BeeBoard

PMC

SwarmUS

Revision 1.000

Date : 2021-03-18

TOP
BEE_BOARD_TOP.SchDoc

TOP
BEE_BOARD_BLOCK_DIAG.SchDoc

The following components were changed:

BSS138LT1G → BVSS138LT1G

Mounting holes

MTH1 MTH3 MTH2

Fiducials

FID1 FID 1MM
FID2 FID 1MM
FID3 FID 1MM

Revision history	

Section name

power

Package size conversion	
Metric	*Imperial*
1005	0402
1608	0603
2012	0805
3216	1206
3225	1210
6432	2512

Power notes

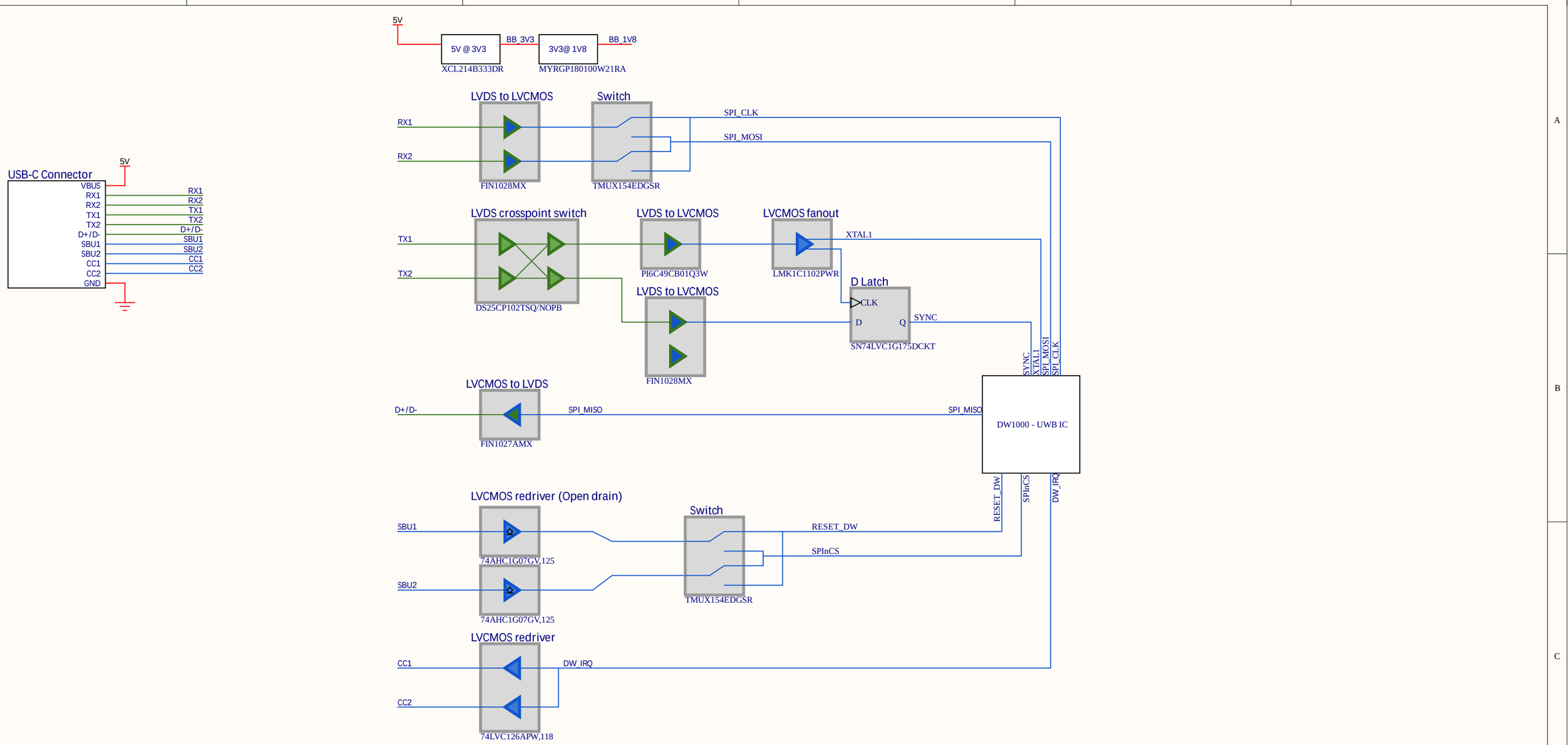
Usage notes

Questions / TODO

Routing notes

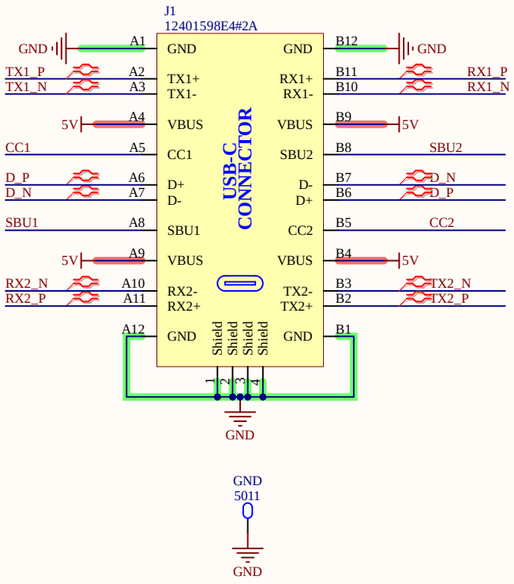
TODO R15 * 1% 0402
TODO C26 * * *
GENERAL_POWER_PORT
INSIDE_SHEET_POWER_PORT
ISOLATED_GROUND
GENERAL_GROUND

Project Title: BeeBoard		
Global Project: *PMC*		
Size: 11x17	Group: SwarmUS	Revision: 1.000
Date: 2021-03-18		Sheet: 1 of 7
Filename: BEE_BOARD_TITLE.SchDoc		Designers: Philippe Arsenault, Hubert Dube, Louis-Daniel Gaulin

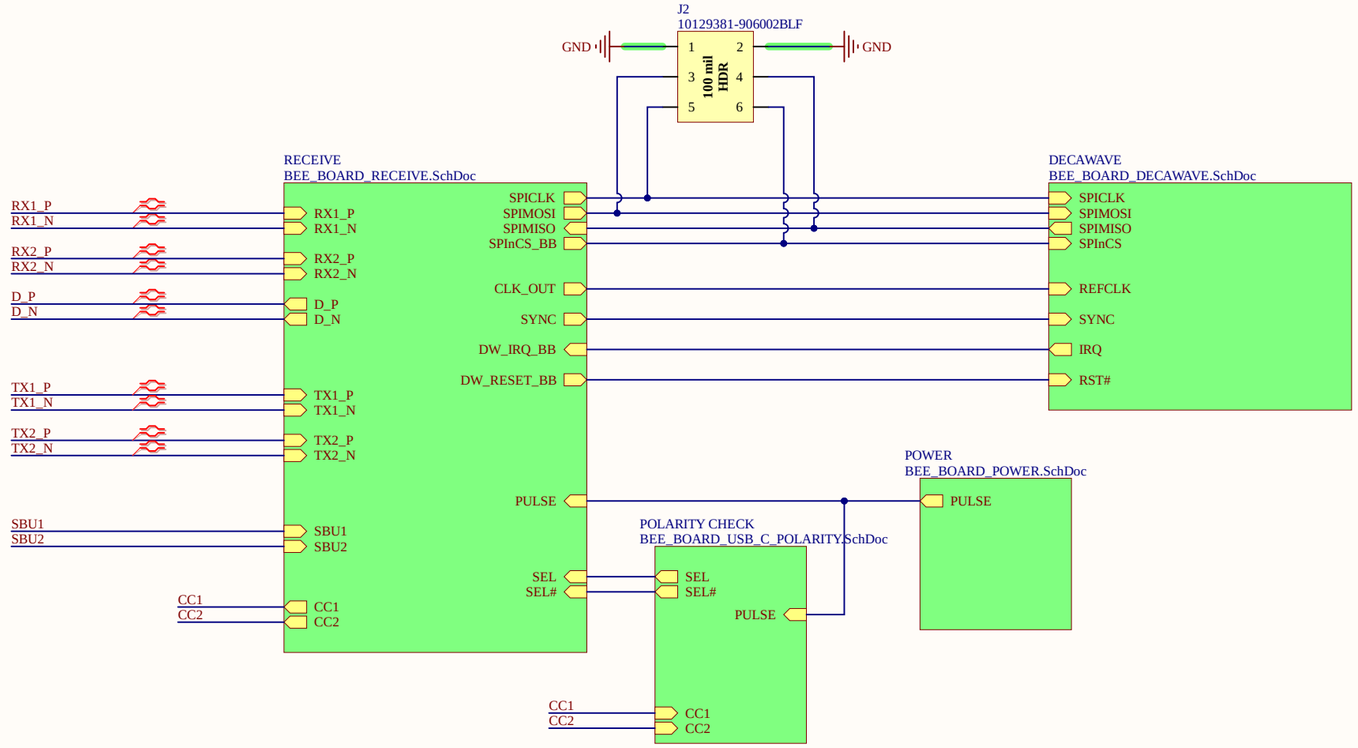


Sheet Name	BLOCK DIAGRAM
Project Title	BeeBoard
Global Project	*PMC*
Size: 11x17 / Group: SwarmUS / Revision: 1.000	
Date: 2021-03-18 / Sheet: 2 of 7	
Filename: BEE_BOARD_BLOCK_DIAG.SchDoc	Designers: Philippe Arsenault, Hubert Dube, Louis-Daniel Gaulin

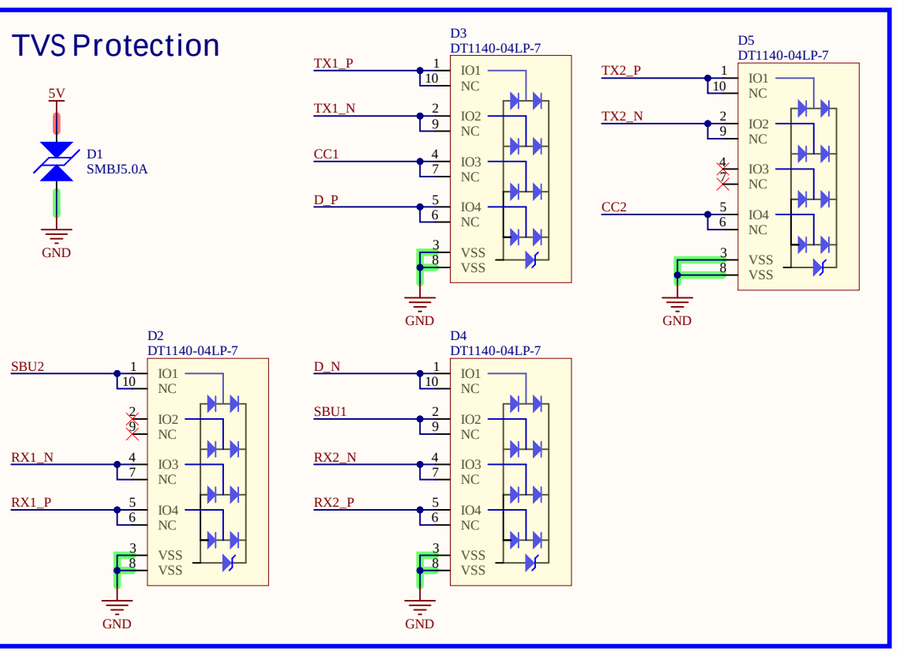
DP diff pair are 85 ohm



On flat cable (no twisting) :
RX1 : SPI CLK
RX2: SPI_MOSI
TX1 : CLK_38.4MHz
TX2 : SYNC
D+/D- : MISO
SBU1 : DW_RESET
SBU2 : SPI_nCS
CC1 : outputs IRQ
CC2 : NC

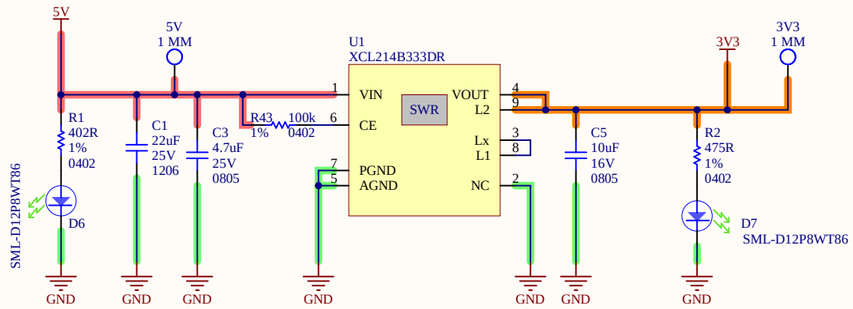


TVS Protection



Sheet Name: Top		
Project Title: BeeBoard		
Global Project: *PMC*		
Size: 11x17	Group: SwarmUS	Revision: 1.000
Date: 2021-03-18		Sheet: 3 of 7
Filename: BEE_BOARD_TOP.SchDoc		Designers: Philippe Arsenault, Hubert Dube, Louis-Daniel Gaulin

3V3 Generation



380mA@5V MAX

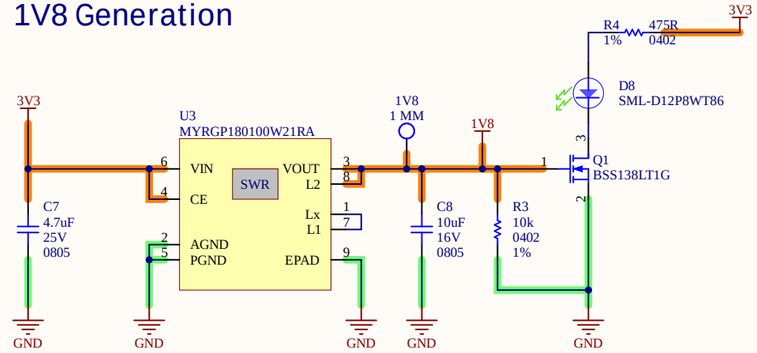
EFFICENCY = 90%+ @250mA

517mA@3V3 MAX

Design Note:
Use CL = 20uF or more when VIN-VOUT (T) <1.5V. Otherwise : CL = 10uF

PCB Note:
Routing must be carefully done following P.11 of the datasheet

1V8 Generation



138mA@3V3 MAX

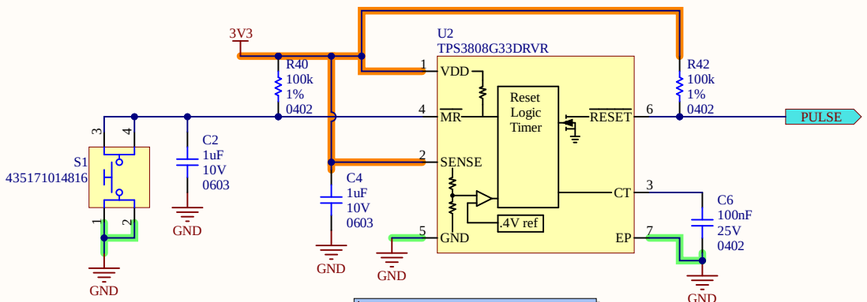
EFFICENCY = 90%+ @180mA

228mA@1V8 MAX

PCB Note:
Routing must be carefully done following P.12 of the datasheet

Close to DW

Pulse generator

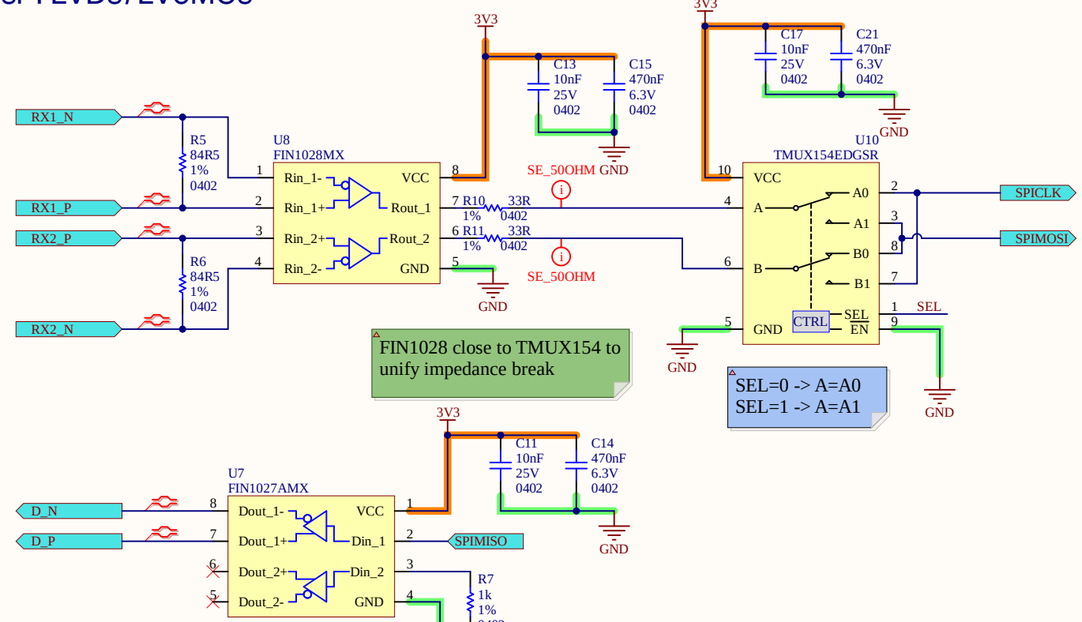


Design Note:
T(s) = CT(nf)/175 + 0.5*10^-3
0.572s @ 100nF

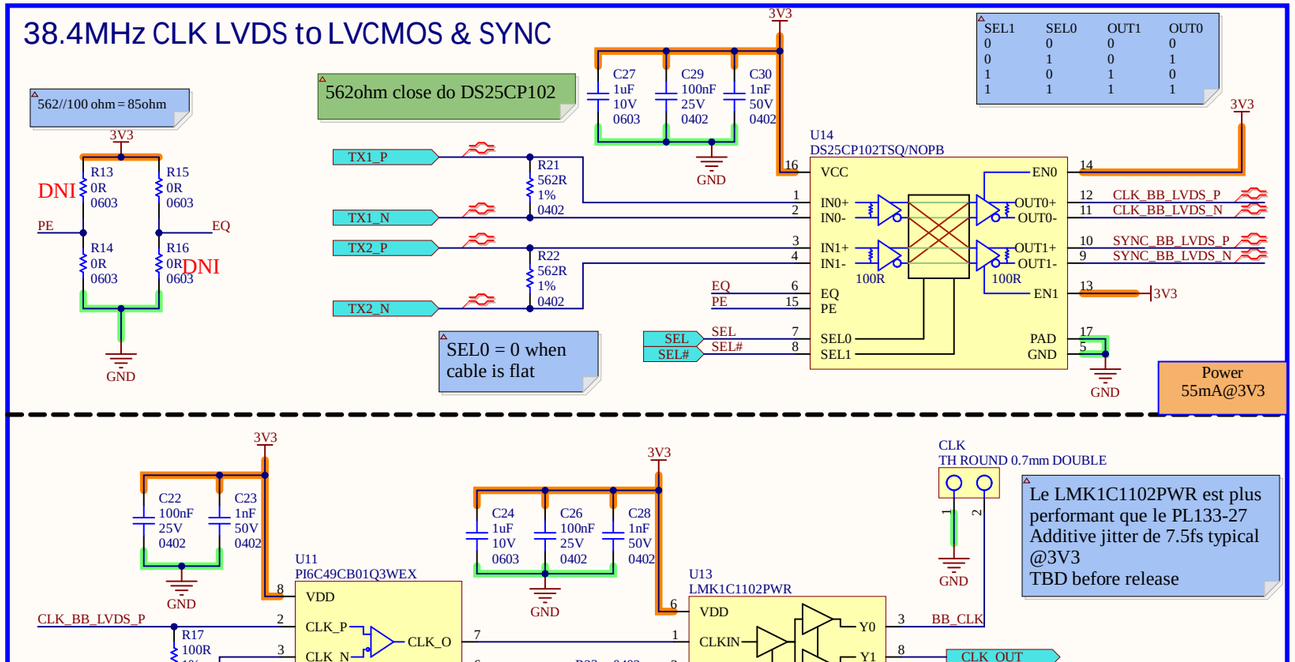
5mA@3V3 MAX

Sheet Name	POWER
Project Title	BeeBoard
Global Project	*PMC*
Size: 11x17 / Group: SwarmUS / Revision: 1.000	
Date: 2021-03-18 / Sheet: 4 of 7	
Filename: BEE_BOARD_POWER.SchDoc	Designers: Philippe Arsenault, Hubert Dube, Louis-Daniel Gaulin

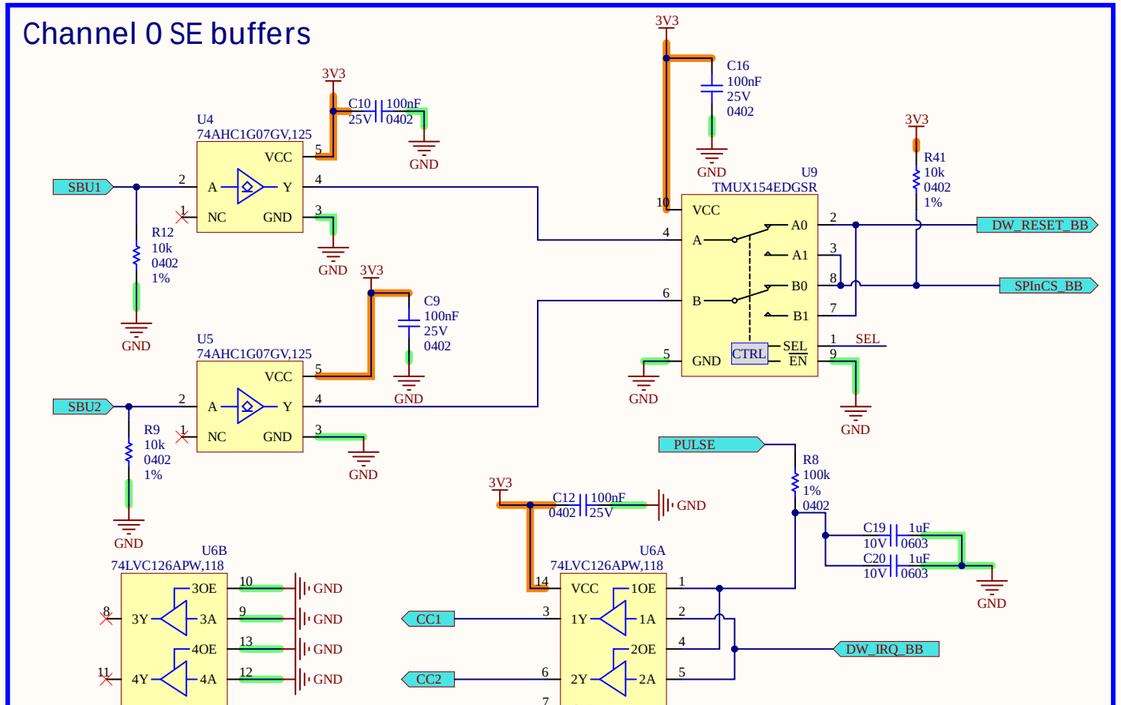
SPI LVDS/LVCMOS



38.4MHz CLK LVDS to LVCMOS & SYNC

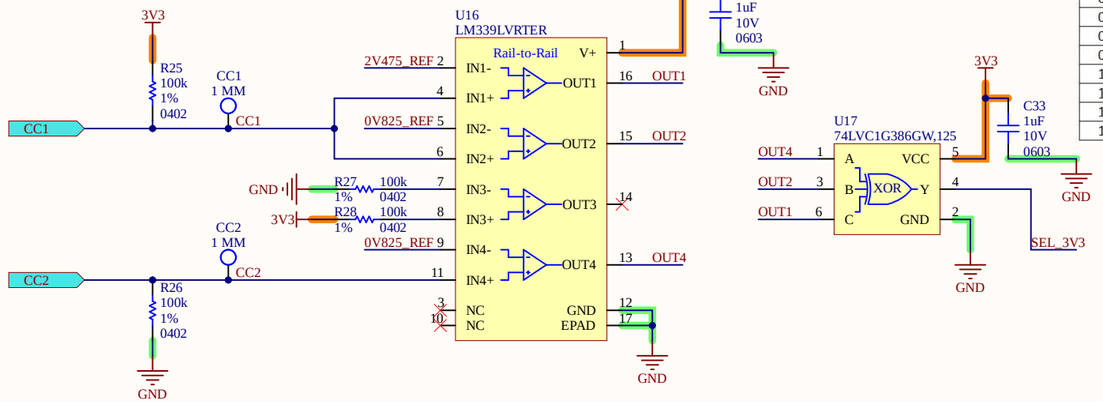


Channel 0 SE buffers



Sheet Name	Receive modules
Project Title	BeeBoard
Global Project	*PMC*
Size	11x17
Group	SwarmUS
Revision	1.000
Date	2021-03-18
Sheet	5 of 7
Filename	BEE_BOARD_RECEIVE.SchDoc
Designers	Philippe Arsenault Hubert Dube Louis-Daniel Gaulin

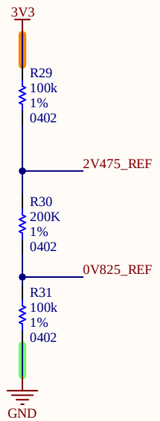
USB-C Entry



Inputs			outputs
W	X	Y	Q = A⊕B⊕C
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

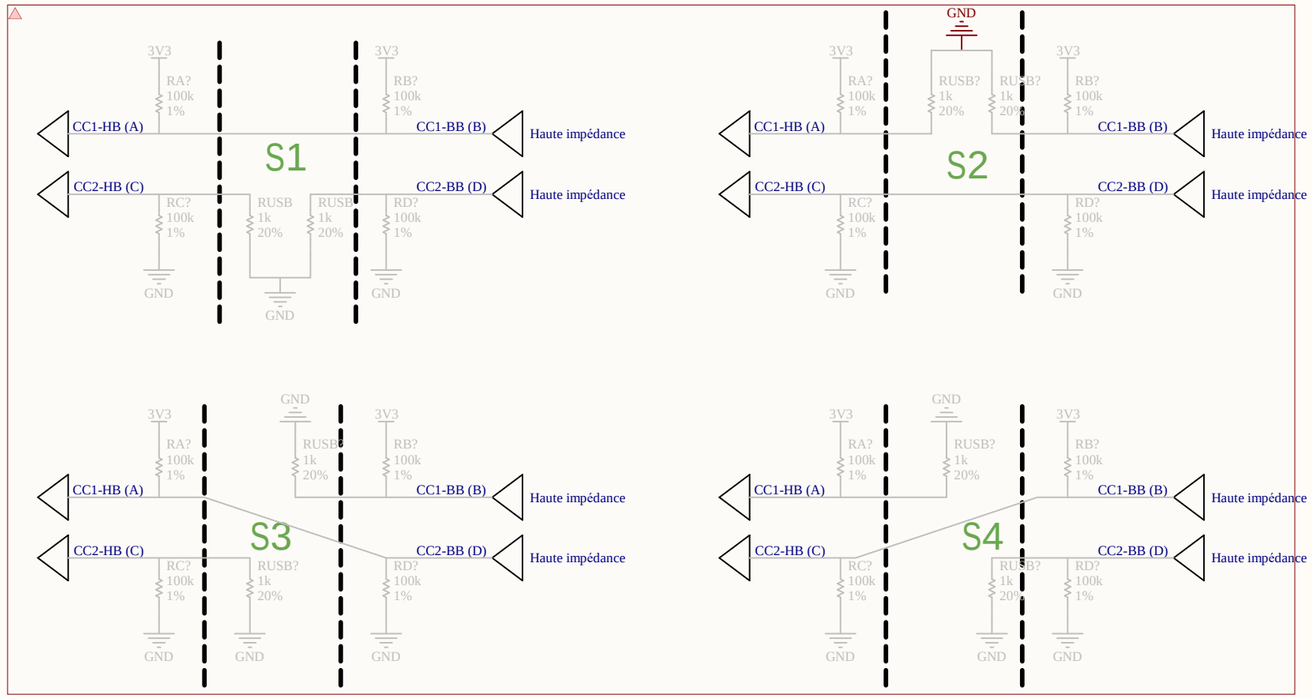
power
210uA@3V3

Resistor comparative

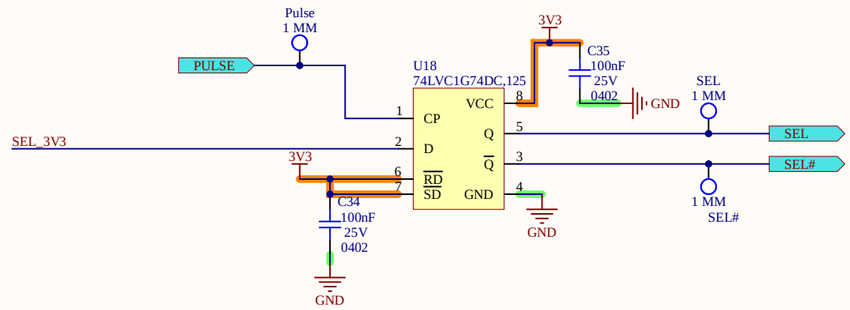


power
8.25uA@3V3

USB-C Polarity Check REFERENCE FIGURES



Selection fanout

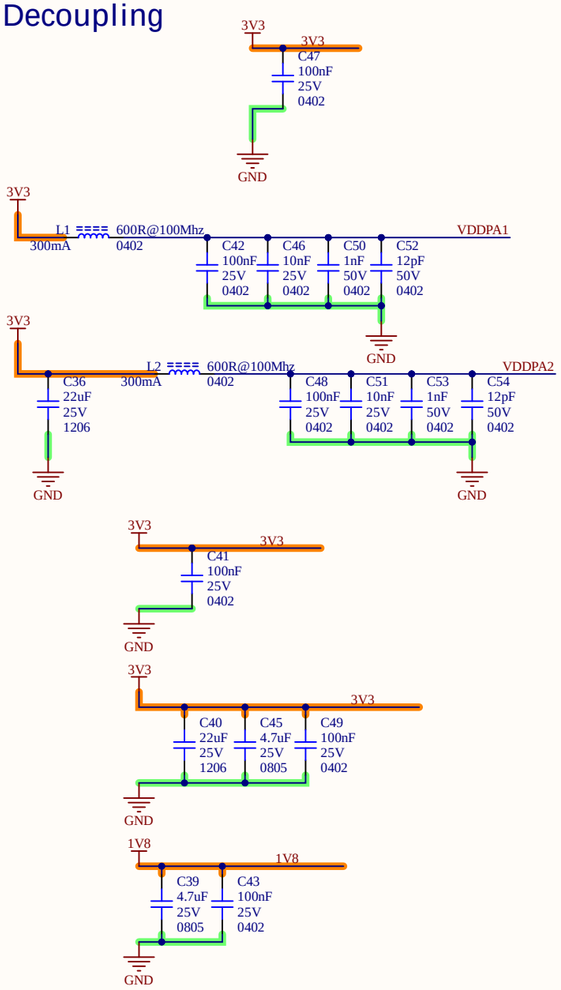


power
100mA@3V3

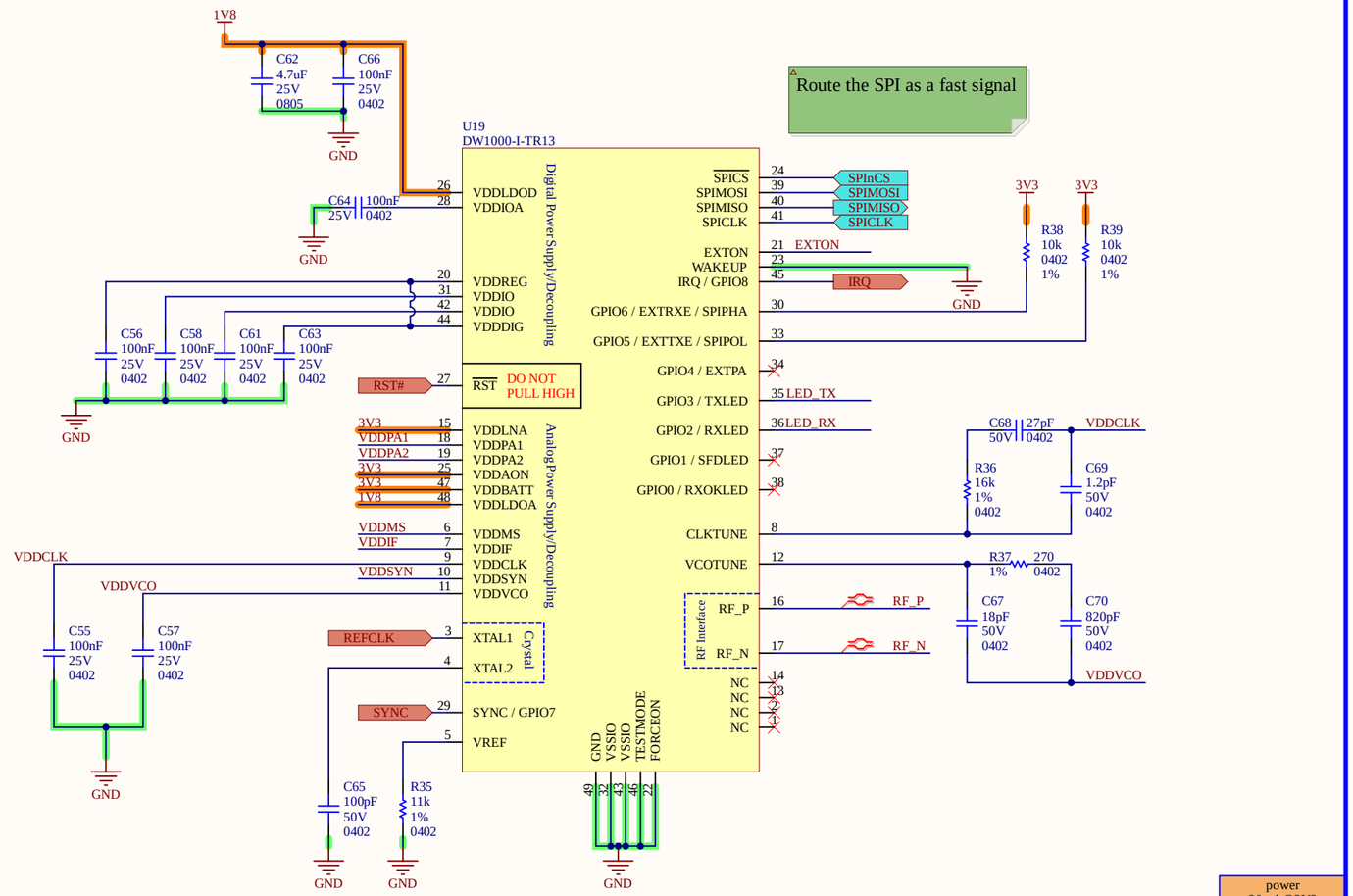
Sheet total
100mA@3V3

Sheet Name	USB Polarity Check
Project Title	BeeBoard
Global Project	*PMC*
Size: 11x17 / Group: SwarmUS / Revision: 1.000	
Date: 2021-03-18	Sheet: 6 of 7
Filename: BEE_BOARD_USB_C_POLARITY.SchDoc	Designers: Philippe Arsenault, Hubert Dube, Louis-Daniel Gaulin

Decoupling



Decawave

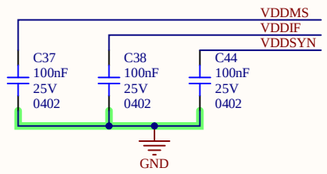


Route the SPI as a fast signal

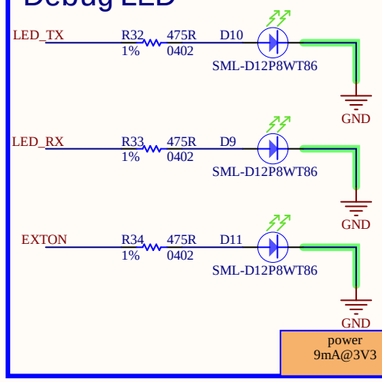
R38/R39 are there to supply a less resistance path for the 3v3 internal pull-up

power
30mA@3V3
210mA@1V8

Off-chip capacitance

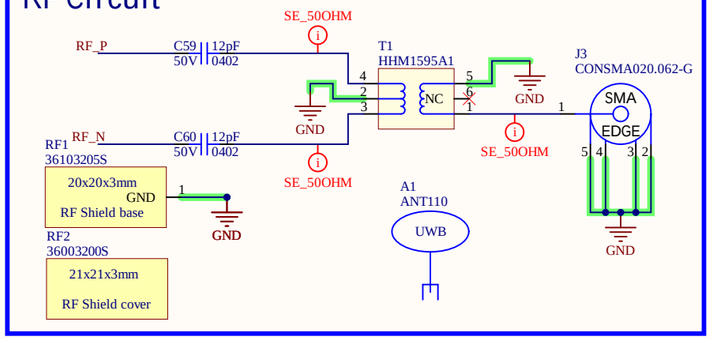


Debug LED



power
9mA@3V3

RF Circuit



Sheet total
39mA@3V3
210mA@1V8

Sheet Name	DECAWAVE
Project Title	BeeBoard
Global Project	*PMC*
Size: 11x17 / Group: SwarmUS / Revision: 1.000	
Date: 2021-03-18 / Sheet: 7 of 7	
Filename: BEE_BOARD_DECAWAVE.SchDoc	Designers: Philippe Arsenault, Hubert Dube, Louis-Daniel Gaulin