# DFI®

# BT700

## Qseven Board
## User's Manual

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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 reason-able 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 encour-aged 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 compli-ance 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)
- One Heat sink

## Optional Items

- Q7X-151 carrier board kit
- Heat spreader
- Heat spreader with heat sink
- 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<br> - E45: Intel® Atom™ E3845, Quad Core, 2M Cache, 1.91GHz, 10W<br> - E26: Intel® Atom™ E3826, Dual Core, 1M Cache, 1.46GHz, 7W<br> - E15: Intel® Atom™ E3815, Single Core, 0.5M Cache, 1.46GHz, 5W<br>• BGA 1170 packaging technology<br>• 22nm process technology |
|---|---|
| System Memory | • 2GB/4GB DDR3L memory down<br>• Supports DDR3L 1333MHz (-E45)<br>  Supports DDR3L 1066MHz (-E26/-E15)<br>• Supports single channel memory interface |
| Graphics | • Intel® HD Graphics<br>• Supports LVDS and DDI interfaces<br>• LVDS: NXP PTN3460, 24-bit, dual channel, resolution up to 1920x1200 @60Hz<br>• Digital Display Interfaces: HDMI, DVI and DP<br>• HDMI, DVI: resolution up to 1920x1080 @60Hz<br>• DP: resolution up to 2560x1600 @60Hz<br>• 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<br> - Intel® I210IT supports wide temperature (-40°C to 85°C)<br>• Integrated 10/100/1000 transceiver<br>• Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab |
| Serial ATA | • Supports 2 Serial ATA interfaces<br>• SATA 2.0 with data transfer rate up to 3Gb/s<br>• Integrated Advanced Host Controller Interface (AHCI) controller |
| eMMC* (optional) | • Supports 4GB, 8GB, 16GB and 32GB eMMC onboard<br>• Supports Windows 8.1 only |
| SD Interface | • Supports 1 SD interface<br>• 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<br>• 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* (BOM option)<br>• Supports 4 USB 2.0 ports<br>• Supports 3 PCIe x1 (default); or 1 PCIe x4 (PCIe port 3, by default, is shared with the onboard LAN)*<br>• Supports LPC interface<br>• Supports I²C interface<br>• Supports SMBus interface<br>• Suppotrs 1 UART interface (TX/RX/CTS/RTS) |
|---|---|
| Damage Free Intelligence | • Monitors CPU temperature<br>• Monitors system fan speed<br>• Monitors Vcore/VGFX/VSM voltages<br>• Watchdog timer function |
| BIOS | • AMI BIOS<br> - 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)<br>• Windows 7 Ultimate x64 & SP1 (64-bit)<br>• Windows 8 Enterprise x86 (32-bit)<br>• Windows 8 Enterprise x64 (64-bit)<br>• Windows 8.1 Enterprise x86 (32-bit)<br>• Windows 8.1 Enterprise x64 (64-bit) |
| Temperature | • Operating<br> : 0°C to 60°C   - Atom (Fanless)<br> : -20°C to 70°C - Atom (Fanless with air flow)<br> : -40°C to 85°C - Atom (Fanless with air flow)<br>• Storage: -40°C to 85°C |
| Humidity | • 5% to 90% |
| PCB | • Dimensions<br> - Qseven form factor<br> - 70mm (2.76") x 70mm (2.76")<br>• Compliance<br> - Qseven specification revision 2.0 |

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

## Features

### • DDR3L

DDR3L is a higher performance DDR3 SDRAM interface providing less voltage and higher speed successor. DDR3L supporting 1066MHz (-E26/-E15) or 1333MHz (-E45) 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 out-standing graphics responsiveness. These enhancements deliver the performance and compat-ibility needed for today's and tomorrow's business applications. Supports HDMI, DVI and DP 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) - BOM option |
| 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 | 0 | 1 | 1 | 1 |
| I²C 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
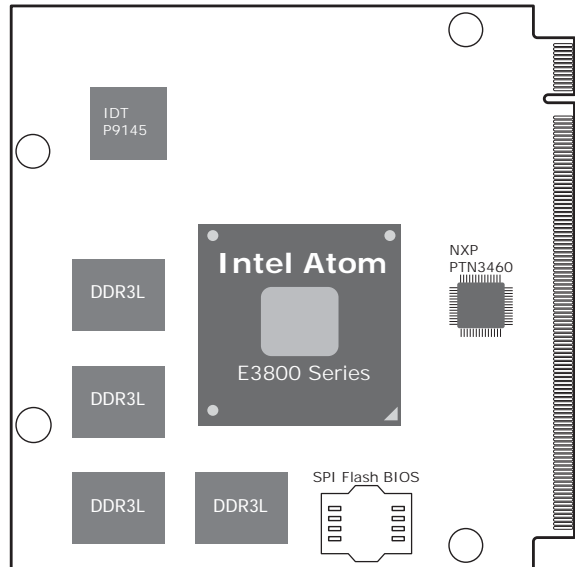


Top View
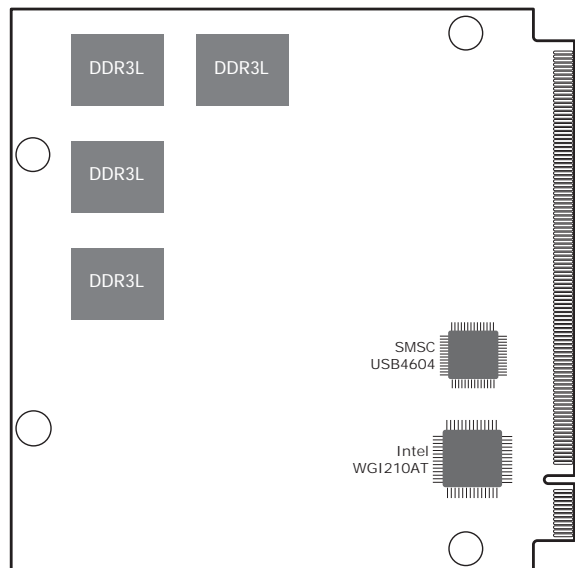
Bottom View

## Block Diagram
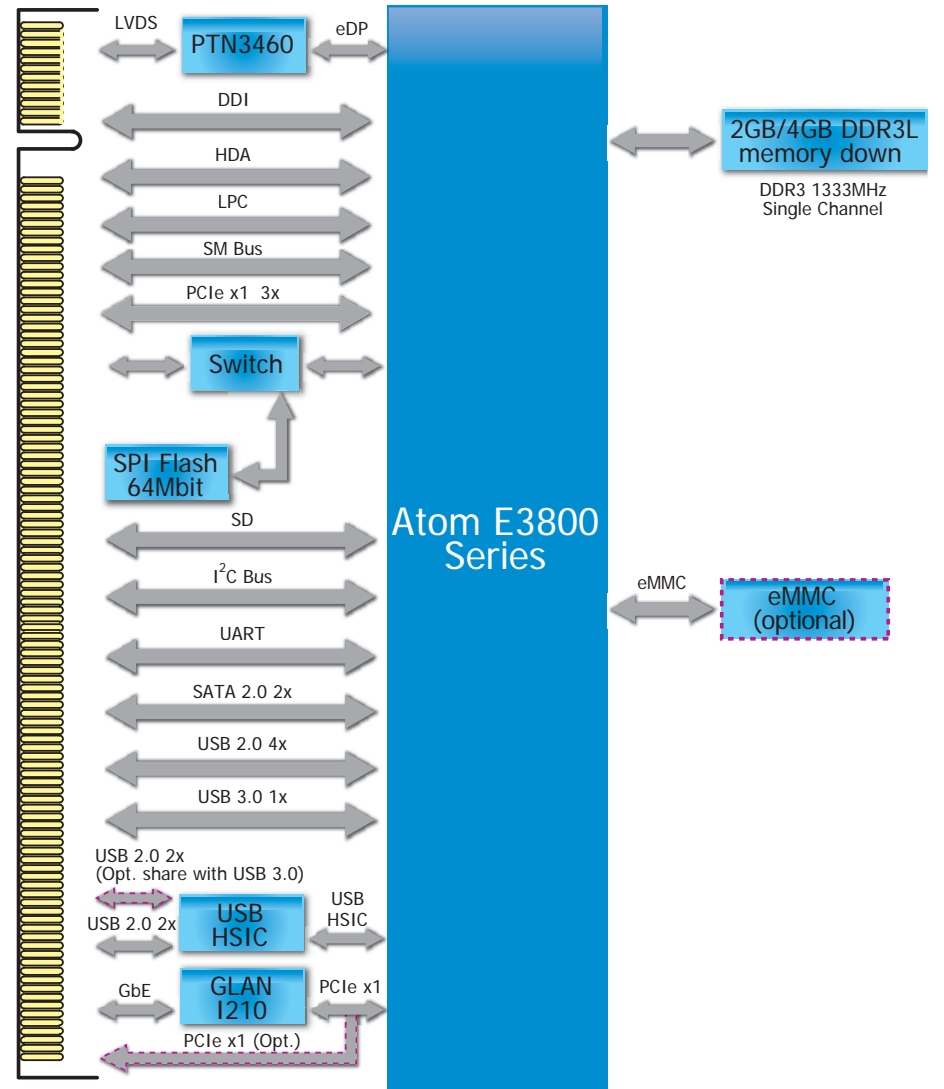
# Mechanical Diagram

**BT700 Module with thermal solution**

20.00

64.90

70.00

Heatsink

Module PCB

20.00

14.00

6.00

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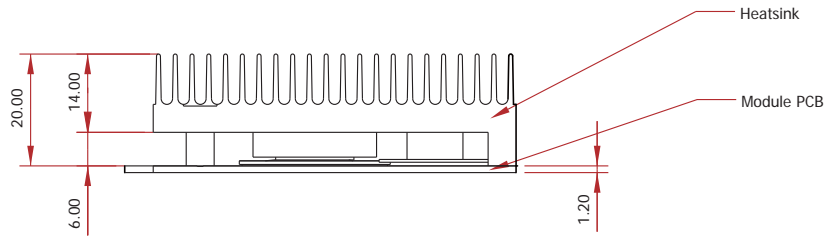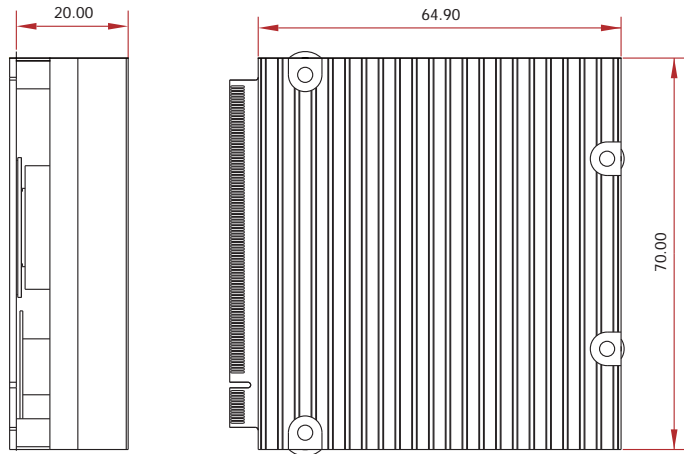
**Side View of the Module with thermal solution and Carrier Board**

**BT700 Module**
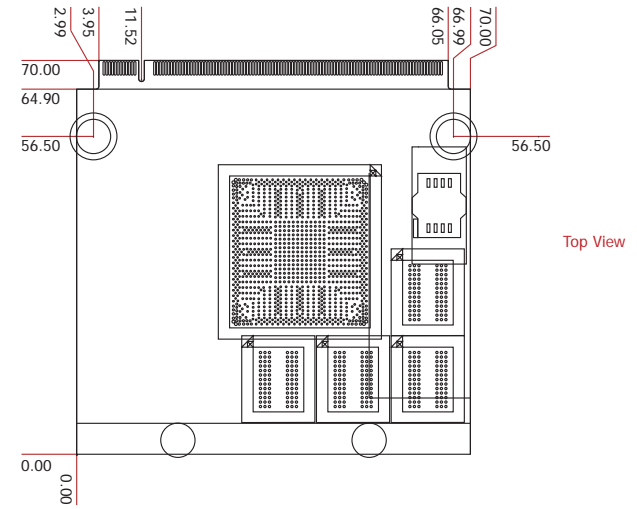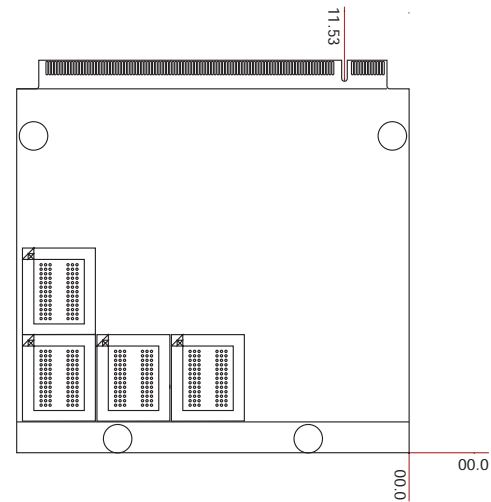
2.99
3.95
11.52
66.05
66.99
70.00

70.00
64.90
56.50
56.50

0.00
0.00

Top View

11.53

Bottom View

00.0
00.0

**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.

# 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 ——
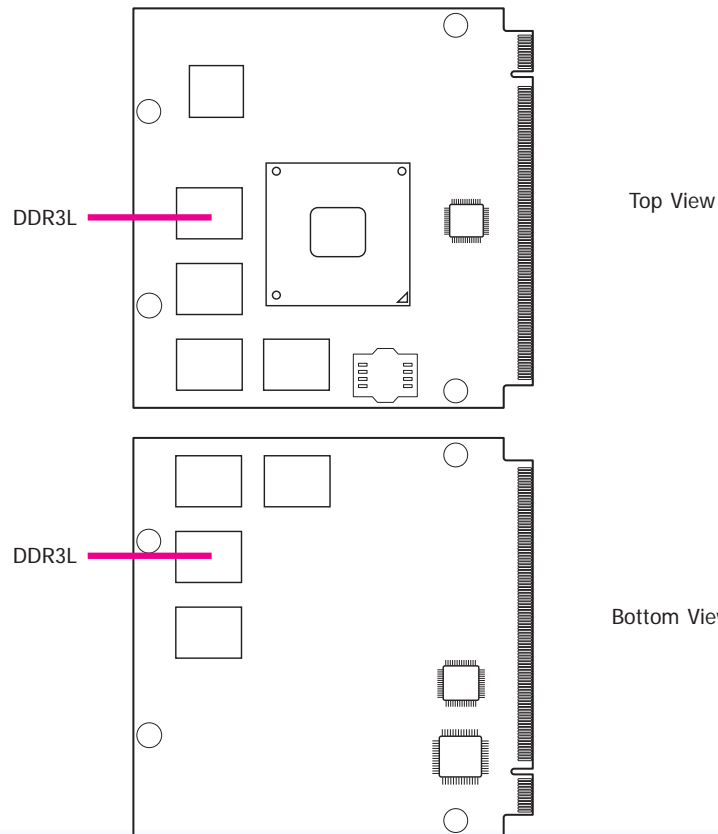
Bottom View

# Cooling Option

## Heat Spreader with Heat Sink



Top View of the Heat Sink
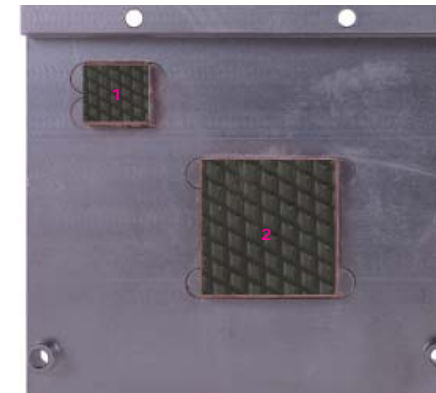


Bottom View of the Heat Sink

• "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.

10

# MXM Connector
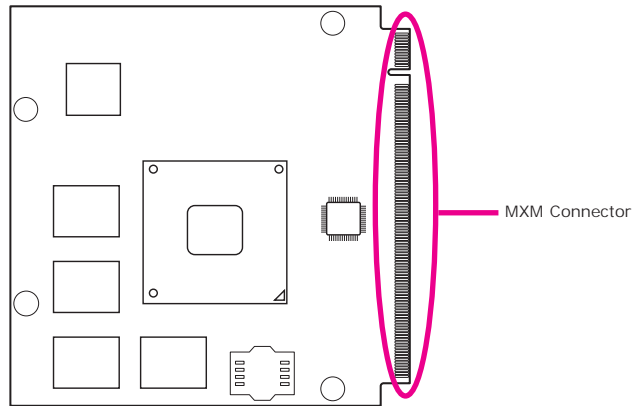


MXM Connector

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 | Pin | Q7 R2.0 Signal | BT700 Signal | Pin | Q7 R2.0 Signal | BT700 Signal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | GND | GND | 2 | GND | GND | 117 | GND | GND | 118 | GND | GND |
| 3 | GBE_MDI3- | GBE_MDI3- | 4 | GBE_MDI2- | GBE_MDI2- | 119 | eDP0_AUX+ / LVDS_A_CLK+ | LVDS_A_CLK+ | 120 | eDP1_AUX+ / LVDS_B_CLK+ | LVDS_B_CLK+ |
| 5 | GBE_MDI3+ | GBE_MDI3+ | 6 | GBE_MDI2+ | GBE_MDI2+ | 121 | eDP0_AUX- / LVDS_A_CLK- | LVDS_A_CLK- | 122 | eDP1_AUX- / LVDS_B_CLK- | LVDS_B_CLK- |
| 7 | GBE_LINK100# | GBE_LINK100# | 8 | GBE_LINK1000# | GBE_LINK1000# | 123 | LVDS_BLT_CTRL /GP_PWM_OUT0 | LVDS_BLT_CTRL | 124 | GP_1-Wire_Bus | GP_1-Wire_Bus |
| 9 | GBE_MDI1- | GBE_MDI1- | 10 | GBE_MDI0- | GBE_MDI0- | 125 | GP2_I2C_DAT / LVDS_DID_DAT | LVDS_DID_DAT | 126 | eDP0_HPD# / LVDS_BLC_DAT | NC |
| 11 | GBE_MDI1+ | GBE_MDI1+ | 12 | GBE_MDI0+ | GBE_MDI0+ | 127 | GP2_I2C_CLK / LVDS_DID_CLK | LVDS_DID_CLK | 128 | eDP1_HPD# / LVDS_BLC_CLK | NC |
| 13 | GBE_LINK# | NC | 14 | GBE_ACT# | GBE_ACT# | 129 | CAN0_TX | NC | 130 | CAN0_RX | NC |
| 15 | GBE_CTREF | NC | 16 | SUS_S5# | SUS_S4# | 131 | DP_LANE3+ / TMDS_CLK+ | DP_LANE3+ | 132 | RSVD (Differential Pair) | NC |
| 17 | WAKE# | WAKE# | 18 | SUS_S3# | SUS_S3# | 133 | DP_LANE3- / TMDS_CLK- | DP_LANE3- | 134 | RSVD (Differential Pair) | NC |
| 19 | SUS_STAT# | SUS_STAT# | 20 | PWRBTN# | PWRBTN# | 135 | GND | GND | 136 | GND | GND |
| 21 | SLP_BTN# | SLP_BTN# | 22 | LID_BTN# | LID_BTN# | 137 | DP_LANE1+ / TMDS_LANE1+ | DP_LANE1+ | 138 | DP_AUX+ | DP_AUX+ |
| 23 | GND | GND | 24 | GND | GND | 139 | DP_LANE1- / TMDS_LANE1- | DP_LANE1- | 140 | DP_AUX- | DP_AUX- |
|  | KEY | KEY |  | KEY | KEY | 141 | GND | GND | 142 | GND | GND |
| 25 | GND | GND | 26 | PWGIN | PWGIN | 143 | DP_LANE2+ / TMDS_LANE0+ | DP_LANE2+ | 144 | RSVD (Differential Pair) | NC |
| 27 | BATLOW# | BATLOW# | 28 | RSTBTN# | RSTBTN# | 145 | DP_LANE2- / TMDS_LANE0- | DP_LANE2- | 146 | RSVD (Differential Pair) | NC |
| 29 | SATA0_TX+ | SATA0_TX+ | 30 | SATA1_TX+ | SATA1_TX+ | 147 | GND | GND | 148 | GND | GND |
| 31 | SATA0_TX- | SATA0_TX- | 32 | SATA1_TX- | SATA1_TX- | 149 | DP_LANE0+ / TMDS_LANE2+ | DP_LANE0+ | 150 | HDMI_CTRL_DAT | HDMI_CTRL_DAT |
| 33 | SATA_ACT# | SATA_ACT# | 34 | GND | GND | 151 | DP_LANE0- / TMDS_LANE2- | DP_LANE0- | 152 | HDMI_CTRL_CLK | HDMI_CTRL_CLK |
| 35 | SATA0_RX+ | SATA0_RX+ | 36 | SATA1_RX+ | SATA1_RX+ | 153 | DP_HDMI_HPD# | DP_HDMI_HPD# | 154 | RSVD | NC |
| 37 | SATA0_RX- | SATA0_RX- | 38 | SATA1_RX- | SATA1_RX- | 155 | PCIE_CLK_REF+ | PCIE_CLK_REF+ | 156 | PCIE_WAKE# | PCIE_WAKE# |
| 39 | GND | GND | 40 | GND | GND | 157 | PCIE_CLK_REF- | PCIE_CLK_REF- | 158 | PCIE_RST# | PCIE_RST# |
| 41 | BIOS_DISABLE# / BOOT_ALT# | BIOS_DISABLE# | 42 | SDIO_CLK# | SDIO_CLK# | 159 | GND | GND | 160 | GND | GND |
| 43 | SDIO_CD# | SDIO_CD# | 44 | SDIO_LED | NC | 161 | PCIE3_TX+ | NC | 162 | PCIE3_RX+ | NC |
| 45 | SDIO_CMD | SDIO_CMD | 46 | SDIO_WP | SDIO_WP | 163 | PCIE3_TX- | NC | 164 | PCIE3_RX- | NC |
| 47 | SDIO_PWR# | SDIO_PWR# | 48 | SDIO_DAT1 | SDIO_DAT1 | 165 | GND | GND | 166 | GND | GND |
| 49 | SDIO_DAT0 | SDIO_DAT0 | 50 | SDIO_DAT3 | SDIO_DAT3 | 167 | PCIE2_TX+ | PCIE2_TX+ | 168 | PCIE2_RX+ | PCIE2_RX+ |
| 51 | SDIO_DAT2 | SDIO_DAT2 | 52 | SDIO_DAT5 | NC | 169 | PCIE2_TX- | PCIE2_TX- | 170 | PCIE2_RX- | PCIE2_RX- |
| 53 | SDIO_DAT4 | NC | 54 | SDIO_DAT7 | NC | 171 | UART0_TX | UART0_TX | 172 | UART0_RTS# | UART0_RTS# |
| 55 | SDIO_DAT6 | NC | 56 | RSVD | NC | 173 | PCIE1_TX+ | PCIE1_TX+ | 174 | PCIE1_RX+ | PCIE1_RX+ |
| 57 | GND | GND | 58 | GND | GND | 175 | PCIE1_TX- | PCIE1_TX- | 176 | PCIE1_RX- | PCIE1_RX- |
| 59 | HDA_SYNC / I2S_WS | HDA_SYNC | 60 | SMB_CLK / GP1_I2C_CLK | SMB_CLK | 177 | UART0_RX | UART0_RX | 178 | UART0_CTS# | UART0_CTS# |
| 61 | HDA_RST# / I2S_RST# | HDA_RST# | 62 | SMB_DAT / GP1_I2C_DAT | SMB_DAT | 179 | PCIE0_TX+ | PCIE0_TX+ | 180 | PCIE0_RX+ | PCIE0_RX+ |
| 63 | HDA_BITCLK / I2S_CLK | HDA_BITCLK | 64 | SMB_ALERT# | SMB_ALERT# | 181 | PCIE0_TX- | PCIE0_TX- | 182 | PCIE0_RX- | PCIE0_RX- |
| 65 | HDA_SDI / I2S_SDI | HDA_SDI | 66 | GP0_I2C_CLK | GP0_I2C_CLK | 183 | GND | GND | 184 | GND | GND |
| 67 | HDA_SDO / I2S_SDO | HDA_SDO | 68 | GP0_I2C_DAT | GP0_I2C_DAT | 185 | LPC_AD0 / GPIO0 | LPC_AD0 | 186 | LPC_AD1 / GPIO1 | LPC_AD1 |
| 69 | THRM# | THRM# | 70 | WDTRIG# | WDTRIG# | 187 | LPC_AD2 / GPIO2 | LPC_AD2 | 188 | LPC_AD3 / GPIO3 | LPC_AD3 |
| 71 | THRMTRIP# | THRMTRIP# | 72 | WDOUT | WDOUT | 189 | LPC_CLK / GPIO4 | LPC_CLK | 190 | LPC_FRAME# / GPIO5 | LPC_FRAME# |
| 73 | GND | GND | 74 | GND | GND | 191 | SERIRQ / GPIO6 | SERIRQ | 192 | LPC_LDRQ# / GPIO7 | NC |
| 75 | USB_P7- / USB_SSTX0- | USB_SSTX0- | 76 | USB_P6- / USB_SSRX0- | USB_SSRX0- | 193 | VCC_RTC | VCC_RTC | 194 | SPKR / GP_PWM_OUT2 | SPKR |
| 77 | USB_P7+ / USB_SSTX0+ | USB_SSTX0+ | 78 | USB_P6+ / USB_SSRX0+ | USB_SSRX0+ | 195 | FAN_TACHOIN / GP_TIMER_IN | FAN_TACHOIN | 196 | FAN_PWMOUT / GP_PWM_OUT1 | FAN_PWMOUT |
| 79 | USB_6_7_OC# | USB_6_7_OC# | 80 | USB_4_5_OC# | USB_4_5_OC# | 197 | GND | GND | 198 | GND | GND |
| 81 | USB_P5- / USB_SSTX1- | USB_P5- | 82 | USB_P4- / USB_SSRX1- | USB_P4- | 199 | SPI_MOSI | SPI_MOSI | 200 | SPI_CS0# | SPI_CS0# |
| 83 | USB_P5+ / USB_SSTX1+ | USB_P5+ | 84 | USB_P4+ / USB_SSRX1+ | USB_P4+ | 201 | SPI_MISO | SPI_MISO | 202 | SPI_CS1# | NC |
| 85 | USB_2_3_OC# | USB_2_3_OC# | 86 | USB_0_1_OC# | USB_0_1_OC# | 203 | SPI_SCK | SPI_SCK | 204 | MFG_NC4 | NC |
| 87 | USB_P3- | USB_P3- | 88 | USB_P2- | USB_P2- | 205 | VCC_5V_SB | VCC_5V_SB | 206 | VCC_5V_SB | VCC_5V_SB |
| 89 | USB_P3+ | USB_P3+ | 90 | USB_P2+ | USB_P2+ | 207 | MFG_NC0 | NC | 208 | MFG_NC2 | UART1_RX |
| 91 | USB_CC | NC | 92 | USB_ID | NC | 209 | MFG_NC1 | UART1_TX | 210 | MFG_NC3 | NC |
| 93 | USB_P1- | USB_P1- | 94 | USB_P0- | USB_P0- | 211 | VCC | VCC | 212 | VCC | VCC |
| 95 | USB_P1+ | USB_P1+ | 96 | USB_P0+ | USB_P0+ | 213 | VCC | VCC | 214 | VCC | VCC |
| 97 | GND | GND | 98 | GND | GND | 215 | VCC | VCC | 216 | VCC | VCC |
| 99 | eDP0_TX0+ / LVDS_A0+ | LVDS_A0+ | 100 | eDP1_TX0+ / LVDS_B0+ | LVDS_B0+ | 217 | VCC | VCC | 218 | VCC | VCC |
| 101 | eDP0_TX0- / LVDS_A0- | LVDS_A0- | 102 | eDP1_TX0- / LVDS_B0- | LVDS_B0- | 219 | VCC | VCC | 220 | VCC | VCC |
| 103 | eDP0_TX1+ / LVDS_A1+ | LVDS_A1+ | 104 | eDP1_TX1+ / LVDS_B1+ | LVDS_B1+ | 221 | VCC | VCC | 222 | VCC | VCC |
| 105 | eDP0_TX1- / LVDS_A1- | LVDS_A1- | 106 | eDP1_TX1- / LVDS_B1- | LVDS_B1- | 223 | VCC | VCC | 224 | VCC | VCC |
| 107 | eDP0_TX2+ / LVDS_A2+ | LVDS_A2+ | 108 | eDP1_TX2+ / LVDS_B2+ | LVDS_B2+ | 225 | VCC | VCC | 226 | VCC | VCC |
| 109 | eDP0_TX2- / LVDS_A2- | LVDS_A2- | 110 | eDP1_TX2- / LVDS_B2- | LVDS_B2- | 227 | VCC | VCC | 228 | VCC | VCC |
| 111 | LVDS_PPEN | LVDS_PPEN | 112 | LVDS_BLEN | LVDS_BLEN | 229 | VCC | VCC | 230 | VCC | VCC |
| 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- |  |  |  |  |  |  |

# 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.<br>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.<br>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. |
| USB_P4- USB_SSRX1- | 82 | | | | | Multiplexed with receive signal differential pairs for the Superspeed USB data path. |
| 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. |
| USB_P5- USB_SSTX1- | 81 | | | | | Multiplexed with transmit signal differential pairs for the Superspeed USB data path. |
| USB_P6+ USB_SSRX0+ | 78 | I/O USB I USB | USB | | | Universal Serial Bus Port 6 differential pair. |
| USB_P6- USB_SSRX0- | 76 | | | | Connect Common Choke in series and ESD suppressors to GND to USB connector(This Port is BOM Option with USB_P6 / USB_P7) | Multiplexed with receive signal differential pairs for the Superspeed USB data path. |
| USB_P7+ USB_SSTX0+ | 77 | I/O USB O USB | USB | AC Coupling capacitor | | Universal Serial Bus Port 7 differential pair. |
| USB_P7- USB_SSTX0- | 75 | | | AC Coupling capacitor | | Multiplexed with transmit signal differential pairs for the Superspeed USB data path. |
| 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 $I^2C$ 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 $I^2C$ 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. |

**LPC Interface Signals**

| Signal | Pin# | Pin Type | Pwr Rail /Tolerance | BT700 | Carrier Board | Description |
|---|---|---|---|---|---|---|
| LPC_AD[0..3]<br>GPIO[0..3] | 185-188 | I/O CMOS | 3.3V/3.3V | | Connect to LPC device | Multiplexed Command, Address and Data.<br>General purpose input/output [0..3] |
| LPC_FRAME#<br>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.<br>General purpose input/output 5. |
| LPC_LDRQ#<br>GPIO7 | 192 | I/O CMOS | 3.3V/3.3V | NC | | LPC DMA request.<br>General purpose input/output 7. |
| LPC_CLK<br>GPIO4 | 189 | I/O CMOS | 3.3V/3.3V | | Connect to LPC device | LPC clock.<br>General purpose input/output 4. |
| SERIRQ<br>GPIO6 | 191 | I/O CMOS | 3.3V/3.3V | | Connect to LPC device | Serialized Interrupt.<br>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.<br>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.<br>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<br>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.<br>Multiplexed with General Purpose I²C bus #1 clock line. |
| SMB_DAT<br>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.<br>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.<br>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.<br>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.<br>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.<br> 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.<br>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.<br>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 ).<br>When MFG_NC4 is high active it is being used for JTAG purposes.<br>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.<br>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
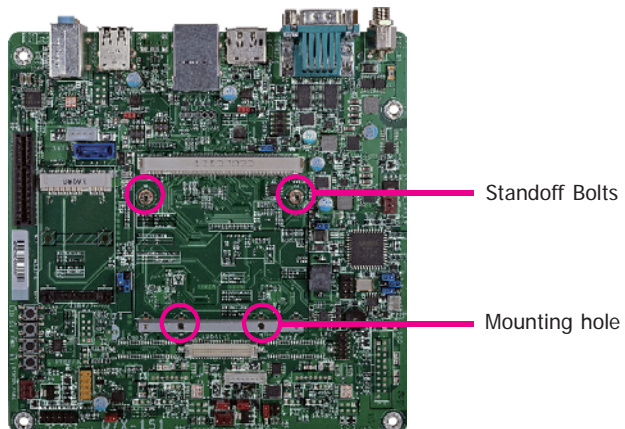
Mounting hole

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
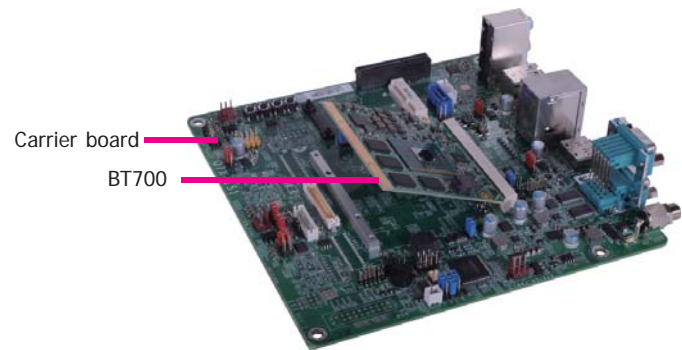
BT700

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

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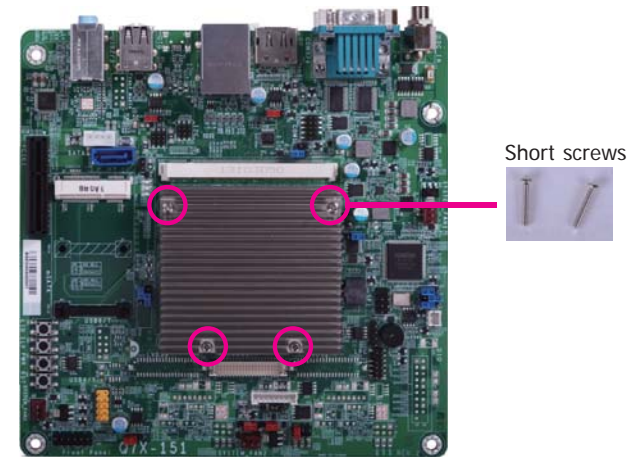
# Chapter 3 - BIOS Setup

## 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 keyboard 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

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```

## 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.

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## 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.
```
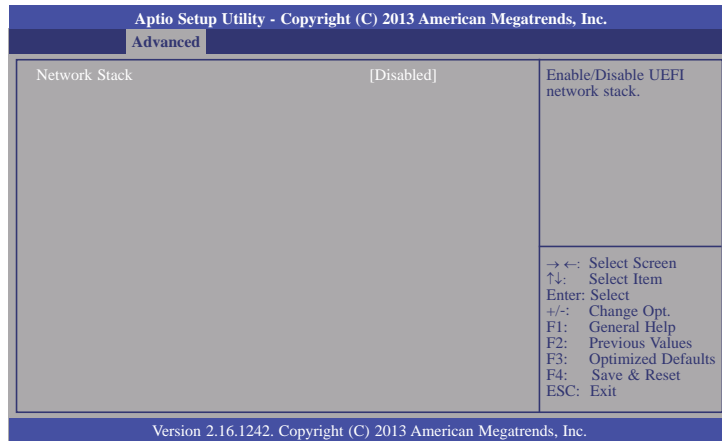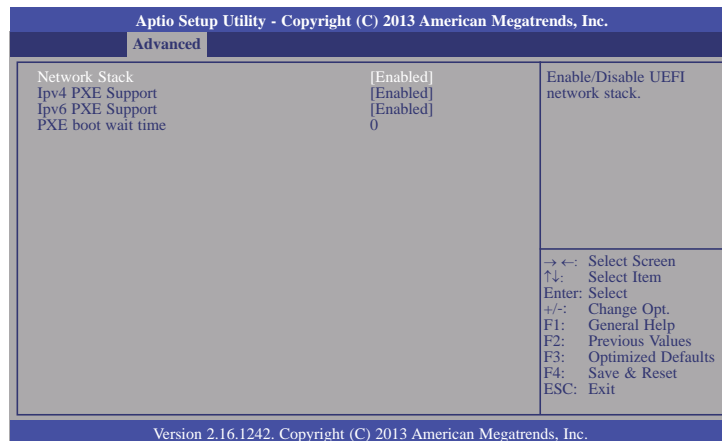
When Network Stack is set to enabled, it will display the following information:

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

Network Stack                        [Enabled]           Enable/Disable UEFI
Ipv4 PXE Support                     [Enabled]           network stack.
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.
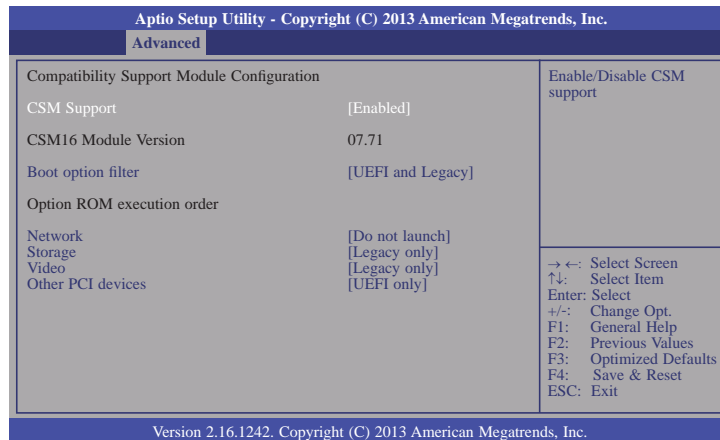
### Ipv6 PXE Support

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.

## 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

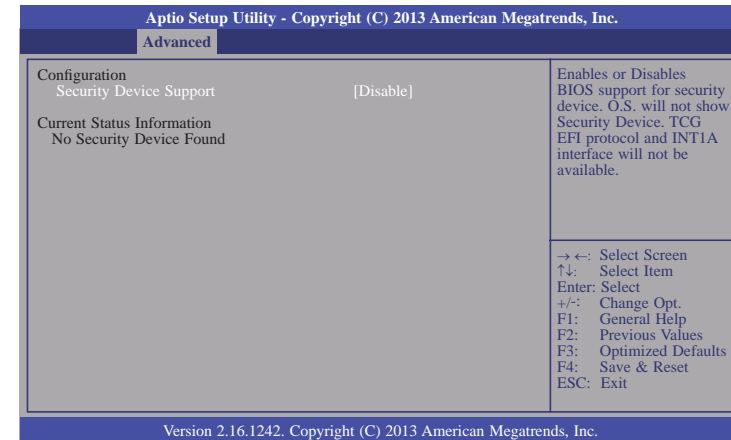This field controls the execution of UEFI and Legacy Storage OpROM.

### 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.
```
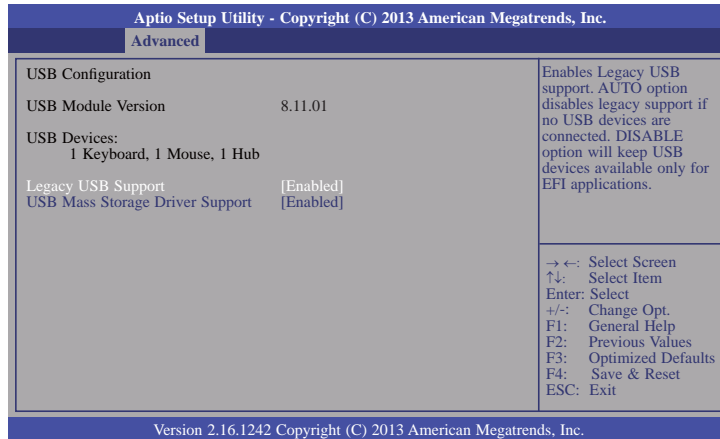
### Security Device Support

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.

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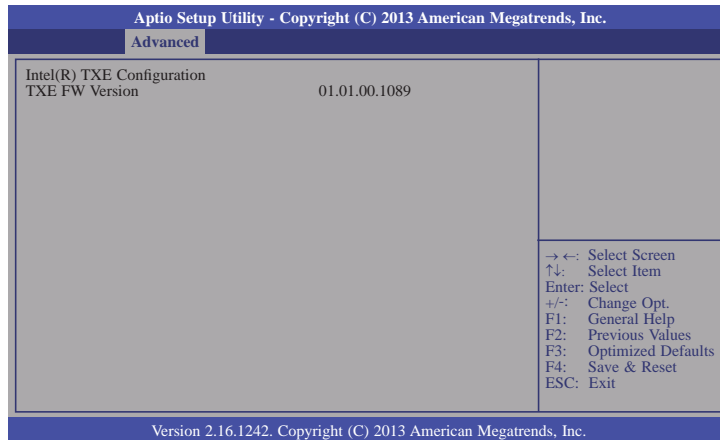
## Intel(R) I210 Gigabit Network Connection - 00:A0:C9:00:...

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.

26

### 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.
```
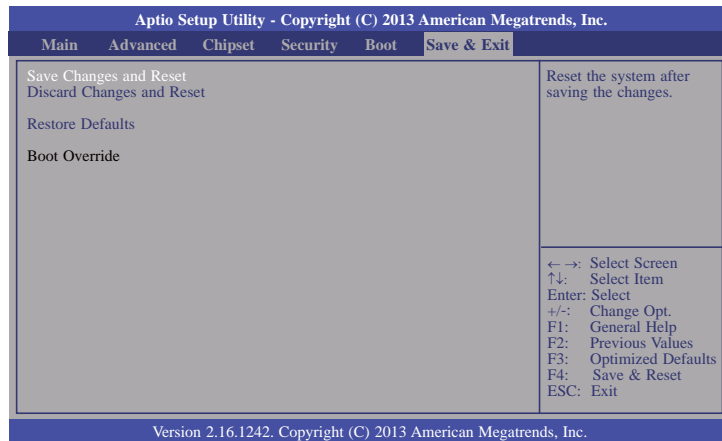
27
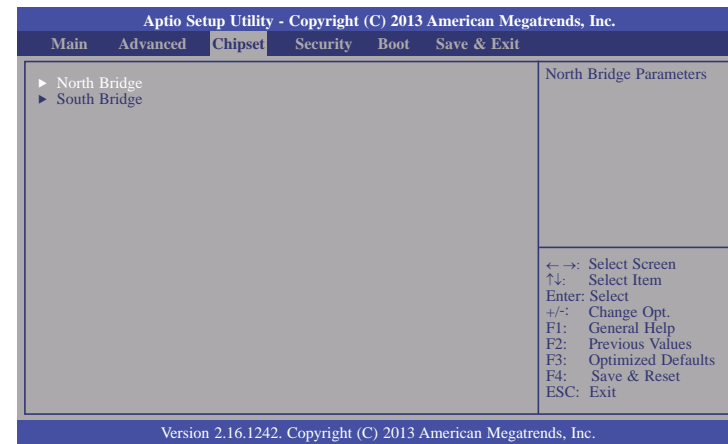
## North Bridge

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 │
                         └─────────────────────────┘

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

### 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.
```
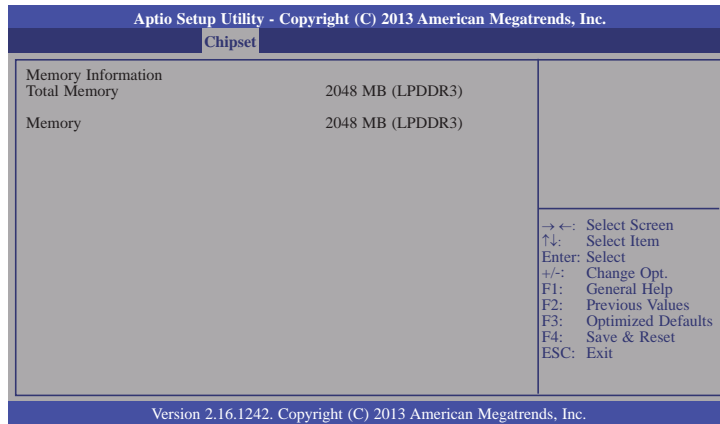
## South Bridge

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

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

### 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.

**Administrator Password**

Set the administrator password.

**User Password**

Set the user password.

# Boot



Aptio Setup Utility - 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.

# 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

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

### 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.

# 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





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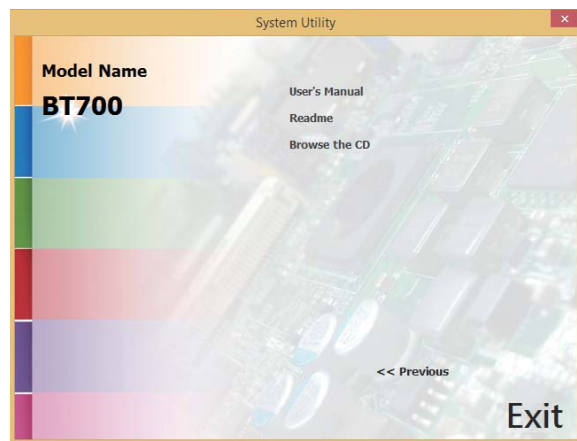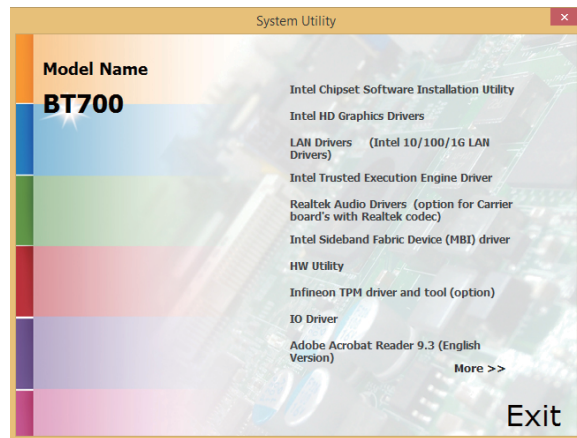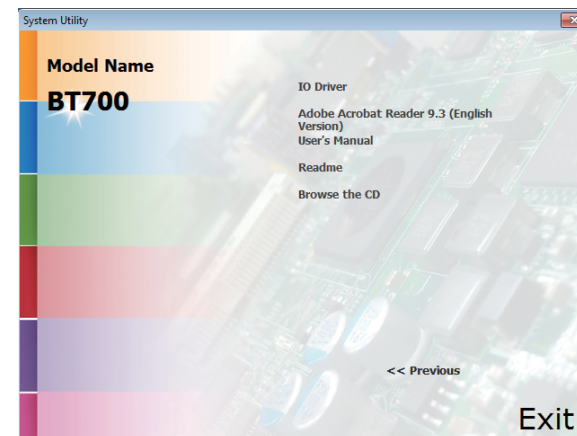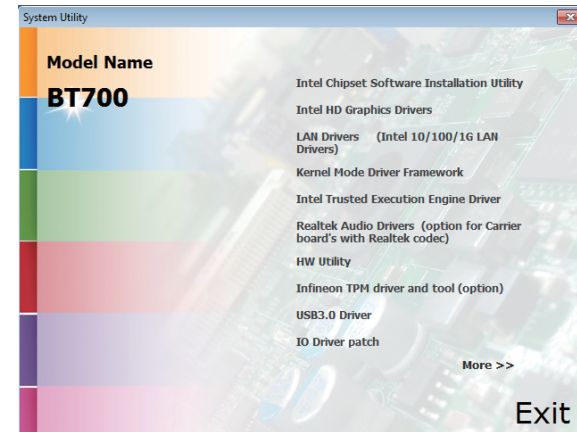
## Intel Chipset Software Installation Utility

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.
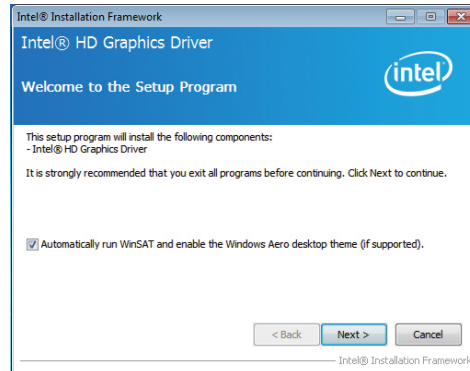
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/ Windows 8 desktop appears. The "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.
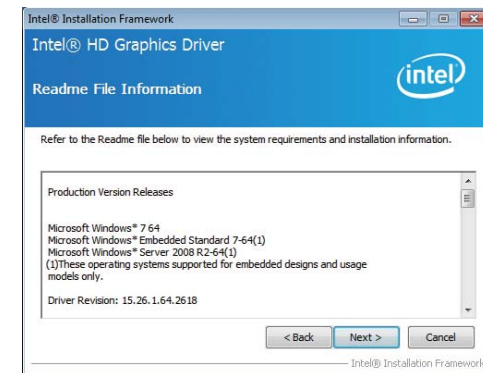
4. Setup is now installing the driver. Click Next to continue.
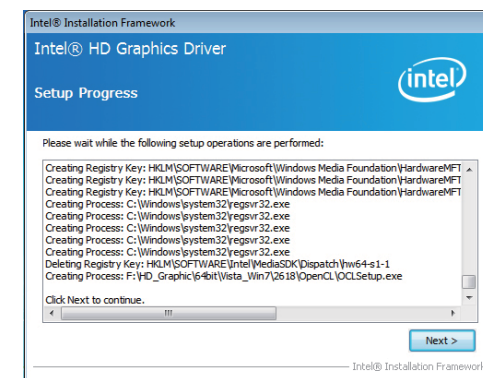
5. Click "Yes, I want to restart this computer now" then click Finish.

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

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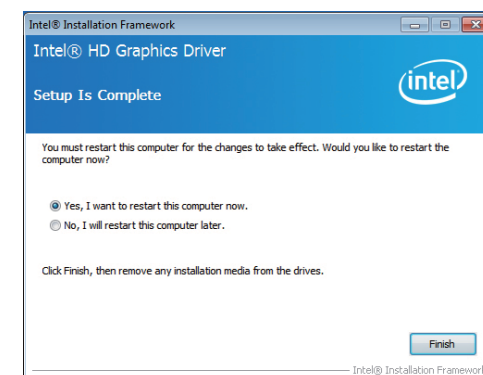
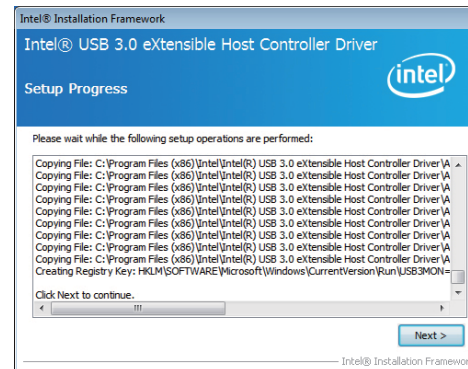## Intel LAN Drivers

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".
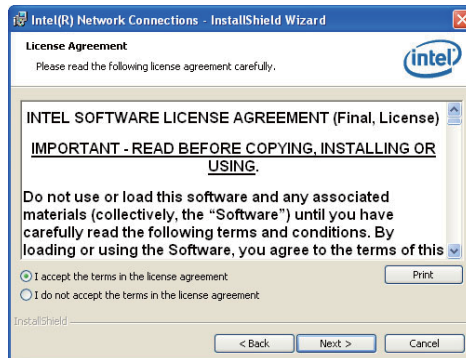
3. Select the program featuers you want installed then click Next.
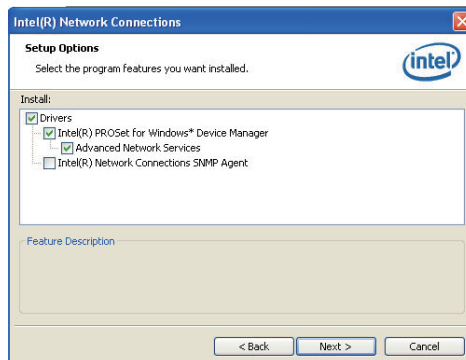
4. Click Install to begin the installation.

5. After completing installation, click Finish.

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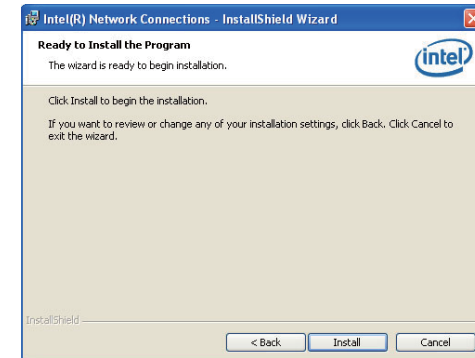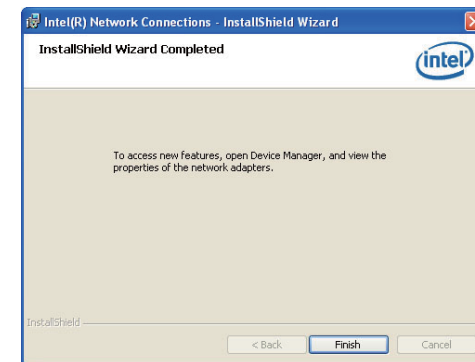
## Kernel Mode Driver Framework (For Windows 7 only)

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

1. Click "Yes" to install the update.
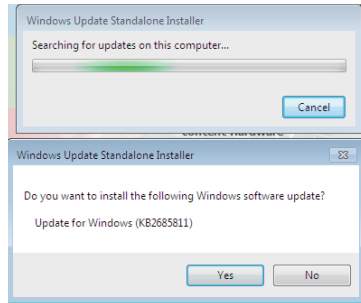


2. The update is installed now.
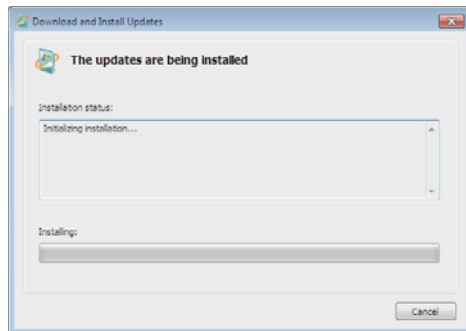


3. Click "Restart Now" to restart your computer when the installation is complete.
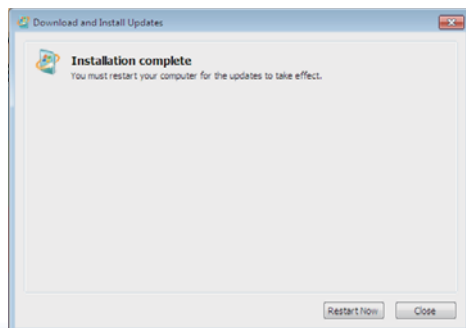


## Intel Trusted Execution Engine Driver

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."
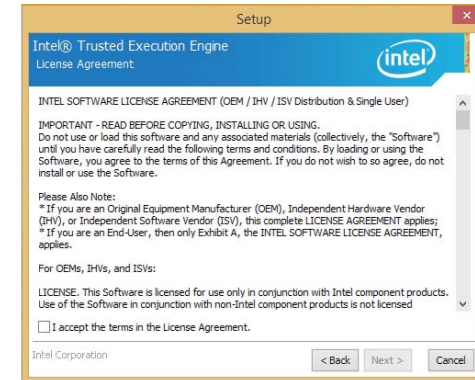


2. The step shows the components which will be installed. Then, Click Next.



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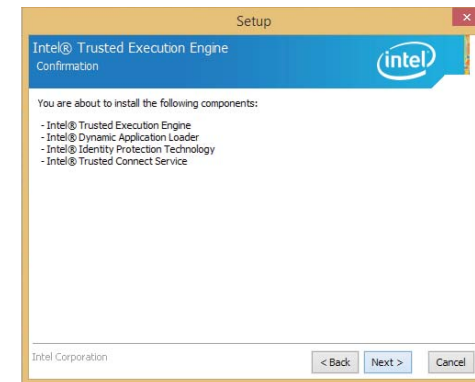
3. The step displays the installing status in the progress.
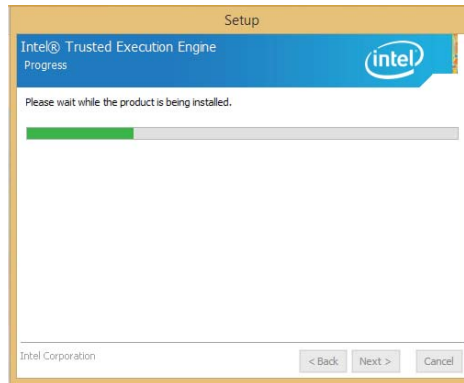


4. Click "Finish" when the installation is complete.
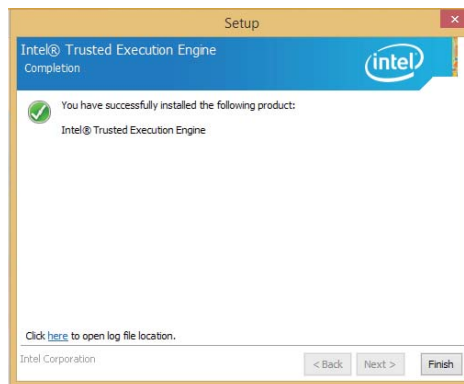


## Realtek Audio Drivers

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.



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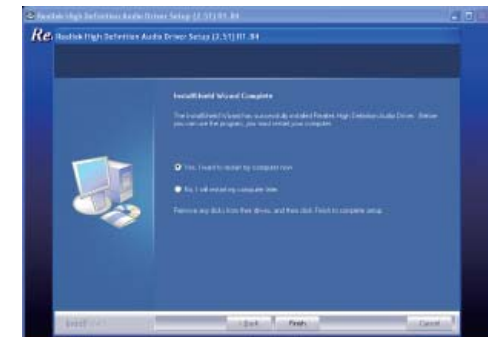
## Intel Sideband Fabric Device (MBI) Driver
## (For Windows 8 only)

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.
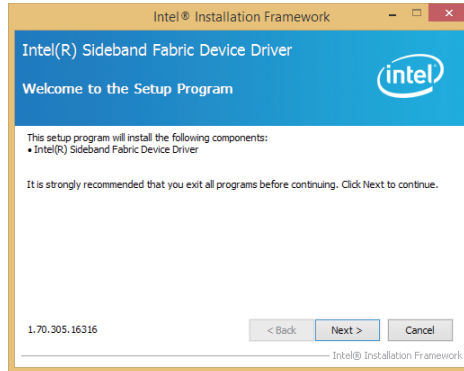


2. Click "Yes" to accept the License Agreement.
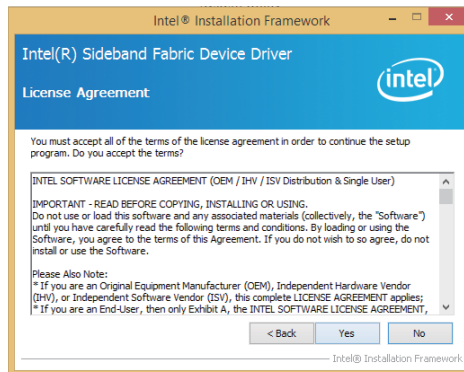


3. The step performs setup operations. Click "Next" to continue.
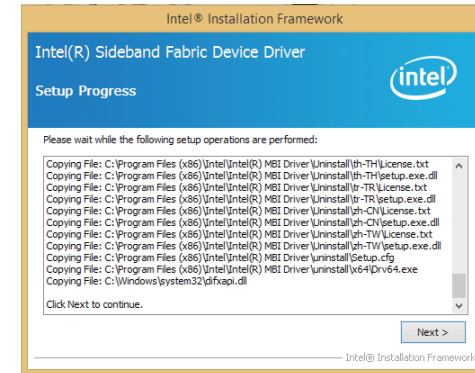


4. Click "Finish" to restart the computer when the setup is completely installed.



41
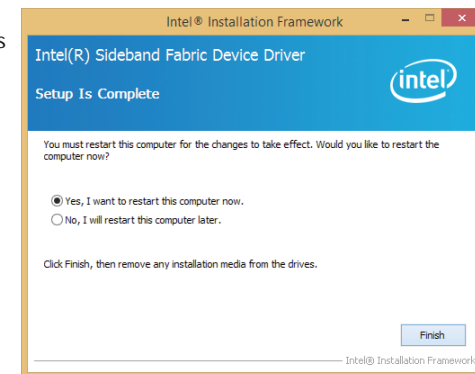
## DFI Utility

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.
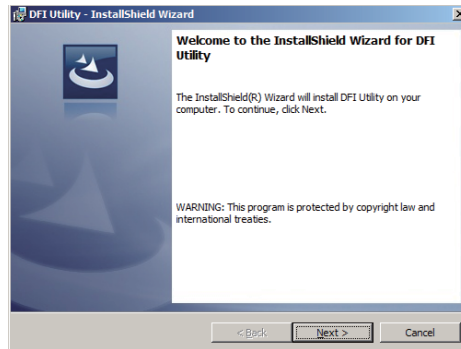


2. Click "I accept the terms in the license agreement" and then click Next.
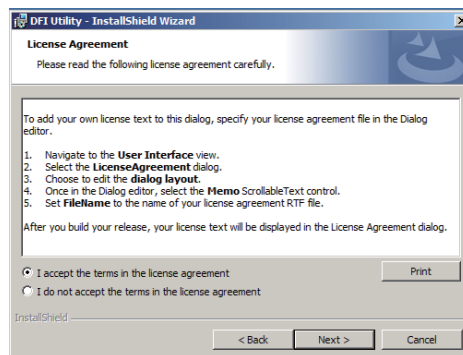


3. Click Install to begin the installation.
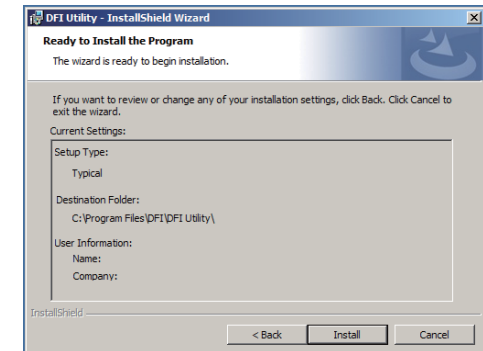


4. After completing installation, click Finish.



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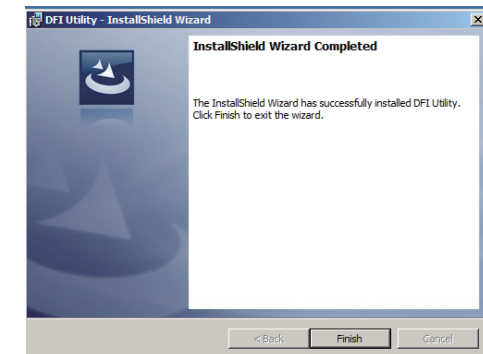
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.
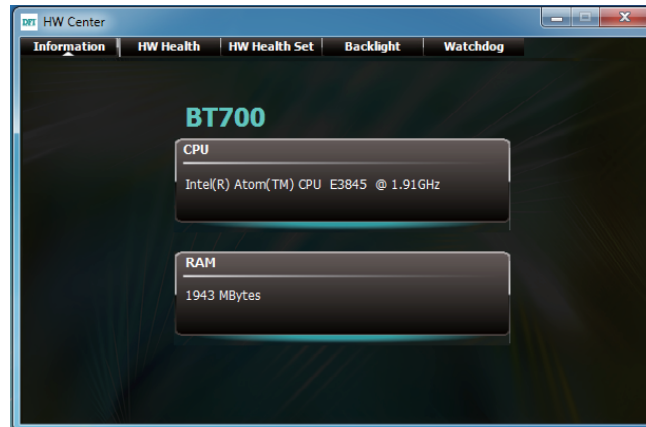


Information
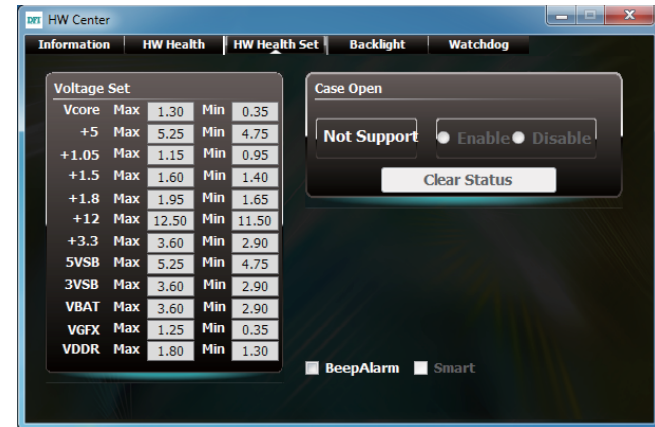


HW Health Set



HW Health



Backlight

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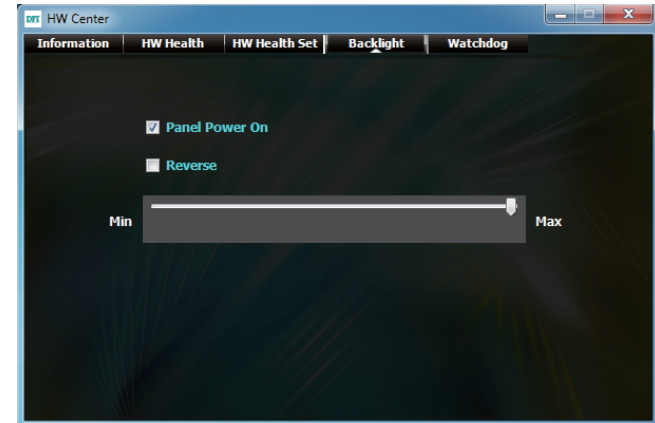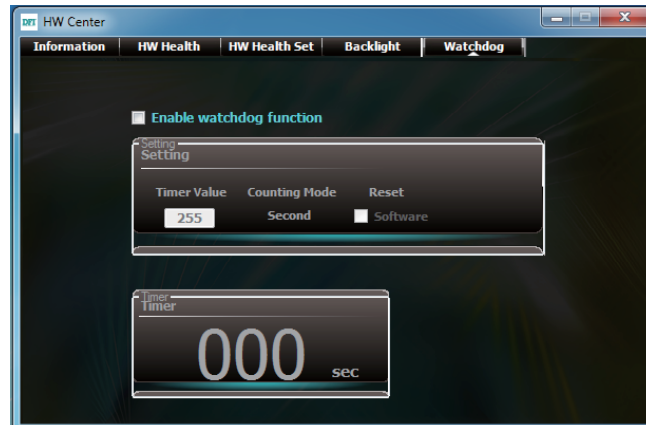
WatchDog

## 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.
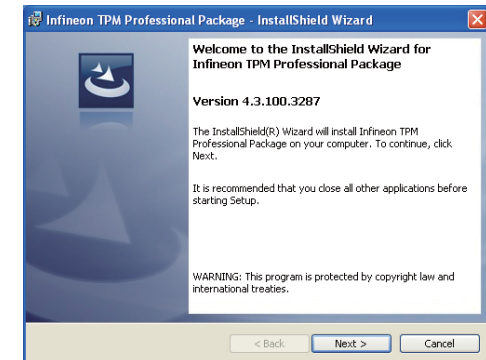
3. Click "I accept the terms in the license agreement" and then click "Next".
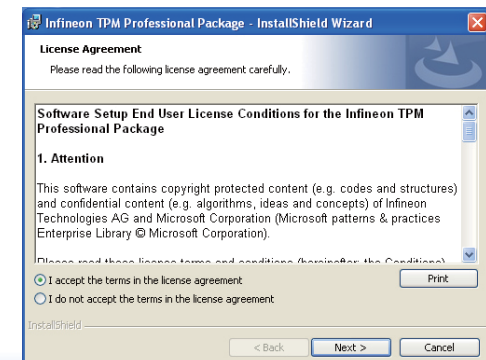
4. Enter the necessary information and then click Next.
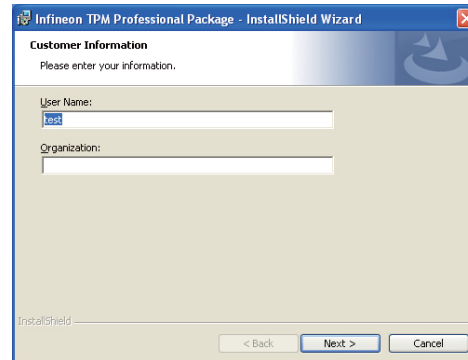


5. Select a setup type and then click Next.
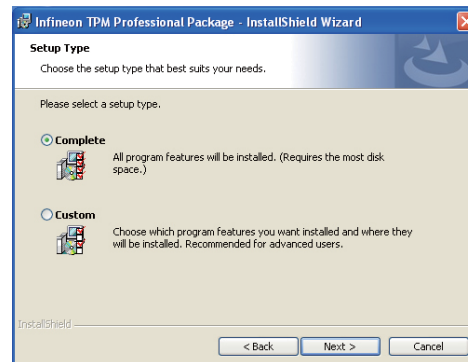


6. Click Install.
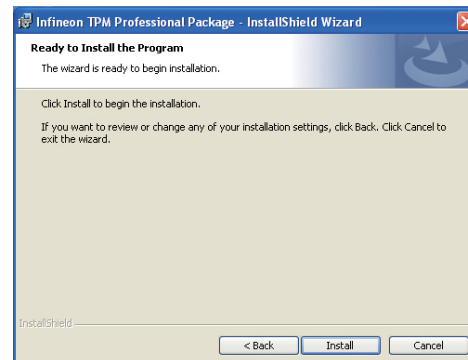


7. TPM requires installing the Micro-soft Visual C++ package prior to installing the utility. Click Install.
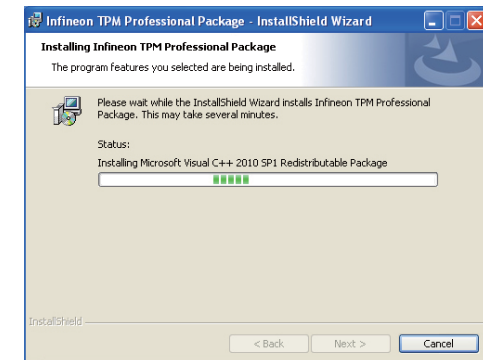


8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click Finish.



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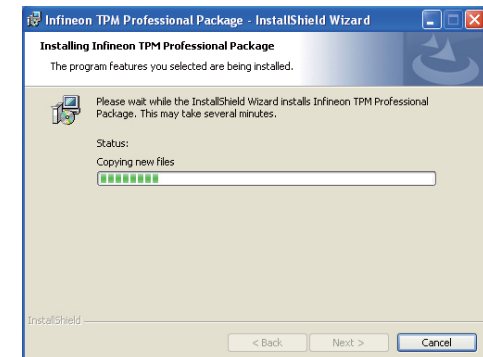
10. Click "Yes" to restart your system.
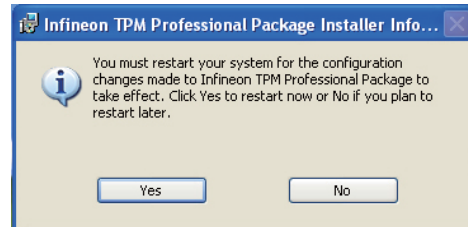


## Intel USB 3.0 Drivers (For Windows 7 Only)

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

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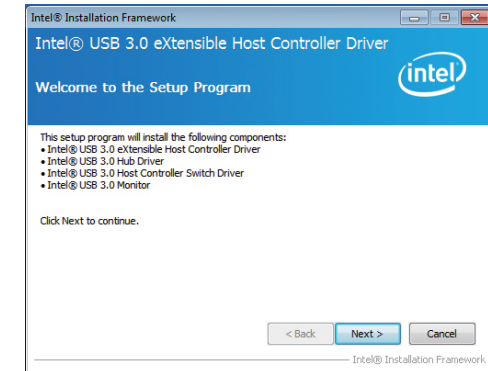


2. Read the license agreement then click Yes.



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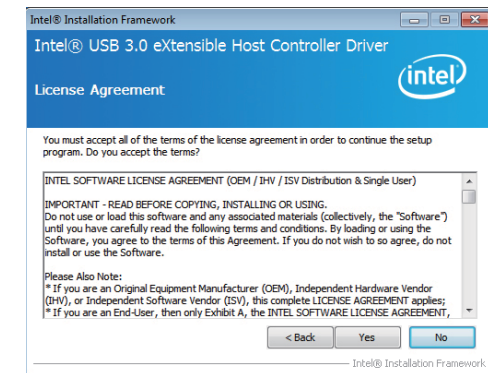
3. Go through the readme docu-
ment for more installation tips
then click Next.
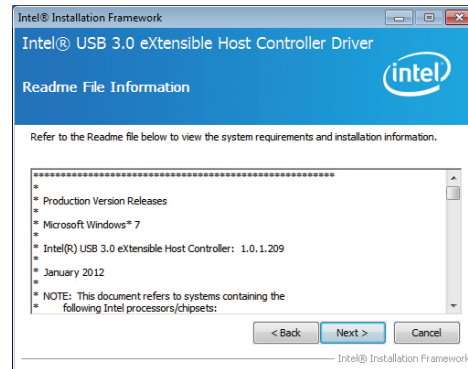


4. Setup is currently installing the
driver. After installation has com-
pleted, click Next.



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.

1. Click "Yes" to install the driver
update.
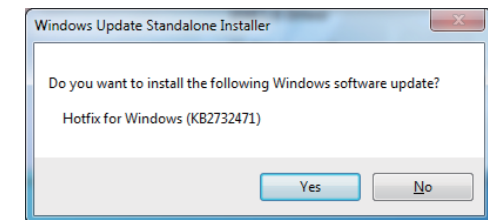


2. After the installation is complete,
click "Close".



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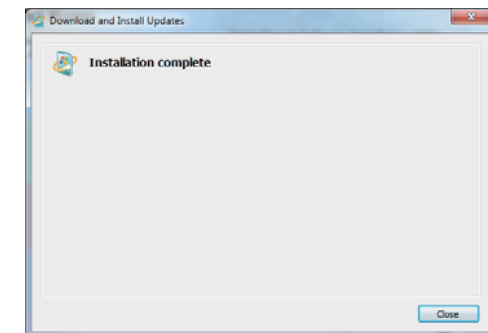
## IO Driver

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".
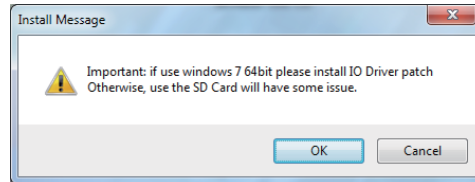
1. The setup program is preparing to install the driver. Click "Next."

2. Read the license agreement. Click "I accept the terms in the license agreement" and then click "Next".
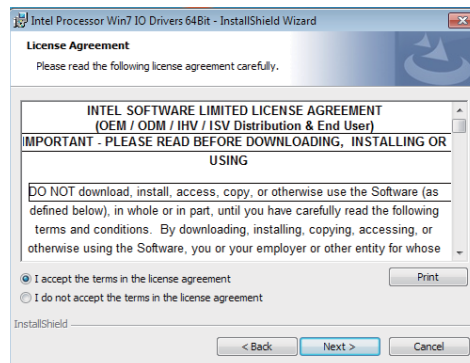
3. Choose the setup type and then click "Next".
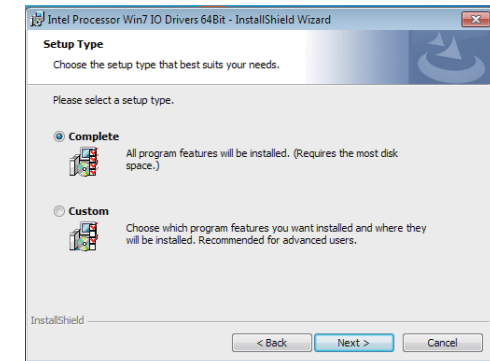
4. Click "Install" to start the installation.
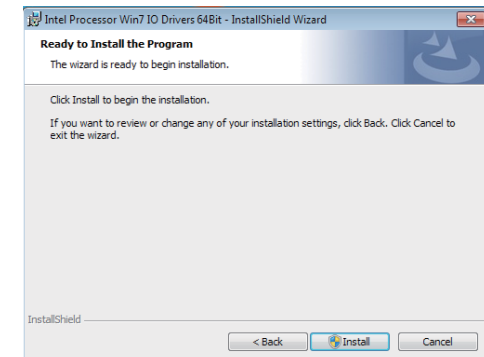
5. A notice for this installation.

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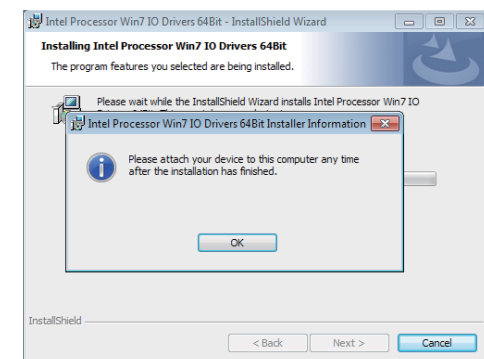
5. The installation has been completed successfully. Click "Finish" to exit the wizard.
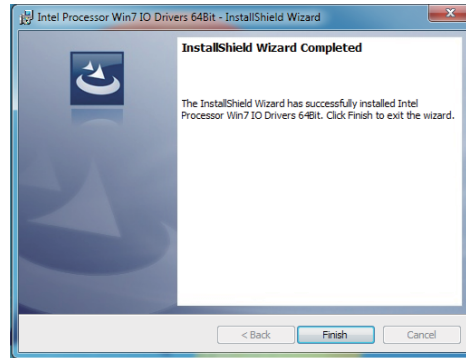
## Adobe Acrobat Reader 9.3

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.
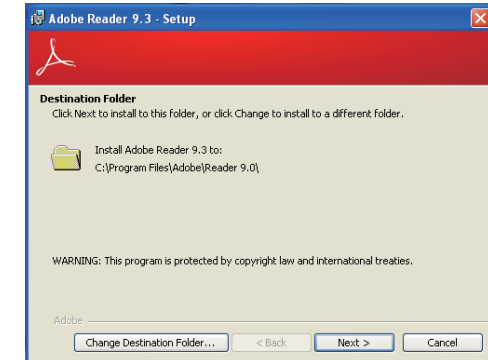
2. Click Install to begin installation.
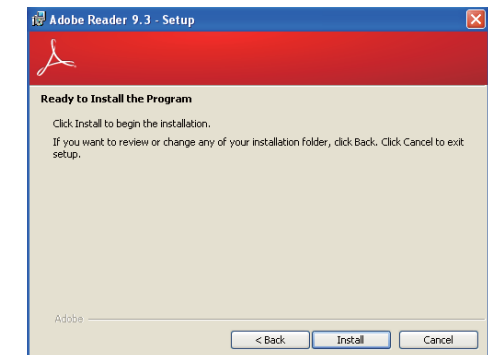
3. Click Finish to exit installation.
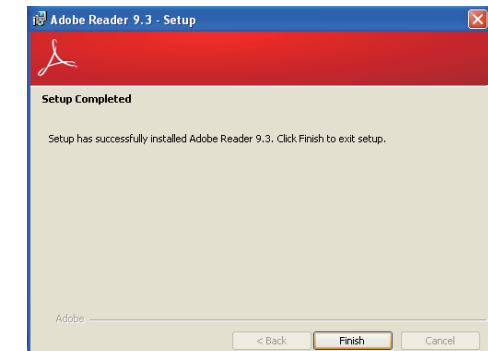
# Appendix A - System Error Message

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.