STM32G5 DPOW Discovery

MB2072

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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.

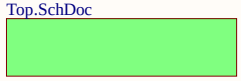
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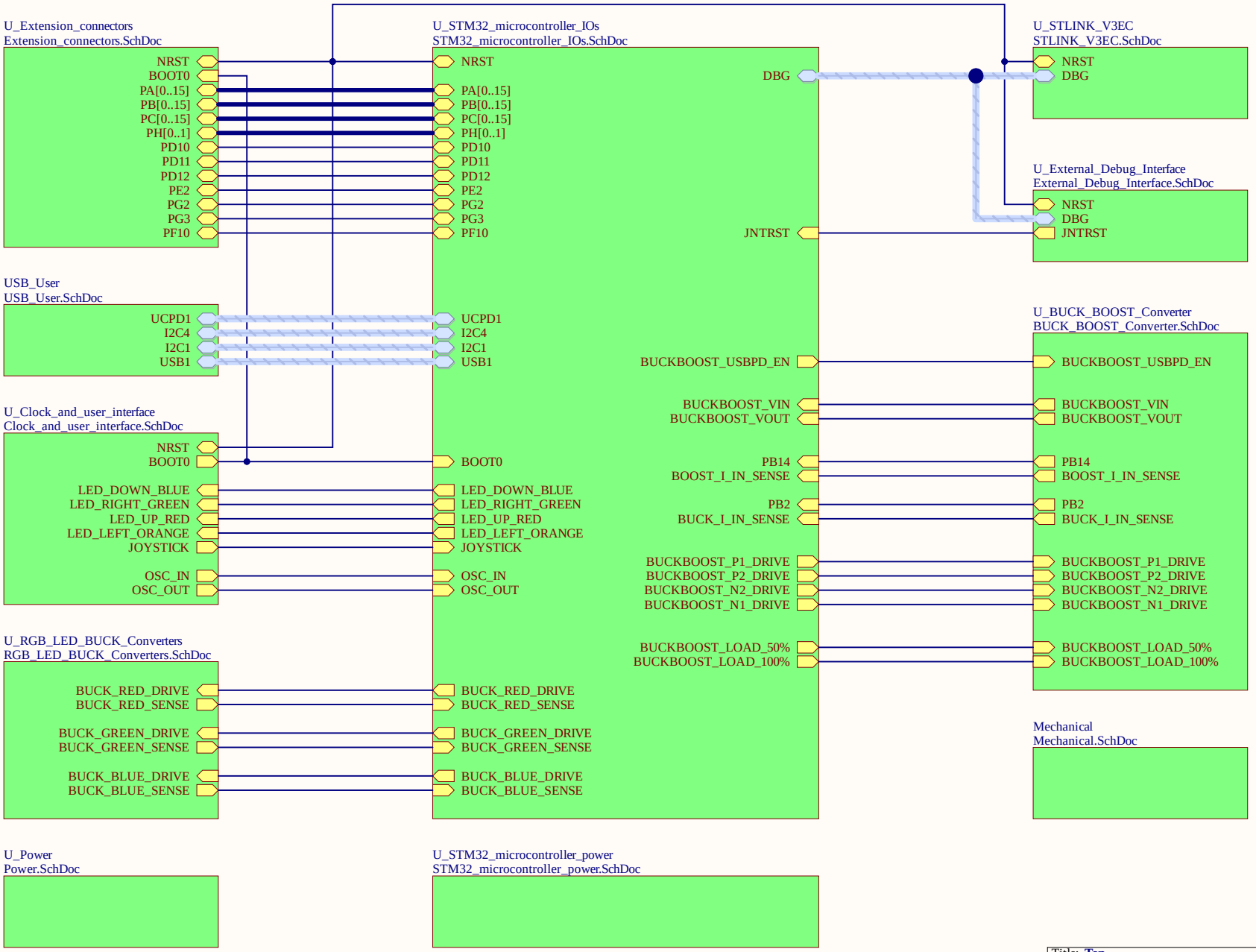
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U_Top
Top.SchDoc



Title: **Project overview**		
Project: **STM32G5 DPOW Discovery**		
Variant: G564RE		
Revision: B-01		Reference: MB2072
Size: A4	Date: 03-July-26	Sheet: 1 of 13



Title: **Top**		
Project: **STM32G5 DPOW Discovery**		
Variant: G564RE		
Revision: B-01		Reference: MB2072
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STM32 microcontroller IOs

Resistors must be close to MCU with very short and symmetric topology : USB differential pair routed on Top and/or Bottom (with GND reference on L2 / L3). PA11/PA12 routed as standard GPIOs signals.

U3A

MCU_IOs

STM32G564REZ3

MCU CLK & RST

DEBUG MCU

I2C1 not used (only for internal dev activities)

SBxx must be close to MCU, can be placed on bottom side

SWDIO and SWCLK with same length and shielded.
JTAG with same length and shielded.

Pull-up on VCP_RX only

SMBUS1

WARNING :
SMBUS1 and JTAG are exclusive
See configuration table on the right

Default configuration

POSITION	SMBUS1 (pull-ups on 3V3)	JTAG	SMBUS1 (external pull-ups)
SB38	Not fitted	Fitted	Not fitted
SB39	X (fitted)	Fitted	Not fitted
SB20	Fitted	X (fitted)	Not fitted
SB22	Fitted	X (fitted)	Not fitted
SB43	Fitted	X (fitted)	Not fitted

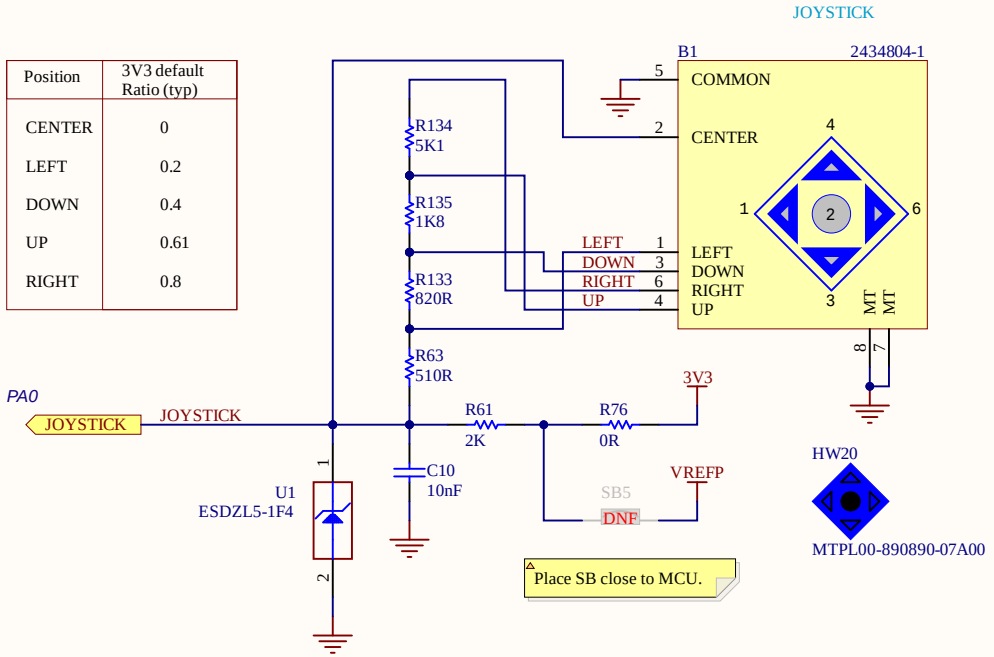
* X means don't care, optionally X can be no fit

RC Sine function

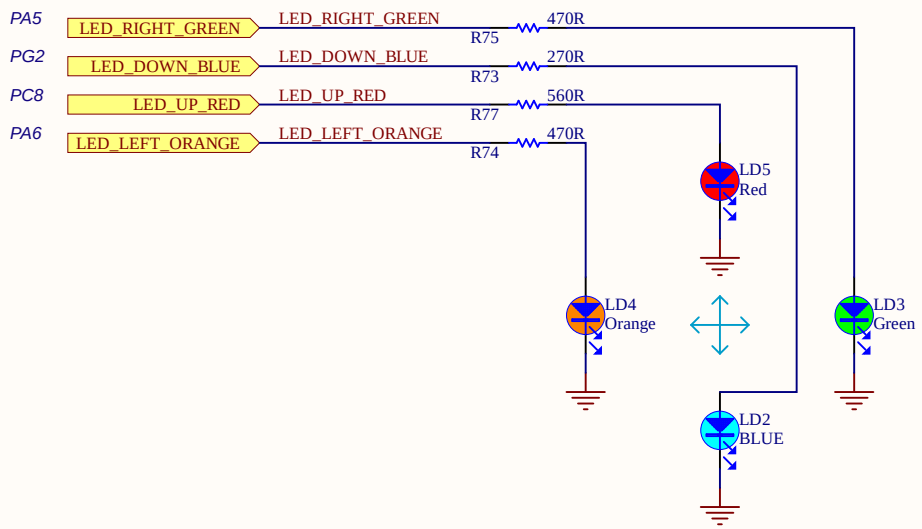
Title:	**STM32 microcontroller IOs**
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Size:	A4
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Clock and user interface

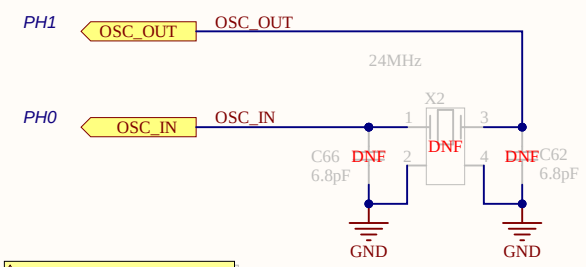
JOYSTICK FUNCTION



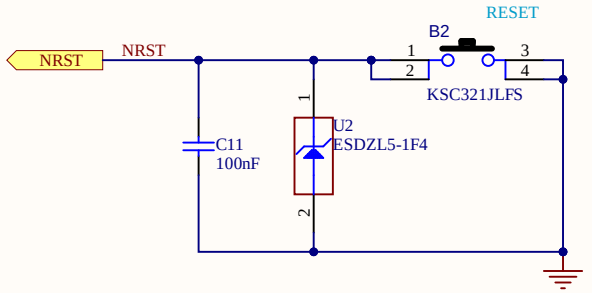
USER LED FUNCTION



EXTERNAL HSE CLK

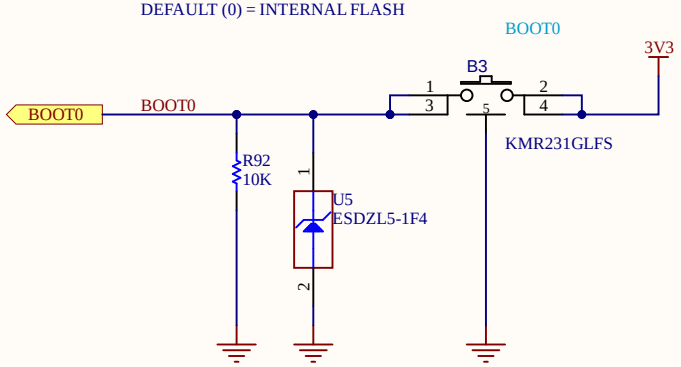


RESET FUNCTION



BOOT SELECT

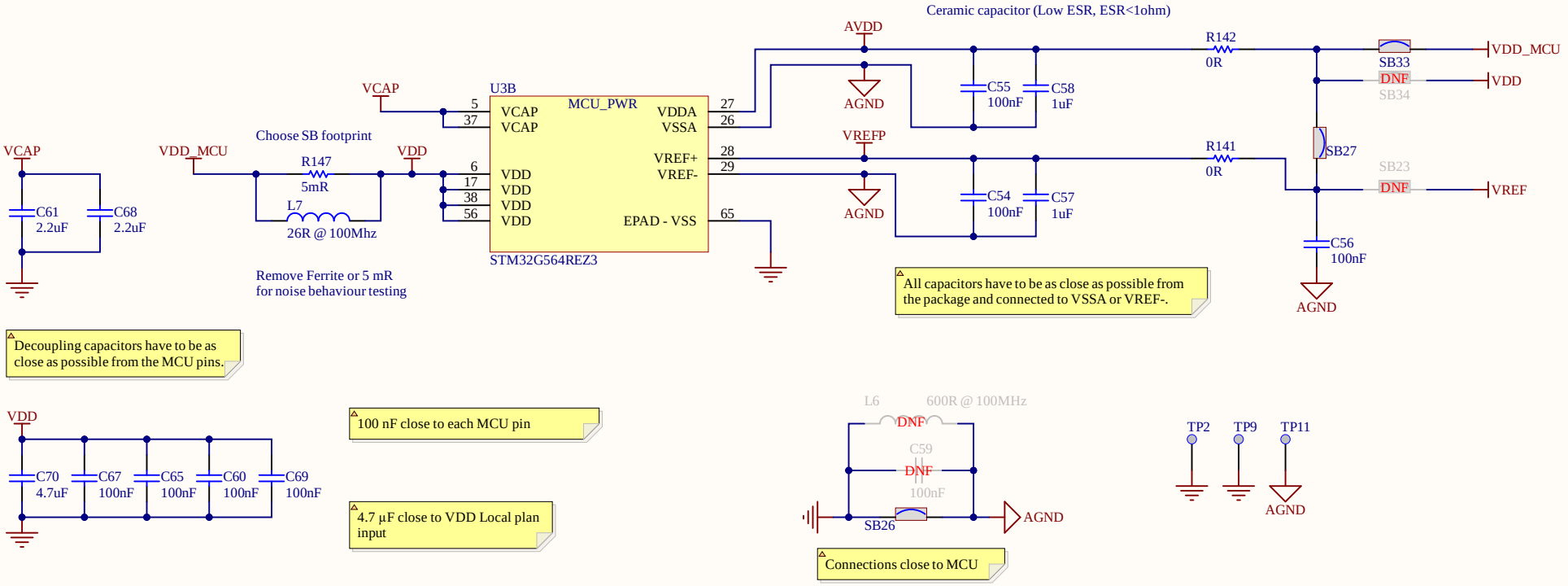
B3 PRESSED DURING RESET (1) = BOOTLOADER
DEFAULT (0) = INTERNAL FLASH



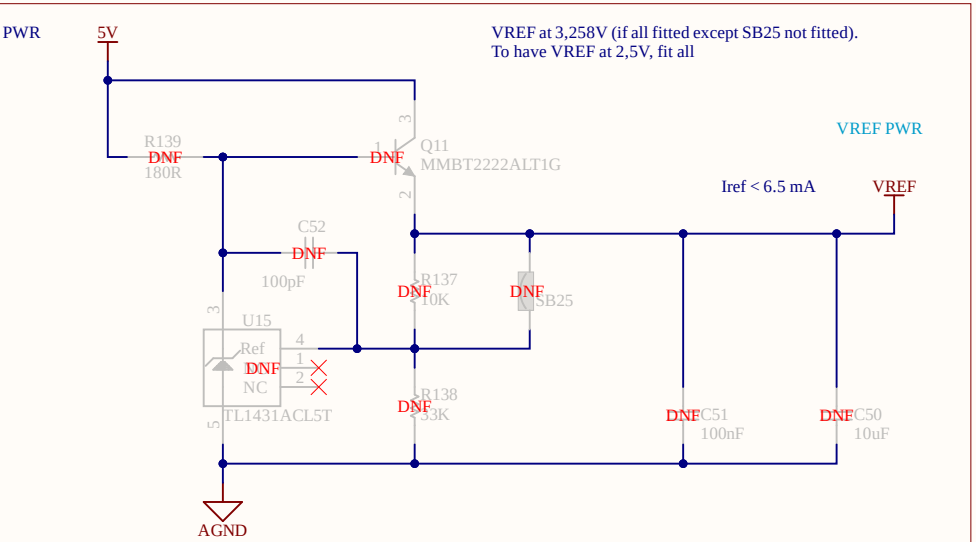
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Project: **STM32G5 DPOW Discovery**			
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STM32 microcontroller power

MCU Power



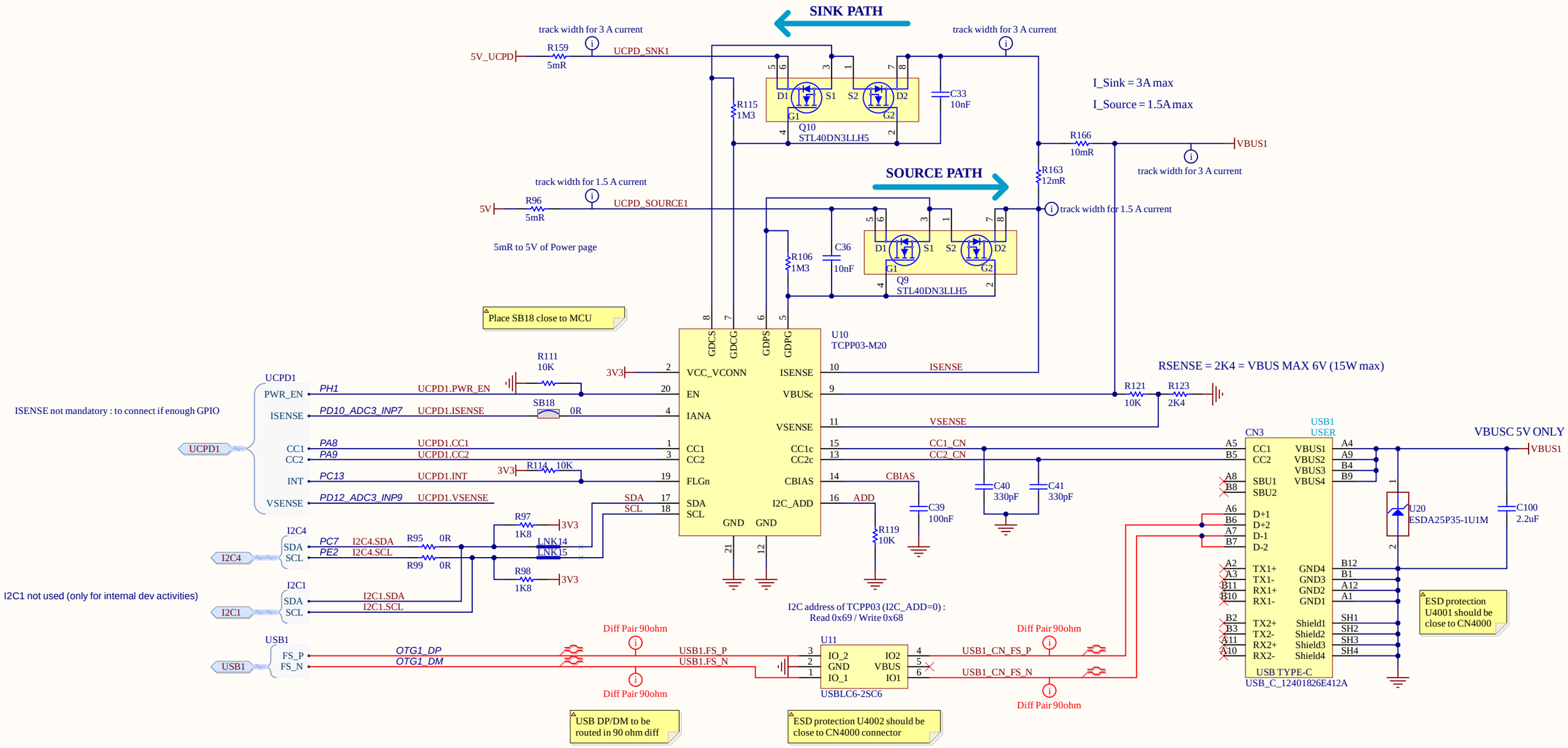
VREF PWR



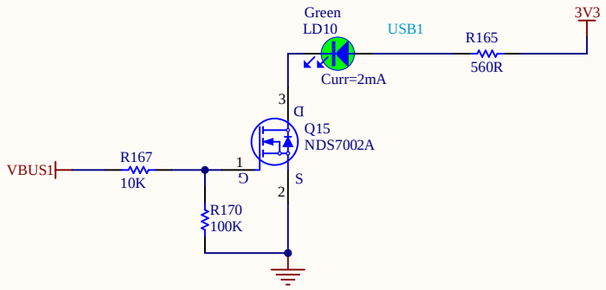
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USB User

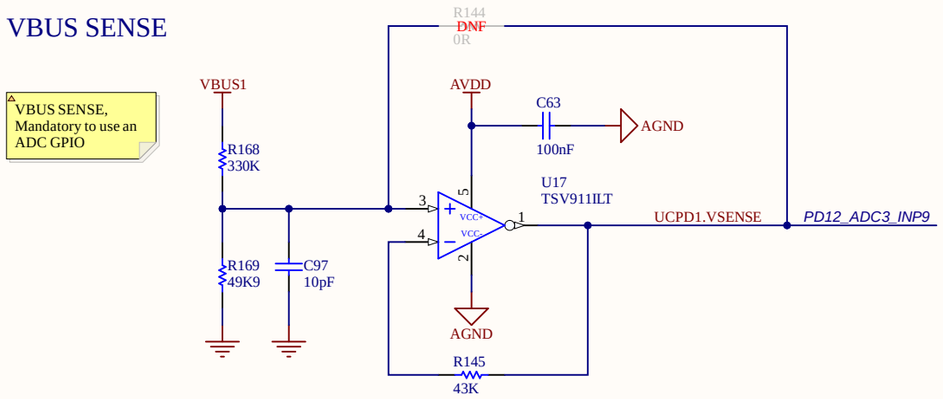
USB Type-C, FS, DRP/DRD, with UCPD, TCPP03



5V_USB_LED

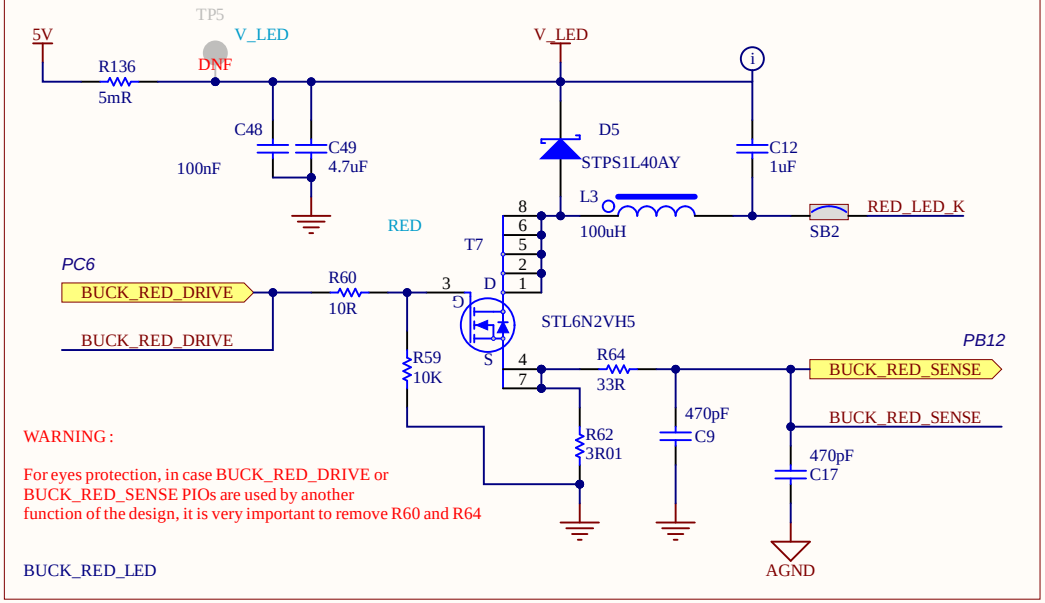


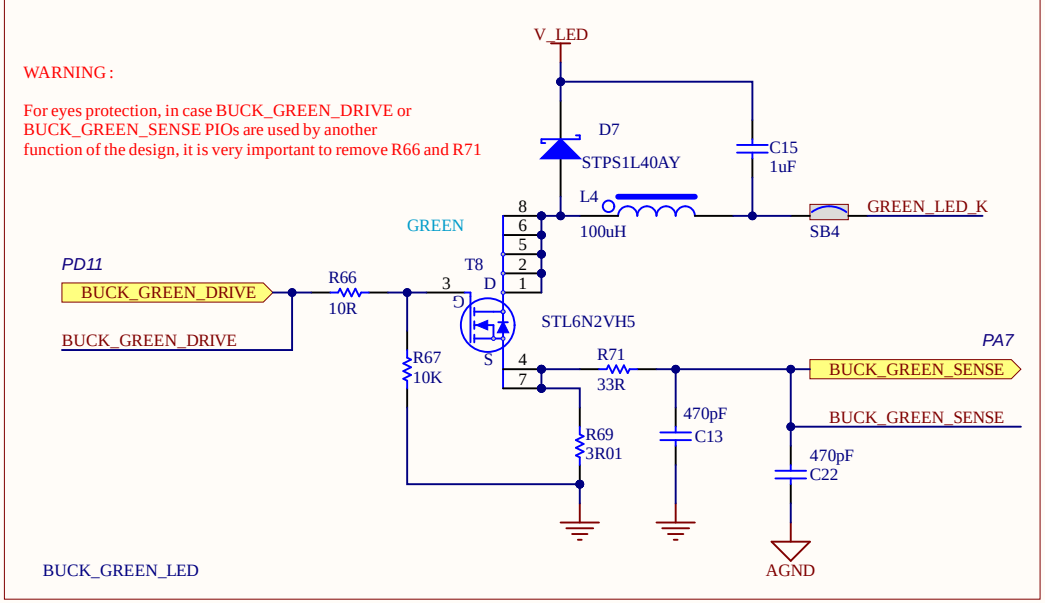
VBUS SENSE

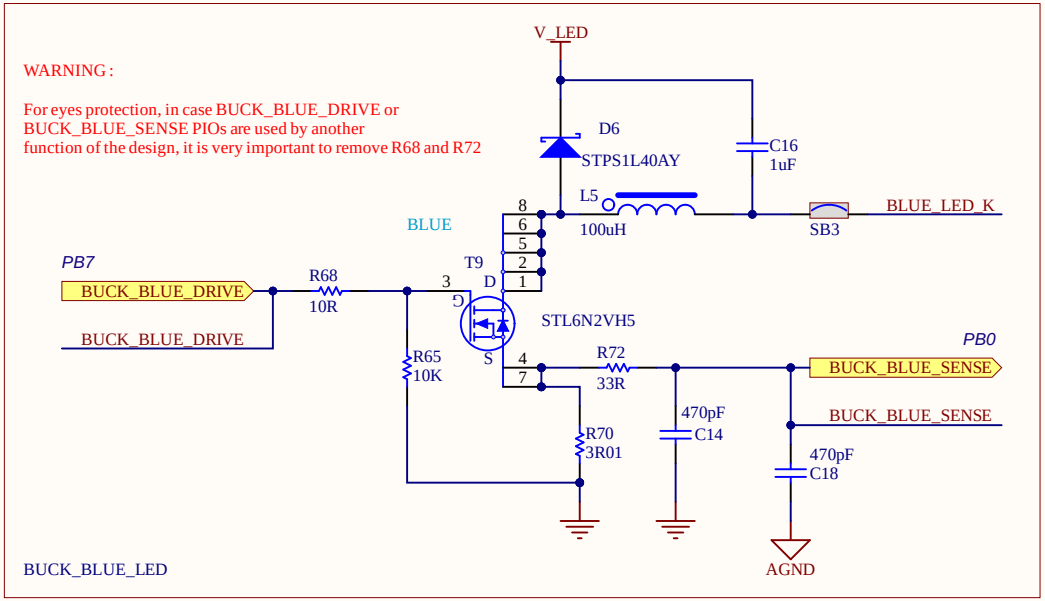


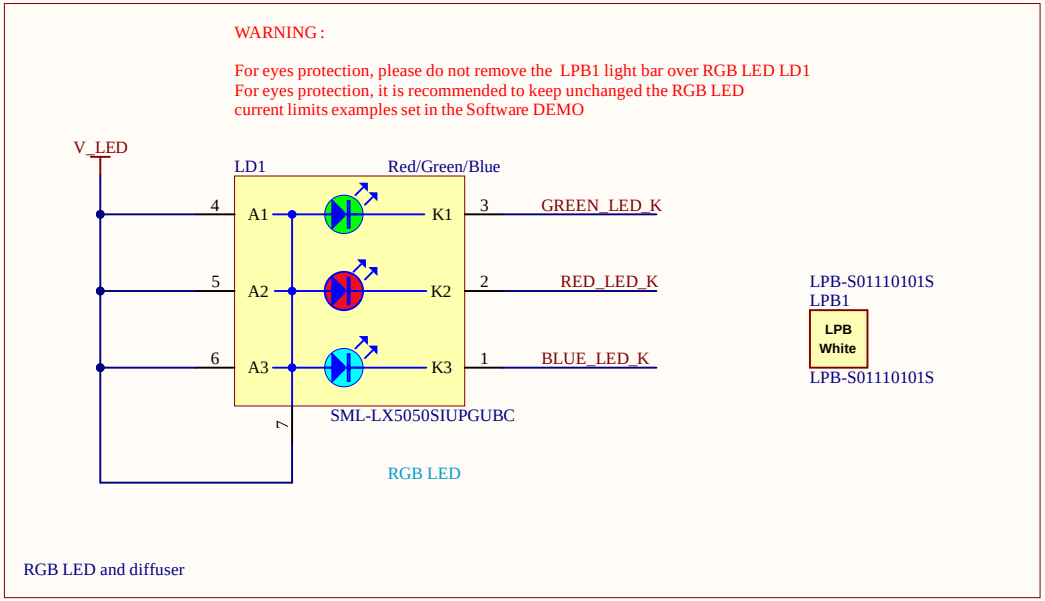
Title: **USB User**		
Project: **STM32G5 DPOW Discovery**		
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RGB LED Buck Converters









Title: **RGB LED Buck Converters**		
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Double Switch

Width Constraint [Pref Width = 2.5mm Min Width = 1mm Max Width = 5mm]
track width from Here to VIN

5V_UCPD — USB_PD_VBUS

Q12 STL9P3LLH6 — C72 DNF 1nF — R153 56K — Q13 STL9P3LLH6 — C73 DNF 1nF

R154 330R

PB15 — BUCKBOOST_USBPD_EN — BUCKBOOST_USBPD_EN

Q14 BSN20BK

R155 10K

VOUT Loads

Width Constraint [Pref Width = 2.225mm Min Width = 2mm Max Width = 2.5mm]
track width from VOUT to GND

VOUT — F2 PTS181230V020

R58 R49 R41 R33 33R
R57 R48 R40 R32 33R
R56 R47 R39 R31 33R
R55 R50 R42 R34 33R

TP3 DNF

PG3 — BUCKBOOST_LOAD_100% — BUCKBOOST_LOAD_100%

R51 10R — R53 10K — STL6N2VH5 T6

Width Constraint [Pref Width = 2.225mm Min Width = 2mm Max Width = 2.5mm]
track width from VOUT to GND

VOUT — F1 PTS181230V020

R43 R35 R27 R24 33R
R45 R37 R29 R23 33R
R44 R36 R28 R25 33R
R46 R38 R30 R26 33R

TP4 DNF

PB10 — BUCKBOOST_LOAD_50% — BUCKBOOST_LOAD_50%

R54 10R — R52 10K — STL6N2VH5 T5

WARNING :

Embedded VOUT Loads can be activated with PB10 and PG3 PIOs, but only for VOUT voltage of 7.5 V maximum.

For higher VOUT voltage or higher current output capability, R51 and R54 shall be unsoldered, and external resistor loads shall be used instead of embedded VOUT Loads

BUCK-BOOST

WARNING :
VIN to be in the 5V +/- 10 % limits for BuckBoost function
Respect programmed BUCK_I_IN_SENSE and BOOST_I_IN_SENSE current limitations.

R13 must be placed between R14/R19/Q7/D2 and T3

WARNING :
In any case, VOUT shall not exceed 7.5V limit and shall not draw more than 500 mA on Header

USB_PD_VBUS — JP1 — USBPD — VIN — GND — Header 3x1

HW02 SNT-100-BK-G

WARNING :

Keep using a JUMPER_CLOSE type to protect USB_PD_VBUS from inadvertent short-circuit

R22 5mR — L2 26R @ 100Mhz

Width Constraint [Pref Width = 2.5mm Min Width = 2mm Max Width = 5mm]
track width for V_IN and GND and VOUT

R19 9K53 — PA1 — BUCKBOOST_VIN

R81 6K8 — C26 22nF — AGND

I+ — I- — R13 47mR — 100nF DNF C5

R14 1K — BC817 Q7 — SMAJ15A D2 — T3 STT4P3LLH6

R20 47R — D4 BAT54FILM — R21 10R — Q3 BC807 — NDS7002A Q6

L1 51uH

JP2 DNF Header 2x1 IBB

PB5 — BUCKBOOST_P1_DRIVE — R7 270R — R5 10K — C1 100nF

C2 22uF — C3 22uF — C4 100nF — R2 270R

T1 STL6N2VH5 — T2 STL6N2VH5

PB6 — BUCKBOOST_N1_DRIVE — R9 10R — Q5 NDS7002A — R6 10K

PC12 — BUCKBOOST_N2_DRIVE — R10 10R — Q4 NDS7002A — R4 10K

VREFP — AVDD — C24 1uF — AGND — C23 1uF — AGND

U14 IC_TSC2010I TSC2010IST — IN+ — IN- — SHDN — VCC — VREF1 — VREF2 — GND — OUT — Av=20

I+ — 10nF C47 — I-

DNF SB24 — PB2 — PB2

R78 200R — PB11 — BUCK_I_IN_SENSE — C20 100pF — AGND

Width Constraint [Pref Width = 2.5mm Min Width = 2mm Max Width = 5mm]
track width for V_IN and GND and VOUT

T4 STT4P3LLH6 — SMAJ15A D3 — Q8 BC817 — R18 1K

R17 47R — D1 BAT54FILM — R11 10R — Q2 BC807 — NDS7002A Q1

R1 270R — PC11 — BUCKBOOST_P2_DRIVE — R3 10K — R8 270R

C6 100nF

VREFP — AVDD — C53 1uF — AGND — C19 1uF — AGND

U13 IC_TSC2010I TSC2010IST — IN+ — IN- — SHDN — VCC — VREF1 — VREF2 — GND — OUT — Av=20

R12 47mR — 10nF C46 — LNK17

DNF SB7 — PB14 — PB14

R79 200R — PB13 — BOOST_I_IN_SENSE — C25 100pF — AGND

TP1 DNF TP

R15 49R9 — R16 7K5 — PA3 — BUCKBOOST_VOUT — 470pF C21 — R80 3K3 — AGND

CN8 Header 2x1 — VOUT — GND

C8 100uF — C7 100nF

Place Current sensing IC and its components close to MCU, keep input capacitor/resistor in BuckBoost area

Place Current sensing IC and its components close to MCU, keep input capacitor/resistor in BuckBoost area

BUCK-BOOST Converter

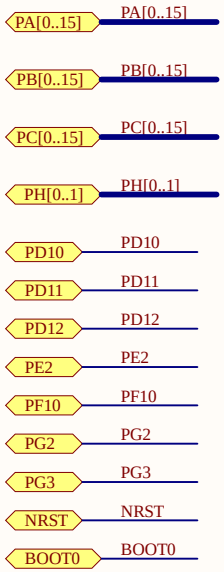
Title: **BUCK-BOOST Converter**		
Project: **STM32G5 DPOW Discovery**		
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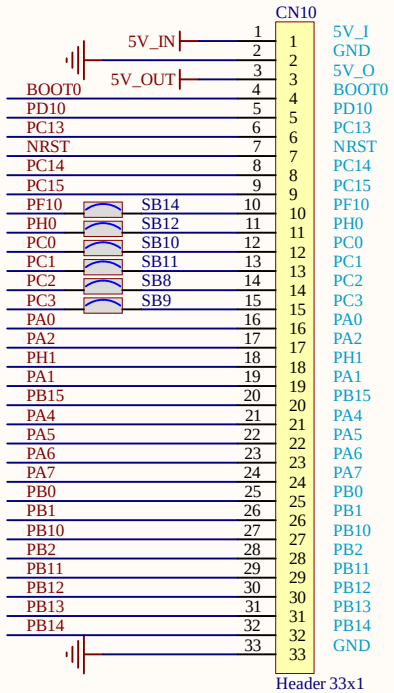
Extension connectors

Using some PIOs on extension connectors may require to unsolder components depending on your need :
Check each PIO and disconnect solder bridges or resistors or capacitors when it is necessary for your application

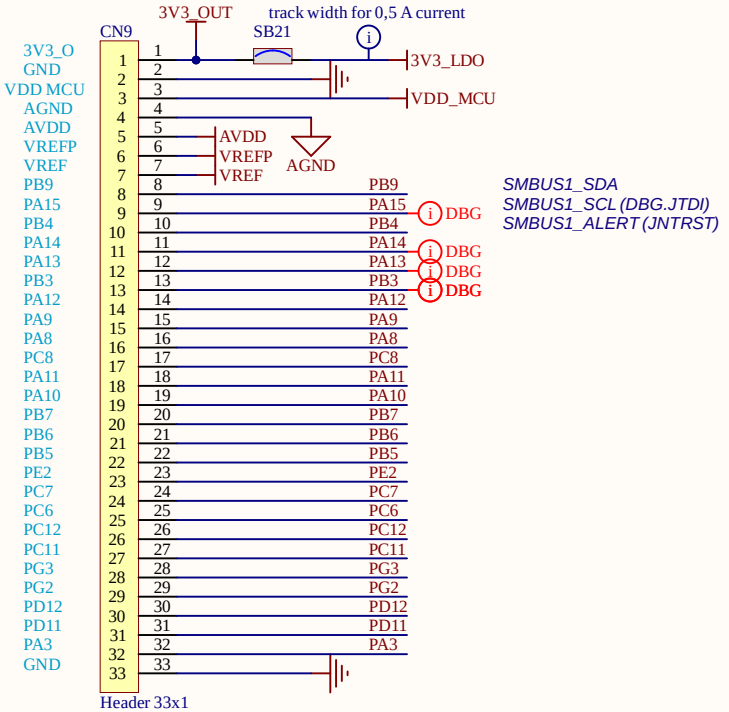
5V_IN is an input power to supply the Discovery

5V_OUT is an output power from Discovery to extension board
5V_OUT capability may depend on current sourced to USB1 User





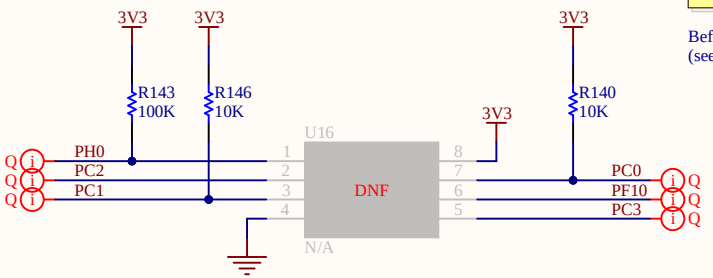
Extension connectors distance : 17x2.54 mm = 43.18 mm. All components on Bottom side shall have their heigth < 2.4 mm (including tolerance)

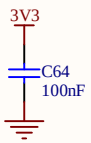


Only for internal development purpose

Place memory close to MCU, with SBxx close to U16, to avoid long stubs to extension connector

Before using U16 : ensure the 6 PIOs SBxx are OFF (see above extension connector CN10)



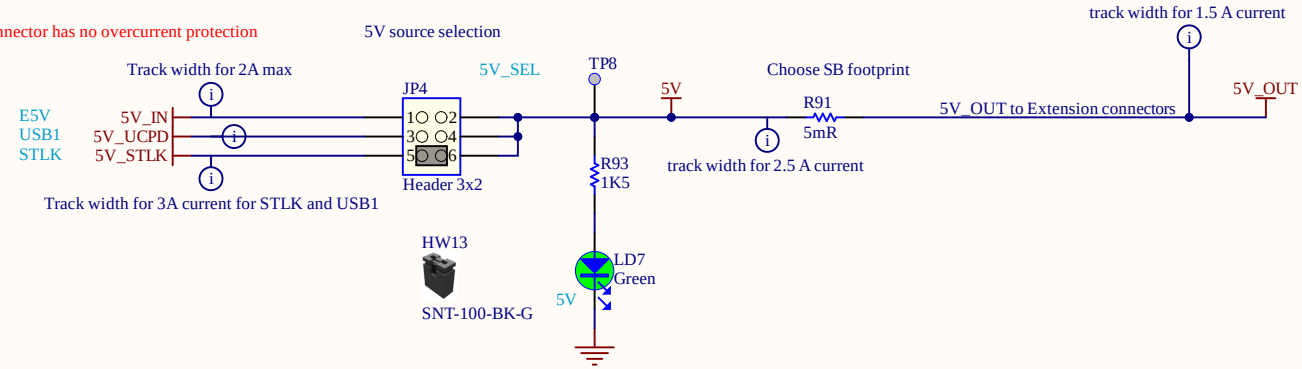


Cap close to U16

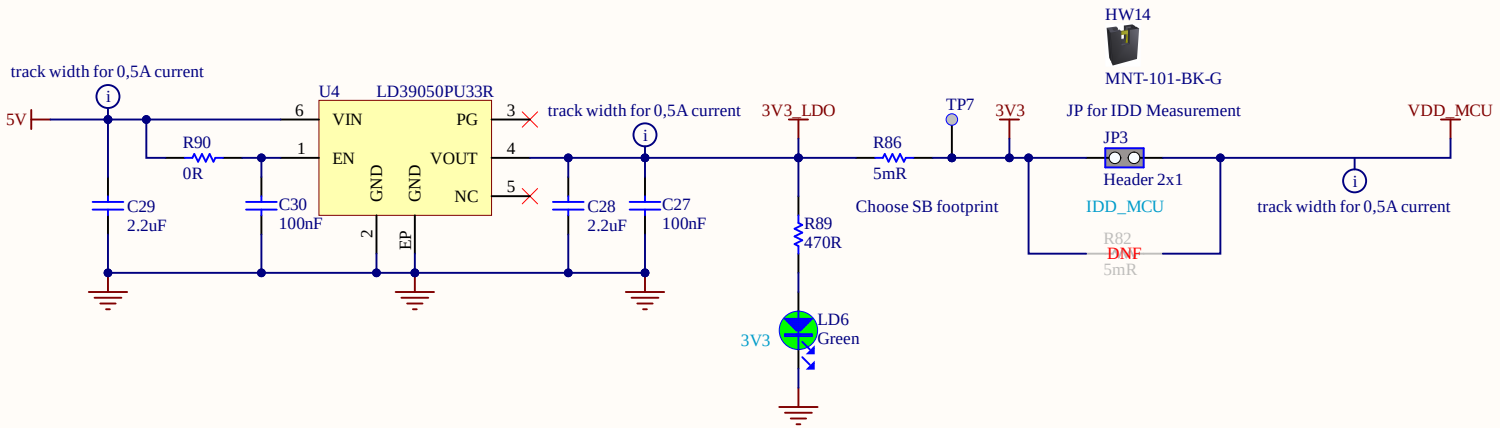
Title: **Extension connectors**		
Project: **STM32G5 DPOW Discovery**		
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Power

5V PWR SELECTION

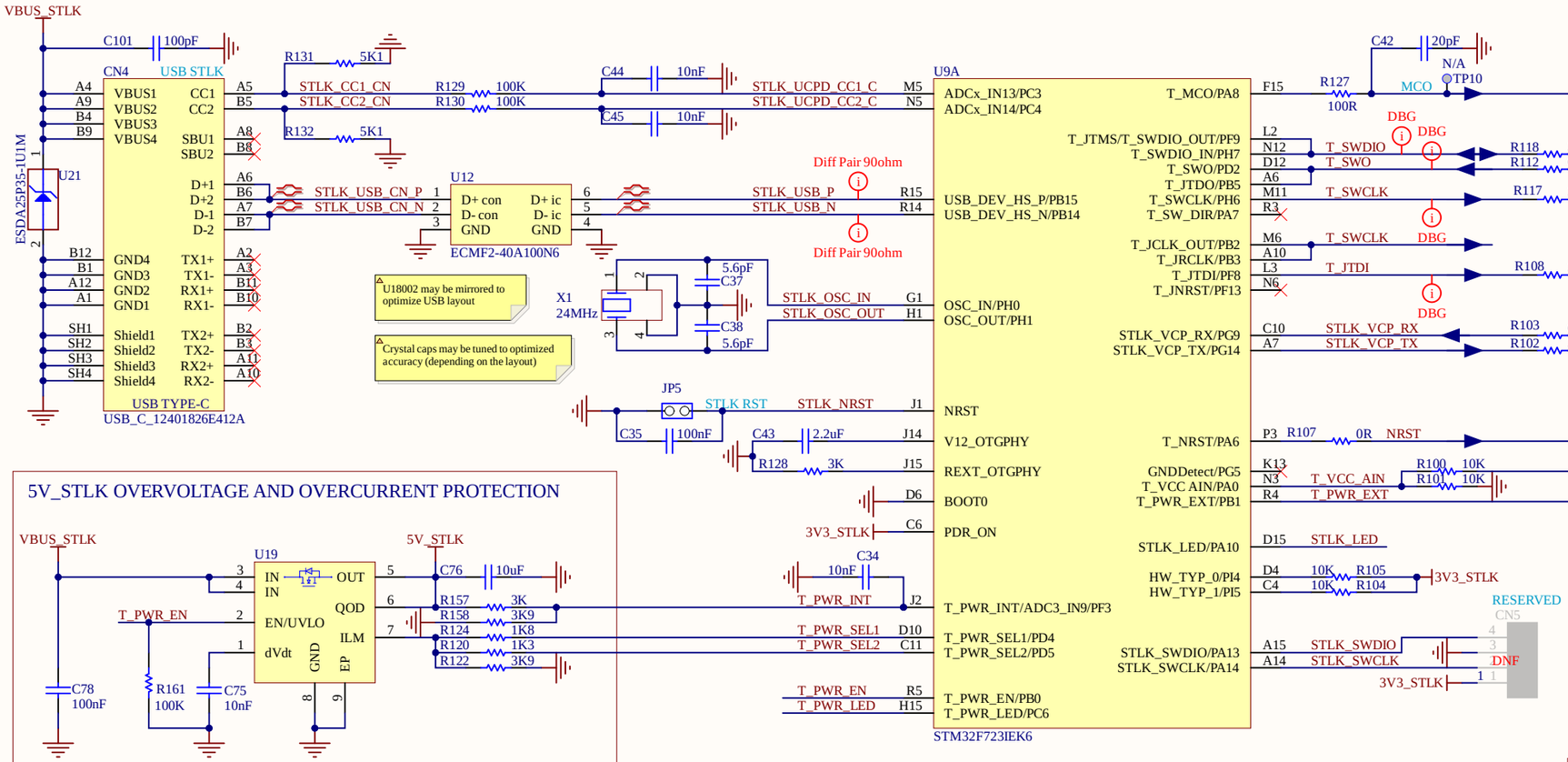


VDD_MCU PWR



Title: **Power**		
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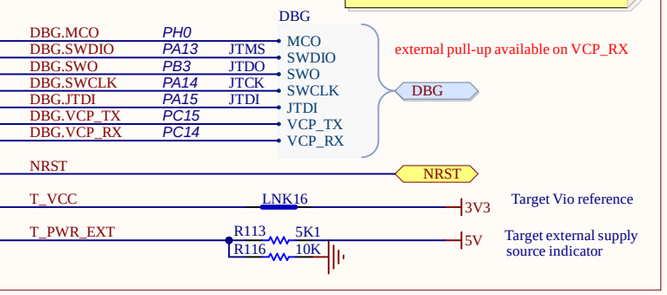
STLINK-V3EC



INTERFACE WITH TARGET MCU

The xxx signal functions (DBG.xxx) are from Target MCU side

All MCU.xxx signals are HiZ after POR, and only initialized after a PC connection to STLink dedicated protocol (either JTAG, or SWD, or VCP).



Discrete pull-up/down resistors should be placed on target side depending on the application and the target internall pulls. Recommended values (to be checked by the Designer) :
- pull-up on Target RX signal
- no pulls on Target TX signal (as it is internally present in STLink MCU)
- no pulls on JTAG signals (as they are internally present in the targeted MCU)
- no pulls on nRST signal (as it is internally present in the targeted MCU)

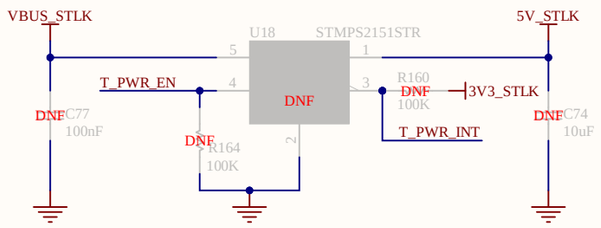
5V_STLK OVERVOLTAGE AND OVERCURRENT PROTECTION

5V_STLK OVERCURRENT PROTECTION MANAGEMENT

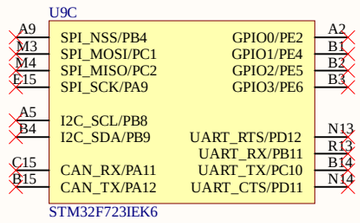
	T_PWR_SEL2/PD5	T_PWR_SEL1/PD4
PowerDefault.SNK *(current limit: 550mA)*	Hi-Z	Hi-Z
Power1.5.SNK *(current limit: 1.66A)*	Hi-Z	0
Power3.0.SNK *(current limit: 3.2A)*	0	0

Hi-Z = IO set in high impedance

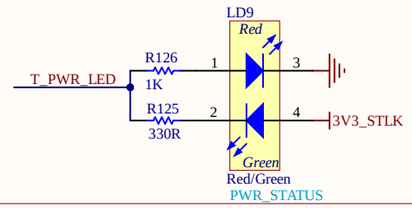
STMPS2151STR is backup of the TPS259535DSG



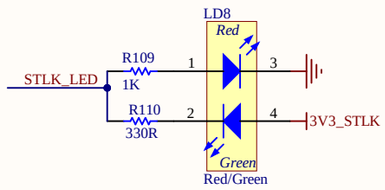
STLINK UNUSED



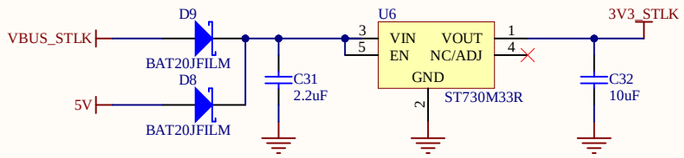
LED POWER STATUS

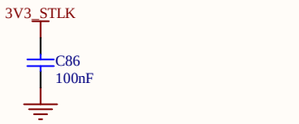


LED STLINK

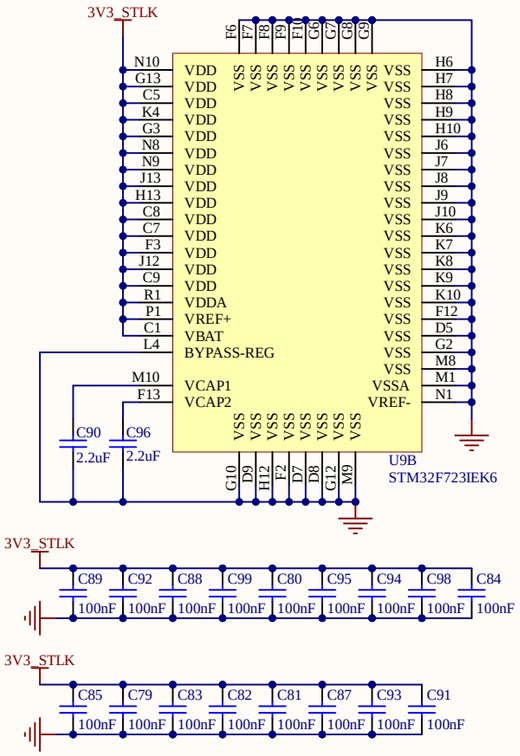


ST-LINK POWER (3V3/300mA)





STLINK MCU POWER

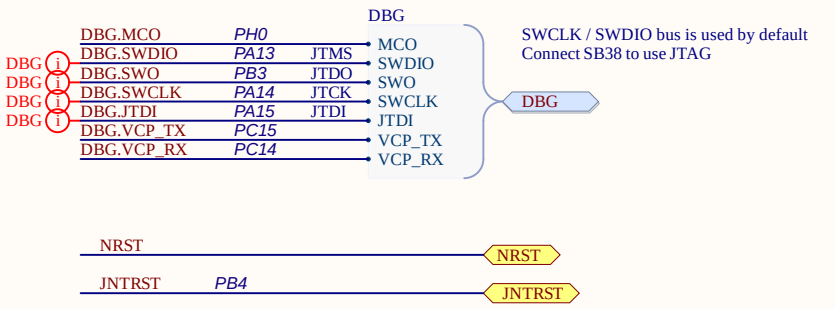


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External Debug Interface

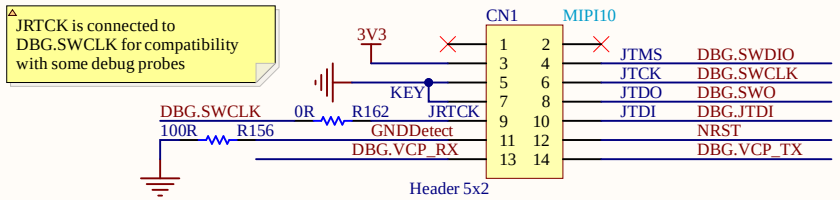
INTERFACE WITH TARGET MCU

The xxx signal functions (DBG.xxx) are from Target MCU side



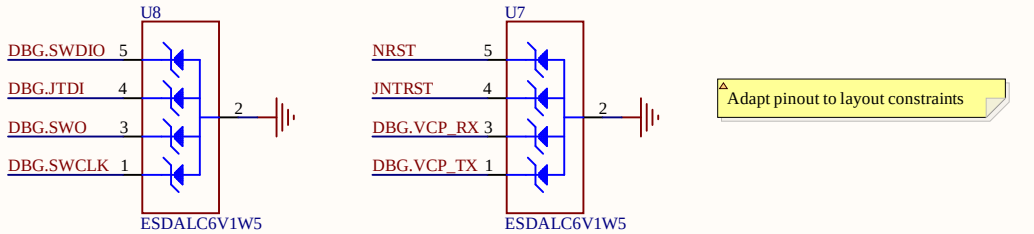
STDC14 RECEIVER

The xxx signal functions (DBG.xxx) are from Target MCU side



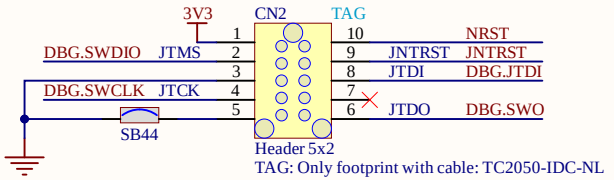
Specific constraints for DBG.SWDIO and DBG.SWCLK
(must be same length and must be Shielded).

ESD PROTECTIONS



TAG RECEIVER

The xxx signal functions (DBG.xxx) are from Target MCU side



Remove the solder bridge if the debugger
probe provides power supply on pin5

Title: **External Debug Interface**		
Project: **STM32G5 DPOW Discovery**		
Variant: G564RE		
Revision: B-01		Reference: MB2072
Size: A4	Date: 03-July-26	Sheet: 12 of 13

Mechanical

HW7

PCB

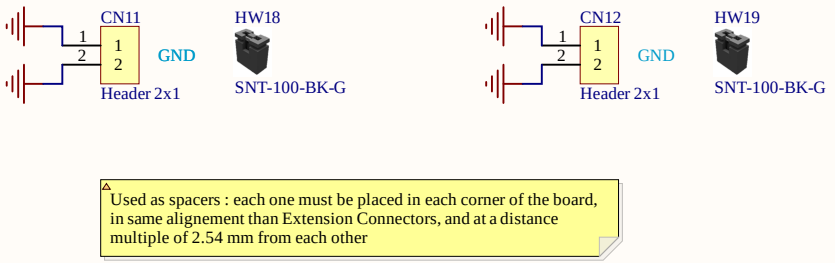
MB2072B

HW5

STICKER PRODUCT

N/A

GND headers (spacers)



HW2

FID

Fiducial Pad

HW3

FID

Fiducial Pad

HW1

FID

Fiducial Pad

HW8

FID

Fiducial Pad

HW6

FID

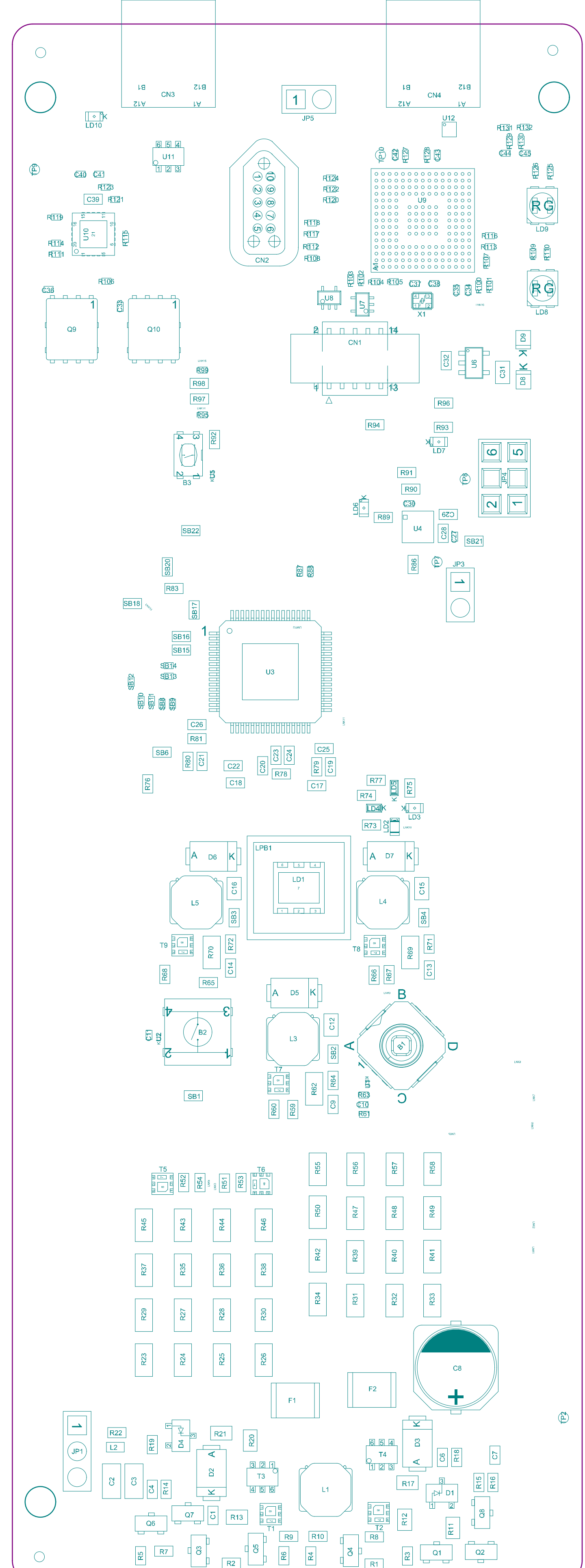
Fiducial Pad

HW4

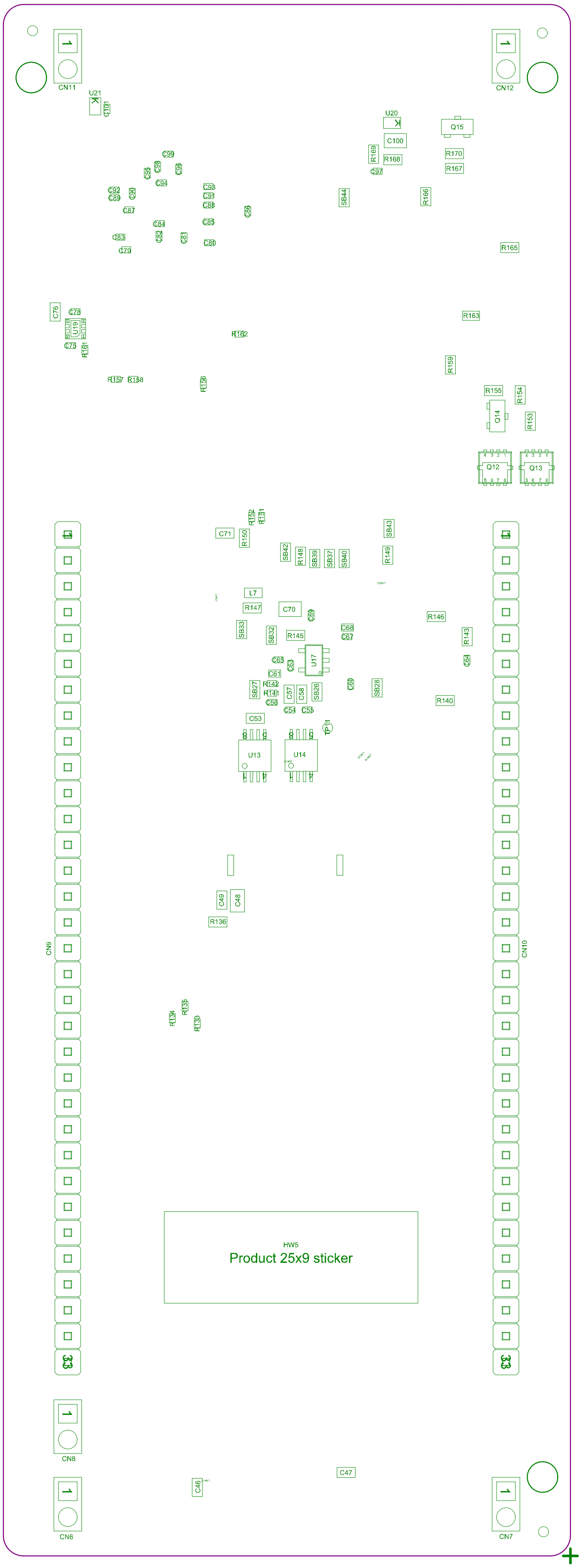
FID

Fiducial Pad

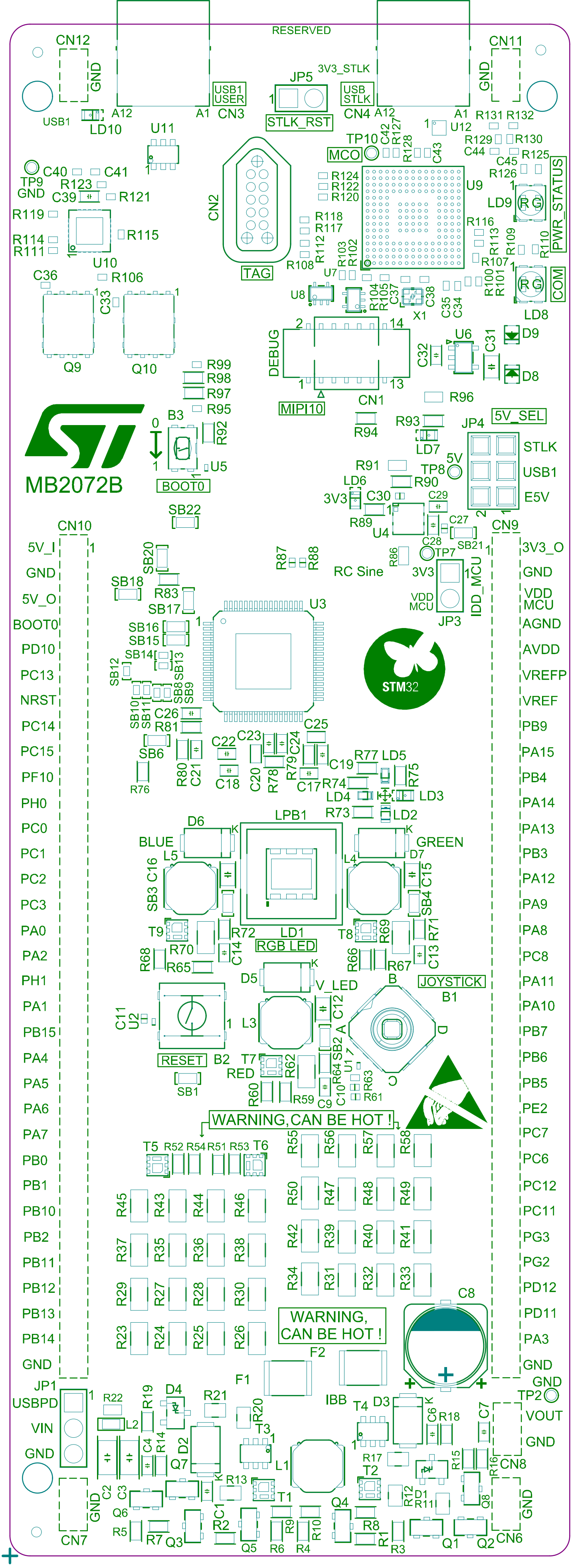
Title: **Mechanical**		
Project: **STM32G5 DPOW Discovery**		
Variant: G564RE		
Revision: B-01		Reference: MB2072
Size: A4	Date: 03-July-26	Sheet: 13 of 13



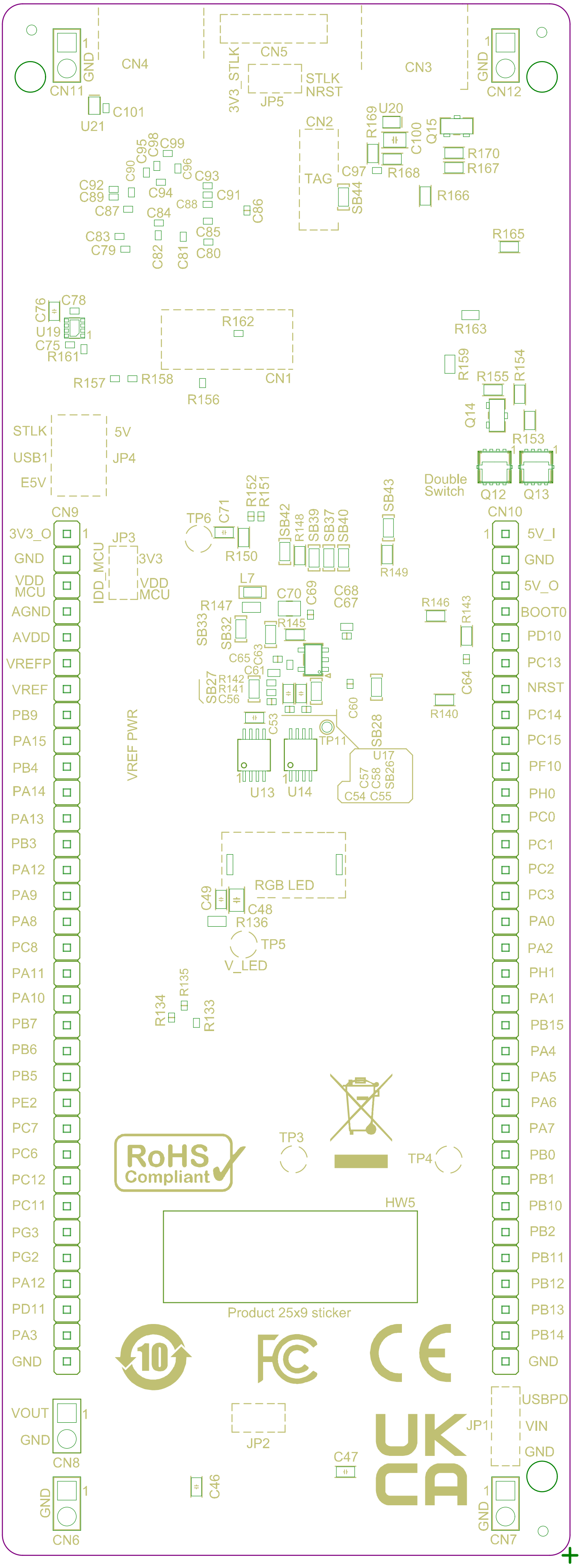
Project: STM32G5 DPOW Discovery	
Layer: M14-Top Assembly	Gerber: .GM14
Variant: G564RE	Ref: MB2072
Date: 03-July-26	Rev: B



Project: STM32G5 DPOW Discovery	
Layer: M15-Bottom Assembly	Gerber:.GM15
Variant: G564RE	Ref: MB2072
Date: 03-July-26	Rev: B



Top Overlay .GTO



Bottom Overlay .GBO