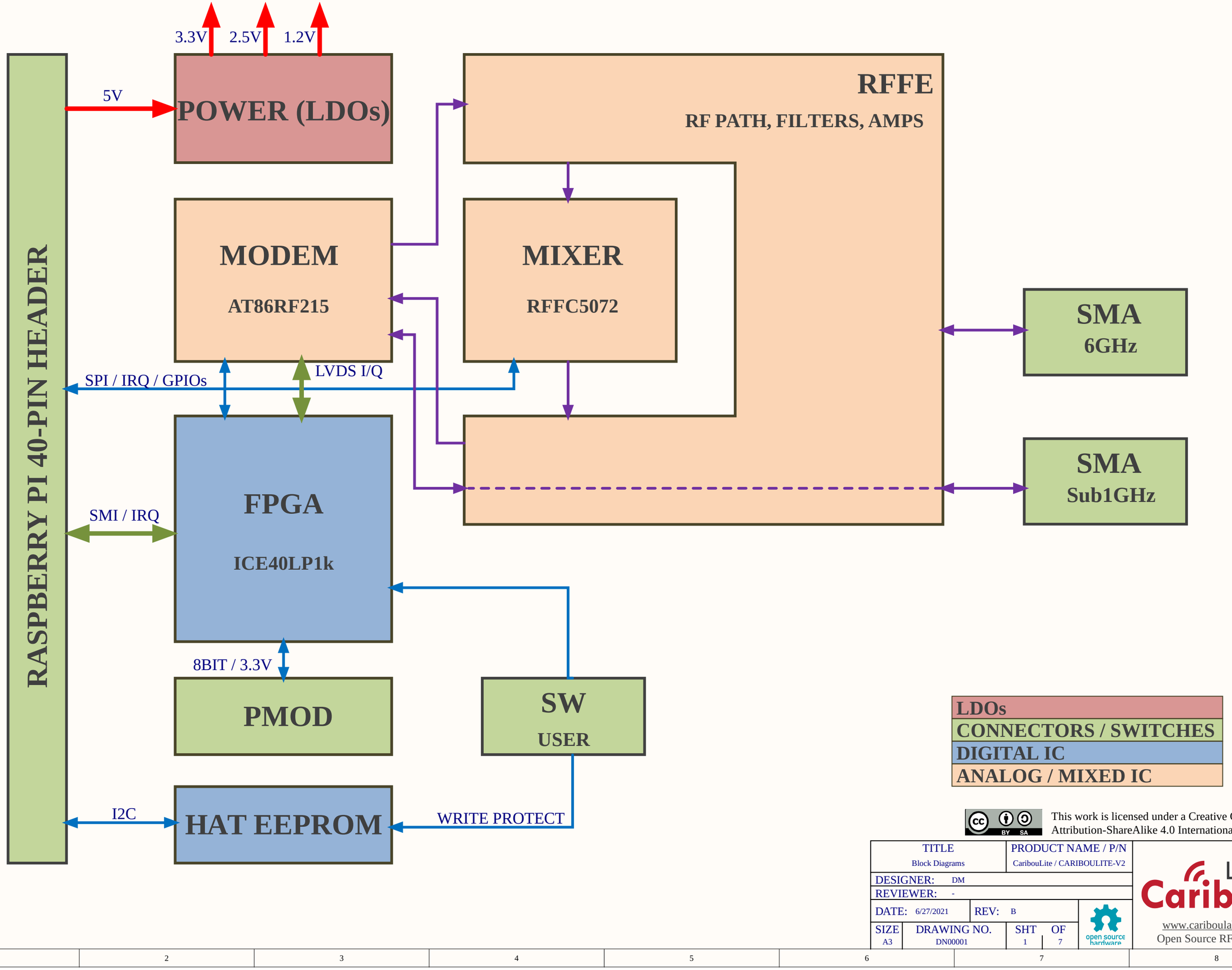

TITLE	PRODUCT NAME / P/N
Block Diagrams	CaribouLite / CARIBOULITE-V2
DESIGNER: DM	
REVIEWER: -	
DATE: 6/27/2021	REV: B
SIZE A3	DRAWING NO. DN00001
SHT 1	OF 7

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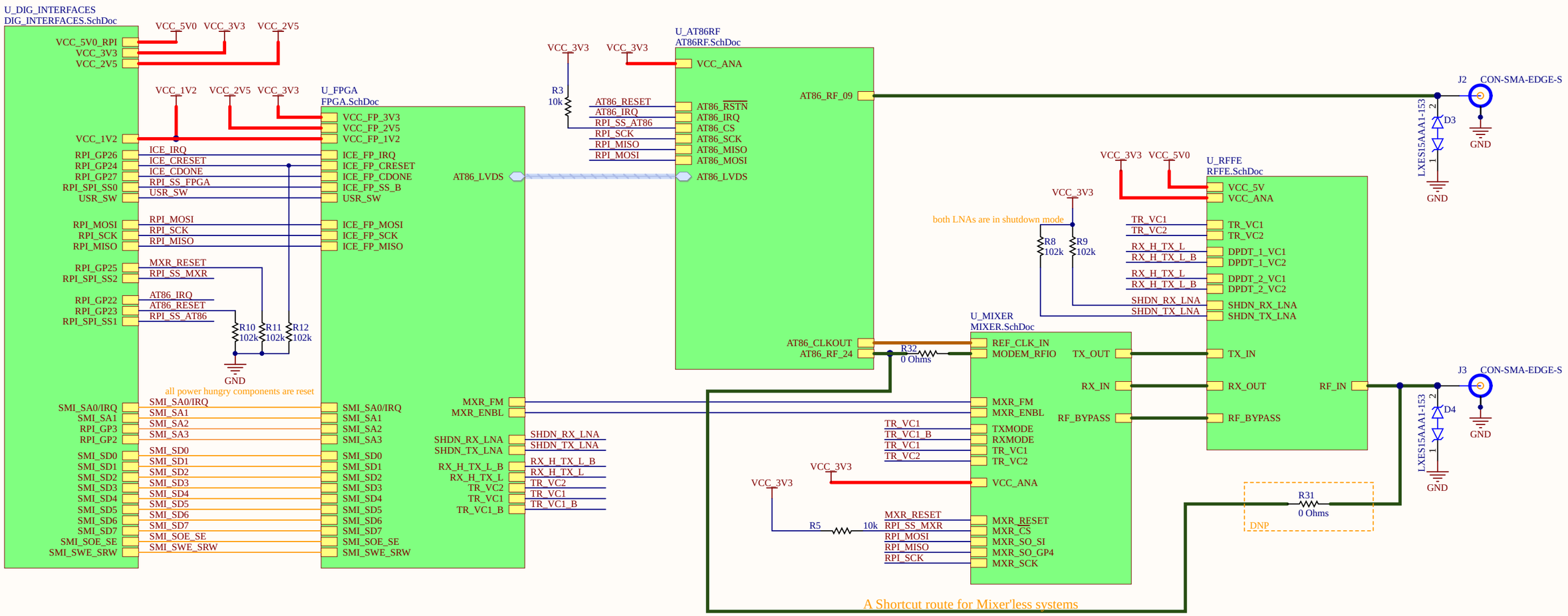

RFFE MODE	TR_VC1	TR_VC2	RX_H_TX_L	~RX_H_TX_L	RX_H_TX_L	~RX_H_TX_L	MXRMODE	TR_VC1	TR_VC2	~TR_VC1	TR_VC1	TR_VC2
MODE	TR_VC1	TR_VC2	DPDT_1_VC1	DPDT_1_VC2	DPDT_2_VC1	DPDT_2_VC2	MODE	TR_VC1	TR_VC2	RXMODE	TXMODE	MXR_RESET
OFF	'0'	'0'	'X'	'X'	'X'	'X'	OFF	'0'	'0'	'X'	'X'	'0'
BYPASS	'1'	'0'	'X'	'X'	'X'	'X'	BYPASS	'1'	'0'	'X'	'X'	'0'
RX LOWPASS	'0'	'1'	'1'	'0'	'1'	'0'	RX	'0'	'1'	'1'	'0'	'1'
RX HIPASS	'0'	'1'	'0'	'1'	'0'	'1'	RX	'0'	'1'	'1'	'0'	'1'
TX LOWPASS	'1'	'1'	'0'	'1'	'0'	'1'	TX	'1'	'1'	'0'	'1'	'1'
TX HIPASS	'1'	'1'	'1'	'0'	'1'	'0'	TX	'1'	'1'	'0'	'1'	'1'

TITLE	PRODUCT NAME / P/N
Top Level Design	CaribouLite / CARIBOULITE-V2
DESIGNER: DM	
REVIEWER: -	
DATE: 6/29/2021	REV: B
SIZE A3	DRAWING NO. DN00001
SHT 2	OF 7

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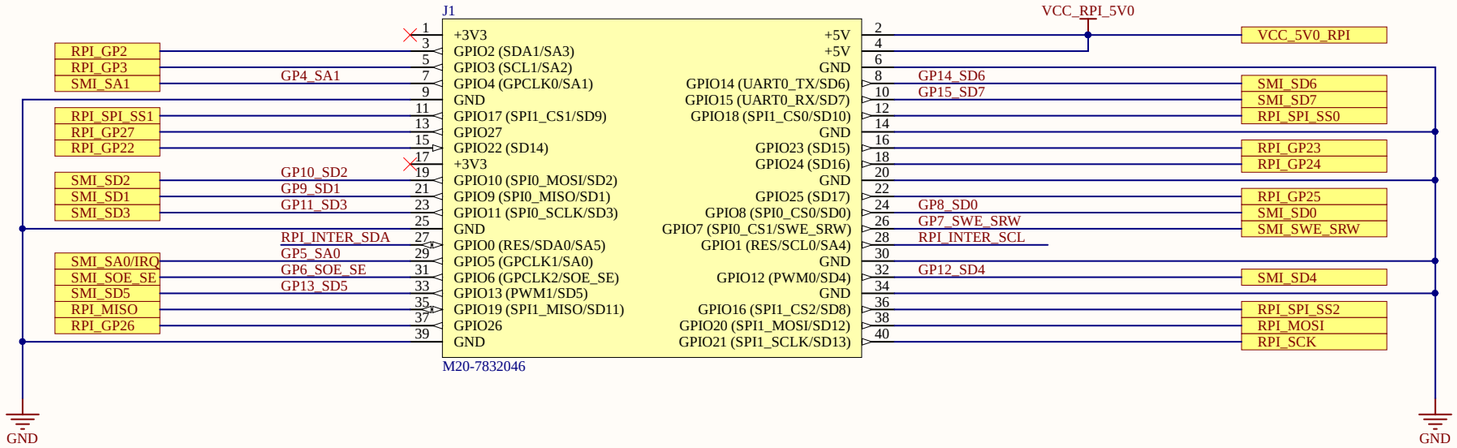
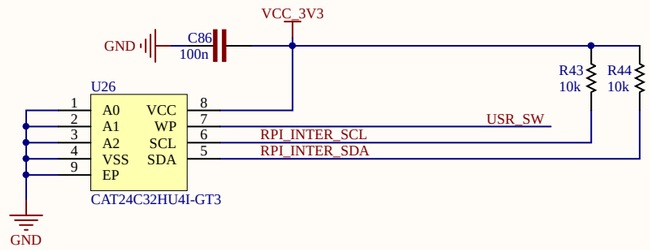
RASPBERRY PI 40-PIN HEADER

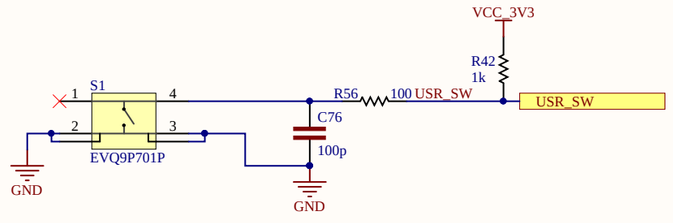


HAT EEPROM

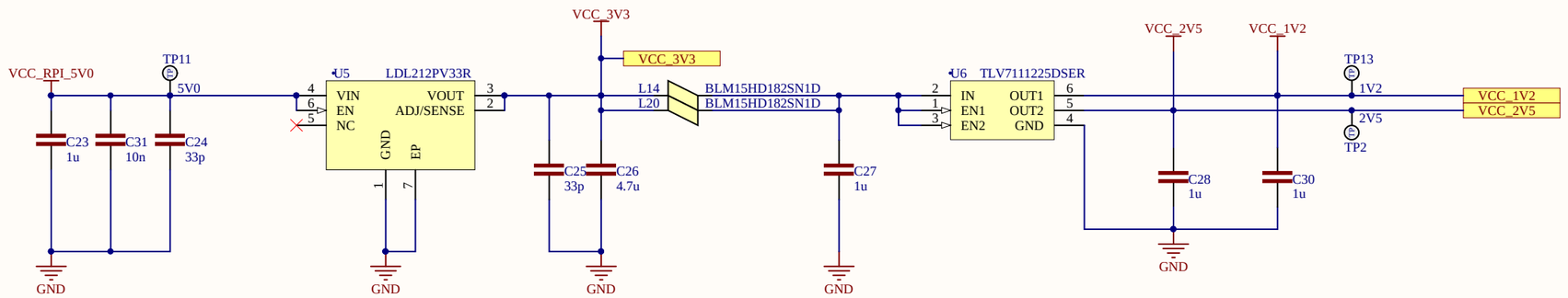


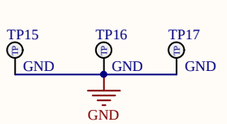
USER SWITCH

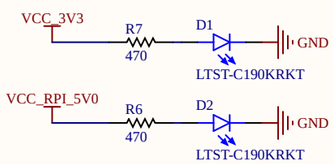
NOTE: Dual function - WP for HAT EEPROM



POWER SUPPLY







TITLE: Connectors and Power	PRODUCT NAME / P/N: CaribouLite / CARIBOULITE-V2
DESIGNER: DM	
REVIEWER: -	
DATE: 6/20/2021	REV: B
SIZE: A3	DRAWING NO.: DN00001
SHT: 3	OF: 7

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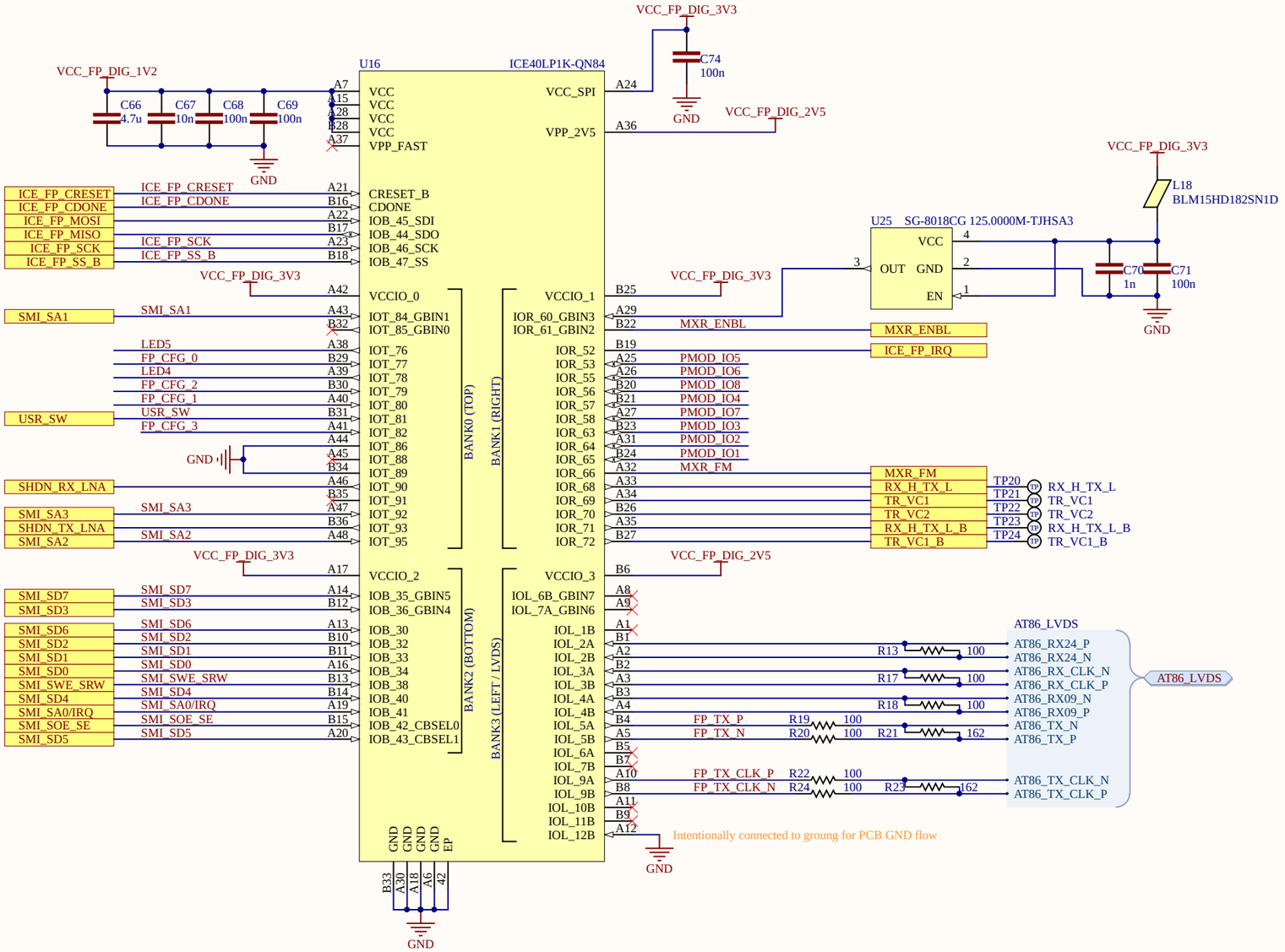
FPGA



LVDS Negated Pairs
==========
AT86_TX
AT86_RX09
AT86_TX_CLK

The other two are direct logic.

PROGRAMMING
==========
POR=> Check SS
1. if SS='1' => if NVCM programmed, use NVCM, otherwise use external flash (SPI MASTER).
2. if SS='0', wait to be configured from external controller through SPI

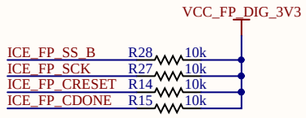
RESET - restarts the configuration
CDONE - before configuration finished is '0', When done turns '1'

Calculation of differential lines
==========
VCCIO = 2.5V
VOD = 0.5V (this is the differential swing nominal)
Rouput = 30 Ohms (given by ICE40 Specs)

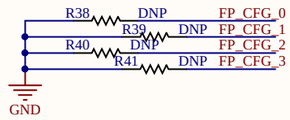
The parallel output resistor:
VCCIO = 2.5V => Rp = 2*(50*2.5/(2.5 - (2*0.5)))= 250 / 1.5 = 166 Ohms => Rp/2 = 83.3 Ohms
The series output resistors:
VCCIO = 2.5V => Rs = (50*83.3)/(83.3-50)-30 = 4165/33.5 -30 = 95 Ohms

But, we want to make Rs a 100 Ohms to minimize BOM =>
Rs = 100 => Rp = 162.5 Ohms => Vod = 0.48 Vdiff => Looks good enough!

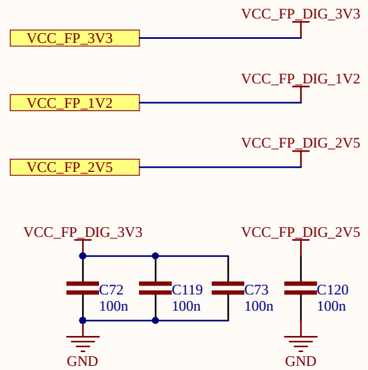
Connect the positive or true polarity side of the differential pair to the DPxxA input and the negative or complementary side of the pair to the DPxxB input.
==== If it is easier to route the differential pair, the input pins can be swapped, which produces an inverted input value. ====
====The inverted input value can subsequently be inverted by logic within the FPGA. ====



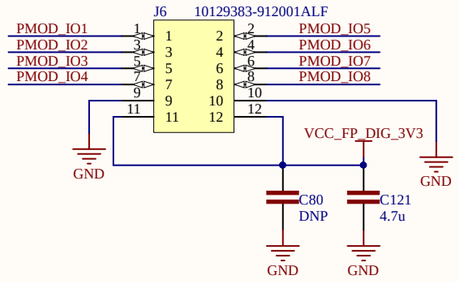
Configuration Resistors - Place 10k for pulldown as needed
Apply internal FPGA pullups on all config pins



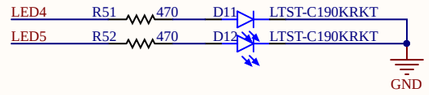
POWER TERMINALS



PMOD



LEDS



TITLE	PRODUCT NAME / P/N
FPGA ICE40LP	CaribouLite / CARIBOULITE-V2
DESIGNER: DM	
REVIEWER: -	
DATE: 6/28/2021	REV: B
SIZE A3	DRAWING NO. DN00001
SHT 4	OF 7

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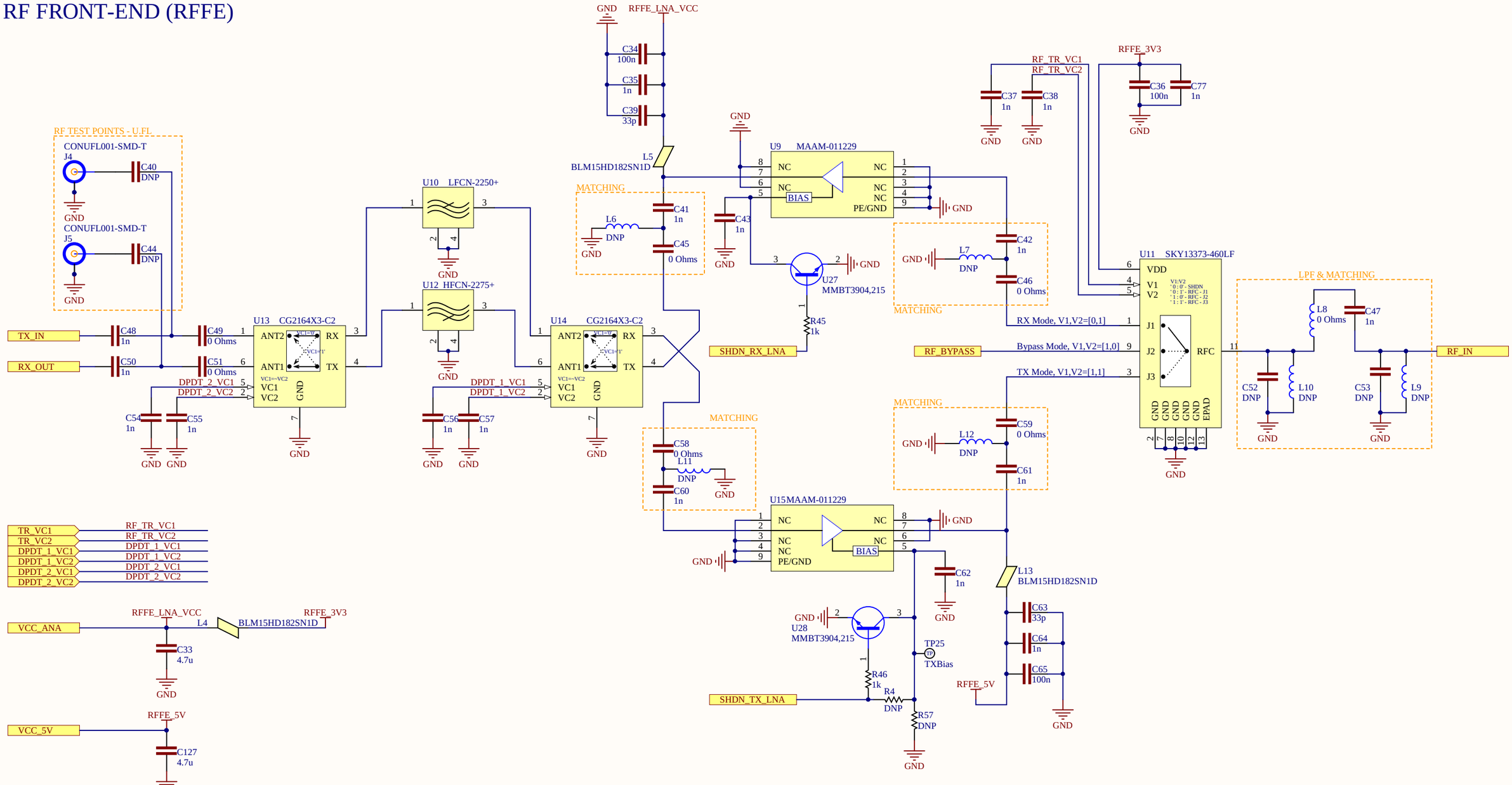
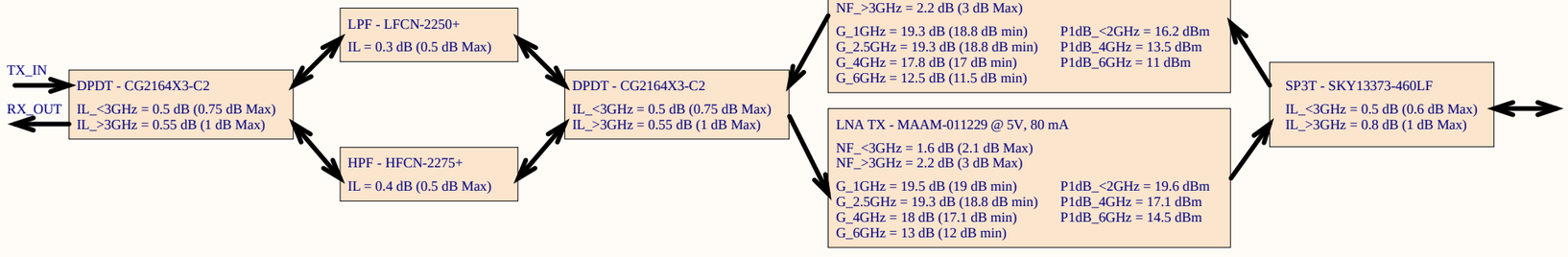
RF FRONT-END (RFFE)



RF DOCUMENTATION



TITLE: RF Front-End	PRODUCT NAME / P/N: CaribouLite / CARIBOULITE-V2
DESIGNER: DM	
REVIEWER: -	
DATE: 6/27/2021	REV: B
SIZE: A3	DRAWING NO.: DN00001
SHT: 5	OF: 7

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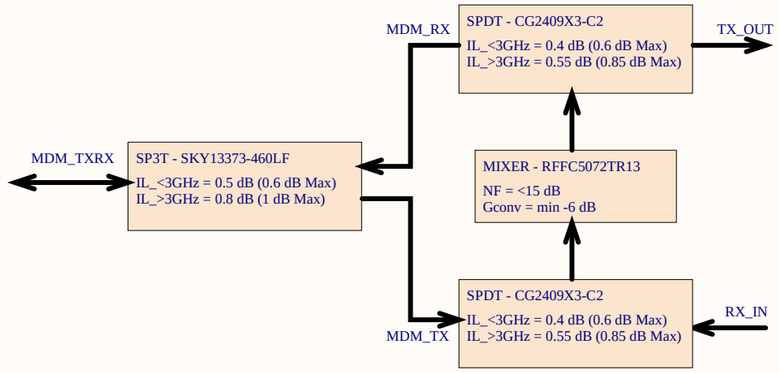
MIXER - QORVO RFFC5072

RF DOCUMENTATION



TITLE: Mixer	PRODUCT NAME / P/N: CaribouLite / CARIBOULITE-V2
DESIGNER: DM	
REVIEWER: -	
DATE: 6/28/2021	REV: B
SIZE: A3	DRAWING NO.: DN00001
SHT: 6	OF: 7

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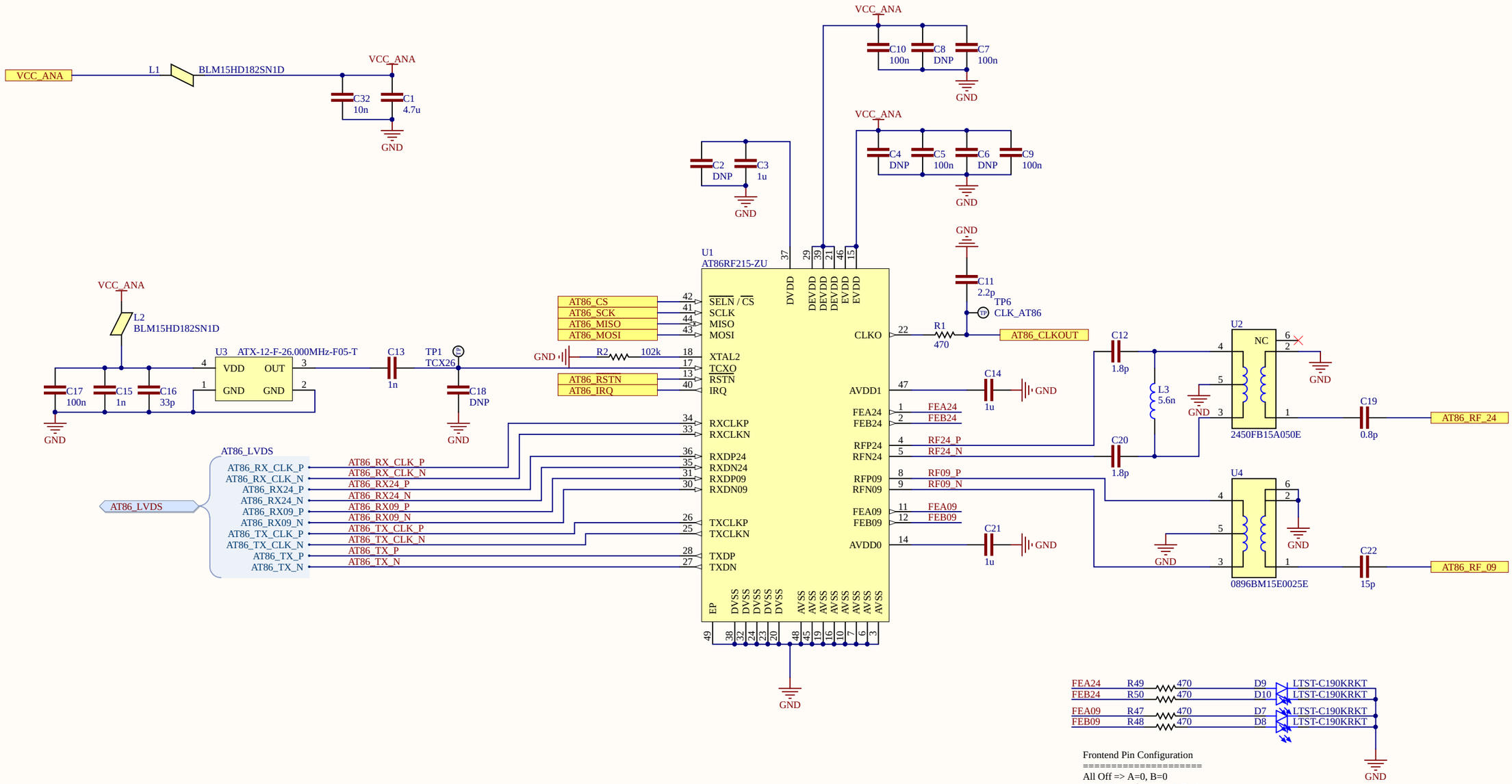
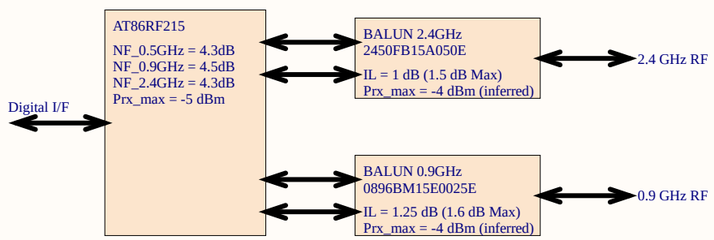
MODEM - AT86RF215



RF DOCUMENTATION



TITLE	PRODUCT NAME / P/N
Modem and TCXO	CaribouLite / CARIBOULITE-V2
DESIGNER: DM	
REVIEWER: -	
DATE: 6/28/2021	REV: B
SIZE A3	DRAWING NO. DN00001
SHT 7	OF 7

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