

Block diagram

A

A

B

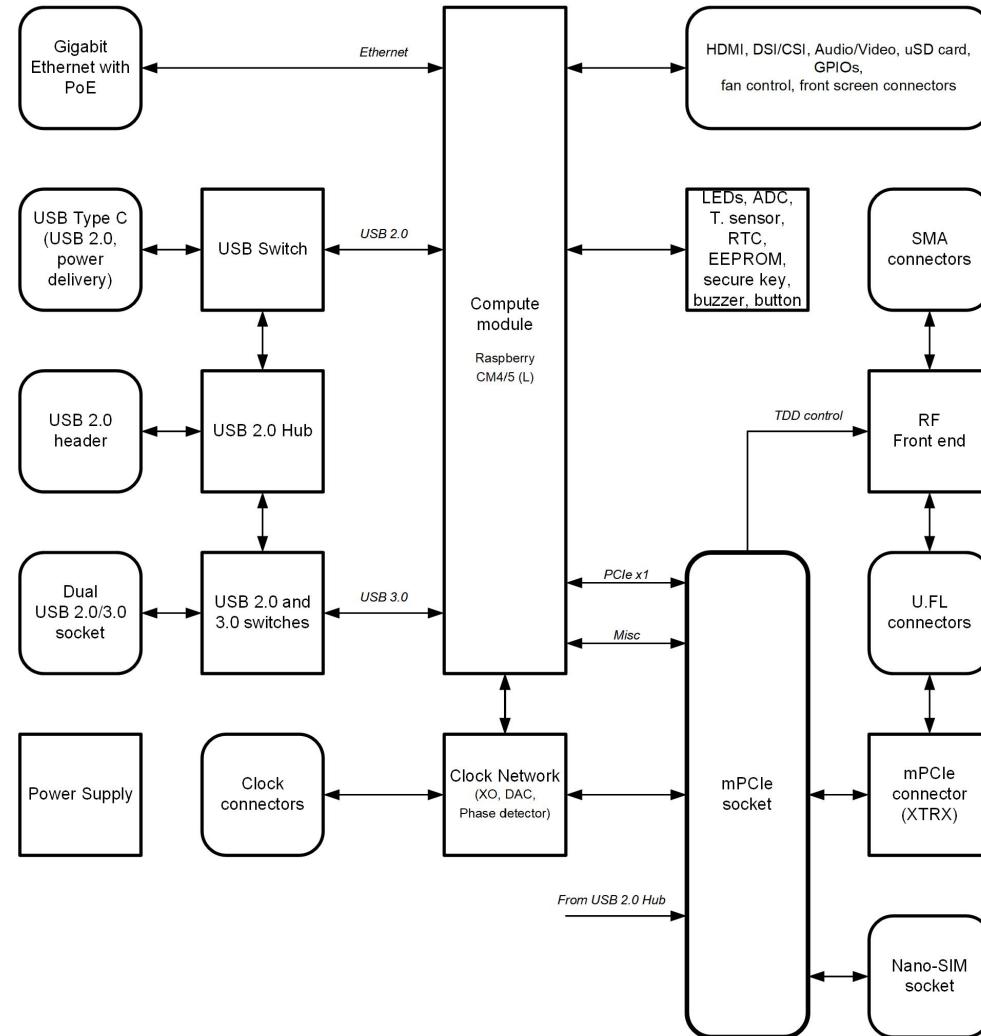
B

C

C

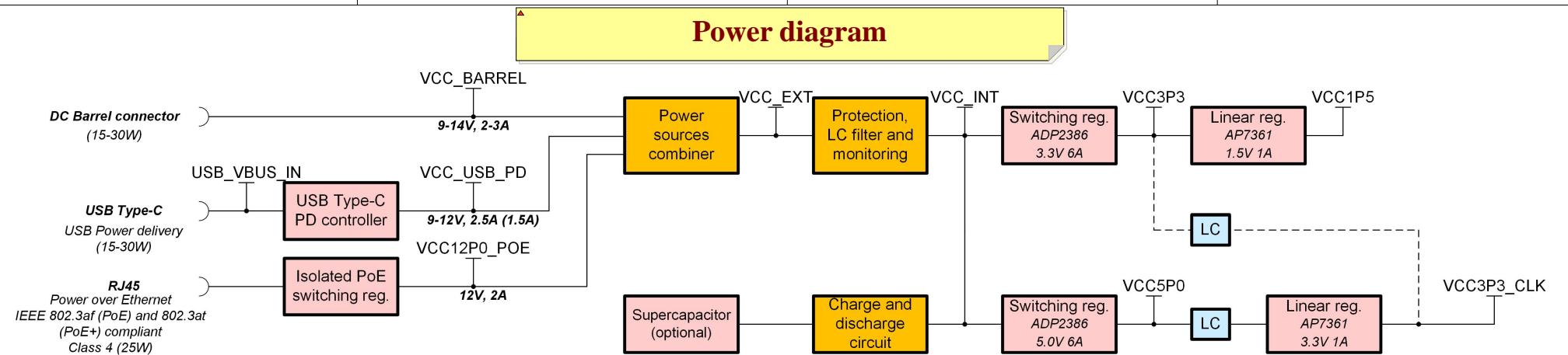
D

D

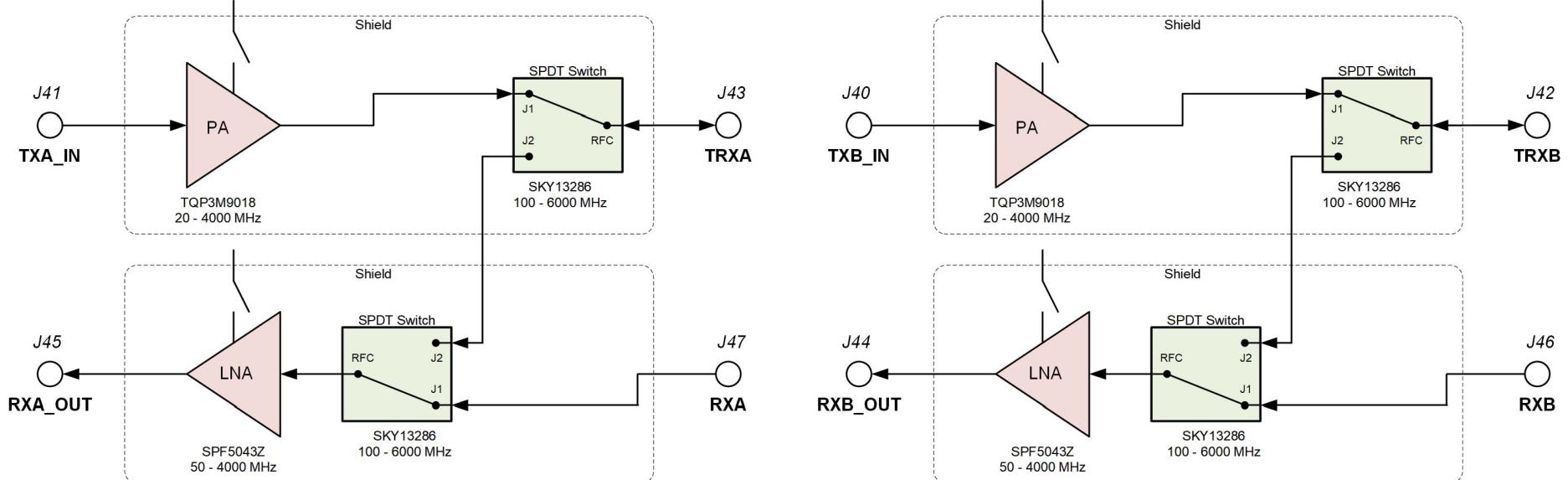
Project name: **LimePSB-RPCM_Iv2.PrbPcb**Title: **Block diagram**Size: **A4** Revision: **v1.2**Date: **2024-10-29** Time: **16:06:41** Sheet **1** of **13**File: **01_Block_diag.SchDoc**

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





RF Front End diagram



* All RF switches are controlled by the same signal RF_SW_TDD

Project name: **LimePSB-RPCM_1v2.PrbPcb**

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

Size: **A4** Revision: **v1.2**

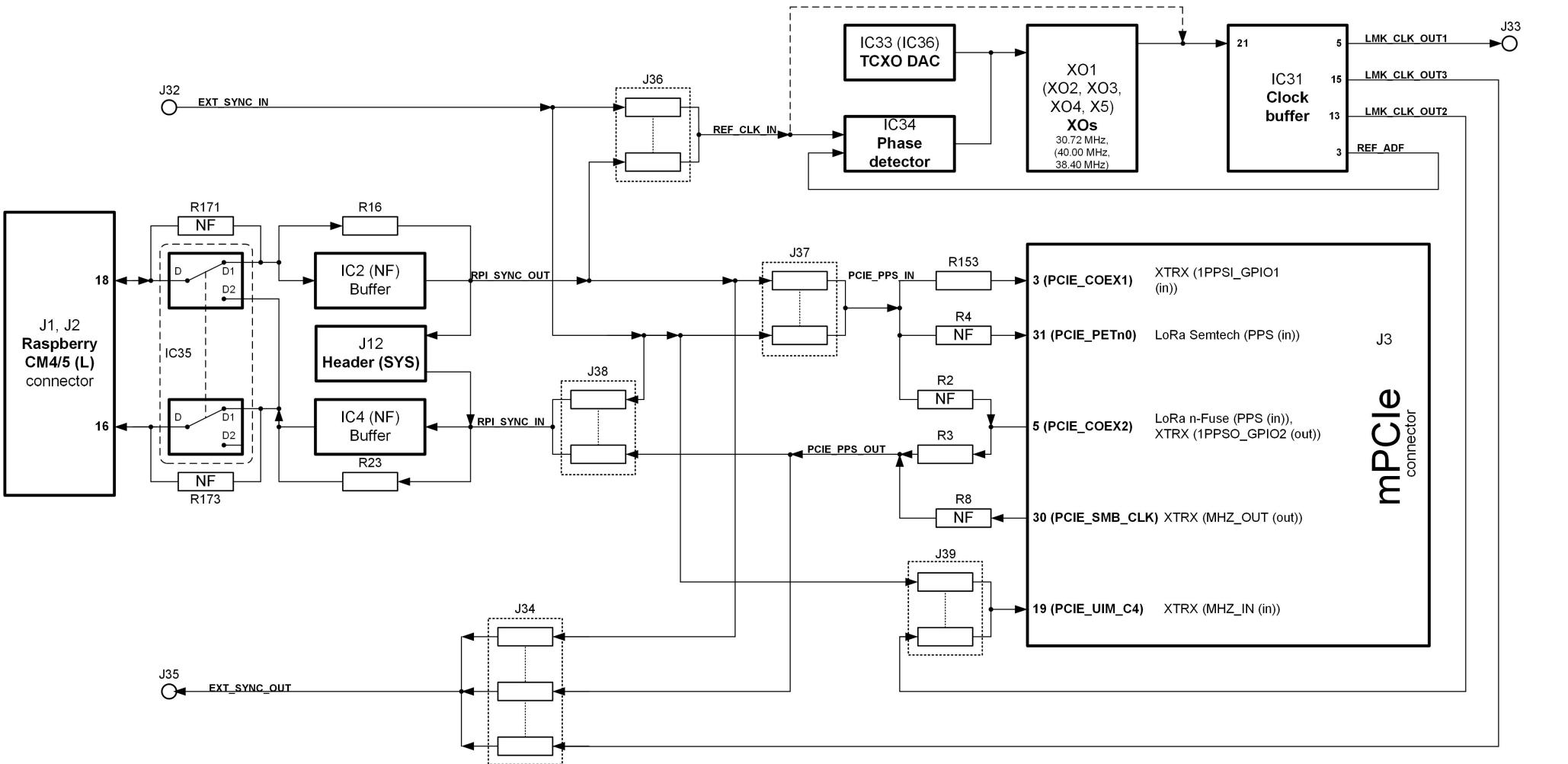
Date: **2024-10-29** Time: **16:06:42** Sheet **2** of **13**

File: **02_Power_RFFE_diag.SchDoc**

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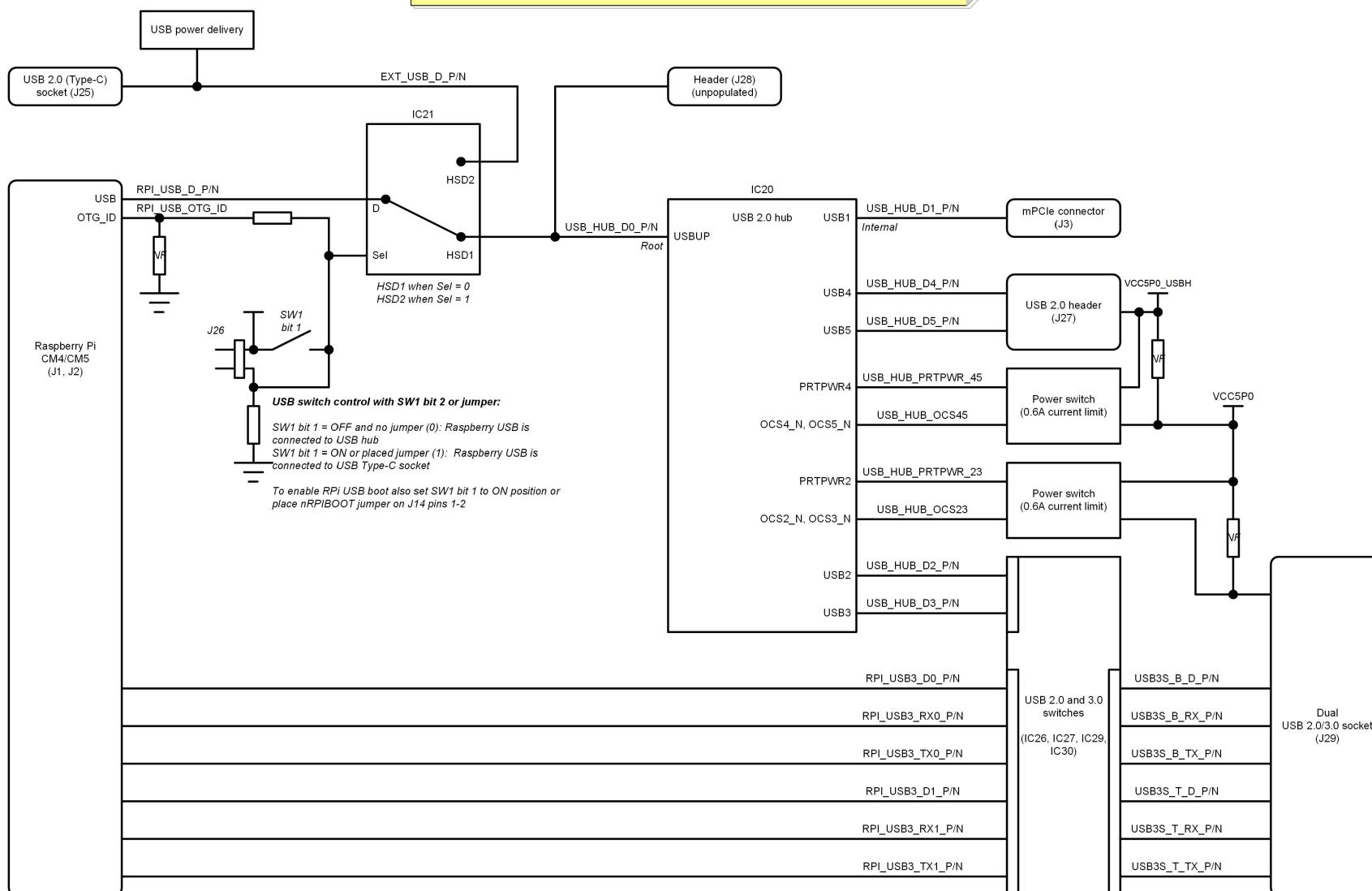
Clock diagram



Project name: **LimePSB-RPCM_1v2.PrjPcb**

Title: Clock diagram		<i>Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom</i>	 Lime microsystems
Size: A4	Revision: v1.2		
Date: 2024-10-29	Time: 16:06:45	Sheet3	of 13
File: 03_Clock_diag.SchDoc			

USB diagram



Project name: **LimePSB-RPCM_Iv2.PrjPcb**

Title: **USB diagram**

Size: **A4** Revision: **v1.2**

Date: **2024-10-29** Time: **16:06:48** Sheet **4** of **13**

File: **04_USB_diag.SchDoc**

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Surrey
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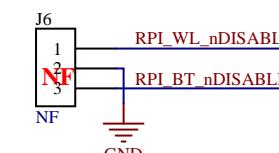
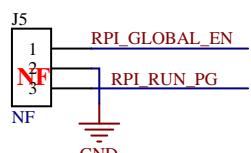
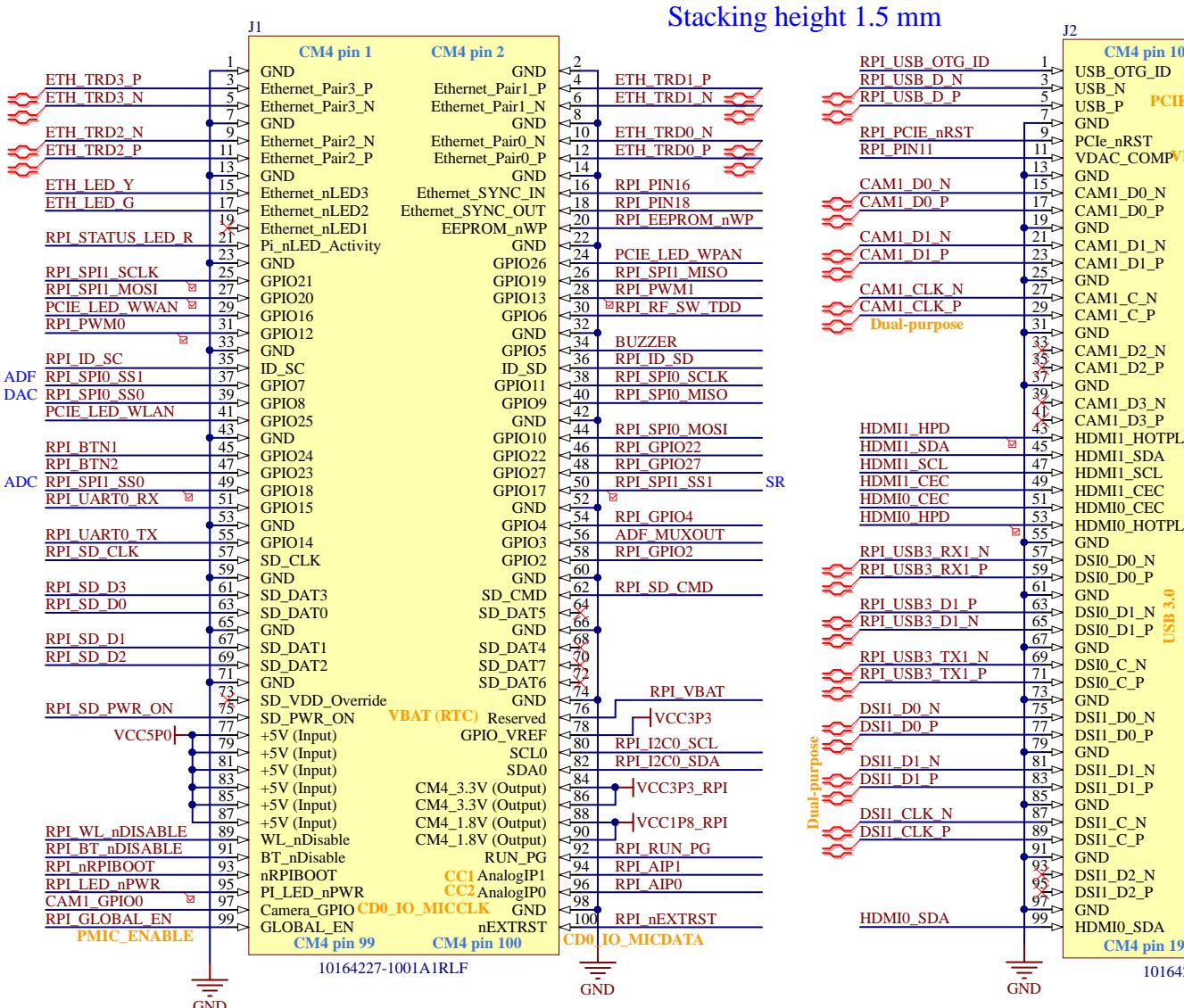


NF elements on sheet: R1, R2, R4, R6, C6, C7, C8, R8, R9, R10, R11, J5, J6
Number of NF elements on sheet: 13

Raspberry Pi CM4/5(L) and mPCIe

mPCIe x1

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



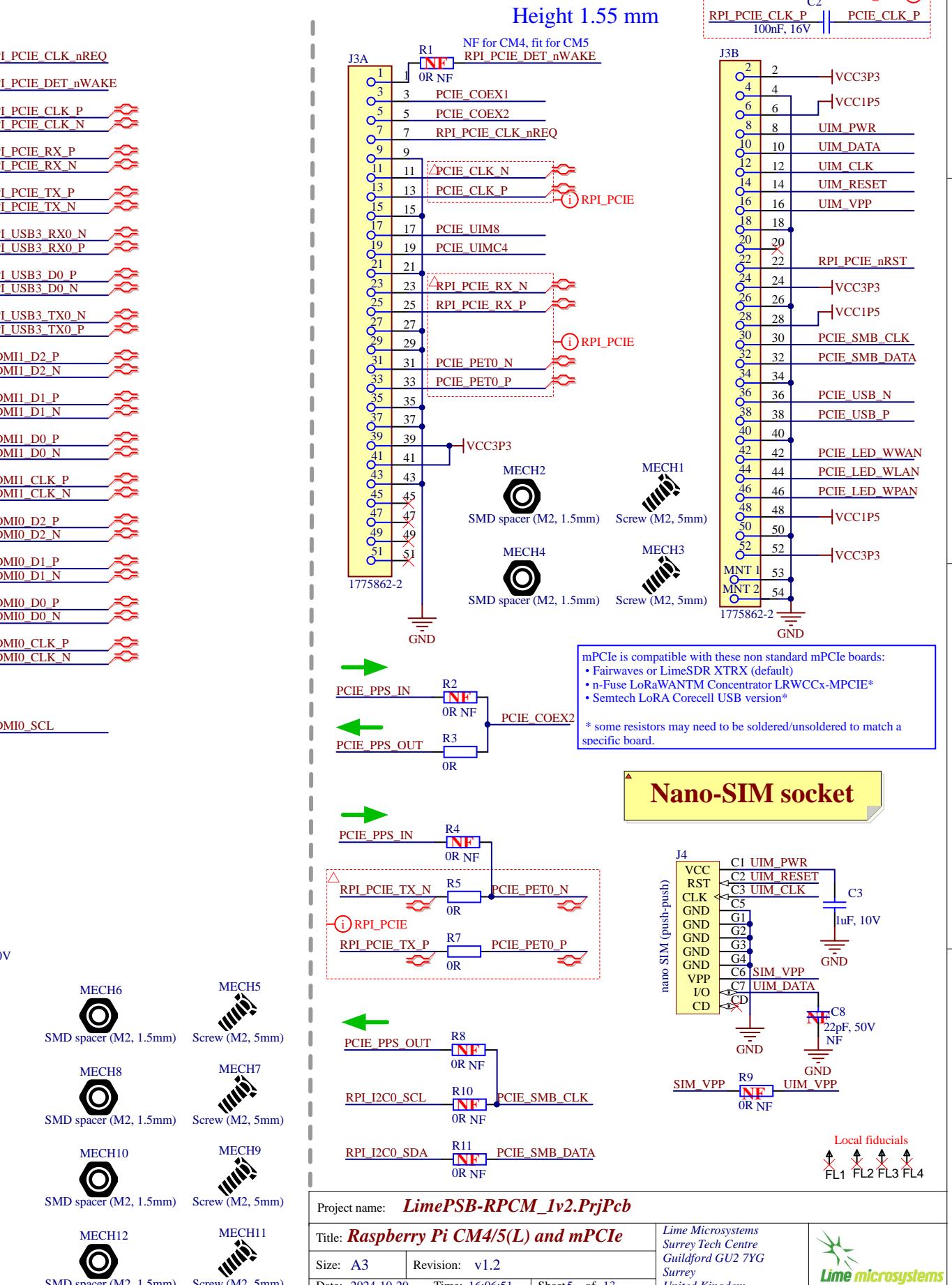
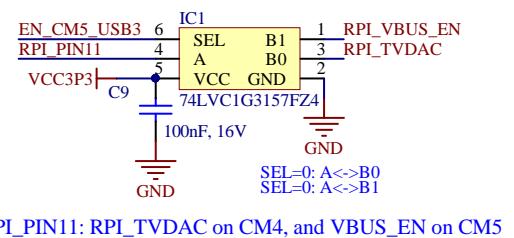
GLOBAL_EN: Drive low to power off CM4.
Internally pulled up with a 100k to +5V.

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.

BT_nDisable: Can be left floating if driven low the Bluetooth interface will be disabled. Internally pulled up via 1.8k to CM4/5 3.3V.

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.



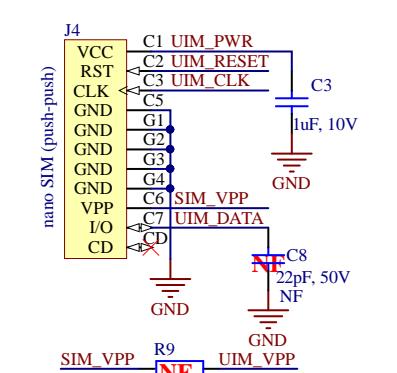
mPCIe is compatible with these non standard mPCIe boards:

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

OEX2

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

Nano-SIM socket



Project name: **LimePSB-RPCM 1v2.PrjPcb**

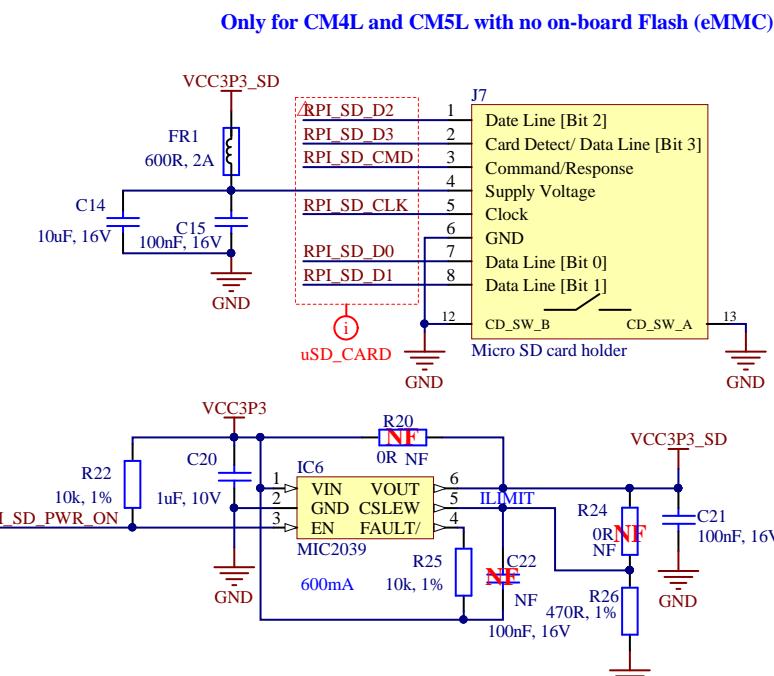
Title: Raspberry Pi CM4/5(L) and mPCIe		Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom	 Lime microsystems
Size: A3	Revision: v1.2		
Date: 2024-10-29	Time: 16:06:51	Sheet 5 of 13	
File: 05_RPi_mPCIe SchDoc			

NF elements on sheet: C10, C11, IC2, C16, IC4, C18, R17, R15, R20, R21, R24, C22, R28, R32, J11, J13, J17

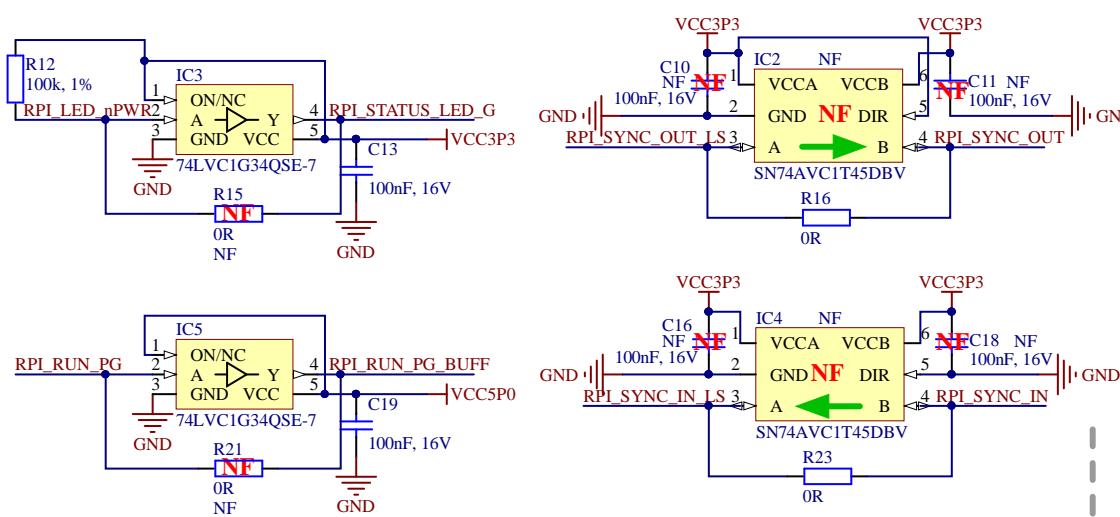
Number of NF elements on sheet: 17

Misc 1

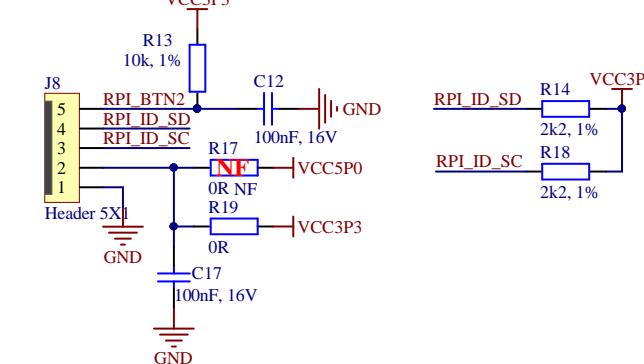
uSD card socket



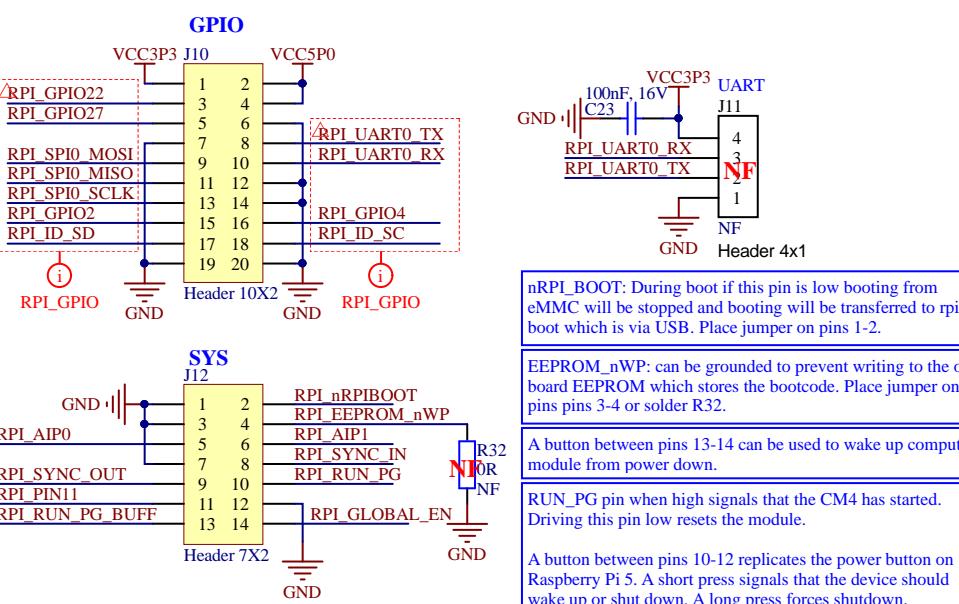
Buffers, level converters



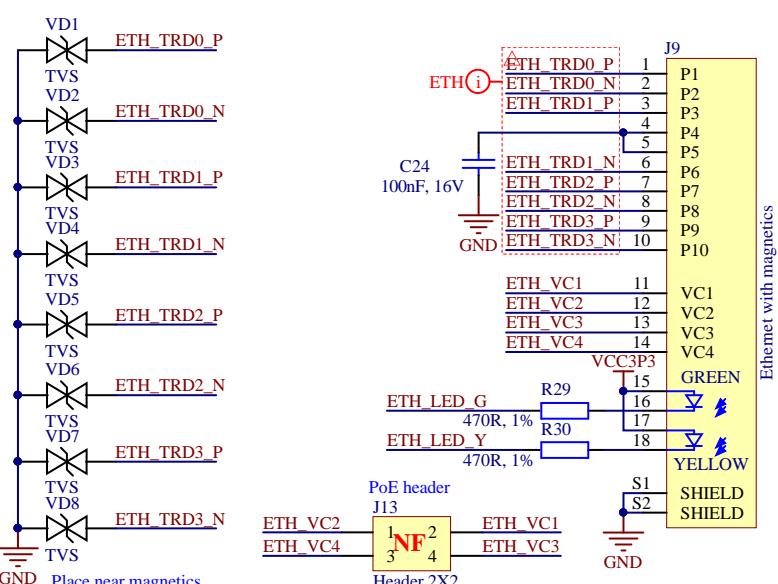
Front screen I2C + BTN



GPIO ans SYS headers

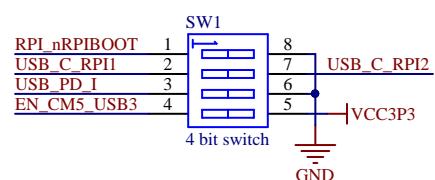


Gigabit Ethernet (RJ45) connector



Ethernet with magnetics

DIP switch



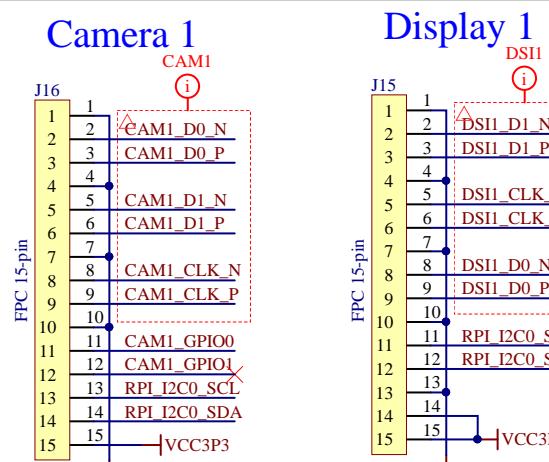
Bit 1: RPi boot source:
OFF: RPi boots from eMMC/uSD (default).
ON: Booting from eMMC will be stopped and booting will be transferred to RPi boot which is via USB.

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.

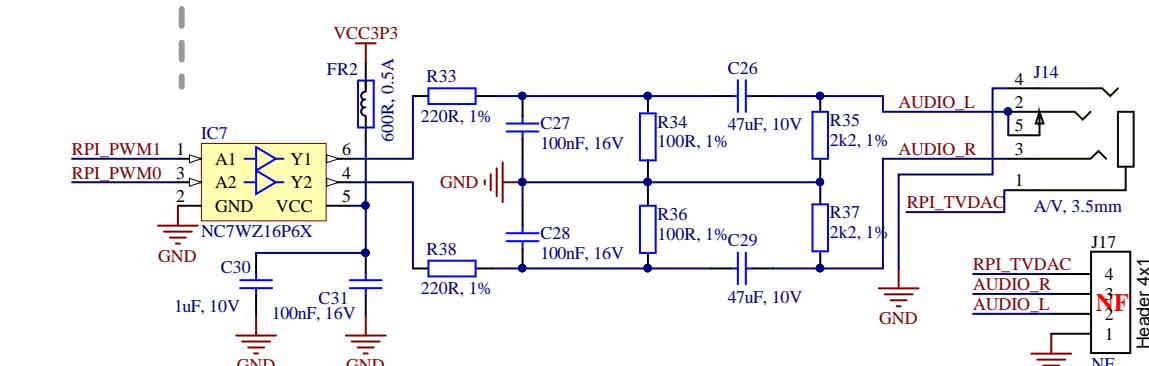
Bit 4: Dual USB socket source:
OFF: connected to USB 2.0 hub (for CM4).
ON: connected to CM5 USB3.0 lines (for CM5).

LVDS (Camera + Display)



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

Display 1



Project name: LimePSB-RPCM_Iv2.PrjPcb

Title: Misc 1

Size: A3 Revision: v1.2

Date: 2024-10-29 Time: 16:06:56 Sheet 6 of 13

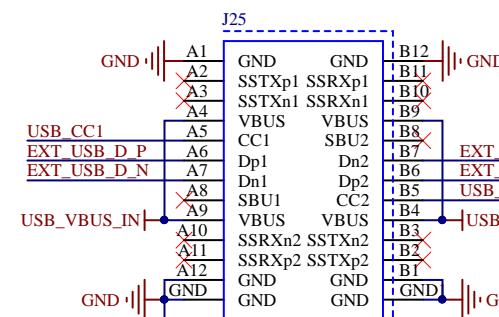
File: 06_Misc_1.SchDoc



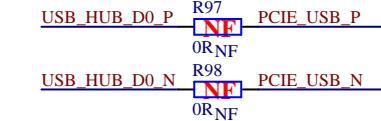
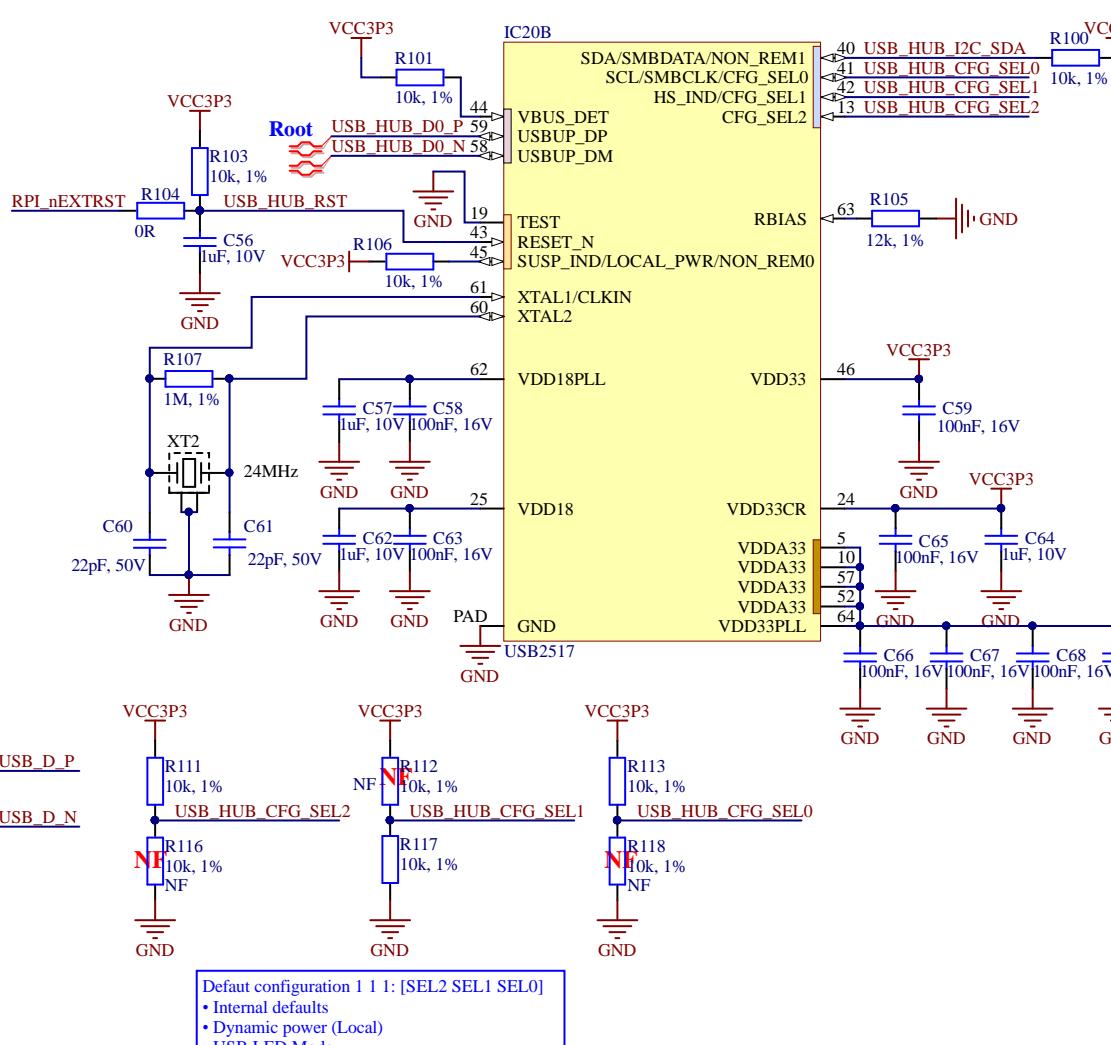
NF elements on sheet: R97, R98, VD9, R108, R109, R114, R116, J26, JMP1, R121, R122, R112, R118, IC22, IC23, J28, R125, R126, R128, C78

Number of NF elements on sheet: 20

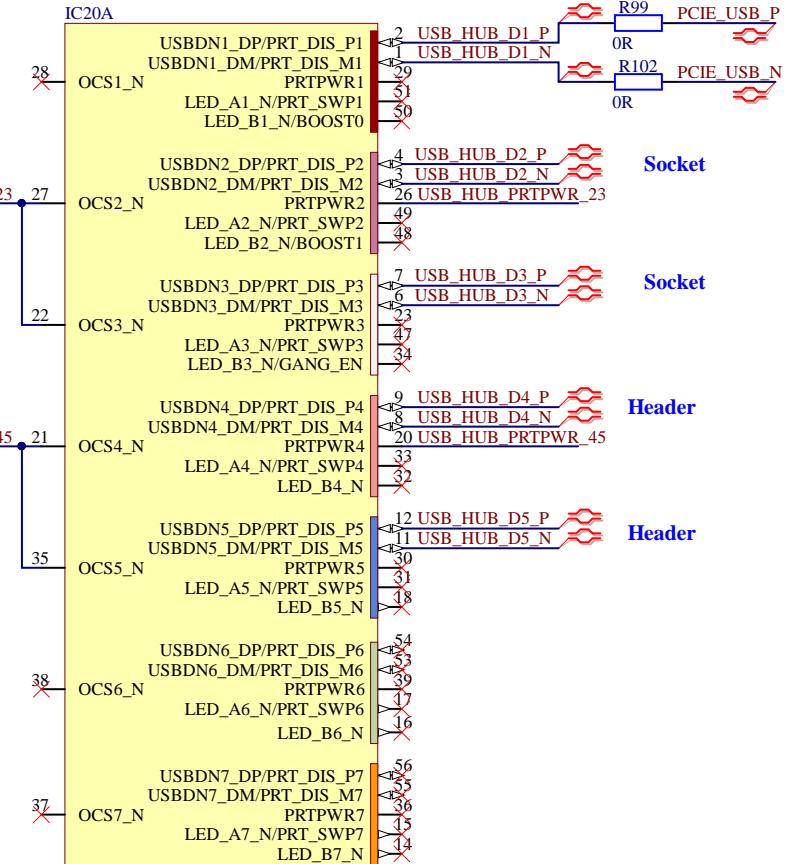
USB C socket



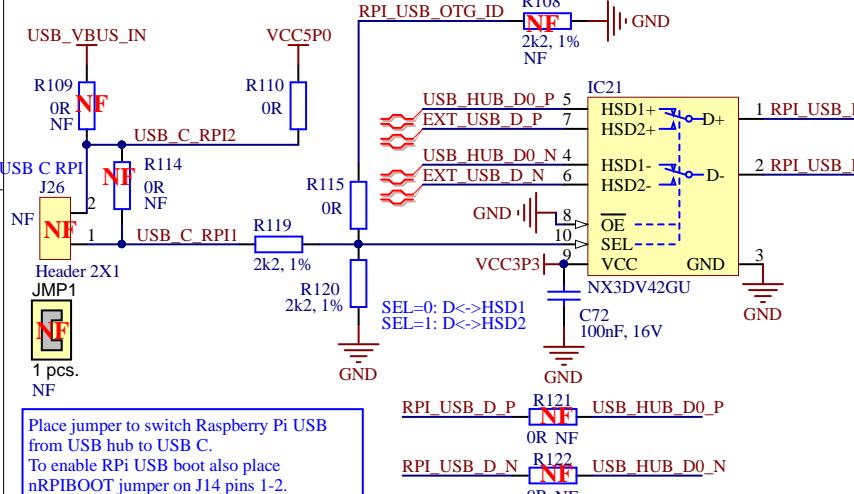
USB 2.0 HUB



Internal (mPCIe)

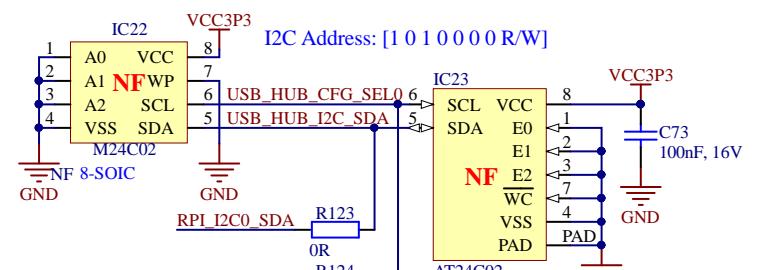
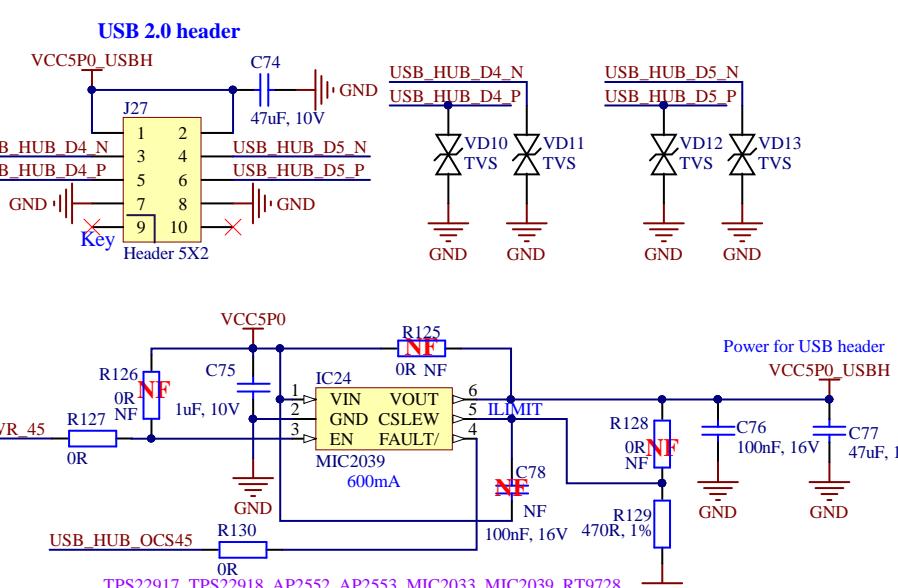


USB switch

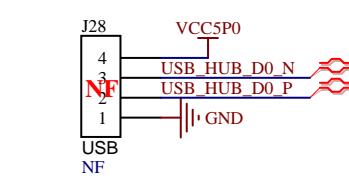


PCB note: USB differential pair impedance is 90Ω

USB 2.0 header



USB2.0 hub upstream



Project name: LimePSB-RPCM_Iv2.PjPcb

Title: **USB 2.0 hub**

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Size: **A3** Revision: **v1.2**

Date: 2024-10-29 Time: 16:07:00 Sheet 8 of 13

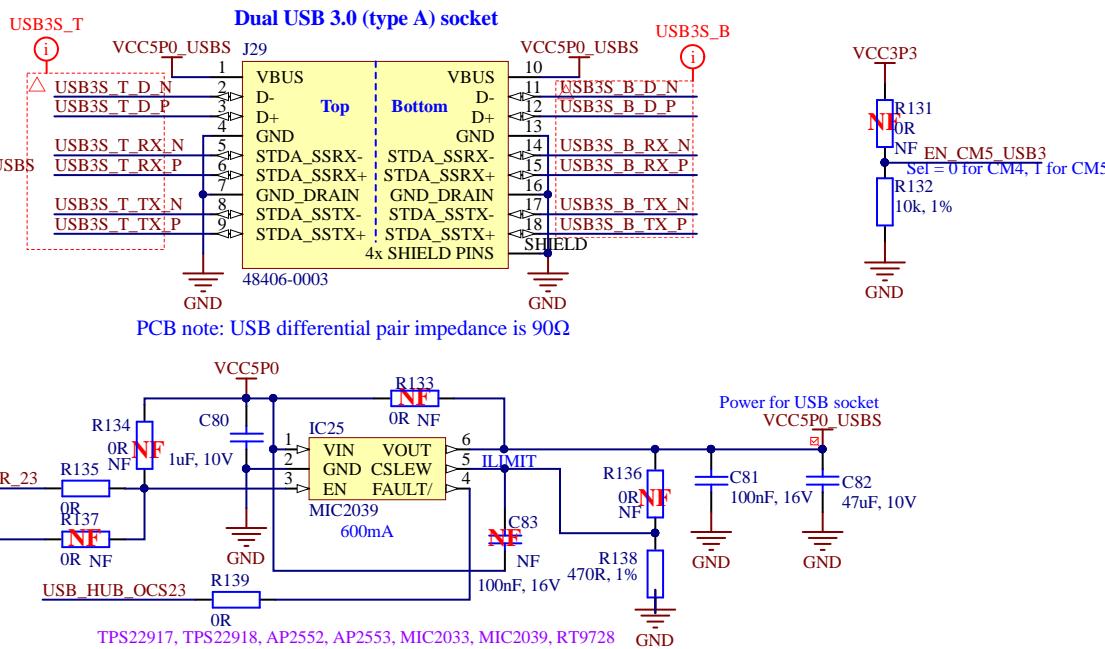
File: 08_USB_hub.SchDoc



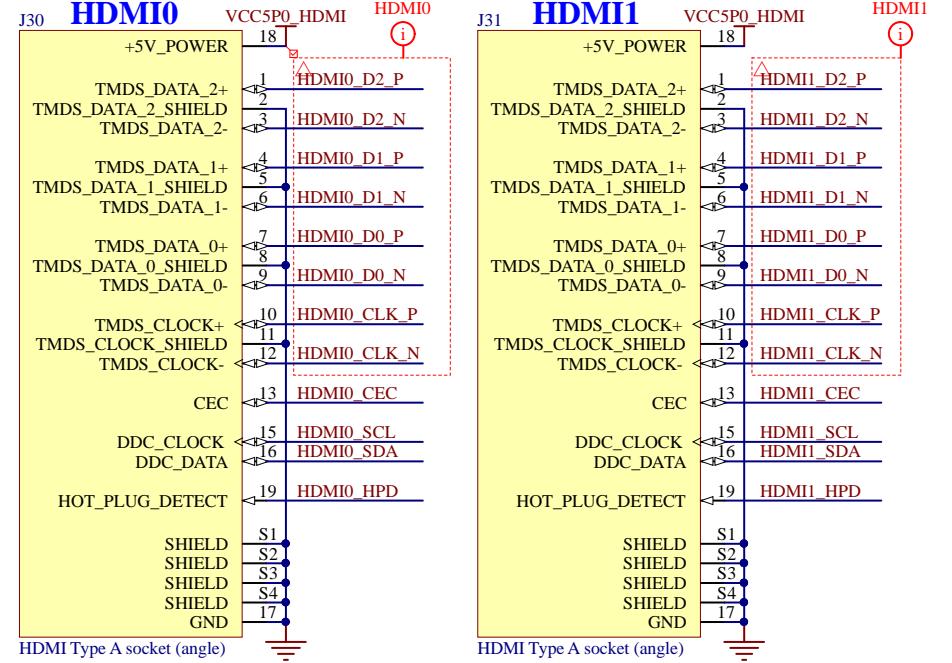
NF elements on sheet: R131, R133, R134, R136, R137, C83, R140, R142, C88
Number of NF elements on sheet: 9

USB and HDMI sockets

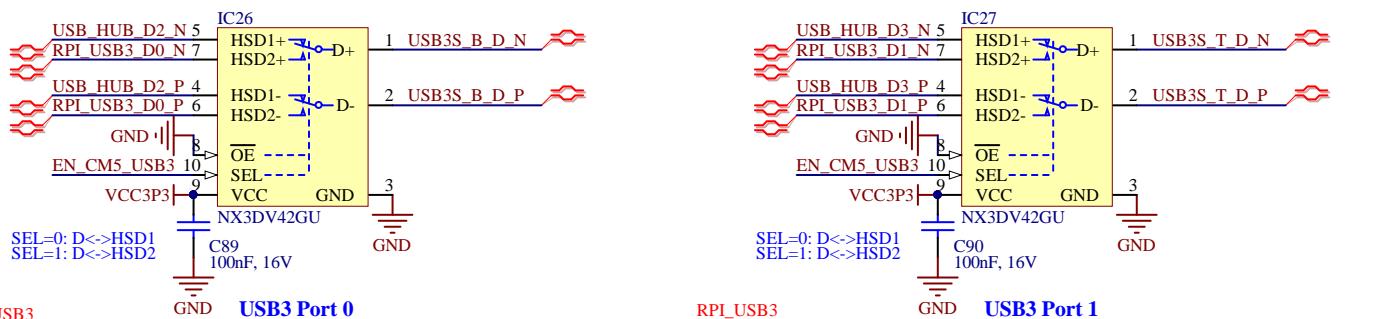
Dual USB 3.0 (type A) socket



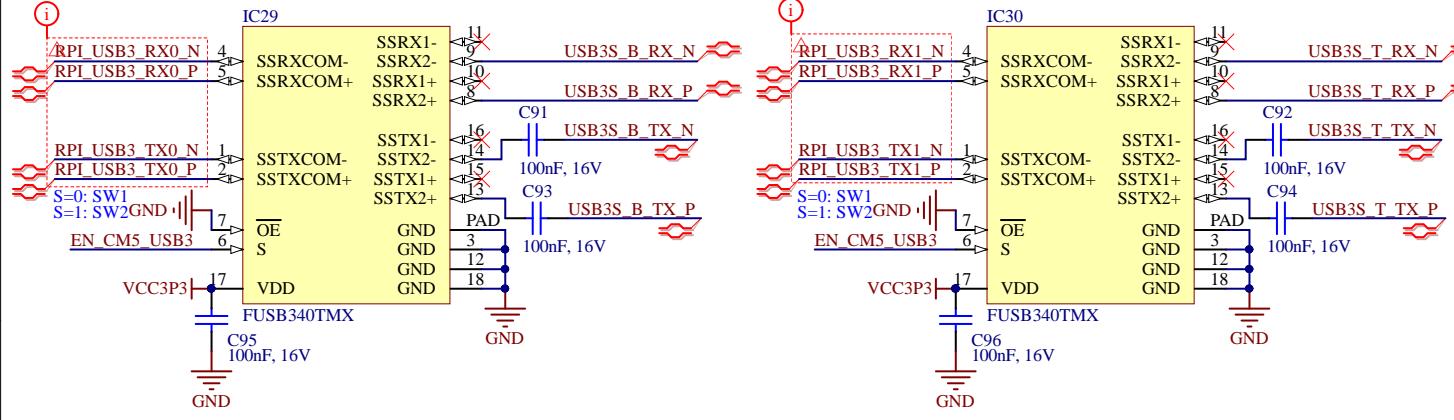
HDMI sockets



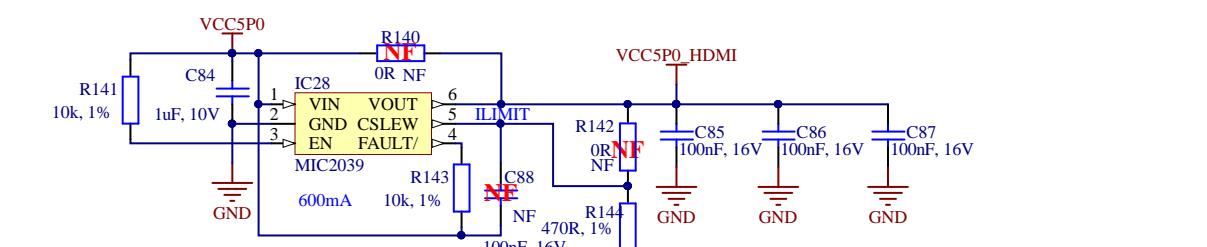
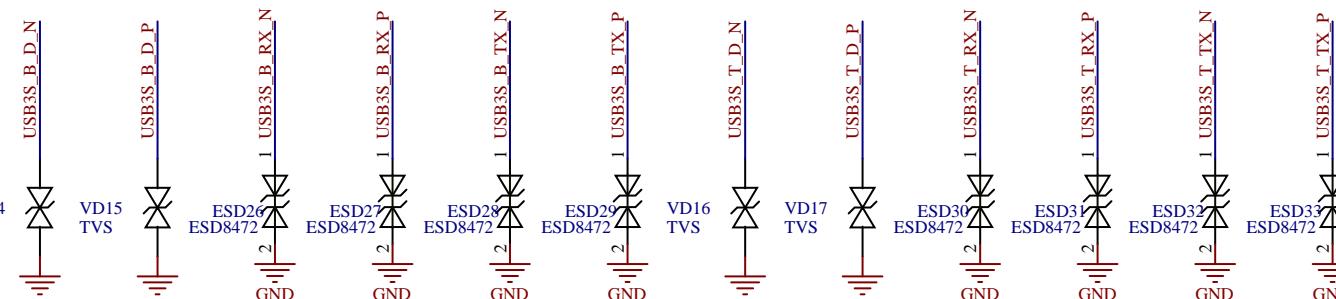
USB 2.0 and 3.0 switches



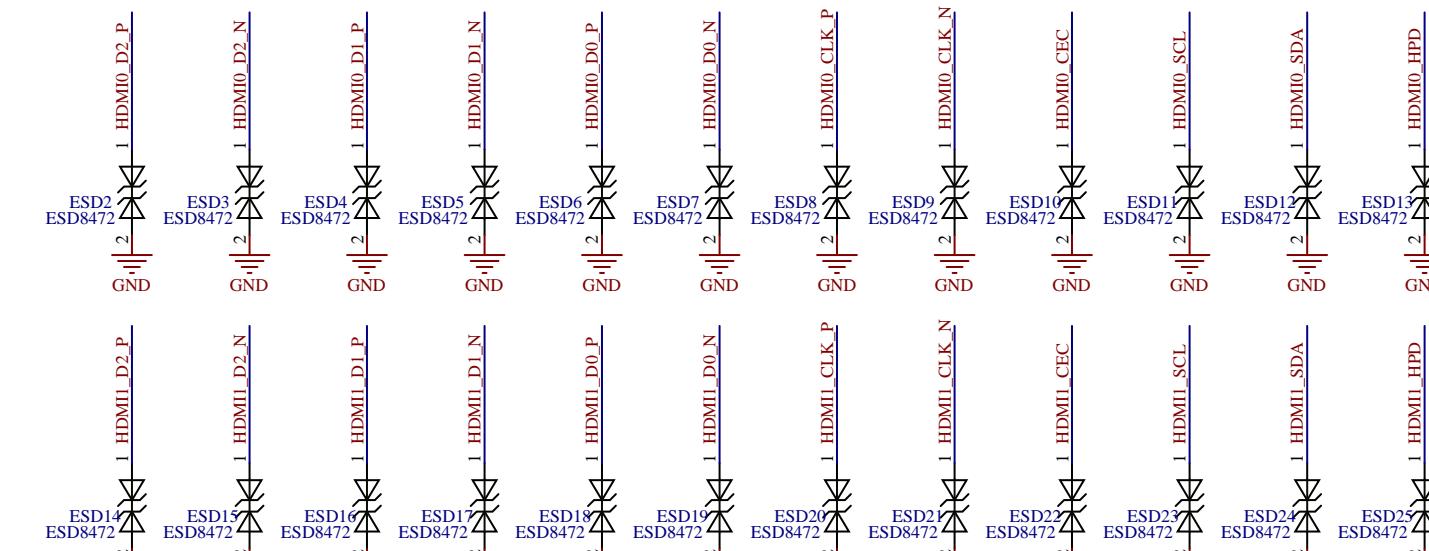
RPI_USB3 **USB3 Port 0**



ESD protection



ESD protection for CM5



Project name: **LimePSB-RPCM_Iv2.PrcPcb**

Title: **USB and HDMI sockets**

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Surrey
United Kingdom

Size: **A3** Revision: **v1.2**

Date: 2024-10-29 Time: 16:07:02 Sheet 9 of 13

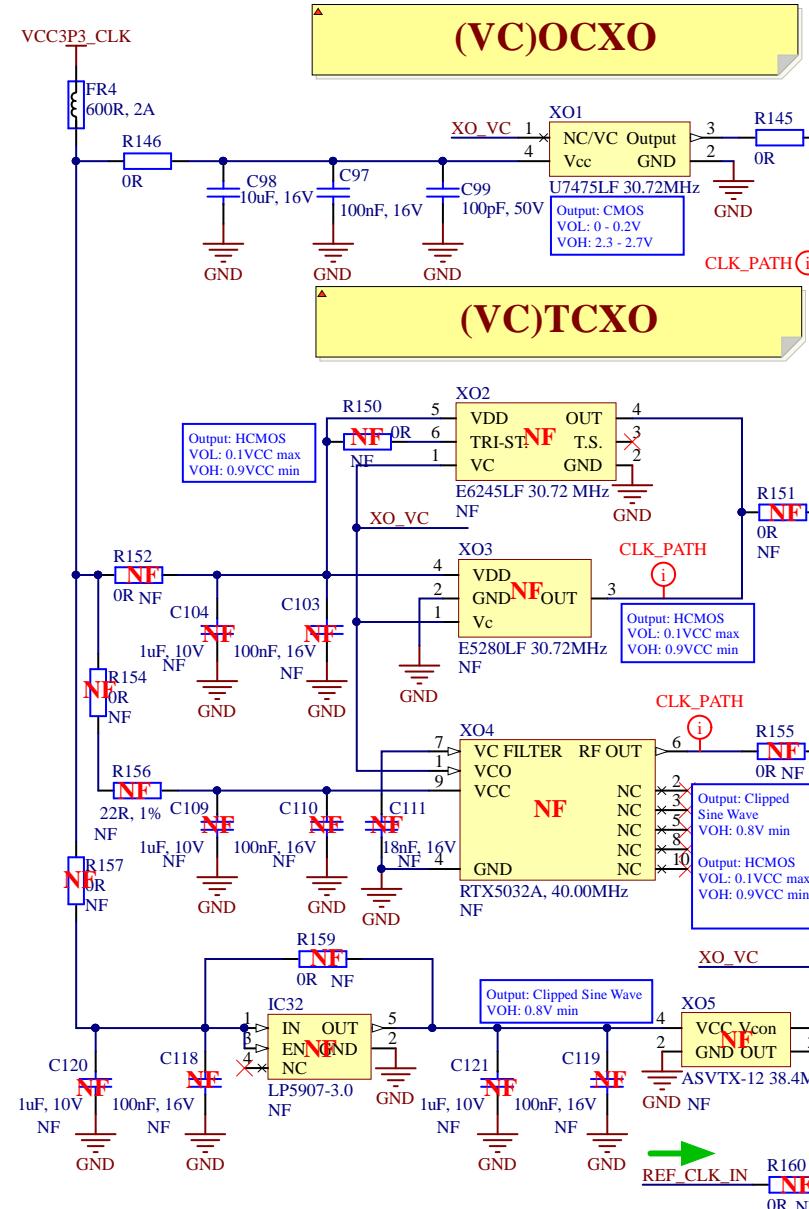
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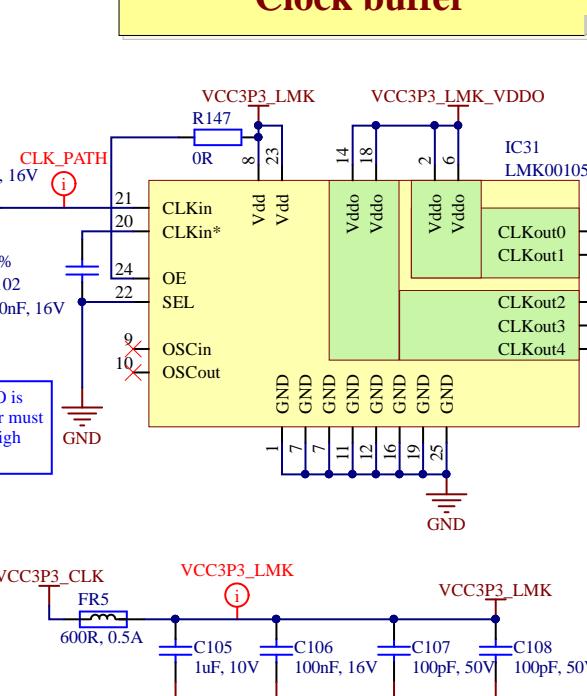
NF elements on sheet: R150, X02, R151, R152, X03, C104, C103, R154, R155, R156, C109, C110, C111, X04, R157, R158, R159, C120, C118, IC32, C121, C119, X05, C160, C131, R166, R172, C139, C140, R177, R179, R182, IC36, C146, R171, R173
Number of NF elements on sheet: 36

Number of NF elements on sheet: 36

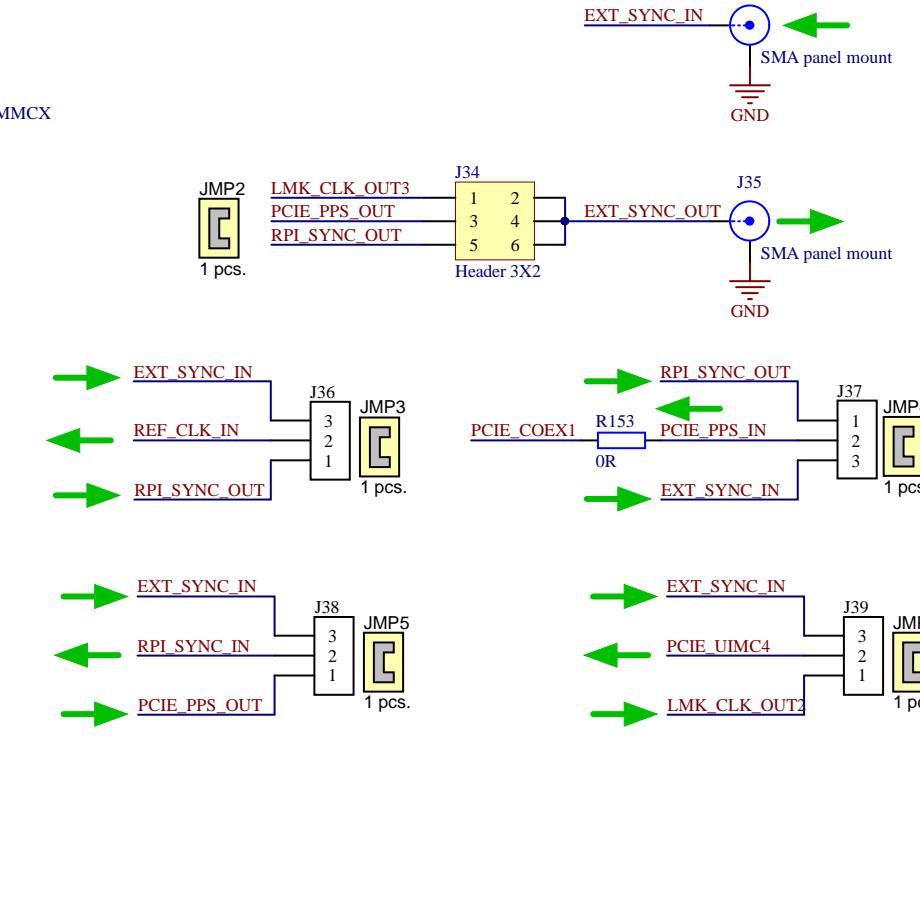
Clock circuits



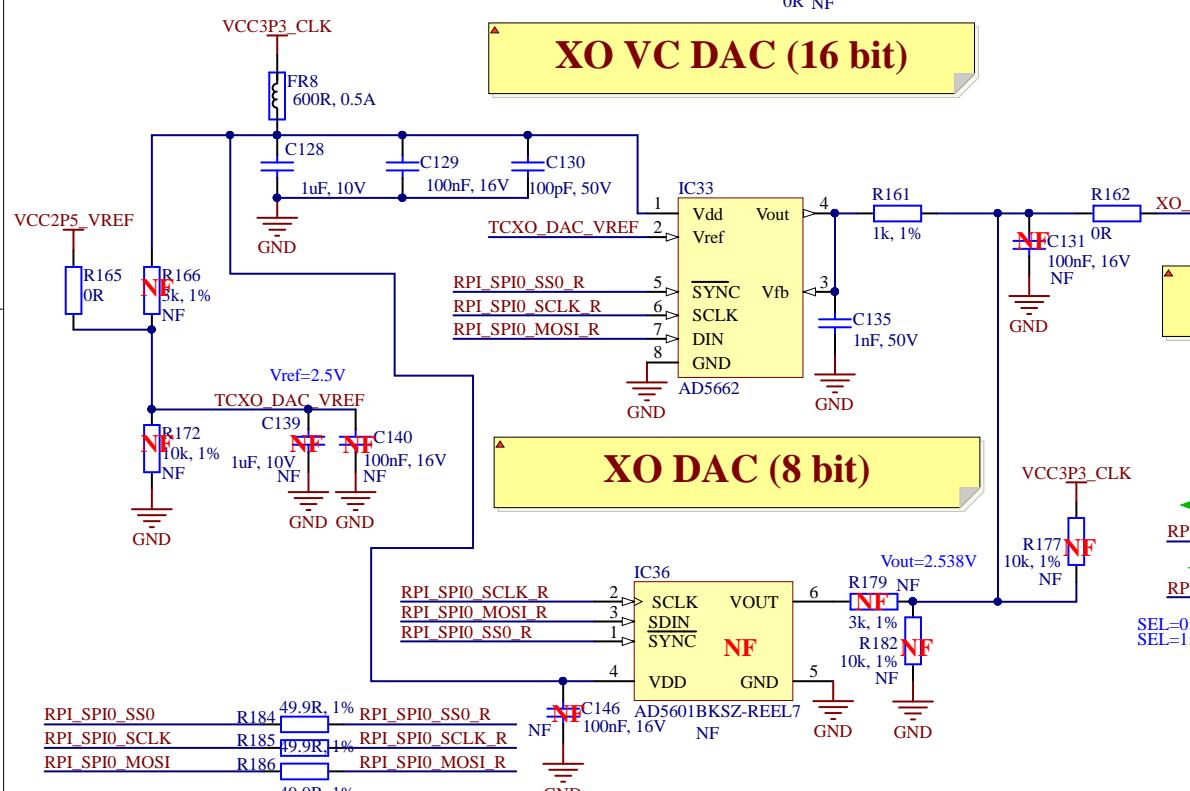
Clock buffer



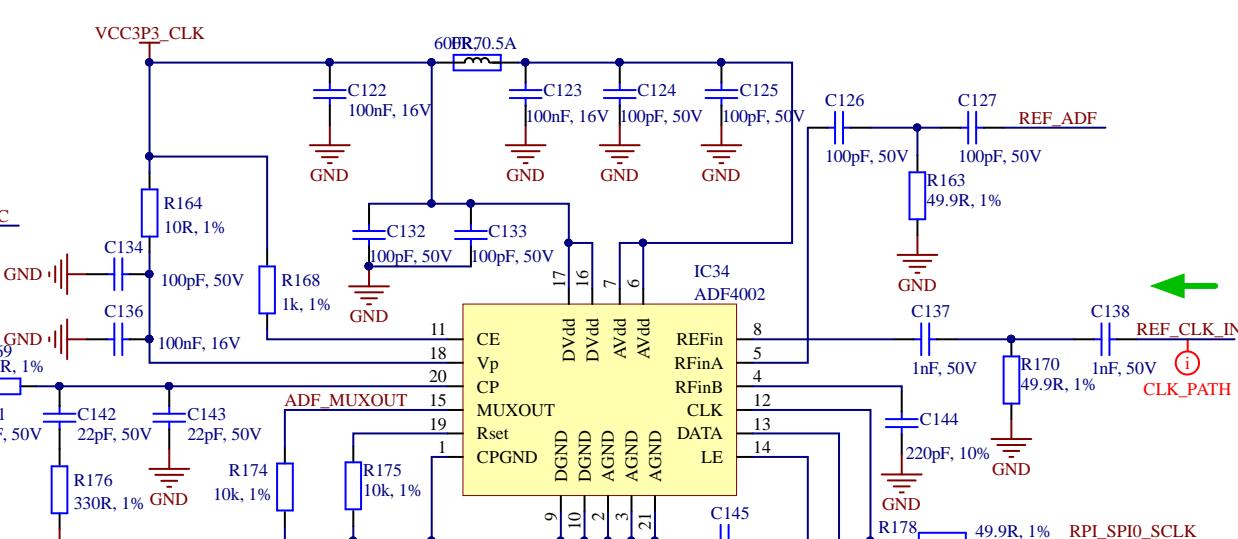
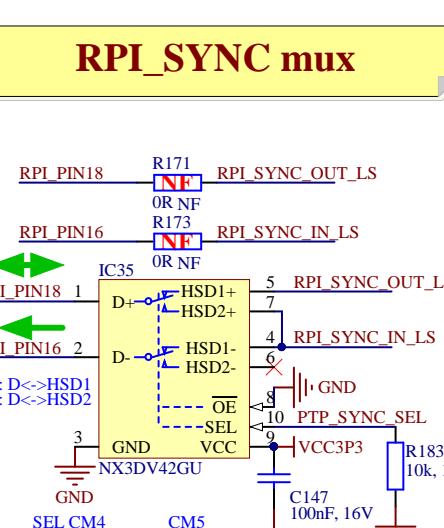
Clock config jumpers and connectors



Phase detector



RPI SYNC mix



Project name: LimePSB-RPCM Lv2 PriPch

Project name: **LimeSDR CM_1V2A1430**

Title: Clock		<i>Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom</i>	
Size: A3	Revision: v1.2		
Date: 2024-10-29	Time: 16:07:05	Sheet 10 of 13	
File: 10_Clock_SchDoc			

 Lime **microsystems**

NF elements on sheet: R189, R193, R196, R200, C196, R190, R194, R199, C197, R187, R191, R195, R197, C194, R188, R192, R198, C195

Number of NF elements on sheet: 18

RF front end

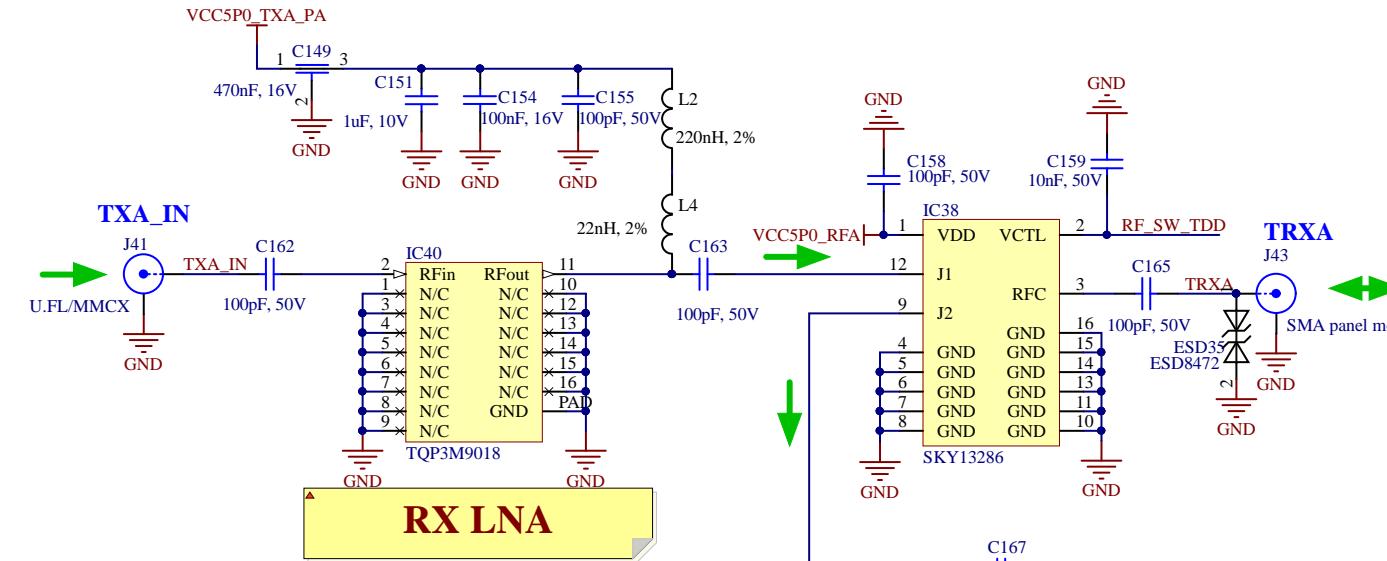
Channel A

All RF switches are controlled together

Channel B

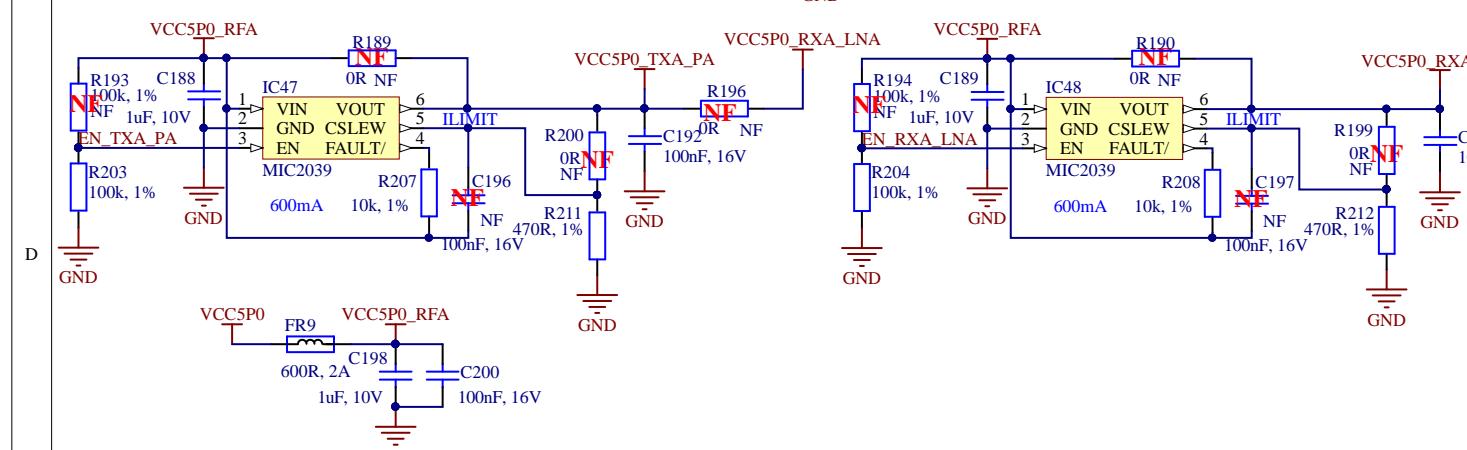
TX PA

RF switches

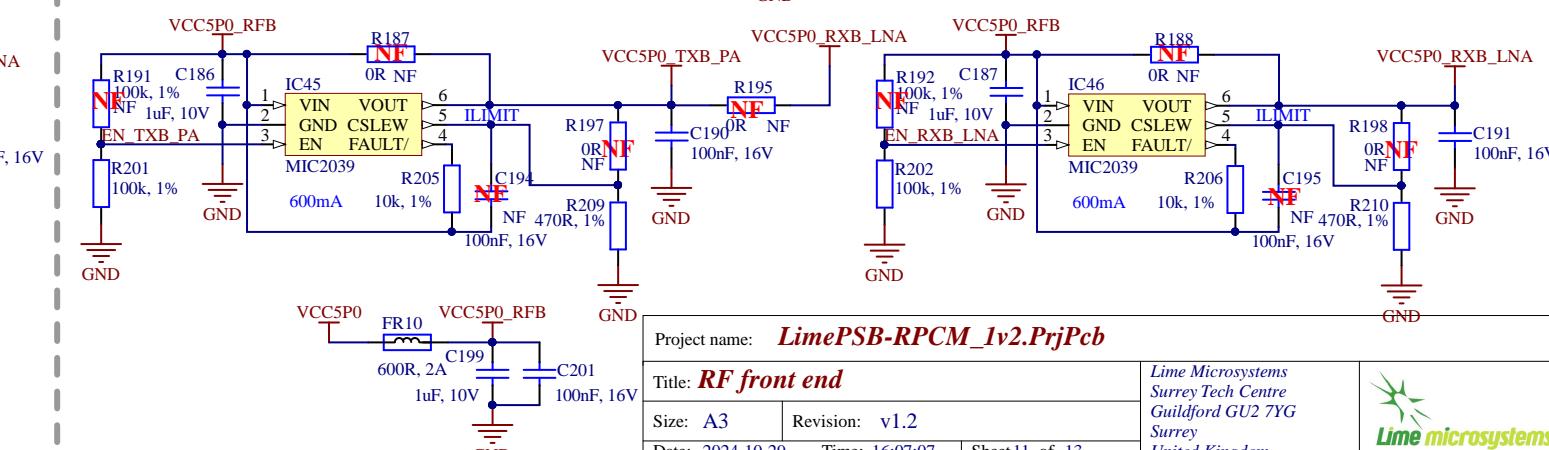


RX LNA

Power switches



Power switches



GND Project name: **LimePSB-RPCM 1v2.PrjPcb**

01

nF, 16V

SIZE.

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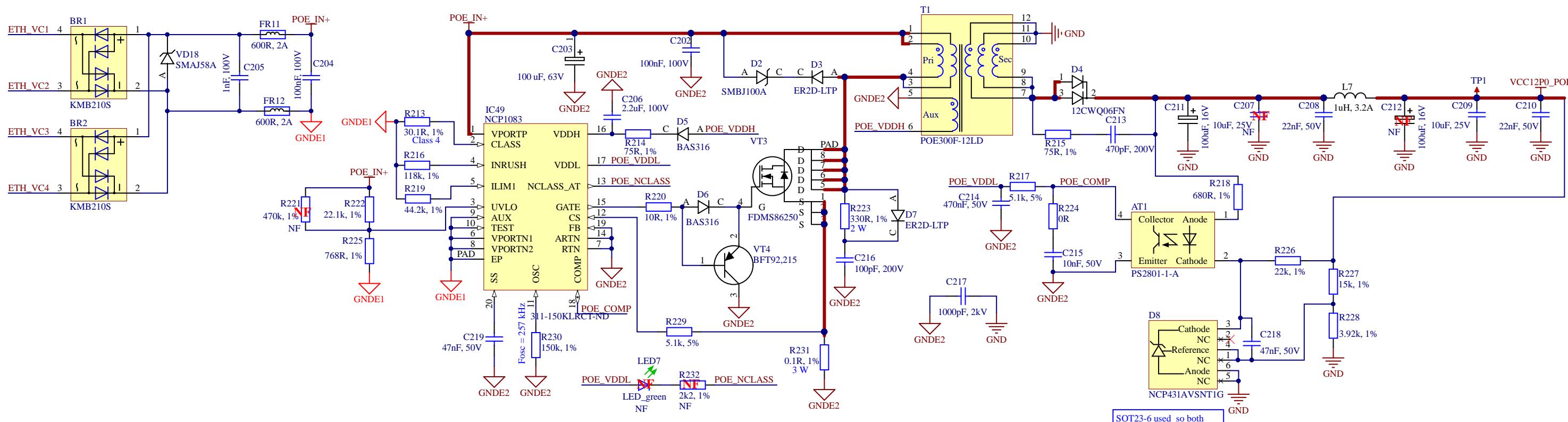
Lime
microsystems

NF elements on sheet: C207, C212, R221, LED7, R232, R249, R247, LED8, R246, R245

Number of NF elements on sheet: 10

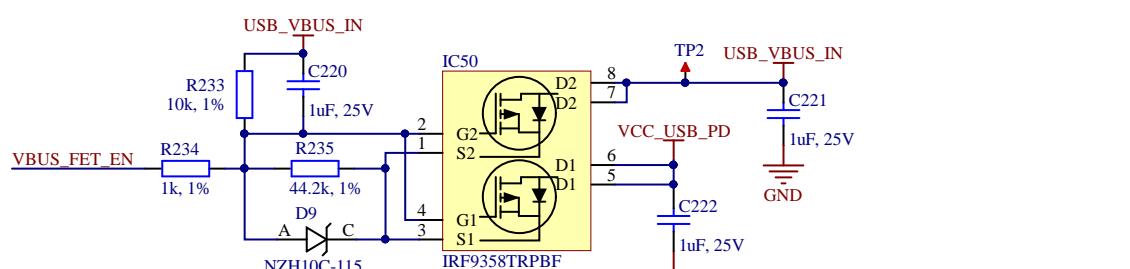
Power over Ethernet

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

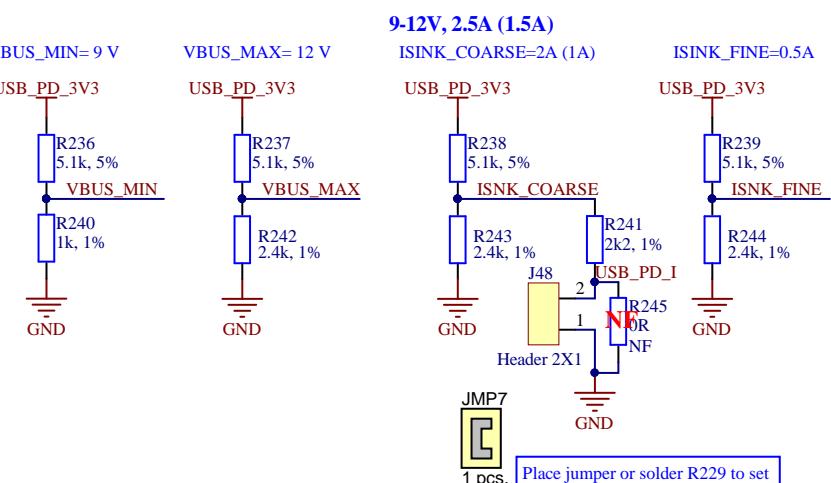
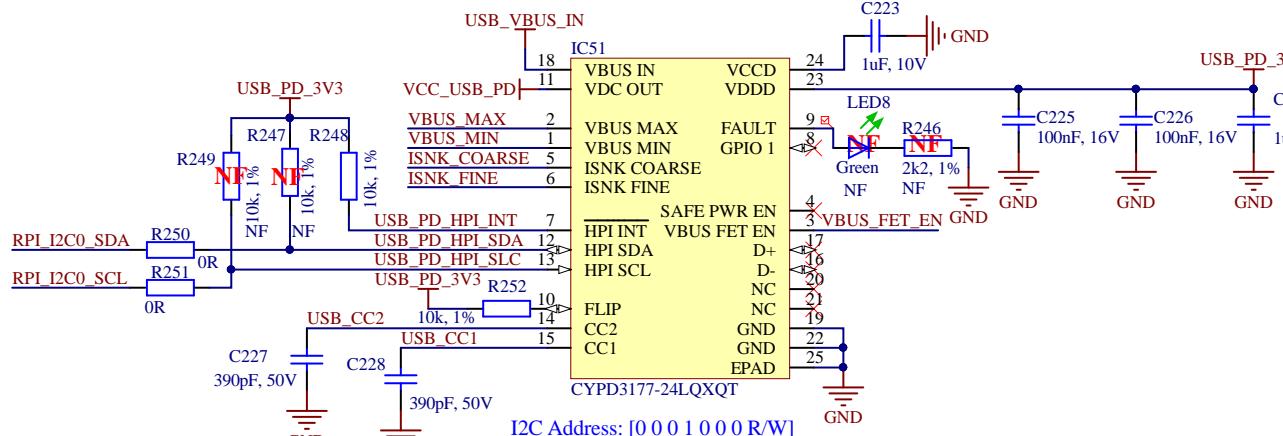


SOT23-6 used so both SOT23-5 and SOT23-3 fit.

USB Power delivery



Resistor dividers for selecting VBUS Voltage and Current



Project name: LimePSB-RPCM_Iv2.PrcPcb

Title: PoE and USB PD

Size: A3 Revision: v1.2

Date: 2024-10-29 Time: 16:07:10 Sheet 12 of 13

File: 12_PoE_USB_PD.SchDoc

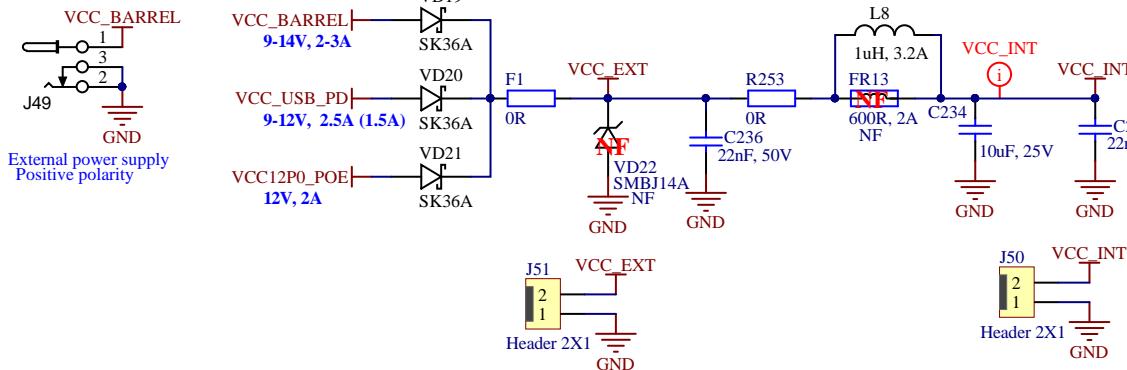
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United Kingdom



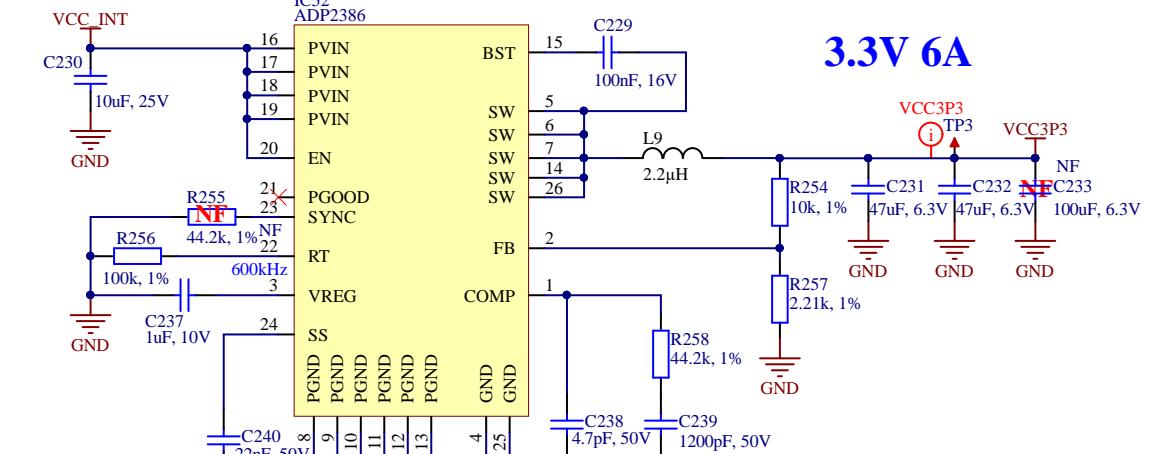
NF elements on sheet: VD22, FR13, R255, C233, R261, J53, R260, C244, C245, FR15, C253, C250, R269
Number of NF elements on sheet: 13
Total number of NF elements on all sheets: 161

Board power circuits

Power input

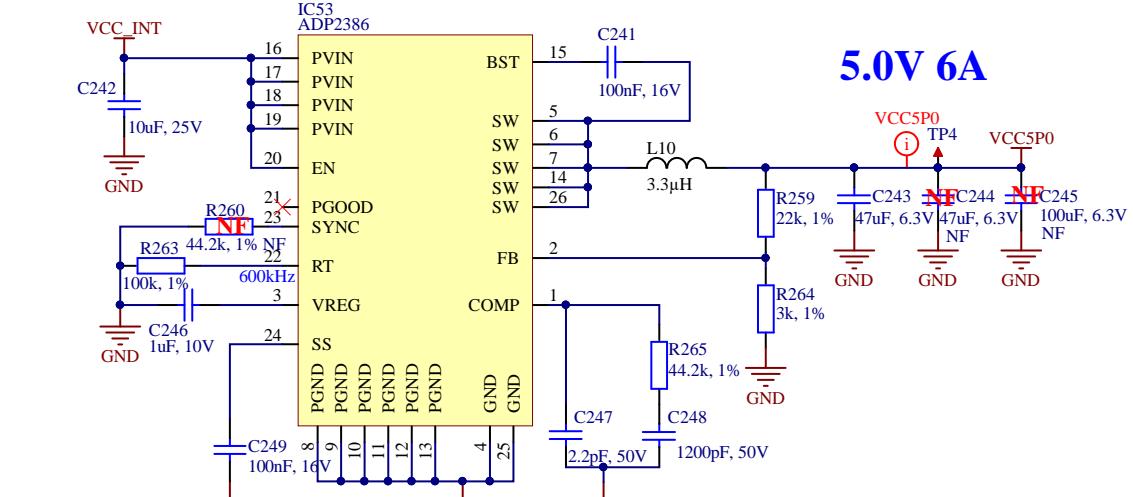
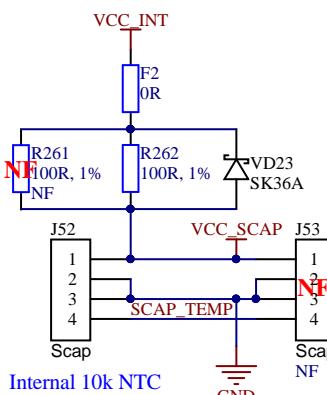


Switching regulators



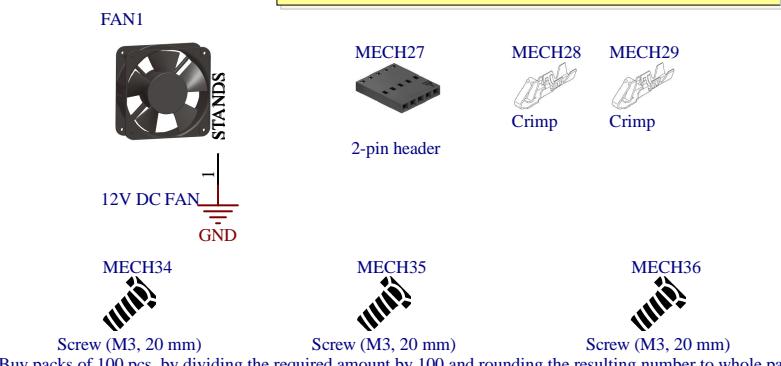
3.3V 6A

Supercapacitor



5.0V 6A

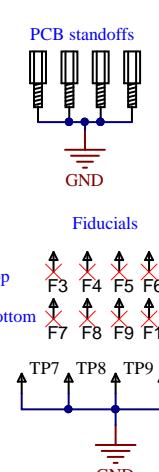
Misc for FAN



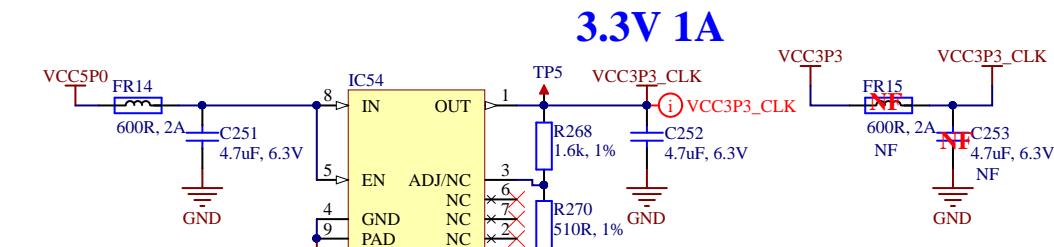
Screw (M3, 20 mm)
Buy packs of 100 pcs. by dividing the required amount by 100 and rounding the resulting number to whole packs.



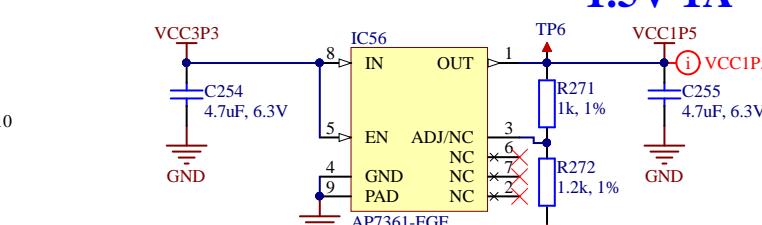
Spacer (M3, 12mm)
Buy packs of 100 pcs. by dividing the required amount by 100 and rounding the resulting number to whole packs.



Linear regulators

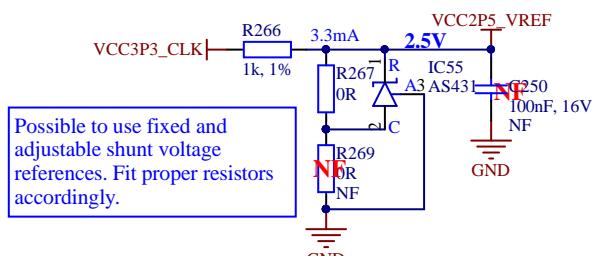


3.3V 1A



1.5V 1A

Voltage reference (2.5V)



Possible to use fixed and adjustable shunt voltage references. Fit proper resistors accordingly.

Alternative reference source for XO DAC and ADC

Project name: LimePSB-RPCM_Iv2.PrcPcb

Title: Power

Size: A3

Revision: v1.2

Date: 2024-10-29

Time: 16:07:13

Sheet 13 of 13

File: 13_Power.SchDoc

