

STM32U5A9NJH6Q Discovery

MB1829

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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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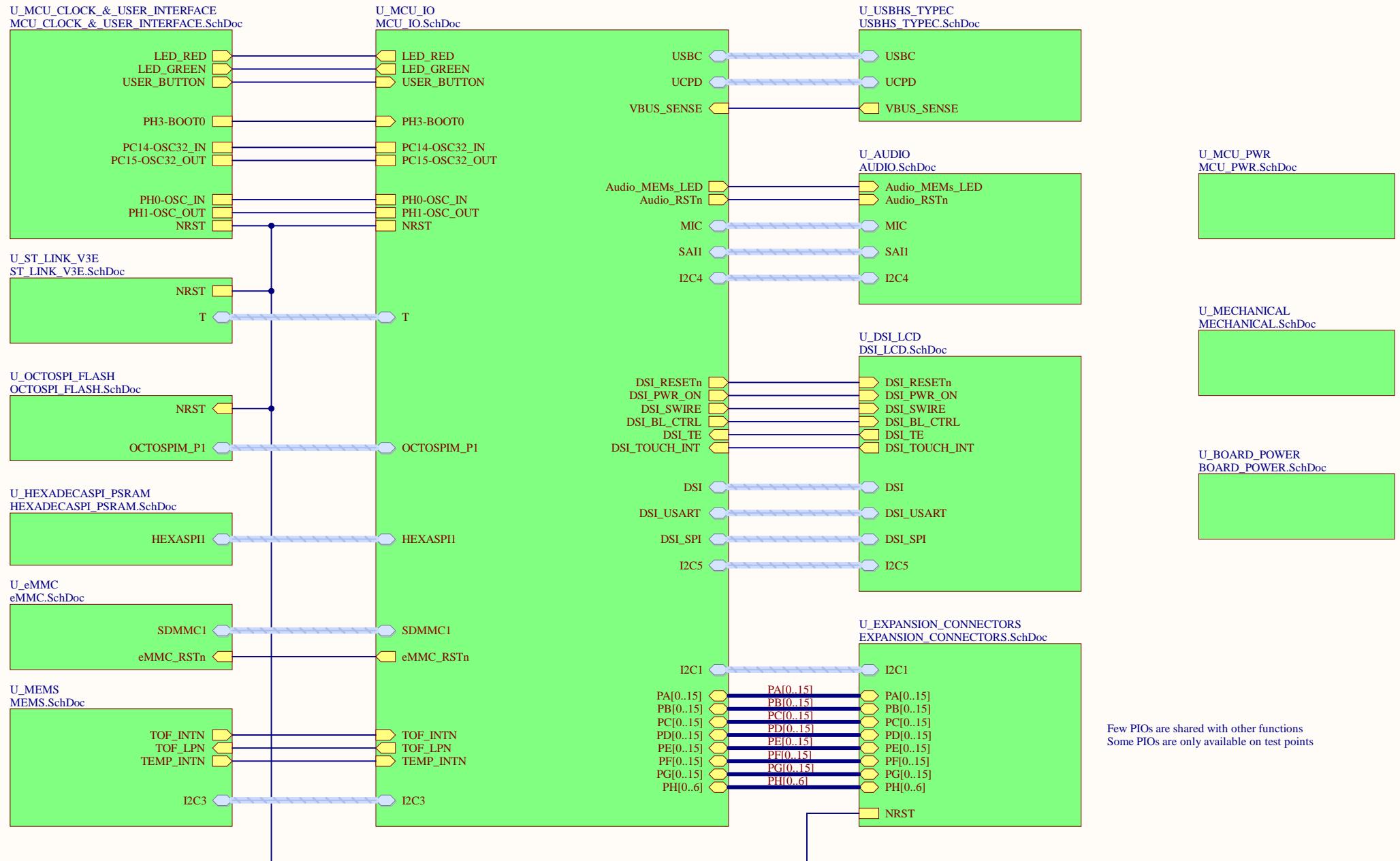
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U_MB1829_TOP
MB1829_TOP.SchDoc

Title: Project_Overview	Project: STM32U5A9NJH6Q Discovery
Variant: U5A9NJQ	
Revision: B-01	Reference: MB1829
Size: A4	Date: 16-Feb-2023
	Sheet: 1 of 16





STM32 MCU I/Os

LIMITATIONS :
Use solder bridges to connect/disconnect

SB59 for Access to PA8 MCO debug

UCPD.ADC1 is exclusive with UCPD.CC1

PA15 UCPD.ADC1

JTDI is exclusive with UCPD.CC1

TSWO (JTDO) is exclusive with SDMMC2_D2
(see also expansion connectors)

PB3 TSWO

UCPD.ADC2 is exclusive with UCPD.CC2

UCPD.CC2 is exclusive with SDMMC2_D1
(see also expansion connectors)

PC0 OCTOSPI_P1.IO7

PC1 OCTOSPI_P1.IO4

PC2 OCTOSPI_P1.IO5

PC3 OCTOSPI_P1.IO6

ADC12_IN13 PC4 R6

ADC12_IN14 PC5 P6

SDMMC1.D6 C15

SDMMC1.D7 B15

SDMMC1.D0 A14

SDMMC1.D1 C14

SDMMC1.D2 A10

SDMMC1.D3 B10

SDMMC1.CK C10

USER_Button F4

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

D0 SDMMC1.D0

D1 SDMMC1.D2

D2 SDMMC1.D3

D3 SDMMC1.D4

D4 SDMMC1.D5

D5 SDMMC1.D6

D6 SDMMC1.D7

eMMC_RSTn eMMC_RSTn

PH6

(HEXASPII is used hereafter to simplify bus naming)

eMMC

eMMC

SDMMC1

CMD SDMMC1.CMD

CK SDMMC1.CK

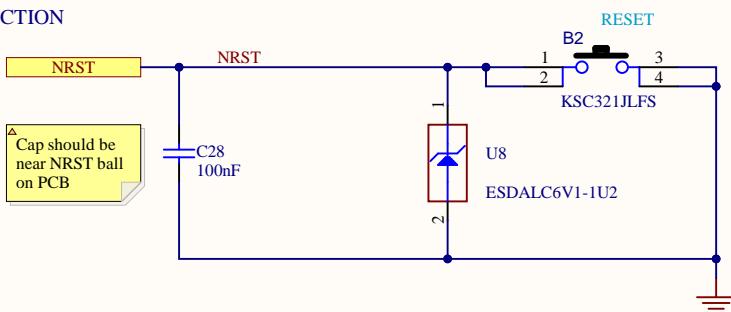
D0 SDMMC1.D0

D1 SDMMC1.D2

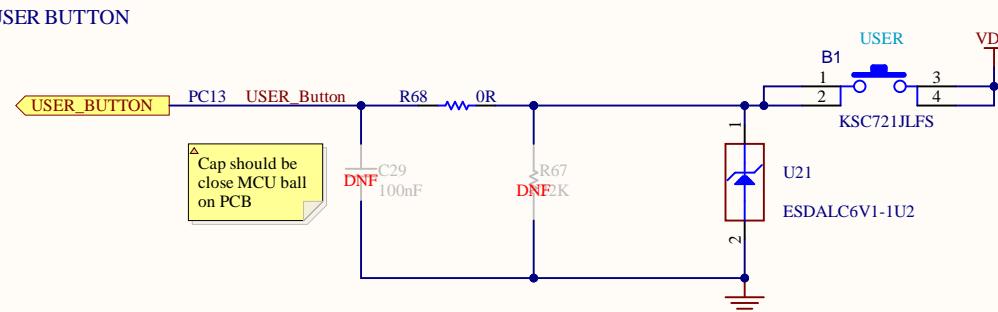
D2 SDMMC1.D3

D3 SDMMC1.D4

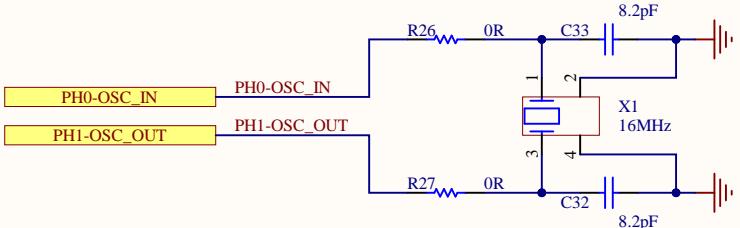
RESET FUNCTION



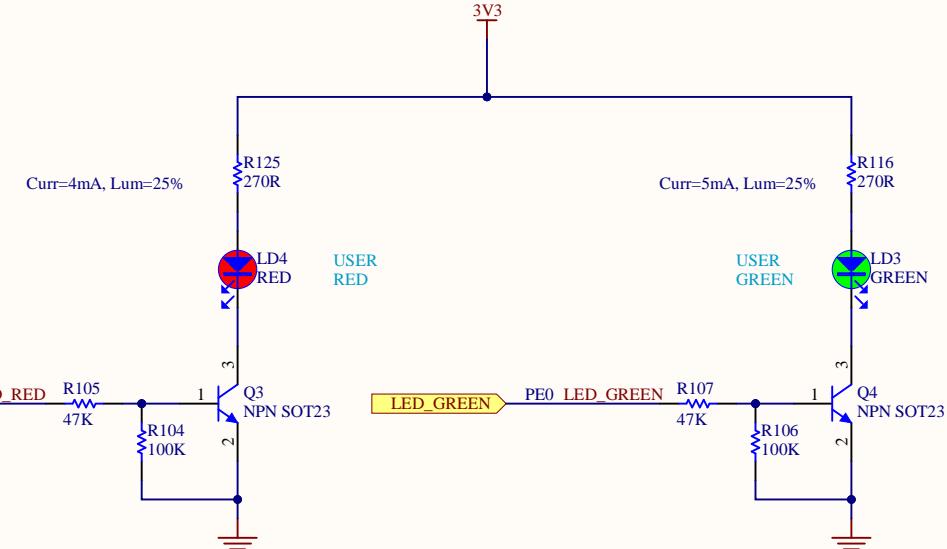
USER BUTTON



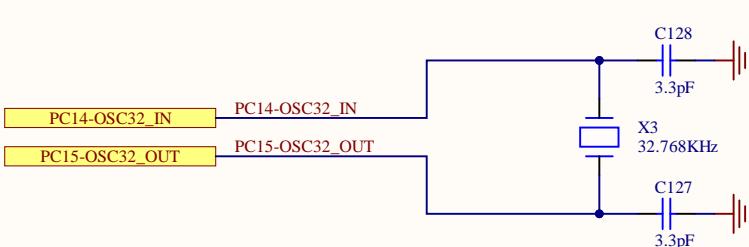
EXTERNAL HSE CLK



USER LEDs

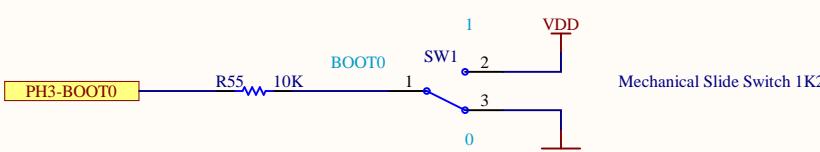


EXTERNAL LSE CLK



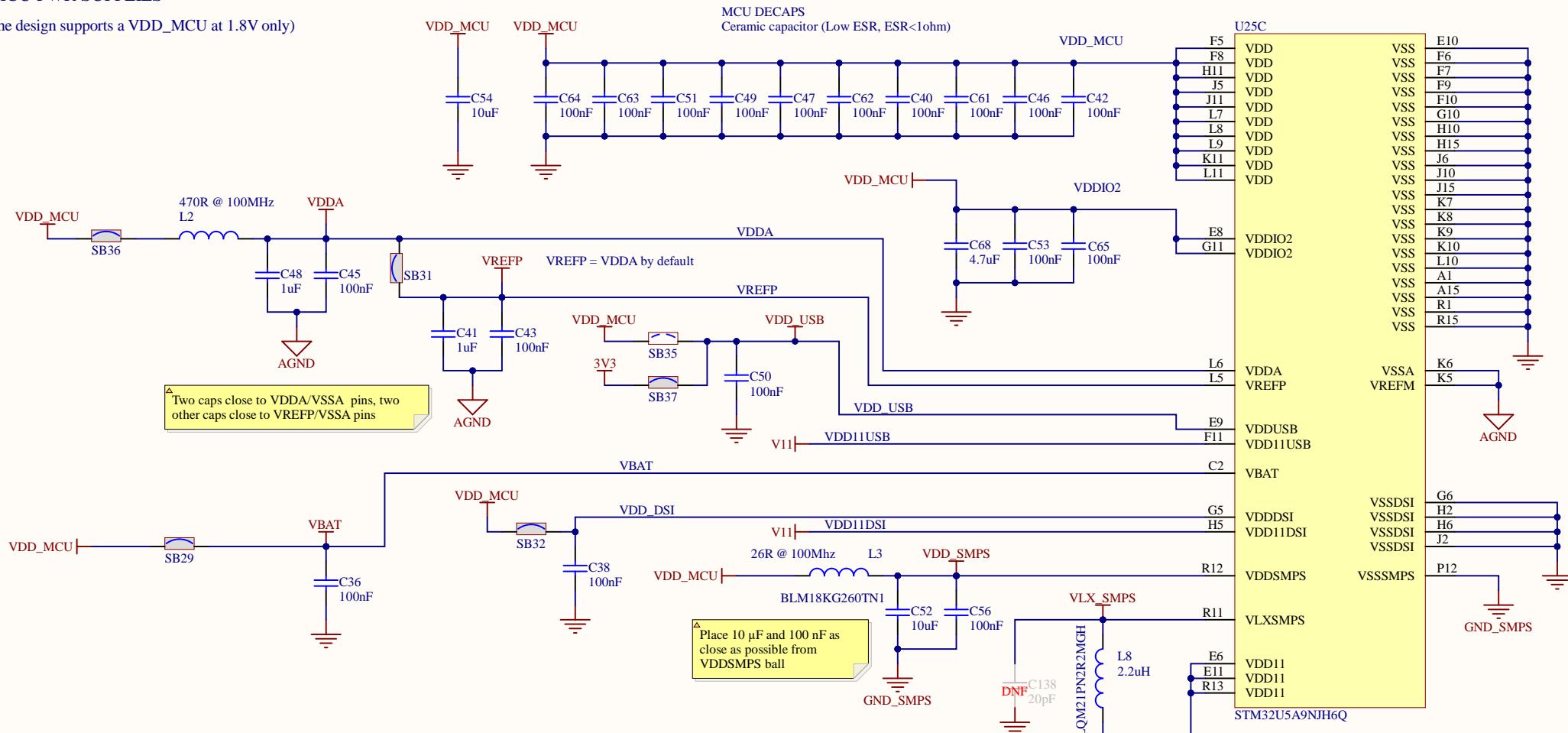
PH3_BOOT0

BOOT0 Low by default to boot from internal Flash



MCU PWR SUPPLIES

(The design supports a VDD_MCU at 1.8V only)



Operating range: $1V71 < VDD < 3V6$
 Operating range: $1V08 < VDDIO2 < 3V6$ (only for IO G[15:2], if independent from VDD)
 Operating range: $1V62 < VDDA < 3V6$ (VREFBUF not used)
 Operating range: $1V62 < VREFP < 3V6$ (external VREFP, VREFBUF not used)
 Operating range: $3V < VDDUSB < 3V6$ (USB used)
 Operating range: $1V65 < VBAT < 3V6$
 Operating range: $1V71 < VDDDSI < 3V6$
 Operating range: $1V71 < VDDSMPS < 3V6$
 Operating range: $1V < VDD11USB$ and $VDD11DSI < 1V26$, must be connected to VDD11
 Operating range: $0V81 < VDD11 < 1V27$ (except STBY/Shutdown : OFF)

GND_SMPS should be connected to GND as close as possible to VDDSMPS pin and its $10\mu F/100\text{nF}$ capacitors

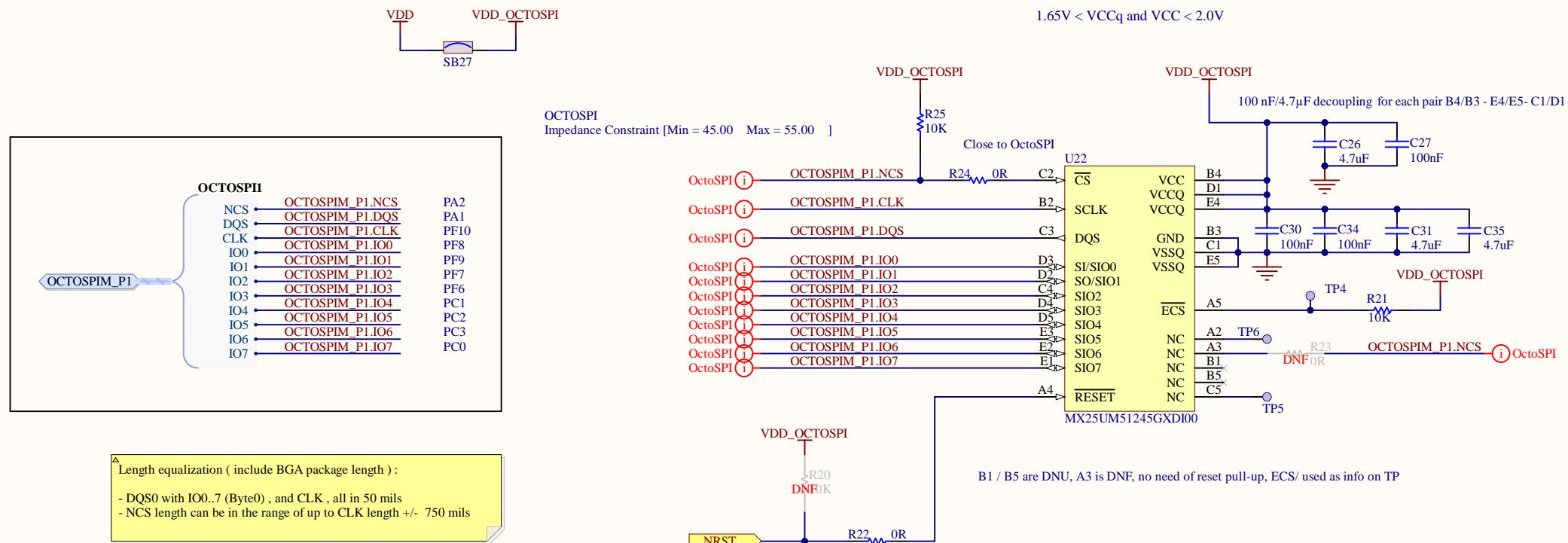
Place one 100nF close of each VDD11USB and VDD11DSI ball

Place one $2.2\mu F$ for each R13 and E6 pins (E11 pin does not need $2.2\mu F$)

Title: MCUPWR	
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OctoSPI Flash Memory



HexadecaSPI PSRAM Memory

HexadecaSPI1

(HEXASPI1 is used hereafter to simplify bus naming)

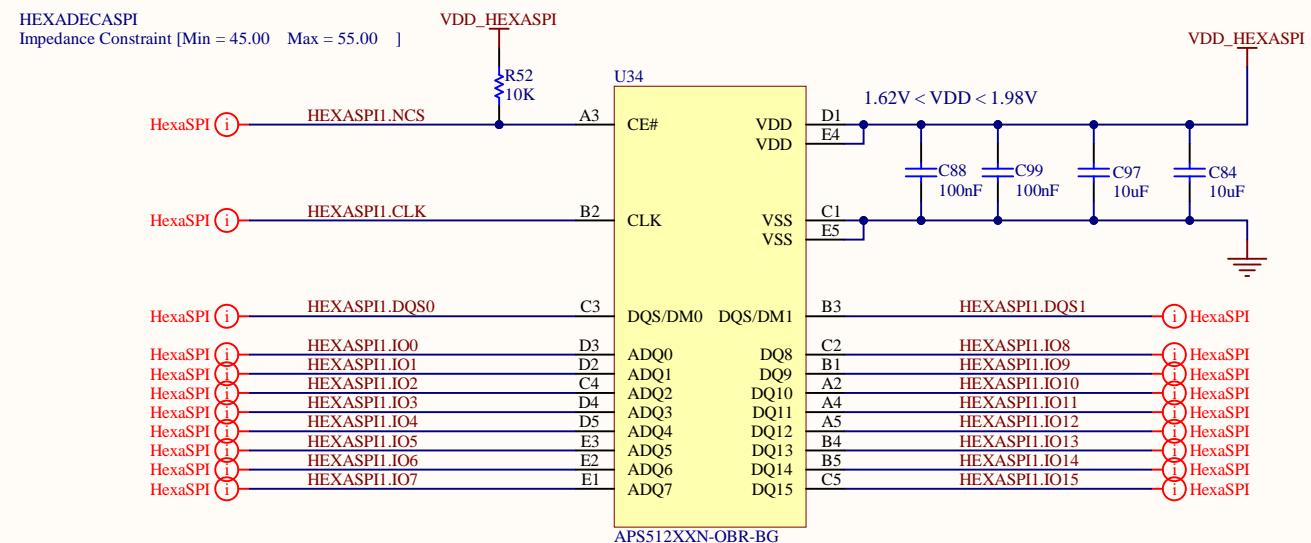
HEXASPII	HEXASPI1.NCS	PH9
	HEXASPI1.CLK	PI3
	HEXASPI1.DQSO	PI2
	IO0	PH10
	IO1	PH11
	IO2	PH12
	IO3	PH13
	IO4	PH14
	IO5	PH15
	IO6	PI0
	IO7	PI1
	DQS1	HEXASPI1.DQS1
	IO8	PI8
	IO9	PI9
	IO10	PI10
	IO11	PI11
	IO12	PI12
	IO13	PI13
	IO14	PI14
	IO15	PI0

Match length (including BGA package length)

- DQS0 with IO0..7 (Byte0), all in 50 mils,
- DQS1 with IO8..15 (Byte1), all in 50 mils,
- CLK is 100 mils from any signal of Byte0 or Byte1
- NCS can be CLK +/- 700 mils



C99/C97 and C88/C84 decoupling for each pin pair C1/D1 - E4/E5

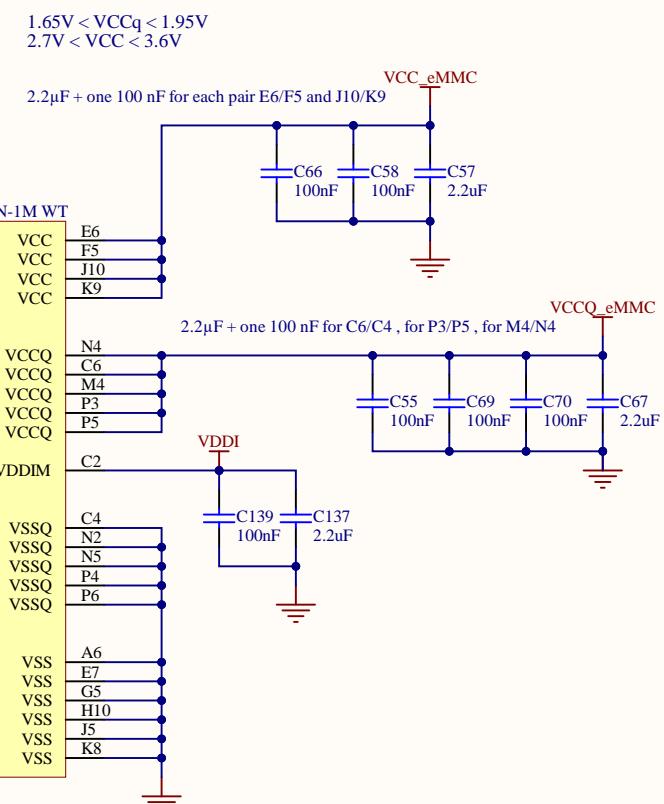
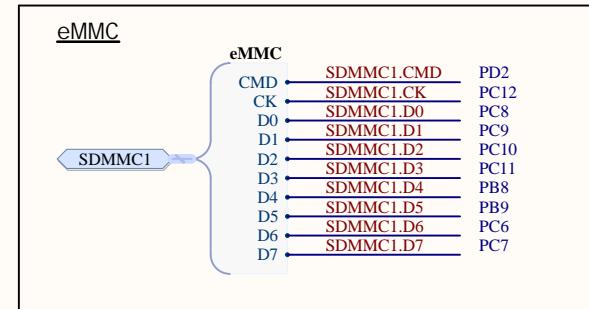
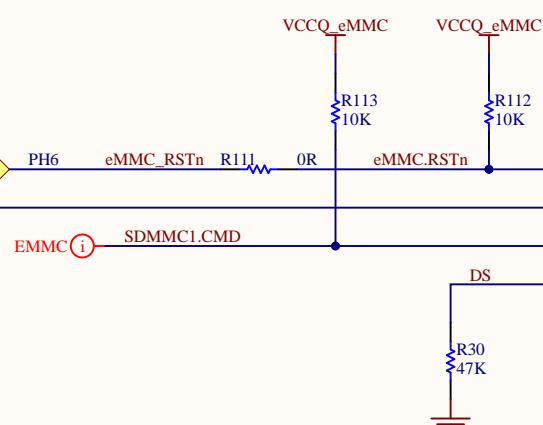
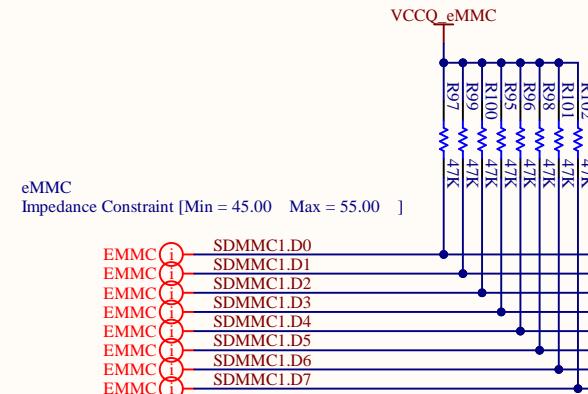
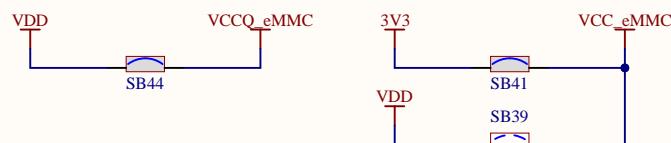
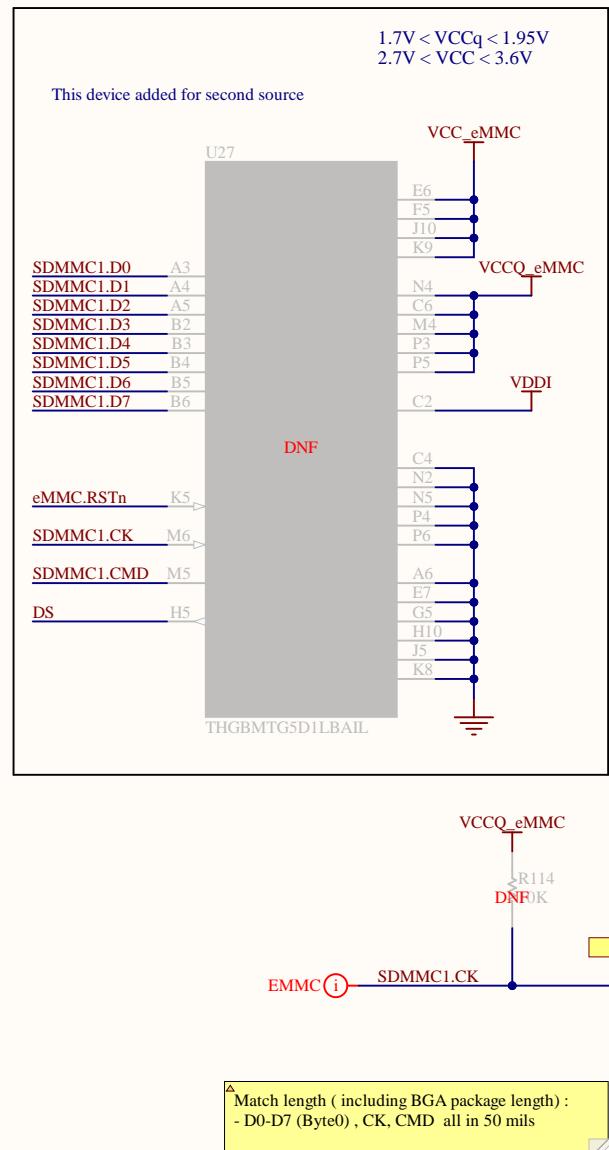


APS512XXN-OBR-BG

Title: HEXADECASPI PSRAM
Project: STM32U5A9NJH6Q Discovery
Variant: U5A9NJQ
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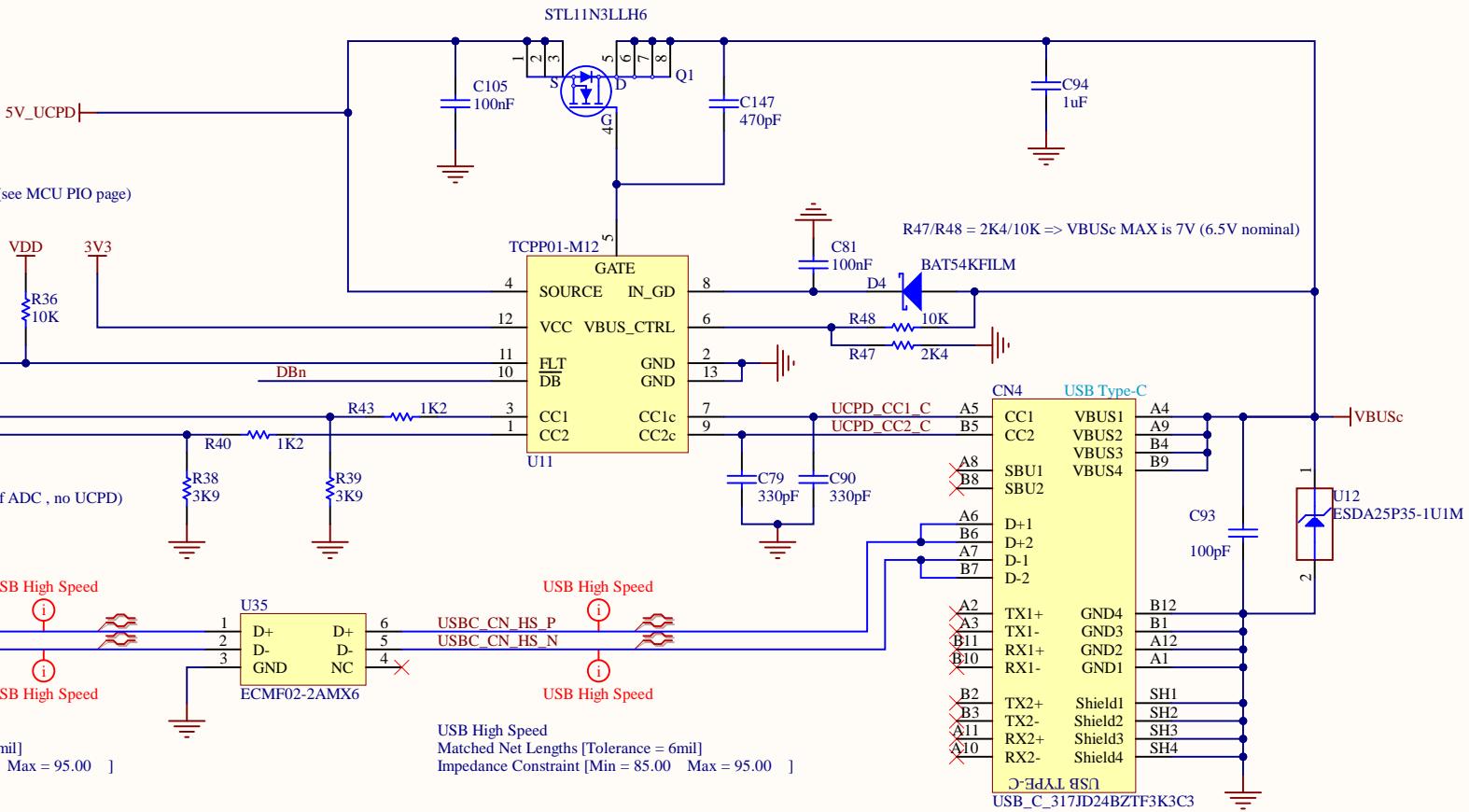


eMMC Memory

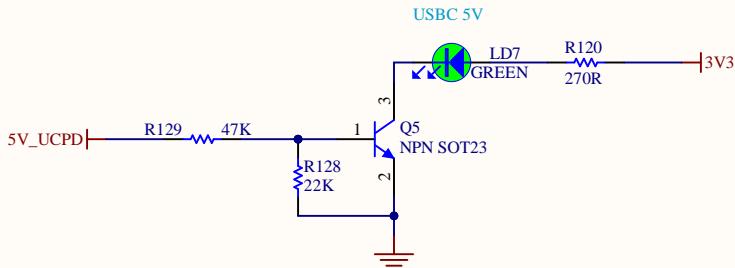


USBHS_TYPE_C CONNECTOR

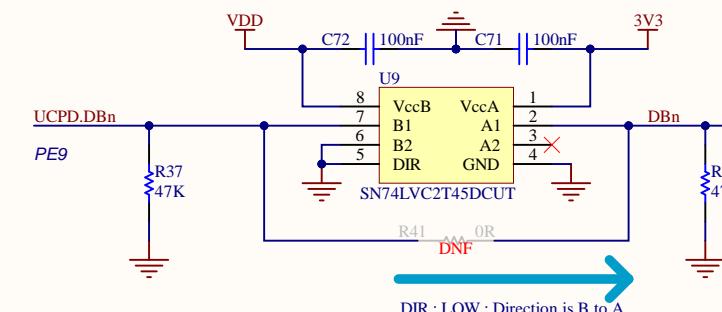
USB-C sink only, up to 15W possible



5V_USB_LED



UCPD.DBn Level shifter



Title: USB HS Type-C

Project: STM32U5A9NJH6Q Discovery

Variant: U5A9NJQ

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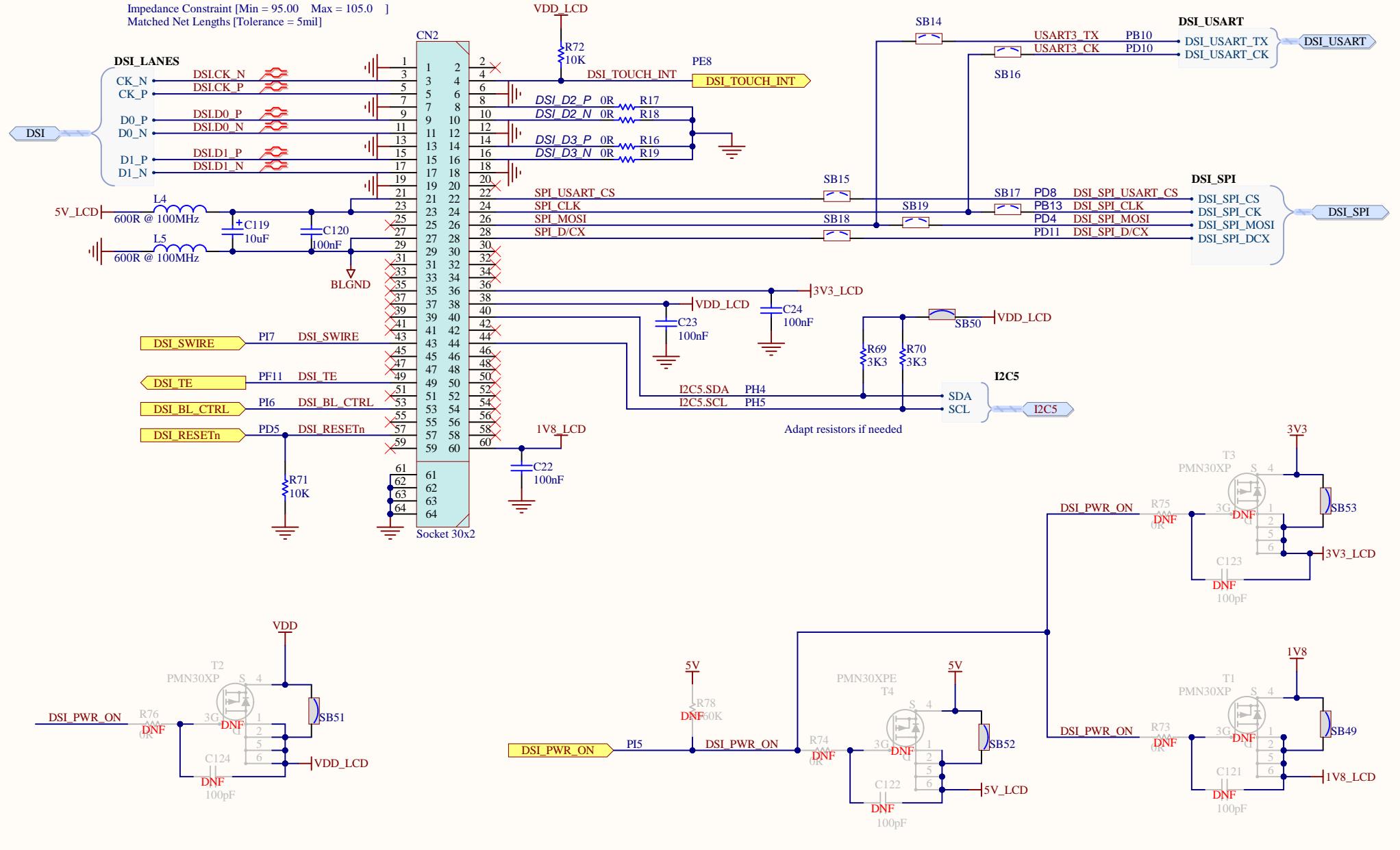
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DSI LCD

DSI.CK_N and DSI.CK_P are inverted on DSI connector pins : swap lanes in Software

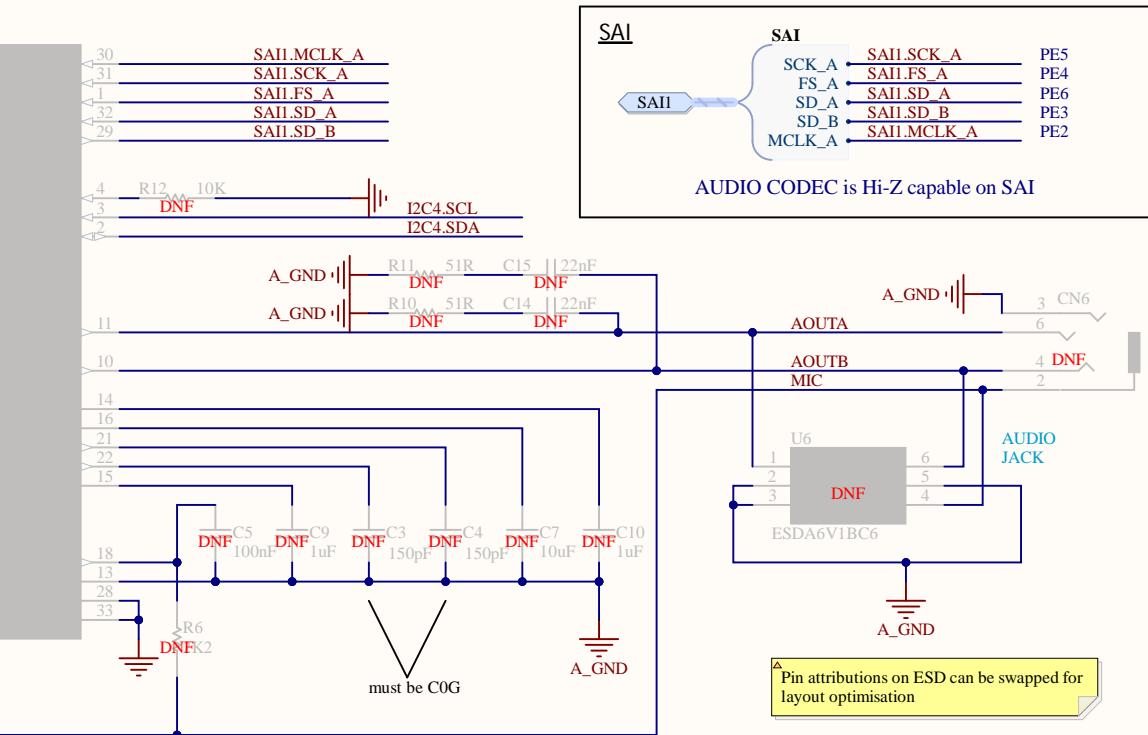
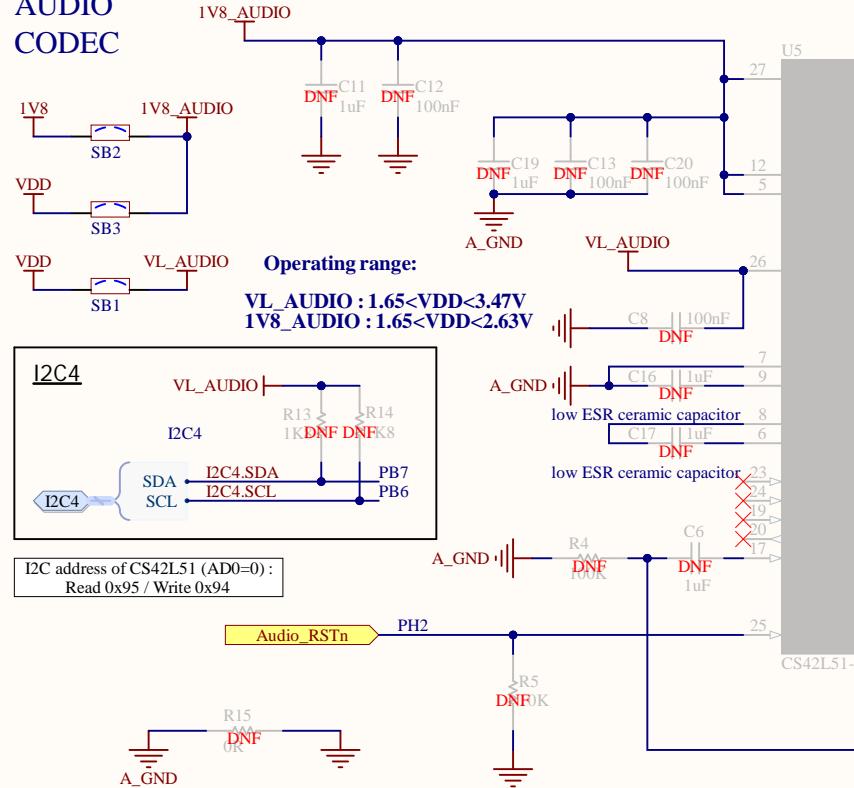
Impedance Constraint [Min = 95.00 Max = 105.0]
Matched Net Lengths [Tolerance = 5mil]



Title: DSILCD	
Project: STM32U5A9NJH6Q Discovery	
Variant: U5A9NJQ	
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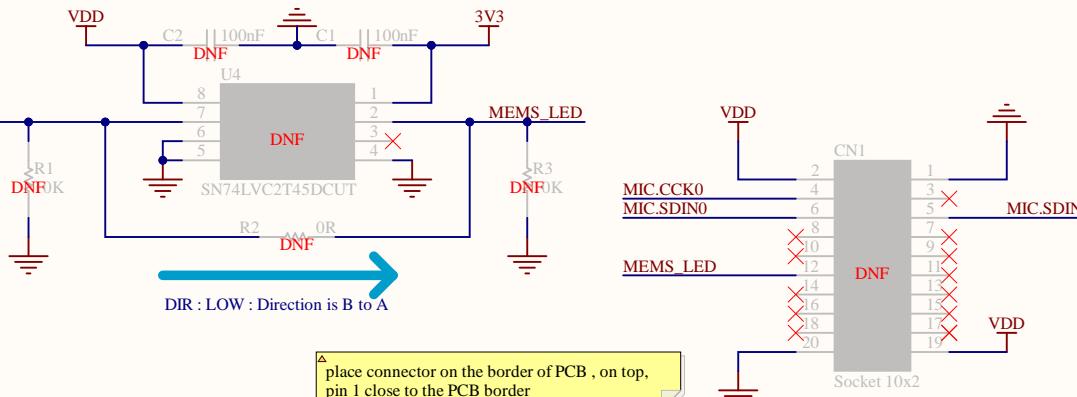
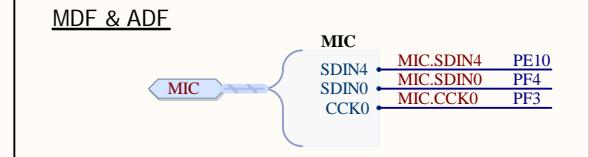
AUDIO CODEC



AUDIO Stereo Out with MIC

Audio MEMs connector

Operating range: 1.64 < VDD < 3.6V



place ESD protection close to pins

ESD PROTECTIONS

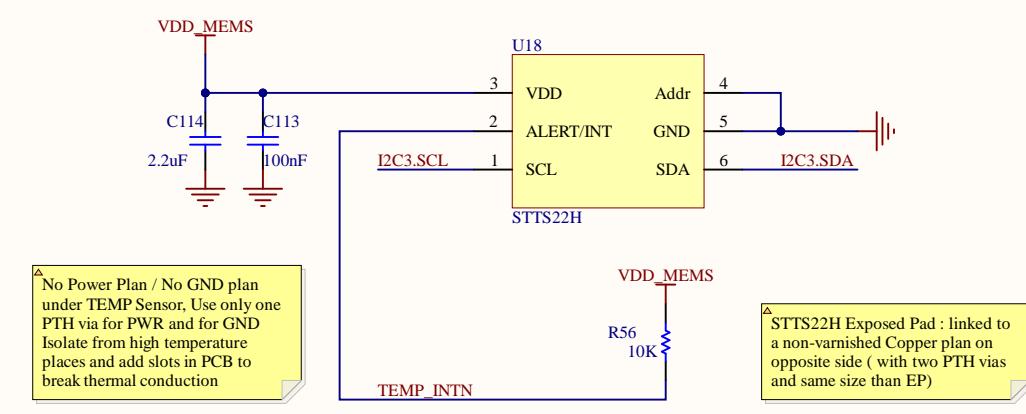


MEMS

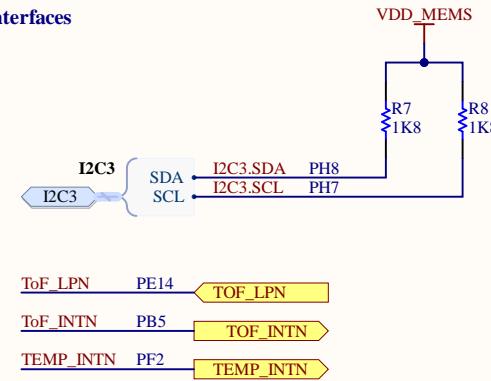
TEMPERATURE SENSOR

I2C Default address : 0x7E / 0x7F (W/R)

1.5V < VDD < 3.6V

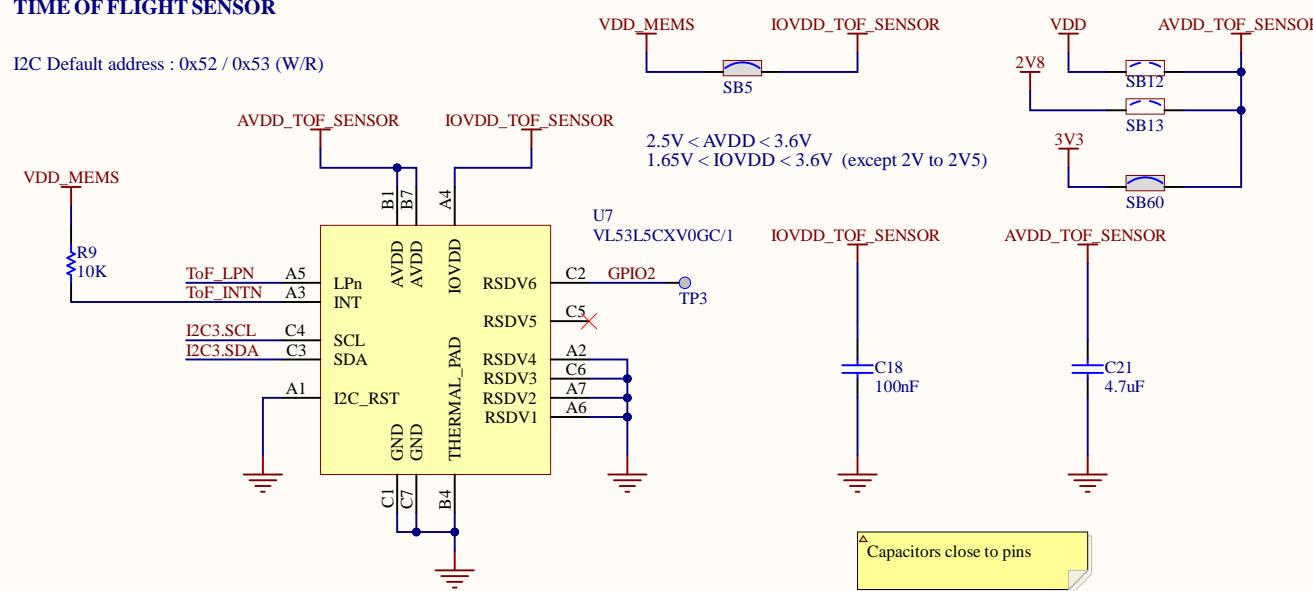


Interfaces



TIME OF FLIGHT SENSOR

I2C Default address : 0x52 / 0x53 (W/R)



Title: MEMS

Project: STM32U5A9NJH6Q Discovery

Variant: USA9NQ

Revision: B-01

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Size: A4

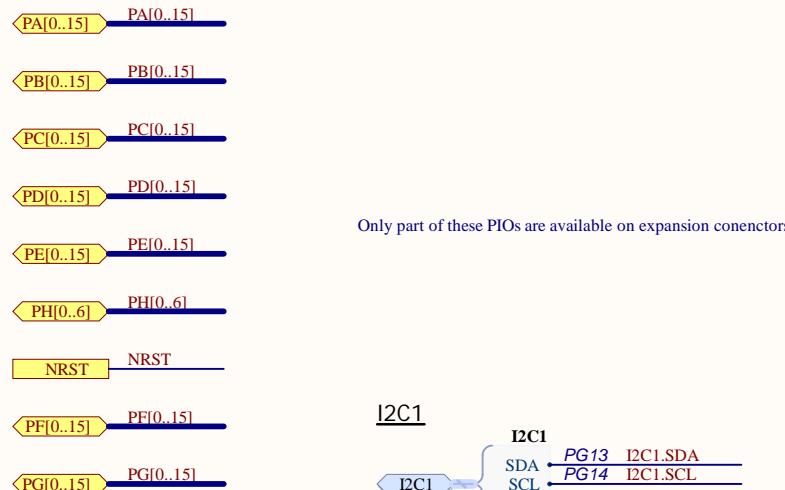
Date: 16-Feb-2023

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EXPANSION CONNECTORS

EXPANSION CONNECTORS, MCU INTERFACES

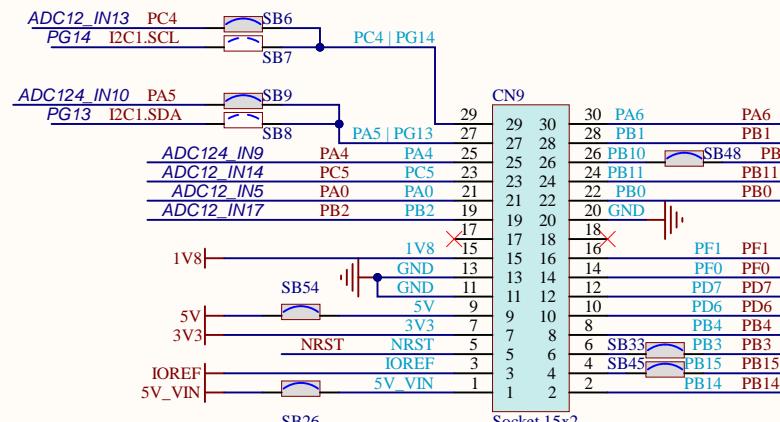


EXPANSION CONNECTORS

EXPANSION CONNECTORS : VDD is 1.8V Default, VREFP / VDDA are 1.8V default



ADC inputs are referenced to VREFP (1.8V default)



LIMITATION :

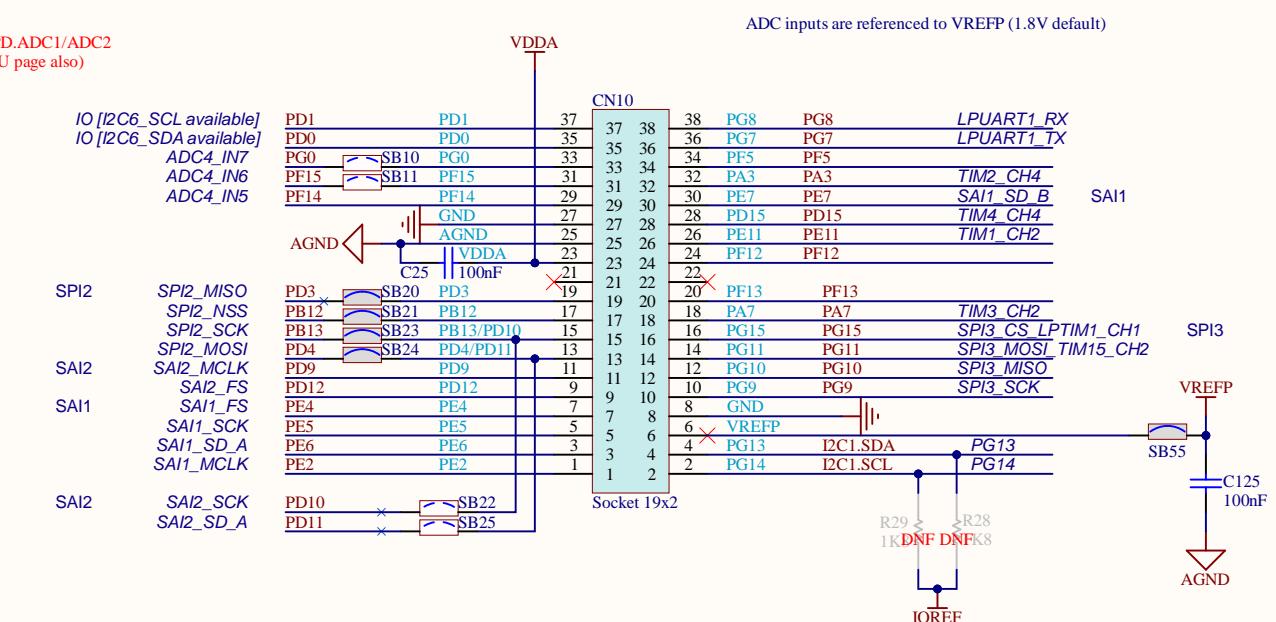
ADC4_IN6 & ADC4_IN7 are exclusive with UCPD.ADC1/ADC2
Use solder bridges to connect/disconnect (on MCU page also)

IO [I2C2_SCL available]
IO [I2C2_SDA available]

SDMMC2_CMD
SDMMC2_CK
SDMMC2_D3
SDMMC2_D2 or T.SWO (JTDO)
SDMMC2_D1 or UCPD.CC2
SDMMC2_D0

LIMITATION :

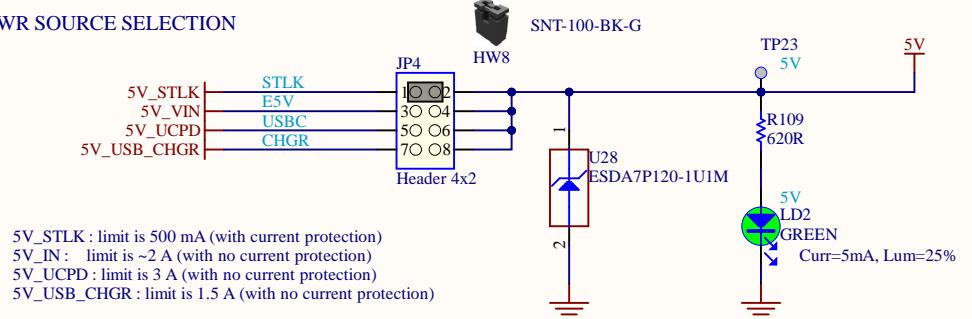
SDMMC2_D2 is exclusive with T.SWO (JTDO) on STLINK/DEBUG/TAG
SDMMC2_D1 is exclusive with UCPD.CC2
Use solder bridges to connect/disconnect (on MCU page also)



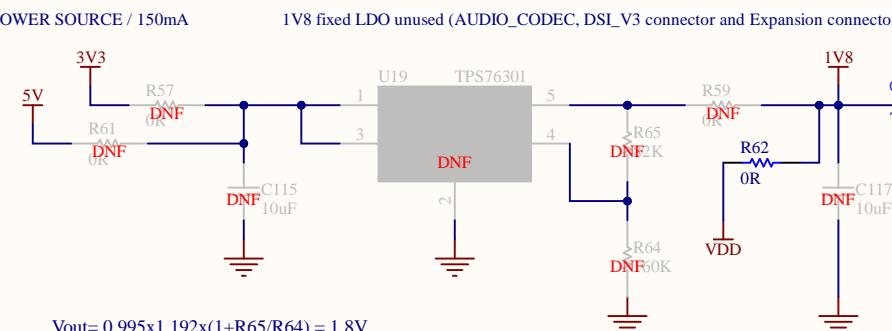
Title: Expansion Connectors
Project: STM32U5A9NJH6Q Discovery
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5V PWR SOURCE SELECTION

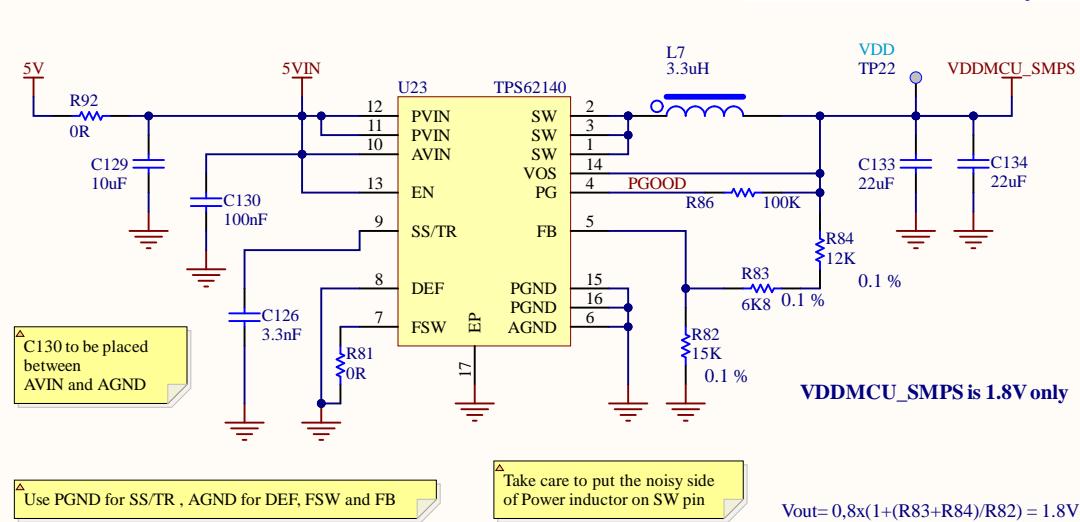


1V8 POWER SOURCE / 150mA



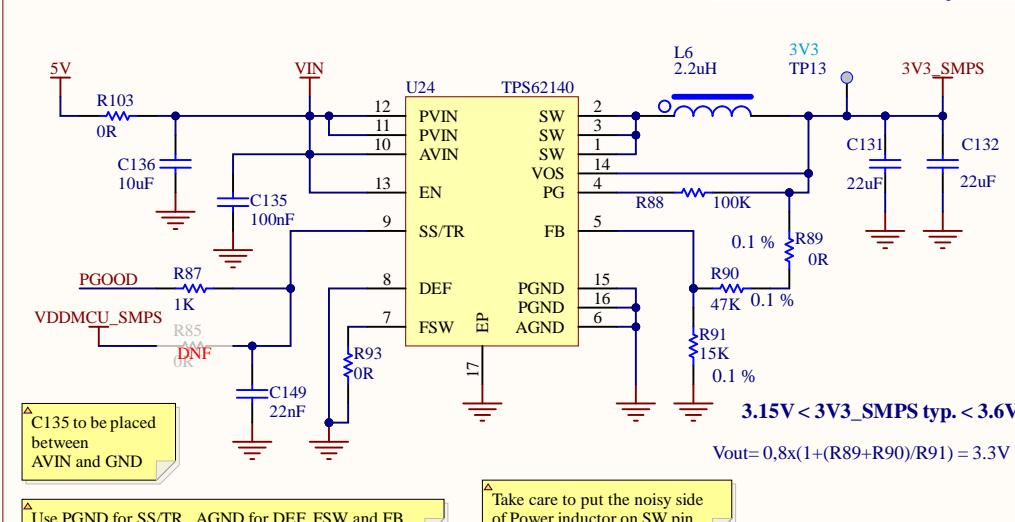
VDD MCU POWER SOURCE / 800mA

1.8V Default

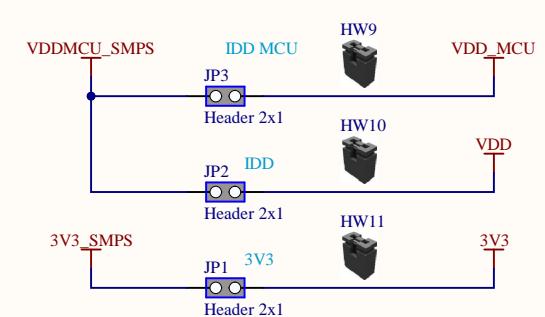


3V3 POWER SOURCE / 800 mA

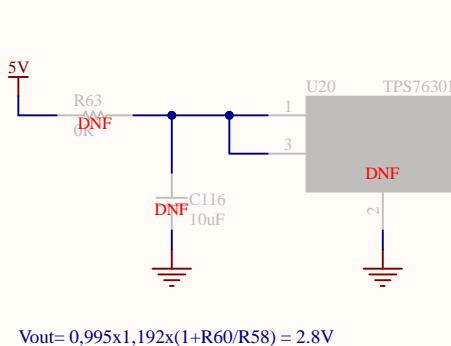
3.3V Default



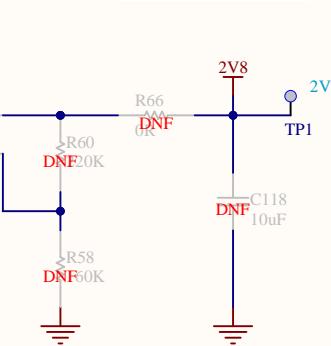
CURRENT MEASUREMENTS



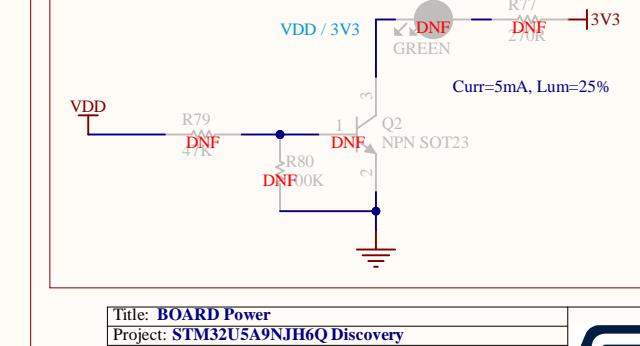
2V8 POWER SOURCE / 150mA



2V8 fixed LDO unused



MCU PWR LED (VDD and 3V3)



Title: BOARD Power

Project: STM32U5A9NJH6Q Discovery

Variant: U5A9NQJ

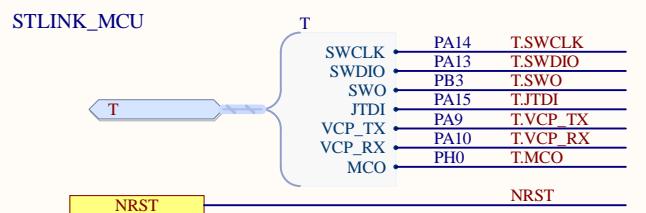
Revision: B-01

Reference: MB1829

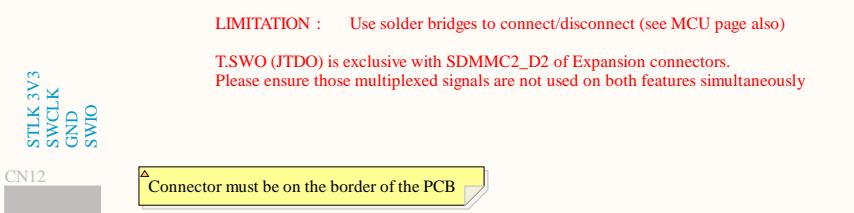
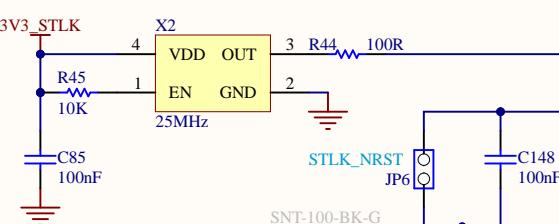
Size: A4 Date: 16-Feb-2023



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HSE CLK STLINK



HW7
PCB
MBxxxxy

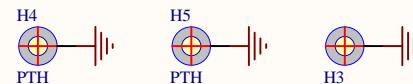
HW3
STICKER BOARD
Sticker board

HW1
STICKER PRODUCT
Sticker product

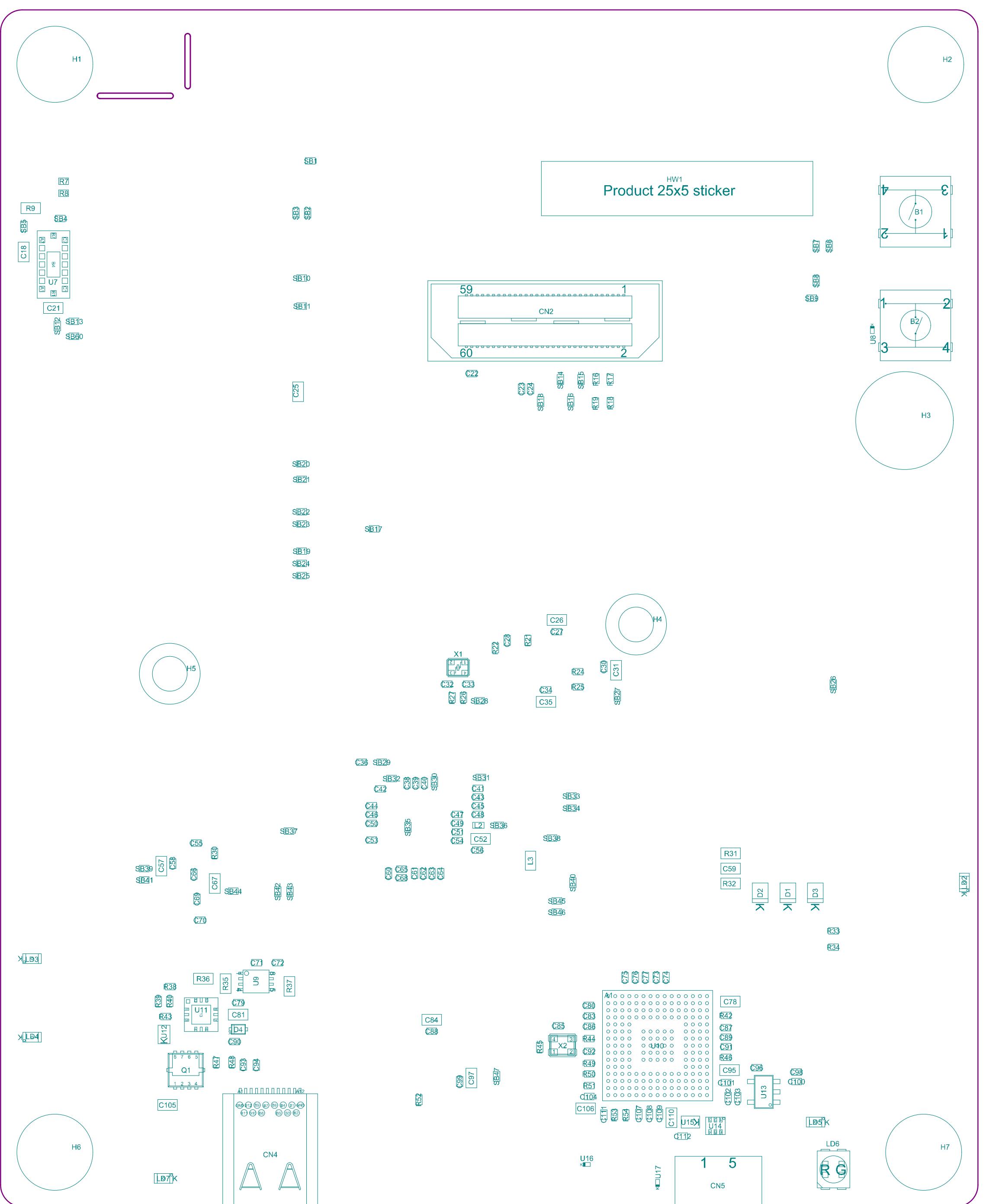
HW2
DNF
Sticker ES



Parts for MB1829 corner holes



Parts for different daughter boards holes



Project: STM32U5A9NJH6Q Discovery

Layer: M14-Top Assembly

Gerber: .GM14

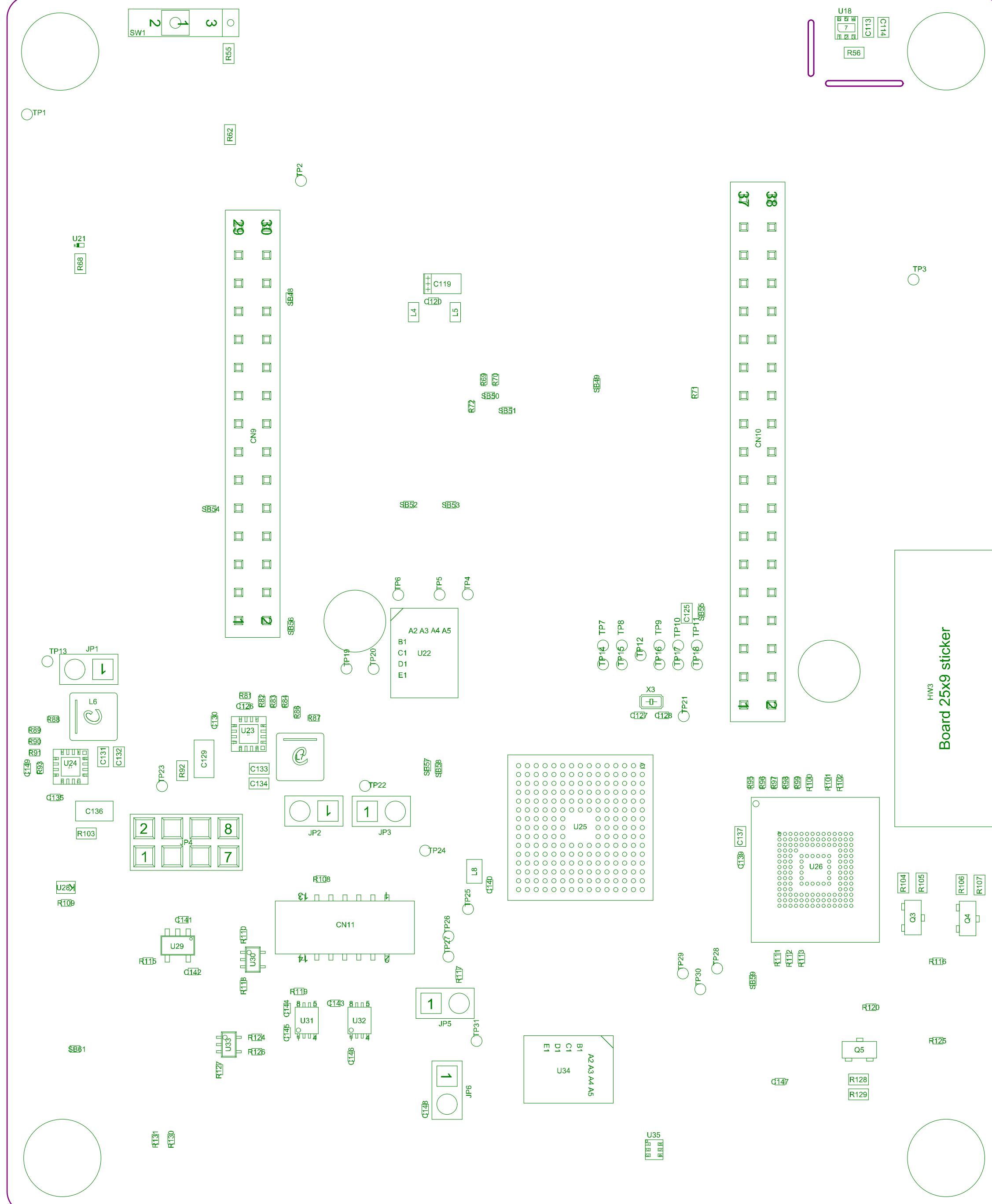
Variant: U5A9NJQ

Ref: MB1829

Date: 16-Feb-2023

Rev: B





Project: STM32U5A9NJH6Q Discovery

Layer: M15-Bottom Assembly

Gerber: .GM15

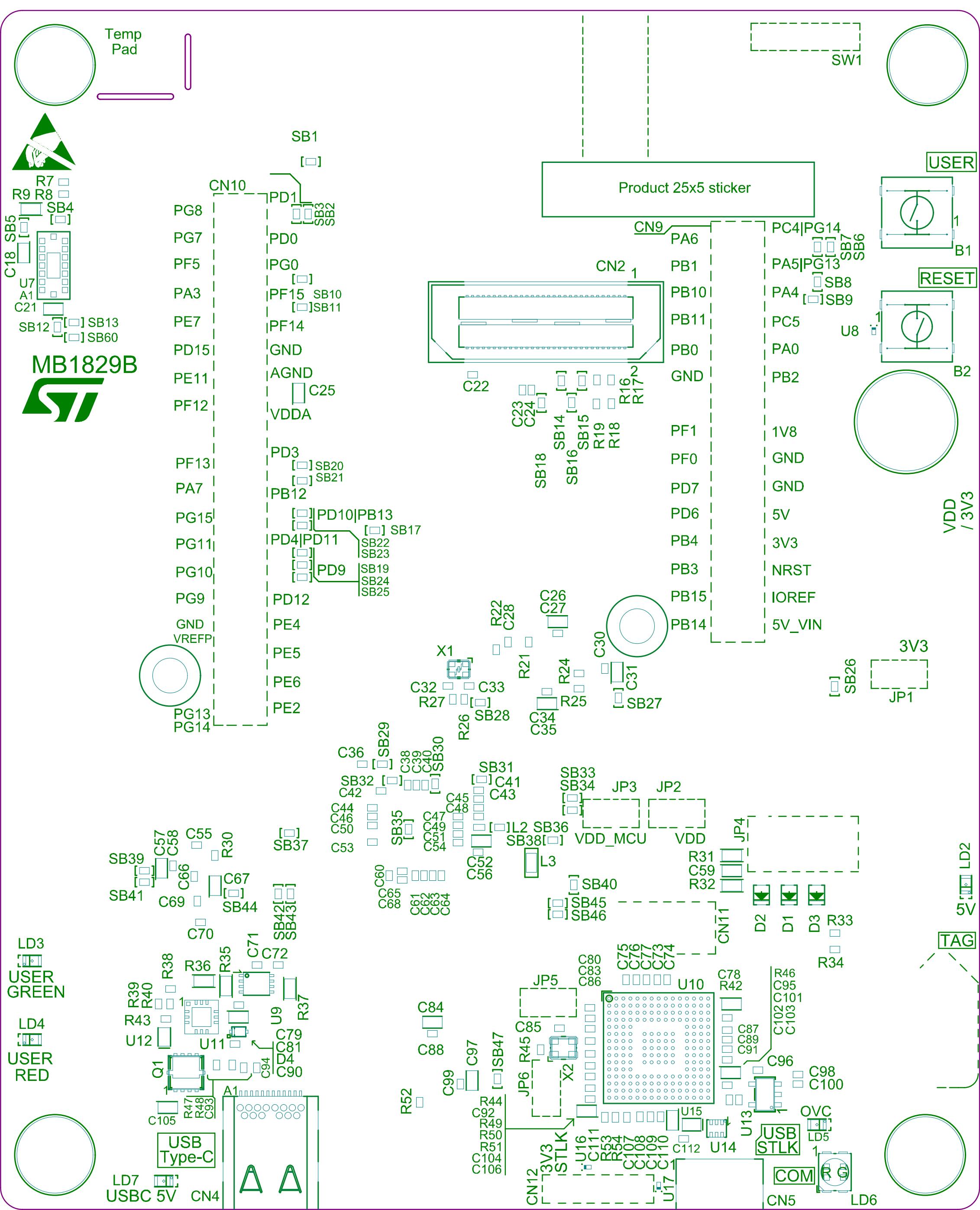
Variant: U5A9NJQ

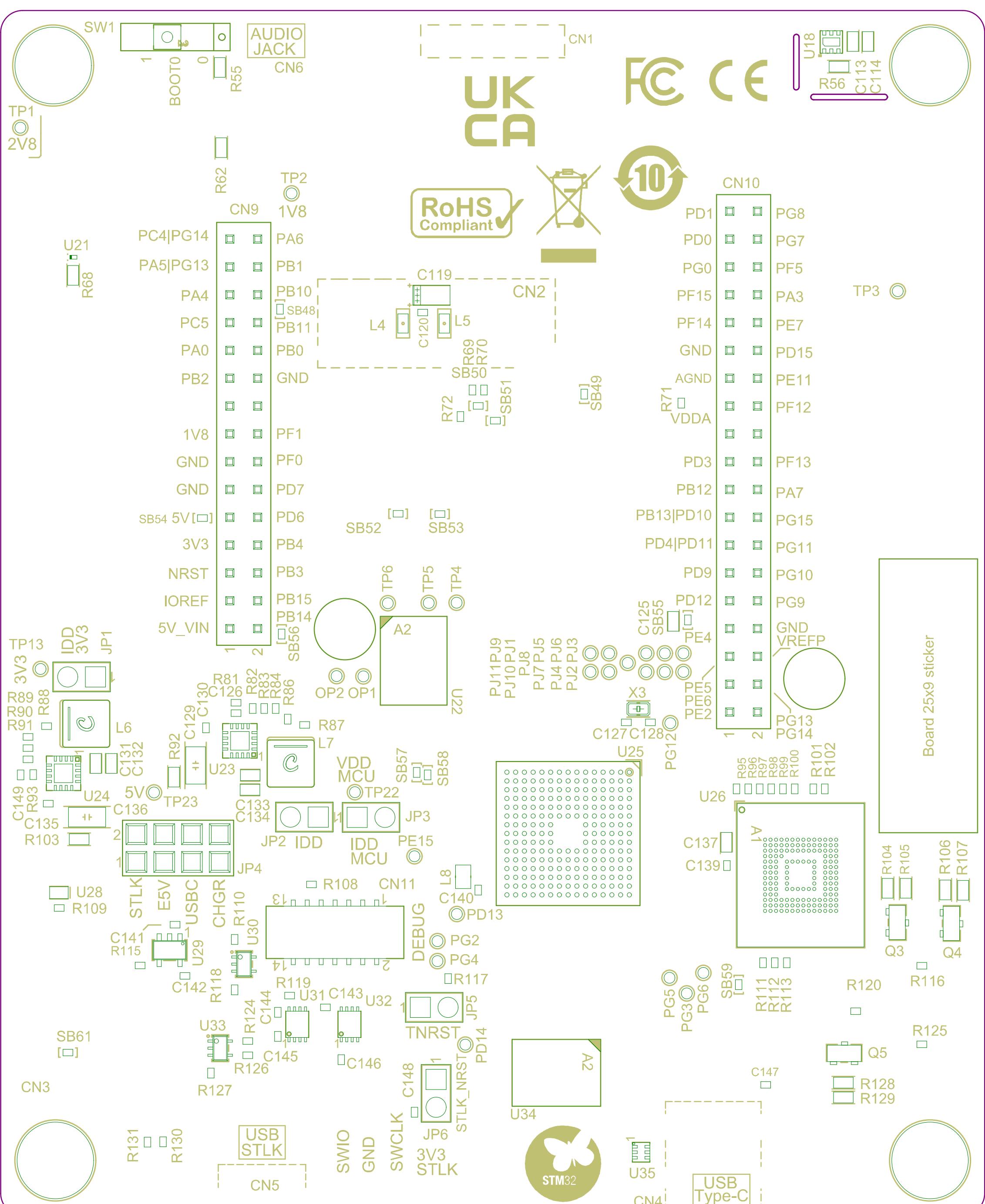
Ref: MB1829

Date: 16-Feb-2023

Rev: B







M15-Bottom Assembly

.GM15