



AXIOMTEK

CEM700

**Intel® Xeon D® and Pentium D®
Processors COM Express™ Type 7
Basic Module**

User's Manual



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CAUTION

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

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ESD Precautions

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

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

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Chapter 1

Introduction



The Axiomtek CEM700 is a COM Express™ Type 7 Basic Module powered by Intel® Xeon D® and Pentium D® processors (formerly Broadwell-DE) which compatible to PICMG COM.0 Rev 3.0 specification and support dual cores or multi cores (up to 16 cores). The CEM700 was designed for customer who need high computing performance and balanced power consumptions for entry networking, micro servers or various applications.

1.1 Features

- Intel® Pentium D® and Xeon D® BGA processors
- 2 DDR4 SODIMM SO-DIMMs (16GB max/SO-DIMM) support ECC
- 1 Intel® I210-IT 1000/100/10Mbps supports Wake-on-LAN, PXE Boot ROM, NCSI
- 2 10Gbe KR interfaces support NCSI
- 4 USB 3.0 ports
- 4 USB 2.0 ports
- 2 SATA-600
- Support 32 Lanes of PCI-Express
- TPM 2.0

1.2 Specifications

- **CPU**
 - Intel® Pentium D® and Xeon D® BGA processors.
Commercial SKUs:
 - Pentium® D1508 2.2/2.6GHz 3MB, 25W (2C).
 - Xeon® D1527 2.2/2.7GHz 6MB, 35W (4C).
 - Xeon® D1577 1.3/2.1GHz 24MB, 45W (16C).Industry SKUs:
 - Pentium® D1519 1.5/2.1GHz 6MB, 25W (4C).
 - Xeon® D1539 1.6/2.2GHz 12MB, 35W (8C).

- **Chipset**
 - NA.

- **BIOS**
 - American Megatrends Inc. BIOS.

- **System Memory**
 - Two DDR4 SODIMM SO-DIMMs (16GB max/SO-DIMM) support ECC. Maximum memory frequency is based on processor number.

- **TPM**
 - Trusted Platform Module compatible with TPM2.0 Main and PC Client specification based on Intel® SPI Bus Interface.

- **Expansion Interface**
 - One PCIe x16 v3.0 (8GT/s) configurable as 1x16, 2x8, 1x8+2x4, 2x4+1x8, 4x4.
 - One PCIe x8 v3.0 (8GT/s) configurable as 1x8, 2x4.
 - One PCIe x8 v2.0 (5GT/s); (PCIe lane 7 is supported by build option, in place of GbE).

- **USB Interface**
 - Four USB ports comply with USB Spec. Rev. 3.0.
 - Four USB ports comply with USB Spec. Rev. 2.0.

- **SATA Interface**
 - Two SATA 6Gb/s ports supported through COM Express™ connector.

- **Graphics**
 - NA.

- **Ethernet**
 - One Intel® I210-IT 1000/100/10Mbps supports Wake-on-LAN, PXE Boot ROM, NCSI.
 - Two 10Gbe KR interfaces support NCSI.

- **General Purpose Serial Interface**
 - Support two UART TX/RX interfaces with console redirect.

- **Other Functions**
 - 4 GPO / 4 GPI.
 - 1 I²C.
 - 1 SMBUS.
 - 1 SPI.
 - 1 LPC.
 - Watchdog Timer: 65536 levels, 65535 secs.
- **Power**
 - ATX: 12V±5%, 5VSB ±5%; AT: 12V±5%.
- **Form Factor**
 - Basic module 125mm x 125mm.

1.3 Utilities Supported

- Ethernet utility and driver
- Chipset driver
- USB 3.0 driver



All specifications and images are subject to change without notice.

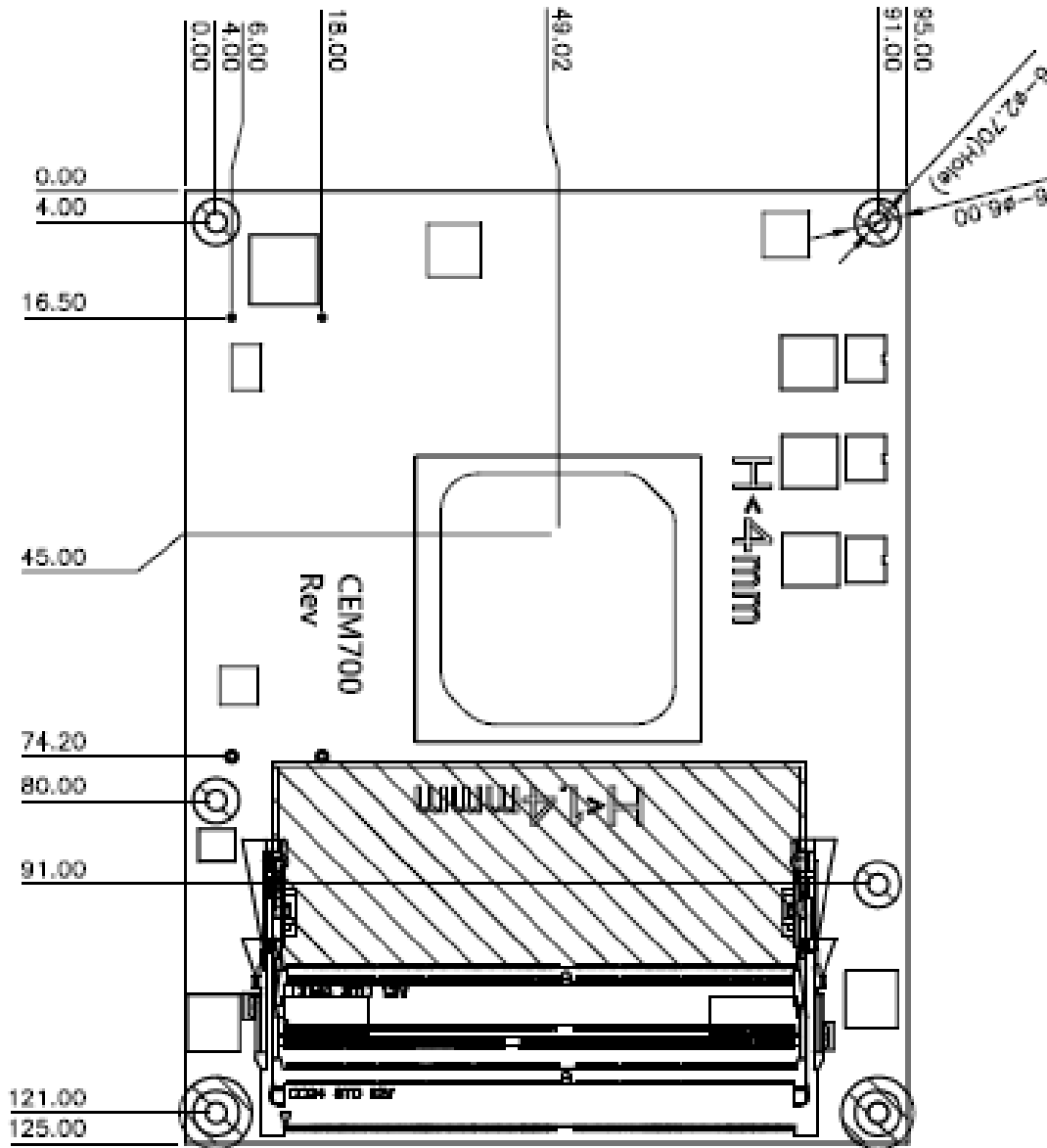
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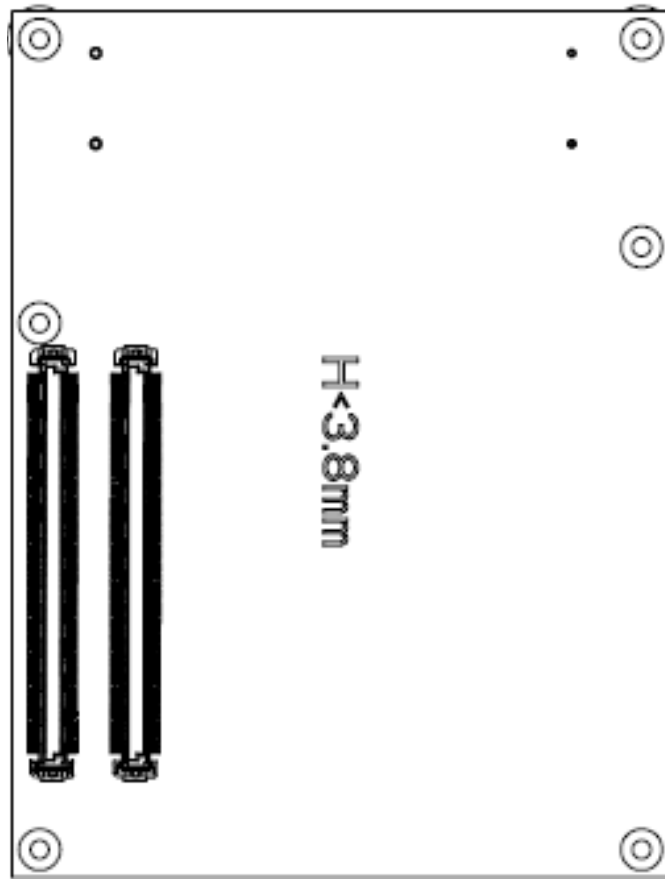
Chapter 2

Module and Pin Assignments

2.1 Module Dimensions and Fixing Holes

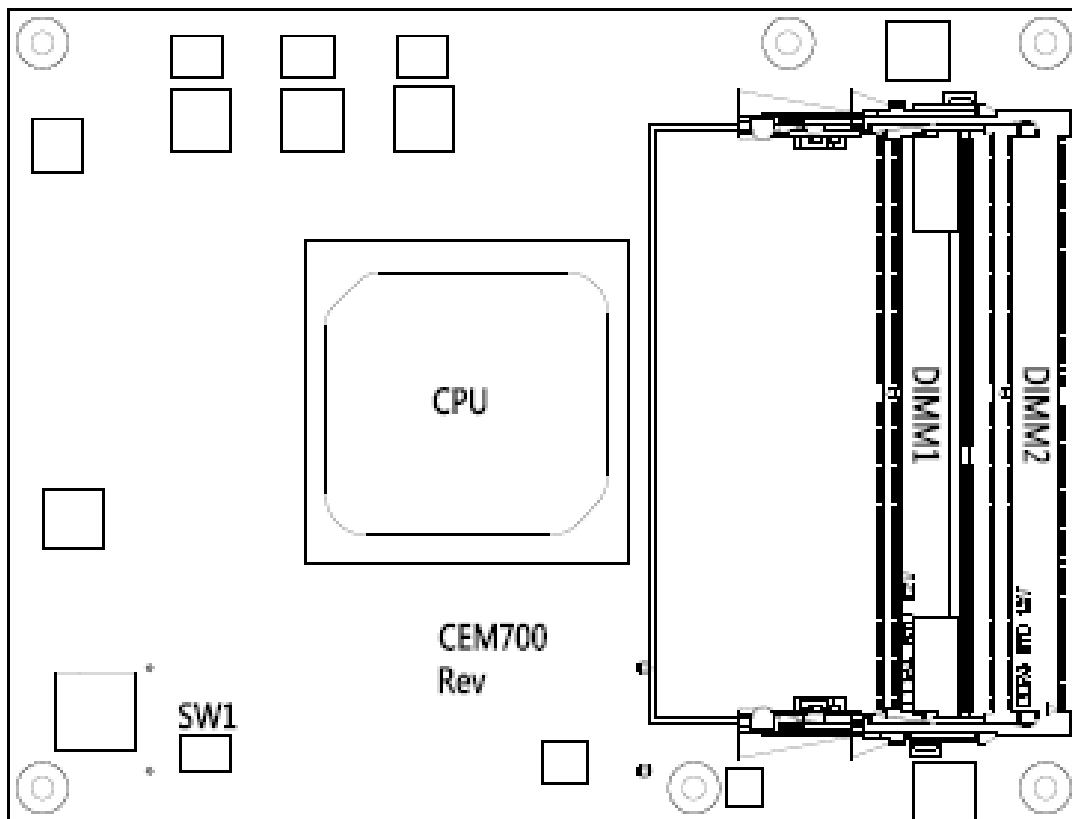


Top View

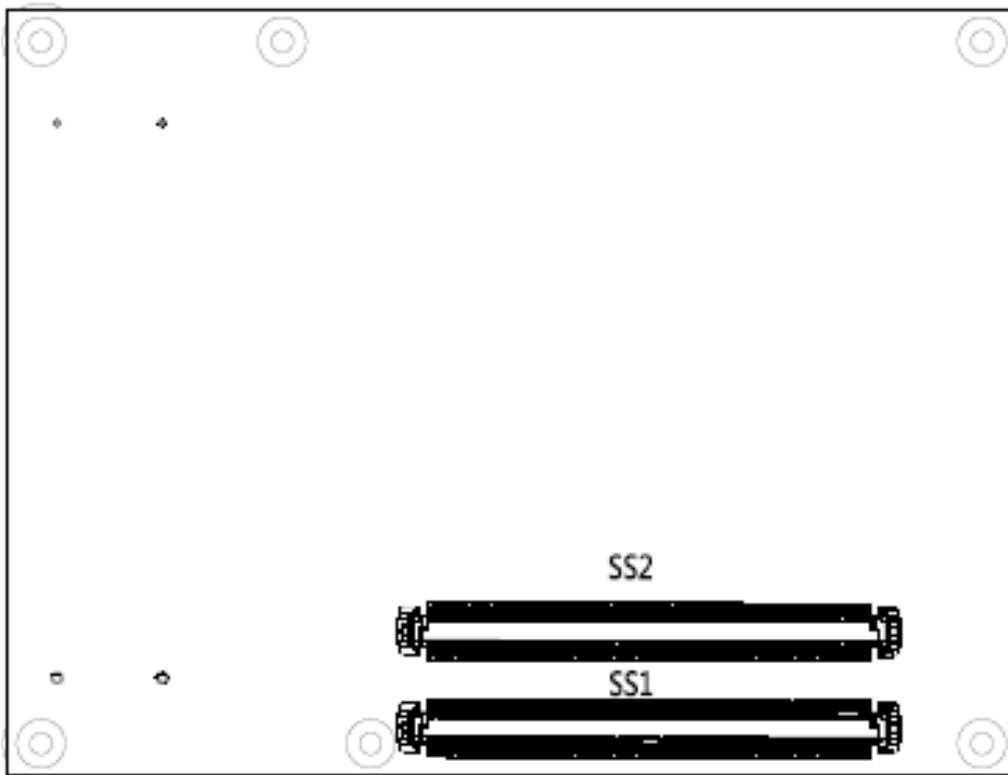


Bottom View

2.2 Module Layout



Top View

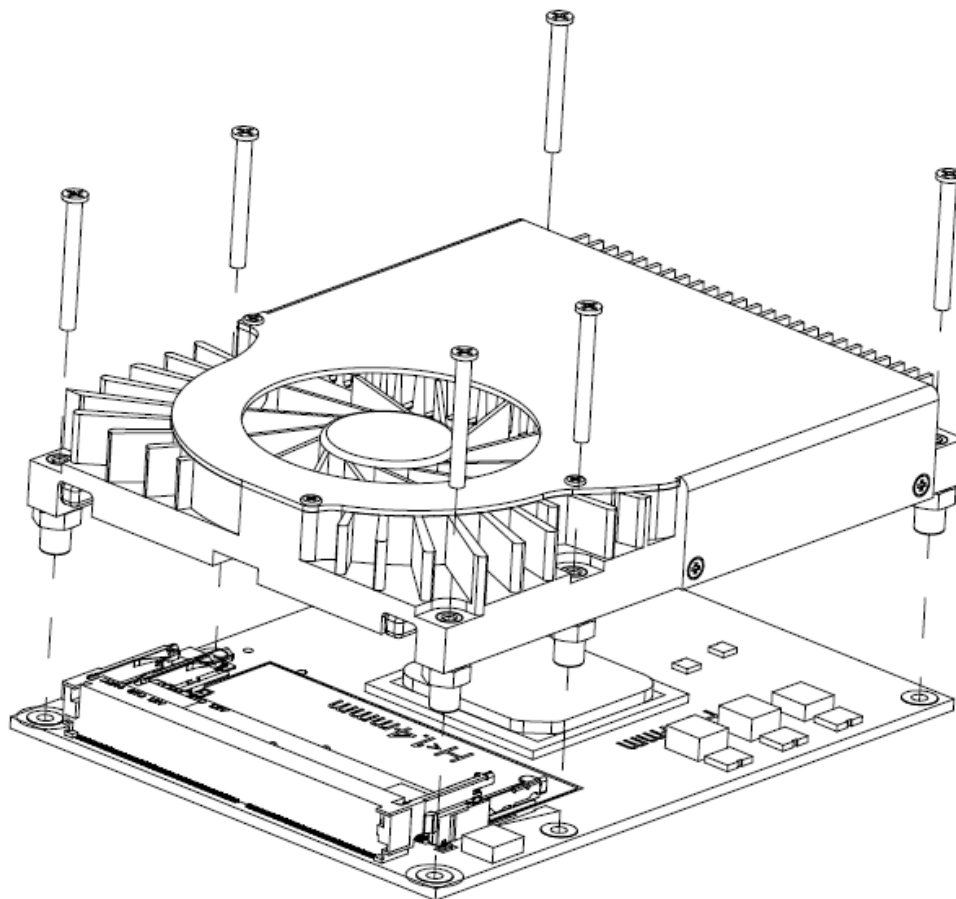


Bottom View

2.3 Installing Thermal Solution

For thermal dissipation, a thermal solution enables the CEM700's components to dissipate heat efficiently. All heat generating components are thermally conducted to the heatsink in order to avoid hot spots. Below images illustrate how to install the thermal solution on CEM700.

1. There is a protective plastic covering on the thermal pads. This must be removed before the heatsink can be mounted.
2. Each heatsink is designed for a specific CEM module. The thermal pads on the heatsink are designed to make contact with the necessary components on the CEM module. When mounting the heatsink you must make sure that the thermal pads on the heatsink make complete contact (no space between thermal pad and component) with the corresponding components on the CEM module. This is especially critical for CEM modules that have higher CPU speeds (for example 1.0GHz or more) to ensure that the heatsink acts as a proper thermal interface for cooling solutions.
3. This CPU module has six assembly holes for installing heatsink plate. Use screws to secure heatsink plate to the CEM700. Be careful not to over-tighten the screws.



2.4 Switch Settings

Properly configure switch settings on the CEM700 to meet your application purpose. Below you can find a summary table of switch and onboard default setting.



Note

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

Switch	Description	Setting
SW1	Auto Power On Default: Disable	SW1-1 OFF
	Restore BIOS Optimal Defaults Default: Normal Operation	SW1-2 OFF

2.4.1 Auto Power On and Restore BIOS Optimal Defaults (SW1)

If dip1 of SW1 (SW1-1) is set to ON position, the system will be automatically power on without pressing soft power button. If this switch is set to OFF position, it is necessary to manually press soft power button to power on the system.

The dip2 of SW1 (SW1-2) is for restoring BIOS default status. Flip SW1-2 to ON position for a few seconds then flip it back to OFF position. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Disable auto power on (Default)	SW1-1 OFF
Enable auto power on	SW1-1 ON
Normal operation (Default)	SW1-2 OFF
Restore BIOS optimal defaults	SW1-2 ON



2.5 Connector

Signals go to the 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 connectors on the hardware.

Connector	Description
SS1	COM Express™ Connector
SS2	COM Express™ Connector
DIMM1	Channel 1 DDR4 SO-DIMM Socket
DIMM2	Channel 0 DDR4 SO-DIMM Socket

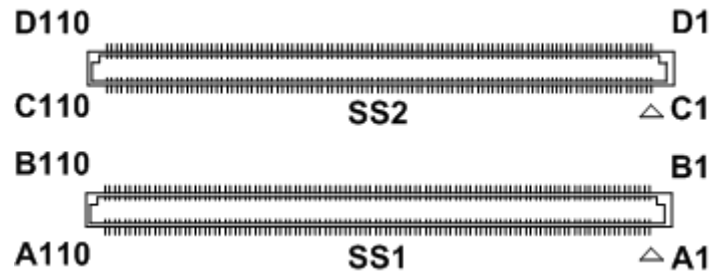


Note

- For single memory channel configuration, install memory module in channel 0 (DIMM2) DDR4 SO-DIMM socket.
- For dual memory channel configuration, install memory modules of the same size, chip width, density and rank in both channel 0 (DIMM2) and channel 1 (DIMM1) DDR4 SO-DIMM sockets.

2.5.1 COM Express™ Connectors (SS1 and SS2)

The following table shows pin assignments of the 220-pin COM Express™ connectors.



CEM700 COM Express™ Type 7 Basic Module

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	GND_A1 (FIXED)	B1	GND_B1 (FIXED)	C1	GND_C1 (FIXED)	D1	GND_D1 (FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#	C2	GND_C2	D2	GND_D2
A3	GBE0_MDI3+	B3	LPC_FRAME#/ESPI_CS0# ^[2]	C3	USB_SSRX0-	D3	USB_SSTX0-
A4	GBE0_LINK100#	B4	LPC_AD0/ESPI_IO_0 ^[2]	C4	USB_SSRX0+	D4	USB_SSTX0+
A5	GBE0_LINK1000#	B5	LPC_AD1/ESPI_IO_1 ^[2]	C5	GND_C5	D5	GND_D5
A6	GBE0_MDI2-	B6	LPC_AD2/ESPI_IO_2 ^[2]	C6	USB_SSRX1-	D6	USB_SSTX1-
A7	GBE0_MDI2+	B7	LPC_AD3/ESPI_IO_3 ^[2]	C7	USB_SSRX1+	D7	USB_SSTX1+
A8	GBE0_LINK#	B8	LPC_DRQ0#/ESPI_ALERT0# ^[2]	C8	GND_C8	D8	GND_D8
A9	GBE0_MDI1-	B9	LPC_DRQ1#/ESPI_ALERT1# ^[2]	C9	USB_SSRX2-	D9	USB_SSTX2-
A10	GBE0_MDI1+	B10	LPC_CLK/ESPI_CLK ^[2]	C10	USB_SSRX2+	D10	USB_SSTX2+
A11	GND_A11 (FIXED)	B11	GND_B11 (FIXED)	C11	GND_C11 (FIXED)	D11	GND_D11 (FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#	C12	USB_SSRX3-	D12	USB_SSTX3-
A13	GBE0_MDI0+	B13	SMB_CK	C13	USB_SSRX3+	D13	USB_SSTX3+
A14	GBE0_CTREF	B14	SMB_DAT	C14	GND_C14	D14	GND_D14
A15	SUS_S3#	B15	SMB_ALERT#	C15	10G_PHY_MDC_SCL3 ^[1]	D15	10G_PHY_MDIO_SDA3 ^[1]
A16	SATA0_TX+	B16	SATA1_TX+	C16	10G_PHY_MDC_SCL2 ^[1]	D16	10G_PHY_MDIO_SDA2 ^[1]
A17	SATA0_TX-	B17	SATA1_TX-	C17	10G_SDP2 ^[1]	D17	10G_SDP3 ^[1]
A18	SUS_S4#	B18	SUS_STAT#/ESPI_RESET# ^[2]	C18	GND_C18	D18	GND_D18
A19	SATA0_RX+	B19	SATA1_RX+	C19	PCIE_RX6+	D19	PCIE_TX6+
A20	SATA0_RX-	B20	SATA1_RX-	C20	PCIE_RX6-	D20	PCIE_TX6-
A21	GND_A21 (FIXED)	B21	GND_B21 (FIXED)	C21	GND_C21 (FIXED)	D21	GND_D21 (FIXED)
A22	PCIE_TX15+	B22	PCIE_RX15+	C22	PCIE_RX7+	D22	PCIE_TX7+
A23	PCIE_TX15-	B23	PCIE_RX15-	C23	PCIE_RX7-	D23	PCIE_TX7-
A24	SUS_S5#	B24	PWR_OK	C24	10G_INT2 ^[1]	D24	10G_INT3 ^[1]
A25	PCIE_TX14+	B25	PCIE_RX14+	C25	GND_C25	D25	GND_D25
A26	PCIE_TX14-	B26	PCIE_RX14-	C26	10G_KR_RX3+ ^[1]	D26	10G_KR_TX3+ ^[1]
A27	BATLOW# ^[1]	B27	WDT	C27	10G_KR_RX3- ^[1]	D27	10G_KR_TX3- ^[1]
A28	(S)ATA_ACT#	B28	RSVD_B28 ^[1]	C28	GND_C28	D28	GND_D28
A29	RSVD_A29 ^[1]	B29	RSVD_B29 ^[1]	C29	10G_KR_RX2+ ^[1]	D29	10G_KR_TX2+ ^[1]
A30	RSVD_A30 ^[1]	B30	RSVD_B30 ^[1]	C30	10G_KR_RX2- ^[1]	D30	10G_KR_TX2- ^[1]
A31	GND_A31 (FIXED)	B31	GND_B31 (FIXED)	C31	GND_C31 (FIXED)	D31	GND_D31 (FIXED)
A32	RSVD_A32 ^[1]	B32	SPKR	C32	10G_SFP_SDA3 ^[1]	D32	10G_SFP_SCL3 ^[1]
A33	RSVD_A33 ^[1]	B33	I2C_CK	C33	10G_SFP_SDA2 ^[1]	D33	10G_SFP_SCL2 ^[1]
A34	BIOS_DIS0#/ESPI_SAFS	B34	I2C_DAT	C34	10G_PHY_RST_23 ^[1]	D34	10G_PHY_CAP_23 ^[1]
A35	THRMTRIP#	B35	THRM# ^[1]	C35	10G_PHY_RST_01	D35	10G_PHY_CAP_01
A36	PCIE_TX13+	B36	PCIE_RX13+	C36	10G_LED_SDA	D36	RSVD_D36 ^[1]
A37	PCIE_TX13-	B37	PCIE_RX13-	C37	10G_LED_SCL	D37	RSVD_D37 ^[1]
A38	GND_A38	B38	GND_B38	C38	10G_SFP_SDA1	D38	10G_SFP_SCL1
A39	PCIE_TX12+	B39	PCIE_RX12+	C39	10G_SFP_SDA0	D39	10G_SFP_SCL0
A40	PCIE_TX12-	B40	PCIE_RX12-	C40	10G_SDP0	D40	10G_SDP1
A41	GND_A41 (FIXED)	B41	GND_B41 (FIXED)	C41	GND_C41 (FIXED)	D41	GND_D41 (FIXED)
A42	USB2-	B42	USB3-	C42	10G_KR_RX1+	D42	10G_KR_TX1+
A43	USB2+	B43	USB3+	C43	10G_KR_RX1-	D43	10G_KR_TX1-
A44	USB_2_3_OC#	B44	USB_0_1_OC#	C44	GND_C44	D44	GND_D44
A45	USB0-	B45	USB1-	C45	10G_PHY_MDC_SCL1	D45	10G_PHY_MDIO_SDA1
A46	USB0+	B46	USB1+	C46	10G_PHY_MDC_SCL0	D46	10G_PHY_MDIO_SDA0
A47	VCC_RTC	B47	ESPI_EN# ^[1]	C47	10G_INT0	D47	10G_INT1
A48	RSVD_A48 ^[1]	B48	USB0_HOST_PRSENT ^[1]	C48	GND_C48	D48	GND_D48
A49	GBE0_SDP	B49	SYS_RESET#	C49	10G_KR_RX0+	D49	10G_KR_TX0+
A50	LPC_SERIRQ/ESPI_CS1# ^[2]	B50	CB_RESET#	C50	10G_KR_RX0-	D50	10G_KR_TX0-
A51	GND_A51 (FIXED)	B51	GND_B51 (FIXED)	C51	GND_C51 (FIXED)	D51	GND_D51 (FIXED)
A52	PCIE_TX5+	B52	PCIE_RX5+	C52	PCIE_RX16+	D52	PCIE_TX16+
A53	PCIE_TX5-	B53	PCIE_RX5-	C53	PCIE_RX16-	D53	PCIE_TX16-
A54	GPIO	B54	GPO1	C54	TYPE0#	D54	RSVD_D54 ^[1]
A55	PCIE_TX4+	B55	PCIE_RX4+	C55	PCIE_RX17+	D55	PCIE_TX17+

^[1] Not connected on the CEM700.

^[2] CEM700 doesn't support ESPI. The voltage of these pins is 3.3V.

CEM700 COM Express™ Type 7 Basic Module

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A56	PCIE_TX4-	B56	PCIE_RX4-	C56	PCIE_RX17-	D56	PCIE_TX17-
A57	GND_A57	B57	GPO2	C57	TYPE1# ^[1]	D57	TYPE2#
A58	PCIE_TX3+	B58	PCIE_RX3+	C58	PCIE_RX18+	D58	PCIE_TX18+
A59	PCIE_TX3-	B59	PCIE_RX3-	C59	PCIE_RX18-	D59	PCIE_TX18-
A60	GND_A60 (FIXED)	B60	GND_B60 (FIXED)	C60	GND_C60 (FIXED)	D60	GND_D60 (FIXED)
A61	PCIE_TX2+	B61	PCIE_RX2+	C61	PCIE_RX19+	D61	PCIE_TX19+
A62	PCIE_TX2-	B62	PCIE_RX2-	C62	PCIE_RX19-	D62	PCIE_TX19-
A63	GPI1	B63	GPO3	C63	RSVD_C63 ^[1]	D63	RSVD_D63 ^[1]
A64	PCIE_TX1+	B64	PCIE_RX1+	C64	RSVD_C64 ^[1]	D64	RSVD_D64 ^[1]
A65	PCIE_TX1-	B65	PCIE_RX1-	C65	PCIE_RX20+	D65	PCIE_TX20+
A66	GND_A66	B66	WAKE0#	C66	PCIE_RX20-	D66	PCIE_TX20-
A67	GPI2	B67	WAKE1#	C67	RAPID_SHUTDOWN ^[1]	D67	GND_D67
A68	PCIE_TX0+	B68	PCIE_RX0+	C68	PCIE_RX21+	D68	PCIE_TX21+
A69	PCIE_TX0-	B69	PCIE_RX0-	C69	PCIE_RX21-	D69	PCIE_TX21-
A70	GND_A70 (FIXED)	B70	GND_B70 (FIXED)	C70	GND_C70 (FIXED)	D70	GND_D70 (FIXED)
A71	PCIE_TX8+	B71	PCIE_RX8+	C71	PCIE_RX22+	D71	PCIE_TX22+
A72	PCIE_TX8-	B72	PCIE_RX8-	C72	PCIE_RX22-	D72	PCIE_TX22-
A73	GND_A73	B73	GND_B73	C73	GND_C73	D73	GND_D73
A74	PCIE_TX9+	B74	PCIE_RX9+	C74	PCIE_RX23+	D74	PCIE_TX23+
A75	PCIE_TX9-	B75	PCIE_RX9-	C75	PCIE_RX23-	D75	PCIE_TX23-
A76	GND_A76	B76	GND_B76	C76	GND_C76	D76	GND_D76
A77	PCIE_TX10+	B77	PCIE_RX10+	C77	RSVD_C77 ^[1]	D77	RSVD_D77 ^[1]
A78	PCIE_TX10-	B78	PCIE_RX10-	C78	PCIE_RX24+	D78	PCIE_TX24+
A79	GND_A79	B79	GND_B79	C79	PCIE_RX24-	D79	PCIE_TX24-
A80	GND_A80 (FIXED)	B80	GND_B80 (FIXED)	C80	GND_C80 (FIXED)	D80	GND_D80 (FIXED)
A81	PCIE_TX11+	B81	PCIE_RX11+	C81	PCIE_RX25+	D81	PCIE_TX25+
A82	PCIE_TX11-	B82	PCIE_RX11-	C82	PCIE_RX25-	D82	PCIE_TX25-
A83	GND_A83	B83	GND_B83	C83	RSVD_C83 ^[1]	D83	RSVD_D83 ^[1]
A84	NCSI_TX_EN	B84	VCC_5V_SBY_1	C84	GND_C84	D84	GND_D84
A85	GPI3	B85	VCC_5V_SBY_2	C85	PCIE_RX26+	D85	PCIE_TX26+
A86	RSVD_A86 ^[1]	B86	VCC_5V_SBY_3	C86	PCIE_RX26-	D86	PCIE_TX26-
A87	RSVD_A87 ^[1]	B87	VCC_5V_SBY_4	C87	GND_C87	D87	GND_D87
A88	PCIE_CK_REF+	B88	BIOS_DIS1#	C88	PCIE_RX27+	D88	PCIE_TX27+
A89	PCIE_CK_REF-	B89	NCSI_RX_ER ^[1]	C89	PCIE_RX27-	D89	PCIE_TX27-
A90	GND_A90 (FIXED)	B90	GND_B90 (FIXED)	C90	GND_C90 (FIXED)	D90	GND_D90 (FIXED)
A91	SPL_POWER	B91	NCSI_CLK_IN	C91	PCIE_RX28+	D91	PCIE_TX28+
A92	SPL_MISO	B92	NCSI_RXD1	C92	PCIE_RX28-	D92	PCIE_TX28-
A93	GPO0	B93	NCSI_RXD0	C93	GND_C93	D93	GND_D93
A94	SPL_CLK	B94	NCSI_CRS_DV	C94	PCIE_RX29+	D94	PCIE_TX29+
A95	SPL_MOSI	B95	NCSI_TXD1	C95	PCIE_RX29-	D95	PCIE_TX29-
A96	TPM_PP	B96	NCSI_TXD0	C96	GND_C96	D96	GND_D96
A97	TYPE10# ^[1]	B97	SPL_CS#	C97	RSVD_C97 ^[1]	D97	RSVD_D97 ^[1]
A98	SER0_TX	B98	NCSI_ARB_IN	C98	PCIE_RX30+	D98	PCIE_TX30+
A99	SER0_RX	B99	NCSI_ARB_OUT	C99	PCIE_RX30-	D99	PCIE_TX30-
A100	GND_A100 (FIXED)	B100	GND_B100 (FIXED)	C100	GND_C100 (FIXED)	D100	GND_D100 (FIXED)
A101	SER1_TX	B101	FAN_PWNOUT	C101	PCIE_RX31+	D101	PCIE_TX31+
A102	SER1_RX	B102	FAN_TACHIN	C102	PCIE_RX31-	D102	PCIE_TX31-
A103	LID#	B103	SLEEP#	C103	GND_C103	D103	GND_D103
A104	VCC_12V_1	B104	VCC_12V_7	C104	VCC_12V_1	D104	VCC_12V_7
A105	VCC_12V_2	B105	VCC_12V_8	C105	VCC_12V_2	D105	VCC_12V_8
A106	VCC_12V_3	B106	VCC_12V_9	C106	VCC_12V_3	D106	VCC_12V_9
A107	VCC_12V_4	B107	VCC_12V_10	C107	VCC_12V_4	D107	VCC_12V_10
A108	VCC_12V_5	B108	VCC_12V_11	C108	VCC_12V_5	D108	VCC_12V_11
A109	VCC_12V_6	B109	VCC_12V_12	C109	VCC_12V_6	D109	VCC_12V_12
A110	GND_A110 (FIXED)	B110	GND_B110 (FIXED)	C110	GND_C110 (FIXED)	D110	GND_D110 (FIXED)

^[1] Not connected on the CEM700.

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Chapter 3

Hardware Description

3.1 Microprocessor

The CEM700 supports Intel® Xeon D® and Pentium D® processors, which enables your system to operate under Windows® 7/10, Windows® Server 2012/2016 and Linux environments. The system performance depends on the microprocessor. You must install the heatsink or cooler carefully and properly to prevent damage.

3.2 BIOS

The CEM700 uses AMI Plug and Play BIOS with a single 128Mbit SPI Flash.

3.3 System Memory

The CEM700 supports two 260-pin DDR4 SO-DIMM sockets for maximum memory capacity up to 32GB. The memory module can come in sizes of 4GB, 8GB and 16GB.

3.4 I/O Port Address Map





















































The I/O port addresses (with CEB94701 baseboard under Windows® 7) are as follows:

Address Range	Device Name
[0000000000000000 - 000000000000000F]	Direct memory access controller
[0000000000000000 - 000000000000CF7]	PCI bus
[0000000000000010 - 00000000000001F]	Motherboard resources
[0000000000000020 - 00000000000003D]	Programmable interrupt controller
[0000000000000040 - 000000000000043]	System timer
[0000000000000050 - 000000000000053]	System timer
[0000000000000060 - 000000000000060]	Standard PS/2 Keyboard
[0000000000000061 - 000000000000061]	System speaker
[0000000000000064 - 000000000000064]	Standard PS/2 Keyboard
[0000000000000070 - 000000000000071]	System CMOS/real time clock
[0000000000000072 - 000000000000073]	Motherboard resources
[0000000000000074 - 000000000000077]	System CMOS/real time clock
[0000000000000080 - 000000000000080]	Motherboard resources
[0000000000000081 - 000000000000083]	Direct memory access controller
[0000000000000084 - 000000000000086]	Motherboard resources
[0000000000000087 - 000000000000087]	Direct memory access controller
[0000000000000088 - 000000000000088]	Motherboard resources
[0000000000000089 - 00000000000008B]	Direct memory access controller
[000000000000008C - 00000000000008E]	Motherboard resources
[000000000000008F - 00000000000008F]	Direct memory access controller
[0000000000000090 - 00000000000009F]	Motherboard resources
[0000000000000092 - 000000000000092]	Motherboard resources
[00000000000000A0 - 0000000000000BD]	Programmable interrupt controller
[00000000000000C0 - 0000000000000DF]	Direct memory access controller
[00000000000000F0 - 0000000000000F0]	Numeric data processor
[0000000000000248 - 000000000000024F]	Communications Port (COM1)
[0000000000000258 - 000000000000025F]	Communications Port (COM2)
[00000000000003B0 - 00000000000003BB]	ASPEED Graphics Family
[00000000000003B0 - 00000000000003BB]	Intel(R) 8 Series/C220 Series PCI Express Root Port #5 - 8C18
[00000000000003B0 - 00000000000003BB]	PCI standard PCI Express to PCI/PCI-X Bridge
[00000000000003C0 - 00000000000003DF]	ASPEED Graphics Family
[00000000000003C0 - 00000000000003DF]	Intel(R) 8 Series/C220 Series PCI Express Root Port #5 - 8C18
[00000000000003C0 - 00000000000003DF]	PCI standard PCI Express to PCI/PCI-X Bridge
[0000000000000400 - 000000000000047F]	Motherboard resources
[00000000000004D0 - 00000000000004D1]	Programmable interrupt controller
[0000000000000500 - 000000000000057F]	Motherboard resources
[0000000000000580 - 000000000000059F]	Motherboard resources
[0000000000000600 - 000000000000061F]	Motherboard resources
[0000000000000800 - 000000000000081F]	Motherboard resources
[0000000000000880 - 0000000000000883]	Motherboard resources
[0000000000001000 - 000000000000FFFF]	PCI bus
[000000000000D000 - 000000000000DFFF]	Intel(R) 8 Series/C220 Series PCI Express Root Port #8 - 8C1E
[000000000000E000 - 000000000000E07F]	ASPEED Graphics Family
[000000000000E000 - 000000000000EFFF]	Intel(R) 8 Series/C220 Series PCI Express Root Port #5 - 8C18
[000000000000E000 - 000000000000EFFF]	PCI standard PCI Express to PCI/PCI-X Bridge
[000000000000F000 - 000000000000F01F]	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[000000000000F020 - 000000000000F03F]	Standard AHCI 1.0 Serial ATA Controller
[000000000000F040 - 000000000000F043]	Standard AHCI 1.0 Serial ATA Controller
[000000000000F050 - 000000000000F057]	Standard AHCI 1.0 Serial ATA Controller
[000000000000F060 - 000000000000F063]	Standard AHCI 1.0 Serial ATA Controller
[000000000000F070 - 000000000000F077]	Standard AHCI 1.0 Serial ATA Controller

3.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list (with CEB94701 baseboard under Windows® 7) is shown as follows:

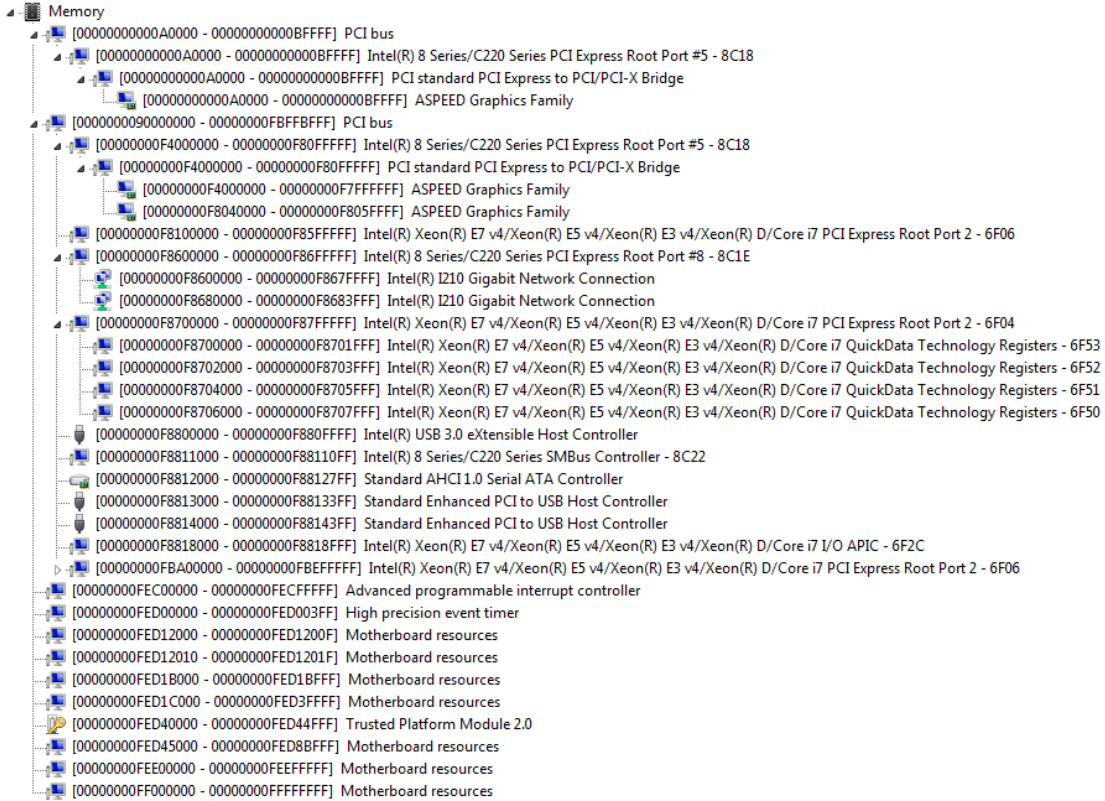
IRQ	Device
(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000001 (01)	Standard PS/2 Keyboard
(ISA) 0x00000006 (06)	Communications Port (COM2)
(ISA) 0x00000007 (07)	Communications Port (COM1)
(ISA) 0x00000008 (08)	System CMOS/real time clock
(ISA) 0x0000000D (13)	Numeric data processor
(ISA) 0x00000051 (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/C220 Series SMBus Controller - 8C22
(PCI) 0x00000005 (05)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 QuickData Technology Registers - 6F50
(PCI) 0x00000005 (05)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 QuickData Technology Registers - 6F51
(PCI) 0x00000005 (05)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 QuickData Technology Registers - 6F52
(PCI) 0x00000005 (05)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 QuickData Technology Registers - 6F53
(PCI) 0x00000010 (16)	ASPEED Graphics Family
(PCI) 0x00000010 (16)	PCI standard PCI Express to PCI/PCI-X Bridge
(PCI) 0x00000010 (16)	Standard AHCI 1.0 Serial ATA Controller
(PCI) 0x00000012 (18)	Standard Enhanced PCI to USB Host Controller
(PCI) 0x00000012 (18)	Standard Enhanced PCI to USB Host Controller
(PCI) 0xFFFFFCD (-51)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFCE (-50)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFCF (-49)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD0 (-48)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD1 (-47)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD2 (-46)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD3 (-45)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD4 (-44)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD5 (-43)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD6 (-42)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD7 (-41)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD8 (-40)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFD9 (-39)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFDA (-38)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFDB (-37)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFDC (-36)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFDD (-35)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFDE (-34)	Intel(R) Ethernet Connection X552 10 GbE SFP+
(PCI) 0xFFFFFDF (-33)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE0 (-32)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE1 (-31)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE2 (-30)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE3 (-29)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE4 (-28)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE5 (-27)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE6 (-26)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE7 (-25)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE8 (-24)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFE9 (-23)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFEA (-22)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFEB (-21)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFEC (-20)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFED (-19)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFEE (-18)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFEF (-17)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFF0 (-16)	Intel(R) Ethernet Connection X552 10 GbE SFP+ #2
(PCI) 0xFFFFFF1 (-15)	Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFF2 (-14)	Intel(R) I210 Gigabit Network Connection
(PCI) 0xFFFFFF3 (-13)	Intel(R) I210 Gigabit Network Connection
(PCI) 0xFFFFFF4 (-12)	Intel(R) I210 Gigabit Network Connection
(PCI) 0xFFFFFF5 (-11)	Intel(R) I210 Gigabit Network Connection
(PCI) 0xFFFFFF6 (-10)	Intel(R) I210 Gigabit Network Connection
(PCI) 0xFFFFFF7 (-9)	Intel(R) I210 Gigabit Network Connection
(PCI) 0xFFFFFF8 (-8)	Intel(R) 8 Series/C220 Series PCI Express Root Port #8 - 8C1E
(PCI) 0xFFFFFF9 (-7)	Intel(R) 8 Series/C220 Series PCI Express Root Port #5 - 8C18
(PCI) 0xFFFFFFA (-6)	Intel(R) 8 Series/C220 Series PCI Express Root Port #1 - 8C10
(PCI) 0xFFFFFFB (-5)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 PCI Express Root Port 3 - 6F08
(PCI) 0xFFFFFFC (-4)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 PCI Express Root Port 2 - 6F06
(PCI) 0xFFFFFFD (-3)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 PCI Express Root Port 2 - 6F04
(PCI) 0xFFFFFFE (-2)	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D/Core i7 PCI Express Root Port 1 - 6F02

3.6 Memory Map

The memory mapping list (with CEB94701 baseboard under Windows® 7) is shown as follows:



Chapter 4

AMI BIOS Setup Utility

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

4.1 Starting

To enter the setup screens, follow the steps below:

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



Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting SW1-2 (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.



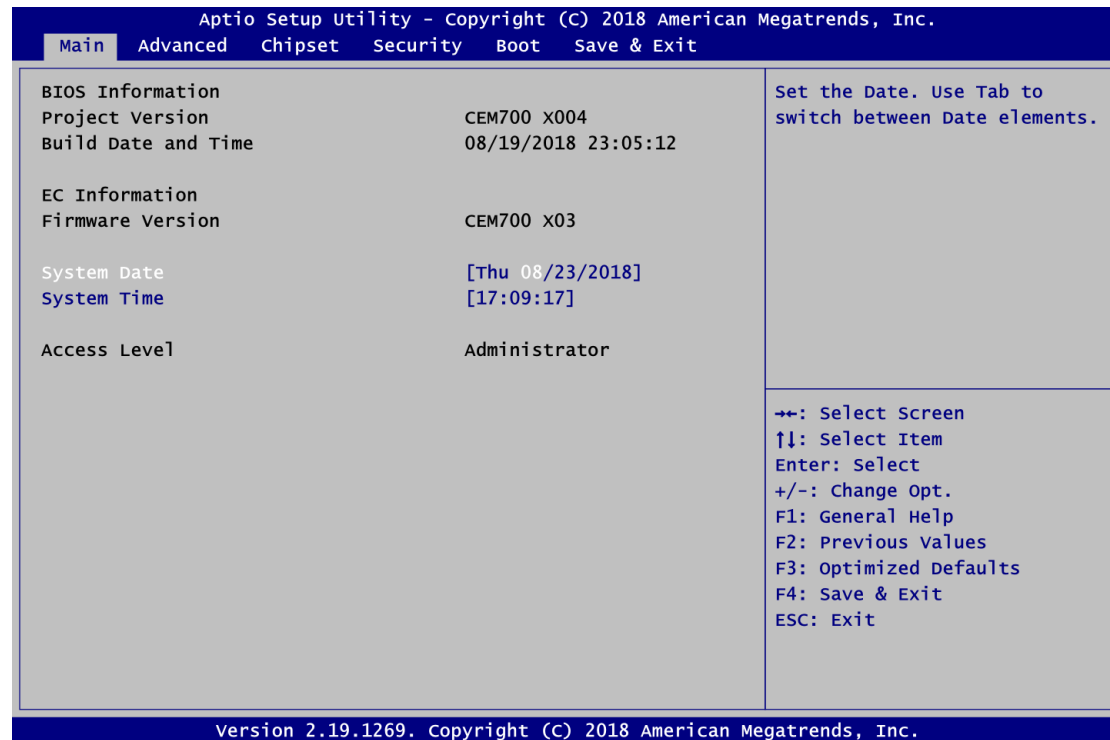
Note

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.



BIOS and EC Information

Display BIOS and EC firmware 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

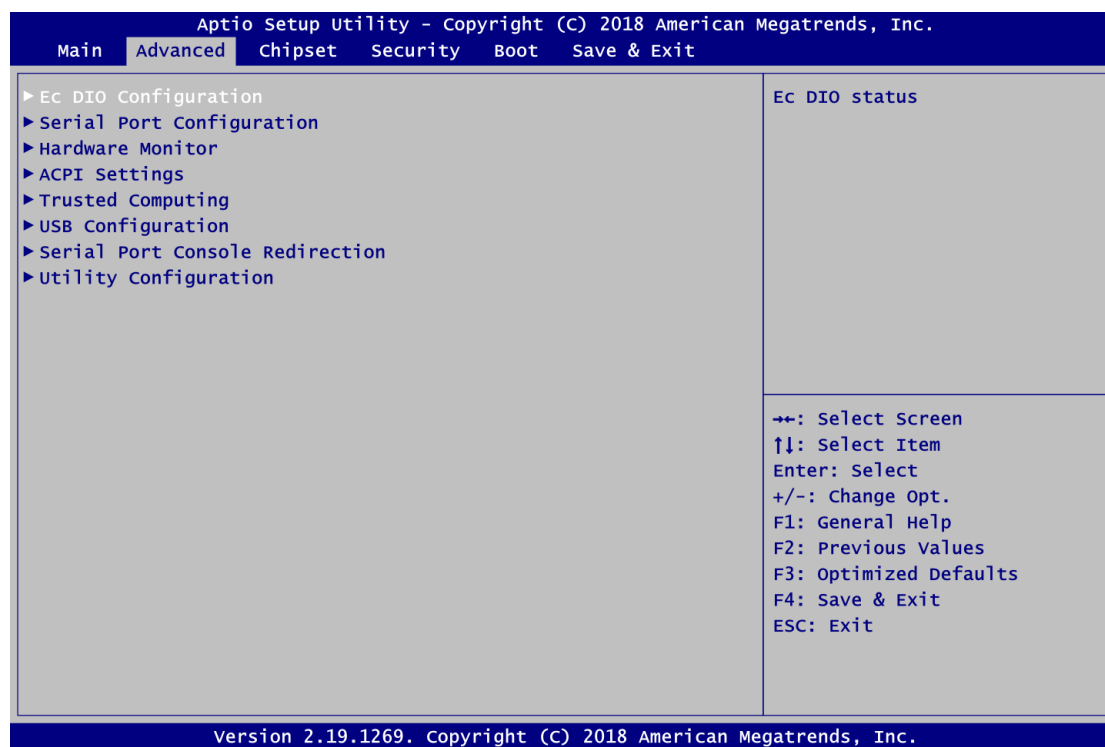
Display the access level of current user.

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:

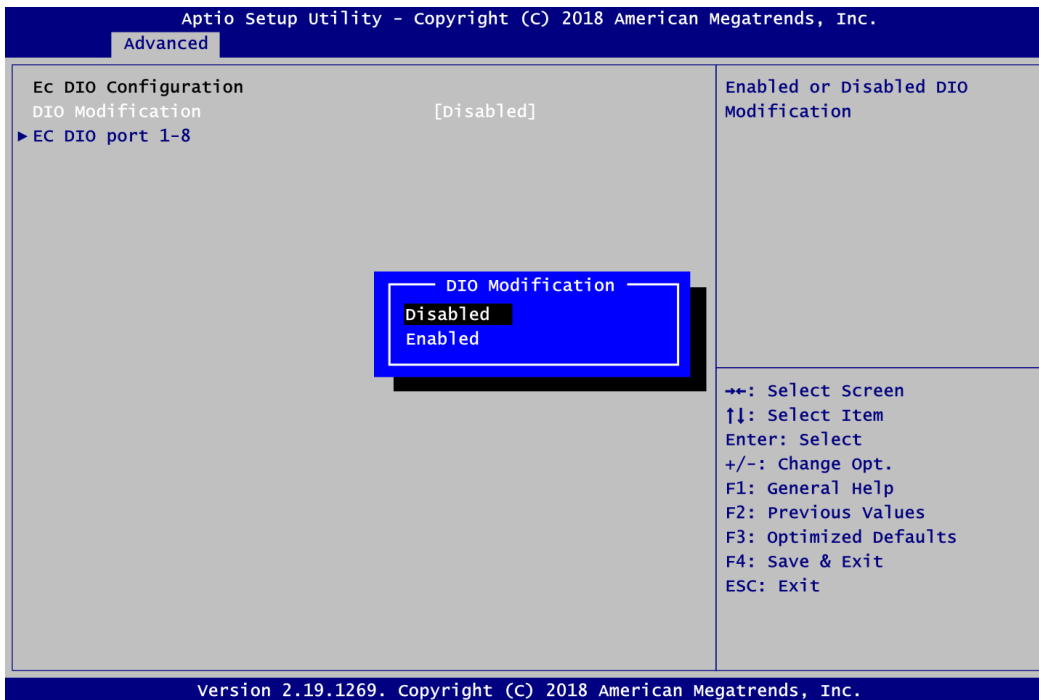
- ▶ Ec DIO Configuration
- ▶ Serial Port Configuration
- ▶ Hardware Monitor
- ▶ ACPI Settings
- ▶ Trusted Computing
- ▶ USB Configuration
- ▶ Serial Port Console Redirection
- ▶ Utility Configuration

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



- **Ec DIO Configuration**

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



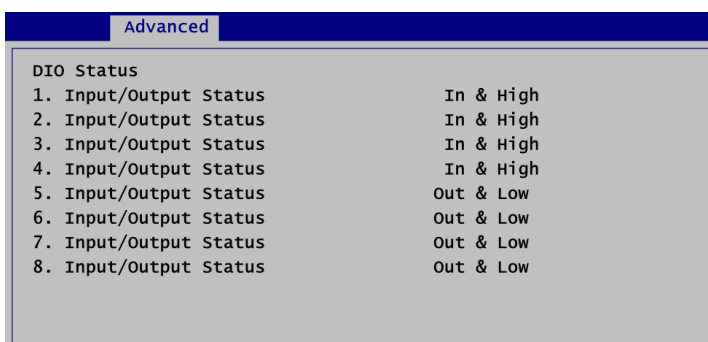
DIO Modification

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

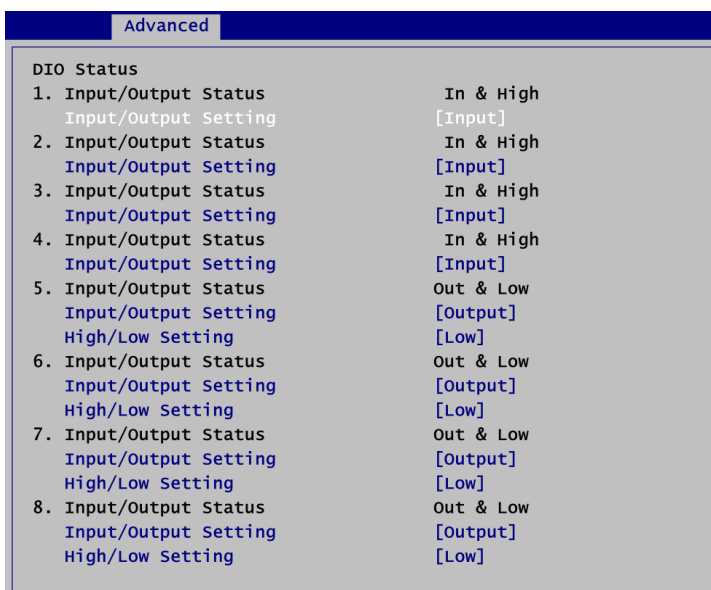
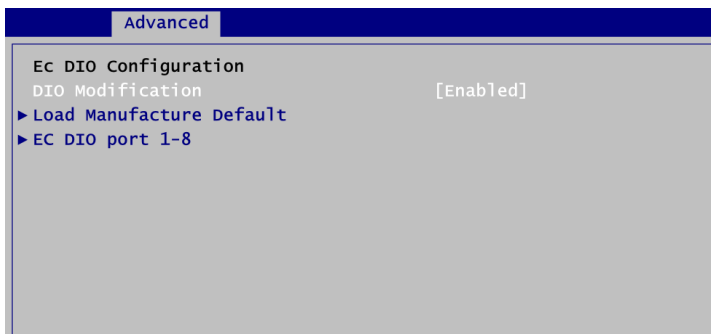
DIO port 1-8

Select this option to open DIO status sub screen.

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

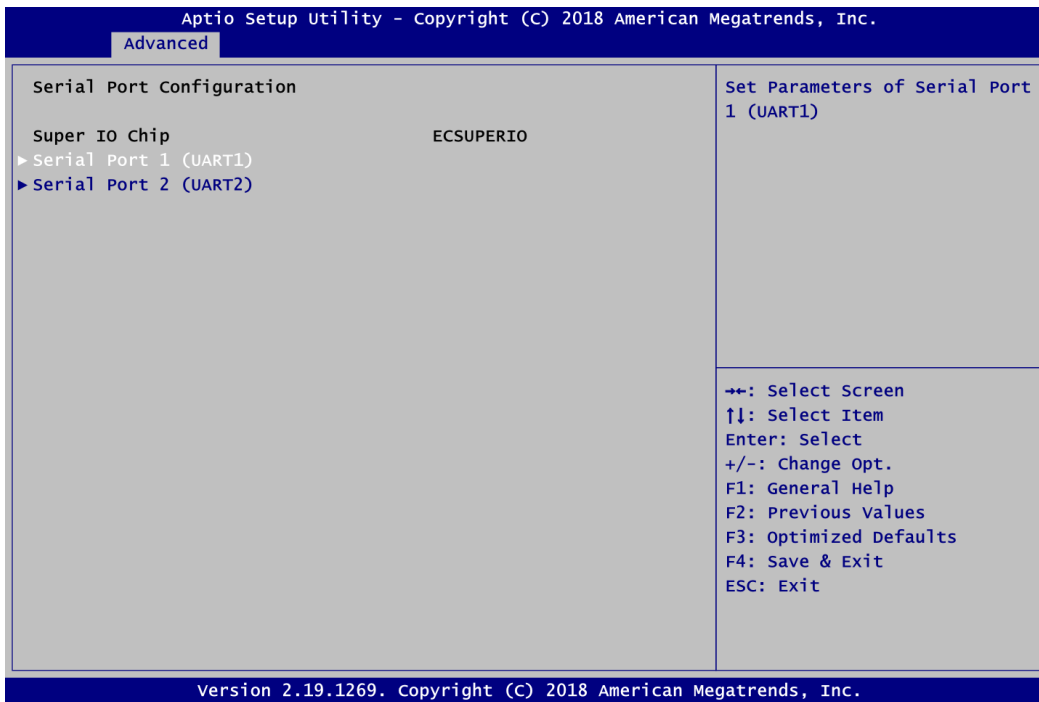


If DIO Modification is enabled, you can load manufacture default and access to the DIO status sub screen to change inputs/outputs setting, see images below.



- **Serial Port Configuration**

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

**Serial Port 1~2 (UART1~2)**

Set parameters related to serial port 1~2.

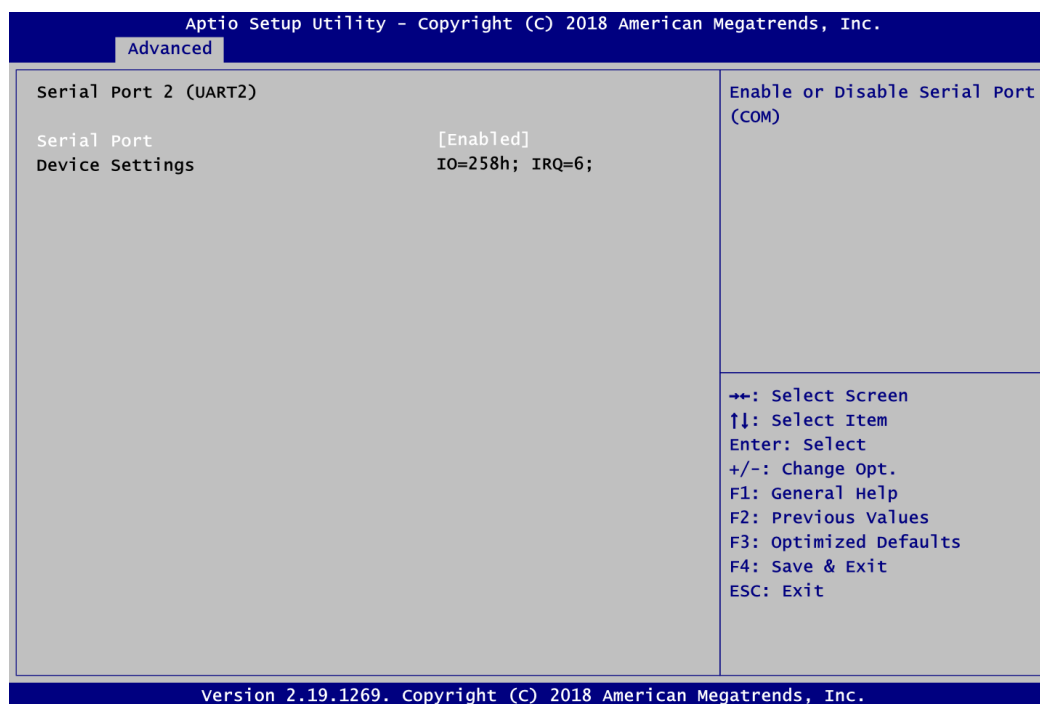
- **Serial Port 1 Configuration**



Serial Port 1 (UART1)

Enable or disable serial port 1. The optimal setting for base I/O address is 248h and for interrupt request address is IRQ7.

- **Serial Port 2 Configuration**

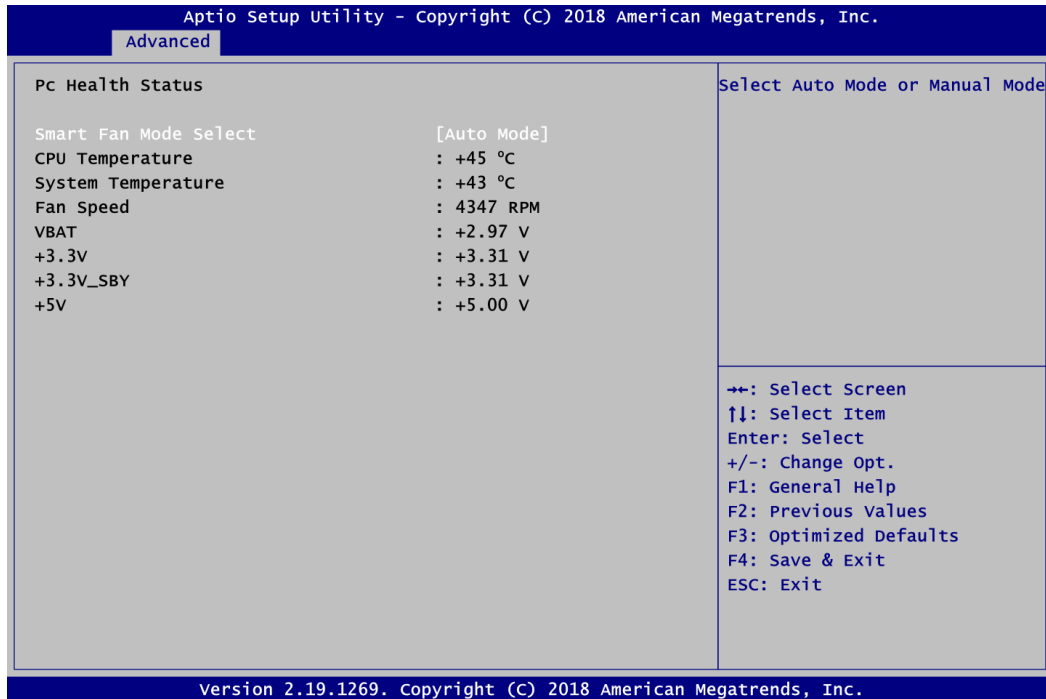


Serial Port 2 (UART2)

Enable or disable serial port 2. The optimal setting for base I/O address is 258h and for interrupt request address is IRQ6.

- **Hardware Monitor**

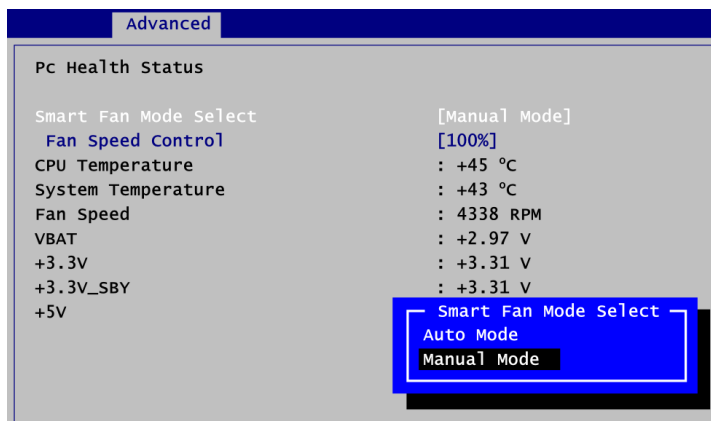
This screen is for fan speed control and hardware health status monitoring.

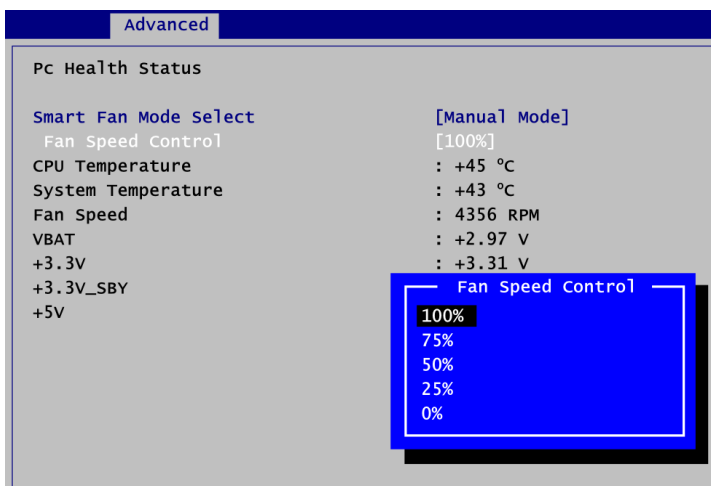


This screen displays the temperature of system and CPU, cooling fans speed in RPM and system voltages (VBAT, +3.3V, +3.3V_SBY and +5V).

Smart Fan Mode Select

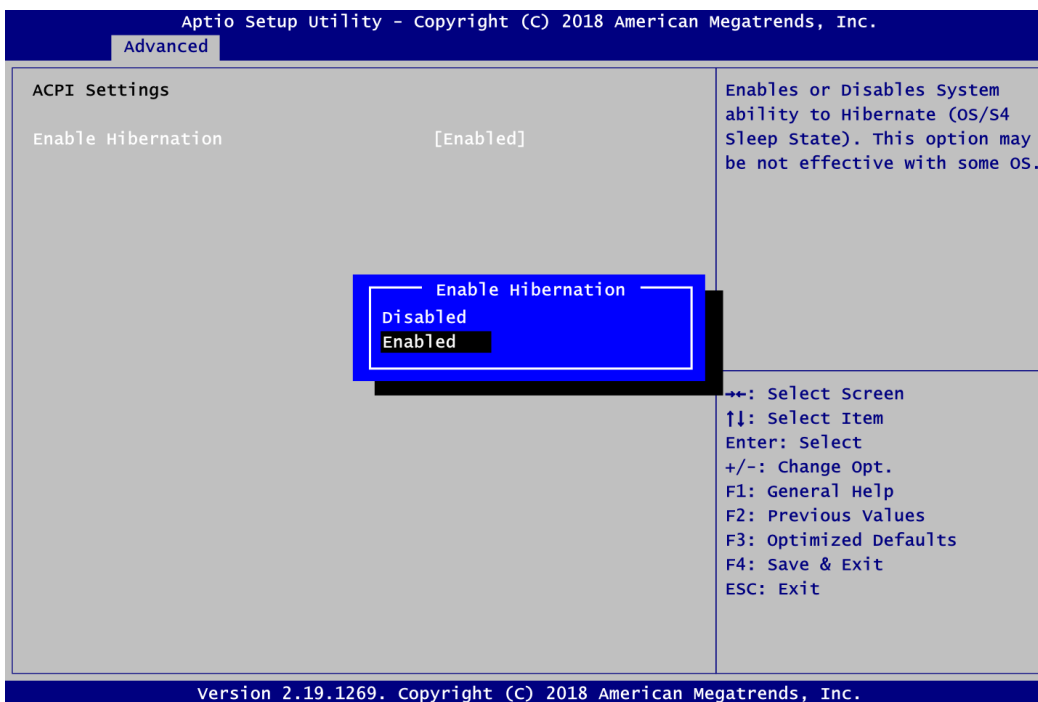
Set Smart Fan mode. The default is Auto Mode. If Smart Fan is in Auto Mode, the system fan spins at different speed depending on system temperature; the higher the temperature, the faster the system fan spins. If Smart Fan is in Manual Mode, user can manually change system fan speed to 0%, 25%, 50%, 75% or 100% (see images below).





- **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.

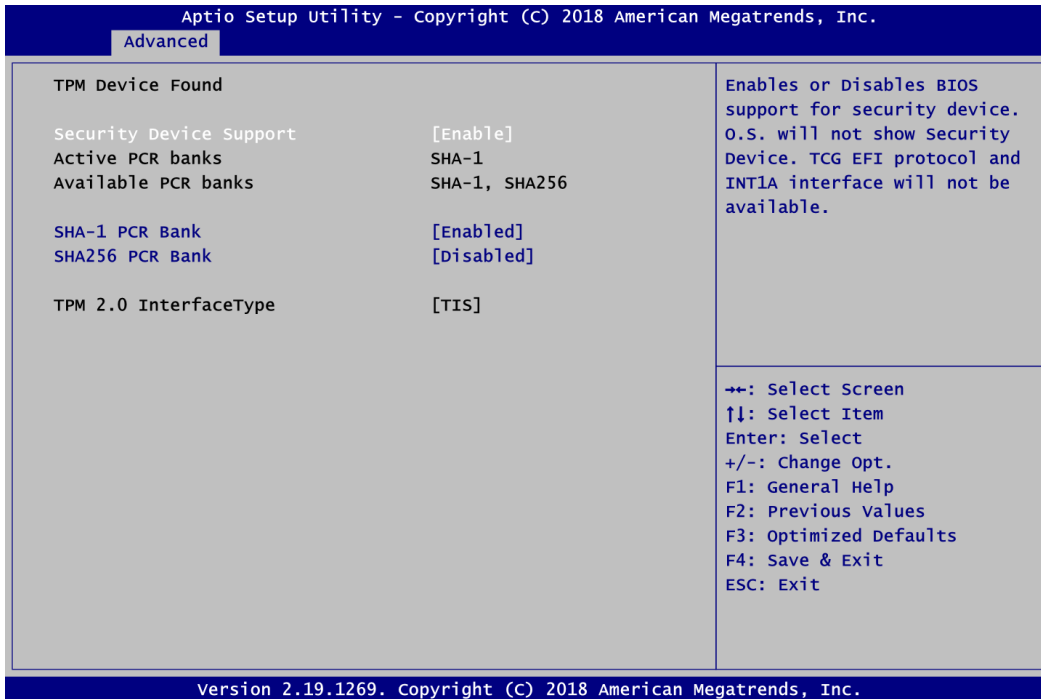


Enable Hibernation

Enable or disable system ability to hibernate (OS/S4 sleep state).

- **Trusted Computing**

You can use this screen for TPM (Trusted Platform Module) configuration.



Security Device Support

Enable or disable BIOS support for security device.

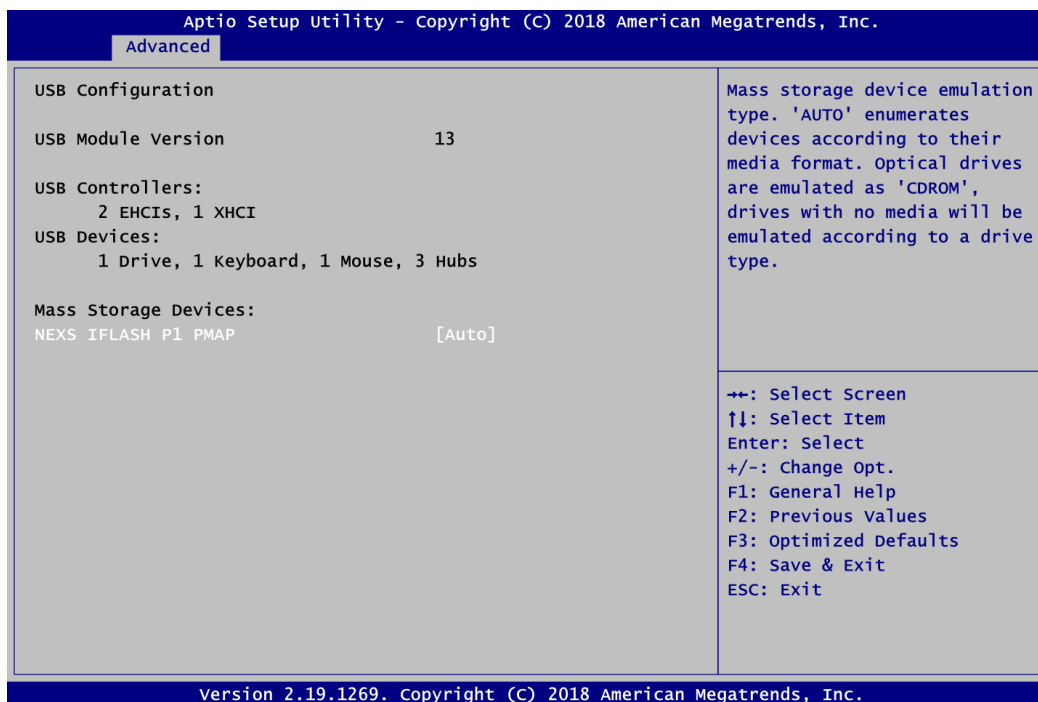
SHA-1 PCR Bank

Enable or disable SHA-1 PCR bank.

SHA256 PCR Bank

Enable or disable SHA256 PCR bank.

- **USB Configuration**



USB Devices

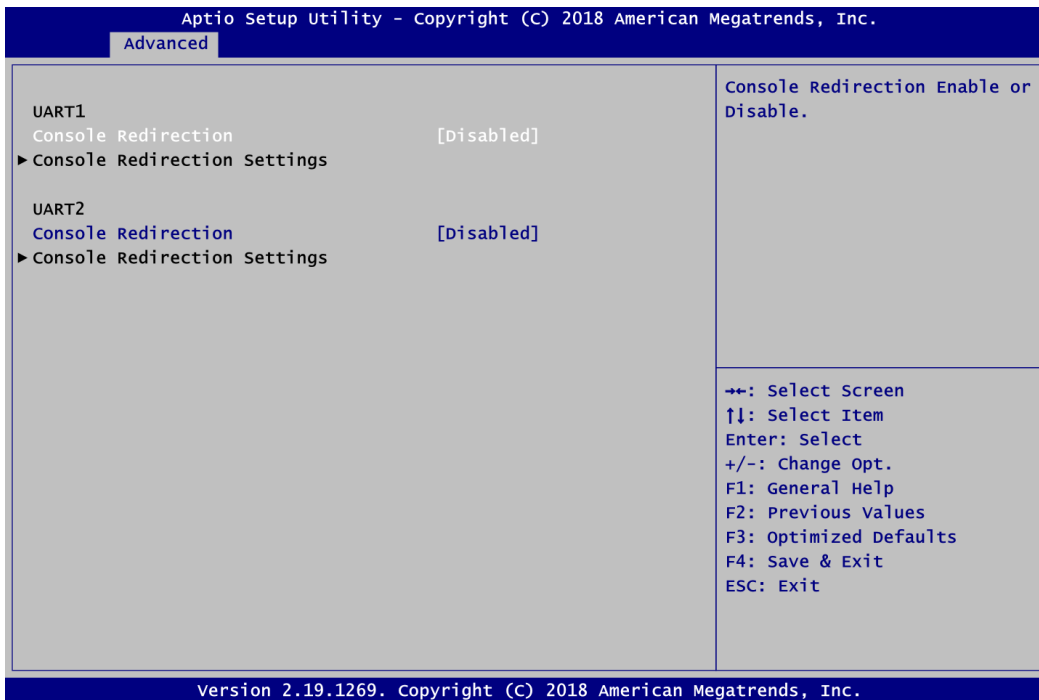
Display all detected USB devices.

Mass Storage Devices

Mass storage device emulation type. Auto option enumerates devices according to their media format. Optical drives are emulated as CDROM, drives with no media will be emulated according to a drive type.

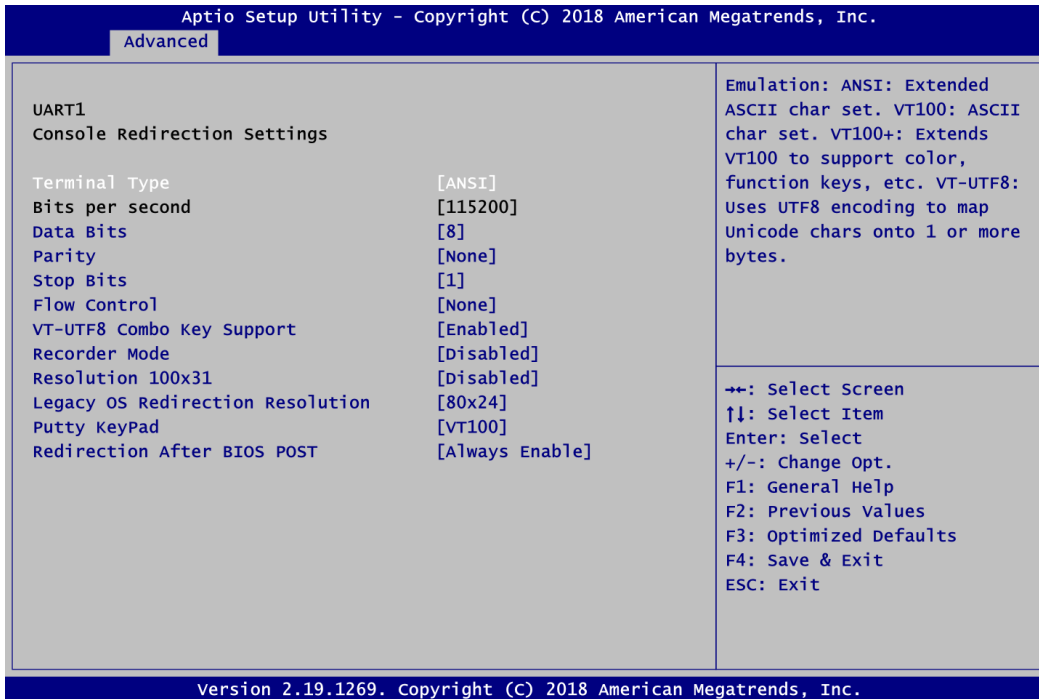
- **Serial Port Console Redirection**

You can use this screen to select options for Serial Port Console Redirection, 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.



UART1\UART2 Console Redirection

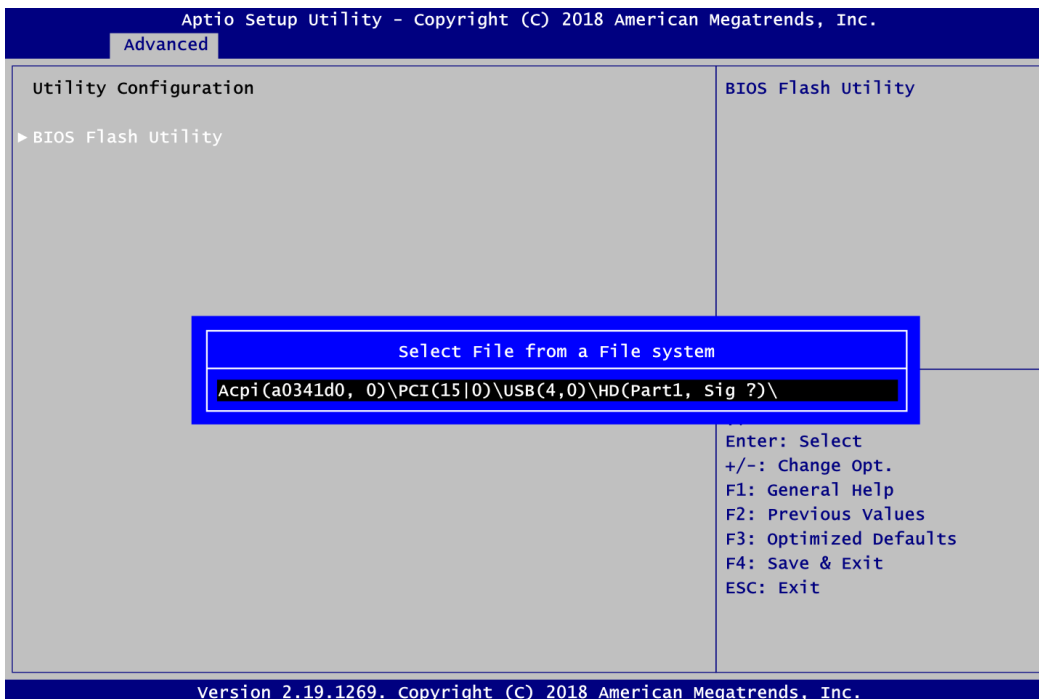
Enable or disable UART1\UART2 console redirection setting.



UART1/UART2 Console Redirection Settings

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

- **Utility Configuration**



BIOS Flash Utility

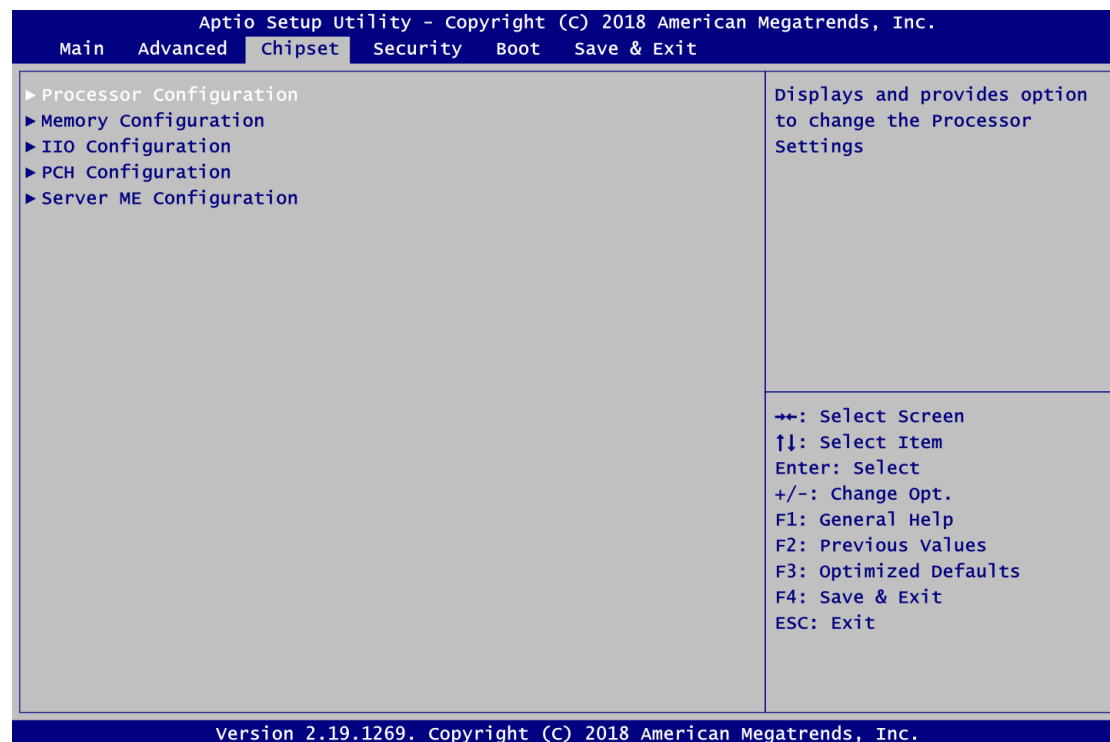
BIOS flash utility configuration. For more detailed information, please refer to Appendix B.

4.5 Chipset Menu

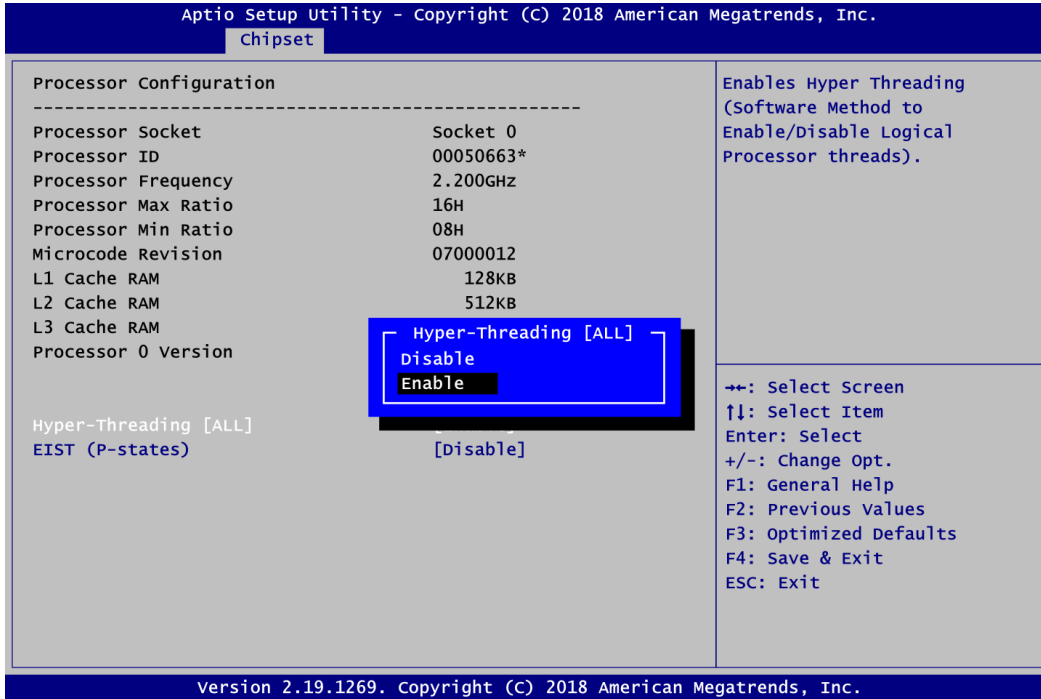
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ Processor Configuration
- ▶ Memory Configuration
- ▶ IIO Configuration
- ▶ PCH Configuration
- ▶ Server ME Configuration

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

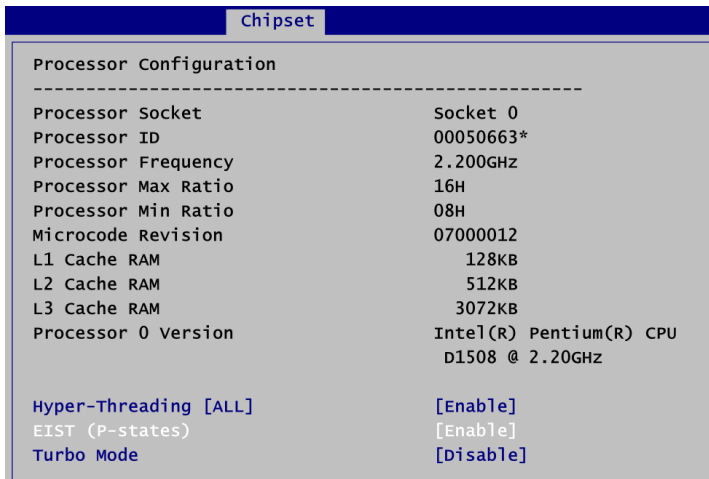


● Processor Configuration



Hyper-Threading [ALL]

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.



EIST (P-states)

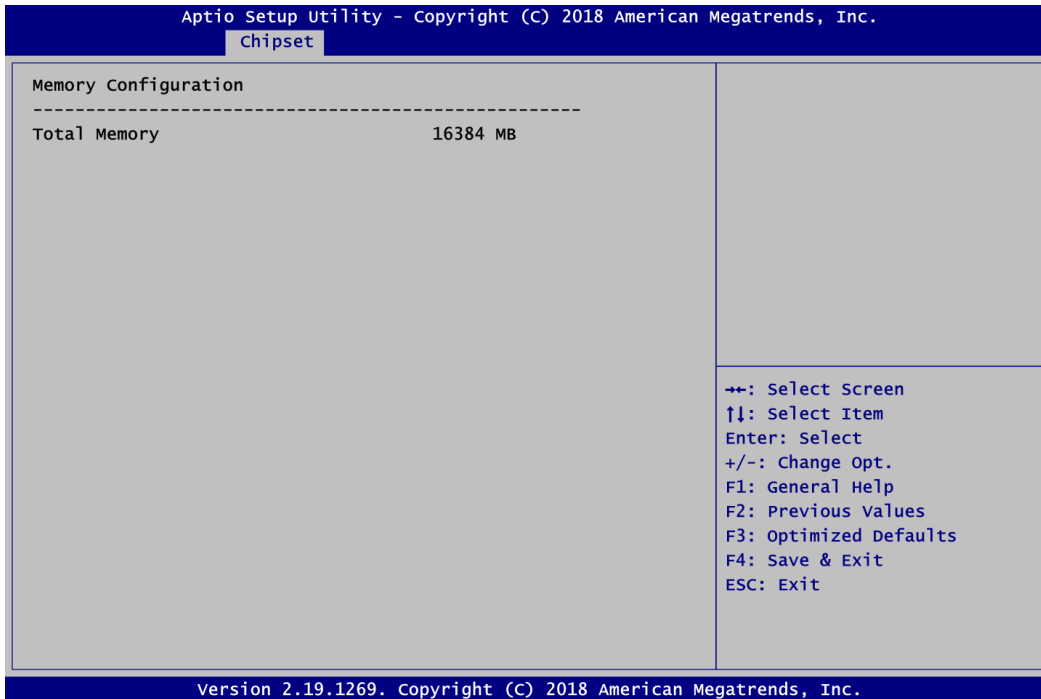
Enable or disable Enhanced Intel® SpeedStep Technology (EIST). When enabled, the CPU speed is controlled by the operating system according to load. When disabled, CPU speed is set at max non-turbo.

Turbo Mode

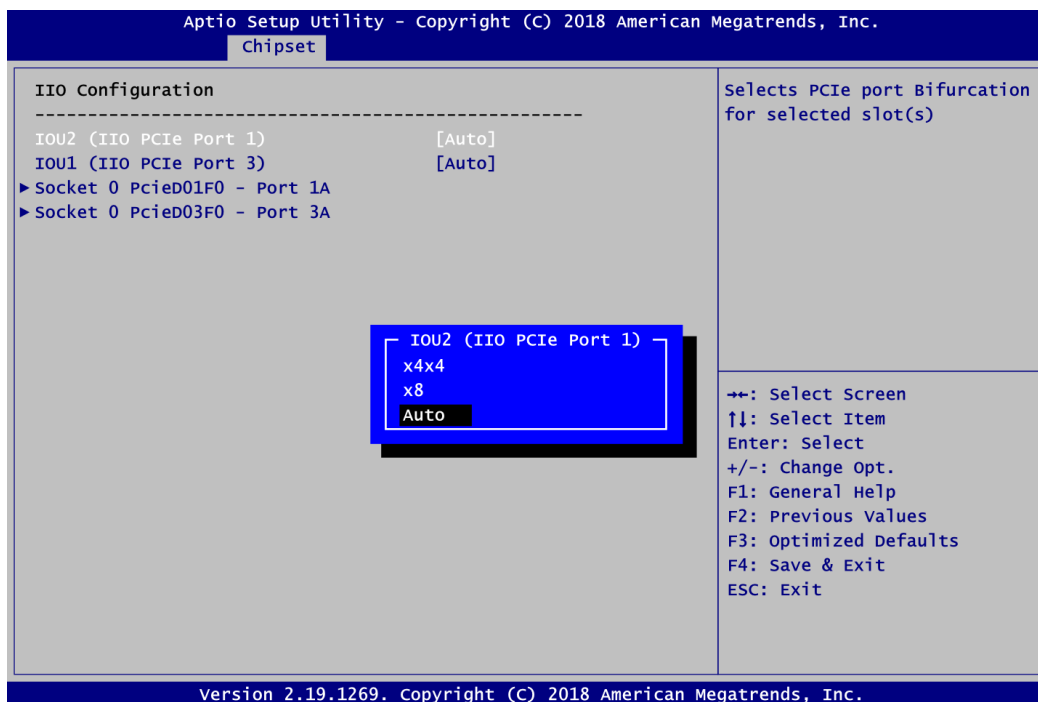
Enable or disable turbo mode.

- **Memory Configuration**

This screen displays system memory information.



● I/O Configuration

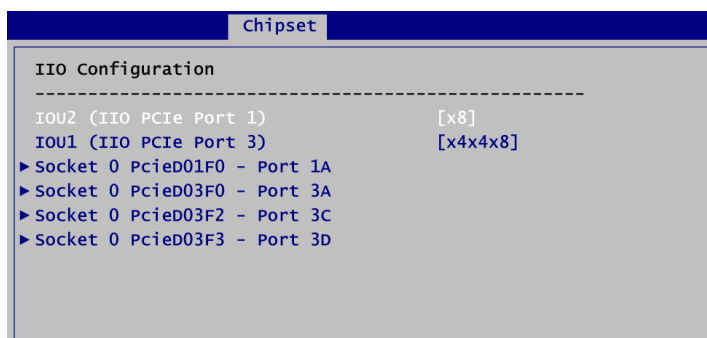
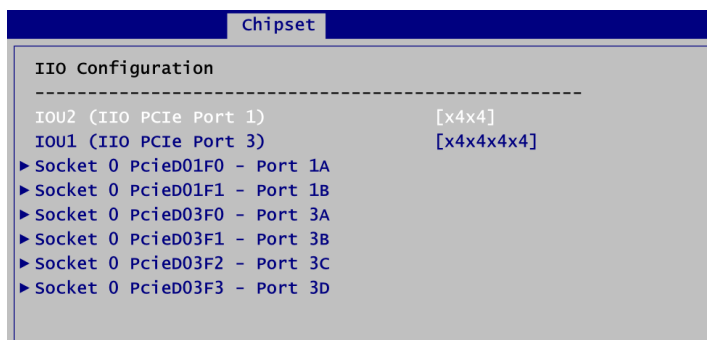


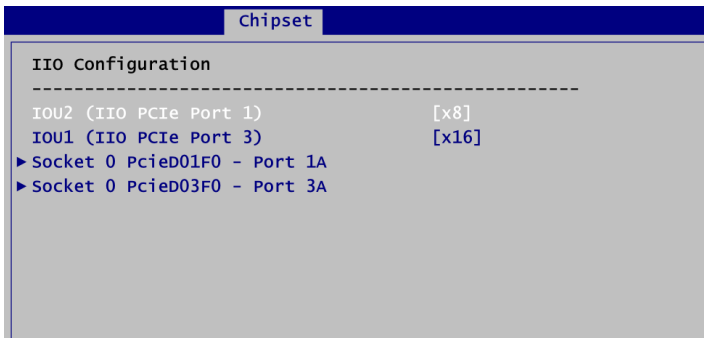
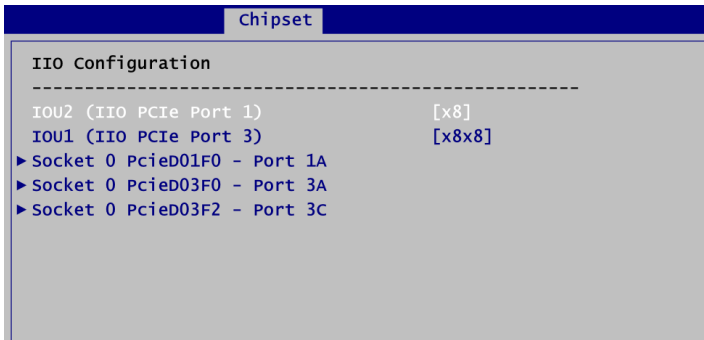
IOU2 (IIO PCIe Port 1)

Selects PCIe port Bifurcation for selected slot(s). Configuration options are x4x4, x8 and Auto.

IOU1 (IIO PCIe Port 3)

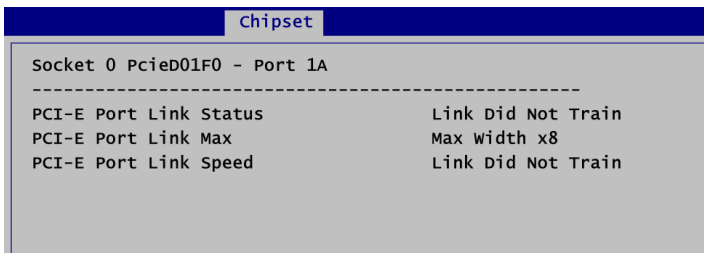
Selects PCIe port Bifurcation for selected slot(s). Configuration options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16 and Auto.





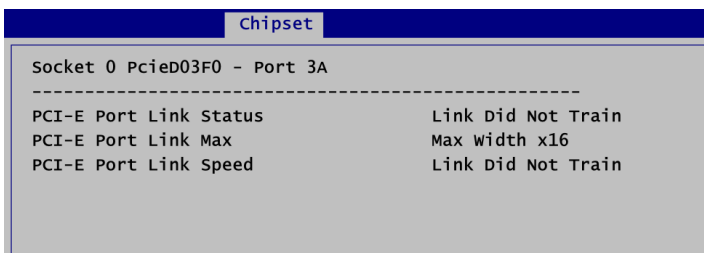
Socket 0 PcieD01F0 – Port 1A

Displays I/O Pcie port status, see image below.



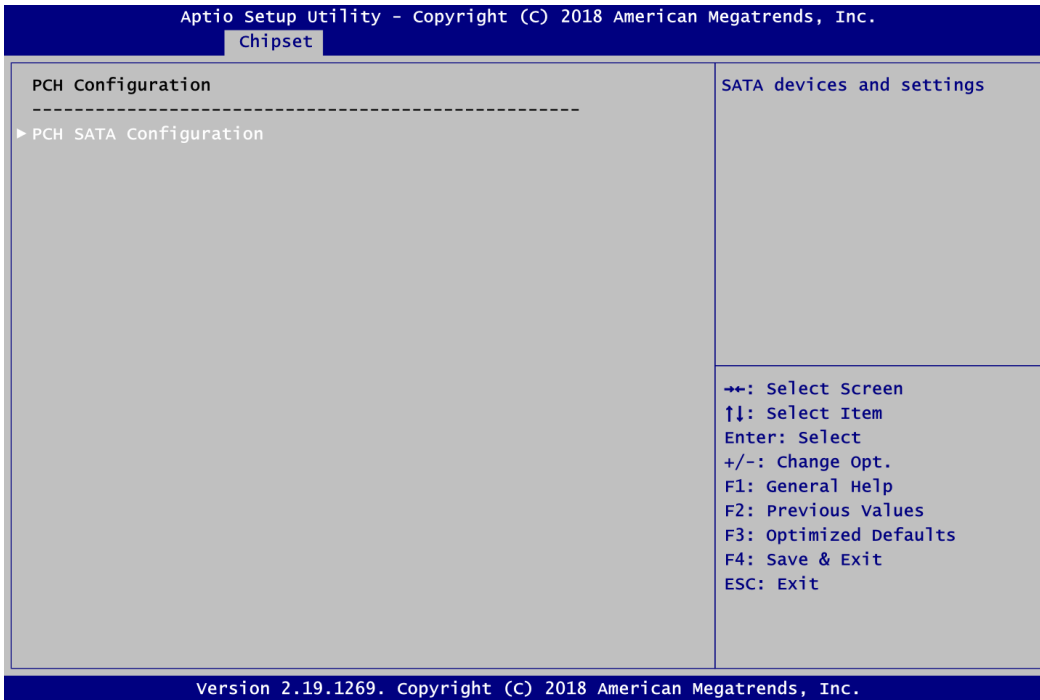
Socket 0 PcieD03F0 – Port 3A

Displays I/O Pcie port status, see image below.



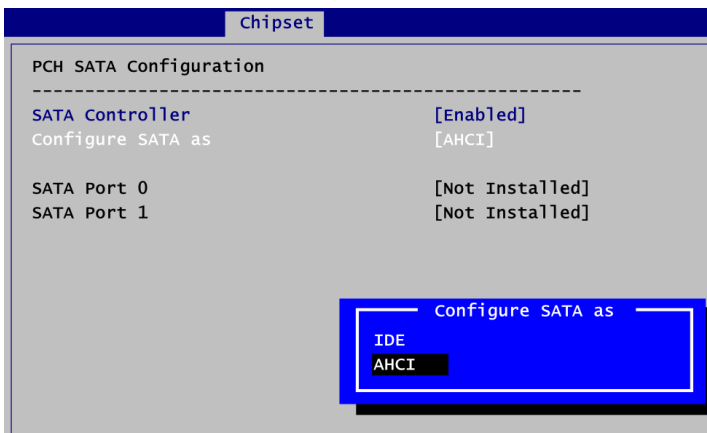
- **PCH Configuration**

You can use this screen to select options for PCH 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.



PCH SATA Configuration

Use this option to change SATA devices and settings.



SATA Controller

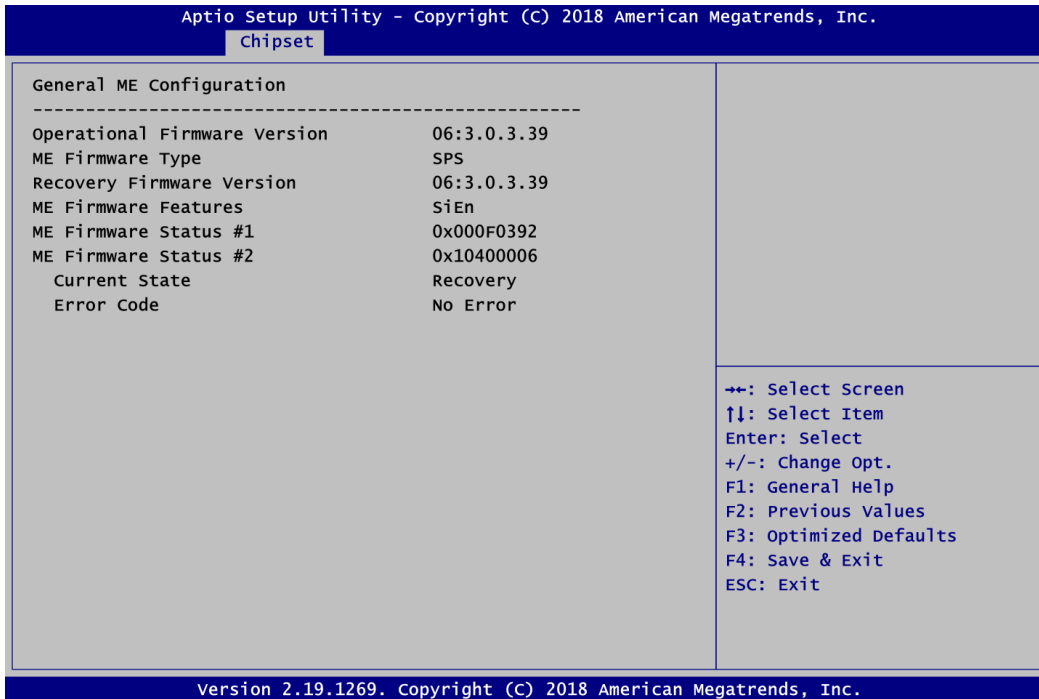
Enable or disable SATA Controller feature.

Configure SATA as

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

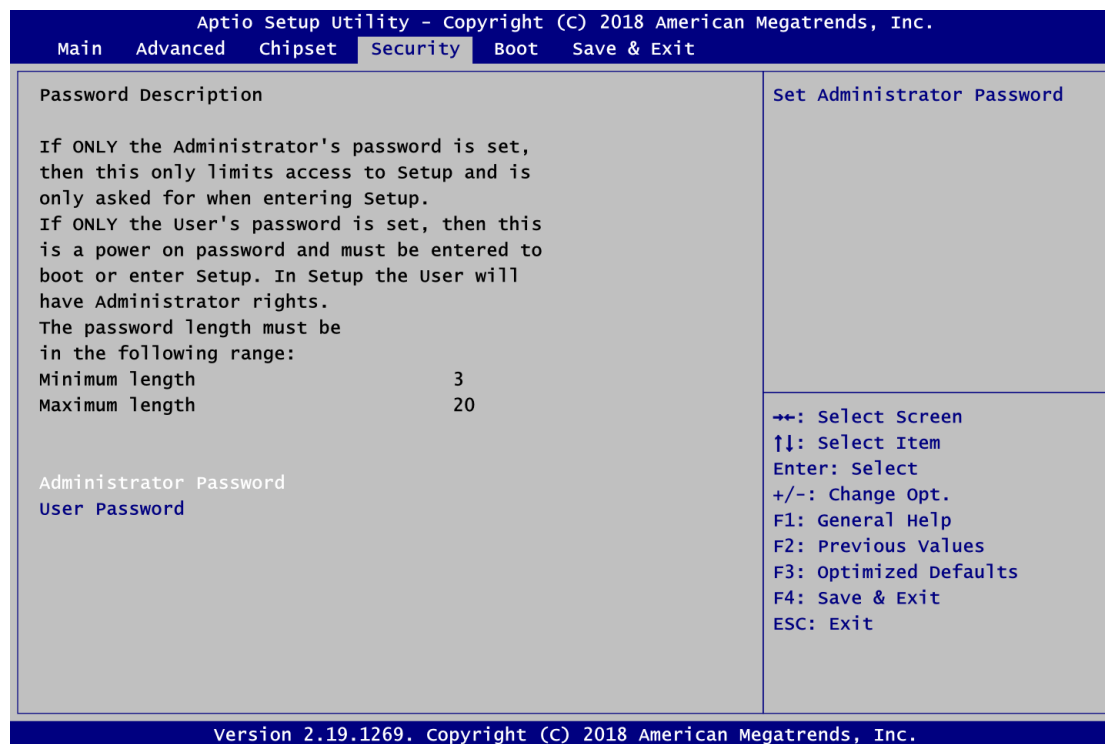
- **General ME Configuration**

This screen displays General ME information.



4.6 Security Menu

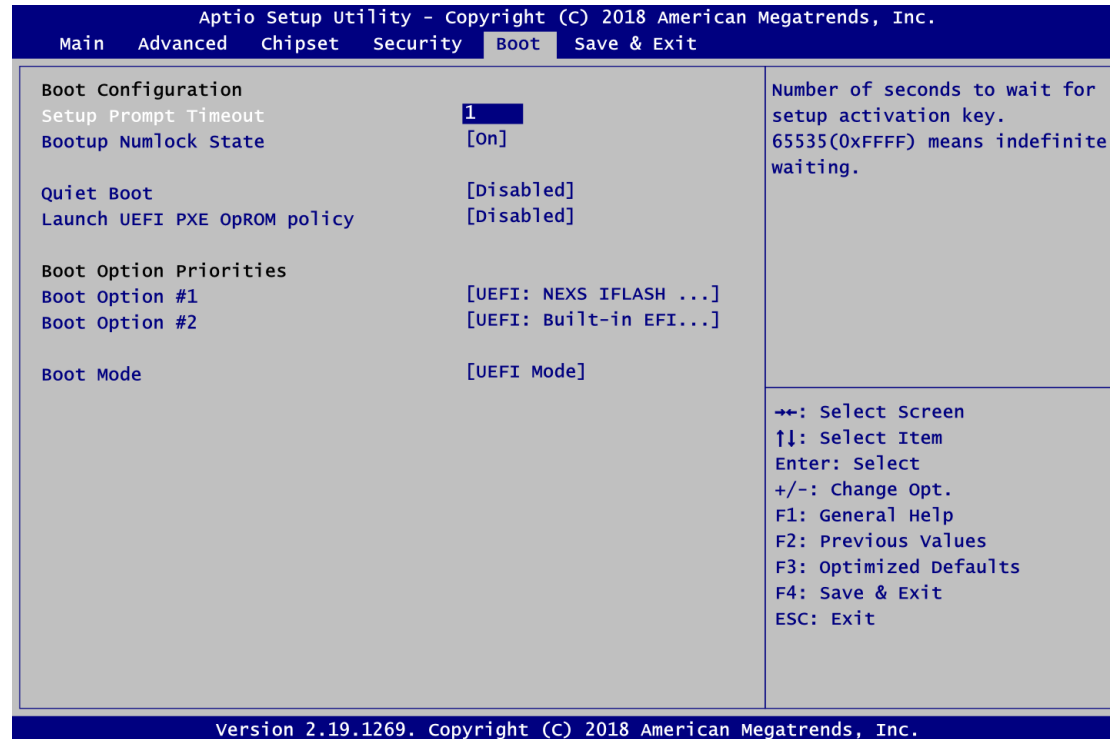
The Security menu allows users to change the security settings for the system.



- Administrator Password**
 This item indicates whether an administrator password has been set (installed or uninstalled).
- User Password**
 This item indicates whether a user password has been set (installed or uninstalled).

4.7 Boot Menu

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

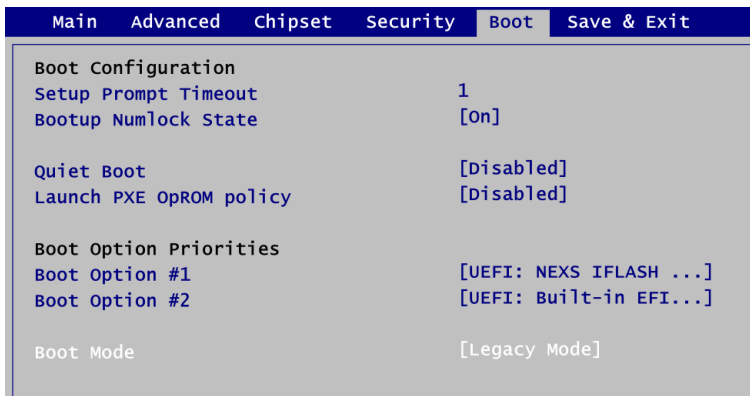


- Setup Prompt Timeout**
 Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- Bootup NumLock State**
 Use this item to select the power-on state for the keyboard NumLock.
- Quiet Boot**
 Select to display either POST output messages or a splash screen during boot-up.
- Launch UEFI PXE OpROM policy**
 Control the execution of UEFI PXE OpROM.
- Boot Option Priorities [Boot Option #1, ...]**
 These are settings for boot priority. Specify the boot device priority sequence from the available devices.

- **Boot Mode**

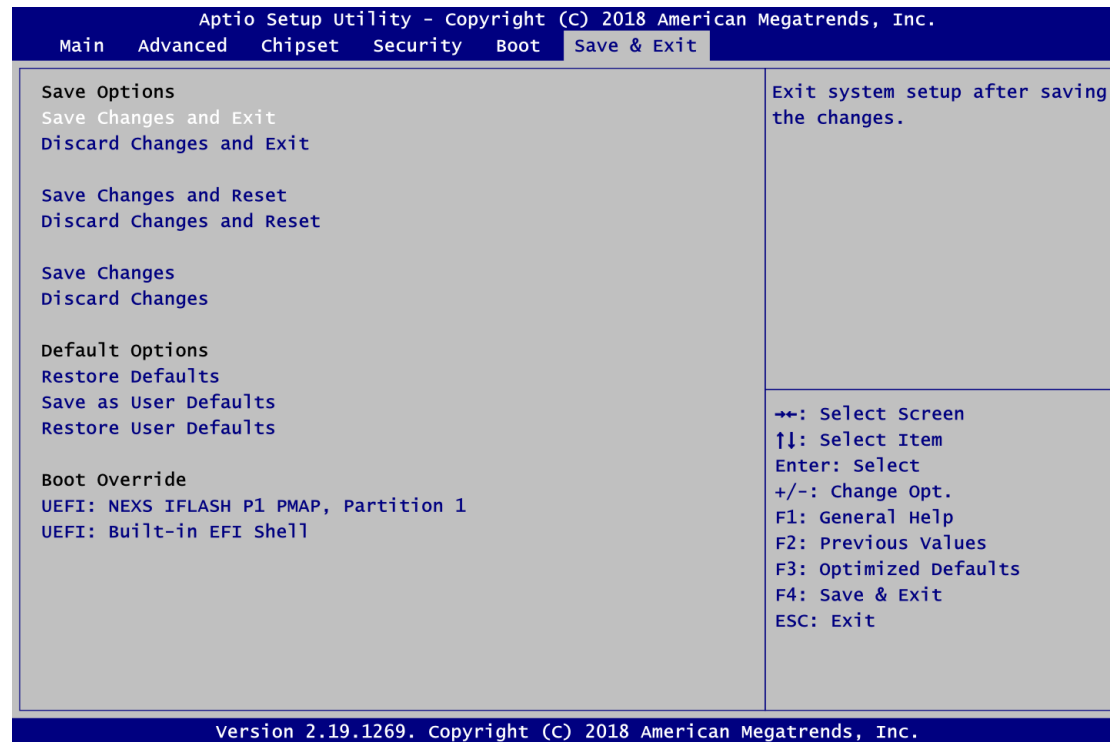
Use this item for boot mode settings.

- UEFI Boot: Select support to boot any UEFI-capable OS.
- Legacy Boot: Select support to boot non UEFI-capable OS that expects a legacy BIOS interface.



4.8 Save & Exit Menu

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



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

- **Discard Changes**
Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.
- **Restore Defaults**
It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.
- **Save as User Defaults**
Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.
- **Restore User Defaults**
It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.
- **Boot Override**
Select boot device regardless of the current boot priority order.

Appendix A

Watchdog Timer and GPIO

A.1 About Watchdog Timer

After the system stops working for a while, it can be auto-reset by the watchdog timer. The integrated watchdog timer can be set up in the system reset mode by program.

Assembly sample code :

```

mov     dx,fa10           ; 5 seconds (Maximum is 65535 seconds; fill in
                        ; 0xFA10 and 0xFA11 register, ex: 0xFA11=0x01,
                        ; 0xFA10=0x68 means 360 seconds)

mov     al,05
out     dx,al

mov     dx,fa12           ; Enable WDT
mov     al,01
out     dx,al

```

A.2 About GPIO

The onboard GPIO or digital I/O has 8 bits (DIO0~7). Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +3.3V level (according to main power). The BIOS default settings are 4 inputs and 4 outputs where all of these pins are set to 1.

Assembly sample code :

```

mov     dx,fa31           ; Set DIO 0-7 to Output
mov     al,00
out     dx,al

mov     dx,fa32           ; Set DIO 4-7 to High
mov     al,f0
out     dx,al

mov     dx,fa31           ; Set DIO 0-7 to Input
mov     al,ff
out     dx,al

mov     dx,fa32           ; Get DIO 0-7 status
in      al,dx

mov     dx,fa31           ; Set DIO 0-4 to Input, 5-7 to Output
mov     al,1f             ; al = 1F => 00011111
out     dx,al

mov     dx,fa32           ; Set DIO 6 to High
mov     al,40             ; al = 40 => 01000000
out     dx,al

in      al,dx             ; Get DIO 0-7 status

```

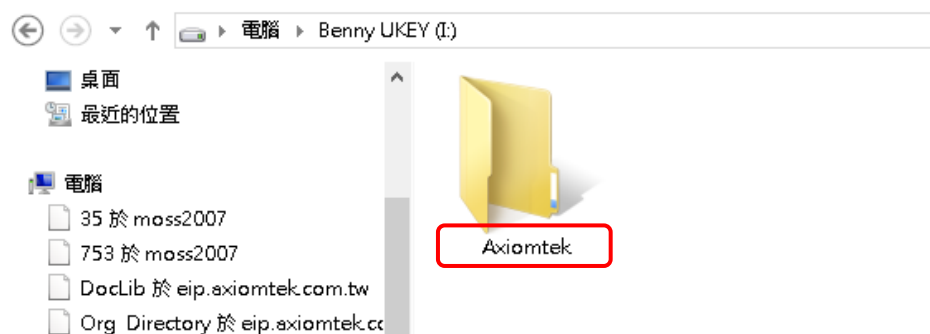
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Appendix B

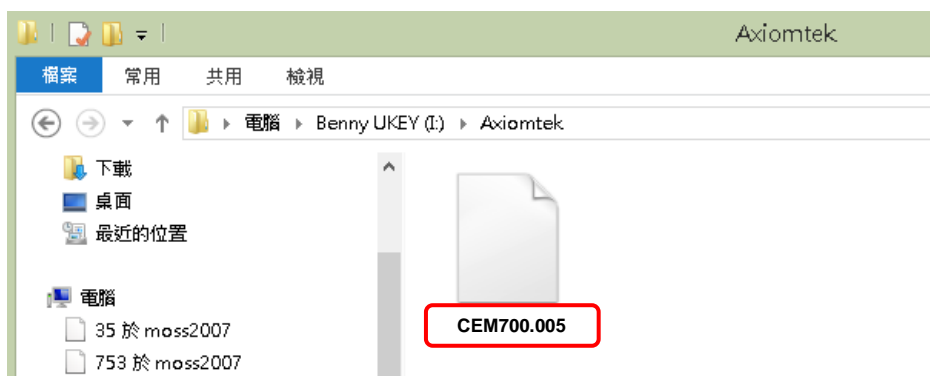
BIOS Flash Utility

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.



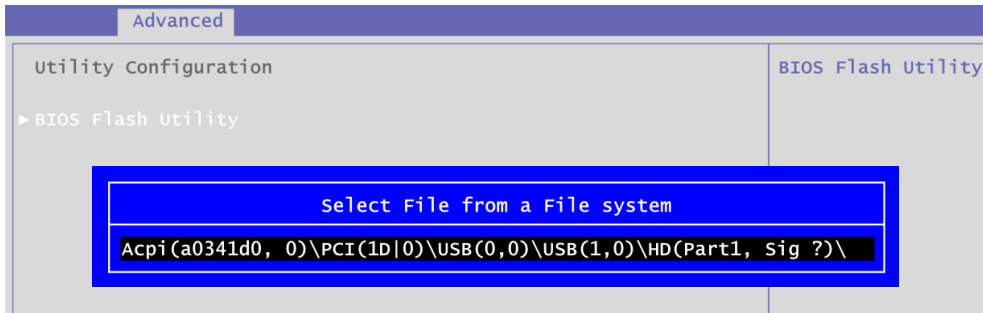
2. Copy BIOS ROM file (e.g. CEM700.005) to “Axiomtek” folder.



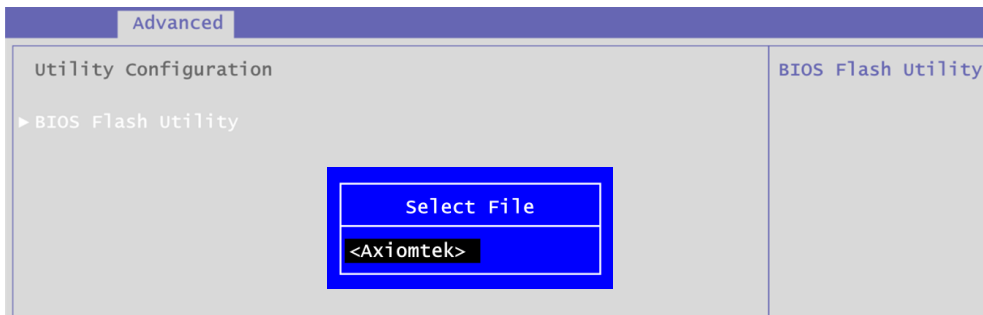
3. Insert the USB flash drive to your system.
4. Enter BIOS setup menu and go to Advanced\Utility Configuration. Select BIOS Flash Utility and press <Enter>.



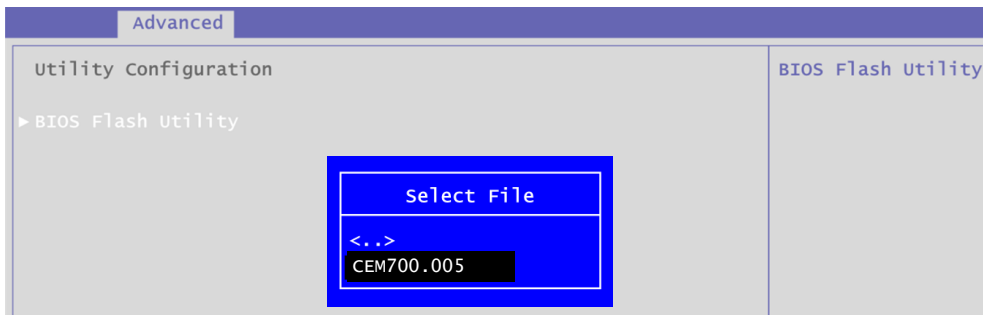
5. BIOS automatically detect all USB drive(s) attached to the system. In this example only one USB drive is attached to the system. That's why, you can see only one device is displayed in figure below.



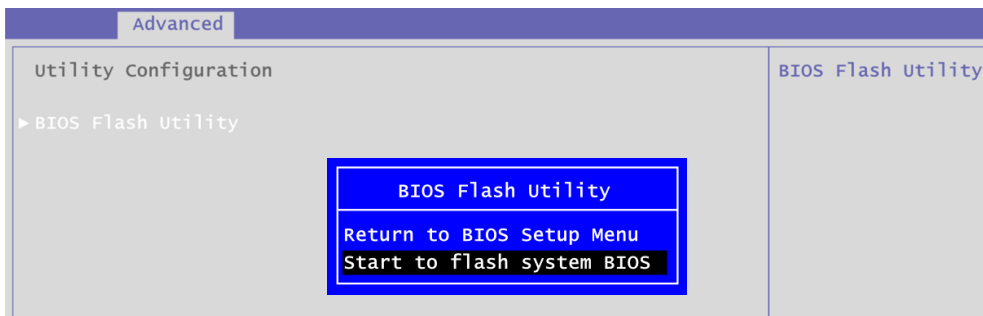
6. Select the USB drive containing BIOS ROM file you want to update using the <↑> or <↓> key. Then press <Enter> to get into "Axiomtek" folder.



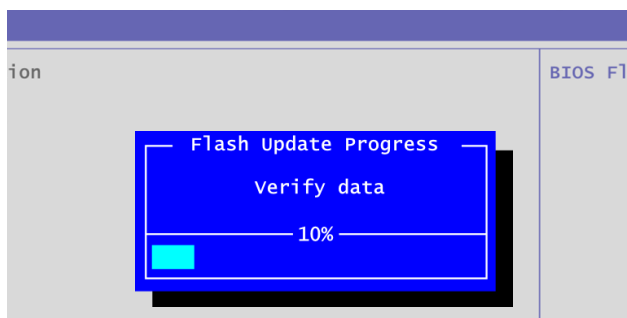
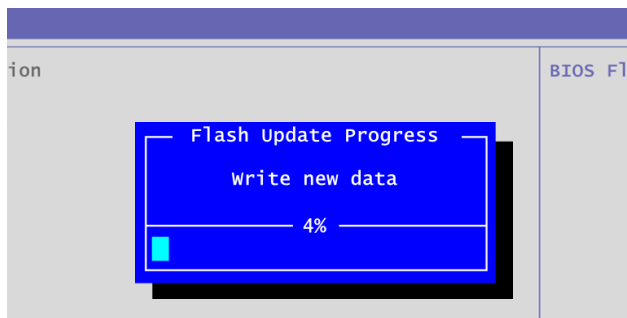
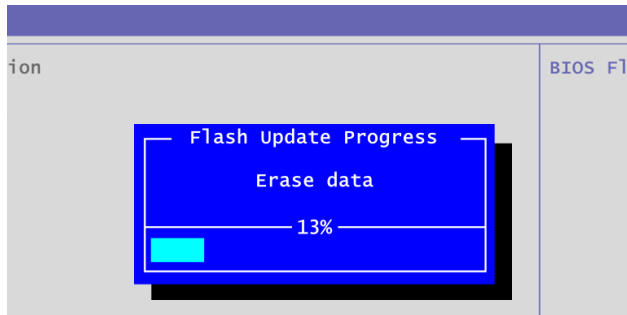
7. Now you can see the BIOS ROM file on the screen, press <Enter> to select.



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



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



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

