



AXIOMTEK

CAPA84R

**Intel® Celeron® J1900/J1800
Processor 3.5" Board**

User's Manual



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CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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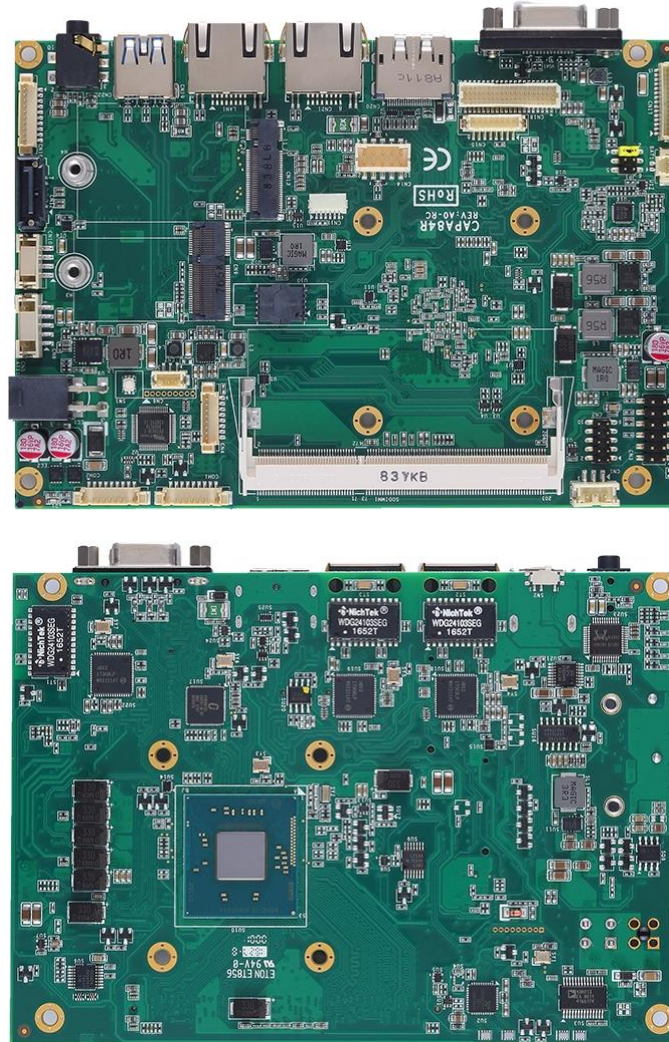
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Chapter 1

Introduction



The CAPA84R, a 3.5" board, supports Intel® Celeron® J1900/J1800 processor. It delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

The CAPA84R has one 204-pin unbuffered SO-DIMM socket for single channel DDR3L 1333MHz memory with maximum capacity up to 8GB. There are three Gigabit/Fast Ethernet ports, one SATA port with transfer rate up to 3Gb/s, one USB 3.0 super speed compliant, two USB 2.0 high speed compliant, and built-in HD audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features, such as two serial ports (two RS-232) and 3.5" form factor that applies an extensive array of PC peripherals.

1.1 Features

- Intel® Celeron® quad core J1900 (2GHz) and dual core J1800 (2.41GHz)
- 1 DDR3L SO-DIMM supports up to 8 GB memory capacity
- 1 USB 3.0 port
- 2 USB 2.0 ports
- 2 COM ports
- 1 M.2 Key B
- 1 M.2 Key E
- +12V only DC-in supported

1.2 Specifications

- **CPU**
 - Intel® Celeron® quad core J1900 2GHz.
 - Intel® Celeron® dual core J1800 2.41GHz.
- **Thermal Solution**
 - Passive.
- **Operating Temperature**
 - -20°C--60°C or -20°C--70°C, subject to thermal solution
- **BIOS**
 - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
 - 16Mbit SPI Flash, DMI, Plug and Play.
 - PXE Ethernet Boot ROM.
- **System Memory**
 - One 204-pin unbuffered DDR3L SO-DIMM socket.
 - Maximum up to 8GB DDR3L 1333MHz memory.
- **Onboard Multi I/O**
 - Controller: Fintek F81803.
 - Serial Ports: Two ports for RS-232
- **Serial ATA**
 - One SATA-300 connector.
 - One M.2 Key B connector 2242/3042
- **USB Interface**
 - One USB port with fuse protection and complies with USB Spec. Rev. 3.0 in Type A connector.
 - Two USB ports with fuse protection and complies with USB Spec. Rev. 2.0 in 2x5-pin wafer connector.
- **Display**
 - One 15-pin D-Sub as VGA connector with max. resolution 1920x1200 @60Hz.
 - One 2x20-pin connector for 18/24-bit single/dual channel LVDS with one 8-pin inverter connector. LVDS resolution is up to 1920x1200 in 24-bit dual channels.
 - One DisplayPort with max. resolution 2560x1440 @60Hz.

- **Watchdog Timer**
 - 1~255 seconds or minutes; up to 255 levels.
- **Ethernet**
 - Three LAN ports with Intel® i211AT support 1000/100/10Mbps Gigabit/Fast Ethernet with Wake-on-LAN and PXE Boot ROM.
- **Audio**
 - HD audio with Realtek ALC662.
 - Line-out and line-in/MIC-in via box header connector.
 - Line-out in 3.5 phone jack on the rear I/O.
- **Expansion Interface**
 - One M.2 Key E connector 2230.
- **Power Input**
 - One 2x2-pin connector.
 - +12V DC-in only at minimum 12V/0.87A.
 - AT auto power on function supported.
- **Power Management**
 - ACPI (Advanced Configuration and Power Interface).
- **Form Factor**
 - 3.5" form factor.



All specifications and images are subject to change without notice.

Note

1.3 Utilities Supported

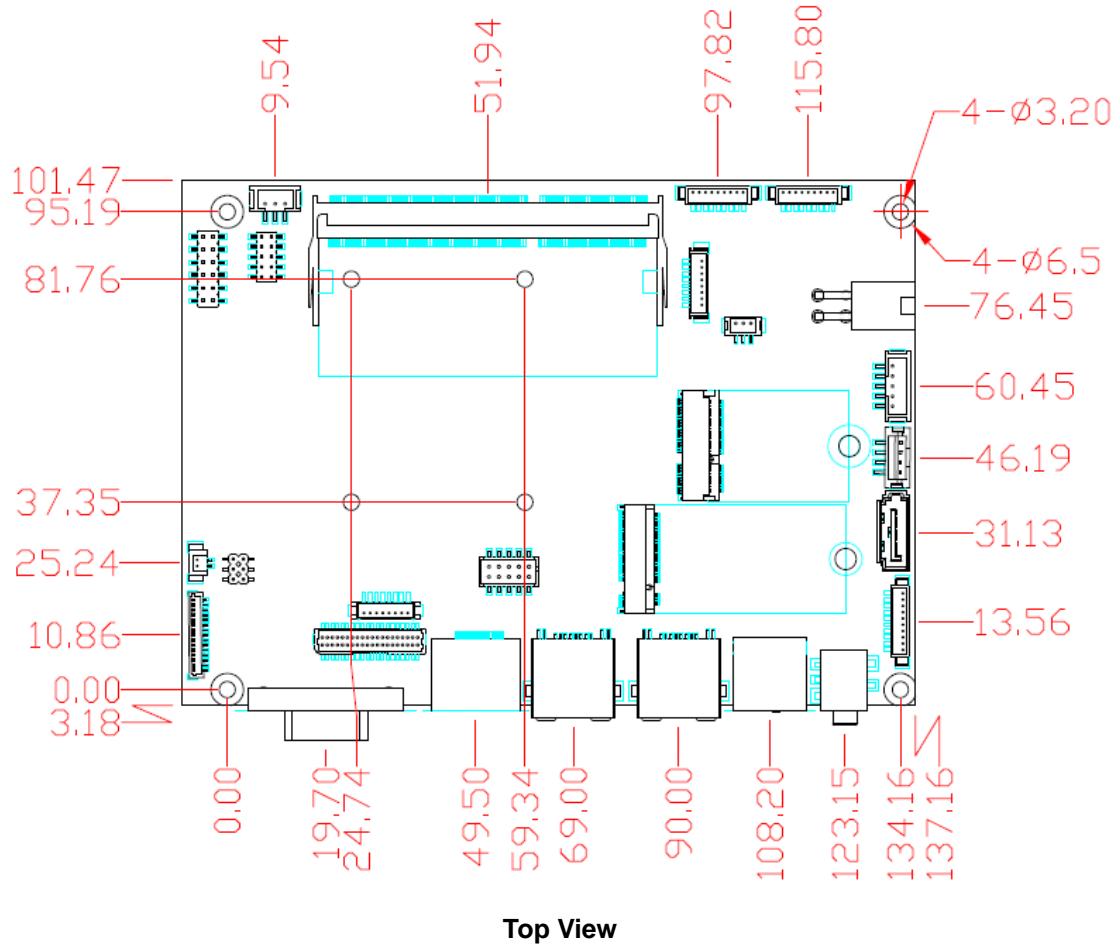
- Chipset and graphics driver
- Ethernet driver
- Audio driver
- Trusted Execution Engine
- Sideband Fabric Device
- USB 3.0 xHCI driver (for Windows® 7)

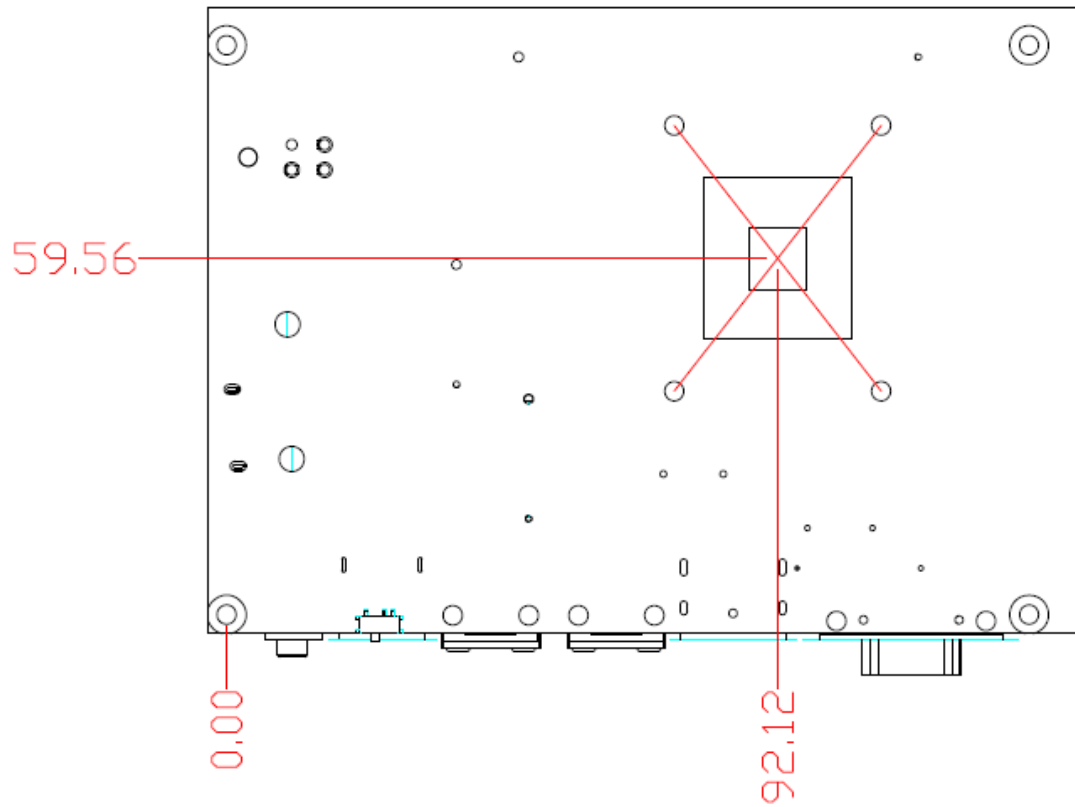
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Chapter 2

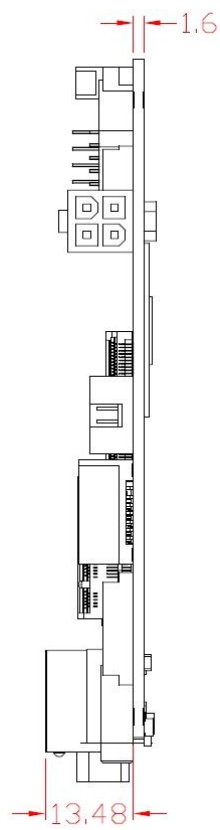
Board and Pin Assignments

2.1 Board Dimensions and Fixing Holes



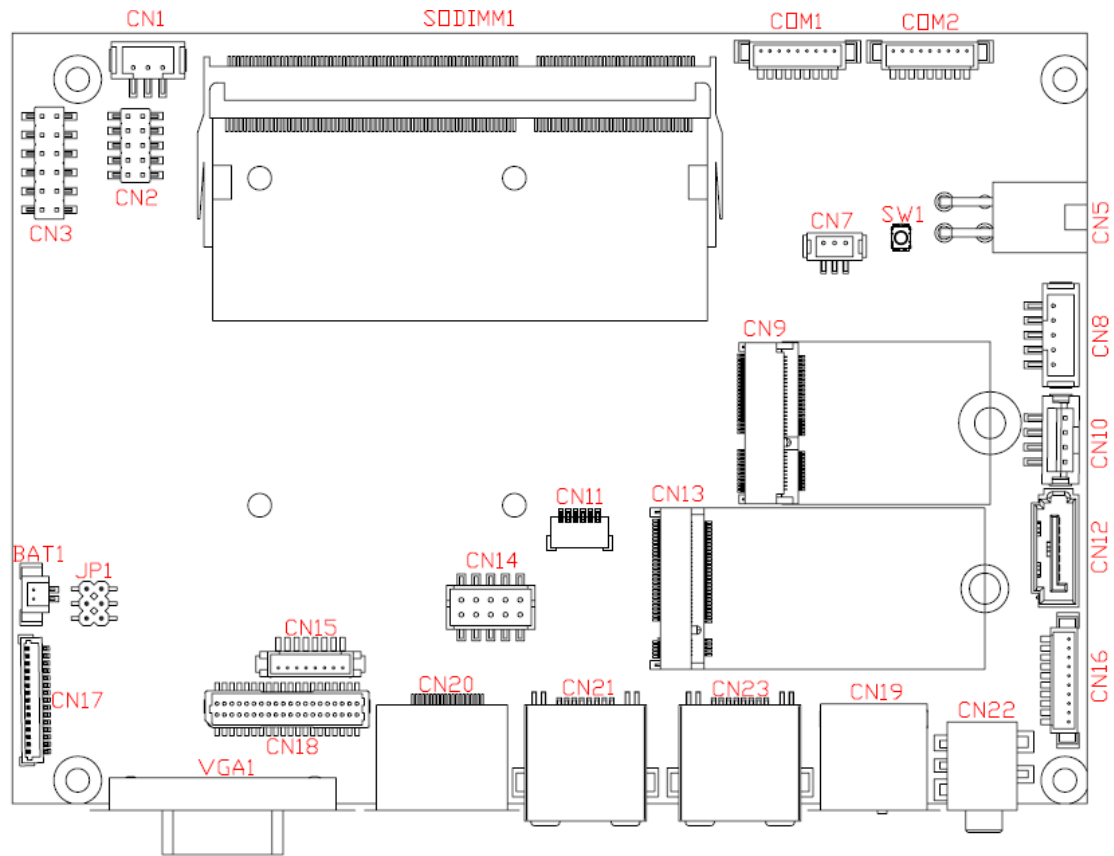


Bottom View

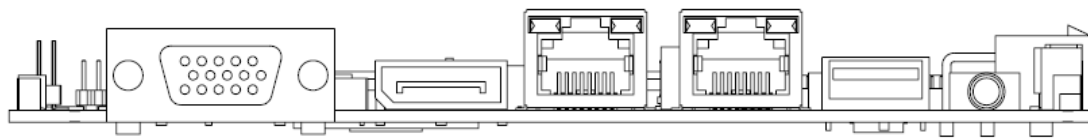


Side View

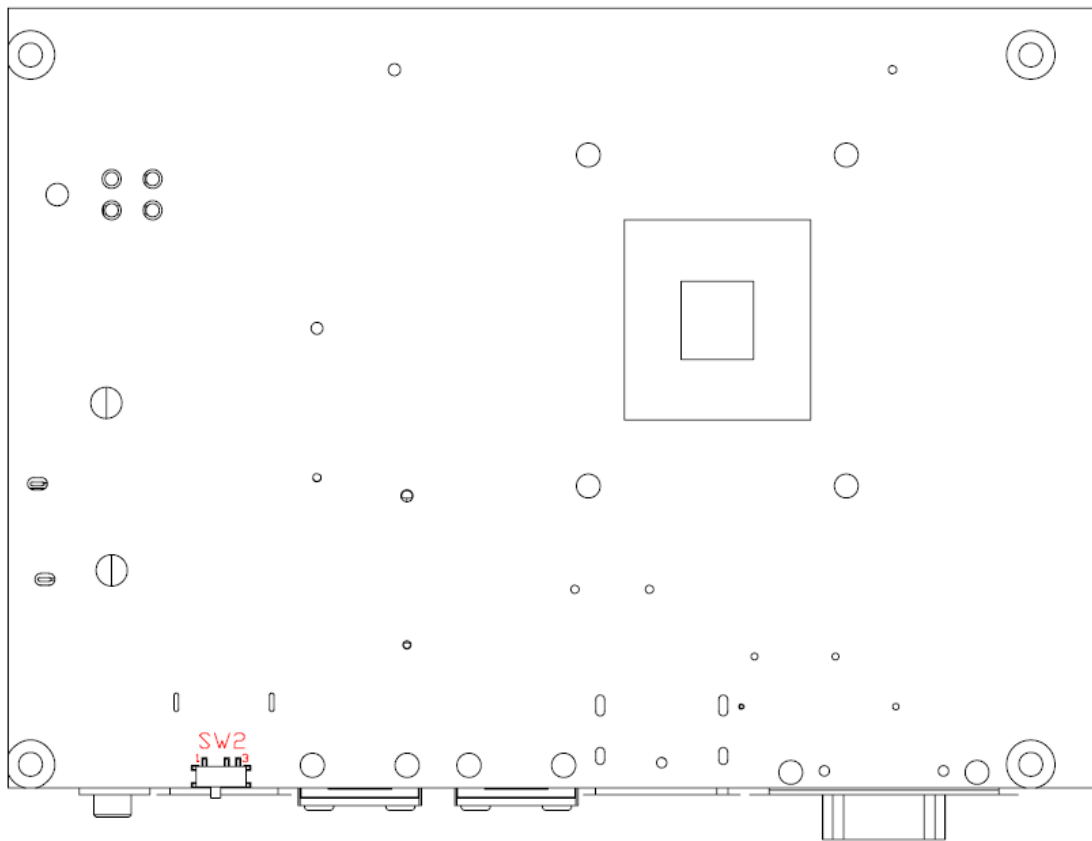
2.2 Board Layout



Top View



Side View

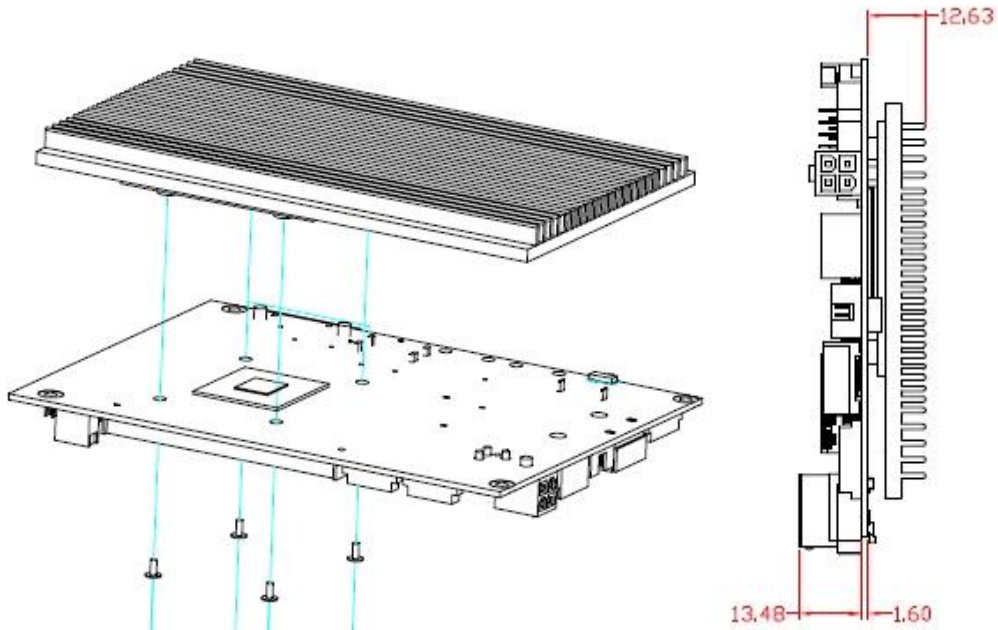


Bottom View

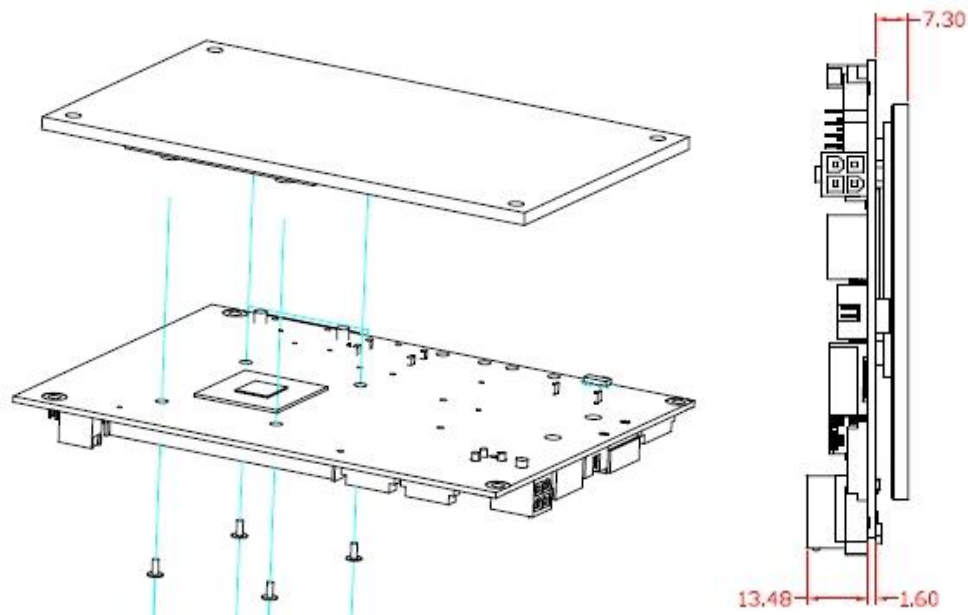
2.3 Assembly Drawing

For thermal dissipation, a thermal solution enables the CAPA84R's components to dissipate heat efficiently. All heat generating components are thermally spread by heatsink or conducted to the heatspreader. Images below illustrate how to install the thermal solution on CAPA84R.

1. Standard -- Heatsink for CAPA84R (see image below):

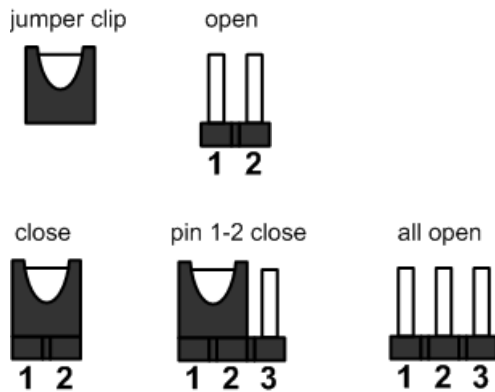


2. Optional -- Heatspreader for CAPA84R (see image below):



2.4 Jumper and Switch Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.



Properly configure jumper and switch settings on the CAPA84R to meet your application purpose. Below you can find a summary table of jumpers, switch and onboard default settings.



Note

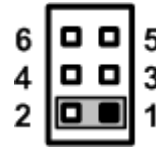
Once the default jumper or switch setting needs to be changed, please do it under power-off condition.

Jumper and Switch	Description	Setting
JP1	LVDS Voltage Selection Default: +3.3V Level	1-2 Close
SW1	Restore BIOS Optimal Defaults Default: Normal Operation	Release
SW2	Auto Power On Default: Disable	1-2 Close

2.4.1 LVDS Voltage Selection (JP1)

This is a 2x3-pin (pitch=2.0mm) jumper. The board supports voltage selection for flat panel displays. Use JP1 to set LVDS connector (CN18) pin 1~6 VCCM to +3.3V, +5V or +12V voltage level. To prevent hardware damage, before connecting please make sure that input voltage of the flat panel is correct.

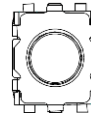
Function	Setting
+3.3V level (Default)	1-2 close
+5V level	2-4 close
	Or 4-6 close
+12V level	5-6 close



2.4.2 Restore BIOS Optimal Defaults (SW1)

Use SW1 to clear CMOS. Press the tact switch for at least 1 second to restore BIOS optimal defaults.

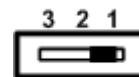
Function	Setting
Normal (Default)	Release
Restore BIOS optimal defaults	Press



2.4.3 Auto Power On (SW2)

If SW2 is enabled for power input, the system will be automatically power on without pressing soft power button. If SW2 is disabled for power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	1-2 close
Enable auto power on	2-3 close



2.5 Connectors

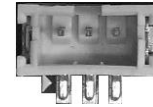
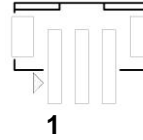
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table of connectors on the hardware.

Connector	Description
CN1	SMBus Connector
CN2	Digital I/O Connector
CN3	Front Panel Connector
CN5/ATX1	DC +12V Power Input Connector
CN7	Fan Connector
CN8	DC +5V/15W Power Output Connector
CN9	M.2 2230 Key E Connector
CN10	SATA Power Connector
CN11	SIM Card Wafer Connector
CN12	SATA Connector
CN13	M.2 2242/3042 Key B Connector
CN14	USB 2.0 Port 1 and 2 Wafer Connector
CN15	Inverter Connector
CN16	Audio Line-in/Line-out/Mic-in Wafer Connector
CN17	Ethernet Port 3 Wafer Connector
CN18	LVDS Connector
CN19	USB 3.0/2.0 Port 0 Type A Connector
CN20	DisplayPort Connector
CN21, CN23	Ethernet Port 1 and 2
CN22	Audio Line-out Phone Jack
VGA1	VGA Connector
COM1, COM2	COM1 and COM2 Wafer Connector
BAT1	CMOS Battery Connector
SODIMM1	DDR3L SO-DIMM Connector

2.5.1 SMBus Connector (CN1)

This is a 3-pin (pitch=2.0mm) wafer connector which is compliant with JST B4B-PH-SM3-TB for SMBus interface. The SMBus (System Management Bus) is a simple bus for the purpose of lightweight communication.

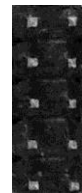
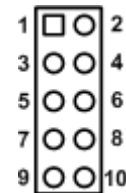
Pin	Signal
1	CLK
2	DATA
3	GND



2.5.2 Digital I/O Connector (CN2)

This is a 2x5-pin (pitch=2.0mm) connector. The board is equipped with an 8-bit digital I/O that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals, please refer to Appendix B.

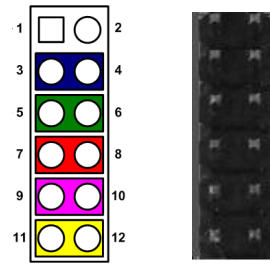
Pin	Signal	Pin	Signal
1	Digital Input Output 0 (Default: Output)	2	Digital Input Output 7 (Default: Input)
3	Digital Input Output 1 (Default: Output)	4	Digital Input Output 6 (Default: Input)
5	Digital Input Output 2 (Default: Output)	6	Digital Input Output 5 (Default: Input)
7	Digital Input Output 3 (Default: Output)	8	Digital Input Output 4 (Default: Input)
9	+5V level	10	GND



2.5.3 Front Panel Connector (CN3)

This is a 2x5-pin header (pitch=2.0mm) for front panel interface.

Pin	Signal	Pin	Signal
1	EXT SPK-	2	EXT SPK+
3	GND	4	PWR_PSON
5	PWRLED-	6	PWRLED+
7	PWRSW-	8	PWRSW+
9	HW RST-	10	HW RST+
11	HDDLED-	12	HDDLED+



External Speaker

Pin 1(-) and 2(+) connect the case-mounted speaker unit or internal buzzer cable.

Power Status

Pin 4 and pin 3 are for power status button; letting user know the power status of this board.

Power LED

Pin 6 connects anode (+) of LED and pin 5 connects cathode (-) of LED. The power LED lights up when the system is powered on.

Power On/Off Button

Pin 8 and 7 connect the power button on front panel to CPU board, which allows users to turn on or off power supply.

System Reset Switch

Pin 10 and 9 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED

This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 12 and 11 connect the hard disk drive to the front panel HDD LED, pin 11 is assigned as cathode(-) and pin 12 is assigned as anode(+).

2.5.4 DC +12V Power Input Connector (CN5/ATX1)

Steady and sufficient power can be supplied to all components on the board by connecting the power connector. Please make sure all components and devices are properly installed before connecting the power connector.

The CN5/ATX1 is a 4-pin DC +12V power input interface. The CN5 is in right angle while the ATX1 is in vertical position. Follow the connector orientation to plug the external power supply. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

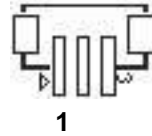
Pin	Signal
1	GND
2	GND
3	+12V
4	+12V



2.5.5 Fan Connector (CN7)

This is a 3-pin (pitch=1.5mm) connector. A fan interface is available through CN7. You can find fan speed within BIOS Setup Utility if fan is installed. For further information, see BIOS Setup Utility: Advanced\Hardware Monitor\PC Health Status in section 4.4.

Pin	Signal
1	GND
2	+12V level
3	Fan speed feedback

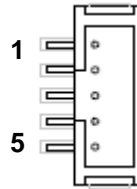


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2.5.6 DC +5V/15W Power Output Connector (CN8)

The CN8 is a 5-pin (pitch=2mm) wafer connector, which is compliant with JST B5B-PH-K-S.

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



1

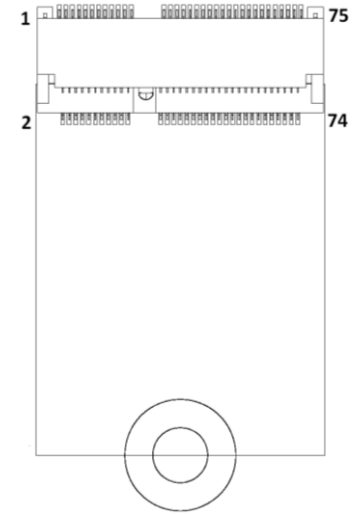
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2.5.7 M.2 2230 Key E Connector (CN9)

The CN9 is a M.2 2230 Key E connector.

It is suggested to install the M.2 wireless module via PCIe1 with 22mm width and 30mm length.

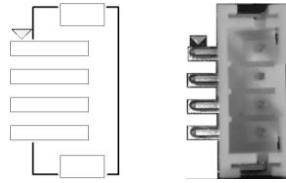
Pin	Signal	Pin	Signal
1	GND	2	+3.3V_SBY
3	NC	4	+3.3V_SBY
5	NC	6	NC
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC	24	Key E
25	Key E	26	
27		28	
29		30	
31		32	
33		GND	34
35	PCIE3_TX_P	36	NC
37	PCIE3_TX_N	38	NC
39	GND	40	NC
41	PCIE3_RX_P	42	NC
43	PCIE3_RX_N	44	NC
45	GND	46	NC
47	CLK_PCIE3_P	48	NC
49	CLK_PCIE3_N	50	SUSCLK(+3.3V Level)
51	GND	52	PERST#(+3.3V Level)
53	CLKREQ0#	54	W_DIS2#(+3.3V Level)
55	PEWAKE0#	56	W_DI12#(+3.3V Level)
57	GND	58	SMB_DATA(+3.3V Level)
59	NC	60	SMB_CLK(+3.3V Level)
61	NC	62	ALERT#(+3.3V Level)
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+3.3V_SBY
73	NC	74	+3.3V_SBY
75	GND		



2.5.8 SATA Power Connector (CN10)

This is a 4-pin (pitch=2mm) wafer connector, which is compliant with JST B4B-PH-K-S, for SATA power interface.

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

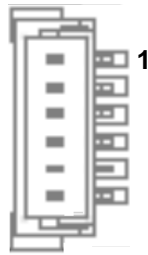


2.5.9 SIM Card Wafer Connector (CN11)

The CN11 is a 6-pin (pitch=1.0mm) wafer connector, which is compliant with JST B6B-PH-K-S, for SIM Card interface. AX93A19 is suggested to use for CN11 to have SIM card slot.

In order to work properly, the SIM card must be used together with 3G/LTE module in M.2 Key B connector/CN13. It is mainly used in 3G/LTE wireless network application.

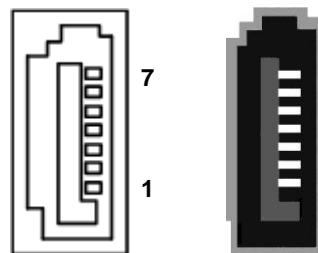
Pin	Signal
1	PWR
2	RESET
3	CLK
4	DAT
5	VPP
6	GND



2.5.10 SATA Connector (CN12)

This Serial Advanced Technology Attachment (Serial ATA or SATA) connector is for high-speed SATA interface. It is a computer bus interface for connecting to devices such as hard disk drive.

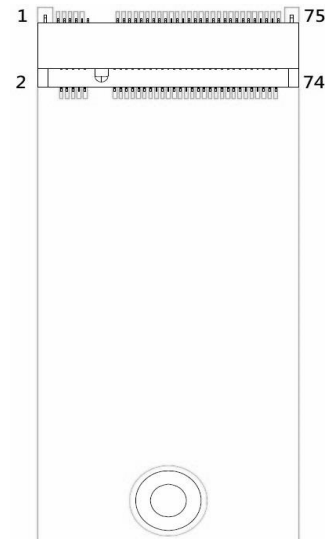
Pin	Signal
1	GND
2	SATA0_TXP
3	SATA0_TXN
4	GND
5	SATA0_RXN
6	SATA0_RXP
7	GND



2.5.11 M.2 2242/3042 Key B Connector (CN13)

The CN13 is a M.2 Key B connector. It is suggested to install the M.2 storage module via SATA with 22mm width and 42mm length or the M.2 cellular module via USB 2.0 with 30mm width and 42mm length.

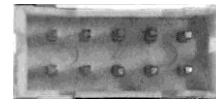
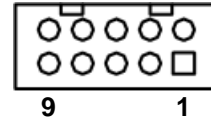
Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V_SBY
3	GND	4	+3.3V_SBY
5	GND	6	Full Card PWR OFF
7	USB_D3+	8	W_DISABLE#
9	USB_D3-	10	NC
11	GND	12	Key B
13	Key B	14	
15		16	
17		18	
19		20	NC
21	CONFIG_0	22	NC
23	GPIO11(+1.8V)	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	SMB_RST
31	NC	32	SMB_CLK
33	GND	34	SMB_DATA
35	NC	36	SMB_PWR
37	NC	38	NC
39	GND	40	SMB_CLK_SBY(+1.8V)
41	SATA1_RX_P	42	SMB_DATA_SBY(+1.8V)
43	SATA1_RX_N	44	SMB_CLK_ALRT(+1.8V)
45	GND	46	NC
47	SATA1_TX_N	48	NC
49	SATA1_RX_P	50	PERST#
51	GND	52	CLKREQ#
53	NC	54	PEWAKE#
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	PLTRST	68	SUSCLK
69	CONFIG_1	70	+3.3V_SBY
71	GND	72	+3.3V_SBY
73	GND	74	+3.3V_SBY
75	CONFIG_2		



2.5.12 USB 2.0 Wafer Connector (CN14)

This is a 2x5-pin (pitch=2mm) wafer connector, which is compliant with Hirose DF11-xdp-2dsa, for installing versatile USB 2.0 compliant interface peripherals.

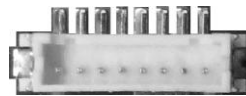
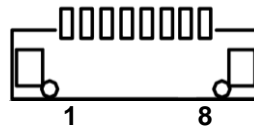
Pin	Signal	Pin	Signal
1	USB VCC (+5V_SBY)	2	USB VCC (+5V_SBY)
3	USB #1_D-	4	USB #2_D-
5	USB #1_D+	6	USB #2_D+
7	GND	8	GND
9	GND	10	GND



2.5.13 Inverter Connector (CN15)

This is an 8-pin (pitch=1.25mm) connector, which is compliant with Hirose DF13-8P-1.25V, for inverter interface. We strongly recommend you to use the matching connector, DF13-8S-1.25C, to avoid malfunction.

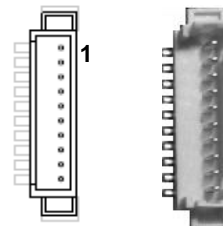
Pin	Signal
1	VBL1 (+12V level)
2	VBL1 (+12V level)
3	VBL2 (+5V level)
4	VBL_ENABLE
5	GND
6	GND
7	GND
8	VBL Brightness Control



2.5.14 Audio Wafer Connector (CN16)

This is a 10-pin (pitch=1.25mm) wafer connector, which is compliant with Molex 53047-1010, for line-in/line-out/MIC-in interface.

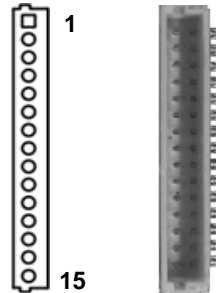
Pin	Signal	Pin	Signal
1	MIC_IN	2	GND
3	LINE_IN_L	4	GND
5	LINE_IN_R	6	GND
7	AUDIO_OUT_L	8	GND
9	AUDIO_OUT_R	10	GND



2.5.15 Ethernet Wafer Connector (CN17)

This is a JST BM16B-SRSS-TB 15-pin (pitch=1.0mm) wafer connector for Ethernet port 3 interface.

Pin	Signal
1	LAN_1000_LED
2	LAN_100_LED
3	GND
4	MDI3-
5	MDI3+
6	MDI1-
7	MDI2-
8	MDI2+
9	MDI1+
10	MDI0-
11	MDI0+
12	GND
13	LAN_VDD33
14	LAN_LINK_ACT
15	GND

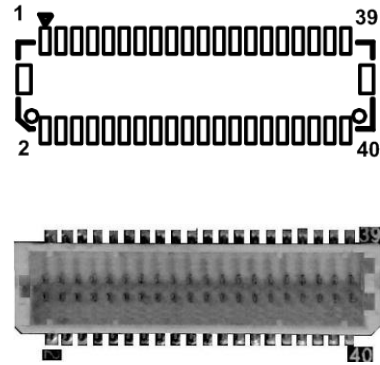


2.5.16 LVDS Connector (CN18)

This board has one 2x20-pin (pitch=1mm) connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V, +5V or +12V by setting JP1 (see section 2.3.1).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND



24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	Channel B D0-
13	N.C	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

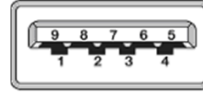
24-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.5.17 USB 3.0/2.0 Type A Connector (CN19)

The Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) type A connector on the rear I/O is for installing USB peripherals such as keyboard, mouse, scanner, etc.

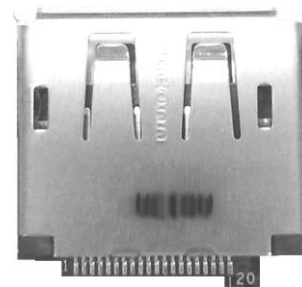
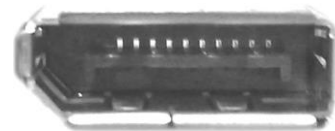
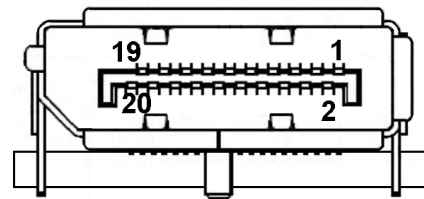
Pin	Signal
1	USB_VCC (+5V)
2	USB #0_D-
3	USB #0_D+
4	GND
5	USB 3_SSRX0-
6	USB 3_SSRX0+
7	GND
8	USB 3_SSTX0-
9	USB 3_SSTX0+



2.5.18 DisplayPort Connector (CN20)

The DisplayPort interface is available through connector CN20.

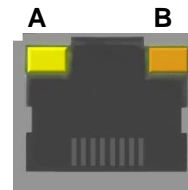
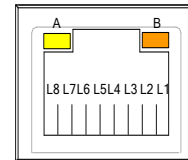
Pin	Signal
1	DP_LANE0
2	GND
3	DP_LANE0#
4	DP_LANE1
5	GND
6	DP_LANE1#
7	DP_LANE2
8	GND
9	DP_LANE2#
10	DP_LANE3
11	GND
12	DP_LANE3#
13	Detect Pin
14	GND
15	DP_AUX
16	GND
17	DP_AUX#
18	DP_HPDE
19	GND
20	+3.3V



2.5.19 Ethernet Ports (CN21 and CN23)

The board has two RJ-45 Ethernet connectors, CN21 (for LAN2) and CN23 (for LAN1). Connection can be established by plugging one end of the Ethernet cable into this connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pin	1000 Base-T	100/10 Base-T	Description
L1	BI_DA+	TX+	Bidirectional or Transmit Data+
L2	BI_DA-	TX-	Bidirectional or Transmit Data-
L3	BI_DB+	RX+	Bidirectional or Receive Data+
L4	BI_DC+	N.C.	Bidirectional or Not Connected
L5	BI_DC-	N.C.	Bidirectional or Not Connected
L6	BI_DB-	RX-	Bidirectional or Receive Data-
L7	BI_DD+	N.C.	Bidirectional or Not Connected
L8	BI_DD-	N.C.	Bidirectional or Not Connected
A	Active Link LED Off: No link Blinking: Data activity detected		
B	Speed LED 1000: Orange 100/10: Green/OFF		



2.5.20 Audio Line-out Phone Jack (CN22)

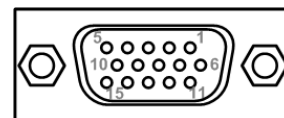
This is phone jack for audio out with HD audio support. Install audio driver, and then attach audio device to CN22.



2.5.21 VGA Connector (VGA1)

This is a standard 15-pin D-Sub connector commonly used for VGA display. This VGA interface configuration can be configured via software utility.

Pin	Signal	Pin	Signal
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	DETECT
7	GND	8	GND
9	VCC	10	GND
11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		

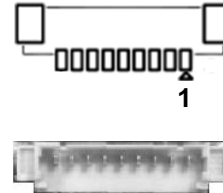


2.5.22 COM Wafer Connectors (COM1 and COM2)

These are 9-pin (pitch=1.25mm) connectors which are compliant with Molex 53047-0910. The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM1 port to support RS-422 or RS-485, please refer to BIOS setting in section 4.4.

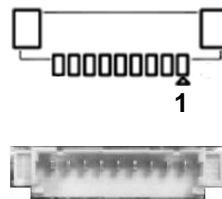
COM1:

Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	DSR	No use	No use
3	RXD	TX+	Data+
4	RTS	No use	No use
5	TXD	RX+	No use
6	CTS	No use	No use
7	DTR	RX-	No use
8	RI	No use	No use
9	GND	No use	No use



COM2:

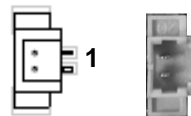
Pin	RS-232
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND



2.5.23 CMOS Battery Connector (BAT1)

This is a 2-pin (pitch=1.25mm) wafer connector for CMOS battery interface.

Pin	Signal
1	VBAT(+3V level)
2	GND



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Chapter 3

Hardware Description

3.1 Microprocessors

The CAPA84R supports Intel® Celeron® J1900/J1800 processor which enables your system to operate under Windows® 10 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for the installed microprocessor to prevent the CPU from damages.

3.2 BIOS

The CAPA84R uses AMI Plug and Play BIOS with a single 16Mbit SPI Flash.

3.3 System Memory

The CAPA84R supports one 204-pin DDR3L SO-DIMM socket for maximum memory capacity up to 8GB DDR3L SDRAMs. The memory module comes in sizes of 2GB, 4GB and 8GB.

3.4 I/O Port Address Map

Input/output (IO)	
[0000000000000000 - 000000000000006F]	PCI bus
[0000000000000020 - 0000000000000021]	Programmable interrupt controller
[0000000000000024 - 0000000000000025]	Programmable interrupt controller
[0000000000000028 - 0000000000000029]	Programmable interrupt controller
[000000000000002C - 000000000000002D]	Programmable interrupt controller
[000000000000002E - 000000000000002F]	Motherboard resources
[0000000000000030 - 0000000000000031]	Programmable interrupt controller
[0000000000000034 - 0000000000000035]	Programmable interrupt controller
[0000000000000038 - 0000000000000039]	Programmable interrupt controller
[000000000000003C - 000000000000003D]	Programmable interrupt controller
[0000000000000040 - 0000000000000043]	System timer
[000000000000004E - 000000000000004F]	Motherboard resources
[0000000000000050 - 0000000000000053]	System timer
[0000000000000061 - 0000000000000061]	Motherboard resources
[0000000000000063 - 0000000000000063]	Motherboard resources
[0000000000000065 - 0000000000000065]	Motherboard resources
[0000000000000067 - 0000000000000067]	Motherboard resources
[0000000000000070 - 0000000000000070]	Motherboard resources
[0000000000000070 - 0000000000000077]	System CMOS/real time clock
[0000000000000078 - 00000000000000CF7]	PCI bus
[0000000000000080 - 000000000000008F]	Motherboard resources
[0000000000000092 - 0000000000000092]	Motherboard resources
[00000000000000A0 - 00000000000000A1]	Programmable interrupt controller
[00000000000000A4 - 00000000000000A5]	Programmable interrupt controller
[00000000000000A8 - 00000000000000A9]	Programmable interrupt controller
[00000000000000AC - 00000000000000AD]	Programmable interrupt controller
[00000000000000B0 - 00000000000000B1]	Programmable interrupt controller
[00000000000000B2 - 00000000000000B3]	Motherboard resources
[00000000000000B4 - 00000000000000B5]	Programmable interrupt controller
[00000000000000B8 - 00000000000000B9]	Programmable interrupt controller
[00000000000000BC - 00000000000000BD]	Programmable interrupt controller
[00000000000002F8 - 00000000000002FF]	Communications Port (COM2)
[00000000000003B0 - 00000000000003BB]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[00000000000003C0 - 00000000000003DF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[00000000000003F8 - 00000000000003FF]	Communications Port (COM1)
[0000000000000400 - 000000000000047F]	Motherboard resources
[00000000000004D0 - 00000000000004D1]	Programmable interrupt controller
[0000000000000500 - 00000000000005FE]	Motherboard resources
[0000000000000600 - 000000000000061F]	Motherboard resources
[0000000000000680 - 000000000000069F]	Motherboard resources
[0000000000000A00 - 0000000000000A0F]	Motherboard resources
[0000000000000A10 - 0000000000000A1F]	Motherboard resources
[0000000000000A20 - 0000000000000A2F]	Motherboard resources
[0000000000000D00 - 0000000000000FFF]	PCI bus
[0000000000000800 - 0000000000000BFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
[0000000000000C00 - 0000000000000CFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
[0000000000000D00 - 0000000000000DFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
[0000000000000E00 - 0000000000000E1F]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
[0000000000000E20 - 0000000000000E3F]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[0000000000000E40 - 0000000000000E43]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[0000000000000E50 - 0000000000000E57]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[0000000000000E60 - 0000000000000E63]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[0000000000000E70 - 0000000000000E77]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[0000000000000E80 - 0000000000000E87]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900

3.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

Interrupt request (IRQ)	Device
(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000003 (03)	Communications Port (COM2)
(ISA) 0x00000004 (04)	Communications Port (COM1)
(ISA) 0x00000008 (08)	High precision event timer
(ISA) 0x0000002A (42)	Intel Device
(ISA) 0x0000002B (43)	Intel Device
(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System

(ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System
(PCI) 0x0000000A (10)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Trusted Execution Engine Interface - 0F18
(PCI) 0x0000000B (11)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
(PCI) 0x00000010 (16)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
(PCI) 0x00000011 (17)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
(PCI) 0x00000012 (18)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
(PCI) 0x00000013 (19)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
(PCI) 0x00000013 (19)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
(PCI) 0x00000016 (22)	High Definition Audio Controller
(PCI) 0xFFFFFFFF1 (-15)	Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFFFF2 (-14)	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
(PCI) 0xFFFFFFFF3 (-13)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFF4 (-12)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFF5 (-11)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFF6 (-10)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFF7 (-9)	Intel(R) I211 Gigabit Network Connection #3
(PCI) 0xFFFFFFFF8 (-8)	Intel(R) I211 Gigabit Network Connection #3
(PCI) 0xFFFFFFFF9 (-7)	Intel(R) I211 Gigabit Network Connection #3
(PCI) 0xFFFFFFFFA (-6)	Intel(R) I211 Gigabit Network Connection #3
(PCI) 0xFFFFFFFFB (-5)	Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFFFC (-4)	Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFFFD (-3)	Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFFFE (-2)	Intel(R) I211 Gigabit Network Connection #2

3.6 Memory Map

The memory mapping list is shown as follows:

Address Range	Device
[0000000000A0000 - 0000000000BFFFFF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[0000000000A0000 - 0000000000BFFFFF]	PCI bus
[0000000000C0000 - 0000000000DFFFFF]	PCI bus
[0000000000E0000 - 0000000000FFFFFF]	PCI bus
[0000000080000000 - 000000008FFFFFFF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[0000000080000000 - 000000009091FFFFE]	PCI bus
[0000000090000000 - 00000000903FFFFFFF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[0000000090400000 - 00000000904FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Trusted Execution Engine Interface - 0F18
[0000000090500000 - 00000000905FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Trusted Execution Engine Interface - 0F18
[0000000090600000 - 000000009061FFFFF]	Intel(R) I211 Gigabit Network Connection #2
[0000000090600000 - 00000000906FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
[0000000090620000 - 0000000090623FFFF]	Intel(R) I211 Gigabit Network Connection #2
[0000000090700000 - 000000009071FFFFF]	Intel(R) I211 Gigabit Network Connection #3
[0000000090700000 - 00000000907FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
[0000000090720000 - 0000000090723FFFF]	Intel(R) I211 Gigabit Network Connection #3
[0000000090800000 - 000000009081FFFFF]	Intel(R) I211 Gigabit Network Connection
[0000000090800000 - 00000000908FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
[0000000090820000 - 0000000090823FFFF]	Intel(R) I211 Gigabit Network Connection
[0000000090900000 - 000000009090FFFFF]	Intel(R) USB 3.0 eXtensible Host Controller
[0000000090914000 - 0000000090917FFFF]	High Definition Audio Controller
[000000009091C000 - 000000009091C01F]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
[000000009091F000 - 000000009091F7FFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[0000000090920000 - 0000000090923FFFF]	Intel Device
[000000009092C000 - 000000009092FFFFFFF]	Intel Device
[0000000090C00000 - 0000000090FFFFFFF]	PCI bus
[00000000E0000000 - 00000000EFFFFFFF]	Motherboard resources
[00000000E00000D0 - 00000000E00000DB]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor MBI Device - 33BD
[00000000FED00000 - 00000000FED003FFF]	High precision event timer
[00000000FED01000 - 00000000FED01FFF]	Motherboard resources
[00000000FED03000 - 00000000FED03FFF]	Motherboard resources
[00000000FED04000 - 00000000FED04FFF]	Motherboard resources
[00000000FED08000 - 00000000FED08FFF]	Motherboard resources
[00000000FED0C000 - 00000000FED0FFFFF]	Motherboard resources
[00000000FED1C000 - 00000000FED1CFFF]	Motherboard resources
[00000000FEE00000 - 00000000FEEFFFFFFF]	Motherboard resources
[00000000FEF00000 - 00000000FEFFFFFFF]	Motherboard resources
[00000000FF000000 - 00000000FFFFFFFFF]	Intel(R) 82802 Firmware Hub Device

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Chapter 4

AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the key immediately.
2. After you press the key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.



Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting SW1 (see section 2.3.2).

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.



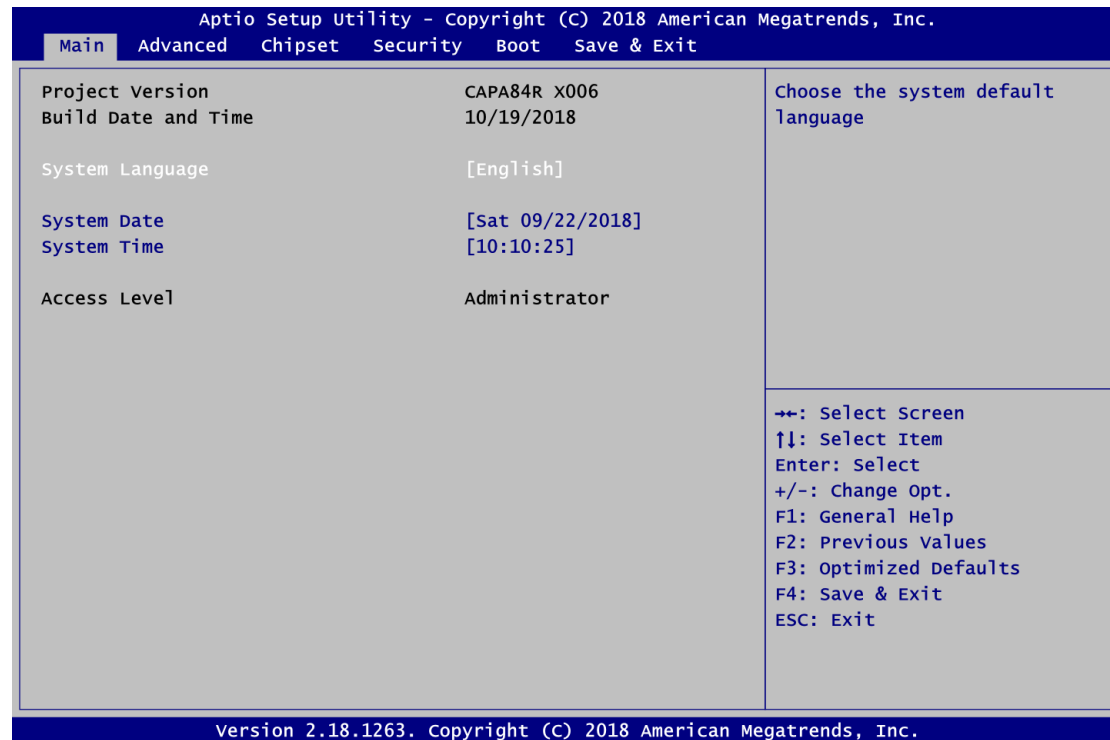
Note

Some of the navigation keys differ from one screen to another.

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

4.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



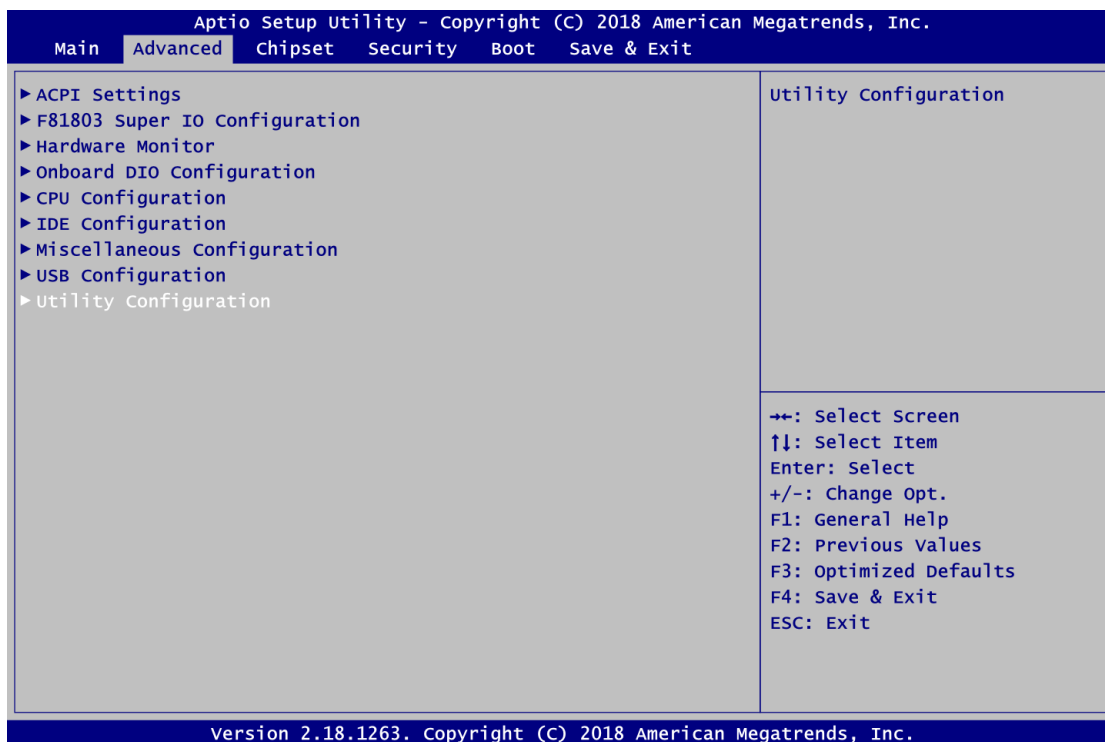
- **BIOS Information**
Display BIOS information.
- **System Language**
Use this option to choose the system default language.
- **System Date/Time**
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.
- **Access Level**
Display the access level of current user.

4.4 Advanced Menu

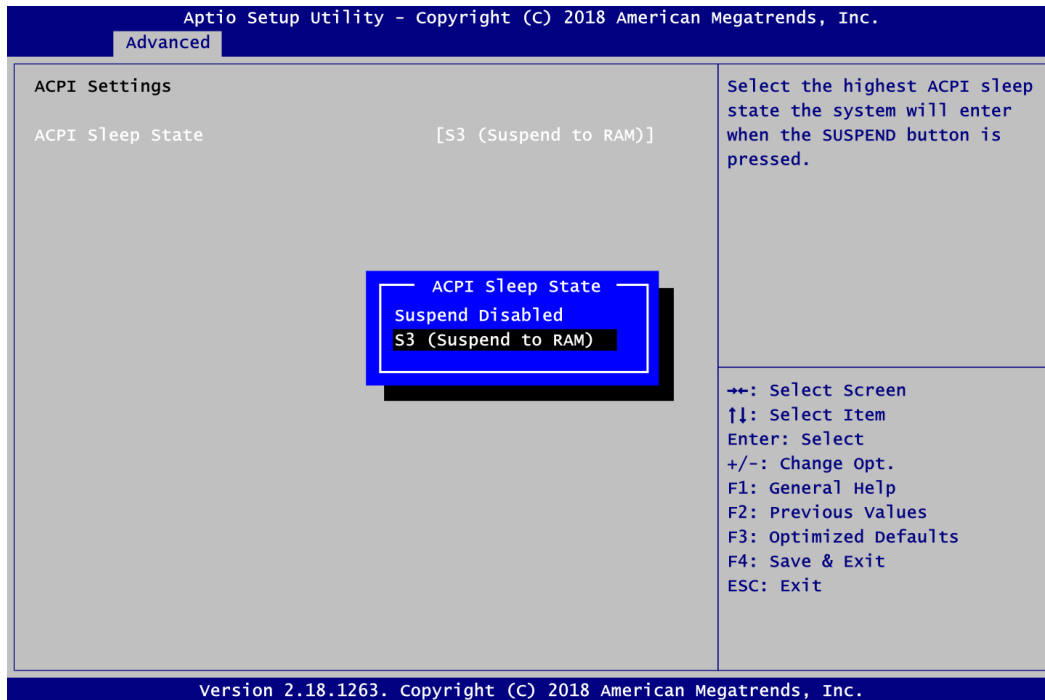
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ ACPI Settings
- ▶ F81803 Super IO Configuration
- ▶ Hardware Monitor
- ▶ Onboard DIO Configuration
- ▶ CPU Configuration
- ▶ IDE Configuration
- ▶ Miscellaneous Configuration
- ▶ USB Configuration
- ▶ Utility Configuration

For items marked with “▶”, please press <Enter> for more options.



- **ACPI Settings**

**ACPI Sleep State**

Select the ACPI (Advanced Configuration and Power Interface) sleep state. Configuration options are Suspend Disabled and S3 (Suspend to RAM). The S3 (Suspend to RAM) option selects ACPI sleep state the system will enter when suspend button is pressed.

- **F81803 Super IO Configuration**

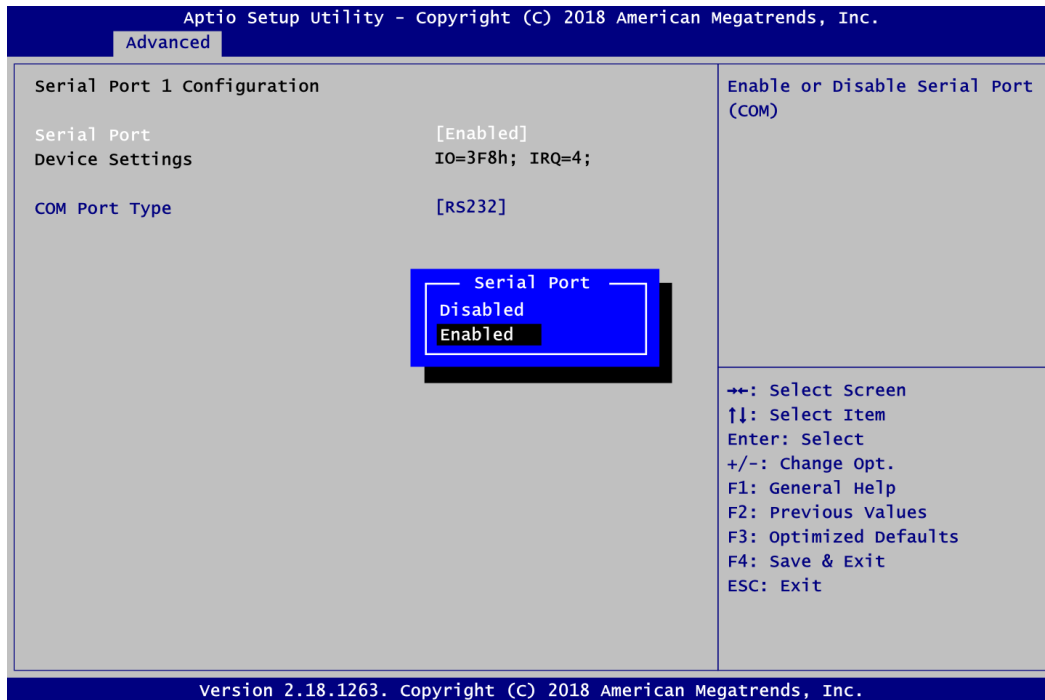
You can use this screen to select options for serial port configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.



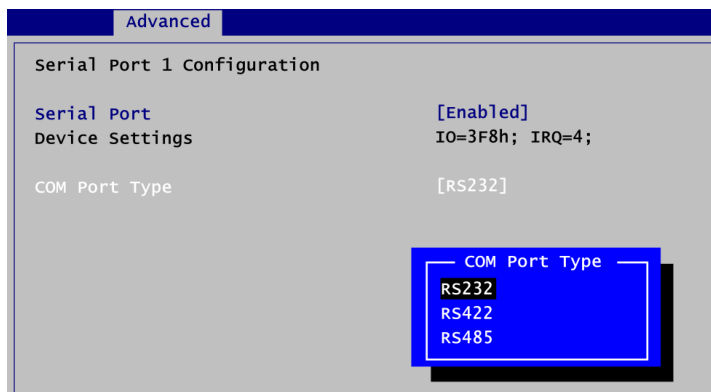
Serial Port 1~2 Configuration

Use these items to set parameters related to serial port 1~2.

- **Serial Port 1 Configuration**

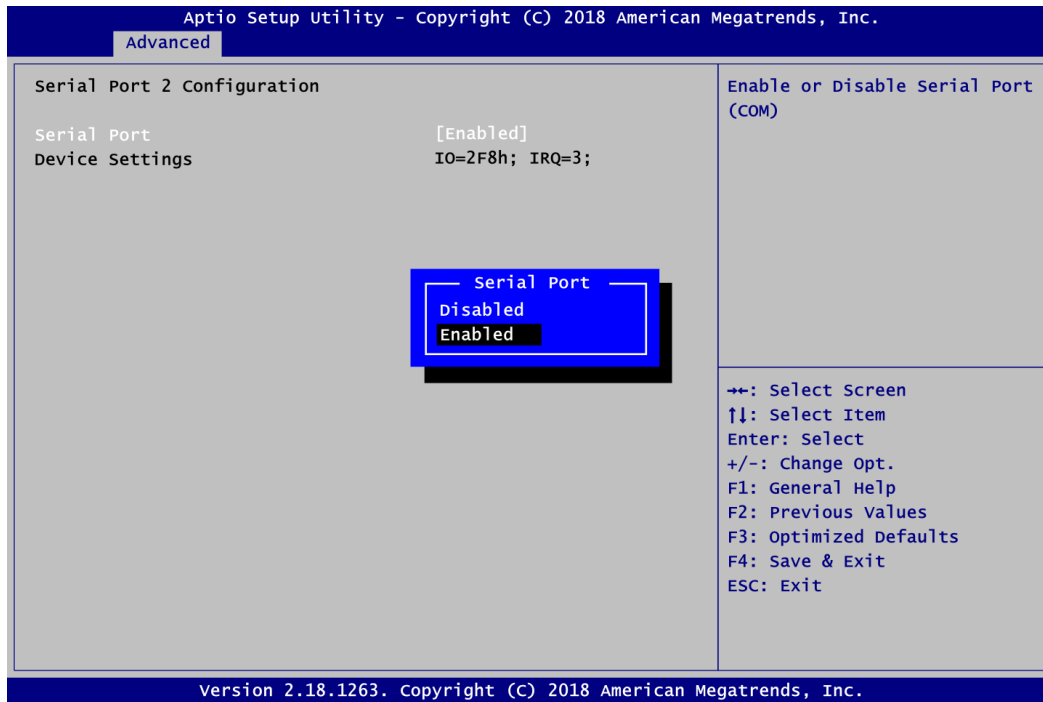
**Serial Port**

Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

**COM Port Type**

Use this item to set RS-232/422/485 communication mode.

- **Serial Port 2 Configuration**

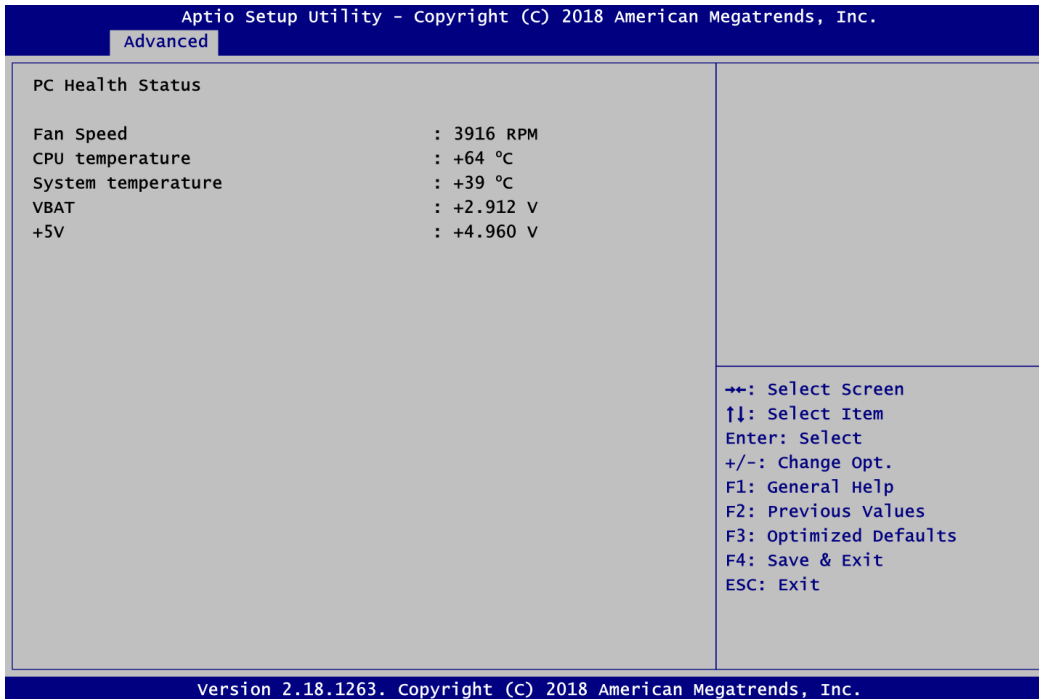


Serial Port

Enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request address is IRQ3.

- **Hardware Monitor**

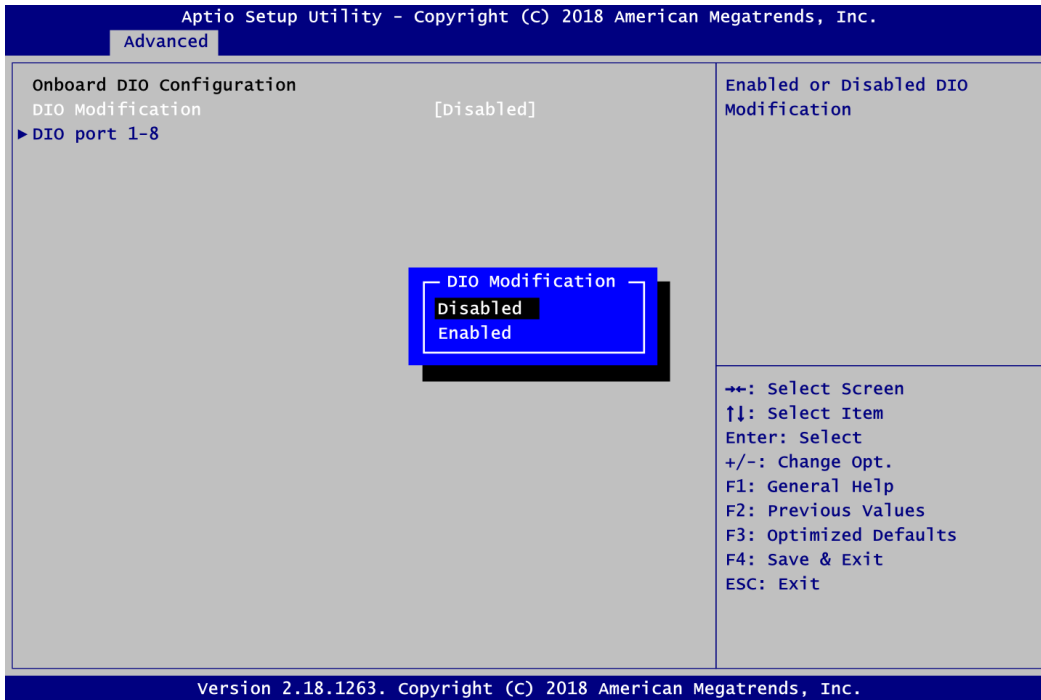
This screen monitors hardware health status.



This screen displays the temperature of system and CPU, fan speed in RPM and system voltages (VBAT and +5V).

- **Onboard DIO Configuration**

You can use this screen to select options for the 8-bit Digital I/O Configuration. A description of the selected item appears on the right side of the screen. For items marked with “▶”, please press <Enter> for more options.



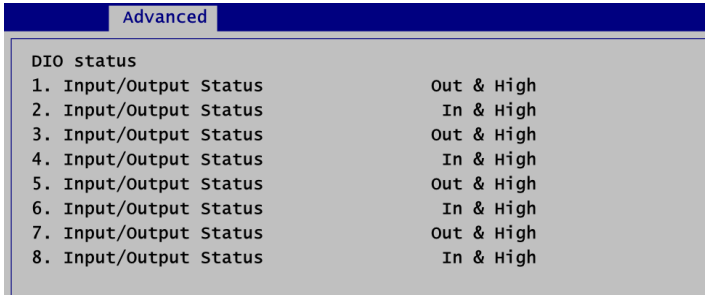
DIO Modification

Enable or disable digital I/O modification. The default is Disabled.

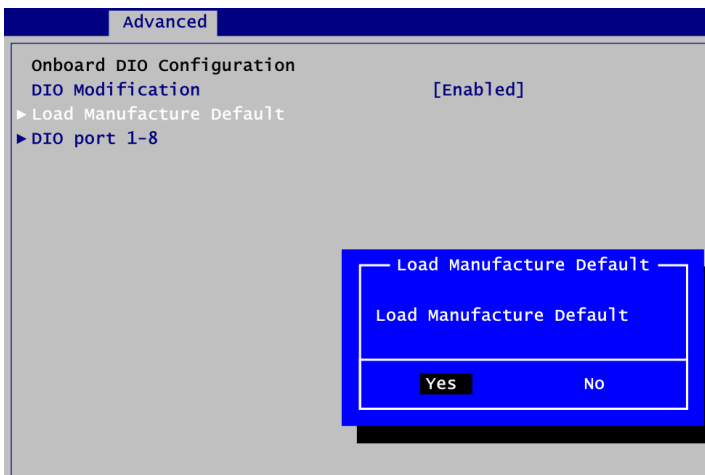
DIO port 1-8

Select this option to open DIO status sub screen.

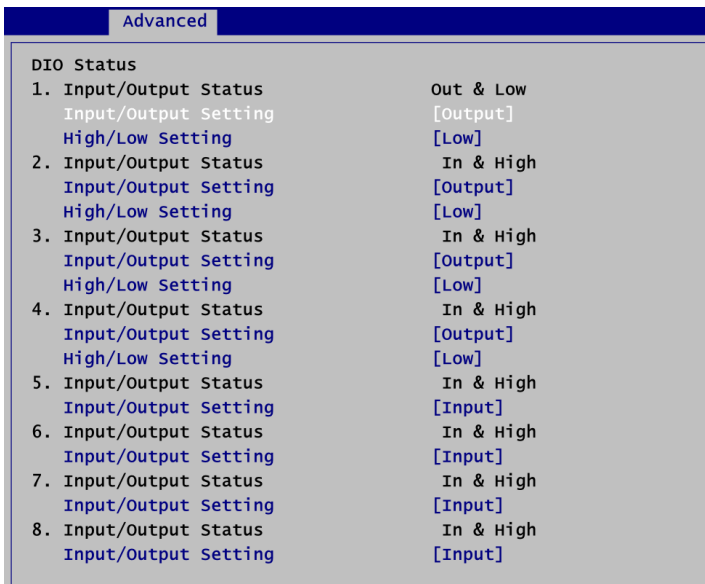
If DIO Modification is disabled, you are not allowed to change input/output setting. The DIO status sub screen is as follows:



If DIO Modification is enabled, you can load manufacture default and access to the DIO status sub screen to change input/output setting, see image below.

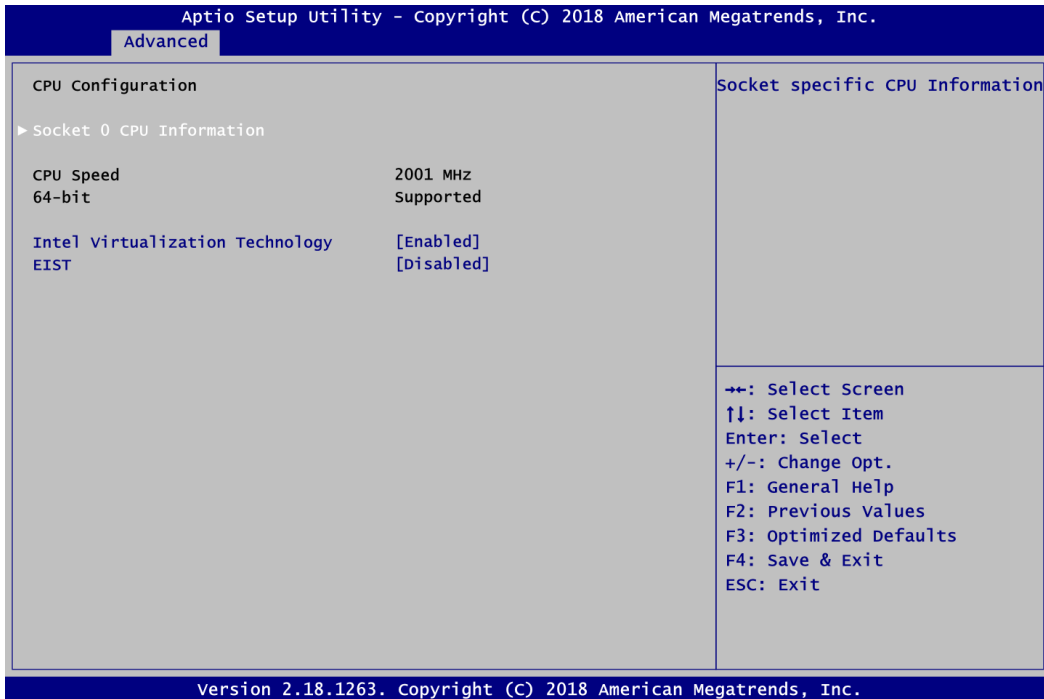


The DIO status sub screen is as follows:



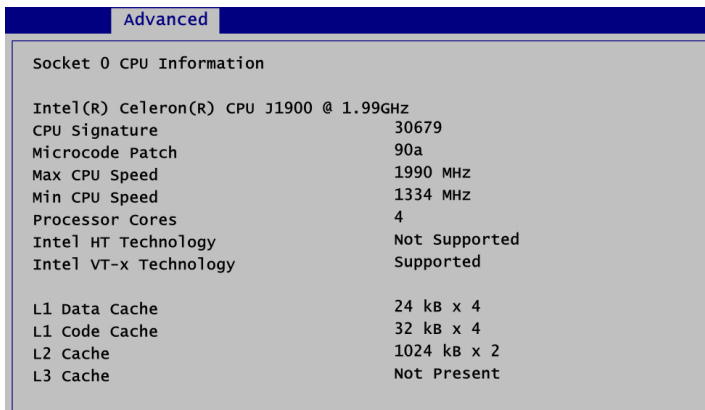
- **CPU Configuration**

This screen shows the CPU Configuration.



Socket 0 CPU Information

Displays CPU information



Intel Virtualization Technology

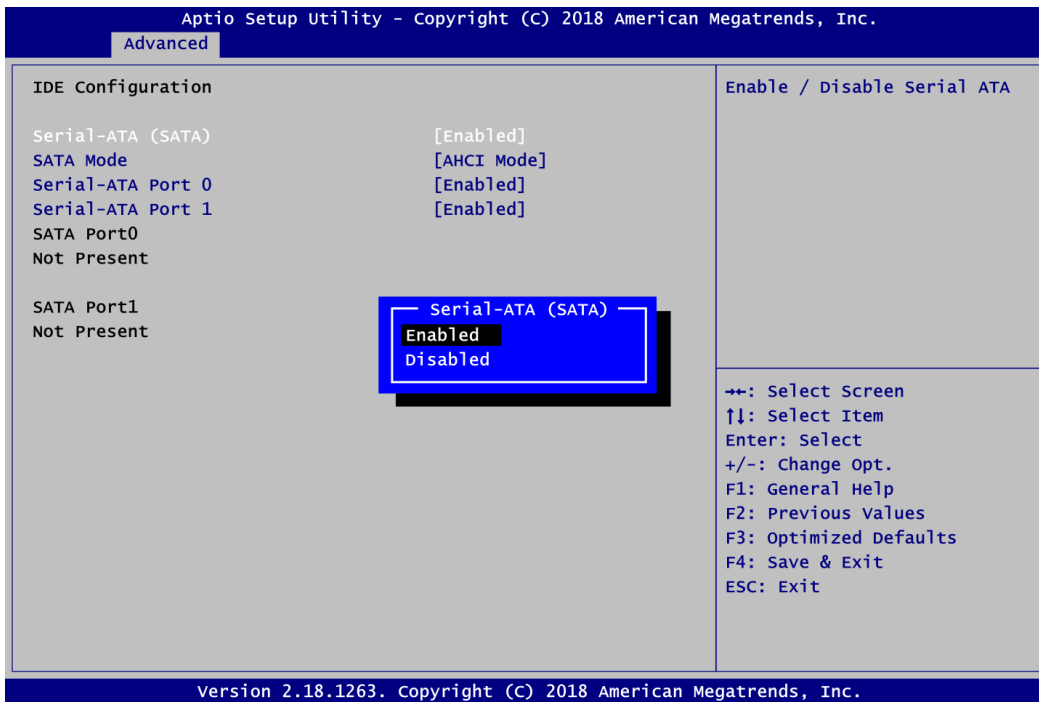
Enable or disable Intel Virtualization Technology. When enabled, a VMM (Virtual Machine Mode) can utilize the additional hardware capabilities. It allows a platform to run multiple operating systems and applications independently, hence enabling a computer system to work as several virtual systems.

EIST

Enable or disable Intel® SpeedStep. When disabled, CPU runs at its default speed. When enabled, the CPU speed is controlled by the operating system.

- **IDE Configuration**

In IDE Configuration menu, you can see the current installed hardware in SATA ports. During system boot up, BIOS automatically detects the presence of SATA devices.



Serial-ATA (SATA)

Enable or disable Chipset SATA Controller.

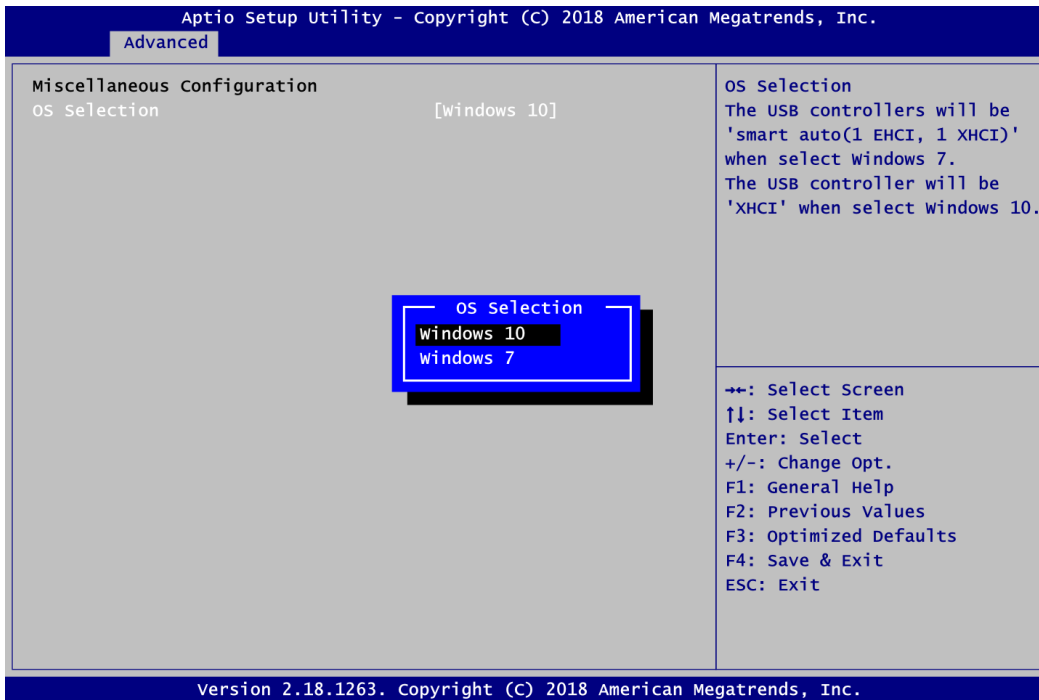
SATA Mode

Determine how SATA controller(s) operate. Operation mode options are IDE Mode and AHCI (Advanced Host Controller Interface) Mode.

Serial-ATA Port 0~1

Enable or disable SATA port 0~1

- **Miscellaneous Configuration**



OS Selection

Use this option to do OS selection. The default is Windows® 10.

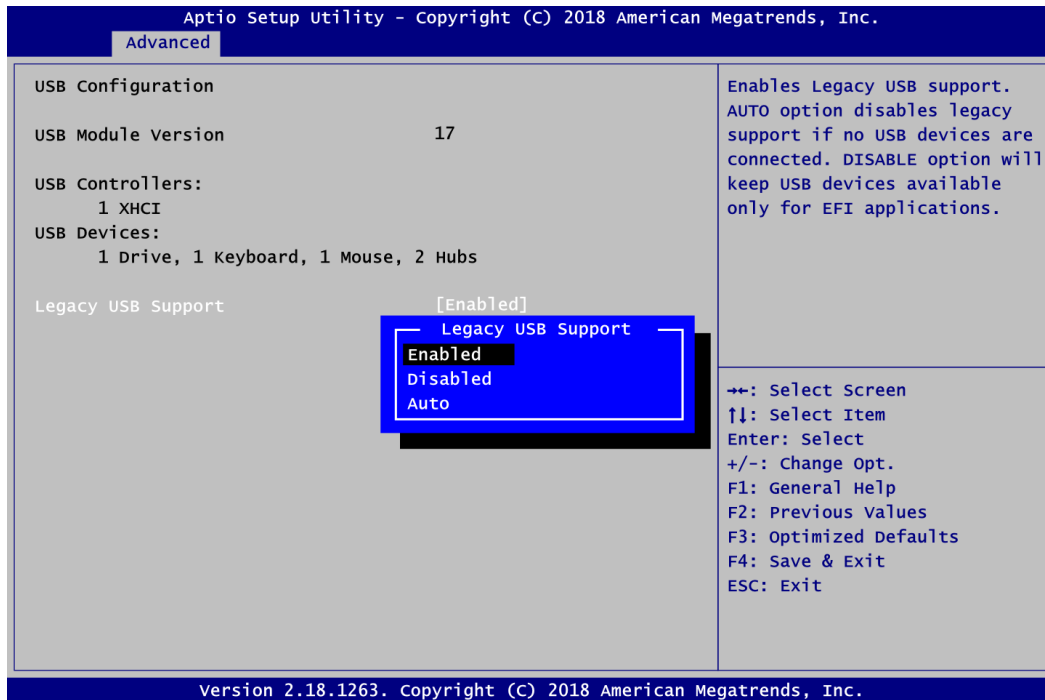
If the Windows® 7 is needed to be installed via USB 3.0 port (CN19, see section 2.4.17), it is suggested to select Windows® 7. After installation of Windows® 7, XHCI driver is needed to be installed to activate USB 3.0 port (CN19, see section 2.4.17).



Note

If the Windows® 10 is selected but install Windows® 7 via USB 3.0 port (CN19, see section 2.4.17), the fail message may be occurred in installation.

- **USB Configuration**

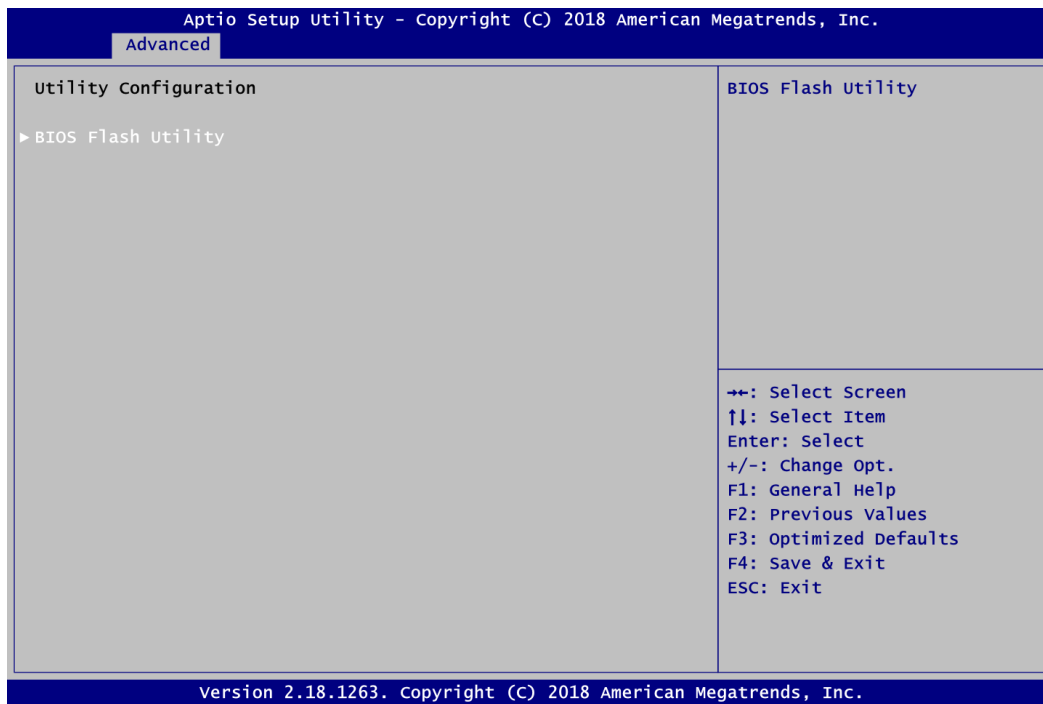
**USB Devices**

Display all detected USB devices.

Legacy USB Support

Enable legacy support for USB devices. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.

- **Utility Configuration**



BIOS Flash Utility

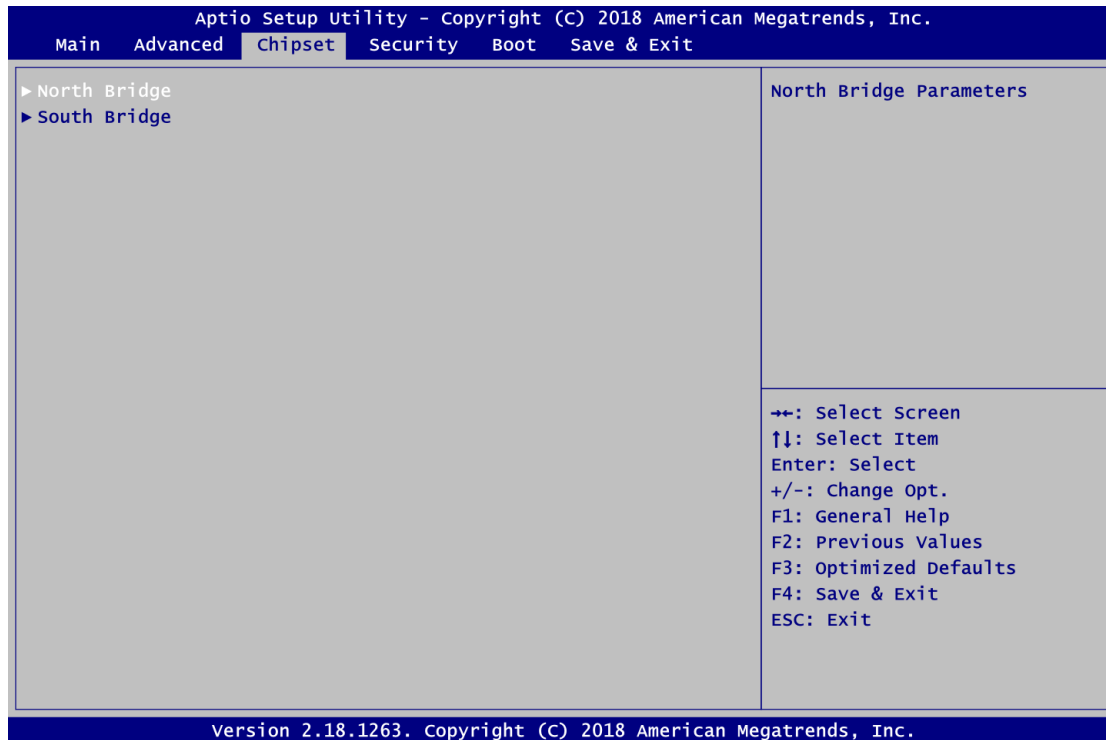
BIOS flash utility configuration. For more detailed information, please refer to Appendix C.

4.5 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

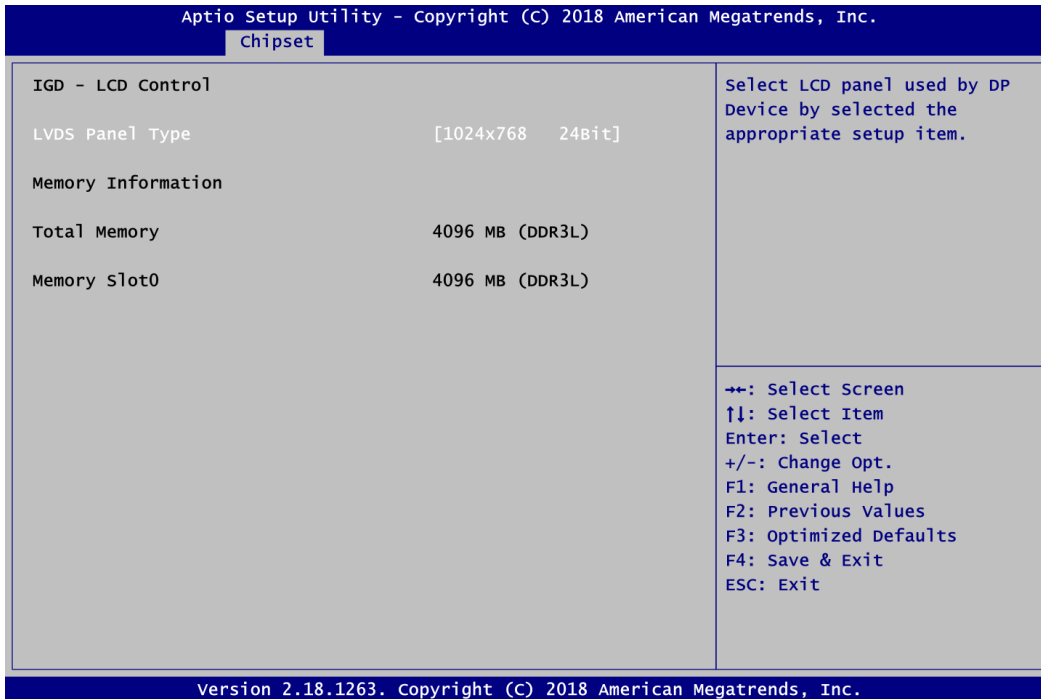
- ▶ North Bridge
- ▶ South Bridge

For items marked with “▶”, please press <Enter> for more options.



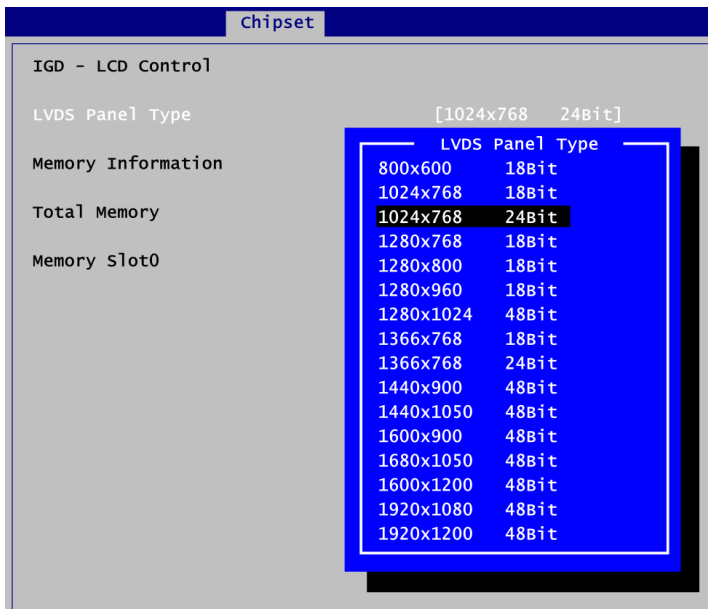
- **North Bridge**

This screen allows users to configure parameters of North Bridge chipset.



LVDS Panel Type

Select the appropriate LVDS panel resolution, see image below.

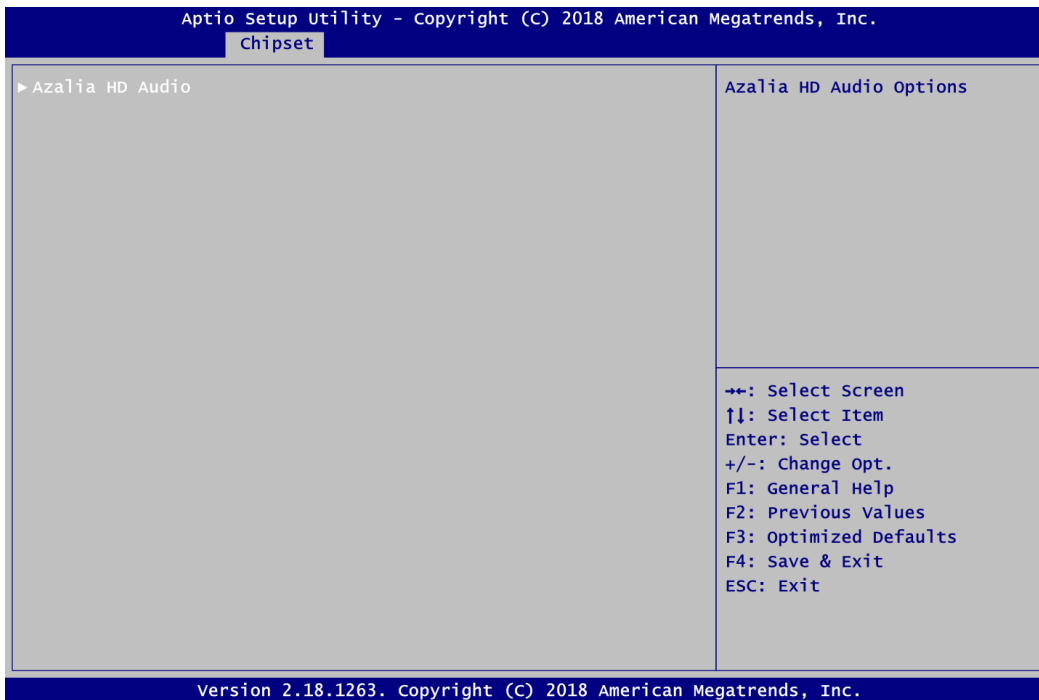


Memory Information

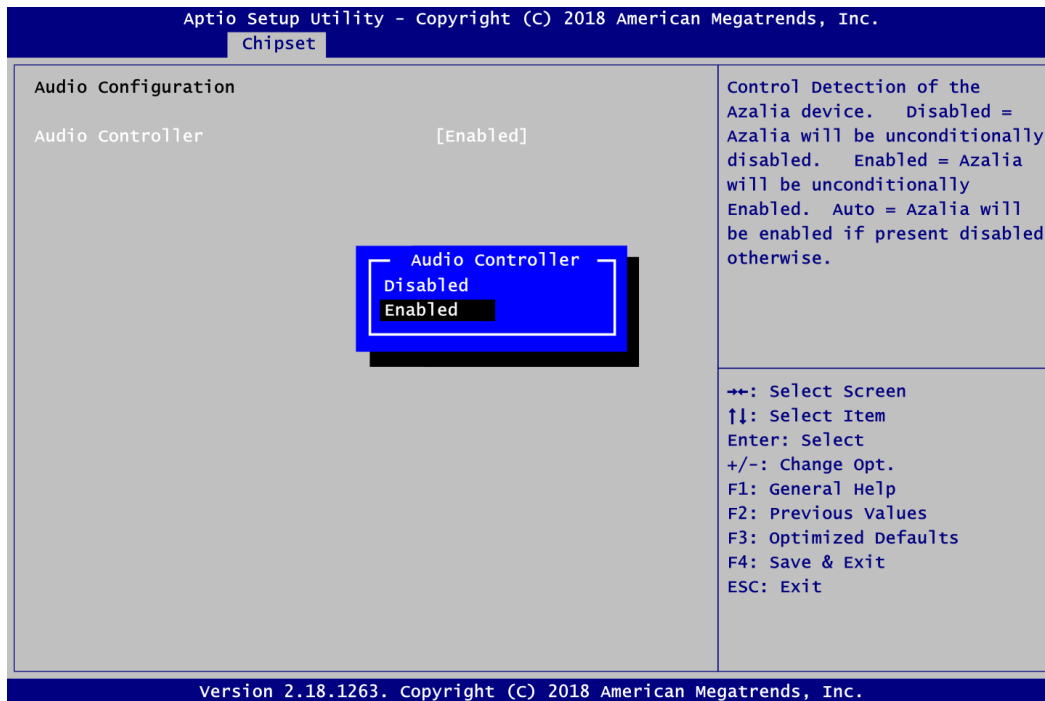
Display system memory information.

- **South Bridge**

This screen shows the information of South Bridge chipset. A description of the selected item appears on the right side of the screen. For items marked with “▶”, please press <Enter> for more options.

**Azalia HD Audio**

Use these items to set parameters related to HD Audio configuration. Please press <Enter> to go to the sub menus.



Audio Controller

Control detection of HD Audio device.

- Disabled: Azalia will be unconditionally disabled.
- Enabled: Azalia will be unconditionally enabled.

4.6 Security Menu

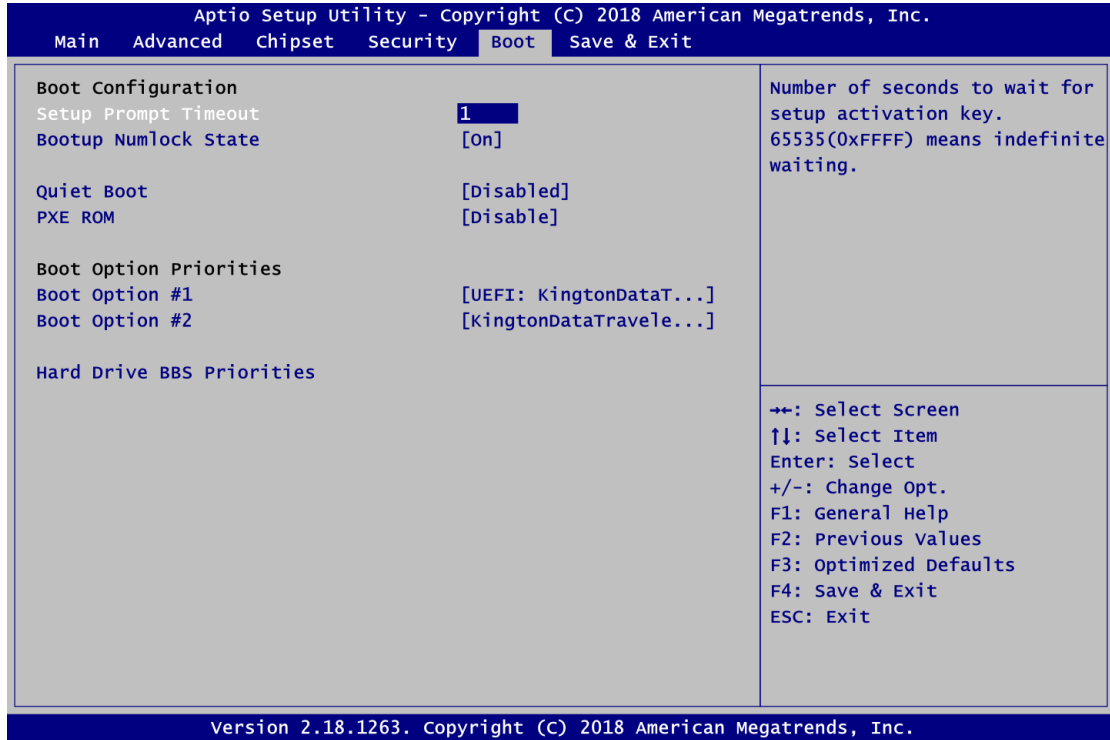
The Security menu allows users to change the security settings for the system.



- **Administrator Password.**
Set administrator password.
- **User Password**
Set user password.
- **HDD Security Configuration**
HDD Security Configuration for selected drive.

4.7 Boot Menu

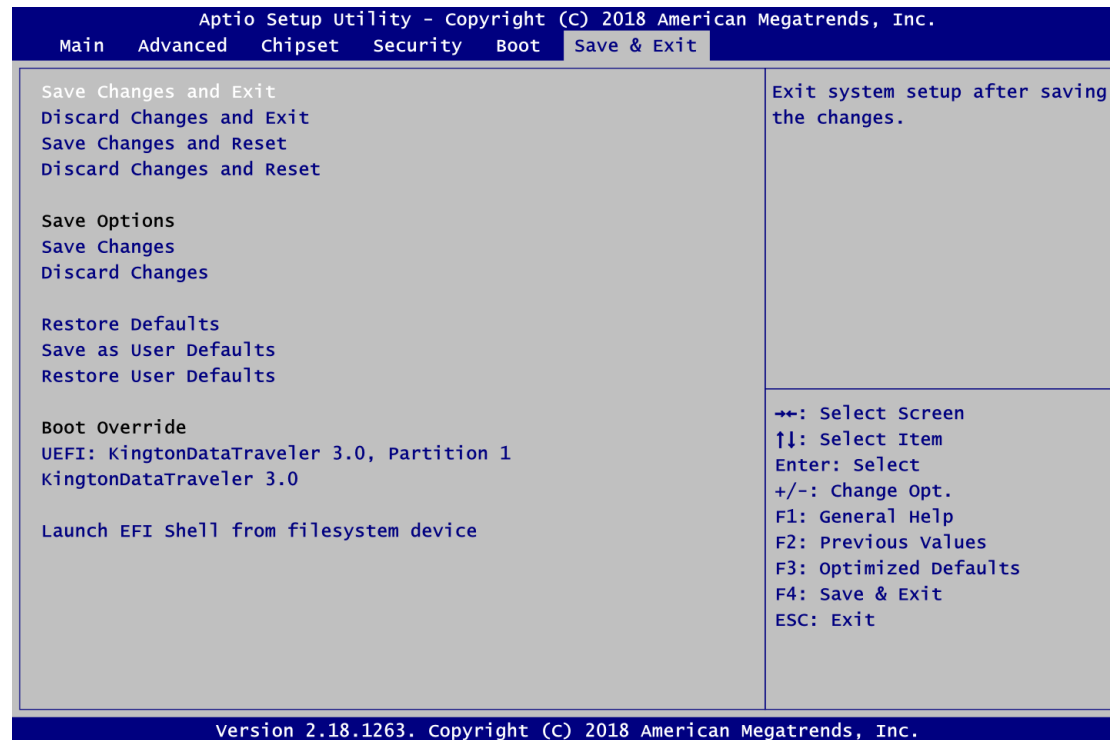
The Boot menu allows users to change boot options of the system.



- Setup Prompt Timeout**
 Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- Bootup NumLock State**
 Use this item to select the power-on state for the keyboard NumLock.
- Quiet Boot**
 Select to display either POST output messages or a splash screen during boot-up.
- PXE ROM**
 Enable or disable the Preboot eXecution Environment (PXE) boot ROM function of the onboard LAN chip during system boots up.
- Boot Option Priorities [Boot Option #1, ...]**
 These are settings for boot priority. Specify the boot device priority sequence from the available devices.
- Hard Drive BBS Priorities**
 Set the order of hard drive boot. This option appears only if at least one device of this group is detected.

4.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- Save Changes and Exit**
 When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.
- Discard Changes and Exit**
 Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.
- Save Changes and Reset**
 When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.
- Discard Changes and Reset**
 Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.
- Save Changes**
 When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.
- **Restore Defaults**
It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.
- **Save as User Defaults**
Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.
- **Restore User Defaults**
It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.
- **Boot Override**
Select a drive to immediately boot that device regardless of the current boot order.
- **Launch EFI Shell from filesystem device**
Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

Appendix A

Watchdog Timer

A.1 About Watchdog Timer

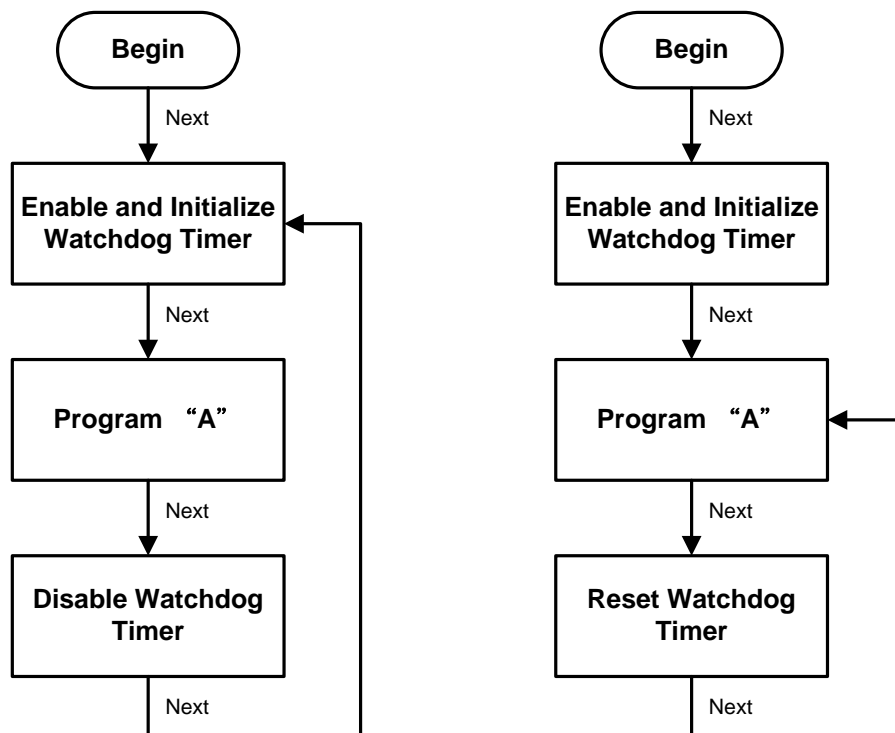
Software stability is major issue in most application. Some embedded systems are not watched by operator for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

A.2 How to Use Watchdog Timer

The I/O port base addresses of watchdog timer are 2E (hex) and 2F (hex). The 2E (hex) and 2F (hex) are address and data port respectively.

Assume that program A is put in a loop that must execute at least once every 10ms. Initialize watchdog timer with a value bigger than 10ms. If the software has no problems; watchdog timer will never expire because software will always restart the counter before it reaches zero.



A.3 Sample Program


Assembly sample code :


```
;Enable WDT:
mov     dx,2Eh
mov     al,87             ;Un-lock super I/O
out     dx,al
out     dx,al

;Select Logic device:
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,07h
out     dx,al

;Enable WDT base address:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al

;Activate WDT:
mov     dx,2Eh
mov     al,0F0h
out     dx,al
mov     dx,2Fh
mov     al,80h
out     dx,al

;Set base timer :
mov     dx,2Eh
mov     al,0F6h
out     dx,al
mov     dx,2Fh
mov     al,Mh             ;M=00h,01h,...FFh (hex),value=0 to 255
out     dx,al             ;(see  Note below)

;Set Second or Minute :
mov     dx,2Eh
mov     al,0F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh             ;N=71h or 79h(see  Note below)
out     dx,al
```

 **Note:**

If **N=71h**, the time base is set to second.

M = time value

00: Time-out disable

01: Time-out occurs after 1 second

02: Time-out occurs after 2 seconds

03: Time-out occurs after 3 seconds

.

.

FFh: Time-out occurs after 255 seconds

If **N**=79h, the time base is set to minute.

M = time value

00: Time-out disable

01: Time-out occurs after 1 minute

02: Time-out occurs after 2 minutes

03: Time-out occurs after 3 minutes

.

.

FFh: Time-out occurs after 255 minutes

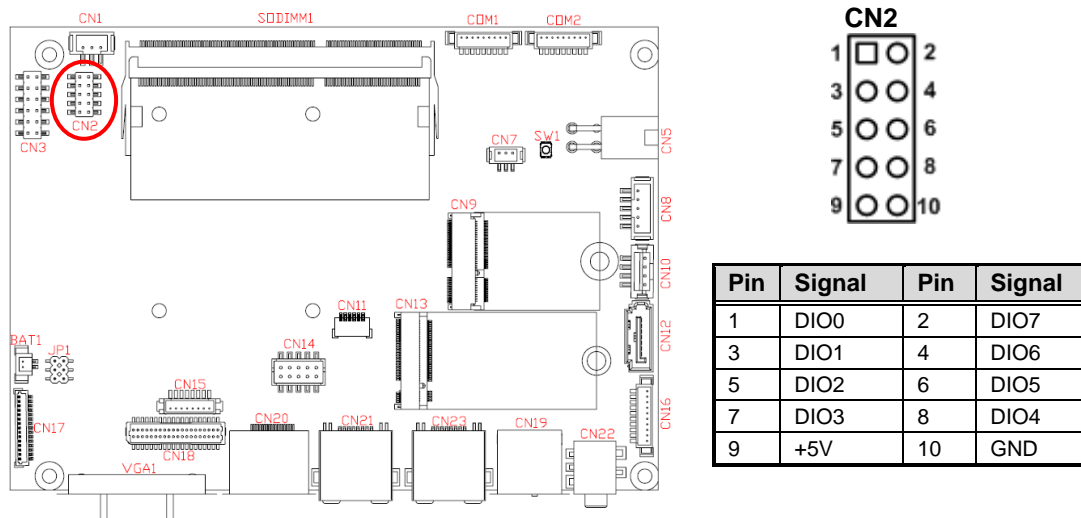
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Appendix B

Digital I/O

B.1 About Digital I/O

The onboard GPIO or digital I/O has 8 bits. Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +5V level (according to main power). The BIOS default settings are 4 inputs and 4 outputs.



B.2 Digital I/O Programming

- I²C to GPIO PCA9554PW GPIO.
- I²C address: 01001000.

Command byte

Command	Protocol	Function
0	Read byte	Input port register
1	Read/write byte	Output port register
2	Read/write byte	Polarity inversion register
3	Read/write byte	Configuration register

The command byte is the first byte to follow the address byte during a write transmission. It is used as a pointer to determine which of the following registers will be written or read.

Register 0: Input port register.

This register is a read-only port. It reflects the incoming logic levels of the pins, regardless of whether the pin is defined as an input or an output by Register 3. Writes to this register have no effect.

The default “X” is determined by the externally applied logic level, normally “1” when no external signal externally applied because of the internal pull-up resistors.

Register 0 – Input port register bit description

Bit	Symbol	Access	Value	Description
7	I7	Read only	X	Determined by externally applied logic level.
6	I6	Read only	X	
5	I5	Read only	X	
4	I4	Read only	X	
3	I3	Read only	X	
2	I2	Read only	X	
1	I1	Read only	X	
0	I0	Read only	X	

Register 1: Output port register.

This register reflects the outgoing logic levels of the pins defined as outputs by Register 3. Bit values in this register have no effect on pins defined as inputs. Reads from this register return the value that is in the flip-flop controlling the output selection, not the actual pin value.

Register 1 – Output port register bit description

Bit	Symbol	Access	Default Value	Description
7	O7	R	1	Reflects outgoing logic levels of pins defined as outputs by Register 3.
6	O6	R	1	
5	O5	R	1	
4	O4	R	1	
3	O3	R	1	
2	O2	R	1	
1	O1	R	1	
0	O0	R	1	

Register 2: Polarity Inversion register.

This register allows the user to invert the polarity of the Input port register data. If a bit in this register is set (written with “1”), the corresponding Input port data is inverted. If a bit in this register is cleared (written with “0”), the Input port data polarity is retained.

Register 2 – Polarity inversion register bit description

Bit	Symbol	Access	Default Value	Description
7	N7	R/W	0	Inverts polarity of Input port register data. 0 = Input port register data retained (default value). 1 = Input port register data inverted.
6	N6	R/W	0	
5	N5	R/W	0	
4	N4	R/W	0	
3	N3	R/W	0	
2	N2	R/W	0	
1	N1	R/W	0	
0	N0	R/W	0	

Register 3: Configuration register.

This register configures the directions of the I/O pins. If a bit in this register is set, the corresponding port pin is enabled as an input with high-impedance output driver. If a bit in this register is cleared, the corresponding port pin is enabled as an output. At reset, the I/Os are configured as inputs with a weak pull-up to V_{DD} .

Register 3 – Configuration register bit description

Bit	Symbol	Access	Default Value	Description
7	C7	R/W	1	Configures the directions of the I/O pins. 0 = Corresponding port pin enabled as an output. 1 = Corresponding port pin configured as input (default value).
6	C6	R/W	1	
5	C5	R/W	1	
4	C4	R/W	1	
3	C3	R/W	1	
2	C2	R/W	1	
1	C1	R/W	1	
0	C0	R/W	1	

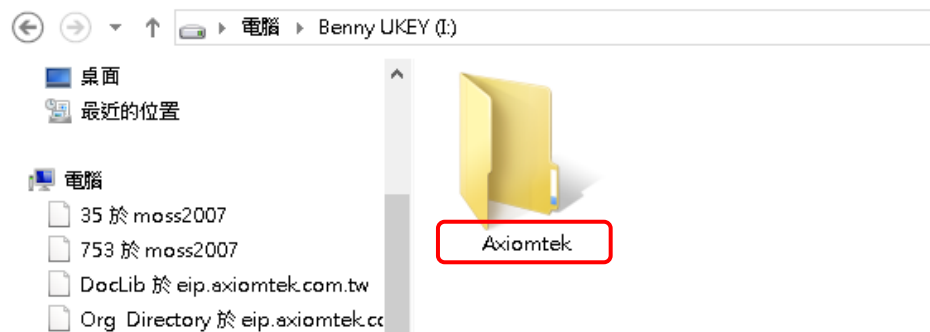
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Appendix C

BIOS Flash Utility

The BIOS Flash utility is a new helpful function in BIOS setup program. With this function you can easily update system BIOS without having to enter operating system. In this appendix you may learn how to do it in just a few steps. Please read and follow the instructions below carefully.

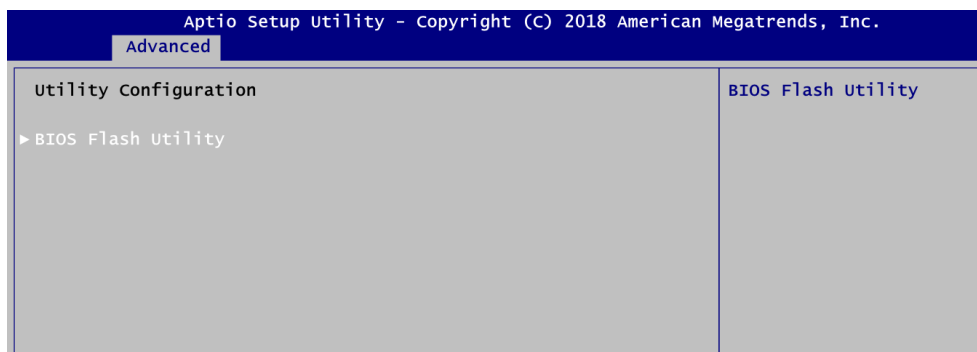
1. In your USB flash drive, create a new folder and name it “Axiomtek”, see figure below.



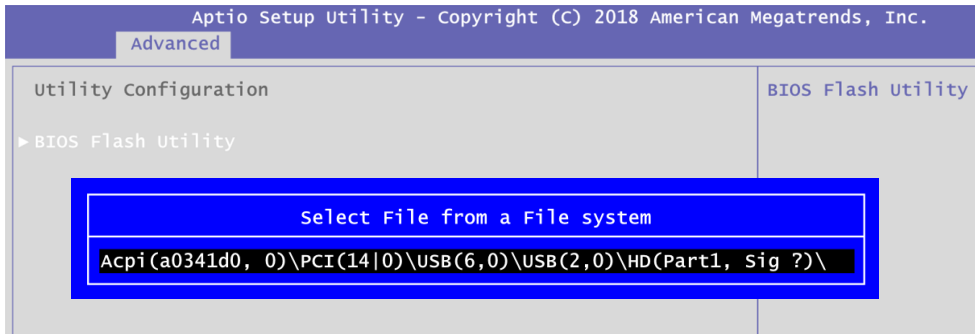
2. Copy BIOS ROM file (e.g. CAPA84R.005) to “Axiomtek” folder.



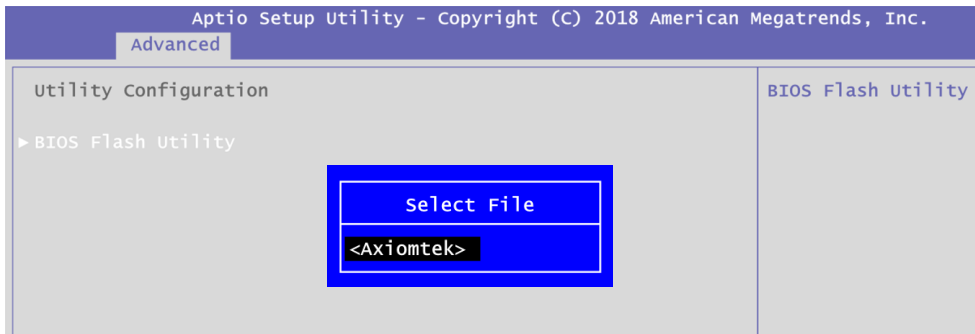
3. Insert the USB flash drive to your system.
4. Enter BIOS setup menu and go to Advanced\Utility Configuration. Select BIOS Flash Utility and press <Enter>.



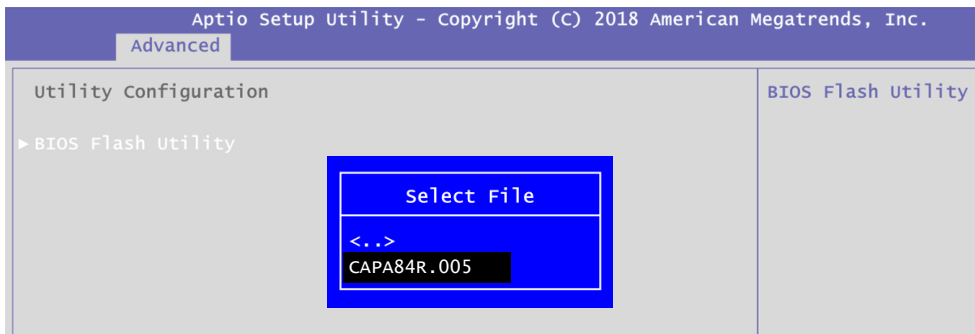
- BIOS automatically detect all USB drive(s) attached to the system. In this example only one USB drive is attached to the system. That's why, you can see only one device is displayed in figure below.



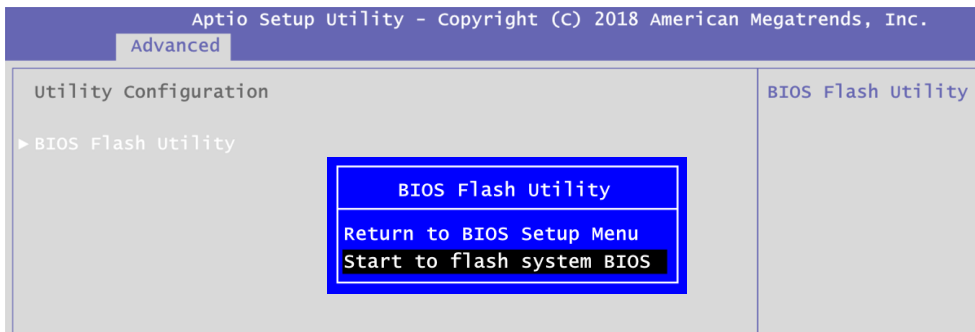
- Select the USB drive containing BIOS ROM file you want to update using the `<↑>` or `<↓>` key. Then press `<Enter>` to get into "Axiomtek" folder.



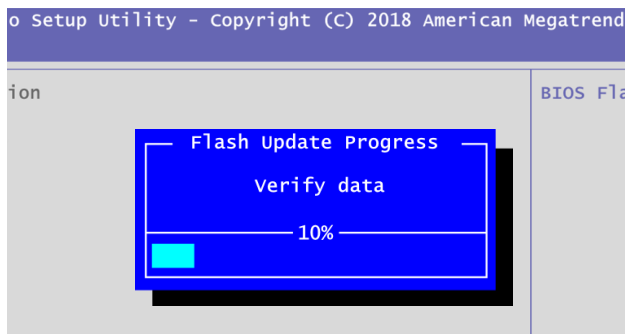
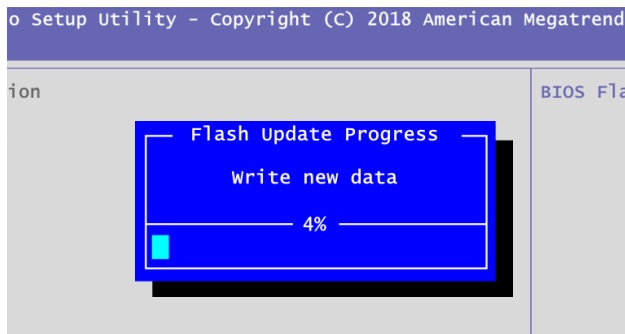
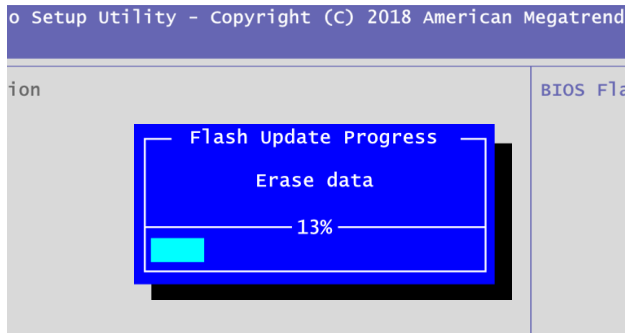
- Now you can see the BIOS ROM file on the screen, press `<Enter>` to select.



- Select Start to flash system BIOS option to begin updating procedure.



- Please wait while BIOS completes the entire flash update process: erase data, write new data and verify data.



- When you see the following figure, press <Enter> to finish the update process. After that the system will shut down and restart immediately.

