# Bluepill LED Blinking Example

This repository contains an example program for blinking an LED on a Bluepill development board using the GCC (GNU Compiler Collection). The Bluepill is an ARM-based STM32F103C8T6 microcontroller board, and this example demonstrates how to set up the GPIO pin for output and control the LED using simple delay-based loops.

## Prerequisites

Before using this example, make sure you have the following tools installed:

- GCC toolchain for ARM (arm-none-eabi)

- OpenOCD or other debugging tools (if programming via USB or JTAG)

- STM32CubeMX (optional for peripheral configuration)

- STM32F1xx HAL (Hardware Abstraction Layer) libraries

You can install the ARM toolchain and OpenOCD through your package manager or from their respective websites:

- [GCC ARM Toolchain](https://developer.arm.com/tools-and-software/open-source-software/developer-tools/gnu-toolchain/gnu-rm)

- [OpenOCD](http://openocd.org/)

## How to Build

1. Clone this repository to your local machine:

bash

git clone https://github.com/your-username/bluepill-blink.git

cd bluepill-blink

2. Set up the environment variables for your GCC toolchain and ARM tools.

3. Run the make command to compile the code:

bash

make

4. The output binary (firmware.bin) will be located in the root directory.

## How to Upload

You can upload the compiled firmware to your Bluepill using OpenOCD or other suitable programming tools. Here's an example of using OpenOCD:

1. Connect the Bluepill to your PC using a USB-to-Serial adapter or ST-Link.

2. Run the following command to upload the firmware:

openocd -f interface/stlink.cfg -f target/stm32f1x.cfg \

-c "adapter speed 50" \

-c "program build/led\_bluepill.elf verify reset exit

## LED Pin Mapping

- The onboard LED is typically connected to \*PC13\* . Ensure that this pin is correctly configured in the code as an output.

## Code Explanation

- \*Main Program:\*

- The program initializes the GPIO pin connected to the LED.

- It then enters a loop, turning the LED on and off with a delay, creating a blinking effect.

- \*GPIO Configuration:\*

- GPIOC Pin 13 (PC13) is configured as an output pin in the main.c file.

## Troubleshooting

- If the LED does not blink, make sure the correct GPIO pin is selected.

- Ensure the Bluepill is properly connected to your programming device (ST-Link or USB-to-Serial adapter).

- Check the Makefile configuration for correct settings for your environment.

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