

# STM32 UART + ADC + Timer PCB Project

## – User Manual

---

### 1. Introduction

This project is a beginner-friendly STM32 development board implementing UART (serial), ADC (analog), and Timer functions.

It uses the STM32F103C6T6 microcontroller and is designed entirely in KiCad. The board can be fabricated using the provided Gerber files and explored using the schematic and PCB layout files.

### 2. Project Structure and Required Tools

- KiCad: Required to open and view `.kicad_sch`` and `.kicad_pcb`` files.
- Folder ``uart``: Contains the schematic and PCB layout.
- Folder ``GerberFile``: Contains production-ready files for PCB fabrication.

### 3. Opening Files in KiCad

1. Launch KiCad.
2. Open the ``uart.kicad_pro`` project file.
3. Open the schematic using the Schematic Editor.
4. Open the PCB layout using the PCB Editor.
5. Optionally, use the 3D Viewer to view the board visually.

### 4. Schematic Overview

Key components in the schematic include:

- STM32F103C6T6 microcontroller
- Power regulation circuitry (3.3V)
- UART TX/RX connections
- ADC input using a light-dependent resistor (LDR)
- Timer-based LED output
- Reset and Boot configuration buttons

## 5. PCB Layout Overview

The PCB is a 2-layer design with the following features:

- Central placement of the STM32 MCU
- USB input and 3.3V regulator circuit
- GPIO, UART, ADC exposed via headers
- LEDs and switches for user interaction
- Clean routing and silkscreen labels for easy assembly

## 6. Gerber Files for Fabrication

The `GerberFile` folder contains all necessary files for PCB manufacturing.

To fabricate the board:

1. Zip the contents of the `GerberFile` folder.
2. Upload to a PCB manufacturer (e.g., PCBWay, JLCPCB).
3. Confirm preview and proceed with order.

## 7. Using the Board (Beginner Tips)

- Power the board using 3.3V via USB or external header.
- UART TX/RX can be connected to a USB-to-TTL adapter for communication.
- The light sensor provides analog input to the ADC pin.
- The LED can be toggled using a timer interrupt.
- No firmware is included, but STM32CubeIDE or PlatformIO can be used to program the MCU.

## 8. Summary

This project is designed for beginners to learn STM32 hardware development with KiCad. It offers a complete hardware platform to explore UART communication, analog signal measurement, and timer-driven output control.