STM32H745I-Disco

MB1381

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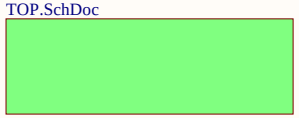
Top
TOP.SchDoc



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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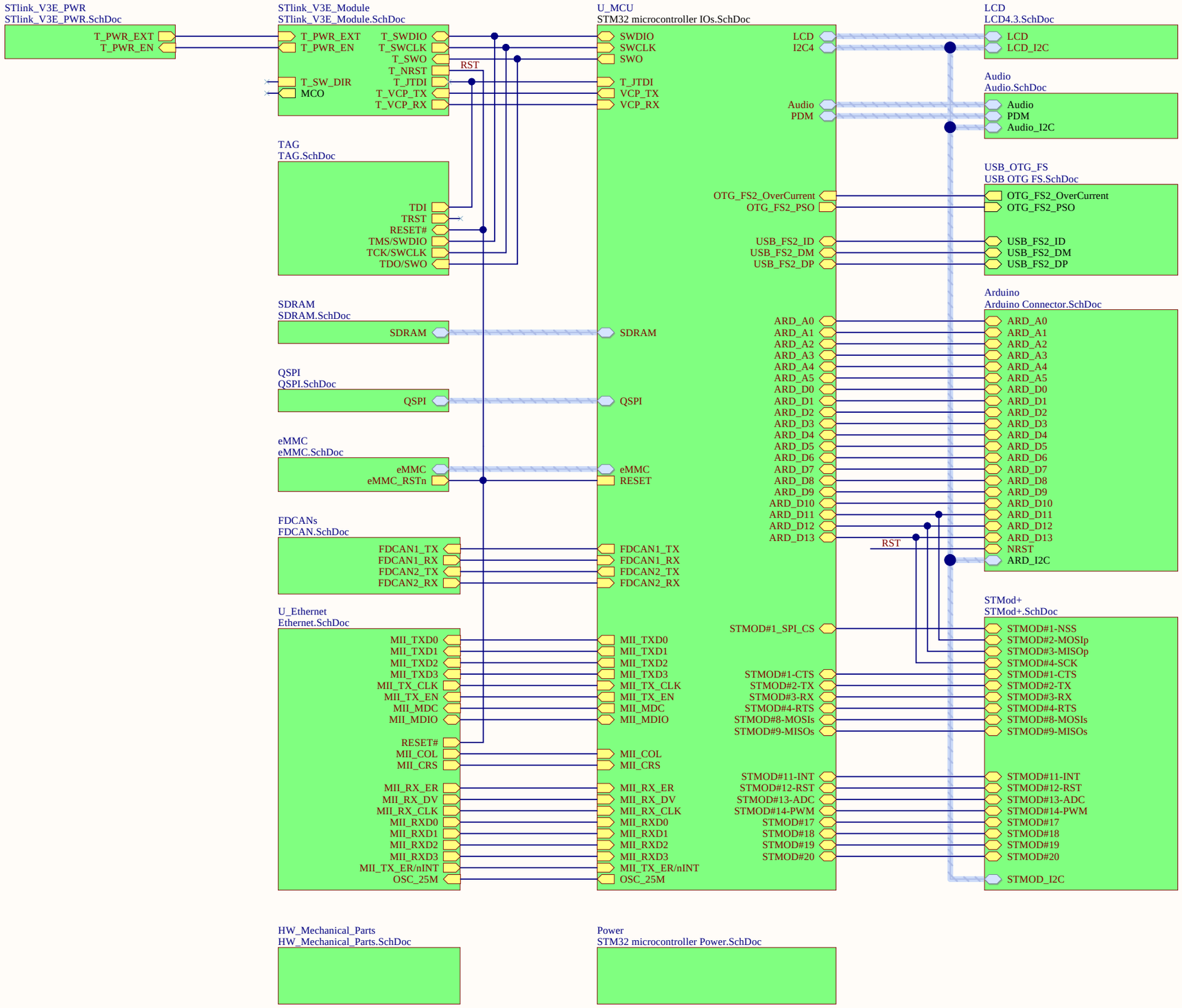
Title: **Project overview**			
Project: **STM32H745I-Disco**			
Variant: H750XB			
Revision: B-01		Reference: MB1381	
Size: A4	Date: 11-JUNE-18	Sheet: 1 of 19	

life.augmented



Title: **TOP**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A3	Date: 11-JUNE-18	Sheet: 2 of 19

life.augmented

SDRAM

SDRAM
SDRAM_A[0..11]
SDRAM_D[0..15]
SDRAM_BA0
SDRAM_BA1
SDRAM_NBL0
SDRAM_NBL1
SDRAM_SDNE1
SDRAM_SDCKE1
SDRAM__SDNCAS
SDRAM__SDNRAS
SDRAM_NWE
SDRAM_CLK

QSPI

QSPI
QSPI_CS1
QSPI_CS2
QSPI_CLK
QSPI_IO0
QSPI_IO1
QSPI_IO2
QSPI_IO3
QSPI_IO4
QSPI_IO5
QSPI_IO6
QSPI_IO7

QSPI_BK1_NCS
QSPI_BK2_NCS
QSPI_CLK
QSPI_BK1_IO0
QSPI_BK1_IO1
QSPI_BK1_IO2
QSPI_BK1_IO3
QSPI_BK2_IO0
QSPI_BK2_IO1
QSPI_BK2_IO2
QSPI_BK2_IO3

eMMC

eMMC
SDIO1_D[0..7]
SDIO1_CK
SDIO1_CMD

DEBUG

SWDIO
SWCLK
SWO
T_JTDI
VCP_RX
VCP_TX
RESET
OSC_25M
R83 51R

FDCAN

FDCAN1_TX
FDCAN1_RX
FDCAN2_TX
FDCAN2_RX

LCD

LCD
LCD_R[0..7]
LCD_G[0..7]
LCD_B[0..7]
LCD_HSYNC
LCD_VSYNC
LCD_DE
LCD_DISP
LCD_CLK
LCD_INT
LCD_RST
LCD_BL

Audio

SAI
Audio
SAI_SCKA
SAI_FSA
SAI_SDA
SAI_SDB
Audio_Int
SAI_MCKA

PDM
PDM
DATA
CLK
SAI4_D2
SAI4_CK2

Ethernet

MII_TX_CLK
MII_TX_EN
MII_TXD0
MII_TXD1
MII_TXD2
MII_TXD3
MII_RXD0
MII_RXD1
MII_RXD2
MII_RXD3
MII_RX_ER
MII_RX_DV
MII_RX_CLK
MII_COL
MII_CRS
MII_MDC
MII_MDIO
MII_TX_ER/nINT

Ethernet

I2C
I2C4
SDA
SCL
IIC4_SDA
IIC4_SCL

ARD_A0
ARD_A1
ARD_A2
ARD_A3
ARD_A4
ARD_A5
ARD_D13
ARD_D12
ARD_D11
ARD_D10
ARD_D9
ARD_D8
ARD_D7
ARD_D6
ARD_D5
ARD_D4
ARD_D3
ARD_D2
ARD_D1
ARD_D0

U6A

STM32H750XBH6

STMOD#1-CTS	N5	PA0	PD0	D13	R86	33R	SDRAM_D2
MII_RX_CLK	N4	PA1	PD1	E12	R84	33R	SDRAM_D3
MII_MDIO	N3	PA2	PD2	D12			SDIO1_CMD
STMOD#14-PWM	U2	PA3	PD3	B12			ARD_D13
STMOD#13-ADC	U3	PA4	PD4	A12			STMOD#4-RTS
OTG_FS2_PSO	T3	PA5	PD5	A11			STMOD#2-TX
ARD_D3	R3	PA6	PD6	B11			STMOD#3-RX
MII_RX_DV	R5	PA7	PD7	C11			LCD_DISP
ARD_D5	E15	PA8	PD8	U16	R55	33R	SDRAM_D13
VBUS_FS2	D15	PA9	PD9	T17	R61	33R	SDRAM_D14
USB_FS2_ID	D14	PA10	PD10	T16	R59	33R	SDRAM_D15
USB_OTG_FS2_N	E17	PA11	PD11	R15	R51	33R	QSPI_BK1_IO0
USB_OTG_FS2_P	E16	PA12	PD12	R16			IIC4_SCL
SWDIO	C15	PA13(JTMS/SWDIO)	PD13	R17			IIC4_SDA
SWCLK	B14	PA14(JTCK/SWCLK)	PD14	P16	R73	33R	SDRAM_D0
STMOD#1_SPI_CS	A14	PA15(JTDI)	PD15	P15	R70	33R	SDRAM_D1
T_JTDI	SB24						
MII_RXD2	U5	PB0	PE0	C4	R106	33R	SDRAM_NBL0
MII_RXD3	T5	PB1	PE1	B4	R107	33R	SDRAM_NBL1
MII_TX_ER/nINT R41 33R	R6	PB2	PE2	C3	R100	33R	MII_TXD3
SWO	C6	PB3(JTDO/TRACESWO)	PE3	D3			ARD_D8
ARD_D10	B7	PB4(NJTRST)	PE4	D2			SAI4_D2
FDCAN2_RX	A5	PB5	PE5	D1			SAI4_CK2
ARD_D1	B5	PB6	PE6	E5			ARD_D6
ARD_D0	C5	PB7	PE7	U9	R46	33R	SDRAM_D4
SDIO1_D4	D5	PB8	PE8	T9	R45	33R	SDRAM_D5
SDIO1_D5	D4	PB9	PE9	P9	R21	33R	SDRAM_D6
VCP_TX	P11	PB10	PE10	N9	R19	33R	SDRAM_D7
VCP_RX	P12	PB11	PE11	P10	R74	33R	SDRAM_D8
LCD_RST	T14	PB12	PE12	R10	R23	33R	SDRAM_D9
FDCAN2_TX	U14	PB13	PE13	T10	R43	33R	SDRAM_D10
STMOD#9-MISOs	U15	PB14	PE14	U10	R44	33R	SDRAM_D11
ARD_D11	T15	PB15	PE15	R11	R63	33R	SDRAM_D12
ARD_A0	L2	PC0	PF0	G4	R108	33R	SDRAM_A0
MII_MDC	M2	PC1	PF1	G3	R110	33R	SDRAM_A1
MII_TXD2 R39 33R	M3	PC2	PF2	G1	R111	33R	SDRAM_A2
MII_TX_CLK	M4	PC3	PF3	H4	R109	33R	SDRAM_A3
MII_RXD0	T4	PC4	PF4	J5	R114	33R	SDRAM_A4
MII_RXD1	U4	PC5	PF5	J4	R112	33R	SDRAM_A5
SDIO1_D6	F14	PC6	PF6	K2	R75	33R	QSPI_BK1_IO3
SDIO1_D7	F13	PC7	PF7	K3	R24	33R	QSPI_BK1_IO2
SDIO1_D0	E13	PC8	PF8	K4			ARD_A1
SDIO1_D1	E14	PC9	PF9	L4	R26	33R	QSPI_BK1_IO1
SDIO1_D2	A13	PC10	PF10	L3	R37	33R	QSPI_CLK
SDIO1_CK	C12	PC11	PF11	T7	R17	33R	SDRAM_SDNRAS
WAKEUP	E3	PC12	PF12	R7	R20	33R	SDRAM_A6
	C2	PC13	PF13	P7	R16	33R	SDRAM_A7
	C1	PC14-OSC32_IN	PF14	P8	R47	33R	SDRAM_A8
		PC15-OSC32_OUT	PF15	R9	R18	33R	SDRAM_A9

QSPI_BK2_NCS
SB47
SDIO1_D3

R93 0R
R98 0R
X2
NX3215SA-32.768K
C62 1.5pF
C70 1.5pF
R67 1K5
R64 1K5
3V3

R231 100R
HW13 BLUE HAT
B1 TD0341X-G01-BLU
DNF C182 N/A
Buttons
R230 330R PC13 WAKEUP
Wakeup & Key Button
R229 220K
U31 ESDA7P60-1U1M

X1 25MHz
R76 10K
C50 100nF
OSC_25M

HW12 BLACK HAT
B2 TD0341X-G01-BLA
U32 ESDA7P60-1U1M
C181 Capacitor close to MCU 100nF

U6B

STM32H750XBH6

SDRAM_A10 R50 33R	T8	PG0	PI0	A16	LCD_G5		
SDRAM_A11 R48 33R	U8	PG1	PI1	A15	LCD_G6		
LCD_INT	H16	PG2	PI2	B15	ARD_D12		
ARD_D2	H15	PG3	PI3	C14	STMOD#8-MOSIs		
SDRAM_BA0 R78 33R	H14	PG4	PI4	A4	SAI2_MCLKA		
SDRAM_BA1 R77 33R	G14	PG5	PI5	A3	SAI2_SCKA		
QSPI_BK1_NCS R81 33R	G15	PG6	PI6	A2	SAI2_SDA		
Audio_Int	F16	PG7	PI7	B3	SAI2_FSA		
SDRAM_SDCLK R80 33R	F15	PG8	PI8	E4	ARD_D7		
QSPI_BK2_IO2 R105 33R	A10	PG9	PI9	E2	LCD_VSYNC		
SAI2_SDB	A9	PG10	PI10	F3	MII_RX_ER		
MII_TX_EN R101 33R	B9	PG11	PI11	F4	STMOD#18		
MII_TXD1 R104 33R	C9	PG12	PI12	H1	LCD_HSYNC		
MII_TXD0 R115 33R	D9	PG13	PI13	H2	LED2		
QSPI_BK2_IO3 R25 33R	D8	PG14	PI14	H3	LCD_CLK		
SDRAM_SDNCAS R113 33R	D6	PG15	PI15	P5	LCD_R0		
MII_CRS SB4				N6	LCD_R1		
MII_COL SB3			PJ0	P6	LCD_R2		
			PJ1	T6	LED1		
QSPI_BK2_IO0 R40 33R	N2	PH2	PJ2	U6	LCD_R4		
QSPI_BK2_IO1 R38 33R	P2	PH3	PJ3	U7	LCD_R5		
STMOD#19	P3	PH4	PJ4	R12	LCD_R6		
SDRAM_SDNWE R22 33R	P4	PH5	PJ5	N15	LCD_R7		
SDRAM_SDNE1 R42 33R	T11	PH6	PJ6	N14	LCD_G0		
SDRAM_SDCKE1 R49 33R	U13	PH7	PJ7	N13	LCD_G1		
STMOD#20	T13	PH8	PJ8	M14	LCD_G2		
LCD_R3	R13	PH9	PJ9	L14	LCD_G3		
STMOD#12-RST	P13	PH10	PJ10	K14	LCD_G4		
OTG_FS2_OverCurrent	P14	PH11	PJ11	D11	LCD_B0		
STMOD#11-INT	R14	PH12	PJ12	E10	LCD_B1		
FDCAN1_TX	D16	PH13	PJ13	D10	LCD_B2		
FDCAN1_RX	B17	PH14	PJ14	B10	LCD_B3		
ARD_D9	B16	PH15	PJ15				
ARD_A2	T1	PA0_C	PK0	J14	LCD_BL		
ARD_A3	T2	PA1_C	PK1	J15	ARD_D4		
			PK2	H17	LCD_G7		
ARD_A4	R1	PC2_C	PK3	C8	LCD_B4		
ARD_A5	R2	PC3_C	PK4	B8	LCD_B5		
			PK5	A8	LCD_B6		
			PK6	C7	LCD_B7		
R79 51R	J2	PH0-OSCIN	PK7	D7	LCD_DE		
STMOD#17	J1	PH1-OSCOUT					
			DSI_CK_P	L16			
			DSI_CK_N	L17			
RESET	K1	NRST					
			DSI_D0_P	M16			
E8		BOOT0	DSI_D0_N	M17			
			DSI_D1_P	K16			
E7		PDR_ON	DSI_D1_N	K17			

BOOT0
R143 10K
DNF R144 N/A
R102 10K
R103 N/A
DNF
3V3

OTG_FS

OTG_FS2_PSO
OTG_FS2_OverCurrent
USB_OTG_FS2_N
USB_OTG_FS2_P
USB_FS2_ID
USB_FS2_DM
USB_FS2_DP
USB_FS2_ID

STMod+

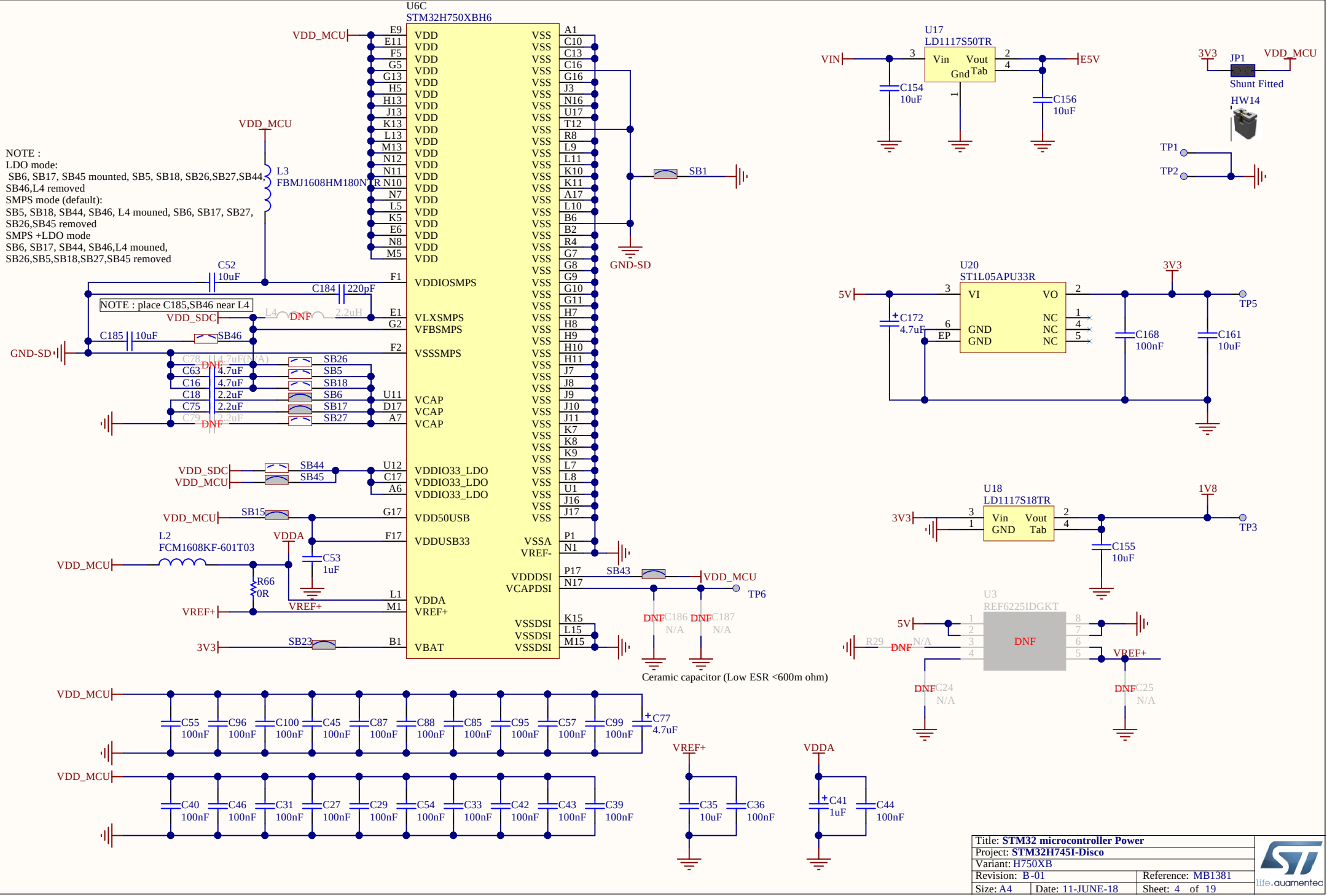
STMOD#1_SPI_CS
STMOD#1-CTS
STMOD#2-TX
STMOD#3-RX
STMOD#4-RTS
STMOD#8-MOSIs
STMOD#9-MISOs
STMOD#11-INT
STMOD#12-RST
STMOD#13-ADC
STMOD#14-PWM
STMOD#17
STMOD#18
STMOD#19
STMOD#20

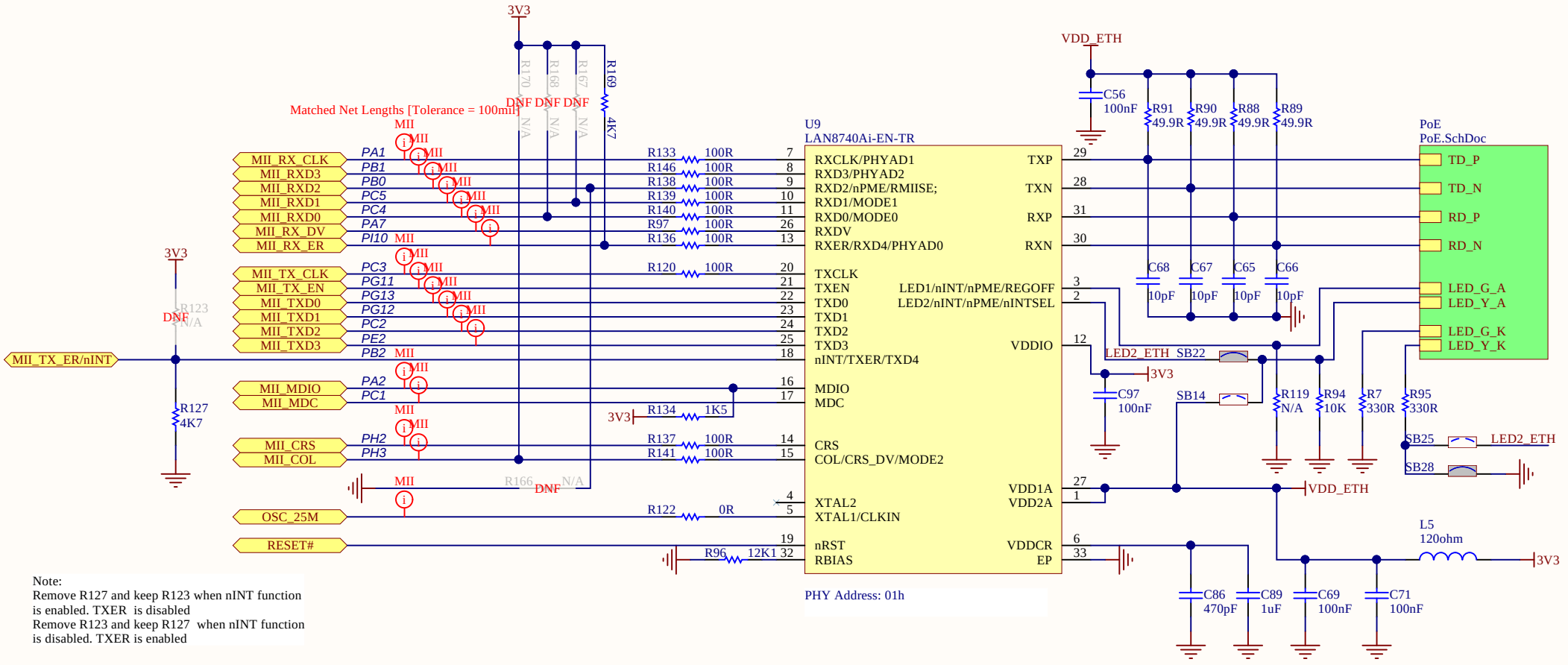
LEDs

3V3
LED1
R233 510R
LD7 GREEN
LED2
R232 680R
LD6 RED

Title: **STM32 microcontroller IOs**	
Project: **STM32H745I-Disco**	
Variant: H750XB	
Revision: B-01	Reference: MB1381
Size: A3	Date: 11-JUNE-18 Sheet: 3 of 19

life.augmented


U6C
STM32H750XBH6
NOTE :
LDO mode:
SB6, SB17, SB45 mounted, SB5, SB18, SB26,SB27,SB44, SB46,L4 removed
SMPS mode (default):
SB5, SB18, SB44, SB46, L4 mouned, SB6, SB17, SB27, SB26,SB45 removed
SMPS +LDO mode
SB6, SB17, SB44, SB46,L4 mouned, SB26,SB5,SB18,SB27,SB45 removed
NOTE : place C185,SB46 near L4
Ceramic capacitor (Low ESR <600m ohm)
U17
LD1117S50TR
U20
ST1L05APU33R
U18
LD1117S18TR
U3
REF6225IDGKT
JP1
Shunt Fitted
HW14
TP1
TP2
TP3
TP5
TP6
SB1
GND-SD
Title: STM32 microcontroller Power
Project: STM32H745I-Disco
Variant: H750XB
Revision: B-01
Reference: MB1381
Size: A4
Date: 11-JUNE-18
Sheet: 4 of 19



Note:
Remove R127 and keep R123 when nINT function is enabled. TXER is disabled
Remove R123 and keep R127 when nINT function is disabled. TXER is enabled

Note:
keep R94 to enable the TXER function, and close SB22,SB28,open SB14,SB25 for LED2
Remove R94 and SB14 to enable nINT founction, and close SB14,SB25, open SB22,SB28 for LED2

Title: **Ethernet**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
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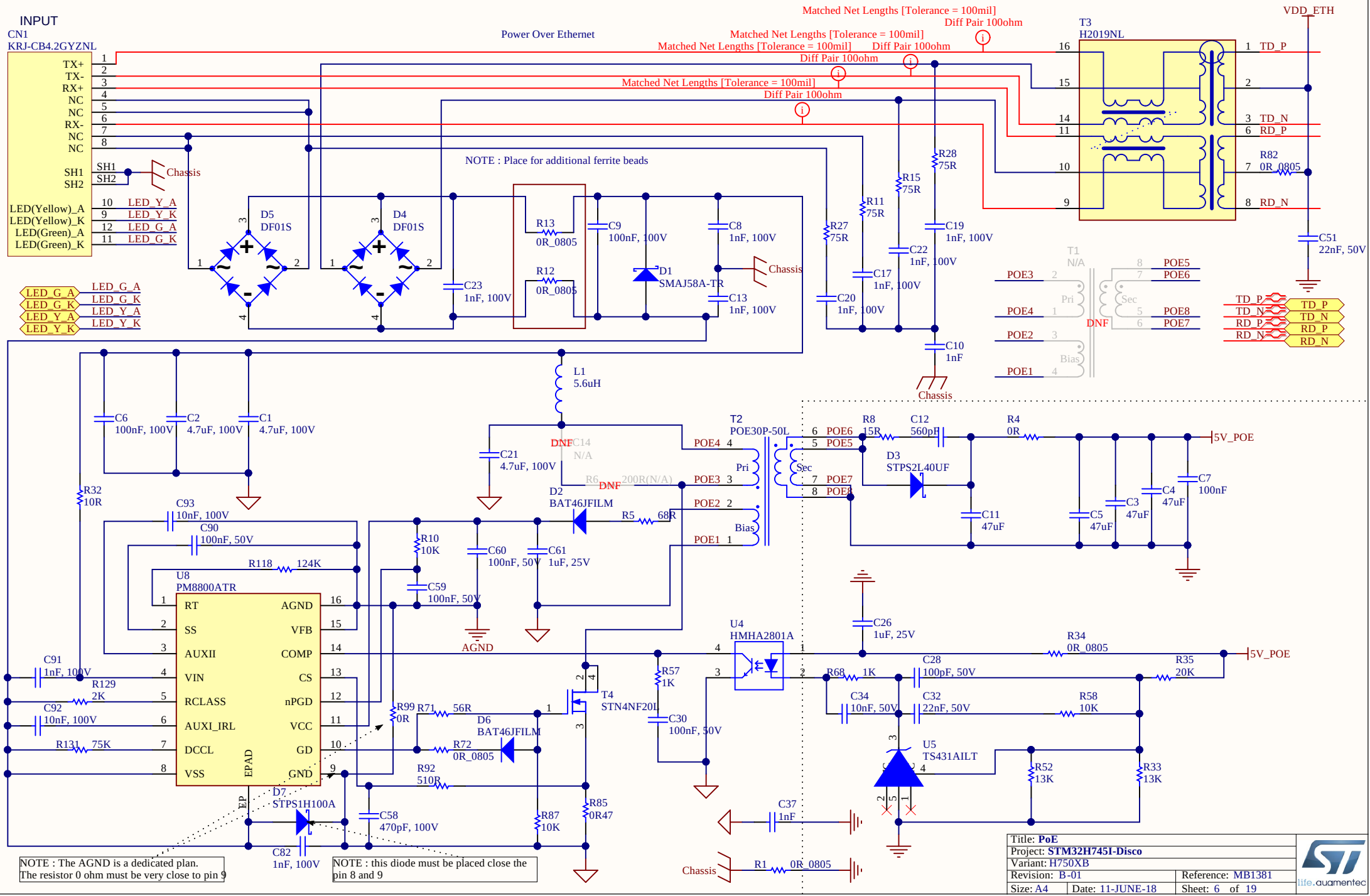
INPUT
CN1
KRJ-CB4.2GYZNL
Power Over Ethernet
Matched Net Lengths [Tolerance = 100mil]
Diff Pair 100ohm
T3
H2019NL
VDD_ETH
NOTE : Place for additional ferrite beads
D5
DF01S
D4
DF01S
D1
SMAJ58A-TR
T1
N/A
T2
POE30P-50L
L1
5.6uH
U8
PM8800ATR
U4
HMHA2801A
U5
TS431AILT
T4
STN4NF20L
D2
BAT46JFILM
D3
STPS2L40UF
D6
BAT46JFILM
D7
STPS1H100A
NOTE : The AGND is a dedicated plan.
The resistor 0 ohm must be very close to pin 9
NOTE : this diode must be placed close the pin 8 and 9
Title: PoE
Project: STM32H745I-Disco
Variant: H750XB
Revision: B-01
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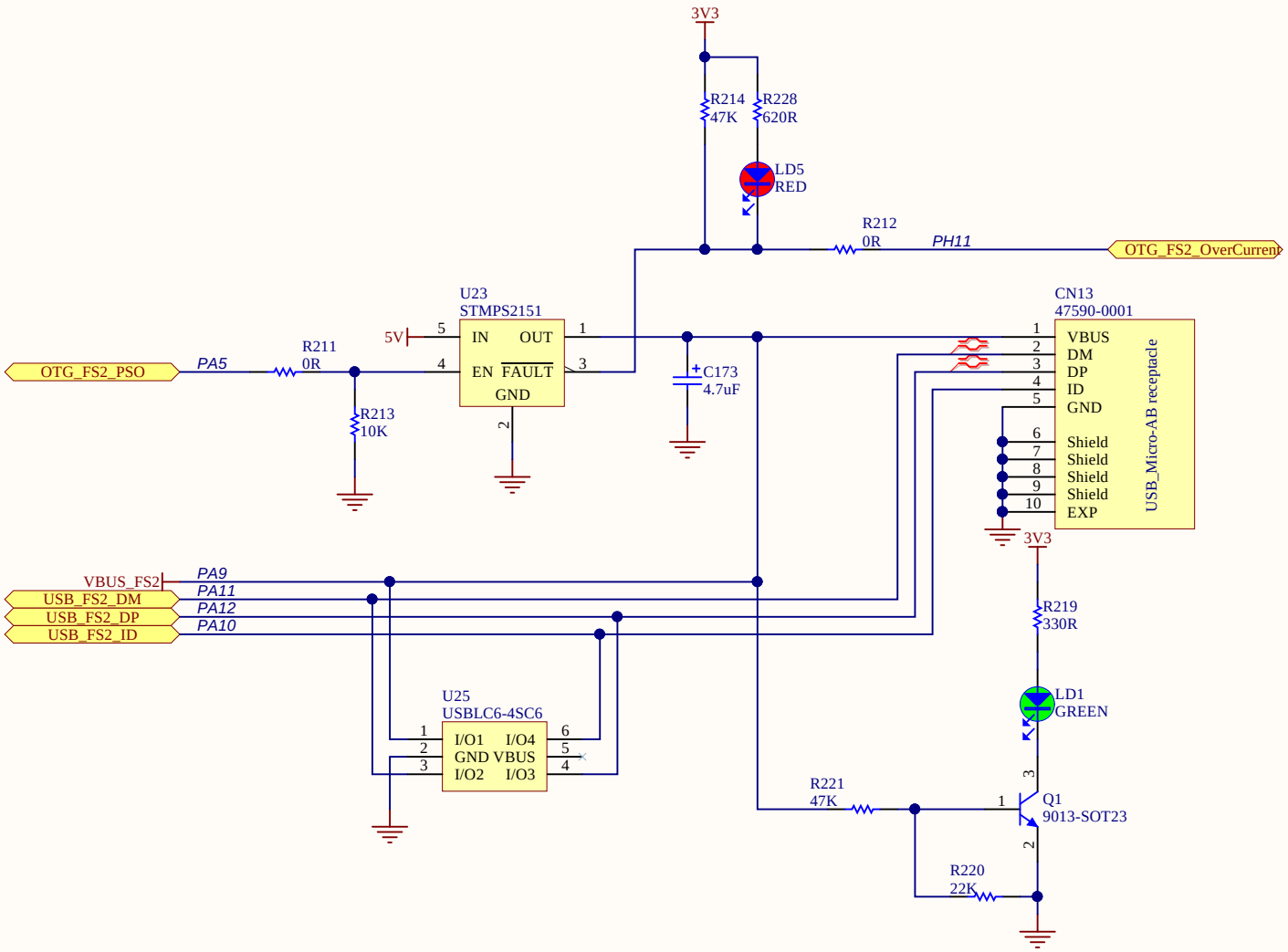

Title: **USB OTG FS**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 7 of 19

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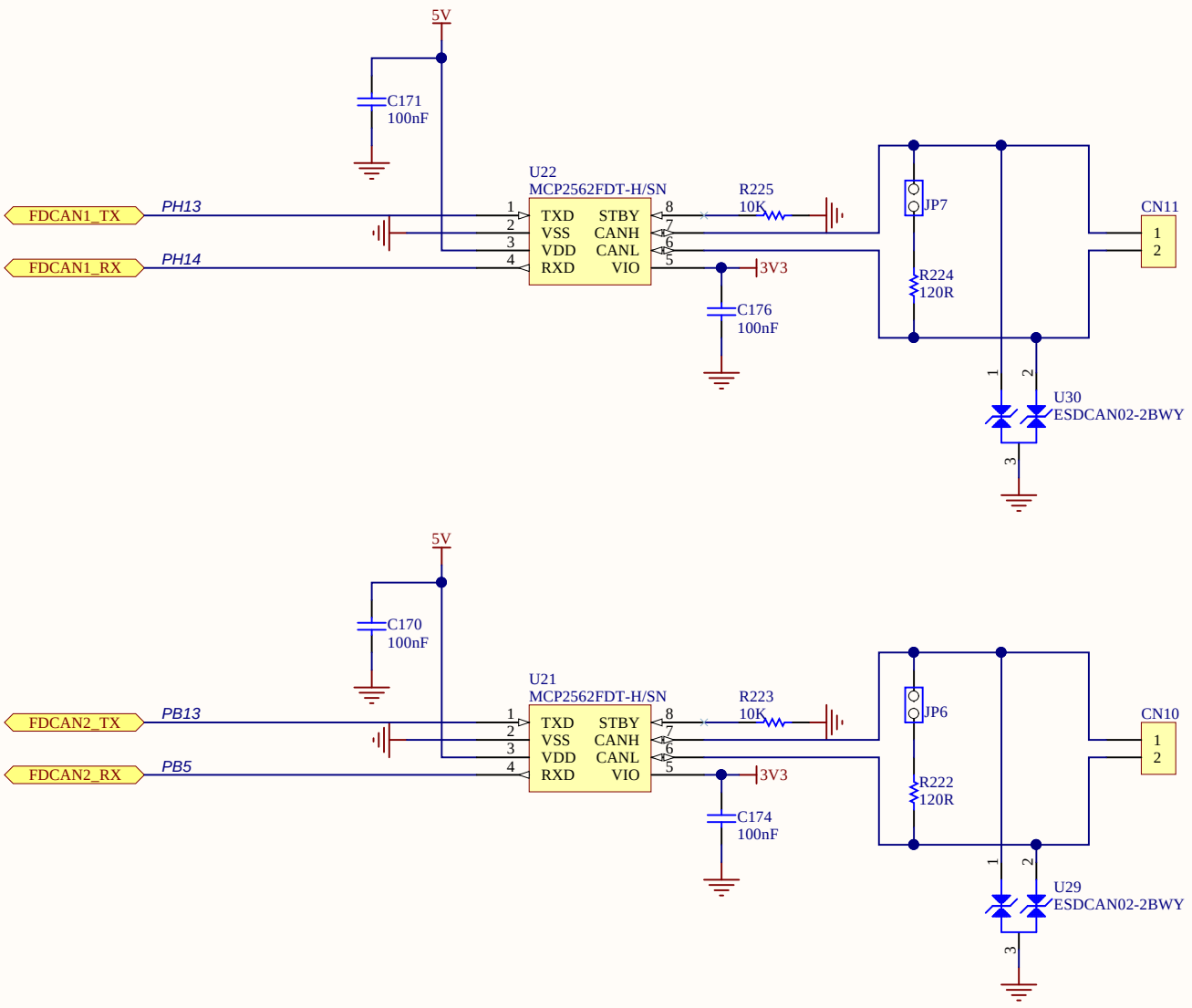

Title: **FDCAN**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 8 of 19

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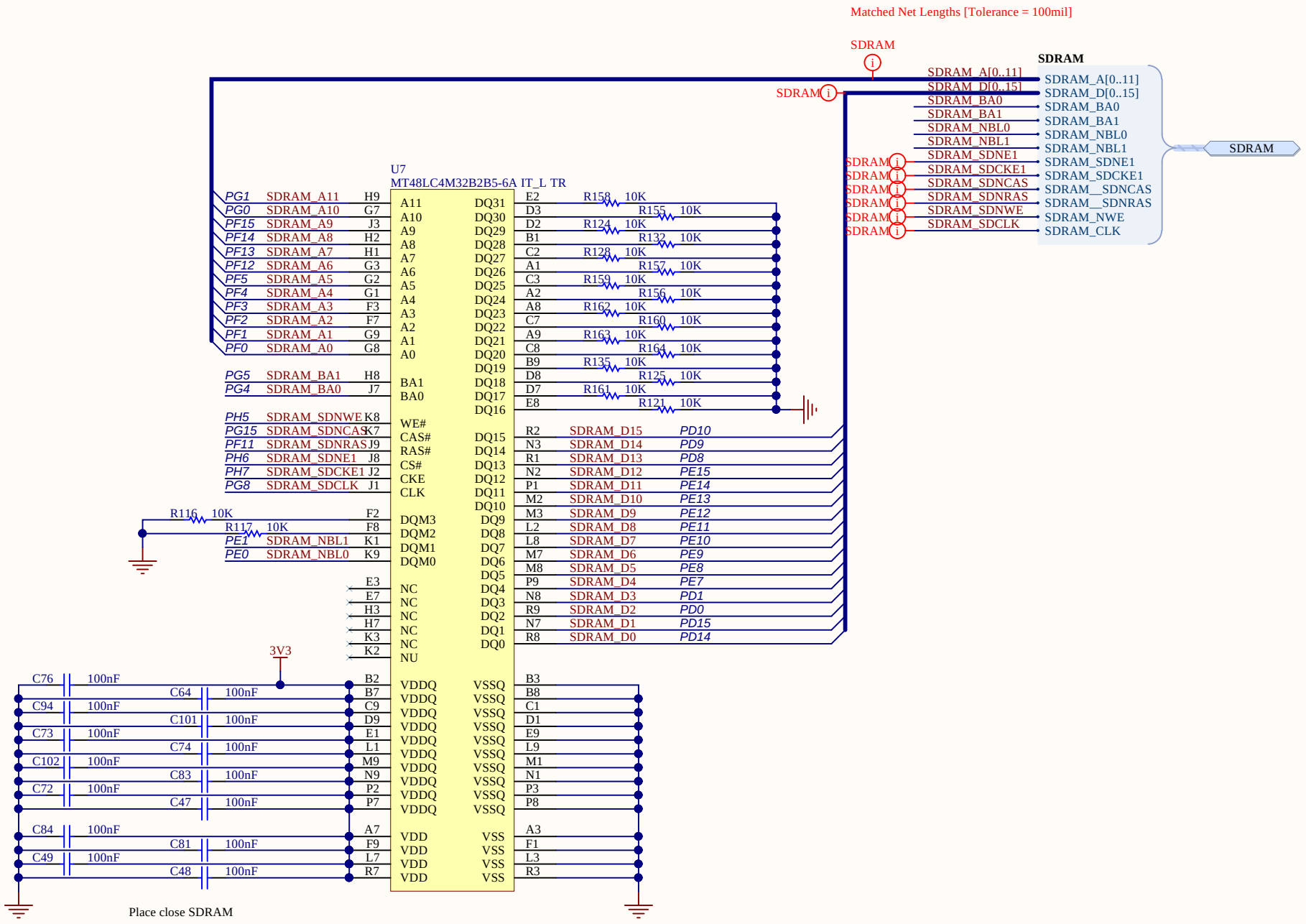

Title: **SDRAM**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
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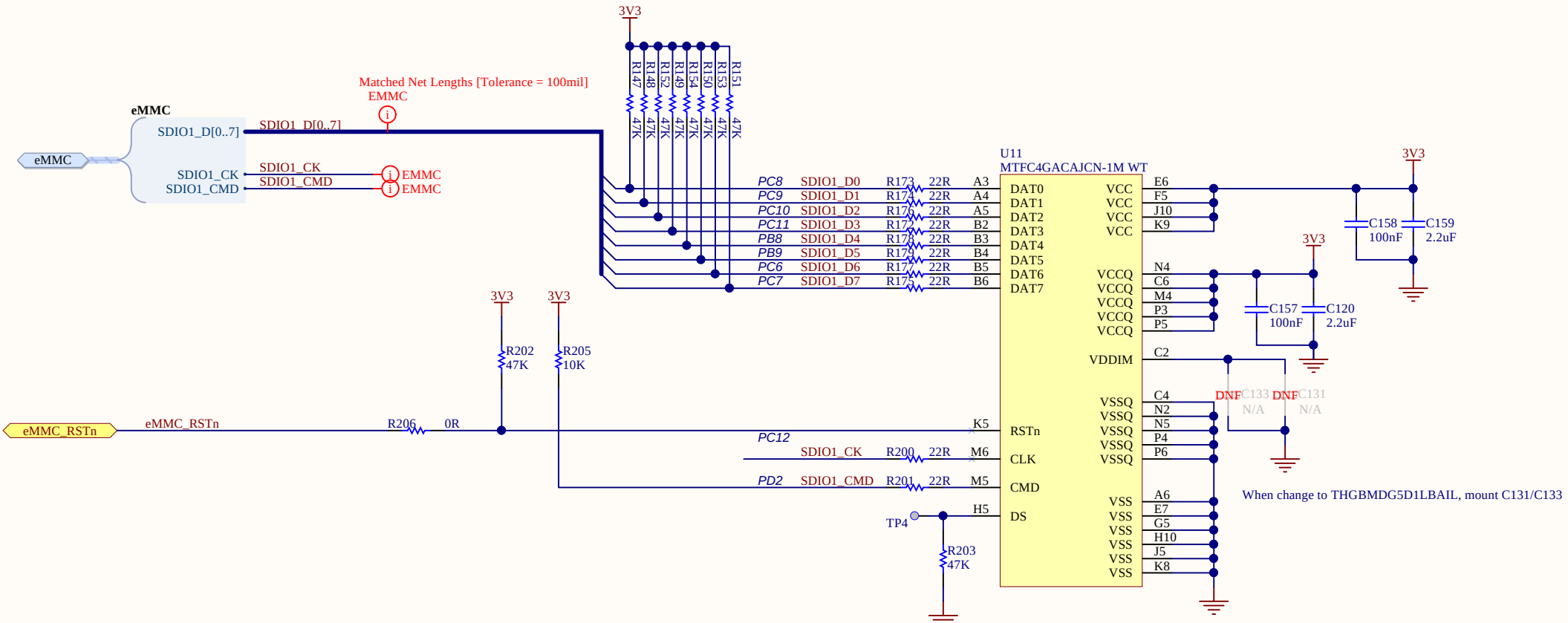
life.augmented



Title: **eMMC**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
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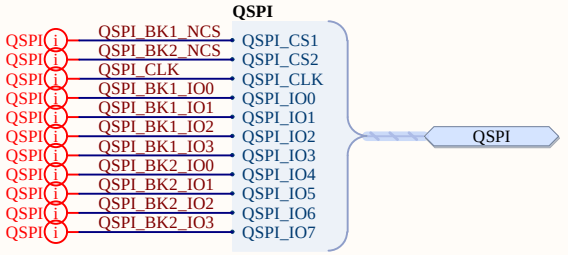
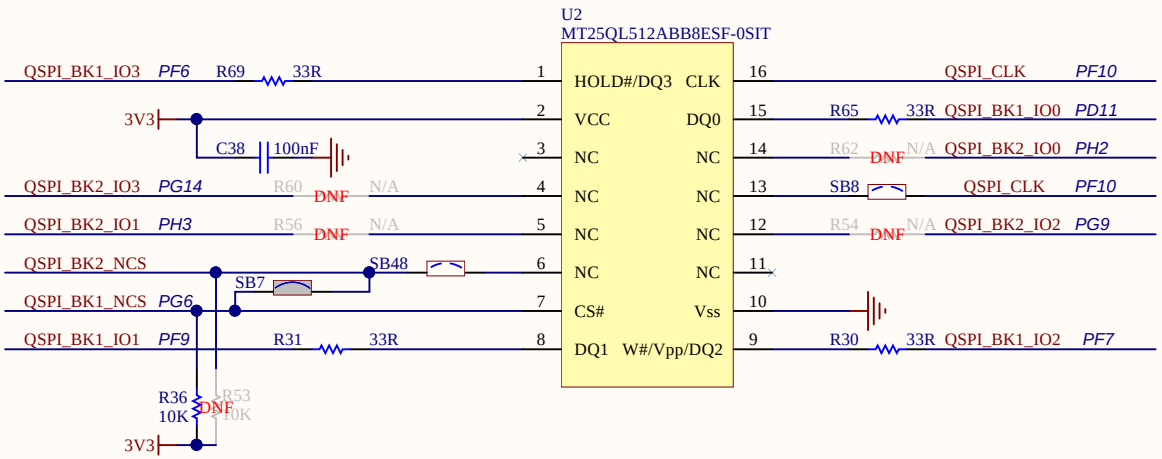
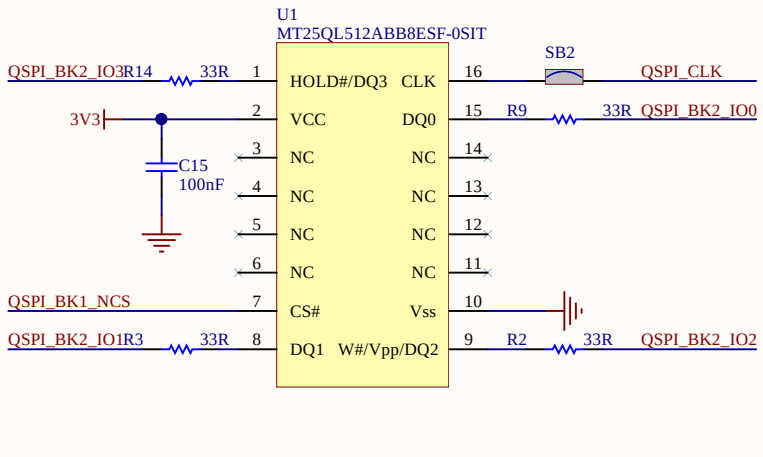
life.augmented

Matched Net Lengths [Tolerance = 100mil]







Twin Quad SPI Flash solutions:

One Twin Quad SPI Fllash	U2:MT25TL01GHBB8ESF-0SIT	U1:NA	R53/R62/R54/R56/R60/SB8/SB48 ON	R14/R3/R2/R9,/SB2,/C15 OFF
Two Quad SPI Fllash	U1:MT25QL512ABB8ESF-0SIT	U2:MT25QL512ABB8ESF-0SIT	R14/R3/R2/R9,/SB2,/C15 ON	R53/R62/R54/R56/R60/SB8/SB48 OFF

Title: **QSPI**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
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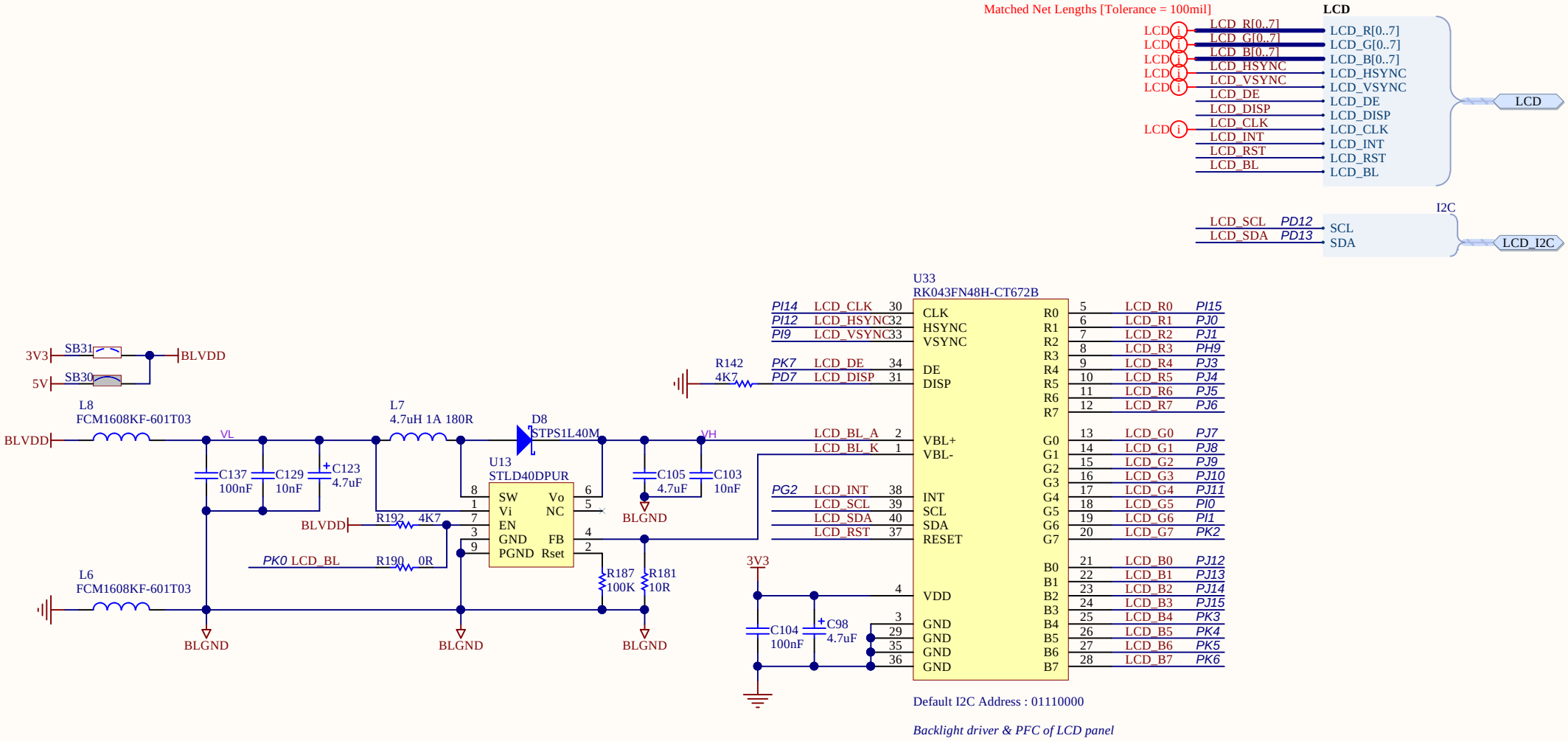
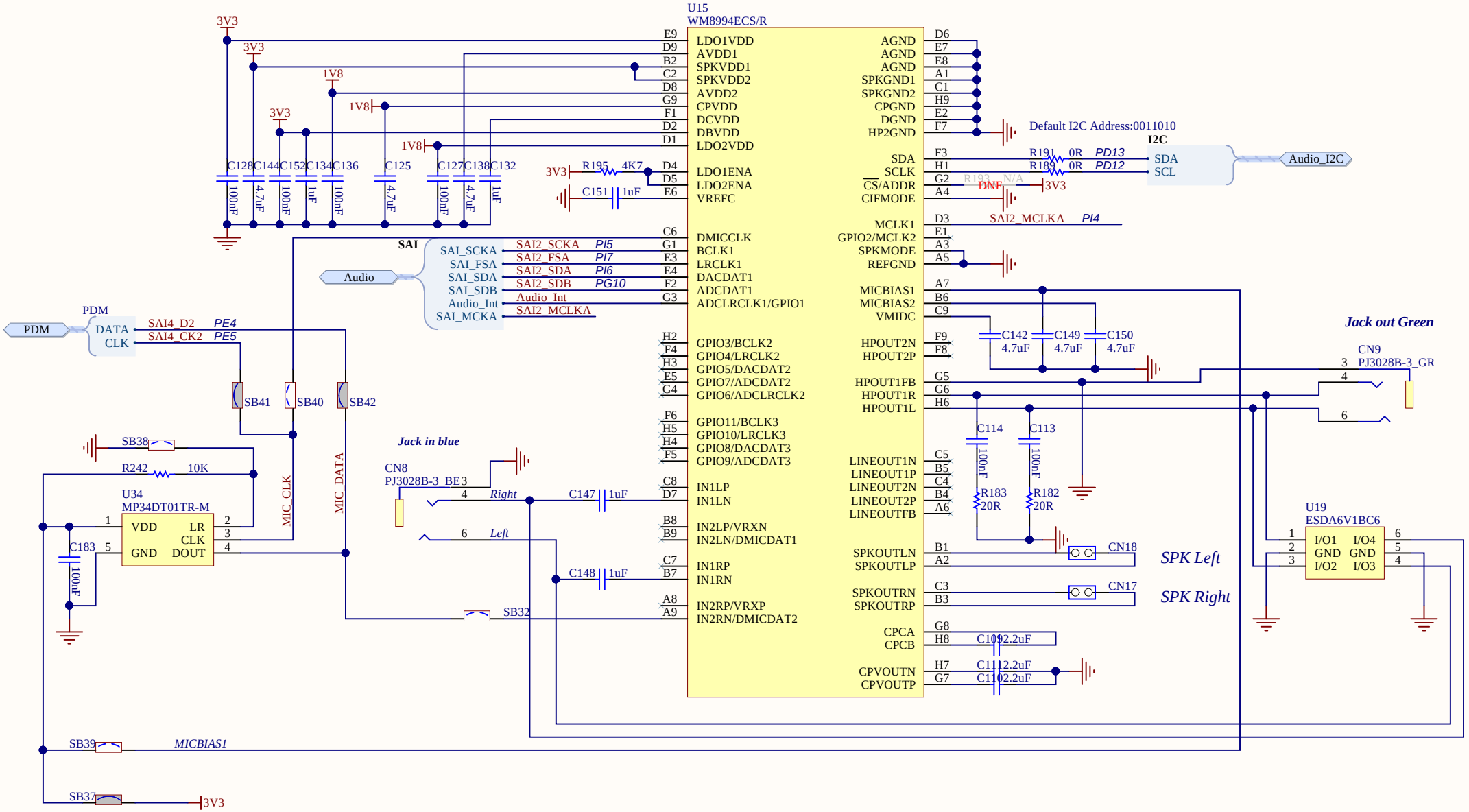


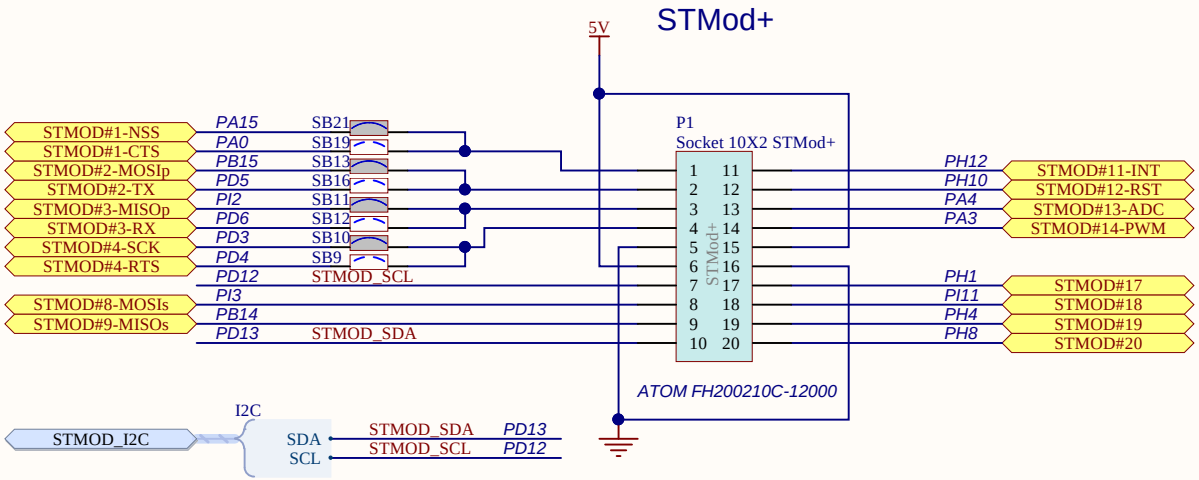
Title: **LCD4.3**			
Project: **STM32H745I-Disco**			
Variant: H750XB			
Revision: B-01		Reference: MB1381	
Size: A4	Date: 11-JUNE-18	Sheet: 12 of 19	

life.augmented



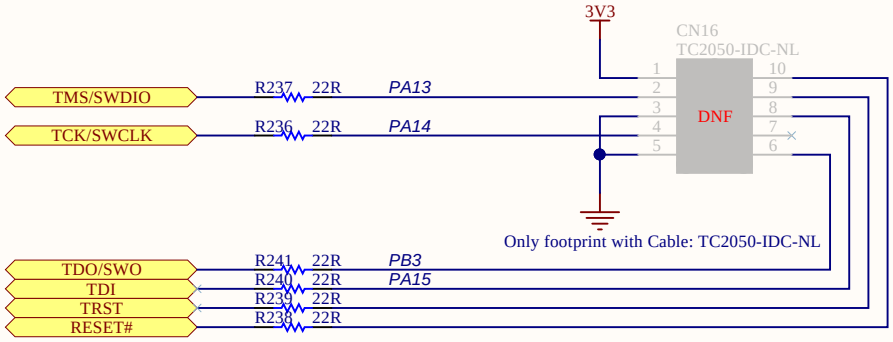
Title: **Audio**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 13 of 19

life.augmented



Title: **STMod+**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 14 of 19

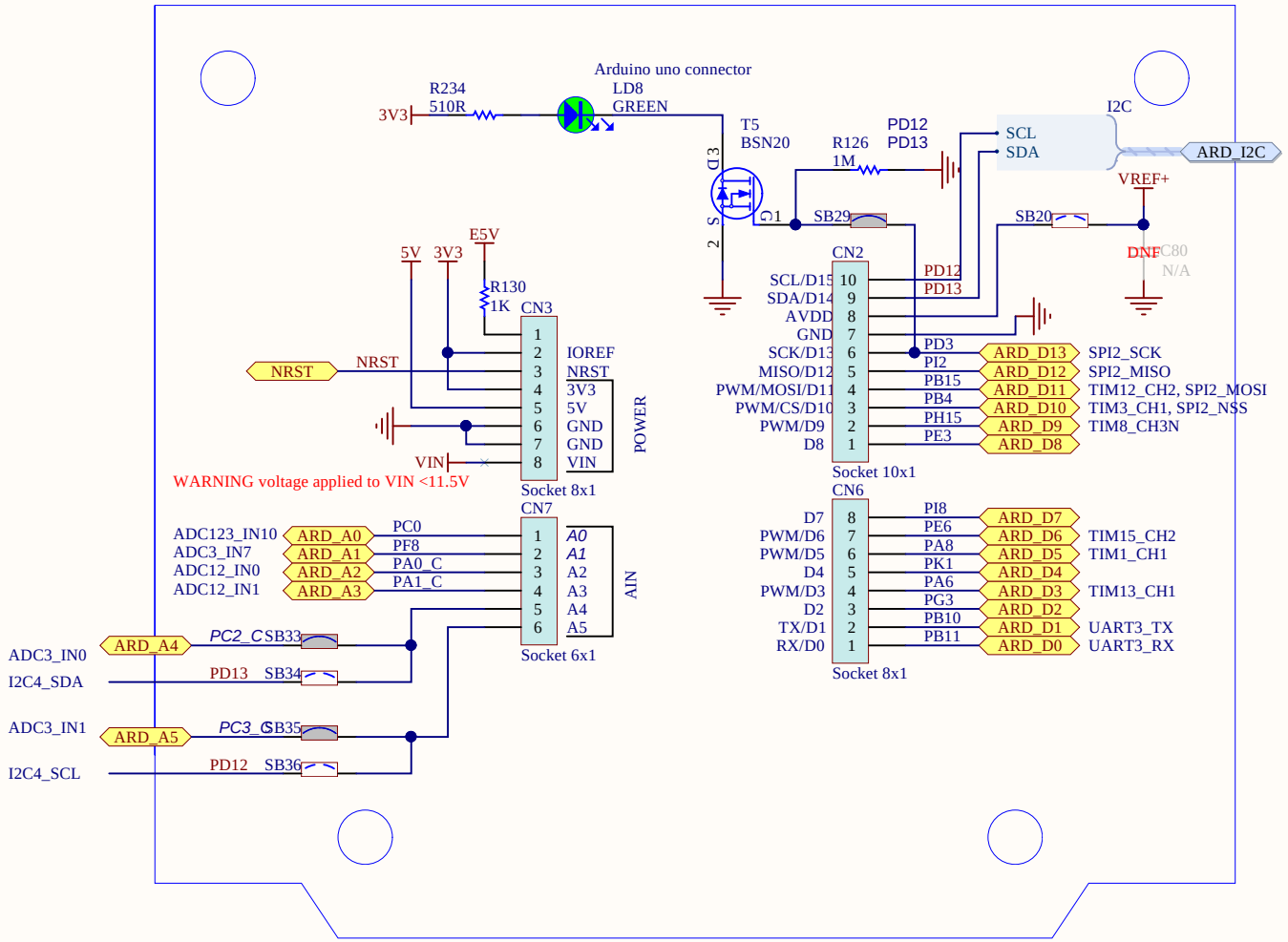
life.augmented



Place this connector close to STDC, they will share the same ESD components

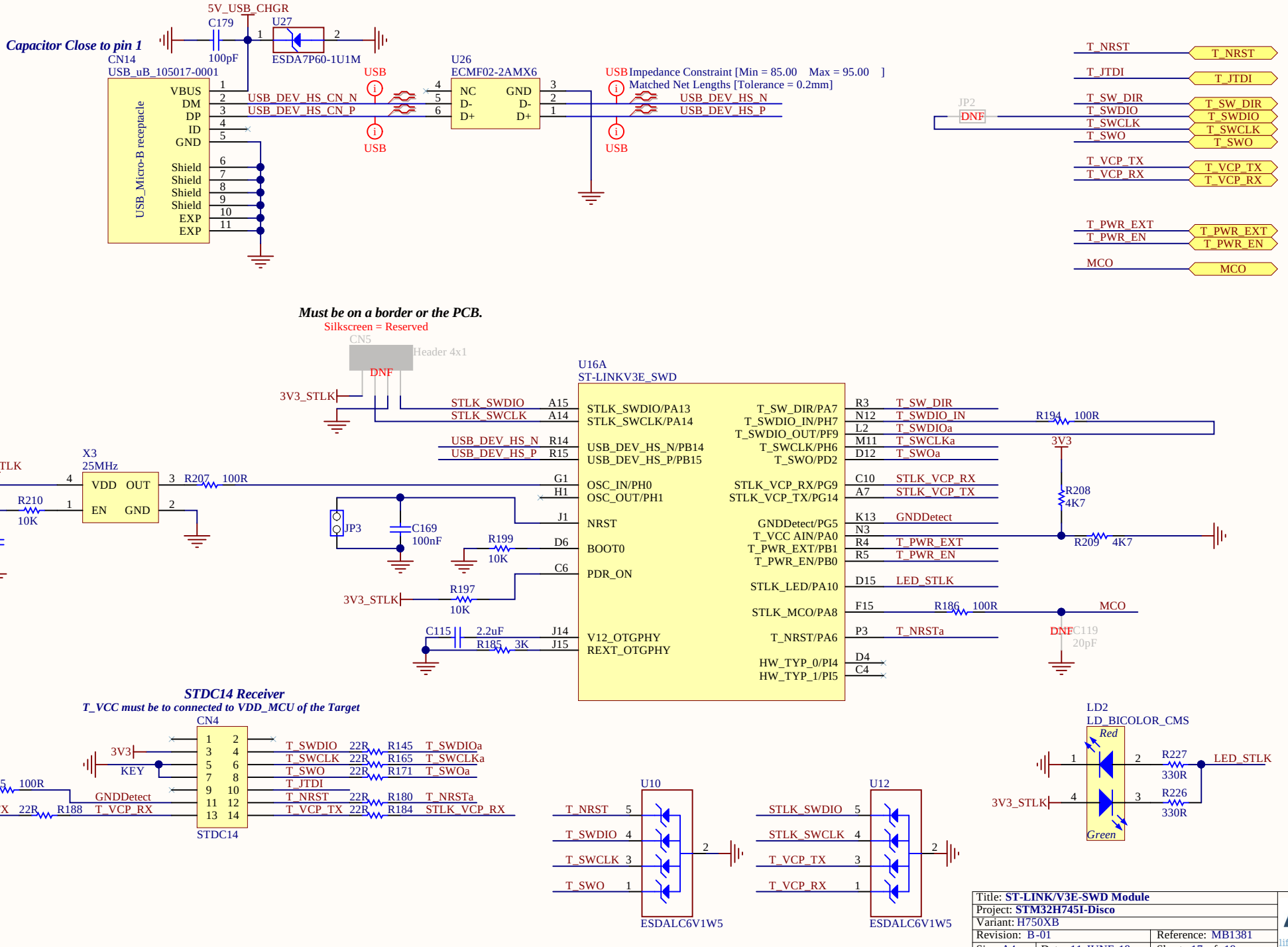
Title: **TAG**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 15 of 19

life.augmented



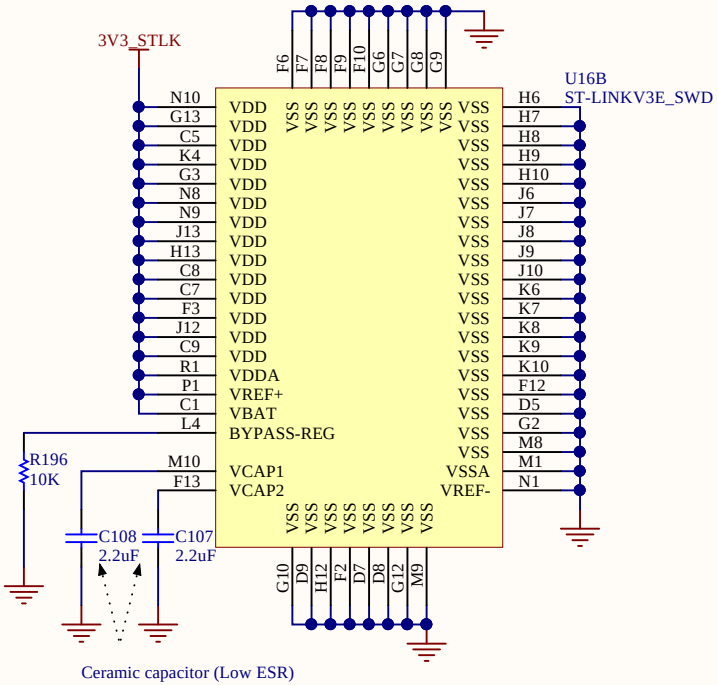
Title: **Arduino Connector**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 16 of 19

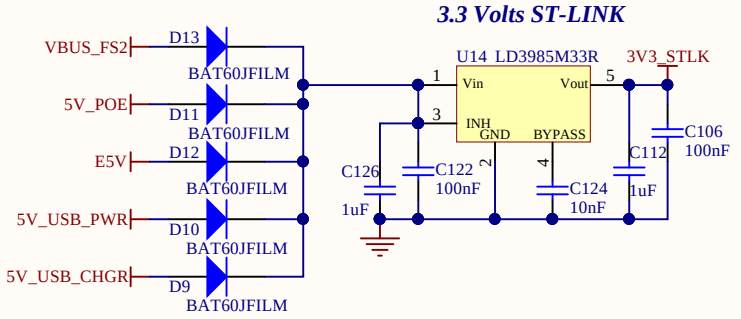
life.augmented

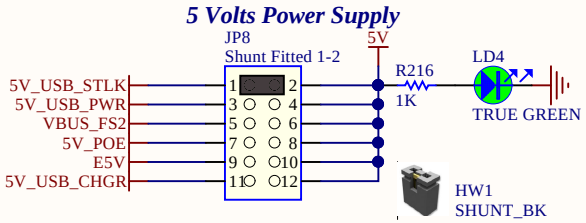


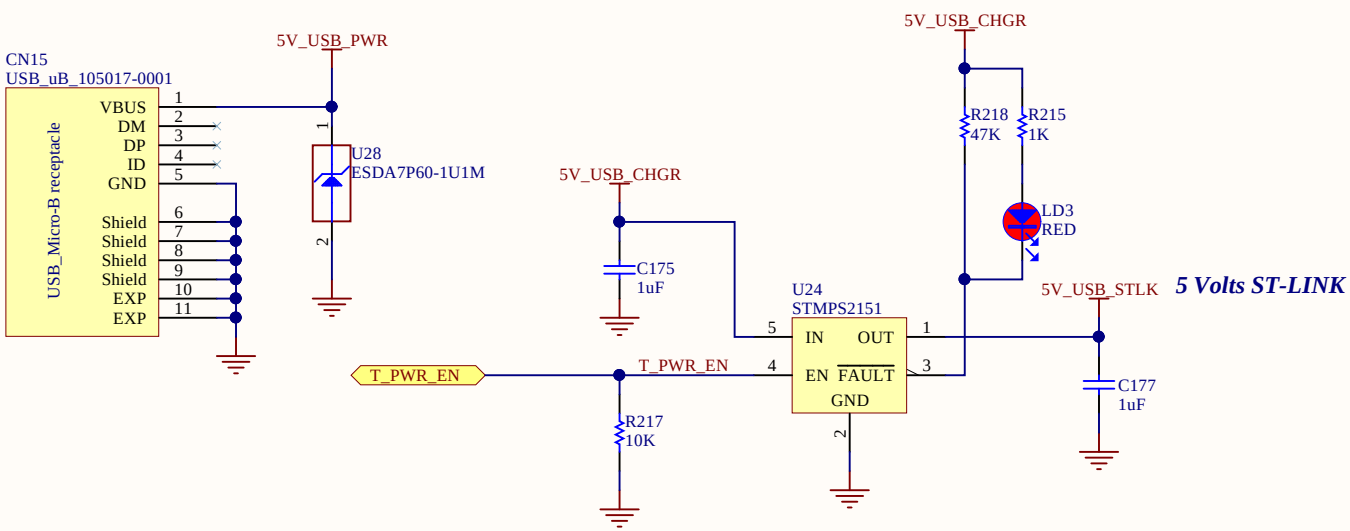
Title: **ST-LINK/V3E-SWD Module**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 17 of 19

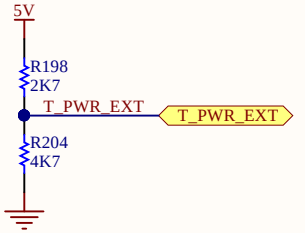
life.augmented

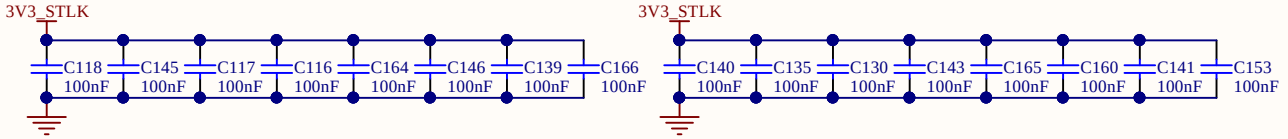












Title: **ST-LINK/V3E-SWD Power Module**		
Project: **STM32H745I-Disco**		
Variant: H750XB		
Revision: B-01		Reference: MB1381
Size: A4	Date: 11-JUNE-18	Sheet: 18 of 18

life.augmented

HW Mechanical parts

HW6
MB1381A
PCB

HW7
MB1381A-01 XXXX
BOARD REF

HW8
STM32H745I-Disco
BOARD CPN

HW4
LOGO ST

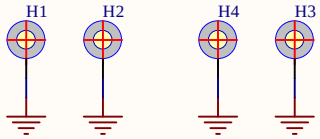
HW5
LOGO CE

HW3
LOGO ESD

HW9
LOGO ROHS

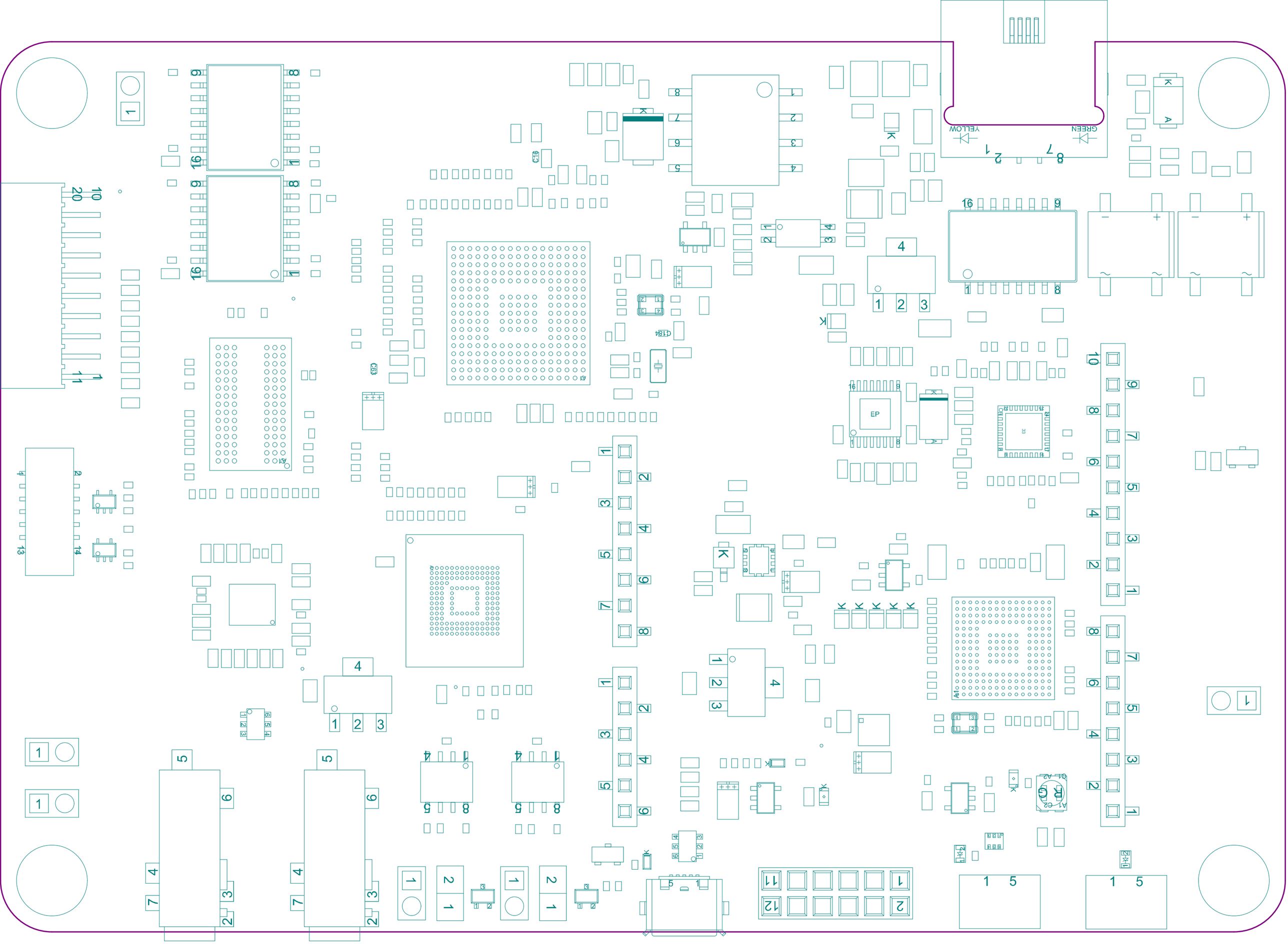
HW10
LOGO STM32

H1 H2 H4 H3



Title: **HW Mechanical parts**			
Project: **STM32H745I-Disco**			
Variant: H750XB			
Revision: B-01		Reference: MB1381	
Size: A4	Date: 11-JUNE-18	Sheet: 19 of 19	

life.augmented



2

LAYER 2 (GND PLANE)

FAB DARWING & DRILL LEGEND

TAB DARMING & DRILL LEGEND

4,3 INCH WQVGA
480x272 DOTS

SB47

1

40

Viewing direction
12:00 O'clock

B1

B2