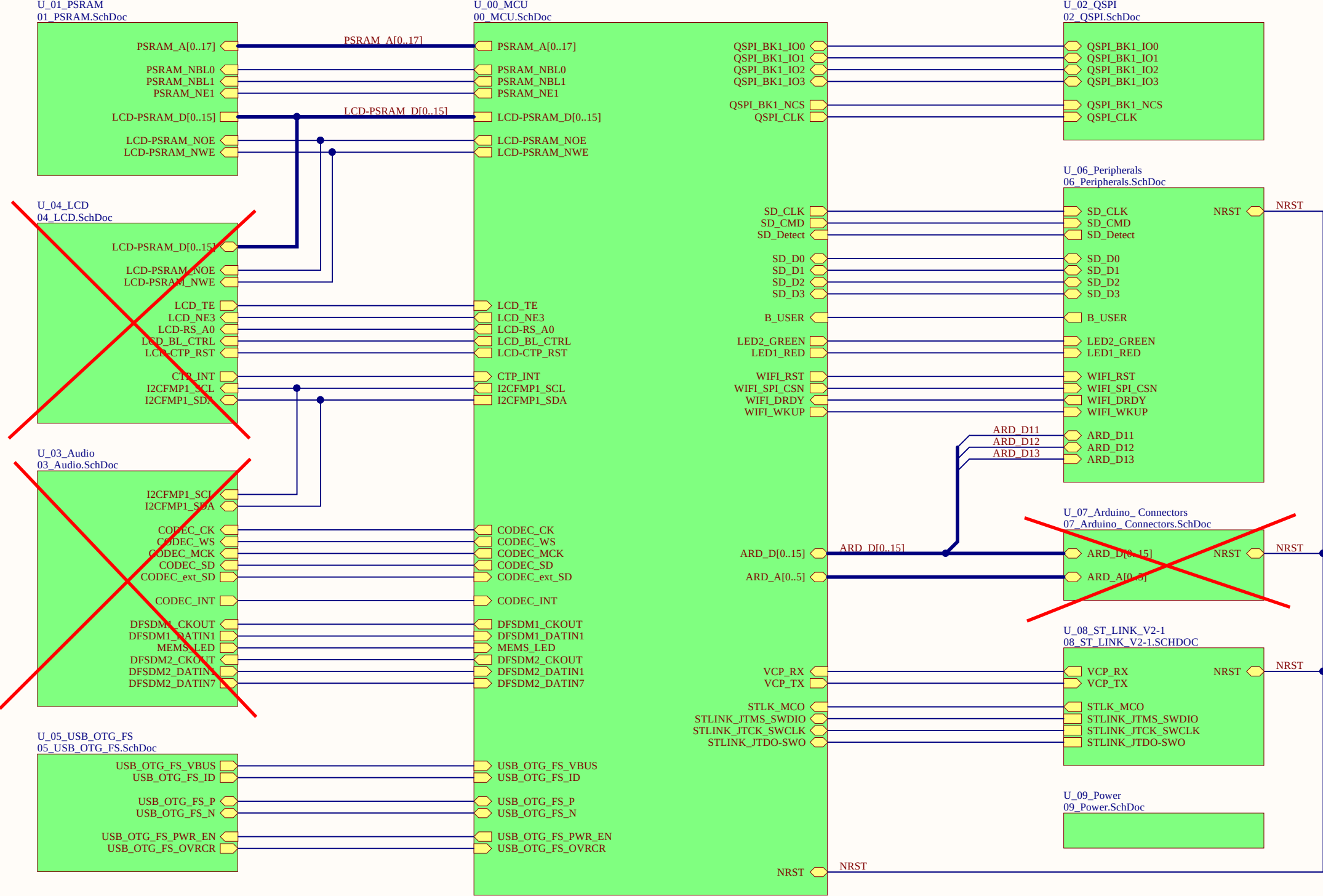


Note: Text in BLUE placed on a wire is not the net name. It just a COMMENT to give more details about the function, or it is the MCU port information.

REVISION E01:  
Released 10 - April- 2017  
- update U21 footprint.  
- Replace R70 from 100K to 10K.  
- Moved CN10 touch screen connector closer to CN16 to 1.5mm.  
- Update CN1 μSD connector footprint to support new reference with positioning holes.

REVISION D01:  
Released 22 - December- 2016  
- Add USB\_VBUS\_ESD protection.



HW PART

HW17

BOARD REF

mb1274E-01 2yyywxxxxx

HW18

ES

HW1

PCB

STM32F413H-DISCO PCB 4L

HW2

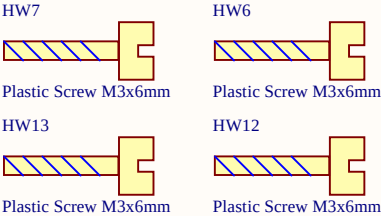
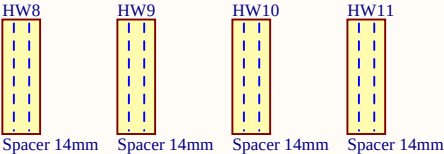
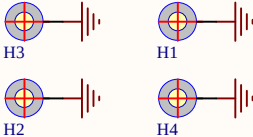
BLISTER

STM32F413H-DISCO BLISTER

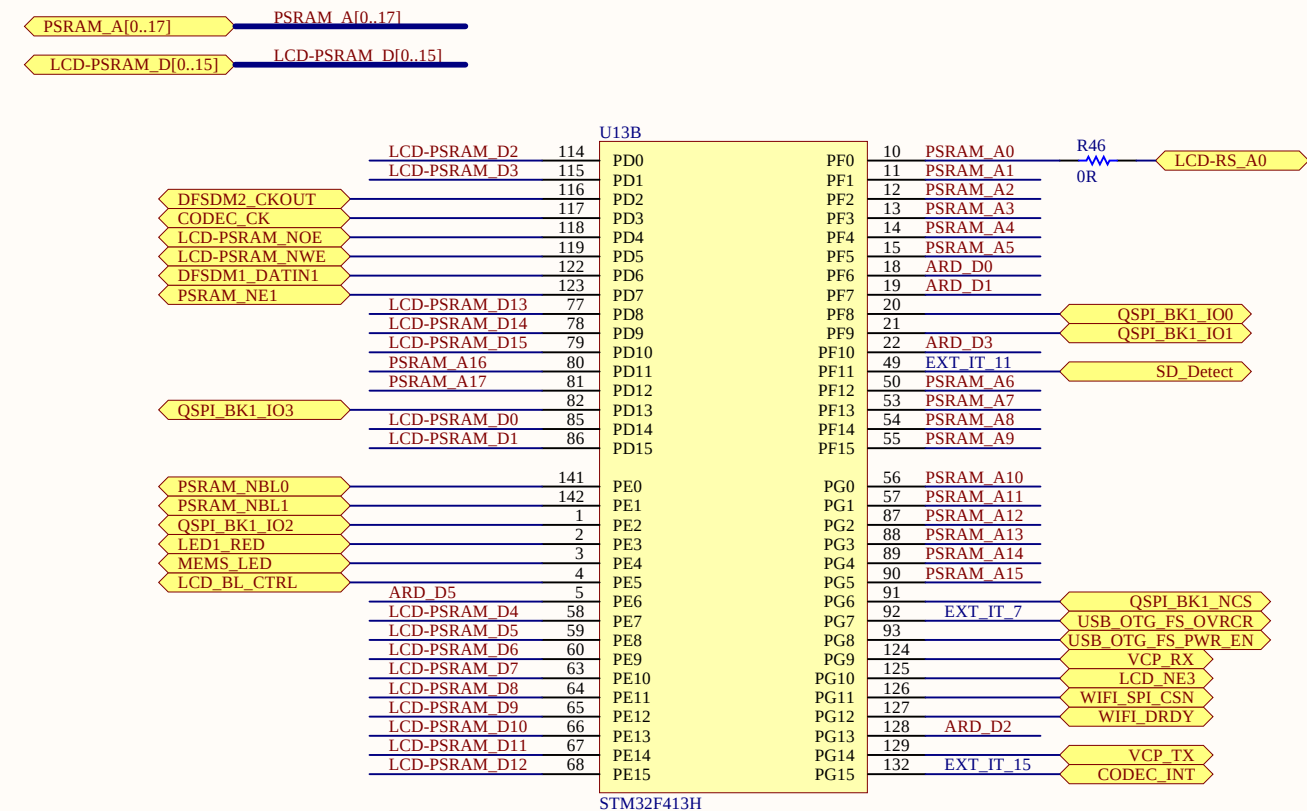
HW3

BLISTER CARD

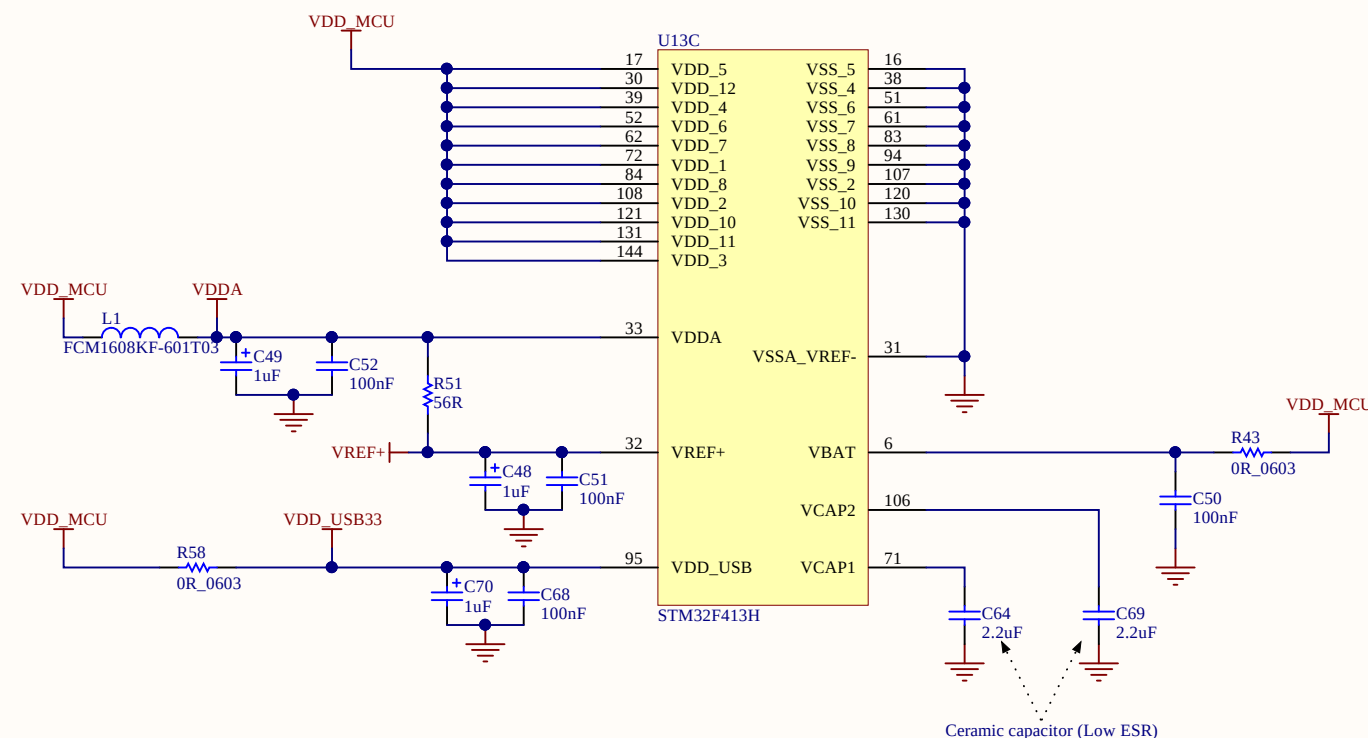
STM32F413H-DISCO BLISTER CARD



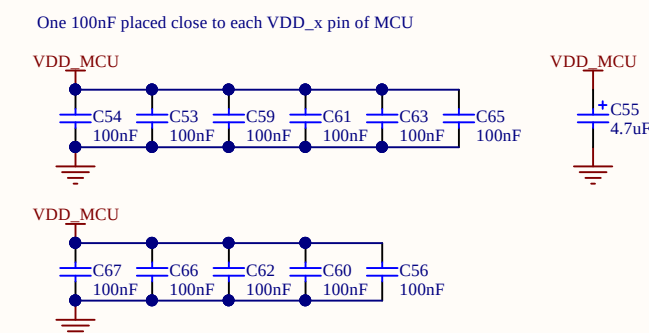
## MCU GPIO BANK D, E, F, G



## MCU PWR



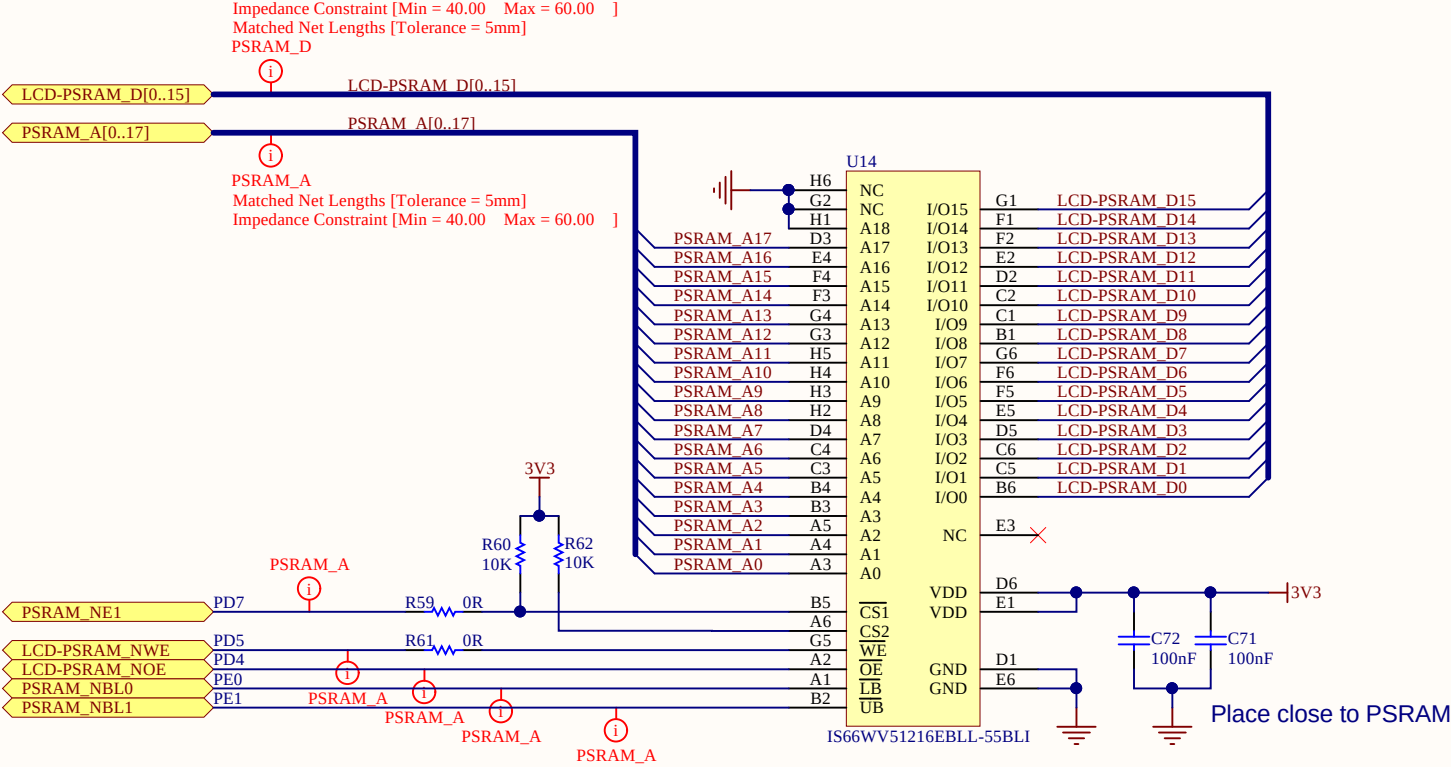
## DECOUPLING CAPACITORS

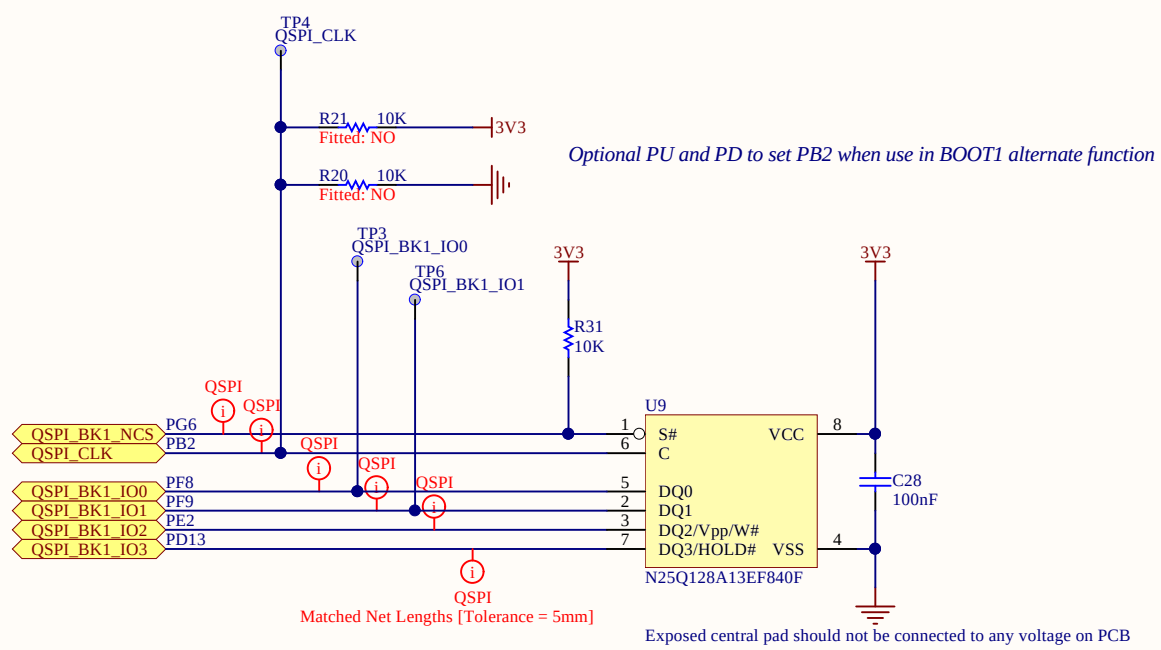


EXT\_IT\_0: User Wake-Up Button connected to PA0-WKUP1  
EXT\_IT\_1: Capacitive Touch Panel: CTP\_INT connected to PC1: (WKUP3)  
EXT\_IT\_6: ARD\_INT connected to PB6  
EXT\_IT\_7: USB Overcurrent: USB\_OTG\_FS\_OVRCCR connected to PG7:  
EXT\_IT\_11: MicroSD detection: uSD\_Detect connected to PF11:  
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:

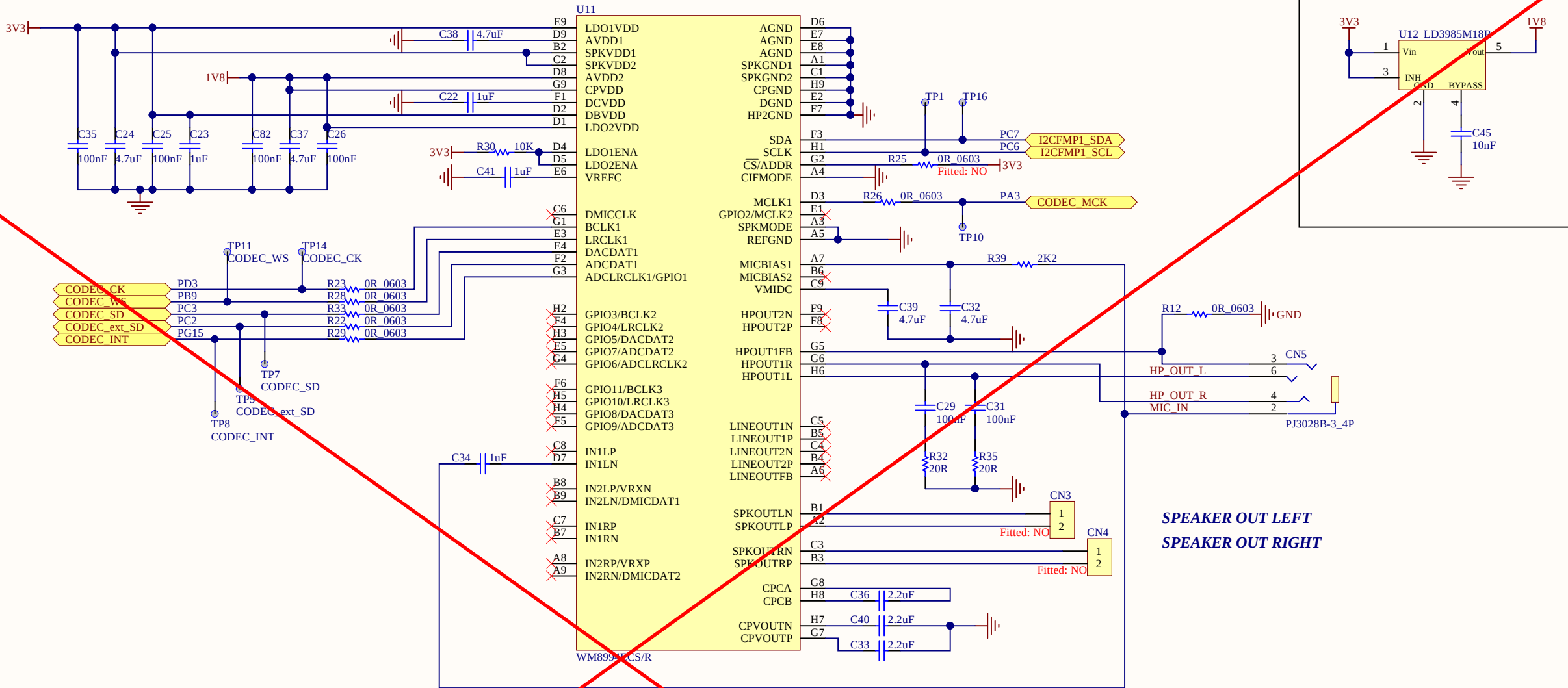
PSRAM

PSRAM Data, NWE & NOE shared with LCD

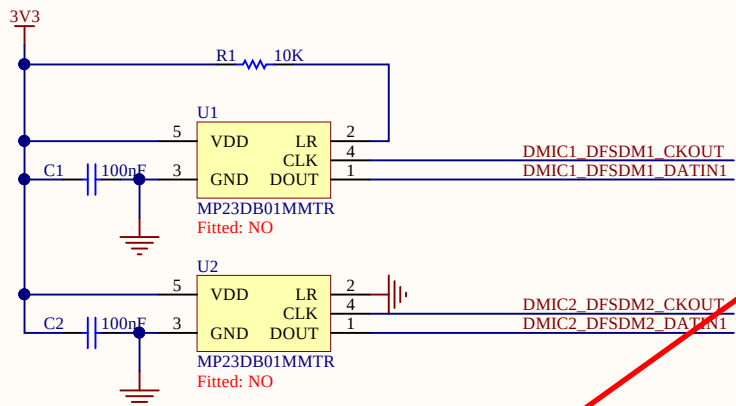




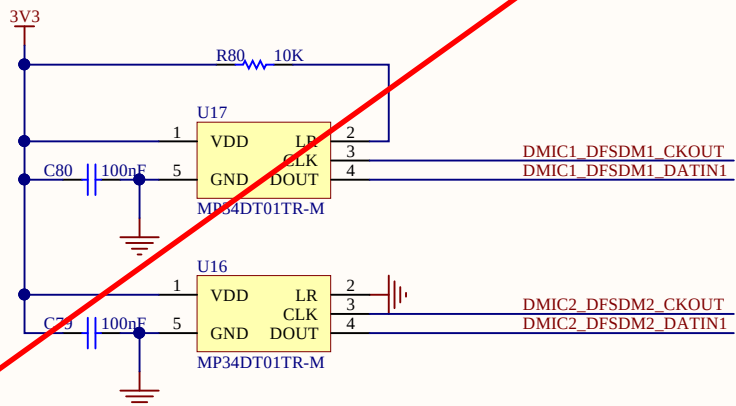
CODEC WOLFSON  
WM8994 I2C Address : 0011 0100  
Operating range: 1.62<VDD<3.6V



MEMS

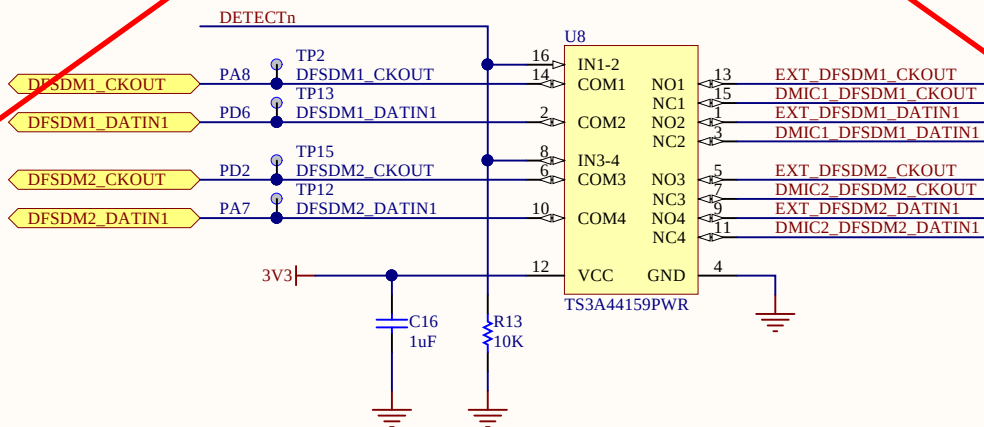


21mm distance between a pair of microphones



21mm distance between a pair of microphones

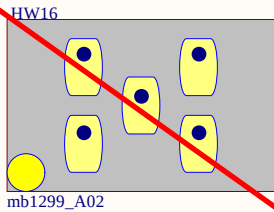
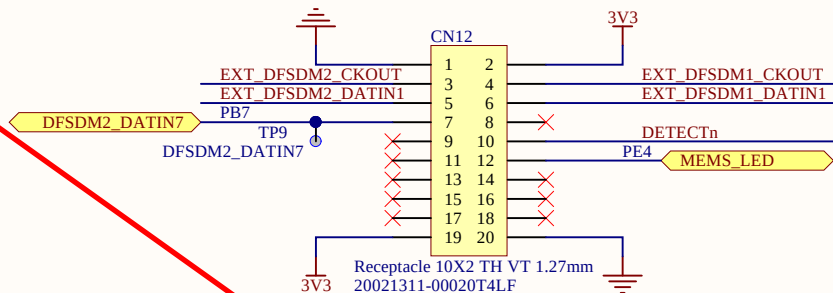
Microphone switch



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)

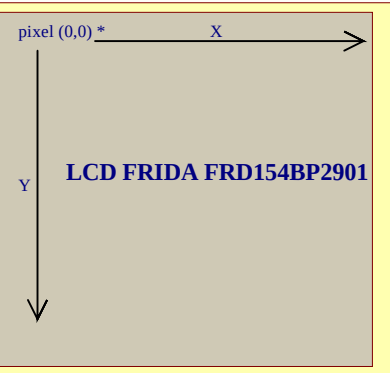
Extension microphones module



Receptacle connector pin 1 connected to header connector pin 2

FRIDA LCD

Top side: layout of CN16

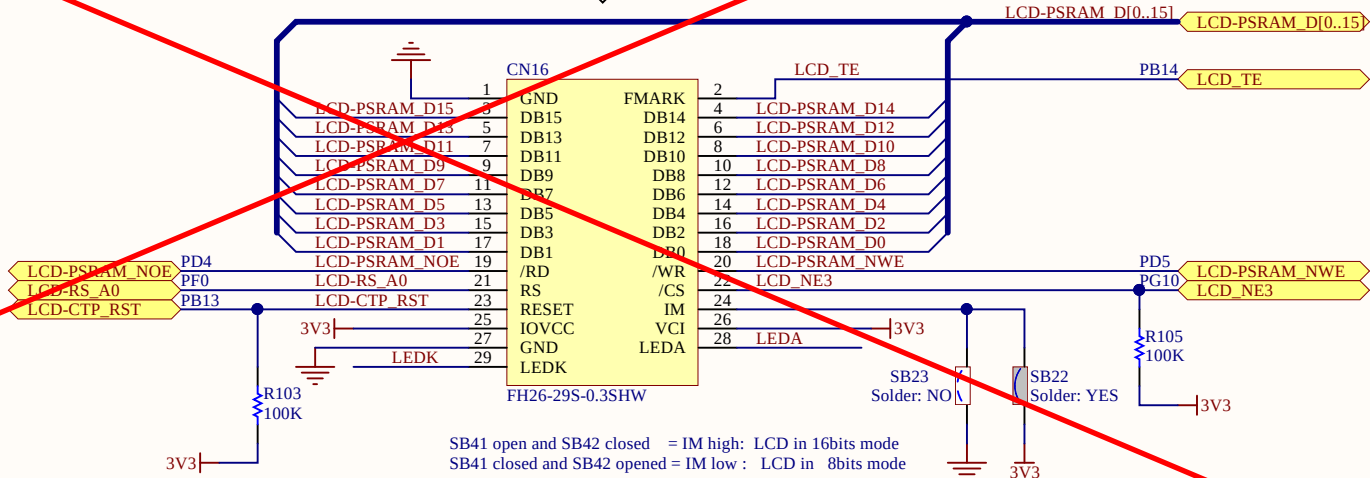


\*: standard orientation. Rotations by 90, 180, 270 degrees possible by registers.

240x240 pixels TFT LCD

HW4

FRIDA LCD FRD154BP2902



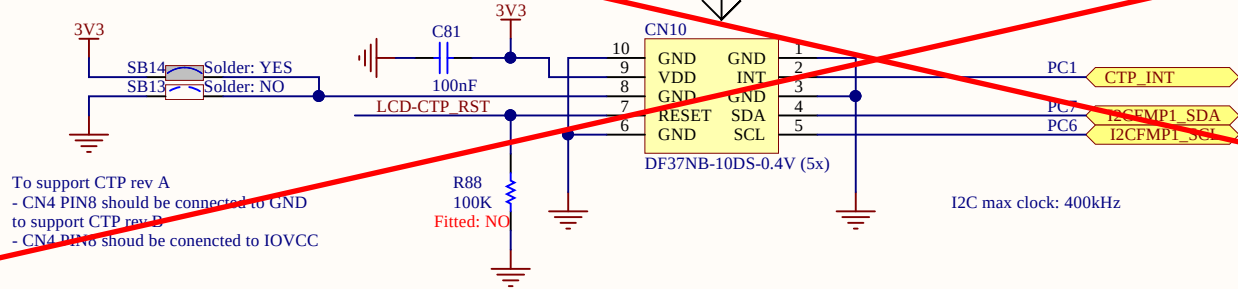
VDD\_MCU operating voltage range: 3V0 to 3V6

Capacitive Touch Panel

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

HW5

CTP LS015GF614A



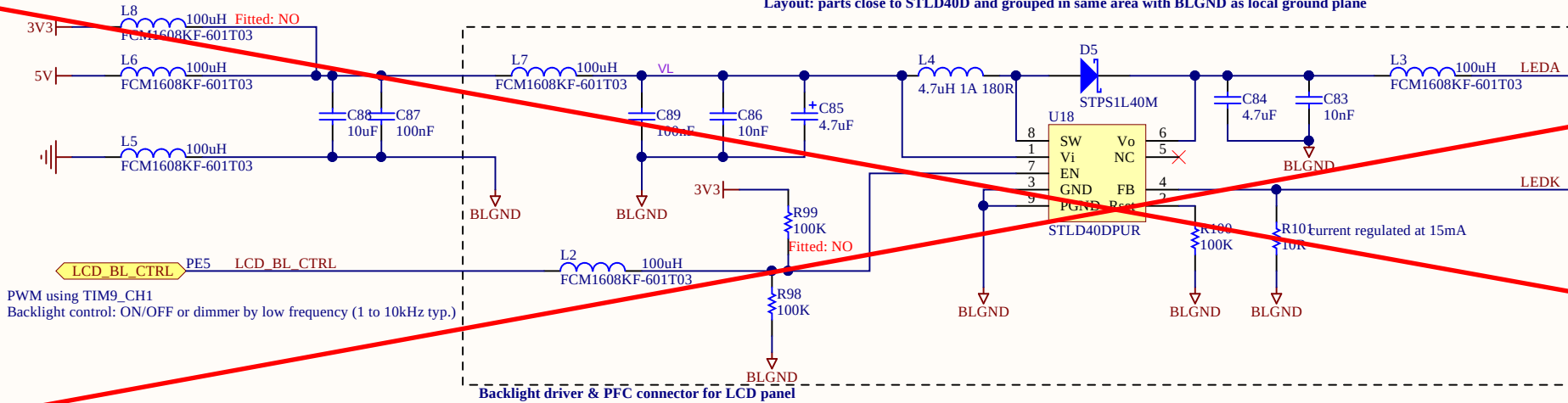
To support CTP rev A  
- CN4 PIN8 should be connected to GND  
to support CTP rev B  
- CN4 PIN6 should be connected to IOVCC

I2C max clock: 400kHz

LCD Backlight

Common mode supply filter

Layout: parts close to STLD40D and grouped in same area with BLGND as local ground plane

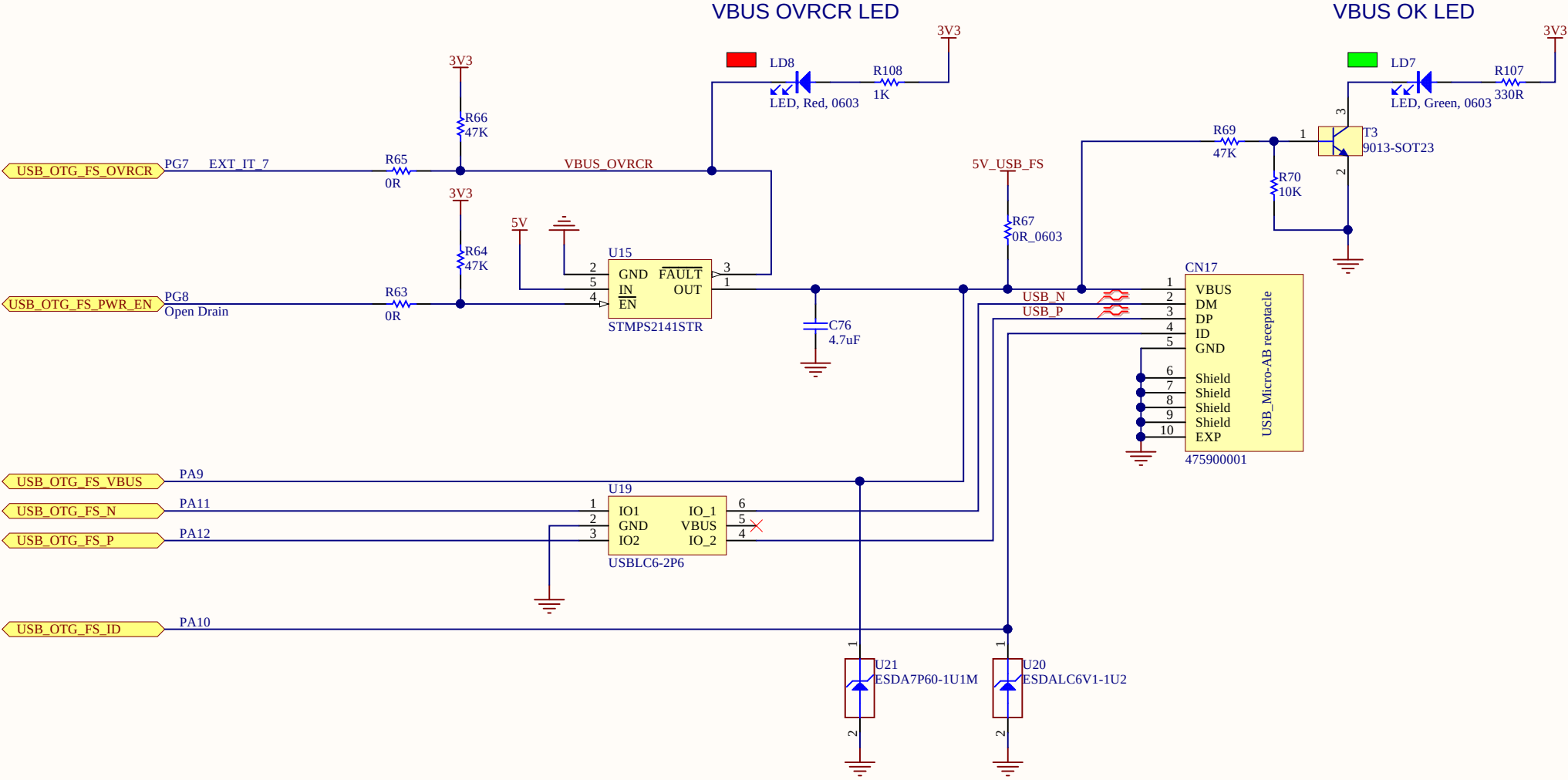


PWM using TIM9\_CH1  
Backlight control: ON/OFF or dimmer by low frequency (1 to 10kHz typ.)

Current regulated at 15mA

USB\_OTG\_FS

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

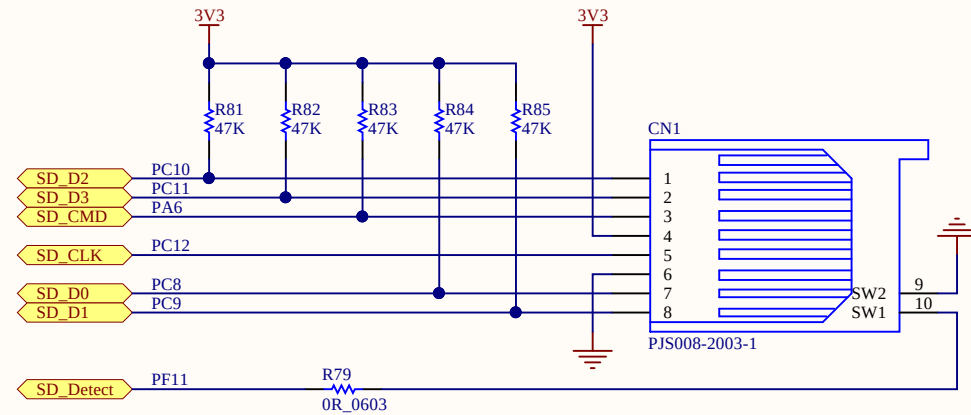


ESD PROTECTION SHOULD BE CLOSE TO THE CONNECTOR

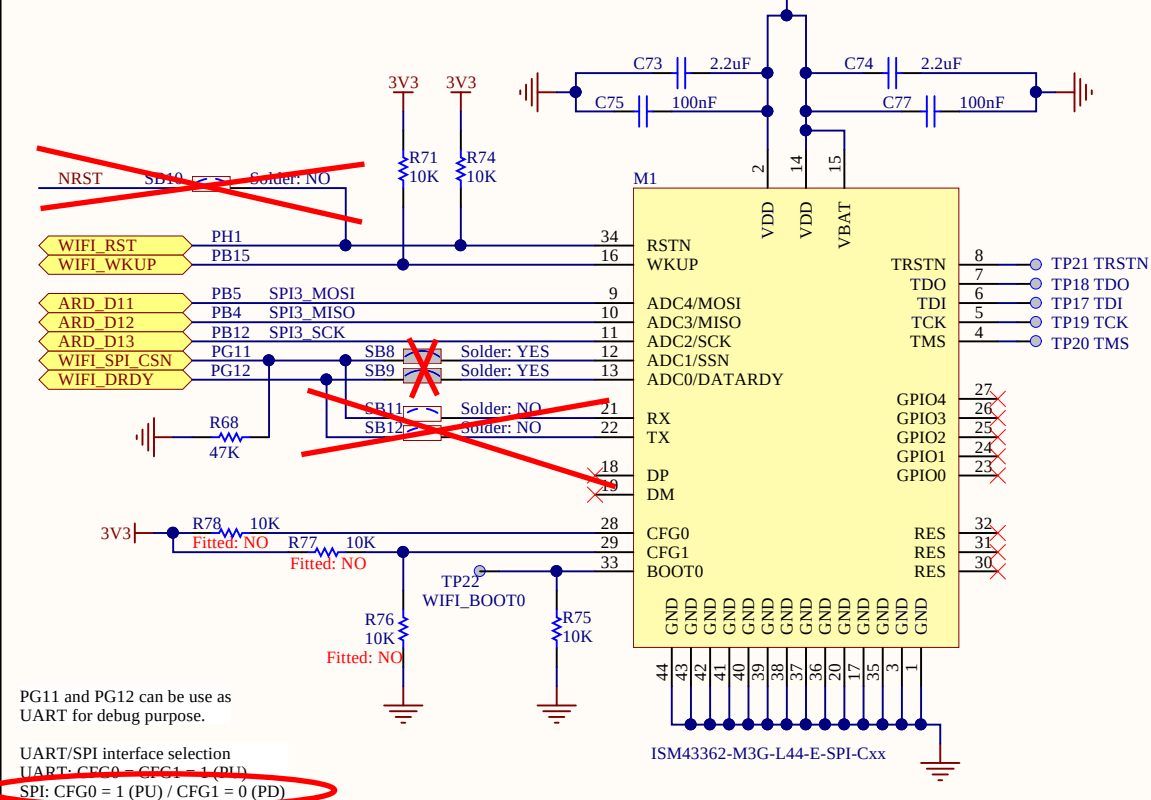




MICRO SD CARD



## WIFI MODULE

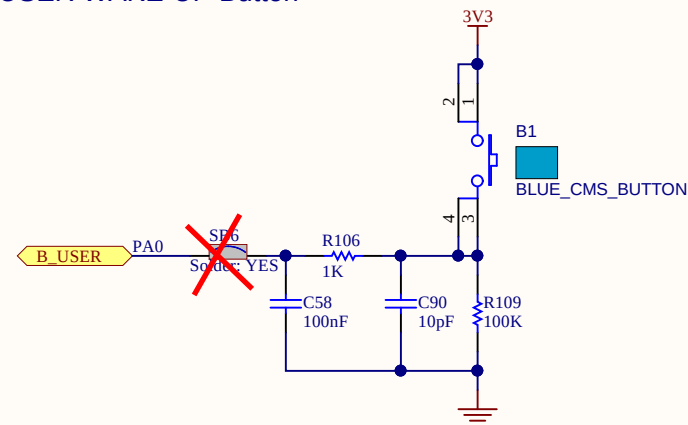


PG11 and PG12 can be use as UART for debug purpose.

UART/SPI interface selection  
UART: CFC0 = CFC1 = 1 (P)

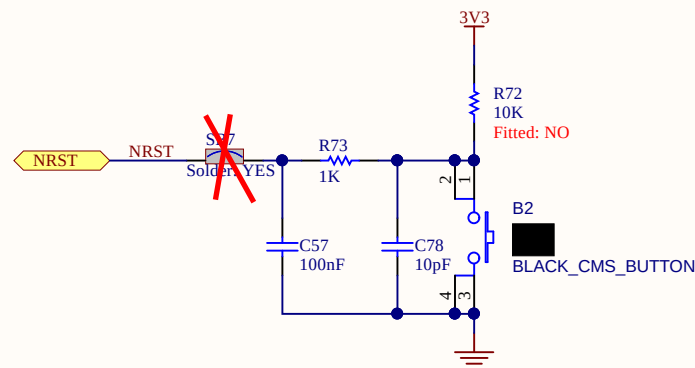
SPI: CFG0 = 1 (PU) / CFG1 = 0 (PD)

## USER WAKE-UP Button



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

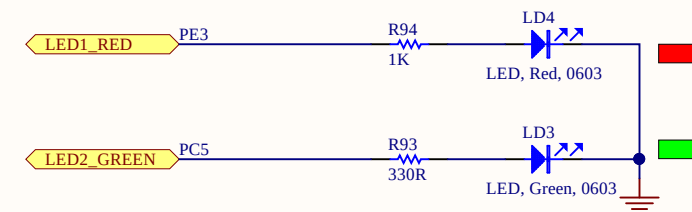
## RESET BUTTON



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**



|                                  |                          |                              |
|----------------------------------|--------------------------|------------------------------|
| Title: <b>Peripherals</b>        |                          |                              |
| Project: <b>STM32F413H-DISCO</b> |                          |                              |
| Size: <b>A4</b>                  | Reference: <b>MB1274</b> | Revision: <b>E-01</b>        |
| Date: <b>10/04/2017</b>          |                          | Sheet: <b>8</b> of <b>11</b> |



