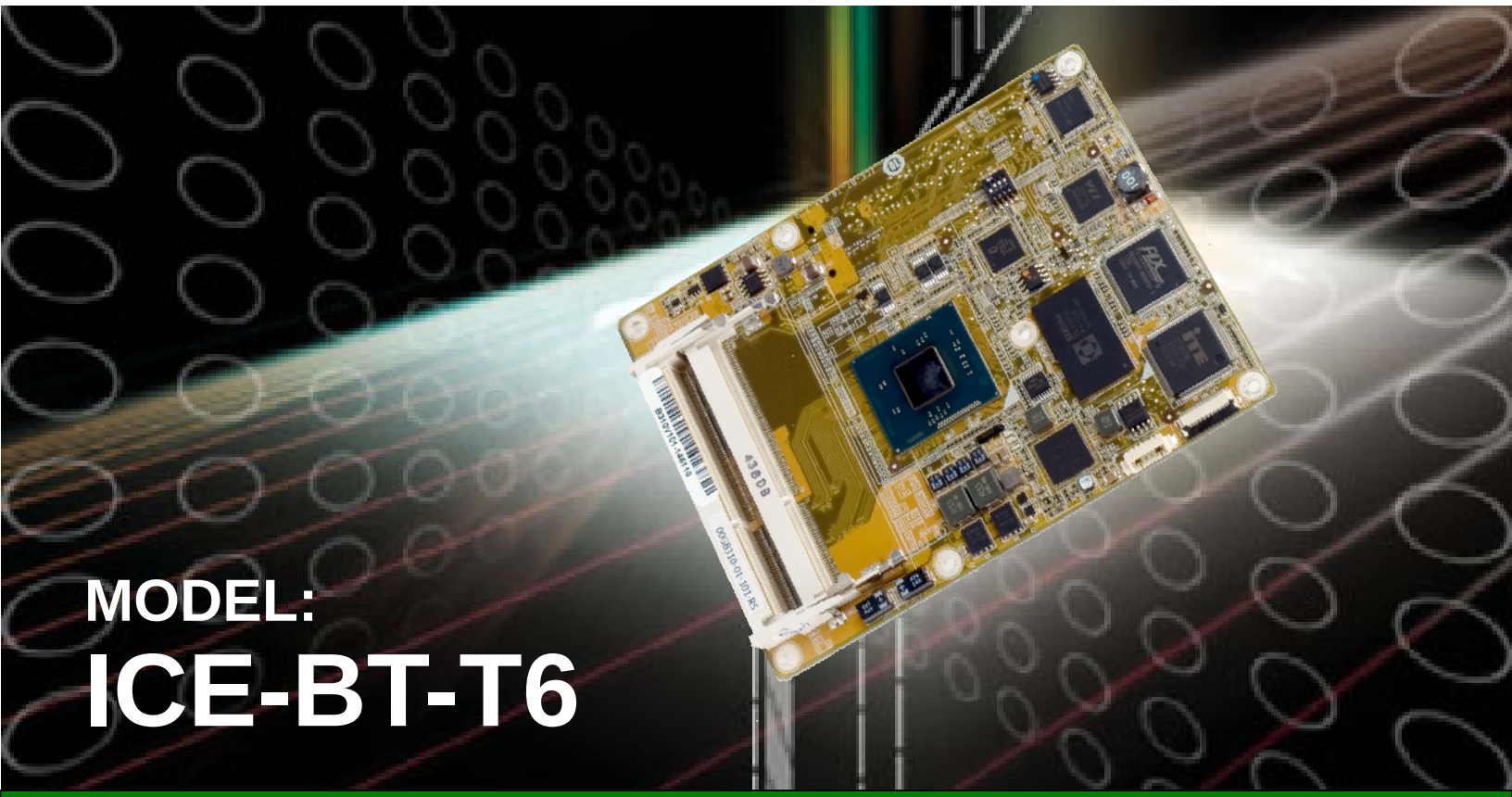
IEI Integration Corp.



MODEL:

ICE-BT-T6

COM Express R2.1 Module (Type 6),
22nm Intel® Atom™ or Celeron® Processor
2 GB DDR3, EEPROM and RoHS Compliant

User Manual

Rev. 1.01 – June 29, 2017

RoHS Lead Free

Revision

Date	Version	Changes
June 29, 2017	1.01	Clarified BIOS specifications
September 23, 2014	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction

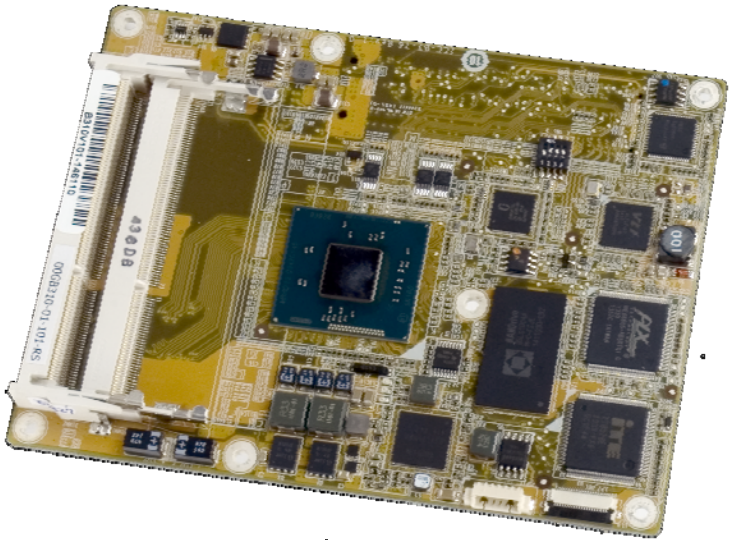


Figure 1-1: ICE-BT-T6

The ICE-BT-T6 COM Express Type 6 module provides the main processing chips and is connected to a compatible COM Express baseboard. The ICE-BT-T6 is preinstalled with 4th generation Intel® Atom™ or Celeron® processor. The COM Express standard allows the COM Express baseboard to be designed, while leaving the choice of processor till the later stages of design. The ICE-BT-T6 provides a low power option with the full range of modern I/O options. The ICE-BT-T6 embedded module is designed for flexible integration by system developers into customized platform devices.

1.2 Model Variations

The model variations for the ICE-BT-T6 series are listed in **Table 1-1**.

Model	On-board SoC					Memory
	Name	Clock Speed	# of Cores	L2 Cache	Max TDP	Slot #
ICE-BT-T6-J19001	Intel® Celeron® J1900	2.0 GHz	4	2 MB	10 W	Two
ICE-BT-T6-N29301	Intel® Celeron® N2930	1.83 GHz	4	2 MB	7.5 W	Two
ICE-BT-T6-N28071	Intel® Celeron® N2807	1.58 GHz	2	2 MB	4.3 W	One
ICE-BT-T6-E38451	Intel® Atom™ E3845	1.91 GHz	4	2 MB	10 W	Two
ICE-BT-T6-E38271	Intel® Atom™ E3827	1.75 GHz	2	1 MB	8 W	Two
ICE-BT-T6-E38261	Intel® Atom™ E3826	1.46 GHz	2	1 MB	7 W	Two
ICE-BT-T6-E38251	Intel® Atom™ E3825	1.33 GHz	2	1 MB	6 W	One
ICE-BT-T6-E38151	Intel® Atom™ E3815	1.46 GHz	1	512 KB	5 W	One

Table 1-1: Model Variations

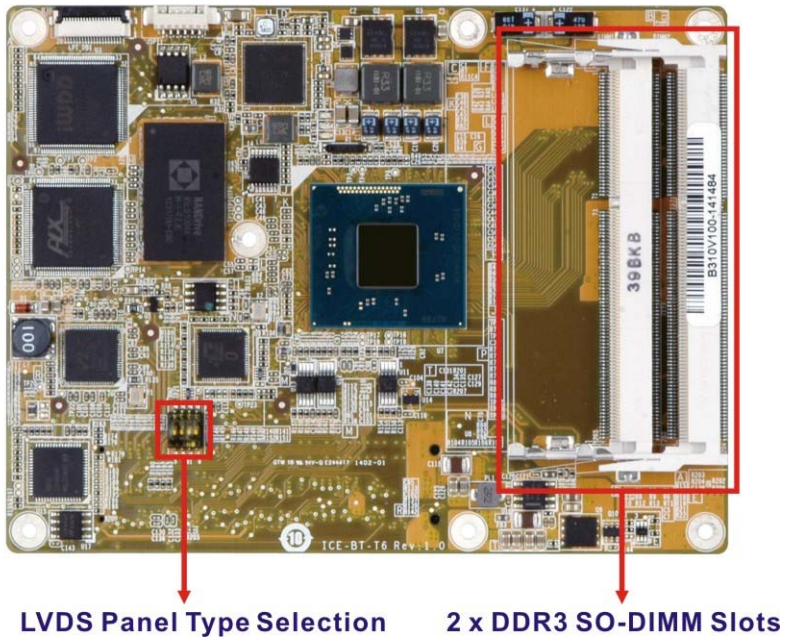
1.3 Features

Some of the ICE-BT-T6 COM Express module features are listed below:

- Complies with COM Express Type 6 form factor
- On-board 22nm Intel® Atom™ or Celeron® processor
- Two/One 204-pin 1066/1333 MHz dual-channel unbuffered DDR3L SDRAM DIMM slots support up to a total of 8 GB of memory
- Optional on-board 4 GB SSD
- Supports analog CRT (VGA), DisplayPort, HDMI and LVDS
- Supports USB 3.0, SATA 3Gb/s and GbE
- RoHS compliant

1.4 Board Overview

The on-board components and connectors of the ICE-BT-T6 are shown in the figures below.



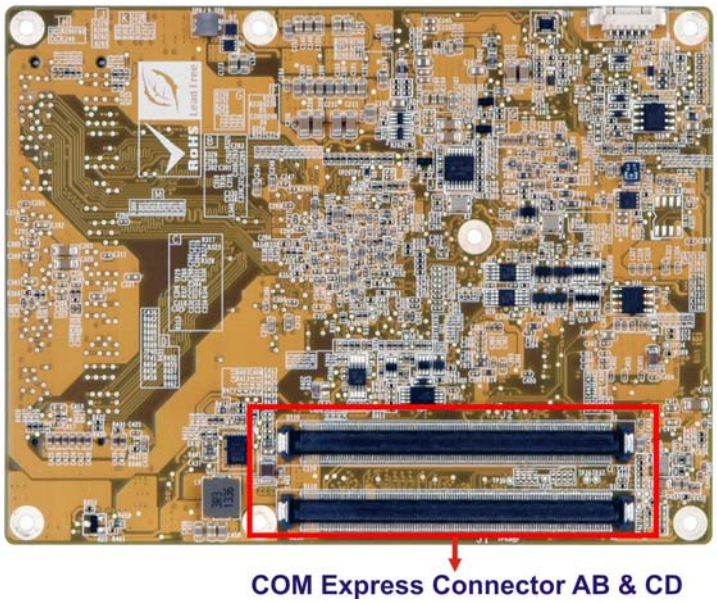


Figure 1-2: On-board Components and Connectors

1.5 Dimensions

The main dimensions of the ICE-BT-T6 are shown in the diagram below.

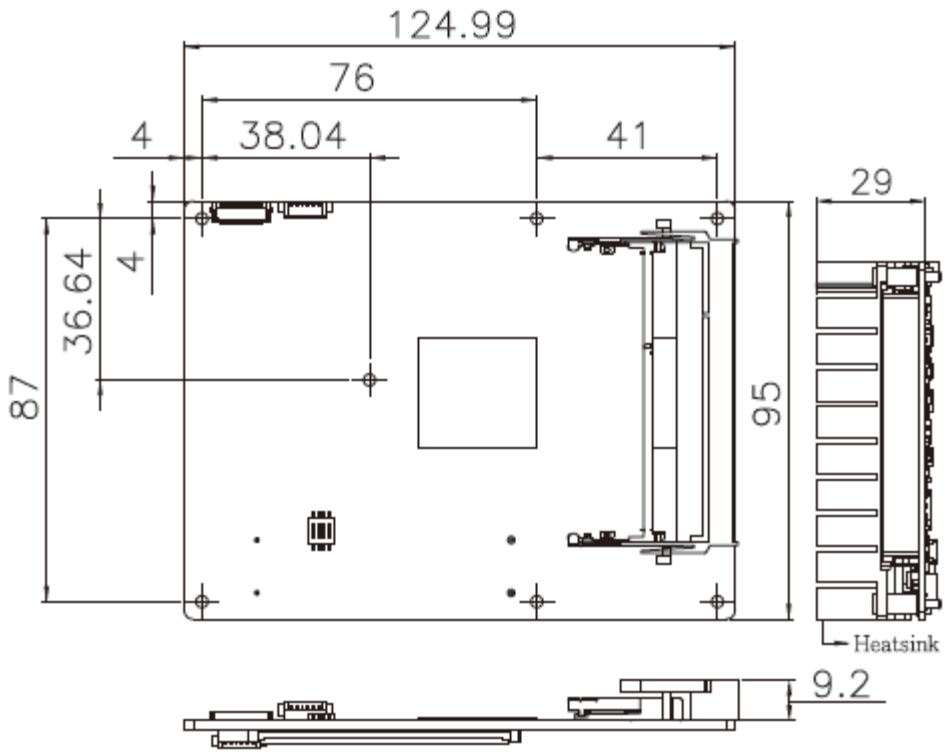


Figure 1-3: ICE-BT-T6 Dimensions (mm)

1.6 Data Flow

Figure 1-4 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

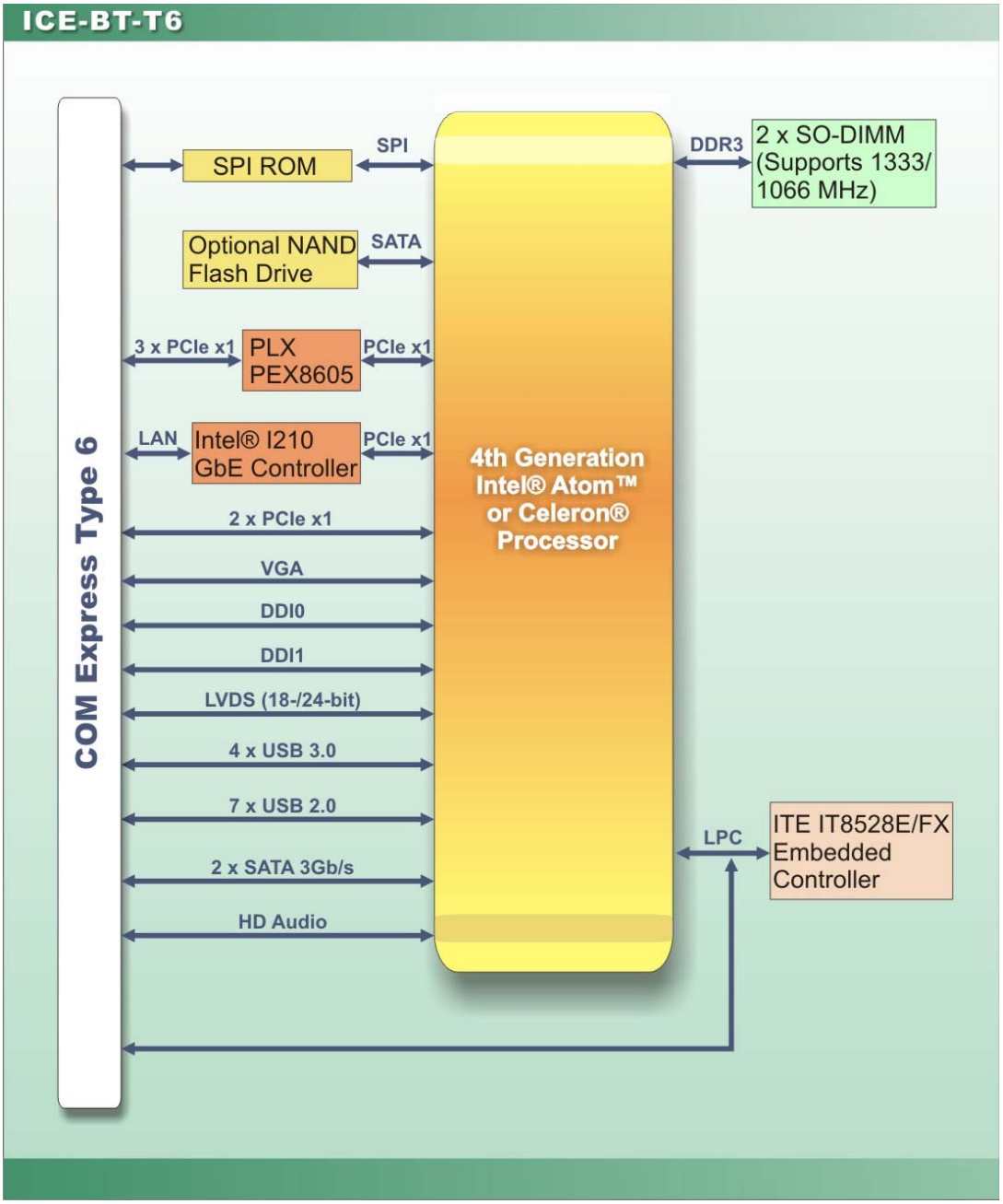


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

The ICE-BT-T6 technical specifications are listed below.

	ICE-BT-T6
Form Factor	PICMG COM Express R2.1 Type 6
On-board SoC	▪ **Standard** o Intel® Celeron® processor J1900 (2GHz, quad-core, 2MB cache, TDP=10W) o Intel® Celeron® processor N2930 (1.83GHz, quad-core, 2MB cache, TDP=7.5W) o Intel® Celeron® processor N2807 (1.58GHz, dual-core, 2MB cache, TDP=4.5W) ▪ **By request** o Intel® Atom™ processor E3845 (1.91GHz, quad-core, 2MB cache, TDP=10W) o Intel® Atom™ processor E3827 (1.75GHz, dual-core, 1MB cache, TDP=8W) o Intel® Atom™ processor E3826 (1.46GHz, dual-core, 1MB cache, TDP=7W) o Intel® Atom™ processor E3825 (1.33GHz, dual-core, 1MB cache, TDP=6W) o Intel® Atom™ processor E3815 (1.46GHz, single-core, 512KB cache, TDP=5W)
Memory	Two 204-pin 1066/1333 MHz dual-channel unbuffered DDR3L SDRAM DIMM slots support up to a total of 8 GB of memory
Internal Storage	2-Kb serial I^2C bus EEPROM supports EAPI Rev. 1.0
Graphics Engine	Intel® HD Graphics Gen 7 with four execution units Supports DirectX 11.1, OpenGL 4.2 and OpenCL 1.2
Ethernet	Intel® I210 Ethernet Controller
Embedded Controller	ITE IT8528E/FX
Watchdog Timer	Software programmable supports 1~255 sec. system reset

	ICE-BT-T6
BIOS	UEFI BIOS ▪ AIxx BIOS version is for Bay Trail I model (CPU: E38xx) ▪ AMxx BIOS version is for Bay Trail M/D model (CPU: J1900/ N2930/N2807)
Storage	Two SATA 3Gb/s (signal to baseboard) Optional on-board 4 GB SSD (SATA port1)
Display **(Signal to Baseboard)**	One VGA (up to 2560 x 1600) One DDI 1 (DP/HDMI, max. resolution: 2560x1600/1920x1080) One DDI 2 (24-bit dual-channel LVDS, optional via CH7511B) One LVDS: 18/24-bit dual-channel LVDS by CH7511B DP to LVDS converter (up to 1920x1200 @ 60Hz)
Expansions **(Signal to Baseboard)**	Five PCIe x1 (two from SoC, three from PLX PEX8605 switch IC)
I/O Interfaces **(Signal to Baseboard)**	Seven USB 2.0 Four USB 3.0 (via one-to-four USB 3.0 hub) Two RS-232 (TX and RX from EC) HD Audio 8-bit GPIO SMBus I^2C LPC SPI
Power Consumption	+12V @ 0.54 A , Vcore_12V @ 0.95 A (2.0 GHz Intel® Celeron® J1900 CPU with one 8 GB 1333 MHz DDR3L memory)
Operating Temperature	-20ºC ~ 60ºC
Storage Temperature	-30ºC ~ 70ºC
Operating Humidity	5% ~ 95% (non-condensing)
Dimensions	125 mm x 95 mm
Weight (GW/NW)	600 g/200 g

Table 1-2: ICE-BT-T6 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband***: Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding***: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad***: When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB***: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the ICE-BT-T6 is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the ICE-BT-T6 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The ICE-BT-T6 is shipped with the following components:

Quantity	Item and Part Number	Image
1	ICE-BT-T6 COM Express Module	
1	Heatsink	
1	Utility CD	
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

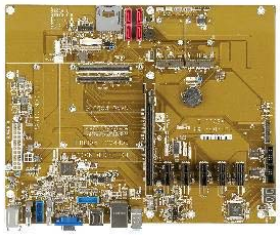
Item and Part Number	Image
Baseboard for COM Express Type 6 modules (**P/N**: ICE-DB-T6R)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the connectors.

3.1.1 ICE-BT-T6 Layout

The figure below shows all the connectors.

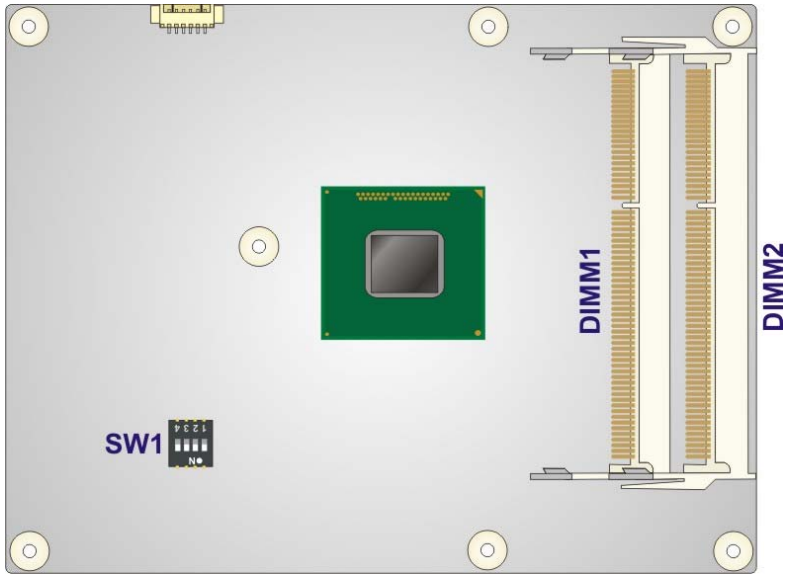


Figure 3-1: Connectors (Front Side)

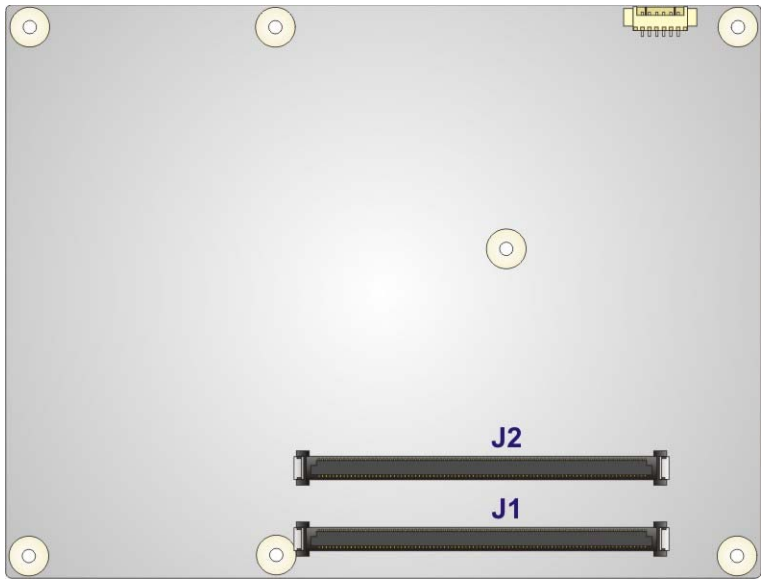


Figure 3-2: Connectors (Solder Side)

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the ICE-BT-T6.

Connector	Type	Label
COM Express connector AB	COM Express connector	J1
COM Express connector CD	COM Express connector	J2
DDR3 SO-DIMM slot	204-pin SO-DIMM slot	DIMM1, DIMM2

Table 3-1: Peripheral Interface Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the ICE-BT-T6.

3.2.1 COM Express Connector AB

CN Label: **J1**

CN Type: 220-pin COM Express connector

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-2**

The standard COM Express connector AB location and pinouts are shown below.

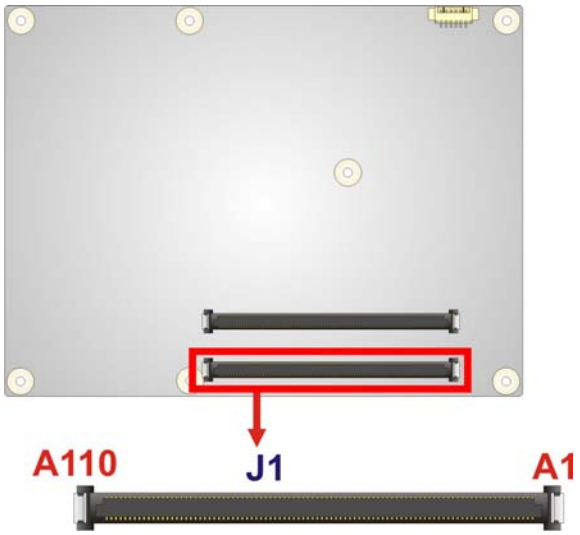


Figure 3-3: COM Express Connector AB Location

Pin No.	Description	Pin No.	Description
A1	GND	B1	GND15
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#
A4	GBE0_LINK100#	B4	LPC_AD0
A5	GBE0_LINK1000#	B5	LPC_AD1
A6	GBE0_MDI2-	B6	LPC_AD2
A7	GBE0_MDI2+	B7	LPC_AD3
A8	RSVD	B8	LPC_DRQ0#

Pin No.	Description	Pin No.	Description
A9	GBE0_MDI1-	B9	LPC_DRQ1#
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND1	B11	GND16
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CK
A14	GBE0_CTREF	B14	SMB_DAT
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+
A17	SATA0_TX-	B17	SATA1_TX-
A18	SUS_S4#	B18	SUS_STAT#
A19	SATA0_RX+	B19	SATA1_RX+
A20	SATA0_RX-	B20	SATA1_RX-
A21	GND2	B21	GND17
A22	RSVD	B22	RSVD
A23	RSVD	B23	RSVD
A24	SUS_S5#	B24	PWR_OK
A25	RSVD	B25	RSVD
A26	RSVD	B26	RSVD
A27	BATLOW#	B27	WDT
A28	ATA_ACT#	B28	RSVD
A29	AC/HD_SYNC	B29	AC/HD_SDIN1
A30	AC/HD_RST#	B30	AC/HD_SDIN0
A31	GND3	B31	GND18
A32	AC/HD_BITCLK	B32	SPKR
A33	AC/HD_SDOUT	B33	I2C_CK
A34	BIOS_DISABLE#	B34	I2C_DAT
A35	RSVD	B35	RSVD
A36	USB6-	B36	RSVD
A37	USB6+	B37	RSVD
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+

Pin No.	Description	Pin No.	Description
A41	GND4	B41	GND
A42	USB2-	B42	USB3-
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USB0-	B45	USB1-
A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	RSVD
A48	RSVD	B48	RSVD
A49	RSVD	B49	SYS_RESET#
A50	LPC_SERIRQ	B50	CB_RESET#
A51	GND5	B51	GND20
A52	RSVD	B52	RSVD
A53	RSVD	B53	RSVD
A54	GPI0	B54	GPO1
A55	PCIE_TX4+	B55	PCIE_RX4+
A56	PCIE_TX4-	B56	PCIE_RX4-
A57	GND6	B57	GPO2
A58	PCIE_TX3+	B58	PCIE_RX3+
A59	PCIE_TX3-	B59	PCIE_RX3-
A60	GND7	B60	GND
A61	PCIE_TX2+	B61	PCIE_RX2+
A62	PCIE_TX2-	B62	PCIE_RX2-
A63	GPI1	B63	GPO3
A64	PCIE_TX1+	B64	PCIE_RX1+
A65	PCIE_TX1-	B65	PCIE_RX1-
A66	GND8	B66	WAKE0#
A67	GPI2	B67	RSVD
A68	PCIE_TX0+	B68	PCIE_RX0+
A69	PCIE_TX0-	B69	PCIE_RX0-
A70	GND9	B70	GND22
A71	LVDS_A0+	B71	LVDS_B0+
A72	LVDS_A0-	B72	LVDS_B0-

Pin No.	Description	Pin No.	Description
A73	LVDS_A1+	B73	LVDS_B1+
A74	LVDS_A1-	B74	LVDS_B1-
A75	LVDS_A2+	B75	LVDS_B2+
A76	LVDS_A2-	B76	LVDS_B2-
A77	LVDS_VDD_EN	B77	LVDS_B3+
A78	LVDS_A3+	B78	LVDS_B3-
A79	LVDS_A3-	B79	LVDS_BKLT_EN
A80	GND10	B80	GND23
A81	LVDS_A_CK+	B81	LVDS_B_CK+
A82	LVDS_A_CK-	B82	LVDS_B_CK-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A84	LVDS_I2C_DAT	B84	VCC5SBY1
A85	GPI3	B85	VCC5SBY2
A86	RSVD	B86	VCC5SBY3
A87	RSVD	B87	VCC5SBY4
A88	PCIE0_CK_REF+	B88	BIOS_DIS1#
A89	PCIE0_CK_REF-	B89	VGA_RED
A90	GND11	B90	GND24
A91	SPI_VCC	B91	VGA_GRN
A92	SPI_MISO	B92	VGA_BLU
A93	GPO0	B93	VGA_HSYNC
A94	SPI_CLK	B94	VGA_VSYNC
A95	SPI_MOSI	B95	VGA_I2C_CK
A96	RSVD	B96	VGA_I2C_DAT
A97	RSVD (TYPE 10#)	B97	SPI_CS#
A98	RS1_TX	B98	RSVD
A99	RS1_RX	B99	RSVD
A100	GND13	B100	GND25
A101	RS2_TX	B101	FAN_PWMOUT
A102	RS2_RX	B102	FAN_TACHIN
A103	LID#	B103	SLEEP#
A104	VCC_12V7	B104	VCC_12V16

Pin No.	Description	Pin No.	Description
A105	VCC_12V8	B105	VCC_12V17
A106	VCC_12V9	B106	VCC_12V18
A107	VCC_12V10	B107	VCC_12V19
A108	VCC_12V11	B108	VCC_12V20
A109	VCC_12V12	B109	VCC_12V21
A110	GND14	B110	GND26

Table 3-2: COM Express Connector Pin Definitions

3.2.2 COM Express Connector CD

CN Label: **J2**

CN Type: 220-pin COM Express connector

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-3**

The standard COM Express connector CD location and pinouts are shown below.

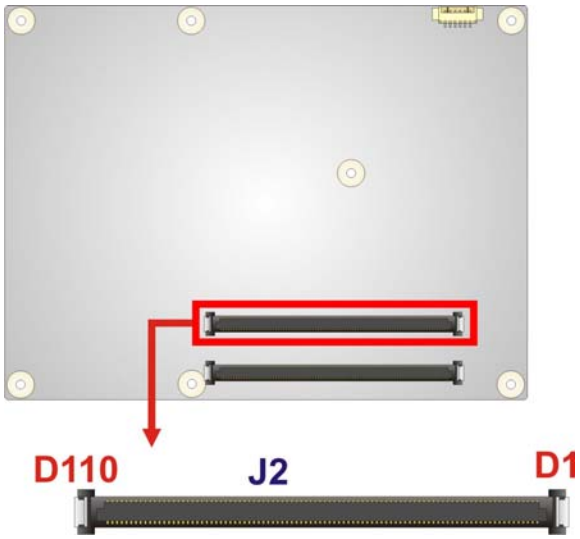


Figure 3-4: COM Express Connector CD Location

Pin No.	Description	Pin No.	Description
C1	GND0	D1	GND15
C2	GND	D2	GND
C3	USB_SSRX0-	D3	USB_SSTX0-
C4	USB_SSRX0+	D4	USB_SSTX0+
C5	GND	D5	GND
C6	USB_SSRX1-	D6	USB_SSTX1-
C7	USB_SSRX1+	D7	USB_SSTX1+
C8	GND	D8	GND
C9	USB_SSRX2-	D9	USB_SSTX2-
C10	USB_SSRX2+	D10	USB_SSTX2+
C11	GND1	D11	GND16
C12	USB_SSRX3-	D12	USB_SSTX3-
C13	USB_SSRX3+	D13	USB_SSTX3+
C14	GND	D14	GND
C15	RSVD	D15	DDI1_CTRLCLK_AUX+ (by request*)
C16	RSVD	D16	DDI1_CTRLDATA_AUX- (by request*)
C17	RSVD	D17	RSVD
C18	RSVD	D18	RSVD
C19	RSVD	D19	RSVD
C20	RSVD	D20	RSVD
C21	GND2	D21	GND17
C22	RSVD	D22	RSVD
C23	RSVD	D23	RSVD
C24	DDI1_HPD	D24	RSVD
C25	RSVD	D25	RSVD
C26	RSVD	D26	DDI1_PAIR0+ (by request*)
C27	RSVD	D27	DDI1_PAIR0- (by request*)
C28	RSVD	D28	RSVD
C29	RSVD	D29	DDI1_PAIR1+ (by request*)
C30	RSVD	D30	DDI1_PAIR1- (by request*)
C31	GND3	D31	GND18

Pin No.	Description	Pin No.	Description
C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+ (by request*)
C33	DDI2_CTRLDATA_AUX-	D33	DDI1_PAIR2- (by request*)
C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL (by request*)
C35	RSVD	D35	RSVD
C36	RSVD	D36	DDI1_PAIR3+ (by request*)
C37	RSVD	D37	DDI1_PAIR3- (by request*)
C38	RSVD	D38	RSVD
C39	RSVD	D39	DDI2_PAIR0+
C40	RSVD	D40	DDI2_PAIR0-
C41	GND4	D41	GND19
C42	RSVD	D42	DDI2_PAIR1+
C43	RSVD	D43	DDI2_PAIR1-
C44	RSVD	D44	DDI2_HPD
C45	RSVD	D45	RSVD
C46	RSVD	D46	DDI2_PAIR2+
C47	RSVD	D47	DDI2_PAIR2-
C48	RSVD	D48	RSVD
C49	RSVD	D49	DDI2_PAIR3+
C50	RSVD	D50	DDI2_PAIR3-
C51	GND5	D51	GND20
C52	RSVD	D52	RSVD
C53	RSVD	D53	RSVD
C54	RSVD (TYPE0#)	D54	RSVD
C55	RSVD	D55	RSVD
C56	RSVD	D56	RSVD
C57	RSVD (TYPE1#)	D57	GND (TYPE2#)
C58	RSVD	D58	RSVD
C59	RSVD	D59	RSVD
C60	GND7	D60	GND21
C61	RSVD	D61	RSVD
C62	RSVD	D62	RSVD

Pin No.	Description	Pin No.	Description
C63	RSVD1	D63	RSVD10
C64	RSVD2	D64	RSVD9
C65	RSVD	D65	RSVD
C66	RSVD	D66	RSVD
C67	RSVD3	D67	GND28
C68	RSVD	D68	RSVD
C69	RSVD	D69	RSVD
C70	GND9	D70	GND22
C71	RSVD	D71	RSVD
C72	RSVD	D72	RSVD
C73	RSVD	D73	RSVD
C74	RSVD	D74	RSVD
C75	RSVD	D75	RSVD
C76	GND8	D76	GND29
C77	RSVD4	D77	RSVD
C78	RSVD	D78	RSVD
C79	RSVD	D79	RSVD
C80	GND10	D80	GND23
C81	RSVD	D81	RSVD
C82	RSVD	D82	RSVD
C83	RSVD5	D83	RSVD8
C84	GND6	D84	GND30
C85	RSVD	D85	RSVD
C86	RSVD	D86	RSVD
C87	GND35	D87	GND31
C88	RSVD	D88	RSVD
C89	RSVD	D89	RSVD
C90	GND27	D90	GND24
C91	RSVD	D91	RSVD
C92	RSVD	D92	RSVD
C93	GND11	D93	GND32
C94	RSVD	D94	RSVD

Pin No.	Description	Pin No.	Description
C95	RSVD	D95	RSVD
C96	GND12	D96	GND33
C97	RSVD6	D97	RSVD
C98	RSVD	D98	RSVD
C99	RSVD	D99	RSVD
C100	GND13	D100	GND25
C101	RSVD	D101	RSVD
C102	RSVD	D102	RSVD
C103	GND	D103	GND34
C104	VCC_12V1	D104	VCC_12V7
C105	VCC_12V2	D105	VCC_12V8
C106	VCC_12V3	D106	VCC_12V9
C107	VCC_12V4	D107	VCC_12V10
C108	VCC_12V5	D108	VCC_12V11
C109	VCC_12V6	D109	VCC_12V12
C110	GND14	D110	GND26
* DDI 1 signals (D15, D16, D26, D27, D29, D30 D32, D33, D34, D36 and D37) are only available upon special order request. These pins are reserved on the standard ICE-BT-T6 module.			

Table 3-3: COM Express Connector CD Pin Definitions

3.2.3 SO-DIMM Connectors

CN Label: **DIMM1, DIMM2**

CN Type: 204-pin DDR3 SO-DIMM connector

CN Location: See **Figure 3-5**

The SO-DIMM connectors are for installing DDR3L memory on the system.

NOTE:

If there is only one memory module being installed, install it in the **DIMM1** slot.

Some of the ICE-BT-T6 models only have one SO-DIMM slot. Please refer to Table 1-1: Model Variations for detailed information.

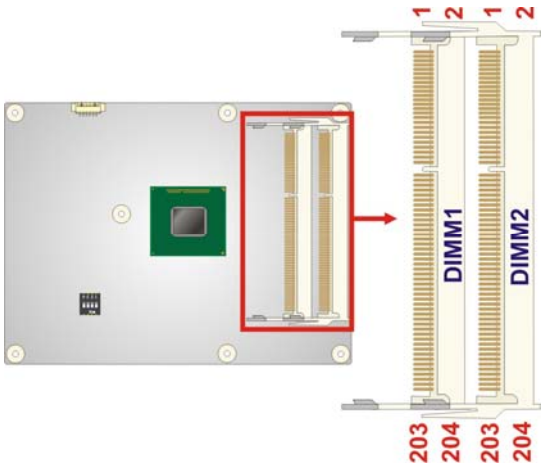


Figure 3-5: SO-DIMM Connector Locations

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the ICE-BT-T6 may result in permanent damage to the ICE-BT-T6 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the ICE-BT-T6. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the ICE-BT-T6 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the ICE-BT-T6, place it on an antic-static pad. This reduces the possibility of ESD damaging the ICE-BT-T6.
- ***Only handle the edges of the PCB***: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the ICE-BT-T6 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the ICE-BT-T6 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the ICE-BT-T6 off:
  - When working with the ICE-BT-T6, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the ICE-BT-T6 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 SO-DIMM Installation

WARNING:

Using incorrectly specified SO-DIMM may cause permanent damage to the ICE-BT-T6. Please make sure the purchased SO-DIMM complies with the memory specifications of the ICE-BT-T6. SO-DIMM specifications compliant with the ICE-BT-T6 are listed in Chapter 1.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 4-1**.

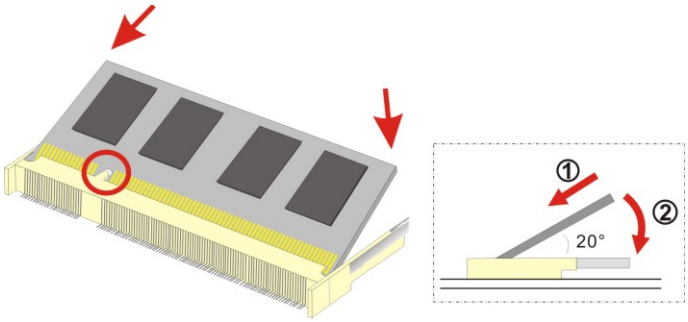


Figure 4-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the ICE-BT-T6 on an anti-static pad with the solder side facing up.

Step 2: **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle. (See **Figure 4-1**)

Step 4: **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 4-1**)

Step 5: **Secure the SO-DIMM**. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

4.4 Jumper Settings

4.4.1 LVDS Panel Type Selection

Jumper Label: **SW1**

Jumper Type: DIP switch

Jumper Settings: See **Table 4-1**

Jumper Location: See **Figure 4-2**

This switch sets the resolution of the panel attached to the LVDS output. The pin order listed in the first column of **Table 4-1** is: 4 → 3 → 2 → 1. (ON=0, OFF=1)

SW1	EDID Resolution	Color Depth	Channel
0000	800X600	18-bit	Single
0001	1024X768	18-bit	Single
0010	1024X768	24-bit	Single
0011	1280X768	18-bit	Single
0100	1280X800	18-bit	Single
0101	1280X960	18-bit	Single
0110	1280X1024	24-bit	Dual
0111	1366X768	18-bit	Single
1000	1366X768	24-bit	Single
1001	1440X960	24-bit	Dual
1010	1400X1050	24-bit	Dual
1011	1600X900	24-bit	Dual
1100	1680X1050	24-bit	Dual
1101	1600X1200	24-bit	Dual
1110	1920X1080	24-bit	Dual
1111	1920X1200	24-bit	Dual

Table 4-1: LVDS Panel Type Selection

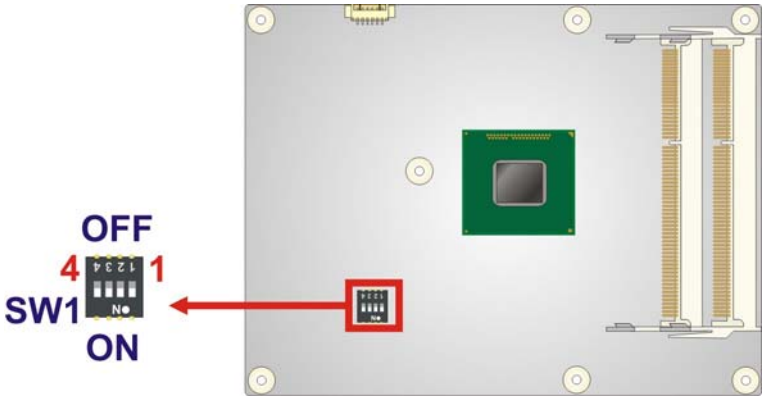


Figure 4-2: LVDS Panel Type Selection Switch Location

4.5 Mounting ICE-BT-T6 to Baseboard

NOTE:

Baseboard can be designed by the end user, customized by IEI, or purchased from IEI. For more information visit the IEI website (www.ieiworld.com) or contact an IEI sales representative.

WARNING:

Never run the COM Express module without the heatsink and a thermal pad. The thermal pad acts as a thermal interface between the module and the heatsink. The heatsink must be installed on the ICE-BT-T6 to maintain proper operating temperatures. Make sure to maintain the heatsink temperature under 60°C in operation.

Follow the steps below to install the ICE-BT-T6 to the optional baseboard.

Step 1: Align the two COM Express connector on the solder side of the ICE-BT-T6 with the corresponding connector on the baseboard. Gently push the COM Express module down to ensure the connectors are properly connected (Figure 4-3).

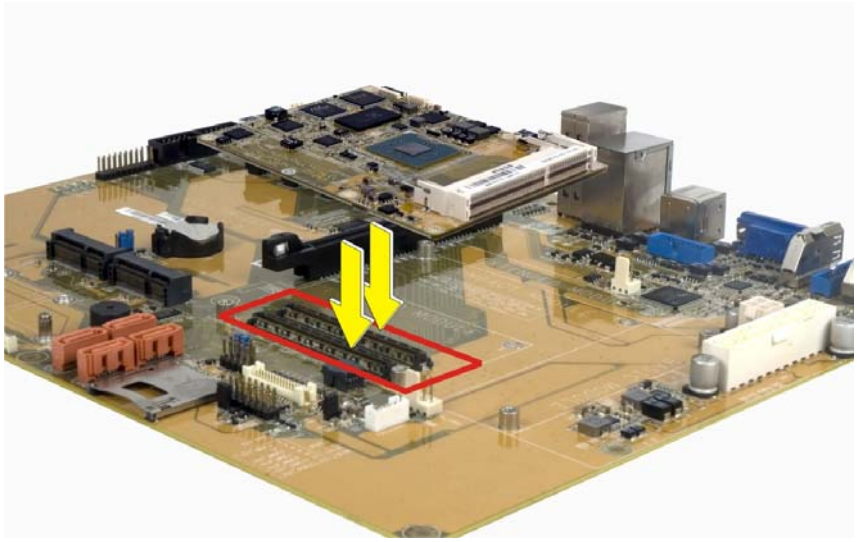


Figure 4-3: Connect the COM Express Connectors

Step 2: Ensure a thermal pad is placed on the CPU of the ICE-BT-T6.

Step 3: Place the heatsink on the ICE-BT-T6, aligning the retention screw holes (Figure 4-4).

Step 4: Secure the heatsink to the ICE-BT-T6 and the baseboard with the supplied retention screws (Figure 4-4).

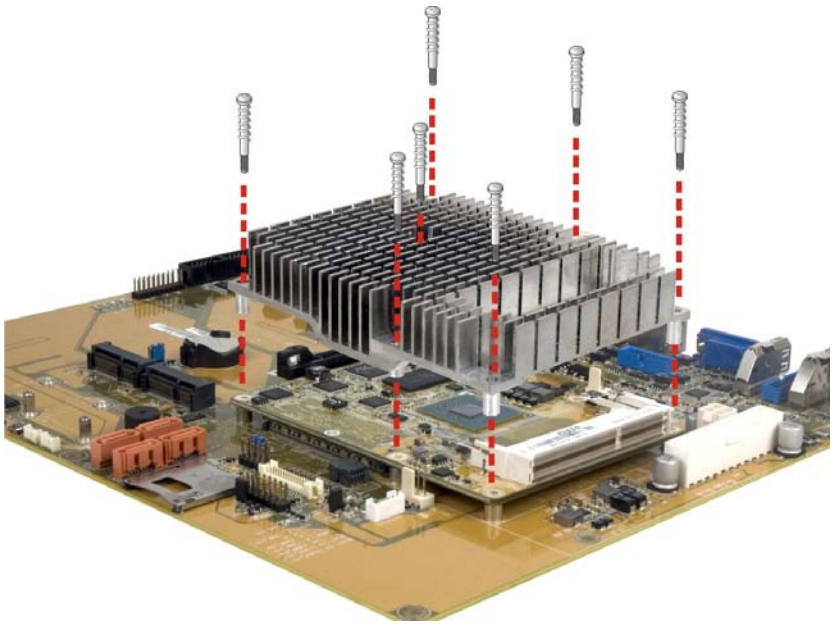


Figure 4-4: Secure the Heatsink

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

5.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DEL** or **F2** key as soon as the system is turned on or
2. Press the **DEL** or **F2** key when the "**Press DEL or F2 to enter SETUP**" message appears on the screen.

If the message disappears before the **DEL or F2** key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in the following table.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
Page Up key	Move to the next page
Page Dn key	Move to the previous page

Key	Function
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Load previous values
F3	Load optimized defaults
F4	Save changes and Exit BIOS

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration are made, CMOS defaults. Use the clear CMOS jumper described in the baseboard user manual.

5.1.5 BIOS Menu Bar

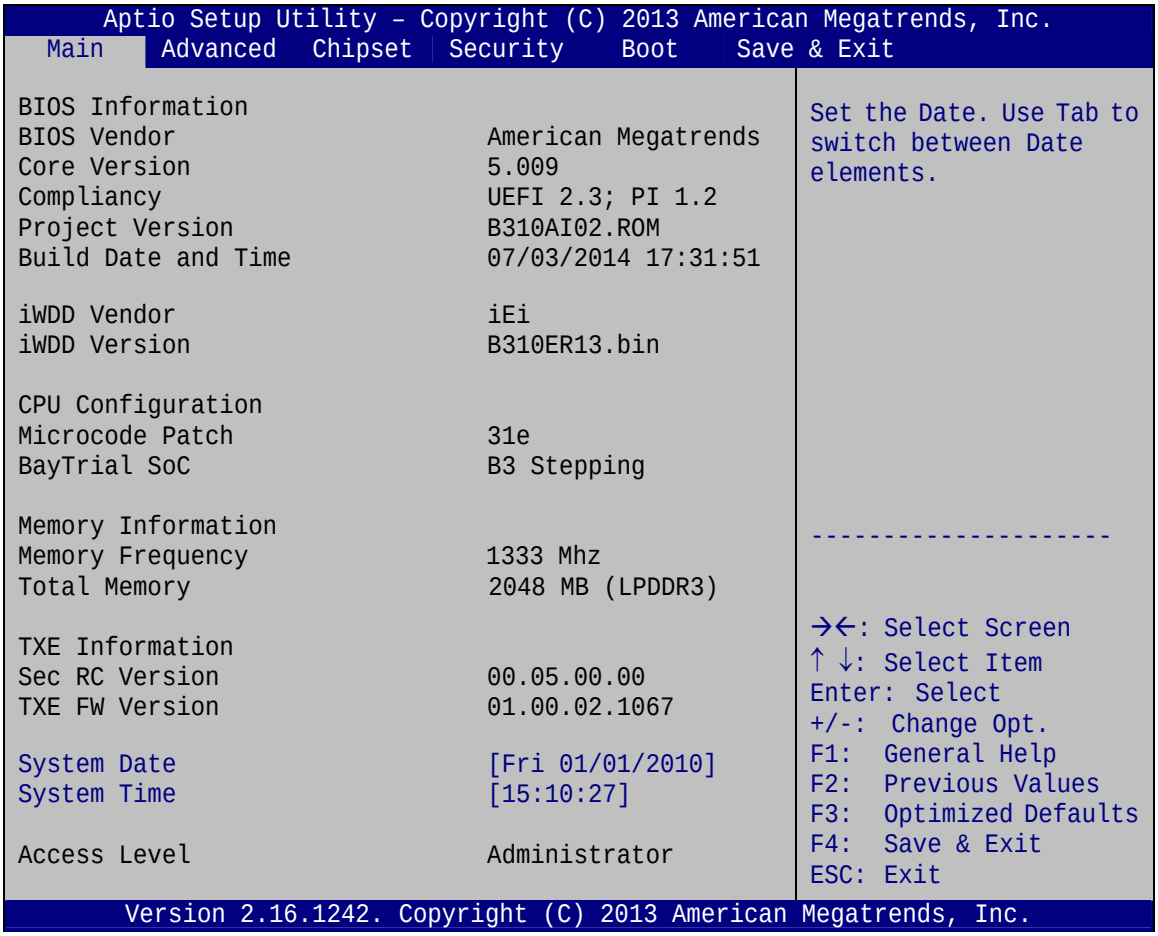
The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Save & Exit – Selects exit options and loads default settings.

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

The System Overview field also has two user configurable fields:

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

➔ **System Time [xx:xx:xx]**

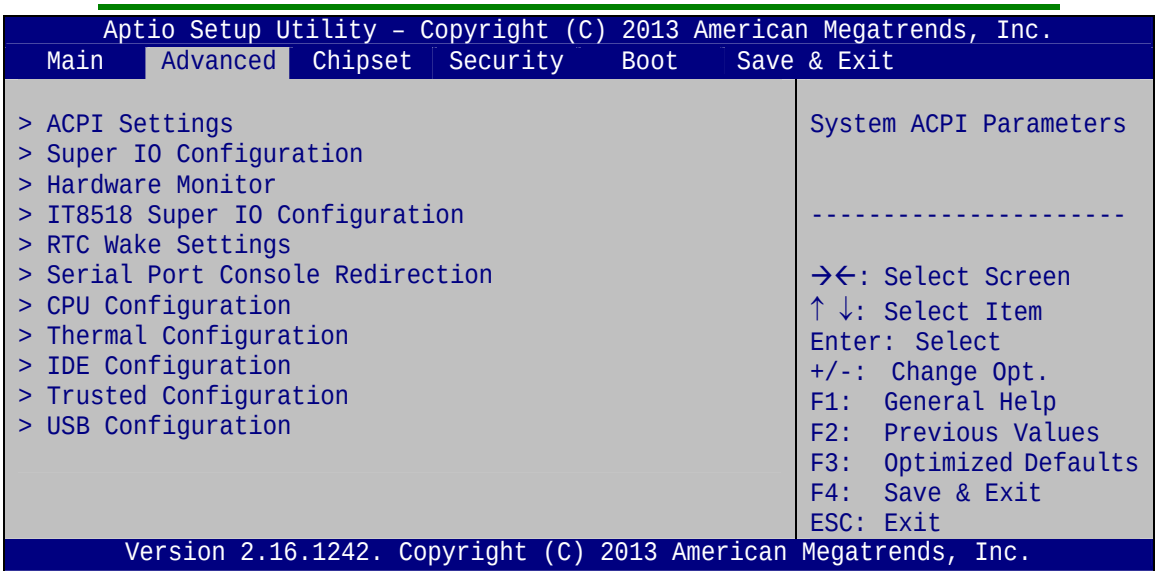
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING:

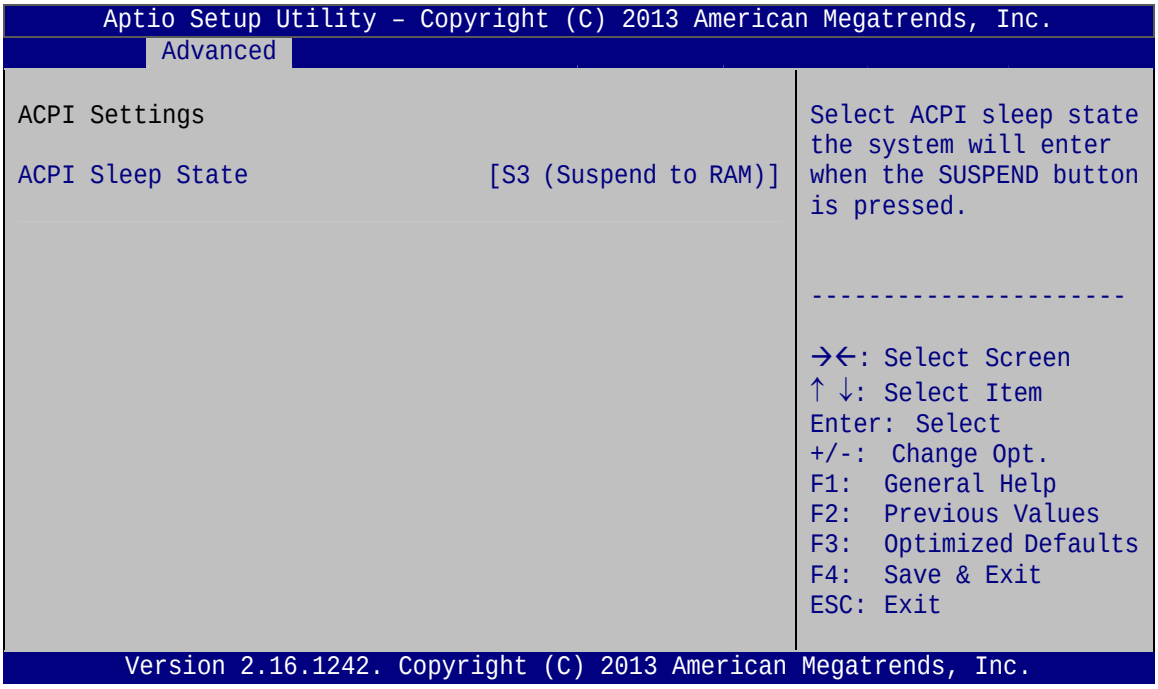
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

5.3.1 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 3**) configures the Advanced Configuration and Power Interface (ACPI) options.



BIOS Menu 3: ACPI Settings

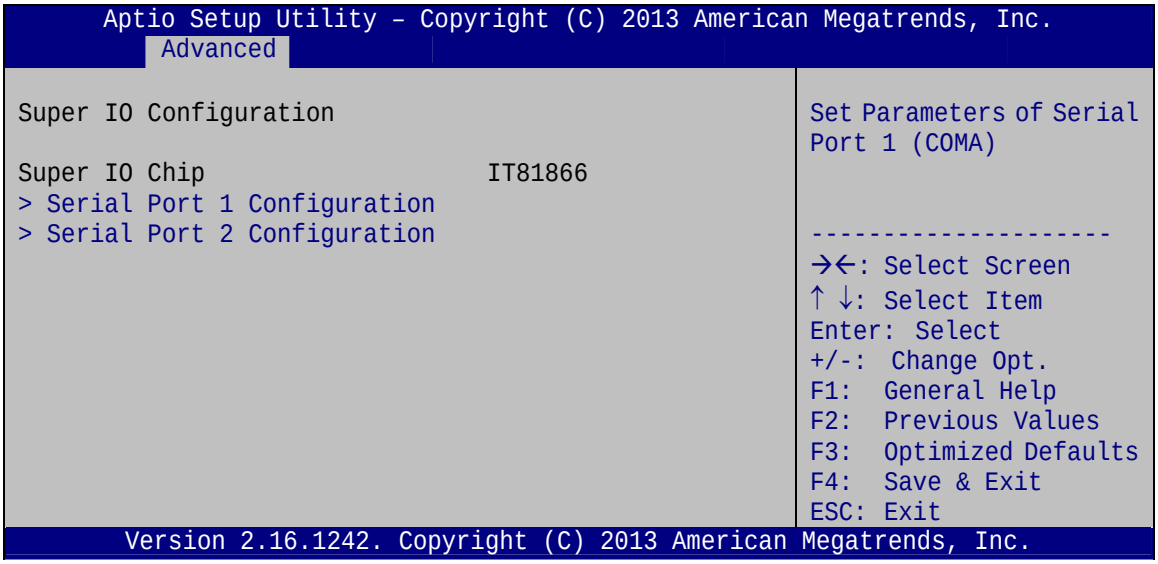
➔ **ACPI Sleep State [S3 (Suspend to RAM)]**

Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

➔ **Suspend Disabled**	System sleep state is disabled.
➔ **S3 (Suspend to RAM)** **DEFAULT**	The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 Super IO Configuration

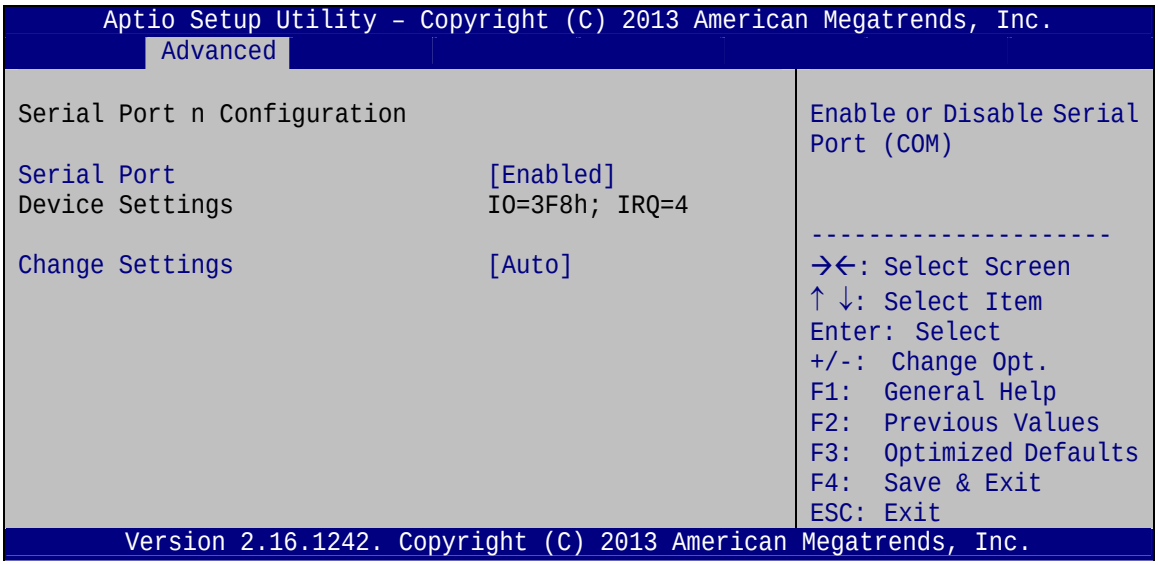
Use the **Super IO Configuration** menu (**BIOS Menu 4**) to set or change the configurations for the serial ports.



BIOS Menu 4: IT8528 Super IO Configuration

5.3.2.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 5**) to configure the serial port n.



BIOS Menu 5: Serial Port n Configuration Menu

5.3.2.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4
➔ **IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

5.3.2.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

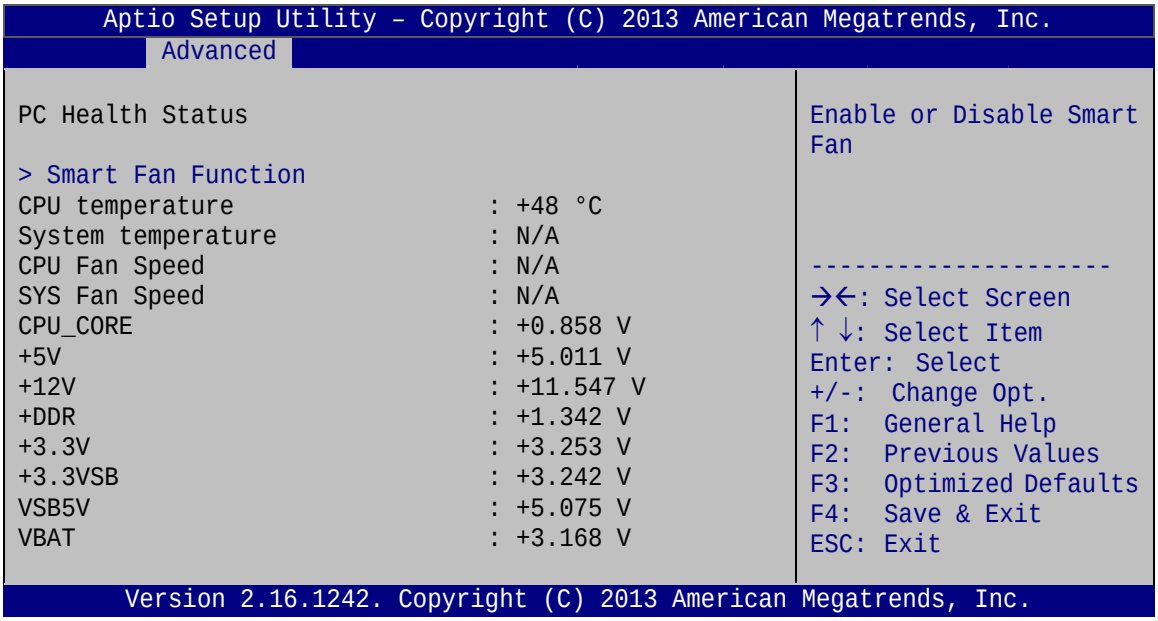
➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2F8h; IRQ=3**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
➔ **IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

5.3.3 Hardware Monitor

The **Hardware Monitor** menu (**BIOS Menu 6**) displays the CPU temperature and CPU fan speed, and contains the fan configuration submenu.



BIOS Menu 6: Hardware Monitor

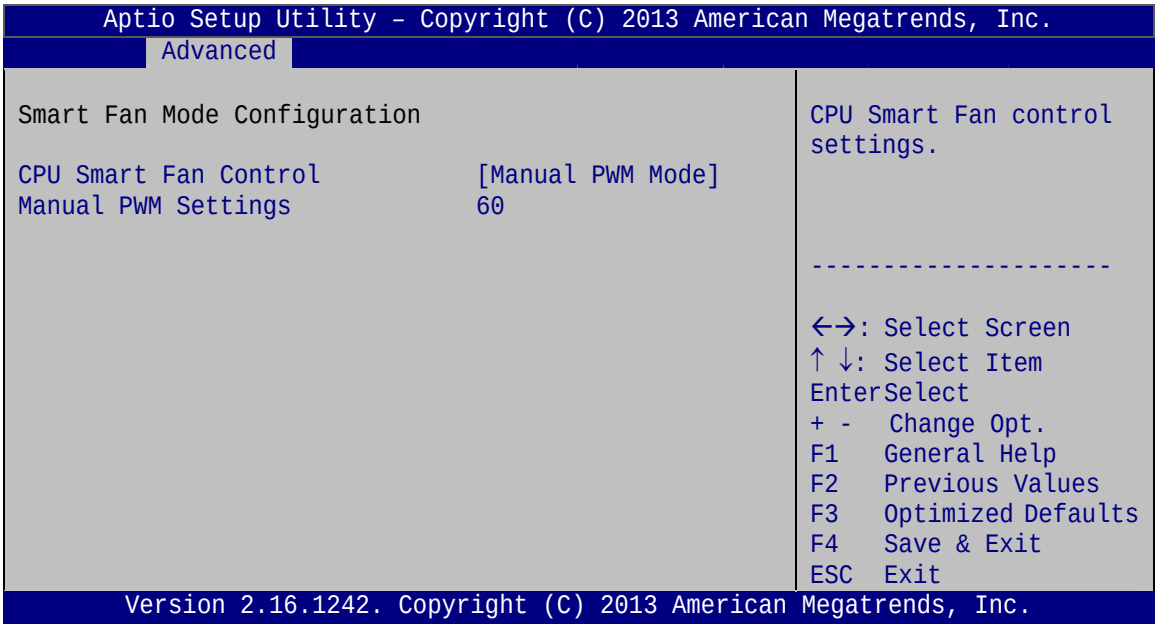
➔ **PC Health Status**

The following system parameters and values are shown. The system parameters that are monitored are:

- CPU temperature
- System temperature
- CPU Fan Speed
- SYS Fan Speed
- CPU_CORE
- +5V
- +12V
- +DDR
- +3.3V
- +3.3VSB
- VSB5V
- VBAT

5.3.3.1 Smart Fan Function

Use the **Smart Fan Function** submenu (**BIOS Menu 7**) to configure the smart fan temperature and speed settings.



BIOS Menu 7: Smar Fan Function

➔ **CPU Smart Fan Control [Manual PWM Mode]**

Use the **Fan 1 Smart Fan Control** option to configure the CPU Smart Fan.

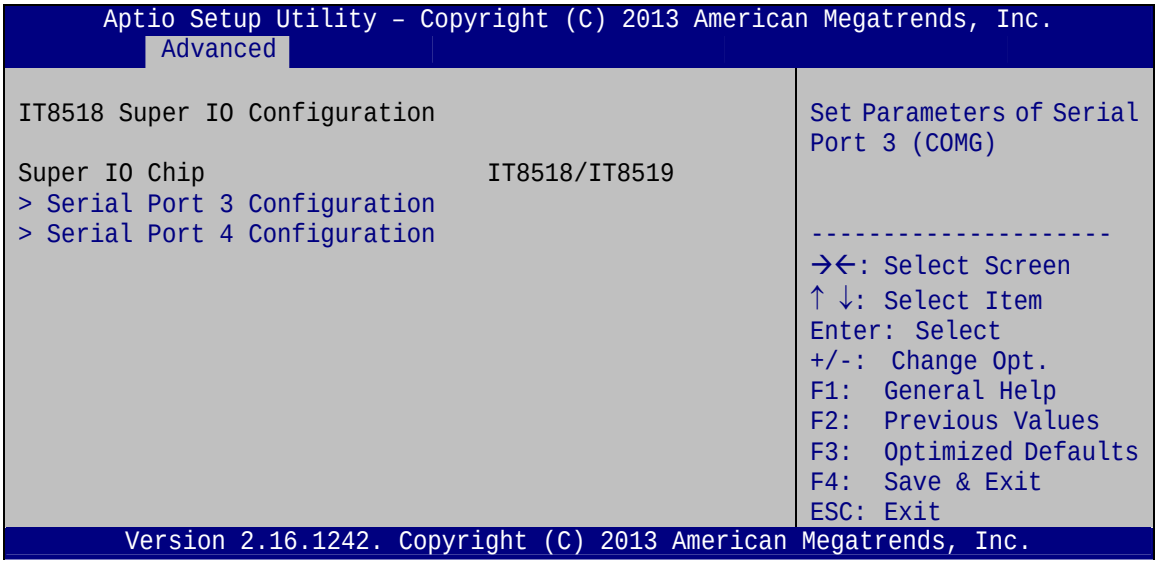
➔ **Full Mode**	The fan spins at full speed
➔ **Manual PWM DEFAULT Mode**	The fan spins at the speed set in Manual PWM Setting
➔ **Auto PWM Mode**	The fan adjusts its speed according to the auto mode settings

➔ **Manual PWM Setting**

Use the + or – key to change the **Manual PWM Setting** value. Enter a decimal number between 1 and 100.

5.3.4 IT8518 Super IO Configuration

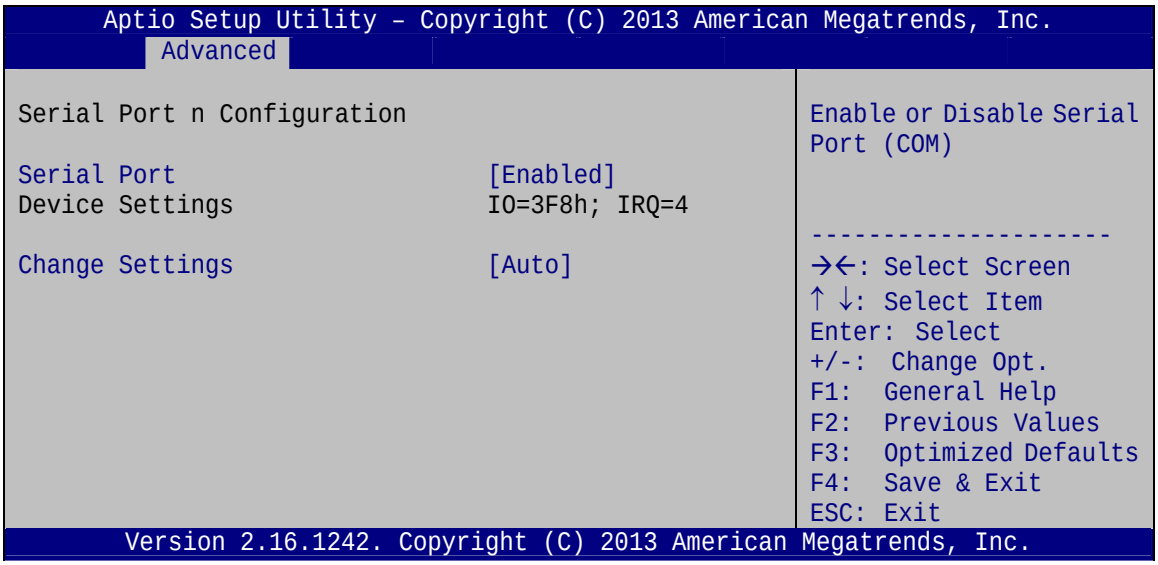
Use the **IT8518 Super IO Configuration** menu (**BIOS Menu 8**) to set or change the configurations for the serial ports.



BIOS Menu 8: IT8518 Super IO Configuration

5.3.4.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 9**) to configure the serial port n.



BIOS Menu 9: Serial Port n Configuration Menu

5.3.4.1.1 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3E8h; IRQ=7**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ7
➔ **IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

➔ **IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2F0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

5.3.4.1.2 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

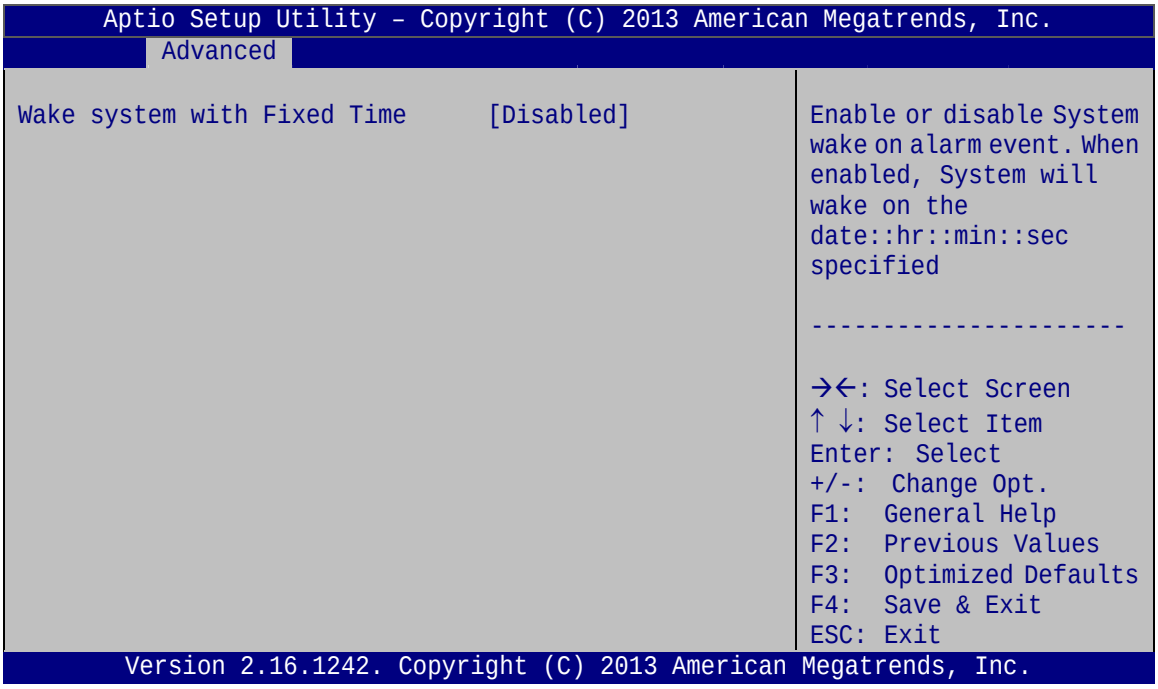
Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2E8h; IRQ=7**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ7
➔ **IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

➔ **IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**	Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**	Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**	Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**	Serial Port I/O port address is 2F0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
➔ **IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12**	Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

5.3.5 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 10**) enables the system to wake at the specified time.



BIOS Menu 10: RTC Wake Settings

➔ **Wake system with Fixed Time [Disabled]**

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

➔ **Disabled**	**DEFAULT**	The real time clock (RTC) cannot generate a wake event
➔ **Enabled**		If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected: Wake up date Wake up hour

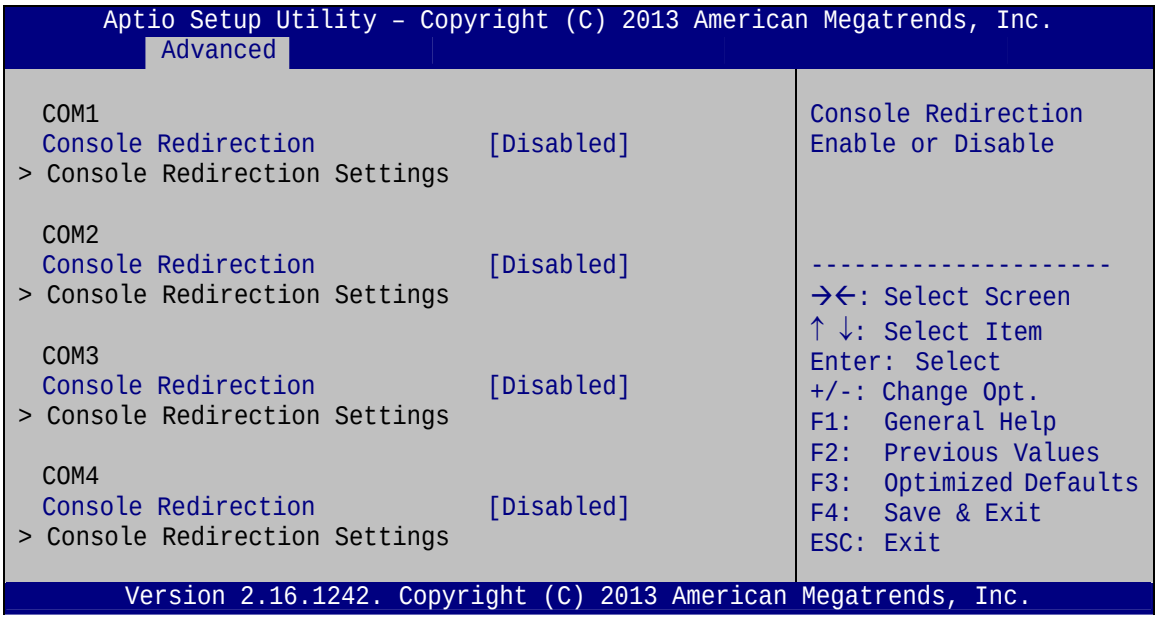
Wake up minute

Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.6 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 11**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 11: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

Use **Console Redirection** option to enable or disable the console redirection function.

➔ **Disabled** **DEFAULT** Disabled the console redirection function

➔ **Enabled** Enabled the console redirection function

NOTE:

The following five options appear when the **Console Redirection** option is enabled.

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** option to specify the remote terminal type.

➔ **VT100**		The target terminal type is VT100
➔ **VT100+**		The target terminal type is VT100+
➔ **VT-UTF8**		The target terminal type is VT-UTF8
➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI

➔ **Bits per second [115200]**

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

➔ **9600**		Sets the serial port transmission speed at 9600.
➔ **19200**		Sets the serial port transmission speed at 19200.
➔ **38400**		Sets the serial port transmission speed at 38400.
➔ **57600**		Sets the serial port transmission speed at 57600.
➔ **115200**	**DEFAULT**	Sets the serial port transmission speed at 115200.

➔ **Data Bits [8]**

Use the **Data Bits** option to specify the number of data bits.

➔ **7**		Sets the data bits at 7.
➔ **8**	**DEFAULT**	Sets the data bits at 8.

➔ **Parity [None]**

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

➔ **None**	**DEFAULT**	No parity bit is sent with the data bits.
➔ **Even**		The parity bit is 0 if the number of ones in the data bits is even.
➔ **Odd**		The parity bit is 0 if the number of ones in the data bits is odd.
➔ **Mark**		The parity bit is always 1. This option does not provide error detection.
➔ **Space**		The parity bit is always 0. This option does not provide error detection.

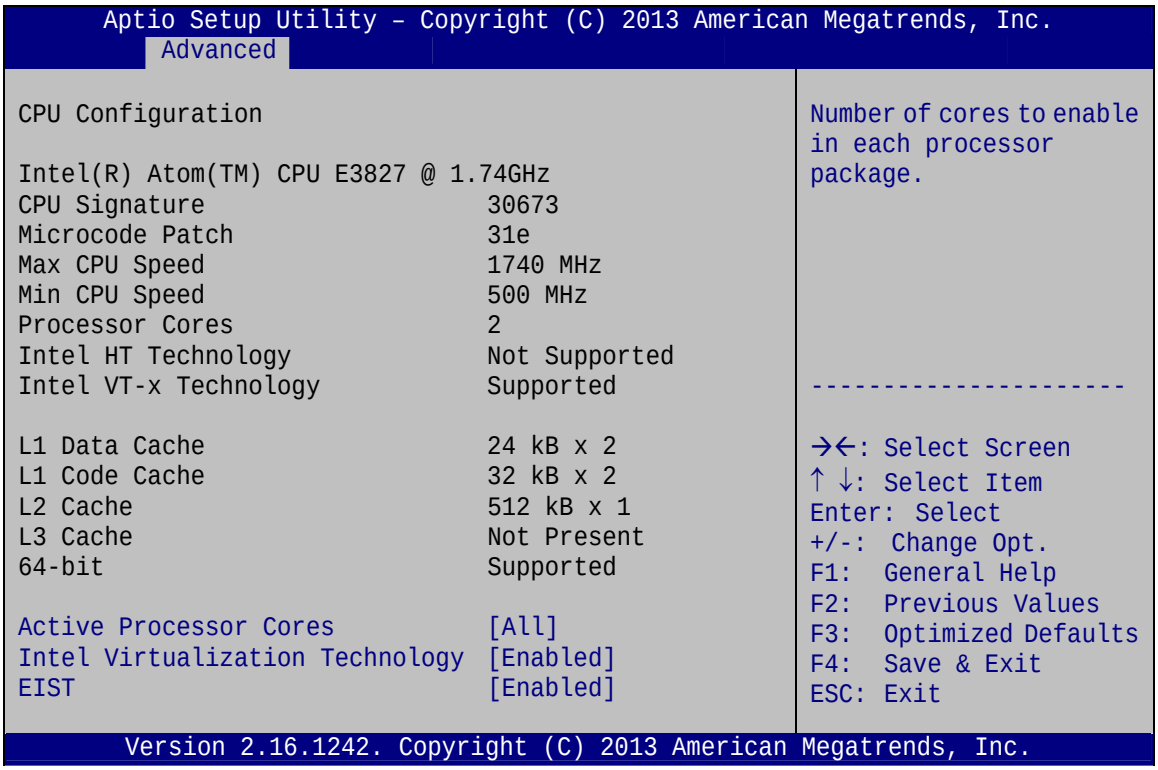
➔ **Stop Bits [1]**

Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

➔ **1**	**DEFAULT**	Sets the number of stop bits at 1.
➔ **2**		Sets the number of stop bits at 2.

5.3.7 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 12**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 12: CPU Configuration

The CPU Configuration menu (**BIOS Menu 12**) lists the following CPU details:

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- Processor Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.

- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.
- 64-bit: Indicates if 64-bit is supported by the CPU.

➔ **Active Processor Cores [All]**

Use the **Active Processor Cores** BIOS option to enable numbers of cores in the processor package.

➔	**All**	**DEFAULT**	Enable all cores in the processor package.
➔	**1**		Enable one core in the processor package.

➔ **Intel Virtualization Technology [Enabled]**

Use the **Intel Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel® Virtualization technology allows several OSs to run on the same system at the same time.

➔	**Disabled**		Disables Intel Virtualization Technology.
➔	**Enabled**	**DEFAULT**	Enables Intel Virtualization Technology.

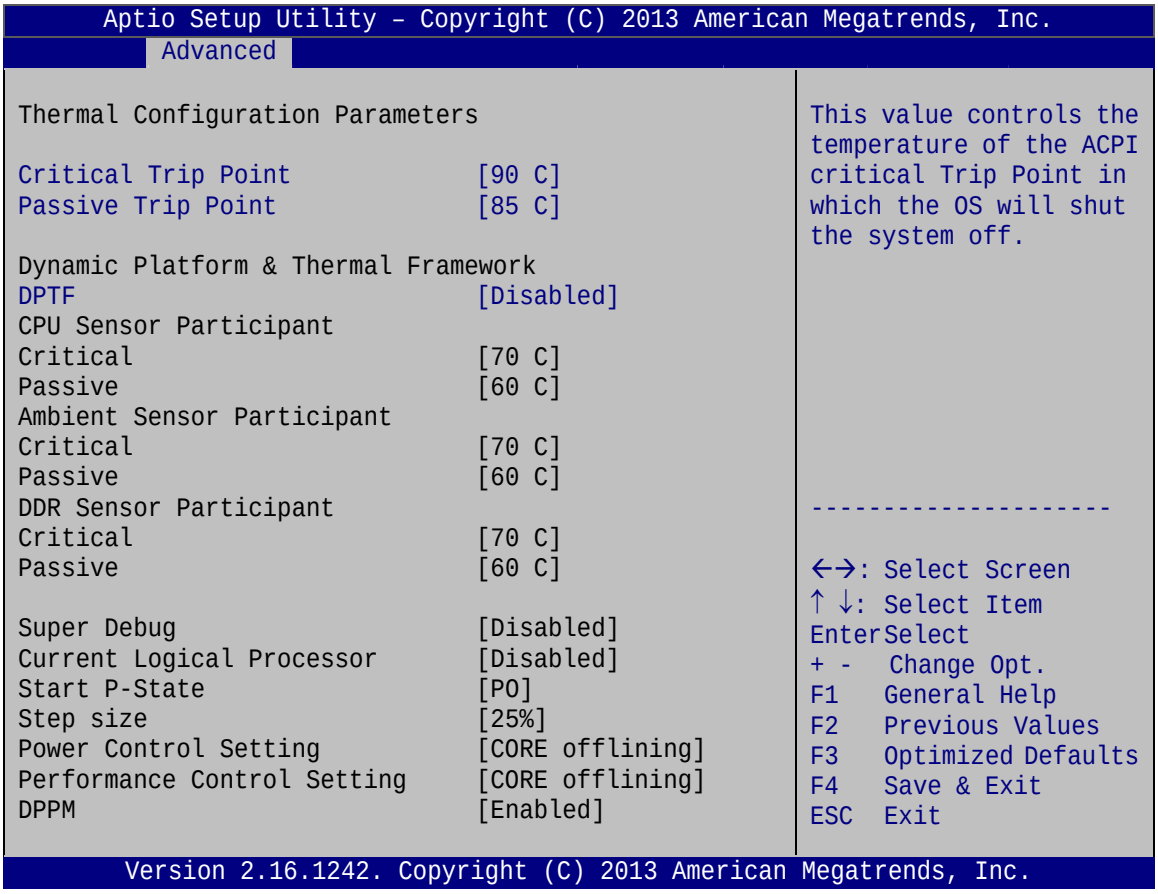
➔ **EIST [Enabled]**

Use the **EIST** option to enable or disable Enhanced Intel SpeedStep® Techonology (EIST).

➔	**Disabled**		Disables Enhanced Intel SpeedStep® Techonology.
➔	**Enabled**	**DEFAULT**	Enables Enhanced Intel SpeedStep® Techonology.

5.3.8 Thermal Configuration

Use the **Thermal Configuration** menu (**BIOS Menu 13**) to configure the thermal control settings.



BIOS Menu 13: Thermal Configuration

➔ **Critical Trip Point**

Use the **Critical Trip Point** option to control the temperature of the ACPI critical trip point in which the OS will shut the system off. The following options are available:

- 90 C **Default**
- 87 C
- 85 C
- 79 C
- 71 C
- 63 C

- 55 C
- 47 C
- 39 C
- 31 C
- 23 C
- 15 C

➔ **Passive Trip Point**

Use the **Passive Trip Point** option to control the temperature of the ACPI passive trip point in which the OS will begin throttling the processor. The following options are available:

- 90 C
- 87 C
- 85 C **Default**
- 79 C
- 71 C
- 63 C
- 55 C
- 47 C
- 39 C
- 31 C
- 23 C
- 15 C

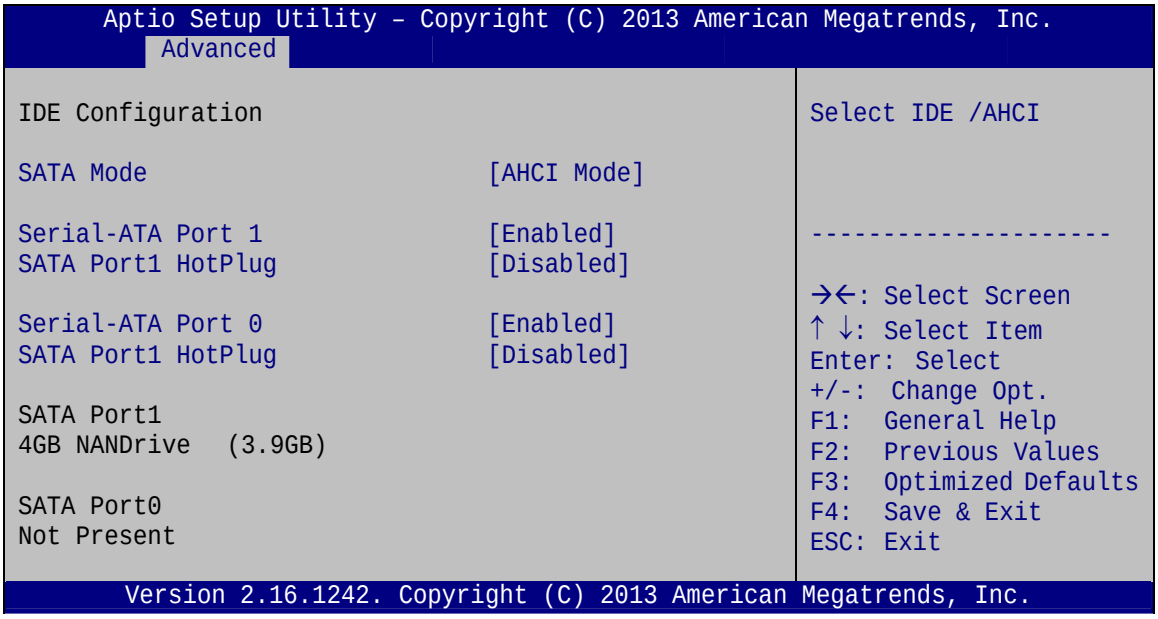
➔ **DPTF [Disabled]**

Use the **DPTF** option to enable or disable the Dynamic Platform and Thermal Framework.

➔ **Enabled**		Dynamic Platform and Thermal Framework is enabled.
➔ **Disabled**	**DEFAULT**	Dynamic Platform and Thermal Framework is disabled.

5.3.9 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 14**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 14: SATA Configuration

➔ **SATA Mode Selection [AHCI Mode]**

Use the **SATA Mode Selection** option to configure SATA devices.

➔ **IDE Mode** Configures SATA devices as normal IDE device.

➔ **AHCI Mode** **DEFAULT** Configures SATA devices as AHCI device.

➔ **Serial-ATA Port 1 [Enabled]**

Use the **Serial-ATA Port 1** option to enable or disable the serial ATA port 1.

➔ **Enabled** **DEFAULT** Enables the SATA port 1.

➔ **Disabled** Disables the SATA port 1.

➔ **SATA Port1 HotPlug [Disabled]**

Use the **SATA Port1 HotPlug** option to enable or disable hotplug function of SATA port 1.

➔ **Enabled**		Enables SATA port 1 hotplug.
➔ **Disabled**	**DEFAULT**	Disables SATA port 1 hotplug.

➔ **Serial-ATA Port 0 [Enabled]**

Use the **Serial-ATA Port 0** option to enable or disable the serial ATA port 0.

➔ **Enabled**	**DEFAULT**	Enables the SATA port 0.
➔ **Disabled**		Disables the SATA port 0.

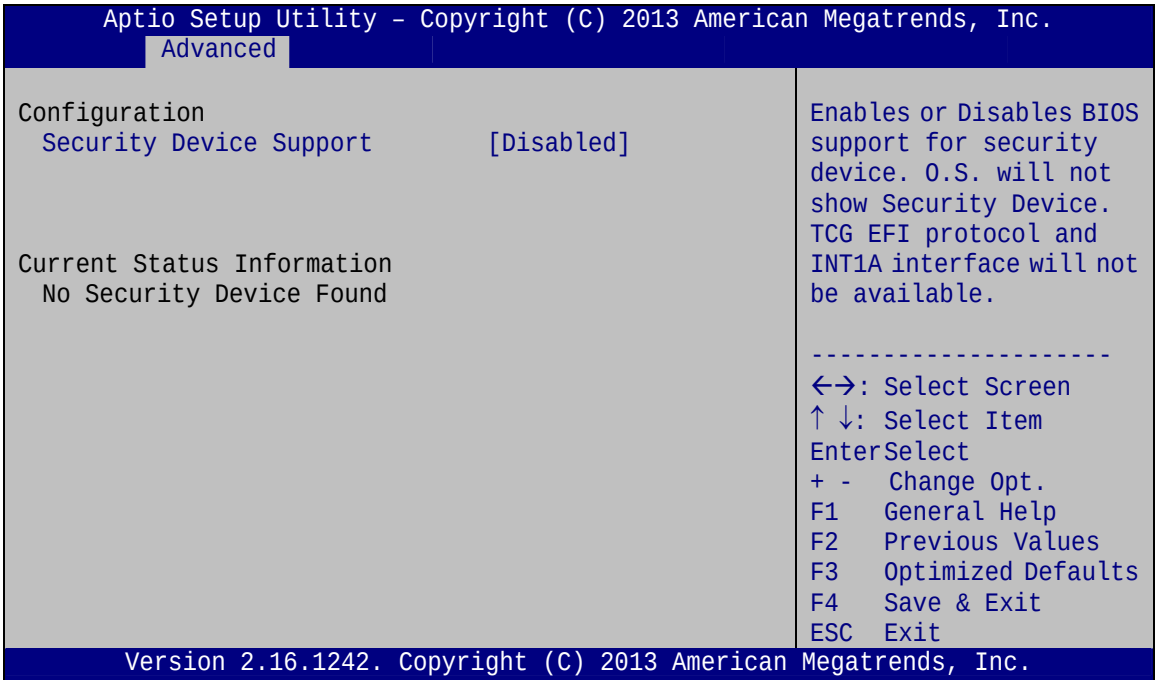
➔ **SATA Port0 HotPlug [Disabled]**

Use the **SATA Port0 HotPlug** option to enable or disable hotplug function of SATA port 0.

➔ **Enabled**		Enables SATA port 0 hotplug.
➔ **Disabled**	**DEFAULT**	Disables SATA port 0 hotplug.

5.3.10 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 15**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 15: Trusted Computing

➔ **Security Device Support [Disabled]**

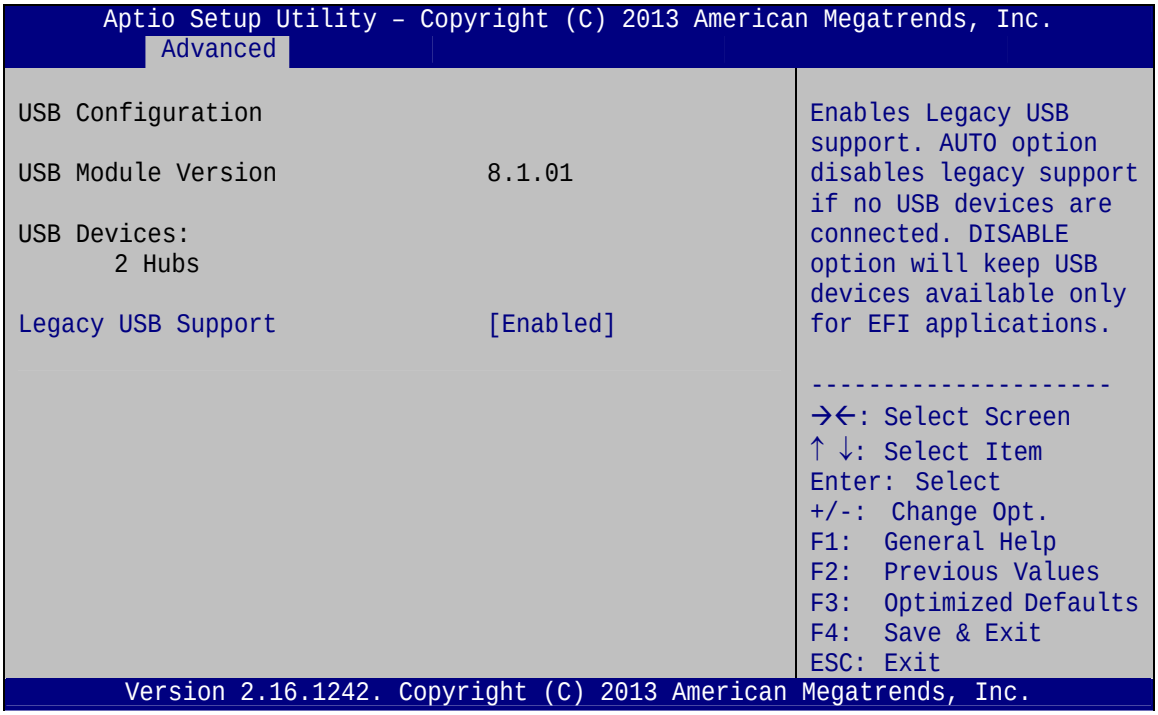
Use the **Security Device Support** option to configure support for the security device.

➔ **Disabled** **DEFAULT** Security device is disabled

➔ **Enabled** Security device is enabled

5.3.11 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 16**) to read USB configuration information and configure the USB settings.



BIOS Menu 16: USB Configuration

➔ **USB Devices**

The **USB Devices** field lists the USB devices that are enabled on the system

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Enabled** **DEFAULT** Legacy USB support enabled

➔	**Disabled**	Legacy USB support disabled
➔	**Auto**	Legacy USB support disabled if no USB devices are connected

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 17**) to access the North Bridge and South Bridge configuration menus.

WARNING!

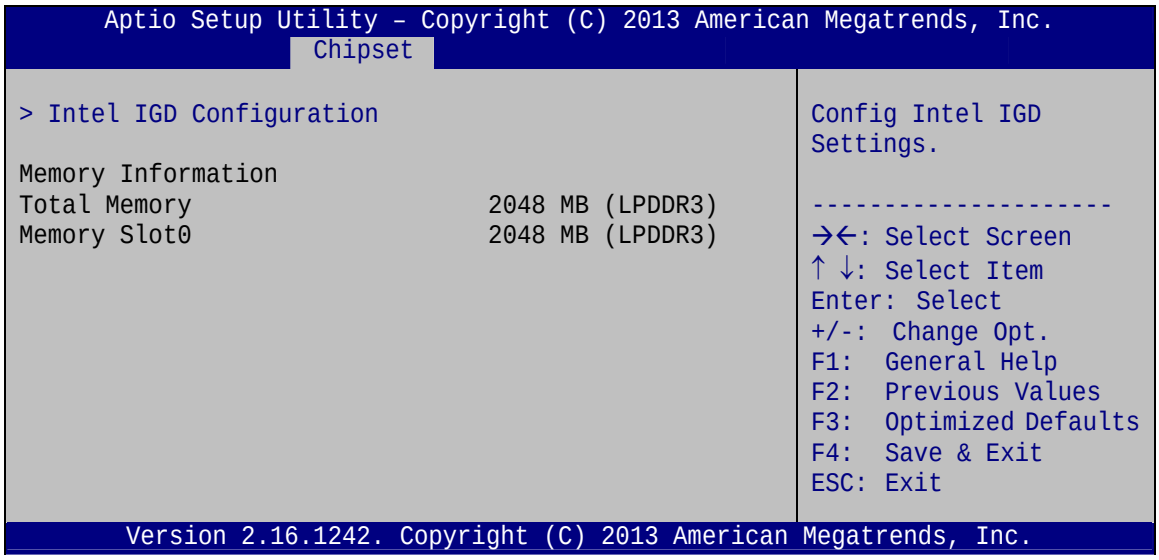
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
      Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
  Main    Advanced  Chipset  Security    Boot    Save & Exit

> North Bridge                                  North Bridge Parameters.
> South Bridge


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

        Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

BIOS Menu 17: Chipset

5.4.1 North Bridge

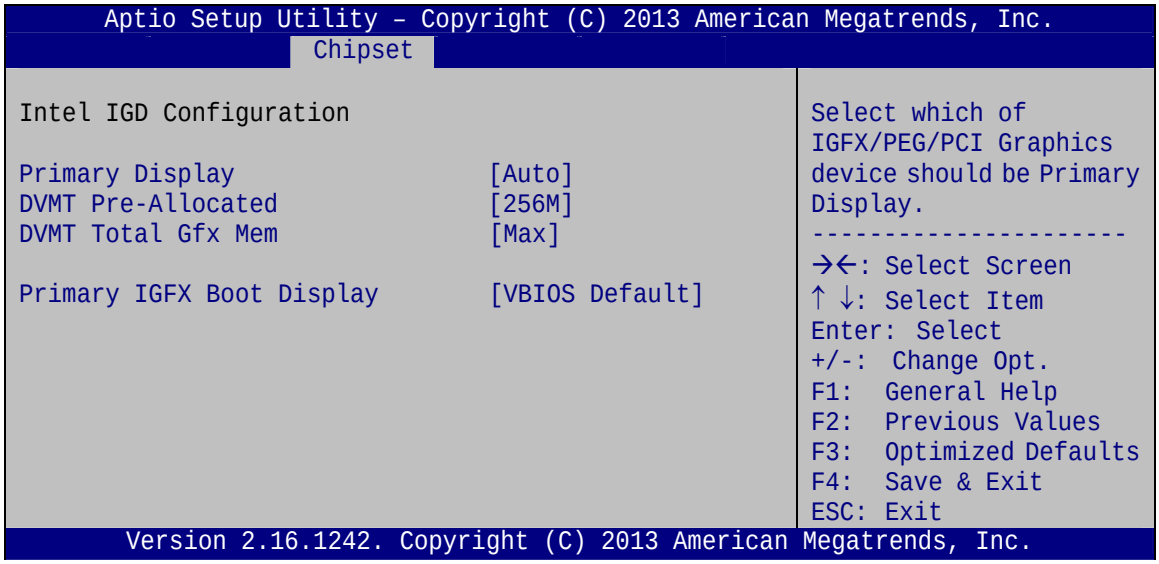
Use the **North Bridge** menu (**BIOS Menu 18**) to configure the north bridge parameters.



BIOS Menu 18: North Bridge Configuration

5.4.1.1 Intel IGD Configuration

Use the **Intel IGD Configuration** submenu (**BIOS Menu 19**) to configure the graphics settings.



BIOS Menu 19: Intel IGD Configuration

➔ **Primary Display [Auto]**

Use the **Primary Display** option to select the primary graphics controller the system uses. The following options are available:

- Auto
- IGD **Default**
- PCI
- SG

➔ **DVMT Pre-Allocated [256M]**

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- 64M
- 128M
- 256M **Default**
- 512M

➔ **DVMT Total Gfx Mem [Max]**

Use the **DVMT Total Gfx Mem** option to select DVMT5.0 total graphic memory size used by the internal graphic device. The following options are available:

- 128M
- 256M
- MAX **Default**

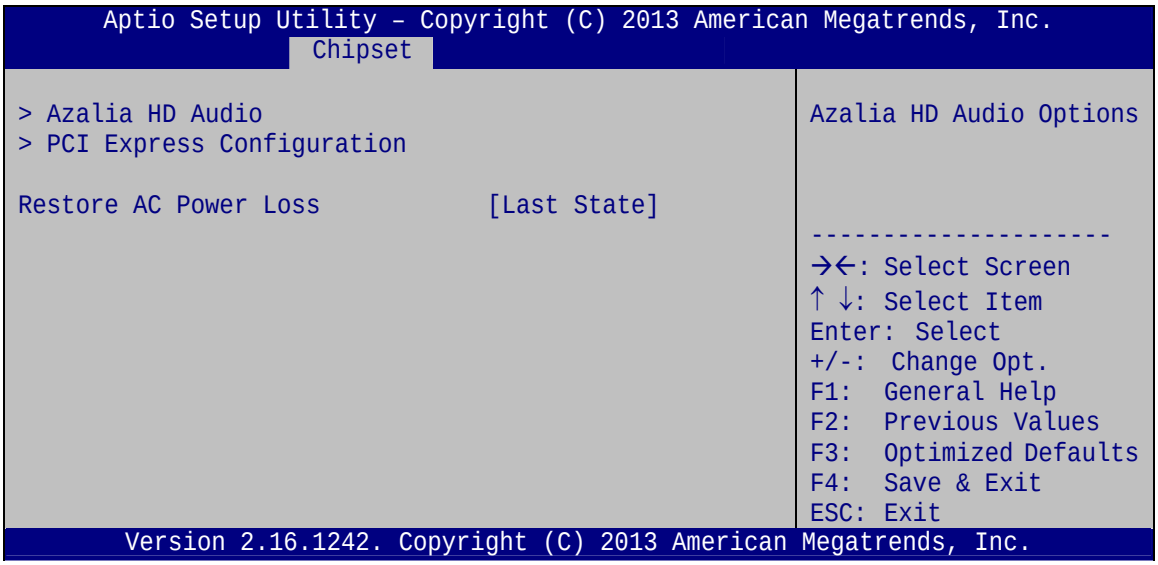
➔ **Primary IGFX Boot Display [VBIOS Default]**

Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- VBIOS Default **DEFAULT**
- CRT
- LVDS
- DP2

5.4.2 South Bridge Configuration

Use the **South Bridge** menu (**BIOS Menu 20**) to configure the south bridge chipset.



BIOS Menu 20: Sorth Bridge Configuration

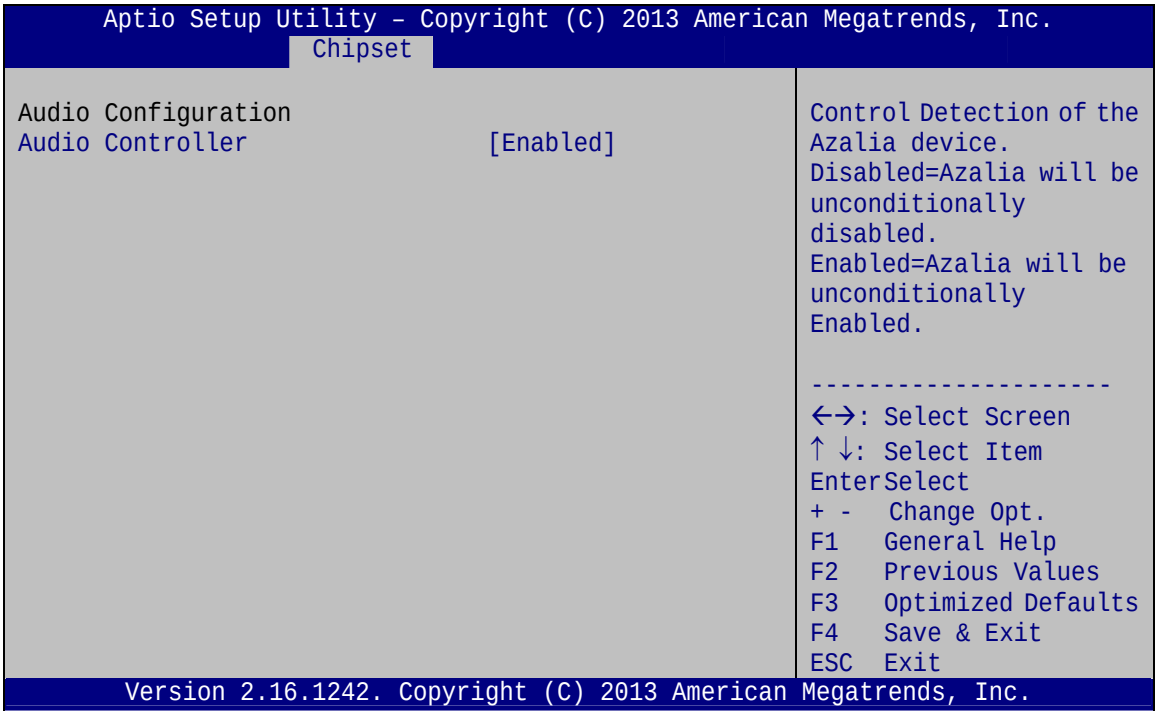
➔ **Restore AC Power Loss [Last State]**

Use the **Restore AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔	**Power Off**		The system remains turned off
➔	**Power On**		The system turns on
➔	**Last State**	**DEFAULT**	The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

5.4.2.1 Azalia HD Audio

Use the **Azalia HD Audio** submenu (**BIOS Menu 21**) to configure the High Definition Audio codec.



BIOS Menu 21: Azalia HD Audio

➔ **Audio Controller [Enabled]**

Use the **Audio Controller** BIOS option to enable or disable the High Definition Audio controller.

➔ **Disabled** The High Definition Audio controller is disabled.

➔ **Enabled** **DEFAULT** The High Definition Audio controller is enabled.

5.4.2.2 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 22**) to select the support type of the PCI Express or PCIe Mini slots.

```
Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
                    Chipset

PCI Express Configuration                  | Enable or Disable the PCI
PCI Express Port 0              [Enabled]  | Express Port 2 in the
  Speed                         [Auto]     | Chipset.
                                           |
PCI Express Port 1              [Enabled]  |
  Speed                         [Auto]     | ----------------------
                                           | →←: Select Screen
PCI Express Port 2              [Enabled]  | ↑ ↓: Select Item
  Speed                         [Auto]     | Enter: Select
                                           | +/-: Change Opt.
                                           | F1: General Help
                                           | F2: Previous Values
                                           | F3: Optimized Defaults
                                           | F4: Save & Exit
                                           | ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

BIOS Menu 22: PCI Express Configuration

➔ **PCI Express Port n [Enabled]**

Use the **PCI Express Port n** option to enable or disable the PCI Express slot on the baseboard.

➔ **Enabled** **DEFAULT** The PCI Express slot is enabled.

➔ **Disabled** The PCI Express slot is disabled.

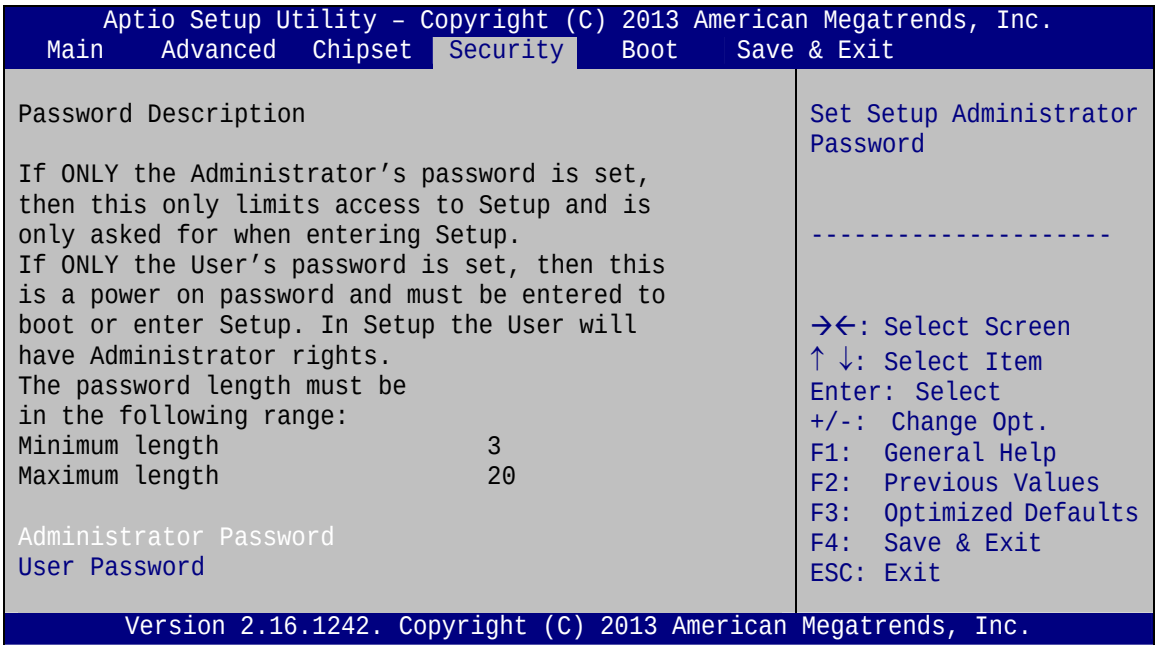
➔ **PCIe Speed**

Use PCIe Speed option to select the speed type of the PCI Express slots. The following options are available:

- Auto **Default**
- Gen1
- Gen2

5.5 Security

Use the **Security** menu (**BIOS Menu 23**) to set system and user passwords.



BIOS Menu 23: Security

➔ **Administrator Password**

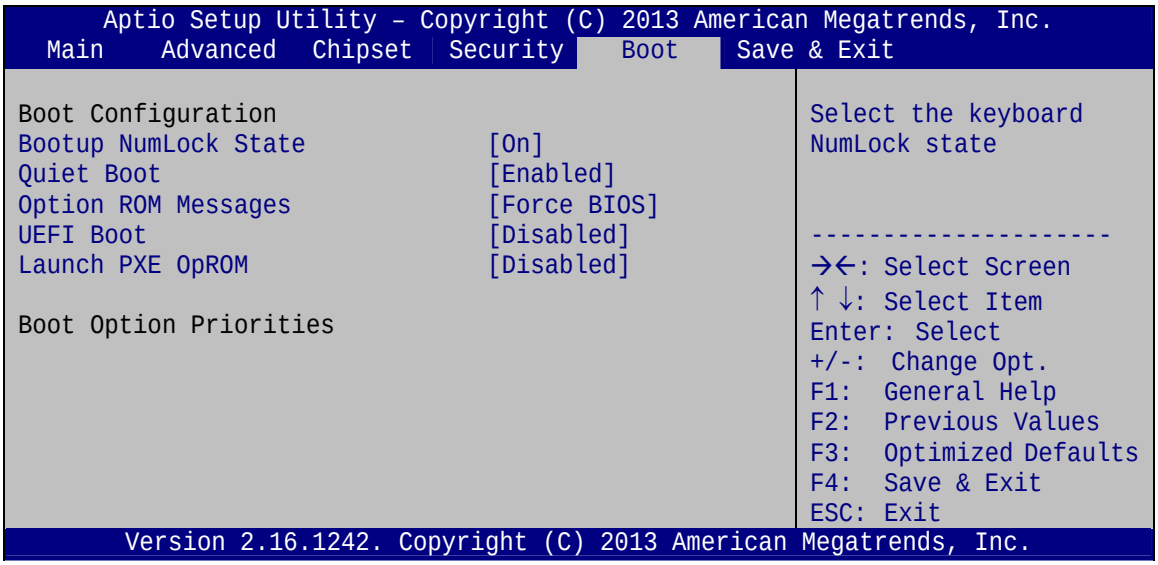
Use the **Administrator Password** to set or change an administrator password.

➔ **User Password**

Use the **User Password** to set or change a user password.

5.6 Boot

Use the **Boot menu** (**BIOS Menu 24**) to configure system boot options.



BIOS Menu 24: Boot

➔ Bootup NumLock State [On]

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **On**	**DEFAULT**	Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.
➔ **Off**		Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **Quiet Boot [Enabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**		Normal POST messages displayed
➔ **Enabled**	**DEFAULT**	OEM Logo displayed instead of POST messages

➔ **Option ROM Messages [Force BIOS]**

Use the **Option ROM Messages** option to set the Option ROM display mode.

➔ **Force BIOS**	**DEFAULT**	Sets display mode to force BIOS.
➔ **Keep Current**		Sets display mode to current.

➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** BIOS option to allow the system to boot from the UEFI devices.

➔ **Disabled**	**DEFAULT**	Disables to boot from the UEFI devices.
➔ **Enabled**		Enables to boot from the UEFI devices.

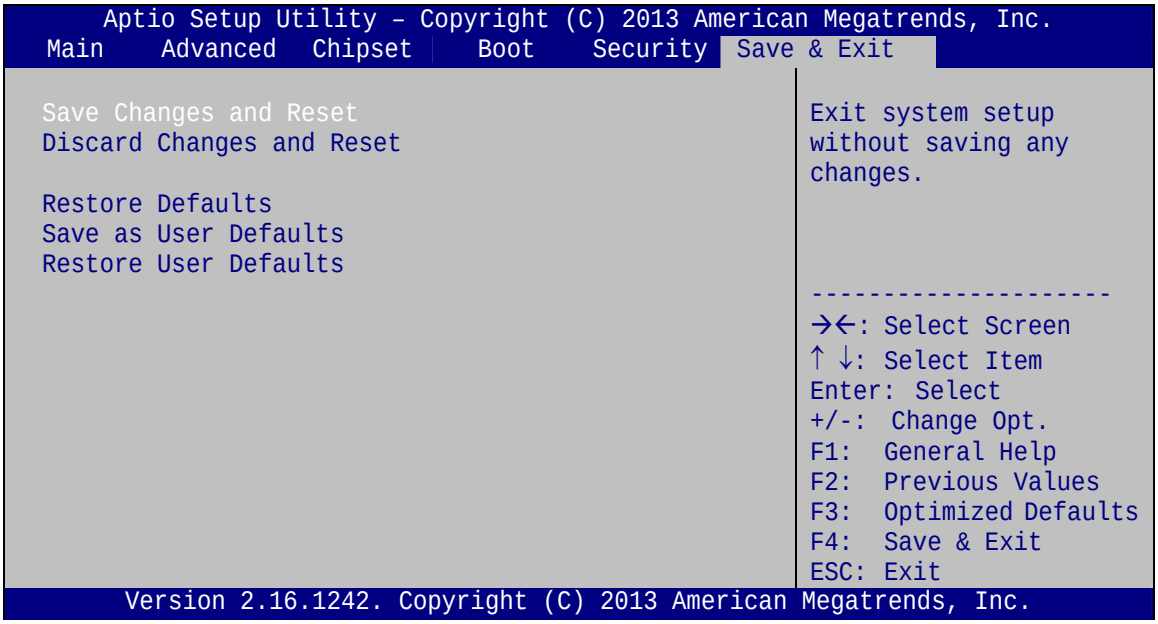
➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

➔ **Disabled**	**DEFAULT**	Ignore all PXE Option ROMs
➔ **Enabled**		Load PXE Option ROMs.

5.7 Save & Exit

Use the **Save & Exit** menu (**BIOS Menu 25**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 25: Save & Exit

➔ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and reset the system.

➔ **Discard Changes and Reset**

Use the **Discard Changes and Reset** option to reset the system without saving the changes made to the BIOS configuration setup program.

➔ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset
- Graphics
- LAN

Installation instructions are given below.

6.2 Starting the Driver Program

To access the driver installation programs, please do the following.

Step 1: Insert the CD that came with the system into a CD drive connected to the system.

NOTE:

If the installation program doesn't start automatically:
Click "Start->Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 6-1**).

Figure 6-1: Start Up Screen

Step 3: Click ICE-BT-T6.

Step 4: The list of drivers in **Figure 6-2** appears.

Figure 6-2: Drivers

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**1-Bay Trail SOC**" and select the folder which corresponds to the operating system.

NOTE:

The remainder of this installation assumes Windows 8 as the operating system.

Step 3: Locate the setup file (infinst_autol_9.4.4.1006.exe) and double click on it.

Step 4: When the setup files are completely extracted, the **Welcome Screen** in **Figure 6-3** appears. Click **Next** to continue.

Figure 6-3: Chipset Driver Welcome Screen

Step 5: The **License Agreement** in **Figure 6-4** appears.

Step 6: Click **Yes** to accept the agreement and continue.

Figure 6-4: Chipset Driver License Agreement

Step 7: The **Read Me** file in **Figure 6-5** appears.

Step 8: Click **Next** to continue.

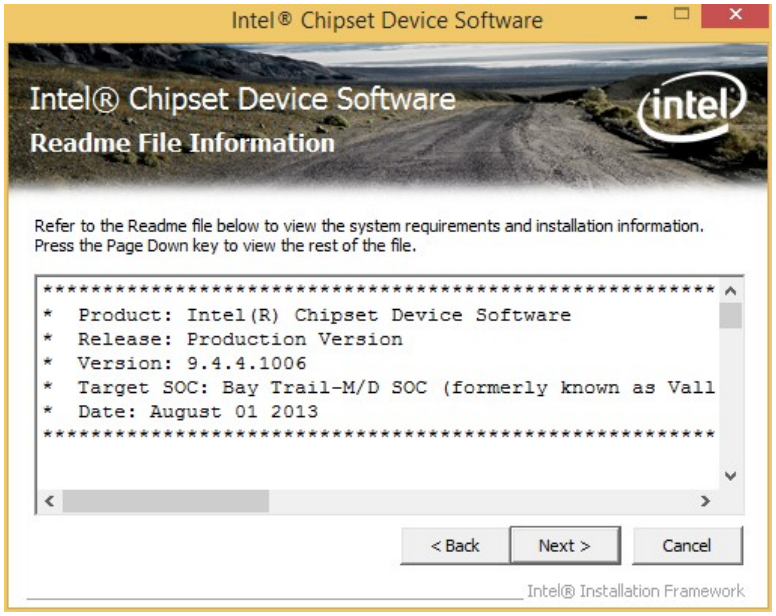


Figure 6-5: Chipset Driver Read Me File

Step 9: **Setup Operations** are performed as shown in **Figure 6-6**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.

Figure 6-6: Chipset Driver Setup Operations

Step 11: The **Finish** screen in **Figure 6-7** appears.

Step 12: Select "**Yes, I want to restart this computer now**" and click **Finish**.

Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the graphics driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**1-Bay Trail SOC**" and select the folder which corresponds to the operating system.

NOTE:

The remainder of this installation assumes Windows 8 as the operating system.

Step 3: Unzip the file called **15.33.7.3366.zip**, and then locate the setup file and double click on it to start the installation. If a 64-bit operating system is installed, please unzip the 15.33.7.64.336.zip file to install the graphics driver.

NOTE:

To install graphics driver on a **32-bit** Windows 7 system, unzip INTEL_EMGD.WIN7_PC_VERSION_36_15_0_1064.7Z.

To install graphics driver on a **64-bit** Windows 7 system, unzip INTEL_EMGD.WIN7_BETA_VERSION_37_15_0_1055.7Z.

Step 4: The **Welcome Screen** in **Figure 6-8** appears.

Step 5: Click **Next** to continue.

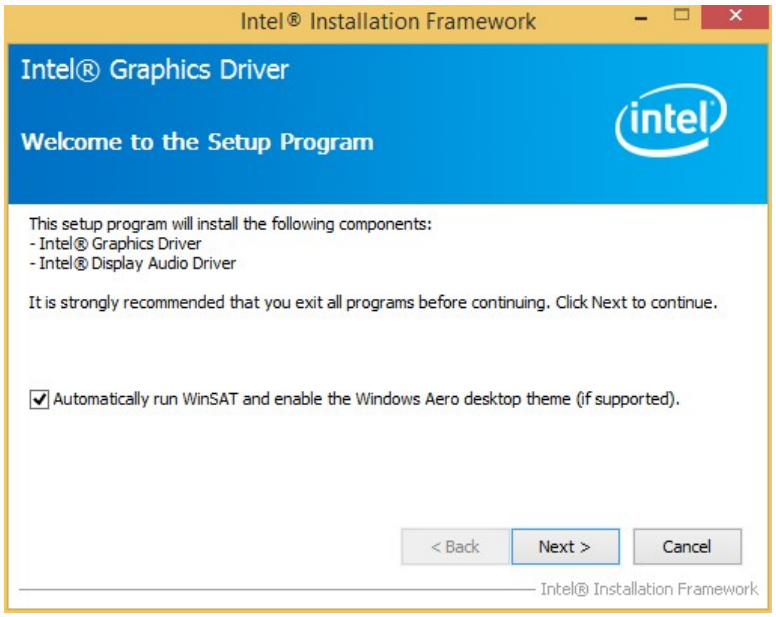


Figure 6-8: Graphics Driver License Agreement

Step 6: The **License Agreement** in **Figure 6-9** appears.

Step 7: Click **Yes** to accept the agreement and continue.

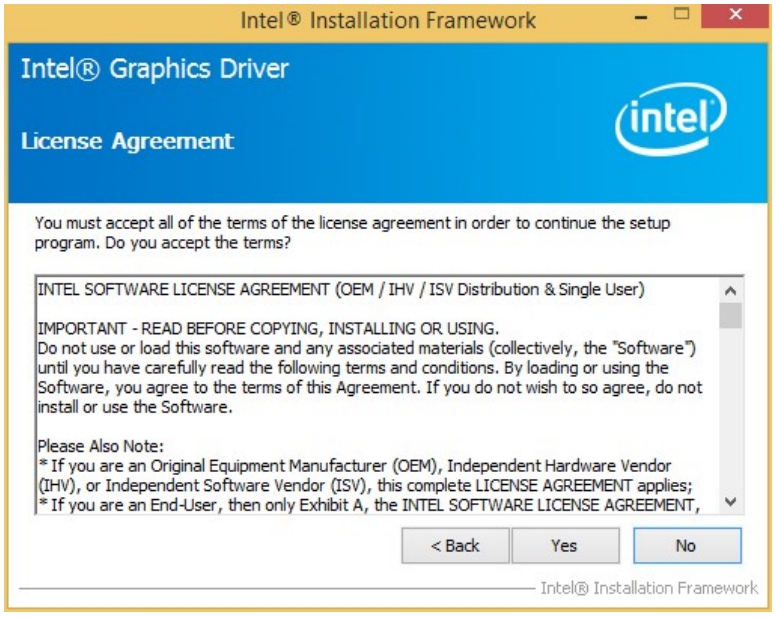


Figure 6-9: Graphics Driver Read Me File

Step 8: The **Read Me** file in **Figure 6-10** appears. Click **Next** to continue.

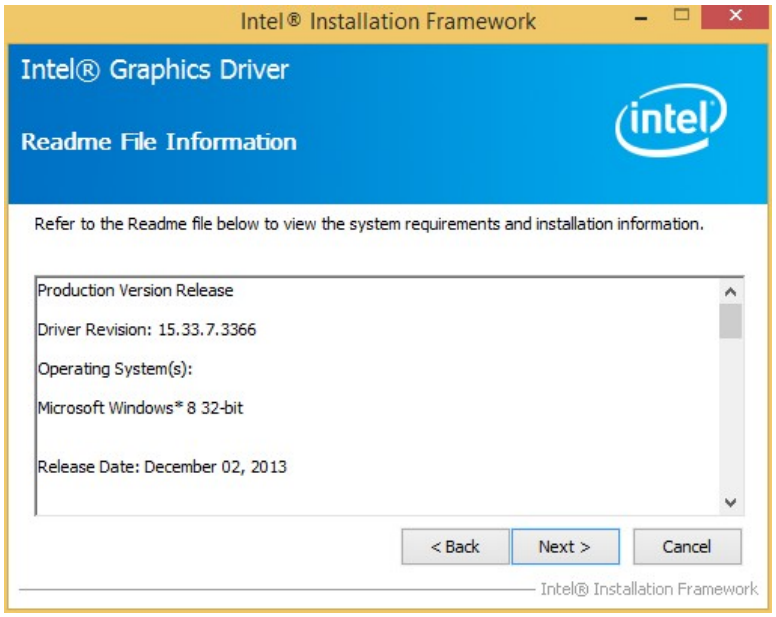


Figure 6-10: Graphics Driver Setup Operations

Step 9: **Setup Operations** are performed as shown in **Figure 6-11**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.

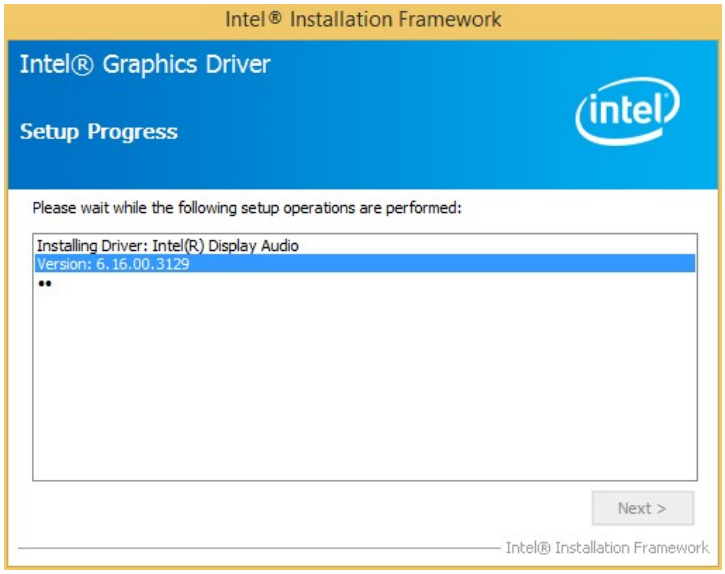


Figure 6-11: Graphics Driver Installation Finish Screen

Step 11: The system starts installing the Graphics Driver.

Step 12: The **Finish** screen in **Figure 6-12** appears.

Step 13: Select "**Yes, I want to restart this computer now**" and click **Finish**.

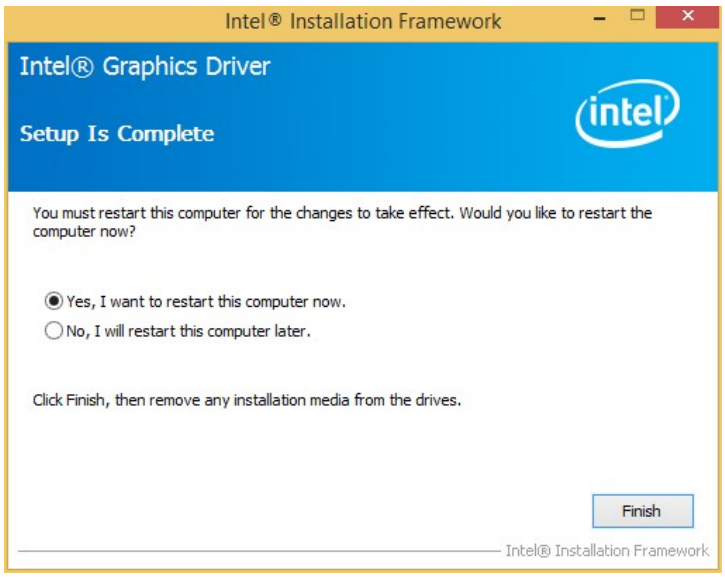


Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

Step 1: Right-click the Computer button from the start menu and select **Properties** (**Figure 6-13**).

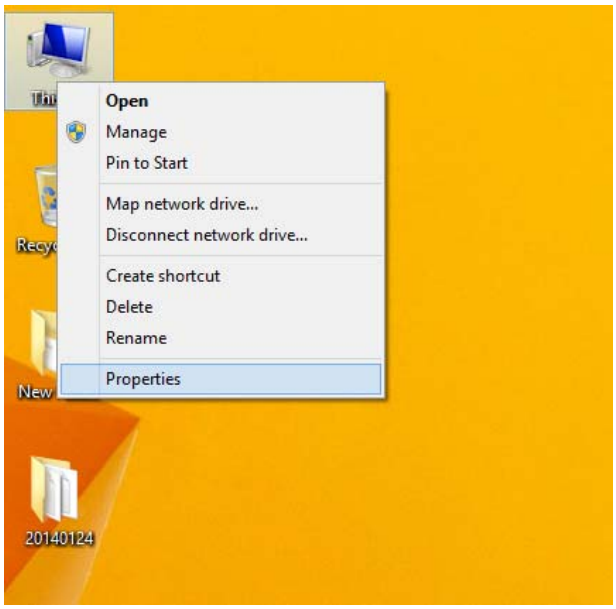


Figure 6-13: Windows Control Panel

Step 2: The system control panel window in **Figure 6-14** appears.

Step 3: Click the Device Manager link (**Figure 6-14**).

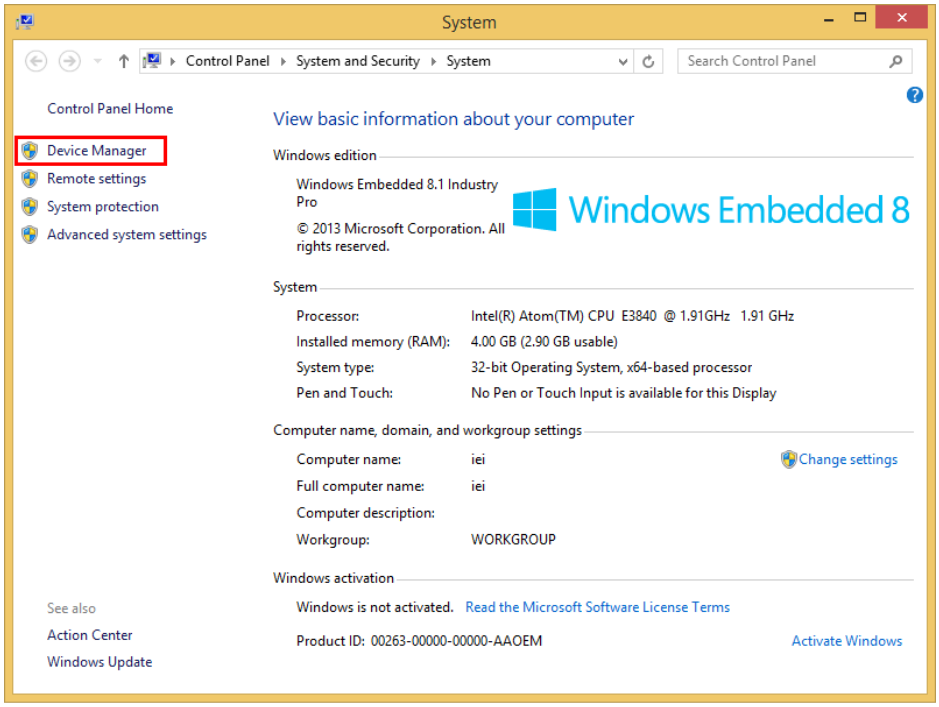


Figure 6-14: System Control Panel

Step 4: A list of system hardware devices appears (**Figure 6-15**).

Step 5: Right-click the Ethernet Controller that has question marks next to it (this means Windows does not recognize the device).

Step 6: Select **Update Driver Software**.

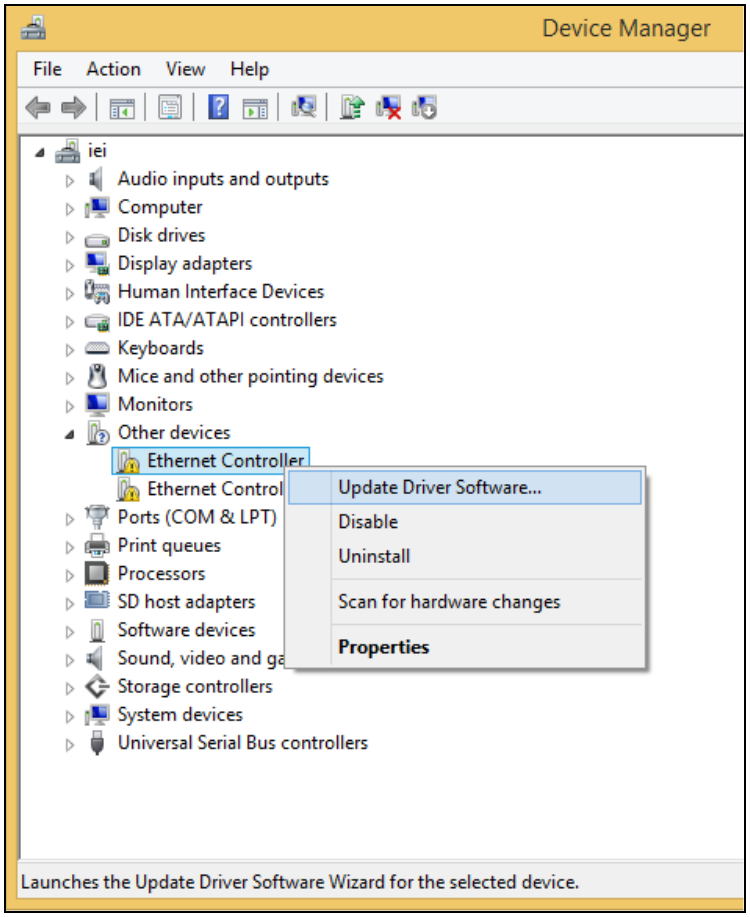


Figure 6-15: Device Manager List

Step 7: The Update Driver Software Window appears (**Figure 6-16**).

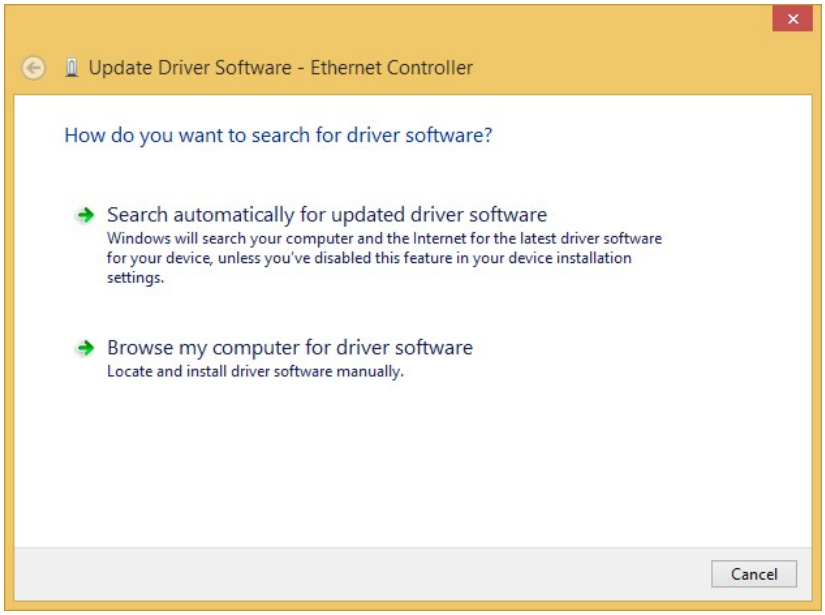


Figure 6-16: Update Driver Software Window

Step 8: Select "Browse my computer for driver software" and click **NEXT** to continue.

Step 9: Click Browse to select "**X:\2-LAN\Intel**" directory in the **Locate File** window, where "**X:\"** is the system CD drive. (**Figure 6-17**).

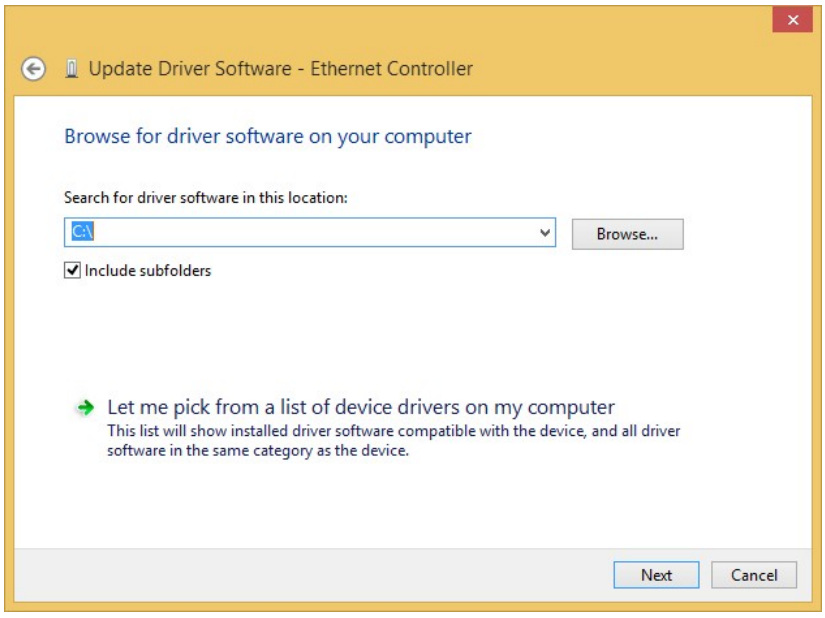


Figure 6-17: Locate Driver Files

Step 10: Click **NEXT** to continue.

Step 11: Driver Installation is performed. When the **Finish** screen appears, click **Close** to exit.

Step 12: Right-click the other Ethernet controller that has question marks next to it as shown in **Figure 6-15**. Repeat **Step 6** – **Step 11** to install the second Ethernet controller driver.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Appendix

B

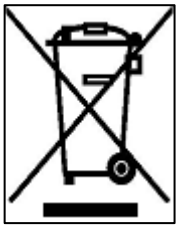
Product Disposal

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union – If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union – The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your device, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

Appendix

C

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

System Date [xx/xx/xx] **36**
System Time [xx:xx:xx] **36**
ACPI Sleep State [S3 (Suspend to RAM)] **38**
Serial Port [Enabled] **40**
Change Settings [Auto] **40**
Serial Port [Enabled] **41**
Change Settings [Auto] **41**
PC Health Status **42**
CPU Smart Fan Control [Manual PWM Mode] **43**
Manual PWM Setting **43**
Serial Port [Enabled] **45**
Change Settings [Auto] **45**
Serial Port [Enabled] **46**
Change Settings [Auto] **46**
Wake system with Fixed Time [Disabled] **48**
Console Redirection [Disabled] **49**
Terminal Type [ANSI] **50**
Bits per second [115200] **50**
Data Bits [8] **50**
Parity [None] **51**
Stop Bits [1] **51**
Active Processor Cores [All] **53**
Intel Virtualization Technology [Enabled] **53**
EIST [Enabled] **53**
Critical Trip Point **54**
Passive Trip Point **55**
DPTF [Disabled] **55**
SATA Mode Selection [AHCI Mode] **56**
Serial-ATA Port 1 [Enabled] **56**
SATA Port1 HotPlug [Disabled] **57**
Serial-ATA Port 0 [Enabled] **57**
SATA Port0 HotPlug [Disabled] **57**
Security Device Support [Disabled] **58**

USB Devices 59
Legacy USB Support [Enabled] 59
Primary Display [Auto] 62
DVMT Pre-Allocated [256M] 62
DVMT Total Gfx Mem [Max] 62
Primary IGFX Boot Display [VBIOS Default] 62
Restore AC Power Loss [Last State] 63
Audio Controller [Enabled] 64
PCI Express Port n [Enabled] 65
PCIe Speed 65
Administrator Password 66
User Password 66
Bootup NumLock State [On] 67
Quiet Boot [Enabled] 68
Option ROM Messages [Force BIOS] 68
UEFI Boot [Disabled] 68
Launch PXE OpROM [Disabled] 68
Save Changes and Reset 69
Discard Changes and Reset 69
Restore Defaults 69
Save as User Defaults 69
Restore User Defaults 70

Appendix

D

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.

DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.

LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

E

Digital I/O Interface

The DIO connector on the ICE-BT-T6 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 8-bit digital inputs and 8-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

The BIOS interrupt call **INT 15H** controls the digital I/O.

INT 15H:

AH – 6FH	
Sub-function:	
AL – 8	:Set the digital port as INPUT
AL	:Digital I/O input value

Assembly Language Sample 1

```
MOV     AX, 6F08H       ;setting the digital port as input
INT     15H             ;
```

AL low byte = value

AH – 6FH	
Sub-function:	
AL – 9	:Set the digital port as OUTPUT
BL	:Digital I/O output value

Assembly Language Sample 2

```
MOV     AX, 6F09H       ;setting the digital port as output
MOV     BL, 09H         ;digital value is 09H
INT     15H             ;
```

Digital Output is 1001b

Appendix

F

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. Contact IEI support or visit the IEI website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table F-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT     15H

;
; ADD THE APPLICATION PROGRAM HERE
;

        CMP     EXIT_AP, 1      ;is the application over?
        JNE     W_LOOP          ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H

;
; EXIT ;
```

Appendix

G

Hazardous Materials Disclosure

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated "Environmentally Friendly Use Period" (EFUP). This is an estimate of the number of years that these substances would "not leak out or undergo abrupt change." This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 (now replaced by GB/T 26572-2011).

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006 (now replaced by GB/T 26572-2011).

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求。