ECO-1818(B)

H110 ATX 平台工控机主板

H110 ATX Platform Embedded PC Motherboard

Version: C00

法律资讯

警告提示

为了您的人身安全以及避免财产损失，必须注意本手册中的提示。人身安全的提示用一个警告三角表示，仅与财产损失有关的提示不带警告三角。警告提示根据危险等级由高到低如下表示。

⚠危险
表示如果不采取相应的小心措施，将会导致死亡或者严重的人身伤害。

⚠警告
表示如果不采取相应的小心措施，可能导致死亡或者严重的人身伤害。

⚠小心
带有警告三角，表示如果不采取相应的小心措施，可能导致轻微的人身伤害。

注意
表示如果不注意相应的提示，可能会出现不希望的结果或状态。

合格的专业人员

本文件所属的产品/系统只允许由符合各项工作要求的合格人员进行操作。其操作必须遵照各自附带的文件说明，特别是其中的安全及警告提示。 由于具备相关培训及经验，合格人员可以察觉本产品/系统的风险，并避免可能的危险。

EVOC产品

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产品保修期两年。用户如另有要求，以双方签署的合同为准。

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文档说明

本文档适用范围

本文档适用于EVOC ECO-1818(B)型号。

约定

在本文档中，术语“本板”或“产品”有时特指EVOC ECO-1818(B)产品。

说明

安全相关注意事项

为避免财产损失以及出于个人安全方面的原因，请注意本入门指南中关于安全方面的信息。 文中使用警告三角来指示这些安全信息，警告三角的出现取决于潜在危险的程度。

历史

本说明书发布版本：

版本	时间
B00	2018.1
C00	2018.3

安全须知

ESD 指令

可以通过下面的标签来识别含有静电敏感设备 (ESD, electrostatic sensitive devices) 的模块：



在操作含有 ESD 的模块时，请严格遵守下面提到的准则：

- 在操作含有 ESD 的模块之前，请务必导去身体上的静电（例如，通过触摸接地物体）。
- 所有设备和工具必须不能带有静电。
- 在安装或卸下含有 ESD 的模块之前，请务必要拔出电源插头并卸下电池。
- 只能通过其边缘来操作装配有 ESD 的模块。
- 请勿触摸含有 ESD 的模块上的任何连接器针脚或导体。

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1.产品介绍

1.1 概述

该主板采用Intel® H110芯片组，支持Intel® Socket LGA1151 封装的第六代Skylake、第七代Kaby Lake系列Core™ I7\I5\I3、Pentium、Celeron 处理器。板载2条288Pin DDR4 内存插槽，最大内存容量可达32GB。板载2个10/100/1000Mbps具有防雷功能的网络接口；支持MIC-IN、LINE-IN、LINE-OUT功能；支持VGA+DVI或者VGA+HDMI或者DVI+HDMI双显输出，支持的最高分辨率为1920×1200；支持3个标准SATA接口， 1个mSATA接口；支持6个USB 2.0端口、4个USB3.0接口；支持10个RS-232串口，其中2个串口还支持RS-422/485功能；支持1个PS/2 键盘/鼠标接口、1个并口、1个8路数字I/O口等丰富的I/O接口；同时提供3个PCI、3个PCIe X4（支持X1）及1个PCIe X16扩展槽；提供1个供LCM模块用的SMBUS接口、1个TPM插针接口。ECO-1818(B)具有充分的接口和扩展选择空间。

1.2 机械尺寸、重量与环境

- 外形尺寸：305mm（长）×244mm（宽）×37.1mm（高）
- 净重：0.68Kg
- 工作环境：

  温度：-10℃～+60℃

  湿度：5%～95%（非凝结状态）
- 贮存环境：

  温度：-20℃～+80℃

  湿度：5%～95%（非凝结状态）

1.3 电源选型参考功耗

参考功耗基于以下环境的数值，扩展卡及其它外加设备功耗在电源选型时需按规格要求增加。

CPU: I7-6700K

内存：Transcend 4G DDR4 2133HZ

硬盘：希捷ST500DM002 500G

操作系统：Win 7 64位旗舰版

运行软件：BurnIntest 7

- +5V@ 0.57A；+5%/-3%
- +3.3V@ 0.436A；+5%/-3%
- +12V@ 6.03A；+5%/-3%

本主板评估最大电流为6.03A，选择电源输入的最大电流不得小于此数值。

1.4 开机最小功耗

开机最小功耗是基于主板在以下配置状态的数值。同等配置下，选择电源允许的最小电流不得大于此数值。

CPU: I7-6700K

内存：Transcend 4G DDR4 2133HZ

- +5V@ 0.57A；+5%/-3%
- +3.3V@ 0.431A；+5%/-3%
- +12V@ 1.53A；+5%/-3%

1.5 微处理器

支持Intel® Socket LGA1151 封装的第六代Skylake、第七代Kaby Lake系列Core™ I7\I5\I3、Pentium、Celeron 处理器。如Intel® Core™ i7-7700 、Intel® Core™ i5-7500 、Intel® Core™ i3-7300 、Intel® Core™ i7-6700 、Intel® Core™ i5-6500 、Intel® Core™ i3-6300、Intel® Pentium® G4400、 Intel® Celeron® G3900等处理器。

1.6 芯片组

Intel® H110

1.7 系统内存

ECO-1818(B)提供 2 条 288Pin DDR4 内存插槽，支持 Un-buffered、NON-ECC UDIMM 内存，支持的内存频率可达 2133MHz，支持双通道功能。单条内存插槽可支持最大内存容量 16GB，总支持最大内存容量 32GB。

1.8 显示功能

- 支持VGA+DVI或者VGA+HDMI或者DVI+HDMI双显的复制、扩展桌面功能；DVI-D支持热插拔功能；
- 支持最低分辨率640 × 480 32bpp@60Hz，最高分辨率1920 × 1200 32bpp@60Hz。

1.9 网络功能

提供2个同型号的Intel 10/100/1000Mbps具有防雷功能网络接口，LAN1可支持网络唤醒功能和网络PXE启动。

1.10 音频功能

采用HDA标准，支持MIC-IN/LINE-IN/LINE-OUT。

1.11 电源特性

采用ATX电源，支持ACPI电源管理功能。可以通过跳线实现AT开机模式，实现来电自动开机功能。

1.12 扩展总线

- 提供1个PCI Express x16插槽，兼容PCI Express 3.0/2.0标准；
- 提供3个PCI Express x4插槽，实际提供X1信号，兼容PCI Express 2.0/1.1标准；
- 提供3个32位5V PCI插槽，兼容PCI Rev2.3标准。

1.13 Watchdog功能

- 支持 255 级，可编程按分或秒；
- 支持看门狗超时中断或复位系统。

1.14 操作系统

支持以下操作系统：Windows 7、Windows 8.1、Windows10、Windows Server 2012、Windows Server 2012 R2、Red Hat® Enterprise Linux、Cent OS Linux 等 Linux 系统（建议使用高内核版本的 linux 系统，以防止由于内核版本太低导致的兼容性问题）。

备注：1、部分系统无法直接使用 USB 设备(USB 光驱、U 盘等)进行安装，如 Windows7，请使用 SATA 光驱安装。Windows 系列需要 Win8 及以

上系统才能支持这个平台 USB 控制器的驱动，Linux 要求 CentOS 6.4 或同等内核环境的 Linux 及以上系统才能支持这个平台 USB 控制器的驱动。

2、驱动支持：Intel 只提供了 Windows7 32bit/64bit、Windows8.1 64bit、Windows10 64bit 芯片组驱动。

3、网卡驱动：Intel 没有提供 Windows Server 系统的 I211 网卡驱动。

1.15 I/O接口

- 提供 1 个并口，支持 SPP/EEP/ECP 工作模式，支持 BIOS 修改工作模式；
- 提供 10 个串口，其中 COM1、COM2 支持 RS-232/RS-422/RS-485 模式选择，且支持 RS-485 的自动流控制功能；COM3-COM10 支持 RS-232 功能；COM1 具有唤醒功能；
- 提供 3 个标准 SATA 接口，支持 SATA3.0，AHCI 模式下支持热插拔功能；提供 1 个 mSATA 接口；
- 提供 6 个 USB 2.0 接口，4 个 USB 3.0 接口；
- 提供 1 个 PS/2 键盘/鼠标接口；
- 提供 1 个 8 路数字 I/O 接口；
- 提供 1 个 TPM 接口；
- 提供 1 个供 LCM 模块用的 SMBUS 接口。

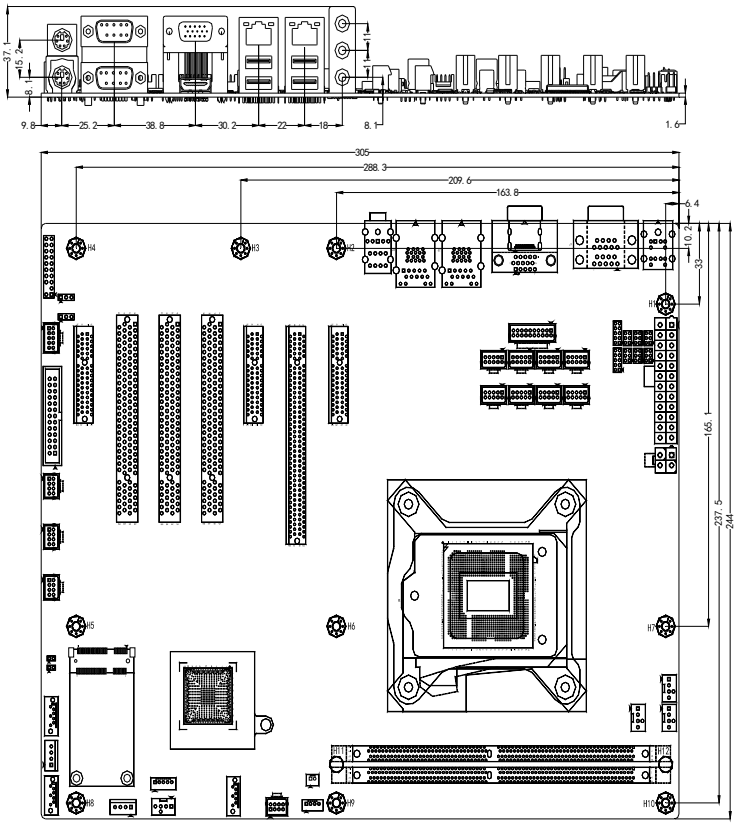
提示：如何识别报警声

1、长鸣声为系统内存出错。

2、短“嘀”一声为开机声。

2.安装说明

2.1 产品外形尺寸图

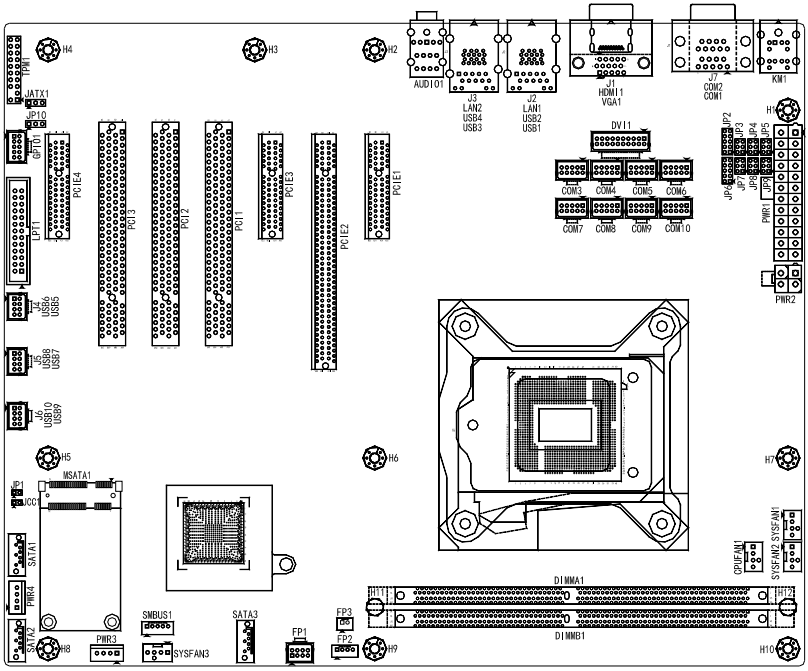


单位：mm

警告！

请务必选择合适的螺钉和使用正确的安装方法（包括板卡定位、CPU、散热器等安装），否则可能损坏板。此板推荐 H1～H10 使用 M3×6 GB-9074.4-88/镀镍/带垫圈组合螺钉。

2.2 接口位置示意图


H4
H3
H2
AUDIO1
J3
LAN2
USB4
USB3
J2
LAN1
USB2
USB1
J1
HDMI1
VGA1
J7
COM2
COM1
KM1
H1
ATX1
JP10
GPIO1
LPT1
PCIE4
PCI3
PCI2
PCI1
PCIE3
PCIE2
PCIE1
DVI1
COM3
COM4
COM5
COM6
COM7
COM8
COM9
COM10
JP2
JP3
JP4
JP5
JP6
JP7
JP8
PWR1
PWR2
J4
USB6
USB5
J12
USB8
USB7
J6
USB10
USB9
H5
H6
H7
MSATA1
JP1
CC1
SATA1
PWR4
SATA2
H8
PWR3
SMBUS1
SYSFAN3
SATA3
FP1
FP3
FP2
H9
DIMMA1
DIMMB1
H10
CPUFAN1
SYSFAN2
SYSFAN1

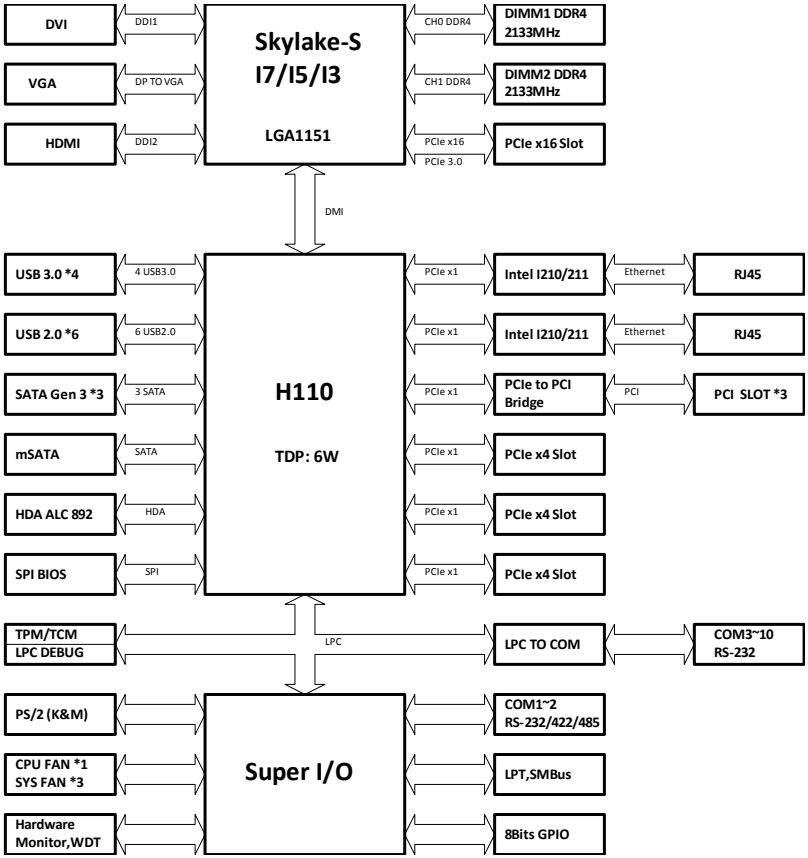
2.3 记录板卡的标识数据

注意
在维修时或失窃后，可凭借这些唯一的编号来识别板卡，请不要撕毁。

序列号：位于板卡上（如下图所示）



2.4 架构图



提示：如何识别跳线、接口第一脚

1、观察插头、插座旁边的文字标记，通常用“1”或加粗的线条或三角符号表示。

2、看看背面的焊盘，通常方型焊盘为第一脚。

2.5 跳线设置

1. JCC1：CMOS内容清除/保持设置（脚距：2.0mm）

CMOS由板上钮扣电池供电。清CMOS会导致永久性消除以前系统配置并将其设为原始（工厂设置）系统设置。其步骤:(1)关闭计算机，断开电源；(2)瞬间短接JCC1插针；(3)开计算机；(4)启动时按屏幕提示按键进入BIOS设置，重新加载最优缺省值；(5)保存并退出设置。设置方式如下：

	设置	功能
 JCC1	1-2 开路	正常工作状态（Default）
	1-2 短路	清除 CMOS 内容，所有 BIOS 设置恢复成出厂值

2. JATX1：开机模式选择（脚距：2.54mm）

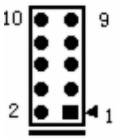
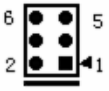
	设置	功能
 JATX1	1-2 短路	ATX 模式（Default）
	2-3 短路	AT 模式

3. JP1：ME更新设置（脚距：2.0mm）

	设置	功能
 JP1	1-2 开路	正常工作状态（Default）
	1-2 短路	Intel ME调试模式（仅更新ME时使用）

4. JP2/JP3/JP4/JP6/JP7/JP8:串口配置（脚距：2.0mm）

可通过设置JP2～JP4(对应COM1设置)、 JP6～JP8(对应COM2设置)（脚距：2.0mm）并配合BIOS设置对COM1/COM2的串口模式进行配置。

	串口	管脚	信号名称		
			RS-232（Default）	RS-422	RS-485
 JP2/JP6	COM1	JP2	1-2/9-10	3-4/9-10	5-6/7-8
		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
 JP3/JP4/JP7/JP8	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模式长距离传输设置（脚距：2.0mm）

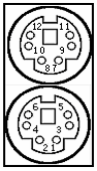
可通过JP5(对应COM1设置)/JP9(对应COM2设置)实现COM1/COM2 RS-422/RS-485模式长距离传输。

	设置	功能
 JP5/JP9	[3-5][4-6]短路	非长距离传输（默认）
	[1-3][2-4]短路	RS-485 模式
	[2-4]短路	RS-422 模式

6、JP10：GPIO初始电平设置（脚距：2.54mm）

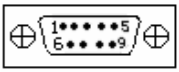
	设置	功能（GPIO 初始电平设置）
 JP10	1-2 短路	高电平（Default）
	2-3 短路	低电平

2.6 KB/MS接口

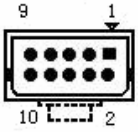
	管脚	信号名称	管脚	信号名称
 KM1	1	KB_DATA	7	MS_DATA
	2	NC	8	NC
	3	GND	9	GND
	4	+5V	10	+5V
	5	KB_CLK	11	MS_CLK
	6	NC	12	NC

2.7 串口

本板提供10个串口，管脚定义如下：



J7（COM1/COM2）



COM3～COM10
（脚距：2.0mm）

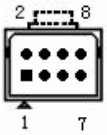
管脚	信号名称		
	RS-232 COM1～COM10	RS-485 COM1/COM2	RS-422 COM1/COM2
1	DCD#	DATA-	TXD-
2	RXD	DATA+	TXD+
3	TXD	NC	RXD+
4	DTR#	NC	RXD-
5	GND	GND	GND
6	DSR#	NC	NC
7	RTS#	NC	NC
8	CTS#	NC	NC
9	RI#	NC	NC
10	NC	NC	NC

注：1、在 RS-485 模式下，数据收发方向为自动控制；

2、J7上层为COM2，下层为COM1；

3、COM1 具有唤醒功能（通过 RI#引脚唤醒）。

2.8 ATX电源开关及指示灯接口

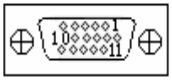


FP1
（脚距：2.0mm）

管脚	信号名称	管脚	信号名称
1	PWRBTN#	2	GND
3	GND	4	RESET#
5	HDD_LED-	6	HDD_LED+
7	GND	8	PWR_LED+

2.9 显示接口

1、本主板提供1个标准DB15 VGA接口，管脚定义如下：

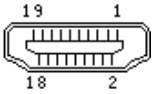


J1A（VGA1）

管脚	信号名称	管脚	信号名称
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	-	-

注：上层为VGA，下层为HDMI。

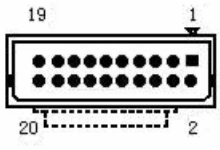
2. 本主板提供1个Type A型HDMI接口，管脚定义如下：



HDMI1

管脚	信号名称	管脚	信号名称
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	20	-

3. 本主板提供1个2×10Pin DVI接口(脚距：2.0mm带扣Wafer)。

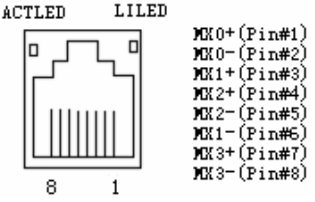


DVI1

管脚	信号名称	管脚	信号名称
1	DATA2-	2	DATA2+
3	GND	4	GND
5	DATA1-	6	DATA1+
7	GND	8	GND
9	DATA0-	10	DATA0+
11	GND	12	GND
13	CLK+	14	CLK_
15	+5V	16	HPDET
17	DDCDATA	18	DDCCLK
19	GND	20	GND

2.10 网络接口

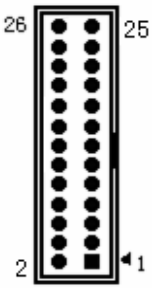
本板提供2个10/100/1000Mbps网络和USB复合接口J2(LAN1)和J3(LAN2)。LAN1支持网络唤醒功能。ACTLED和LILED是以太网接口两边的绿色和双色LED，它们显示着LAN的活动指示状态和网络速度指示状态。请参考以下每一个LED的状态描述：



J2(LAN1)、J3(LAN2)

ACTLED （单色：绿色灯）	网络活动 指示状态		LILED （双色：橙绿双色）	网络速度 指示状态
			绿色	1000Mbps
闪烁	有数据传输		橙色	100Mbps
灭	无数据传输		灭	10Mbps

2.11 LPT接口(IDC连接器)



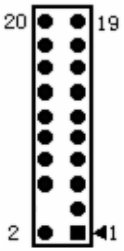
LPT1

（脚距：2.54mm）

管脚	信号名称	管脚	信号名称
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

2.12 TPM接口

本板提供1个2×10Pin TPM插针接口（Pin4为空）。

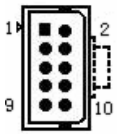


TPM1
(脚距：2.54mm)

管脚	信号名称	管脚	信号名称
1	LPC_CLK	2	GND
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

注：CLKRUN 信号实际下拉4.7K到GND。

2.13 GPIO接口



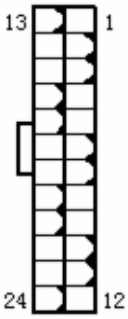
GPIO1
(脚距：2.0mm)

管脚	信号名称	管脚	信号名称
1	INPUT0	2	OUTPUT0
3	INPUT1	4	OUTPUT1
5	INPUT2	6	OUTPUT2
7	INPUT3	8	OUTPUT3
9	GND	10	NC

注：出厂GPIO Default值为TTL输入/输出，输入输出信号的电压范围为0～5V。

2.14 主板供电接口

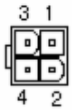
1、24Pin ATX电源接口



PWR1
（脚距：4.2mm）

管脚	信号名称	管脚	信号名称
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

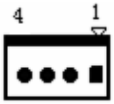
2、4Pin CPU电源接口



PWR2
（脚距：4.2mm）

管脚	信号名称
1	GND
2	GND
3	+12V
4	+12V

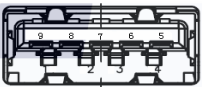
3、4Pin SATA电源接口

	管脚	信号名称
 PWR3/PWR4 （脚距：2.54mm）	1	+12V
	2	GND
	3	GND
	4	+5V

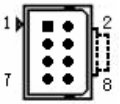
2.15 USB接口

主板后面板提供2个双层USB 3.0和RJ45复合接口，3个USB2.0 Wafer接口。

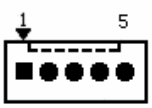
1、双层USB3.0接口

	管脚	信号名称
 J2（USB1/USB2） J3（USB3/USB4）	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+

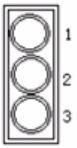
2、USB2.0 Wafer 接口

	管脚	信号名称	管脚	信号名称
 J4～J6 （脚距：2.0mm）	1	+5V_USB	2	+5V_USB
	3	USB1_DATA-	4	USB2_DATA-
	5	USB1_DATA+	6	USB2_DATA+
	7	GND	8	GND

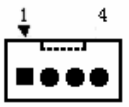
2.16 SMBUS接口

	管脚	信号名称
 SMBUS1 （脚距：2.0mm Wafer）	1	+3.3V
	2	SMB_DATA
	3	SMB_CLK
	4	GND
	5	+5V

2.17 音频接口

	管脚	信号名称
 AUDIO1	1	LINE_IN
	2	LINE_OUT
	3	MIC_IN

2.18 扬声器输出接口



FP2

（脚距：2.0mm）

管脚	信号名称
1	BUZ-
2	NC
3	GND
4	BUZ+

2.19 PWRBTN#接口



FP3

（脚距：2.0mm wafer）

管脚	信号名称
1	PWRBTN#
2	GND

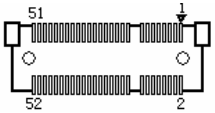
2.20 SATA接口



SATA1～SATA3

管脚	信号名称
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

2.21 mSATA接口



MSATA1

管脚	信号名称	管脚	信号名称
1	NC	2	+3.3VSB
3	NC	4	GND
5	NC	6	+1.5V
7	CLKREQ#	8	NC
9	GND	10	NC
11	NC	12	NC
13	NC	14	NC
15	GND	16	NC
17	Reserved	18	GND
19	Reserved	20	NC
21	GND	22	PERST#
23	SATA_RX+	24	+3.3V
25	SATA_RX-	26	GND
27	GND	28	+1.5V
29	GND	30	NC
31	SATA_TX-	32	NC
33	SATA_TX+	34	GND
35	GND	36	NC
37	GND	38	NC
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	NC
45	Reserved	46	NC
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	Reserved	52	+3.3VSB

2.22 CPU风扇接口/系统风扇接口



CPUFAN1/SYSFAN1/
SYSFAN2/SYSFAN3
（脚距：2.54mm）

管脚	信号名称
1	GND
2	+12V
3	FAN_IO
4	FAN_PWM

注：FAN_IO：风扇转速脉冲输出； FAN_PWM：风扇转速 PWM 控制。

2.23 PCIe X16 接口

本板提供1个PCIe X16插槽（PCIE2），其管脚定义如下：

管脚	信号名称	管脚	信号名称	管脚	信号名称	管脚	信号名称
A1	PRSNT1#	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	+12V	B4	GND
A5	TCK	A6	TDI	B5	SMCLK	B6	SMDATA
A7	TDO	A8	TMS	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	TRST#	B10	3.3Vaux
A11	PWRGD/PERST#	A12	GND	B11	WAKE#	B12	RSVD
A13	REFCLK+	A14	REFCLK-	B13	GND	B14	PET0+
A15	GND	A16	PER0+	B15	PET0-	B16	GND
A17	PER0-	A18	GND	B17	PRSNT2#	B18	GND
A19	RSVD	A20	GND	B19	PET1+	B20	PET1-
A21	PER1+	A22	PER1-	B21	GND	B22	GND
A23	GND	A24	GND	B23	PET2+	B24	PET2-
A25	PER2+	A26	PER2-	B25	GND	B26	GND
A27	GND	A28	GND	B27	PET3+	B28	PET3-

A29	PER3+	A30	PER3-	B29	GND	B30	RSVD
A31	GND	A32	RSVD	B31	PRSNT2#A	B32	GND
A33	RSVD	A34	GND	B33	PET4+	B34	PET4-
A35	PER4+	A36	PER4-	B35	GND	B36	GND
A37	GND	A38	GND	B37	PET5+	B38	PET5-
A39	PER5+	A40	PER5-	B39	GND	B40	GND
A41	GND	A42	GND	B41	PET6+	B42	PET6-
A43	PER6+	A44	PER6-	B43	GND	B44	GND
A45	GND	A46	GND	B45	PET7+	B46	PET7-
A47	PER7+	A48	PER7-	B47	GND	B48	PRSNT2#B
A49	GND	A50	RSVD	B49	GND	B50	PET8+
A51	GND	A52	PER8+	B51	PET8-	B52	GND
A53	PER8-	A54	GND	B53	GND	B54	PET9+
A55	GND	A56	PER9+	B55	PET9-	B56	GND
A57	PER9-	A58	GND	B57	GND	B58	PET10+
A59	GND	A60	PER10+	B59	PET10-	B60	GND
A61	PER10-	A62	GND	B61	GND	B62	PET11+
A63	GND	A64	PER11+	B63	PET11-	B64	GND
A65	PER11-	A66	GND	B65	GND	B66	PET12+
A67	GND	A68	PER12+	B67	PET12-	B68	GND
A69	PER12-	A70	GND	B69	GND	B70	PET13+
A71	GND	A72	PER13+	B71	PET13-	B72	GND
A73	PER13-	A74	GND	B73	GND	B74	PET14+
A75	GND	A76	PER14+	B75	PET14-	B76	GND
A77	PER14-	A78	GND	B77	GND	B78	PET15+
A79	GND	A80	PER15+	B79	PET15-	B80	GND
A81	PER15-	A82	GND	B81	PRSNT2#C	B82	RSVD

2.24 PCIe X4 接口

本板提供3个PCIE X4插槽（PCIE1/PCIE3/PCIE4），实际提供X1信号，PCIE1其管脚定义如下：

管脚	信号名称	管脚	信号名称	管脚	信号名称	管脚	信号名称
A1	PRSNT1#	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	+12V	B4	GND
A5	TCK	A6	TDI	B5	SMCLK	B6	SMDATA
A7	TDO	A8	TMS	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	TRST#	B10	3.3Vaux
A11	PWRGD/PERST#	A12	GND	B11	WAKE#	B12	RSVD
A13	REFCLK+	A14	REFCLK-	B13	GND	B14	PET0+
A15	GND	A16	PER0+	B15	PET0-	B16	GND
A17	PER0-	A18	GND	B17	NC	B18	GND
A19	NC	A20	GND	B19	NC	B20	NC
A21	NC	A22	NC	B21	GND	B22	GND
A23	GND	A24	GND	B23	NC	B24	NC
A25	NC	A26	NC	B25	GND	B26	GND
A27	GND	A28	GND	B27	NC	B28	NC
A29	NC	A30	NC	B29	GND	B30	NC
A31	GND	A32	NC	B31	NC	B32	GND

2.25 PCI接口

本板提供3个5V的标准PCI接口(PCI1～PCI3)，管脚定义如下：

管脚	信号名称	管脚	信号名称	管脚	信号名称	管脚	信号名称
A1	TRST#	A31	PCI_AD18	B1	-12V	B31	+3.3V
A2	+12V	A32	PCI_AD16	B2	TCK	B32	PCI_AD17
A3	TMS	A33	+3.3V	B3	GND	B33	PCI_C/BE#2
A4	TDI	A34	PCI_FRAME#	B4	TDO	B34	GND
A5	+5V	A35	GND	B5	+5V	B35	PCI_IRDY#
A6	INTA#	A36	PCI_TRDY#	B6	+5V	B36	+3.3V
A7	INTC#	A37	GND	B7	INTB#	B37	PCI_DEVSEL#
A8	+5V	A38	PCI_STOP#	B8	INTD#	B38	GND
A9	Null	A39	+3.3V	B9	PRSNT1#	B39	PCI_LOCK#
A10	+5V	A40	SMCLK	B10	Null	B40	PCI_PERR#
A11	Null	A41	SMDATA	B11	PRSNT2#	B41	+3.3V
A12	GND	A42	GND	B12	GND	B42	PCI_SERR#
A13	GND	A43	PCI_PAR	B13	GND	B43	+3.3V
A14	3.3Vaux	A44	PCI_AD15	B14	Null	B44	PCI_C/BE#1
A15	PCI_RST#	A45	+3.3V	B15	GND	B45	PCI_AD14
A16	+5V	A46	PCI_AD13	B16	PCI_CLK	B46	GND
A17	PCI_GNT#	A47	PCI_AD11	B17	GND	B47	PCI_AD12
A18	GND	A48	GND	B18	PCI_REQ#	B48	PCI_AD10
A19	PCI_PME#	A49	PCI_AD9	B19	+5V	B49	GND
A20	PCI_AD30	A50	PCI_C/BE#0	B20	PCI_AD31	B50	PCI_AD8
A21	+3.3V	A51	+3.3V	B21	PCI_AD29	B51	PCI_AD7
A22	PCI_AD28	A52	PCI_AD6	B22	GND	B52	+3.3V
A23	PCI_AD26	A53	PCI_AD4	B23	PCI_AD27	B53	PCI_AD5
A24	GND	A54	GND	B24	PCI_AD25	B54	PCI_AD3
A25	PCI_AD24	A55	PCI_AD2	B25	+3.3V	B55	GND
A26	PCI_IDSEL	A56	PCI_AD0	B26	PCI_C/BE#3	B56	PCI_AD1
A27	+3.3V	A57	+5V	B27	PCI_AD23	B57	+5V
A28	PCI_AD22	A58	PCI_REQ64#	B28	GND	B58	PCI_ACK64#
A29	PCI_AD20	A59	+5V	B29	PCI_AD21	B59	+5V
A30	GND	A60	+5V	B30	PCI_AD19	B60	+5V

2.26 CPU安装

安装 CPU 按以下步骤进行（安装见下图）：

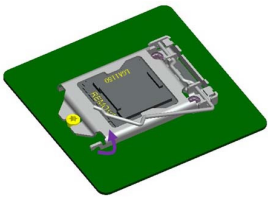
注意：

（1） 主板未安装 CPU 时，CPU 插座需用保护盖盖住，避免存放时损坏 CPU 插座；

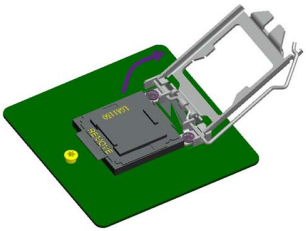
（2） 安装 CPU 时不能带线制类手套，避免丝线刮伤 CPU 插座针脚；

（3） 主板返修时，CPU 插座需用保护盖盖住。

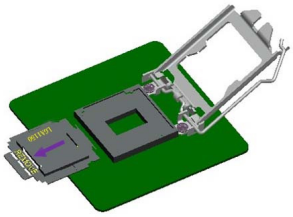
步骤 1：向下按下控制杆，并稍微向外拉使其脱开固定卡口；



步骤 2：完全打开加载板；

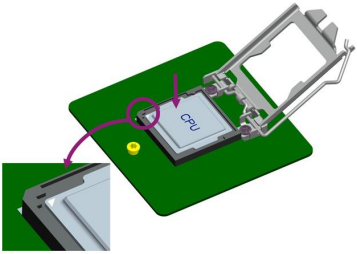


步骤 3：取下黑色保护盖，黑色保护盖可以通过盖上标有“移开”标签进行拉起；

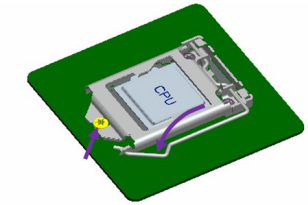


步骤 4：按正确方式定位 CPU，并对齐针脚，然后将其轻轻地插入 CPU 插座中；

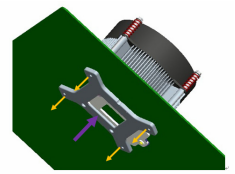
注：CPU 插座上的三角形标识需与 CPU 上的三角形标识对齐。



步骤 5：合上加载板，稍微向后拉加载板使其能够到旋钮，并将控制杆推回到原来位置；



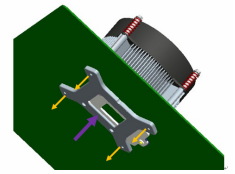
步骤 6：将散热器放置在 CPU 上，然后用螺钉将其与支架锁紧固定。



2.27 CPU散热风扇安装

安装 CPU 散热风扇按以下步骤进行：

- 先将散热片背板从 CPU 卡背面的固定孔放置好；务必注意 T 形缺口位置与 CPU 背板支架对应；
- 把散热片从正面与背板对接固定，注意散热片与 CPU 的顶盖平面接触良好；
- 然后用两颗螺丝固定散热片的对角两端（先不要拧到紧），再添加另外对角两颗螺丝，再将四个螺丝拧紧；
- 最后将风扇电源线接到主板的风扇插座上。



注意！建议使用经Intel认证过的散热风扇；在安装风扇前，先把散热膏涂抹在CPU与风扇散热片接触的表面上以增强散热效果。

2.28 SATA硬盘热插拔

SATA 硬盘热插拔需注意：

（1） 硬盘必须支持：SATA2.0 接口以上，并且采用 15 芯 SATA 硬盘电源接口；

（2） SATA 硬盘仅工作在 AHCI 模式下且打开热拔插选项时支持热插拔功能；

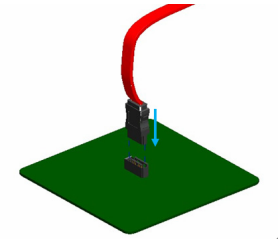
（3） 芯片组驱动程序支持 SATA 硬盘的热插拔；

（4） 不能对操作系统所在的 SATA 硬盘进行带电热插拔。

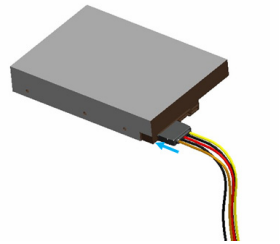
注：请按照如下步骤进行 SATA 硬盘热插拔，否则，操作不当会导致硬盘损坏和数据丢失。

热插入SATA硬盘步骤：

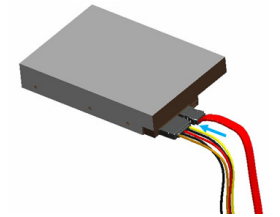
步骤1：将SATA数据线接到主板上的SATA接口；



步骤2：将SATA电源线15-针脚接口（黑色）一端接到SATA硬盘；



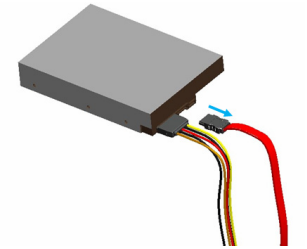
步骤3：将SATA数据线接到SATA硬盘。



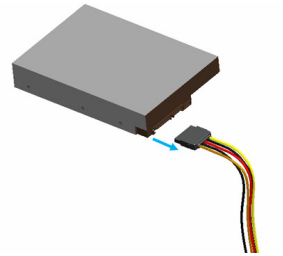
热拔出SATA硬盘步骤：

步骤 1：从设备管理器中卸载该硬盘；

步骤 2：从 SATA 硬盘一侧拔去 SATA 数据线；



步骤 3：从 SATA 硬盘一侧拔去 SATA 15-针脚电源线接口（黑色）。



3.BIOS功能介绍

3.1 UEFI简介

UEFI(Unified Extensible Firmware Interface：标准的可扩展固件接口)，是新一代的计算机固件，用于取代传统的BIOS。UEFI固件存储在主板的闪存存储器中，主要功能包括：初始化系统硬件，设置各系统部件的工作状态，调整各系统部件的工作参数，诊断系统各部件的功能并报告故障，给上层软件系统提供硬件操作控制接口，引导操作系统等。UEFI提供用户一个菜单式的人机接口，方便用户配置各系统参数设置，控制电源管理模式，调整系统设备的资源分配等。

正确设置UEFI的各项参数，可使系统稳定可靠地工作，同时也能提升系统的整体性能。不适当的甚至错误的UEFI参数设置，则会使系统工作性能大为降低，使系统工作不稳定，甚至无法正常工作。

3.2 UEFI参数设置

每当系统接通电源，正常开机后，便可看见进入UEFI设置程序提示的信息。此时(其它时间无效)，按下提示信息所指定的按键（通常为<Del>键或<ESC>键）即可进入UEFI设置程序。

通过UEFI设置程序修改的所有设置值（除了日期、时间）都保存在系统的闪存存储器中，即使掉电或拔掉主板电池，其内容也不会丢失；而日期、时间则保存在系统的CMOS存储器中，该CMOS存储器由电池供电，即使切断外部电源，其内容也不会丢失，除非执行清除CMOS内容的操作。

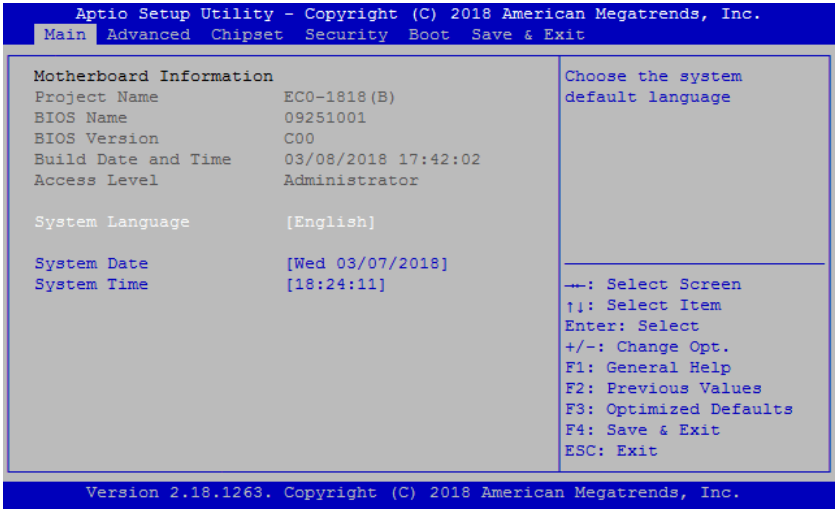
注意！UEFI的设置直接影响到电脑的性能，设置错误的参数将造成电脑的损坏，甚至不能开机，请使用UEFI内置缺省值来恢复系统正常运行。

由于本公司不断研发更新UEFI，其设置界面也会略有不同，以下的画面供您参考，有可能跟您目前所使用的UEFI设置程序不完全相同。

3.3 UEFI基本功能设置

当SETUP程序启动之后，您可以看到Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.主画面如下：

◆ **Main**



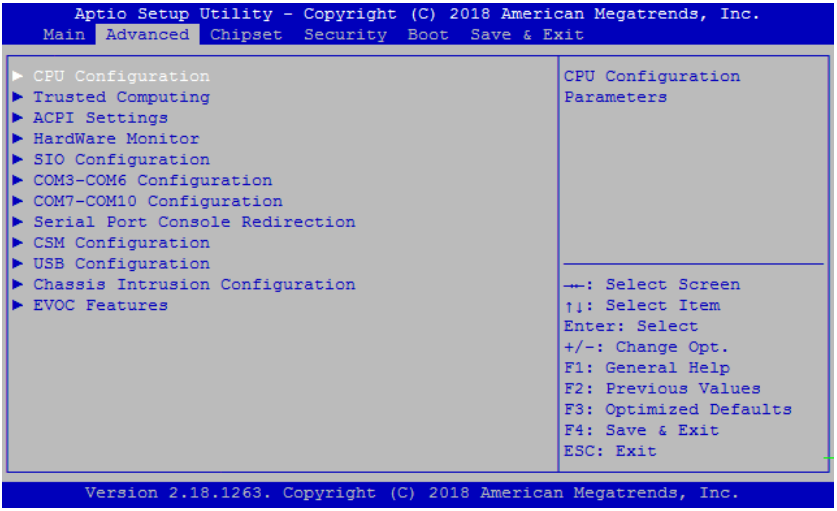
➢ **System Date**

选择此选项，用< + > / < - >来设置目前的日期。以月/日/年的格式来表示。各项目合理的范围是：Month/月(1-12)，Date/日(01-31)，Year/年(最大至 2099)， Week/星期(Mon.～ Sun.)。

➢ **System Time**

选择此选项，用< + > / < - >来设置目前的时间。以时/分/秒的格式来表示。各项目合理的范围是：Hour/时(00-23)，Minute/分(00-59)，Second/秒(00-59)。

◆ Advanced



➢ CPU Configuration

此项显示 CPU 的相关信息及功能。请注意：CPU 的型号，工作频率，处理器核的个数，超线程技术及虚拟技术等 CPU 技术参数，与所安装的 CPU 有关，不同系列的 CPU 所显示的信息内容有所不同。



- **SW Guard Extensions(SGX)**

  一种旨在增加应用程序代码和数据安全性的Intel架构扩展。

- **CPU Flex Ratio Override**

  CPU倍频，取值范围由CPU决定。当“CPU Flex Ratio Override”设置为“Enabled”时“CPU Flex Ratio Setting”可编辑。

- **Hardware Prefetcher**

  MLC预取功能控制开关。

- **Adjacent Cache Line Prefetch**

相邻的高速缓存线路的预取控制开关。

- **Intel(VMX) Virtualization Technology**

  Intel虚拟技术功能的控制开关。

- **PECI**

  平台环境接口控制选项。

- **Active Processor Cores**

  活动的处理器核的个数配置。

- **Hyper-Threading**

  超线程功能的控制开关。

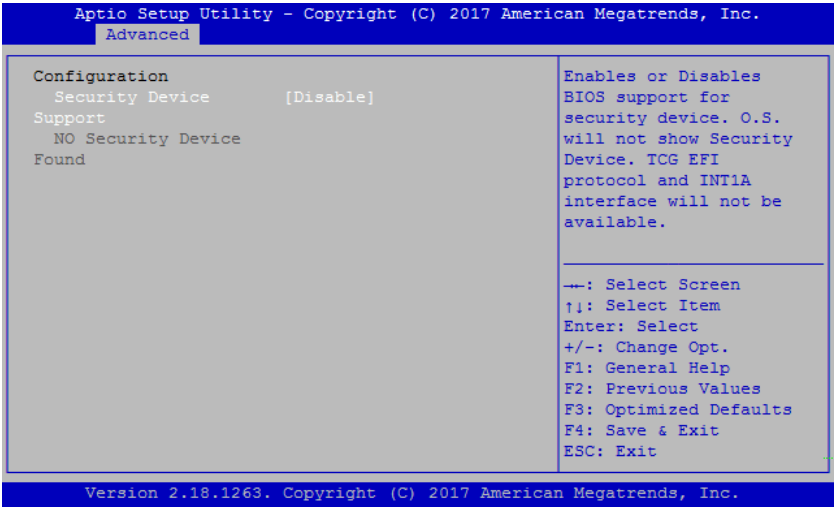
- **BIST**

  一种允许机器进行自我测试的机制。

- **MonitorMWait**

  Monitor/Mwait指令开关控制选项。

➢ **Trusted Computing**

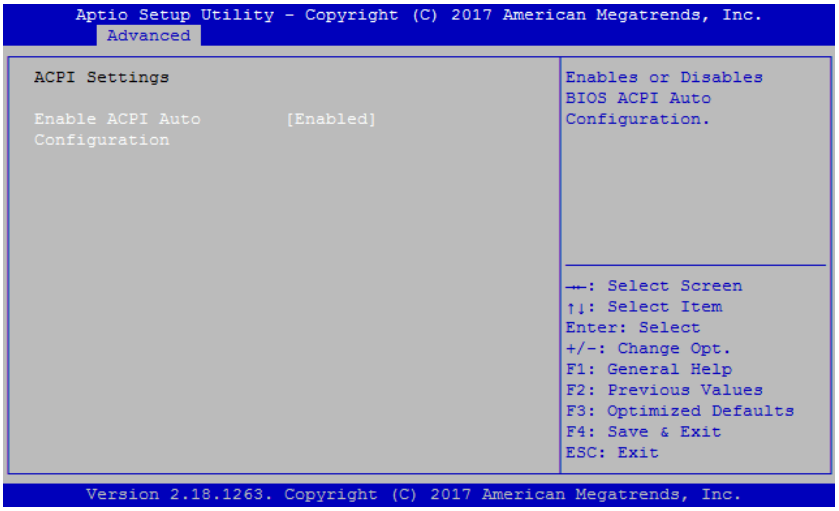


- **Security Device Support**

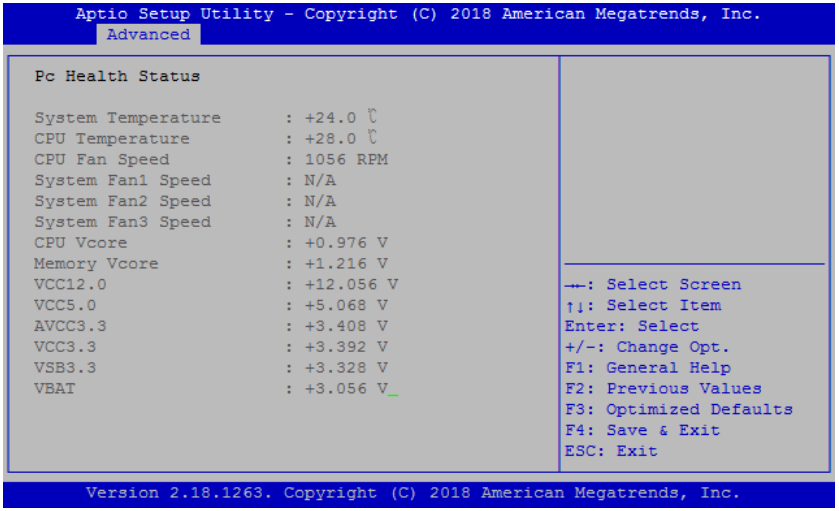
  使能或关闭TPM（可信计算）功能。

➢ **ACPI Settings**

此项显示系统的ACPI设置。



➢ **HardWare Monitor**



- System temperature

  侦测显示主板的环境系统温度。

- CPU temperature

  侦测显示CPU核心温度。

- CPU FAN Speed

  显示当前主板CPU风扇(CPUFAN1)的转速。

- System Fan1 Speed

  侦测显示当前主板系统风扇(SYSFAN1)的转速。

- CPU Vcore

  侦测显示当前主板CPU核心电压的工作电压值。

- Memory Vcore

  侦测显示主板内存当前的电压值。

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

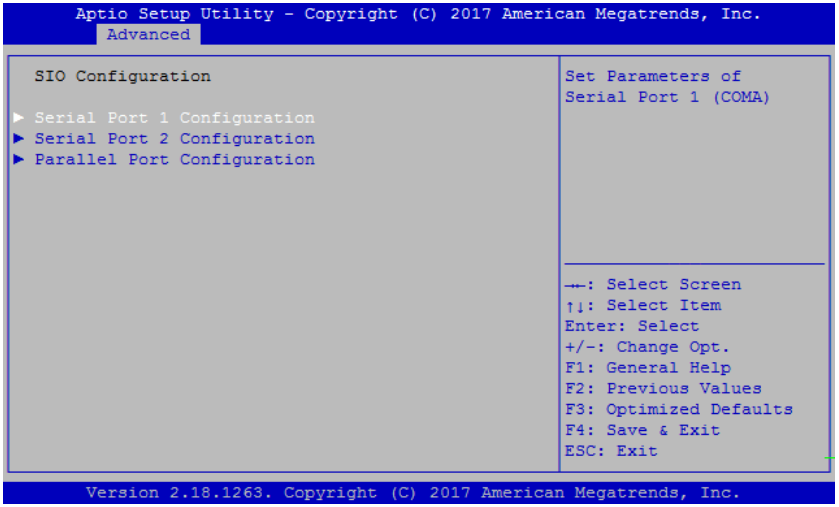
  侦测显示ATX电源的各主电压的工作电压值。

- VBAT

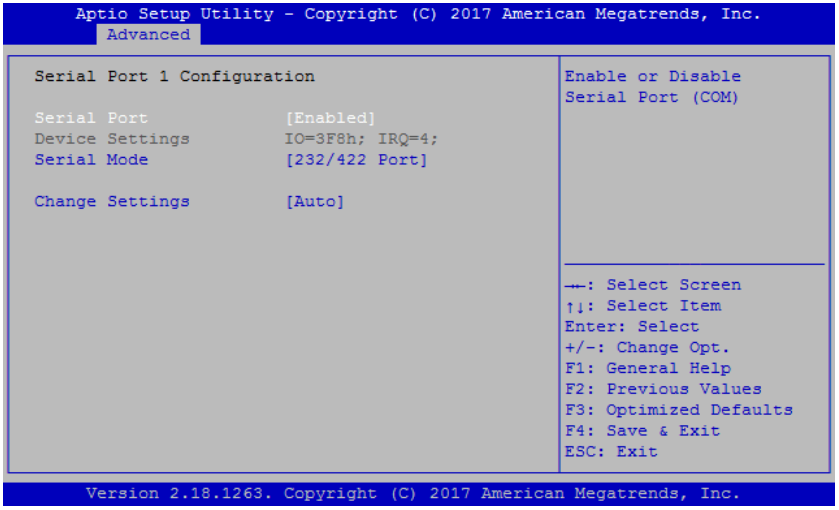
  侦测显示主板电池当前的电压值。

➢ Super IO Configuration

该项提供本平台的串口COM1～2和并口的配置。



- Serial Port 1～2 Configuration



✧ Serial Port

当前串口使用的控制开关。

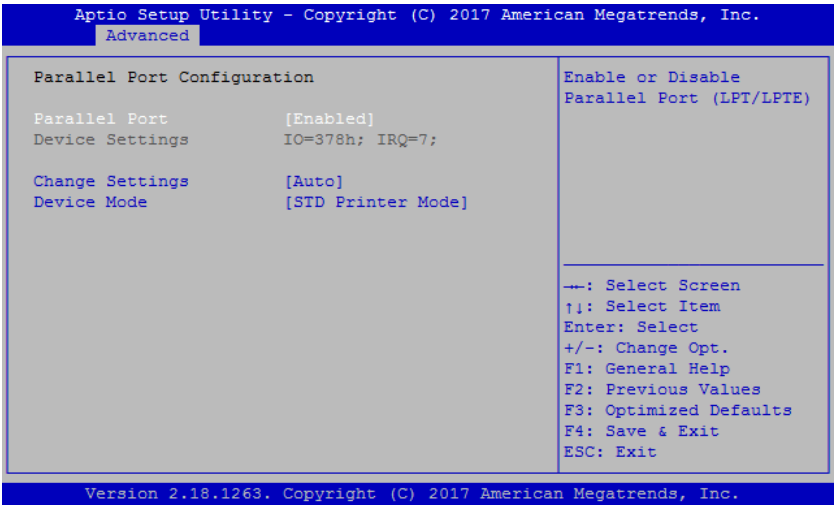
✧ Device Settings

显示串口当前的资源配置。

✧ **Serial Mode**

更改串口模式为 232 或者 485/422 模式。

● **Parallel Port Configuration**



✧ **Parallel Port**

当前并口使用的控制开关。

✧ **Device Settings**

显示并口当前的资源配置。

✧ **Change Settings**

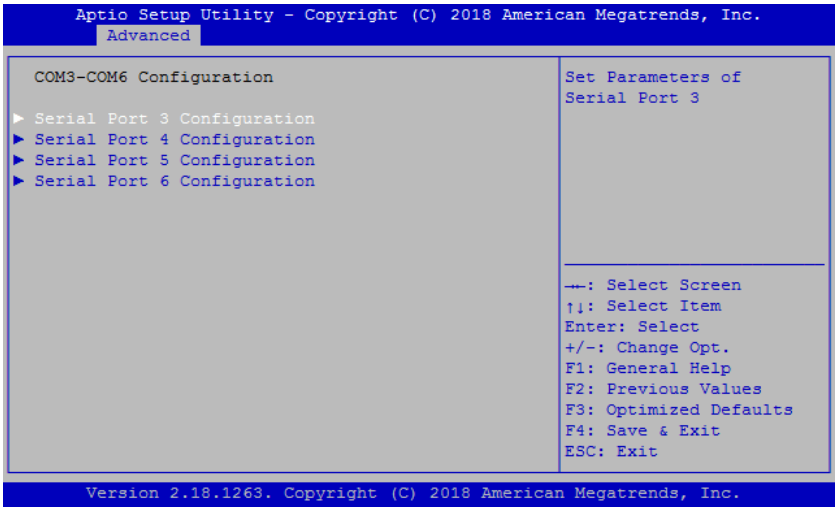
设置并口的IO地址和IRQ资源。

✧ **Device Mode**

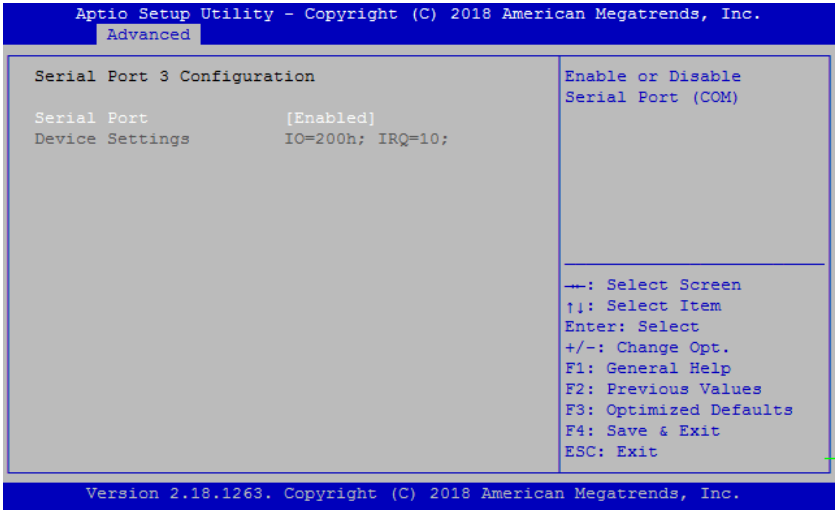
并口工作模式选择。

➢ **COM3-COM6 Configuration**

设置串口3～6的资源。



- Serial Port 3～6 Configuration



✧ Serial Port

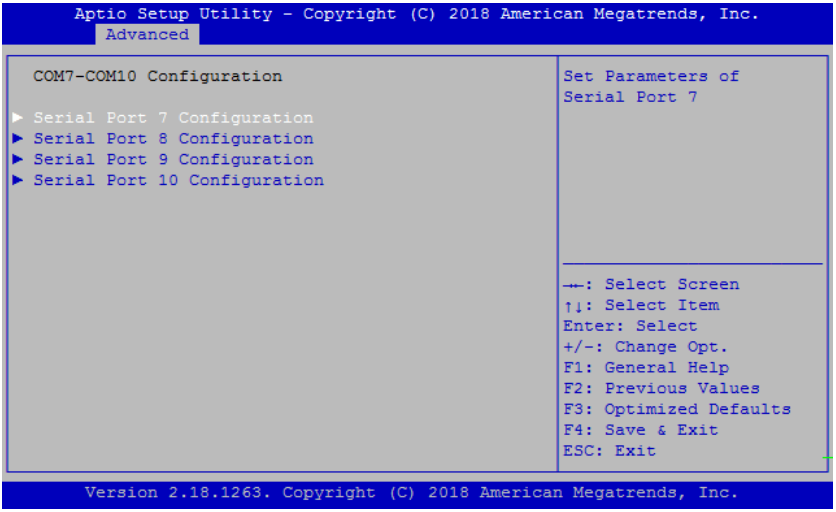
当前串口使用的控制开关。

✧ Device Settings

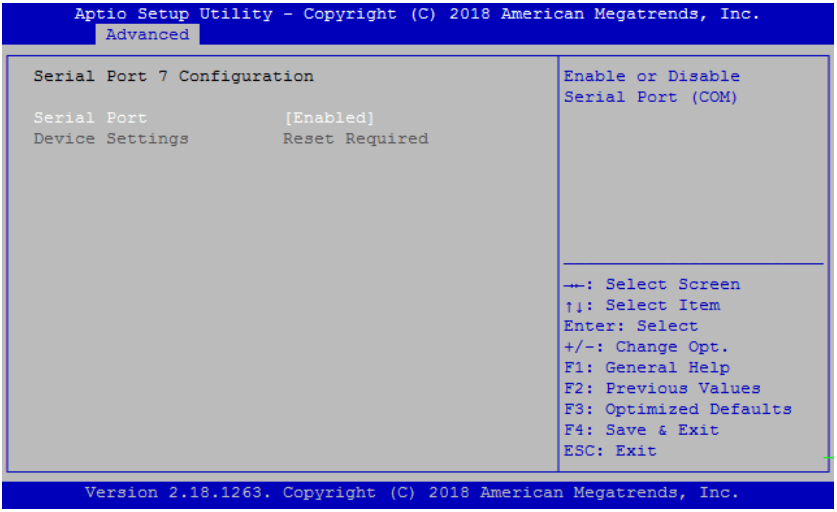
显示串口当前的资源配置。

➢ COM7-COM10 Configuration

设置串口7～10的资源。



● Serial Port 7～10 Configuration



✧ Serial Port

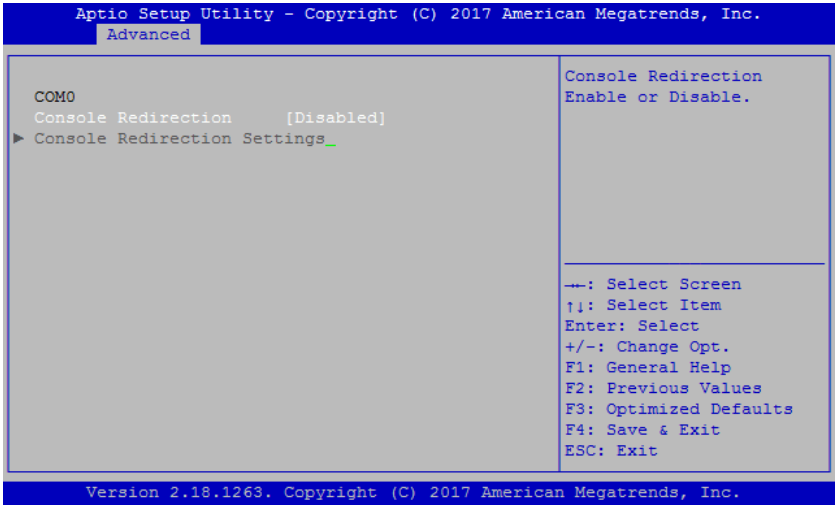
当前串口使用的控制开关。

✧ Device Settings

显示串口当前的资源配置。

➢ Serial Port Console Redirection

该项提供串口重定向功能的配置。

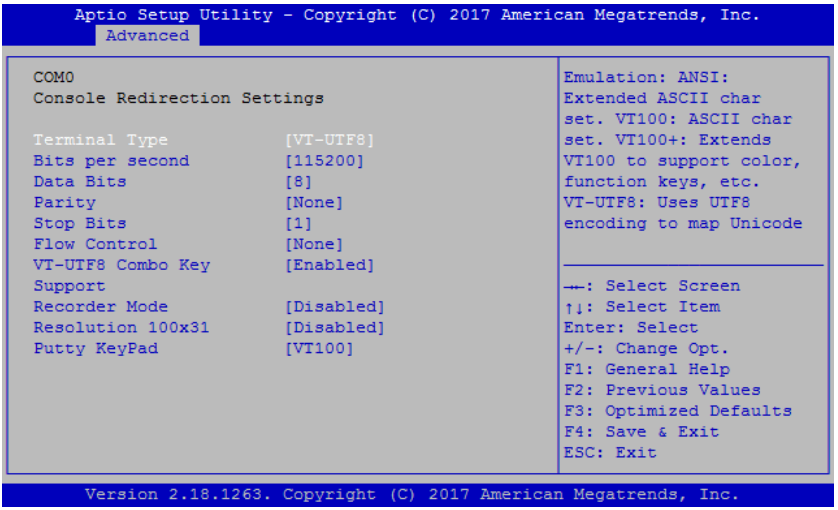


● Console Redirection

串口重定向功能的控制开关。

● Console Redirection Settings

该项提供串口重定向功能的参数配置。



✧ **Terminal Type**

终端类型的设置，默认值：ANSI。

✧ **Bits per second**

波特率的设置，默认值：115200。

✧ **Data Bits**

数据位宽度的设置，配置值：8。

✧ **Parity**

校验位的设置，默认值：None。

✧ **Stop Bits**

停止位位数的设置，默认值：1。

✧ **Flow Control**

流控制的设置，默认值：None。

不同的串口重定向终端的键盘定义可能存在不兼容的情况，这与串口重定向终端软件本身有关系。如果存在键盘按键不兼容的情况，请使用下表所描述的组合键代替原键盘的功能。

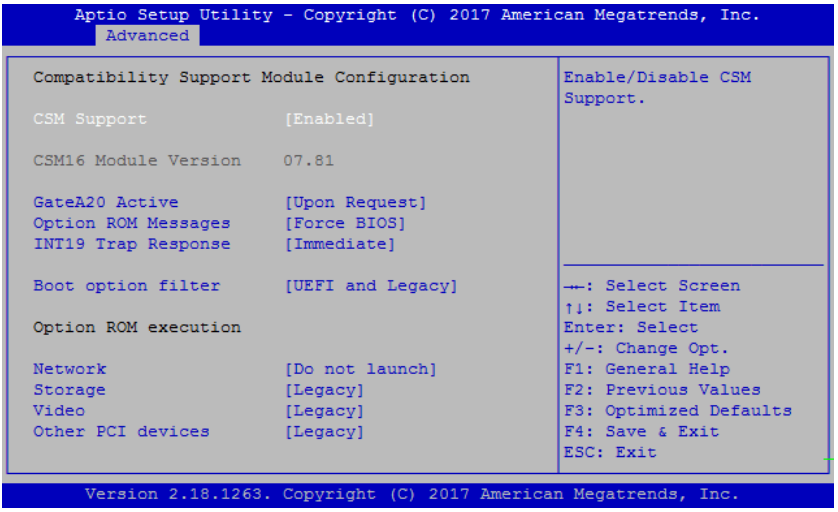
串口重定向功能键描述如下表：

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>@

注:串口重定向功能仅支持文字界面的重定向，不支持图形界面的重定向。

➢ **CSM Configuration**

与Legacy设备兼容相关配置。



- **CSM Support**

  控制 CSM 功能的开关。

- **GateA20 Active**

  设置 GateA20 的动作模式，用来设定系统存取 1MB 以上内存(扩展内存)的方式。当设为“Upon Request”，可以使用 BIOS 来关闭 GA20，设为“Always”时，不允许关闭 GA20，默认是 Upon Request。

- **Option ROM Messages**

  设置选择 ROM 信息显示方式。设置 Force BIOS 为强制 BIOS 显示方式，设置 Keep Current 为保持当前方式，默认是 Force BIOS。 Force BIOS（强制 BIOS）是 ROM 初始化时显示 ROM 信息，Keep Current（保持当前）则不显示信息

- **INT19 Trap Response**

  设置 INT19 中断捕捉信号响应，设置 Immediate 为立即执行，设置 Postponed 为延迟， 默认是 Immediate

- **Boot option filter**

  设置使用兼容传统式（Legacy）BIOS 或者是 UEFI。默认为两者都兼容。

- **Network**

  设置 PXE OpROM 启动开关，选择是 Legacy 或者是 UEFI 启动，当选择 Do not launch 即为关闭。

- **Storage**

  设置存储格式启动开关，选择是 Legacy 或者是 UEFI 启动，Do not launch 即为关闭。

- **Video**

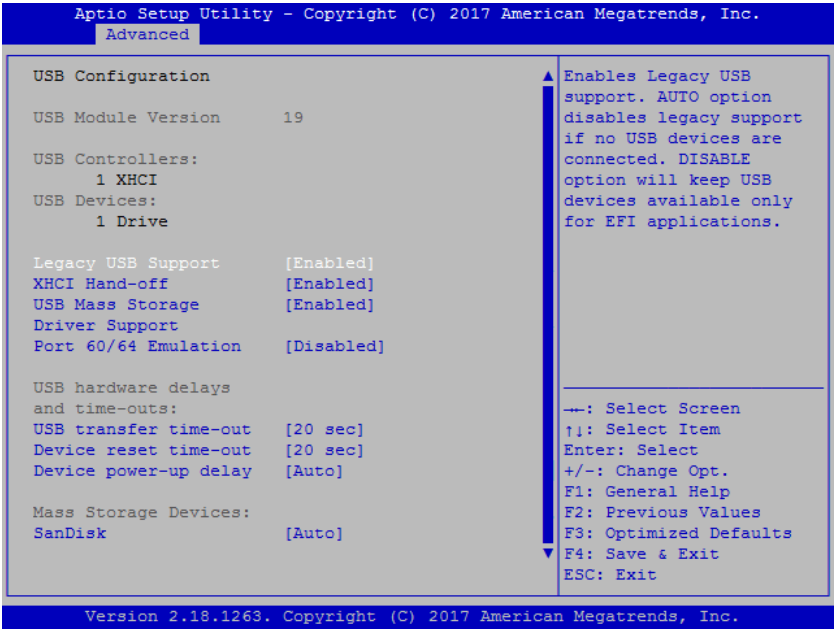
  设置视频显示的启动开关，选择是 Legacy 或者是 UEFI 启动，Do not launch 即为关闭。

- **Other PCI devices**

  设置其他 PCI 挂载设备启动开关，选择是 Legacy 或者是 UEFI 启动，Do not launch 即为关闭。

➢ **USB Configuration**

该项提供关于USB控制器的配置。



- **Legacy USB Support**

  此选项用于支持传统的USB设备（键盘，鼠标，存储设备等），当该项设为Enabled时，即使不支持USB的操作系统如DOS下也能使用USB设备。当设置成Disabled时，传统设备在不支持USB的操作系统中将不可用。

  注意，EFI application下USB仍然可用，如Shell下。

- **XHCI Hand-off**

  是否让BIOS接管EHCI控制。当操作系统不支持EHCI时，就要让BIOS来控制。默认关闭。

- **USB Mass Storage Driver Support**

  USB 大容量储存设备设置选项。默认开启支持。

- **Port 60/64 Emulation**

此项控制 USB 端口 64/60 仿真功能。当此功能被启用时，USB 键盘可以打出一些特殊的组合键。

- **USB transfer time-out**

  此选项设定 USB2.0 总线上一数据传输的最长时间，如果在此时间内传输没有完成，则报错给EFI。此设置仅作用于EFI，对OS下USB驱动无作用。

- **Device reset time-out**

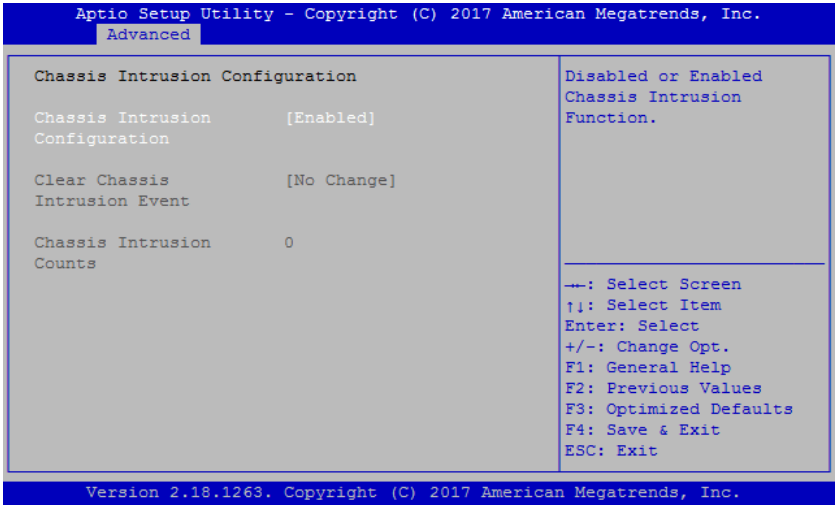
  此选项设定USB2.0 总线上存储设备复位所需的最长时间。 在此时间内，EFI会检查存储设备是否可以接受指令。如果超时，则认为存储设备出错。

- **Device poer-up delay**

  此选项设定USB设备上电后的延时，之后才可被访问。设定为“Auto”，则从设备获取此数据；设定为“Manual”，则用户自己输入时间。

➢ **Chassis Intrusion Configuration**

该项提供关于机箱入侵检测配置。



- **Chassis Intrusion Configuration**

  是否开启机箱入侵检测功能。

- **Clear Chassis Intrusion Event**

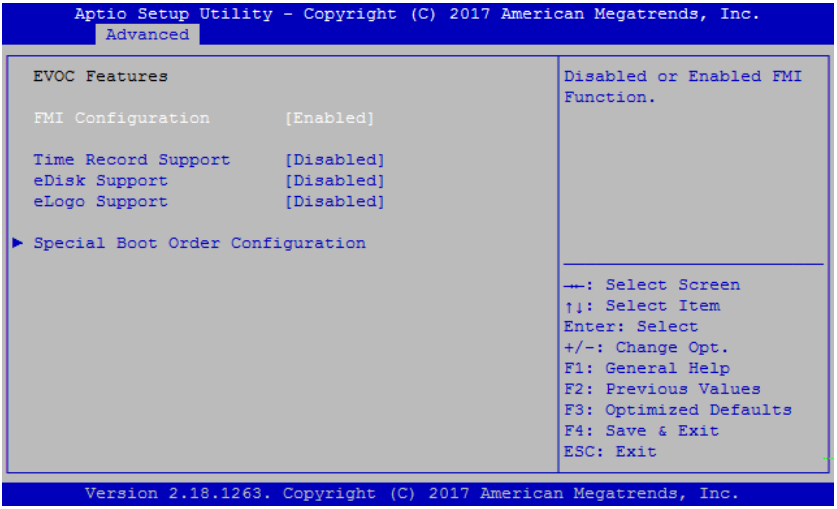
  清除机箱入侵事件。取消报警。

- **Chassis Intrusion Count**

  记录机箱被打开的次数。

➢ **EVOC Features**

该项提供EVOC特有功能(简称:“FMI”)的配置。



- **FMI Configuration**

  FMI功能的总开关，用来控制是否支持EVOC Features。

- **Time Record Support**

  此项用来记录主板运行时长。

- **eDisk Support**

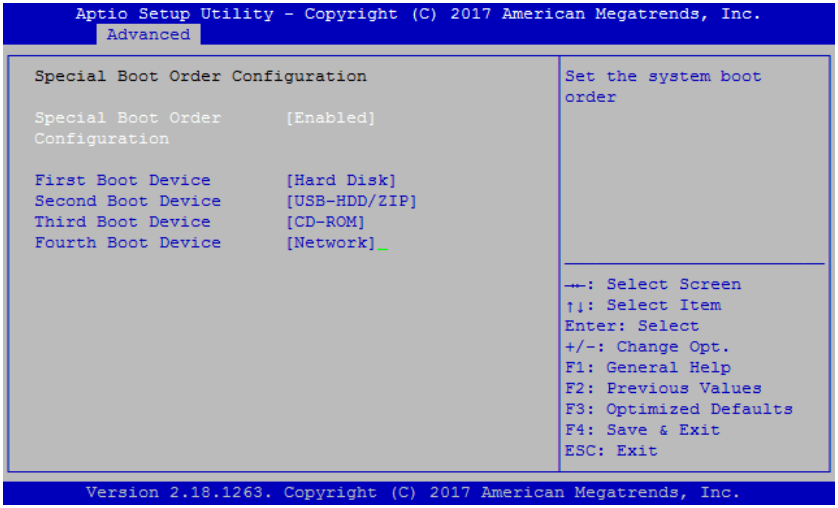
  此项用来打开或关闭虚拟磁盘。

- **eLogo support**

  此项用来在线更换开机Logo，只有当eDisk Support是enabled时，该功能才能实现。LOGO图片的格式必须为BMP，且文件名为LOGO.BMP。

- **Special Boot Order Configuration**

  该项提供EVOC特定引导设备启动顺序的配置。

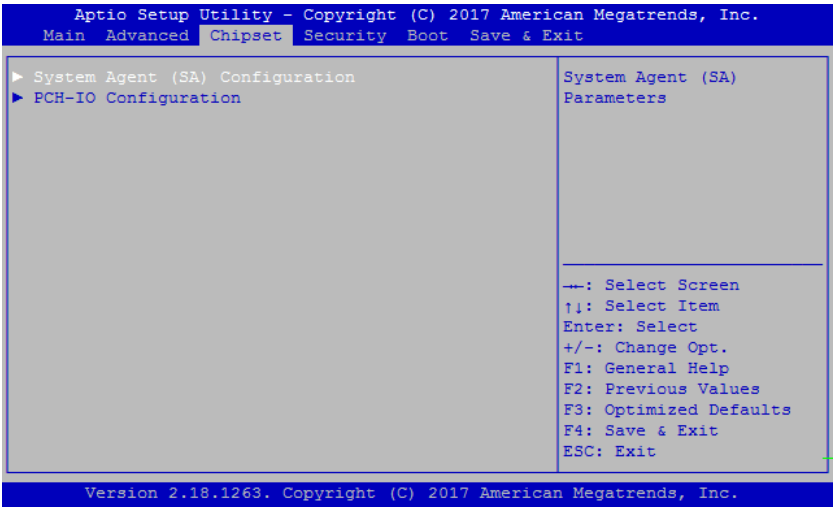


✧ **Special Boot Order Configuration**

EVOC特定引导设备启动顺序功能的控制开关。仅当该项设置为“Enabled”时，才能配置引导设备启动顺序。

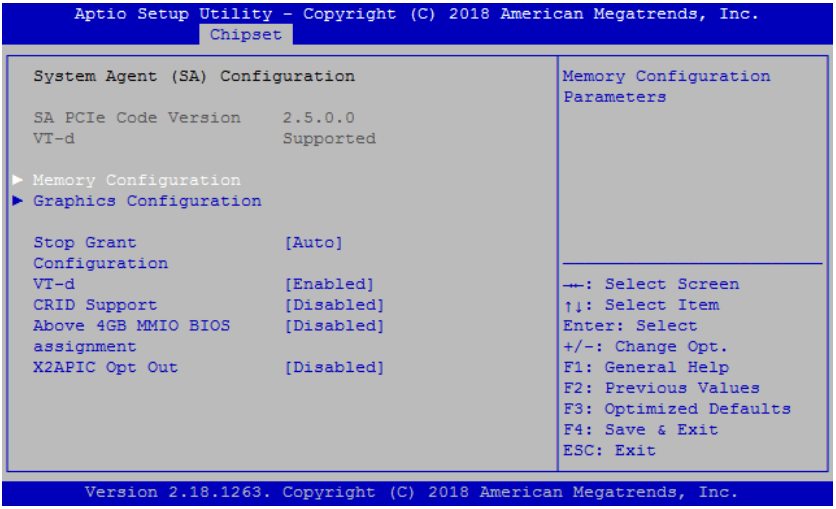
◆ **Chipset**

该项提供关于平台芯片组的配置。

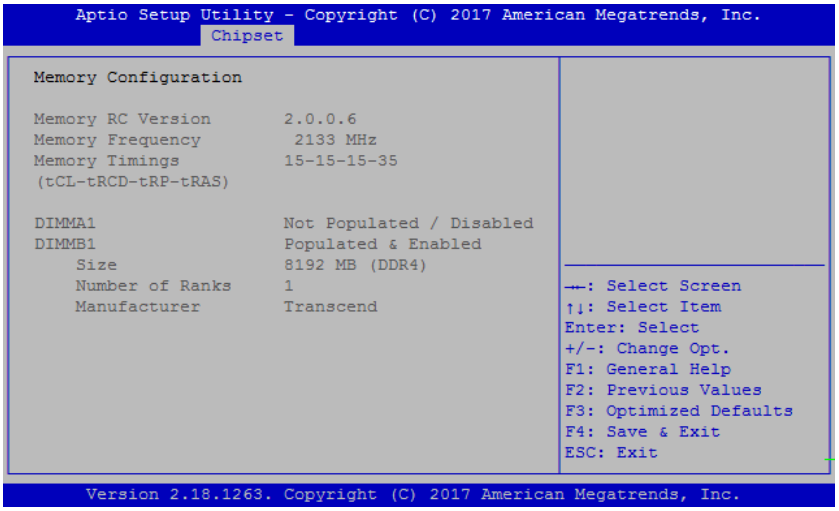


➢ **System Agent(SA) Configuration**

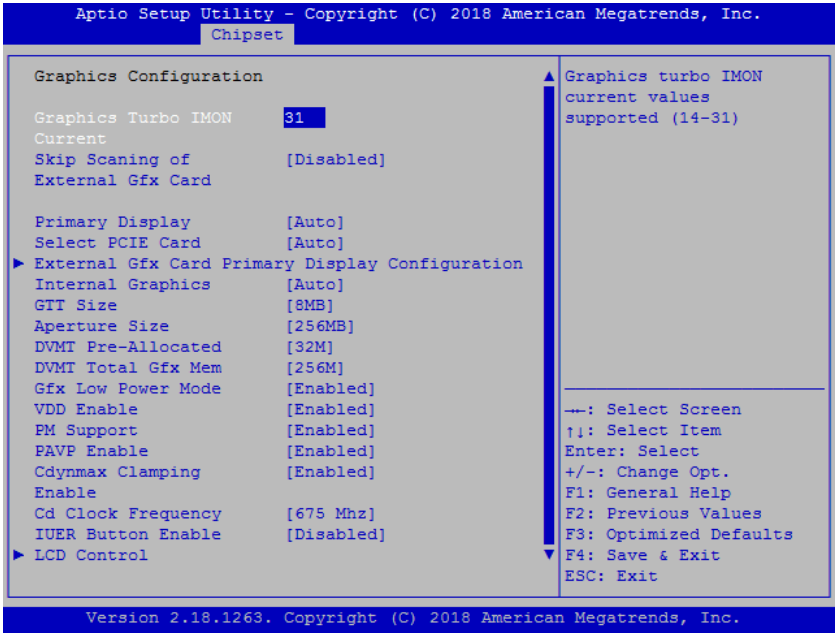
该项提供关于 System Agent 功能的配置。



- Memory Configuration



- Graphics Configuration



✧ **Graphics Turbo IMON Current**

图形睿频IMON流控制选项。

✧ **Skip Scaning of External Gfx Card**

扫描外接显卡的开关控制选项。

✧ **Primary Display**

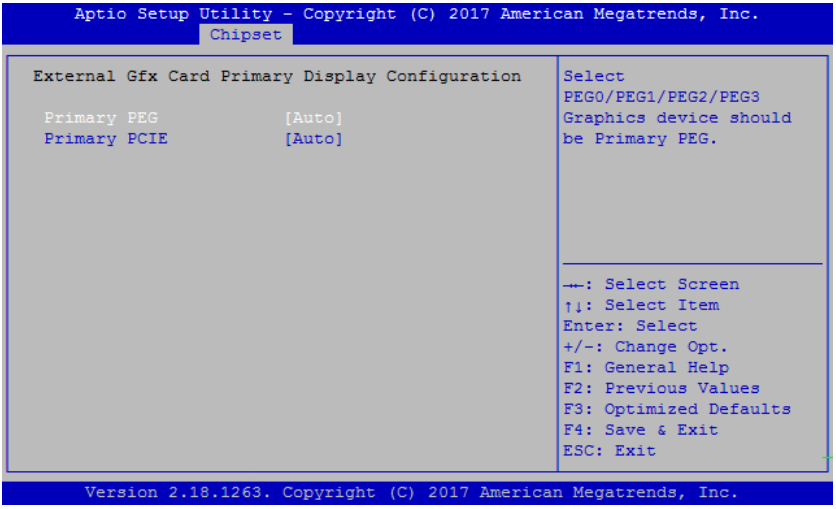
设置主显示设备。设定值有：IGD（集成显卡）、PCIE（独显PCIEX1）、HG（混合图形显示功能）

✧ **Select PCIE Card**

选择PCIE卡的控制平台控制选项。

✧ **External Gfx Card Primary Display Configuration**

外接显卡显示优先级控制选项。



✧ **Internal Graphics**

集成显卡的控制开关。

✧ **GTT Size**

设置集成显卡的显存大小。

✧ **Aperture Size**

显卡暂用内存大小。

✧ **DVMT Pre-Allocated**

设置共享显存的初始值。

✧ **DVMT Total Gfx Mem**

设置共享显存的最大值。

✧ **Gfx Low Power Mode**

适用于显卡模式设定触发器的开关控制选项。

✧ **VDD Enable**

显示电源VDD的开关控制选项。

✧ **PM Support**

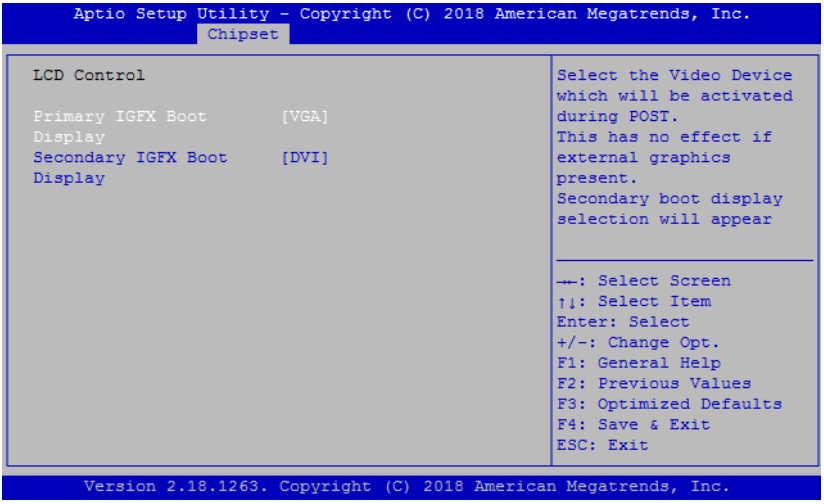
电源管理控制开关选项。

✧ **PAVP Enable**

Intel 智能音频技术。

✧ **LCD Control**

显示接口VGA/DVI/HDMI在BIOS/DOS阶段优先输出的接口设置。



- **VT-d**

  VT虚拟支持。

- **CRID Support**

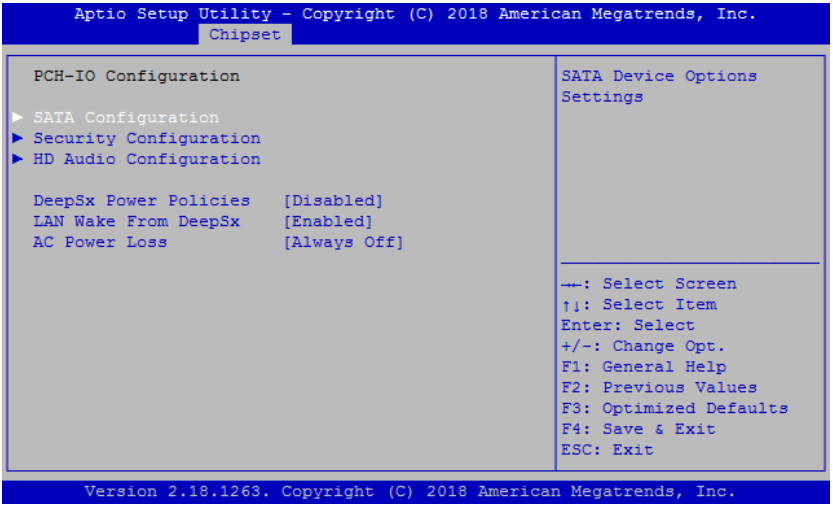
  intel控制稳定图像平台程序的控制选项。

- **Above 4GB MMIO BIOS assignment**

  开启或关闭 4G 以上内存映射的 IO BIOS 分配。

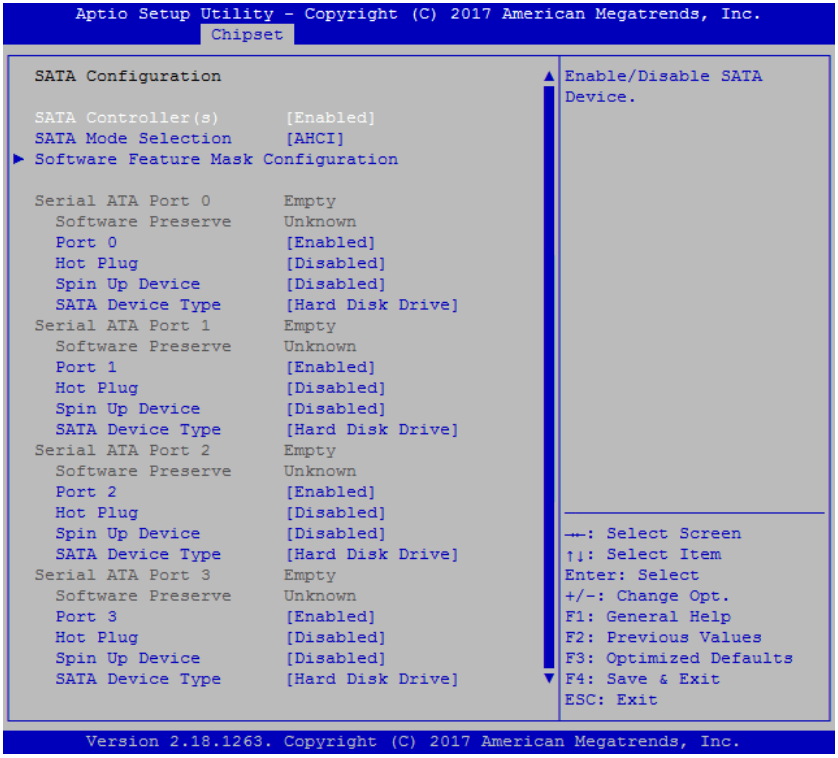
➢ **PCH-IO Configuration**

该项提供Intel PCH芯片的功能配置。



➢ **SATA Configuration**

该项显示主板所接硬盘信息。动态侦测主板上有没有接硬盘设备，如果对应的端口上有接设备，则显示该硬盘设备的型号。否则，显示为空(“Empty”)。



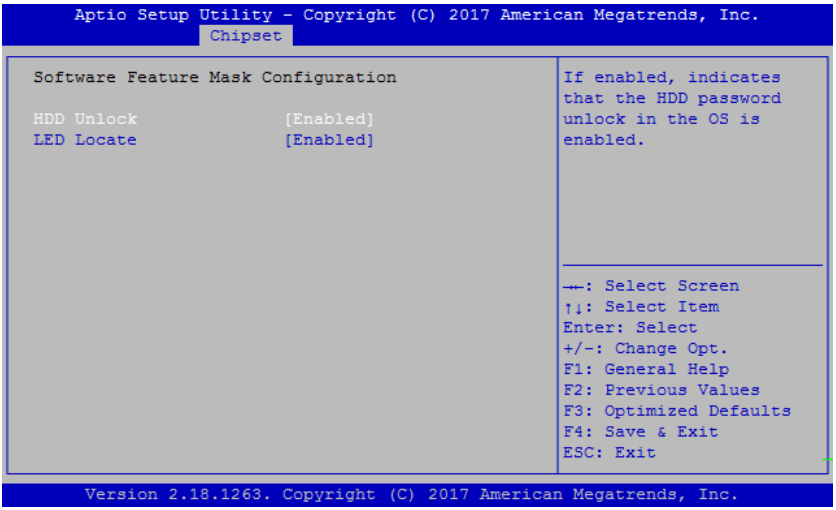
- **SATA Controller(s)**

  使能或关闭SATA控制器。

- **SATA Mode Selection**

  SATA工作模式选择。该平台提供IDE和AHCI模式。

- **Software Feature Mask Configuration**



✧ **HDD Unlock**

硬盘锁控制开关。

✧ **LED Locate**

如果启用，表明 LED / SGPIO 硬件连接和萍定位功能是操作系统上启用。

● **Port 0～3**

SATA 0至3的硬盘端口使用的控制开关。

● **Hot Plug**

指定这个端口是热插拔的控制开关。

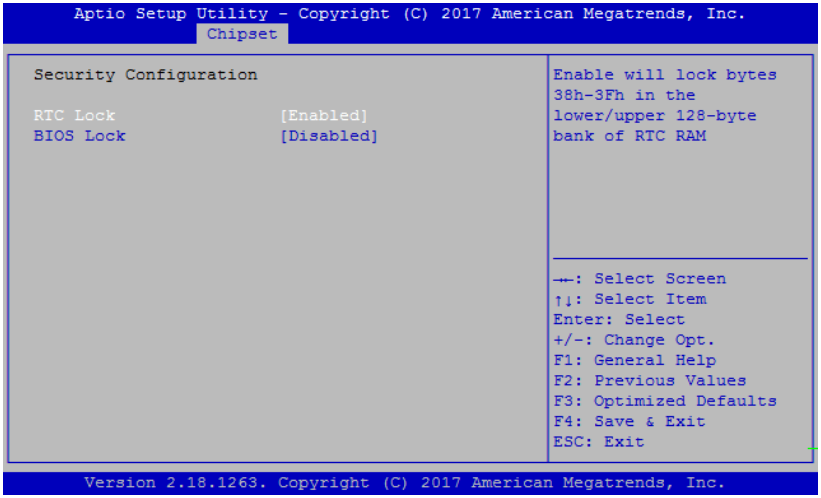
● **Spin Up Device**

在边缘检测从0到1,PCH COMRESET初始化序列开始的设备。

● **SATA Device Type**

识别SATA端口连接到固态驱动器或硬盘驱动器。

➢ **Security Configuration**



✧ **RTC Lock**

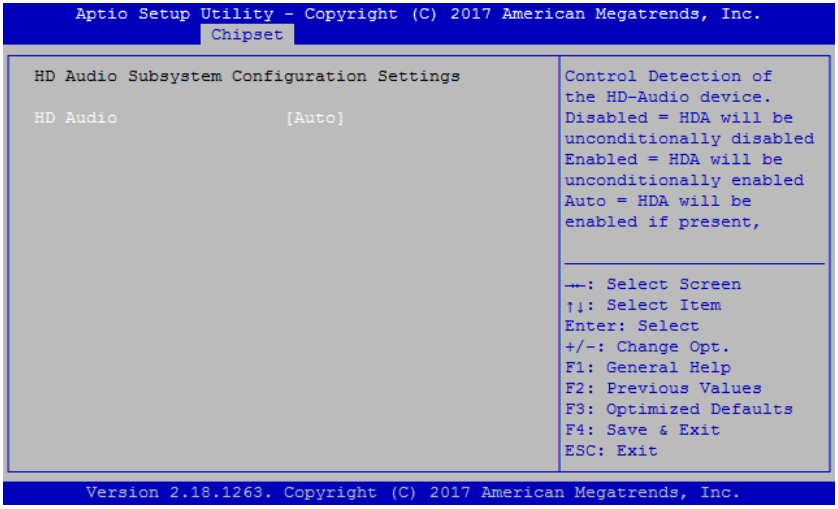
RCT 寄存器锁。若访问 CMOS 寄存器的高位寄存器，需要 enable。

✧ **BIOS Lock**

Enable 后将保护BIOS FLASH ，不能对其进行写操作。

➢ **HD Audio Configuration**

该项提供打开关闭声卡功能。



- **DeepSx Power Policies**

  控制电源管理项目的控制选项，深度睡眠状态下的电源管理策略。

- **LAN Wake From DeepSx**

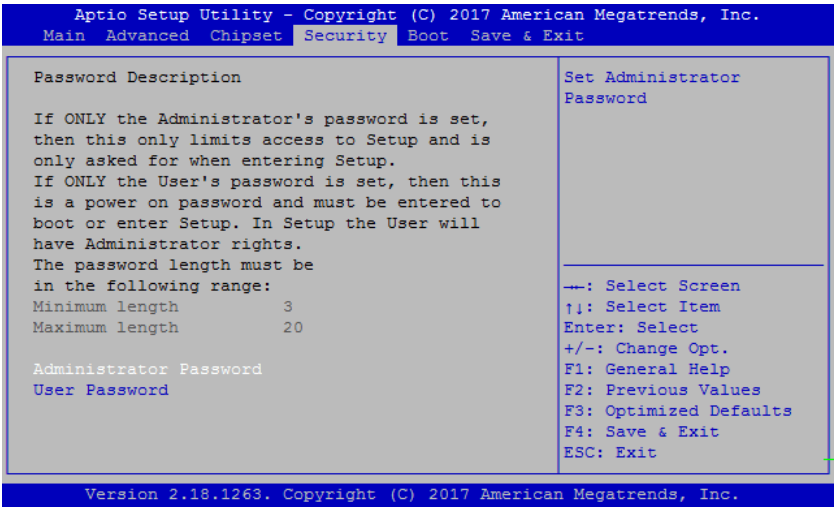
  网络唤醒控制选项。

- **AC Power Loss**

  使用该选项可以设置计算机在交流电停电而后再来电时系统所处状态。

  Power Off，让系统处于关机状态，Power On，系统自动开启， Last State，则保持到断电前的状态。

◆ Security



➢ Administrator Password

此项用于设置管理员密码。

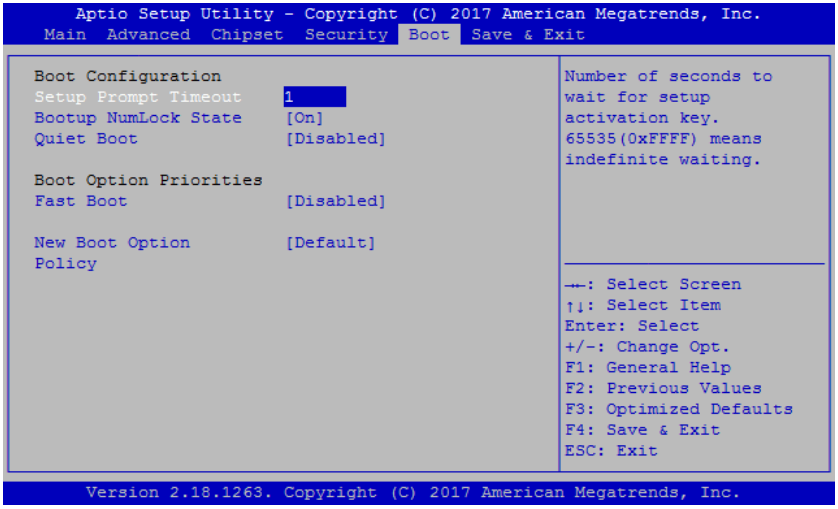
注意：如果只设置管理员密码，那么，当进入Setup设置程序时不输入密码也可以以User账户进入SETUP设置程序（即，此时空密码有效）。

➢ User Password

此项用于设置普通用户密码。

注意：如果只设置普通用户密码，那么，当进入Setup设置程序时输入密码后将获得管理员权限。 此时，空密码无效。

◆ Boot



➢ Setup Prompt Timeout

提示按F2后的等候用户响应的时间。

➢ Bootup NumLock State

NumLock小键盘灯开机亮灭开关。

➢ Quiet Boot

Boot模式选择开关，用于打开或关闭Quiet Boot功能。

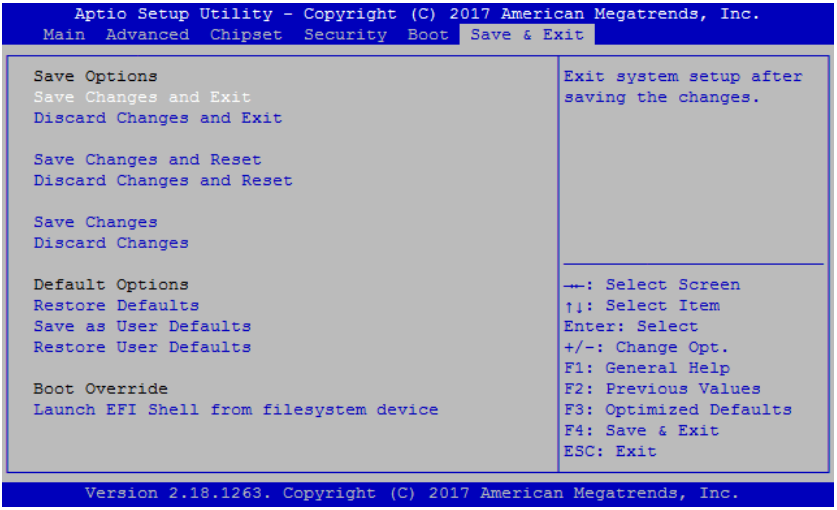
➢ Boot Option Priorities

此项用于配置系统引导的优先次序，编号越大优先级越低。其中，#1优先级最高。

- **Fast Boot**

  用于打开或关闭Fast Boot功能。

◆ Save & Exit



- **Save Changes and Reset**

  此项用于保存修改并重启。

- **Discard Changes and Reset**

  此项用于放弃所作修改并重启。

- **Restore Defaults**

  此项用于重新加载优化默认值。

3.4 x86 平台下UEFI所要管理的系统资源

这里的系统资源我们定义三种：I/O端口地址，IRQ中断号和Memory地址。

◆ **IO端口地址**

X86的I/O地址线只设计16条，从0～0FFFFh，I/O地址空间总共有64K，在传统的ISA接口，只使用到前面的1024个（0000～03FFh），0400h以上的端口为PCI接口与EISA接口所使用。每一外围设备都会占用一段I/O地址空间。下表给出了X86平台大致上所要用到的I/O接口列表。

地　址	设备描述
0000-0CF7	PCI bus
0020-0021	Programmable interrupt controller
0024-0025	Programmable interrupt controller
0028-0029	Programmable interrupt controller
002C-002D	Programmable interrupt controller
002E-002F	Motherboard resources
0030-0031	Programmable interrupt controller
0034-0035	Programmable interrupt controller
0038-0039	Programmable interrupt controller
003C-003D	Programmable interrupt controller
0040-0043	System timer
004E-004F	Motherboard resources
0050-0053	System timer
0060-0060	PS/2 标准键盘
0061-0061	Motherboard resources
0063-0063	Motherboard resources
0064-0064	PS/2 标准键盘

0065-0065	Motherboard resources
0067-0067	Motherboard resources
0070-0070	Motherboard resources
0070-0077	System CMOS/real time clock
0080-0080	Motherboard resources
0092-0092	Motherboard resources
00A0-00A1	Programmable interrupt controller
00A4-00A5	Programmable interrupt controller
00A8-00A9	Programmable interrupt controller
00AC-00AD	Programmable interrupt controller
00B0-00B1	Programmable interrupt controller
00B2-00B3	Motherboard resources
00B4-00B5	Programmable interrupt controller
00B8-00B9	Programmable interrupt controller
00BC-00BD	Programmable interrupt controller
00F0-00F0	Numeric data processor
02F8-02FF	通信端口 (COM2)
0378-037F	打印端口 (LPT1)
03B0-03BB	标准 VGA 图形适配器
03C0-03DF	标准 VGA 图形适配器
03F8-03FF	通信端口 (COM1)
04D0-04D1	Motherboard resources
04D0-04D1	Programmable interrupt controller
0680-069F	Motherboard resources
0800-087F	Motherboard resources
0A00-0A0F	Motherboard resources
0A10-0A1F	Motherboard resources

0A20-0A2F	Motherboard resources
0A30-0A3F	Motherboard resources
0D00-FFFF	PCI bus
164E-164F	Motherboard resources
1800-18FE	Motherboard resources
1854-1857	Motherboard resources
E000-EFFF	PCI Express standard Root Port
F000-F03F	标准 VGA 图形适配器
F040-F05F	SM 总线控制器
F060-F07F	标准 AHCI 1.0 串行 ATA 控制器
F080-F083	标准 AHCI 1.0 串行 ATA 控制器
F090-F097	标准 AHCI 1.0 串行 ATA 控制器
FF00-FFFE	Motherboard resources
FFFF-FFFF	Motherboard resources
FFFF-FFFF	Motherboard resources
FFFF-FFFF	Motherboard resources

◆ **IRQ中断分配表**

系统共0有15个中断源，有些已被系统设备独占。只有未被独占的中断才可分配给其它设备使用。ISA设备要求独占使用中断；只有即插即用ISA设备才可由UEFI或操作系统分配中断。而多个PCI设备可共享同一中断，并由UEFI或操作系统分配。下表给出了X86平台部分设备的中断分配情况，但没有给出PCI设备所占用的中断资源。

中断号	设备描述
IRQ0	System timer
IRQ1	PS/2 标准键盘
IRQ2	保留
IRQ3	通讯端口(COM2)
IRQ4	通讯端口(COM1)
IRQ5	保留
IRQ6	保留
IRQ7	保留
IRQ8	System CMOS/read time clock
IRQ9	保留
IRQ10	保留
IRQ11	保留
IRQ12	Microsoft PS/2 Mouse
IRQ13	Numeric data processor
IRQ14	Motherboard resources
IRQ15	保留

◆ **APIC**

高级可编程中断控制器。在现代P4以上级别的主板中，大都支持APIC，可以提供多于16个中断源，如IRQ16—IRQ23，部分主板如支持PCI-X的主板可以有多达28个中断源。但要启用该功能必须相应的操作系统支持。

◆ Memory地址

地　址	设备描述
000A0000-000BFFFF	标准 VGA 图形适配器
000A0000-000BFFFF	PCI bus
90000000-DFFFFFFF	PCI bus
C0000000-CFFFFFFF	标准 VGA 图形适配器
DE000000-DEFFFFFF	标准 VGA 图形适配器
DF000000-FD01FFFF	以太网控制器
DF000000-DF0FFFFF	PCI Express standard Root Port
DF020000-DF023FFF	以太网控制器
DF100000-DF10FFFF	多媒体音频控制器
DF110000-DF11FFFF	PCI Express 上游交换机端口
DF110000-DF1FFFFF	PCI Express standard Root Port
DF220000-DF12FFFF	多媒体音频控制器
DF230000-DF23FFFF	通用串行总线（USB）控制器
DF240000-DF243FFF	多媒体音频控制器
DF244000-DF247FFF	PCI 内存控制器
DF248000-DF249FFF	标准 AHCI 1.0 串行 ATA 控制器
DF24A000-DF24A0FF	SM 总线控制器
DF24B000-DF24B7FF	标准 AHCI 1.0 串行 ATA 控制器
DF24C000-DF24C0FF	标准 AHCI 1.0 串行 ATA 控制器
DF24E000-DF24EFFF	PCI 数据捕获和信号处理控制器
DF24F000-DF24FFFF	基本系统设备
DFFE0000-DFFFFFFF	Motherboard resources
E0000000-EFFFFFFF	Motherboard resources

FD000000-FDABFFFF	Motherboard resources
FD000000-FE7FFFFF	PCI bus
FDAC0000-FDACFFFF	Motherboard resources
FDAD0000-FDADFFFF	Motherboard resources
FDAE0000-FDAEFFFF	Motherboard resources
FDAF0000-FDAFFFFF	Motherboard resources
FDB00000-FDFFFFFF	Motherboard resources
FE000000-FE01FFFF	Motherboard resources
FE036000-FE03BFFF	Motherboard resources
FE410000-FE7FFFFF	Motherboard resources
FED00000-FED003FF	High precision event timer
FED10000-FED17FFF	Motherboard resources
FED18000-FED18FFF	Motherboard resources
FED19000-FED19FFF	Motherboard resources
FED20000-FED3FFFF	Motherboard resources
FED45000-FED8FFFF	Motherboard resources
FED90000-FED93FFF	Motherboard resources
FEE00000-FEEFFFFF	Legacy device
FF000000-FFFFFFFF	Intel(R) 82802 Firmware Hub Device
FF000000-FFFFFFFF	Motherboard resources

4.驱动程序安装说明

本产品的驱动程序可依据配套光盘内容安装，在此不做介绍。

遇到驱动程序无法正常安装时，比如出现黄色问号或叹号等，建议先安装对应操作系统的最新补丁包或直接安装最新发行版本的操作系统，再安装驱动程序。

5. 附录

5.1 BPI介绍

BPI(BIOS Programming Interface)是一种跨平台的，易维护的，支持 32 位或 64 位操作系统保护模式下的访问硬件的软件接口规范，支持多进程和多线程访问硬件。BPI 是硬件和应用软件之间的纽带，其目的是为应用层提供平台无关的操作硬件的标准接口（以库函数的形式呈现，类似标准 C 的库函数），应用软件工程师无需关心主板具体的硬件实现方案。用户利用 BPI 库就可以快速开发出自己的软件产品，而且在主板硬件升级时，无需修改应用层软件，原来的软件就可在新的平台上正常运行。BPI 大大提高了产品的开发速度和降低产品的维护成本。

BPI 架构如图 1 所示：

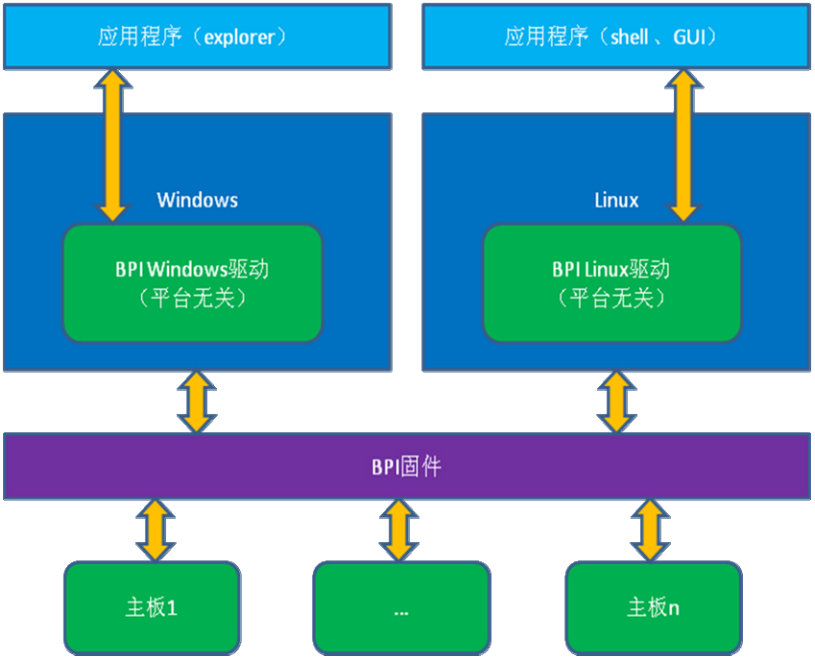


图 1 BPI 架构

1. BPI 支持功能

1) 看门狗

支持看门狗启动，停止及喂狗功能。

2) GPIO

支持 GPIO 输入输出编程。

3) 硬件监控

支持主板 CPU 温度，系统温度，风扇转速及主板核心电压侦测，如 CPU Core 电压，V12.0，电池电压等。

用户可以根据应用需求利用 BPI 库进行二次开发，例如：

1) 通过侦测 CPU 温度，如果温度过高，触发蜂鸣器报警。

2) 通过对 GPIO 编程来控制外设等。

2. BPI 的优点

1) 平台无关性

BPI 向应用层提供的接口，即 BPI 库函数是平台无关的，因此使用 BPI 库函数开发的软件，无需做任何修改，就可直接在支持 BPI 功能的新硬件平台上正常运行，具有良好的可移植性。

2) 安全性和可靠性高

访问硬件的 BPI 库函数由主板开发商编写，并经过严格测试，可避免因对系统硬件操作不当，造成系统异常问题。

3) 易维护

传统方式的 WDT 及 GPIO 编程与硬件密切相关，测试及调试复杂，且需要维护不同平台的软件，而使用 BPI 库开发的软件，只要维护一套软件即可。

4) 成本低

用户使用 BPI 开发应用程序，不会增加额外的硬件或软件成本。应用软件工程师利用 BPI 库函数可以很方便地进行二次开发，无需关注具体硬件的访问细节，可大大降低产品开发难度和缩短开发周期，帮助系统集成商产品快速上市。

注：BPI 测试程序在 Windows 下的使用介绍：见光盘中的“Software\Chinese\BPI\EVOC_BPI X”

BPI 测试程序在 Linux 下的使用介绍：见光盘中的“Software\Chinese\BPI\linux_BPI_X”

5.2 FMI简介

FMI(Firmware Management Interface)是基于 BPI 规范开发的管理软件，目前 FMI 支持日志管理 eLog 功能，其测试程序详见说明书光盘。

1) 日志管理 eLog

详细记录计算机使用情况，如第一次开机时间，测试完成时间，出厂时间，每次开关机时间，系统总的开机次数，非法关机次数，计算机总的在线时长，CPU 总的心跳次数。日志管理信息可以为失效分析和产品升级提供非常有价值的参考信息。

5.3 常见故障分析与解决

常见故障	检查点
通电之后不开机	1. 请确认电源连接线是否连接正常 2. 请确认所用电源是否满足主板的供电要求 3. 查看CPU是否安装到位，CPU卡扣是否扣好 4. 尝试重新插拔内存条 5. 尝试更换内存条 6. 尝试根据主板说明书清除主板CMOS 7. 请确认是否有外接卡，去除外接卡后是否正常 8. 断开外部电源后要求等待30秒以上才能再次接入外部电源
BIOS Setup设置不能保存	1. 请确认CMOS电池电压是否低于2.8V，如低于2.8V，请更换新电池，重新设置保存
提示无法找到可引导设备	1. 请确认硬盘电源线、数据线是否连接正常 2. 请确认硬盘是否有物理损坏 3. 请确认硬盘中是否正常安装操作系统
进入系统过程中蓝屏或死机	1. 请确认内存条及外接卡是否松动 2. 尝试去掉新安装的硬件，卸载驱动或软件 3. 尝试更换内存
进入操作系统缓慢	1. 尝试使用第三方软件检查硬盘是否有坏道 2. 请确认系统所在分区剩余空间是否过少 3. 请确认 CPU 散热风扇是否正常转动
系统自动重启	1. 请确认 CPU 散热风扇是否正常转动 2. 请确认是否误触发工控机复位按钮 3. 请使用杀毒软件确认系统是否感染病毒 4. 请确认内存条及外接卡是否松动 5. 请确认所用电源带载能力是否足够，可尝试更换电源

无法检测到USB设备	1. 请确认 USB 设备是否需要单独供电 2. 请确认 USB 接口是否存在接触不良 3. 请确认 BIOS Setup 中 USB 控制器是否打开
无法检测到PCI卡	1. 请确认 PCI 卡是否需要额外供电 2. 请确认 PCI 卡工作所需电压与主板 PCI 提供电压(默认 5V) 是否相符 3. 请确认更换 PCI 槽位后能否被识别
无法检测到ISA卡	1. 依据 ISA 卡手册确定 ISA 卡所使用的资源已经被 BIOS 预留--大部分主板 BIOS Setup 中有针对 ISA 使用 I/O 或 memory 资源的预留选项，ISA 卡所使用的 IRQ 是否在 BIOS Setup 中被 reserved 2. ISA 卡一般在系统下无法直接识别，Windows 系统需在“控制面板”中选择“添加硬件”进行添加

5.4 缩略语

缩略语	术语	含义
AC	交流	交流
APM	高级电源管理	用于监视和降低 PC 功耗的工具
ACPI	高级配置与电源接口	
AHCI	高级主控接口/高级主机控制器接口	串行 ATA 的标准控制接口,Microsoft windows XP (高于 SP1 版本)和 IAA 驱动程序支持该接口
APIC	高级可编程中断控制器	扩张的可编程中断控制器
ASPM	活动状态电源管理	一种对 PCIE 设备空闲节电模式控制
ATM	异步传输模式	
ASCII	美国信息交换标准代码	

API	应用程序编程接口	
ATM	异步传输模式	
AT	高级技术	AT 电源
ATX	高级技术扩展	ATX 主板结构或 ATX 电源
AWG	美国线缆规格	区分电缆直径的美国标准
BIOS	基本输入输出系统	BIOS 代码
bps	位/秒	数据传输速率的一种描述
BGA	球状矩阵排列	一种芯片封装形式
Buffer	缓冲器	
Battery	电池	
BBS	电子公告牌系统	
BMP	位图	一种图形格式
CAN	控制器局域网络	一种通用的工业现场总线
CD-ROM	只读光盘	大数据存储只读光盘
CD-RW	可读写光盘	刻录光盘
CE	欧洲共同体(CE 认证符号)	欧盟产品的统一认证标示
CF	CF 卡	
CGA	彩色图形设配器	标准监视器接口
CLK	时钟脉冲	时钟信号
CMOS	互补金属氧化物半导体	
COA	真品证书	Microsoft Windows 产品密钥
CoL	许可证书	许可证授权
COM	串行通信端口	串行接口
CP	通信处理器	通信计算机
CPU	中央处理单元	
CRT	阴极射线管	CRT 显示器
CSA	加拿大标准协会	按照本国或两国标准(使用 UL/USA)进行测试和认证的加拿大组织
CTS	清除发送	
CPCI	紧凑型 PCI	一种高性能工业总线接口标准

CISC	复杂指令集计算机	
CRC	循环冗余校验码	一种错误校验编码
CGI	通用网关界面	
Cache	高速缓冲存储器	
DRAM	动态随机存取存储器	
DDRAM	双数据随机存取存储器	带有高速接口的存储器芯片
DC	直流	
DCD	数据载波检测	数据载波信号检测
DMA	直接存储器存取	直接内存存取
DOS	磁盘操作系统	无图形界面的操作系统
DP	显示端口	Display Port
DQS	德国质量与环境管理体系认证机构	
DSR	数据设置就绪	操作就绪
DTR	数据终端就绪	
DVD	数字多功能光盘	
DVI-D	数字视频接口	数字显示器接口
DVI-I	数字视频接口	具备数字和 VGA 模拟信号的显示器接口
dB	分贝	一种纯计数单位,表示两个量的比值大小
DCE	数据通信设备	数据通信终端设备
DOM	DOM 电子硬盘	Disk on module 的缩写
DOC	单芯片快闪磁盘	Disk on chip 的缩写
DDC	显示数据通道	显示器和主机通信总线标准
DDR	双倍数据速率	一种内存规范
Decode	指令解码	
DFP	数字平面显示器	
DHCP	动态主机设置协议	一种局域网的网络协议
DES	数据加密算法	一种对称加密算法

DIMM	双列直插式存储模块	
DMI	直接媒体接口	处理器 CPU 和 IO 控制器(PCH, ICH)间的数据传输通道
DNS	域名系统	因特网的一项核心服务
Dot Pitch	点距	显示屏相邻两个像素点的间距
DPMS	显示能源管理信号	VESA 组织制定的一种显示能源管理标准
DVMT	动态分配共享显存技术	用于设定显卡可使用的共享内存大小的技术
ECC	错误检查修正	
ECP	扩展的功能端口	扩展的并行端口
EGA	增强型图形适配器	PC 和监视器的接口
ESD	静电释放	
EDID	扩展显示标识数据	一种 VESA 标准数据格式
EIDE	增强型 IDE	增强形电子集成驱动器
EISA	扩展工业标准体系结构	扩展的 ISA 标准
EM64T	64 位内存扩展技术	
EN	欧洲标准	成员国的国家标准必须与 EN 标准保持一致
EEPROM	电可擦可编程只读存储器	使用 EEPROM 芯片的子模块
EPP	增强型并行端口	
ESC	退出字符	控制字符
EC	嵌入式控制器	
EMI	电磁干扰	
EMC	电磁兼容	
ES	能源之星	
ESCD	可扩展系统配置数据	
EIA	电子工业协会	
FAQ	常见问题解答	

FAT32	32 位文件分配表	
FDD	软盘驱动器	
FSB	前端总线	外部总线
FCPGA	倒装芯片针脚栅格阵列	一种芯片封装形式
FCBGA	倒装球拴栅格阵列	一种芯片封装形式
FIFO	先入先出队列	
FireWire	火线	IEEE1394 标准
Firmware	固件	固化的软件
FWH	固件中心	
FPU	浮点运算单元	
FTP	文件传输协议	
GND	接地	
GB	千兆位	
GPS	全球定位系统	
GSM	全球移动通信系统	
GUI	图形用户界面	
GMCH	图形和内存控制中心	
GPU	图形处理器	
HDD	硬盘驱动器	
HDTV	高清晰度电视	
HEX	十六进制	
HTML	超文本标记语言	用于创建 Internet 页面的脚本语言
HTTP	超文本传输协议	Internet 上的数据传输协议
HardWare	硬件	
HW Monitor	硬件监控	
Hz	赫兹	
HDMI	高清晰度多媒体接口	一种高清晰显示接口
H D A	高保真音频	
HT	超线程技术	

HS	热插拔 Hot-plug	开机状态下的设备卡带电拔插操作
I/O	输入输出	计算机的数据输入/输出
IDE	电子集成驱动器	
IGD	集成的图形设备	
IP	防护等级	
IP	Internet 通信协议	
IR	红外线	一种低速近距离的无线传输
IRDA	红外线数据协会	用于通过 IR 模块传输数据的标准
IRQ	中断请求	
ISA	工业标准体系结构	用于扩展模块的总线
IC	集成电路	
IDSL	因特网数字用户线路	
IE	微软因特网浏览器	
IEEE	电机及电子学工程师联合会	
IPC	工业控制计算机	
ISO	国际标准化组织	
IT	信息技术	
IA	英特尔架构	
ICH	输入/输出控制中心	
ID	身份标识号码	
IDF	英特尔开发者论坛	
INI File	初始化文件	
ISP	因特网服务提供商	
IPMI	智能平台管理接口	
JEDEC	固态技术协会	存储设备的标准规范制定协会
KB	键盘	
Kbps	千位每秒钟	传输速率的一种
L2 Cache	二级缓存	
LAN	局域网	局限于本地通讯的计算机网络

LCD	液晶显示器	
LED	发光二极管	
LPT	打印机端口	
LVDS	低电压差分信号	
Latency time	潜伏延迟时间	
LBA	逻辑块寻址	一种机械硬盘的块寻址模式
LFP	LCD 平板	LCD 平板显示器
MAC	介质访问控制	
MMC	微型存储卡	32×24.5mm 格式的存储卡
MPI	用于编程设备的多点接口	
MS-DOS	微软磁盘操作系统	
MTBF	平均无故障间隔时间	
MB	兆字节	
MPEG	动态影像压缩标准	一种视频的压缩标准
MTTR	平均修复时间	
MBR	主引导记录	
MHz	兆赫兹	一种频率的单位
MCU	微控制单元	单片微型计算机的一种
MODEM	调制解调器	
NA	空	
NC	未连接	
NP	未安装	
NCQ	原生命令队列	自动将文件和磁盘存取重新排列，以提高性能
NMI	不可屏蔽中断	
NTFS	新技术文件系统	Windows XP、Windows Server 2008、
		Vista 和 Windows 7 的标准文件系统
NIC	网络接口卡	网络适配器
NB	北桥	北桥芯片

ODD	光盘驱动器	
OS	操作系统	
OSD	屏幕显示菜单	
PATA	并行 ATA	存储接口标准的一种
PC	个人电脑	个人计算机
PCI	外围设备互连	PCI 总线
PCIE	Peripheral Component Interconnect Express	一种高速串行差分全双工的总线传输规范
PCMCIA	个人计算机存储卡国际协会	
PEG	PCI EXPRESS 图形	
POST	开机自检	
PXE	预引导执行环境	用于通过网络运行没有硬盘数据 PC 的软件
PMC	PCI 夹层卡	PCI Mezzanine Card
PS2	PS2 接口设备	IBM开发的PS2 鼠标键盘标准接口形式
PICMG	PCI 工业计算机制造商协会	
RAID	独立磁盘冗余阵列	冗余硬盘阵列
RI	振铃输入	呼入唤醒信号
RS485	协调子层 485	设计用于多大 32 个节点的双向总线系统
RTC	实时时钟	
RTS	发送数据请求	
RXD	接收数据	
RF	射频	频率范围从 300KHz～30GHz 之间的无线发射电磁波
RSV	保留使用引脚	
RST	复位	Reset
SCSI	小型计算机系统接口	

SDK	软件开发工具包	
SSD	固态电子盘	
SV	标准电压	
SMART	自我检视,分析和报告技术	硬盘错误诊断程序
SO-DIMM	小外形双列内存模组	笔记本内存的一种
SRAM	静态随机存取存储器	
SDRAM	同步动态随机存储器	
SVGA	超级视频图形阵列	
SW	软件	Software
S5	关机	所有硬件设备（包括电源）全部都关闭
S4	挂起到硬盘	内存信息写入硬盘，然后所有部件停止工作
S3	挂起到内存	将运行中的数据写入内存后关闭硬盘
S1	POS（Power on Suspend）	CPU 停止工作，其他的硬件设备仍然正常工作
S0	电脑正常工作	所有硬件设备全部处于打开或正常工作的状态
SMB	全系统管理总线	
SMD	表面安装设备	
SMI	系统管理中断	只有触发 SMI 才能进入 SMM 模式
SMM	系统管理模式	
SNR	信噪比	
SPD	串行存在探测	一个 256KB 的 EEPROM
S/PDIF	索尼/飞利浦数字接口	一种民用数字音频接口协议
SCI	系统控制中断	硬件产生的通知 OS 的 ACPI 中断事件
TFT	薄膜晶体管	LCD 平面屏幕类型
TxD	发送数据	数据传送信号

TDP	热量设计功耗	Thermal Design Power
TTL	晶体管 to 晶体管逻辑电路	
Turbo	瞬间加速自动超频技术	英特尔睿频加速技术 Turbo boost
TPM	可信任平台模组	
USB	通用串行总线	
UPS	不间断电源	
UL	美国保险商实验室	UL 认证
U	服务器尺寸单位， 1U=44.45mm	
UEFI	统一的可扩展固件接口	Intel 全新固件接口标准,采用 C 语言
VGA	视频图形阵列	满足工业标准的视频适配器
VRM	电压调整模块	
VT	虚拟化技术	通过 Internet 技术可以使用模拟封闭环境
VID	电压识别定义	
VSYNC	垂直同步	垂直同步刷新
VESA	视频电子标准协会	
VRAM	视讯随机存取存储器	
VIO	VIO 电压	PCI 总线设备上的 IO 电压
VPX	新一代高速串行总线	
WDT	看门狗	Watch dog
WLAN	无线局域网	
WOL	网络唤醒	局域网唤醒
WWW	环球信息网	万维网
WAN	广域网络	Wide Area Network
WAP	无线应用协议	
XGA	扩展图形阵列	最大分辨率支持 1024×768
XMC	XMC 夹层过渡卡	XMC Switched Mezzanine Card

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:

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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(B).

Convention

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

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	2018.1
C00	2018.3

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® H110 chipset, and supports Intel® Socket LGA1151 package 6th-generation Skylake, 7th-generation Kaby Lake family Core™ I7\I5\I3, Pentium, Celeron processors. It contains onboard two 288Pin DDR4 memory slots, supporting up to 32GB memory capacity. It also contains two onboard 10/100/1000Mbps network ports with lightning-proof function. It supports MIC-IN, LINE-IN and LINE-OUT function; supports VGA+DVI or VGA+HDMI or DVI+HDMI dual-display output, and maximum resolution of 1920×1200. The product supports three standard SATA interfaces and one mSATA interface. It supports six USB 2.0 ports, four USB3.0 ports, ten RS-232 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 parallel port, one 8-bit digital I/O port. Meanwhile, it also provides three PCI, three PCIe X4 (supports X1) and one PCIe X16 expansion slot. It also provides one SMBUS port for LCM module, and one TPM pin header port. EC0-1818(B) has abundant ports and expansion space.

1.2 Mechanical Dimensions, Weight and Environment

- Dimensions: 305mm(L) ×244mm (W) ×37.1mm(H)
- Net weight: 0.68Kg
- Operating environment:

  Temperature: -10℃～+60℃

  Humidity: 5%～95% (non-condensing)

- Storage environment:

  Temperature: -20℃～+80℃

  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: I7-6700K

Memory: Transcend 4G DDR4 2133HZ

HDD: Seagate ST500DM002 500G

Operating system: Win 7 64 bit Flagship version

Operating software: BurnIntest 7

- +5V@ 0.57A；+5%/-3%
- +3.3V@ 0.436A；+5%/-3%
- +12V@ 6.03A；+5%/-3%

The maximum current of motherboard is estimated at 6.03A, and the maximum current of power supply input should not be less than this value.

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: I7-6700K

Memory: Transcend 4G DDR4 2133HZ

- +5V@ 0.57A；+5%/-3%
- +3.3V@ 0.431A；+5%/-3%
- +12V@ 1.53A；+5%/-3%

1.5 Microprocessor

It supports Intel® Socket LGA1151 package 6th-generation Skylake, 7th-generation Kaby Lake family Core™ I7\I5\I3, Pentium, Celeron processors, for example Intel® Core™ i7-7700, Intel® Core™ i5-7500, Intel® Core™ i3-7300, Intel® Core™ i7-6700 , Intel® Core™ i5-6500 , Intel® Core™ i3-6300, Intel® Pentium® G4400, Intel® Celeron® G3900 and other processors.

1.6 Chipset

Intel® H110

1.7 System Memory

EC0-1818(B) provides two 288Pin DDR4 memory slots, and supports Un-buffered, NON-ECC UDIMM memory. The supported memory frequency is up to 2133MHz, and dual-channel function is supported. A single memory slot supports up to 16GB memory capacity, which brings the total memory capacity to 32GB.

1.8 Display Function

- Supports VGA+DVI or VGA+HDMI or DVI+HDMI dual display cloning, expansion desktop function; DVI-D supports hot swap function;
- It supports the minimum resolution of 640×480 32bpp@60Hz and maximum resolution of 1920×1200 32bpp@60Hz.

1.9 Network Function

It provides two same model Intel 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. Automatic power-on function can be realized by jumper setting.

1.12 Expansion Bus

- 1 x PCI Express x16 slot, compatible with PCI Express 3.0/2.0 standard;
- 3 x PCI Express x4 slots, actually providing X1 signal, compatible with PCI Express 2.0/1.1 standard;
- 3 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: Windows 7, Windows 8.1, Windows10, Windows Server 2012, Windows Server 2012 R2, Red Hat® Enterprise Linux, Cent OS Linux and other Linux systems (It is recommended to use high kernel version Linux system, to prevent compatibility problem caused by low kernel version).

Notes:

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.

3. Network card driver: Intel does not provide driver for I211 network card of Windows Server system.

1.15 I/O Ports

- 1 x parallel port, supporting SPP/EEP/ECP working modes, and supporting

BIOS modification working mode;

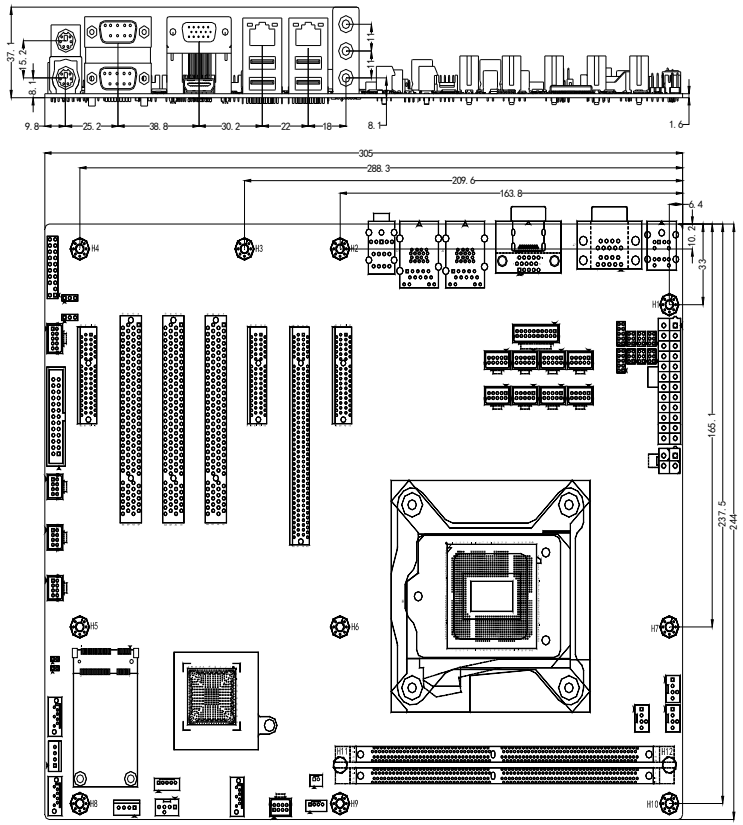
- 10 x COM ports; among them, COM1 and COM2 support RS-232/RS-422/RS-485 mode selection, and support RS-485 automatic flow control function; COM3-COM10 support RS-232 function; COM1 has wake-up function;
- 3 x standard SATA interfaces, supporting SATA3.0, and supporting hot swap function under AHCI mode. The product also provides one mSATA interface.
- 6 x USB 2.0 ports, 4 x USB 3.0;
- 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

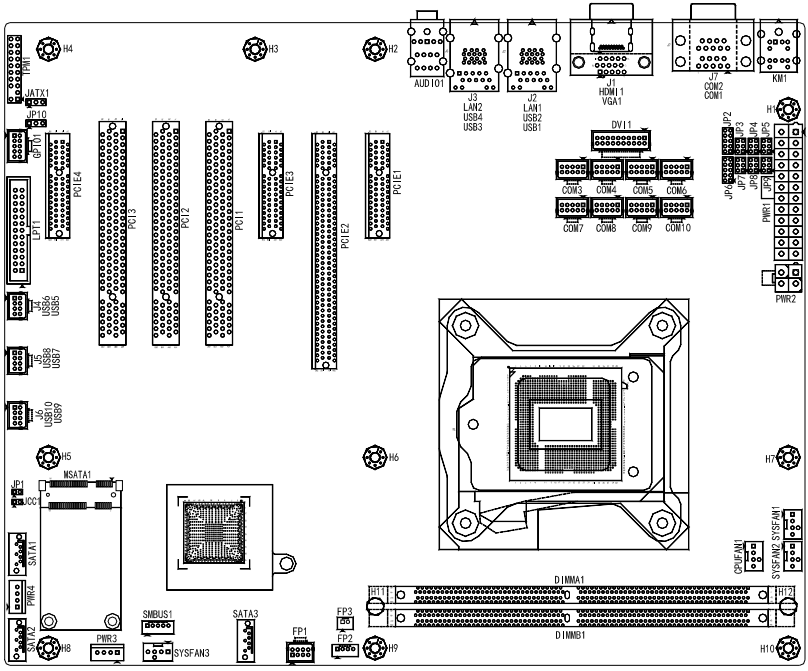


Unit: mm

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



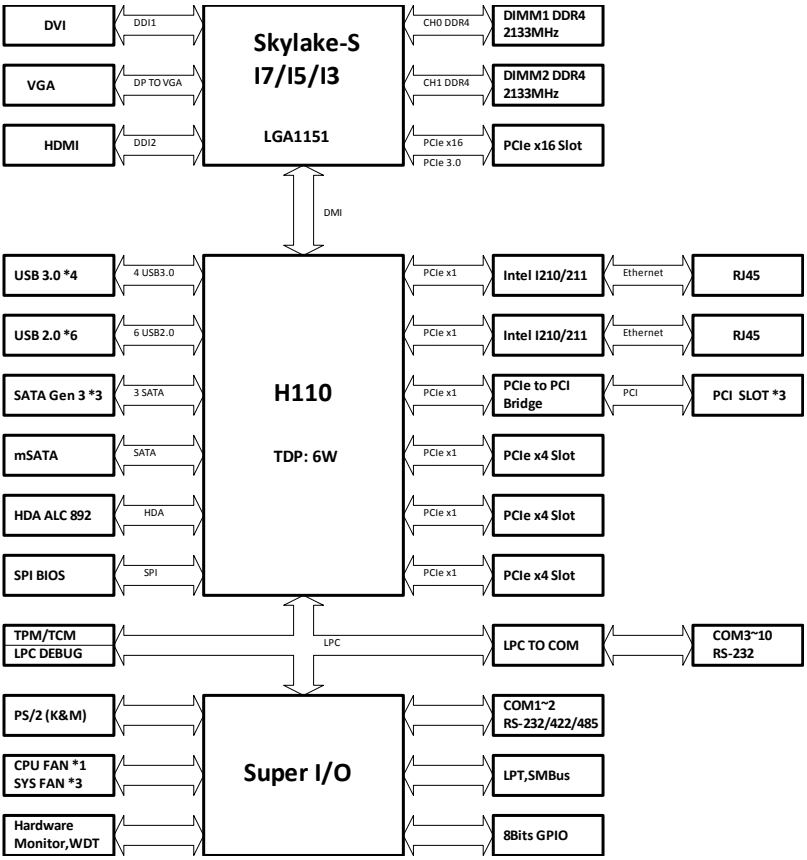
2.3 Data to Identify the Board

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)



2.4 Structure Diagram



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.

2.5 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:

	Setup	Function
 JCC1	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)

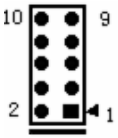
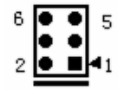
	Setup	Function
 JATX1	1-2 Short	ATX mode (Default)
	2-3 Short	AT mode

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

	Setup	Function
 JP1	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.

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

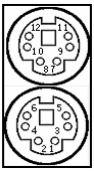
JP5 (corresponding to COM1)/JP9(corresponding to COM2) can be used to realize COM1/COM2 RS-422/RS-485 mode long-distance transmission.

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

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

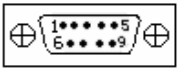
	Setup	Function (GPIO initial electrical level setup)
 JP10	1-2 Short	High level (Default)
	2-3 Short	Low level

2.6 KB/MS Port

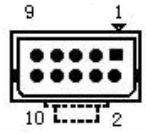
	Pin	Signal Name	Pin	Signal Name
 KM1	1	KB_DATA	7	MS_DATA
	2	NC	8	NC
	3	GND	9	GND
	4	+5V	10	+5V
	5	KB_CLK	11	MS_CLK
	6	NC	12	NC

2.7 COM Port

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



J7(COM1/COM2)



COM3～COM10
(pitch: 2.0mm)

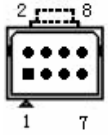
Pin	Signal Name		
	RS-232 COM1～COM10	RS-485 COM1/COM2	RS-422 COM1/COM2
1	DCD#	DATA-	TXD-
2	RXD	DATA+	TXD+
3	TXD	NC	RXD+
4	DTR#	NC	RXD-
5	GND	GND	GND
6	DSR#	NC	NC
7	RTS#	NC	NC
8	CTS#	NC	NC
9	RI#	NC	NC
10	NC	NC	NC

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

2. The upper layer of J7 is COM2, and the lower layer is COM1;

3. COM1 has wake-up function (wake-up by RI# pin).

2.8 ATX Power Switch and LED Port

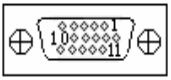


FP1
(pitch: 2.0mm)

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+

2.9 Display Port

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

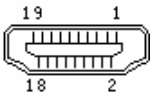


J1A（VGA1）

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	-	-

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

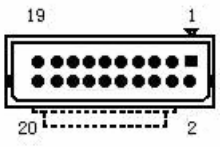
2. This motherboard provides one TypeA HDMI port. Its pin definition is as follows:



HDMI1

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	20	-

3. This motherboard provides one 2×10Pin DVI port (pitch: 2.0mm Wafer with buckle).

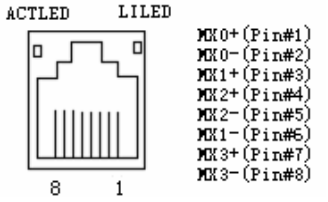


DVI1

Pin	Signal Name	Pin	Signal Name
1	DATA2-	2	DATA2+
3	GND	4	GND
5	DATA1-	6	DATA1+
7	GND	8	GND
9	DATA0-	10	DATA0+
11	GND	12	GND
13	CLK+	14	CLK_
15	+5V	16	HPDET
17	DDCDATA	18	DDCCLK
19	GND	20	GND

2.10 Network Port

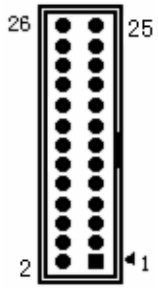
This board provides two 10/100/1000Mbps network and USB combo port J2 (LAN1) and J3(LAN2). LAN1 supports Wake-On-LAN. ACTLED and LILED are the green and dual color LEDs on both sides of the Ethernet port, which respectively indicates the activity status and the speed of LAN. Please refer to the status description for each LED:



J2(LAN1)、J3(LAN2)

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

2.11 LPT Port (IDC Connector)



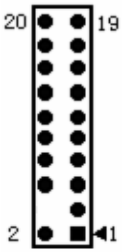
LPT1

(pitch: 2.54mm)

Pin	Signal Name	Pin	Signal Name
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

2.12 TPM Port

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



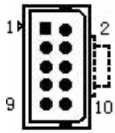
TPM1

(pitch: 2.54mm)

Pin	Signal Name	Pin	Signal Name
1	LPC_CLK	2	GND
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.

2.13 GPIO Port



GPIO1

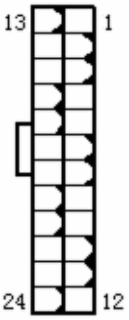
(pitch: 2.0mm)

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.

2.14 Motherboard Power Connector

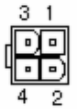
1. 24Pin ATX Power Connector



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

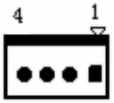
2. 4Pin CPU Power Connector



PWR2
(pitch: 4.2mm)

Pin	Signal Name
1	GND
2	GND
3	+12V
4	+12V

3. 4Pin SATA Power Connector



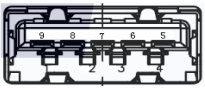
PWR3/PWR4
(pitch: 2.54mm)

Pin	Signal Name
1	+12V
2	GND
3	GND
4	+5V

2.15 USB Port

The motherboard rear panel provides two double-layer USB 3.0 and RJ45 combo port, and three USB2.0 Wafer ports.。

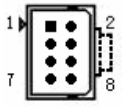
1. Double-layer USB3.0 port



J2 (USB1/USB2)
J3 (USB3/USB4)

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+

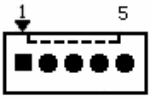
2. USB2.0 Wafer Port



J4～J6
(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

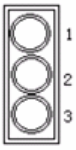
2.16 SMBUS Port



SMBUS1
(pitch: 2.0mm Wafer)

Pin	Signal Name
1	+3.3V
2	SMB_DATA
3	SMB_CLK
4	GND
5	+5V

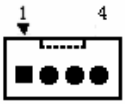
2.17 Audio Port



AUDIO1

Pin	Signal Name
1	LINE_IN
2	LINE_OUT
3	MIC_IN

2.18 Speaker Output Port



FP2
(pitch: 2.0mm)

Pin	Signal Name
1	BUZ-
2	NC
3	GND
4	BUZ+

2.19 PWRBTN# Port



FP3
(pitch: 2.0mm Wafer)

Pin	Signal Name
1	PWRBTN#
2	GND

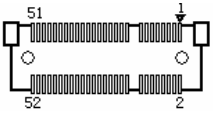
2.20 SATA Interface



SATA1～SATA3

Pin	Signal Name
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

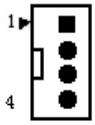
2.21 mSATA Interface



MSATA1

Pin	Signal Name	Pin	Signal Name
1	NC	2	+3.3VSB
3	NC	4	GND
5	NC	6	+1.5V
7	CLKREQ#	8	NC
9	GND	10	NC
11	NC	12	NC
13	NC	14	NC
15	GND	16	NC
17	Reserved	18	GND
19	Reserved	20	NC
21	GND	22	PERST#
23	SATA_RX+	24	+3.3V
25	SATA_RX-	26	GND
27	GND	28	+1.5V
29	GND	30	NC
31	SATA_TX-	32	NC
33	SATA_TX+	34	GND
35	GND	36	NC
37	GND	38	NC
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	NC
45	Reserved	46	NC
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	Reserved	52	+3.3VSB

2.22 CPU Fan Connector/System Fan Connector



CPUFAN1/SYSFAN1/
SYSFAN2/SYSFAN3
(pitch: 2.54mm)

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.

2.23 P PCIe X16 Slot

This board provides one PCIe X16 slot (PCIE2). Its pin definition is as follows:

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	PRSNT1#	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	+12V	B4	GND
A5	TCK	A6	TDI	B5	SMCLK	B6	SMDATA
A7	TDO	A8	TMS	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	TRST#	B10	3.3Vaux
A11	PWRGD/PERST#	A12	GND	B11	WAKE#	B12	RSVD
A13	REFCLK+	A14	REFCLK-	B13	GND	B14	PET0+
A15	GND	A16	PER0+	B15	PET0-	B16	GND
A17	PER0-	A18	GND	B17	PRSNT2#	B18	GND
A19	RSVD	A20	GND	B19	PET1+	B20	PET1-
A21	PER1+	A22	PER1-	B21	GND	B22	GND
A23	GND	A24	GND	B23	PET2+	B24	PET2-
A25	PER2+	A26	PER2-	B25	GND	B26	GND
A27	GND	A28	GND	B27	PET3+	B28	PET3-

A29	PER3+	A30	PER3-	B29	GND	B30	RSVD
A31	GND	A32	RSVD	B31	PRSNT2#A	B32	GND
A33	RSVD	A34	GND	B33	PET4+	B34	PET4-
A35	PER4+	A36	PER4-	B35	GND	B36	GND
A37	GND	A38	GND	B37	PET5+	B38	PET5-
A39	PER5+	A40	PER5-	B39	GND	B40	GND
A41	GND	A42	GND	B41	PET6+	B42	PET6-
A43	PER6+	A44	PER6-	B43	GND	B44	GND
A45	GND	A46	GND	B45	PET7+	B46	PET7-
A47	PER7+	A48	PER7-	B47	GND	B48	PRSNT2#B
A49	GND	A50	RSVD	B49	GND	B50	PET8+
A51	GND	A52	PER8+	B51	PET8-	B52	GND
A53	PER8-	A54	GND	B53	GND	B54	PET9+
A55	GND	A56	PER9+	B55	PET9-	B56	GND
A57	PER9-	A58	GND	B57	GND	B58	PET10+
A59	GND	A60	PER10+	B59	PET10-	B60	GND
A61	PER10-	A62	GND	B61	GND	B62	PET11+
A63	GND	A64	PER11+	B63	PET11-	B64	GND
A65	PER11-	A66	GND	B65	GND	B66	PET12+
A67	GND	A68	PER12+	B67	PET12-	B68	GND
A69	PER12-	A70	GND	B69	GND	B70	PET13+
A71	GND	A72	PER13+	B71	PET13-	B72	GND
A73	PER13-	A74	GND	B73	GND	B74	PET14+
A75	GND	A76	PER14+	B75	PET14-	B76	GND
A77	PER14-	A78	GND	B77	GND	B78	PET15+
A79	GND	A80	PER15+	B79	PET15-	B80	GND
A81	PER15-	A82	GND	B81	PRSNT2#C	B82	RSVD

2.24 PCIe X4 Slot

This board provides three PCIE X4 slots (PCIE1/PCIE3/PCIE4), which actually provideX1 signals. The pin definition of PCIE1 is as follows:

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	PRSNT1#	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	+12V	B4	GND
A5	TCK	A6	TDI	B5	SMCLK	B6	SMDATA
A7	TDO	A8	TMS	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	TRST#	B10	3.3Vaux
A11	PWRGD/PERST#	A12	GND	B11	WAKE#	B12	RSVD
A13	REFCLK+	A14	REFCLK-	B13	GND	B14	PET0+
A15	GND	A16	PER0+	B15	PET0-	B16	GND
A17	PER0-	A18	GND	B17	NC	B18	GND
A19	NC	A20	GND	B19	NC	B20	NC
A21	NC	A22	NC	B21	GND	B22	GND
A23	GND	A24	GND	B23	NC	B24	NC
A25	NC	A26	NC	B25	GND	B26	GND
A27	GND	A28	GND	B27	NC	B28	NC
A29	NC	A30	NC	B29	GND	B30	NC
A31	GND	A32	NC	B31	NC	B32	GND

2.25 PCI Slot

This board provides three 5V standard PCI slots (PCI1～PCI3). Their pin definitions are as follows:

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	TRST#	A31	PCI_AD18	B1	-12V	B31	+3.3V
A2	+12V	A32	PCI_AD16	B2	TCK	B32	PCI_AD17
A3	TMS	A33	+3.3V	B3	GND	B33	PCI_C/BE#2
A4	TDI	A34	PCI_FRAME#	B4	TDO	B34	GND
A5	+5V	A35	GND	B5	+5V	B35	PCI_IRDY#
A6	INTA#	A36	PCI_TRDY#	B6	+5V	B36	+3.3V
A7	INTC#	A37	GND	B7	INTB#	B37	PCI_DEVSEL#
A8	+5V	A38	PCI_STOP#	B8	INTD#	B38	GND
A9	Null	A39	+3.3V	B9	PRSNT1#	B39	PCI_LOCK#
A10	+5V	A40	SMCLK	B10	Null	B40	PCI_PERR#
A11	Null	A41	SMDATA	B11	PRSNT2#	B41	+3.3V
A12	GND	A42	GND	B12	GND	B42	PCI_SERR#
A13	GND	A43	PCI_PAR	B13	GND	B43	+3.3V
A14	3.3Vaux	A44	PCI_AD15	B14	Null	B44	PCI_C/BE#1
A15	PCI_RST#	A45	+3.3V	B15	GND	B45	PCI_AD14
A16	+5V	A46	PCI_AD13	B16	PCI_CLK	B46	GND
A17	PCI_GNT#	A47	PCI_AD11	B17	GND	B47	PCI_AD12
A18	GND	A48	GND	B18	PCI_REQ#	B48	PCI_AD10
A19	PCI_PME#	A49	PCI_AD9	B19	+5V	B49	GND
A20	PCI_AD30	A50	PCI_C/BE#0	B20	PCI_AD31	B50	PCI_AD8
A21	+3.3V	A51	+3.3V	B21	PCI_AD29	B51	PCI_AD7
A22	PCI_AD28	A52	PCI_AD6	B22	GND	B52	+3.3V
A23	PCI_AD26	A53	PCI_AD4	B23	PCI_AD27	B53	PCI_AD5
A24	GND	A54	GND	B24	PCI_AD25	B54	PCI_AD3
A25	PCI_AD24	A55	PCI_AD2	B25	+3.3V	B55	GND
A26	PCI_IDSEL	A56	PCI_AD0	B26	PCI_C/BE#3	B56	PCI_AD1
A27	+3.3V	A57	+5V	B27	PCI_AD23	B57	+5V
A28	PCI_AD22	A58	PCI_REQ64#	B28	GND	B58	PCI_ACK64#
A29	PCI_AD20	A59	+5V	B29	PCI_AD21	B59	+5V
A30	GND	A60	+5V	B30	PCI_AD19	B60	+5V

2.26 CPU Installation

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

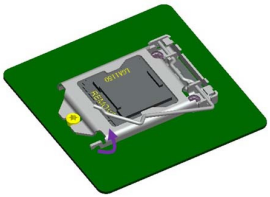
Notes:

(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;

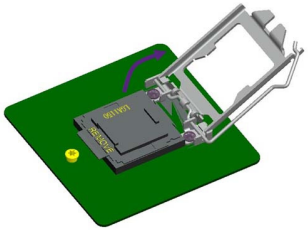
(2) When installing the CPU, do not wear knitted gloves, to prevent scratching CPU socket pins;

(3) If the motherboard is to be returned for repair, the CPU socket should be protected by protection cover.

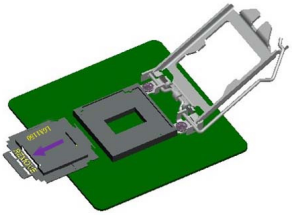
Step 1: First press down the control rod, and pull it outward slightly to disengage it from the fastening clip;



Step 2: Fully open the loading plate;

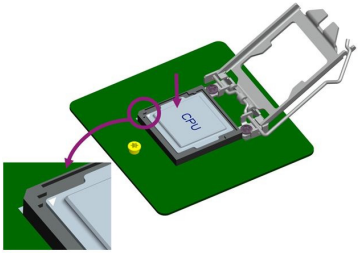


Step 3: Remove the black protection cover, which can be pulled up by the direction of a mark on the cover –"Remove";

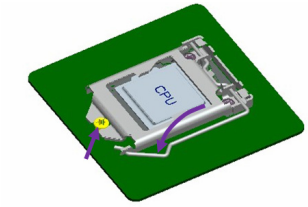


Step 4: Use right method to fix the CPU, and align the pins, then gently insert it into the CPU socket;

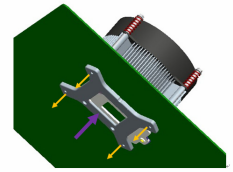
Note: The triangle mark on the CPU socket should align with the triangle mark on the CPU.



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.



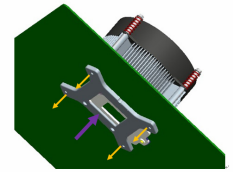
Step 6: Place the heat sink on the CPU, and use screws to fasten it with the bracket.



2.27 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.

2.28 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.

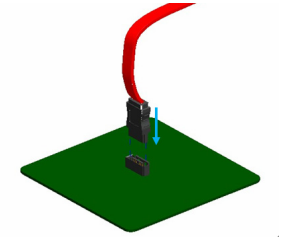
(3) The driver of chipset shall support the hot-swap of SATA hard disk.

(4) Do not hot swap SATA hard disk where the operating system is located when system is powered-on.

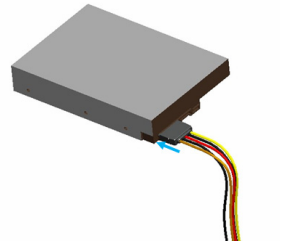
Note: Please carry out hot plugging as follows. Improper operation may destroy the hard disk or result in data loss.

Steps for hot plugging SATA hard drive:

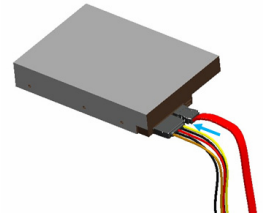
Step1: Connect the SATA data cable with the SATA interface on the motherboard;



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



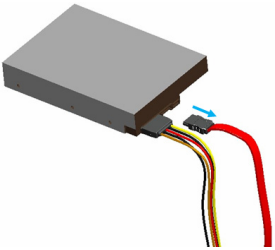
Step3: Insert the SATA data cable into the SATA hard disk.



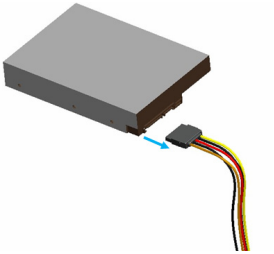
Steps for hot Unplugging SATA hard drive:

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 <Del> or<ESC>) 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.

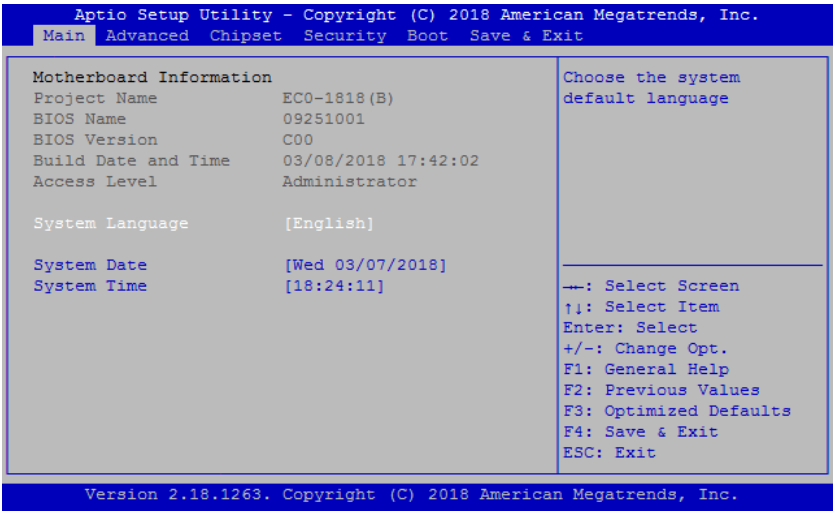
Note! UEFI setting will influence the computer performance directly. Setting parameter improperly will cause damage to the computer; it may even be unable to power on. Please use the internal default value of UEFI to restore the system.

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**



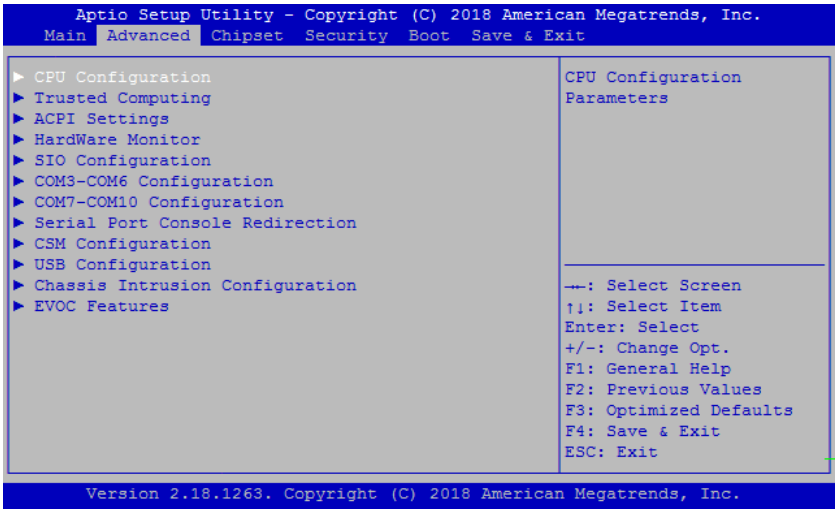
➢ **System Date**

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.



- **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.

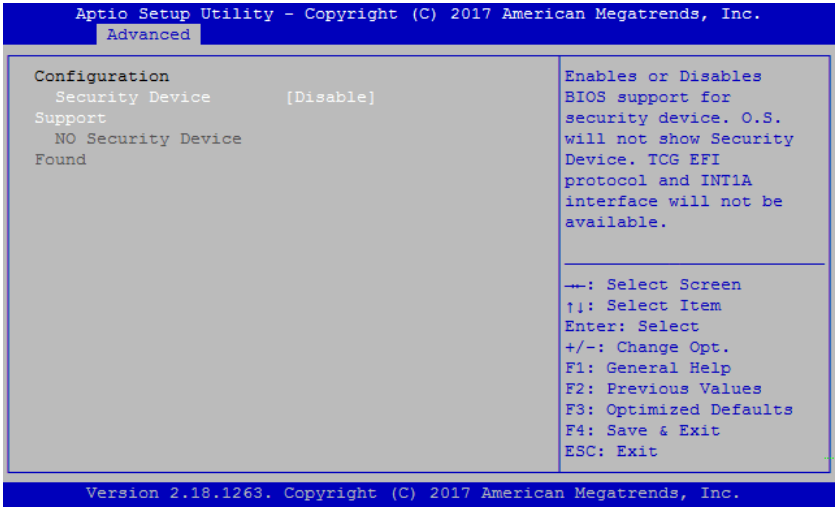
- **BIST**

  A mechanism to allow computers self-test.

- **MonitorMWait**

  Monitor/Mwait command switch control options.

➢ **Trusted Computing**

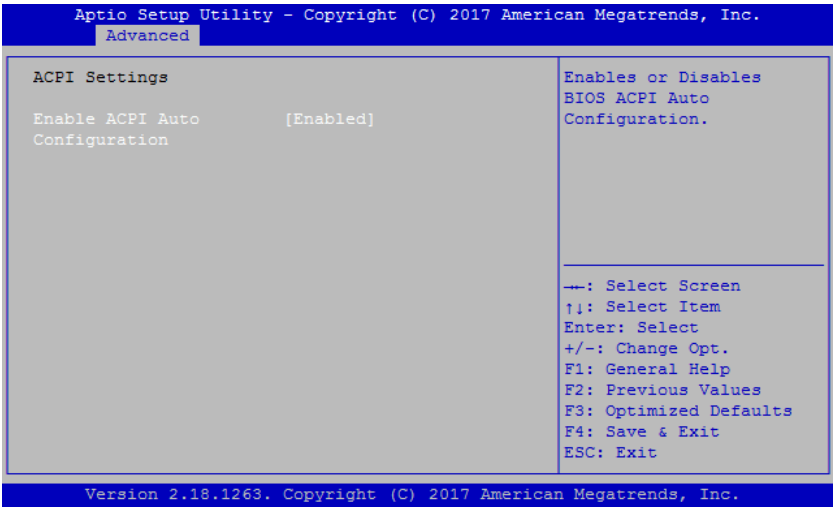


- **Security Device Support**

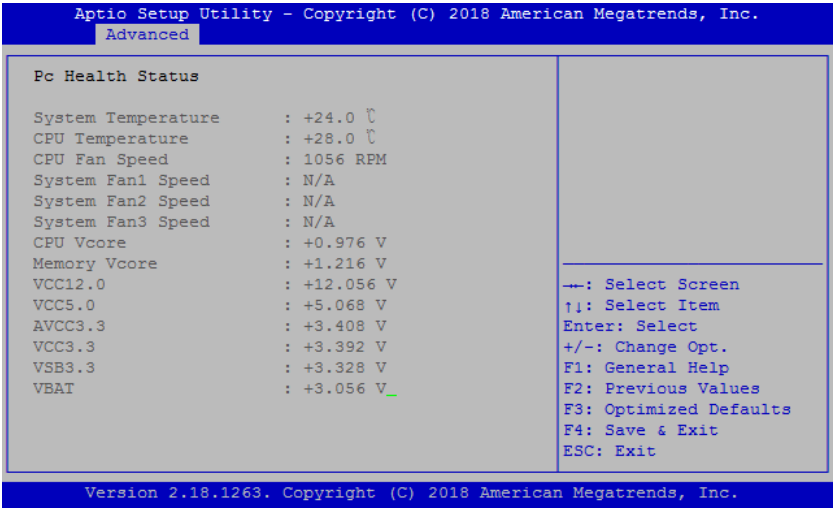
  To enable or disable TPM (Trusted Platform Module) function.

➢ **ACPI Settings**

This item indicates ACPI settings of the system.



➢ **HardWare Monitor**



- **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**

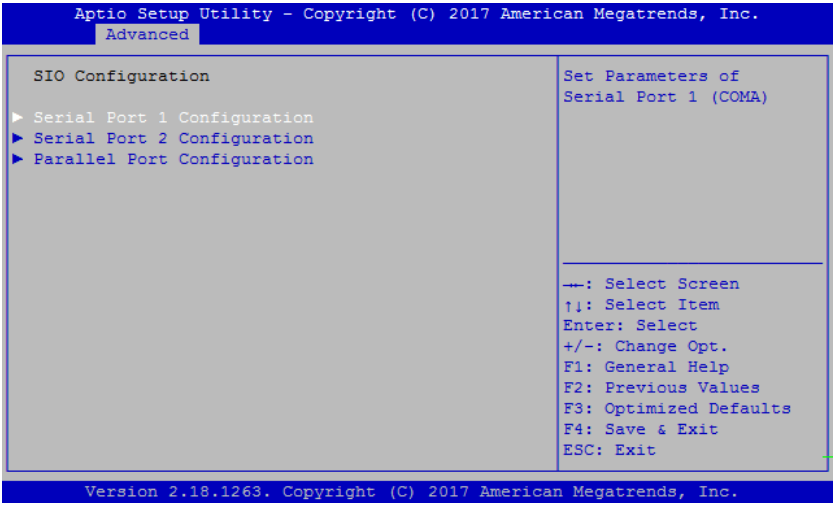
  To detect and display working voltage values of various primary voltages of ATX power supply.

- **VBAT**

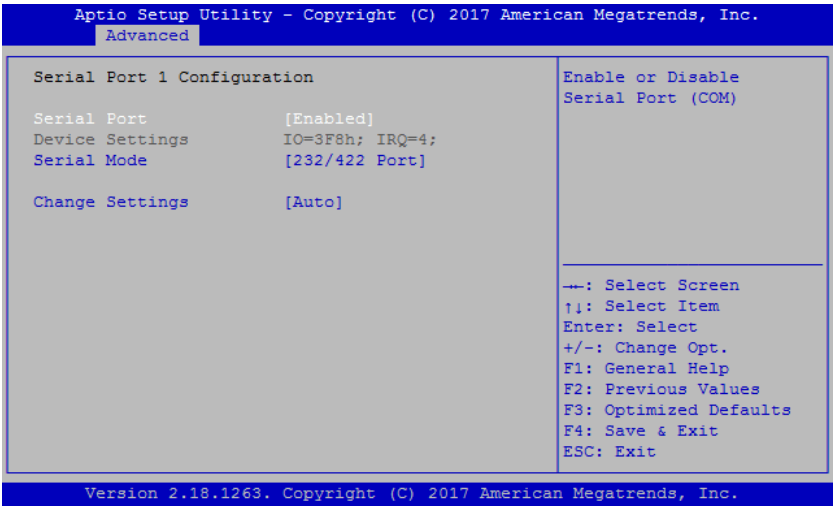
  To detect and display voltage value of current motherboard battery.

➢ **Super IO Configuration**

This item provides configuration of COM ports (COM1～2) and parallel port of this platform.



- **Serial Port 1～2 Configuration**



✧ **Serial Port**

Control switch of current COM port.

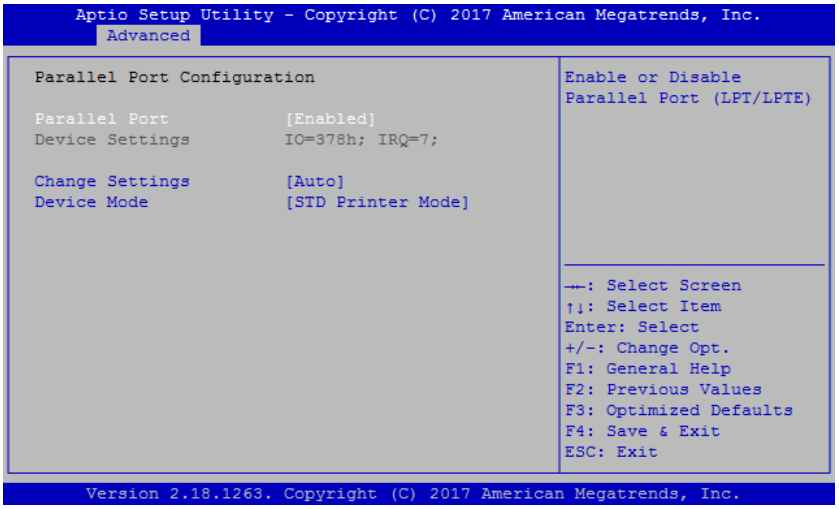
✧ **Device Settings**

To indicate current resource configuration of COM port.

✧ **Serial Mode**

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

● **Parallel Port Configuration**



✧ **Parallel Port**

Control switch for current parallel port.

✧ **Device Settings**

To indicate current resource configuration of parallel port.

✧ **Change Settings**

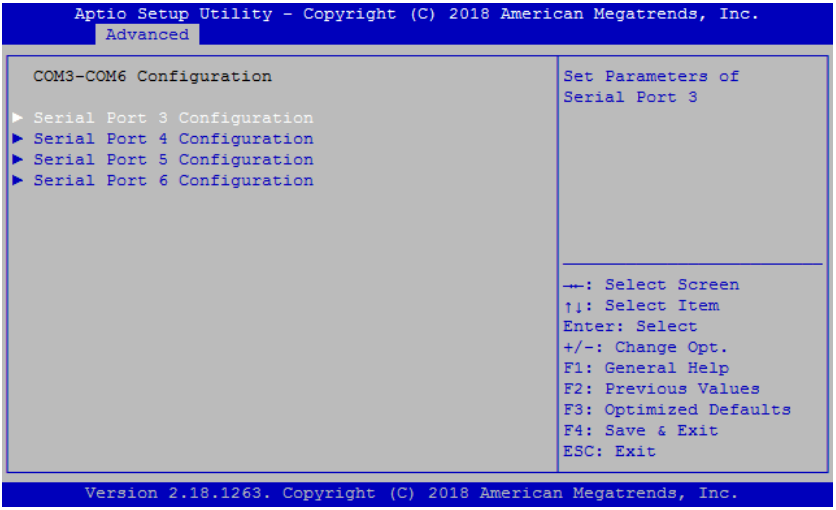
To set up IO address and IRQ resource of parallel port.

✧ **Device Mode**

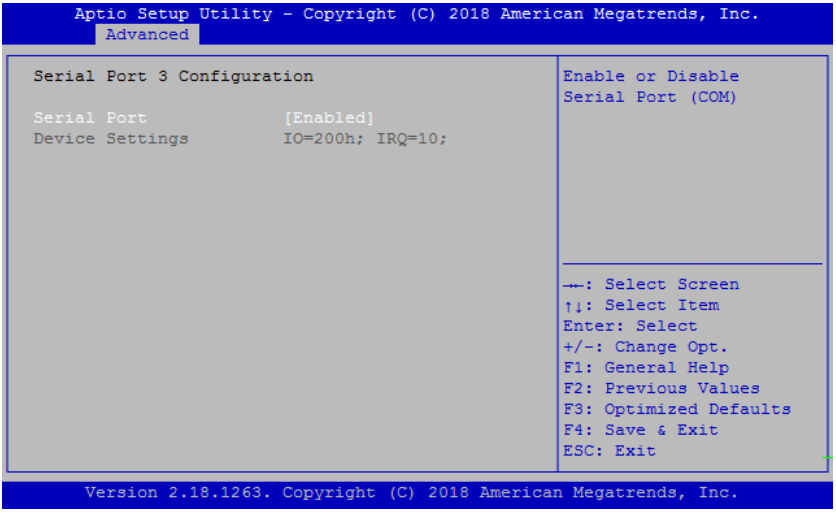
Parallel port working mode selection.

➢ **COM3-COM6 Configuration**

To set up resources of COM ports 3～6.



- **Serial Port 3～6 Configuration**



✧ **Serial Port**

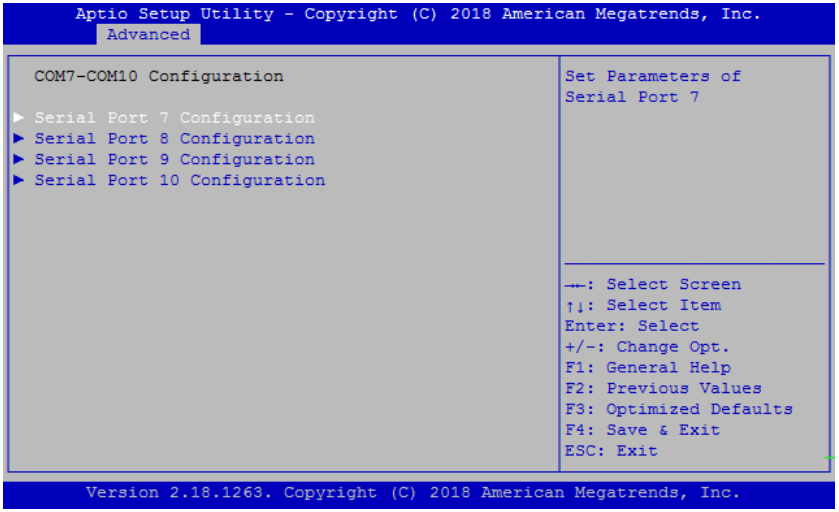
Control switch of current COM port.

✧ **Device Settings**

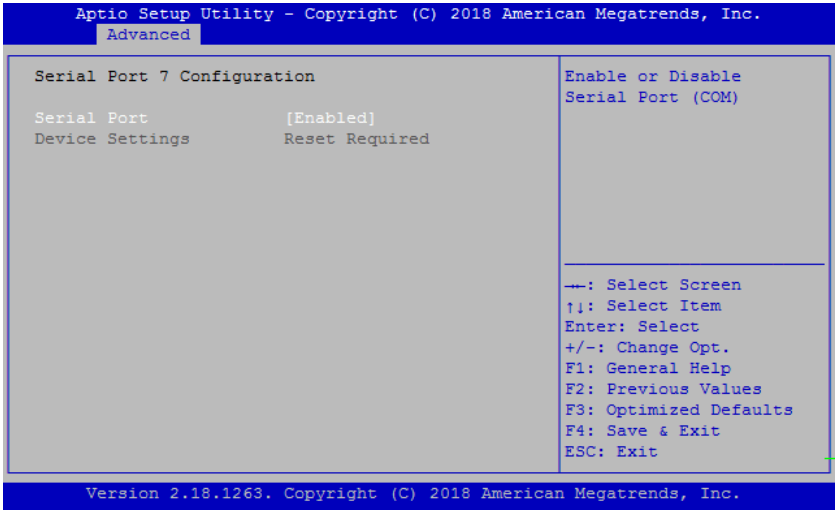
To indicate current resource configuration of COM ports.

➢ **COM7-COM10 Configuration**

To set up resources of COM ports7～10.



● **Serial Port 7～10 Configuration**



✧ **Serial Port**

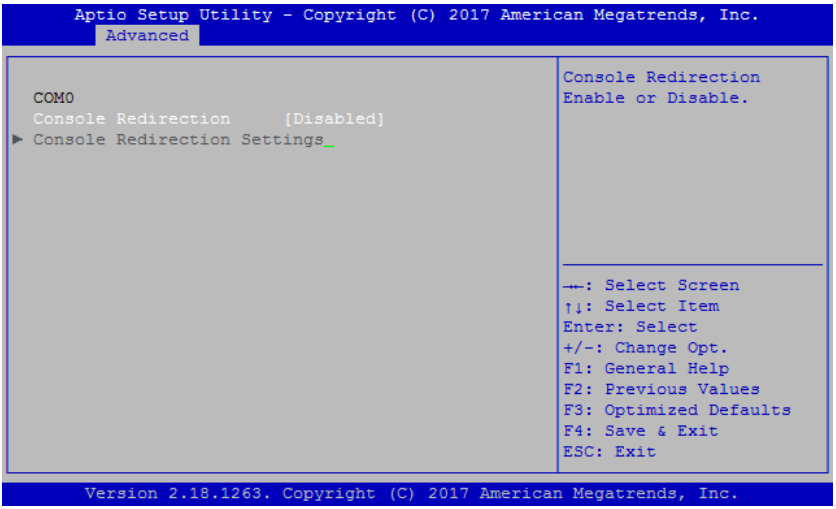
Control switch of current COM port.

✧ **Device Settings**

To indicate current resource configuration of COM ports.

➢ **Serial Port Console Redirection**

This option provides configuration of COM port redirection function.

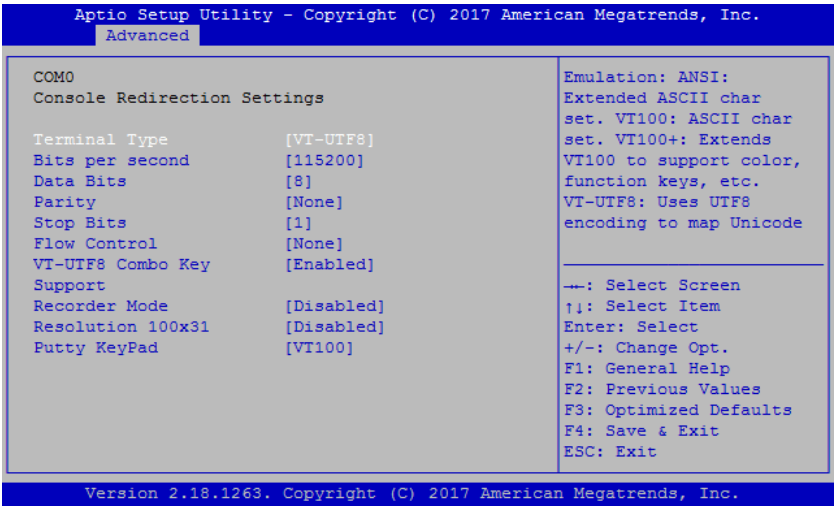


- **Console Redirection**

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.

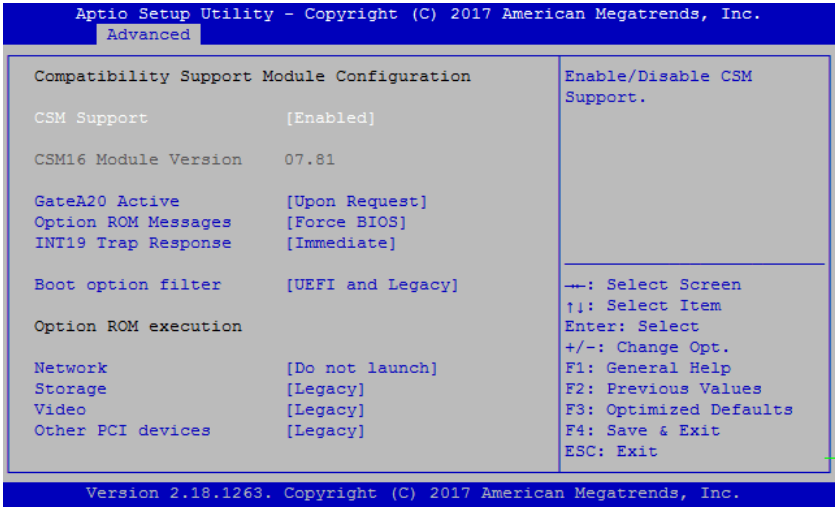
The function keys of COM port redirection function are shown in the table below:

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.



- **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 isUpon Request.

- **Option ROM Messages**

  To set up the way to select ROM information display. When it is set to Force BIOS, it isBIOS 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**

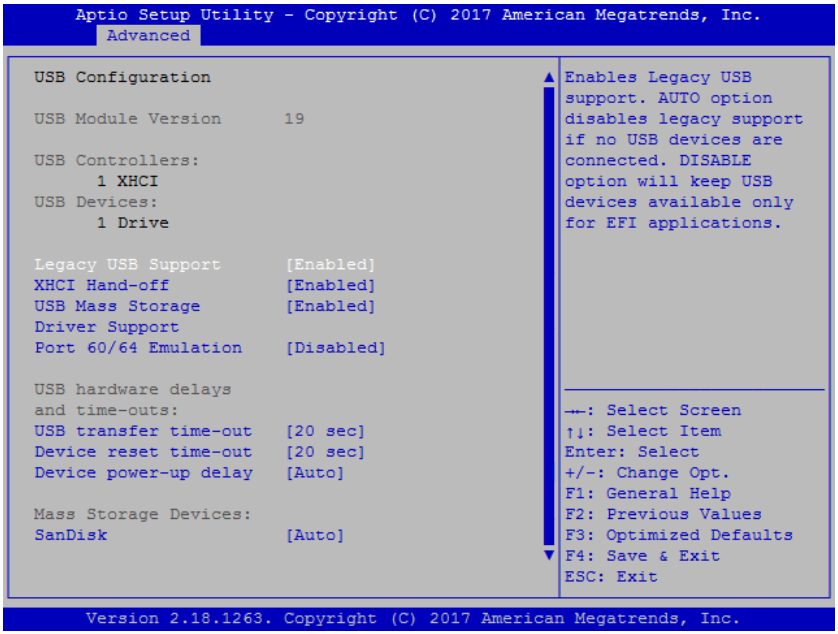
  To set up boot switch for video display, whether to select Legacy or UEFI boot. WhenDo not launch is selected, it means to disable.

- **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**

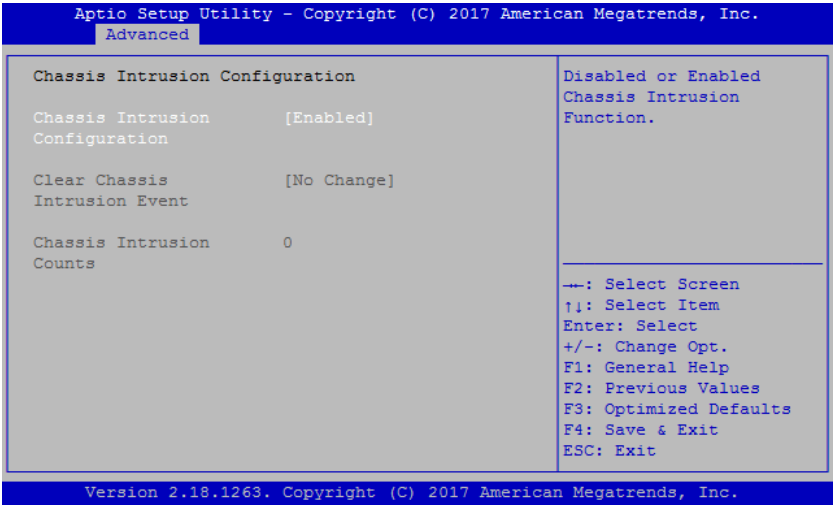
  This option is to set maximum time duration need to save device reset on USB2.0 bus. Within the time duration, EFI will check whether storage device can receive command. If the time is out, it is regarded as a storage device error.

- **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**

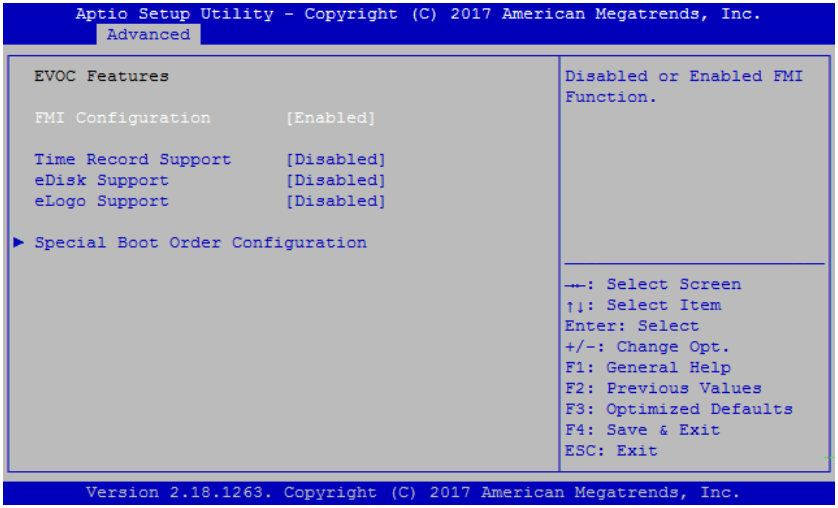
  To clear chassis intrusion event. Cancel alarm.

- **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**

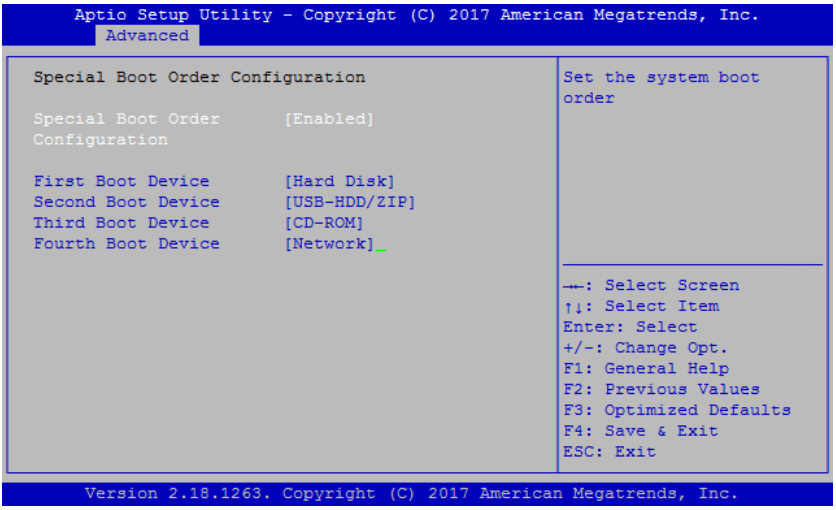
  This option is used to enable or disable eDisk.

- **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.

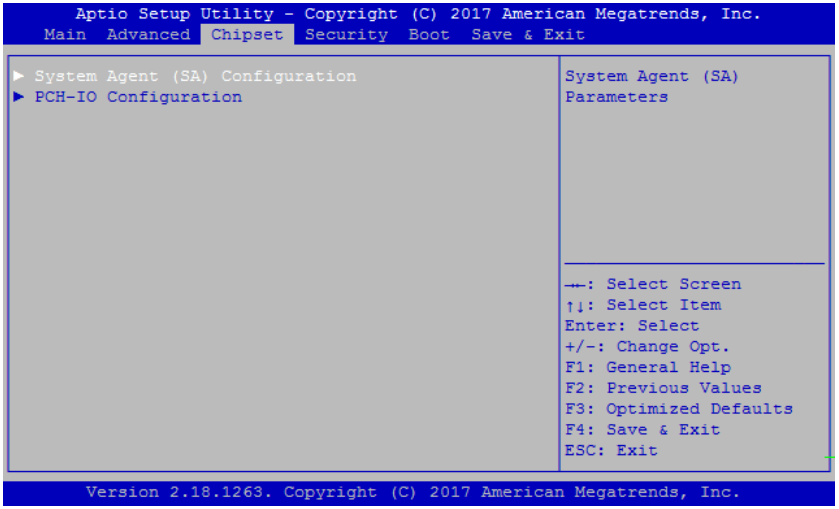


✧ **Special Boot Order Configuration**

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

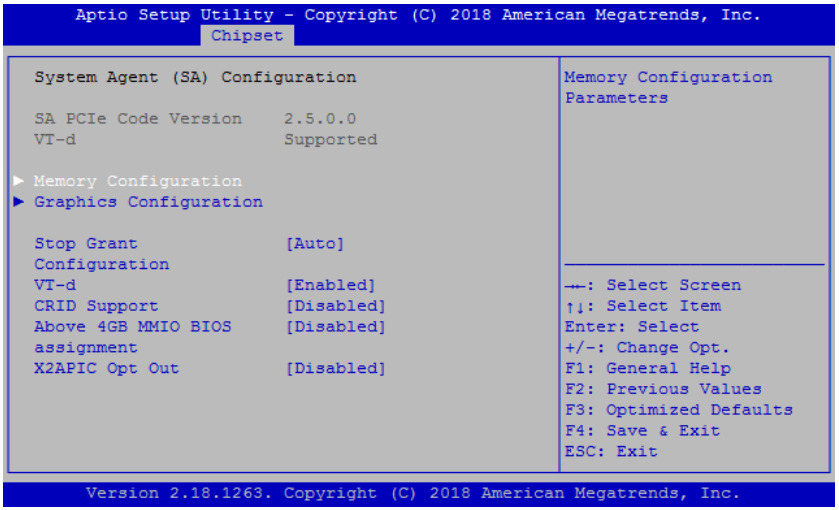
◆ **Chipset**

This option provides configuration about platform chipset.

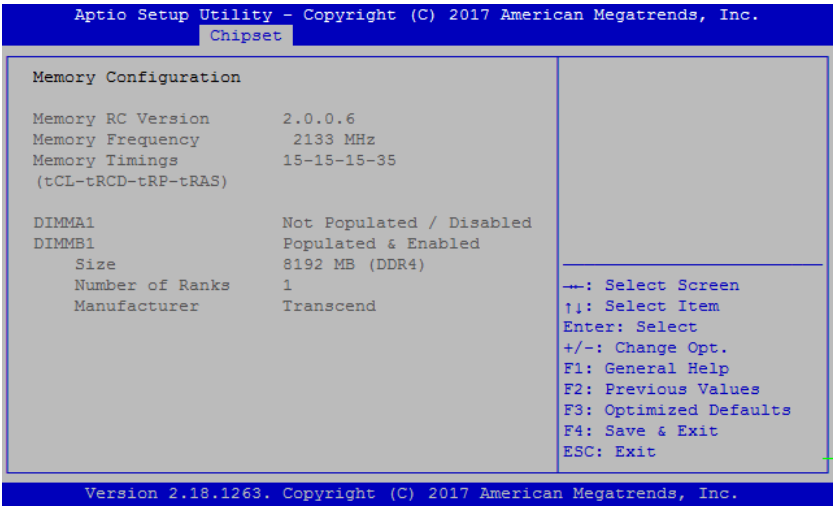


➢ **System Agent(SA) Configuration**

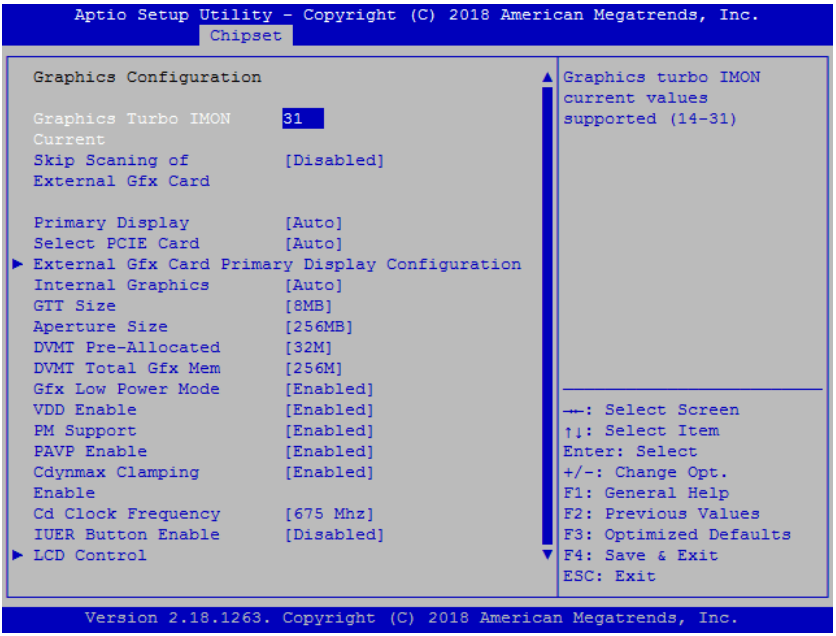
This option provides configuration of System Agent function



- **Memory Configuration**



- **Graphics Configuration**



✧ **Graphics Turbo IMON Current**

Graphical core frequency IMON flow control options.

✧ **Skip Scaning of External Gfx Card**

Switch control option to skip scanning of external Gfx

✧ **Primary Display**

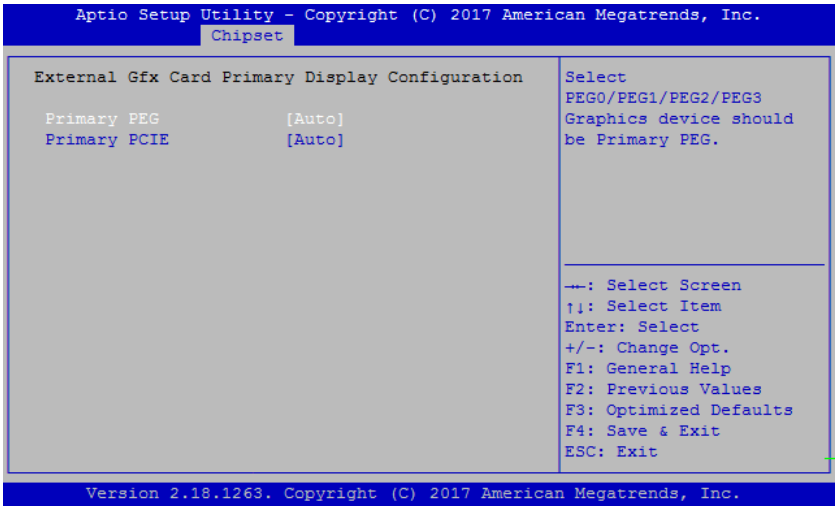
To set primary display device. The options are: IGD (integrated graphics card), PCIE (independent display PCIEX1), HG (Mixed graphics display function)

✧ **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**

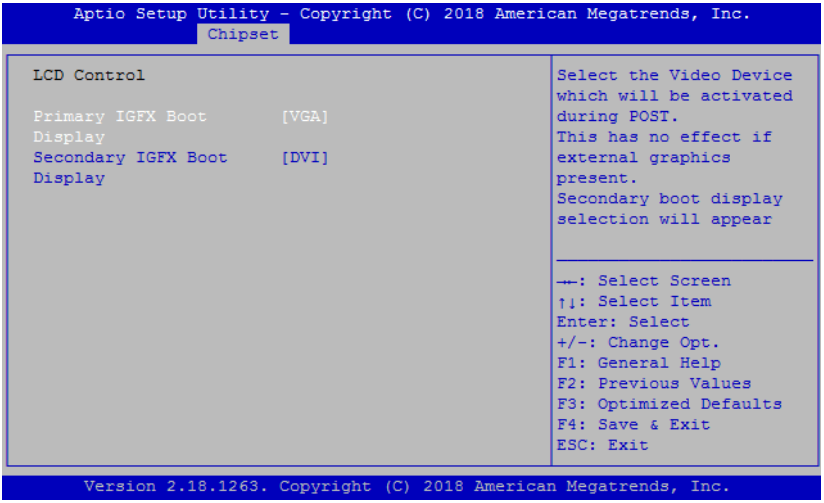
Power management control switch options.

✧ **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**

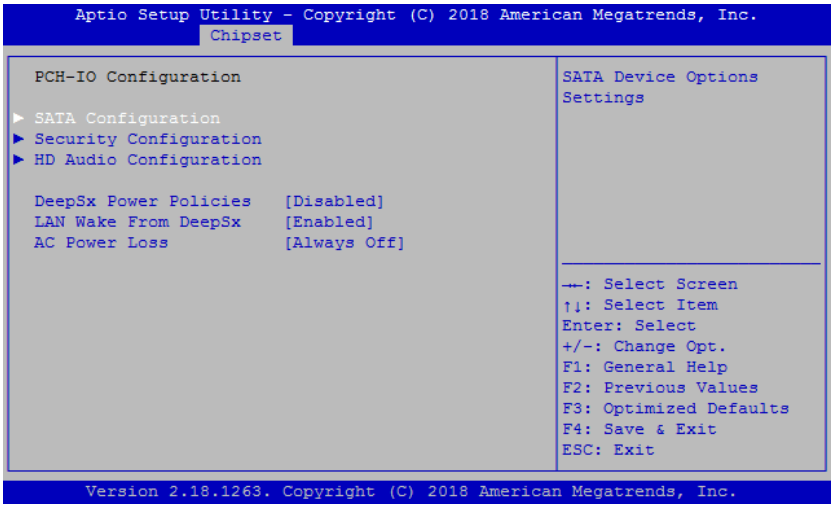
  To control whether Intel SIPP technology is supported via CRID.

- **Above 4GB MMIO BIOS assignment**

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

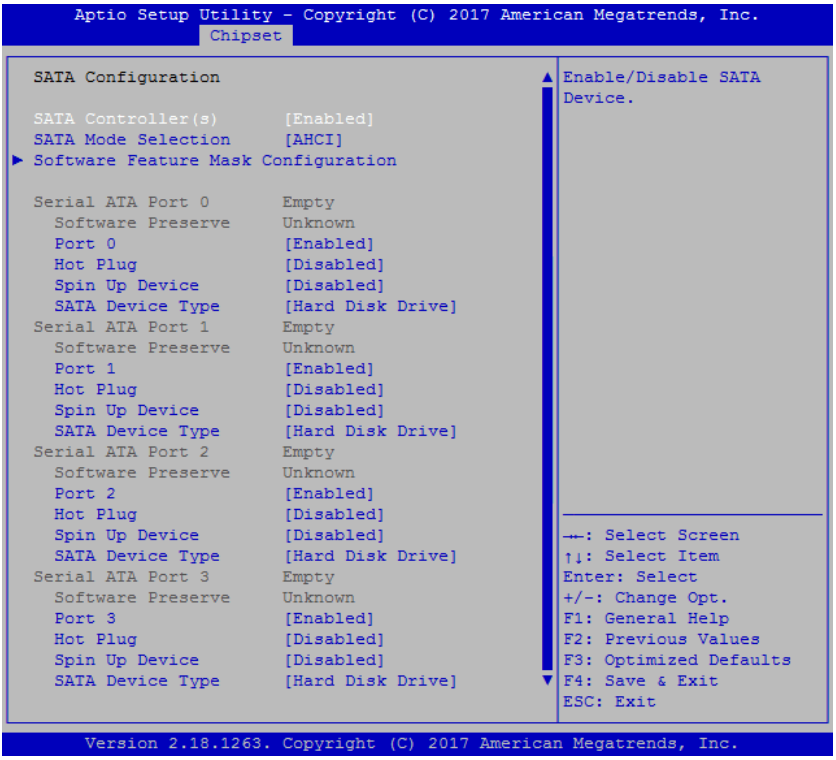
➢ **PCH-IO Configuration**

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”.



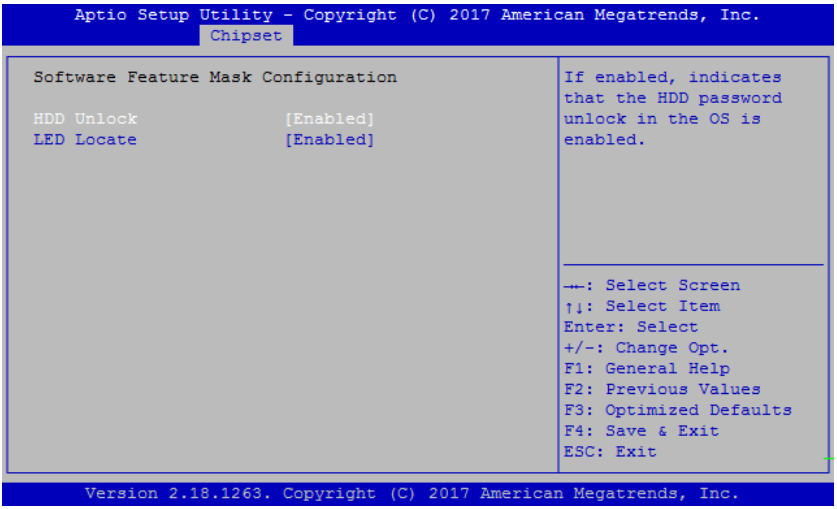
- **SATA Controller(s)**

  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.

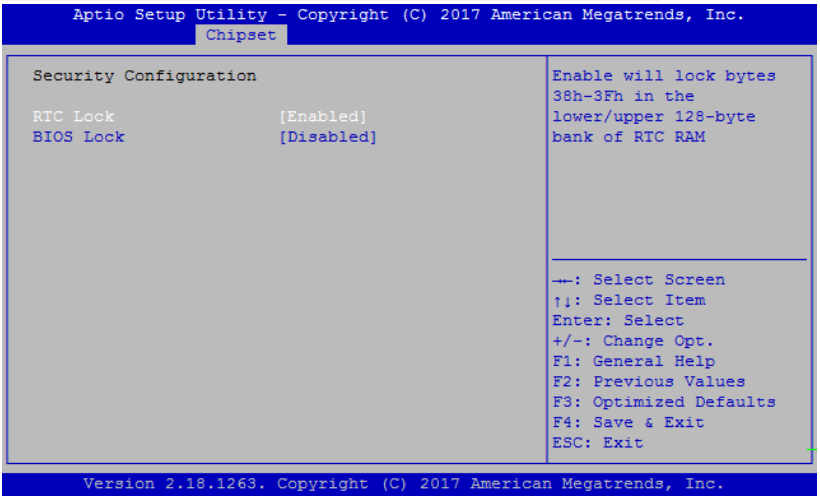
- **Spin Up Device**

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**

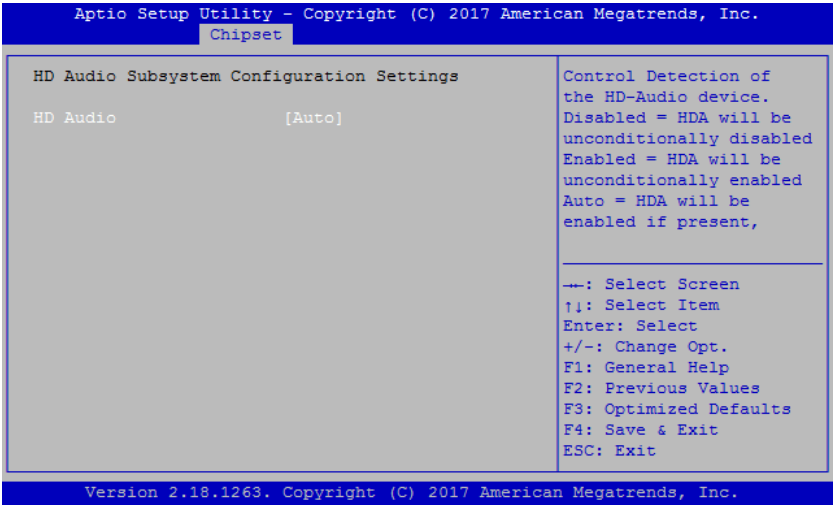
RCT register lock. If high level register of CMOS register needs to be accessed, it must be enabled.

✧ **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.

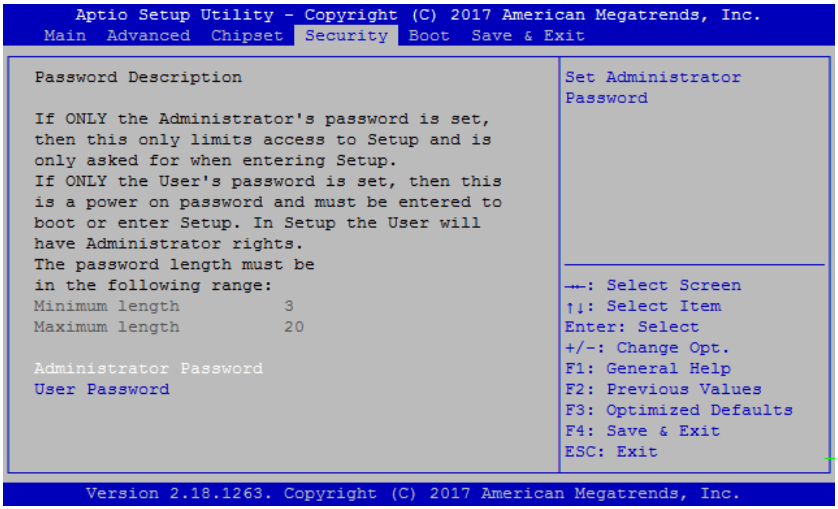
- **LAN Wake From DeepSx**

  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.

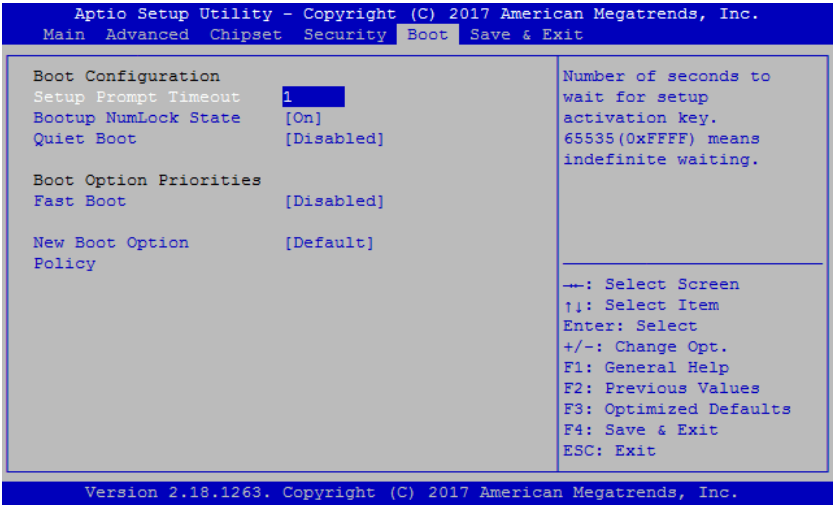
Note: If only the administrator password is set, the password does not need to be keyed in when entering into Setup program with User account. (i.e. at this time, empty password is effective).

➢ **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**



➢ **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.

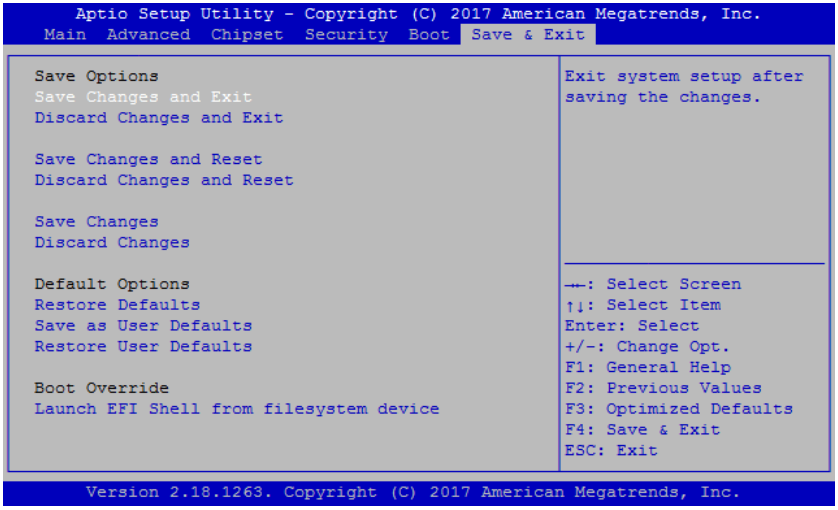
➢ **Boot Option Priorities**

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 Defualts**

This option is used to restore defaults.

3.4 System Resource Managed by UEFI under X86 Platform

We define three kinds of system resources here: I/O port address, IRQ interrupt number and DMA number.

- **IO Port Address**

  Only 16 IO address lines are designed for X86, from 0 ~ 0FFFFh; there is 64K for the system I/O address space. In traditional ISA connector, only the foregoing 1024 (0000 ~ 03FFh) are used while the ports above 0400h are used by PCI and EISA connectors. Each peripheral will occupy portion of the space. The table below shows the I/O connectors used in X86 platform.

Address	Device Description
0000-0CF7	PCI bus
0020-0021	Programmable interrupt controller
0024-0025	Programmable interrupt controller
0028-0029	Programmable interrupt controller
002C-002D	Programmable interrupt controller
002E-002F	Motherboard resources
0030-0031	Programmable interrupt controller
0034-0035	Programmable interrupt controller
0038-0039	Programmable interrupt controller
003C-003D	Programmable interrupt controller
0040-0043	System timer
004E-004F	Motherboard resources
0050-0053	System timer
0060-0060	PS/2 standard keyboard
0061-0061	Motherboard resources

0063-0063	Motherboard resources
0064-0064	PS/2 standard keyboard
0065-0065	Motherboard resources
0067-0067	Motherboard resources
0070-0070	Motherboard resources
0070-0077	System CMOS/real time clock
0080-0080	Motherboard resources
0092-0092	Motherboard resources
00A0-00A1	Programmable interrupt controller
00A4-00A5	Programmable interrupt controller
00A8-00A9	Programmable interrupt controller
00AC-00AD	Programmable interrupt controller
00B0-00B1	Programmable interrupt controller
00B2-00B3	Motherboard resources
00B4-00B5	Programmable interrupt controller
00B8-00B9	Programmable interrupt controller
00BC-00BD	Programmable interrupt controller
00F0-00F0	Numeric data processor
02F8-02FF	COM2
0378-037F	LPT1
03B0-03BB	Standard
03C0-03DF	Standard
03F8-03FF	COM1
04D0-04D1	Motherboard resources
04D0-04D1	Programmable interrupt controller
0680-069F	Motherboard resources
0800-087F	Motherboard resources

0A00-0A0F	Motherboard resources
0A10-0A1F	Motherboard resources
0A20-0A2F	Motherboard resources
0A30-0A3F	Motherboard resources
0D00-FFFF	PCI bus
164E-164F	Motherboard resources
1800-18FE	Motherboard resources
1854-1857	Motherboard resources
E000-EFFF	PCI Express standard Root Port
F000-F03F	Standard VGA graphics adapter
F040-F05F	SM bus controller
F060-F07F	Standard AHCI 1.0 Serial ATA controller
F080-F083	Standard AHCI 1.0 Serial ATA controller
F090-F097	Standard AHCI 1.0 Serial ATA controller
FF00-FFFE	Motherboard resources
FFFF-FFFF	Motherboard resources
FFFF-FFFF	Motherboard resources
FFFF-FFFF	Motherboard resources

◆ **IRQ Assignment Table**

There are 15 interrupt sources of the system. Some have been occupied by the system devices. Only the ones that are not occupied can be assigned to other devices. ISA device requests exclusive use of its interrupt. Only the plug and play ISA devices can be assigned by the UEFI or the OS. And several PCI devices can share one interrupt, which is assigned by UEFI or OS. Interrupt assignment of some devices of X86 platform is shown in the table below, but it does not show the interrupt source occupied by the PCI devices.

Interrupt No.	Device Description
IRQ0	System timer
IRQ1	PS/2 standard keyboard
IRQ2	Reserved
IRQ3	COM2
IRQ4	COM1
IRQ5	Reserved
IRQ6	Reserved
IRQ7	Reserved
IRQ8	System CMOS/read time clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Microsoft PS/2 Mouse
IRQ13	Numeric data processor
IRQ14	Motherboard resources
IRQ15	Reserved

◆ **APIC**

Advanced programmable interrupt controller. Most motherboards above P4 level support APIC and provide more than 16 interrupt sources, like IRQ16 - IRQ23; while some others can have up to 28 interrupt sources, such as motherboard supporting PCI-X. However, relevant OS are required to enable that function.

◆ **Memory Address**

Address	Device Description
000A0000-000BFFFF	Standard VGA graphics adapter
000A0000-000BFFFF	PCI bus
90000000-DFFFFFFF	PCI bus
C0000000-CFFFFFFF	Standard VGA graphics adapter
DE000000-DEFFFFFF	Standard VGA graphics adapter
DF000000-FD01FFFF	Ethernet controller
DF000000-DF0FFFFF	PCI Express standard Root Port
DF020000-DF023FFF	Ethernet controller
DF100000-DF10FFFF	Multi-media audio controller
DF110000-DF11FFFF	PCI Express upstream switch port
DF110000-DF1FFFFF	PCI Express standard Root Port
DF220000-DF12FFFF	Multi-media audio controller
DF230000-DF23FFFF	Universal Serial Bus (USB) controller
DF240000-DF243FFF	Multi-media audio controller
DF244000-DF247FFF	PCI memory controller
DF248000-DF249FFF	Standard AHCI 1.0 Serial ATA controlle
DF24A000-DF24A0FF	SM bus controller
DF24B000-DF24B7FF	Standard AHCI 1.0 Serial ATA controlle
DF24C000-DF24C0FF	Standard AHCI 1.0 Serial ATA controlle
DF24E000-DF24EFFF	PCI data acquisition and signal processing controller
DF24F000-DF24FFFF	Basic system device
DFFE0000-DFFFFFFF	Motherboard resources
E0000000-EFFFFFFF	Motherboard resources

FD000000-FDABFFFF	Motherboard resources
FD000000-FE7FFFFF	PCI bus
FDAC0000-FDACFFFF	Motherboard resources
FDAD0000-FDADFFFF	Motherboard resources
FDAE0000-FDAEFFFF	Motherboard resources
FDAF0000-FDAFFFFF	Motherboard resources
FDB00000-FDFFFFFF	Motherboard resources
FE000000-FE01FFFF	Motherboard resources
FE036000-FE03BFFF	Motherboard resources
FE410000-FE7FFFFF	Motherboard resources
FED00000-FED003FF	High precision event timer
FED10000-FED17FFF	Motherboard resources
FED18000-FED18FFF	Motherboard resources
FED19000-FED19FFF	Motherboard resources
FED20000-FED3FFFF	Motherboard resources
FED45000-FED8FFFF	Motherboard resources
FED90000-FED93FFF	Motherboard resources
FEE00000-FEEFFFFF	Legacy device
FF000000-FFFFFFFF	Intel(R) 82802 Firmware Hub Device
FF000000-FFFFFFFF	Motherboard resources

4. Installing the Drivers

Regarding the 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 operating system. As a link between hardware and application software, the purpose of BPI is to provide a platform-irrelevant standard interface (in the form of library function, similar to library function of standard C) of operating hardware for the application layer, therefore, application software engineers do not need to care about specific hardware solutions of motherboard. Users can use BPI library to rapidly develop their own software products, and when the hardware of the motherboard is to be upgraded, there is no need to modify the application software and the previous software can operate on the new platform normally. BPI has greatly sped up the product development and reduced the maintenance cost. The BPI structure is shown in the Figure1 below:

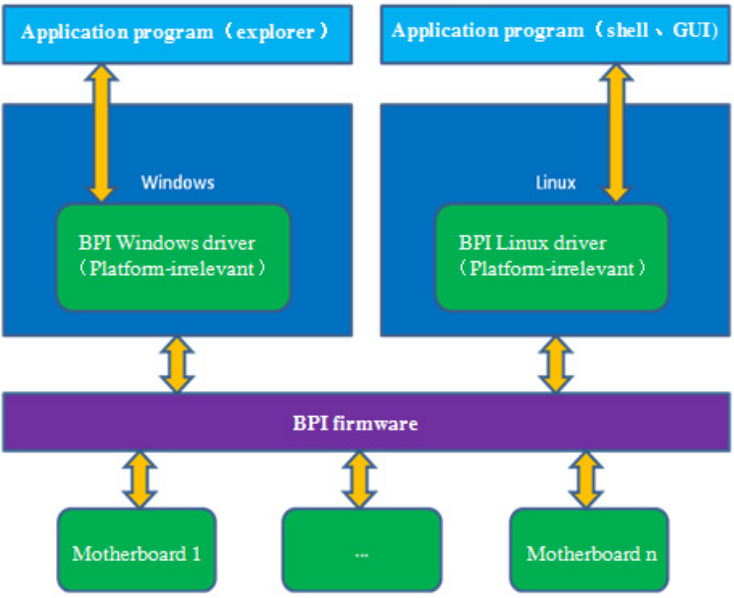


Figure1 BPI Structure

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:

1) By monitoring CPU temperature: If the temperature is too high, the alarm will be triggered.
2) 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 eLog function. As for its test procedure, please refer to eManager software in the user manual CD.

1) eLog

It keeps detailed records of the operation of PC, for example, the time of first bootup, completion time of test, time of leaving factory, time of each power-on/off, total bootup times of the system, illegal power-off times, total online time length of the PC, total heart beat times of CPU. The log management information can provide valuable 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	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	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.

Blue screen or computer crush occurred when entering system	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.
Slow to enter operating system	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.
System reboots automatically	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.
No USB device can be detected	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	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	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.

5.4 Abbreviations

Abbreviation	Terminology	Meaning
AC	Alternate current	Alternate current
APM	Advanced Power Management	A tool used to monitor and lower PC power consumption.
ACPI	Advanced Configuration and Power Interface	
AHCI	Advanced Host Controller Interface	Standard control interface of serial ATA, Microsoft windows XP (above SP1 version) and IAA driver program supports the interface
APIC	Advanced Programmable Interrupt Controller	Extended programmable interrupt controller

ASPM	Active State Power Management	A power saving mode control for PCIE devices in idle status
ATM	Asynchronous Transfer Mode	
ASCII	American Standard Code for Information Interchange	
API	Application Program Interface	
ATM	Asynchronous Transfer Mode	
AT	Advanced Technology	AT power supply
ATX	Advanced Technology Extended	ATX motherboard structure or ATX power supply
AWG	American wire gauge	An American standard to differentiate wire diameter
BIOS	Basic Input/Output System	BIOS code
Bps	Bit/Second	A description of data transfer rate
BGA	Ball Grid Array	A chip package type
Buffer	Buffer	
Battery	Battery	
BBS	Bulletin Board System	
BMP	Bitmap	A graphics format
CAN	Controller Area Network	A universal industrial site bus
CD-ROM	Compact Disc Read-only Memory	Large data storage read-only disc
CD-RW	CD Read & Write	Burner disc
CE	Communate Europpene (European Conformity) (CE Certificate Mark)	Unified certificate mark of European Union products

CF	CF card	
CGA	Color Graphic Adapter	Standard monitor interface
CLK	Clock Pulse	Clock Signal
CMOS	Complementary Metal-oxide Semi-conductor	
COA	Certificate Of Authenticity	Microsoft Windows product key
CoL	Certificate of License	License authorization
COM	Serial Communication Port	Serial Port
CP	Communications Processor	Communication PC
CPU	Central Processing Unit	
CRT	Cathode Ray Tube	CRT monitor
CSA	Canada Standard Association	A Canada organization which carries out test and certification by the standard of Canada or the two countries (using UL/USA)
CTS	Clear to Send	
CPCI	Compact PCI	A high-performance industrial bus port standard
CISC	Complicated Instruction Set Computer	
CRC	Cycle Redundant Check	An error check code
CGI	Common Gateway Interface	
Cache	High Speed Cache Memory	
DRAM	Dynamic Random Access Memory	

DDRAM	Double Data Rate Random Access Memory	Memory chip with high speed port
DC	Direct Current	
DCD	Data Carrier Detect	Data carrier signal detect
DMA	Direct Memory Access	Direct memory access
DOS	Disk Operating System	Operating system without graphic interface
DP	Display Port	Display Port
DQS	German Certification body for Quality and Environment Management Systems	
DSR	Data Set Ready	Operation ready
DTR	Data Terminal Ready	
DVD	Digital Video Disc	
DVI-D	Digital Video Interface	Digital monitor interface
DVI-I	Digital Video Interface	Monitor port with digital and VGA analog signals
dB	Decibel	A counting unit to indicate ratio of two values
DCE	Data Communications Equipment	Data communication terminal device
DOM	DOM electronic hard disk	Abbreviation of Disk on module
DOC	Disk On Chip	Abbreviation of Disk on Chip
DDC	Display Data Channel	Bus standard for communication between monitor and host
DDR	Double Data Rate	A memory specification
Decode	Command Decode	
DFP	Digital Flat Panel	

DHCP	Dynamic Host Configuration Protocol	A network protocol of local area network
DES	Data Encryption Standard	A symmetrical encryption algorithm
DIMM	Double In-Line Memory Module	
DMI	Direct Media Interface	Data transmission channel between CPU and IO controller (PCH, ICH).
DNS	Domain Name System	A core service of Internet
Dot Pitch	Dot Pitch	Distance between two neighboring pixel dots on the screen
DPMS	Display Power Management Signaling	A display power management standard stipulated by VESA organization
DVMT	Dynamic video memory technology	A technology used to set shared memory size which can be used by video card
ECC	Error Correcting Code	
ECP	Enhanced Capability Port	Extended parallel port
EGA	Enhanced Graphics Adapter	Connector between PC and monitor
ESD	Electrostatic Discharge	
EDID	Extend display Identification Data	A VESA standard data format
EIDE	Enhanced IDE	Enhanced electronic integrated drive
EISA	Extended Industry Standard Architecture	Extended ISA standard
EM64T	Extended Memory 64 Technology	
EN	European Norm	The national standards of member countries must be compliant with EN standards

EEPROM	Electrically Erasable Programmable Read-Only Memory	Use sub-module of EEPROM chip
EPP	Enhanced Parallel Port	
ESC	Character for exit	Control character
EC	Embedded Controller	
EMI	ElectroMagnetic Interference	
EMC	Electro Magnetic Compatibility	
ES	Energy Star	
ESCD	Extended System Configuration Data	
EIA	Electronic Industries Association	
FAQ	Frequently Asked Question	
FAT32	32-bit File Allocation Table	
FDD	Floppy Disk Drive	
FSB	Front Side Bus	External bus
FCPGA	Flip Chip Pin Grid Array	A chip package type
FCBGA	Flip Chip Ball Grid Array	A chip package type
FIFO	First IN First Out	
FireWire	Fire Wire	IEEE1394 standard
Firmware	Firmware	Firm software
FWH	Firm Ware Hub	
FPU	Float Point Unit	
FTP	File Transfer Protocol	
GND	Grounding	

GB	Gigabit	
GPS	Global Positioning System	
GSM	Global System for Mobile communication	
GUI	Graphical User Interface	
GMCH	Graphics & Memory controller hub	
GPU	Graphics Processing Unit	
HDD	Hard Disk Drive	
HDTV	High Definition TV	
HEX	Hexadecimal	
HTML	Hyper Text Markup Language	Used to create script language of Internet page
HTTP	Hyper Text Transfer Protocol	Data transfer protocol on the Internet
HardWare	Hardware	
HW Monitor	Hardware monitor	
Hz	Hertz	
HDMI	High Definition Multimedia Interface	A high definition display port
HAD	High Definition Audio	
HT	Hyper-Thread technology	
HS	Hot Swap	Hotswap operation of device card under power-on status
I/O	Input/Output	Data input/out of the computer
IDE	Integrated Drive Electronics	
IGD	Integrated Graphic Device	

IP	Ingress Protection	
IP	Internet Protocol	
IR	Infrared	A low-speed short-distance wireless transmission
IRDA	Infrared Data Association	Used for the standard of data transmitted by IR module
IRQ	Interrupt Request	
ISA	Industrial Standard Architecture	Used for bus of extended module
IC	Integrated Circuit	
IDSL	Internet Digital Subscriber Line	
IE	Internet Explorer	
IEEE	Institute of Electrical and Electronic Engineers	
IPC	Industrial PC	
ISO	International Standards Organization	
IT	Information Technology	
IA	Intel Architecture	
ICH	I/O Controller Hub	
ID	Identity code	
IDF	Intel Development Forum	
INI File	Initialization File	
ISP	Internet Server Provider	
IPMI	Intelligent Platform Management Interface	
JEDEC	Solid State Technology Association	Standard and specification formulation association for storage devices

KB	Keyboard	
Kbps	Kb per second	A transmission rate
L2 Cache	Level2 Cache	
LAN	Local Area Network	Computer network confined for local communication
LCD	Liquid Crystal Display	
LED	Light Emitting Diode	
LPT	Line Print Terminal	
LVDS	Low-Voltage Differential Signaling	
Latency time	Latency Time	
LBA	Logic Block Addressing	A block addressing mode for mechanical hard drive
LFP	LCD Flat Panel	LCD flat panel display
MAC	Media Access Control	
MMC	Micro Memory Card	32*24.5mm format memory card
MPI	Multiple Point Interface Used for Programming Devices	
MS-DOS	Microsoft Disk Operating System	
MTBF	Meantime between Failure	
MB	Megabyte	
MPEG	Moving Pictures Experts Group	A video compression standard
MTTR	Meantime to Repair	
MBR	Main Boot Record	
MHz	Mega Herdz	A unit of frequency
MCU	Micro Control Unit	A single-chip micro computer

MODEM	MOdulator/DEModulator	
NA	Not Available	
NC	Not Connected	
NP	Not Installed	
NCQ	Native Command Queuing	Automatically rearrange the files and disc access, to improve performance
NMI	Non Maskable Interrupt	
NTFS	New Technology File System	Windows XP, Windows Server 2008
		Vista and Windows 7 standard file system
NIC	Network Interface Card	Network adapter
NB	Northbridge	Northbridge chip
ODD	Optical Disc Drive	
OS	Operating System	
OSD	On-screen Display	
PATA	Parallel ATA	A storage interface standard
PC	Personal PC	Personal computer
PCI	Peripheral Component Interconnect	PCI bus
PCIE	Peripheral Component Interconnect Express	A high-speed serial differential full-duplex bus transfer specification
PCMCIA	Personal Computer Memory Card International Association	
PEG	PCI EXPRESS Graphics	
POST	Power On Self Test	
PXE	Pre-boot Execution Environment	Used to operate software without HDD data PC via network

PMC	PCI Mezzanine Card	PCI Mezzanine Card
PS2	PS2 Interface Device	PS2 mouse/keyboard standard port type developed by IBM
PICMG	The PCI Industrial Computer Manufacturers Group	
RAID	Redundant Arrays of independent Disks	Redundant HDD array
RI	Ringing	Call in wake-up signal
RS485	Reconciliation Sub layer 485	Designed to be used for bidirectional bus system of up to 32 nodes
RTC	Real Time Clock	
RTS	Request to Send	
RXD	Receive Data	
RF	Radio Frequency	Wireless transmission of electro-magnetic wave with frequency ranging from 300KHz～30GHz
RSV	Reserve Use of Pin	
RST	Reset	Reset
SCSI	Small Computer System Interface	
SDK	Software Development Kit	
SSD	Solid State Drive	
SV	Standard Voltage	
SMART	Self-Monitoring, Analysis and Reporting Technology	Hard drive error diagnosis program
SO-DIMM	Small Outline Dual Inline	A laptop memory

	Memory Module	
SRAM	Static Random Access Memory	
SDRAM	Synchronous Dynamic Random Access Memory	
SVGA	Super Video Graphics Array	
SW	Software	Software
S5	Power-off	All hardware devices (including power supply) are shut off
S4	Suspend to Disk	Write the memory information into hard drive, and all components stop working
S3	Suspend to Memory	Write the data in operation into memory and shut off hard disk
S1	POS (Power on Suspend)	CPU stops working, and all the other hardware devices are still working normally
S0	Normal Operation of the Computer	All hardware devices are turned on or in normal operation status
SMB	System Management Bus	
SMD	Surface Mounted Devices	
SMI	System Management Interrupt	Only when SMI is triggered, can the system enter into SMM mode
SMM	System Management Mode	
SNR	Signal to Noise Ratio	
SPD	Serial Presence Detect	A 256KB EEPROM
S/PDIF	Sony/Philips Digital Interconnect Format	A civil digital audio interface protocol
SCI	System Control Interrupt	Notification of ACPI interrupt event

		of OS generated by hardware
TFT	Thin Film Transistor	An LCD screen type
TxD	Transmit Data	Data transmission signal
TDP	Thermal Design Power	Thermal Design Power
TTL	Transistor-Transistor-Logic	
Turbo	Instantaneous Acceleration Automatic Overclocking Technology	Intel Turbo boost
TPM	Trusted Platform Module	
USB	Universal Serial Bus	
UPS	Uninterruptible Power Supply	
UL	Underwriters Laboratories	UL certification
U	Server size unit, 1U=44.45mm	
UEFI	Unified Extensible Firmware Interface	Intel latest firmware interface standard, using C language
VGA	Video Graphics Array	A video adapter to meet industrial standard
VRM	Voltage Regulator Module	
VT	Virtualization Technology	Analog closed environment can be used by Internet technology
VID	Voltage Identification	
VSYNC	Vertical Synchronization	Vertical synchronization update
VESA	Video Electronics Standards Association	
VRAM	Video Random Access	

	Memory	
VIO	VIO voltage	IO voltage on PCI bus equipment
VPX	New-generation High-speed Serial Bus	
WDT	Watchdog	Watch dog
WLAN	Wireless Local Area Network	
WOL	Wake-On-LAN	LAN wakeup
WWW	World Wide Web	World Wide Web
WAN	Wide Area Network	Wide Area Network
WAP	Wireless Application Protocol	
XGA	Extended Graphics Array	Supports maximum resolution of 1024*768
XMC	XMC Express Mezzanine Card	XMC Switched Mezzanine Card