For more product details, please visit GIGABYTE's website.

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- In order to assist in the use of this product, carefully read the User's Manual.
- For product-related information, check on our website at: https://www.gigabyte.com

Identifying Your Motherboard Revision
The revision number on your motherboard looks like this: "REV: X.X." For example, "REV: 1.0" means the revision of the motherboard is 1.0. Check your motherboard revision before updating motherboard BIOS, drivers, or when looking for technical information.

Example:
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H410M DS2V Motherboard Layout

Box Contents

- H410M DS2V motherboard
- Motherboard driver disc
- User’s Manual
- Two SATA cables
- I/O Shield

* The box contents above are for reference only and the actual items shall depend on the product package you obtain. The box contents are subject to change without notice.
Chapter 1  Hardware Installation

1-1  Installation Precautions

The motherboard contains numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD). Prior to installation, carefully read the user’s manual and follow these procedures:

- Prior to installation, make sure the chassis is suitable for the motherboard.
- Prior to installation, do not remove or break motherboard S/N (Serial Number) sticker or warranty sticker provided by your dealer. These stickers are required for warranty validation.
- Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.
- When connecting hardware components to the internal connectors on the motherboard, make sure they are connected tightly and securely.
- When handling the motherboard, avoid touching any metal leads or connectors.
- It is best to wear an electrostatic discharge (ESD) wrist strap when handling electronic components such as a motherboard, CPU or memory. If you do not have an ESD wrist strap, keep your hands dry and first touch a metal object to eliminate static electricity.
- Prior to installing the motherboard, please have it on top of an antistatic pad or within an electrostatic shielding container.
- Before connecting or unplugging the power supply cable from the motherboard, make sure the power supply has been turned off.
- Before turning on the power, make sure the power supply voltage has been set according to the local voltage standard.
- Before using the product, please verify that all cables and power connectors of your hardware components are connected.
- To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components.
- Make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing.
- Do not place the computer system on an uneven surface.
- Do not place the computer system in a high-temperature or wet environment.
- Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
- If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.
- If you use an adapter, extension power cable, or power strip, ensure to consult with its installation and/or grounding instructions.
## 1-2 Product Specifications

**CPU**
- Support for 10th Generation Intel® Core™ i9 processors/Intel® Core™ i7 processors/Intel® Core™ i5 processors/Intel® Core™ i3 processors/Intel® Pentium® processors/Intel® Celeron® processors in the LGA1200 package
  (Go to GIGABYTE’s website for the latest CPU support list.)
- L3 cache varies with CPU

**Chipset**
- Intel® H410 Express Chipset

**Memory**
- Intel® Core™ i9/i7 processors:
  - Support for DDR4 2933/2666/2400/2133 MHz memory modules
- Intel® Core™ i5/i3/Pentium®/Celeron® processors:
  - Support for DDR4 2666/2400/2133 MHz memory modules
  - 2 x DDR4 DIMM sockets supporting up to 64 GB (32 GB single DIMM capacity) of system memory
  - Dual channel memory architecture
  - Support for ECC Un-buffered DIMM 1Rx8/2Rx8 memory modules (operate in non-ECC mode)
  - Support for non-ECC Un-buffered DIMM 1Rx8/2Rx8/1Rx16 memory modules
  - Support for Extreme Memory Profile (XMP) memory modules
  (Go to GIGABYTE’s website for the latest supported memory speeds and memory modules.)

**Onboard Graphics**
- Integrated Graphics Processor-Intel® HD Graphics support:
  - 1 x D-Sub port, supporting a maximum resolution of 1920x1200@60 Hz
  - 1 x DVI-D port, supporting a maximum resolution of 1920x1200@60 Hz
  - The DVI-D port does not support D-Sub connection by adapter.
- Maximum shared memory of 512 MB

**Audio**
- Realtek® ALC887 codec
- High Definition Audio
- 2/4/5.1/7.1-channel
  - To configure 7.1-channel audio, you need to open the audio software and select Device advanced settings > Playback Device to change the default setting first.
  - Please visit GIGABYTE’s website for details on configuring the audio software.

**LAN**
- Realtek® GbE LAN chip (1000 Mbit/100 Mbit)

**Expansion Slots**
- 1 x PCI Express x16 slot, running at x16
- 2 x PCI Express x1 slots
  (The PCI Express slots conform to PCI Express 3.0 standard.)

**Storage Interface**
- 1 x M.2 connector (Socket 3, M key, type 2242/2260/2280 SATA and PCIe x2 SSD support)
- 4 x SATA 6Gb/s connectors
  - Refer to "1-7 Internal Connectors," for the installation notices for the M.2 and SATA connectors.

**USB**
- Chipset:
  - 4 x USB 3.2 Gen 1 ports (2 ports on the back panel, 2 ports available through the internal USB header)
  - 6 x USB 2.0/1.1 ports (4 ports on the back panel, 2 ports available through the internal USB header)
### Internal Connectors
- 1 x 24-pin ATX main power connector
- 1 x 8-pin ATX 12V power connector
- 1 x CPU fan header
- 1 x system fan header
- 1 x RGB LED strip header
- 4 x SATA 6Gb/s connectors
- 1 x M.2 Socket 3 connector
- 1 x front panel header
- 1 x front panel audio header
- 1 x USB 3.2 Gen 1 header
- 1 x USB 2.0/1.1 header
- 1 x Trusted Platform Module header (For the GC-TPM2.0 SPI/GC-TPM2.0 SPI 2.0 module only)
- 1 x serial port header
- 1 x Clear CMOS jumper

### Back Panel Connectors
- 1 x PS/2 keyboard/mouse port
- 1 x D-Sub port
- 1 x DVI-D port
- 2 x USB 3.2 Gen 1 ports
- 4 x USB 2.0/1.1 ports
- 1 x RJ-45 port
- 3 x audio jacks

### I/O Controller
- iTE® I/O Controller Chip

### Hardware Monitor
- Voltage detection
- Temperature detection
- Fan speed detection
- Overheating warning
- Fan fail warning
- Fan speed control
  * Whether the fan speed control function is supported will depend on the cooler you install.

### BIOS
- 1 x 128 Mbit flash
- Use of licensed AMI UEFI BIOS
- PnP 1.0a, DMI 2.7, WfM 2.0, SM BIOS 2.7, ACPI 5.0
### Unique Features
- **Support for APP Center**
  - Available applications in APP Center may vary by motherboard model. Supported functions of each application may also vary depending on motherboard specifications.
  - @BIOS
  - Ambient LED
  - EasyTune
  - Fast Boot
  - Game Boost
  - ON/OFF Charge
  - Smart Backup
  - System Information Viewer
- **Support for Q-Flash**
- **Support for Xpress Install**

### Bundled Software
- Norton® Internet Security (OEM version)
- Realtek® 8118 Gaming LAN Bandwidth Control Utility

### Operating System
- Support for Windows 10 64-bit

### Form Factor
- Micro ATX Form Factor; 22.6cm x 18.5cm

* GIGABYTE reserves the right to make any changes to the product specifications and product-related information without prior notice.
1-3 Installing the CPU

Read the following guidelines before you begin to install the CPU:

- Make sure that the motherboard supports the CPU.
  (Go to GIGABYTE’s website for the latest CPU support list.)
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Locate the pin one of the CPU. The CPU cannot be inserted if oriented incorrectly. (Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.)
- Apply an even and thin layer of thermal grease on the surface of the CPU.
- Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur.
- Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc.

1-4 Installing the Memory

Read the following guidelines before you begin to install the memory:

- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.
  (Go to GIGABYTE’s website for the latest supported memory speeds and memory modules.)
- Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.
- Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction.

Dual Channel Memory Configuration

This motherboard provides two memory sockets and supports Dual Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling Dual Channel memory mode will double the original memory bandwidth.

Please visit GIGABYTE’s website for details on hardware installation.
The two DDR4 memory sockets are divided into two channels and each channel has one memory socket as following:

Channel A: DDR4_1
Channel B: DDR4_2

Due to CPU limitations, read the following guidelines before installing the memory in Dual Channel mode.

1. Dual Channel mode cannot be enabled if only one memory module is installed.
2. When enabling Dual Channel mode with two memory modules, it is recommended that memory of the same capacity, brand, speed, and chips be used.

1-5 Installing an Expansion Card

Read the following guidelines before you begin to install an expansion card:

• Make sure the motherboard supports the expansion card. Carefully read the manual that came with your expansion card.
• Always turn off the computer and unplug the power cord from the power outlet before installing an expansion card to prevent hardware damage.

1-6 Back Panel Connectors

USB 2.0/1.1 Port
The USB port supports the USB 2.0/1.1 specification. Use this port for USB devices.

PS/2 Keyboard/Mouse Port
Use this port to connect a PS/2 mouse or keyboard.

D-Sub Port
The D-Sub port supports a 15-pin D-Sub connector and supports a maximum resolution of 1920x1200@60 Hz (the actual resolutions supported depend on the monitor being used). Connect a monitor that supports D-Sub connection to this port.

DVI-D Port (Note)
The DVI-D port conforms to the DVI-D specification and supports a maximum resolution of 1920x1200@60 Hz (the actual resolutions supported depend on the monitor being used). Connect a monitor that supports DVI-D connection to this port.

USB 3.2 Gen 1 Port
The USB 3.2 Gen 1 port supports the USB 3.2 Gen 1 specification and is compatible to the USB 2.0 specification. Use this port for USB devices.

• When removing the cable connected to a back panel connector, first remove the cable from your device and then remove it from the motherboard.
• When removing the cable, pull it straight out from the connector. Do not rock it side to side to prevent an electrical short inside the cable connector.

(Note) The DVI-D port does not support D-Sub connection by adapter.
**RJ-45 LAN Port**
The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. The following describes the states of the LAN port LEDs.

**Line In/Rear Speaker Out (Blue)**
The line in jack. Use this audio jack for line in devices such as an optical drive, walkman, etc.

**Line Out/Front Speaker Out (Green)**
The line out jack. Use this audio jack for a headphone or 2-channel speaker.

**Mic In/Center/Subwoofer Speaker Out (Pink)**
The Mic in jack.

### Audio Jack Configurations:

<table>
<thead>
<tr>
<th>Jack</th>
<th>Headphone/2-channel</th>
<th>4-channel</th>
<th>5.1-channel</th>
<th>7.1-channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line In/Rear Speaker Out</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line Out/Front Speaker Out</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mic In/Center/Subwoofer Speaker Out</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front Panel Line Out/Side Speaker Out</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The integrated HD (High Definition) audio provides jack retasking capability that allows the user to change the function for each jack through the audio driver.
- To configure 7.1-channel audio, you need to open the audio software and select Device advanced settings > Playback Device to change the default setting first.

Please visit GIGABYTE's website for details on configuring the audio software.
Read the following guidelines before connecting external devices:

1. First make sure your devices are compliant with the connectors you wish to connect.
2. Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
3. After installing the device and before turning on the computer, make sure the device cable has been securely attached to the connector on the motherboard.
To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.

### ATX

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.3V</td>
</tr>
<tr>
<td>2</td>
<td>3.3V</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>+5V</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>+5V</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>Power Good</td>
</tr>
<tr>
<td>9</td>
<td>5VSB (stand by +5V)</td>
</tr>
<tr>
<td>10</td>
<td>+12V</td>
</tr>
<tr>
<td>11</td>
<td>+12V (Only for 2x12-pin ATX)</td>
</tr>
<tr>
<td>12</td>
<td>3.3V (Only for 2x12-pin ATX)</td>
</tr>
<tr>
<td>13</td>
<td>3.3V</td>
</tr>
<tr>
<td>14</td>
<td>-12V</td>
</tr>
<tr>
<td>15</td>
<td>GND</td>
</tr>
<tr>
<td>16</td>
<td>PS_ON (soft On/Off)</td>
</tr>
<tr>
<td>17</td>
<td>GND</td>
</tr>
<tr>
<td>18</td>
<td>GND</td>
</tr>
<tr>
<td>19</td>
<td>GND</td>
</tr>
<tr>
<td>20</td>
<td>NC</td>
</tr>
<tr>
<td>21</td>
<td>+5V</td>
</tr>
<tr>
<td>22</td>
<td>+5V</td>
</tr>
<tr>
<td>23</td>
<td>+5V (Only for 2x12-pin ATX)</td>
</tr>
<tr>
<td>24</td>
<td>GND (Only for 2x12-pin ATX)</td>
</tr>
</tbody>
</table>

### CPU_FAN/SYS_FAN

All fan headers on this motherboard are 4-pin. Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The speed control function requires the use of a fan with fan speed control design. For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis.

- Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating. Overheating may result in damage to the CPU or the system may hang.
- These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers.
5) **LED_C (RGB LED Strip Header)**
The header can be used to connect a standard 5050 RGB LED strip (12V/G/R/B), with maximum power rating of 2A (12V) and maximum length of 2m.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12V</td>
</tr>
<tr>
<td>2</td>
<td>G</td>
</tr>
<tr>
<td>3</td>
<td>R</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
</tr>
</tbody>
</table>

Connect your RGB LED strip to the header. The power pin (marked with a triangle on the plug) of the LED strip must be connected to Pin 1 (12V) of this header. Incorrect connection may lead to the damage of the LED strip.

6) **SATA3 0/1/2/3 (SATA 6Gb/s Connectors)**
The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and SATA 1.5Gb/s standard. Each SATA connector supports a single SATA device.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>5</td>
<td>RXN</td>
</tr>
<tr>
<td>2</td>
<td>TXP</td>
<td>6</td>
<td>RXP</td>
</tr>
<tr>
<td>3</td>
<td>TXN</td>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To enable hot-plugging for the SATA ports, refer to Chapter 2, "BIOS Setup," "Settings\|I/O Ports\| SATA And RST Configuration," for more information.
7) **M2M_SB (M.2 Socket 3 Connector)**
   The M.2 connector supports M.2 SATA SSDs or M.2 PCIe SSDs.

   ![Diagram of M2M_SB connector]

   Follow the steps below to correctly install an M.2 SSD in the M.2 connector.
   
   **Step 1:**
   Locate the proper mounting hole for the M.2 SSD to be installed and then install the mounting clip first.
   
   **Step 2:**
   Slide the M.2 SSD into the connector at an angle.
   
   **Step 3:**
   Press the M.2 SSD down and then secure it by pressing the clip pin into the mounting hole.

   *Select the proper hole for the mounting clip according to the length of the M.2 SSD to be installed.*

**Installation Notices for the M.2 and SATA Connectors:**
The availability of the SATA connectors may be affected by the type of device installed in the M2M_SB socket. Refer to the following table for details.

<table>
<thead>
<tr>
<th>Type of M.2 SSD</th>
<th>SATA3 0</th>
<th>SATA3 1</th>
<th>SATA3 2</th>
<th>SATA3 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.2 SATA SSD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>M.2 PCIe SSD *</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>No M.2 SSD Installed</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓: Available, ✗: Not available

* The M2M_SB connector supports up to PCIe x2 SSDs
8) **F_PANEL (Front Panel Header)**

Connect the power switch, reset switch, speaker, chassis intrusion switch/sensor and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

- **PLED/PWR_LED (Power LED):**
  Connects to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S3/S4 sleep state or powered off (S5).

- **PW (Power Switch):**
  Connects to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch (refer to Chapter 2, "BIOS Setup," "Settings/Platform Power," for more information).

- **SPEAK (Speaker):**
  Connects to the speaker on the chassis front panel. The system reports system startup status by issuing a beep code. One single short beep will be heard if no problem is detected at system startup.

- **HD (Hard Drive Activity LED):**
  Connects to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

- **RES (Reset Switch):**
  Connects to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

- **CI (Chassis Intrusion Header):**
  Connects to the chassis intrusion switch/sensor on the chassis that can detect if the chassis cover has been removed. This function requires a chassis with a chassis intrusion switch/sensor.

- **NC: No connection.**

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

9) **F_AUDIO (Front Panel Audio Header)**

The front panel audio header supports High Definition audio (HD). You may connect your chassis front panel audio module to this header. Make sure the wire assignments of the module connector match the pin assignments of the motherboard header. Incorrect connection between the module connector and the motherboard header will make the device unable to work or even damage it.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MIC2_L</td>
<td>6</td>
<td>Sense</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>7</td>
<td>FAUDIO_JD</td>
</tr>
<tr>
<td>3</td>
<td>MIC2_R</td>
<td>8</td>
<td>No Pin</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
<td>9</td>
<td>LINE2_L</td>
</tr>
<tr>
<td>5</td>
<td>LINE2_R</td>
<td>10</td>
<td>Sense</td>
</tr>
</tbody>
</table>

Some chassis provide a front panel audio module that has separated connectors on each wire instead of a single plug. For information about connecting the front panel audio module that has different wire assignments, please contact the chassis manufacturer.
10) F_U32 (USB 3.2 Gen 1 Header)
The header conforms to USB 3.2 Gen 1 and USB 2.0 specification and can provide two USB ports. For purchasing the optional 3.5" front panel that provides two USB 3.2 Gen 1 ports, please contact the local dealer.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VBUS</td>
<td>11</td>
<td>D2+</td>
</tr>
<tr>
<td>2</td>
<td>SSRX1-</td>
<td>12</td>
<td>D2-</td>
</tr>
<tr>
<td>3</td>
<td>SSRX1+</td>
<td>13</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>14</td>
<td>SSTX2+</td>
</tr>
<tr>
<td>5</td>
<td>SSTX1-</td>
<td>15</td>
<td>SSTX2-</td>
</tr>
<tr>
<td>6</td>
<td>SSTX1+</td>
<td>16</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>17</td>
<td>SSRX2+</td>
</tr>
<tr>
<td>8</td>
<td>D1-</td>
<td>18</td>
<td>SSRX2-</td>
</tr>
<tr>
<td>9</td>
<td>D1+</td>
<td>19</td>
<td>VBUS</td>
</tr>
<tr>
<td>10</td>
<td>NC</td>
<td>20</td>
<td>No Pin</td>
</tr>
</tbody>
</table>

11) F_USB1 (USB 2.0/1.1 Header)
The header conforms to USB 2.0/1.1 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power (5V)</td>
<td>6</td>
<td>USB DY+</td>
</tr>
<tr>
<td>2</td>
<td>Power (5V)</td>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>USB DX-</td>
<td>8</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>USB DY-</td>
<td>9</td>
<td>No Pin</td>
</tr>
<tr>
<td>5</td>
<td>USB DX+</td>
<td>10</td>
<td>NC</td>
</tr>
</tbody>
</table>

- Do not plug the IEEE 1394 bracket (2x5-pin) cable into the USB 2.0/1.1 header.
- Prior to installing the USB bracket, be sure to turn off your computer and unplug the power cord from the power outlet to prevent damage to the USB bracket.

12) COM (Serial Port Header)
The COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NDCD-</td>
<td>6</td>
<td>NDSR-</td>
</tr>
<tr>
<td>2</td>
<td>NSIN</td>
<td>7</td>
<td>NRTS-</td>
</tr>
<tr>
<td>3</td>
<td>NSOUT</td>
<td>8</td>
<td>NCTS-</td>
</tr>
<tr>
<td>4</td>
<td>NDTR-</td>
<td>9</td>
<td>NRI-</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>10</td>
<td>No Pin</td>
</tr>
</tbody>
</table>
13) SPI_TPM (Trusted Platform Module Header)
You may connect an SPI TPM (Trusted Platform Module) to this header.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Definition</th>
<th>Pin No.</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data Output</td>
<td>7</td>
<td>Chip Select</td>
</tr>
<tr>
<td>2</td>
<td>Power (3.3V)</td>
<td>8</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>No Pin</td>
<td>9</td>
<td>IRQ</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
<td>10</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>Data Input</td>
<td>11</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>CLK</td>
<td>12</td>
<td>RST</td>
</tr>
</tbody>
</table>

14) CLR_CMOS (Clear CMOS Jumper)
Use this jumper to clear the BIOS configuration and reset the CMOS values to factory defaults. To clear the CMOS values, use a metal object like a screwdriver to touch the two pins for a few seconds.

- Open: Normal
- Short: Clear CMOS Values

- Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values.
- After system restart, go to BIOS Setup to load factory defaults (select Load Optimized Defaults) or manually configure the BIOS settings (refer to Chapter 2, "BIOS Setup," for BIOS configurations).

15) BAT (Battery)
The battery provides power to keep the values (such as BIOS configurations, date, and time information) in the CMOS when the computer is turned off. Replace the battery when the battery voltage drops to a low level, or the CMOS values may not be accurate or may be lost.

You may clear the CMOS values by removing the battery:
1. Turn off your computer and unplug the power cord.
2. Gently remove the battery from the battery holder and wait for one minute. (Or use a metal object like a screwdriver to touch the positive and negative terminals of the battery holder, making them short for 5 seconds.)
3. Replace the battery.
4. Plug in the power cord and restart your computer.

- Always turn off your computer and unplug the power cord before replacing the battery.
- Replace the battery with an equivalent one. Damage to your devices may occur if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by yourself or uncertain about the battery model.
- When installing the battery, note the orientation of the positive side (+) and the negative side (-) of the battery (the positive side should face up).
- Used batteries must be handled in accordance with local environmental regulations.
Chapter 2  BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters and loading operating system, etc. BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features. When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS.

To access the BIOS Setup program, press the <Delete> key during the POST when the power is turned on. To upgrade the BIOS, use either the GIGABYTE Q-Flash or @BIOS utility.

- Q-Flash allows the user to quickly and easily upgrade or back up BIOS without entering the operating system.
- @BIOS is a Windows-based utility that searches and downloads the latest version of BIOS from the Internet and updates the BIOS.

Because BIOS flashing is potentially risky, if you do not encounter problems using the current version of BIOS, it is recommended that you not flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction.

It is recommended that you not alter the default settings (unless you need to) to prevent system instability or other unexpected results. Inadequately altering the settings may result in system’s failure to boot. If this occurs, try to clear the CMOS values and reset the board to default values. (Refer to the “Load Optimized Defaults” section in this chapter or introductions of the battery/clear CMOS jumper in Chapter 1 for how to clear the CMOS values.)

2-1  Startup Screen

The following startup Logo screen will appear when the computer boots.

There are two different BIOS modes as follows and you can use the <F2> key to switch between the two modes. The Classic Setup mode provides detailed BIOS settings. You can press the arrow keys on your keyboard to move among the items and press <Enter> to accept or enter a sub-menu. Or you can use your mouse to select the item you want. Easy Mode allows users to quickly view their current system information or to make adjustments for optimum performance. In Easy Mode, you can use your mouse to move through configuration items.

- When the system is not stable as usual, select the Load Optimized Defaults item to set your system to its defaults.
- The BIOS Setup menus described in this chapter are for reference only and may differ by BIOS version.
Advanced Mode Function Keys

<→<→> Move the selection bar to select a setup menu

<↑><↓> Move the selection bar to select a configuration item on a menu

<Enter>/Double Click Execute command or enter a menu

<↑><Page Up> Increase the numeric value or make changes

<↓><Page Down> Decrease the numeric value or make changes

<F1> Show descriptions of the function keys

<F2> Switch to Easy Mode

<F3> Save the current BIOS settings to a profile

<F4> Load the BIOS settings from a profile created before

<F5> Restore the previous BIOS settings for the current submenus

<F6> Display the Smart Fan 5 screen

<F7> Load the Optimized BIOS default settings for the current submenus

<F8> Access the Q-Flash utility

<F10> Save all the changes and exit the BIOS Setup program

<F11> Switch to the Favorites submenu

<F12> Capture the current screen as an image and save it to your USB drive

<Insert> Add or remove a favorite option

<Ctrl>+<S> Display information on the installed memory

<Esc> Main Menu: Exit the BIOS Setup program

Submenus: Exit current submenu
Set your frequently used options as your favorites and use the <F11> key to quickly switch to the page where all of your favorite options are located. To add or remove a favorite option, go to its original page and press <Insert> on the option. The option is marked with a star sign if set as a “favorite.”
Whether the system will work stably with the overclock/overvoltage settings you made is dependent on your overall system configurations. Incorrectly doing overclock/overvoltage may result in damage to CPU, chipset, or memory and reduce the useful life of these components. This page is for advanced users only and we recommend you not to alter the default settings to prevent system instability or other unexpected results. (Inadequately altering the settings may result in system's failure to boot. If this occurs, clear the CMOS values and reset the board to default values.)

- **CPU Clock Ratio**
  Allows you to alter the clock ratio for the installed CPU. The adjustable range is dependent on the CPU being installed.

- **Ring Ratio**
  Allows you to set the CPU Uncore ratio. The adjustable range is dependent on the CPU being used. (Default: Auto)

- **IGP Ratio** *(Note)*
  Allows you to set the Graphics Ratio. (Default: Auto)

- **AVX Offset** *(Note)*
  AVX offset is the negative offset of AVX ratio.

#### Advanced CPU Settings

- **CPU Over Temperature Protection** *(Note)*
  Allows you to fine-tune the TJ Max offset value. (Default: Auto)

- **FCLK Frequency for Early Power On**
  Allows you to set the FCLK frequency. Options are: Normal(800Mhz), 1GHz, 400MHz. (Default: 1GHz)

- **Hyper-Threading Technology**
  Allows you to determine whether to enable multi-threading technology when using an Intel® CPU that supports this function. This feature only works for operating systems that support multi-processor mode. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

- **No. of CPU Cores Enabled**
  Allows you to select the number of CPU cores to enable in an Intel® multi-core CPU (the number of CPU cores may vary by CPU). **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

*(Note)* This item is present only when you install a CPU that supports this feature. For more information about Intel® CPUs' unique features, please visit Intel's website.
VT-d
Enables or disables Intel® Virtualization Technology for Directed I/O. (Default: Enabled)

Intel(R) Speed Shift Technology (Intel® Speed Shift Technology) *(Note)*
Enables or disables Intel® Speed Shift Technology. Enabling this feature allows the processor to ramp up its operating frequency more quickly and then improves the system responsiveness. (Default: Enabled)

CPU Thermal Monitor *(Note)*
Enables or disables Intel® Thermal Monitor function, a CPU overheating protection function. When enabled, the CPU core frequency and voltage will be reduced when the CPU is overheated. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Ring to Core offset (Down Bin)
Allows you to determine whether to disable the CPU Ring ratio auto-down function. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

CPU EIST Function *(Note)*
Enables or disables Enhanced Intel® Speed Step Technology (EIST). Depending on CPU loading, Intel® EIST technology can dynamically and effectively lower the CPU voltage and core frequency to decrease average power consumption and heat production. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Race To Halt (RTH) *(Note)*/Energy Efficient Turbo *(Note)*
Enables or disables the CPU power saving related settings. (Default: Auto)

Voltage Optimization
Allows you to determine whether to enable voltage optimization to reduce power consumption. (Default: Auto)

Intel(R) Turbo Boost Technology *(Note)*
Allows you to determine whether to enable the Intel® CPU Turbo Boost technology. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Intel(R) Turbo Boost Max Technology 3.0 *(Note)*
Enables or disables Intel® Turbo Boost Max Technology 3.0. Intel® Turbo Boost Max Technology 3.0 allows the system to identify the processor's best performance core and lets you manually direct the most critical workloads to it. You can even adjust the frequency of each core individually for performance optimization. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

CPU Flex Ratio Override
Enables or disables the CPU Flex Ratio. The maximum CPU clock ratio will be based on the CPU Flex Ratio Settings value if CPU Clock Ratio is set to **Auto**. (Default: Disabled)

CPU Flex Ratio Settings
Allows you to set the CPU Flex Ratio. The adjustable range may vary by CPU.

Active Turbo Ratios

Turbo Ratio (1-Core Active~10-Core Active)
Allows you to set the CPU Turbo ratios for different number of active cores. **Auto** sets the CPU Turbo ratios according to the CPU specifications. This item is configurable only when Active Turbo Ratios is set to **Enabled**. (Default: Auto)

(Note) This item is present only when you install a CPU that supports this feature. For more information about Intel® CPUs' unique features, please visit Intel's website.
C-States Control

CPU Enhanced Halt (C1E)
Enables or disables Intel® CPU Enhanced Halt (C1E) function, a CPU power-saving function in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. **Auto** lets the BIOS automatically configure this setting. This item is configurable only when C-States is enabled. (Default: Auto)

C3 State Support (Note)
Allows you to determine whether to let the CPU enter C3 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C3 state is a more enhanced power-saving state than C1. **Auto** lets the BIOS automatically configure this setting. This item is configurable only when C-States is enabled. (Default: Auto)

C6/C7 State Support
Allows you to determine whether to let the CPU enter C6/C7 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C6/C7 state is a more enhanced power-saving state than C3. **Auto** lets the BIOS automatically configure this setting. This item is configurable only when C-States Control is set to Enabled. (Default: Auto)

C8 State Support (Note)
Allows you to determine whether to let the CPU enter C8 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C8 state is a more enhanced power-saving state than C6/C7. **Auto** lets the BIOS automatically configure this setting. This item is configurable only when C-States Control is set to Enabled. (Default: Auto)

C10 State Support (Note)
Allows you to determine whether to let the CPU enter C10 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C10 state is a more enhanced power-saving state than C8. **Auto** lets the BIOS automatically configure this setting. This item is configurable only when C-States Control is set to Enabled. (Default: Auto)

Package C State Limit (Note)
Allows you to specify the C-state limit for the processor. **Auto** lets the BIOS automatically configure this setting. This item is configurable only when C-States Control is set to Enabled. (Default: Auto)

Turbo Power Limits
Allows you to set a power limit for CPU Turbo mode. When the CPU power consumption exceeds the specified power limit, the CPU will automatically reduce the core frequency in order to reduce the power. **Auto** sets the power limit according to the CPU specifications. (Default: Auto)

Package Power Limit TDP (Watts) / Package Power Limit Time
Allows you to set the power limit for CPU Turbo mode and how long it takes to operate at the specified power limit. If the specified value is exceeded, the CPU will automatically reduce the core frequency in order to reduce the power. **Auto** sets the power limit according to the CPU specifications. This item is configurable only when Turbo Power Limits is set to Enabled. (Default: Auto)

DRAM Power Limit (Watts) / DRAM Power Limit Time
Allows you to set the power limit for memory Turbo mode and how long it takes to operate at the specified power limit. **Auto** lets the BIOS automatically configure this setting. This item is configurable only when Turbo Power Limits is set to Enabled. (Default: Auto)

(Note) This item is present only when you install a CPU that supports this feature. For more information about Intel® CPUs’ unique features, please visit Intel’s website.
Core Current Limit (Amps)
Allows you to set a current limit for CPU Turbo mode. When the CPU current exceeds the specified current limit, the CPU will automatically reduce the core frequency in order to reduce the current. **Auto** sets the power limit according to the CPU specifications. This item is configurable only when Turbo Power Limits is set to **Enabled**. (Default: Auto)

Turbo Per Core Limit Control *(Note 1)*
Allows you to control each CPU core limit separately. (Default: Auto)

Extreme Memory Profile (X.M.P.) *(Note 2)*
Allows the BIOS to read the SPD data on XMP memory module(s) to enhance memory performance when enabled.
- Disabled: Disables this function. (Default)
- Profile1: Uses Profile 1 settings.
- Profile2 *(Note 2)*: Uses Profile 2 settings.

System Memory Multiplier
Allows you to set the system memory multiplier. **Auto** sets memory multiplier according to memory SPD data. (Default: Auto)

Memory Ref Clock
Allows you to manually adjust the memory reference clock. (Default: Auto)

Memory Odd Ratio (100/133 or 200/266)
**Enabled** allows Qclk to run in odd frequency. (Default: Auto)

Advanced Memory Settings

Memory Multiplier Tweaker
Provides different levels of memory auto-tuning. (Default: Auto)

Channel Interleaving
Enables or disables memory channel interleaving. **Enabled** allows the system to simultaneously access different channels of the memory to increase memory performance and stability. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Rank Interleaving
Enables or disables memory rank interleaving. **Enabled** allows the system to simultaneously access different ranks of the memory to increase memory performance and stability. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Memory Boot Mode
Provides memory detection and training methods.
- **Auto**: Lets the BIOS automatically configure this setting. (Default)
- **Normal**: The BIOS automatically performs memory training. Please note that if the system becomes unstable or unbootable, try to clear the CMOS values and reset the board to default values. (Refer to the introductions of the battery/clear CMOS jumper in Chapter 1 for how to clear the CMOS values.)
- **Enable Fast Boot**: Skip memory detection and training in some specific criteria for faster memory boot.
- **Disable Fast Boot**: Detect and train memory at every single boot.

*(Note 1)* This item is present only when you install a CPU that supports this feature. For more information about Intel® CPUs’ unique features, please visit Intel's website.

*(Note 2)* This item is present only when you install a CPU and a memory module that support this feature.
Realtime Memory Timing
Allows you to fine-tune memory timings after the BIOS stage. (Default: Auto)

Memory Enhancement Settings
Provides several memory performance enhancement settings: Auto, Relax OC, Enhanced Stability, Normal (basic performance), Enhanced Performance, High Frequency, High Density, and DDR-4500+. (Default: Auto)

Memory Channel Detection Message
Allows you to determine whether to show an alert message when the memory is not installed in the optimal memory channel. (Default: Enabled)

- SPD Info
  Displays information on the installed memory.

- Memory Channels Timings
  - Channels Standard Timing Control, Channels Advanced Timing Control, Channels Misc Timing Control
  These sections provide memory timing settings. Note: Your system may become unstable or fail to boot after you make changes on the memory timings. If this occurs, please reset the board to default values by loading optimized defaults or clearing the CMOS values.

Vcore Voltage Mode/CPU Vcore/Dynamic Vcore(DVID)/BCLK Adaptive Voltage/CPU Graphics Voltage (VAXG)/DRAM Voltage (CH A/B)
These items allow you to adjust the CPU Vcore and memory voltages.

- Advanced Voltage Settings
  This submenu allows you to configure Load-Line Calibration level, over-voltage protection level, and over-current protection level.
2-5 Settings

- **Platform Power**

  - **Platform Power Management**
    Enables or disables the Active State Power Management function (ASPM). (Default: Disabled)

  - **PEG ASPM**
    Allows you to configure the ASPM mode for the device connected to the CPU PEG bus. This item is configurable only when Platform Power Management is set to Enabled. (Default: Disabled)

  - **PCH ASPM**
    Allows you to configure the ASPM mode for the device connected to Chipset's PCI Express bus. This item is configurable only when Platform Power Management is set to Enabled. (Default: Disabled)

  - **DMI ASPM**
    Allows you to configure the ASPM mode for both CPU side and Chipset side of the DMI link. This item is configurable only when Platform Power Management is set to Enabled. (Default: Disabled)

- **Power On By Keyboard**

  Allows the system to be turned on by a PS/2 keyboard wake-up event.

  Note: To use this function, you need an ATX power supply providing at least 1A on the +5VSB lead.

  - **Disabled** Disables this function. (Default)
  - **Password** Set a password with 1~5 characters to turn on the system.
  - **Keyboard 98** Press POWER button on the Windows 98 keyboard to turn on the system.
  - **Any Key** Press any key to turn on the system.

- **Power On Password**

  Set the password when Power On By Keyboard is set to Password.

  Press <Enter> on this item and set a password with up to 5 characters and then press <Enter> to accept.

  To turn on the system, enter the password and press <Enter>.

  Note: To cancel the password, press <Enter> on this item. When prompted for the password, press <Enter> again without entering the password to clear the password settings.

- **Power On By Mouse**

  Allows the system to be turned on by a PS/2 mouse wake-up event.

  Note: To use this function, you need an ATX power supply providing at least 1A on the +5VSB lead.

  - **Disabled** Disables this function. (Default)
  - **Move** Move the mouse to turn on the system.
  - **Double Click** Double click on left button on the mouse to turn on the system.
ErP
Determine whether to let the system consume least power in S5 (shutdown) state. (Default: Disabled)
Note: When this item is set to Enabled, the following functions will become unavailable: Resume by Alarm, power on by mouse, power on by keyboard, and wake on LAN.

Soft-Off by PWR-BTTN
Configures the way to turn off the computer in MS-DOS mode using the power button.
- Instant-Off: Press the power button and then the system will be turned off instantly. (Default)
- Delay 4 Sec: Press and hold the power button for 4 seconds to turn off the system. If the power button is pressed for less than 4 seconds, the system will enter suspend mode.

Resume by Alarm
Determine whether to power on the system at a desired time. (Default: Disabled)
If enabled, set the date and time as following:
- Wake up day: Turn on the system at a specific time on each day or on a specific day in a month.
- Wake up hour/minute/second: Set the time at which the system will be powered on automatically.
Note: When using this function, avoid inadequate shutdown from the operating system or removal of the AC power, or the settings may not be effective.

Power Loading
Enables or disables dummy load. When the power supply is at low load, a self-protection will activate causing it to shutdown or fail. If this occurs, please set to Enabled. Auto lets the BIOS automatically configure this setting. (Default: Auto)

RC6(Render Standby)
Allows you to determine whether to let the onboard graphics enter standby mode to decrease power consumption. (Default: Enabled)

AC BACK
Determines the state of the system after the return of power from an AC power loss.
- Memory: The system returns to its last known awake state upon the return of the AC power.
- Always On: The system is turned on upon the return of the AC power.
- Always Off: The system stays off upon the return of the AC power. (Default)

IO Ports
Initial Display Output
Specifies the first initiation of the monitor display from the installed PCI Express graphics card or the onboard graphics.
- IGFX (Note): Sets the onboard graphics as the first display.
- PCIe 1 Slot: Sets the graphics card on the PCIEX16 slot as the first display. (Default)

Internal Graphics
Enables or disables the onboard graphics function. (Default: Auto)

DVMT Pre-Allocated
Allows you to set the onboard graphics memory size. Options are: 0M~512M. (Default: 64M)

DVMT Total Gfx Mem
Allows you to allocate the DVMT memory size of the onboard graphics. Options are: 128M, 256M, MAX. (Default: 256M)

Aperture Size
Allows you to set the maximum amount of system memory that can be allocated to the graphics card. Options are: 128MB, 256MB, 512MB, 1024MB, and 2048MB. (Default: 256MB)

(Note) This item is present only when you install a CPU that supports this feature.
OnBoard LAN Controller
Enables or disables the onboard LAN function. (Default: Enabled)
If you wish to install a 3rd party add-in network card instead of using the onboard LAN, set this item to Disabled.

Audio Controller
Enables or disables the onboard audio function. (Default: Enabled)
If you wish to install a 3rd party add-in audio card instead of using the onboard audio, set this item to Disabled.

Above 4G Decoding
Enables or disables 64-bit capable devices to be decoded in above 4 GB address space (only if your system supports 64-bit PCI decoding). Set to Enabled if more than one advanced graphics card are installed and their drivers are not able to be launched when entering the operating system (because of the limited 4 GB memory address space). (Default: Disabled)

IOAPIC 24-119 Entries
Enables or disables this function. (Default: Enabled)

Super IO Configuration

Serial Port
Enables or disables the onboard serial port. (Default: Enabled)

USB Configuration

Legacy USB Support
Allows USB keyboard/mouse to be used in MS-DOS. (Default: Enabled)

XHCI Hand-off
Determines whether to enable XHCI Hand-off feature for an operating system without XHCI Hand-off support. (Default: Enabled)

USB Mass Storage Driver Support
Enables or disables support for USB storage devices. (Default: Enabled)

Mass Storage Devices
Displays a list of connected USB mass storage devices. This item appears only when a USB storage device is installed.

Network Stack Configuration

Network Stack
Disables or enables booting from the network to install a GPT format OS, such as installing the OS from the Windows Deployment Services server. (Default: Disabled)

IPv4 PXE Support
Enables or disables IPv4 PXE Support. This item is configurable only when Network Stack is enabled.

IPv4 HTTP Support
Enables or disables HTTP boot support for IPv4. This item is configurable only when Network Stack is enabled.
IPv6 PXE Support
Enables or disables IPv6 PXE Support. This item is configurable only when Network Stack is enabled.

IPv6 HTTP Support
Enables or disables HTTP boot support for IPv6. This item is configurable only when Network Stack is enabled.

PXE boot wait time
Allows you to configure how long to wait before you can press <Esc> to abort the PXE boot.

Media detect count
Allows you to set the number of times to check the presence of media.

■ NVMe Configuration
Displays information on your M.2 NVME PCIe SSD if installed.

■ SATA And RST Configuration

■ SATA Controller(s)
Enables or disables the integrated SATA controllers. (Default: Enabled)

■ SATA Mode Selection
Specifies the operating mode of the integrated SATA controllers.

- AHCI  Configures the SATA controllers to AHCI mode. Advanced Host Controller Interface (AHCI) is an interface specification that allows the storage driver to enable advanced Serial ATA features such as Native Command Queuing and hot plug. (Default)

■ Aggressive LPM Support
Enables or disables the power saving feature, ALPM (Aggressive Link Power Management), for the Chipset SATA controllers. (Default: Disabled)

■ Port 0/1/2/3
Enables or disables each SATA port. (Default: Enabled)

■ Hot plug
Enables or disable the hot plug capability for each SATA port. (Default: Disabled)

■ Configured as eSATA
Enables or disables support for external SATA devices.

■ Realtek PCIe GBE Family Controller
This sub-menu provides information on LAN configuration and related configuration options.
■ **Miscellaneous**

**LEDs in System Power On State**
Allows you to enable or disable motherboard LED lighting when the system is on.

- Off  Disables the selected lighting mode when the system is on.
- On   Enables the selected lighting mode when the system is on. (Default)

**Intel Platform Trust Technology (PTT)**
Enables or disables Intel® PTT Technology. (Default: Disabled)

**Software Guard Extensions (SGX)**
Enables or disables the Intel® Software Guard Extensions technology. This feature allows legal software to operate in a safe environment and protects the software against attacks from malicious software. The **Software Controlled** option allows you to enable or disable this feature with an Intel-provided application. (Default: Software Controlled)

**Max Link Speed**
Allows you to set the operation mode of the PCI Express slots to Gen 1, Gen 2, or Gen 3. Actual operation mode is subject to the hardware specification of each slot. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

**3DMark01 Enhancement**
Allows you to determine whether to enhance some legacy benchmark performance. (Default: Disabled)

■ **Trusted Computing**
Enables or disables Trusted Platform Module (TPM).

■ **PC Health Status**

**Reset Case Open Status**

- **Disabled**  Keeps or clears the record of previous chassis intrusion status. (Default)
- **Enabled**   Clears the record of previous chassis intrusion status and the **Case Open** field will show "No" at next boot.

**Case Open**
Displays the detection status of the chassis intrusion detection device attached to the motherboard CI header. If the system chassis cover is removed, this field will show "Yes", otherwise it will show "No". To clear the chassis intrusion status record, set **Reset Case Open Status** to **Enabled**, save the settings to the CMOS, and then restart your system.

**CPU Vcore/CPU VCCSA/DRAM Channel A/B Voltage/+3.3V/+5V/+12V/CPU VAXG**
Displays the current system voltages.
Smart Fan 5

Monitor
Allows you to select a target to monitor and to make further adjustment. (Default: CPU FAN)

Fan Speed Control
Allows you to determine whether to enable the fan speed control function and adjust the fan speed.

- Normal
  Allows the fan to run at different speeds according to the temperature. You can adjust the fan speed with System Information Viewer based on your system requirements.
  (Default)
- Silent
  Allows the fan to run at slow speeds.
- Manual
  Allows you to control the fan speed in the curve graph.
- Full Speed
  Allows the fan to run at full speeds.

Fan Control Use Temperature Input
Allows you to select the reference temperature for fan speed control.

Temperature Interval
Allows you to select the temperature interval for fan speed change.

Fan Control Mode
- Auto
  Lets the BIOS automatically detect the type of fan installed and sets the optimal control mode. (Default)
- Voltage
  Voltage mode is recommended for a 3-pin fan.
- PWM
  PWM mode is recommended for a 4-pin fan.

Fan Stop
Enables or disables the fan stop function. You can set the temperature limit using the temperature curve. The fan stops operation when the temperature is lower than the limit. (Default: Disabled)

Temperature
Displays the current temperature of the selected target area.

Fan Speed
Displays current fan speeds.

Temperature Warning Control
Sets the warning threshold for temperature. When temperature exceeds the threshold, BIOS will emit warning sound. Options are: Disabled (default), 60°C/140°F, 70°C/158°F, 80°C/176°F, 90°C/194°F.

Fan Fail Warning
Allows the system to emit warning sound if the fan is not connected or fails. Check the fan condition or fan connection when this occurs. (Default: Disabled)
2-6 System Info.

This section provides information on your motherboard model and BIOS version. You can also select the default language used by the BIOS and manually set the system time.

Access Level
Displays the current access level depending on the type of password protection used. (If no password is set, the default will display as Administrator.) The Administrator level allows you to make changes to all BIOS settings; the User level only allows you to make changes to certain BIOS settings but not all.

System Language
Selects the default language used by the BIOS.

System Date
Sets the system date. The date format is week (read-only), month, date, and year. Use <Enter> to switch between the Month, Date, and Year fields and use the <Page Up> or <Page Down> key to set the desired value.

System Time
Sets the system time. The time format is hour, minute, and second. For example, 1 p.m. is 13:00:00. Use <Enter> to switch between the Hour, Minute, and Second fields and use the <Page Up> or <Page Down> key to set the desired value.

Plug in Devices Info
Displays information on your PCI Express and M.2 devices if installed.

Q-Flash
Allows you to access the Q-Flash utility to update the BIOS or back up the current BIOS configuration.
2-7 Boot

Bootup NumLock State
Enables or disables NumLock feature on the numeric keypad of the keyboard after the POST. (Default: On)

Security Option
Specifies whether a password is required every time the system boots, or only when you enter BIOS Setup.
After configuring this item, set the password(s) under the Administrator Password/User Password item.

- Setup A password is only required for entering the BIOS Setup program.
- System A password is required for booting the system and for entering the BIOS Setup program. (Default)

Full Screen LOGO Show
Allows you to determine whether to display the GIGABYTE Logo at system startup. Disabled skips the GIGABYTE Logo when the system starts up. (Default: Enabled)

Boot Option Priorities
Specifies the overall boot order from the available devices. Removable storage devices that support GPT format will be prefixed with "UEFI:" string on the boot device list. To boot from an operating system that supports GPT partitioning, select the device prefixed with "UEFI:" string.
Or if you want to install an operating system that supports GPT partitioning such as Windows 10 64-bit, select the optical drive that contains the Windows 10 64-bit installation disc and is prefixed with "UEFI:" string.

Fast Boot
Enables or disables Fast Boot to shorten the OS boot process. Ultra Fast provides the fastest bootup speed. (Default: Disable Link)

SATA Support
- Last Boot SATA Devices Only Except for the previous boot drive, all SATA devices are disabled before the OS boot process completes. (Default)
- All Sata Devices All SATA devices are functional in the operating system and during the POST.
This item is configurable only when Fast Boot is set to Enabled or Ultra Fast.

VGA Support
Allows you to select which type of operating system to boot.
- Auto Enables legacy option ROM only.
- EFI Driver Enables EFI option ROM. (Default)
This item is configurable only when Fast Boot is set to Enabled or Ultra Fast.
USB Support
- Disable Link  All USB devices are disabled before the OS boot process completes.
- Full Initial   All USB devices are functional in the operating system and during the POST. (Default)
- Partial Initial Part of the USB devices are disabled before the OS boot process completes.
This item is configurable only when Fast Boot is set to Enabled or Ultra Fast. This function is disabled when Fast Boot is set to Ultra Fast.

PS2 Devices Support
- Disable Link  All PS/2 devices are disabled before the OS boot process completes.
- Enabled   All PS/2 devices are functional in the operating system and during the POST. (Default)
This item is configurable only when Fast Boot is set to Enabled or Ultra Fast. This function is disabled when Fast Boot is set to Ultra Fast.

Network Stack Driver Support
- Disable Link  Disables booting from the network. (Default)
- Enabled   Enables booting from the network.
This item is configurable only when Fast Boot is set to Enabled or Ultra Fast.

Next Boot After AC Power Loss
- Normal Boot  Enables normal bootup upon the return of the AC power. (Default)
- Fast Boot   Keeps the Fast Boot settings upon the return of the AC power.
This item is configurable only when Fast Boot is set to Enabled or Ultra Fast.

Mouse Speed
Allows you to set the mouse cursor movement speed. (Default: 1 X)

Windows 10 Features
Allows you to select the operating system to be installed. (Default: Windows 10)

CSM Support
Enables or disables UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.
- Enabled   Enables UEFI CSM.
- Disabled  Disables UEFI CSM and supports UEFI BIOS boot process only. (Default)

LAN PXE Boot Option ROM
Allows you to select whether to enable the legacy option ROM for the LAN controller. (Default: Disabled)
This item is configurable only when CSM Support is set to Enabled.

Storage Boot Option Control
Allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller.
- Do not launch  Disables option ROM.
- UEFI     Enables UEFI option ROM only.
- Legacy   Enables legacy option ROM only. (Default)
This item is configurable only when CSM Support is set to Enabled.

Other PCI devices
Allows you to select whether to enable the UEFI or Legacy option ROM for the PCI device controller other than the LAN, storage device, and graphics controllers.
- Do not launch  Disables option ROM.
- UEFI     Enables UEFI option ROM only. (Default)
- Legacy   Enables legacy option ROM only.
This item is configurable only when CSM Support is set to Enabled.
Administrator Password
Allows you to configure an administrator password. Press <Enter> on this item, type the password, and then press <Enter>. You will be requested to confirm the password. Type the password again and press <Enter>. You must enter the administrator password (or user password) at system startup and when entering BIOS Setup. Differing from the user password, the administrator password allows you to make changes to all BIOS settings.

User Password
Allows you to configure a user password. Press <Enter> on this item, type the password, and then press <Enter>. You will be requested to confirm the password. Type the password again and press <Enter>. You must enter the administrator password (or user password) at system startup and when entering BIOS Setup. However, the user password only allows you to make changes to certain BIOS settings but not all. To cancel the password, press <Enter> on the password item and when requested for the password, enter the correct one first. When prompted for a new password, press <Enter> without entering any password. Press <Enter> again when prompted to confirm.

NOTE: Before setting the User Password, be sure to set the Administrator Password first.

Secure Boot
Allows you to enable or disable Secure Boot and configure related settings. This item is configurable only when CSM Support is set to Disabled.

Preferred Operating Mode
Allows you to select whether to enter Easy mode or Advanced mode after entering BIOS Setup. Auto enters the BIOS mode where it was last time. (Default: Auto)
2-8  Save & Exit

Press <Enter> on this item and select Yes. This saves the changes to the CMOS and exits the BIOS Setup program. Select No or press <Esc> to return to the BIOS Setup Main Menu.

Exit Without Saving
Press <Enter> on this item and select Yes. This exits the BIOS Setup without saving the changes made in BIOS Setup to the CMOS. Select No or press <Esc> to return to the BIOS Setup Main Menu.

Load Optimized Defaults
Press <Enter> on this item and select Yes to load the optimal BIOS default settings. The BIOS defaults settings help the system to operate in optimum state. Always load the Optimized defaults after updating the BIOS or after clearing the CMOS values.

Boot Override
Allows you to select a device to boot immediately. Press <Enter> on the device you select and select Yes to confirm. Your system will restart automatically and boot from that device.

Save Profiles
This function allows you to save the current BIOS settings to a profile. You can create up to 8 profiles and save as Setup Profile 1~ Setup Profile 8. Press <Enter> to complete. Or you can select Select File in HDD/FDD/USB to save the profile to your storage device.

Load Profiles
If your system becomes unstable and you have loaded the BIOS default settings, you can use this function to load the BIOS settings from a profile created before, without the hassles of reconfiguring the BIOS settings. First select the profile you wish to load and then press <Enter> to complete. You can select Select File in HDD/FDD/USB to input the profile previously created from your storage device or load the profile automatically created by the BIOS, such as reverting the BIOS settings to the last settings that worked properly (last known good record).
Drivers Installation

- Before installing the drivers, first install the operating system.
- After installing the operating system, insert the motherboard driver disc into your optical drive. Click on the message "Tap to choose what happens with this disc" on the top-right corner of the screen and select "Run Run.exe." (Or go to My Computer, double-click the optical drive and execute the Run.exe program.)

"Xpress Install" will automatically scan your system and then list all of the drivers that are recommended to install. You can click the Xpress Install button and "Xpress Install" will install all of the selected drivers. Or click the arrow icon to individually install the drivers you need.

Please visit GIGABYTE's website for more software information.

Please visit GIGABYTE's website for more troubleshooting information.
Regulatory Notices

United States of America, Federal Communications Commission Statement

Supplier’s Declaration of Conformity
47 CFR § 2.1077 Compliance Information

Product Name: Motherboard
Trade Name: GIGABYTE
Model Number: H410M DS2V
Responsible Party – U.S. Contact Information: G.B.T. Inc.
Address: 17358 Railroad street, City Of Industry, CA91748
Tel.: 1-626-854-9338
Internet contact information: https://www.gigabyte.com

FCC Compliance Statement:
This device complies with Part 15 of the FCC Rules, Subpart B, Unintentional Radiators. 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.

European Union (EU) CE Declaration of Conformity
This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. This class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d’Industrie Canada
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

European Union (EU) CE Declaration of Conformity
This device complies with the following directives: Electromagnetic Compatibility Directive 2014/30/EU, Low-voltage Directive 2014/35/EU, RoHS directive (recast) 2011/65/EU & the 2015/863 Statement. This product has been tested and found to comply with all essential requirements of the Directives.

GIGABYTE products have not intended to add and safe from hazardous substances (Cd, Pb, Hg, Cr+6, PBDE, PBB, DEHP, BBP, DBP and DIBP). GIGABYTE will fulfill the national laws as interpreted from the 2012/19/ EU WEEE (Waste Electrical and Electronic Equipment) (recast) directive. The WEEE Directive specifies the treatment, collection, recycling and disposal of electric and electronic devices and their components. Under the Directive, used equipment must be marked, collected separately, and disposed of properly.

Canadian Department of Communications Statement
This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. This class B digital apparatus complies with Canadian ICES-003.

Déclaration de conformité aux Directives de l’Union européenne (UE)
Cet appareil portant la marque CE est conforme aux directives de l’UE suivantes: directive Compatibilité Electromagnétique 2014/30/UE, directive Basse Tension 2014/35/UE et directive RoHS II 2011/65/UE. La conformité à ces directives est évaluée sur la base des normes européennes harmonisées applicables.

End of Life Directives-Recycling
The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure.

CE declaración de conformidad
Este producto cumple con la marca CE están en conformidad con las siguientes Directivas de la Unión Europea: Directiva EMV 2014/30/EU, Niederspannungsrichtlinie 2014/30/EU und RoHS-Richtlinie 2011/65/EU. El cumplimiento de estas directivas se evalúa mediante las normas europeas armonizadas.

CE declaración de conformidade
Este produto cumprir com a marcação CE estão em conformidade com as seguintes Directivas de la Unión Europea: Directiva EMC 2014/30/EU, Diretiva RSP 2011/65/UE. A conformidade com estas directivas é verificada utilizando as normas europeias harmonizadas.

CE Declaración de conformidad

Dichiarazione di conformità CE
Questo prodotto è conforme alle seguenti direttive: Direttiva sulla compatibilità elettromagnetica 2014/30/UE, Direttiva sulla bassa tensione 2014/35/UE, Direttiva RoHS (ritruzione) 2011/65/UE. Questo prodotto è stato testato e trovato conforme a tutti i requisiti essenziali delle Direttive.
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- GIGABYTE eSupport
To submit a technical or non-technical (Sales/Marketing) question, please link to:
https://esupport.gigabyte.com