AXIOMTEK

PICO880

4th/5th Generation Intel® Core™ i7/ i5/ i3 and Celeron® Processor Pico-ITX Board

User's Manual

RoHS

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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.

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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Chapter 1
Introduction

The PICO880 is a Pico-ITX board with 4th/5th Generation Intel® Core™ i7/ i5/ i3 and Celeron® processor that delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

The board has one 204-pin unbuffered SO-DIMM socket for DDR3L 1600MHz SO-DIMM memory, maximum memory capacity up to 8GB. It also features one Gigabit/Fast Ethernet, one SATA port with transfer rates up to 6Gb/s, one USB 2.0 high speed compliant, and built-in high definition audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded feature such as Pico-ITX form factor that applies an extensive array of PC peripherals. The board can be enhanced by its built-in watchdog timer function, a special industrial feature not commonly seen on other motherboards.

1.1   Features

- 4th/5th Generation Intel® Core™ i7/ i5/ i3 and Celeron® processor
- 1 DDR3L SO-DIMM supports up to 8GB memory capacity
- 1 USB 2.0 port
- Intel® AMT 9.5 support

1.2   Specifications

- **CPU**
  - 4th Generation Intel® Core™ i7-4650U 1.7GHz dual core.
  - 4th Generation Intel® Core™ i5-4300U 1.9GHz dual core.
  - 4th Generation Intel® Core™ i3-4010U 1.7GHz dual core.
  - 4th Generation Intel® Celeron® 2980U 1.6GHz dual core.
  - 5th Generation Intel® Core™ i7-5650U 2.2GHz dual core.
  - 5th Generation Intel® Core™ i5-5350U 1.8GHz dual core.
  - 5th Generation Intel® Core™ i3-5010U 2.1GHz dual core.
  - 5th Generation Intel® Celeron® 3755U 1.7GHz dual core.

- **Thermal Solution**
  - Active.

- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
  - 128Mbit SPI Flash, DMI, Plug and Play.
  - RPL/PXE Ethernet Boot ROM.

- **System Memory**
  - One 204-pin unbuffered DDR3L SO-DIMM socket.
  - Maximum up to 8GB DDR3 1600MHz memory.

- **Onboard Multi I/O**
  - Controller: Fintek F81801U.
  - Two UARTs.

- **Serial ATA**
  - One SATA-600 connector.
  - mSATA support (Optional)

- **USB Interface**
  - One USB port with fuse protection and complies with USB Spec. Rev. 2.0.

- **Display**
  - One DisplayPort connector.
  - One 2x20-pin connector for 18/24-bit single and dual channel LVDS and one 8-pin wafer connector for inverter control. LVDS resolution is up to 1920x1200 in 24-bit dual channel.

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

- **Ethernet**
  - One port with Intel® i218LM for Gigabit/Fast Ethernet.
  - One RJ-45 connector.

- **Audio**
  - HD audio compliant with Realtek ALC662.

- **Expansion Interface**
  - One PCI-Express Mini Card socket complies with PCI-Express Mini Card Spec. V1.2.
  - Two High speed Board to Board connectors

- **Power Input**
  - DC power jack connector, co-layout with 1x2-pin right angle connector.
  - +12V DC-in only.
  - AT auto power on function supported.

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Form Factor**
  - Pico-ITX form factor.

Note

All specifications and images are subject to change without notice.

1.3   Utilities

- Chipset and graphics driver
- Ethernet driver (i218LM)
- Audio driver
- USB 3.0 driver
- Intel Management Engine Software for AMT support

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Chapter 2
Board and Pin Assignments

2.1   Board Dimensions and Fixing Holes
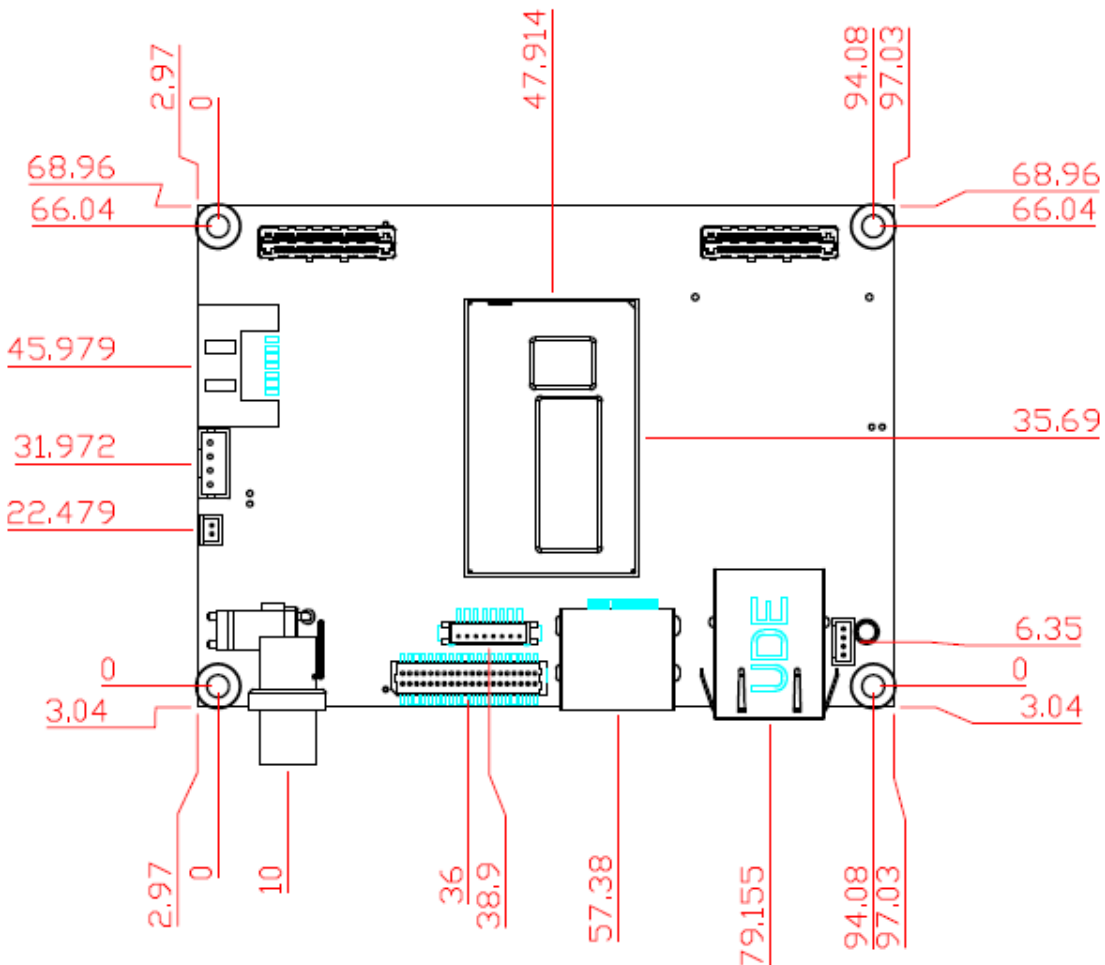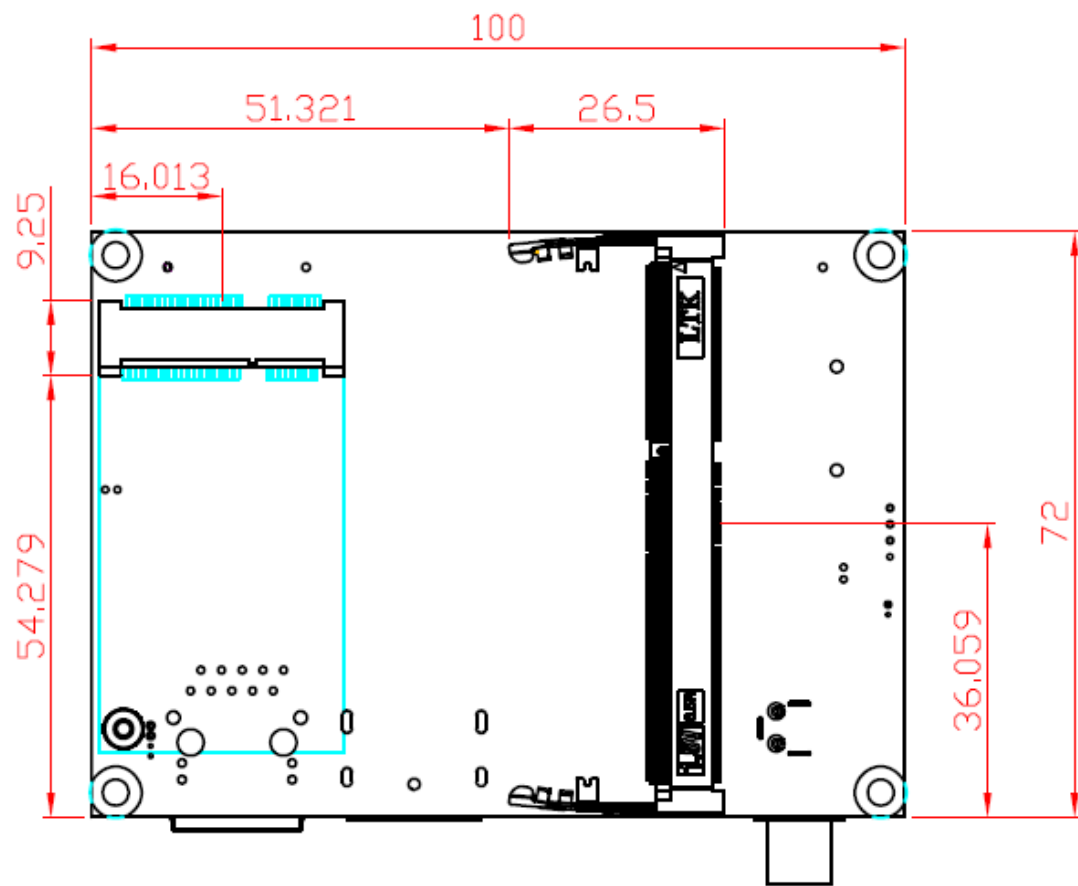
Top View
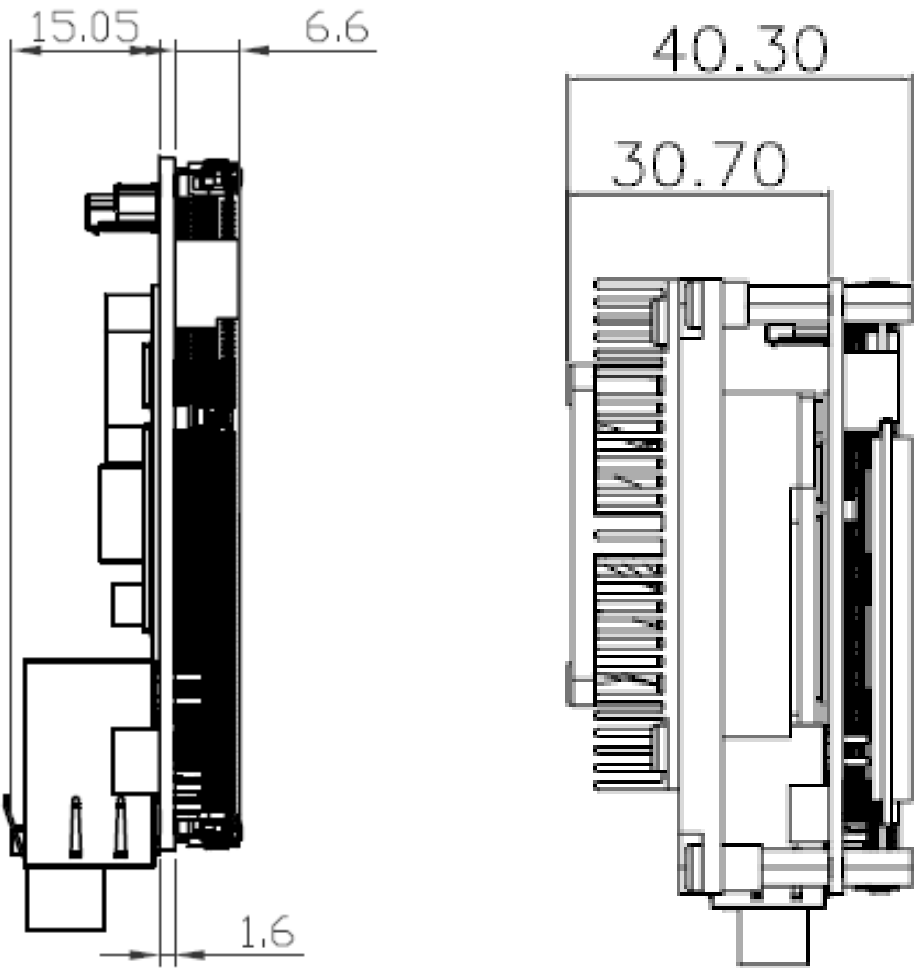
Bottom View

Side View

2.2   Board Layout
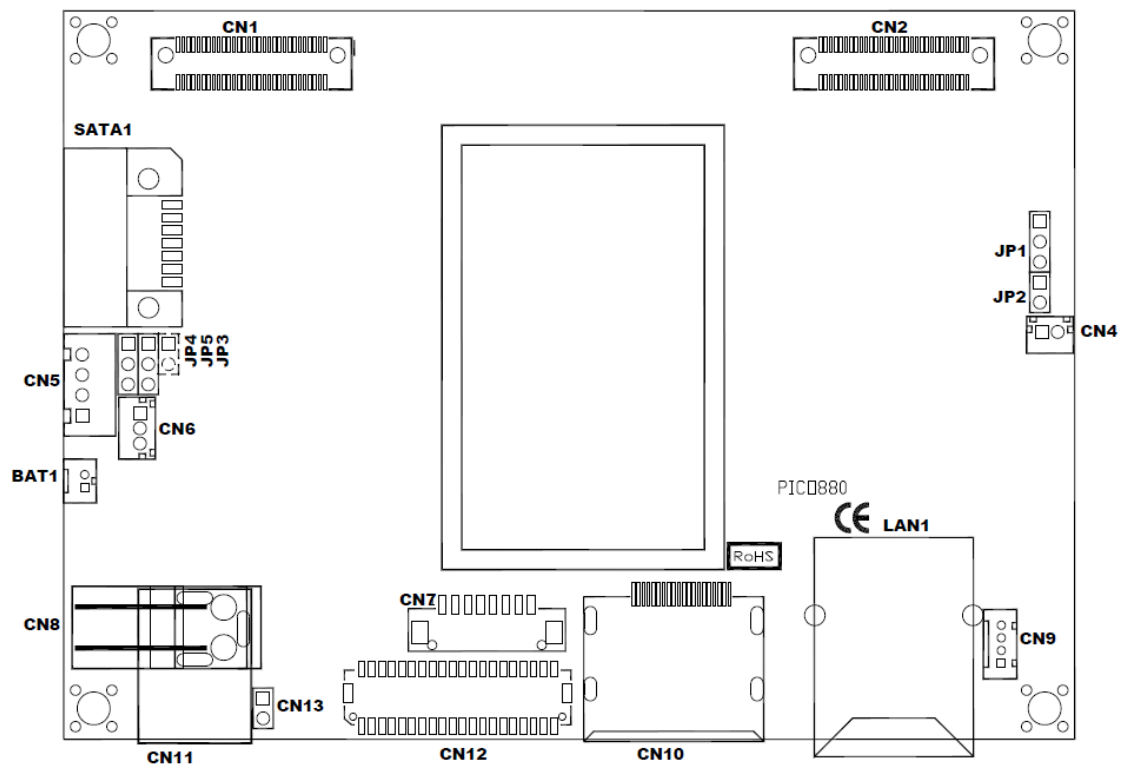
Top View
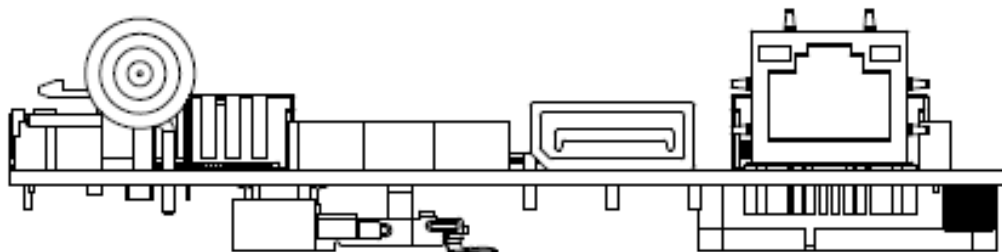
Side View
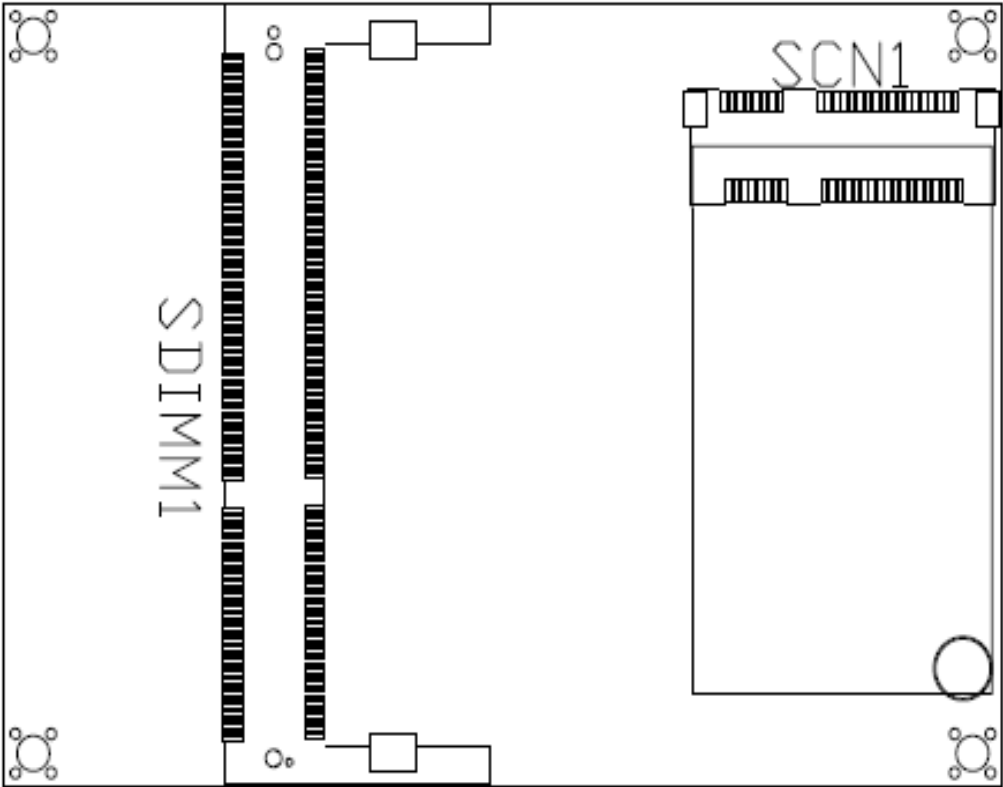
Bottom View

2.3 Assembly Drawing

Heatsink for PICO880 (see image below):
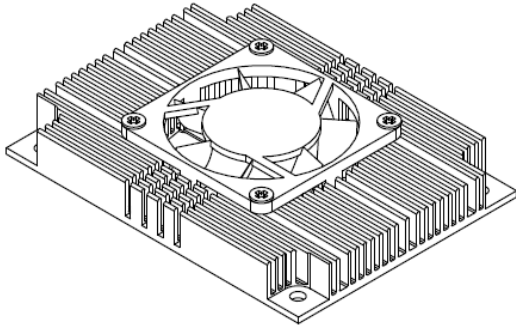
Heatspreader for PICO880 (see image below):
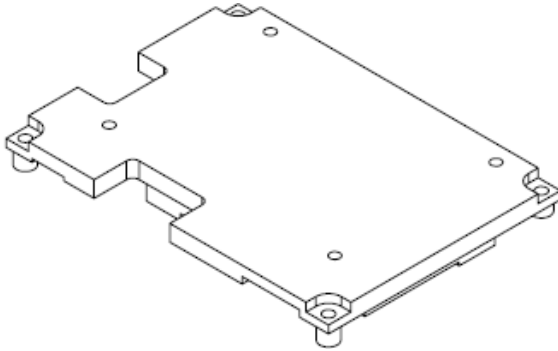
First of all, screw heatsink w/ cooler into heatspreader.

x 4
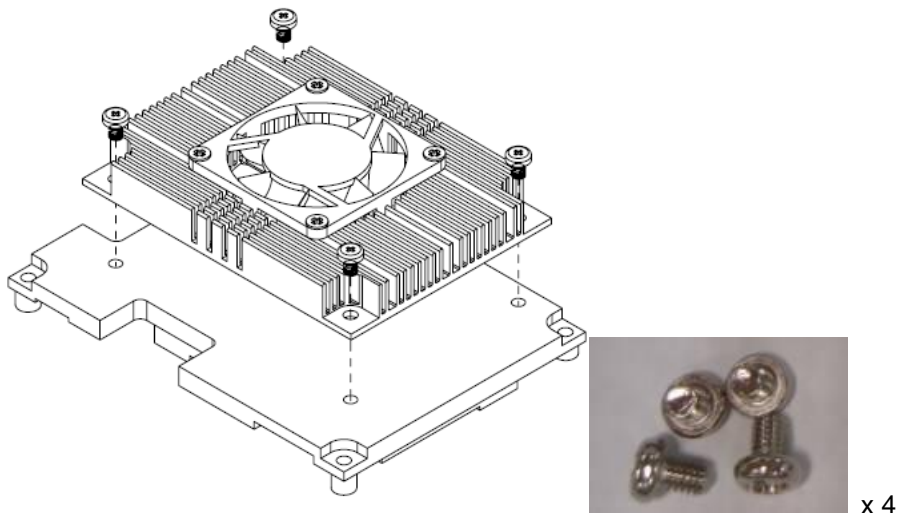
For thermal dissipation, a heatspreader enables the PICO880's components to dissipate heat efficiently. Images below illustrate how to install the heatspreader.

Installing Heatspreader
The PICO880 has four assembly holes for installing heatspreader plate. Align and firmly secure the heatspreader plate to the PICO880. Be careful not to over-tighten the screws.

 x4

 x2

 x2

 x4
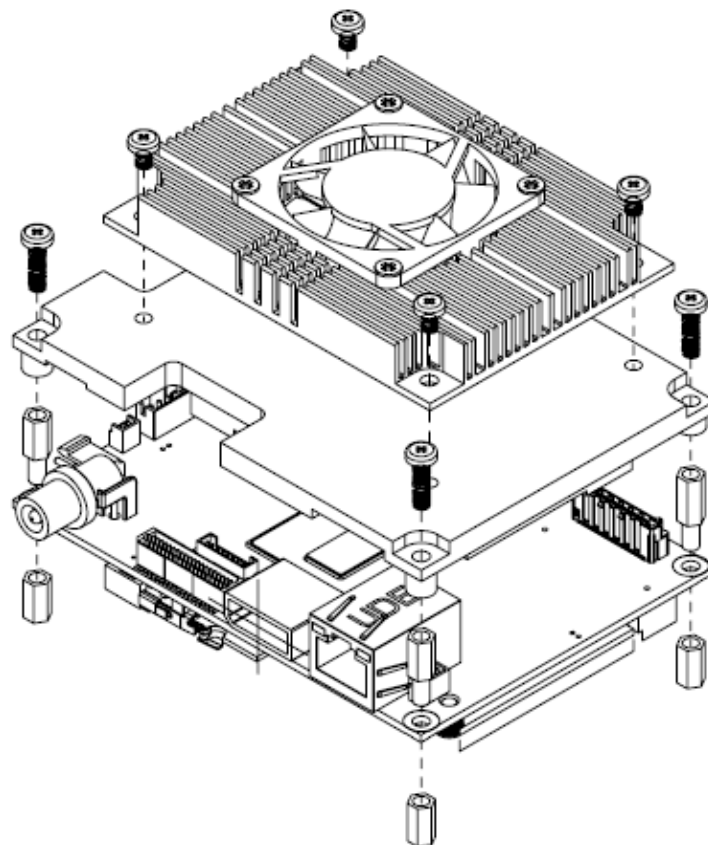
2.4   Jumper Settings

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.
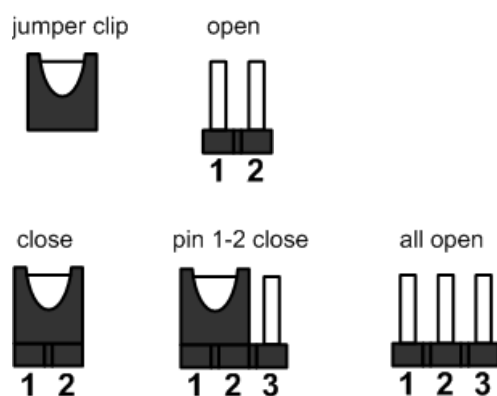
Properly configure jumper settings on the PICO880 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

> **Note**
>
> ***Once the default jumper setting needs to be changed, please do it under power-off condition.***

Jumper	Description	Setting
JP1	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close
JP2	Auto Power On Default: Enable	1-2 Open
JP3 (Optional)	LVDS +12 Voltage Selection Default: +12V	1-2 Close
JP4	LVDS Brightness Control Mode Setting Default: PWM Mode	1-2 Close
JP5	LVDS +3.3V/+5V Voltage Selection Default: +3.3V	1-2 Close

2.4.1 Restore BIOS Optimal Defaults (JP1)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close

2.4.2 Auto Power On (JP2)

If JP2 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP2 is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

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

> **Note**
>
> ***This function is similar to the feature of power on after power failure, which is controlled by hardware circuitry instead of BIOS.***

2.4.3 LVDS +12V Voltage Selection (JP3) (Optional)

The board supports voltage selection for flat panel displays. Use JP3 to set LVDS connector (CN12) pin 1~6 VCCM to +12V.

Function	Setting
+12V (Default)	1-2 close

2.4.4 LVDS Brightness Control Mode Setting (JP4)

The JP4 enables you to select PWM or voltage control mode for inverter connector (CN7). These two control modes are for adjusting the brightness of LVDS panel.

Function	Setting
PWM mode (Default)	1-2 close
Voltage mode	2-3 close

2.4.5   LVDS +3.3V/+5V Voltage Selection (JP5)

The board supports voltage selection for flat panel displays. Use JP5 to set LVDS connector (CN12) pin 1~6 VCCM to +3.3V or +5V.

Function	Setting
+3.3V (Default)	1-2 close
+5V	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 which shows all connectors on the hardware.

Connector	Description
CN1	High Speed Board to Board Connector 1
CN2	High Speed Board to Board Connector 2
CN4	Fan Power Connector
CN5	Serial ATA Power Connector
CN6	SMBus Connector
CN7	Inverter Connector
CN8 (Optional)	DC Power Connector
CN9	USB 2.0 Wafer Connector
CN10	DisplayPort Connector
CN11	DC Power Jack w/ Screw
CN12	LVDS Connector
CN13	Power LED Header
LAN1	LAN Port
BAT1	CMOS Battery Connector
SATA1	Serial ATA Connector
SCN1	PCI-Express Mini Card Connector
SDIMM1	DDR3L SO-DIMM Connector

2.5.1   High Speed Board to Board Connectors (CN1 and CN2)

CN1 is a 2x30-pin high speed board to board connector. The pin assignments of CN1 are given as follows.

Pin	Signal	Pin	Signal
1	MIC-L	2	AUDIO_OUT-L
3	MIC-R	4	AUDIO_OUT-R
5	AUDIO_GND	6	AUDIO_GND
7	DCD2	8	DSR2
9	RXD2	10	RTS2
11	TXD2	12	CTS2
13	DTR2	14	RI2
15	DCD1	16	DSR1
17	RXD1	18	RTS
19	TXD1	20	CTS1
21	DTR1	22	RI1
23	GND	24	GND
25	SIO_PSIN#	26	GPO_485_EN_N
27	SATA_LED	28	GPO_485TERM_EN
29	HW_RESET#	30	GPO_485_MODE0
31	PLTRST_SIO	32	GPO_485_MODE1
33	USB_OC01	34	USB_OC23
35	GND	36	GND
37	DP0	38	DP2
39	DN0	40	DN2
41	GND	42	GND
43	DP1	44	DN3
45	DN1	46	DP3
47	GND	48	GND
49	NA	50	+V5_SBY
51	NA	52	+V5_SBY
53	NA	54	+V5_SBY
55	+V12S	56	+V5_SBY
57	+V3.3S	58	+V5S
59	+V3.3S	60	+V5S
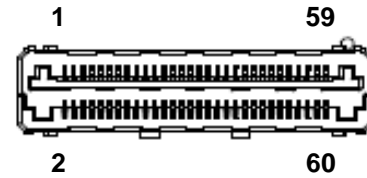
CN2 is a 2x30-pin high speed board to board connector. The pin assignments of CN2 are given as follows.

Pin	Signal	Pin	Signal
1	USB3_RXP1	2	PCIE_IO_RXP
3	USB3_RXN1	4	PCIE_IO_RXN
5	GND	6	GND
7	USB3_TXP1	8	PCIE_IO_TXP
9	USB3_TXN1	10	PCIE_IO_TXN
11	GND	12	GND
13	USB3_RXP2	14	B2B_PCIE_CLK
15	USB3_RXN2	16	B2B_PCIE_CLK#
17	GND	18	GND
19	USB3_TXP2	20	DDI2_TXP0
21	USB3_TXN2	22	DDI2_TXN0
23	GND	24	GND
25	USB3_RXP3	26	DDI2_TXP1
27	USB3_RXN3	28	DDI2_TXN1
29	GND	30	GND
31	USB3_TXP3	32	DDI2_TXP2
33	USB3_TXN3	34	DDI2_TXN2
35	GND	36	GND
37	USB3_RXP4	38	DDI2_TXP3
39	USB3_RXN4	40	DDI2_TXN3
41	GND	42	GND
43	USB3_TXP4	44	DDPC_CTRLDATA
45	USB3_TXN4	46	DDPC_CTRLCLK
47	GND	48	GND
49	DDPC_AUXP	50	DDPC_HPD
51	DDPC_AUXN	52	PLTRST_MINICARD
53	GND	54	PCIE_WAKE#
55	NA	56	NA
57	+V3.3_SBY	58	+V5S
59	+V3.3_SBY	60	+V5S
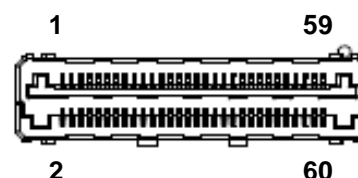
Note

It is suggested to insert I/O board (AX93275 or AX93276) into CN1 and CN2 on PICO880 (see Appendix A for details of I/O board).

2.5.2 Fan Power Connector (CN4)

The CN4 is a wafer connector (pitch=1.5mm) for fan power interface.

Pin	Signal
1	+5V
2	GND
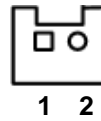
2.5.3 Serial ATA Power Connector (CN5)

The connector is for serial ATA (SATA) power interface.

Pin	Signal
1	+12V
2	GND
3	GND
4	+5V
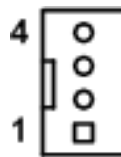
2.5.4 SMBus Connector (CN6)

This connector is for SMBus interface. The SMBus (System Management Bus) is a simple 2-wire bus for the purpose of lightweight communication.

Pin	Signal
1	SMBus clock
2	SMBus data
3	GND
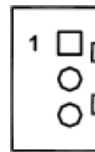
2.5.5 Inverter Connector (CN7)

This is a DF13-8S-1.25C 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction. Pin 8 can be set to two different modes for adjusting the brightness of LVDS panel (see section 2.4.4).

Pin	Signal
1	+12V
2	+12V
3	+5V
4	BL_ENABLE
5	GND
6	GND
7	GND
8	BR_CTRL
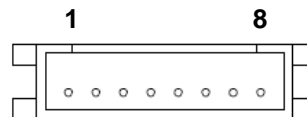
2.5.6 DC Power Connector (CN8) (Optional)

The CN8 is a 1x2-pin wafer connector in right angle (pitch=3.96mm) for DC +12V input.

Pin	Signal
1	+12V
2	GND
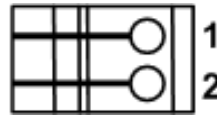
2.5.7 USB 2.0 Wafer Connector (CN9)

This is an internal connector for USB 2.0 interface.

Pin	Signal
1	USB3_PWR67
2	D6+
3	D6-
4	GND

2.5.8 DisplayPort Connector (CN10)

The DisplayPort interface is available through connector CN10.

Pin	Signal
1	DDPC_0P
2	GND
3	DDCP_0N
4	DDPC_1P
5	GND
6	DDCP_1N
7	DDPC_2P
8	GND
9	DDCP_2N
10	DDPC_3P
11	GND
12	DDCP_3N
13	HDMI_DETE
14	GND
15	DCP_AUX_DP
16	GND
17	DCP_AUX_DN
18	DDC_HDP
19	GND
20	DP_PWR
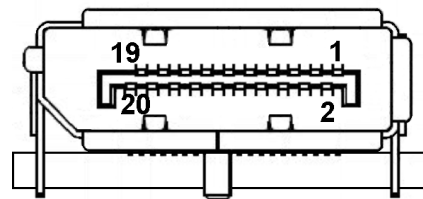
2.5.9   DC Power Jack w/ Screw (CN11)

The CN11 is a DC power jack with screw. Firmly insert at least 60W adapter into this connector. Loose connection may cause system instability and make sure all components/devices are properly installed before connecting this power jack
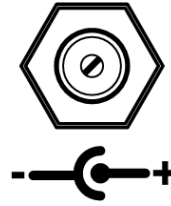
2.5.10   LVDS Connector (CN12)

This board has a 40-pin connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B 40-pin connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V, +5V or +12V by setting JP5 or JP3 (see section 2.4.5 and 2.4.3).

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

2.5.11 Power LED Header (CN13)

The CN13 is for power LED interface.

Pin	Signal
1	+5V
2	GND

2.5.12 LAN Port (LAN1)

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

Pin	Signal	Pin	Signal
L1	MDI0P	L5	MDI2P
L2	MDI0N	L6	MDI2N
L3	MDI1P	L7	MDI3P
L4	MDI1N	L8	MDI3N
A	Active LED (Yellow)		
B	100 LAN LED (Green) / 1000 LAN LED (Orange)		
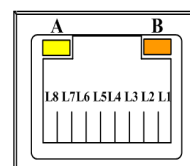
2.5.13 CMOS Battery Connector (BAT1)

This connector is for CMOS battery interface.

Pin	Signal
1	+3.3V
2	GND
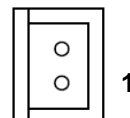
2.5.14 Serial ATA Connector (SATA1)

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

Pin	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND
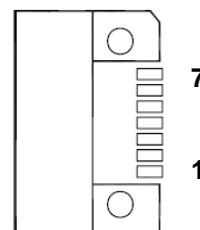
2.5.15   PCI-Express Mini Card Connector (SCN1)

This is a PCI-Express Mini Card connector on the bottom side supporting PCI-Express x1 link and USB 2.0 link. It complies with PCI-Express Mini Card Spec. V1.2. A PCI-Express Mini Card can be applied to either PCI-Express or USB 2.0 or SATA (mSATA). To enable or disable mSATA support, please refer to BIOS setting in section 4.4.

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/SATA_RXP	24	+3.3VSB
25	PE_RXP3/SATA_RXN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3/SATA_TXN	32	SMB_DATA
33	PE_TXP3/SATA_TXP	34	GND
35	GND	36	USB #6_D-
37	GND	38	USB #6_D+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB
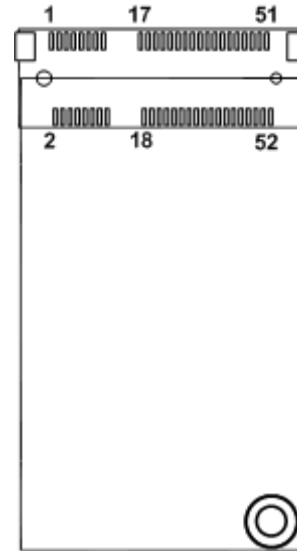
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Chapter 3
Hardware Description

3.1 Microprocessors

The PICO880 supports 4th/5th Generation Intel® Core™ i7/ i5 /i3 and Celeron® processor, which enables your system to operate under Windows® 7 and Windows® 8 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2 BIOS
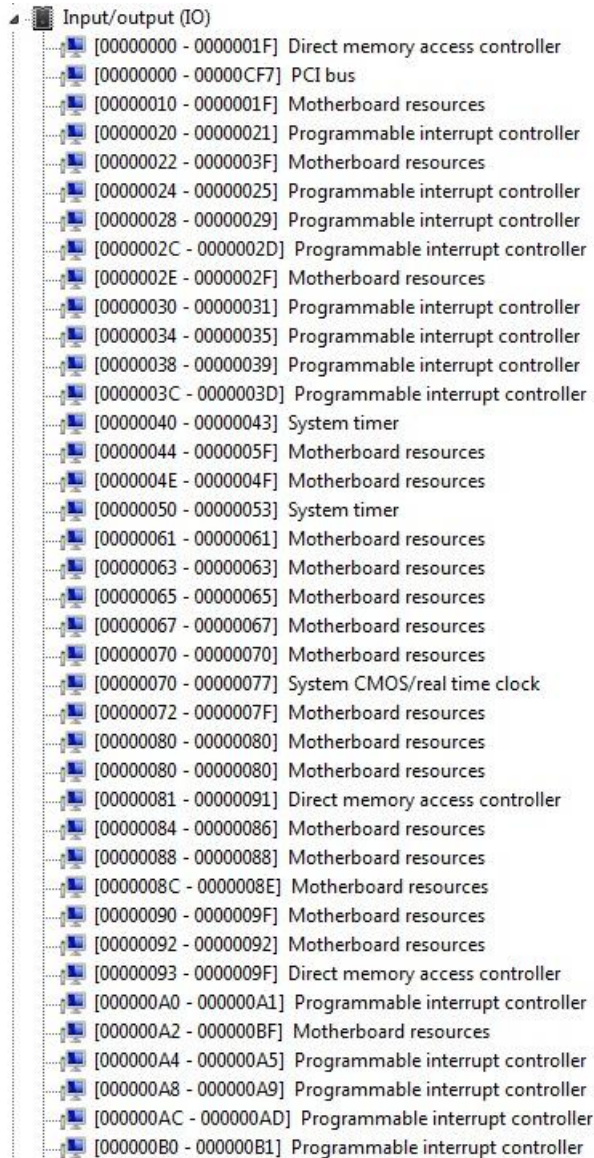
The PICO880 uses AMI Plug and Play BIOS with a single 128Mbit SPI Flash.

3.3 System Memory

The PICO880 supports one 204-pin DDR3L only SO-DIMM socket for a maximum memory of 8GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB, 4GB and 8GB.

3.4 I/O Port Address Map

The 4th/5th Generation Intel® Core™ i7/ i5/ i3 and Celeron® processor communicates via I/O ports.
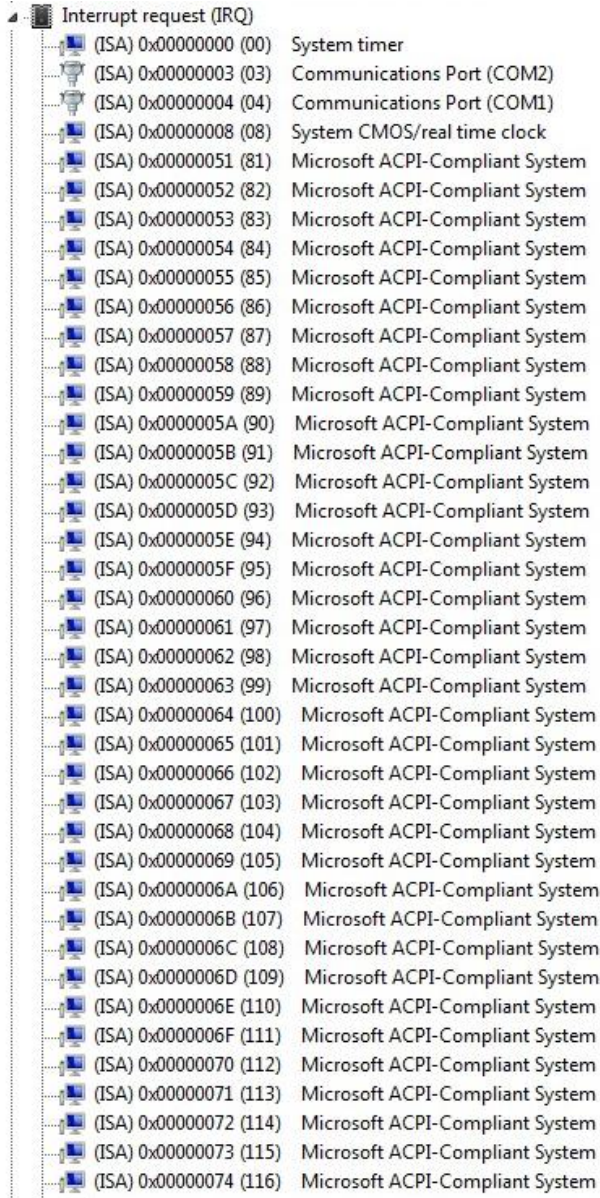
```
Input/output (IO)
    [00000000 - 0000001F]  Direct memory access controller
    [00000000 - 00000CF7]  PCI bus
    [00000010 - 0000001F]  Motherboard resources
    [00000020 - 00000021]  Programmable interrupt controller
    [00000022 - 0000003F]  Motherboard resources
    [00000024 - 00000025]  Programmable interrupt controller
    [00000028 - 00000029]  Programmable interrupt controller
    [0000002C - 0000002D]  Programmable interrupt controller
    [0000002E - 0000002F]  Motherboard resources
    [00000030 - 00000031]  Programmable interrupt controller
    [00000034 - 00000035]  Programmable interrupt controller
    [00000038 - 00000039]  Programmable interrupt controller
    [0000003C - 0000003D]  Programmable interrupt controller
    [00000040 - 00000043]  System timer
    [00000044 - 0000005F]  Motherboard resources
    [0000004E - 0000004F]  Motherboard resources
    [00000050 - 00000053]  System timer
    [00000061 - 00000061]  Motherboard resources
    [00000063 - 00000063]  Motherboard resources
    [00000065 - 00000065]  Motherboard resources
    [00000067 - 00000067]  Motherboard resources
    [00000070 - 00000070]  Motherboard resources
    [00000070 - 00000077]  System CMOS/real time clock
    [00000072 - 0000007F]  Motherboard resources
    [00000080 - 00000080]  Motherboard resources
    [00000080 - 00000080]  Motherboard resources
    [00000081 - 00000091]  Direct memory access controller
    [00000084 - 00000086]  Motherboard resources
    [00000088 - 00000088]  Motherboard resources
    [0000008C - 0000008E]  Motherboard resources
    [00000090 - 0000009F]  Motherboard resources
    [00000092 - 00000092]  Motherboard resources
    [00000093 - 0000009F]  Direct memory access controller
    [000000A0 - 000000A1]  Programmable interrupt controller
    [000000A2 - 000000BF]  Motherboard resources
    [000000A4 - 000000A5]  Programmable interrupt controller
    [000000A8 - 000000A9]  Programmable interrupt controller
    [000000AC - 000000AD]  Programmable interrupt controller
    [000000B0 - 000000B1]  Programmable interrupt controller
```

[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000A4 - 000000A5] Programmable interrupt controller
[000000A8 - 000000A9] Programmable interrupt controller
[000000AC - 000000AD] Programmable interrupt controller
[000000B0 - 000000B1] Programmable interrupt controller
[000000B2 - 000000B3] Motherboard resources
[000000B4 - 000000B5] Programmable interrupt controller
[000000B8 - 000000B9] Programmable interrupt controller
[000000BC - 000000BD] Programmable interrupt controller
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[00000285 - 00000294] Motherboard resources
[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] Intel(R) HD Graphics 5000
[000003C0 - 000003DF] Intel(R) HD Graphics 5000
[000003F8 - 000003FF] Communications Port (COM1)
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000680 - 0000069F] Motherboard resources
[00000D00 - 0000FFFF] PCI bus
[0000164E - 0000164F] Motherboard resources
[00001800 - 000018FE] Motherboard resources
[00001854 - 00001857] Motherboard resources
[00001C00 - 00001CFE] Motherboard resources
[00001D00 - 00001DFE] Motherboard resources
[00001E00 - 00001EFE] Motherboard resources
[00001F00 - 00001FFE] Motherboard resources
[0000F000 - 0000F03F] Intel(R) HD Graphics 5000
[0000F040 - 0000F05F] Intel(R) 8 Series SMBus Controller - 9C22
[0000F060 - 0000F07F] Intel(R) 8 Series SATA AHCI Controller - 9C03
[0000F0A0 - 0000F0A3] Intel(R) 8 Series SATA AHCI Controller - 9C03
[0000F0B0 - 0000F0B7] Intel(R) 8 Series SATA AHCI Controller - 9C03
[0000F0C0 - 0000F0C3] Intel(R) 8 Series SATA AHCI Controller - 9C03
[0000F0D0 - 0000F0D7] Intel(R) 8 Series SATA AHCI Controller - 9C03
[0000F0E0 - 0000F0E7] Intel(R) Active Management Technology - SOL (COM3)
[0000FFFF - 0000FFFF] Motherboard resources
[0000FFFF - 0000FFFF] Motherboard resources
[0000FFFF - 0000FFFF] Motherboard resources

3.5 Interrupt Controller (IRQ) Map

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

```
▲ ▮ Interrupt request (IRQ)
    ▮ (ISA) 0x00000000 (00)   System timer
    ▮ (ISA) 0x00000003 (03)   Communications Port (COM2)
    ▮ (ISA) 0x00000004 (04)   Communications Port (COM1)
    ▮ (ISA) 0x00000008 (08)   System CMOS/real time clock
    ▮ (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) 0x00000005 (05)	Intel(R) 8 Series SMBus Controller - 9C22
(PCI) 0x00000005 (05)	Intel(R) 8 Series Thermal - 9C24
(PCI) 0x00000010 (16)	High Definition Audio Controller
(PCI) 0x00000013 (19)	Intel(R) 8 Series SATA AHCI Controller - 9C03
(PCI) 0x00000013 (19)	Intel(R) Active Management Technology - SOL (COM3)
(PCI) 0x00000016 (22)	High Definition Audio Controller
(PCI) 0x00000017 (23)	Intel(R) 8 Series USB Enhanced Host Controller #1 - 9C26
(PCI) 0xFFFFFFFB (-5)	Intel(R) Ethernet Connection I218-LM #2
(PCI) 0xFFFFFFFC (-4)	Intel(R) Management Engine Interface
(PCI) 0xFFFFFFFD (-3)	Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFFFE (-2)	Intel(R) HD Graphics 5000

3.6   Memory Map

The memory mapping list is shown as follows:

```
▲ 🖳 Memory
    🖳 [000A0000 - 000BFFFF]  Intel(R) HD Graphics 5000
    🖳 [000A0000 - 000BFFFF]  PCI bus
    🖳 [000D0000 - 000D3FFF]  PCI bus
    🖳 [000D4000 - 000D7FFF]  PCI bus
    🖳 [000D8000 - 000DBFFF]  PCI bus
    🖳 [000DC000 - 000DFFFF]  PCI bus
    🖳 [000E0000 - 000E3FFF]  PCI bus
    🖳 [000E4000 - 000E7FFF]  PCI bus
    🖳 [DF200000 - FEAFFFFF]  PCI bus
    🖳 [E0000000 - EFFFFFFF]  Intel(R) HD Graphics 5000
    🖳 [F7800000 - F7BFFFFF]  Intel(R) HD Graphics 5000
    🖳 [F7C00000 - F7C1FFFF]  Intel(R) Ethernet Connection I218-LM #2
    🖳 [F7C20000 - F7C2FFFF]  Intel(R) USB 3.0 eXtensible Host Controller
    🖳 [F7C30000 - F7C33FFF]  High Definition Audio Controller
    🖳 [F7C34000 - F7C37FFF]  High Definition Audio Controller
    🖳 [F7C38000 - F7C38FFF]  Intel(R) 8 Series Thermal - 9C24
    🖳 [F7C39000 - F7C390FF]  Intel(R) 8 Series SMBus Controller - 9C22
    🖳 [F7C3A000 - F7C3A7FF]  Intel(R) 8 Series SATA AHCI Controller - 9C03
    🖳 [F7C3B000 - F7C3B3FF]  Intel(R) 8 Series USB Enhanced Host Controller #1 - 9C26
    🖳 [F7C3C000 - F7C3CFFF]  Intel(R) Ethernet Connection I218-LM #2
    🖳 [F7C3D000 - F7C3DFFF]  Intel(R) Active Management Technology - SOL (COM3)
    🖳 [F7C3F000 - F7C3F01F]  Intel(R) Management Engine Interface
    🖳 [F7FEF000 - F7FEFFFF]  Motherboard resources
    🖳 [F7FF0000 - F7FF0FFF]  Motherboard resources
    🖳 [F8000000 - FBFFFFFF]  Motherboard resources
    🖳 [FED00000 - FED003FF]  High precision event timer
    🖳 [FED10000 - FED17FFF]  Motherboard resources
    🖳 [FED18000 - FED18FFF]  Motherboard resources
    🖳 [FED19000 - FED19FFF]  Motherboard resources
    🖳 [FED1C000 - FED1FFFF]  Motherboard resources
    🖳 [FED20000 - FED3FFFF]  Motherboard resources
    🖳 [FED40000 - FED44FFF]  System board
    🖳 [FED45000 - FED8FFFF]  Motherboard resources
    🖳 [FED90000 - FED93FFF]  Motherboard resources
    🖳 [FEE00000 - FEEFFFFF]  Motherboard resources
    🖳 [FF000000 - FFFFFFFF]  Intel(R) 82802 Firmware Hub Device
    🖳 [FF000000 - FFFFFFFF]  Motherboard resources
```

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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 <Del> key immediately.
2.   After you press the <Del> 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 JP1 (see section 2.4.1).*

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.

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Main    Advanced   Chipset    Security    Boot    Save & Exit

   BIOS Information                                        Set the Date. Use Tab to
   BIOS Vendor                   American Megatrends       switch between Date elements.
   Core Version                  5.010
   Compliancy                    UEFI 2.4; PI 1.3
   Build Date and Time           05/28/2015 09:03:33
   Project Name                  PICO880 X014

   System Date                   [Wed 01/07/2009]
   System Time                   [21:04:18]

   Access Level                  Administrator

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

          Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

● **BIOS Information**
Display the auto-detected BIOS information.

● **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:

- ► F81801 Super IO Configuration
- ► Hardware Monitor
- ► ACPI Settings
- ► CPU Configuration
- ► SATA Configuration
- ► PCH-FW Configuration
- ► AMT Configuration
- ► USB Configuration
- ► Intel RC Drivers Version Detail
- ► Utility Configuration

For items marked with "►", please press <Enter> for more options.

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Main   Advanced   Chipset   Boot   Security   Save & Exit

 ► F81801 Super IO Configuration                         System Super IO Chip
 ► Hardware Monitor                                      Parameters.
 ► ACPI Settings
 ► CPU Configuration
 ► SATA Configuration
 ► PCH-FW Configuration
 ► AMT Configuration
 ► USB Configuration
 ► Intel RC Drivers Version Detail
 ► Utility Configuration

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



          Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
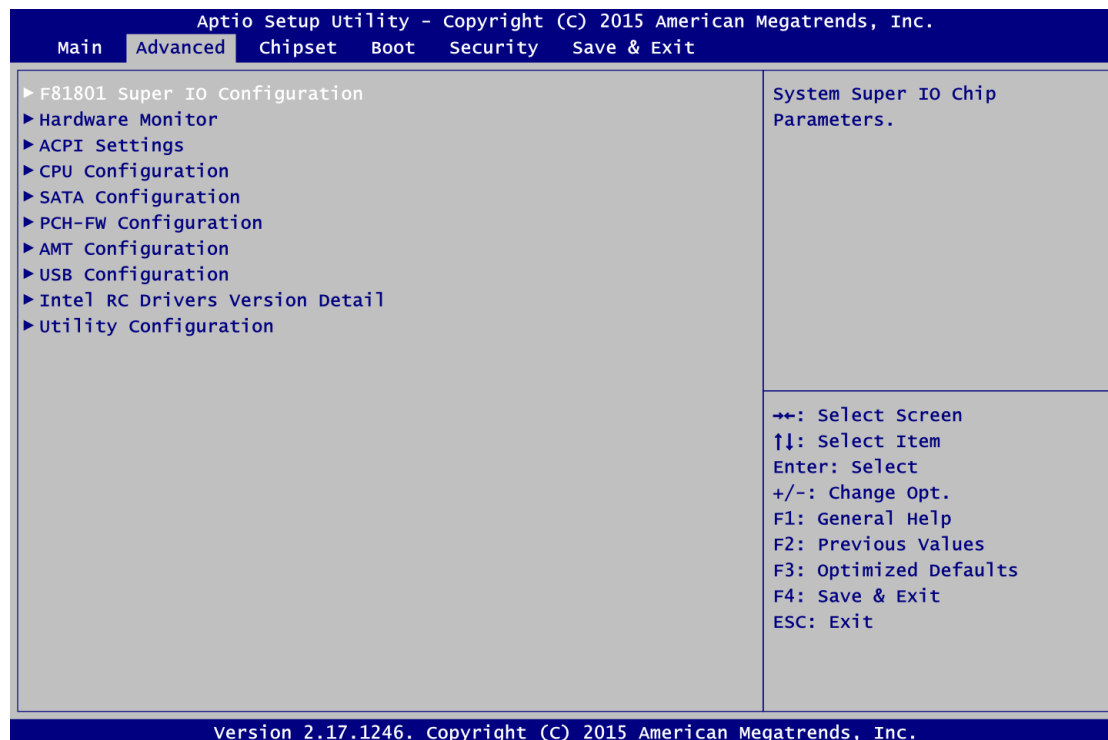
● **F81801 Super IO Configuration**
You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.

```
          Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
        Advanced

    F81801 Super IO Configuration                              Set Parameters of Serial Port
                                                               1 (COMA)
    Super IO Chip                        F81801
  ► Serial Port 1 Configuration
  ► Serial Port 2 Configuration




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



          Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Serial Port 1~2 Configuration
Use these items to set parameters of serial port 1~2 when AX93275 or AX93276 is installed (see Appendix A for details of I/O Boards).

● **Serial Port 1 Configuration**
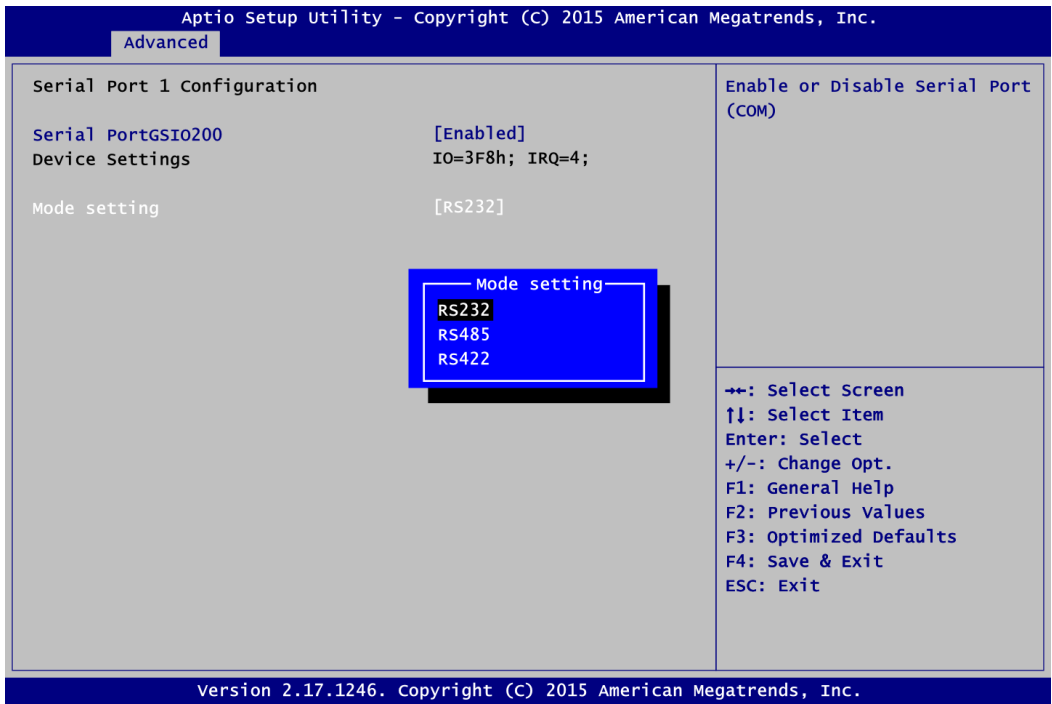
```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

Serial Port 1 Configuration                                    Enable or Disable Serial Port
                                                               (COM)
Serial PortGSIO200               [Enabled]
Device Settings                  IO=3F8h; IRQ=4;

Mode setting                     [RS232]

                          ┌──── Mode setting ────┐
                          │ RS232                │
                          │ RS485                │
                          │ RS422                │
                          └──────────────────────┘
                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit



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```

Serial PortGSIO200
The default is Disabled. Once AX93275 or AX93276 is installed, please enable this option. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

Mode Setting
Use this option to set RS-232/RS-422/RS-485 mode for CN6B on AX93275 or CN7B on AX93276 (see Appendix A for details of I/O Boards).

● **Serial Port 2 Configuration**
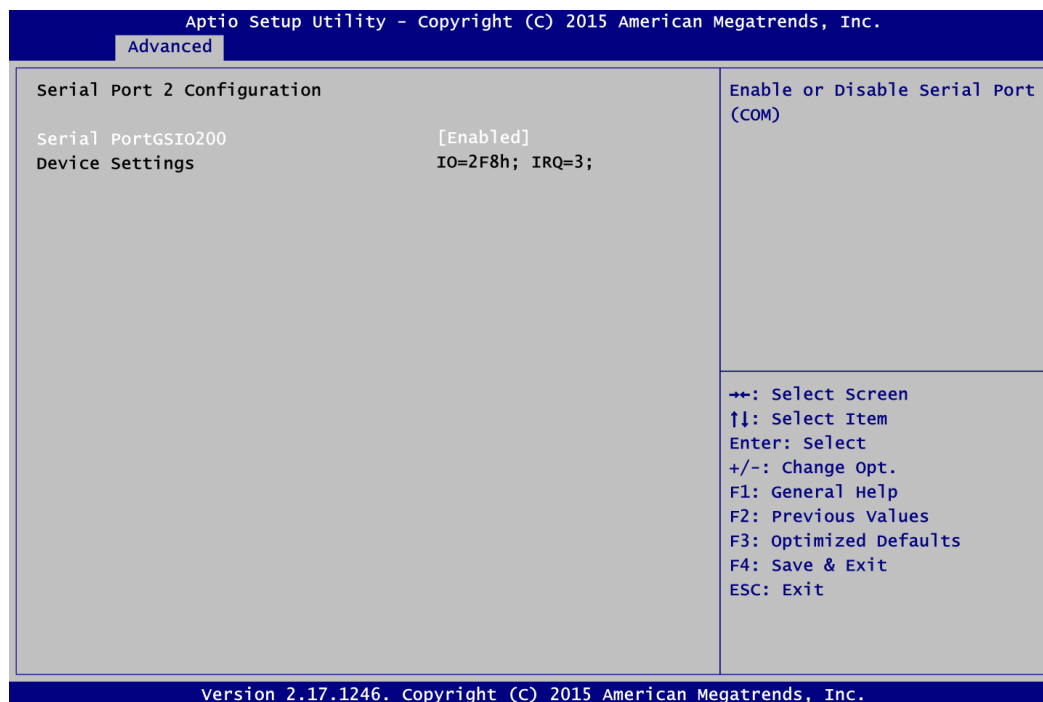
```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
              Advanced

   Serial Port 2 Configuration                                  Enable or Disable Serial Port
                                                                (COM)
   Serial PortGSIO200                    [Enabled]
   Device Settings                       IO=2F8h; IRQ=3;




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



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```

Serial PortGSIO200
The default is Disabled. Once AX93275 or AX93276 is installed, please enable this option.
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.

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
              Advanced

   Pc Health Status

   CPU temperature                      : +42 C
   System temperature                   : +37 C
   VCORE                                : +1.768 V
   5V                                   : +5.000 V




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



          Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
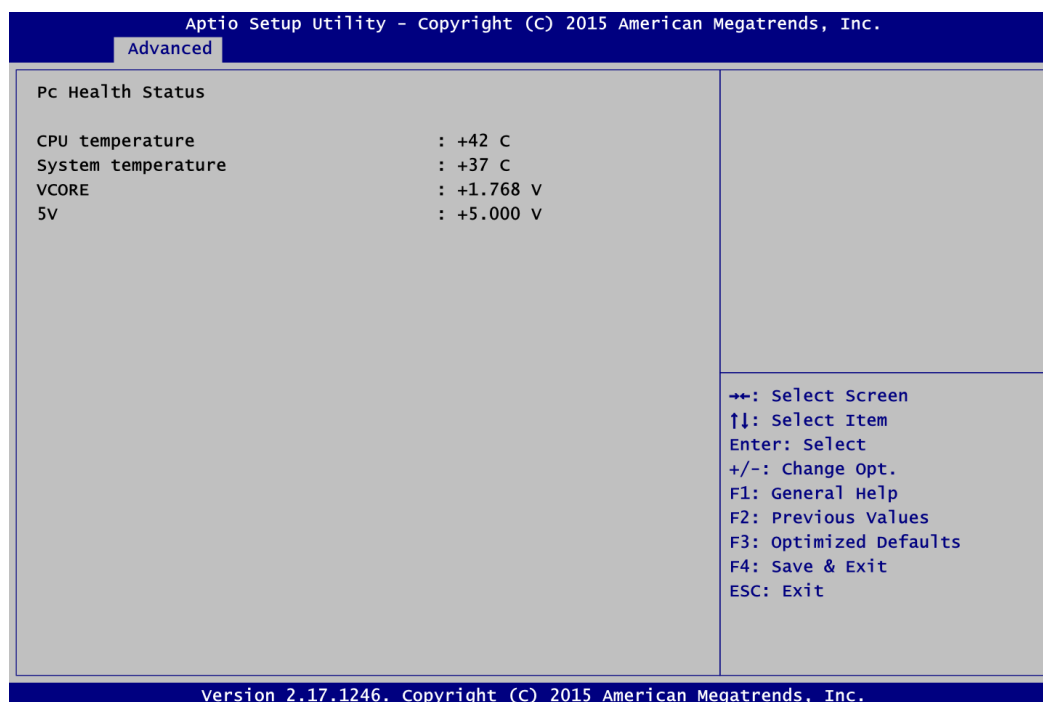
This screen displays the temperature of system and CPU, and system voltages (VCORE and 5V).

● **ACPI Settings**
   You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

```
                 Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

 ACPI Settings

 ACPI Sleep State                    [S3 (Suspend to RAM)]




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


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```

ACPI Sleep State
When the suspend button is pressed, the ACPI sleep state is S3 (Suspend to RAM).

● **CPU Configuration**
This screen shows the CPU Configuration.

```
                 Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

  CPU Configuration                                            Enabled for Windows XP and
                                                               Linux (OS optimized for
  Intel(R) Core(TM) i5-5350U CPU @ 1.80GHz                     Hyper-Threading Technology)
  CPU Signature                    306d4                       and Disabled for other OS (OS
  Microcode Patch                  16                          not optimized for
  Max CPU Speed                    1800 MHz                    Hyper-Threading Technology).
  Min CPU Speed                    500 MHz                     When Disabled only one thread
  CPU Speed                        1800 MHz                    per enabled core is enabled.
  Processor Cores                  2
  Intel HT Technology              Supported
  Intel VT-x Technology            Supported
  Intel SMX Technology             Supported
  64-bit                           Supported
  EIST Technology                  Supported
  CPU C3 state                     Supported               →←: Select Screen
  CPU C6 state                     Supported               ↑↓: Select Item
  CPU C7 state                     Supported               Enter: Select
                                                            +/-: Change Opt.
  L1 Data Cache                    32 kB x 2                F1: General Help
  L1 Code Cache                    32 kB x 2                F2: Previous Values
  L2 Cache                         256 kB x 2               F3: Optimized Defaults
  L3 Cache                         3 MB                     F4: Save & Exit
                                                            ESC: Exit
  Hyper-threading                  [Enabled]
  Intel Virtualization Technology  [Enabled]

                 Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Hyper-threading
Enable or disable Hyper-Threading Technology, which allows a single physical processor to multitask as multiple logical processors. When disabled, only one thread per enabled core is enabled.

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.

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

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
              Advanced

  SATA Mode Selection            [AHCI]                    mSATA Device.

  mSATA                          [Disabled]
  mini PCIe                      [Enabled]

  Serial ATA Port 0              Empty
  Serial ATA Port 1              Empty
                           ┌──────── mSATA ────────┐
                           │ Enabled               │
                           │ Disabled              │
                           └───────────────────────┘
                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit


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```

SATA Mode Selection
AHCI (Advanced Host Controller Interface) mode is how SATA controller(s) operate.

mSATA
Enable or disable mSATA device. The default is Disabled.

mini PCIe
When mSATA is enabled, mini PCIe is disabled automatically and vice versa.

Serial ATA Port 0
It shows the device installed in connector SATA1 (see section 2.5.14).

Serial ATA Port 1
It shows the mSATA card installed when mSATA is enabled.

- **PCH-FW Configuration**
  This screen displays ME Firmware information.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

   ME FW Version                         10.0.30.1072
   ME Firmware Mode                      Normal Mode
   ME Firmware Type                      Full Sku Firmware
   ME Firmware SKU                       5MB




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


              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
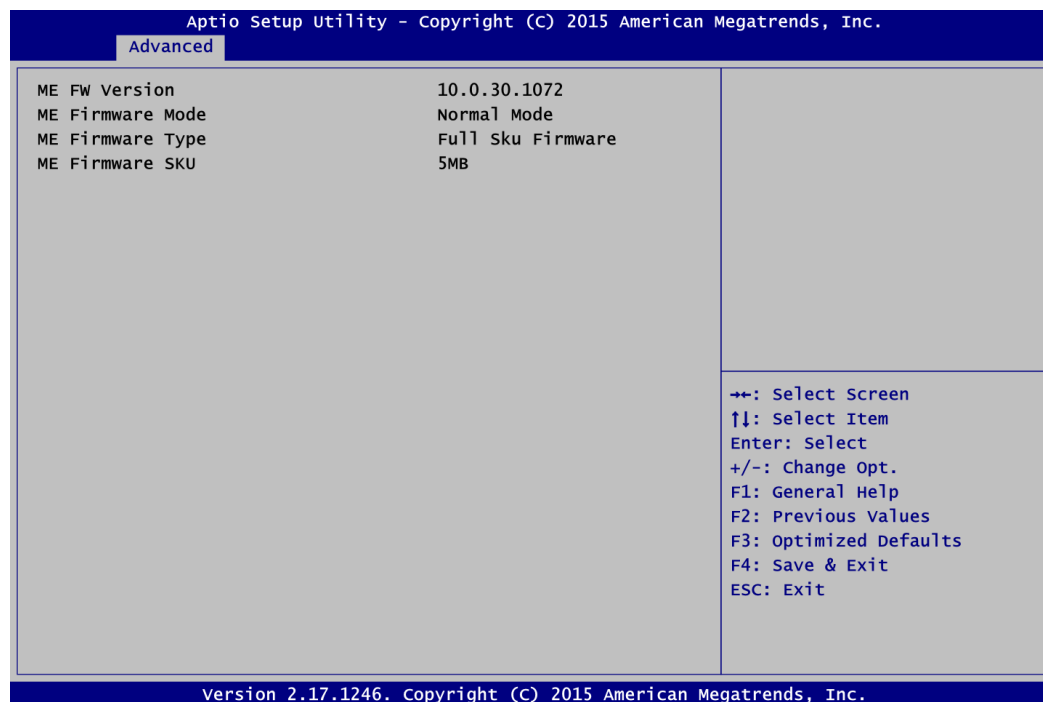
- **AMT Configuration**
  Use this screen to configure AMT parameters.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

   Intel AMT                             [Enabled]        Enable/Disable Intel (R)
                                                          Active Management Technology
                                                          BIOS Extension.
                                                          Note : iAMT H/W is always
                                                          enabled.
                                                          This option just controls the
                                                          BIOS extension execution.
                                                          If enabled, this requires
                                                          additional firmware in the SPI
                                                          device.


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



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```

Intel AMT
Enable or disable Intel® Active Management Technology BIOS Extension. The default is Enabled. For more detailed information, please refer to Appendix C.

USB Configuration

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

USB Configuration

USB Module Version                    8.11.03

USB Devices:
      1 Keyboard, 1 Hub


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



            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
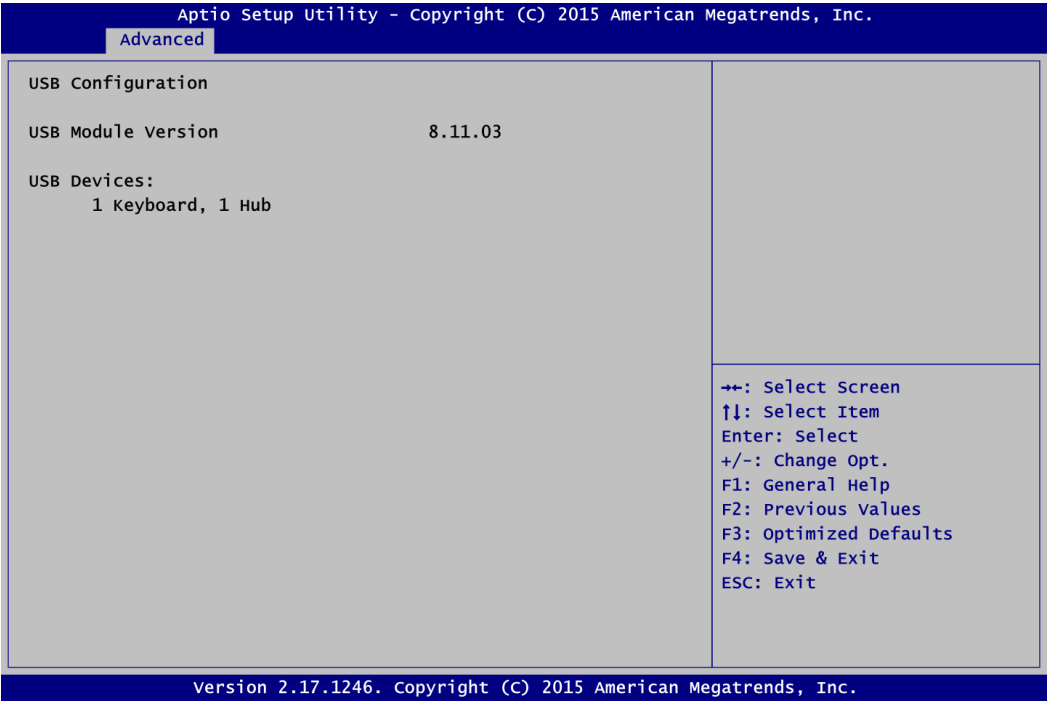
USB Devices
Display all detected USB devices which are installed in connector CN9 on PICO880 or CN7 and CN8 on AX93275 or CN4 and CN6 on AX93276 (see section 2.5.7 and Appendix A).

● **Intel RC Drivers Version Detail**
This screen displays Intel® RC drivers version information.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

Intel CPU RC Version          2.5.0.0
Intel SA RC Version           2.5.0.0
Intel PCH RC Version          2.5.0.0
Intel ACPI RC Version         2.5.0.0
Intel ME RC Version           2.5.0.0




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



            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

● **Utility Configuration**

```
           Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
      Advanced

  Utility Configuration                                    BIOS Flash Utility

 ▶ BIOS Flash Utility




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



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```

BIOS Flash Utility
BIOS flash utility configuration. For more detailed information, please refer to Appendix D.

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:

> ►   PCH-IO Configuration
> ►   System Agent (SA) Configuration

For items marked with "►", please press <Enter> for more options.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main    Advanced   Chipset   Security    Boot    Save & Exit

 ▶ PCH-IO Configuration                                    PCH Parameters
 ▶ System Agent (SA) Configuration




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



            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
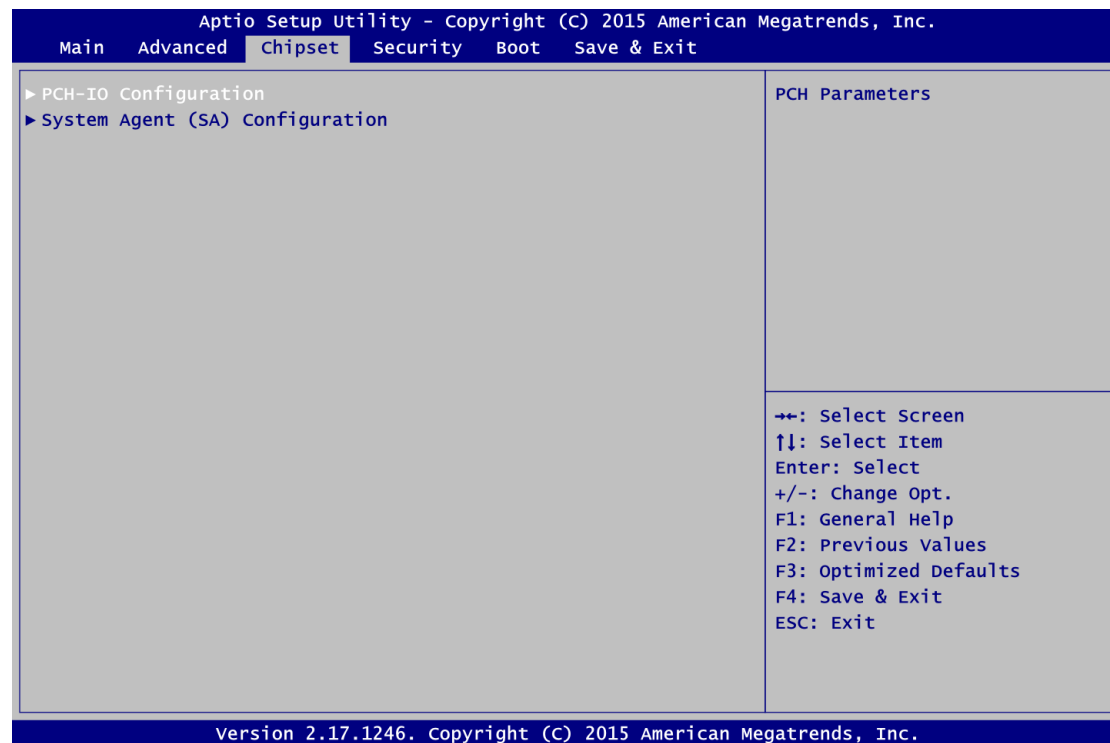
● **PCH-IO Configuration**
This screen allows you to set PCH parameters.

```
                 Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
       Main    Advanced   Chipset   Boot    Security    Save & Exit

    Intel PCH RC Version              2.5.0.0                     PCH HD Audio Configuration
    Intel PCH SKU Name                Premium SKU(BDW-U)          settings.
    Intel PCH Rev ID                  03/B2

    ▶ PCH HD Audio Configuration



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



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```

PCH HD Audio Configuration
Use this item for PCH HD Audio configuration settings.

● **PCH HD Audio Configuration**

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Main   Advanced   Chipset   Boot   Security   Save & Exit

   PCH HD Audio Configuration                                    Control Detection of the
                                                                 HD Audio device.
   HD Audio                          [Enabled]                   Disabled = HD Audio will be
                                                                 unconditionally disabled
                                                                 Enabled = HD Audio will be
                                                                 unconditionally Enabled
                                                                 Auto = HD Audio will be
                                                                 enabled if present, disabled
                                                                 otherwise.


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



              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

HD Audio
Control detection of the HD Audio device. Configuration options are Disabled, Enabled and Auto.

● **System Agent (SA) Configuration**
This screen shows System Agent version information and provides function for specifying related parameters.

```
             Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
              Chipset

  System Agent Bridge Name        Broadwell            Config Graphics Settings.
  System Agent RC Version         2.5.0.0
  VT-d Capability                 Supported


 ▶ Graphics Configuration
 ▶ Memory Configuration


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



             Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Graphics Configuration
Use this item to configure internal graphics controller.

Memory Configuration
Use this item to refer to the information related to system memory.

● **Graphics Configuration**

```
           Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
             Chipset

 Graphics Configuration                                    Select the Video Device which
 IGFX VBIOS Version                1038                     will be activated during POST.
 IGfx Frequency                    600 MHz                  This has no effect if external
                                                            graphics present.
 Primary IGFX Boot Display         [DP]                     Secondary boot display
 VGA(AX93275)/HDMI(AX93276)        [Disabled]               selection will appear based on
 Secondary IGFX Boot Display       [Disabled]               your selection.
 LVDS Panel Type                   [1024x768    24Bit]      VGA modes will be supported
                                                            only on primary display.

                        ┌──── Primary IGFX Boot Display ────┐
                        │ DP                                 │
                        │ LVDS                               │      Select Screen
                        │                                    │      Select Item
                        │                                    │   r: Select
                        └────────────────────────────────────┘  +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit


            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Primary IGFX Boot Display

Select the video device which will be activated during POST (Power-On Self Test). The default is DP. The image above shows option list in Primary IGFX Boot Display when no I/O board is installed.

> **Note** *When powering on PICO880 for the first time, video device must be plugged into DisplayPort (DP). Then, after first power on, you can set VGA on AX93275 or HDMI on AX93276 as primary IGFX boot display.*
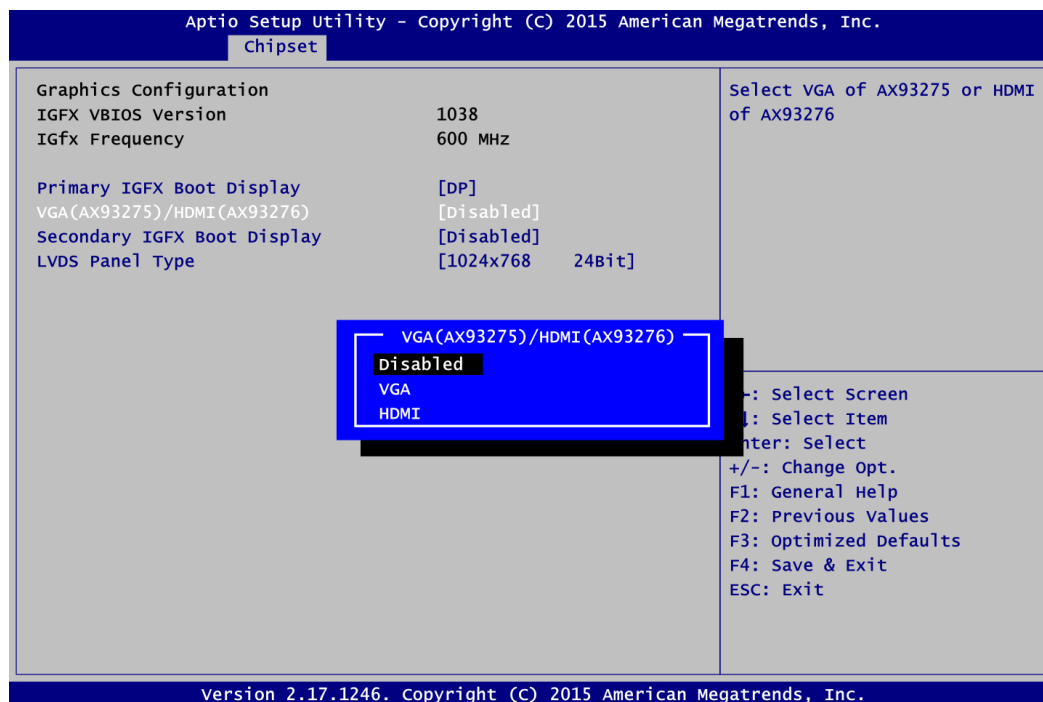
VGA(AX93275)/HDMI(AX93276)
Use this item to select VGA on AX93275 or HDMI on AX93276.

When AX93275 is installed, set VGA(AX93275)/HDMI(AX93276) to VGA. Then the option list in Primary IGFX Boot Display will be DP, LVDS and VGA (see image below).
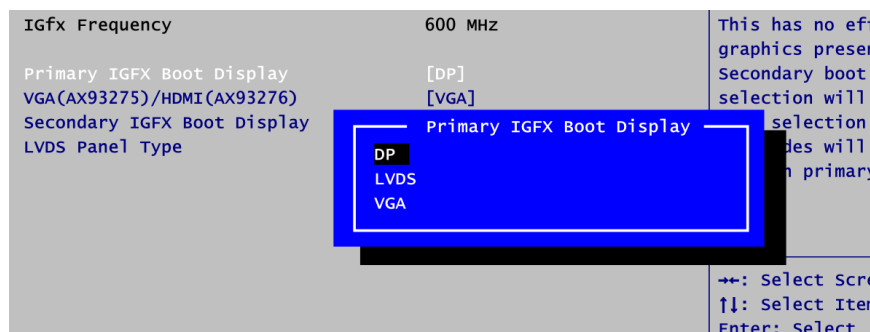
Otherwise when AX93276 is installed, set VGA(AX93275)/HDMI(AX93276) to HDMI. Then the option list in Primary IGFX Boot Display will be DP, LVDS and HDMI (see image below).

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
                    Chipset

 Graphics Configuration                               Select Secondary Display Device
 IGFX VBIOS Version              1038
 IGfx Frequency                  600 MHz

 Primary IGFX Boot Display       [DP]
 VGA(AX93275)/HDMI(AX93276)      [Disabled]
 Secondary IGFX Boot Display     [Disabled]
 LVDS Panel Type                 [1024x768    24Bit]

                  ┌─── Secondary IGFX Boot Display ───┐
                  │ Disabled                           │
                  │ LVDS                               │
                  │                              Select Screen
                  │                              Select Item
                  │                           r: Select
                  │                         +/-: Change Opt.
                  │                         F1: General Help
                  │                         F2: Previous Values
                  │                         F3: Optimized Defaults
                  │                         F4: Save & Exit
                  │                         ESC: Exit


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```

Secondary IGFX Boot Display
Select secondary display device. The default is Disabled. The image above shows option list in Secondary IGFX Boot Display when no I/O board is installed and VGA(AX93275)/HDMI(AX93276) is set to Disabled.

When AX93275 is installed, set Primary IGFX Boot Display to DP and VGA(AX93275)/HDMI(AX93276) to VGA. The option list in Secondary IGFX Boot Display will be Disabled, LVDS and VGA (see image below).

```
 Primary IGFX Boot Display       [DP]
 VGA(AX93275)/HDMI(AX93276)      [VGA]
 Secondary IGFX Boot Display     [Disabled]
 LVDS Panel Type                 [1024x768    24Bit]


                  ┌─── Secondary IGFX Boot Display ───┐
                  │ Disabled                           │
                  │ LVDS                               │
                  │ VGA                              Sel
                  │                                  Sel
                  │                               r:
                  │                                Cha
                                               F1: Gen
```
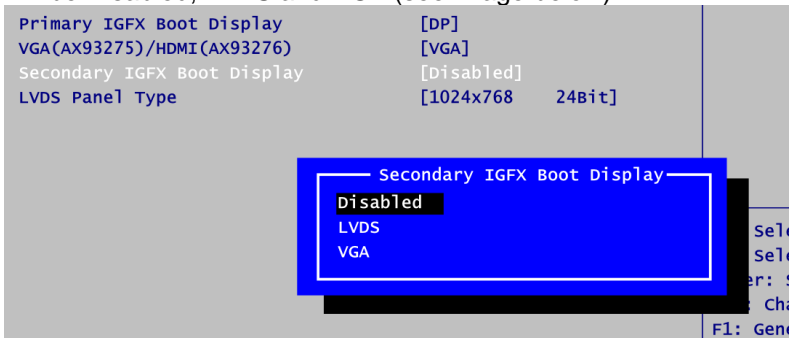
Otherwise when AX93276 is installed, set Primary IGFX Boot Display to DP and VGA(AX93275)/HDMI(AX93276) to HDMI. The option list in Secondary IGFX Boot Display will be Disabled, LVDS and HDMI (see image below).

```
 Primary IGFX Boot Display       [DP]
 VGA(AX93275)/HDMI(AX93276)      [HDMI]
 Secondary IGFX Boot Display     [Disabled]
 LVDS Panel Type                 [1024x768    24Bit]


                  ┌─── Secondary IGFX Boot Display ───┐
                  │ Disabled                           │
                  │ LVDS                               │
                  │ HDMI                             Sel
                  │                                  Sel
                  │                               r:
                  │                                Cha
                                               F1: Gen
```

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
                  Chipset

   Graphics Configuration                                        Select LCD panel used by DP
   IGFX VBIOS Version                 1038                        Device by selecting the
   IGfx Frequency                     600 MHz                     appropriate setup item.

   Primary IGFX Boot Display   ┌────── LVDS Panel Type ──────┐
   VGA(AX93275)/HDMI(AX93276)  │ 800x600      18Bit          │
   Secondary IGFX Boot Display │ 1024x768     18Bit          │
   LVDS Panel Type             │ 1024x768     24Bit          │
                               │ 1280x768     18Bit          │
                               │ 1280x800     18Bit          │
                               │ 1280x960     18Bit          │
                               │ 1280x1024    48Bit          │
                               │ 1366x768     18Bit          │  →←: Select Screen
                               │ 1366x768     24Bit          │  ↑↓: Select Item
                               │ 1440x900     48Bit          │  Enter: Select
                               │ 1440x1050    48Bit          │  +/-: Change Opt.
                               │ 1600x900     48Bit          │  F1: General Help
                               │ 1680x1050    48Bit          │  F2: Previous Values
                               │ 1600x1200    48Bit          │  F3: Optimized Defaults
                               │ 1920x1080    48Bit          │  F4: Save & Exit
                               │ 1920x1200    48Bit          │  ESC: Exit
                               └─────────────────────────────┘

           Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
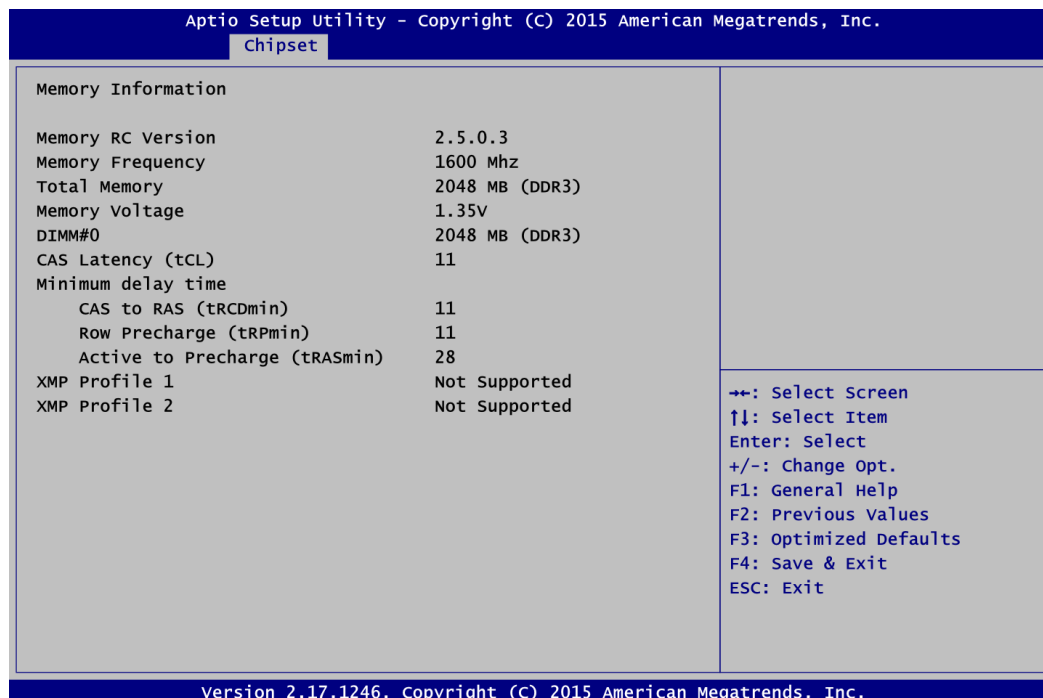
LVDS Panel Type
Select LVDS panel resolution; see the selection options in image above.

● **Memory Information**
This screen shows the system memory information.

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
                  Chipset

   Memory Information

   Memory RC Version                  2.5.0.3
   Memory Frequency                   1600 Mhz
   Total Memory                       2048 MB (DDR3)
   Memory Voltage                     1.35V
   DIMM#0                             2048 MB (DDR3)
   CAS Latency (tCL)                  11
   Minimum delay time
        CAS to RAS (tRCDmin)          11
        Row Precharge (tRPmin)        11
        Active to Precharge (tRASmin) 28
   XMP Profile 1                      Not Supported        →←: Select Screen
   XMP Profile 2                      Not Supported        ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit

           Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
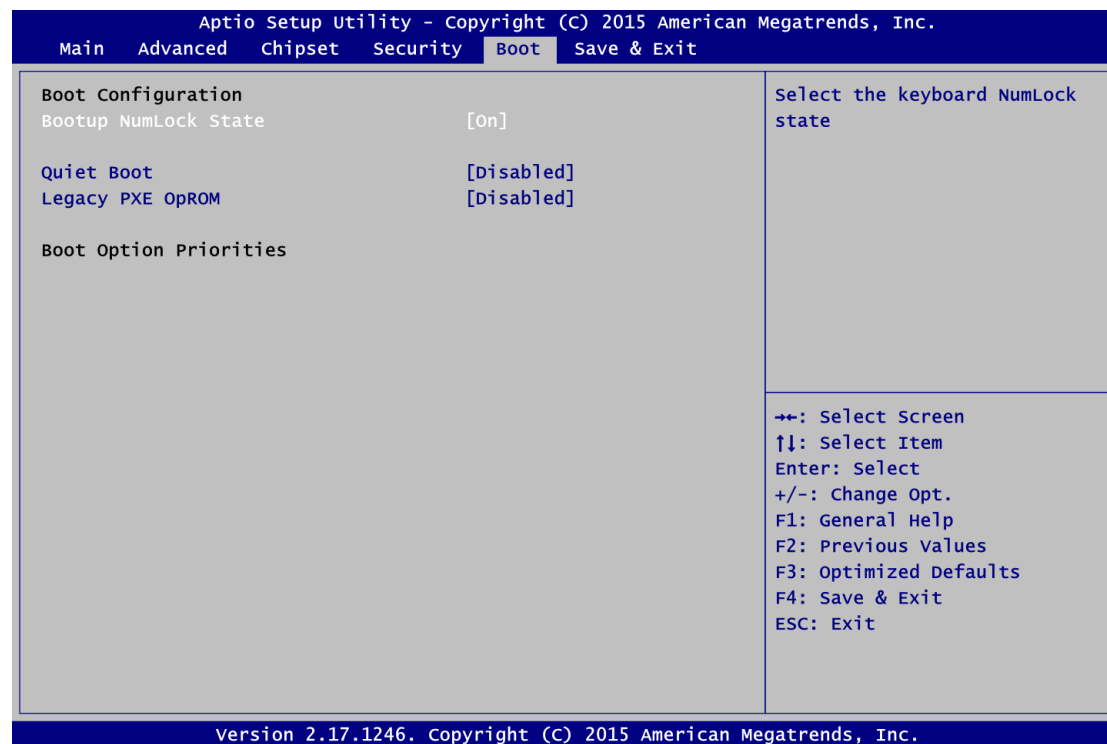
4.6   Security Menu

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

```
               Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Main    Advanced    Chipset    Security    Boot    Save & Exit

  Password Description                                    Set Administrator Password

  If ONLY the Administrator's password is set,
  then this only limits access to Setup and is
  only asked for when entering Setup.
  If ONLY the User's password is set, then this
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have Administrator rights.
  The password length must be
  in the following range:
  Minimum length                    3
  Maximum length                    20                  →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
  Administrator Password                                F1: General Help
  User Password                                         F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit


               Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

●   **Administrator Password**
     This item indicates whether an administrator password has been set (installed or
     uninstalled).

●   **User Password**
     This item indicates whether an user password has been set (installed or uninstalled).
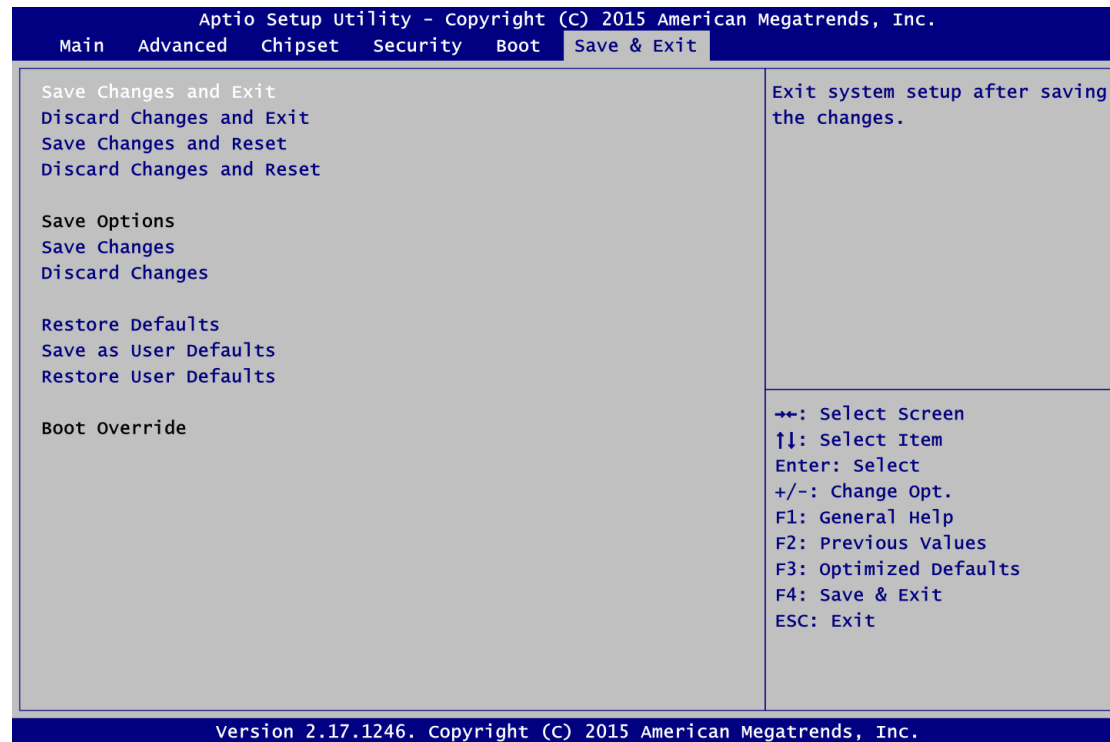
4.7 Boot Menu

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

```
          Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
   Main   Advanced   Chipset   Security   Boot   Save & Exit

   Boot Configuration                                    Select the keyboard NumLock
   Bootup NumLock State            [On]                  state

   Quiet Boot                      [Disabled]
   Legacy PXE OpROM                [Disabled]

   Boot Option Priorities


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



          Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

- **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.

- **Legacy PXE OpROM**
  Use this item to enable or disable the boot ROM function of the onboard LAN chip when the 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.

4.8   Save & Exit Menu

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

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Main    Advanced    Chipset    Security    Boot    Save & Exit

   Save Changes and Exit                              Exit system setup after saving
   Discard Changes and Exit                           the changes.
   Save Changes and Reset
   Discard Changes and Reset

   Save Options
   Save Changes
   Discard Changes

   Restore Defaults
   Save as User Defaults
   Restore User Defaults

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



           Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

- **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.

Appendix A
I/O Boards (Optional)

The AX93275 and AX93276 are I/O expansion boards which are suggested to insert carefully into CN1 and CN2 on PICO880. Their specifications and detailed information are given in this chapter.

A.1   AX93275 Specifications

● **Size**
   ■ 118mm x 40mm

● **Features**
   ■ Audio jack (MIC-in/line-out).
   ■ Four USB 3.0.
   ■ Serial Ports: One port for RS-232/422/485 and one port for RS-232.
   ■ Power-on, reset and red/green LED.

> **Note**   *All specifications and images are subject to change without notice.*

A.2   AX93275 Dimensions and Fixing Holes
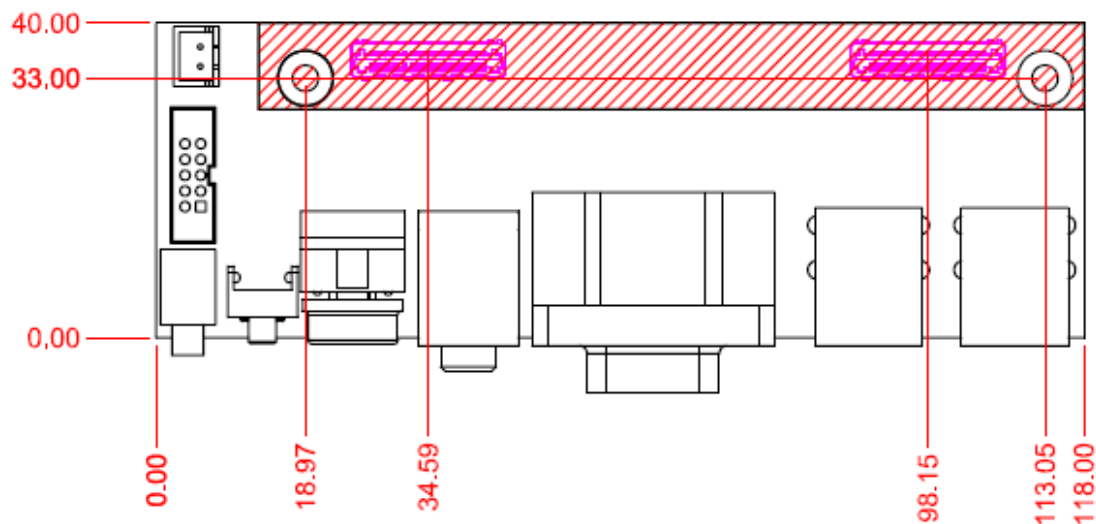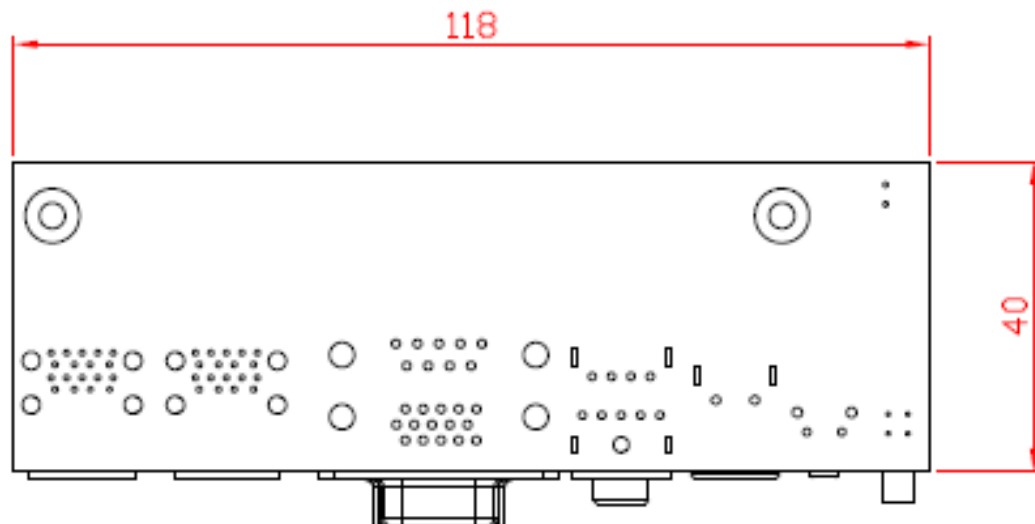
Top View

Bottom View

A.3 AX93275 Board Layout
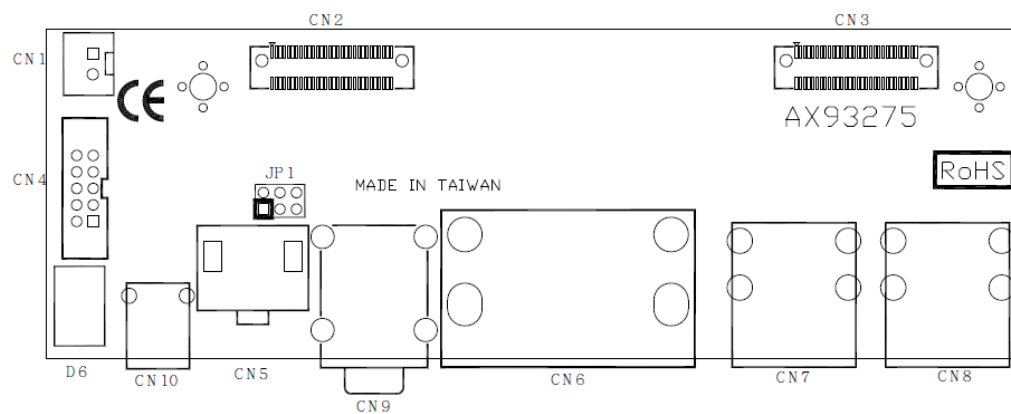
Top View
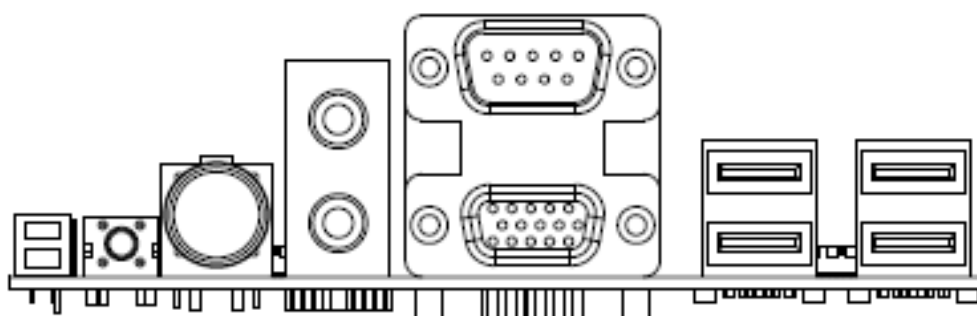
Side View

A.4　　AX93275 Assembly Drawing

Installing Heatspreader and I/O Board
Gently insert I/O Board into CN1 and CN2 on PICO880. Align and firmly secure the heatspreader plate and I/O board to the PICO880. Be careful not to over-tighten the screws.

x4

x4

x4

x4
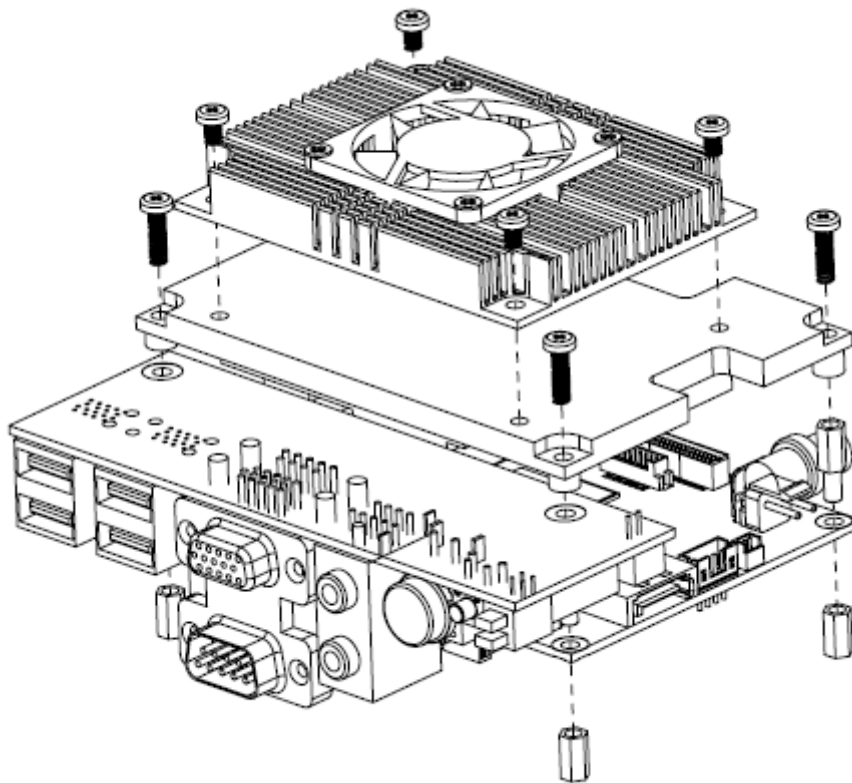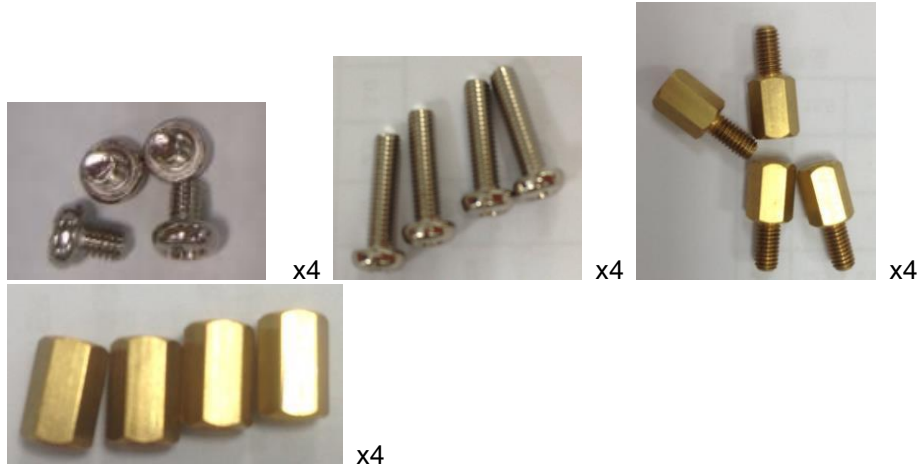
A.5   AX93275 Jumper Settings

Properly configure jumper settings on the AX93275 I/O board to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

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

Note

Jumper	Description		Setting
JP1	COM1 Data/Power Selection Default: RS-232 Data	CN6B Pin 1: DCD	3-5 Close
		CN6B Pin 9: RI	4-6 Close

A.5.1   COM1 Data/Power Selection (JP1)

The COM1 port has +5V level power capability on DCD and +12V level on RI by setting JP1. When this port is set to +12V or +5V level, please make sure its communication mode is RS-232 (see BIOS setting in section 4.4).

Function	Setting
Power: Set CN6B pin 1 to +5V level	1-3 close
Data: Set CN6B pin 1 to DCD (Default)	3-5 close
Power: Set CN6B pin 9 to +12V level	2-4 close
Data: Set CN6B pin 9 to RI (Default)	4-6 close
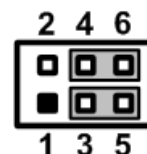
A.6　AX93275 Connectors, Switches and LED

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 which shows all connectors, buttons and LED on the hardware.

Connector	Description
CN1	Power Connector
CN2	High Speed Board to Board Connector 1
CN3	High Speed Board to Board Connector 2
CN4	COM2 Connector
CN5	System Power Switch
CN6A	VGA D-Sub Connector
CN6B	COM1 D-Sub Connector
CN7~CN8	USB 3.0 Stack Connectors
CN9	Audio Jack
CN10	System Reset Switch
D6	Power and HDD LED Indicator

A.6.1　Power Connector (CN1)

This is a 1x2-pin (pitch=2.0mm) connector, which outputs +5V at 1A. It is suggested to connect to CN4 on PICO880 via cable for fan to cool down CPU and system temperature.
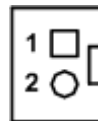
Pin	Signal
1	+5V
2	GND

A.6.2   High Speed Board to Board Connectors (CN2 and CN3)

The pin assignments of CN2 are given as follows.

Pin	Signal	Pin	Signal
1	AUDIO_OUT-L	2	MIC-L
3	AUDIO_OUT-R	4	MIC-R
5	AUDIO_GND	6	AUDIO_GND
7	DSR2	8	DCD2
9	RTS2	10	RXD2
11	CTS2	12	TXD2
13	RI2	14	DTR2
15	DSR1	16	DCD1
17	RTS	18	RXD1
19	CTS1	20	TXD1
21	RI1	22	DTR1
23	GND	24	GND
25	GPO_485_EN_N	26	SIO_PSIN#
27	GPO_485TERM_EN	28	SATA_LED
29	GPO_485_MODE0	30	HW_RESET#
31	GPO_485_MODE1	32	PLTRST_SIO
33	USB_OC23	34	USB_OC01
35	GND	36	GND
37	DP2	38	DP0
39	DN2	40	DN0
41	GND	42	GND
43	DN3	44	DP1
45	DP3	46	DN1
47	GND	48	GND
49	+V5_SBY	50	NA
51	+V5_SBY	52	NA
53	+V5_SBY	54	NA
55	+V5_SBY	56	+V12S
57	+V5S	58	+V3.3S
59	+V5S	60	+V3.3S
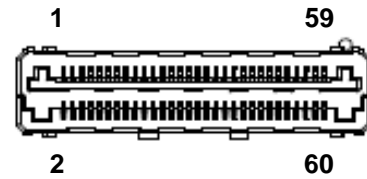
The pin assignments of CN3 are given as follows.

Pin	Signal	Pin	Signal
1	NA	2	USB3_RXP1
3	NA	4	USB3_RXN1
5	GND	6	GND
7	NA	8	USB3_TXP1
9	NA	10	USB3_TXN1
11	GND	12	GND
13	NA	14	USB3_RXP2
15	NA	16	USB3_RXN2
17	GND	18	GND
19	DDI2_TXP0	20	USB3_TXP2
21	DDI2_TXN0	22	USB3_TXN2
23	GND	24	GND
25	DDI2_TXP1	26	USB3_RXP3
27	DDI2_TXN1	28	USB3_RXN3
29	GND	30	GND
31	NA	32	USB3_TXP3
33	NA	34	USB3_TXN3
35	GND	36	GND
37	NA	38	USB3_RXP4
39	NA	40	USB3_RXN4
41	GND	42	GND
43	NA	44	USB3_TXP4
45	NA	46	USB3_TXN4
47	GND	48	GND
49	DDPC_HPD	50	DDPC_AUXP
51	PLTRST_MINICARD	52	DDPC_AUXN
53	PCIE_WAKE#	54	GND
55	NA	56	NA
57	+V5S	58	+V3.3_SBY
59	+V5S	60	+V3.3_SBY

1   **59**

2   **60**
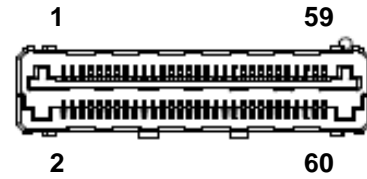
Please gently insert CN2 and CN3 into CN1 and CN2 on PICO880.

Note

A.6.3 COM2 Connector (CN4)

The board comes with 2x5-pin box header for COM2 serial port interface, see table below.

Pin	Signal
1	Data Carrier Detect (DCD)
2	Data Set Ready (DSR)
3	Receive Data (RXD)
4	Request to Send (RTS)
5	Transmit Data (TXD)
6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)
8	Ring Indicator (RI)
9	Ground (GND)
10	No Connector
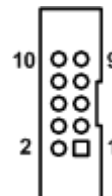
A.6.4 System Power Switch (CN5)

This button is for turning on/off the system power.

Function	Description
On	Turn on/off system
Off	Keep system status
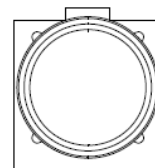
A.6.5   VGA and COM1 D-Sub Connector (CN6A and CN6B)

The lower 15-pin D-Sub connector (CN6A) is for VGA interface and the upper 9-pin D-Sub connector (CN6B) is for COM1 serial port interface. Note that CN6B is also equipped with power capability on DCD and RI pins by setting JP1 (see section A.5.1). If you need COM1 port to support RS-422 or RS-485 mode, please do it via BIOS setting (see section 4.4). The pin assignments of RS-232/RS-422/RS-485 are listed in table below.

CN6B Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	N.C
4	DTR	RX-	N.C.
5	GND	No use	No use
6	DSR	No use	No use
7	RTS	No use	No use
8	CTS	No use	No use
9	RI	No use	No use

CN6B
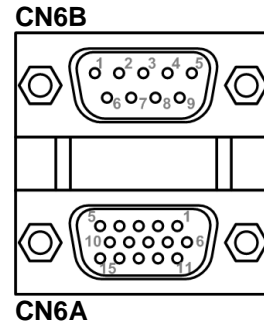
CN6A

The CN6A is a standard type 15-pin D-Sub connector which is commonly used for VGA monitor. This VGA interface configuration can be configured via software utility.

CN6A Pin	Signal	Pin	Signal
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		

A.6.6 USB 3.0 Stack Connectors (CN7 and CN8)

The board comes with two double-deck Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) connectors on the rear I/O which are for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
1	USB_VCC (+5V level standby power)	10	USB_VCC (+5V level standby power)
2	USB_Data2-	11	USB_Data3-
3	USB_Data2+	12	USB_Data3+
4	GND	13	GND
5	SSRX2-	14	SSRX3-
6	SSRX2+	15	SSRX3+
7	GND	16	GND
8	SSTX2-	17	SSTX3-
9	SSTX2+	18	SSTX3+

A.6.7 Audio Jack (CN9)

This is audio jack with HD audio support. Install audio driver, and then attach audio devices to CN9.

Pin Color	Signal
Green	Line-out
Pink	MIC-in

A.6.8 System Reset Switch (CN10)

This button reboots your computer without turning off the power supply. It is a better way to reboot your system for a longer life of the system power supply.

Function	Description
On	Reset system
Off	Keep system status

A.6.9 Power and HDD LED Indicator (D6)

The red LED is linked to Hard Disk Drive (HDD) activity signal. LED flashes every time HDD is accessed.

The power LED (green) lights up and will remain steady while the system is powered on.

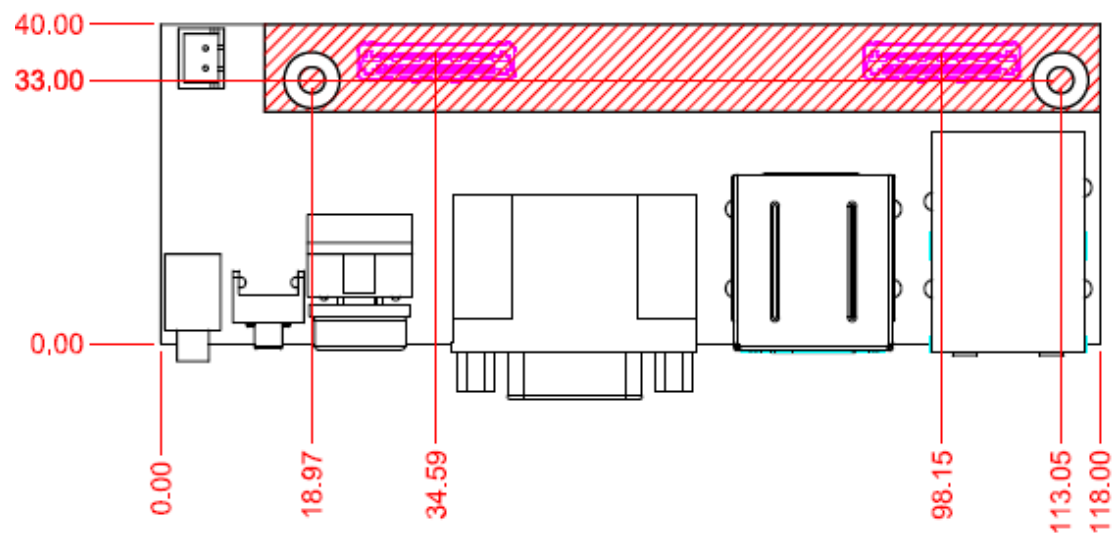| LED Color	Description
Red	Hard disk drive activity
Green	Power on/off

A.7   AX93276 Specifications

● **Size**
   ■ 118mm x 40mm

● **Features**
   ■ HDMI port.
   ■ LAN port.
   ■ Four USB 3.0.
   ■ Serial Ports: One port for RS-232/422/485 and one port for RS-232.
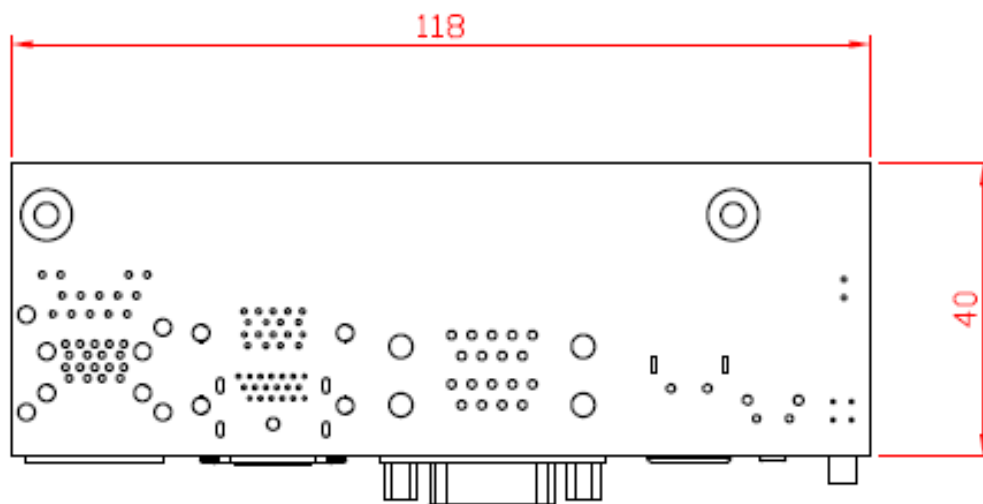   ■ Power-on, reset and red/green LED.

> **Note**   ***All specifications and images are subject to change without notice.***
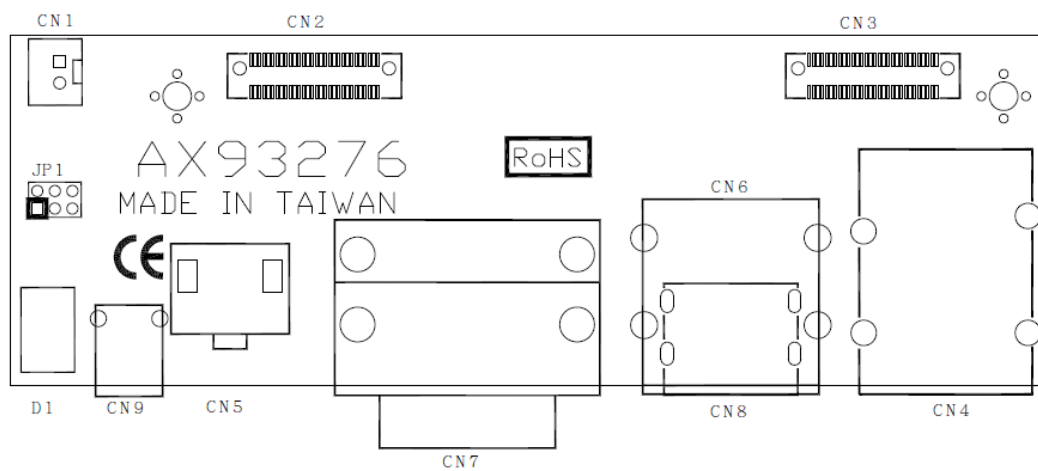
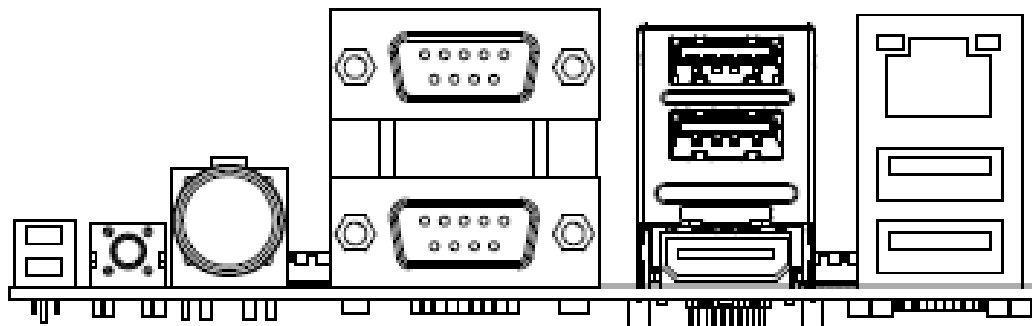## A.8   AX93276 Dimensions and Fixing Holes

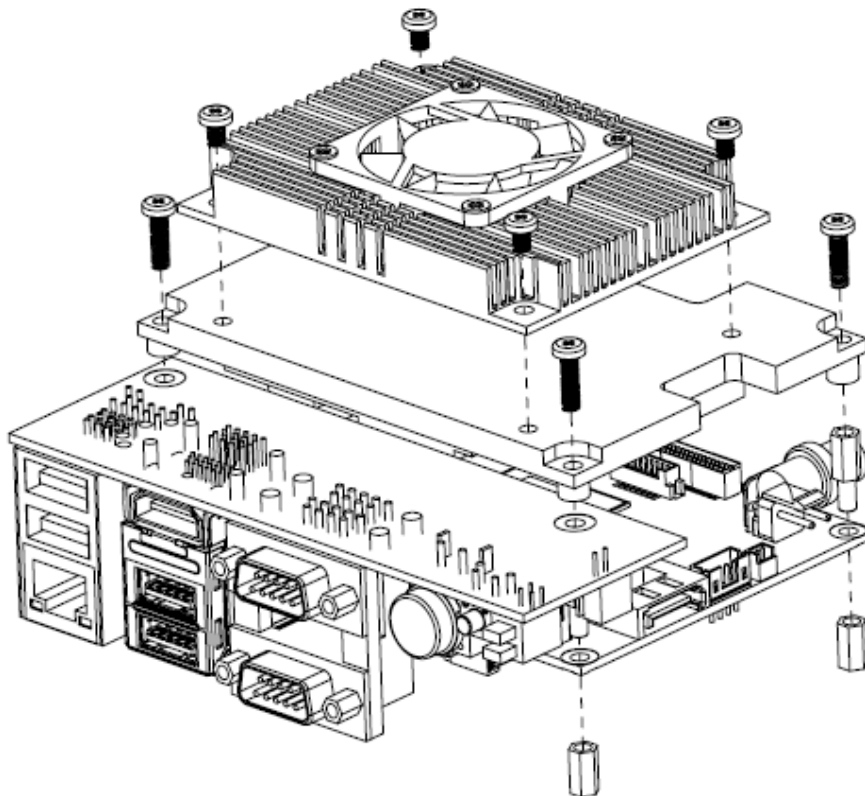**Top View**

Bottom View

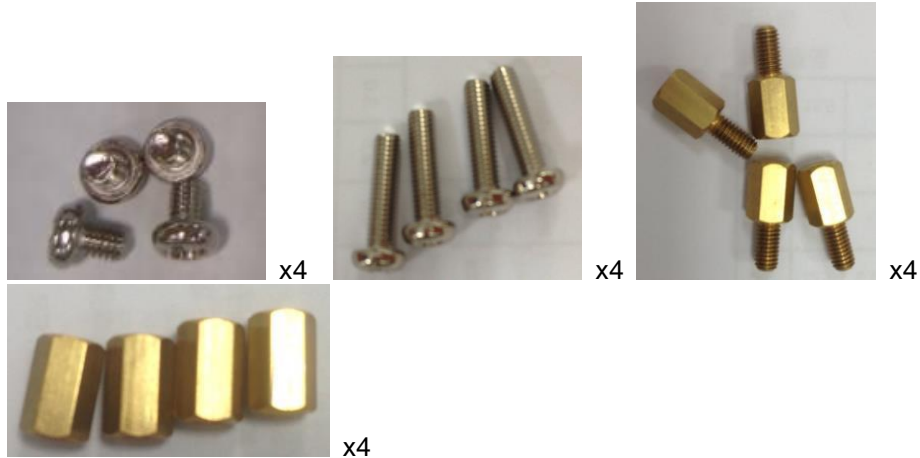## A.9   AX93276 Board Layout

Top View

Side View

A.10   AX93276 Assembly Drawing

Installing Heatspreader and I/O Board
Gently insert I/O Board into CN1 and CN2 on PICO880. Align and firmly secure the heatspreader plate and I/O board to the PICO880. Be careful not to over-tighten the screws.

A.11   AX93276 Jumper Settings

Properly configure jumper settings on the AX93276 I/O board to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

>
> **Note**
>
> ***Once the default jumper setting needs to be changed, please do it under power-off condition.***

Jumper	Description		Setting
JP1	COM1 Data/Power Selection Default: RS-232 Data	CN7B Pin 1: DCD	3-5 Close
		CN7B Pin 9: RI	4-6 Close

A.11.1   COM1 Data/Power Selection (JP1)

The COM1 port has +5V level power capability on DCD and +12V level on RI by setting JP1. When this port is set to +12V or +5V level, please make sure its communication mode is RS-232 (see BIOS setting in section 4.4).

| Function	Setting
Power: Set CN7B pin 1 to +5V level	1-3 close
Data: Set CN7B pin 1 to DCD (Default)	3-5 close
Power: Set CN7B pin 9 to +12V level	2-4 close
Data: Set CN7B pin 9 to RI (Default)	4-6 close
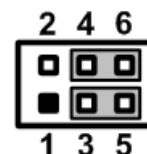
A.12　AX93276 Connectors, Switches and LED

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 which shows all connectors, buttons and LED on the hardware.

Connector	Description
CN1	Power Connector
CN2	High Speed Board to Board Connector 1
CN3	High Speed Board to Board Connector 2
CN4	LAN and USB 3.0 Connector
CN5	System Power Switch
CN6	USB 3.0 Stack Connector
CN7A~CN7B	COM1 and COM2 D-Sub Connectors
CN8	HDMI Connector
CN9	System Reset Switch
D1	Power and HDD LED Indicator

A.12.1　Power Connector (CN1)

This is a 1x2-pin (pitch=2.0mm) connector, which outputs +5V at 1A. It is suggested to connect to CN4 on PICO880 via cable for fan to cool down CPU and system temperature.
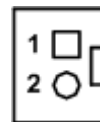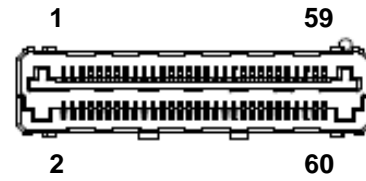
Pin	Signal
1	+5V
2	GND

A.12.2   High Speed Board to Board Connectors (CN2 and CN3)

The pin assignments of CN2 are given as follows.

Pin	Signal	Pin	Signal
1	NA	2	NA
3	NA	4	NA
5	NA	6	NA
7	DSR2	8	DCD2
9	RTS2	10	RXD2
11	CTS2	12	TXD2
13	RI2	14	DTR2
15	DSR1	16	DCD1
17	RTS	18	RXD1
19	CTS1	20	TXD1
21	RI1	22	DTR1
23	GND	24	GND
25	GPO_485_EN_N	26	SIO_PSIN#
27	GPO_485TERM_EN	28	SATA_LED
29	GPO_485_MODE0	30	HW_RESET#
31	GPO_485_MODE1	32	PLTRST_SIO
33	USB_OC23	34	USB_OC01
35	GND	36	GND
37	DP2	38	DP0
39	DN2	40	DN0
41	GND	42	GND
43	DN3	44	DP1
45	DP3	46	DN1
47	GND	48	GND
49	+V5_SBY	50	NA
51	+V5_SBY	52	NA
53	+V5_SBY	54	NA
55	+V5_SBY	56	NA
57	+V5S	58	+V3.3S
59	+V5S	60	+V3.3S

The pin assignments of CN3 are given as follows.

Pin	Signal	Pin	Signal
1	PCIE_IO_RXP	2	USB3_RXP1
3	PCIE_IO_RXN	4	USB3_RXN1
5	GND	6	GND
7	PCIE_IO_TXP	8	USB3_TXP1
9	PCIE_IO_TXN	10	USB3_TXN1
11	GND	12	GND
13	B2B_PCIE_CLK	14	USB3_RXP2
15	B2B_PCIE_CLK#	16	USB3_RXN2
17	GND	18	GND
19	DDI2_TXP0	20	USB3_TXP2
21	DDI2_TXN0	22	USB3_TXN2
23	GND	24	GND
25	DDI2_TXP1	26	USB3_RXP3
27	DDI2_TXN1	28	USB3_RXN3
29	GND	30	GND
31	DDI2_TXP2	32	USB3_TXP3
33	DDI2_TXN2	34	USB3_TXN3
35	GND	36	GND
37	DDI2_TXP3	38	USB3_RXP4
39	DDI2_TXN3	40	USB3_RXN4
41	GND	42	GND
43	DDPC_CTRLDATA	44	USB3_TXP4
45	DDPC_CTRLCLK	46	USB3_TXN4
47	GND	48	GND
49	DDPC_HPD	50	NA
51	PLTRST_MINICARD	52	NA
53	PCIE_WAKE#	54	GND
55	NA	56	NA
57	+V5S	58	+V3.3_SBY
59	+V5S	60	+V3.3_SBY

1   **59**

**2**   **60**
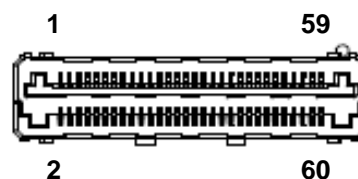
Note

Please gently insert CN2 and CN3 into CN1 and CN2 on PICO880.

A.12.3 LAN and USB 3.0 Connector (CN4)

The board comes with one high performance plug and play Ethernet interface (RJ-45) which is fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

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

Pin	LAN Signal	Pin	LAN Signal
L1	MDI0+	L5	MDI2+
L2	MDI0-	L6	MDI2-
L3	MDI1+	L7	MDI3+
L4	MDI1-	L8	MDI3-
A	100 LAN LED (Green)/ 1000 LAN LED (Orange)		
B	Active LED		
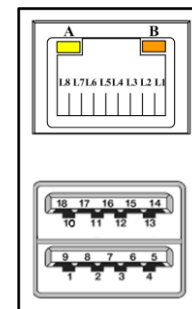
Pin	USB Signal	Pin	USB Signal
1	USB_VCC (+5V level standby power)	10	USB_VCC (+5V level standby power)
2	USB_Data2-	11	USB_Data3-
3	USB_Data2+	12	USB_Data3+
4	GND	13	GND
5	SSRX2-	14	SSRX3-
6	SSRX2+	15	SSRX3+
7	GND	16	GND
8	SSTX2-	17	SSTX3-
9	SSTX2+	18	SSTX3+

A.12.4 System Power Switch (CN5)

This button is for turning on/off the system power.

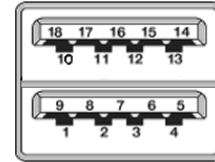| Function	Description
On	Turn on/off system
Off	Keep system status
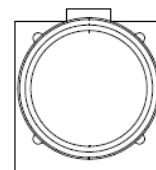
A.12.5   USB 3.0 Stack Connector (CN6)

The board comes with a high rise double-deck Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) connector on the rear I/O which are for installing USB peripherals such as keyboard, mouse, scanner, etc.
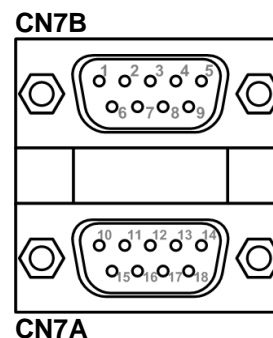
Pin	Signal	Pin	Signal
1	USB_VCC (+5V level standby power)	10	USB_VCC (+5V level standby power)
2	USB_Data2-	11	USB_Data3-
3	USB_Data2+	12	USB_Data3+
4	GND	13	GND
5	SSRX2-	14	SSRX3-
6	SSRX2+	15	SSRX3+
7	GND	16	GND
8	SSTX2-	17	SSTX3-
9	SSTX2+	18	SSTX3+

A.12.6   COM1 and COM2 D-Sub Connector (CN7A and CN7B)

The CN7 is a double-deck 9-pin D-Sub connector. The lower connector (CN7A) is for COM2 and the upper connector (CN7B) is for COM1. Note that only COM1 port comes with power capability on DCD and RI pins by setting jumper (see section A.11.1). If you need COM1 port to support RS-422 or RS-485 mode, please do it via BIOS setting (see section 4.4). The pin assignments of RS-232/RS-422/RS-485 are listed in table below.

CN7B Pin	RS-232	RS-422	RS-485
10	DCD	TX-	Data-
11	RXD	TX+	Data+
12	TXD	RX+	N.C
13	DTR	RX-	N.C.
14	GND	No use	No use
15	DSR	No use	No use
16	RTS	No use	No use
17	CTS	No use	No use
18	RI	No use	No use

CN7B

CN7A

CN7A Pin	Signal
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)

A.12.7 HDMI Connector (CN8)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable. Its interface is available through connector CN8.

Pin	Signal	Pin	Signal
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	CEC	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		
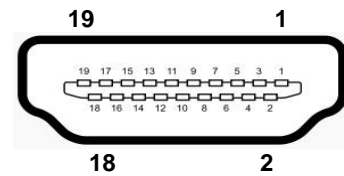
A.12.8 System Reset Switch (CN9)

This button reboots your computer without turning off the power supply. It is a better way to reboot your system for a longer life of the system power supply.

Function	Description
On	Reset system
Off	Keep system status

A.12.9 Power and HDD LED Indicator (D1)

The red LED is linked to Hard Disk Drive (HDD) activity signal. LED flashes every time HDD is accessed.

The power LED (green) lights up and will remain steady while the system is powered on.

LED Color	Description
Red	Hard disk drive activity
Green	Power on/off

Appendix B
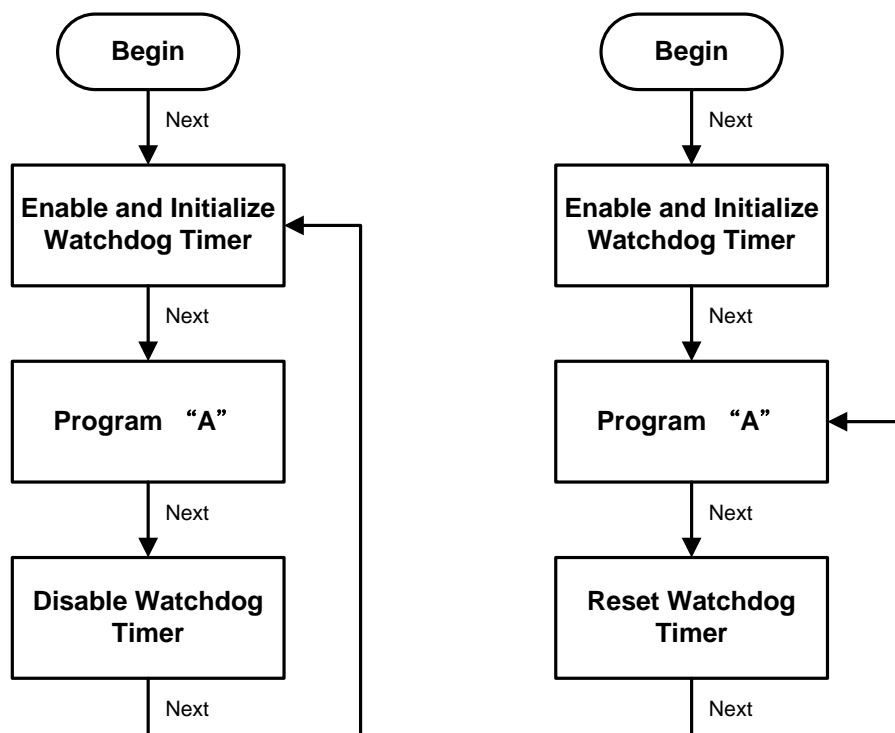# Watchdog Timer

B.1   About Watchdog Timer

Software stability is major issue in most application. Some embedded systems are not watched by human 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.

B.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.

```
    ┌──────────────┐                              ┌──────────────┐
    │    Begin     │                              │    Begin     │
    └──────┬───────┘                              └──────┬───────┘
           │ Next                                        │ Next
           ▼                                             ▼
 ┌──────────────────┐                          ┌──────────────────┐
 │ Enable and       │◄──┐                      │ Enable and       │
 │ Initialize       │   │                      │ Initialize       │
 │ Watchdog Timer   │   │                      │ Watchdog Timer   │
 └────────┬─────────┘   │                      └────────┬─────────┘
          │ Next        │                               │ Next
          ▼             │                               ▼
 ┌──────────────────┐   │                      ┌──────────────────┐
 │                  │   │                      │                  │◄──┐
 │  Program "A"     │   │                      │  Program "A"     │   │
 │                  │   │                      │                  │   │
 └────────┬─────────┘   │                      └────────┬─────────┘   │
          │ Next        │                               │ Next        │
          ▼             │                               ▼             │
 ┌──────────────────┐   │                      ┌──────────────────┐   │
 │ Disable Watchdog │   │                      │ Reset Watchdog   │   │
 │ Timer            │   │                      │ Timer            │   │
 └──────────────────┘   │                      └──────────────────┘   │
          │ Next        │                               │ Next        │
          └─────────────┘                               └─────────────┘
```

B.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,08h
out     dx,al

;Activate WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al

;Set Second or Minute :
mov     dx,2Eh
mov     al,0F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh              ;N=00h or 08h(see below 🖉 Note)
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 below 🖉 Note)

;Disable WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,00h             ;Can be disabled at any time
out     dx,al
```

🖉 ***Note***:
*If **N**=00h, 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**=08h, 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 C
iAMT Settings

The Intel® Active Management Technology (Intel® iAMT) has decreased a major barrier to IT efficiency that uses built-in platform capabilities and popular third-party management and security applications to allow IT a better discovering, healing, and protection their networked computing assets.

In order to utilize Intel® iAMT you must enter the ME BIOS (<Ctrl + P> during system startup), change the ME BIOS password, and then select "Intel® iAMT" as the manageability feature.

C.1   Entering MEBx

1. Go to BIOS to enable iAMT function (see section 4.4).
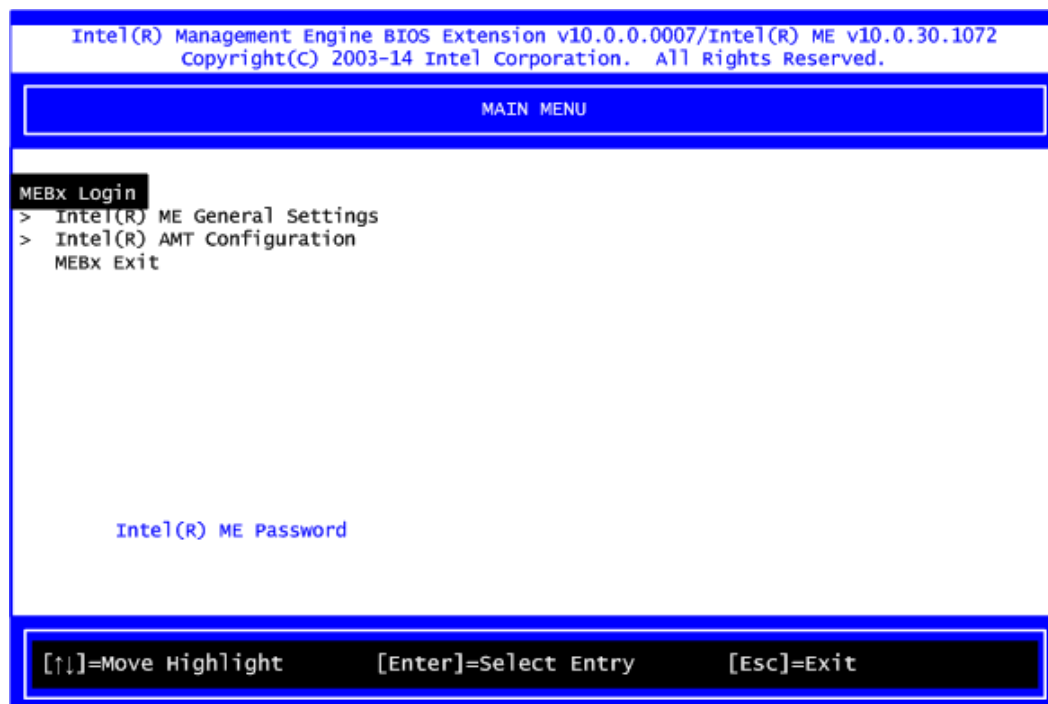2. Exit from BIOS after starting iAMT, and press <Ctrl + P> to enter MEBx Setting.
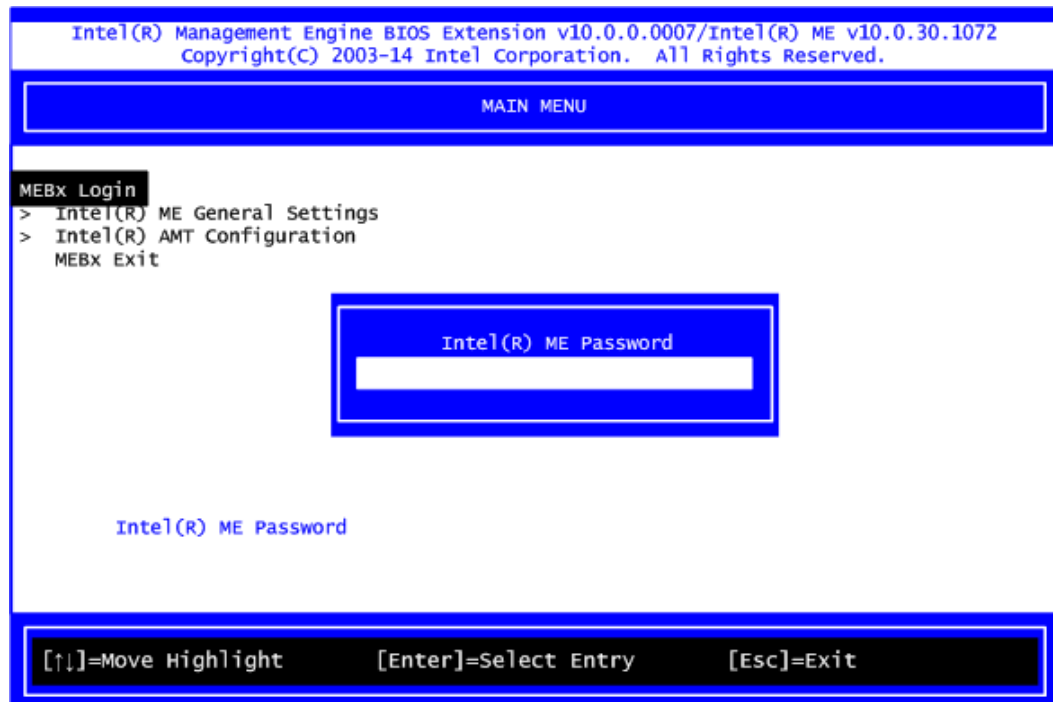
> **Note**
>
> *It is better to press <Ctrl + P> before the screen popping out.*

C.2   Set and Change Password

1. You will be asked to set a password when first log in. The default password is "admin".

2. You will be asked to change the password before setting ME.

3. You must confirm your new password while revising. The new password must contain: (example: **!!11qqQQ**) (default value).
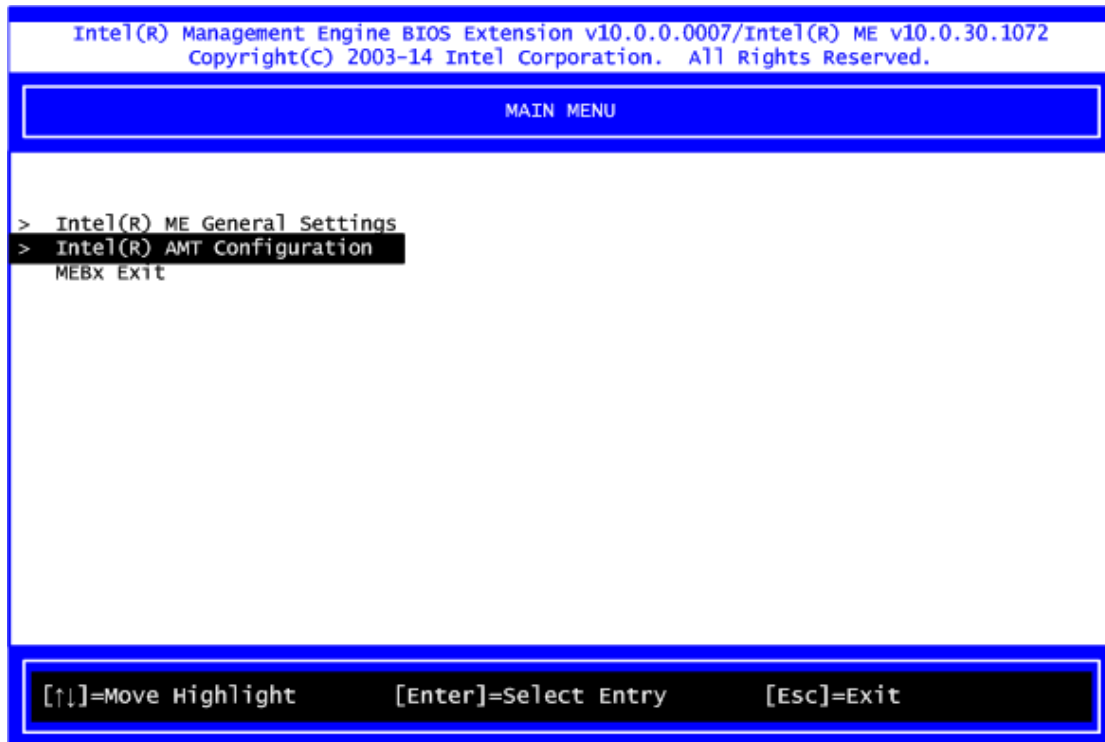
    ● Eight characters
    ● One upper case
    ● One lower case
    ● One number
    ● One special symbol, such as ! 、 $ or ; , (、 " ,   excepted)

    Underline (_) and space are valid characters for password, but they won't make higher complexity.
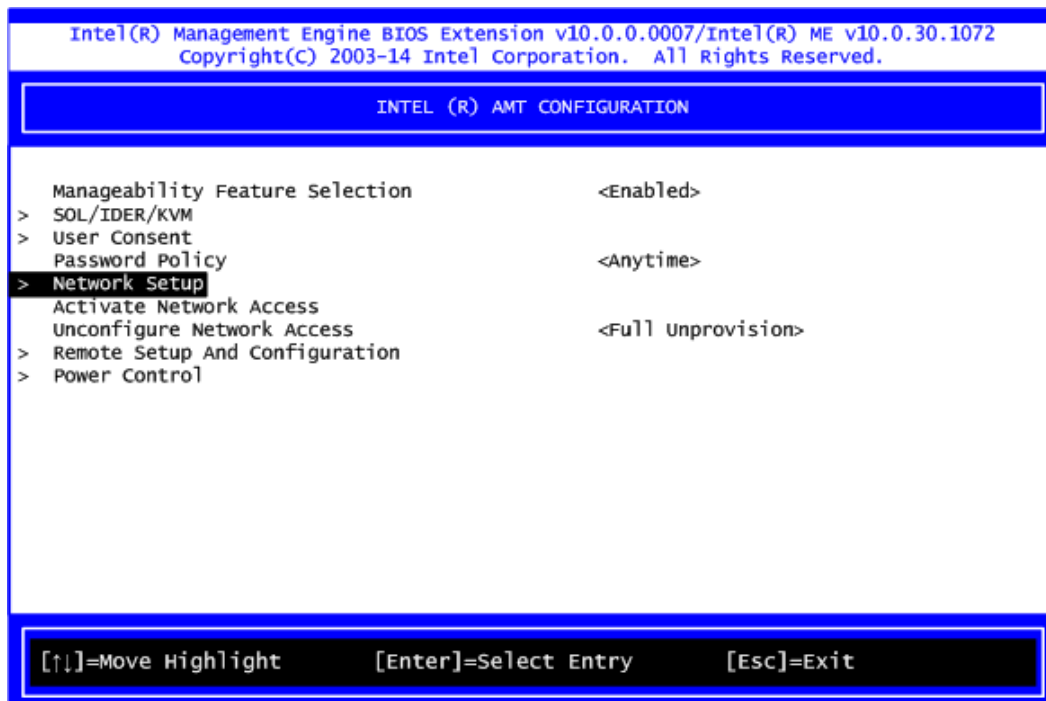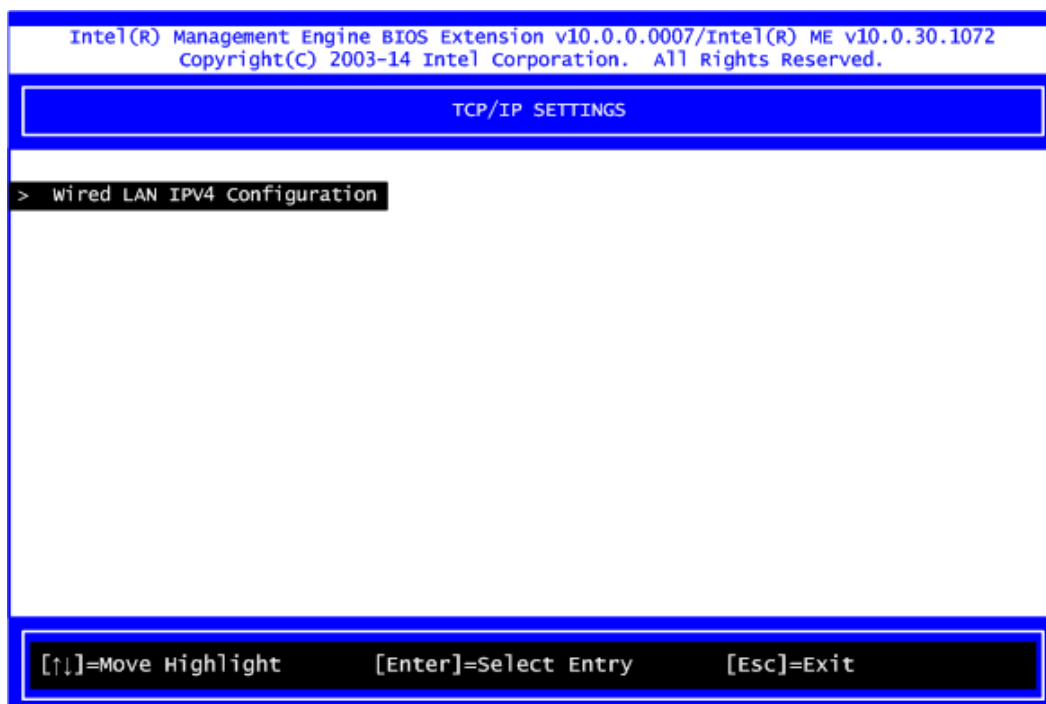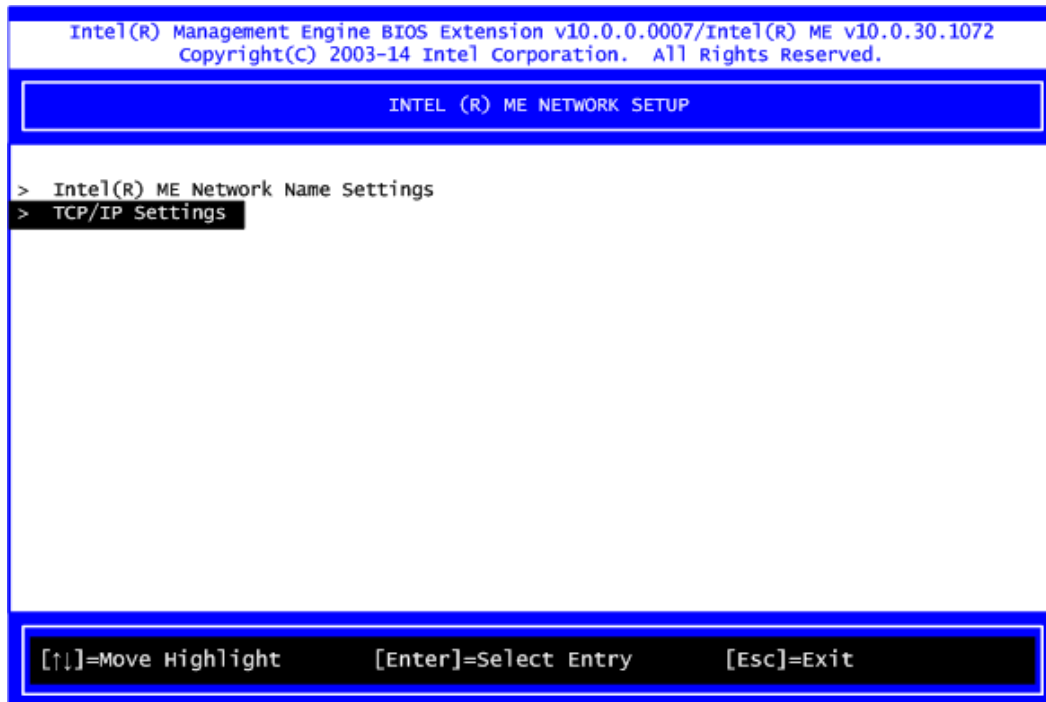
C.3   iAMT Settings

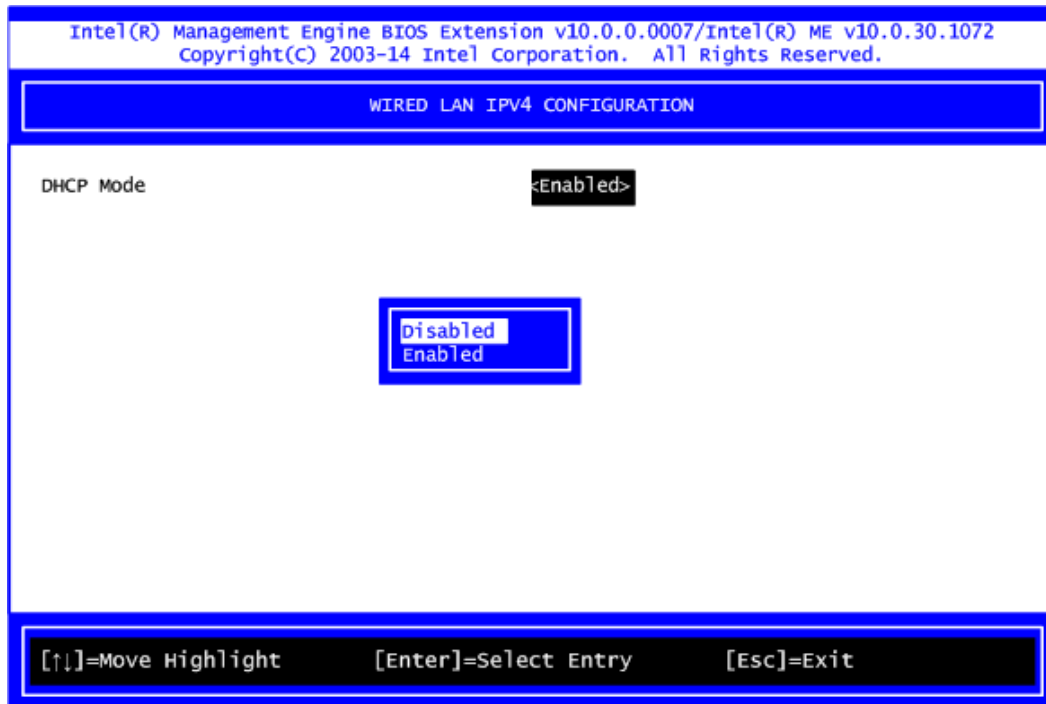Select Intel® iAMT configuration and press <Enter>.

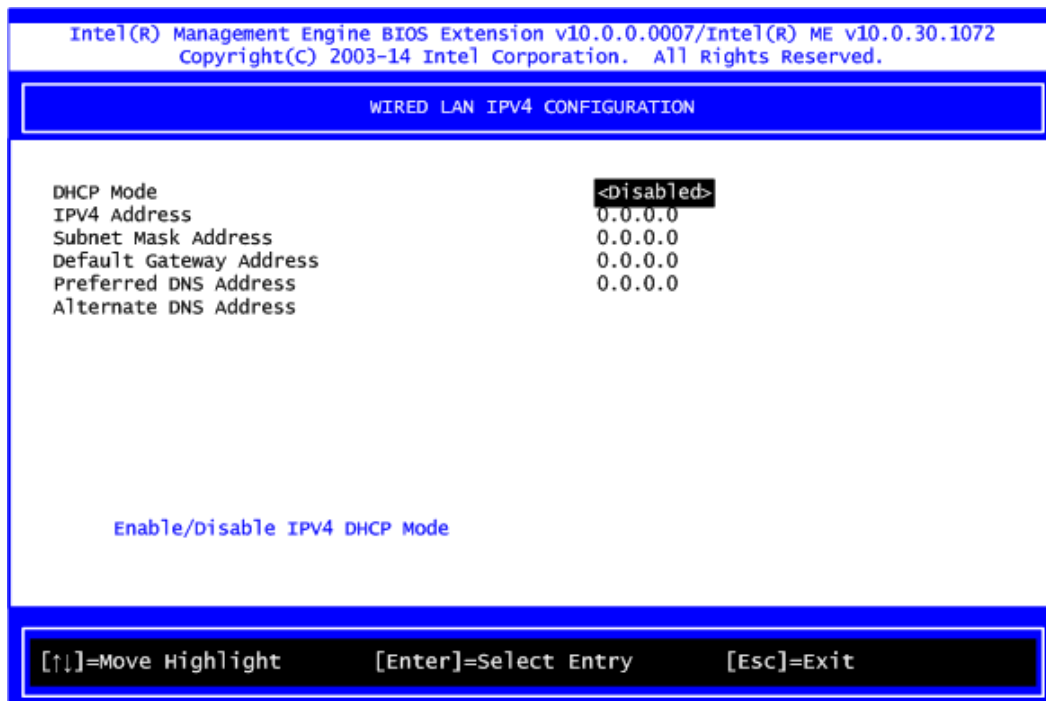

1.   Select Network Setup to configure iAMT.

2. Select TCP/IP to get into Network interface and set it to Enabled. Get into DHCP Mode and set it to Disabled.

3. If DHCP Mode is disabled, set the following settings:

- IP address
- Subnet mask

4. Go back to Intel® iAMT Configuration, then select Activate Network Access and press <Enter>.

```
Intel(R) Management Engine BIOS Extension v10.0.0.0007/Intel(R) ME v10.0.30.1072
            Copyright(C) 2003-14 Intel Corporation.  All Rights Reserved.

                        INTEL (R) AMT CONFIGURATION

    Manageability Feature Selection              <Enabled>
>   SOL/IDER/KVM
>   User Consent
    Password Policy                              <Anytime>
>   Network Setup
    Activate Network Access
    Unconfigure Network Access
>   Remote Setup And Configurati   Activates the current network settings
>   Power Control                     and opens the ME network interface
                                            Continue: (Y/N)




    [↑↓]=Move Highlight        [Enter]=Select Entry        [Esc]=Exit
```

5. Exit from MEBx after completing the iAMT settings.

C.4 iAMT Web Console

1. From a web browser, please type http://(IP ADDRESS):16992, which connects to iAMT Web.

    Example: http://10.1.40.214:16992
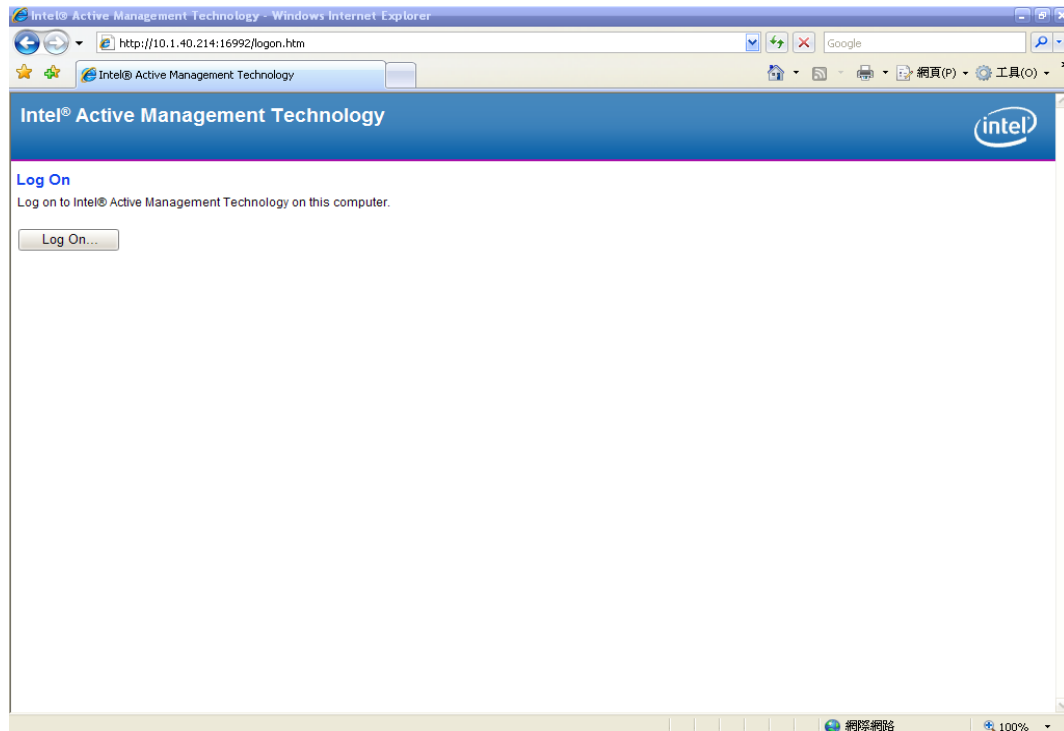
2. To log on, you will be required to type in username and password for access to the Web.

    USER: admin (default value)
    PASS: (MEBx password)

3. Enter the iAMT Web.

4. Click Remote Control, and select commands on the right side.
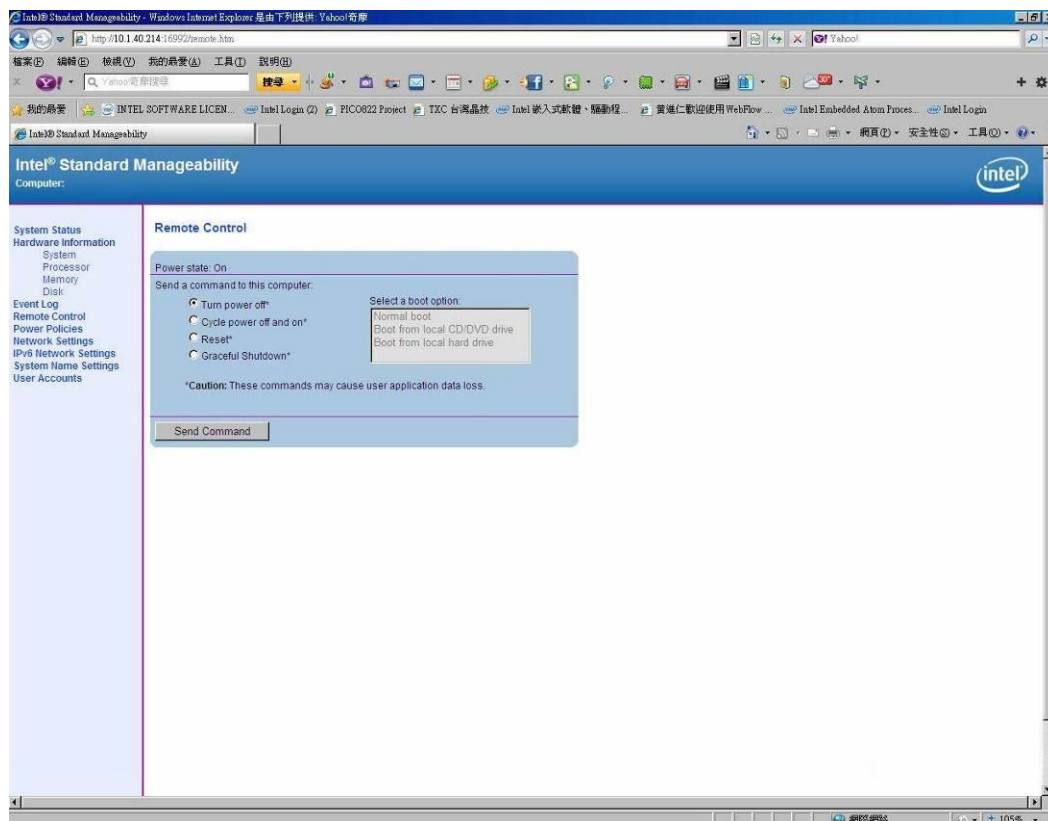
5. When you have finished using the iAMT Web console, close the Web browser.

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Appendix D
BIOS Flash Utility

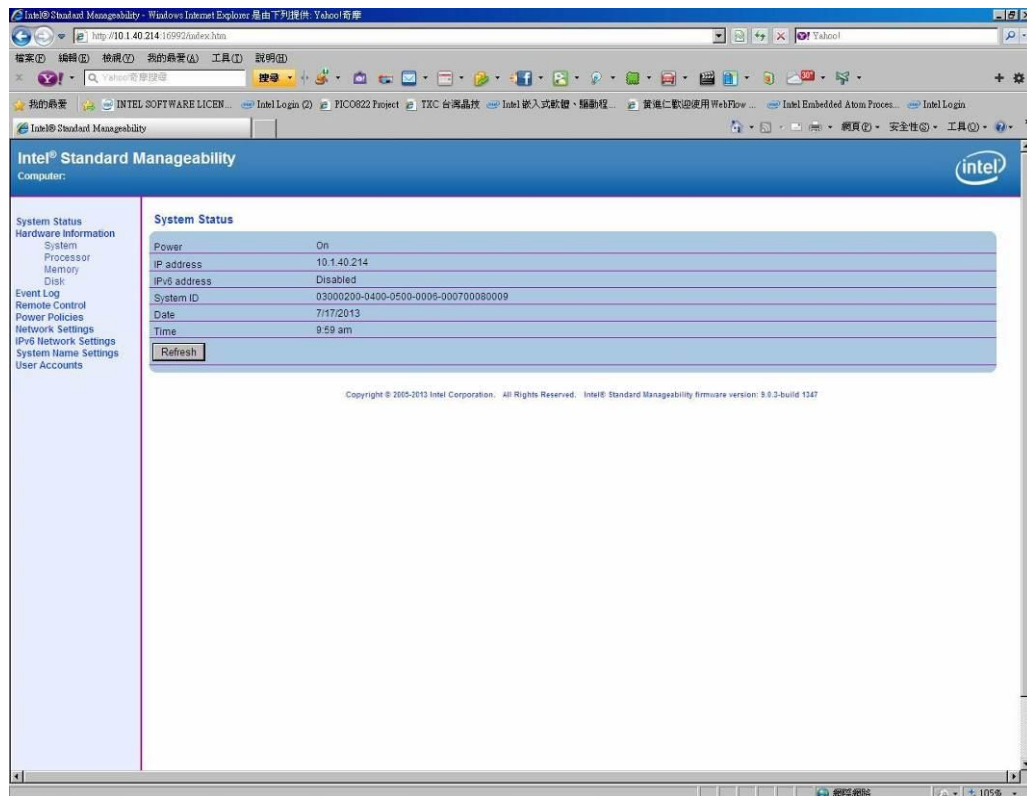The BIOS Flash utility is a new helpful function in BIOS setup program. With this function you can easily update system BIOS without having to enter operating system. In this appendix you may learn how to do it in just a few steps. Please read and follow the instructions below carefully.

1. In your USB flash drive, create a new folder and name it "Axiomtek", see figure below.
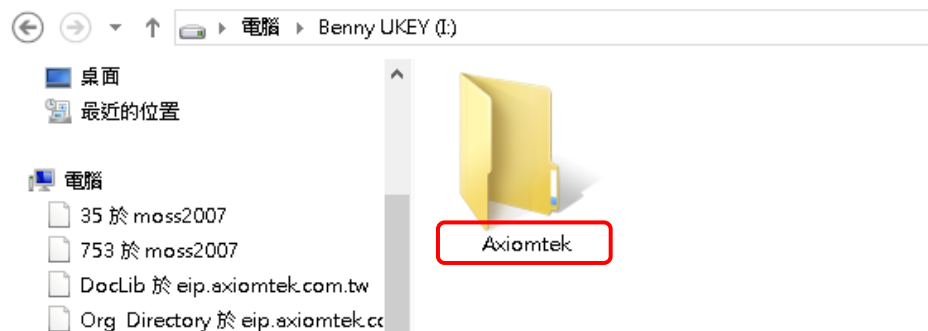
2. Copy BIOS ROM file (e.g. PICO880.005) to "Axiomtek" folder.
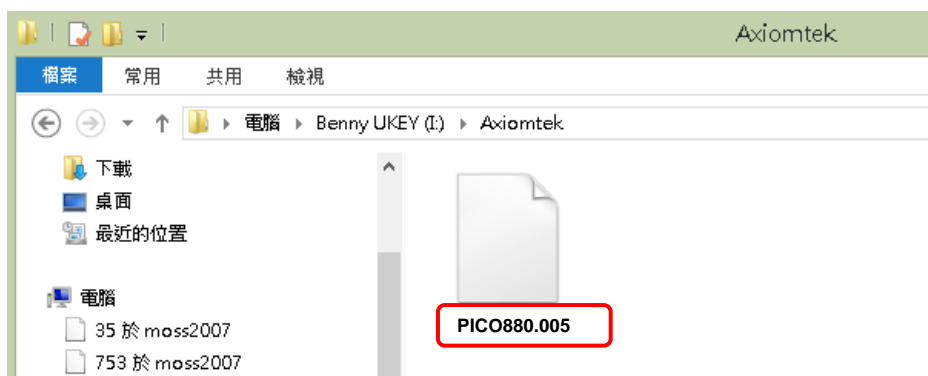
3. Insert the USB flash drive to your system.

4. Enter BIOS setup menu and go to Advanced\Utility Configuration. Select BIOS Flash Utility and press <Enter>.

5. 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.

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
          Advanced

 Utility Configuration                                          BIOS Flash Utility

 ▶ BIOS Flash Utility

          ┌────────────────────────────────────────────────────────────┐
          │              Select File from a File system                 │
          ├────────────────────────────────────────────────────────────┤
          │ Acpi(a0341d0, 0)\PCI(1D|0)\USB(0,0)\USB(1,0)\HD(Part1, Sig ?)\│
          └────────────────────────────────────────────────────────────┘
```

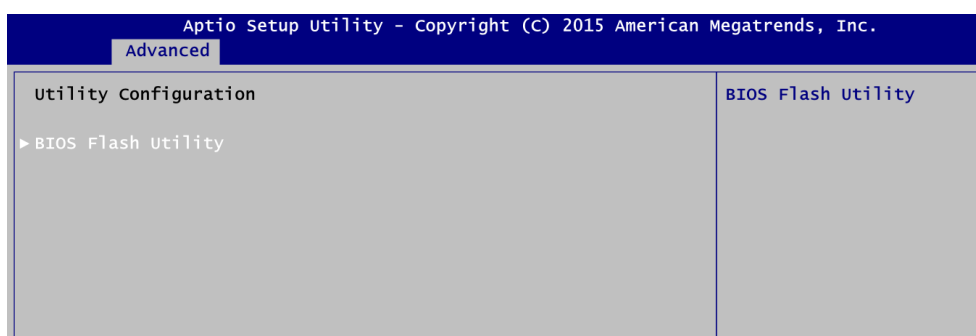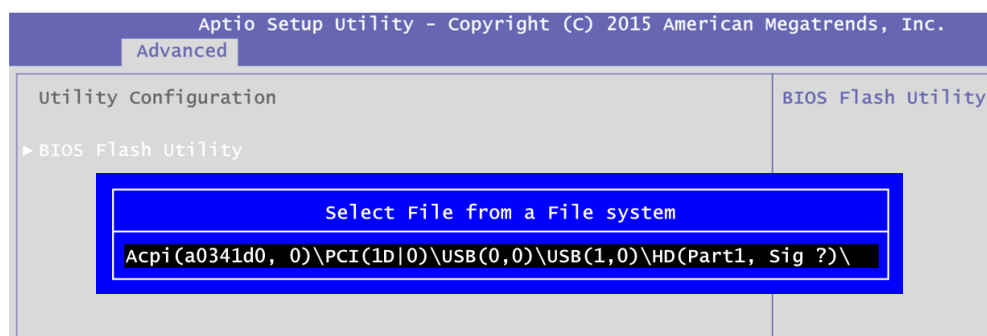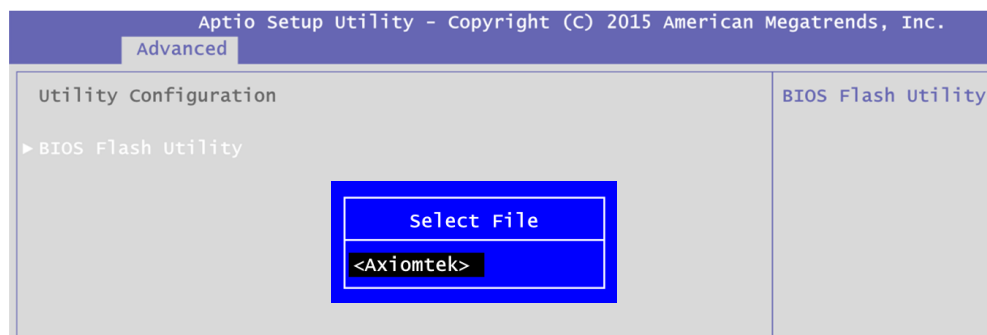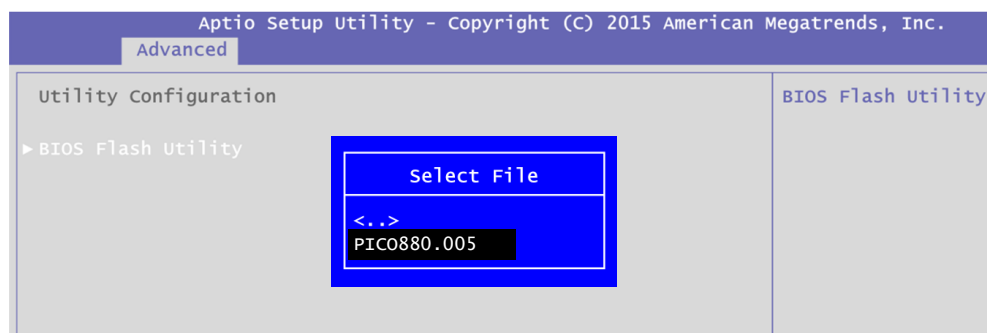6. Select the USB drive containing BIOS ROM file you want to update using the <↑> or <↓> key. Then press <Enter> to get into "Axiomtek" folder.

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
          Advanced

 Utility Configuration                                          BIOS Flash Utility

 ▶ BIOS Flash Utility

                    ┌──────────────────────────┐
                    │       Select File        │
                    ├──────────────────────────┤
                    │ <Axiomtek>               │
                    └──────────────────────────┘
```

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

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
          Advanced

 Utility Configuration                                          BIOS Flash Utility

 ▶ BIOS Flash Utility
                    ┌──────────────────────────┐
                    │       Select File        │
                    ├──────────────────────────┤
                    │ <..>                     │
                    │ PICO880.005              │
                    └──────────────────────────┘
```

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

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
          Advanced

 Utility Configuration                                          BIOS Flash Utility

 ▶ BIOS Flash Utility
                    ┌──────────────────────────┐
                    │     BIOS Flash Utility    │
                    ├──────────────────────────┤
                    │ Return to BIOS Setup Menu │
                    │ Start to flash system BIOS│
                    └──────────────────────────┘
```
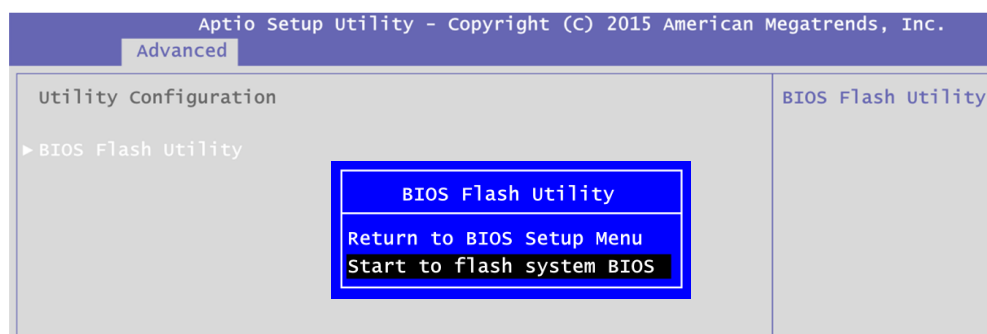
9.   Please wait while BIOS completes the entire flash update process: erase data, write new data and verify data.

```
o Setup Utility - Copyright (C) 2015 American Megatrend

ion                                              BIOS Fla

           ┌──── Flash Update Progress ────┐
           │          Erase data           │
           │            13%                │
           │  ████                         │
           └───────────────────────────────┘
```

```
o Setup Utility - Copyright (C) 2015 American Megatrend

ion                                              BIOS Fla

           ┌──── Flash Update Progress ────┐
           │         Write new data         │
           │             4%                │
           │  ██                           │
           └───────────────────────────────┘
```

```
o Setup Utility - Copyright (C) 2015 American Megatrend

ion                                              BIOS Fla

           ┌──── Flash Update Progress ────┐
           │          Verify data          │
           │            10%                │
           │  ████                         │
           └───────────────────────────────┘
```
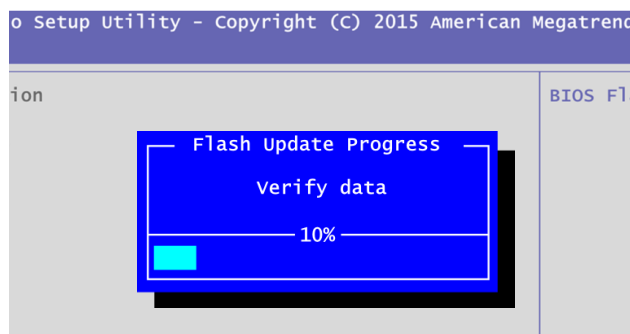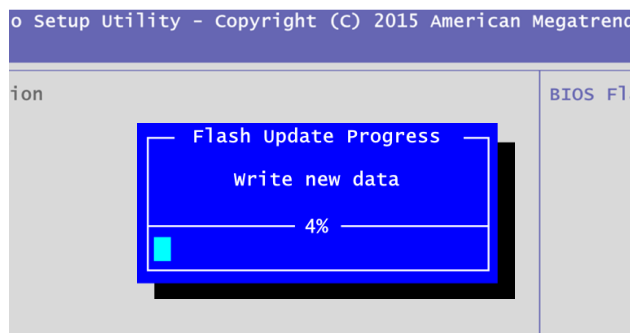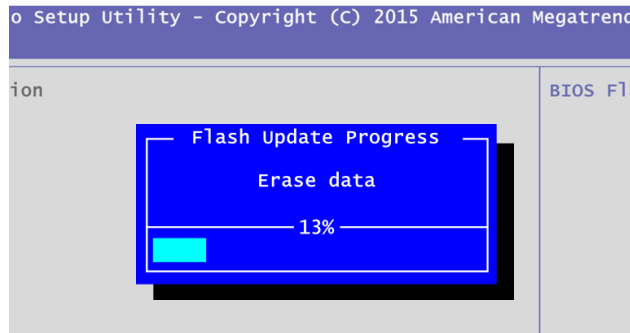
10. When you see the following figure, press <Enter> to finish the update process. After that the system will shut down and restart immediately.

```
         Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Advanced

 Utility Configuration                                    BIOS Flash Utility

 ▶ BIOS Flash Utility
                    ┌──── Flash Update Progress ────┐
                    │   Flash system BIOS finish!   │
                    │                               │
                    │            ▐ OK ▌             │
                    └───────────────────────────────┘
```
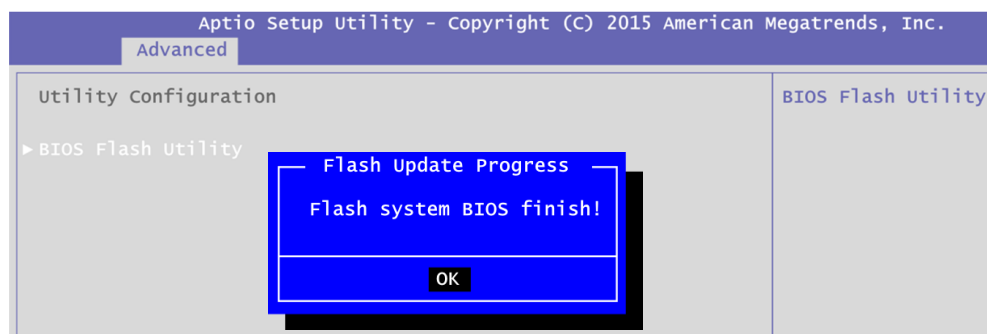
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Appendix E
About Installing Intel® ME
Driver

If you see figure below during Intel® ME driver installation, it means that a required update is missing. You are recommended to install Windows Update KB 2685811 before installing Intel® ME driver in Windows® 7. Refer to product information CD item 5: kmdf-1.11-Win-6.1-x64(x32).msu or click on link below to download update from Microsoft Download Center.

https://www.microsoft.com/en-us/download/details.aspx?id=38423