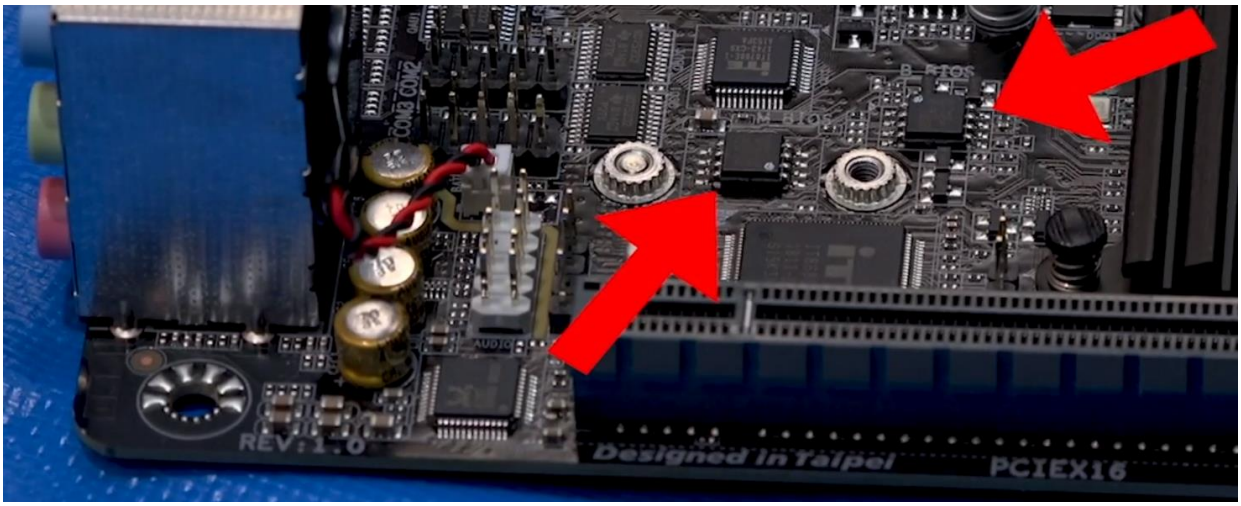
What is the BIOS?

- BIOS programming enables interaction with motherboard before 0S loads
- BIOS is stored in nonvolatile media, thus called firmware
- POST routines are built into firmware
- System Setup utility is also part of the firmware



Motherboard Assumed Hardware - RAM; CPU; USB; Wireless; Speakers/Headphones;
Network Connection; Mass Storage; etc

BIOS (Basic Input/Output Services) - Built into the Motherboard, there's programming (code)
that's designed to let you talk to the *assumed hardware* of the computer
POST (Power-On Self-Test) - Before the system even boots into an OS,
we need to be able to communicate with the other devices (assumed hardware)
to test they're working properly!!

2 BIOS Chips on the Motherboard (1 is a backup)
Firmware - it's burned on a chip (whereas software is copied)

POST

- POST runs at boot, requesting devices to self check
- POST errors manifest as specific beep codes or display (text) codes
- POST cards enable testing of "dead" computers

Power Good Wire - Built into the back of a CPU
When it gets enough voltage, the CPU starts running.
First thing it does, talks to the BIOS and runs the POST

POST broadcasts to the entire Motherboard, “If there’s a connection, Test yourself out!”
It’ll go through its own internal diagnostic, then responds to the CPU that it’s ok!

If installed, you could have a speaker that will make a *BEEP* that will report on POST
BEEP Codes - alerts you of any errors by beeping code

Display Codes - errors will be presented on the monitor

POST Card - 2 digit Hexi-decimal codes (could be numbers or letters)
Motherboard book will let you know what these “Q-Codes” mean in a table!

These POST Codes are ONLY
Valid during the boot up
Invalid after the OS is displayed

Don’t buy the $300 POST Card. All you need is the $30 ones

System Setup

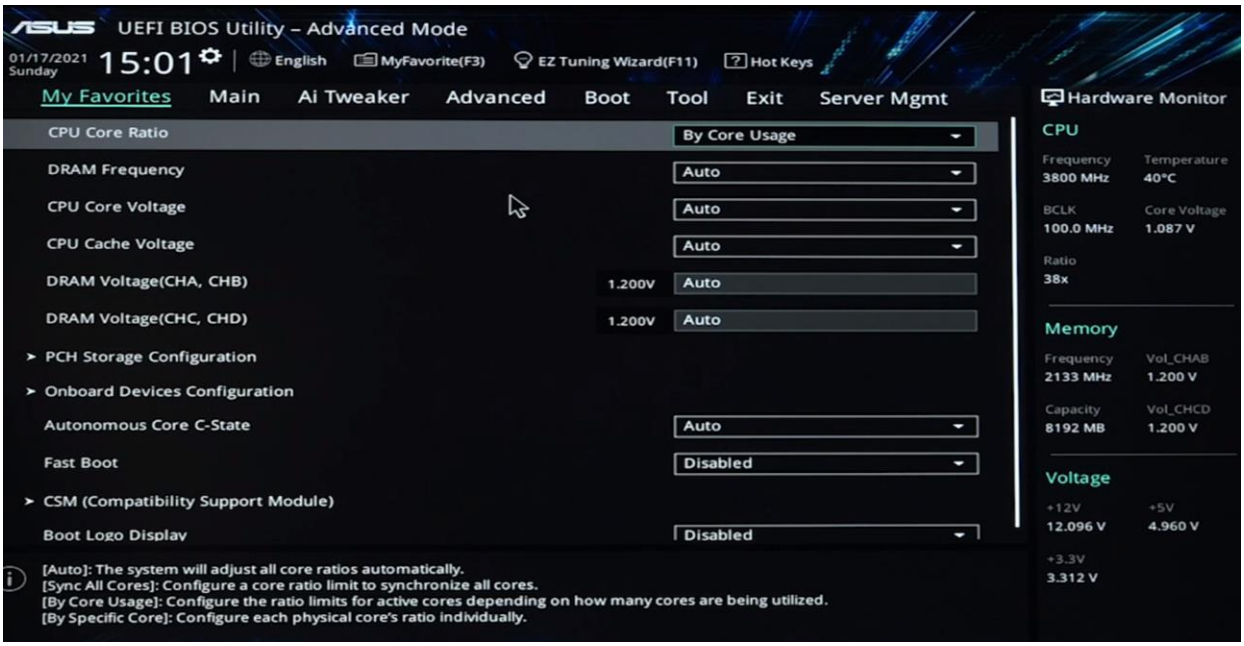
- UEFI replaces traditional 16-bit BIOS in modern systems
- System Setup enables custom information about changeable devices
- System Setup enables Changes to CPU frequencies, RAM timings,
BIOS passwords, boot options, and more

BIOS wasn’t upgraded for years

UEFI (Unified Extensible Firmware Interface) - much more powerful version of BIOS

System Setup - Interface we can access on our computer where we can
make changes to our changed out Assumed Hardware

During Bootup, repeatedly pressing F2, or Delete key, will open up System Setup

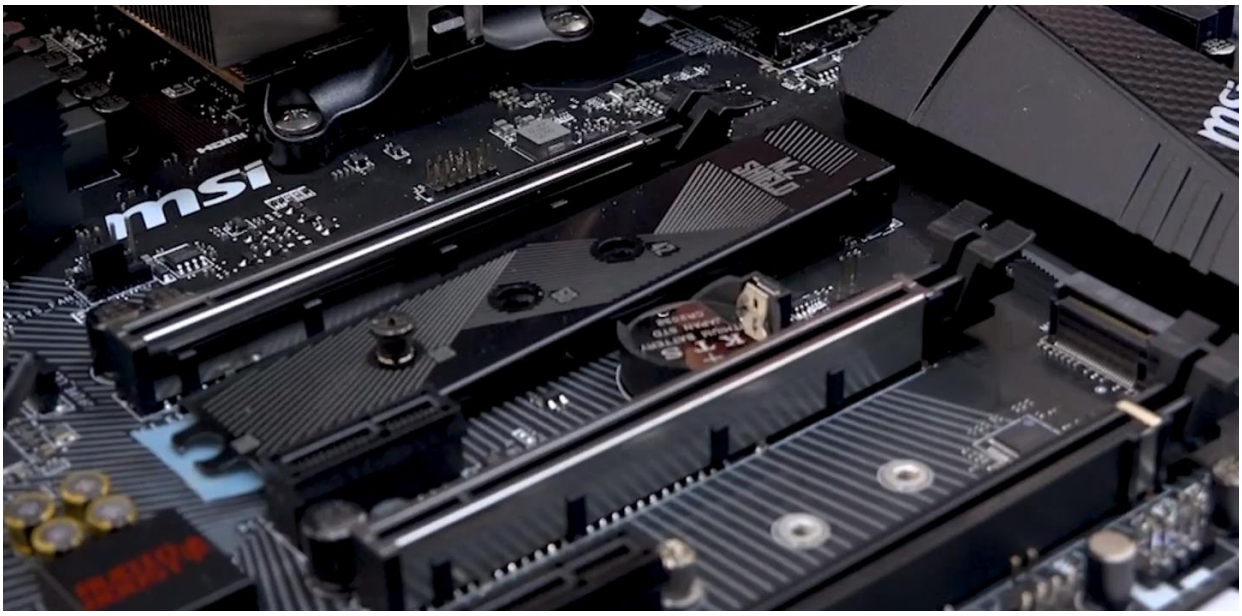


Troubleshooting Firmware

- Real-time clock battery keeps system time without external power
- System Setup allows for Changes; exit without saving is an option
- Reset System Setup for defaults
- Flash the ROM chip to update firmware

Single-Flash ROM Chips - Flash is a type of ROM (Read Only Memory)
that we can “Flash” (reprogram) if we wanted to update the BIOS

RTC (Real-Time Clock) - In a Windows Network, all of the computers in the Network need to be very closely synchronized (in ms) to even boot up
It’s essential that these processes are synchronized by the clocks.



If there’s no power supply, the Motherboard has a battery to keep this synchronization

CMOS Battery - CR2032 ($2)

If the battery is bad/not working,

Loss of Time/Time will Slow Down (clock may be 20 min behind the time it should be)

All System Information that’s been updated through your System Setup disappears

(computer doesn’t detect harddrive; default settings; passwords disappeared)