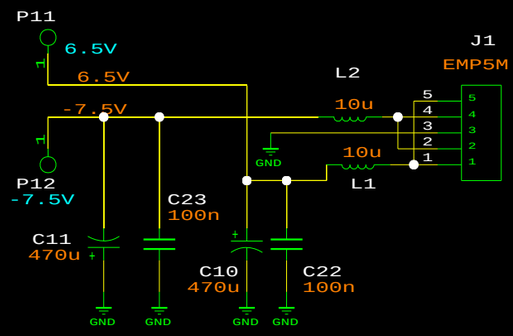
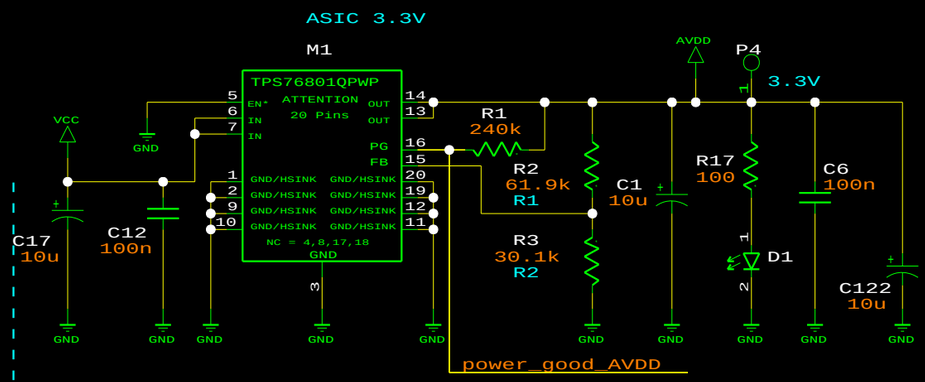
POWER SUPPLY

R 0805 (1%) for regulators

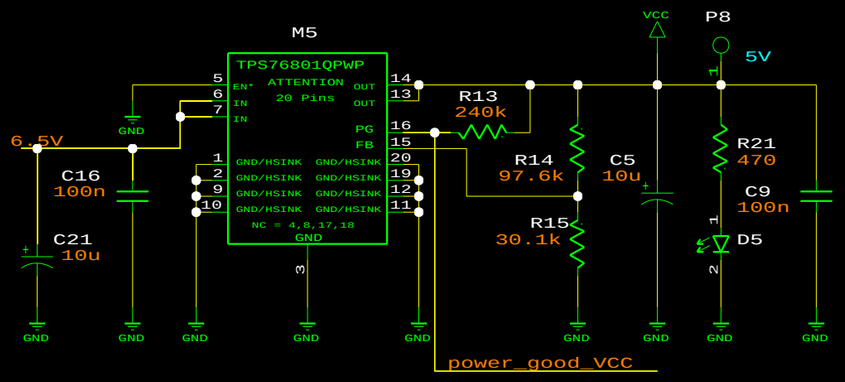
Vreg=1.1834*(1+R1/R2) et R2=30.1k



ASIC power supply

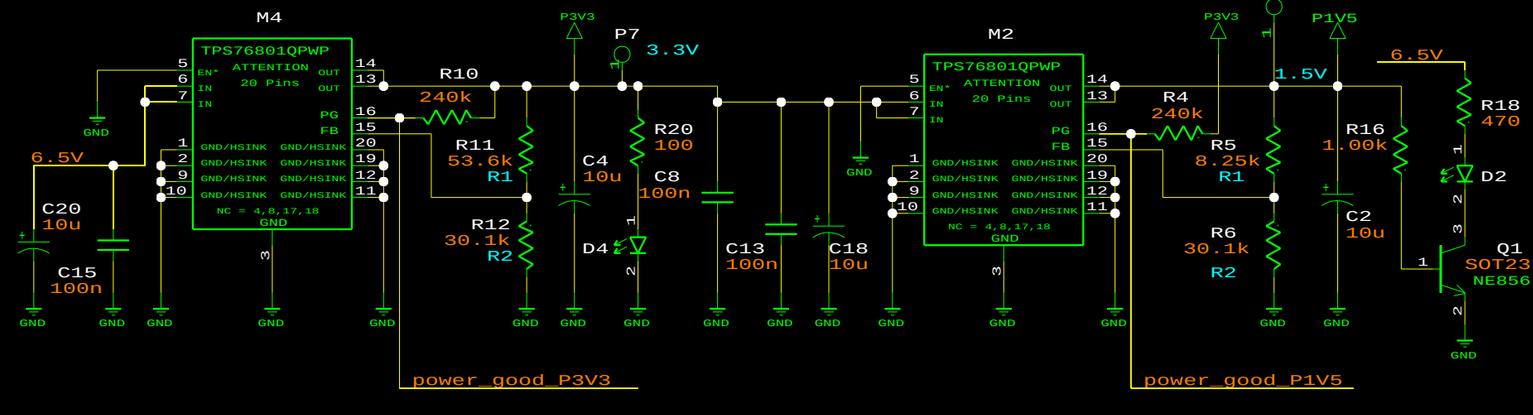


Vcc for Buffers, USB & external ADC

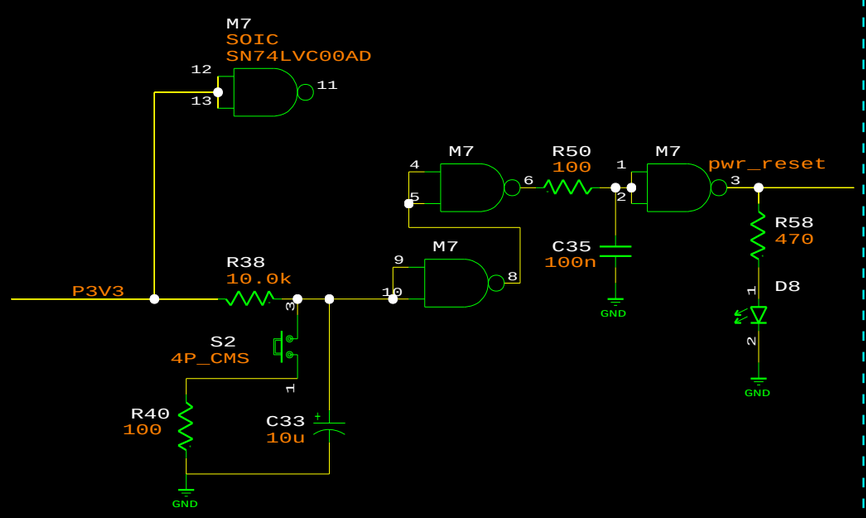


ALTERA power supply

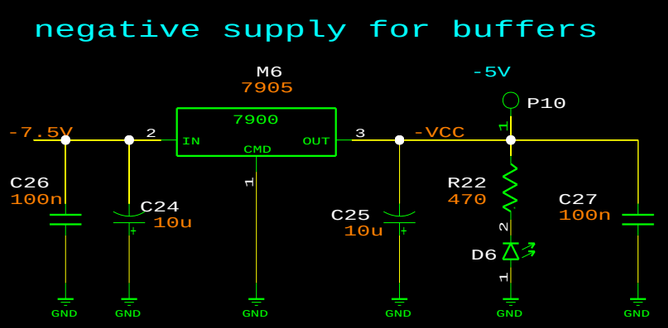
3.3V for banks 1, 2 & 3



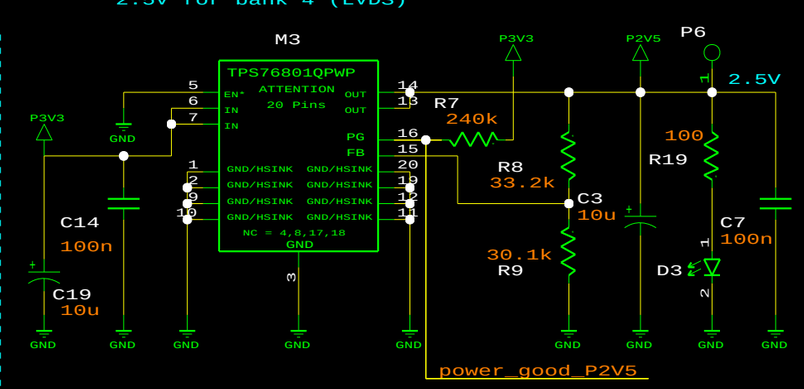
Power-on reset



negative supply for buffers



2.5V for bank 4 (LVDS)



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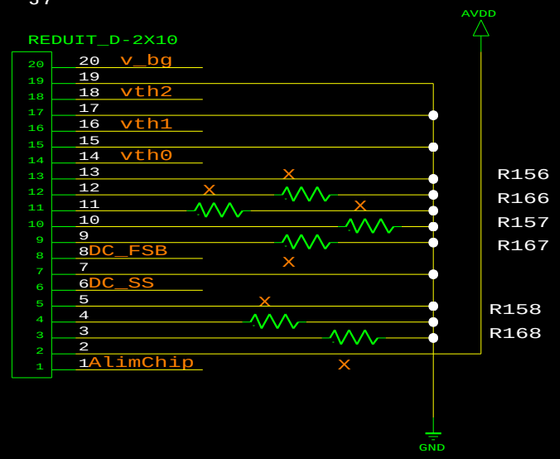
ANALOG INPUTS

KEITHLEY DMM 2000 - CONNECTOR

J7

REDUIT_D-2X10



Chip Consumption

MIRA1
I21
MIREALIGN

MIR2
I23
MIRELOS

MIR3
I22
MIRELOS

MIRA2
MIREALIGN
I17

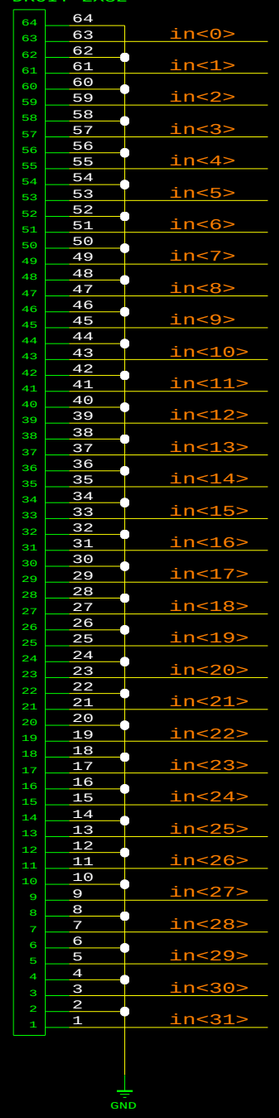
MIRT1
MIRETOP
I18

MIR1
MIRELOS
I19

MIRB1
MIREBOT
I20

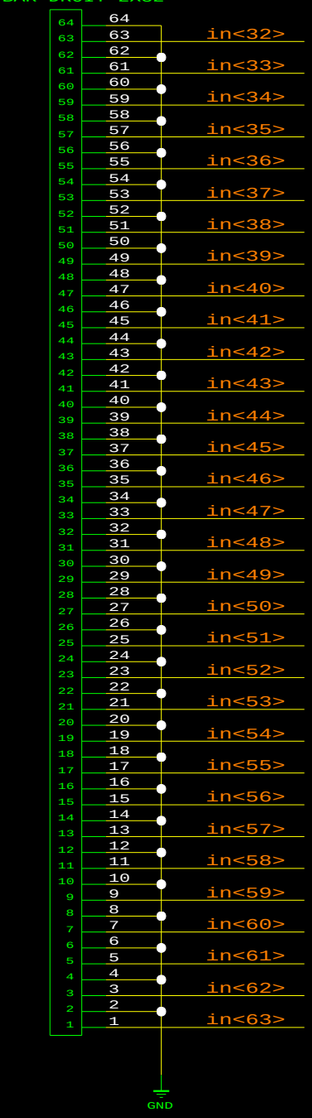
J3

BAR-DROIT-2X32

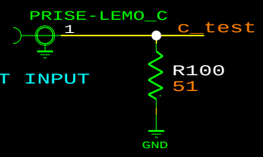


J8

BAR-DROIT-2X32



PX18



TEST INPUT

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HARDROC2 CHIP

SUP_ARIES TQFP M12

HARDROC2 ANALOGUE 1/3

c_test	59	ctest	
in<63..0>		in<63..0>	
	128	out_fsb	out_fsb
	129	out_q	out_q
	77	vth2	vth2
	78	vth1	vth1
	79	vth0	vth0
	70	v_bg	v_bg
	61	vgain_pa	vgain_pa
	62	vcasc_pmos	vcasc_pmos
	65	vcasc_nmos	vcasc_nmos
	71	ibi_otadac	ibi_otadac
	72	iref_dac	iref_dac
	73	ibi_otabg	ibi_otabg
	91	ib_rec	ib_rec
	123	ibo_d	ibo_d
	124	ibi_d	ibi_d
	130	ib_otaq	ib_otaq
	131	ibo_fsb	ibo_fsb
	132	ibi_fsb	ibi_fsb
	133	ib_w	ib_w
	134	ibi_pa	ibi_pa
	135	vref_ss	vref_ss
	136	vref_fsb	vref_fsb

SUP_ARIES TQFP M12

HARDROC2 DIGITAL 2/3

holdb	63	holdb	
trig_ext	86	trig_ext	
pwr_on_dac	87	pwr_on_dac	
pwr_on_adc	88	pwr_on_adc	
pwr_on_a	89	pwr_on_a	
pwr_on_d	90	pwr_on_d	
start_acq	92	start_acq	
val_evtp	93	val_evtp	
val_evtn	94	val_evtn	
raz_chnp	95	raz_chnp	
raz_chnn	96	raz_chnn	
ck_5p	97	ck_5p	
ck_5n	98	ck_5n	
ck_40p	99	ck_40p	
ck_40n	100	ck_40n	
resetb	102	resetb	
rst_counterb	109	rst_counterb	
start_readout1	110	start_readout1	
start_readout2	111	start_readout2	
select	114	select	
sr_rstb	115	sr_rstb	
sr_ck	116	sr_ck	
sr_in	117	sr_in	
sr_load	119	sr_load	
	83	out_trig2	out_trig2
	84	out_trig1	out_trig1
	85	out_trig0	out_trig0
	104	Dout1b	Dout1b
	105	Dout2b	Dout2b
	106	TransmitOn1b	TransmitOn1b
	107	TransmitOn2b	TransmitOn2b
	108	ChipSatb	ChipSatb
	112	end_readout1	end_readout1
	113	end_readout2	end_readout2
	118	sr_out	sr_out

holdb

R117 X vddd

SUP_ARIES TQFP M12

HARDROC2 POWER 3/3

vdd_pad	40	vdd_pad	
vdd_pa	2	vdd_pad	
vdd_dac	60	vdd_pa	
vdd_bg	67	vdd_dac	
vdd_d	68	vdd_bg	
vddd2	76	vdd_d	
vddd	120	vddd2	
vdd_fsb	82	vddd	
vdd_ss	137	vddd	
	143	vdd_fsb	
		vdd_ss	
	122	gndd	
	125	gnd_d	
	138	gnd_fsb1	
	139	gnd_fsb0	
	140	gnd_nmos	
	64	gnd_nmos	
	141	gnd_capa	
	142	gnd_ss	
	160	gnd_pa	
	145	gnd_pa	
	57	gnd_pa	
	42	gnd_pa	
	21	gnd_pa	
	66	gnd_dac	
	69	gnd_bg	
	103	rtn	RTN

vssm 75, vssm 126, vssi 1, vssi 41, vssa 58, vssa 74, vssa 127, vssa 144, vssd 81, vssd 101, vssd 121

GND

DECOUPLAGE DU VDD(pres du chip)

C30 10u

AlimChip

R89 0

AlimChipD P136

R24 0

AlimChipSC P15

C31 10u

P80 1

C92 100n C86 100n R137 10.0 103 RTN

R25 X	R90 10.0	R92 10.0	R83 10.0	R26 10.0	R41 10.0	R85 10.0	C43 10u
C72 X	C98 100n	C110 100n	C96 100n	C77 100n	C71 100n	C107 100n	R95 10.0
C104 X							C106 100n
							C105 10u
2 40 vdd_pad	60 vdd_pa	67 vdd_dac	68 vdd_bg	137 vdd_fsb	143 vdd_ss	76 vdd_d	80 vddd2
P18	P130	P132	P117	P19	P27	P119	P135

R47 10.0, C103 100n, C73 100n, 82 120 vddd, P33

Chip Consumption

S1 AVDD R23 10.0 AlimChip_3.3V P14 AlimChip

C28 X, C29 X GND

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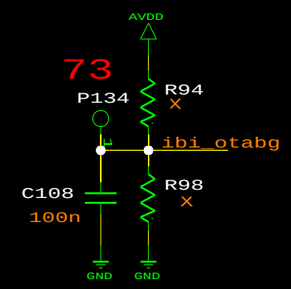
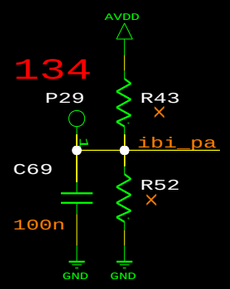
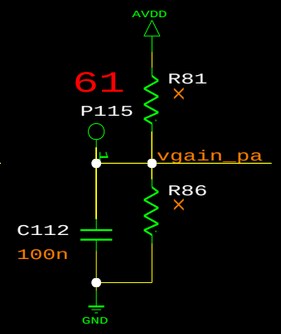
SERIGRAPHIE: Pin ASIC

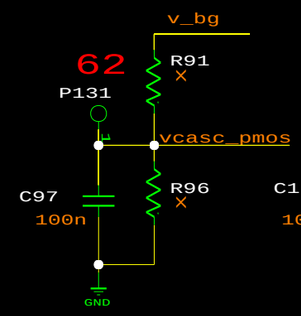


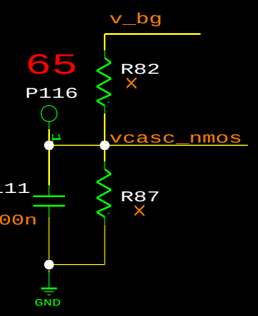




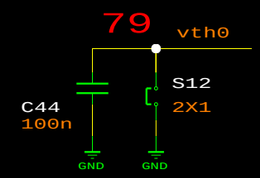
BG

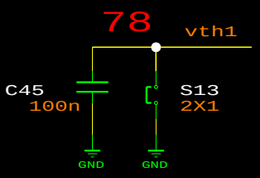
SBC PA

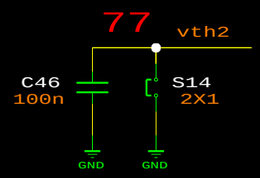


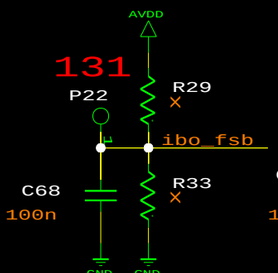


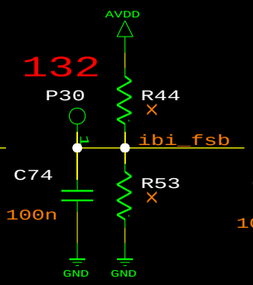
Threshold

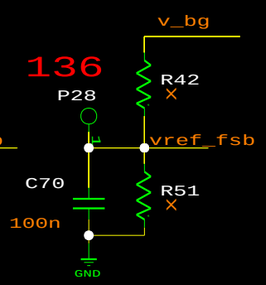




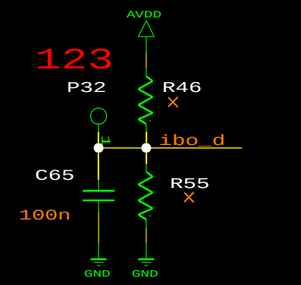


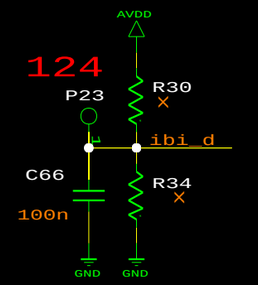




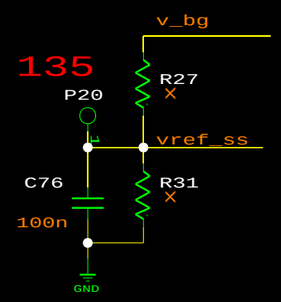


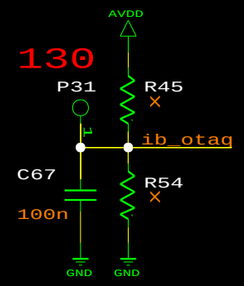
FS BIP





DISCRI SHAPER

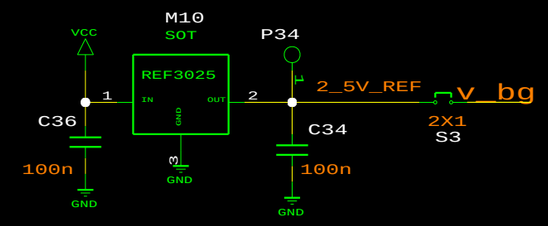


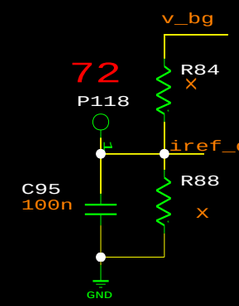


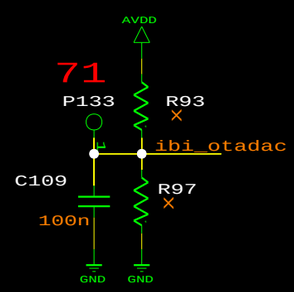
SLOW SHAPER

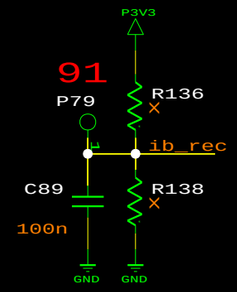
OTA Q and FSB

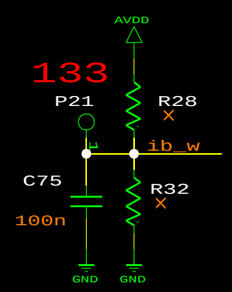
REF. VOLTAGE











DAC

LVDS to CMOS Rec

Widlar

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CLOCKs INPUTS

P99 — 1 — ck_5p — 97

R127 1.00k — au plus proche du chip

P100 — 1 — ck_5n — 98

P97 — 1 PASTILLE143 — ck_40p — 99

R126 1.00k — au plus proche du chip

P98 — 1 — ck_40n — 100

au plus proche de l'altera

R69 100 — 40M_p — ck_40p

R77 X

R70 100 — 40M_n — ck_40n

R71 100 — 5M_p — ck_5p

R78 X

R72 100 — 5M_n — ck_5n

R73 100 — r_c_p — raz_chnp

R79 X

R74 100 — r_c_n — raz_chnn

v_e_p — val_evtp

R75 100

R80 X

R76 100 — v_e_n — val_evtn

------external ADC---------

2_5V_REF — R66 680 — 1.8 V — R67 1.80k — C62 100n — GND

analog_to_adc — R65 51 — C59 X — GND

ADC

P3V3 — BP2 6A — C64 100n — GND

M11 SOIC

C58 100n — GND

adc_clk — 1 — P53

C57 100n — GND

C42 10u

C41 100n

C56 100n — GND

C38 X

C39 100n

C40 10u

R62 0

R61 X

AD9220 ADC 12Bits

DVSS			
DVDD			
CML		OTR	14 — OTR
CLK			
(MSB)	B01		13 ADC<12>
	B02		12 ADC<11>
VINA	B03		11 ADC<10>
VINB	B04		10 ADC<09>
	B05		9 ADC<08>
CAPT	B06		8 ADC<07>
CAPB	B07		7 ADC<06>
	B08		6 ADC<05>
VERF	B09		5 ADC<04>
SENSE	B10		4 ADC<03>
	B11		3 ADC<02>
(LSB)	B12		2 ADC<01>
REFCOM			
AVSS			
AVDD			
AVSS			
AVDD			

P36 PASTILLE143

BP1 6A — VCC — C63 100n — GND

I/O ASIC

P2V5

R132 1.00k — TransmitOn1b — 106 — R133 X

R122 1.00k — TransmitOn2b — 107 — R123 X

R121 1.00k — ChipSatb — 108 — R125 X

R143 X — out_trig0 — 85 — R142 X

R134 1.00k — Dout1b — 104 — R135 X

R128 1.00k — Dout2b — 105 — R129 X

R144 X — out_trig1 — 84 — R145 X

R146 X — out_trig2 — 83 — R147 X

P102 — 1 — raz_chnn — 96

R130 1.00k — au plus proche du chip

P101 — 1 — raz_chnp — 95

P104 — 1 — val_evtn — 94

R131 1.00k — au plus proche du chip

P103 — 1 — val_evtp — 93

VCC

P38 — 1

P37 — 1

P39 — 1

P26 — 1 v_bg

P24 — 1

P25 — 1

Pastilles pour connexions shapes

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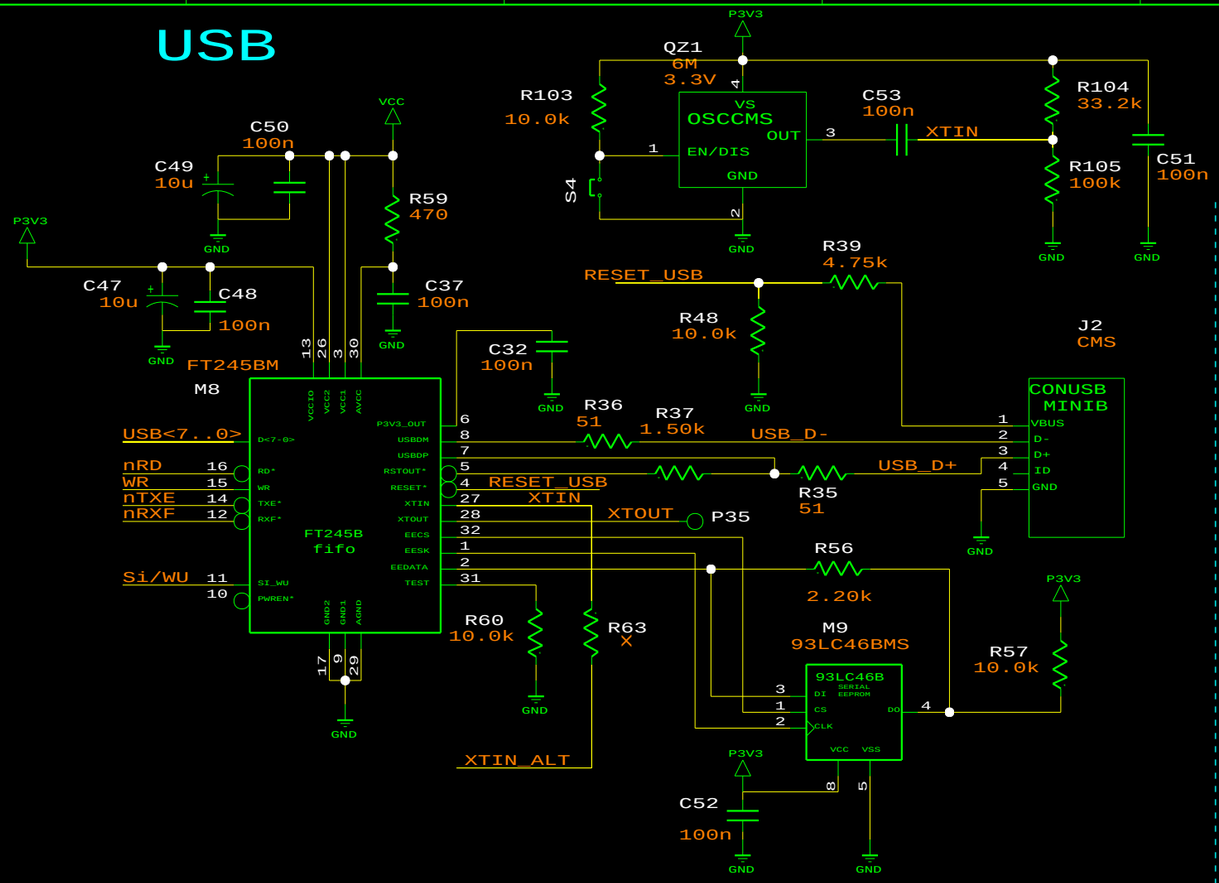
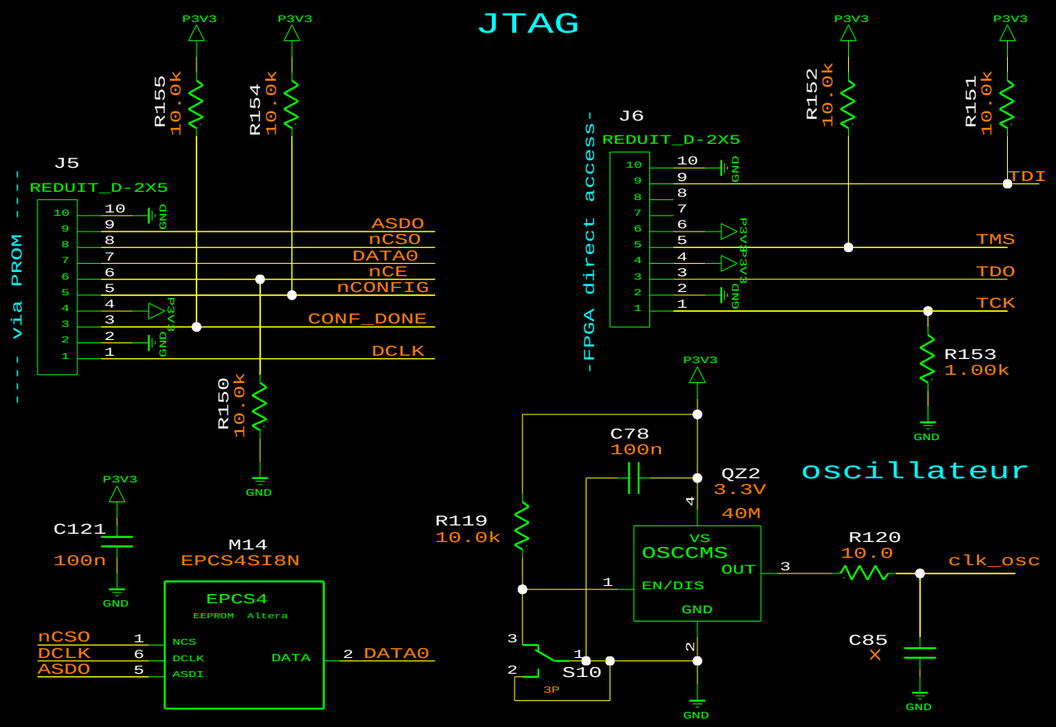
CNRS IN2P3 U P S

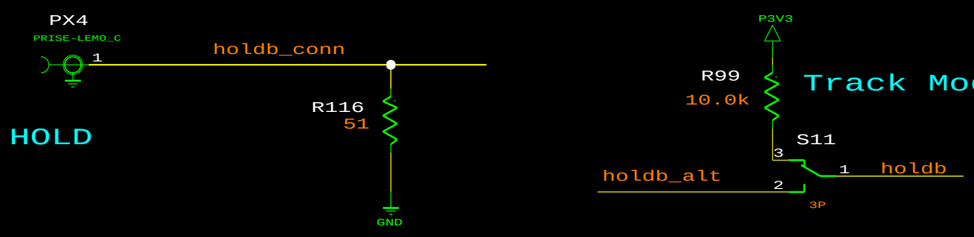
USB



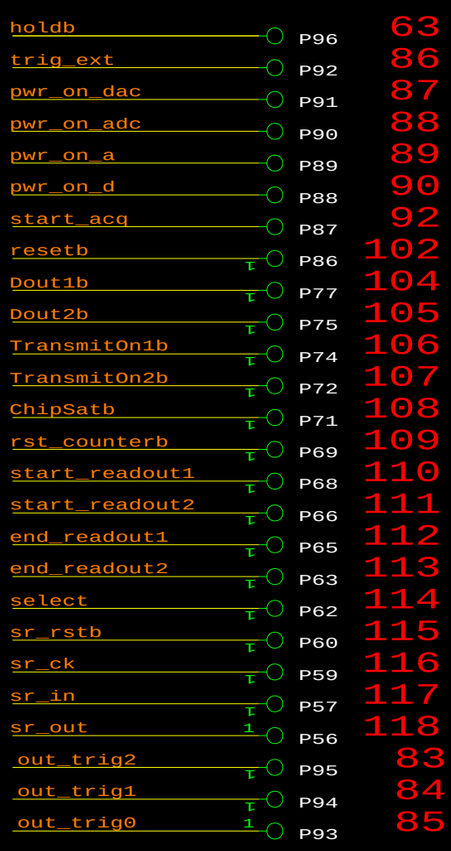
JTAG



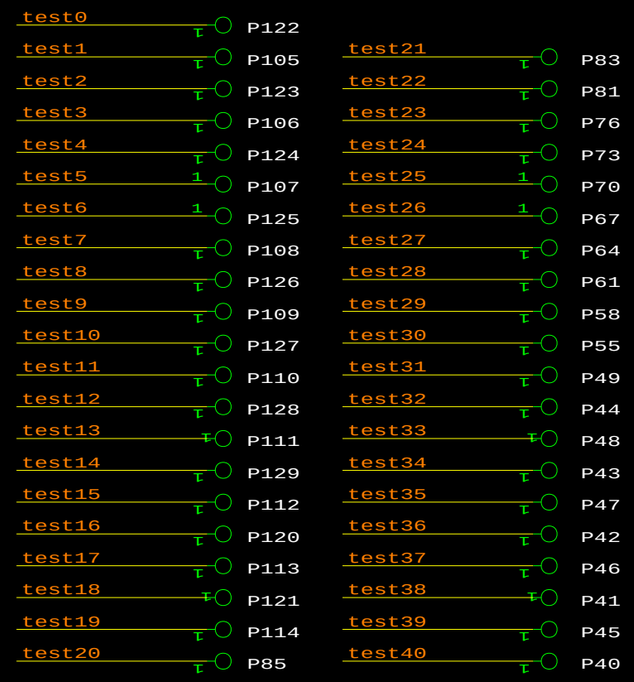
-----HOLD------



Digital ASIC



PINS TEST



test_hardroc2c

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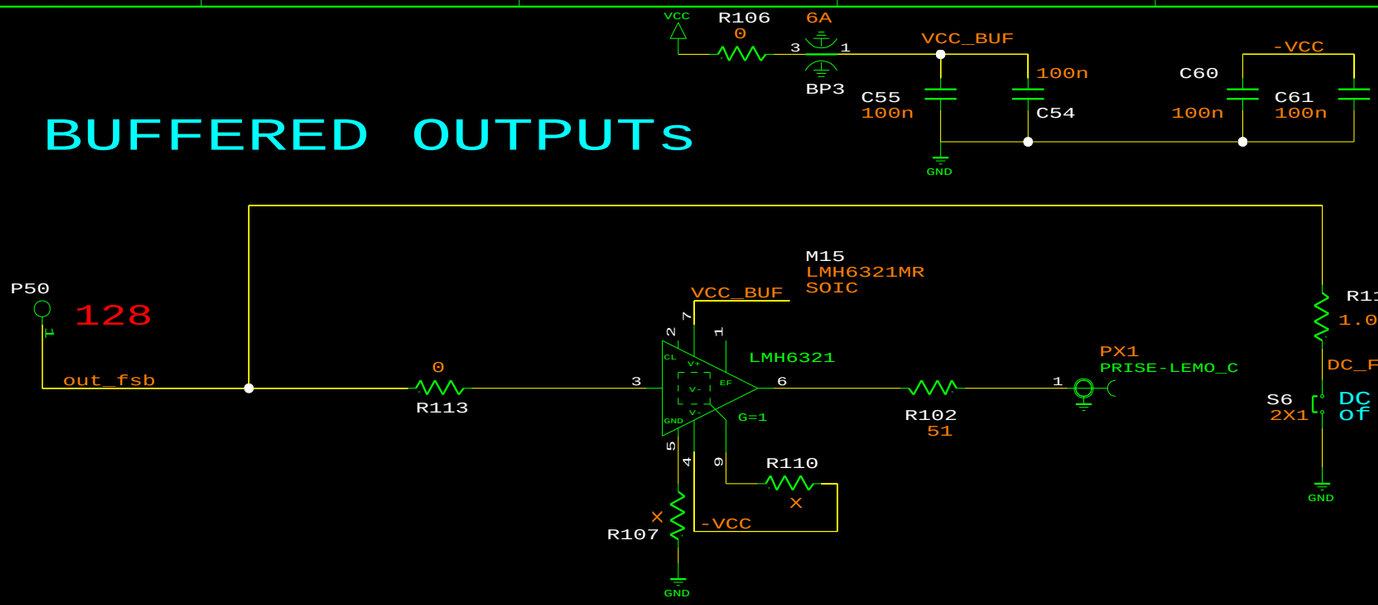
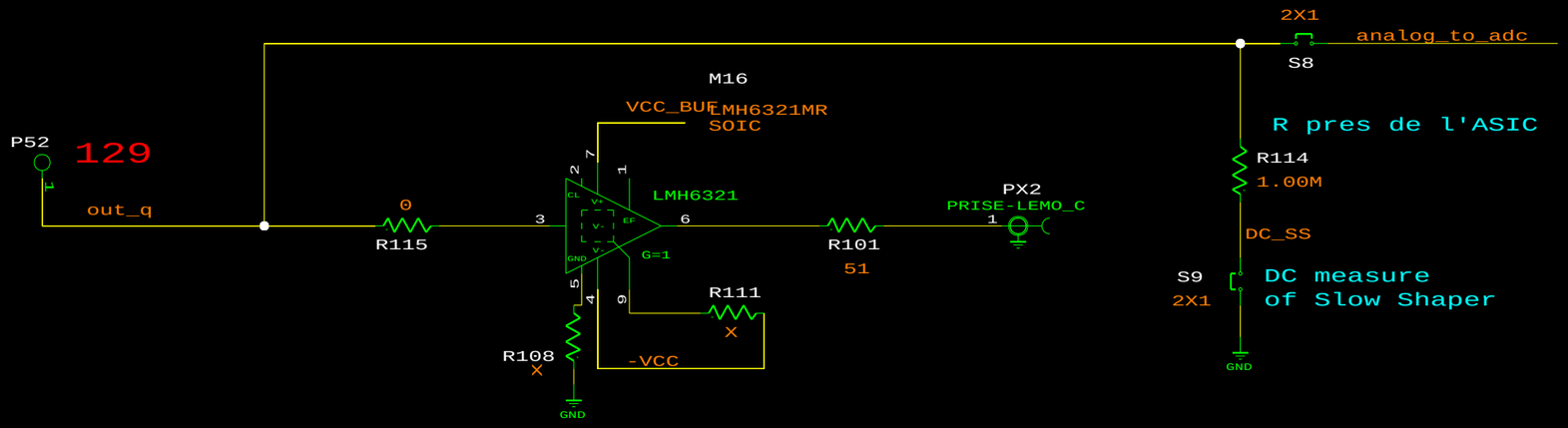
LABORATOIRE DE L'ACCELERATEUR LINEAIRE

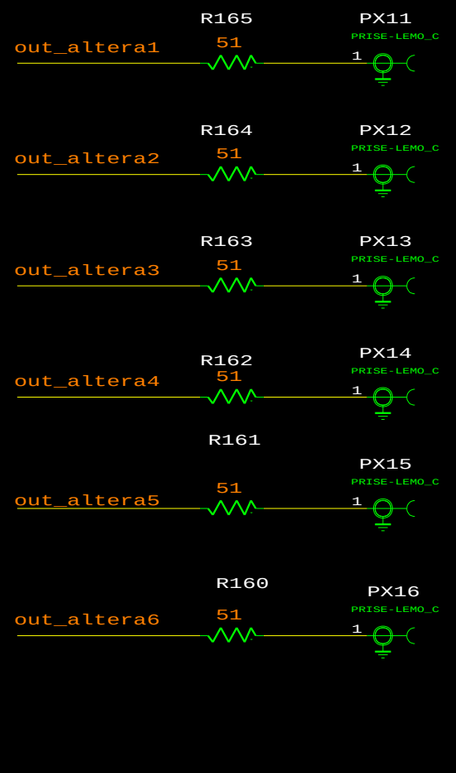
CNRS IN2P3 U P S

BUFFERED OUTPUTs

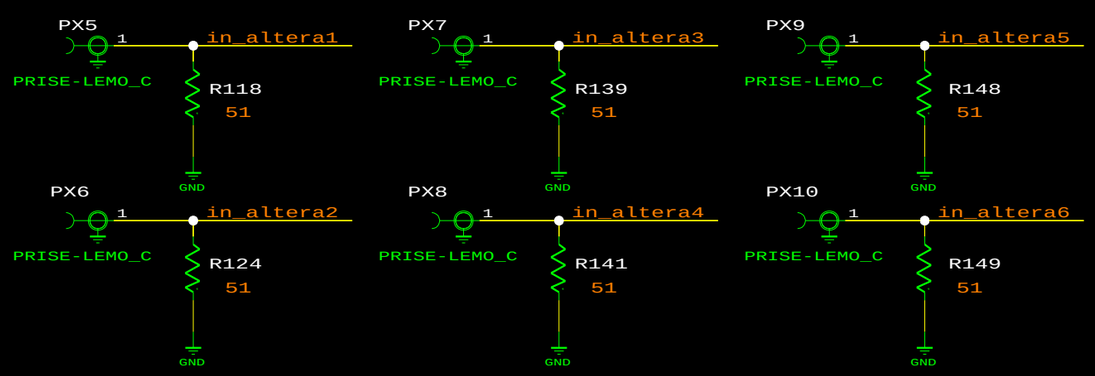




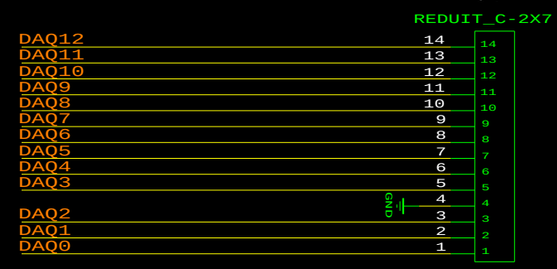
I/O from ALTERA



I/O to ALTERA



DAQ Connector



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LABORATOIRE DE L'ACCELERATEUR LINEAIRE

CNRS IN2P3 U P S

VCCINT=P1V5;VCCIO4=P2V5;VCCIO1=P3V3;VCCIO2=P3V3;VCCIO3=P3V3(pwr)

EP1C6Q240C6
PQFP
M13

EP1C6Q240_LAL_USB

BANK1

	1	IO1/LVDS14p	nCE	33	nCE
sr_out	2	IO2/LVDS14n	MSEL0	34	
sr_in	3	IO3/LVDS13p	MSEL1	35	
sr_ck	4	IO4/LVDS13n	DCLK	36	DCLK
sr_rstb	5	IO5	ASDO	37	ASDO
select	6	IO6	PLL1_OUTp	38	PLL_OUT
	7	IO7/LVDS12p	PLL1_OUTn	39	
	8	IO8/LVDS12n	IO21	41	
end_readout2	11	IO9	IO22/LVDS6p	42	resetb
end_readout1	12	IO10/LVDS11p	IO23/LVDS6n	43	start_acq
start_readout2	13	IO11/LVDS11n	IO24/LVDS5p	44	
start_readout1	14	IO12/LVDS10p	IO25/LVDS5n	45	
rst_counterb	15	IO13/LVDS10n	IO26/LVDS4p	46	pwr_on_d
	16	IO14/LVDS9p	IO27/LVDS4n	47	pwr_on_a
ChipSatb	17	IO15/LVDS9n	IO28/LVDS3p	48	pwr_on_adc
TransmitOn2b	18	IO16/LVDS8p	IO29/LVDS3n	49	pwr_on_dac
TransmitOn1b	19	IO17/LVDS8n	IO30	50	
Dout2b	20	IO18/LVDS7p	IO31/LVDS2p	53	trig_ext
Dout1b	21	IO19/LVDS7n	IO32/LVDS2n	54	
	23	IO20	IO33	55	out_trig0
nCSO	24	nCSO	IO34	56	out_trig1
DATA0	25	DATA0	IO35/LVDS1p	57	out_trig2
nCONFIG	26	nCONFIG	IO36/LVDS1n	58	
clk_osc	28	CLK0/LVDSCLK1p	IO37/LVDS0p	59	
	29	CLK1/LVDSCLK1n	IO38/LVDS0n	60	holdb_alt
	32	nCEO			

1/4

GND

PLL_OUT
P84

P2V5
3B 100n 3B
3B
GND

EP1C6Q240C6
PQFP
M13

EP1C6Q240_LAL_USB

	61	IO39/LVDS71p	IO63	93	
	62	IO40/LVDS71n	IO64/LVDS61p	94	
40M_p	63	IO41/LVDS70p	IO65/LVDS61n	95	test0
40M_n	64	IO42/LVDS70n	IO66/LVDS60p	96	test1
	65	IO43/LVDS69p	IO67/LVDS60n	97	test2
	66	IO44/LVDS69n	IO68/LVDS59p	98	test3
5M_p	67	IO45/LVDS68p	IO69/LVDS59n	99	test4
5M_n	68	IO46/LVDS68n	IO70/LVDS58p	100	test5
	73	IO47	IO71/LVDS58n	101	test6
	74	IO48	IO72/LVDS57p	102	test7
r_c_p	75	IO49/LVDS67p	IO73/LVDS57n	103	test8
r_c_n	76	IO50/LVDS67n	IO74/LVDS56p	104	test9
	77	IO51/LVDS66p	IO75/LVDS56n	105	test10
	78	IO52/LVDS66n	IO76	106	test11
	79	IO53	IO77	107	
v_e_p	80	IO54/LVDS65p	IO78	108	
v_e_n	81	IO55/LVDS65n	IO79/LVDS55p	113	
	82	IO56/LVDS64p	IO80/LVDS55n	114	
	83	IO57/LVDS64n	IO81/LVDS54p	115	test12
	84	IO58/LVDS63p	IO82/LVDS54n	116	test13
	85	IO59/LVDS63n	IO83/LVDS53p	117	test14
	86	IO60/LVDS62p	IO84/LVDS53n	118	test15
	87	IO61/LVDS62n	IO85/LVDS52p	119	test16
	88	IO62	IO86/LVDS52n	120	test17

BANK4

4/4

EP1C6Q240C6
PQFP
M13

EP1C6Q240_LAL_USB

test18	121	IO87/LVDS51n	CLK2/LVDSCLK2n	152	
test19	122	IO88/LVDS51p	CLK3/LVDSCLK2p	153	
out_altera1	123	IO89/LVDS50n	TDI	155	TDI
out_altera2	124	IO90/LVDS50p	IO106	156	SYNC_GENE
out_altera3	125	IO91/LVDS49n	IO107/LVDS43n	158	test21
out_altera4	126	IO92/LVDS49p	IO108/LVDS43p	159	test22
out_altera5	127	IO93	IO109/LVDS42n	160	DAQ2
out_altera6	128	IO94	IO110/LVDS42p	161	DAQ0
DAQ11	131	IO95	IO111/LVDS41n	162	DAQ1
DAQ12	132	IO96/LVDS48n	IO112/LVDS41p	163	test23
DAQ9	133	IO97/LVDS48p	IO113/LVDS40n	164	test24
DAQ10	134	IO98/LVDS47n	IO114/LVDS40p	165	test25
DAQ7	135	IO99/LVDS47p	IO115/LVDS39n	166	test26
DAQ8	136	IO100/LVDS46n	IO116/LVDS39p	167	test27
DAQ5	137	IO101/LVDS46p	IO117/LVDS38n	168	clk_gene_ext
DAQ6	138	IO102/LVDS45n	IO118/LVDS38p	169	test28
DAQ3	139	IO103/LVDS45p	IO119	170	test29
DAQ4	140	IO104/LVDS44n	IO120/LVDS37n	173	test30
test20	141	IO105/LVDS44p	IO121/LVDS37p	174	in_altera6
	143	PLL2_OUTn	IO122	175	in_altera5
	144	PLL2_OUTp	IO123	176	in_altera4
CONF_DONE	145	CONF_DONE	IO124/LVDS36n	177	in_altera3
nSTATUS	146	nSTATUS	IO125/LVDS36p	178	in_altera2
TCK	147	TCK	IO126/LVDS35n	179	in_altera1
TMS	148	TMS	IO127/LVDS35p	180	holdb_conn
TDO	149	TDO			

P3V3
R140
10.0k

BANK3

3/4

P1V5
L3
10u
C93
10u
C100
100n
C99
1n
VCCA_PLL2
GND

P1V5
L4
10u
C94
10u
C101
100n
C102
1n
VCCA_PLL1
GND

_____entrees cote altera_____

clk_gene_ext

PX3
PRISE-LEMO_C
NIM
S7
2X1
Q2
SOT23
NE856
R64
1.00k
P3V3
clk_gene_ext
R109
51
S5
2X1
R68
51
GND
clk_gene_ext
TTL

_____sorties cote altera_____

SYNC_gene

SYNC_GENE
R159
51
PX17
PRISE-LEMO_C
P9
GROUND HOLE
Sans VE !

GROUND TEST POINTS

TEST2540
P54
P137
P78
P51
P17
P139
P140
P138
P82
P13
P16

PASTILLES MECANIQUES

PASTILLE_P320
P141
P142
P143
P1
P2
P3

EP1C6Q240C6
PQFP
M13

EP1C6Q240_LAL_USB

USB<0>	181	USB<0>	IO139	213	test40
USB<1>	182	USB<1>	IO140/LVDS24n	214	OTR
USB<2>	183	USB<2>	IO141/LVDS24p	215	ADC<12>
USB<3>	184	USB<3>	IO142/LVDS23n	216	ADC<11>
USB<4>	185	USB<4>	IO143/LVDS23p	217	ADC<10>
USB<5>	186	USB<5>	IO144/LVDS22n	218	ADC<9>
USB<6>	187	USB<6>	IO145/LVDS22p	219	ADC<8>
USB<7>	188	USB<7>	IO146/LVDS21n	220	ADC<7>
XTIN_ALT	193	XTIN	IO147/LVDS21p	221	ADC<6>
nRXF	194	RXF	IO148	222	ADC<5>
nTXE	195	TXE	IO149/LVDS20n	223	ADC<4>
WR	196	usb_wr	IO150/LVDS20p	224	ADC<3>
nRD	197	usb_rd	IO151/LVDS19n	225	ADC<2>
Si/WU	198	Si_WU	IO152/LVDS19p	226	ADC<1>
test31	199	IO128	IO153	227	adc_clk
test32	200	IO129/LVDS28n	IO134	228	pwr_reset
test33	201	IO135/LVDS28p	IO154/LVDS18n	233	
test34	202	IO130/LVDS27n	IO155/LVDS18p	234	
LED	203	IO136/LVDS27p	IO156/LVDS17n	235	
test35	204	IO131/LVDS26n	IO157/LVDS17p	236	
test36	205	IO137/LVDS26p	IO158/LVDS16n	237	
test37	206	IO132/LVDS25n	IO159/LVDS16p	238	
test38	207	IO133/LVDS25p	IO160/LVDS15n	239	
test39	208	IO138	IO161/LVDS15p	240	

BANK2

2/4

I/O for analogue switches on PCB 0807

P3V3
9B 100n 9B
9B
GND

P1V5
6B 100n 6B
6B
GND

test_hardroc2c

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