TECHNICAL MANUAL

Of

Intel Bay Trail Series CPU

Based Mini-ITX M/B

NO. G03-NLBT-F

Revision: 3.0

Release date: October 1, 2019

Trademark:

* Specifications and Information contained in this documentation are furnished for information use only, and are subject to change at any time without notice, and should not be construed as a commitment by manufacturer.
Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.
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Environmental Safety Instruction

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.

- 0 to 60 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)

- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots’ that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.

- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.

- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.
USER’S NOTICE

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Manual Revision Information

Reversion  Revision History  Date
3.0        Third Edition    October 1, 2019

Item Checklist

☑ Motherboard
☑ Cable(s)
☑ I/O Back panel shield
Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Onboard Intel® Bay Trail Series Processor, with low power consumption never denies high performance
- Support DDR3L SO-DIMM 1066/1333 MHz up to 8GB
- Support 1 * SATAII (3Gb/s) Device
- Support m-SATA connector
- Support Mini-PCIE connector
- Support USB 3.0 data transport demand
- Integrated with 24-bit dual channel LVDS header
- Support VGA display output
- Supports ACPI S3 Function
- Support CPU Smart FAN
- Support Watchdog Timer Technology
- Support Windows 8 OS
- Support Thunder Protection Function
- Compliance with EuP Standard
### 1-2 Specification

<table>
<thead>
<tr>
<th>Spec</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>● Mini-ITX form factor;</td>
</tr>
<tr>
<td></td>
<td>● PCB size: 17.0 x 17.0 cm</td>
</tr>
<tr>
<td><strong>Embedded CPU</strong></td>
<td>● Intel® Bay Trail-D/M/I series CPU</td>
</tr>
<tr>
<td><strong>Memory Slot</strong></td>
<td>● 1* DDR3L SO-DIMM slot</td>
</tr>
<tr>
<td></td>
<td>● Support DDR3L 800/1066/1333 MHz SDRAM, expandable to 8GB</td>
</tr>
<tr>
<td><strong>Expansion Slot</strong></td>
<td>● 1* Full-size Mini-PCIE slot</td>
</tr>
<tr>
<td></td>
<td>● 1* PCIE x1 slot</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>● 1* SATAII 3Gb/s port</td>
</tr>
<tr>
<td></td>
<td>● 1* Full-size mSATA slot</td>
</tr>
<tr>
<td><strong>LAN Chip</strong></td>
<td>● Integrated with Realtek RTL8111G PCI-E Gigabit LAN chip</td>
</tr>
<tr>
<td></td>
<td>● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate</td>
</tr>
<tr>
<td></td>
<td>* <strong>NLBT-I1900-2L series</strong> are integrated with dual gigabit LAN chip</td>
</tr>
<tr>
<td><strong>Audio Chip</strong></td>
<td>● Realtek ALC887 HD Audio Codec integrated</td>
</tr>
<tr>
<td></td>
<td>● Audio driver and utility included</td>
</tr>
<tr>
<td><strong>BIOS</strong></td>
<td>● AMI 64MB Flash ROM</td>
</tr>
<tr>
<td><strong>Multi I/O</strong></td>
<td><strong>Rear Panel I/O:</strong></td>
</tr>
<tr>
<td></td>
<td>● 1* 4-pin DC 12V power-in connector</td>
</tr>
<tr>
<td></td>
<td>● 1* VGA port</td>
</tr>
<tr>
<td></td>
<td>● 1* COM port</td>
</tr>
<tr>
<td></td>
<td>● 1* Parallel port (Optional for <strong>NLBT-I1900-2L series</strong>)</td>
</tr>
<tr>
<td></td>
<td>● 3* USB 2.0 port</td>
</tr>
<tr>
<td></td>
<td>● 1* USB 3.0 port</td>
</tr>
<tr>
<td></td>
<td>● 1* RJ-45 LAN port (Optional for <strong>NLBT-I1900/ NLBT-I1800/ NLBT-I2930 series</strong>)</td>
</tr>
<tr>
<td></td>
<td>● 2* RJ-45 LAN port (Optional for <strong>NLBT-I1900-2L series</strong>)</td>
</tr>
<tr>
<td></td>
<td>● 1* Line-out port</td>
</tr>
<tr>
<td><strong>Internal I/O Connectors &amp; Headers:</strong></td>
<td>● 1 *4-pin ATX12V internal power connector</td>
</tr>
<tr>
<td></td>
<td>● 1 *4-pin SATA Power connector</td>
</tr>
<tr>
<td></td>
<td>● 1 * Front panel audio header</td>
</tr>
</tbody>
</table>
Note: 1. Optional parts are only available to specific models. 2. This manual serves as a common manual NLBT series, which include different models. Their main differences are listed as below:

<table>
<thead>
<tr>
<th>Model</th>
<th>CPU</th>
<th>Rear I/O</th>
<th>Other Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLBT-I1900</td>
<td>I1900</td>
<td>Same Rear I/O Layout; With 1* RJ-45 LAN Port (Refer to Page 4)</td>
<td>With 1* Parallel port header</td>
</tr>
<tr>
<td>NLBT-I1800</td>
<td>I1800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLBT-I2930</td>
<td>I2930</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLBT-I1900-2L</td>
<td>I1900</td>
<td>Rear I/O with: 1* Parallel port; 2* RJ-45 LAN Port (*Refer to Page 4)</td>
<td>Without Parallel port header</td>
</tr>
</tbody>
</table>
1-3 Layout Diagram

*Rear IO Diagram*

*For NLBT-I1900/NLBT-I2930/ NLBT-I1800 Series:*

- DC12V Power-in Connector
- USB 2.0 Port
- VGA Port
- COM1 Port
- RJ-45 LAN Port
- Line-OUT
- USB 3.0 Port
- USB 2.0 Ports

*For NLBT-I1900-2L Series:*

- DC12V Power-in Connector
- USB 2.0 Port
- Parallel Port
- RJ-45 LAN Ports
- Line-OUT
- USB 3.0 Port
- VGA Port
- COM1 Port
- USB 2.0 Ports
Motherboard Internal Diagram-1
For NLBT-I1900/NLBT-I2930/ NLBT-I1800 Series:

Note:
1. The parts marked with an asterisk are only available to specific models; please refer to the model you purchase for actual specifications.
2. The other diagrams for illustration in this common manual is the same as the above diagram (Motherboard Internal Diagram-1), unless otherwise stated.
Motherboard Internal Diagram-2
For NLBT-I1900-2L Series:

- ATX12V Power Connector
- DC12V Power-in Connector
- USB 2.0 Port Over USB 3.0 Port
- Parallel Port over VGA Port & COM1 Port
- RJ-45 LAN Port Over USB 2.0 Ports
- RJ-45 LAN Port
- Line-Out Connector
- Front Panel Audio Header
- PCI Express x1 Slot
- HDMI Port Header
- VGA Port Header
- LVDS Header
- INT12V Power Connector
- DDR3L SODIMM Slot
- Intel CPU
- LVDS Inverter SPEAKCON1
- LVDS Inverter SPEAKCON2
- CPUFAN1 Header
- M-SATA Connector
- PS2 KB/MS Header
- SATAII Port (SATA1)
- USB 2.0 Header
- SATA Hard Disk Power-Out Connector
- GPIO Header
- Front Panel Header
- DC12V Power-in Connector
- HDMI_SPDIF Header
- TX-RXCOM2 Header
- Serial Port Headers (COM6/5/4/3/2)
*SIM card slot is available to specific models.
Please refer to the product you purchase for actual specification.
### Jumper

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JBAT</td>
<td>CMOS RAM Clear Function Setting</td>
<td>2-pin Block</td>
</tr>
<tr>
<td>ME_RTC</td>
<td>Clear ME RTC Function Setting</td>
<td>2-pin Block</td>
</tr>
<tr>
<td>COPEN1</td>
<td>Case Open Message Display Function</td>
<td>2-pin Block</td>
</tr>
<tr>
<td>JP3</td>
<td>INVERTER VCC 3.3V/5V/12V Select</td>
<td>4-pin Block</td>
</tr>
<tr>
<td>JP4</td>
<td>LVDS VCC 3.3V/5V/12V Select</td>
<td>4-pin Block</td>
</tr>
<tr>
<td>JCOMP1</td>
<td>COM1 Header Pin9 Function Select</td>
<td>6-Pin Block</td>
</tr>
<tr>
<td>JCOMP2</td>
<td>COM2 Header Pin9 Function Select</td>
<td>6-Pin Block</td>
</tr>
<tr>
<td>JCOM2</td>
<td>COM2 Header RS485/RS422 Select</td>
<td>6-Pin Block</td>
</tr>
</tbody>
</table>

### Connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCIN1</td>
<td>DC 12V Power–in Connector</td>
</tr>
<tr>
<td>ATX12V1</td>
<td>ATX 12V Power Connector</td>
</tr>
<tr>
<td>USB1 (Top)</td>
<td>Top: USB 2.0 Port Connector, Bottom: USB 3.0 Port Connector</td>
</tr>
<tr>
<td>VGA</td>
<td>Video Graphic Attach Connector</td>
</tr>
<tr>
<td>COM1</td>
<td>Serial Port Connector</td>
</tr>
<tr>
<td>UL1(*)</td>
<td>Top: RJ-45 LAN Port, Middle &amp; Bottom: USB 2.0 Port X2</td>
</tr>
<tr>
<td>UL1(*)</td>
<td>USB 2.0 Port Connector X2</td>
</tr>
<tr>
<td>LAN2</td>
<td>RJ-45 LAN Port Connector</td>
</tr>
<tr>
<td>HOUT1</td>
<td>Audio Line Out Connector</td>
</tr>
<tr>
<td>SATA1</td>
<td>SATAAll Connector</td>
</tr>
<tr>
<td>SATAPW</td>
<td>SATA Power out Connector</td>
</tr>
</tbody>
</table>
### Headers

<table>
<thead>
<tr>
<th>Header</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP_AUDIO1</td>
<td>Front Panel Audio Header</td>
<td>9-pin Block</td>
</tr>
<tr>
<td>SPEAK_CON1</td>
<td>Left Speaker Header</td>
<td>2-pin Block</td>
</tr>
<tr>
<td>SPEAK_CON2</td>
<td>Right Speaker Header</td>
<td>2-pin Block</td>
</tr>
<tr>
<td>SPDIF</td>
<td>HDMI_SPDIF Header</td>
<td>2-pin Block</td>
</tr>
<tr>
<td>COM2/3/4/5/6</td>
<td>Serial Port Header X 5</td>
<td>9-pin Block</td>
</tr>
<tr>
<td>TX-RXCOM2</td>
<td>RS422/RS485 Header</td>
<td>4-pin Block</td>
</tr>
<tr>
<td>JW_FP</td>
<td>Front Panel Header(PWR LED/ HD LED/Power Button /Reset)</td>
<td>9-pin Block</td>
</tr>
<tr>
<td>GPIO</td>
<td>GPIO Header</td>
<td>10-pin block</td>
</tr>
<tr>
<td>F_USB1</td>
<td>USB 2.0 Port Header</td>
<td>9-pin Block</td>
</tr>
<tr>
<td>PS2KBMS</td>
<td>PS2 Keyboard &amp; Mouse Header</td>
<td>6-pin Block</td>
</tr>
<tr>
<td>LPT1</td>
<td>Parallel Port Header</td>
<td>25-pin Block</td>
</tr>
<tr>
<td>HDMI</td>
<td>HDMI Port Header</td>
<td>20-pin Block</td>
</tr>
<tr>
<td>CPUFAN1</td>
<td>CPUFAN Header</td>
<td>4-pin Block</td>
</tr>
<tr>
<td>SYSFAN1</td>
<td>SYSFAN Header</td>
<td>3-pin Block</td>
</tr>
<tr>
<td>VGA1</td>
<td>VGA Port Header</td>
<td>12-pin Block</td>
</tr>
<tr>
<td>JP2</td>
<td>LVDS Panel Brightness Adjustment Header</td>
<td>2-pin Block</td>
</tr>
<tr>
<td>INVERTER</td>
<td>LVDS Inverter</td>
<td>6-pin Block</td>
</tr>
<tr>
<td>LVDS</td>
<td>LVDS Header</td>
<td>30-pin Block</td>
</tr>
</tbody>
</table>
Chapter 2
Hardware Installation

2-1 Jumper Setting

**JBAT (2-pin): Clear CMOS Setting**

1-2 Open: Normal; 1-2 Closed: Clear CMOS

**ME_RTC (2-pin): Clear ME_RTC Function Setting**

1-2 Open: Normal; 1-2 Closed: Clear ME_RTC.
**COPEN1 (2-pin): Case Open Message Display Function Select**

Pin 1-2 Closed: When Case open function pin short to GND, the Case open function was detected. When used, needs to enter BIOS and enable ‘Case Open Detect’ function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.

**JP3 (4-pin): INVERTER Back Light VCC 3.3V/5V/12V Select**

COPEN1

1 - GND

Case open function

JP3—Inverter Back Light

<table>
<thead>
<tr>
<th>Pin</th>
<th>6</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

2-4 Closed: Inverter Backlight VCC= 3.3V

<table>
<thead>
<tr>
<th>Pin</th>
<th>6</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>3</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>•</td>
<td>1</td>
</tr>
</tbody>
</table>

3-4 Closed: Inverter Backlight VCC= 5V

<table>
<thead>
<tr>
<th>Pin</th>
<th>6</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

6-4 Closed: Inverter Backlight VCC= 12V
**JP4 (4-pin): LVDS VCC 3.3V/5V/12V Select**

- **JP4→LVDS VCC**
  - 2-4 Closed: VCC=3.3V;
  - 3-4 Closed: VCC= 5V;
  - 4-6 Closed: VCC= 12V.

**JCOMP1 (6-pin): COM1 Port Pin9 Function Select**

- **JCOMP1→COM1**
  - 1-2 Closed: RS232;
  - 3-4 Closed : +12V;
  - 5-6 Closed : +5V.
JCOMP2 (6-pin): COM2 Header Pin9 Function Select

1-2 Closed: RS232; 3-4 Closed : +12V  5-6 Closed : +5V

JCOM2 (6-pin): COM2 Header RS232/RS485/RS422 Function Select

1-2 Closed: RS232; 3-4 Closed : RS485; 5-6 Closed : RS422.
## 2-2 Connectors and Headers

### 2-2-1 Connectors

(1) Rear I/O Panel

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="DC-in 12V Power Connector" /></td>
<td>DC-in 12V Power Connector</td>
<td>For user to connect compatible power adapter to provide power supply for the system.</td>
</tr>
<tr>
<td><img src="image" alt="USB 2.0 Port" /></td>
<td>USB 2.0 Port</td>
<td>To connect USB keyboard, mouse or other devices compatible with USB specification.</td>
</tr>
<tr>
<td><img src="image" alt="USB 3.0 Port" /></td>
<td>USB 3.0 Port</td>
<td>To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.0 ports supports up to 5Gbps data transfer rate.</td>
</tr>
<tr>
<td><img src="image" alt="VGA Port" /></td>
<td>VGA Port</td>
<td>To connect display device that support VGA specification.</td>
</tr>
<tr>
<td><img src="image" alt="Serial Port" /></td>
<td>Serial Port</td>
<td>Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface.</td>
</tr>
<tr>
<td><img src="image" alt="Parallel Port" /></td>
<td>Parallel Port</td>
<td>Also called LPT connector. Mostly for user to connect printer or scanner with parallel interface.</td>
</tr>
<tr>
<td><img src="image" alt="RJ-45 LAN Port" /></td>
<td>RJ-45 LAN Port</td>
<td>This connector is standard RJ-45 LAN jack for Network connection.</td>
</tr>
<tr>
<td><img src="image" alt="Line-Out Connector" /></td>
<td>Line-Out Connector</td>
<td>For user to connect external speaker, earphones, etc to transfer system audio output.</td>
</tr>
</tbody>
</table>
(2) COM1 (9-pin block): Serial Port Connector

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>RING/5V/12V (JCOMP1)</td>
</tr>
</tbody>
</table>

(3) DC12V1 (4-pin block): DC12V Power Connector

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12V DC_IN</td>
</tr>
<tr>
<td>2</td>
<td>+12V DC_IN</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
</tbody>
</table>
(4) ATX12V (4-pin block): ATX12V Type Power Connector

Pin No. | Definition  
---|---
1 | GND  
2 | GND  
3 | +12V  
4 | +12V  

(5) SATA1 (7-pin block): SATAII Port connector

This connector is a high-speed SATAII port that supports 3 GB/s transfer rate.

Pin No. | Definition  
---|---
1 | GND  
2 | TXP  
3 | TXN  
4 | GND  
5 | RXN  
6 | RXP  
7 | GND
(6) SATAPW(4-pin): SATA Hard Disk Power-out Connector

2-2-2 Headers

(1) FP_AUDIO1 (9-pin): Line-Out, MIC-In Header
   This header connects to Front Panel Line-out, MIC-In connector with cable.
(2) SPEAK_CON1 (2-pin)/ SPEAK_CON 2 (2-pin): Speaker Headers

(3) SPDIF (2-pin): HDMI_SPDIF Out Header
(4) COM2/3/4/5/6 (9-Pin): Serial Port Headers

(5) TX-RXCOM2 (4-Pin): RS422/485 Header

*Notice: User needs to go to BIOS to set ‘Transmission Mode Select’ as [RS422/RS485] for COM2 as well (refer to Page 34).
(6) JW-FP (9-pin): Front Panel Header

(7) GPIO (10-pin): GPIO Header
(8) F_USB1 (9-pin): USB 2.0 Port Header

(9) PS2KBMS (6-pin): PS/2 Keyboard & Mouse Header
(10) LPT1 (25-pin): Parallel Port Header

<table>
<thead>
<tr>
<th>Pin NO.</th>
<th>Pin Definition</th>
<th>Pin NO.</th>
<th>Pin Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>STB-</td>
<td>Pin 14</td>
<td>AFD-</td>
</tr>
<tr>
<td>Pin 2</td>
<td>PRD0</td>
<td>Pin 15</td>
<td>ERR-</td>
</tr>
<tr>
<td>Pin 3</td>
<td>PRD1</td>
<td>Pin 16</td>
<td>INIT-</td>
</tr>
<tr>
<td>Pin 4</td>
<td>PRD2</td>
<td>Pin 17</td>
<td>SLIN-</td>
</tr>
<tr>
<td>Pin 5</td>
<td>PRD3</td>
<td>Pin 18</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 6</td>
<td>PRD4</td>
<td>Pin 19</td>
<td>GND</td>
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<td>Pin 7</td>
<td>PRD5</td>
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<tr>
<td>Pin 8</td>
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<tr>
<td>Pin 9</td>
<td>PRD7</td>
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<td>Pin 10</td>
<td>ACK-</td>
<td>Pin 23</td>
<td>GND</td>
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<td>BUSY</td>
<td>Pin 24</td>
<td>GND</td>
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<tr>
<td>Pin 12</td>
<td>PE</td>
<td>Pin 25</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 13</td>
<td>SLCT</td>
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</tr>
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</table>

*Note: Parallel port header is optional for NLBT-I1900/ NLBT -I1800/ NLBT -I2930 series.*
### (11) HDMI (20-pin): HDMI Header

<table>
<thead>
<tr>
<th>Pin NO.</th>
<th>Pin Definition</th>
<th>Pin NO.</th>
<th>Pin Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>GND</td>
<td>Pin 2</td>
<td>HDMI_TXP2</td>
</tr>
<tr>
<td>Pin 3</td>
<td>HDMI_TXP1</td>
<td>Pin 4</td>
<td>HDMI_TXN2</td>
</tr>
<tr>
<td>Pin 5</td>
<td>HDMI_TXN1</td>
<td>Pin 6</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 7</td>
<td>GND</td>
<td>Pin 8</td>
<td>HDMI_TXP0</td>
</tr>
<tr>
<td>Pin 9</td>
<td>HDMI_TXCP</td>
<td>Pin 10</td>
<td>HDMI_TXN0</td>
</tr>
<tr>
<td>Pin 11</td>
<td>HDMI_TXCN</td>
<td>Pin 12</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 13</td>
<td>NC</td>
<td>Pin 14</td>
<td>NC</td>
</tr>
<tr>
<td>Pin 15</td>
<td>HDMI_SDA</td>
<td>Pin 16</td>
<td>HDMI_SCL</td>
</tr>
<tr>
<td>Pin 17</td>
<td>HDMI_+5V</td>
<td>Pin 18</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 19</td>
<td>GND</td>
<td>Pin 20</td>
<td>HDMI_HPD</td>
</tr>
</tbody>
</table>
(12) CPUFAN1 (4-pin)/SYSFAN1 (3-pin): FAN Headers

Pin 1

CPUFAN1

SYSFAN

(13) VGA1 (12-pin): VGA Header

Pin 1

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC5(Reserved)</td>
</tr>
<tr>
<td>2</td>
<td>VGA_VSYNC</td>
</tr>
<tr>
<td>3</td>
<td>VGA_HSYNC</td>
</tr>
<tr>
<td>4</td>
<td>GND_RED</td>
</tr>
<tr>
<td>5</td>
<td>RED_VGA</td>
</tr>
<tr>
<td>6</td>
<td>GND_GRN</td>
</tr>
<tr>
<td>7</td>
<td>GRN_VGA</td>
</tr>
<tr>
<td>8</td>
<td>GND_BLUE</td>
</tr>
<tr>
<td>9</td>
<td>BLUE_VGA</td>
</tr>
<tr>
<td>10</td>
<td>GND</td>
</tr>
<tr>
<td>11</td>
<td>DDC_DATA</td>
</tr>
<tr>
<td>12</td>
<td>DDC_CLK</td>
</tr>
</tbody>
</table>
(14) JP2 (2-pin): LVDS Panel Brightness Adjustment Header

(15) INVERTER (6-Pin): LVDS1 Inverter Header

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BKL_T_PWR1</td>
</tr>
<tr>
<td>2</td>
<td>BKL_T_PWR2</td>
</tr>
<tr>
<td>3</td>
<td>BKL_T_EN</td>
</tr>
<tr>
<td>4</td>
<td>BKL_T_PWM</td>
</tr>
<tr>
<td>5</td>
<td>GND1</td>
</tr>
<tr>
<td>6</td>
<td>GND2</td>
</tr>
</tbody>
</table>
(16) LVDS (30-Pin): 24-bit dual channel LVDS Header

![Diagram of LVDS connector]

<table>
<thead>
<tr>
<th>Pin NO.</th>
<th>Pin Define</th>
<th>Pin NO.</th>
<th>Pin Define</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>LVDS_VCC</td>
<td>Pin 2</td>
<td>LVDS_VCC</td>
</tr>
<tr>
<td>Pin 3</td>
<td>LVDS_VCC</td>
<td>Pin 4</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 5</td>
<td>GND</td>
<td>Pin 6</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 7</td>
<td>LVDSA_DATAN0</td>
<td>Pin 8</td>
<td>LVDSA_DATAP0</td>
</tr>
<tr>
<td>Pin 9</td>
<td>LVDSA_DATAN1</td>
<td>Pin 10</td>
<td>LVDSA_DATAP1</td>
</tr>
<tr>
<td>Pin 11</td>
<td>LVDSA_DATAN2</td>
<td>Pin 12</td>
<td>LVDSA_DATAP2</td>
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<tr>
<td>Pin 13</td>
<td>GND</td>
<td>Pin 14</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 15</td>
<td>LVDSA_CLKN</td>
<td>Pin 16</td>
<td>LVDSA_CLKP</td>
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<td>Pin 17</td>
<td>LVDSA_DATAN3</td>
<td>Pin 18</td>
<td>LVDSA_DATAP3</td>
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<tr>
<td>Pin 19</td>
<td>LVDSB_DATAN0</td>
<td>Pin 20</td>
<td>LVDSB_DATAP0</td>
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<tr>
<td>Pin 21</td>
<td>LVDSB_DATAN1</td>
<td>Pin 22</td>
<td>LVDSB_DATAP1</td>
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<tr>
<td>Pin 23</td>
<td>LVDSB_DATAN2</td>
<td>Pin 24</td>
<td>LVDSB_DATAP2</td>
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<tr>
<td>Pin 25</td>
<td>GND</td>
<td>Pin 26</td>
<td>GND</td>
</tr>
<tr>
<td>Pin 27</td>
<td>LVDSB_CLKN</td>
<td>Pin 28</td>
<td>LVDSB_CLKP</td>
</tr>
<tr>
<td>Pin 29</td>
<td>LVDSB_DATAN3</td>
<td>Pin 30</td>
<td>LVDSB_DATAP3</td>
</tr>
</tbody>
</table>
The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

3-1 Entering Setup
Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press <Del> to enter Setup
3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:

3-3 Function Keys

In the above BIOS Setup main menu of, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press ←→ (left, right) to select screen;
- Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
● Press <Enter> to select.
● Press <->/<- keys when you want to modify the BIOS parameters for the active option.
● [F1]: General help.
● [F2]: Previous value.
● [F3]: Optimized defaults.
● [F4]: Save & Reset.
● Press <Esc> to quit the BIOS Setup.

3-4 Getting Help

Main Menu
The on-line description of the highlighted setup function is displayed at the top right corner the screen.

Status Page Setup Menu/Option Page Setup Menu
Press [F1] to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

3-5 Menu Bars

There are six menu bars on top of BIOS screen:

- Main: To change system basic configuration
- Advanced: To change system advanced configuration
- Chipset: To change chipset configuration
- Security: Password settings
- Boot: To change boot settings
- Save & Exit: Save setting, loading and exit options.

User can press the right or left arrow key on the keyboard to switch from menu bar. The selected one is highlighted.
3-6  Main Menu
Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.


System Date
Set the date. Please use [Tab] to switch between date elements.

System Time
Set the time. Please use [Tab] to switch between time elements.
3-7 Advanced Menu

OS Selection
The optional settings: [Windows 8.X]; [Android]; [Windows 7].
* **Note:** User need to go to this item to select the OS mode before installing corresponding OS driver, otherwise problems will occur when installing the driver.

- **ACPI Settings**
  Press [Enter] to make settings for the following sub-item:
  **ACPI Settings**

  **Enable Hibernation**
  Use this item to enable or disable system ability to hibernate (OS S4 Sleep State). This option may be not effective with some OS. The optional settings: [Disabled]; [Enabled].
ACPI Sleep State
Use this item to select the highest ACPI sleep state the system will enter when the suspend button is pressed.
The optional settings are: [Suspend Disabled]; [S3 (Suspend to RAM)].

EUP Function
The optional settings: [Disabled]; [Enabled].
This item should be set as [Disabled] if you wish to have all active wake-up functions.

Wake-Up by PCIE/LAN from S5
The optional settings: [Enabled]; [Disabled].
*This function is supported when EUP Function is set as [Disabled].

Wake-Up by PS/2 Keyboard
The optional settings: [Enabled]; [Disabled].
Use this function to enable or disable PS/2 keyboard wake-up from S3/S4/S5.
*This function is supported when EUP Function is set as [Disabled].

Wake-Up by PS/2 Mouse
The optional settings: [Enabled]; [Disabled].
Use this function to enable or disable PS/2 mouse wake-up from S3/S4/S5.
*This function is supported when EUP Function is set as [Disabled].

PWRON After PWR-Fail
The optional settings are: [Former-Sts]; [Always on]; [Always off].
*This function is supported when EUP Function is set as [Disabled].

RTC WakeUp
The optional settings: [Disabled]; [Fixed Time]; [Dynamic Time].
Use this item to enable or disable system wake on alarm event.
When set as [Fixed Time], system will wake on the hour/min/sec specified.
When set as [Dynamic Time], system will wake on the current time + increased minute(s).
*This function is supported when EUP Function is set as [Disabled].

Super I/O Configuration
Press [Enter] to make settings for the following sub-items:
Super I/O Configuration
- Serial Port 1 Configuration/Serial Port 3 Configuration / Serial Port 4
Configuration/Serial Port 5 Configuration / Serial Port 6 Configuration
Press [Enter] to make settings for the following items:

Serial Port Configuration
Serial Port
Use this item to enable or disable serial port (COM).
Change Settings
Use this item to select an optimal setting for super IO device.

Serial Port 2 Configuration
Press [Enter] to make settings for the following items:

Serial Port Configuration
Serial Port
Use this item to enable or disable serial port (COM).
Change Settings
Use this item to select an optimal setting for super IO device.
Transmission Mode Select
The optional settings are: [RS232]; [RS422/RS485].

Parallel Port Configuration
Press [Enter] to make settings for the following items:

Parallel Port Configuration
Parallel Port
Use this item to enable or disable parallel port (LPT/LPTE).
Change Settings
Use this item to select an optimal setting for super IO device.
Device Mode
Use this item to change the printer port mode.
The optional settings are: [STD Printer Mode]; [SPP Mode]; [EPP-1.9 and SPP Mode]; [EPP-1.7 and SPP Mode]; [ECP Mode]; [ECP and EPP 1.9 Mode]; [ECP and EPP 1.7 Mode].

WatchDog Timer
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable WatchDog Timer Control. When set as [Enabled], the following sub-items shall appear:
WatchDog Timer Value
User can set a value in the range of [4] to [255].

**WatchDog Timer Unit**
The optional settings are: [Sec.]; [Min.].

**Case Open Detect**
Use this item to detect case has already open or not, show message in POST.
The optional settings: [Disabled]; [Enabled].

- **H/W Monitor**
  Press [Enter] to view current PC health status & system working status and make settings for the following sub-items:
  
  **CPUFAN Smart Mode**
The optional settings are: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:
  
  **CPUFAN Full-Speed Temperature**
Use this item to set CPUFAN full speed temperature. Fan will run at full speed when above the pre-set temperature.
  
  **CPUFAN Idle-Speed Temperature**
Use this item to set CPUFAN idle speed temperature. Fan will run at idle speed when below the pre-set temperature.
  
  **CPUFAN Full-Speed Duty**
Use this item to set CPUFAN full speed duty. Fan will run at full speed when above the pre-set duty.
  
  **CPUFAN Idle-Speed Duty**
Use this item to set CPUFAN idle speed duty. Fan will run at idle speed when below the pre-set duty.

- **CPU Configuration**
  Press [Enter] to view current CPU configuration and make settings for the following sub-items:
  
  **Active Processor Cores**
Use this item to set the number of cores to enable in each processor packages.
  
  **Limit CPUID Maximum**
The optional settings: [Disabled]; [Enabled].
This item should be set as [Disabled] for Windows XP.

**Execute Disable Bit**
The optional settings: [Disabled]; [Enabled].

**Hardware Prefetcher**
The optional settings are: [Disabled]; [Enabled].
Use this item to turn on/off the Mid Level Cache (L2) streamer prefetcher.

**Adjacent Cache Line Prefetch**
The optional settings are: [Disabled]; [Enabled].
Use this item to turn on/off prefetching of adjacent cache lines.

**Intel Virtualization Technology**
The optional settings: [Enabled]; [Disabled].
When set as [Enabled], a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

**Power Technology**
The optional settings: [Disabled]; [Energy Efficient]; [Custom].
*When set as [Custom], user can make further settings in the following sub-items:

**EIST**
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable Intel SpeedStep.

**Turbo Mode**
The optional settings: [Disabled]; [Enabled].

**P-STATE Coordination**
Use this item to change P-STATE coordination type.
The optional settings: [HW_ALL]; [SW_ALL]; [SW_ANY].

**CPU C6 report**
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable CPU C6 (ACPI C3) report to OS.

**CPU C7 report**
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable CPU C7 (ACPI C3) report to OS.

**Package C State Limit**
The optional items are: [C0]; [C1]; [C3]; [C6]; [C7]; [No Limit].

- **PPM Configuration**
Press [Enter] to make settings for PPM Configuration:

**PPM Configuration:**
EIST
The optional settings: [Enabled]; [Disabled].
Use this item to enable or disable Intel SpeedStep.

CPU C Status Report
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable CPU C status report to OS.
*When set as [Enabled], the following sub-items shall appear:

Max CPU C-state
This option controls Max C state that the processor will support.
The optional settings: [C7]; [C6]; [C1].

SATA Configuration
Press [Enter] to make settings for the following sub-items:

SATA Configuration

SATA Port
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable Serial ATA port.

SATA Speed Support
The item is for user to set the maximum speed the SATA controller can support.
The optional settings are: [Gen1]; [Gen2].

SATA ODD Port
The optional settings are: [Port0 ODD]; [No ODD].

SATA Mode
The optional settings are: [IDE Mode]; [AHCI Mode].

SATA1 or HDD HotPlug
The optional settings are: [Enabled]; [Disabled].
Use this item to enable or disable support for SATA Port HotPlug function.

CSM Configuration
Press [Enter] to make settings for the following sub-items:

Compatibly Support Module Configuration

Option ROM Message
Use this item to set display mode for option ROM.
The optional settings are: [Force BIOS]; [Keep Current].

INT19 Trap Response
This item is for BIOS reaction on INT19 trapping by Option ROM.
The optional settings are: [Immediate]; [Postponed].
[Immediate]: To execute the trap right away;
[Postponed]: To execute the trap during legacy boot.

Option ROM execution order
Storage
This item controls the execution of UEFI and Legacy Storage OpROM.
The optional settings are: [Do not launch]; [UEFI only]; [Legacy only]; [Legacy first]; [UEFI first].
Video
This item controls the execution of UEFI and Legacy Video OpROM.
The optional settings are: [Do not launch]; [UEFI only]; [Legacy only]; [Legacy first]; [UEFI first].
Other PCI devices
This item determines OpROM execution policy for devices other than Network, storage or video.
The optional settings are: [UEFI first]; [Legacy Only].

USB Configuration
Press [Enter] to make settings for the following sub-items:

USB Configuration
Legacy USB Support
The optional settings are: [Enabled]; [Disabled]; [Auto].
[Enabled]: To enable legacy USB support.
[Disabled]: To keep USB devices available only for EFI specification,
[Auto]: To disable legacy support if no USB devices are connected.

XHCI Hand-off
This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
The optional settings are: [Enabled]; [Disabled].

EHCI Hand-off
This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
The optional settings are: [Disabled]; [Enabled].
USB Mass Storage Driver Support
The optional settings are: [Disabled]; [Enabled].

3-8 Chipset Menu

- North Bridge
  Press [Enter] to view current using memory information and make settings for the following sub-items:
  **IGD Turbo Enable**
  The optional settings are: [Enabled]; [Disabled].
  **DVMT Pre-Allocated**
  Use this item to select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.
  The optional settings are: [64M]; [128M]; [256M]; [512M].
DVMT Total Gfx Mem
Use this item to select DVMT 5.0 total graphics memory size used by the internal graphics device.
The optional settings are: [128M]; [256M]; [MAX].

Spread Spectrum Clock
The optional settings are: [Enabled]; [Disabled].

RC6(Render Standby)
Use this item to enable or disable render standby support.

Primary IGFX Boot Display
Use this item to select the video device which will be activated during POST. This has no effect if external graphics present.
The optional settings are: [VBIOS Default]; [CRT]; [HDMI]; [LVDS].

LVDS Support
The optional settings are: [Enabled]; [Disabled].
*When set as [Enabled], user can make further settings in ‘LVDS Panel Type’.

LVDS Panel Type
Use this item to select LVDS panel used by Internal Graphics Device by selecting the appropriate setup item.

South Bridge
Press [Enter] to make settings for the following sub-items:

Mini PCIE
Use this item to enable or disable Mini-PCIE.
The optional settings are: [Disabled]; [Enabled].
When set as [Enabled], user can make settings in ‘Speed’ that appears:

Speed
Use this item to select PCIE speed for Mini-PCIE slot.
The optional settings are: [Auto]; [Gen2]; [Gen1].

Onboard PCIE Lan Device
Use this item to control the Onboard PCIE Lan device.
The optional settings are: [Disabled]; [Enabled].

Onboard Lan BootROM
Use this item to enable or disable boot option ROM for onboard network devices.
**XHCI Mode**
The system will show whether current XHCI support is enabled or disabled.

**USB 2.0 (EHCI) Support**
The system will show whether current USB 2.0 (EHCI) support is enabled or disabled.

**Audio Controller**
Use this item to control the detection of the Azalia HD Audio device.
The optional settings are: [Disabled]; [Enabled].

[Disabled]: Azalia will be unconditionally disabled;
[Enabled]: Azalia will be unconditionally enabled;
When set as [Enabled], user can make settings in ‘Azalia HDMI Codec’ that appears:

**Azalia HDMI Codec**
Use this item to enable or disable internal HDMI codec for Azalia.
The optional settings are: [Enabled]; [Disabled].

**High Precision Timer**
Use this item to enable or disable the high precision event timer.
The optional settings are: [Enabled]; [Disabled].
3-9 Security Menu

Security menu allow users to change administrator password and user password settings.
3-10 Boot Menu

**Boot Configuration**

**Setup Prompt Timeout**
Use this item to set number of seconds to wait for setup activation key.

**Bootup Numlock State**
Use this item to select keyboard numlock state.
The optional settings are: [On]; [Off].

**Fast Boot**
The optional settings are: [Enabled]; [Disabled].
When set as [Enabled], user can make settings in the following items that appear:

**VGA Support**
The optional settings are: [Auto]; [EFI Driver].
*When set as [Auto], it will only install Legacy OpROM with Legacy OS and logo*
will not be shown during POST. EFI driver will still be installed with EFI OS.

**USB Support**
The optional settings are: [Disabled]; [Full Initial]; [Partial Initial].
[Disabled]: All USB devices will NOT be available until after OS boot;
[Partial Initial]: USB mass storage and specific USB port/device will NOT be available before OS boot;
[Full Initial]: All USB devices will NOT be available in OS and POST.

**PS2 Device Support**
The optional settings are: [Disabled]; [Enabled].
The PS2 devices will be skipped if this is set as [Disabled].

**Network Stack Driver Support**
The optional settings are: [Disabled]; [Enabled].

**Network Stack Driver** will be skipped if this is set as [Disabled].

**Boot Option Priorities**

Boot Option # 1/#2…
Use this item to set system boot order.
The optional settings are: [UEFI: Built-in EFI Shell]; [Disabled].
3-11 Save & Exit Menu

Save Changes and Reset
This item allows user to reset the system after saving the changes.

Discard Changes and Reset
This item allows user to reset the system without saving any changes.

Save Options
Save Changes
This item allows user to save changes done so far to any of the setup options.

Discard Changes
This item allows user to discard changes done so far to any of the setup options.

Restore Defaults
Use this item to restore/load default values for all the setup options.

Save as User Defaults
Use this item to save the changes done so far as user defaults.

**Restore User Defaults**
Use this item to restore defaults to all the setup options.

**Boot Override**

**UEFI: Built-in EFI Shell**
Press this item and a dialogue box shall appear to ask if user wish to save configuration and reset.

**Launch EFI Shell from filesystem device**
Use this item to launch EFI shell application (shell.efi) from one of the available filesystem device.

**Reset System with ME disable Mode MEUD000**
Press [Enter] for ME to run into the temporary disable mode. Ignore if ME Ignition FWMEUD001.