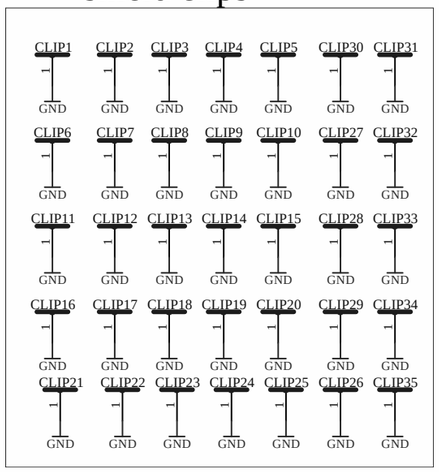
shield clips



Output SMAs

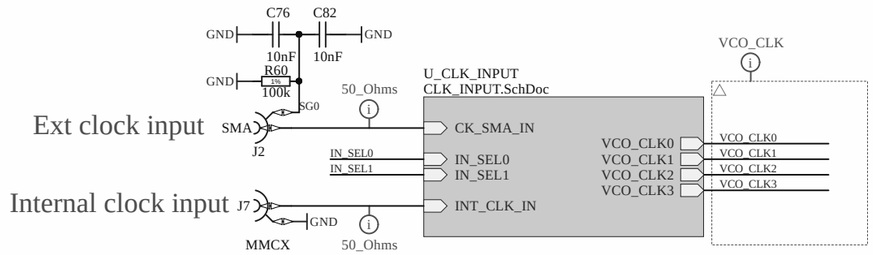
SMA Insulating washers

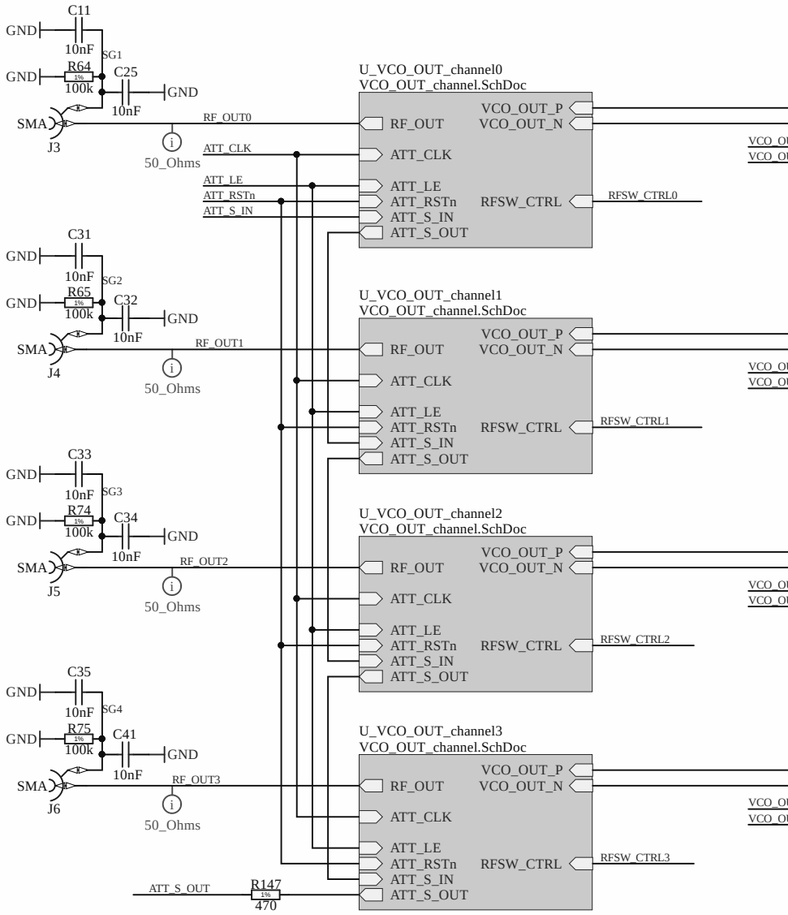
WASHER1 D11.1xd6.6	WASHER2 D11.1xd6.6
WASHER3 D11.1xd6.6	WASHER4 D11.1xd6.6
WASHER5 D11.1xd6.6	WASHER6 D11.1xd6.6
WASHER7 D11.1xd6.6	WASHER8 D11.1xd6.6
WASHER9 D11.1xd6.6	WASHER10 D11.1xd6.6

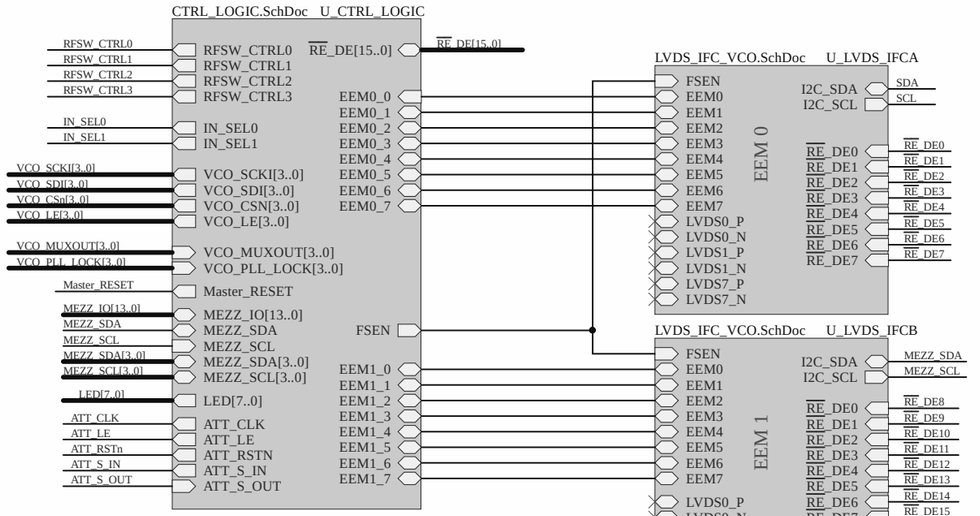
Input frequency range:
10MHz-250MHz

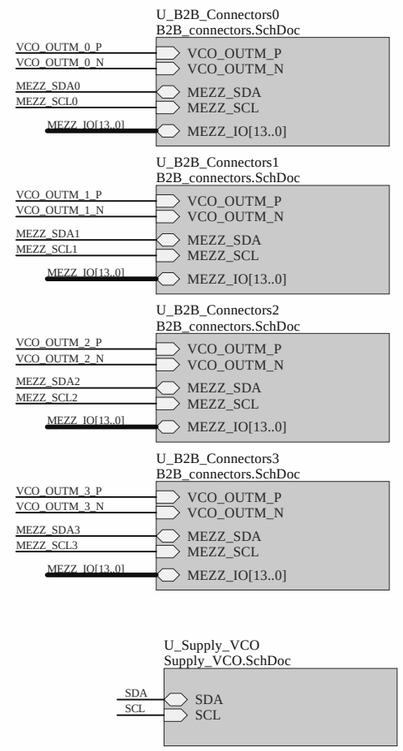
Ext clock input

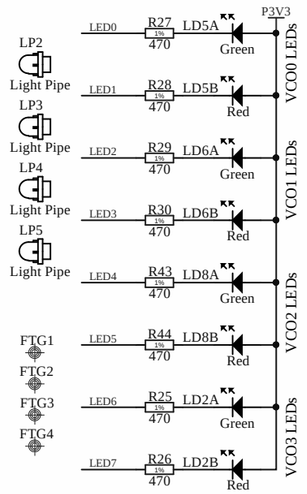
Internal clock input











Project/Equipment	ARTIQ/SINARA		
Document	**3U VCO/PLL (MIRNY) v1.0** **Top entity**	Designer K.B.	
		Drawn by K.B.	XX/XX/XXXX
		Check.by	-
		Last Mod. -	2018-11-30
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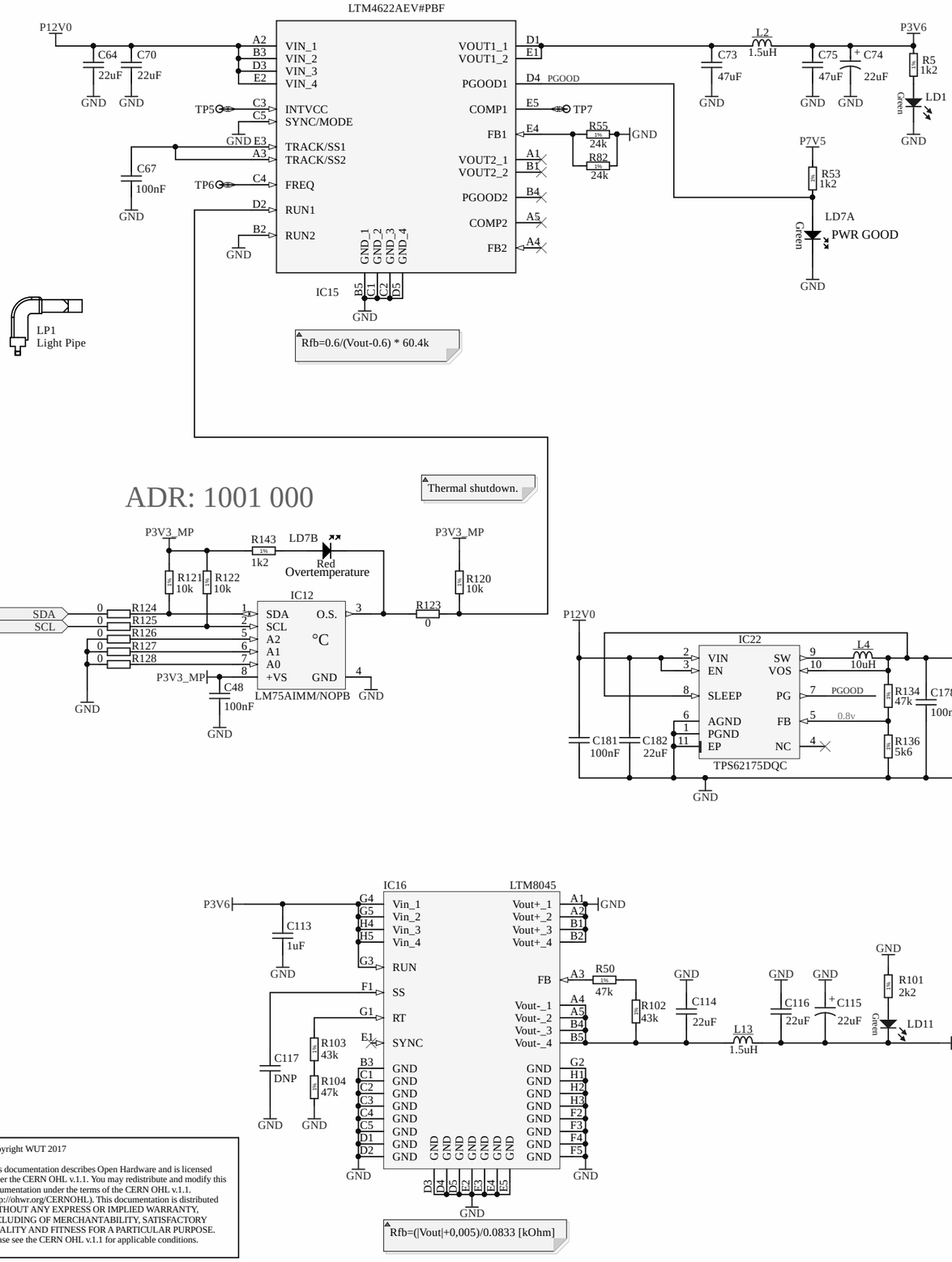
		Print Date 2018-12-02 02:28:30	Sheet 1 of 8
	Warsaw Univeristy of Technology Nowowiejska 15/19 **ISE**	ARTIQ	Size A3 / Rev -



Power budget (max ratings):

P3V3:	
LVDS interface 4x	660
LVDS load 4x24mA	96
CPLD	100
ADF4351	4*(27+36+80+26)=676
SY89855UMG	4*(85)=340
TCXO	6
TOTAL P3V3	1878
TOTAL POWER	6,1974 W
P5V0:	
HMC542BLP4E	4*2,9=11.6
HMC349LP4C	4*3,5=14
TOTAL 5V0	25,6
TOTAL POWER	0,125 W
P7V0:	
ERA-4XSM+	4*85=340
TOTAL 7V0	340
TOTAL POWER	2,38
DC/DC converter losses	
TPS62175 eff .95	0,05*(0,366)*7,5=0,137 W
LTM4622:3.6V eff .9	0,1*1,878*3,6=0,676 W
LTM8045 eff .8	0,2*(4*25)*3,6=0,072 W
LDO losses	
3.6V->3.3V	0,564 W
7.5V->5V	0,064 W
Total power from 12V	10,5 W
Total current from 12V	0,875 A

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Power supply DC/DC & LDOs

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Size	A3
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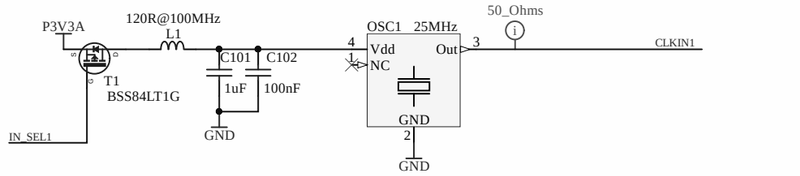
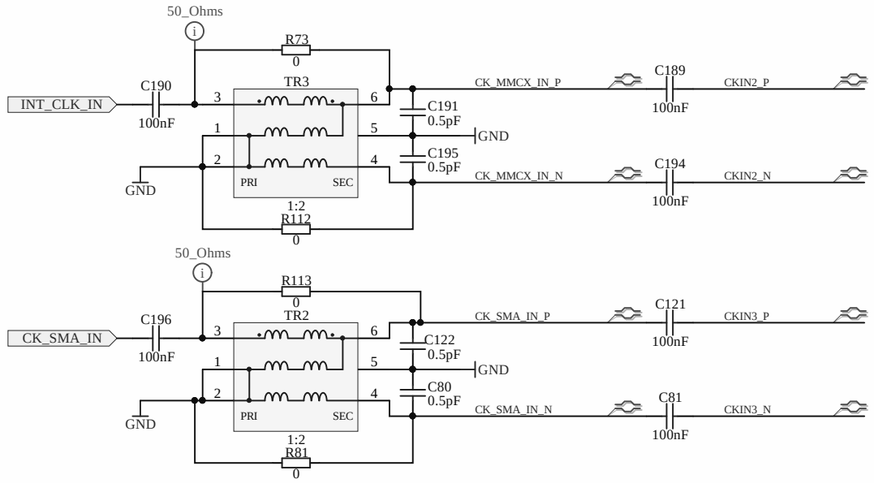
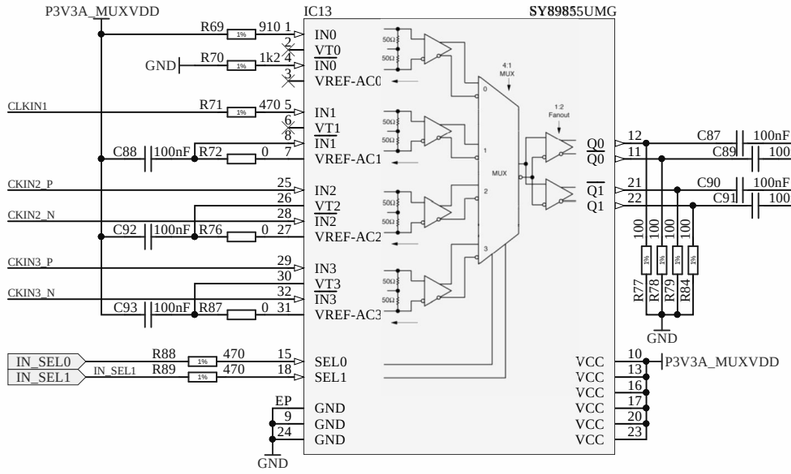
	2018-12-01

ARTIQ



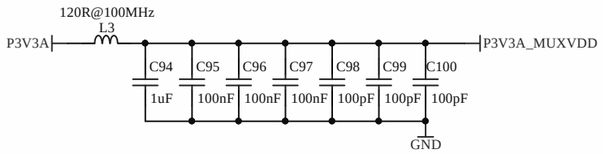


AC-Coupled Input Termination, Such as LVDS and LEVPECL



TRUTH TABLE

SEL1	SEL0		
0	0	IN0 Input Selected	-
0	1	IN1 Input Selected	XO
1	0	IN2 Input Selected	MMCX
1	1	IN3 Input Selected	SMA



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Clock distribution and generation

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Drawn by	K.B.	XX/XX/XXXX
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Last Mod.	-	2018-11-30
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Print Date	2018-12-02 02:28:31	Sheet 3 of 8

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$$RF_{OUT} = [INT + (FRAC/MOD)] \times (f_{PFD}/RF\ Divider)$$

where:
RF_{OUT} is the RF frequency output.
INT is the integer division factor.
$FRAC$ is the numerator of the fractional division (0 to MOD − 1).
MOD is the preset fractional modulus (2 to 4095).
$RF\ Divider$ is the output divider that divides down the VCO frequency.

$$f_{PFD} = REF_{IN} \times [(1 + D)/(R \times (1 + T))]$$

where:
REF_{IN} is the reference frequency input.
D is the RF REF_{IN} doubler bit (0 or 1).
R is the RF reference division factor (1 to 1023).
T is the reference divide-by-2 bit (0 or 1).

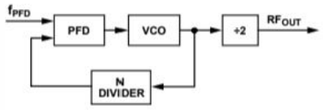
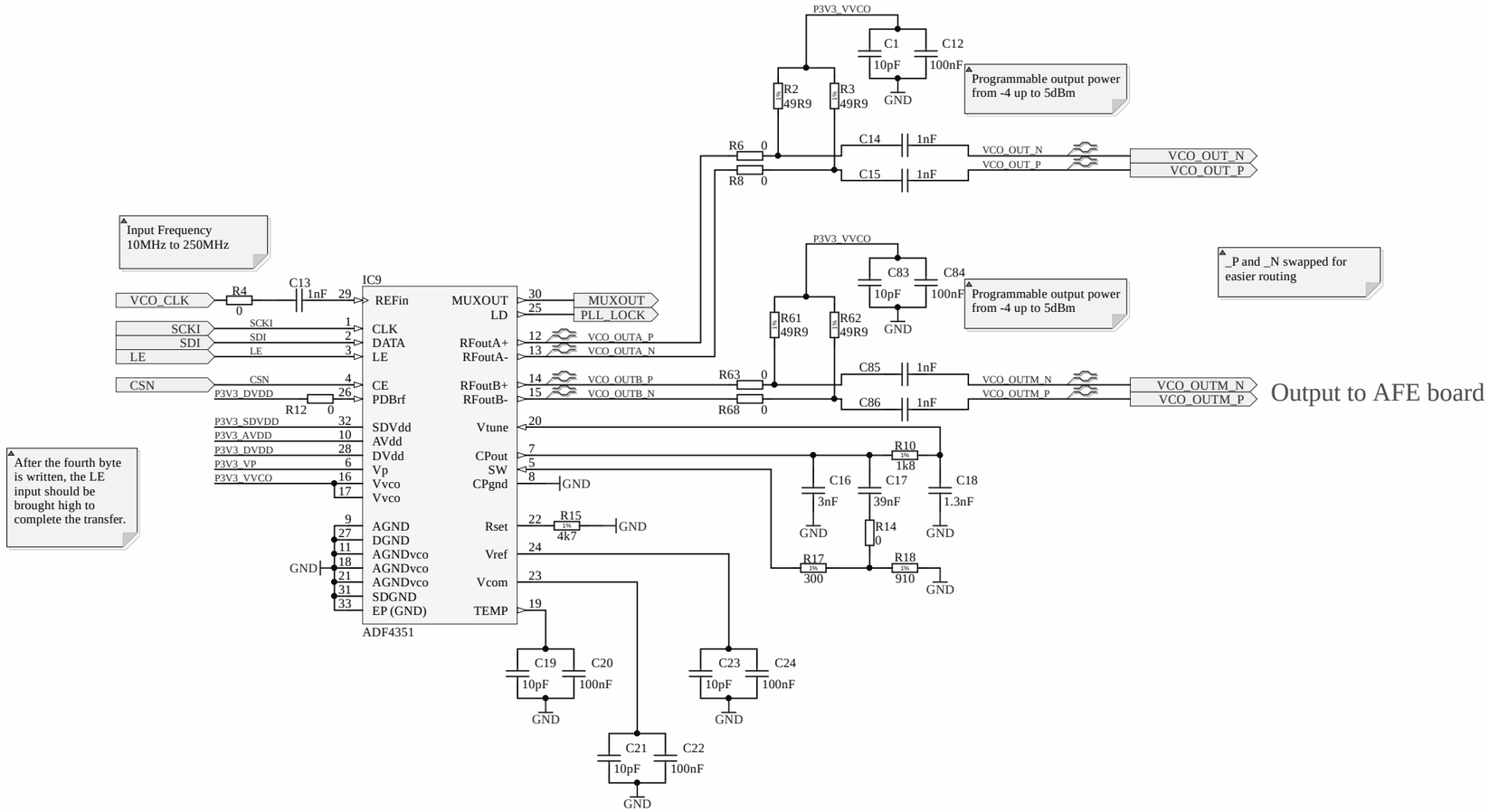


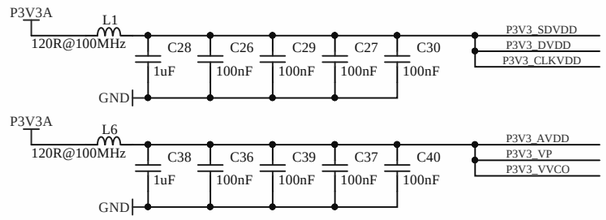
Figure 30. Loop Closed Before Output Divider

D = 0
T = 0
R = 1
MOD = 4000

Start Freq	Stop Freq	VCO Divider	Channel Spacing
40.0MHz	68.75MHz	64	97.656 Hz
68.75MHz	137.5MHz	32	195.31 Hz
137.5MHz	275MHz	16	390.63 Hz
275MHz	550MHz	8	781.25 Hz
550MHz	1.10GHz	4	1.5625kHz
1.10GHz	2.20GHz	2	3.125kHz
2.20GHz	4.00GHz	1	6.25kHz



Output to AFE board



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ADF4351 VCO

Designer K.B.
Drawn by K.B. XX/XX/XXXX
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Last Mod. - 2018-11-30
File VCO_channel.SchDoc
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One of Two RF filters can be used switchable by the two jumpers (R57/59 and R58/C28)
for jumper configuration see ADC_channel sheet
Populate Filter Components according to individual project design
For Custom FIlter reference design and Possible configurations (as AWR MWO projects) are found in documentation folder

Discrete-elemet filter with R57/59 & R58/C28

Mini-Circuits FV1206 filter

Jumper

Jumper

Digital Attenuator

F clk max = 30MHz

HMC542BLP4E

Amplifier
+13dB @ 2GHz typ.

HMC349ALP4CE

SPDT switch

Project/Equipment	ARTIQ/SINARA
Document	***Output stage : Attenuator, amplifier and filter***
Designer	K.B.
Drawn by	K.B. XX/XX/XXXX
Check.by	-
Last Mod.	- 2018-11-30
File	VCO_OUT_channel.SchDoc
Print Date	2018-12-02 02:28:31 Sheet 5 of 8
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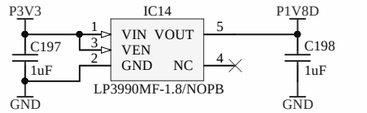
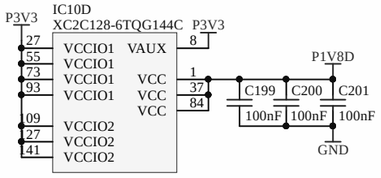
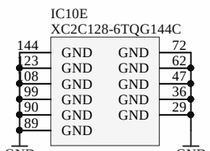
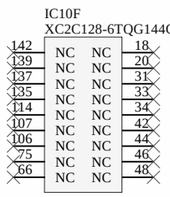
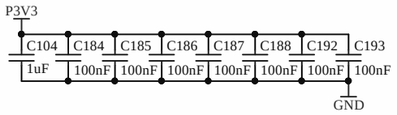
	ARTIQ Size A3 Rev -

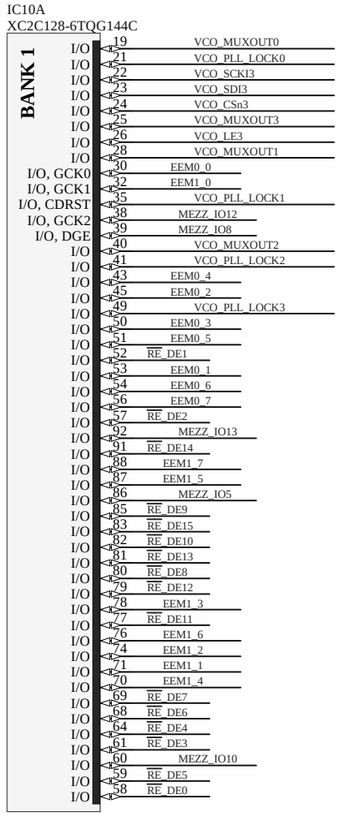


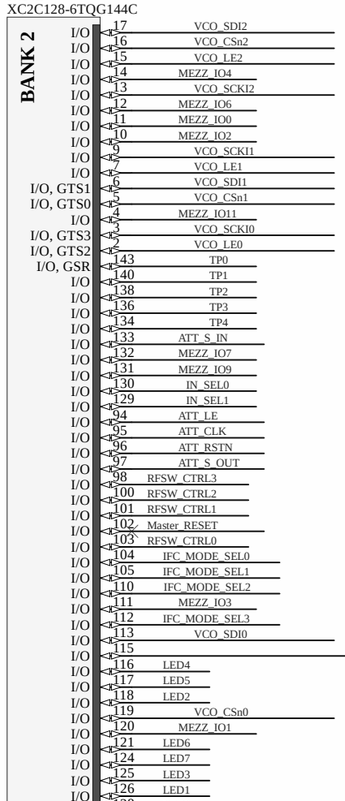


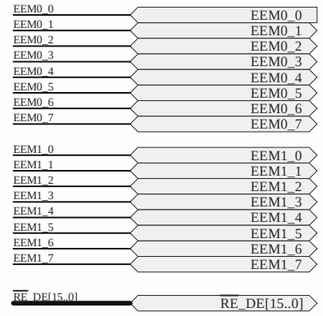


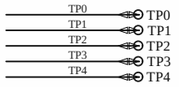


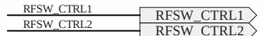


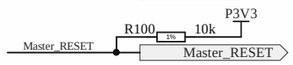


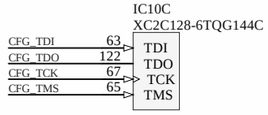


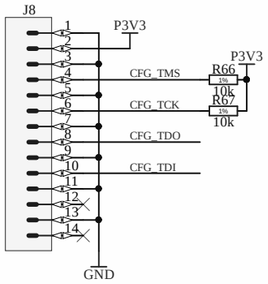


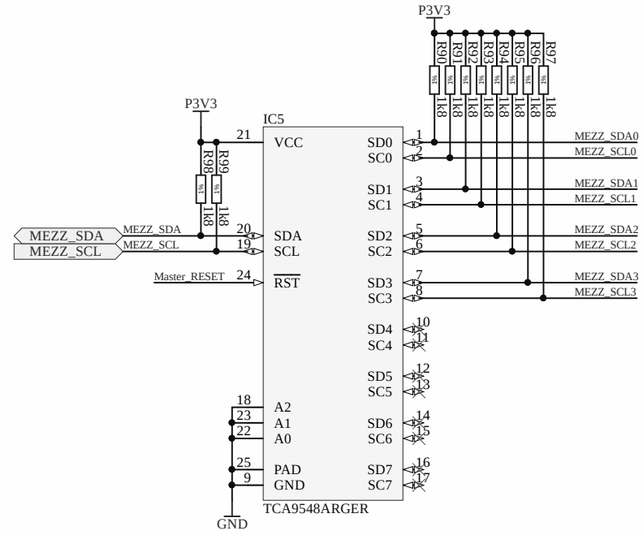


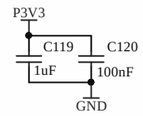












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Document

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CPLD logic & option switches

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Drawn by	K.B. XX/XX/XXXX
Check.by	-
Last Mod.	- 2018-11-29
File	CTRL_LOGIC.SchDoc
Print Date	2018-12-02 02:28:31 Sheet 6 of 8

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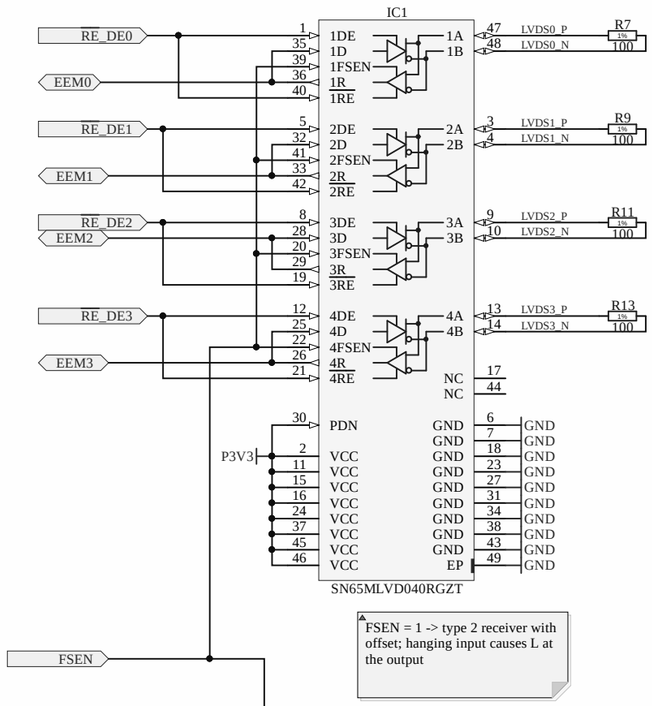
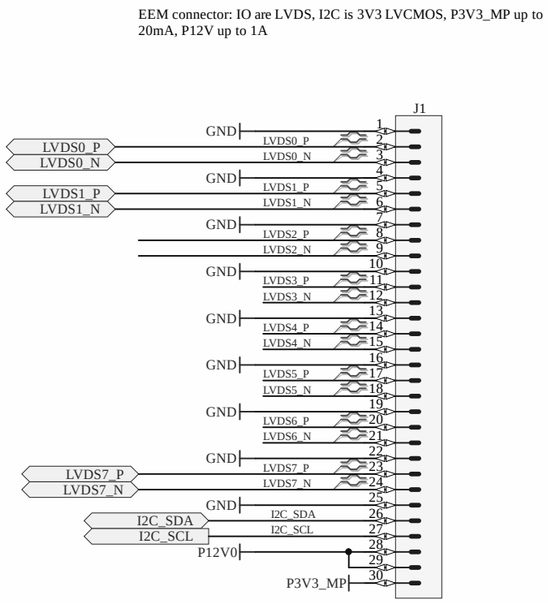
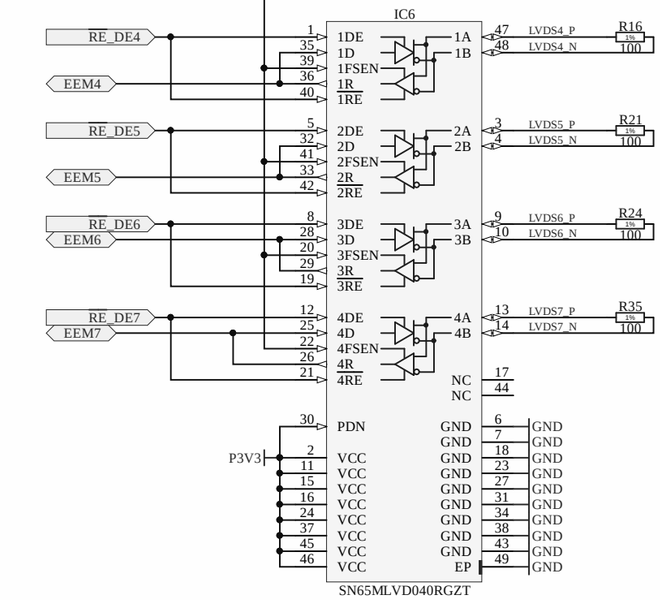
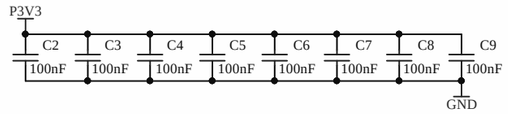
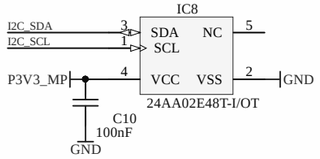
Size A3 Rev -











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LVDS to LVTTL interface & EEM connector

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Check.by	
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File	LVDS_IFC_VCO.SchDoc
Print Date	2018-12-02 02:28:32
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Rev	-

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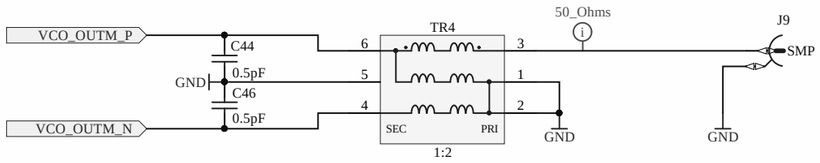
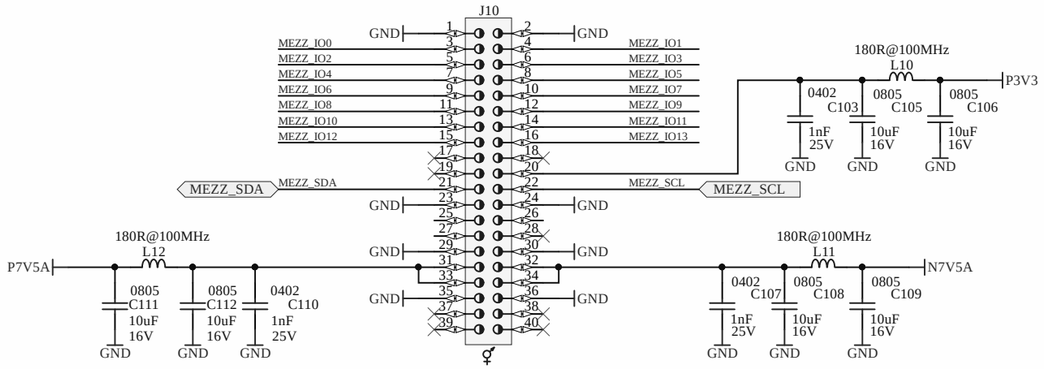
Board-2-Board Analog Connectors



Board-2-Board Digital Connectors



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AFE Mezzanine Connectors

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