

EC0-1818-C236

C236 ATX Platform Embedded

PC Motherboard

Version: C00

Legal Information

Warnings

Please pay attention to the tips within the manual so as to avoid personal injury or property losses. The tips for personal injury are indicated in warning triangles while the tips only related to property losses have no warning triangles. The warning tips are listed as follows with the hazardous scale from severe to slight.

 Danger

If handled carelessly, death or severe human injury will occur.

 Warning
--

If handled carelessly, death or severe human injury might occur.
--

 Caution
--

Warning triangle indicates that slight human injury might occur if handled carelessly.
--

Note

Unexpected result or status might occur, if not handled according to the tips.
--

Professional Personnel

The product/system covered by the manual can only be handled by qualified and professional personnel. During operation, please follow the respective instructive manuals, especially the safety warnings. The professional personnel have been trained and possess relevant experiences; therefore, he/she could be aware of the risks of the product/system and avoid possible damages.

EVOC Product

Please pay attention to the following instructions:

 Warning
--

EVOC product can only be used according to the descriptions within the manual, including the contents and the relevant technical documents. If the products or components from other companies are required, please get the recommendation and grant from EVOC first. Proper transportation, storage, assembly, installation, debugging, operation and maintenance are prerequisite to ensure product safety and normal operation; therefore, please ensure permitted environment conditions and pay attention to the tips within the manual.



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Warranty Terms:

The warranty on the product lasts for two years. If the user has additional requirements, the contract signed between the two sides shall prevail.

Please visit our website: <http://www.evoc.com> for more information, or send an email to the Technical Support Mailbox support@evoc.com (International) or support@evoc.cn (Domestic) for consultation.

Hotline: 4008809666

About this manual

Scope of the Manual


The manual is appropriate for EVOC EC0-1818-C236.

Convention

The term “the Board” or “the Product” within the manual usually stands for EVOC EC0-1818-C236.

Instructions

Safety instructions

To avoid property losses or individual injury, please pay attention to the safety instructions within the manual. The warnings within the manual are marked with warning triangle , whose existence is dependent upon the scale of the potential hazard.

History

Version release of this manual:

Version	Time
B00	2018.8
C00	2018.11



Safety Instructions

ESD Instructions

The following label can be used to identify the modules that contain electrostatic sensitive devices:



When operating the modules that contain electrostatic sensitive devices, please follow the instructions below:

- When operating the modules that contain electrostatic sensitive devices, make sure to release static electricity on your body (for example, by touching a grounded object).
- All the devices and tools should not contain ESD.
- Before installing or removing modules that contain ESD, make sure to pull out the power plug and remove the battery.
- When assembling modules that contain ESD, always handle them by their edge.
- Please do not touch any connector pin or conductive part on the modules that contain ESD.

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1. Product Introduction

1.1 Overview

The motherboard adopts Intel® C236 chipset, and supports Intel® LGA 1151 pin Xeon E3-1200 V5/V6 processors, 6th-generation and 7th-generation Core™ i7/i5/i3, Pentium, Celeron processors. The motherboard provides four DDR4 ECC/Non-ECC UDIMM memory slots, supporting up to 64GB memory capacity. It contains onboard two 10/100/1000Mbps network ports with lightning-proof function. It supports MIC-IN, LINE-IN, LINE-OUT function; and supports any triple-display combination of VGA, HDMI, DVI-D, DP, and maximum resolution of 4096×2160. The product supports four standard SATA interfaces, eight USB 2.0 ports, six USB3.0 ports and six RS-232 COM ports, including two COM ports which support RS-422/485 function. It also supports multiple IO ports, including one PS/2 keyboard/mouse port, one 8-bit digital I/O port. Meanwhile, it provides two PCI, two PCIe 3.0 x16 standard slots and three PCIe 3.0 x8 slots. It also provides one SMBUS port for LCM module, and one TPM pin header port.

The product can be widely used in petrochemical industry, automation control, automatic testing, safety monitoring, intelligent traffic, environment protection, communication, etc.

1.2 Mechanical Dimensions, Weight and Environment

- Dimensions: 305mm (L) x 244mm (W) x 37.1mm (H)
- Net weight: 0.67kg
- Operating environment:

Temperature: $-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$

Humidity: 5%~95% (non-condensing)

➤ Storage environment:

Temperature: $-20^{\circ}\text{C} \sim +80^{\circ}\text{C}$

Humidity: 5%~95% (non-condensing)

1.3 Reference Power Consumption for Power Supply Model Selection

The reference power consumption is based on the values under the following environment. In power supply model selection, the power consumption for expansion card and other peripheral devices is to be added according to specifications.

CPU: E3-1275V5

Memory: DDR4 16G×4

HDD: ST2000NM0055

Operating system: Windows7

Operating software: AIDA64

- +5V@ 2.8A; +5%/-3%
- +3.3V@ 1.1A; +5%/-3%
- +12V@ 5.8A; +5%/-3%

1.4 Minimum Power Consumption for Power-on Status

The reference power consumption is based on the following configurations. Under the same configuration, the minimum current of the selected power supply should not be larger than this value.

CPU: E3-1275V5

Memory: DDR4 16×4

- +5V@ 1.6A; +5%/-3%
- +3.3V@ 0.8A; +5%/-3%
- +12V@ 0.9A; +5%/-3%

1.5 Microprocessor

It supports Intel® LGA 1151 pin Xeon E3-1200 V5/V6 processors, 6th-generation and 7th-generation I3/I5/I7 Core™ Processor, Intel® Pentium® Processor , Intel® Celeron® Processor and other processors.

For example Intel® Xeon® Processor E3-1225 v5, Intel® Xeon® Processor E3-1225 v6, Intel® Core™ i7-6700 , Intel® Core™ i7-7500, Intel® Core™ i5-6500 , Intel® Core™ i3-6300, Intel® Pentium® G4400, Intel® Celeron® G3900 and other processors.

1.6 Chipset

Intel® C236

1.7 System Memory

The board provides four 288Pin 1.2V DDR4 1866/2133/2400MHz memory slots. It supports ECC/Non-ECC DDR4 UDIMM memory, and dual-channel function. A single memory slot supports up to 16GB memory capacity, which brings the total memory capacity to 64GB.

It is recommended to choose from memory modules listed in the table below:

DIMMA1	DIMMB1	DIMMA2	DIMMB2	Total system memory capacity
		2GB	2GB	4GB
2GB	2GB	2GB	2GB	8GB
		4GB	4GB	8GB
4GB	4GB	4GB	4GB	16GB
		8GB	8GB	16GB
8GB	8GB	8GB	8GB	32GB
		16GB	16GB	32GB
16GB	16GB	16GB	16GB	64GB

Note: When installing memory module, first consider DIMMA2,DIMMB2, then consider DIMMA1,DIMMB1. It is recommended to use the memory modules of same type, same speed, and same brand, and avoid using memory modules of different types and different speeds at the same time.

1.8 Display Function

- It supports duplication and expansion desktop function of any triple display combination of VGA,HDMI,DVI-D,DP. DVI-D supports hot swap function;
- It supports the minimum resolution of 640×480@60Hz and maximum resolution of 4096×2160@60Hz.

Note: Some Xeon E3-1200 V5/V6 CPUs do not support the above display ports; such as Intel® Xeon® Processor E3-1220 v5.

1.9 Network Function

It provides two Intel I210/I211 10/100/1000Mbps network ports, which have lightning-proof function. LAN1 support Wake-On-Lan and network PXE boot.

1.10 Audio

It adopts HDA standard, and supports MIC-IN/LINE-IN/LINE-OUT.

1.11 Power Feature

It adopts ATX power supply and supports ACPI power management function. Jumper can help realize AT boot-up mode, and support automatic power-on upon AC power connection.

1.12 Expansion Bus

- 1 x P PCIe x16/x8 (x16 slot, PCIE2), compatible with PCIe 3.0 standard; For details, please refer to the Chapter 2.20;
- 1 x P PCIe x8 (x16 slot, PCIE5), compatible with PCIe 3.0 standard;
- 3 x PCIe x4 (x8 slot, PCIE1, PCIE3, PCIE4), compatible with PCIe 3.0 standard;
- 2 x 32-bit 5V PCI slots, compatible with PCI Rev2.3 standard.

1.13 Watchdog Function

- Supports 255 levels, programmable by minute/second;
- Supports Watchdog timeout interrupt or reset system.

1.14 Operating System

Supported operating systems: WIN7, WIN10, Linux, Server2008, Server2010, and etc. (Linux system recommended to use high kernel version, to prevent compatibility problem caused by low kernel version).

Note:

1. Some systems cannot use USB devices (USB optical driver, U disk, etc.) directly, for example, for Windows7 please use SATA optical driver for installation. Windows family needs Win8 and above systems to support drivers of USB controller on this platform. Linux requires CentOS 6.4 or same kernel environment Linux and above systems to support drivers of USB controller on this platform.
2. Driver support: Intel only provides chipset driver of Windows7 32bit/64bit, Windows8.1 64bit and Windows10 64bit. Intel official website does not provide video card drivers and other drivers of other 32bit systems.
3. Network card driver: Intel does not provide driver for I211 network card of Windows Server system.

1.15 I/O Ports

- 6 x COM ports; among them, COM1 and COM2 support RS-232/RS-422/RS-485 mode selection, and support RS-485 automatic flow control function; COM3-COM6 support RS-232 function;
- 4 x standard SATA interfaces, supporting SATA3.0 and hot swap function under AHCI mode.
- 8 x USB 2.0 ports, 6 x USB 3.0 ports;
- 1 x PS/2 keyboard/mouse port;

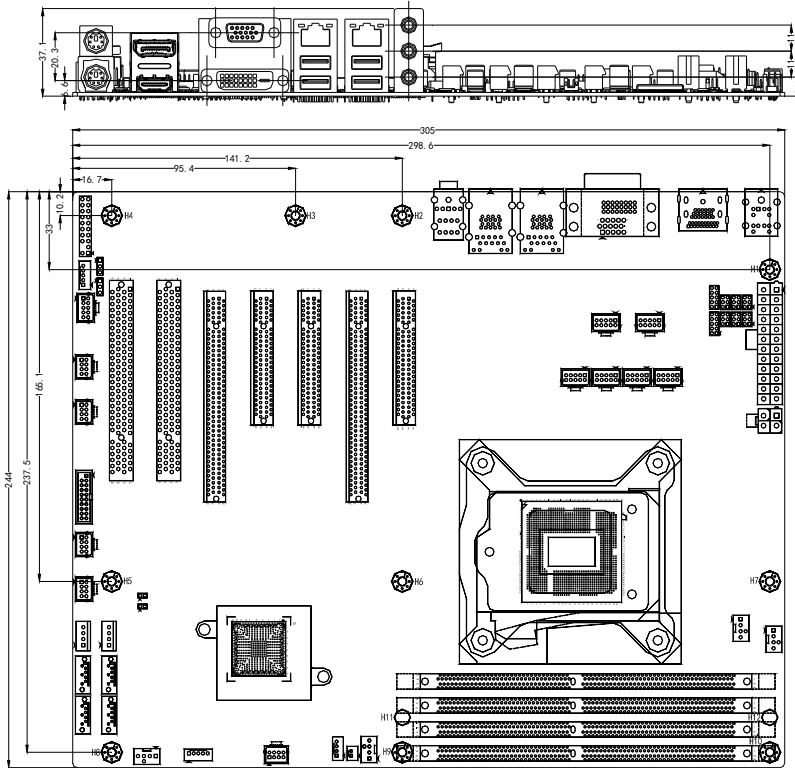
- 1 x 8-bit digital I/O port;;
- 1 x TPM port;
- 1 x SMBUS port for LCM module.

Note: How to identify alarms

1. A long beep means a system memory error;
2. A short beep means boot-up.

2. Installation Instructions

2.1 Product Dimensions Drawing

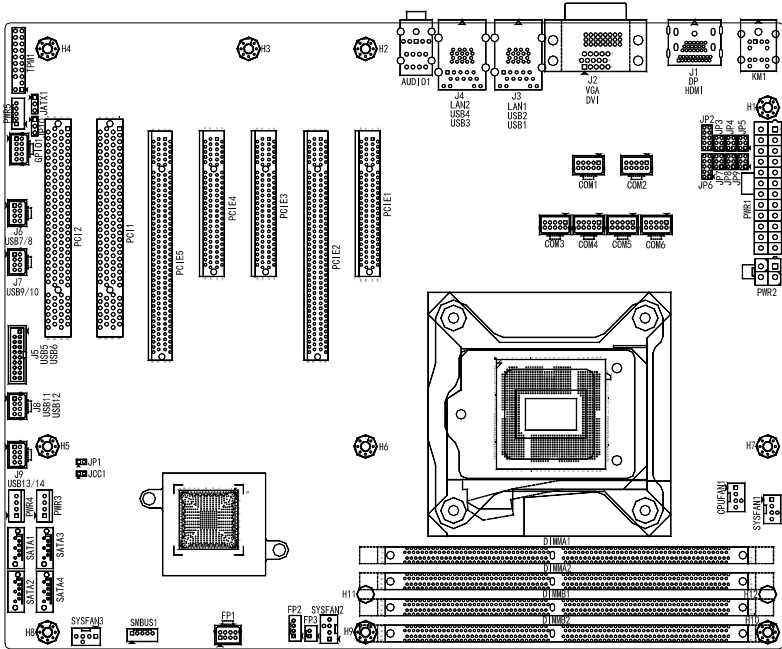


Unit: mm

Warning!

Please adopt appropriate screws and proper installation methods (including board allocation, CPU and heat sink installation); otherwise, the board may be damaged. It is recommended to use M3x6 GB-9074.4-88/with gasket combo/Nickel-plated screws at H1 ~ H10.

2.2 Port Location

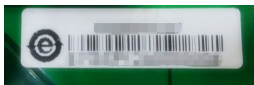


2.3 Data to Identify the Board

Attention

During maintenance or after the product is stolen, this code can be used to identify the PC. Please do not rip it off.

Serial No.: Located on the board (as shown below)




Tip: How to identify the first pin of the jumpers and connectors

1. Observe the letter beside the socket, the first pin is usually marked with “1” or bold lines or triangular symbols;
2. Observe the solder pad on the back: usually the square pad is the first pin.

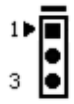
2.4 Jumper Setting

1. JCC1: Clear/Keep CMOS Setting (pitch: 2.0mm)


CMOS is powered by the button battery on board. Clearing CMOS will restore original settings (factory default). The steps are listed as follows: (1) Turn off the computer and unplug the power cable; (2) Instantly short circuit JCC1; (3) Turn on the computer; (4) Follow the prompt on screen to enter BIOS setup when booting the computer, load optimized defaults; (5) Save and exit. Please set as follows:

 JCC1	Setup	Function
	1-2 Open	Normal (Default)
	1-2 Short	Clear the contents of CMOS and all BIOS settings will restore to factory default values.

2. JATX1: Power-on Mode Selection (pitch: 2.54mm)

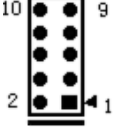

 JATX1	Setup	Function
	1-2 Short	ATX mode (Default)
	2-3 Short	AT mode

3. JP1: ME Update Setting (pitch: 2.0mm)

 JP1	Setup	Function
	1-2 Open	Normal (Default)
	1-2 Short	Intel ME debugging mode (only used when updating ME)

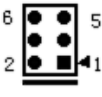
4. JP2/JP3/JP4/JP6/JP7/JP8: COM Port Configuration (pitch: 2.0mm)

Set up JP2~JP4(corresponding to COM1), JP6~JP8(corresponding to COM2)(pitch: 2.0mm), together with BIOS setup, to configure COM1/COM2 COM port mode.


 JP2/JP6  JP3/JP4/JP7/JP8	COM port	Pin	Signal Name		
			RS-232 (Default)	RS-422	RS-485
			COM1	JP2	1-2/9-10
	JP3	1-3/2-4	3-5/4-6	3-5/4-6	
	JP4	1-3/2-4	3-5/4-6	3-5/4-6	
COM2	JP6	1-2/9-10	3-4/9-10	5-6/7-8	
	JP7	1-3/2-4	3-5/4-6	3-5/4-6	
	JP8	1-3/2-4	3-5/4-6	3-5/4-6	

5. JP5, JP9: RS-422/RS-485 Mode Long-distance Transmission Setup (pitch: 2.0mm)

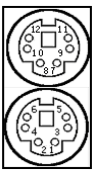
JP5 (corresponding to COM1)/JP9(corresponding to COM2) can be used to realize COM1/COM2 RS-422/RS-485 mode long-distance transmission.

 JP5/JP9	Setup	Function
	[3-5][4-6] Short	Non-long-distance transmission (default)
	[1-3][2-4] Short	RS-485 mode
	[2-4] Short	RS-422 mode

6. JP10: GPIO Initial Electrical Level Setup (pitch: 2.54mm)

 JP10	Setup	Function (GPIO initial electrical level setup)
	1-2 Short	High level (Default)
	2-3 Short	Low level

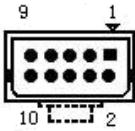
2.5 KB/MS Port

 KM1	Pin	Signal Name	Pin	Signal Name
	1	KB_DATA	7	MS_DATA
	2	NC	8	NC
	3	GND	9	GND
	4	+5V	10	+5V
	5	KB_CLK	11	MS_CLK
	6	NC	12	NC

2.6 COM Port

This board provides six COM ports. Their pin definitions are as follows:

Pin	Signal Name		
	RS-232 COM1~COM6	RS-485 COM1/COM2	RS-422 COM1/COM2
1	DCD#	DATA-	TXD-
2	RXD	DATA+	TXD+
3	TXD	NC	RXD+
4	DTR#	NC	RXD-
5	GND	GND	GND
6	DSR#	NC	NC
7	RTS#	NC	NC
8	CTS#	NC	NC
9	RI#	NC	NC
10	NC	NC	NC



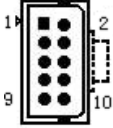
COM1~COM6
(pitch: 2.0mm)

Note: 1. Under RS-485 mode, the data receiving/sending direction is automatically controlled.

2. For Burintest full load maximum speed test, it is recommended to install the serial.sys file of CD-ROM drive. The installation methods are as follows:

- a. First find the existing system of serial.sys, remove it. It is usually located in the C windows->system32->drivers;
- b. In the COM port drive of our CD-ROM drive, find the corresponding serial.sys, put it under the serial.sys directory that comes with the system;
- c. Restart the system.

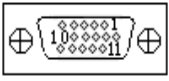
2.7 GPIO Port

 GPIO1 (pitch: 2.0mm)	Pin	Signal Name	Pin	Signal Name
	1	INPUT0	2	OUTPUT0
	3	INPUT1	4	OUTPUT1
	5	INPUT2	6	OUTPUT2
	7	INPUT3	8	OUTPUT3
	9	GND	10	NC

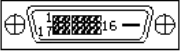
Note: The factory GPIO Default value is TTL input/output, and the voltage range of the input/output signals is 0~5V.

2.8 Display Port

1. This board provides one standard DB15 VGA port. Its pin definition is as follows:

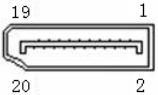
 VGA	Pin	Signal Name	Pin	Signal Name
	1	Red	2	Green
	3	Blue	4	NC
	5	GND	6	GND
	7	GND	8	GND
	9	NC	10	GND
	11	NC	12	DDCDATA
	13	HSYNC	14	VSYNC
	15	DDCCLK	-	-

2. This board provides one standard DVI-D port. Its pin definition is as follows:

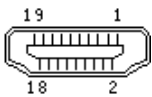
 DVI-D	Pin	Signal Name	Pin	Signal Name
	1	DATA2-	13	NC
	2	DATA2+	14	+5V
	3	GND_DVI	15	GND
	4	NC	16	HOTPLUG
	5	NC	17	DATA0-
	6	DDCCLK	18	DATA0+
	7	DDCDATA	19	GND_DVI
	8	NC	20	NC
	9	DATA1-	21	NC
	10	DATA1+	22	GND_DVI
	11	GND_DVI	23	CLK+
	12	NC	24	CLK-

Note: The upper layer is VGA, and the lower layer is DVI-D.

3. This board provides one standard DP port. Its pin definition is as follows:


 DP	Pin	Signal Name	Pin	Signal Name
	1	LANE0P	2	GND1
	3	LANE0N	4	LANE1P
	5	GND2	6	LANE1N
	7	LANE2P	8	GND3
	9	LANE2N	10	LANE3P
	11	GND4	12	LANE3N
	13	GND5	14	GND6
	15	AUXCHP	16	GND7
	17	AUXCHN	18	HPD
	19	RETURN	20	DP_PWR

4. This board provides one Type A HDMI port. Its pin definition is as follows:

 HDMI	Pin	Signal Name	Pin	Signal Name
	1	TMDS DATA2+	2	TMDS DATA2 Shield
	3	TMDS DATA2-	4	TMDS DATA1+
	5	TMDS DATA1 Shield	6	TMDS DATA1-
	7	TMDS DATA0+	8	TMDS DATA0 Shield
	9	TMDS DATA0-	10	TMDS CLK+
	11	TMDS CLK Shield	12	TMDS CLK-
	13	CEC (NC on device)	14	RSVD(NC on device)
	15	SCL	16	SDA
	17	DDC/CEC Ground	18	+5V
19	Hot Plug Detect	-	-	

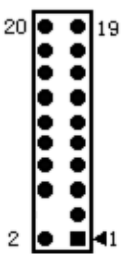
Note: The upper layer is DP, and the lower layer is HDMI.

2.9 ATX Power Switch and LED Port

 FP1 (pitch: 2.0mm)	Pin	Signal Name	Pin	Signal Name
	1	PWRBTN#	2	GND
	3	GND	4	RESET#
	5	HDD_LED-	6	HDD_LED+
7	GND	8	PWR_LED+	

2.10 TPM Port

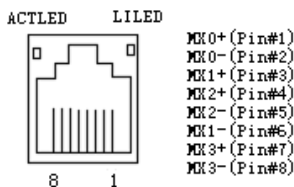
This board provides one 2×10Pin TPM pin header port (Pin4 is not occupied).

 <p>TPM1 (pitch: 2.54mm)</p>	Pin	Signal Name	Pin	Signal Name
		1	LPC_CLK	2
	3	LPC_FRAME#	4	NA
	5	PLT_RST#	6	+5V
	7	LPC_AD3	8	LPC_AD2
	9	+3.3V	10	LPC_AD1
	11	LPC_AD0	12	GND
	13	SMB_CLK	14	SMB_DATA
	15	+3.3VSB	16	SERIRQ
	17	GND	18	CLKRUN
	19	SUS_STA-	20	NC

Note: CLKRUN signal is actually pulled down by 4.7K to GND.

2.11 Network Port

This board provides two 10/100/1000Mbps network and USB combo port J3(LAN1) and J4(LAN2). LAN1 supports Wake-On-LAN. ACTLED and LILED are the green and dual color LEDs on both sides of the Ethernet port, which respectively indicates the activity status and the speed of LAN. Please refer to the status description for each LED:

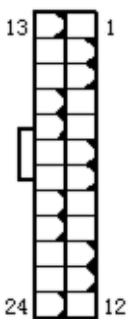


J3(LAN1), J4(LAN2)

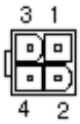
ACTLED (single color: green)	Network activity		L1LED (dual-color: orange and green)	Network speed
			Green	1000Mbps
Flash	Data being transmitted		Orange	100Mbps
Off	No data being transmitted		Off	10Mbps

2.12 Motherboard Power Connector


1. 24Pin ATX Power Connector

 PWR1 (pitch: 4.2mm)	Pin	Signal Name	Pin	Signal Name
	1	+3.3V	13	+3.3V
	2	+3.3V	14	-12V
	3	GND	15	GND
	4	+5V	16	PS_ON#
	5	GND	17	GND
	6	+5V	18	GND
	7	GND	19	GND
	8	PWROK	20	-5V
	9	+5VSB	21	+5V
	10	+12V	22	+5V
	11	+12V	23	+5V
12	+3.3V	24	GND	


2. 4Pin CPU Power Connector

 <p>PWR2 (pitch: 4.2mm)</p>	Pin	Signal Name
	1	GND
	2	GND
	3	+12V
	4	+12V

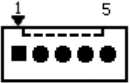
3. 4Pin SATA Power Connector

 <p>PWR3/PWR4 (pitch: 2.54mm)</p>	Pin	Signal Name
	1	+12V
	2	GND
	3	GND
	4	+5V


4. 5Pin TPM Power Connector

 <p>PWR5 (pitch: 2.0mm)</p>	Pin	Signal Name
	1	GND
	2	+5V
	3	+5V
	4	GND
5	+5V	


2.13 SMBUS Port

 <p>SMBUS1 (pitch: 2.0mm Wafer)</p>	Pin	Signal Name
	1	+3.3V
	2	SMB_DATA
	3	SMB_CLK
	4	GND
5	+5V	


2.14 Audio Port

 <p>AUDIO1</p>	Pin	Signal Name
	1	LINE_IN
	2	LINE_OUT
3	MIC_IN	

2.15 Speaker Output Port

 <p>FP2 (pitch: 2.0mm)</p>	Pin	Signal Name
	1	BUZ-
	2	NC
	3	GND
4	BUZ+	

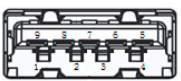
2.16 PWRBTN# Port

 <p>FP3 (pitch: 2.0mm Wafer)</p>	Pin	Signal Name
	1	PWRBTN#
	2	GND

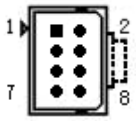
2.17 USB Port

The motherboard rear panel provides two double-layer USB 3.0 and RJ45 combo ports, four USB2.0 Wafer ports and one 2×10Pin USB3.0 Wafer port.

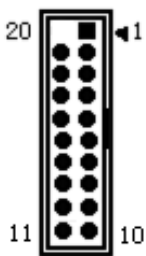
1. Double-layer USB3.0 Port

 <p>J3 (USB1/USB2) J4 (USB3/USB4)</p>	Pin	Signal Name
	1	+5V_USB
	2	USB_DATA-
	3	USB_DATA+
	4	GND
	5	USB_SSRX-
	6	USB_SSRX+
	7	GND
	8	USB_SSTX-
	9	USB_SSTX+


2. USB2.0 Wafer Port

 J6 (USB7/8) J7 (USB9/10) J8 (USB11/12) J9 (USB13/14) (pitch: 2.0mm)	Pin	Signal Name	Pin	Signal Name
	1	+5V_USB	2	+5V_USB
	3	USB1_DATA-	4	USB2_DATA-
	5	USB1_DATA+	6	USB2_DATA+
	7	GND	8	GND


3. 2×10Pin USB3.0 Port

 J5 (USB5/USB6) (pitch: 2.0mm)	Pin	Signal Name	Pin	Signal Name
	1	+5V_USB	2	USB_SSRX0-
	3	USB_SSRX0+	4	GND
	5	USB_SSTX0-	6	USB_SSTX0+
	7	GND	8	USB_DATA0-
	9	USB_DATA0+	10	RSVD
	11	USB_DATA1+	12	USB_DATA1-
	13	GND	14	USB_SSTX1+
	15	USB_SSTX1-	16	GND
	17	USB_SSRX1+	18	USB_SSRX1-
	19	+5V_USB	20	NA

2.18 SATA Interface

 <p>SATA1~SATA4</p>	Pin	Signal Name
	1	GND
	2	SATA_TX+
	3	SATA_TX-
	4	GND
	5	SATA_RX-
	6	SATA_RX+
	7	GND

2.19 CPU Fan Connector/System Fan Connector

 <p>CPUFAN1/SYSFAN1/ SYSFAN2/SYSFAN3 (pitch: 2.54mm)</p>	Pin	Signal Name
	1	GND
	2	+12V
	3	FAN_IO
	4	FAN_PWM

Note: FAN_IO: Fan rotation speed pulse output; FAN_PWM: fan rotation speed PWM control.

2.20 PCIe x16 Slot

This board provides two PCIe 3.0 x16 slots (PCIE2,PCIE5). Among them, the system PCIE5 slot supports x8 signals, and another PCIE2 slot supports x16/x8 signals automatic identification. When PCIE5 slot is not used by a card, PCIE2 slot supports x16 signals; when PCIE5 slot is inserted by a card, PCIE2 supports up to x8 signals.

2.21 PCIe x8 Slot

This board provides three PCIe 3.0 x8 slots (PCIE1,PCIE3,PCIE4) , which actually provide x4 signals.

2.22 PCI Slot

This board provides two 5V standard PCI slots (PCI1, PCI2).

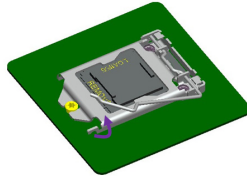
2.23 CPU Installation

Notes:

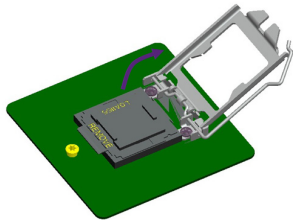
- (1) When CPU is not installed in the motherboard, the CPU socket should be protected by protection cover, to prevent damage to the CPU socket;
- (2) When installing the CPU, do not wear knitted gloves, to prevent scratching CPU socket pins;
- (3) If the motherboard is to be returned for repair, the CPU socket should be protected by protection cover.

Please follow the steps below when installing CPU (see the picture below for installation):

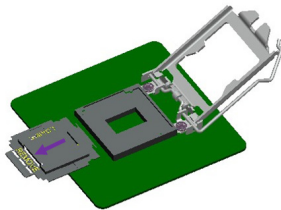
Step 1: First press down the control rod, and pull it outward slightly to disengage it from the fastening clip;



Step 2: Fully open the loading plate;

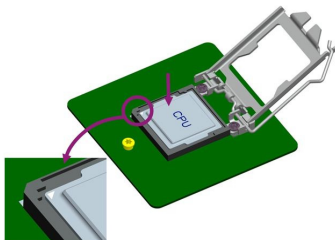


Step 3: Remove the black protection cover, which can be pulled up by the direction of a mark on the cover -“Remove”;

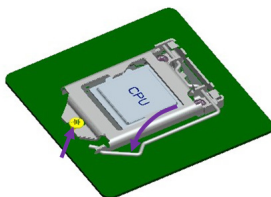


Step 4: Use right method to fix the CPU, and align the pins, then gently insert it into the CPU socket;

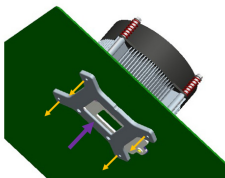
Note: The triangle mark on the CPU socket should align with the triangle mark on the CPU.



Step 5: Close the loading plate, slightly pull the loading plate backward until it reaches the knob, and push the control rod back to the original place.



Step 6: Place the heat sink on the CPU, and use screws to fasten it with the bracket.

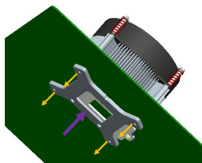


2.24 CPU Fan Installation

The steps to install CPU cooling fan are as follows:

- First, place the heat sink backplane by the fastening hole at the back of the CPU card; please make sure the T-shape notch aligns with CPU backplane bracket;

- Connect the front side of the heat sink with the backplane, and make sure the heat sink contacts well with the top cover surface of the CPU;
- Use two screws to fasten the two diagonal corners of the heat sink (do not tighten them first), then add two screws on the other diagonal corners. Then, tighten the four screws;
- Finally, connect the fan power cable with the fan socket on the motherboard.



Note: It is recommended to use cooling fan authenticated by Intel; Before installing the fan, smear thermal grease onto the contact surface between CPU and fan cooling fins, so as to enhance the heat dissipation performance.

2.25 SATA HDD Hot Swap

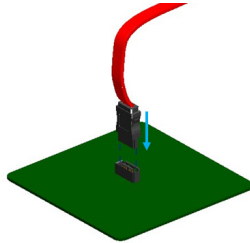
Please pay attention to the following when carrying out SATA HDD hotswap:

- (1) The hard disk must support SATA2.0 interface or above, and 15-pin SATA HDD power connector is used;
- (2) The SATA hard disk only supports hot swap function only at AHCI mode and when the hot swap function is enabled.
- (3) The driver of chipset shall support the hot-swap of SATA hard disk.
- (4) Do not hot swap SATA hard disk where the operating system is located when system is powered-on.

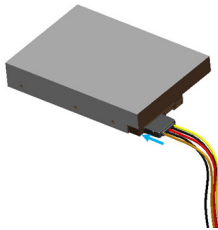
Note: Please carry out hot plugging as follows. Improper operation may destroy the hard disk or result in data loss.

Steps for hot plugging SATA hard drive:

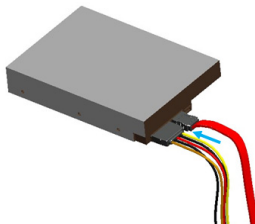
Step1: Connect the SATA data cable with the SATA interface on the motherboard;



Step2: Insert the SATA power cable 15-pin connector (black) into the SATA hard disk;



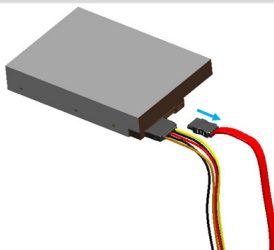
Step3: Insert the SATA data cable into the SATA hard disk.



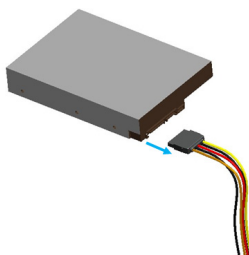
Steps for hot Unplugging SATA hard drive:

Step1: Uninstall the hard drive from the device manager.

Step2: Unplug the SATA data cable from the SATA hard drive.



Step 3: Unplug the SATA 15-pin power connector (black) from the SATA hard drive.



3. BIOS Setup

3.1 UEFI Overview

UEFI (Unified Extensible Firmware Interface) is the latest computer firmware to replace traditional BIOS. UEFI is solidified in the flash memory on the CPU board. Its main functions include: initialize system hardware, set the operating status of the system components, adjust the operating parameters of the system components, diagnose the functions of the system components and report failures, provide hardware operating and controlling interface for the upper level software system, guide operating system and so on. UEFI provides users with a human-computer interface in menu style to facilitate the configuration of system parameters for users, control power management mode and adjust the resource distribution of system device, etc.

Setting the parameters of the UEFI correctly could enable the system operating stably and reliably; it could also improve the overall performance of the system at the same time. Inadequate even incorrect UEFI parameter setting will decrease the system operating capability and make the system operating unstably even unable to operate normally.

3.2 UEFI Parameter Setup

Prompt message for UEFI setting may appear once powering on the system. At that time (invalid at other time), press the key specified in the prompt message (usually or <F2>) to enter UEFI setting.

All the setup values modified by UEFI (excluding data and time) are saved in the flash storage in system; the contents will not be lost even if powered down or remove the battery of the board. The data and time are saved in CMOS storage, which is powered by battery; unless clearing CMOS is executed, its contents would not be lost even if powered off.

Note! UEFI setting will influence the computer performance directly. Setting parameter improperly will cause damage to the computer; it may even be unable to power on. Please use the internal default value of UEFI to restore the system.

Our company is constantly researching and updating UEFI, its setup interface may be a bit different. The figure below is for reference only; it may be different from your UEFI setting in use.

3.3 Basic Function Setting for UEFI

After starting SETUP program, the main interface of Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. will appear:

◆ Main

```

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit

-----
| Motherboard Information                                     | Choose the system
| Project Name      ECO-1818-C236                          | default language
| BIOS Name        09270000                                |
| BIOS Version     B00                                     |
| Build Date and Time 08/31/2018 15:26:59                  |
| Access Level      Administrator                          |
|
| System Language   [English]                              |
|
| System Date       [Mon 09/03/2018]                       |
| System Time       [07:05:46]                             |
|
|-----|-----
|>: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit

-----
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```

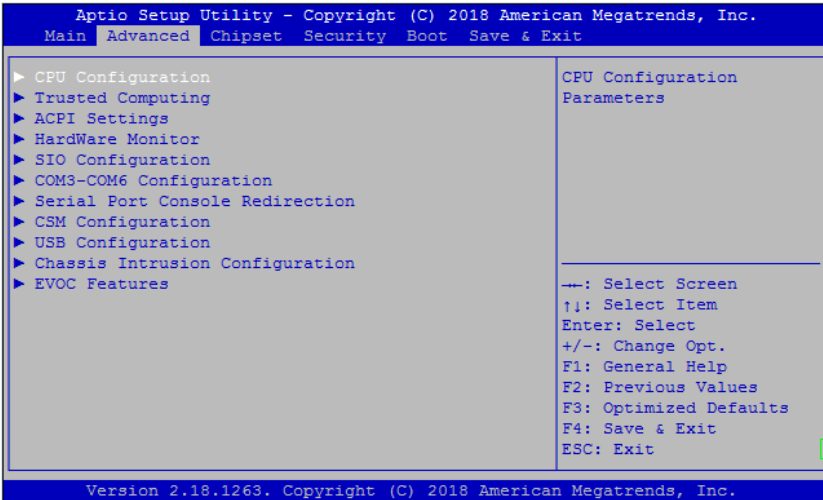
➤ System Date

Choose this option and set the current date by < + > / < - >, which is displayed in format of month/date/year. Reasonable range for each option is: Month (1-12), Date (01-31), Year (Maximum to 2099), Week (Mon. ~ Sun.).

➤ System Time

Choose this option and set the current time by < + > / < - >, which is displayed in format of hour/minute/second. Reasonable range for each option is: Hour (00-23), Minute (00-59), Second (00-59).

◆ **Advanced**



➤ **CPU Configuration**

This option displays related information and functions of CPU. Please note that the CPU specifications including models, working frequency, number of processor cores, ultra-threading technology and virtualization technology are related to the CPU installed; different families of CPUs will display different information.

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.

Advanced

CPU Configuration		Enable/Disable Software Guard Extensions (SGX)
Type	Intel(R) Core(TM)	
	i7-6700K CPU @ 4.00GHz	
ID	0x506E3	
Speed	4000 MHz	
L1 Data Cache	32 KB x 4	
L1 Instruction Cache	32 KB x 4	
L2 Cache	256 KB x 4	
L3 Cache	8 MB	
L4 Cache	N/A	
VMX	Supported	
SMX/TXT	Not Supported	
SW Guard Extensions (SGX)	[Software Controlled]	
PRMRR Size	[INVALID PRMRR]	
CPU Flex Ratio Override	[Disabled]	
CPU Flex Ratio	40	
Settings		
Hardware Prefetcher	[Enabled]	
Adjacent Cache Line Prefetch	[Enabled]	
Intel (VMX) Virtualization Technology	[Enabled]	
PECI	[Enabled]	
Active Processor Cores	[All]	
Hyper-Threading	[Enabled]	
BIST	[Disabled]	
MonitorMWait	[Enabled]	

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

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- **SW Guard Extensions(SGX)**

An Intel architecture extension intended to enhance application code and data security.

- **CPU Flex Ratio Override**

CPU frequency doubling, range of value depends on CPU. When “CPU Flex Ratio Override” is set to “Enabled”, “CPU Flex Ratio Setting” can be edited.

- **Hardware Prefetcher**

Control switch of MLC prefetcher function.

- **Adjacent Cache Line Prefetch**

Prefetching control switch of adjacent high-speed caching lines.

- **Intel(VMX) Virtualization Technology**

The control switch of Intel Virtualization Technology function.

- **PECI**

Platform environment port control options.

- **Active Processor Cores**

To configure number of active processor cores.

- **Hyper-Threading**

Control switch for Hyper Threading Technology function.

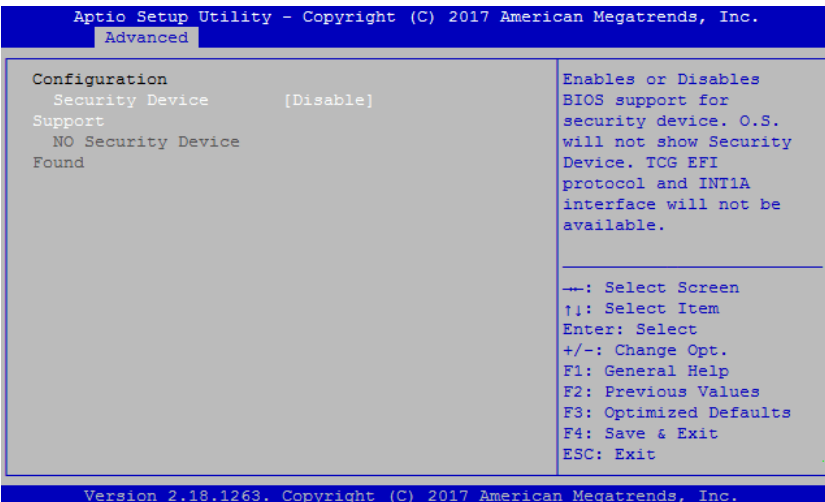
- **BIST**

A mechanism to allow computers self-test.

- **MonitorMWait**

Monitor/Mwait command switch control options.

- **Trusted Computing**



- **Security Device Support**

To enable or disable TPM (Trusted Platform Module) function.

- **ACPI Settings**

This item indicates ACPI settings of the system.

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Advanced

<p>ACPI Settings</p> <p>Enable ACPI Auto Configuration [Enabled]</p>	<p>Enables or Disables BIOS ACPI Auto Configuration.</p> <hr/> <p>---: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</p>
---	--

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- **HardWare Monitor**

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Advanced

<p>Pc Health Status</p> <p>System Temperature : +24.0 °C CPU Temperature : +28.0 °C CPU Fan Speed : 1056 RPM System Fan1 Speed : N/A System Fan2 Speed : N/A System Fan3 Speed : N/A CPU Vcore : +0.976 V Memory Vcore : +1.216 V VCC12.0 : +12.056 V VCC5.0 : +5.068 V AVCC3.3 : +3.408 V VCC3.3 : +3.392 V VSB3.3 : +3.328 V VBAT : +3.056 V_</p>	<p>---: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</p>
---	---

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- **System temperature**

To detect and display environment system temperature of the motherboard.

- **CPU temperature**

To detect and display current CPU core temperature.

- **CPU FAN Speed**

To display rotation speed of current motherboard CPU fan (CPUFAN1).

- **System Fan1 Speed**

To detect and display rotation speed of current motherboard system fan (SYSFAN1).

- **CPU Vcore**

To detect and display working voltage of current motherboard CPU core voltage.

- **Memory Vcore**

To detect and display voltage value of current motherboard memory.

- **V12.0/V5.0/V3.3**

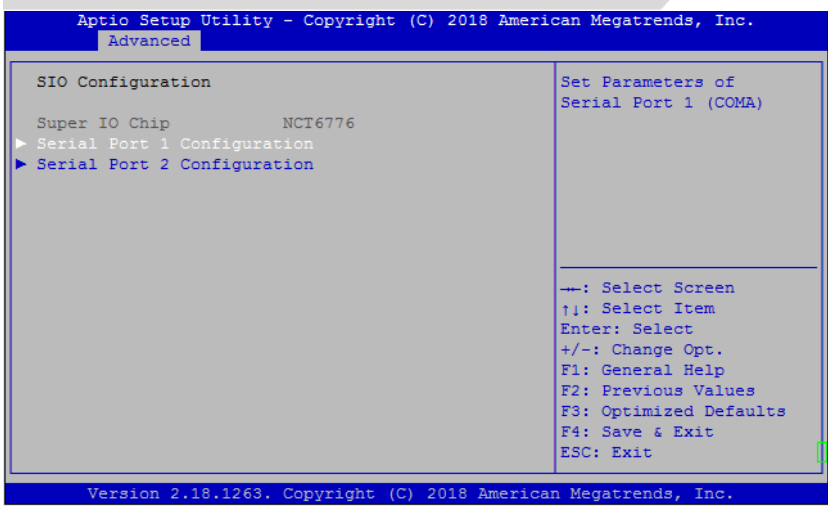
To detect and display working voltage values of various primary voltages of ATX power supply.

- **VBAT**

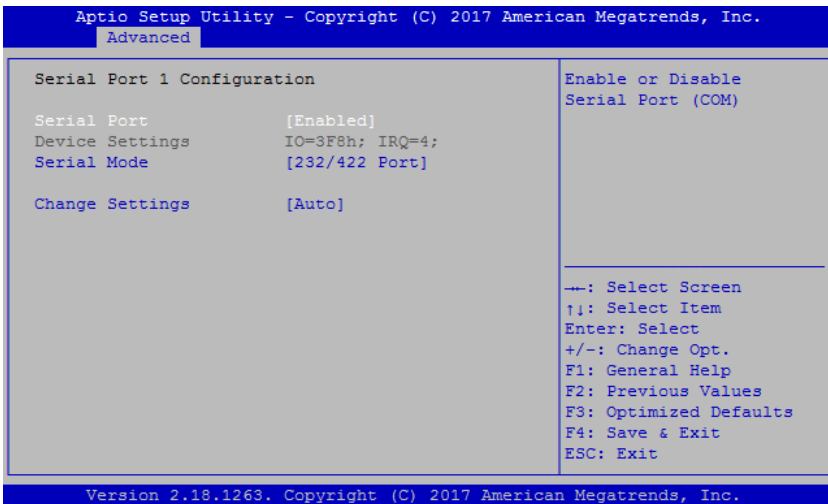
To detect and display voltage value of current motherboard battery.

- **Super IO Configuration**

This item provides configuration of COM ports (COM1~2).



● **Serial Port 1~2 Configuration**



◇ **Serial Port**

Control switch of current COM port.

◇ **Device Settings**

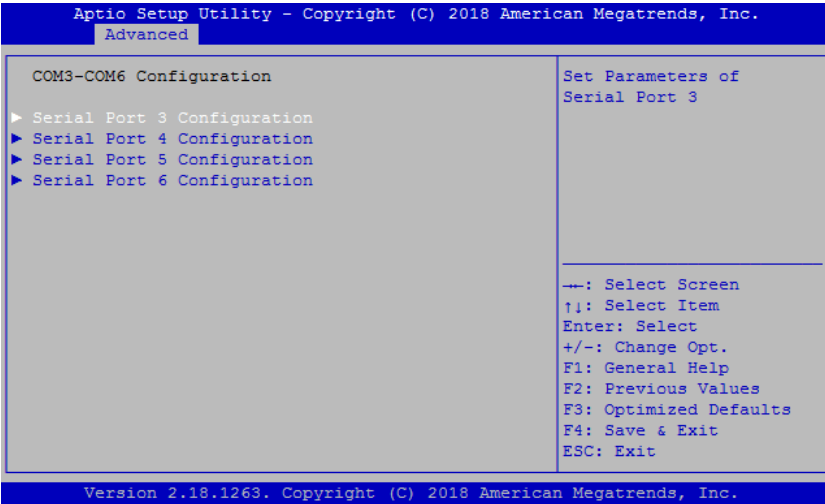
To indicate current resource configuration of COM port.

✧ **Serial Mode**

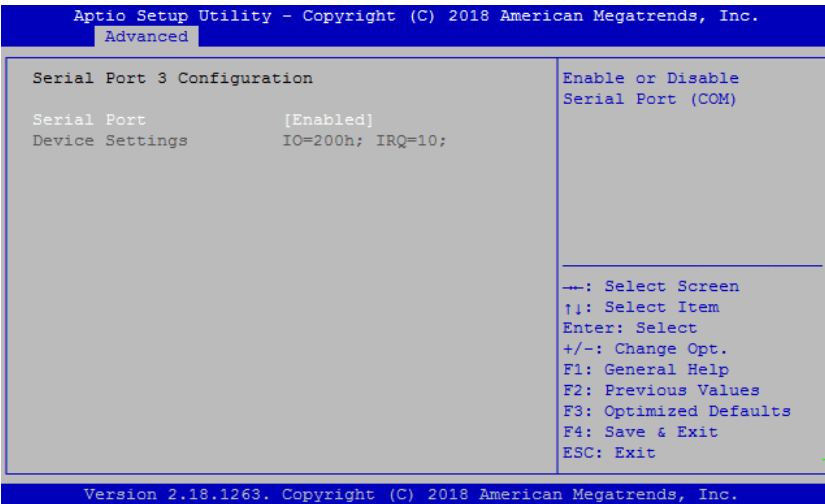
To change COM mode to 232 or 485/422 mode.

➤ **COM3-COM6 Configuration**

To set up resources of COM ports 3~6.



● **Serial Port 3~6 Configuration**



❖ **Serial Port**

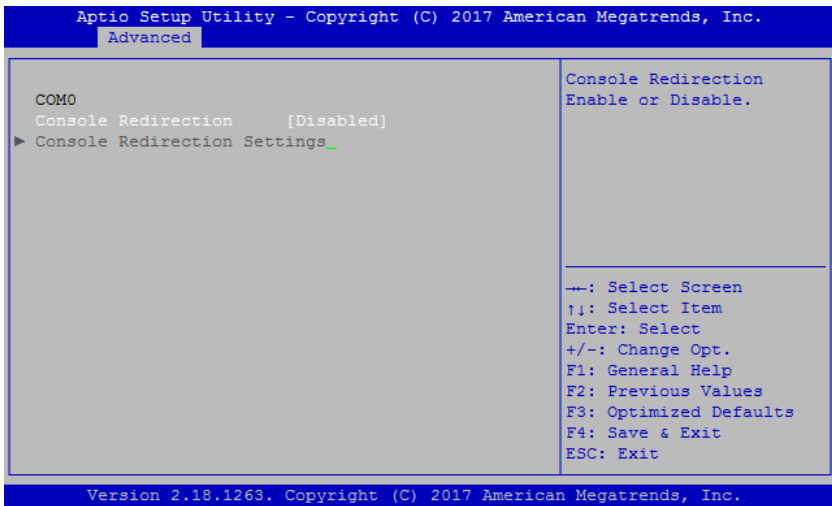
Control switch of current COM port.

❖ **Device Settings**

To indicate current resource configuration of COM port.

➤ **Serial Port Console Redirection**

This option provides configuration of COM port redirection function.

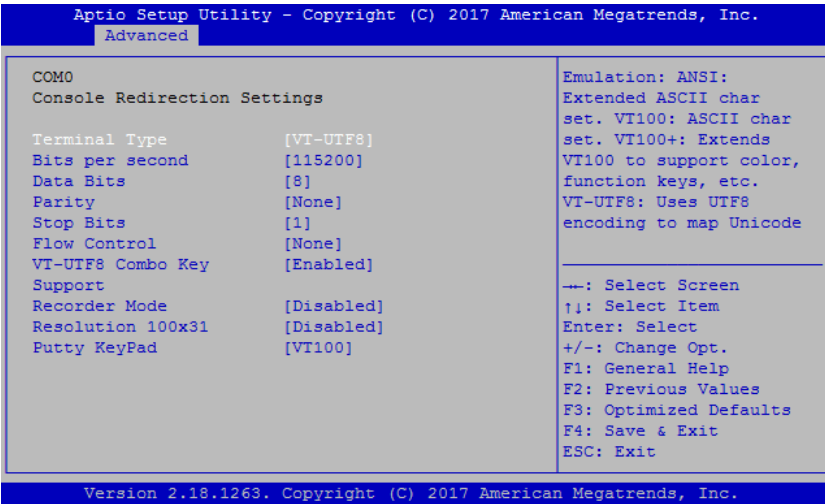


● **Console Redirection**

The control switch of COM port redirection function.

● **Console Redirection Settings**

This option provides configuration of COM port redirection function.



- ✧ **Terminal Type**
To set up terminal type; default: ANSI.
- ✧ **Bits per second**
To set up baud rate; default: 115200.
- ✧ **Data Bits**
To set up data bit width; configuration: 8.
- ✧ **Parity**
To set up parity; default: None.
- ✧ **Stop Bits**
To set up stop bits; default: 1.
- ✧ **Flow Control**
To set up flow control; default: None.

The keyboard definitions of different COM port redirection terminals may be incompatible with each other, which has to do with the COM port redirection terminal

software itself. If keyboard key incompatibility exists, please use the combo keys described below to replace the original keyboard function.

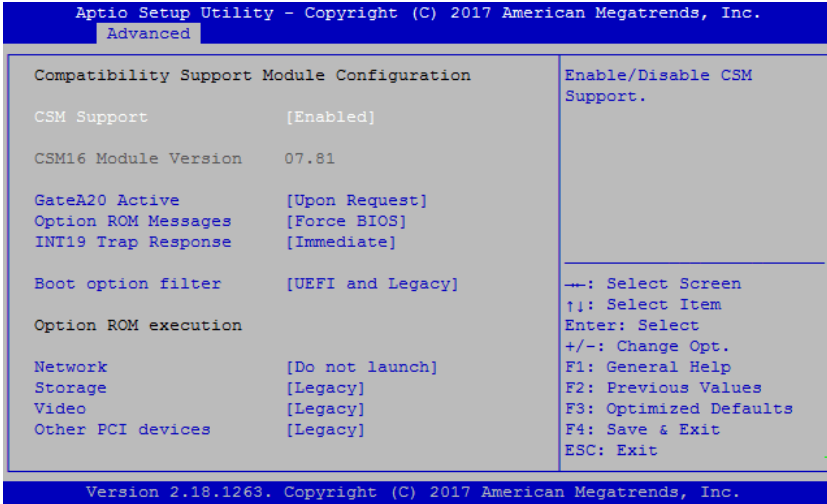
The function keys of COM port redirection function are shown in the table below:

Key or Function	Sequence
Home	<ESC>h
End	<ESC>k
Insert	<ESC>+
Delete	<ESC>-
Page Up	<ESC>?
Page Down	<ESC>/
F1	<ESC>1
F2	<ESC>2
F3	<ESC>3
F4	<ESC>4
F5	<ESC>5
F6	<ESC>6
F7	<ESC>7
F8	<ESC>8
F9	<ESC>9
F10	<ESC>0
F11	<ESC>!
F12	<ESC>@

Note: The COM port redirection function only supports redirection of text interface, does not supports redirection of graphics interface.

➤ **CSM Configuration**

Configuration related to Legacy device compatibility.



● **CSM Support**

Switch to control CSM function.

● **GateA20 Active**

To set up action mode of GateA20, a method used to set up access to more than 1MBmemory (expansion memory). When it is set to “Upon Request”, BIOS can be used to disable GA20; when it is set to “Always”, disabling GA20 is not allowed. The default is Upon Request.

● **Option ROM Messages**

To set up the way to select ROM information display. When it is set to Force BIOS, it is BIOS display method by force; when it is set to Keep Current, the current method is kept. The default is Force BIOS. Force BIOS means ROM information is displayed during ROM initialization; Keep Current (to keep the

current status) means no information is displayed.

- **INT19 Trap Response**

To set up INT19 interrupt capture of signal response. When it is set to Immediate, it means to execute immediately; when it is set to Postponed, it means to postpone. The default is Immediate.

- **Boot option filter**

To set up whether to use legacy BIOS or UEFI. The default is compatibility of the both.

- **Network**

To set up boot switch of PXE OpROM, whether to use Legacy or UEFI boot. When Do not launch is selected, it means to disable.

- **Storage**

To set up memory format boot switch, whether to select Legacy or UEFI boot. When Do not launch is selected, it means to disable.

- **Video**

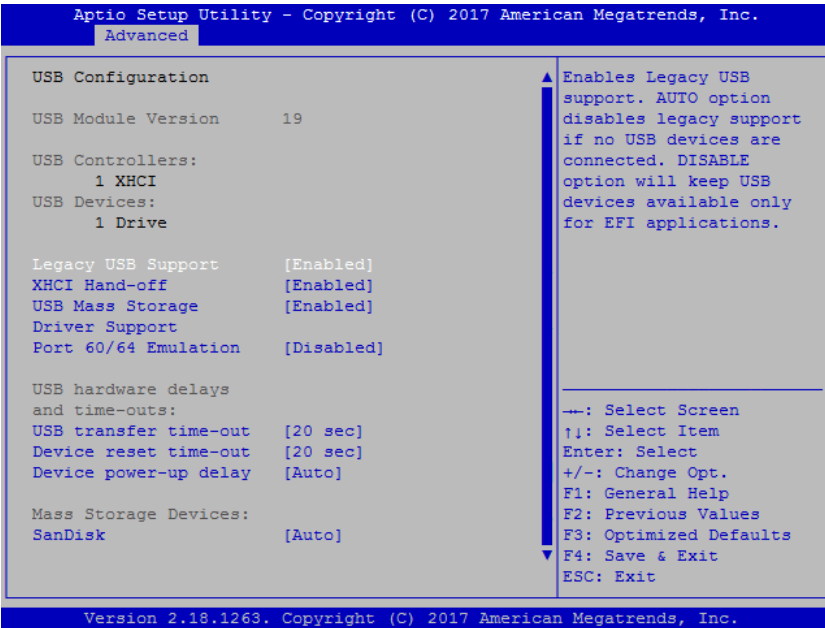
To set up boot switch for video display, whether to select Legacy or UEFI boot. When Do not launch is selected, it means to disable.

- **Other PCI devices**

To set up boot switch for other PCI mounting device, whether to select Legacy or UEFIboot. When Do not launch is selected, it means to disable.

- **USB Configuration**

This option provides configuration about USB controller.



- **Legacy USB Support**

This option is used to support legacy USB devices (keyboard, mouse, storage device, etc). When it is set to Enabled, the USB devices can be used in the OS that does not support USB, such as DOS. When it is set to Disabled, the legacy devices cannot be used in the OS that does not support USB.

Note: USB can be used in EFI application, such as in Shell.

- **XHCI Hand-off**

Whether let BIOS take over EHCI control. When the operating system does not support EHCI, BIOS will take the control. Disable by default.

- **USB Mass Storage Driver Support**

USB mass storage device setup option. Support enabled by default.

- **Port 60/64 Emulation**

This option controls USB port 64/60 simulation function. When this function is enabled, USB keyboard can type some special combo keys.

- **USB transfer time-out**

This option is used to set maximum time duration for data transmission on USB2.0. If within the time duration, the transmission is not completed, it will report error to EFI. This setup is only effective to EFI, not effective to USB drive under OS.

- **Device reset time-out**

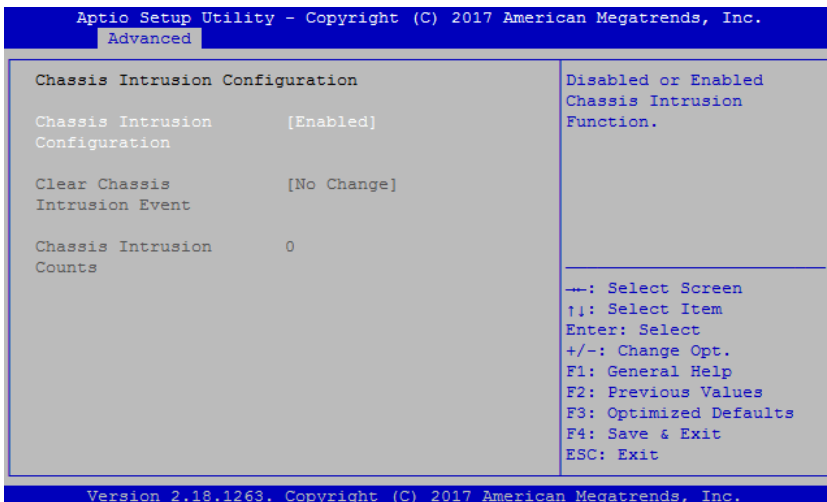
This option is to set maximum time duration need to save device reset on USB2.0 bus. Within the time duration, EFI will check whether storage device can receive command. If the time is out, it is regarded as a storage device error.

- **Device poer-up delay**

This option is to set USB device power-up delay, which means it can be accessed after the delay. If it is set to “Auto”, the data is acquired from the device; if it is set to “Manual”, users need to enter time by themselves.

- **Chassis Intrusion Configuration**

This option provides configuration related to chassis intrusion detection.



- **Chassis Intrusion Configuration**

Whether to enable chassis intrusion detection function.

- **Clear Chassis Intrusion Event**

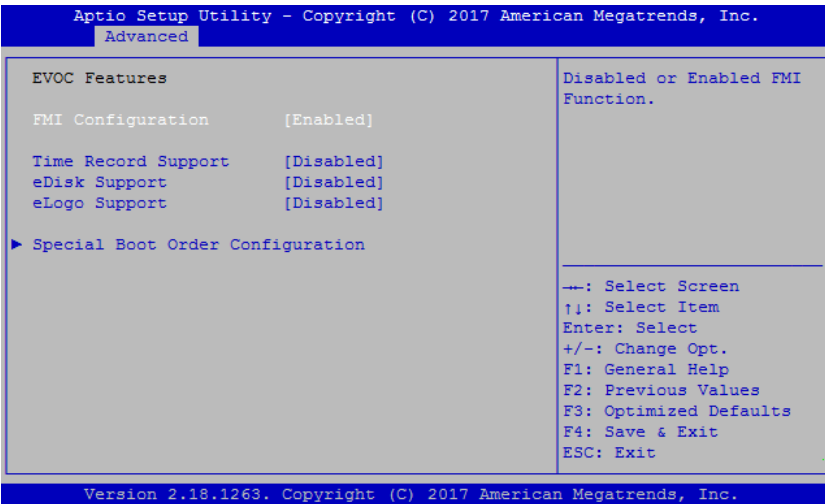
To clear chassis intrusion event. Cancel alarm.

- **Chassis Intrusion Count**

To record chassis intrusion count.

➤ **EVOC Features**

This option provides configuration of EVOC special functions (“FMI” for short).



- **FMI Configuration**

The general switch of FMI function, used to control whether EVOC Features are supported.

- **Time Record Support**

This option is used to record the operation time of motherboard.

- **eDisk Support**

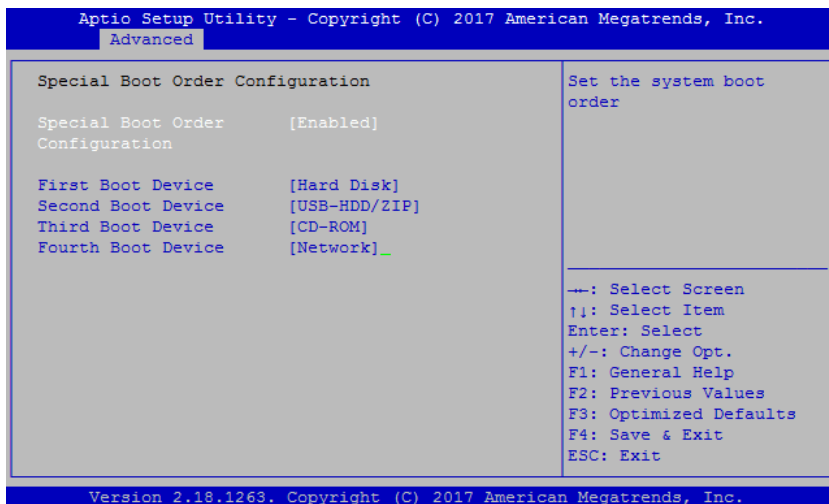
This option is used to enable or disable eDisk.

- **eLogo support**

This option is used to change bootup Logo. Only when eDisk Support is enabled, can this function be realized. The format of LOGO image must be BMP, and the file name must be LOGO.BMP.

- **Special Boot Order Configuration**

This option provides EVOC special boot order configuration.

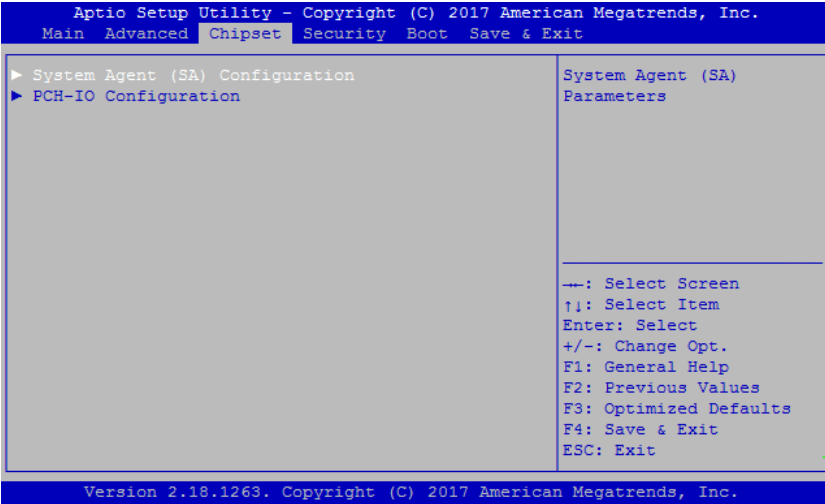


- ◇ **Special Boot Order Configuration**

The control switch of EVOC special boot order function. Only when this option is set to “Enabled”, can the boot order be configured.

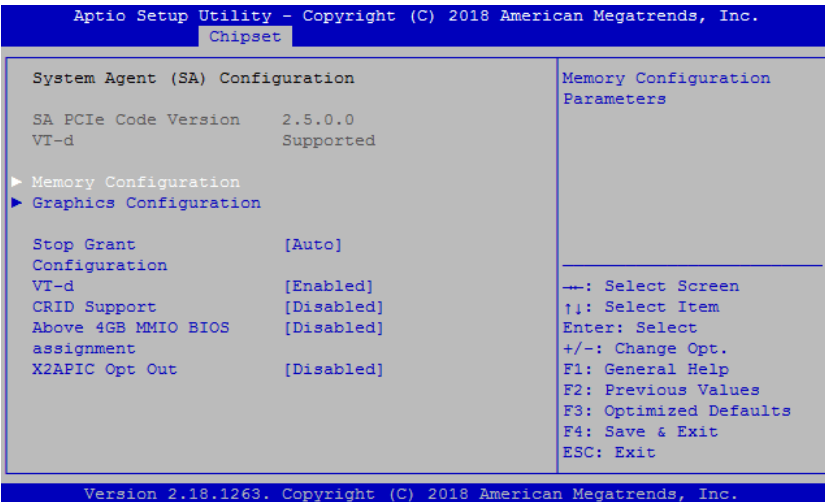
◆ Chipset

This option provides configuration about platform chipset.



➤ System Agent(SA) Configuration

This option provides configuration of System Agent function.



● **Memory Configuration**

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 Chipset

Memory Configuration	
Memory RC Version	2.5.0.0
Memory Frequency	2133 MHz
Memory Timings (tCL-tRCD-tRP-tRAS)	15-15-15-35
DIMMA1 Populated & Enabled	
Size	16384 MB (DDR4)
Number of Ranks	2
Manufacturer	UnKnown
DIMMA2 Not Populated / Disabled	
DIMMB1 Not Populated / Disabled	
DIMMB2 Not Populated / Disabled	

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

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● **Graphics Configuration**

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
 Chipset

Graphics Configuration	
Graphics Turbo IMON	31
Current	
Skip Scanning of External Gfx Card	[Disabled]
Primary Display	[Auto]
Select PCIE Card	[Auto]
▶ External Gfx Card Primary Display Configuration	
Internal Graphics	[Auto]
GTT Size	[8MB]
Aperture Size	[256MB]
DVMT Pre-Allocated	[32M]
DVMT Total Gfx Mem	[256M]
Gfx Low Power Mode	[Enabled]
VDD Enable	[Enabled]
PM Support	[Enabled]
PAVP Enable	[Enabled]
Cdynmax Clamping Enable	[Enabled]
Cd Clock Frequency	[675 Mhz]
IUER Button Enable	[Disabled]
▶ LCD Control	

Graphics turbo IMON current values supported (14-31)

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

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✧ **Graphics Turbo IMON Current**

Graphical core frequency IMON flow control options.

✧ **Skip Scanning of External Gfx Card**

Switch control option to skip scanning of external Gfx

✧ **Primary Display**

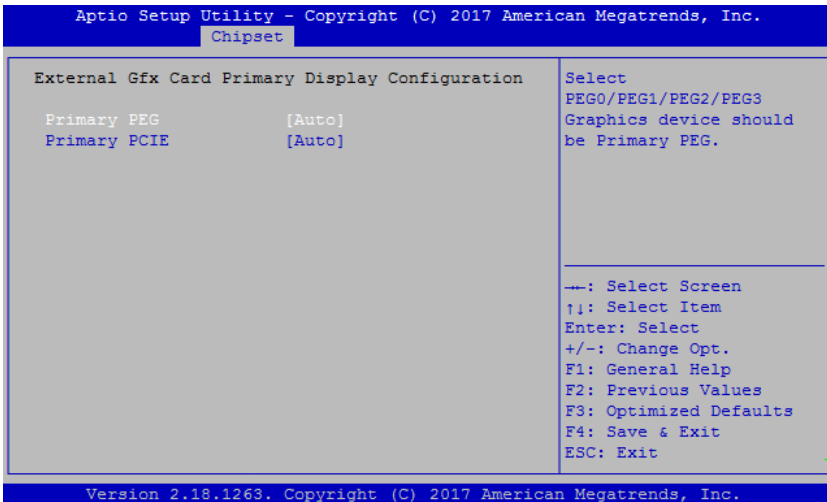
To set primary display device. The options are: IGD (integrated graphics card), PCIE (independent display PCIEX1), HG (Mixed graphics display function)

✧ **Select PCIE Card**

Control option to select control platform for PCIE card.

✧ **External Gfx Card Primary Display Configuration**

Priority control options for external video card display.



✧ **Internal Graphics**

The control switch of integrated graphics card.

✧ **GTT Size**

To set up capacity of video memory of integrated graphics card.

✧ **Aperture Size**

To set up video memory capacity of integrated graphics card.

❖ **DVMT Pre-Allocated**

To set up shared initial value of video memory.

❖ **DVMT Total Gfx Mem**

To set up the maximum value of share video memory.

❖ **Gfx Low Power Mode**

Switch control options applicable to video card mode setup trigger.

❖ **VDD Enable**

Switch control options for display of power supply VDD.

❖ **PM Support**

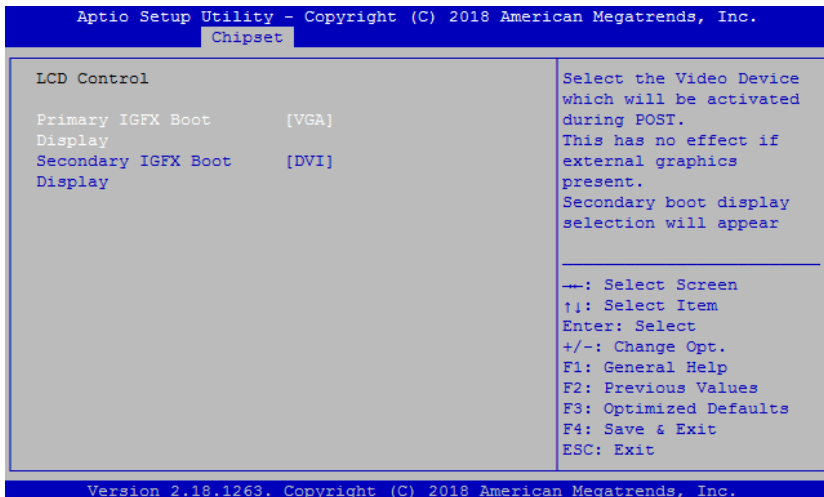
Power management control switch options.

❖ **PAVP Enable**

Intel intelligent audio technology.

❖ **LCD Control**

Port setup for priority output for VGA/DVI/HDMI display ports at BIOS/DOS stage.



- **VT-d**

VT virtual support.

- **CRID Support**

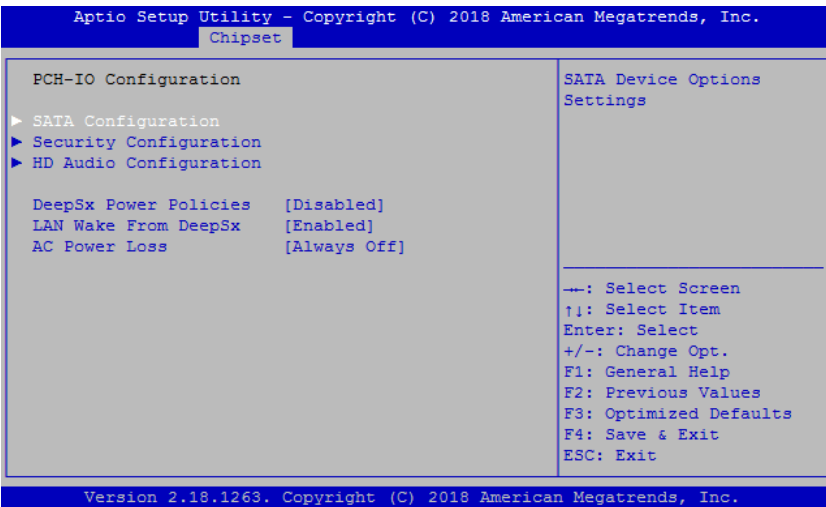
To control whether Intel SIPP technology is supported via CRID.

- **Above 4GB MMIO BIOS assignment**

To enable or disable above 4GB memory map IO BIOS assignment.

- **PCH-IO Configuration**

This option provides function configuration of Intel PCH chip.



- **SATA Configuration**

This option shows the information of HDD connected to the motherboard. It dynamically detects whether there are SATA devices on the motherboard. If a device is connected with the corresponding port, it will display the SATA device type. Otherwise, it will display “Empty”.



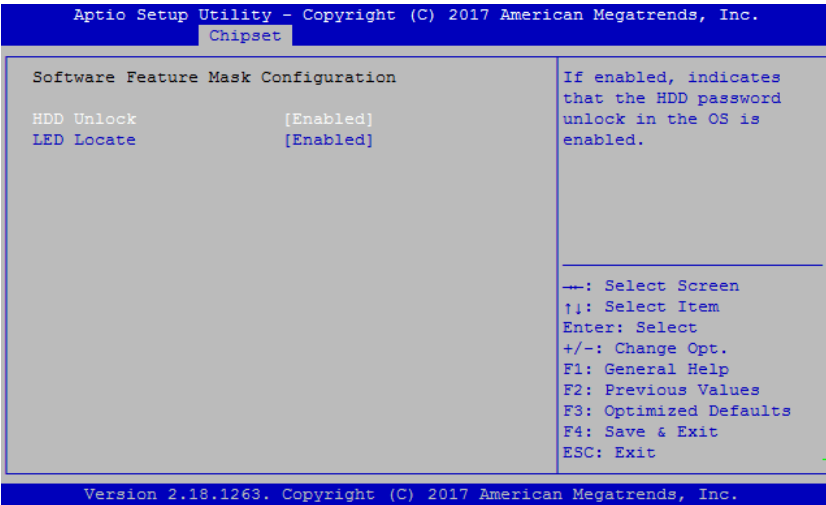
- **SATA Controller(s)**

To enable or disable SATA Controller.

- **SATA Mode Selection**

SATA mode selection. This platform provides IDE and AHCI modes.

● **Software Feature Mask Configuration**



◇ **HDD Unlock**

HDD lock control switch.

◇ **LED Locate**

If enabled, indicates that the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.

● **Port 0~3**

The control switch used by SATA 0~3 ports.

● **Hot Plug**

Designated control switch for hot plug.

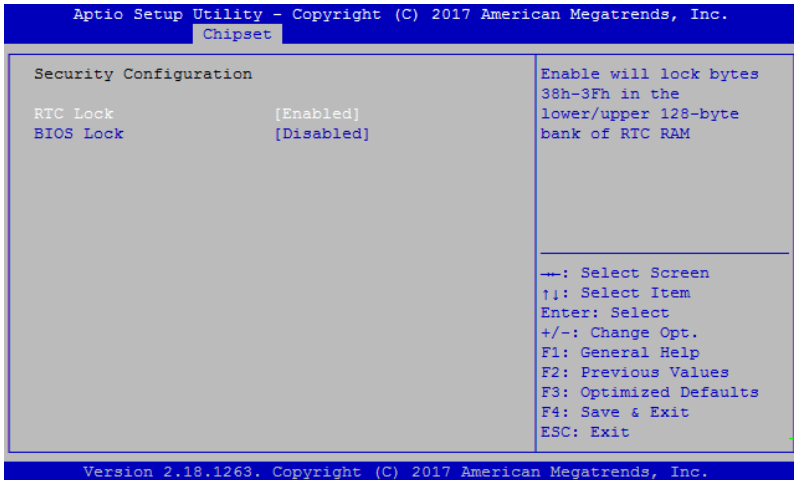
● **Spin Up Device**

On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.

● **SATA Device Type**

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

➤ **Security Configuration**



❖ **RTC Lock**

RTC register lock. If high level register of CMOS register needs to be accessed, it must be enabled.

❖ **BIOS Lock**

When it is Enabled, BIOS FLASH will be protected, and write operation is not allowed.

➤ **HD Audio Configuration**

This option provides enabling/disabling of audio port.



- **DeepSx Power Policies**

Control option to control power management item, power management policy under deep sleep state.

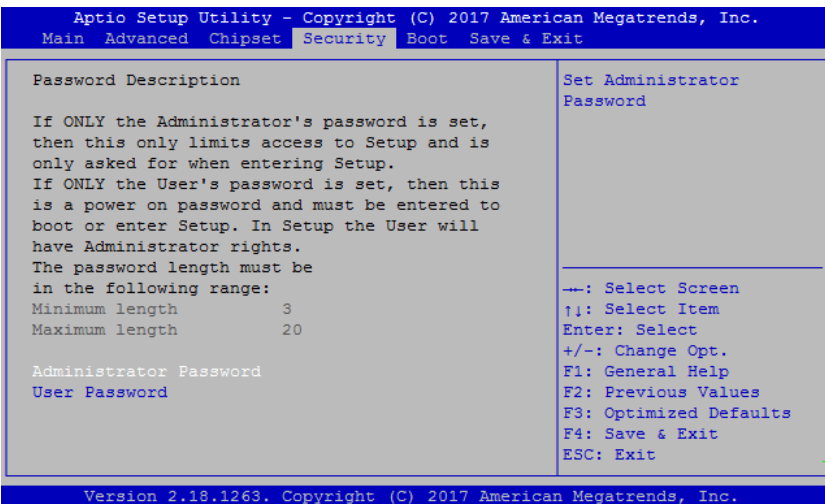
- **LAN Wake From DeepSx**

LAN Wake-up control option.

- **AC Power Loss**

This option could set the system status when the computer is re-electrified after powered off under AC. Power Off: the system stays at power-off status; Power On: the system is automatically powered on; Last State: the system return to the status before power disconnection.

- ◆ **Security**



- **Administrator Password**

This option is used to set up administrator password.

Note: If only the administrator password is set, the password does not need to be keyed in when entering into Setup program with User account. (i.e. at this time, empty password is effective).

➤ User Password

This option is used to set up user password.

Note: If only the user password is set, administrator authority can be obtained after the password is keyed in when entering Setup program. At this time, empty password is ineffective.

◆ Boot

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit

Boot Configuration
Setup Prompt Timeout      1
Bootup NumLock State     [On]
Quiet Boot                [Disabled]

Boot Option Priorities
Fast Boot                 [Disabled]

New Boot Option Policy   [Default]

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

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

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```

➤ Setup Prompt Timeout

The prompt waiting time for user response after pressing F2.

➤ Bootup NumLock State

NumLock keypad LED power-on/off switch.

➤ Quiet Boot

Boot mode selection switch, used to enable or disable Quiet Boot function.

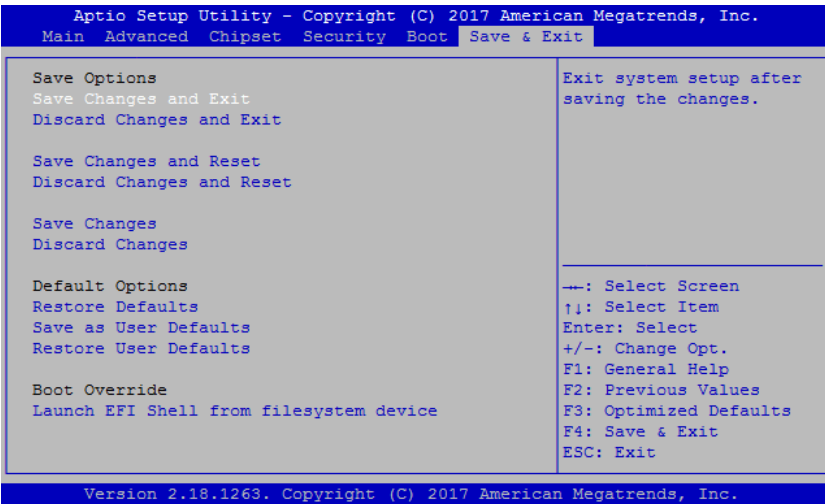
➤ **Boot Option Priorities**

This option is used to configure priorities for system boot. Among them, #1 represents highest priority, #n represents lowest priority.

➤ **Fast Boot**

To enable or disable Fast Boot function.

◆ **Save & Exit**



➤ **Save Changes and Reset**

This option is used to save changes and reset.

➤ **Discard Changes and Reset**

This option is used to discard changes and reset.

➤ **Restore Defaults**

This option is used to restore defaults.

4. Installing the Drivers

Regarding installation of driver program of this product, please refer to the enclosed CD.

When driver program cannot be installed, for example a yellow question mark or exclamation mark appears, it is recommended to install latest patch package of corresponding operating system, or directly install the operating system of latest release version before installing the driver program.

5. Appendix

5.1 BPI Overview

BPI (BIOS Programming Interface) is a cross-platform, easy-to-maintain software interface specification, which supports access to hardware under the Protected Mode of 32-bit or 64-bit operating system and supports multi-process and multi-threading hardware access. BPI is a bridge between hardware and application software, and its purpose is to provide a unified standard interface for the application layer (in the form of library function, similar to library function of standard C). With BPI, application software engineer do not need to care about the specific hardware solution of the motherboard. The users can use BPI library to rapidly develop their own software products, and when the hardware of the motherboard is upgraded, there is no need to modify the application software or driver and the former software can operate on the new platform normally. BPI has greatly sped up the product development and reduced the maintenance cost. The BPI architecture is shown in the Figure 1 below:

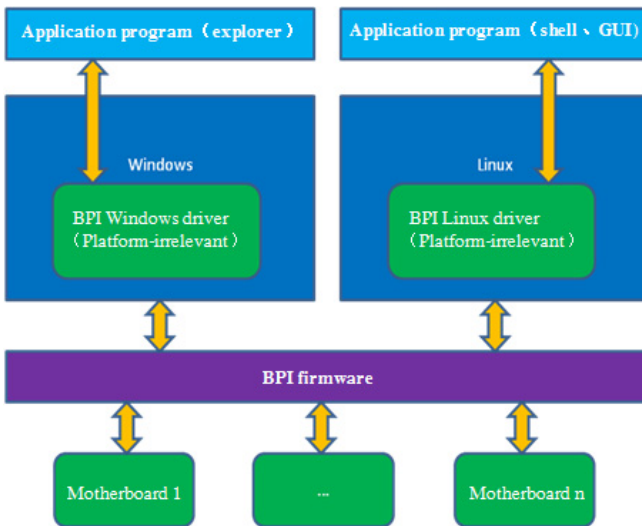


Figure1 BPI Structure

1. Functions supported by BPI

1) Watchdog

Supports Watchdog Startup, Stop and Feed Dog functions.

2) GPIO

Supports GPIO input/output programming.

3) Hardware monitoring

Supports monitoring of motherboard CPU temperature, system temperature, fan rotation speed and motherboard core voltage detection, such as CPU Core voltage, V12.0, battery voltage, and etc.

Users can use BPI library to carry out second development according the application requirements, for example:

- a) By monitoring CPU temperature: If the temperature is too high, the alarm will be triggered.
- b) To control peripheral devices by GPIO programming.

2. Advantages of BPI

1) Platform Irrelevant

The interface provided by BPI to the application layer, i.e. the BPI library function is irrelevant to the platform. Therefore, when using software developed by BPI library function, there is no need to modify the application software and it can operate on a new platform normally.

2) Security and High Reliability

The BPI library function accessing the hardware is programmed by the motherboard developer and is strictly tested; therefore, it can avoid system malfunction caused by improper operation of the system hardware.

3) Easy Maintenance

Traditional WDT and GPIO programming are closely related to the hardware, with complicated test and debug process and maintenance of software of different platforms; however, the software developed by BPI library requires maintaining only one set of the software.

4) Low Cost

Using the applications developed by BPI will not result in additional hardware and software cost. Application software engineers can conveniently use BPI library function to carry out second development, and do not need to care about access details about hardware, which greatly reduces the development difficulty, shortens development cycle and time-to-market for the system integrator.

Note: User Manual for BPI Test Program under Windows: see “Software\Chinese\BPI\EVOC_BPI_X” in the enclosed CD.

User Manual for BPI Test Program under Linux: see “Software\Chinese\BPI\linux_BPI_X” in the enclosed CD.

5.2 FMI Overview

FMI (Firmware Management Interface) is a management software developed based on BPI specifications. Currently, FMI supports log management eLog function. As for the test program, please refer to the eManager software in the user manual CD.

1) eLog

eLog can record the information of PC operation in details, such as time for first boot, time for completion of test, data of production, On/Off time, total boot times of the system, illegal power-off times, total online time length of the PC, total CPU heartbeat times. The log management information can provide valueable reference information for failure analysis and product upgrade.

5.3 Troubleshooting and Solutions

Common Malfunctions	Items to be Checked
Unable to power on after connected to power supply	<ol style="list-style-type: none"> 1. Please make sure whether the power cord is well connected; 2. Please make sure whether the adopted power supply meets the power requirement of the motherboard; 3. Please check whether the CPU has been properly installed and whether the CPU has been buckled properly; 4. Remove and install the memory bank again; 5. Replace the memory bank; 6. Please clear the CMOS according to the Manual; Please make sure whether there are peripheral cards connected, and whether it is normal after removing the peripheral cards; 7. After disconnecting peripheral power supply, wait for at least 30 seconds before reconnecting power supply again. 8. Before reconnecting external power supply, wait at least 30 seconds after disconnecting external power supply.
BIOS Setup cannot be saved	Please make sure whether the CMOS battery voltage is lower than 2.8V; if so, replace it with a new battery, set and save the BIOS Setup again.
No bootable device can be found	<ol style="list-style-type: none"> 1. Please make sure whether the power cable or data cable of the hard disk is connected properly; 2. Please make sure whether there are physical damage on the hard disk; 3. Please make sure whether operating system has been normally installed in the hard disk.

<p>Blue screen or computer crush occurred when entering system</p>	<ol style="list-style-type: none"> 1. Please make sure whether the memory bank or the peripheral card is loose; 2. Try to remove the newly installed hardware, uninstall the driver or software; 3. Try to replace the memory.
<p>Slow to enter operating system</p>	<ol style="list-style-type: none"> 1. Please check whether there are bad tracks on the hard disk by third party software; 2. Please make sure whether the remaining space on the system partition is enough; 3. Please make sure whether the CPU fan is operating normally.
<p>System reboots automatically</p>	<ol style="list-style-type: none"> 1. Please make sure whether the CPU fan is operating normally; 2. Please make sure whether the reset button has been triggered by accident; 3. Please make sure whether the system is affected by virus using anti-virus software; 4. Please make sure whether the memory bank or the peripheral card is loose; 5. Please make sure whether the loading capability of the adopted power supply is enough; please try to replace the power.
<p>No USB device can be detected</p>	<ol style="list-style-type: none"> 1. Please make sure whether independent power supply is required on the USB device; 2. Please make sure whether ill contact exists on the USB port; 3. Please make sure whether the USB controller in BIOS Setup has been enabled.

No PCI card can be detected	<ol style="list-style-type: none">1. Please make sure whether additional power supply is needed on the PCI card;2. Please make sure whether the operating voltage of the PCI card is in accord with that supplied by motherboard (5V by default);3. Please make sure whether the PCI slot can be identified after replacement.
No ISA card can be detected	<ol style="list-style-type: none">1. Please make sure the resources used by ISA card have been reserved by BIOS according to the ISA card manual. There are reserving options in BIOS Setup for ISA used I/O or memory resource on most of the motherboards; whether the IRQ used by ISA card has been reserved in BIOS Setup;2. The ISA card usually cannot be identified directly within system; please choose “Add in Hardware” in the “Control Panel” in Windows system to set.