NUCLEO 144 H7 LEGACY

MB1364

H753ZI

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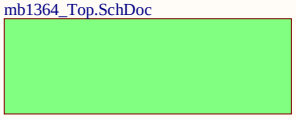
Sheet 9: ST-LINK V3E SWD

U_mb1364_Top
mb1364_Top.SchDoc



Legend

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

Text to be added to silkscreen.

Warning text.

Notes to generate the board layout.

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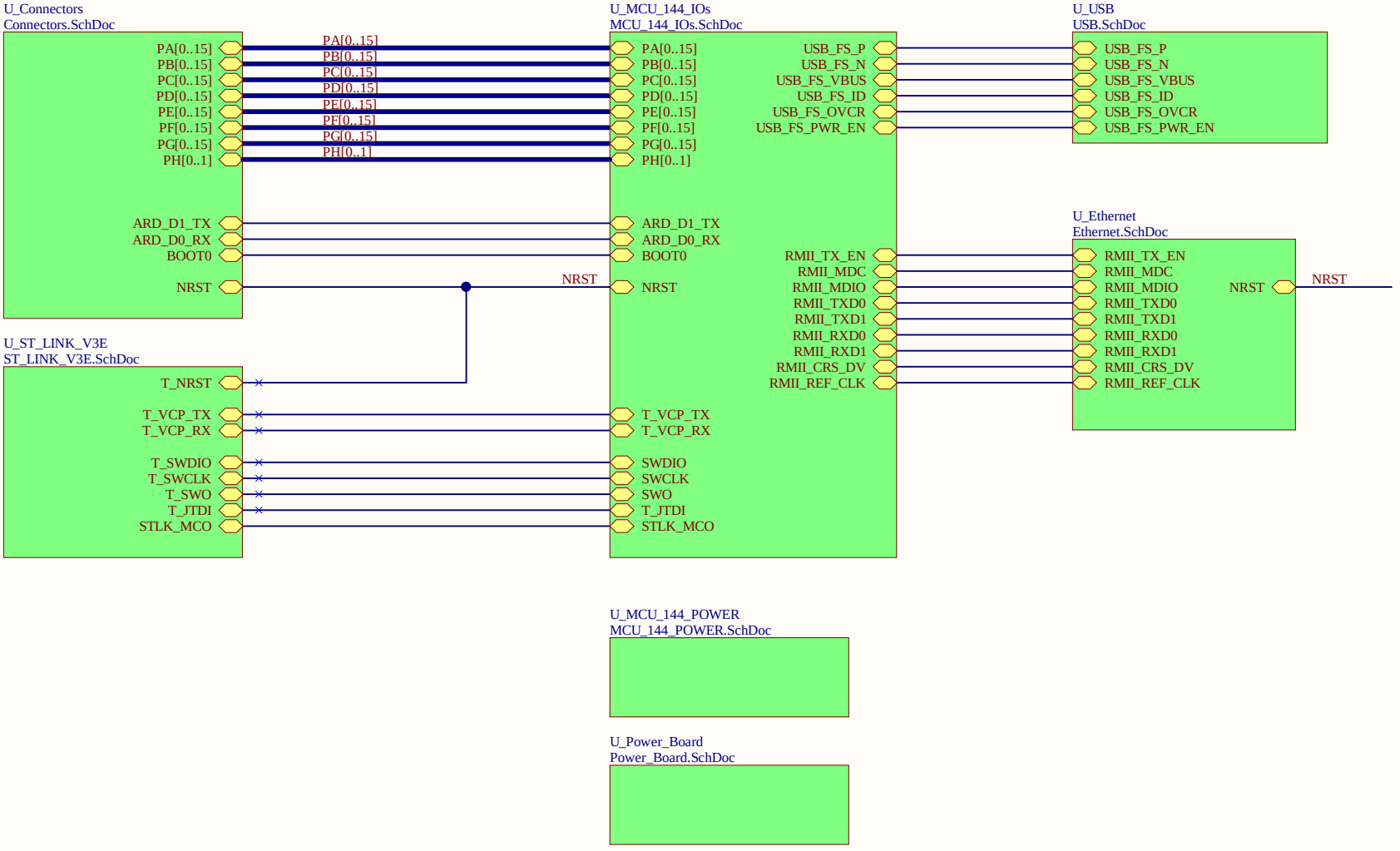
Title: **Project overview**			
Project: **NUCLEO 144 H7 LEGACY**			
Variant: H753ZI			
Revision: E -01		Reference: MB1364	
Size: A4	Date: 16-OCT-2019	Sheet: 1 of 9	life.augmented



Title: **MB1364 Top: hierarchical view**		
Project: **NUCLEO 144 H7 LEGACY**		
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Revision: E-01		Reference: MB1364
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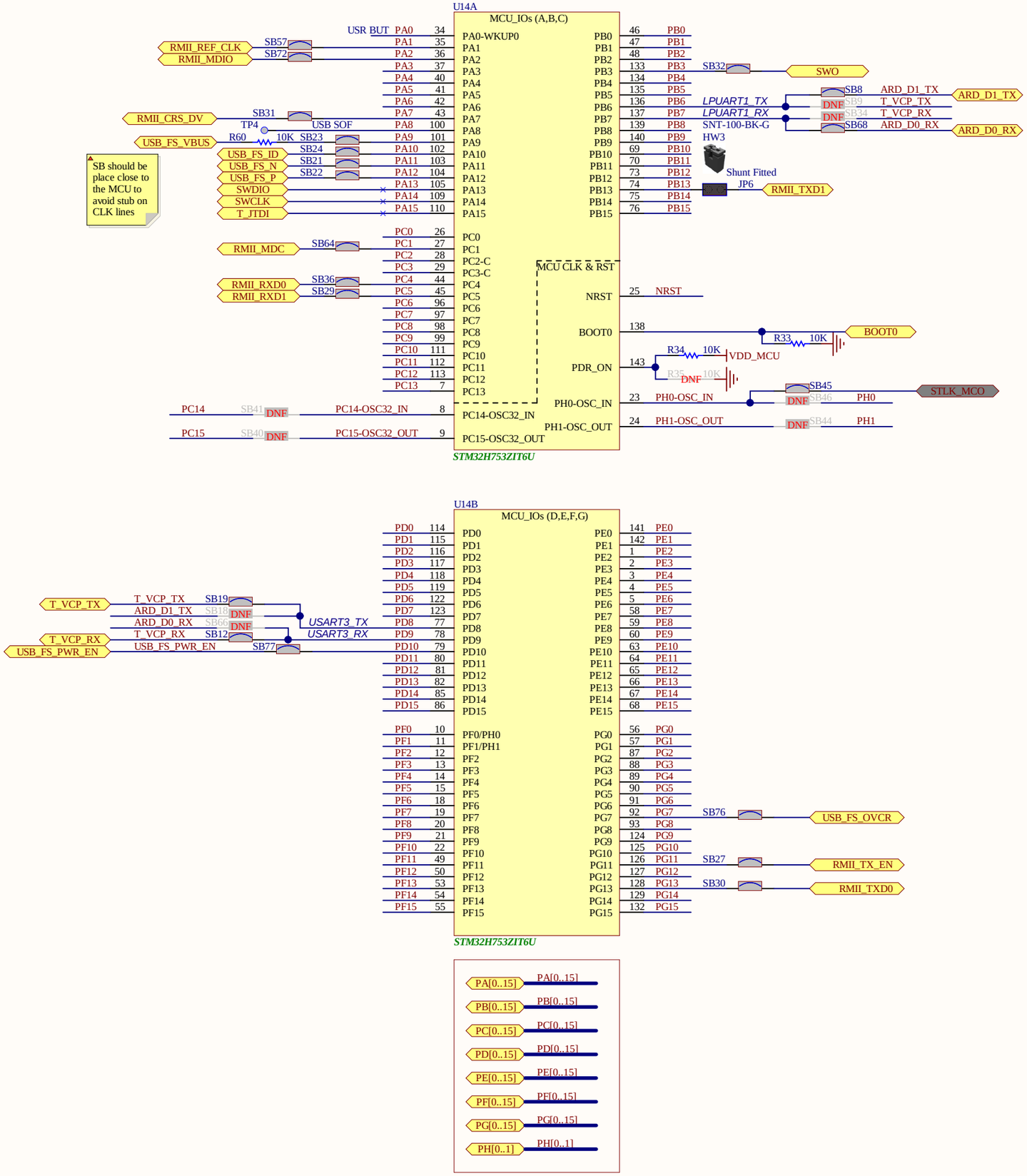
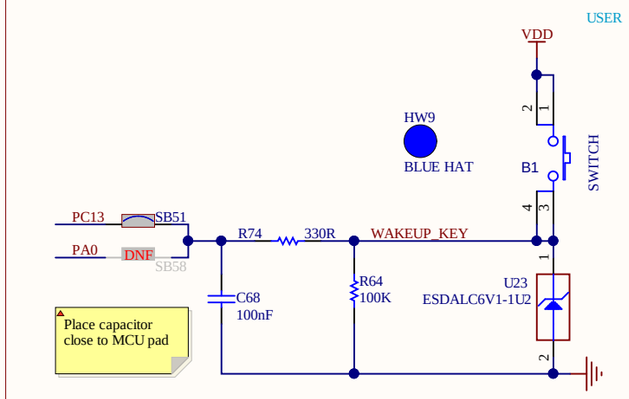
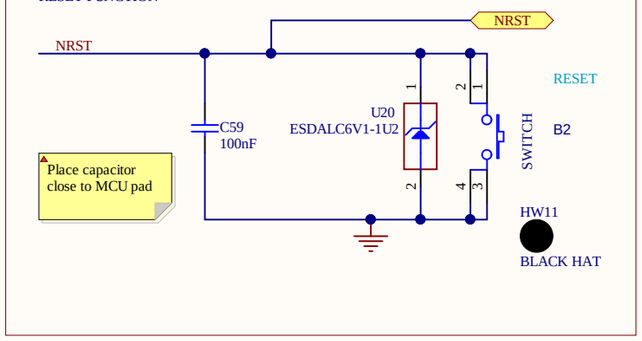
MCU IO CLK and RST



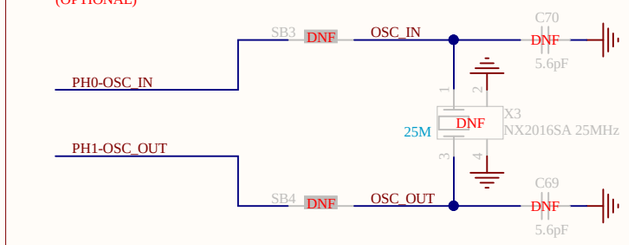
USER BUTTON



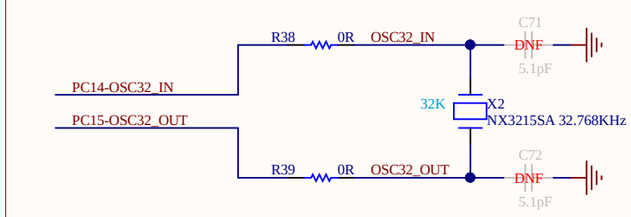
RESET FUNCTION



EXTERNAL HSE CLK (OPTIONAL)



EXTERNAL LSE CLK



Title: **MCU 144 I/Os**		
Project: **NUCLEO 144 H7 LEGACY**		
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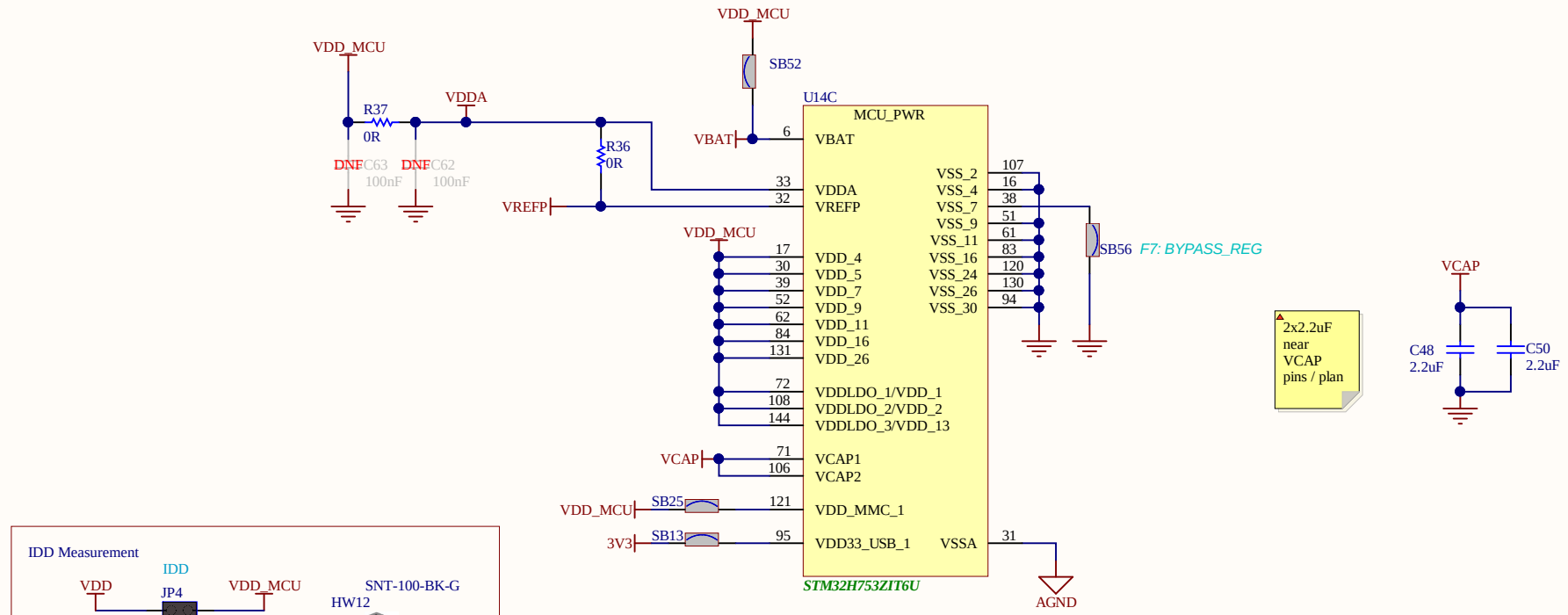
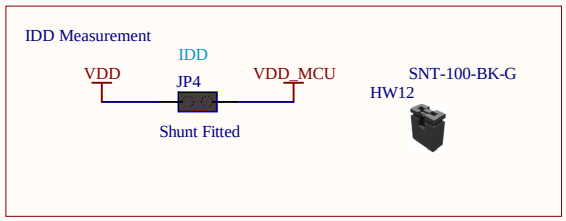
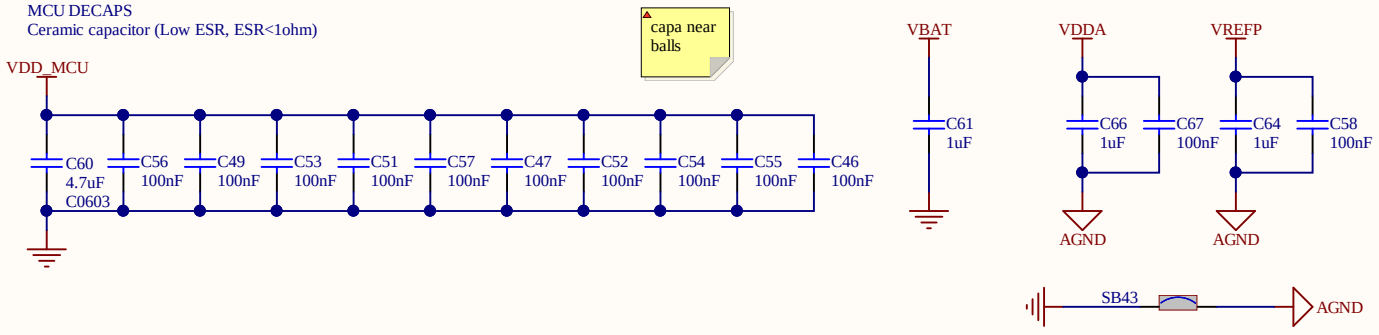
MCU PWR SUPPLIES





MCU DECAPS
Ceramic capacitor (Low ESR, ESR<1ohm)



Title: **MCU 144 POWER**		
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MORPHO CONNECTOR LEFT SIDE

Put the IO in BOTTOM side

CN11

Header 35x2
DNF

SB81

CN16
SNT-100-BK-G

HW1

ZIO CONNECTOR ARDUINO UNO COMPATIBLE

Arduino Uno compatible

CN8
Socket 8x2_N144_ARD

CN9
Socket 15x2_N144_ARD

Arduino Uno compatible

CN7
Socket 10x2_N144_ARD

CN10
Socket 17x2_N144_ARD

VREFP
SB42
C65
100nF
AGND

MORPHO CONNECTOR RIGHT SIDE

SB5 and SB6 to avoid stub of SDMMC signals
SB8 and SB24 to avoid stub on USB signals

Put the IO in BOTTOM side

CN12

Header 35x2
DNF

CN15
GND

HW2
SNT-100-BK-G

PA[0..15] PB[0..15] PC[0..15] PD[0..15] PE[0..15] PF[0..15] PG[0..15] PH[0..1] NRST BOOT0

ARD_D13_LED

LD1
GREEN
R26 270R
R73 47K
R68 100K
Q1 SOT23
D13 PA5 SB47 DNF
PB0 SB39

USER LED2

Curr=3mA, Lum=26%

LD2
YELLOW
R28 470R
R71 47K
R69 100K
Q2 SOT23
PE1

USER LED3

LD3
RED
R27 270R
R72 47K
R70 100K
Q3 SOT23
PB14

Title: **Connectors**	
Project: **NUCLEO 144 H7 LEGACY**	
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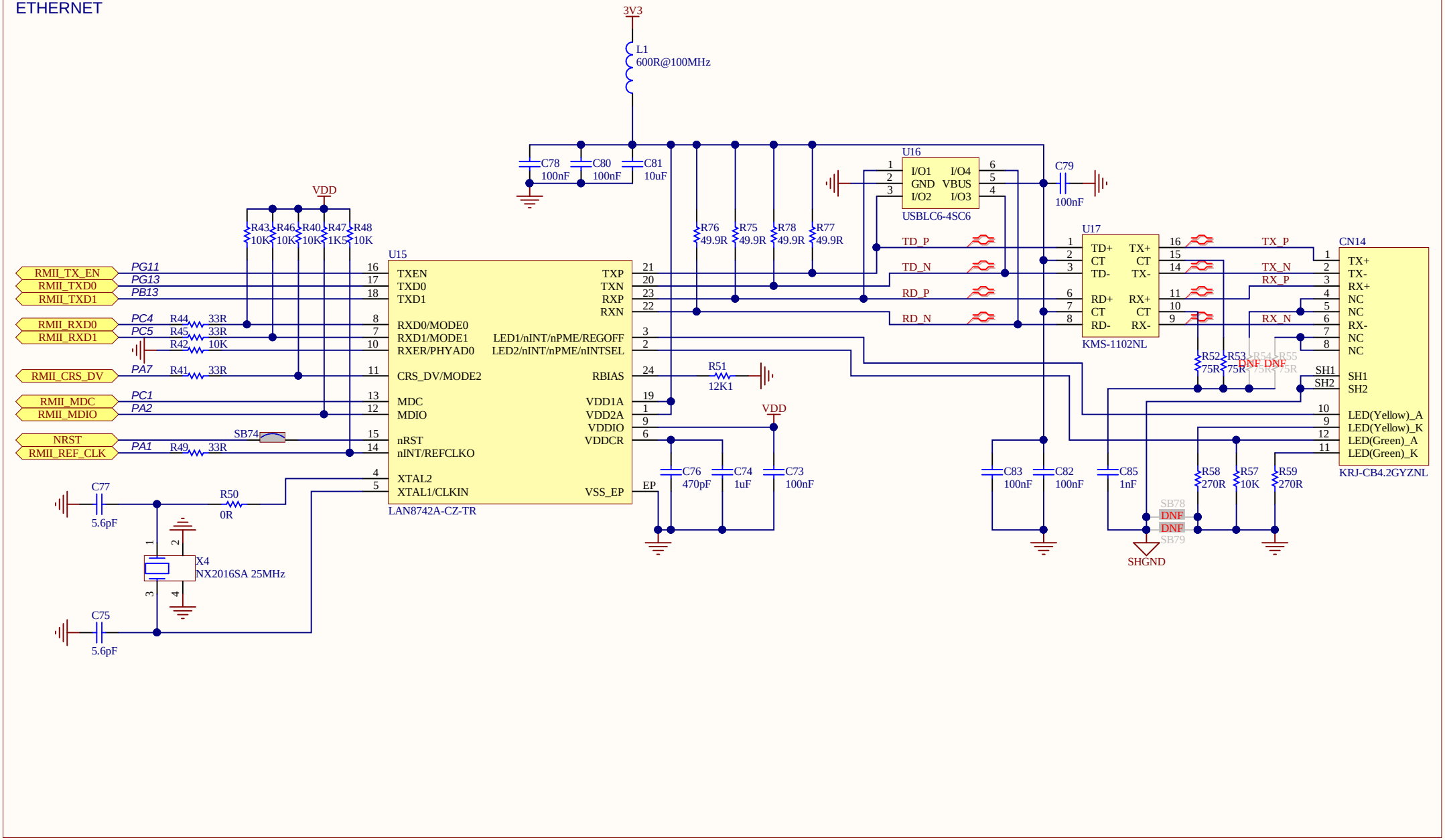
ETHERNET



Title: **Ethernet PHY with RJ45 connector**		
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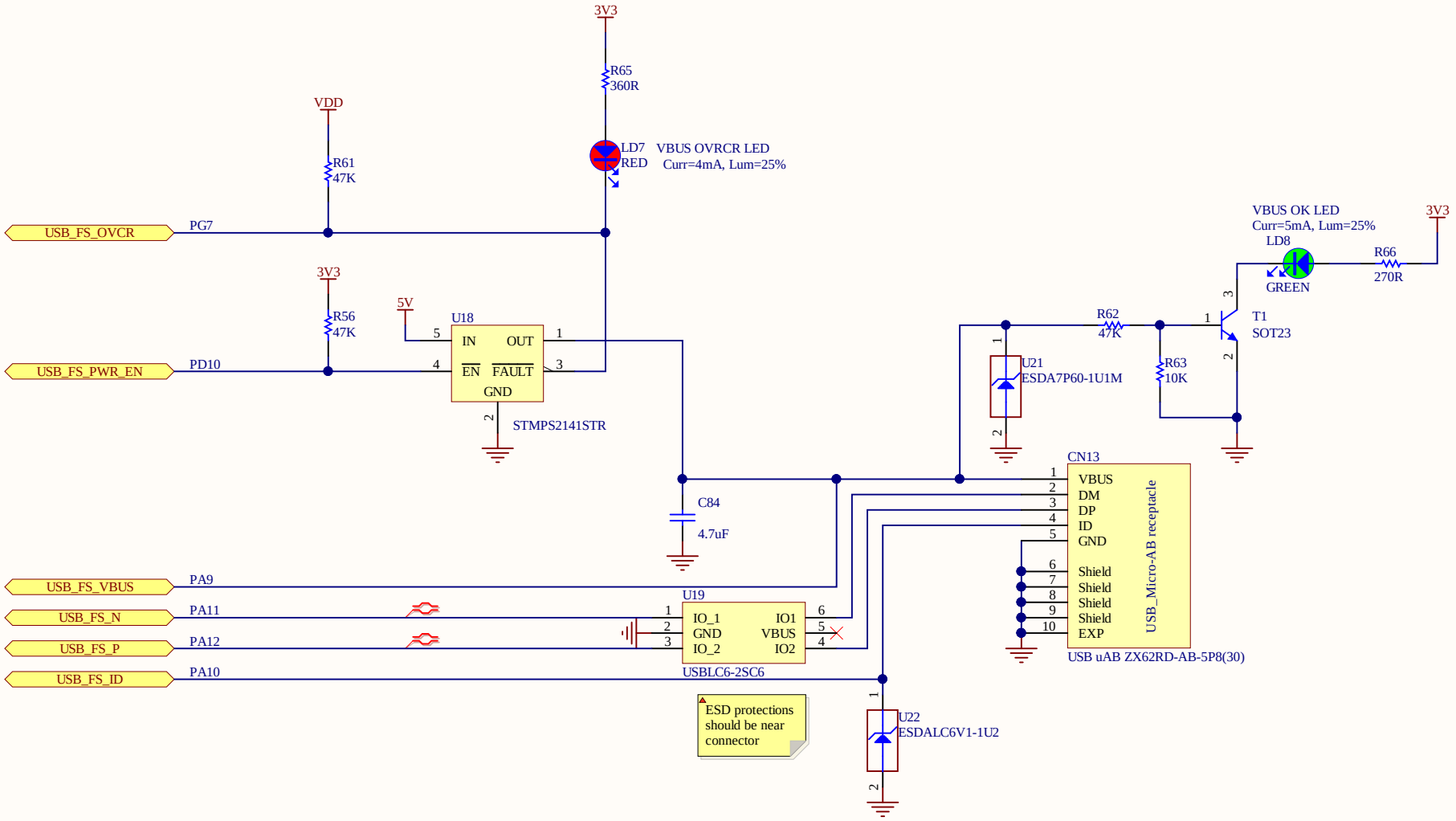
USB



Title: **USB**		
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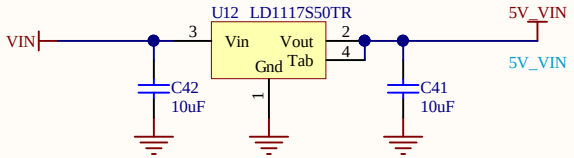
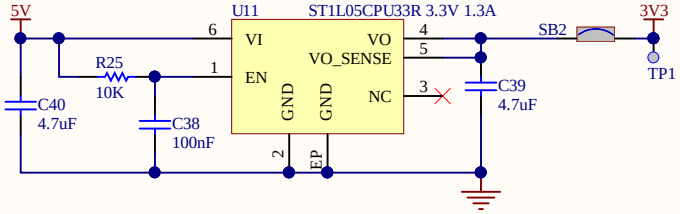
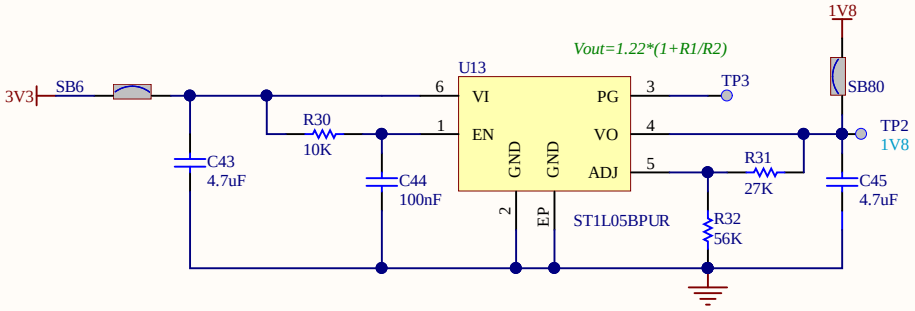
VIN / 5V PWR



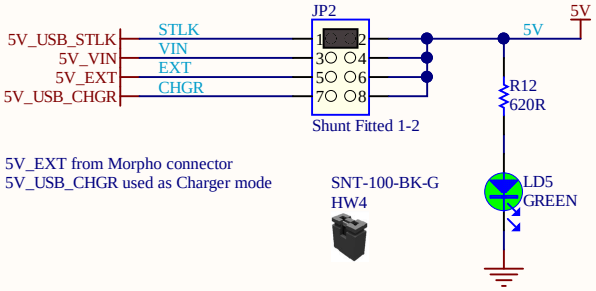
3V3 PWR

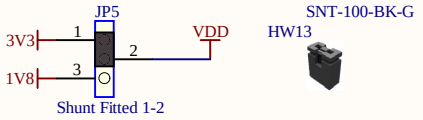


1V8 PWR



5V PWR SELECTION





Title: **MAIN POWER 5V / 3V3 / 1V8**		
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STLINK_MCU

DFU CONNECTOR

CN2

DNF

Header 4x1

Connector must be on the border of the PCB

The routing of the tracks must be done on continuity from ST-LINK to 22ohm resistors and from resistors to Target MCU to avoid stub noises and EMC approach. (22ohm resistors must be very close to STDC14)

3V3_STLK

HSE CLK STLINK

X1

NZ2520SH 25MHz

R24 10K

R21 100R

C37 100nF

JP1 Shunt not fitted

NRST

C28 100nF

D6

C6

C7 2.2uF

R6 3K

J14

J15

U7A

ST-LINKV3E_SWD

STLK_SWDIO	A15	STLK_SWDIO/PA13	T_SW_DIR/PA7
STLK_SWCLK	A14	STLK_SWCLK/PA14	T_SWDIO_IN/PH7
			T_SWDIO_OUT/PF9
USB_DEV_HS_N	R14	USB_DEV_HS_N/PB14	T_SWCLK/PH6
USB_DEV_HS_P	R15	USB_DEV_HS_P/PB15	T_SWO/PD2
	G1	OSC_IN/PH0	STLK_VCP_RX/PG9
	H1	OSC_OUT/PH1	STLK_VCP_TX/PG14
	J1	NRST	GNDDetect/PG5
	D6	BOOT0	T_VCC AIN/PA0
3V3_STLK	C6	PDR_ON	T_PWR_EXT/PB1
			T_PWR_EN/PB0
			STLK_LED/PA10
			STLK_MCO/PA8
C7 2.2uF / R6 3K	J14 / J15	V12_OTGPHY / REXT_OTGPHY	T_NRST/PA6
			HW_TYP_0/PI4
			HW_TYP_1/PI5

R3			
N12	T_SWDIO_IN	level shifter 1V8/3V3	
L2	T_SWDIOa	level shifter 1V8/3V3	
M11	T_SWCLKa		R11 22R T_SWCLK → T_SWCLK
D12	T_SWOa	level shifter 1V8/3V3	
C10	STLK_VCP_RX	level shifter 1V8/3V3	
A7	STLK_VCP_TX		R23 22R T_VCP_RX → T_VCP_RX
K13	GNDDetect		R20 4K7 / R18 4K7 VDD
N3			
R4	T_PWR_EXT		R15 2K7 / R14 4K7 5V
R5	T_PWR_EN		
D15	LED_STLK		
F15			R5 100R C5 20pF STLK_MCO → STLK_MCO
P3	T_NRSTa		R29 22R JP3 Shunt Fitted T_NRST → T_NRST
D4			
C4			

HW6 SNT-100-BK-G

ST-LINK POWER

3V3_STLK

U7B ST-LINKV3E_SWD

R22 10K

C13 2.2uF

C12 2.2uF

Ceramic capacitor (Low ESR)

3V3_STLK

C34 100nF, C8 100nF, C33 100nF, C22 100nF, C17 100nF, C15 100nF, C9 100nF, C10 100nF

3V3_STLK

C21 100nF, C25 100nF, C14 100nF, C30 100nF, C29 100nF, C31 100nF, C32 100nF, C11 100nF

3V3_STLK

C35 4.7uF, C36 1uF, C16 100nF

STDC14 Receiver

CN5

MIPI10 on STDC14 footprint

VDD

KEY

R17 100R

GNDDetect

T_VCP_RX

T_SWDIO

T_SWCLK

T_SWO

T_JTDI

T_NRST

T_VCP_TX

Specific constraints for T_SWDIO and T_SWCLK (must be same length and must be Shielded).

ESD PROTECTIONS

U4 ESDALC6V1-1U2

U3 ESDALC6V1-1U2

STLK_SWDIO

STLK_SWCLK

U8 ESDALC6V1W5

U24 ESDALC6V1W5

T_SWDIO

T_SWCLK

T_SWO

T_JTDI

T_NRST

T_VCP_TX

T_VCP_RX

T_JTDI

Pin attributions on ESD can be swapped for layout optimisation

LED STLK

LD4 LD_BICOLOR_CMS

Red

Green

3V3_STLK

R9 330R

R8 330R

LED_STLK

ST-LINK USB CONNECTOR

5V_USB_CHGR

C6 100pF

U6 ESDA7P60-1U1M

Capacitor close to pin 1

Matched Net Lengths [Tolerance = 2.5mm]
Impedance Constraint [Min = 85.00 Max = 95.00]

CN1 STLK

USB_Micro-B receptacle

VBUS, DM, DP, ID, GND, Shield, Shield, Shield, Shield, EXP, EXP

USB_DEV_HS_CN_N

USB_DEV_HS_CN_P

USB

U5 ECMF02-2AMX6

NC, GND, D-, D-, D+, D+

USB_DEV_HS_N

USB_DEV_HS_P

USB_uB_105017-0001

SW LEVEL SHIFTER FOR MCU_1V8

MCU_1V8/3V3

ST_LINK_3V3

VDD

C26 100nF

C27 100nF

3V3_STLK

U10 SN74LVC2T45DCUT

VccB, VccA, B1, B2, DIR, GND, A1, A2

T_SWDIO

T_SWO

R10 22R

R13 22R

T_SWDIOa

T_SWDIO_IN

T_SWOa

SB5 DNF

R67 100R DNF

MCU_1V8/3V3

ST_LINK_3V3

VDD

C4 100nF

C2 100nF

3V3_STLK

U1 SN74LVC2T45DCUT

R4 100K

T_VCP_TX

PB6

R3 22R

STLK_VCP_RX

SB1 DNF

5V ST-LINK PROTECTION

5V_USB_CHGR

U2 STMPS2151STR

IN, OUT, EN, FAULT, GND

T_PWR_EN

5V_USB_STLK

C3 1uF

R2 1K

R1 100K

R7 10K

C1 1uF

LD6 RED

ST-LINK POWER 3V3 / 150mA

5V_VIN

5V_EXT

5V_USB_CHGR

BAT60JFILM

D1

D2

D3

3.3 Volts ST-LINK

U9 LD3985M33R

Vin, Vout, INH, GND, BYPASS

3V3_STLK

C18 1uF

C20 100nF

C19 10nF

C23 1uF

C24 100nF

GND

SNT-100-BK-G

CN3 Header 2x1 16mm

HW7

SNT-100-BK-G

CN4 Header 2x1 16mm

HW8

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