FTDI Adapter

U4 — FT231XS

Pins: VCC, VCCIO, 3V3OUT, USBDM, USBDP, RESET, GND, GND | TXD, RXD, RTS, CTS, DTR, DSR, DCD, RI, CBUS0, CBUS1, CBUS2, CBUS3

Signals: RXD, TXD, RTS, DTR

J2 USB-C: VBUS, D+, D-, CC1, CC2, SHLD, GND
VBUS1*2, A6*2, A7*2, A5, B5, SHLD1*8, GND*2

F1 500mA
V_USB, VUSB-RAW
3V3_F
R13 27, R14 27
C11 0.1uF, C12 47pF, C13 47pF
C14 0.1uF, C15 4.7uF, C16 0.1uF
R3 5.1k, R19 5.1k
GND

ESP32 WROOM

U2 — ESP-WROOM-32

3.3V, R8 10k, RESET, C21 4.7uF
3.3V, R9 10k

Pins: 3V3, EN, IO0, IO2, IO4, CS0_V/IO5, MISO_H/IO12, MOSI_H/IO13, SCK_H/IO14, CS0_H/IO15, IO16, IO17, SCK_V/IO18, MISO_V/IO19, NC, IO21, IO22, MOSI_V/IO23, IO25, IO26, IO27, XTAL_P/IO32, XTAL_N/IO33, IO34, IO35, SENSOR_VP/I36, SENSOR_VN/I39

TXD, RXD, IO0, SD_CS, LCD_MISO, LCD_MOSI, LCD_SCK, LCD_CS, LCD_DC, LCD_BL, SD_SCK, SD_MISO, PBT_B, PBT_A, SD_MOSI, I2S_DOUT, I2S_LRCLK, I2S_BCLK, JACK_SENS, VBAT_SENS, PBT_C, INT_ENC_B, PBT_ENC, INT_ENC_A

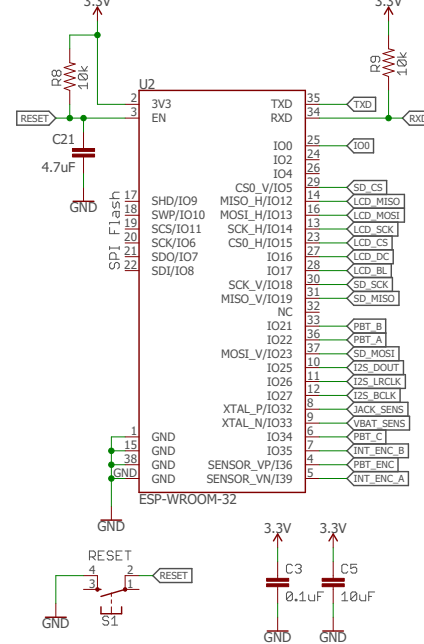SHD/IO9, SWP/IO10, SCS/IO11, SCK/IO6, SDO/IO7, SDI/IO8 (SPI Flash)
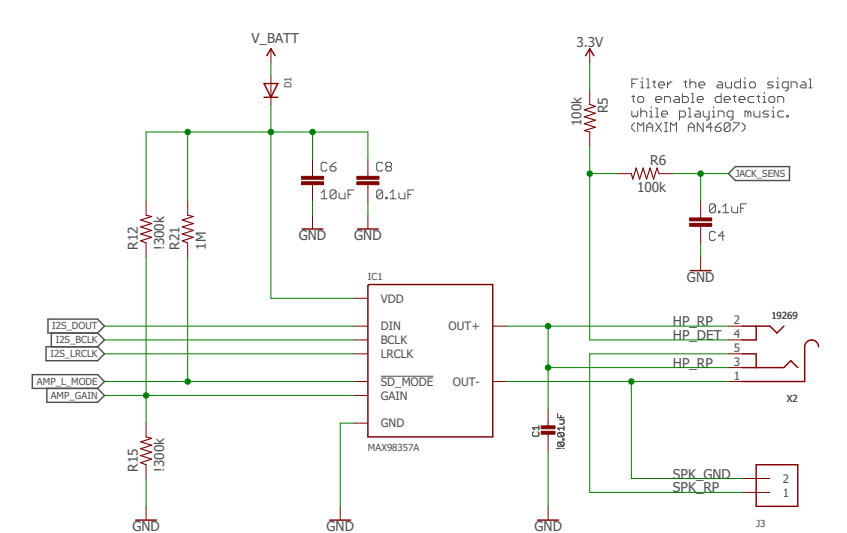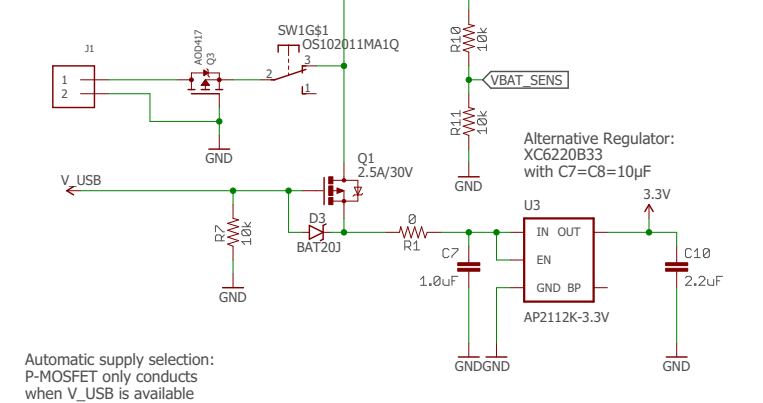
GND
RESET S1
3.3V C3 0.1uF, 3.3V C5 10uF

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
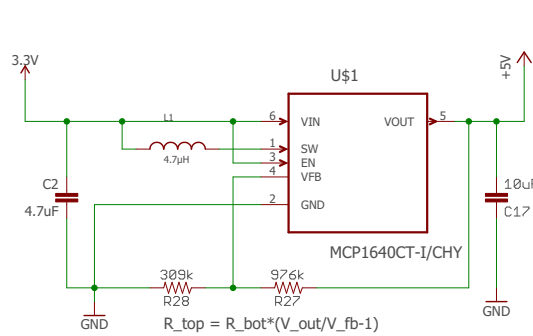only for GPIOs: 32-39?
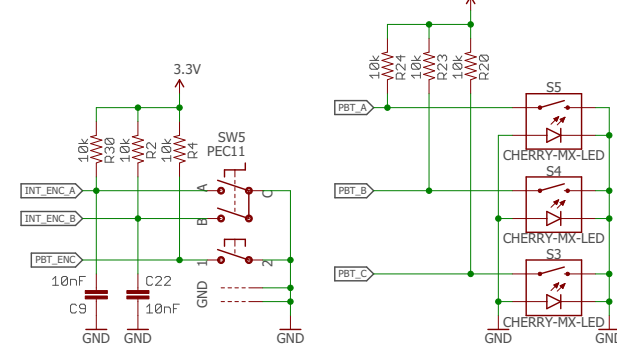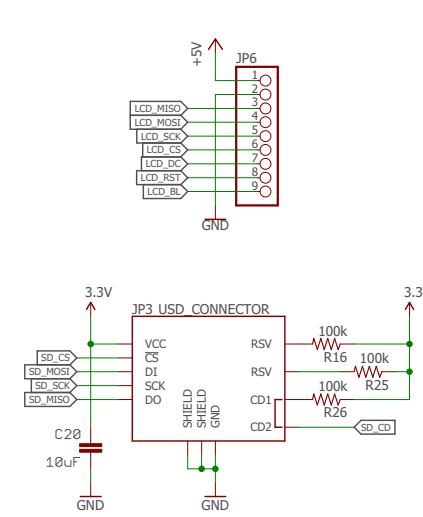no internal Pullups /Pulldowns

Audio Output Stage

V_BATT, D1
C6 10uF, C8 0.1uF
3.3V, R5 100k
R6 100k, JACK_SENS
C4 0.1uF
Filter the audio signal to enable detection while playing music. (MAXIM AN4607)

IC1 — MAX98357A
VDD, DIN, BCLK, LRCLK, SD_MODE, GAIN, GND | OUT+, OUT-
R12 !300k, R21 1M
I2S_DOUT, I2S_BCLK, I2S_LRCLK
AMP_L_MODE, AMP_GAIN
R15 !300k

HP_RP, HP_DET, HP_RP 19269 X2
C1 !0.01uF
SPK_GND, SPK_RP J3

Power Supply

J1 (1, 2)
Q3 AOD417
SW1G$1 OS102011MA1Q
V_BATT
R10 10k, VBAT_SENS
R11 10k
Q1 2.5A/30V
V_USB
R7 10k
D3 BAT20J
R1 0
C7 1.0uF
U3 — AP2112K-3.3V: IN, OUT, EN, GND, BP
3.3V, C10 2.2uF

Alternative Regulator:
XC6220B33
with C7=C8=10µF

Automatic supply selection:
P-MOSFET only conducts
when V_USB is available

LCD Charge Pump

3.3V
U$1 — MCP1640CT-I/CHY
L1 4.7µH
C2 4.7uF
VIN, SW, EN, VFB, GND | VOUT
+5V
C17 10uF
R28 309k, R27 976k
GND
R_top = R_bot*(V_out/V_fb-1)

Encoder and Buttons

3.3V
R30 10k, R2 10k, R4 10k
SW5 PEC11: A, B, C
INT_ENC_A, INT_ENC_B, PBT_ENC
C9 10nF, C22 10nF
3.3V
R24 10k, R23 10k, R20 10k
PBT_A, PBT_B, PBT_C
S5, S4, S3 CHERRY-MX-LED

LCD / uSD Connectors

+5V JP6 (1-9)
LCD_MISO, LCD_MOSI, LCD_SCK, LCD_CS, LCD_DC, LCD_RST, LCD_BL
GND

3.3V JP3 USD_CONNECTOR
VCC, CS, DI, SCK, DO, SHIELD, SHIELD, GND | RSV, RSV, CD1, CD2
SD_CS, SD_MOSI, SD_SCK, SD_MISO
R16 100k, R25 100k, R26 100k
SD_CD
C20 10uF
GND

Boot Mode Configuration

Pin	Default	Boot	Download
GPIO0	1	1	0
U0TXD	1	1	×
GPIO2	0	×	0
GPIO4	×	×	×
MTDO	1	×	×
GPIO5	1	×	×

If U0TXD, GPIO2, GPIO5 are floating,
GPIO0 determines boot mode

RESET
Q2Q1 MBT3904DW1T1, R17 10k, DTR
Q2Q2 MBT3904DW1T1, R18 10k, RTS
IO0
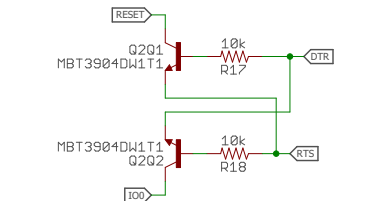
If DTR is LOW, toggling RTS from
HIGH to LOW resets to run mode.
If RTS is HIGH, toggling DTR from
LOW to HIGH resets to bootloader.

Retro Audio Rev2.1
Maximilian Kern
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