

# Model Name: GA-Z87X-OC-Force

SHEET

TITLE

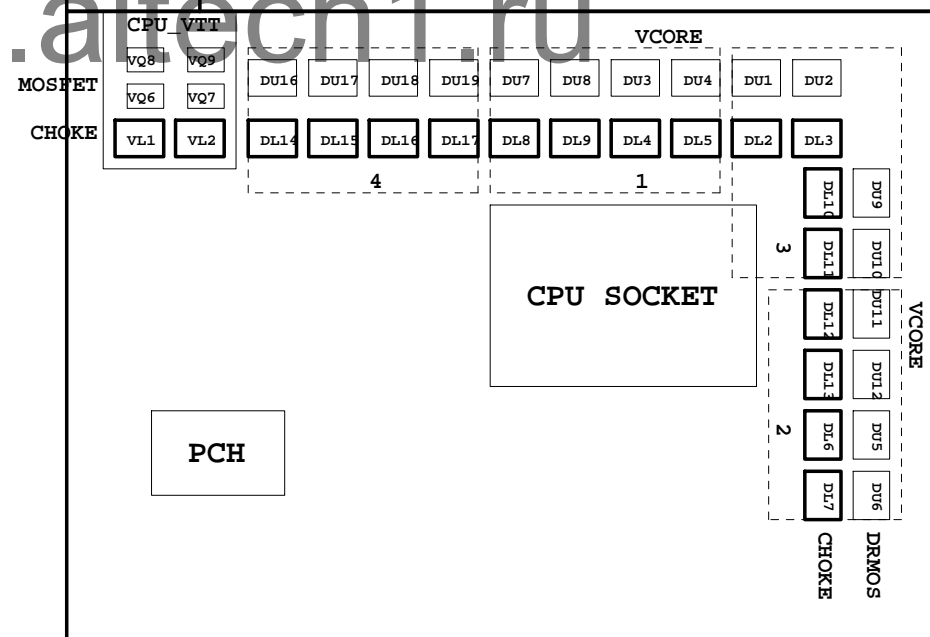
Rev1.03

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1155-A
05	CPU_LGA1155-B
06	CPU_LGA1155-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH_FDI,DMI,USB,PCIE,NVRAM
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT_3
15	PCI EXPRESS*16/*8 SWITCH_2
16	PCI EXPRESS*8 SLOT_2
17	PCI EXPRESS*16 SLOT_1
18	PCI EXPRESS*16/*8 SWITCH_1
19	PCI EXPRESS*8 SLOT_1
20	PCI EXPRESS*1 SLOTS X1
21	HDMI/DVI/DP
22	Dual BIOS , TPM SLB9635TT
23	ALC 898
24	REAR AUDIO JACK
25	AMplifier
26-28	IR 3563A+IR3550-Vcore
29	DISCRETE POWER1
30	DISCRETE POWER2
31	ITE 8728 LPC IO
32	FP,FUSB,-PHOT
33	ATX POWER, CLOCK GEN
34	HWM,KB/MS , FAN CTRL
35	INTEL LAN I217
36	INTEL LAN I210
37	Marvell 9230
38-39	IR3570A+IR3550-DDR15 POWER

SHEET

TITLE

40	COM PORT
41	RST, PWR, CLR_CMOS
42	PEX8747S UPSTREAM & MISC
43	PEX8747S DOWNSTREAM SLOTS
44	PEX8747S STRAP & CPLD INTF
45	PEX8747S POWER
46	REFCLK
47	PEX8747 POWER DESIGN
48	SWITCH
49	PCI EXPRESS X16 SWITCH_3-1
50	PCI EXPRESS X16 SWITCH_3-2
51	PCI EXPRESS X16 PORT_2
52	IT8790
53	FAN CTRL
54-56	D720210 4port_Hub - Rear
57-59	D720210 4port_Hub - Front
60	TABLE LIST



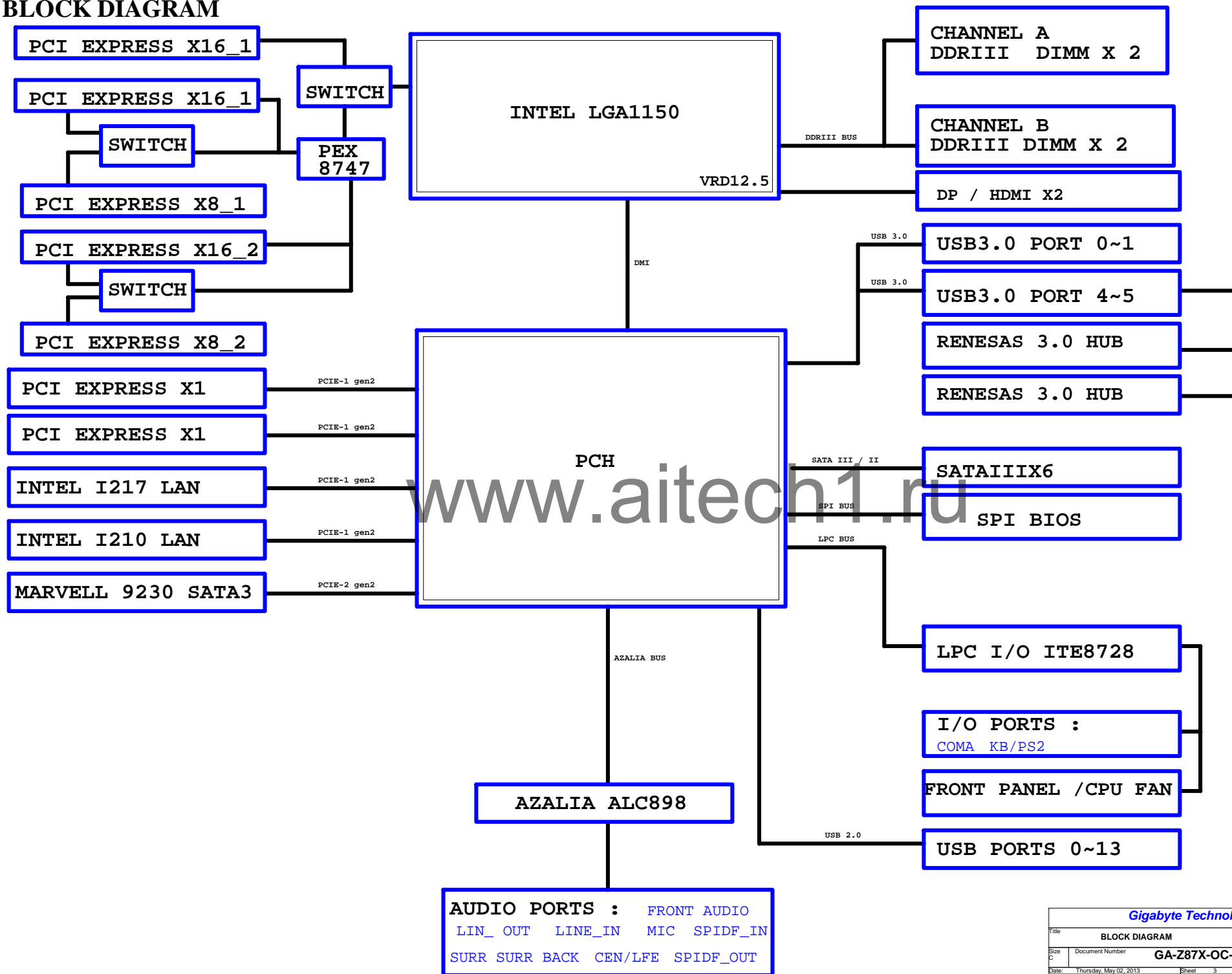
Gigabyte Technology

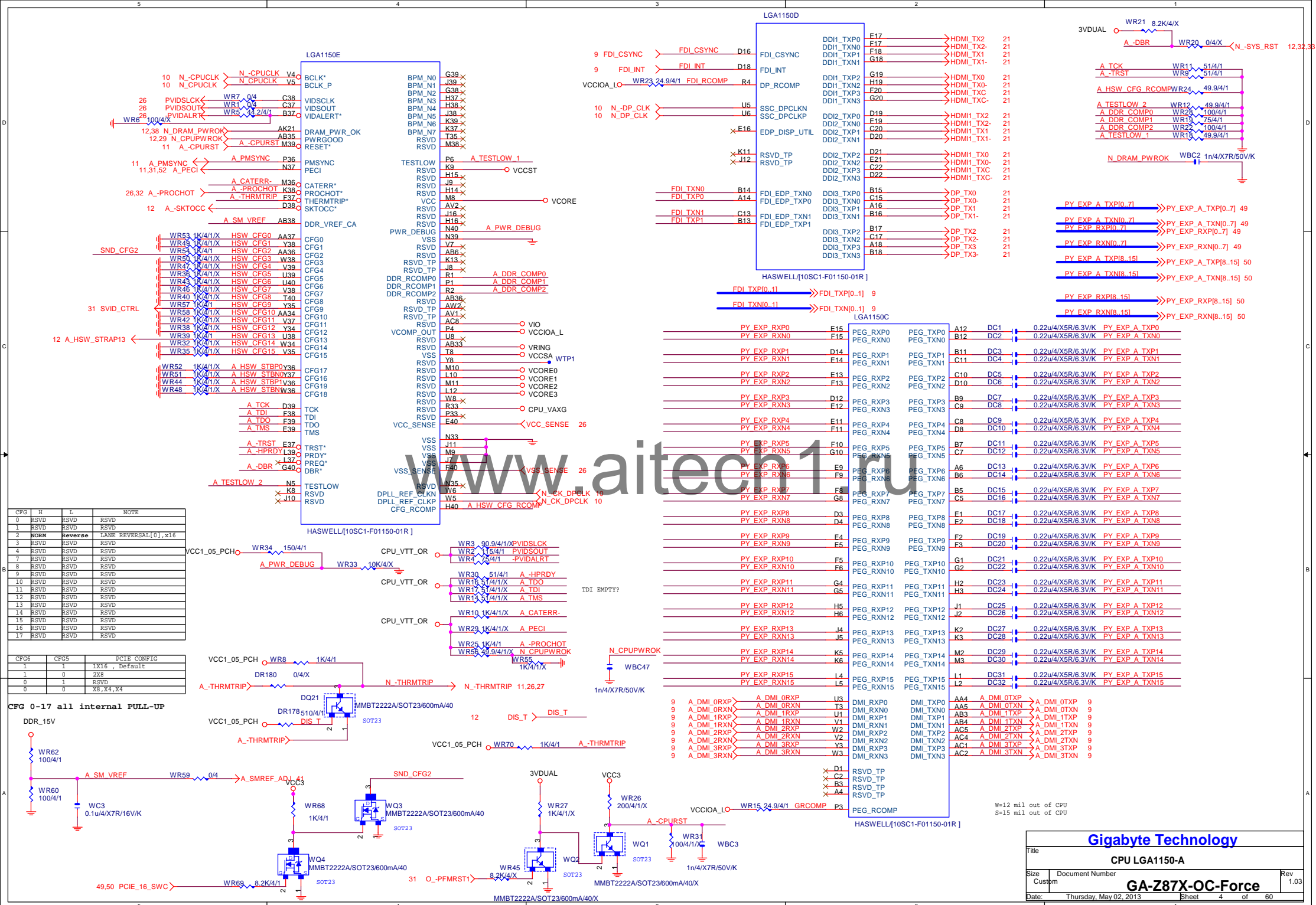
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Size		Document Number	
Custom		GA-Z87X-OC-Force	
Date:		Thursday, May 02, 2013	
Sheet		1 of 60	

Rev  
1.03

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## BLOCK DIAGRAM





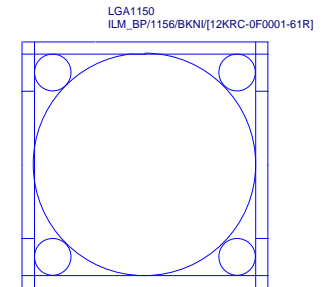


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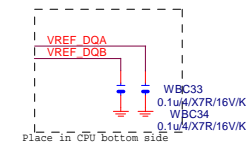
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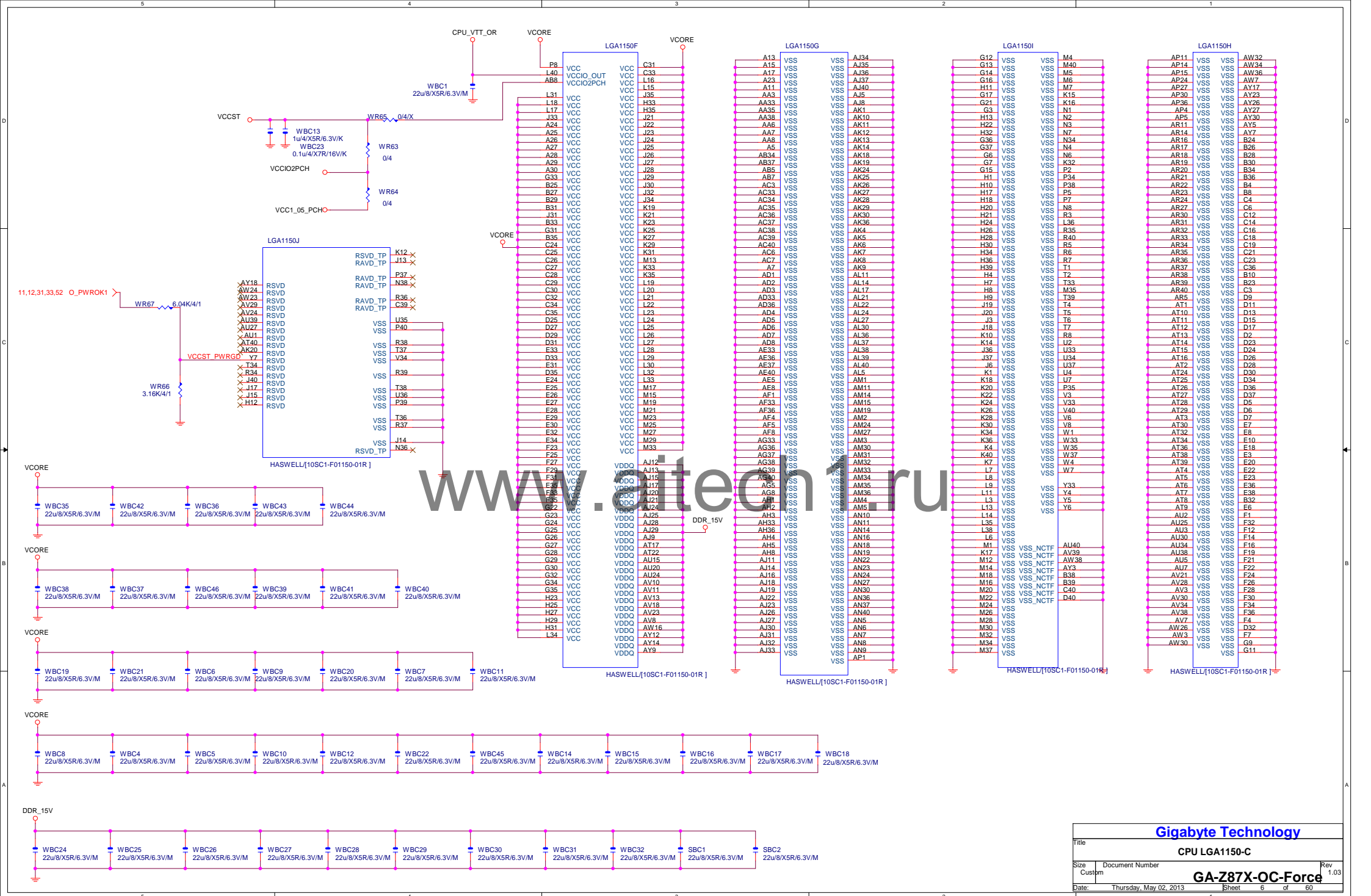
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MAA80	AL19	DDR1_M0	DDR1_D06	AE34	MD80
MAA81	AK23	DDR1_M1	DDR1_D01	AE35	MD81
MAA82	AM22	DDR1_M2	DDR1_D02	AG35	MD82
MAA83	AM23	DDR1_M3	DDR1_D03	AH35	MD83
MAA84	AM24	DDR1_M4	DDR1_D04	AD34	MD84
MAA85	AL23	DDR1_M5	DDR1_D05	AD35	MD85
MAA86	AY24	DDR1_M6	DDR1_D06	AG34	MD86
MAA87	AV25	DDR1_M7	DDR1_D07	AH34	MD87
MAA88	AU26	DDR1_M8	DDR1_D08	AL34	MD88
MAA89	AW25	DDR1_M9	DDR1_D09	AL35	MD89
MAA810	AP18	DDR1_M10	DDR1_D010	AK31	MD810
MAA811	AP18	DDR1_M10	DDR1_D011	AK31	MD811
MAA812	AV26	DDR1_M12	DDR1_D012	AK34	MD812
MAA813	AR15	DDR1_M13	DDR1_D013	AK35	MD813
MAA814	AY27	DDR1_M14	DDR1_D014	AK32	MD814
MAA815	AV28	DDR1_M15	DDR1_D015	AL32	MD815
			DDR1_D016	AN34	MD816
MODT_B0	AM17	DDR1_D070	DDR1_D016	AP34	MD817
MODT_B1	AL16	DDR1_D071	DDR1_D018	AN31	MD819
MODT_B2	AM16	DDR1_D072	DDR1_D019	AP31	MD823
MODT_B3	AK15	DDR1_D073	DDR1_D020	AN35	MD820
			DDR1_D021	AP35	MD826
	AM26	DDR1_EC00	DDR1_D022	AN32	MD818
	AM25	DDR1_EC01	DDR1_D023	AP32	MD825
	AP25	DDR1_EC01	DDR1_D024	AM28	MD822
	AP26	DDR1_EC02	DDR1_D024	AM28	MD828
	AP26	DDR1_EC03	DDR1_D025	AR28	MD827
	AR25	DDR1_EC04	DDR1_D027	AR28	MD830
	AR25	DDR1_EC05	DDR1_D028	AL28	MD824
	AR26	DDR1_EC06	DDR1_D028	AL29	MD829
	AR25	DDR1_EC07	DDR1_D029	AP29	MD826
		DDR1_D030	DDR1_D031	AP28	MD831
SBAB0	AK17	DDR1_BA0	DDR1_D031	AR12	MD832
SBAB1	AL18	DDR1_BA1	DDR1_D032	AR12	MD833
SBAB2	AW18	DDR1_BA2	DDR1_D033	AP12	MD834
			DDR1_D034	AL12	MD835
CKE80	AW29	DDR1_CKE0	DDR1_D035	AR13	MD836
CKE81	AY29	DDR1_CKE1	DDR1_D036	AP13	MD837
CKE82	AU28	DDR1_CKE2	DDR1_D037	AM13	MD838
CKE83	AU29	DDR1_CKE3	DDR1_D038	AM12	MD839
			DDR1_D039	AR9	MD845
CSB0	AN17	DDR1_CS_N0	DDR1_D040	AP9	MD841
CSB1	AN17	DDR1_CS_N1	DDR1_D041	AR6	MD846
CSB2	AN17	DDR1_CS_N2	DDR1_D042	AP6	MD843
CSB3	AL15	DDR1_CS_N3	DDR1_D043	AR10	MD844
			DDR1_D044	AP10	MD840
			DDR1_D045	AR7	MD846
			DDR1_D046	AP7	MD842
CLKB0	AM20	DDR1_CLK_P0	DDR1_D048	AM9	MD853
CLKB0	AM20	DDR1_CLK_P0	DDR1_D048	AL9	MD852
CLKB1	AP22	DDR1_CLK_P1	DDR1_D049	AL6	MD850
CLKB1	AP21	DDR1_CLK_P1	DDR1_D050	AL7	MD858
CLKB2	AN20	DDR1_CLK_P2	DDR1_D051	AL10	MD848
CLKB3	AN21	DDR1_CLK_P2	DDR1_D052	AL10	MD849
CLKB3	AP19	DDR1_CLK_P2	DDR1_D053	AM6	MD854
CLKB3	AP19	DDR1_CLK_P2	DDR1_D054	AM7	MD851
CLKB3	AP20	DDR1_CLK_P3	DDR1_D055	AM6	MD861
		DDR1_CLK_N3	DDR1_D056	AM7	MD860
SCASB	AP16	DDR1_CAS*	DDR1_D057	AM8	MD859
	AL20	DDR1_SV0	DDR1_D058	AM7	MD863
SKASB	AM18	DDR1_RAS*	DDR1_D059	AM6	MD856
SWFB	AK16	DDR1_WE*	DDR1_D061	AF7	MD857
			DDR1_D062	AF6	MD858
	AB39	DDR_VREF_D00	DDR1_D063	AF7	MD862
	AB40	DDR_VREF_D01	DDR1_D064	AF35	QDSB0
			DDR1_D065	AF33	QDSB2
			DDR1_D066	AN28	QDSB3
			DDR1_D067	AN12	QDSB4
			DDR1_D068	AP8	QDSB5
			DDR1_D069	AL8	QDSB6
			DDR1_D070	AG7	QDSB7
			DDR1_D071	AN25	QDSB8
			DDR1_D072	AF34	QDSB0
			DDR1_D073	AK33	QDSB1
			DDR1_D074	AN33	QDSB2
			DDR1_D075	AN29	QDSB3
			DDR1_D076	AN13	QDSB4
			DDR1_D077	AM6	QDSB5
			DDR1_D078	AM6	QDSB6
			DDR1_D079	AG6	QDSB7
			DDR1_D080	AN26	QDSB8

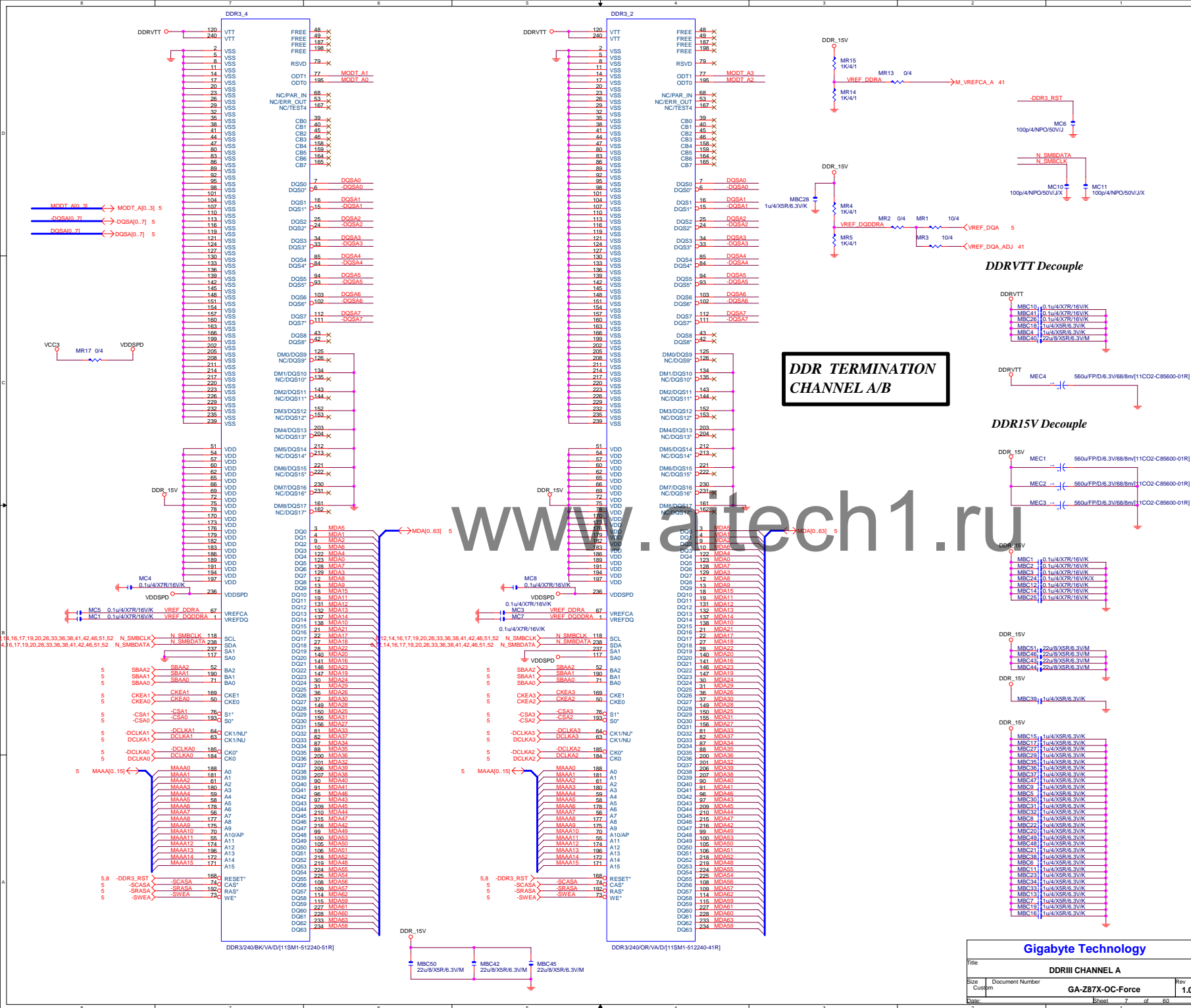
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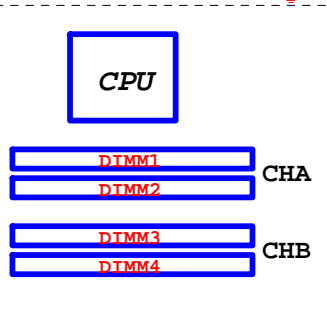
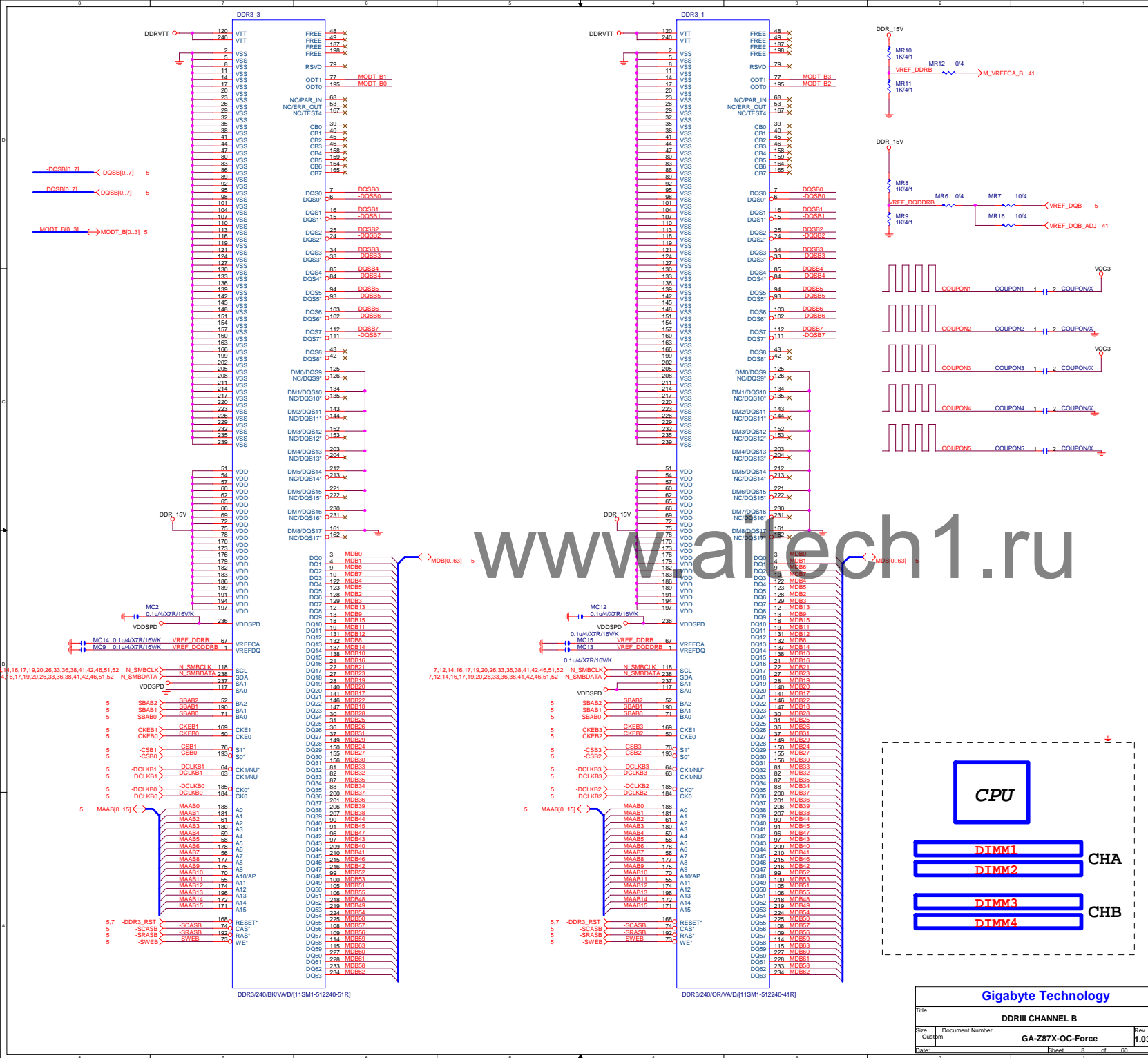


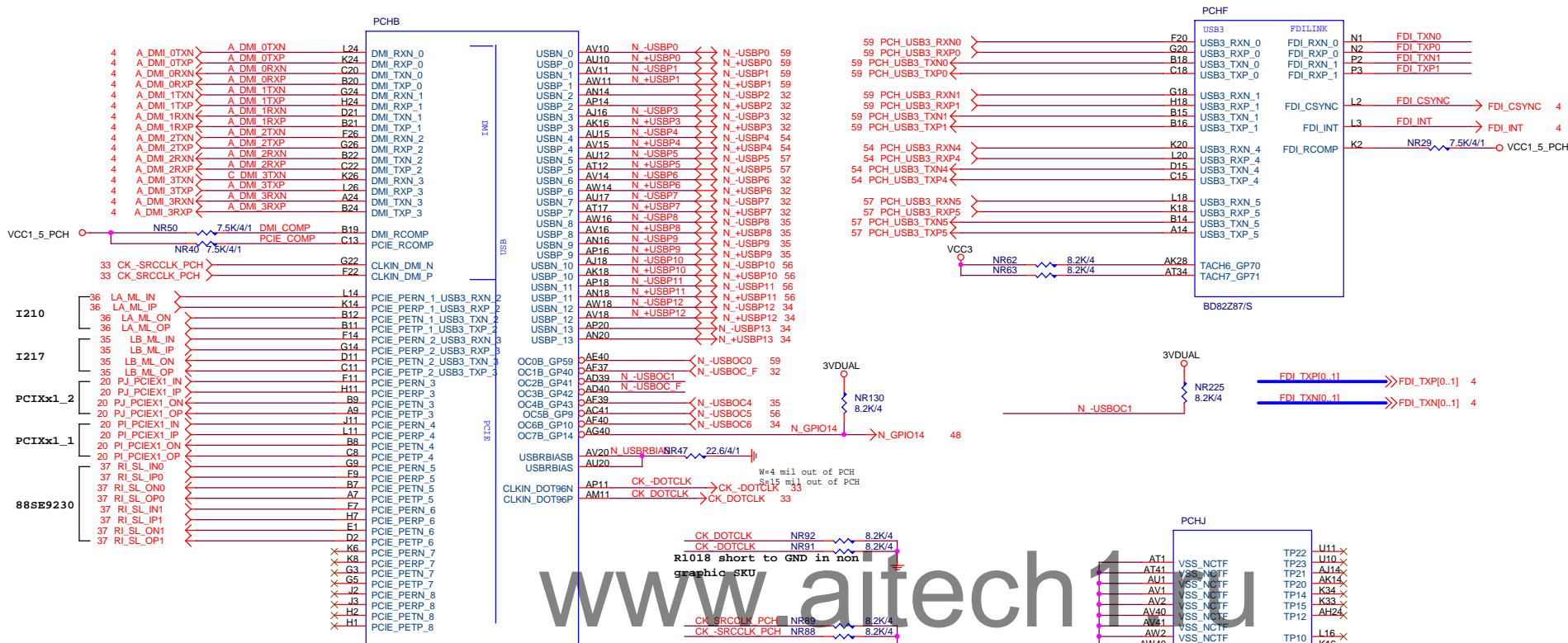
Need check the new CPU ME





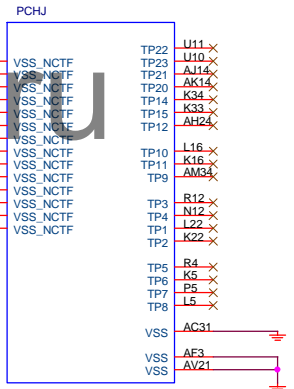
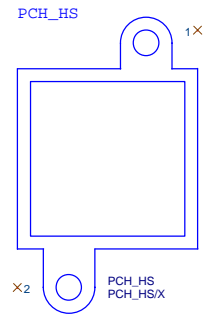




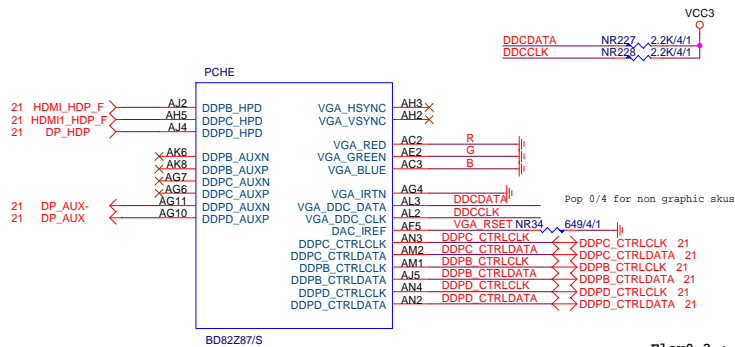


PCIEX1:16/5/5/16 (breakout min 8/4/4/8)  
Impedance=80 +/- 17.5%

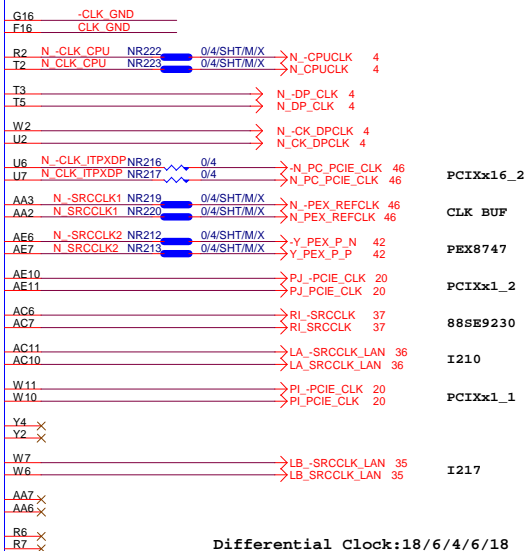
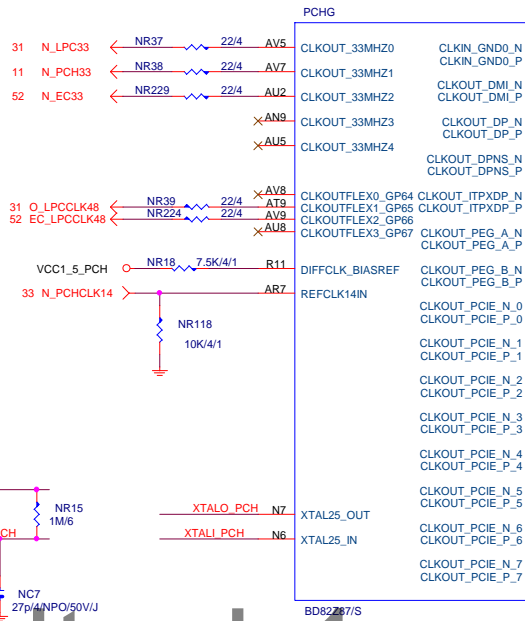
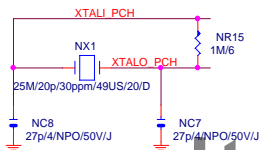
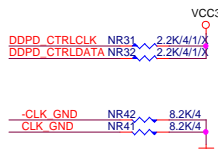
BD82Z87/S



Gigabyte Technology			
Title			
PCH FDI,DMI,USB,PCIe,NVRAM			
Size	Document Number	Rev	
Custom			1.03
GA-Z87X-OC-Force			
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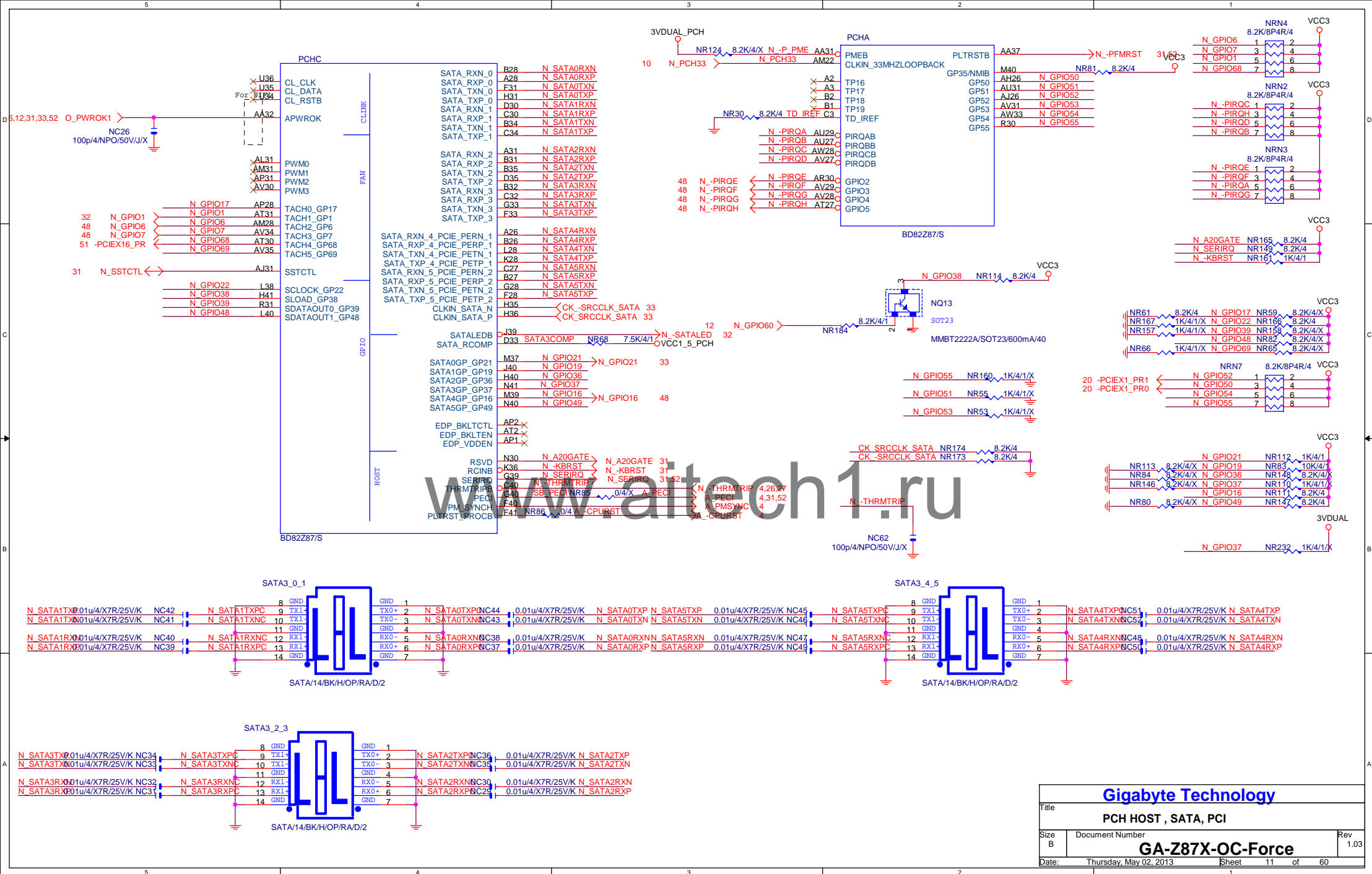


Flex0,2 : 33MHZ  
Flex1,3 : 27/14/24/48/25MHZ

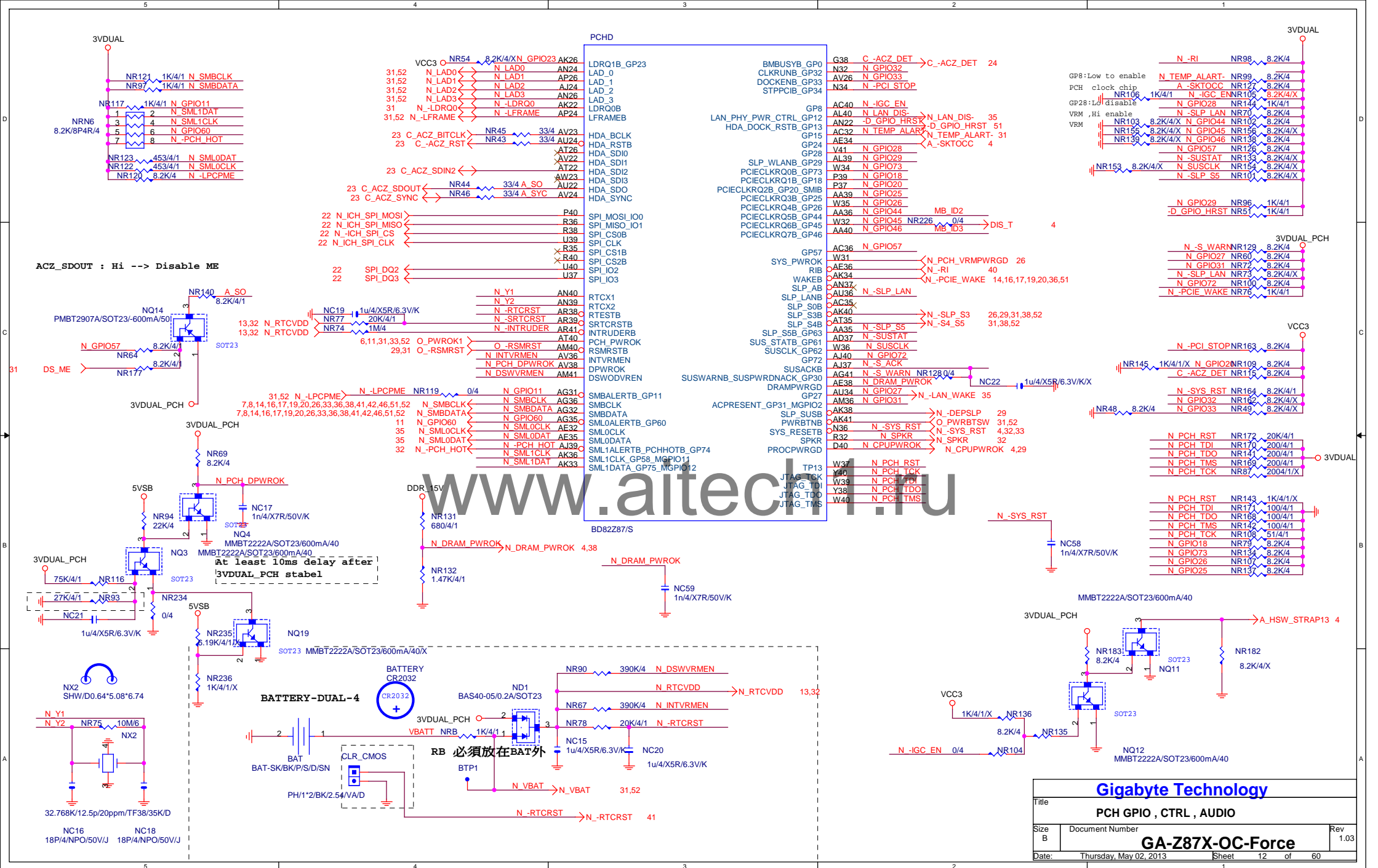


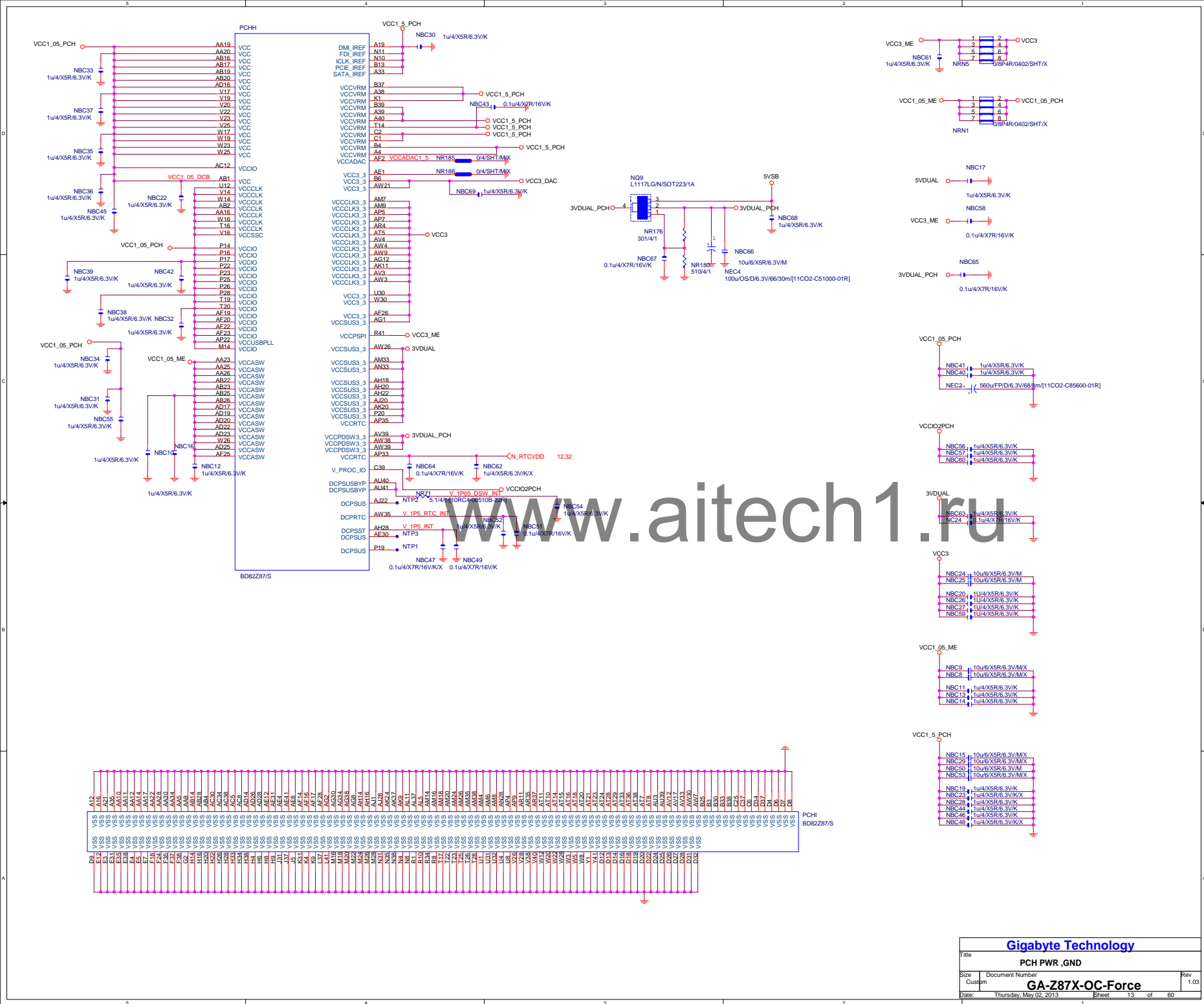
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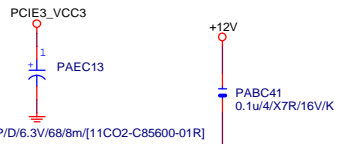
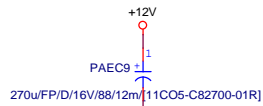






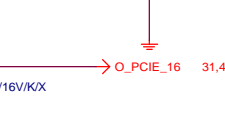
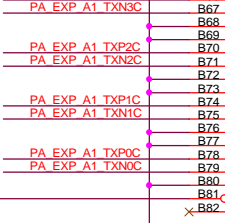
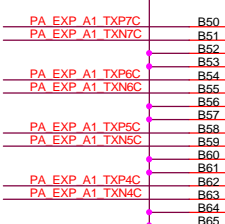
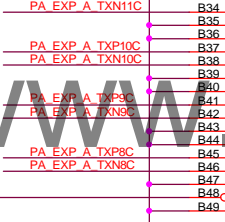
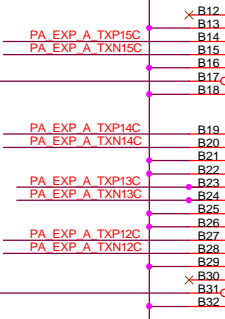
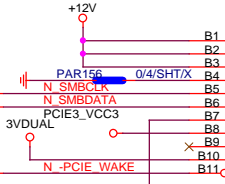
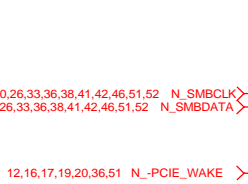
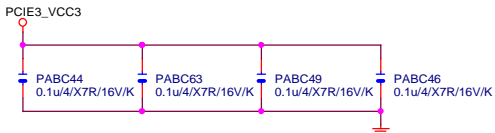




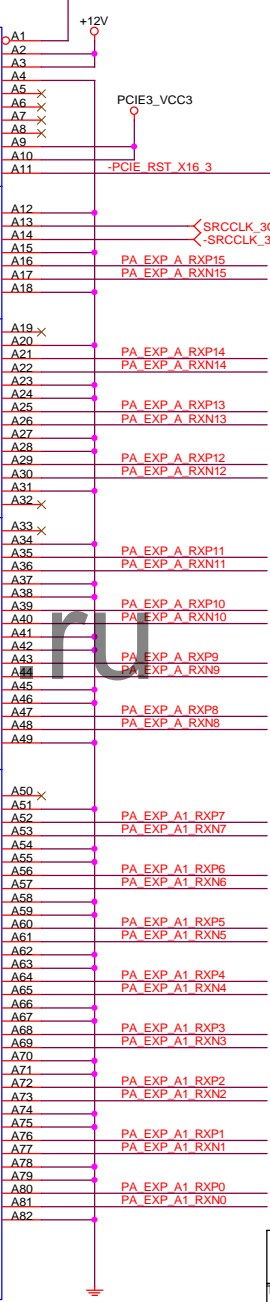
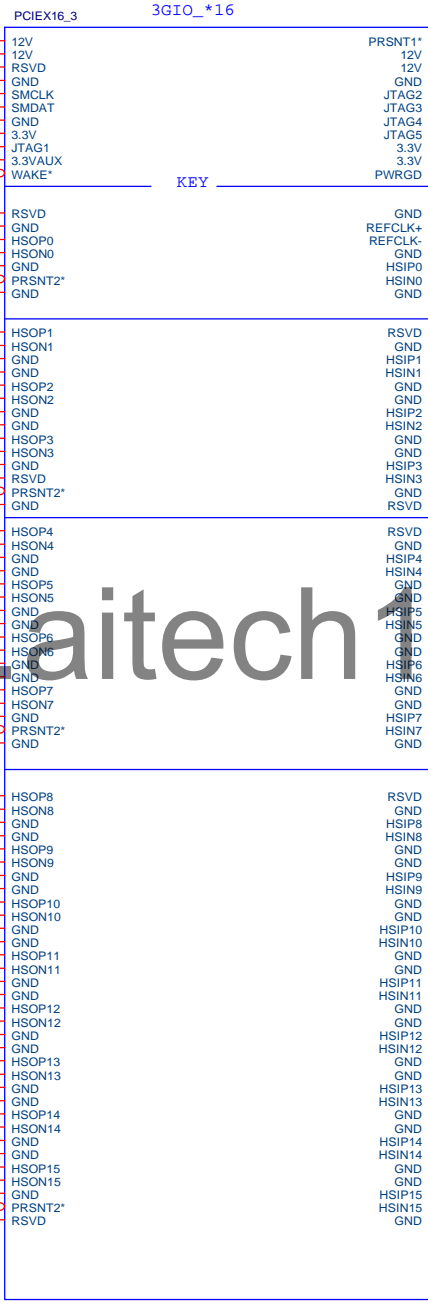


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PA EXP A TXN15	PAC115	0.22u/4/X5R/6.3V/K	PA EXP A TXN15C
PA EXP A TXP14	PAC110	0.22u/4/X5R/6.3V/K	PA EXP A TXP14C
PA EXP A TXN14	PAC111	0.22u/4/X5R/6.3V/K	PA EXP A TXN14C
PA EXP A TXP13	PAC109	0.22u/4/X5R/6.3V/K	PA EXP A TXP13C
PA EXP A TXN13	PAC110	0.22u/4/X5R/6.3V/K	PA EXP A TXN13C
PA EXP A TXP12	PAC108	0.22u/4/X5R/6.3V/K	PA EXP A TXP12C
PA EXP A TXN12	PAC109	0.22u/4/X5R/6.3V/K	PA EXP A TXN12C
PA EXP A TXP11	PAC97	0.22u/4/X5R/6.3V/K	PA EXP A TXP11C
PA EXP A TXN11	PAC98	0.22u/4/X5R/6.3V/K	PA EXP A TXN11C
PA EXP A TXP10	PAC92	0.22u/4/X5R/6.3V/K	PA EXP A TXP10C
PA EXP A TXN10	PAC93	0.22u/4/X5R/6.3V/K	PA EXP A TXN10C
PA EXP A TXP9	PAC87	0.22u/4/X5R/6.3V/K	PA EXP A TXP9C
PA EXP A TXN9	PAC88	0.22u/4/X5R/6.3V/K	PA EXP A TXN9C
PA EXP A TXP8	PAC83	0.22u/4/X5R/6.3V/K	PA EXP A TXP8C
PA EXP A TXN8	PAC85	0.22u/4/X5R/6.3V/K	PA EXP A TXN8C
PA EXP A1 TXP7	PAC80	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP7C
PA EXP A1 TXN7	PAC82	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN7C
PA EXP A1 TXP6	PAC74	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP6C
PA EXP A1 TXN6	PAC77	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN6C
PA EXP A1 TXP5	PAC68	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP5C
PA EXP A1 TXN5	PAC70	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN5C
PA EXP A1 TXP4	PAC62	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP4C
PA EXP A1 TXN4	PAC64	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN4C
PA EXP A1 TXP3	PAC56	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP3C
PA EXP A1 TXN3	PAC58	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN3C
PA EXP A1 TXP2	PAC50	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP2C
PA EXP A1 TXN2	PAC52	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN2C
PA EXP A1 TXP1	PAC43	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP1C
PA EXP A1 TXN1	PAC46	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN1C
PA EXP A1 TXP0	PAC39	0.22u/4/X5R/6.3V/K	PA EXP A1 TXP0C
PA EXP A1 TXN0	PAC38	0.22u/4/X5R/6.3V/K	PA EXP A1 TXN0C

PA EXP A RXP18..15]	>>>PA_EXP_A_RXP[8..15]	43
PA EXP A RXN18..15]	>>>PA_EXP_A_RXN[8..15]	43
PA EXP A TXP18..15]	>>>PA_EXP_A_TXP[8..15]	43
PA EXP A TXN18..15]	>>>PA_EXP_A_TXN[8..15]	43
PA EXP A1 RXP10..7]	>>>PA_EXP_A1_RXP[0..7]	15
PA EXP A1 RXN10..7]	>>>PA_EXP_A1_RXN[0..7]	15
PA EXP A1 TXP10..7]	>>>PA_EXP_A1_TXP[0..7]	15
PA EXP A1 TXN10..7]	>>>PA_EXP_A1_TXN[0..7]	15



# PCIESLOT-164DN-2



Title

PCI EXPRESS X16 PORT\_1

Size

Document Number

GA-Z87X-OC-Force

Rev

1.03

Date:

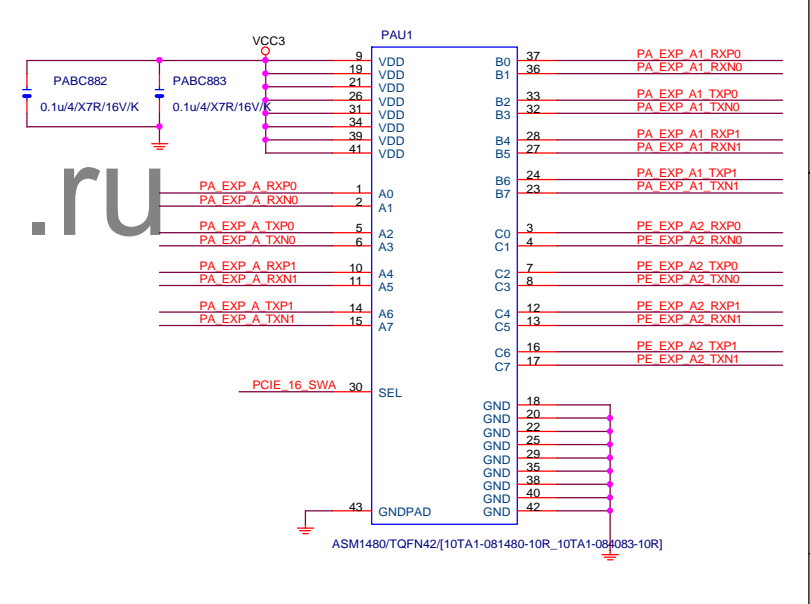
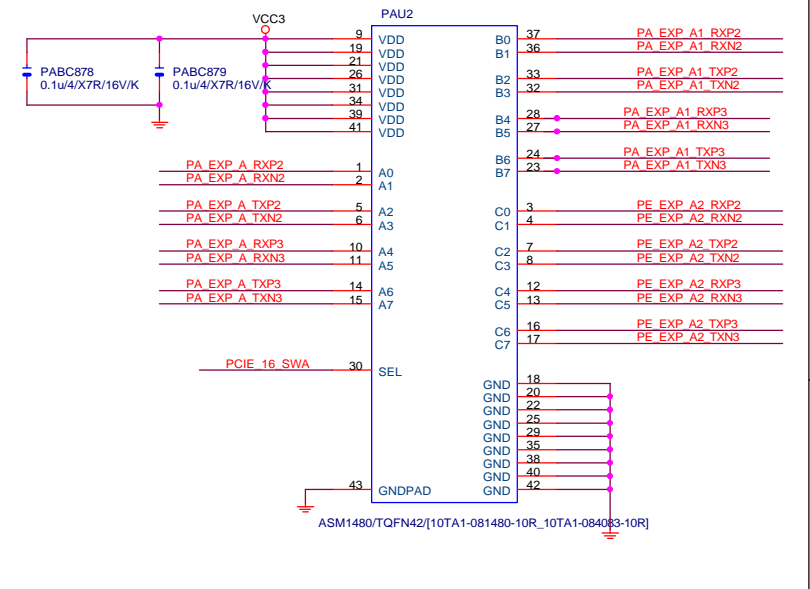
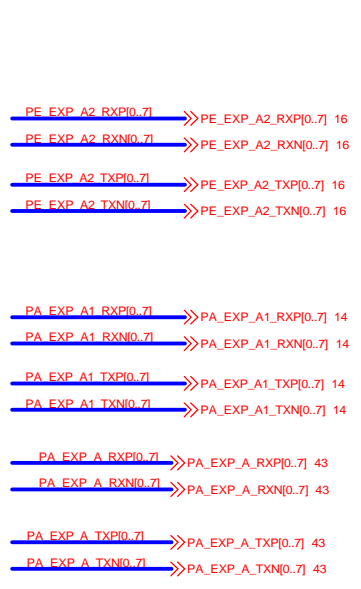
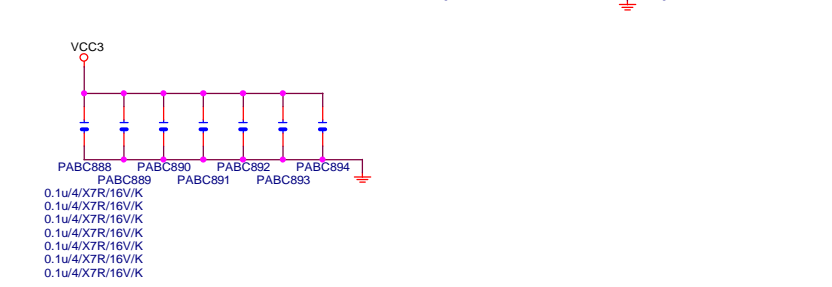
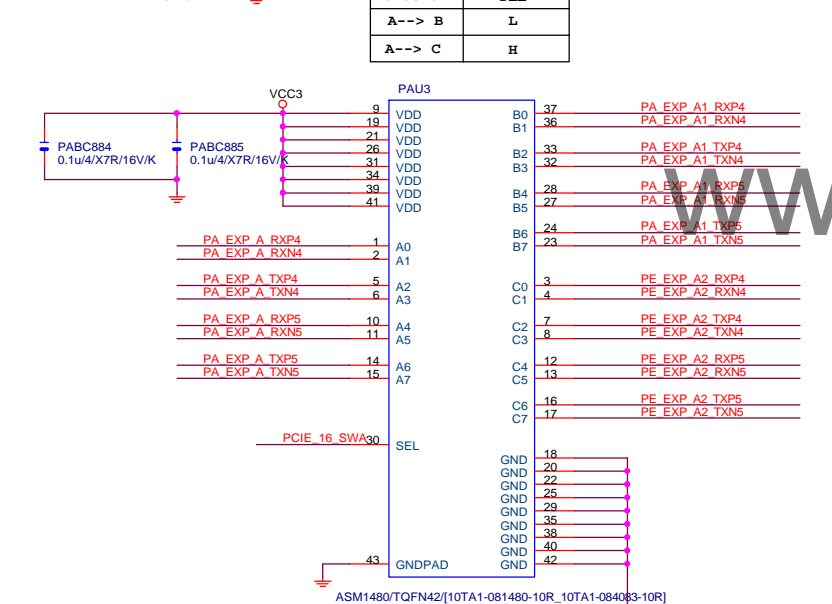
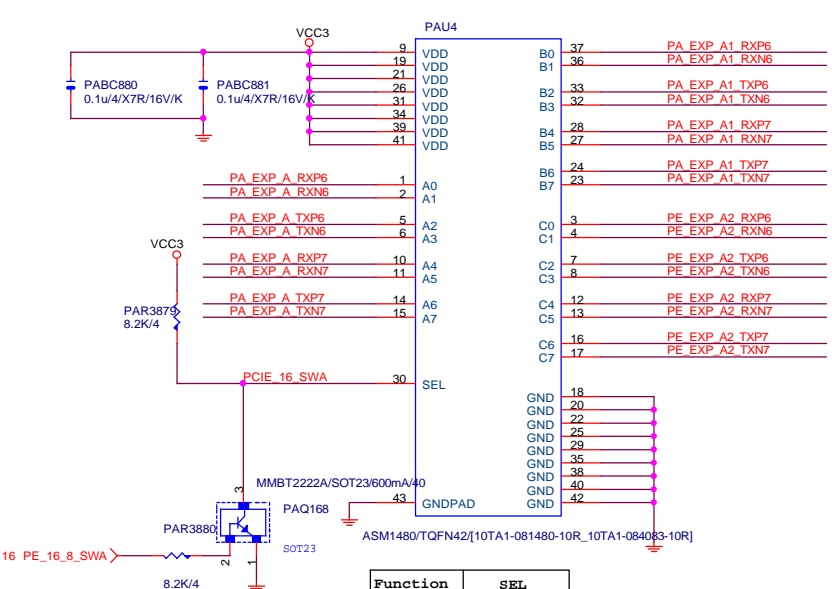
Thursday, May 02, 2013

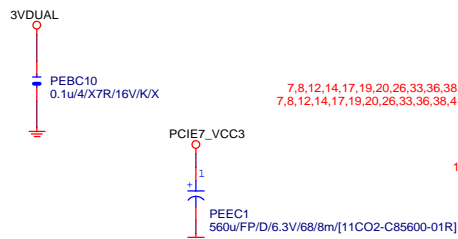
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of

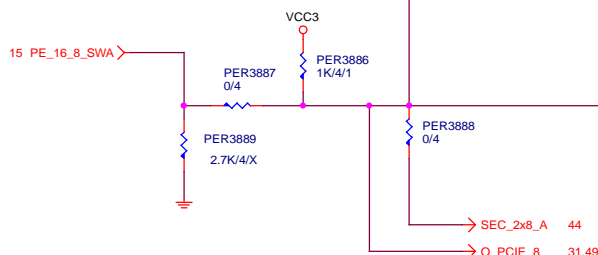
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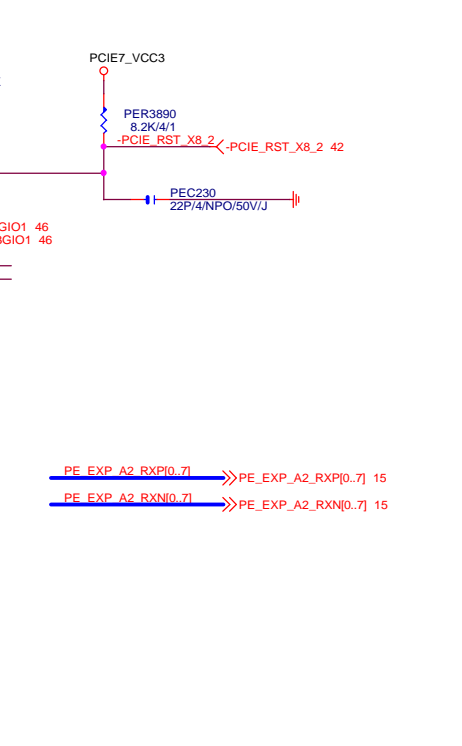
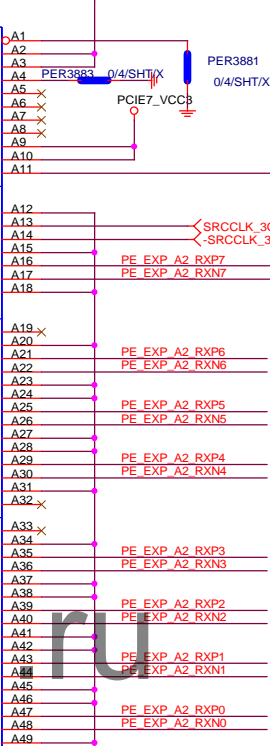
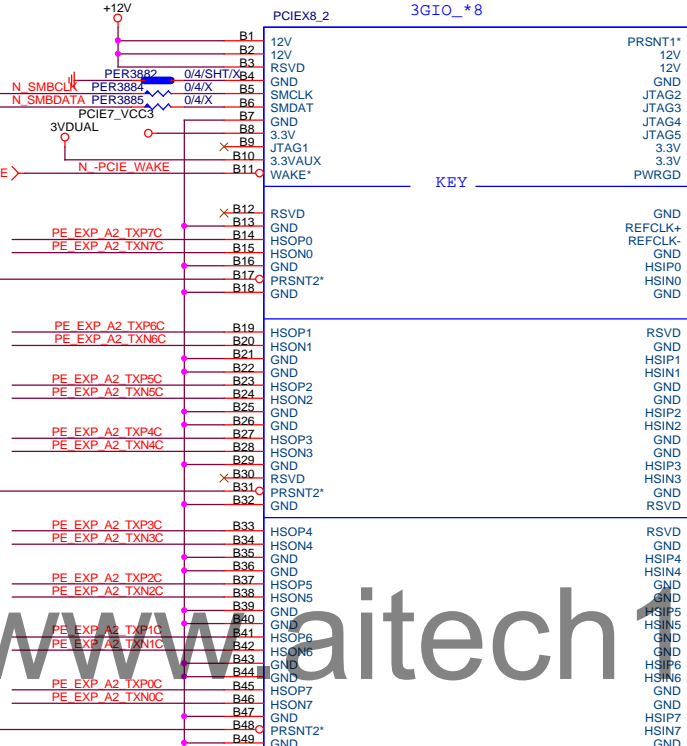


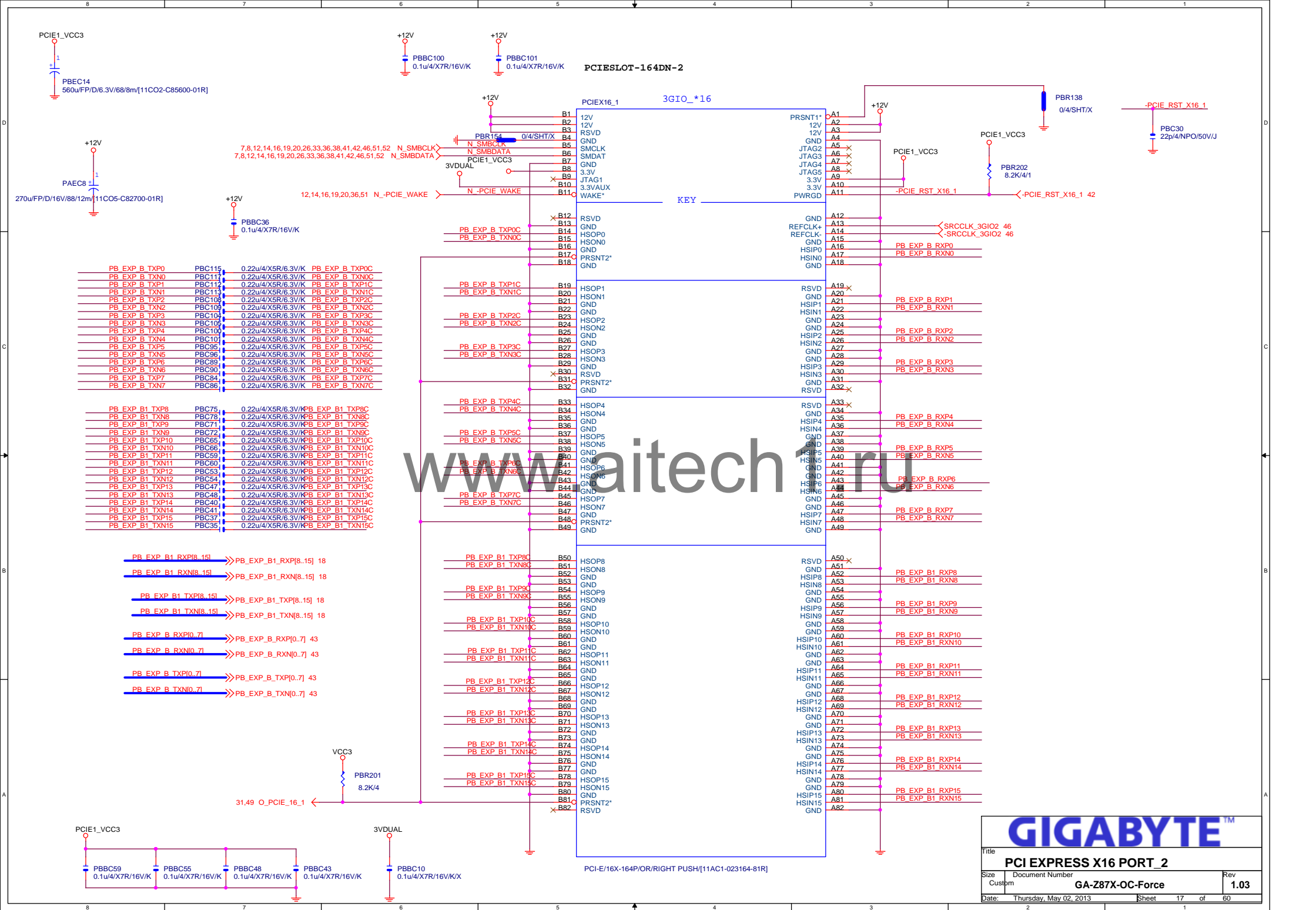
PE\_EXP\_A2\_TXP0..7I >>> PE\_EXP\_A2\_TXP[0..7] 15  
PE\_EXP\_A2\_TXN0..7I >>> PE\_EXP\_A2\_TXN[0..7] 15

PE_EXP_A2_TXP7	PEC231	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP7C
PE_EXP_A2_TXN7	PEC232	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN7C
PE_EXP_A2_TXP6	PEC233	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP6C
PE_EXP_A2_TXN6	PEC234	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN6C
PE_EXP_A2_TXP5	PEC235	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP5C
PE_EXP_A2_TXN5	PEC236	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN5C
PE_EXP_A2_TXP4	PEC237	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP4C
PE_EXP_A2_TXN4	PEC238	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN4C
PE_EXP_A2_TXP3	PEC239	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP3C
PE_EXP_A2_TXN3	PEC240	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN3C
PE_EXP_A2_TXP2	PEC241	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP2C
PE_EXP_A2_TXN2	PEC242	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN2C
PE_EXP_A2_TXP1	PEC243	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP1C
PE_EXP_A2_TXN1	PEC244	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN1C
PE_EXP_A2_TXP0	PEC245	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXP0C
PE_EXP_A2_TXN0	PEC246	0.22u/4/X5R/6.3V/K	PE_EXP_A2_TXN0C

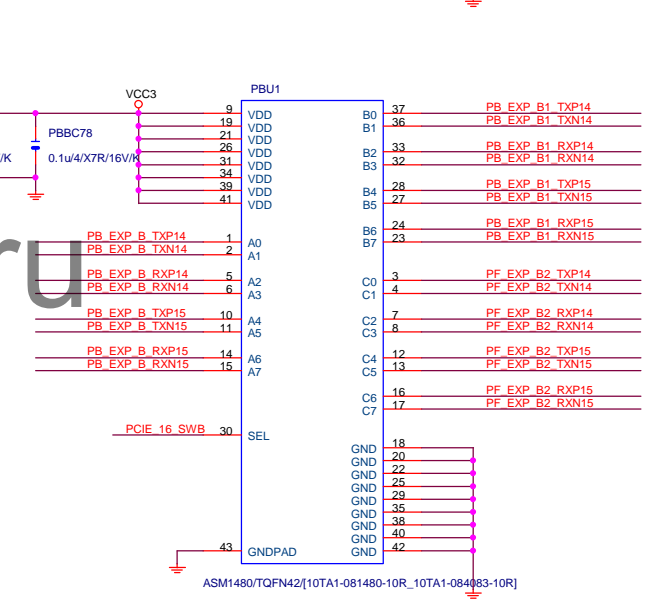
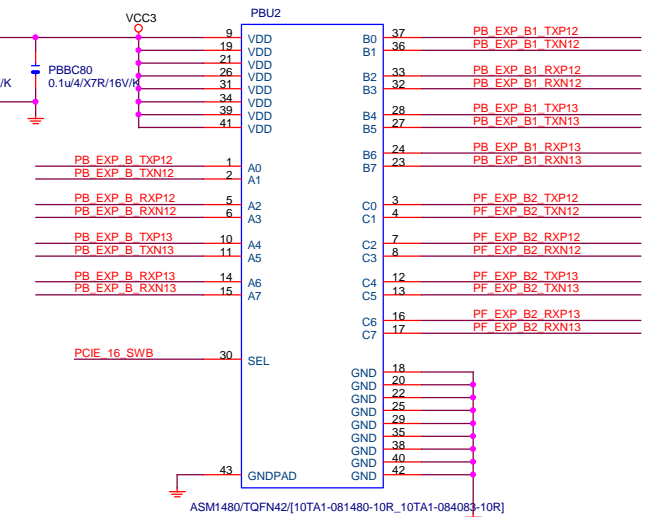
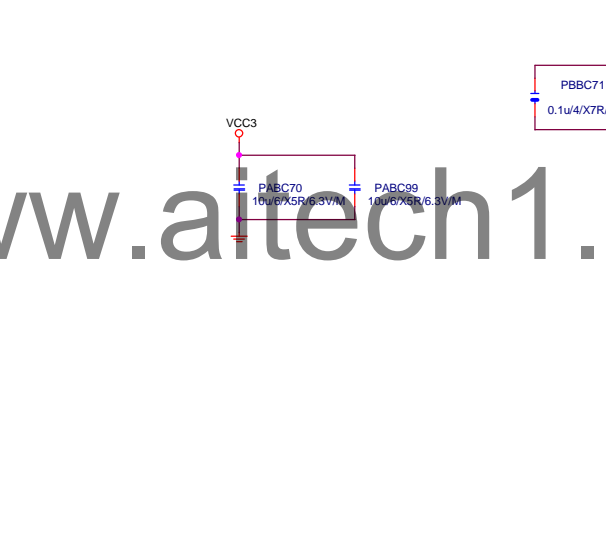
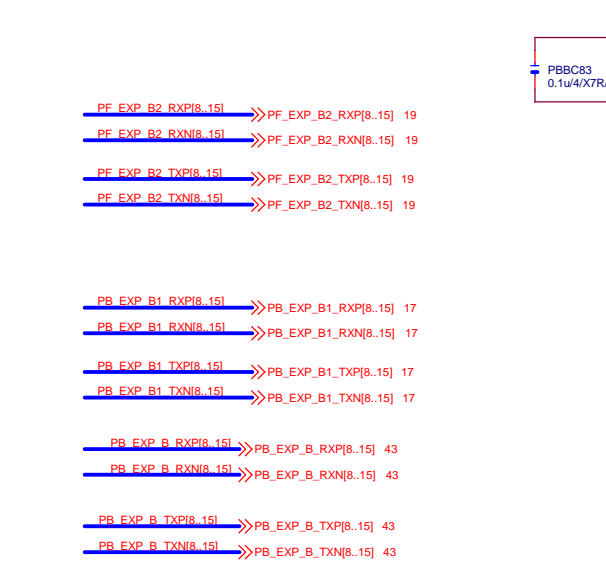
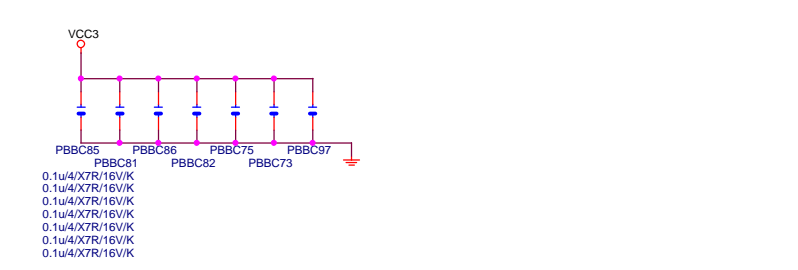
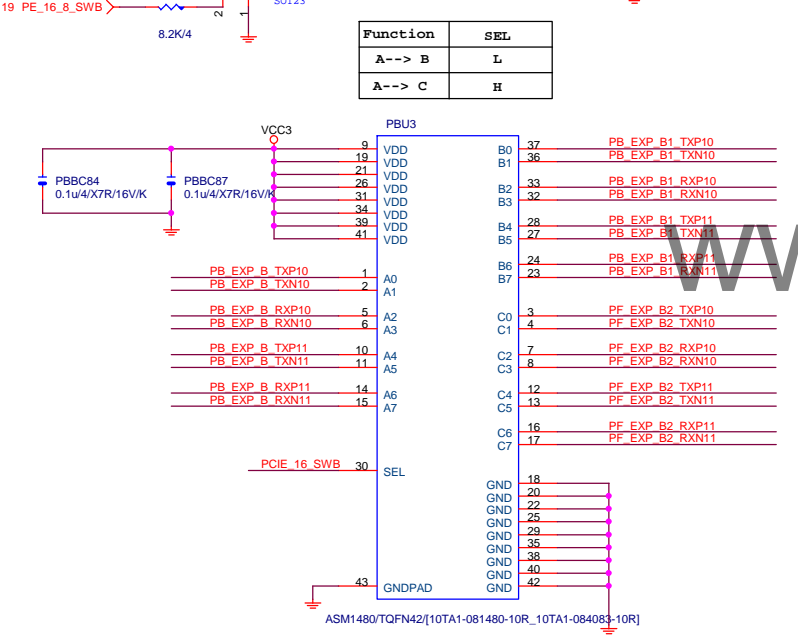
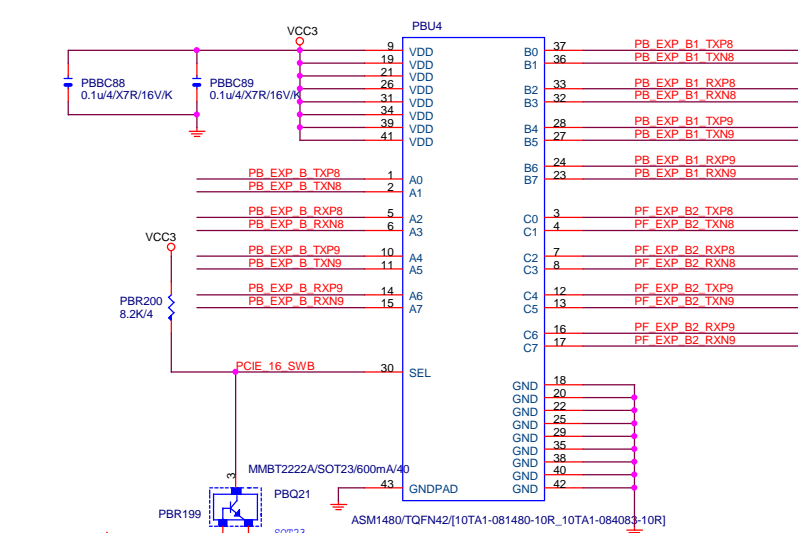


12,14,17,19,20,36,51 N\_-PCIE\_WAKE

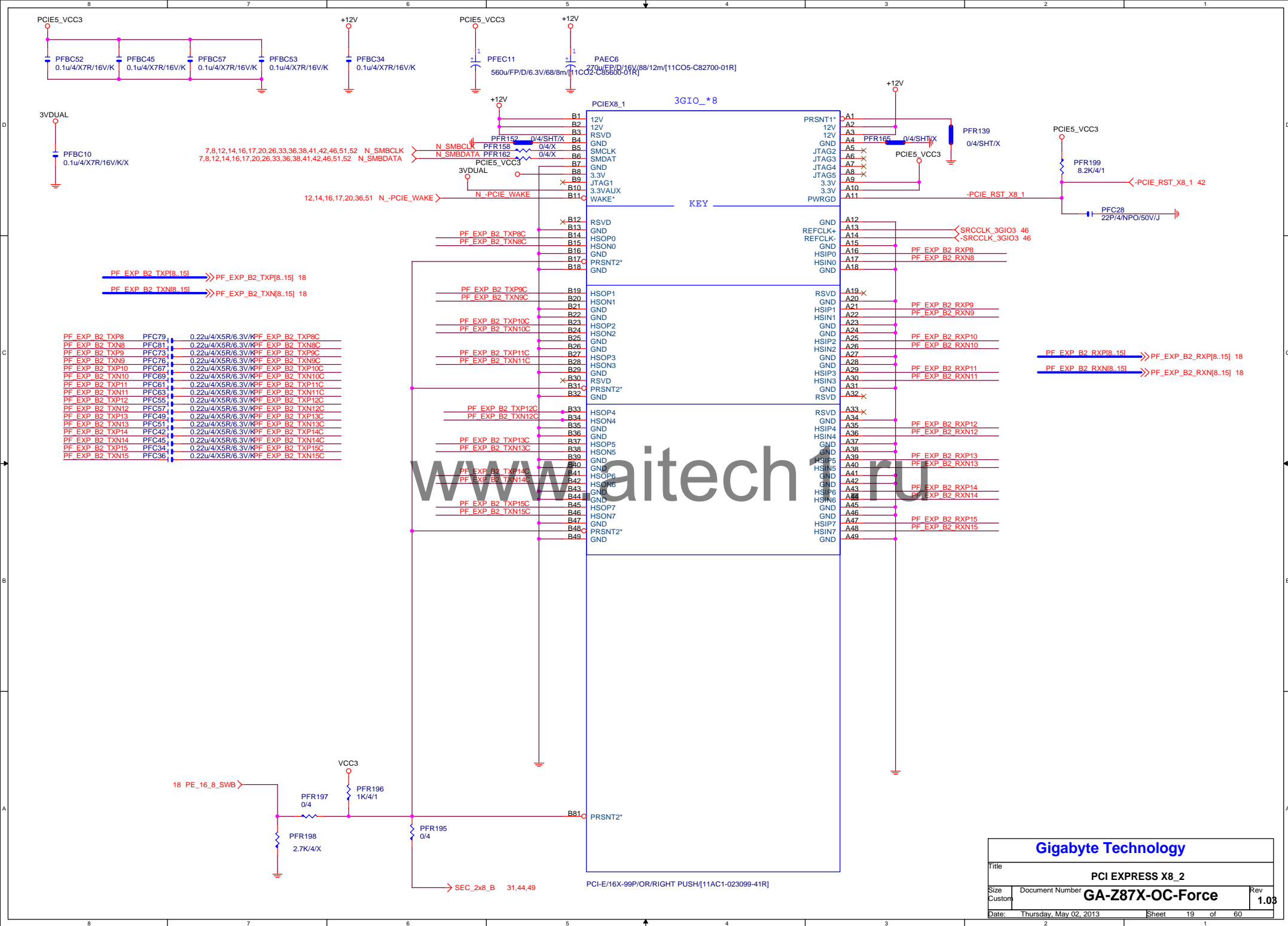


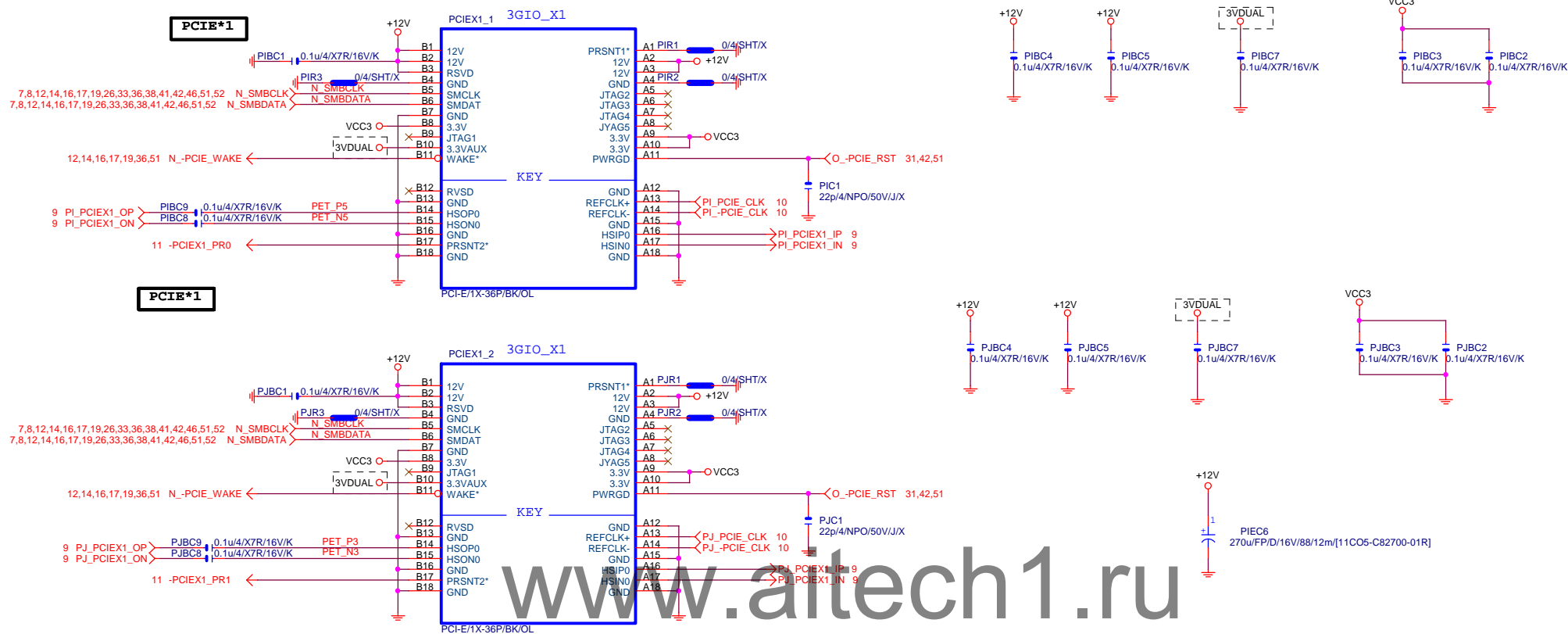






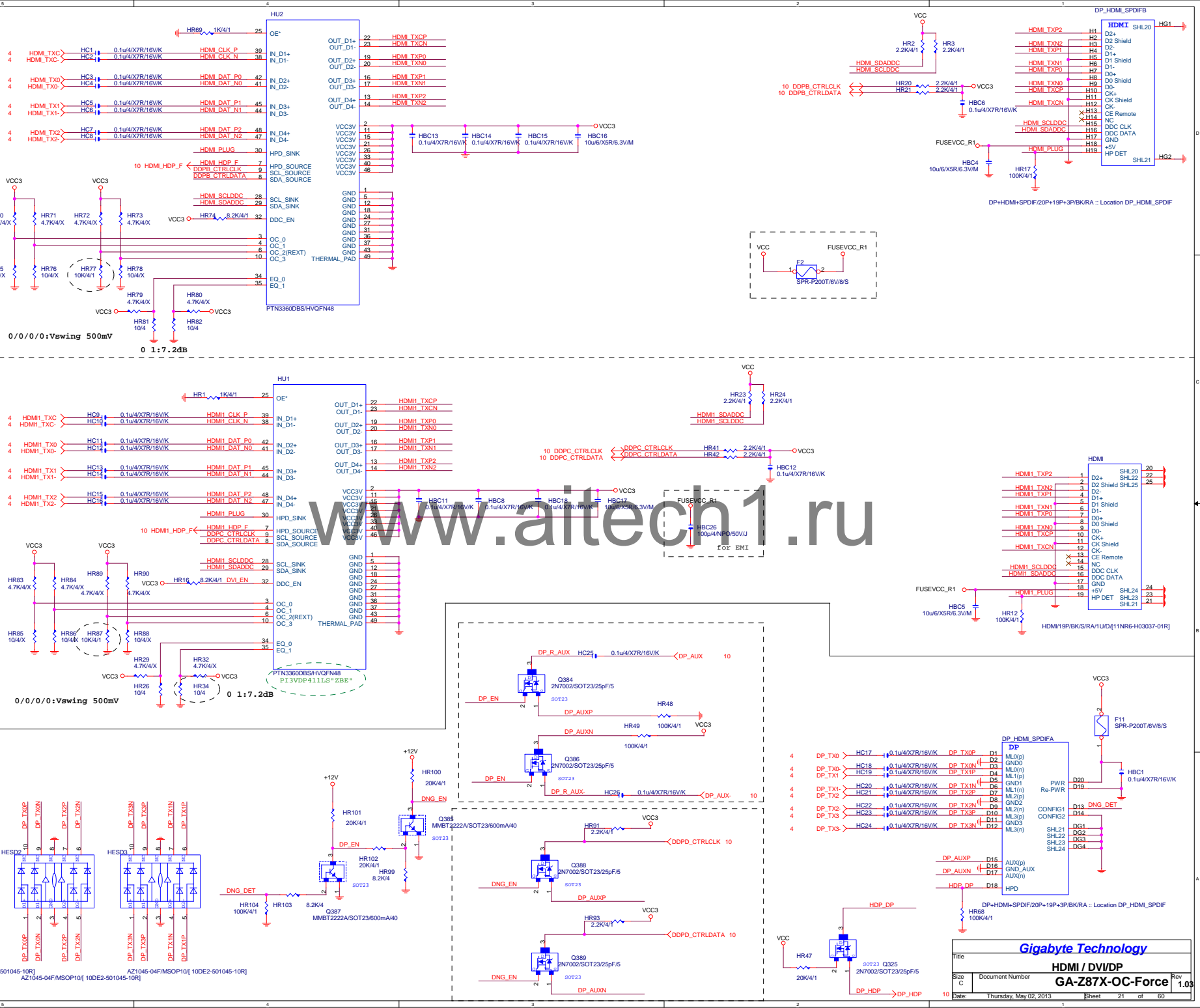


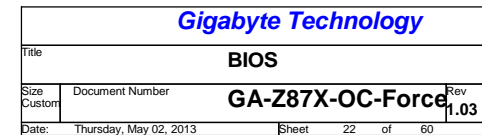
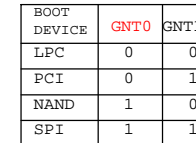


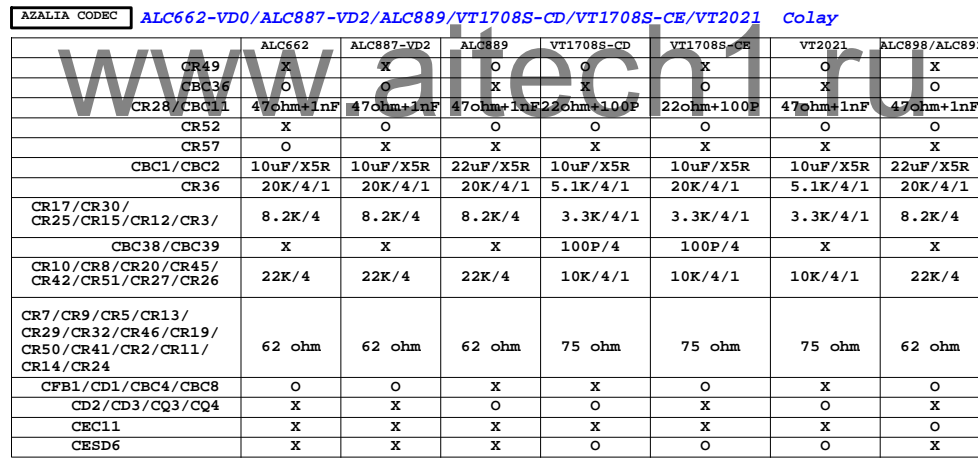
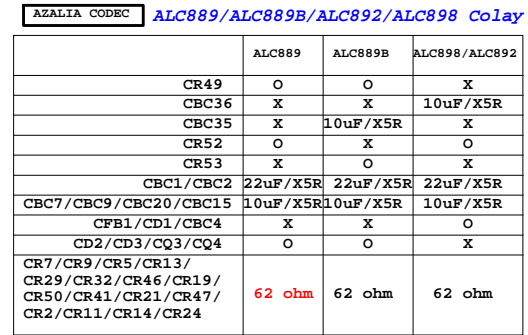


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PCIE X1 1,2			
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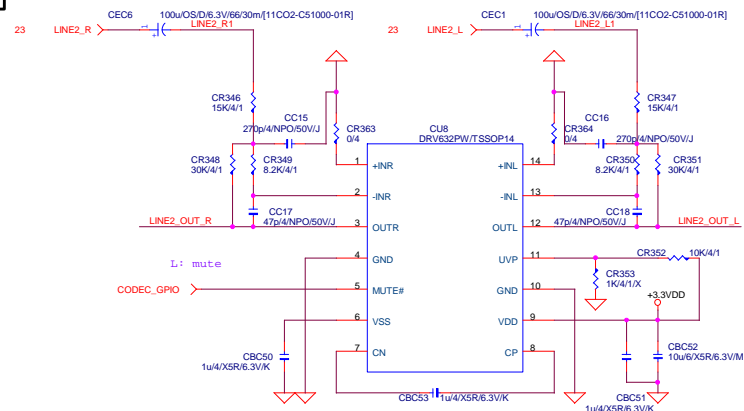




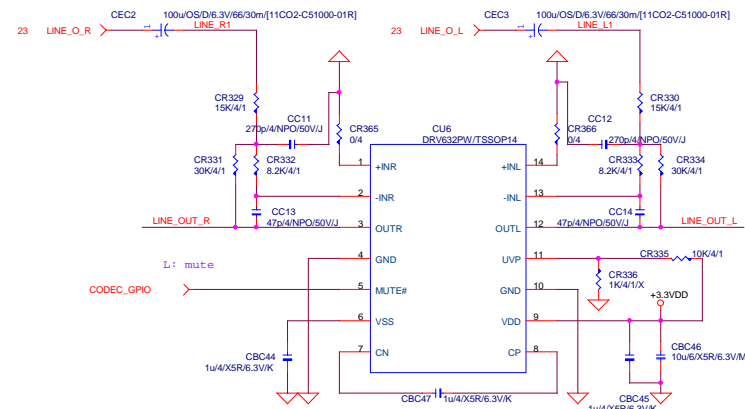




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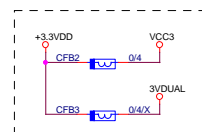
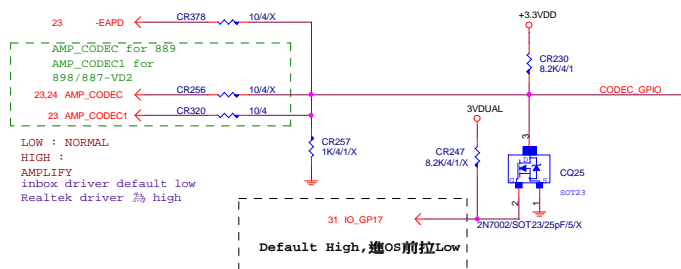


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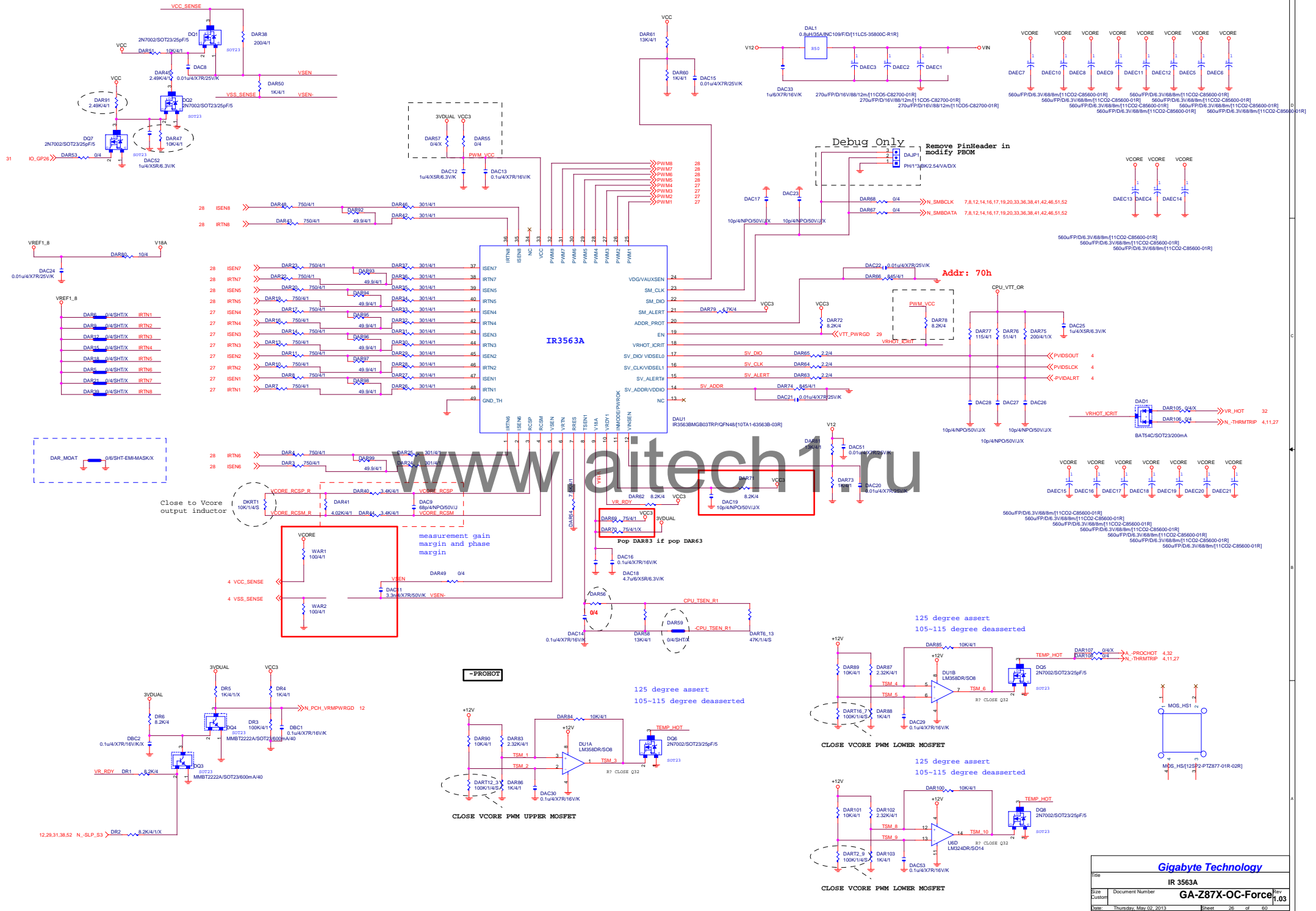


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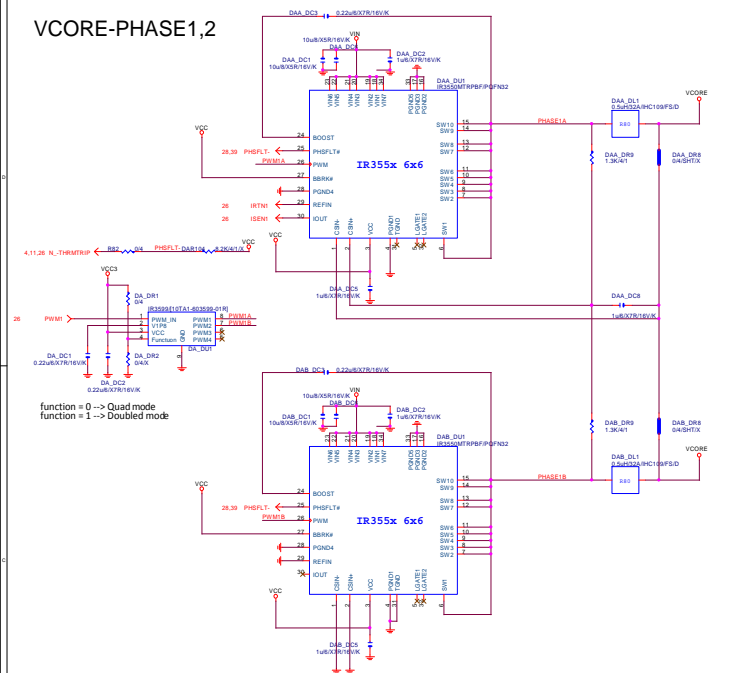
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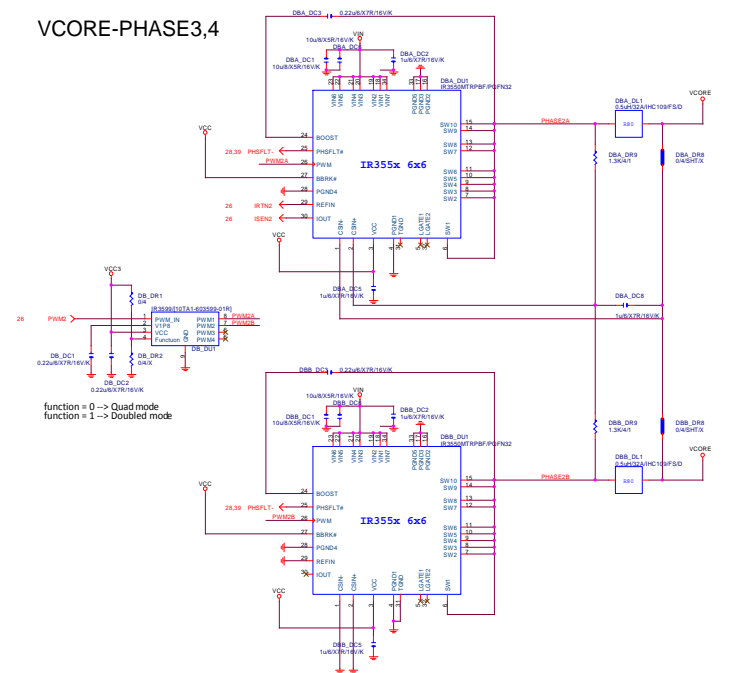




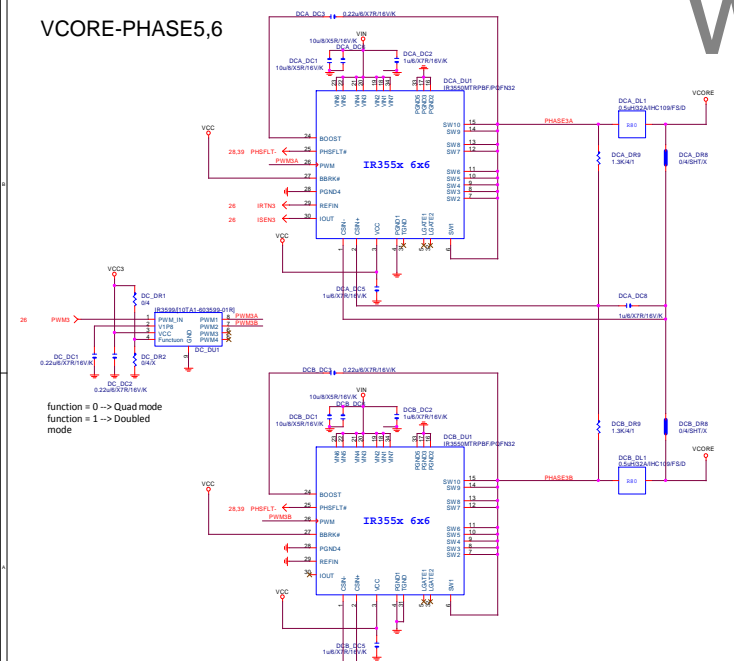
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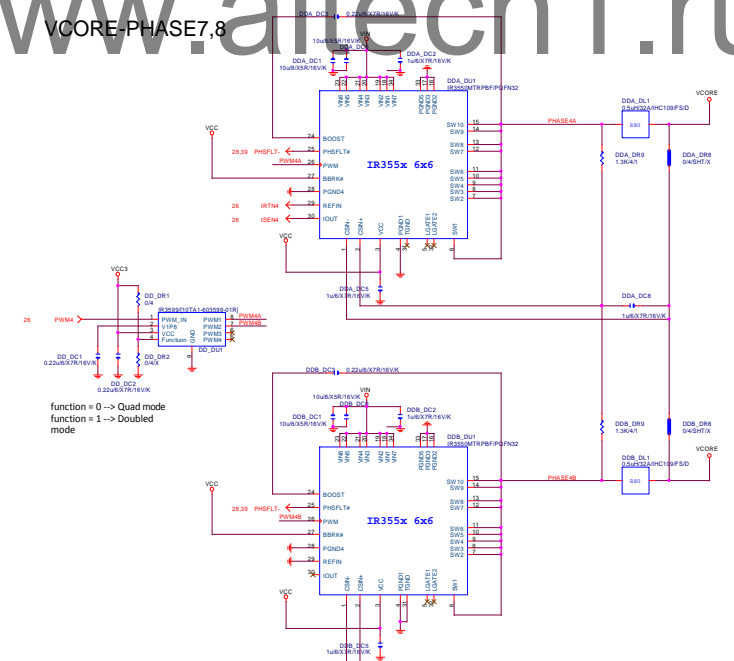
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## VCORE-PHASE5,6



## VCORE-PHASE7,8



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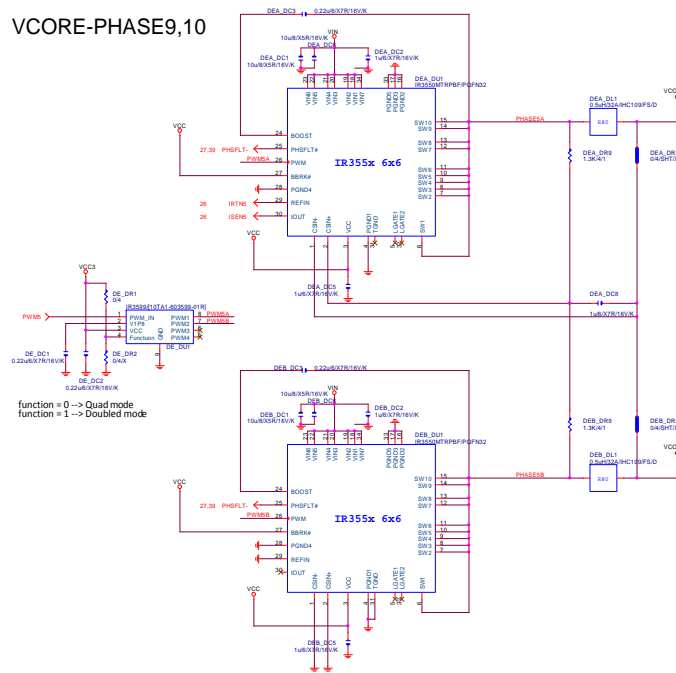
Gigabyte Technology

CPU CORE VR

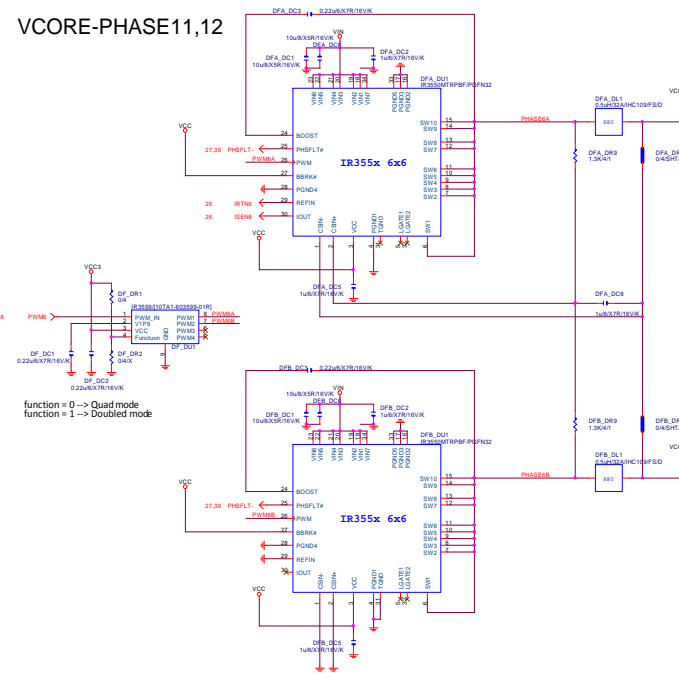
GA-Z87X-OC-Force

Rev. 1.00

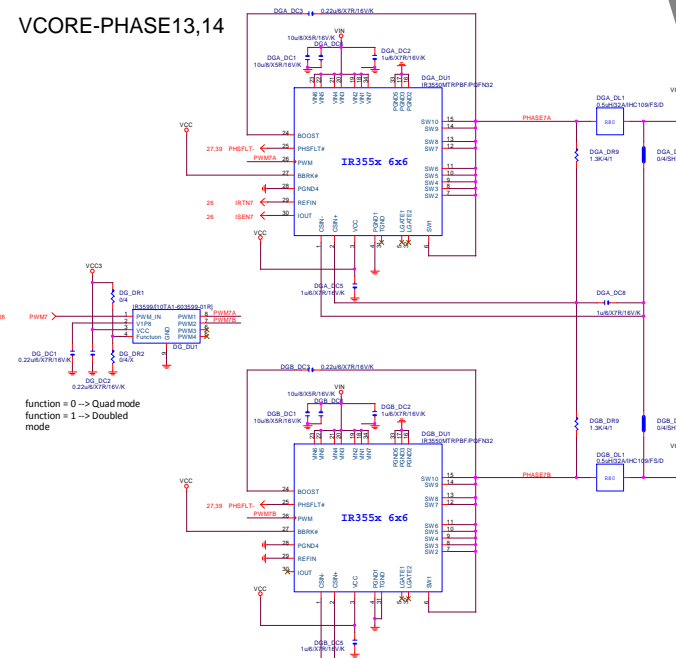
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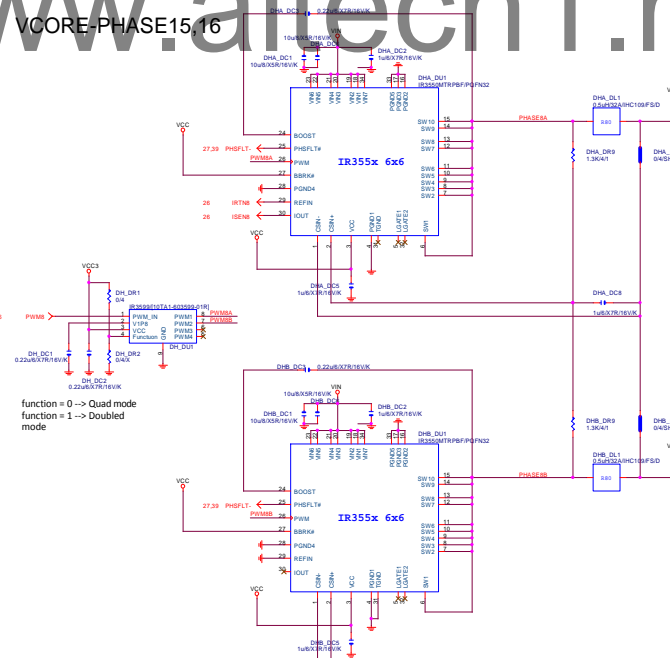
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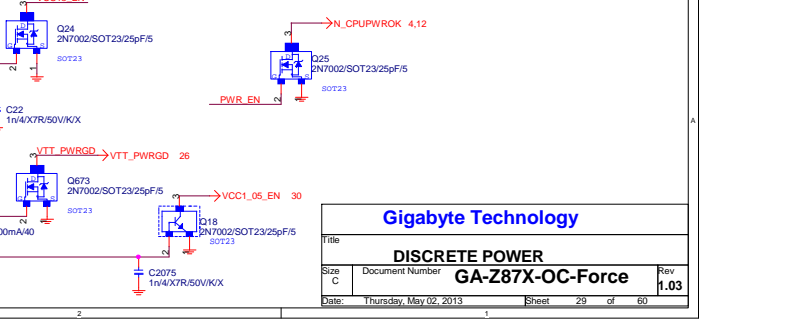
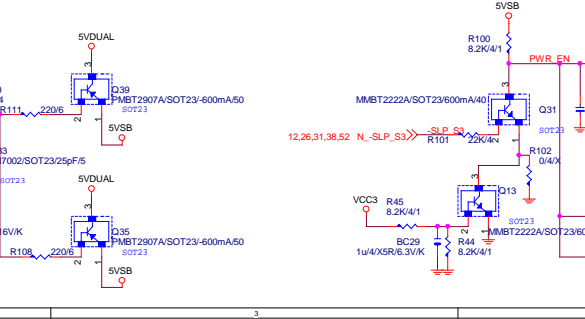
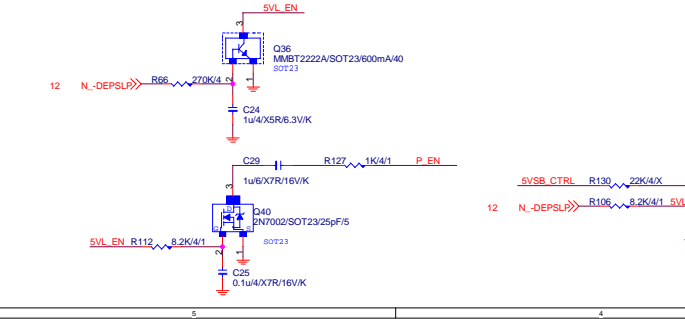
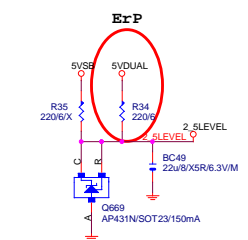
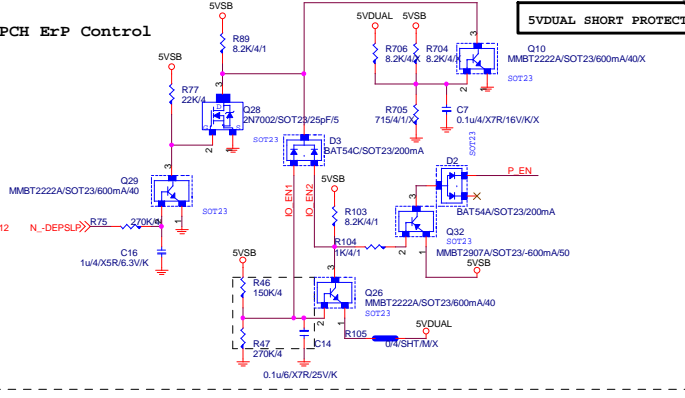
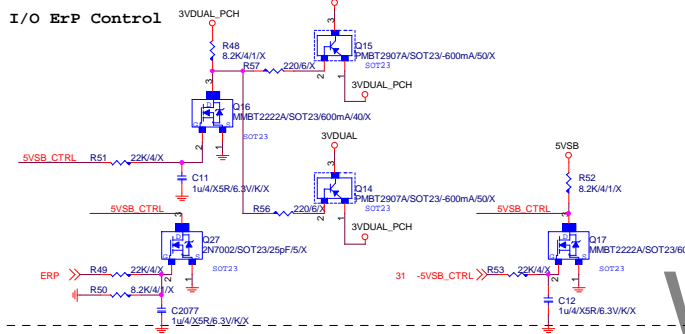
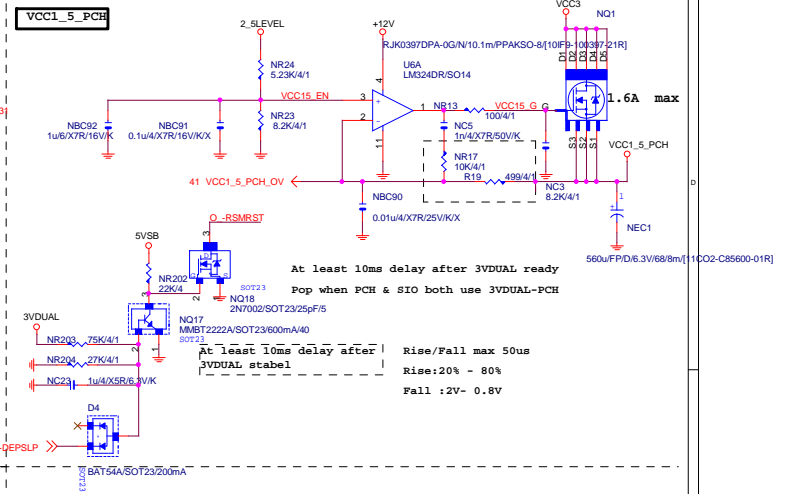
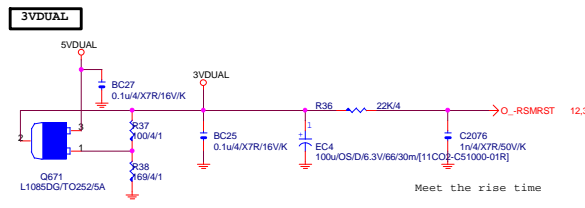
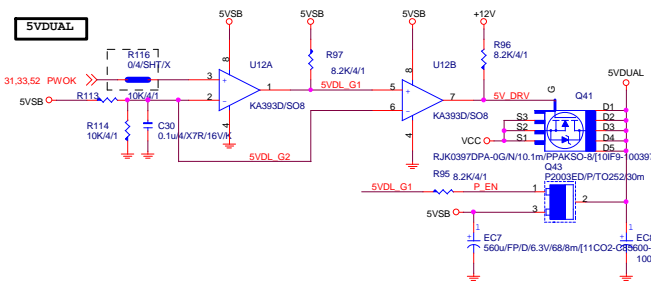
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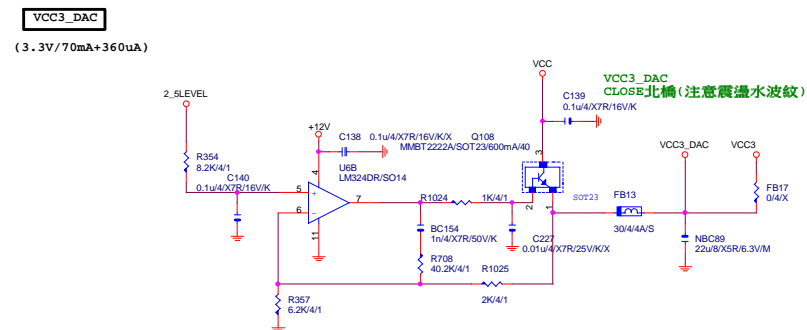
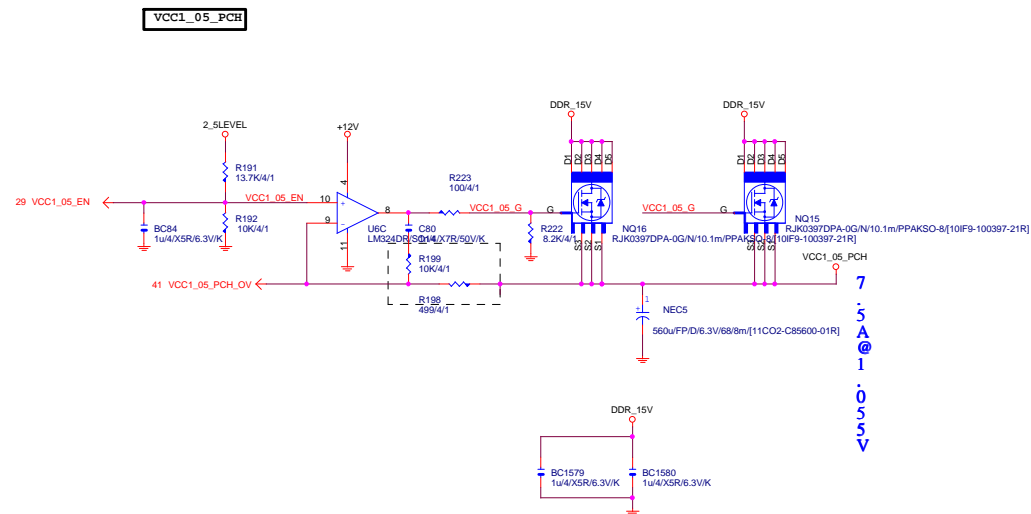


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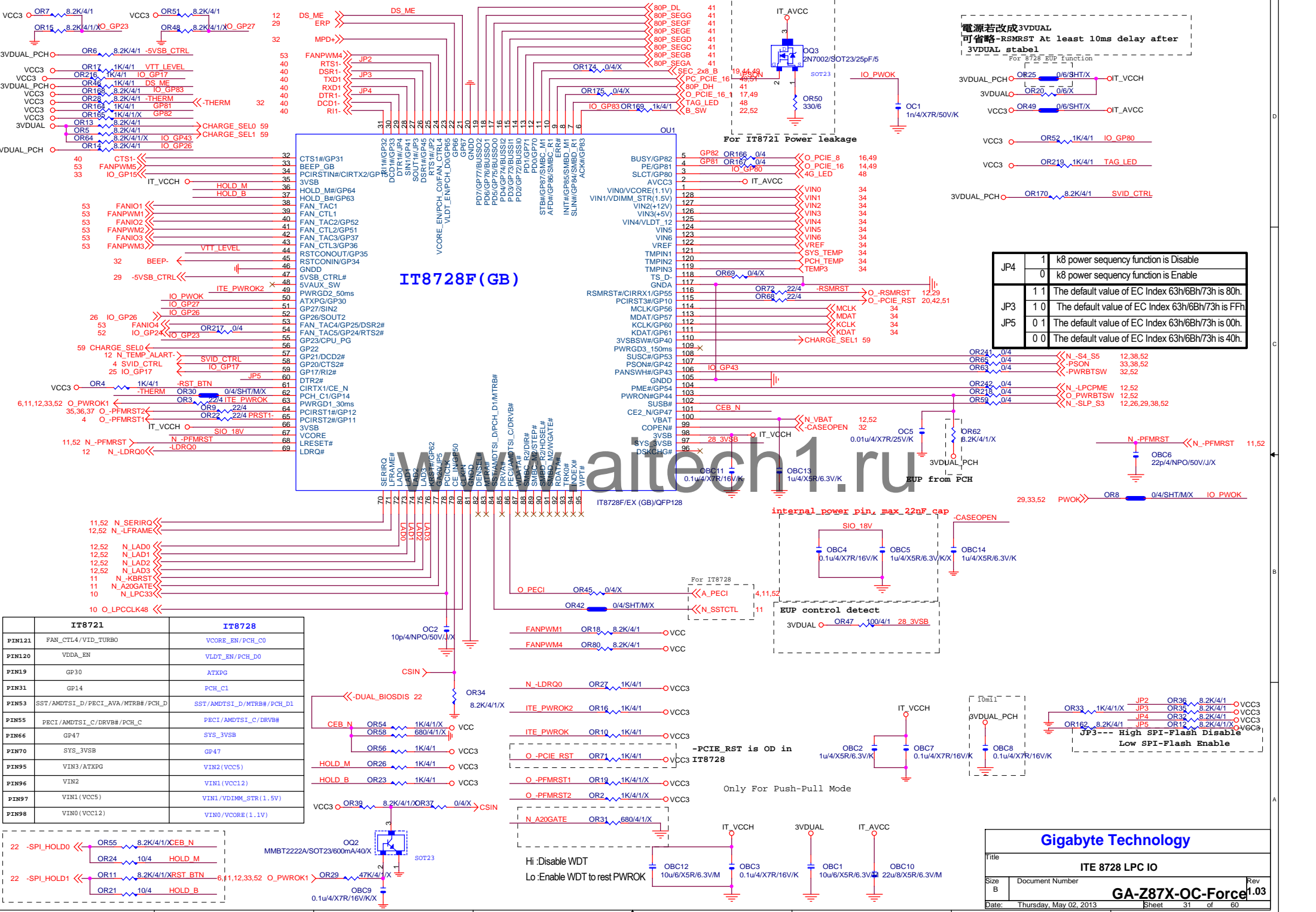


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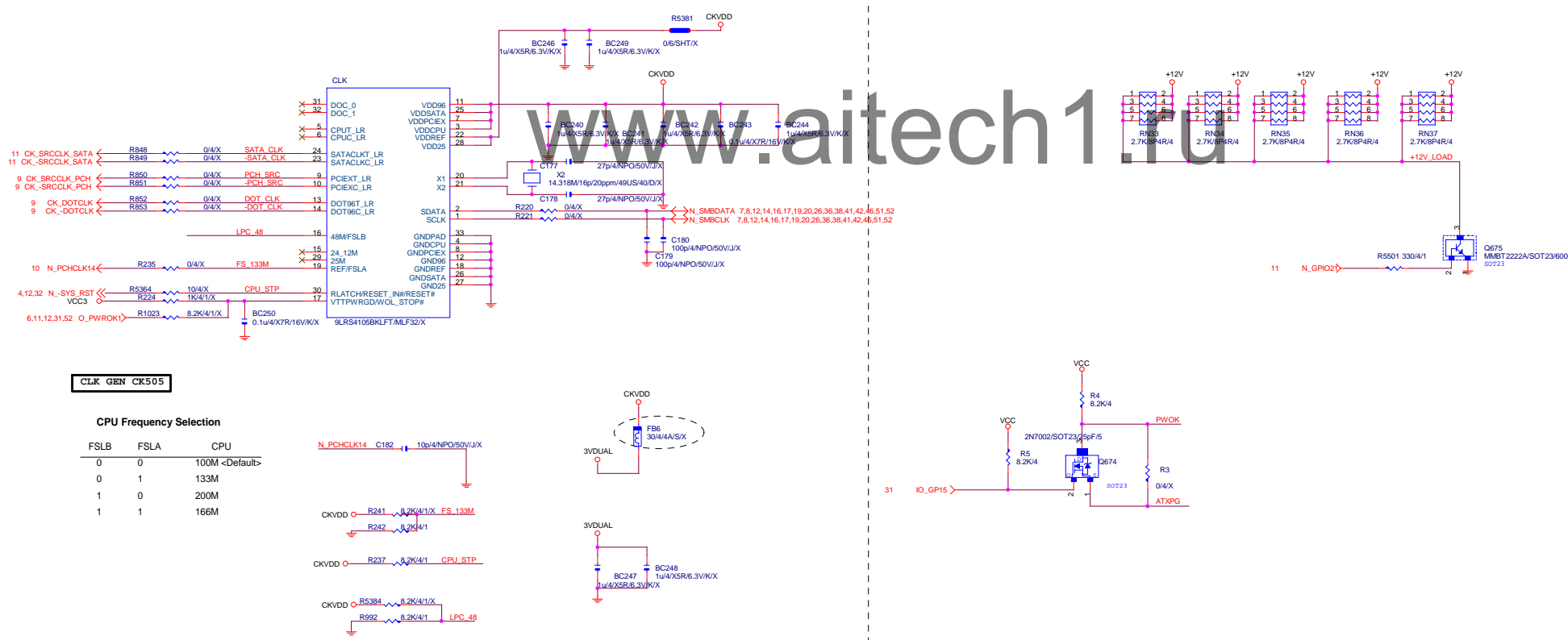
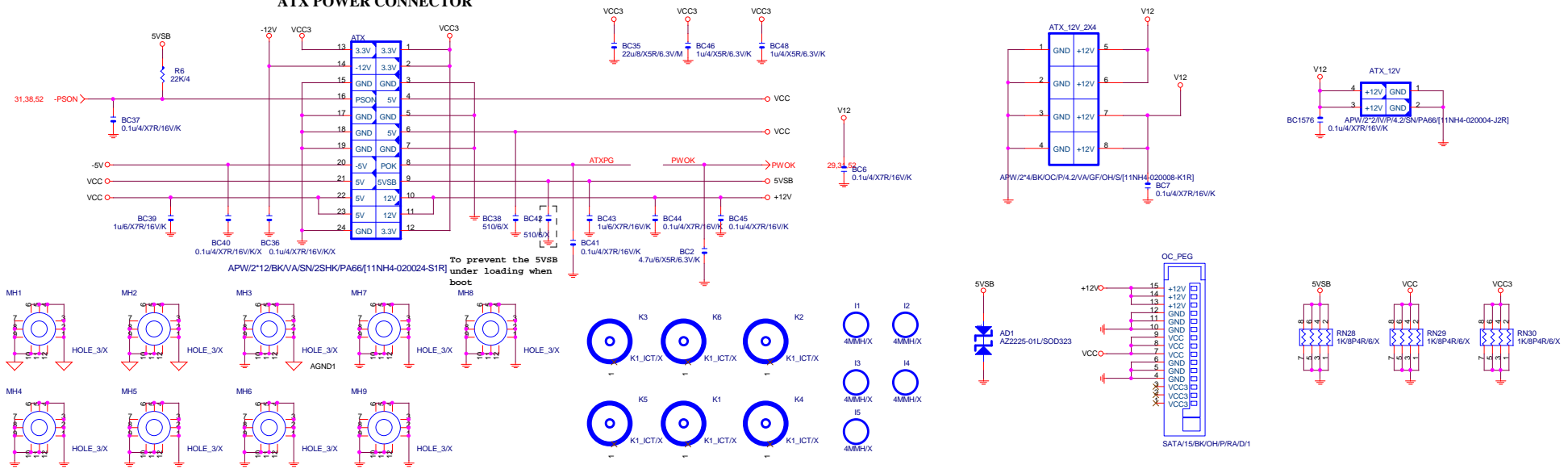
電源若改成3VDUAL  
可省略-RSMRST At least 10ms delay after  
3VDUAL stabal

JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
	1 0	The default value of EC Index 63h/6Bh/73h is FFh
JP5	0 1	The default value of EC Index 63h/6Bh/73h is 00h.
	0 0	The default value of EC Index 63h/6Bh/73h is 40h.





# ATX POWER CONNECTOR



CLK GEN CK505

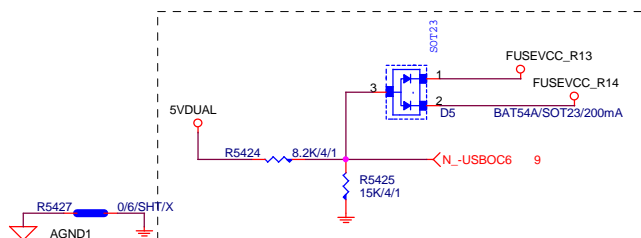
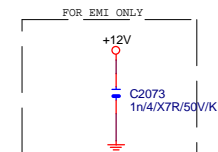
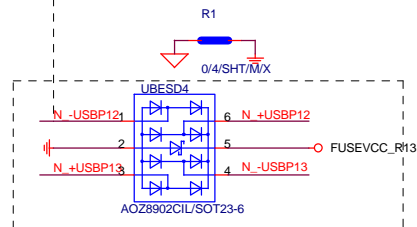
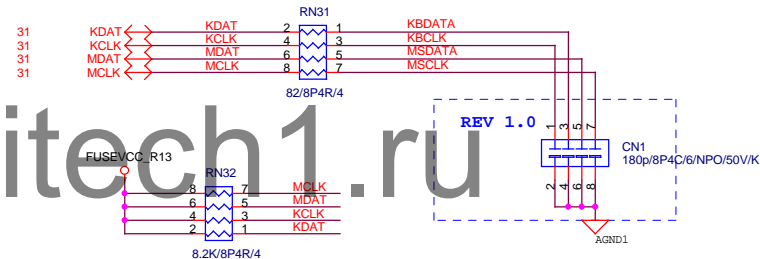
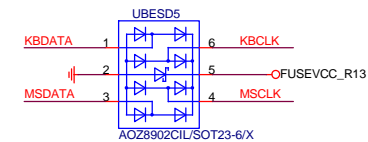
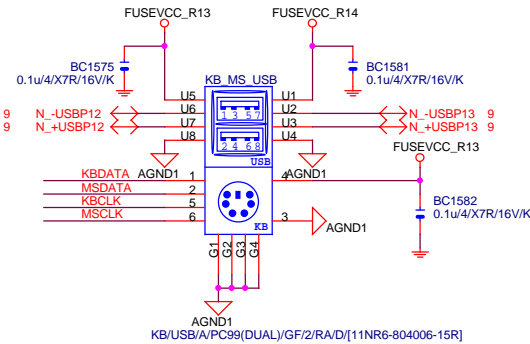
## CPU Frequency Selection

FSLB	FSLA	CPU
0	0	100M <Default>
0	1	133M
1	0	200M
1	1	166M

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~~V-FOR E VERSION~~



5VDUAL

EC36  
100uS/D6.3V/66/30m

C0-07V

F20  
SPR-P200T/6V/8/S

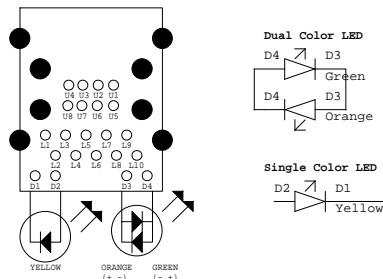
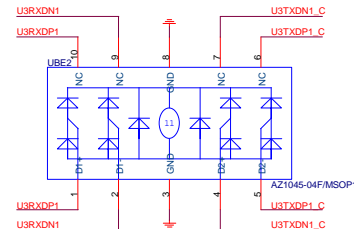
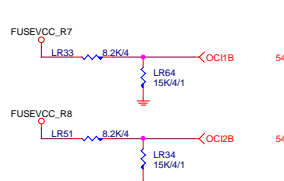
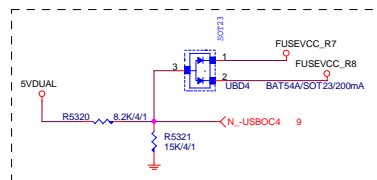
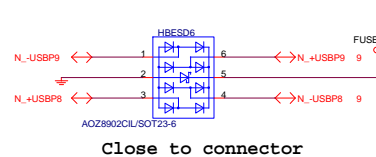
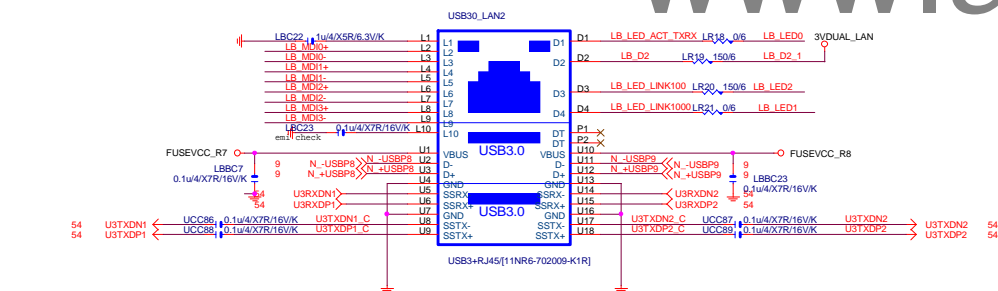
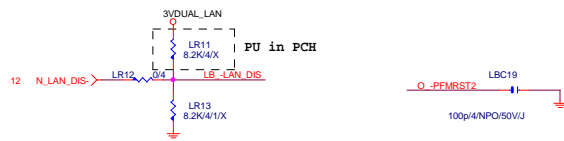
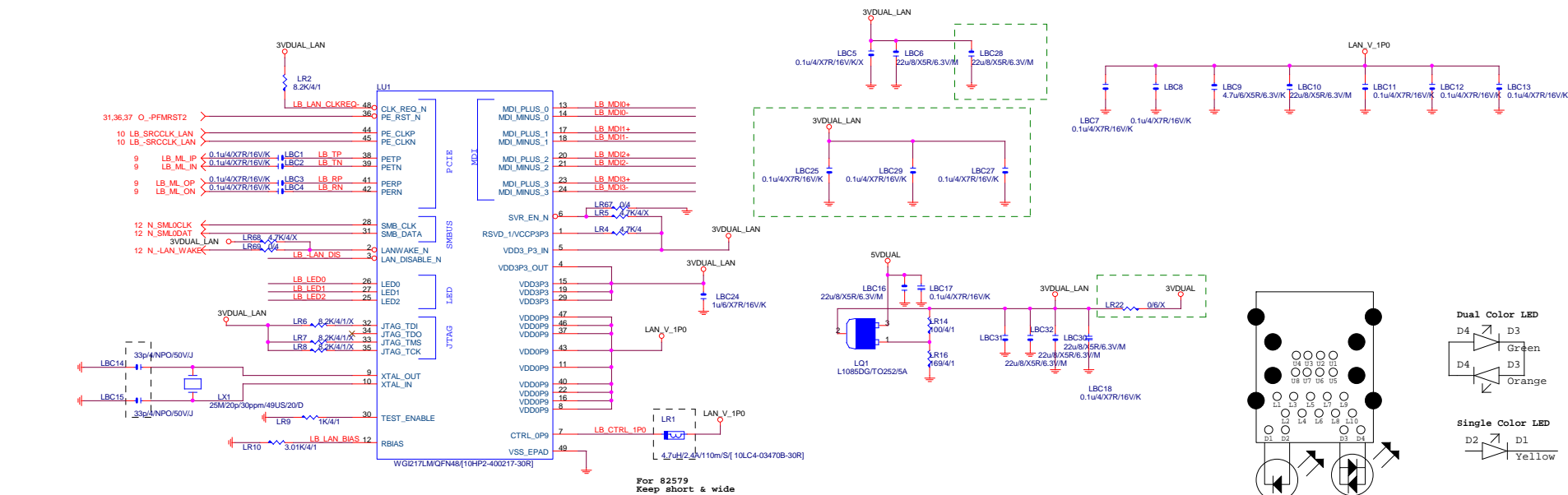
F21  
SPR-P200T/6V/8/S

FUSEVCC\_R13

FUSEVCC\_R14

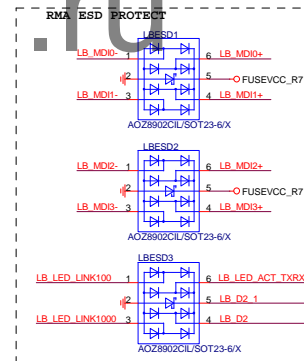
Close to connector

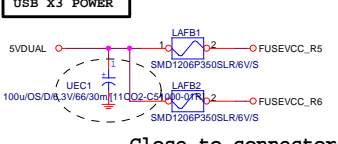
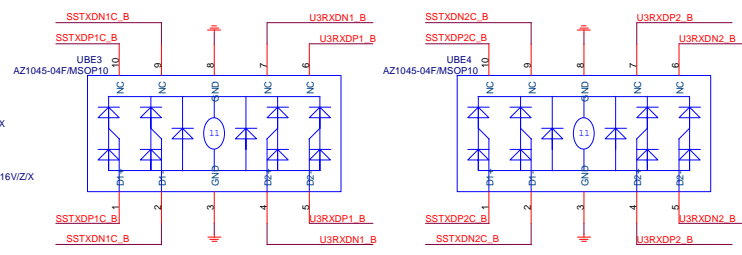
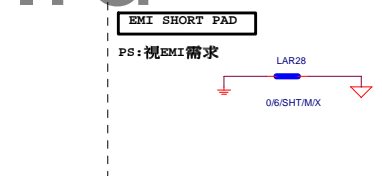
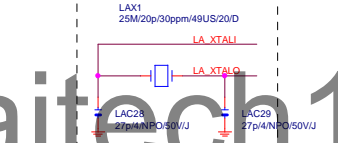
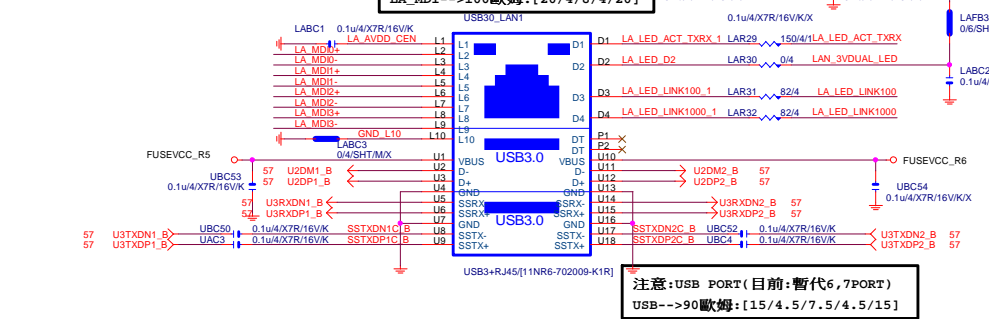
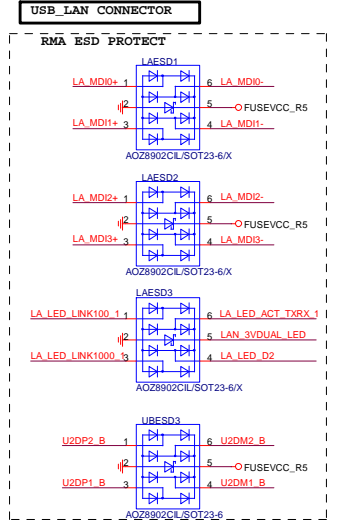
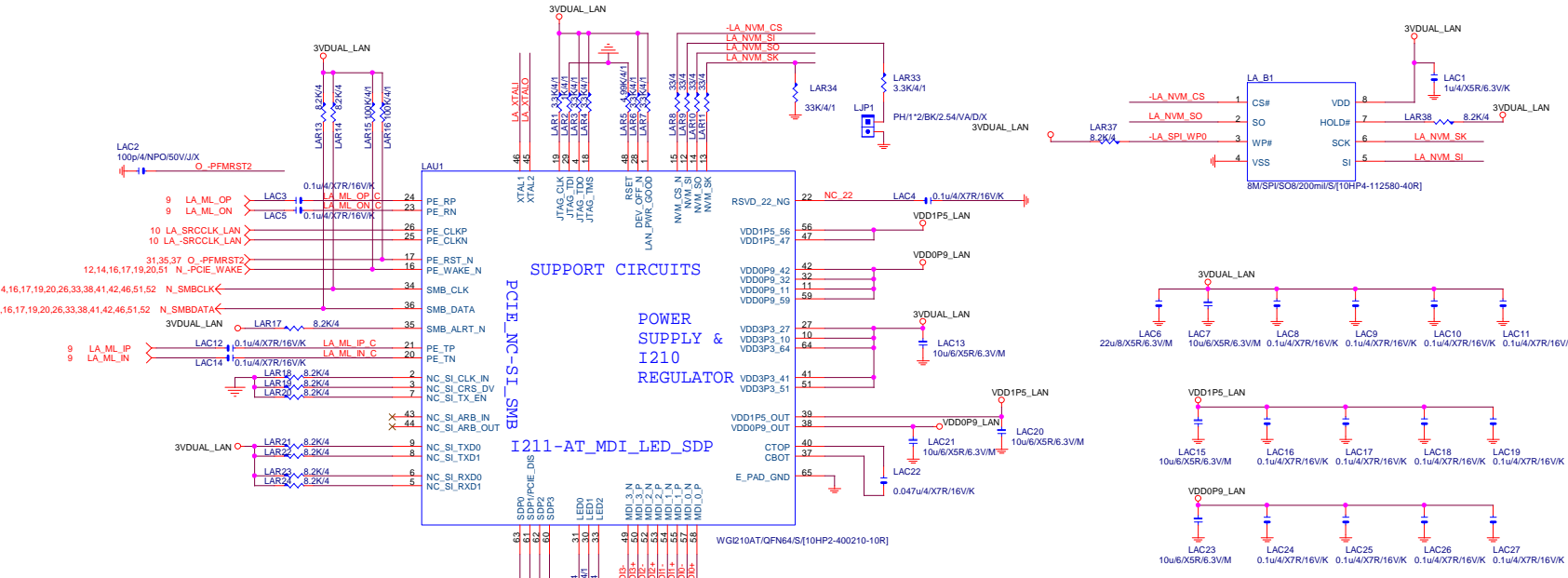
<b>Gigabyte Technology</b>			
Title			
HWM,KB/MS, FAN CTRL			
Size	Document Number	Rev	
Custom	<b>GA-Z87X-OC-Force</b>	<b>1.03</b>	
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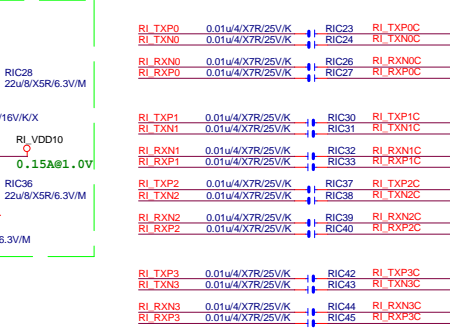
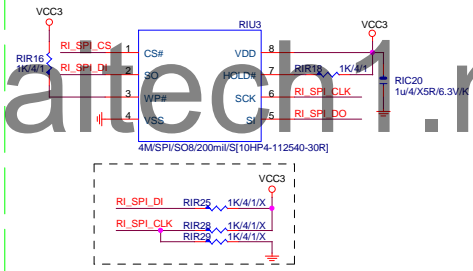
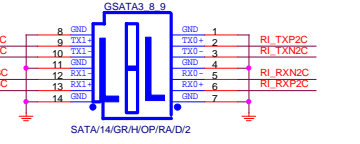
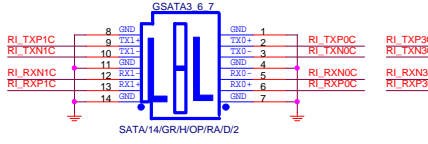
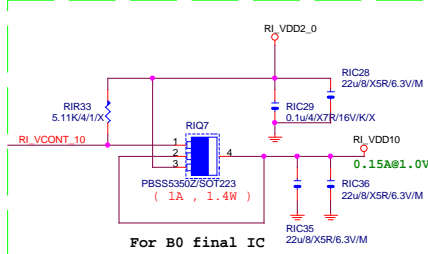
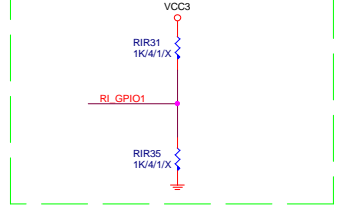
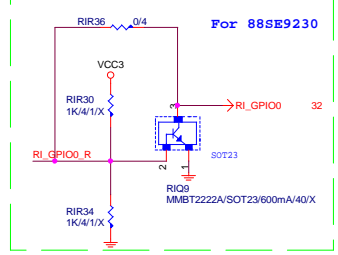
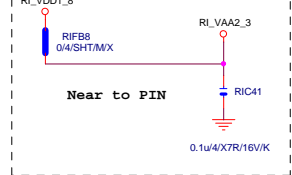
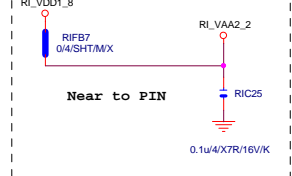
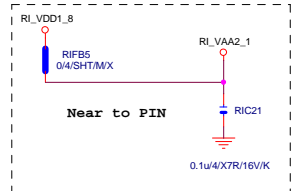
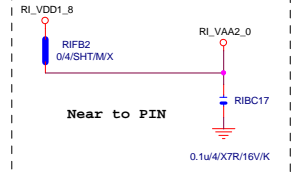
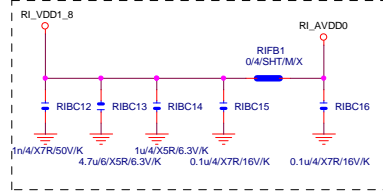
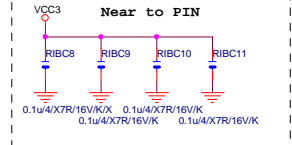
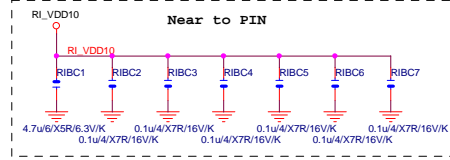
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100Mb	Green
10Mb	Off

Access	Blinking
Link	Yellow

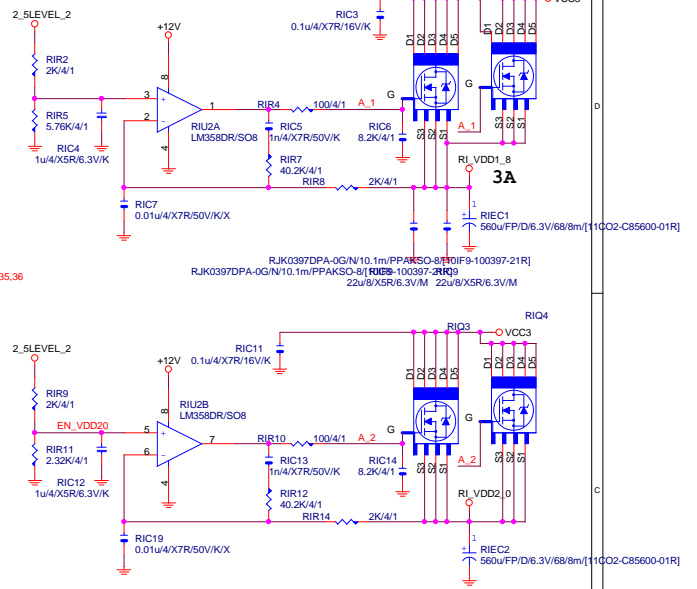


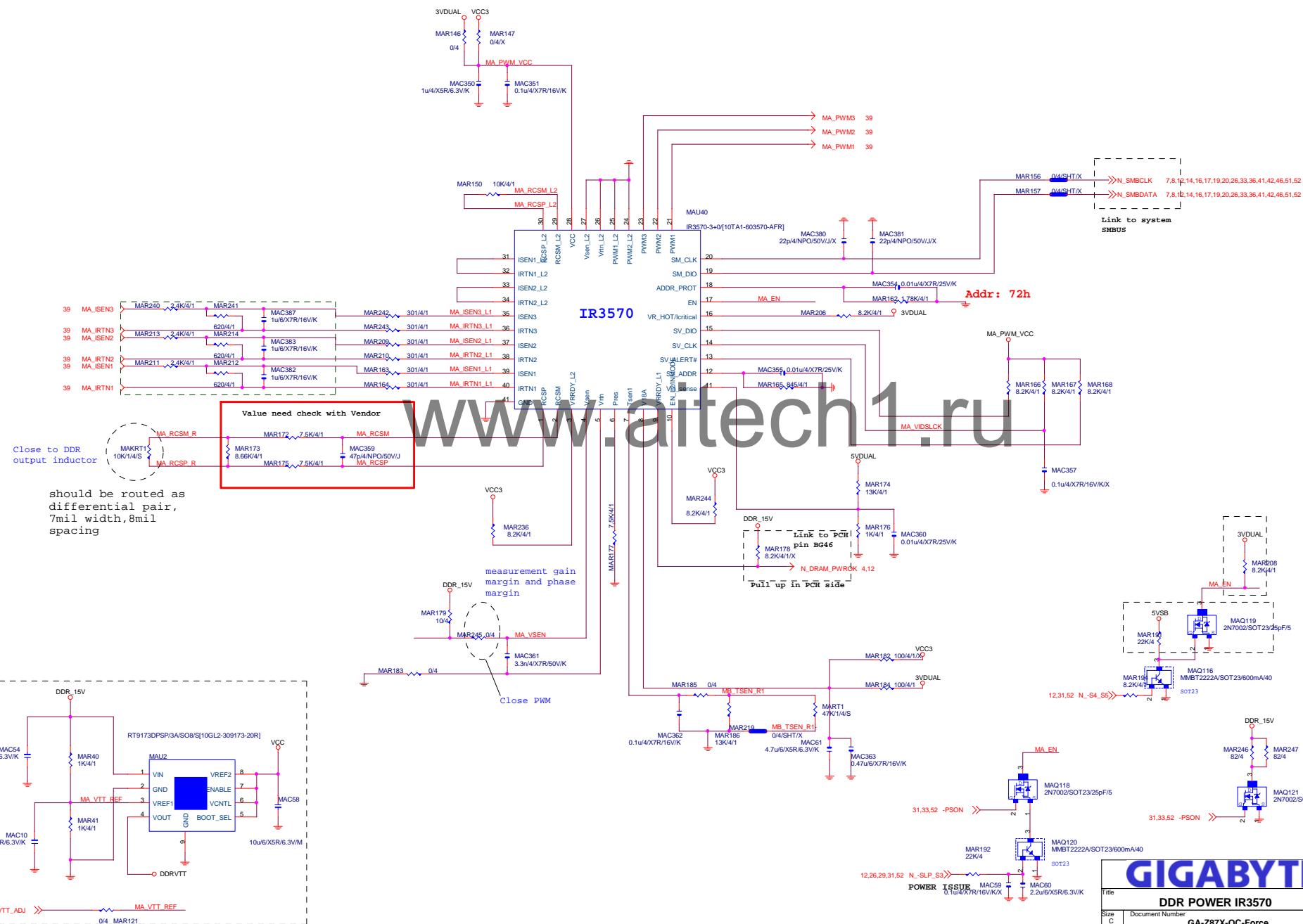
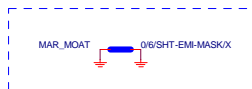


Gigabyte Technology		
INTEL LAN		
File	Document Number	GA-Z87X-OC-Force
Size	Custom	Rev 1.03
Date	Thursday, May 02, 2013	Sheet 36 of 60

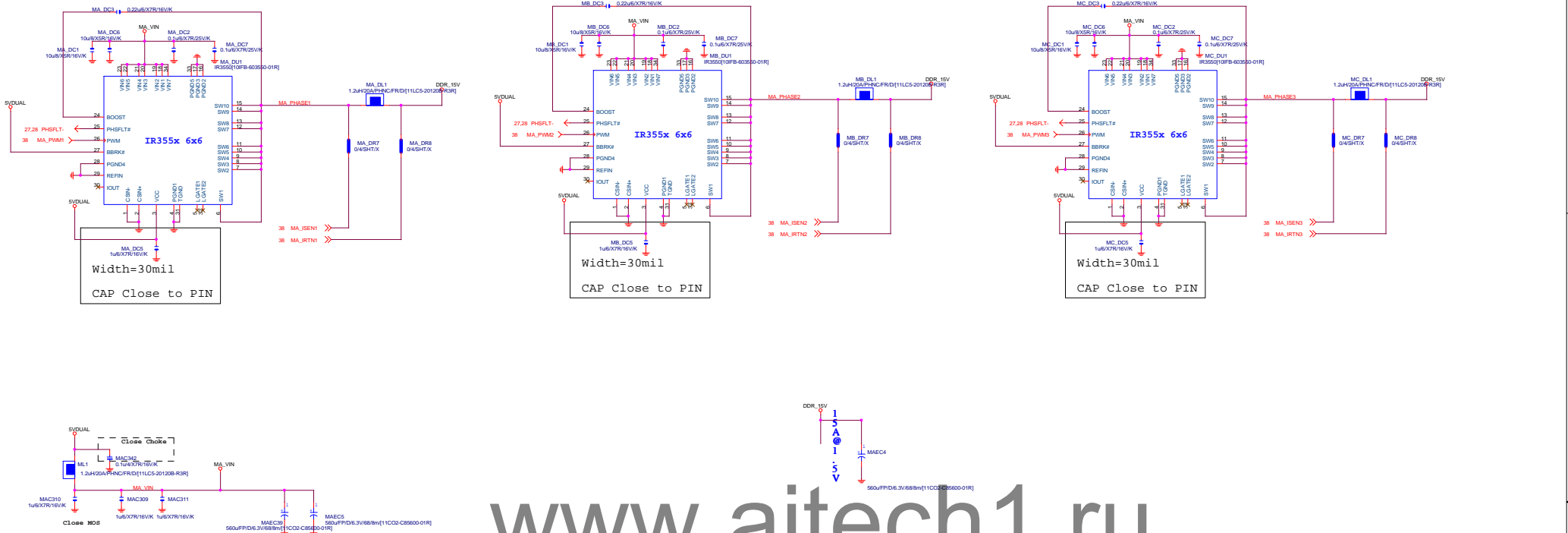


### 3.3V to 1.8V Voltage Regulator





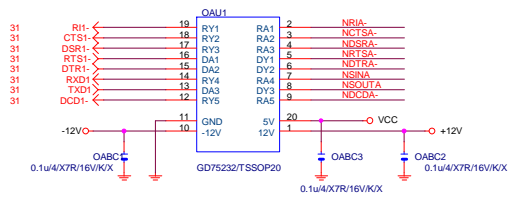
DDR\_15V



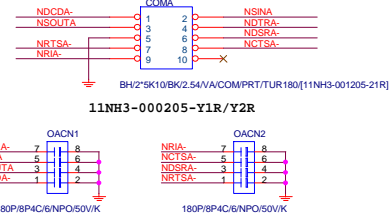
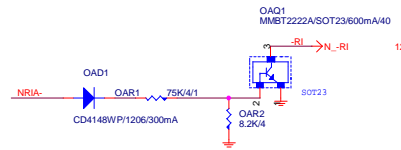
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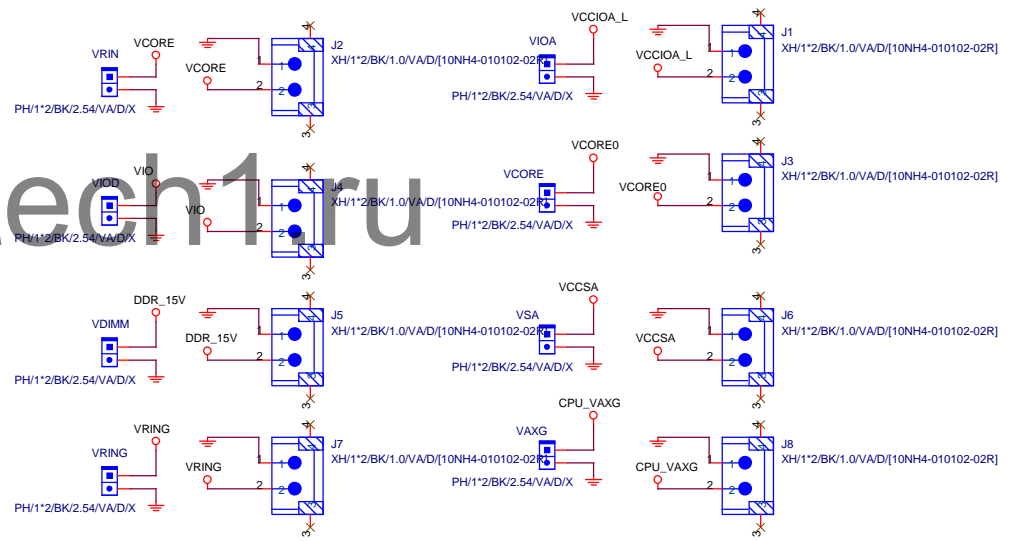
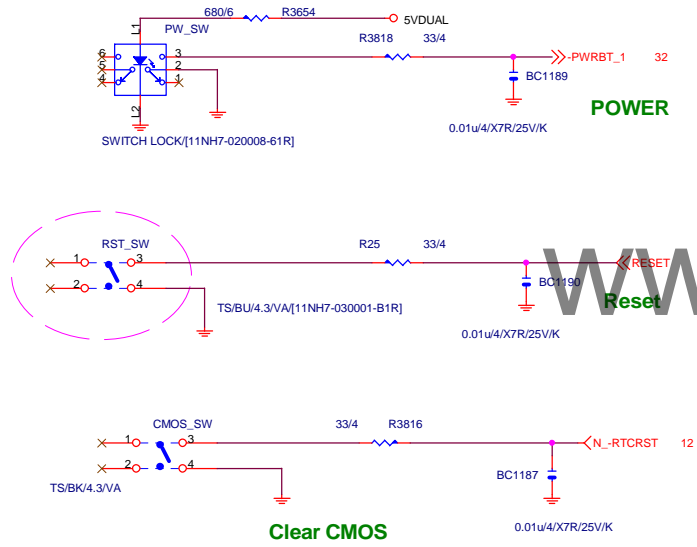
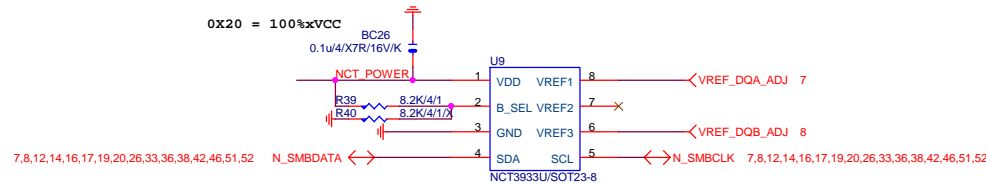
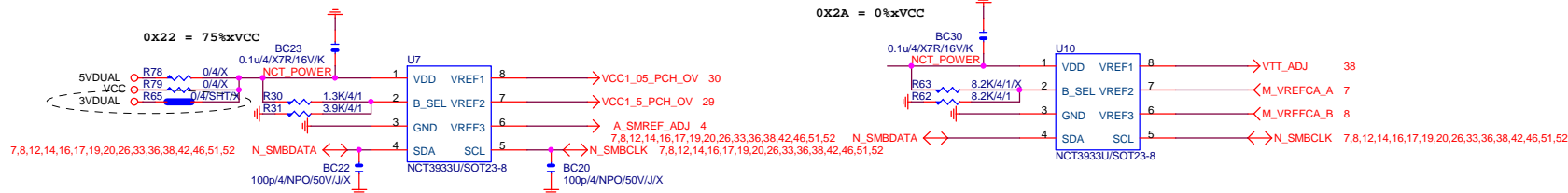
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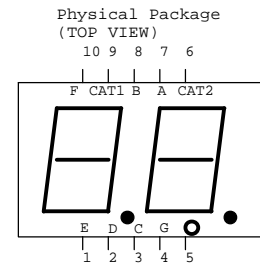
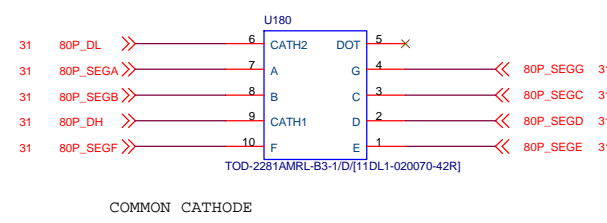
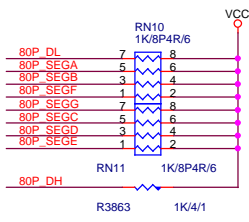
COM RI



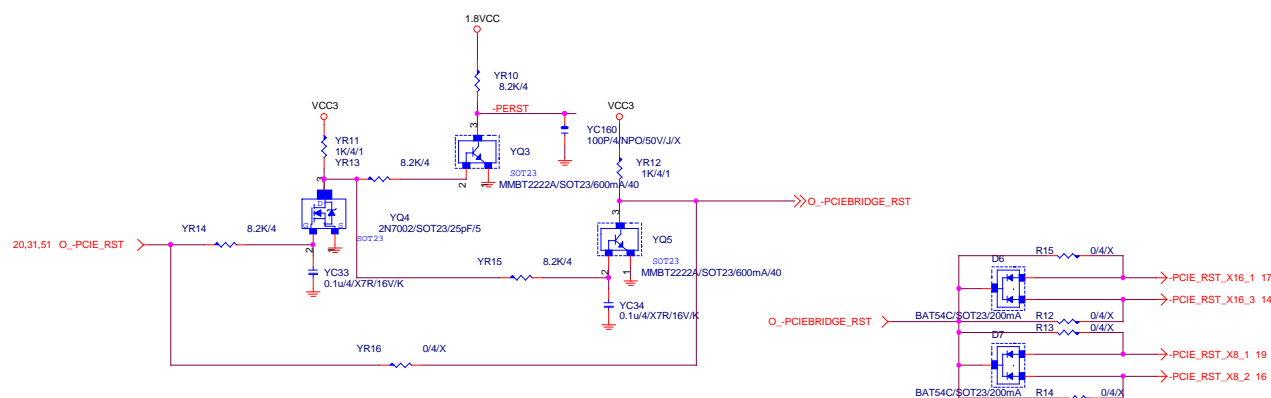
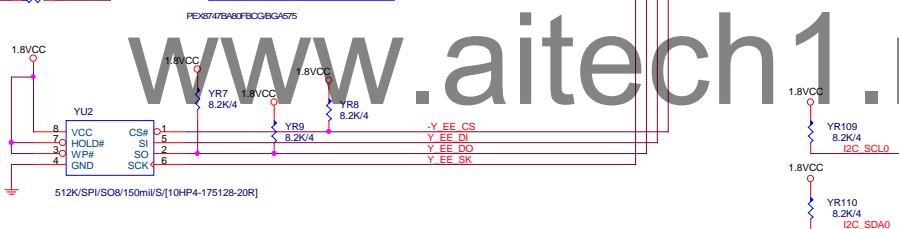
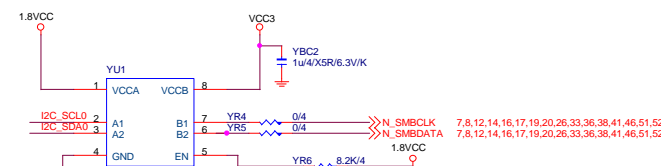
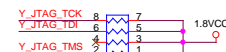
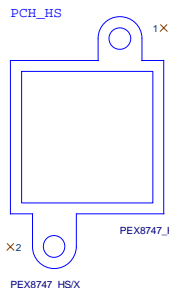
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80 PORT

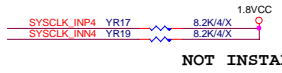


GIGABYTE™			
Title RST, PWR, CLR_CMOS			
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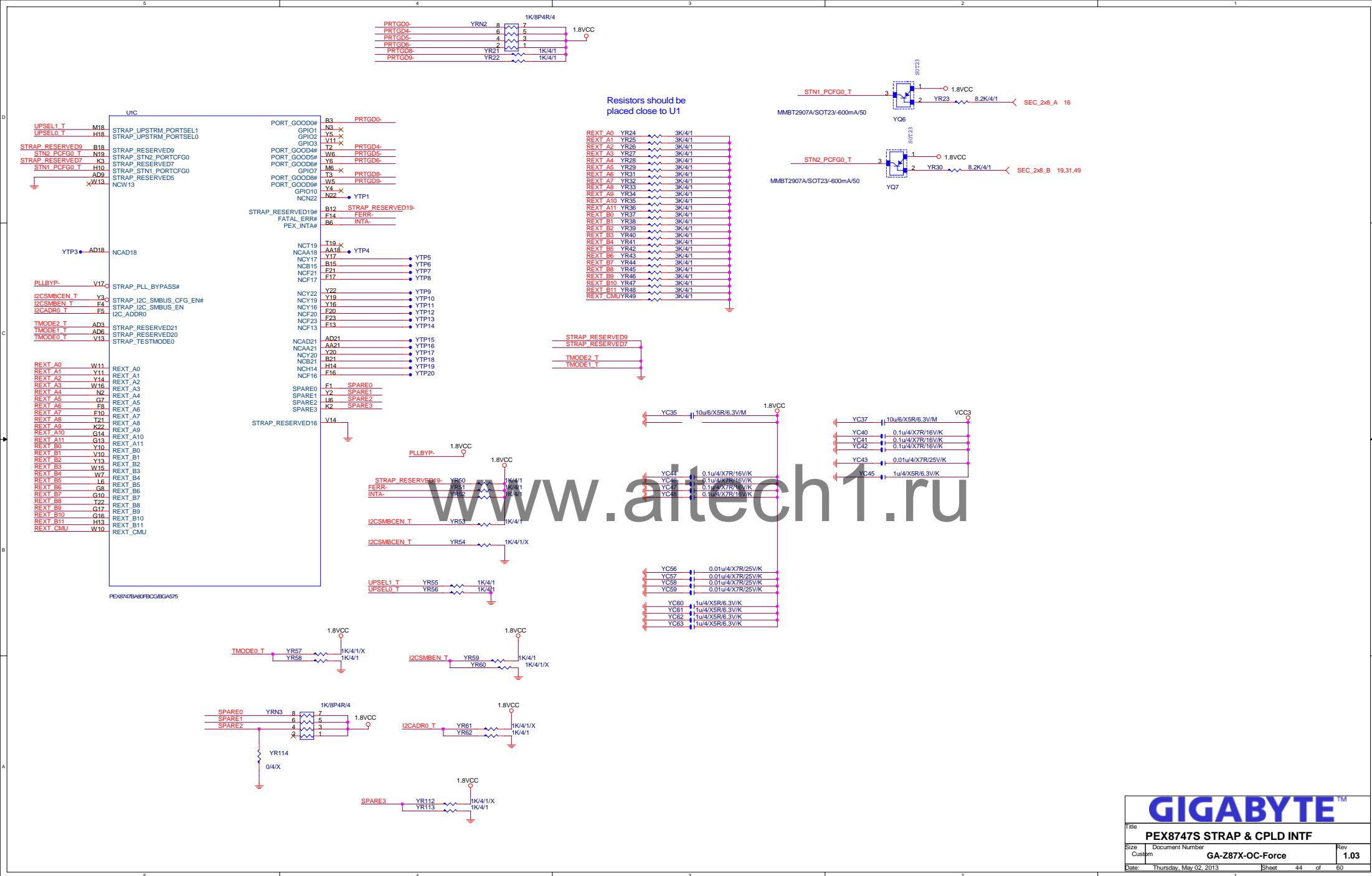
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PA EXP A RXP1	U4	PEX_PETP17	U2
PA EXP A RXN1	U5	PEX_PETP17	U1
PA EXP A RXP2	R5	PEX_PETN17	R2
PA EXP A RXN2	R4	PEX_PETN18	R1
PA EXP A RXP3	P5	PEX_PETN18	P2
PA EXP A RXN3	P4	PEX_PETP19	P1
PA EXP A RXP4	M5	PEX_PETN19	M2
PA EXP A RXN4	M4	PEX_PETP20	M1
PA EXP A RXP5	L5	PEX_PETN20	L2
PA EXP A RXN5	L4	PEX_PETP21	L1
PA EXP A RXP6	J5	PEX_PETN21	J2
PA EXP A RXN6	J4	PEX_PETP22	J1
PA EXP A RXP7	H5	PEX_PETP23	H2
PA EXP A RXN7	H4	PEX_PETN23	H1
PA EXP A RXP8	D5	PEX_PETP24	A1
PA EXP A RXN8	D4	PEX_PETN24	A2
PA EXP A RXP9	D2	PEX_PETP25	B2
PA EXP A RXN9	D1	PEX_PETN25	B1
PA EXP A RXP10	E4	PEX_PETN25	B4
PA EXP A RXN10	E5	PEX_PETP26	A4
PA EXP A RXP11	E7	PEX_PETN26	A5
PA EXP A RXN11	D7	PEX_PETP27	A6
PA EXP A RXP12	D6	PEX_PETN27	A7
PA EXP A RXN12	D5	PEX_PETP28	B7
PA EXP A RXP13	E8	PEX_PETN28	B8
PA EXP A RXN13	E9	PEX_PETP29	B9
PA EXP A RXP14	D10	PEX_PETN29	A8
PA EXP A RXN14	D11	PEX_PETP30	B10
PA EXP A RXP15	E11	PEX_PETN30	A10
PA EXP A RXN15	D11	PEX_PETP31	B11
		PEX_PETN31	A11

SYSCLK_INP4	P7	PEX_REFCLK_SSCP4	P17	SYSCLK_INP8
SYSCLK_INN4	P6	PEX_REFCLK_SSCN4	P18	SYSCLK_INN8
		PEX_REFCLK_SSCP8		
		PEX_REFCLK_SSCN8		



- PA EXP A RXP0\_7I >>> PA\_EXP\_A\_RXP[0..7] 15
- PA EXP A RXN0\_7I >>> PA\_EXP\_A\_RXN[0..7] 15
- PA EXP A TXP0\_7I >>> PA\_EXP\_A\_TXP[0..7] 15
- PA EXP A TXN0\_7I >>> PA\_EXP\_A\_TXN[0..7] 15
- PA EXP A RXP8\_15I >>> PA\_EXP\_A\_RXP[8..15] 14
- PA EXP A RXN8\_15I >>> PA\_EXP\_A\_RXN[8..15] 14
- PA EXP A TXP8\_15I >>> PA\_EXP\_A\_TXP[8..15] 14
- PA EXP A TXN8\_15I >>> PA\_EXP\_A\_TXN[8..15] 14
- PB EXP B RXP0\_7I >>> PB\_EXP\_B\_RXP[0..7] 17
- PB EXP B RXN0\_7I >>> PB\_EXP\_B\_RXN[0..7] 17
- PB EXP B TXP0\_7I >>> PB\_EXP\_B\_TXP[0..7] 17
- PB EXP B TXN0\_7I >>> PB\_EXP\_B\_TXN[0..7] 17
- PB EXP B RXP8\_15I >>> PB\_EXP\_B\_RXP[8..15] 18
- PB EXP B RXN8\_15I >>> PB\_EXP\_B\_RXN[8..15] 18
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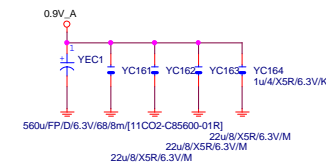
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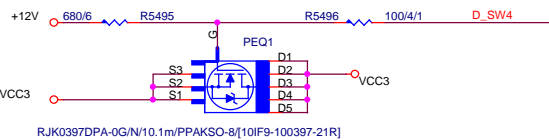
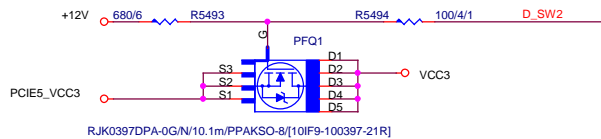
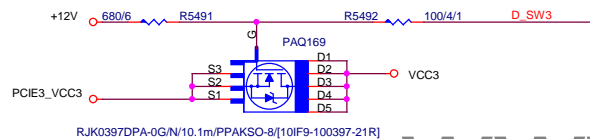
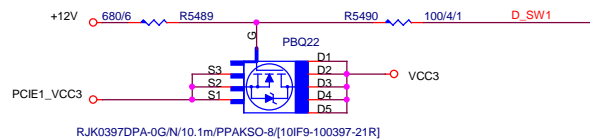
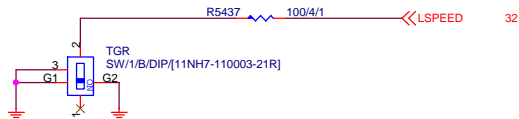




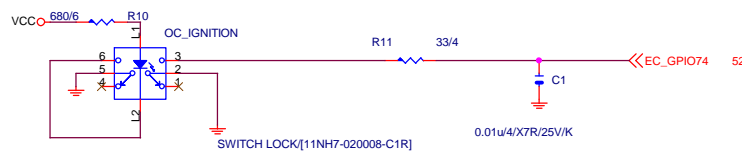




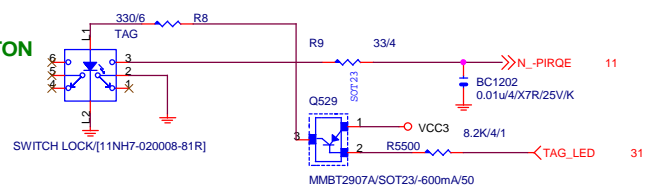
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Size	Document Number	Rev	
Custom	<b>GA-287X-OC-Force</b>		<b>1.03</b>
Date:	Thursday, May 02, 2013	Sheet	47 of 60



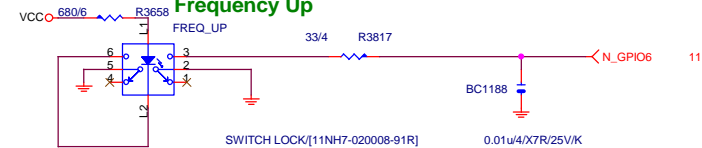
### EnPWR BUTTON



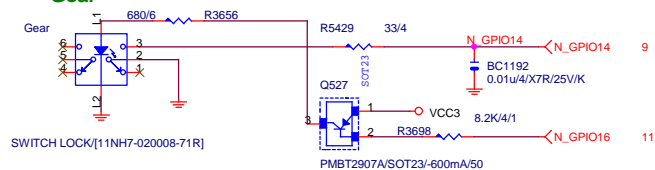
### TAG BUTTON



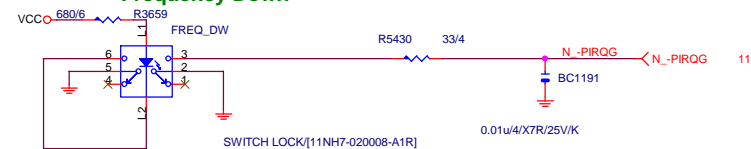
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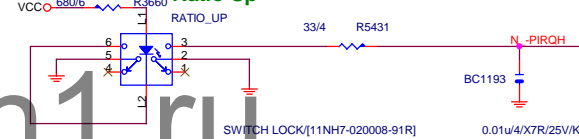
### Gear



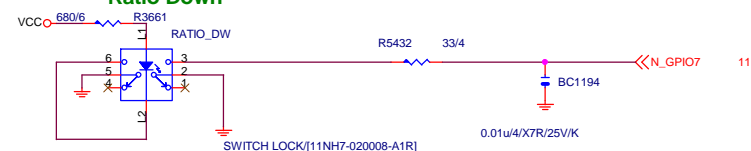
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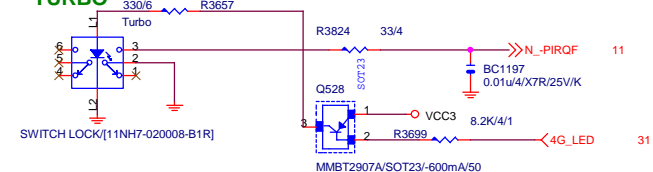
### Ratio Up



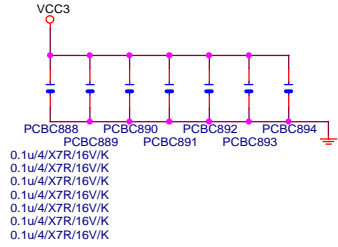
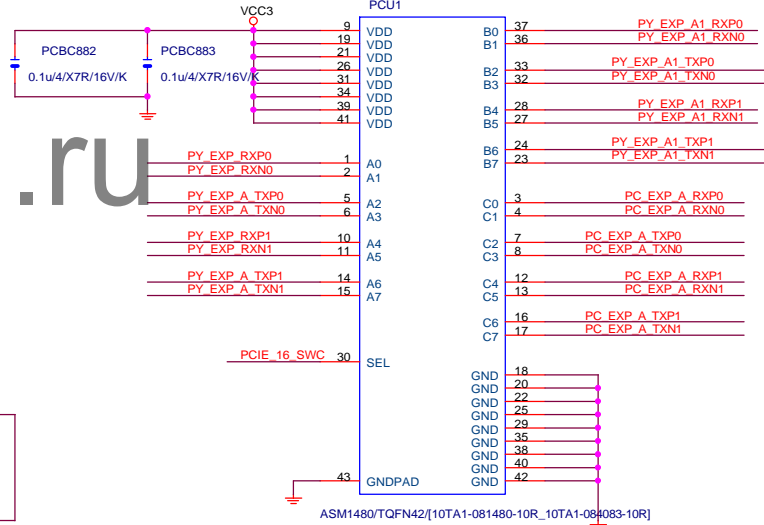
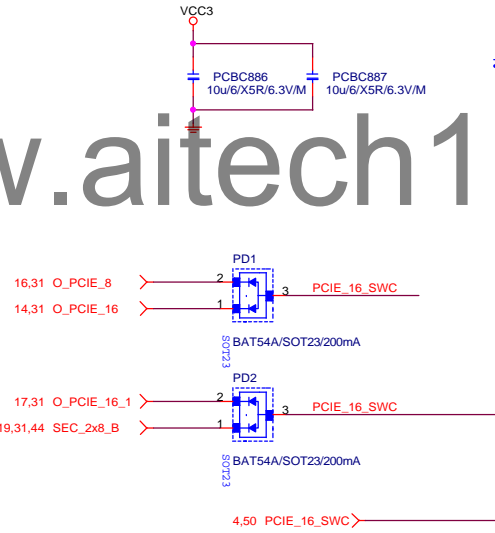
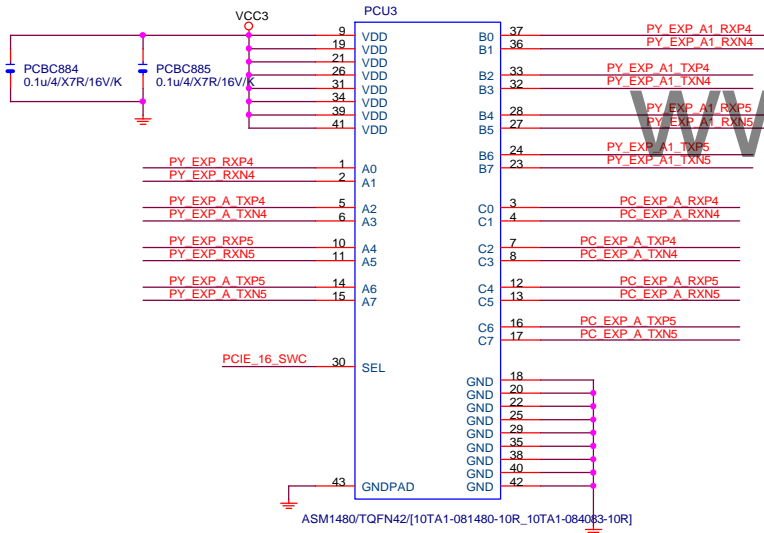
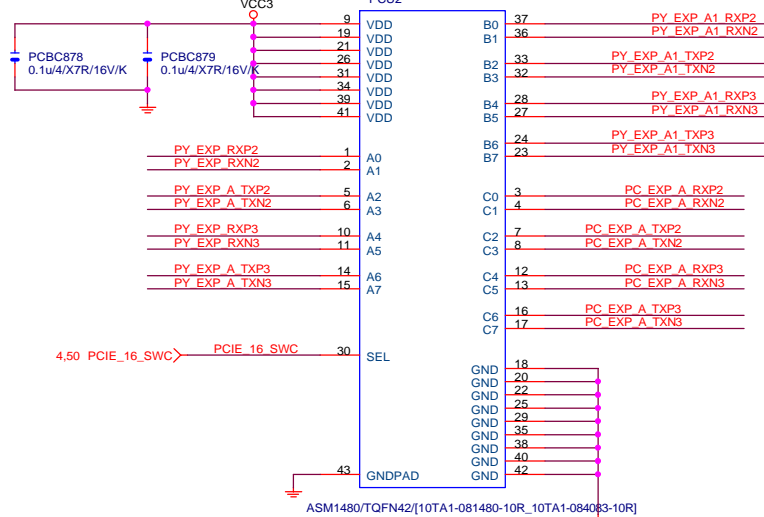
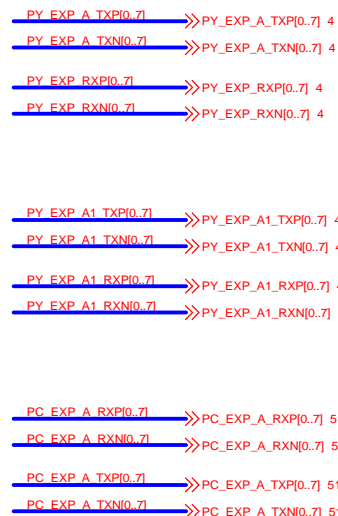
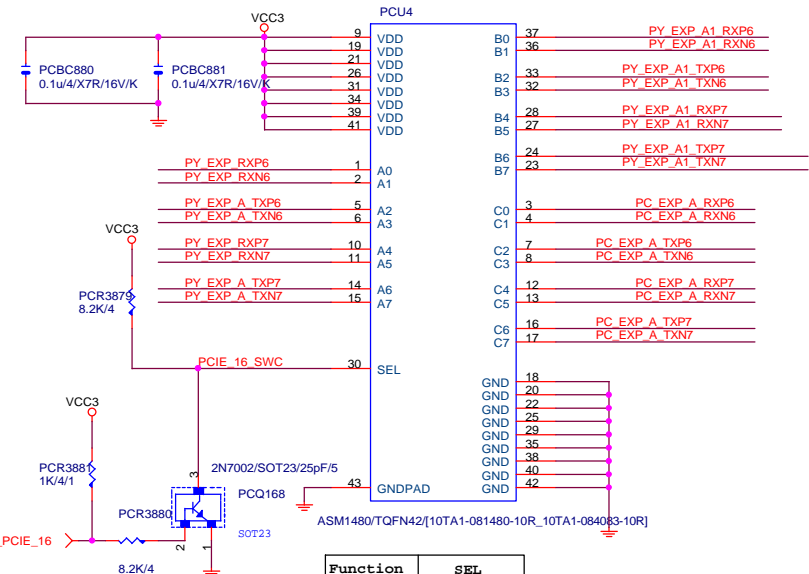
### Ratio Down

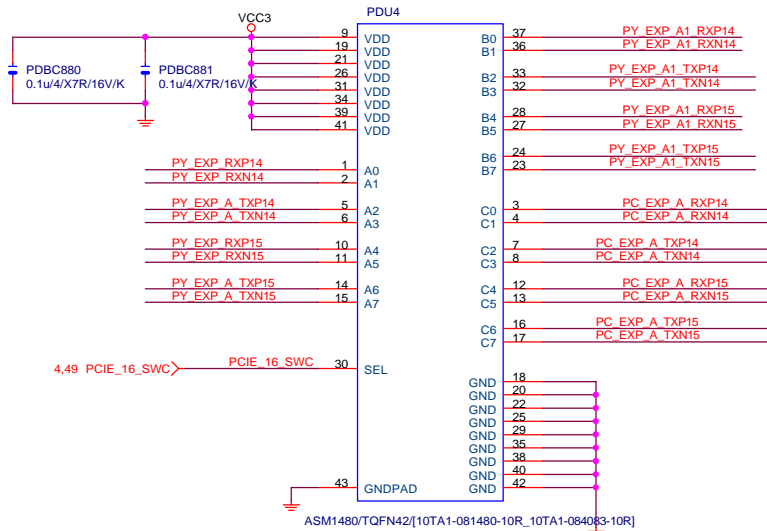


### TURBO

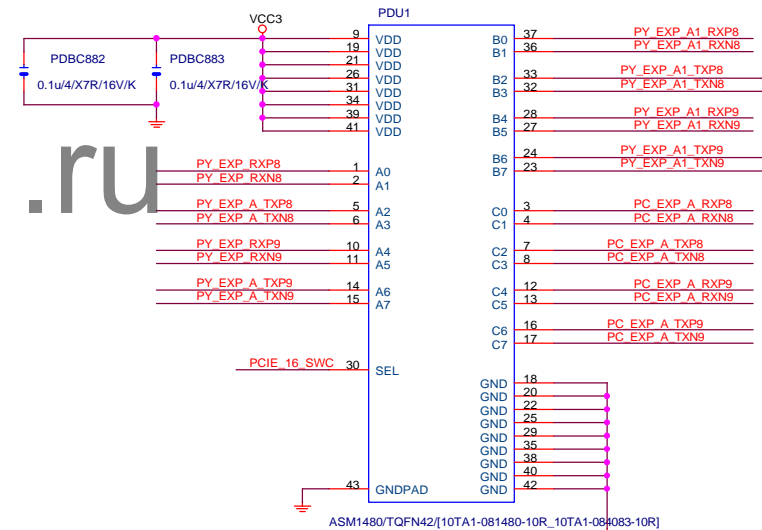
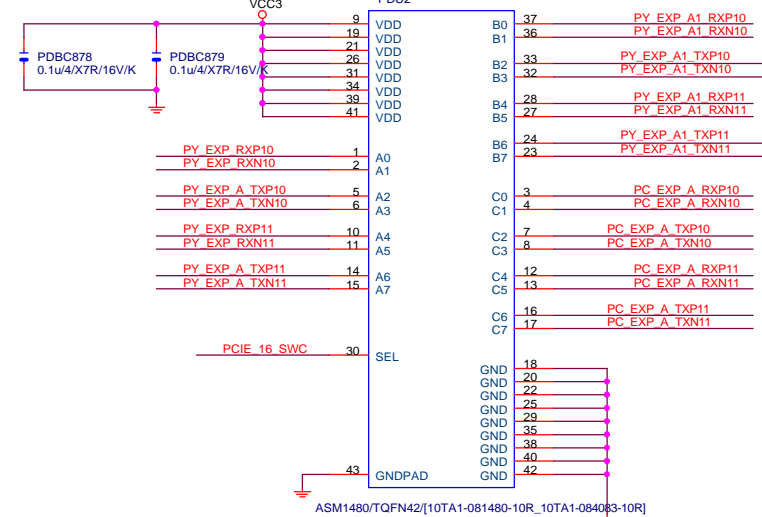
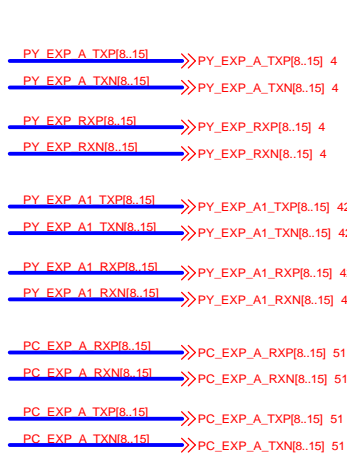
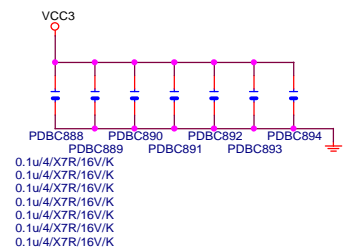
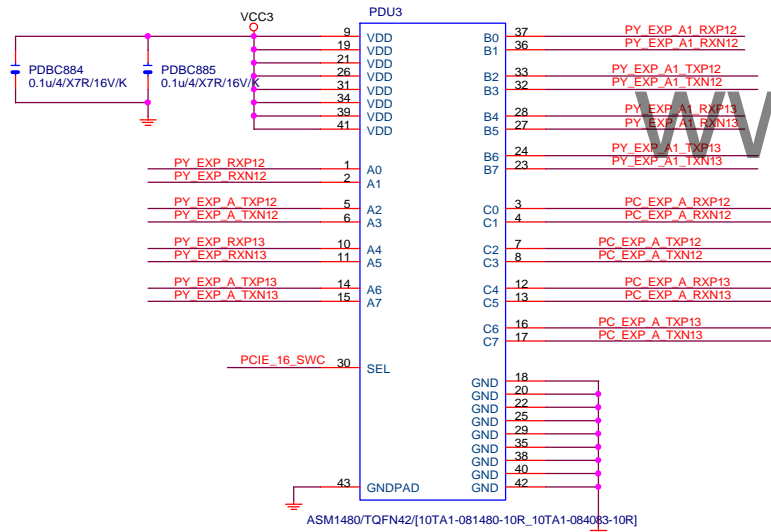


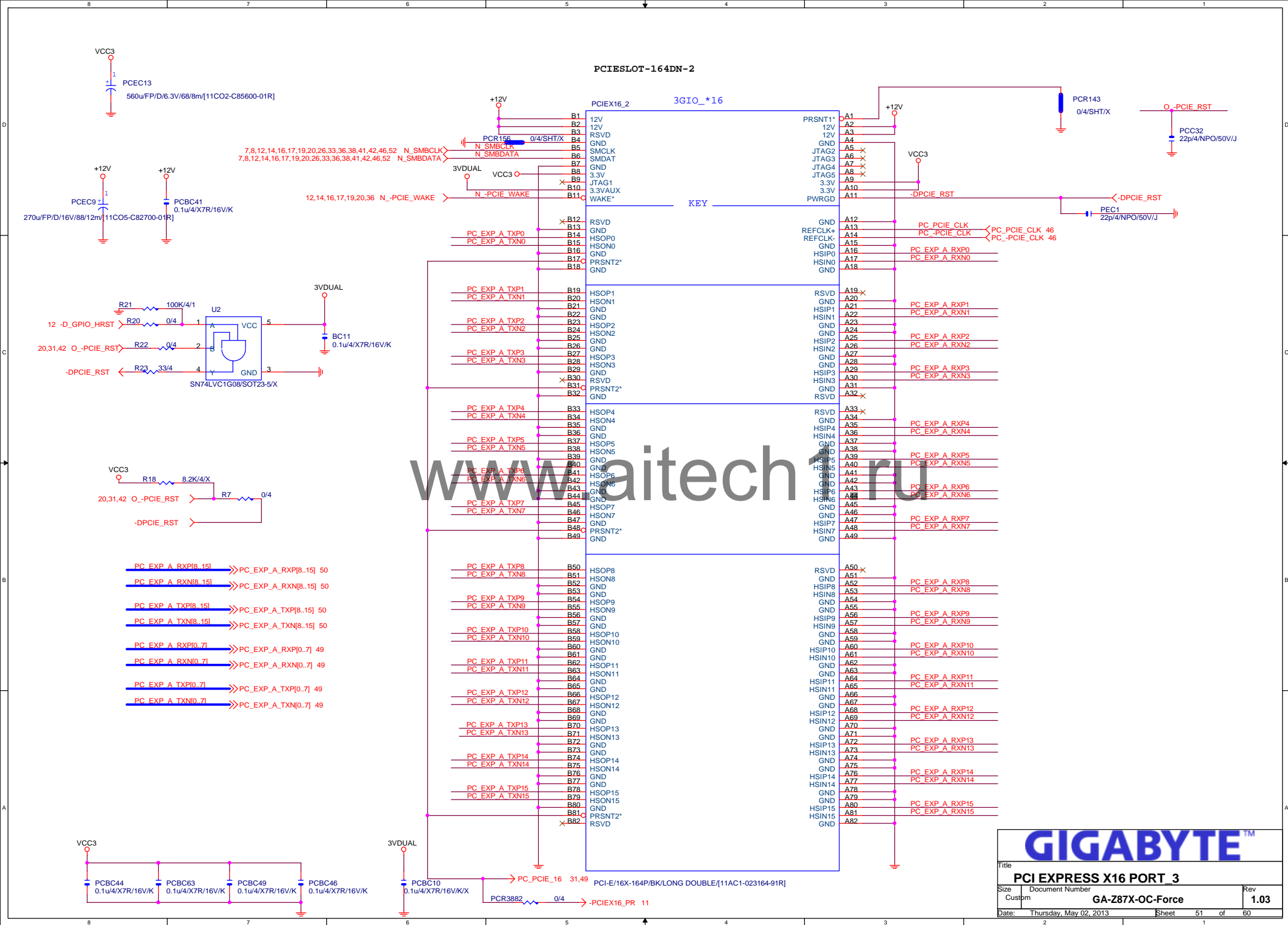
GIGABYTE™			
Title	SWITCH		
Size	Document Number	Rev	
Custom	GA-Z87X-OC-Force	1.03	
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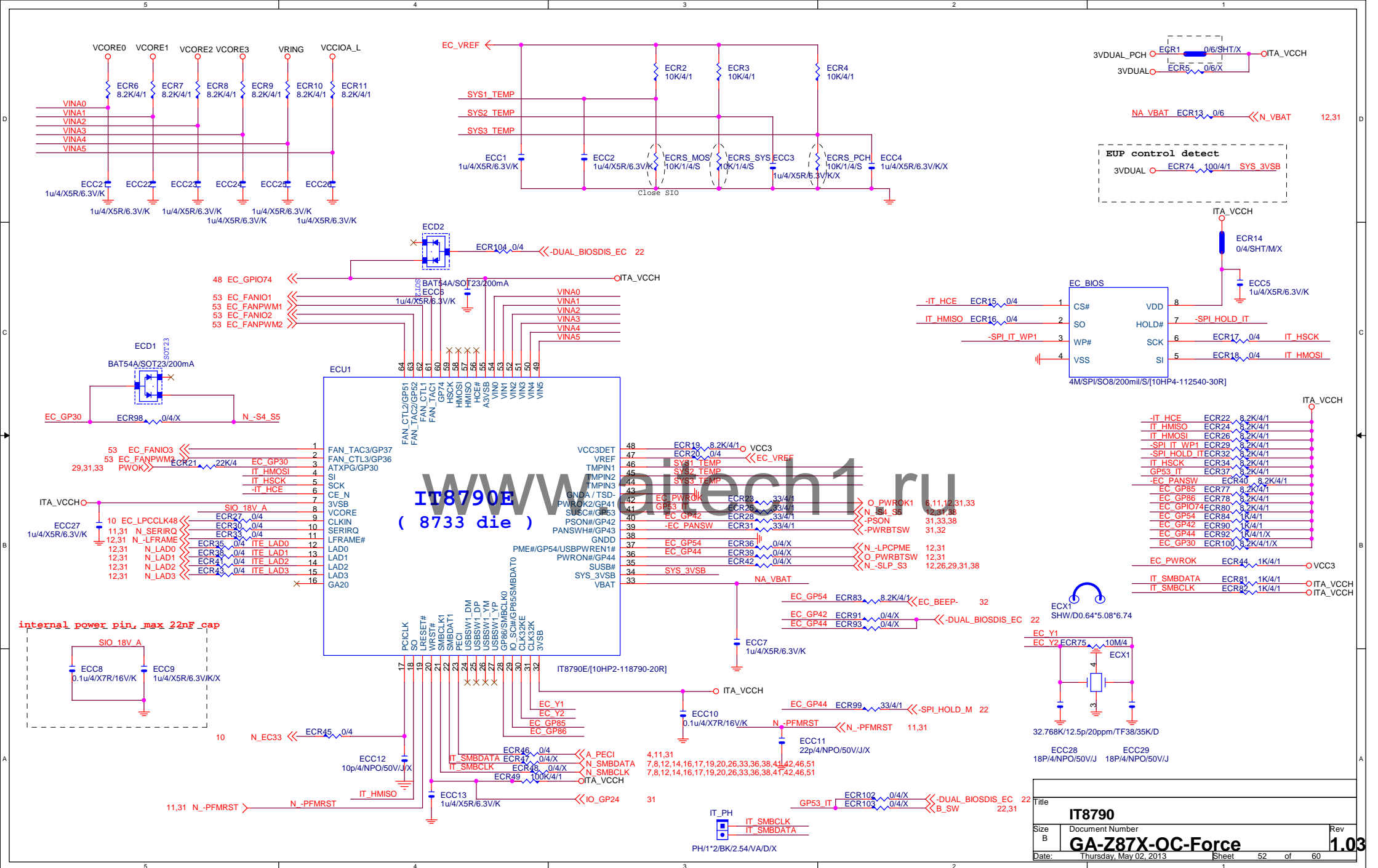


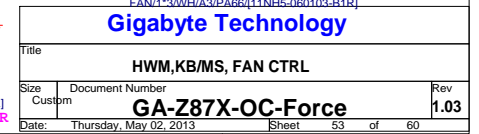


Function	SEL
A--> B	L
A--> C	H

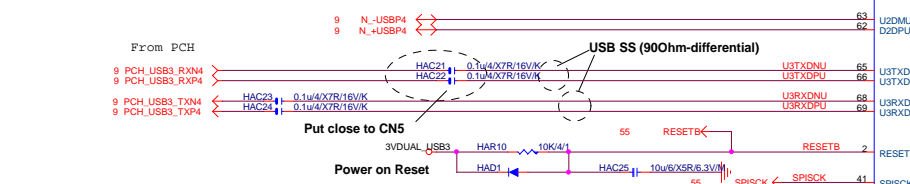
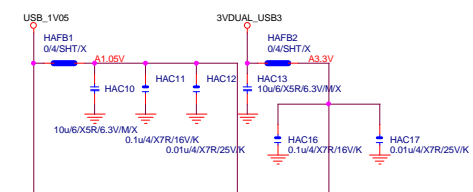
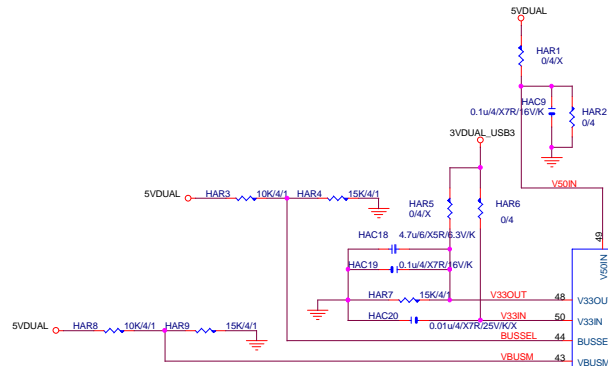
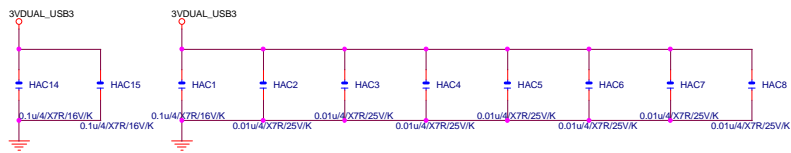




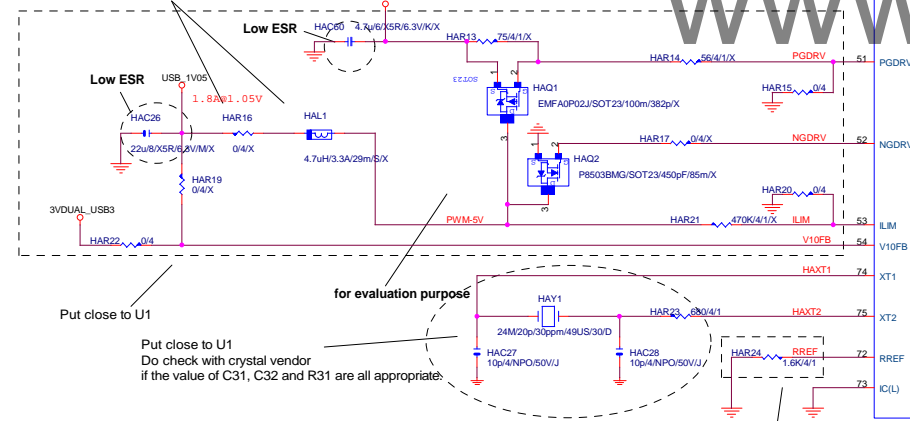




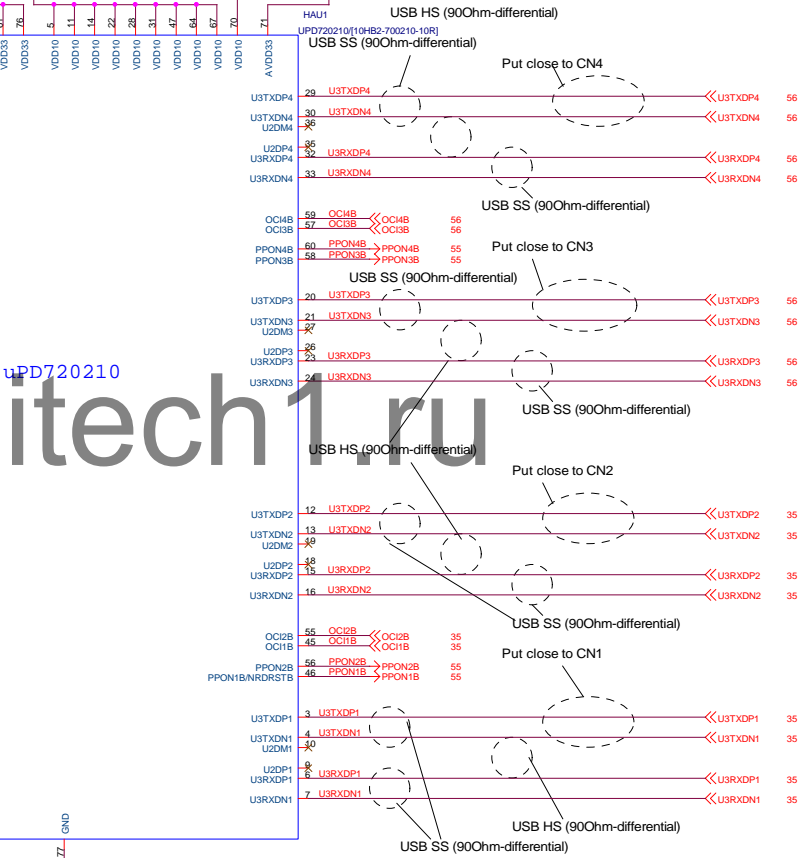
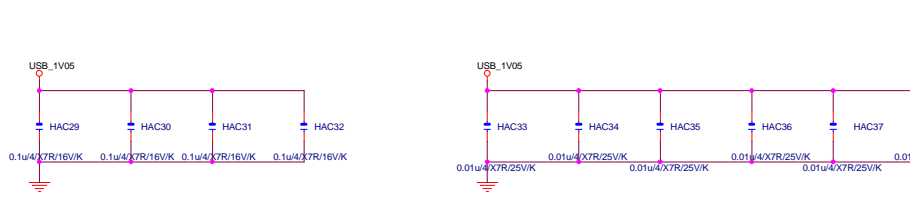




The over current protection of VDD10 is detected with ILIM pin (No.53) using 180 mOhm of DC resistance (DCR) of inductor L1.  
HAR16 should be choosing so that the total resistance of DCR(L1) becomes 180 mOhm.  
→ HAR16 + DCR(HAL1) = 180 [mOhm]

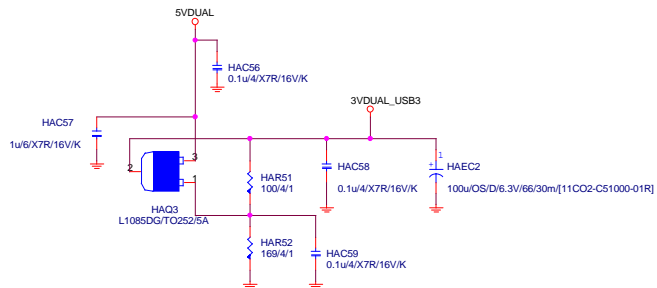


Put close to U1  
Do check with crystal vendor  
if the value of C31, C32 and R31 are all appropriate.

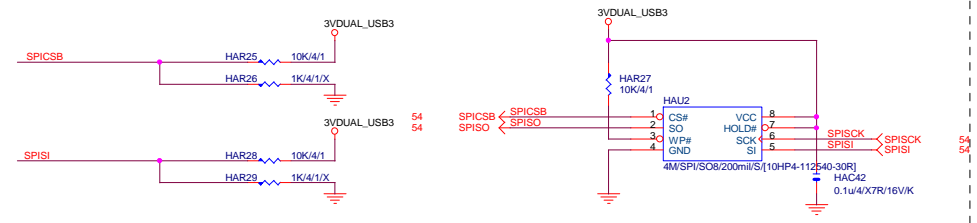


Put close to U1  
Short and broad connection to GND  
Don't split R32 into multiple resistors.

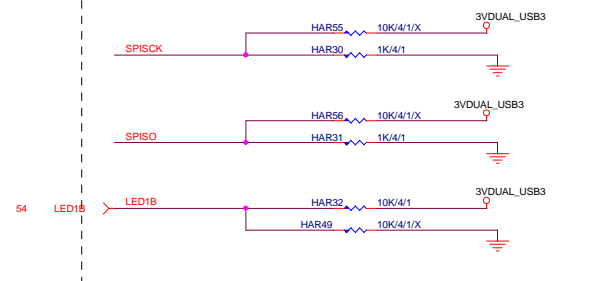
## 3VDUAL\_USB\_1



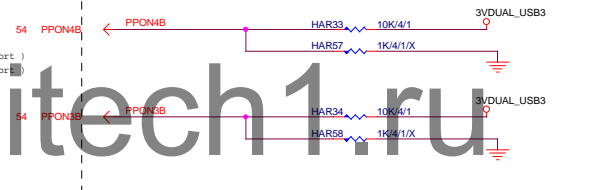
```
# External SPI ROM ; SPI ROM
attached mode
```



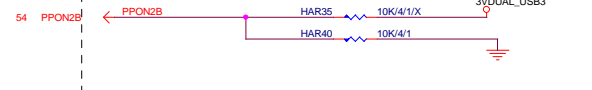
## # Battery Charging



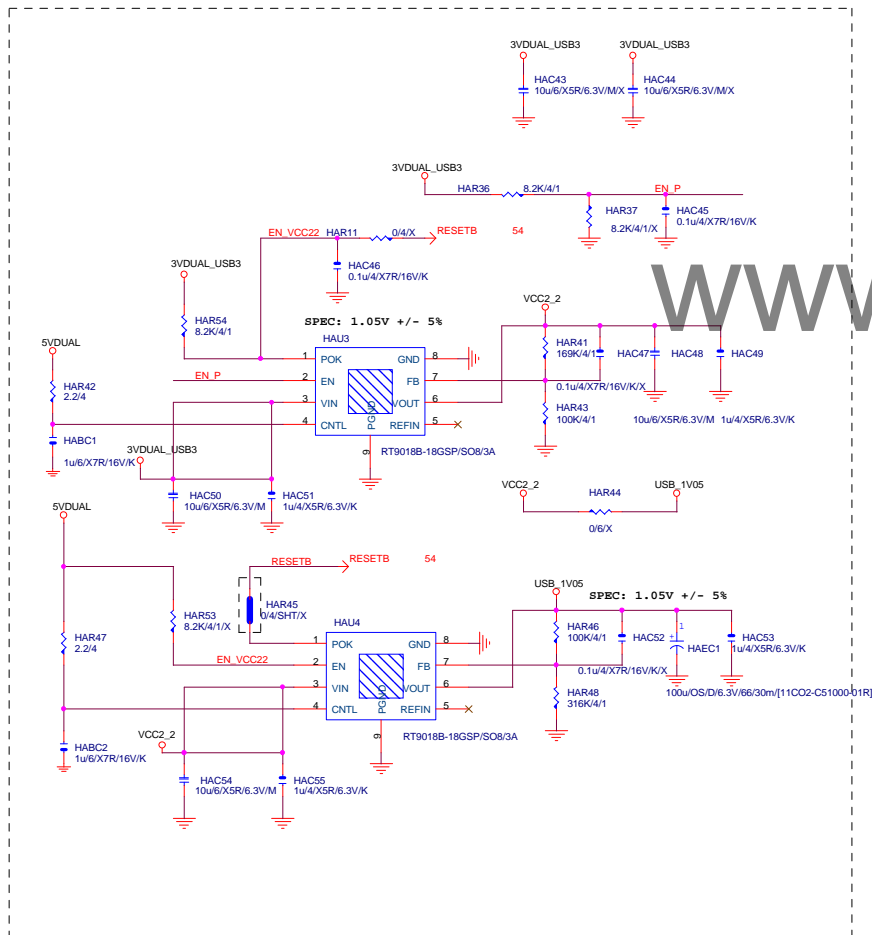
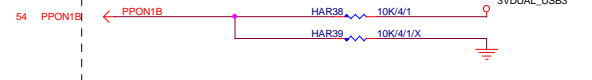
**# Number of Ports ; 4Ports  
mode**



### #5 VBUS Power Control ; Individual mode



```
# PPON1B Pin Function ;
Port1 PPONB mode
```



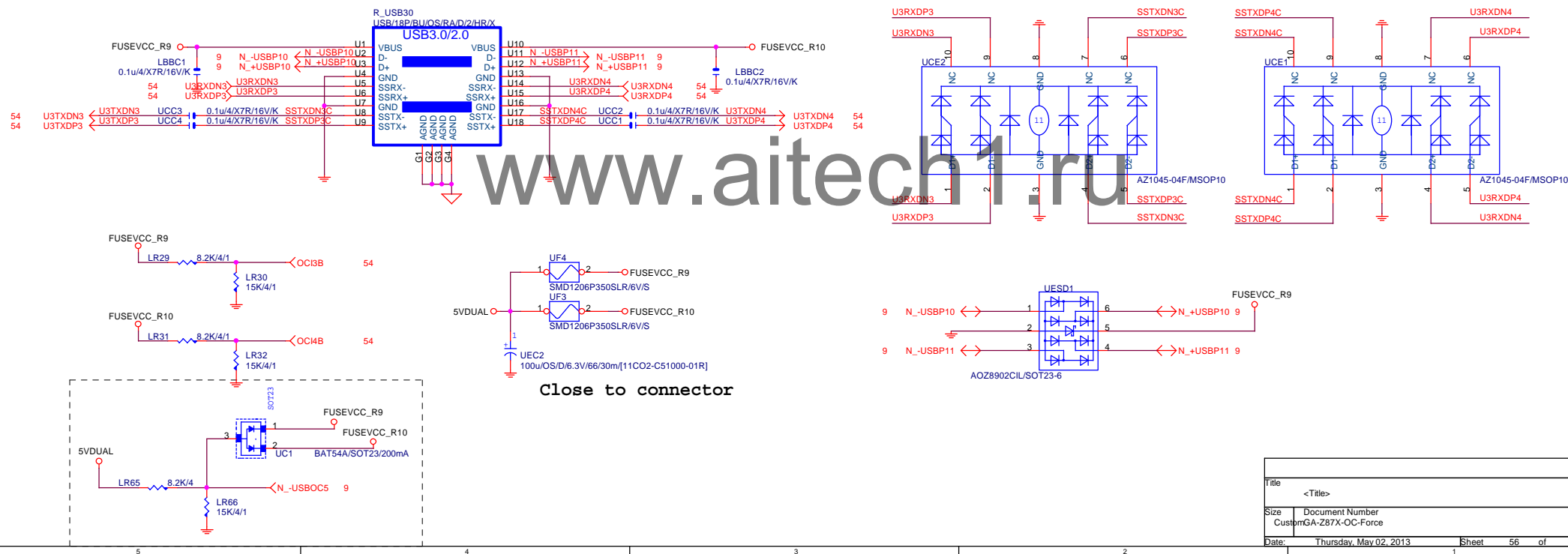
PPON3B / PPON4B : H / H ( 4 port )  
PPON3B / PPON4B : L / L ( 2 port )

54 PPON3B ← PPON5B

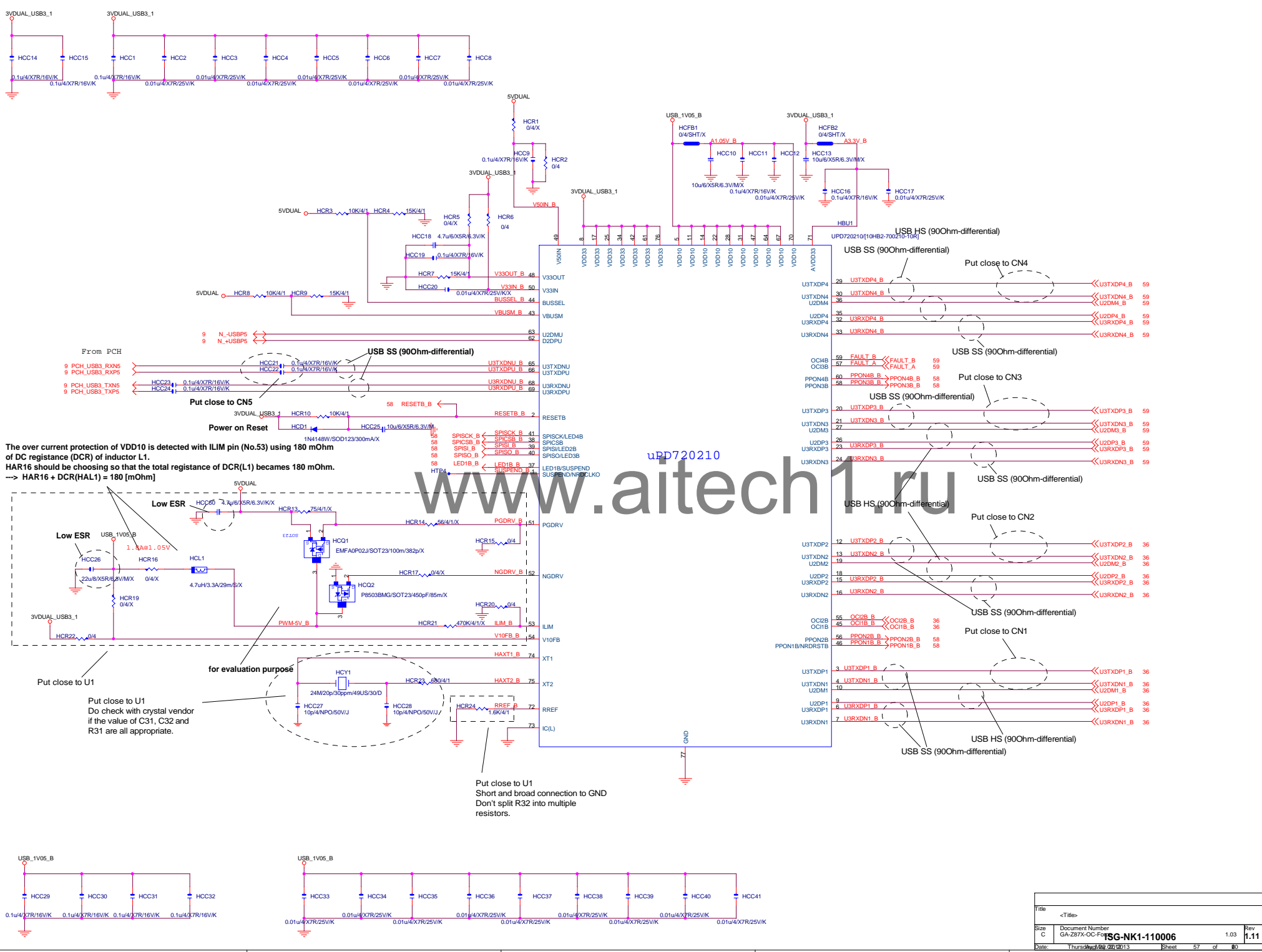
HAR34 10K4/1  
HAR58 1K/4/1X

Renesas Electronics Confidential

Title			
UPD720210 reference design 4port Hub board			
Size	Document Number		Rev
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Title		
<Title>		
Size	Document Number	Rev
Custom	GA-Z87X-OC-Force	1.03
Date:	Thursday, May 02, 2013	Sheet 56 of 60



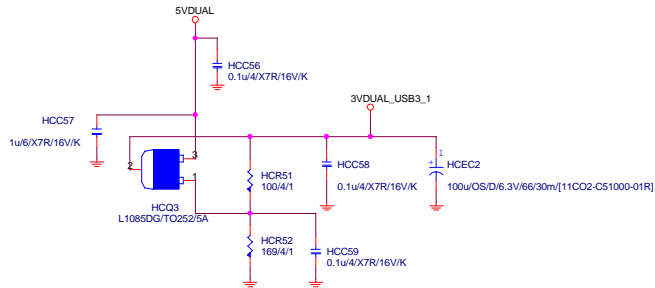
The over current protection of VDD10 is detected with ILIM pin (No.53) using 180 mOhm of DC resistance (DCR) of inductor L1.  
HAR16 should be choosing so that the total resistance of DCR(L1) becomes 180 mOhm.  
→ HAR16 + DCR(HAL1) = 180 [mOhm]

uRP720210

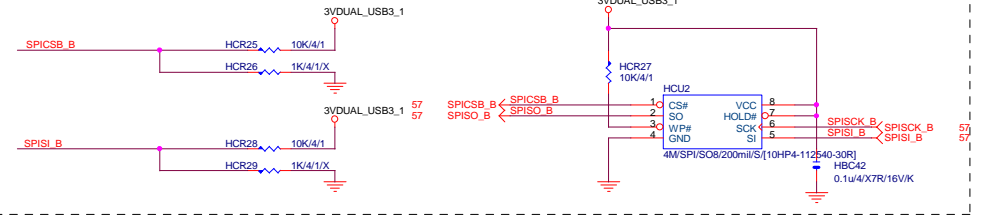
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Title		<Title>	
Size	C	Document Number	SG-NK1-110006
Date	Thursday, 20/09/2013	Sheet	57 of 80
Rev	1.11		

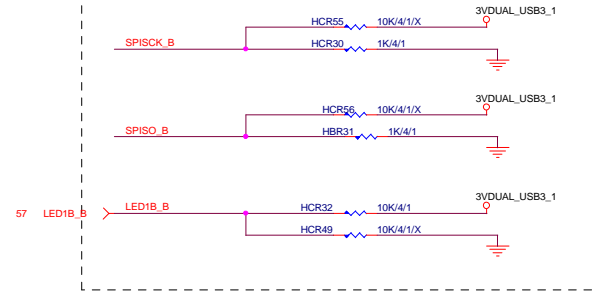
### 3VDUAL\_USB\_2



### # External SPI ROM ; SPI ROM attached mode

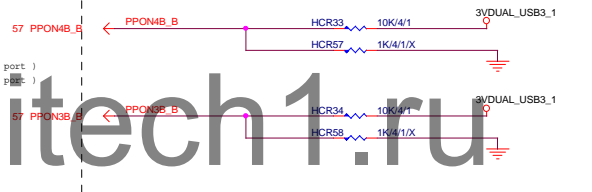


### # Battery Charging

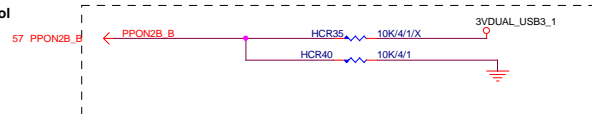


### # Number of Ports ; 4Ports mode

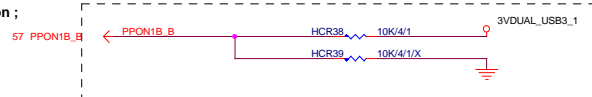
PPON3B / PPON4B : H / H ( 4 port )  
PPON3B / PPON4B : L / L ( 2 port )



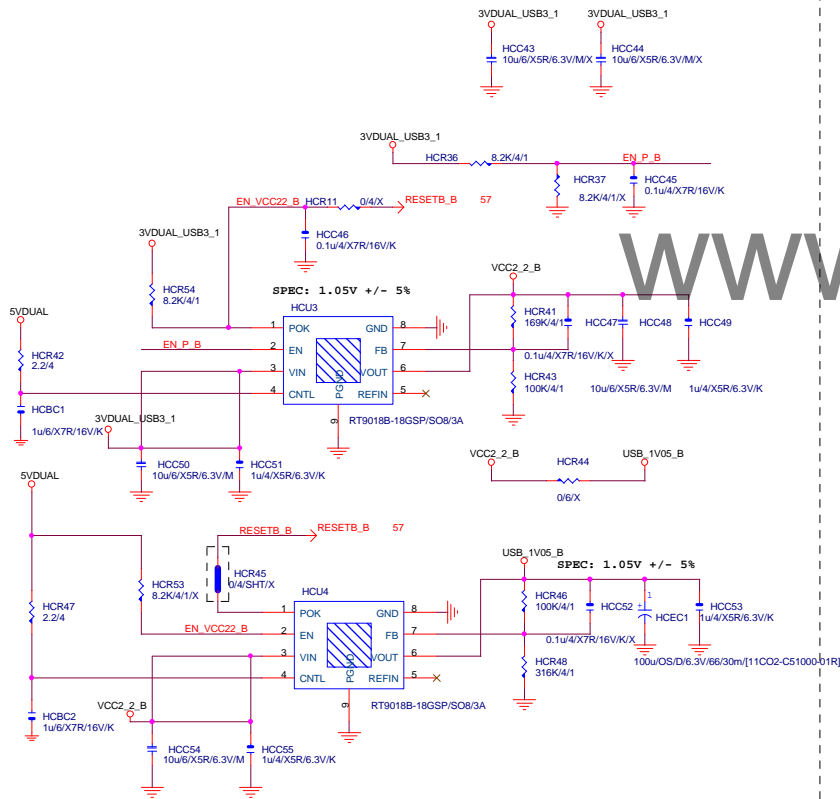
### #5 VBUS Power Control ; Individual mode



### # PPON1B Pin Function ; Port1 PPONB mode

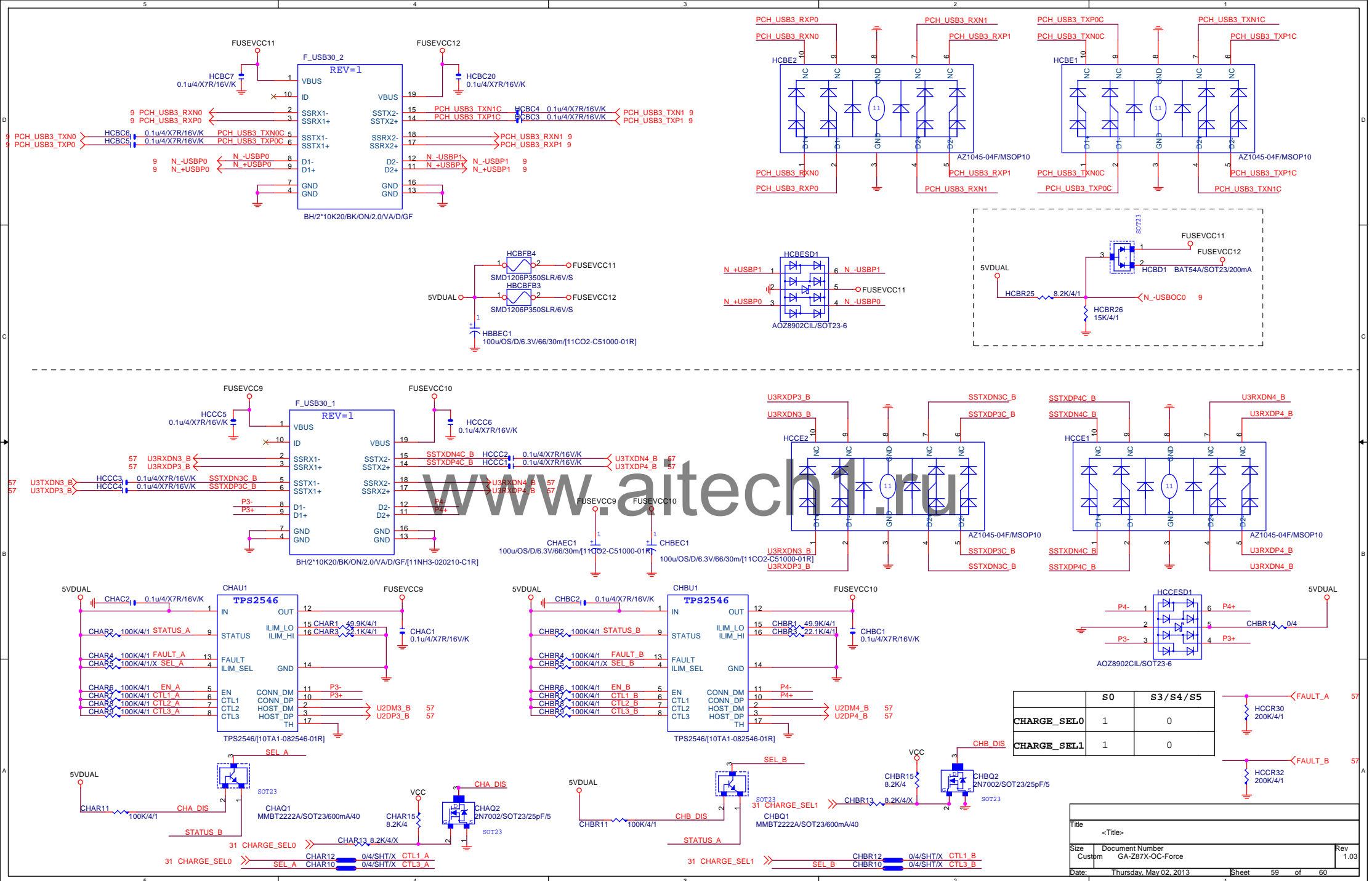


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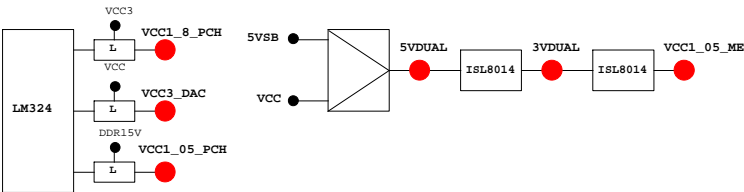


PCH GPIO LIST TABLE				
PIN NAME	PWR	Default	USAGE	NOTE
GP0	MAIN	H-Z	GPI -PECI_REQ	N/A
GP1/TACH1	MAIN		GPI ICH_FAN_TACH1	N/A
GP2/PIRQ#	MAIN		GPI -PIRQE	P/U 8.2K VCC3
GP3/PIRQ#	MAIN		GPI -PIRQF	P/U 8.2K VCC3
GP4/PIRQG#	MAIN		GPI -PIRQG	P/U 8.2K VCC3
GP5/PIRQH#	MAIN		GPI -PIRQH	P/U 8.2K VCC3
GP6/TACH2	MAIN		GPI ICH_FAN_TACH2	N/A
GP7/TACH3	MAIN		GPI ICH_FAN_TACH3	N/A
GP8	STBY	H	GPO GPIO8	P/U 8.2K 3VDUAL
GP9/OC5#	STBY		NATIVE OC5#	N/A
GP10/OC6#	STBY		NATIVE OC6#	N/A
GP11/SMBALERT#	STBY		NATIVE -SMBALERT	P/U 8.2K 3VDUAL
GP12	STBY	L	GPI LAN_PHY_PWR_CTRL	P/U 8.2K 3VDUAL
GP13	STBY	L	GPI GPIO13	P/U 8.2K 3VDUAL
GP14/OC7#	STBY		NATIVE OC7#	N/A
GP15	STBY	L	GPO GPIO15	N/A
GP16	MAIN		GPI -SKTOCC	P/U 8.2K VCC3
GP17/TACH0	MAIN		GPI ICH_FAN_TACH0	N/A
GP18	MAIN		NATIVE MB_ID0	P/D 8.2K GND
GP19	MAIN		GPI -LAN1_ISO	P/U 8.2K VCC3
GP20	MAIN		NATIVE LED_CTL	P/U 1K VCC3
GP21	MAIN		GPI VCC18_FCH_OV2	P/U 8.2K VCC3
GP22	MAIN	H-Z	GPI VCORE_OV3	P/U 8.2K VCC3
GP23	MAIN		NATIVE -LDRQ1	P/U 8.2K VCC3
GP24	STBY	L	GPO TLS	P/U 8.2K 3VDUAL
GP25	STBY		NATIVE -CPU_STOP	P/U 8.2K 3VDUAL
GP26	STBY		NATIVE -ACZ_DET	P/U 8.2K 3VDUAL
GP27	STBY	H	GPO GPIO27	P/U 8.2K 3VDUAL
GP28	STBY	H	GPO GPIO28	P/U 8.2K 3VDUAL
GP29	STBY	L	GPI GPIO29	N/A
GP30	STBY	H-Z	GPI S_PWR_ACK	P/U 100K 3VDUAL
GP31	STBY	H-Z	GPI N/A(Reverse)	P/U 8.2K VCC3
GP32	MAIN	H	GPO MB_ID1	P/D 8.2K GND
GP33	MAIN	H	GPO LOAD-LINE	P/U 1K VCC3
GP34	MAIN	H-Z	GPI -PCI_STOP	P/U 8.2K VCC3
GP35	MAIN	L	GPO GPIO35	P/U 8.2K VCC3
GP36	MAIN		GPI -LAN1_DSM	P/U 8.2K VCC3
GP37	MAIN		GPI N/A	P/U 8.2K VCC3
GP38	MAIN	H-Z	GPI VCORE_OV2	P/U 8.2K VCC3
GP39	MAIN	H-Z	GPI -LAN_DSM	P/U 8.2K VCC3
GP40	STBY		NATIVE OC1#	N/A
GP41	STBY		NATIVE OC2#	N/A
GP42	STBY		NATIVE OC3#	N/A
GP43	STBY		NATIVE OC4#	N/A
GP44	STBY	L	NATIVE N/A	P/U 8.2K 3VDUAL
GP45	STBY		NATIVE -LPCPME	P/U 8.2K 3VDUAL
GP46	STBY	L	NATIVE PWR_LED	P/U 8.2K 3VDUAL
GP47	STBY		NATIVE PSI_LED	P/U 8.2K 3VDUAL
GP48	MAIN	H-Z	IN EN_PWM	P/U 8.2K VCC3
GP49	MAIN	H-Z	IN VCC18_OV1	P/U 8.2K VCC3
GP50	MAIN		NATIVE -REQ1	P/U 2.2K VCC
GP51	MAIN	H	NATIVE -GNT1	N/A
GP52	MAIN		NATIVE -REQ2	P/U 2.2K VCC
GP53	MAIN	H	NATIVE -GNT2	N/A
GP54	MAIN		NATIVE -REQ3	P/U 2.2K VCC
GP55	MAIN	H	NATIVE -GNT3	N/A
GP56	STBY		NATIVE N/A(Reverse)	P/U 8.2K 3VDUAL
GP57	STBY	H-Z	IN VCORE_OV1	P/U 8.2K 3VDUAL
GP58	STBY	H-Z	NATIVE F_USB_OC	P/U 8.2K 3VDUAL
GP59	STBY		NATIVE USB_OC0#	N/A
GP60	STBY	H-Z	NATIVE N/A(Reverse)	P/U 8.2K 3VDUAL
GP61	STBY	L	NATIVE -SUSTAT	N/A
GP62	STBY	L	NATIVE SUSCLK	N/A
GP63	STBY	L	NATIVE GPIO63	N/A
GP64	MAIN	L	NATIVE CLKOUTFLEX0	N/A
GP65	MAIN	L	NATIVE CLKOUTFLEX1	N/A
GP66	MAIN	L	NATIVE CLKOUTFLEX2	N/A
GP67	MAIN	L	NATIVE CLKOUTFLEX3	N/A
GP72	STBY	H-Z	NATIVE VCORE_OV4	P/U 8.2K 3VDUAL
GP73	STBY		NATIVE 1_05V_OV1	P/U 8.2K 3VDUAL
GP74	STBY	H-Z	NATIVE 1_05V_OV2	P/U 8.2K 3VDUAL
GP75	STBY	H-Z	NATIVE N/A(Reverse)	P/U 8.2K 3VDUAL

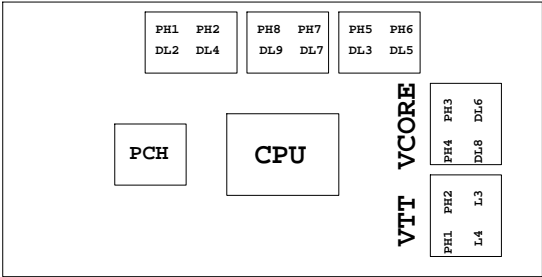
Super I/O ITE8720 GPIO Table

PIN NAME	USAGE	NOTE
SVC/PECI_RQT/GP14	-PECI_REQ	
PWROK1/GP13	PWROK1/ITE_PWROK	
KRST#/GP62	-KBRST	
SO/GP50	-ICH_SPI_CS	
IRTX/GP47/CE2_N/JP7	CEB_N	
GP46/IRRX	-LAN2_DSM	
PSION#/GP42	-PSON	
PWROK2#/GP41	PECI_CTL	
PCIRST3#/GP10/VDIMM_STR_EN	-PCIE_RST	
RSMRST#CIRRXL/GP55	-RSMRST	
PME#/GP54	-LPCPME	
PD5/GP75/BUSSO0	N/A	

PIN NAME	USAGE	NOTE
FAN_TAC2/GP52	FANIO2	
FAN_TAC3/GP37	FANIO3	
VIDO3/FAN_TAC4/GP25/DSR2#	FANIO4	
FAN_CTL2/GP51	FANPWM2	
FAN_CTL3/GP36	FANPWM3	
VID4/GP34	BEEP-	
VID3/GP33	TURBO1	
VID2/GP32	TURBO0	
VCORE_GOOD/VID6/GP63	CPUT_LED1_C	
VID5/GP35	CPUT_LED2_C	
VID1/GP31	CPUT_LED3_C	
VID0/GP30	-LAN1_DSM	NBT_LED1_C
SLCT/GP80	CPU_LED1_C	
PE/GP81	CPU_LED2_C	
BUSY/GP82	CPU_LED3_C	
PD3/GP73/BUSSI1	SB_LED1_C	
PD4/GP74/BUSSI2	SB_LED2_C	
VCORE_EN/VID7/GP64	IT_GP64	SB_LED3_C
PD0/GP70	NB_LED1_C	
PD1/GP71	NB_LED2_C	
PD2/GP72/BUSSI0	NB_LED3_C	
GP22/SCK	LOW_PWR_1	
VID05/GP27/SIN2	LOW_PWR_2	
PCIRST2#/GP11	-PWRST1	
PCIRST1#/GP12	-PWRST2	
3VSBSW#/GP40	CSI_F0	BSEL166_1
SUSC#/GP53	CSI_F1	BSEL166_2
GP23/SI	BSEL166_3/CSISBSL	
VID00/GP20/CTS2#	CPUT_LED1_C	BSEL166_4
GP65/VDDA_EN/GB_01	MB_ID2	
PD6/GP76/BUSSO1	MB_ID3	
PD7/GP77/BUSSO2	MB_ID4	
AFD#/GP86/SMBD_R	2X PIN	FST_2X8
INIT#/GP85/SMBD_M	SEC_2x8	GTLREF_AD2
ACK#/GP83	DDR_LED1_C	
VID01/GP21/DCD2#	DDR_LED2_C	
STB#/GP87/SMBD_M	DDR_LED3_C	
PWRON#GP44	VCORE_OV1	
PANSWH#/GP43	PWRBTSW	
KDAT/GP61	-PWRBTSW	
KCLK/GP60	KDAT	
MDAT/GP57	KCLK	
MACL/GP56	MDAT	
GP66/VLDT_EN/GB_02	NBT_LED1_C	MCLK
SVD/PCIRSTIN#/CIRTX/GP15	PWM2_CR	
KDAT/GP61	PWM2_CR	
GP67/CPU_PG/GB_03	EN_LOADLINE	IT_GP67/-EN_PWM2
SLIN#/GP84/SMBD_R	-EN_PWM2	
PSI_L/FAN_CLT5/CIRRXL2/GP16	-THERM	
VID04/GP26/SOUT2	DDR18V_PH2_EN	
VID02/FAN_TAC5/GP24/DSR2#	DDR18V_LED	
VID06/GP17/RI2#	1_1V_PH_EN	
VID07/JP6/DTR2#	JP6	
PD5/GP75/BUSSO0	SB_LED3_C	



PWM各相位的擺法如下：



BIOS超電壓對應表：

散熱模組料號：

線路圖名稱	BIOS選項
Vcore	CPU Vcore
CPU_VTT	CPU Termination
CPU_VAXG	CPU Graphic Core
VCC1_8_PCH	CPU PLL
VCC1_05_PCH	PCH core
3VDUAL	3VDUAL
DDR15V	DRAM voltage
DDRVTT	DRAM Terminatio
VREF_CA_A/VREF_CA_B	DRAM Address Ref
VREF_DQ_A/VREF_DQ_B	DRAM Data Ref

	3 pin FAN control	4 pin FAN control	FAN speed	Controller
CPU FAN	FANPWM1	FANPWM3	FANIO1	IT8720
	ICH_FAN_PWM2	ICH_FAN_PWM0	ICH_FAN_TACH0	PCH
SYS FAN	FANPWM2	N/A	FANIO2	IT8720
	ICH_FAN_PWM1	N/A	ICH_FAN_TACH1	PCH
PWR FAN	N/A	N/A	FANIO3	IT8720
			ICH_FAN_TACH2	PCH

Gigabyte Technology			
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