BT700

Qseven Board
User's Manual

A31400409

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Qseven Specification Reference

http://www.qseven-standard.org/

FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B 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 residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

Table of Contents

About this Manual

An electronic file of this manual is included in the CD. To view the user's manual in the CD, insert the CD into a CD-ROM drive. The autorun screen (Main Board Utility CD) will appear. Click "User's Manual" on the main menu.

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.

2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.

3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.

4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface.

4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

> **Important:**
> Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:
• Use the correct AC input voltage range.

To reduce the risk of electric shock:
• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- One BT700 board
- One DVD
- One QR (Quick Reference)

Optional Items

- Q7X-151 carrier board kit
- Heat sink
- Heat spreader
- Heat spreader with heat sink
- One bracket

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Chapter 1 - Introduction

Specifications

Processor	• Intel® Atom™ processors - E45: Intel® Atom™ E3845, Quad Core, 2M Cache, 1.91GHz, 10W - E27: Intel® Atom™ E3827, Dual Core, 1M Cache, 1.75GHz, 8W - E26: Intel® Atom™ E3826, Dual Core, 1M Cache, 1.46GHz, 7W - E25: Intel® Atom™ E3825, Dual Core, 1M Cache, 1.33GHz, 6W - E15: Intel® Atom™ E3815, Single Core, 0.5M Cache, 1.46GHz, 5W • BGA 1170 packaging technology • 22nm process technology
System Memory	• 2GB/4GB DDR3L memory down • Supports DDR3L 1333MHz (-E45/-E27) Supports DDR3L 1066MHz (-E26/-E25/-E15) • Supports single channel memory interface
Graphics	• Intel® HD Graphics • Supports LVDS and DDI interfaces • LVDS: NXP PTN3460, 24-bit, dual channel, resolution up to 1920x1200 @60Hz • Digital Display Interfaces: HDMI, DVI and DP • HDMI, DVI: resolution up to 1920x1080 @60Hz • DP: resolution up to 2560x1600 @60Hz • Supports hardware acceleration for DirectX 11, OCL 1.2, OGL 4.0, H.264, MPEG2, MVC, VC-1, WMV9 and VP8 (supported version dependent on OS)
Audio	• Supports High Definition Audio interface
LAN	• Intel® I210AT/IT Gigabit Ethernet Controller - Intel® I210IT supports wide temperature (-40°C to 85°C) • Integrated 10/100/1000 transceiver • Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
Serial ATA	• Supports 2 Serial ATA interfaces • SATA 2.0 with data transfer rate up to 3Gb/s • Integrated Advanced Host Controller Interface (AHCI) controller
eMMC* (optional)	• Supports 4GB, 8GB, 16GB and 32GB eMMC onboard
SD Interface	• Supports 1 SD interface • Supports SDIO specification Ver. 3.0, HC Standard specification Ver. 3.0, physical layer specification Ver. 3.0, security specification Ver. 1.01
Trusted Platform Module - TPM* (optional)	• Provides a Trusted PC for secure transactions • Provides software license protection, enforcement and password protection
Watchdog Timer	• Watchdog timeout programmable via software from 1 to 255 seconds

Expansion Interfaces	• Supports 1 USB 3.0 port and 1 USB HSIC for 2 USB 2.0 (default); or 4 USB 2.0 ports (USB 3.0, by default, is shared with the USB 2.0 port 6 and 7)* • Supports 4 USB 2.0 ports • Supports 3 PCIe x1 (default); or 1 PCIe x4 (PCIe port 3, by default, is shared with the onboard LAN)* • Supports LPC interface • Supports I²C interface • Supports SMBus interface • Suppotrs 1 UART interface (TX/RX/CTS/RTS)
Damage Free Intelligence	• Monitors CPU temperature • Monitors system fan speed • Monitors Vcore/VGFX/VSM voltages • Watchdog timer function
BIOS	• AMI BIOS - 64Mbit SPI BIOS
Power	• Input: VCC_RTC, 5V standby, 5V
Power Consumption	• BT700-T44-E45: 12.72W with E3845 at 1.91GHz and 4GB DDR3L memory down
OS Support	• Windows 7 Ultimate x86 & SP1 (32-bit) • Windows 7 Ultimate x64 & SP1 (64-bit) • Windows 8 Enterprise x86 (32-bit) • Windows 8 Enterprise x64 (64-bit) • Windows 8.1 Enterprise x86 (32-bit) • Windows 8.1 Enterprise x64 (64-bit)

Temperature	• Operating
	  : 0°C to 60°C - Atom (Fanless)
	  : -20°C to 70°C - Atom (Fanless with air flow)
	  : -40°C to 85°C - Atom (Fanless with air flow)
	• Storage: -40°C to 85°C

Humidity	• 5% to 95%

PCB	• Dimensions
	  - Qseven form factor
	  - 70mm (2.76") x 70mm (2.76")
	• Compliance
	  - Qseven specification revision 2.0

Note:
*Optional and is not supported in standard model. Please contact your sales representative for more information.

Features

• DDR3L

DDR3L is a higher performance DDR3 SDRAM interface providing less voltage and higher speed successor. DDR3L supporting 1066MHz (-E26/-E25/-E15) or 1333MHz (-E45/-E27/-J00/-N30/-N07) delivers increased system bandwidth and improved performance to provide its higher bandwidth and its increase in performance at a lower power than DDR3 and DDR2.

• Graphics

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports LVDS and DDI interfaces for display outputs.

• Serial ATA

Serial ATA is a storage interface that is compliant with SATA 2.0a specification. With speed of up to 3Gb/s (SATA 2.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

• Gigabit LAN

The Intel® I210AT/IT Gigabit Ethernet Controller supports up to 1Gbps data transmission.

• Watchdog Timer

The Watchdog Timer function allows your application to regularly "clear" the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

Specification Comparison Table

The table below shows the Qseven standard specifications and the corresponding specifications supported on the BT700 module.

System I/O Interface	ARM/RISC Based Minimum Configuration	X86 Based Minimum Configuration	Maximum Configuration	DFI BT700 Configuration
PCI Express Lanes	0	1 (x1 link)	4	3+1(shared with Ethernet)
Serial ATA channels	0	0	2	2
USB 2.0 ports	3	4	8	6+2(shared with 1 USB 3.0 port)
USB 3.0 ports	0	0	2	1
LVDS channels embedded Display Port	0	0	Dual Channel 24bits	Dual Channel 24bits
DisplayPort, TMDS	0	0	1	1
High Definition Audio/AC'97/I2S	0	0	1	1
Ethernet 10/100 Mbit/Gigabit	0	0	1 (Gigabit Ethernet)	1
UART	0	0	1	1
Low Pin Count bus	0	0	1	1
Secure Digital I/O 8-bit for SD/MMC cards	0	0	1	1
System Management Bus	0	1	1	1
I^2C Bus	1	1	1	1
SPI Bus	0	0	1	1
CAN Bus	0	0	1	0
Watchdog Trigger	1	1	1	1
Power Button	1	1	1	1
Power Good	1	1	1	1
Reset Button	1	1	1	1
LID Button	0	0	1	1
Sleep Button	0	0	1	1
Suspend To RAM (S3 mode)	0	0	1	1
Wake	0	0	1	1
Battery low alarm	0	0	1	1
Thermal control	0	0	1	1
FAN control	0	0	1	1

Chapter 2 - Hardware Installation

Board Layout

IDT
P9145

Intel Atom

E3800 Series

DDR3L

DDR3L

NXP
PTN3460

DDR3L

DDR3L

SPI Flash BIOS

Top View

DDR3L

DDR3L

DDR3L

DDR3L

SMSC
USB4604

Intel
WGI210AT
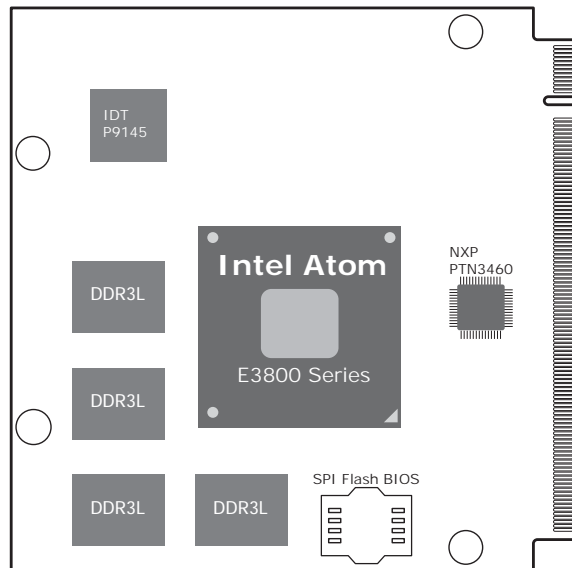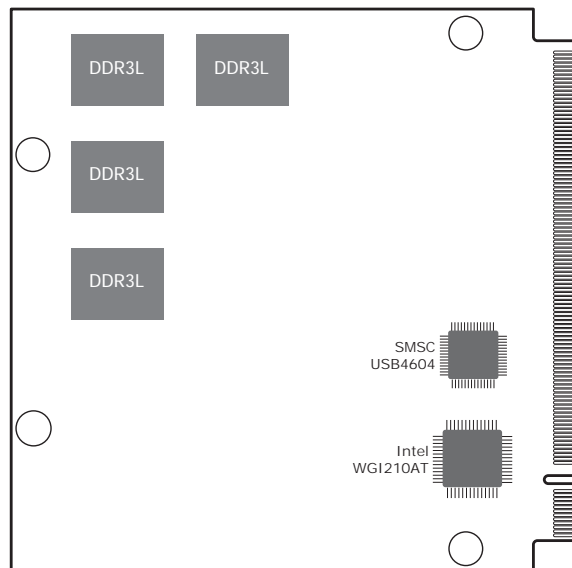
Bottom View

Block Diagram

LVDS

PTN3460

eDP

DDI

HDA

LPC

SM Bus

PCIe x1 3x

Switch

SPI Flash
64Mbit

SD

I^2C Bus

UART

SATA 2.0 2x

USB 2.0 4x

USB 3.0 1x

USB 2.0 2x
(Opt. share with USB 3.0)

USB 2.0 2x

USB
HSIC

USB
HSIC

GbE

GLAN
I210

PCIe x1

PCIe x1 (Opt.)

Atom E3800
Series

2GB/4GB DDR3L
memory down

DDR3 1333MHz
Single Channel

eMMC

eMMC
(optional)

8
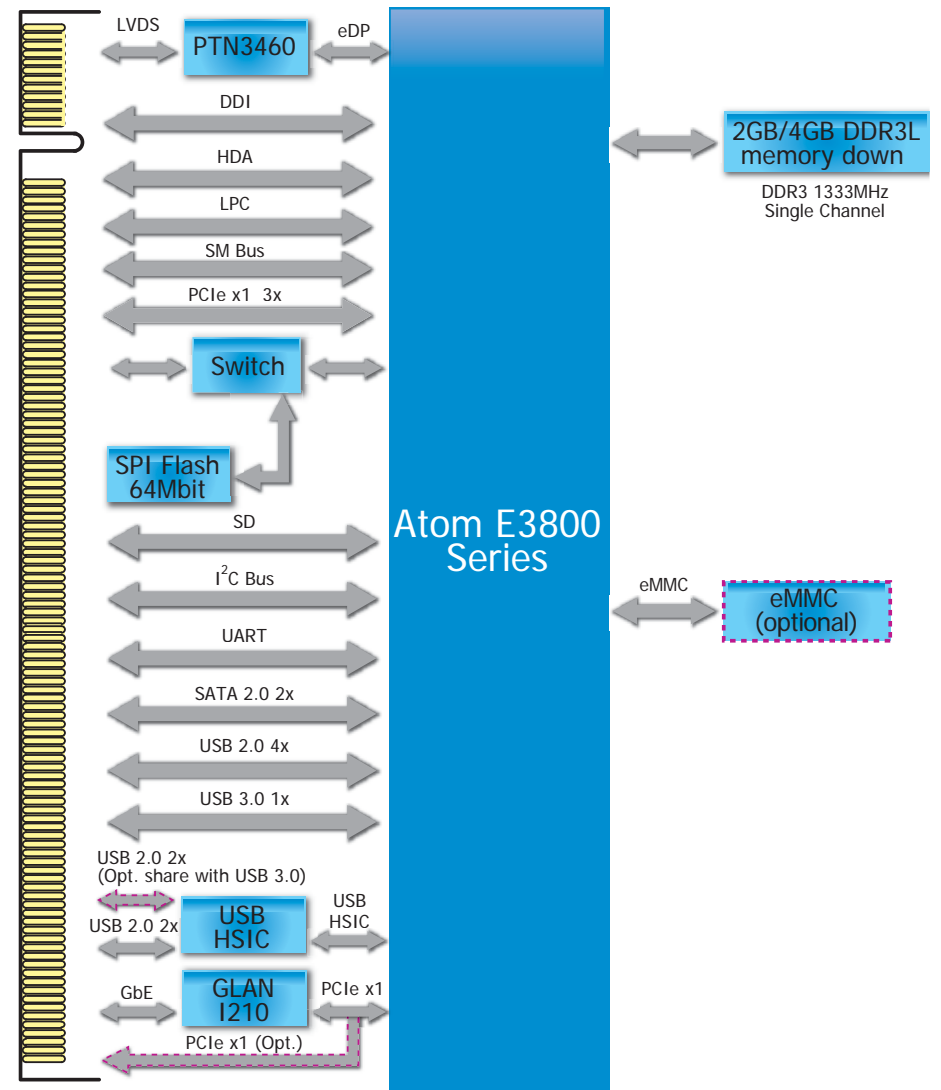
Mechanical Diagram

BT700 Module with thermal solution

20.00

64.90

70.00

Heatsink

Module PCB

20.00

14.00

6.00

1.20
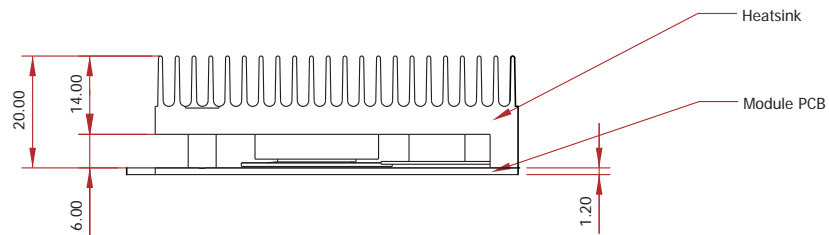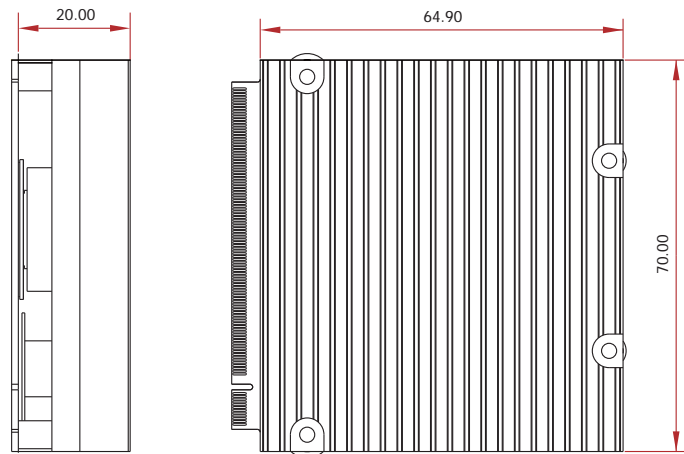
Side View of the Module with thermal solution and Carrier Board

BT700 Module
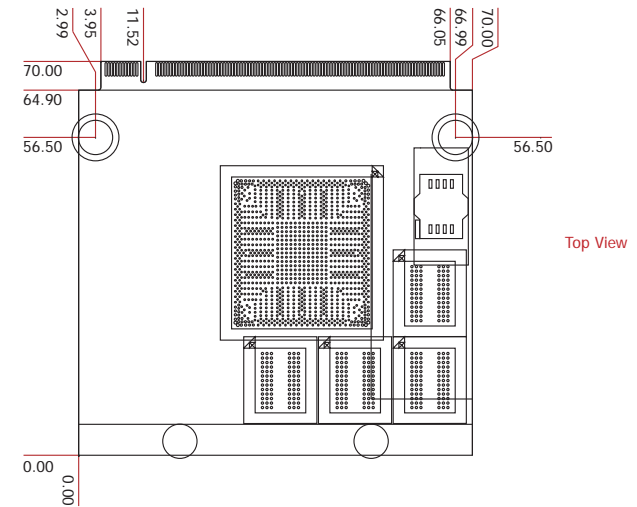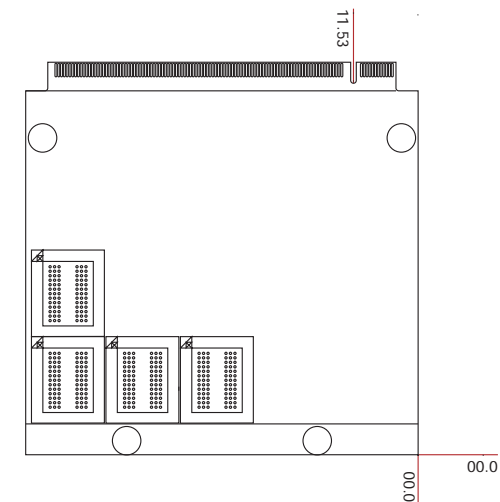
3.95
2.99
11.52
66.05
66.99
70.00

70.00

64.90

56.50

56.50

Top View

0.00

0.00

11.53

Bottom View

00.0

00.0

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Important:
Electrostatic discharge (ESD) can damage your processor, disk drive and other com-
ponents. Perform the upgrade instruction procedures described at an ESD worksta-
tion only. If such a station is not available, you can provide some ESD protection by
wearing an antistatic wrist strap and attaching it to a metal part of the system chas-
sis. If a wrist strap is unavailable, establish and maintain contact with the system
chassis throughout any procedures requiring ESD protection.

System Memory

The system board is equipped with eight 2GB/4GB DDR3L onboard memory inerfaces.

• Supports DDR3L 1333MHz (-E45/-E27/-J00/-N30/-N07)
  Supports DDR3L 1066MHz (-E26/-E25/-E15)
• Supports single channel memory interface

DDR3L

Top View

DDR3L
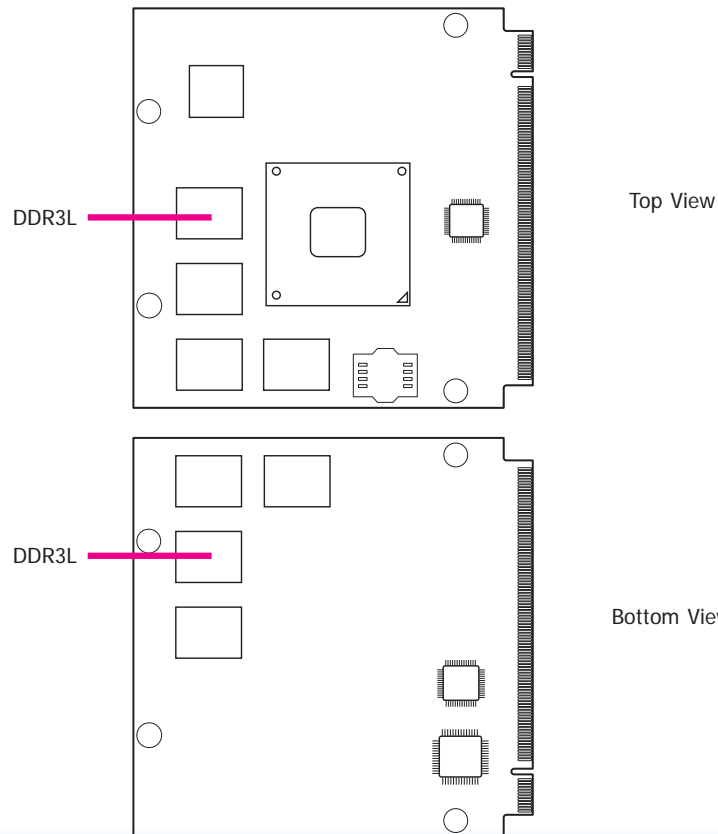
Bottom View

Cooling Option

Heat Spreader with Heat Sink

Top View of the Heat Sink
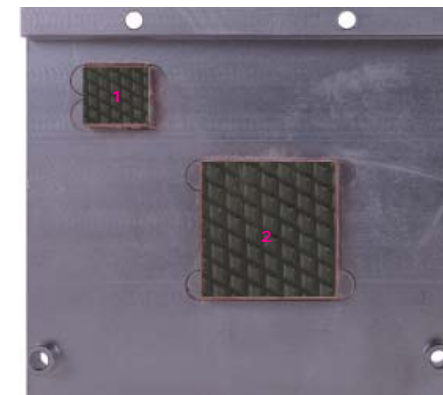
Bottom View of the Heat Sink

• "1" and "2" denote the locations of the
thermal pads designed to contact the
corresponding components that are on
BT700.

• Remove the plastic covering from the
thermal pads prior to mounting the heat
sink onto BT700.

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MXM Connector
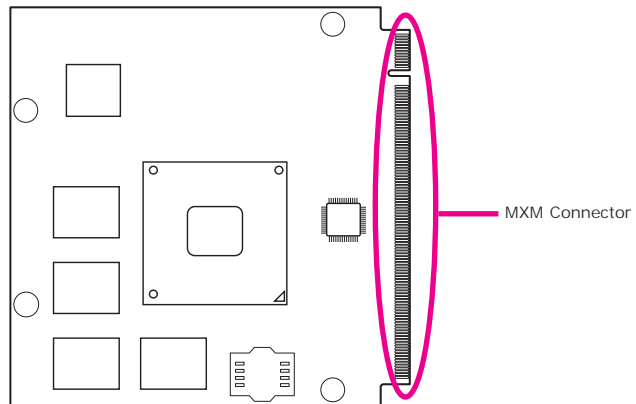
MXM Connector

The MXM connector is used to interface with the carrier board. Insert BT700 to the MXM connector on the carrier board. Refer to the following pages for the pin functions of this connector.

Refer to "Installing BT700 onto a Carrier Board" section for more information.

Pin	Q7 R2.0 Signal	BT700 Signal	Pin	Q7 R2.0 Signal	BT700 Signal
1	GND	GND	2	GND	GND
3	GBE_MDI3-	GBE_MDI3-	4	GBE_MDI2-	GBE_MDI2-
5	GBE_MDI3+	GBE_MDI3+	6	GBE_MDI2+	GBE_MDI2+
7	GBE_LINK100#	GBE_LINK100#	8	GBE_LINK1000#	GBE_LINK1000#
9	GBE_MDI1-	GBE_MDI1-	10	GBE_MDI0-	GBE_MDI0-
11	GBE_MDI1+	GBE_MDI1+	12	GBE_MDI0+	GBE_MDI0+
13	GBE_LINK#	NC	14	GBE_ACT#	GBE_ACT#
15	GBE_CTREF	NC	16	SUS_S5#	SUS_S4#
17	WAKE#	WAKE#	18	SUS_S3#	SUS_S3#
19	SUS_STAT#	SUS_STAT#	20	PWRBTN#	PWRBTN#
21	SLP_BTN#	SLP_BTN#	22	LID_BTN#	LID_BTN#
23	GND	GND	24	GND	GND
	KEY	KEY		KEY	KEY
25	GND	GND	26	PWGIN	PWGIN
27	BATLOW#	BATLOW#	28	RSTBTN#	RSTBTN#
29	SATA0_TX+	SATA0_TX+	30	SATA1_TX+	SATA1_TX+
31	SATA0_TX-	SATA0_TX-	32	SATA1_TX-	SATA1_TX-
33	SATA_ACT#	SATA_ACT#	34	GND	GND
35	SATA0_RX+	SATA0_RX+	36	SATA1_RX+	SATA1_RX+
37	SATA0_RX-	SATA0_RX-	38	SATA1_RX-	SATA1_RX-
39	GND	GND	40	GND	GND
41	BIOS_DISABLE# / BOOT_ALT#	BIOS_DISABLE#	42	SDIO_CLK#	SDIO_CLK#
43	SDIO_CD#	SDIO_CD#	44	SDIO_LED	NC
45	SDIO_CMD	SDIO_CMD	46	SDIO_WP	SDIO_WP
47	SDIO_PWR#	SDIO_PWR#	48	SDIO_DAT1	SDIO_DAT1
49	SDIO_DAT0	SDIO_DAT0	50	SDIO_DAT3	SDIO_DAT3
51	SDIO_DAT2	SDIO_DAT2	52	SDIO_DAT5	NC
53	SDIO_DAT4	NC	54	SDIO_DAT7	NC
55	SDIO_DAT6	NC	56	RSVD	NC
57	GND	GND	58	GND	GND
59	HDA_SYNC / I2S_WS	HDA_SYNC	60	SMB_CLK / GP1_I2C_CLK	SMB_CLK
61	HDA_RST# / I2S_RST#	HDA_RST#	62	SMB_DAT / GP1_I2C_DAT	SMB_DAT
63	HDA_BITCLK / I2S_CLK	HDA_BITCLK	64	SMB_ALERT#	SMB_ALERT#
65	HDA_SDI / I2S_SDI	HDA_SDI	66	GP0_I2C_CLK	GP0_I2C_CLK
67	HDA_SDO / I2S_SDO	HDA_SDO	68	GP0_I2C_DAT	GP0_I2C_DAT
69	THRM#	THRM#	70	WDTRIG#	WDTRIG#
71	THRMTRIP#	THRMTRIP#	72	WDOUT	WDOUT
73	GND	GND	74	GND	GND
75	USB_P7- / USB_SSTX0-	USB_SSTX0-	76	USB_P6- / USB_SSRX0-	USB_SSRX0-
77	USB_P7+ / USB_SSTX0+	USB_SSTX0+	78	USB_P6+ / USB_SSRX0+	USB_SSRX0+
79	USB_6_7_OC#	USB_6_7_OC#	80	USB_4_5_OC#	USB_4_5_OC#
81	USB_P5- / USB_SSTX1-	USB_P5-	82	USB_P4- / USB_SSRX1-	USB_P4-
83	USB_P5+ / USB_SSTX1+	USB_P5+	84	USB_P4+ / USB_SSRX1+	USB_P4+
85	USB_2_3_OC#	USB_2_3_OC#	86	USB_0_1_OC#	USB_0_1_OC#
87	USB_P3-	USB_P3-	88	USB_P2-	USB_P2-
89	USB_P3+	USB_P3+	90	USB_P2+	USB_P2+
91	USB_CC	NC	92	USB_ID	NC
93	USB_P1-	USB_P1-	94	USB_P0-	USB_P0-
95	USB_P1+	USB_P1+	96	USB_P0+	USB_P0+
97	GND	GND	98	GND	GND
99	eDP0_TX0+ / LVDS_A0+	LVDS_A0+	100	eDP1_TX0+ / LVDS_B0+	LVDS_B0+
101	eDP0_TX0- / LVDS_A0-	LVDS_A0-	102	eDP1_TX0- / LVDS_B0-	LVDS_B0-
103	eDP0_TX1+ / LVDS_A1+	LVDS_A1+	104	eDP1_TX1+ / LVDS_B1+	LVDS_B1+
105	eDP0_TX1- / LVDS_A1-	LVDS_A1-	106	eDP1_TX1- / LVDS_B1-	LVDS_B1-
107	eDP0_TX2+ / LVDS_A2+	LVDS_A2+	108	eDP1_TX2+ / LVDS_B2+	LVDS_B2+
109	eDP0_TX2- / LVDS_A2-	LVDS_A2-	110	eDP1_TX2- / LVDS_B2-	LVDS_B2-
111	LVDS_PPEN	LVDS_PPEN	112	LVDS_BLEN	LVDS_BLEN
113	eDP0_TX3+ / LVDS_A3+	LVDS_A3+	114	eDP1_TX3+ / LVDS_B3+	LVDS_B3+
115	eDP0_TX3- / LVDS_A3-	LVDS_A3-	116	eDP1_TX3- / LVDS_B3-	LVDS_B3-

Pin	Q7 R2.0 Signal	BT700 Signal	Pin	Q7 R2.0 Signal	BT700 Signal
117	GND	GND	118	GND	GND
119	eDP0_AUX+ / LVDS_A_CLK+	LVDS_A_CLK+	120	eDP1_AUX+ / LVDS_B_CLK+	LVDS_B_CLK+
121	eDP0_AUX- / LVDS_A_CLK-	LVDS_A_CLK-	122	eDP1_AUX- / LVDS_B_CLK-	LVDS_B_CLK-
123	LVDS_BLT_CTRL /GP_PWM_OUT0	LVDS_BLT_CTRL	124	GP_1-Wire_Bus	GP_1-Wire_Bus
125	GP2_I2C_DAT / LVDS_DID_DAT	LVDS_DID_DAT	126	eDP0_HPD# / LVDS_BLC_DAT	NC
127	GP2_I2C_CLK / LVDS_DID_CLK	LVDS_DID_CLK	128	eDP1_HPD# / LVDS_BLC_CLK	NC
129	CAN0_TX	NC	130	CAN0_RX	NC
131	DP_LANE3+ / TMDS_CLK+	DP_LANE3+	132	RSVD (Differential Pair)	NC
133	DP_LANE3- / TMDS_CLK-	DP_LANE3-	134	RSVD (Differential Pair)	NC
135	GND	GND	136	GND	GND
137	DP_LANE1+ / TMDS_LANE1+	DP_LANE1+	138	DP_AUX+	DP_AUX+
139	DP_LANE1- / TMDS_LANE1-	DP_LANE1-	140	DP_AUX-	DP_AUX-
141	GND	GND	142	GND	GND
143	DP_LANE2+ / TMDS_LANE0+	DP_LANE2+	144	RSVD (Differential Pair)	NC
145	DP_LANE2- / TMDS_LANE0-	DP_LANE2-	146	RSVD (Differential Pair)	NC
147	GND	GND	148	GND	GND
149	DP_LANE0+ / TMDS_LANE2+	DP_LANE0+	150	HDMI_CTRL_DAT	HDMI_CTRL_DAT
151	DP_LANE0- / TMDS_LANE2-	DP_LANE0-	152	HDMI_CTRL_CLK	HDMI_CTRL_CLK
153	DP_HDMI_HPD#	DP_HDMI_HPD#	154	RSVD	NC
155	PCIE_CLK_REF+	PCIE_CLK_REF+	156	PCIE_WAKE#	PCIE_WAKE#
157	PCIE_CLK_REF-	PCIE_CLK_REF-	158	PCIE_RST#	PCIE_RST#
159	GND	GND	160	GND	GND
161	PCIE3_TX+	NC	162	PCIE3_RX+	NC
163	PCIE3_TX-	NC	164	PCIE3_RX-	NC
165	GND	GND	166	GND	GND
167	PCIE2_TX+	PCIE2_TX+	168	PCIE2_RX+	PCIE2_RX+
169	PCIE2_TX-	PCIE2_TX-	170	PCIE2_RX-	PCIE2_RX-
171	UART0_TX	UART0_TX	172	UART0_RTS#	UART0_RTS#
173	PCIE1_TX+	PCIE1_TX+	174	PCIE1_RX+	PCIE1_RX+
175	PCIE1_TX-	PCIE1_TX-	176	PCIE1_RX-	PCIE1_RX-
177	UART0_RX	UART0_RX	178	UART0_CTS#	UART0_CTS#
179	PCIE0_TX+	PCIE0_TX+	180	PCIE0_RX+	PCIE0_RX+
181	PCIE0_TX-	PCIE0_TX-	182	PCIE0_RX-	PCIE0_RX-
183	GND	GND	184	GND	GND
185	LPC_AD0 / GPIO0	LPC_AD0	186	LPC_AD1 / GPIO1	LPC_AD1
187	LPC_AD2 / GPIO2	LPC_AD2	188	LPC_AD3 / GPIO3	LPC_AD3
189	LPC_CLK / GPIO4	LPC_CLK	190	LPC_FRAME# / GPIO5	LPC_FRAME#
191	SERIRQ / GPIO6	SERIRQ	192	LPC_LDRQ# / GPIO7	NC
193	VCC_RTC	VCC_RTC	194	SPKR / GP_PWM_OUT2	SPKR
195	FAN_TACHOIN / GP_TIMER_IN	FAN_TACHOIN	196	FAN_PWMOUT / GP_PWM_OUT1	FAN_PWMOUT
197	GND	GND	198	GND	GND
199	SPI_MOSI	SPI_MOSI	200	SPI_CS0#	SPI_CS0#
201	SPI_MISO	SPI_MISO	202	SPI_CS1#	NC
203	SPI_SCK	SPI_SCK	204	MFG_NC4	NC
205	VCC_5V_SB	VCC_5V_SB	206	VCC_5V_SB	VCC_5V_SB
207	MFG_NC0	NC	208	MFG_NC2	UART1_RX
209	MFG_NC1	UART1_TX	210	MFG_NC3	NC
211	VCC	VCC	212	VCC	VCC
213	VCC	VCC	214	VCC	VCC
215	VCC	VCC	216	VCC	VCC
217	VCC	VCC	218	VCC	VCC
219	VCC	VCC	220	VCC	VCC
221	VCC	VCC	222	VCC	VCC
223	VCC	VCC	224	VCC	VCC
225	VCC	VCC	226	VCC	VCC
227	VCC	VCC	228	VCC	VCC
229	VCC	VCC	230	VCC	VCC

MXM Connector Signal Description

Pin Types
I   Input Pin
O   Output Pin
I/O   Bi-directional input / output Pin
OD   Open drain
OC   Open Collector
PP   Push Pull
NC   Not Connected

PCI Express Interface Signals Descriptions

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
PCIE0_RX+	180	I PCIE	PCIE		**Device** - Connect AC Coupling cap 0.1uF	PCI Express channel 0, Receive Input differential pair.
PCIE0_RX-	182				**Slot** - Connect to PCIE Conn pin	
PCIE0_TX+	179	O PCIE	PCIE	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express channel 0, Transmit Output differential pair.
PCIE0_TX-	181			AC Coupling capacitor		
PCIE1_RX+	174	I PCIE	PCIE		**Device** - Connect AC Coupling cap 0.1uF	PCI Express channel 1, Receive Input differential pair.
PCIE1_RX-	176				**Slot** - Connect to PCIE Conn pin	
PCIE1_TX+	173	O PCIE	PCIE	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express channel 1, Transmit Output differential pair.
PCIE1_TX-	175			AC Coupling capacitor		
PCIE2_RX+	168	I PCIE	PCIE		**Device** - Connect AC Coupling cap 0.1uF	PCI Express channel 2, Receive Input differential pair.
PCIE2_RX-	170				**Slot** - Connect to PCIE Conn pin	
PCIE2_TX+	167	O PCIE	PCIE	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express channel 2, Transmit Output differential pair.
PCIE2_TX-	169			AC Coupling capacitor		
PCIE3_RX+	162	I PCIE	PCIE		**Device** - Connect AC Coupling cap 0.1uF (This Port is BOM Option with On board LAN)	PCI Express channel 3, Receive Input differential pair.(This Port is BOM Option with On board LAN)
PCIE3_RX-	164				**Slot** - Connect to PCIE Conn pin	
PCIE3_TX+	161	O PCIE	PCIE	AC Coupling capacitor	Connect to PCIE device or slot (This Port is BOM Option with On board LAN)	PCI Express channel 3, Transmit Output differential pair.(This Port is BOM Option with On board LAN)
PCIE3_TX-	163			AC Coupling capacitor		
PCIE_CLK_REF+	155	O PCIE	PCIE		Connect to PCIE device, **PCIe CLK Buffer** or slot	PCI Express Reference Clock for Lanes 0 to 3.
PCIE_CLK_REF-	157					
PCIE_WAKE#	156	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend		PCI Express Wake Event: Sideband wake signal asserted by components requesting wakeup.
PCIE_RST#	158	O CMOS	3.3V/3.3V			Reset Signal for external devices.

UART Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
UART0_TX	171	O CMOS	3.3V/3.3V		Connect to UART device	Serial Data Transmitter
UART0_RX	177	I CMOS	3.3V/3.3V		Connect to UART device	Serial Data Reciever
UART0_CTS#	178	I CMOS	3.3V/3.3V		Connect to UART device	Handshake signal, ready to send data
UART0_RTS#	172	O CMOS	3.3V/3.3V		Connect to UART device	Handshake signal, ready to receive data

Gigabit Ethernet Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
GBE_MDI0+	12	I/O GB_LAN	GB_LAN		Connect to Magnetics Module MDI0+/-	Media Dependent Interface (MDI) differential pair 0. The MDI can operate in 1000, 100, and 10Mbit/sec modes.This signal pair is used for all modes.
GBE_MDI0-	10					
GBE_MDI1+	11	I/O GB_LAN	GB_LAN		Connect to Magnetics Module MDI1+/-	Media Dependent Interface (MDI) differential pair 1. The MDI can operate in 1000, 100, and 10Mbit/sec modes.This signal pair is used for all modes.
GBE_MDI1-	9					
GBE_MDI2+	6	I/O GB_LAN	GB_LAN		Connect to Magnetics Module MDI2+/-	Media Dependent Interface (MDI) differential pair 2. The MDI can operate in 1000, 100, and 10Mbit/sec modes.This signal pair is used for all modes.
GBE_MDI2-	4					
GBE_MDI3+	5	I/O GB_LAN	GB_LAN		Connect to Magnetics Module MDI3+/-	Media Dependent Interface (MDI) differential pair 3. The MDI can operate in 1000, 100, and 10Mbit/sec modes.This signal pair is used for all modes.
GBE_MDI3-	3					
GBE_CTREF	15	REF		NC		Reference voltage for carrier board Ethernet channel 0 magnetics center tap. The reference voltage is determined by the requirements of the module's PHY and may be as low as 0V and as high as 3.3V. The reference voltage output should be current limited on the module. In a case in which the reference is shorted to ground, the current must be limited to 250mA or less.
GBE_LINK#	13	O CMOS 3.3V PP	3.3V/3.3V	NC		Ethernet controller 0 link indicator, active low.
GBE_LINK100#	7	O CMOS 3.3V PP	3.3V/3.3V			Ethernet controller 0 100Mbit/sec link indicator, active low.
GBE_LINK1000#	8	O CMOS 3.3V PP	3.3V/3.3V			Ethernet controller 0 1000Mbit/sec link indicator, active low.
GBE_ACT#	14	O CMOS 3.3V PP	3.3V/3.3V			Ethernet controller 0 activity indicator, active low.

Serial ATA Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
SATA0_RX+	35	I SATA	SATA	AC Coupling capacitor	Connect to SATA0 Conn RX pin	Serial ATA channel 0, Receive Input differential pair.
SATA0_RX-	37			AC Coupling capacitor		
SATA0_TX+	29	O SATA	SATA	AC Coupling capacitor	Connect to SATA0 Conn TX pin	Serial ATA channel 0, Transmit Output differential pair.
SATA0_TX-	31			AC Coupling capacitor		
SATA1_RX+	36	I SATA	SATA	AC Coupling capacitor	Connect to SATA1 Conn RX pin	Serial ATA channel 1, Receive Input differential pair.
SATA1_RX-	38			AC Coupling capacitor		
SATA1_TX+	30	O SATA	SATA	AC Coupling capacitor	Connect to SATA1 Conn TX pin	Serial ATA channel 1, Transmit Output differential pair.
SATA1_TX-	32			AC Coupling capacitor		
SATA_ACT#	33	O OC 3.3V	3.3V/3.3V			Serial ATA Led. Open collector output pin driven during SATA command activity.

USB Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
USB_P0+	96	I/O USB	USB		Connect 90 Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Universal Serial Bus Port 0 differential pair.
USB_P0-	94					
USB_P1+	95	I/O USB	USB		Connect 90 Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Universal Serial Bus Port 1 differential pair.This port may be optionally used as USB client port.
USB_P1-	93					
USB_P2+	90	I/O USB	USB		Connect 90 Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Universal Serial Bus Port 2 differential pair.
USB_P2-	88					
USB_P3+	89	I/O USB	USB		Connect 90 Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Universal Serial Bus Port 3 differential pair.
USB_P3-	87					
USB_P4+ USB_SSRX1+	84	I/O USB I USB	USB		Connect 90 Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Universal Serial Bus Port 4 differential pair. Multiplexed with receive signal differential pairs for the Superspeed USB data path.
USB_P4- USB_SSRX1-	82					
USB_P5+ USB_SSTX1+	83	I/O USB O USB	USB		Connect 90 Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Universal Serial Bus Port 5 differential pair. Multiplexed with transmit signal differential pairs for the Superspeed USB data path.
USB_P5- USB_SSTX1-	81					
USB_P6+ USB_SSRX0+	78	I/O USB I USB	USB		Connect Common Choke in series and ESD suppressors to GND to USB connector(This Port is BOM Option with USB_P6 / USB_P7)	Universal Serial Bus Port 6 differential pair. Multiplexed with receive signal differential pairs for the Superspeed USB data path.
USB_P6- USB_SSRX0-	76					
USB_P7+ USB_SSTX0+	77	I/O USB O USB	USB	AC Coupling capacitor		Universal Serial Bus Port 7 differential pair. Multiplexed with transmit signal differential pairs for the Superspeed USB data path.
USB_P7- USB_SSTX0-	75			AC Coupling capacitor		
USB_0_1_OC#	86	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend	Connect to Overcurrent of USB Power Switch	Over current detect input 1. This pin is used to monitor the USB power over current of the USB Ports 0 and 1.
USB_2_3_OC#	85	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend	Connect to Overcurrent of USB Power Switch	Over current detect input 2. This pin is used to monitor the USB power over current of the USB Ports 2 and 3.
USB_4_5_OC#	80	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend	Connect to Overcurrent of USB Power Switch	Over current detect input 3. This pin is used to monitor the USB power over current of the USB Ports 4 and 5.
USB_6_7_OC#	79	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend	Connect to Overcurrent of USB Power Switch	Over current detect input 4. This pin is used to monitor the USB power over current of the USB Ports 6 and 7.
USB_ID	92	I CMOS	3.3V Suspend/3.3V	NC		USB ID pin.Configures the mode of the USB Port 1. If the signal is detected as being 'high active' the BIOS will automatically configure USB Port 1 as USB Client and enable USB Client support. This signal should be driven as OC signal by external circuitry.
USB_CC	91	I CMOS	3.3V Suspend/3.3V	NC		USB Client Connect pin.If USB Port 1 is configured for client mode then an externally connected USB host should set this signal to high-active in order to properly make the connection with the module's internal USB client controller. If the external USB host is disconnected, this signal should be set to low-active in order to inform the USB client controller that the external host has been disconnected. A level shifter/protection circuitry should be implemented on the carrier board for this signal.

SDIO Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
SDIO_CD#	43	I/O CMOS	3.3V/3.3V		Connect to SD Card	SDIO Card Detect. This signal indicates when a SDIO/MMC card is present.
SDIO_CLK	42	O CMOS	3.3V/3.3V		Connect to SD Card	SDIO Clock. With each cycle of this signal a one-bit transfer on the command and each data line occurs. This signal has maximum frequency of 48 MHz.
SDIO_CMD	45	I/O OD/PP CMOS	3.3V/3.3V		Connect to SD Card	SDIO Command/Response. This signal is used for card initialization and for command transfers. During initialization mode this signal is open drain. During command transfer this signal is in push-pull mode.
SDIO_LED	44	O CMOS	3.3V/3.3V	NC		SDIO LED. Used to drive an external LED to indicate when transfers occur on the bus.
SDIO_WP	46	I/O CMOS	3.3V/3.3V		Connect to SD Card	SDIO Write Protect. This signal denotes the state of the write-protect tab on SD cards.
SDIO_PWR#	47	O CMOS	3.3V/3.3V			SDIO Power Enable. This signal is used to enable the power being supplied to a SD/MMC card device.
SDIO_DAT0-7	48-55	I/O PP CMOS	3.3V/3.3V	SDIO_DAT4-7 NC	Connect to SD Card	SDIO Data lines. These signals operate in push-pull mode

High Definition Audio Signals/AC'97

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
HDA_RST# I2S_RST#	61	O CMOS	3.3V/3.3V		Connect to CODEC	HD Audio/AC'97 Codec Reset. Multiplexed with I2S Codec Reset.
HDA_SYNC I2S_WS	59	O CMOS	3.3V/3.3V		Connect to CODEC	Serial Bus Synchronization. Multiplexed with I2S Word Select from Codec.
HDA_BCLK I2S_CLK	63	O CMOS	3.3V/3.3V		Connect to CODEC	HD Audio/AC'97 24 MHz Serial Bit Clock from Codec. Multiplexed with I2S Serial Data Clock from Codec.
HDA_SDO I2S_SDO	67	O CMOS	3.3V/3.3V		Connect to CODEC	HD Audio/AC'97 Serial Data Output to Codec. Multiplexed with I2S Serial Data Output from Codec.
HDA_SDIN I2S_SDI	65	I CMOS	3.3V/3.3V		Connect to CODEC	HD Audio/AC'97 Serial Data input to Codec. Multiplexed with I2S Serial Data Input from Codec.

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LVDS Flat Panel Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
LVDS_PPEN	111	O CMOS	3.3V/3.3V		Connect to enable control of LVDS panel power circuit	Controls panel power enable.
LVDS_BLEN	112	O CMOS	3.3V/3.3V		Connect to enable control of LVDS panel backlight power circuit.	Controls panel Backlight enable.
LVDS_BLT_CTRL/GP_PWM_OUT0	123	O CMOS	3.3V/3.3V		Connect to brightness control of LVDS panel backlight power circuit.	Primary functionality is to control the panel backlight brightness via pulse width modulation (PWM). When not in use for this primary purpose it can be used as General Purpose PWM Output.
LVDS_A0+ eDP0_TX0+	99	O LVDS	LVDS		Connect to LVDS connector	LVDS primary channel differential pair 0. Display Port primary channel differential pair 0.
LVDS_A0- eDP0_TX0-	101					
LVDS_A1+ eDP0_TX1+	103	O LVDS	LVDS		Connect to LVDS connector	LVDS primary channel differential pair 1. Display Port primary channel differential pair 1.
LVDS_A1- eDP0_TX1-	105					
LVDS_A2+ eDP0_TX2+	107	O LVDS	LVDS		Connect to LVDS connector	LVDS primary channel differential pair 2. Display Port primary channel differential pair 2.
LVDS_A2- eDP0_TX2-	109					
LVDS_A3+ eDP0_TX3+	113	O LVDS	LVDS		Connect to LVDS connector	LVDS primary channel differential pair 3. Display Port primary channel differential pair 3.
LVDS_A3- eDP0_TX3-	115					
LVDS_A_CLK+ eDP0_AUX+	119	O LVDS	LVDS		Connect to LVDS connector	LVDS primary channel differential pair clock lines. Display Port primary auxiliary channel.
LVDS_A_CLK- eDP0_AUX-	121					
LVDS_B0+ eDP1_TX0+	100	O LVDS	LVDS		Connect to LVDS connector	LVDS secondary channel differential pair 0. Display Port secondary channel differential pair 0.
LVDS_B0- eDP1_TX0-	102					
LVDS_B1+ eDP1_TX1+	104	O LVDS	LVDS		Connect to LVDS connector	LVDS secondary channel differential pair 1. Display Port secondary channel differential pair 1.
LVDS_B1- eDP1_TX1-	106					
LVDS_B2+ eDP1_TX2+	108	O LVDS	LVDS		Connect to LVDS connector	LVDS secondary channel differential pair 2. Display Port secondary channel differential pair 2.
LVDS_B2- eDP1_TX2-	110					
LVDS_B3+ eDP1_TX3+	114	O LVDS	LVDS		Connect to LVDS connector	LVDS secondary channel differential pair 3. Display Port secondary channel differential pair 3.
LVDS_B3- eDP1_TX3-	112					
LVDS_B_CLK+ eDP1_AUX+	120	O LVDS	LVDS		Connect to LVDS connector	LVDS secondary channel differential pair clock lines. Display Port secondary auxiliary channel.
LVDS_B_CLK- eDP1_AUX-	122					
LVDS_DID_CLK/GP_I2C_CLK	127	I/O OD CMOS	3.3V/3.3V	PU 2.2K to 3.3V	Connect to DDC clock of LVDS panel	Primary functionality is DisplayID DDC clock line used for LVDS flat panel detection. If primary functionality is not used it can be as General Purpose I²C bus clock line.
LVDS_DID_DAT/GP_I2C_DAT	125	I/O OD CMOS	3.3V/3.3V	PU 2.2K to 3.3V	Connect to DDC clock of LVDS panel	Primary functionality DisplayID DDC data line used for LVDS flat panel detection. If primary functionality is not used it can be as General Purpose I²C bus data line.
LVDS_BLC_CLK/eDP1_HPD#	128	I/O OD CMOS	3.3V/3.3V	NC		Control clock signal for external SSC clock chip. If the primary functionality is not used, it can be used as an embedded DisplayPort secondary Hotplug detection.
LVDS_BLC_DAT/eDP0_HPD#	126	I/O OD CMOS	3.3V/3.3V	NC		Control data signal for external SSC clock chip. If the primary functionality is not used, it can be used as an embedded DisplayPort primary Hotplug detection.

DisplayPort Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
DP_LANE3-	133	O PCIE	DP	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	DisplayPort differential pair lines lane 3.
DP_LANE3+	131				Connect AC Coupling Capacitors 0.1uF to Device	
DP_LANE2-	145	O PCIE	DP	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	DisplayPort differential pair lines lane 2.
DP_LANE2+	143				Connect AC Coupling Capacitors 0.1uF to Device	
DP_LANE1-	139	O PCIE	DP	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	DisplayPort differential pair lines lane 1.
DP_LANE1+	137				Connect AC Coupling Capacitors 0.1uF to Device	
DP_LANE0-	151	O PCIE	DP	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	DisplayPort differential pair lines lane 0.
DP_LANE0+	149				Connect AC Coupling Capacitors 0.1uF to Device	
DP_AUX-	140	I/O PCIE	DP	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device, PU 100K to 3.3V	Auxiliary channel used for link management and device control. Differential pair lines.
DP_AUX+	138				Connect AC Coupling Capacitors 0.1uF to Device, PD 100K to GND	
DP_HDMI_HPD#	153	I CMOS	3.3V/3.3V	PU 10K to 3.3V		Hot plug detection signal that serves as an interrupt request.

HDMI Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
TMDS_CLK-	133	O TMDS	TMDS	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	TMDS differential pair clock lines.
TMDS_CLK+	131				Connect AC Coupling Capacitors 0.1uF to Device	
TMDS_LANE0-	145	O TMDS	TMDS	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	TMDS differential pair lines lane 0.
TMDS_LANE0+	143				Connect AC Coupling Capacitors 0.1uF to Device	
TMDS_LANE1-	139	O TMDS	TMDS	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	TMDS differential pair lines lane 1.
TMDS_LANE1+	137				Connect AC Coupling Capacitors 0.1uF to Device	
TMDS_LANE2-	151	O TMDS	TMDS	AC coupled off Module	Connect AC Coupling Capacitors 0.1uF to Device	TMDS differential pair lines lane 2.
TMDS_LANE2+	149				Connect AC Coupling Capacitors 0.1uF to Device	
HDMI_CTRL_CLK	152	I/O OD CMOS	3.3V/3.3V	PU 2.2K to 3.3V		DDC based control signal (clock) for HDMI device. Note: Level shifters must be implemented on the carrier board for this signal in order to be compliant with the HDMI Specification.
HDMI_CTRL_DAT	150	I/O OD CMOS	3.3V/3.3V	PU 2.2K to 3.3V		DDC based control signal (data) for HDMI device. Note: Level shifters must be implemented on the carrier board for this signal in order to be compliant with the HDMI Specification
DP_HDMI_HPD#	153	I CMOS	3.3V/3.3V	PU 10K to 3.3V		Hot plug detection signal that serves as an interrupt request.

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LPC Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
LPC_AD[0..3] GPIO[0..3]	185-188	I/O CMOS	3.3V/3.3V		Connect to LPC device	Multiplexed Command, Address and Data. General purpose input/output [0..3]
LPC_FRAME# GPIO5	190	I/O CMOS	3.3V/3.3V		Connect to LPC device	LPC frame indicates the start of a new cycle or the termination of a broken cycle. General purpose input/output 5.
LPC_LDRQ# GPIO7	192	I/O CMOS	3.3V/3.3V	NC		LPC DMA request. General purpose input/output 7.
LPC_CLK GPIO4	189	I/O CMOS	3.3V/3.3V		Connect to LPC device	LPC clock. General purpose input/output 4.
SERIRQ GPIO6	191	I/O CMOS	3.3V/3.3V		Connect to LPC device	Serialized Interrupt. General purpose input/output 6.

SPI Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
SPI_MOSI	199	O CMOS	3.3V/3.3V		Connect a series resistor to Carrier Board SPI Device SI pin	Master serial output/Slave serial input signal. SPI serial output data from Qseven module to the SPI device.
SPI_MISO	201	I CMOS	3.3V/3.3V		Connect a series resistor to Carrier Board SPI Device SO pin	Master serial input/Slave serial output signal. SPI serial input data from the SPI device to Qseven module.
SPI_SCK	203	O CMOS	3.3V/3.3V		Connect a series resistor to Carrier Board SPI Device SCK pin	SPI clock output.
SPI_CS0#	200	O CMOS	3.3V/3.3V		Connect a series resistor to Carrier Board SPI Device CS# pin	SPI chip select 0 output.
SPI_CS1#	202	O CMOS	3.3V/3.3V	NC		SPI Chip Select 1 signal is used as the second chip select when two devices are used. Do not use when only one SPI device is used.

CAN Bus Interface Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
CAN0_TX	129	O CMOS	3.3V/3.3V	NC		CAN (Controller Area Network) TX output for CAN Bus channel 0. In order to connect a CAN controller device to the Qseven module's CAN bus it is necessary to add transceiver hardware to the carrier board.
CAN0_RX	130	I CMOS	3.3V/3.3V	NC		RX input for CAN Bus channel 0. In order to connect a CAN controller device to the Qseven module's CAN bus it is necessary to add transceiver hardware to the carrier board.

Power Control Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
PWGIN	26	I CMOS	5V/5V	PU 10K to 5V		High active input for the Qseven® module indicates that all power rails located on the carrier board are ready for use.
PWRBTN#	20	I CMOS	3.3V Standby	PU 10K to 3.3V Suspend		Power Button: Low active power button input. This signal is triggered on the falling edge.

Power Management Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
RSTBTN#	28	I CMOS	3.3V/3.3V	PU 10K to 3.3V		Reset button input. This input may be driven active low by an external circuitry to reset the Qseven module.
BATLOW#	27	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend		Battery low input. This signal may be driven active low by external circuitry to signal that the system battery is low or may be used to signal some other external battery management event.
WAKE#	17	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend		External system wake event. This may be driven active low by external circuitry to signal an external wake-up event.
SUS_STAT#	19	O CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend		Suspend Status: indicates that the system will be entering a low power state soon.
SUS_S3#	18	O CMOS	3.3V Suspend/3.3V			S3 State: This signal shuts off power to all runtime system components that are not maintained during S3 (Suspend to Ram), S4 or S5 states. The signal SUS_S3# is necessary in order to support the optional S3 cold power state.
SUS_S5#	16	O CMOS	3.3V Suspend/3.3V			S5 State: This signal indicates S4 or S5 (Soft Off) state.
SLP_BTN#	21	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend		Sleep button. Low active signal used by the ACPI operating system to transition the system into sleep state or to wake it up again. This signal is triggered on falling edge.
LID_BTN#	22	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend		LID button. Low active signal used by the ACPI operating system to detect a LID switch and to bring system into sleep state or to wake it up again. Open/Close state may be software configurable.

Miscellaneous Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
WDTRIG#	70	I CMOS	3.3V/3.3V	PU 10K to 3.3V		Watchdog trigger signal. This signal restarts the watchdog timer of the Qseven module on the falling edge of a low active pulse.
WDOUT	72	O CMOS	3.3V/3.3V	PU 10K to 3.3V		Watchdog event indicator. High active output used for signaling a missing watchdog trigger. Will be deasserted by software, system reset or a system power down.
GP0_I2C_CLK	66	I/O OD CMOS	3.3V/3.3V	PU 2.2K to 3.3V		General Purpose I²C bus #0 clock line.
GP0_I2C_DAT	68	I/O OD CMOS	3.3V/3.3V	PU 2.2K to 3.3V		General Purpose I²C bus #0 data line.
SMB_CLK GP1_I2C_CLK	60	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3.3V Suspend		Clock line of System Management Bus. Multiplexed with General Purpose I²C bus #1 clock line.
SMB_DAT GP1_I2C_DAT	62	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3.3V Suspend		Data line of System Management Bus. Multiplexed with General Purpose I²C bus #1 data line.
SMB_ALERT#	64	I/O OD CMOS	3.3V Suspend/3.3V	PU 10K to 3.3V Suspend		System Management Bus Alert input. This signal may be driven low by SMB devices to signal an event on the SM Bus.
SPKR/GP_PWM_OUT2	194	O CMOS	3.3V/3.3V			Primary functionality is output for audio enunciator, the"speaker" in PC AT systems. When not in use for this primary purpose it can be used as General Purpose PWM Output.
BIOS_DISABLE#/BOOT_ALT#	41	I CMOS	3.3V/3.3V	PU 10K to 3.3V		Module BIOS disable input signal. Pull low to disable module's on-board BIOS. Allows off-module BIOS implementations. This signal can also be used to disable standard boot firmware flash device and enable an alternative boot firmware source, for example a boot loader.
RSVD	56,154,132,134,144,146	NC		NC		Do not connect
GP_1-Wire_Bus	124	I/O CMOS	3.3V/3.3V			General Purpose 1-Wire bus interface. Can be used for consumer electronics control bus (CEC) of HDMI

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Manufacturing Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
MFG_NC0	207	N.A	N.A	NC		This pin is reserved for manufacturing and debugging purposes. May be used as JTAG_TCK signal for boundary scan purposes during production or as a vendor specific control signal. When used as a vendor specific control signal the multiplexer must be controlled by the MFG_NC4 signal.
MFG_NC1	209	N.A	N.A			This pin is reserved for manufacturing and debugging purposes. May be used as JTAG_TDO signal for boundary scan purposes during production. May also be used, via a multiplexer, as a UART_TX signal to connect a simple UART for firmware and boot loader implementations. In this case the multiplexer must be controlled by the MFG_NC4 signal.
MFG_NC2	208	N.A	N.A			This pin is reserved for manufacturing and debugging purposes. May be used as JTAG_TDI signal for boundary scan purposes during production. May also be used, via a multiplexer, as a UART_RX signal to connect a simple UART for firmware and boot loader implementations. In this case the multiplexer must be controlled by the MFG_NC4 signal.
MFG_NC3	210	N.A	N.A	NC		This pin is reserved for manufacturing and debugging purposes. May be used as JTAG_TMS signal for boundary scan purposes during production. May also be used, via a multiplexer, as vendor specific BOOT signal for firmware and boot loader implementations. In this case the multiplexer must be controlled by the MFG_NC4 signal.
MFG_NC4	204	N.A	N.A	NC		This pin is reserved for manufacturing and debugging purposes. May be used as JTAG_TRST# signal for boundary scan purposes during production. May also be used as control signal for a multiplexer circuit on the module enabling secondary function for MFG_NC0..3 (JTAG / UART). When MFG_NC4 is high active it is being used for JTAG purposes. When MFG_NC4 is low active it is being used for UART purposes.

Thermal Management Signals

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
THRM#	69	I CMOS	3.3V/3.3V	PU 10K to 3.3V		Thermal Alarm active low signal generated by the external hardware to indicate an over temperature situation. This signal can be used to initiate thermal throttling.
THRMTRIP#	71	O CMOS	3.3V/3.3V	PU 10K to 3.3V		Thermal Trip indicates an overheating condition of the processor. If 'THRMTRIP#' goes active the system immediately transitions to the S5 State (Soft Off).

Fan Control Implementation

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
FAN_PWMOUT/GP_PWM_OUT1	196	O OC CMOS	3.3V/3.3V			Primary functionality is fan speed control. Uses the Pulse Width Modulation (PWM) technique to control the Fan's RPM based on the CPU's die temperature. When not in use for this primary purpose it can be used as General Purpose PWM Output.
FAN_TACHOIN/GP_TIMER_IN	195	I CMOS	3.3V/3.3V	PU 10K to 3.3V		Primary functionality is fan tachometer input. When not in use for this primary purpose it can be used as General Purpose Timer Input.

Input Power Pins

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	BT700	Carrier Board	Description
VCC	211-230	Power				Power Supply +5VDC ±5%
VCC_5V_SB	205-206	Power				Standby Power Supply +5VDC ±5%
VCC_RTC	193	Power				3 V backup cell input. VCC_RTC should be connected to a 3V backup cell for RTC operation and storage register non-volatility in the absence of system power. (VCC_RTC = 2.4 - 3.3 V).
GND	1-2, 23-25, 34, 39-40, 57-58, 73-74, 97-98, 117-118, 135-136, 141-142, 147-148, 159-160, 165-166, 183-184, 197-198	Power Ground				Power Ground.

Installing BT700 onto a Carrier Board

> **Important:**
> The carrier board used in this section is for reference purpose only and may not resemble your carrier board. These illustrations are mainly to guide you on how to install BT700 onto the carrier board of your choice.

1. The photo below shows the locations of the mounting holes and the bolts already fixed in place.

Standoff Bolts
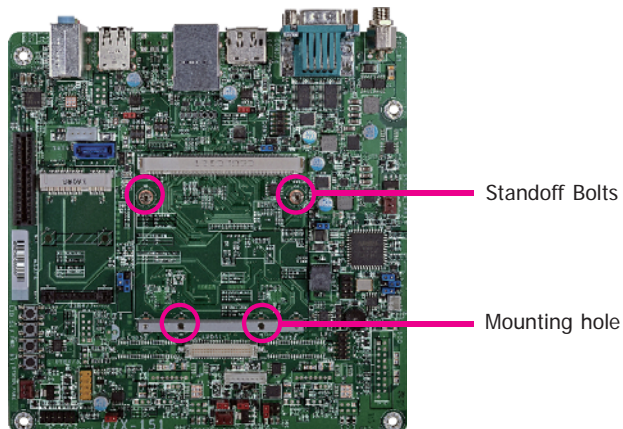
Mounting hole

2. Grasping BT700 by its edges, insert it into the carrier board, and you will hear a distinctive "click" indicating BT700 is correctly locked into position.

Carrier board
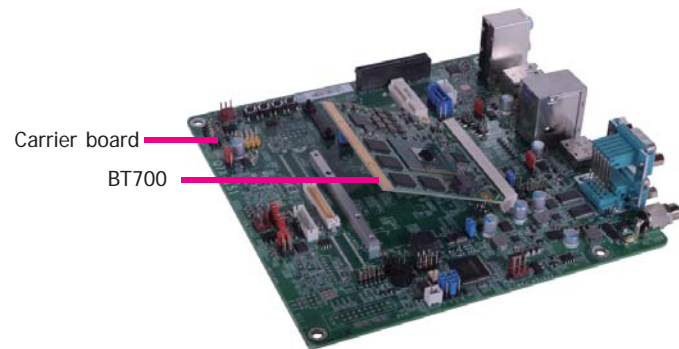
BT700

3. Press down BT700 and put on the heat sink on top of BT700 with its mounting holes and bolts aligned on the carrier board. Use the mounting screws to fix BT700 and heat sink in place.

Short screws

18
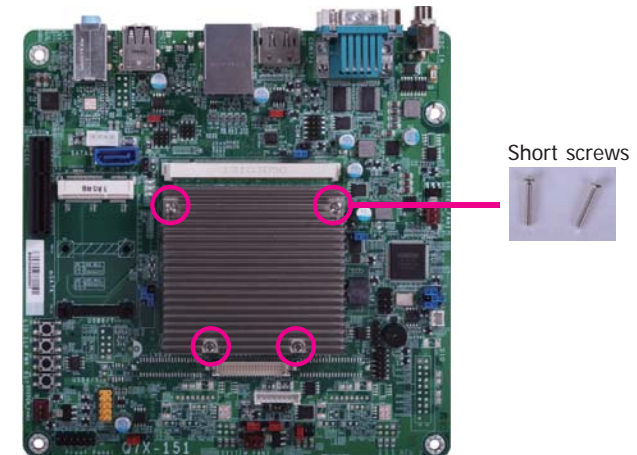
Chapter 3 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

Note:
The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are key-board commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

KEYs	Function
Right and Left Arrows	Moves the highlight left or right to select a menu.
Up and Down Arrows	Moves the highlight up or down between submenus or fields.
<Esc>	Exits to the BIOS setup utility
+ (plus key)	Scrolls forward through the values or options of the hightlighted field.
- (minus key)	Scolls backward through the values or options of the hightlighted field.
<F1>	Displays general help
<F2>	Displays previous values
<F3>	Optimized defaults
<F4>	Saves and reset the setup program.
<Enter>	Press <Enter> to enter the highlighted submenu

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

AMI BIOS Setup Utility

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.

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

  BIOS Information                                      Set the Date. Use Tab
  BIOS Vendor              American Megatrends          to switch between Date
  Project Version          OACCT 0.11 x64               elements.
  Build Date and Time      10/02/2014 15:04:50

  System Date              [Wed 15/10/2014]
  System Time              [00:27:35]

  Access Level             Administraor

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

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

System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

> **Important:**
> Setting incorrect field values may cause the system to malfunction.

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

  OS Selection                        [Windows 7]        OS Selection

  ▶ PC Health Status
  ▶ CPU Configuration
  ▶ SATA Configuration
  ▶ LPSS & SCC Configuration
  ▶ Network Stack Configuration
  ▶ CSM Configuration
  ▶ Trusted Computing
  ▶ USB Configuration
  ▶ Security Configuration
                                                         → ←:  Select Screen
  ▶ Intel(R) I210 Gigabit Network Connection - 00:A0:C9:00:......  ↑↓:    Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         F4:     Save & Reset
                                                         ESC:  Exit

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

OS Selection

Select the OS support: Windows 7 or Windows 8.X.

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PC Health Status

This section only displays the hardware health monitor.

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced

    System Hardware Monitor

    CPU Temperature            : +39C
    FAN1 Speed                 : 6585 RPM
    3.3V                       : +3.324 V
    V_SM                       : +1.364 V
    VCORE                      : +0.926 V
    VGFX                       : +1.006 V

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

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

CPU Configuration

This section is used to configure the CPU. It will also display the detection of CPU information.

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced

    CPU Configuration                                        Number of cores to enable
                                                             in each processor package.
    Intel(R) Atom(TM) CPU E3845 @ 1.91GHz
    CPU Signature                    30679
    Microcode Patch                  901
    CPU Speed                        1918 MHz
    64-bit                           Supported
    Processor Cores                  4
    Intel VT-x Technology            Supported

    L1 Data Cache                    24 KB x4
    L1 Code Cache                    32 KB x4
    L2 Cache                         1024 KB x2

    Active Processor Cores           [All]              → ←:  Select Screen
    Intel Virtualization Technology  [Enabled]          ↑↓:    Select Item
    EIST                             [Enabled]          Enter: Select
                                                        +/-:   Change Opt.
                                                        F1:    General Help
                                                        F2:    Previous Values
                                                        F3:    Optimized Defaults
                                                        F4:     Save & Reset
                                                        ESC:  Exit

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

Active Processor Cores

Number of cores to enable in each processor package.

Intel Virtualization Technology

When this field is set to enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

EIST

This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

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SATA Configuration

This section is used to configure the settings of SATA device.

```
           Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
   Advanced

  SATA Configuration                                          Enable/Disable Serial
                                                              ATA
  Serial-ATA (SATA)                 [Enabled]

  Serial-ATA Port 0                 [Enabled]
  Serial-ATA Port 1                 [Enabled]

  SATA Port0
  Not Present

  SATA Port1
  Not Present
                                                              → ←:  Select Screen
                                                              ↑↓:    Select Item
                                                              Enter: Select
                                                              +/-:   Change Opt.
                                                              F1:    General Help
                                                              F2:    Previous Values
                                                              F3:    Optimized Defaults
                                                              F4:    Save & Reset
                                                              ESC:  Exit

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

Serial ATA Port 0 and 1

This field is used to enable or disable the Serial ATA port 0 and 1.

LPSS & SCC Configuration

This section is used to configure the LPSS & SCC settings.

```
           Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
   Advanced

  LPSS Configuration                                          LPSS I2C #1 Support
  LPSS I2C #1 Support               [Enabled]                 Enable/Disable
  LPSS HSUART #1 Support            [Enabled]
  LPSS HSUART #2 Support            [Enabled]
  LPSS SPI Support                  [Enabled]



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

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

LPSS I2C #1 Support

Enable or disable the support of the LPSS I2C device.

LPSS HSUART #1/#2 Support

Enable or disable the support of the LPSS HSUART device.

LPSS SPI Support

Enable or disable the support of the LPSS SPI device.

Network Stack Configuration

This section is used to enable or disable UEFI network stack.

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.		
Advanced		
Network Stack	[Disabled]	Enable/Disable UEFI network stack.
		→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.		
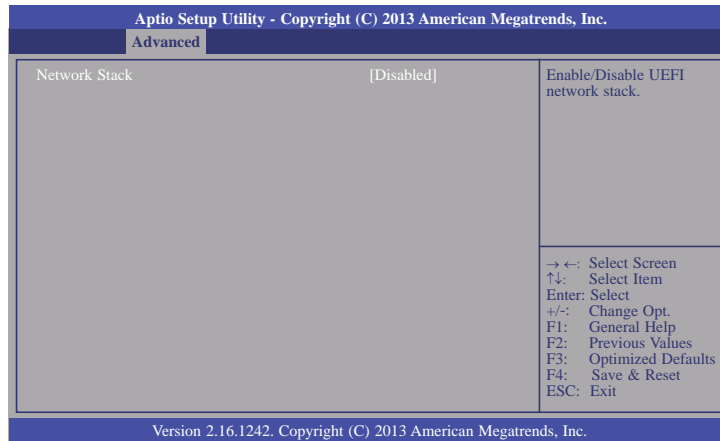
When Network Stack is set to enabled, it will display the following information:

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.		
Advanced		
Network Stack	[Enabled]	Enable/Disable UEFI network stack.
Ipv4 PXE Support	[Enabled]	
Ipv6 PXE Support	[Enabled]	
PXE boot wait time	0	
		→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.		

Ipv4 PXE Support

When enabled, Ipv4 PXE boot supports. When disabled, Ipv4 PXE boot option will not be created.

Ipv6 PXE Support

When enabled, Ipv6 PXE boot supports. When disabled, Ipv6 PXE boot option will not be created.

PXE boot wait time

Enter the value of wait time to press <Esc> key to abort the PXE boot.

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CSM Configuration

This section configures the CSM settings.

```
Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
  Advanced

Compatibility Support Module Configuration              Enable/Disable CSM
                                                        support
CSM Support                       [Enabled]

CSM16 Module Version              07.71

Boot option filter                [UEFI and Legacy]

Option ROM execution order

Network                           [Do not launch]
Storage                           [Legacy only]        → ←: Select Screen
Video                             [Legacy only]        ↑↓:   Select Item
Other PCI devices                 [UEFI only]          Enter: Select
                                                        +/-:   Change Opt.
                                                        F1:    General Help
                                                        F2:    Previous Values
                                                        F3:    Optimized Defaults
                                                        F4:     Save & Reset
                                                        ESC:  Exit

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

CSM Support

This field is used to enable or disable the CSM support.

Boot option filter

This option controls Legacy/UEFI ROMs priority.

Network

This field controls the execution of UEFI and Legacy PXE OpROM.

Storage

This field controls the execution of UEFI and Legacy Storage OpROM.

Video

This field controls the execution of UEFI and Legacy Video OpROM.

Other PCI devices

This field determines OpROM execution policy for devices other than network, storage or video.

Trusted Computing

This section configures settings relevant to Trusted Computing innovations.

```
Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
  Advanced

Configuration                                           Enables or Disables
    Security Device Support           [Disable]         BIOS support for security
                                                        device. O.S. will not show
Current Status Information                              Security Device. TCG
  No Security Device Found                              EFI protocol and INT1A
                                                        interface will not be
                                                        available.

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

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

Security Device Support

This field is used to enable or disable BIOS supporting for the security device. O.S will not show the security device. TCG EFI protocol and INT1A interface will not be available.

USB Configuration

This section is used to configure parameters of the USB device.

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
          Advanced

  USB Configuration                                       Enables Legacy USB
                                                          support. AUTO option
  USB Module Version              8.11.01                 disables legacy support if
                                                          no USB devices are
  USB Devices:                                            connected. DISABLE
        1 Keyboard, 1 Mouse, 1 Hub                        option will keep USB
                                                          devices available only for
  Legacy USB Support              [Enabled]               EFI applications.
  USB Mass Storage Driver Support [Enabled]

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

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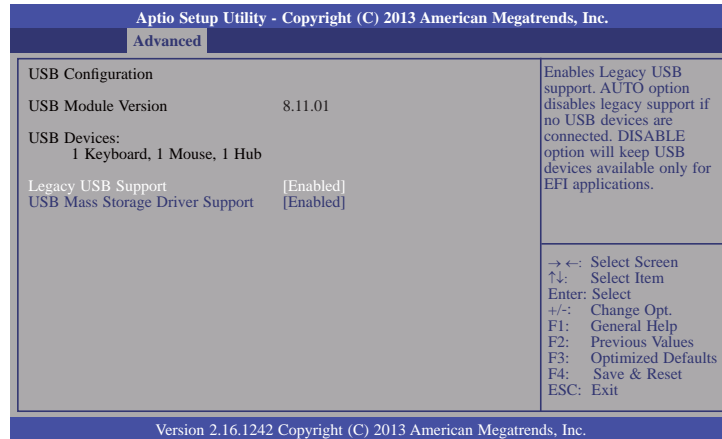
Legacy USB Support

Enabled
Enable legacy USB.

Auto
Disable support for legacy when no USB devices are connected.

Disabled
Keep USB devices available only for EFI applications.

USB Mass Storage Driver Support

Enable or disable the support of the USB Mass Storage Driver.

Important:
When installing Windows 7, only native USB 2.0 devices (USB port 0 to USB port 3) can operate under DOS mode. Please refer to the following tables for more infomation on the type of USB ports.

Table 1. OS Selection

Operation Environment for Customers	DOS	Windows 7	Windows 8.x	Linux
OS Selection in the BIOS Advanced Menu	Windows 8.x	Windows 7	Windows 8.x	Windows 8.x
Available USB ports	All	When installing Windows 7 first time, only native USB 2.0 ports can work. Please refer to the USB type in table 2 below.	All	All

Table 2. The Type of USB Ports

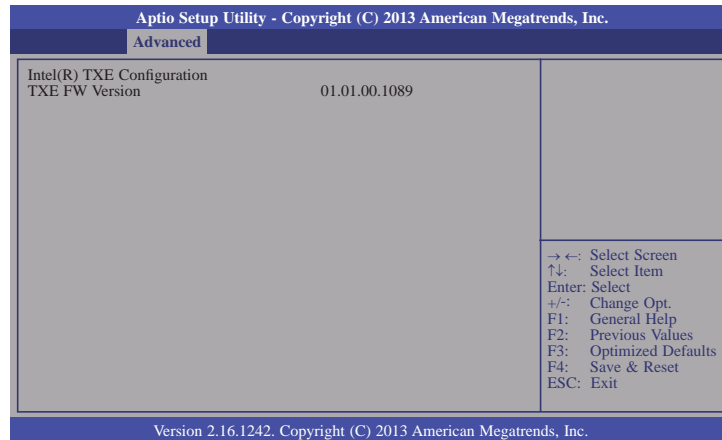| Model Name	BT700
USB 3.0	Native (share with USB 2.0 port 6 and 7)*
USB 0	Native
USB 1	Native
USB 2	Native
USB 3	Native
USB 4	HSIC port 0
USB 5	HSIC port 1
USB 6	HSIC port 2 (share with USB 3.0)*
USB 7	HSIC port 3 (share with USB 3.0)*

Note:
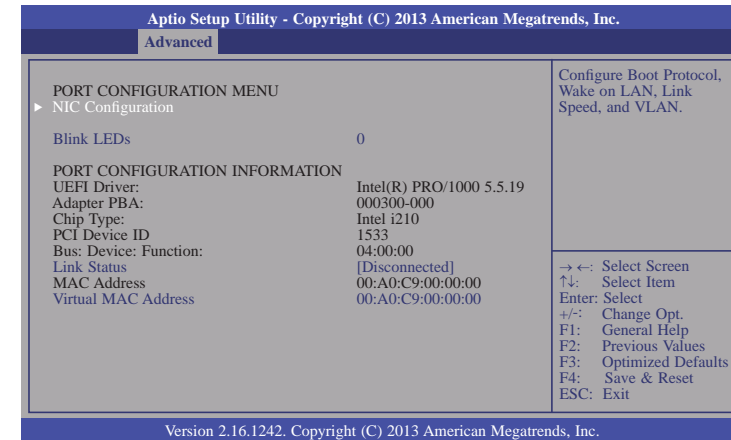*Optional and is not supported in standard model. Please contact your sales representative for more information.

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Security Configuration

This section only displays the setting relevant to the Intel(R) Anti-Theft Technology.

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
  Advanced

Intel(R) TXE Configuration
TXE FW Version                       01.01.00.1089




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

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

Intel(R) I210 Gigabit Network Connection - 00:A0:C9:00:...

This section is used to configure the parameters of Gigabit Ethernet device.

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
  Advanced
                                                                    Configure Boot Protocol,
  PORT CONFIGURATION MENU                                           Wake on LAN, Link
  ▶ NIC Configuration                                               Speed, and VLAN.

  Blink LEDs                              0

  PORT CONFIGURATION INFORMATION
  UEFI Driver:                            Intel(R) PRO/1000 5.5.19
  Adapter PBA:                            000300-000
  Chip Type:                              Intel i210
  PCI Device ID                           1533
  Bus: Device: Function:                  04:00:00
  Link Status                             [Disconnected]           → ←:  Select Screen
  MAC Address                             00:A0:C9:00:00:00        ↑↓:    Select Item
  Virtual MAC Address                     00:A0:C9:00:00:00        Enter: Select
                                                                   +/-:   Change Opt.
                                                                   F1:    General Help
                                                                   F2:    Previous Values
                                                                   F3:    Optimized Defaults
                                                                   F4:    Save & Reset
                                                                   ESC:  Exit

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

Blink LEDs

Identify the physical network port by blinking the associated LED.
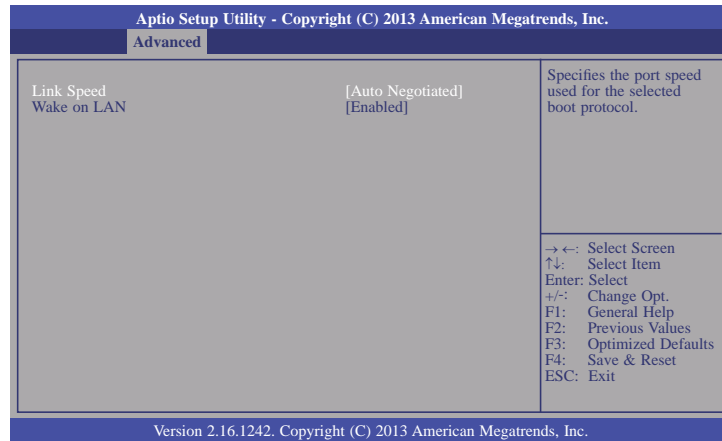
Link Status

This field indicates the link status of the network device.

Virtual MAC Address

This field indicates programmatically assignable MAC address for the network port.

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NIC Configuration
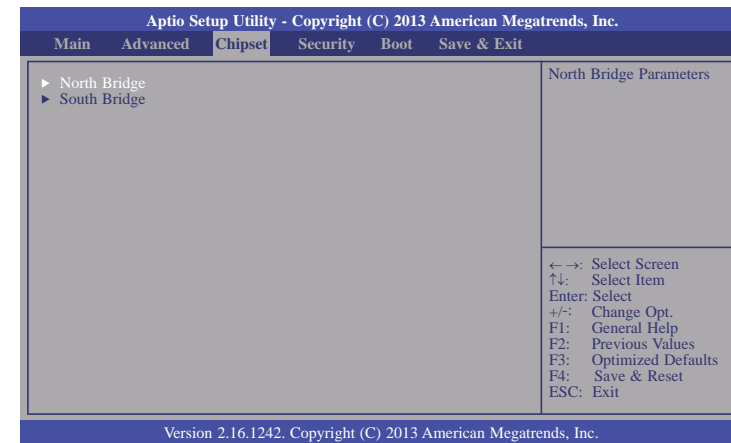
This field is used to configure the network device.

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
  Advanced

  Link Speed                              [Auto Negotiated]      Specifies the port speed
  Wake on LAN                             [Enabled]              used for the selected
                                                                 boot protocol.




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

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

Link Speed

Specify the port speed which is used for the selected boot protocol.

Wake on LAN

Enables the server to be powered on using an in-band magic packet.

Chipset

The section configures the relevant functions of chipset.

```
                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 & Reset
                                                                 ESC:  Exit

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

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North Bridge

This section configures the North bridge parameters.

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

 ▶ Intel IGD Configuration                         Config Intel IGD Settings.
 ▶ LCD Control
 ▶ Memory Configuration




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

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

Intel IGD Configuration

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

 GOP Information
 Intel(R) GOP Driver                    [N/A]




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

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

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LCD Control

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

  LCD Control                                                    Select the Video Device
                                                                 which will be activated
  Primary IGFX Boot Display              [DDI]                   during POST. This has no
  Secondary IGFX Boot Display            [LVDS]                  effect if external graphics
  LCD Panel Type                         [Type 3 1024x768...]    present.
  LVDS Support                           [Enabled]               Secondary boot display
                                                                 selection will appear
                                                                 based on your selection.
                                                                 VGA modes will be sup-
                                                                 ported only on primary
                                                                 display.

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

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

Primary IGFX Boot Display

Select the Video Device which will be activated during POST. This has no effect if the external graphics presents. The selection of secondary boot display will appear based on your selection. VGA modes will be supported only on primary display.

Secondary IGFX Boot Display

Select the secondary display device: DDI-0 or DDI-1. DDI-0 is the default setting.

LCD Panel Type

Select the LCD panel used by Internal Graphics Device by selecting the appropriate setup item. Please refer to the screen shown below.

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

  LCD Control                                                    Select LCD panel used
                                                                 by Internal Graphics
  Primary IGFX Boot Display              [DDI]                   Device by selecting the
  Secondary IGFX Boot Display                                    appropriate setup item.
  LCD Panel Type            ┌────────── LCD Panel Type ──────────┐
  LVDS Support              │ VBIOS Default                      │
                           │ Type 1    640x480          18 Bit  │
                           │ Type 2    800x600          18 Bit  │
                           │ Type 3    1024x768         18 Bit  │
                           │ Type 4    1280x1024        36 Bit  │
                           │ Type 5    1400x1050 (108MHz) 36 Bit │
                           │ Type 6    1400x1050 (122MHz) 36 Bit │
                           │ Type 7    1600x1200        36 Bit  │   → ←:  Select Screen
                           │ Type 8    1366x768         18 Bit  │   ↑↓:   Select Item
                           │ Type 9    1680x1050        36 Bit  │   Enter: Select
                           │ Type 10   1920x1200        36 Bit  │   +/-:   Change Opt.
                           │ Type 11   1440x900         36 Bit  │   F1:    General Help
                           │ Type 12   1024x768         24 Bit  │   F2:    Previous Values
                           │ Type 13   1280x1024        48 Bit  │   F3:    Optimized Defaults
                           │ Type 14   1280x800         36 Bit  │   F4:    Save & Reset
                           │ Type 15   1920x1080        48 Bit  │   ESC:  Exit
                           │ Type 16   2048x1536        48 Bit  │
                           └────────────────────────────────────┘

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```

LVDS Support

Enable or disable the onboard LVDS function.

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Memory Configuration

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

```
Memory Information
Total Memory                    2048 MB (LPDDR3)

Memory                          2048 MB (LPDDR3)
                                                    →←:  Select Screen
                                                    ↑↓:    Select Item
                                                    Enter: Select
                                                    +/-:   Change Opt.
                                                    F1:    General Help
                                                    F2:    Previous Values
                                                    F3:    Optimized Defaults
                                                    F4:    Save & Reset
                                                    ESC:  Exit
```
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
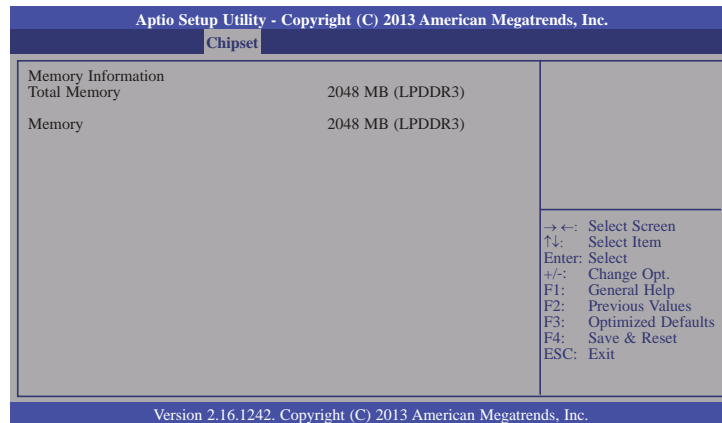
South Bridge

This field is used to configure the parameters of the South Bridge.

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

```
▶  Azalia HD Audio                                  Azalia HD Audio Options
▶  PCI Express Configuration
   Restore AC Power Loss        [Power On]
   Intel(R) I210 Controller     [Enabled]
   SPI Interface Selection      [PCU_SPI]

                                                    →←:  Select Screen
                                                    ↑↓:    Select Item
                                                    Enter: Select
                                                    +/-:   Change Opt.
                                                    F1:    General Help
                                                    F2:    Previous Values
                                                    F3:    Optimized Defaults
                                                    F4:    Save & Reset
                                                    ESC:  Exit
```
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Restore AC Power Loss

Power Off
When power returns after an AC power failure, the system's power is off. You **must** press the Power button to power-on the system.

Power On
When power returns after an AC power failure, the system will automatically power-on.

Last State
When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

Intel(R) I210 Controller

Enable the Intel(R) I210 ethernet controller.

SPI Interface Selection

The option is PCU_SPI or SIO_SPI.

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Azalia HD Audio

This section configues Azalia HD Audio options.

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

  Audio Configuration                                    Control Detection of the
  Audio Controller                    [Enabled]          Azalia device. Disabled =
      Azalia HDMI Codec               [Enabled]          Azalia will be uncondition-
        DP/HDMI Port B                [Enabled]          ally disabled. Enabled =
                                                         Azalia will be uncondition-
                                                         ally enabled. Auto = Azalia
                                                         will be enabled if present
                                                         disabled otherwise.


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

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

Audio Controller

This item controls the detection of the Azalia device.

Disabled
Azalia will be unconditionally disabled.

Enabled
Azalia will be unconditionally enabled.

Auto
Azalia will be enabled automatically.

Azalia HDMI Codec

Enable or disable the internal HDMI codec for Azalia.

DP/HDMI Port B

Enable or disable the DP/HDMI Port B.

PCI Express Configuration

This section configues settings relevant to PCI Express devices.

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

  PCI Express Configuration                              Enable or Disable the
  PCI Express Port 0                  [Enabled]          PCI Express Port 0 in the
      Speed                           [Auto]             Chipset

  PCI Express Port 1                  [Enabled]
      Speed                           [Auto]

  PCI Express Port 2                  [Enabled]
      Speed                           [Auto]

  PCI Express Port 3                  [Enabled]
      Speed                           [Auto]            → ←:  Select Screen
                                                        ↑↓:    Select Item
                                                        Enter: Select
                                                        +/-:   Change Opt.
                                                        F1:    General Help
                                                        F2:    Previous Values
                                                        F3:    Optimized Defaults
                                                        F4:     Save & Reset
                                                        ESC:  Exit

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```

PCI Express Port 0-3

Enable or disable the PCI Express port in the chipset.

Speed

Select the speed for the PCI Express devices. The options are Auto, Gen1 or Gen2.

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Security

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

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

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

Administrator Password

Set the administrator password.

User Password

Set the user password.

Boot

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

   Boot Configuration                                     Number of seconds to
   Setup Prompt Timeout            1                      wait for setup activation
   Bootup NumLock State            [On]                   key.
                                                          65535(0xFFFF) means
                                                          indefinite waiting.
   Boot Option Priorities


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

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

Setup Prompt Timeout

Select the number of seconds to wait for the setup activation key. 65535(0xFFFF) denotes indefinite waiting.

Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

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Save & Exit

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

Save Changes and Reset
Discard Changes and Reset

Restore Defaults

Boot Override

Reset the system after saving the changes.

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

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Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility, AFUDOS.EXE. Please contact technical support or your sales representative for the files.

To execute the utility, type:
A:> AFUDOS BIOS_File_Name /b /p /n
then press <Enter>.

```
C:\AFU\AFUDOS>afudos filename /B /P /N

+------------------------------------------------------------+
|            AMI Firmware Update Utility(APTIO) v2.25         |
|     Copyright (C)2008 American Megatrends Inc. All Rights Reserved. |
+------------------------------------------------------------+

Reading file ............................   done
Erasing flash ...........................   done
Writing flash ...........................   done
Verifying flash .........................   done
Erasing BootBlock ....................   done
Writing BootBlock ....................   done
Verifying BootBlock .................   done

C:\AFU\AFUDOS>
```

After finishing BIOS update, please turn off the AC power. Wait about 10 seconds and then turn on the AC power again.

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Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.

2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.

3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:
a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

Chapter 4 - Supported Software

The CD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

Insert the CD into a CD-ROM drive. The autorun screen (Mainboard Utility CD) will appear. If after inserting the CD, "Autorun" did not automatically start (which is, the Mainboard Utility CD screen did not appear), please go directly to the root directory of the CD and double-click "Setup".

For Windows 8.x
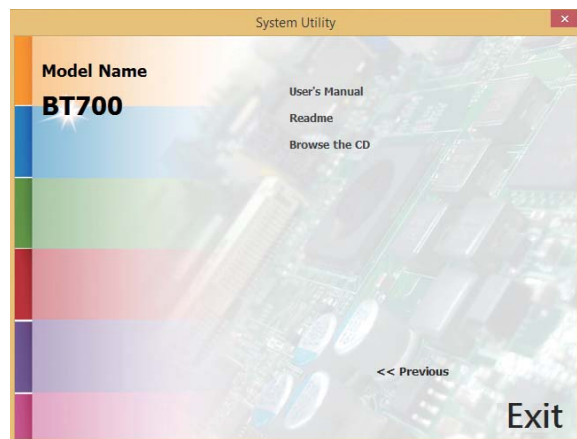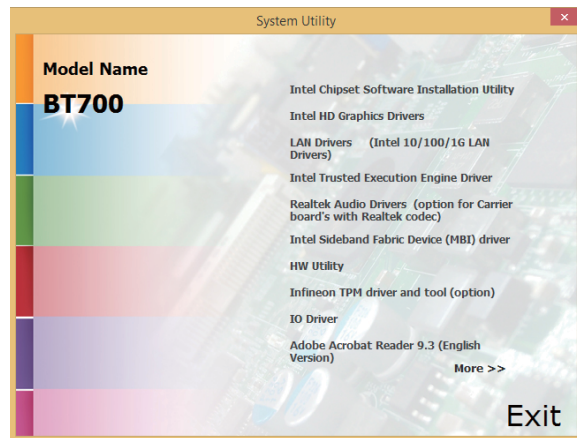
For Windows 7
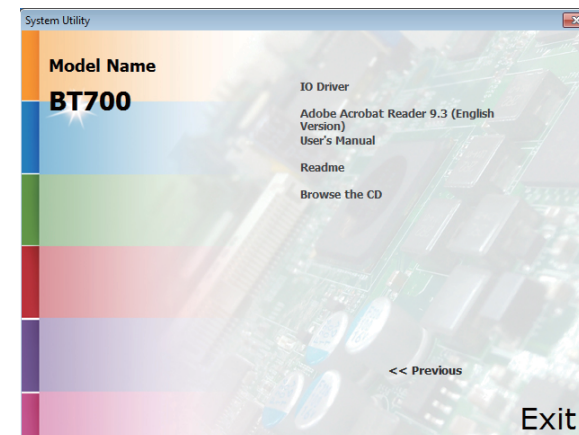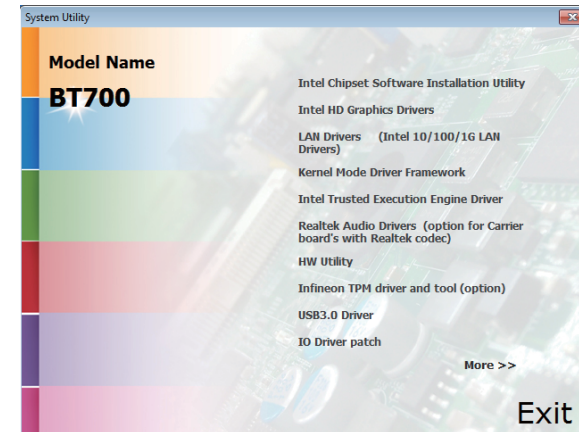
Intel Chipset Software Installation Utility

The Intel Chipset Device Software is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, click "Intel Chipset Software Installation Utility" on the main menu.

1. Setup is ready to install the utility. Click Next.

2. Read the license agreement then click Yes.
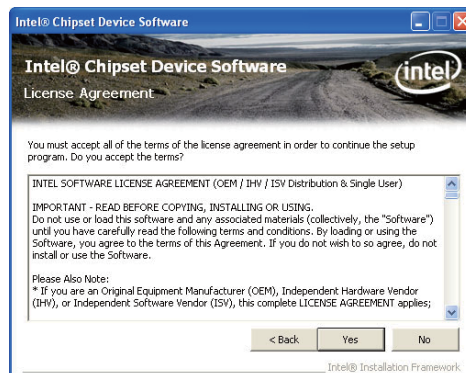
3. Go through the readme document for more installation tips then click Next.

4. After all setup operations are done, click Next.
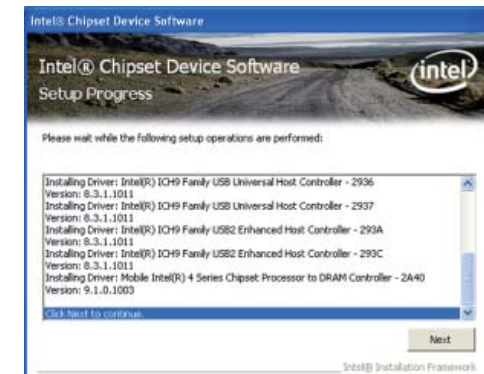
5. Click "Yes, I want to restart this computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.

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Intel HD Graphics Drivers

To install the driver, click "Intel HD Graphics Drivers" on the main menu.

1. Setup is now ready to install the graphics driver. Click Next.

By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/ Windows 8 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

We recommend that you skip this process by disabling this function then click Next.

2. Read the license agreement then click Yes.
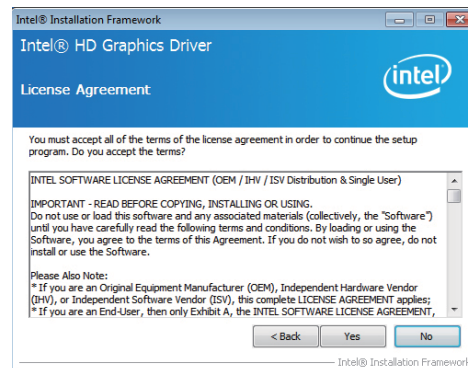
3. Go through the readme document for system requirements and installation tips then click Next.
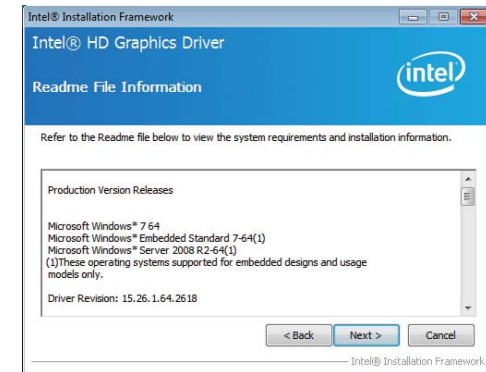
4. Setup is now installing the driver. Click Next to continue.
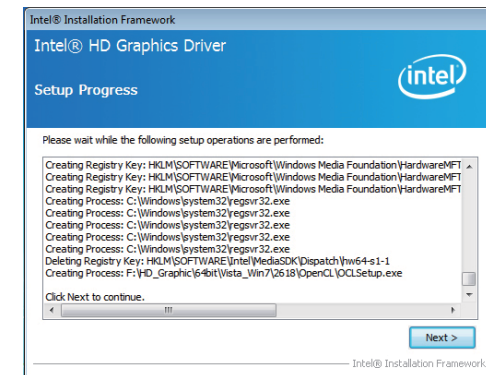
5. Click "Yes, I want to restart this computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.

37
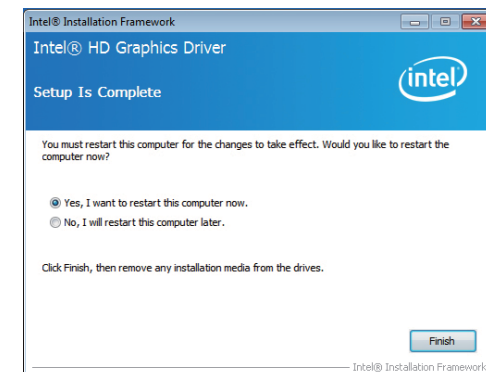
Intel LAN Drivers

To install the driver, click "Intel LAN Drivers" on the main menu.

1. Setup is ready to install the driver. Click Next.
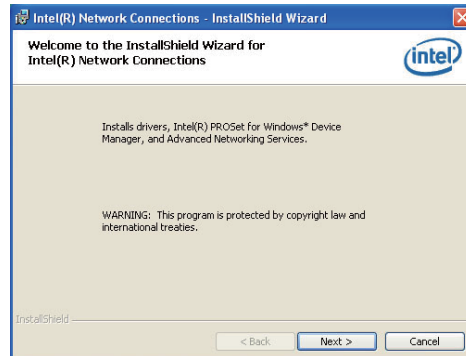
2. Click "I accept the terms in the license agreement" then click "Next".
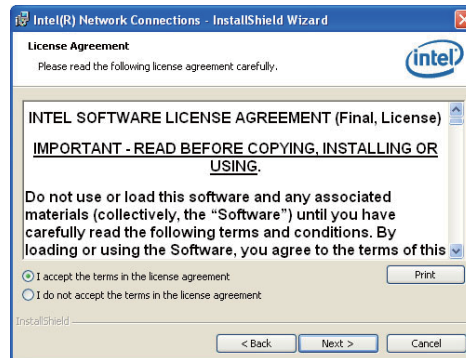
3. Select the program featuers you want installed then click Next.
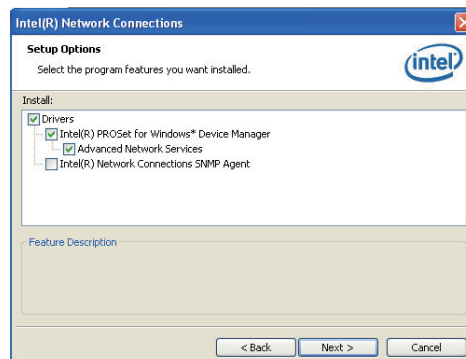
4. Click Install to begin the installation.

5. After completing installation, click Finish.

38
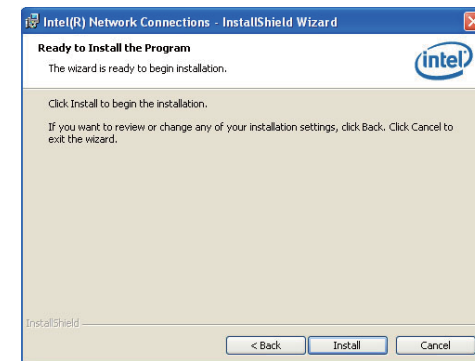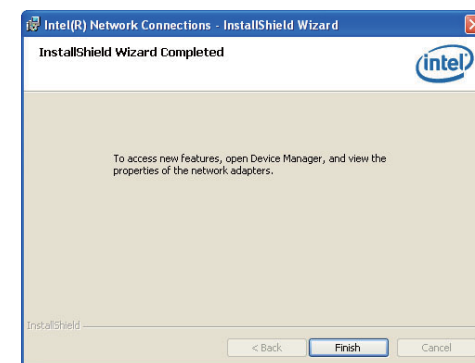
Kernel Mode Driver Framework (For Windows 7 only)

To install the driver, click "Kernel Mode Driver Framework" on the main menu.

1. Click "Yes" to install the update.
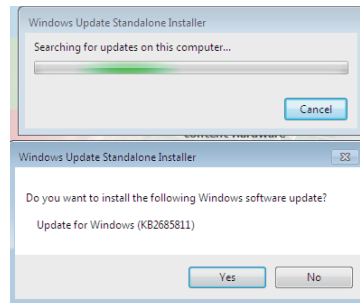
2. The update is installed now.
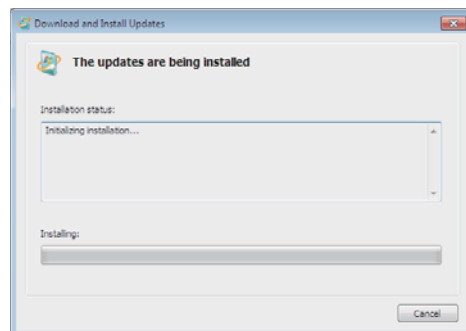
3. Click "Restart Now" to restart your computer when the installation is complete.
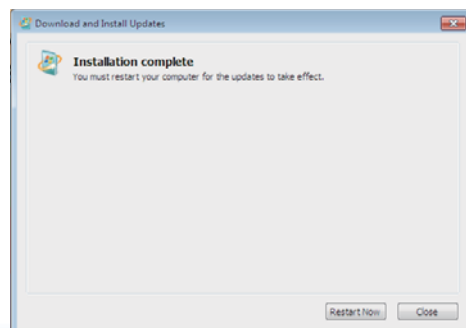
Intel Trusted Execution Engine Driver

To install the driver, click "Intel Trusted Execution Engine Driver" on the main menu.

1. Tick "I accept the terms in the License Agreement" and then click "Next."
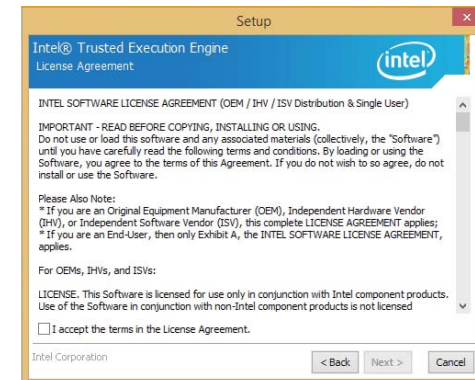
2. The step shows the components which will be installed. Then, Click Next.

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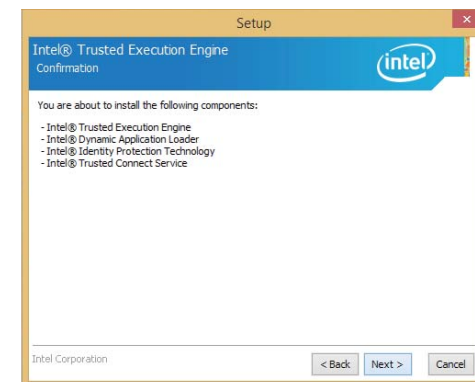
3. The step displays the installing status in the progress.
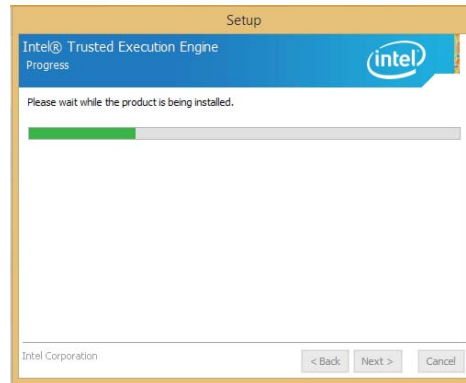
4. Click "Finish" when the installation is complete.
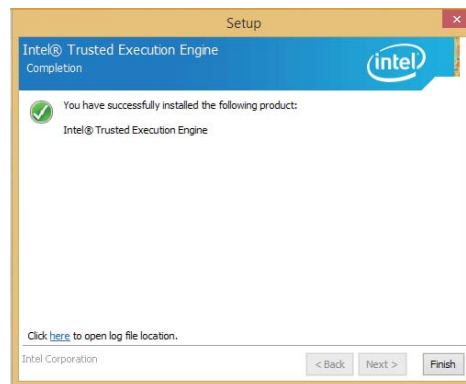
Realtek Audio Drivers

To install the driver, click "Realtek Audio Drivers" on the main menu.

1. Setup is now ready to install the audio driver. Click Next.

2. Follow the remainder of the steps on the screen; clicking "Next" each time you finish a step.

3. Click "Yes, I want to restart my computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.

40
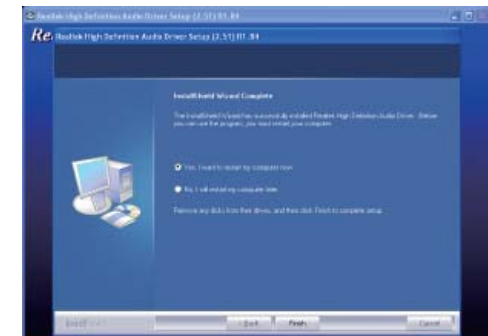
Intel Sideband Fabric Device (MBI) Driver (For Windows 8 only)

To install the driver, click "Intel Sideband Fabric Device (MBI) Driver" on the main menu.

1. The setup program will be installed. Click "Next" to continue.
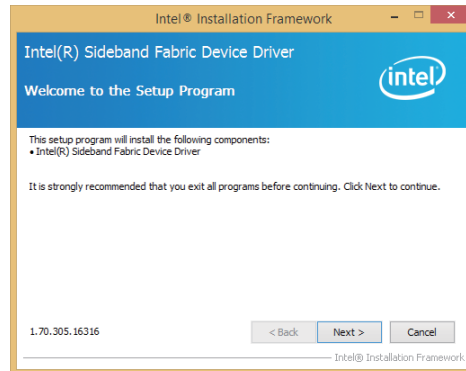
2. Click "Yes" to accept the License Agreement.
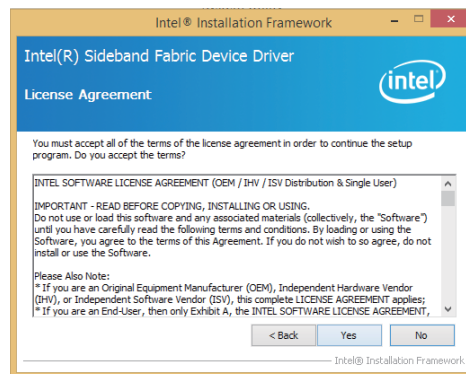
3. The step performs setup operations. Click "Next" to continue.
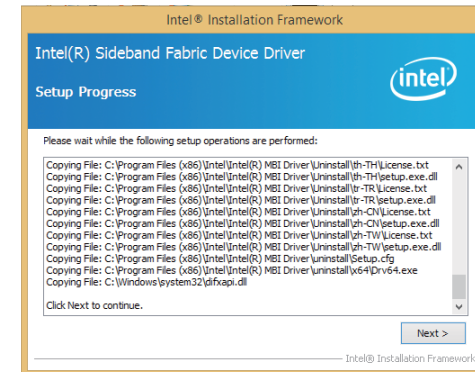
4. Click "Finish" to restart the computer when the setup is completely installed.

41
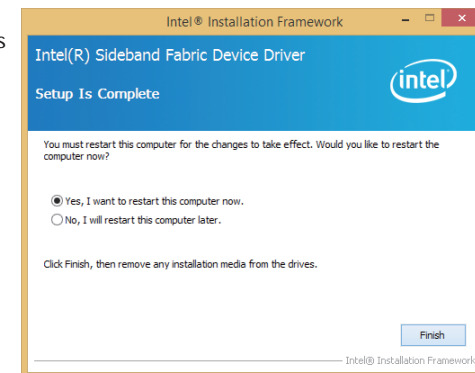
DFI Utility

DFI Utility provides information about the board, HW Health, Watchdog, DIO, and Backlight. To access the utility, click "DFI Utility" on the main menu.

> **Note:**
> If you are using Windows 7, you need to access the operating system as an administrator to be able to install the utility.

1. Setup is ready to install the DFI Utility drifer. Click Next.

2. Click "I accept the terms in the license agreement" and then click Next.
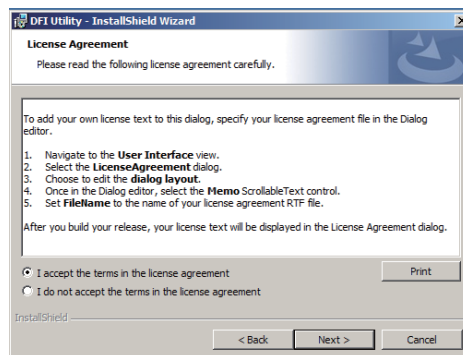
3. Click Install to begin the installation.
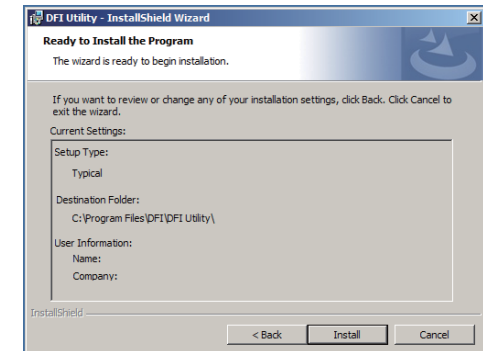
4. After completing installation, click Finish.
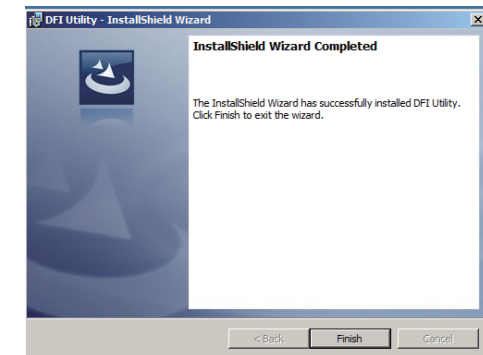
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.

Information
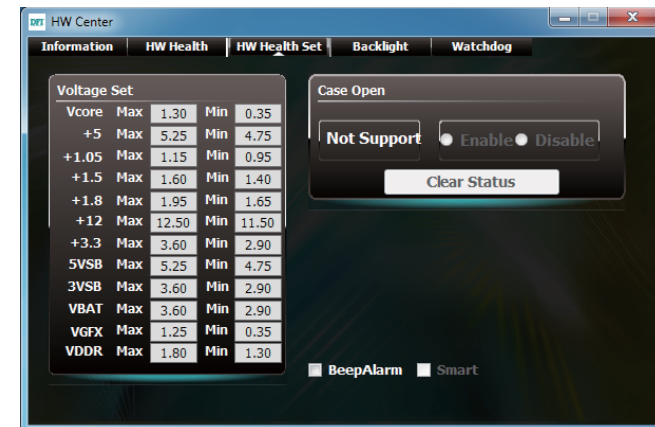
HW Health Set

HW Health
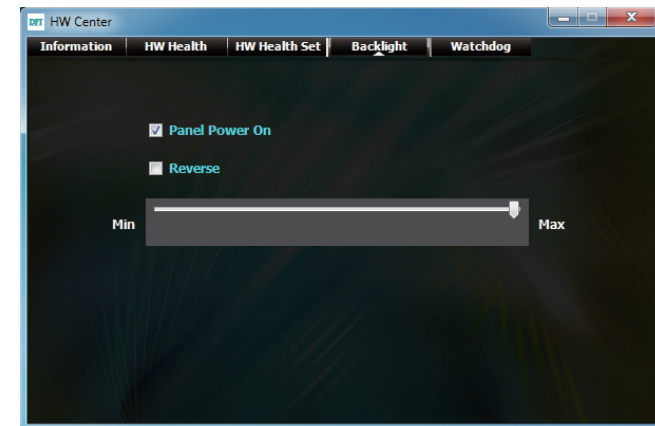
Backlight
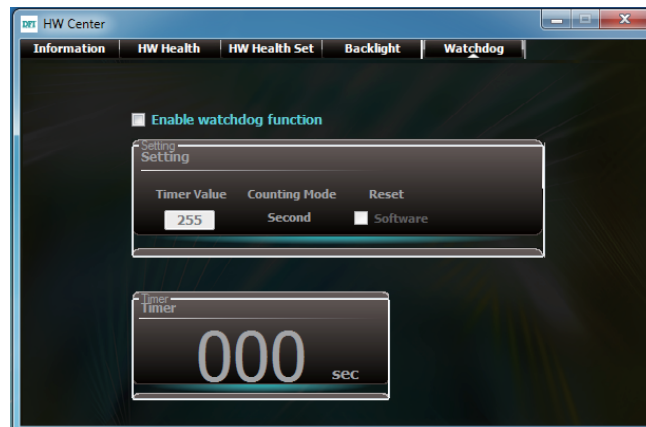
WatchDog

Infineon TPM Driver and Tool (option)

To install the driver, click "Infineon TPM driver and tool (option)" on the main menu.

1. The setup program is preparing to install the driver.
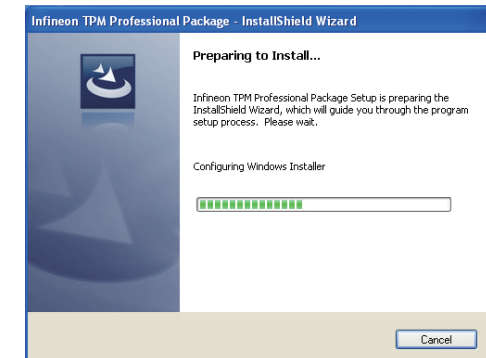
2. The setup program is now ready to install the utility. Click Next.
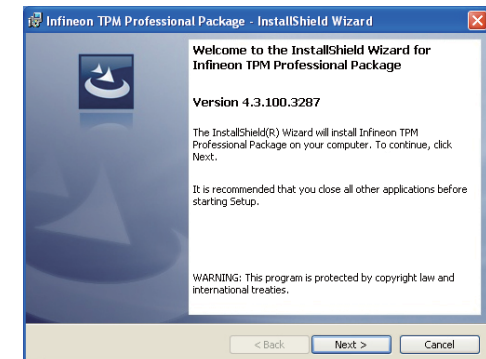
3. Click "I accept the terms in the license agreement" and then click "Next".

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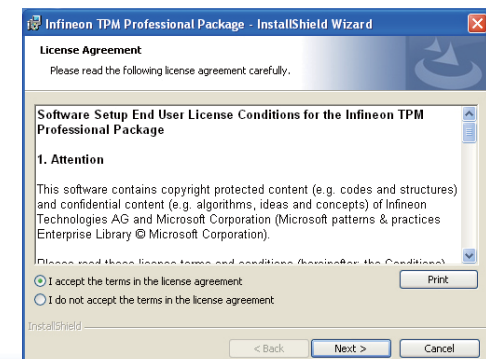
4. Enter the necessary information and then click Next.
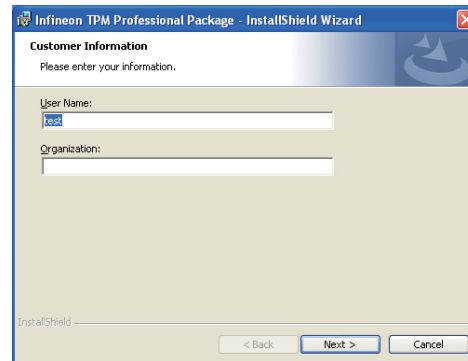
5. Select a setup type and then click Next.
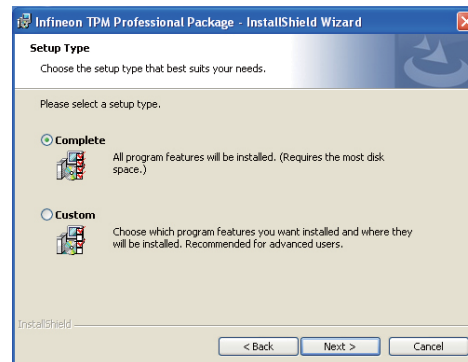
6. Click Install.
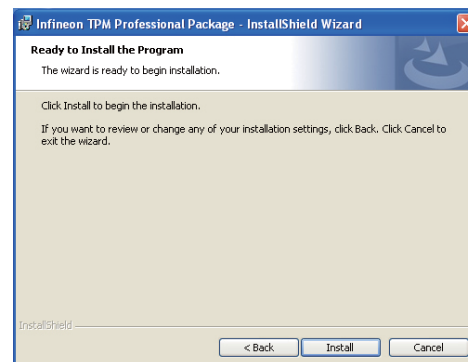
7. TPM requires installing the Micro-soft Visual C++ package prior to installing the utility. Click Install.
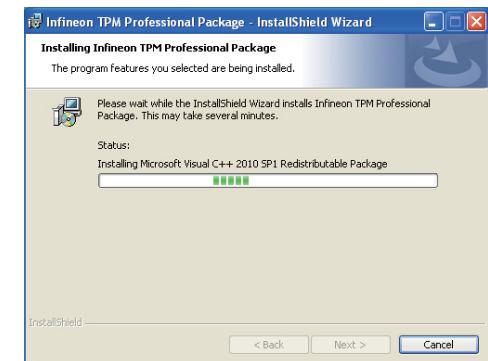
8. The setup program is currently installing the Microsoft Visual C++ package.

9. Click Finish.

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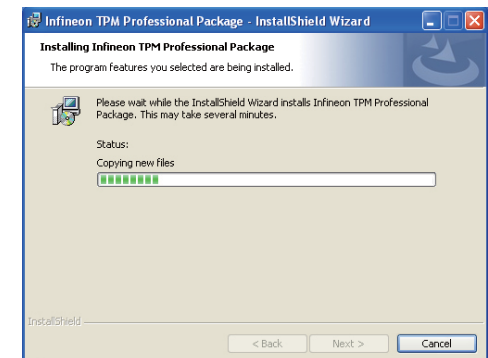
10. Click "Yes" to restart your system.
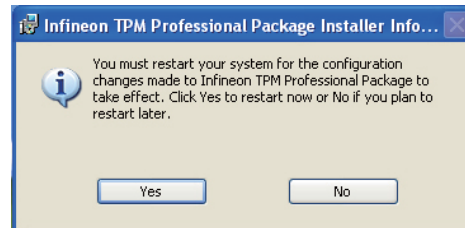
Intel USB 3.0 Drivers (For Windows 7 Only)

To install the driver, click "Intel USB 3.0 Driver" on the main menu.

1. Setup is ready to install the driver. Click Next.
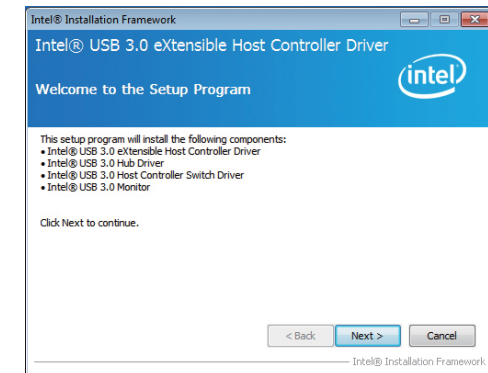
2. Read the license agreement then click Yes.

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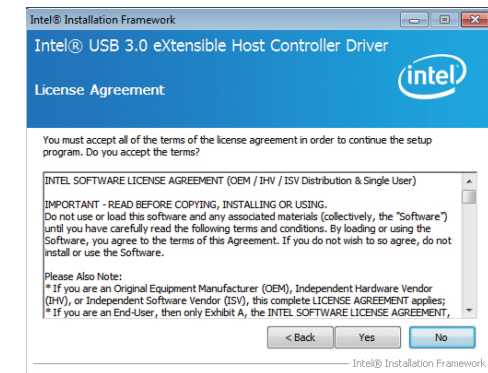
3. Go through the readme docu-
ment for more installation tips
then click Next.
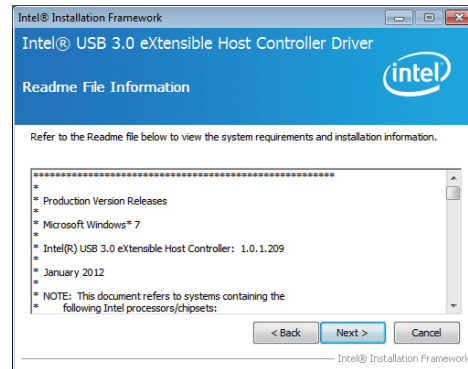
4. Setup is currently installing the
driver. After installation has com-
pleted, click Next.
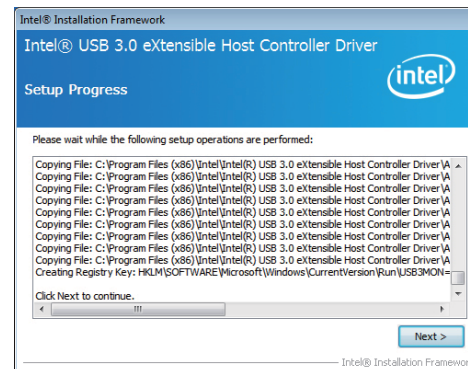
5. After completing installation, click
Finish.

IO Driver Patch (For Windows 7 - 64bit Only)

To install the driver, click "IO Driver Patch" on the main menu.

Note:
When you have problems in using the IO Driver on Windows 7 - 64bit, you need
to follow the setps to install the IO Driver Patch.

1. Click "Yes" to install the driver
update.
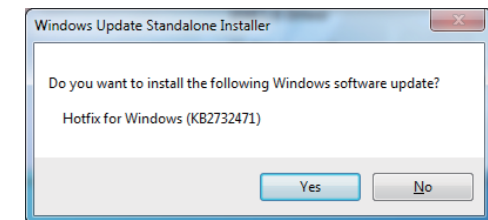
2. After the installation is complete,
click "Close".

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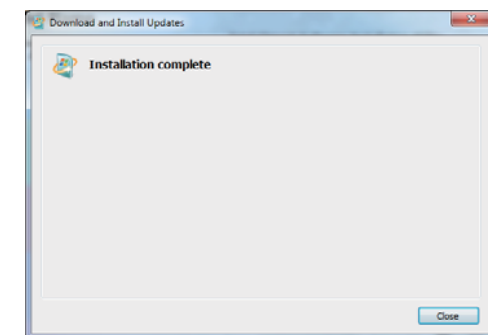
IO Driver

To install the driver, click "IO Driver" on the main menu.

Before you install the IO Driver, read the install message and then click "OK".
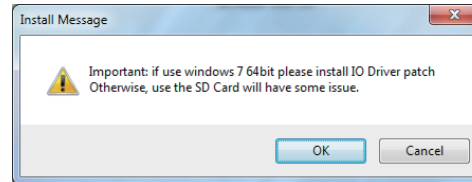
1. The setup program is preparing to install the driver. Click "Next."
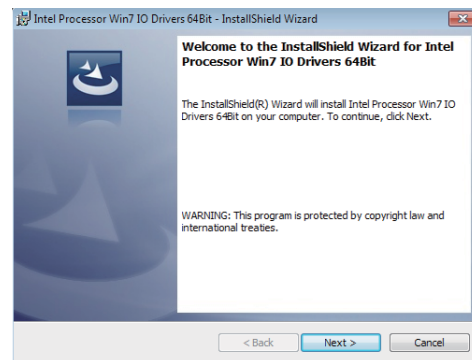
2. Read the license agreement. Click "I accept the terms in the license agreement" and then click "Next".
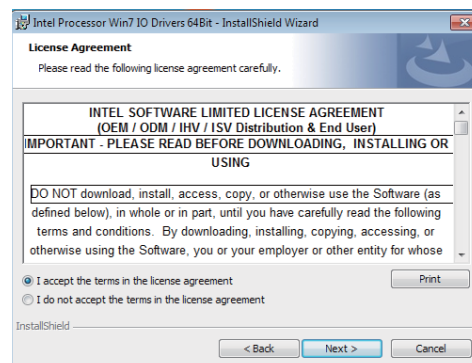
3. Choose the setup type and then click "Next".
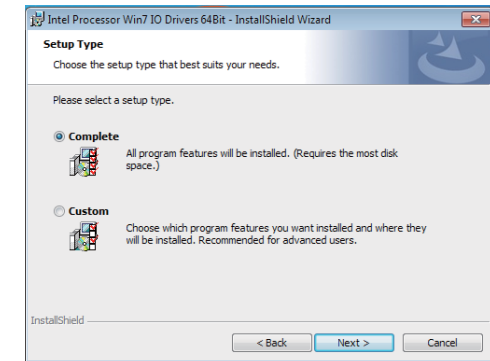
4. Click "Install" to start the installation.
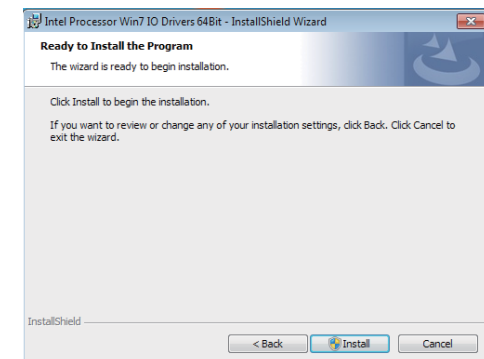
5. A notice for this installation.

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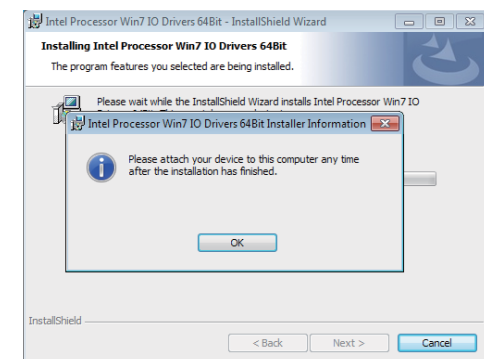
5. The installation has been com-
pleted successfully. Click "Finish"
to exit the wizard.
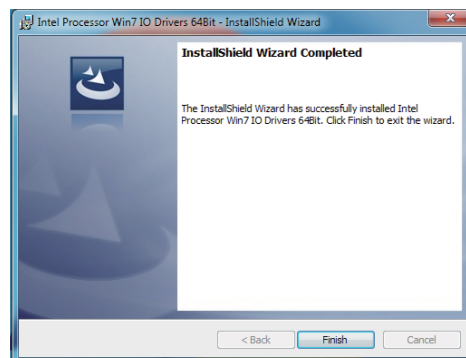
Adobe Acrobat Reader 9.3

To install the reader, click "Adobe Acrobat Reader 9.3" on the main menu.

1. Click Next to install or click
Change Destination Folder to
select another folder.
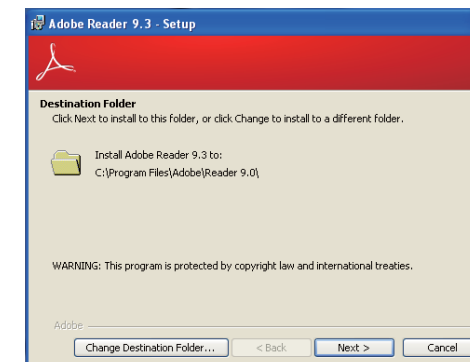
2. Click Install to begin installation.
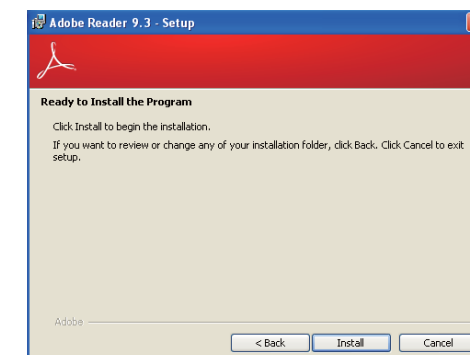
3. Click Finish to exit installation.

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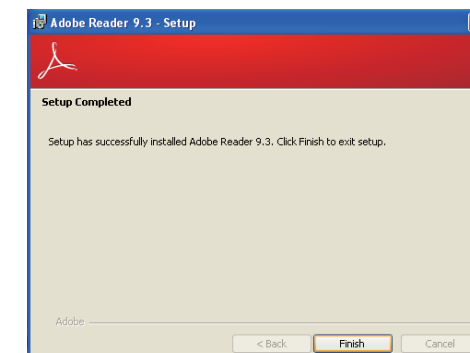
Appendix A - System Error Message

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message, PRESS F1 TO CONTINUE, CTRL-ALT-ESC or DEL TO ENTER SETUP, will be shown in the information box at the bottom. Enter Setup to correct the error.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list indicates the error messages for all Awards BIOSes:

CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.

> **Important:**
> Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

Appendix B - Troubleshooting

Troubleshooting Checklist

This chapter of the manual is designed to help you with problems that you may encounter with your personal computer. To efficiently troubleshoot your system, treat each problem individually. This is to ensure an accurate diagnosis of the problem in case a problem has multiple causes.

Some of the most common things to check when you encounter problems while using your system are listed below.

1. The power switch of each peripheral device is turned on.

2. All cables and power cords are tightly connected.

3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.

4. The monitor is turned on.

5. The display's brightness and contrast controls are adjusted properly.

6. All add-in boards in the expansion slots are seated securely.

7. Any add-in board you have installed is designed for your system and is set up correctly.

Monitor/Display

If the display screen remains dark after the system is turned on:

1. Make sure that the monitor's power switch is on.

2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.

3. Check that the video input cable is properly attached to the monitor and the system's display adapter.

4. Adjust the brightness of the display by turning the monitor's brightness control knob.

The picture seems to be constantly moving.

1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.

2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.

3. Make sure your video card's output frequencies are supported by this monitor.

The screen seems to be constantly wavering.

1. If the monitor is close to another monitor, the adjacent monitor may need to be turned off. Fluorescent lights adjacent to the monitor may also cause screen wavering.

Power Supply

When the computer is turned on, nothing happens.

1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.

2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.

3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

Hard Drive

Hard disk failure.

1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.

2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

Serial Port

The serial device (modem, printer) doesn't output anything or is outputting garbled

characters.

1. Make sure that the serial device's power is turned on and that the device is on-line.

2. Verify that the device is plugged into the correct serial port on the rear of the computer.

3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.

4. Make sure the COM settings and I/O address are configured correctly.

Keyboard

Nothing happens when a key on the keyboard was pressed.

1. Make sure the keyboard is properly connected.

2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

System Board

1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.

2. Check the jumper settings to ensure that the jumpers are properly set.

3. Verify that all memory modules are seated securely into the memory sockets.

4. Make sure the memory modules are in the correct locations.

5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.

6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.