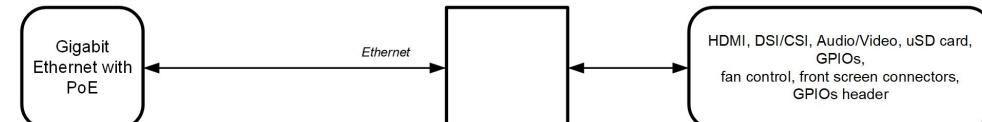
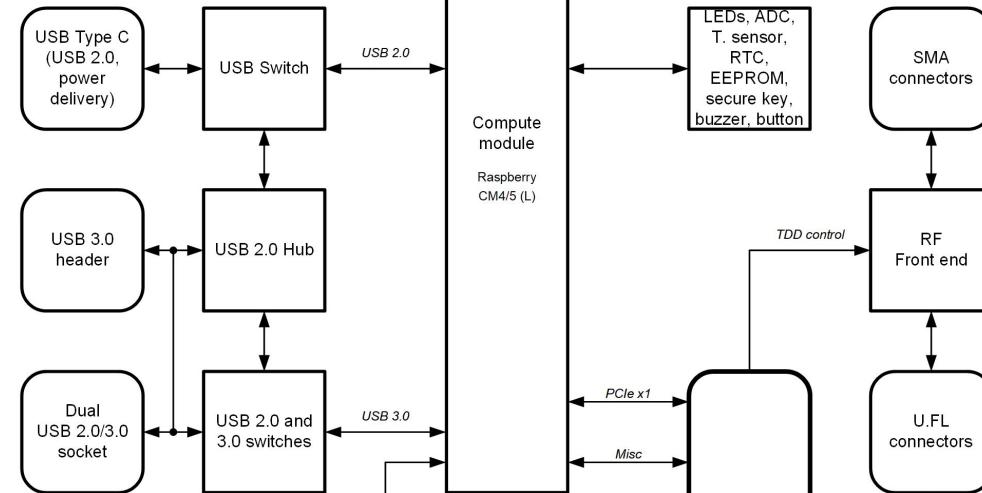


## Block diagram

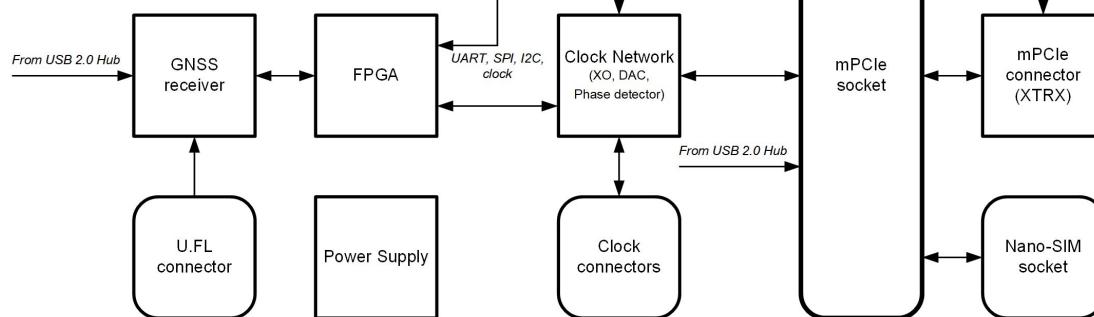
A



B



C



D

Project name: **LimePSB-RPCM\_Iv3.PrjPcb**

Title: **Block diagram**

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

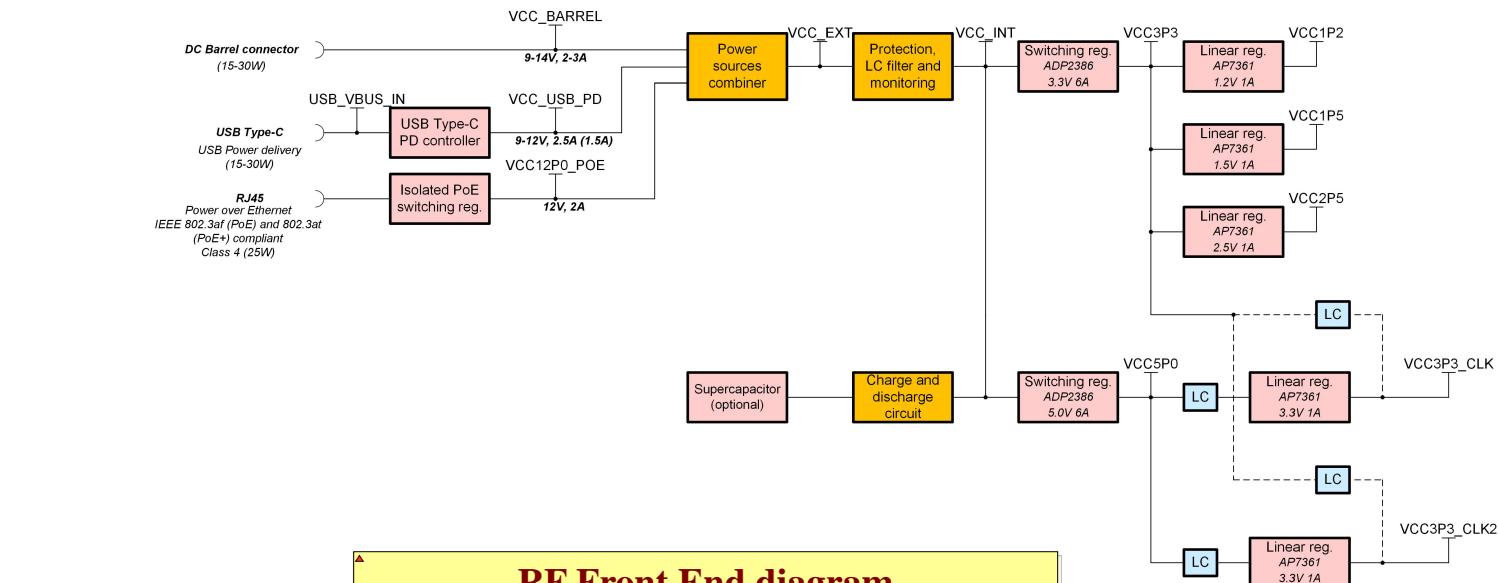
Date: **2024-10-10** Time: **10:19:56** Sheet**1** of **15**

File: **01\_Block\_diag.SchDoc**

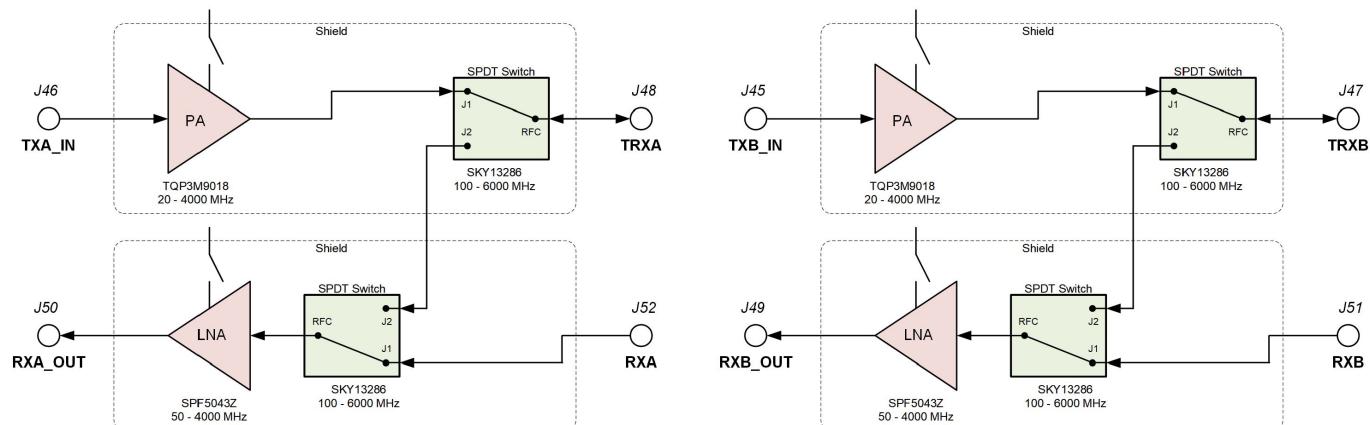
Lime Microsystems  
Surrey Tech Centre  
Guildford GU2 7YG  
Surrey  
United Kingdom



## Power diagram



## RF Front End diagram



Project name: **LimePSB-RPCM\_1v3.PrbPcb**

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

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

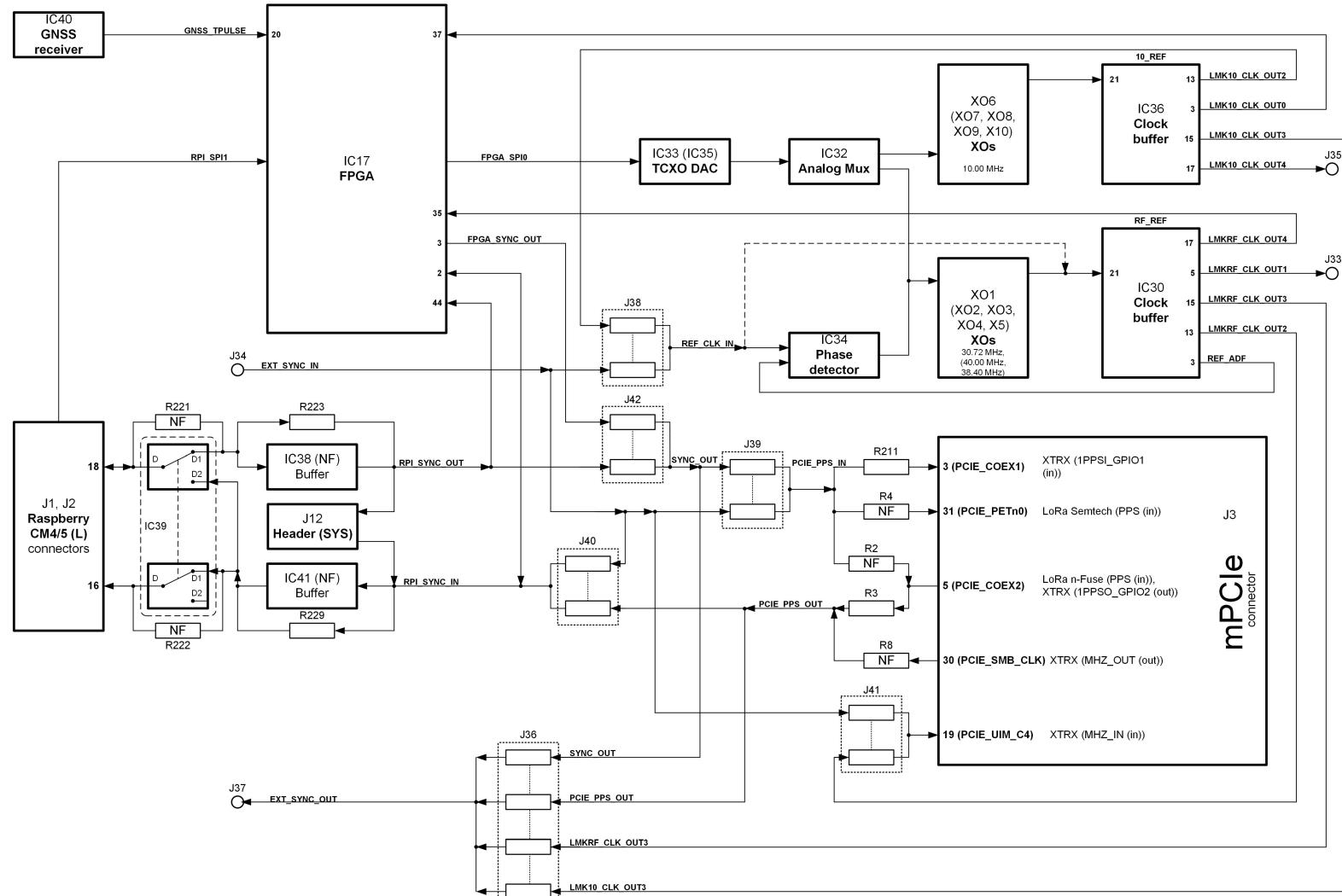
Date: **2024-10-10** Time: **10:19:58** Sheet **2** of **15**

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**

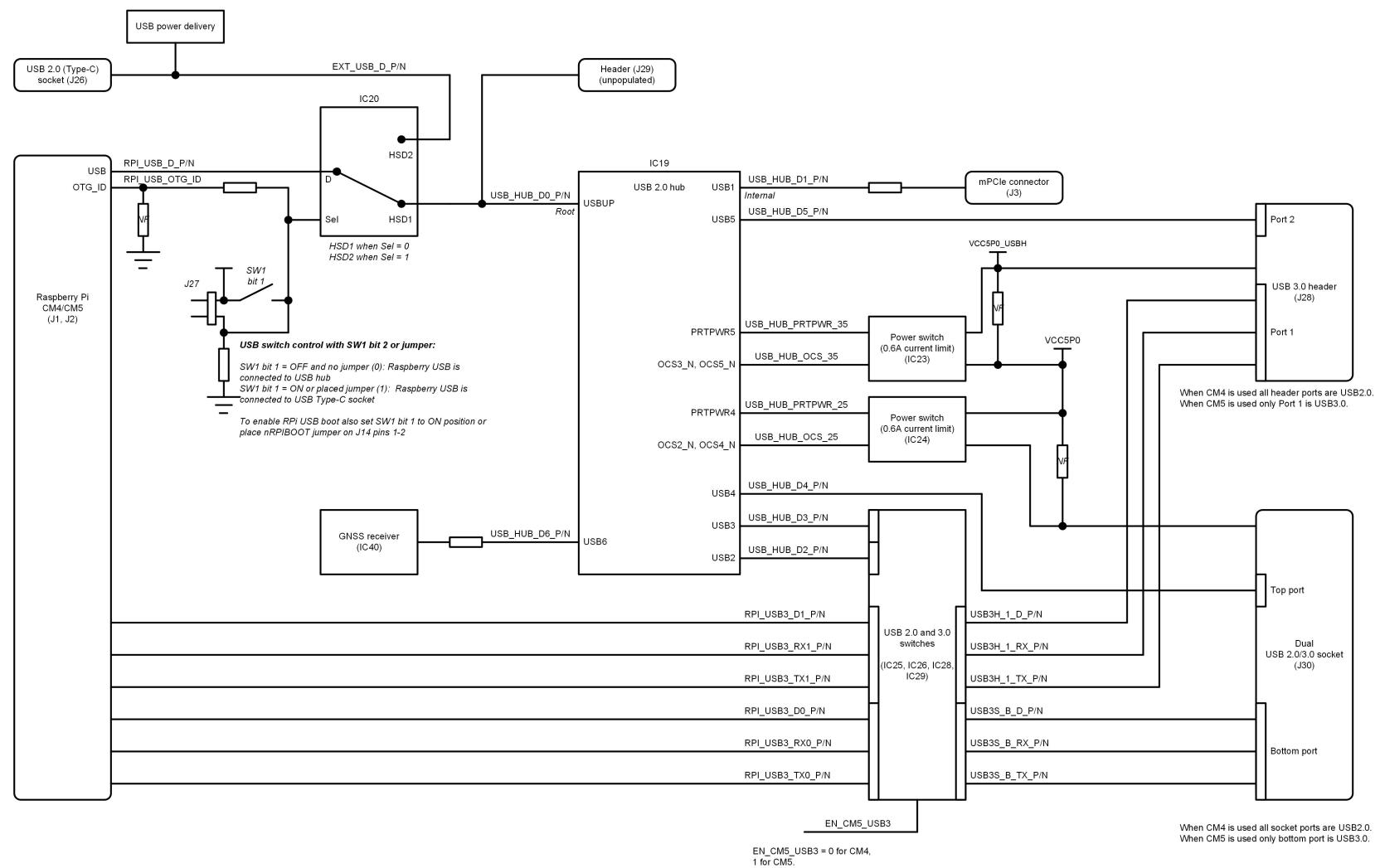
Date: **2024-10-10** Time: **10:20:02** Sheet **3 of 15**

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: **2024-10-10** Time: **10:20:07** Sheet **4** of **15**

File: **04\_USB\_diag.SchDoc**

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

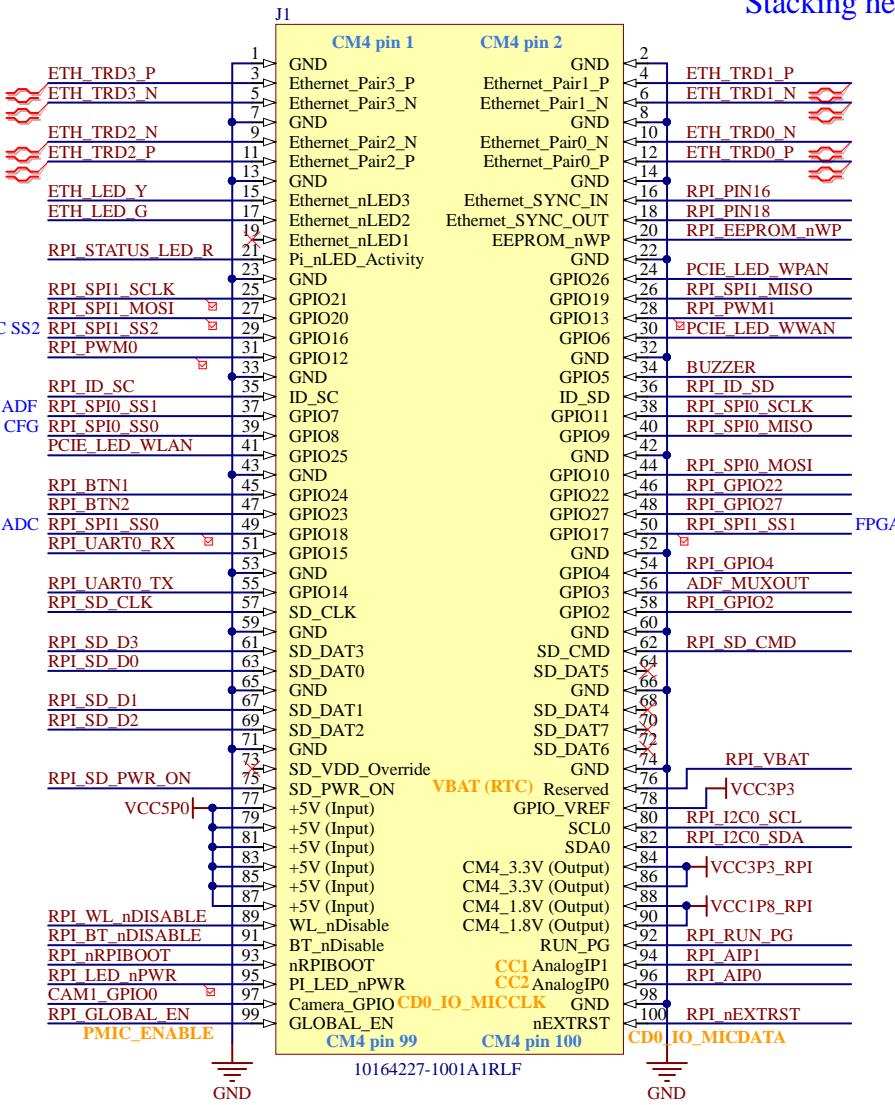


NF elements on sheet: R1, R2, R4, R8, R10, R12, R13, C8, R6, C6, C7, R9, R11, J5, J6  
Number of NF elements on sheet: 15

## Raspberry Pi CM4/5(L) and mPCIe

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

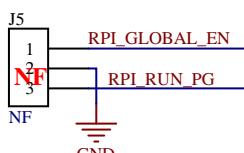
Stacking height 1.5 mm



Board SPI interfaces:

RPI\_SPI0 (3.3V): FPGA CFG (SS0 - GPIO8), ADF (SS1 - GPIO7)

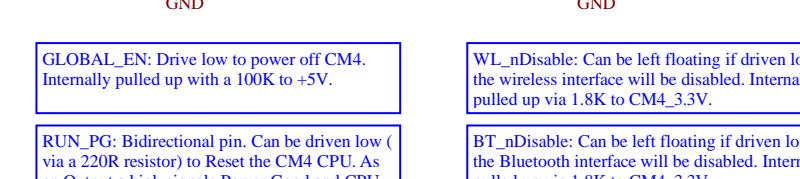
RPI\_SPI1 (3.3V): ADC (SS0 - GPIO18), FPGA (SS1 - GPIO17), XO DAC (SS2 - GPIO16 to FPGA)



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

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.



WL\_nDisable: Can be left floating if driven low the wireless interface will be disabled. Internal pulled up via 1.8K to CM4\_3.3V.

BT\_nDisable: Can be left floating if driven low the Bluetooth interface will be disabled. Internal pulled up via 1.8K to CM4\_3.3V.

RPI\_PIN11: RPI\_TVDAC on CM4, and VBUS\_EN on CM5

IC1: 74LVC1G3157FZ4

C9: 100nF, 16V

SEL=0: A>>B0  
SEL=0: A>>B1

R9: 0R NF  
R11: 0R NF

VCC3P3: 47uF, 10V

C4: 47uF, 10V

C5: 47uF, 10V

C6: 47uF, 10V

C7: 47uF, 10V

R6: 0R NF

VCC1P8\_RPI: 47uF, 10V

R7: 0R NF

PCIE\_PPS\_IN: 0R NF

R8: 0R NF

PCIE\_PPS\_OUT: 0R NF

R10: 0R NF

UIM\_VPP: 22pF, 50V

C8: 22pF, 50V

GND: GND

MECH1: Screw (M2, 5mm)

MECH2: SMD spacer (M2, 1.5mm)

MECH3: Screw (M2, 5mm)

MECH4: SMD spacer (M2, 1.5mm)

MNT 1: 1775862-2

MNT 2: 1775862-2

GND: GND

MECH5: Screw (M2, 5mm)

MECH6: SMD spacer (M2, 1.5mm)

MECH7: Screw (M2, 5mm)

MECH8: SMD spacer (M2, 1.5mm)

MECH9: Screw (M2, 5mm)

MECH10: SMD spacer (M2, 1.5mm)

MECH11: Screw (M2, 5mm)

MECH12: SMD spacer (M2, 1.5mm)

FL1: Local fiducials

FL2: Local fiducials

FL3: Local fiducials

FL4: Local fiducials

MECH13: Local fiducials

MECH14: Local fiducials

MECH15: Local fiducials

MECH16: Local fiducials

MECH17: Local fiducials

MECH18: Local fiducials

MECH19: Local fiducials

MECH20: Local fiducials

MECH21: Local fiducials

MECH22: Local fiducials

MECH23: Local fiducials

MECH24: Local fiducials

MECH25: Local fiducials

MECH26: Local fiducials

MECH27: Local fiducials

MECH28: Local fiducials

MECH29: Local fiducials

MECH30: Local fiducials

MECH31: Local fiducials

MECH32: Local fiducials

MECH33: Local fiducials

MECH34: Local fiducials

MECH35: Local fiducials

MECH36: Local fiducials

MECH37: Local fiducials

MECH38: Local fiducials

MECH39: Local fiducials

MECH40: Local fiducials

MECH41: Local fiducials

MECH42: Local fiducials

MECH43: Local fiducials

MECH44: Local fiducials

MECH45: Local fiducials

MECH46: Local fiducials

MECH47: Local fiducials

MECH48: Local fiducials

MECH49: Local fiducials

MECH50: Local fiducials

MECH51: Local fiducials

MECH52: Local fiducials

MECH53: Local fiducials

MECH54: Local fiducials

MECH55: Local fiducials

MECH56: Local fiducials

MECH57: Local fiducials

MECH58: Local fiducials

MECH59: Local fiducials

MECH60: Local fiducials

MECH61: Local fiducials

MECH62: Local fiducials

MECH63: Local fiducials

MECH64: Local fiducials

MECH65: Local fiducials

MECH66: Local fiducials

MECH67: Local fiducials

MECH68: Local fiducials

MECH69: Local fiducials

MECH70: Local fiducials

MECH71: Local fiducials

MECH72: Local fiducials

MECH73: Local fiducials

MECH74: Local fiducials

MECH75: Local fiducials

MECH76: Local fiducials

MECH77: Local fiducials

MECH78: Local fiducials

MECH79: Local fiducials

MECH80: Local fiducials

MECH81: Local fiducials

MECH82: Local fiducials

MECH83: Local fiducials

MECH84: Local fiducials

MECH85: Local fiducials

MECH86: Local fiducials

MECH87: Local fiducials

MECH88: Local fiducials

MECH89: Local fiducials

MECH90: Local fiducials

MECH91: Local fiducials

MECH92: Local fiducials

MECH93: Local fiducials

MECH94: Local fiducials

MECH95: Local fiducials

MECH96: Local fiducials

MECH97: Local fiducials

MECH98: Local fiducials

MECH99: Local fiducials

MECH100: Local fiducials

MECH101: Local fiducials

MECH102: Local fiducials

MECH103: Local fiducials

MECH104: Local fiducials

MECH105: Local fiducials

MECH106: Local fiducials

MECH107: Local fiducials

MECH108: Local fiducials

MECH109: Local fiducials

MECH110: Local fiducials

MECH111: Local fiducials

MECH112: Local

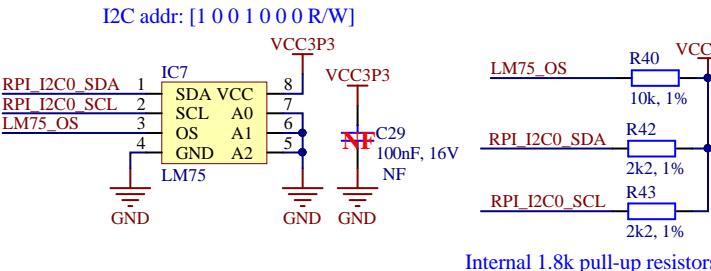


NF elements on sheet: J18, J19, C29, R44, R48, C30, C31, R49, R50, J20, R51, IC9, IC11, R66, R80, BATT2, IC15, R75, R77, R79, R84, R86, R87, R88

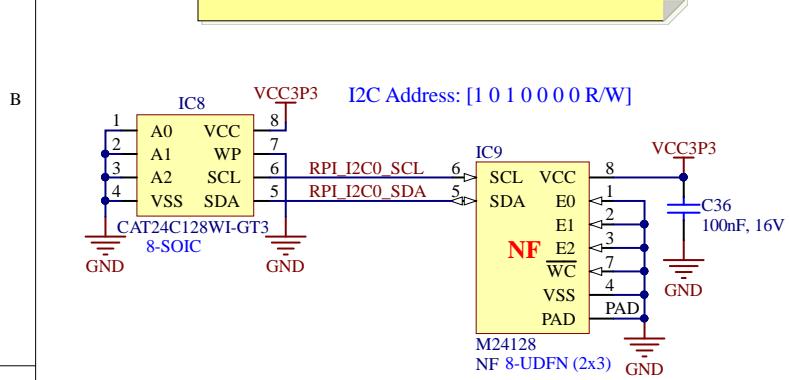
Number of NF elements on sheet: 24

Misc 2

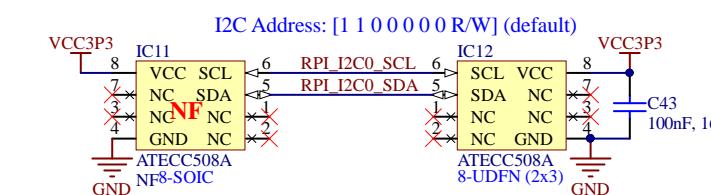
## I2C Temperature sensor



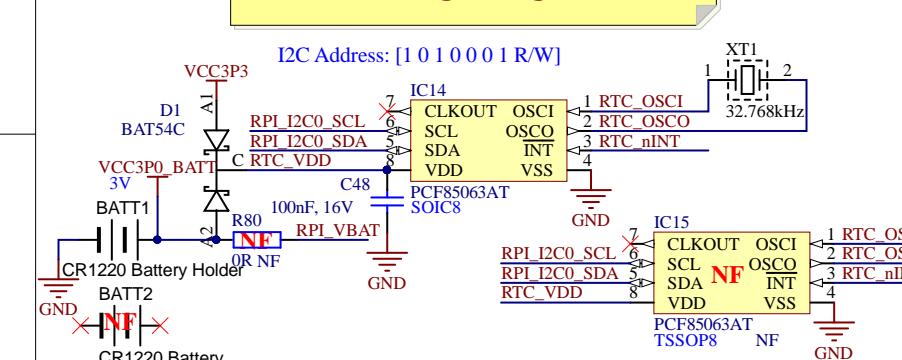
I2C EEPROM



## I2C secure key storage

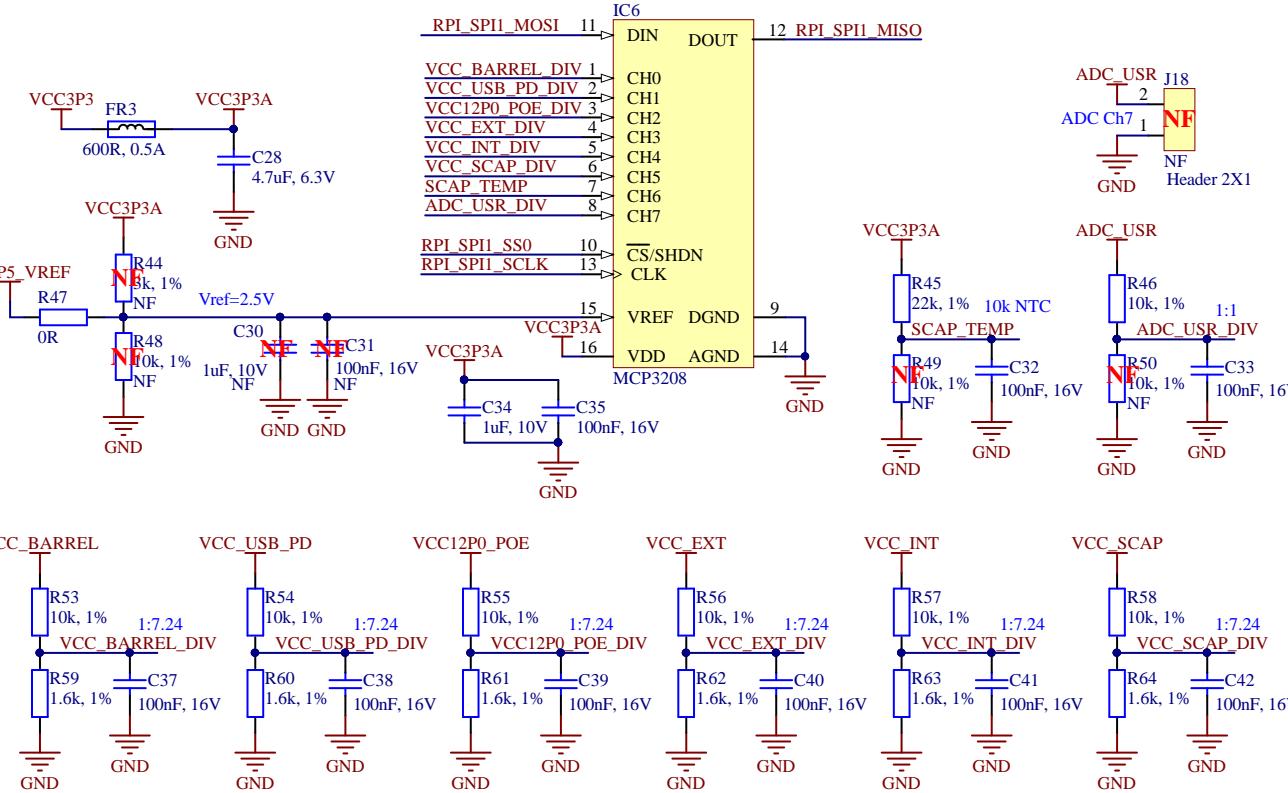


L2C RTC

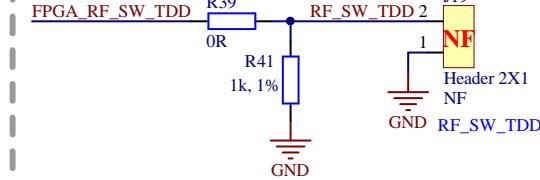


Circuit diagram showing a logic inverter IC16 (74LVC1G34QSE-7) with its inputs connected to ground via resistors R93 and R94. The output is connected to ground through a capacitor C51.

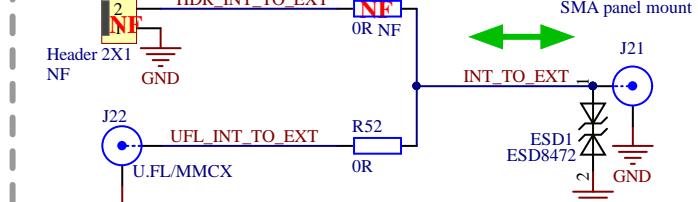
SPI ADC



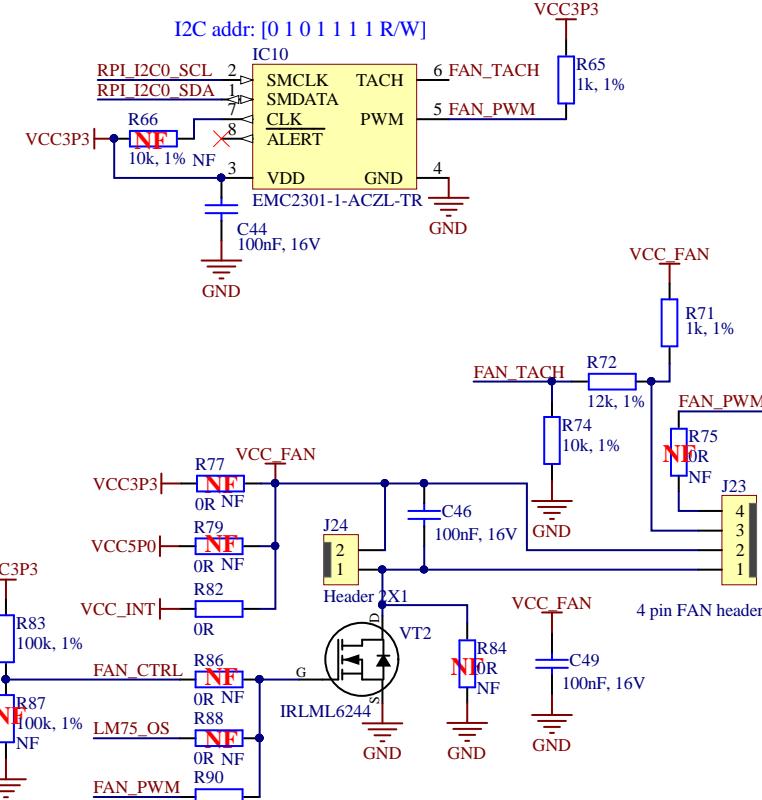
## RFFE TDD control



## Int to ext



FAN control



Project name: **LimePSB-RPCM 1v3.PnjPcb**

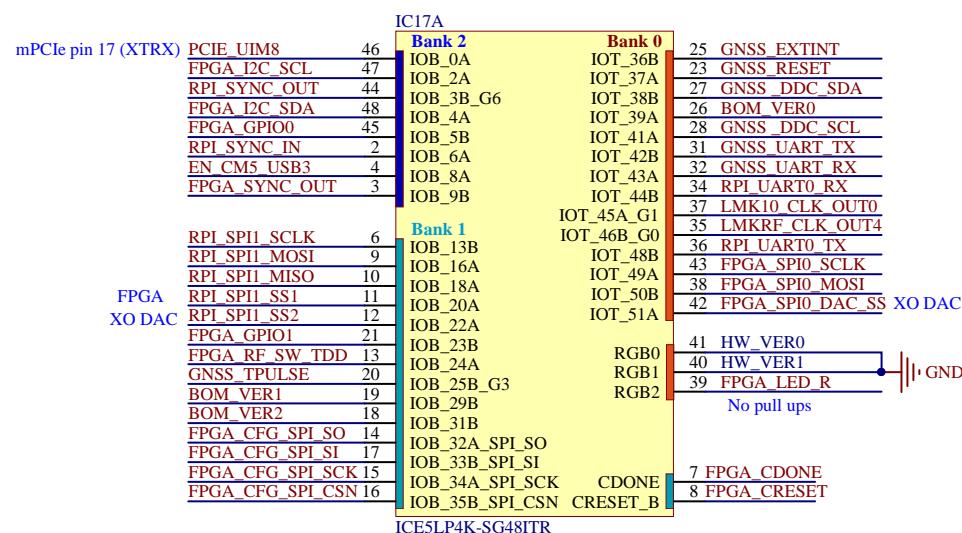
Title: <b>Misc 2</b>		Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom	 Lime microsystems
Size: A3	Revision: v1.3		
Date: 2024-10-10	Time: 10:20:20	Sheet 7 of 15	
File: 07_Misc_2.SchDoc			

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

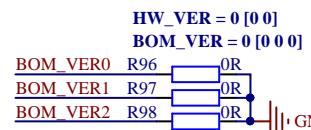
Number of NF elements on sheet: 4

## FPGA

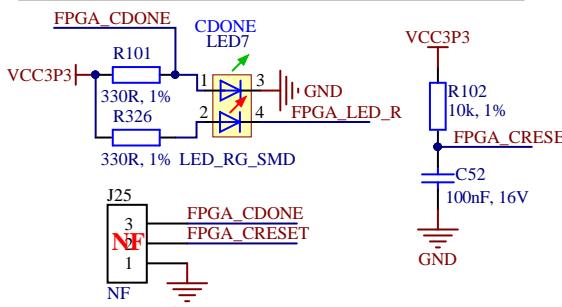
### FPGA



### HW\_VER, BOM\_VER



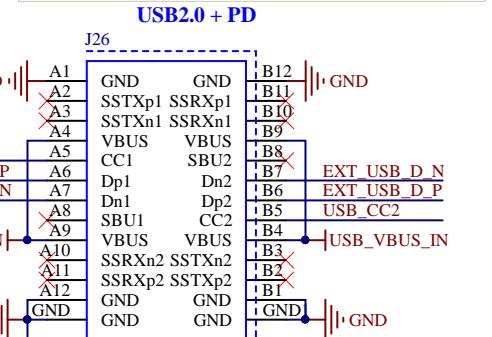
### FPGA misc



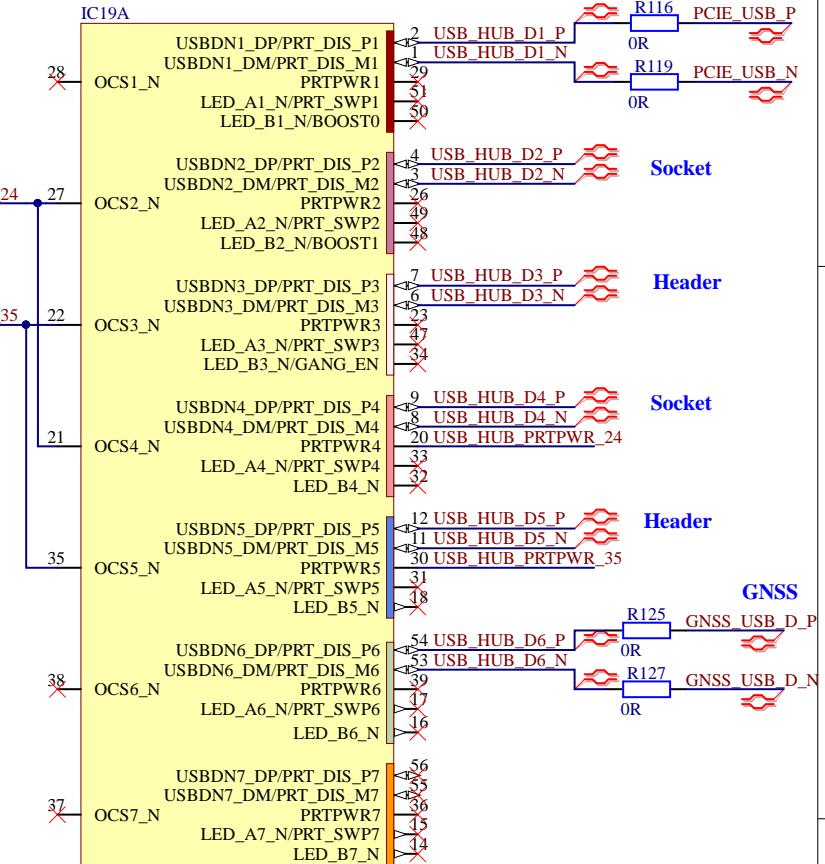
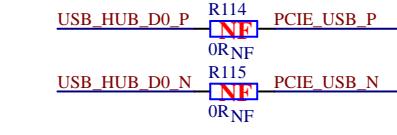
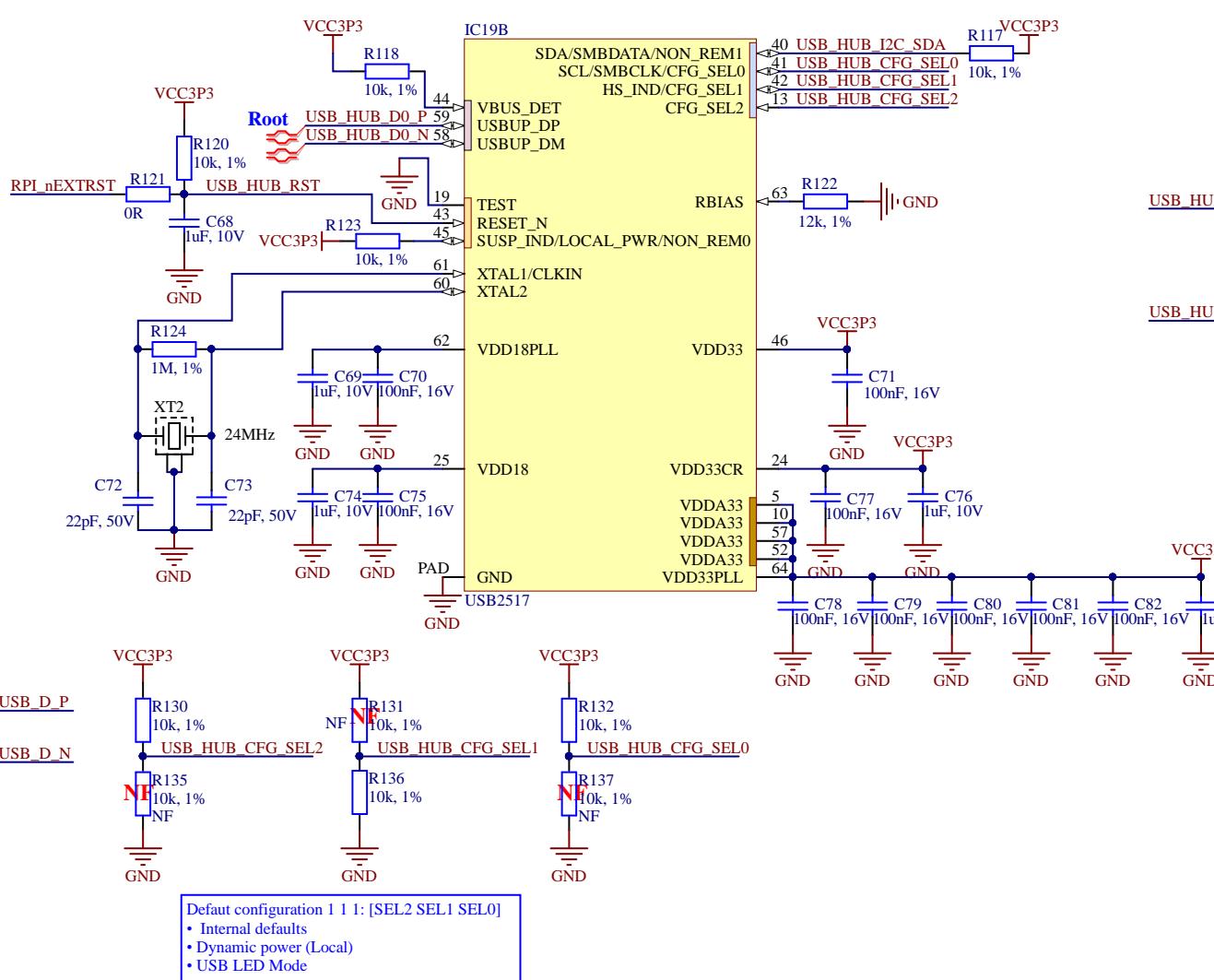
NF elements on sheet: R114, R115, VD9, R126, R128, R133, J27, JMP1, R140, R141, R135, R131, R137, IC21, IC22, J29, R144, R145, R147, C90

Number of NF elements on sheet: 20

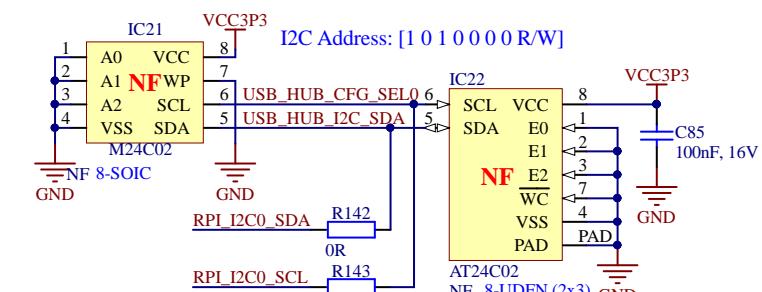
### USB C socket



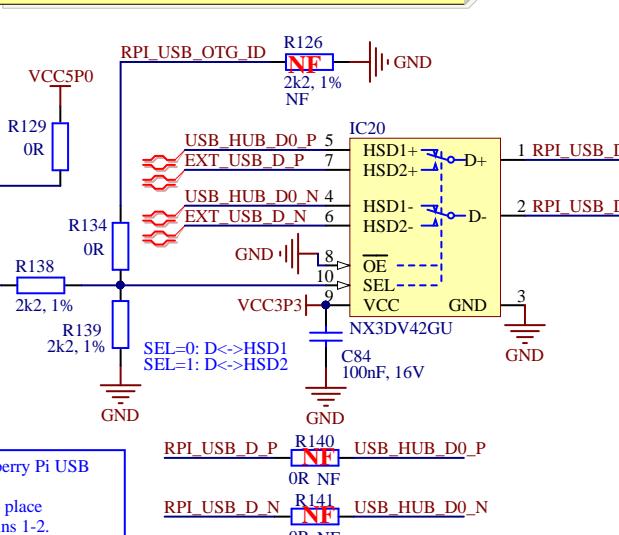
### USB 2.0 HUB



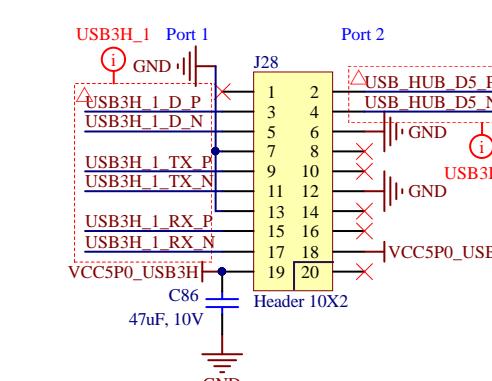
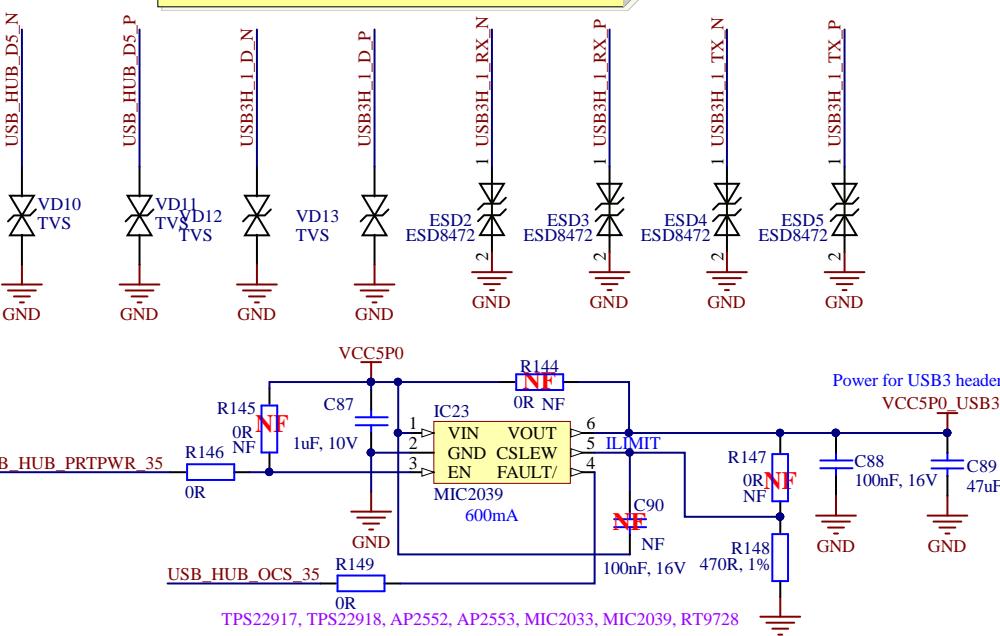
PCB note: USB differential pair impedance is 90Ω



### USB switch

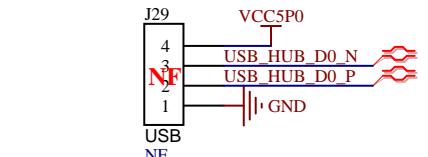


### USB 3.0 header



When CM4 is used all header ports are USB2.0.  
When CM5 is used only Port 1 is USB3.0.

### USB2.0 hub upstream



For debug purposes only

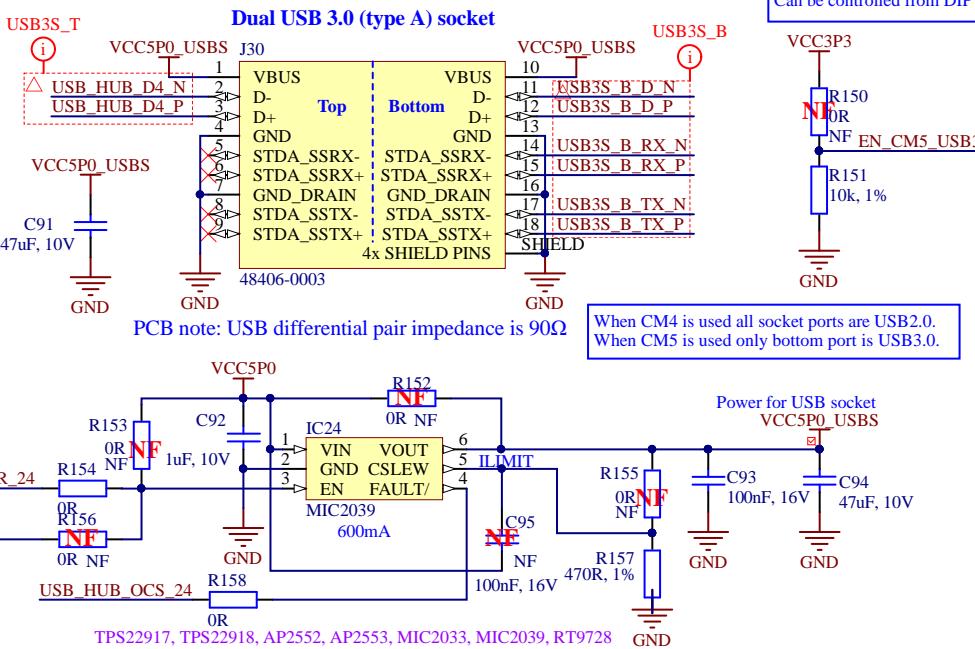
Project name: LimePSB-RPCM_Iv3.PjPcb	
Title: USB 2.0 hub	
Size: A3	Revision: v1.3
Date: 2024-10-10	Time: 10:20:27
Sheet 9 of 15	United Kingdom
File: 09_USB_hub.SchDoc	Lime Microsystems Surrey Tech Centre Guildford GU2 7YG Surrey United Kingdom



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

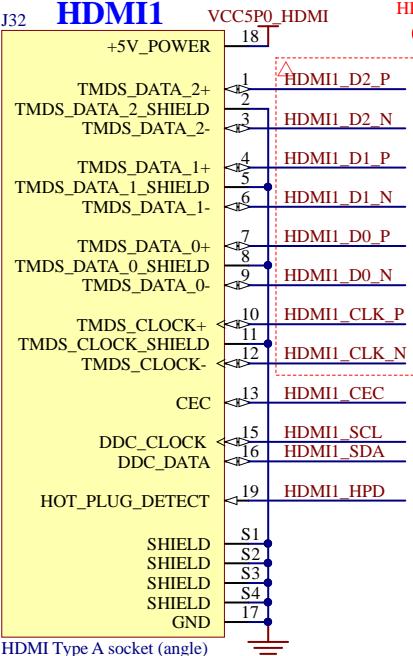
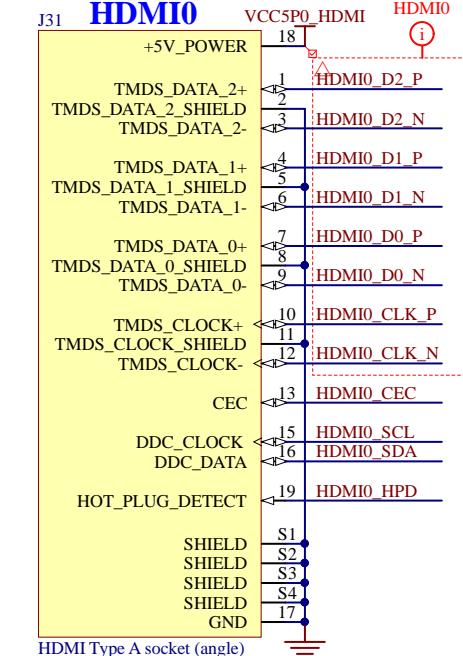
## USB and HDMI sockets

### Dual USB 3.0 (type A) socket



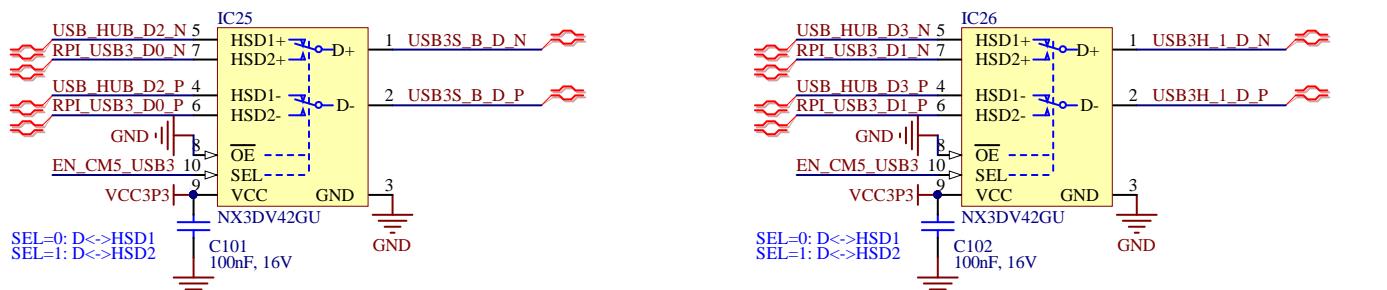
EN\_CM5\_USB3: Enable CM5 USB3 ports:  
0: all ports connected to USB 2.0 hub (for CM4)  
1: header Port 1 and socket bottom port are connected to CM5 USB3.0 lines (for CM5)  
Can be controlled from DIP SW Bit 4.

### HDMI sockets

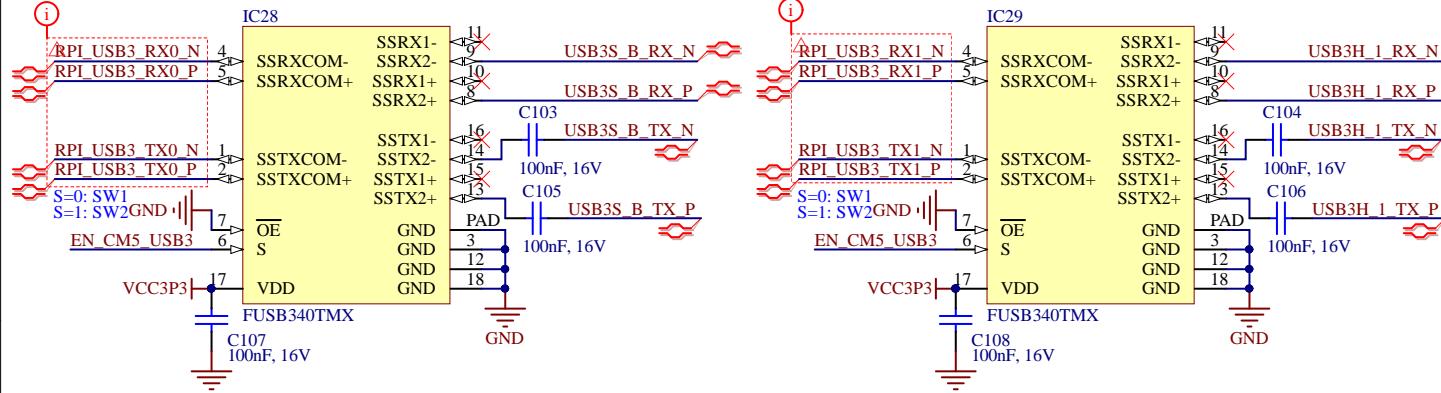


PCB note: make each HDMI group differential traces lenght equal and impedance of 100Ω

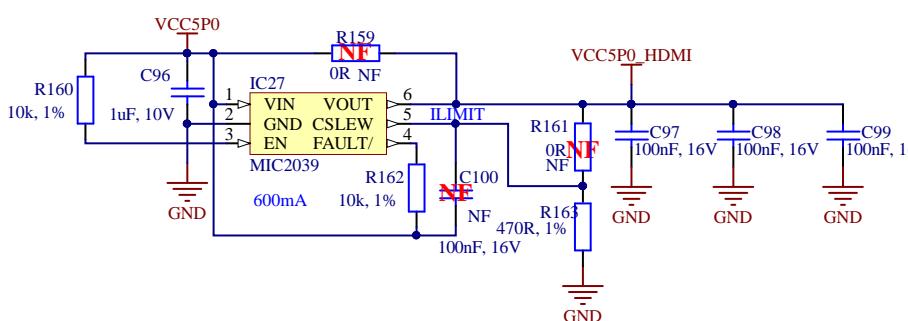
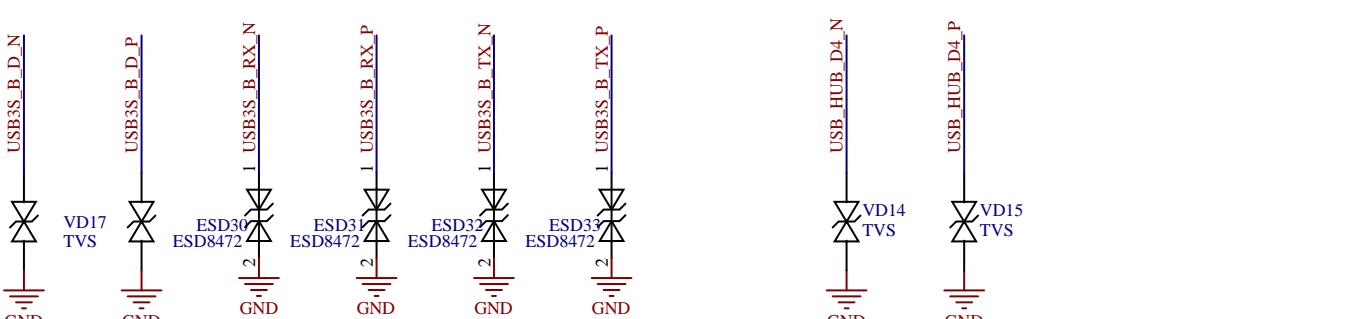
### USB 2.0 and 3.0 switches



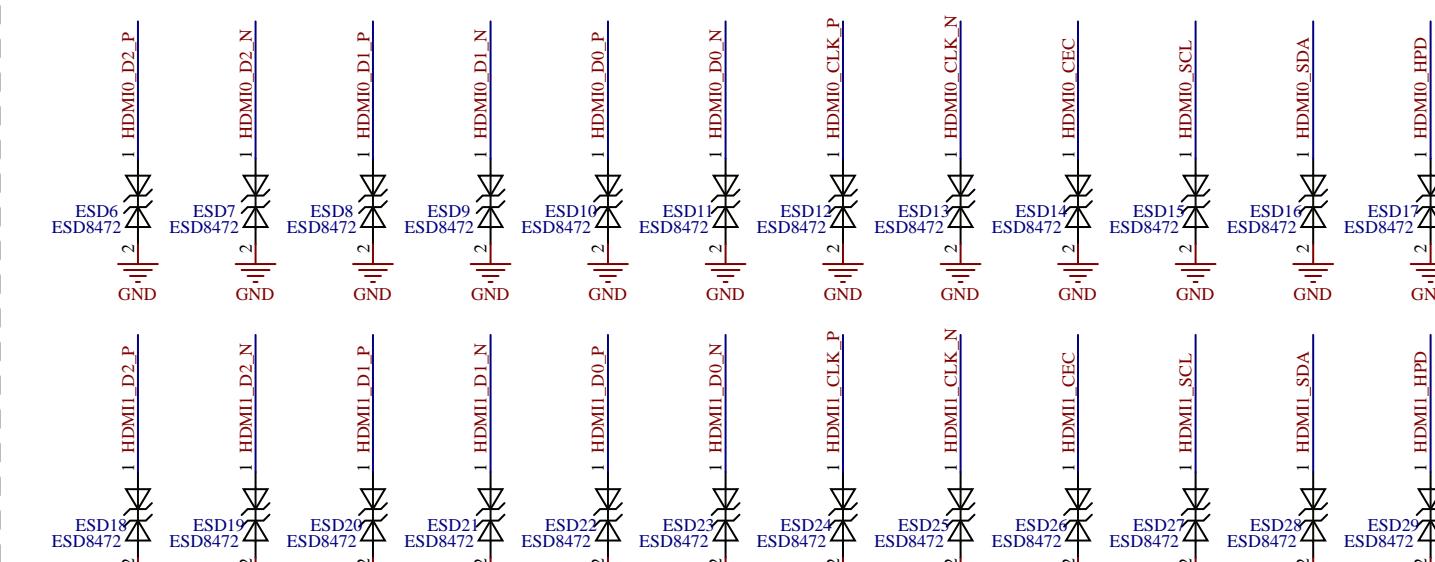
RPI\_USB3 GND USB3 Port 0 (socket bottom)



### ESD protection



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

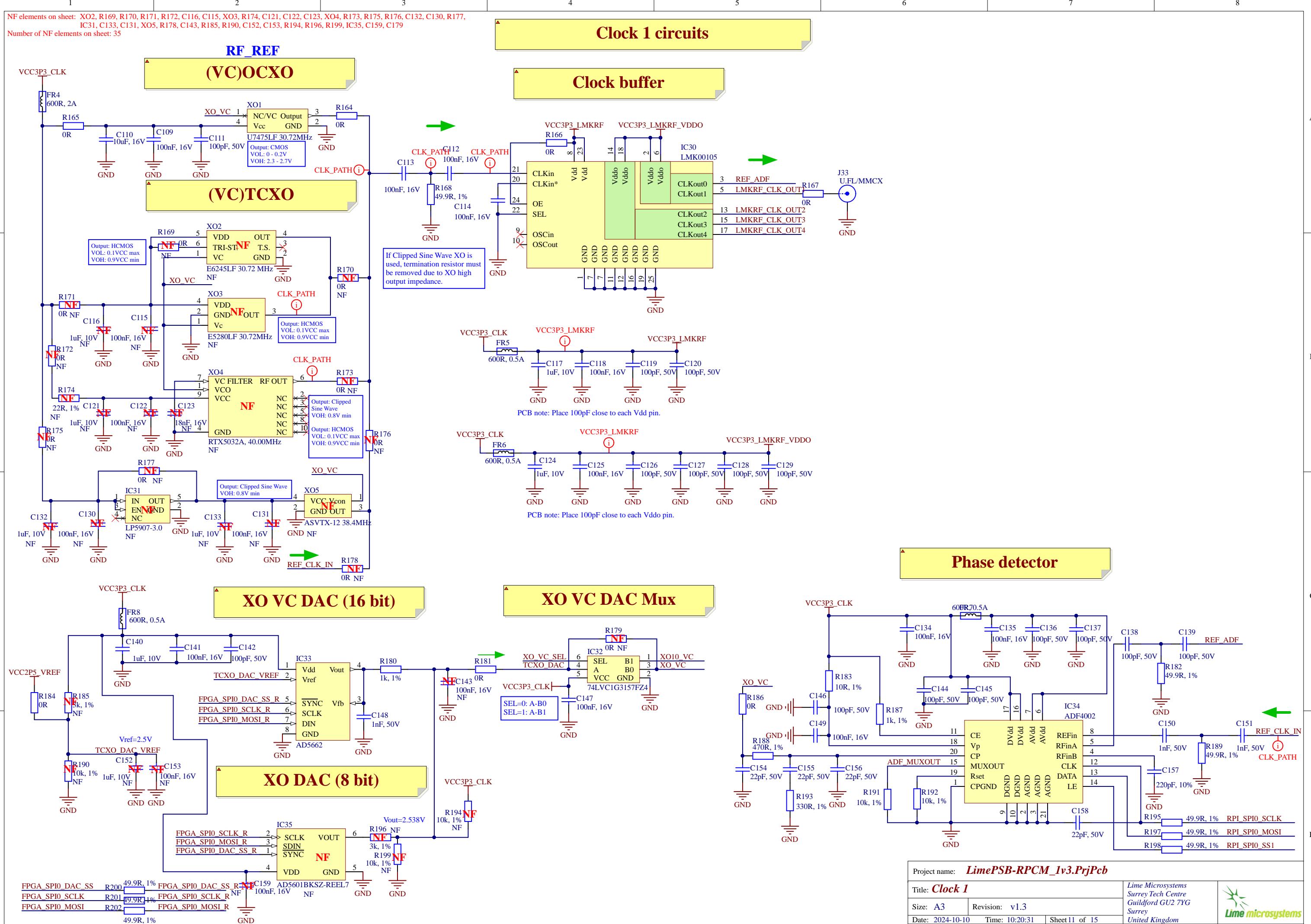


Size: A3 Revision: v1.3

Date: 2024-10-10 Time: 10:20:29

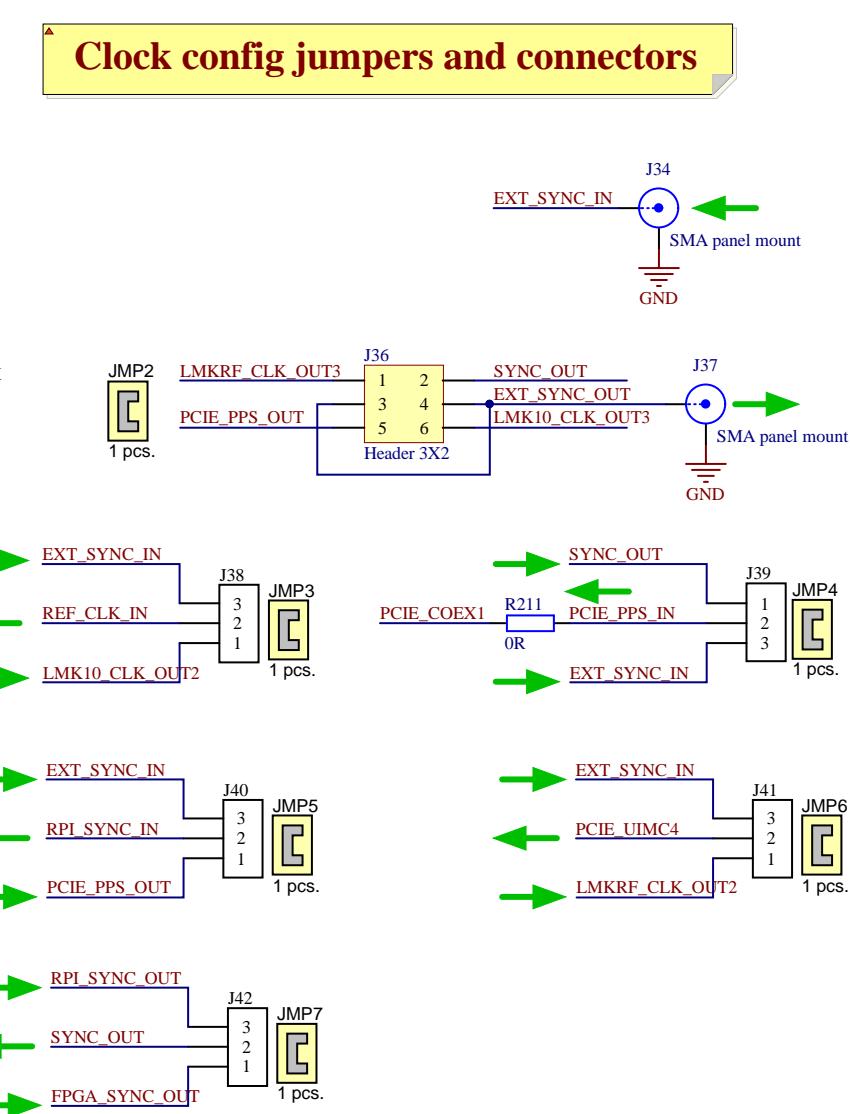
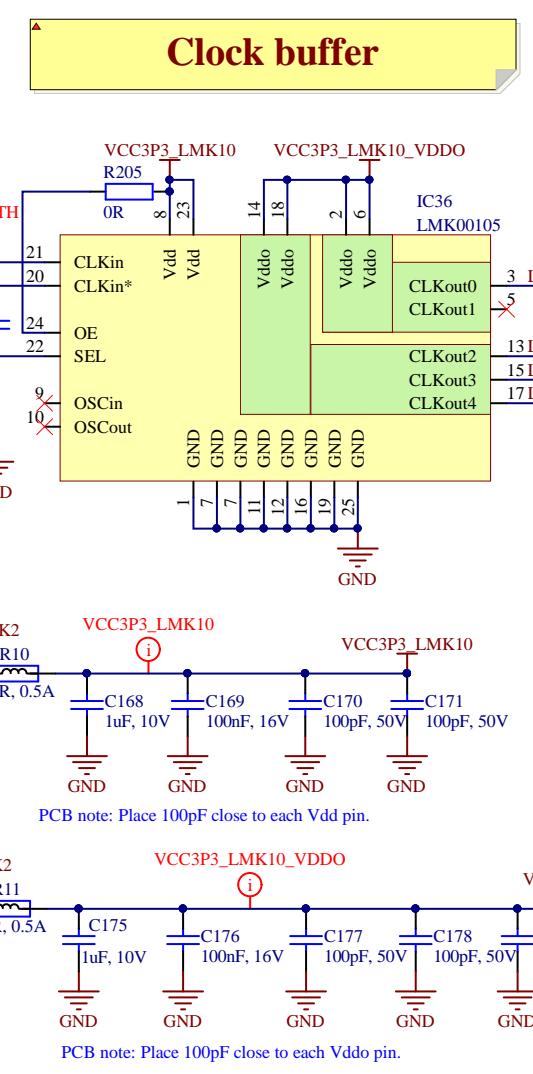
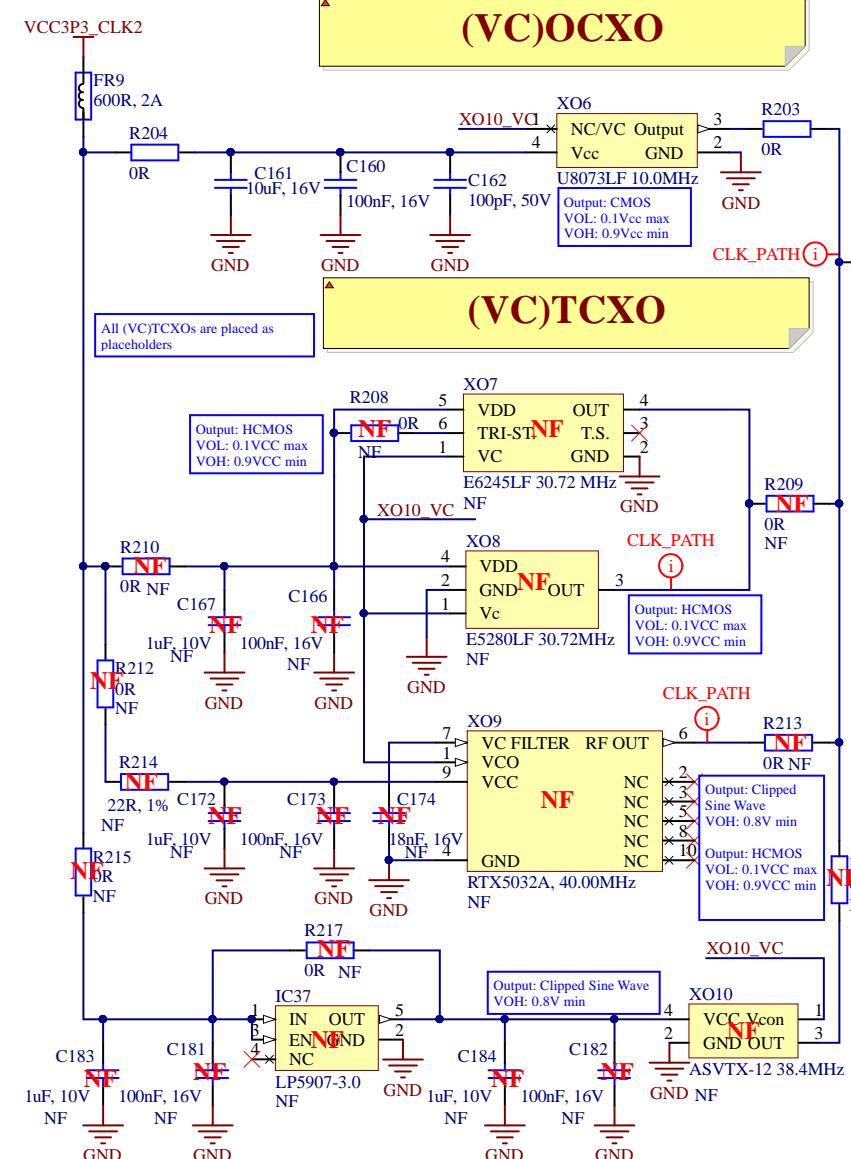
Sheet 10 of 15

File: 10\_USB\_HDMI.SchDoc

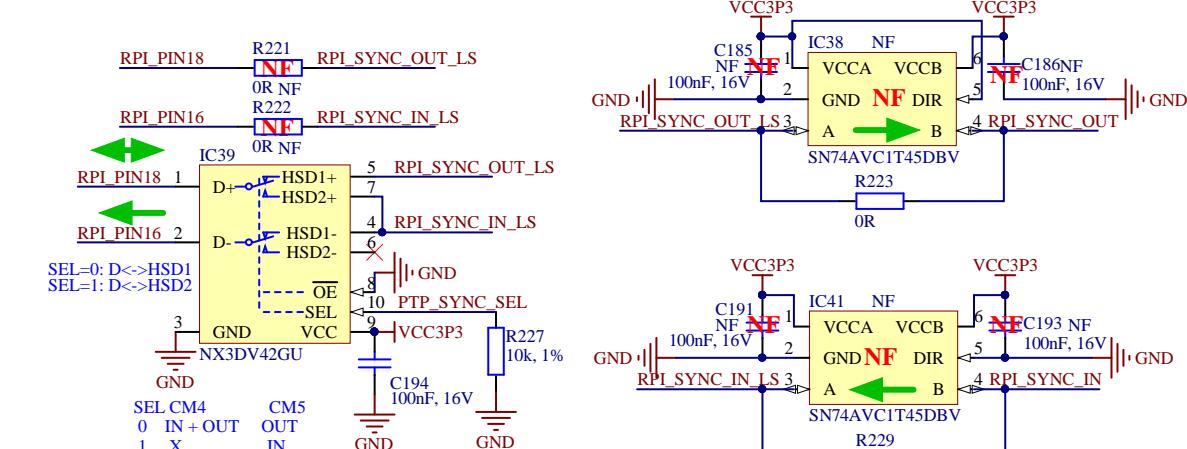
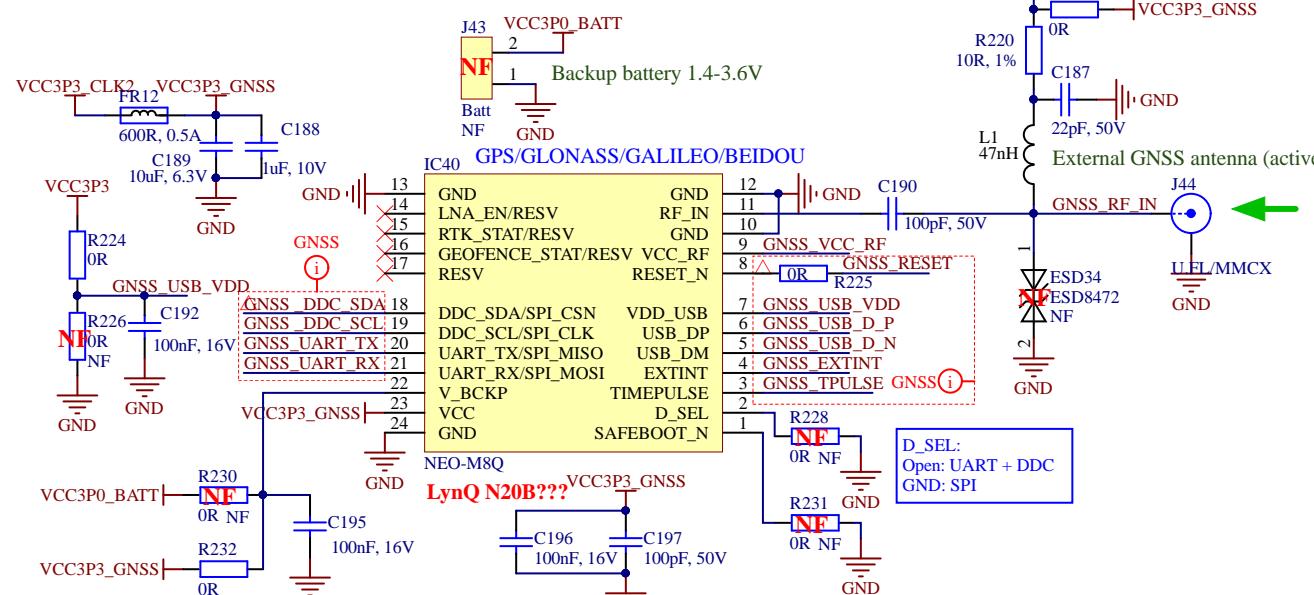


## Clock 2 circuits

10\_REF



## GNSS receiver



Project name: **LimePSB-RPCM Lv3 PriPch**

Title: *Clock?*

Sigma A3

Date: 2024-10-10 Time: 10:20:33 Sheet 12 of 15

File: 12\_Clock\_2.SchDoc

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



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

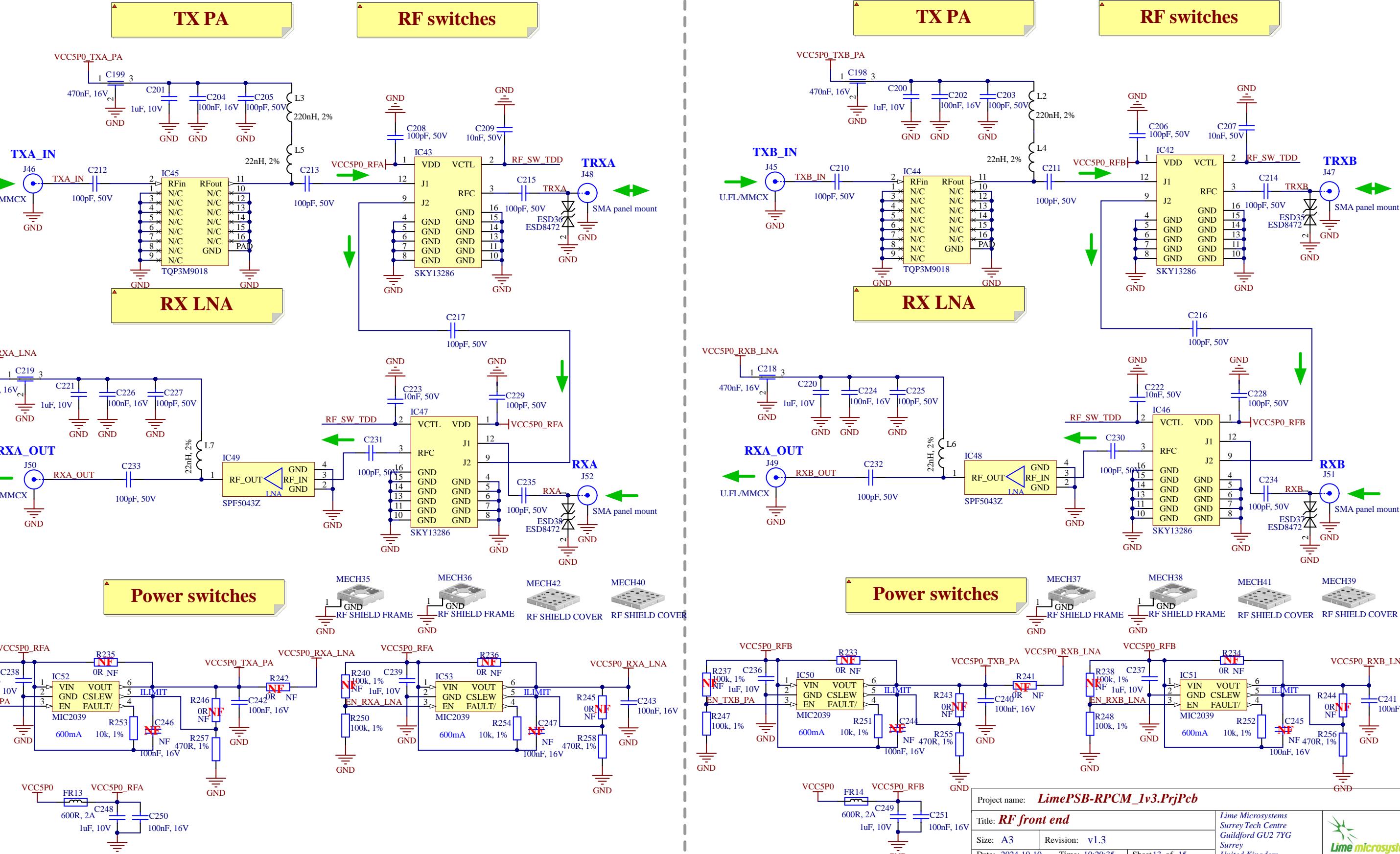
Number of NF elements on sheet: 18

## RF front end

### Channel A

All RF switches are controlled together

### Channel B

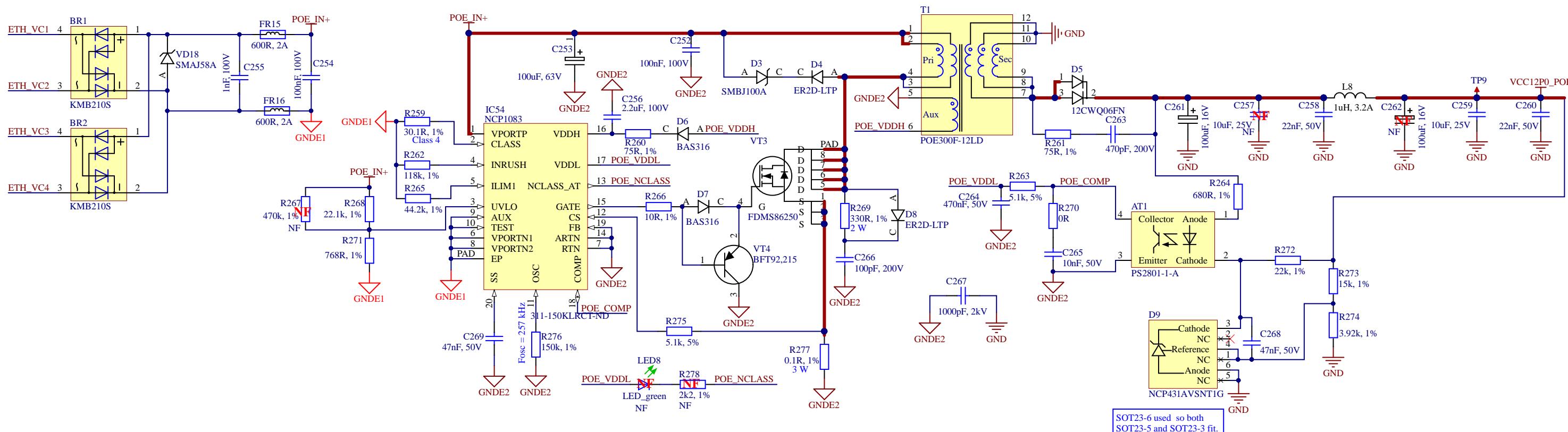


NF elements on sheet: R267, C257, C262, LED8, R278, LED9, R292, R293, R295, R291

Number of NF elements on sheet: 10

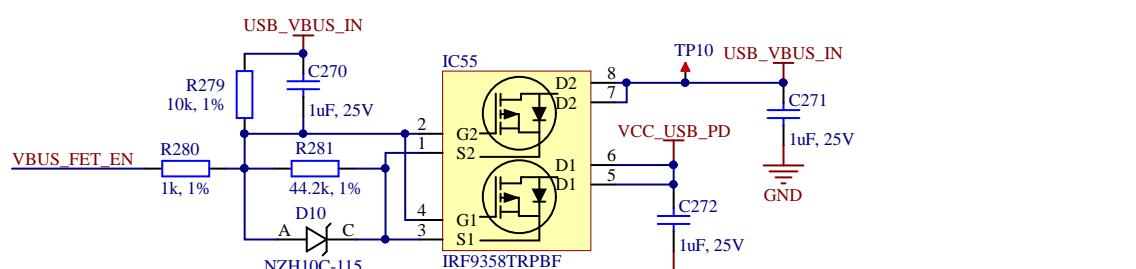
## Power over Ethernet

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

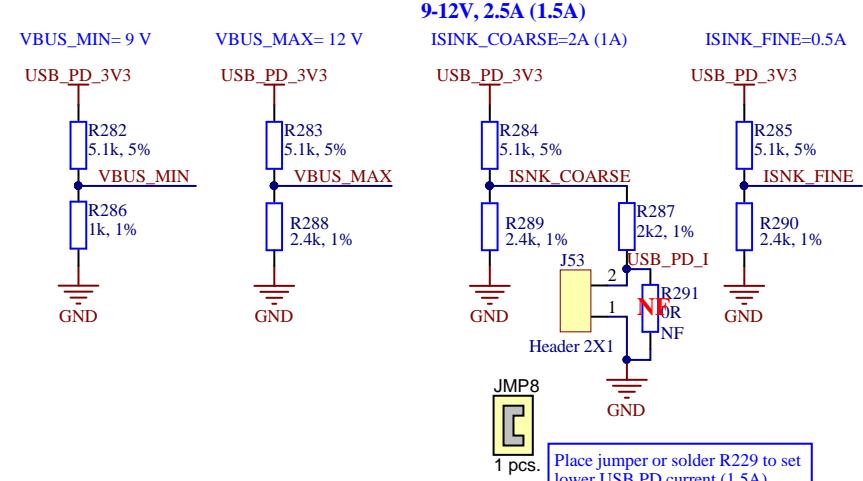
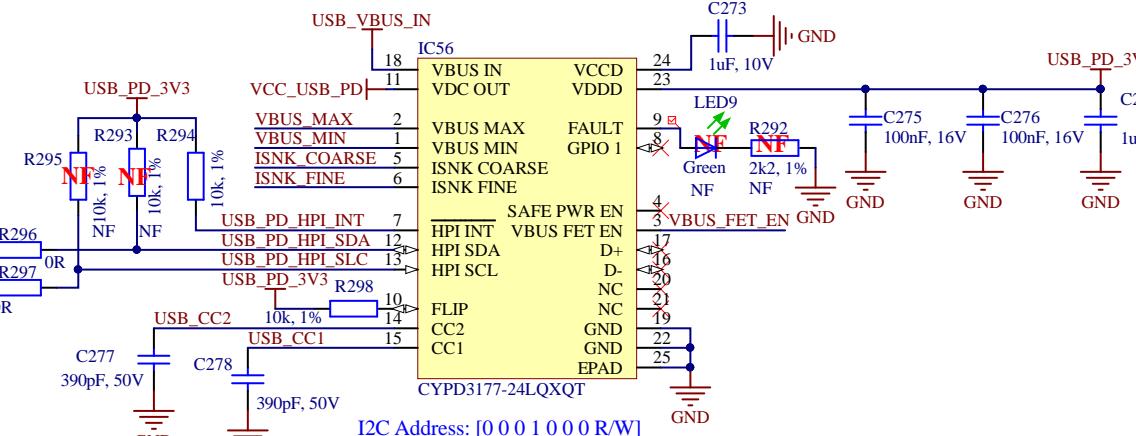


SOT23-6 used so both SOT23-5 and SOT23-3 fit.

## 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: 2024-10-10 Time: 10:20:37 Sheet 14 of 15

File: 14\_PoE\_USB\_PD.SchDoc

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



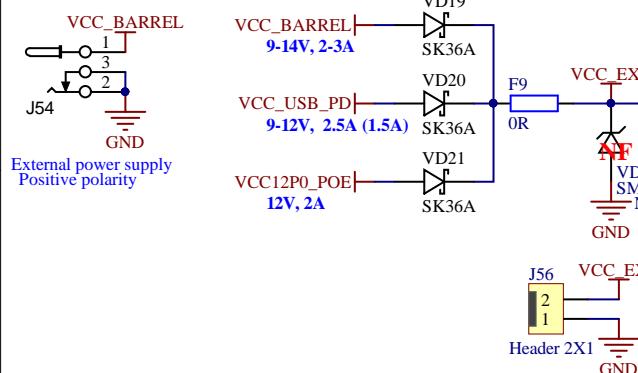
NF elements on sheet: VD22, FR17, R301, C283, R306, C294, C295, R307, J58, FR19, C303, FR21, C312, R321, C300, R317

Number of NF elements on sheet: 16

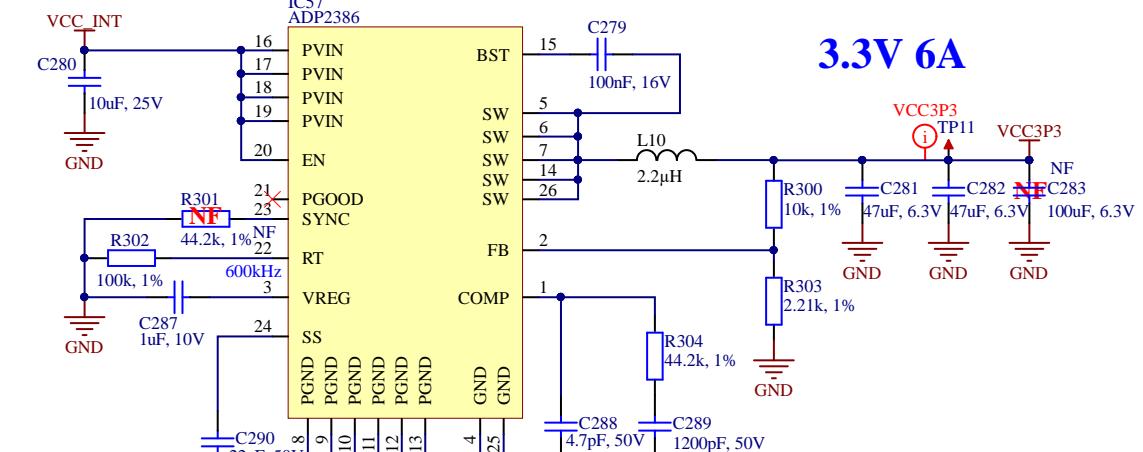
Total number of NF elements on all sheets: 199

## Board power circuits

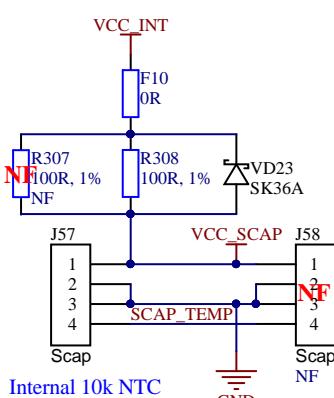
### Power input



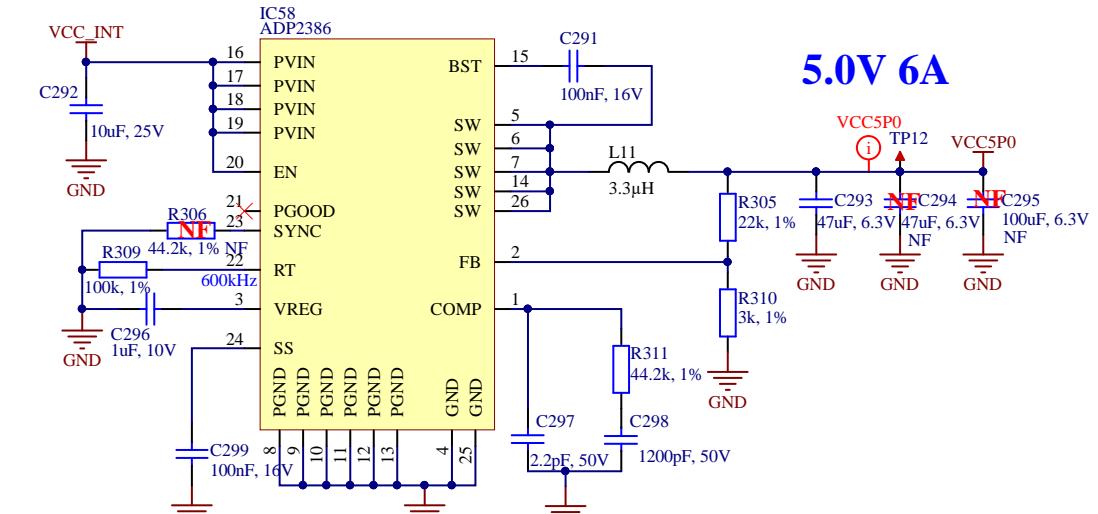
### Switching regulators



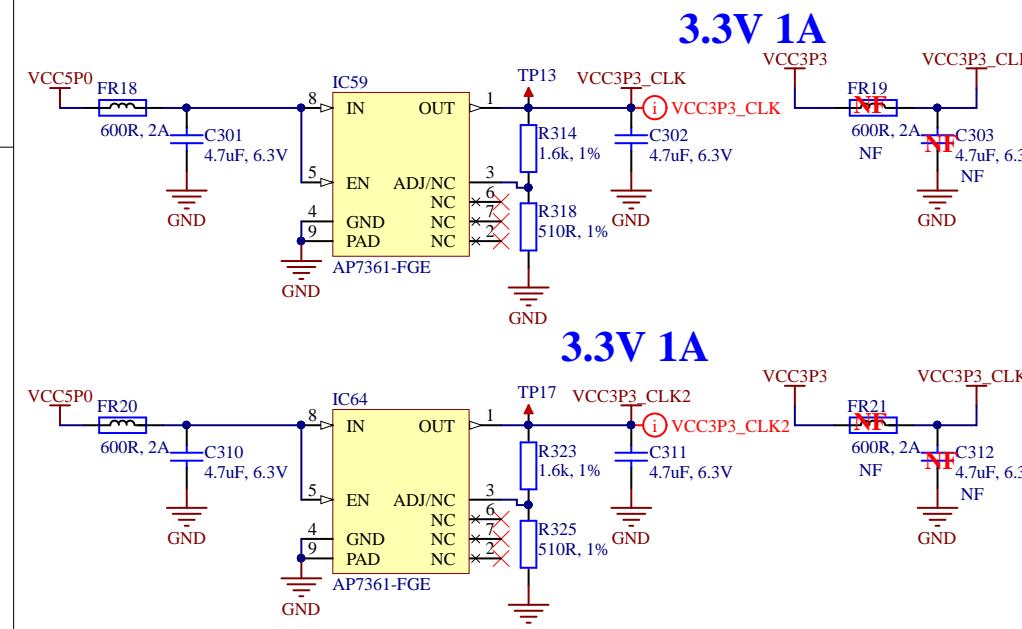
### Supercapacitor



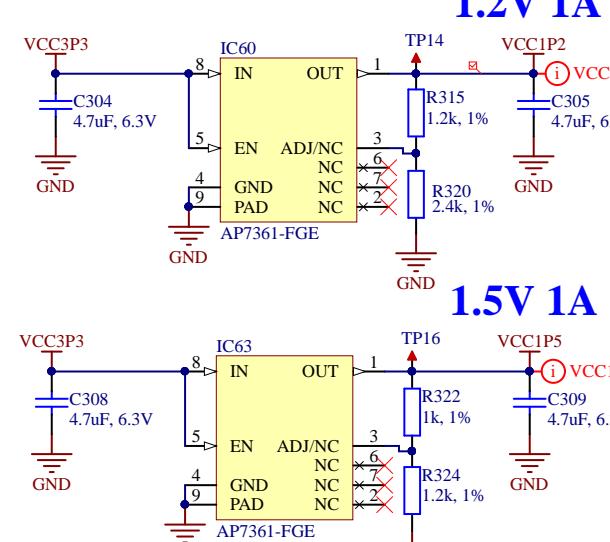
### 5.0V 6A



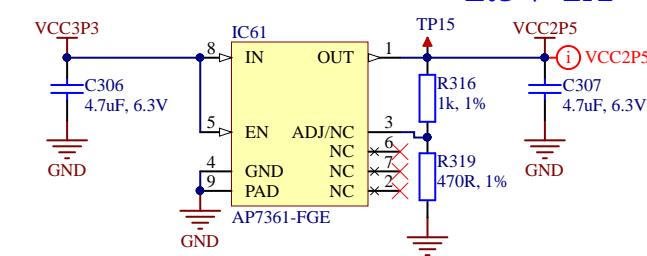
### Linear regulators



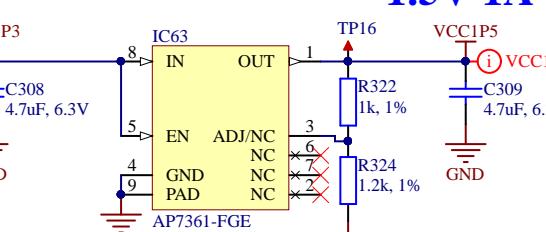
### 1.2V 1A



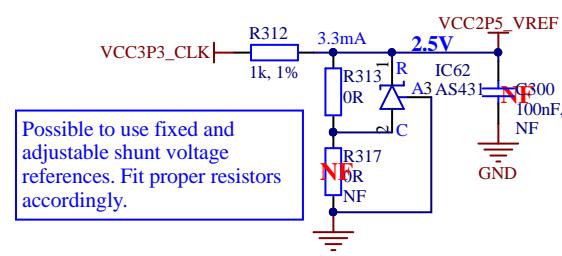
### 2.5V 1A



### 1.5V 1A



### Voltage reference (2.5V)



Alternative reference source for XO DAC and ADC

Project name: LimePSB-RPCM\_Iv3.PrbPcb

Title: Power

Size: A3

Revision: v1.3

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



Date: 2024-10-10 Time: 10:20:39 Sheet 15 of 15

File: 15\_Power.SchDoc