# What is the Difference Between Flash Memory and EEPROM?

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Flash memory is a type of electronically-erasable programmable read-only memory (EEPROM), but it can also be a standalone memory storage device such as USB drive.

It is a non-volatile memory chip used for storage and for transferring data between a PC and other digital devices. It is often found in USB flash drives, MP3 players, digital cameras and solid-state drives.

Toshiba developed flash memory in the early 1980s and introduced it to the market in 1984.

Flash memory incorporates the use of floating-gate transistors to store data.

EEPROM is a type of data memory device that uses an electronic device to erase or write digital data. It has per byte erase-and-write capabilities, which makes it slow. Flash memory is a distinct type of EEPROM, which is programmed and erased in large blocks. Nonetheless, the trend seems to be of using AND flash for devices that only support large-block erasure. Flash memory has many features. It is a lot cheaper than EEPROM and does not require batteries for solid-state storage such as static RAM.

To sum it up,

- Flash is just one type of EEPROM.
- Flash uses NAND-type memory, while EEPROM uses NOR type.
- Flash is block-wise erasable, while EEPROM is byte-wise erasable.
- Flash is constantly rewritten, while other EEPROMs are seldom rewritten.
- Flash is used when large amounts are needed, while EEPROM is used when only small amounts are needed.

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## Other Important Questions:

### Q. How can we control direct-on-line three-phase motor starter, and which relay can control it from Arduino?

Small three-phase induction motors of below 5kW can be started with the help of a direct-on-line starter, which consists of a contactor and motor-protection device such as circuit breaker. The starter is put into action by a coil-operated contactor, which can be controlled by start and stop pushbuttons. When the start push-button is pressed, the contactor gets energised and closes all three phases of the motor to the supply phases at a time. The stop push-button de-energises the contactor and disconnects all three phases to stop the motor.

As per your requirement, manual operations of start and stop are to be replaced by relays, which, in turn, are controlled by Arduino. You can opt for an electromagnetic or solid-state relay; selection is made on the basis of voltage and current requirements of the coil of the direct-on-line starter, environmental conditions and mounting options.

### Q. How does Bluetooth keep devices connected?

Bluetooth, named after Danish King Harald Bluetooth, who unified Scandinavia, is a standard protocol for unifying wireless voice and data communications among mobile telephones, environment systems, printers, portable computers, local area networks and other electronics. It connects all equipment through one universal short-range radio link.

The standard is incorporated in a radio module, a microchip that can send voice and data signals for about 10 metres, or 30 feet (100 metres with a power amplifier). Its signals operate in the free 2.45GHz ISM (which is short for industry, science and medicine) band that non-Bluetooth devices also use.

In command of Bluetooth protocol is each device's link manager. This software identifies other Bluetooth devices, creates links with these for voice or data, and sends and receives data at a theoretical 1Mbps (725kbps, real world). Link manager also determines the mode in which Bluetooth operates.

After a link is established between the master and the slave, Bluetooth sends short bursts of data in packets. To survive in a noisy radio frequency environment, radio transmissions from the master and the slave hop among 79 different frequencies to send each packet of data. Transmission also includes error correction in case a packet is dropped or garbled.

## Q. What are the differences between Arduino Uno and Leonardo?

Differences between Arduino Uno and Leonardo are listed below:

- Arduino Uno uses Atmega328, while Arduino Leonardo uses Atmega32U4.
- The microcontroller on Arduino Leonardo cannot be detached as it is mounted on the board, while the microcontroller on Arduino Uno can be easily removed.
- Arduino Uno has six pulse-wave modulation pins, while Leonardo has seven.
- Arduino Uno uses 14 input/output pins, while Arduino Leonardo is capable of using 20 since it can use the analogue pins as input/output.