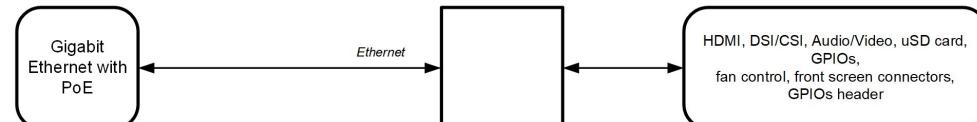
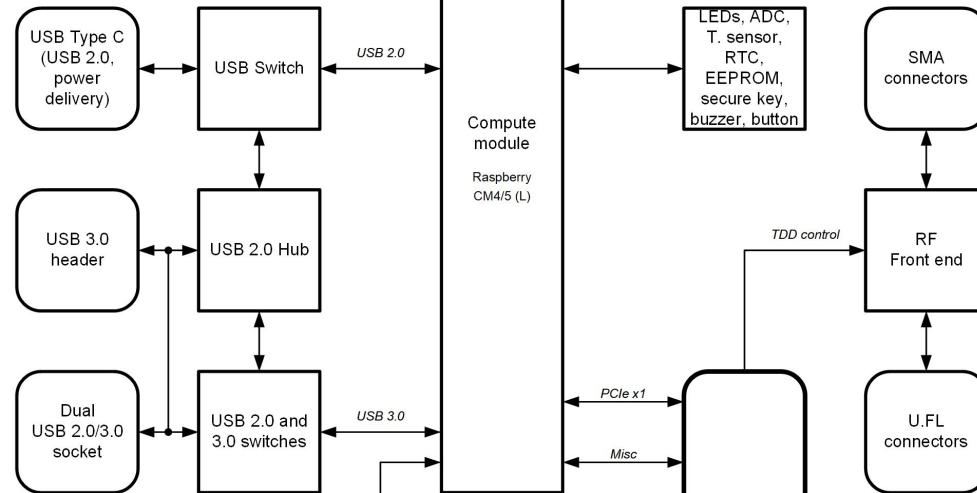


Block diagram

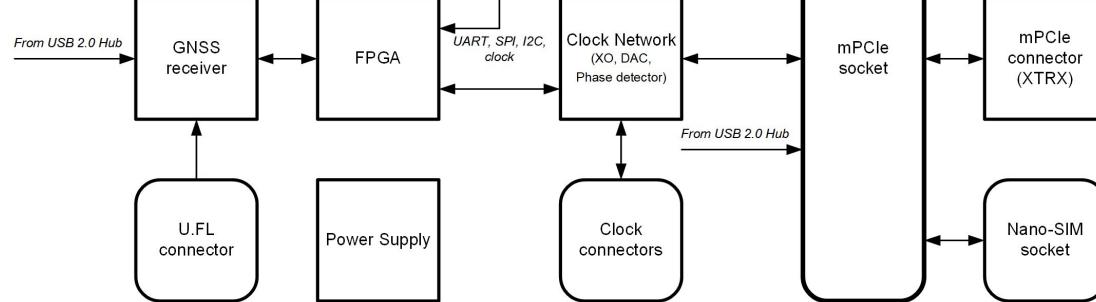
A



B



C



D

Project name: **LimePSB-RPCM_Iv3.PrjPcb**

Title: **Block diagram**

Size: **A4** Revision: **v1.3**

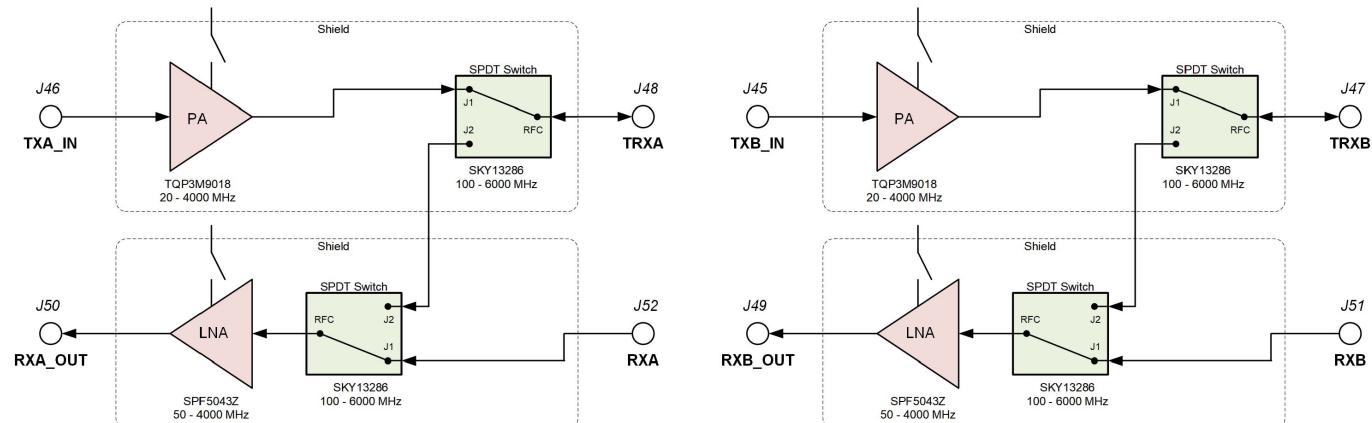
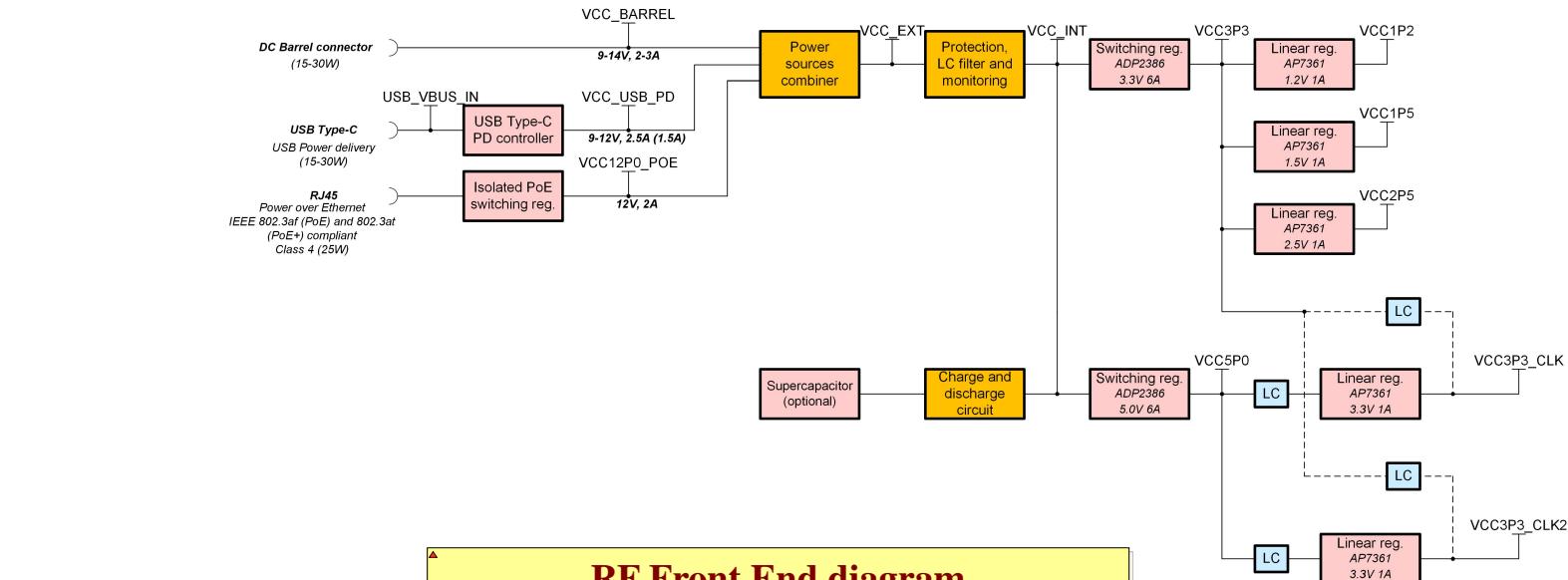
Date: **2024-10-29** Time: **15:42:14** Sheet**1** of **15**

File: **01_Block_diag.SchDoc**

Lime Microsystems
Surrey Tech Centre
Guildford GU2 7YG
Surrey
United Kingdom



Power diagram



* All RF switches are controlled by the same signal RF_SW_TDD

Project name: **LimePSB-RPCM_1v3.PrbPcb**

Title: **Power + RF Front End diagram**

Size: **A4** Revision: **v1.3**

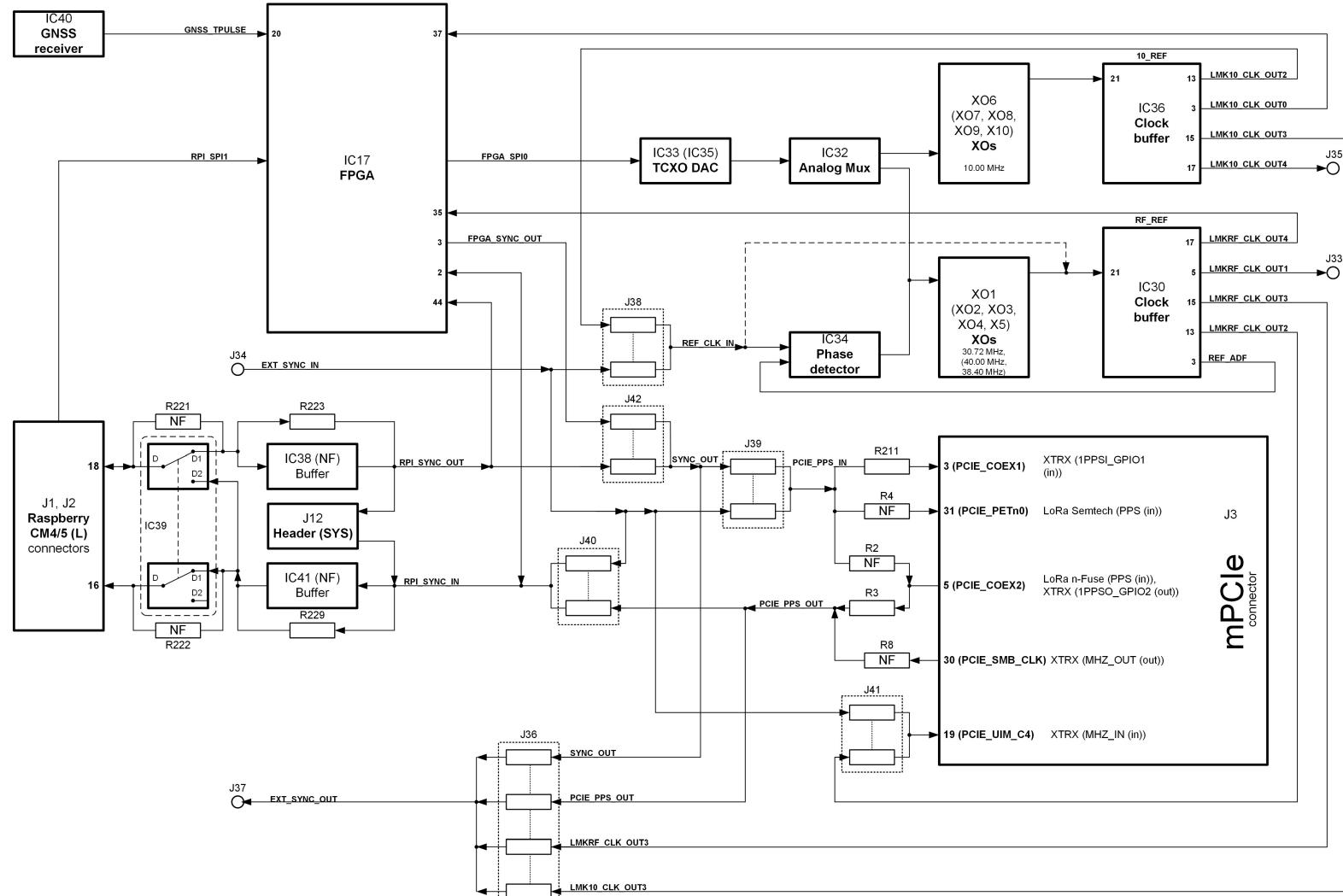
Date: **2024-10-29** Time: **15:42:16** Sheet **2** of **15**

File: **02_Power_RFFE_diag.SchDoc**

Lime Microsystems
Surrey Tech Centre
Guildford GU2 7YG
Surrey
United Kingdom



Clock diagram



Project name: **LimePSB-RPCM_Iv3.PrbPcb**

Title: **Clock diagram**

Size: **A4** Revision: **v1.3**

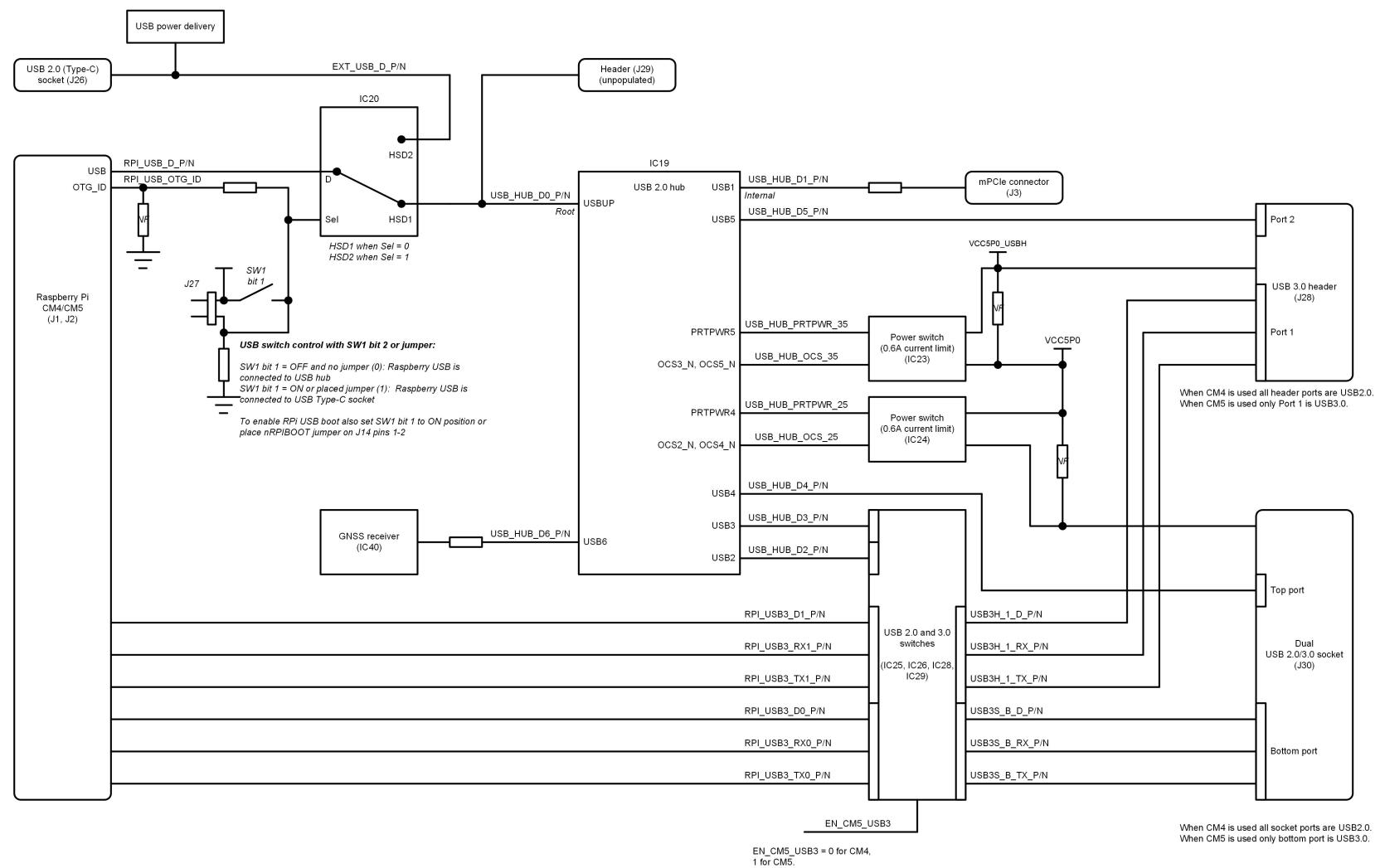
Date: **2024-10-29** Time: **15:42:19** Sheet**3** of **15**

File: **03_Clock_diag.SchDoc**

Lime Microsystems
Surrey Tech Centre
Guildford GU2 7YG
Surrey
United Kingdom



USB diagram



Project name: **LimePSB-RPCM_Iv3.PjrPcb**

Title: **USB diagram**

Size: **A4** Revision: **v1.3**

Date: **2024-10-29** Time: **15:42:22** Sheet **4** of **15**

File: **04_USB_diag.SchDoc**

Lime Microsystems
Surrey Tech Centre
Guildford GU2 7YG
Surrey
United Kingdom

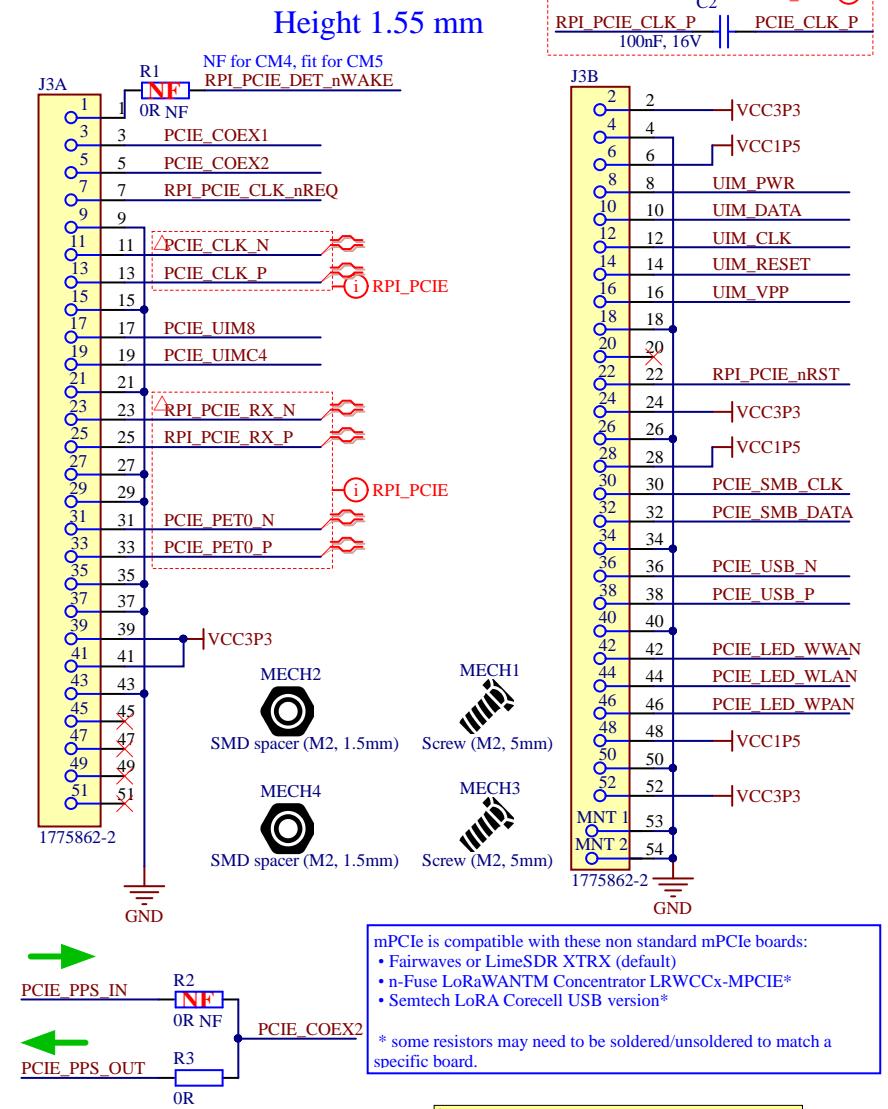
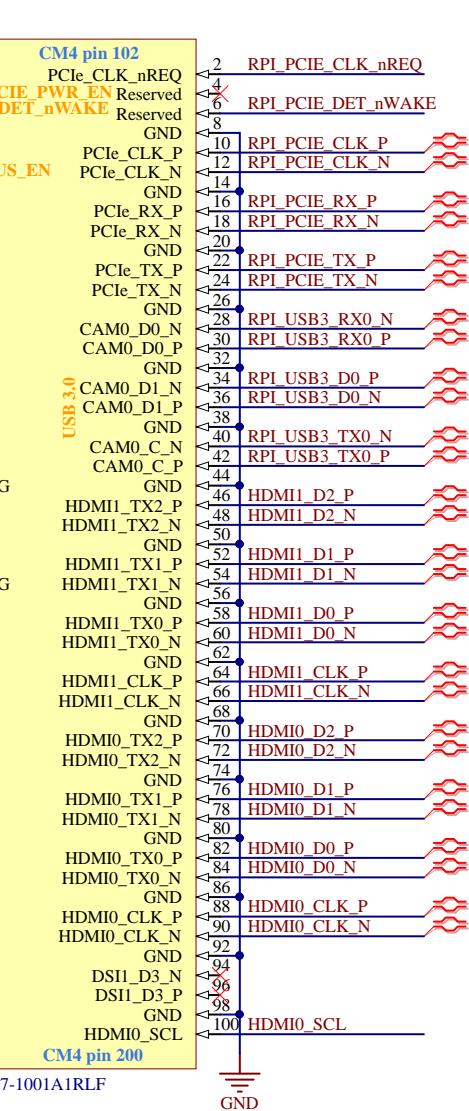
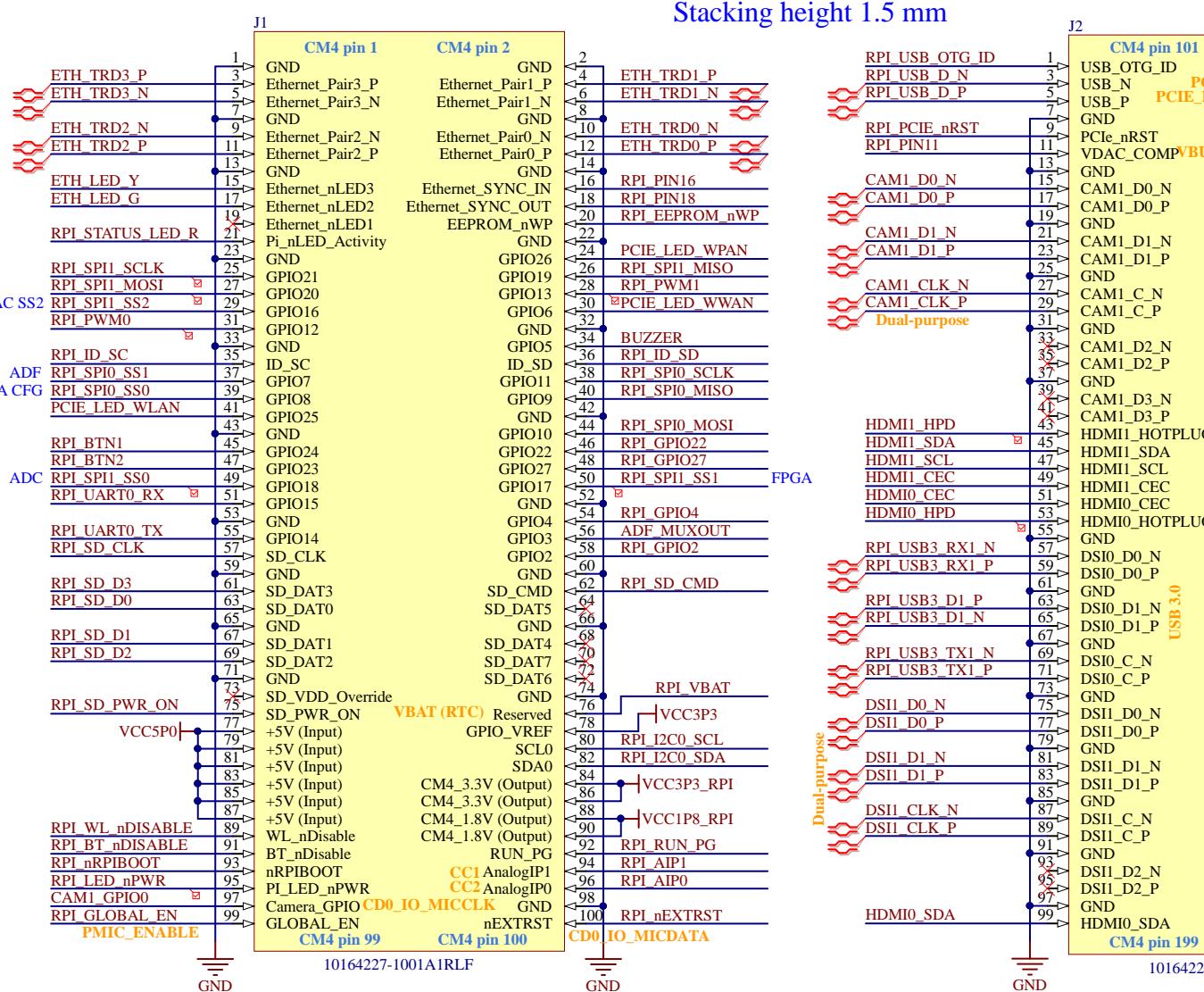


NF elements on sheet: R1, R2, R4, R8, R10, R12, R13, C8, R6, C6, C7, R9, R11, J5, J6
Number of NF elements on sheet: 15

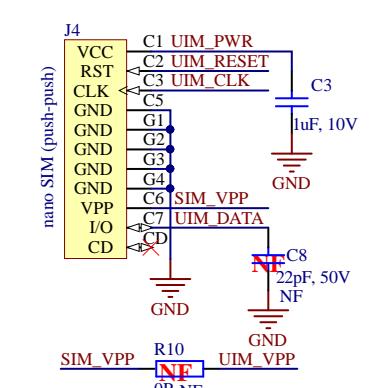
Raspberry Pi CM4/5(L) and mPCIe

mPCIe x1

Board to Board connector for Raspberry Pi CM4/5(L)



Nano-SIM socket



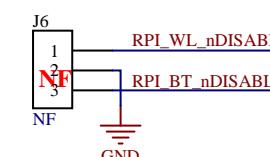
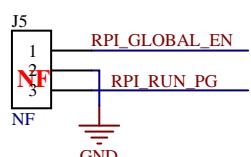
Project name: **LimePSB-RPCM_1v3.PrjPcb**

Title: Raspberry Pi CM4/5(L) and mPCIe		Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom	 Lime microsystems
Size: A3	Revision: v1.3		
Date: 2024-10-29	Time: 15:42:26	Sheet 5 of 15	
File: 05_RPi_mPCIe.SchDoc			

Board SPI interfaces:

RPI_SPI0 (3.3V): FPGA CFG (SS0 - GPIO8), ADF (SS1 -

RPI_SPI1 (3.3V): ADC (SS0 - GPIO18), FPGA (SS1 - GPIO17), XO DAC (SS2 - GPIO16 to FPGA)

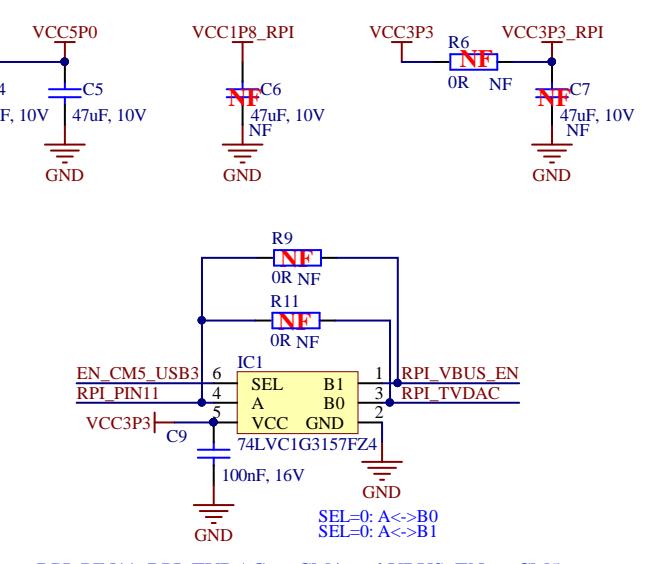


GLOBAL_EN: Drive low to power off CM4.
Internally pulled up with a 100k to +5V.

WL_nDisable: Can be left floating if driven low, the wireless interface will be disabled. Internal pull-up via 1.8k to CM4/5_3.3V.

RUN_PG: Bidirectional pin. Can be driven low (via a 220R resistor) to Reset the CM4 CPU. As an Output a high signals Power Good and CPU running. Internally pulled up to +3.3V via 10k.

A button between pins 2-3 replicates the power button on Raspberry Pi 5 (only for CM5). A short press signals that the device should wake up or shut down. A long press forces shutdown.

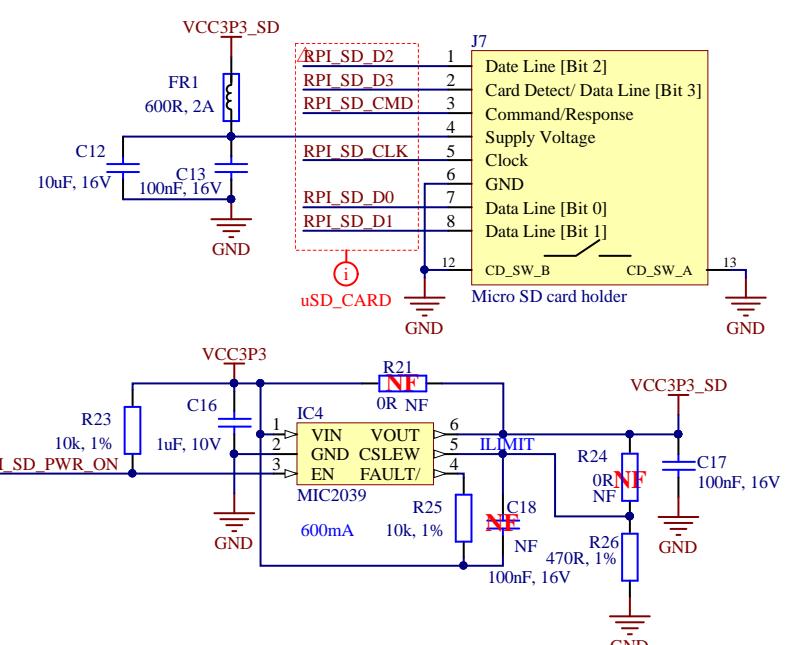


NF elements on sheet: R17, R18, R21, R22, R24, C18, J11, R28, R32, J13, J17
Number of NF elements on sheet: 11

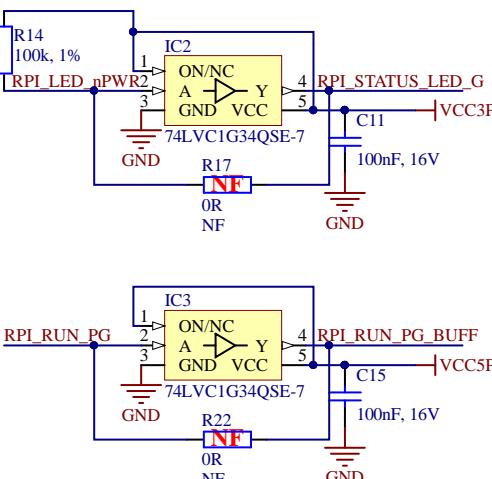
Misc 1

uSD card socket

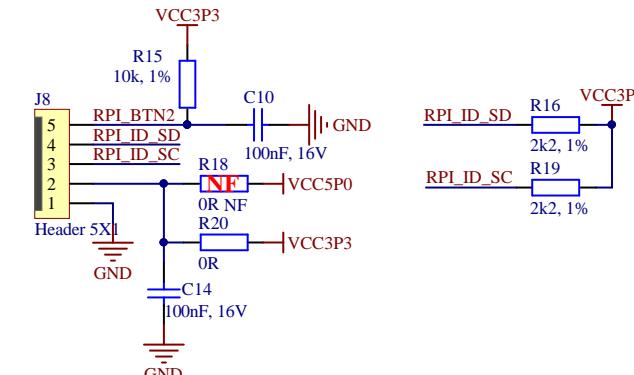
Only for CM4L and CM5L with no on-board Flash (eMMC)



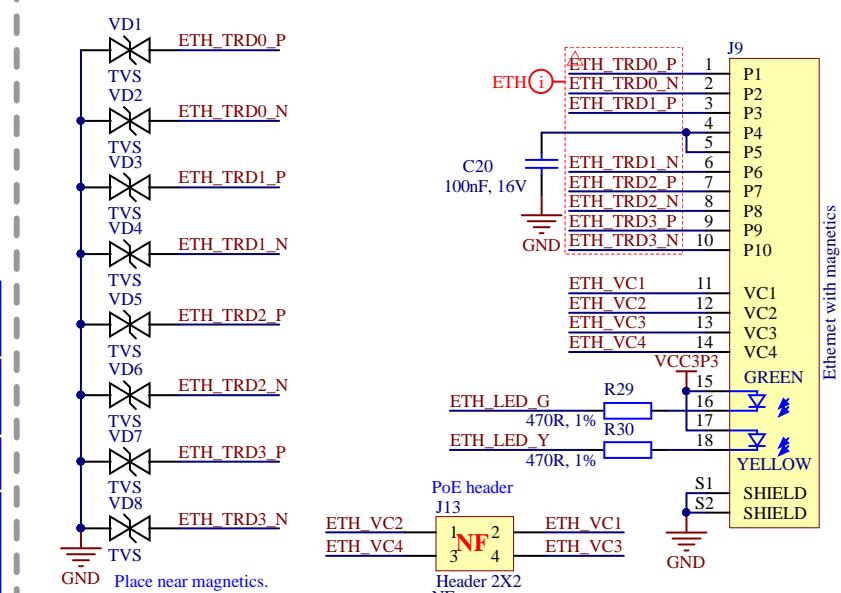
Buffers, level converters



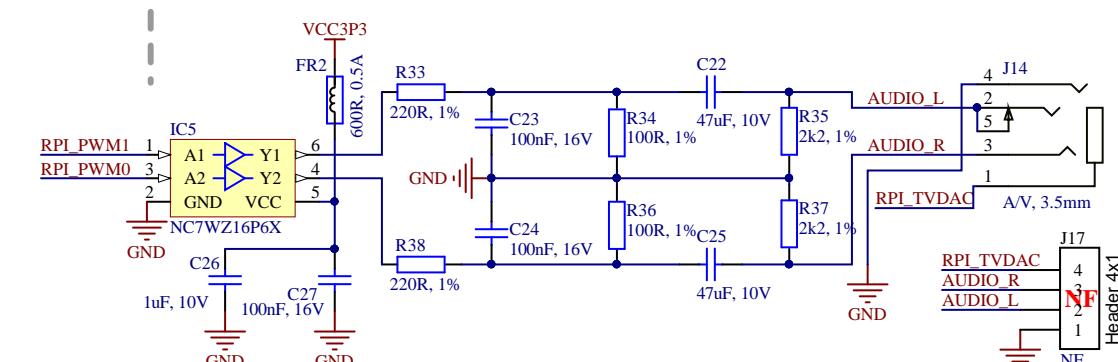
Front screen I2C + BTN



Gigabit Ethernet (RJ45) connector



Analog audio + Composite video out



Project name: LimePSB-RPCM_Iv3.PrbPcb

Title: Misc 1

Size: A3 Revision: v1.3

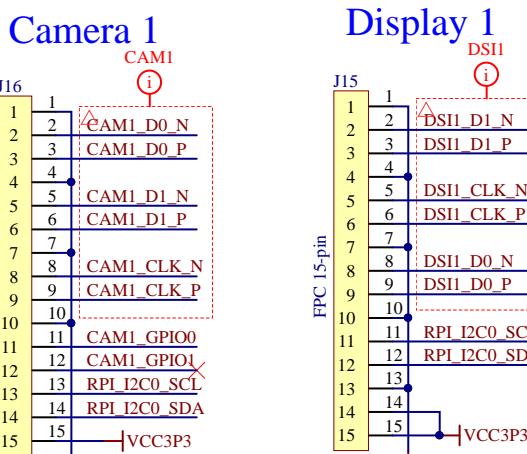
Lime Microsystems
Surrey Tech Centre
Guildford GU2 7YG
Surrey
United Kingdom



Date: 2024-10-29 Time: 15:42:30 Sheet 6 of 15

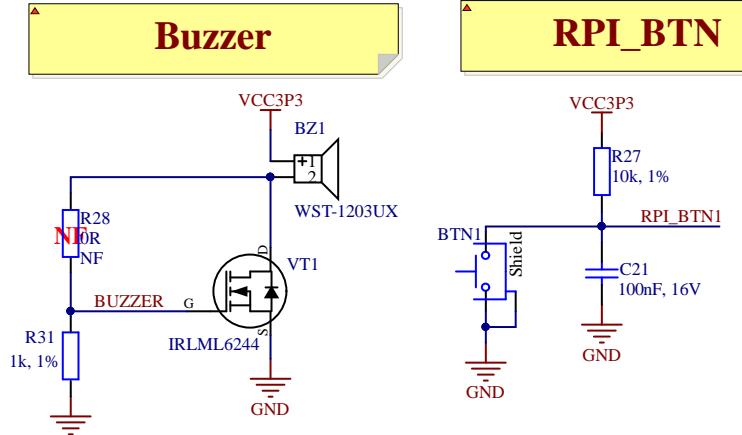
File: 06_Misc_1.SchDoc

LVDS (Camera + Display)

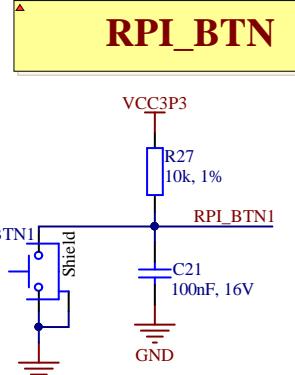


For CM5 CAM1 and DSII signals become dual-purpose and can be used for either a CSI camera or a DS1 display.

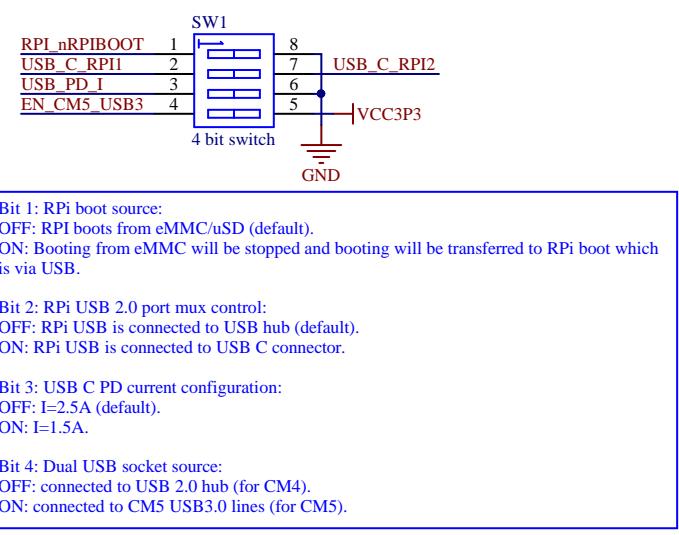
Buzzer



RPI_BTN



DIP switch



Bit 1: RPi boot source:
OFF: RPi boots from eMMC/uSD (default).
ON: Booting from eMMC will be stopped and booting will be transferred to RPi boot which is via USB.

Bit 2: RPi USB 2.0 port mux control:
OFF: RPi USB is connected to USB hub (default).
ON: RPi USB is connected to USB C connector.

Bit 3: USB C PD current configuration:
OFF: I=2.5A (default).
ON: I=1.5A.

Bit 4: Dual USB socket source:
OFF: connected to USB 2.0 hub (for CM4).
ON: connected to CMS USB3.0 lines (for CM5).

A

B

C

D

A

B

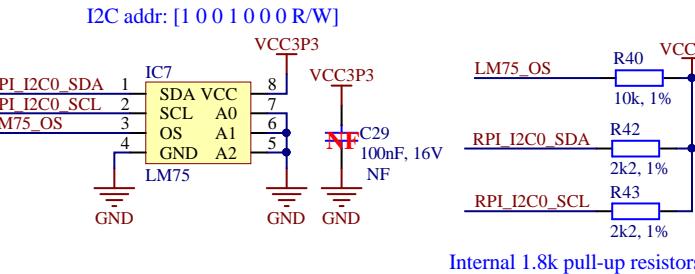
C

D

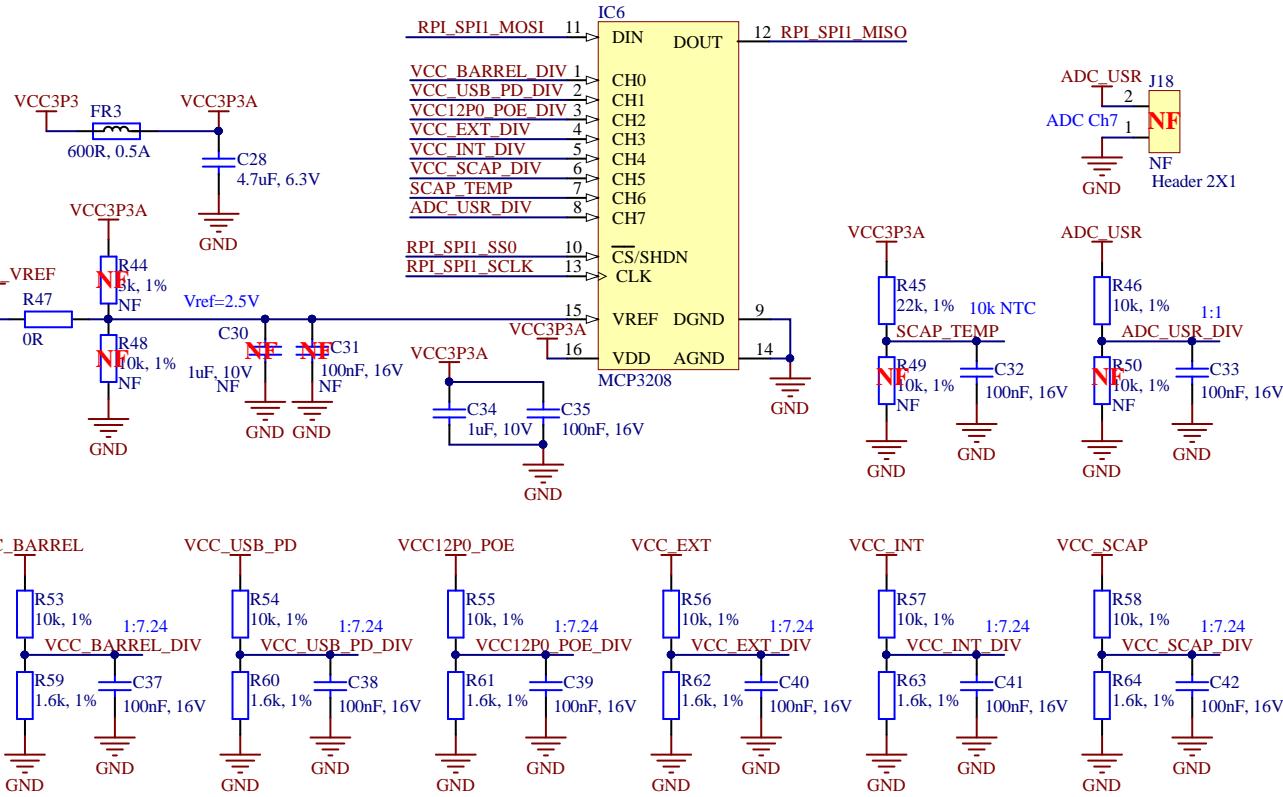
NF elements on sheet: J18, J19, C29, R44, R48, C30, C31, R49, R50, J20, R51, IC9, IC11, R66, R80, BATT2, IC15, R75, R77, R79, R84, R86, R87, R88
Number of NF elements on sheet: 24

Misc 2

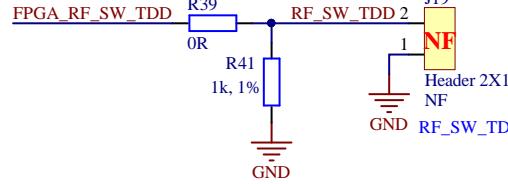
I2C Temperature sensor



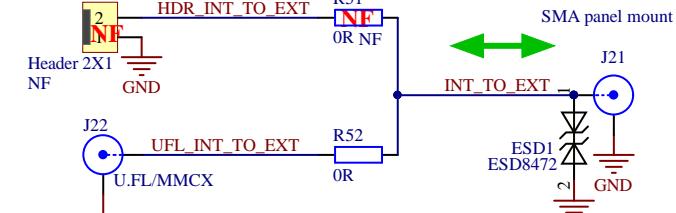
SPI ADC



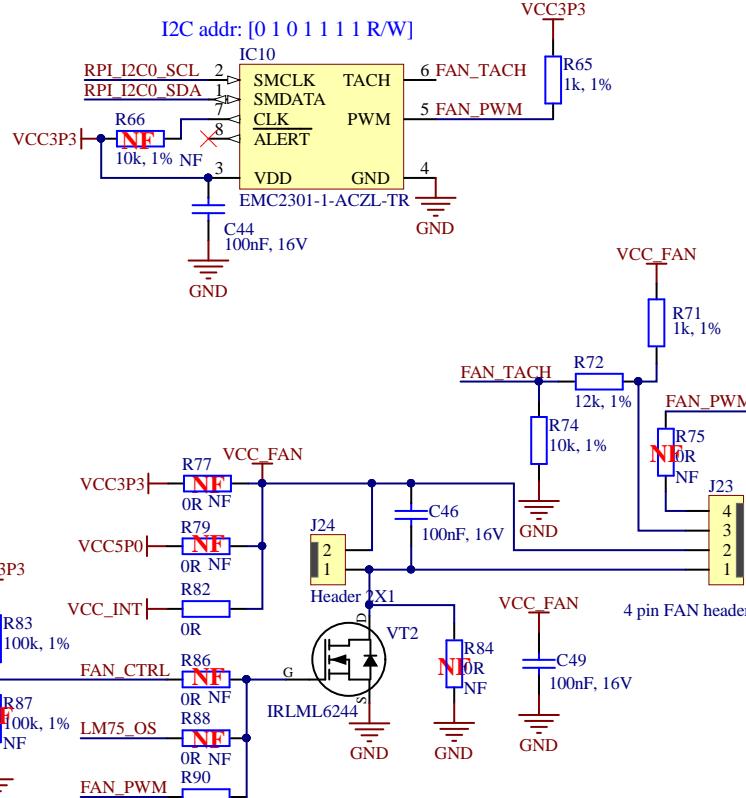
RFFE TDD control



Int to ext



FAN control

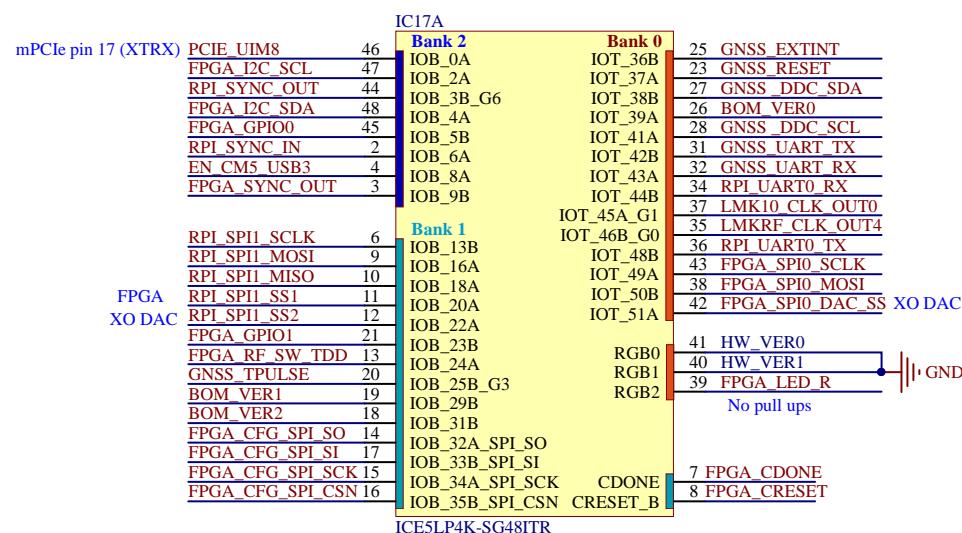


NF elements on sheet: J25, R104, R106, R111

Number of NF elements on sheet: 4

FPGA

FPGA



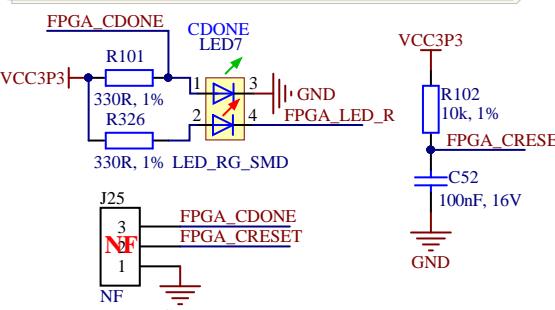
HW_VER, BOM_VER

HW_VER = 0 [0 0]
BOM_VER = 0 [0 0 0]

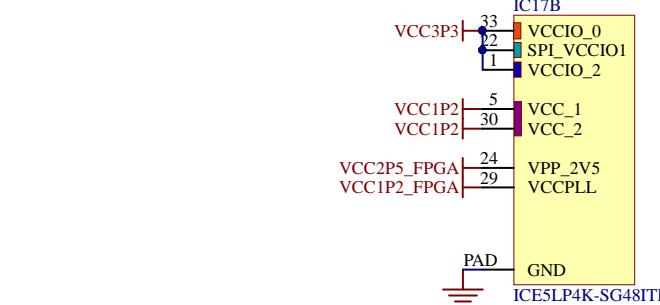
BOM_VER0 R96 OR
BOM_VER1 R97 OR
BOM_VER2 R98 OR || GND

RPI_I2C0_SCL R99 FPGA_I2C_SCL
OR
RPI_I2C0_SDA R100 FPGA_I2C_SDA
OR

FPGA misc



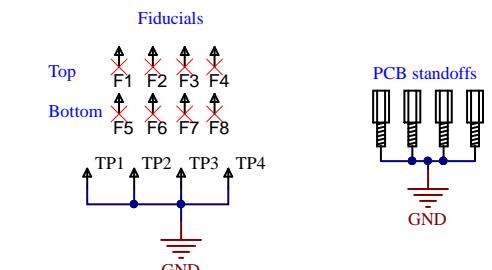
FPGA power



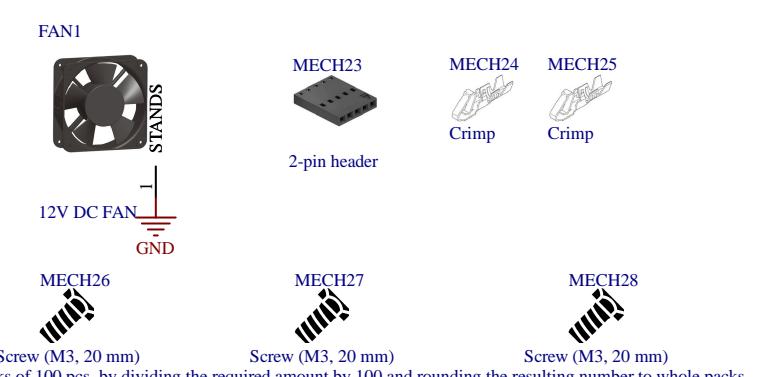
Slave SPI (default):
R103 fit
R104 NF
R105 fit
R106 NF
R107 fit
R108 fit
R109 fit
R111 fit

Master SPI:
R103 fit
R104 fit
R105 NF
R106 fit
R107 NF
R108 fit
R109 NF
R111 fit

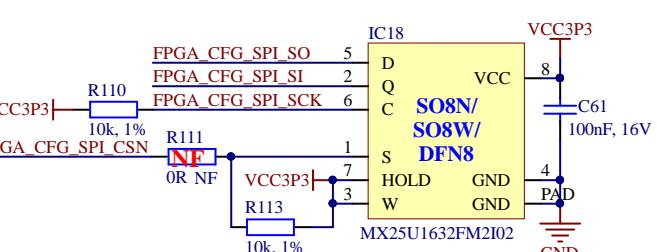
RPI_SPI0_SCLK R103 TP5
RPI_SPI0_MOSI R104 NF TP6
RPI_SPI0_MISO R105 OR NF TP7
RPI_SPI0_SS0 R106 OR R107 TP8
RPI_SPI0_SS1 R108 OR R109 10k, 1% TP8



Misc for FAN



FPGA configuration Flash



Project name: LimePSB-RPCM_Iv3.PrbPcb

Title: **FPGA**

Size: A3 Revision: v1.3

Date: 2024-10-29 Time: 15:42:34 Sheet 8 of 15

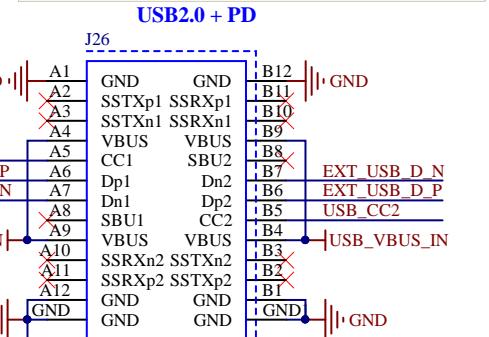
File: 08_FPGA.SchDoc



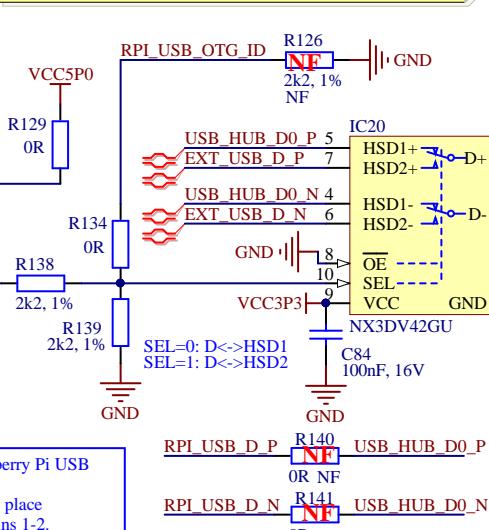
NF elements on sheet: R114, R115, VD9, R126, R128, R133, J27, JMP1, R140, R141, R135, R131, R137, IC21, IC22, J29, R144, R145, R147, C90

Number of NF elements on sheet: 20

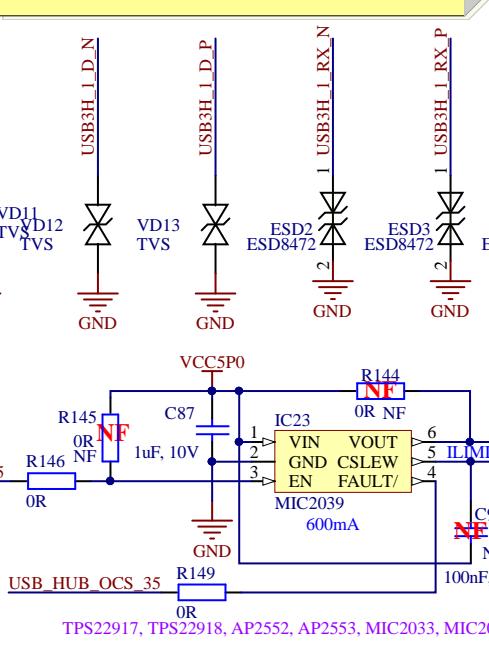
USB C socket



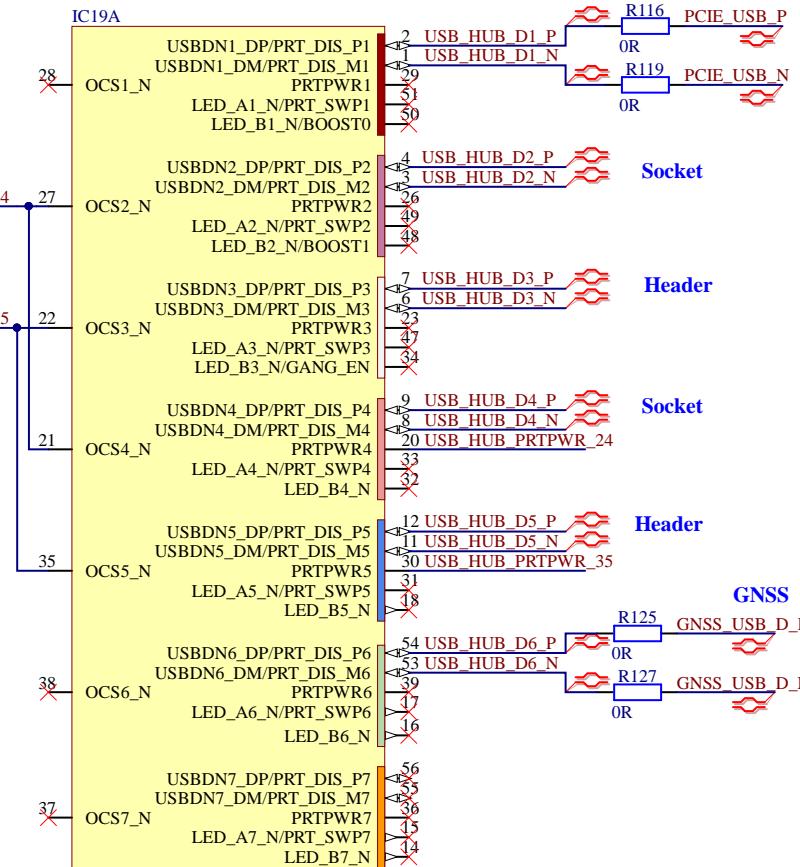
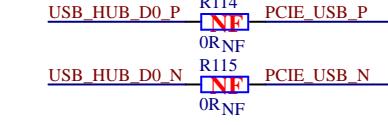
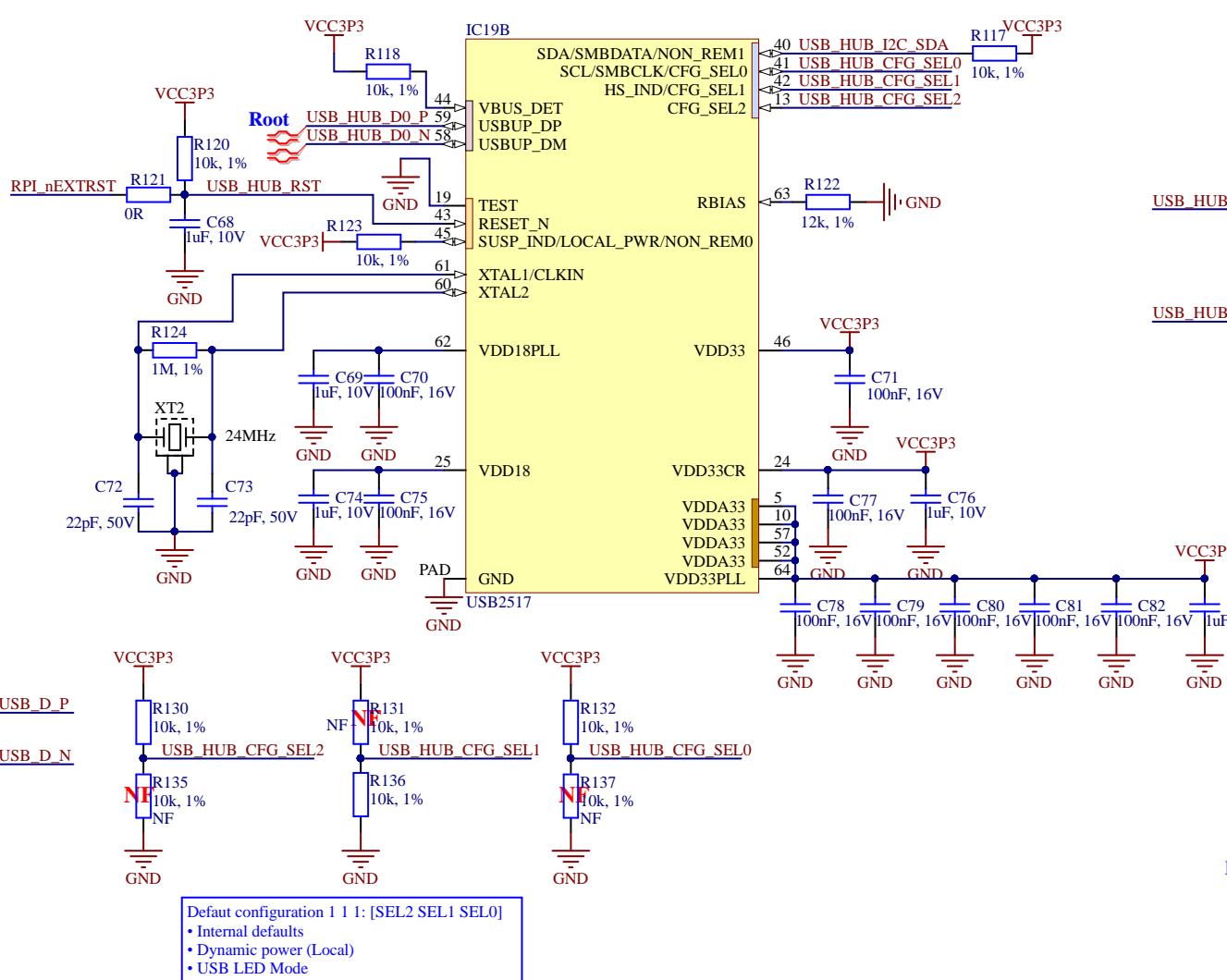
USB switch



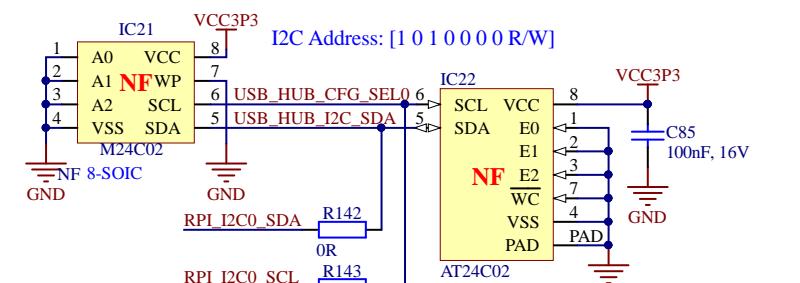
USB 3.0 header



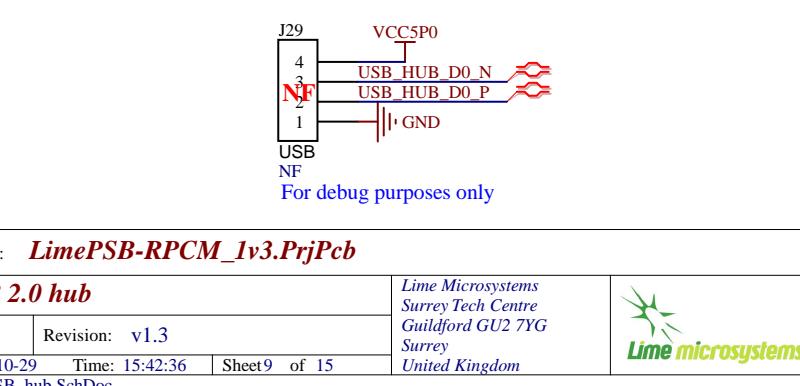
USB 2.0 HUB



PCB note: USB differential pair impedance is 90Ω



USB2.0 hub upstream



Project name: LimePSB-RPCM_Iv3.PjPcb

Title: USB 2.0 hub

Size: A3

Revision: v1.3

Date: 2024-10-29

Time: 15:42:36

Sheet 9 of 15

File: 09_USB_hub.SchDoc

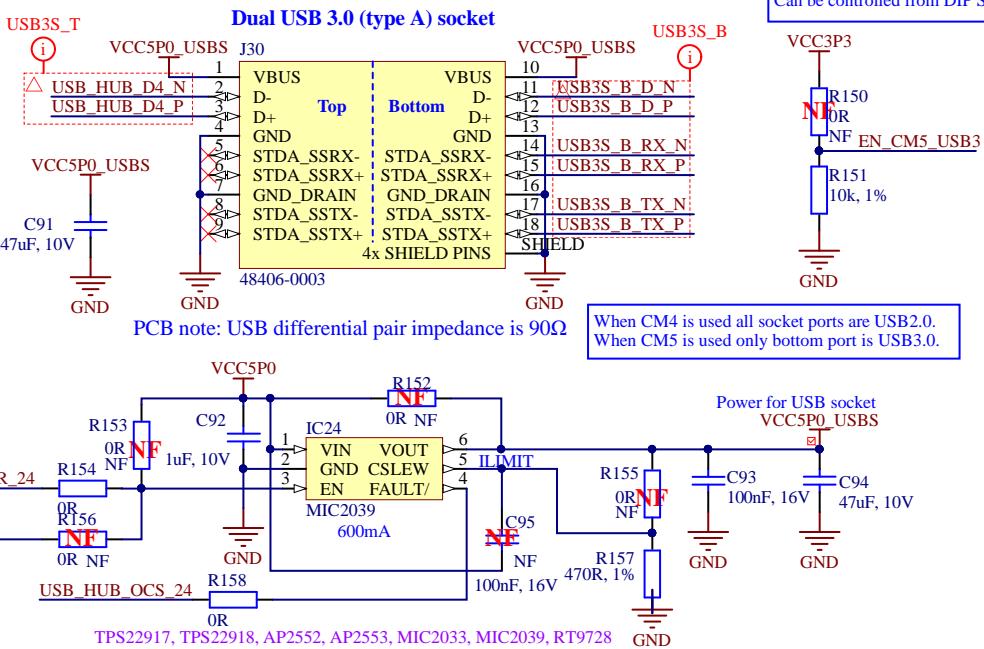


NF elements on sheet: R150, R152, R153, R155, R156, C95, R159, R161, C100

Number of NF elements on sheet: 9

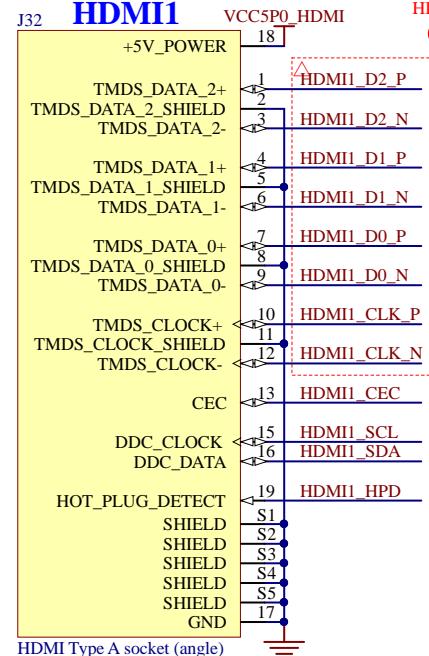
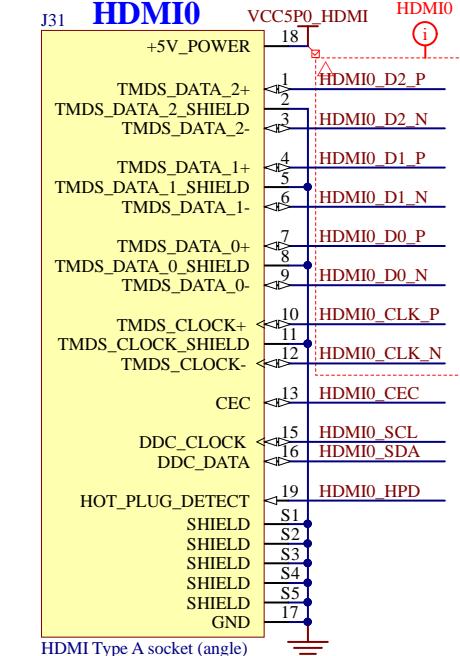
USB and HDMI sockets

Dual USB 3.0 (type A) socket

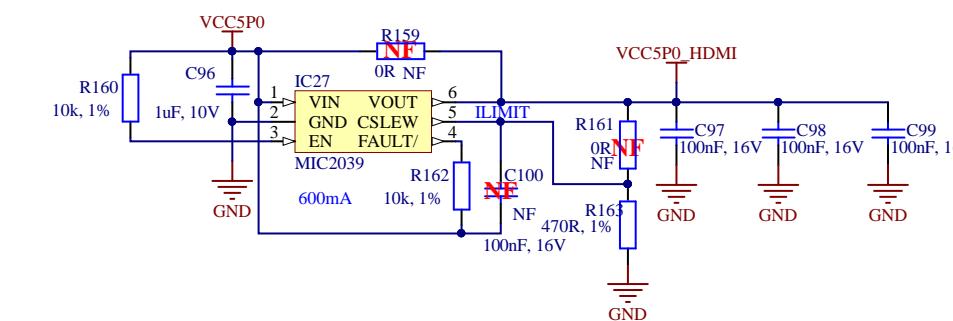


EN_CM5_USB3: Enable CM5 USB3 ports:
0: all ports connected to USB 2.0 hub (for CM4)
1: header Port 1 and socket bottom port are connected to CM5 USB3.0 lines (for CM5)
Can be controlled from DIP SW Bit 4.

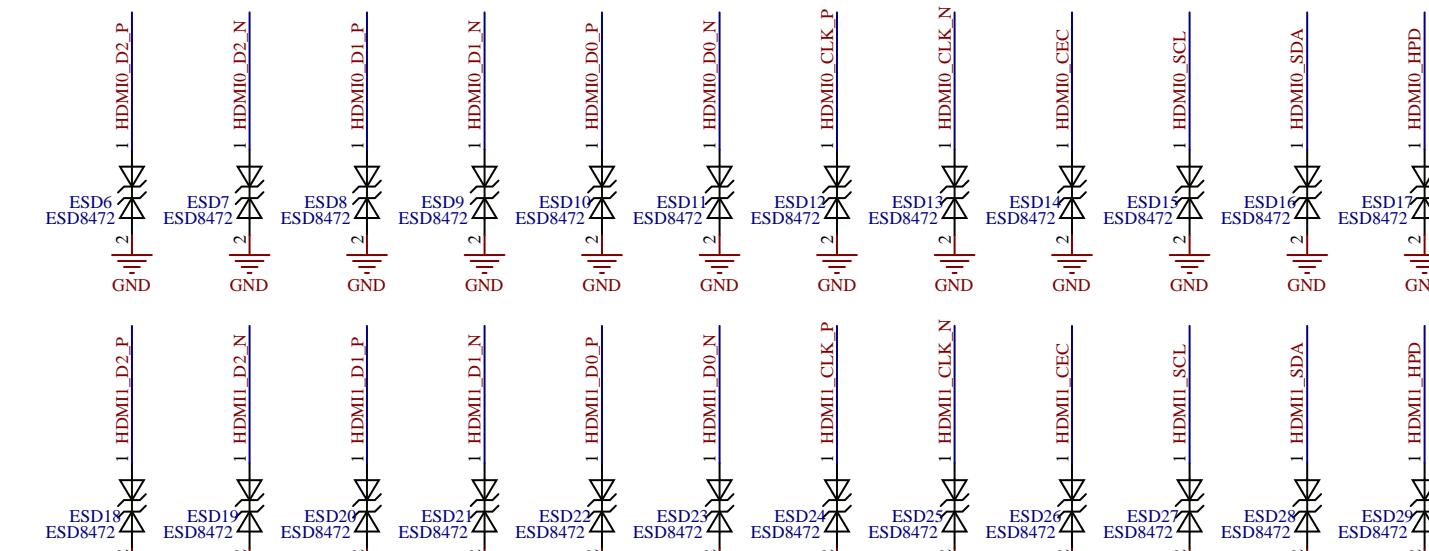
HDMI sockets



PCB note: make each HDMI group differential traces lenght equal and impedance of 100Ω
Alternative HDMI P/Ns: RAVHD19ETR (with board lock)



ESD protection for CM5



Project name: LimePSB-RPCM_Iv3.PrcPcb

Title: USB and HDMI sockets

Lime Microsystems
Surrey Tech Centre
Guildford GU2 7YG
Surrey
United Kingdom



Size: A3 Revision: v1.3

Date: 2024-10-29 Time: 15:42:38 Sheet 10 of 15

File: 10_USB_HDMI.SchDoc

A

A

B

B

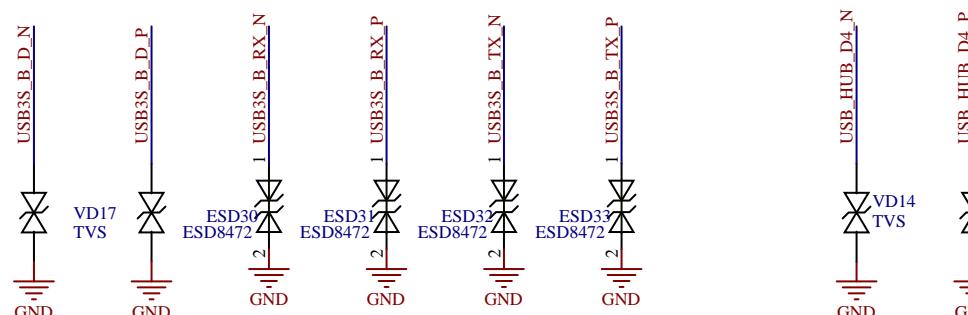
C

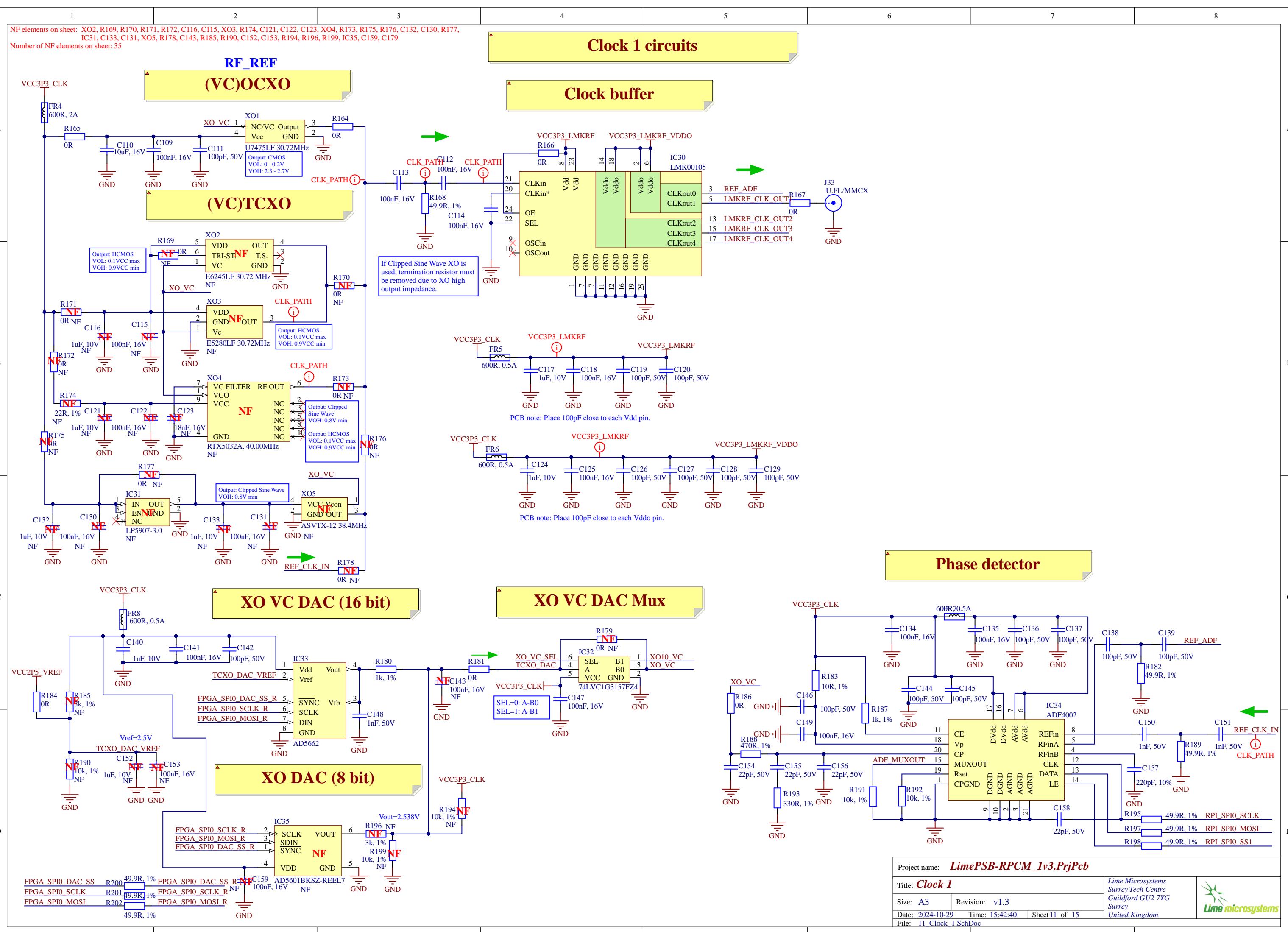
C

D

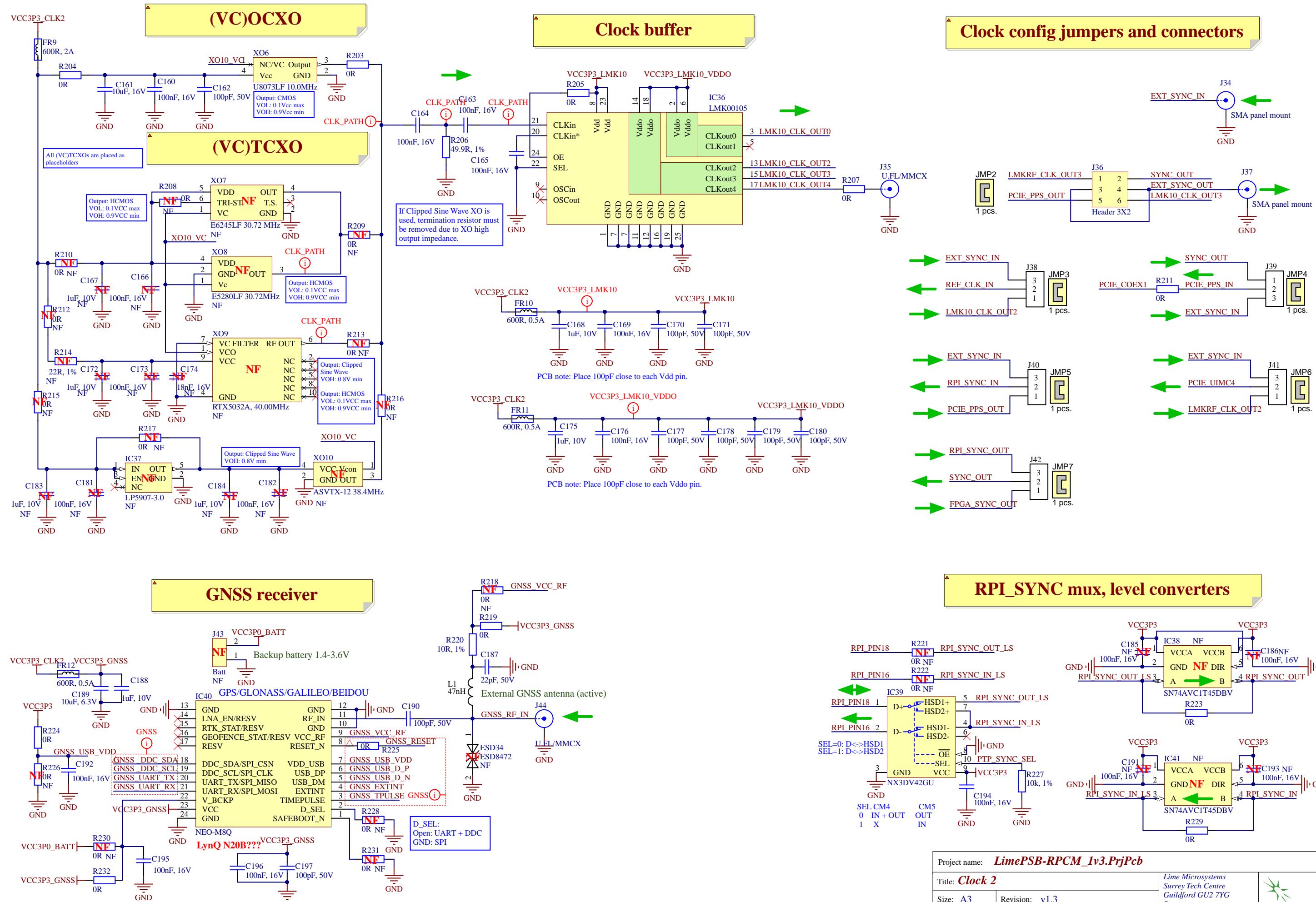
D

ESD protection





Clock 2 circuits

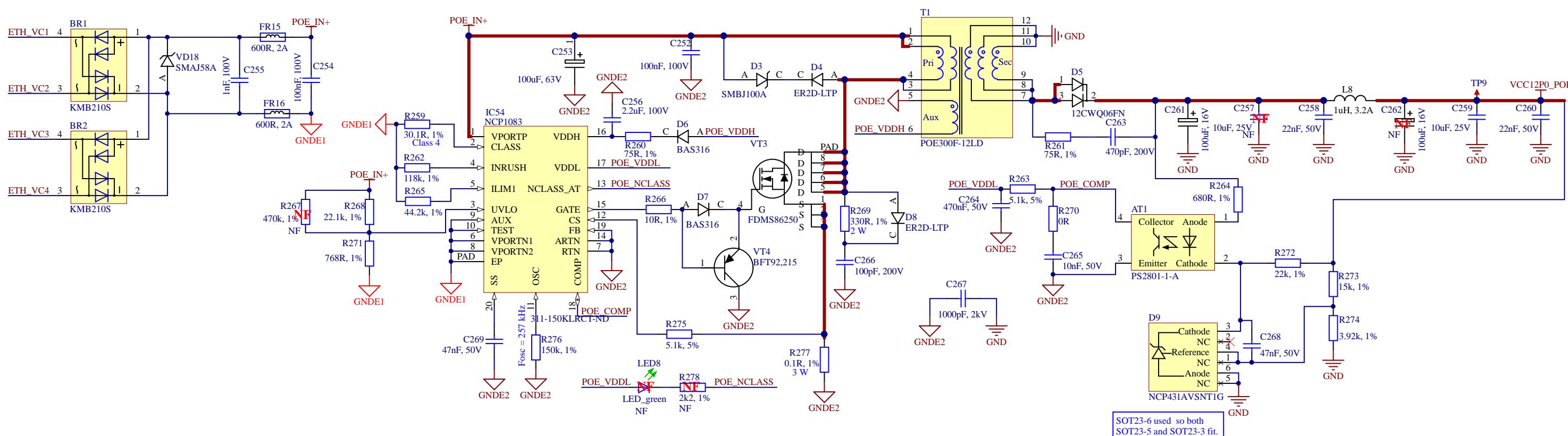


NF elements on sheet: R267, C257, C262, LED8, R278, LED9, R292, R293, R295, R291

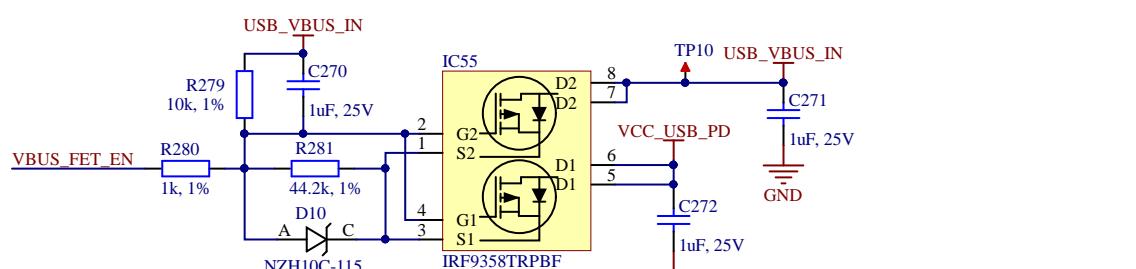
Number of NF elements on sheet: 10

Power over Ethernet

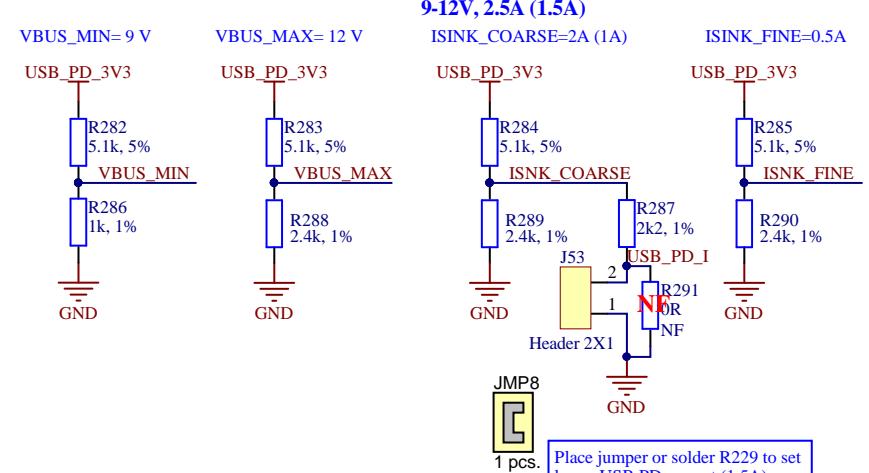
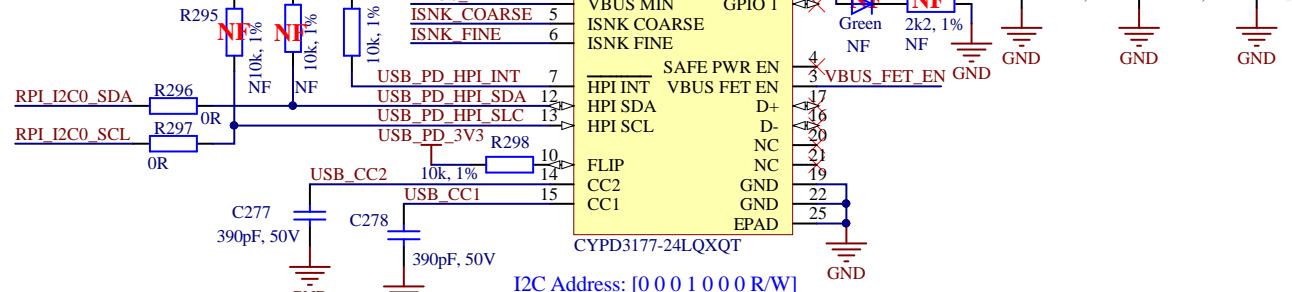
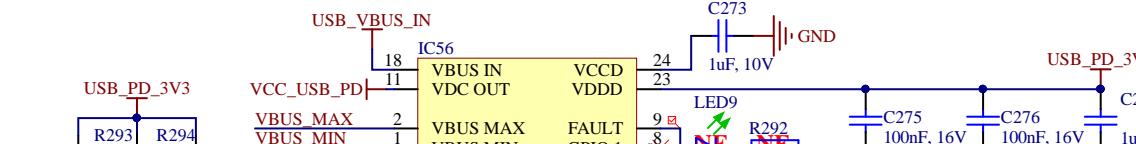
802.3at (PoE+) compliant Class 4 (25W max)



USB Power delivery



Resistor dividers for selecting VBUS Voltage and Current



Project name: LimePSB-RPCM_Iv3.PrcPcb

Title: PoE and USB PD

Size: A3 Revision: v1.3

Date: 2024-10-29 Time: 15:42:46 Sheet 14 of 15

File: 14_PoE_USB_PD.SchDoc



Lime Microsystems
Surrey Tech Centre
Guildford GU7 5Y
Surrey
United Kingdom

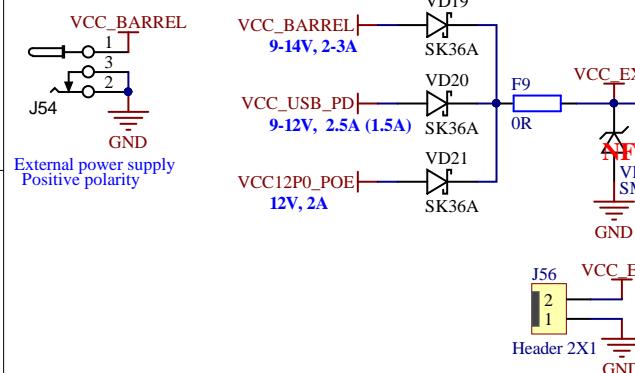
NF elements on sheet: VD22, FR17, R301, C283, R306, C294, C295, R307, J58, FR19, C303, FR21, C312, R321, C300, R317

Number of NF elements on sheet: 16

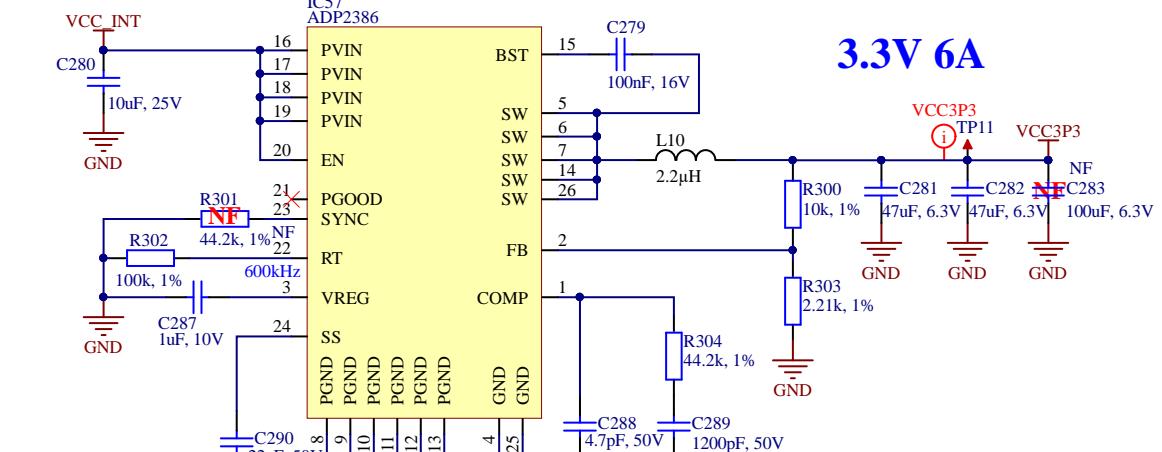
Total number of NF elements on all sheets: 199

Board power circuits

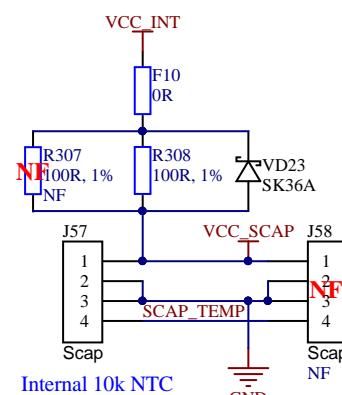
Power input



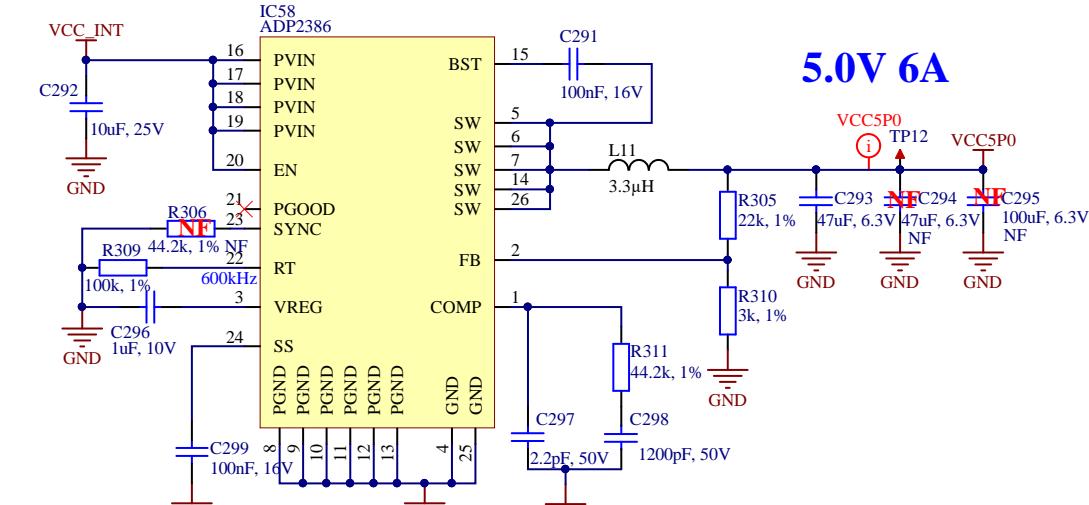
Switching regulators



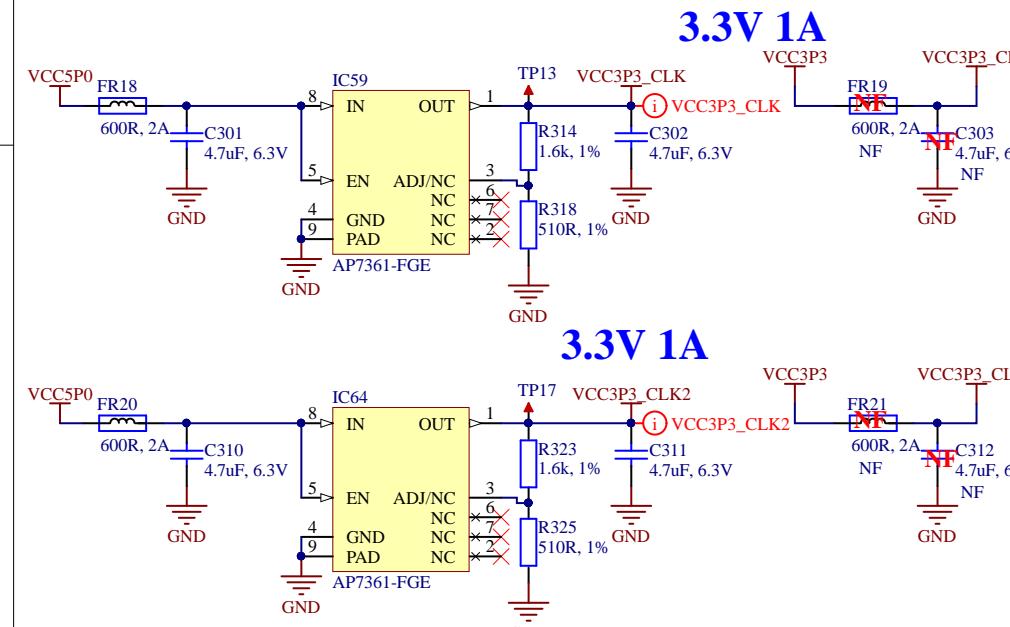
Supercapacitor



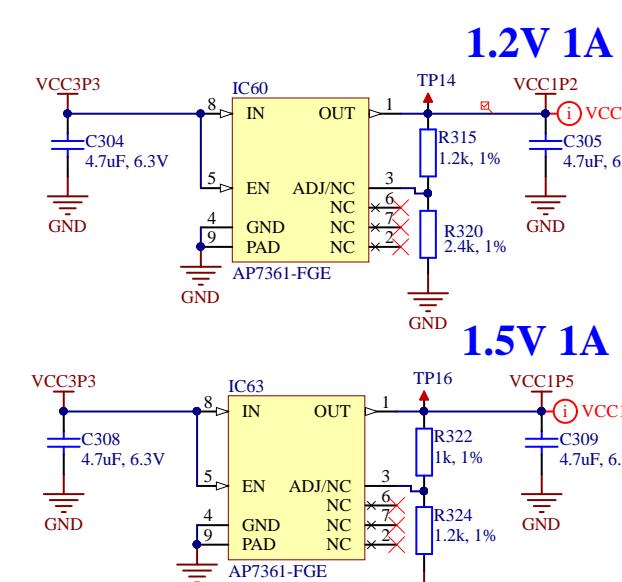
3.3V 6A



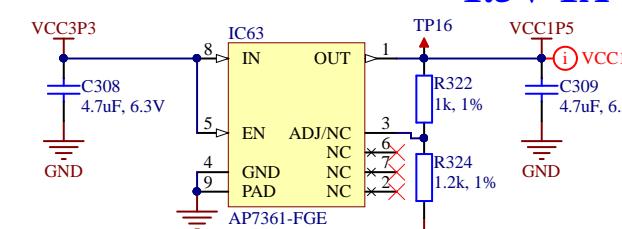
Linear regulators



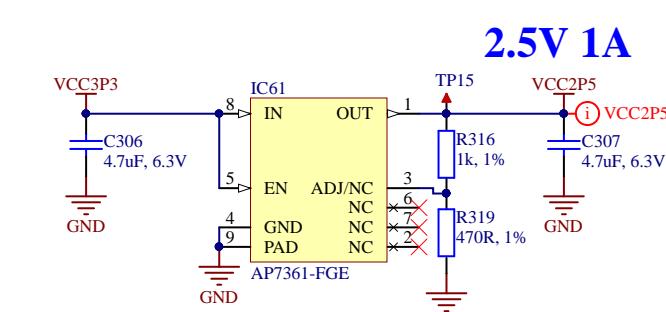
3.3V 1A



1.2V 1A



1.5V 1A



2.5V 1A

Voltage reference (2.5V)

