
MB-i77Q0

**Micro-ATX
Industrial Motherboard**

User's Manual

Version 1.1

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Revision History

| Version | Release Time | Description |
|---------|---------------|--|
| 1.0 | November 2012 | Initial release |
| 1.1 | Jan 2014 | <ul style="list-style-type: none">▶ Jumper JP14 is newly featured to enable/disable LVDS. See JP14 at 2.3.2. Jumpers.▶ Jumpers JP8, JP9, JP10, JP11 are newly provided to configure LVDS features. See JP8, JP9, JP10, JP11 at 2.3.2. Jumpers.▶ BIOS Setup utility is updated to v2.00. Newly featured settings are: 3.2.14. Intel(R) 82579LM Gigabit Network Connection on page 61 and 3.2.15. Intel(R) 82583V Gigabit Network Connection on page 62. |

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Declaration of Conformity

CE

The CE symbol on your product indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class B

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

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

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential

installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and 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.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals)

regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Warning

Single Board Computers and their components contain very delicate Integrated Circuits (IC). To protect the Single Board Computer and its components against damage from static electricity, you should always follow the following precautions when handling it :

1. Disconnect your Single Board Computer from the power source when you want to work on the inside.
2. Hold the board by the edges and try not to touch the IC chips, leads or circuitry.
3. Use a grounded wrist strap when handling computer components.
4. Place components on a grounded antistatic pad or on the bag that comes with the Single Board Computer, whenever components are separated from the system.

Replacing Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash-can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please do not hesitate to call or e-mail our customer service.

<http://www.arbor.com.tw>

E-mail: info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of two years from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

Chapter 1

Introduction

1.1. Product Highlights

- Intel® LGA1155 3rd / 2nd Gen. Core™ Processors supported
- Dual Gigabit Ethernet Ports
- Dual Independent Displays
- DVI-I, DVI-D and Dual Channels 24-bit LVDS (for Windows 7 only)
- RS-485 Auto-flow Control supported
- Intel® AMT8.0 supported
- RAID 0, 1, 5, 10 supported
- USB 3.0 supported

1.2. About This Manual

This user’s manual provides general information and installation instructions about the product. This User’s Manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this booklet, please consult your vendor before further handling.

1.3. Packing List

Before starting to install the single board, make sure the following items are shipped. If any of the following items is damaged or missing, contact your vendor immediately.



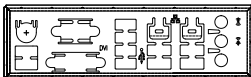
1 x MB-i77Q0 Industrial Motherboard



1 x Driver CD



1 x Quick Installation Guide



1 x I/O Bracket

1.4. Ordering Information

| | |
|-----------------------|---|
| MB-i77Q0 | Intel® LGA1155 socket Core™ i7/i5/i3 embedded Micro-ATX motherboard |
| CPF-67Q0-C1 | CPU Cooling Fan for LGA1155/1156 CPU |
| CBK-11-77Q0-00 | Cable kit 6 x SATA cables 1 x two-port COM cable 2 x COM flat cables 2 x USB cables |

1.5. Recommended CPU List

Intel® 3rd Generation

i7-3770 3.4GHz Core™ Processor

i5-3550S 3.0GHz Core™ Processor

i3-3220 3.3GHz Core™ Processor

Intel® 2nd Generation

i7-2600 3.4GHz Core™ Processor

i5-2400 3.1GHz Core™ Processor

i3-2120 3.3GHz Core™ Processor

G850 2.9GHz Pentium® Dual Core Processor

G540 2.5GHz Celeron® Dual Core Processor

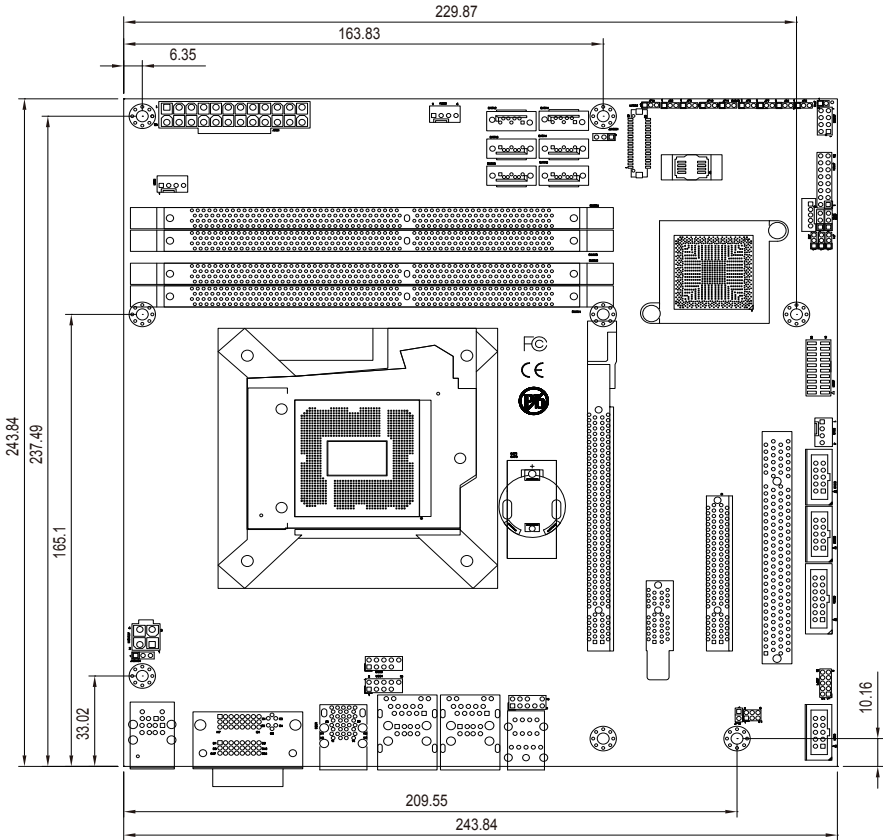
1.6. Specification

| | |
|-----------------------------|--|
| Form Factor | Micro-ATX Industrial Motherboard |
| CPU | 3rd generation Intel® Core™ i7/i5/i3 processors in LGA1155 socket |
| Chipset | Intel® PCH Q77 |
| System Memory | 4 x 240-pin DDR3 DIMM sockets, supporting 1333/1600MHz SDRAM up to 32GB |
| Display | Integrated Intel® HD Graphics 4000 and HD Graphics 2500 |
| | 1 x DVI-I connector, supporting either analog RGB or DVI, resolution up to 2048 x 1536 for analog RGB and 1920 x 1200 for TMDS |
| | 1 x DVI-D connector, supporting resolution up to 1920 x 1200 |
| | Dual Channel 24-bit LVDS up to 1600 x 1200 resolution supported |
| Ethernet | 1 x Intel® 82583V Gigabit Ethernet controller |
| | 1 x Intel® 82579LM Gigabit Ethernet PHY w/ iAMT |
| I/O Chip | Fintek F71869ED + Fintek F81216AD |
| BIOS | AMI BIOS |
| Watchdog Timer | 1~255 levels reset |
| Serial ATA | 4 x Serial ATA 300MB/s HDD transfer rate |
| | 2 x Serial ATA 600MB/s HDD transfer rate |
| | Intel® Rapid Storage Technology supported |
| | RAID 0, 1, 5, 10 supported |
| Serial Port | 4 x COM ports: COM1~3 RS-232, COM4 RS-232/422/485 selectable w/ auto-flow control |
| Universal Serial Bus | 4 x USB 3.0/2.0 compatible ports |
| | 10 x USB 2.0 ports |
| KBMS | 1 x 6-pin wafer connector for PS/2 keyboard and mouse |
| Expansion Bus | 1 x PCIe x16 slot |
| | 1 x PCIe x1 slot |
| | 1 x PCIe x4 interface in x8 slot |
| | 1 x PCI slot |
| Digital I/O | 1 x 16-bit digital I/O, 8 in/8 out |
| Audio | Realtek ALC886 HD Audio Codec, Mic-in/Line-in/Line-out |
| Power Consumption | 6.5A@+12V, 3.8A@+5V, 1.8A@+3.3V with Intel® Core™ i7-3770 3.4GHz processor (Typical) |
| Power Connector | 24-pin + 4-pin ATX connector |
| Certification | CE/FCC Class B |
| Operating Temp. | 0°C ~ 60°C (32°F ~ 140°F) |
| Storage Temp. | -20°C ~ 80°C (-4°F ~ 176°F) |
| Humidity | 0% ~ 95% non-condensing |
| Dimension (L x W) | 244 x 244 mm (9.6" x 9.6") |

Chapter 2

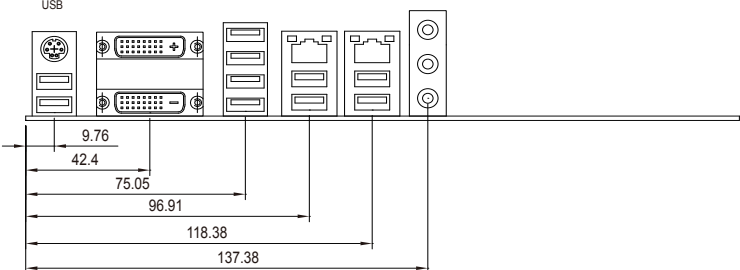
Getting Started

2.1. Board Dimensions

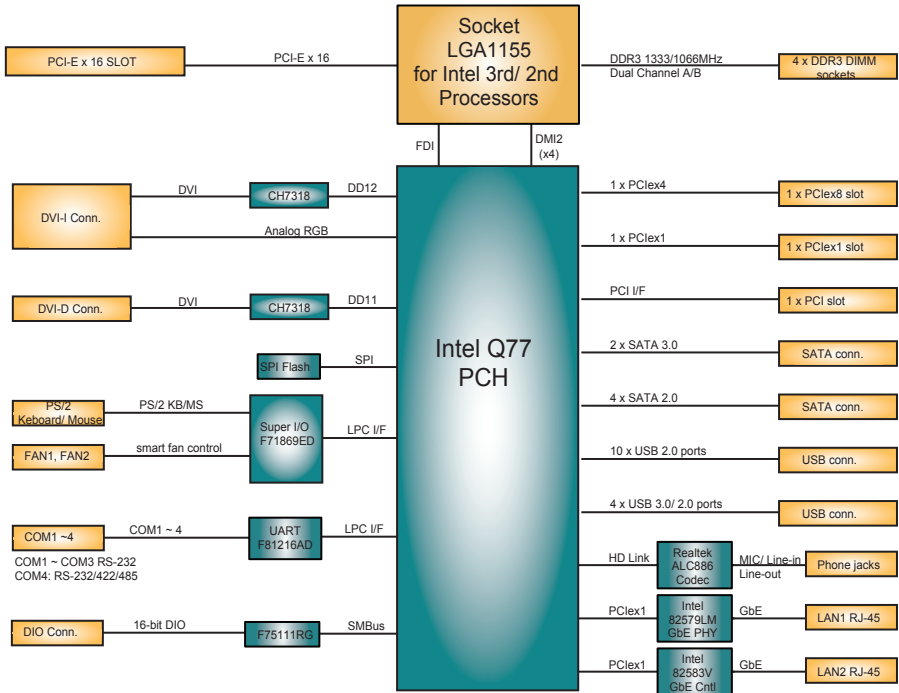


KB/MS USB COM/DVI-D USB*4 LAN/USB LAN/USB Line in/out/Mic

Unit: mm



2.2. Block Diagram



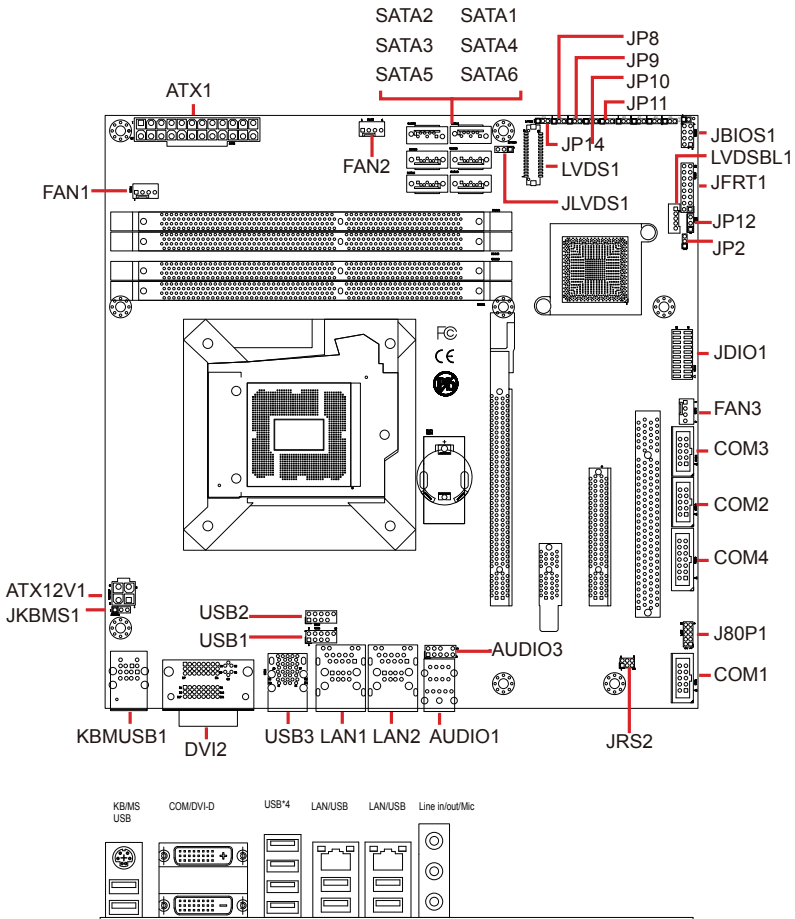
2.3. Jumpers & Connectors

The board comes with some connectors to join some devices and also some jumpers to alter the hardware configuration. The following in this section will explicate each of these components one-by-one.

2.3.1. Board Layout

An overview of this board's top side:

Board Top



2.3.2. Jumpers

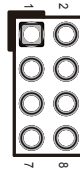
Jumper Settings

The jumper is “short” (closed) when the jumper cap is placed on pins; otherwise the jumper is “open.”

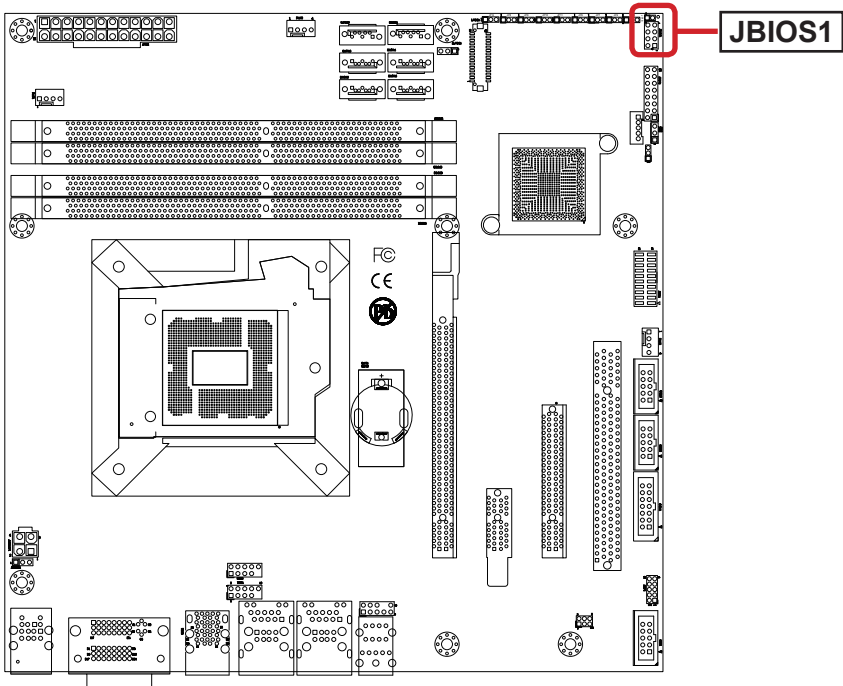
JBIOS1

Function: BIOS update port
Jumper Type: 2.54mm pitch 2x4-pin header

| Setting: | Pin | Desc. | Pin | Desc. |
|----------|-----|-------|-----|-------|
| | 1 | 3.3V | 2 | GND |
| | 3 | CS0# | 4 | CLK |
| | 5 | SO | 6 | SI |
| | 7 | N/C | 8 | N/C |



Board Top

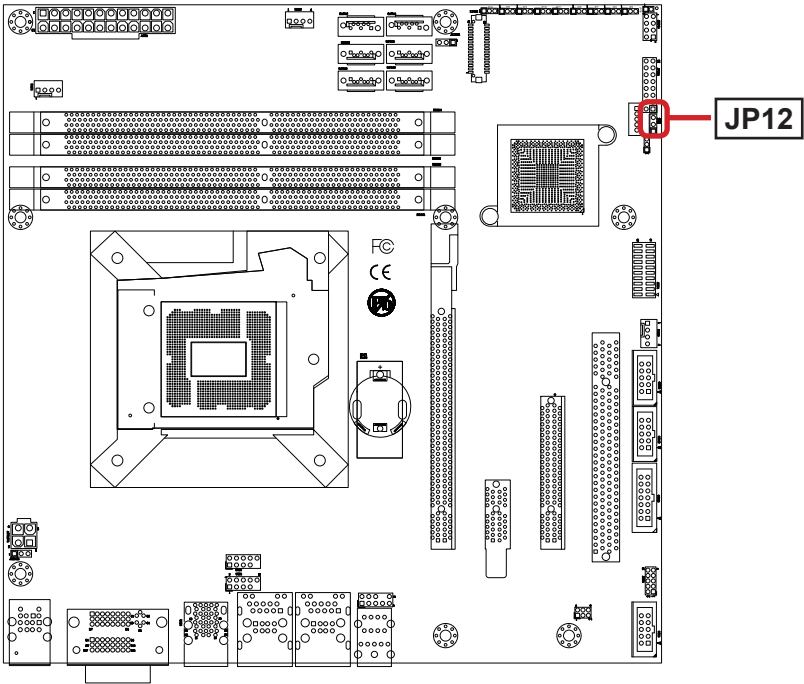


JP12

Function: Configures Intel® ME mode
Jumper Type: 2.54mm pitch 1x3-pin header
Setting:



| Pin | Description |
|-------|---------------------|
| 3 2 1 | Disable ME |
| 3 2 1 | Enable ME (Default) |

Board Top

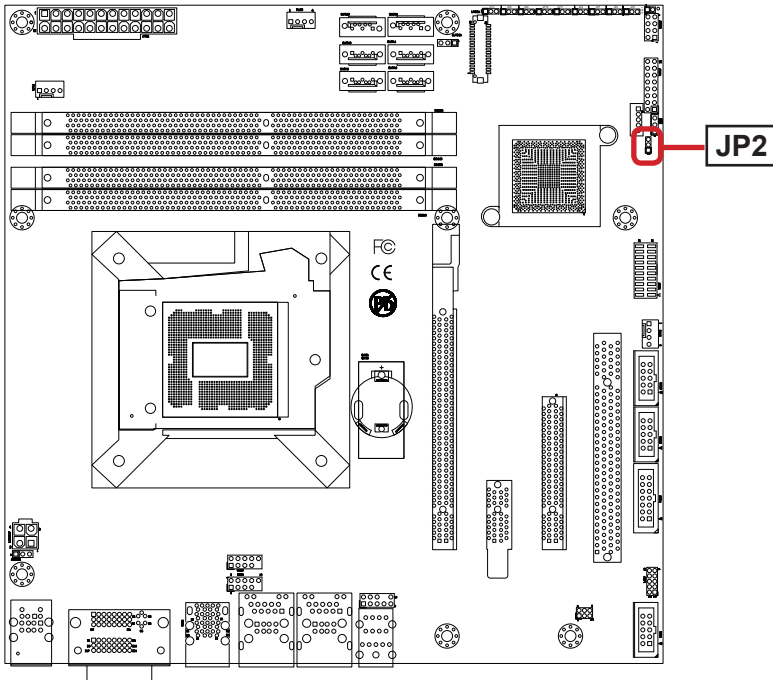


JP2

Function: CMOS setup
Jumper Type: 2.00mm pitch 1x3-pin header
Setting:

| Pin | Description | |
|-----|------------------|---|
| 1-2 | Normal (default) |  |
| 2-3 | Clears CMOS |  |

Board Top






JRS2

Function: Configures COM4 RS-232/422/485

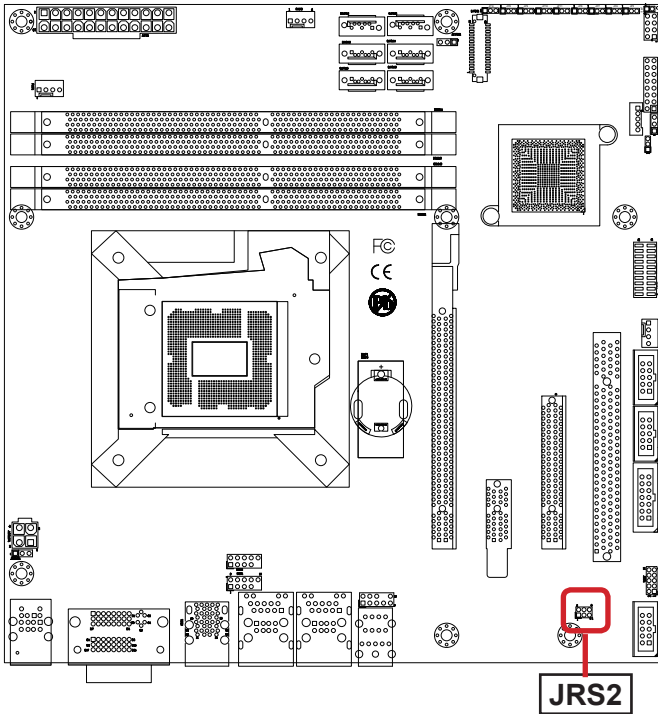
Jumper Type: 2.00mm pitch 2x3-pin header

Setting:

| Mode | RS-232 (default) | RS-422 | RS-485 |
|---------|---------------------|--------|--------|
| Pin 1-2 | Short | Open | Open |
| Pin 3-4 | Open | Short | Open |
| Pin 5-6 | Open | Open | Short |

| | | | | | |
|---|---|---|---|---|---|
| 1 | 2 | 1 | 2 | 1 | 2 |
|  | |  | |  | |
| 5 | 6 | 5 | 6 | 5 | 6 |

Board Top



JKBMS1

Function: Configures KB/MS power source

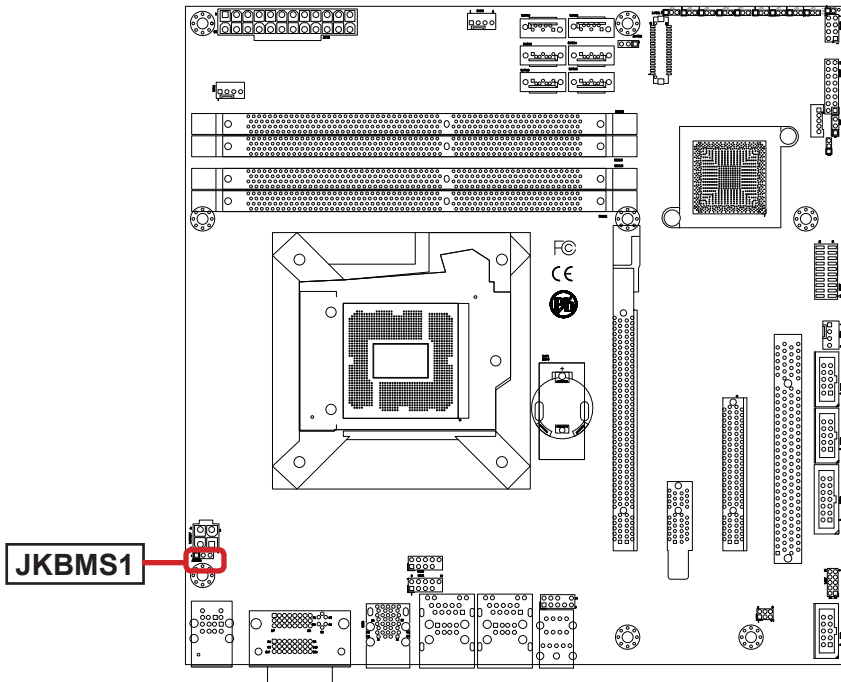
Jumper Type: 2.54mm pitch 1x3-pin header

Setting: **Pin Voltage**

| | 3 | 2 | 1 |
|------------------|---|---|---|
| 1-2 5V (Default) | ○ | □ | □ |

| | 3 | 2 | 1 |
|----------|---|---|---|
| 2-3 5VSB | □ | □ | ○ |

Board Top



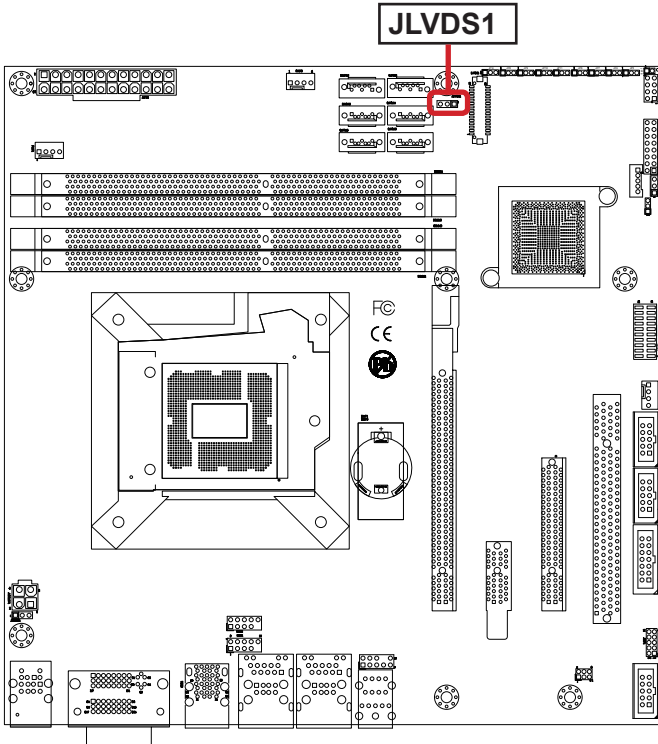
JLVDS1

Function: Configures LCD voltage
Jumper Type: 2.54mm pitch 1x3-pin header
Setting:

| Pin | Voltage |
|-----|--------------|
| 1-2 | 3.3V |
| 2-3 | 5V (Default) |



Board Top



JP14

Function: Enables/disables LVDS

Jumper Type: 2.00mm pitch 1x3-pin header

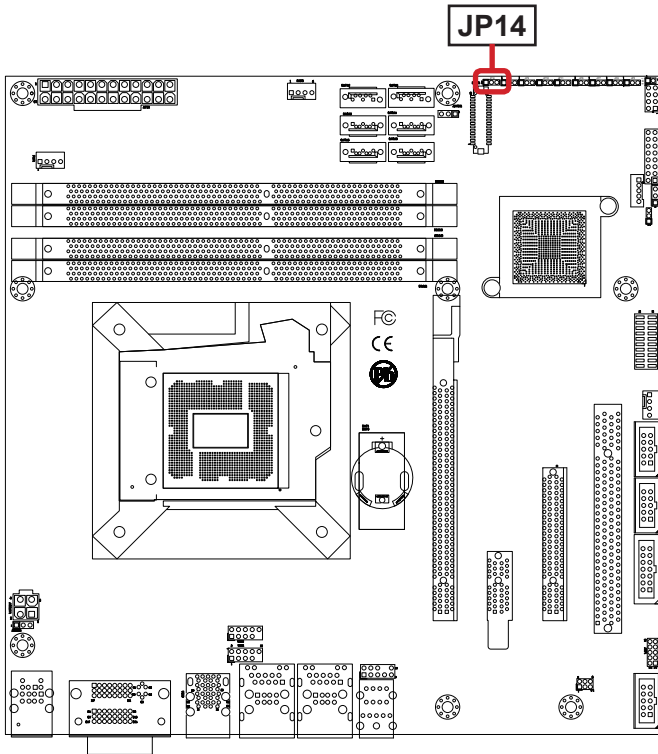
Setting:

| Pin | Description |
|-----|-------------|
|-----|-------------|

| | | |
|-----|--------|---|
| 1-2 | Enable |  |
|-----|--------|---|

| | | |
|-----|-------------------|---|
| 2-3 | Disable (default) |  |
|-----|-------------------|---|

Board Top



JP8, JP9, JP10, JP11

Function: Configures LVDS features

Jumper Type: 2.00mm pitch 1x3-pin header

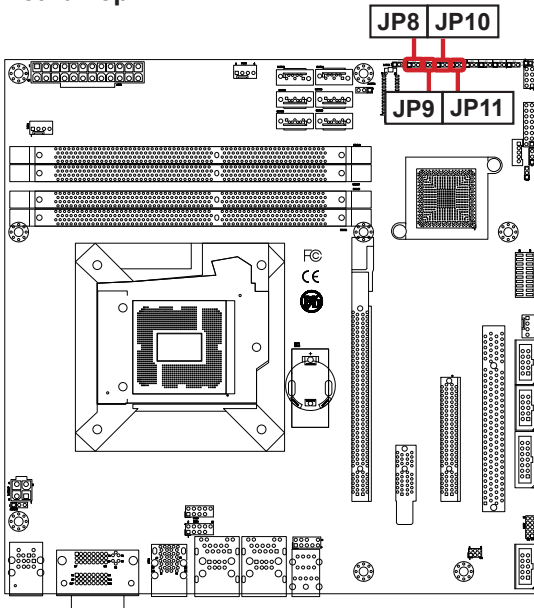
Setting:

Pin Description



| JP8 | JP9 | JP10 | JP11 | EDID Resolution | Color Depth | Channel |
|-----|-----|------|------|--------------------|-------------|---------|
| Off | Off | Off | Off | 640 x 480 @ 60Hz | 18-bit | Single |
| On | Off | Off | Off | 800 x 600 @ 60Hz | 18-bit | Single |
| Off | On | Off | Off | 1024 x 768 @ 60Hz | 18-bit | Single |
| On | On | Off | Off | 1024 x 768 @ 60Hz | 24-bit | Single |
| Off | Off | On | Off | 1280 x 720 @ 60Hz | 18-bit | Single |
| On | Off | On | Off | 1280 x 800 @ 60Hz | 18-bit | Single |
| Off | On | On | Off | 1366 x 768 @ 60Hz | 18-bit | Single |
| On | On | On | Off | 1440 x 900 @ 60Hz | 18-bit | Single |
| Off | Off | Off | On | 1366 x 768 @ 60Hz | 24-bit | Single |
| On | Off | Off | On | 1440 x 900 @ 60Hz | 24-bit | Single |
| Off | On | Off | On | 1280 x 1024 @ 60Hz | 24-bit | Dual |
| On | On | Off | On | 1440 x 1050 @ 60Hz | 24-bit | Dual |
| Off | Off | On | On | 1600 x 900 @ 60Hz | 24-bit | Dual |
| On | Off | On | On | 1680 x 1050 @ 60Hz | 24-bit | Dual |
| Off | On | On | On | 1600 x 1200 @ 60Hz | 24-bit | Dual |
| On | On | On | On | 1920 x 1080 @ 60Hz | 24-bit | Dual |

Board Top



2.3.3. Connectors

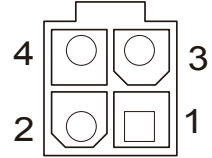
ATX12V1

Description: ATX +12V connector to supply +12V for CPU operation

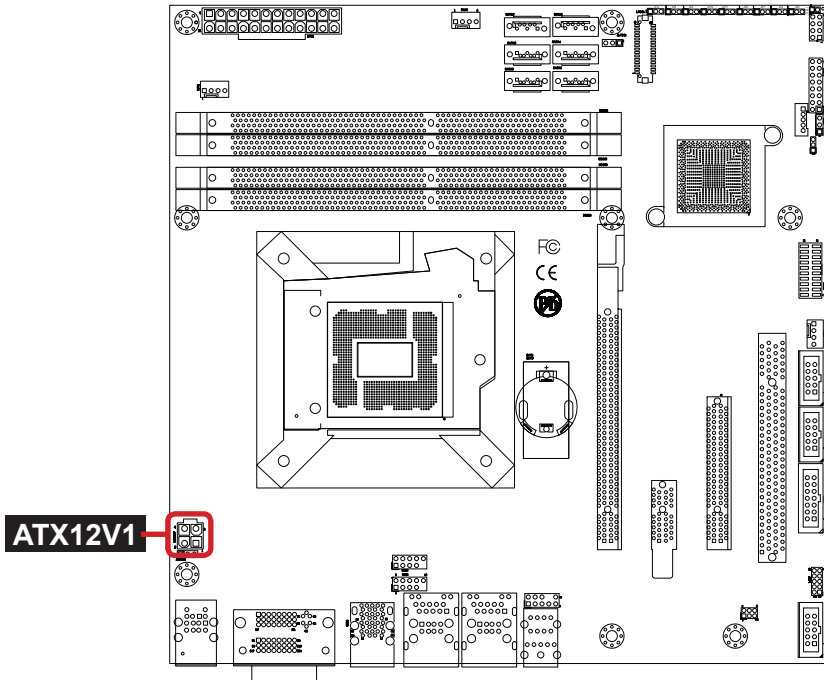
Connector Type: 4-pin ATX 12V connector

Pin Definition:

| Pin | Desc. | Pin | Desc. |
|-----|-------|-----|-------|
| 1 | GND | 2 | GND |
| 3 | +12V | 4 | +12V |



Board Top



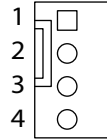
FAN1, 2, 3

Description: Fan power connectors

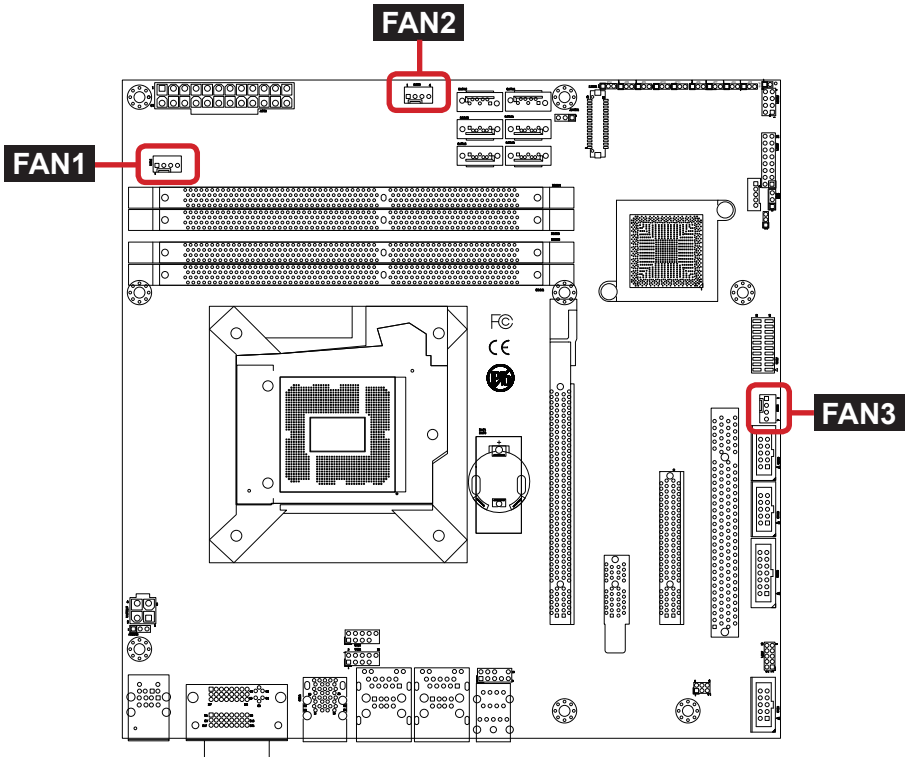
Connector Type: 2.54mm pitch 1x4 wafer one wall connector

Pin Definition:

| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | +12V |
| 3 | FAN_IN |
| 4 | FAN_CTL |



Board Top



SATA1~6

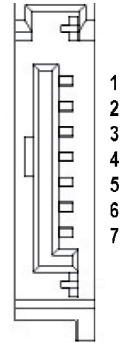
Description: Serial ATA connectors

Connector Type: Lockable SATA connectors with housing

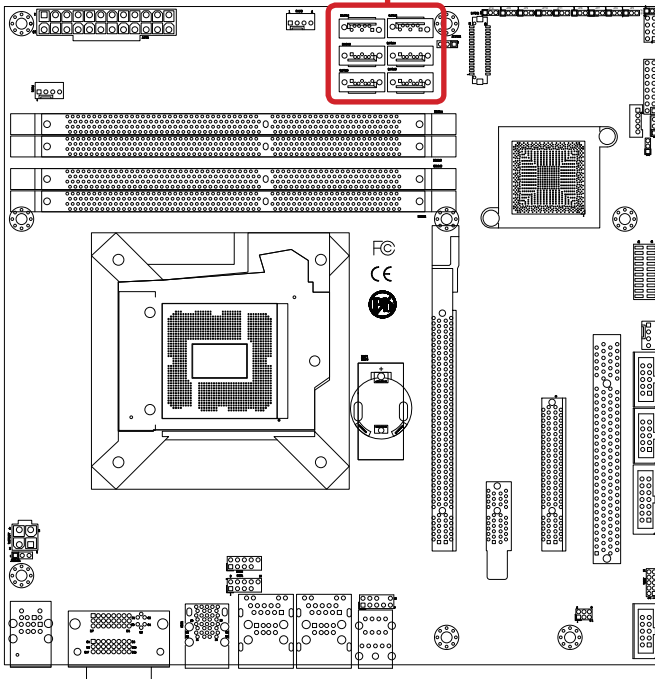
- SATA1~2 support 600MB/s HDD transfer rate.
- SATA3~6support 300MB/s HDD transfer rate.

Pin Definition:

| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | TX+ |
| 3 | TX- |
| 4 | GND |
| 5 | RX- |
| 6 | RX+ |
| 7 | GND |



Board Top

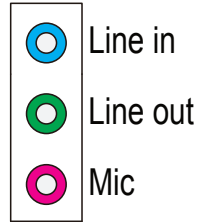


AUDIO1

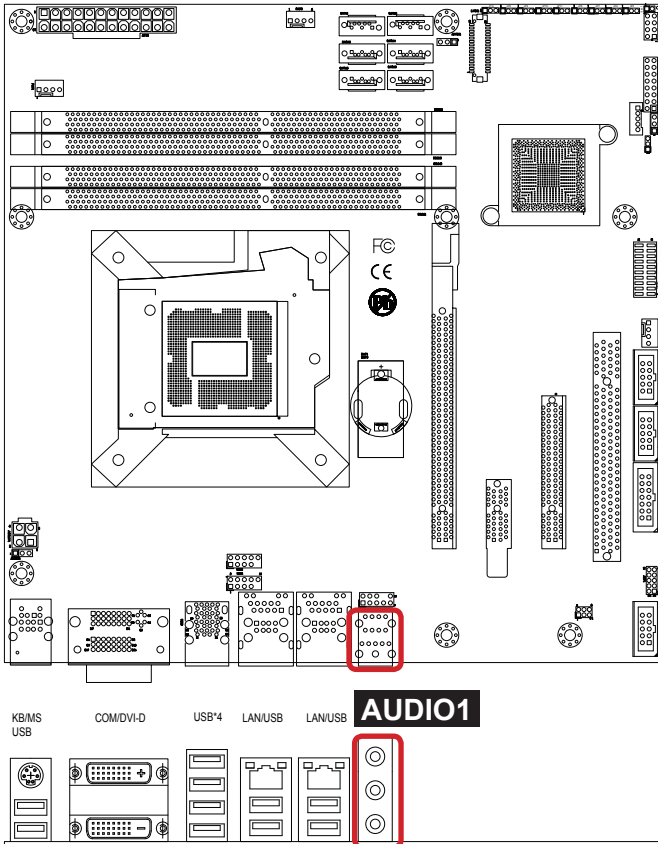
Description: Audio interface port
Connector Type: 3 x 3.5mm phone jack stacked

Pin Definition:

| Audio Jack | Description |
|------------|-------------|
| Blue | Line-in |
| Green | Line-out |
| Pink | Mic-in |



Board Top



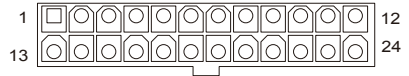
ATX1

Description: ATX power connector

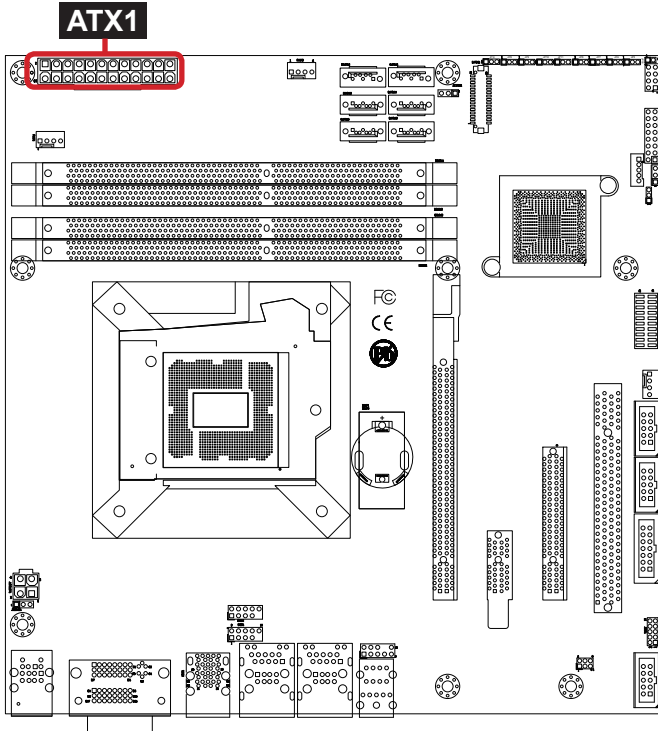
Connector Type: 24-pin ATX power supply connector

Pin Definition:

| Pin | Desc. | Pin | Desc. |
|-----|-------|-----|-------|
| 1 | +3.3V | 13 | +3.3V |
| 2 | +3.3V | 14 | -12V |
| 3 | GND | 15 | GND |
| 4 | +5V | 16 | PS-ON |
| 5 | GND | 17 | GND |
| 6 | +5V | 18 | GND |
| 7 | GND | 19 | GND |
| 8 | PW-OK | 20 | -5V |
| 9 | +5VSB | 21 | +5V |
| 10 | +12V | 22 | +5V |
| 11 | +12V | 23 | +5V |
| 12 | +3.3V | 24 | GND |



Board Top



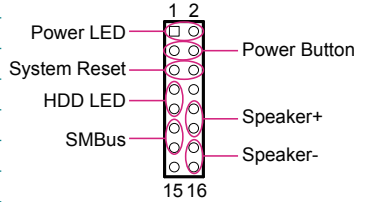
JFRT1

Description: Provides status LED lights for computer and switches to change the computer's activities

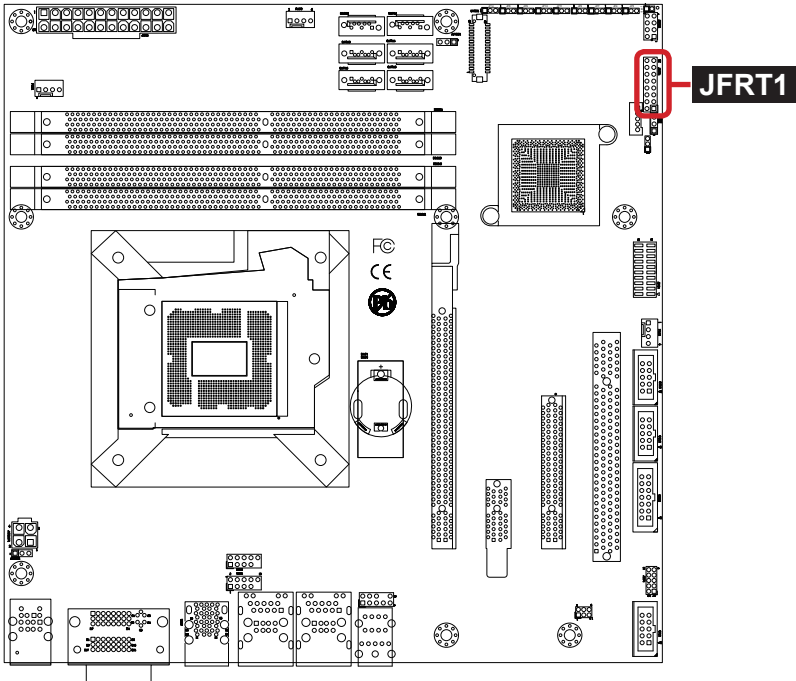
Connector Type: 2.54mm pitch 2x8 pin header

Pin Definition:

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | LED- | 2 | LED+ |
| 3 | PWRBTN- | 4 | PWRBTN+ |
| 5 | RESET- | 6 | RESET+ |
| 7 | HDD LED+ | 8 | GND |
| 9 | HDD LED- | 10 | SPEAKER+ |
| 11 | SMB_CLK | 12 | SPEAKER+ |
| 13 | SMB_DATA | 14 | SPEAKER- |
| 15 | GND | 16 | SPEAKER- |



Board Top



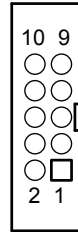
COM1, 2, 3

Description: Serial port connectors

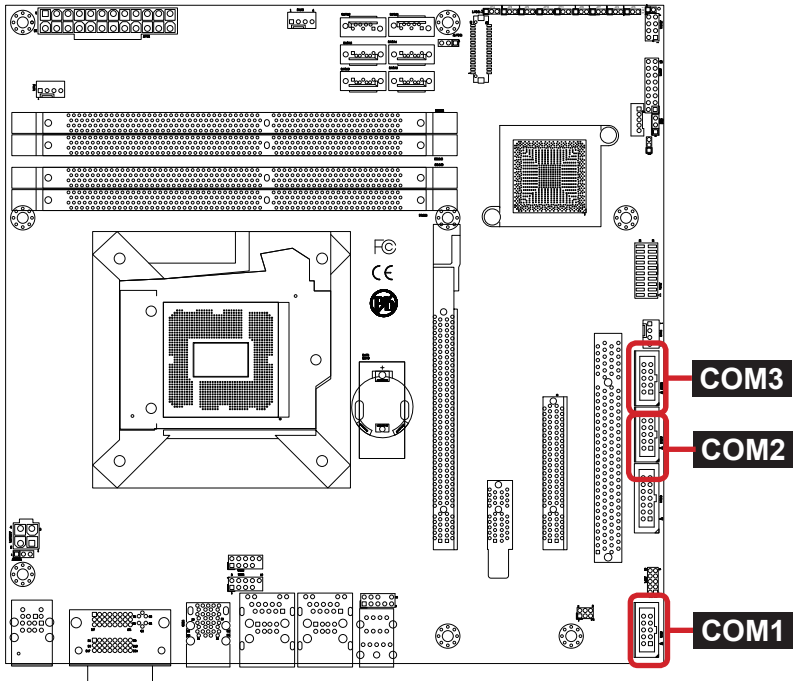
Connector Type: 2.54mm pitch 2x5-pin box header.

Pin Definition:

| Pin | Desc. | Pin | Desc. |
|-----|-------|-----|-------|
| 10 | N/C | 9 | RI1 |
| 8 | CTS1 | 7 | RTS1 |
| 6 | DSR1 | 5 | GND |
| 4 | DTR1 | 3 | TXD1 |
| 2 | RXD1 | 1 | DCD1 |



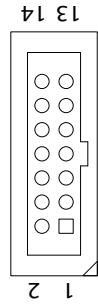
Board Top



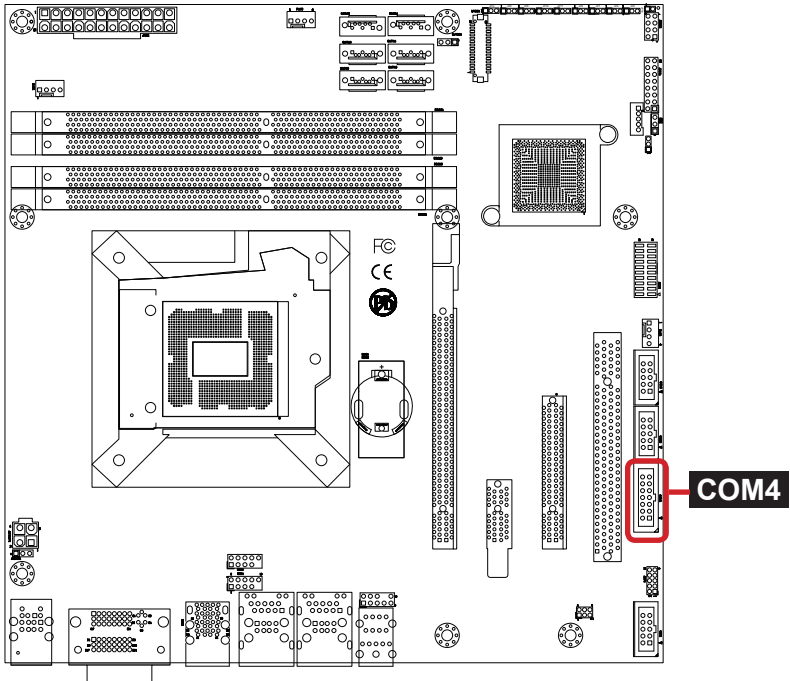
COM4

Description: RS-232/422/485 connector
Connector Type: 2.54mm pitch 2x7-pin header
Pin Definition:

| | Pin | Desc. | Pin | Desc. |
|------------|-----|------------|-----|------------|
| RS-485/422 | 14 | 422RX- | 13 | 422RX+ |
| | 12 | 422TX-485- | 11 | 422TX+485+ |
| | 10 | N/C | 9 | RI |
| RS-232 | 8 | CTS | 7 | RTS |
| | 6 | DSR | 5 | GND |
| | 4 | DTR | 3 | TXD |
| | 2 | RXD | 1 | DCD |



Board Top



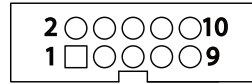
AUDIO3

Description: AUX audio connector

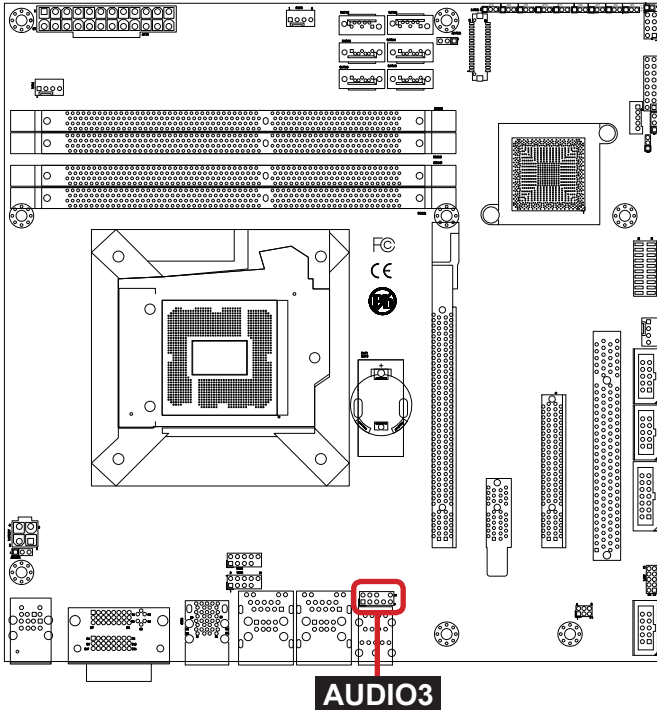
Connector Type: 2.54mm pitch 2x5-pin box header

Pin Definition:

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | MIC2_L | 2 | GND |
| 3 | MIC2_R | 4 | PRESENCE |
| 5 | LINE2_R | 6 | MIC2_JD |
| 7 | SENSE | 8 | N/C |
| 9 | LINE2_L | 10 | LINE2_JD |

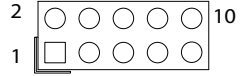


Board Top



USB1,2

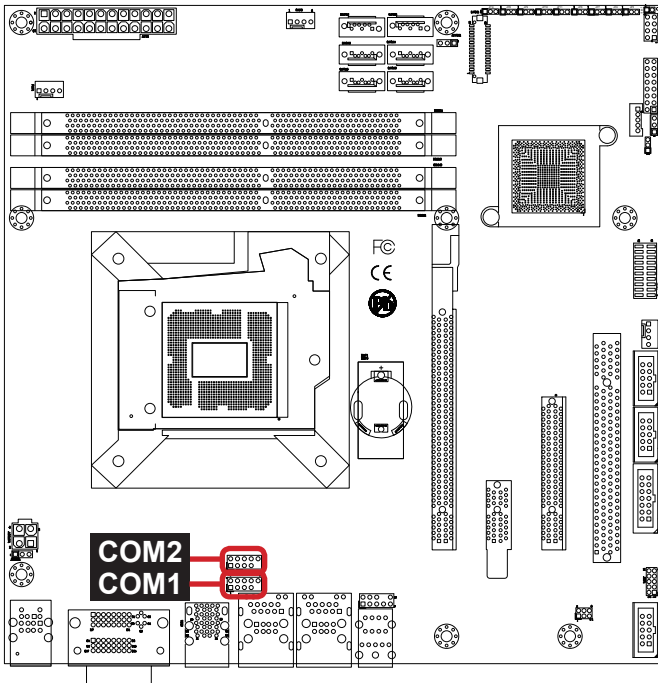
Description: USB connectors
Connector Type: 2.54mm pitch 2x5 pin header



Pin Definition:

| Pin | Desc. | Pin | Desc. | Pin | Desc. | Pin | Desc. | Pin | Desc. |
|-----|-------|-----|--------|-----|--------|-----|-------|-----|-------|
| 1 | +5V | 3 | USBD1- | 5 | USBD1+ | 7 | GND | 9 | N/C |
| 2 | +5V | 4 | USBD2- | 6 | USBD2+ | 8 | GND | 10 | N/C |

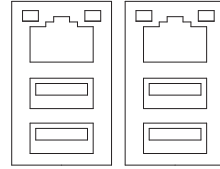
Board Top



LAN1,2

Description: Ethernet ports and double-stacked USB ports

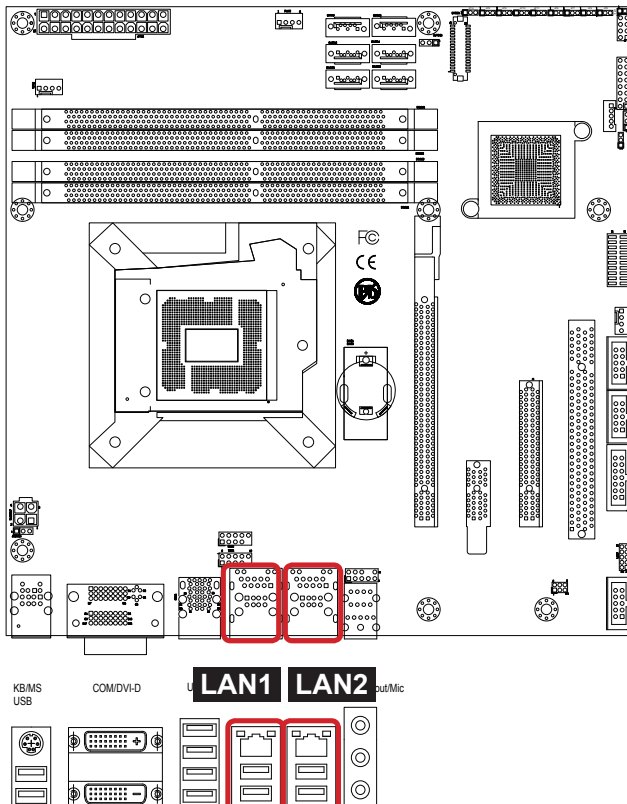
Connector Type: RJ-45 connectors with LED and double-stacked USB type A connectors



Pin Definition:

| LAN (RJ-45) | | | | USB (USB type A connector) | | | |
|-------------|-----------|-----|-----------|----------------------------|-------|----|-------|
| Pin | Desc. | Pin | Desc. | B1 | +5V | B5 | +5V |
| A1 | TCT VCC | A2 | M0+ | B2 | USB1- | B6 | USB2- |
| A3 | M0- | A4 | M1+ | B3 | USB1+ | B7 | USB2+ |
| A5 | M1- | A6 | M2+ | B4 | GND | B8 | GND |
| A7 | M2- | A8 | M3+ | H1 | GND | H5 | GND |
| A9 | M3- | A10 | RCT GND | H2 | GND | H6 | GND |
| A11 | LED1 Y- | A12 | LED1 Y+ | H3 | GND | H7 | GND |
| A13 | LED2 G-O+ | A14 | LED2 G+O- | H4 | GND | H8 | GND |

Board Top



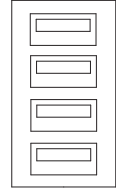
USB3

Description: Four USB ports

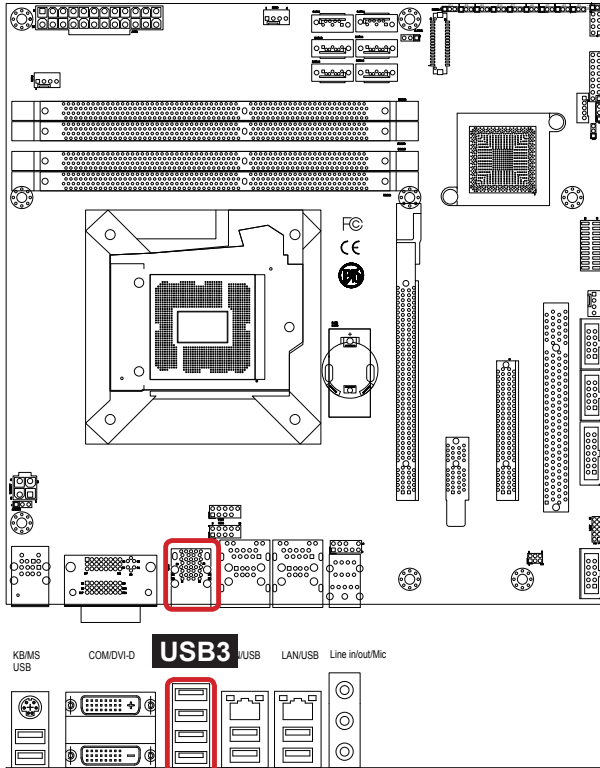
Connector Type: 4-stack USB 3.0/2.0 type A connectors

Pin Definition:

| Pin | Desc. | Pin | Desc. | Pin | Desc. | Pin | Desc. |
|-----|--------|-----|--------|-----|--------|-----|--------|
| 11 | 5V | 33 | USB3+ | 21 | 5V | 43 | USB3+ |
| 12 | USB1- | 34 | GND5 | 22 | USB2- | 44 | GND7 |
| 13 | USB1+ | 35 | SSRX3- | 23 | USB2+ | 45 | SSRX4- |
| 14 | GND1 | 36 | SSRX3+ | 24 | GND3 | 46 | SSRX4+ |
| 15 | SSRX1- | 37 | GND6 | 25 | SSRX2- | 47 | GND8 |
| 16 | SSRX1+ | 38 | SSTX3- | 26 | SSRX2+ | 48 | SSTX4- |
| 17 | GND2 | 39 | SSTX3+ | 27 | GND4 | 49 | SSTX4+ |
| 18 | SSTX1- | H1 | GND | 28 | SSTX2- | H4 | GND |
| 19 | SSTX1+ | H2 | GND | 29 | SSTX2+ | H5 | GND |
| 31 | 5V | H3 | GND | 41 | 5V | H6 | GND |
| 32 | USB3- | | | 42 | USB3- | | |



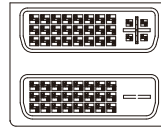
Board Top



DVI2

Description: DVI-I port and DVI-D port

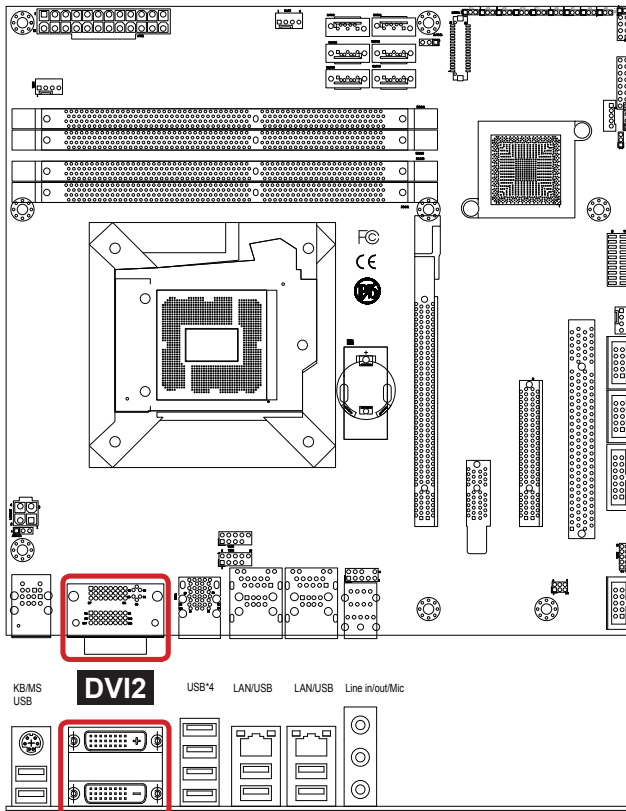
Connector Type: Female DVI-D connector and female DVI-I connector



DVI-I

DVI-D

Board Top



KBMS
USB

DVI2

USB*4

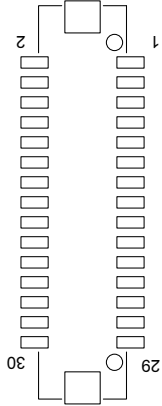
LAN/USB

LAN/USB

Line in/out/Mic

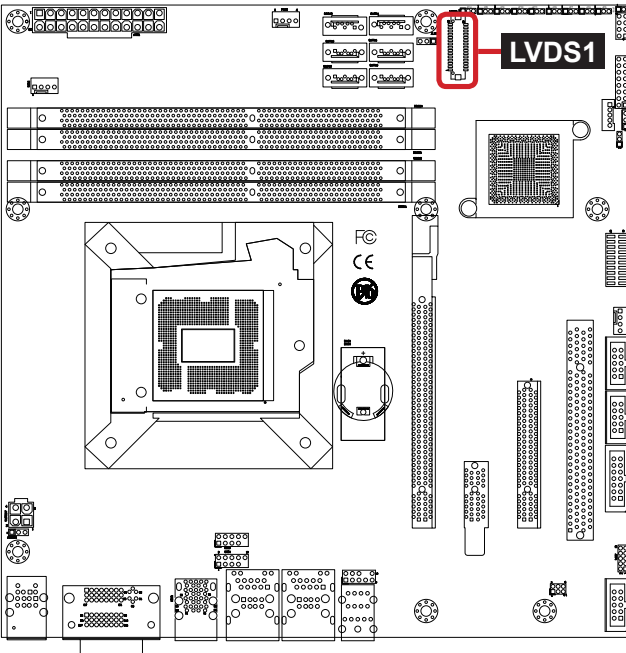
LVDS1

Description: LCD connector
Connector Type: 34-pin female LDVS connector



| Pin | Desc. | Pin | Desc. |
|-----|---------|-----|---------|
| 33 | N.C. | 34 | N.C. |
| 31 | N.C. | 32 | N.C. |
| 29 | TX1D3- | 30 | TX2D3- |
| 27 | TX1D3+ | 28 | TX2D3+ |
| 25 | GND | 26 | GND |
| 23 | TX1D2- | 24 | TX2D2- |
| 21 | TX1D2+ | 22 | TX2D2+ |
| 19 | GND | 20 | GND |
| 17 | TX1D1- | 18 | TX2D1- |
| 15 | TX1D1+ | 16 | TX2D1+ |
| 13 | GND | 14 | GND |
| 11 | TX1D0- | 12 | TX2D0- |
| 9 | TX1D0+ | 10 | TX2D0+ |
| 7 | GND | 8 | GND |
| 5 | TX1CLK- | 6 | TX2CLK- |
| 3 | TX1CLK+ | 4 | TX2CLK+ |
| 1 | VDD1 | 2 | VDD2 |

Board Top



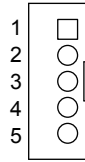
LVDSBL1

Description: LCD inverter connector

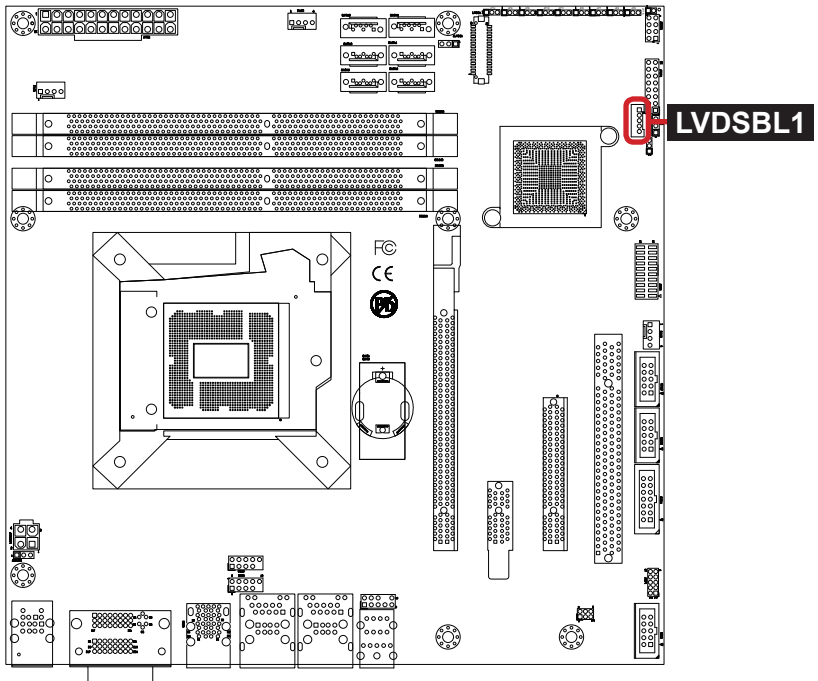
Connector Type: 2.00mm pitch 1x5-pin box wafer connector

Pin Definition:

| Pin | Description |
|-----|--------------------|
| 1 | +12V/+5V |
| 2 | GND |
| 3 | Backlight on/off |
| 4 | Brightness control |
| 5 | GND |



Board Top

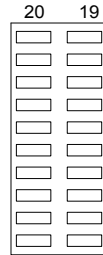


JDIO1

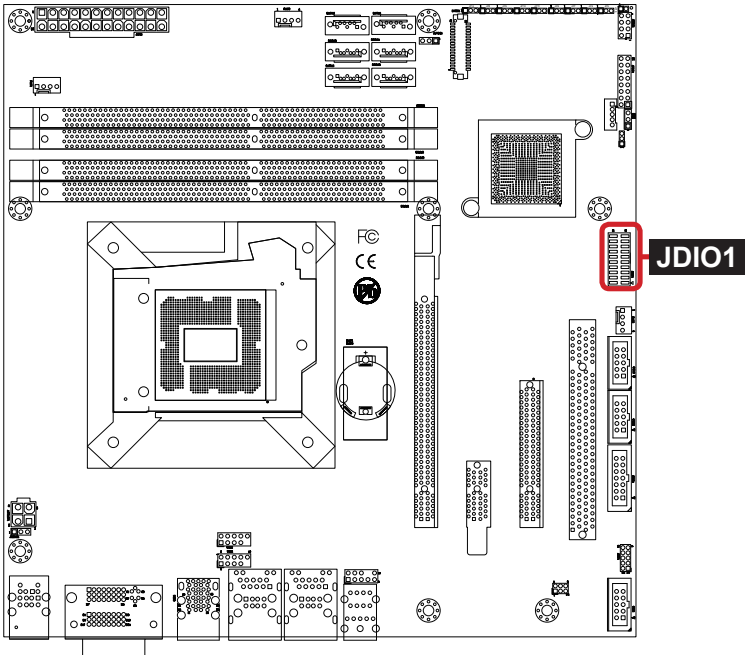
Description: Digital I/O connector that supports 16-bit programmable digital input/output

Connector Type: 2.00mm pitch 2x10-pin header

| Pin | Desc. | Pin | Desc. |
|-----|-------|-----|-------|
| 20 | GND | 19 | VCC |
| 18 | GND | 17 | VCC |
| 16 | DIO15 | 15 | DIO14 |
| 14 | DIO13 | 13 | DIO12 |
| 12 | DIO11 | 11 | DIO10 |
| 10 | DIO9 | 9 | DIO8 |
| 8 | DIO7 | 7 | DIO6 |
| 6 | DIO5 | 5 | DIO4 |
| 4 | DIO3 | 3 | DIO2 |
| 2 | DIO1 | 1 | DIO0 |



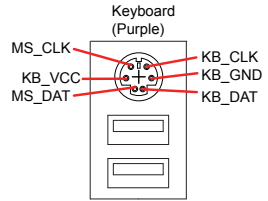
Board Top



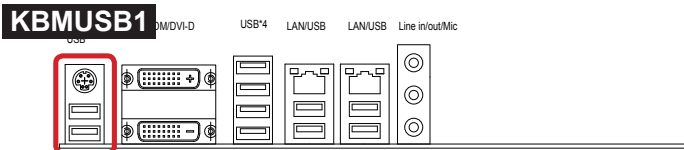
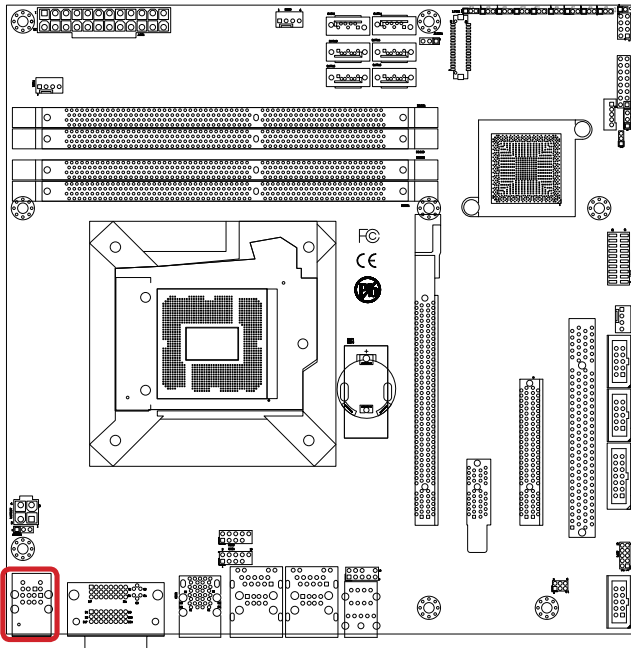
KBMUSB1

Description: PS/2 keyboard and double-stacked USB connectors

Connector Type: 6-pin Mini-DIN connector and double-stacked type A USB connectors



Board Top



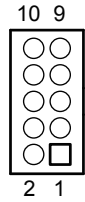
J80P1

Description: I/O port 80 connector

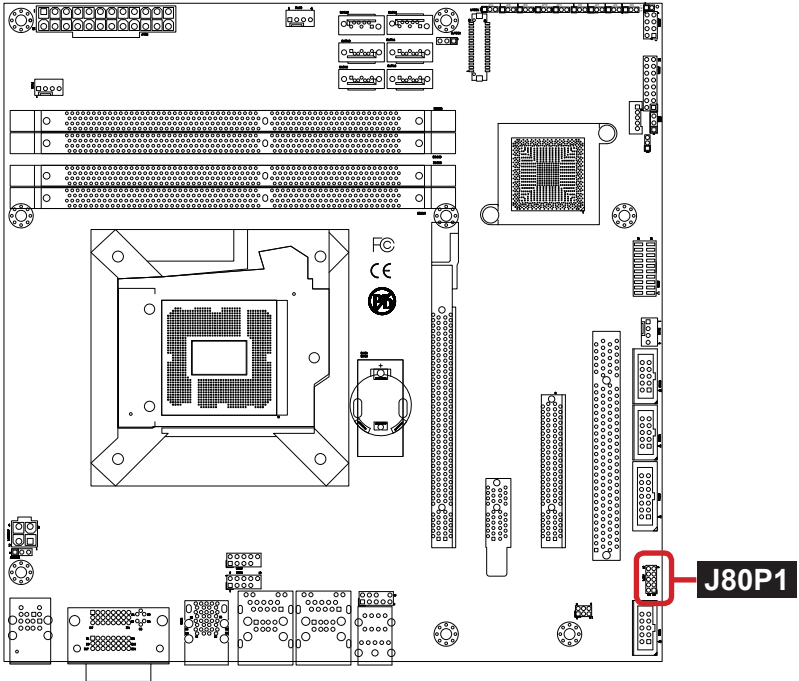
Connector Type: 2.00mm pitch 2x5-pin female connector

Pin Definition:

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 10 | L_AD1 | 9 | VCC3 |
| 8 | L_AD2 | 7 | L_AD3 |
| 6 | N/C | 5 | P_PCIRST_N |
| 4 | L_AD0 | 3 | L_FRAME_N |
| 2 | GND | 1 | CK_P33M |



Board Top



2.4. Driver Installation Notes

The board supports Windows 7. Find the necessary drivers on the CD that comes with your purchase.

Find the drivers on CD by the following paths:

Windows 7

| Driver | Path |
|----------|--|
| Chipset | \\MB-i77Q0\CHIPSET\Win7 |
| AMT | \\MB-i77Q0\ME\MEI_allOS_8.0.4.1441_PV_5M |
| Graphics | \\MB-i77Q0\GRAPHICS\Win7\Win32 \\MB-i77Q0\GRAPHICS\Win7\Win64 |
| LAN | \\MB-i77Q0\ETHERNET\WIN_allos_Ver16.3 |
| Audio | \\MB-i77Q0\AUDIO\Vista_Win7_R261-32_64 bit |
| USB3.0 | \\MB-i77Q0\USB3.0 |

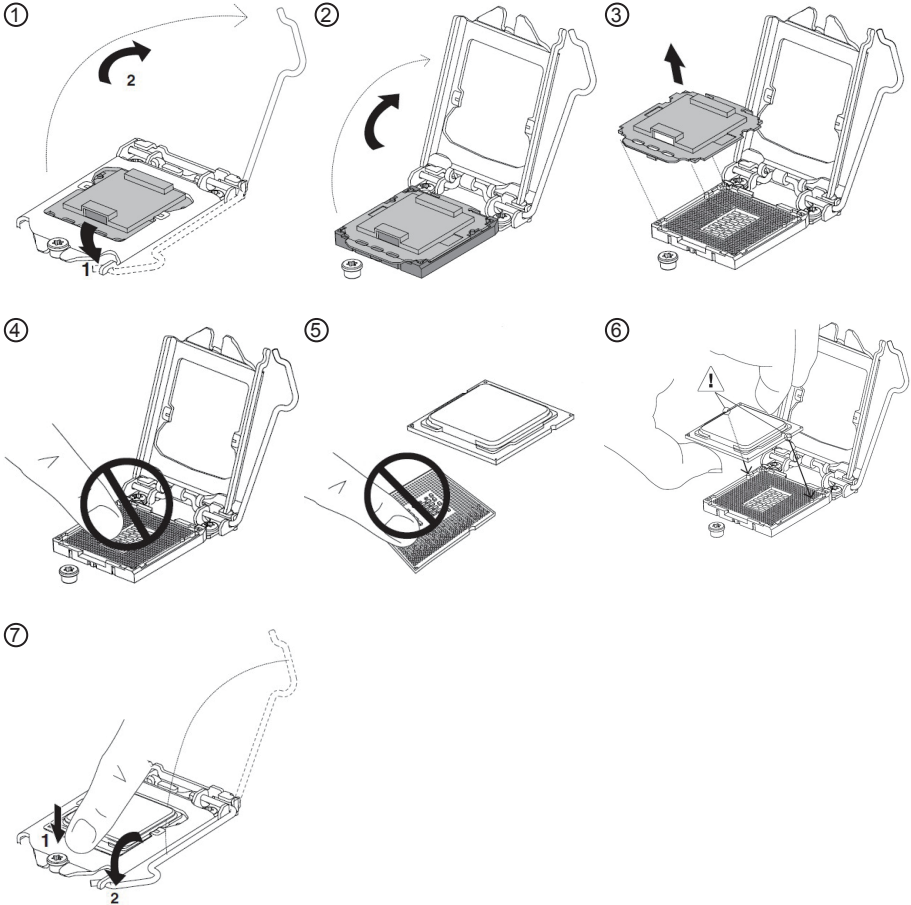
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Chapter 3

Hardware Installation

3.1. Install CPU

The LGA1155 processor socket comes with a lever to secure the processor. Please refer to the pictures step by step as below and note that the cover of the LGA1155 socket must always be installed during transportation to avoid damage to the socket.



Make sure that heat sink putting on the CPU's top surface is in complete contact to avoid overheating problem.

If not, it would cause your system or CPU hanged, unstable or damaged.

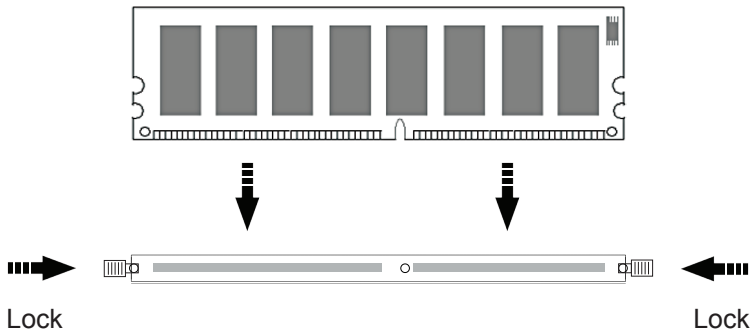
3.2. Install/uninstall Memory

To install the memory module:

1. Find the memory DIMM socket on the board.

The DIMM socket has a slot connector with a off-center break and a spring-loaded latch on each side to fix the DDR3 memory module in place.

2. Position the memory module's pin side at the SO-DIMM socket, with the memory module's key notch aligning at the SO-DIMM socket's slot connector break.



3. Insert the memory module to the slot connector at an slanted angle. Note to “fully” insert the memory module to avoid improper insertion.
4. Press down the memory module until it auto-clicks in place.

To uninstall the memory module:

1. Pull back the latches from both sides of the SO-DIMM socket.
2. The memory module will be auto-released from the socket.
3. Remove the memory module.

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Chapter 4

BIOS

3.1. Main

The AMI BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS RAM of the system stores the Setup utility and configurations. When you turn on the computer, the AMI BIOS is immediately activated. To enter the BIOS SETUP UTILITY, press “Delete” once the power is turned on. When the computer is shut down, the battery on the motherboard supplies the power for BIOS RAM.

The **Main Setup** screen lists the following information:

| Setting | Description |
|---------------------|---|
| BIOS Information | |
| BIOS Vendor | displays vendor name |
| Core Version | displays current core version information |
| BIOS Version | displays current BIOS version information |
| Build Date and Time | the date that the BIOS version was made/updated |
| System Language | Choose the system default language |

| | |
|-------------|---|
| System Date | <p>Set the system date. Note that the 'Day' automatically changes when you set the date.</p> <p>▶ The date format is: Day: Sun to Sat Month: 1 to 12 Date: 1 to 31 Year: 1998 to 2099</p> |
| System Time | <p>Set the system time.</p> <p>▶ The time format is: Hour: 00 to 23 Minute: 00 to 59 Second: 00 to 59</p> |

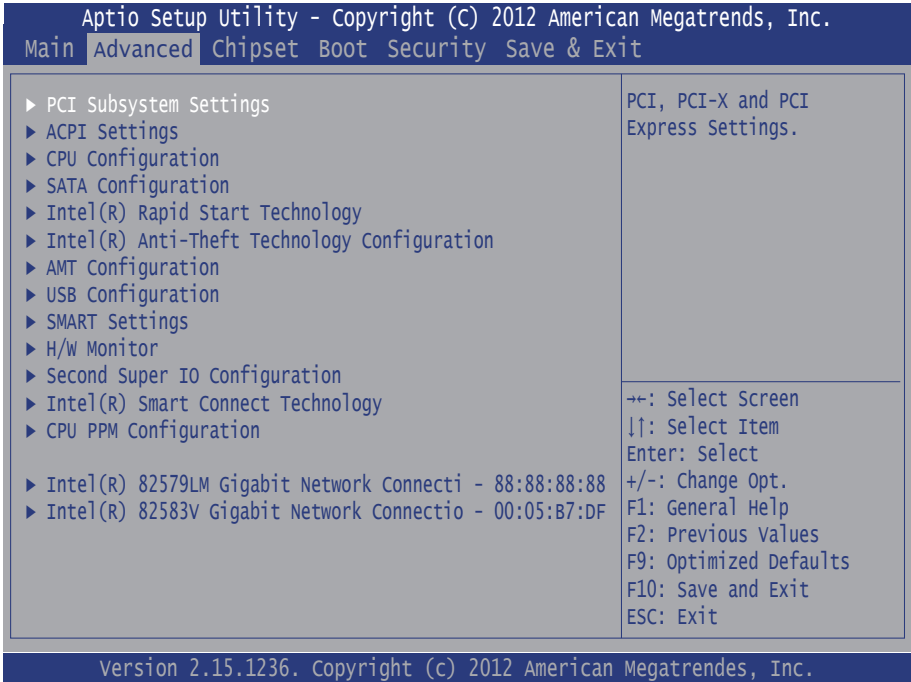
Key Commands

BIOS Setup Utility is mainly a key-based navigation interface. Please refer to the following key command instructions for navigation process.

| Keystroke | Function |
|-------------|--|
| ◀ ▶ | Move to highlight a particular configuration screen from the top menu bar / Move to highlight items on the screen |
| ▼ ▲ | Move to highlight previous/next item |
| Enter | Select and access a setup item/field |
| Esc | <p>On the Main Menu – Quit the setup and not save changes into CMOS (a message screen will display and ask you to select “OK” or “Cancel” for exiting and discarding changes. Use “←” and “→” to select and press “Enter” to confirm)</p> <p>On the Sub Menu – Exit current page and return to main menu</p> |
| Page Up / + | Increase the numeric value on a selected setup item / make change |
| Page Down - | Decrease the numeric value on a selected setup item / make change |
| F1 | Activate “General Help” screen |
| F10 | Save the changes that have been made in the setup and exit. (a message screen will display and ask you to select “OK” or “Cancel” for exiting and saving changes. Use “←” and “→” to select and press “Enter” to confirm) |

3.2. Advanced

The “Advanced” setting page provides you the options to configure the details of your hardware, such as PCI, ACPI, CPU, SATA, AMT, USB and Second Super IO.



| Setting | Description |
|--|-------------------|
| PCI Subsystem Settings | See Section 3.2.1 |
| ACPI Settings | See Section 3.2.2 |
| CPU Configuration | See Section 3.2.3 |
| SATA Configuration | See Section 3.2.4 |
| Intel(R) Rapid Start Technology | See Section 3.2.5 |
| Intel(R) Anti-Theft Technology Configuration | See Section 3.2.6 |
| AMT Configuration | See Section 3.2.7 |
| USB Configuration | See Section 3.2.8 |

| | |
|---|--------------------|
| SMART Settings | See Section 3.2.9 |
| H/W Monitor | See Section 3.2.10 |
| Second Super IO Configuration | See Section 3.2.11 |
| Intel(R) Smart Connect Technology | See Section 3.2.12 |
| CPU PPM Configuration | See Section 3.2.13 |
| Intel(R) 82579LM Gigabit Network Connection | See Section 3.2.14 |
| Intel(R) 82583V Gigabit Network Connection | See Section 3.2.15 |

3.2.1. PCI Subsystem Settings

| Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. | | |
|--|---------------------|---|
| Advanced | | |
| PCI Bus Driver Version | V 2.05.02 | Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding). |
| PCI 64bit Resources Handling Above 4G Decoding | [Disabled] | |
| PCI Common Settings | | |
| PCI Latency Timer | [32 PCI Bus Clocks] | |
| VGA Palette Snoop | [Disabled] | |
| PERR# Generation | [Disabled] | |
| SERR# Generation | [Disabled] | |
| | | ++: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |
| Version 2.15.1236. Copyright (c) 2012 American Megatrendes, Inc. | | |

| Setting | Description |
|------------------------------|--|
| PCI 64bit Resources Handling | |
| Above 4G Decoding | Enable or Disable (default) 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding). |
| PCI Common Settings | |
| PCI Latency Timer | Value to be programmed into PCI Latency Timer Register. ▶ Options: 32 (default)/ 64/96/128/160/192/224/248 PCI Bus Clocks. |
| VGA Palette Snoop | Enable or Disable (default) VGA Palette Registers Snooping. |
| PERR# Generation | Enable or Disable (default) PCI Device to Generate PERR#. |
| SERR# Generation | Enable or Disable (default) PCI Device to Generate SERR#. |

3.2.2. ACPI Settings

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

| | | |
|--------------------|-------------------------|---|
| ACPI Settings | | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS. |
| Enable Hibernation | [Enabled] | |
| ACPI Sleep State | [Both S1 and S3 ava...] | |

→+: Select Screen
 ↓↑: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F9: Optimized Defaults
 F10: Save and Exit
 ESC: Exit

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| Setting | Description |
|--------------------|--|
| Enable Hibernation | Enable (default) or Disable system ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS. |
| ACPI Sleep State | Select ACPI sleep state the system will enter when the SUSPEND button is pressed. ► Options: Suspend Disabled , S1 only (CPU Stop Clock), S3 only (Suspend to RAM), Both S1 and S3 available for OS to choose from (default). |

3.2.3. CPU Configuration

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

| | | |
|---------------------------------|------------|---|
| CPU Configuration | | To turn on/off prefetching of adjacent cache lines. |
| Genuine Intel(R) CPU @ 2.20GHz | | |
| CPU Signature | 306a4 | |
| Microcode Patch | 7 | |
| Max CPU Speed | 2200 MHz | |
| Min CPU Speed | 1600 MHz | |
| CPU Speed | 2200 MHz | |
| Processor Cores | 4 | |
| Intel HT Technology | Supported | |
| Intel VT-x Technology | Supported | |
| Intel SMX Technology | Supported | |
| 64-bit | Supported | |
| L1 Data Cache | 32 KB x 4 | |
| L1 Code Cache | 32 KB x 4 | |
| L2 Cache | 256 KB x 4 | |
| L3 Cache | 8192 KB | |
| Hyper-threading | [Enabled] | |
| Active Processor Cores | [All] | |
| Limit CPUID Maximum | [Disabled] | |
| Execute Disable Bit | [Enabled] | |
| Intel Virtualization Technology | [Disabled] | |
| Hardware Prefetcher | [Enabled] | |
| Adjacent Cache Line Prefetch | [Enabled] | |

→+: Select Screen
↓↑: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F9: Optimized Defaults
F10: Save and Exit
ESC: Exit

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| Setting | Description |
|-----------------|---|
| Hyper-threading | Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled (default) for other OS (OS not optimized for Hyper-threading Technology). When Disabled only one thread per enabled core is enabled. |

| | |
|---------------------------------|--|
| Active Processor Cores | Number of cores to enable in each processor package. ▶ Options: All (default), 1 , 2 , 3 . |
| Limit CPUID Maximum | Disabled for Windows XP ▶ Options: Enabled and Disabled (default). |
| Execute Disable Bit | XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 update 3.) ▶ Options: Enabled (default) and Disabled . |
| Intel Virtualization Technology | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. ▶ Options: Enabled and Disabled (default). |
| Hardware Prefetcher | To turn on/off the Mid Level Cache (L2) streamer prefetcher. ▶ Options: Enabled (default) and Disabled . |
| Adjacent Cache Line Prefetch | To turn on/off prefetching of adjacent cache lines. ▶ Options: Enabled (default) and Disabled . |

3.2.4. SATA Configuration

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 Advanced

| | | |
|---------------------|-----------|---|
| SATA Controller(s) | [Enabled] | Enable or Disable SATA Device. |
| SATA Mode Selection | [AHCI] | |
| Serial ATA Port 0 | Empty | →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |
| Software Preserve | Unknown | |
| Serial ATA Port 1 | Empty | |
| Software Preserve | Unknown | |
| Serial ATA Port 2 | Empty | |
| Software Preserve | Unknown | |
| Serial ATA Port 3 | Empty | |
| Software Preserve | Unknown | |
| Serial ATA Port 4 | Empty | |
| Software Preserve | Unknown | |
| Serial ATA Port 5 | Empty | |
| Software Preserve | Unknown | |

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| Setting | Description |
|---------------------|--|
| SATA Controller(s) | Enable (default) or Disable SATA Device. |
| SATA Mode Selection | Determine how SATA controller(s) operate. ► Options: IDE , AHCI (default) and RAID . |

3.2.5. Intel(R) Rapid Start Technology

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Advanced

Intel(R) Rapid Start Technology [Disabled]

→+: Select Screen
↓↑: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F9: Optimized Defaults
F10: Save and Exit
ESC: Exit

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3.2.6. Intel(R) Anti-Theft Technology Configuration

Disabling Intel(R) AT Allow User to login to platform. This is strictly for testing only. This does not disable Intel(R) AT Services in ME.

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Advanced

| | | |
|--|------------|---|
| Intel(R) Anti-Theft Technology Configuration | | Enable/Disable Intel (R) AT in BIOS for testing only. |
| Intel(R) Anti-Theft Technology | [Enabled] | |
| Intel(R) Anti-Theft Technology Rec | 3 | |
| Enter Intel(R) AT Suspend Mode | [Disabled] | |
| | | →←: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |

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| Setting | Description |
|------------------------------------|---|
| Intel(R) Anti-Theft Technology | Enable or Disable (default) Intel(R) AT in BIOS for testing only. |
| Intel(R) Anti-Theft Technology Rec | Set the number of times Recovery attempted will be allowed. |

3.2.7. AMT Configuration

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Advanced

| | | |
|------------------------------------|------------|--|
| Intel AMT | [Enabled] | Enable/Disable Intel (R) Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |
| ASF | [Enabled] | |
| Activate Remote Assistance Process | [Disabled] | |
| AMT CIRA Timeout | 0 | |

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| Setting | Description |
|------------------------------------|--|
| Intel AMT | Enable (default) or Disable Intel (R) Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device |
| ASF | Enable (default) or Disable Alert Specification Format. |
| Activate Remote Assistance Process | Trigger CIRA boot. ► Options: Enabled and Disabled (default). |

3.2.8. USB Configuration

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

| | |
|---|---|
| USB Configuration USB Devices: 1 Keyboard, 1 Mouse, 2 Hubs Legacy USB Support [Enabled] USB3.0 Support [Enabled] USB Beep Switch [Enabled] Port 60/64 Emulation [Enabled] | Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications. →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |
|---|---|

Version 2.15.1236. Copyright (c) 2012 American Megatrendes, Inc.

| Setting | Description |
|----------------------|---|
| Legacy USB Support | Enables (default) Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications. |
| USB3.0 Support | Enable (default) or Disable USB3.0 (XHCI) Controller support. |
| USB Beep Switch | Enable (default) or Disable USB Beep sound. |
| Port 60/64 Emulation | Enable (default) I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes. |

3.2.9. SMART Settings

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
 Advanced

| | |
|----------------------------|---|
| SMART Settings | Run SMART Self Test on all HDDs during POST. |
| SMART Self Test [Disabled] | |
| | →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |

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| Setting | Description |
|-----------------|--|
| SMART Self Test | Run SMART Self Test on all HDDs during POST. ► Options: Enabled and Disabled (default). |

3.2.10. H/W Monitor

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
 Advanced

| | | |
|----------------------------------|------------------------|--------------------------|
| FAN1 Mode setting | [Auto Fan by PWM Duty] | FAN Control Mode setting |
| CPU Temperature Limit of Highest | 55 | |
| CPU Temperature Limit of Lowest | 45 | |
| SYSF1 Highest Setting | 100 | |
| SYSF1 Second Setting | 70 | |
| SYSF1 Lowest Setting | 50 | |
| FAN2 Mode setting | [Auto Fan by PWM Duty] | |
| SYS Temperature Limit of Highest | 55 | |
| SYS Temperature Limit of Lowest | 45 | |
| SYSF2 Highest Setting | 100 | |
| SYSF2 Second Setting | 70 | |
| SYSF2 Lowest Setting | 50 | |
| FAN3 Mode setting | [Auto Fan by PWM Duty] | |
| SYS Temperature Limit of Highest | 55 | |
| SYS Temperature Limit of Lowest | 45 | |
| SYSF3 Highest Setting | 100 | |
| SYSF3 Second Setting | 70 | |
| SYSF3 Lowest Setting | 50 | |
| PC Health Status | | |
| CPU Temperature | : +26°C | |
| System temperature2 | : +25°C | |
| System temperature | : +27°C | |
| FAN1 Speed | : N/A | |
| FAN2 Speed | : N/A | |
| FAN3 Speed | : 2400 RPM | |
| Vcore | : +0.904 V | |
| +3.3V | : +3.408 V | |
| +1.05V | : +1.032 V | |
| VDIMM | : +1.493 V | |
| +5V | : +5.003 V | |
| +12V | : +12.056 V | |

++: Select Screen
 ↓↑: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F9: Optimized Defaults
 F10: Save and Exit
 ESC: Exit

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| Setting | Description |
|-----------------------|---|
| FAN1/2/3 Mode setting | Fan Control Mode Setting ► Options: Manual Duty Mode and Auto Fan by PWM Duty (default). |

| | |
|--|--|
| CPU/SYS Temperature Limit of Highest | Highest Temperature Setting. Min=0 Max=127 Please input Dec number: |
| CPU/SYS Temperature Limit of Lowest | Lowest Temperature Setting. Min=0 Max=127 Please input Dec number: |
| SYSF1/2/3 Highest Setting | Highest Speed Value Min=0 Max=100 Please input Dec number: |
| SYSF1/2/3 Second Setting | Second Speed Value Min=0 Max=100 Please input Dec number: |
| SYSF1/2/3 Lowest Setting | Lowest Speed Value Min=0 Max=100 Please input Dec number: |

3.2.11. Second Super IO Configuration

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Advanced

| | |
|---|--|
| <p>Second Super IO Configuration</p> <p>Super IO Chip Fintek F81216</p> <ul style="list-style-type: none"> ▶ Serial Port 1 Configuration ▶ Serial Port 2 Configuration ▶ Serial Port 3 Configuration ▶ Serial Port 4 Configuration | <p>Set Parameters of Serial Port 1 (COMA)</p> <hr/> <p>→+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit</p> |
|---|--|

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Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.

Advanced

| | | |
|-----------------------------|-----------|---|
| Serial Port 4 Configuration | | Enable or Disable Serial Port (COM) |
| Serial Port | [Enabled] | |
| I/O Settings | [IO=2E8h] | |
| IRQ Settings | [IRQ3] | |
| COM4 RS485 AutoFlow | [Disable] | →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |

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| Setting | Description |
|--|--|
| Serial Port | Enable (default) or Disable Serial Port (COM) |
| I/O Settings | Select an optimal setting for Super IO device. ▶ Options: IO=3F8h/2F8h/3E8h/2E8h/2F0h/2E0h |
| IRQ Settings | Select an optimal setting for Super IO device. ▶ Options: IRQ3/4/5/6/7/10/11/12 |
| COM4 RS485 AutoFlow (only for Serial Port 4) | COM4 RS485 Autoflow ▶ Options: Enabled and Disabled (default). |

3.2.12. Intel(R) Smart Connect Technology

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 Advanced

| | | |
|--------------------|------------|---|
| ISCT Configuration | [Disabled] | Enable/Disable ISCT Configuration. |
| | | →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |

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| Setting | Description |
|--------------------|---|
| ISCT Configuration | Enable or Disable (default) ISCT Configuration |

3.2.13. CPU PPM Configuration

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Advanced

| | |
|---|---|
| <p>CPU PPM Configuration</p> <p>EIST [Enabled]</p> <p>Turbo Mode [Enabled]</p> <p>CPU C3 Report [Enabled]</p> <p>CPU C6 Report [Enabled]</p> <p>CPU C7 Report [Enabled]</p> | <p>Enable/Disable Intel SpeedStep.</p> <hr/> <p>→+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit</p> |
|---|---|

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| Setting | Description |
|---------------|--|
| EIST | Enable (default) or Disable Intel SpeedStep |
| Turbo Mode | Enable (default) or Disable Turbo Mode |
| CPU C3 Report | Enable (default) or Disable CPU C3(ACPI C2) report to OS |
| CPU C6 Report | Enable (default) or Disable CPU C6(ACPI C3) report to OS |
| CPU C7 Report | Enable (default) or Disable CPU C7(ACPI C3) report to OS |

3.2.14. Intel(R) 82579LM Gigabit Network Connection

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.

Advanced

| | |
|---|---|
| <p>PORT CONFIGURATION MENU</p> <p>▶NIC Configuration</p> <p>Blink LEDs (range 0-15 seconds) 0</p> <p>PORT CONFIGURATION INFORMATION</p> <p>UEFI Driver: Intel(R) PRO/1000 4.8.01</p> <p>Adapter PBA: FFFFFFFF-0FF</p> <p>Chip Type: Intel PCH2</p> <p>PCI Device ID 1502</p> <p>PCI Bus:Device:Function 00:25:00</p> <p>Link Status [Disconnected]</p> <p>Factory MAC Address 88:88:88:88:87:88</p> | <p>Enable/Disable Intel SpeedStep.</p> <hr/> <p>→+: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit</p> |
|---|---|

Version 2.15.1236. Copyright (c) 2012 American Megatrends, Inc.

| Submenu / Setting | Description | | | | | | |
|-------------------------|--|-------------|-------------|------------|--|-------------|--|
| NIC Configuration | Configures the network device port by the following settings: | | | | | | |
| | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #d9ead3;"> <th style="width: 30%;">Setting</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">Link Speed</td> <td>Changes the link speed and the duplex for the current port. ▶ Options: AutoNeg, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half and 100 Mbps Full.</td> </tr> <tr> <td style="vertical-align: top;">Wake on LAN</td> <td>Enables/disables waking the system with a network message.</td> </tr> </tbody> </table> | Setting | Description | Link Speed | Changes the link speed and the duplex for the current port. ▶ Options: AutoNeg, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half and 100 Mbps Full. | Wake on LAN | Enables/disables waking the system with a network message. |
| | Setting | Description | | | | | |
| Link Speed | Changes the link speed and the duplex for the current port. ▶ Options: AutoNeg, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half and 100 Mbps Full. | | | | | | |
| Wake on LAN | Enables/disables waking the system with a network message. | | | | | | |
| Blink LEDs (range 0-15) | Specifies the duration for Blink LEDs. (Configurable are 0 to 15 seconds.) | | | | | | |
| Link Status | Shows the link status. | | | | | | |

3.2.15. Intel(R) 82583V Gigabit Network Connection

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Advanced

| | |
|--|---|
| <p>PORT CONFIGURATION MENU</p> <p>▶NIC Configuration</p> <p>Blink LEDs (range 0-15 seconds) 0</p> <p>PORT CONFIGURATION INFORMATION</p> <p>UEFI Driver: Intel(R) PRO/1000 4.8.01</p> <p>Adapter PBA: FFFFFFF-0FF</p> <p>Chip Type: Intel 82583v</p> <p>PCI Device ID 1502</p> <p>PCI Bus:Device:Function 02:00:00</p> <p>Link Status [Disconnected]</p> <p>Factory MAC Address 00:05:B7:DF:3B:6F</p> | <p>Enable/Disable Intel SpeedStep.</p> <hr/> <p>→+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit</p> |
|--|---|

Version 2.15.1236. Copyright (c) 2012 American Megatrendes, Inc.

| Submenu / Setting | Description | | | | | | |
|-------------------------|--|-------------|-------------|------------|--|-------------|--|
| NIC Configuration | Configures the network device port by the following settings: | | | | | | |
| | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #d9ead3;"> <th style="width: 30%;">Setting</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">Link Speed</td> <td>Changes the link speed and the duplex for the current port. ▶ Options: AutoNeg, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half and 100 Mbps Full.</td> </tr> <tr> <td style="vertical-align: top;">Wake on LAN</td> <td>Enables/disables waking the system with a network message.</td> </tr> </tbody> </table> | Setting | Description | Link Speed | Changes the link speed and the duplex for the current port. ▶ Options: AutoNeg, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half and 100 Mbps Full. | Wake on LAN | Enables/disables waking the system with a network message. |
| | Setting | Description | | | | | |
| Link Speed | Changes the link speed and the duplex for the current port. ▶ Options: AutoNeg, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half and 100 Mbps Full. | | | | | | |
| Wake on LAN | Enables/disables waking the system with a network message. | | | | | | |
| Blink LEDs (range 0-15) | Specifies the duration for Blink LEDs. (Configurable are 0 to 15 seconds.) | | | | | | |
| Link Status | Shows the link status. | | | | | | |

3.3. Chipset

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 Main Advanced **Chipset** Boot Security Save & Exit

| | |
|---|--|
| <ul style="list-style-type: none"> ▶ PCH-IO Configuration ▶ System Agent (SA) Configuration | <p>PCH Parameters</p> <hr/> <p>→+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit</p> |
|---|--|

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| Setting | Description |
|---------------------------------|-------------------|
| PCH-IO Configuration | See Section 3.3.1 |
| System Agent (SA) Configuration | See Section 3.3.2 |

3.3.1. PCH-IO Configuration

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Chipset

| | | |
|--|-------------|---------------------------------------|
| Intel PCH RC Version | 1.2.0.1 | PCI Express Configuration settings |
| Intel PCH SKU Name | QM77 | |
| Intel PCH Rev ID | 04/C1 | |
| ▶ PCH Express Configuration | | |
| ▶ USB Configuration | | |
| PCH LAN Controller | [Enabled] | |
| Wake on LAN | [Enabled] | |
| High Precision Event Timer Configuration | | |
| High Precision Timer | [Enabled] | |
| Restore AC Power LOSS | [Power Off] | |

→+: Select Screen
 ↓↑: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F9: Optimized Defaults
 F10: Save and Exit
 ESC: Exit

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| Setting | Description |
|--|---|
| PCH Express Configuration | See PCH Express Configuration tab |
| USB Configuration | See USB Configuration tab |
| PCH LAN Controller | Enable (default) or Disable onboard NIC. |
| Wake on LAN | Enable (default) or Disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.) |
| High Precision Event Timer Configuration | |
| High Precision Timer | Enable (default) or Disable the High Precision Event Timer. |
| Restore AC Power LOSS | Select AC power state when power is re-applied after a power failure. ▶ Options: Power Off (default), Power On and Last State . |

PCH Express Configuration

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Chipset

PCI Express Configuration

PCIE Port 2 is assigned to GLAN1

- ▶ PCI Express GLAN2 82583V
- ▶ PCI Express x1 slot
- ▶ PCI Express x4 slot

PCI Express GLAN2
82583V Settings.

→+: Select Screen
↓↑: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F9: Optimized Defaults
F10: Save and Exit
ESC: Exit

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Chipset

| | | |
|---|------------------------------------|---|
| PCI Express Root Port 3 [Enabled] ASPM Support [Auto] PME SCI [Enabled] Hot Plug [Disabled] PCIe Speed [Auto] | Control the PCI Express Root Port. | →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |
|---|------------------------------------|---|

Version 2.15.1236. Copyright (c) 2012 American Megatrendes, Inc.

| Setting | Description |
|------------------------------|---|
| PCI Express Root Port 3/4/x4 | Control the PCI Express Root Port. ▶ Options: Enabled (default) and Disabled . |
| ASPM Support | Set the ASPM Level: Force L0 - Force all links to L0 State; AUTO - BIOS auto configure; DISABLE - Disable ASPM ▶ Options: Disabled, L0s, L1, L0sL1, Auto (default) |
| PME SCI | Enable (default) or Disable PCI Express PME SCI. |
| Hot Plug | Enable or Disable (default) PCI Express Hot Plug. |
| PCIe Speed | Select PCI Express port speed. ▶ Options: Auto (default), Gen1, Gen2 |

USB Configuration

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Chipset

| | | |
|------------------------------------|--------------|---|
| USB Configuration | | Enable or disable xHCI Pre-Boot Driver support. |
| XHCI Pre-Boot Driver | [Enabled] | |
| xHCI Mode | [Smart Auto] | |
| HS Port #1 Switchable | [Enabled] | |
| HS Port #2 Switchable | [Enabled] | |
| HS Port #3 Switchable | [Enabled] | |
| HS Port #4 Switchable | [Enabled] | |
| xHCI Streams | [Enabled] | |
| EHCI1 | [Enabled] | |
| EHCI2 | [Enabled] | |
| USB Ports Per-Port Disable Control | [Disabled] | |

→+: Select Screen
 ↓↑: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F9: Optimized Defaults
 F10: Save and Exit
 ESC: Exit

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| Setting | Description |
|-----------------------------|---|
| XHCI Pre-Boot Driver | Enable (default) or Disable XHCI Pre-Boot Driver support. |
| xHCI Mode | Mode of operation of xHCI controller. ► Options: Smart Auto (default), Auto , Enabled , Disabled |
| HS Port #1/2/3/4 Switchable | Always for HS port switching between xHCI and EHCI. If disabled, port is routed to EHCI. If HS port is routed to xHCI, the corresponding SS port is enabled. ► Options: Enabled (default) and Disabled . |
| xHCI Streams | Enable (default) or Disable xHCI Maximum Primary Stream Array Size. |

| | |
|------------------------------------|--|
| EHCI1/2 | Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled. ▶ Options: Enabled (default) and Disabled . |
| USB Ports Per-Port Disable Control | Control each of the USB ports (0~13) disabling. ▶ Options: Enabled and Disabled (default). |

3.3.2. System Agent (SA) Configuration

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Chipset

| | | |
|--|--|--|
| System Agent Bridge Name System Agent RC version VT-d Capability VT-d ▶ LCD Control ▶ Graphics Configuration ▶ NB PCIe Configuration ▶ Memory Configuration | IvyBridge 1.2.0.0 Supported [Enabled] | Check to enable VT-d function on MCH. →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |
|--|--|--|

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| Setting | Description |
|------------------------|--|
| VT-d | Check to enable VT-d function on MCH. ▶ Options: Enabled (default) and Disabled . |
| LCD Control | See LCD Control tab |
| Graphics Configuration | See Graphics Configuration tab |
| NB PCIe Configuration | See NB PCIe Configuration tab |
| Memory Configuration | See Memory Configuration tab |

LCD Control

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Chipset

| | | |
|---------------------------|-----------------|--|
| LCD Control | | Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display ⇐+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |
| Primary IGFX Boot Display | [VBIOS Default] | |
| Panel Scaling | [Auto] | |
| Panel Color Depth | [18 Bit] | |

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| Setting | Description |
|---------------------------|--|
| Primary IGFX Boot Display | Select the Video Device that will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display. ▶ Options: VBIOS Default (default), CRT , LFP , DVI-I , DVI-D |
| Panel Scaling | Select the LCD panel scaling option used by the Internal Graphics Device. ▶ Options: Auto (default), Force Scaling |
| Panel Color Depth | Select the LFP Panel Color Depth ▶ Options: 18 Bit (default), 24 Bit |

Graphics Configuration

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Chipset

| | | |
|------------------------|---------|---|
| Graphics Configuration | | Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or Select SG for switchable Gfx. |
| IGFX VBIOS Version | 2132 | |
| IGfx Frequency | 400 MHz | |
| Primary Display | [Auto] | |
| Internal Graphics | [Auto] | |
| GTT Size | [2MB] | |
| Aperture Size | [256MB] | |
| DVMT Pre-Allocated | [64M] | |
| DVMT Total Gfx Mem | [256M] | |
| | | →←: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |

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| Setting | Description |
|--------------------|--|
| Primary Display | Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx. ► Options: Auto (default), Disabled , Enabled |
| Internal Graphics | Keep IGD enabled based on the setup options. ► Options: Auto (default), Disabled , Enabled |
| GTT Size | Select the GTT Size ► Options: 1MB , 2MB (default) |
| Aperture Size | Select the Aperture Size ► Options: 128MB , 256MB (default), 512MB |
| DVMT Pre-Allocated | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device ► Options: 32/64 (default) / 96/128/160/192/224/256/288/320/352/384/416/448/480/512/1024M |

| | |
|--------------------|---|
| DVMT Total Gfx Mem | Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device ▶ Options: 128M , 256M (default), MAX |
|--------------------|---|

NB PCIe Configuration

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Chipset

| | | |
|------------------------------|-------------|---|
| NB PCIe Configuration | | Configure PEG0 B0:D1:F0 Gen1-Gen3 |
| PEG0 | Not Present | |
| PEG0 - Gen X | [Auto] | |
| PEG0 ASPM | [Auto] | |
| Enable PEG | [Auto] | |
| Detect Non-Compliance Device | [Disabled] | |
| De-emphasis Control | [-3.5 dB] | |
| | | →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |

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| Setting | Description |
|--------------|--|
| PEG0 - Gen X | Configure PEG0 B0:D1:F0 Gen1-Gen3 ▶ Options: Auto (default), Gen1 , Gen2 , Gen3 |
| PEG0 ASPM | Control ASPM support for the PEG: Device 1 Function 0. This has no effect if PEG is not the currently active device. ▶ Options: Disabled , Auto (default), ASPM L0s , ASPM L1 , ASPM L0sL1 |

| | |
|------------------------------|---|
| Enable PEG | To enable or disable the PEG. ▶ Options: Disabled , Enabled , Auto (default) |
| Detect Non-Compliance Device | Detect Non-Compliance PCI Express Device in PEG ▶ Options: Enabled and Disabled (default). |
| De-emphasis Control | Configure the De-emphasis control on PEG ▶ Options: -6 dB , -3.5 dB (default) |

Memory Configuration

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Chipset

| | | |
|-------------------------------|----------------|------------------------|
| Memory Information | | |
| Memory RC Version | 1.2.0.0 | |
| Memory Frequency | 1333 MHz | |
| Total Memory | 4096 MB (DDR3) | |
| DIMM#0 | 4096 MB (DDR3) | |
| DIMM#1 | Not Present | |
| DIMM#2 | Not Present | |
| DIMM#3 | Not Present | |
| CAS Latency (tCL) | 9 | |
| Minimum delay time | | |
| CAS to RAS (tRCDmin) | 9 | →←: Select Screen |
| Row Precharge (tRPmin) | 9 | ↓↑: Select Item |
| Active to Precharge (tRASmin) | 24 | Enter: Select |
| | | +/-: Change Opt. |
| | | F1: General Help |
| | | F2: Previous Values |
| | | F9: Optimized Defaults |
| | | F10: Save and Exit |
| | | ESC: Exit |

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3.4. Boot

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
 Main Advanced Chipset **Boot** Security Save & Exit

| | |
|---|---|
| Boot Configuration Setup Prompt Timeout 1 Bootup NumLock State [On] | Select the keyboard NumLock state |
| Quiet Boot [Disabled] Fast Boot [Disabled] | |
| CSM16 Module version 07.69 | |
| Option ROM Messages [Force BIOS] INT19 Trap Response [Immediate] | |
| Boot Option Priorities ▶ CSM parameters | →+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit |

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| Setting | Description |
|----------------------|--|
| Setup Prompt Timeout | Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. |
| Bootup NumLock State | Select the keyboard NumLock state ▶ Options: On (default), Off |
| Quiet Boot | Enable or Disable (default) Quiet Boot option. |
| Fast Boot | Enable or Disable (default) boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options. |
| Option ROM Messages | Set display mode for Option ROM. Options: Force BIOS (default) and Keep Current . |
| INT19 Trap Response | BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot. ▶ Options: Immediate (default) and Postponed . |

| | |
|----------------|-------------------|
| CSM parameters | See Section 3.4.1 |
|----------------|-------------------|

3.4.1. CSM parameters

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Boot

| | | |
|---|---|--|
| <p>Launch CSM [Always] Launch PXE OpROM policy [Do not launch] Launch Storage OpROM policy [Legacy only] Launch Video OpROM policy [Legacy only]</p> | <p>This option controls if CSM will be launched</p> | <p>→+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit</p> |
|---|---|--|

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| Setting | Description |
|-----------------------------|---|
| Launch CSM | This option controls if CSM will be launched. ▶ Options: Always (default), Never . |
| Launch PXE OpROM policy | Controls the execution of UEFI and Legacy PXE OpROM. ▶ Options: Do not launch (default), Legacy only . |
| Launch Storage OpROM policy | Controls the execution of UEFI and Legacy Storage OpROM. ▶ Options: Do not launch , Legacy only (default). |

| | |
|---------------------------|---|
| Launch Video OpROM policy | <p>Controls the execution of UEFI and Legacy Video OpROM.</p> <p>► Options: Do not launch, Legacy only (default).</p> |
|---------------------------|---|

3.5. Security

The **Security** menu sets up the administrator or user password. Once an administrator password is set up, this BIOS SETUP utility is limited to access and will ask for the password each time any access is attempted.

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Main Advanced Chipset Boot **Security** Save & Exit

| | | | | | |
|---|----------------|---|----------------|----|--|
| <p>Password Description</p> <p>If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.</p> <p>If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.</p> <p>The password length must be in the following range:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">Minimum length</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Maximum length</td> <td style="text-align: right;">20</td> </tr> </table> <p>Administrator Password</p> <p>User Password</p> | Minimum length | 3 | Maximum length | 20 | <p>Set Administrator Password</p> <hr/> <p>→+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save and Exit ESC: Exit</p> |
| Minimum length | 3 | | | | |
| Maximum length | 20 | | | | |

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| Setting | Description |
|-----------------------------|---|
| Administrator/User Password | <p>To set up an administrator password:</p> <ol style="list-style-type: none"> 1. Select Administrator Password. The screen then pops up an Create New Password dialog. 2. Enter your desired password that is no less than 3 characters and no more than 20 characters. 3. Hit [Enter] key to submit. |

3.6. Save & Exit Options

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Main Advanced Chipset Boot Security **Save & Exit**

Save Changes and Exit
 Discard Changes and Exit
 Restore Defaults

Boot Override

Exit system setup after saving the changes.

→←: Select Screen
 ↓↑: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F9: Optimized Defaults
 F10: Save and Exit
 ESC: Exit

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| Setting | Description |
|--------------------------|---|
| Save Changes and Exit | Saves the changes and resets the system. ► Enter the item and then a dialog box pops up: Save configuration and exit? |
| Discard Changes and Exit | Exit system setup without saving any changes. ► Enter the item and then a dialog box pops up: Quit without saving? |
| Restore Defaults | Restore/Load Default values for all the setup options. ► Enter the item and then a dialog box pops up: Load Optimized Defaults? |
| Boot Override | Boot Override presents a list of boot devices on screen. Select the device to boot up the system regardless of the currently configured boot priority. |

Appendices

Appendix A. AMI BIOS Checkpoints

A.1. Checkpoint Ranges

| Status Code Range | Description |
|-------------------|--|
| 0x01 – 0x0B | SEC execution |
| 0x0C – 0x0F | SEC errors |
| 0x10 – 0x2F | PEI execution up to and including memory detection |
| 0x30 – 0x4F | PEI execution after memory detection |
| 0x50 – 0x5F | PEI errors |
| 0x60 – 0x8F | DXE execution up to BDS |
| 0x90 – 0xCF | BDS execution |
| 0xD0 – 0xDF | DXE errors |
| 0xE0 – 0xE8 | S3 Resume (PEI) |
| 0xE9 – 0xEF | S3 Resume errors (PEI) |
| 0xF0 – 0xF8 | Recovery (PEI) |
| 0xF9 – 0xFF | Recovery errors (PEI) |

A.2. Standard Checkpoints

SEC Phase

| Status Code | Description |
|------------------------|--|
| 0x00 | Not used |
| Progress Codes | |
| 0x01 | Power on. Reset type detection (soft/hard). |
| 0x02 | AP initialization before microcode loading |
| 0x03 | North Bridge initialization before microcode loading |
| 0x04 | South Bridge initialization before microcode loading |
| 0x05 | OEM initialization before microcode loading |
| 0x06 | Microcode loading |
| 0x07 | AP initialization after microcode loading |
| 0x08 | North Bridge initialization after microcode loading |
| 0x09 | South Bridge initialization after microcode loading |
| 0x0A | OEM initialization after microcode loading |
| 0x0B | Cache initialization |
| SEC Error Codes | |
| 0x0C – 0x0D | Reserved for future AMI SEC error codes |
| 0x0E | Microcode not found |
| 0x0F | Microcode not loaded |

PEI Phase

| Status Code | Description |
|-----------------------|--|
| Progress Codes | |
| 0x10 | PEI Core is started |
| 0x11 | Pre-memory CPU initialization is started |
| 0x12 | Pre-memory CPU initialization (CPU module specific) |
| 0x13 | Pre-memory CPU initialization (CPU module specific) |
| 0x14 | Pre-memory CPU initialization (CPU module specific) |
| 0x15 | Pre-memory North Bridge initialization is started |
| 0x16 | Pre-Memory North Bridge initialization (North Bridge module specific) |
| 0x17 | Pre-Memory North Bridge initialization (North Bridge module specific) |
| 0x18 | Pre-Memory North Bridge initialization (North Bridge module specific) |
| 0x19 | Pre-memory South Bridge initialization is started |
| 0x1A | Pre-memory South Bridge initialization (South Bridge module specific) |
| 0x1B | Pre-memory South Bridge initialization (South Bridge module specific) |
| 0x1C | Pre-memory South Bridge initialization (South Bridge module specific) |
| 0x1D – 0x2A | OEM pre-memory initialization codes |
| 0x2B | Memory initialization. Serial Presence Detect (SPD) data reading |
| 0x2C | Memory initialization. Memory presence detection |
| 0x2D | Memory initialization. Programming memory timing information |
| 0x2E | Memory initialization. Configuring memory |
| 0x2F | Memory initialization (other). |
| 0x30 | Reserved for ASL (see ASL Status Codes section below) |
| 0x31 | Memory Installed |
| 0x32 | CPU post-memory initialization is started |
| 0x33 | CPU post-memory initialization. Cache initialization |
| 0x34 | CPU post-memory initialization. Application Processor(s) (AP) initialization |
| 0x35 | CPU post-memory initialization. Boot Strap Processor (BSP) selection |
| 0x36 | CPU post-memory initialization. System Management Mode (SMM) initialization |
| 0x37 | Post-Memory North Bridge initialization is started |
| 0x38 | Post-Memory North Bridge initialization (North Bridge module specific) |
| 0x39 | Post-Memory North Bridge initialization (North Bridge module specific) |

| | |
|---------------------------------|--|
| 0x3A | Post-Memory North Bridge initialization (North Bridge module specific) |
| 0x3B | Post-Memory South Bridge initialization is started |
| 0x3C | Post-Memory South Bridge initialization (South Bridge module specific) |
| 0x3D | Post-Memory South Bridge initialization (South Bridge module specific) |
| 0x3E | Post-Memory South Bridge initialization (South Bridge module specific) |
| 0x3F-0x4E | OEM post memory initialization codes |
| 0x4F | DXE IPL is started |
| PEI Error Codes | |
| 0x50 | Memory initialization error. Invalid memory type or incompatible memory speed |
| 0x51 | Memory initialization error. SPD reading has failed |
| 0x52 | Memory initialization error. Invalid memory size or memory modules do not match. |
| 0x53 | Memory initialization error. No usable memory detected |
| 0x54 | Unspecified memory initialization error. |
| 0x55 | Memory not installed |
| 0x56 | Invalid CPU type or Speed |
| 0x57 | CPU mismatch |
| 0x58 | CPU self test failed or possible CPU cache error |
| 0x59 | CPU micro-code is not found or micro-code update is failed |
| 0x5A | Internal CPU error |
| 0x5B | reset PPI is not available |
| 0x5C-0x5F | Reserved for future AMI error codes |
| S3 Resume Progress Codes | |
| 0xE0 | S3 Resume is started (S3 Resume PPI is called by the DXE IPL) |
| 0xE1 | S3 Boot Script execution |
| 0xE2 | Video repost |
| 0xE3 | OS S3 wake vector call |
| 0xE4-0xE7 | Reserved for future AMI progress codes |
| S3 Resume Error Codes | |
| 0xE8 | S3 Resume Failed |
| 0xE9 | S3 Resume PPI not Found |
| 0xEA | S3 Resume Boot Script Error |
| 0xEB | S3 OS Wake Error |

Appendices

| | |
|-----------|-------------------------------------|
| 0xEC-0xEF | Reserved for future AMI error codes |
|-----------|-------------------------------------|

Recovery Progress Codes

| | |
|------|--|
| 0xF0 | Recovery condition triggered by firmware (Auto recovery) |
|------|--|

| | |
|------|--|
| 0xF1 | Recovery condition triggered by user (Forced recovery) |
|------|--|

| | |
|------|--------------------------|
| 0xF2 | Recovery process started |
|------|--------------------------|

| | |
|------|----------------------------------|
| 0xF3 | Recovery firmware image is found |
|------|----------------------------------|

| | |
|------|-----------------------------------|
| 0xF4 | Recovery firmware image is loaded |
|------|-----------------------------------|

| | |
|-----------|--|
| 0xF5-0xF7 | Reserved for future AMI progress codes |
|-----------|--|

Recovery Error Codes

| | |
|------|-------------------------------|
| 0xF8 | Recovery PPI is not available |
|------|-------------------------------|

| | |
|------|-------------------------------|
| 0xF9 | Recovery capsule is not found |
|------|-------------------------------|

| | |
|------|--------------------------|
| 0xFA | Invalid recovery capsule |
|------|--------------------------|

| | |
|-------------|-------------------------------------|
| 0xFB – 0xFF | Reserved for future AMI error codes |
|-------------|-------------------------------------|

DXE Phase

| Status Code | Description |
|-------------|--|
| 0x60 | DXE Core is started |
| 0x61 | NVRAM initialization |
| 0x62 | Installation of the South Bridge Runtime Services |
| 0x63 | CPU DXE initialization is started |
| 0x64 | CPU DXE initialization (CPU module specific) |
| 0x65 | CPU DXE initialization (CPU module specific) |
| 0x66 | CPU DXE initialization (CPU module specific) |
| 0x67 | CPU DXE initialization (CPU module specific) |
| 0x68 | PCI host bridge initialization |
| 0x69 | North Bridge DXE initialization is started |
| 0x6A | North Bridge DXE SMM initialization is started |
| 0x6B | North Bridge DXE initialization (North Bridge module specific) |
| 0x6C | North Bridge DXE initialization (North Bridge module specific) |
| 0x6D | North Bridge DXE initialization (North Bridge module specific) |
| 0x6E | North Bridge DXE initialization (North Bridge module specific) |
| 0x6F | North Bridge DXE initialization (North Bridge module specific) |
| 0x70 | South Bridge DXE initialization is started |
| 0x71 | South Bridge DXE SMM initialization is started |
| 0x72 | South Bridge devices initialization |
| 0x73 | South Bridge DXE Initialization (South Bridge module specific) |
| 0x74 | South Bridge DXE Initialization (South Bridge module specific) |
| 0x75 | South Bridge DXE Initialization (South Bridge module specific) |
| 0x76 | South Bridge DXE Initialization (South Bridge module specific) |
| 0x77 | South Bridge DXE Initialization (South Bridge module specific) |
| 0x78 | ACPI module initialization |
| 0x79 | CSM initialization |
| 0x7A – 0x7F | Reserved for future AMI DXE codes |
| 0x80 – 0x8F | OEM DXE initialization codes |
| 0x90 | Boot Device Selection (BDS) phase is started |
| 0x91 | Driver connecting is started |
| 0x92 | PCI Bus initialization is started |

Appendices

| | |
|-------------|---|
| 0x93 | PCI Bus Hot Plug Controller Initialization |
| 0x94 | PCI Bus Enumeration |
| 0x95 | PCI Bus Request Resources |
| 0x96 | PCI Bus Assign Resources |
| 0x97 | Console Output devices connect |
| 0x98 | Console input devices connect |
| 0x99 | Super IO Initialization |
| 0x9A | USB initialization is started |
| 0x9B | USB Reset |
| 0x9C | USB Detect |
| 0x9D | USB Enable |
| 0x9E – 0x9F | Reserved for future AMI codes |
| 0xA0 | IDE initialization is started |
| 0xA1 | IDE Reset |
| 0xA2 | IDE Detect |
| 0xA3 | IDE Enable |
| 0xA4 | SCSI initialization is started |
| 0xA5 | SCSI Reset |
| 0xA6 | SCSI Detect |
| 0xA7 | SCSI Enable |
| 0xA8 | Setup Verifying Password |
| 0xA9 | Start of Setup |
| 0xAA | Reserved for ASL (see ASL Status Codes section below) |
| 0xAB | Setup Input Wait |
| 0xAC | Reserved for ASL (see ASL Status Codes section below) |
| 0xAD | Ready To Boot event |
| 0xAE | Legacy Boot event |
| 0xAF | Exit Boot Services event |
| 0xB0 | Runtime Set Virtual Address MAP Begin |
| 0xB1 | Runtime Set Virtual Address MAP End |
| 0xB2 | Legacy Option ROM Initialization |
| 0xB3 | System Reset |
| 0xB4 | USB hot plug |
| 0xB5 | PCI bus hot plug |

| | |
|------------------------|---|
| 0xB6 | Clean-up of NVRAM |
| 0xB7 | Configuration Reset (reset of NVRAM settings) |
| 0xB8 – 0xBF | Reserved for future AMI codes |
| 0xC0 – 0xCF | OEM BDS initialization codes |
| DXE Error Codes | |
| 0xD0 | CPU initialization error |
| 0xD1 | North Bridge initialization error |
| 0xD2 | South Bridge initialization error |
| 0xD3 | Some of the Architectural Protocols are not available |
| 0xD4 | PCI resource allocation error. Out of Resources |
| 0xD5 | No Space for Legacy Option ROM |
| 0xD6 | No Console Output Devices are found |
| 0xD7 | No Console Input Devices are found |
| 0xD8 | Invalid password |
| 0xD9 | Error loading Boot Option (LoadImage returned error) |
| 0xDA | Boot Option is failed (StartImage returned error) |
| 0xDB | Flash update is failed |
| 0xDC | Reset protocol is not available |

ACPI/ASL Checkpoints

| Status Code | Description |
|-------------|---|
| 0x01 | System is entering S1 sleep state |
| 0x02 | System is entering S2 sleep state |
| 0x03 | System is entering S3 sleep state |
| 0x04 | System is entering S4 sleep state |
| 0x05 | System is entering S5 sleep state |
| 0x10 | System is waking up from the S1 sleep state |
| 0x20 | System is waking up from the S2 sleep state |
| 0x30 | System is waking up from the S3 sleep state |
| 0x40 | System is waking up from the S4 sleep state |
| 0xAC | System has transitioned into ACPI mode. Interrupt controller is in PIC mode. |
| 0xAA | System has transitioned into ACPI mode. Interrupt controller is in APIC mode. |

Appendix B: I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device.

The following table lists the I/O port addresses used.

| Address | Device Description |
|-----------------------|---|
| 0x00000020-0x00000021 | Programmable interrupt controller |
| 0x00000024-0x00000025 | Programmable interrupt controller |
| 0x00000028-0x00000029 | Programmable interrupt controller |
| 0x0000002C-0x0000002D | Programmable interrupt controller |
| 0x00000030-0x00000031 | Programmable interrupt controller |
| 0x00000034-0x00000035 | Programmable interrupt controller |
| 0x00000038-0x00000039 | Programmable interrupt controller |
| 0x0000003C-0x0000003D | Programmable interrupt controller |
| 0x000000A0-0x000000A1 | Programmable interrupt controller |
| 0x000000A4-0x000000A5 | Programmable interrupt controller |
| 0x000000A8-0x000000A9 | Programmable interrupt controller |
| 0x000000AC-0x000000AD | Programmable interrupt controller |
| 0x000000B0-0x000000B1 | Programmable interrupt controller |
| 0x000000B4-0x000000B5 | Programmable interrupt controller |
| 0x000000B8-0x000000B9 | Programmable interrupt controller |
| 0x000000BC-0x000000BD | Programmable interrupt controller |
| 0x000004D0-0x000004D1 | Programmable interrupt controller |
| 0x000004D0-0x000004D1 | Motherboard resources |
| 0x00000040-0x00000043 | System timer |
| 0x00000050-0x00000053 | System timer |
| 0x0000F0D0-0x0000F0D7 | Intel(R) 7 Series/C216 Chipset Family SATA AHCI Controller - 1E02 |
| 0x0000F0C0-0x0000F0C3 | Intel(R) 7 Series/C216 Chipset Family SATA AHCI Controller - 1E02 |
| 0x0000F0B0-0x0000F0B7 | Intel(R) 7 Series/C216 Chipset Family SATA AHCI Controller - 1E02 |
| 0x0000F0A0-0x0000F0A3 | Intel(R) 7 Series/C216 Chipset Family SATA AHCI Controller - 1E02 |
| 0x0000F060-0x0000F07F | Intel(R) 7 Series/C216 Chipset Family SATA AHCI Controller - 1E02 |
| 0x00000000-0x0000001F | Direct memory access controller |

| | |
|-------------------------|--|
| 0x00000000-0x0000001F | PCI bus |
| 0x00000081-0x00000091 | Direct memory access controller |
| 0x00000093-0x0000009F | Direct memory access controller |
| 0x000000C0-0x000000DF | Direct memory access controller |
| 0x0000003F8-0x0000003FF | Communications Port (COM1) |
| 0x000002F8-0x000002FF | Communications Port (COM2) |
| 0x000003E8-0x000003EF | Communications Port (COM3) |
| 0x000002E8-0x000002EF | Communications Port (COM4) |
| 0x00000D00-0x0000FFFF | PCI bus |
| 0x0000E000-0x0000EFFF | Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 3 - 1E14 |
| 0x00000070-0x00000077 | System CMOS/real time clock |
| 0x00000070-0x00000077 | Motherboard resources |
| 0x0000F0E0-0x0000F0E7 | Intel(R) Active Management Technology - SOL (COM5) |
| 0x00000010-0x0000001F | Motherboard resources |
| 0x00000022-0x0000003F | Motherboard resources |
| 0x00000044-0x0000005F | Motherboard resources |
| 0x00000062-0x00000063 | Motherboard resources |
| 0x00000065-0x0000006F | Motherboard resources |
| 0x00000065-0x0000006F | Motherboard resources |
| 0x00000072-0x0000007F | Motherboard resources |
| 0x00000080-0x00000080 | Motherboard resources |
| 0x00000080-0x00000080 | Motherboard resources |
| 0x00000084-0x00000086 | Motherboard resources |
| 0x00000088-0x00000088 | Motherboard resources |
| 0x0000008C-0x0000008E | Motherboard resources |
| 0x00000090-0x0000009F | Motherboard resources |
| 0x000000A2-0x000000BF | Motherboard resources |
| 0x000000E0-0x000000EF | Motherboard resources |
| 0x00000290-0x0000029F | Motherboard resources |
| 0x0000F000-0x0000F03F | Intel(R) HD Graphics 4000 |
| 0x000003B0-0x000003BB | Intel(R) HD Graphics 4000 |
| 0x000003C0-0x000003DF | Intel(R) HD Graphics 4000 |
| 0x0000002E-0x0000002F | Motherboard resources |
| 0x0000004E-0x0000004F | Motherboard resources |

Appendices

| | |
|-----------------------|--|
| 0x00000061-0x00000061 | Motherboard resources |
| 0x00000063-0x00000063 | Motherboard resources |
| 0x00000067-0x00000067 | Motherboard resources |
| 0x00000092-0x00000092 | Motherboard resources |
| 0x000000B2-0x000000B3 | Motherboard resources |
| 0x00000680-0x0000069F | Motherboard resources |
| 0x00000200-0x0000020F | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x00000400-0x00000453 | Motherboard resources |
| 0x00000458-0x0000047F | Motherboard resources |
| 0x00000500-0x0000057F | Motherboard resources |
| 0x0000164E-0x0000164F | Motherboard resources |
| 0x000000F0-0x000000FF | Numeric data processor |
| 0x0000F040-0x0000F05F | Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22 |
| 0x00000454-0x00000457 | Motherboard resources |

Appendix C: Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

| Level | Function |
|--------|--|
| IRQ 0 | System timer |
| IRQ 4 | Communications Port (COM1) |
| IRQ 4 | Communications Port (COM3) |
| IRQ 3 | Communications Port (COM2) |
| IRQ 3 | Communications Port (COM4) |
| IRQ 8 | System CMOS/real time clock |
| IRQ 13 | Numeric data processor |
| IRQ 11 | Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22 |

Appendix D: BIOS Memory Mapping

| Address | Device Description |
|-----------------------|---|
| 0xF7D40000-0xF7D5FFFF | Intel(R) 82583V Gigabit Network Connection |
| 0xF7C00000-0xF7CFFFFF | Intel(R) 82583V Gigabit Network Connection |
| 0xF7C00000-0xF7CFFFFF | Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 3 - 1E14 |
| 0xF7D60000-0xF7D63FFF | Intel(R) 82583V Gigabit Network Connection |
| 0xF7E37000-0xF7E373FF | Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E26 |
| 0xF7E36000-0xF7E367FF | Intel(R) 7 Series/C216 Chipset Family SATA AHCI Controller - 1E02 |
| 0xFED00000-0xFED003FF | High Precision Event Timer, HPET |
| 0xF7E38000-0xF7E383FF | Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E2D |
| 0xF7E20000-0xF7E2FFFF | Intel (R) USB 3.0 Extensible Host Controller |
| 0xA0000-0xBFFFF | PCI bus |
| 0xA0000-0xBFFFF | Intel(R) HD Graphics 4000 |
| 0xD0000-0xD3FFF | PCI bus |
| 0xD4000-0xD7FFF | PCI bus |
| 0xD8000-0xDBFFF | PCI bus |
| 0xDC000-0xDFFFF | PCI bus |

Appendices

| | |
|-----------------------|--|
| 0xE0000-0xE3FFF | PCI bus |
| 0xE4000-0xE7FFF | PCI bus |
| 0xDFA00000-0xFEAF0000 | PCI bus |
| 0xDFA00000-0xFEAF0000 | Motherboard resources |
| 0xF7E3C000-0xF7E3C00F | Intel(R) Management Engine Interface |
| 0xFED40000-0xFED44FFF | System board |
| 0x20000000-0x201FFFFF | System board |
| 0x40004000-0x40004FFF | System board |
| 0xF7E3A000-0xF7E3AFFF | Intel(R) Active Management Technology - SOL (COM5) |
| 0xFED1C000-0xFED1FFFF | Motherboard resources |
| 0xFED10000-0xFED17FFF | Motherboard resources |
| 0xFED18000-0xFED18FFF | Motherboard resources |
| 0xFED19000-0xFED19FFF | Motherboard resources |
| 0xF8000000-0xFBFFFF00 | Motherboard resources |
| 0xFED20000-0xFED3FFFF | Motherboard resources |
| 0xFED90000-0xFED93FFF | Motherboard resources |
| 0xFED45000-0xFED8FFFF | Motherboard resources |
| 0xFF000000-0xFFFFFFFF | Motherboard resources |
| 0xFF000000-0xFFFFFFFF | Intel(R) 82802 Firmware Hub Device |
| 0xFEE00000-0xFEE0FFFF | Motherboard resources |
| 0xF7800000-0xF7BFFFFF | Intel(R) HD Graphics 4000 |
| 0xE0000000-0xEFFFFFFF | Intel(R) HD Graphics 4000 |
| 0xF7E30000-0xF7E33FFF | High Definition Audio Controller |
| 0xF7E00000-0xF7E1FFFF | Intel(R) 82579LM Gigabit Network Connection |
| 0xF7E39000-0xF7E39FFF | Intel(R) 82579LM Gigabit Network Connection |
| 0xF7E35000-0xF7E350FF | Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22 |

Appendix E: Watchdog Timer (WDT) Setting

WDT is widely used for industry application to monitoring the activity of CPU. Application software depends on its requirement to trigger WDT with adequate timer setting. Before WDT time out, the functional normal system will reload the WDT. The WDT never time out for a normal system. The WDT will not be reload by an abnormal system, then WDT will time out and reset the system automatically to avoid abnormal operation.

This board supports 255 levels watchdog timer by software programming I/O ports.

Below is an assembly program example for disable and load of WDT.

```

/*----- Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

/*----- routing, sub-routing -----*/

void main()
{
/*----- index port 0x4e -----*/
    outportb(0x4e, 0x87);          /* initial IO port */
    outportb(0x4e, 0x87);          /* twice, */

    outportb(0x4e, 0x07);          /* point to logical device */
    outportb(0x4e+1, 0x07);        /* select logical device 7 */
    outportb(0x4e, 0xf5);          /* select offset f5h */
    outportb(0x4e+1, 0x40);        /* set bit5 = 1 to clear bit5 */
    outportb(0x4e, 0xf0);          /* select offset f0h */
    outportb(0x4e+1, 0x81);        /* set bit7 =1 to enable WDTRST# */
    outportb(0x4e, 0xf6);          /* select offset f6h */
    outportb(0x4e+1, 0x05);        /* update offset f6h to 0ah :10sec
*/

    outportb(0x4e, 0xf5);          /* select offset f5h */
    outportb(0x4e+1, 0x20);        /* set bit5 = 1 enable watch dog
time */

    outportb(0x4e, 0xAA);          /* stop program F71869E, Exit */
/*----- index port 0x2e -----*/
    outportb(0x2e, 0x87);          /* initial IO port */
    outportb(0x2e, 0x87);          /* twice, */

    outportb(0x2e, 0x07);          /* point to logical device */
    outportb(0x2e+1, 0x07);        /* select logical device 7 */
    outportb(0x2e, 0xf5);          /* select offset f5h */
    outportb(0x2e+1, 0x40);        /* set bit5 = 1 to clear bit5 */
    outportb(0x2e, 0xf0);          /* select offset f0h */
    outportb(0x2e+1, 0x81);        /* set bit7 =1 to enable WDTRST# */
    outportb(0x2e, 0xf6);          /* select offset f6h */

```

```
        outportb(0x2e+1, 0x05);          /* update offset f6h to 0ah :10sec
*/
        outportb(0x2e, 0xf5);           /* select offset f5h */
        outportb(0x2e+1, 0x20);         /* set bit5 = 1 enable watch dog
time */
        outportb(0x2e, 0xAA);           /* stop program F71869E, Exit */
}
```

Appendix F: Digital I/O Setting

Below are the source codes written in C, please take them for Digital I/O application examples. The default I/O address is 6Eh.

C Language Code

```
//-----
#include "DigitalIO.h"

#define DELAY_TIME 10
//-----

/*****/
/* Variable */
/*****/

int SMB_PORT_AD = 0x0400;           // SM bus Add = 0400h
int SMB_DI0_ADD = 0x6e;           // Fintek F75111 Add = 6eh

bool bWinIoInitOK;
//-----

/*****/
/* Function */
/*****/

unsigned char SMB_Byte_READ(int SMPORT, int DeviceID, int iREG_INDEX);
void SMB_Byte_WRITE(int SMPORT, int DeviceID, int oREG_INDEX, int oREG_DATA);
void GPIO_Control(void);
//-----

#pragma argsused
```

```
BOOL WINAPI DllMain(HINSTANCE hinstDLL, DWORD fwdreason, LPVOID lpvReserved)
{
    bWinIoInitOK = InitializeWinIo();

    return 1;
}
//-----

void _export __stdcall DIO_Open()
{
    GPIO_Control();
}
//-----

void _export __stdcall DIO_Close()
{
    if (bWinIoInitOK)
    {
        ShutdownWinIo();
    }
}
//-----

unsigned char SMB_Byte_READ(int SMPORT, int DeviceID, int iREG_INDEX)
{
    DWORD iData;

    SetPortVal (SMPORT+02, 0x00, 1);
    SetPortVal (SMPORT+00, 0xff, 1);
    Sleep (DELAY_TIME);
    SetPortVal (SMPORT+04, DeviceID, 1);
    SetPortVal (SMPORT+03, iREG_INDEX, 1);
    SetPortVal (SMPORT+02, 0x48, 1);
    Sleep (DELAY_TIME);

    GetPortVal (SMPORT+05, &iData, 1);

    return iData;
}
//-----

void SMB_Byte_WRITE(int SMPORT, int DeviceID, int oREG_INDEX, int oREG_DATA)
{
    SetPortVal (SMPORT+02, 0x00, 1);
    SetPortVal (SMPORT+00, 0xff, 1);
    Sleep (DELAY_TIME);
    SetPortVal (SMPORT+04, DeviceID, 1);
    SetPortVal (SMPORT+03, oREG_INDEX, 1);
    SetPortVal (SMPORT+05, oREG_DATA, 1);
    SetPortVal (SMPORT+02, 0x48, 1);
    Sleep (DELAY_TIME);
}
//-----

void GPIO_Control(void)
{

```

```
/* GPIO10~17 Output pin control */
SMB_Byte_WRITE(SMB_PORT_AD,SMB_DIO_ADD,0x10,0xff);
Sleep(DELAY_TIME);

/* GPIO20~27 Input pin control */
SMB_Byte_WRITE(SMB_PORT_AD,SMB_DIO_ADD,0x20,0x00);
Sleep(DELAY_TIME);

/* GPIO30~33 Output pin control */
SMB_Byte_WRITE(SMB_PORT_AD,SMB_DIO_ADD,0x40,0xff);
Sleep(DELAY_TIME);
}
//-----

void _export __stdcall DIO_Out(int iData)
{
    int iTemp;

    // GPI1X Output
    SMB_Byte_WRITE(SMB_PORT_AD,SMB_DIO_ADD,0x11,iData);

    // GPI3X Output
    iTemp = ( iData & 0x04 ) >> 2;
    SMB_Byte_WRITE(SMB_PORT_AD,SMB_DIO_ADD,0x41,iTemp);
}
//-----

int _export __stdcall DIO_In()
{
    DWORD iData;

    // GPI2X Input
    iData = SMB_Byte_READ(SMB_PORT_AD,SMB_DIO_ADD,0x22);
    iData = SMB_Byte_READ(SMB_PORT_AD,SMB_DIO_ADD,0x22);
    iData = SMB_Byte_READ(SMB_PORT_AD,SMB_DIO_ADD,0x22);

    return iData;
}
//-----
```


Digital IO Usage Table (Super IO Chipset F75111)

| Pin | Description | Chipset Pin# | Chipset Pin Description |
|------------|--------------------|---------------------|--------------------------------|
| 1 | DIO0 | 10 | GPIO10 |
| 2 | DIO1 | 11 | GPIO11 |
| 3 | DIO2 | 12 | GPIO12 |
| 4 | DIO3 | 3 | GPIO13 |
| 5 | DIO4 | 9 | GPIO14 |
| 6 | DIO5 | 19 | GPIO15 |
| 7 | DIO6 | 4 | GPIO16 |
| 8 | DIO7 | 5 | GPIO17 |
| 9 | DIO8 | 6 | GPIO20 |
| 10 | DIO9 | 7 | GPIO21 |
| 11 | DIO10 | 8 | GPIO22 |
| 12 | DIO11 | 24 | GPIO23 |
| 13 | DIO12 | 23 | GPIO24 |
| 14 | DIO13 | 22 | GPIO25 |
| 15 | DIO14 | 21 | GPIO26 |
| 16 | DIO15 | 20 | GPIO27 |