

### FTDI Adapter

The diagram illustrates the internal circuitry of an FTDI adapter. It features a USB-B connector (JP15) with pins VUSB-RAW, D-, D+, and ID. The D- and D+ lines are connected to the USBDM and USBDP pins of the FT232RL chip (U4) through capacitors C11 (0.1uF) and C12 (47pF). The D+ line is also connected to ground through capacitors C13 (47pF) and C14 (0.1uF). A 500mA fuse (F1) is connected to the VUSB-RAW line, which then goes to the V\_USB output. The chip's VCC, VCCIO, and 3V3OUT pins are connected to a 3.3V supply (F3). The chip's TXD, RXD, RTS, CTS, DTR, DSR, and DCD pins are connected to a 4-pin header (DTR, RTS, TXD, RXD). The chip's CBUS0, CBUS1, CBUS2, and CBUS3 pins are connected to ground through capacitors C15 (4.7uF) and C16 (0.1uF).

### Power Supply

ADC\_BAT for voltage sensing and as a wakeup source (R11 acts as pulldown)

V\_BATT

S2

V\_USB

R7 10k

GND

D3 BAT20J

Q1 2.5A/30V

R10 470k

R11 470k

C9 0.1uF

GND

U3 AP2112K-3.3V

IN OUT

EN

GND BP

3.3V

C10 2.2uF

GND

R1 10k

C7 1.0uF

GND

### 5V Charge Pump for LCD

The diagram shows a 5V Charge Pump circuit for an LCD. The input is 3.3V, which is connected to the VIN pin of the MCP1640CT-I/CHY IC (U\$1). The SW pin (1) is connected to the EN pin (3) and the VFB pin (4). The GND pin (2) is connected to the output of the charge pump, which is also connected to the output of the 10uF capacitor (C8). The output is 5V. The circuit also includes a 309k resistor (R9) connected to the SW pin, a 4.7uF capacitor (C1) connected to the EN pin, and a 4.7uH inductor (L1) connected to the SW pin. The output of the charge pump is connected to the output of the 10uF capacitor (C8).

U\$1

3.3V

R3

C1

4.7uF

L1

4.7uH

6

1

3

4

2

5

5V

C8

10uF

R9

309k

R5

976k

MCP1640CT-I/CHY

GND

GND

$R_{top} = R_{bot} * (V_{out} / V_{fb-1})$

ESP32 Wroom

3.3V

3.3V

C3 0.1uF

C5 10uF

GND

GND

R8 10k

RESET

C2 0.1uF

GND

U2

3V3

EN

TXD

RXD

I00

I02

I04

I05

CS0\_V/I05

MISO\_H/I012

SWP/I010

MOSI\_H/I013

SCS/I011

SCK\_H/I014

CS0\_H/I015

SDQ/I017

SDI/I08

SCK\_V/I018

MISO\_V/I019

NC

I021

I022

MOSI\_V/I023

I025

I026

I027

XTAL\_P/I032

XTAL\_N/I033

I034

I035

GND

GND

GND

GND

SENSOR\_VP/I36

SENSOR\_VN/I39

TXD

RXD

I00

SHARP\_VCOM

SHARP\_EXTMODE

SHARP\_MOSI

SHARP\_SCK

SHARP\_CS

PBT\_RIGHT

PBT\_UP

PBT\_LEFT

PBT\_DOWN

PBT\_B

PBT\_A

CRG\_STAT

ADC\_BAT

ESP-WROOM-32

RTC GPIOs: 0,2,4,12-15,25-27,32-39  
 usable by ULP, internal Pullups /Pulldowns  
 ext0 for one pin as wakeup source  
 ext1 for multiple pins as wakeup source  
 only for GPIOs: 32-39?  
 no internal Pullups /Pulldowns

## Joystick and Buttons

The diagram shows a 5-WAY-TACTILE-SWITCH (S1) with five pins: UP, DOWN, LEFT, RIGHT, and CENT. Each pin is connected to a pull-up resistor (10k) and a pull-down resistor (10k). The pull-up resistors are connected to 3.3V and the pull-down resistors are connected to GND. The switch is labeled S1 and the pull-up resistors are labeled R2 and R4.

3.3V

SW1

SW2

EVQQ

EVQQ

10k R2

10k R4

GND

PBT\_A

PBT\_B

PBT\_UP

PBT\_DOWN

PBT\_LEFT

PBT\_RIGHT

PBT\_CENT

UP

DOWN

LEFT

RIGHT

CENT

S1

5-WAY-TACTILE-SWITCH

### LiPo Charger

Charge current:  
 $I_{CHG} = 1000 / R_{PROG}$   
 $1000 / 4k\Omega = 256mA$

STAT	
- High Z	Shutdown
- High Z	No Battery Present
- Low	Constant Voltage
- High	Charge Complete

### Sharp Display Connector

K1  
68711014522

SHARP\_SCK  
SHARP\_MOSI  
SHARP\_CS  
SHARP\_VCOM  
SHARP\_EXTMODE

5V  
C4  
0.1uF  
GND

Maximilian Kern  
09/2019

Pin	Default	Boot	Download
GP100	1	1	0
U0TXD	1	1	x
GP102	0	x	0
GP104	0	x	x
MTD0	1	x	x
GP105	1	1	x

If U0TXD, GP102, GP105 are floating,  
GP100 determines boot mode