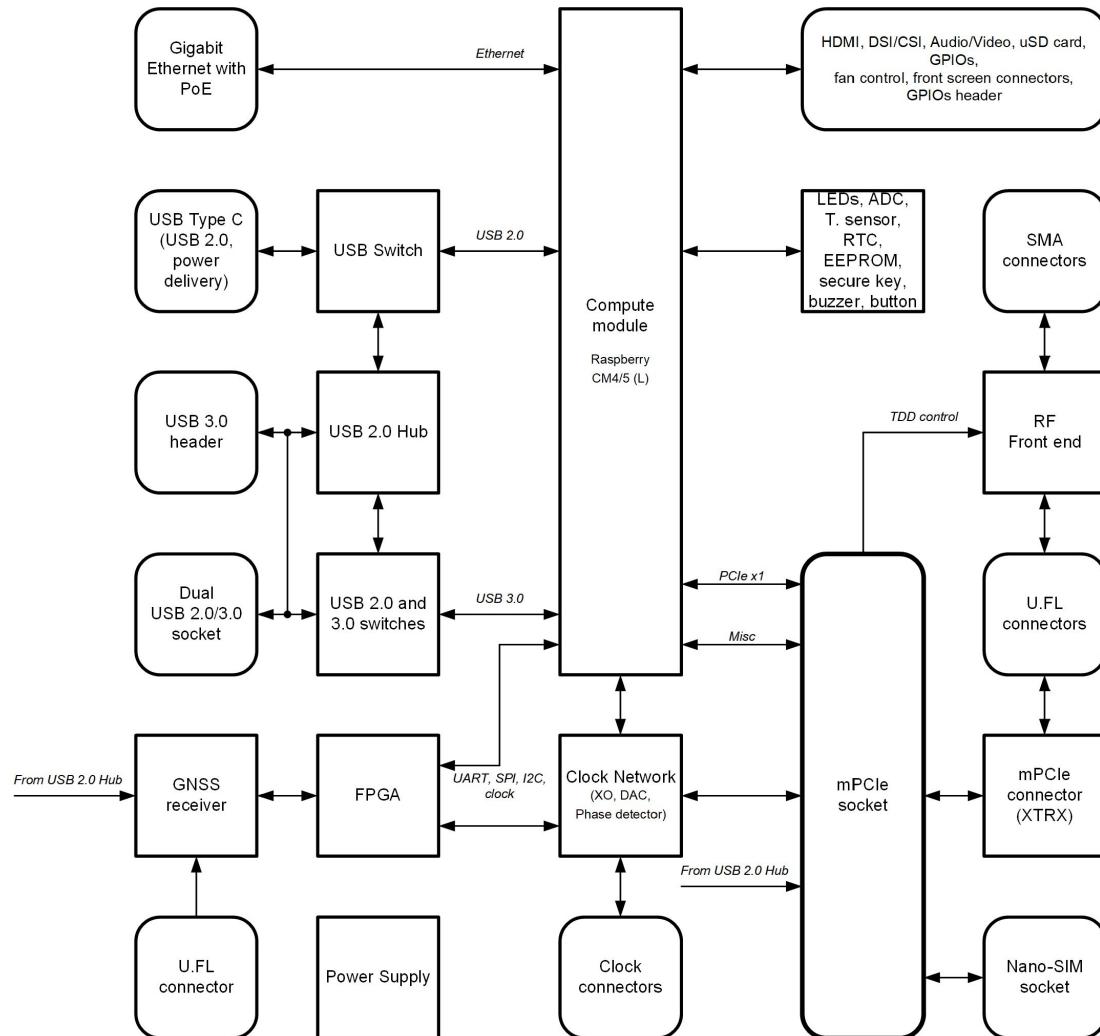


Block diagram



Project name: **LimePSB-RPCM_Inv3.Pcb**

Title: **Block diagram**

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

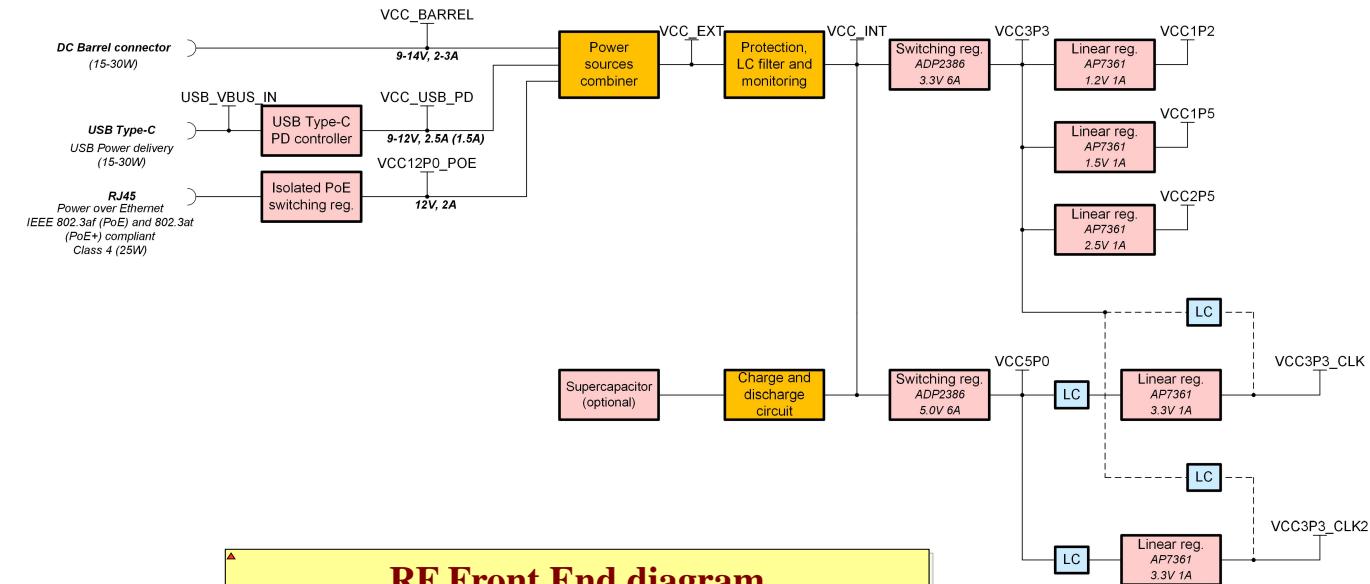
Date: **2024-10-08** Time: **10:35:21** Sheet**1** of **13**

File: **01_Block_diag.SchDoc**

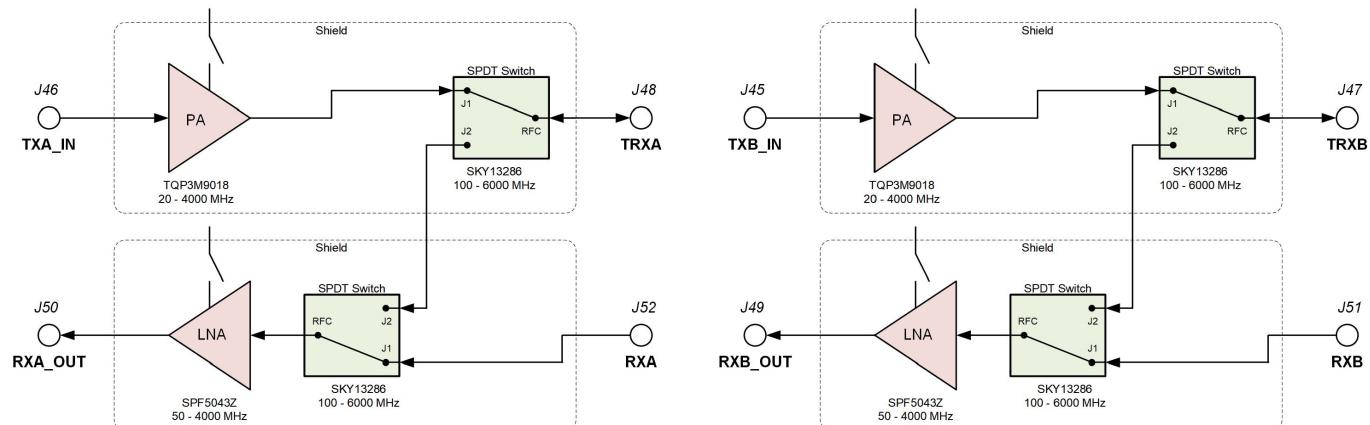
Lime Microsystems
Surrey Tech Centre
Guildford GU2 7YG
Surrey
United Kingdom



Power diagram



RF Front End diagram



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

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

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

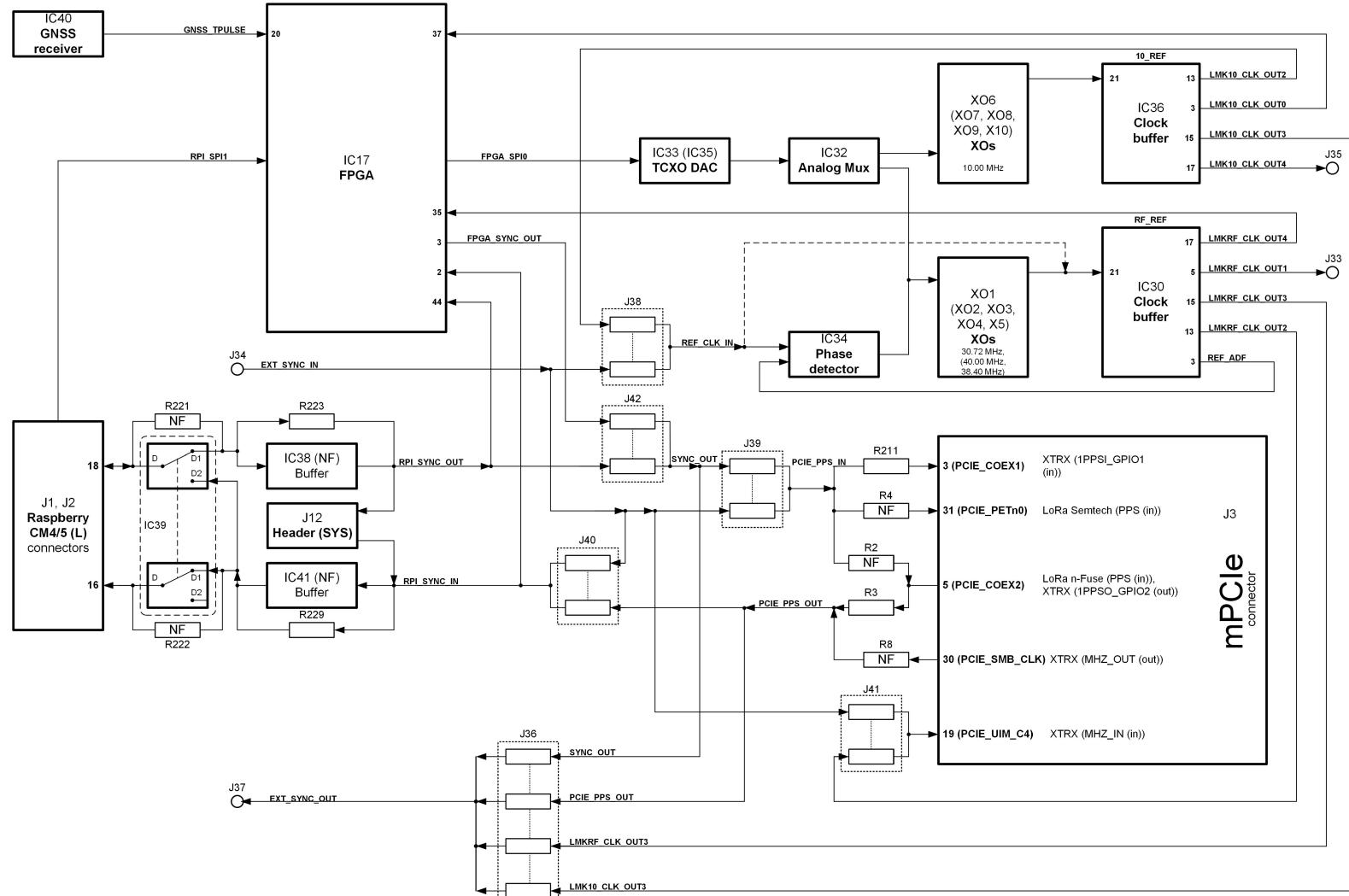
Date: **2024-10-08** Time: **10:35:26** Sheet **2** of **13**

File: **02_Power_RFFE_diag.SchDoc**

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United Kingdom



Clock diagram



Project name: **LimePSB-RPCM_Inv3.PrjPcb**

Title: **Clock diagram**

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

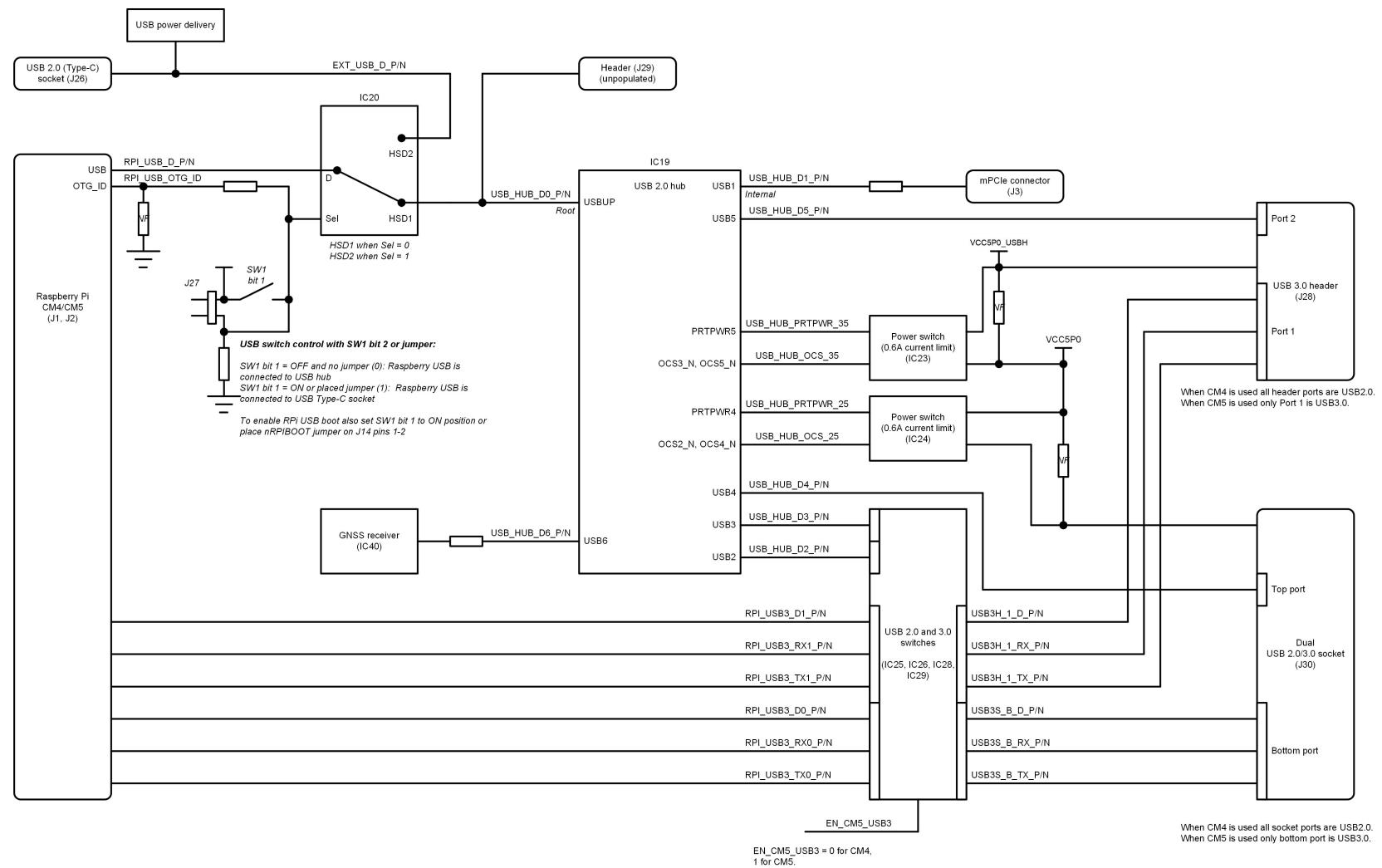
Date: **2024-10-08** Time: **10:35:31** Sheet**3** of **13**

File: **03_Clock_diag.SchDoc**

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United Kingdom



USB diagram



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

Title: **USB diagram**

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

Date: **2024-10-08** Time: **10:35:38** Sheet **4** of **13**

File: **04_USB_diag.SchDoc**

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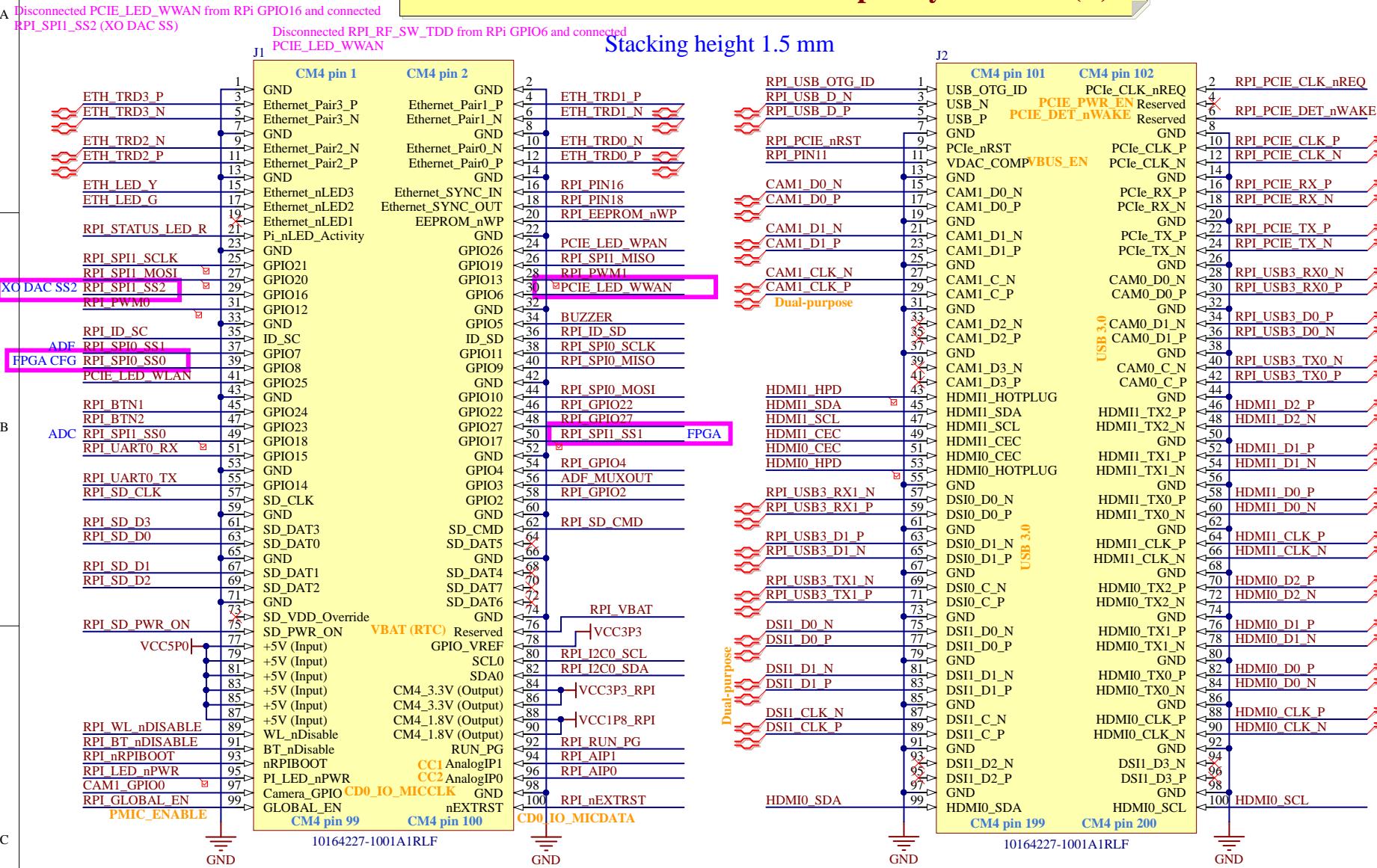


NF elements on sheet: R1, R2, R4, R8, R10, R12, R13, C8, R6, C6, C7, R9, R11, J5, J6
Number of NF elements on sheet: 15

Raspberry Pi CM4/5(L) and mPCIe

mPCIe x1

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

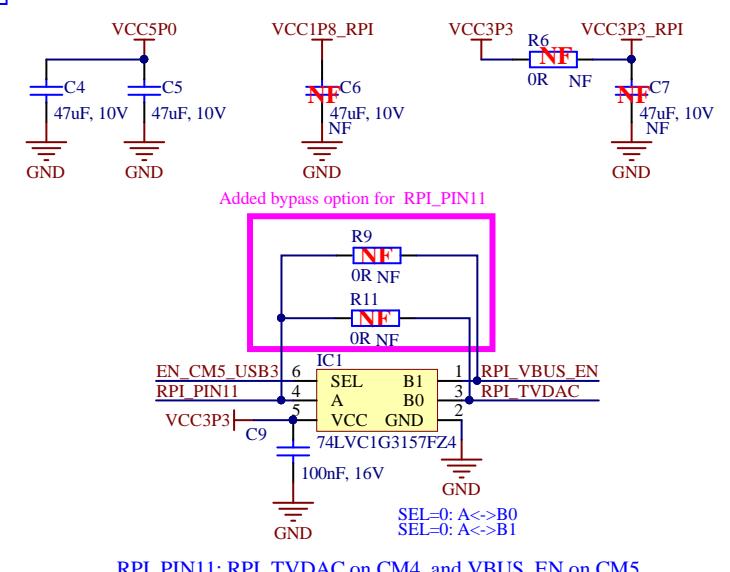


Board SPI interfaces:

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)

Changed SPI interfaces:
RPI_SPI0 SS0 changed from XO DAC to FPGA CFG
RPI_SPI1 SS1 changed from SR to FPGA
RPI_SPI1 SS2 connected to XO DAC (GPIO16 to FPGA)

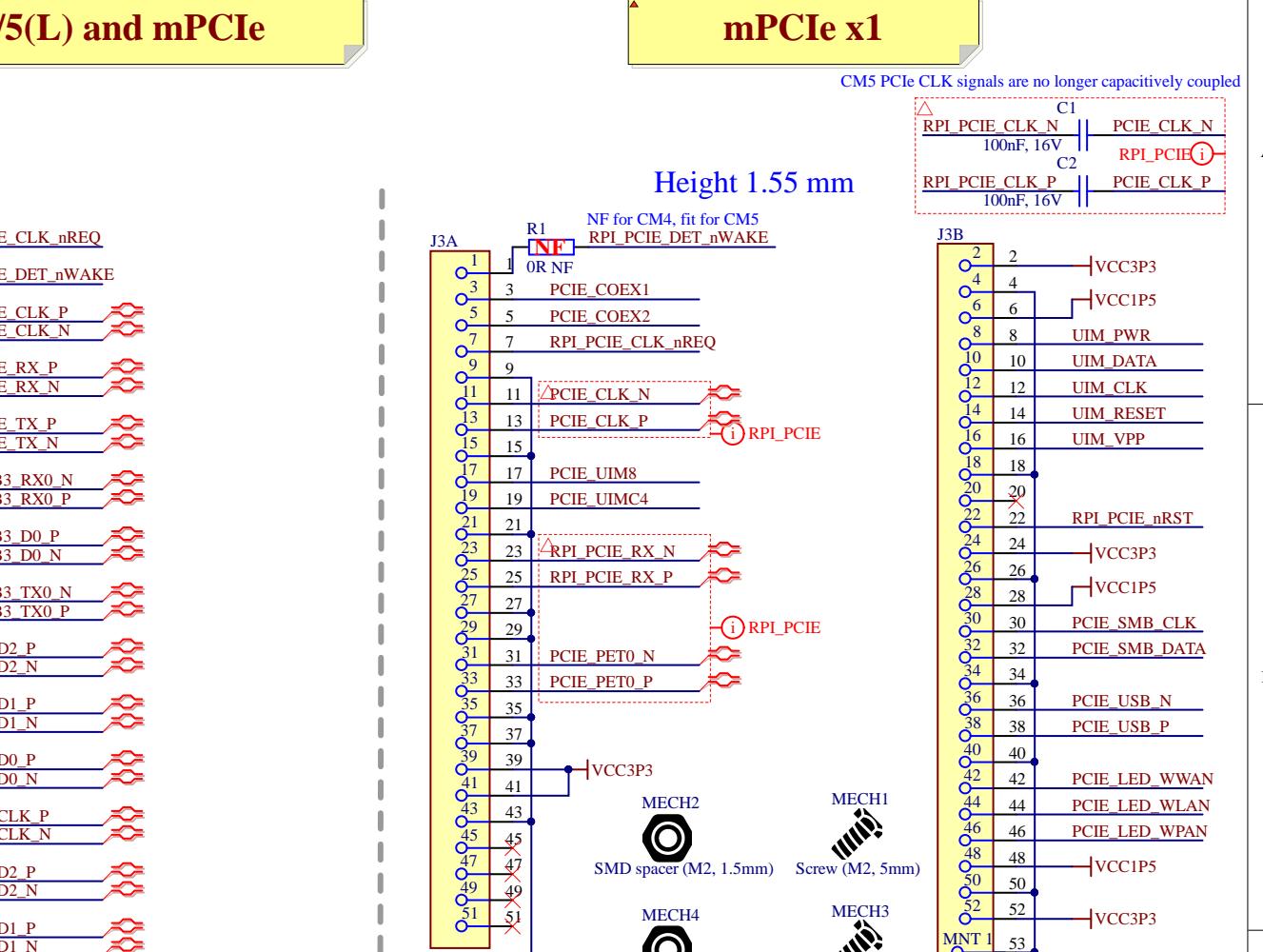


GLOBAL_EN: Drive low to power off CM4.
Internally pulled up with a 100K to +5V.

WL_nDisable: Can be left floating if driven low, the wireless interface will be disabled. Internally pulled up via 1.8K to CM4_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.

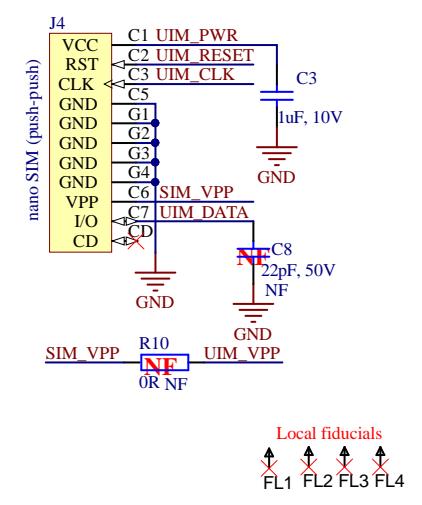


mPCIe is compatible with these non standard mPCIe boards:

- Fairwaves or LimeSDR XTRX (default)
- n-Fuse LoRaWANTM Concentrator LRWCCx-MPCIE*
- Semtech LoRa Corecell USB version*

* some resistors may need to be soldered/unsoldered to match a specific board

Nano-SIM socket



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

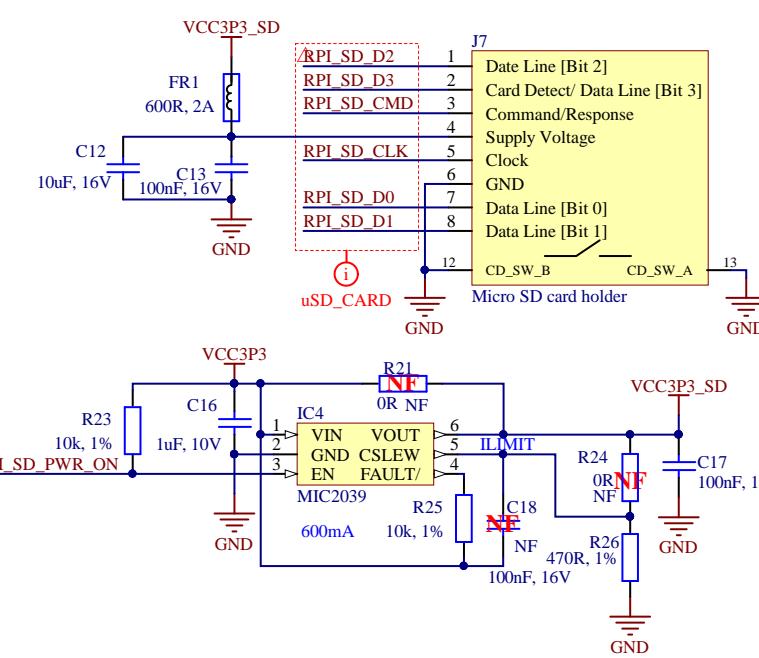
Title: Raspberry Pi CM4/5(L) and mPCIe		Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom	 Lime microsystems
Size: A3	Revision: v1.3		
Date: 2024-10-08	Time: 10:35:44	Sheet 5 of 13	
File: 05_RPi_mPCIe.SchDoc			

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

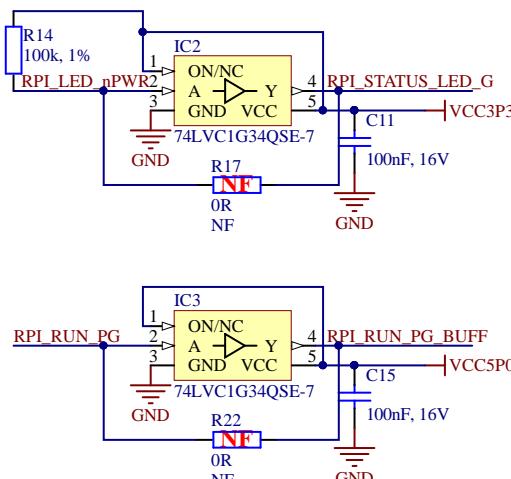
Misc 1

uSD card socket

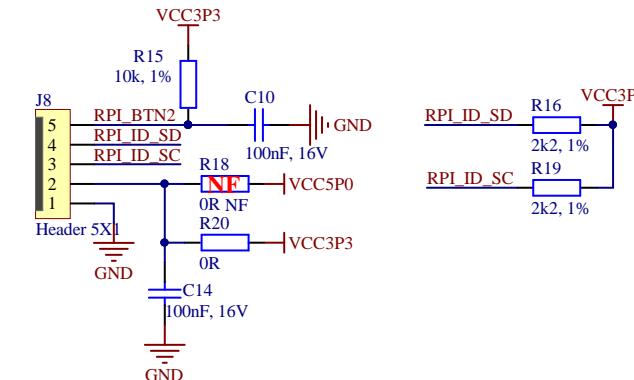
Only for CM4L and CM5L with no on-board Flash (eMMC)



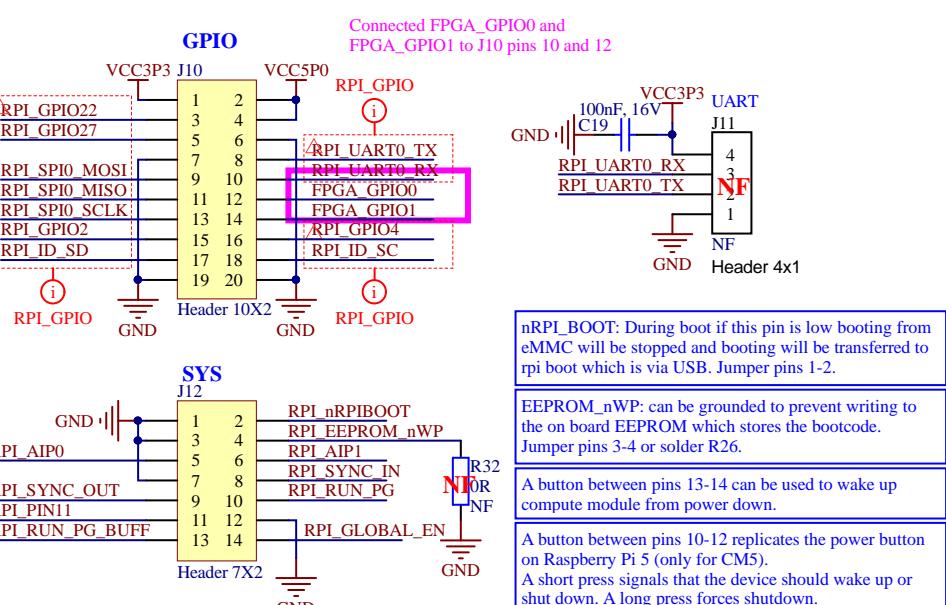
Buffers, level converters



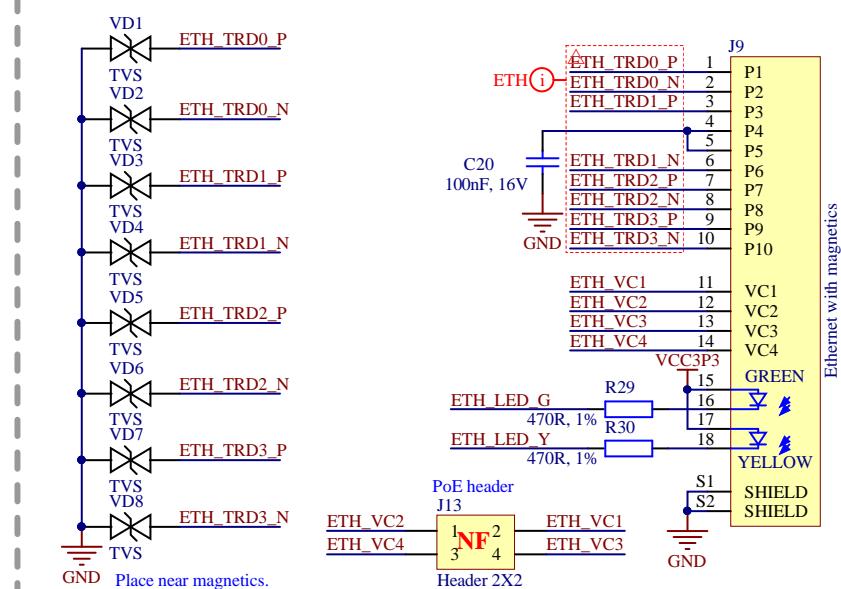
Front screen I2C + BTN



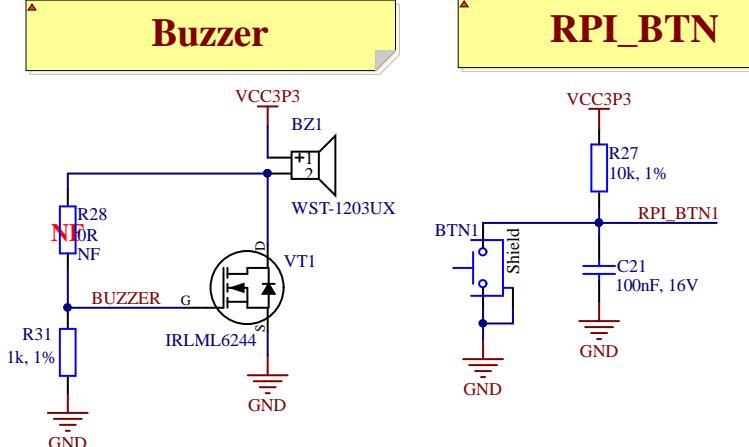
GPIO ans SYS headers



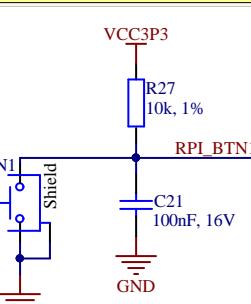
Gigabit Ethernet (RJ45) connector



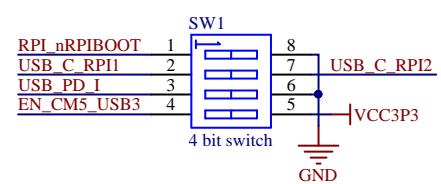
Buzzer



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.

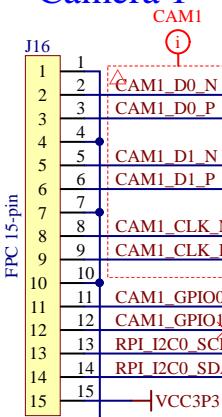
Bit 2: RPi USB 2.0 port mux control:
OFF: RPi USB is connected to USB hub (default).
ON: RPi USB is connected to USB C connector.

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

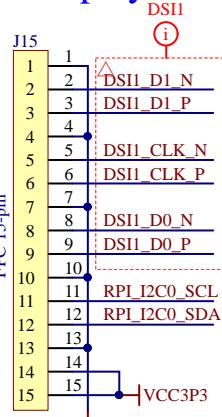
Bit 4: Dual USB socket source:
OFF: connected to USB 2.0 hub (for CM4).
ON: connected to CM5 USB3.0 lines (for CM5).

LVDS (Camera + Display)

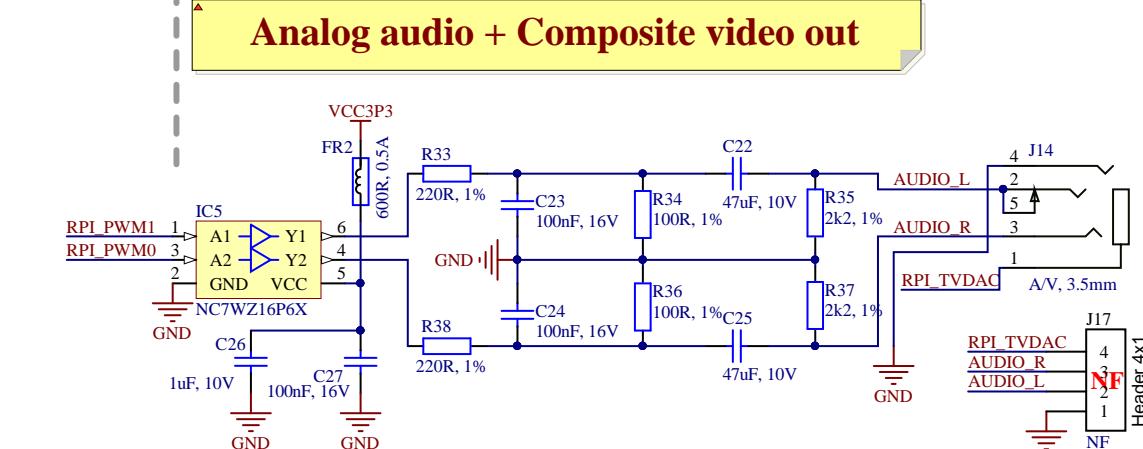
Camera 1



Display 1



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



Project name: LimePSB-RPCM_Iv3.PrjPcb

Title: Misc 1

Size: A3 Revision: v1.3

Date: 2024-10-08 Time: 10:35:53 Sheet 6 of 13

File: 06_Misc_1.SchDoc

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Surrey
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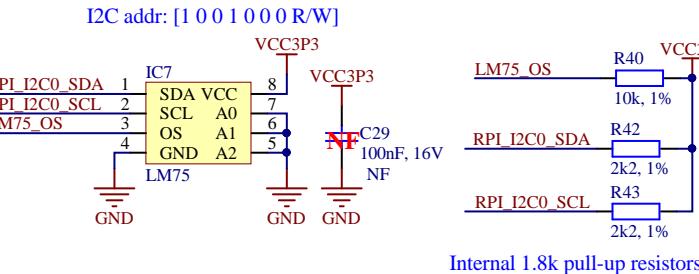


NF elements on sheet: J18, J19, C29, R44, R48, C30, C31, R49, R50, J20, R51, IC9, IC11, R66, R80, BATT2, IC15, R75, R77, R79, R84, R86, R87, R88

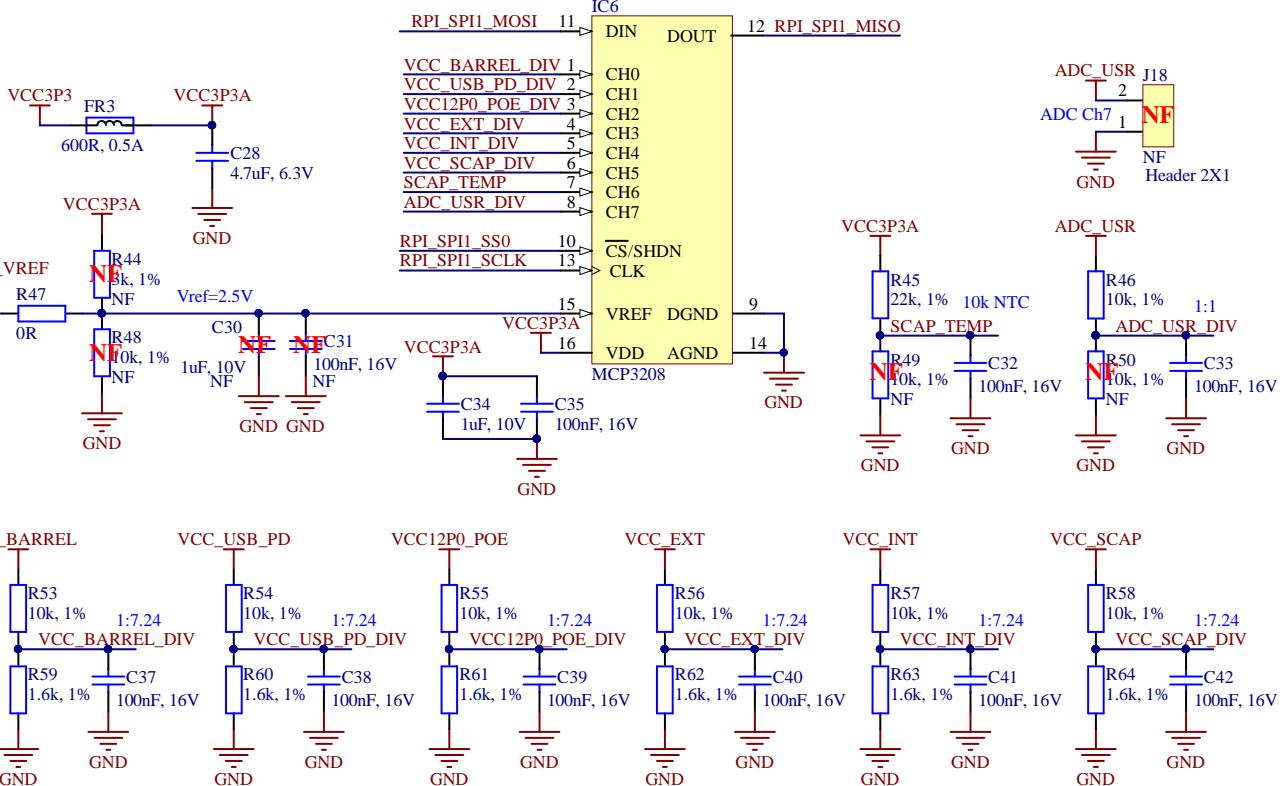
Number of NF elements on sheet: 24

Misc 2

I2C Temperature sensor

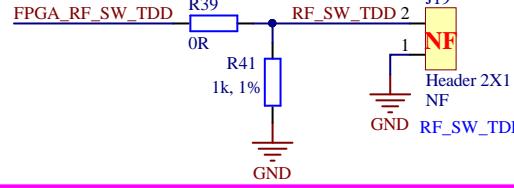


SPI ADC

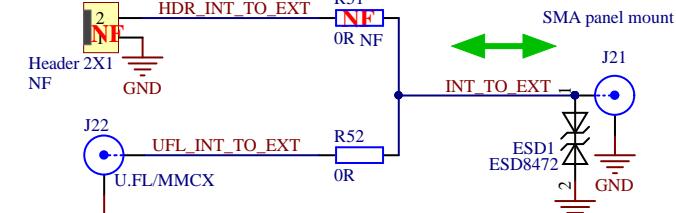


RFFE TDD control

Disconnected RPI_RF_SW_TDD and PCIE_UIM8 from RF_SW_TDD and connected FPGA_RF_SW_TDD.

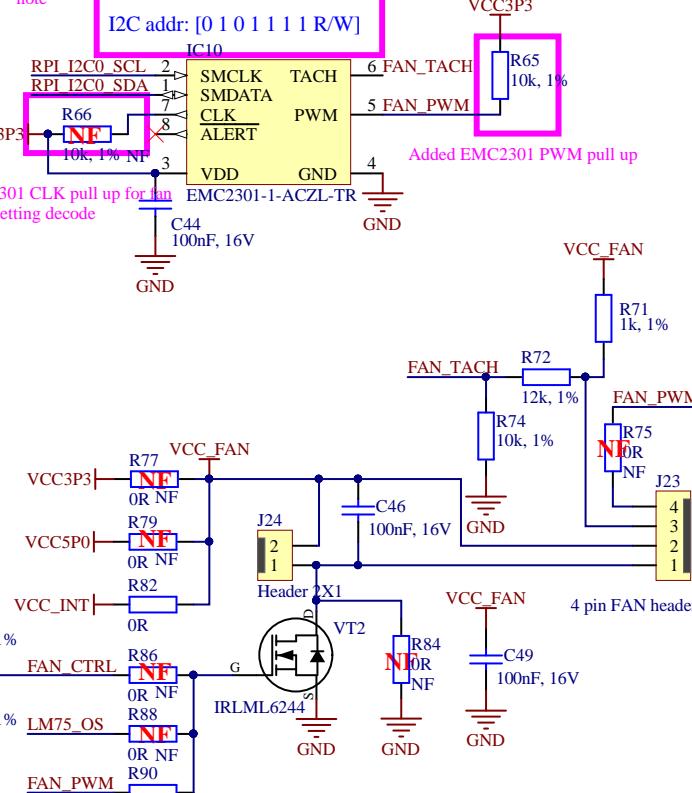


Int to ext

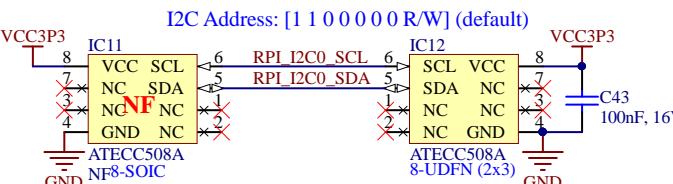


FAN control

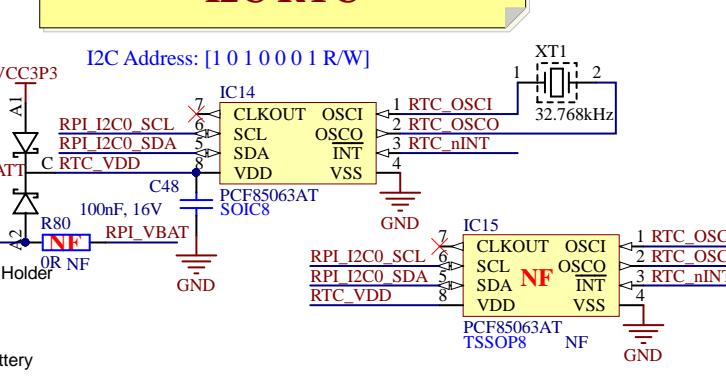
Corrected FAN controller I2C address note



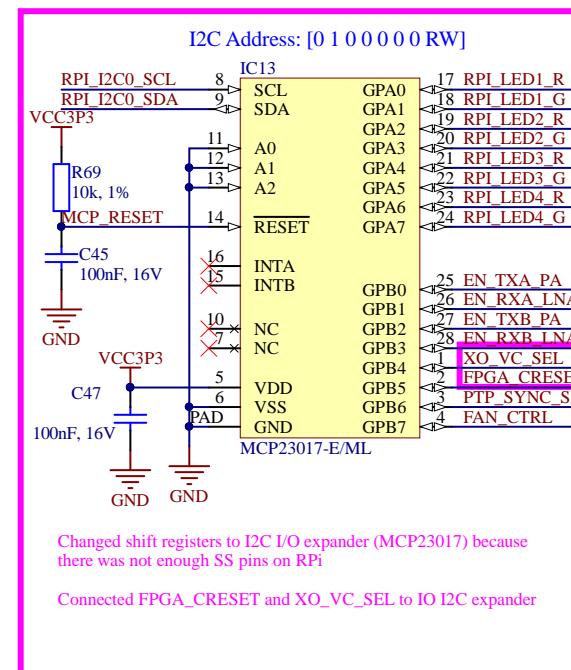
I2C secure key storage



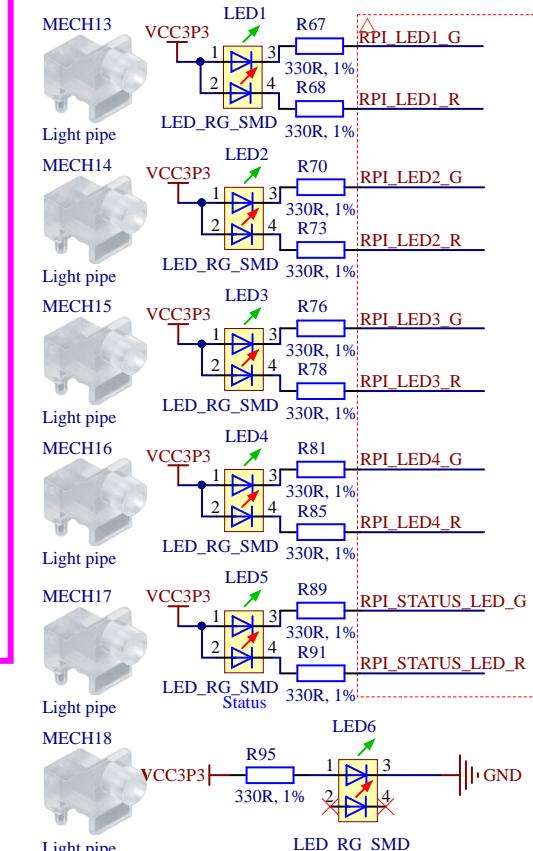
I2C RTC



I2C I/O expander



Raspberry Pi LEDs



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

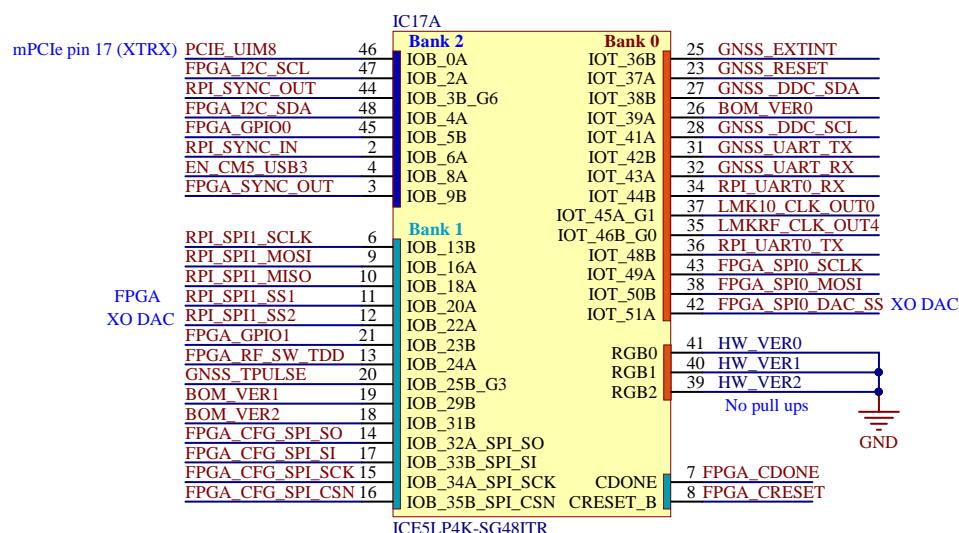
Title: Misc 2		<i>Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom</i>	
Size: A3	Revision: v1.3		
Date: 2024-10-08	Time: 10:35:58	Sheet 7	of 13
File: 07_Misc_2.SchDoc			

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

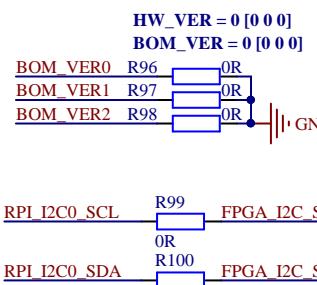
Number of NF elements on sheet: 4

FPGA

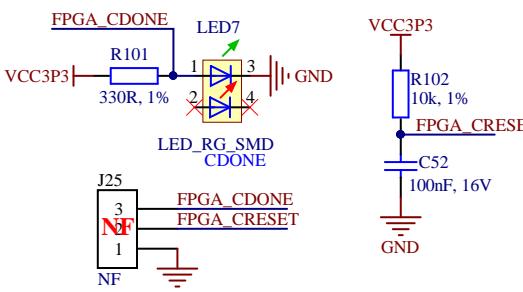
FPGA



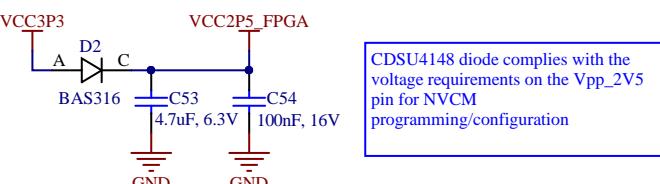
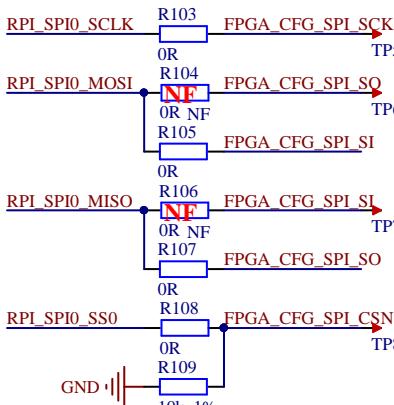
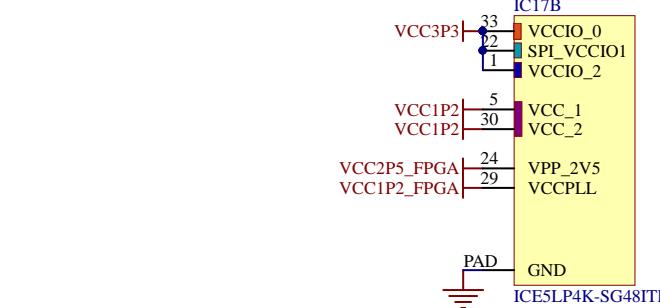
HW_VER, BOM_VER



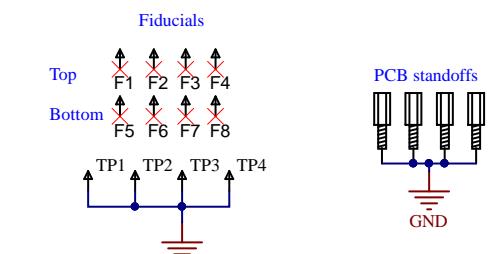
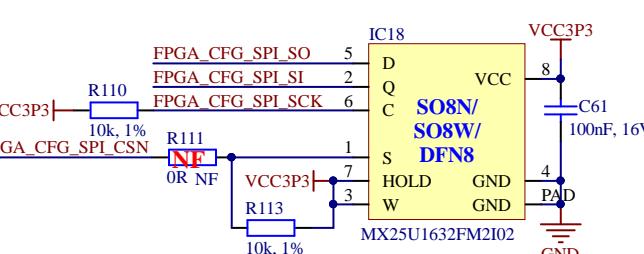
FPGA misc



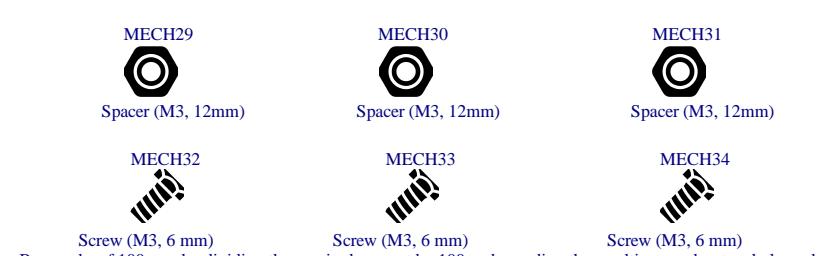
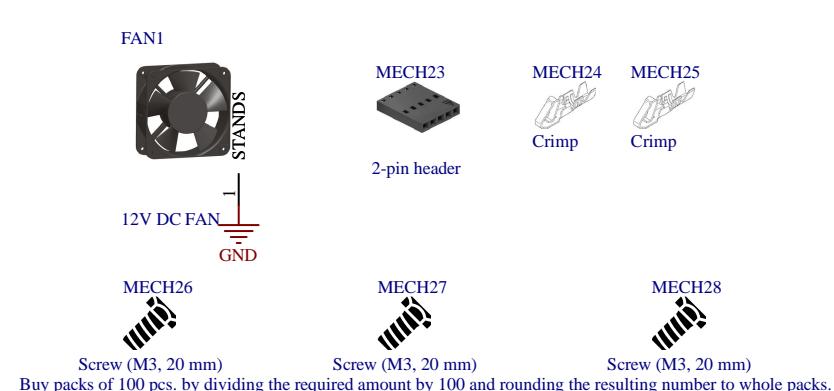
FPGA power



FPGA configuration Flash



Misc for FAN



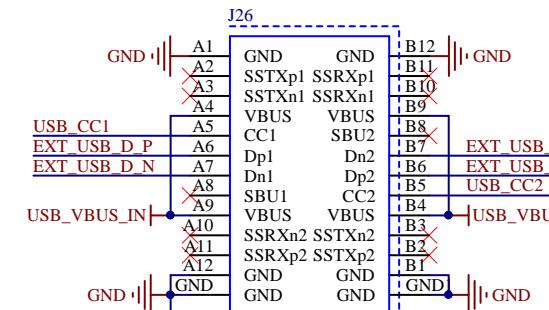
Project name: LimePSB-RPCM_Iv3.PrcPcb		Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom
Title: FPGA		File: 08_FPGA.SchDoc
Size: A3	Revision: v1.3	Date: 2024-10-08 Time: 10:36:03 Sheet 13 of 13

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

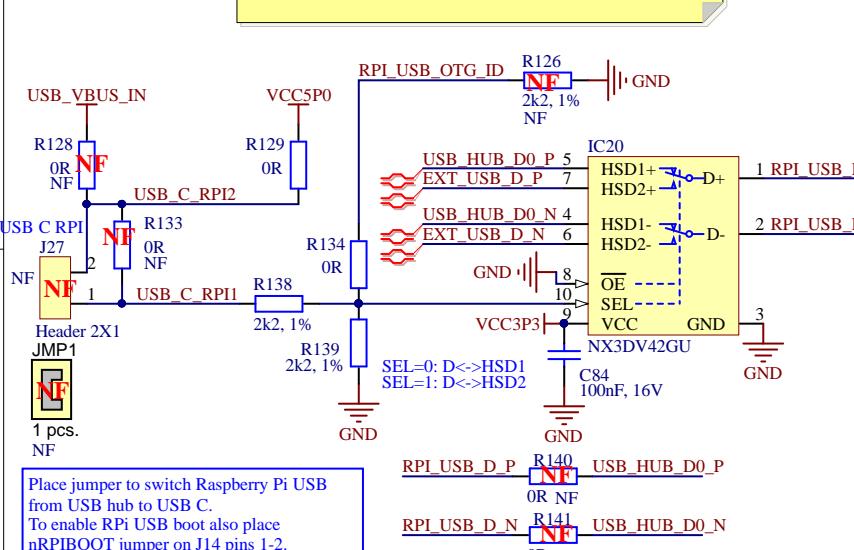
Number of NF elements on sheet: 20

USB C socket

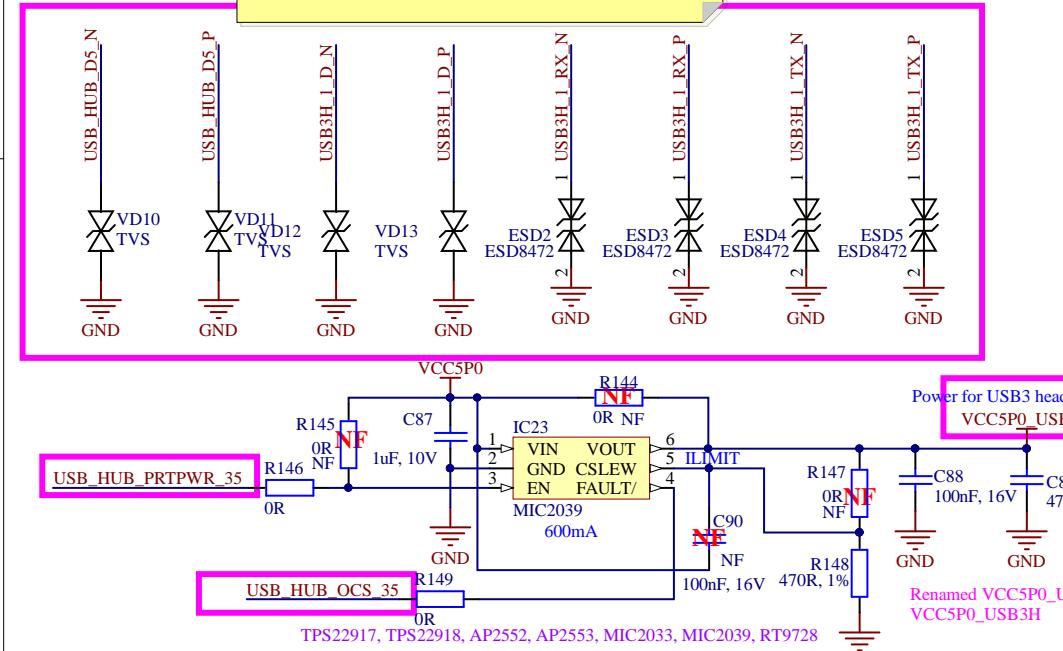
USB2.0 + PD



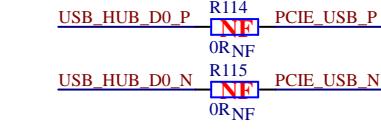
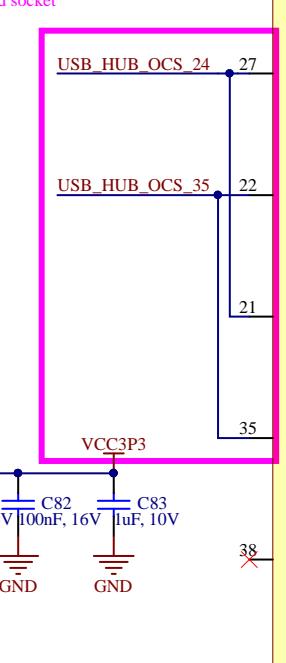
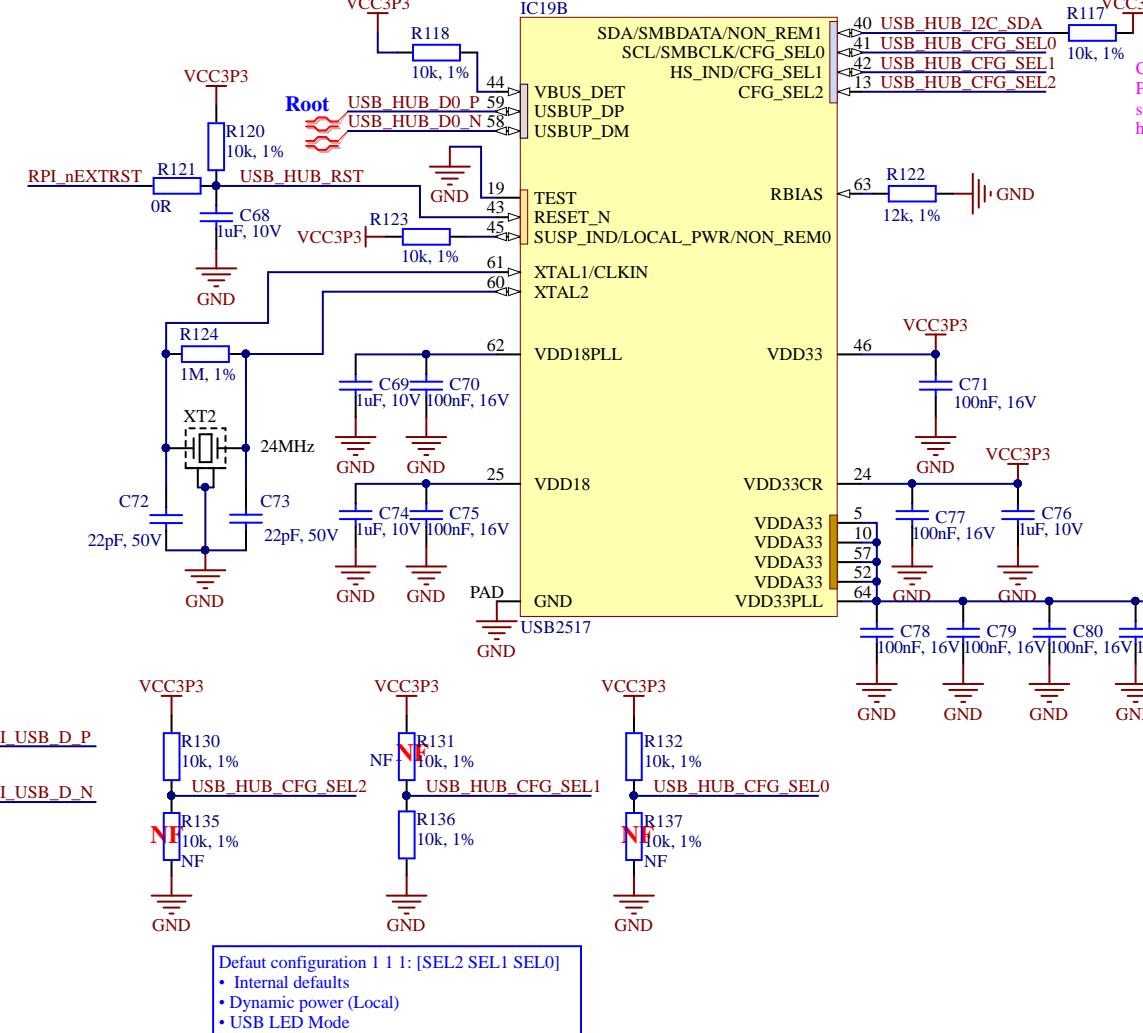
USB switch



USB 3.0 header



USB 2.0 HUB



Project name: LimePSB-RPCM_Iv3.PrcPcb

Title: USB 2.0 hub

Size: A3 Revision: v1.3

Date: 2024-10-08 Time: 10:36:09 Sheet 8 of 13

File: 09_USB_hub.SchDoc

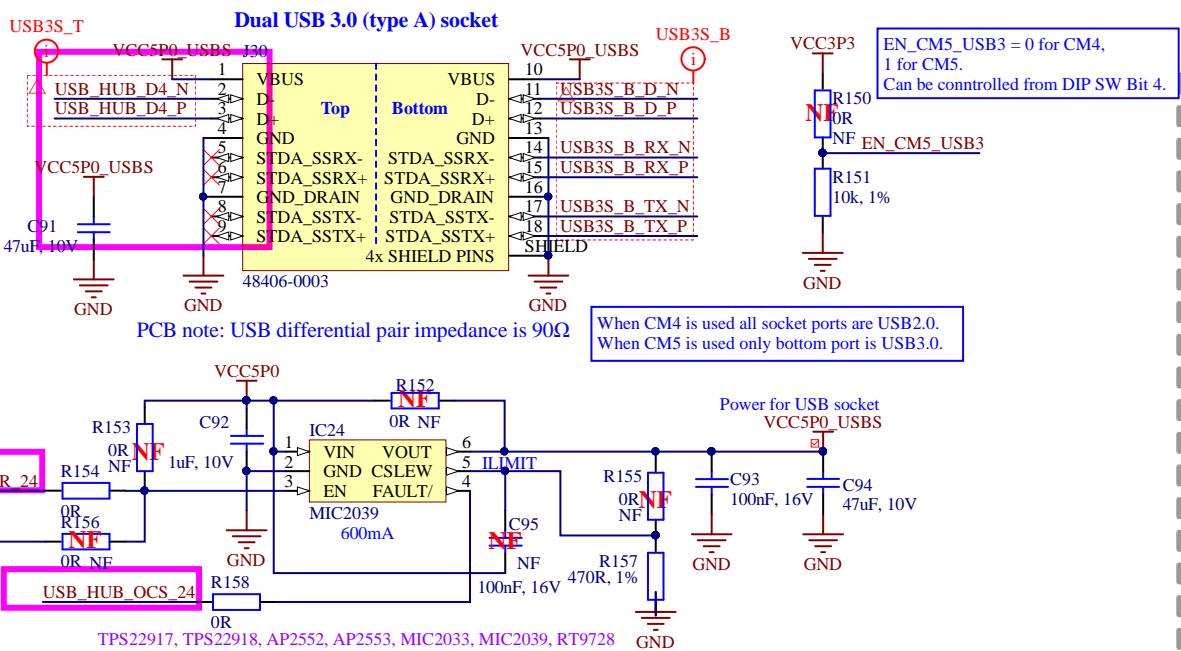
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Surry
United Kingdom



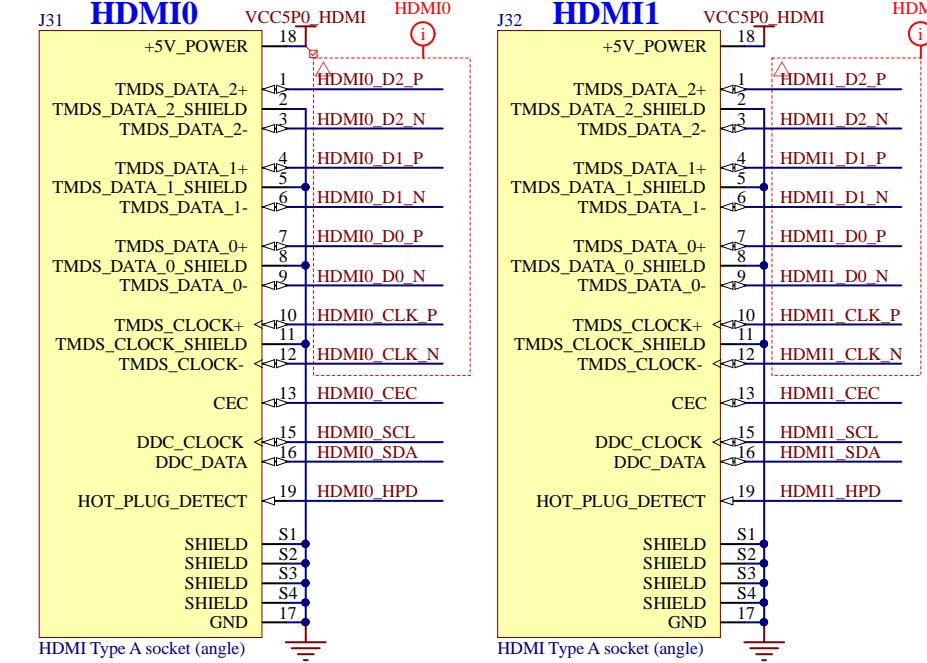
NF elements on sheet: R150, R152, R153, R155, R156, C95, R159, R161, C100
Number of NF elements on sheet: 9

USB and HDMI sockets

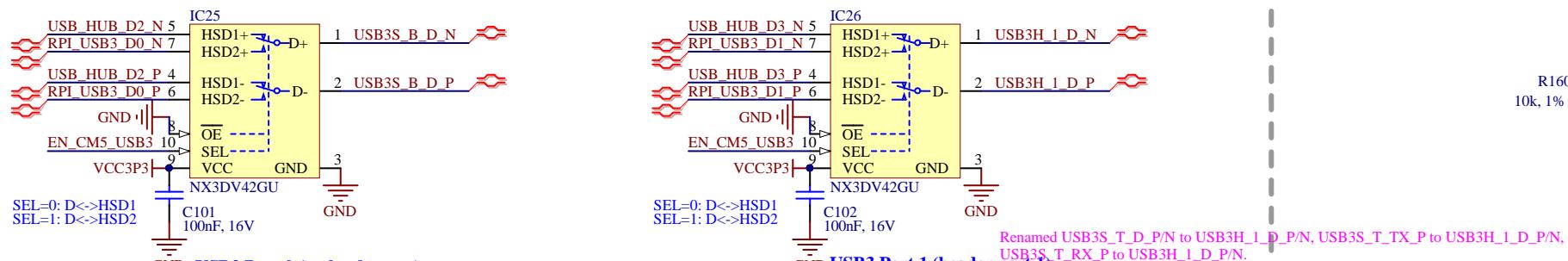
Dual USB 3.0 (type A) socket



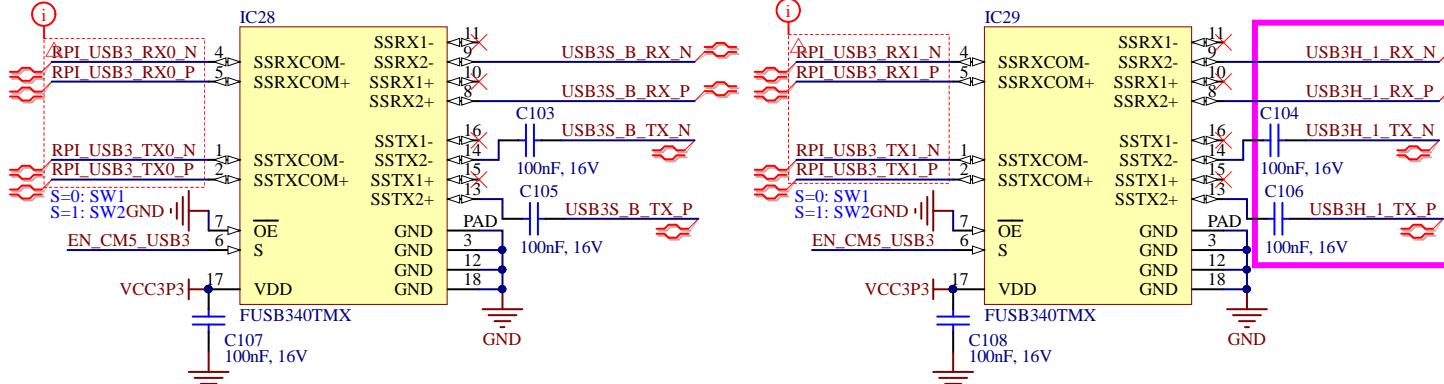
HDMI sockets



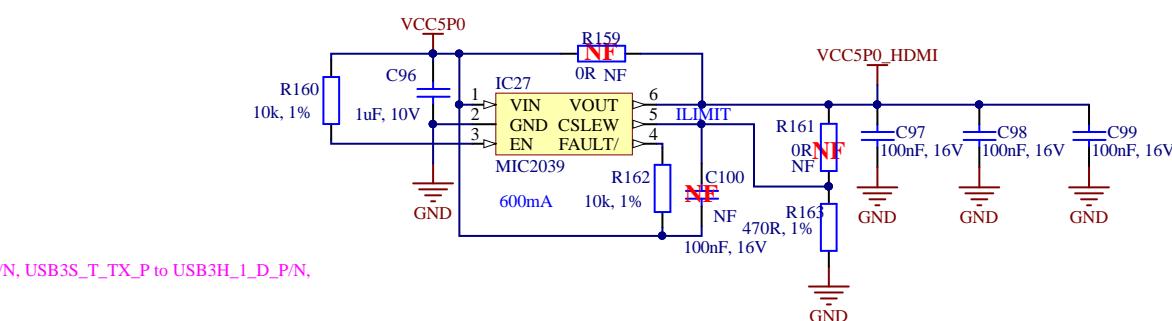
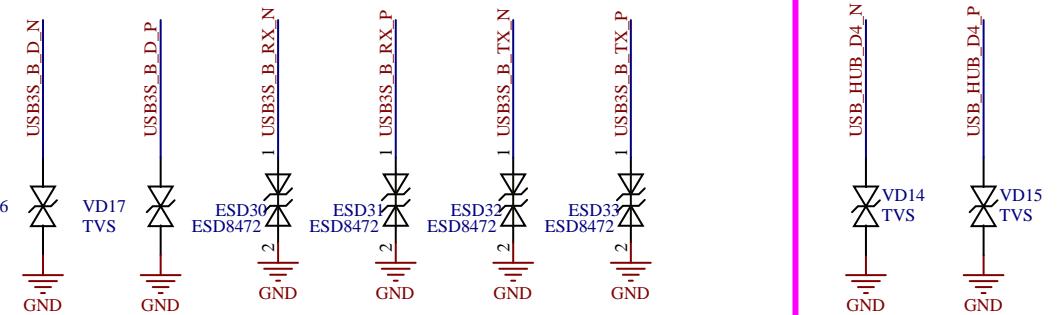
USB 2.0 and 3.0 switches



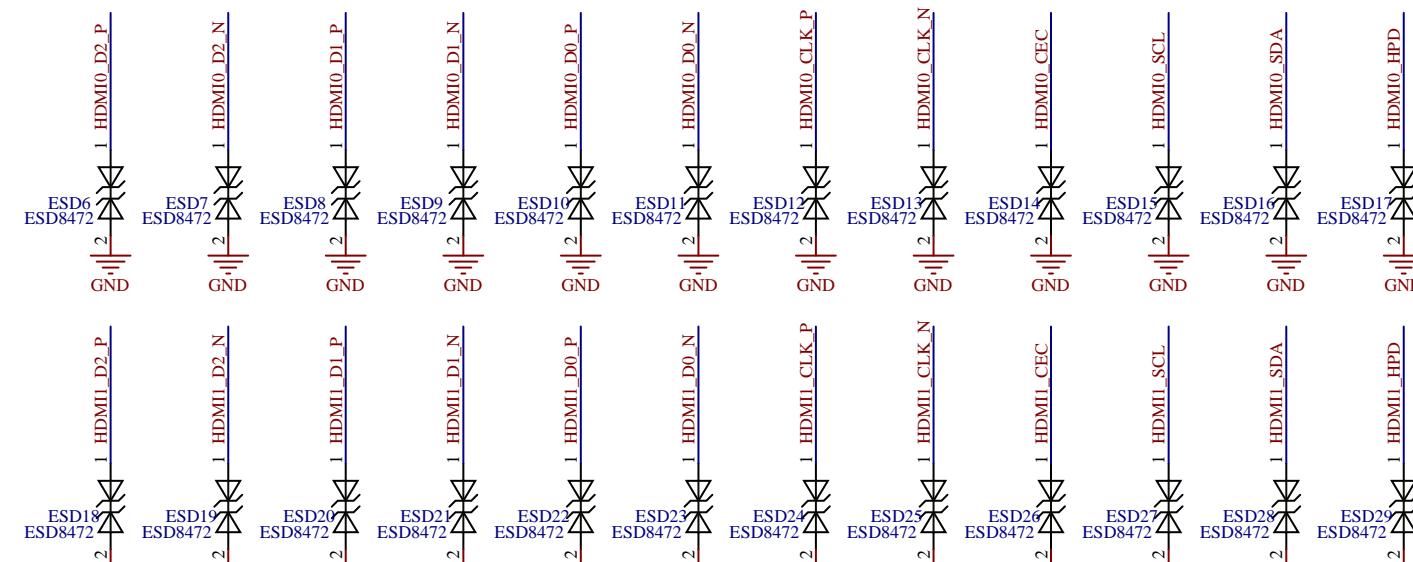
RPI_USB3 Port 0 (socket bottom)



ESD protection



ESD protection for CM5



Project name: LimePSB-RPCM_Iv3.PrcPcb

Title: USB and HDMI sockets

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United Kingdom

Size: A3 Revision: v1.3

Date: 2024-10-08 Time: 10:36:13 Sheet 9 of 13

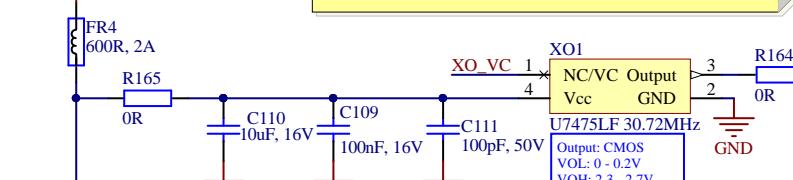
File: 10_USB_HDMI.SchDoc



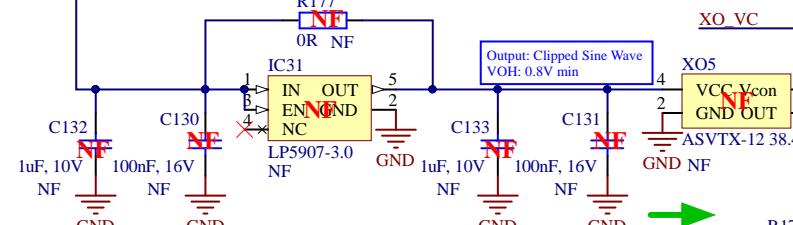
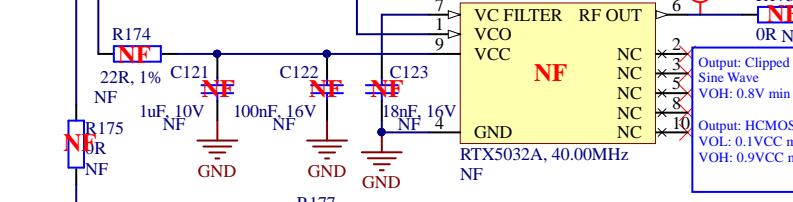
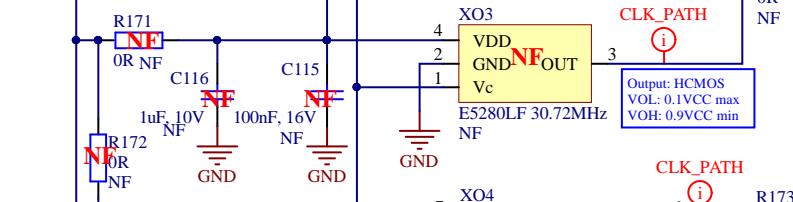
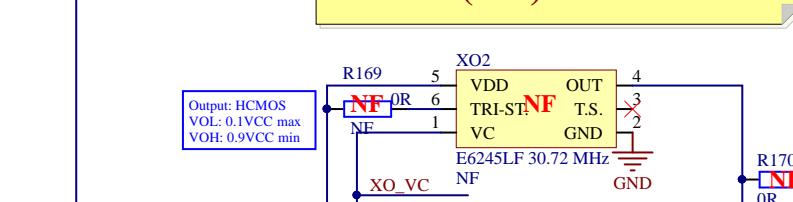
NF elements on sheet: XO2, R169, R170, R171, R172, C116, C115, XO3, R174, C121, C122, C123, XO4, R173, R175, R176, C132, C130, R177, IC31, C133, C131, XO5, R178, C143, R185, R190, C152, C153, R194, R196, R199, IC35, C159, C179
Number of NF elements on sheet: 35

RF_REF

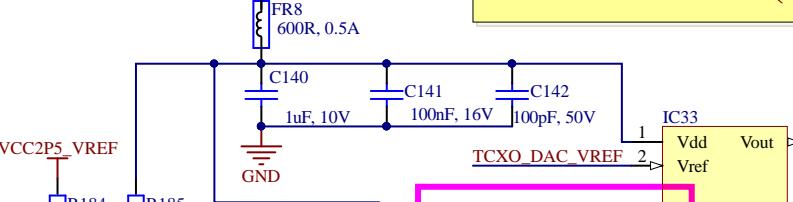
(VC)OCXO



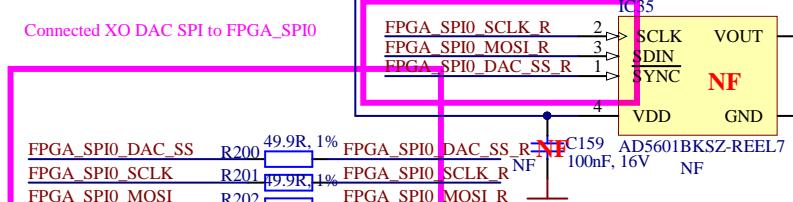
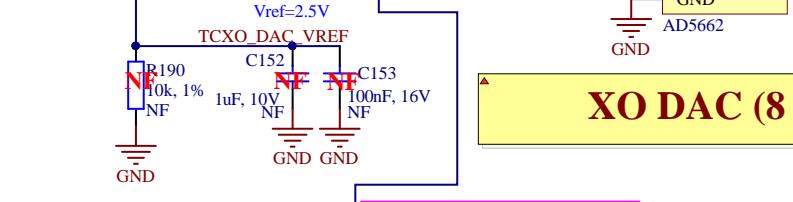
(VC)TCXO



XO VC DAC (16 bit)

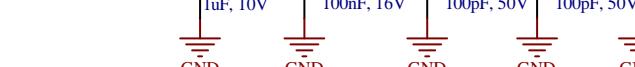
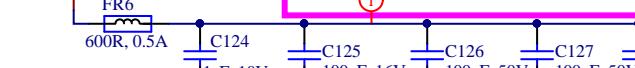
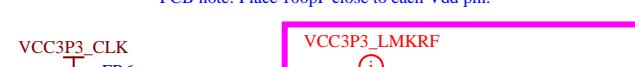
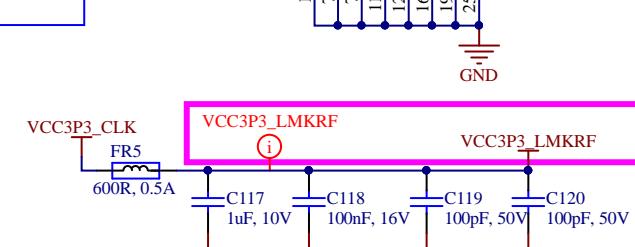
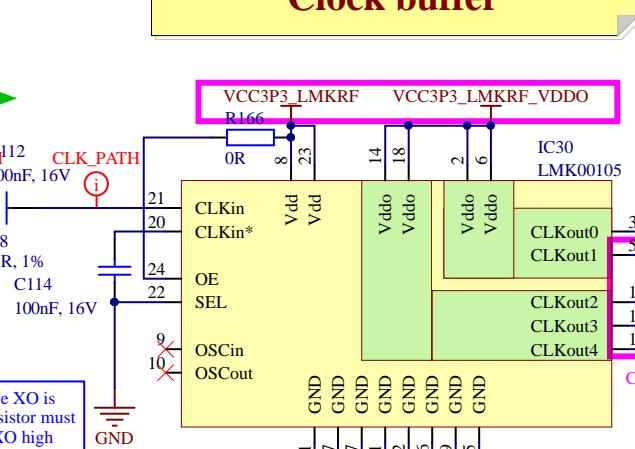


XO DAC (8 bit)

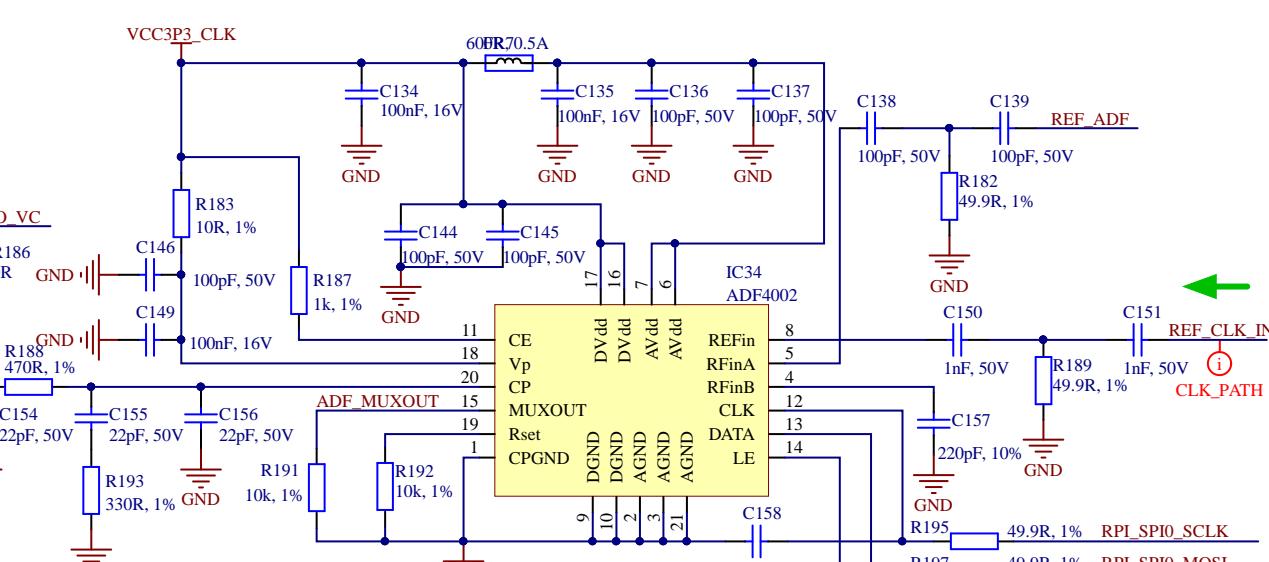


Clock 1 circuits

Clock buffer



Phase detector



Project name: LimePSB-RPCM_Iv3.PrjPcb

Title: Clock 1

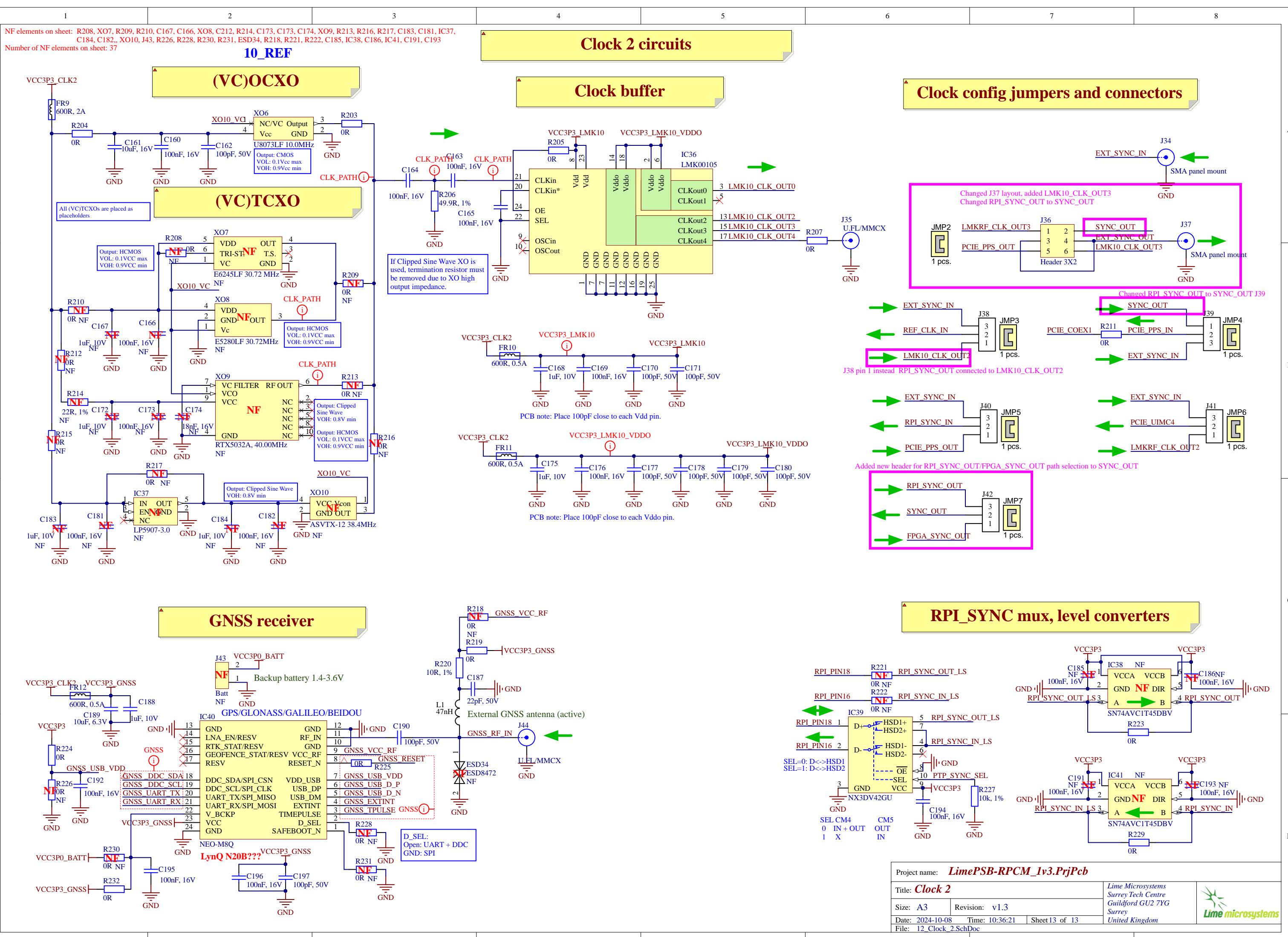
Size: A3 Revision: v1.3

Date: 2024-10-08 Time: 10:36:17 Sheet 10 of 13

File: 11_Clock_1.SchDoc

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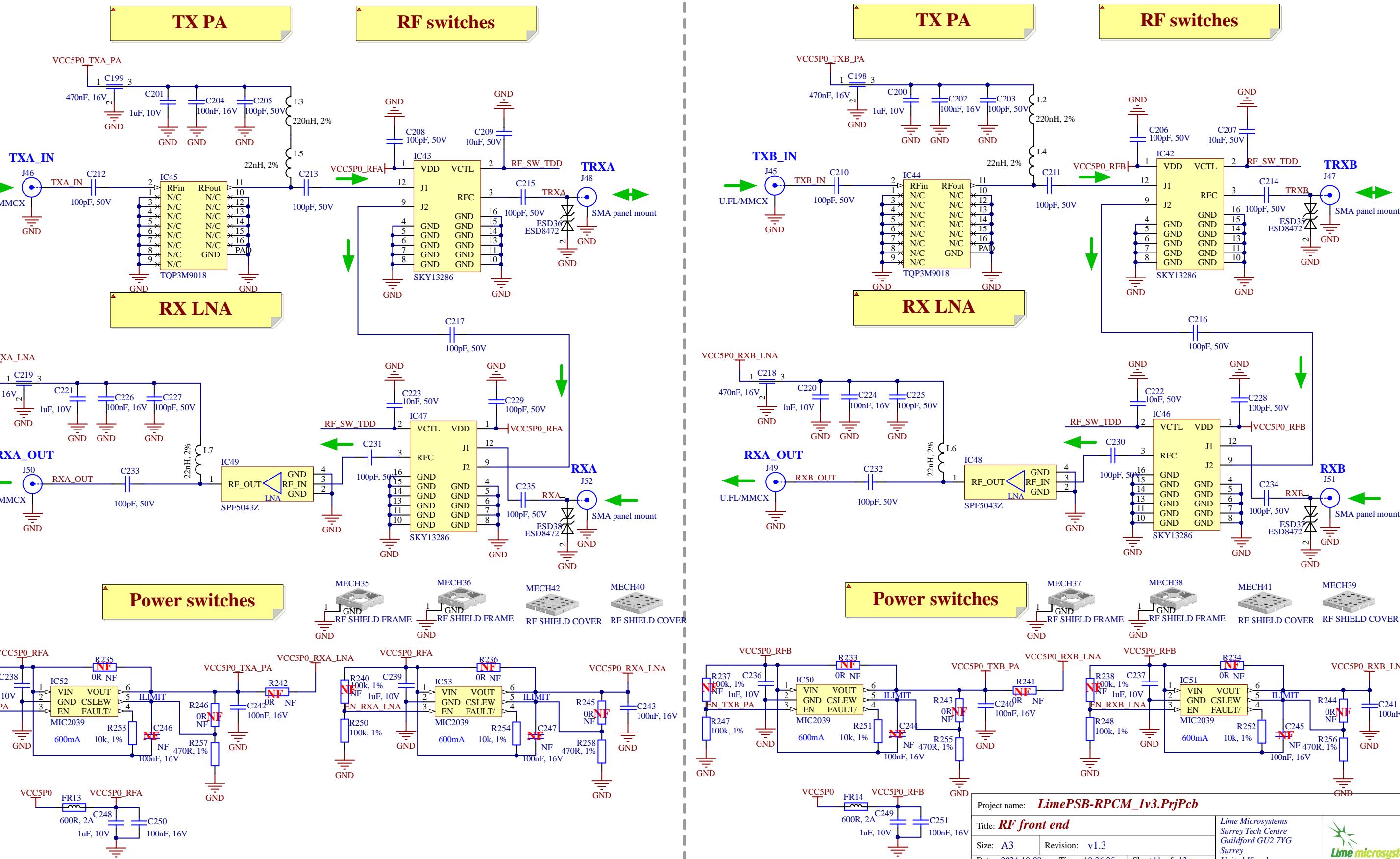
NF elements on sheet: R235, R239, R242, R246, C246, R240, R236, C247, R245, R237, R233, C244, R243, R241, R238, R234, C245, R244
Number of NF elements on sheet: 18

RF front end

Channel A

All RF switches are controlled together

Channel B



Project name: LimePSB-RPCM_Iv3.PnjPcb

Title: RF front end

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Size: A3

Revision: v1.3

Date: 2024-10-08 Time: 10:36:25 Sheet 11 of 13

File: 13_RFFE.SchDoc

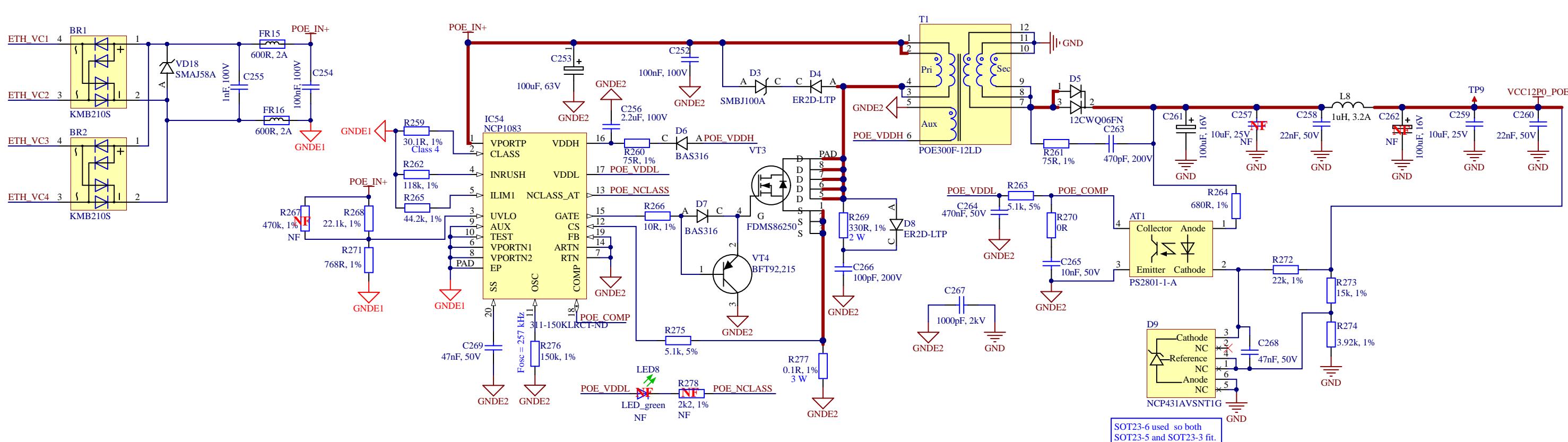


NF elements on sheet: R267, C257, C262, LED8, R278, LED9, R292, R293, R295, R291

Number of NF elements on sheet: 10

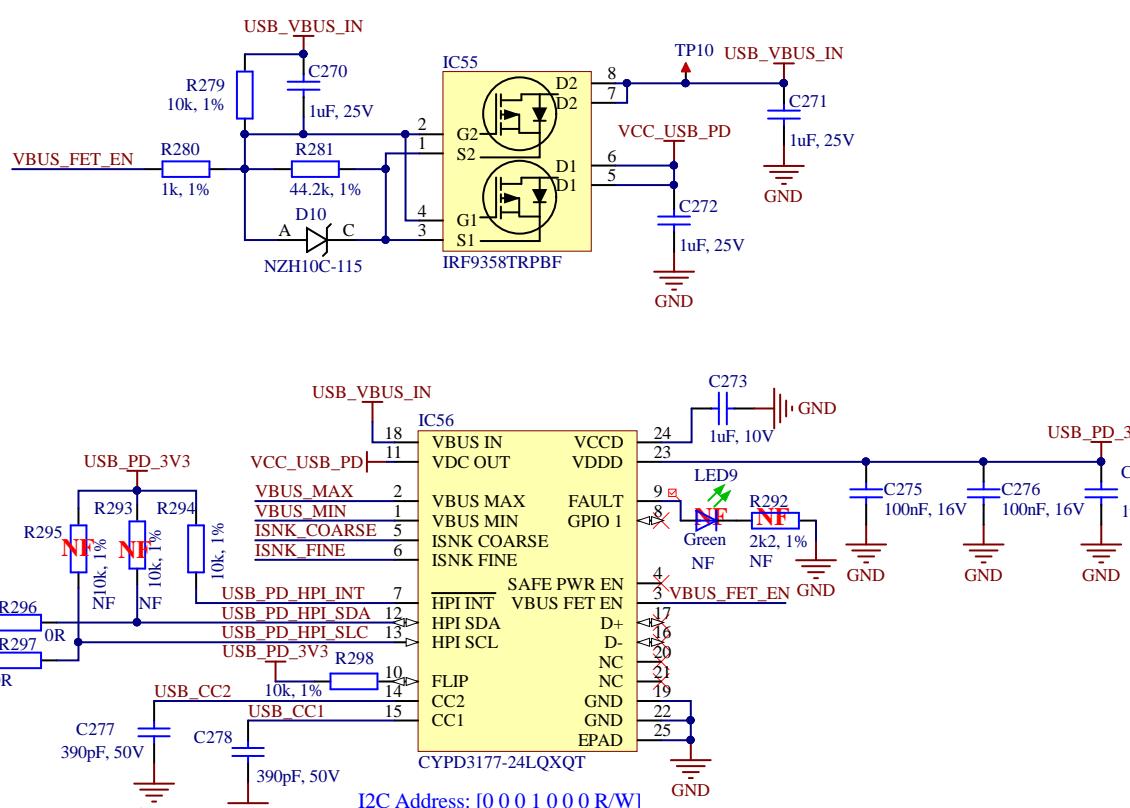
Power over Ethernet

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

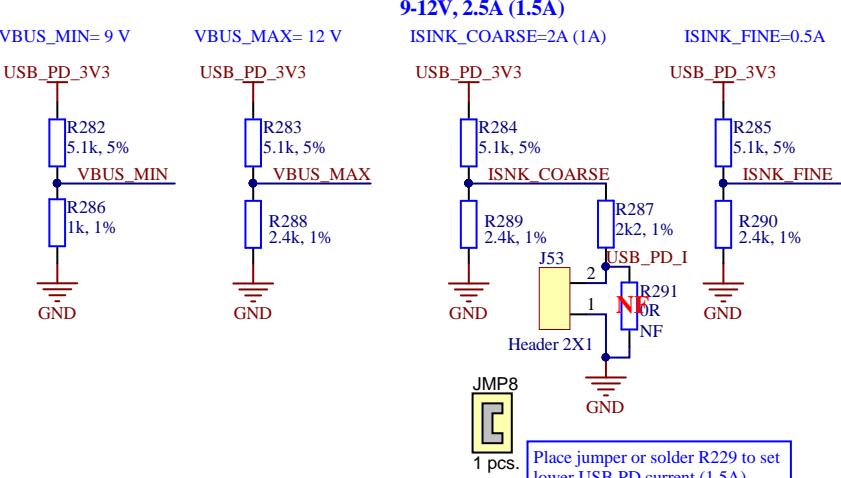


SOT23-6 used so both SOT23-5 and SOT23-3 fit.

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: 2024-10-08 Time: 10:36:30 Sheet 12 of 13

File: 14_PoE_USB_PD.SchDoc

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