NUCLEO 144 H7 LEGACY

MB1364

H753ZI

Table of contents

Sheet 1: Project overview (this page)

Sheet 2: mb1364_Top

Sheet 3: MCU I/Os

Sheet 4: MCU POWER

Sheet 5: CONNECTORS

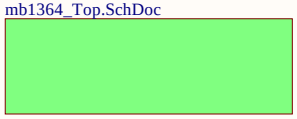
Sheet 6: ETHERNET

Sheet 7: USB

Sheet 8: POWER BOARD

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.

OPEN PLATFORM LICENSE AGREEMENT

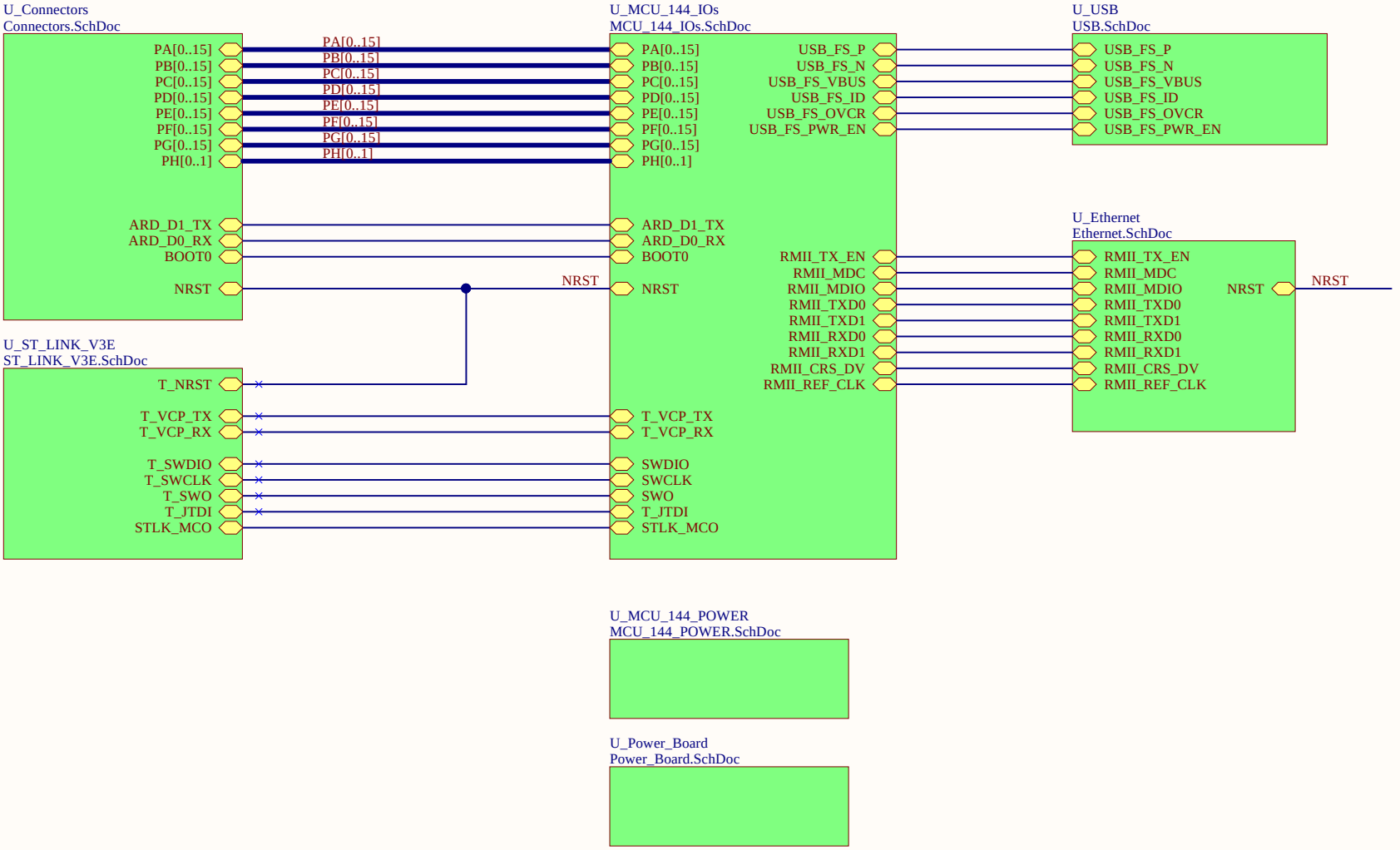
The Open Platform License Agreement (“Agreement”) is a binding legal contract between you ("You") and STMicroelectronics International N.V. (“ST”), a company incorporated under the laws of the Netherlands acting for the purpose of this Agreement through its Swiss branch 39, Chemin du Champ des Filles,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

Title: **Project overview**		
Project: **NUCLEO 144 H7 LEGACY**		
Variant: H753ZI		
Revision: C-01		Reference: MB1364
Size: A4	Date: 17-DEC-2018	Sheet: 1 of 9

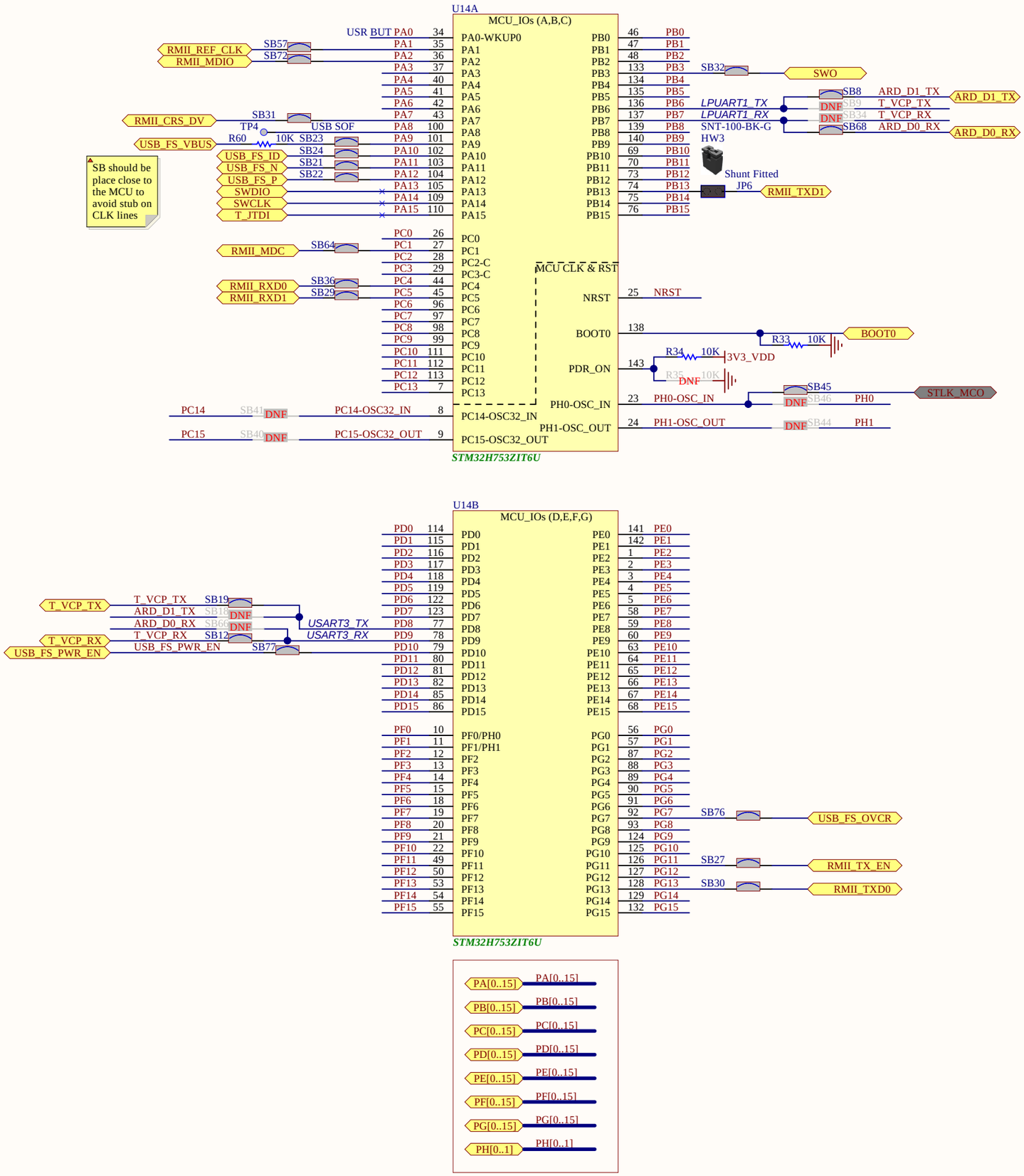
life.augmented



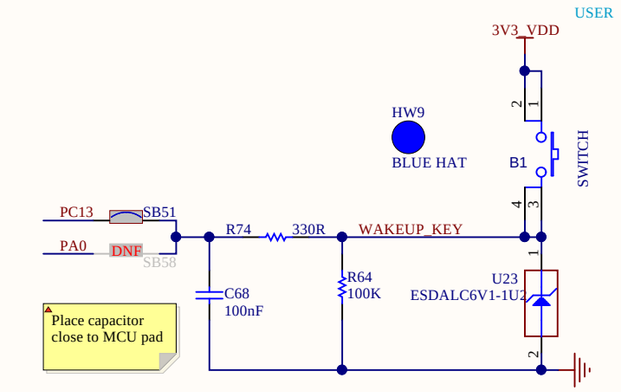
Title: **mb1319 Top: hierarchical view**		
Project: **NUCLEO 144 H7 LEGACY**		
Variant: H753ZI		
Revision: C-01		Reference: MB1364
Size: A4	Date: 17-DEC-2018	Sheet: 2 of 9

life.augmented

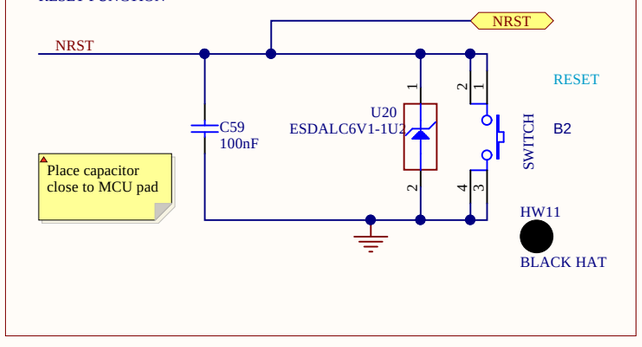
MCU IO CLK and RST



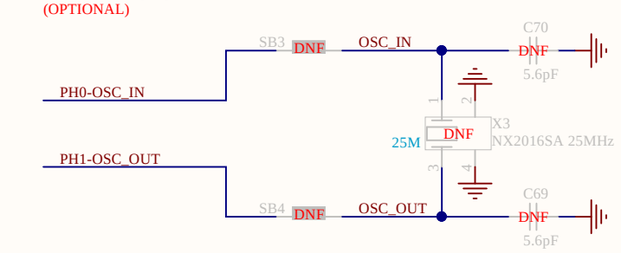
USER BUTTON



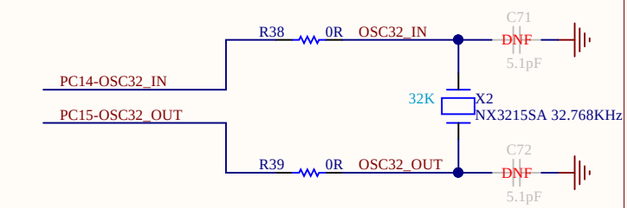
RESET FUNCTION



EXTERNAL HSE CLK (OPTIONAL)

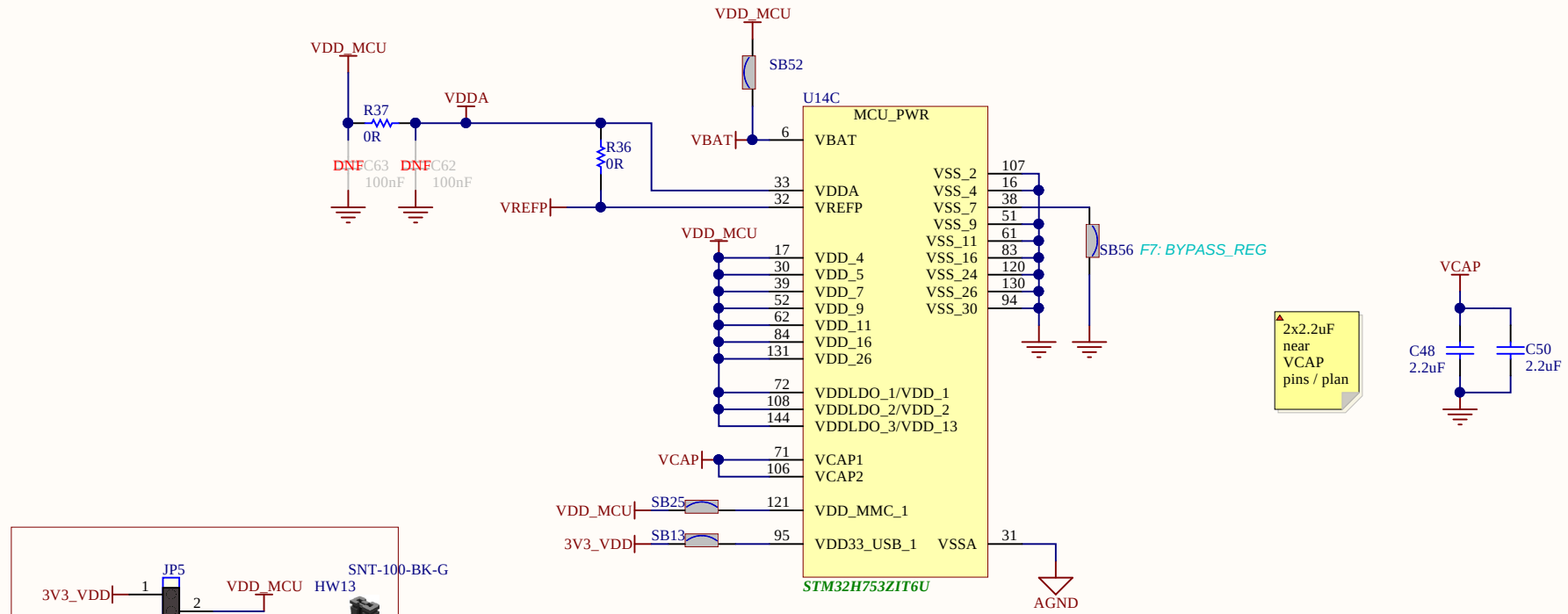


EXTERNAL LSE CLK



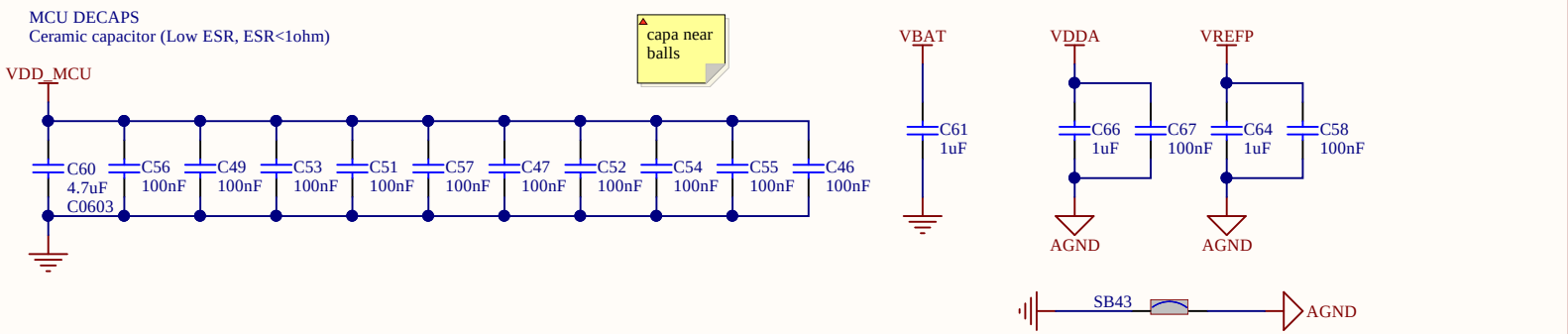
Title: **MCU 144 I/Os**		
Project: **NUCLEO 144 H7 LEGACY**		
Variant: H753ZI		
Revision: C-01		Reference: MB1364
Size: A3	Date: 17-DEC-2018	Sheet: 3 of 9

MCU PWR SUPPLIES



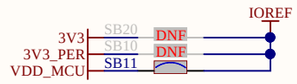
MCU DECAPS

Ceramic capacitor (Low ESR, ESR<1ohm)

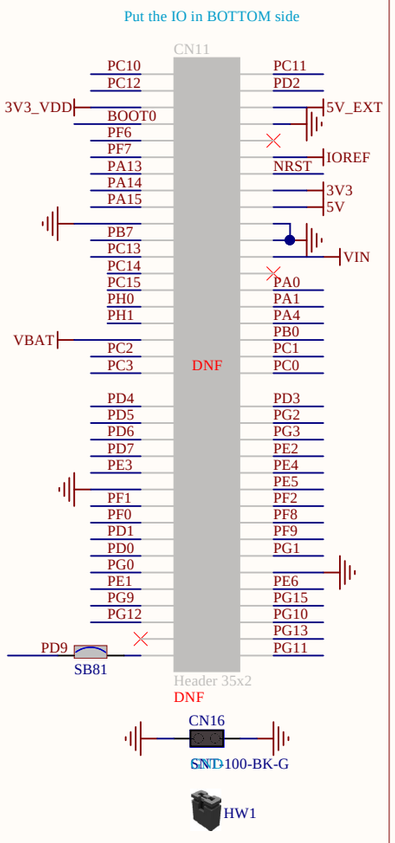


Title: **MCU 144 POWER**		
Project: **NUCLEO 144 H7 LEGACY**		
Variant: H753ZI		
Revision: C-01	Reference: MB1364	
Size: A4	Date: 17-DEC-2018	Sheet: 4 of 9

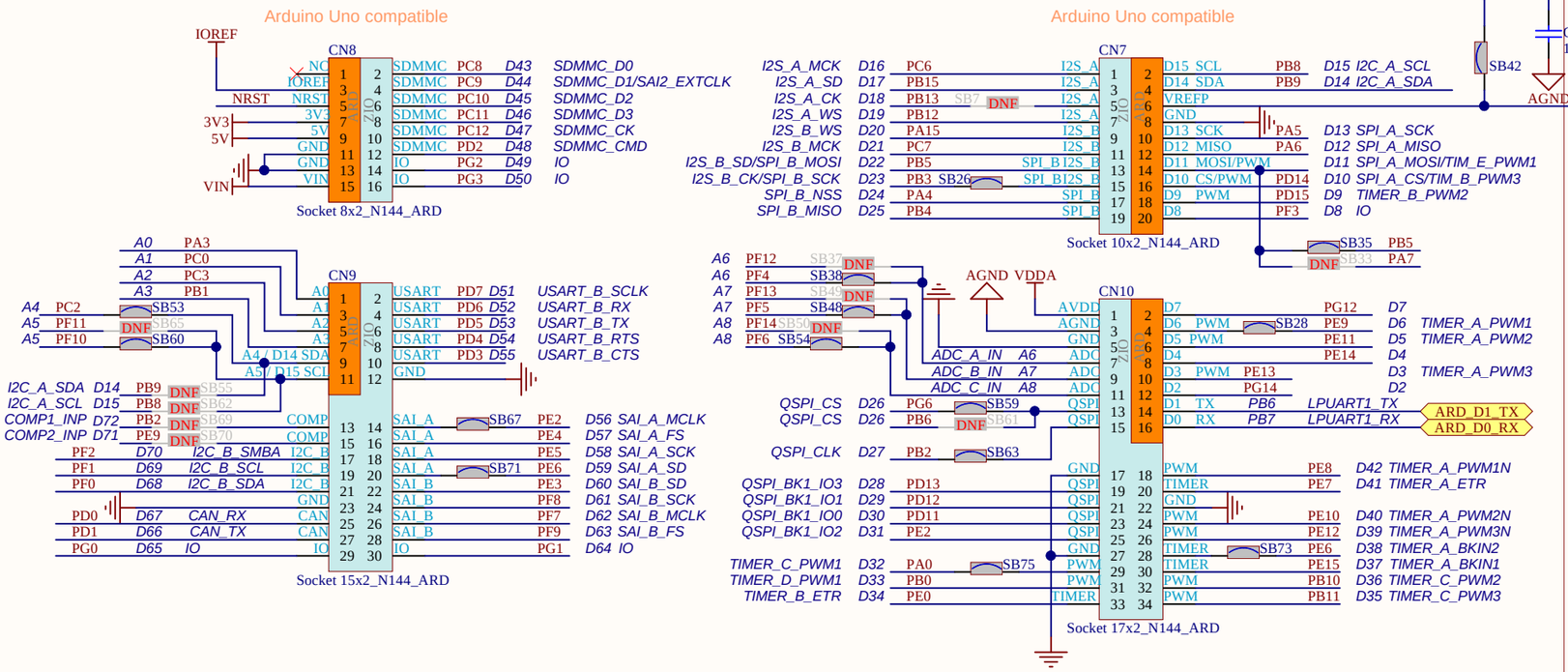
life.augmented



MORPHO CONNECTOR LEFT SIDE

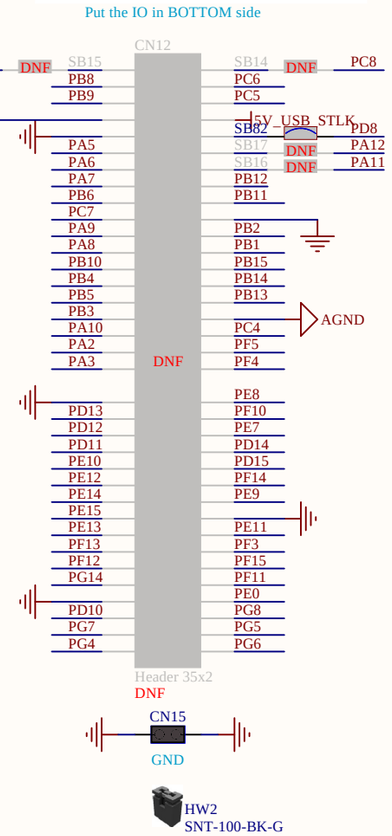


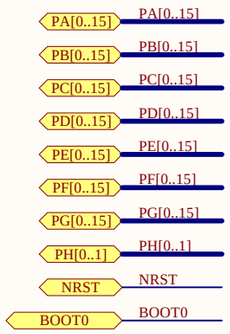
ZIO CONNECTOR ARDUINO UNO COMPATIBLE

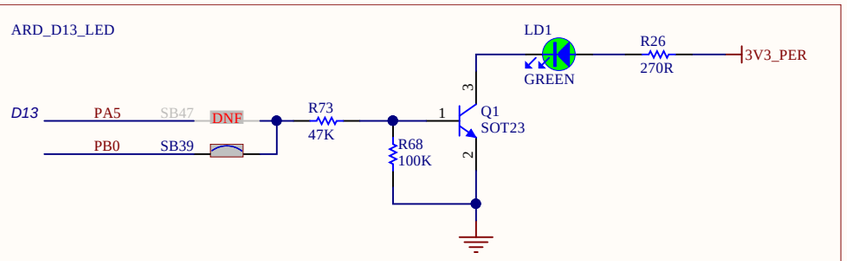


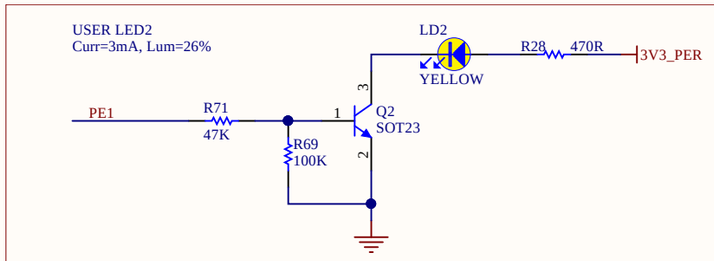
MORPHO CONNECTOR RIGHT SIDE

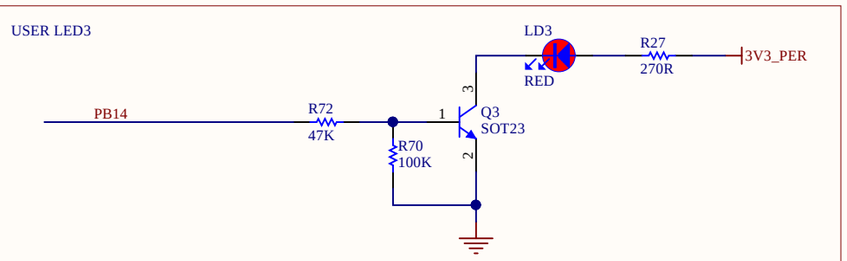
SB5 and SB6 to avoid stub of SDMMC signals
SB8 and SB24 to avoid stub on USB signals





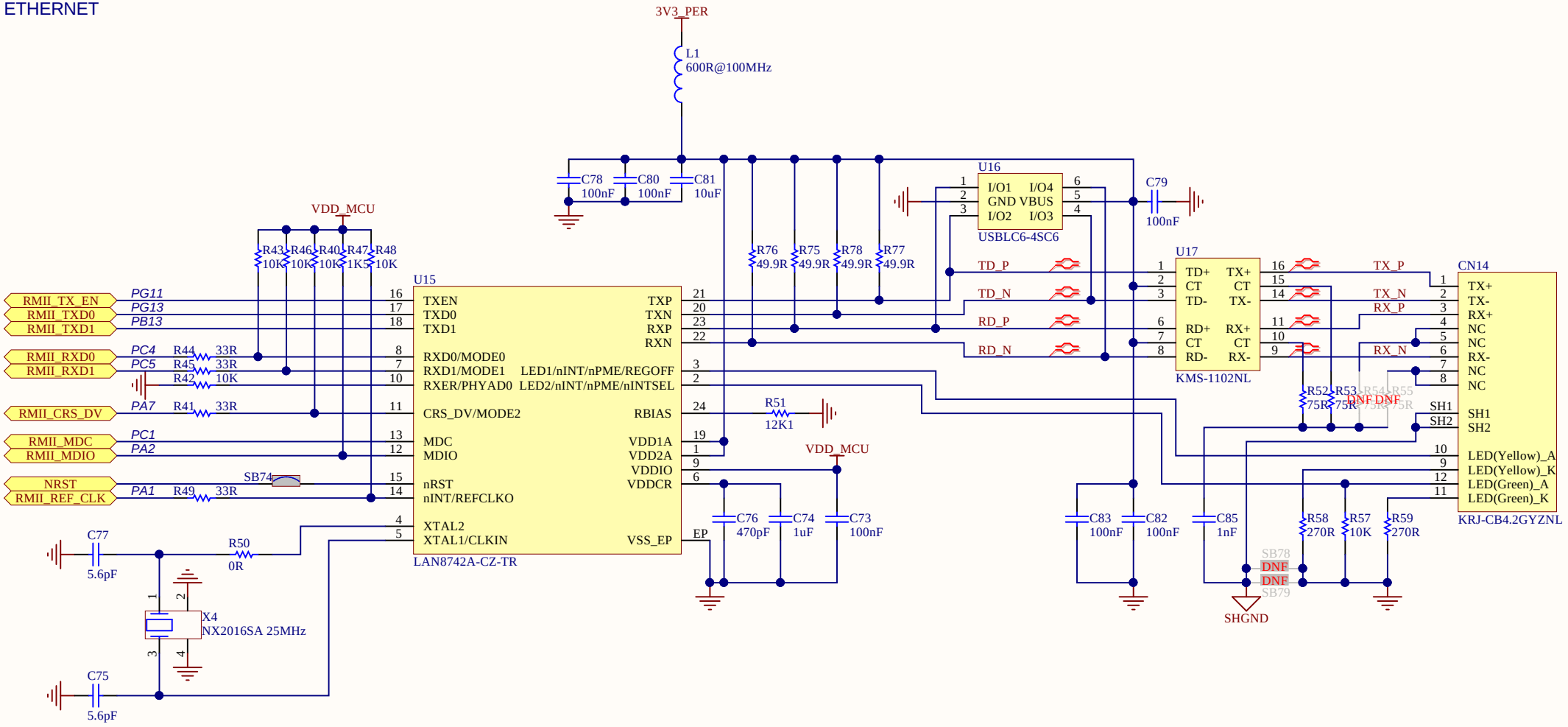






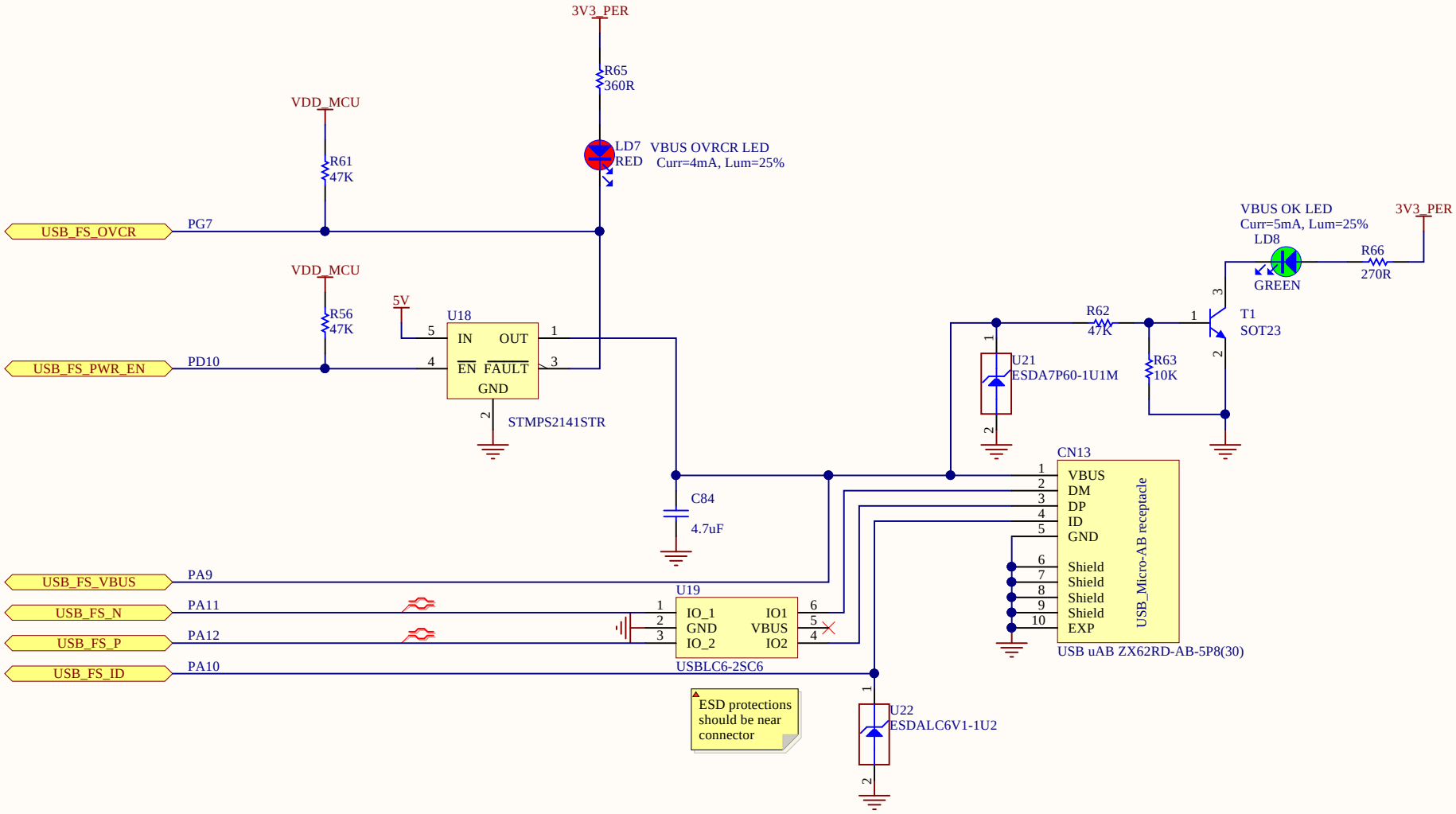
Title: **Connectors**	
Project: **NUCLEO 144 H7 LEGACY**	
Variant: H753ZI	
Revision: C-01	Reference: MB1364
Size: A3 | Date: 17-DEC-2018	Sheet: 5 of 9

ETHERNET



Title: **Ethernet PHY with RJ45 connector**		
Project: **NUCLEO 144 H7 LEGACY**		
Variant: H753ZI		
Revision: C-01		Reference: MB1364
Size: A4	Date: 17-DEC-2018	Sheet: 6 of 9

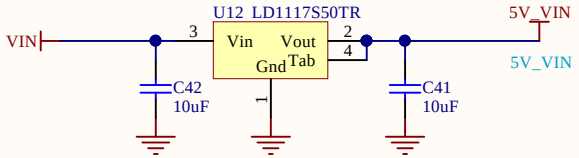
USB



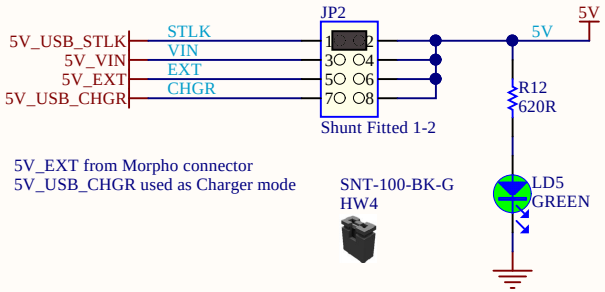
Title: **USB**		
Project: **NUCLEO 144 H7 LEGACY**		
Variant: H753ZI		
Revision: C-01		Reference: MB1364
Size: A4	Date: 17-DEC-2018	Sheet: 7 of 9

life.augmented

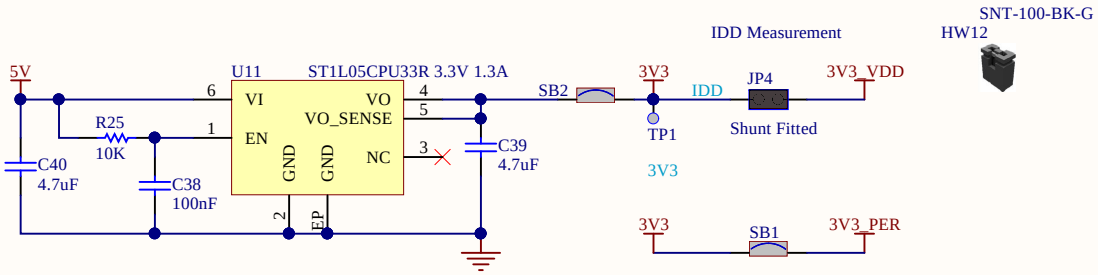
VIN / 5V PWR



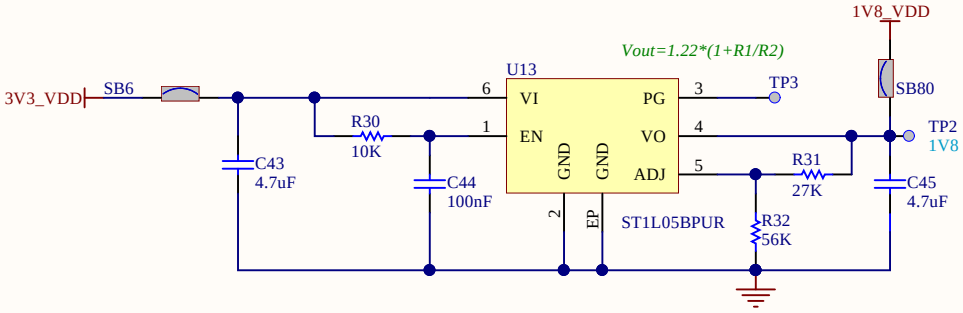
5V PWR SELECTION



3V3 PWR



1V8 PWR



Title: **MAIN POWER 5V / 3V3 / 1V8**		
Project: **NUCLEO 144 H7 LEGACY**		
Variant: H753ZI		
Revision: C-01		Reference: MB1364
Size: A4	Date: 17-DEC-2018	Sheet: 8 of 9

life.augmented

STLINK_MCU

DFU CONNECTOR

CN2

Header 4x1

DNF

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

U7A

ST-LINKV3E_SWD

STLK_SWDIO	A15	STLK_SWDIO/PA13	
STLK_SWCLK	A14	STLK_SWCLK/PA14	
USB_DEV_HS_N	R14	USB_DEV_HS_N/PB14	
USB_DEV_HS_P	R15	USB_DEV_HS_P/PB15	
	G1	OSC_IN/PH0	
	H1	OSC_OUT/PH1	
	J1	NRST	
		BOOT0	
		PDR_ON	
	J14	V12_OTGPHY	
	J15	REXT_OTGPHY	
	R3	T_SW_DIR/PA7	
T_SWDIO_IN	N12	T_SWDIO_IN/PH7	level shifter 1V8/3V3
T_SWDIOa	L2	T_SWDIO_OUT/PF9	level shifter 1V8/3V3
T_SWCLKa	M11	T_SWCLK/PH6	level shifter 1V8/3V3
T_SWOa	D12	T_SWO/PD2	
STLK_VCP_RX	C10	STLK_VCP_RX/PG9	level shifter 1V8/3V3
STLK_VCP_TX	A7	STLK_VCP_TX/PG14	level shifter 1V8/3V3
GNDDetect	K13	GNDDetect/PG5	
	N3	T_VCC AIN/PA0	
T_PWR_EXT	R4	T_PWR_EXT/PB1	
T_PWR_EN	R5	T_PWR_EN/PB0	
LED_STLK	D15	STLK_LED/PA10	
	F15	STLK_MCO/PA8	
T_NRSTa	P3	T_NRST/PA6	
	D4	HW_TYP_0/PI4	
	C4	HW_TYP_1/PI5	

R11 22R T_SWCLK → T_SWCLK

R23 22R T_VCP_RX → T_VCP_RX

R20 4K7 3V3_PER

R18 4K7

R15 2K7 5V

R14 4K7

R5 100R C5 20pF STLK_MCO → STLK_MCO

R29 22R JP3 Shunt Fitted T_NRST → T_NRST

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)

C34 C8 C33 C22 C17 C15 C9 C10 — 100nF

C21 C25 C14 C30 C29 C31 C32 C11 — 100nF

C35 4.7uF C36 1uF C16 100nF

STDC14 Receiver

CN5

MIPI10 on STDC14 footprint

3V3

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 U3 ESDALC6V1-1U2

STLK_SWDIO

STLK_SWCLK

ESDALC6V1-1U2

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 LED_STLK

R8 330R

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 D- D+ GND 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_MCU C26 100nF C27 100nF 3V3_STLK

U10 SN74LVC2T45DCUT

VccB VccA B1 A1 B2 A2 DIR GND

T_SWDIO T_SWO

T_SWDIO R10 22R T_SWDIOa

T_SWO R13 22R T_SWOa

T_SWDIO_IN

SB5 DNF

R67 100R DNF

MCU_1V8/3V3

ST_LINK_3V3

VDD_MCU C4 100nF C2 100nF 3V3_STLK

U1 SN74LVC2T45DCUT

VDD_MCU R4 100K

T_VCP_TX PB6 T_VCP_TX_R3 22R

STLK_VCP_RX

5V ST-LINK PROTECTION

U2 STMPS2151STR

5V_USB_CHGR

C3 1uF

R2 1K

R1 100K

LD6 RED

T_PWR_EN

R7 10K

5V_USB_STLK

C1 1uF

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

CN4 Header 2x1 16mm HW8

Title: **STLINK_V3E**			
Project: **NUCLEO 144 H7 LEGACY**			
Variant: H753ZI			
Revision: C-01		Reference: MB1364	
Size: A3	Date: 17-DEC-2018	Sheet: 9 of 9	

life.augmented