MCU

BTN3 #RESET GND I2C_SCL SPEAKER I2C_SDA

VCC R1 10K

U1 ATtiny85

- 1 PB5
- 3 PB3
- 4 GND PB4 2
- VCC 8
- PB2 7
- PB1 6
- PB0 5

Y_BTN1
X_BTN2

C1 0.1uF VCC

ISP_SCK
ISP_MISO
ISP_MOSI

GND

BUTTONS & JOYSTICK

X_BTN2 Y_BTN1

VCC R6 10K R3 10K VCC
R2 10K R4 10K GND R5 10K R7 10K

SW4 Btn1 BTN3 R11 47K

SW3 Joy & Btn3

V1 V2 V3 H1 H2 H3
B1B B1A B2B B2A
MOUNT4 MOUNT3 MOUNT2 MOUNT1

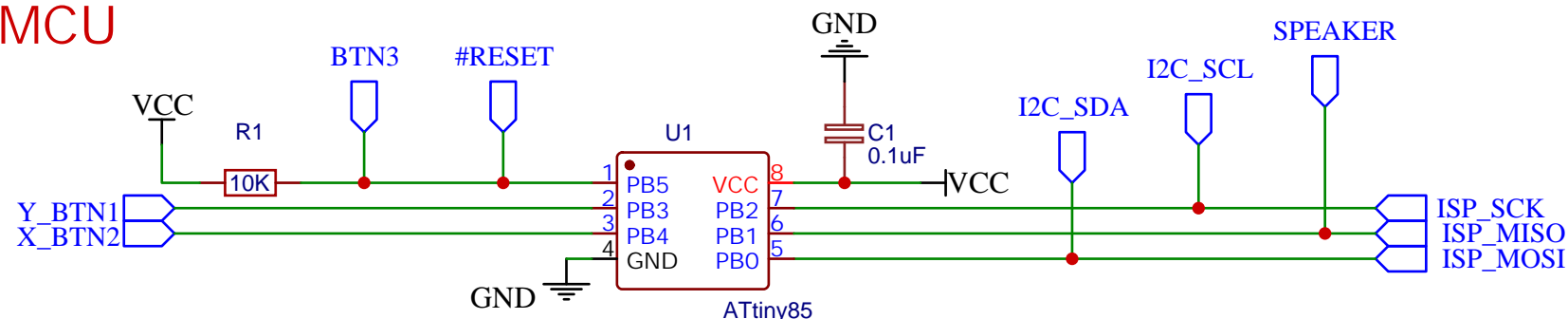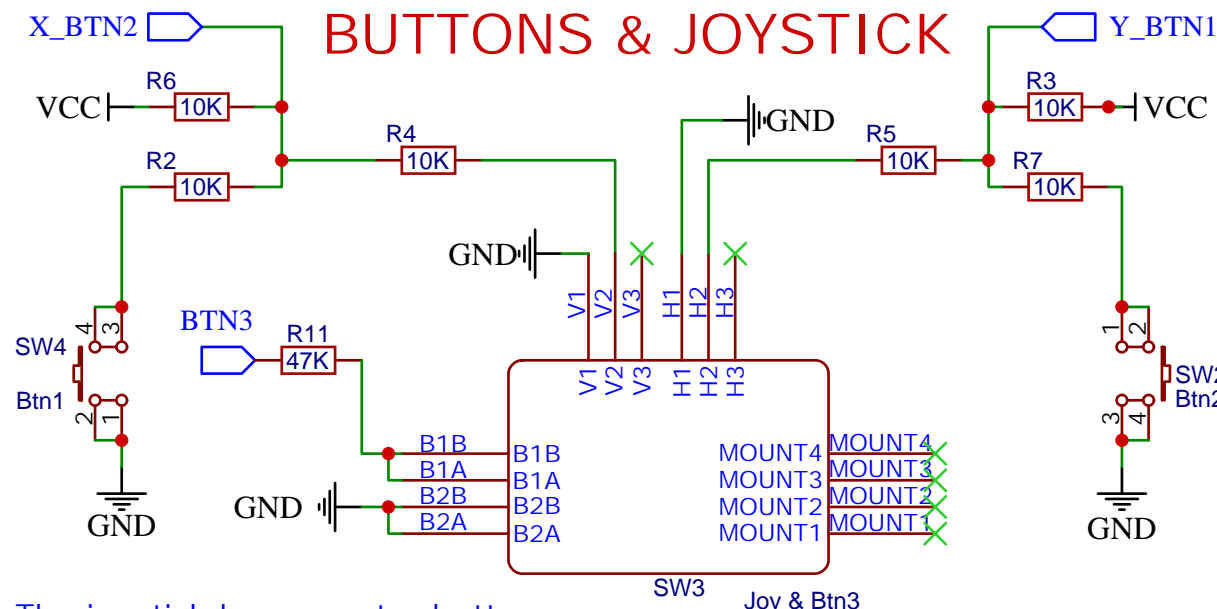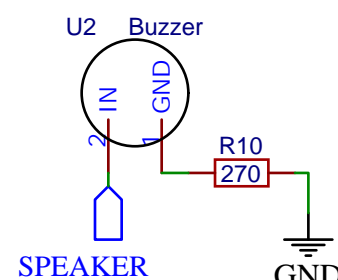SW2 Btn2

GND

The joystick has an extra button, we connect it to the #RESET PIN using a larger resistor so we don't bring the #RESET line down fully.
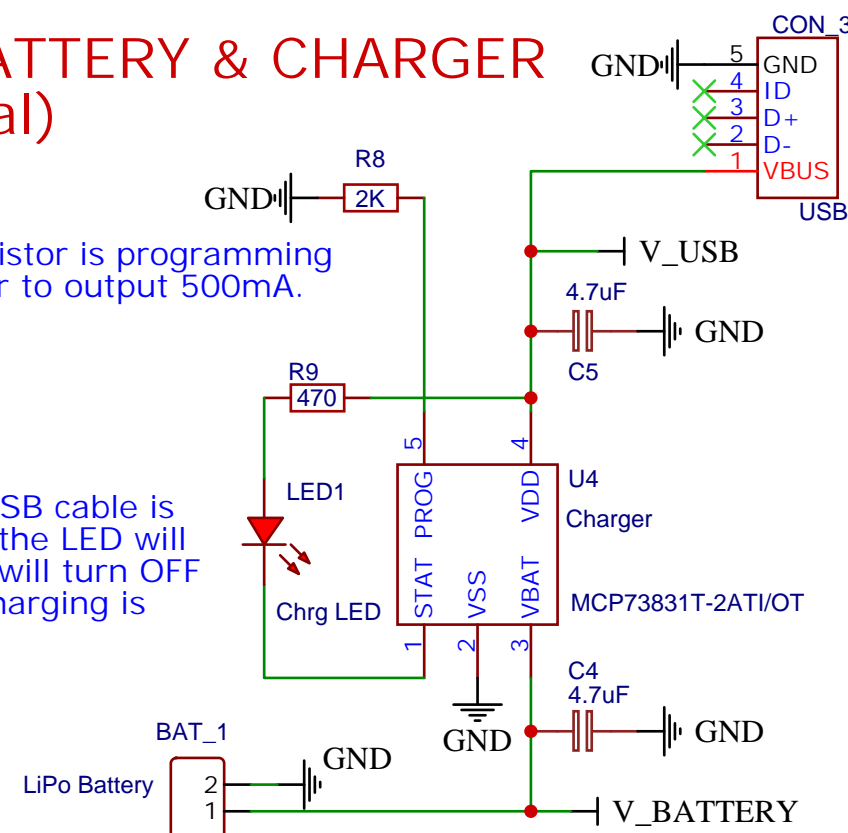
SPEAKER

U2 Buzzer

2 IN   GND

R10 270

SPEAKER GND

Adding a small resistor to the speaker protects the ISP_MISO line during programming and makes the sound more quiet.
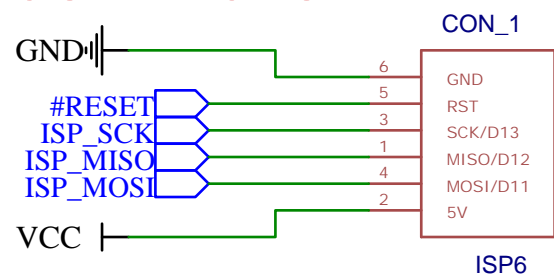
LIPO BATTERY & CHARGER (optional)

GND CON_3

- 5 GND
- 4 ID
- 3 D+
- 2 D-
- 1 VBUS

USB

GND R8 2K V_USB

4.7uF C5 GND

R9 470

LED1 Chrg LED

U4 Charger MCP73831T-2ATI/OT

- 5 STAT
- 5 PROG
- 4 VDD
- 1 VSS
- 3 VBAT

C4 4.7uF GND

BAT_1 LiPo Battery

2
1

GND V_BATTERY

The 2K resistor is programming the charger to output 500mA.

When the USB cable is connected, the LED will turn ON. It will turn OFF when the charging is complete.
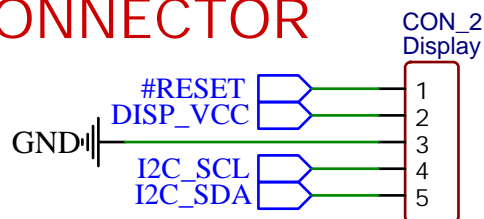
Optional LiPo Battery:

It must have built-in Over-charge and Over-discharge protection (otherwise you need to add that). If not a LiPo battery is used then make sure to check if a voltage controller is needed to protect the ATtiny and the display module. (LiPo with protection usually produces 3 V - 4.2 V, which is OK.)
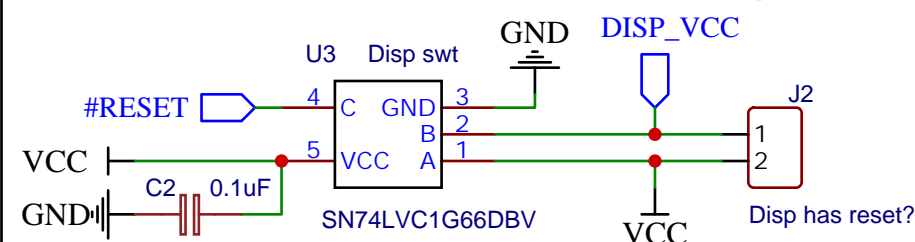
ISP PROGRAMMER CONNECTOR

GND CON_1

- 6 GND
- 5 RST
- 3 SCK/D13
- 1 MISO/D12
- 4 MOSI/D11
- 2 5V

#RESET
ISP_SCK
ISP_MISO
ISP_MOSI
VCC

ISP6

DISPLAY CONNECTOR

GND CON_2 Display

#RESET 1
DISP_VCC 2
3
I2C_SCL 4
I2C_SDA 5

DISPLAY SEPARATOR   (optional)

#RESET GND DISP_VCC

U3 Disp swt SN74LVC1G66DBV

- 4 C
- 5 VCC
- 3 GND
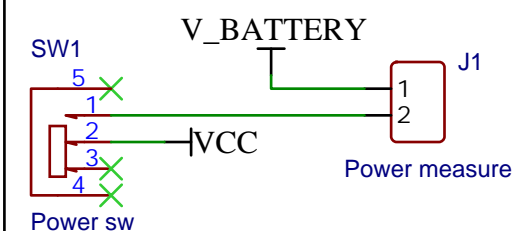- 2 B
- 1 A

VCC C2 0.1uF GND

J2
1
2

Disp has reset?

The display must not drive the ISP lines during programming. The programmer will pull down the #RESET line, so we can use this to disable the display when the programmer is active.

If the display has a #RESET pin, then use it and add a jumper to send constant VCC to the display. Standard I2C OLED modules usually have 4 PINs only and don't have a #RESET PIN, but the #RESET of the display controller is connected to GND with a small capacitor. You should remove the capacitor (to make the ISP programmer more stable) and you can also manually connect the #RESET PIN of the display with the #RESET line.

If you can not manually connect the #RESET line and there is no #RESET pin on the display, then remove the jumper and add an analogue switch to enable the display VCC only if #RESET is high.
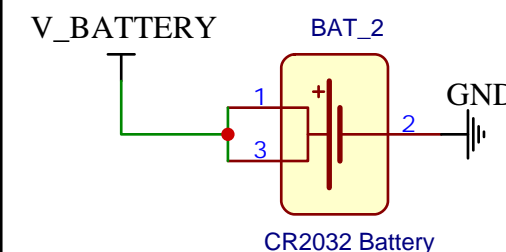
POWER SWITCH

Always turn-off the power before connecting the ISP programmer!

SW1 V_BATTERY

- 5
- 1
- 2
- 3
- 4

VCC

Power sw

J1
1
2

Power measure

Also add a jumper to enable the measuring of power consumption.

COIN BATTERY (optional)

V_BATTERY BAT_2

1
3
2

GND

CR2032 Battery

A standard 2032 coin battery can also be used (a 230 mAh battery should last around 10-15 hours, depending on the software you run and on the size of your display).

TITLE: Tiny-Gameboy

REV: 1.0

Company: N/A

Sheet: 1/1

Date: 2022-01-07   Drawn By: Máté Szalay-Bek

EasyEDA