Intel® UHD Graphics for 10th Gen Intel® processors.

The VCOM-1600 COM Express Compact Type 6 module is equipped with multiple I/O, including DDI, VGA, and LVDS display interfaces with resolutions up to 4K, PCIe Gen3 lanes, USB 3.1 Gen 2, and one 2.5GigE LAN with support for Intel TSN technology.

The VCOM-1600 provides off-the-shelf features to meet specific applications in the fields of Factory Automation, Medical, Marine, Retail, as well as Transportation and Logistics.



## 1.2 Features

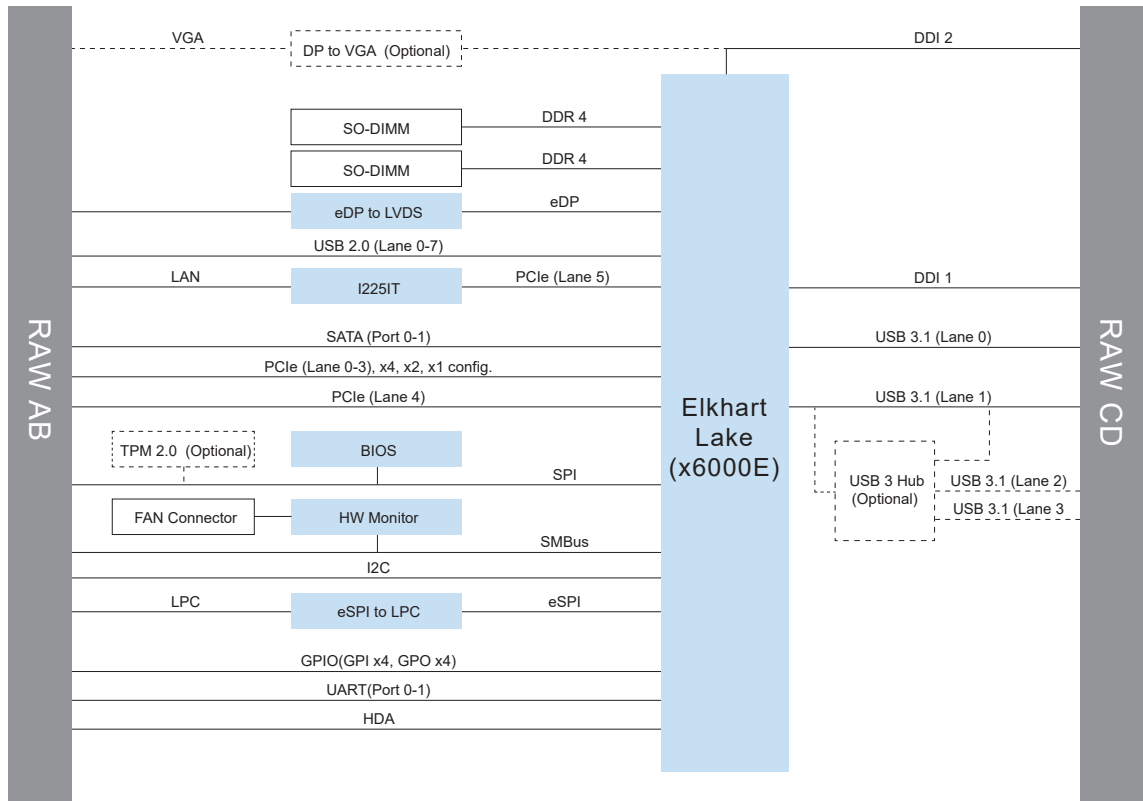
- Intel Atom<sup>®</sup> x6000E Processor (Elkhart Lake), boost up to 3.0GHz
- Multiple DDI, VGA, LVDS display interfaces, support up to 4K resolution
- DDR4 3200MHz memory, up to 32GB
- 1 independent 2.5GigE LAN supports Intel<sup>®</sup> Time Coordinated Computing (TCC) and Time Sensitive Networking (TSN) for realtime data synchronization
- PCIe Gen3 lanes, TPM 2.0 supported
- USB 3.1 Gen 2 supports up to 10Gbps data transfer

## 1.3 Product Specification

<b>System</b>	
Processor	Intel Atom® x6000E Processor (Elkhart Lake)
BIOS	AMI
Memory	2 DDR4 3200MHz SO-DIMM, up to 32GB
<b>Graphics</b>	
Graphics Processor	Intel® UHD Graphics for 10th Gen Intel® Processors
Interface	Multiple independent display : <ul style="list-style-type: none"> <li>• VGA : 1920 x1200 @60Hz</li> <li>• LVDS : 1920 1200 @60Hz</li> <li>• 2 DDI: 4096 x2160 @60Hz</li> </ul>
<b>Ethernet</b>	
LAN 1	Intel® I225IT 2.5GigE LAN
<b>Audio</b>	
Audio Codec	On VCOM-BASE (Realtek ALC88S-VD standard support)
Audio Interface	HAD Bus
<b>Storage</b>	
SATA	2 SATA III (6Gbps) (to RAW A/B)
<b>I/O Interface</b>	
Internal I/O	<ul style="list-style-type: none"> <li>• 2 DDR4 SO-DIMM Socket</li> <li>• 1 FAN Connector</li> <li>• RAW AB/CD Connector</li> </ul>
<b>Expansion</b>	
PCIe	<ul style="list-style-type: none"> <li>• 4 PCIe x1 (configurable to 4 x1, 2 x2, 1 x4, 2 x1+1 x2, 1 x2+2 x1, to RAW A/B)</li> <li>• 1 PCIe x1 (to RAW A/B)</li> </ul>
<b>Power</b>	
Power Input	ATX: 12V±5% / 5Vsb ±5%; or AT: 12V±5%
<b>Others</b>	
TPM	Infineon SLB9670 supports TPM 2.0, SPI Interface (Optional)
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.

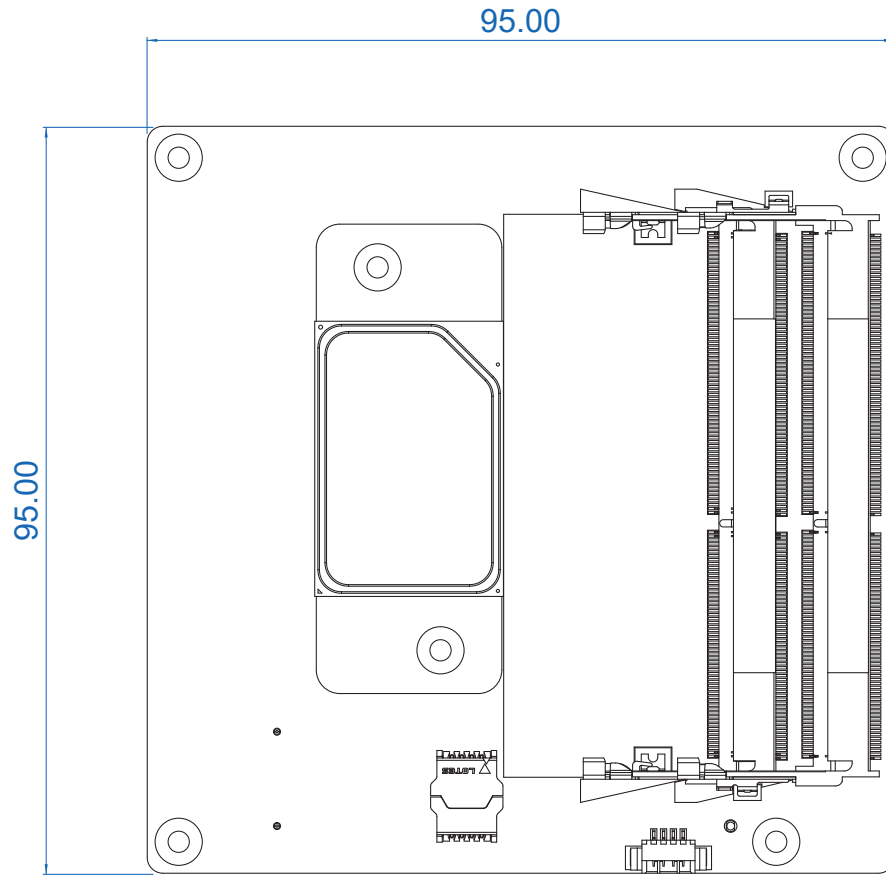
<b>Software Support</b>	
OS	Windows 10, Linux
<b>Mechanical</b>	
Dimension (W x L)	Compact size: 95mm x 95mm (3.74"x 3.74")
Form Factor	PICMG COM.0 Rev 3.0 Type 6
<b>Environment</b>	
Operating Temperature	-40°C to 85°C with Fan sink
Storage Temperature	-40°C to 85°C
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 85°C
EMC	CE, FCC

# 1.4 Block Diagram



## 1.5 Mechanical Dimension

Unit : mm (inch)



# 2

## GETTING TO KNOW YOUR VCOM-1600

### 2.1 Packing List

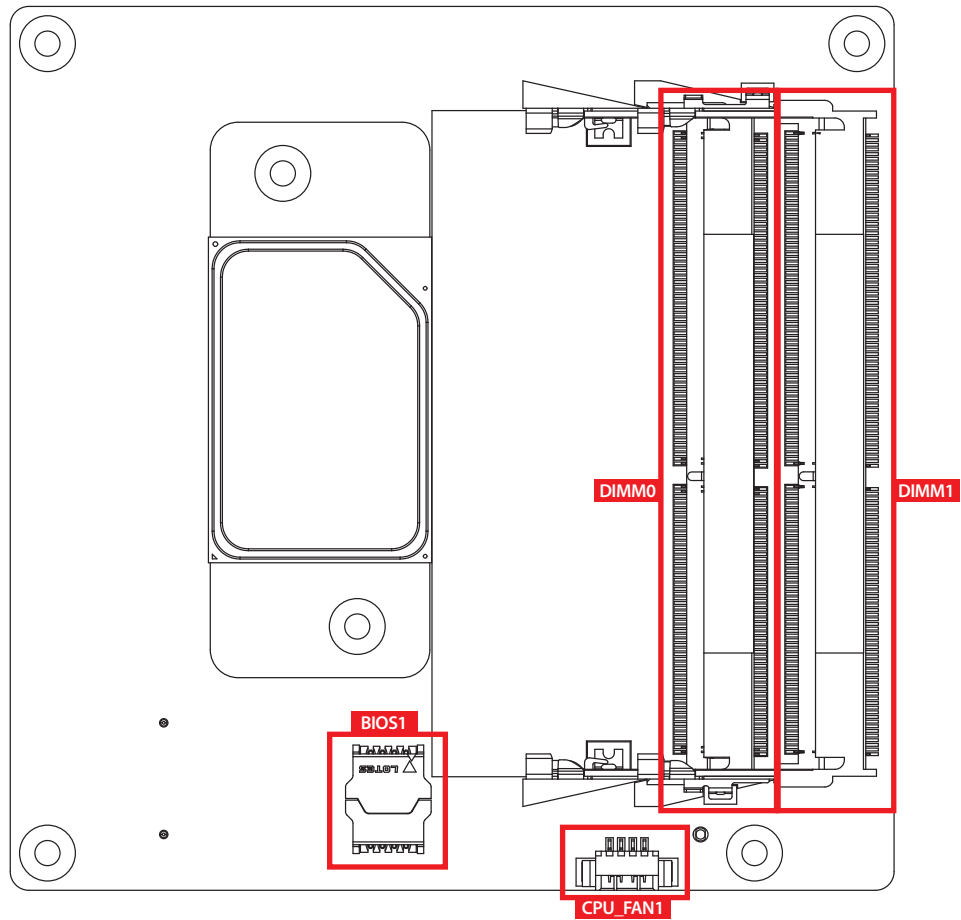
Item	Description	Qty
1	VCOM-1600, Compact COM Express Type 6 with Intel Atom® x6000E	1

## 2.2 COM Module Connectors

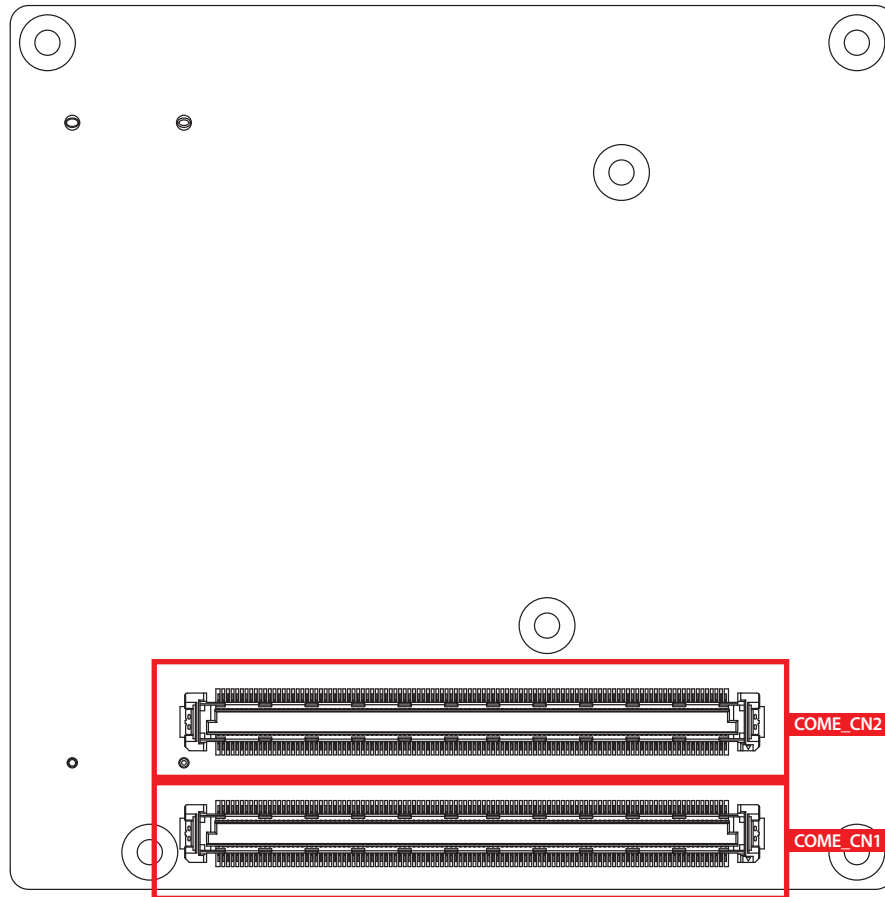
### 2.2.1 Connector Pin Definition

The VCOM-1600 is a most commonly-used Type 6 and features two board to-board connectors on bottom side.

#### Top Side

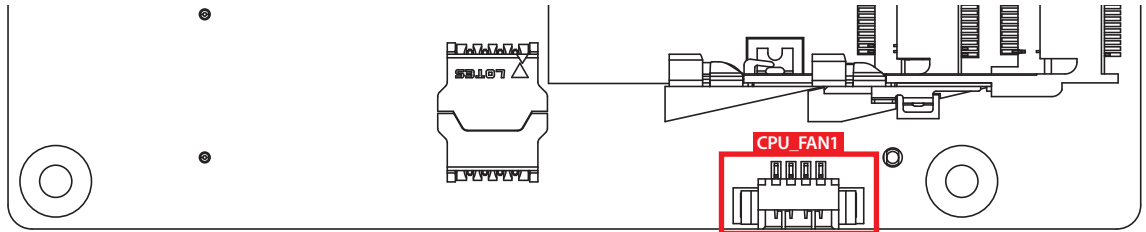


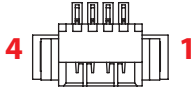
## Bottom Side





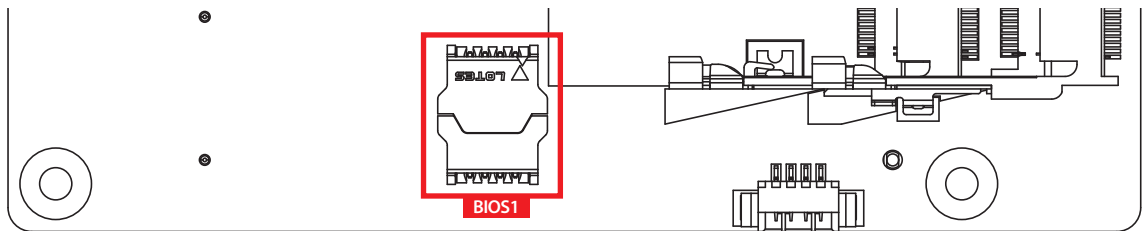
## 2.2.2 CPU FAN Connector

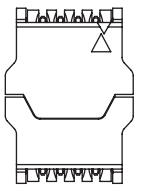


	Pin No.	Definition	Pin No.	Definition
	1	GND	2	+12V
	3	Fan speed sensor	4	Fan PWM

## 2.2.3 BIOS1: SPI BIOS Socket

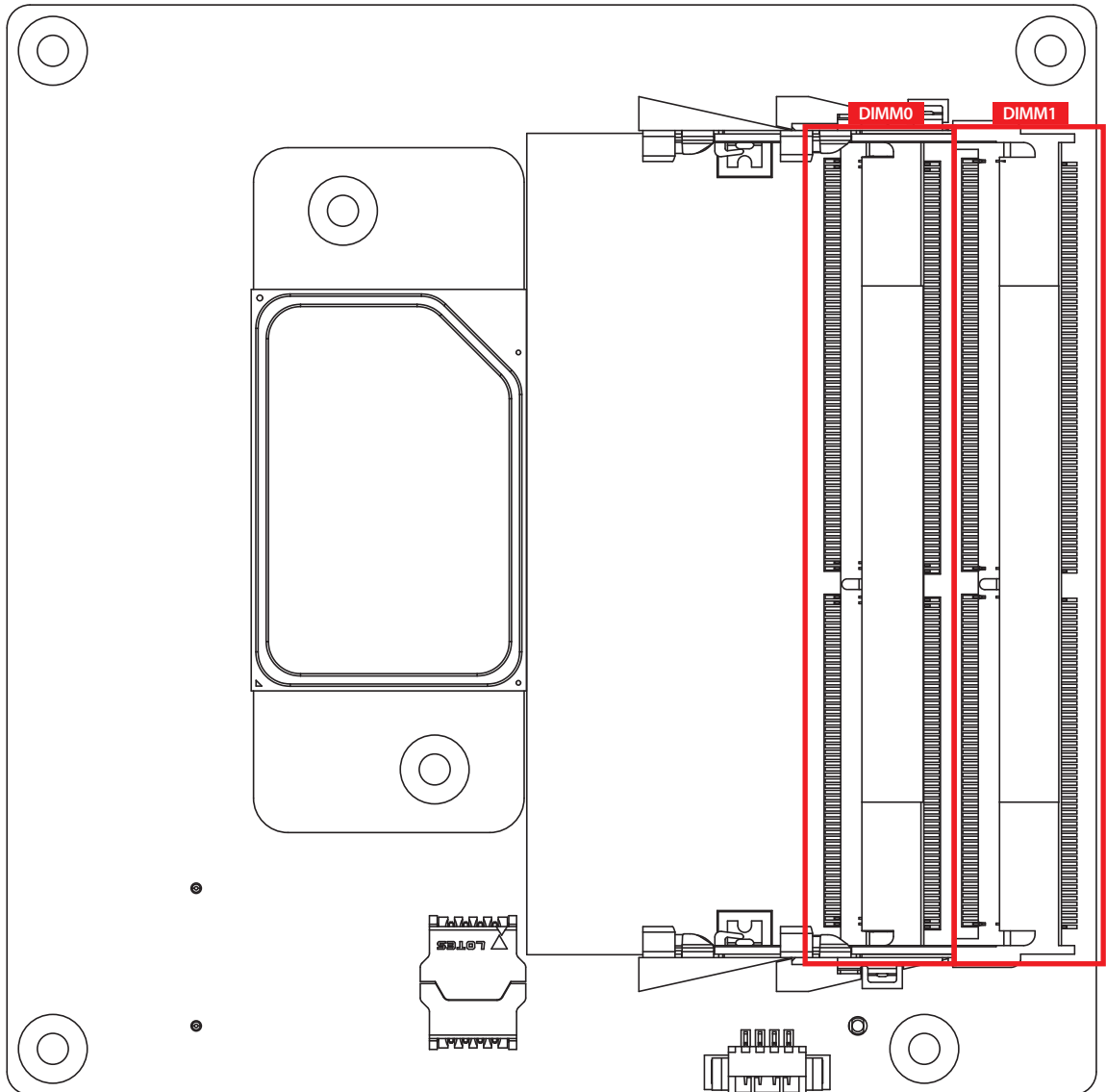
If the BIOS needs to be changed, please contact the Vecow RMA service team.



	Pin No.	Definition	Pin No.	Definition
	1	CS#	5	DI
	2	DO	6	CLK
	3	WP#	7	HOLD#
	4	GND	8	+3.3V

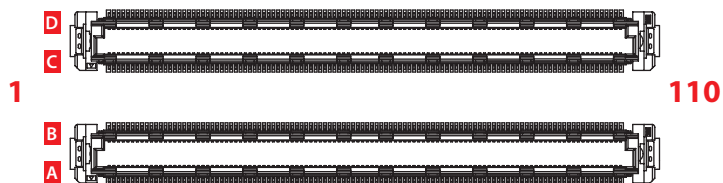
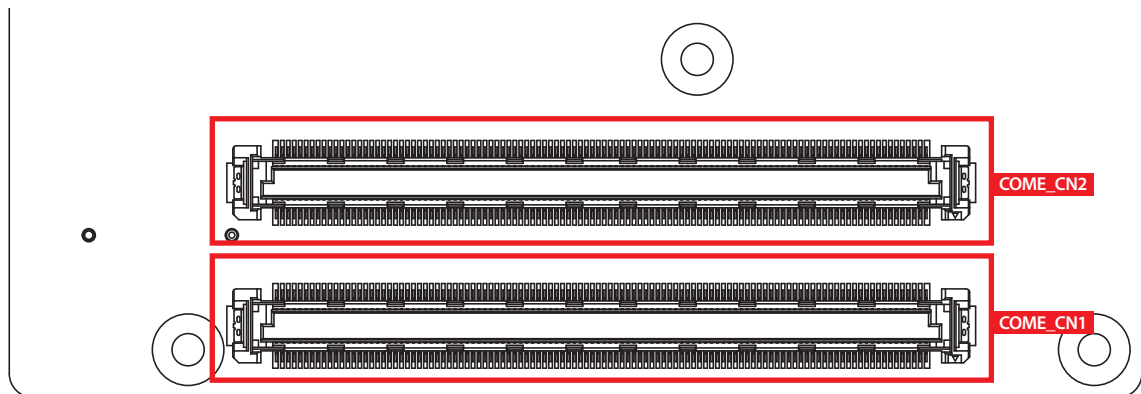
## 2.2.4 DIMM0 : DIMM1: DDR4 SO-DIMM socket

There are 2 DDR4 SO-DIMM socket onboard.



Socket	Description
DIMM0	DDR4 Channel A
DIMM1	DDR4 Channel B

## 2.2.5 COME\_CN1 : COME\_CN2: COM Express Connector (bottom side)



No.	Pin Name	No.	Pin Name	No.	Pin Name	No.	Pin Name
A1	GND(FIXE D)	B1	GND(FIXE D)	C1	GND(FIXE D)	D1	GND(FIXE D)
A2	GBE 0 _MDI3-	B2	GBE 0 _ACT#	C2	GND	D2	GND
A3	GBE 0 _MDI3+	B3	LPC _FRAME #	C3	USB _SSRX0-	D3	USB _SSTX0-
A4	GBE 0 _LINK100#	B4	LPC _AD0	C4	USB _SSRX0+	D4	USB _SSTX0+
A5	GBE 0 _LINK1000#	B5	LPC _AD1	C5	GND	D5	GND
A6	GBE 0 _MDI2-	B6	LPC _AD2	C6	USB _SSRX1-	D6	USB _SSTX1-
A7	GBE 0 _MDI2+	B7	LPC _AD3	C7	USB _SSRX1+	D7	USB _SSTX1+
A8	GBE 0 _LINK#	B8	LPC _DRQ0#	C8	GND	D8	GND
A9	GBE 0 _MDI1-	B9	LPC _DRQ1#	C9	USB _SSRX2-	D9	USB _SSTX2-
A10	GBE 0 _MDI1+	B10	LPC _CLK	C10	USB _SSRX2+	D10	USB _SSTX2+
A11	GND(FIXE D)	B11	GND(FIXE D)	C11	GND(FIXE D)	D11	GND(FIXE D)
A12	GBE 0 _MDI0-	B12	PWRBTN#	C12	USB _SSRX3-	D12	USB _SSTX3-
A13	GBE 0 _MDI0+	B13	SMB _CLK	C13	USB _SSRX3+	D13	USB _SSTX3+
A14	GBE 0 _CTREF	B14	SMB _DAT	C14	GND	D14	GND
A15	SUS _S3#	B15	SMB _ALE RT#	C15	DDI1 _PAIR6+	D15	DDI1 _CTRLCLK_AUX+
A16	SATA0 _TX+	B16	SATA1 _TX+	C16	DDI1 _PAIR6-	D16	DDI1 _CTRLDATA_AUX
A17	SATA0 _TX-	B17	SATA1 _TX-	C17	RSVD	D17	RSVD
A18	SUS _S4#	B18	SUS _STAT#	C18	RSVD	D18	RSVD
A19	SATA0 _RX+	B19	SATA1 _RX+	C19	PCIE _RX6+	D19	PCIE _TX6+
A20	SATA0 _RX-	B20	SATA1 _RX-	C20	PCIE _RX6-	D20	PCIE _TX6-
A21	GND(FIXE D)	B21	GND(FIXE D)	C21	GND(FIXE D)	D21	GND(FIXE D)
A22	SATA2 _TX+	B22	SATA3 _TX+	C22	PCIE _RX7+	D22	PCIE _TX7+
A23	SATA2 _TX-	B23	SATA3 _TX-	C23	PCIE _RX7-	D23	PCIE _TX7-
A24	SUS _S5#	B24	PWR _OK	C24	DDI1 _HPD	D24	RSVD
A25	SATA2 _RX+	B25	SATA3 _RX+	C25	DDI1 _PAIR4+	D25	RSVD
A26	SATA2 _RX-	B26	SATA3 _RX-	C26	DDI1 _PAIR4-	D26	DDI1 _PAIR0+

No.	Pin Name	No.	Pin Name	No.	Pin Name	No.	Pin Name
A27	BATLOW #	B27	WDT	C27	RSVD	D27	DDI1_PAIR0-
A28	(S)ATA_ACT#	B28	AC/HDA_SDIN2	C28	RSVD	D28	RSVD
A29	AC/HDA_SYNC	B29	AC/HDA_SDIN1	C29	DDI1_PAIR5+	D29	DDI1_PAIR1+
A30	AC/HDA_RST#	B30	AC/HDA_SDIN0	C30	DDI1_PAIR5-	D30	DDI1_PAIR1-
A31	GND(FIXE D)	B31	GND(FIXE D)	C31	GND(FIXE D)	D31	GND(FIXE D)
A32	AC/HDA_BITCLK	B32	SPKR	C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+
A33	AC/HDA_SDOUT	B33	I2C_CK	C33	DDI2_CTRLDATA_AUX-	D33	DDI1_PAIR2-
A34	BIOS_DIS0#	B34	I2C_DAT	C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL
A35	THRMTRIP#	B35	THRM#	C35	RSVD	D35	RSVD
A36	USB 6-	B36	USB 7-	C36	DDI3_CTRLCLK_AUX+	D36	DDI1_PAIR3+
A37	USB 6+	B37	USB 7+	C37	DDI3_CTRLDATA_AUX-	D37	DDI1_PAIR3-
A38	USB_6_7_OC #	B38	USB_4_5_OC#	C38	DDI3_DDC_AUX_SEL	D38	RSVD
A39	USB 4-	B39	USB 5-	C39	DDI3_PAIR0+	D39	DDI2_PAIR0+
A40	USB 4+	B40	USB 5+	C40	DDI3_PAIR0-	D40	DDI2_PAIR0-
A41	GND(FIXE D)	B41	GND(FIXE D)	C41	GND(FIXE D)	D41	GND(FIXE D)
A42	USB 2-	B42	USB 3-	C42	DDI3_PAIR1+	D42	DDI2_PAIR1+
A43	USB 2+	B43	USB 3+	C43	DDI3_PAIR1-	D43	DDI2_PAIR1-
A44	USB_2_3_OC #	B44	USB_0_1_OC#	C44	DDI3_HPD	D44	DDI2_HPD
A45	USB0-	B45	US B 1-	C45	RSVD	D45	RSVD
A46	USB0+	B46	US B 1+	C46	DDI3_PAIR2+	D46	DDI2_PAIR2+
A47	VCC_RTC	B47	EXCD1_PERST#	C47	DDI3_PAIR2-	D47	DDI2_PAIR2-
A48	EXCD0_PERST#	B48	EXCD1_CPPE#	C48	RSVD	D48	RSVD
A49	EXCD0_CPPE #	B49	SYS_RESET#	C49	DDI3_PAIR3+	D49	DDI2_PAIR3+
A50	LPC_SERIRQ	B50	CB_RESET#	C50	DDI3_PAIR3-	D50	DDI2_PAIR3-
A51	GND(FIXE D)	B51	GND(FIXE D)	C51	GND(FIXE D)	D51	GND(FIXE D)
A52	PCIE_TX5+	B52	PCIE_RX5+	C52	PEG_RX0+	D52	PEG_TX0+
A53	PCIE_TX5-	B53	PCIE_RX5-	C53	PEG_RX0-	D53	PEG_TX0-
A54	GPI0	B54	GPO1	C54	TYPE0#	D54	PEG_LANE_RV#
A55	PCIE_TX4+	B55	PCIE_RX4+	C55	PEG_RX1+	D55	PEG_TX1+
A56	PCIE_TX4-	B56	PCIE_RX4-	C56	PEG_RX1-	D56	PEG_TX1-
A57	GND	B57	GPO2	C57	TYPE1#	D57	TYPE2#
A58	PCIE_TX3+	B58	PCIE_RX3+	C58	PEG_RX2+	D58	PEG_TX2+
A59	PCIE_TX3-	B59	PCIE_RX3-	C59	PEG_RX2-	D59	PEG_TX2-
A60	GND(FIXE D)	B60	GND(FIXE D)	C60	GND(FIXE D)	D60	GND(FIXE D)
A61	PCIE_TX2+	B61	PCIE_RX2+	C61	PEG_RX3+	D61	PEG_TX3+
A62	PCIE_TX2-	B62	PCIE_RX2-	C62	PEG_RX3-	D62	PEG_TX3-
A63	GPI1	B63	GPO3	C63	RSVD	D63	RSVD
A64	PCIE_TX1+	B64	PCIE_RX1+	C64	RSVD	D64	RSVD
A65	PCIE_TX1-	B65	PCIE_RX1-	C65	PEG_RX4+	D65	PEG_TX4+
A66	GND	B66	WAKE 0#	C66	PEG_RX4-	D66	PEG_TX4-
A67	GPI2	B67	WAKE 1#	C67	RSVD	D67	GND
A68	PCIE_TX0+	B68	PCIE_RX0+	C68	PEG_RX5+	D68	PEG_TX5+
A69	PCIE_TX0-	B69	PCIE_RX0-	C69	PEG_RX5-	D69	PEG_TX5-
A70	GND(FIXE D)	B70	GND(FIXE D)	C70	GND(FIXE D)	D70	GND(FIXE D)

No.	Pin Name	No.	Pin Name	No.	Pin Name	No.	Pin Name
A71	LVDS_A0+	B71	LVDS_B0+	C71	PEG_RX6+	D71	PEG_TX6+
A72	LVDS_A0-	B72	LVDS_B0-	C72	PEG_RX6-	D72	PEG_TX6-
A73	LVDS_A1+	B73	LVDS_B1+	C73	GND	D73	GND
A74	LVDS_A1-	B74	LVDS_B1-	C74	PEG_RX7+	D74	PEG_TX7+
A75	LVDS_A2+	B75	LVDS_B2+	C75	PEG_RX7-	D75	PEG_TX7-
A76	LVDS_A2-	B76	LVDS_B2-	C76	GND	D76	GND
A77	LVDS_VDD_EN	B77	LVDS_B3+	C77	RSVD	D77	RSVD
A78	LVDS_A3+	B78	LVDS_B3-	C78	PEG_RX8+	D78	PEG_TX8+
A79	LVDS_A3-	B79	LVDS_BKLT_EN	C79	PEG_RX8-	D79	PEG_TX8-
A80	GND(FIXE D)	B80	GND(FIXE D)	C80	GND(FIXE D)	D80	GND(FIXE D)
A81	LVDS_A_CK+	B81	LVDS_B_CK+	C81	PEG_RX9+	D81	PEG_TX9+
A82	LVDS_A_CK-	B82	LVDS_B_CK-	C82	PEG_RX9-	D82	PEG_TX9-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL	C83	TPM_PP	D83	RSVD
A84	LVDS_I2C_DAT	B84	VCC_5V_S BY	C84	GND	D84	GND
A85	GPI3	B85	VCC_5V_S BY	C85	PEG_RX10+	D85	PEG_TX10+
A86	RSVD	B86	VCC_5V_S BY	C86	PEG_RX10-	D86	PEG_TX10-
A87	RSVD	B87	VCC_5V_S BY	C87	GND	D87	GND
A88	PCIE_CLK_REF+	B88	BIOS DIS1#	C88	PEGRX11+	D88	PEG TX11+
A89	PCIE_CLK_REF-	B89	VGA_RED	C89	PEG_RX11-	D89	PEG_TX11-
A90	GND(FIXE D)	B90	GND(FIXE D)	C90	GND(FIXE D)	D90	GND(FIXE D)
A91	SPI POWER	B91	VGA GRN	C91	PEG RX12+	D91	PEG TX12+
A92	SPI MISO	B92	VGA BLU	C92	PEG RX12-	D92	PEG TX12-
A93	GPO0	B93	VGA_HSYNC	C93	GND	D93	GND
A94	SPI CLK	B94	VGA_VSYNC	C94	PEG RX13+	D94	PEG TX13+
A95	SPI MOSI	B95	VGA_I2C_CK	C95	PEG RX13-	D95	PEG TX13-
A96	TPM_PP	B96	VGA_I2C_DAT	C96	GND	D96	GND
A97	TYPE 10#	B97	SPI CS #	C97	RSVD	D97	RSVD
A98	SER0 TX	B98	RSVD	C98	PEG RX14+	D98	PEG TX14+
A99	SER0RX	B99	RSVD	C99	PEG RX14-	D99	PEG TX14-
A100	GND(FIXE D)	B100	GND(FIXE D)	C100	GND(FIXE D)	D100	GND(FIXE D)
A101	SER1 TX	B101	FAN PWMOUT	C101	PEG RX15+	D101	PEG TX15+
A102	SER1 RX	B102	FAN TAC HIN	C102	PEG RX15-	D102	PEG TX15-
A103	LID#	B103	SLEEP#	C103	GND	D103	GND
A104	VCC_12V	B104	VCC_12V	C104	VCC_12V	D104	VCC_12V
A105	VCC_12V	B105	VCC_12V	C105	VCC_12V	D105	VCC_12V
A106	VCC_12V	B106	VCC_12V	C106	VCC_12V	D106	VCC_12V
A107	VCC_12V	B107	VCC_12V	C107	VCC_12V	D107	VCC_12V
A108	VCC_12V	B108	VCC_12V	C108	VCC_12V	D108	VCC_12V
A109	VCC_12V	B109	VCC_12V	C109	VCC_12V	D109	VCC_12V
A110	GND(FIXE D)	B110	GND(FIXE D)	C110	GND(FIXE D)	D110	GND(FIXE D)

# 3

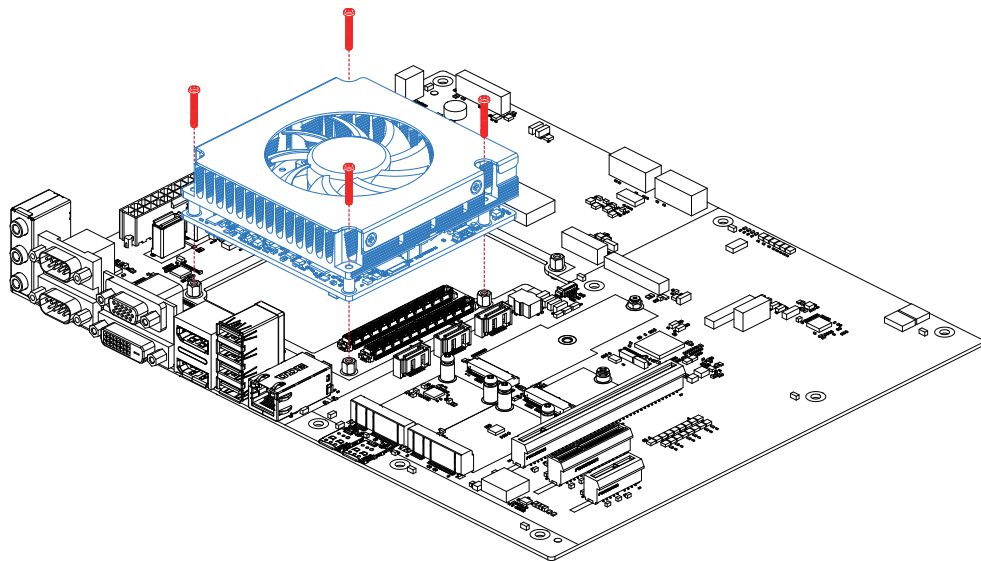
## SYSTEM SETUP

### 3.1 How to Install Your COM Module

Place the **COM Express module** and heatsink assembly onto the connectors on the carrier board.

Then press down on the module until it is firmly seated on the carrier board.

Use the **five M2.5, L=16 mm screws** provided to secure the **COM Express module** to the carrier board.





## 3.2 Installing DDR4 SO-DIMM Modules

**Step 1** Install DDR5 RAM module into SO-DIMM socket.

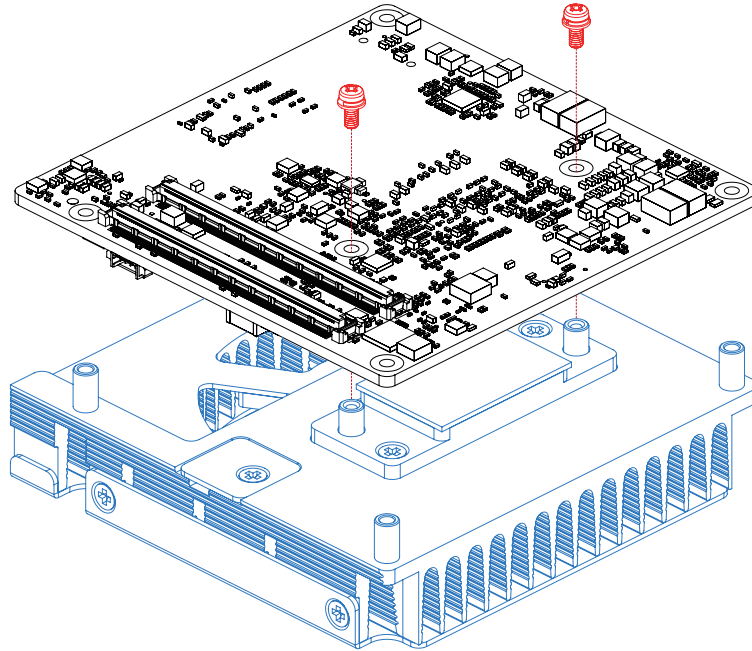


**Step 2** Make sure RAM module is locked by the memory slot.

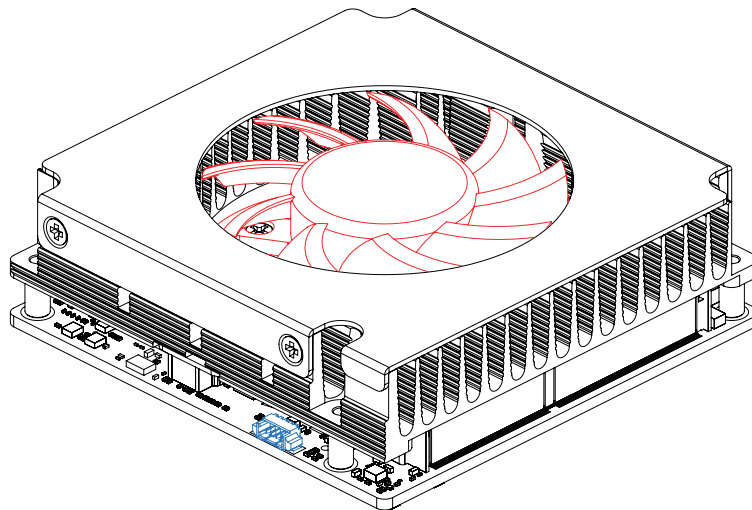


### 3.3 Installing Cooler/Spreader

**Step 1** Use the **two M2.5, Spring+Flat washer, L=6 mm screws** provided to secure the **Cooler/Spreader** to COM Express module.



**Step 2** Connect the **plug of fan** to **CPU FAN Connector**.





# 4

## BIOS AND DRIVER SETTING

### 4.1 BIOS Settings

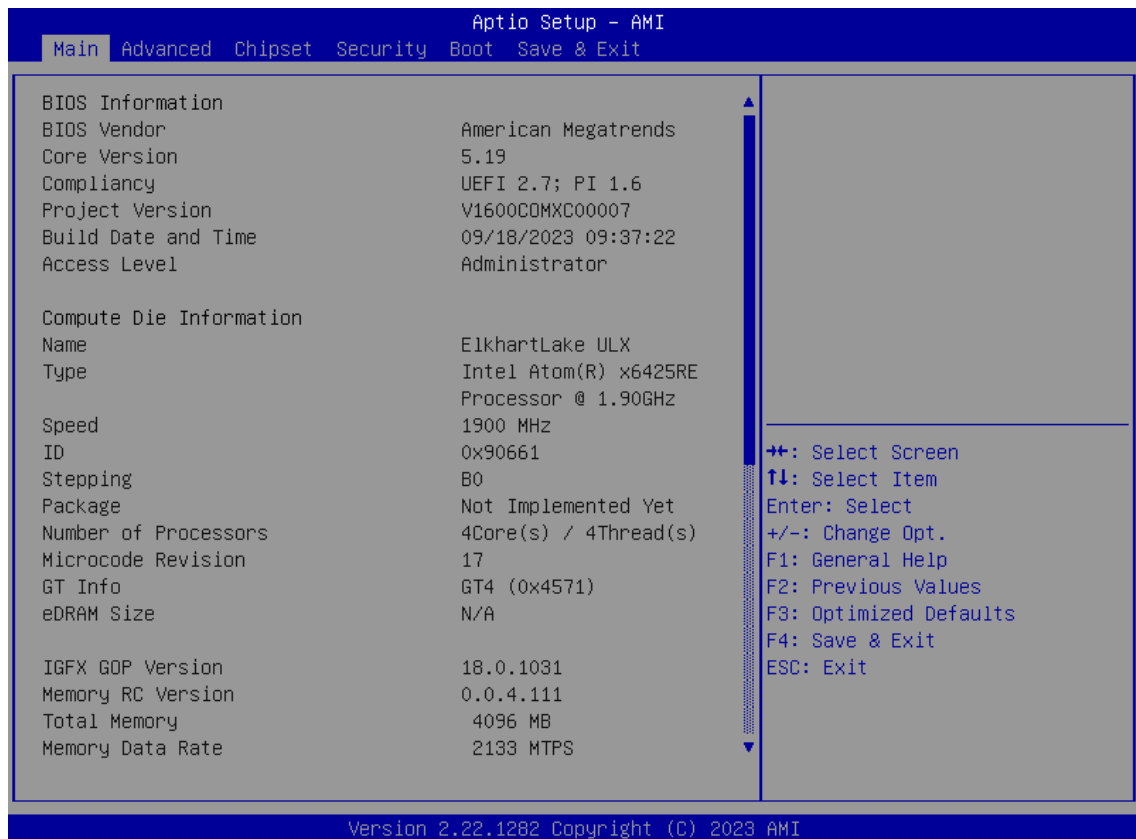


Figure 4-1 : Entering Setup Screen

BIOS provides an interface for users to check and change system configuration. The BIOS setup program is accessed by pressing the <Del> key when POST display output is shown.

## 4.2 Main Menu

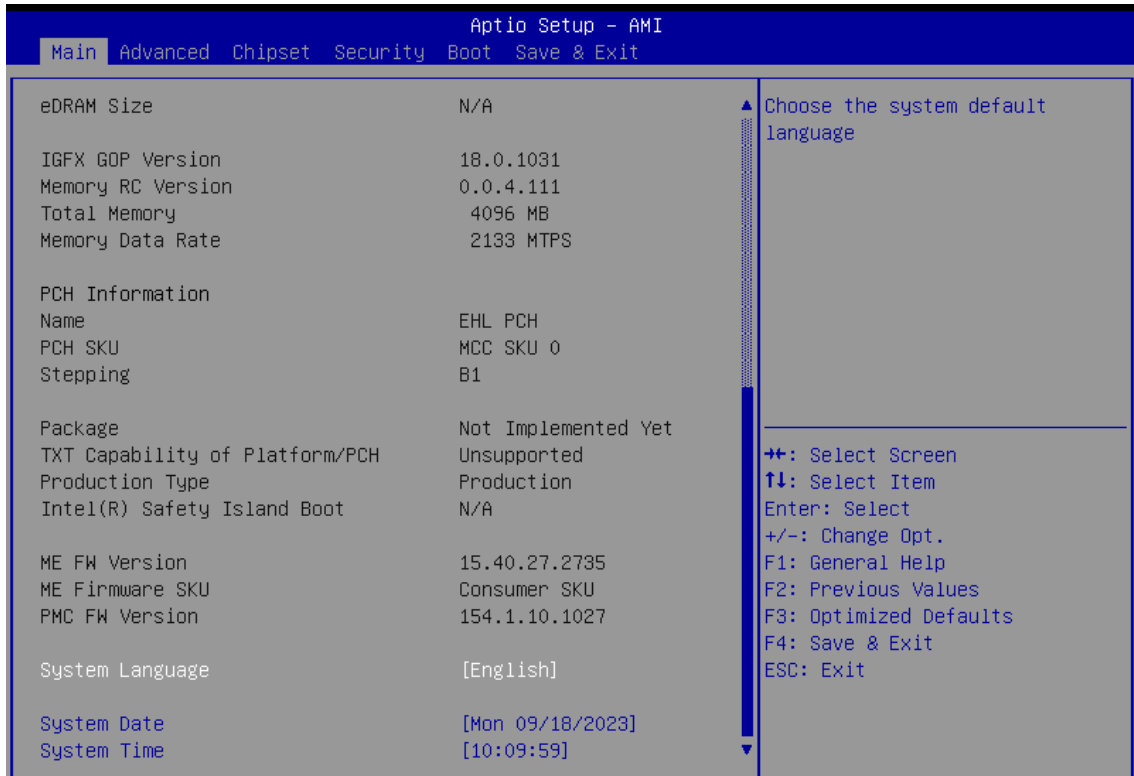


Figure 4-2 : BIOS Main Menu

The main menu displays BIOS version and system information. There are two options on Main menu.

### System Date

Set the date. Use <Tab> to switch between date elements.

### System Time

Set the time. Use <Tab> to switch between time elements.

## 4.3 Advanced Function

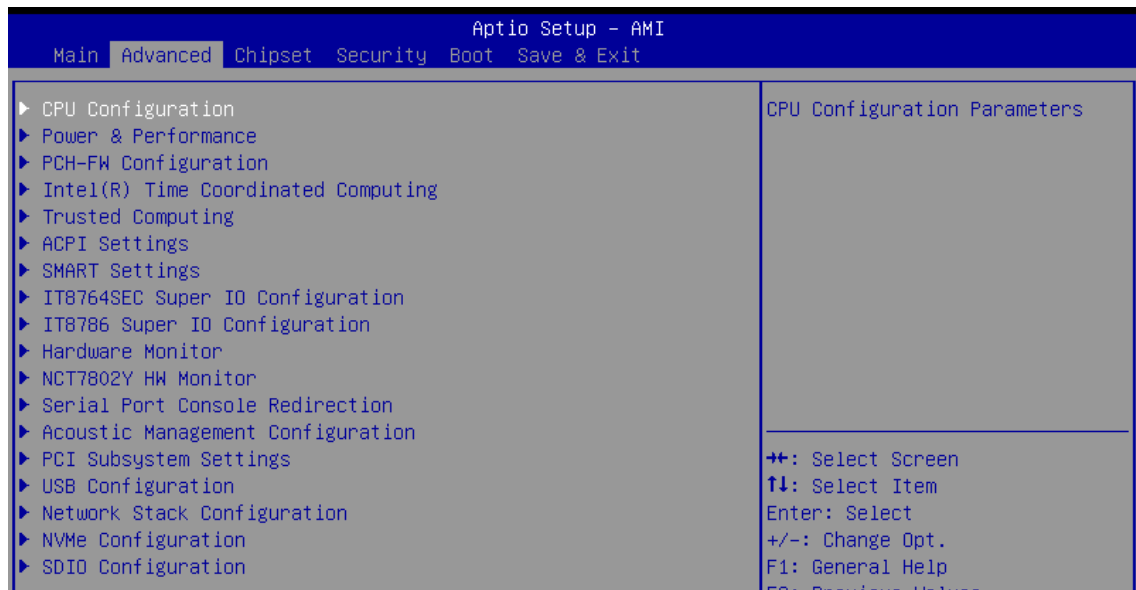


Figure 4-3 : BIOS Advanced Menu

Select advanced tab to enter advanced BIOS setup options, such as CPU configuration, and USB configuration.

### 4.3.1 CPU Configuration

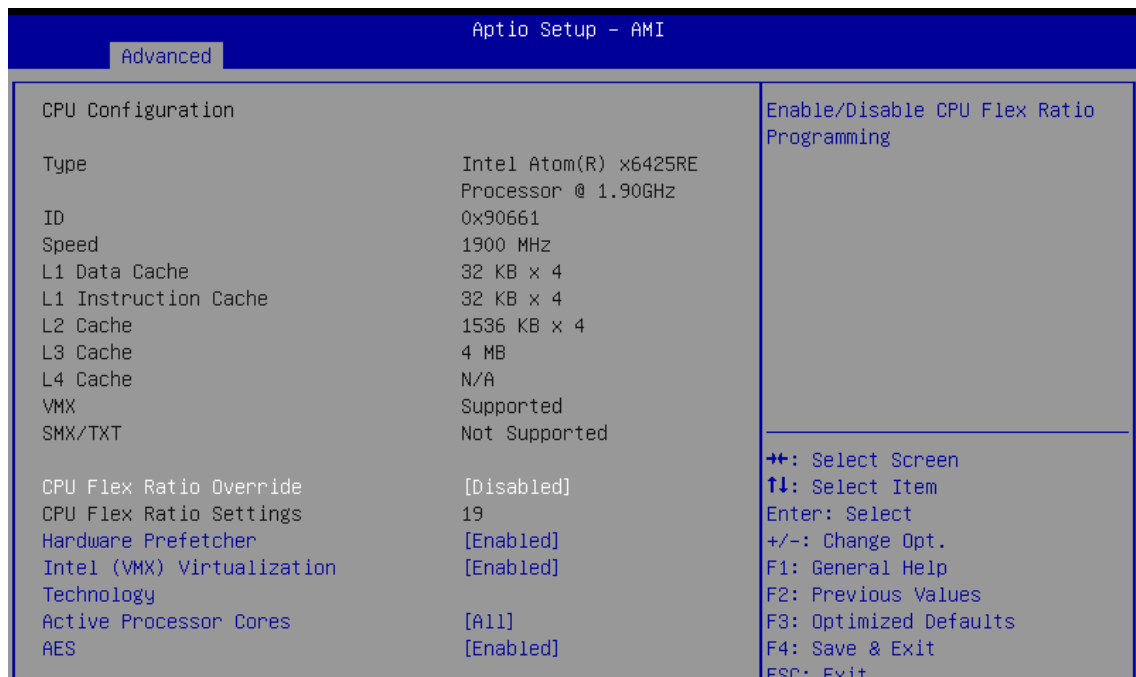


Figure 4-3-1 : CPU Configuration

### CPU Flex Ratio Override

Enable or 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 or off the MLC streamer prefetcher.

### Intel (VMX) Virtualization Technology

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

### Active Processor Cores

Number of cores to enable in each processor package.

### AES

Enable/Disable AES (Advanced Encryption Standard).

## 4.3.2 Power & Performance

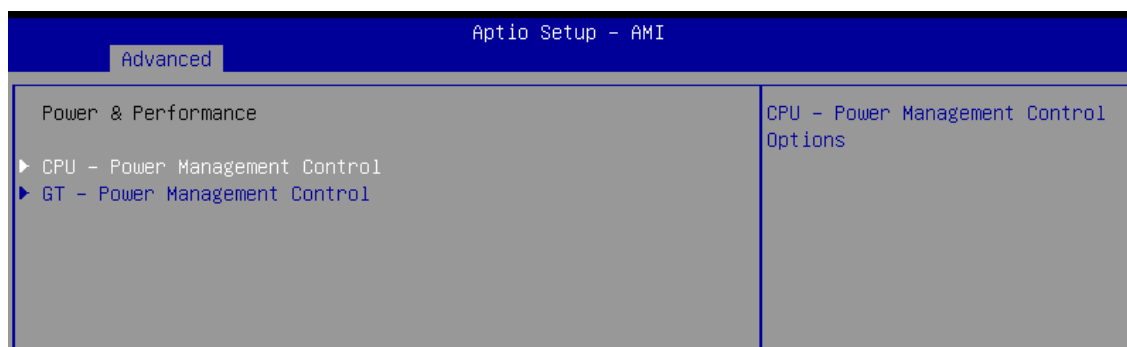


Figure 4-3-2 : Power & Performance

### 4.3.2.1 CPU – Power Management Control

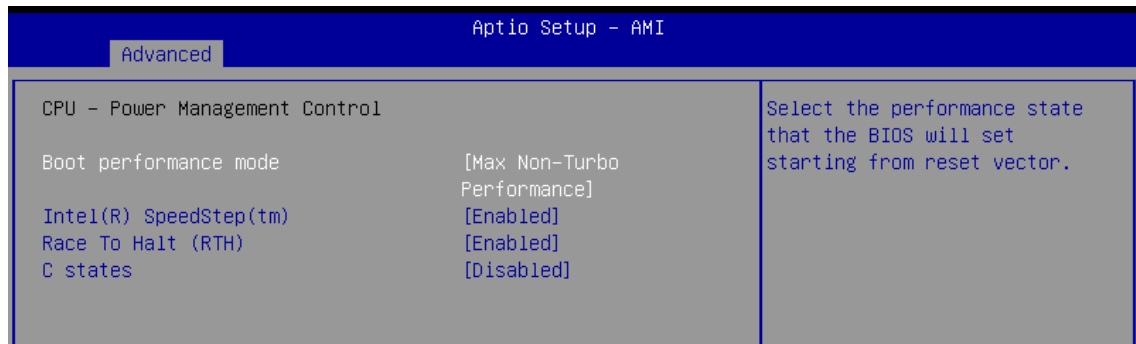


Figure 4-3-2-1 : CPU – Power Management Control

#### Boot performance mode

Select the performance state that the BIOS will set starting from reset vector.

#### Intel(R) SpeedStep(tm)

Allows more than two frequency ranges to be supported.

#### Race To Halt (RTH)

Enable/Disable Race To Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power.

#### C states

Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

### 4.3.2.2 GT – Power Management Control

Aptio Setup – AMI		
Advanced		
GT – Power Management Control		Maximum GT frequency limited by the user. Choose between 200MHz (RPN) and 400MHz (RPO). Value beyond the range will be clipped to min/max supported
Maximum GT frequency	[Default Max Frequency]	
Disable Turbo GT frequency	[Disabled]	

Figure 4-3-2-2 : GT – Power Management Control

#### 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.

### 4.3.3 PCH-FW Configuration

Aptio Setup – AMI		
Advanced		
ME Firmware Version	15.40.27.2785	When Disabled ME will be put into ME Temporarily Disabled Mode.
ME Firmware Mode	Normal Mode	
ME Firmware SKU	Consumer SKU	
ME Firmware Status 1	0x90000255	
ME Firmware Status 2	0x30850106	
ME State	[Enabled]	
ME Unconfig on RTC Clear	[Enabled]	
▶ PTT Configuration		

Figure 4-3-3 : PCH-FW Settings

#### ME State

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

#### ME Unconfig on RTC Clear State

When Disabled ME will not be unconfigured on RTC Clear.

### 4.3.3.1 PTT Configuration

Aptio Setup - AMI		
Advanced		
PTT Capability / State	1 / 0	Selects TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning ! PTT/dTPM will be disabled and all data saved on it will be lost.
TPM Device Selection	[dTPM]	

Figure 4-3-3-1 : PTT Configuration

### TPM Device Selection

Selects TPM device: PTT or discrete TPM.

### 4.3.4 Intel(R) Time Coordinated Computing

Aptio Setup - AMI		
Advanced		
Intel(R) Time Coordinated Computing (Intel(R) TCC)		Enable or Disable Software SRAM. Enable will allocate 1 way of LLC; if Cache Configuration subregion is available, it will allocate based on the subregion.
Software SRAM	[Disabled]	
Data Streams Optimizer	[Disabled]	
Error Log	[Enabled]	
▶ Intel(R) TCC Authentication Menu		
Intel(R) TCC Mode	[Disabled]	
Intel(R) TCC Mode Affected Settings		
IO Fabric Low Latency	[Disabled]	
GT CLOS	[Disabled]	

Figure 4-3-4 : Intel(R) Time Coordinated Computing

### Software SRAM

Enable or Disable Software SRAM.

### Data Streams Optimizer

Enable or Disable Data Streams Optimizer (DSO).

### Error Log

Enable or Disable Error Log.

### Intel(R) TCC Mode

Enable or Disable Intel(R) TCC Mode.

### IO Fabric Low Latency

Enable or Disable IO Fabric Low Latency.

### GT CLOS

Enable or Disable Graphics Technology(GT) Class of Service.

### 4.3.4.1 Intel(R) TCC Authentication Menu



Figure 4-3-4-1 : Intel(R) TCC Authentication Menu

### Intel(R) TCC Authentication

Intel(R) TCC Authentication determines the key to be used. OEM Enrolled Key is built in by OEM. Non-OEM Enrolled Key can be add by user.

### 4.3.5 Trusted Computing



Figure 4-3-5 : Trusted Computing

Control the TPM device status and display related information if TPM chip is present.

### 4.3.6 ACPI Settings

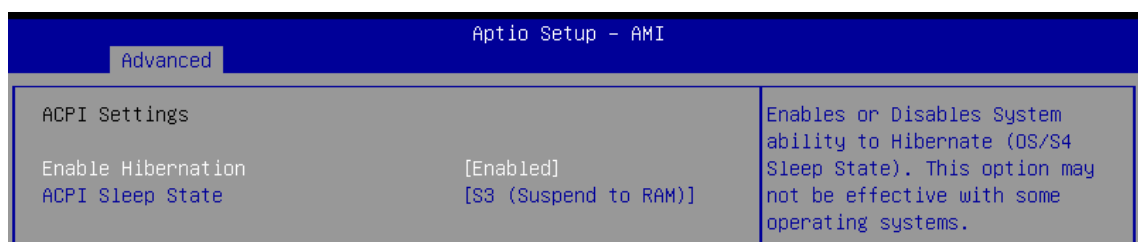


Figure 4-3-6 : ACPI Settings

### Enable Hibernation

Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.

### ACPI Sleep State

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



### 4.3.7 SMART Settings

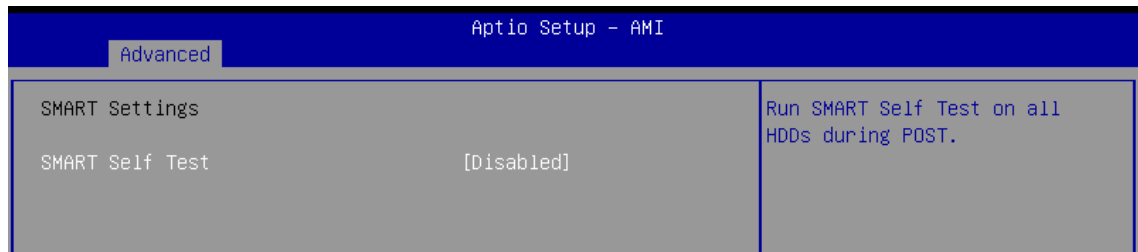


Figure 4-3-7 : SMART Settings

#### SMART Self Test

Run SMART Self Test on all HDDs during POST.

### 4.3.8 IT8764SEC Super IO Configuration



Figure 4-3-8 : IT8764SEC Super IO Configuration



#### IT8764SEC Serial Port 1 to 2 Configuration

Enable or Disable Serial Port (COM).

### 4.3.9 IT8786 Super IO Configuration



Figure 4-3-9 : IT8786 Super IO Configuration

### 4.3.9.1 Serial Port X Configuration

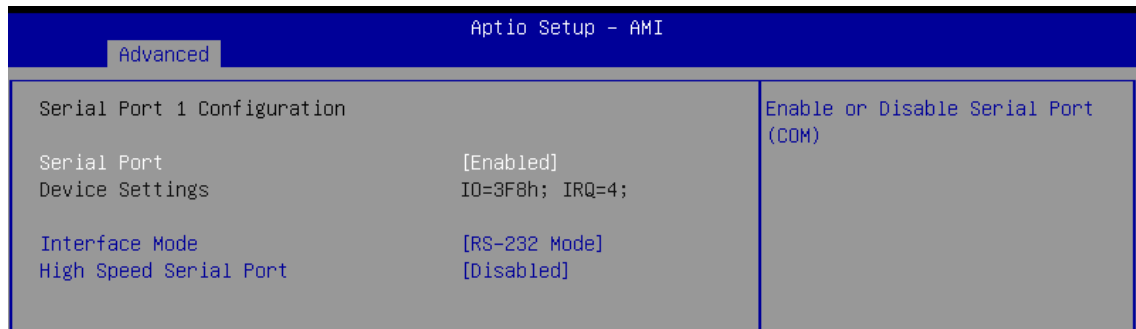


Figure 4-3-9-1 : Serial Port X Configuration

#### Serial Port

Enable or Disable Serial Port (COM).

#### Interface Mode

Serial Port Mode Selection;

RS-232;

RS-422;

RS-485;

Loop Back;

#### High Speed Serial Port

Enable or disable High Speed Serial Port. (Serial Port 1 only)

### 4.3.10 Hardware Monitor

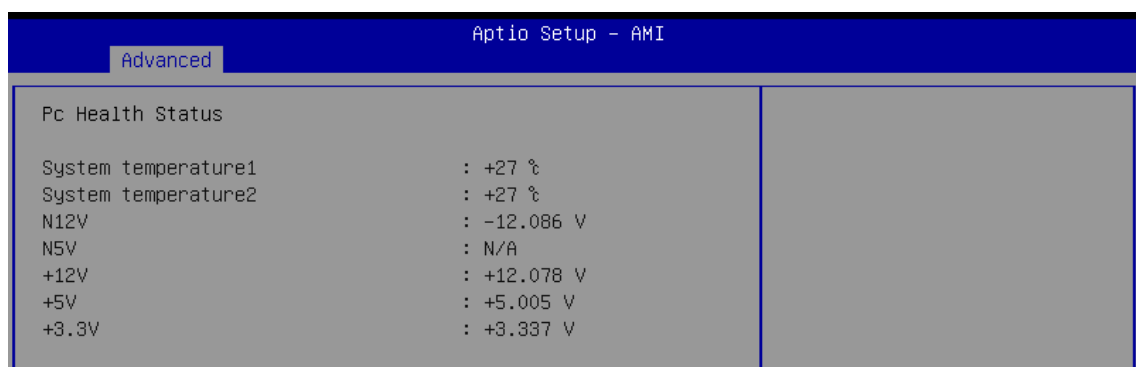


Figure 4-3-10 : Hardware Monitor

The IT8786 SIO features an enhanced hardware monitor providing thermal, and system voltages status monitoring.

### 4.3.11 NCT7802Y HW Monitor

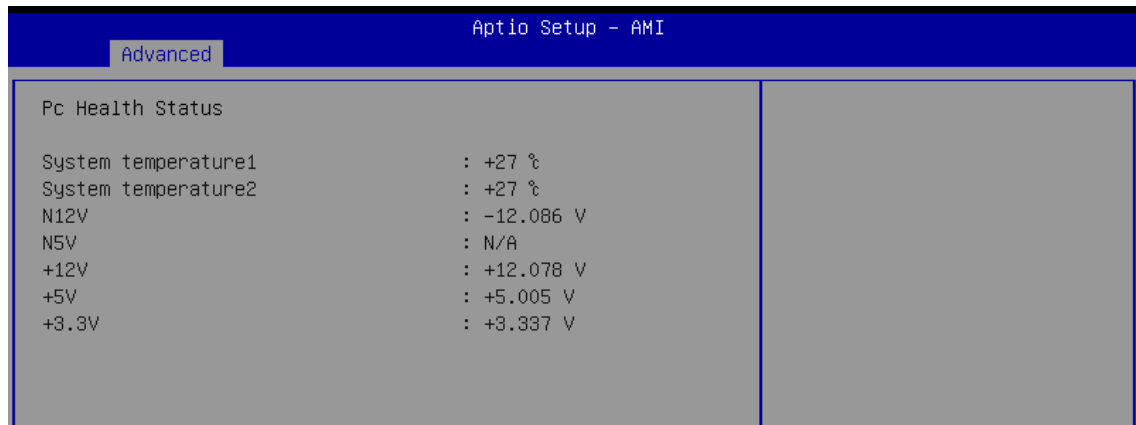


Figure 4-3-11 : NCT7802Y HW Monitor

The NCT7802Y SIO features an enhanced hardware monitor providing thermal, and system voltages status monitoring.

### 4.3.12 Serial Port Console Redirection

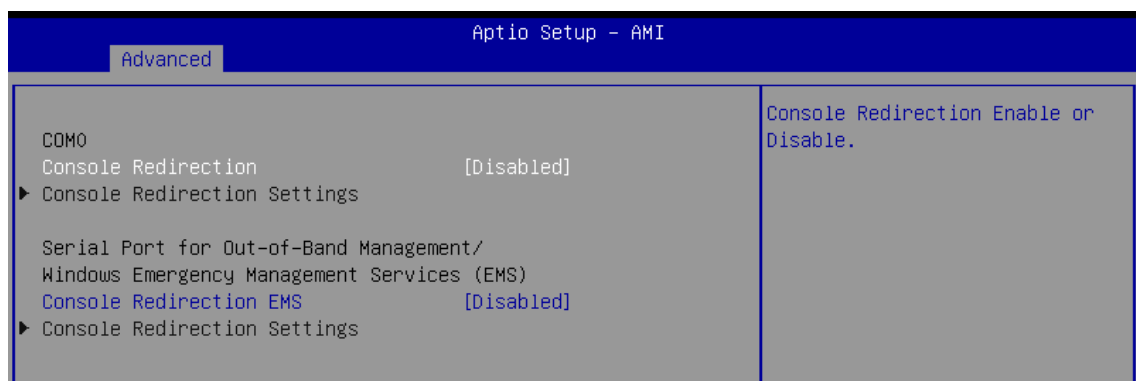


Figure 4-3-12 : Serial Port Console Redirection Settings

#### Console Redirection

Console redirection enable or disable.

#### Console Redirection Settings

These settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

#### Console Redirection EMS

Console redirection enable or disable.

### 4.3.13 Acoustic Management Configuration

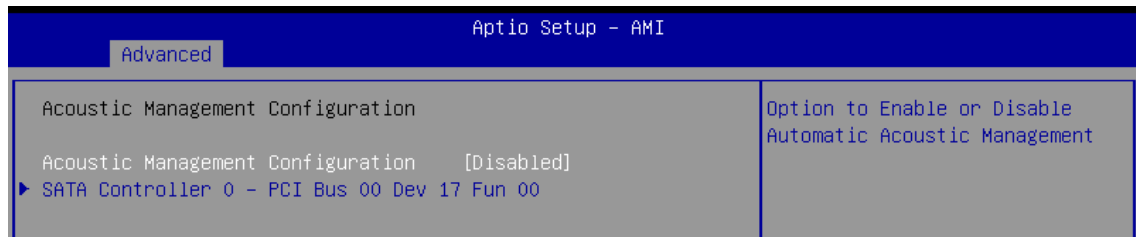


Figure 4-3-13 : Acoustic Management Settings

#### Acoustic Management Configuration

Option to enable or disable automatic acoustic management.

### 4.3.14 PCI Subsystem Setting

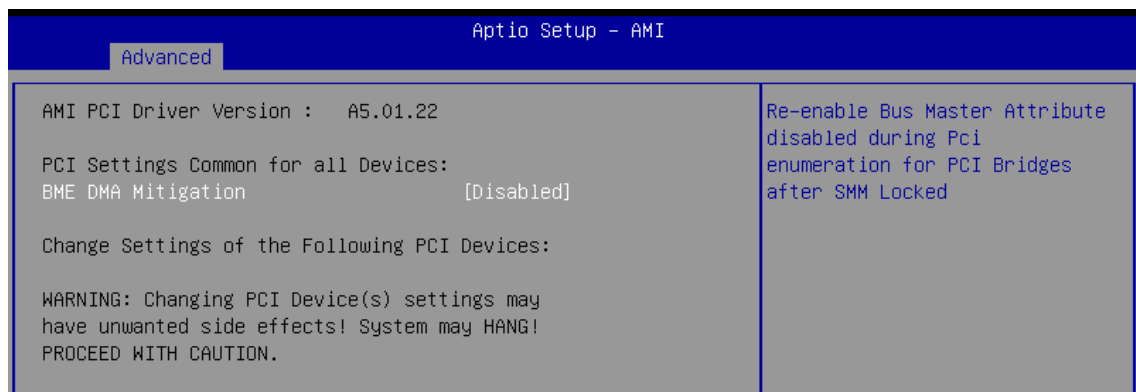


Figure 4-3-14 : PCI Subsystem Settings

#### BME DMA Mitigation

Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked.

### 4.3.15 USB Configuration

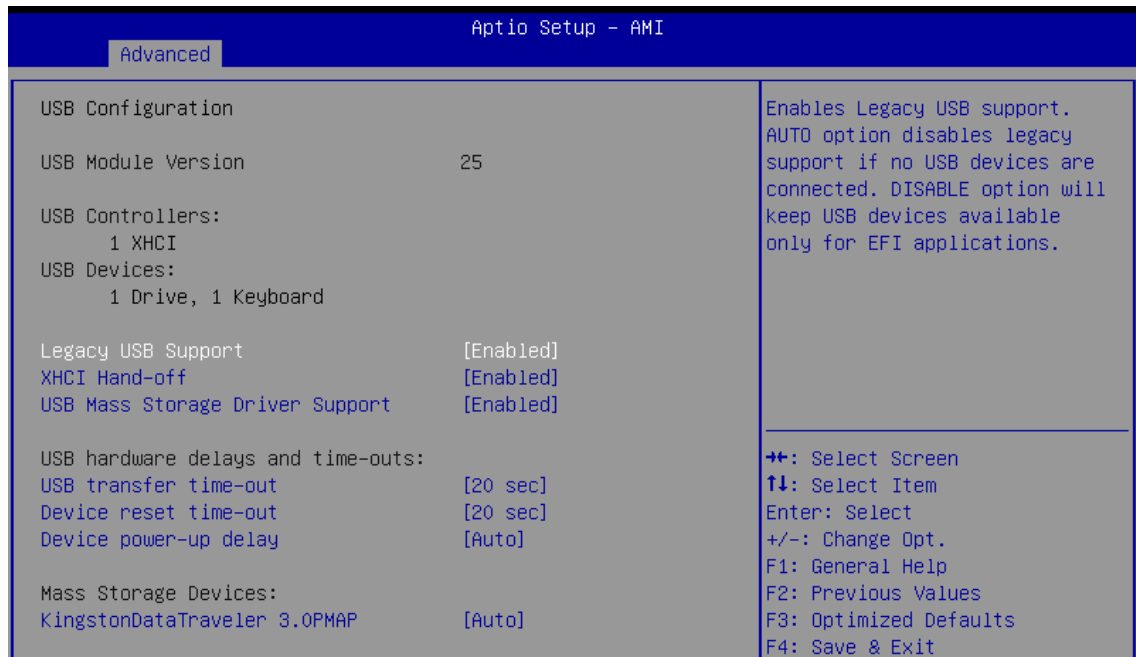


Figure 4-3-15 : USB Settings

#### Legacy USB Support

Enables Legacy USB support.

AUTO option disables Legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

#### XHCI Hand-off

This is a workaround for Oses without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

#### USB Mass Storage Driver Support

Enable/disable USB mass storage driver support.

#### 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. 'Auto' uses default value, for a root port it is 100 ms, for a hub port the delay is taken from the hub descriptor.

### 4.3.16 Network Stack Configuration

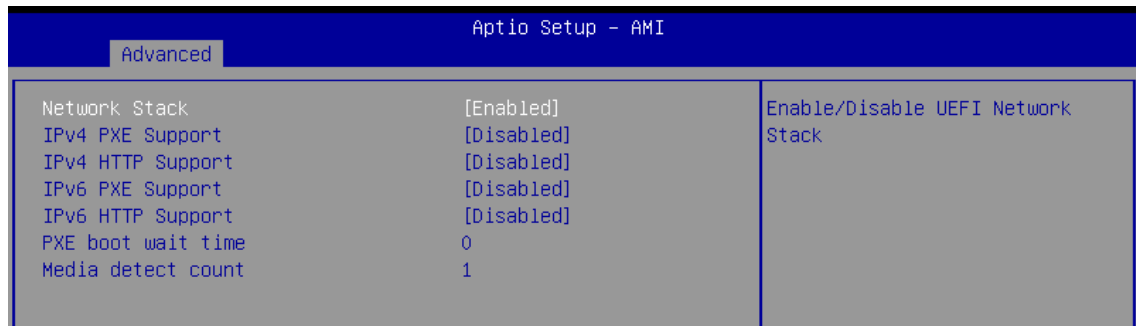


Figure 4-3-16 : Network Stack Settings

#### Network Stack

Enable/Disable UEFI Network Stack

#### Ipv4 PXE Support

Enable/Disable IPv4 PXE boot support.

#### Ipv4 HTTP Support

Enable/Disable IPv4 HTTP boot support.

#### Ipv6 PXE Support

Enable/Disable IPv6 PXE boot support.

#### Ipv6 HTTP Support

Enable/Disable IPv6 HTTP boot support.

#### PXE boot wait time

Wait time to press ESC key to abort the PXE boot.

#### Media detect count

Number of times presence of media will be checked.

### 4.3.17 NVMe Configuration



Figure 4-3-17 : NVMe Settings

Display NVMe controller and Drive information.

### 4.3.18 SDIO Configuration

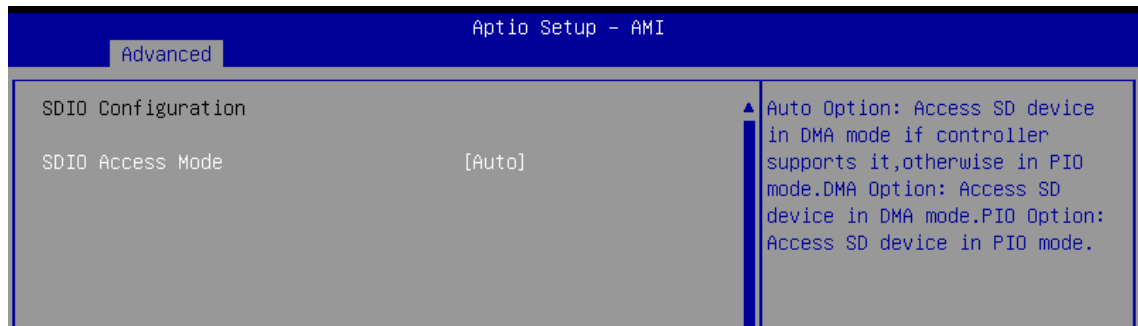


Figure 4-3-18 : SDIO Configuration

#### SDIO Access Mode

Auto Option: Access SD device in DMA mode if controller supports it , otherwise in PIO mode.

### 4.3.19 Intel(R) Ethernet Controller I225-IT

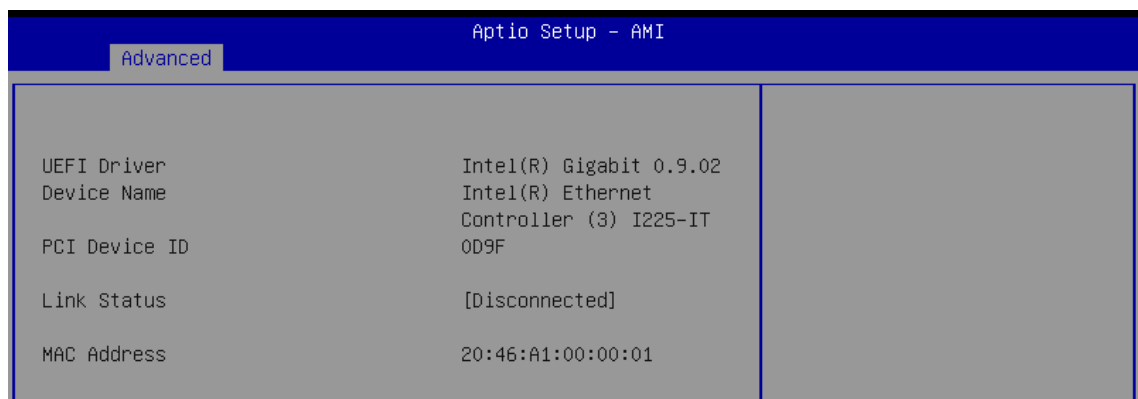


Figure 4-3-19 : Intel(R) Ethernet Controller I225-IT

Configure Gigabit Ethernet device parameters.

### 4.3.20 Driver Health

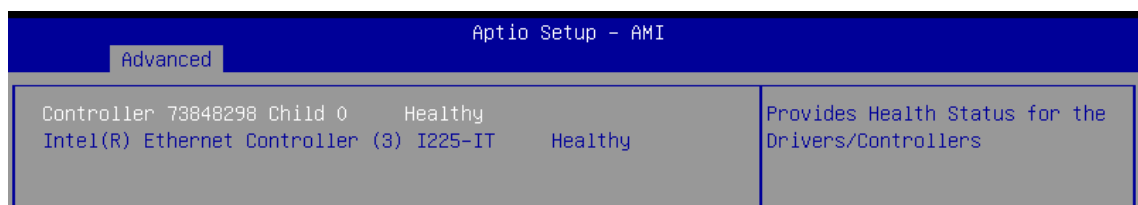


Figure 4-3-20 : Driver Health

Configure Gigabit Ethernet device parameters.

## 4.4 Chipset Function

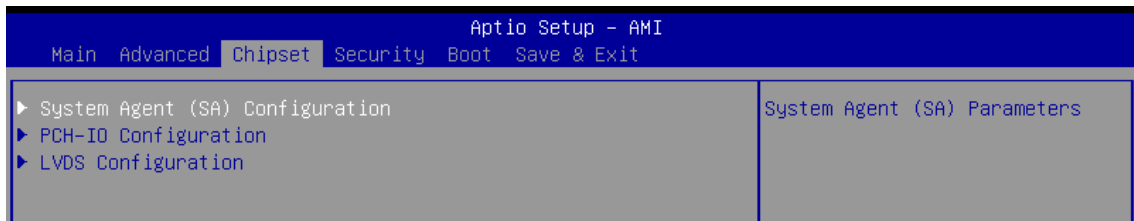


Figure 4-4 : Chipset Function

### System Agent (SA) Configuration

System Agent (SA) parameters.

### PCH-IO Configuration

PCH parameters.

### LVDS Configuration

LVDS Configuration.

### 4.4.1 System Agent (SA) Configuration

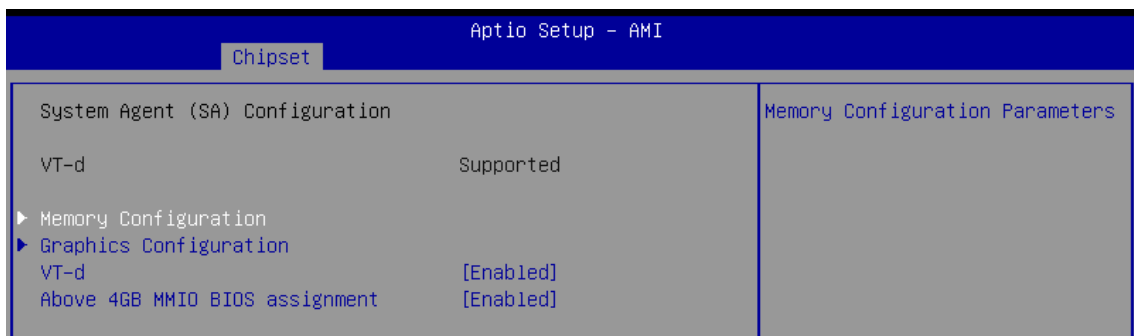


Figure 4-4-1 : System Agent Settings

#### VT-d

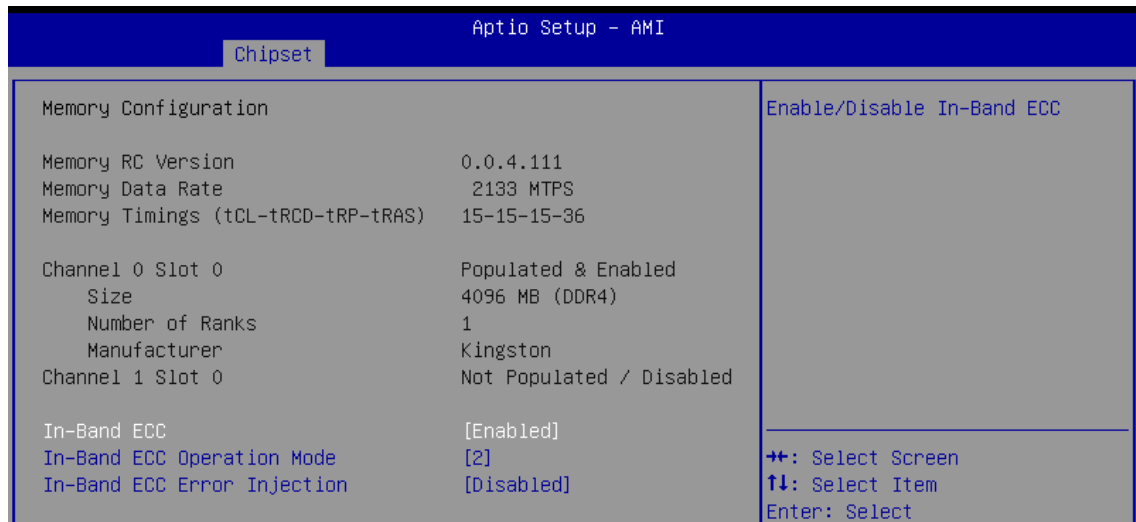
VT-d capability.

#### Above 4GB MMIO BIOS assignment

Enable/disable above 4GB MemoryMappedIO BIOS assignment. This is disabled automatically when aperture size is set to 2048MB.



### 4.4.1.1 Memory Configuration



The screenshot shows the 'Chipset' menu in the Aptio Setup - AMI BIOS. The 'Memory Configuration' section is expanded, displaying the following information:

Memory Configuration		Enable/Disable In-Band ECC
Memory RC Version	0.0.4.111	
Memory Data Rate	2133 MTPS	
Memory Timings (tCL-tRCD-tRP-tRAS)	15-15-15-36	
Channel 0 Slot 0	Populated & Enabled	
Size	4096 MB (DDR4)	
Number of Ranks	1	
Manufacturer	Kingston	
Channel 1 Slot 0	Not Populated / Disabled	
In-Band ECC	[Enabled]	
In-Band ECC Operation Mode	[2]	←←: Select Screen
In-Band ECC Error Injection	[Disabled]	↑↓: Select Item
		Enter: Select

Figure 4-4-1-1 : Memory Information

#### In-Band ECC

Enable/Disable In-Band ECC.

#### In-Band ECC Operation Mode

- 0: Functional Mode protects requests based on the address range.
- 1: Makes all requests non protected and ignore range checks.
- 2: Makes all requests protected and ignore range checks.

#### In-Band ECC Error Injection

By enabling this Error Injection Enabling feature, the user acknowledges the security risks.

## 4.4.1.2 Graphics Configuration

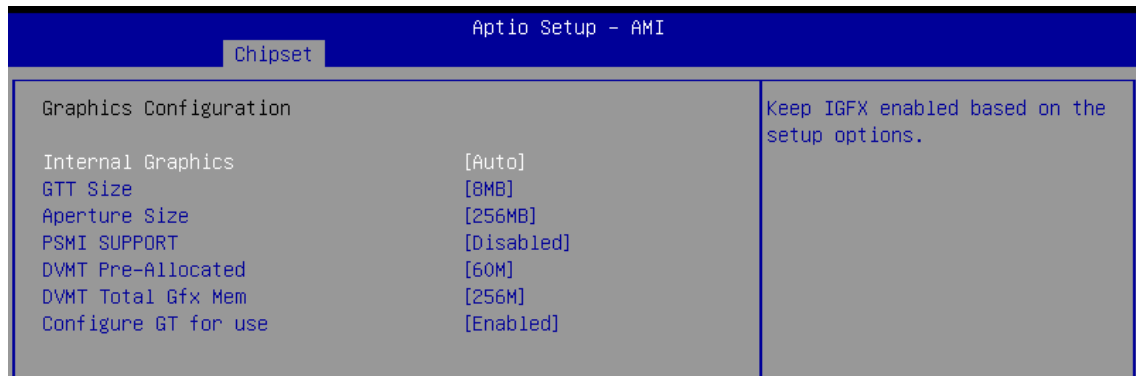


Figure 4-4-1-2 : Graphics Settings

### Internal graphics

Keep IGFX enabled based on the setup options.

### GTT Size

Select the GTT Size.

### Aperture Size

Select the Aperture Size.

Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

### PSMI SUPPORT

PSMI Enable/Disable.

### DVMT Pre-Allocated

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

### DVMT Total Gfx Mem

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

### Configure GT for use

Enable/Disable GT configuration in BIOS.

## 4.4.2 PCH-IO Configuration

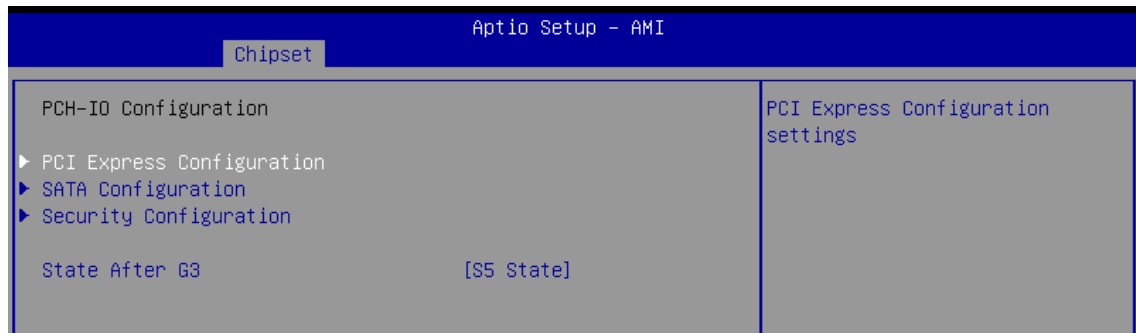


Figure 4-4-2 : PCH-IO Settings

### State After G3

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

S0 State: Always turn-on the system when power source plugged-in.

S5 State: Always turn-off the system when power source plugged-in.

### 4.4.2.1 PCI Express Configuration

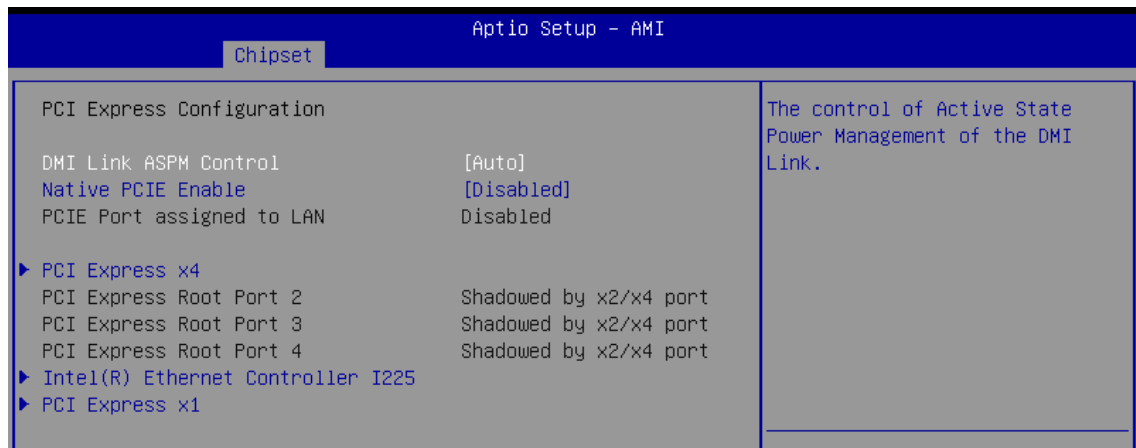


Figure 4-4-2-1 : PCI Settings

#### DMI Link ASPM Control

The control of Active State Power Management of the DMI Link.

#### Native PCIE Enable

PCIE Express Native Support Enable/Disable.

#### PCI Express device settings

Bios options for PCI Express device setting.

## 4.4.2.2 SATA Configuration

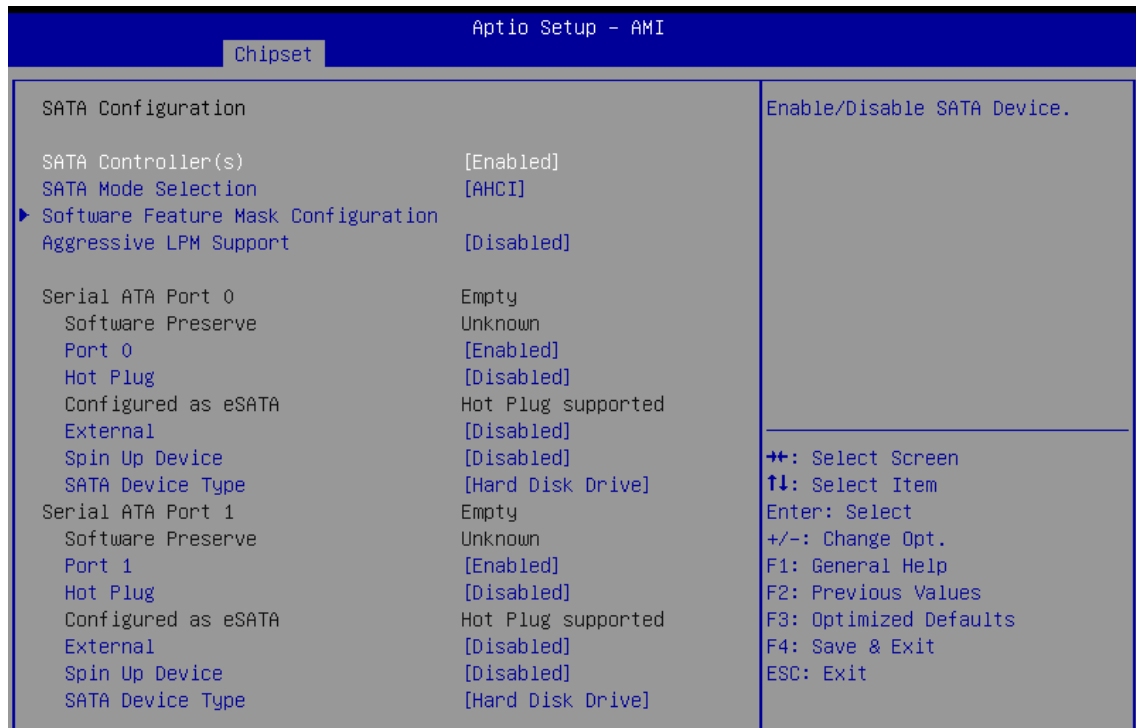


Figure 4-4-2-2 : SATA Configuration

### SATA Controller(s)

Enable or disable SATA Device.

### SATA Mode Selection

Determines how SATA controller(s) operate.

### Software Feature Mask Configuration

RST Legacy OROM/RST UEFI driver will refer to the SWFM configuration to enable or disable the storage features.

### Aggressive LPM Support

Enable PCH to aggressively enter link power state.

### Options for each SATA port :

#### Port n

Enable or disable SATA Port.

#### Hot Plug

Designated this port as Hot Pluggable.

#### External

Marks this port as external.

#### Spin Up Device

If enabled for any of ports Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

#### SATA Device Type

Identifies that the SATA port is connected to Solid State Drive or Hard Disk Drive.

### 4.4.2.3 Security Configuration

Aptio Setup - AMI		
Chipset		
Security Configuration		Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
BIOS Lock	[Enabled]	
Force unlock on all GPIO pads	[Disabled]	

Figure 4-4-2-3 : Security Settings

#### 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.

### 4.4.3 LVDS Configuration

Aptio Setup - AMI		
Chipset		
LCD Resolution Control		Select LCD Panel Resolution
LCD Panel Type	[1024x768 LVDS]	800x600-NLB104SV01L-01 1024x600 LVDS 1024x768-TM150TDSG70 V1.3 1280x800-G101EVN01.0 1280x1024 LVDS

Figure 4-4-3 : LVDS Configuration

#### LCD Panel Type

Select LCD Panel Resolution.

## 4.5 Security Function

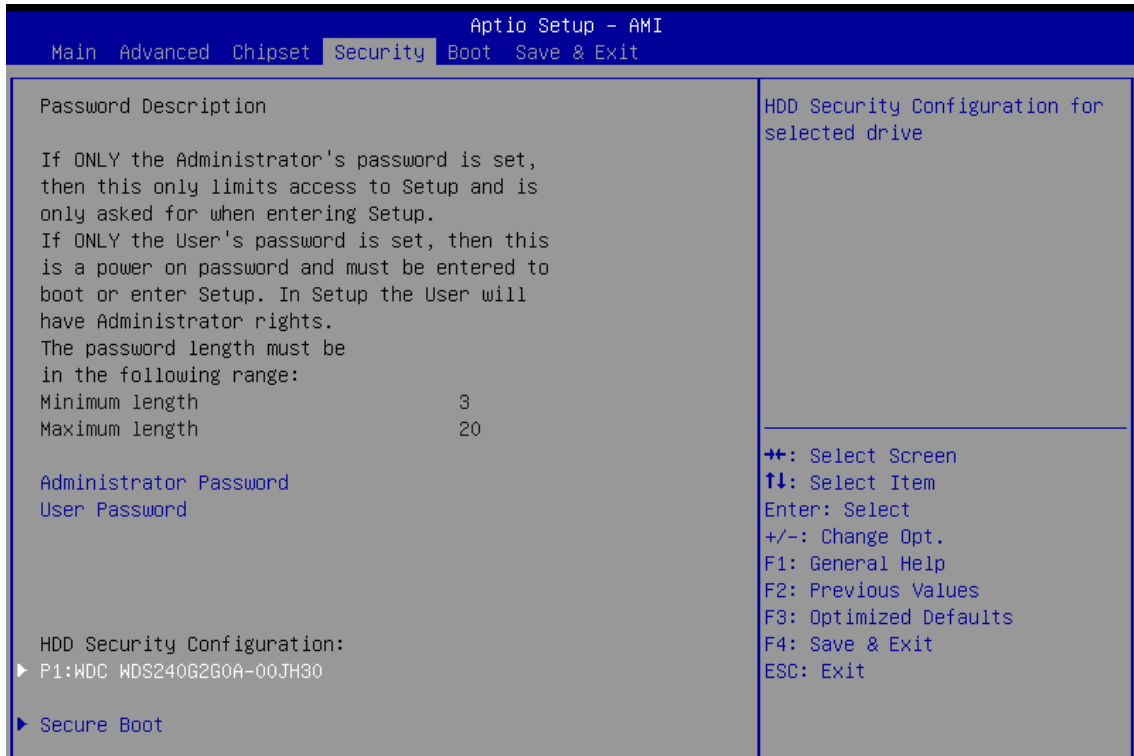


Figure 4-5 : BIOS Security Menu

### Administrator Password

Set administrator password.

### User Password

Set user password.

### Secure Boot

Secure Boot configuration.

## 4.5.1 HDD Security Configuration

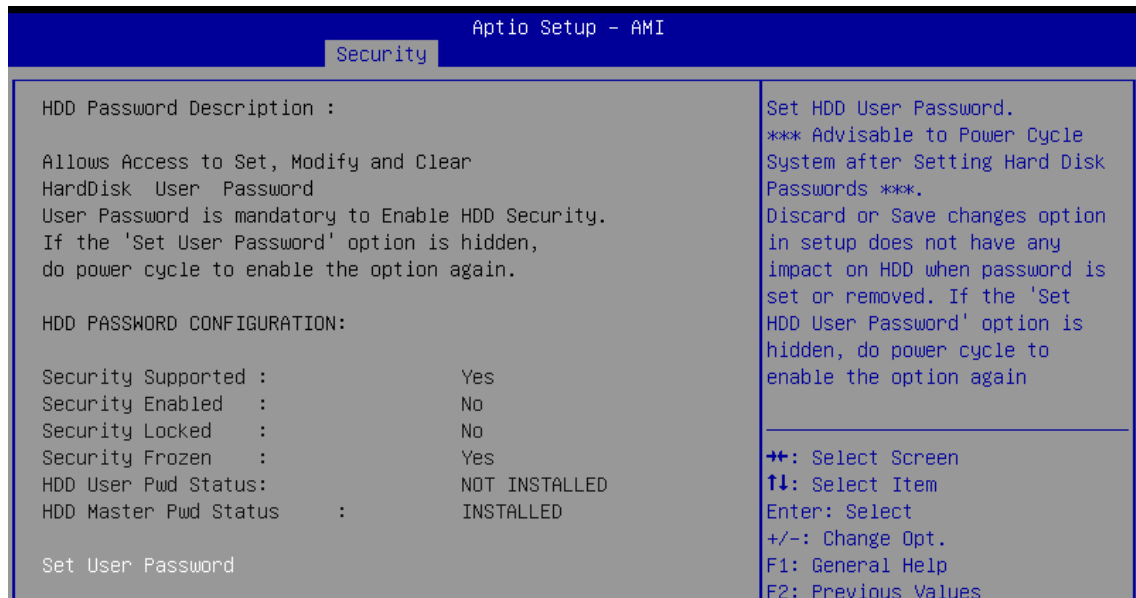


Figure 4-5-1 HDD Security Configuration.BMP

### Set User Password

Set HDD User Password.

\*\*\* Advisable to Power Cycle System after Setting Hard Disk Passwords \*\*\*.

Discard or Save changes option in setup does not have any impact on HDD when password is set or removed. If the 'Set HDD User Password' option is hidden, do power cycle to enable the option again.

## 4.5.2 Security Boot



Figure 4-5-2 : Secure Boot

### Secure Boot

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

### Secure Boot Mode

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

### Restore Factory Keys

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

### Reset To Setup Mode

Delete all Secure Boot key databases from NVRAM.

### Key Management

Enables expert users to modify Secure boot policy variables without full authentication.



## 4.6 Boot Function

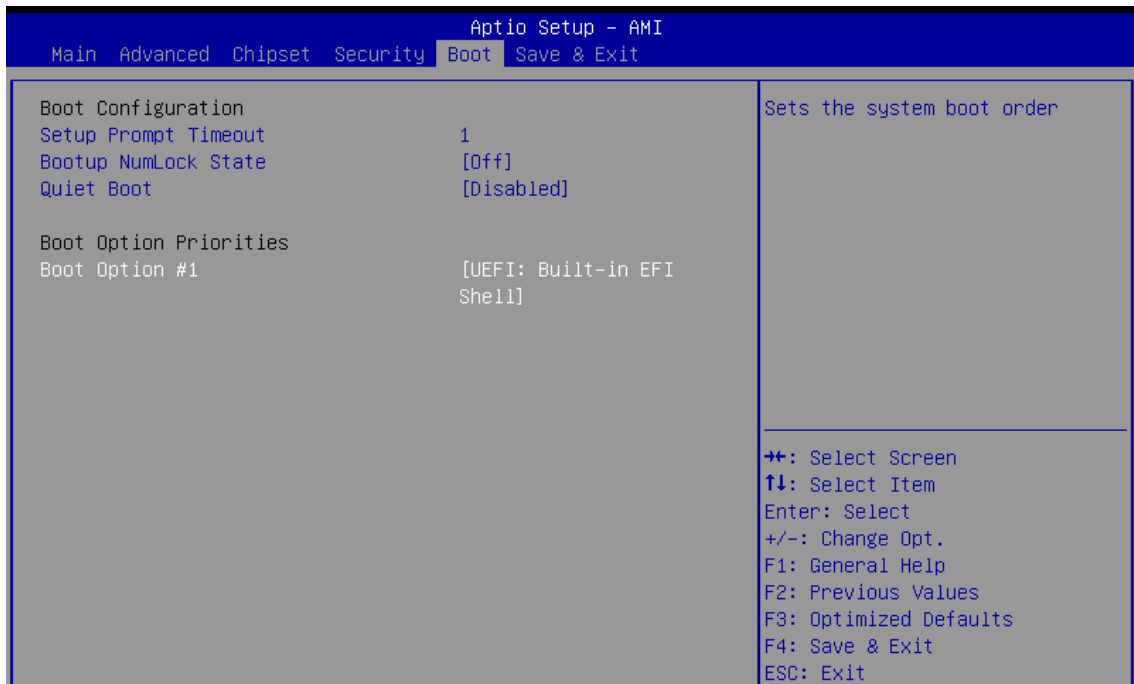


Figure 4-6 : BIOS Boot Menu

### 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 Quiet Boot option.

### Boot Option

Sets the system boot order.

## 4.7 Save & Exit

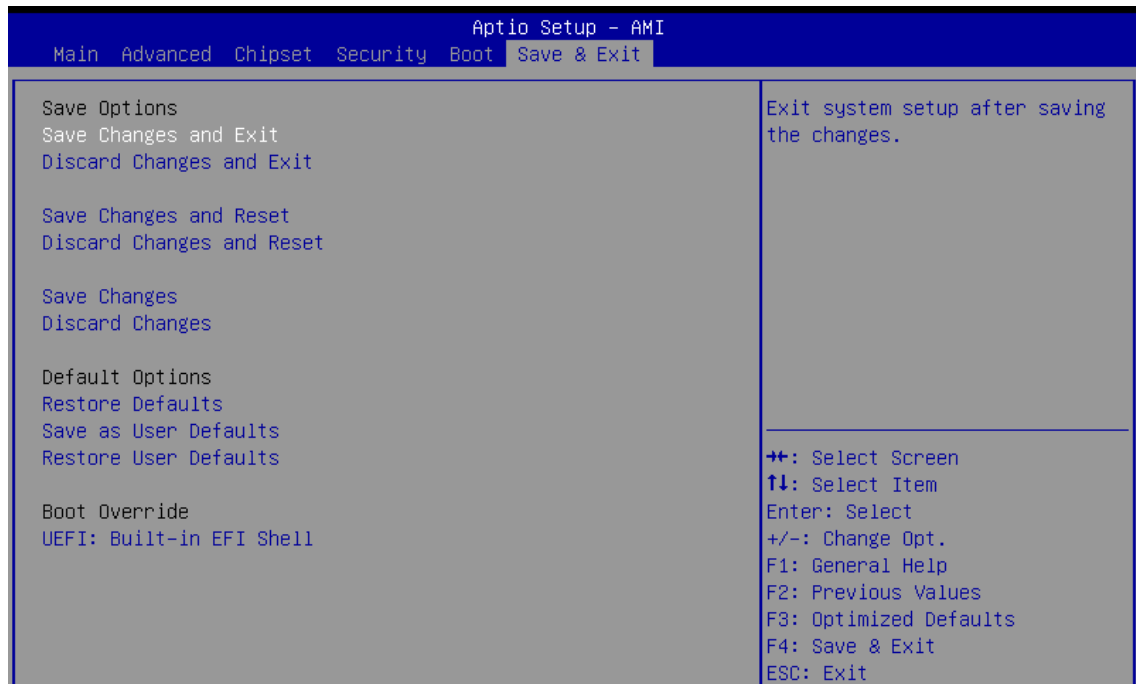


Figure 4-7 : BIOS Save and Exit Menu

### 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

Save the changes done so far as User Defaults.

### Restore User Defaults

Restore the User Defaults to all the setup options

# A

## APPENDIX A : GPIO Guide (with VCOM-BASE)

### A.1 Function Description

The VCOM-1600 offers a 8bit Non-Isolated DIO(GPIO) 4DI/4D , and a watchdog timer. Paired with VCOM-Base carrier board ,GPIO definition is shown below:

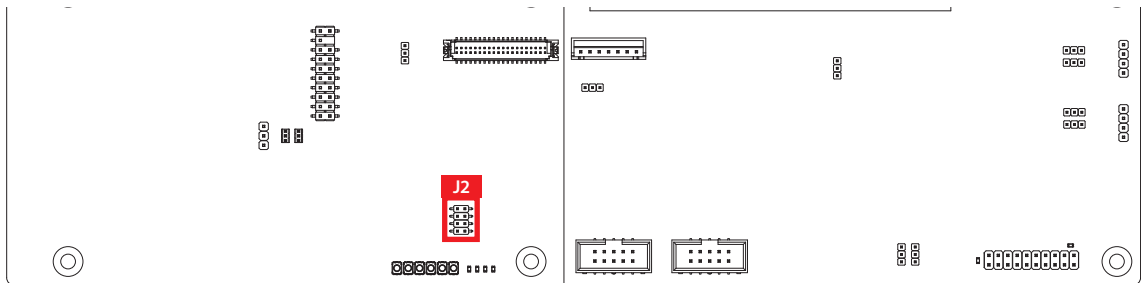


Figure A-1: VCOM Base GPIO definition

Pin No.	GPIO Definition	Pin No.	GPIO Definition
1	GPI0	2	GPO 0
3	GPI1	4	GPO 1
5	GPI2	6	GPO 2
7	GPI3	8	GPO 3

## A.2 Software Package contain

Distribution folder include x32 and x64 versions, use batch file for installation.

There are included as followed :

Win10\_32.bat, and Win10\_64.bat:

Installation for driver, and

Uninstall\_32.bat, and Uninstall\_64.bat:

Uninstallation for driver

Run batch file as Administrator.

- Distribution
- Header
- Manual
- Sample
- Source
- 📄 Uninstall\_32.bat
- 📄 Uninstall\_64.bat
- 📄 Win10\_32.bat
- 📄 Win10\_64.bat

Make sure Windows version before installation.

Header folder include head file for software developer or System Integration.

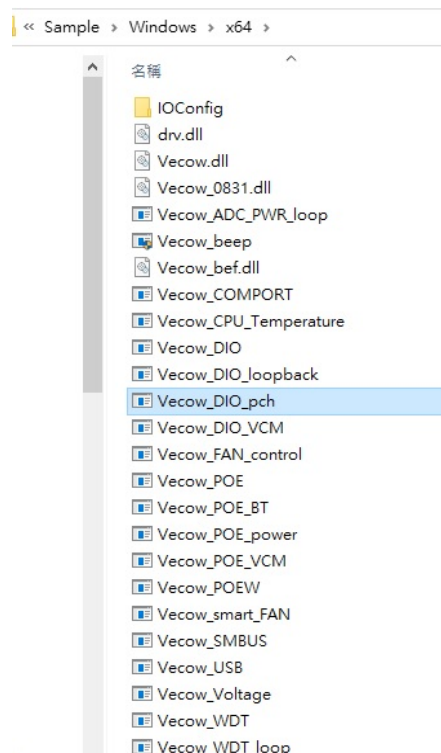
Manual folder include API description.

Sample folder include sample program, driver library, and API library for Windows/Linux.

Source folder include sample program source code that compile on Visual Studio 2008/ ubuntu16.04.

## A.3 Sample

Execute demo tool(Vecow\_DIO\_pch).



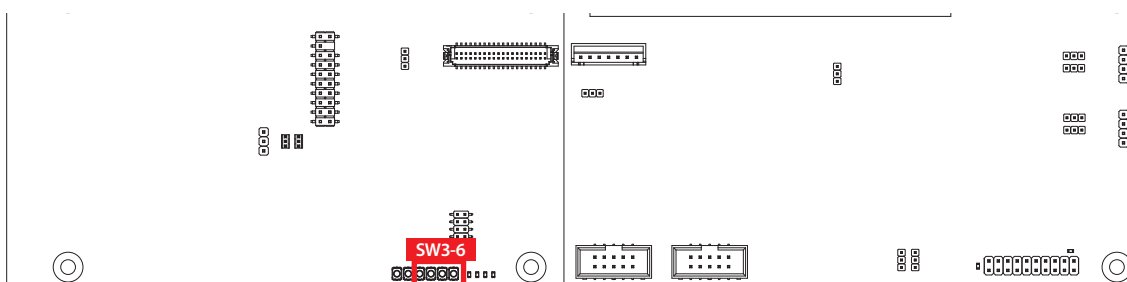
### A.3-1 Select the GPIO direction of sample control

```
選取 C:\Users\aaa\Desktop\VecowHWMSample_v1.5.0410 - Copy\Sample\Windows\x64\Vecow_DIO_pch.exe
DIO sample version : v1.1.0406
Load Vecow.dll at least v1.1.0914
Vecow.dll Version : v1.31.0914.0000
Choose GPIO IN/OUT : (0/1) _
```

### A.3-2 Selecting GPIO IN will get the data status

```
選取 C:\Users\aaa\Desktop\VecowHWMSample_v1.5.0410 - Copy\Sample\Windows\x64\Vecow_DIO_pch.exe
DIO sample version : v1.1.0406
Load Vecow.dll at least v1.1.0914
Vecow.dll Version : v1.31.0914.0000
Choose GPIO IN/OUT : (0/1) 0
MACHINE_SERIES: V1600
Get Data=0xf
```

With the carrier board buttons SW3(GPI0)~SW6(GPI3),different states can be read.

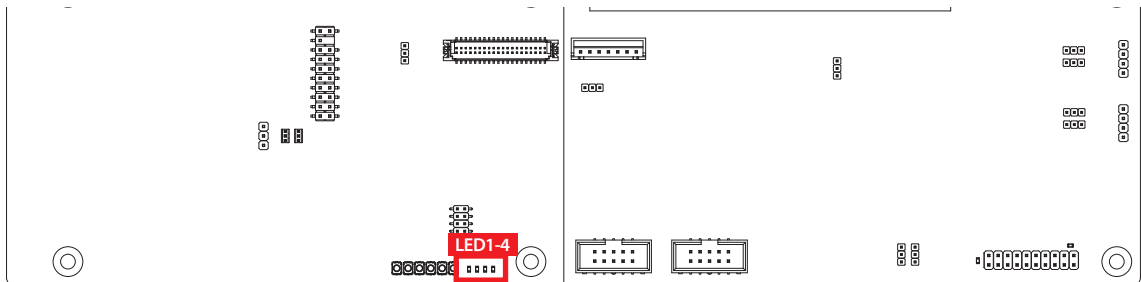


```
C:\Users\aaa\Desktop\VecowHWMSample_v1.5.0410 - Copy\Sample\Windows\x64\Vecow_DIO_pch.exe
DIO sample version : v1.1.0406
Load Vecow.dll at least v1.1.0914
Vecow.dll Version : v1.31.0914.0000
Choose GPIO IN/OUT : (0/1) 0
MACHINE_SERIES: V1600
Get Data=0xe
```

### A.3-3 Selecting GPIO OUT will set pin state

```
C:\Users\aaa\Desktop\VecowHWMSample_v1.5.0410 - Copy\Sample\Windows\x64\Vecow_DIO_pch.exe
DIO sample version : v1.1.0406
Load Vecow.dll at least v1.1.0914
Vecow.dll Version : v1.31.0915.0000
Choose GPIO IN/OUT : (0/1) 1
Choose GPIO output port : (0~3, 4 = All port) 1
Set GPIO output status : (0/1)(L/H) 0
```

With the carrier board LED1(GPO0)~LED4(GPO3),set do lo state,LED will light up.



# B

## APPENDIX B : POWER CONSUMPTION (WITH VCOM-BASE)

Testing Board	VCOM-1600 (with VCOM-BASE)
RAM	32GB * 2
USB-1	USB Keyboard Microsoft Wired Keyboard 600
USB-2	USB Mouse Logitech M105
SATA 0	Apacer AS340X 120GB SSD
Graphics Output	DP
Power Plan	Balance (Windows10 Power plan)
Power Source	CHANNEL WELL RPG600E-G 600W

## B.1 Intel® Atom® x6425RE 1.90 GHz (1.5M Cache)

CPU	Power Input	+12V		+5V		+5VSB	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
Intel Atom x6425RE	ATX	1.715A	20.58W	0.208A	01.04W	0.179A	00.90W

CPU	Power Input	+3.3V	
		Max Current	Max Consumption
Intel Atom x6425RE	ATX	0.123A	00.41W





## APPENDIX C : SUPPORTED MEMORY

### C.1 Test Item

Testing Board	VCOM-1600
Memory Test	MemTest86 V10.6 Build 2000
BurnInTest	BurnInTest Pro V10.2 (build 1006)

Channel	Memory Test	Burn-in Test	Sleep	Hibernate	Reset	OS internal info
(DIMM0+DIMM1)	PASS	PASS	PASS	PASS	PASS	PASS

## C.2 Supported Non-ECC Memory List

Brand	Info	Test Temp. (Celsius)
MEMXPRO 16GB DDR4-2666 SODIMM	D4S-AG26H1G8W2	25°C
SAMSUNG 8GB DDR4-3200 SODIMM	M471A1K43EB1-CWE	25°C
SAMSUNG 16GB DDR4-3200 SODIMM	M471A2K43EB1-CWE	25°C
SLLINK 32GB DDR4-3200 SODIMM	J4BGSH2G8TMFC	25°C

## C.3 Supported ECC Memory List

Brand	Info	Test Temp. (Celsius)
Transcend 8GB DDR4-3200 ECC SODIMM	TS1GSH72V2B3	25°C

## C.4 Supported Storage List

Type	Brand	Model	Capacity
SATA SSD	Kingston	SA400S371120G	120GB
	Apacer	AS340X	120GB
	FORESEE	S903S128G	128GB
	SAMSUNG	860 EVO MZ-76E250	250GB
	MEMXPRO	ET30	256GB
	MEMXPRO	PT31	256GB
	FORESEE	S903S256G	256GB

\*\* If more help is needed, please contact Vecow technical support \*\*



For further support information, please visit [www.vecow.com](http://www.vecow.com)

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