

9.2 Circuit description

The Twitoo circuit is mainly composed by two modules.

- A GE863-Pro3 by Telit
- A LMX9838 by National Semiconductors.

The GE863-Pro3 module has two main functionalities. A quad band GSM/GPRS modem, and a ARM9 processor with all memory and peripherals needed to run. The LMX9838 is a Bluetooth module.

The next points will describe the circuit in details. Please refer to the schematic top level for pages signals interconnections.

9.2.1 Power supply

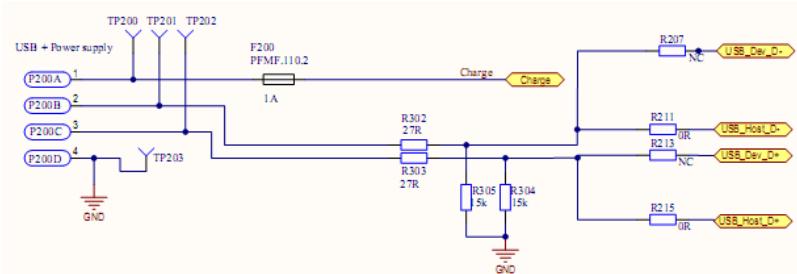


Figure 2 Power entry

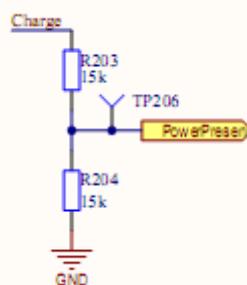


Figure 3 Power present measurement

The P200 connector has two functionalities. First it is power supply connector which needs 5V supply. It is also a USB host connection port but it will not be used. The 5V power is connected to U1 (GE863-Pro3) on charge pin through a 1A resettable fuse. The voltage divider through R203 and R204 is used to check if the 5V supply is connected or not.

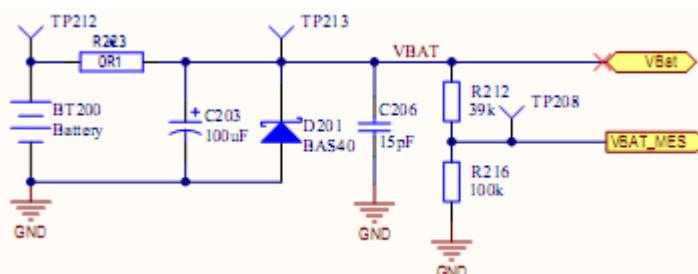


Figure 4 Battery connection

The battery BT200 is soldered on the PCB. It is connected on the Vbatt pads of U1 which manages the battery charge and discharge. The voltage divider through R212 and R216 is used to measure the battery voltage. The battery voltage range is 3.4V to 4.2V.

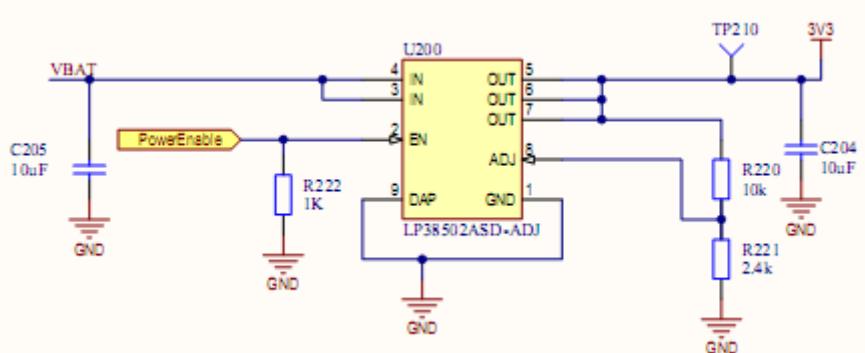


Figure 5 Peripheral power supply

U200 converts the battery voltage to 3.3V that powers the peripherals (Bluetooth, LEDs, vibrator, touch sensor). This power can be en/disabled by the *PowerEnable* signal which comes from U1.

9.2.2 Reset circuit

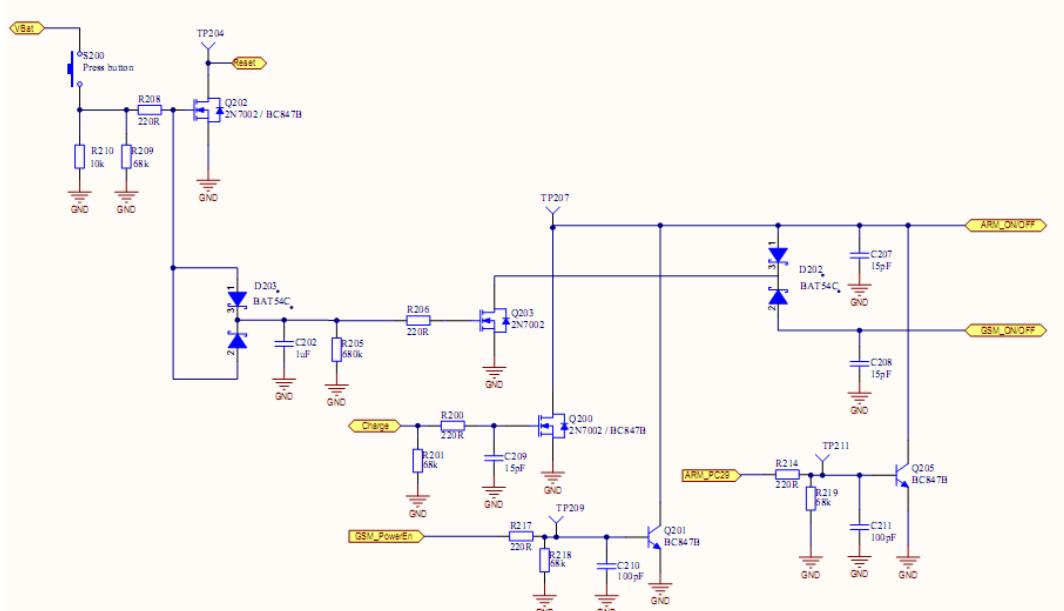


Figure 6 Reset circuit

The reset circuit is a complicated part that manages to

- Reset the ARM processor
- Holds low the *ARM_ONOFF* and *GSM_ONOFF* signals to power on the GE863-Pro3 modem and processor.
- Power on the Twitoo when the power supply is not plugged in.

Without main power supply:

Here is the description of the reset circuit when the main power supply is not plugged in.

As long as S200 button is pressed, the *Reset* signal is held low, it is pulled high when the button is released through U1 internal pull-ups.

When S200 is pressed, the capacitor C202 is charged through diode D203. When the button is released, C202 discharge slowly through R205. During this discharge phase, Q203 stay closed and tied low *ARM_ONOFF* and *GSM_ONOFF* signals. The ARM processor of U1 will start and apply a high voltage on the *ARM_PC29* signal, which will keep the *ARM_ONOFF* signal low. Then the capacitor C202 will become completely discharged and release the *GSM_ONOFF* signal. The system is then started as long as the *ARM_PC29* signal is held high by the processor.

The *GSM_PowerEn* signal comes from the GSM part of U1 and is used to reboot the processor on battery power supply. During the processor reboot procedure, the *ARM_PC29* is released and the *GSM_PowerEn* signal is here to keep the *ARM_ONOFF* signal low.

With main power supply

When the main power supply is plugged in, the *Chage* signal is high, so that the *ARM_ONOFF* signal is always low and the system is started. That means that the system is always started when the power is plugged in. In this case, when S200 button is pressed, the *Reset* signal is tied low and the *GSM_ONOFF* is toggled.

9.2.3 GE863-Pro3 Processor part

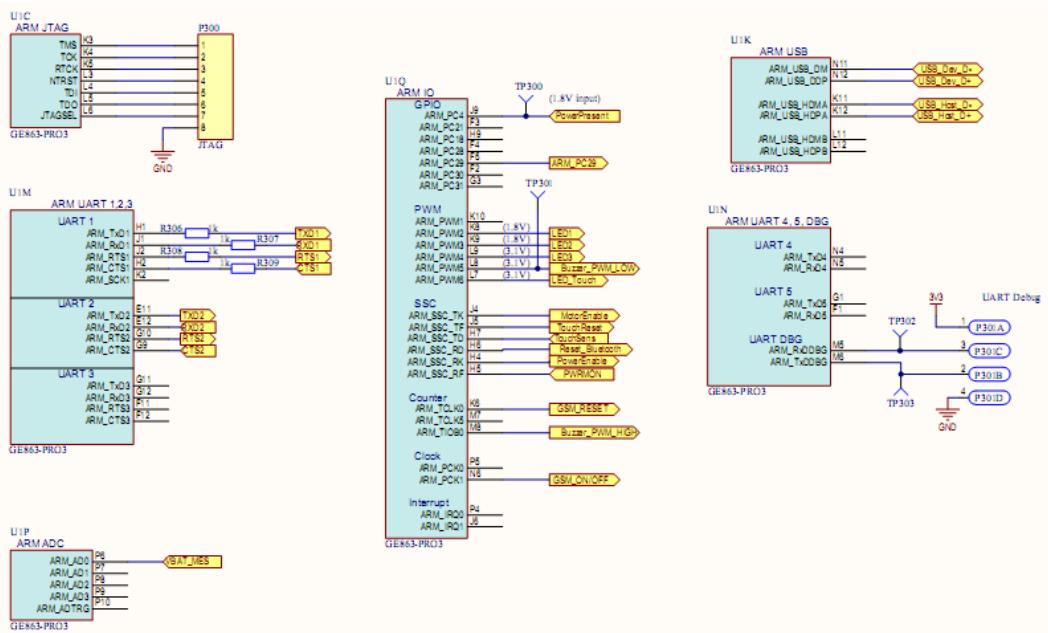


Figure 7 GE863-Pro3 processor part

This part of the schematic shows the processor part of the GE863-Pro3. All the signals of this page are described in the other schematic parts.

9.2.4 Indicators

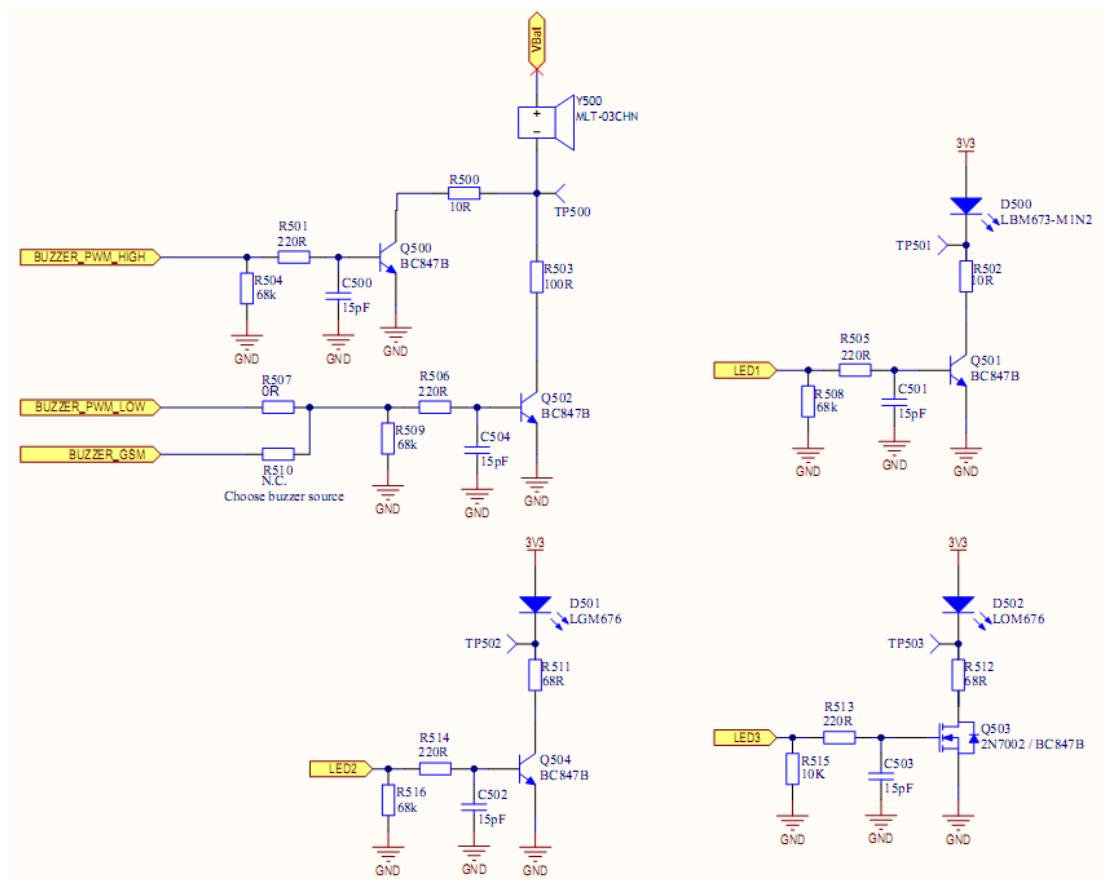


Figure 8 Indicators

On the main PCB, there are 3 LEDs and a buzzer. The buzzer can be driven by 2 different signals that allow 2 different volumes. The frequency of this buzzer is 4kHz.

9.2.5 Bluetooth module

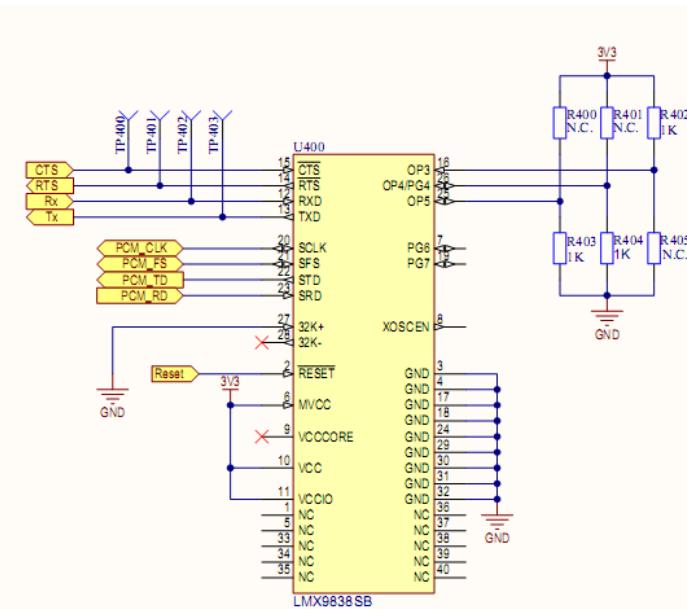


Figure 9 Bluetooth module

The bluetooth module LMX9838 (U400) is connected to the processor part of U1 through a standard serial port that works up to 115200bps. It is also connected to the modem part of U1 through a PCM interface which is currently not used.

9.2.6 Extension PCB connector

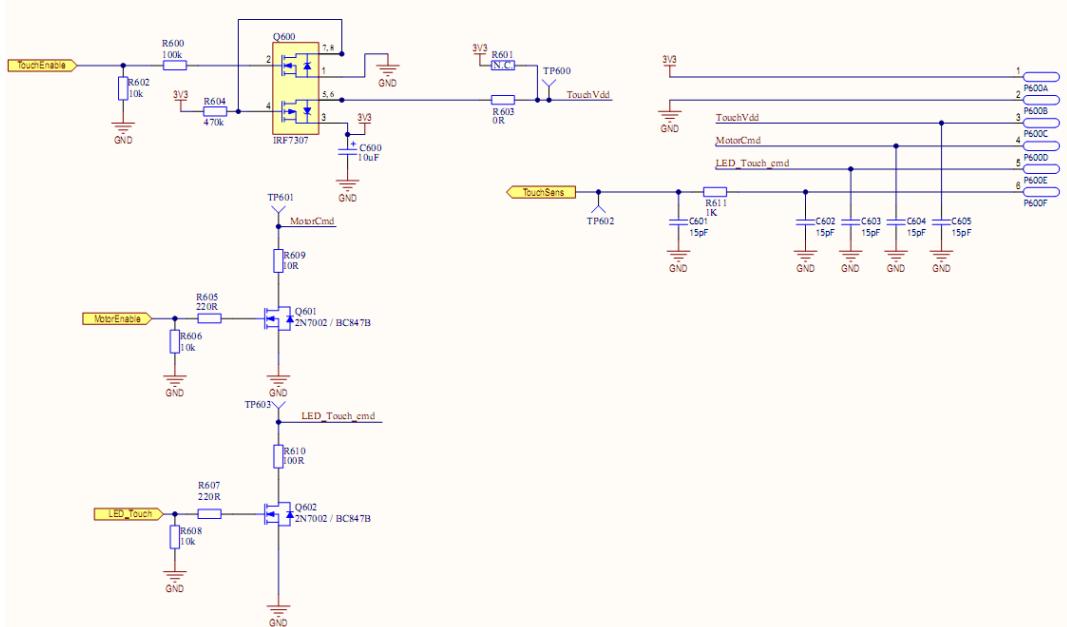


Figure 10 Extension PCB connector

The connector P600 is used to connect the extension PCB that has a touch sensor, a LED and a vibrator motor. The LED and the vibrator motor are directly driven through Q601 and Q602. The power supply of the touch sensing IC can be dis/enabled by the Q600 transistor, this is used to re-initialize the touch sensing IC.

9.2.7 GSM

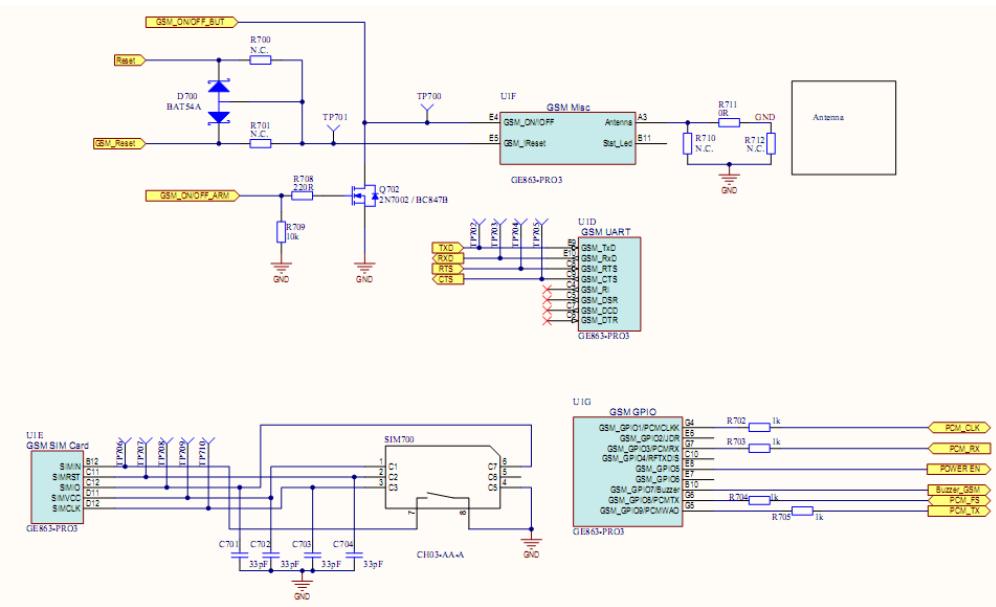


Figure 11 GE863-Pro3 GSM part

The GSM part of U1 is connected to the processor part of U1 through a serial line (part U1D). The *GSM_ONOFF* signal (part U1F pin E4) can come from two sources. First is from the reset circuit, second is from the processor part of U1. The SIM card is connected to the dedicated pins of U1. The U1G part shows also the PCM connection to the Bluetooth U400 and the *POWER_EN* signal is connected to the *GSM_PowerEn* signal on the reset circuit.

9.2.8 Extension PCB

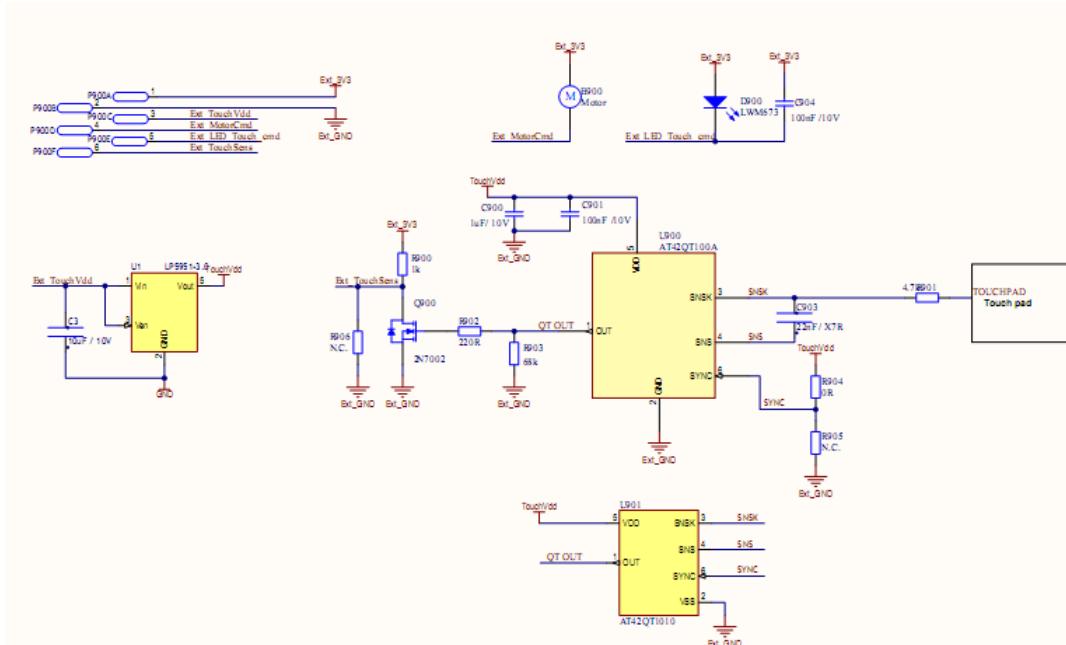


Figure 12 Extension PCB

The extension PCB is placed just behind the button of the Twitoo product. This PCB has a LED, a vibrator motor and a touch sensing IC. The LED and the vibrator motor are directly driven from the main PCB. There are two possibilities for the touch sensing IC, the one used is the U900, the U901 is not mounted.