

## Model Name: GA-Z87X-OC

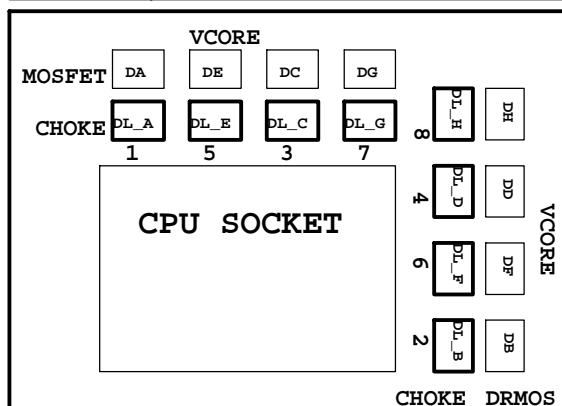
Rev 1.04

SHEET TITLE

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	PCH HDMI/DP
15	PCI EXPRESS*16 SLOT
16	PCI EXPRESS*8 SLOT
17	PCI EXPRESS*1 SLOTS X1
18	PCI EXPRESS X8 X4 SWITCH
19	PCI EXPRESS*4 SLOT (CPU)
20	PCI EXPRESS*4 SLOT (PCH)
21	ITE 8892
22	PCI SLOT 1&2
23	ALC892
24	REAR AUDIO JACK
25	Dual BIOS
26	IR3563A PWM
27	IR3550-VCORE

SHEET TITLE

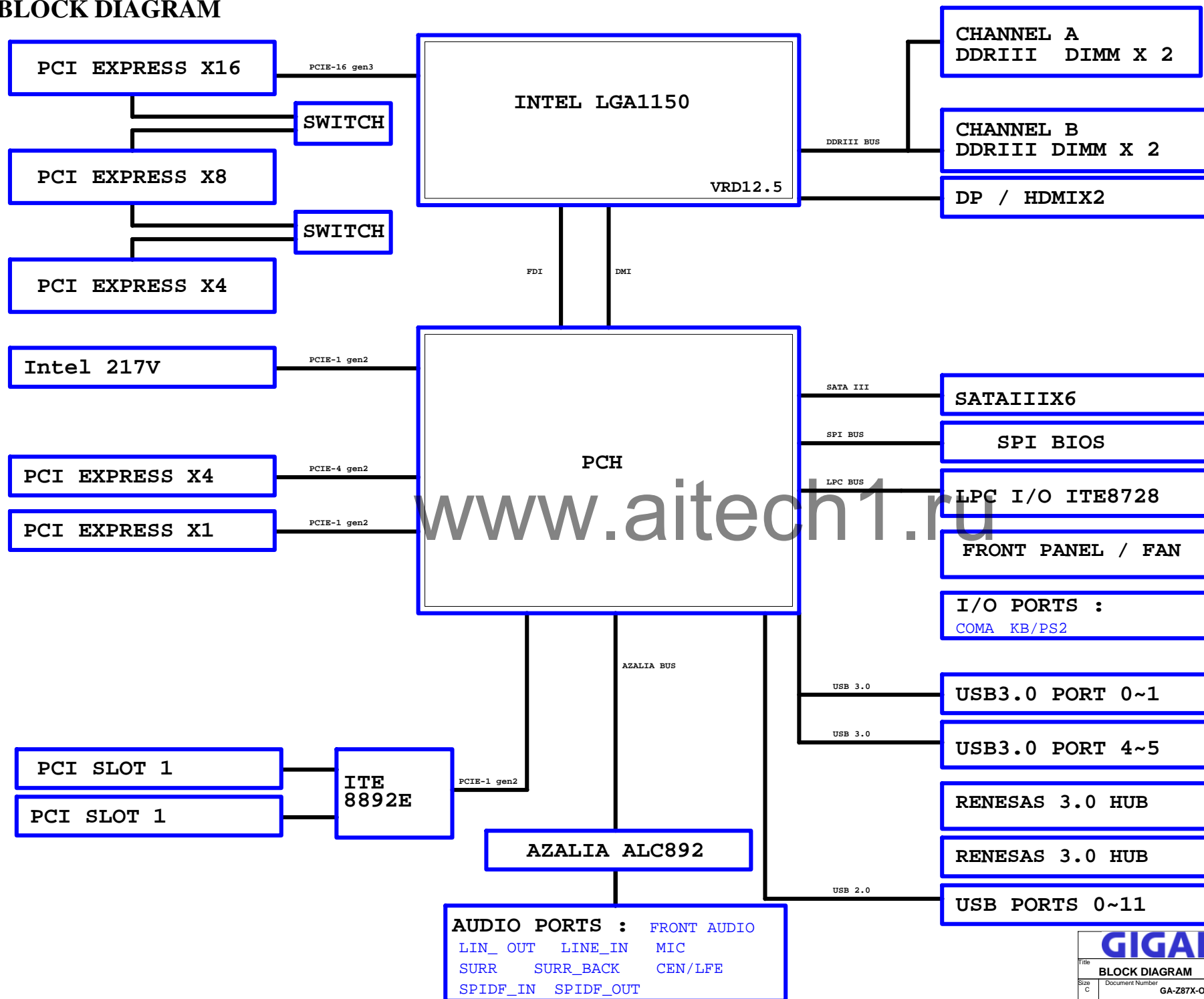
28	IR3570-DDR PWM
29	IR3598-DDR POWER
30	5VDUAL, 3VDAUL, ERP
31	PCH1.05V, PCH1.5V, VCC3_DAC
32	I/O ITE8728
33	KB/USB3
34	F_PANEL , F_USB , PHOT
35	F_USB 2.0
36	F_USB 3.0
37	ATX POWER, CLOCK GEN
38	HWM, FAN CTRL
39	INTEL I217
40	Highly switch
41	RST, PWR, CLR_CMOS
42	IT 8790
43	FAN CTRL
44-45	RENESAS USB3.0 HUB_A
46-48	RENESAS USB3.0 HUB_B
49	TABLE LIST

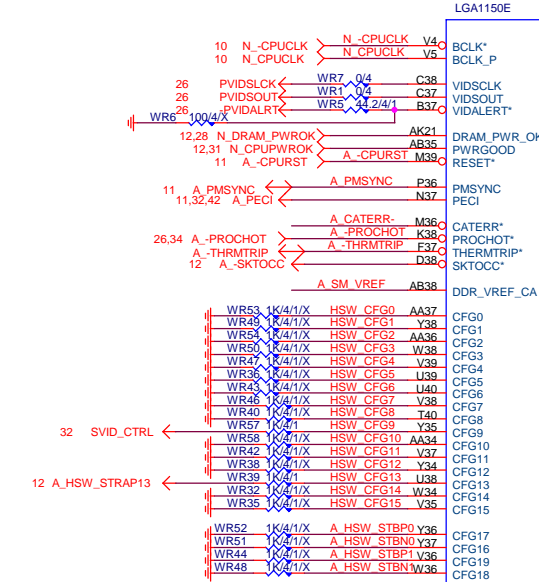


<b>GIGABYTE™</b>		
Title <b>Cover Sheet</b>		
Size Custom	Document Number <b>GA-Z87X-OC</b>	Rev <b>1.04</b>
Date: Tuesday, May 28, 2013 Sheet 1 of 49		



## BLOCK DIAGRAM

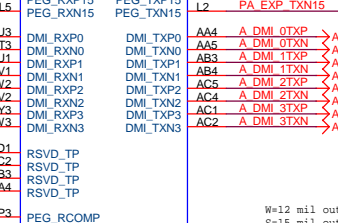
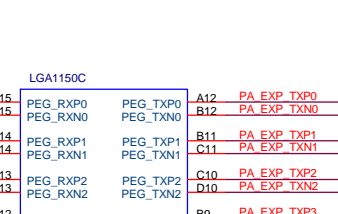
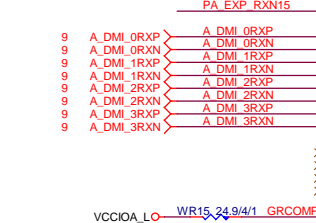
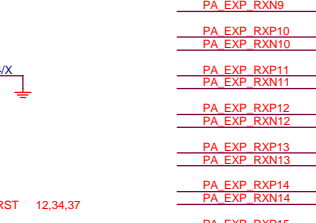
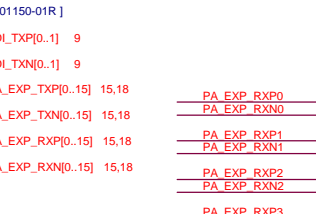
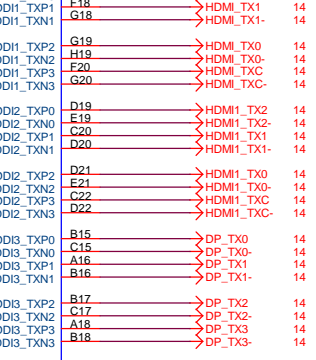
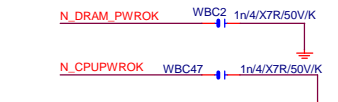
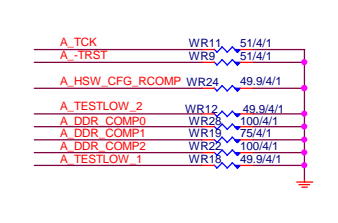
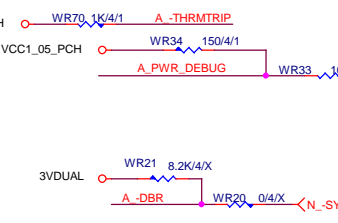
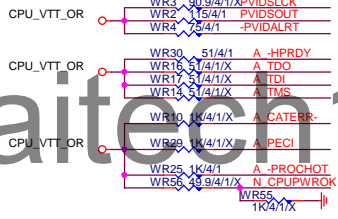
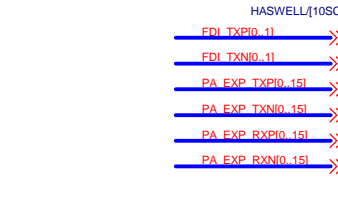
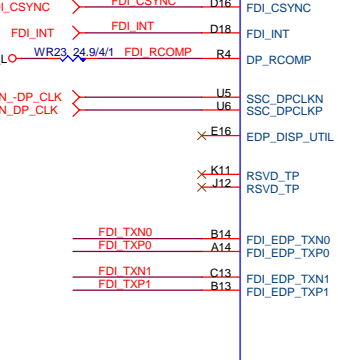
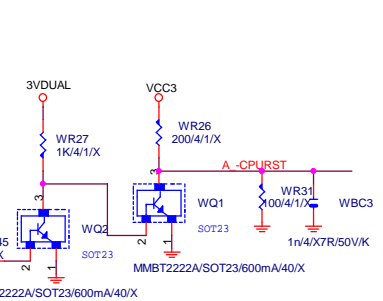
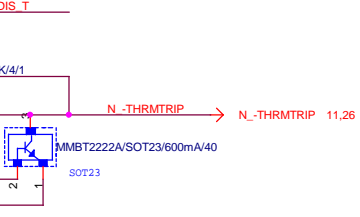
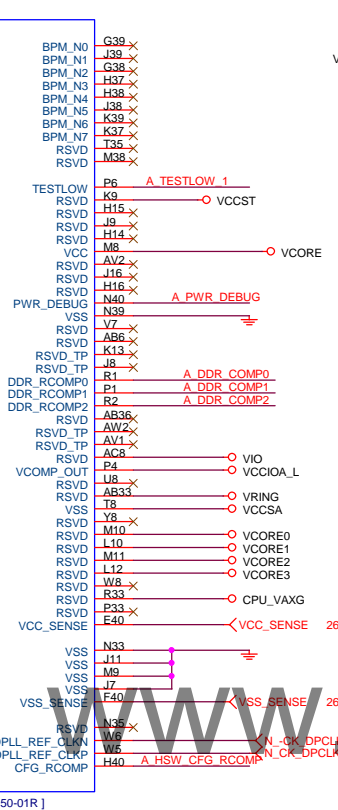
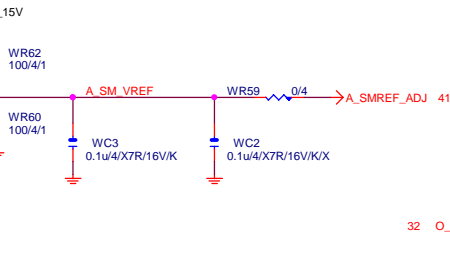




CFG	H	L	NOTE
0	RSVD	RSVD	RSVD
1	RSVD	RSVD	RSVD
2	NORM	Reverse	LANE REVERSAL[0..x16]
3	RSVD	RSVD	RSVD
4	RSVD	RSVD	RSVD
7	RSVD	RSVD	RSVD
8	RSVD	RSVD	RSVD
9	RSVD	RSVD	RSVD
10	RSVD	RSVD	RSVD
11	RSVD	RSVD	RSVD
12	RSVD	RSVD	RSVD
13	RSVD	RSVD	RSVD
14	RSVD	RSVD	RSVD
15	RSVD	RSVD	RSVD
16	RSVD	RSVD	RSVD
17	RSVD	RSVD	RSVD

CFG6	CFG5	PCIE CONFIG
1	1	1x16, Default
1	0	2x8
0	1	RSVD
0	0	x8, x4, x4

CFG 0-17 all internal PULL-UP



Title

CPU LGA1150-A

Size

Document Number

GA-Z87X-OC

Rev

1.04

Date

Tuesday, May 28, 2013

Sheet

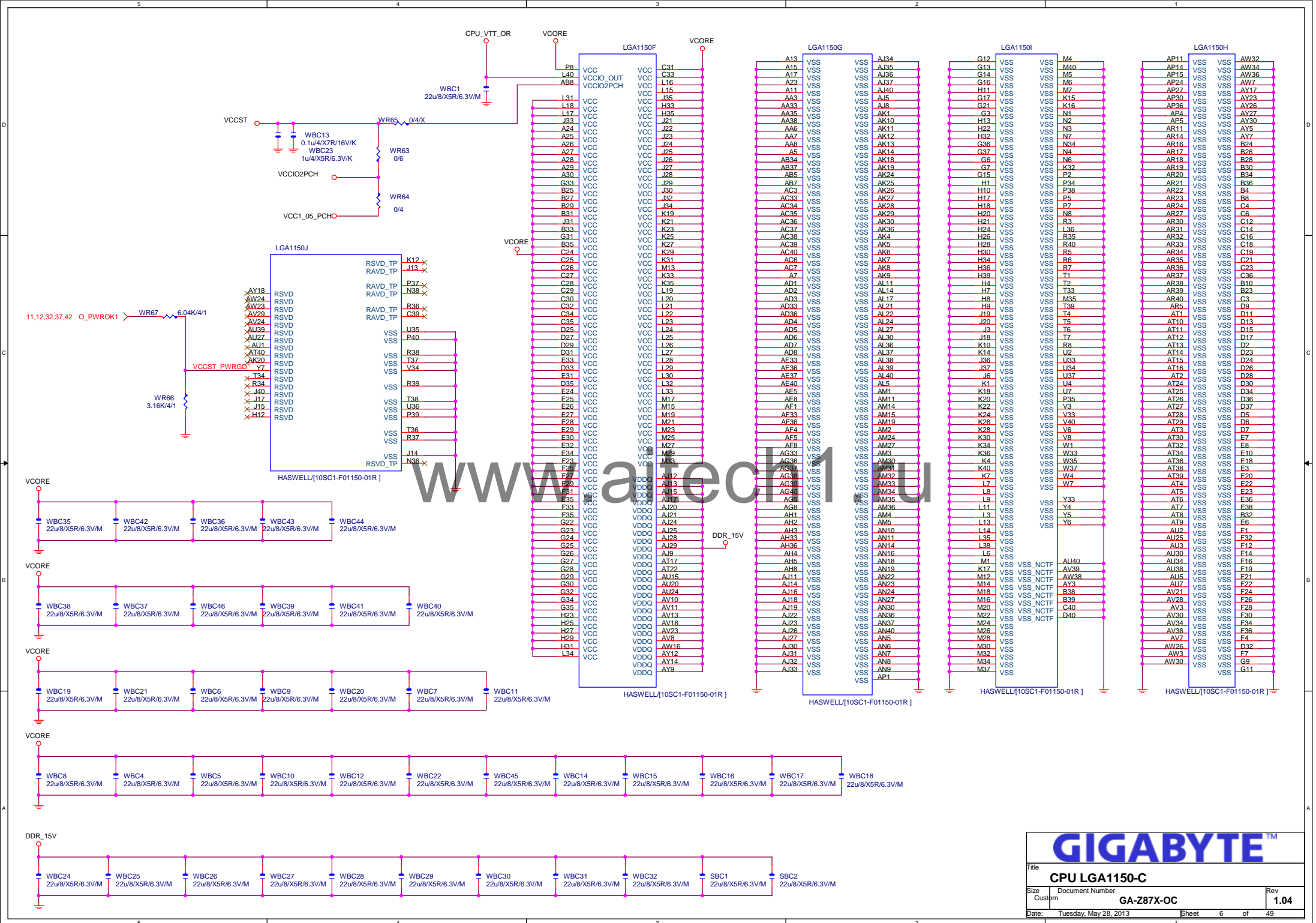
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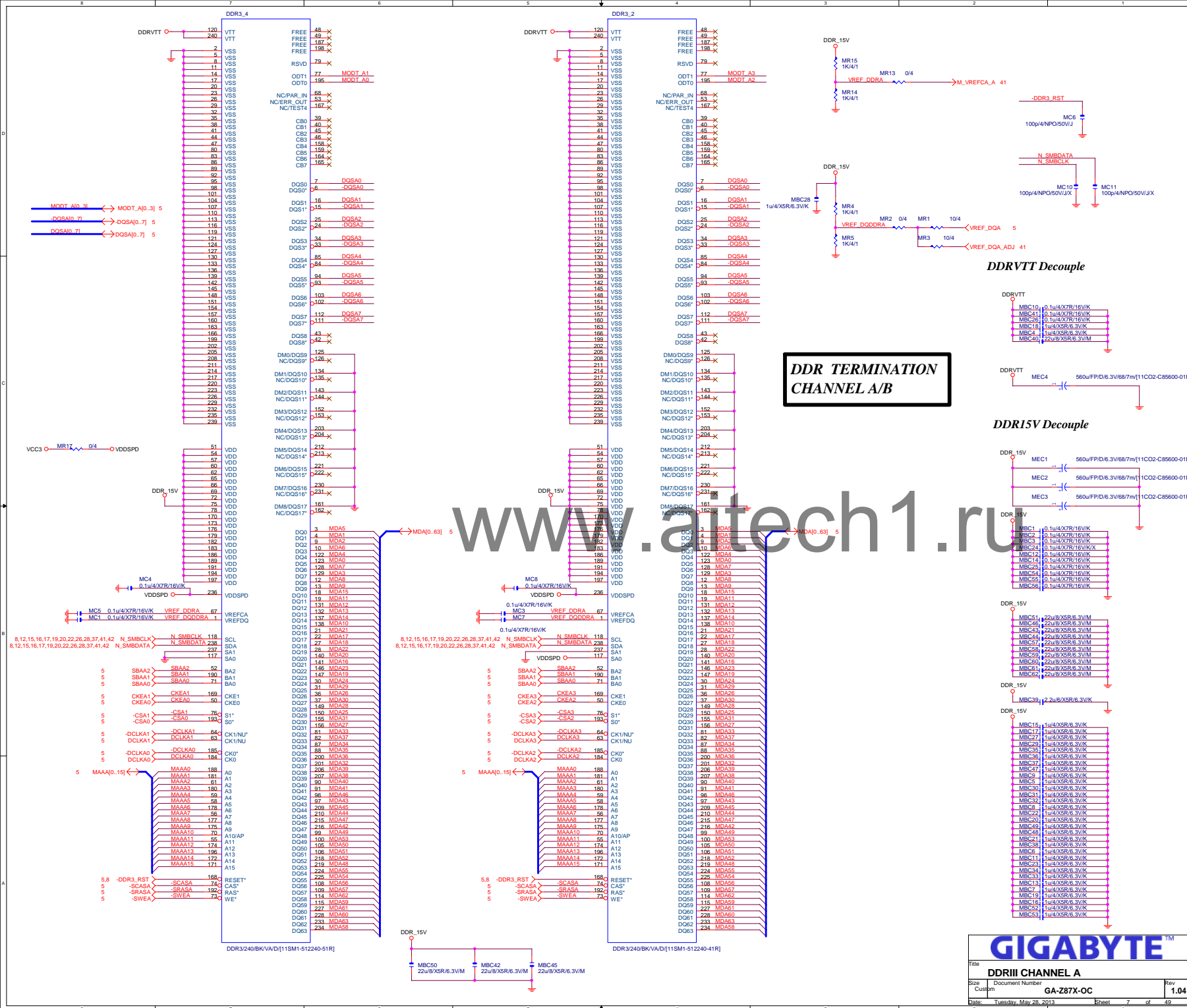
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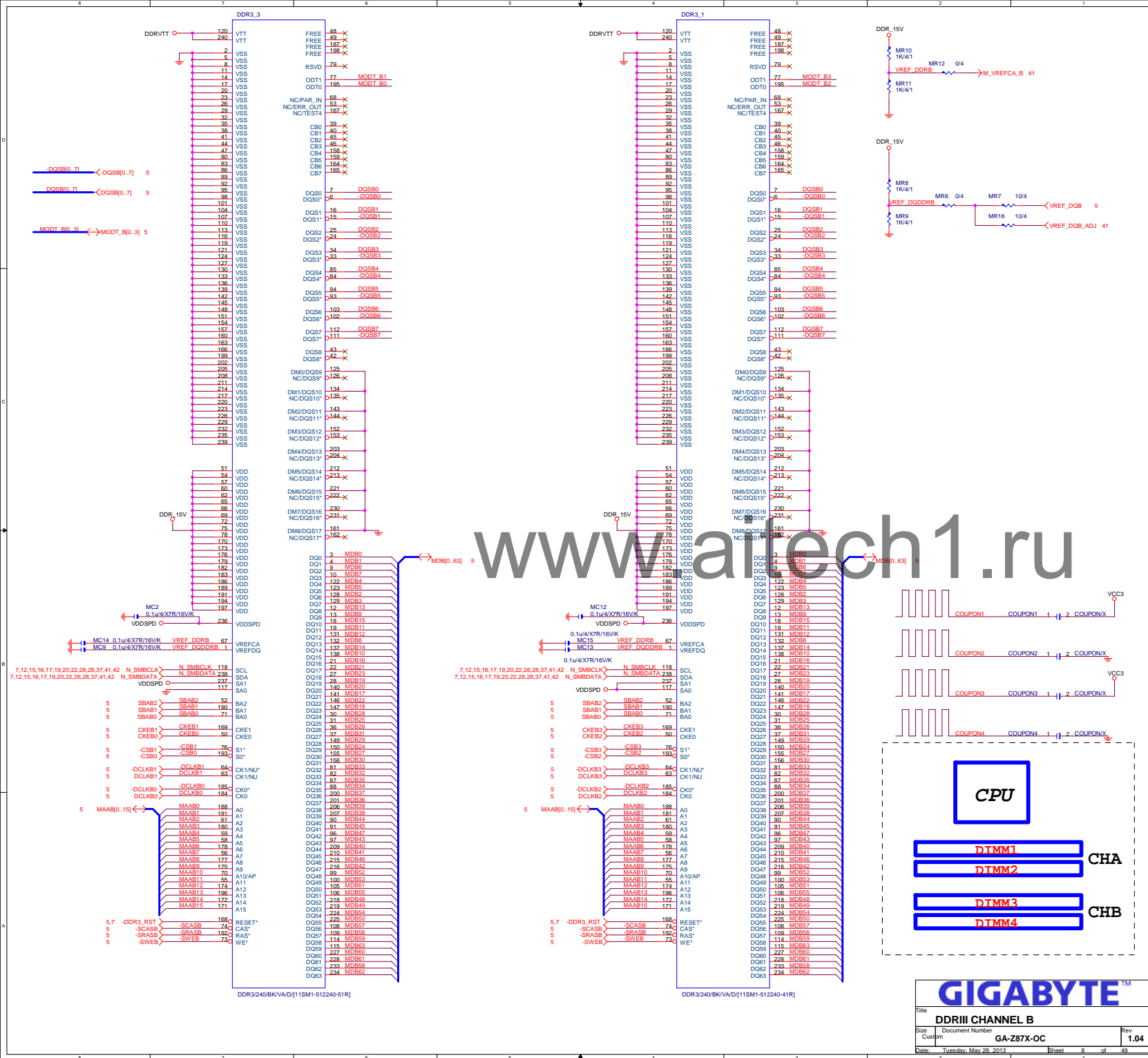
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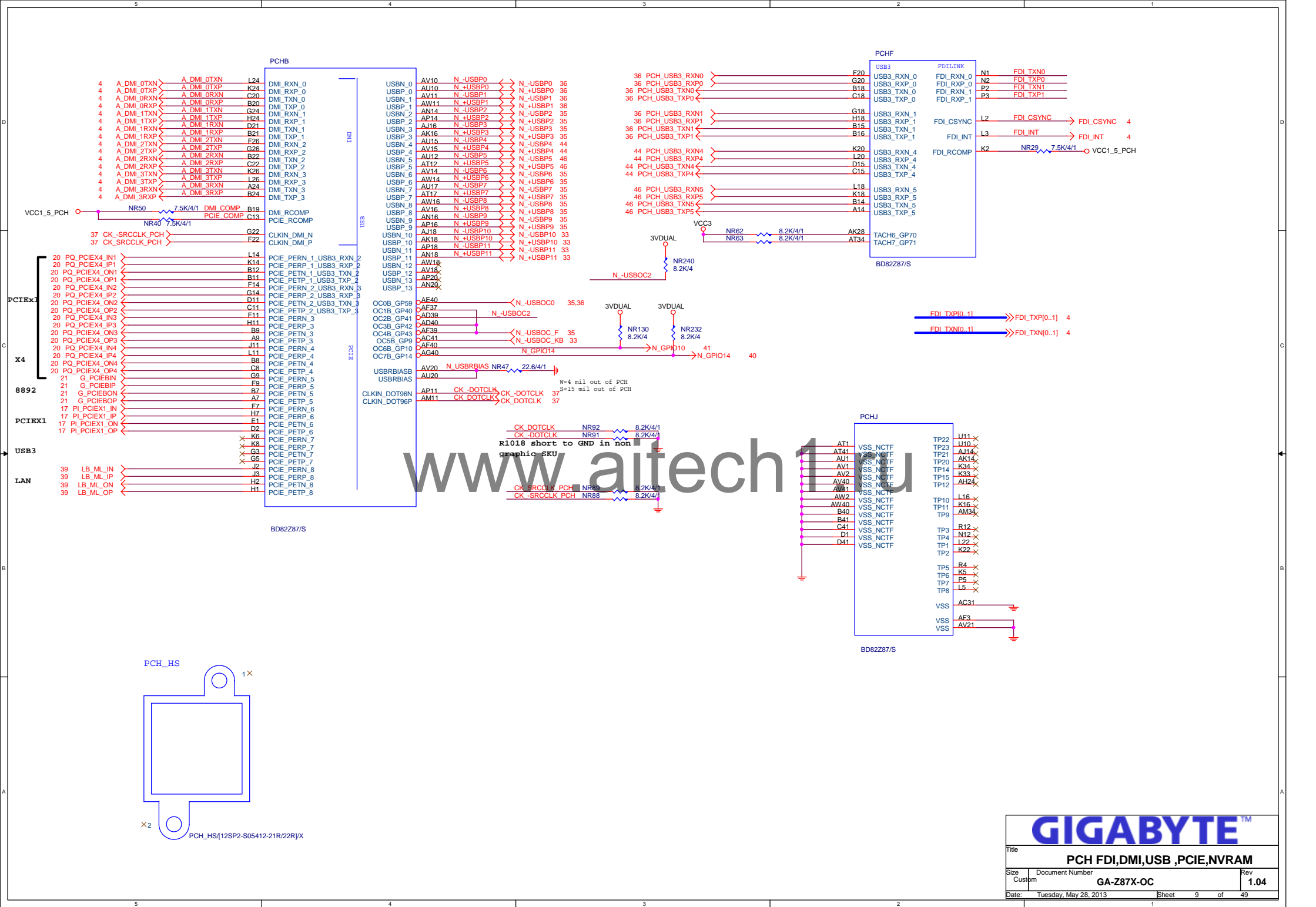




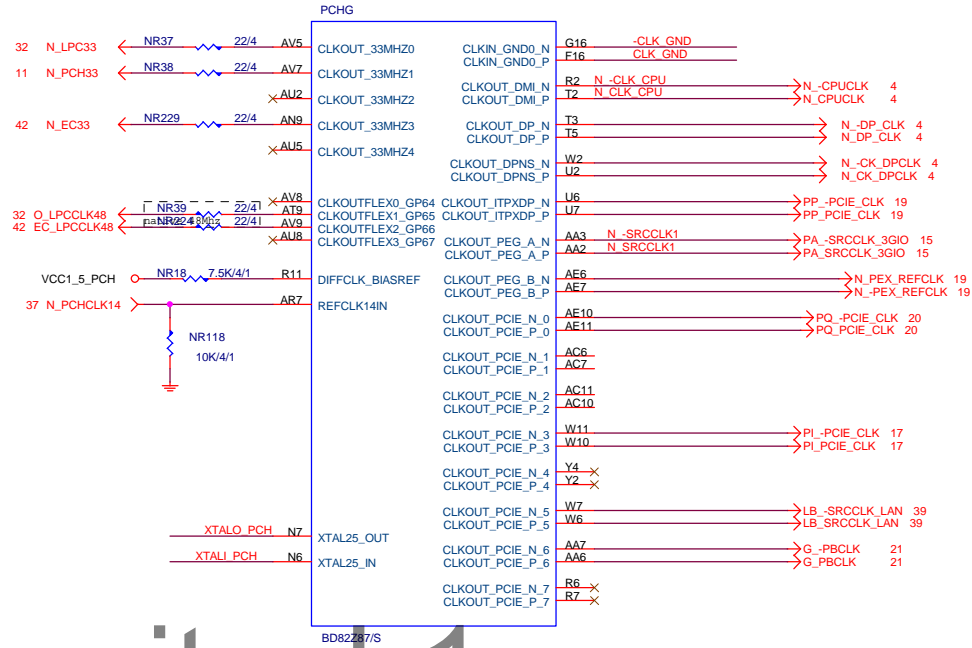
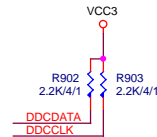
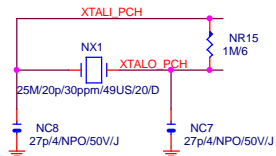
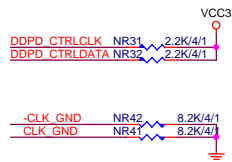
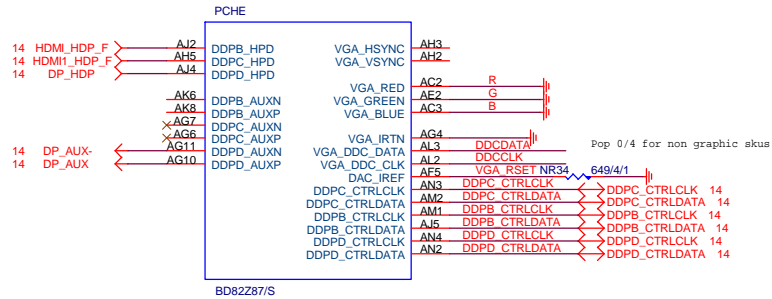












PCIXx4

PCIXx16

CLK Buffer

USB3

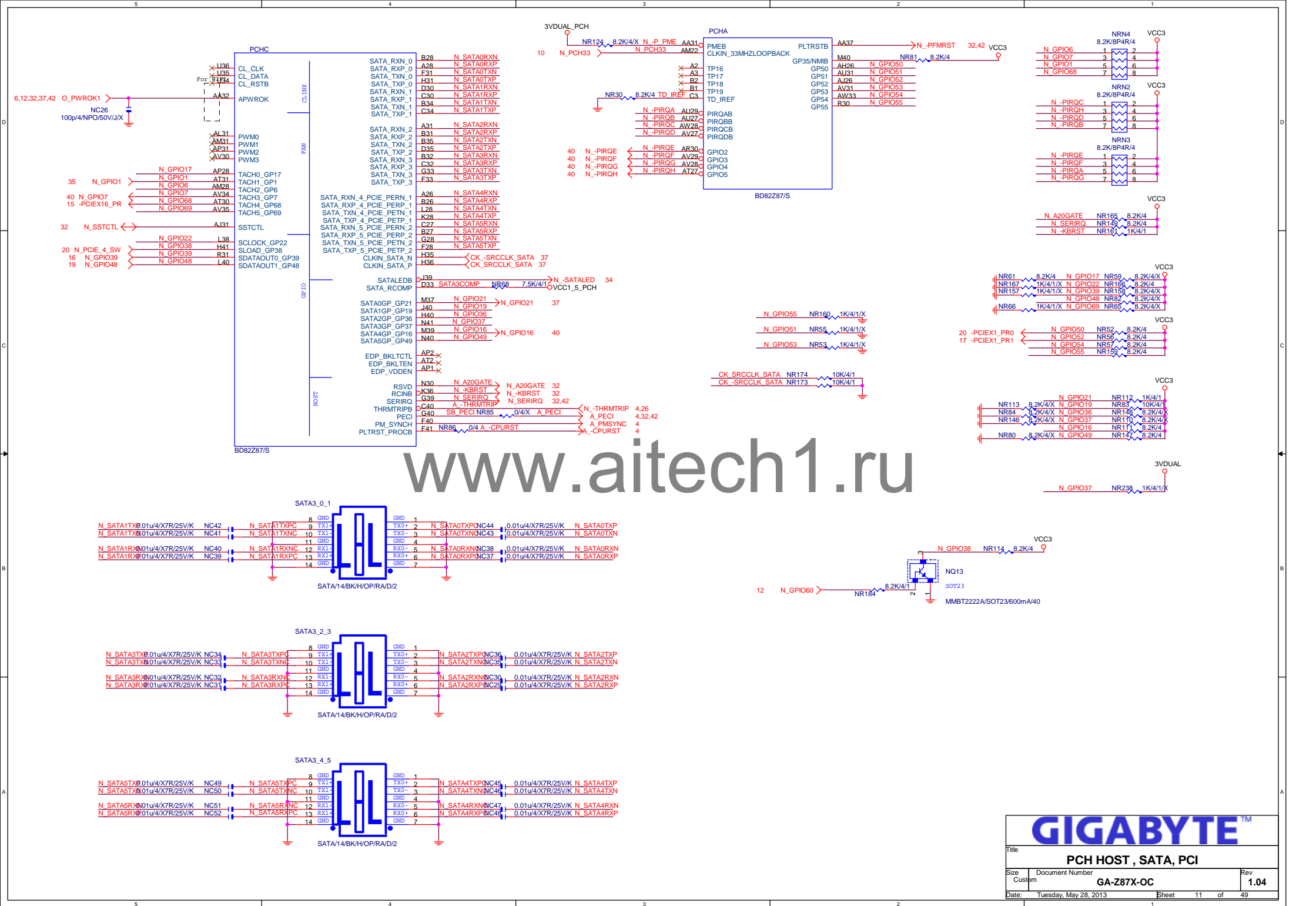
PCIXx1

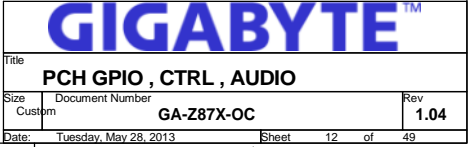
LAN

8892

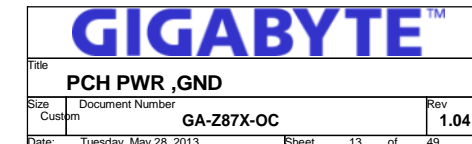
CLK BUF

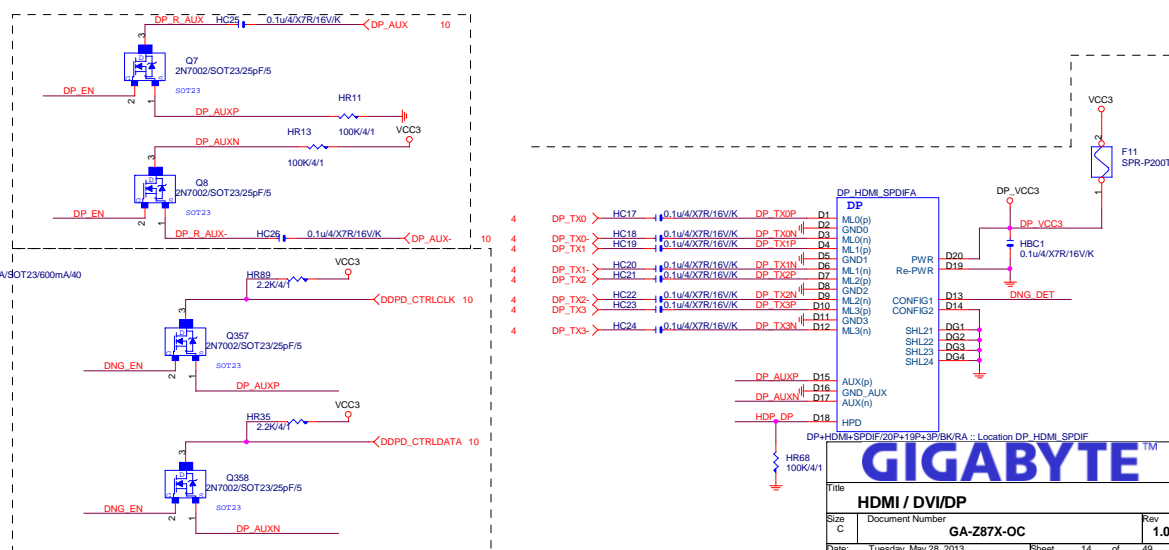
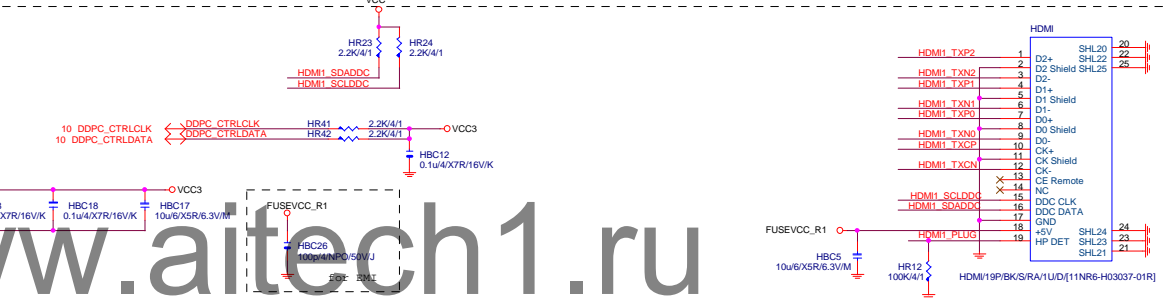
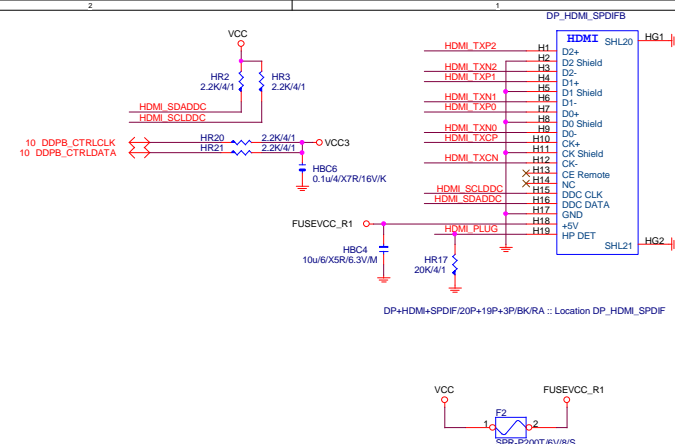
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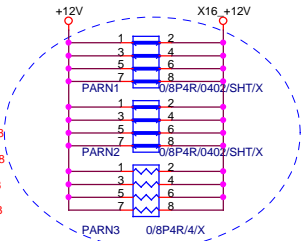








**+12 protect  
short-wire test**



PCIE16:16/5/5/16

PA\_EXP\_RXP0\_15] >> PA\_EXP\_RXP0[0..15] 4,18  
PA\_EXP\_RXN0\_15] >> PA\_EXP\_RXN0[0..15] 4,18  
PA\_EXP\_TXP0\_15] >> PA\_EXP\_TXP0[0..15] 4,18  
PA\_EXP\_TXN0\_15] >> PA\_EXP\_TXN0[0..15] 4,18

PA_EXP_TXP0	PAC5	0.22u/4/X5R/6.3V/K	PA_EXP_TXP0 C
PA_EXP_TXN0	PAC4	0.22u/4/X5R/6.3V/K	PA_EXP_TXN0 C
PA_EXP_TXP1	PAC6	0.22u/4/X5R/6.3V/K	PA_EXP_TXP1 C
PA_EXP_TXN1	PAC7	0.22u/4/X5R/6.3V/K	PA_EXP_TXN1 C
PA_EXP_TXP2	PAC8	0.22u/4/X5R/6.3V/K	PA_EXP_TXP2 C
PA_EXP_TXN2	PAC9	0.22u/4/X5R/6.3V/K	PA_EXP_TXN2 C
PA_EXP_TXP3	PAC10	0.22u/4/X5R/6.3V/K	PA_EXP_TXP3 C
PA_EXP_TXN3	PAC11	0.22u/4/X5R/6.3V/K	PA_EXP_TXN3 C
PA_EXP_TXP4	PAC12	0.22u/4/X5R/6.3V/K	PA_EXP_TXP4 C
PA_EXP_TXN4	PAC13	0.22u/4/X5R/6.3V/K	PA_EXP_TXN4 C
PA_EXP_TXP5	PAC14	0.22u/4/X5R/6.3V/K	PA_EXP_TXP5 C
PA_EXP_TXN5	PAC15	0.22u/4/X5R/6.3V/K	PA_EXP_TXN5 C
PA_EXP_TXP6	PAC16	0.22u/4/X5R/6.3V/K	PA_EXP_TXP6 C
PA_EXP_TXN6	PAC17	0.22u/4/X5R/6.3V/K	PA_EXP_TXN6 C
PA_EXP_TXP7	PAC18	0.22u/4/X5R/6.3V/K	PA_EXP_TXP7 C
PA_EXP_TXN7	PAC19	0.22u/4/X5R/6.3V/K	PA_EXP_TXN7 C
PA_EXP_SW_TXP8	PAC21	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP8 C
PA_EXP_SW_TXN8	PAC20	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXN8 C
PA_EXP_SW_TXP9	PAC22	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP9 C
PA_EXP_SW_TXN9	PAC23	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXN9 C
PA_EXP_SW_TXP10	PAC24	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP10 C
PA_EXP_SW_TXN10	PAC25	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXN10 C
PA_EXP_SW_TXP11	PAC26	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP11 C
PA_EXP_SW_TXN11	PAC27	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXN11 C
PA_EXP_SW_TXP12	PAC28	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP12 C
PA_EXP_SW_TXN12	PAC29	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXN12 C
PA_EXP_SW_TXP13	PAC30	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP13 C
PA_EXP_SW_TXN13	PAC31	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXN13 C
PA_EXP_SW_TXP14	PAC32	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP14 C
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PA_EXP_SW_TXP15	PAC34	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXP15 C
PA_EXP_SW_TXN15	PAC35	0.22u/4/X5R/6.3V/K	PA_EXP_SW_TXN15 C

PA\_EXP\_SW\_RXP8\_15] >> PA\_EXP\_SW\_RXP8[8..15] 18  
PA\_EXP\_SW\_RXN8\_15] >> PA\_EXP\_SW\_RXN8[8..15] 18  
PA\_EXP\_SW\_TXP8\_15] >> PA\_EXP\_SW\_TXP8[8..15] 18  
PA\_EXP\_SW\_TXN8\_15] >> PA\_EXP\_SW\_TXN8[8..15] 18

PCI-E REV:1.1--> 2.5GHZ

PCE-E X1(單向) BANDWITH=2.5GHz\*(8b/10b)=2Gb/s=250MB/s

PCE-E X1(雙向) BANDWITH=2.5GHz\*(8b/10b)X2=4Gb/s=500MB/s

PCE-E X16(單向) BANDWITH=2.5GHz\*(8b/10b)X16=32Gb/s=4GB/s

PCE-E X16(雙向) BANDWITH=2.5GHz\*(8b/10b)X16X2=64Gb/s=8GB/s

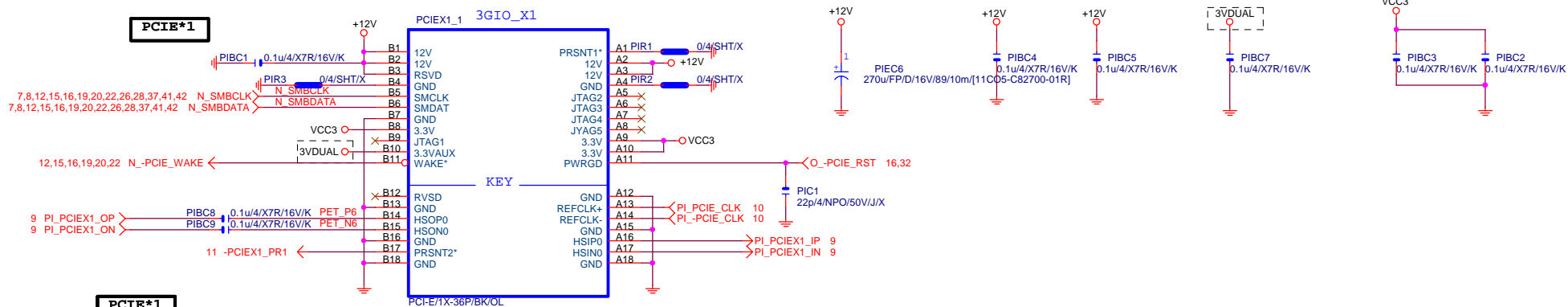
PCI-E REV:2.0--> 5GHZ

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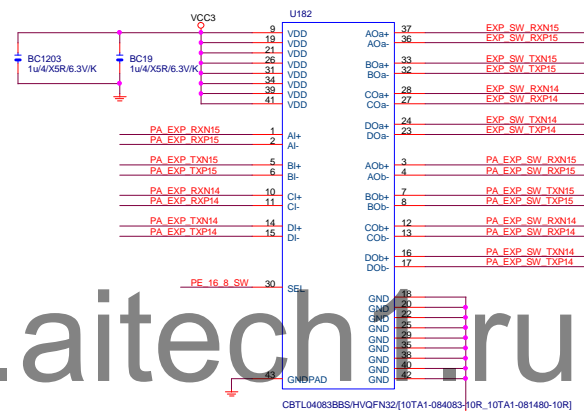
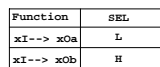
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Title <b>PCI EXPRESS * 16</b>		
Size Custom	Document Number <b>GA-Z87X-OC</b>	Rev <b>1.04</b>
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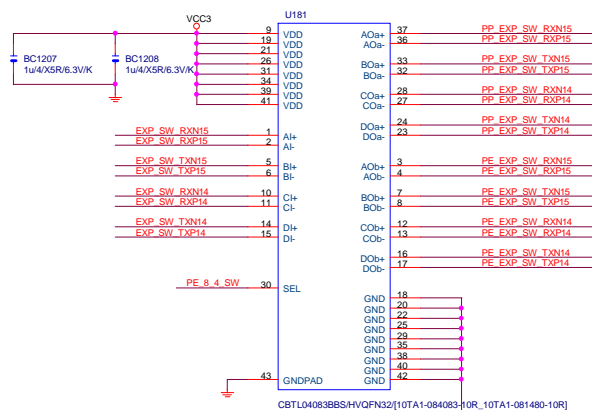




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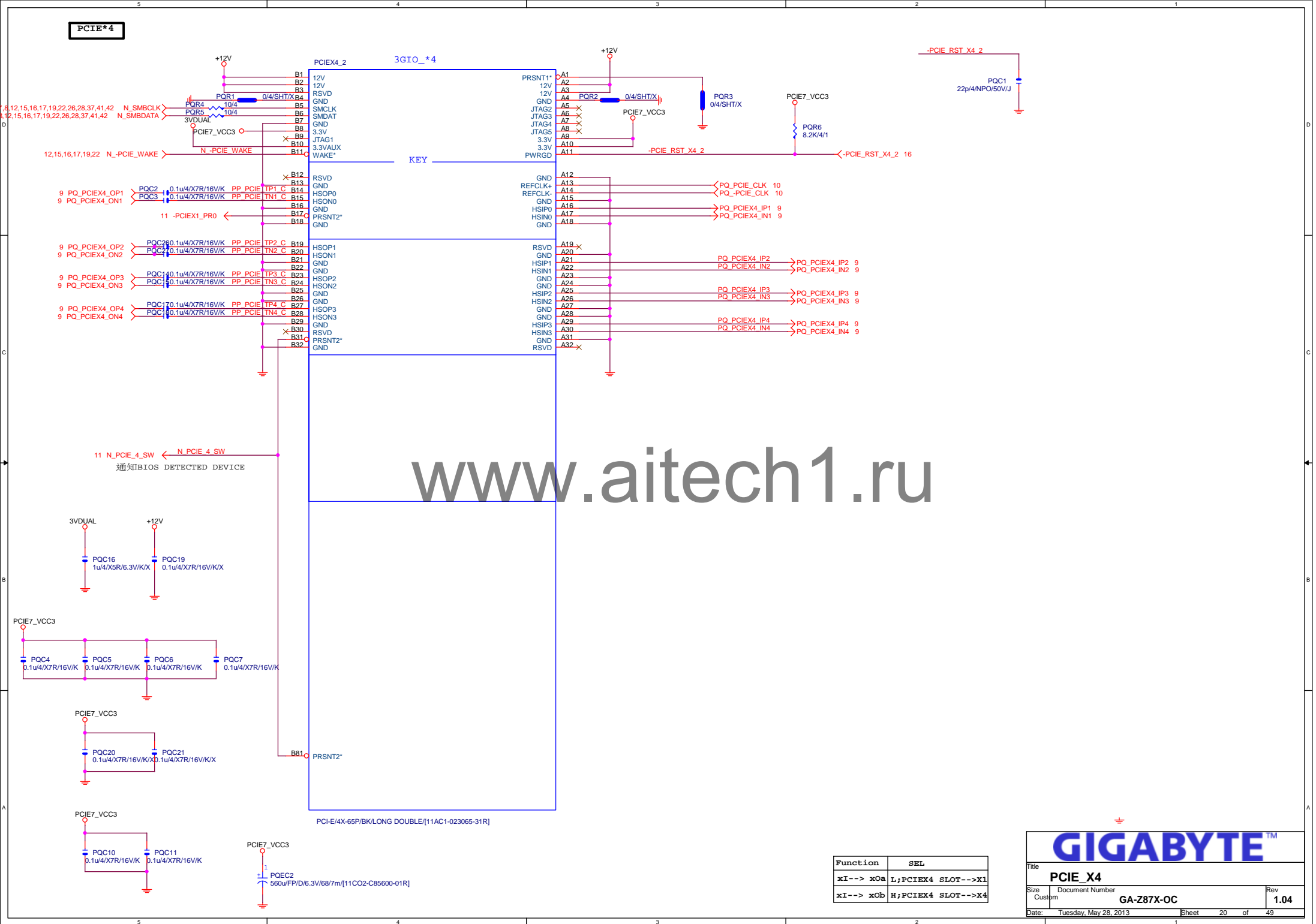


<u>PA EXP SW_RXIP8_15i</u>	→ PA_EXP_SW_RXIP[8..15]	15
<u>PA EXP SW_RXIN8_15i</u>	→ PA_EXP_SW_RXIN[8..15]	15
<u>PA EXP SW_TXIP8_15i</u>	→ PA_EXP_SW_TXIP[8..15]	15
<u>PA EXP SW_TXIN8_15i</u>	→ PA_EXP_SW_TXIN[8..15]	15
<u>PE EXP SW_RXIP8_15i</u>	→ PE_EXP_SW_RXIP[8..15]	16
<u>PE EXP SW_RXIN8_15i</u>	→ PE_EXP_SW_RXIN[8..15]	16
<u>PE EXP SW_TXIP8_15i</u>	→ PE_EXP_SW_TXIP[8..15]	16
<u>PE EXP SW_TXIN8_15i</u>	→ PE_EXP_SW_TXIN[8..15]	16

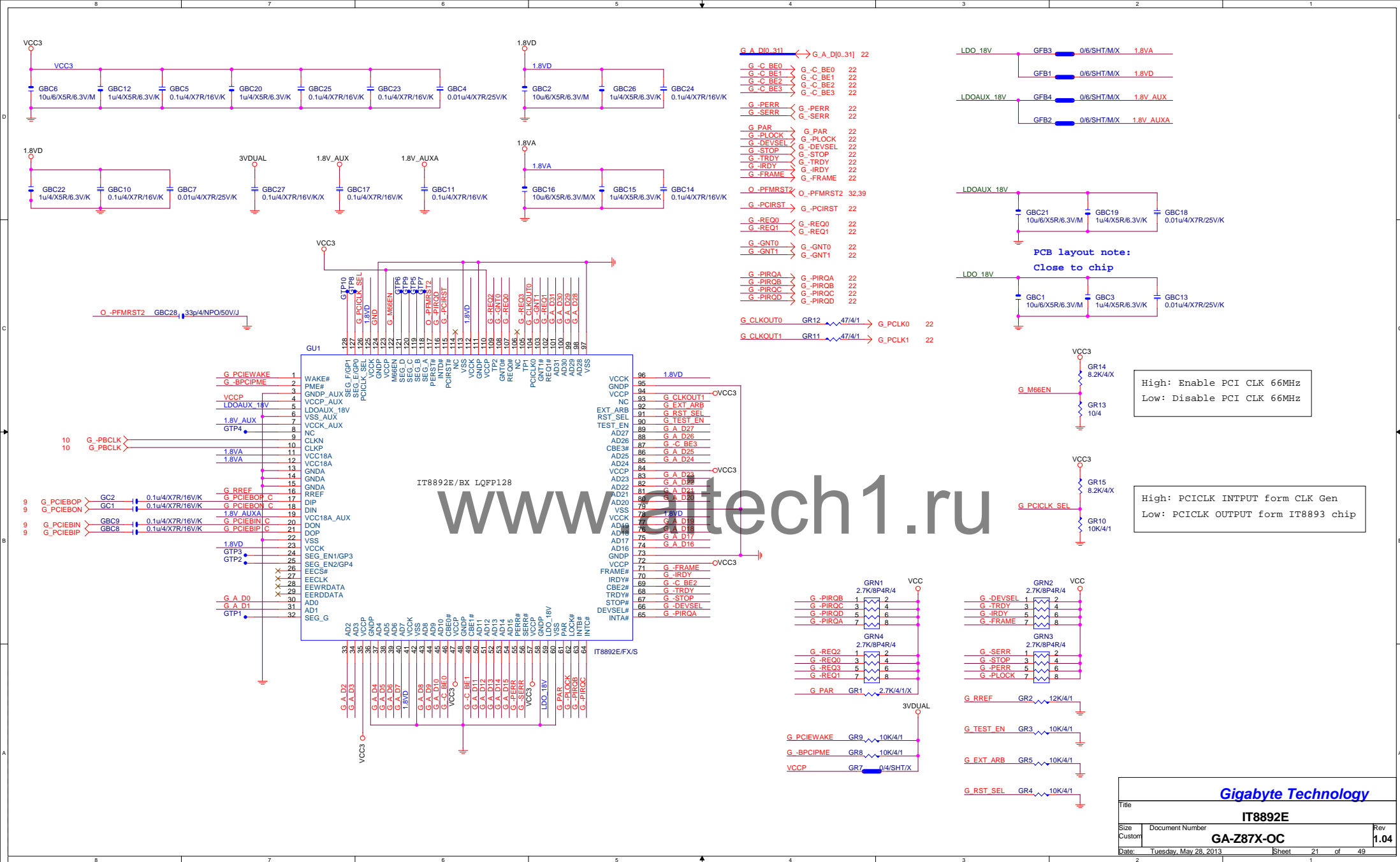


Function	SEL
xI--> x0a	L
xI--> x0b	H



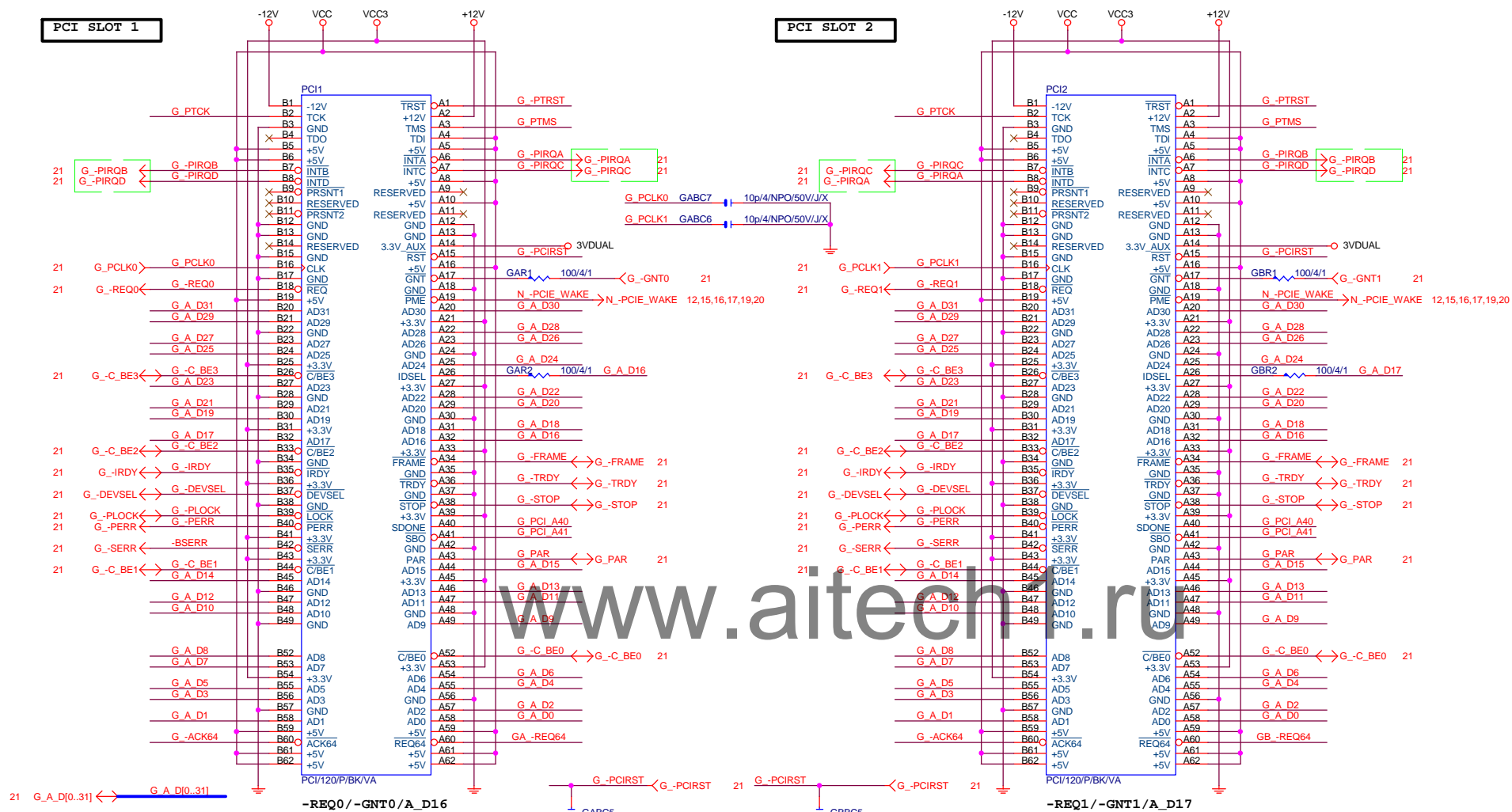






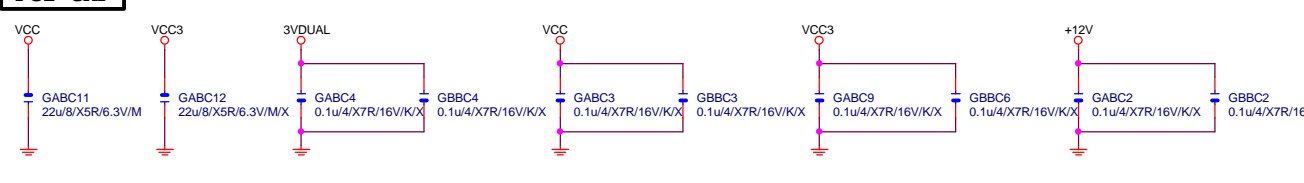
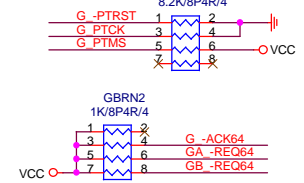
# PCI SLOT 1

# PCI SLOT 2



## PCI PU

## PCI CAP



# GIGABYTE™

## PCI SLOT 1&2

Size: Custom Document Number: **GA-Z87X-OC** Rev: **1.04**

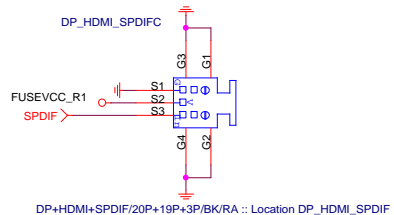
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FOR ON/OFF PLAY

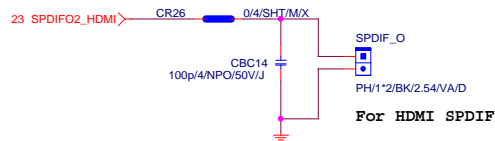


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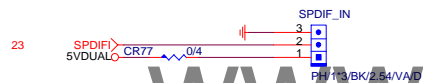
CR49 0/6/SHT/M/X → Close F\_AUDIO  
 CR50 0/6/SHT/M/X → Close Codec  
 CR21 2.2/6 → Audio jack <--> USB\_LAN  
 CR24 0/6/X → Under Audio jack



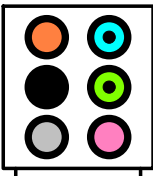
#### SPDIF\_OUT



#### SPDIF\_IN



#### AZALIA JACK

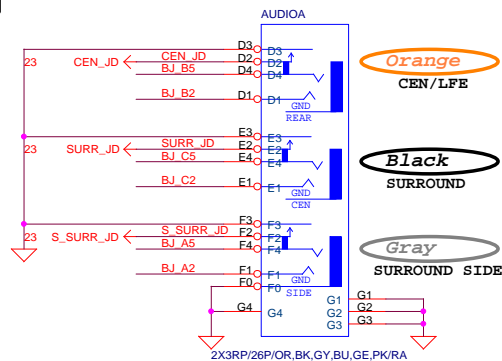
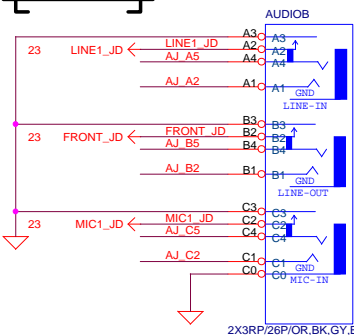


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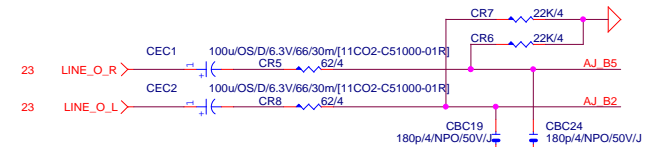
BLUE  
LINE-IN

GREEN  
LINE-OUT

PINK  
MIC-IN



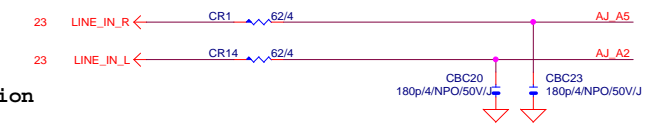
#### LINE-OUT



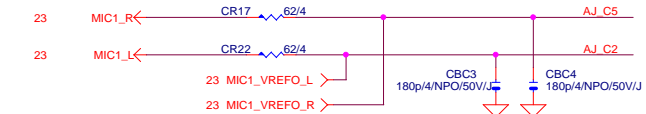
#### LINE-IN

Verify MIC function  
in LINE-in

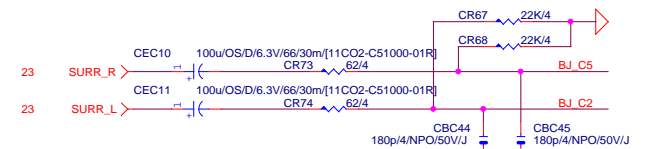
Only reserved for ALC888



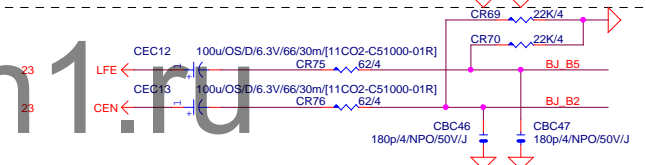
#### MIC-IN



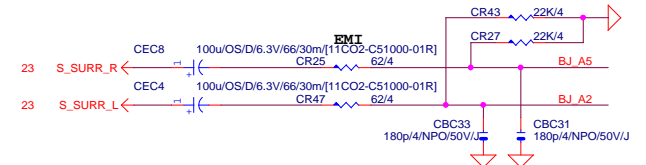
#### SURROUND



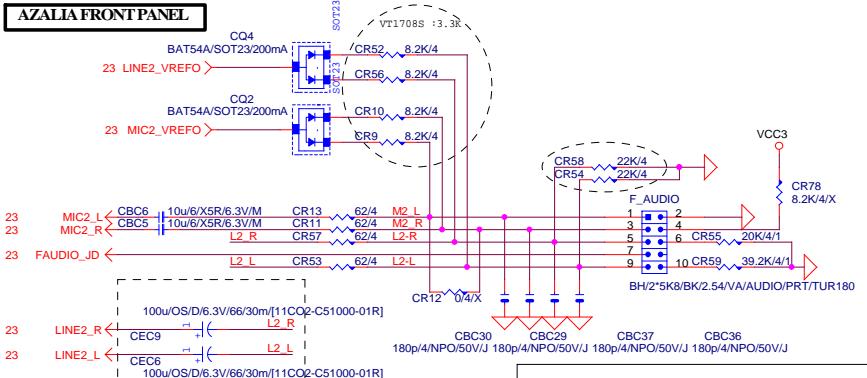
#### CEN/LFE



#### SURRBACK



#### AZALIA FRONT PANEL

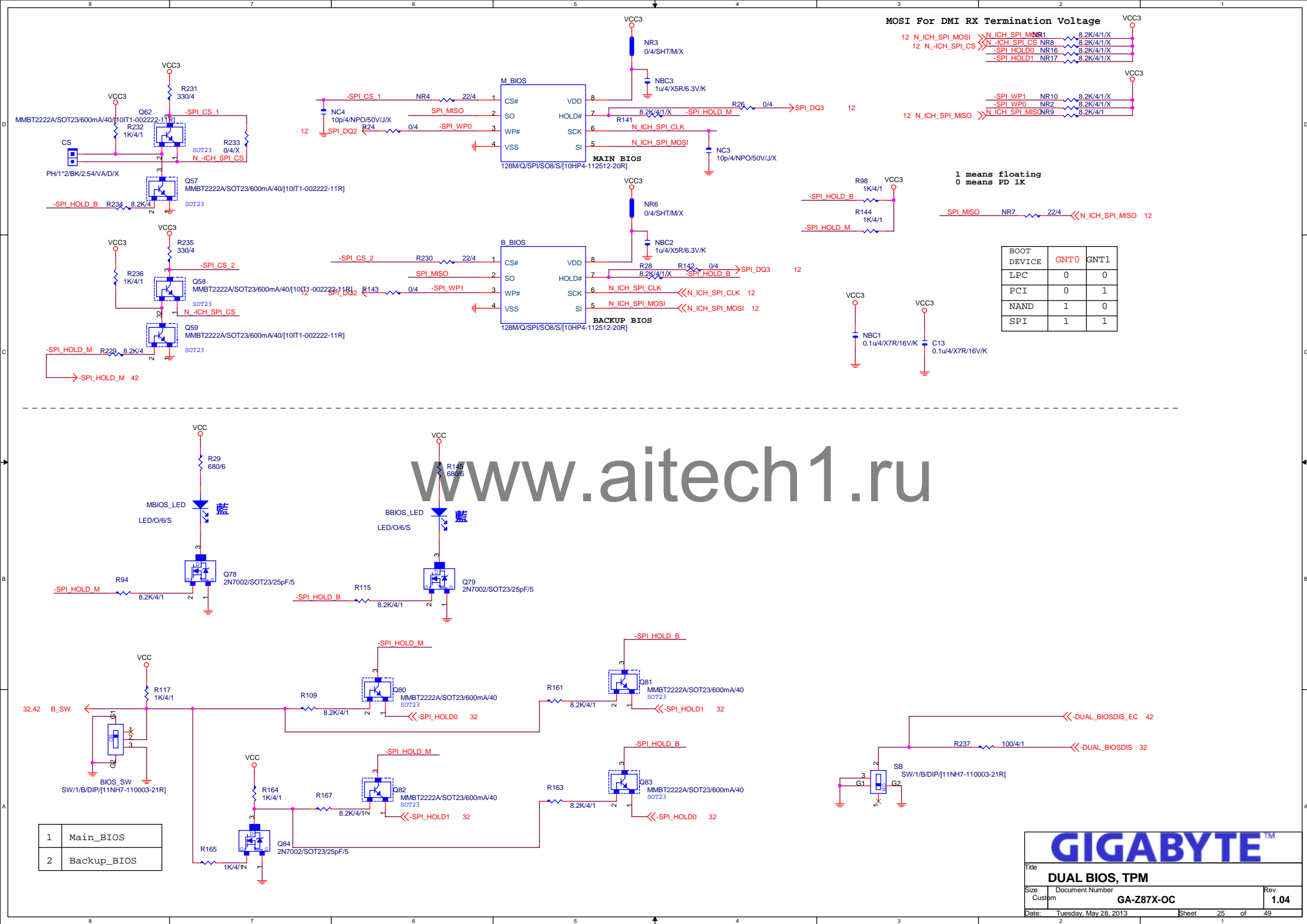


Gigabyte Technology

AUDIO JACK

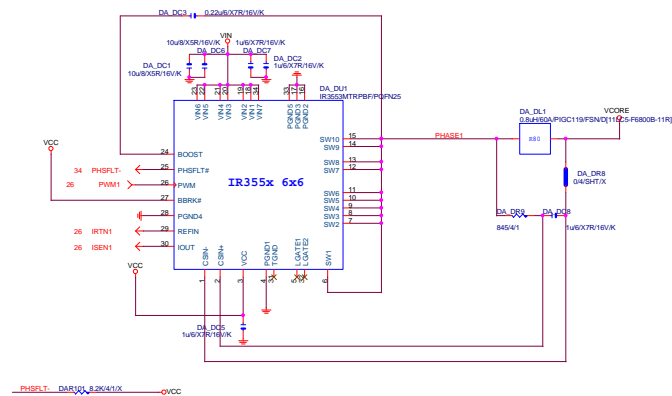
GA-Z87X-OC

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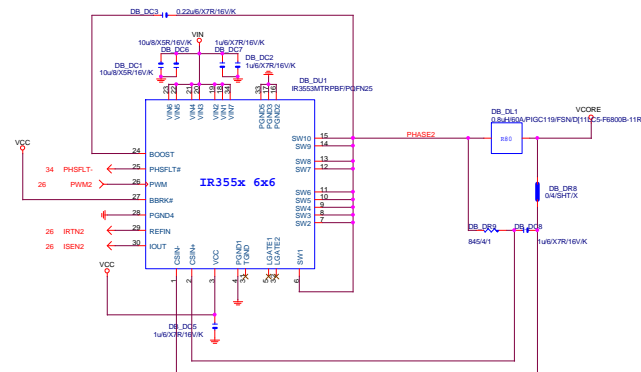




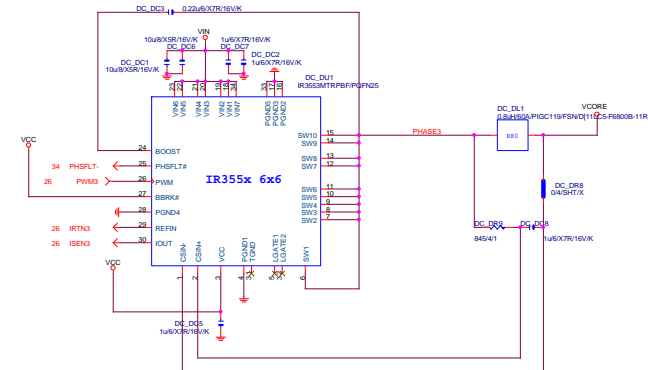
## VCORE-PHASE1



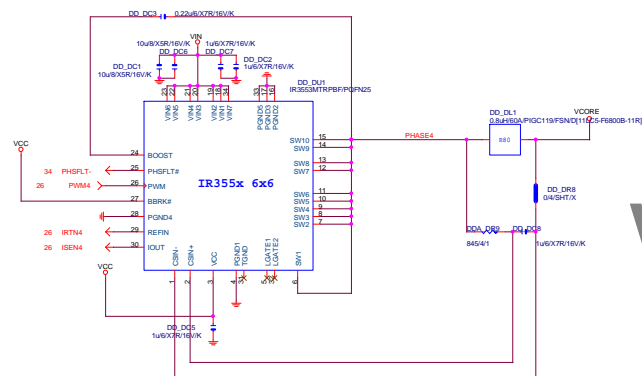
## VCORE-PHASE2



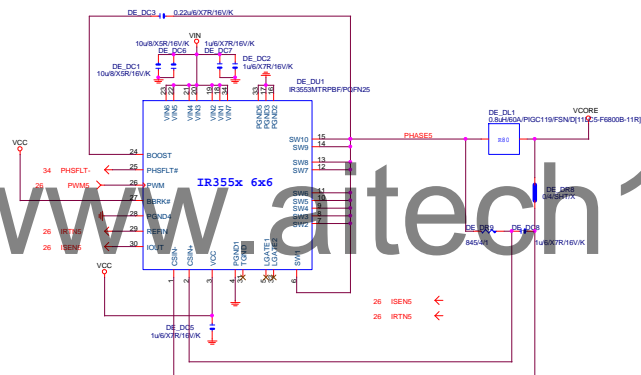
## VCORE-PHASE3



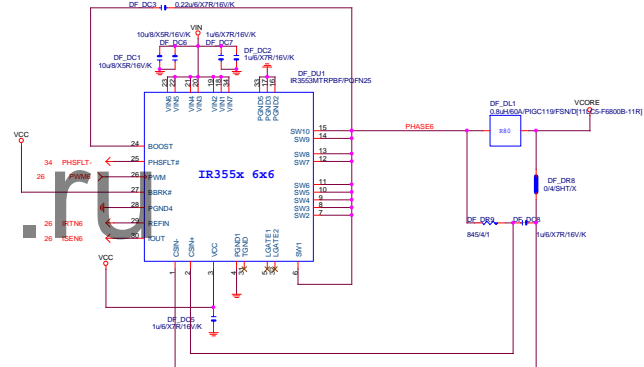
## VCORE-PHASE4



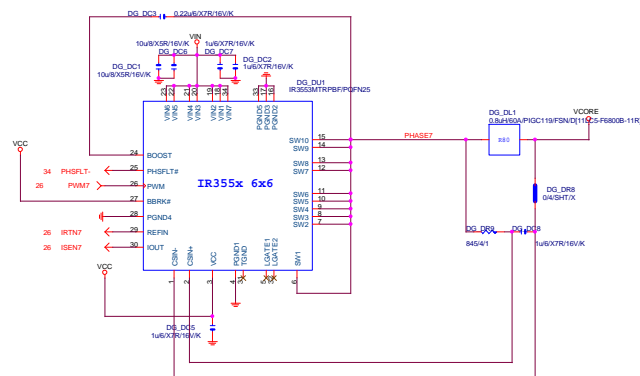
## VCORE-PHASE5



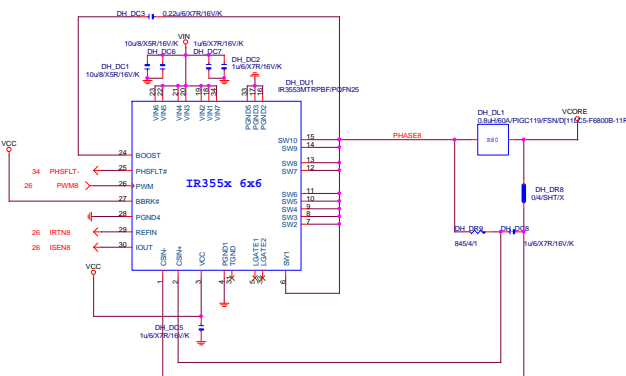
## VCORE-PHASE6

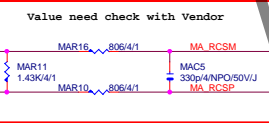
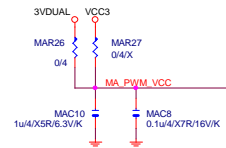
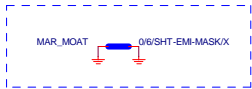


## VCORE-PHASE7



## VCORE-PHASE8

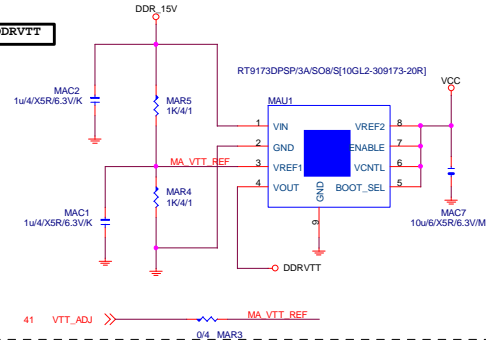




Close to DDR output inductor

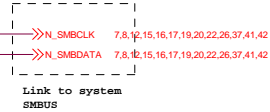
should be routed as differential pair, 7mil width, 8mil spacing

DDRVTT



IR3570

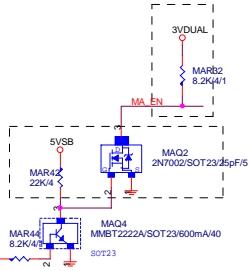
MA\_PWM2 29  
MA\_PWM1 29



Addr: 72h

Link to PCH pin BQ46

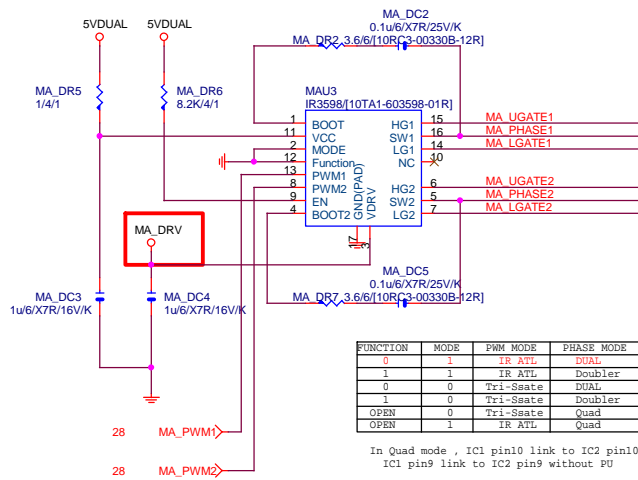
Full up in PCH side



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Title DDR POWER IR3570			
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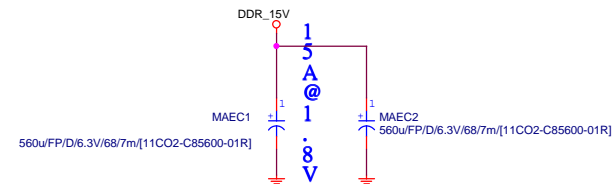
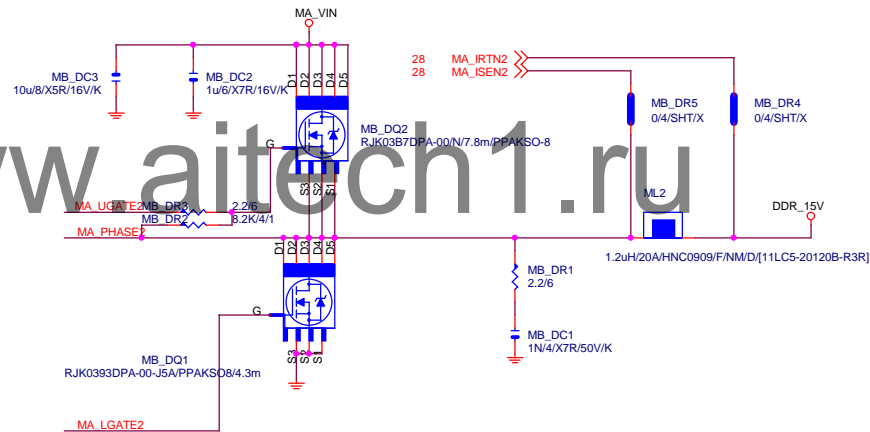
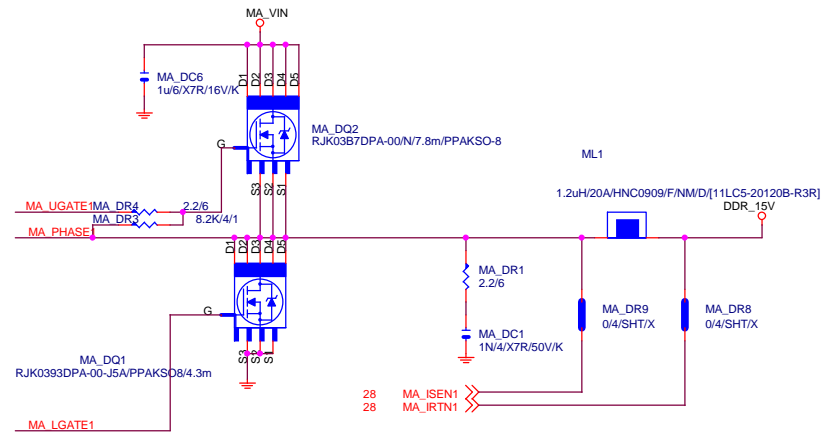
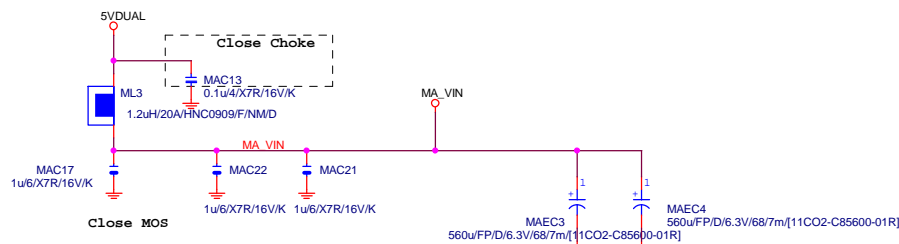
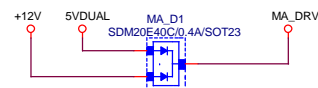


DDR\_15V

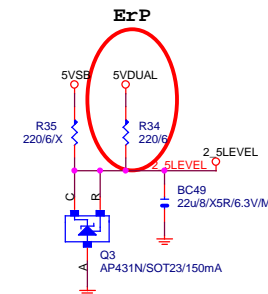


FUNCTION	MODE	PWM MODE	PHASE MODE
0	1	IR ATL	DUAL
1	1	IR ATL	Doubler
0	0	Tri-Ssate	DUAL
1	0	Tri-Ssate	Doubler
OPEN	0	Tri-Ssate	Quad
OPEN	1	IR ATL	Quad

In Quad mode , IC1 pin10 link to IC2 pin10  
IC1 pin9 link to IC2 pin9 without PU





[illegible][illegible]

2.5\_LEVEL

R354 8.2K/4

C140 0.1u/4/X7R/16V/K

+12V

C138 0.1u/4/X7R/16V/K/X

U6B LM324DR/SO14

Q108 Q109 MMBT2222A/SOT23/600mA/40

R904 1K/4/1

BC154 1n/4/X7R/50V/K

R708 40.2K/4/1

R905 2K/4/1

C227 0.01u/4/X7R/25V/K/X

Q108 Q109 MMBT2222A/SOT23/600mA/40

SOT23

FB13 30/4/4/S

VCC3\_DAC

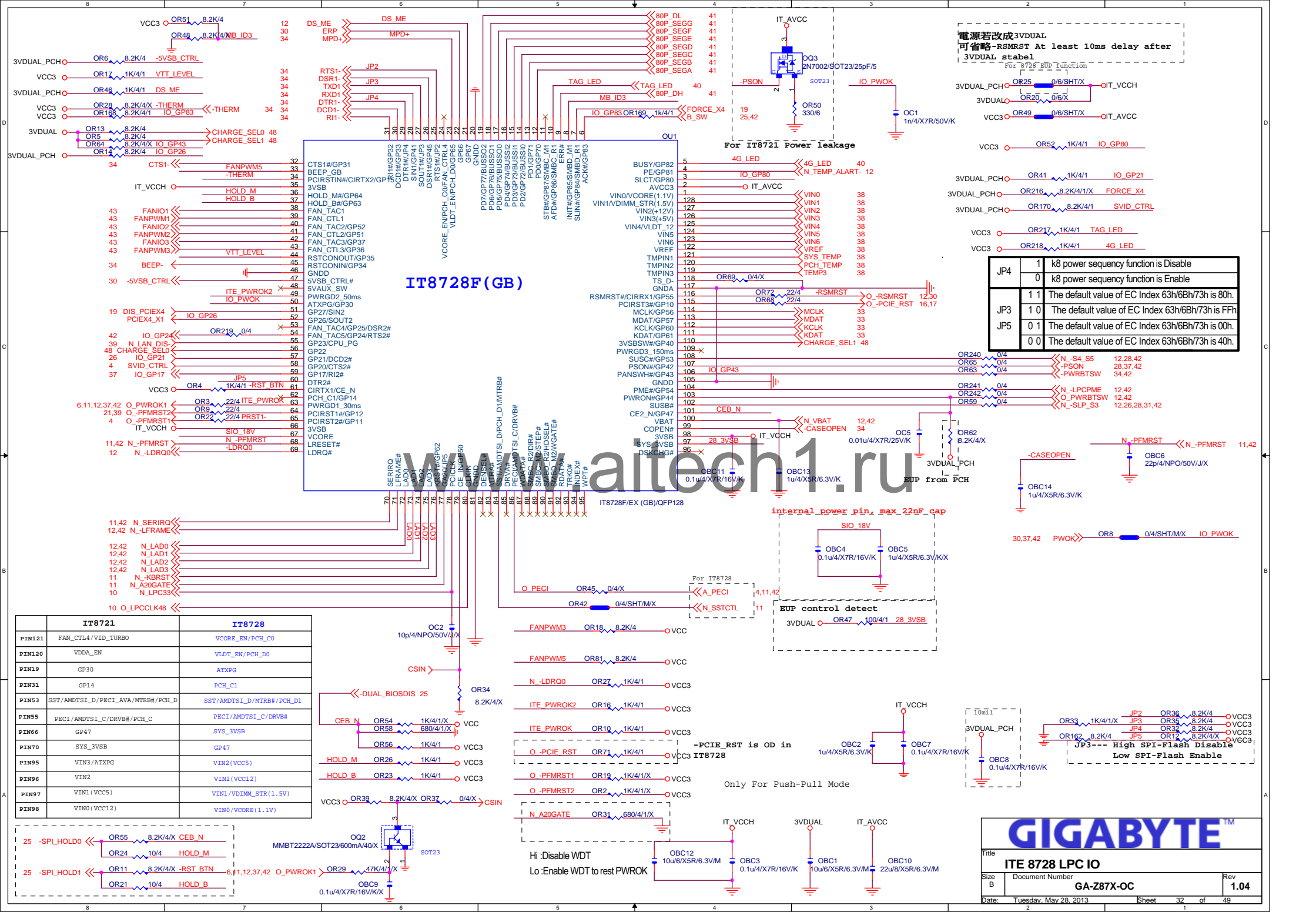
C139 0.1u/4/X7R/16V/K

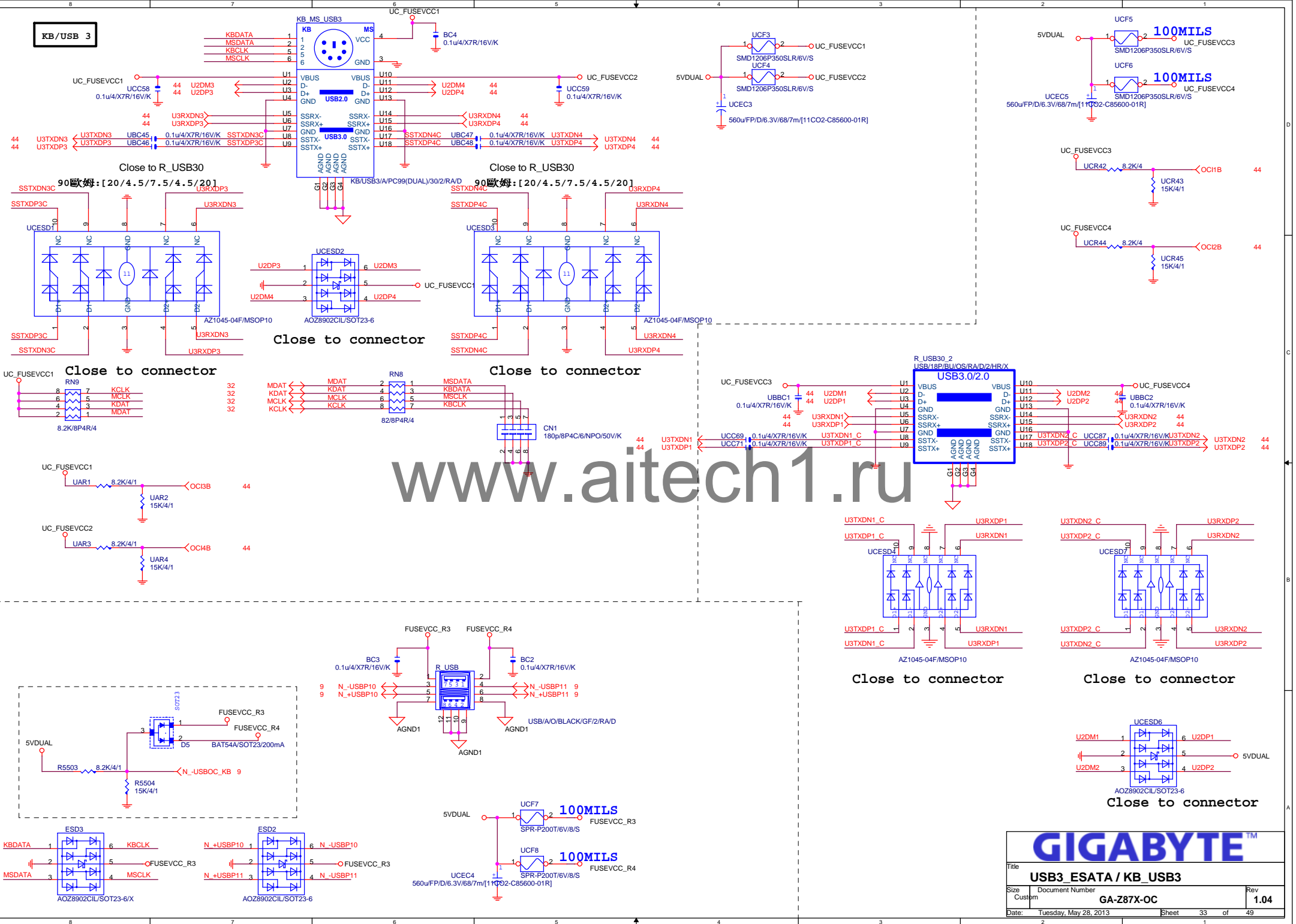
VCC3

FB17 0/4/X

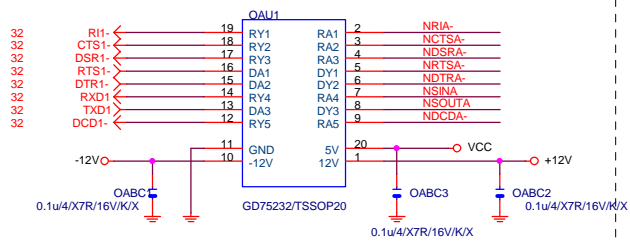
NBC89 22u/8/X5R/6.3V/M

VCC3\_DAC CLOSE北橋 (注意震盪水波紋)

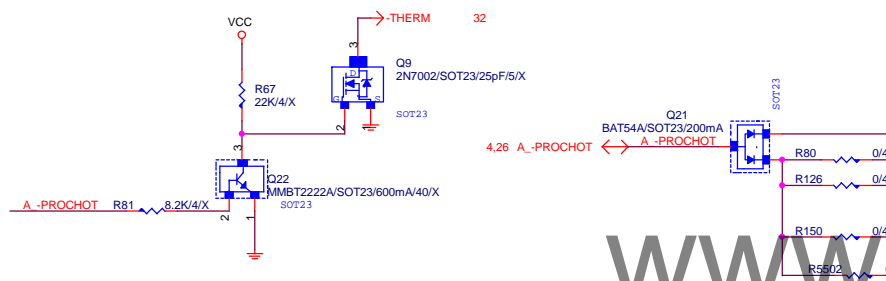
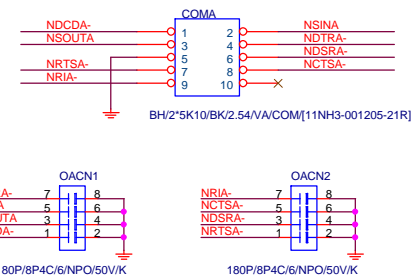
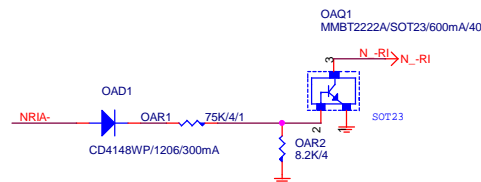




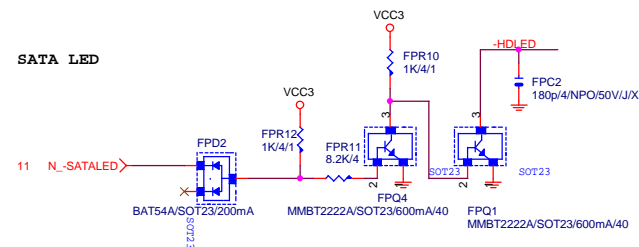
COMA



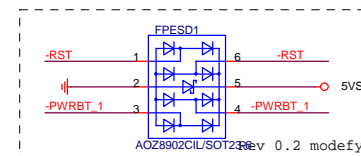
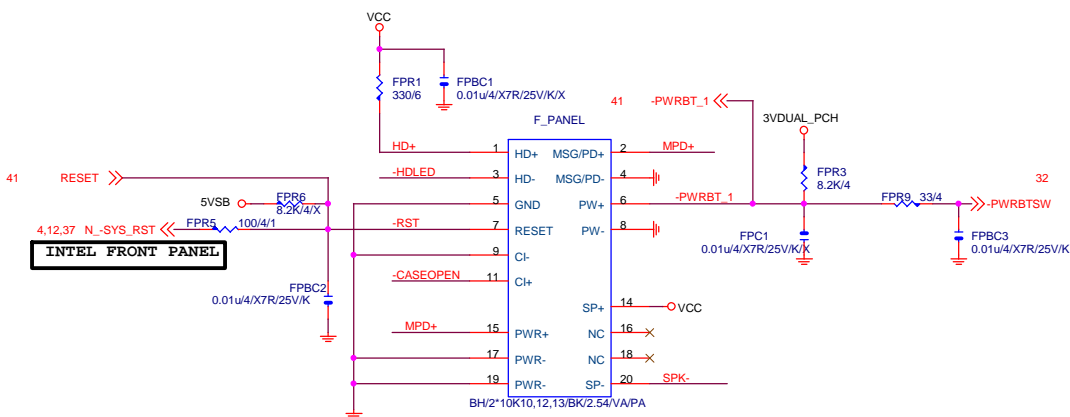
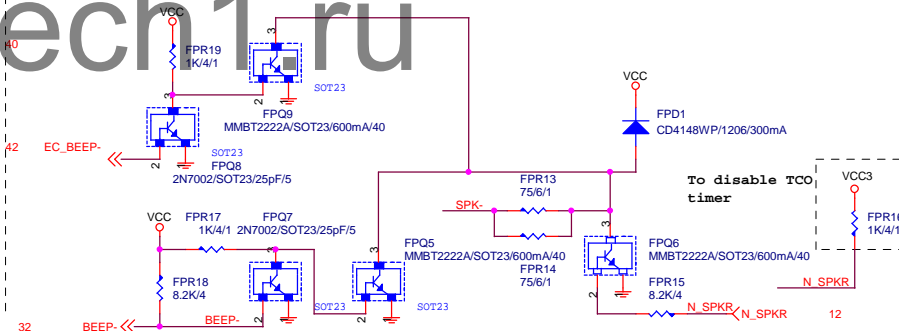
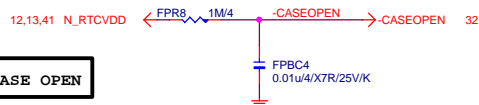
COM RI



SATA LED

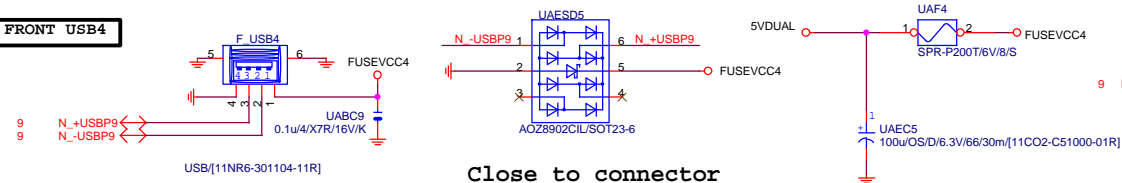


CASE OPEN

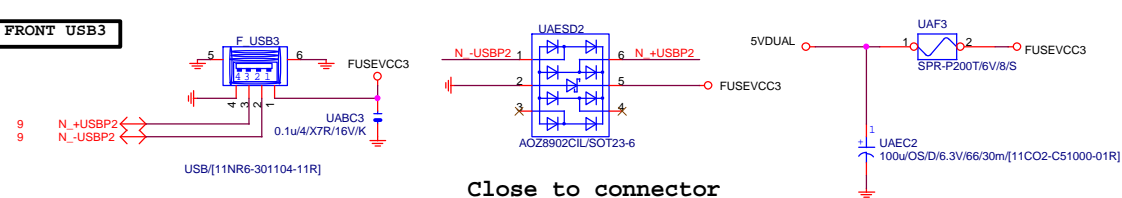


Close to connector

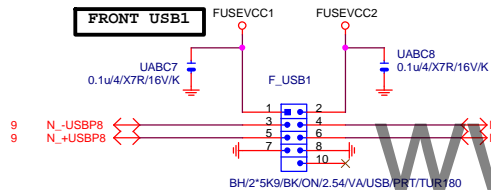
# FRONT USB4



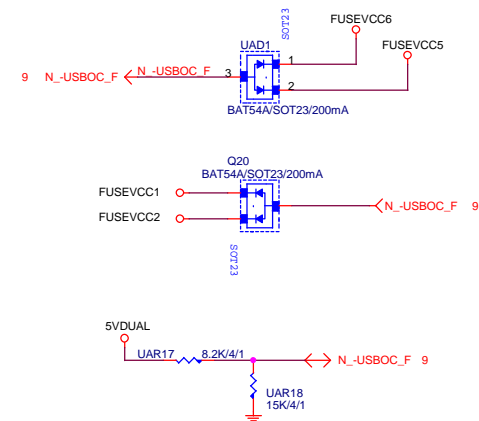
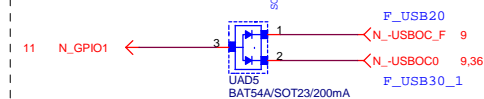
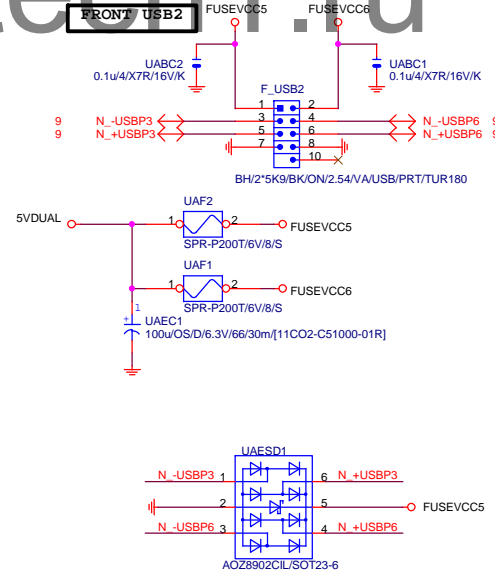
# FRONT USB3



# FRONT USB1

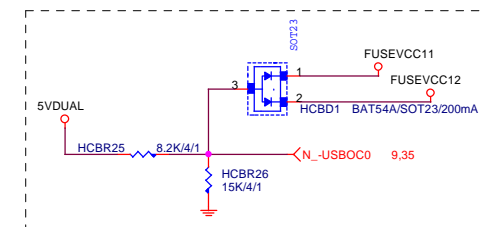
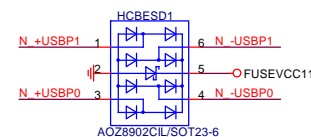
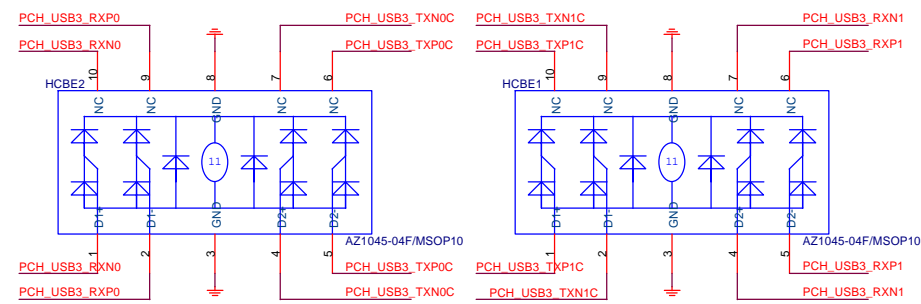


# FRONT USB2



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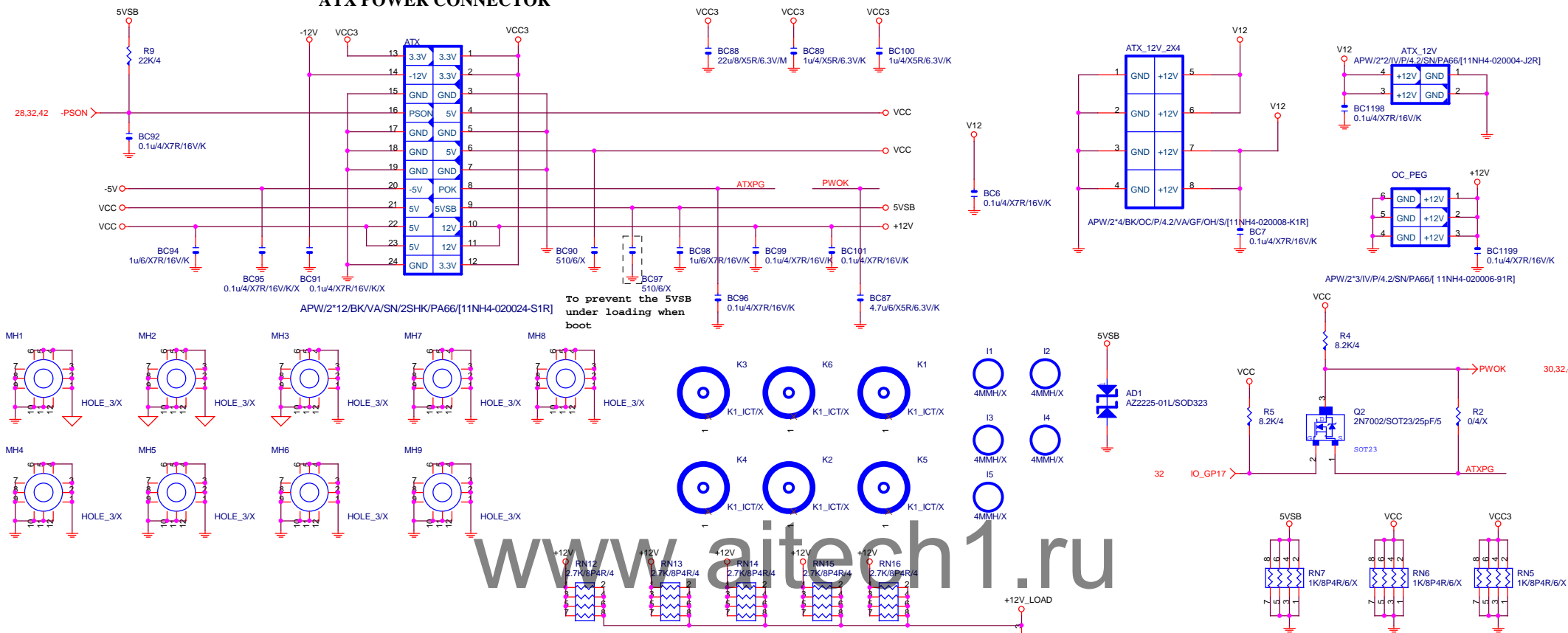
Title <b>FRONT USB 2.0</b>		
Size Custom	Document Number <b>GA-Z87X-OC</b>	Rev <b>1.04</b>
Date: Tuesday, May 28, 2013	Sheet 35	of 49



[www.aitech1.ru](http://www.aitech1.ru)



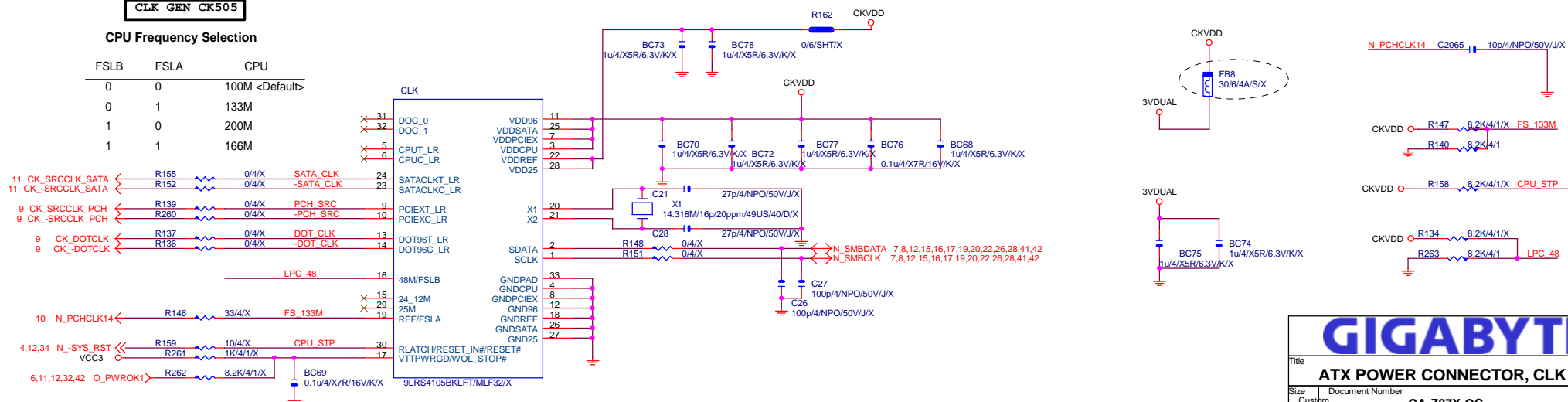
## ATX POWER CONNECTOR



CLK GEN CK505

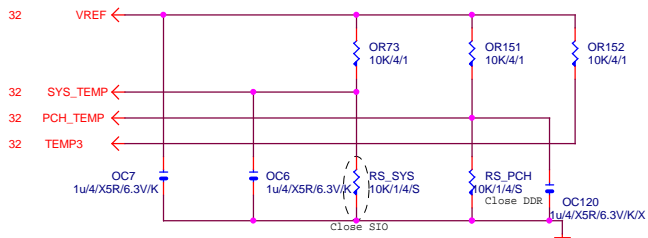
### CPU Frequency Selection

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

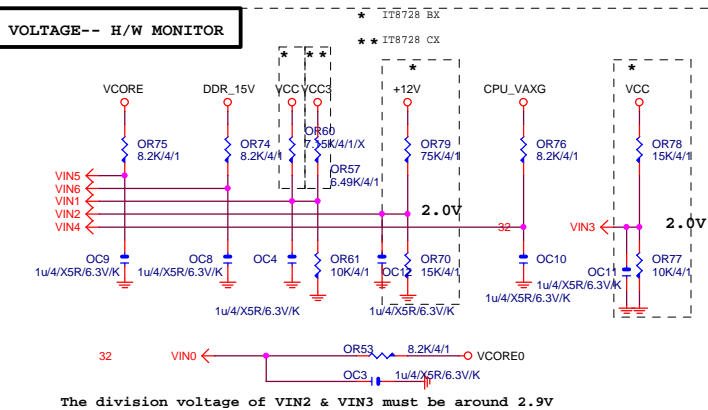
**GIGABYTE™**

Title			
<b>ATX POWER CONNECTOR, CLK GEN</b>			
Size	Document Number	Rev	
Custom	<b>GA-Z87X-OC</b>	<b>1.04</b>	
Date:	Tuesday, May 28, 2013	Sheet	37 of 49

# TEMP H/W MONITOR



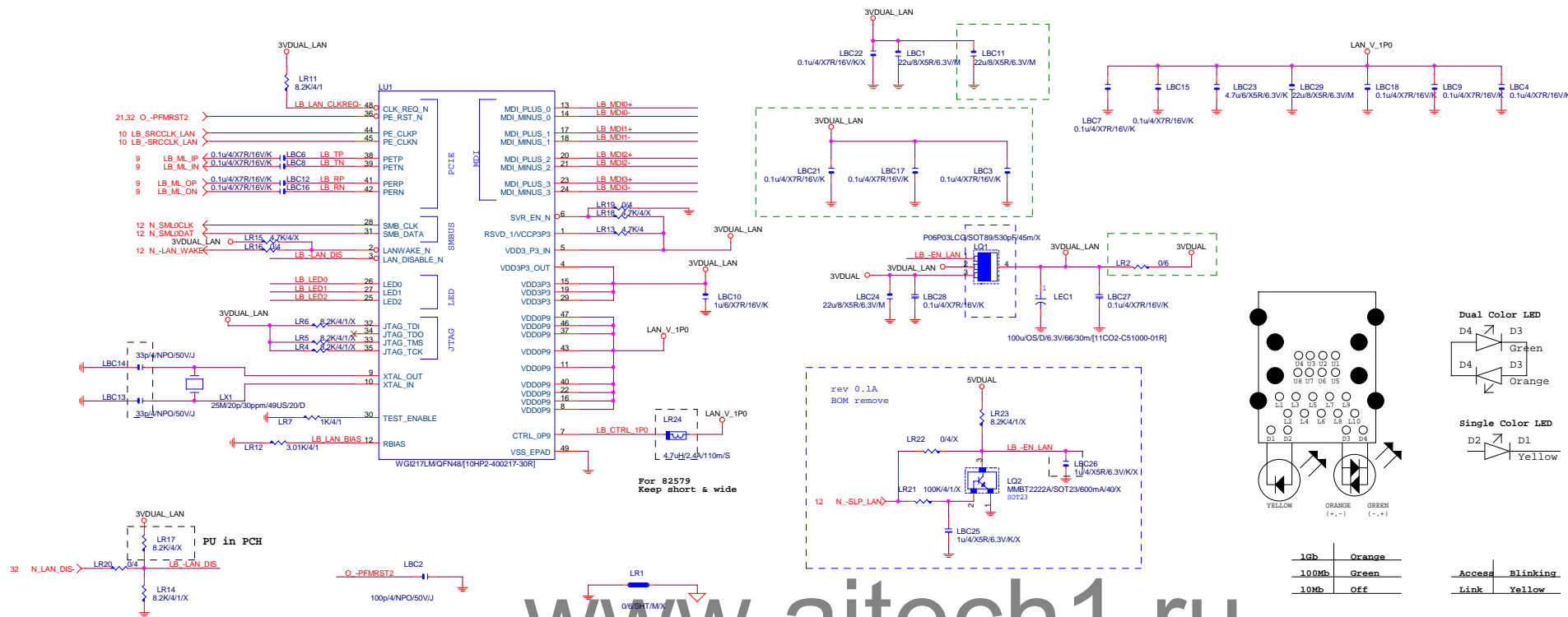
# VOLTAGE-- H/W MONITOR



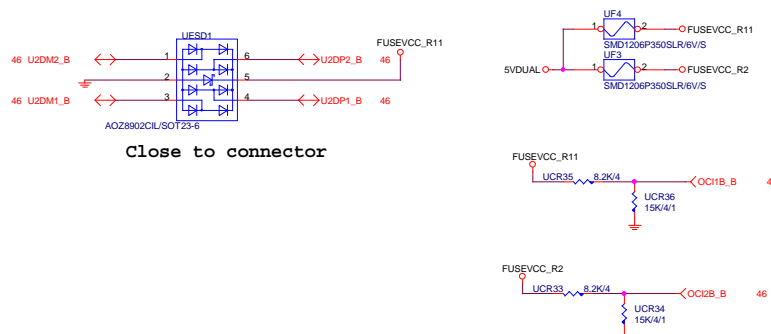
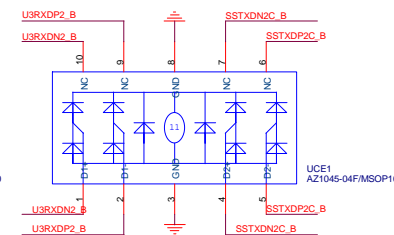
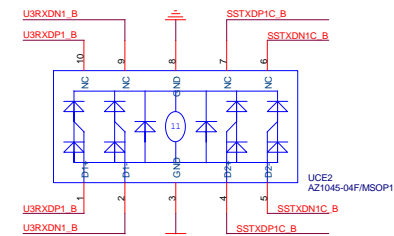
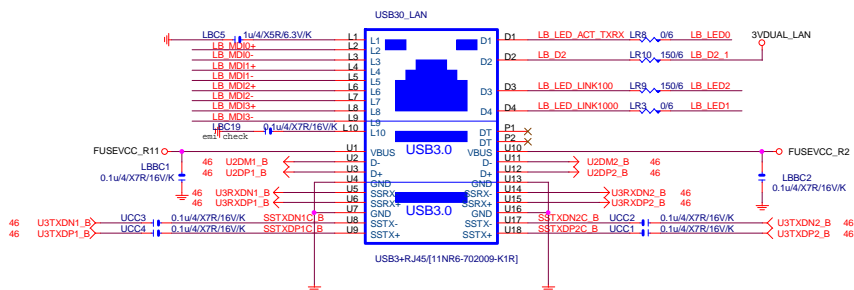
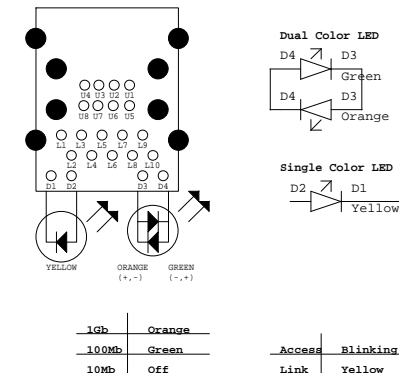
www.aitech1.ru

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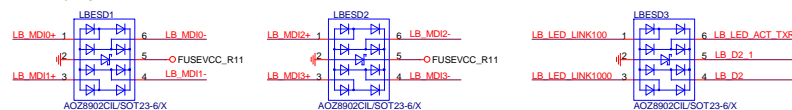
Title			HWM, FAN CTRL	
Size	Document Number		GA-Z87X-OC	
Custom			Rev	1.04
Date:	Tuesday, May 28, 2013		Sheet	38 of 49



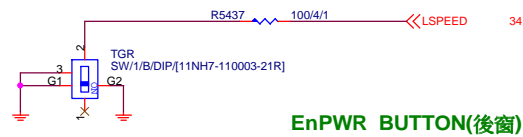
www.aitech1.ru



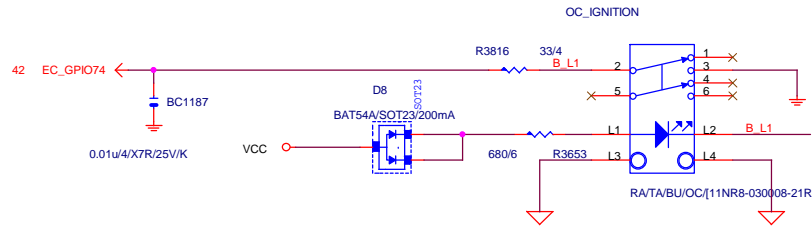
#### RMA ESD PROTECT



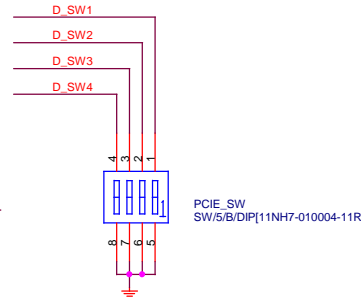
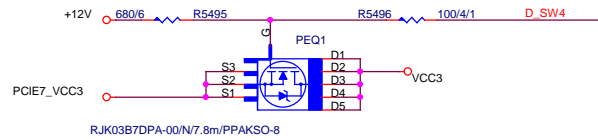
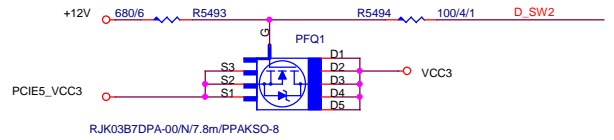
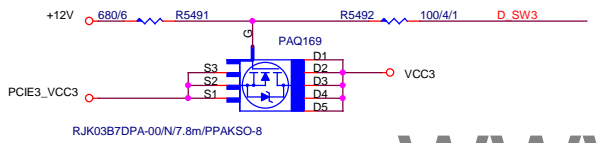
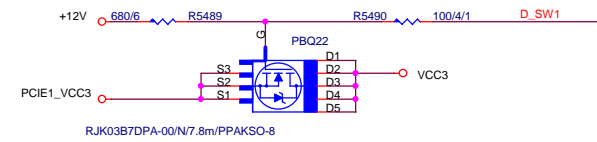
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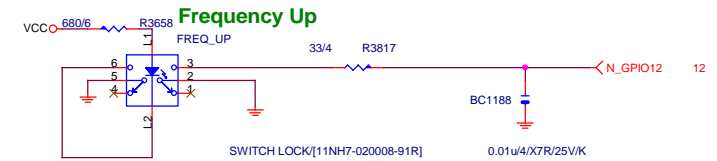
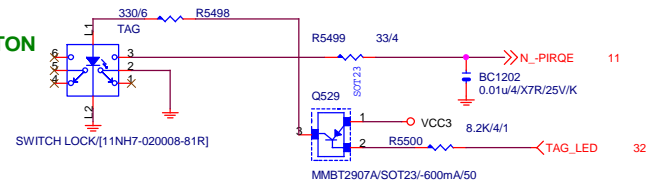
EnPWR BUTTON(後窗)



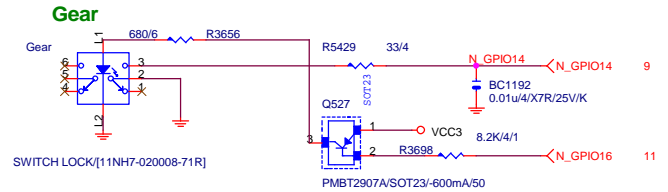
OC\_IGNITION



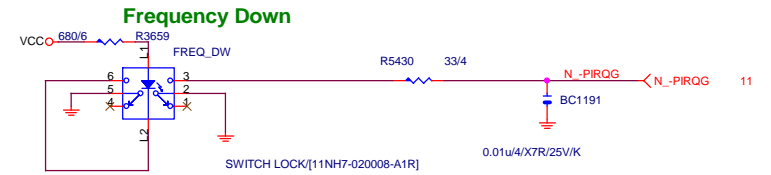
TAG BUTTON



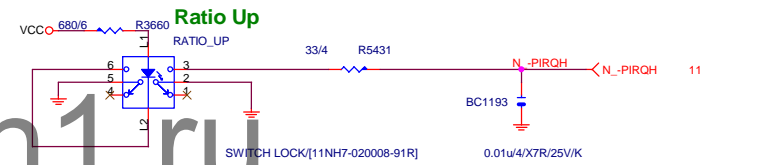
Frequency Up



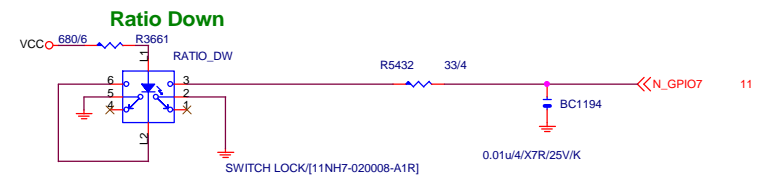
Gear



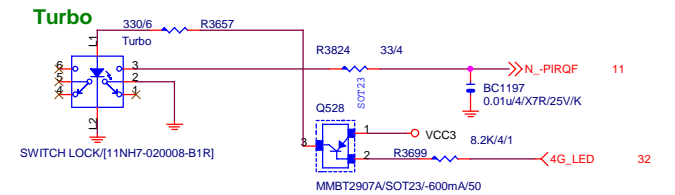
Frequency Down



Ratio Up

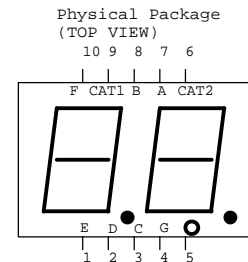
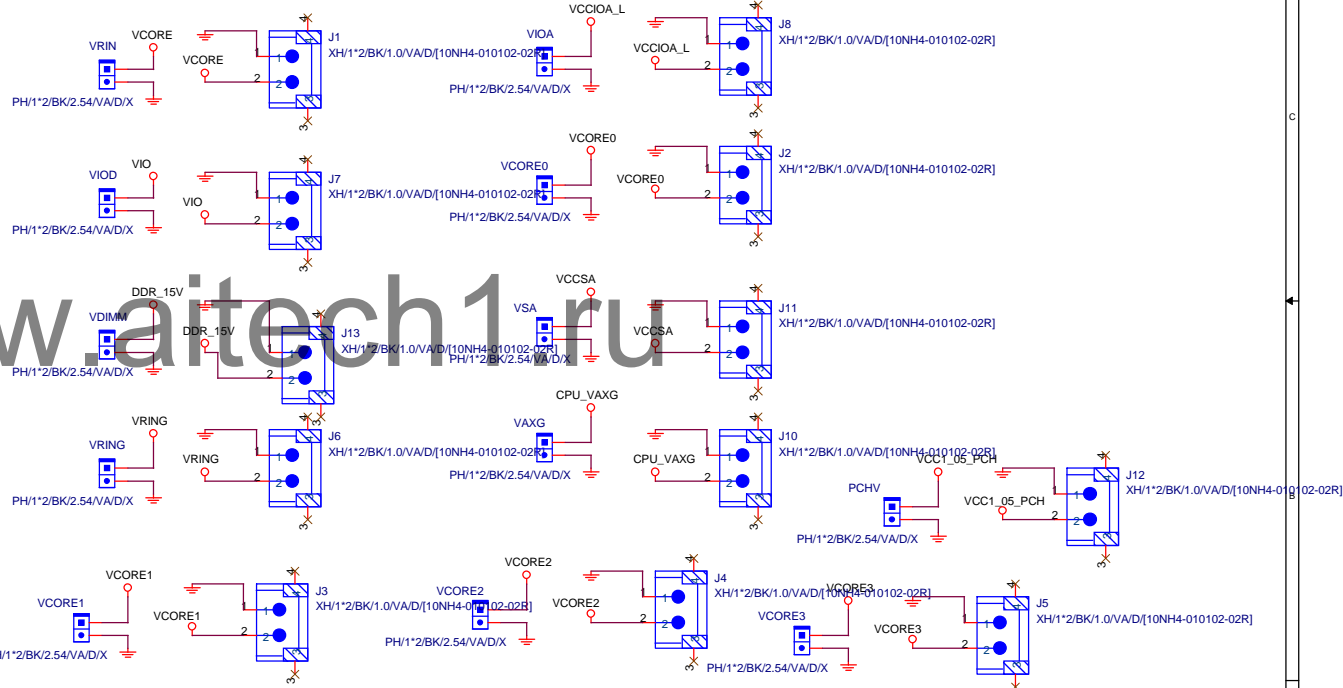
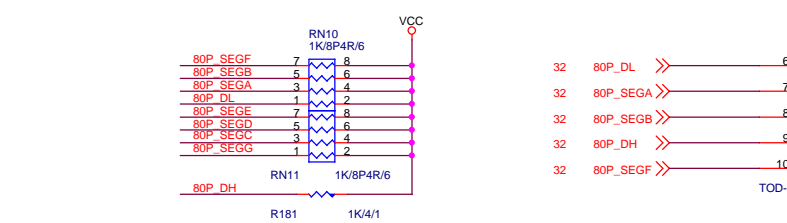
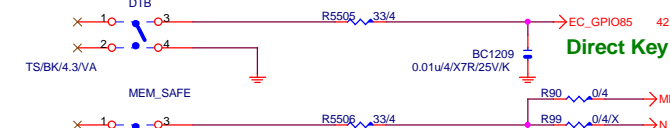
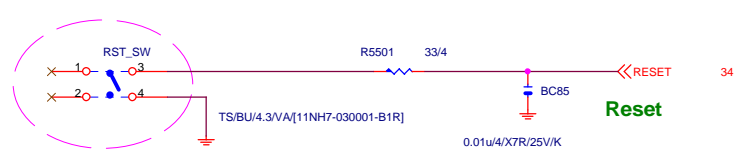
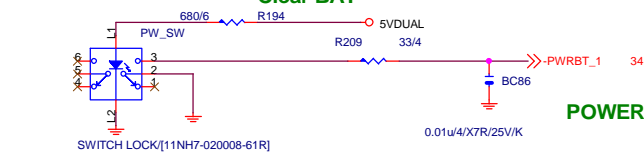
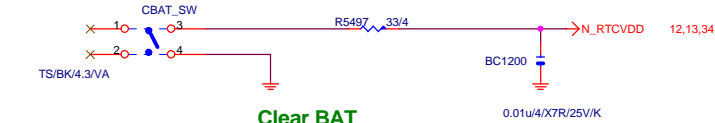
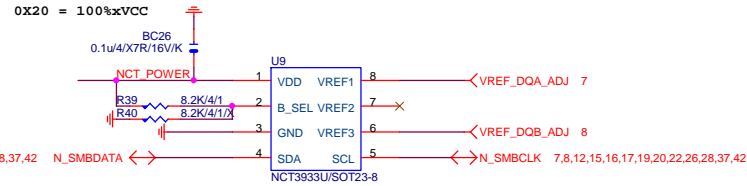
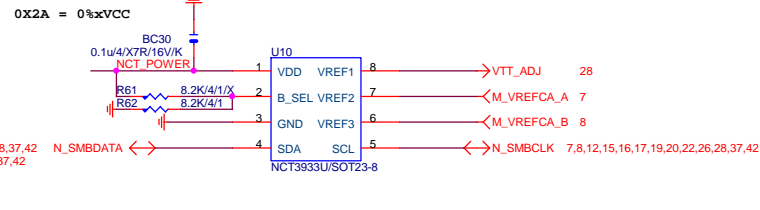
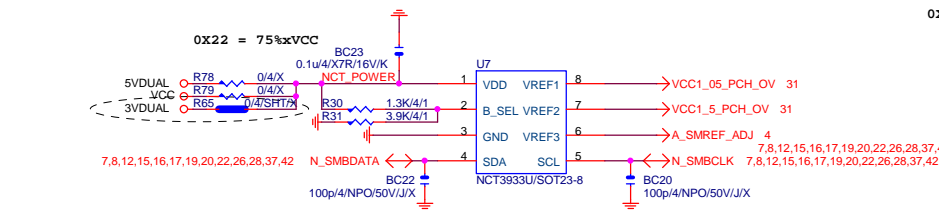


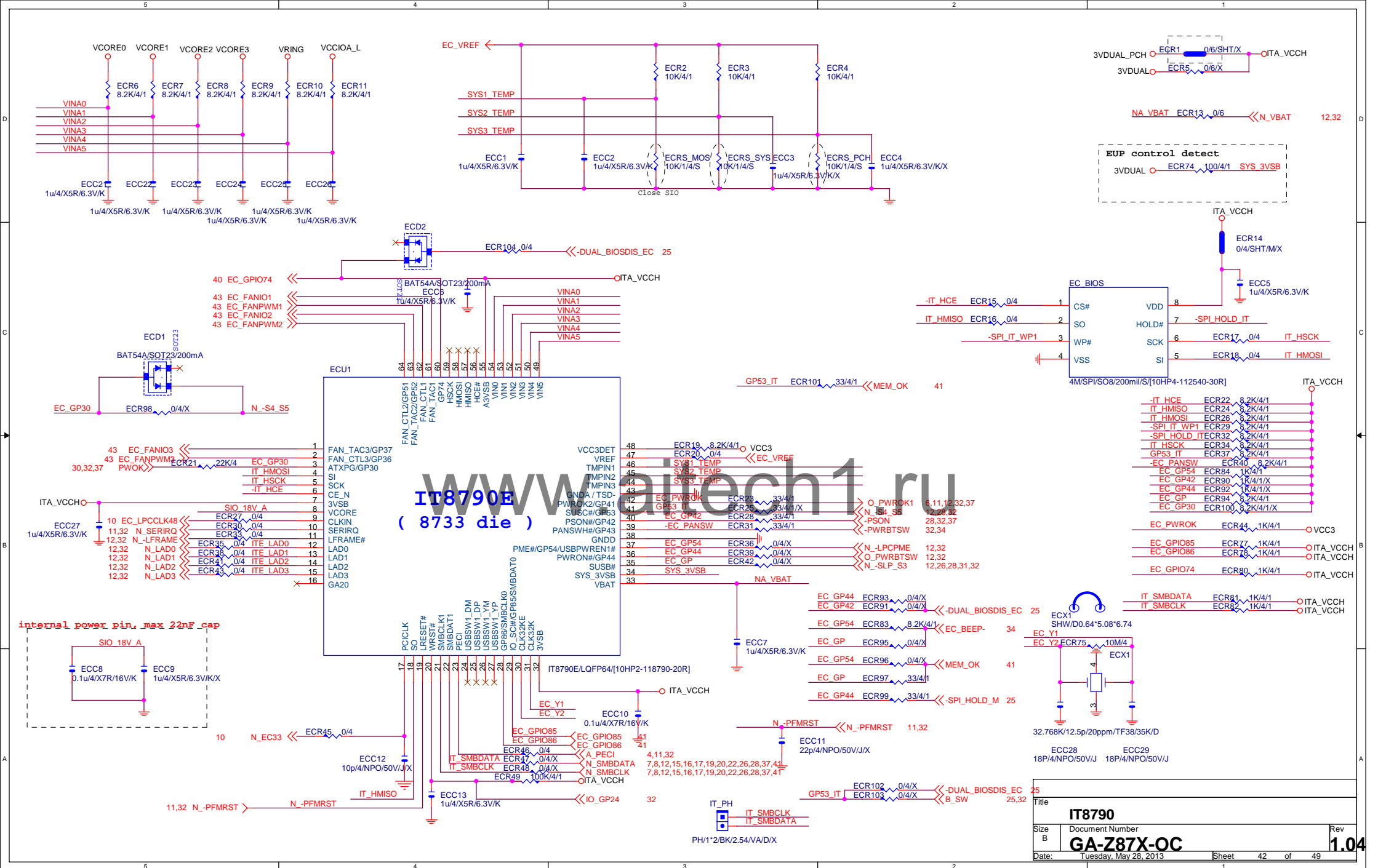
Ratio Down



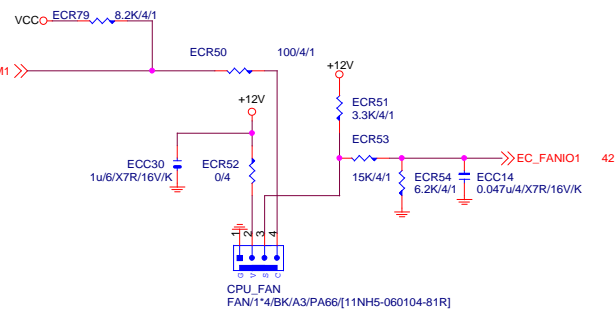
Turbo

GIGABYTE™		
Title		
SWITCH		
Size	Document Number	Rev
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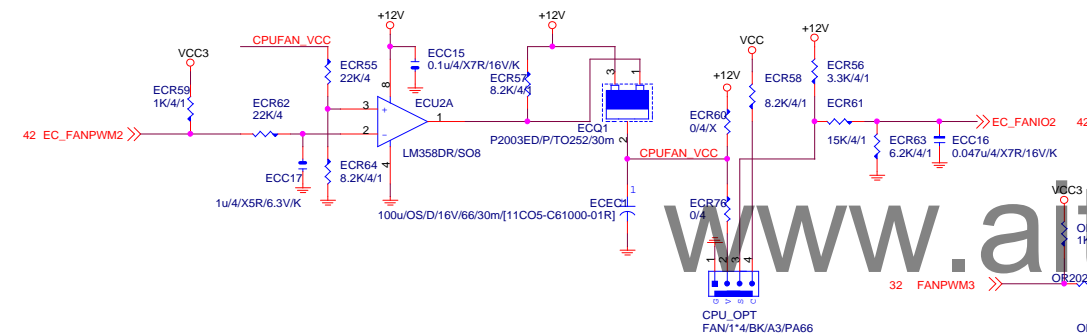




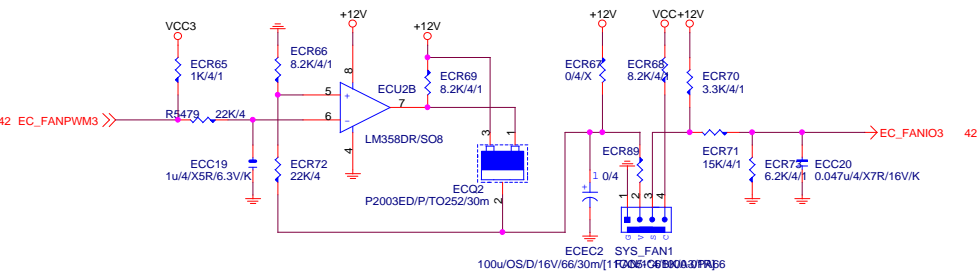
# CPU SMART FAN



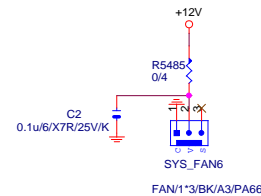
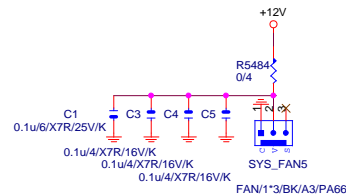
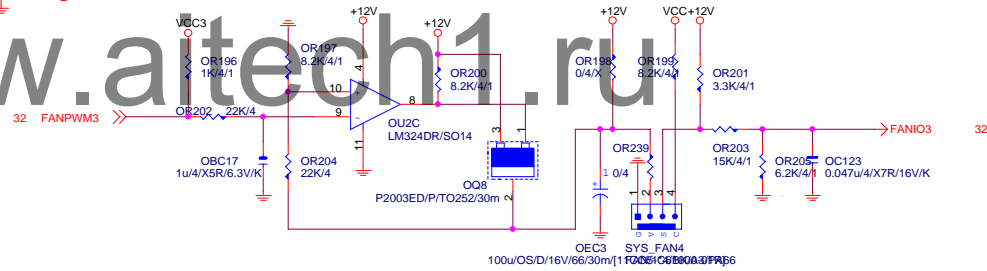
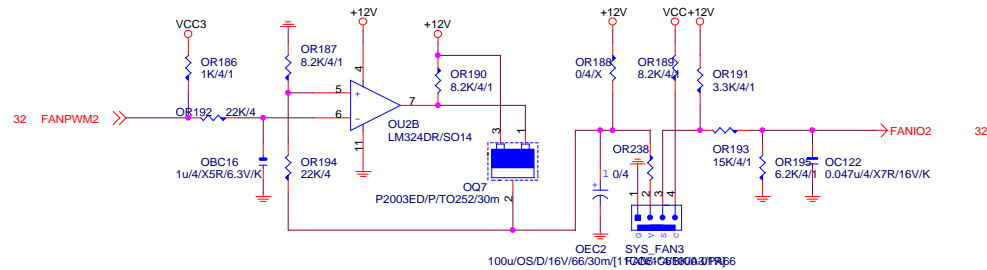
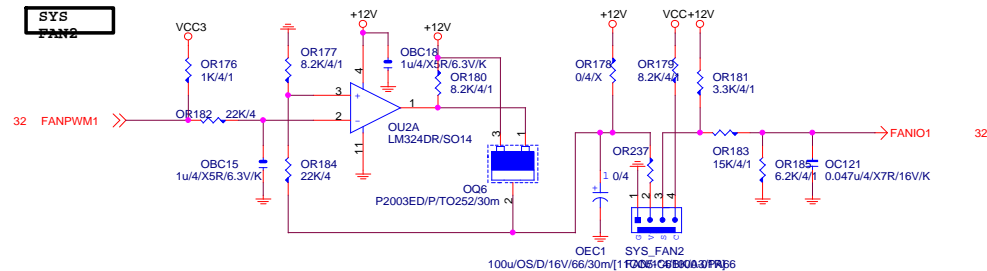
# CPUOPT FAN



# SYS FAN1



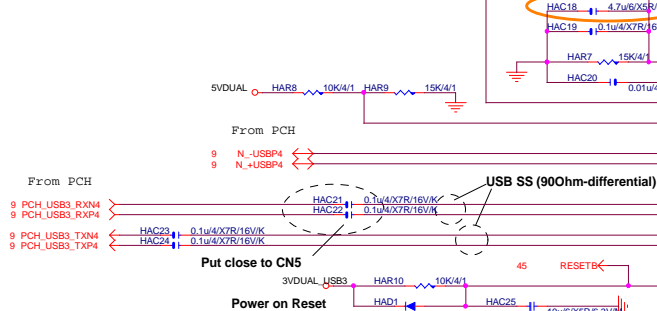
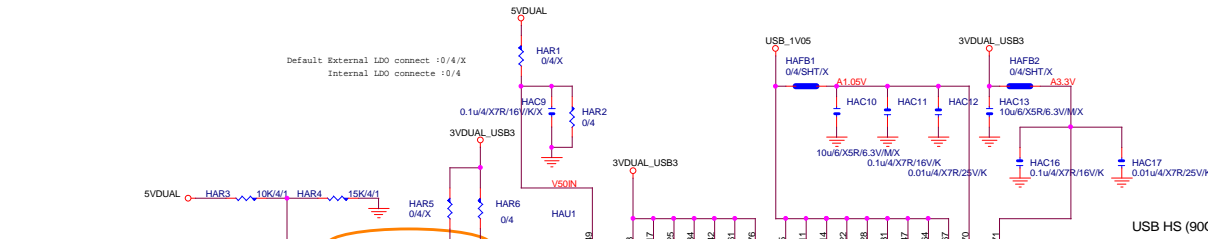
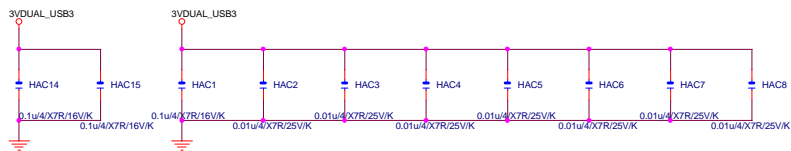
# SYS FAN2



Gigabyte Technology

Title			HWM,KB/MS, FAN CTRL
Size	Document Number	Rev	
Custom	GA-Z87X-OC	1.04	
Date:	Tuesday, May 28, 2013	Sheet	43 of 49





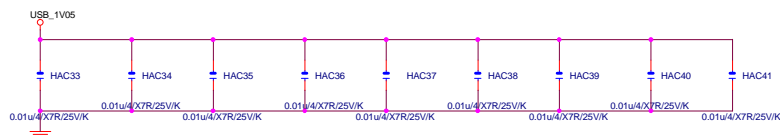
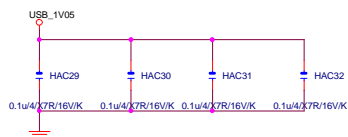
The over current protection of VDD10 is detected with ILIM pin (No.53) using 180 mOhm of DC resistance (DCR) of inductor L1.  
HAR16 should be choosing so that the total resistance of DCR(L1) becomes 180 mOhm.  
→ HAR16 + DCR(HAL1) = 180 [mOhm]

Remove



Put close to U1

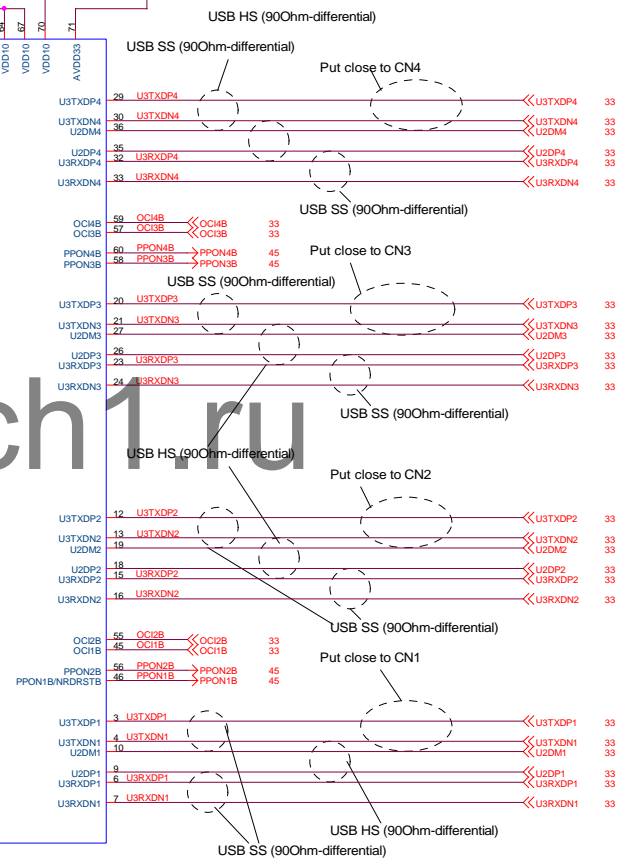
Put close to U1  
Do check with crystal vendor  
if the value of C31, C32 and R31 are all appropriate.



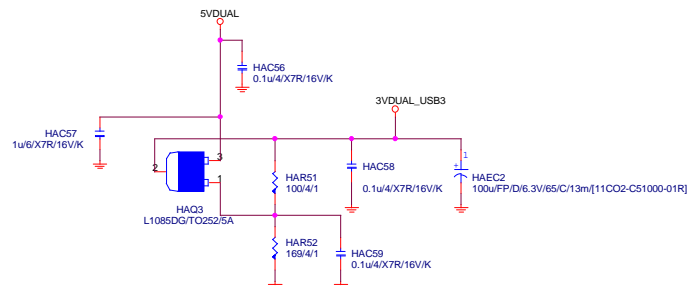
Put close to U1  
Short and broad connection to GND  
Don't split R32 into multiple resistors.

uPD720210

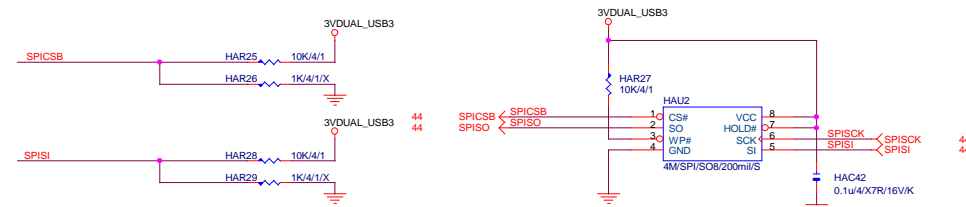
www.aitech1.ru



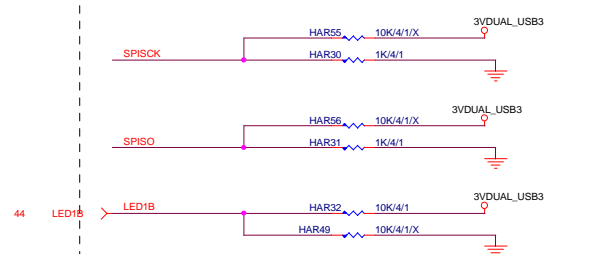
## 3VDUAL\_USB



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



## # Battery Charging

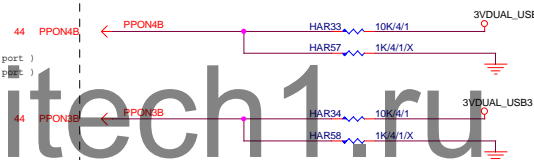


```
# Number of Ports ; 4Ports
mode
```

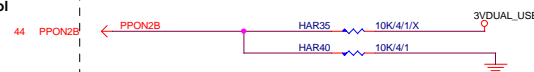
```

PFON3B / PFON4B : H / H ( 4 port )
PFON3B / PFON4B : L / L ( 2 port )

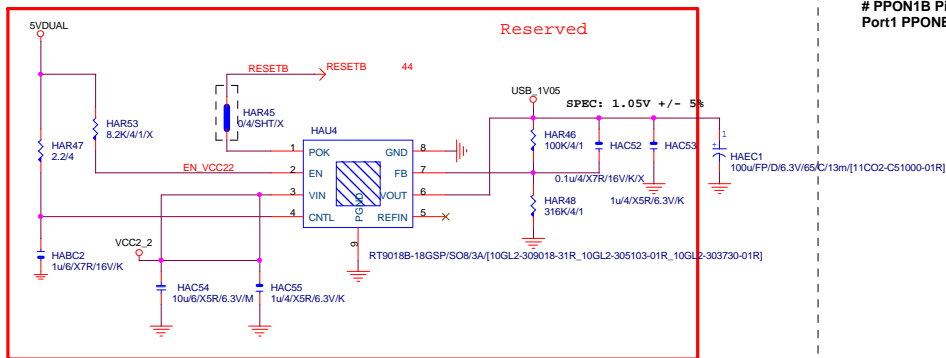
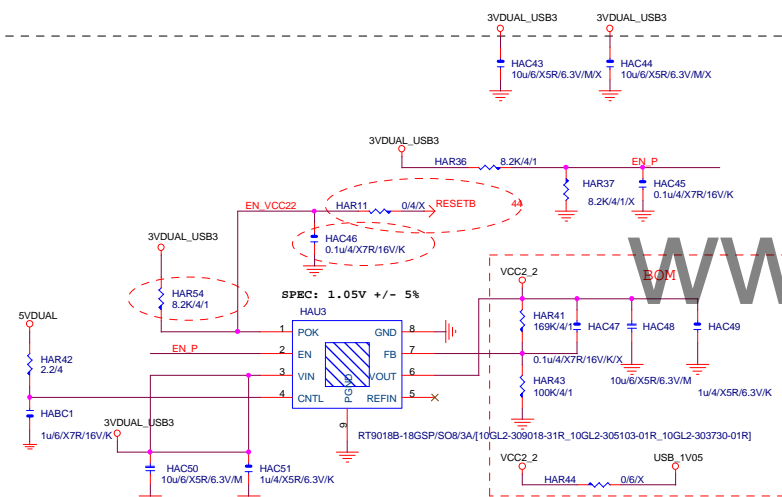
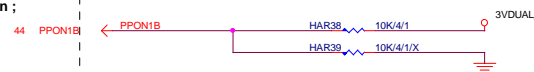
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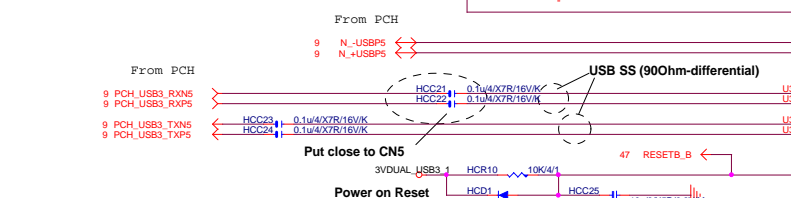
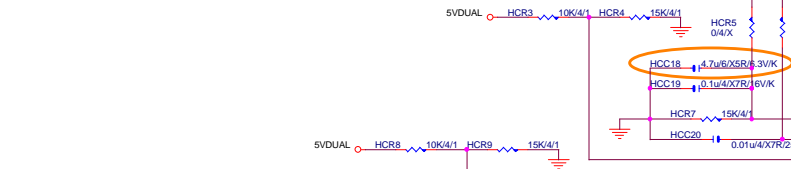
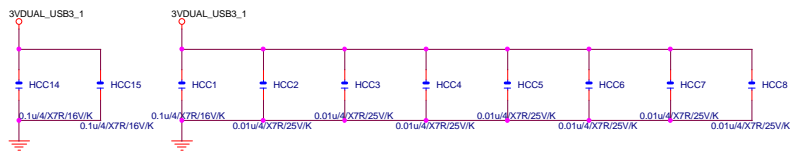


### #5 VBUS Power Control ; Individual mode

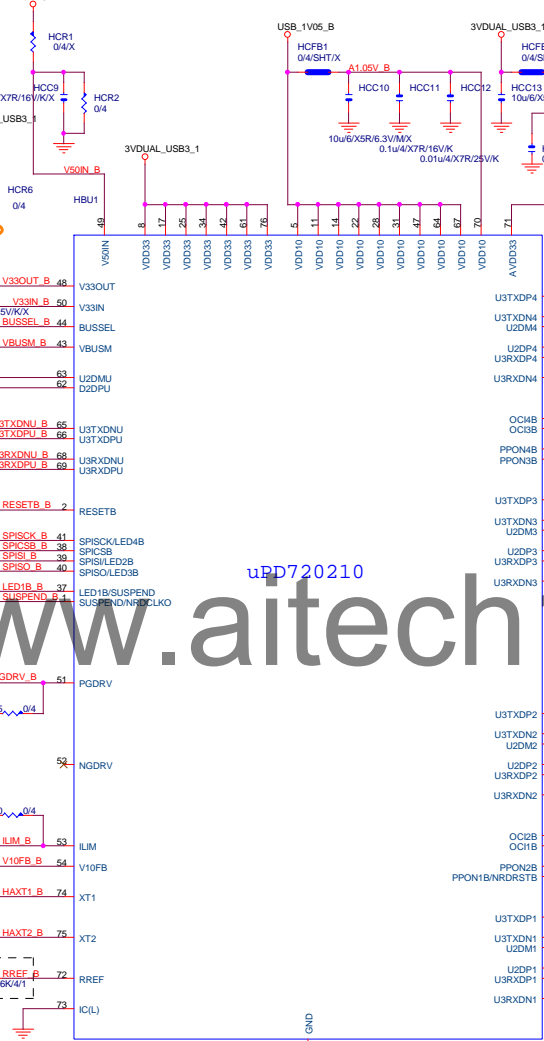
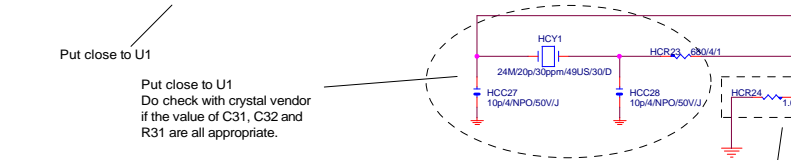
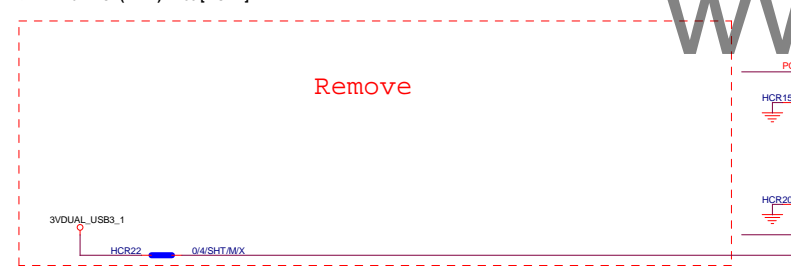


```
# PPON1B Pin Function ;
Port1 PPONB mode
```

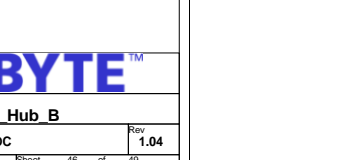
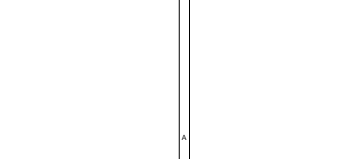
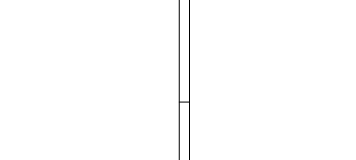
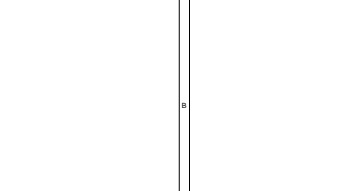
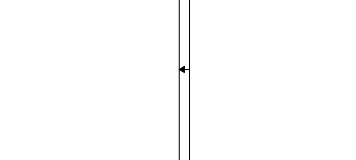
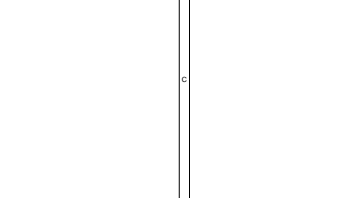
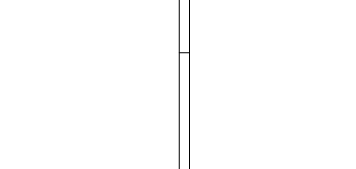
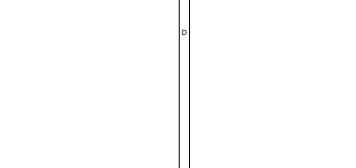
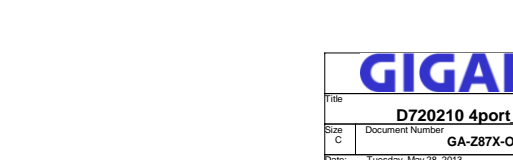
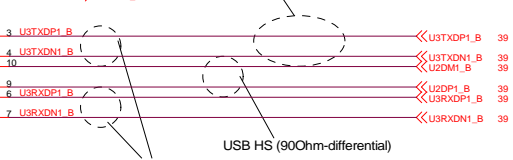
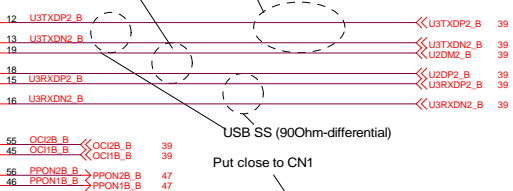
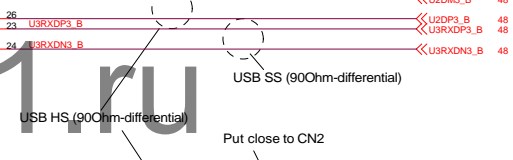
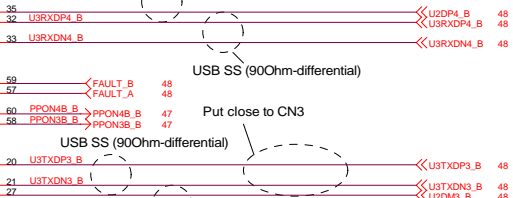
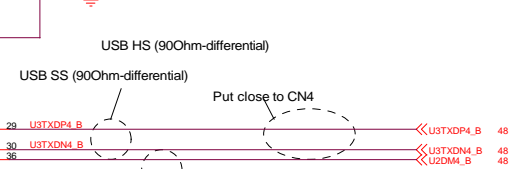
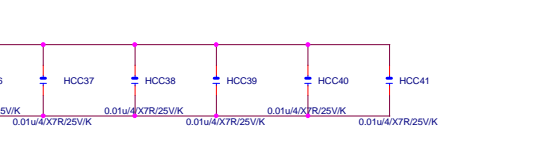




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HAR16 should be choosing so that the total resistance of DCR(L1) becomes 180 mOhm.  
→ HAR16 + DCR(HAL1) = 180 [mOhm]



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



3VDUAL\_USB

5VDUAL

HCC56  
0.1uF/4X7R/16V/K

HCC57  
1uF/6X7R/16V/K

HCC03  
L1085DG/TO252/5A

HCC58  
0.1uF/4X7R/16V/K

HCC59  
0.1uF/4X7R/16V/K

HCC62  
100uF/PP/D/6.3V/65°C/13m[11CO2-C51000-01R]

3VDUAL\_USB3\_1

The schematic diagram illustrates the power management section for the RT9018B-18GSP/S08/3A, featuring two channels (HCU3 and HCU4) and a USB 1V05\_B output.

**Channel HCU3 (Top):**

- Input:** 5VDUAL input, connected to HCR42 (2.2/4) and HBC1 (1u6/X7R/16V/K).
- EN VCC22\_B:** Connected to HCR54 (8.2K/4/1) and HCR50 (10u6/X5R/6.3V/M).
- 3VDUAL\_USB3\_1:** Connected to HCR36 (8.2K/4/1) and HCR37 (8.2K/4/1/X).
- Regulator:** HCU3 (RT9018B-18GSP/S08/3A) with pins: POK (1), EN (2), VIN (3), CNTL (4), GND (8), FB (7), VOUT (6), REFIN (5).
- Output:** VCC2\_2\_B, connected to HCR41 (169K/4/1), HCR43 (100K/4/1), HCR47 (0.1u4/X7R/16V/K/X), HCC47 (10u6/X5R/6.3V/M), HCC48 (1u4/X5R/6.3V/K), and HCC49.
- Specifications:** SPEC: 1.05V +/- 5%.

**Channel HCU4 (Bottom):**

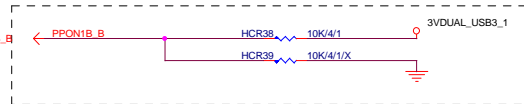
- Input:** 5VDUAL input, connected to HCR47 (2.2/4) and HBC2 (1u6/X7R/16V/K).
- EN VCC22\_B:** Connected to HCR53 (8.2K/4/1/X) and HCC54 (10u6/X5R/6.3V/M).
- 3VDUAL\_USB3\_1:** Connected to HCR36 (8.2K/4/1) and HCR37 (8.2K/4/1/X).
- Regulator:** HCU4 (RT9018B-18GSP/S08/3A) with pins: POK (1), EN (2), VIN (3), CNTL (4), GND (8), FB (7), VOUT (6), REFIN (5).
- Output:** VCC2\_2\_B, connected to HCR46 (100K/4/1), HCR48 (316K/4/1), HCC52 (10u6/X5R/6.3V/M), HCC53 (1u4/X5R/6.3V/K), and HCC55.
- Specifications:** SPEC: 1.05V +/- 5%.

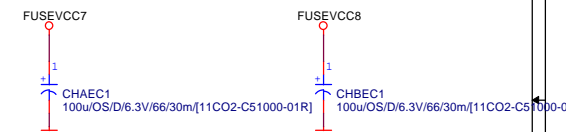
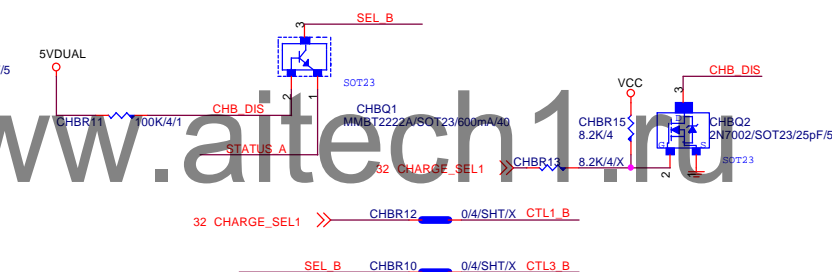
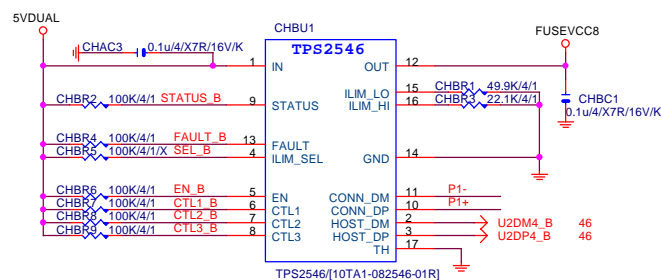
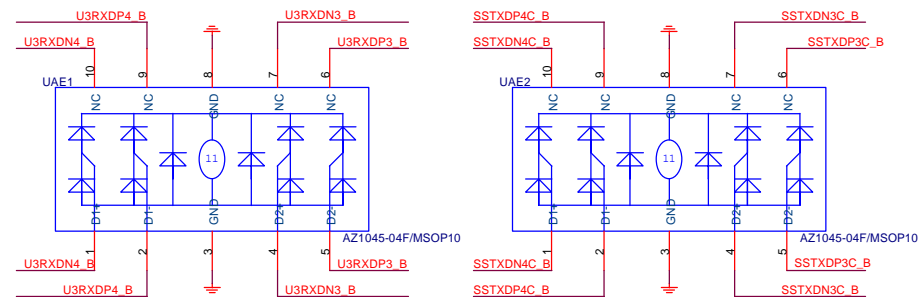
**USB 1V05\_B:**

- Connected to HCR44 (0/6/X) and HCC51 (1u4/X5R/6.3V/K).
- Output voltage: USB 1V05\_B.

**Other Components:**

- 3VDUAL\_USB3\_1:** Connected to HCR36 (8.2K/4/1) and HCR37 (8.2K/4/1/X).
- 3VDUAL\_USB3\_1:** Connected to HCR36 (8.2K/4/1) and HCR37 (8.2K/4/1/X).
- 3VDUAL\_USB3\_1:** Connected to HCR36 (8.2K/4/1) and HCR37 (8.2K/4/1/X).
- 3VDUAL\_USB3\_1:** Connected to HCR36 (8.2K/4/1) and HCR37 (8.2K/4/1/X).



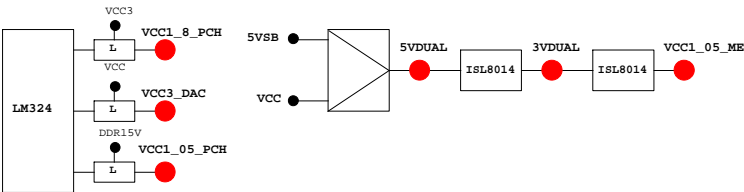


PCH GPIO LIST TABLE				
PIN NAME	PWR	Default	USAGE	NOTE
GP0	MAIN	H-Z	GPI -PECI_REQ	N/A
GP1/TACH1	MAIN		GPI ICH_FAN_TACH1	N/A
GP2/PIRQ#	MAIN		GPI -PIRQE	P/U 8.2K VCC3
GP3/PIRQ#	MAIN		GPI -PIRQF	P/U 8.2K VCC3
GP4/PIRQG#	MAIN		GPI -PIRQG	P/U 8.2K VCC3
GP5/PIRQH#	MAIN		GPI -PIRQH	P/U 8.2K VCC3
GP6/TACH2	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 -SKT0CC	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

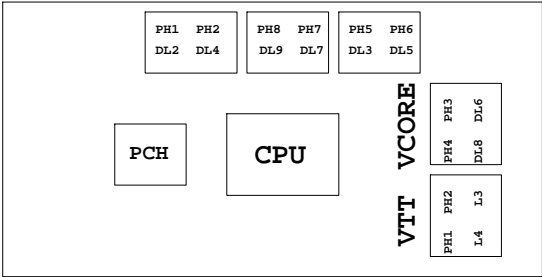
Super I/O ITE8720 GPIO Table

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	-PWRMST1	
PCIRST1#/GP12	-PWRMST2	
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/SMBC_R	3V PIN	FST_2X8
INIT#/GP85/SMBD_M	SEC_2x8	GTLREF_AD2
ACK#/GP83	DDR_LED1_C	
VID01/GP21/DCD2#	DDR_LED2_C	
STB#/GP87/SMBC_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

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