Use USB-TTL Converter to program with STM32CubeIDE

To program the STM32 Bluepill using STM32CubeIDE with a USB-TTL converter, follow these steps:

1. **Connections:**
   - USB-TTL **TX** → STM32 **A10 (RX1)**
   - USB-TTL **RX** → STM32 **A9 (TX1)**
   - GND → GND
   - **BOOT0 → 1 (HIGH)** for flashing
2. **Driver & Software:**
   - Install **USB-TTL (CP2102/FTDI/CH340) driver**
3. **Flashing Process:**
   - Open **STM32CubeProgrammer**
   - Select **UART** mode and enter COM port
   - Click **Start** to upload firmware
4. **Run Mode:**
   - After flashing, set **BOOT0 → 0 (LOW)** and reset the board.

This method uses **USART1** for bootloading STM32 without an ST-Link debugger.

Advantages of Using USB-TTL Converter for Programming STM32 (Bluepill)

1. **Low Cost** – USB-TTL converters (CP2102, CH340, FTDI) are cheaper than ST-Link.

2. **Ease of Use** – Simple wiring (TX, RX, GND) without extra debugging hardware.
3. **No Need for ST-Link** – Ideal if ST-Link is unavailable or faulty.
4. **Works on Most Systems** – Compatible with Windows, Linux, and macOS.
5. **Can Be Used for Debugging** – After flashing, the USB-TTL can still be used for UART communication.

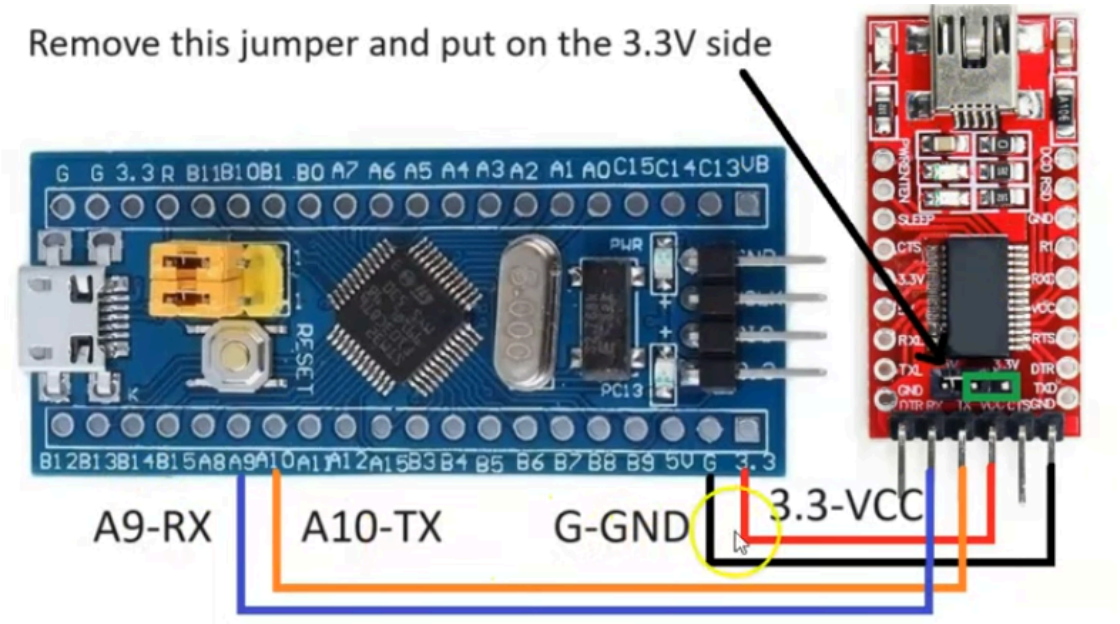
Disadvantages

1. **Slower than ST-Link** – Flashing via UART is slower than SWD.
2. **No Debugging Support** – Cannot perform real-time debugging like ST-Link.
3. **Requires Manual Boot Mode Change** – BOOT0 pin must be manually set HIGH/LOW.
4. **Limited to Certain Boards** – Only works if STM32 has a built-in UART bootloader.
5. **Possible Driver Issues** – Some USB-TTL modules require additional drivers.

For serious development, **ST-Link is preferred**, but for quick firmware uploads, **USB-TTL is a simple alternative**.

#Prequest

1. Flow this Circuit Diagram



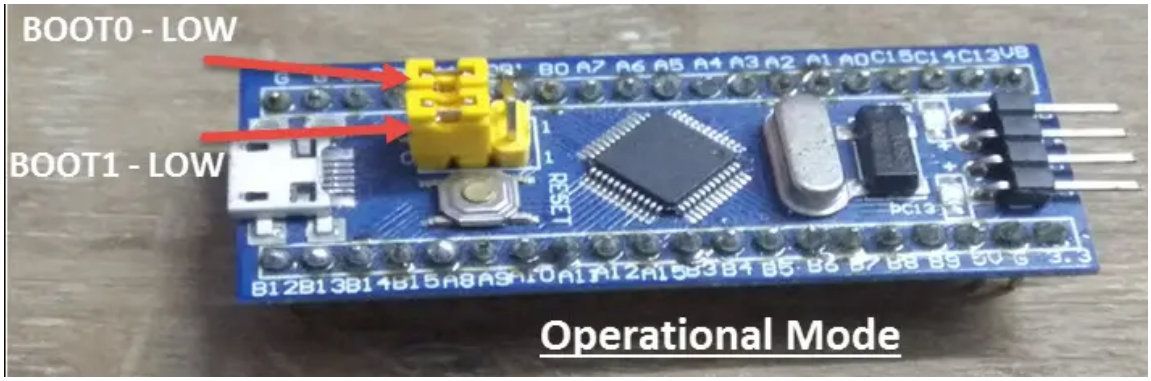


Fig01: **Normal Operation Mode** and total circuit connection for UART Programming mode

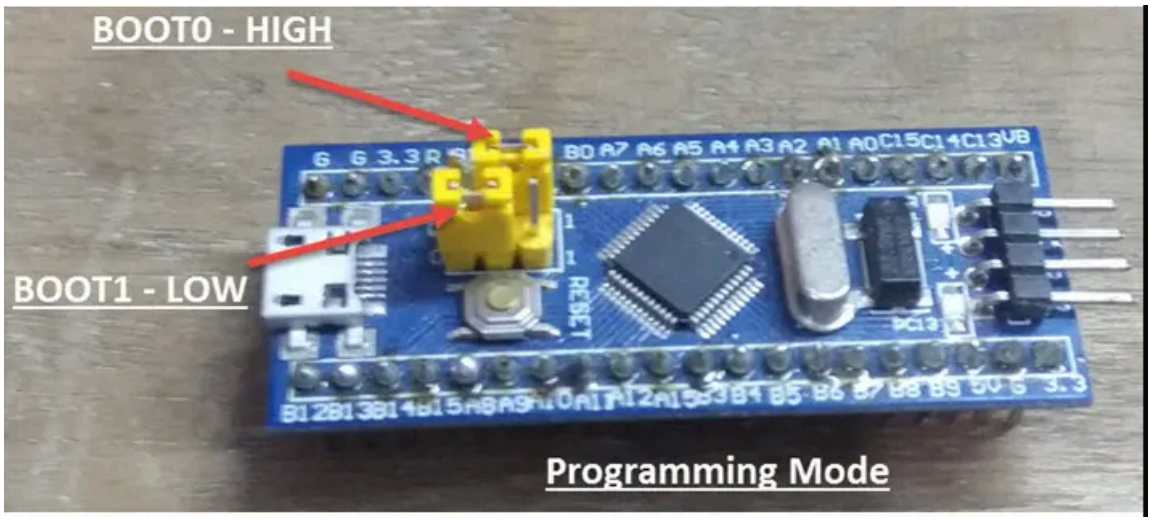
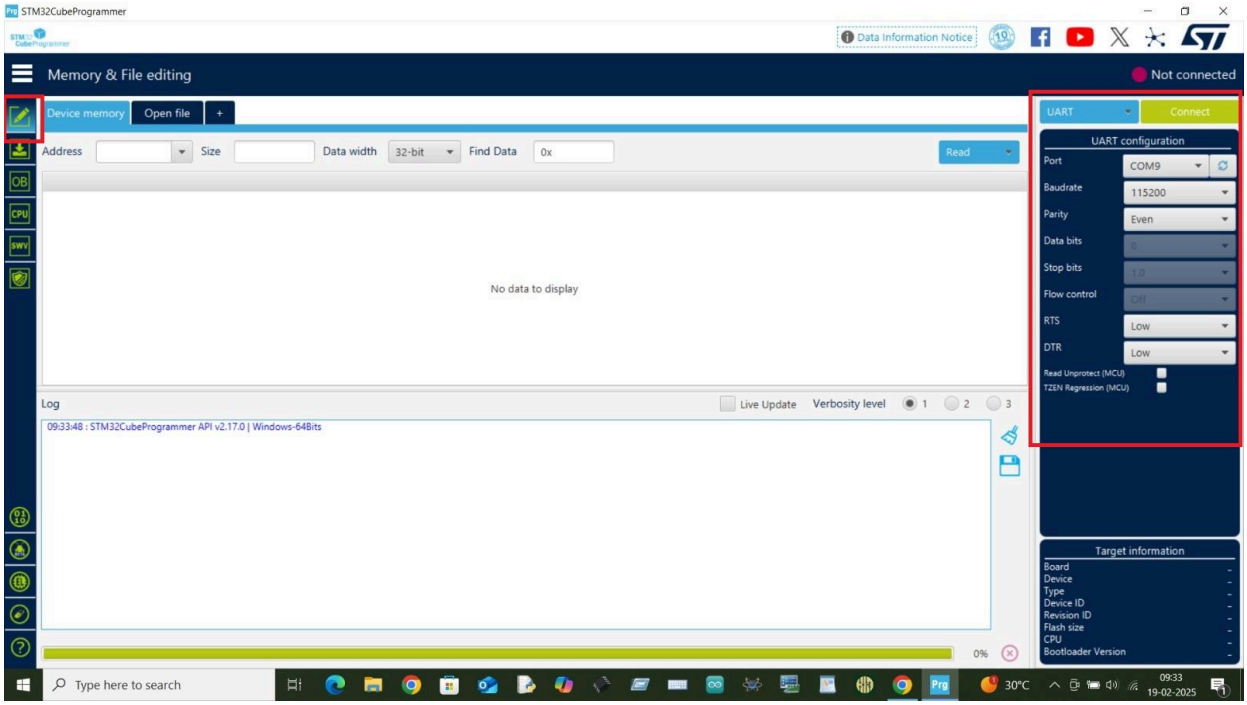


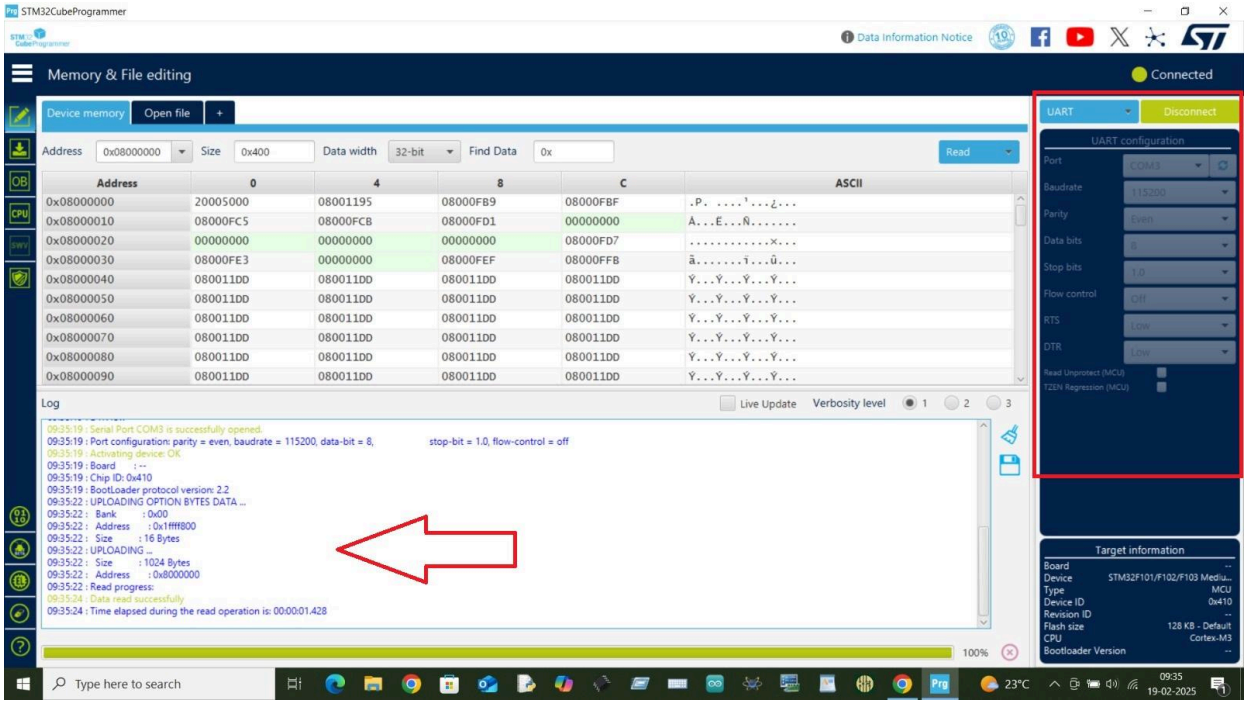
Fig02: **UART Programming Mode**

#Open STM32CubeProgrammer

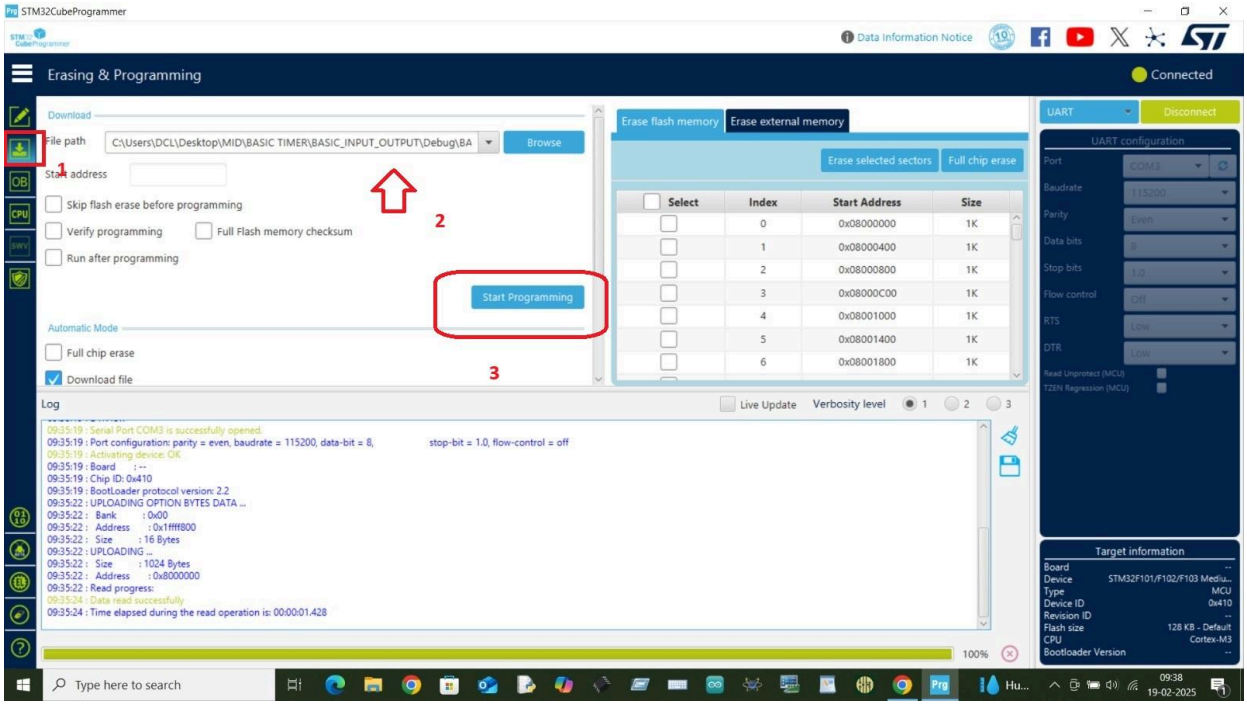
#Prequest >> circuit change like Fig02



#Connect UART mode and set parameter

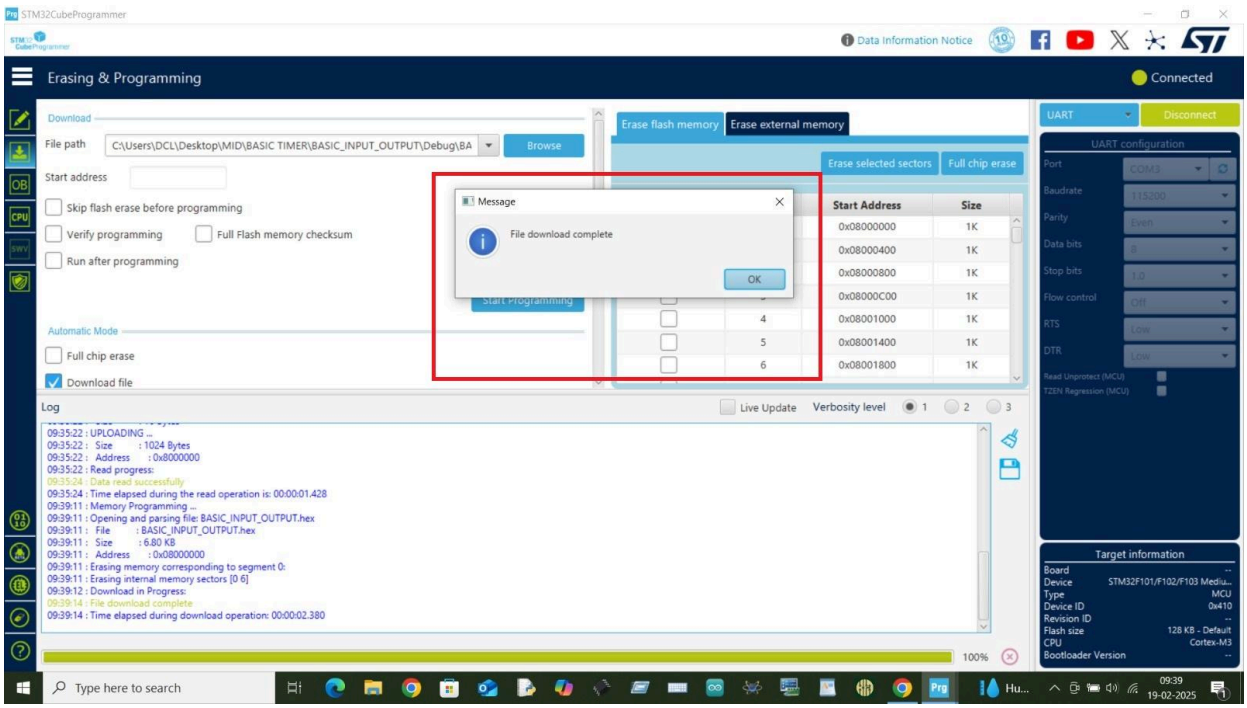


#Select Firmware file for downloading



1. Click this second icon
2. Select your firmware file
3. Press “**Start programming”** button

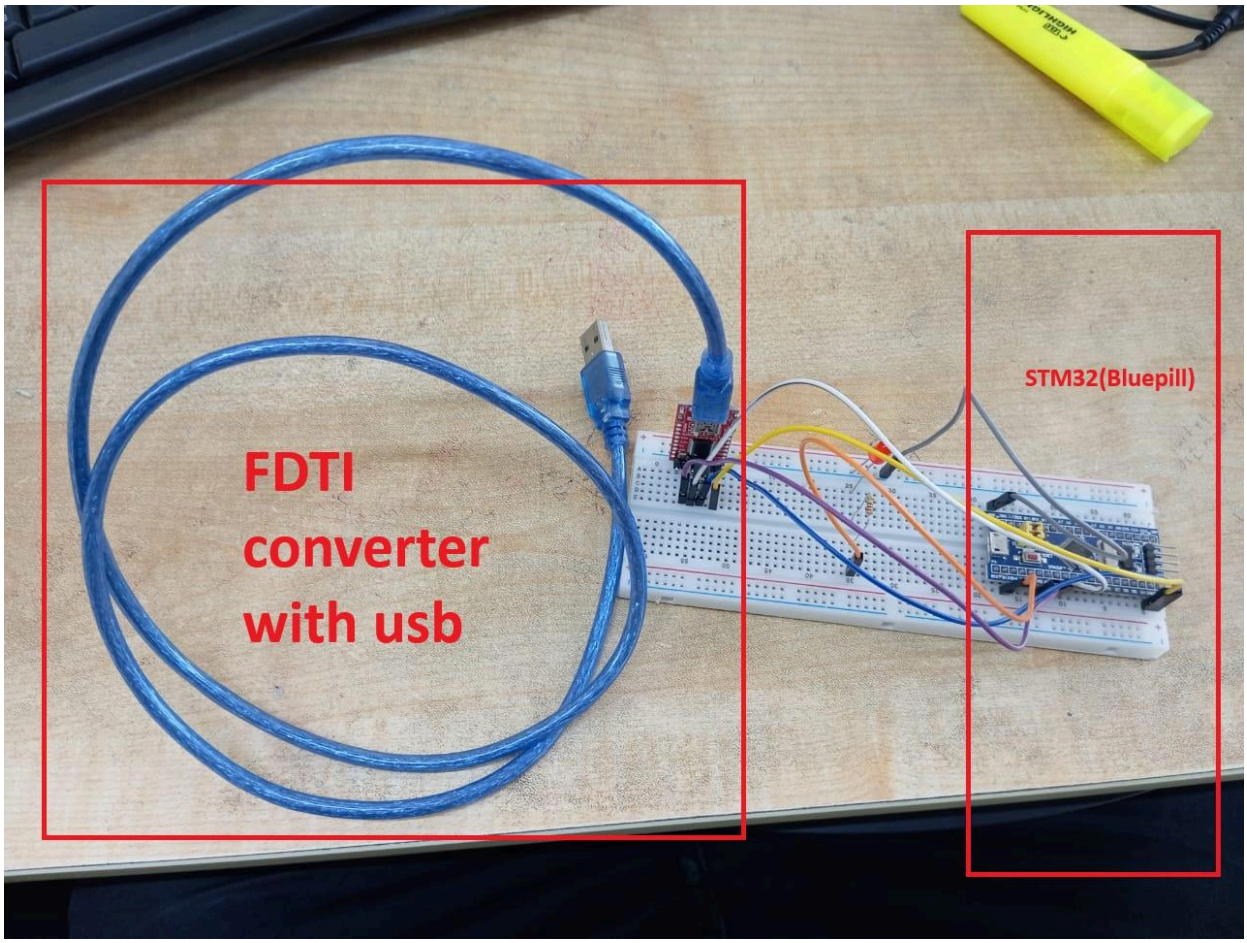
#After successfully firmware upload

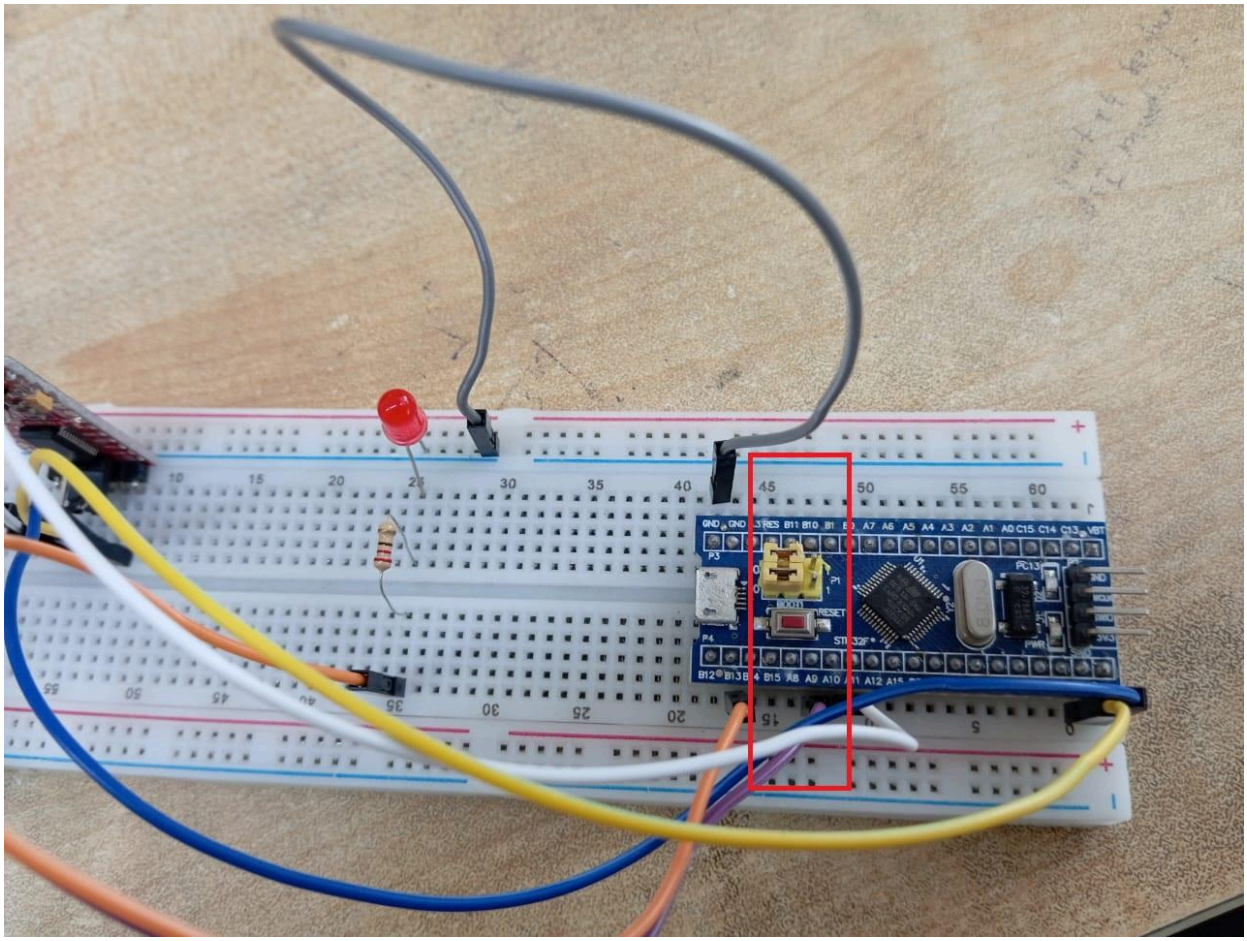


#After uploading firmware file successfully

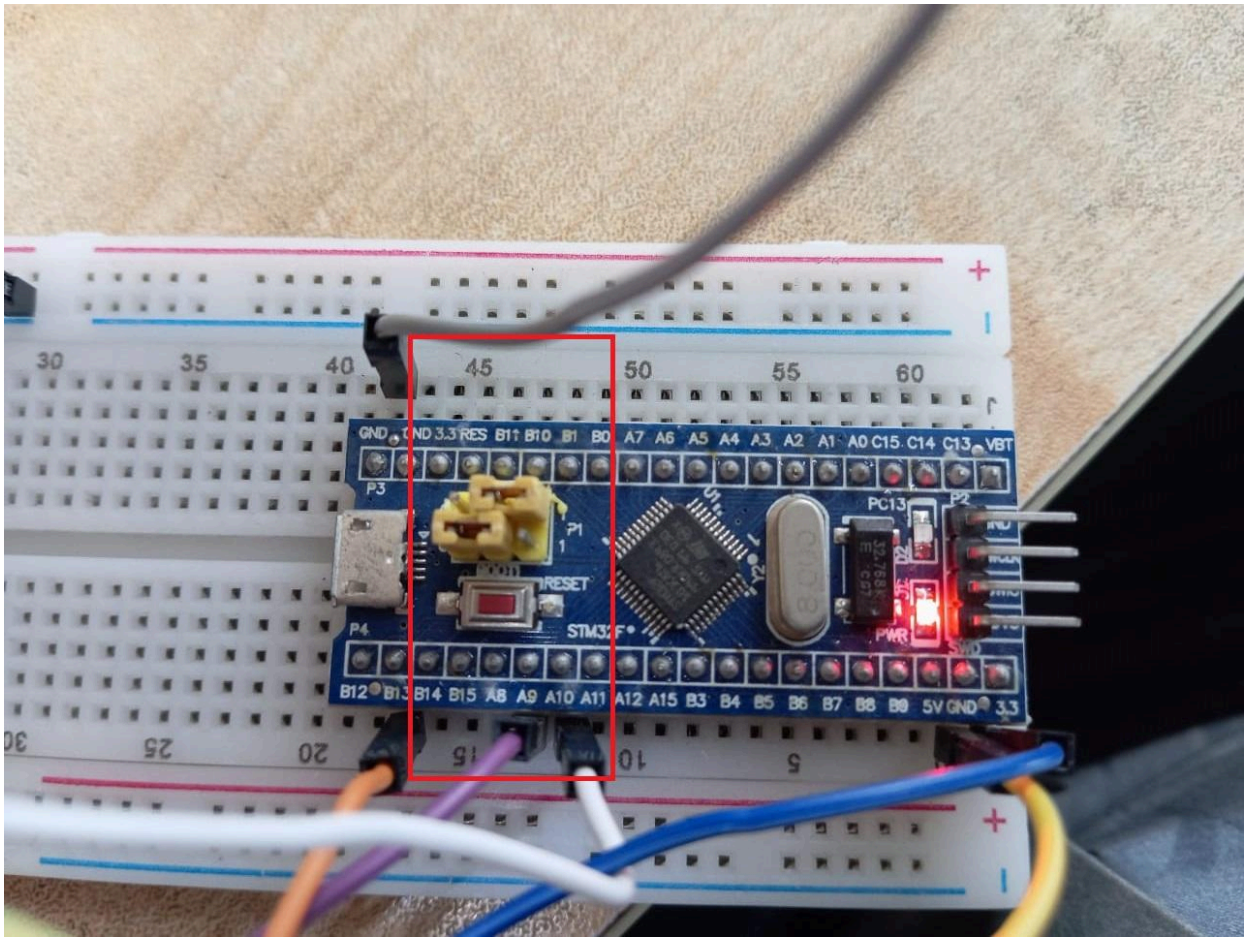
1. Remove Usb cable from power source
2. circuit change like Fig01
3. Test the uploading file correctly

#Step with Circuit image

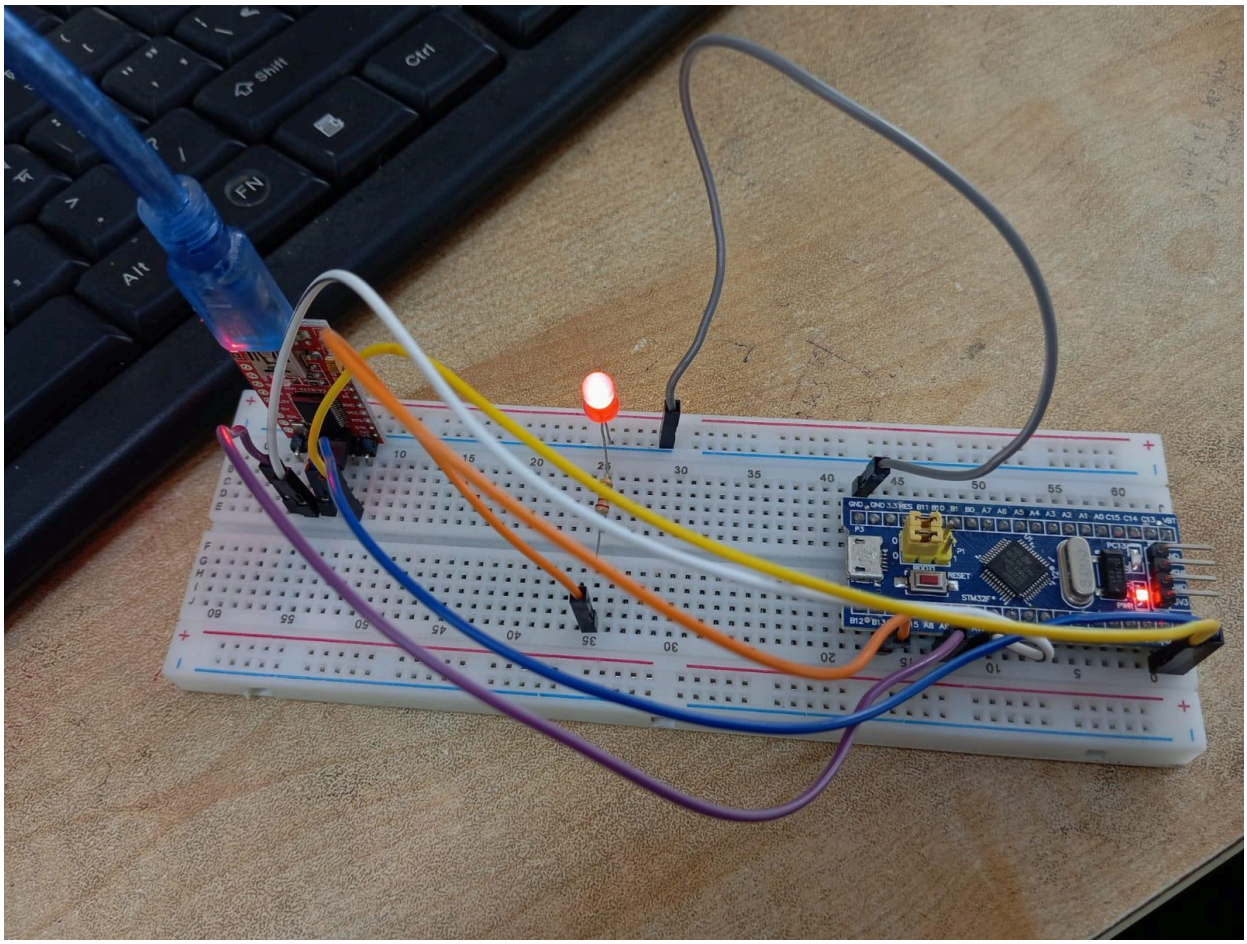




#Normal Operation



 # When UART Mode Program Upload and STM32CubeProgrammer Connecting .



#Finally Testing the firmware by uploaded UART Programming Mode