Flashing STM32 using STLINK or RPI GPIO

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Contents

***Abstract*—This manual shows how to program an STM32 board using STLINK and Raspberry Pi. The procedure is the same for any Linux machine.**

1 Components

The necessary components for this manual are listed in Table I.

Component	Quantity
STM32F103C8T6	1
Raspberry Pi 3	1
STLINK V2	1
Female-Female Jumper Wires	5

TABLE I

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2 Software Setup

Open a terminal and execute the following commands

```
cd ~
mkdir -p ~/sandbox
cd ~/sandbox
```

2.1 Install Necessary Packages

```
sudo apt-get install git
    autoconf libtool make
    automake texinfo pkg-config
    libusb-1.0-0 libusb-1.0-0-dev
     gcc-arm-none-eabi libnewlib-
    arm-none-eabi telnet
```

2.2 Installing Openocd and Programming Environment

```
git clone git://repo.or.cz/
    openocd.git
git clone https://github.com/
    gadepall/STM32F103C8T6.git
```

2.3 Configure Openocd

```
cd openocd
./bootstrap
./configure --enable-sysfsgpio
    --enable-bcm2835gpio
make
sudo make install
```

While using STLINK, **./configure** without the –enable switches is sufficient.

3 Hardware Setup

3.1 STLINK

Connect the STLINK to a USB port of the Raspberry Pi. The hardware connections between the STLINK and STM32 are available in Table II. See Fig. 1 as well for the *black pill* board. Fig. 2 shows the *blue pill* board.

STM32	STLINK
GND	GND
3.3V	3.3V
SWDIO	SWDIO
SWCLK	SWCLK

TABLE II: STLINK-STM32 connections

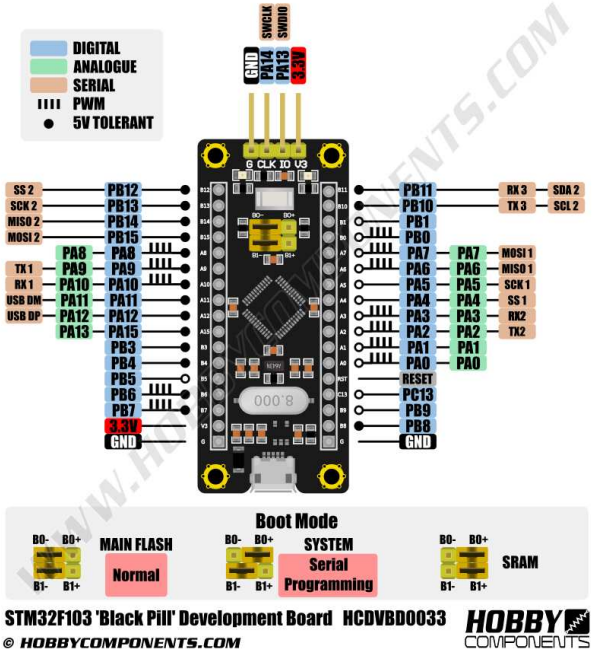

Fig. 1: STM32F103C8T6 Pin Configuration (Black Pill)

3.2 RPI GPIO

The hardware connections between the RPI GPIO pins and STM32 are available in Table III.

Raspberry Pi	STM32
GND (Pin 6)	GND
3.3V (Pin 1)	3.3V
GPIO 24	SWDIO
GPIO 25	SCLK
GPIO 18	RESET

TABLE III: Raspberry Pi and STM32 Connections

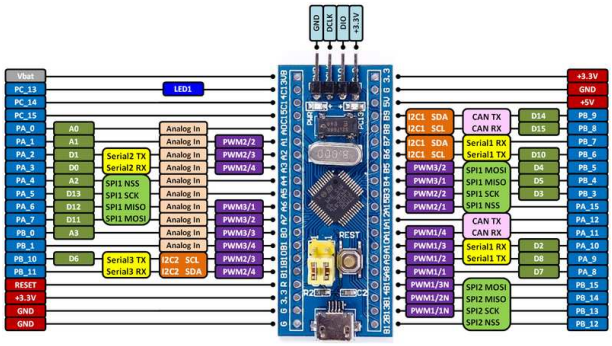

Fig. 2: STM32F103C8T6 Pin Configuration (Blue Pill)

4 Make File and Flashing

1. Communicate with the STM32 board. While using STLINK,

```
cd ~/sandbox/openocd
sudo openocd -f /usr/local/
    share/openocd/scripts/
    interface/stlink.cfg -f
    usr/local/share/openocd/
    scripts/target/stm32f1x.
    cfg
```

If only RPI GPIO is used, then

```
cd ~/sandbox/openocd
cp ~/sandbox/STM32F103C8T6/
    refs/openocd.cfg ~/sandbox
    /openocd
sudo openocd
```

2. Open a new terminal and type

```
telnet localhost 4444
```

This will establish a connection between the RPI and STM32

3. Open another new terminal and type

```
cp ~/sandbox/STM32F103C8T6/
   examples/blink.c ~/sandbox
   /STM32F103C8T6/main.c
sudo make
cp main.bin cd ~/sandbox/
   openocd
```

4. Make sure that the two pin caps (Boot0 and Boot1) beside the reset button are non-aligned.
5. Go to the telnet terminal

```
reset halt
flash write_image erase main.
   bin 0x08000000
reset run
```

6. Align the two pin caps beside the reset button. Press the reset button. You should see an LED blinking.
7. Modify main.c in the STM32F103C8T6 directory and modify the code to keep the LED on. Flash it to the STM32 and verify.