NUCLEO144_Q (int-SMPS)

MB1549

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Top.SchDoc

Legend

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

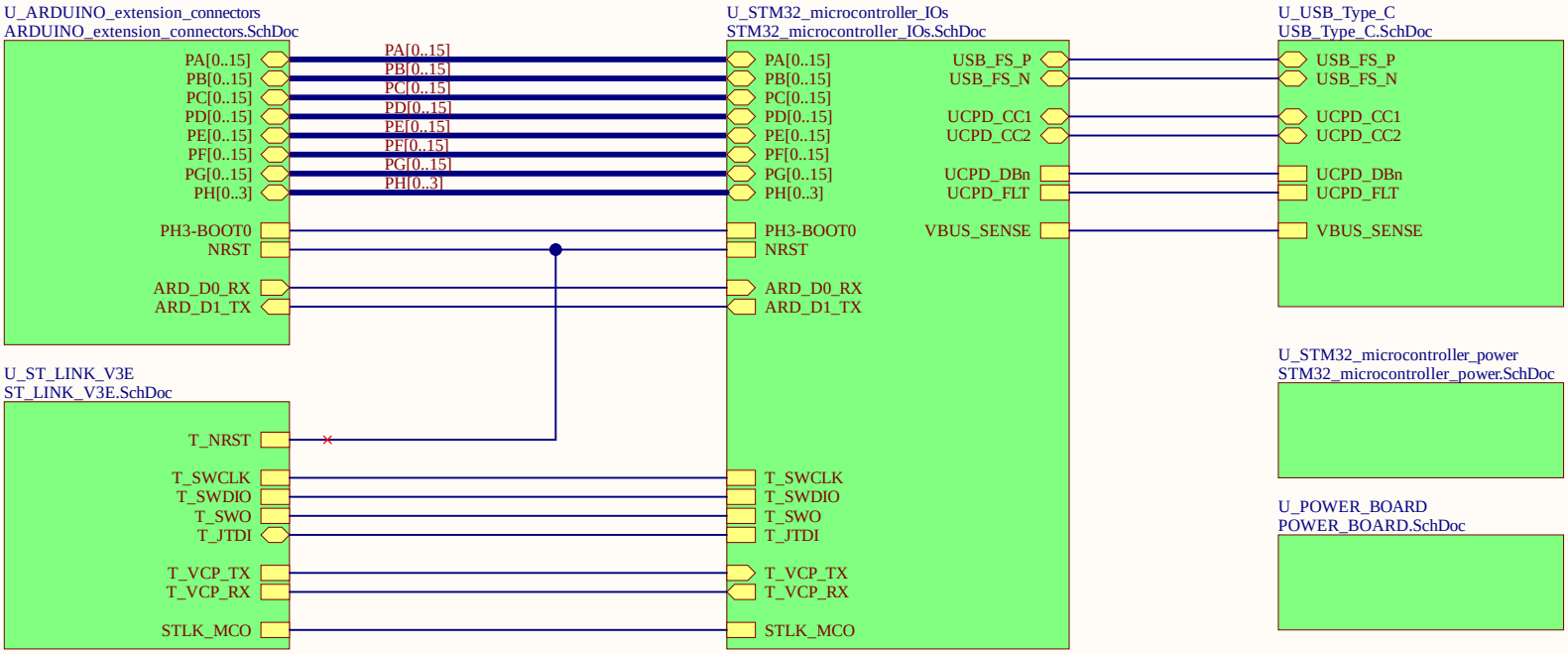
Text to be added to silkscreen.

Warning text.

Notes to generate the board layout.

OPEN PLATFORM LICENSE AGREEMENT

Title: **Project overview**		
Project: **NUCLEO144_Q (int-SMPS)**		
Variant: U575ZIQ		
Revision: C-05		Reference: MB1549
Size: A4	Date: 12-July-2023	Sheet: 1 of 8



MECHANICAL PARTS

HW101

BOARD REF

MBxxxxy-zz syywwxxxxx

HW102

BOARD CPN

Board CPN

Title: **Top: hierarchical view**		
Project: **NUCLEO144_Q (int-SMPS)**		
Variant: U575ZIQ		
Revision: C-05		Reference: MB1549
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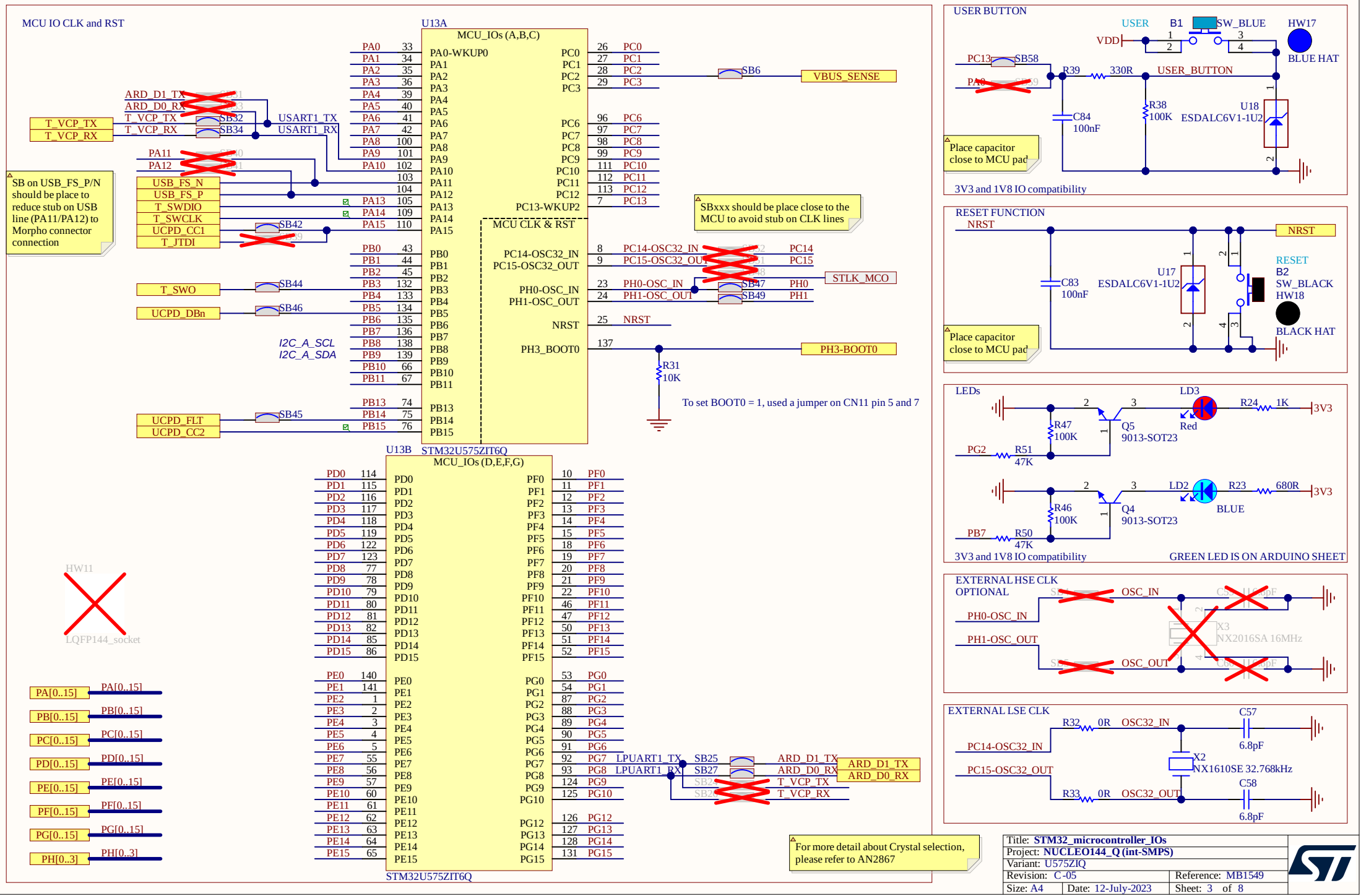
MCU IO CLK and RST
U13A
MCU_IOs (A,B,C)
PA0-WKUP0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PB8
PB9
PB10
PB11
PB13
PB14
PB15
PC0
PC1
PC2
PC3
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13-WKUP2
MCU CLK & RST
PC14-OSC32_IN
PC15-OSC32_OUT
PH0-OSC_IN
PH1-OSC_OUT
NRST
PH3_BOOT0
SB6
VBUS_SENSE
T_VCP_TX
T_VCP_RX
ARD_D1_TX
ARD_D0_RX
USART1_TX
USART1_RX
USB_FS_N
USB_FS_P
T_SWDIO
T_SWCLK
UCPD_CC1
T_JTDI
T_SWO
UCPD_DBn
UCPD_FLT
UCPD_CC2
I2C_A_SCL
I2C_A_SDA
STLK_MCO
PH3-BOOT0
R31
10K
To set BOOT0 = 1, used a jumper on CN11 pin 5 and 7
SB on USB_FS_P/N should be place to reduce stub on USB line (PA11/PA12) to Morpho connector connection
SBxxx should be place close to the MCU to avoid stub on CLK lines
U13B
STM32U575ZIT6Q
MCU_IOs (D,E,F,G)
PD0
PD1
PD2
PD3
PD4
PD5
PD6
PD7
PD8
PD9
PD10
PD11
PD12
PD13
PD14
PD15
PE0
PE1
PE2
PE3
PE4
PE5
PE6
PE7
PE8
PE9
PE10
PE11
PE12
PE13
PE14
PE15
PF0
PF1
PF2
PF3
PF4
PF5
PF6
PF7
PF8
PF9
PF10
PF11
PF12
PF13
PF14
PF15
PG0
PG1
PG2
PG3
PG4
PG5
PG6
PG7
PG8
PG9
PG10
PG12
PG13
PG14
PG15
LPUART1_TX
LPUART1_RX
HW11
LQFP144_socket
PA[0..15]
PB[0..15]
PC[0..15]
PD[0..15]
PE[0..15]
PF[0..15]
PG[0..15]
PH[0..3]
USER BUTTON
USER
B1
SW_BLUE
HW17
BLUE HAT
VDD
PC13
SB58
R39
330R
USER_BUTTON
C84
100nF
R38
100K
U18
ESDALC6V1-1U2
Place capacitor close to MCU pad
3V3 and 1V8 IO compatibility
RESET FUNCTION
NRST
C83
100nF
U17
ESDALC6V1-1U2
RESET
B2
SW_BLACK
HW18
BLACK HAT
Place capacitor close to MCU pad
LEDs
LD3
R24
1K
3V3
R47
100K
Q5
9013-SOT23
Red
PG2
R51
47K
LD2
R23
680R
R46
100K
Q4
9013-SOT23
BLUE
PB7
R50
47K
3V3 and 1V8 IO compatibility
GREEN LED IS ON ARDUINO SHEET
EXTERNAL HSE CLK
OPTIONAL
OSC_IN
PH0-OSC_IN
PH1-OSC_OUT
OSC_OUT
X3
NX2016SA 16MHz
EXTERNAL LSE CLK
R32
0R
OSC32_IN
C57
6.8pF
PC14-OSC32_IN
X2
NX1610SE 32.768kHz
PC15-OSC32_OUT
R33
0R
OSC32_OUT
C58
6.8pF
For more detail about Crystal selection, please refer to AN2867
Title: STM32_microcontroller_IOs
Project: NUCLEO144_Q (int-SMPS)
Variant: U575ZIQ
Revision: C-05
Reference: MB1549
Size: A4
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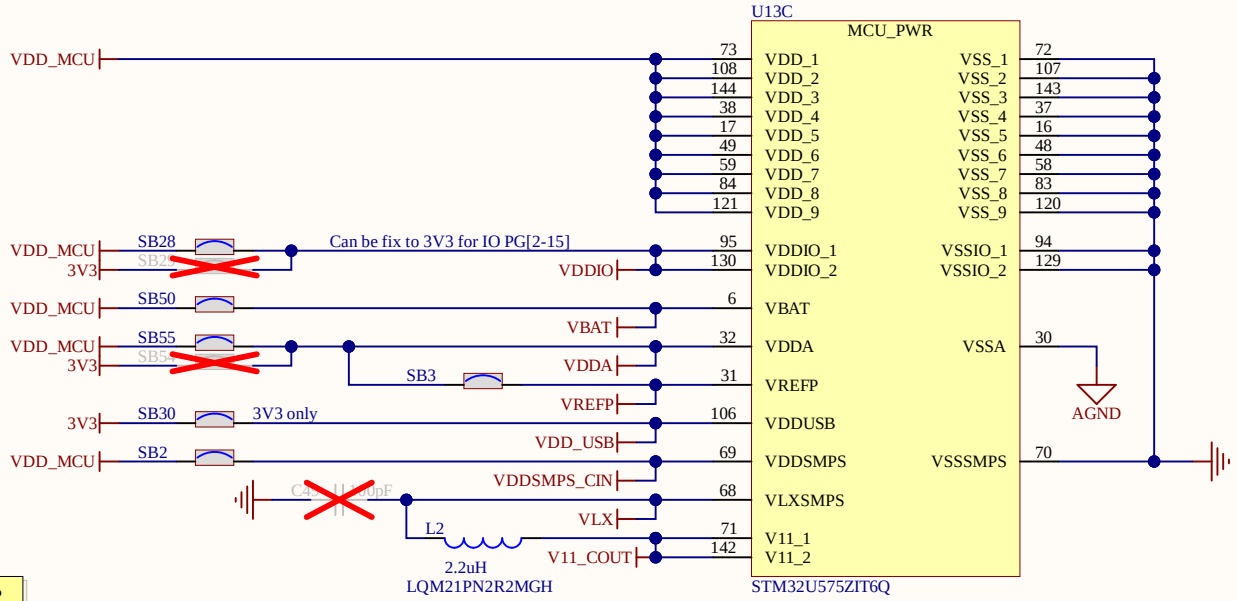
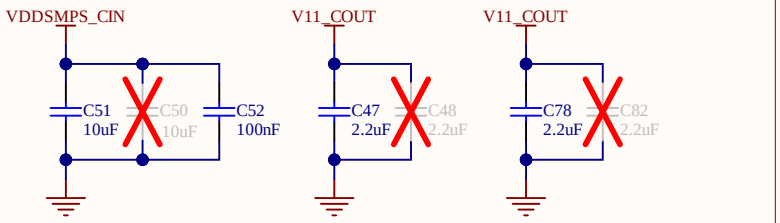
MCU PWR SUPPLIES

Operating range: 1V71<VDD<3V6
Operating range: 1V08<VDDIO<3V6 (only for IO PG[2:15])
Operating range: 1V65<VBAT<3V6
Operating range: 1V62<VDDA<3V6
Operating range: 1V62<VREF<3V6 (depend of VDDA)
Operating range: 1V71<VDDSMPS<3V6

Operating range: 3V0<VDDUSB<3V6



"CIN" and "COUT" should be as closed as possible to the LQFP associated pad. COUT 10µF should be place near L4. Or 1 couple of capacitors per pad (4.7µF / 100nF)

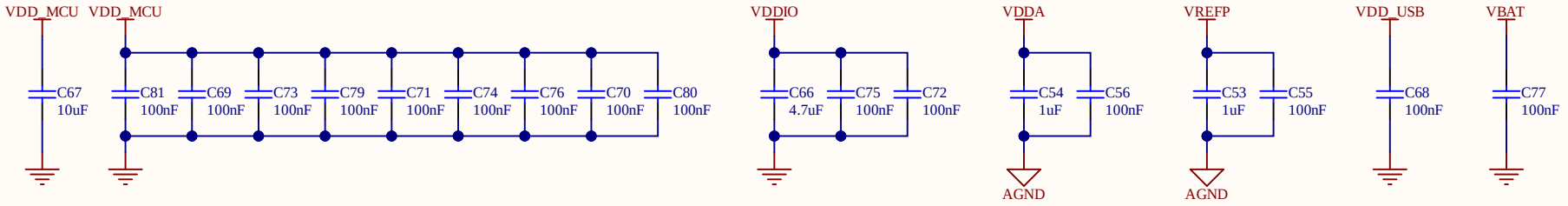


IDD Measurement

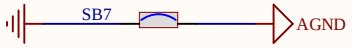
Used to give access to VDD MCU consumption only

MCU DECAPS

Ceramic capacitor (Low ESR, ESR<1ohm)



For more detail about decap, please refer to AN5373



Title: **STM32_microcontroller_power**		
Project: **NUCLEO144_Q (int-SMPS)**		
Variant: U575ZIQ		
Revision: C-05		Reference: MB1549
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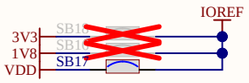
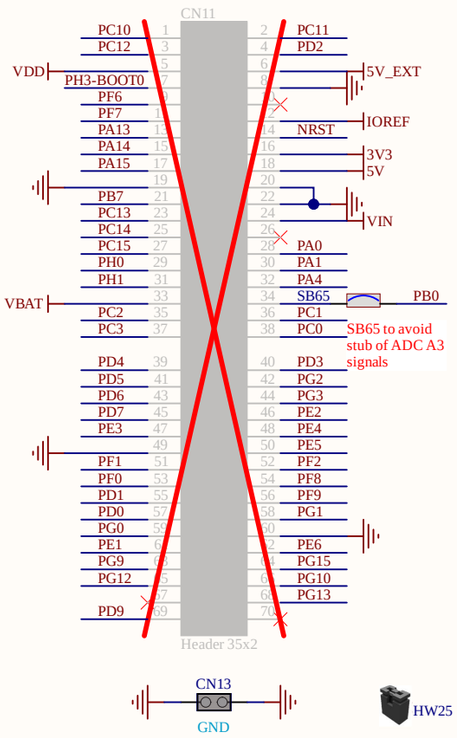
EXTENSION CONNECTORS, MCU INTERFACES



PA[0..15] PA[0..15]
PB[0..15] PB[0..15]
PC[0..15] PC[0..15]
PD[0..15] PD[0..15]
PE[0..15] PE[0..15]

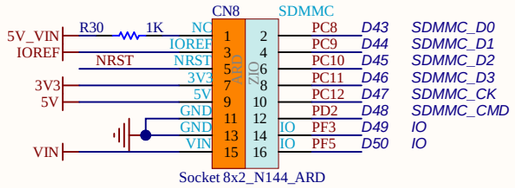
PF[0..15] PF[0..15]
PG[0..15] PG[0..15]
PH[0..3] PH[0..3]
NRST NRST
PH3-BOOT0 PH3-BOOT0

MORPHO CONNECTOR LEFT SIDE

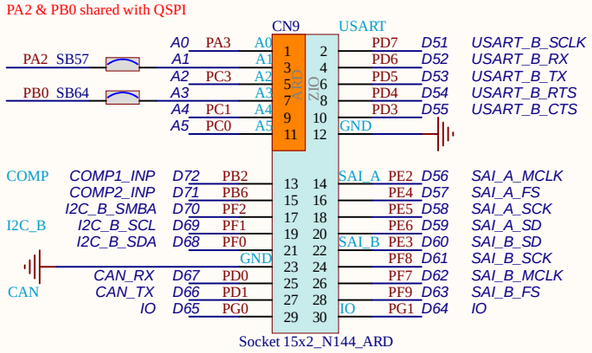


ZIO CONNECTOR ARDUINO UNO V3 COMPATIBLE

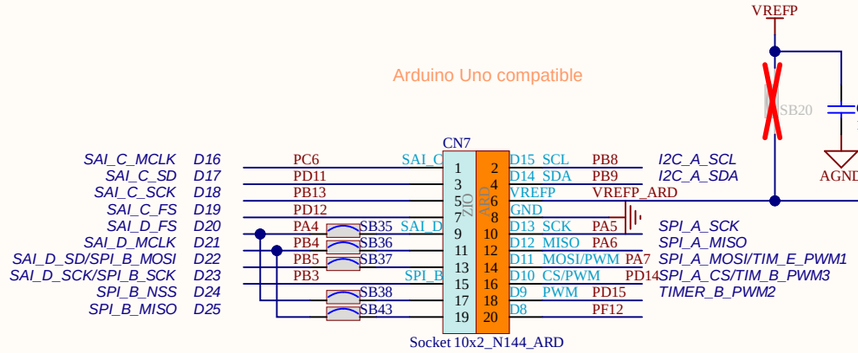
Arduino Uno compatible



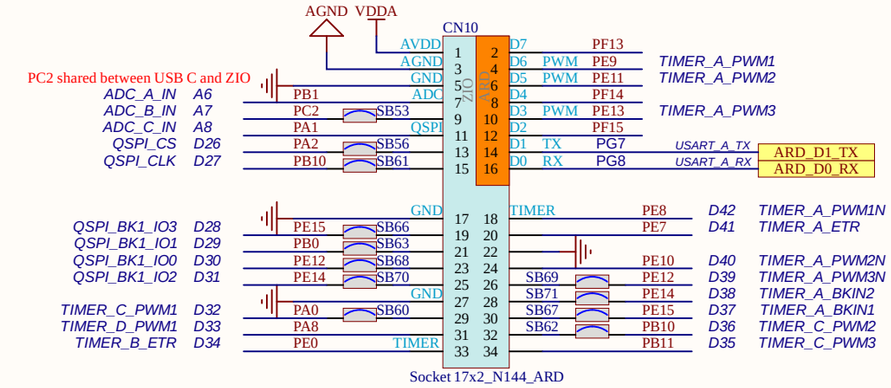
PA2 & PB0 shared with QSPI



Arduino Uno compatible



PC2 shared between USB C and ZIO

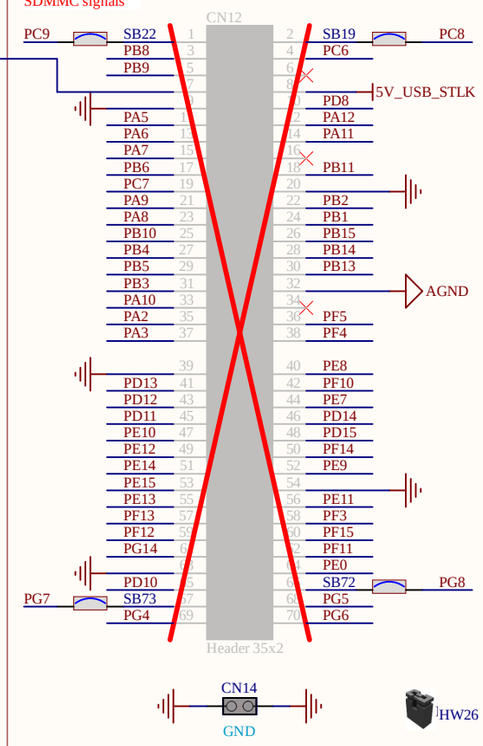


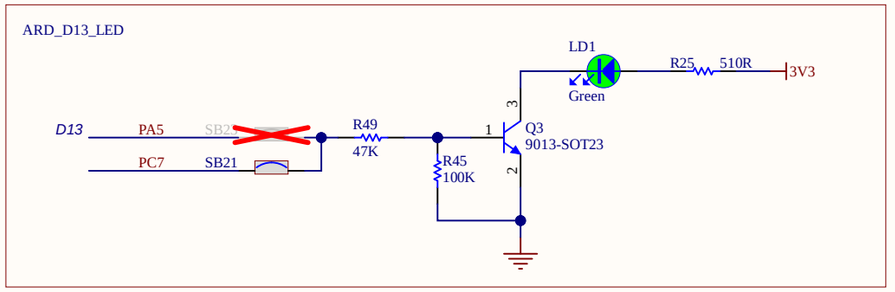
PA2 & PB0 shared with Arduino_ADC

PE12, PE14, PE15 shared between TIMER for MOTOR-CONTROL and QSPI

MORPHO CONNECTOR RIGHT SIDE

SB19/SB22 to avoid stub of SDMMC signals





Title: **ARDUINO_extension_connectors**		
Project: **NUCLEO144_Q (int-SMPS)**		
Variant: U575ZIQ		
Revision: C-05		Reference: MB1549
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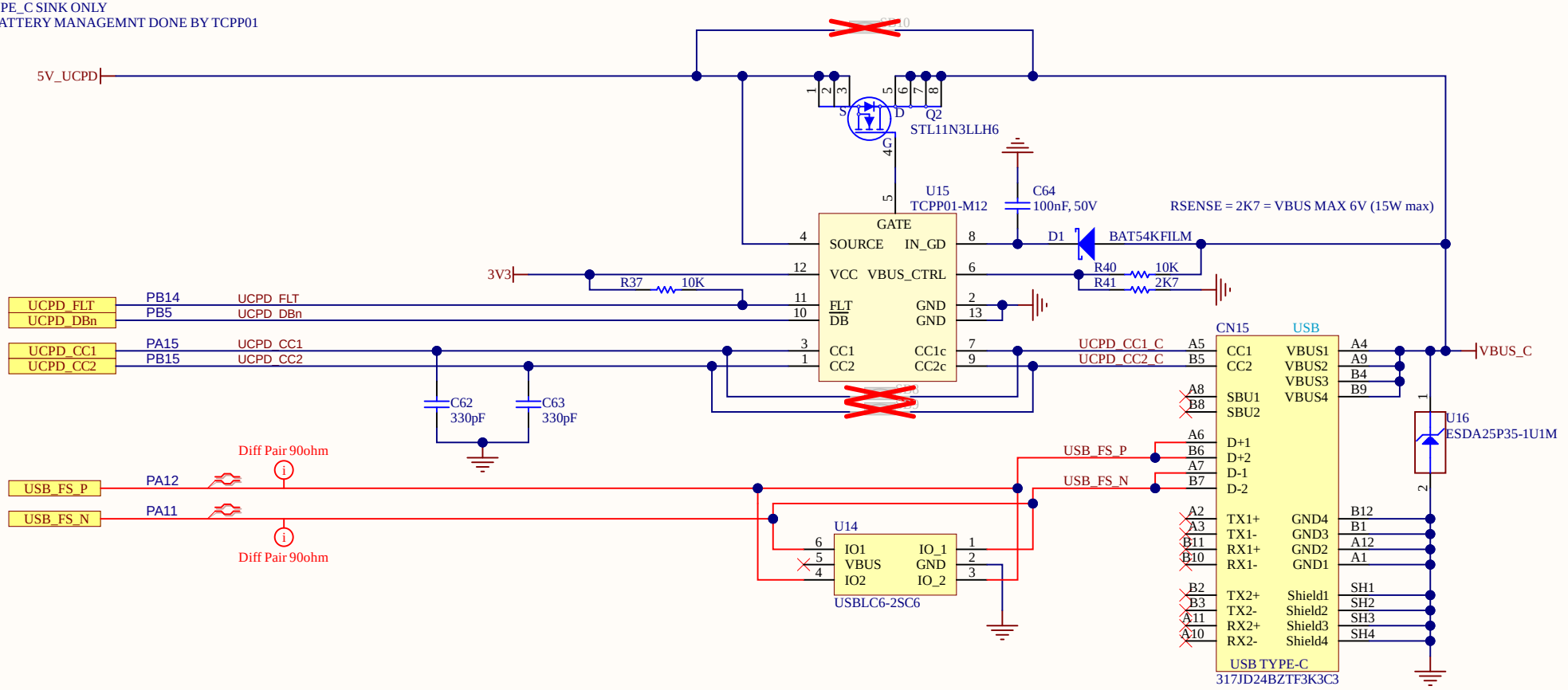
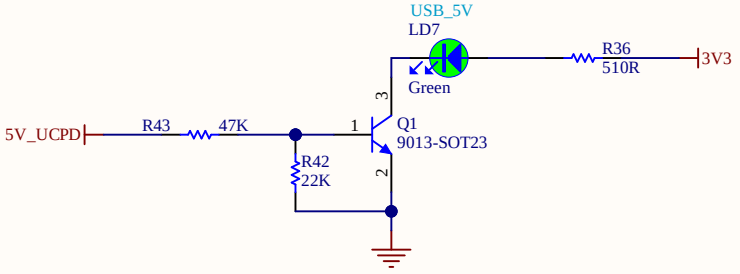
USB_TYPE_C CONNECTOR

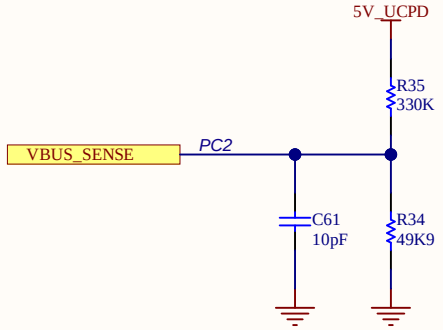
USB_TYPE_C SINK ONLY
DEAD BATTERY MANAGEMNT DONE BY TCPP01



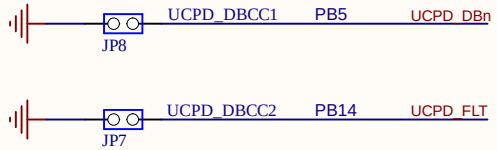
5V_USB_LED



VBUS SENSE



RESERVED FOR DEBUG
DEAD BATTERY MANAGEMENT BY MCU



Title: **USB_Type_C**		
Project: **NUCLEO144_Q (int-SMPS)**		
Variant: U575ZIQ		
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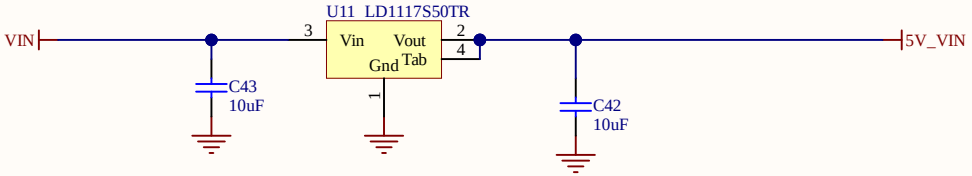
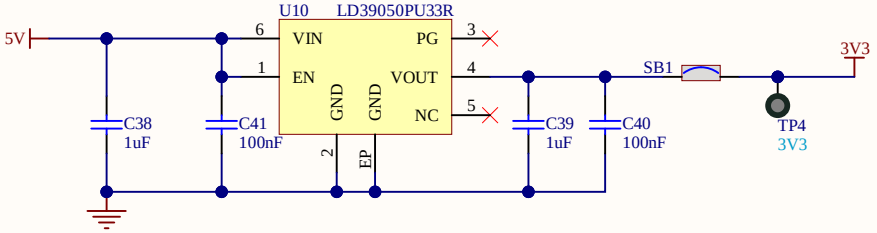
BOARD PWR: VIN / 5V (output current depend of VIN range)

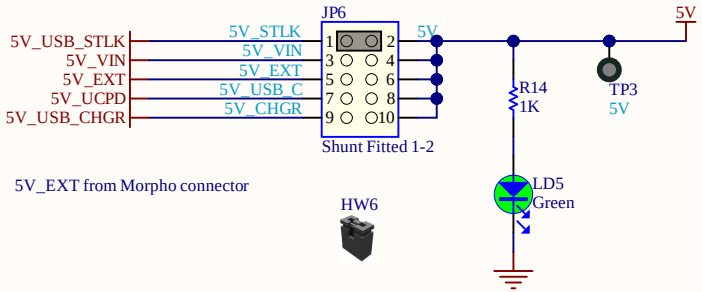


3V3 POWER SOURCE / 500mA



5V PWR SELECTION

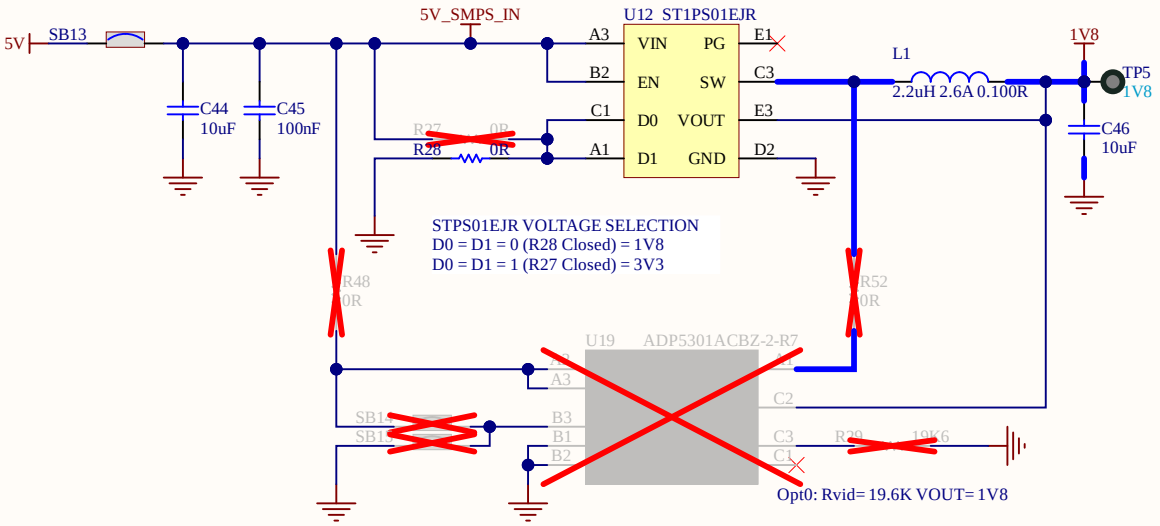
MAX CURRENT 500mA WHEN USING POWER INPUT 5V_USB_STLK



5V_EXT from Morpho connector

1V8 POWER SOURCE / 400mA

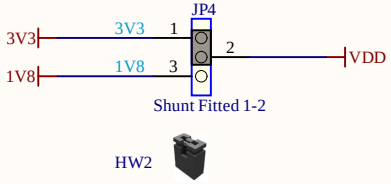
ONLY ONE DEVICE TO BE USED U7 or U101



STPS01EJR VOLTAGE SELECTION
D0 = D1 = 0 (R28 Closed) = 1V8
D0 = D1 = 1 (R27 Closed) = 3V3

ADP5301 MODE SELECTION
SYNC/MODE = 1 (SB14 Closed) = HYSTERESIS MODE 50mA
SYNC/MODE = 0 (SB15 Closed) = PWM MODE 500mA

VDD_MCU_SELECTION AND CURRENT MEASUREMENT



VDD table	JP4
VDD = 3V3	[1-2]
VDD = 1V8	[2-3]

Title: **POWER_BOARD**		
Project: **NUCLEO144_Q (int-SMPS)**		
Variant: U575ZIQ		
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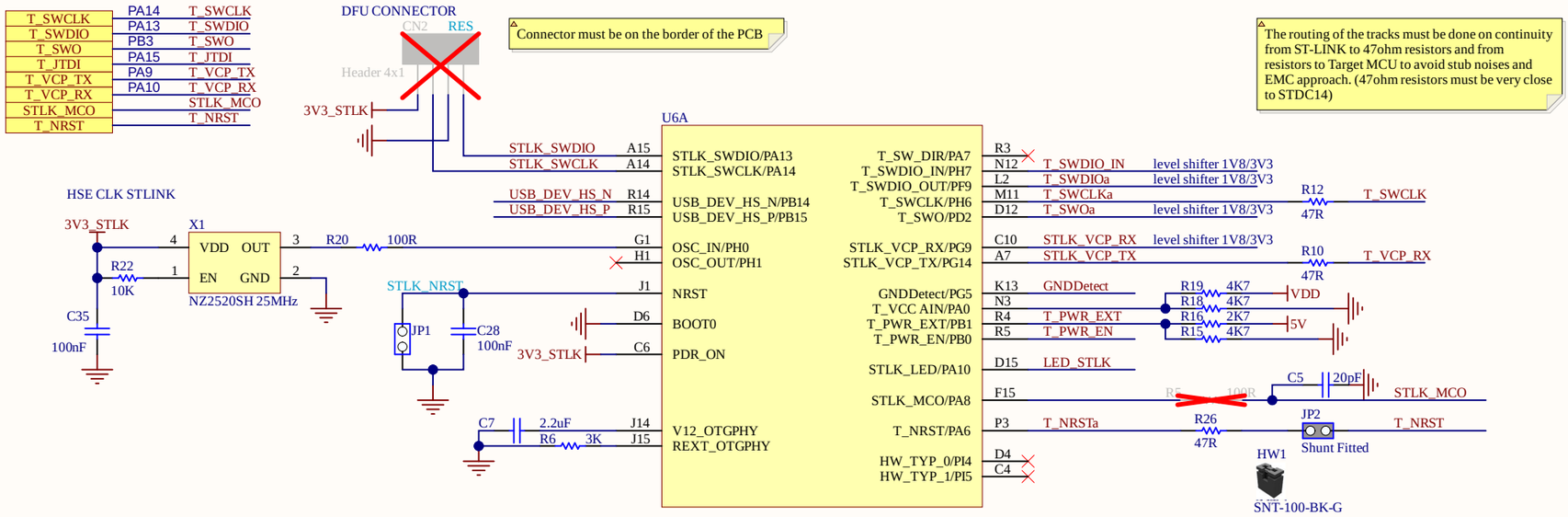
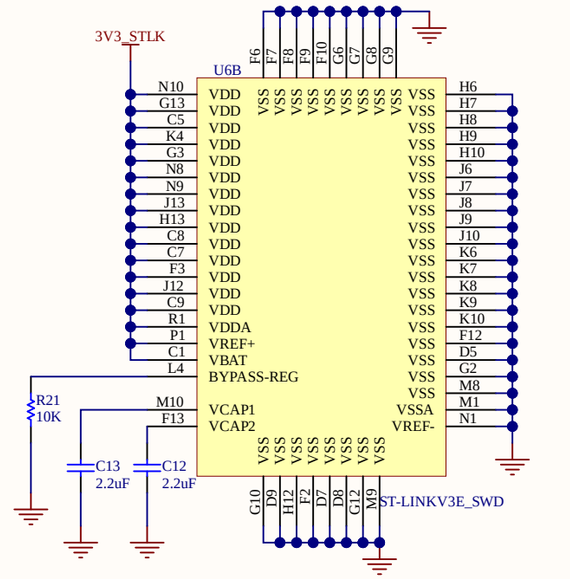
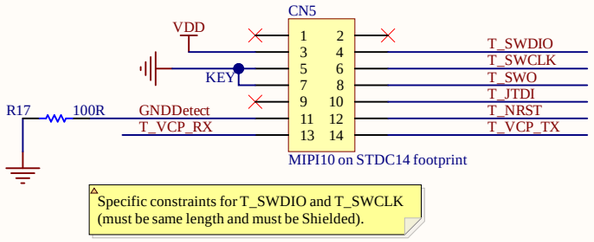
STLINK_MCU



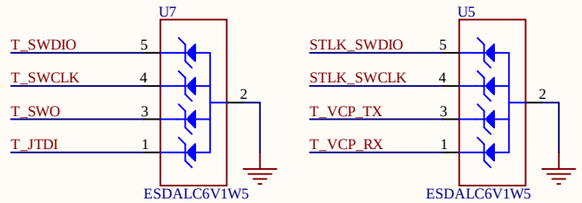
ST-LINK POWER



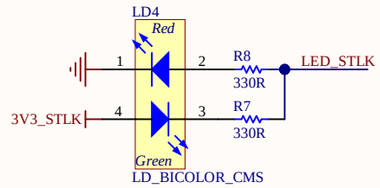
STDC14 Receiver

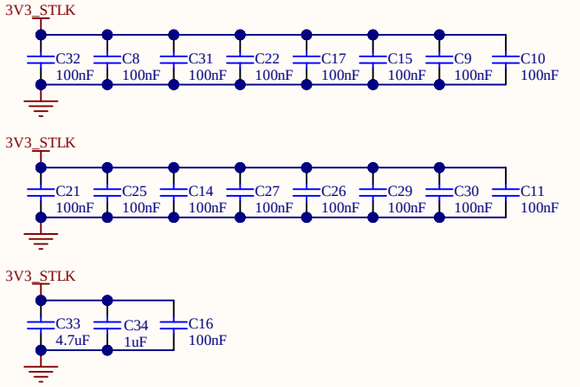


ESD PROTECTIONS

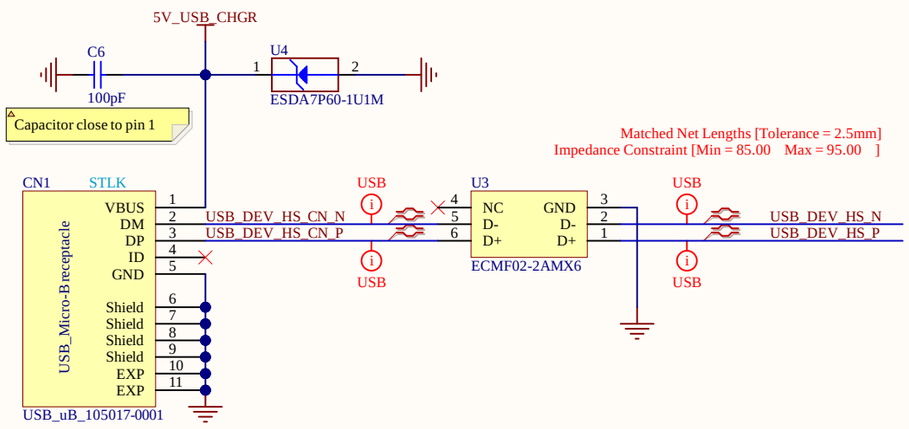


LED STLK

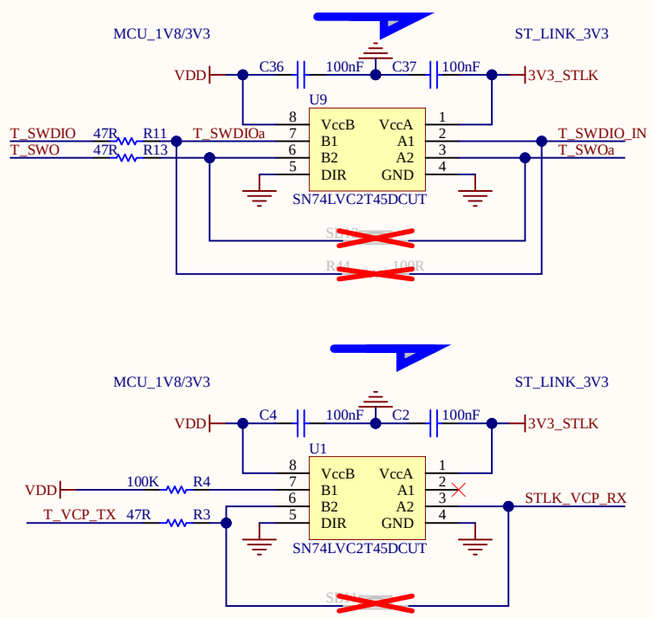




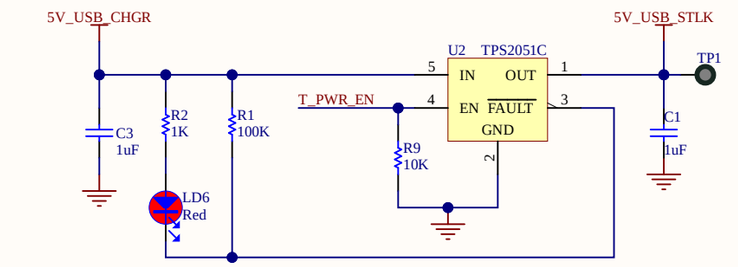
ST-LINK USB CONNECTOR



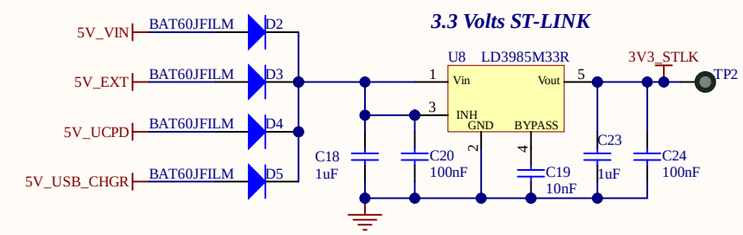
SW LEVEL SHIFTER FOR MCU_1V8



5V ST-LINK PROTECTION



ST-LINK POWER 3V3 / 150mA



GND

Title: **STLINK_V3E**		
Project: **NUCLEO144_Q (int-SMPS)**		
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