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# PICO-BSW1

Pico-ITX Board

User's Manual 2nd Ed

*Last Updated: January 5, 2017*

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## Packing List

Before setting up your product, please make sure the following items have been shipped:

| Item | Quantity |
|---|---|
| ● PICO-BSW1 | 1 |
| ● Product DVD with User's Manual (in pdf) and drivers | 1 |
| ● Heat Spreader | 1 |
| ● COM + Line-out Cable | 1 |

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

## About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

## Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any AC supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out for high temperatures when the system is running.
14. Do not touch the heat sink or heat spreader when the system is running
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please the contact our service personnel:
    i. Damaged power cord or plug
    ii. Liquid intrusion to the device
    iii. Exposure to moisture
    iv. Device is not working as expected or in a manner as described in this manual
    v. The device is dropped or damaged
    vi. Any obvious signs of damage displayed on the device
18. DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20° C (-4°F) OR ABOVE 60°C (140°F) TO PREVENT DAMAGE.

## FCC Statement

This device complies with Part 15 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.

*Caution:*

*There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.*

*Attention:*

*Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.*
*Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.*

## China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

| 部件名称 | 有毒有害物质或元素 | | | | | |
|---|---|---|---|---|---|---|
| | 铅<br>(Pb) | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr(VI)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 印刷电路板<br>及其电子组件 | O | O | O | O | O | O |
| 外部信号<br>连接器及线材 | O | O | O | O | O | O |

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

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

备注：此产品所标示之环保使用期限，系指在一般正常使用状况下。

## China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products

AAEON Main Board/ Daughter Board/ Backplane

| Component | Poisonous or Hazardous Substances or Elements | | | | | |
|---|---|---|---|---|---|---|
| | Lead (Pb) | Mercury (Hg) | Cadmium (Cd) | Hexavalent Chromium (Cr(VI)) | Polybrominated Biphenyls (PBB) | Polybrominated Diphenyl Ethers (PBDE) |
| PCB & Other Components | O | O | O | O | O | O |
| Wires & Connectors for External Connections | O | O | O | O | O | O |

O：The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.

X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.

Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only

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# Chapter 1

## Product Specifications

## 1.1 Specifications

| System | |
|---|---|
| Form Factor | Pico-ITX |
| Processor | Intel® N3160 Quad Core 1.6GHz (6W),<br>Intel® N3060 Dual Core 1.6GHz (6W),<br>Intel® X5-E8000 Quad Core 1.04GHz (5W) |
| System Memory | 204-pin DDR3L 1600 SODIMM, up to 8 GB |
| Chipset | Intel® N3160 Quad Core 1.6GHz (6W),<br>Intel® N3060 Dual Core 1.6GHz (6W),<br>Intel® X5-E8000 Quad Core 1.04GHz (5W) |
| BIOS | AMI / SPI |
| Wake On LAN | Yes |
| Watchdog Timer | 255 levels |
| Power Requirement | DC 12 V |
| Power Supply Type | AT/ATX (default). lockable connector optional |
| System Cooling | Head spreader; Heatsink optional |
| Board Size | 100 x 72 mm (3.94 x 2.84") |
| Gross Weight | 200 g (0.44 .lb) |
| Operating Temperature | 0 ~ 60°C (32 ~ 140°F ) |
| Storage Temperature | -40 ~ 80°C (-40 ~176°F) |
| Operation Humidity | 0 ~ 90% relative humidity, non-condensing |

## Display

| | |
|---|---|
| ● Chipset | Intel® N3160 Quad Core 1.6GHz (6W),<br>Intel® N3060 Dual Core 1.6GHz (6W),<br>Intel® X5-E8000 Quad Core 1.04GHz (5W) |
| ● Resolution | LVDS (18/24bit 2CH) 1920 x 1200<br>HDMI up to 3840 x 2160<br>DDI (BIO) |
| ● LCD Interface | 18/24-bit LVDS |

## I/O

| | |
|---|---|
| ● Storage | SATA III 6.0Gb/s x 1,<br>mSATA/MiniCard (Full size) x 1 |
| ● Ethernet | Realtek RTL 8111E 10/100/1000Base-TX<br>RJ-45 x 1 |
| ● USB | USB 3.0 x 2 |
| ● Serial Port | RS-232 x 1<br>RS-232/422/485 x 1 (Ring / +5V / +12V) |
| ● Audio | Line-out x 1 |
| ● DI/O | 4-bit programmable (2-in/ 2-out) |
| ● Expansion Slot | Mini Card(Half-size) x 1,<br>BIO x 1, (Optional)<br>I2C x 1 or Smbus x 1 |

# Chapter 2

## Hardware Information

## 2.1 Dimensions

### Component Side

Component Side

Solder Side

## Heat Spreader

unit:mm
(17.00)
(11.20)
1.60
8.50
2.00
100.00

100.00
3.00
94.00
50.00
4-M3 Extrude
b
b
a
a
4-Ø4*90° Sala
4-M2.5 Extrude
50.00
47.00
66.00
b
b
17.00
a
a
9.50
7.00
76.00
3.00

## 2.2 Jumpers and Connectors

### Component Side

Component Side

Solder Side

## 2.3 List of Jumpers

Please refer to the table below for all of the board's jumpers that you can configure for your application

| Label | Function |
|---|---|
| JP1 | Auto Power Button Selection and Clear CMOS Jumper |
| JP2 | LVDS Port VDD and Backlight Inverter VCC Selection |
| JP3 | LVDS Port Backlight Lightness Control Mode Selection |
| JP4 | COM2 Pin8 Function Selection |

### 2.3.1 Auto Power Button and Clear CMOS Jumper (JP1)

CMOS Normal (Default) (1-3)
AT Mode (2-4)

Clear CMOS (3-5)
ATX Mode (4-6)

### 2.3.2 LVDS Port VDD and Backlight Inverter VCC Selection (JP2)

LVDS Port VDD +3.3V (Default) (3-5)
Backlight Inverter VCC +5V (Default) (2-4)

LVDS Port VDD +5V (1-3)
Backlight Inverter VCC +12V (4-6)

### 2.3.3 LVDS Port Backlight Control Mode Selection (JP3)

BKLT_CTRL_VR (Default) (1-2)

LVDS_BKLCTL_CON (2-3)

### 2.3.4 COM2 Pin8 Function Selection (JP4)

+12V (1-2)

Ring(Default) (3-4)

+5V (5-6)

## 2.4 List of Connectors

Please refer to the table below for all of the board's connectors that you can configure for your application

| Label | Function |
|---|---|
| JP16 | Front Panel Connector |
| CN1 | USB Ports 0 and 1 |
| CN3 | RTC Battery |
| CN5 | LVDS Port Inverter / Backlight Connector |
| CN6 | LVDS Port |
| CN8 | BIO (Board-Board Connector) |
| CN9 | LAN (RJ-45) |
| CN10 | Mini-Card Slot (Half-Mini Card) |
| CN11 | SATA Port |
| CN12 | +5V Output for SATA HDD |
| CN13 | Mini-Card Slot (Full-Mini Card) |
| CN18 | 4bit DIO |
| CN20 | LPC Port |
| CN21 | COM Port (COM1 and COM2) and Audio I/O Port |
| CN22 | External +12V Input |
| CN24 | HDMI Port |
| TH1 | Thermal Sensor (Near CPU) |
| TH2 | Thermal Sensor (Near PCB) |

### 2.4.1 Front Panel Connector (JP16)

| Pin | Pin Name | Pin | Pin Name |
|---|---|---|---|
| Pin 1 | PWR_BTN- | Pin 2 | PWR_BTN+ |
| Pin 3 | HDD_LED- | Pin 4 | HDD_LED+ |
| Pin 5 | SPEAKER- | Pin 6 | SPEAKER+ |
| Pin 7 | PWR_LED- | Pin 8 | PWR_LED+ |
| Pin 9 | H/W RESET- | Pin 10 | H/W RESET+ |

### 2.4.2 USB Ports 0 and 1 (CN1)

| Pin | Pin Name | Signal Type | Signal level |
|---|---|---|---|
| 1 | +5VSB | PWR | +5V |
| 2 | USB0_D- | DIFF | |
| 3 | USB0_D+ | DIFF | |

| Pin | Pin Name | Signal Type | Signal level |
|---|---|---|---|
| 4 | GND | GND | |
| 5 | USB0_SSRX– | DIFF | |
| 6 | USB0_SSRX+ | DIFF | |
| 7 | GND | GND | |
| 8 | USB0_SSTX– | DIFF | |
| 9 | USB0_SSTX+ | DIFF | |
| 10 | +5VSB | PWR | +5V |
| 11 | USB1_D- | DIFF | |
| 12 | USB1_D+ | DIFF | |
| 13 | GND | GND | |
| 14 | USB1_SSRX– | | |
| 15 | USB1_SSRX+ | | |
| 16 | GND | GND | |
| 17 | USB1_SSTX– | | |
| 18 | USB1_SSTX+ | | |

### 2.4.3 RTC Battery (CN3)

| Pin | Pin Name | Signal Type | Signal level |
|---|---|---|---|
| 1 | +3.3V | PWR | 3.3V |
| 2 | GND | GND | |

### 2.4.4 LVDS Port Inverter / Backlight Connector (CN5)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | BKL_PWR | PWR | +5V / +12V |
| 2 | BKL_CONTROL | OUT | |
| 3 | GND | GND | |
| 4 | GND | GND | |
| 5 | BKL_ENABLE | OUT | +3.3V |

### 2.4.5 LVDS Port (CN6)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | BKL_ENABLE | OUT | |
| 2 | BKL_CONTROL | OUT | |
| 3 | LCD_PWR | PWR | +3.3V/+5V |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 4 | GND | GND | |
| 5 | LVDS_A_CLK- | DIFF | |
| 6 | LVDS_A_CLK+ | DIFF | |
| 7 | LCD_PWR | PWR | +3.3V/+5V |
| 8 | GND | GND | |
| 9 | LVDS_DA0- | DIFF | |
| 10 | LVDS_DA0+ | DIFF | |
| 11 | LVDS_DA1- | DIFF | |
| 12 | LVDS_DA1+ | DIFF | |
| 13 | LVDS_DA2- | DIFF | |
| 14 | LVDS_DA2+ | DIFF | |
| 15 | LVDS_DA3- | DIFF | |
| 16 | LVDS_DA3+ | DIFF | |
| 17 | DDC_DATA | I/O | +3.3V |
| 18 | DDC_CLK | I/O | +3.3V |
| 19 | LVDS_DB0- | DIFF | |
| 20 | LVDS_DB0+ | DIFF | |
| 21 | LVDS_DB1- | DIFF | |
| 22 | LVDS_DB1+ | DIFF | |
| 23 | LVDS_DB2- | DIFF | |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 24 | LVDS_DB2+ | DIFF | |
| 25 | LVDS_DB3- | DIFF | |
| 26 | LVDS_DB3+ | DIFF | |
| 27 | LCD_PWR | PWR | +3.3V/+5V |
| 28 | GND | GND | |
| 29 | LVDS_B_CLK- | DIFF | |
| 30 | LVDS_B_CLK+ | DIFF | |

### 2.4.6 BIO Connector (CN8)

| Pin | Pin Name | Pin | Pin Name |
|---|---|---|---|
| 1 | +12VSB | 2 | GND |
| 3 | GND | 4 | PCIE_TXN0 |
| 5 | PCIE_RXN0 | 6 | PCIE_TXP0 |
| 7 | PCIE_RXP0 | 8 | GND |
| 9 | GND | 10 | NC |
| 11 | NC | 12 | NC |
| 13 | NC | 14 | GND |
| 15 | GND | 16 | PS_ON# |
| 17 | NC | 18 | NC |
| 19 | +5VSB | 20 | +5VSB |
| 21 | +5VSB | 22 | +5VSB |
| 23 | PCIE_REF_CLK0 | 24 | RESET# |
| 25 | PCIE_REF_CLK0# | 26 | GND |

| Pin | Pin Name | Pin | Pin Name |
|---|---|---|---|
| 27 | GND | 28 | NC |
| 29 | NC | 30 | NC |
| 31 | NC | 32 | GND |
| 33 | GND | 34 | NC |
| 35 | NC | 36 | NC |
| 37 | NC | 38 | GND |
| 39 | GND | 40 | NC |
| 41 | NC | 42 | GND |
| 43 | NC | 44 | NC |
| 45 | GND | 46 | NC |
| 47 | USBN0 | 48 | GND |
| 49 | USBP0 | 50 | USBN1 |
| 51 | GND | 52 | USBP2 |
| 53 | SMB_CLK | 54 | GND |
| 55 | SMB_DATA | 56 | WAKE# |
| 57 | GND | 58 | USB_OC0# |
| 59 | +5V | 60 | USB_OC1# |
| 61 | +5V | 62 | +5V |
| 63 | +5V | 64 | +5V |
| 65 | LPC_AD0 | 66 | LPC_FRAME# |
| 67 | LPC_AD1 | 68 | SERIRQ |
| 69 | LPC_AD2 | 70 | LPC_DRQ |
| 71 | LPC_AD3 | 72 | PWG/GPIO0 |
| 73 | GND | 74 | AGND |
| 75 | LPC_CLK | 76 | AUD_LINEOUT_L |
| 77 | PME# | 78 | AUD_LINEOUT_R |

| Pin | Pin Name | Pin | Pin Name |
|---|---|---|---|
| 79 | GND | 80 | GND |

## 2.4.7 LAN (RJ-45) Port (CN9)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | MDI0+ | DIFF | |
| 2 | MDI0- | DIFF | |
| 3 | MDI1+ | DIFF | |
| 4 | MDI2+ | DIFF | |
| 5 | MDI2- | DIFF | |
| 6 | MDI1- | DIFF | |
| 7 | MDI3+ | DIFF | |
| 8 | MDI3- | DIFF | |

## 2.4.8 Mini-Card Slot (Half-Mini Card) (CN10)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | PCIE_WAKE# | IN | |
| 2 | +3.3VSB | PWR | +3.3V |
| 3 | NC | | |
| 4 | GND | GND | |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 5 | NC | | |
| 6 | +1.5V | PWR | +1.5V |
| 7 | PCIE_CLK_REQ# | IN | |
| 8 | NC | PWR | |
| 9 | GND | GND | |
| 10 | NC | I/O | |
| 11 | PCIE_REF_CLK- | DIFF | |
| 12 | NC | IN | |
| 13 | PCIE_REF_CLK+ | DIFF | |
| 14 | NC | | |
| 15 | GND | GND | |
| 16 | NC | PWR | |
| 17 | NC | | |
| 18 | GND | GND | |
| 19 | NC | | |
| 20 | W_DISABLE# | OUT | +3.3V |
| 21 | GND | GND | |
| 22 | PCIE_RST# | OUT | +3.3V |
| 23 | PCIE_RX- | DIFF | |
| 24 | +3.3VSB | PWR | +3.3V |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 25 | PCIE_RX+ | DIFF | |
| 26 | GND | GND | |
| 27 | GND | GND | |
| 28 | +1.5V | PWR | +1.5V |
| 29 | GND | GND | |
| 30 | SMB_CLK | I/O | +3.3V |
| 31 | PCIE_TX- | DIFF | |
| 32 | SMB_DATA | I/O | +3.3V |
| 33 | PCIE_TX+ | DIFF | |
| 34 | GND | GND | |
| 35 | GND | GND | |
| 36 | USB_D- | DIFF | |
| 37 | GND | GND | |
| 38 | USB_D+ | DIFF | |
| 39 | +3.3VSB | PWR | +3.3V |
| 40 | GND | GND | |
| 41 | +3.3VSB | PWR | +3.3V |
| 42 | NC | | |
| 43 | GND | GND | |
| 44 | NC | | |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 45 | NC | | |
| 46 | NC | | |
| 47 | NC | | |
| 48 | +1.5V | PWR | +1.5V |
| 49 | NC | | |
| 50 | GND | GND | |
| 51 | NC | | |
| 52 | +3.3VSB | PWR | +3.3V |

### 2.4.9 SATA Port (CN11)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | GND | GND | |
| 2 | SATA_TX1+ | DIFF | |
| 3 | SATA_TX1- | DIFF | |
| 4 | GND | GND | |
| 5 | SATA_RX1- | DIFF | |
| 6 | SATA_RX1+ | DIFF | |
| 7 | GND | GND | |

## 2.4.10 +5V Output for SATA HDD (CN12)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | +5V | PWR | +5V |
| 2 | GND | GND | |

## 2.4.11 MiniCard Slot (Full-Mini Card) (CN13)

| Pin | Pin Name | Signal Type | Signal level |
|---|---|---|---|
| 1 | PCIE_WAKE# | IN | |
| 2 | +3.3VSB/+3.3V | PWR | +3.3V |
| 3 | NC | | |
| 4 | GND | GND | |
| 5 | NC | | |
| 6 | +1.5V | PWR | +1.5V |
| 7 | PCIE_CLK_REQ# | IN | |
| 8 | UIM_PWR | PWR | |
| 9 | GND | GND | |
| 10 | UIM_DATA | I/O | |
| 11 | PCIE_REF_CLK- | DIFF | |

| Pin | Pin Name | Signal Type | Signal level |
|---|---|---|---|
| 12 | UIM_CLK | IN | |
| 13 | PCIE_REF_CLK+ | DIFF | |
| 14 | UIM_RST | IN | |
| 15 | GND | GND | |
| 16 | UIM_VPP | PWR | |
| 17 | NC | | |
| 18 | GND | GND | |
| 19 | NC | | |
| 20 | W_DISABLE# | OUT | +3.3V |
| 21 | GND | GND | |
| 22 | PCIE_RST# | OUT | +3.3V |
| 23 | PCIE_RX-/mSATARX+ | DIFF | |
| 24 | +3.3VSB/+3.3V | PWR | +3.3V |
| 25 | PCIE_RX+/mSATARX- | DIFF | |
| 26 | GND | GND | |
| 27 | GND | GND | |
| 28 | +1.5V | PWR | +1.5V |
| 29 | GND | GND | |
| 30 | SMB_CLK | I/O | +3.3V |
| 31 | PCIE_TX-/mSATATX- | DIFF | |
| 32 | SMB_DATA | I/O | +3.3V |

| Pin | Pin Name | Signal Type | Signal level |
|---|---|---|---|
| 33 | PCIE_TX+/mSATATX+ | DIFF | |
| 34 | GND | GND | |
| 35 | GND | GND | |
| 36 | USB_D- | DIFF | |
| 37 | GND | GND | |
| 38 | USB_D+ | DIFF | |
| 39 | +3.3VSB/+3.3V | PWR | +3.3V |
| 40 | GND | GND | |
| 41 | +3.3VSB/+3.3V | PWR | +3.3V |
| 42 | NC | | |
| 43 | GND | GND | |
| 44 | NC | | |
| 45 | NC | | |
| 46 | NC | | |
| 47 | NC | | |
| 48 | +1.5V | PWR | +1.5V |
| 49 | NC | | |
| 50 | GND | GND | |
| 51 | NC | | |
| 52 | +3.3VSB/+3.3V | PWR | +3.3V |

### 2.4.12 Digital IO Port (CN18)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | +5V | PWR | +5V |
| 2 | DIO0 | I/O | +5V |
| 3 | DIO1 | I/O | +5V |
| 4 | DIO2 | I/O | +5V |
| 5 | DIO3 | I/O | +5V |
| 6 | GND | GND | |

### 2.4.13 LPC Port (CN20)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | LAD0 | I/O | +3.3V |
| 2 | LAD1 | I/O | +3.3V |
| 3 | LAD2 | I/O | +3.3V |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 4 | LAD3 | I/O | +3.3V |
| 5 | +3.3V | PWR | +3.3V |
| 6 | LFRAME# | IN | |
| 7 | LRESET# | OUT | +3.3V |
| 8 | GND | GND | |
| 9 | LCLK | OUT | |
| 10 | I2C0_CLK (Default)/SMBUS_CLK(Option) | I/O | +3.3V |
| 11 | I2C_DATA (Default) /SMBUS_DATA(Option) | I/O | +3.3V |
| 12 | SERIRQ | I/O | +3.3V |

| SMBUS (Optional) | | | |
|---|---|---|---|
| Pin | Pin Name | Signal Type | Signal Level |
| 8 | GND | GND | |
| 10 | SMBUS_CLK | I/O | +3.3V |
| 11 | SMBUS_DATA | I/O | +3.3V |

| I2C (Optional) | | | |
|---|---|---|---|
| Pin | Pin Name | Signal Type | Signal Level |
| 8 | GND | GND | |
| 10 | I2C0_CLK | I/O | +3.3V |
| 11 | I2C0_DATA | I/O | +3.3V |

### 2.4.14 COM Port & Audio I/O Connector (CN21)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | DCDB | IN | |
| 2 | DSRB | IN | |
| 3 | RXB | IN | |
| 4 | RTSB | OUT | ±9V |
| 5 | TXB | OUT | ±9V |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 6 | CTSB | IN | |
| 7 | DTRB | OUT | ±9V |
| 8 | RIB/+5V/+12V | IN/ PWR | +5V/+12V |
| 9 | DCDA | IN | |
| 10 | DSRA | IN | |
| 11 | RXA | IN | |
| 12 | RTSA | OUT | ±9V |
| 13 | TXA | OUT | ±9V |
| 14 | CTSA | IN | |
| 15 | DTRA | OUT | ±9V |
| 16 | RIA | IN | |
| 17 | GND | GND | |
| 18 | AGND | GND | |
| 19 | LOUT_R | I/O | |
| 20 | LOUT_L | I/O | |

## 2.4.15 External +12V Input (CN22)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | +12V | PWR | +12V |
| 2 | GND | GND | |

## 2.4.16 HDMI Port (CN24)

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 1 | TMDS_DAT2+ | DIFF | |
| 2 | GND | GND | |
| 3 | TMDS_DAT2- | DIFF | |
| 4 | TMDS_DAT1+ | DIFF | |
| 5 | GND | GND | |
| 6 | TMDS_DAT1- | DIFF | |
| 7 | TMDS_DAT0+ | DIFF | |
| 8 | GND | GND | |
| 9 | TMDS_DAT0- | DIFF | |
| 10 | TMDS_CLK+ | DIFF | |

| Pin | Pin Name | Signal Type | Signal Level |
|---|---|---|---|
| 11 | GND | GND | |
| 12 | TMDS_CLK- | DIFF | |
| 13 | NC | | |
| 14 | NC | | |
| 15 | DDC_CLK | I/O | +5V |
| 16 | DDC_DATA | I/O | +5V |
| 17 | GND | GND | |
| 18 | +5V | I/O | +5V |
| 19 | HPLG_DETECT | IN | |

# Chapter 3

AMI BIOS Setup

## 3.1 System Test and Initialization

The board uses certain routines to perform testing and initialization. If an error, fatal or non-fatal, is encountered, a few short beeps or an error message will be outputted. The board can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.

## 3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press <Del> or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

Main – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Enable/ Disable boot option for legacy network devices

Chipset – For hosting bridge parameters

Boot – Enable/ Disable quiet Boot Option

Security – The setup administrator password can be set here

Save & Exit –Save your changes and exit the program

## 3.3 Setup Submenu: Main

Press "Delete" to enter Setup

Options summary: (*default setting*)

| | | |
|---|---|---|
| System Date | Day MM:DD:YYYY | |
| Change the month, year and century. The 'Day' is changed automatically. | | |
| System Time | HH : MM : SS | |
| Change the clock of the system. | | |

## 3.4 Setup Submenu: Advanced

Options summary: (*default setting*)

| | | |
|---|---|---|
| CPU Configuration | | |
| CPU Configuration Parameters | | |
| SATA Configuration | | |
| SATA Device Configuration | | |
| USB Configuration | | |
| USB Configuration Parameters | | |
| SIO Configuration | | |
| SIO Chip configuration .Enable or Disable SIO Logical Devices, Resources and Features settings, etc. | | |
| Hardware Monitor | | |
| | | |

| | | |
|---|---|---|
| Power Management | | |
| System ACPI/Power Mode/Wake Event Configuration | | |
| Digital IO Port Configuration | | |
| Set Input/Output of digital Port Configuration | | |

## 3.4.1 Advanced: CPU configuration

Options summary: (*default setting*)

| | | |
|---|---|---|
| EIST | *Enabled* | |
| | Disabled | |
| Enable/Disable Intel SpeedStep feature. | | |
| Turbo Mode | *Enabled* | |
| | Disabled | |
| Turbo mode. | | |

| | | |
|---|---|---|
| Intel Virtualization Technology | *Enabled* | |
| | Disabled | |
| When enabled, a VMM can utilize the additional hardware capabilities provide by Vanderpool Technology | | |
| CPU C state Report | *Enabled* | |
| | Disabled | |
| Enable/Disable CPU C state report to OS. | | |

## 3.4.2 Advanced: SATA Configuration

Options summary: (*default setting*)

| | | |
|---|---|---|
| SATA Mode | *AHCI Mode* | |
| Only AHCI mode support on this platform | | |
| SATA Port0/Port1 HotPlug | Enabled | |
| | *Disabled* | |
| Enabled/Disabled SATA Port0/Port1 HotPlug function | | |

### 3.4.3 Advanced: USB Configuration

Options summary: (*default setting*)

| | | |
|---|---|---|
| XHCI Mode | *Enabled* | |
| | Disabled | |
| Mode of operation of xHCI controller | | |
| Legacy USB Support | *Enabled* | |
| | Disabled | |
| | Auto | |
| Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI application | | |

### 3.4.4 Advanced: SIO Configuration

Options summary: (*default setting*)

| | | |
|---|---|---|
| Serial Port 1/2 Configuration | | |
| View and Set Basic properties of the SIO Logical device. Like IO Base , IRQ Range , DMA Channel and Device Mode. | | |

### 3.4.4.1 SIO Configuration: Serial Port 1 / 2 Configuration

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Advanced

Serial Port  x Configuration                    Enable or Disable this Logical
                                                Devcie.
Use This Device                  [Enabled]

Logical Device Settings:
Current :     IO=xxxh; IRQ=x;

Possible:                        [Auto]
Mode    :                        [RS232]

WARNING: disabling SIO Logical Devices may have unwanted
side effects.
PROCEED WITH CAUTION.                           →←: Select Screen
                                                ↑↓: Select Item
                                                Enter: Select
                                                +/-: Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F3: Optimized Defaults
                                                F4: Save & Exit
                                                ESC: Exit

Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

Options summary: (*default setting*)

| | | |
|---|---|---|
| Use This Device | Disabled | |
| | *Enabled* | |
| En/Disable specified serial port. | | |
| Change Settings (COM1) | *Use Automatic Settings* | |
| | IO=3F8h; IRQ=4; | |
| | IO=2F8h; IRQ=3; | |
| Change Settings (COM2) | *Use Automatic Settings* | |
| | IO=2F8h; IRQ=3; | |
| | IO=3F8h; IRQ=4; | |
| Select a resource setting for Super IO device. | | |
| Mode | *RS232* | |

| | | |
|---|---|---|
| | RS422 | |
| | RS485 | |
| Configure COM operated as RS232, RS422 or RS485. Only COM2 support this function. | | |

## 3.4.5 Advanced: Hardware Monitor

## 3.4.6 Advanced: CSM Configuration

Options summary: (*default setting*)

| | | |
|---|---|---|
| CSM Support | *Enabled* | |
| | Disable | |
| Enable/Disable CSM Support. | | |
| Boot option filter | *UEFI and Legacy* | |
| | Legacy only | |
| | UEFI only | |
| This option controls Legacy/UEFI ROMs priority | | |
| Launch PXE ROM | *DIsabled* | |
| | Enabled | |
| Controls the execution of UEF and Legacy PXE OpROM | | |

| | | |
|---|---|---|
| Storage | Do not launch | |
| | UEFI | |
| | *Legacy* | |
| Controls the execution of UEFI and Legacy Storage OpROM. | | |
| Video | Do not launch | |
| | UEFI | |
| | *Legacy* | |
| Controls the execution of UEFI and Legacy Video OpROM. | | |

## 3.4.7 Advanced: Power Management

```
Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Main

Power Management                                  Select system power mode.

Power Mode                    [ATX Type]
Restore AC Power Loss         [Last State]

Wake Events
RI Wake Event                 [Enabled]
RTC wake system from S5       [Disabled]

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

Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

Options summary: (*default setting*)

| | | |
|---|---|---|
| Power Mode | *ATX Type* | |
| | AT Type | |
| Select system power mode | | |
| Restore AC Power Loss | Power Off | |
| | Power on | |
| | *Late State* | |
| | | |
| RI Wake Event | *Enabled* | |
| | Disabled | |
| Enabled or disabled wake on ring function. | | |

| | | |
|---|---|---|
| RTC wake system from S5 | *Disabled* | |
| | Fixed Time | |
| | Dynamic Time | |
| Enable system to wake from S5 using RTC alarm. | | |
| Wake up day | 0-31 | |
| Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up | | |
| Wake up hour | 0-23 | |
| | | |
| Wake up minute | 0-59 | |
| | | |
| Wake up second | 0-59 | |
| | | |
| Wake up minute increase | 1-5 | |
| | | |

## 3.4.8 Advanced: Digital IO Port Configuration

```
Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
Advanced

Digital IO Port Configuration                    Set DIO as Input or Output

DIO Port1                          [Output]
  Output Level                     [High  ]
DIO Port2                          [Output]
  Output Level                     [High  ]
DIO Port3                          [Output]
  Output Level                     [High  ]
DIO Port4                          [Output]
  Output Level                     [High  ]
DIO Port5                          [Input ]
DIO Port6                          [Input ]
DIO Port7                          [Input ]
DIO Port8                          [Input ]

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

Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

Options summary: (*default setting*)

| | | |
|---|---|---|
| DIO Port1/2/3/4 | Input | |
| | *Output* | |
| Set DIO Port1/2/3/4 as Input or Output | | |
| DIO Port5/6/7/8 | *Input* | |
| | Output | |
| Set GPIO3/GPIO4 as Input or Output | | |
| Output Level | Hi | |
| | *Low* | |
| Set GPIO Level when used as Output | | |

## 3.5 Setup submenu: Chipset

Options summary: (*default setting*)

| | | |
|---|---|---|
| North Bridge | | |
| North Bridge Parameters. | | |
| South Bridge | | |
| South Bridge Parameters | | |

## 3.5.1 Chipset: North Bridge

Options summary: (*default setting*)

| | | |
|---|---|---|
| Max TOLUD | *2GB* | |
| | 2.25 GB | |
| | 2.5 GB | |
| | 2.75 GB | |
| Maximum Value of TOLUD. | | |

| | | |
|---|---|---|
| Primary Boot Display | *Auto* | |
| | Extension Board | |
| | LVDS | |
| | HDMI | |
| Select the Video Device which will be activated during POST. This has no effect if external graphics present.<br>Secondary boot display Selection will appear based on your selection.<br>VGA mode will be supported only on primary disply. | | |
| Secondary Boot Display | *Disabled* | |
| | Extension Board | |
| | LVDS | |
| | HDMI | |
| Select Primary boot display device | | |
| DVMT Pre-Allocated | *32MB* | |
| | 32MB~512MB | |
| Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. | | |
| DVMT Total Gfx Mem | 128MB | |
| | *256MB* | |
| | Max | |
| Select DVMT 5.0 Total Graphic Memory size used by the IGD. | | |
| LVDS Panel Configuration | | |
| Config LVDS panel parameters. | | |

### 3.5.1.1 North Bridge: LVDS Panel Configuration

```
Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Main

LVDS Panel Configuration                    Enable/Disabled this panel

LVDS                          [Enabled]
  Panel Type                  [1024x768@60Hz]
  Color Depth                 [18-Bit]
  Backlight Type              [Normal]
  Backlight Level             [ 80%]
  Backlight PWM Freq          [ 220Hz]

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

Version 2.17.1249. Copyright (C) 2016 American Megatrends, Inc.
```

Options summary: (*default setting*)

| | | |
|---|---|---|
| LVDS | Disabled | |
| | *Enabled* | |
| Enable or Disable LVDS interface | | |
| Panel Type | 640x480 | |
| | 800x480 | |
| | 800x600 | |
| | 1024x600 | |
| | *1024x768* | |
| | 1280x768 | |
| | 1280x800 | |
| | 1280x1024 | |
| | 1366x768 | |

| | | |
|---|---|---|
| | 1440x900 | |
| | 1600x1200 | |
| | 1920x1080 | |
| | 1920x1200 | |
| Select panel resolution. | | |
| Color Depth | *18-Bit* | |
| | 24-Bit | |
| | 36-Bit | |
| | 48-Bit | |
| Select color depth of the panel | | |
| Backlight Type | Inverted | |
| | *Normal* | |
| Select Backlight control type.<br>Inverted: Brightest for low PWM duty cycle and low voltage.<br>Normal: Brightest for high PWM duty cycle and high voltage. | | |
| Backlight Level | 100% | |
| | 90% | |
| | *80%* | |
| | 70% | |
| | 60% | |
| | 50% | |
| | 40% | |
| | 30% | |
| | 20% | |
| | 10% | |
| | 0% | |
| Select Backlight Level | | |

## 3.5.2 Chipset: South Bridge

Options summary: (*default setting*)

| | | |
|---|---|---|
| Audio Controller | Disabled | |
| | *Enabled* | |
| Enable or disabled Azalia device for audio function. | | |

## 3.6 Setup submenu: Security

```
Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
 Main  Advanced  Chipset  Security  Boot  Save & Exit

Password Description                          Set Administrator Password

If ONLY the Administrator's password is set,
then this only limits access to Setup and is
only asked for when entering Setup.
If ONLY the User's password is set, then this
is a power on password and must be entered to
boot or enter Setup. In Setup the User will
have Administrator rights.
The password length must be
in the following range:
Minimum length                    3
Maximum length                    20

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

Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

### Change User/Administrator Password

You can set a User Password once an Administrator Password is set. The password will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your password for a final confirmation. Press Enter again after you have retyped it correctly.

### Removing the Password

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

## 3.7 Setup submenu: Boot

```
Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit

Boot Configuration                                  Enables or disables Quiet Boot
                                                    option
Quiet Boot                          [Enabled]
Launch PXE ROM                      [Disabled]

Boot Option Priorities
Boot Option #1                      [Device Modelname]
Boot Option #2                      [Device Modelname]
Boot Option #3                      [Device Modelname]
Boot Option #4                      [Device Modelname]
Boot Option #5                      [Device Modelname]

CD/DVD ROM Drive BBS Priorities
Hard Drive BBS Priorities                           →←: Select Screen
Floppy Drive BBS Priorities                         ↑↓: Select Item
Network Device BBS Priorities                       Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit

Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
```

Options summary: (*default setting*)

| | | |
|---|---|---|
| Quiet Boot | Disabled | |
| | *Enabled* | |
| En/Disable showing boot logo. | | |
| Launch PXE OpROM | *Disabled* | |
| | Enabled | |
| En/Disable network OpROM for legacy PXE boot | | |
| Boot Option #X/<br>XXXX Drive BBS Priorities | | |
| The order of boot priorities. | | |

### 3.7.1 Boot: BBS Priorities

Options summary: (*default setting*)

| | | |
|---|---|---|
| Boot Option #x | Disabled | |
| | Device name | |
| Sets the system boot order | | |

## 3.8 Setup submenu: Save & Exit

Options summary: (*default setting*)

| | | |
|---|---|---|
| Save Changes and Reset | | |
| Reset the system after saving the changes | | |
| Discard Changes and Exit | | |
| Reset system setup without saving any changes | | |
| Restore Defaults | | |
| Restore/Load Default values for all the setup options. | | |

# Chapter 4

## Drivers Installation

## 4.1 Product CD/DVD

The PICO-BSW1 comes with a product DVD that contains all the drivers and utilities you need to setup your product. Insert the DVD and follow the steps in the autorun program to install the drivers.

In case the program does not start, follow the sequence below to install the drivers.

### Step 1 – Install Chipset Driver

1. Open the **Step1 - Chipset** folder and open the **SetupChipset.exe** file
2. Follow the instructions
3. Drivers will be installed automatically

### Step 2 – Install Graphic Driver

1. Open the **Step2 - Graphic** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Driver will be installed automatically

### Step 3 – Install LAN Driver

1. Open the **Step3 - LAN** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Driver will be installed automatically

### Step 4 – Install Audio Driver

1. Open the **Step4 - Audio** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Driver will be installed automatically

### Step 5 – Install TXE Driver

1. Open the **Step5 - TXE** folder and open the **Setup.exe** file
2. Follow the instructions
3. Driver will be installed automatically

### Step 6 – Install USB3.0 Driver

1. Open the **Step6 - USB3.0** folder and open the **Setup.exe** file
2. Follow the instructions
3. Driver will be installed automatically

### Step 7 – Install Serial Port Driver (Optional)

1. Open the **STEP7 - Serial Port Driver(Optional)** folder and open the **Setup.exe** file
2. Follow the instructions
3. Driver will be installed automatically

# Appendix A

Watchdog Timer Programming

## A.1 Watchdog Timer Registers

| Table 1 : Watch dog relative IO address | | |
|---|---|---|
| | Default Value | Note |
| I/O Base Address | 0x2E | I/O Base address for Watchdog operation.<br>This address is assigned by SIO LDN7 |

| Table 2 : Watchdog relative register table | | | | |
|---|---|---|---|---|
| Register | Offset | BitNum | Value | Note |
| Watchdog WDTRST# Enable | 0x00 | 7 | 1 | Enable/Disable time out output via WDTRST#<br>0: Disable<br>1: Enable |
| Pulse Width | 0x05 | 0:1 | 01 | Width of Pulse signal<br>00: 1ms (do not use)<br>01: 25ms<br>10: 125ms<br>11: 5s<br>*Pulse width is must longer then 16ms.* |
| Signal Polarity | 0x05 | 2 | 0 | 0: low active<br>1: high active<br>*Must set this bit to 0* |
| Counting Unit | 0x05 | 3 | 0 | Select time unit.<br>0: second<br>1: minute |
| Output Signal Type | 0x05 | 4 | 1 | 0: Level<br>1: Pulse<br>*Must set this bit to 1* |
| Watchdog Timer Enable | 0x05 | 5 | 1 | 0: Disable<br>1: Enable |
| Timeout Status | 0x05 | 6 | 1 | 1: timeout occurred. Write a 1 to clear timeout status |
| Timer Counter | 0x06 | | | Time of watchdog timer (0~255) |

## A.2 Watchdog Sample Program

```
*****************************************************************************
// WDT I/O operation relative definition (Please reference to Table 1)
#define   WDTAddr        0x510   // WDT I/O base address
Void   WDTWriteByte(byte Register, byte Value);
byte   WDTReadByte(byte Register);
Void   WDTSetReg(byte Register, byte Bit, byte Val);
// Watch Dog relative definition (Please reference to Table 2)
#define   DevReg          0x00   // Device configuration register
      #define   WDTRstBit   0x80   // Watchdog WDTRST# (Bit7)
      #define   WDTRstVal   0x80   // Enabled WDTRST#
#define   TimerReg       0x05   // Timer register
      #define   PSWidthBit     0x00     // WDTRST# Pulse width (Bit0:1)
      #define   PSWidthVal     0x01     // 25ms for WDTRST# pulse
      #define   PolarityBit    0x02     // WDTRST# Signal polarity (Bit2)
      #define   PolarityVal    0x00     // Low active for WDTRST#
      #define   UnitBit        0x03     // Unit for timer (Bit3)
      #define   ModeBit        0x04     // WDTRST# mode (Bit4)
      #define   ModeVal        0x01     // 0:level 1: pulse
      #define   EnableBit      0x05     // WDT timer enable (Bit5)
      #define   EnableVal      0x01     // 1: enable
      #define   StatusBit      0x06     // WDT timer status (Bit6)
#define   CounterReg   0x06   // Timer counter register
*****************************************************************************

*****************************************************************************
VOID   Main(){
        // Procedure : AaeonWDTConfig
        // (byte)Timer : Counter of WDT timer.(0x00~0xFF)
        // (boolean)Unit : Select time unit(0: second, 1: minute).
        EnterSIOconfig();
        SetWDT();
        AaeonWDTConfig(Counter, Unit);
        // Procedure : AaeonWDTEnable
         // This procudure will enable the WDT counting.
        AaeonWDTEnable();
        ExitSIOconfig();
}
*****************************************************************************
```

```
*****************************************************************************
// Procedure : AaeonWDTEnable
VOID    EnterSIOconfig ():{
        IOWriteByte (IoConfAddr,0x87);
        IOWriteByte (IoConfAddr,0x87);
}

VOID    ExitSIOconfig ():{
        IOWriteByte (IoConfAddr,0xAA);
}

VOID    SetWDT ()
        IOWriteByte (IoConfAddr,0x2B);
        IOWriteByte(IoConfAddr+1, (IOReadByte(IoConfAddr+1)&0xFC));
}

// Procedure : AaeonWDTEnable
VOID    AaeonWDTEnable ():{
        WDTEnableDisable(1);
}

// Procedure : AaeonWDTConfig
VOID    AaeonWDTConfig (byte Counter, BOOLEAN Unit):{
        // Disable WDT counting
        WDTEnableDisable(0);
        // Clear Watchdog Timeout Status
        WDTClearTimeoutStatus();
        // WDT relative parameter setting
        WDTParameterSetting(Timer, Unit);
}

VOID    WDTEnableDisable(byte Value):{
        If (Value == 1)
            WDTSetBit(TimerReg, EnableBit, 1);
        else
            WDTSetBit(TimerReg, EnableBit, 0);
}

VOID    WDTParameterSetting(byte Counter, BOOLEAN Unit):{
        // Watchdog Timer counter setting
        WDTWriteByte(CounterReg, Counter);
       // WDT counting unit setting
```

```
        WDTSetBit(TimerReg, UnitBit, Unit);
        // WDT output mode set to pulse
        WDTSetBit(TimerReg, ModeBit, ModeVal);
        // WDT output mode set to active low
        WDTSetBit(TimerReg, PolarityBit, PolarityVal);
        // WDT output pulse width is 25ms
        WDTSetBit(TimerReg, PSWidthBit, PSWidthVal);
         // Watchdog WDTRST# Enable
         WDTSetBit(DevReg, WDTRstBit, WDTRstVal);
}

VOID    WDTClearTimeoutStatus(){
        WDTSetBit(TimerReg, StatusBit, 1);
}
*******************************************************************************

*******************************************************************************
VOID    WDTWriteByte(byte Register, byte Value){
        IOWriteByte(WDTAddr+Register, Value);
}

byte    WDTReadByte(byte Register){
        return IOReadByte(WDTAddr+Register);
}

VOID    WDTSetBit(byte Register, byte Bit, byte Val){
        byte TmpValue;

        TmpValue = WDTReadByte(Register);
        TmpValue &= ~(1 << Bit);
        TmpValue |= Val << Bit;
        WDTWriteByte(Register, TmpValue);
}

*******************************************************************************
```

# Appendix B

I/O Information

## B.1 I/O Address Map

```
DESKTOP-3E9EL87
  Input/output (IO)
    [0000000000000000 - 000000000000006F] PCI Express Root Complex
    [0000000000000020 - 0000000000000021] Programmable interrupt controller
    [0000000000000020 - 0000000000000021] Programmable interrupt controller
    [0000000000000024 - 0000000000000025] Programmable interrupt controller
    [0000000000000024 - 0000000000000025] Programmable interrupt controller
    [0000000000000028 - 0000000000000029] Programmable interrupt controller
    [0000000000000028 - 0000000000000029] Programmable interrupt controller
    [000000000000002C - 000000000000002D] Programmable interrupt controller
    [000000000000002C - 000000000000002D] Programmable interrupt controller
    [0000000000000030 - 0000000000000031] Programmable interrupt controller
    [0000000000000030 - 0000000000000031] Programmable interrupt controller
    [0000000000000034 - 0000000000000035] Programmable interrupt controller
    [0000000000000034 - 0000000000000035] Programmable interrupt controller
    [0000000000000038 - 0000000000000039] Programmable interrupt controller
    [0000000000000038 - 0000000000000039] Programmable interrupt controller
    [000000000000003C - 000000000000003D] Programmable interrupt controller
    [000000000000003C - 000000000000003D] Programmable interrupt controller
    [0000000000000040 - 0000000000000043] System timer
    [0000000000000040 - 0000000000000043] System timer
    [000000000000004E - 000000000000004F] Motherboard resources
    [0000000000000050 - 0000000000000053] System timer
    [0000000000000050 - 0000000000000053] System timer
    [0000000000000060 - 0000000000000060] Standard PS/2 Keyboard
    [0000000000000061 - 0000000000000061] Motherboard resources
    [0000000000000063 - 0000000000000063] Motherboard resources
    [0000000000000064 - 0000000000000064] Standard PS/2 Keyboard
    [0000000000000065 - 0000000000000065] Motherboard resources
    [0000000000000067 - 0000000000000067] Motherboard resources
    [0000000000000070 - 0000000000000070] Motherboard resources
    [0000000000000070 - 0000000000000077] System CMOS/real time clock
    [0000000000000078 - 0000000000000CF7] PCI Express Root Complex
    [000000000000008F - 000000000000008F] Motherboard resources
    [0000000000000092 - 0000000000000092] Motherboard resources
```

```
[00000000000000A0 - 00000000000000A1]  Programmable interrupt controller
[00000000000000A0 - 00000000000000A1]  Programmable interrupt controller
[00000000000000A4 - 00000000000000A5]  Programmable interrupt controller
[00000000000000A4 - 00000000000000A5]  Programmable interrupt controller
[00000000000000A8 - 00000000000000A9]  Programmable interrupt controller
[00000000000000A8 - 00000000000000A9]  Programmable interrupt controller
[00000000000000AC - 00000000000000AD]  Programmable interrupt controller
[00000000000000AC - 00000000000000AD]  Programmable interrupt controller
[00000000000000B0 - 00000000000000B1]  Programmable interrupt controller
[00000000000000B0 - 00000000000000B1]  Programmable interrupt controller
[00000000000000B2 - 00000000000000B3]  Motherboard resources
[00000000000000B4 - 00000000000000B5]  Programmable interrupt controller
[00000000000000B4 - 00000000000000B5]  Programmable interrupt controller
[00000000000000B8 - 00000000000000B9]  Programmable interrupt controller
[00000000000000B8 - 00000000000000B9]  Programmable interrupt controller
[00000000000000BC - 00000000000000BD]  Programmable interrupt controller
[00000000000000BC - 00000000000000BD]  Programmable interrupt controller
[00000000000002F8 - 00000000000002FF]  Communications Port (COM2)
[00000000000003B0 - 00000000000003BB]  Intel(R) HD Graphics
[00000000000003C0 - 00000000000003DF]  Intel(R) HD Graphics
[00000000000003F8 - 00000000000003FF]  Communications Port (COM1)
[0000000000000400 - 000000000000047F]  Motherboard resources
[00000000000004D0 - 00000000000004D1]  Programmable interrupt controller
[00000000000004D0 - 00000000000004D1]  Programmable interrupt controller
[0000000000000500 - 00000000000005FE]  Motherboard resources
[0000000000000680 - 000000000000069F]  Motherboard resources
[0000000000000A00 - 0000000000000A0F]  Motherboard resources
[0000000000000A10 - 0000000000000A1F]  Motherboard resources
[0000000000000A20 - 0000000000000A2F]  Motherboard resources
[0000000000000D00 - 000000000000FFFF]  PCI Express Root Complex
[000000000000C000 - 000000000000CFFF]  PCI-to-PCI Bridge
[000000000000D000 - 000000000000DFFF]  PCI-to-PCI Bridge
[000000000000E000 - 000000000000E01F]  SM Bus Controller
[000000000000E000 - 000000000000E0FF]  Realtek PCIe GBE Family Controller #2
[000000000000E000 - 000000000000E0FF]  Realtek PCIe GBE Family Controller
```

```
[000000000000E000 - 000000000000E0FF]  Realtek PCIe GBE Family Controller
[000000000000E000 - 000000000000EFFF]  PCI Express Root Port
[000000000000E020 - 000000000000E03F]  Standard SATA AHCI Controller
[000000000000E040 - 000000000000E043]  Standard SATA AHCI Controller
[000000000000E050 - 000000000000E057]  Standard SATA AHCI Controller
[000000000000E060 - 000000000000E063]  Standard SATA AHCI Controller
[000000000000E070 - 000000000000E077]  Standard SATA AHCI Controller
[000000000000E080 - 000000000000E087]  Microsoft Basic Display Adapter
[000000000000F000 - 000000000000F03F]  Intel(R) HD Graphics
[000000000000F040 - 000000000000F05F]  Intel(R) Celeron(R)/Pentium(R) SM Bus Controller - 2292
[000000000000F060 - 000000000000F07F]  Standard SATA AHCI Controller
> Interrupt request (IRQ)
> Memory
```

## B.2 Memory Address Map

```
Memory
  [00000000000A0000 - 00000000000BFFFF]  Intel(R) HD Graphics
  [00000000000A0000 - 00000000000BFFFF]  PCI Express Root Complex
  [00000000000C0000 - 00000000000DFFFF]  PCI Express Root Complex
  [00000000000E0000 - 00000000000FFFFF]  PCI Express Root Complex
  [0000000080000000 - 0000000080FFFFFF]  Intel(R) HD Graphics
  [0000000080000000 - 00000000DFFFFFFF]  PCI Express Root Complex
  [0000000081000000 - 00000000810FFFFF]  Intel(R) Trusted Execution Engine Interface
  [0000000081100000 - 00000000811FFFFF]  Intel(R) Trusted Execution Engine Interface
  [0000000081200000 - 000000008120FFFF]  Realtek PCIe GBE Family Controller
  [0000000081200000 - 000000008120FFFF]  Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
  [0000000081210000 - 000000008121 3FFF]  High Definition Audio Controller
  [0000000081214000 - 00000000812140 1F]  Intel(R) Celeron(R)/Pentium(R) SM Bus Controller - 2292
  [0000000081215000 - 00000000812157FF]  Standard SATA AHCI Controller
  [0000000090000000 - 000000009FFFFFFF]  Intel(R) HD Graphics
  [00000000A0000000 - 00000000A0003FFF]  Realtek PCIe GBE Family Controller #2
  [00000000A0000000 - 00000000A0003FFF]  Realtek PCIe GBE Family Controller
  [00000000A0000000 - 00000000A00FFFFF]  PCI Express Root Port
  [00000000A0004000 - 00000000A0004FFF]  Realtek PCIe GBE Family Controller #2
  [00000000C0000000 - 00000000CFFFFFFF]  Microsoft Basic Display Adapter
  [00000000D0000000 - 00000000D03FFFFF]  Microsoft Basic Display Adapter
  [00000000D0400000 - 00000000D04FFFFF]  PCI Encryption/Decryption Controller
  [00000000D0500000 - 00000000D05FFFFF]  PCI Encryption/Decryption Controller
  [00000000D0600000 - 00000000D06FFFFF]  PCI-to-PCI Bridge
  [00000000D0700000 - 00000000D07FFFFF]  PCI-to-PCI Bridge
  [00000000D0800000 - 00000000D080FFFF]  Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
  [00000000D0810000 - 00000000D0813FFF]  High Definition Audio Controller
  [00000000D0814000 - 00000000D081401F]  SM Bus Controller
  [00000000D0816000 - 00000000D08167FF]  Standard SATA AHCI Controller
  [00000000E0000000 - 00000000EFFFFFFF]  Motherboard resources
  [00000000E00000D0 - 00000000E00000DB]  Unknown device
  [00000000FEA00000 - 00000000FEAFFFFF]  Motherboard resources
  [00000000FED00000 - 00000000FED003FF]  High precision event timer
  [00000000FED01000 - 00000000FED01FFF]  Motherboard resources
  [00000000FED03000 - 00000000FED03FFF]  Motherboard resources
```

[00000000FED06000 - 00000000FED06FFF] Motherboard resources
[00000000FED08000 - 00000000FED09FFF] Motherboard resources
[00000000FED1C000 - 00000000FED1CFFF] Motherboard resources
[00000000FED40000 - 00000000FED44FFF] Trusted Platform Module 1.2
[00000000FED80000 - 00000000FEDBFFFF] Motherboard resources
[00000000FEE00000 - 00000000FEEFFFFF] Motherboard resources
[00000000FF000000 - 00000000FFFFFFFF] Legacy device

## B.3 IRQ Mapping Chart

Interrupt request (IRQ)

| | |
|---|---|
| (ISA) 0x00000000 (00) | System timer |
| (ISA) 0x00000000 (00) | System timer |
| (ISA) 0x00000001 (01) | Standard PS/2 Keyboard |
| (ISA) 0x00000003 (03) | Communications Port (COM2) |
| (ISA) 0x00000003 (03) | PCI Encryption/Decryption Controller |
| (ISA) 0x00000004 (04) | Communications Port (COM1) |
| (ISA) 0x00000004 (04) | High Definition Audio Controller |
| (ISA) 0x00000005 (05) | Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft) |
| (ISA) 0x00000008 (08) | High precision event timer |
| (ISA) 0x0000000A (10) | PCI-to-PCI Bridge |
| (ISA) 0x0000000A (10) | PCI-to-PCI Bridge |
| (ISA) 0x0000000A (10) | SM Bus Controller |
| (ISA) 0x0000000A (10) | Standard SATA AHCI Controller |
| (ISA) 0x0000000B (11) | Microsoft Basic Display Adapter |
| (ISA) 0x0000000B (11) | PCI-to-PCI Bridge |
| (ISA) 0x0000000B (11) | PCI-to-PCI Bridge |
| (ISA) 0x0000000B (11) | Realtek PCIe GBE Family Controller |
| (ISA) 0x0000000C (12) | Microsoft PS/2 Mouse |
| (ISA) 0x00000036 (54) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000037 (55) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000038 (56) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000039 (57) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000003A (58) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000003B (59) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000003C (60) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000003D (61) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000003E (62) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000003F (63) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000040 (64) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000041 (65) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000042 (66) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000043 (67) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000044 (68) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000045 (69) | Microsoft ACPI-Compliant System |

| | |
|---|---|
| (ISA) 0x00000046 (70) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000047 (71) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000048 (72) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000049 (73) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000004A (74) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000004B (75) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000004C (76) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000004D (77) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000004E (78) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000004F (79) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000050 (80) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000051 (81) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000052 (82) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000053 (83) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000054 (84) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000055 (85) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000056 (86) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000057 (87) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000058 (88) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000059 (89) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000005A (90) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000005B (91) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000005C (92) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000005D (93) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000005E (94) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000005F (95) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000060 (96) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000061 (97) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000062 (98) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000063 (99) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000064 (100) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000065 (101) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000066 (102) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000067 (103) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000068 (104) | Microsoft ACPI-Compliant System |

| | |
|---|---|
| (ISA) 0x00000069 (105) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000006A (106) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000006B (107) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000006C (108) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000006D (109) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000006E (110) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000006F (111) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000070 (112) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000071 (113) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000072 (114) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000073 (115) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000074 (116) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000075 (117) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000076 (118) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000077 (119) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000078 (120) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000079 (121) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000007A (122) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000007B (123) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000007C (124) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000007D (125) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000007E (126) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000007F (127) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000080 (128) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000081 (129) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000082 (130) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000083 (131) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000084 (132) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000085 (133) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000086 (134) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000087 (135) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000088 (136) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000089 (137) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000008A (138) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000008B (139) | Microsoft ACPI-Compliant System |

| | |
|---|---|
| (ISA) 0x000000AF (175) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B0 (176) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B1 (177) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B2 (178) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B3 (179) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B4 (180) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B5 (181) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B6 (182) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B7 (183) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B8 (184) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000B9 (185) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000BA (186) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000BB (187) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000BC (188) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000BD (189) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000BE (190) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000BF (191) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C0 (192) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C1 (193) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C2 (194) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C3 (195) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C4 (196) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C5 (197) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C6 (198) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C7 (199) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C8 (200) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000C9 (201) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000CA (202) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000CB (203) | Microsoft ACPI-Compliant System |
| (ISA) 0x000000CC (204) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000100 (256) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000101 (257) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000102 (258) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000103 (259) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000104 (260) | Microsoft ACPI-Compliant System |

| | |
|---|---|
| (ISA) 0x00000105 (261) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000106 (262) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000107 (263) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000108 (264) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000109 (265) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000010A (266) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000010B (267) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000010C (268) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000010D (269) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000010E (270) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000010F (271) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000110 (272) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000111 (273) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000112 (274) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000113 (275) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000114 (276) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000115 (277) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000116 (278) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000117 (279) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000118 (280) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000119 (281) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000011A (282) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000011B (283) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000011C (284) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000011D (285) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000011E (286) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000011F (287) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000120 (288) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000121 (289) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000122 (290) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000123 (291) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000124 (292) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000125 (293) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000126 (294) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000127 (295) | Microsoft ACPI-Compliant System |

| | |
|---|---|
| (ISA) 0x00000128 (296) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000129 (297) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000012A (298) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000012B (299) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000012C (300) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000012D (301) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000012E (302) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000012F (303) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000130 (304) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000131 (305) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000132 (306) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000133 (307) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000134 (308) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000135 (309) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000136 (310) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000137 (311) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000138 (312) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000139 (313) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000013A (314) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000013B (315) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000013C (316) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000013D (317) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000013E (318) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000013F (319) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000140 (320) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000141 (321) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000142 (322) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000143 (323) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000144 (324) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000145 (325) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000146 (326) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000147 (327) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000148 (328) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000149 (329) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000014A (330) | Microsoft ACPI-Compliant System |

| | |
|---|---|
| (ISA) 0x0000014B (331) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000014C (332) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000014D (333) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000014E (334) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000014F (335) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000150 (336) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000151 (337) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000152 (338) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000153 (339) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000154 (340) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000155 (341) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000156 (342) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000157 (343) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000158 (344) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000159 (345) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000015A (346) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000015B (347) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000015C (348) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000015D (349) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000015E (350) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000015F (351) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000160 (352) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000161 (353) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000162 (354) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000163 (355) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000164 (356) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000165 (357) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000166 (358) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000167 (359) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000168 (360) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000169 (361) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000016A (362) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000016B (363) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000016C (364) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000016D (365) | Microsoft ACPI-Compliant System |

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| (ISA) 0x0000016E (366) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000016F (367) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000170 (368) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000171 (369) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000172 (370) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000173 (371) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000174 (372) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000175 (373) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000176 (374) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000177 (375) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000178 (376) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000179 (377) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000017A (378) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000017B (379) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000017C (380) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000017D (381) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000017E (382) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000017F (383) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000180 (384) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000181 (385) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000182 (386) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000183 (387) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000184 (388) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000185 (389) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000186 (390) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000187 (391) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000188 (392) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000189 (393) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000018A (394) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000018B (395) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000018C (396) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000018D (397) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000018E (398) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000018F (399) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000190 (400) | Microsoft ACPI-Compliant System |

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| (ISA) 0x00000191 (401) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000192 (402) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000193 (403) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000194 (404) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000195 (405) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000196 (406) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000197 (407) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000198 (408) | Microsoft ACPI-Compliant System |
| (ISA) 0x00000199 (409) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000019A (410) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000019B (411) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000019C (412) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000019D (413) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000019E (414) | Microsoft ACPI-Compliant System |
| (ISA) 0x0000019F (415) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A0 (416) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A1 (417) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A2 (418) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A3 (419) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A4 (420) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A5 (421) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A6 (422) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A7 (423) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A8 (424) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001A9 (425) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001AA (426) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001AB (427) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001AC (428) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001AD (429) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001AE (430) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001AF (431) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B0 (432) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B1 (433) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B2 (434) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B3 (435) | Microsoft ACPI-Compliant System |

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| (ISA) 0x000001B4 (436) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B5 (437) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B6 (438) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B7 (439) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B8 (440) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001B9 (441) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001BA (442) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001BB (443) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001BC (444) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001BD (445) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001BE (446) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001BF (447) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C0 (448) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C1 (449) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C2 (450) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C3 (451) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C4 (452) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C5 (453) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C6 (454) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C7 (455) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C8 (456) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001C9 (457) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001CA (458) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001CB (459) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001CC (460) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001CD (461) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001CE (462) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001CF (463) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D0 (464) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D1 (465) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D2 (466) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D3 (467) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D4 (468) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D5 (469) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D6 (470) | Microsoft ACPI-Compliant System |

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| (ISA) 0x000001D7 (471) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D8 (472) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001D9 (473) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001DA (474) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001DB (475) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001DC (476) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001DD (477) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001DE (478) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001DF (479) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E0 (480) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E1 (481) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E2 (482) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E3 (483) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E4 (484) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E5 (485) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E6 (486) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E7 (487) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E8 (488) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001E9 (489) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001EA (490) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001EB (491) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001EC (492) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001ED (493) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001EE (494) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001EF (495) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F0 (496) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F1 (497) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F2 (498) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F3 (499) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F4 (500) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F5 (501) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F6 (502) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F7 (503) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F8 (504) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001F9 (505) | Microsoft ACPI-Compliant System |

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| (ISA) 0x000001FA (506) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001FB (507) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001FC (508) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001FD (509) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001FE (510) | Microsoft ACPI-Compliant System |
| (ISA) 0x000001FF (511) | Microsoft ACPI-Compliant System |
| (PCI) 0x0000000A (10) | Intel(R) Celeron(R)/Pentium(R) SM Bus Controller - 2292 |
| (PCI) 0x00000016 (22) | High Definition Audio Controller |
| (PCI) 0xFFFFFFF8 (-8) | Realtek PCIe GBE Family Controller #2 |
| (PCI) 0xFFFFFFF9 (-7) | Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft) |
| (PCI) 0xFFFFFFFA (-6) | Intel(R) HD Graphics |
| (PCI) 0xFFFFFFFB (-5) | Intel(R) Trusted Execution Engine Interface |
| (PCI) 0xFFFFFFFC (-4) | Standard SATA AHCI Controller |
| (PCI) 0xFFFFFFFD (-3) | PCI Express Root Port |
| (PCI) 0xFFFFFFFE (-2) | PCI Express Root Port |

# Appendix C

Electrical Specifications for I/O Ports

## C.1 Electrical Specifications for I/O Ports

| I/O | Reference | Signal Name | Rate Output |
|---|---|---|---|
| USB 3.0 Ports 0 & 1 | CN1 | +5VSB | +5VSB/1A (per channel) |
| LVDS Port Inverter / Backlight Connector | CN5 | VDD | +5V/2A or +12V/2A |
| LVDS Port | CN6 | VCC | +3.3V/2A or +5V/2A |
| MiniCard Slot (Halfl MiniCard) | CN10 | +3.3VSB<br>+1.5V | +3.3V/1.1A<br>+1.5V/0.375A |
| +5V Output for SATA HDD | CN11 | +5V | +5V/1A |
| MiniCard Slot (Full MiniCard) | CN13 | +3.3VSB<br>+1.5V | +3.3V/1.1A<br>+1.5V/0.375A |
| Digital IO Port | CN18 | D0~D3 | +5V/0.125A (per channel) |
| LPC Port | CN20 | +3.3V | +3.3V/0.5A |
| COM Port 1/2 & Line out | CN21 | +5V/+12V | +5V/1A or +12V/1A |
| HDMI | CN24 | +5V | +5V/0.5A |

# Appendix D

Mating Connectors

## D.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

| Connector Label | Function | Mating Connector | | Available Cable | Cable P/N |
|---|---|---|---|---|---|
| | | Vendor | Model no | | |
| CN1 | USB 3.0 Connector | Contek | UDNFA199N-AY-21-A | | NA |
| CN3 | Battery | Molex | 51021-0200 | | 175011901M |
| CN5 | LVDS Port Inverter / Backlight Connector | PINREX | 721-94-05TWR9 | | NA |
| CN6 | LVDS Port | HSG | 11002TOP-2E | | N/A |
| CN8 | BIO connector | Hirose | FX18-80P-0.8SV | | N/A |
| CN9 | LAN Connector | UDE | RT7-17FAAM1A | | NA |
| CN10 | Mini-Card Slot (Half-Mini Card) | FOXCONN | AS0B226-S68Q-7H | | NA |
| CN11 | SATA Port | Molex | 887505318 | SATA Cable | 1709070500 |
| CN12 | +5V Output for SATA HDD | JST | PHR-2 | 2 Pins For SATA HDD Power | 1702150155 |
| CN13 | Mini-Card Slot (Full-Mini Card) | FOXCONN | AS0B226-S68Q-7H | | NA |
| CN18 | Digital IO Port | JST | SM6B-GHS-TB | | NA |
| CN20 | LPC Port | JST | SHR-12V-S-B | AAEON LPC Cable | 1703120130 |
| CN21 | COM Port 1/2 & line out connector | HRS | DF14-20S-1.25C | COM Port 1/2 & line out cable | 1703200153 |

| | | | | | |
|---|---|---|---|---|---|
| CN22 | External +12V Input | DINKLE | DT-126VP-S2016 002P | Power cable | 170204010R |
| DIMM1 | DDR3 204PIN SKT | FOXCONN | AS0A626-JER6-7 H | | N/A |
| JP16 | Buzzer connector | PINREX | 712-73-02TWE0 | Buzzer Cable | 170302010C |
| JP16 | Front Panel Connector | PINREX | 222-97-05GBE1 | Front Panel Cable | 1701100156 |