TECHNOCRATS
THEORY

Raspberry Pi

Raspberry pi ,is a small integrated chip with USB ports ,power port,HDMI ,and camera interface .Portable and use 5-8volts of power supply,i.e. charger adaptor.It has various model latest is raspberry pi 3 Raspberry pi specification having raspberry on board with clock speed 1.8 GHz and 32 GB storage capacity and doesn't work under the condition of load capacity works.Raspberry can do many things like it attached in television to work as a computer.Now a days raspberry used in a project works.Using maximum no. Of raspberry pi you can create your own server.


An Arduino is a microcontroller motherboard. A microcontroller is a simple computer that can run one program at a time, over and over again. It is very easy to

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use.A Raspberry Pi is a general-purpose computer, usually with a Linux operating system, and the ability to run multiple programs. It is more complicated to use than an Arduino.
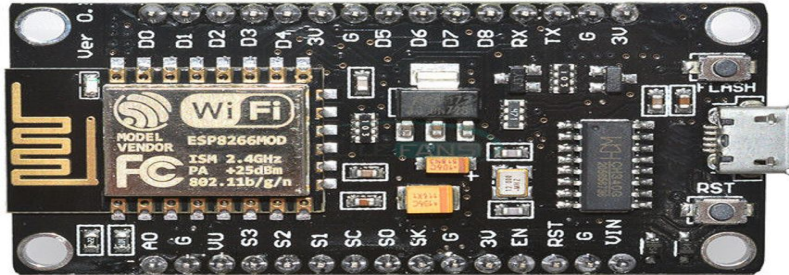
How to configure raspberry pi step by step:https://www.imore.com/how-get-started-using-raspberry-pi
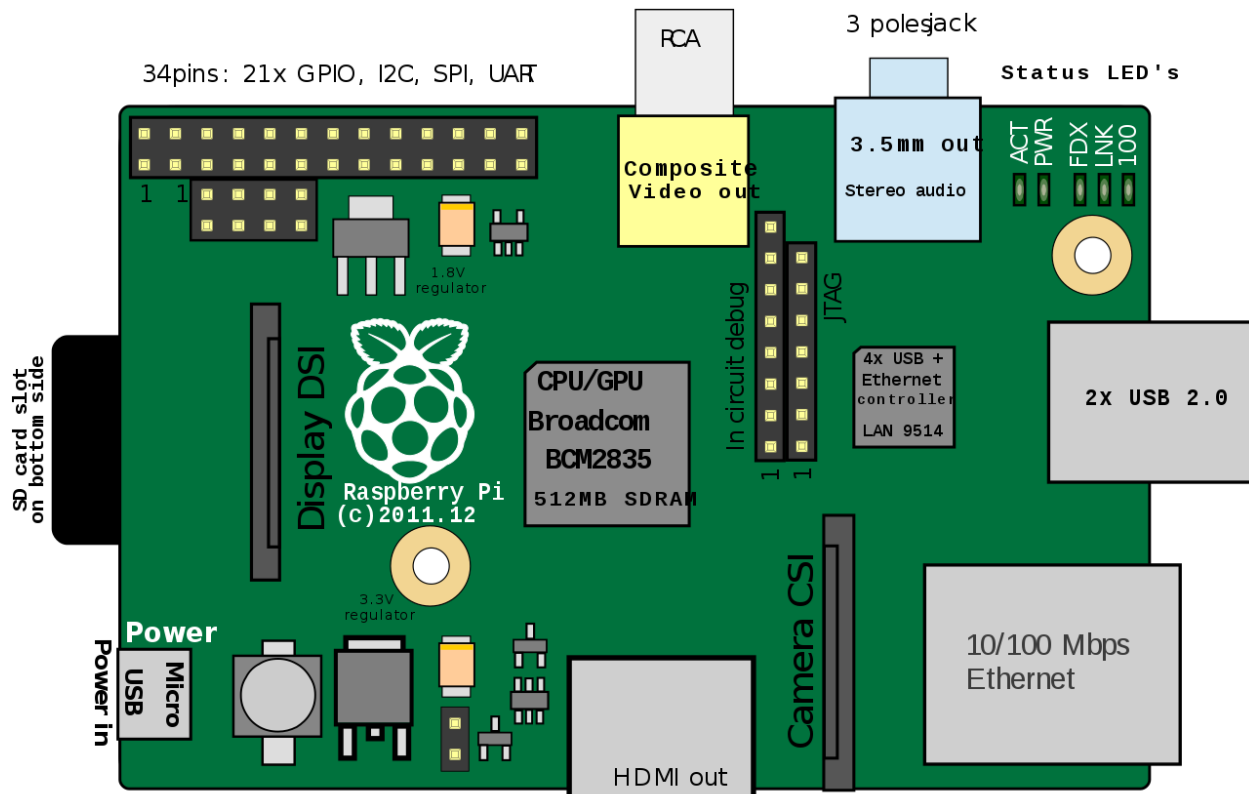
Alternative for Arduino/ Raspberry Pi

NodeMCU

The NodeMCU (otherwise known as the ESP8266) can run the familiar Arduino architecture and with onboard Wi-Fi and a similar pin layout to Arduino boards.

MSP430

Low power alternative for over 15 years, many users report an operational current draw three times lower than comparable Arduino boards.

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PocketBeagle

The PocketBeagle has five analog inputs along with 44 GPIO pins and a microSD slot. This tiny Linux board is incredibly versatile, and has a foot in both Arduino and Raspberry Pi camps.


ARM cortex M based microcontrollers

The Cortex-M4 processor is developed to address digital signal control markets that demand an efficient, easy-to-use blend of control and signal processing capabilities. The combination of high-efficiency signal processing functionality with the low-power, low cost and ease-of-use benefits of the Cortex-M family of processors is designed to satisfy the emerging category of flexible solutions specifically targeting the motor

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control, automotive, power management, embedded audio and industrial automation markets.

STM32

The STM32 family of 32-bit microcontrollers based on the Arm® Cortex®-M processor is designed to offer new degrees of freedom to MCU users. It offers products combining very high performance, real-time capabilities, digital signal processing, and low-power and low-voltage operation, and connectivity, while maintaining full integration and ease of development.
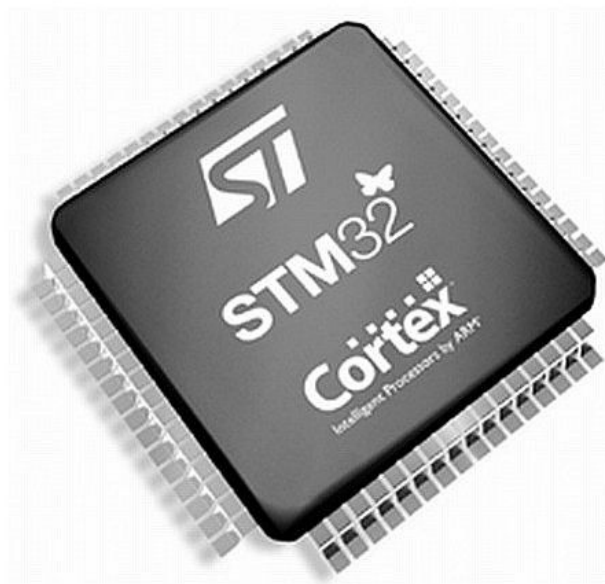
The STM32F103xx medium-density performance line family incorporates the high-performance ARM Cortex -M3 32-bit RISC core operating at a 72 MHz frequency, high-speed embedded memories (Flash memory up to 128 Kbytes and SRAM up to 20 Kbytes), and an extensive range of enhanced I/Os and peripherals connected to two APB buses. All devices offer two 12-bit ADCs, three general purpose 16-bit timers plus one PWM timer, as well as standard and advanced communication interfaces: up to two I2Cs and SPIs, three USARTs, an USB and a CAN.

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The devices operate from a 2.0 to 3.6 V power supply. They are available in both the –40 to +85 °C temperature range and the –40 to +105 °C extended temperature range. A comprehensive set of power-saving mode allows the design of low-power applications.
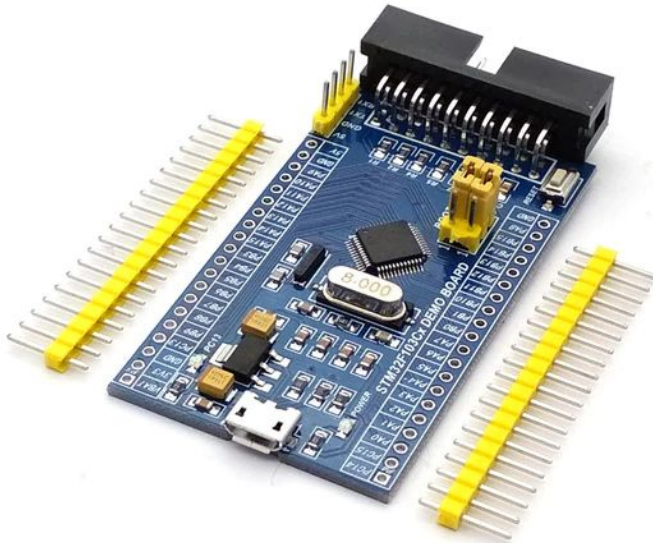
The STM32F103xx medium-density performance line family includes devices in six different package types: from 36 pins to 100 pins. Depending on the device chosen, different sets of peripherals are included, the description below gives an overview of the complete range of peripherals proposed in this family.

These features make the STM32F103xx medium-density performance line microcontroller family suitable for a wide range of applications such as motor drives, application control, medical and handheld equipment, PC and gaming peripherals, GPS platforms, industrial applications, PLCs, inverters, printers, scanners, alarm systems, video intercoms, and HVACs.
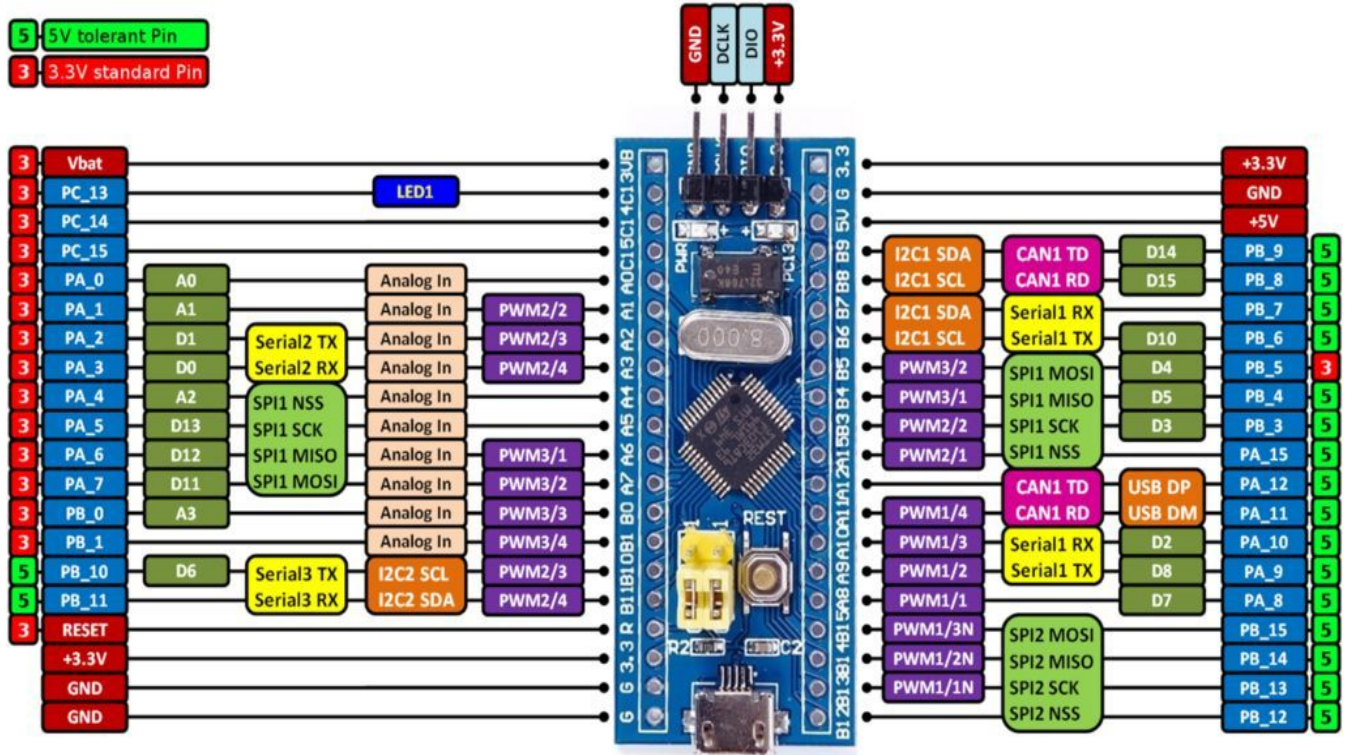
KEY FEATURES

- 72 MHz maximum frequency,1.25 DMIPS/MHz (Dhrystone 2.1) performance at 0 wait state memory access

- Single-cycle multiplication and hardware division

- 64 or 128 Kbytes of Flash memory

- 20 Kbytes of SRAM

- 2.0 to 3.6 V application supply and I/Os

- POR, PDR, and programmable voltage detector (PVD)

- 4-to-16 MHz crystal oscillator

- Internal 8 MHz factory-trimmed RC

- Internal 40 kHz RC

- PLL for CPU clock

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- 32 kHz oscillator for RTC with calibration

*reference:***https://www.st.com/en/microcontrollers-microprocessors/stm32f103c8.html**
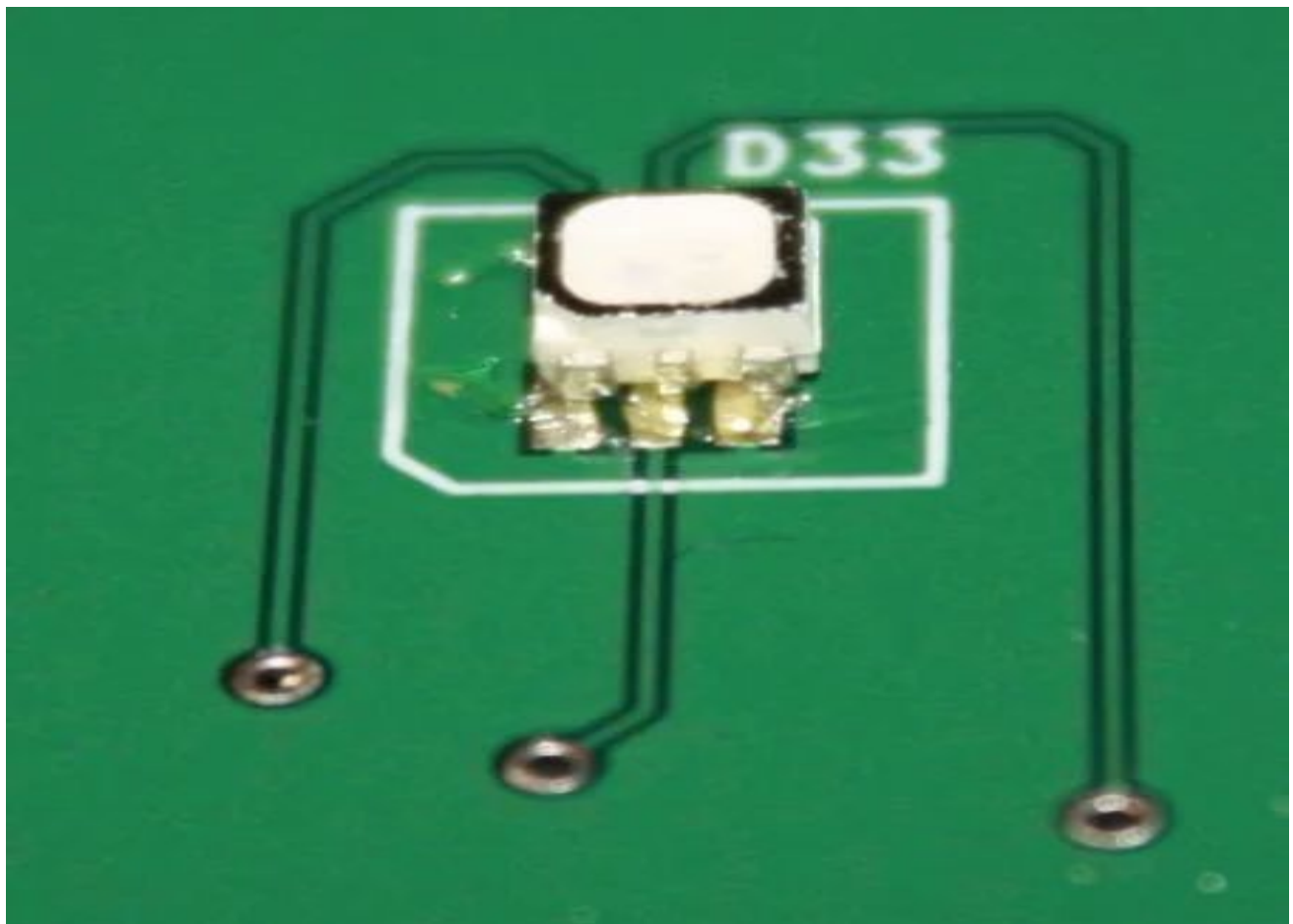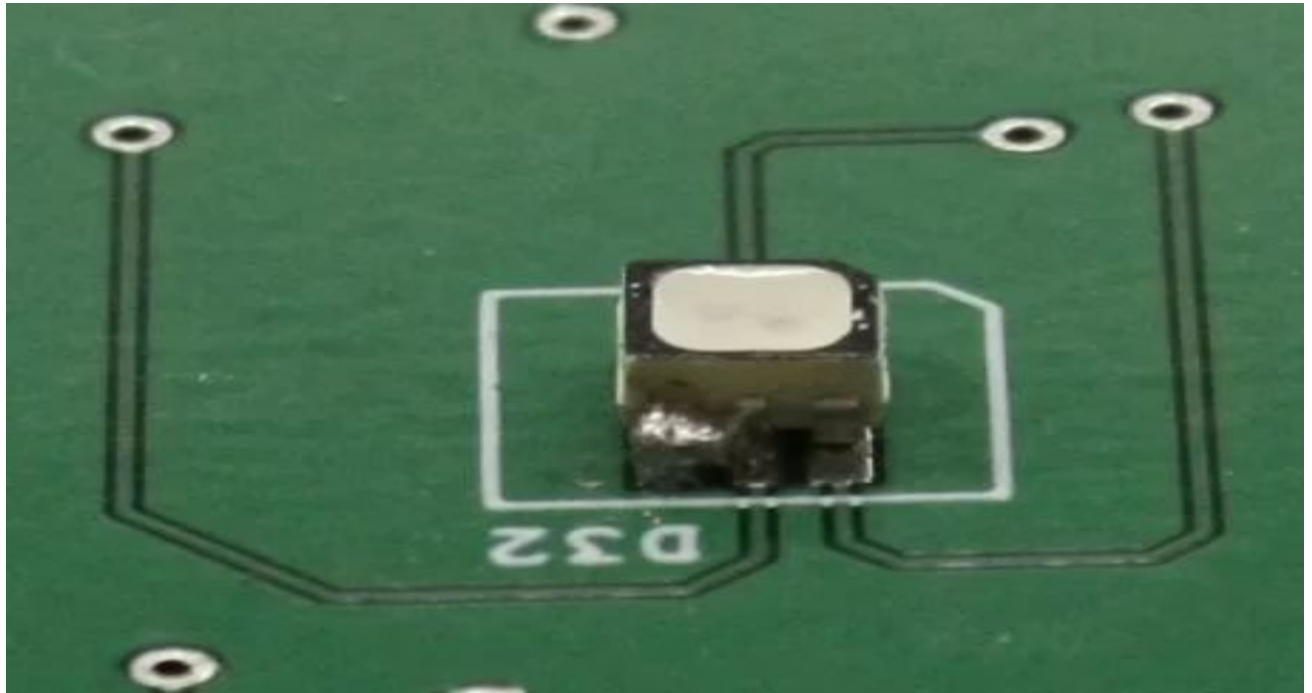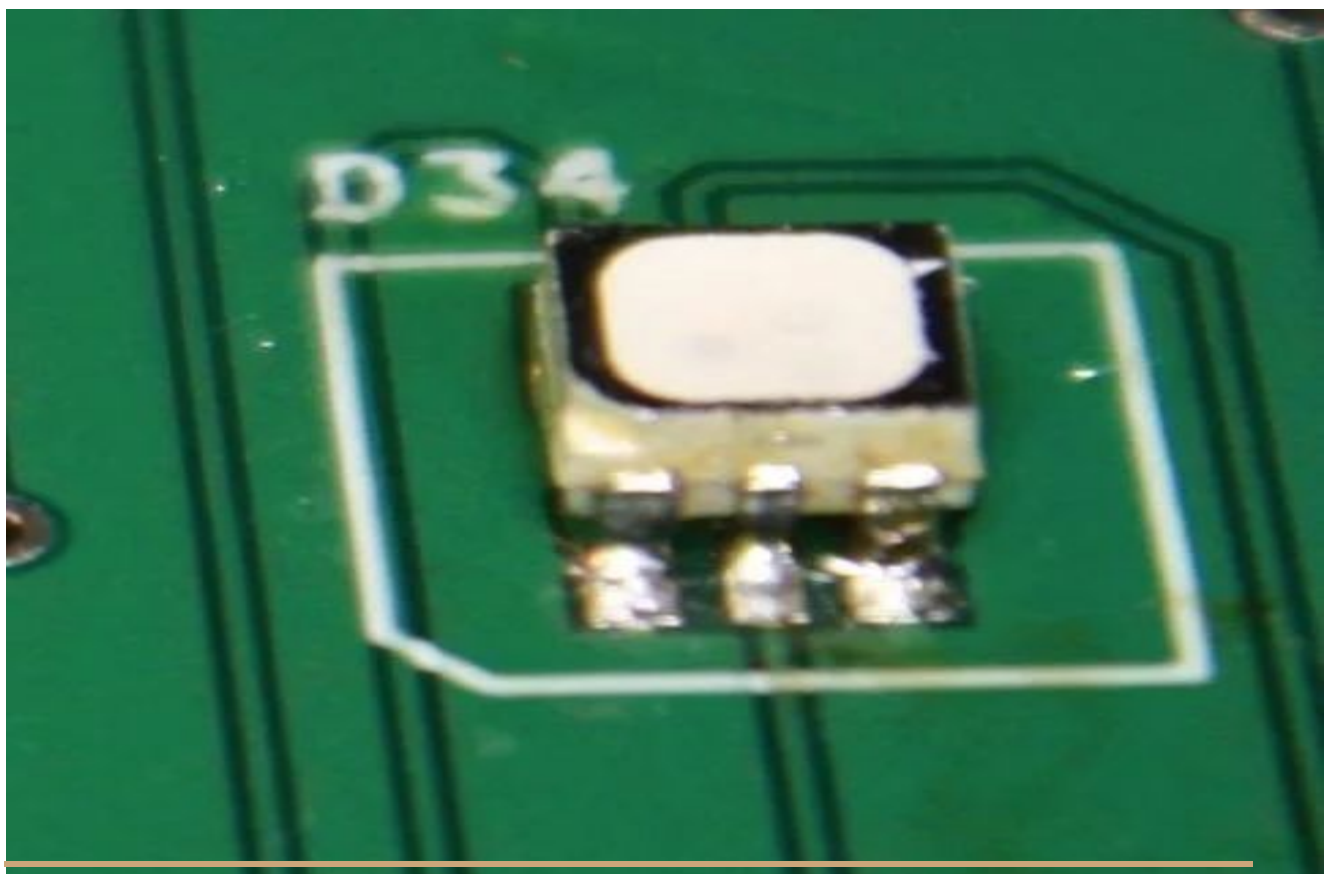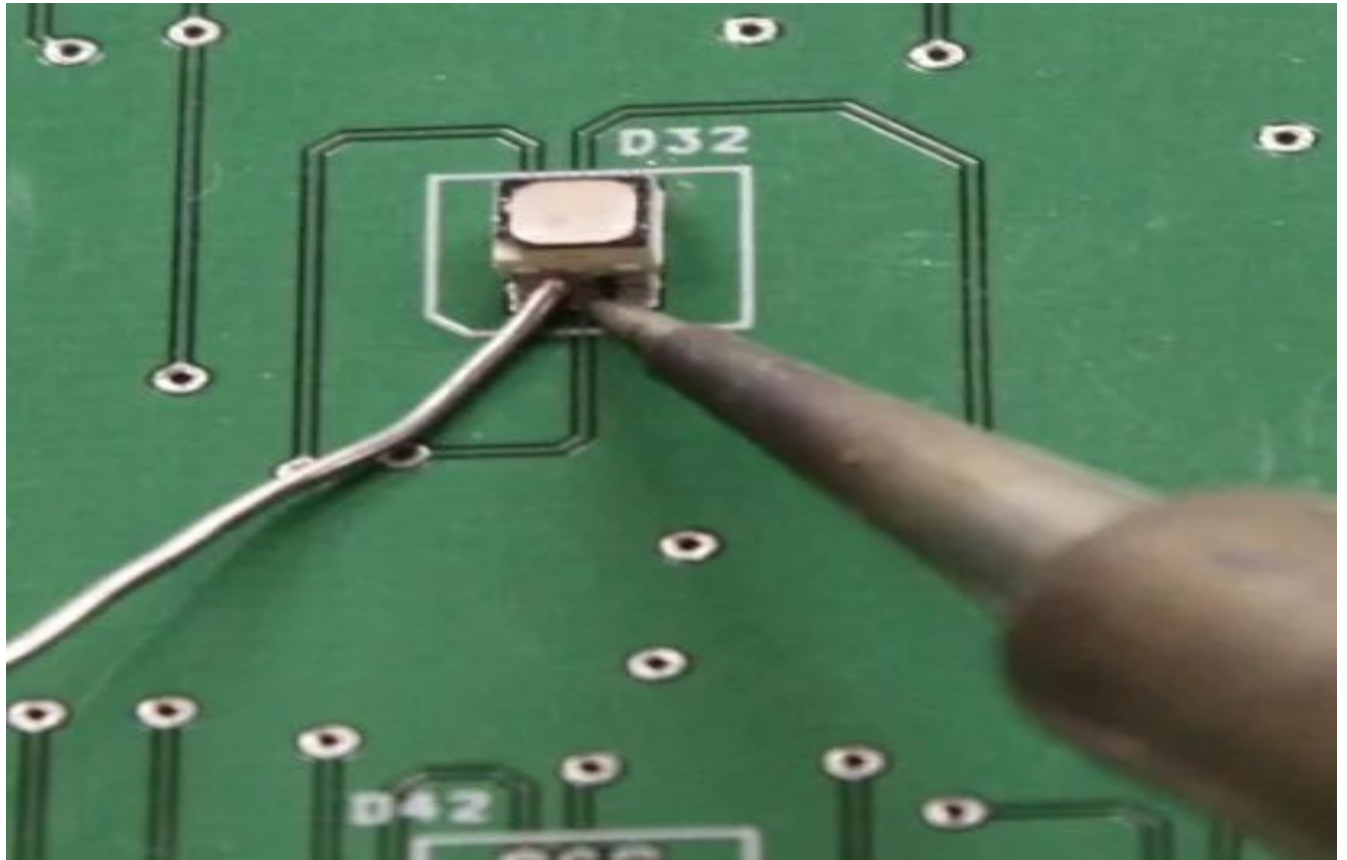
SMD soldering
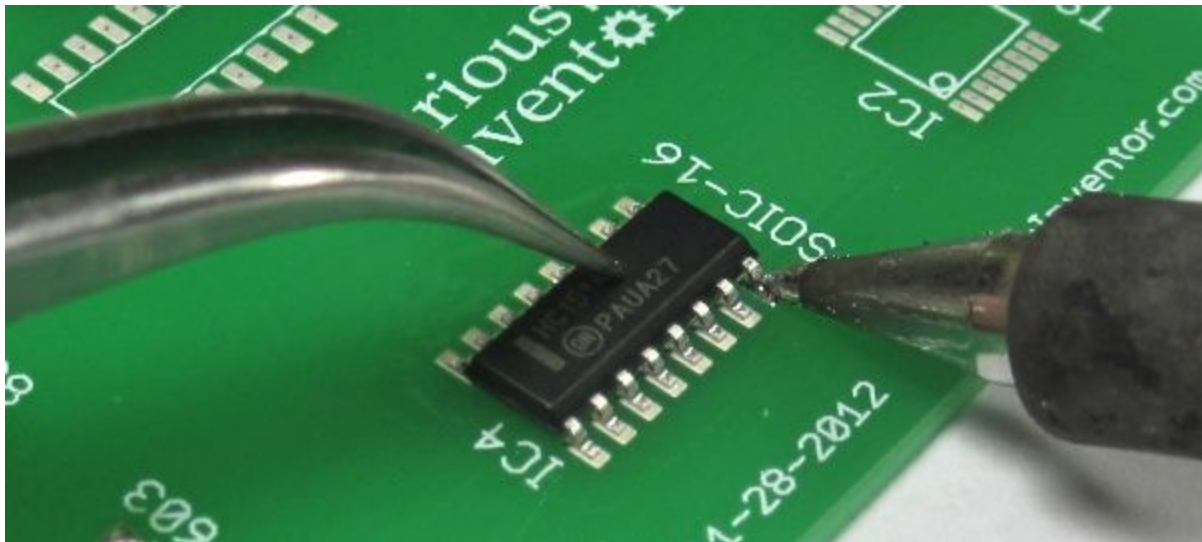
SMD stands for Surface Mount Device and indicates that the component is mounted on the surface of the circuit board in contrast to through-hole components which are mounted in holes.The method to solder a surface mount chip is very similar to the method for soldering a resistor.Start by applying flux on all the pads on the circuit board.Apply some solder to one of the chip's corner pads.Place and align the chip using tweezers.Hold the chip in place while touching the corner pad with the tip of the soldering iron so that the

solder melts the pin and the pad together.Check the alignment of the chip. If it is not in its place, use your soldering iron to loosen the pin chip and align the chip properly.

STEP BY STEP IMAGES: