

Model Name: GA-Z87X-HD3

1.1

SHEET

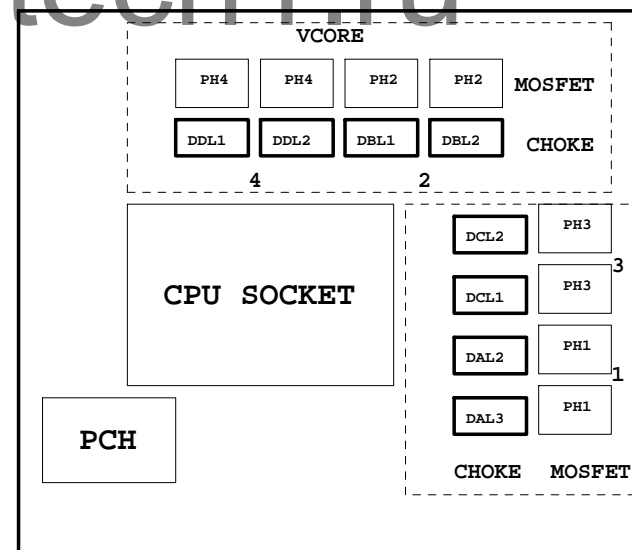
TITLE

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1150-A
05	CPU_LGA1150-B
06	CPU_LGA1150-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH_FDI,DMI,USB,PCIE
10	PCH_RGB,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESS*8 SLOT
16	PCI EXPRESS*16 SWITCH
17	PCIEX1&2&3
18	ITE8892 PCI BRIDGE
19	PCI SLOT 1&2
20	I/O ITE8728
21	COM, -PROHOT, R_USB
22	Dual BIOS / LPT
23	ALC892 CODEC
24	REAR AUDIO JACK
25	VCORE_ ISL95820_1
26	VCORE_ ISL95820_2
27	DDR15V / M3 POWER

SHEET

TITLE

28	NCP3933 OVER VOLTAGE
29	DISCRETE POWER
30	F_PANEL , F_USB2.0/3.0
31	ATX POWER, CLOCK GEN
32	HWM , KB/MS , FAN CTRL
33	Realtek 8111F-VL
34	DVI
35	HDMI
36	TABLE LIST
37	
38	
39	
40	



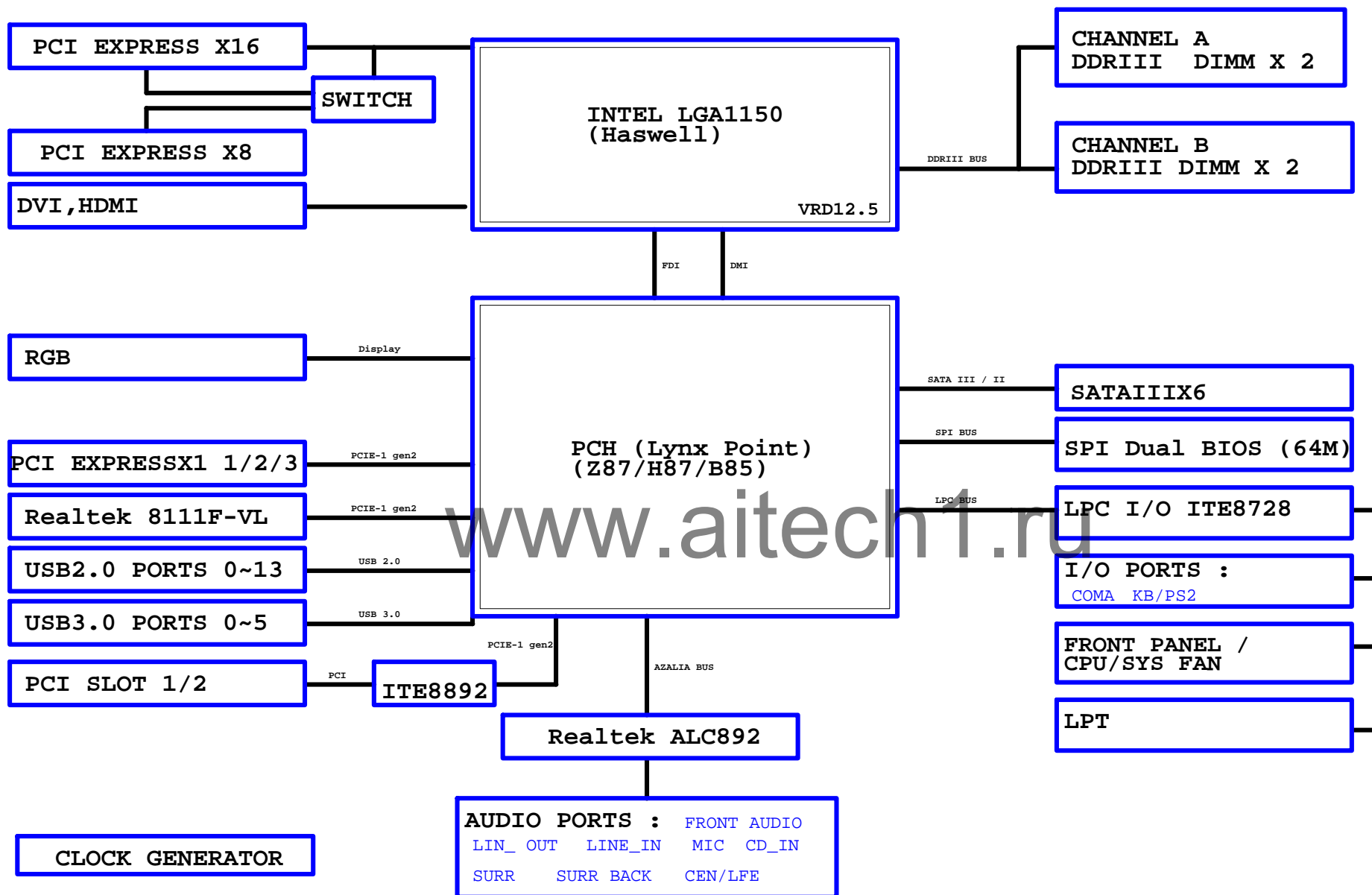
Gigabyte Technology

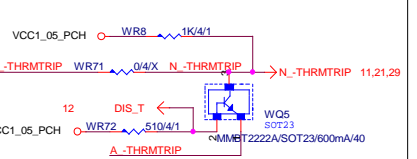
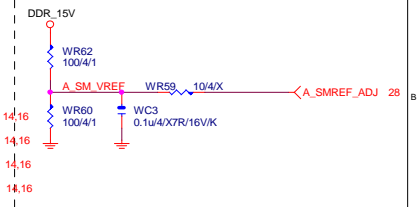
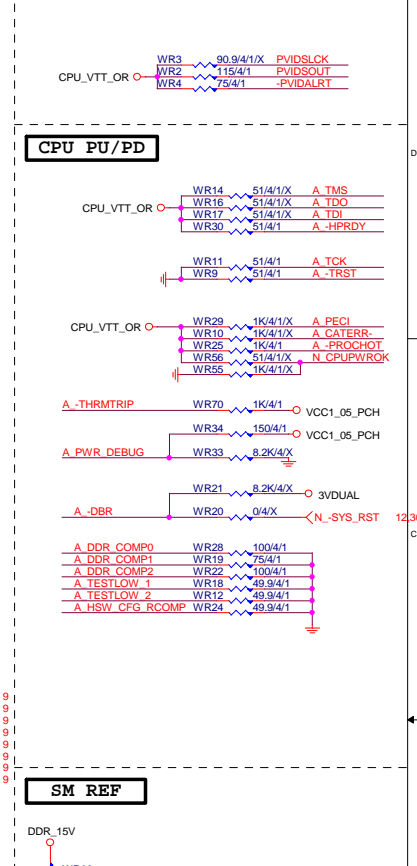
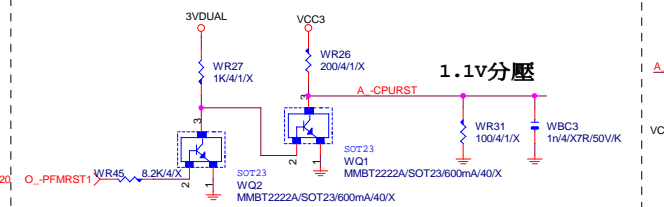
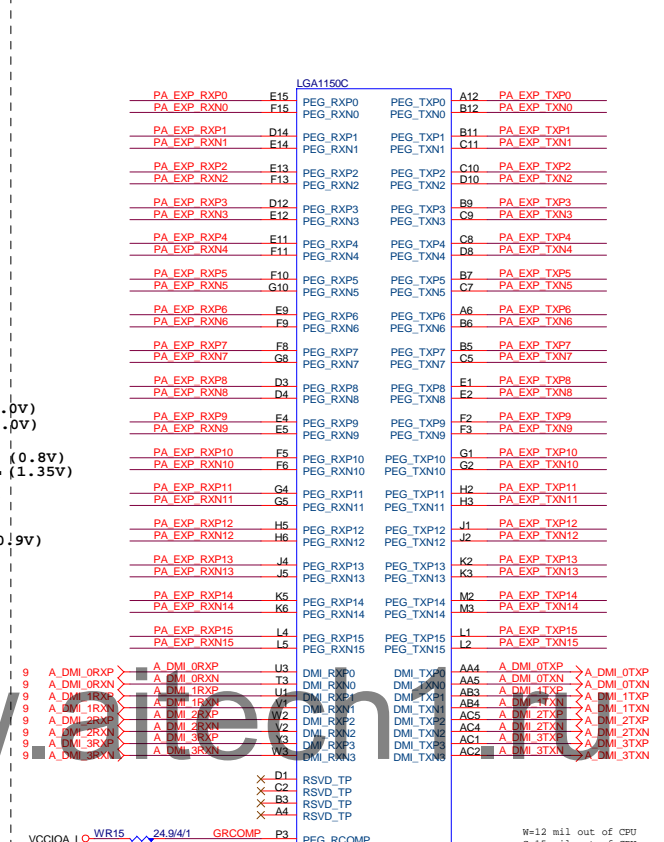
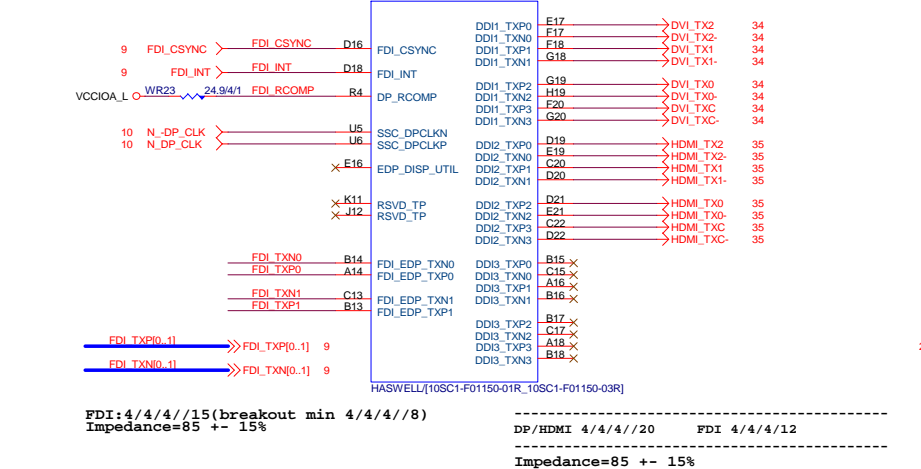
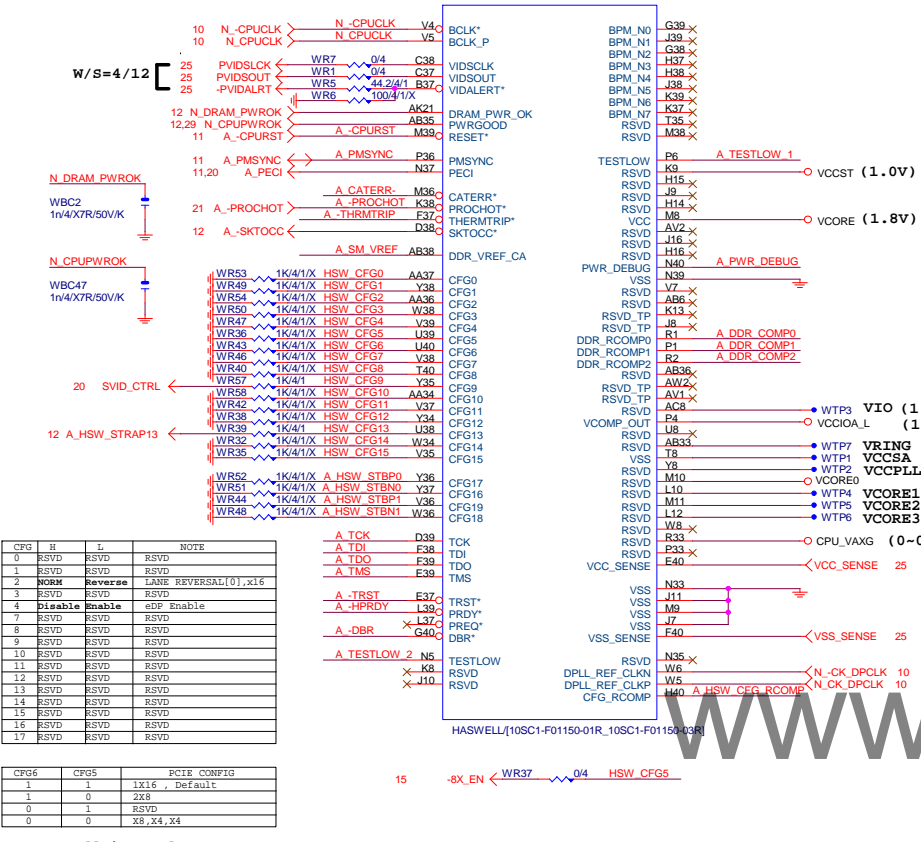
Title		
Cover Sheet		
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## Component value change history

[illegible][illegible]

# BLOCK DIAGRAM





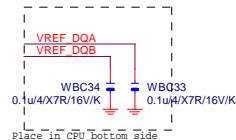
## LGA1150 (A)

LGA1150A		DDR0_MA0	DDR0_D00	AD38	MDA0
MAAA0	AU13	DDR0_MA1	DDR0_D01	AD39	MDA1
MAAA1	AV16	DDR0_MA2	DDR0_D02	AF38	MDA2
MAAA2	AU16	DDR0_MA3	DDR0_D03	AF39	MDA3
MAAA3	AW17	DDR0_MA4	DDR0_D04	AD37	MDA4
MAAA4	AU17	DDR0_MA5	DDR0_D05	AD40	MDA5
MAAA5	AW18	DDR0_MA6	DDR0_D06	AE37	MDA6
MAAA6	AV17	DDR0_MA7	DDR0_D07	AF40	MDA7
MAAA7	AT18	DDR0_MA8	DDR0_D08	AH40	MDA9
MAAA8	AU18	DDR0_MA9	DDR0_D09	AH39	MDA10
MAAA9	AT19	DDR0_MA10	DDR0_D10	AK38	MDA10
MAAA10	AW11	DDR0_MA11	DDR0_D11	AK39	MDA11
MAAA11	AV19	DDR0_MA12	DDR0_D12	AH37	MDA12
MAAA12	AU19	DDR0_MA13	DDR0_D13	AH38	MDA12
MAAA13	AW10	DDR0_MA14	DDR0_D14	AK37	MDA14
MAAA14	AT20	DDR0_MA15	DDR0_D15	AK40	MDA15
MAAA15	AU21	DDR0_MA16	DDR0_D16	AM40	MDA17
MODT_A0	AW10	DDR0_ODT0	DDR0_D17	AM39	MDA21
MODT_A1	AV8	DDR0_ODT1	DDR0_D18	AP38	MDA18
MODT_A2	AW9	DDR0_ODT2	DDR0_D19	AP39	MDA19
MODT_A3	AU8	DDR0_ODT3	DDR0_D20	AM37	MDA20
			DDR0_D21	AM38	MDA16
			DDR0_D22	AP37	MDA22
			DDR0_D23	AP40	MDA23
			DDR0_D24	AV37	MDA25
			DDR0_D25	AW37	MDA29
			DDR0_D26	AU35	MDA26
			DDR0_D27	AV35	MDA27
			DDR0_D28	AT37	MDA28
			DDR0_D29	AU37	MDA24
			DDR0_D30	AT35	MDA30
			DDR0_D31	AW35	MDA31
			DDR0_D32	AY6	MDA33
			DDR0_D33	AU6	MDA37
			DDR0_D34	AV4	MDA34
			DDR0_D35	AU4	MDA35
			DDR0_D36	AW6	MDA32
			DDR0_D37	AW4	MDA38
			DDR0_D38	AY4	MDA39
			DDR0_D39	AR1	MDA41
			DDR0_D40	AR4	MDA45
			DDR0_D41	AN3	MDA42
			DDR0_D42	AN4	MDA43
			DDR0_D43	AR2	MDA44
			DDR0_D44	AR3	MDA40
			DDR0_D45	AN2	MDA46
			DDR0_D46	AN1	MDA47
			DDR0_D47	AL1	MDA49
			DDR0_D48	AL4	MDA53
			DDR0_D49	AL4	MDA50
			DDR0_D50	AJ4	MDA51
			DDR0_D51	AJ2	MDA52
			DDR0_D52	AJ2	MDA48
			DDR0_D53	AJ2	MDA54
			DDR0_D54	AJ1	MDA55
			DDR0_D55	AG1	MDA57
			DDR0_D56	AG4	MDA61
			DDR0_D57	AE3	MDA58
			DDR0_D58	AE4	MDA59
			DDR0_D59	AG2	MDA60
			DDR0_D60	AG3	MDA56
			DDR0_D61	AE2	MDA62
			DDR0_D62	AE1	MDA63
			DDR0_D63	AE39	DQSA0
			DDR0_D64	AJ39	DQSA1
			DDR0_D65	AN39	DQSA2
			DDR0_D66	AV36	DQSA3
			DDR0_D67	AV5	DQSA4
			DDR0_D68	AP3	DQSA5
			DDR0_D69	AK3	DQSA6
			DDR0_D70	AF3	DQSA7
			DDR0_D71	AV32	
			DDR0_D72	AE38	-DQSA0
			DDR0_D73	AJ38	-DQSA1
			DDR0_D74	AN38	-DQSA2
			DDR0_D75	AJ36	-DQSA3
			DDR0_D76	AW5	-DQSA4
			DDR0_D77	AP2	-DQSA5
			DDR0_D78	AK2	-DQSA6
			DDR0_D79	AF2	-DQSA7
			DDR0_D80	AU32	

HASWELL[10SC1-F01150-01R\_10SC1-F01150-03R]

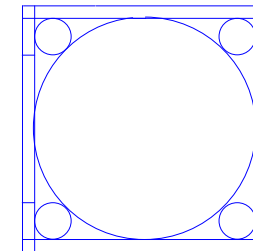
## LGA1150 (B)

LGA1150B		DDR1_MA0	AE34	MDB0
MAAB0	AL19	DDR1_MA1	AE35	MDB1
MAAB1	AK23	DDR1_MA2	AG35	MDB2
MAAB2	AM22	DDR1_MA3	AH35	MDB3
MAAB3	AM23	DDR1_MA4	AD34	MDB4
MAAB4	AP23	DDR1_MA5	AD35	MDB5
MAAB5	AL23	DDR1_MA6	AG34	MDB6
MAAB6	AY24	DDR1_MA7	AH34	MDB7
MAAB7	AV25	DDR1_MA8	AL34	MDB8
MAAB8	AU26	DDR1_MA9	AL35	MDB9
MAAB9	AW25	DDR1_MA10	AL31	MDB10
MAAB10	AP18	DDR1_MA11	AL31	MDB11
MAAB11	AY25	DDR1_MA12	AK34	MDB12
MAAB12	AV26	DDR1_MA13	AK35	MDB13
MAAB13	AR15	DDR1_MA14	AK32	MDB14
MAAB14	AV27	DDR1_MA15	AL32	MDB15
MAAB15	AY28			
MODT_B0	AM17	DDR1_ODT0	AP34	MDB17
MODT_B1	AL16	DDR1_ODT1	AN31	MDB19
MODT_B2	AM16	DDR1_ODT2	AP31	MDB23
MODT_B3	AK15	DDR1_ODT3	AP35	MDB20
			AP35	MDB16
			AN32	MDB18
			AP32	MDB22
			AM29	MDB25
			AM28	MDB28
			AR29	MDB27
			AR28	MDB30
			AL28	MDB24
			AL28	MDB29
			AP29	MDB26
			AP28	MDB31
			AR12	MDB32
			AL13	MDB34
			AL12	MDB35
			AR13	MDB36
			AP13	MDB37
			AM13	MDB38
			AM12	MDB39
			AR9	MDB45
			AP9	MDB41
			AR6	MDB47
			AP6	MDB43
			AR10	MDB44
			AP10	MDB40
			AR7	MDB46
			AP7	MDB42
			AM9	MDB52
			AL9	MDB53
			AL6	MDB50
			AL7	MDB55
			AM10	MDB48
			AL10	MDB49
			AM6	MDB54
			AM7	MDB51
			AH6	MDB61
			AH7	MDB60
			AE6	MDB59
			AE7	MDB63
			AJ6	MDB56
			AJ7	MDB57
			AG6	MDB58
			AF7	MDB62
			AF35	DQSB0
			AL33	DQSB1
			AN28	DQSB2
			AN28	DQSB3
			AN12	DQSB4
			AP8	DQSB5
			AL8	DQSB6
			AG7	DQSB7
			AN25	
			AF34	-DQSB0
			AK33	-DQSB1
			AN33	-DQSB2
			AN29	-DQSB3
			AN13	-DQSB4
			AR8	-DQSB5
			AM8	-DQSB6
			AG6	-DQSB7
			AN26	



HASWELL[10SC1-F01150-01R\_10SC1-F01150-03R]

## LGA1150 (CR)

LGA1150  
ILM\_BP/1156/CSP

## DDR BUS

7	MODT_A[0..3]	MODT_A0..3
8	MODT_B[0..3]	MODT_B0..3
7	MDA[0..63]	MDA0..63
8	MDB[0..63]	MDB0..63
7	DQSA[0..7]	DQSA0..7
7	-DQSA[0..7]	-DQSA0..7
7	MAAA[0..15]	MAAA0..15
8	MAAB[0..15]	MAAB0..15
8	DQSB[0..7]	DQSB0..7
8	-DQSB[0..7]	-DQSB0..7

## Gigabyte Technology

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(F, J)



(G,H,I)



(X30)



(x15)



Title			
CPU LGA1150-C			
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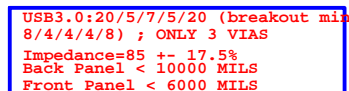
(B)

USB2.0 : 12/5/7/5/12 (breakout min 8/4/4/4/8)  
Impedance=85 +- 15%



usb2.0 5/7/5//12  
usb3.0 5/7/5//20      Impedance=85 +- 15%

**PCH (F)**



CK\_DOTCLK NR92 8.2K $\Omega$   
CK -DOTCLK NR91 8.2K $\Omega$   
NR92 short to GND in non  
graphic SKU

(J)



PCH H/S

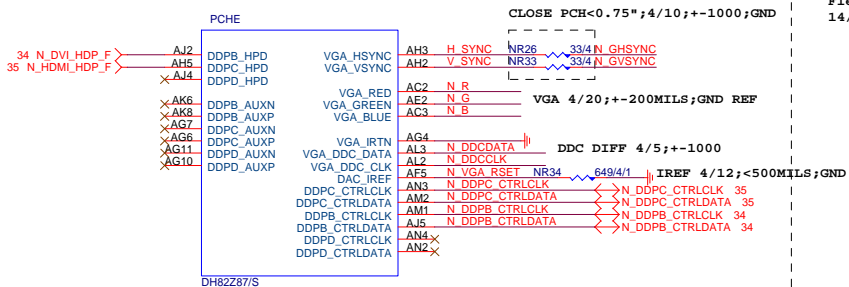


## USB TABLE

USB OC#	Configure
OC0#	USB0,1
OC1#	USB2,3
OC2#	USB4,5
OC3#	USB6,7
OC4#	USB8,9
OC5#	USB10,11
OC6#	USB12,13
OC7#	Not Use

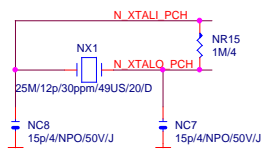
Title			
PCH FDI,DMI,USB ,PCIE			
Size	Document Number	Rev	
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# PCH (E)

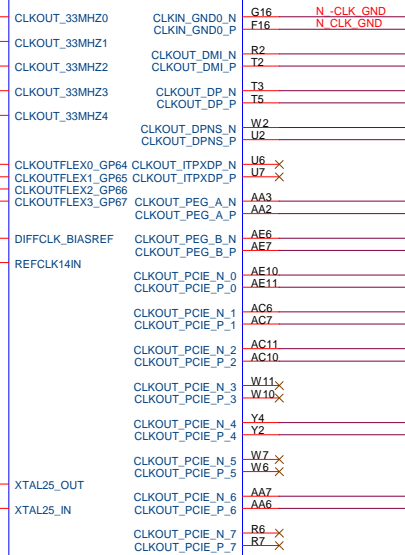


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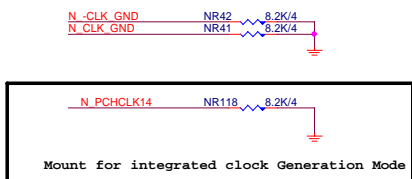
Flex1,2,3,4 :  
14/24/33/48MHZ



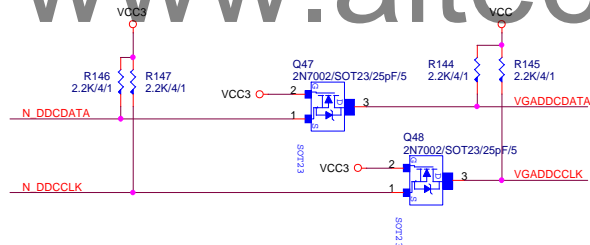
# PCHG



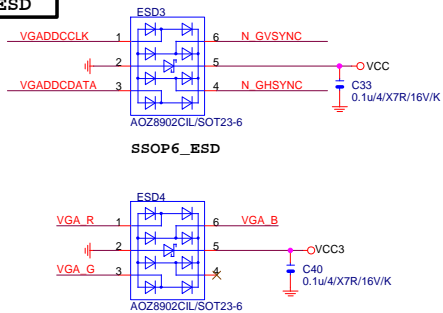
# PCH CLK PD



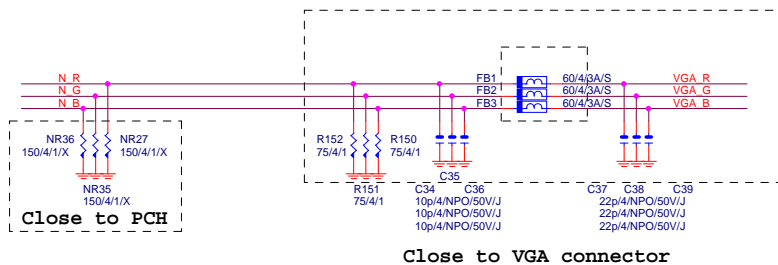
# VGA DDC



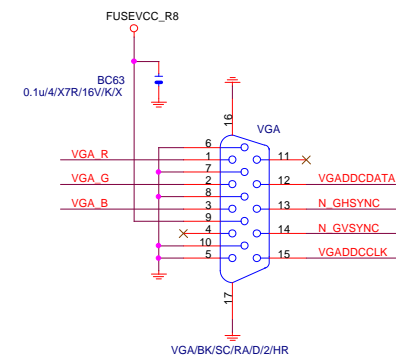
# VGA ESD



# VGA DDC



# VGA CONNECTOR



# Gigabyte Technology

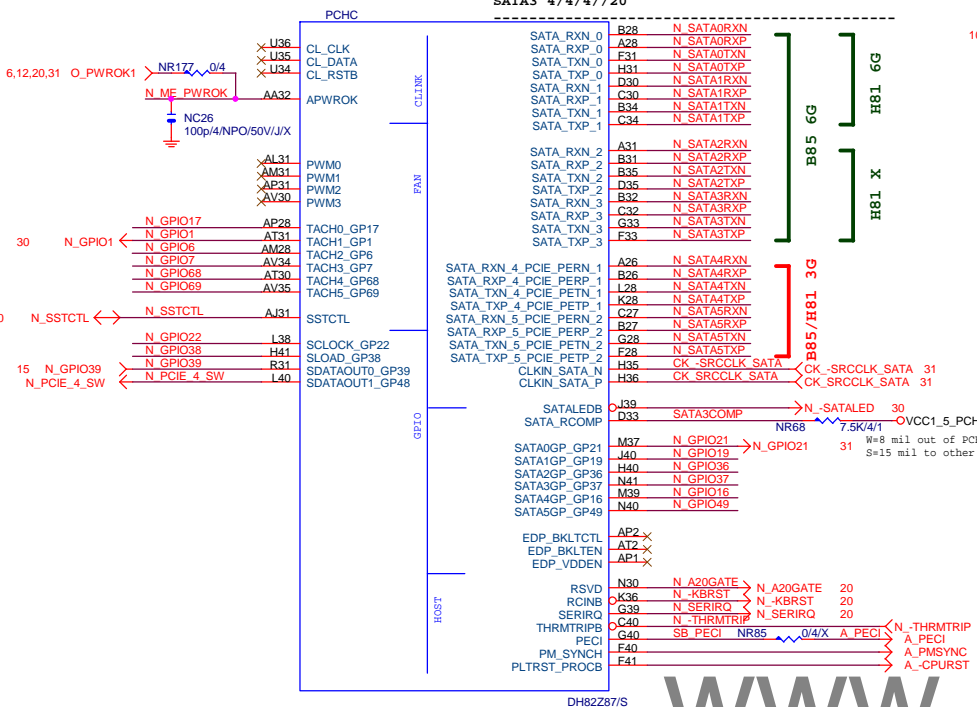
Title			
PCH DISPLAY ,CLK BUFFER			
Size	Document Number	Rev	
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**PCH (C)**

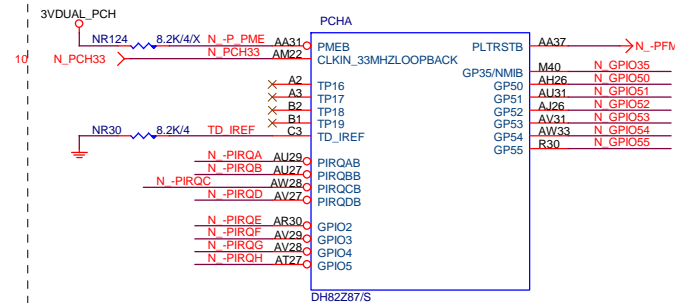
SATA3 : 20/4/4/4/20 (breakout min 8/4/4/4/8)  
Impedance=85  $\pm$  17.5%

Impedance=8  
-----

```
SATA2 4/4/4//15
SATA3 4/4/4//20
```



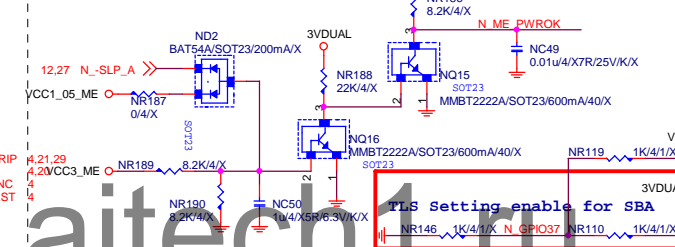
**PCH (A)**



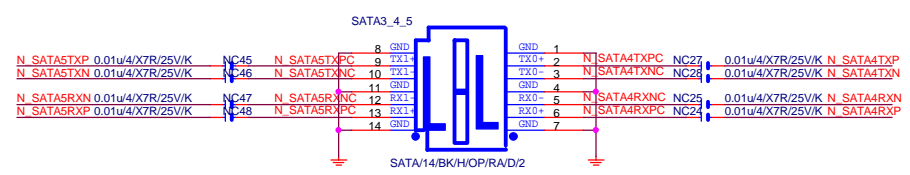
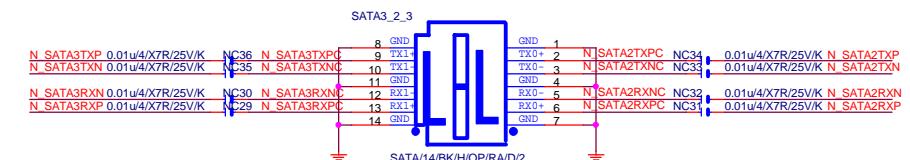
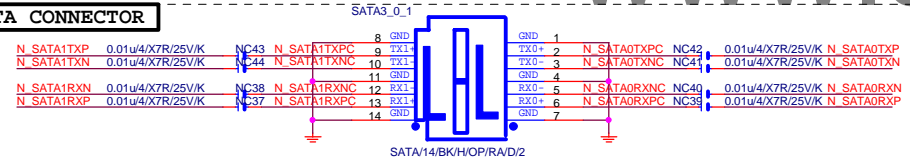
BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	float	float

```
Default int pull up on GP51,
Default SPI boot devices
```

ME PWROK



**SATA CONNECTOR**



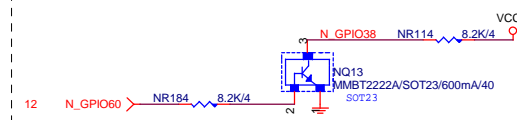
GPIO38 Ctrl

MFG Mode

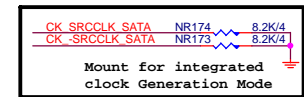
```

N_GPIO38 : Lo --> Enable
           Hi --> Disable

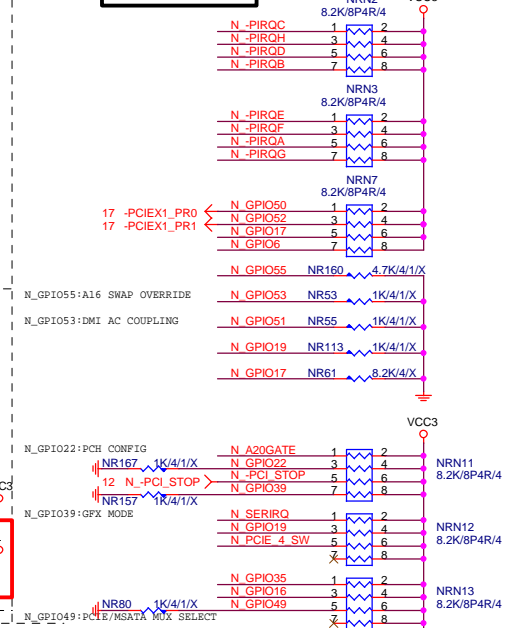
```



PCH CLK PD



PCH PU/PD



soft	
strap	
0	
1	

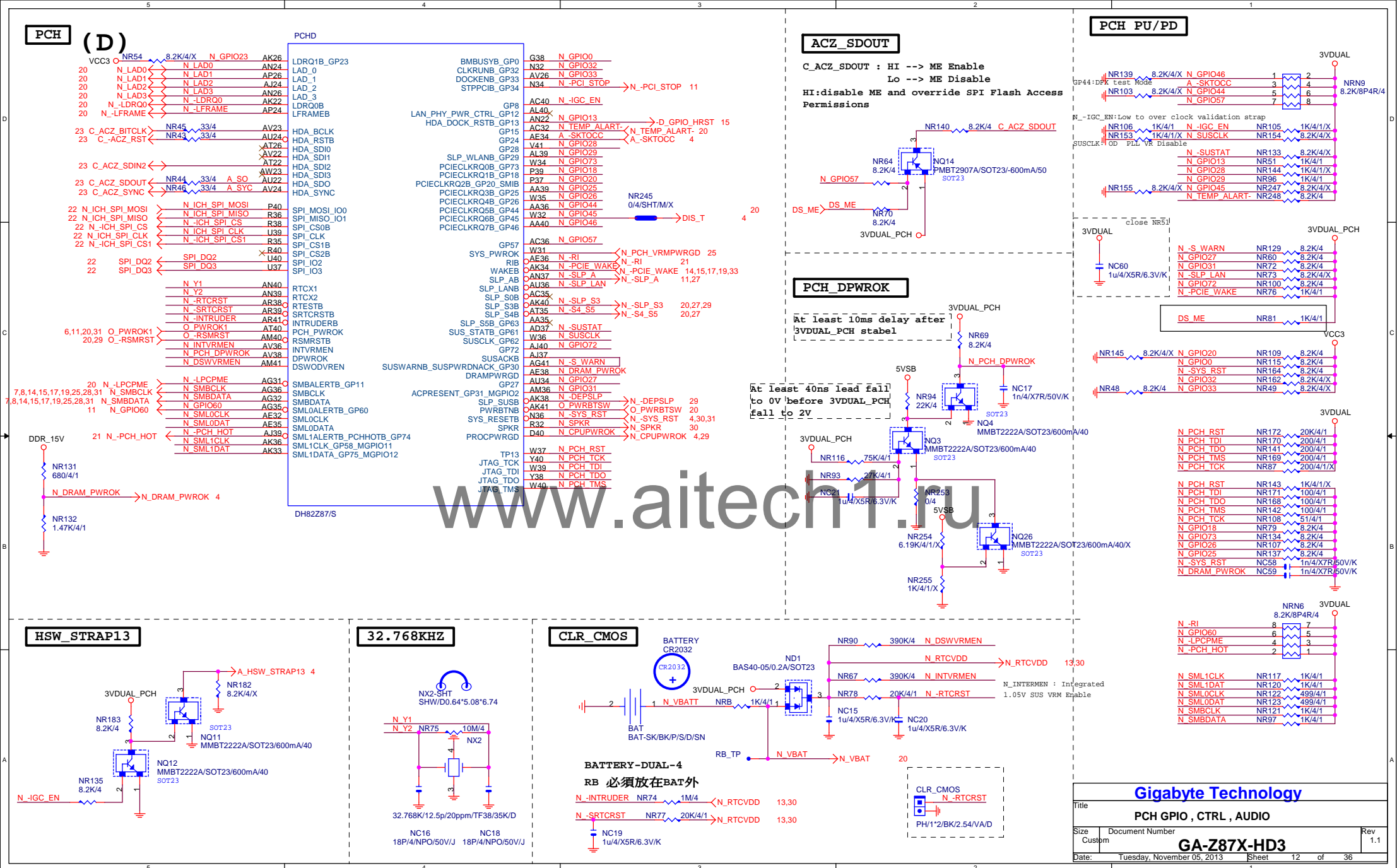
N\_GPIO36:DMI RX TERMINATION  
NR84 1K/4/1/X  
N\_GPIO69:SV DETECT  
NR66 1K/4/1/X

17 -PCIEX1\_PR2 ←

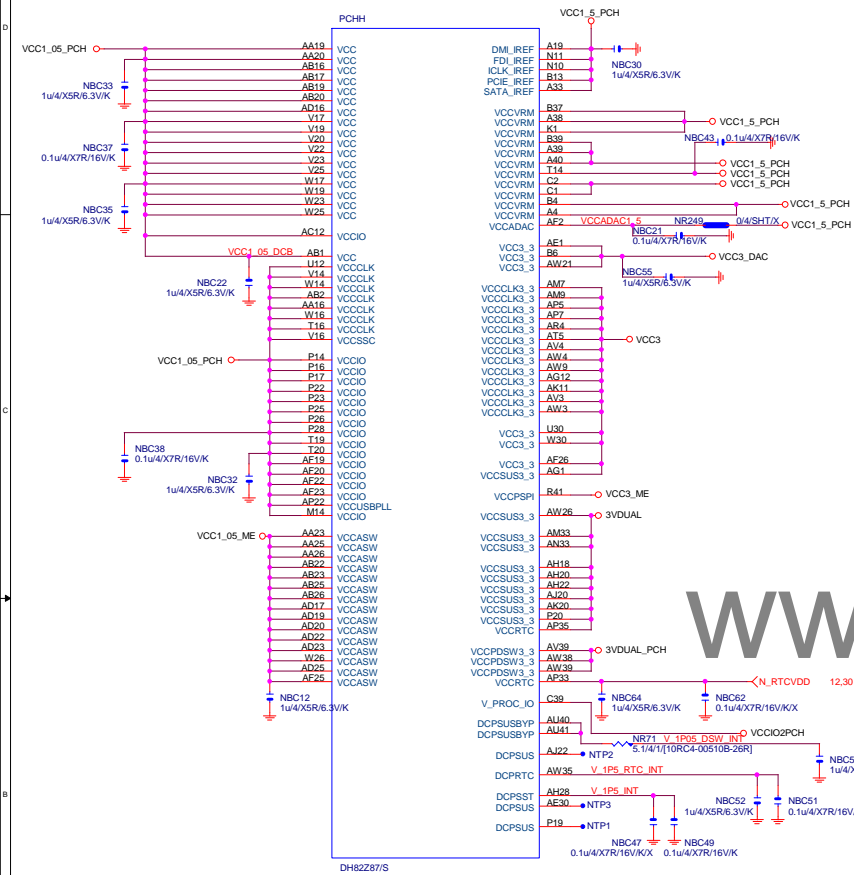
1111

## Gigabyte Technology

Title			
PCH HOST , SATA, PCI			
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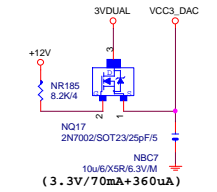


# PCH (H)

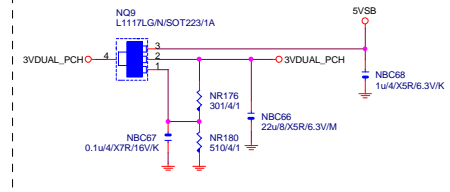


# VCC3\_DAC

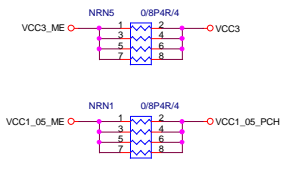
CLOSE北橋(注意震盪水波紋)



# 3VDUAL\_PCH



# SHT\_PWR



# CAP

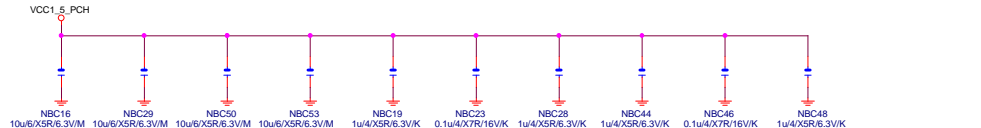
(3.3V) (X6)

(1.05V) (X5)

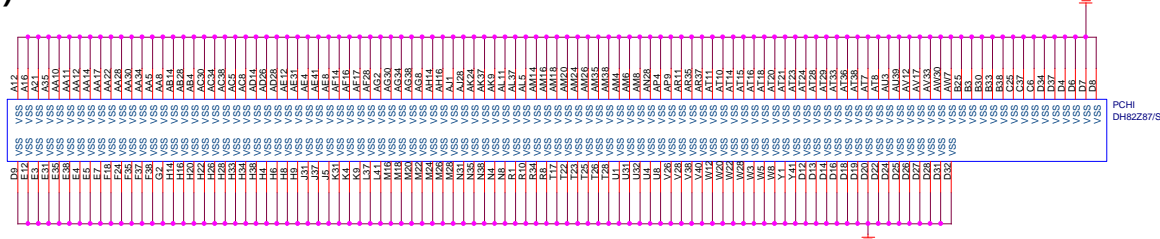
(1.05V) (X6)

(1.05V) (X2) (3.3V) (X2)

(1.5V) (X10)



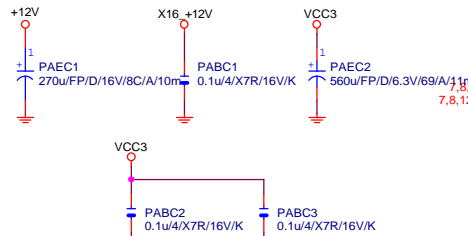
# PCH (I)



Gigabyte Technology		
Title PCH PWR_GND		
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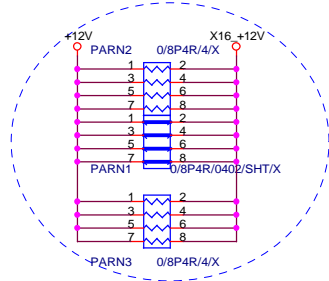


## PCIEX16 CAP



## PCIEX16 PROTECT SHT

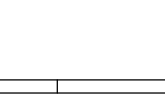
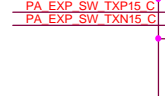
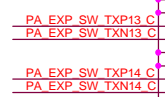
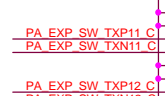
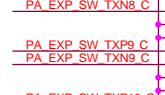
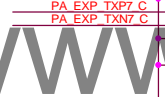
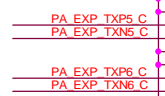
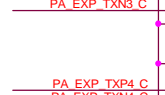
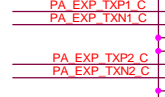
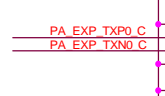
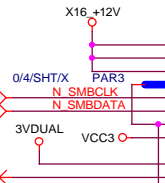
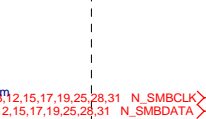
+12 protect short-wire test



## PCIEX16 AC CAP

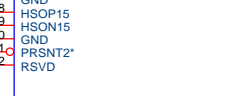
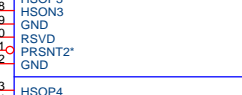
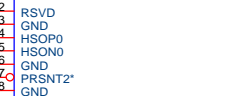
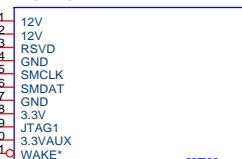
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PA EXP TXN0	PAC4	0.22u/4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u/4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u/4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u/4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u/4/X5R/6.3V/K	PA EXP TXN2 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	PAC20	0.22u/4/X5R/6.3V/K	PA EXP SW TXP8 C
PA EXP SW TXN8	PAC21	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
PA EXP SW TXN14	PAC33	0.22u/4/X5R/6.3V/K	PA EXP SW TXN14 C
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

## PCIEX16 SLOT

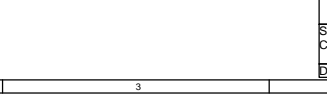
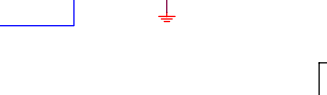
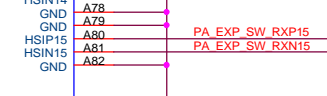
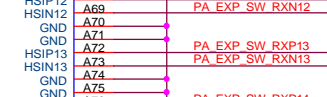
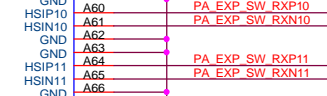
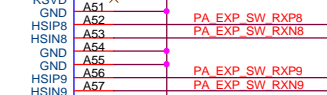
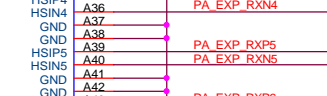
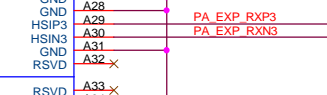
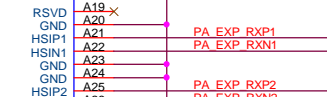
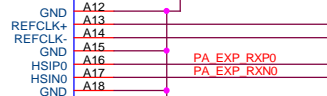
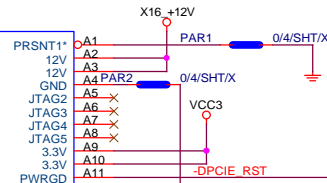


## PCIESLOT-164DN-Q

3GIO\_\*16



PCI-E/16x-164P/BK/LONG DOUBLE/METEL HK



PCIEX16:16/5/5/5/16

PA EXP RXP0.15]	>>>PA_EXP_RXP[0.15] 4,16
PA EXP RXN0.15]	>>>PA_EXP_RXN[0.15] 4,16
PA EXP TXP0.15]	>>>PA_EXP_TXP[0.15] 4,16
PA EXP TXN0.15]	>>>PA_EXP_TXN[0.15] 4,16
PA EXP SW RXP8.15]	>>>PA_EXP_SW_RXP[8.15] 16
PA EXP SW RXN8.15]	>>>PA_EXP_SW_RXN[8.15] 16
PA EXP SW TXP8.15]	>>>PA_EXP_SW_TXP[8.15] 16
PA EXP SW TXN8.15]	>>>PA_EXP_SW_TXN[8.15] 16

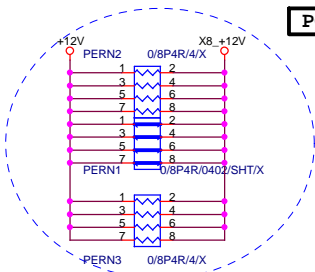
Gigabyte Technology

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PCI EXPRESS * 16			
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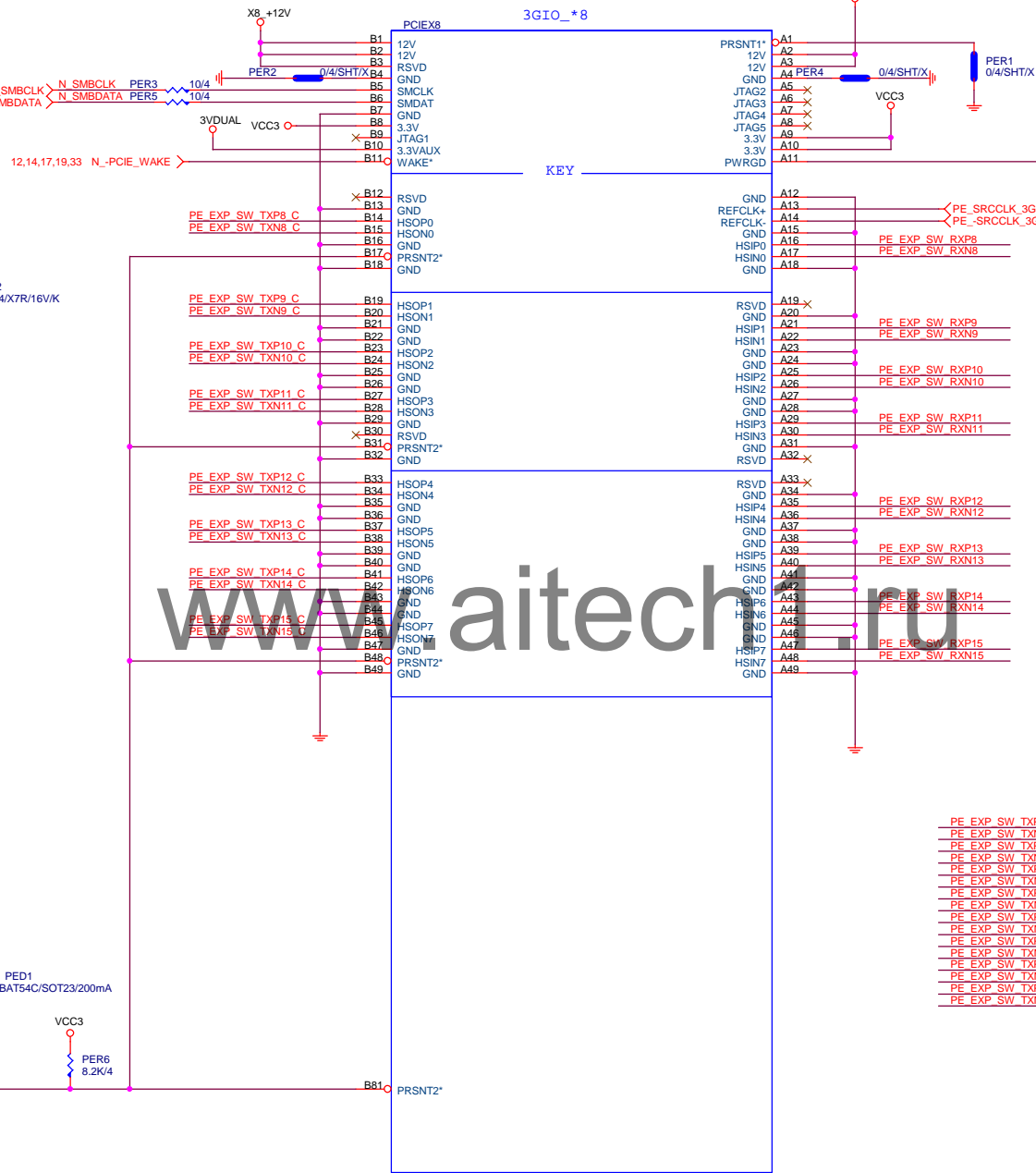
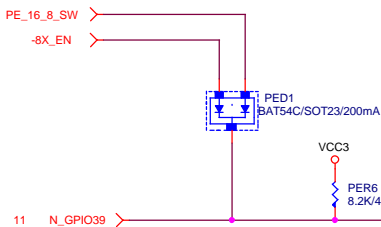
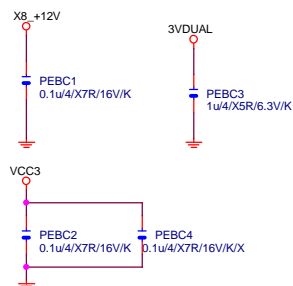
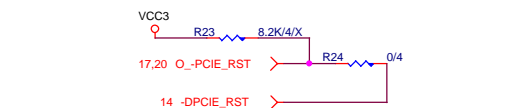
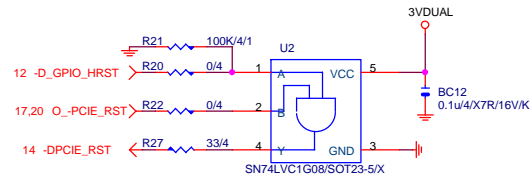


# PCIEX8 PROTECT SHT

+12 protect  
short-wire  
test



7,8,12,14,17,19,25,28,31 N\_SMBCLK N\_SMBCLK PER3 10/4  
7,8,12,14,17,19,25,28,31 N\_SMBDATA N\_SMBDATA PER5 10/4



PE\_EXP\_SW\_RXP[8..15] >> PE\_EXP\_SW\_RXP[8..15] 16  
PE\_EXP\_SW\_TXN[8..15] >> PE\_EXP\_SW\_TXN[8..15] 16  
PE\_EXP\_SW\_TXP[8..15] >> PE\_EXP\_SW\_TXP[8..15] 16  
PE\_EXP\_SW\_TXN[8..15] >> PE\_EXP\_SW\_TXN[8..15] 16

PE_EXP_SW_TXP8	PEC2	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP8_C
PE_EXP_SW_TXN8	PEC3	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN8_C
PE_EXP_SW_TXP9	PEC4	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP9_C
PE_EXP_SW_TXN9	PEC5	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN9_C
PE_EXP_SW_TXP10	PEC6	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP10_C
PE_EXP_SW_TXN10	PEC7	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN10_C
PE_EXP_SW_TXP11	PEC8	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP11_C
PE_EXP_SW_TXN11	PEC9	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN11_C
PE_EXP_SW_TXP12	PEC10	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP12_C
PE_EXP_SW_TXN12	PEC11	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN12_C
PE_EXP_SW_TXP13	PEC12	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP13_C
PE_EXP_SW_TXN13	PEC13	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN13_C
PE_EXP_SW_TXP14	PEC14	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP14_C
PE_EXP_SW_TXN14	PEC15	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN14_C
PE_EXP_SW_TXP15	PEC16	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP15_C
PE_EXP_SW_TXN15	PEC17	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN15_C

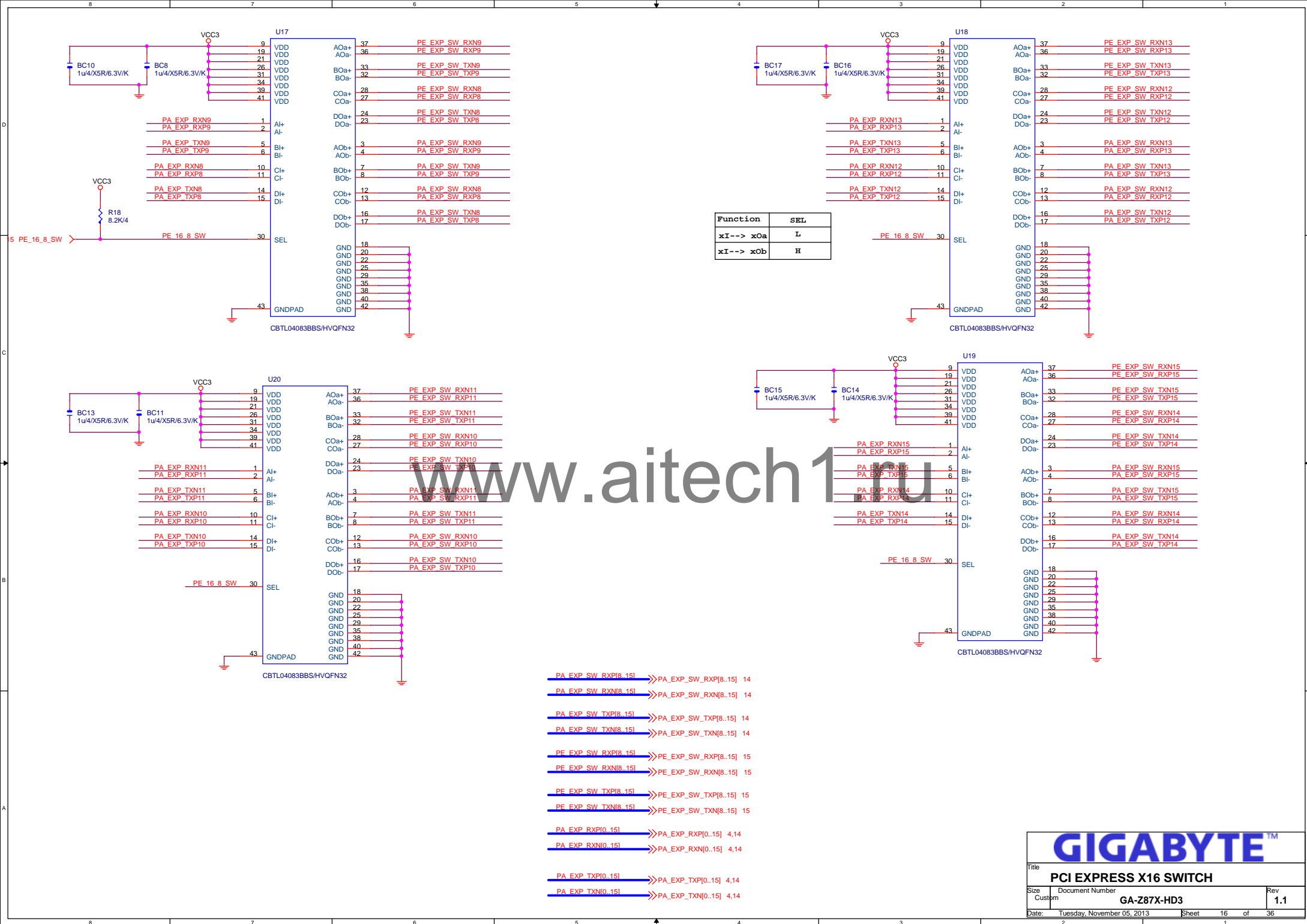
PCI-E/8X-99P/BK/LONG DOUBLE

Title  
**PCI EXPRESS X 8**

Size Custom Document Number  
**GA-Z87X-HD3**

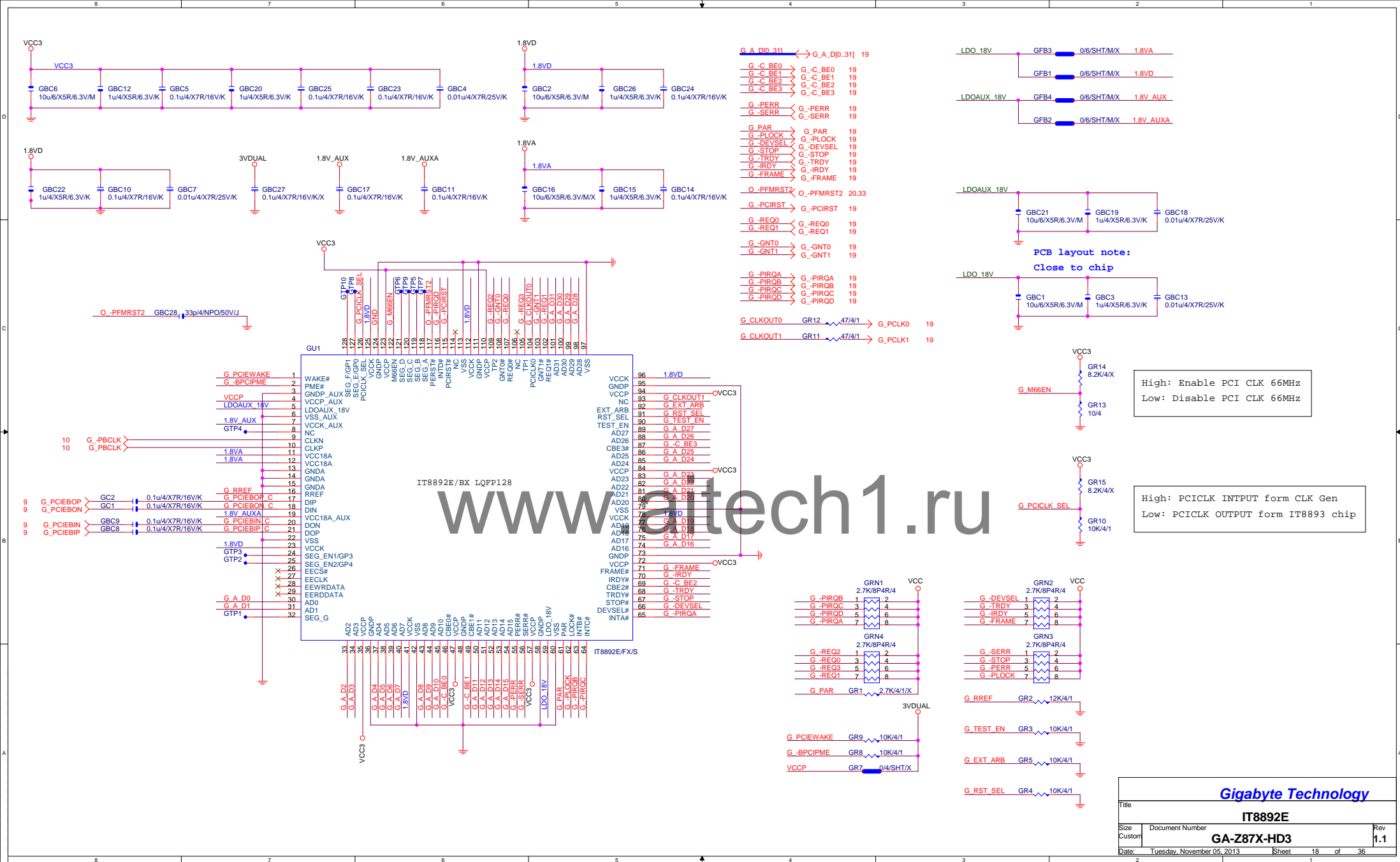
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**1.1**



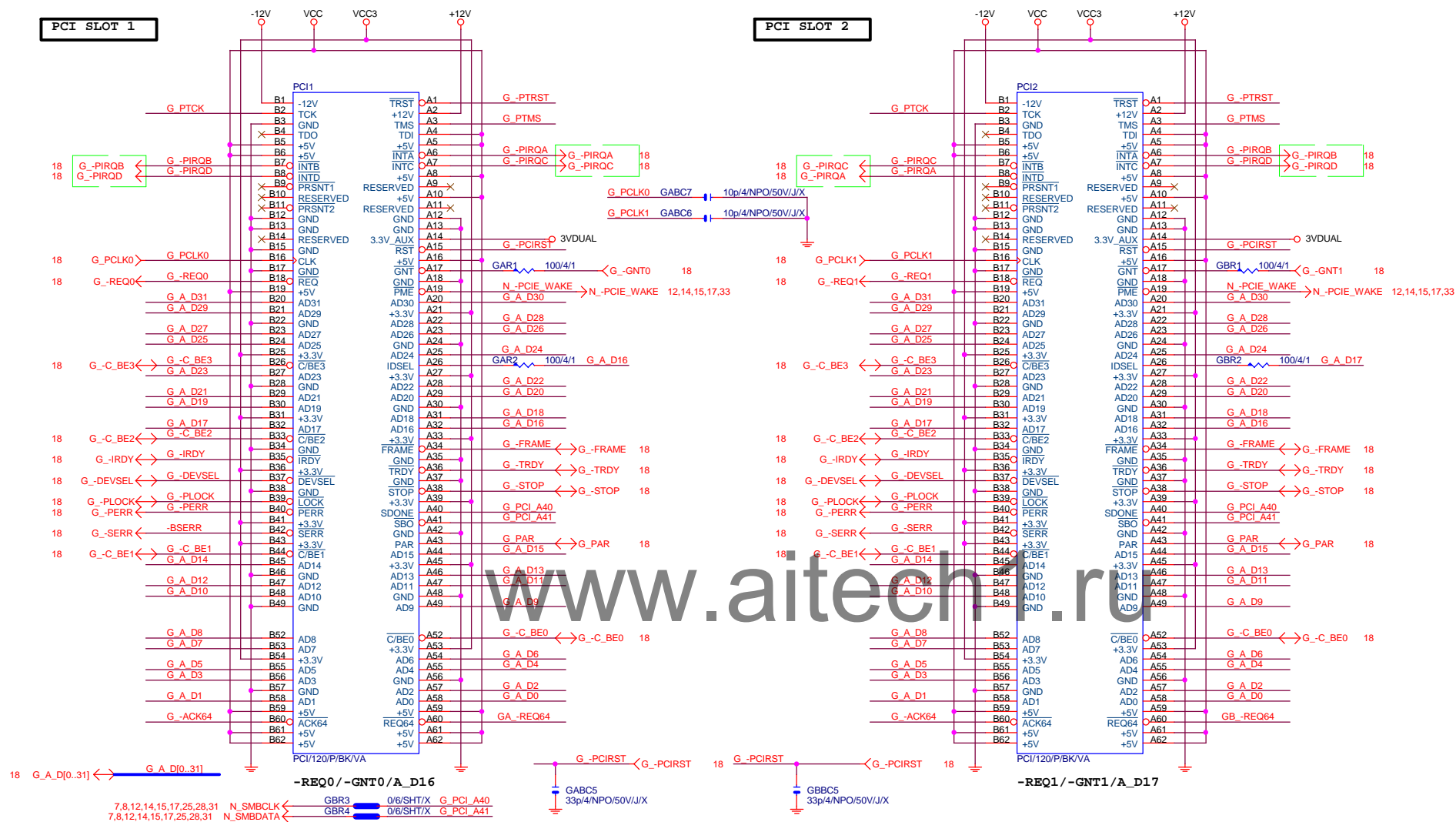
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PA EXP SW\_TXN[8..15] >> PA\_EXP\_SW\_TXN[8..15] 14  
PE EXP SW\_RXP[8..15] >> PE\_EXP\_SW\_RXP[8..15] 15  
PE EXP SW\_RXN[8..15] >> PE\_EXP\_SW\_RXN[8..15] 15  
PE EXP SW\_TXP[8..15] >> PE\_EXP\_SW\_TXP[8..15] 15  
PE EXP SW\_TXN[8..15] >> PE\_EXP\_SW\_TXN[8..15] 15  
PA EXP\_RXP[0..15] >> PA\_EXP\_RXP[0..15] 4,14  
PA EXP\_RXN[0..15] >> PA\_EXP\_RXN[0..15] 4,14  
PA EXP\_TXP[0..15] >> PA\_EXP\_TXP[0..15] 4,14  
PA EXP\_TXN[0..15] >> PA\_EXP\_TXN[0..15] 4,14





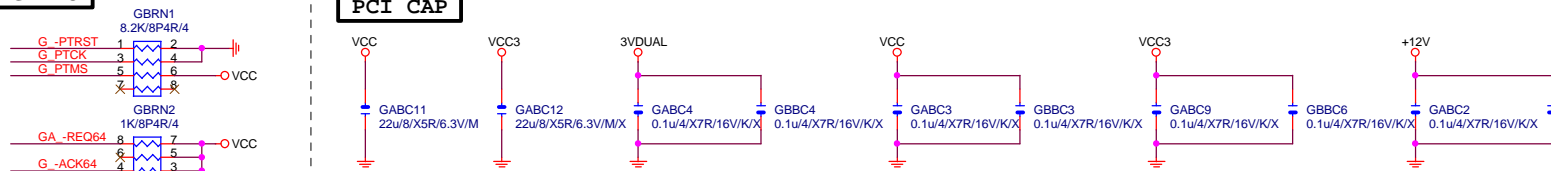
# PCI SLOT 1

# PCI SLOT 2



## PCI PU

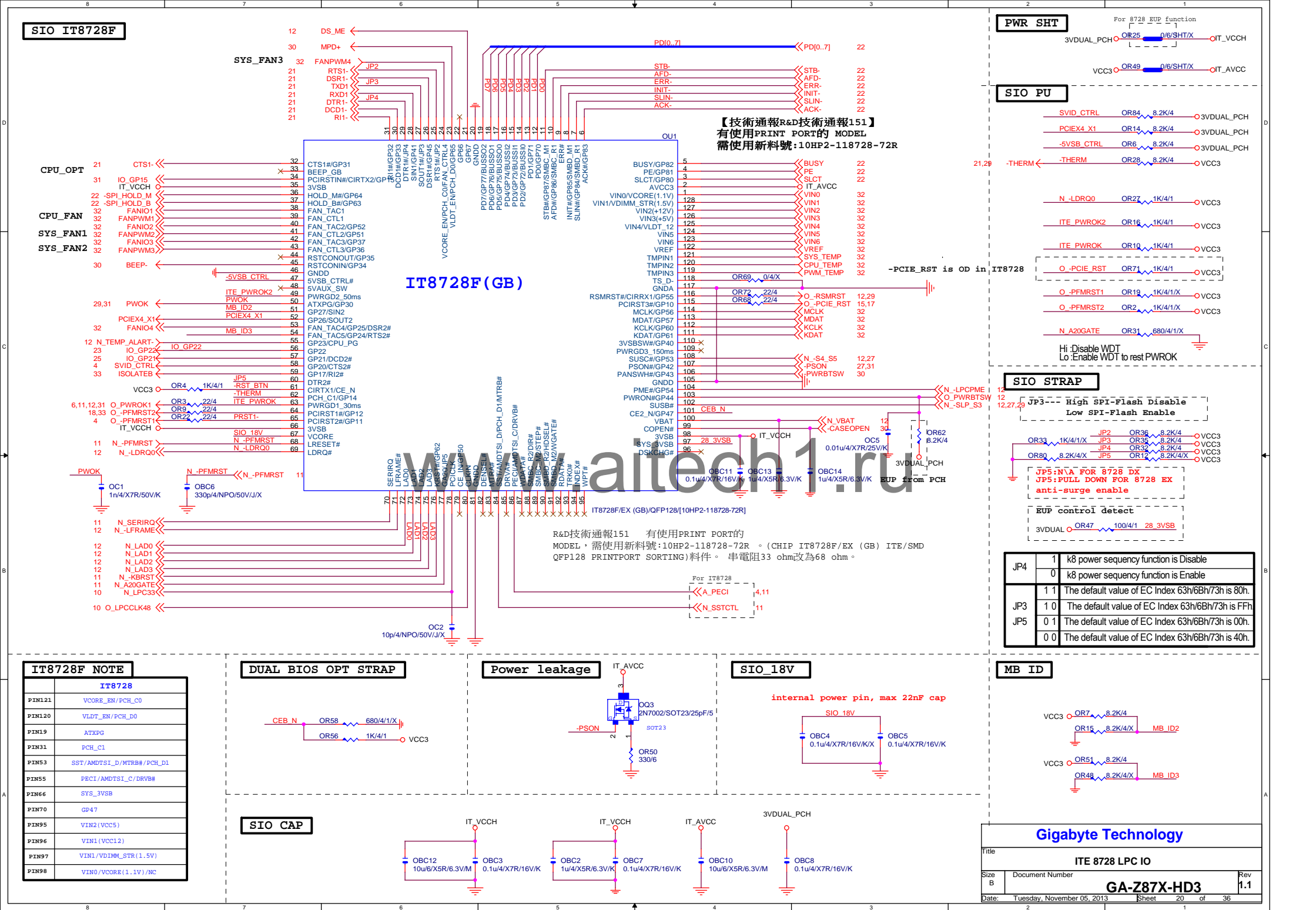
## PCI CAP



**GIGABYTE™**

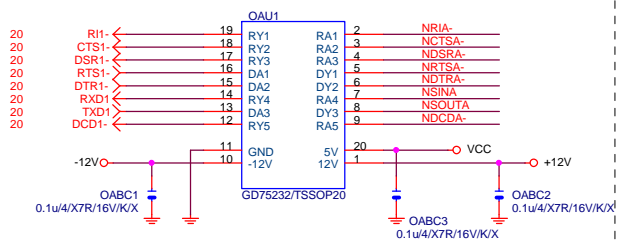
**PCI SLOT 1&2**

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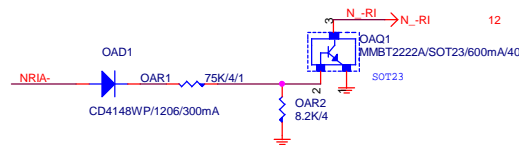




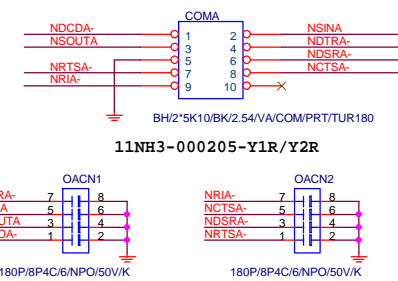
## COMA



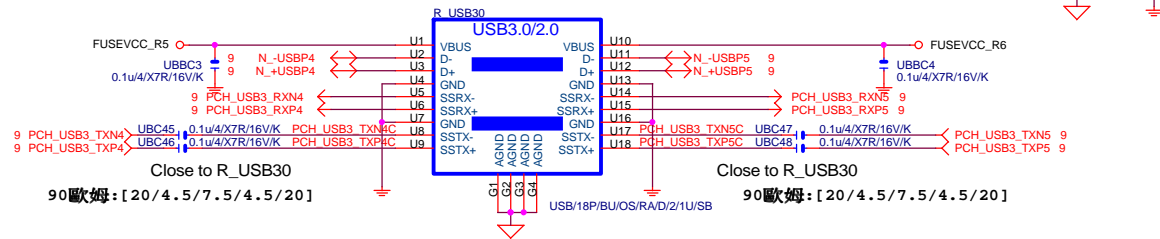
## COM RI



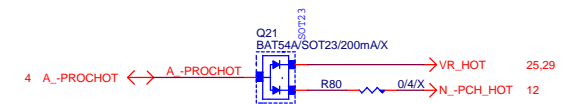
## COM BUFFER



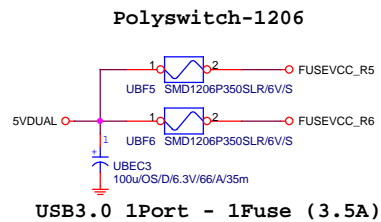
## USB3\_20 CONNECT



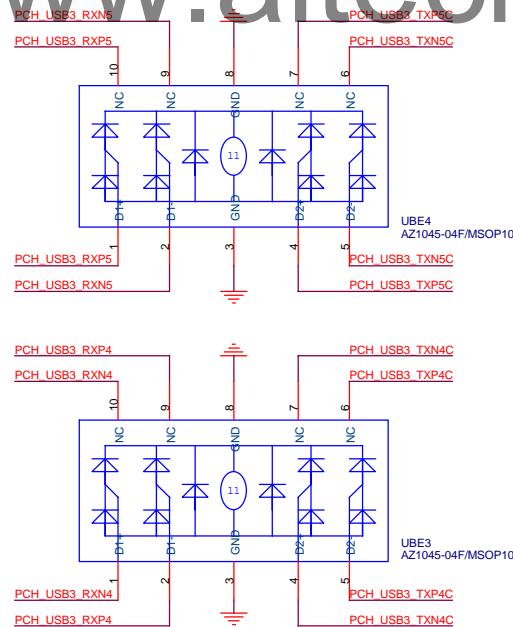
## -PROHOT



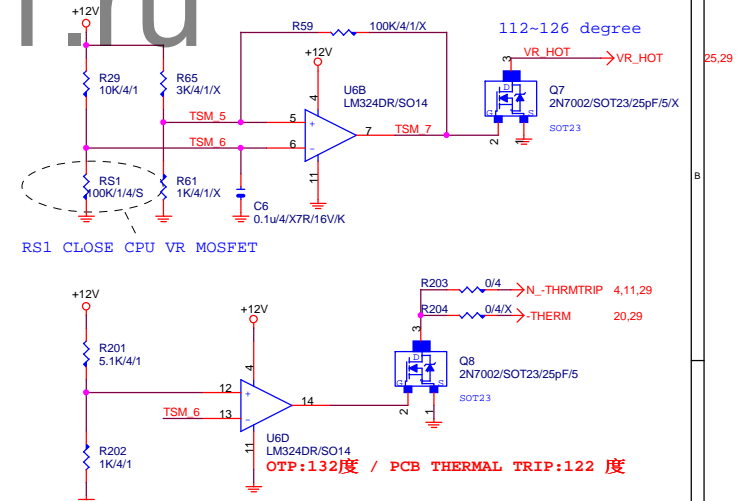
## USB30 PWR



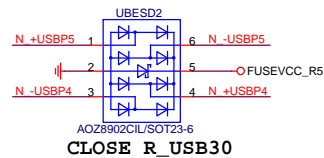
## USB30 ESD PROTECT



## -PROHOT



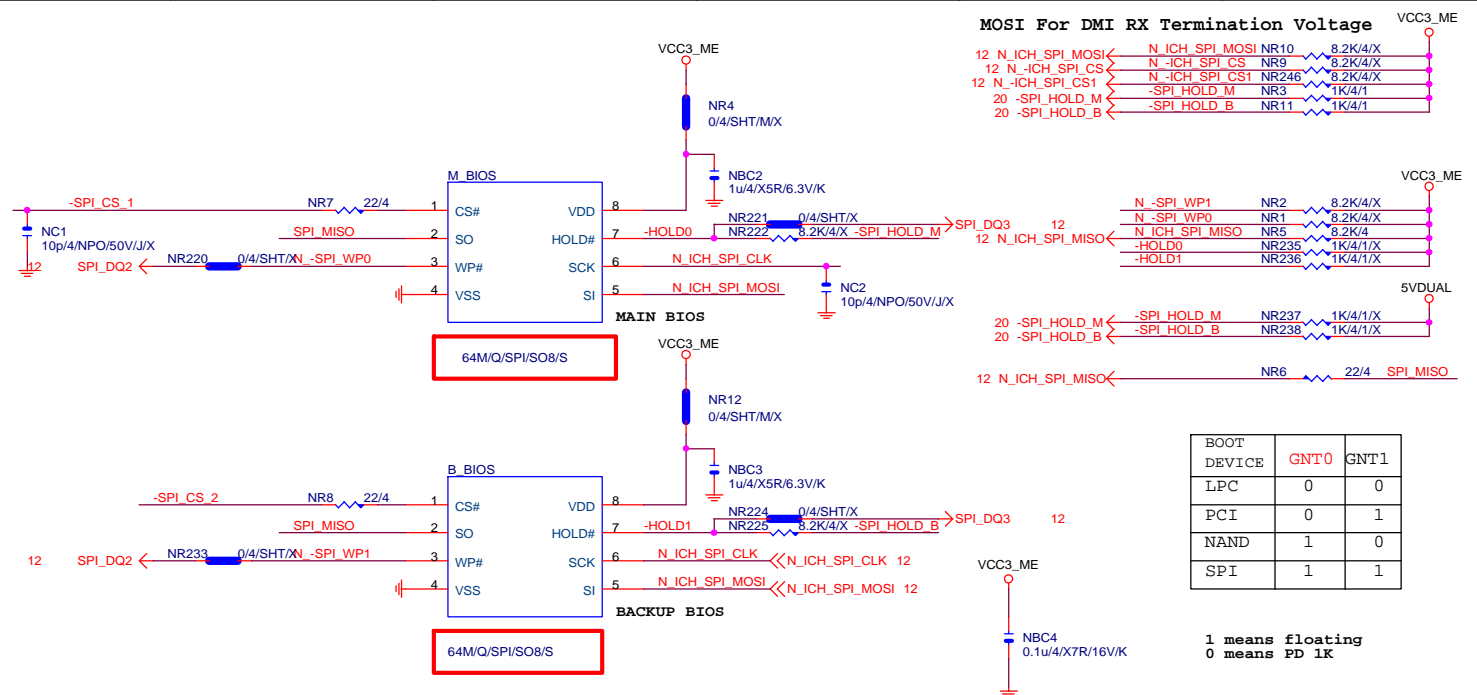
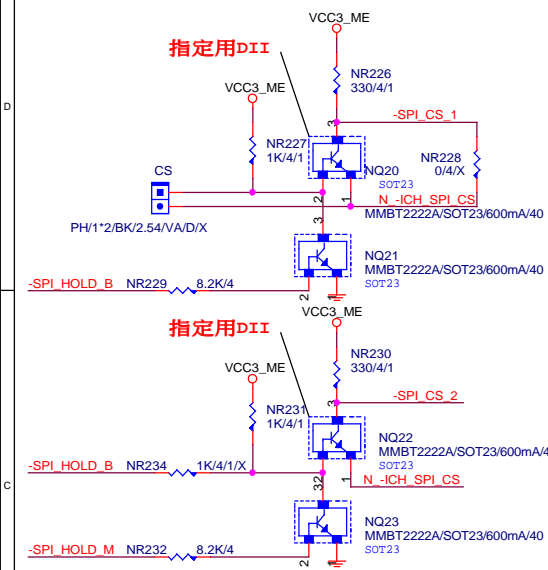
## USB20 ESD PROTECT



Gigabyte Technology

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## DUAL BIOS

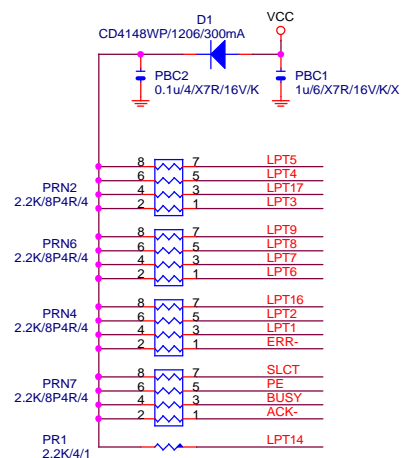
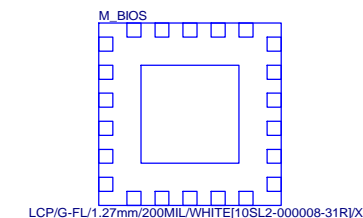
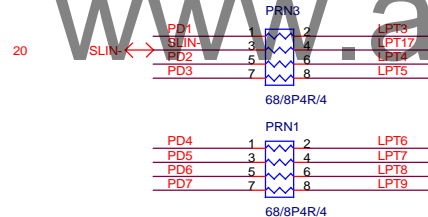
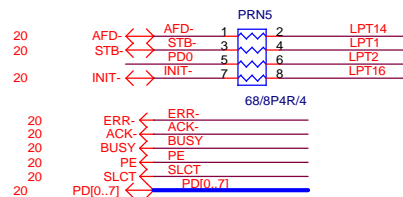


BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

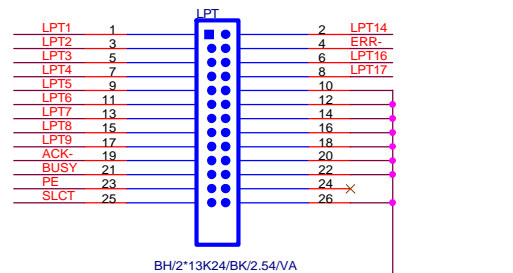
1 means floating  
0 means PD 1K

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LPT PORT



R&D技術通報151 有使用PRINT PORT的  
MODEL，需使用新料號:10HP2-118728-72R。(CHIP IT8728F/EX (GB) ITE/SMD  
QFP128 PRINTPORT SORTING)料件。串電阻33 ohm改為68 ohm。

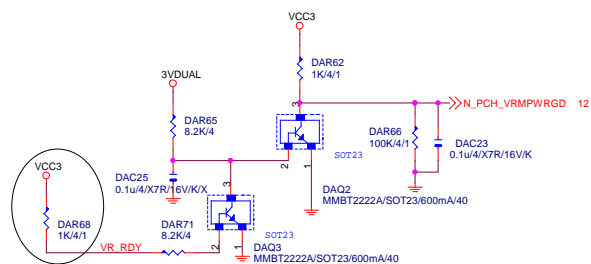
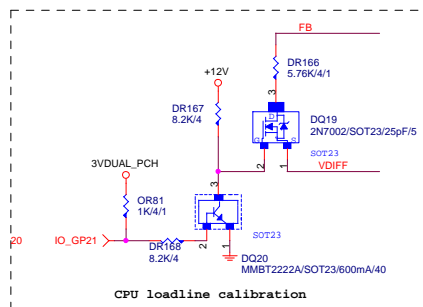
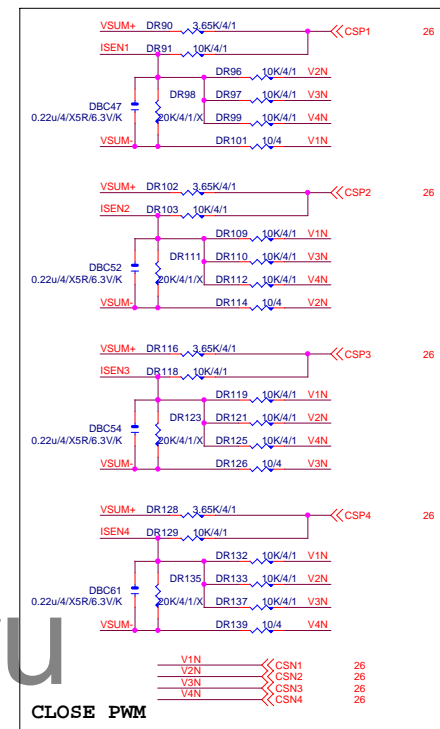
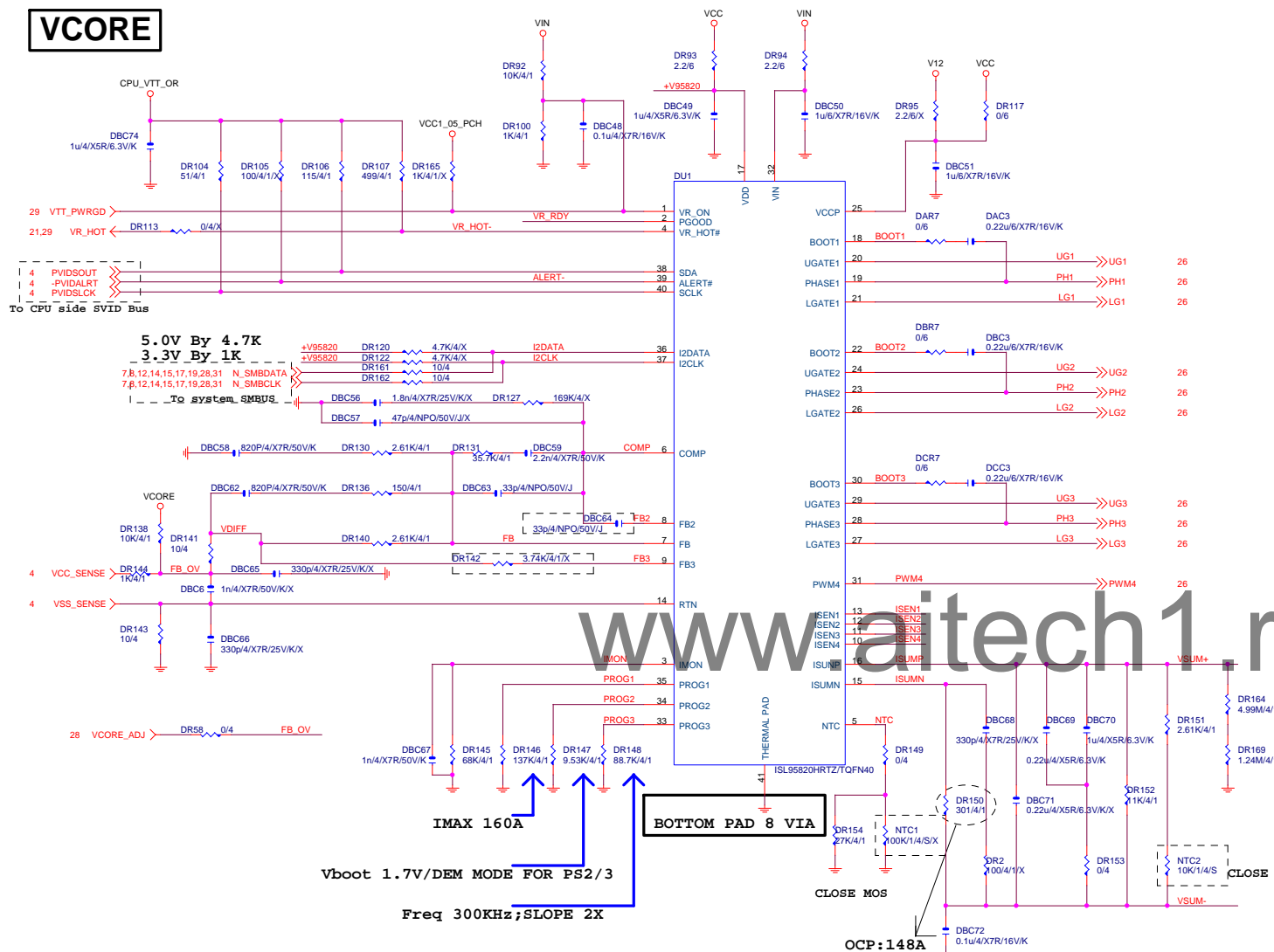


FOR ON/OFF PLAY



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**VCORE**

<b>Gigabyte Technology</b>			
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[1]



[ 3 ]



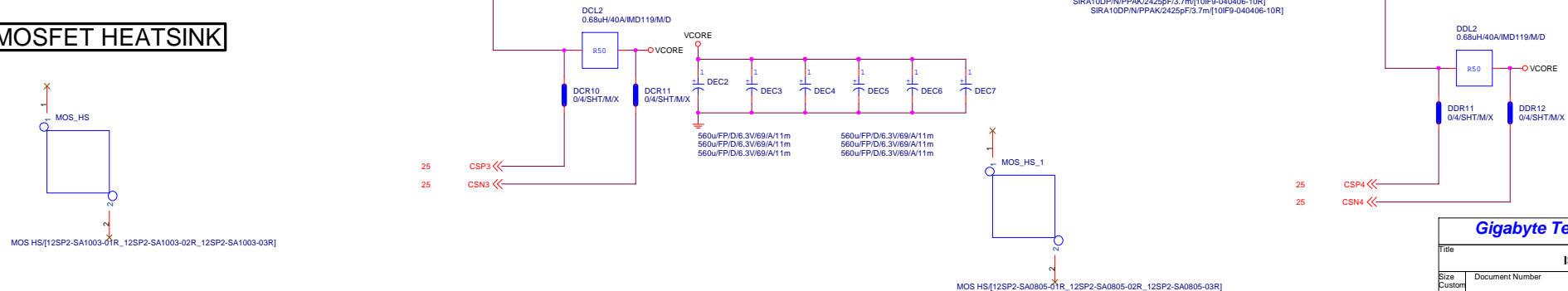
MOS\_HS

V<sub>gs</sub>

GND

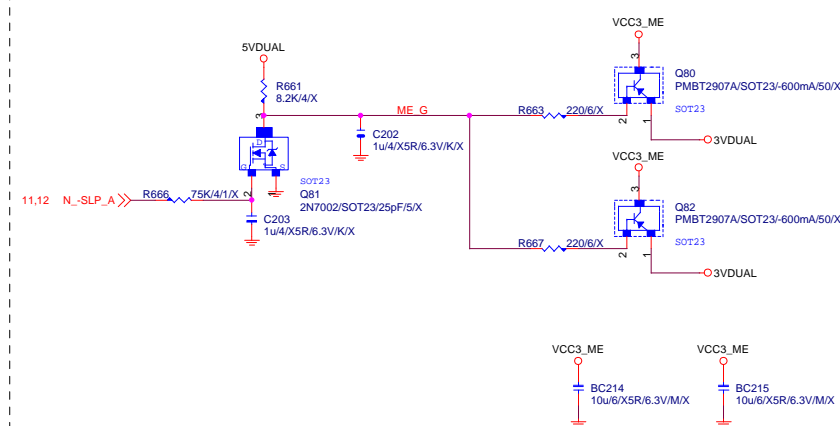
V<sub>ds</sub>

R<sub>L</sub>

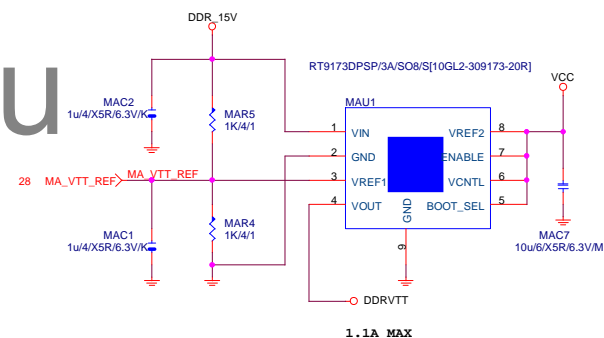




## VCC3\_ME



DDRVTT



Remote sense請從最重的負載端點拉回

$$0.8 \cdot [1 + 2K / 2.2K] = 1.527V$$

VIN=5V,VOUT=1.5V,IOUT=25A,PHASE=1  
IRMS=11.45A

560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A  
Coefficient=1.7(85°C),1(105°C)

VIN Ripple current=4.7X1.7=7.99A(85°C)  
-->故固態電容須2X7.99=15.98>11.45A

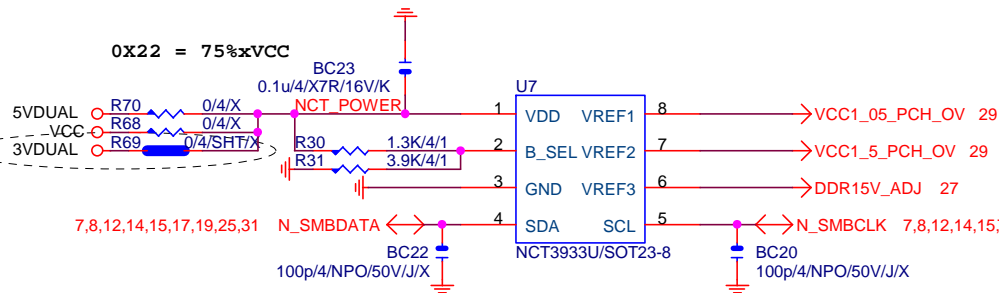
```
OCP:35.82A for Rds=6.7m for vishay@4.5V
OCP:72.727A for Rds=3.3m for renesas@10V
OCP:48A=Roset*Iocset / Rds(on)
      =12K*10uA / [5//5]
```

# GIGABYTE

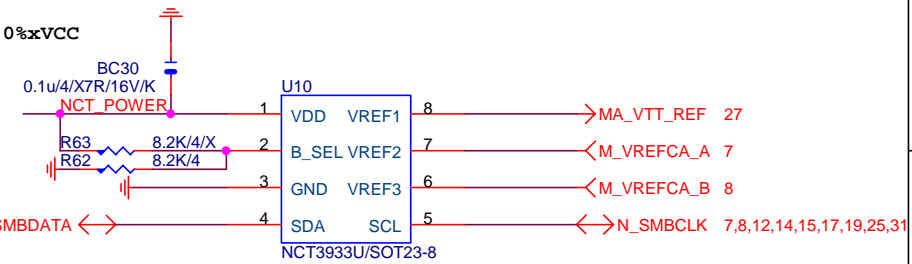
### DDR15V / M3 POWER

Size Custom	Document Number <b>GA-Z87X-HD3</b>	Rev <b>1.1</b>
Date: Tuesday, November 05, 2013	Sheet 27 of 36	

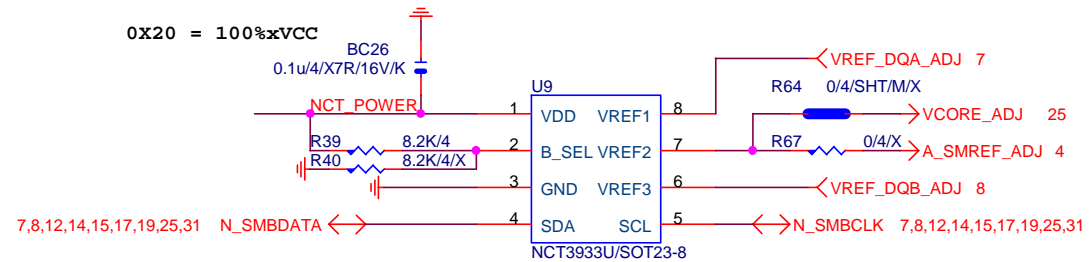
# OVER VOLTAGE



**0X2A = 0%xVCC**



**0X20 = 100%xVCC**



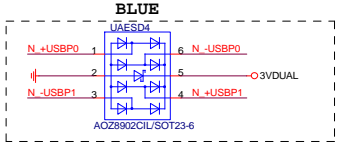
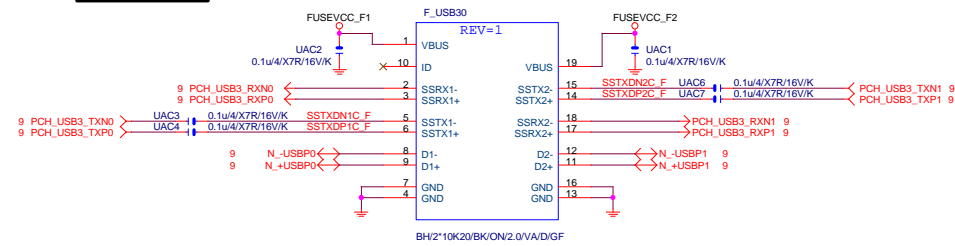
NCT3933	0X2A	0X20	0X22
VREF1	DDRVTT	VREF_DDRA_DQ	PCH Core
VREF2	VREF_DDRA_CA	N/A	VCC1_5_PCH
VREF3	VREF_DDRA_CA	VREF_DDRB_DQ	SMREF

**Gigabyte Technology**

Title		
CPU CORE VR-2		
Size	Document Number	Rev
Custom	GA-Z87X-HD3	1.1
Date:	Tuesday, November 05, 2013	Sheet 28 of 36

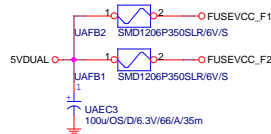


# Front USB3.0

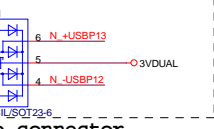
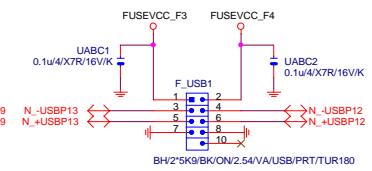


Close to connector

# F\_USB30 PWR

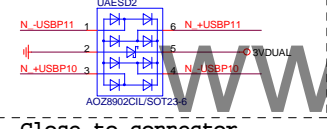
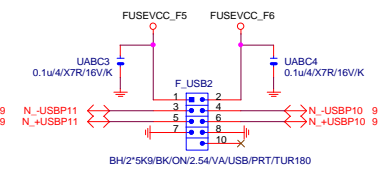


# FRONT USB1



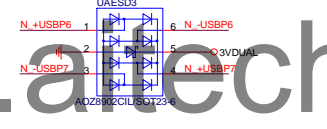
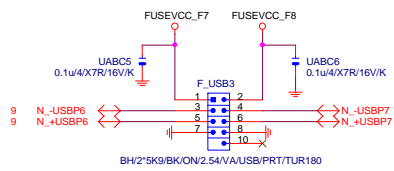
Close to connector

# FRONT USB2

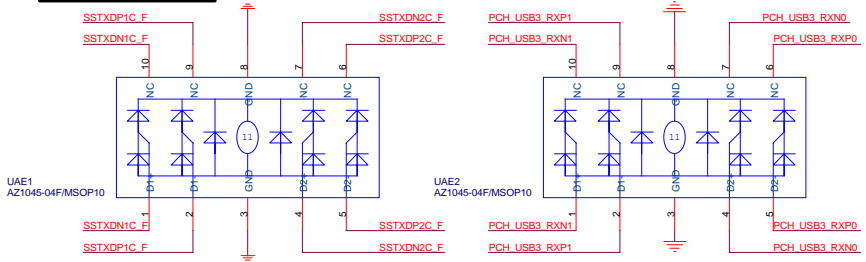


Close to connector

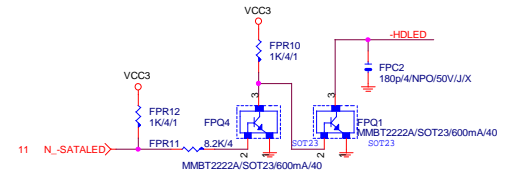
# FRONT USB3



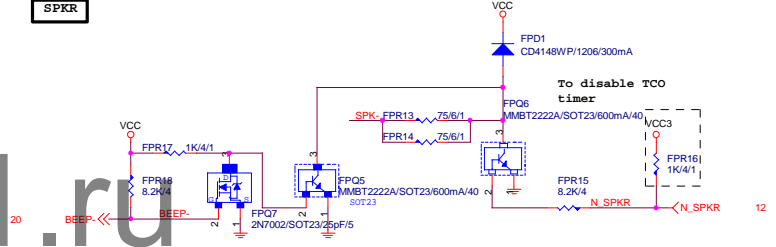
# F\_USB30 ESD PROTECT



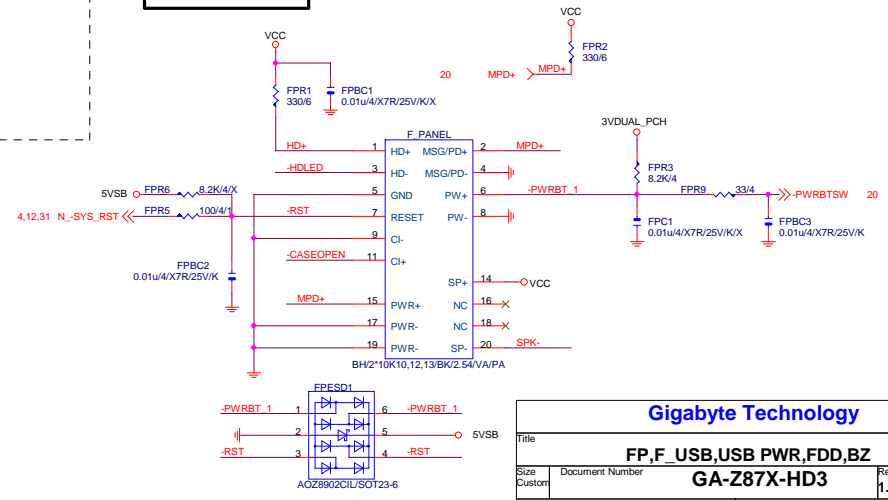
# SATA LED



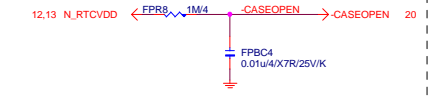
# SPKR



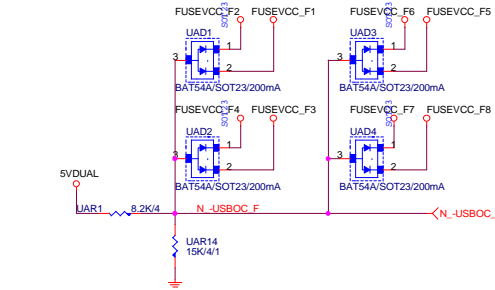
# INTEL FRONT PANEL



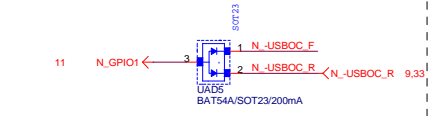
# CASE OPEN



# -USBOC\_F

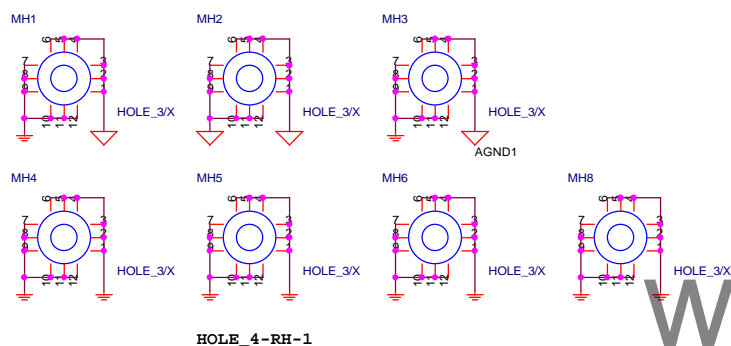
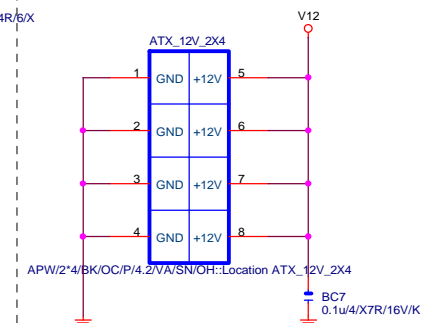
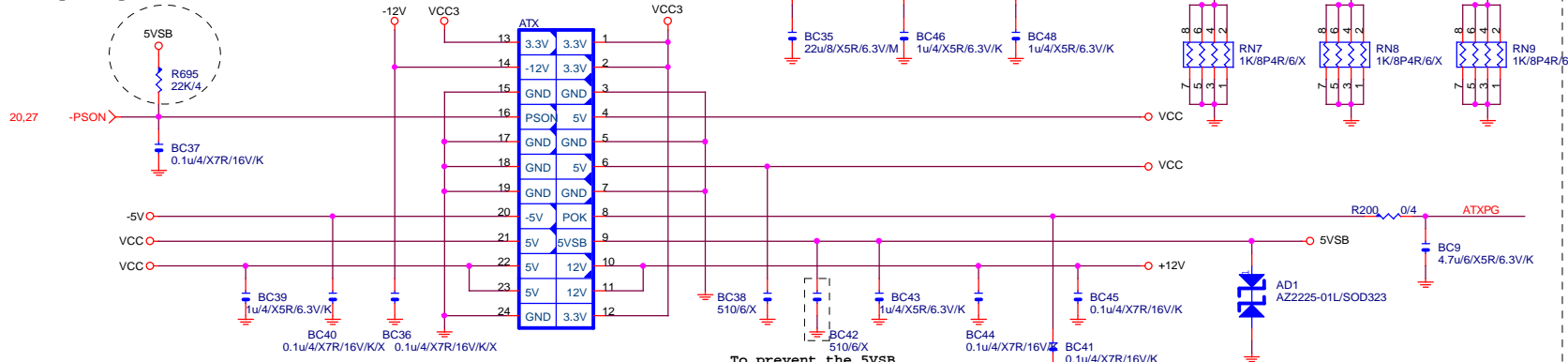


# F\_USB POWER PROTECT



Gigabyte Technology

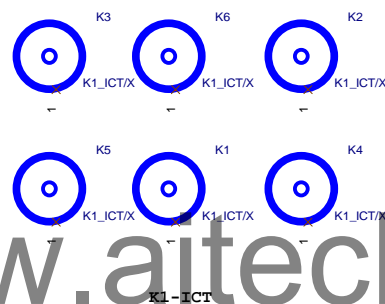
Title			FP,F_USB,USB PWR,FDD,BZ
Size			Custom
Document Number			GA-Z87X-HD3
Date:			Tuesday, November 05, 2013
Sheet			30 of 36
Rev			1.1



```

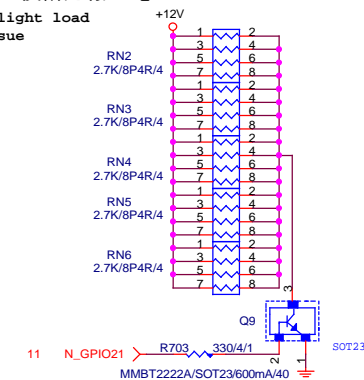
510/6X
To prevent the 5VSB
under loading when
boot-----

```



## 【技術通報R&amp;D技術通報153】

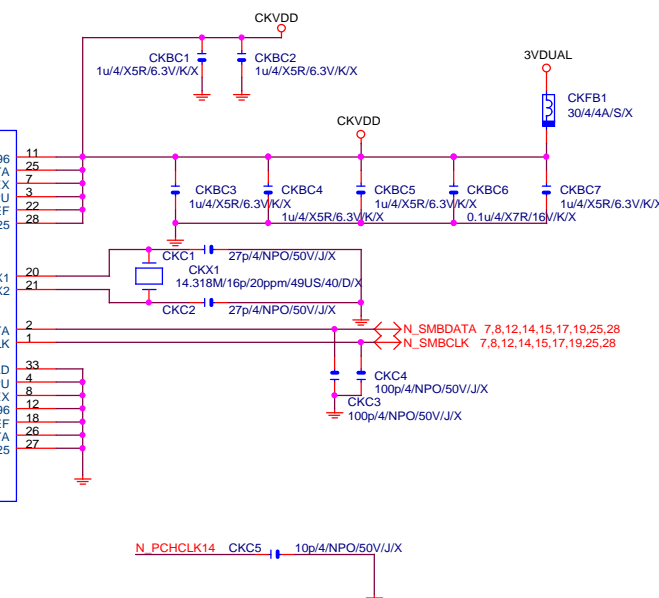
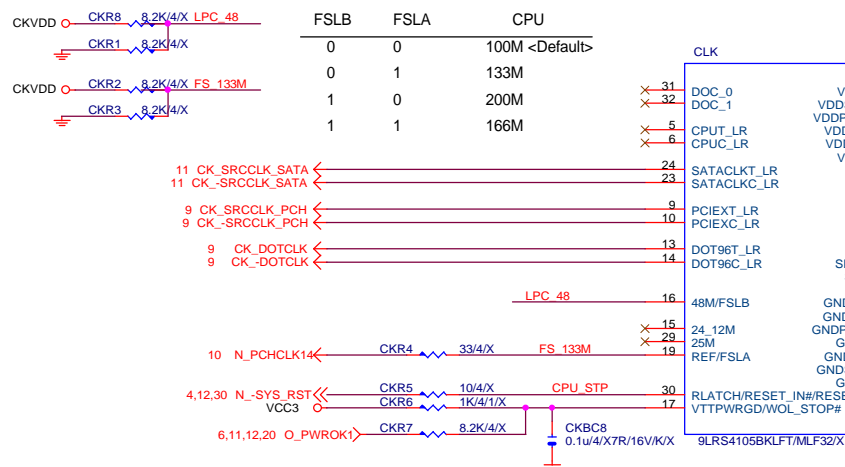
To fix 12V light load  
abnromal issue



CLK GEN

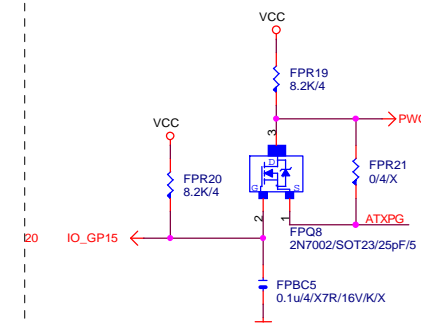
### CPU Frequency Selection

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



## PWOK PATCH

## 【技術通報R&amp;D技術通報154】

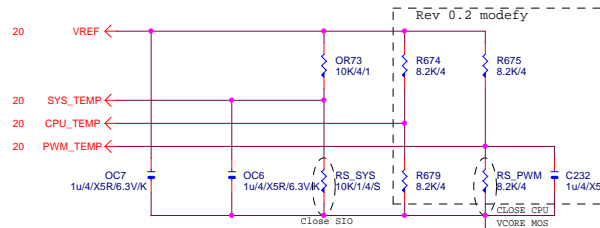


## Gigabyte Technology

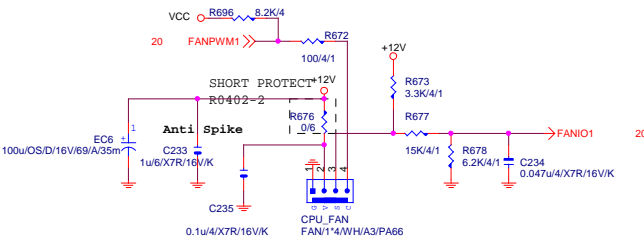
Title		<b>ATX POWER CONNECTOR</b>	
Size	Document Number	<b>GA-Z87X-HD3</b>	
Custom			

Rev
1.1

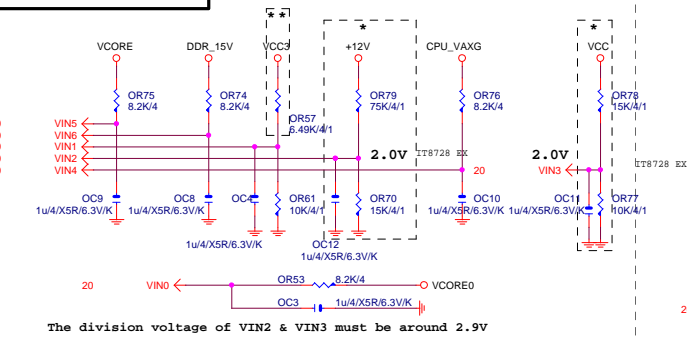
# TEMP H/W MONITOR



# CPU SMART FAN

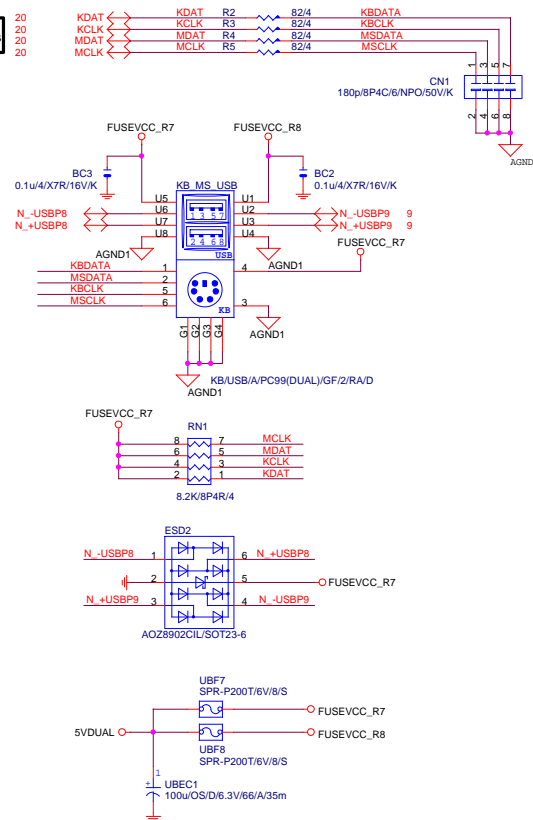


# VOLTAGE-- H/W MONITOR



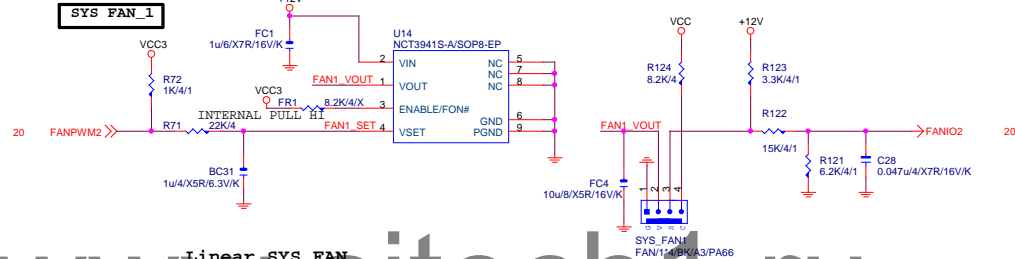
The division voltage of VIN2 & VIN3 must be around 2.9V

# KB/USB

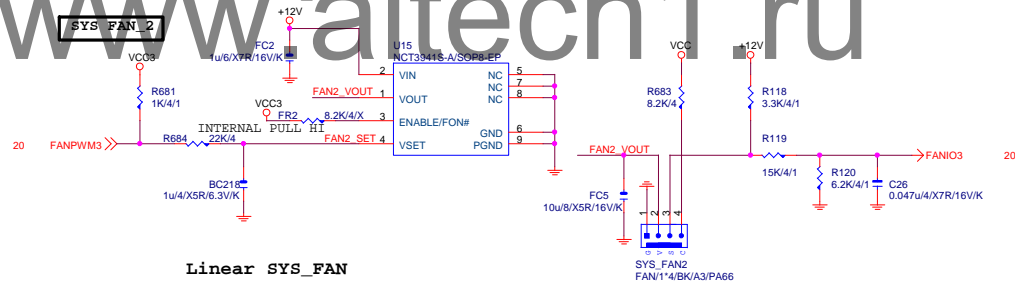


# Linear SYS\_FAN

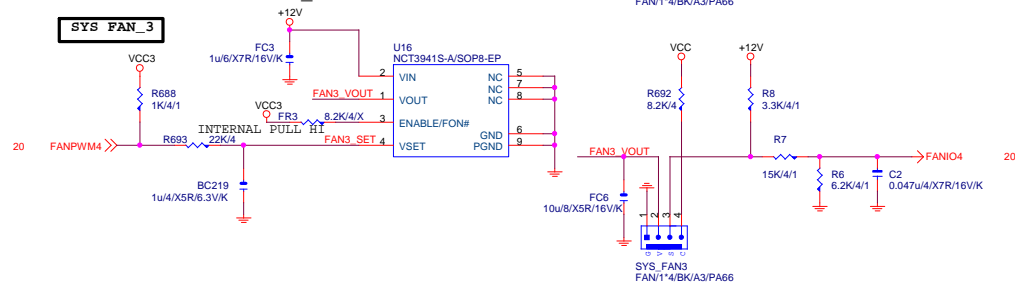
Enable Function (NCT3941S)  
Full Turn On Function (NCT3941S-A)



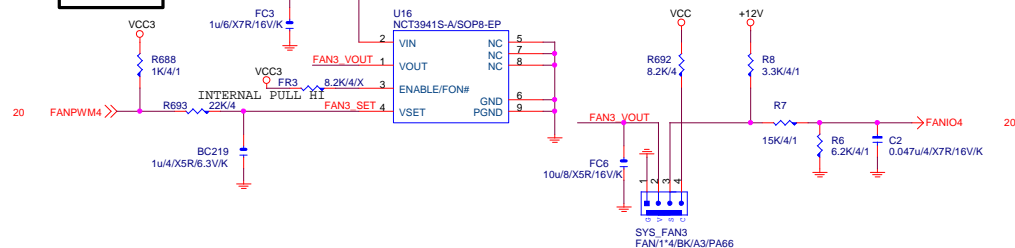
# Linear SYS\_FAN



# Linear SYS\_FAN



# SYS\_FAN\_3



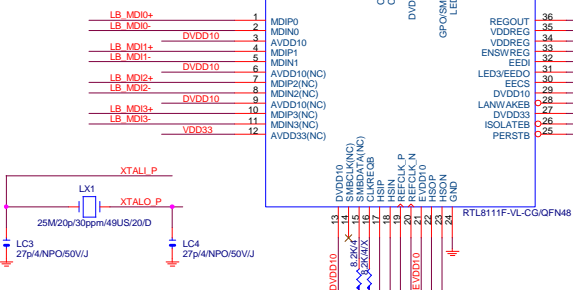
# FOR FAN1 ONLY



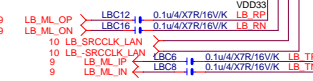
Gigabyte Technology

Title			HWM,KB/MS, FAN CTRL
Size	Document Number	Rev	
Custom	GA-Z87X-HD3	1.1	
Date:	Tuesday, November 05, 2013	Sheet	32 of 36

100歐姆:[20/4/8/4/20]



80歐姆:[15/5/5/5/15]

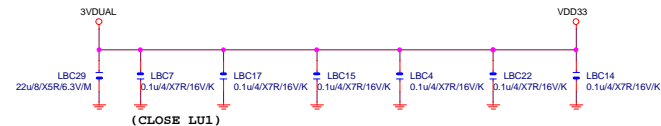
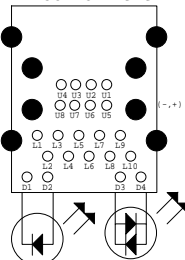


SRCCLK 50歐姆:[18/4/10/4/18]

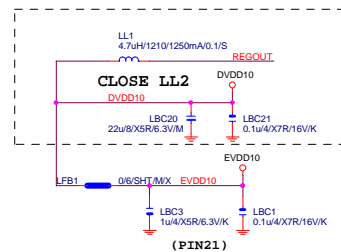
離IC近越好

FOR DSM MODE  
(DEEP SLEEP MODE)VDD33  
ENSWREG  
ENABLE SWDual Color LED  
D4  
D3  
Green  
OrangeSingle Color LED  
D2  
D1  
Yellow

P35-152-19W9



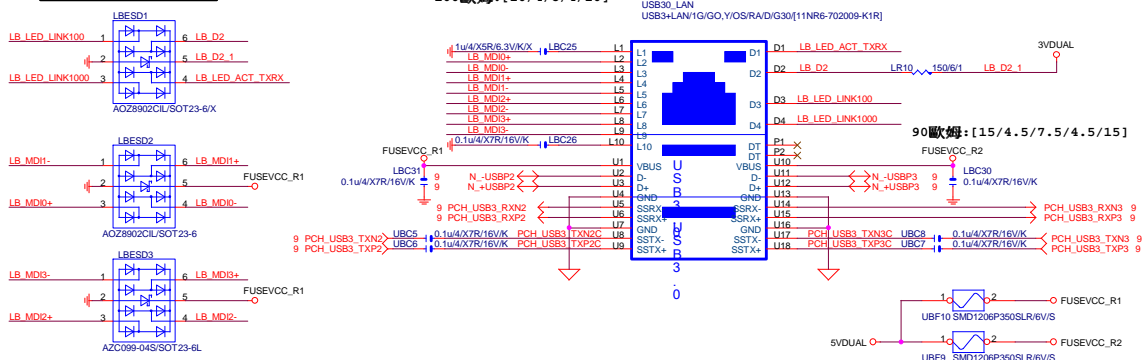
(PIN3, 6, 9, 13, 29, 41, 45)



(PIN21)

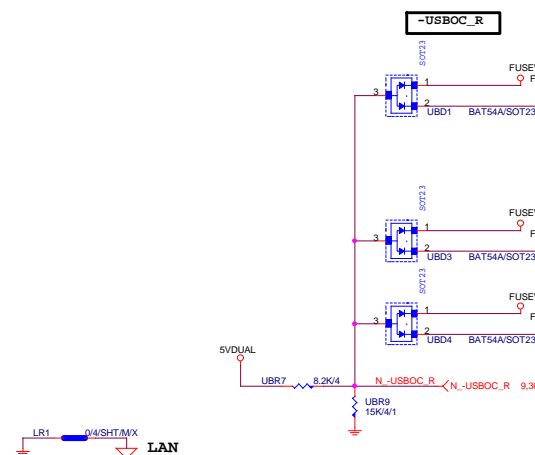
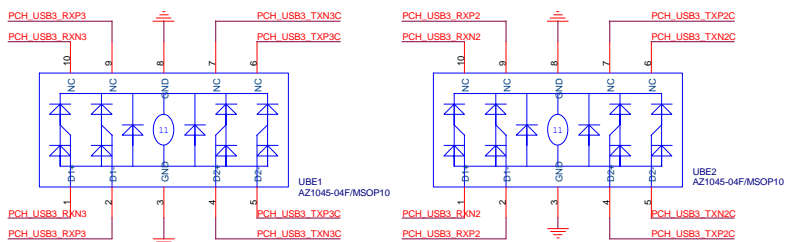
USB30\_LAN CONNECTOR

100歐姆:[20/4/8/4/20]

USB30\_LAN  
USB30\_LAN1/G/GQ,YOSRA/D/G30[11NR6-702009-K1R]

90歐姆:[15/4.5/7.5/4.5/15]

CLOSE USB30\_LAN



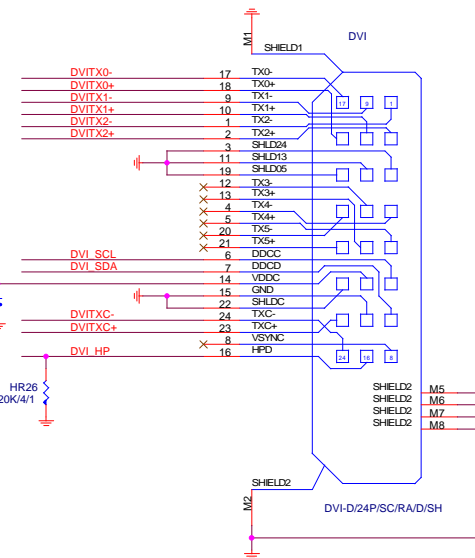
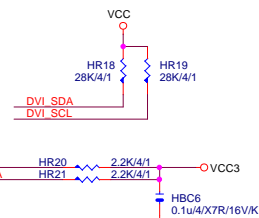
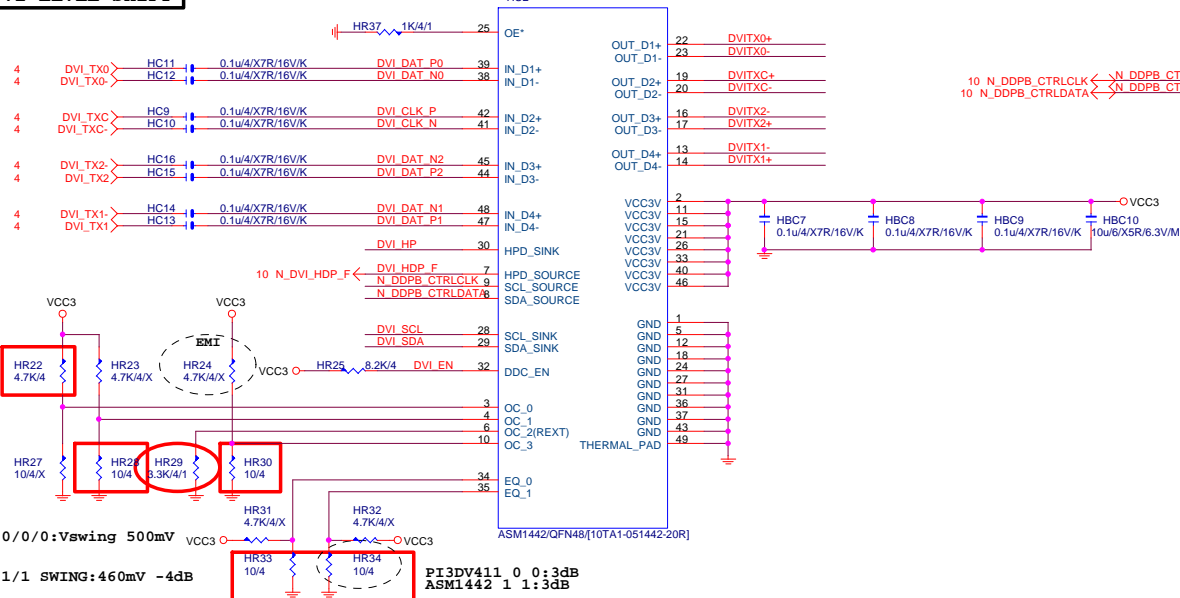
USB\_LAN &lt;--&gt; R\_USB30\_1



# DVI LEVEL SHIFT

DVI:20/4/6/4/20

Impedance=85 +- 17.5%

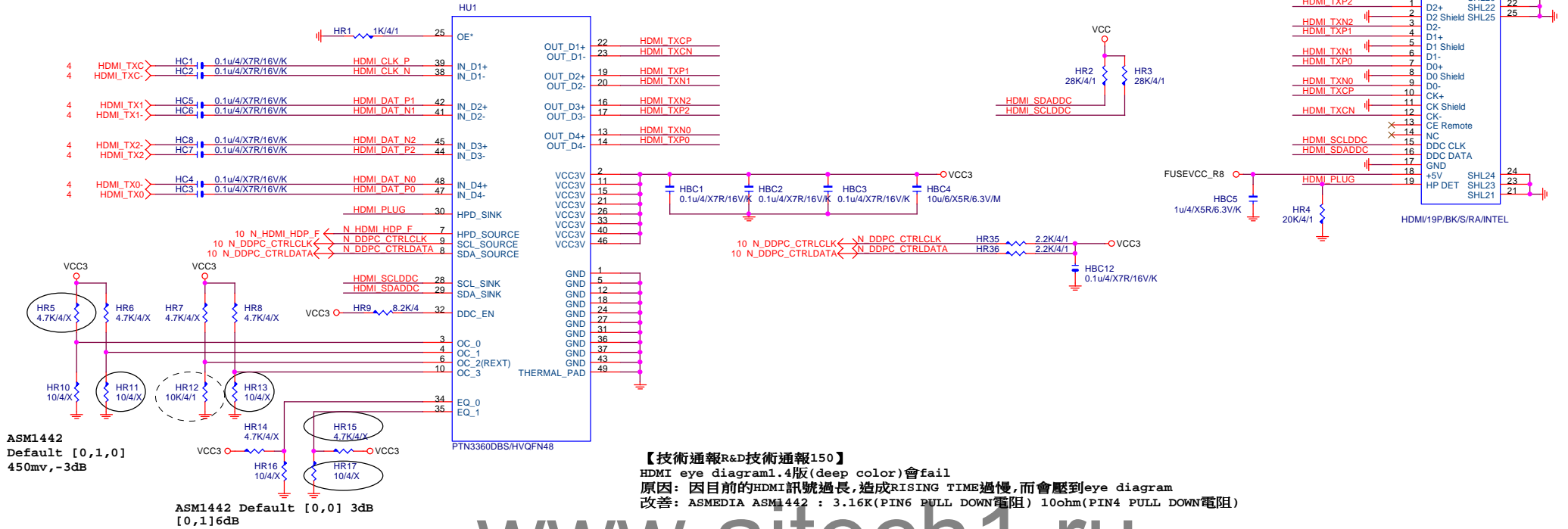


www.aitech1.ru

Gigabyte Technology		
Title		
TI TSB43AB23 1394		
Size	Document Number	Rev
Custom	GA-Z87X-HD3	1.1
Date:	Tuesday, November 05, 2013	Sheet 34 of 36

# HDMI LEVEL SHIFT

HDMI:20/4/6/4/20  
Impedance=85 +- 17.5%



www.aitech1.ru

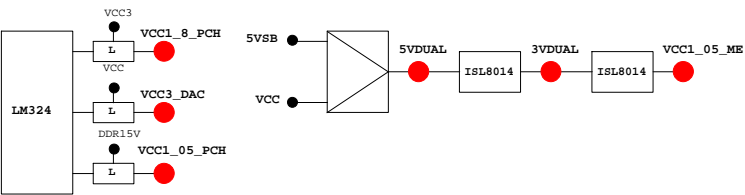
GIGABYTE™			
Title			
HDMI			
Size	Document Number	Rev	
Custom	GA-Z87X-HD3	1.1	
Date:	Tuesday, November 05, 2013	Sheet	35 of 36

PCH GPIO LIST TABLE					
PIN NAME	PWR	Default	USAGE	NOTE	
GP0	MAIN	H-Z	GPI	GPIO0	N/A
GP1/TACH1	MAIN		GPI	GPIO1	N/A
GP2/PIRQE#	MAIN		GPI	-PIRQE	P/U 8.2K VCC3
GP3/PIRQF#	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	PCIEX1 Detect	P/U 8.2K VCC3
GP7/TACH3	MAIN		GPI	GPIO7	P/U 8.2K VCC3
GP8	STBY	H	GPI	GPIO8	N/A
GP9/OC5#	STBY		NATIVE	USB OC5#	N/A
GP10/OC6#	STBY		NATIVE	USB OC6#	N/A
GP11/SMBALERT#	STBY		NATIVE	USB PWR protect	P/U 8.2K 3VDUAL
GP12	STBY	L	GPI	GPIO12	N/A
GP13	STBY	L	GPI	LPCPME#	P/U 8.2K 3VDUAL
GP14/OC7#	STBY		NATIVE	USB OC7#	N/A
GP15	STBY	L	GPI	GPIO15(TLS Enable)	P/U 8.2K 3VDUAL
GP16	MAIN		GPI	GPIO16	P/U 8.2K VCC3
GP17/TACH0	MAIN		GPI	GPIO17	P/U 8.2K VCC3
GP18	MAIN		GPI	Mobile Only	N/A
GP19	MAIN		GPI	GPIO19	P/U 8.2K VCC3
GP20	MAIN		GPI	GPIO20	P/U 8.2K VCC3
GP21	MAIN		GPI	GPIO21	P/U 8.2K VCC3
GP22	MAIN	H-Z	GPI	GPIO22	P/U 8.2K VCC3
GP23	MAIN		GPI	GPIO23	N/A
GP24	STBY	L	GPI	SKTOCC#	N/A
GP25	STBY			Mobile Only	N/A
GP26	STBY			Mobile Only	N/A
GP27	STBY	H	GPO	GPIO27	P/U 8.2K 3VDUAL
GP28	STBY	H	GPO	PWR LED	P/U 8.2K 3VDUAL
GP29	STBY	L	GPI	GPIO29	N/A
GP30	STBY	H-Z	GPI	Mobile Only	N/A
GP31	STBY	H-Z	GPI	Mobile Only	N/A
GP32	MAIN	H	GPO	N/A	N/A
GP33	MAIN	H	GPO	N/A	N/A
GP34	MAIN	H-Z	GPI	-PCI_STOP	P/U 8.2K VCC3
GP35	MAIN	L	GPO	-ACZ_DET	P/U 8.2K VCC3
GP36	MAIN		GPI	N/A	N/A
GP37	MAIN		GPI	N/A	N/A
GP38	MAIN	H-Z	GPI	PCIEX4 Detect	P/U 8.2K VCC3
GP39	MAIN	H-Z	GPI	GPIO39	P/U 8.2K VCC3
GP40	STBY		NATIVE	USB OC1#	N/A
GP41	STBY		NATIVE	USB OC2#	N/A
GP42	STBY		NATIVE	USB OC3#	N/A
GP43	STBY		NATIVE	USB OC4#	N/A
GP44	STBY	L	NATIVE	GPIO44	P/U 8.2K 3VDUAL
GP45	STBY		NATIVE	GPIO45	P/U 8.2K 3VDUAL
GP46	STBY	L	NATIVE	GPIO46	P/U 8.2K 3VDUAL
GP47	STBY			Mobile Only	N/A
GP48	MAIN	H-Z	IN	GPIO48	P/U 8.2K 3VDUAL
GP49	MAIN	H-Z	IN	GPIO49	P/U 8.2K 3VDUAL
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	Mobile Only	N/A
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			Mobile Only	N/A
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

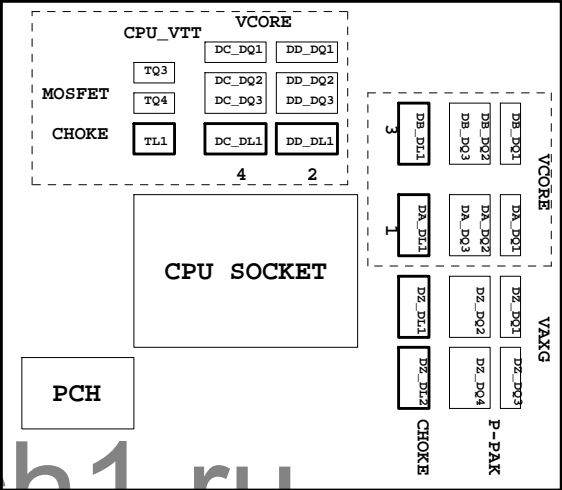
Super I/O ITE8720 GPIO Table

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	-PCI_E_RST	
RSMRST#CIRRXL/GP55	-RSMRST	
PME#/GP54	-LPCPME	
PD5/GP75/BUSS00	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	
3VBSBW#/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/BUSS01	MB_ID3	
PD7/GP77/BUSS02	MB_ID4	
AFD#/GP86/SMBC_R	SEC_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/BUSS00	SB_LED3_C	



PWM各相位的擺法如下：



BIOS超電壓對應表：

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

散熱模組料號：

Z77-D3H :  
PCH :  
12SP2-S05511-01R/02R/03R  
MOSFET :  
12SP2-S08924-01R/02R/03R

	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