STM32F412G-DISCO

MB1209

Table of contents

Legend

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

Text to be added to silkscreen.

Warning text.

Notes to generate the board layout.

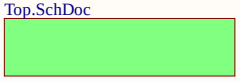
Open Platform License Agreement

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.

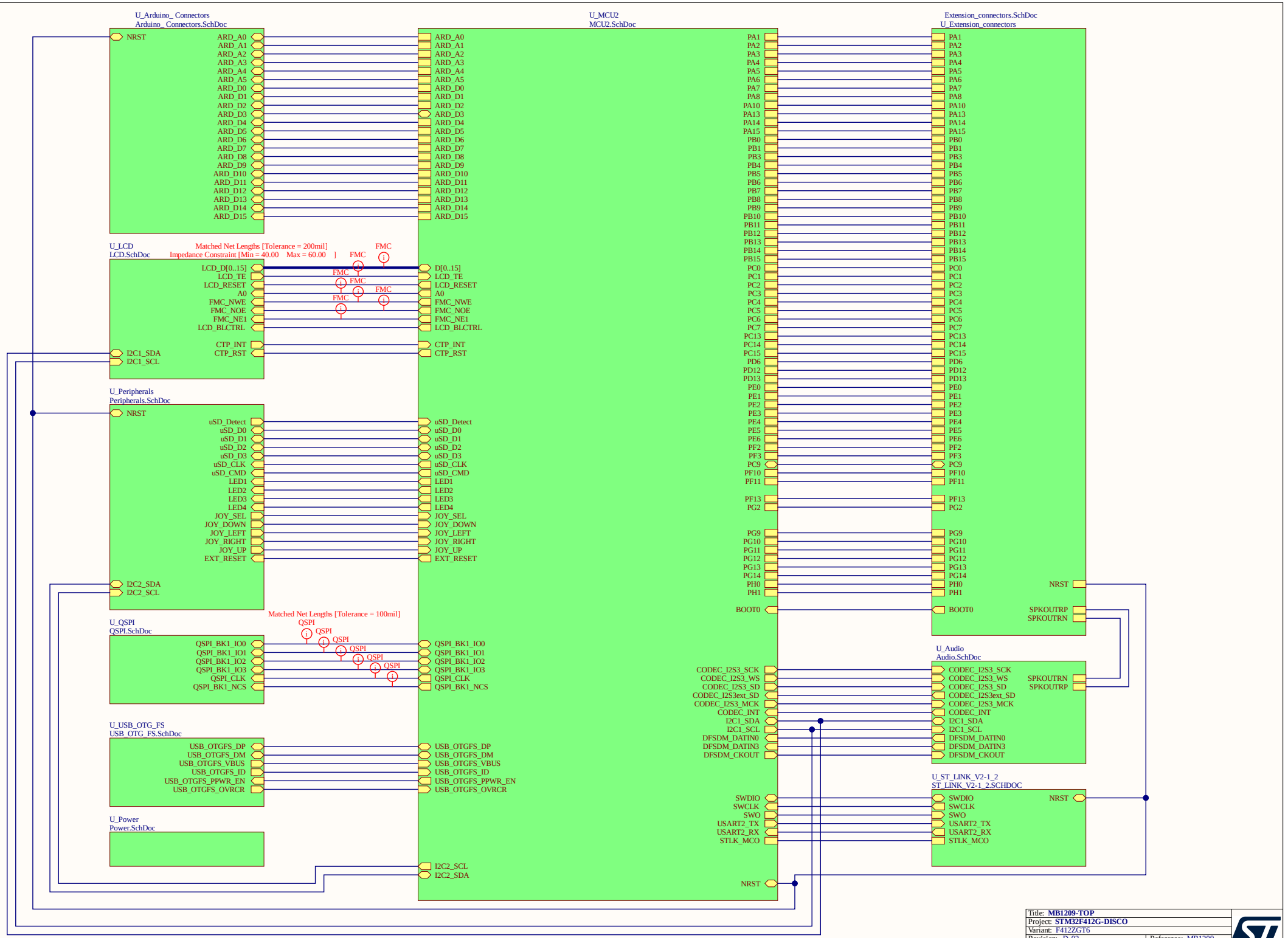
By using the enclosed reference designs, schematics, PC board layouts, and documentation, in hardcopy or CAD tool file format (collectively, the “Reference Material”), You are agreeing to be bound by the terms and conditions of this Agreement. Do not use the Reference Material until You have read and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

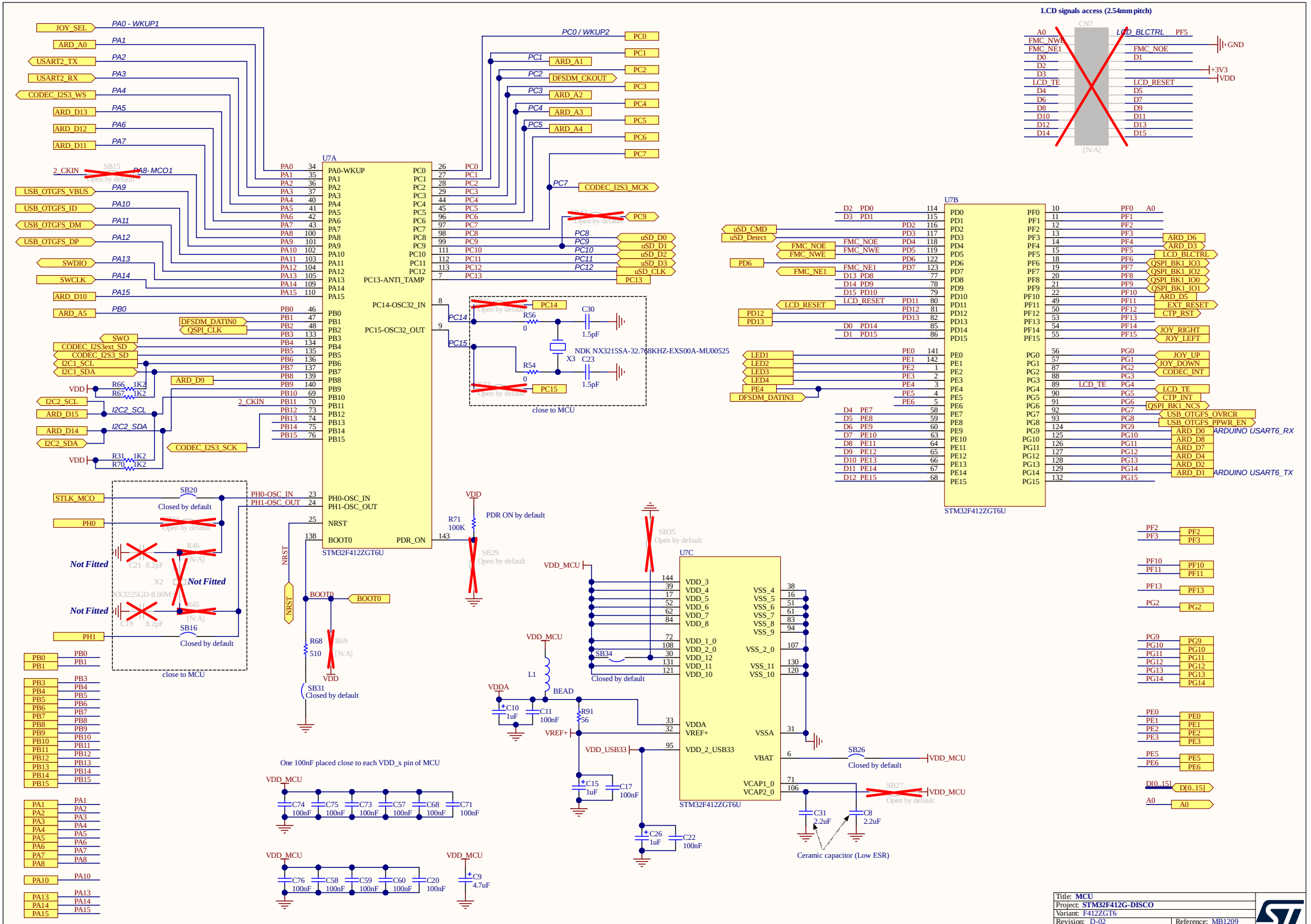
U_Top
Top.SchDoc



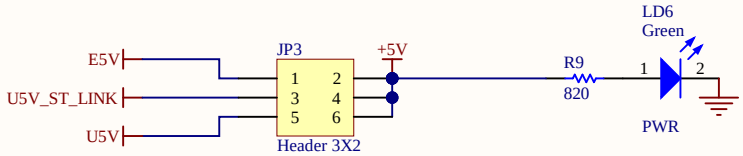
Title: **Project Overview**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A4	Date: 29/06/2016	Sheet: 1 of 12

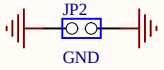


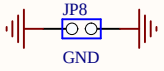
Title: **MB1209-TOP**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A3	Date: 29/06/2016	Sheet: 2 of 12

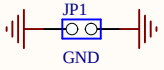


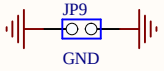
Title: MCU			
Project: STM32F412G-DISCO			
Variant: F412ZGT6			
Revision: D-02		Reference: MB1209	
Size: A3	Date: 29/06/2016	Sheet: 3 of 12	

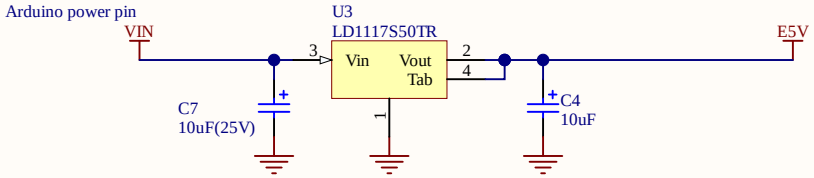




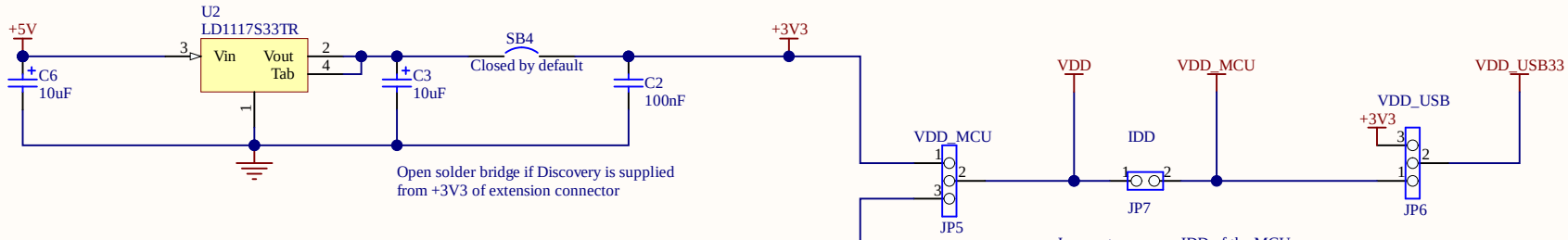




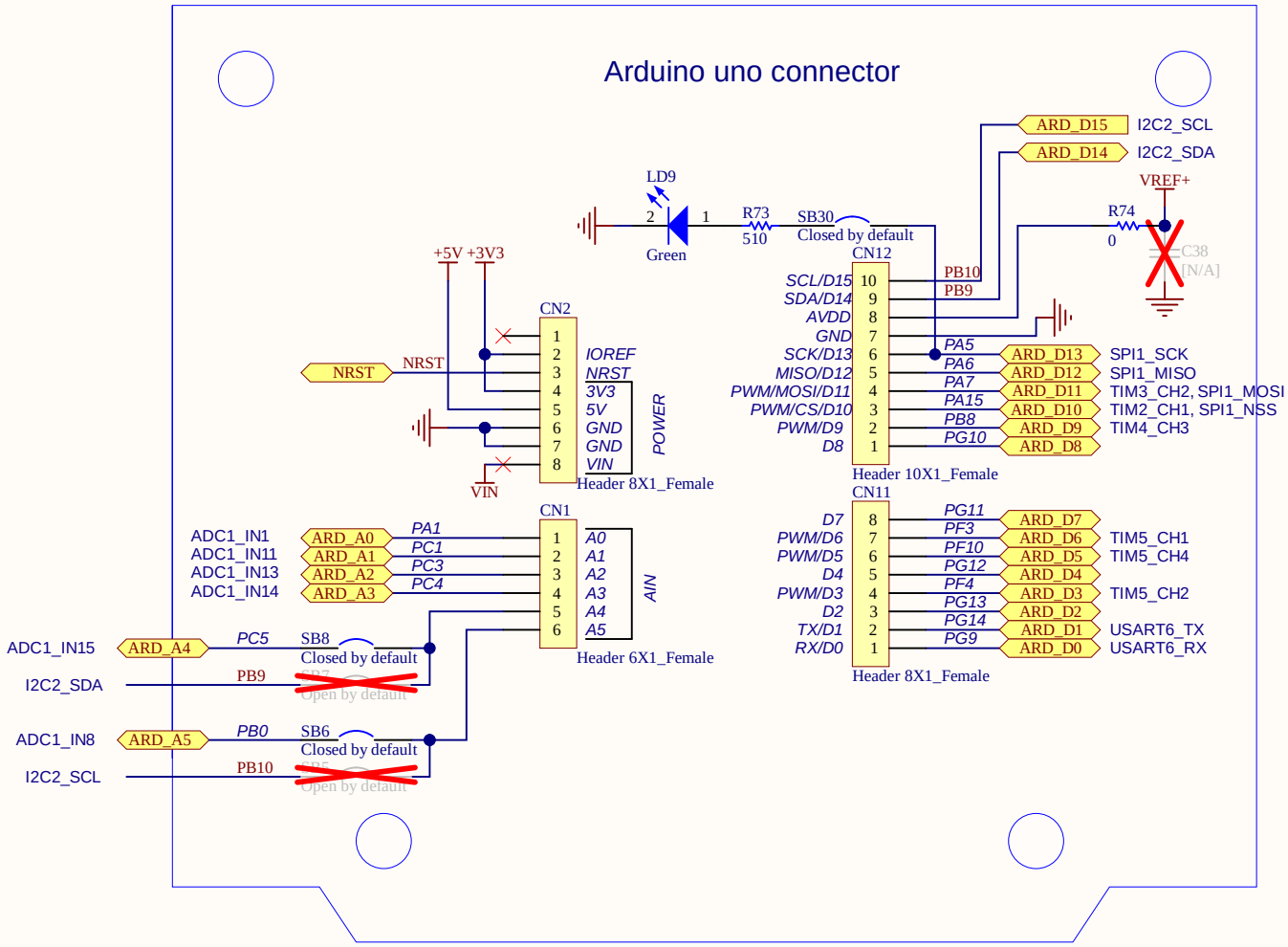




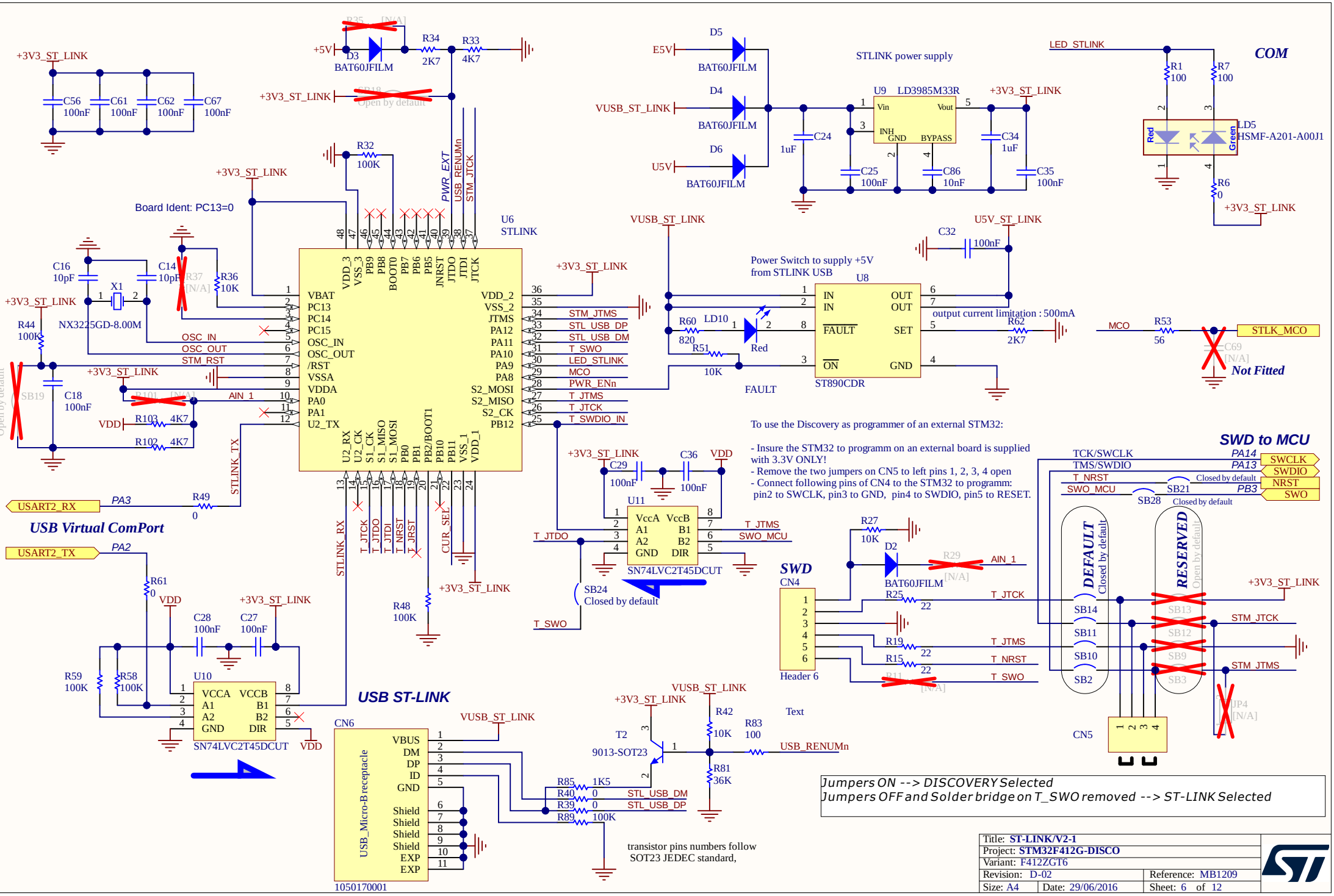
VDD= supply of peripherals
VDD_MCU= supply of MCU pins VDD only

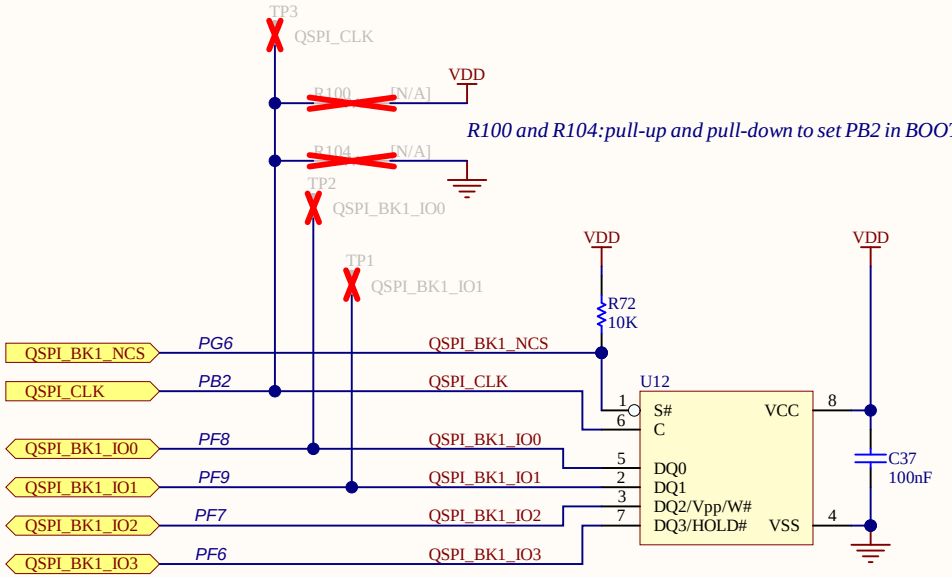


Title: **Power**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A4	Date: 29/06/2016	Sheet: 4 of 12



Title: **Arduino Uno connector**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A4	Date: 29/06/2016	Sheet: 5 of 12


Board Ident: PC13=0
STLINK power supply
U6 STLINK
U9 LD3985M33R
U8
ST890CDR
Power Switch to supply +5V from STLINK USB
output current limitation : 500mA
FAULT
COM
LD5 HSMF-A201-A00J1
Not Fitted
To use the Discovery as programmer of an external STM32:
- Insure the STM32 to programm on an external board is supplied with 3.3V ONLY!
- Remove the two jumpers on CN5 to left pins 1, 2, 3, 4 open
- Connect following pins of CN4 to the STM32 to programm:
pin2 to SWCLK, pin3 to GND, pin4 to SWDIO, pin5 to RESET.
SWD to MCU
SWD
CN4
Header 6
SN74LVC2T45DCUT
USB Virtual ComPort
USB ST-LINK
USB_Micro-B receptacle
1050170001
transistor pins numbers follow SOT23 JEDEC standard,
DEFAULT
RESERVED
CN5
Jumpers ON --> DISCOVERY Selected
Jumpers OFF and Solder bridge on T_SWO removed --> ST-LINK Selected
Title: ST-LINK/V2-1
Project: STM32F412G-DISCO
Variant: F412ZGT6
Revision: D-02
Reference: MB1209
Size: A4
Date: 29/06/2016
Sheet: 6 of 12



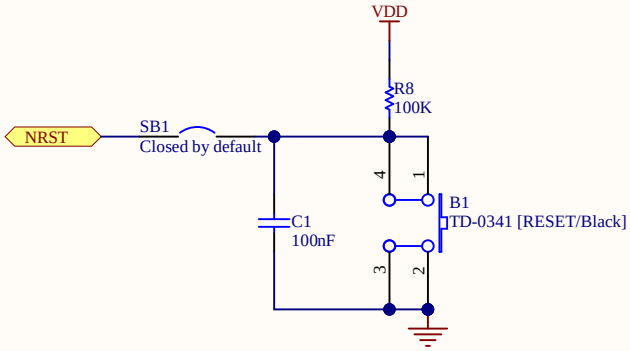
R100 and R104:pull-up and pull-down to set PB2 in BOOT1 alternate function

MICRON N25Q128A13EF840F

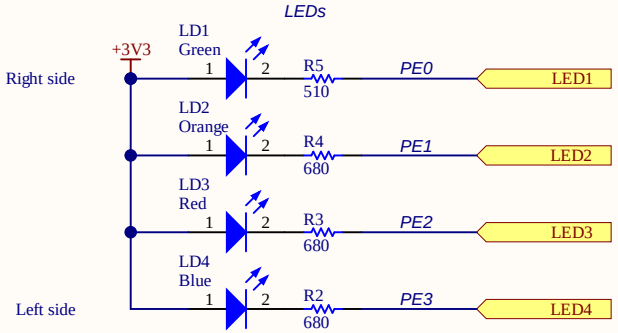
Exposed central pad should not be connected to any voltage on PCB

Title: **QSPI**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A4	Date: 29/06/2016	Sheet: 7 of 12

Reset Button

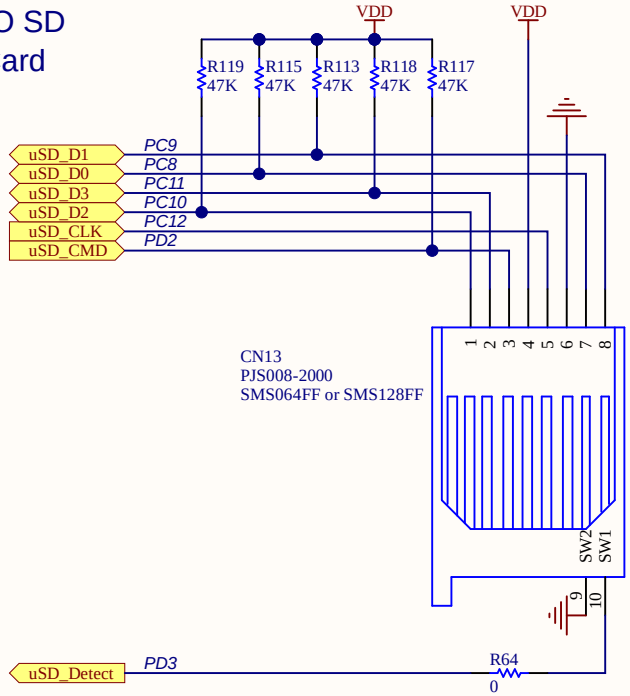


LEDs

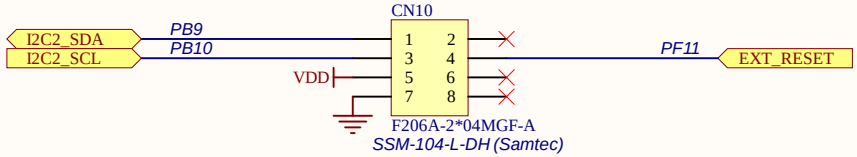


The 4 LEDs are top side

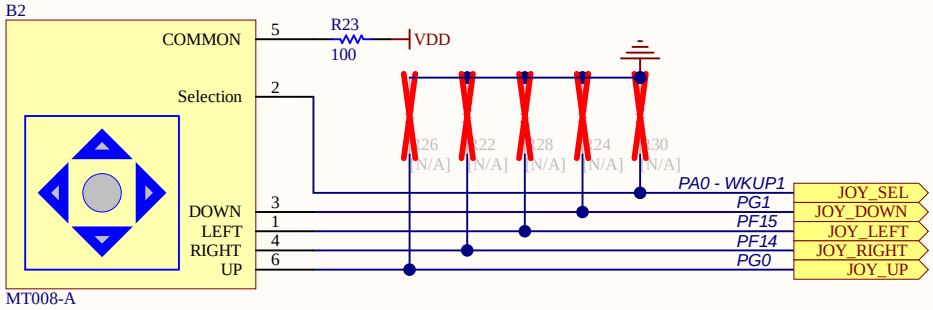
MICRO SD (TF) Card



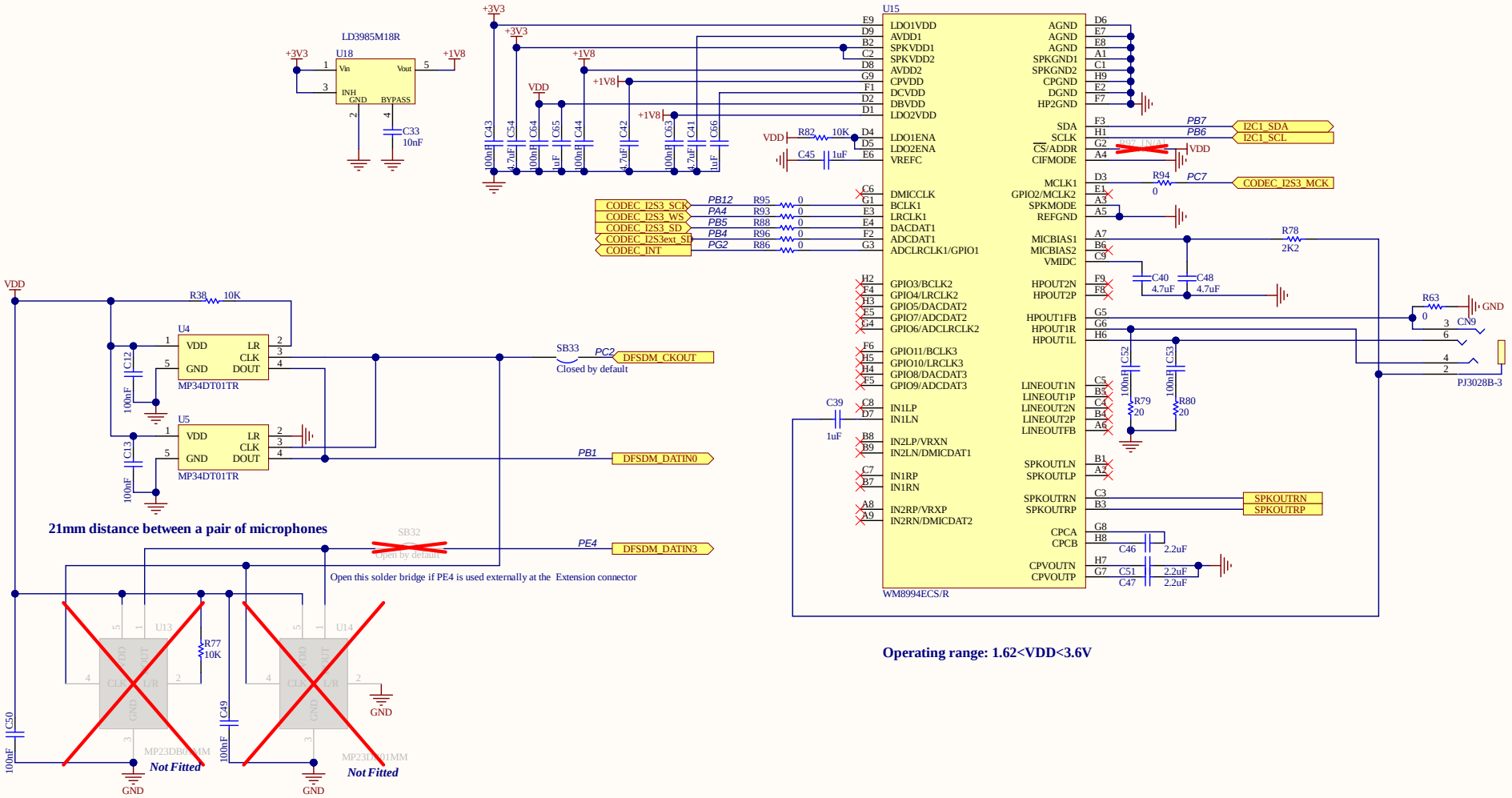
I2C Extension Connector



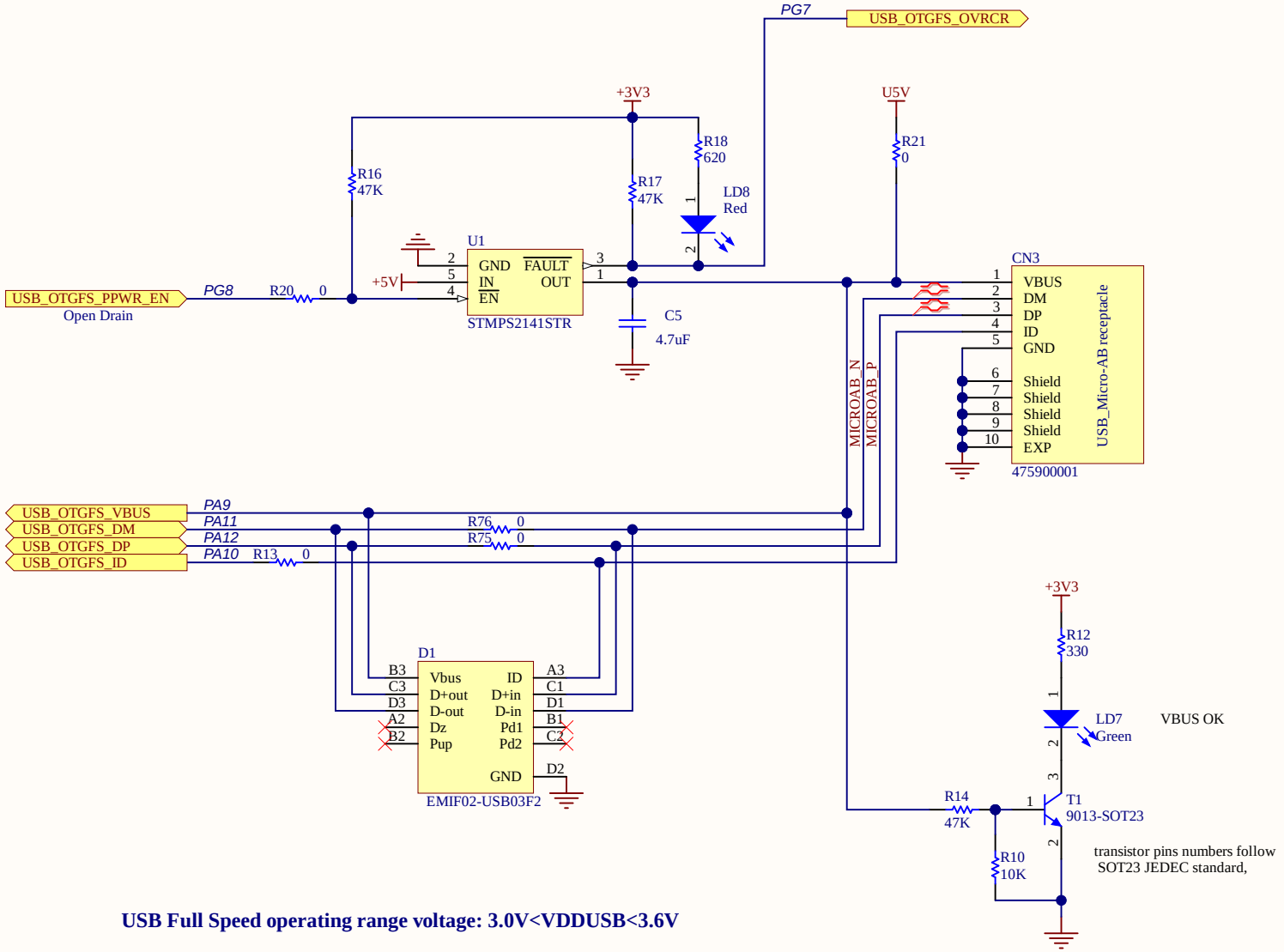
JOYSTICK



Title: **Peripherals**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A4	Date: 29/06/2016	Sheet: 8 of 12



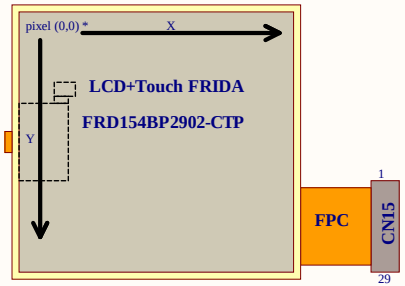
Title: **Audio**			
Project: **STM32F412G-DISCO**			
Variant: F412ZGT6			
Revision: D-02		Reference: MB1209	
Size: A3	Date: 29/06/2016	Sheet: 9 of 12	



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

Title: **USB_OTG_FS**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A4	Date: 29/06/2016	Sheet: 10 of 12

Top side: layout of CN15



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

240x240 pixels TFT LCD with Capaticitve Touch Panel

ZZ1

FRD154BP2902-CTP

CN15

FH26-29S-0.3SHW

LCD_D[0..15] D[0..15]

FMC_NOE PD4 FMC_NOE

A0 PF0 A0

LCD_RESET PD11 LCD_RESET

LEDK

LCD_TE PG4 LCD_TE

FMC_NWE PD5 FMC_NWE

FMC_NE1 PD7 FMC_NE1

LEDA

R41 100K

R99 100K

SB41 Open by default

SB42 Closed by default

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

SB41 closed and SB42 opened = IMlow : LCD in 8bits mode

Reserved use

CN8

MOLEX 503304-4440

C72 100nF

C70 100nF

IM1 R57 0

IM0 R55 0

P68 R84 0

Capacitive Touch Panel connector of FRD154BP2902-CTP

CN14

DF37NB-10DS-0.4V (5x)

CTP_RST PF12

CTP_INT PG5

Pull-down to insure CTP is in Reset at power-on

R105 100K

R106 [N/A]

R107 [N/A]

C80 100nF

C87 100nF

R98 100K

Pull-down to insure CTP is in Reset at power-on

SB44 Closed by default

SB43 Open by default

CTP operation: MCU operating voltage range 1.8 to 3.6V

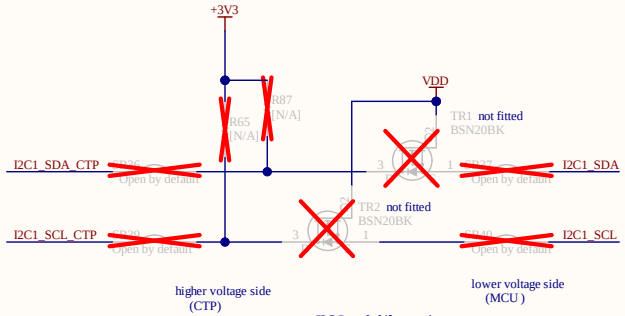
LCD Operation: MCU operating voltage range 1.65 to 3.6V

I2C1_SDA_CTP SB17 I2C1_SDA PB7 I2C1_SDA

I2C1_SCL_CTP SB38 I2C1_SCL PB6 I2C1_SCL

Closed by default

I2C max clock: 400kHz



I2C Level shifter option
(TR1, TR2, R65, R87 parts are not soldered)

Common mode supply filter

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

+3V3 L0 Not Fitted BEAD

+5V L4 BEAD

L6 BEAD

C82 10uF C83 100nF

L3 BEAD

C85 100nF C78 10nF C81 4.7uF/10V

4.7uH(1A) L5

Z1 STPS1L40M

C77 4.7uF/50V

C79 10nF

L2 BEAD LEDA

U17 STLD40DPUR

R47 100K R43 10 current regulated at 15mA

LEDK

BLGND

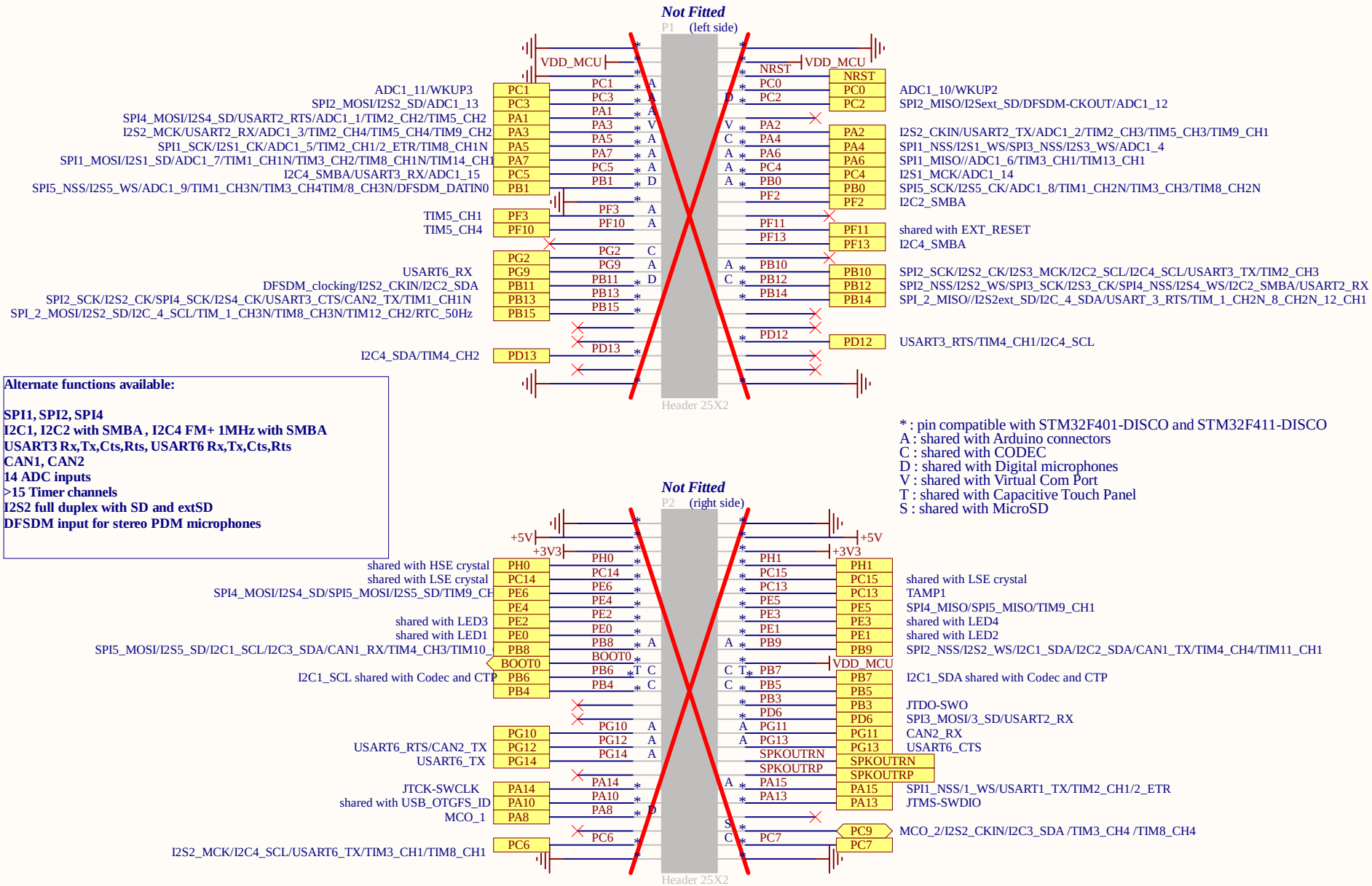
Backlight control: ON/OFF or dimmer by low frequency (1 to 10kHz typ.) PWM using TIM5_CH3

LCD_BLCTRL PF5 L7 BEAD

R52 [N/A] R50 100K

Backlight driver & PFC connector for LCD panel

Title: **LCD**			
Project: **STM32F412G-DISCO**			
Variant: F412ZGT6			
Revision: D-02		Reference: MB1209	
Size: A3	Date: 29/06/2016	Sheet: 11 of 12	



Title: **Extension connectors**		
Project: **STM32F412G-DISCO**		
Variant: F412ZGT6		
Revision: D-02		Reference: MB1209
Size: A4	Date: 29/06/2016	Sheet: 12 of 12