

User Guide

EVGA Z170 FTW

Specs and Initial Installation

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## Before You Begin...

Mainstream performance has been redefined, introducing the EVGA Z170 FTW. The Z170 platform is the first mainstream chipset to feature DDR4 memory, and the new 6<sup>th</sup> Generation Intel® Core™ Processors! Features upgrades to the already top notch UEFI interface, 5 phase VRM, 1 M.2 slot, Native SATA 3/6G and USB3, 2 way SLI, Intel NIC, and more sitting on an 6 layer PCB.

As with any EVGA motherboard, it's designed for the overclocker. Built from the ground up to give you all the essentials that you need for overclocking, and stability, with a GUI BIOS/UEFI that is focused on functionality, high quality components and next generation dual channel DDR4 memory.

With these features and more, it is clear that the EVGA Z170 motherboards are engineered to set the new standard for the mainstream chipset motherboard.

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## Parts NOT in the Kit

This kit contains all the hardware necessary to install and connect your new EVGA Z170 FTW Motherboard. However, it does NOT contain the following items that must be purchased separately in order to make the system fully functional and install an Operating System:

- ❑ **Intel Socket 1151 Processor**
- ❑ **DDR4 System Memory**
- ❑ **CPU Cooling Device**
- ❑ **PCI Express Graphics Card**
- ❑ **Power Supply**
- ❑ **Hard Drive or SSD**
- ❑ **Keyboard / Mouse**
- ❑ **Monitor**
- ❑ **(Optional) Optical Drive**
- ❑ **Operating System**

EVGA assumes you have purchased all the necessary parts needed to allow for proper system functionality. For a full list of supported CPUs on this motherboard, please visit [www.evga.com/support/motherboard](http://www.evga.com/support/motherboard)

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## Intentions of the Kit

This kit provides you with the motherboard and all connecting cables necessary to install the motherboard into a PC case.

When replacing a motherboard in an existing PC, you will need to reinstall an operating system even though the current storage drive may already have one installed.

# Motherboard

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## Motherboard Specifications

- ❑ **Size:**
  - ATX form factor of 12 inches x 9.6 inches
- ❑ **Microprocessor support:**
  - Intel Socket 1151 Processor
- ❑ **Operating Systems:**
  - Supports Windows 10 / 8 / 7
  - For Windows 7 users, please remember drivers are REQUIRED for USB3 and above support.
- ❑ **Contains Intel Z170 chipset**
- ❑ **System Memory support:**
  - Supports Dual channel DDR4 up to 3200MHz+.
  - Supports up to 64GB of DDR4 memory.
- ❑ **USB 2.0 Ports:**
  - 2x from Intel Z170 PCH, on I/O Panel
  - Supports hot plug
  - Supports wake-up from S3 and S4 mode
  - Supports USB 2.0 protocol up to a 480 Mbps transmission rate
- ❑ **USB 3.0 Ports:**
  - 8x from Intel Z170 PCH – 6x external on I/O panel, 2x internal (1 Header)
  - Supports transfer speeds up to 5Gbps
  - Backwards compatible USB 2.0 and USB 1.1 support
- ❑ **SATA Ports:**
  - Intel Z170 PCH Controller
  - 6x SATA 3/6G (600 MB/s) data transfer rate
    - Support for RAID 0, RAID 1, RAID 5, AND RAID 10
    - Supports hot plug
- ❑ **Onboard LAN:**
  - 1x Intel i219 Gigabit Ethernet PHY
  - Supports 10/100/1000 Mb/sec Ethernet

❑ **Onboard Audio:**

Realtek HD Audio (ALC1150)  
Supports 8-channel (7.1) audio  
Supports Optical Output

❑ **Power Functions:**

Supports ACPI (Advanced Configuration and Power Interface)  
Supports S0 (normal), S3 (suspend to RAM), S4 (Suspend to disk - depends on OS), and S5 (soft - off)

❑ **Expansion Slots:**

4x PCI-E 3.0 1x16/8, 1x8, 1x4 (4 lanes from PCH), 1x1 (1 lane from PCH) slots

1x PCI-E 3.0 1x4 (4 Lanes from PCH) slot

1x M.2 Key M (PCIE + SATA)

-Key M has speeds up to 32Gbps (PCIE3.0 4x or SATA3) shared with  
2x native SATA (Ports 4 and 5)

❑ **SLI and Crossfire support:**

2 Way SLI and Quad SLI (dual processor cards are required to be Gen3 NATIVE)

2 Way Crossfire and Quadfire (dual processor cards are required to be Gen3 NATIVE)

❑ **2x Video Out (on I/O Panel):**

-1x DP 1.2

-1x HDMI 1.4

❑ **7x Fan Headers:**

-2x PWM Fan headers supporting up to 1amp @ 12Volt **MAX**

-5x DC/PWM fan headers supporting up to 1amp @ 12Volt **MAX**  
(selectable in BIOS, can function as DC or PWM)

# Unpacking and Parts Descriptions

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## Equipment

The following accessories are included with the EVGA Z170 FTW Motherboard:



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### **The EVGA Z170 FTW Motherboard**

This motherboard contains the Intel Z170 chipset.



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### **I/O Shield**

Installs in the system case to block radio frequency transmissions, protect internal components from dust, foreign objects, and aids in proper airflow within the chassis.



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### **2x SATA 3G/6G Data Cables**

Used to support the SATA protocol and each one connects a single drive to the motherboard.



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### **I/O Cover**

This optional cover attaches to the PCB and covers the I/O area

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**2Way SLI Bridge**

Link for attaching 2 cards in SLI.

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**Case Badge**

EVGA enthusiast Case Badge

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**Fastener kit**

Screws for mounting your I/O Cover

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**Installation CD**

Contains drivers and software needed to setup the motherboard.

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**User Manual**

The user manual you are reading right now!

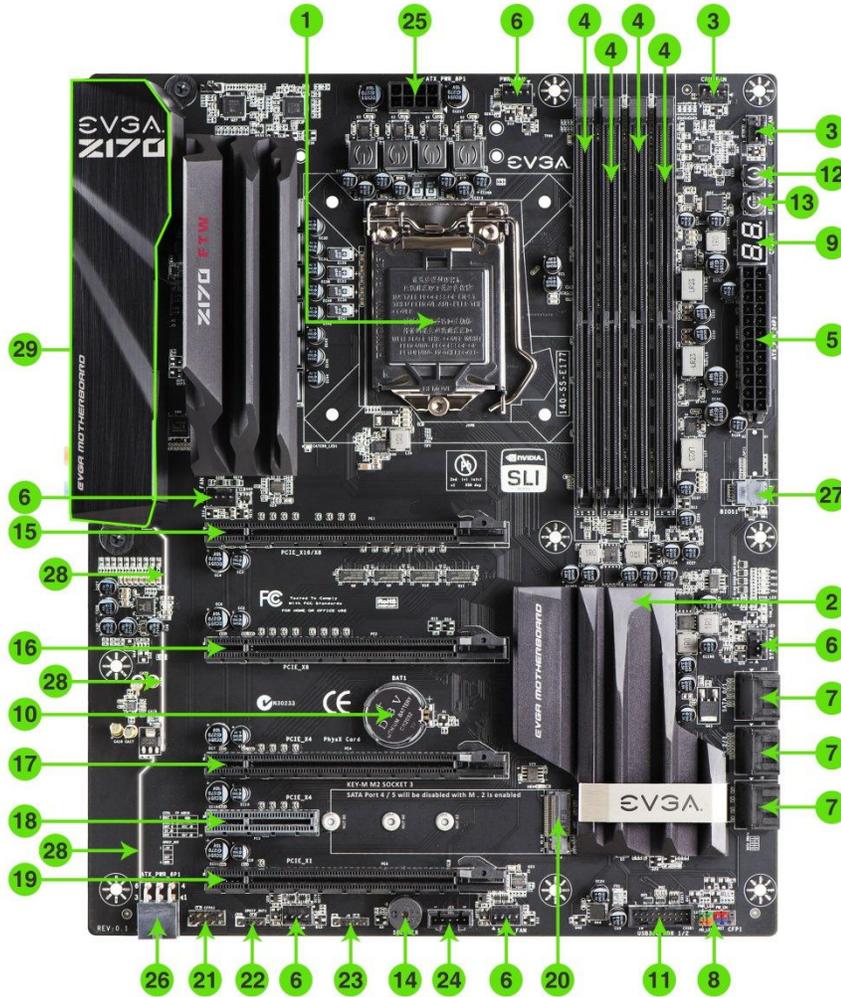
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# Component Legend

## Intel Z170 FTW Motherboard

The EVGA Z170 FTW Motherboard with the Intel Z170 and PCH Chipset. Figure 1 shows the motherboard and Figure 2 shows the back panel connectors

**FIGURE 1. Z170 FTW Motherboard Layout**



|                                 |                              |                                      |
|---------------------------------|------------------------------|--------------------------------------|
| 1. CPU Socket 1151              | 11. USB 3.0 Headers          | 21. Front Panel Audio Connector      |
| 2. Intel Z170 PCH               | 12. Power Button             | 22. S/PDIF Out                       |
| 3. CPU Fan Header (1 amp PWM)   | 13. Reset Button             | 23. EVGauge                          |
| 4. DDR4 Memory DIMM Slots 1-4   | 14. PC Speaker               | 24. Thunderbolt GPIO                 |
| 5. 24-pin ATX power connector   | 15. PCI-E Slot x16/x8        | 25. 8 pin EPS Connector              |
| 6. Fan Headers (1 amp DC/PWM)   | 16. PCI-E Slot x8            | 26. Supplemental PCI-E 6pin Power    |
| 7. Intel SATA 6G Ports          | 17. PCI-E Slot x4 (x16 slot) | 27. Removable BIOS Chip              |
| 8. Front Panel Connectors       | 18. PCI-E Slot x4            | 28. Shielded/backlit audio traces    |
| 9. Debug LED / CPU Temp Monitor | 19. PCI-E Slot x1 (x16 slot) | 29. Back Panel Connectors (Figure 2) |
| 10. CMOS Battery                | 20. M.2 Socket 3 Key-M       |                                      |

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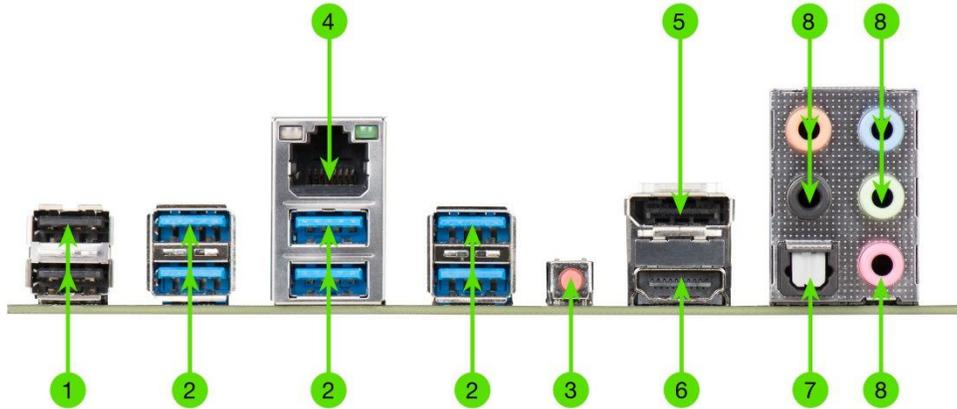
## PCI-E Slot Breakdown

### PCI-E Lane Distribution

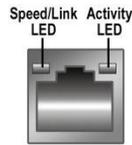
- ❑ PE1 – x16/8 (x8 if PE2 is used), 16/8 lanes from CPU
  - ❑ PE2 – x8, 8 lanes form CPU
  - ❑ PE3 – x4, 4 lanes from PCH
  - ❑ PE4 – x4 4 lanes from PCH
  - ❑ PE5 – x1, 1 lane from PCH
- This motherboard does not have lane replication via PLX; all lanes are derived from CPU and PCH.

## Rear I/O Panel Legend

Figure 2. Chassis Rear Panel Connectors



|                    |                     |                              |
|--------------------|---------------------|------------------------------|
| 1. USB 2.0         | 4. Intel i219 NIC   | 7. Optical Out               |
| 2. USB 3.0         | 5. Display Port 1.2 | 8. Analog Audio Output Jacks |
| 3. BIOS/CMOS Reset | 6. HDMI 1.4         |                              |



| Speed/Link LED Status | Description         |
|-----------------------|---------------------|
| Orange                | 1000 Mbps data rate |
| Green                 | 100 Mbps data rate  |
| Off                   | 10 Mbps data rate   |

| Activity LED Status | Description          |
|---------------------|----------------------|
| Off                 | No data transmission |
| Blinking (Green)    | Data transmission    |

| Analog Audio Port Breakdown | 2/2.1 Channel                             | 4.0/4.1 Channel                           | 5.1 (6 Channel)      | 7.1 (8 Channel)    |
|-----------------------------|---|---|----------------------|--------------------|
| Blue                        | Line in                                   | Line In                                   | Line in              | * Side Speaker Out |
| Green                       | Front Speaker Out/<br>Front Speaker + Sub | Front Speaker Out/<br>Front Speaker + Sub | Front Speaker<br>Out | Front Speaker Out  |
| Pink                        | Mic In                                    | Mic In                                    | Mic In               | Mic In             |
| Black                       |   | Rear Speaker Out                          | Rear Speaker<br>Out  | Rear Speaker Out   |
| Orange                      |   |   | Center/Sub Out       | Center/Sub Out     |

\* Only used in 7.1 and is changed via Realtek Software from within Windows.

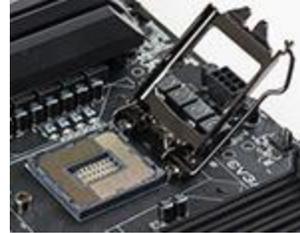
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# Preparing the Motherboard

## Installing the CPU

Be very careful when handling the CPU. Hold the processor only by the edges and do not touch the bottom of the processor.

**Note:** Use extreme caution when working with the CPU, not to damage any pins in the CPU socket on the motherboard!



Use the following procedure to install the CPU onto the motherboard:

- ❑ Remove the plastic protective socket cover by pulling it straight up. Be sure not to damage any of the pins inside the socket.
- ❑ Unhook the socket lever by pushing down and away from the socket.
- ❑ Pull the socket lever back and the load plate will lift.
- ❑ Open the load plate and make sure not to damage any of the pins inside the socket.



**Note:** After removing the CPU socket cover, it is recommended to store it in case you ever need to transport your motherboard. If you ever remove the CPU, it is highly recommended to reinstall the socket cover.

- ❑ Align the notches on the CPU to the notches in the socket.
- ❑ Lower the processor straight down into the socket.



Note: Make sure the CPU is fully seated and level in the socket.

- ❑ Lower the load plate so it is resting on the CPU.
- ❑ Carefully lock the lever back into place.



## Installing the CPU Cooling Device

There are many different cooling devices that can be used with this motherboard. Follow the instructions that come with your cooling assembly.

## Installing System Memory (DIMMs)

Your Z170 FTW has 4 (288-pin) slots for DDR4 memory. These slots support 4GB, 8GB and 16GB DDR4 DIMMs. There must be at least one memory slot populated to ensure normal operation.

The Intel Z170 chipset supports dual channel memory recommended to be populated in pairs; supports a maximum of 64GB of DDR4 and up to 3200MHz+ in dual channel configuration. Slots 1 and 3 are the primary priority slots; slots 2 and 4 are the secondary slots. It is required to populate slot 1 first.

Use the following procedure to install DIMMs. Note that there is only one gap near the center of the DIMM slots. This slot matches the slot on the DIMM to ensure the component is installed properly.



|        | Channel 0 |       | Channel 1 |       |
|--------|-----------|-------|-----------|-------|
|        | Slot1     | Slot2 | Slot3     | Slot4 |
| 1 DIMM |           | ●     |           |       |
| 2 DIMM |           | ●     |           | ●     |
| 3 DIMM | ●         | ●     |           | ●     |
| 4 DIMM | ●         | ●     | ●         | ●     |

- ❑ Unlock a DIMM slot by pressing the module clip.
- ❑ Align the memory module to the DIMM slot, and insert the module vertically into the DIMM slot, pressing straight down to seat the module. The plastic clips at top side of the DIMM slot automatically lock the DIMM into the connector.

**Note:** The memory controller on most Skylake CPUs runs at a default frequency of 2133MHz. To achieve memory speeds above 2133+ may require manual setting of the memory timings, frequency and voltages and/or overclocking of the CPU.

Refer to the memory manufacturer specifications for the recommended memory timings. For overclocking support you can visit our forums: <http://forums.evga.com/>

# Installing the Motherboard

The sequence of installing the motherboard into a system case depends on the chassis you are using and if you are replacing an existing motherboard or working with an empty system case. Determine if it would be easier to make all the connections prior to this step or to secure the motherboard and then make all the connections. It is normally easier to secure the motherboard first.

Use the following procedure to install the I/O shield and secure the motherboard into the chassis.

**Note:** Be sure that the CPU fan assembly has enough clearance for the system case covers to lock into place and for the expansion cards. Also make sure the CPU Fan assembly is aligned with the vents on the covers. This will depend on the system case being used.

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## Installing the I/O Shield/Cover

The motherboard kit comes with an I/O shield that is used to block internal components from dust and foreign objects, and promotes correct airflow within the chassis.

Before installing the motherboard, install the I/O shield from the inside of the chassis. Press the I/O shield into place and make sure it fits securely.

Also included is an I/O cover. This I/O cover adds a unique appearance to the I/O area of the motherboard and is completely optional. If you wish to use the cover, please place it over the I/O area, and install the chassis screws. The chassis screws are intended to hold the I/O cover down.

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## Securing the Motherboard into a System Case

Most system cases have a base with mounting holes you thread standoffs onto to allow the motherboard to be secured to the chassis and help to prevent short circuits. If there are studs that do not align with a mounting hole on the motherboard, it is recommended that you remove that standoff to prevent the possibility of a short circuit.

- ❑ Carefully place the motherboard onto the standoffs located inside the chassis.
- ❑ Align the mounting holes with the standoffs.
- ❑ Align the connectors to the I/O shield and/or I/O cover.
- ❑ Ensure that the fan assembly is aligned with the chassis vents according to the fan assembly instruction.
- ❑ Secure the motherboard with nine (9), or ten (10) screws depending on the specific board in the series, less fasteners are needed on mATX and mITX boards, please see pic on following page for locations of all standoff locations for this board series. Ensure that each screw is lined up with and screwing into the corresponding standoff under the board. Double check alignment to make sure nothing gets cross-threaded.
- ❑ See the picture below for a zoomed in view of a hole to use a standoff in as well as the locations of standoff holes for all boards in the Z170 series.



- Above, all locations safe to secure the board to a standoff with are circled in red, and the upper left side of that picture is a zoomed in view of the hole.
- Keep in mind that when the screws are installed but not fully tightened, the motherboard should have 1-2mm of movement; this can help with getting cards mounted or other tight tolerance/close fitting cards.

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## Connecting Cables

This section takes you through all the necessary connections on the motherboard. This will include:

- ❑ Power Connections

- 24pin ATX power (**PW1**)

- EPS 8pin 12V power

- ❑ Internal Headers

- Front Panel connectors (power/reset/LED's)

- Fan Headers (PWM for CPU and DC/PWM for case fans )

- USB 3.0 Header

- Audio Header

- S/PDIF

- Thunderbolt GPIO

- EVGauge

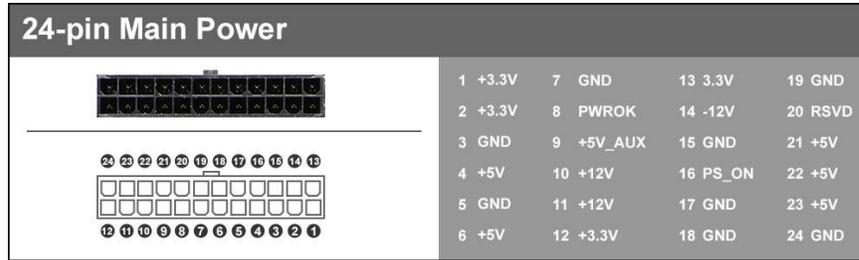
- ProbeIT

- SATA III

- 6pin PCIE

- ❑ Rear I/O Panel

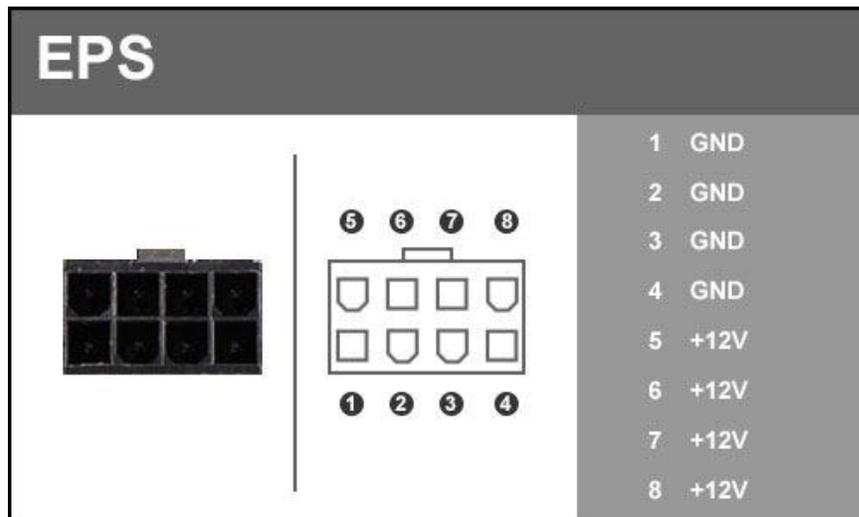
## 24-pin ATX Power (ATX\_PWR\_24P)



**ATX\_PWR\_24p** is the main power supply connector located along the lower right edge of the board. Make sure that the power supply cable and pins are properly aligned with the connector on the motherboard. Firmly plug the power supply cable into the connector and make sure it is secure.

The 24pin Power Connector may be standard or right angled depending on your motherboard model.

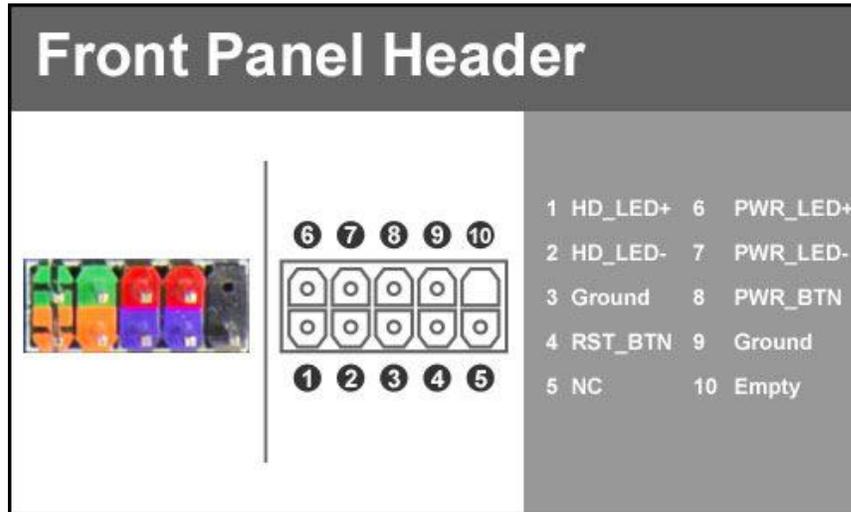
## EPS 8-pin 12V Power (PWR 8P1)



**EPS PWR 8P1**, the 8-pin ATX 12V power connections, is used to provide power to the CPU. Align the pins to the connector and press firmly until seated. The secondary is optional for improved overclocking. Please remember to make sure that the tab on the EPS socket is aligned with the release clip on the cable, because if they are on opposite sides, while it will be able to fit, it is the incorrect cable and WILL damage the board if powered on, as that is a PCI-E 8pin cable.

## Connecting Internal Headers

### Front Panel Header



The front panel header on this motherboard is used to connect the following four cables.

❑ **PWRLED**

Attach the front panel power LED cable to these two pins of the connector. The Power LED indicates the system's status. When the system is powered on, the LED will be on.

❑ **PWRSW**

Attach the power button cable from the case to these two pins. Pressing the power button on the front panel turns the system on and off rather than using the onboard button.

❑ **HD\_LED**

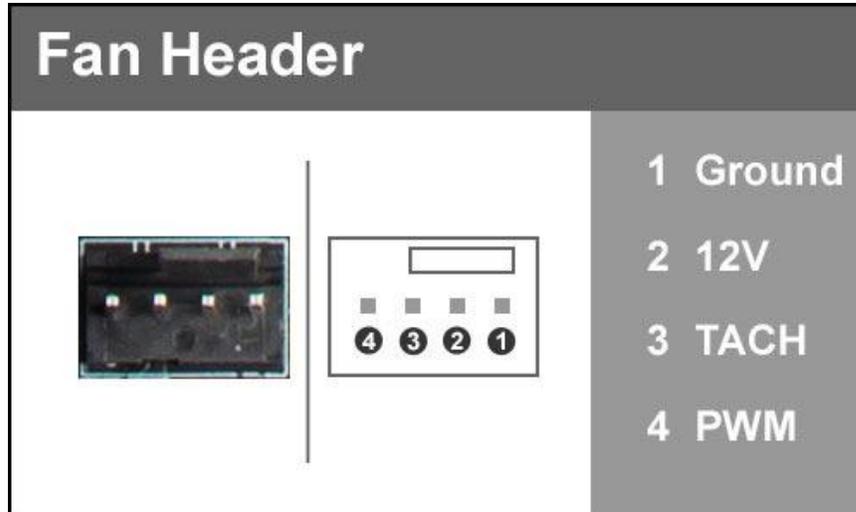
Attach the hard disk drive indicator LED cable to these two pins. The HDD indicator LED indicates the activity status of the hard disks.

❑ **RESET**

Attach the Reset switch cable from the front panel of the case to these two pins.

**Note:** Some system cases may not have all four cables. Be sure to match the name on the connectors to the corresponding pins.

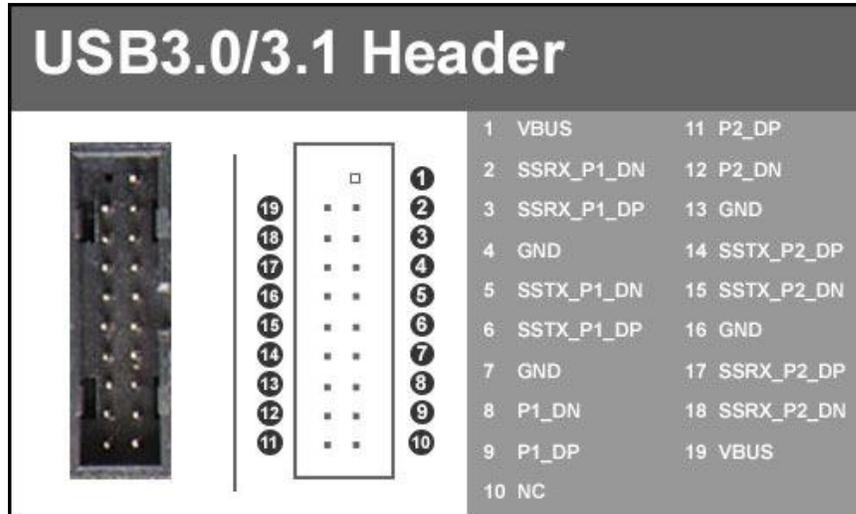
## Fan Header



This motherboard line only has 4pin fan headers, which are backwards compatible with 3 pin, can be controlled by PWM or DC controls and has an absolute safe power limit of 1 Amp @ 12 Volts (12 Watts). These plugs are for your CPU heatsink and chassis cooling fans.

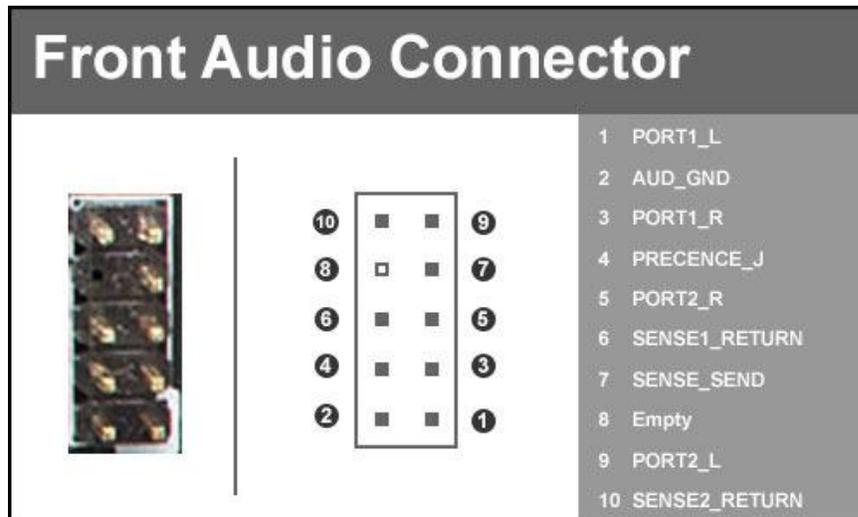
## USB Headers

The motherboard has a 19-pin internal header connectors onboard that can be used to connect an optional external bracket containing up to (2) USB 3.0 ports.



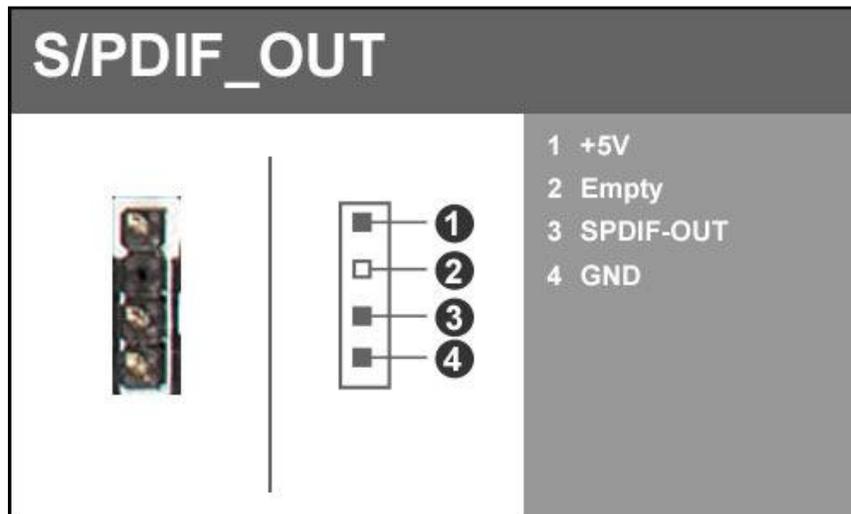
- ❑ Secure the bracket to either the front or rear panel of your chassis (not all chassis are equipped with the front panel option).
- ❑ Connect the two ends of the cables to the USB 3.0 headers on the motherboard.
- ❑ USB 3.0 and 3.1 share the same header and pinouts, physically they are the same, and the difference is the controller they are attached to. The header is labelled as a 3.0/3.1 accordingly.

## Front Panel Audio



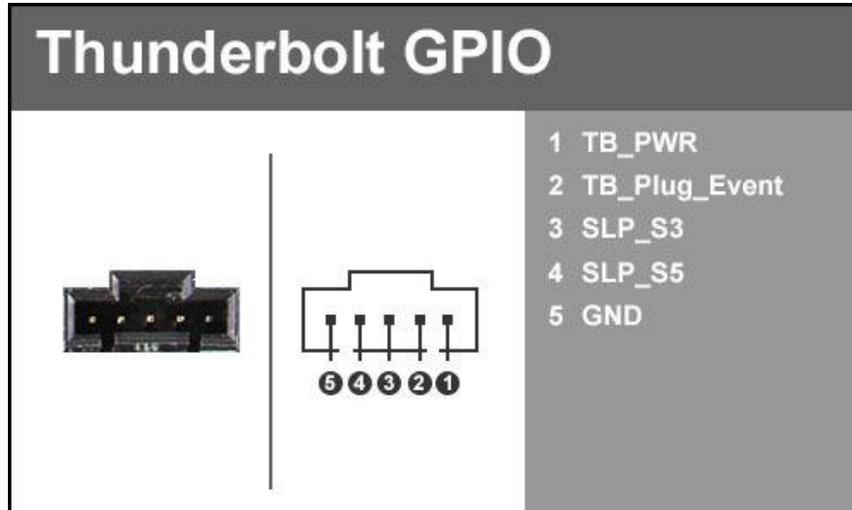
The audio connector supports HD audio standard and provides two kinds of audio output choices: the Front Audio and the Rear Audio.

## S/PDIF Header



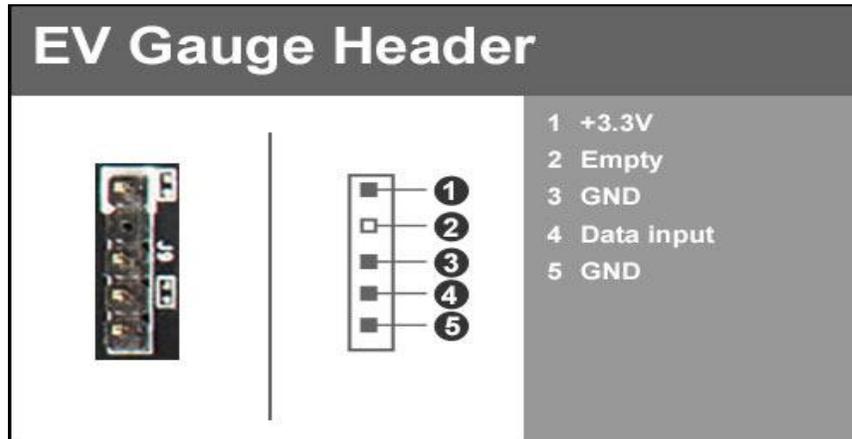
The S/PDIF (Sony/Philips Digital Interface Format) is used for specific Audio-Out applications, typically for using an audio pass-through device.

## Thunderbolt GPIO



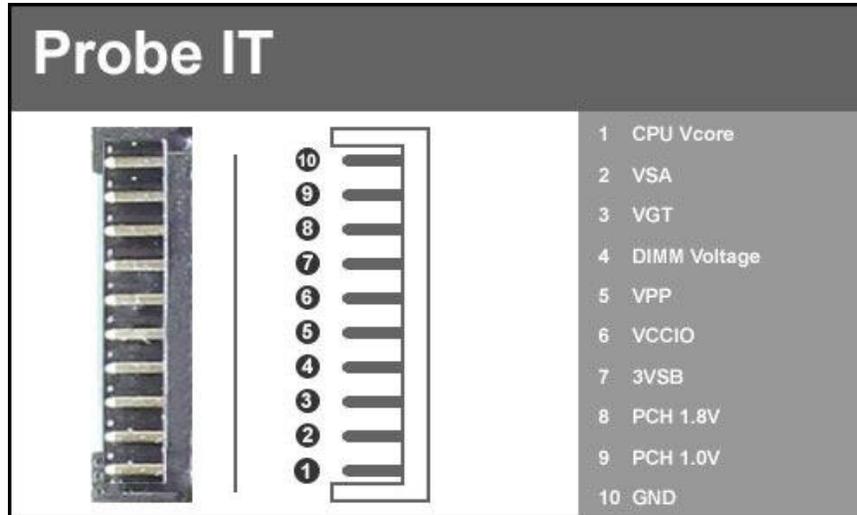
Thunderbolt technology is a transformational high-speed, dual protocol, PC I/O delivering performance, simplicity and flexibility. Thunderbolt I/O technology lets you move data between your devices and your computer with 2 channels of 20Gbps flowing both ways (upstream and downstream) at the same time. And it allows you to connect as many as 6 devices, daisy chained, through a single compact port.

## EVGauge



The EVGauge gives you a physical gauge to view the speed your processor is running at. This will show you live updates showing idle speeds as well as your Boost/Overclock speeds.

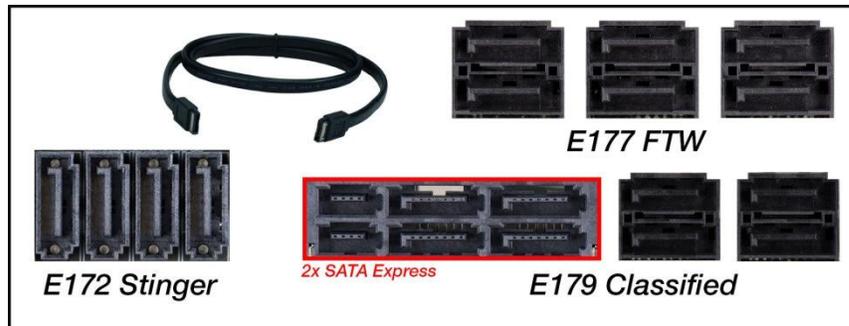
## Probe IT



The Probe IT offers a means of monitoring several different voltages under any level of load with a digital multi-meter so you can see exactly what voltages your board is pushing, mainly used for extreme overclocking.

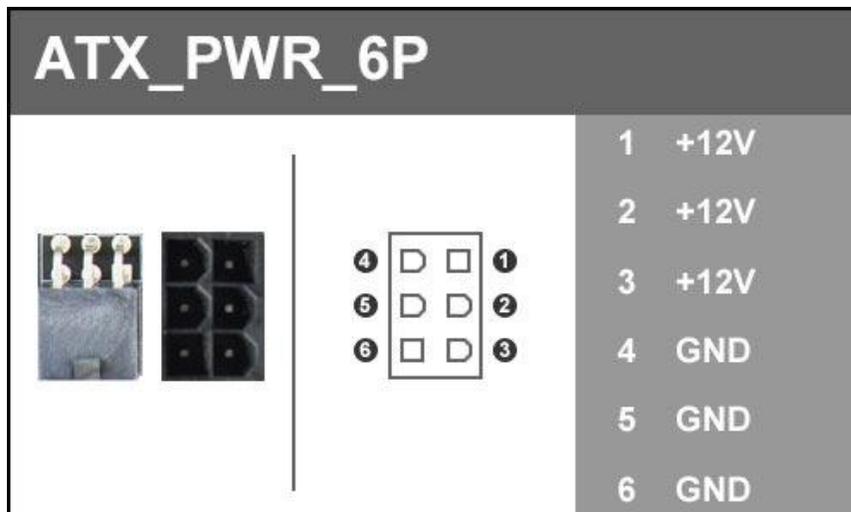
## SATA 3/6G & SATA Express

SATA3/6G is the current standard for HDD/SSD/Optical interface. These cables are the data interconnect for the motherboard. Don't forget that these devices will still need a separate power connection.



SATA Express is a significant increase over SATA3 but has a much larger connector; the internals of the connector are segmented in such a way that they will support standard SATA cables/devices at the devices native speed.

## 6pin PCIE



The 6pin PCIE connector present on the motherboard is there to provide additional power to the PCIE slots rather than pulling it all from the 24 pin main power. It is advised when using SLI especially with higher power draw cards, 3 and 4 way SLI it is strongly recommended to use this, regardless of GPU.

## PCI-E & M.2 Slots

All of the boards in this series have at least 1 PCI-E x16 slot available, which is typically used for a video card, however if you use a CPU with onboard video you can leave it empty or place a different type of card into the slot. You will also see x4 PCIE slots as well as 2 variants of M.2

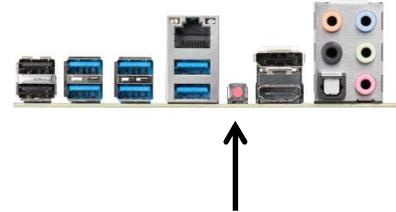


## Onboard Buttons

These onboard buttons include RESET, POWER and Clear CMOS. These functions allow you to easily reset the system, turn on/off the system, or clear the CMOS.

### Clear CMOS Button

The motherboard uses the CMOS RAM to store all the set parameters. The CMOS can be cleared by pressing the Clear CMOS button either onboard or on the external I/O Panel.



External Clear CMOS Button

### RESET and POWER Button

These onboard buttons allow you to easily turn on/off the system. These buttons allow for easy debugging and testing of the system during troubleshooting situations.

The POWER button with an integrated LED indicates the system's status. When the system is powered on, the LED remains a solid red.

The RESET button with an integrated LED indicates the activity status of the hard disk drives and will flicker accordingly.



↑  
Power  
Button

↑  
Reset  
Button

---

## Post Debug LED and LED Status Indicators

### Post Port Debug LED

Provides two-digit diagnostic POST codes which shows system boot status and can also show why the system may be failing to boot. It is very useful during troubleshooting situations.

This Debug LED will display a series of hexadecimal (0-F) codes during the POST and upon a successful boot, will display current CPU socket temperatures after the system has fully booted into the Operating System. See the “POST CODE” section below for more detailed descriptions of specific POST Codes.



Debug LED with CPU  
Temperature Monitor

### LED Status Indicators

These LEDs indicate the system's status and are located near the 24pin connector.

❑ **POWER LED (Green):**

When the System is powered on: This LED is on.

❑ **DIMM LED (Yellow):**

When the Memory slot is functional: This LED is on.

❑ **STANDBY LED (Blue):**

When the System is in Standby Mode: This LED is on. This LED will remain on as long as the motherboard is receiving constant power.

# Installing Drivers and Software

**Note:** It is important to remember that before installing the driver CD that is shipped in the kit, you need to load your operating system. The motherboard supports 64 bit versions of Windows 10 and 8, also 64 & 32 bit versions of Windows 7.

The kit comes with a CD that contains utilities, drivers, and additional software.

The CD that has been shipped with the EVGA Z170 Motherboard contains the following software and drivers:

- ❑ Chipset Drivers
- ❑ Audio Drivers
- ❑ RAID Drivers
- ❑ LAN Drivers
- ❑ USB 3.0 Drivers
- ❑ ME Drivers
- ❑ SATA Drivers
- ❑ EVGA E-LEET X
- ❑ User's Manual

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## Windows 10/8/7 Driver Installation

1. Insert the EVGA Z170 installation CD for the motherboard included in the kit.
2. The CD will autorun. Install the drivers and utilities listed on the install screen. If the CD does not run, go to My Computer and click on the CD to open.

# POST Codes

This section provides the AMI POST Codes for the EVGA Z170 Dark Motherboard during system boot up.

The POST Codes are displayed on the Debug LED readout located directly onboard the motherboard.



Debug LED with CPU Temperature Monitor

This Debug LED will also display current CPU temperatures after the system has fully booted into the Operating System.

## AMI POST Codes

|       |  |
|-------|--|
| 01    | Power on. Reset type detection (soft/hard).                      |
| 02    | AP initialization before microcode loading                       |
| 03    | North Bridge initialization before microcode loading             |
| 04    | South Bridge initialization before microcode loading             |
| 05    | OEM initialization before microcode loading                      |
| 06    | Microcode loading  |
| 07    | AP initialization after microcode loading                        |
| 08    | North Bridge initialization after microcode loading              |
| 09    | South Bridge initialization after microcode loading              |
| 0A    | OEM initialization after microcode loading                       |
| 0B    | Cache initialization   |
| 0C-0D | Reserved for future AMI SEC error codes                          |
| 0E    | Microcode not found  |
| 0F    | Microcode not loaded   |
| 10    | PEI Core is started  |
| 11-14 | Pre-memory CPU initialization is started                         |
| 15-18 | Pre-memory North Bridge initialization is started                |
| 19-1C | Pre-memory South Bridge initialization is started                |
| 1D-2A | OEM pre-memory initialization codes                              |
| 2B    | Memory initialization. Serial Presence Detect (SPD) data reading |
| 2C    | Memory initialization. Memory presence detection                 |
| 2D    | Memory initialization. Programming memory timing                 |

|       |  |
|-------|--|
|       | information  |
| 2E    | Memory initialization. Configuring memory  |
| 2F    | Memory initialization (other).   |
| 30    | Reserved for ASL (see ASL Status Codes section below)                            |
| 31    | Memory Installed   |
| 32    | CPU post-memory initialization is started  |
| 33    | CPU post-memory initialization. Cache initialization                             |
| 34    | CPU post-memory initialization. Application Processor(s) (AP) initialization     |
| 35    | CPU post-memory initialization. Boot Strap Processor (BSP) selection             |
| 36    | CPU post-memory initialization. System Management Mode (SMM) initialization      |
| 37-3A | Post-Memory North Bridge initialization is started                               |
| 3B-3E | Post-Memory South Bridge initialization is started                               |
| 3F-4E | OEM post memory initialization codes   |
| 4F    | DXE IPL is started   |
| 50    | Memory initialization error. Invalid memory type or incompatible memory speed    |
| 51    | Memory initialization error. SPD reading has failed                              |
| 52    | Memory initialization error. Invalid memory size or memory modules do not match. |
| 53    | Memory initialization error. No usable memory detected                           |
| 54    | Unspecified memory initialization error.   |
| 55    | Memory not installed   |
| 56    | Invalid CPU type or Speed  |
| 57    | CPU mismatch   |
| 58    | CPU self test failed or possible CPU cache error                                 |
| 59    | CPU micro-code is not found or micro-code update is failed                       |
| 5A    | Internal CPU error   |
| 5B    | reset PPI is not available   |
| 5C-5F | Reserved for future AMI error codes  |
| E0    | S3 Resume is started (S3 Resume PPI is called by the DXE IPL)                    |
| E1    | S3 Boot Script execution   |
| E2    | Video repost   |
| E3    | OS S3 wake vector call   |
| E4-E7 | Reserved for future AMI progress codes   |
| E8-EB | S3 Resume Failed   |
| EC-EF | Reserved for future AMI error codes  |
| F0    | Recovery condition triggered by firmware (Auto recovery)                         |
| F1    | Recovery condition triggered by user (Forced recovery)                           |
| F2    | Recovery process started   |

|       |  |
|-------|--|
| F3    | Recovery firmware image is found                               |
| F4    | Recovery firmware image is loaded                              |
| F5-F7 | Reserved for future AMI progress codes                         |
| F8    | Recovery PPI is not available                                  |
| F9    | Recovery capsule is not found                                  |
| FA    | Invalid recovery capsule                                       |
| FB-FF | Reserved for future AMI error codes                            |
| 60    | DXE Core is started  |
| 61    | NVRAM initialization   |
| 62    | Installation of the South Bridge Runtime Services              |
| 63-67 | CPU DXE initialization is started                              |
| 68    | PCI host bridge initialization                                 |
| 69    | North Bridge DXE initialization is started                     |
| 6A    | North Bridge DXE SMM initialization is started                 |
| 6B-6F | North Bridge DXE initialization (North Bridge module specific) |
| 70    | South Bridge DXE initialization is started                     |
| 71    | South Bridge DXE SMM initialization is started                 |
| 72    | South Bridge devices initialization                            |
| 73-77 | South Bridge DXE Initialization (South Bridge module specific) |
| 78    | ACPI module initialization                                     |
| 79    | CSM initialization   |
| 7A-7F | Reserved for future AMI DXE codes                              |
| 80-8F | OEM DXE initialization codes                                   |
| 90    | Boot Device Selection (BDS) phase is started                   |
| 91    | Driver connecting is started                                   |
| 92    | PCI Bus initialization is started                              |
| 93    | PCI Bus Hot Plug Controller Initialization                     |
| 94    | PCI Bus Enumeration  |
| 95    | PCI Bus Request Resources                                      |
| 96    | PCI Bus Assign Resources                                       |
| 97    | Console Output devices connect                                 |
| 98    | Console input devices connect                                  |
| 99    | Super IO Initialization  |
| 9A    | USB initialization is started                                  |
| 9B    | USB Reset  |
| 9C    | USB Detect   |
| 9D    | USB Enable   |
| 9E-9F | Reserved for future AMI codes                                  |
| A0    | IDE initialization is started                                  |
| A1    | IDE Reset  |
| A2    | IDE Detect   |
| A3    | IDE Enable   |
| A4    | SCSI initialization is started                                 |

|       |   |
|-------|---|
| A5    | SCSI Reset  |
| A6    | SCSI Detect   |
| A7    | SCSI Enable   |
| A8    | Setup Verifying Password                              |
| A9    | Start of Setup  |
| AA    | Reserved for ASL (see ASL Status Codes section below) |
| AB    | Setup Input Wait                                      |
| AC    | Reserved for ASL (see ASL Status Codes section below) |
| AD    | Ready To Boot event                                   |
| AE    | Legacy Boot event                                     |
| AF    | Exit Boot Services event                              |
| B0    | CPU Memory controller configuration                   |
| B1    | Runtime Set Virtual Address MAP End                   |
| B2    | iMC init  |
| B3    | Memory training                                       |
| B4    | Memory training                                       |
| B5    | Memory training / timing training                     |
| B6    | Memory training                                       |
| B7    | Memory training                                       |
| B8-BF | Memory training / DRAM final configuration            |
| C0-CF | OEM BDS initialization codes                          |
| D0    | CPU initialization error                              |
| D1    | North Bridge initialization error                     |
| D2    | South Bridge initialization error                     |
| D3    | Some of the Architectural Protocols are not available |
| D4    | PCI resource allocation error. Out of Resources       |
| D5    | No Space for Legacy Option ROM                        |
| D6    | No Console Output Devices are found                   |
| D7    | No Console Input Devices are found                    |
| D8    | Invalid password                                      |
| D9    | Error loading Boot Option (Load Image returned error) |
| DA    | Boot Option is failed (Start Image returned error)    |

# EVGA Glossary of Terms

AC – Alternating Current

ACPI - Advanced Configuration and Power Interface

AHCI – Advanced Host Controller Interface

AFR – Alternate Frame Rendering

APIC - Advanced Programmable Interrupt Controller

BCLK – Base Clock (or operating frequency of base system bus)

BIOS - Basic Input Output System

CMOS - Complementary Metal-Oxide Semiconductor

CPU – Central Processing Unit

DDR - Double Data Rate

DIMM - Dual In-line Memory Module

DMI – Direct Memory Interface

DRAM - Dynamic random access memory

DVI – Digital Video Interface

ELEET/ELEET X – EVGA motherboard monitoring and tuning software

GHz – Gigahertz

GPU – Graphics Processing Unit

HDD - Hard Disk Drive

HDMI - High-Definition Multimedia Interface

HDR – High Dynamic Range Lighting

HPET - High Precision Event Timer

HT – Hyper-Threading

HSF - Heat Sink Fan

I/O - Input/ Output

IEEE - Institute of Electrical and Electronics Engineers

IGP - Integrated Graphics Processors

IMC – Integrated memory controller

IRQ - Interrupt Request  
JBOD - Just a Bunch of Disks  
JEDEC - Joint Electron Device Engineering Council  
LAN - Local Area Network  
LCD - Liquid Crystal Display  
LGA – Land Grid Array  
LN2 – Liquid Nitrogen Cooling  
MAC - Media Access Control  
MCP - Media and Communications Processor  
Intel ME – Intel Management Engine  
MHz – Megahertz  
MMIO – Memory Mapped I/O  
NB - Northbridge  
NCQ - Native Command Queuing  
NIC - Network Interface Card  
NTFS - New Technology File System  
OEM - Original Equipment Manufacturer  
PATA - Parallel Advanced Technology Attachment  
PCB - Printed Circuit Board  
PCH – Platform Controller Hub  
PCI - Peripheral Component Interconnect  
PCI-E - Peripheral Component Interconnect Express  
PLL – Phase Locked Loop  
POST – Power on Self Test  
PWM – Pulse Width Modulation  
QDR - Quad Data Rate  
QPI – Quick Path Interconnect  
RAID - Redundant Array of Inexpensive Disks  
RAM – Random Access Memory  
ROM – Read Only Memory  
RGB - Red Green Blue

SATA - Serial Advanced Technology Attachment  
SAS – Serial Attached SCSI  
SB - Southbridge  
SCSI - Small Computer System Interface  
SFR – Split Frame Rendering  
SLI - Scalable Link Interface  
SPD - Serial Presence Detect  
S/PDIF - Sony/Philips Digital Interconnect Format  
SPP - System Platform Processors  
SSD – Solid State Drive  
TCP/IP - Transmission Control Protocol/Internet Protocol  
USB - Universal Serial Bus  
VDroop - Voltage Droop  
VGA - Video Graphics Array  
VREG – Voltage Regulator

# Compliance Information

## FCC Compliance Information

This device complies with FCC Rules Part 15. 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. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: (1) Increase the separation between the equipment and signal source, or (2) connect the equipment to an outlet on a circuit different from that to which the signal source is connected. Consult the dealer or an experienced computer technician for help. The use of shielded cables for connection of peripheral devices to the PC systems is required to ensure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## CE Compliance Information

Generic Radiation Interference Standard for Information Technology Equipment. (EN 55022: 2006, Class B), (EN 61000-3-2: 2006), (EN 61000-3-3: 1995 + A1: 2001 + A2: 2005). Warning: This is a Class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measure. Generic Immunity Standard for Information Technology Equipment. (EN 55024: 1998 + A1: 2001 + A2: 2003).

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