

STM32F413H-DISCO

MB1274

Table of contents

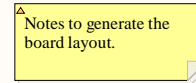
Sheet 1: Project overview (this page)
Sheet 2: Top
Sheet 3: MCU
Sheet 4: PSRAM
Sheet 5: QSPI
Sheet 6: Audio
Sheet 7: LCD
Sheet 8: USB_OTG_FS
Sheet 9: Peripherals
Sheet 10: Arduino_Connectors
Sheet 11: ST-Link/V2-1
Sheet 12: Power

Legend

General comment such as function title, configuration, ...

Text to be added to silkscreen.

Warning text.



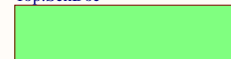
Open Platform License Agreement

The Open Platform License Agreement (“Agreement”) is a binding legal contract between you (“You”) and STMicroelectronics International N.V. (“ST”), a company incorporated under the laws of the Netherlands acting for the purpose of this Agreement through its Swiss branch 39, Chemin du Champ des Filles, 1228 Plan-les-Ouates, Geneva, Switzerland.

By using the enclosed reference designs, schematics, PC board layouts, and documentation, in hardcopy or CAD tool file format (collectively, the “Reference Material”), You are agreeing to be bound by the terms and conditions of this Agreement. Do not use the Reference Material until You have read and agreed to this Agreement terms and conditions. The use of the Reference Material automatically implies the acceptance of the Agreement terms and conditions.

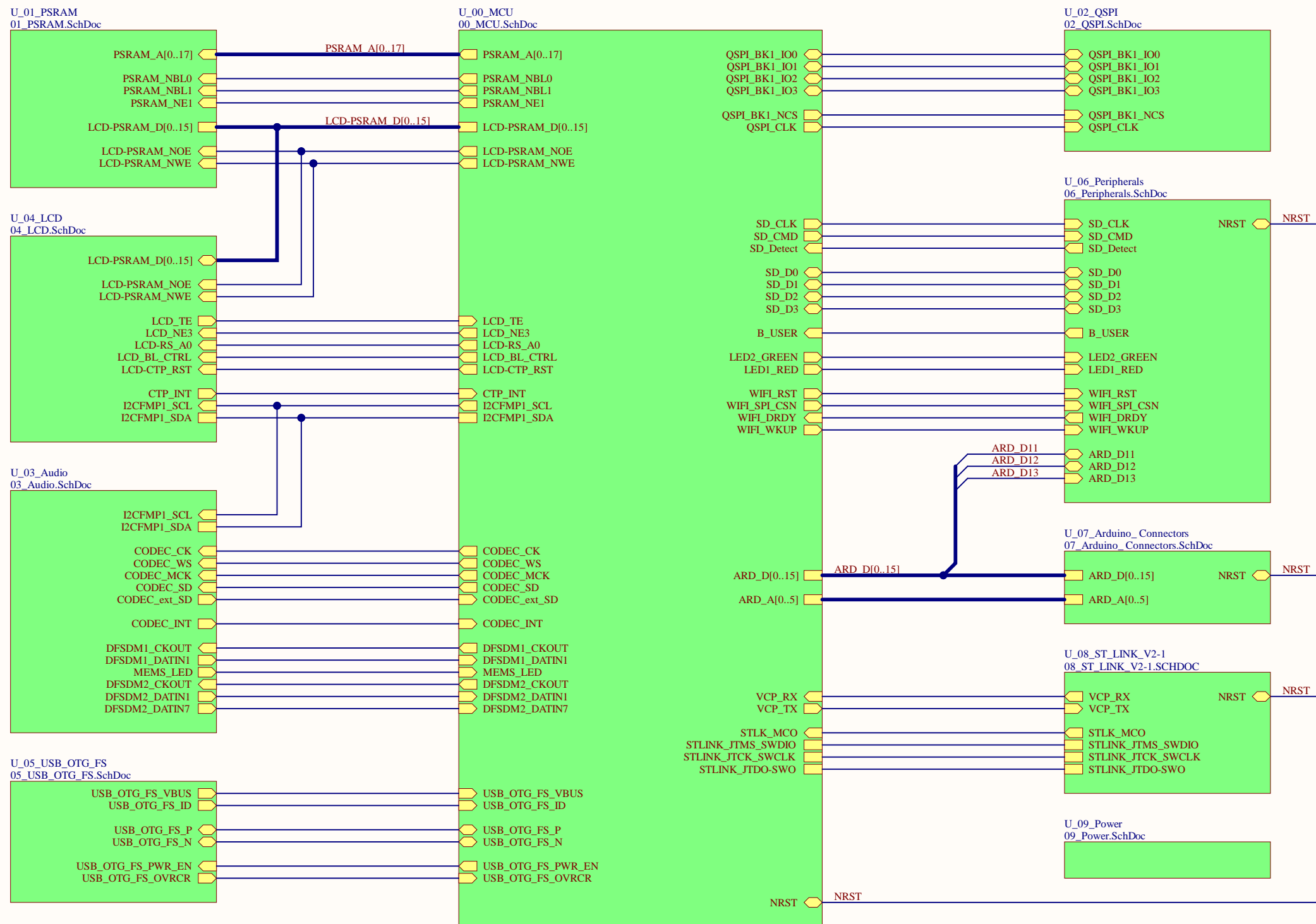
The complete Open Platform License Agreement can be found on www.st.com/opla.

U_Top
Top.SchDoc



Title: Project overview		
Project: STM32F413H-DISCO		
Variant: F413ZHT6		
Revision: E-03		Reference: MB1274
Size: A4	Date: 14/10/2021	Sheet: 1 of 12





HW PART

STICKER BOARD

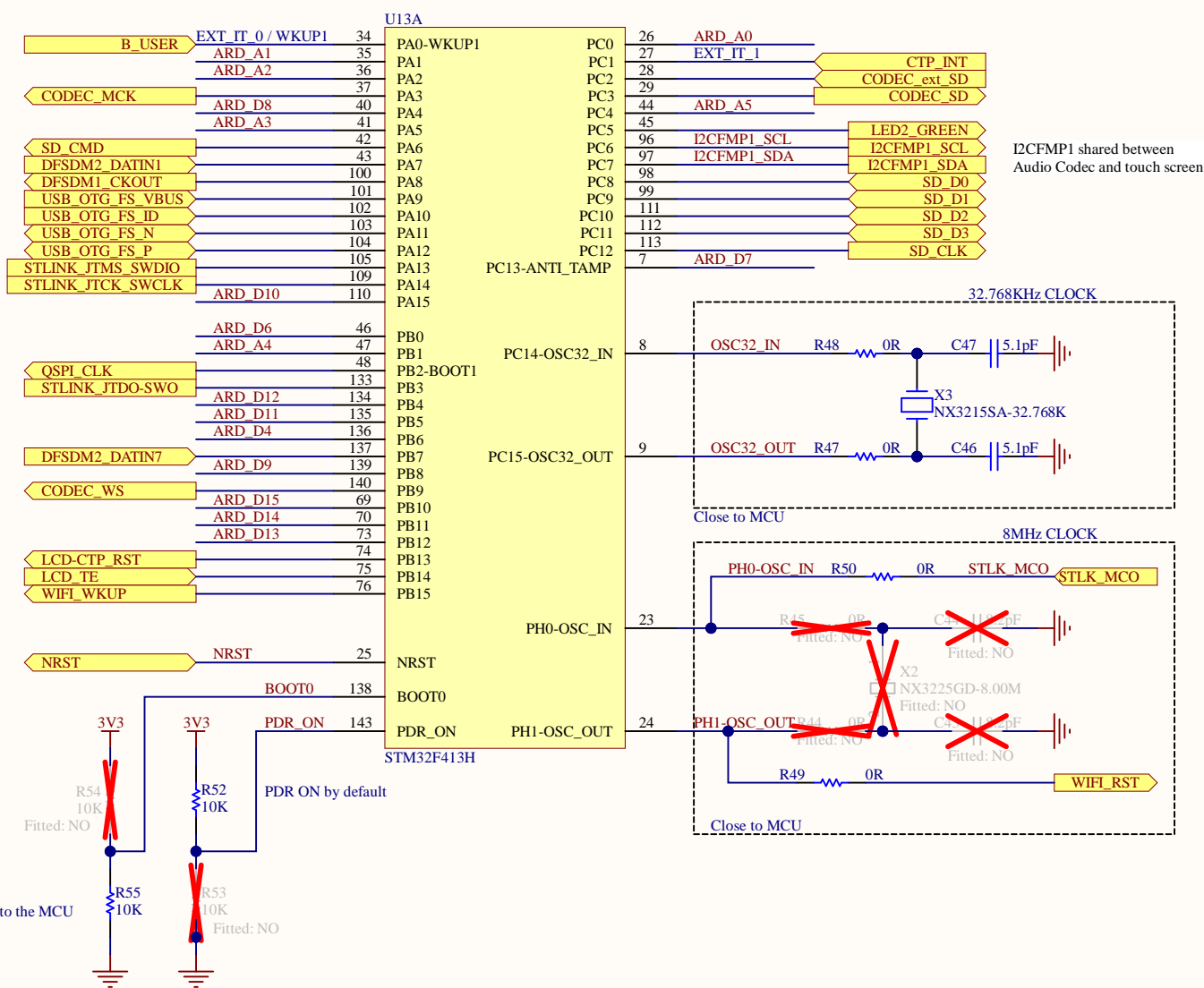
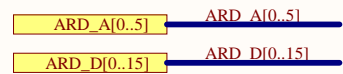
HW1



STICKER PRODUCT

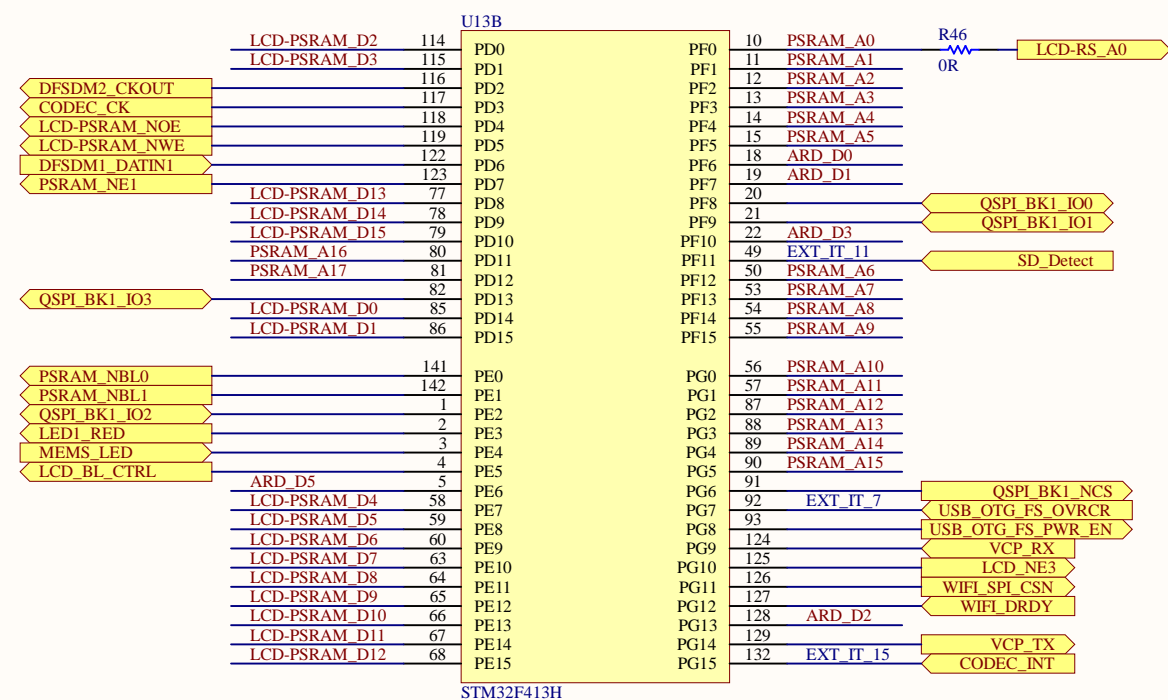
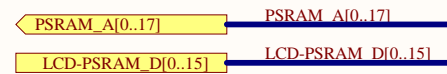
HW2



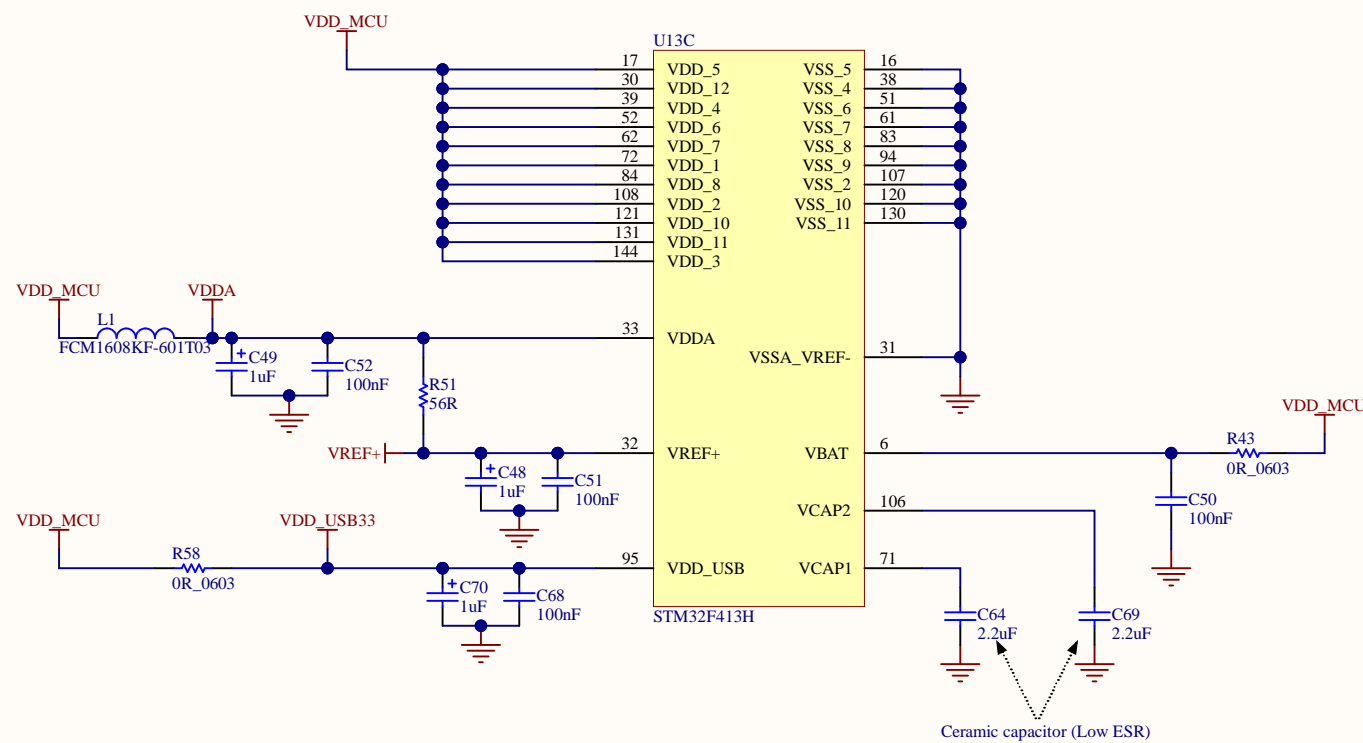


INTERRUPTION SOURCES

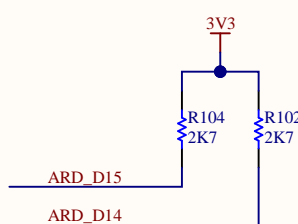
- EXT_IT_0: User Wake-Up Button connected to PA0-WKUP1
- EXT_IT_1: Capacitive Touch Panel: CTP_INT connected to PC1: (WKUP3)
- EXT_IT_6: ARD_INT connected to PB6
- EXT_IT_7: USB Overcurrent: USB_OTG_FS_OVRCCR connected to PG7:
- EXT_IT_11: MicroSD detection: uSD_Detect connected to PF11:
- EXT_IT_12: WIFI DATA RDY connected to PG12
- EXT_IT_14: LCD Tearing Effect: LCD_TE connected to PB14:
- EXT_IT_15: Audio CODEC interruption: CODEC_INT connected to PG15:



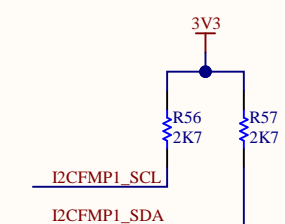
MCU PWR



I2C2_PULL-UP

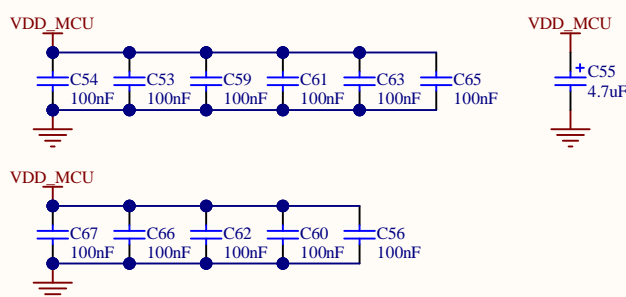


I2CFMP1_PULL-UP



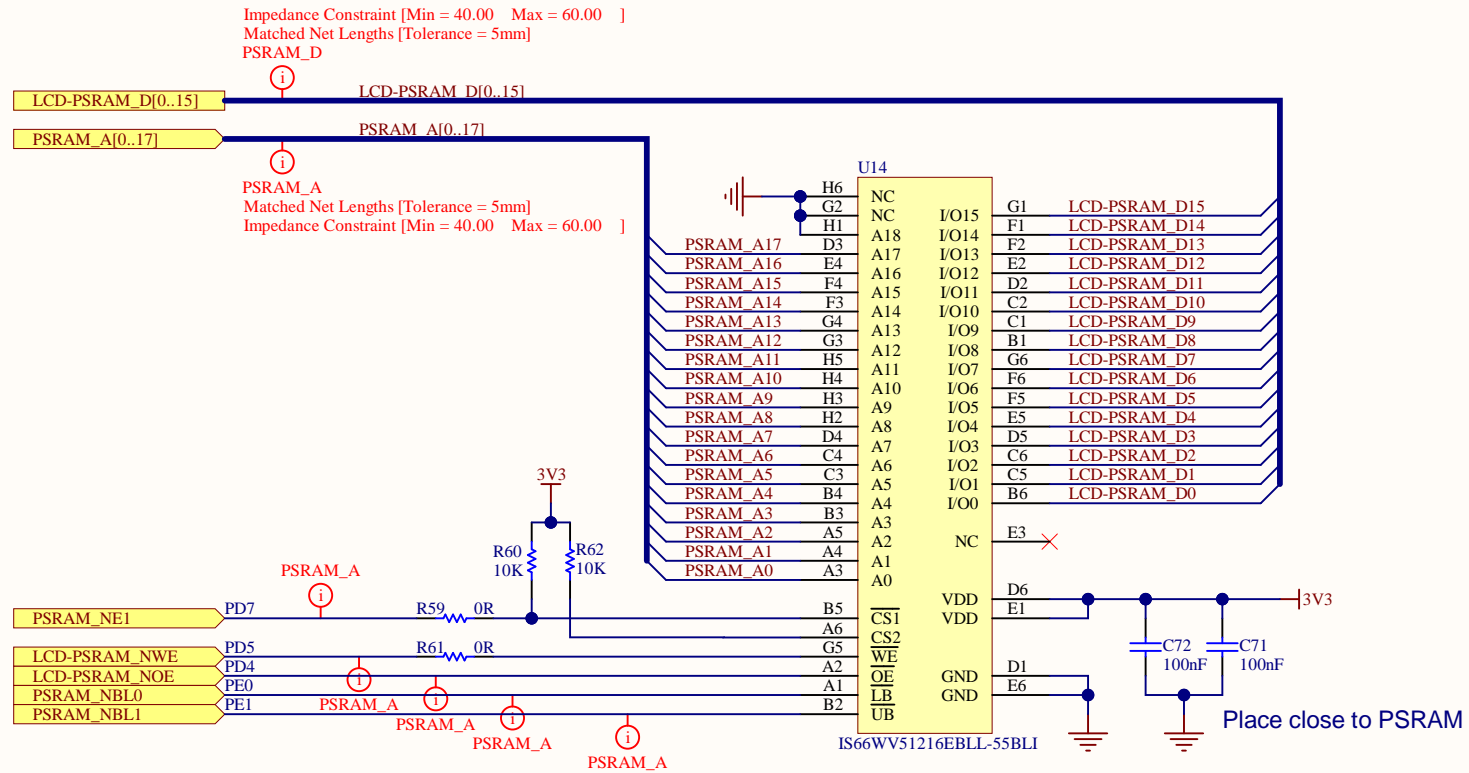
DECOUPLING CAPACITORS

One 100nF placed close to each VDD_x pin of MCU

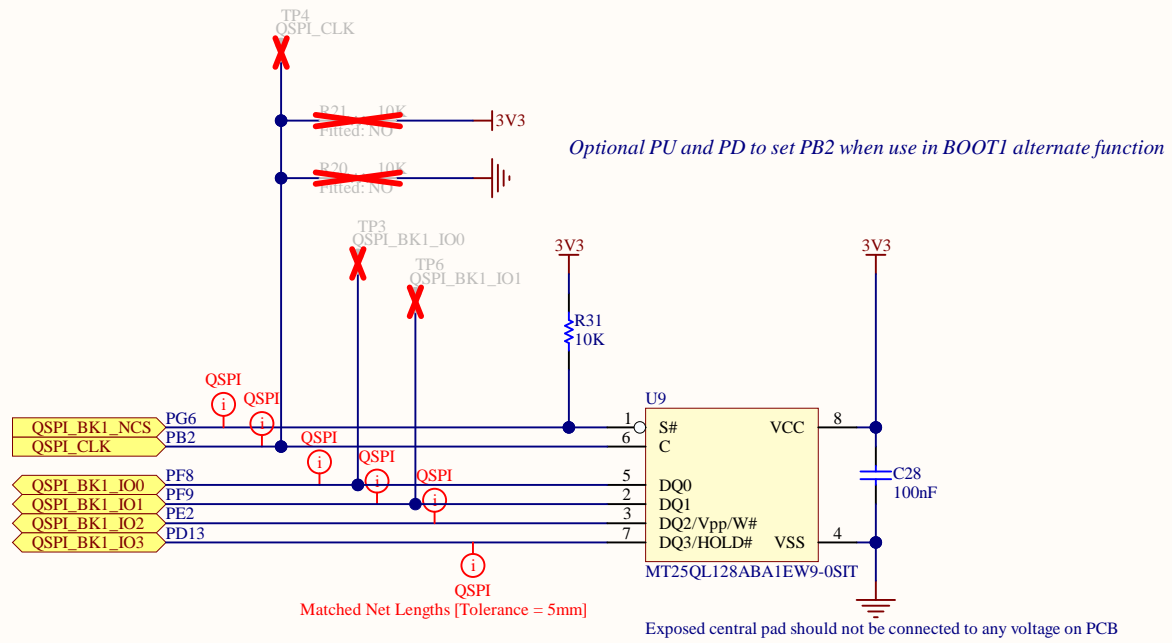


PSRAM

PSRAM Data, NWE & NOE shared with LCD



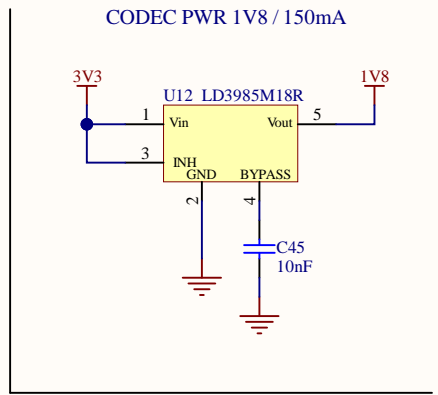
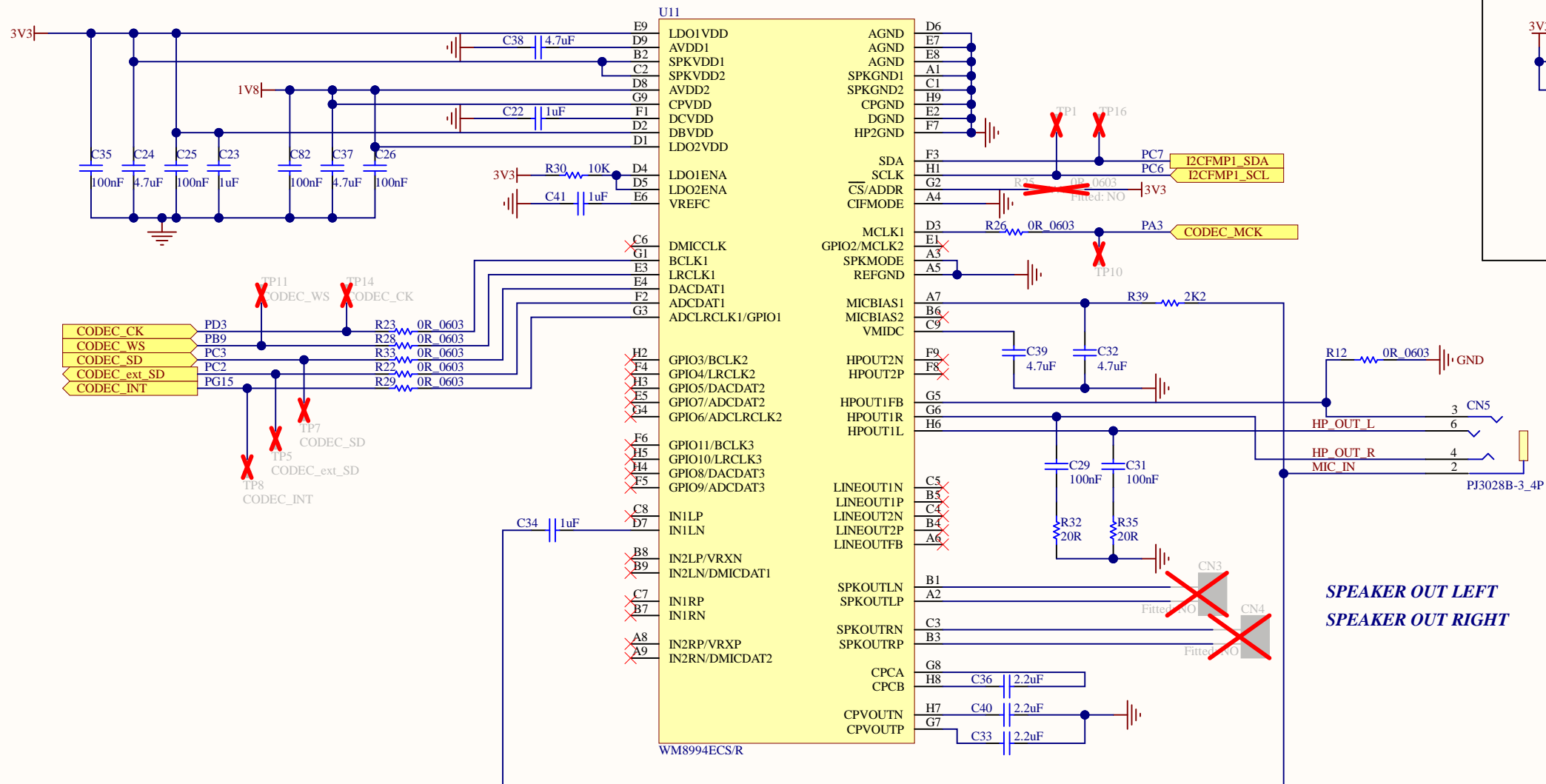
QSPI



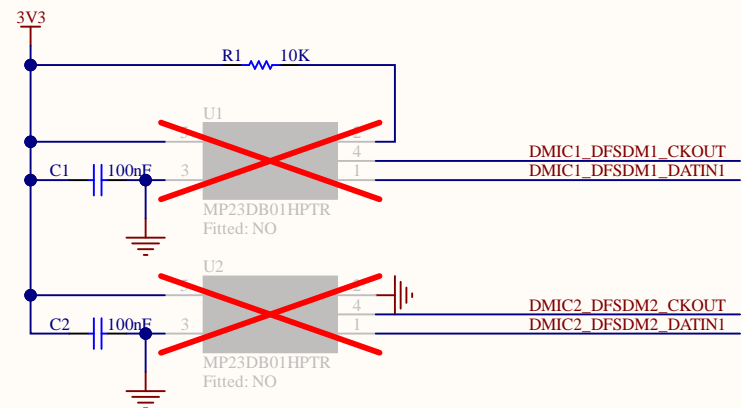
CODEC WOLFSON

WM8994 I2C Address : 0011 0100

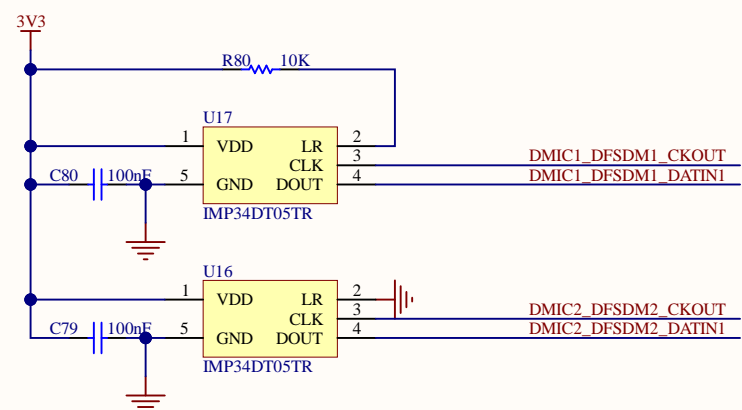
Operating range: 1.62<VDD<3.6V



MEMS

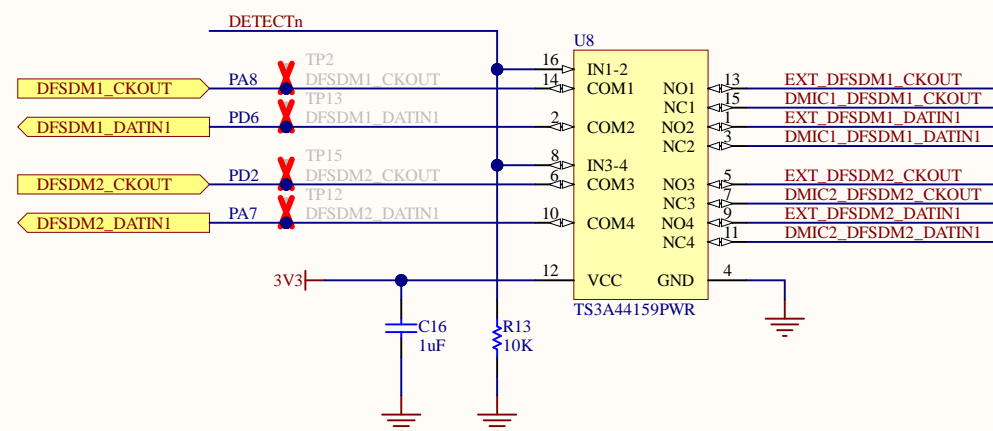


21mm distance between a pair of microphones



21mm distance between a pair of microphones

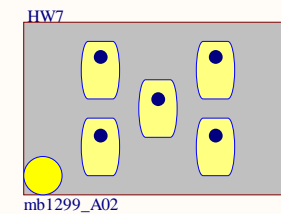
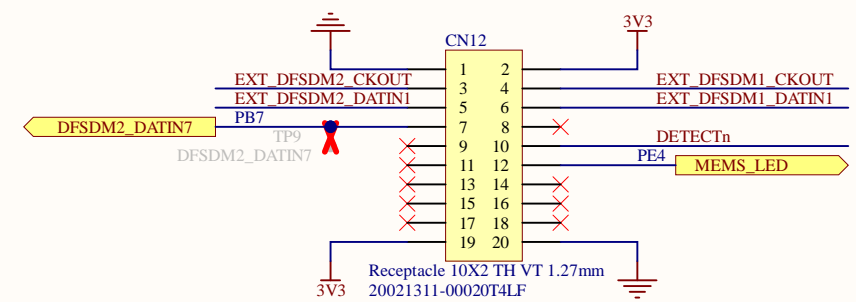
Microphone switch



NC = Normally Closed / NO Normally Open

IN = L => COM TO NC / NC TO COM (NO OFF)
IN = H => COM TO NO / NO TO COM (NC OFF)

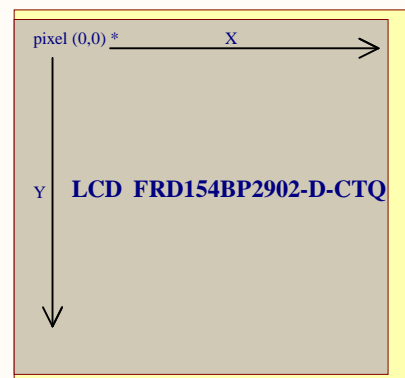
Extension microphones module



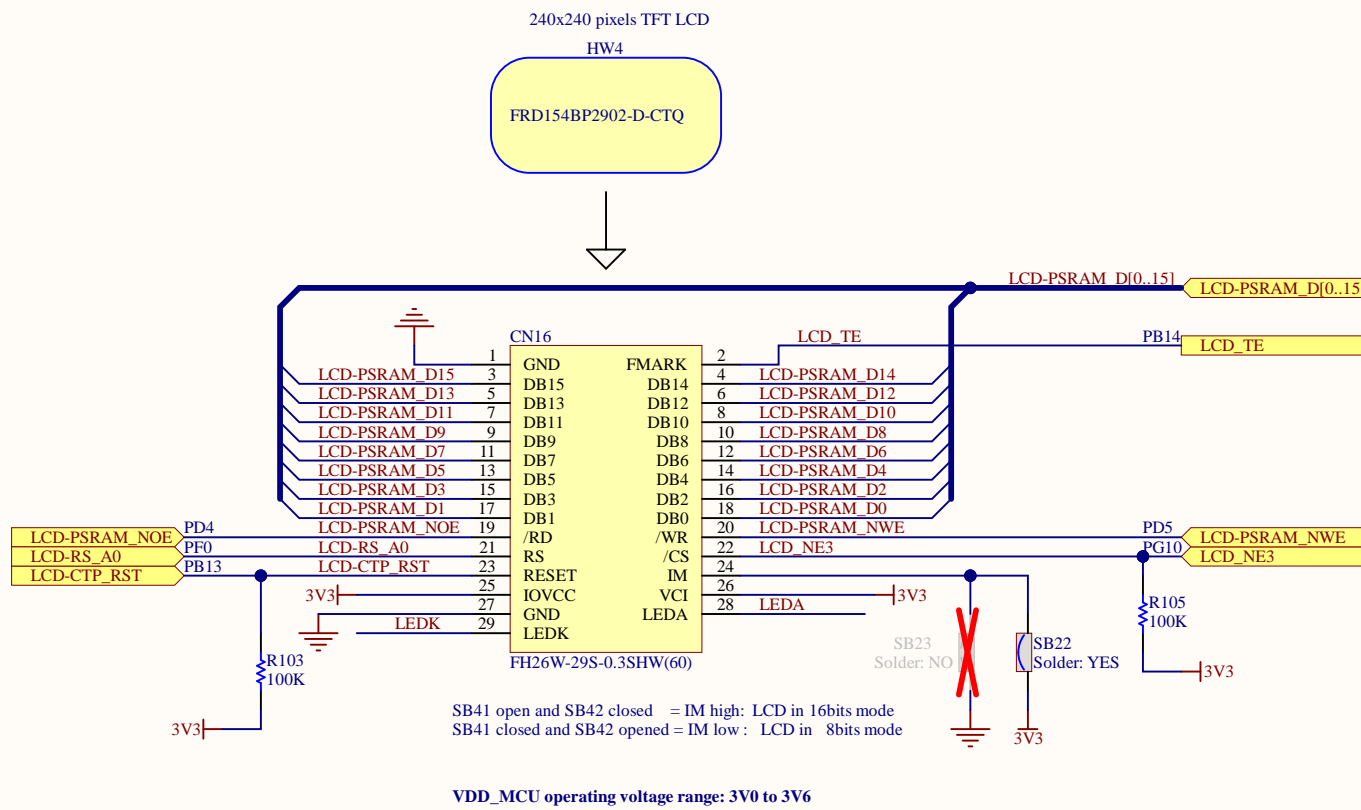
Receptacle connector pin 1 connected to header connector pin 2



Top side: layout of CN16

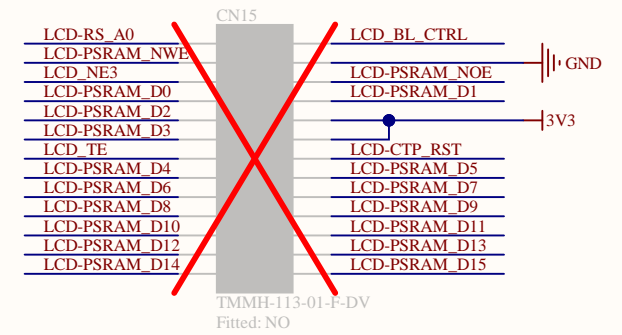


*: standard orientation. Rotations by 90, 180, 270 degrees possible by registers.



SB41 open and SB42 closed = IM high: LCD in 16bits mode
SB41 closed and SB42 opened = IM low : LCD in 8bits mode

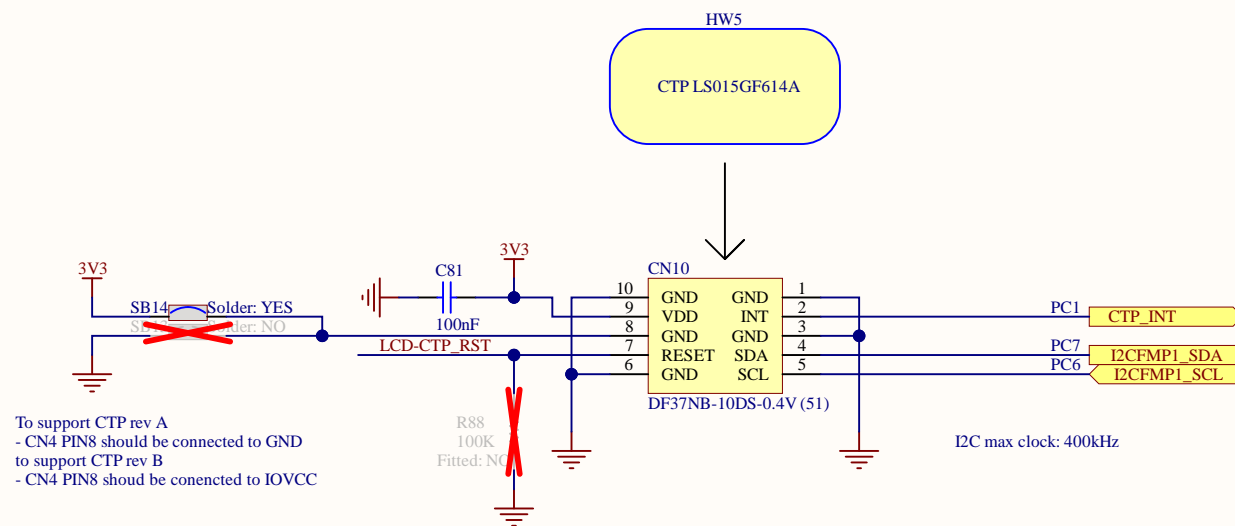
VDD_MCU operating voltage range: 3V0 to 3V6



TMMH-113-01-F-DV
Fitted: NO

Capacitive Touch Panel

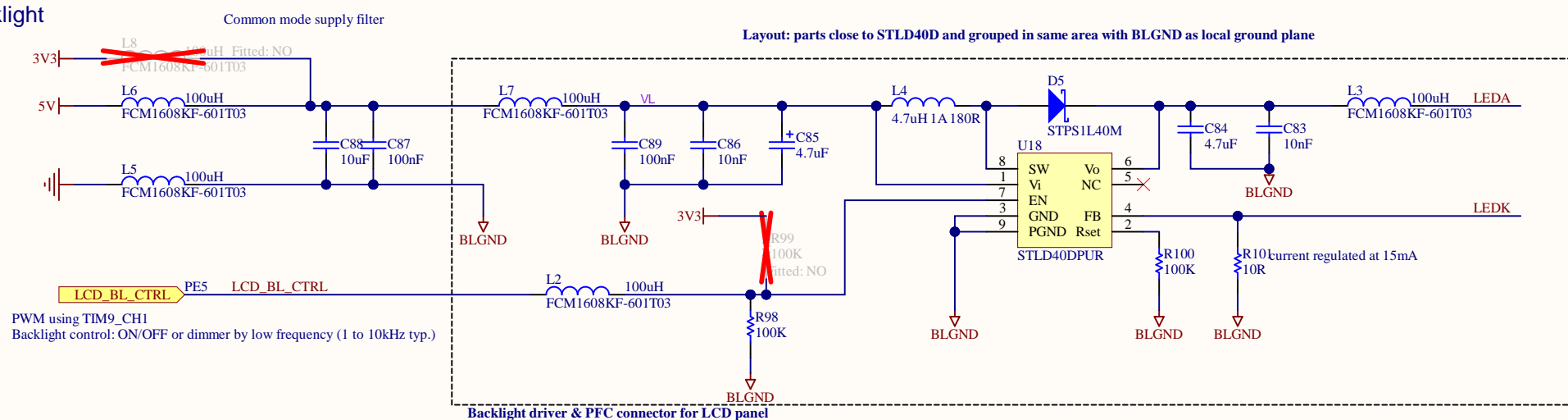
LCD RST and CTP RST share the same PIO for RST. Active LOW



To support CTP rev A
- CN4 PIN8 should be connected to GND
to support CTP rev B
- CN4 PIN8 should be conencted to IOVCC

I2C max clock: 400kHz

LCD Backlight



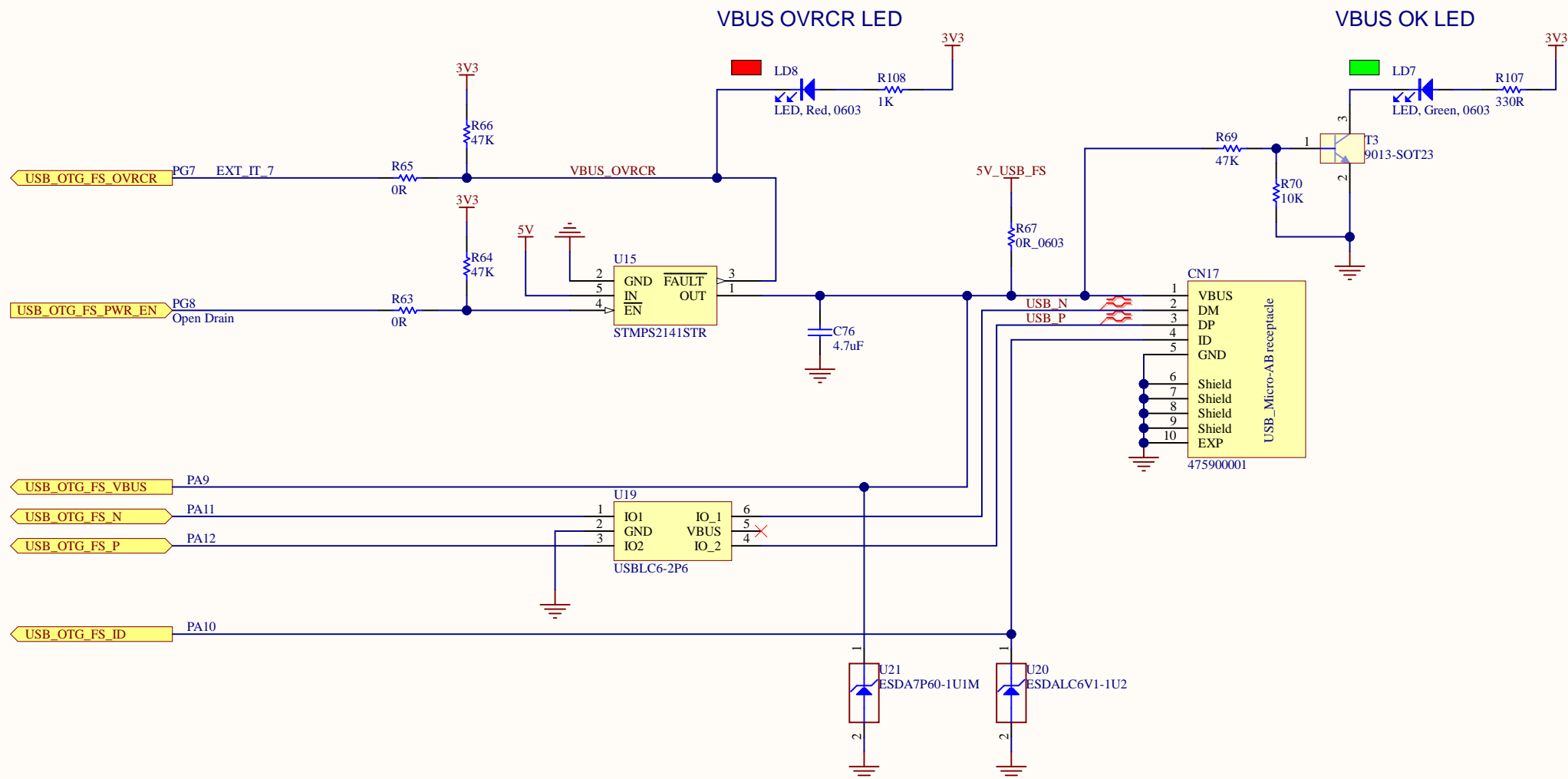
PWM using TIM9_CH1
Backlight control: ON/OFF or dimmer by low frequency (1 to 10kHz typ.)

Backlight driver & PFC connector for LCD panel



USB_OTG_FS

USB Full Speed operating range voltage: $3.0V < VDDUSB < 3.6V$

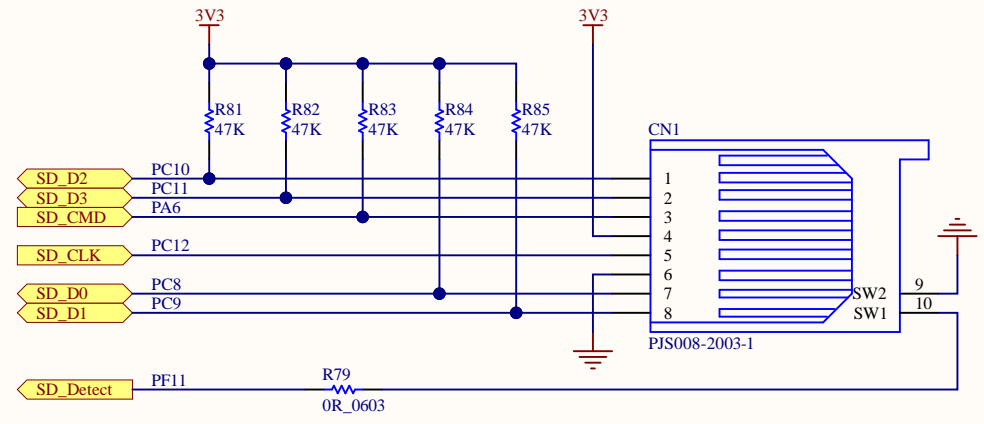


ESD PROTECTION SHOULD BE CLOSE TO THE CONNECTOR

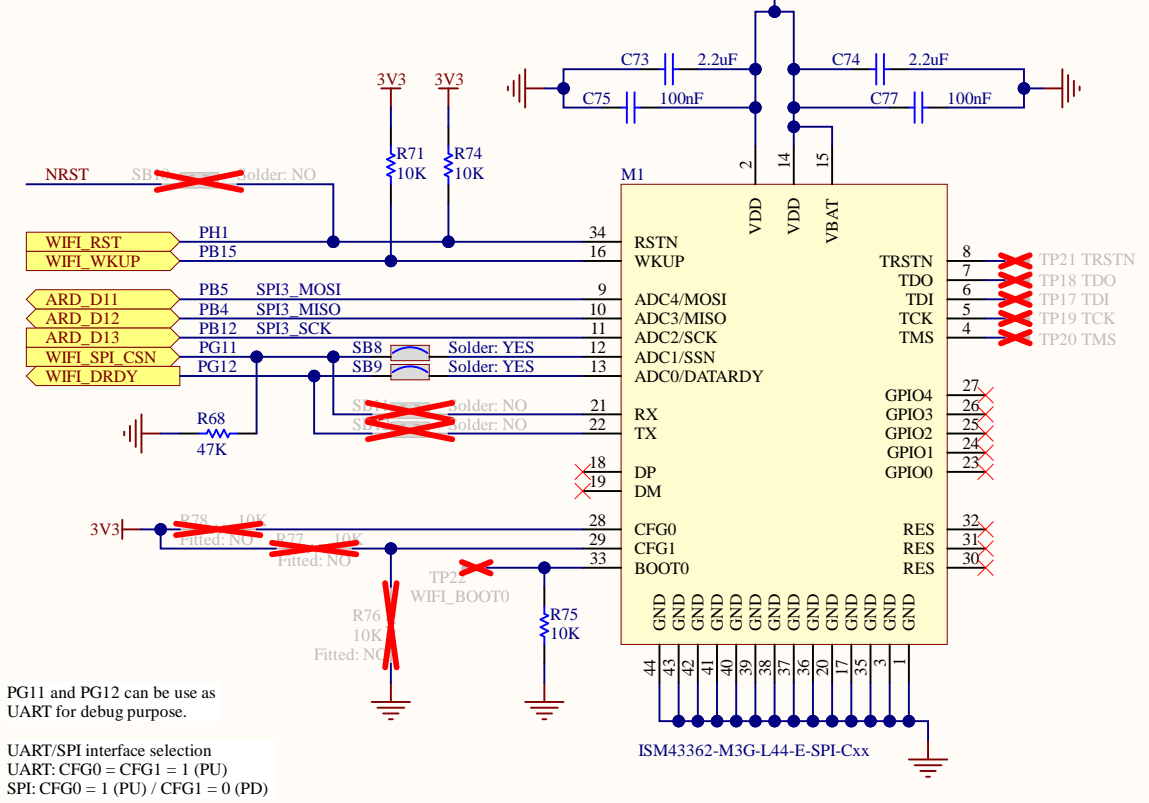


PERIPHERALS

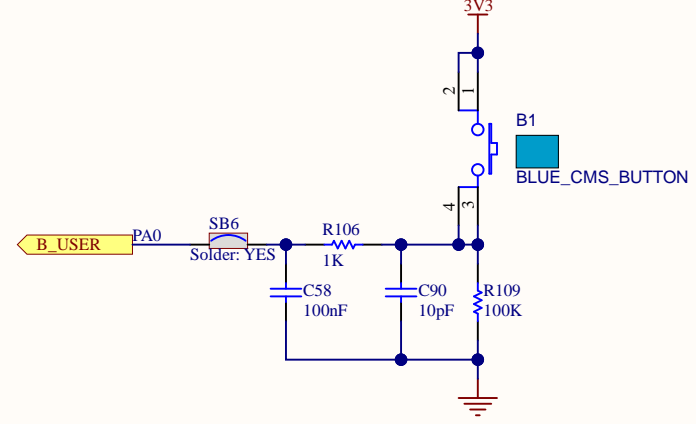
MICRO SD CARD



WIFI MODULE

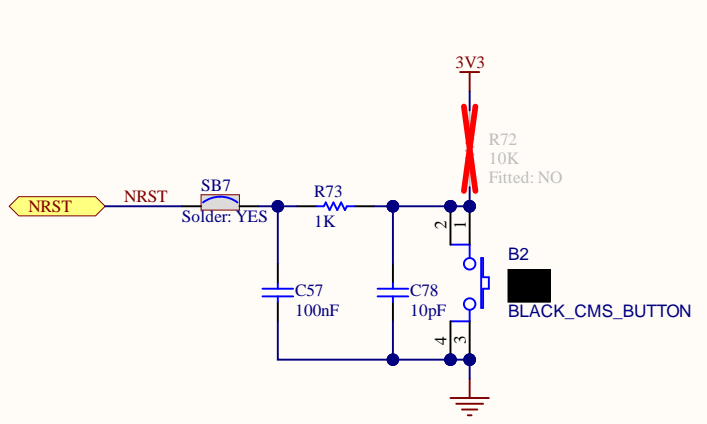


USER WAKE-UP Button



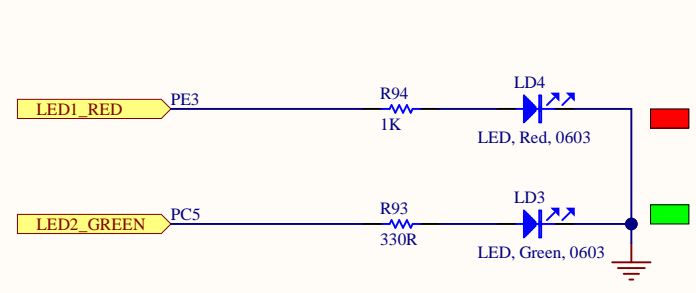
100nF should be place close to the MCU
 10pF and 1K should be place close to the button

RESET BUTTON

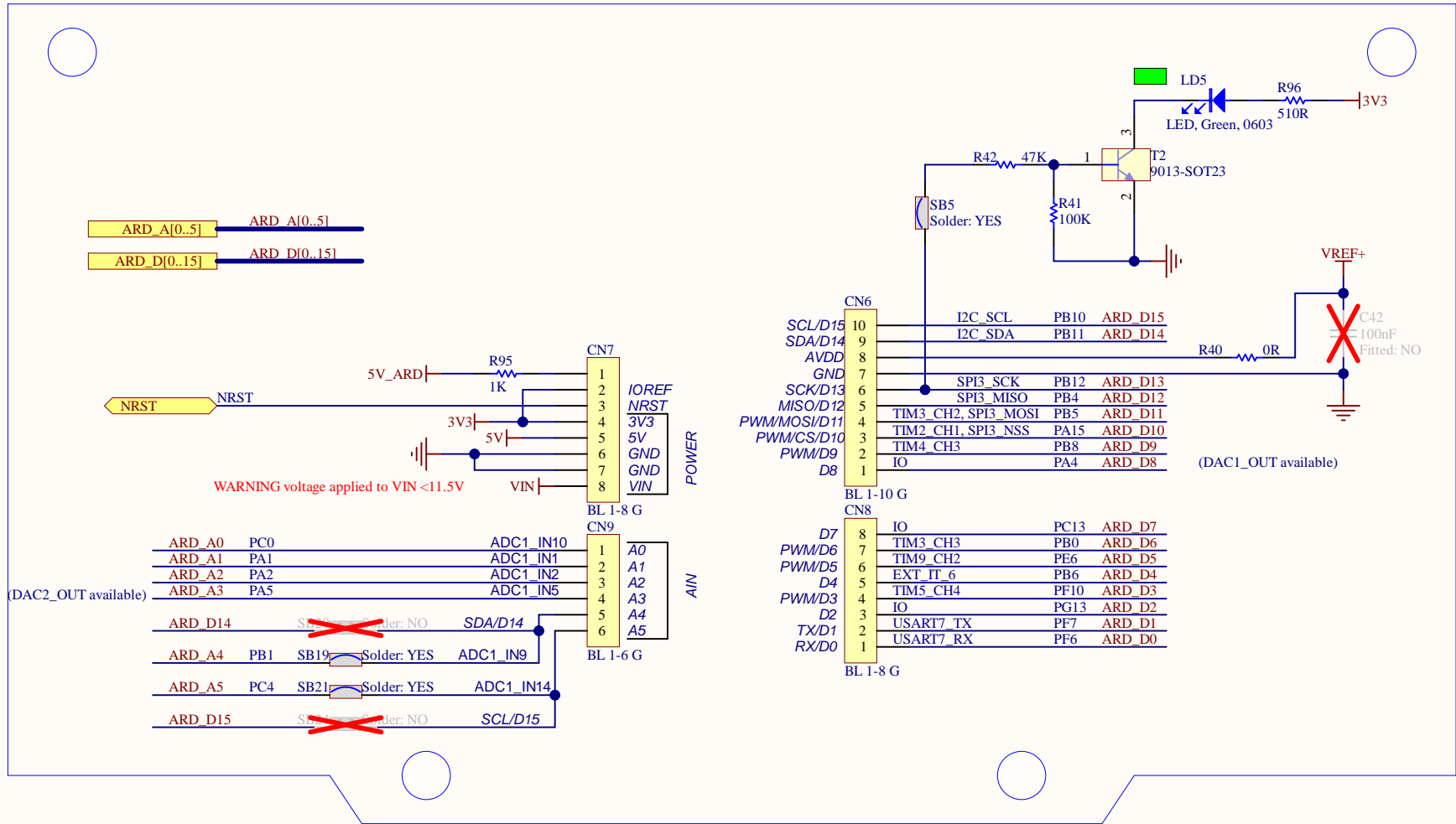


100nF should be place close to the MCU
 10pF and 1K should be place close to the button

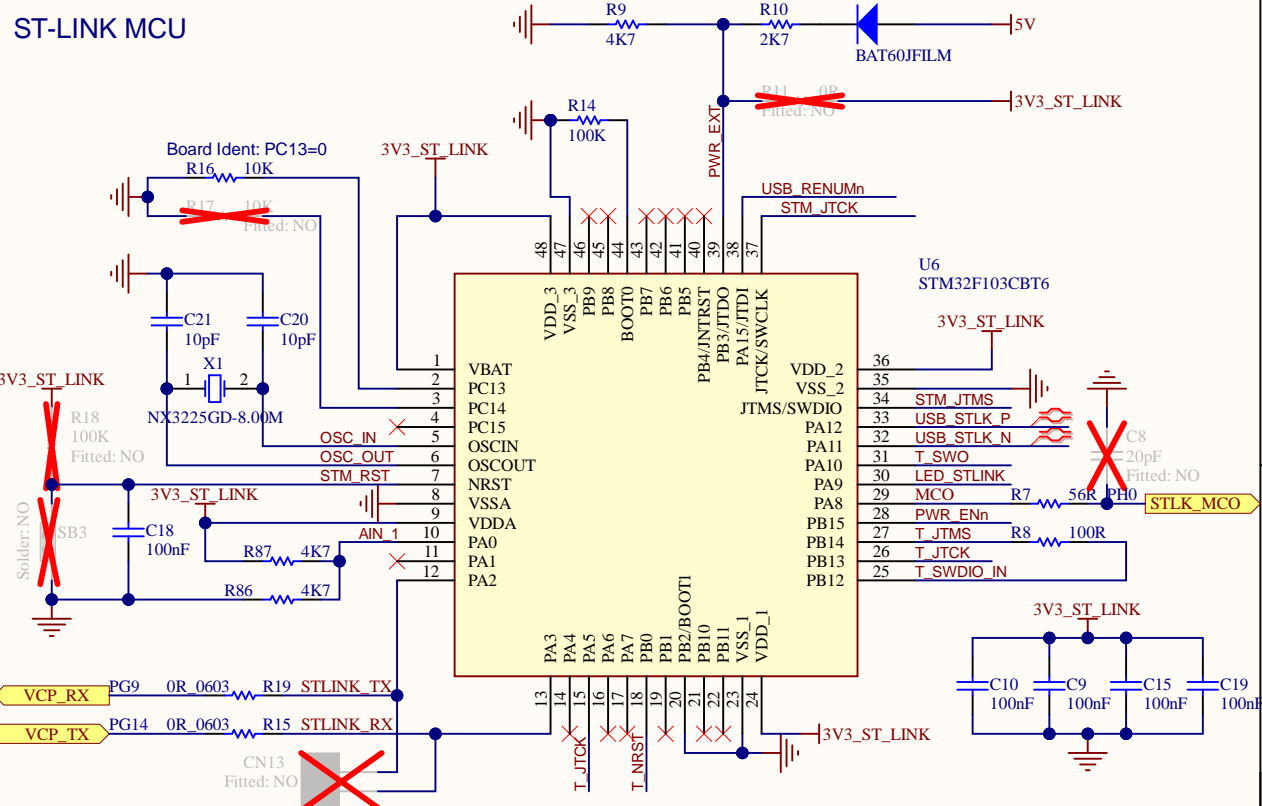
USER LED
 The 2 LEDs are top side



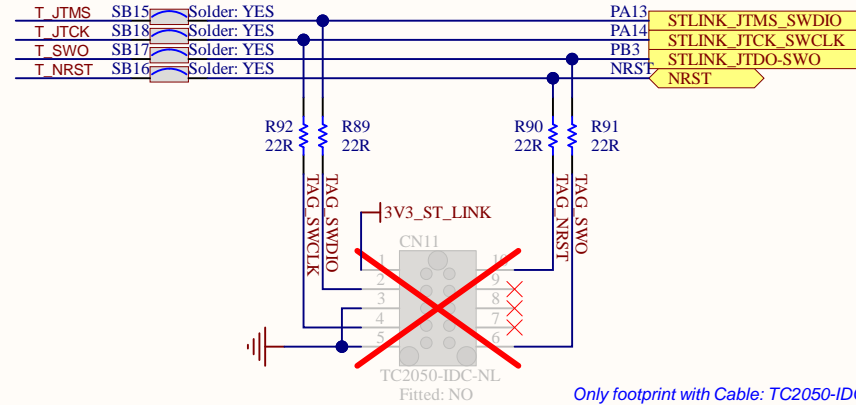
ARDUINO UNO connector



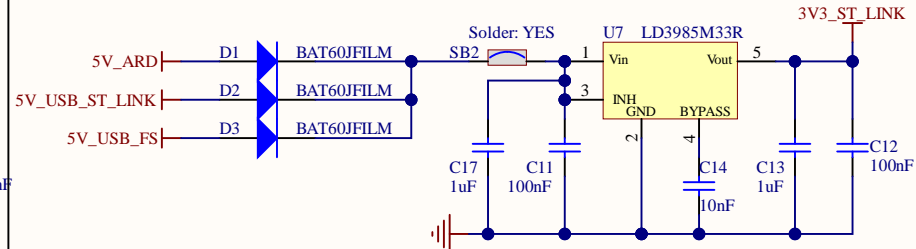
ST-LINK MCU



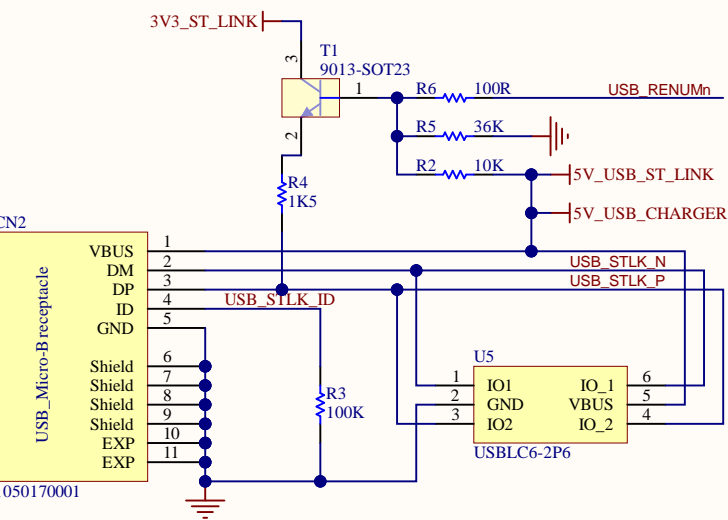
SWD INTERFACE



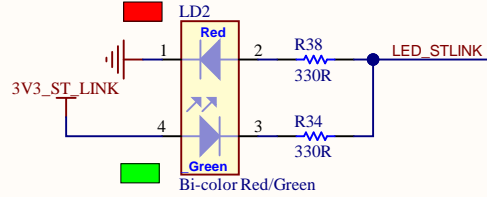
ST-LINK POWER 3V3 / 150mA



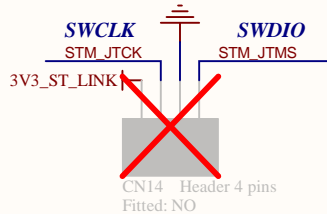
ST-LINK USB CONNECTOR



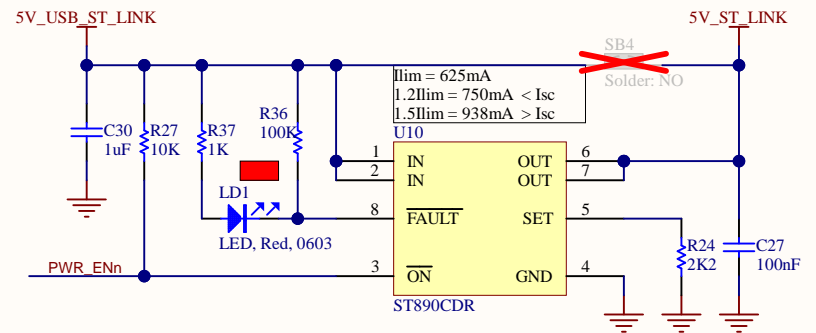
STLINK_LED



ST-LINK DFU



ST LINK USB Power switch 5V / 1.2A

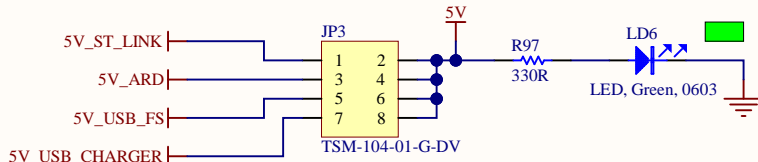


ESD PROTECTION SHOULD BE CLOSE TO THE CONNECTOR

Must be on a border or the PCB.

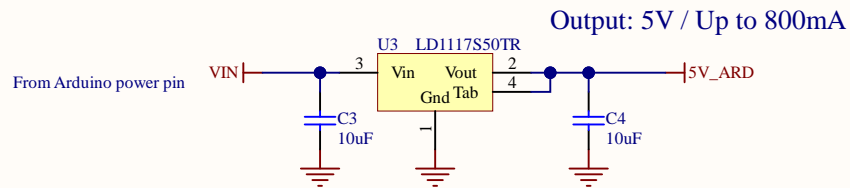


5V PWR SELECTION FROM EXTERNAL SOURCES



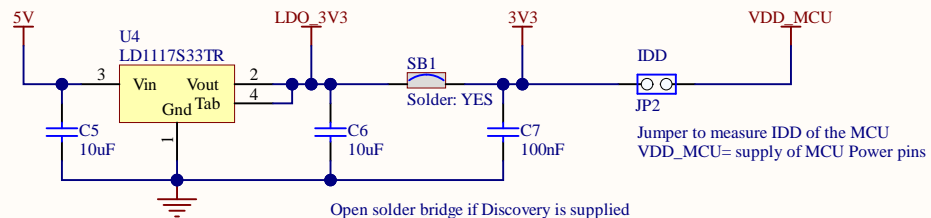
Connect only one jumper to supply the DISCO from one of the external 5V.
If the DK board is connected to an external 220/5V USB Charger, used Jumper on pin 7/8.

5V PWR FROM ARDUINO (VIN < 11.5V)



Output: 5V / Up to 800mA

3V3 PWR

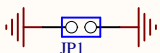


Output: 3V3 / Up to 800mA

Open solder bridge if Discovery is supplied from +3V3 of extension connector



GND PROBE



PWR TREE

