

## Model Name: GA-Z97X-UD5H-BK

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 EXPRESSx16 SLOT
15	PCI EXPRESSx8 SLOT
16	PCI EXPRESSx4 SLOT
17	PCI EXPRESSx16 x8 x4 Switch
18	PCI EXPRESSx1 Slot 1 & 2
19	ITE8892E PCIe to PCI Bridge
20	PCI SLOT 1 & 2
21	ALC1150 CODEC
22	REAR AUDIO JACK
23	ITE8620CX LPC IO
24	COM/KB_MS_USB/PROHOT/USB PROTECT
25	IR3563B
26	IR3598 VCORE Phase 1~6
27	IR3598 VCORE Phase 7~12
28	DISCRETE POWER
29	DUAL BIOS

SHEET

TITLE

30	FP,F_USB,BZ
31	ATX POWER CONNECTOR
32	H/W MONITOR,FAN CTRL
33	DVI
34	HDMI & USB30
35	ARTHEROS E2201 (Bigfoot)
36	M.2_SATA_EXPRESS
37	IR3570 DDR PWM
38	IR3598 DDR1.5V 2-Phase
39	Intel i217V GbE LAN
40	Marvell 9172 SATA6Gx2
41	uPD720210 USB3.0 Hub
42	uPD720210 USB3.0 Hub_Power
43	M3 Power
44	RST, PWR, CLR_CMOS Button
45	TABLE LIST

PH7 PH8 PH1 PH2 PH9 PH10 PH3

PH4

PH11

PH12

PH5

PH6

CPU SOCKET

2 oz PCB

Gigabyte Technology

Title			
Cover Sheet			
Size	Document Number	Rev	
Custom	GA-Z97X-UD5H	1.01	
Date:	Monday, May 26, 2014	Sheet	1 of 45

## D

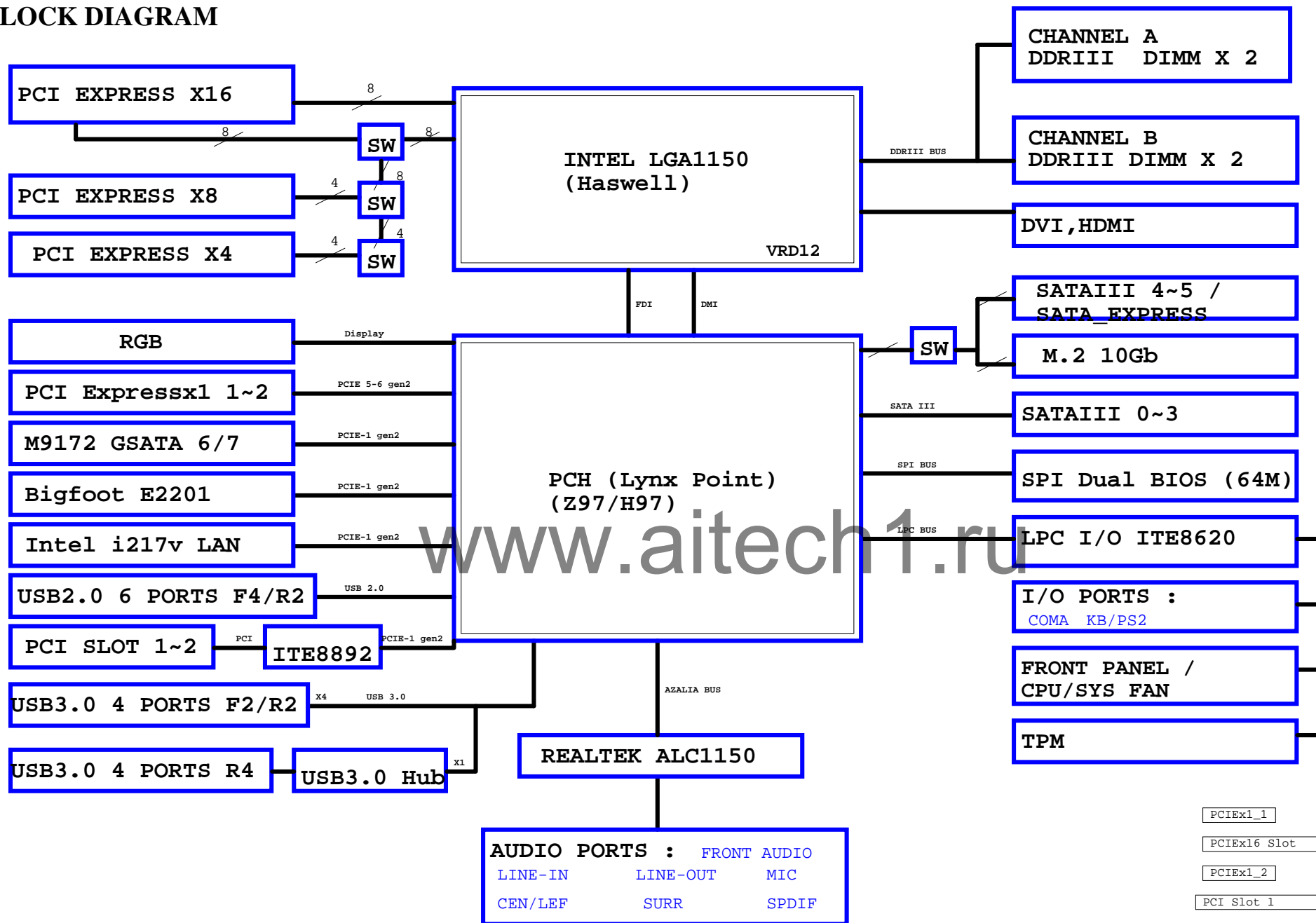
[illegible]C

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## 3

D

# BLOCK DIAGRAM



PCIEx1\_1

PCIEx16 Slot

PCIEx1\_2

PCI Slot 1

PCIEx8

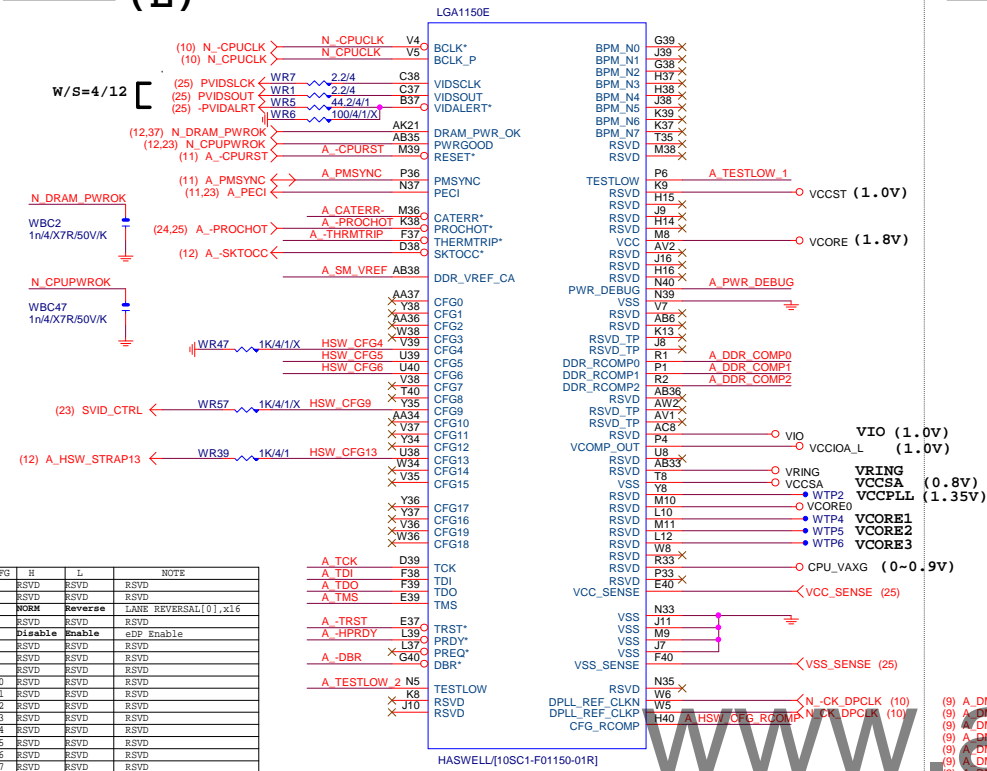
PCI Slot 2

PCIEx4

**Gigabyte Technology**

Title			BLOCK DIAGRAM
Size	Document Number	GA-Z97X-UD5H	
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LGA1150 (E)

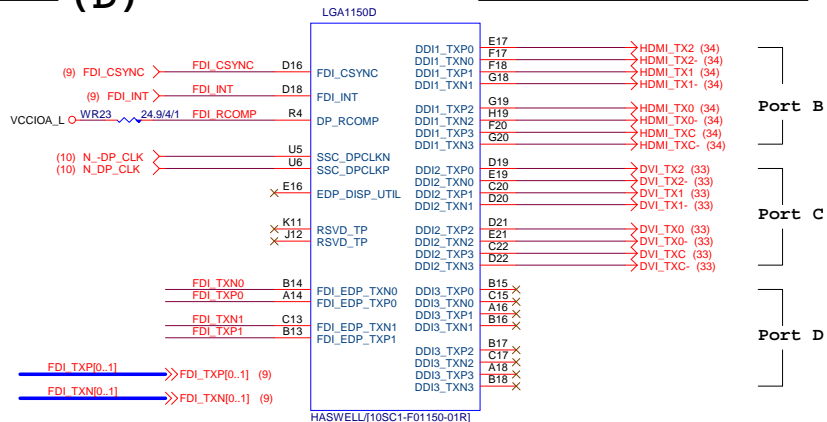


CFG	H	L	NOTE
0	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
1	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
2	<b>Non-Reversible</b>	<b>RSVD</b>	<b>DATA REVERSAL[0],x16</b>
3	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
4	<b>Disable</b>	<b>Enable</b>	<b>eDP Enable</b>
7	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
8	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
9	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
10	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
11	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
12	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
13	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
14	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
15	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
16	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>
17	<b>RSVD</b>	<b>RSVD</b>	<b>RSVD</b>

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

**LGA1150 (D)**



FDI:4/4/4//15(breakout min 4/4/4//8)  
Impedance=85 +- 15%

DP/HDMI 4/4/4//20      FDI 4/4/4/12

Impedance=85 +- 15%

**LGA1155 (C)**



CPU PEG 5/5/5//20 Impedance=80 +- 15%

DMI 4/4/4//15

\_\_\_\_\_

## -CPURST

1.1V分壓

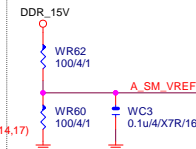
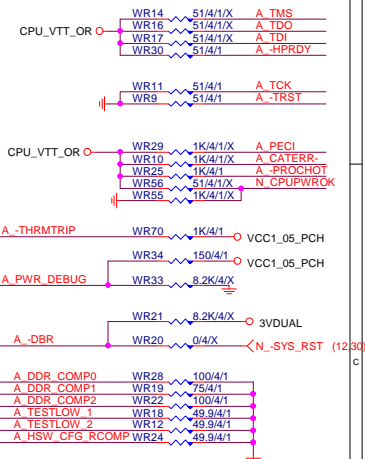
Remove分壓電阻

WBC3  
1p4/Y3B/E0V/V

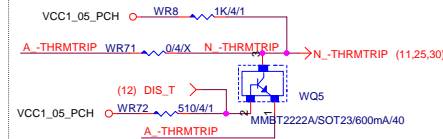
## CPU SVID



## CPU PU/PD



## THRMTRIP DISABLE FOR Z87 OVERCLOCK





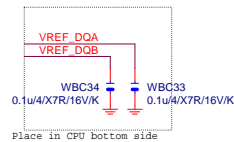
## LGA1150 (A)

LGA1150A			
MAAA0	AU13	DDR0_MA0	DDR0_DQ0
MAAA1	AV16	DDR0_MA1	DDR0_DQ1
MAAA2	AU16	DDR0_MA2	DDR0_DQ2
MAAA3	AW17	DDR0_MA3	DDR0_DQ3
MAAA4	AU17	DDR0_MA4	DDR0_DQ4
MAAA5	AW18	DDR0_MA5	DDR0_DQ5
MAAA6	AV17	DDR0_MA6	DDR0_DQ6
MAAA7	AT18	DDR0_MA7	DDR0_DQ7
MAAA8	AU18	DDR0_MA8	DDR0_DQ8
MAAA9	AT19	DDR0_MA9	DDR0_DQ9
MAAA10	AW11	DDR0_MA10	DDR0_DQ10
MAAA11	AV19	DDR0_MA11	DDR0_DQ11
MAAA12	AU19	DDR0_MA12	DDR0_DQ12
MAAA13	AY10	DDR0_MA13	DDR0_DQ13
MAAA14	AT20	DDR0_MA14	DDR0_DQ14
MAAA15	AU21	DDR0_MA15	DDR0_DQ15
MODT_A0	AW10	DDR0_ODT0	DDR0_ODT0
MODT_A1	AY8	DDR0_ODT1	DDR0_ODT1
MODT_A2	AW9	DDR0_ODT2	DDR0_ODT2
MODT_A3	AU8	DDR0_ODT3	DDR0_ODT3
AW33		DDR0_ECC0	DDR0_ECC0
AV33		DDR0_ECC1	DDR0_ECC1
AU31		DDR0_ECC2	DDR0_ECC2
AV31		DDR0_ECC3	DDR0_ECC3
AT33		DDR0_ECC4	DDR0_ECC4
AU33		DDR0_ECC5	DDR0_ECC5
AT31		DDR0_ECC6	DDR0_ECC6
AW31		DDR0_ECC7	DDR0_ECC7
SBA00	SBA01	DDR0_BA0	DDR0_BA0
SBA01	SBA02	DDR0_BA1	DDR0_BA1
SBA02	AT21	DDR0_BA2	DDR0_BA2
CKEA0	AV22	DDR0_CKE0	DDR0_CKE0
CKEA1	AT23	DDR0_CKE1	DDR0_CKE1
CKEA2	AU22	DDR0_CKE2	DDR0_CKE2
CKEA3	AU23	DDR0_CKE3	DDR0_CKE3
CSA0	AU14	DDR0_CS_N0	DDR0_CS_N0
CSA1	AV9	DDR0_CS_N1	DDR0_CS_N1
CSA2	AU10	DDR0_CS_N2	DDR0_CS_N2
CSA3	AW8	DDR0_CS_N3	DDR0_CS_N3
DCLKA0	AY15	DDR0_CLK_P0	DDR0_CLK_P0
DCLKA0	AY16	DDR0_CLK_N0	DDR0_CLK_N0
DCLKA1	AW15	DDR0_CLK_P1	DDR0_CLK_P1
DCLKA1	AV15	DDR0_CLK_N1	DDR0_CLK_N1
DCLKA2	AW14	DDR0_CLK_P2	DDR0_CLK_P2
DCLKA2	AW14	DDR0_CLK_N2	DDR0_CLK_N2
DCLKA3	AW13	DDR0_CLK_P3	DDR0_CLK_P3
DCLKA3	AY13	DDR0_CLK_N3	DDR0_CLK_N3
AW12		RSVD	RSVD
SRASA	AU12	DDR0_RAS*	DDR0_RAS*
SWEA	AU11	DDR0_WE*	DDR0_WE*
AW20		RSVD	RSVD
AW27		RSVD	RSVD
SCASA	AU9	DDR0_CAS*	DDR0_CAS*
WR61	AK22	DDR_RESET	DDR_RESET
WC4			
0.1u4/X7R/16V/KX			

HASWELL[10SC1-F01150-01R]

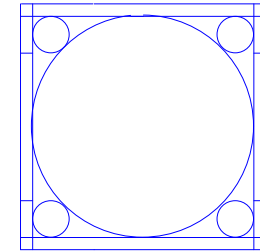
## LGA1150 (B)

LGA1150B			
MAAB0	AL19	DDR1_MA0	DDR1_DQ0
MAAB1	AK23	DDR1_MA1	DDR1_DQ1
MAAB2	AM22	DDR1_MA2	DDR1_DQ2
MAAB3	AM23	DDR1_MA3	DDR1_DQ3
MAAB4	AP23	DDR1_MA4	DDR1_DQ4
MAAB5	AL23	DDR1_MA5	DDR1_DQ5
MAAB6	AY24	DDR1_MA6	DDR1_DQ6
MAAB7	AV25	DDR1_MA7	DDR1_DQ7
MAAB8	AU26	DDR1_MA8	DDR1_DQ8
MAAB9	AW25	DDR1_MA9	DDR1_DQ9
MAAB10	AP18	DDR1_MA10	DDR1_DQ10
MAAB11	AY25	DDR1_MA11	DDR1_DQ11
MAAB12	AV26	DDR1_MA12	DDR1_DQ12
MAAB13	AR15	DDR1_MA13	DDR1_DQ13
MAAB14	AV27	DDR1_MA14	DDR1_DQ14
MAAB15	AY28	DDR1_MA15	DDR1_DQ15
MODT_B0	AM17	DDR1_ODT0	DDR1_ODT0
MODT_B1	AL18	DDR1_ODT1	DDR1_ODT1
MODT_B2	AM16	DDR1_ODT2	DDR1_ODT2
MODT_B3	AK15	DDR1_ODT3	DDR1_ODT3
AM26		DDR1_ECC0	DDR1_ECC0
AP25		DDR1_ECC1	DDR1_ECC1
AP26		DDR1_ECC2	DDR1_ECC2
AL26		DDR1_ECC3	DDR1_ECC3
AL25		DDR1_ECC4	DDR1_ECC4
AR26		DDR1_ECC5	DDR1_ECC5
AR25		DDR1_ECC6	DDR1_ECC6
AK17		DDR1_BA0	DDR1_BA0
SBA01	AL18	DDR1_BA1	DDR1_BA1
SBA02	AW28	DDR1_BA2	DDR1_BA2
CKEB0	AW29	DDR1_CKE0	DDR1_CKE0
CKEB1	AU29	DDR1_CKE1	DDR1_CKE1
CKEB2	AU28	DDR1_CKE2	DDR1_CKE2
CKEB3	AU29	DDR1_CKE3	DDR1_CKE3
CSB0	AP17	DDR1_CS_N0	DDR1_CS_N0
CSB1	AN15	DDR1_CS_N1	DDR1_CS_N1
CSB2	AN17	DDR1_CS_N2	DDR1_CS_N2
CSB3	AL15	DDR1_CS_N3	DDR1_CS_N3
DCLKB0	AM20	DDR1_CLK_P0	DDR1_CLK_P0
DCLKB0	AM21	DDR1_CLK_N0	DDR1_CLK_N0
DCLKB1	AP21	DDR1_CLK_P1	DDR1_CLK_P1
DCLKB1	AN20	DDR1_CLK_N1	DDR1_CLK_N1
DCLKB2	AN20	DDR1_CLK_P2	DDR1_CLK_P2
DCLKB2	AP19	DDR1_CLK_N2	DDR1_CLK_N2
DCLKB3	AP20	DDR1_CLK_P3	DDR1_CLK_P3
DCLKB3	AP20	DDR1_CLK_N3	DDR1_CLK_N3
SCASB	AP16	DDR1_CAS*	DDR1_CAS*
SRASB	AM18	RSVD	RSVD
SWEB	AK16	DDR1_RAS*	DDR1_RAS*
SWEB	AK16	DDR1_WE*	DDR1_WE*
AB39		DDR_VREF_DQ0	DDR_VREF_DQ0
AB40		DDR_VREF_DQ1	DDR_VREF_DQ1



HASWELL[10SC1-F01150-01R]

## LGA1150 (CR)

LGA1150  
ILM\_BP\_CR/115X/BKNI[12KRC-0F0001-61R]

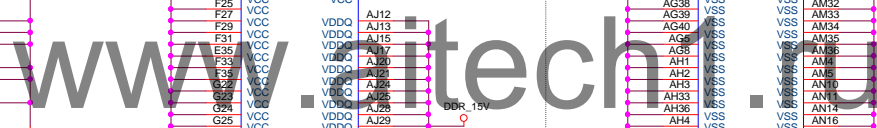
## DDR BUS

(7) MODT_A[0..3]	MODT_A[0..3]
(8) MODT_B[0..3]	MODT_B[0..3]
(7) MDA[0..63]	MDA[0..63]
(8) MDB[0..63]	MDB[0..63]
(7) DQSA[0..7]	DQSA[0..7]
(7) DQSA[0..7]	-DQSA[0..7]
(7) MAA[0..15]	MAA[0..15]
(8) MAAB[0..15]	MAAB[0..15]
(8) DQSB[0..7]	DQSB[0..7]
(8) -DQSB[0..7]	-DQSB[0..7]

## Gigabyte Technology

Title		CPU LGA1150-B	
Size	Document Number	GA-Z97X-UD5H	
Custom			Rev 1.01
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**(F, J)**



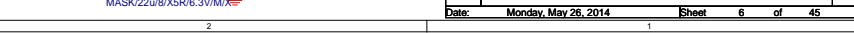
**(G,H,I)**

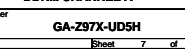


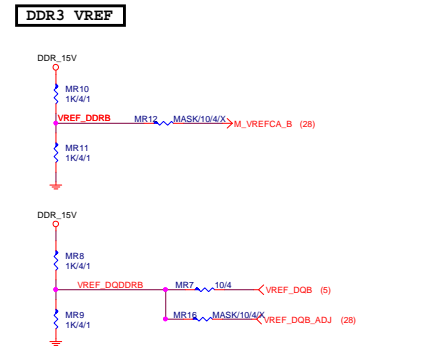
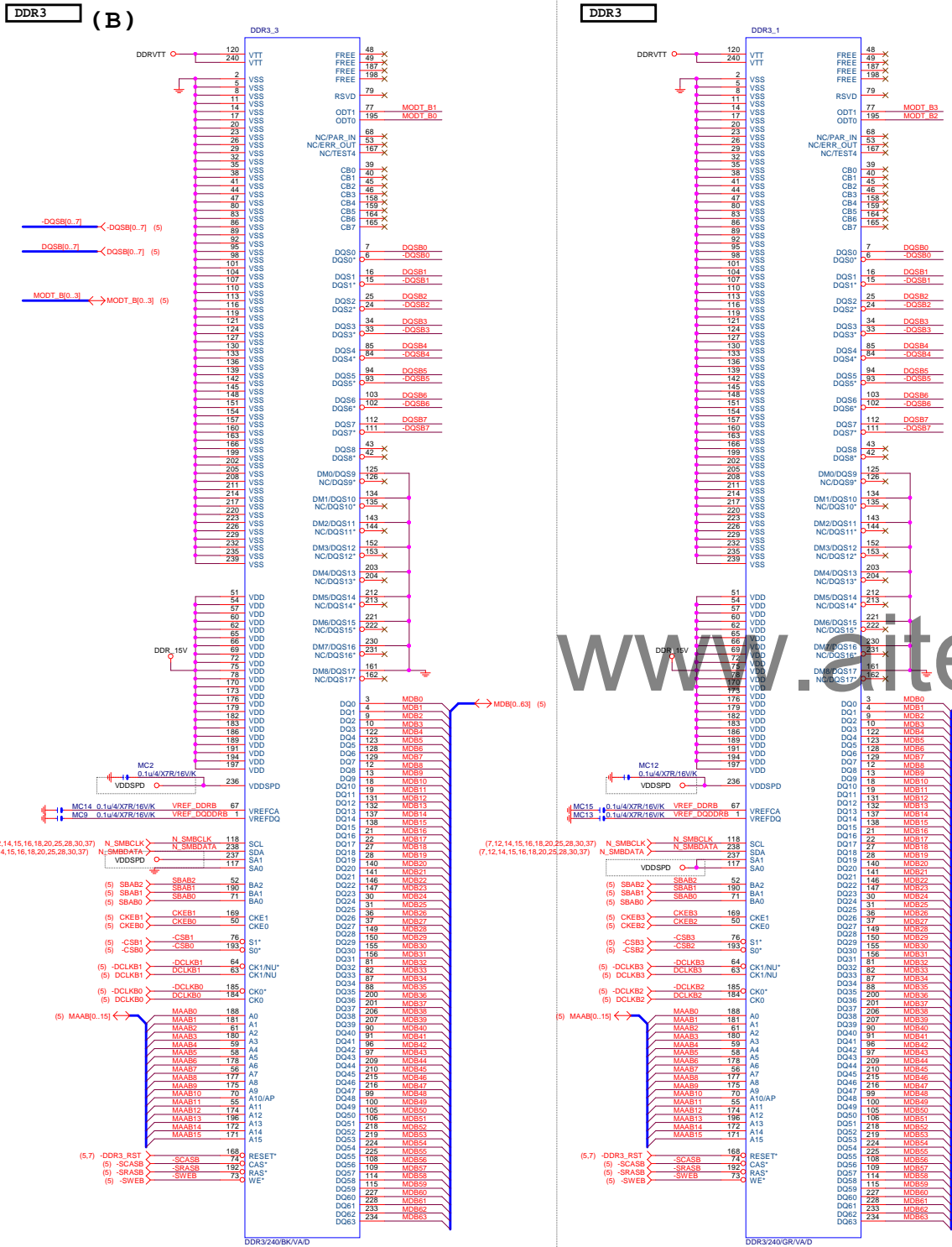
(X30)



(X15)







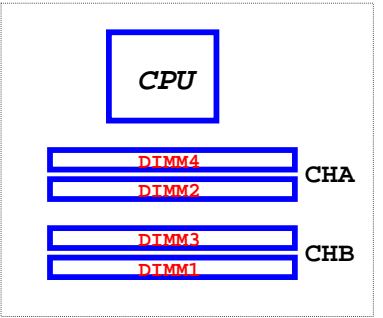
**DDR3 1066,1333,1600MHZ BANDWIDTH**

DDR3 1066MHZ  
DDR3 clock=533MHZ  
DDR3 single channel bandwidth=533x2x8Byte=8.5GB/s  
DDR3 dual channel bandwidth=533x2x2x8Byte=17GB/s

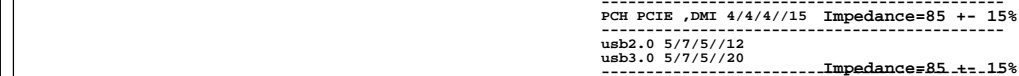
DDR3 1333MHZ  
DDR3 clock=667MHZ  
DDR3 single channel bandwidth=10.6GB/s  
DDR3 dual channel bandwidth=21GB/s

DDR3 1600MHZ  
DDR3 clock=800MHZ  
DDR3 single channel bandwidth=12.8GB/s  
DDR3 dual channel bandwidth=25.6GB/s

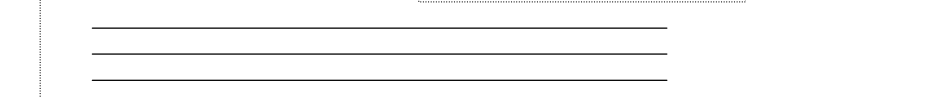
COUPON



DMI:12/4/4/4/12(breakout min 8/4/4/4/8)  
Impedance=85 +- 17.5%



(30) PCH USB3 RXN0 >



Pin connection diagram for the 297/SI10HB1-030Z97-20R1 component. The diagram shows a central component box with pins on the left and right. Left pins are labeled AT1, AT41, AU1, AV1, AV2, AV40, AV41, AW2, AW40, B40, B41, C41, D1, and D41. Right pins are labeled TP22, TP23, TP21, TP20, TP14, TP15, TP12, TP10, TP11, TP9, TP3, TP4, TP1, TP2, TP5, TP6, TP7, TP8, AC31, AF3, and AV21. Some pins are crossed out with an 'X'. A ground symbol is shown at the bottom left and bottom right.

PCH\_HS

1X

X2

PCH\_HS[12SP2-PTZ975-11R]

MOS heatsink + PCH heatsink  
Black edition

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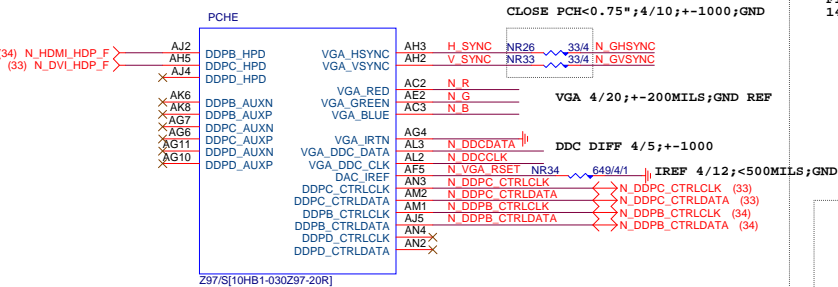
OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)

```

USB Usage & OC# Configure			
OC0#	USB0_1	F_USB30	FUSEVCC_F1_F2
OC1#	USB2	USB3_LAN1	UC_FUSEVCC34
	(U3 Hub)	USB3_LAN2	UC_FUSEVCC12
	USB3	N/A	
OC2#	USB4_5	HDMI & R_USB3	FUSEVCC_R1_R2
OC3#	USB6_7	N/A	
OC4#	USB8_9	KB_MS_USB	FUSEVCC_R3_R4
OC5#	USB10_11	F_USB2	FUSEVCC_F5_F6
OC6#	USB12_13	F_USB1	FUSEVCC_F3_F4
OC7#	Not Use		



# PCH (E)



**VGA DISABLE**

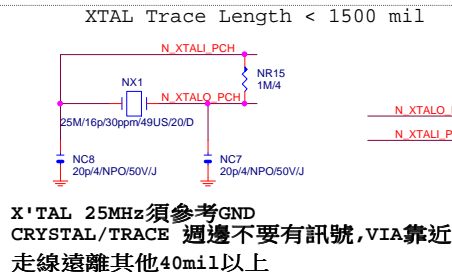
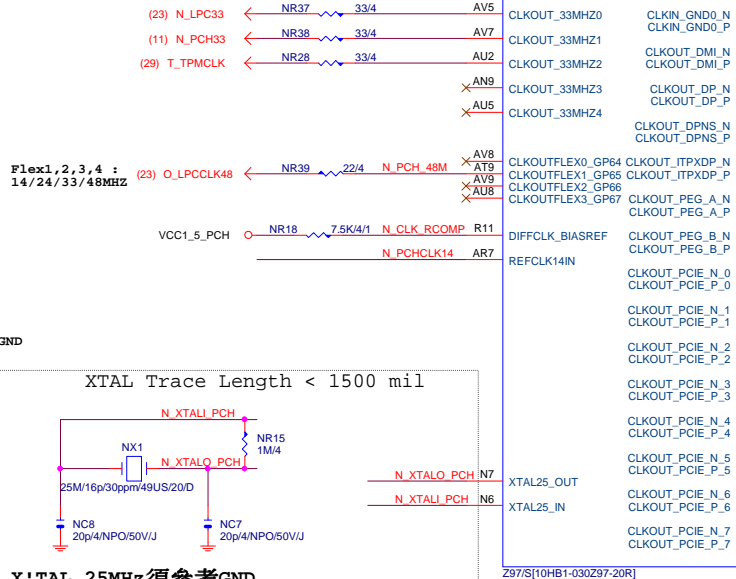
R,G,B NC OR GND

IRTN / IREF GND

VGA\_HSYNC, VGA\_VSYNC, DDC\_CLK,  
DDC\_DATA NC

POWER VCCADAC(AF2),  
VCCADACBG(AE1) GND

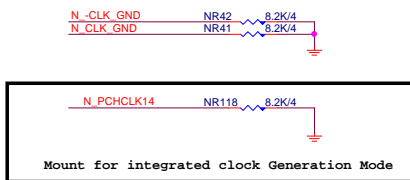
# PCH (G)



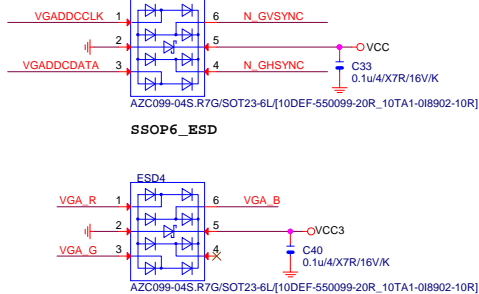
PCIE4 CLOCK(PE\_SRCCLK\_3GIO1)由PIN R6,R7  
換成PIN W7,W6 避免跟CRYSTAL 25MHZ干擾

Differential Clock:18/4/6/4/18  
Impedance=90 +- 15%

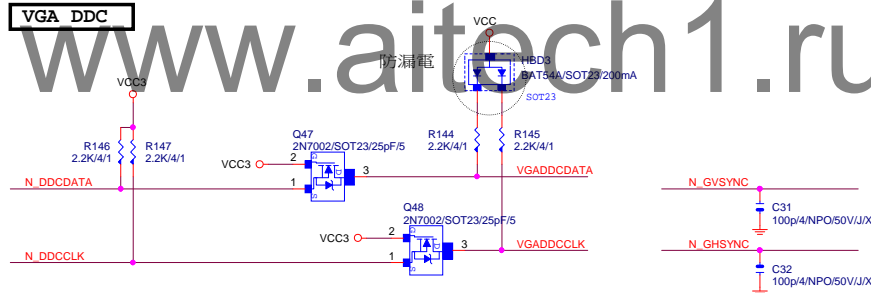
## PCH CLK PD



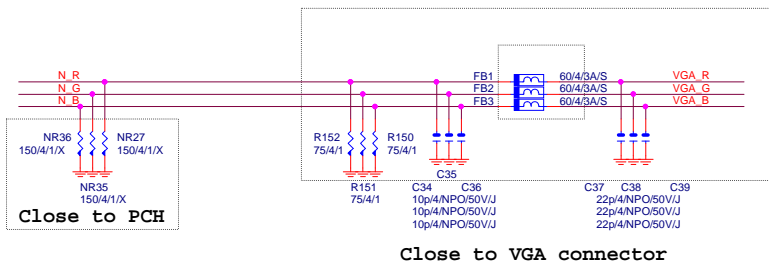
## VGA ESD



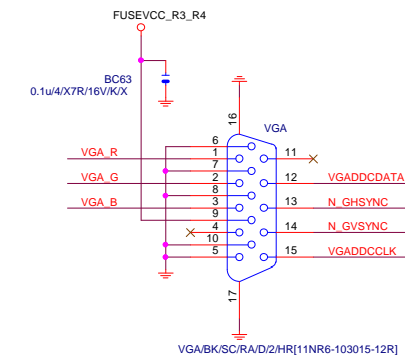
## VGA DDC



## VGA DDC



## VGA CONNECTOR

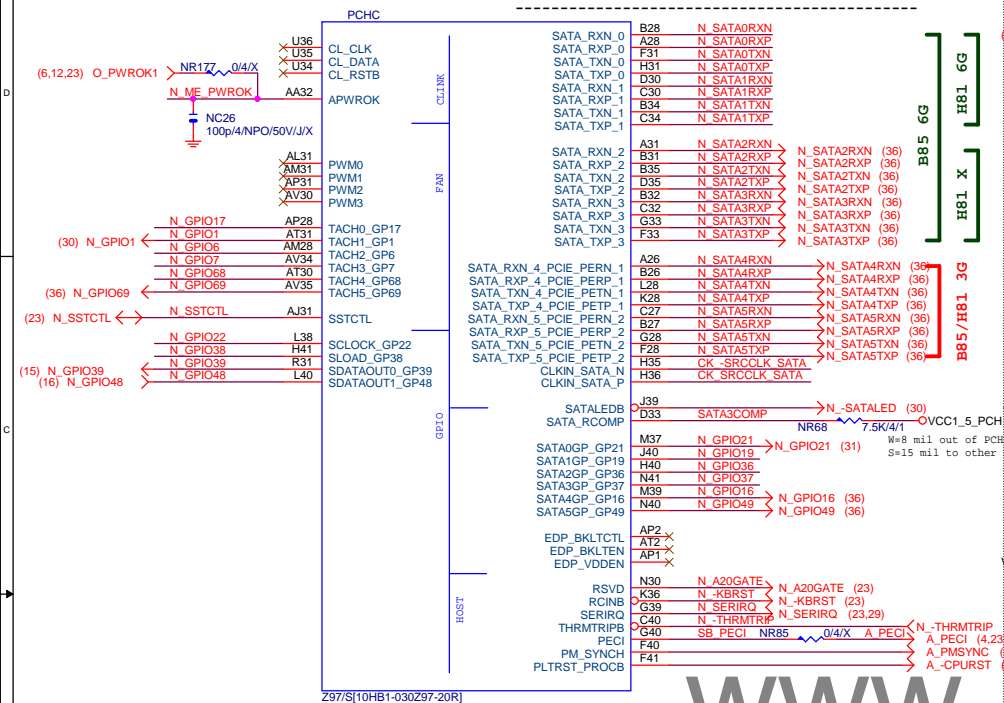


## Gigabyte Technology

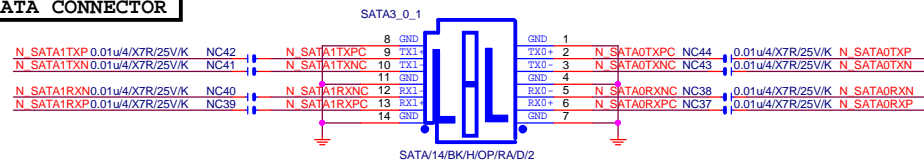
Title			
PCH DISPLAY ,CLK BUFFER			
Size	Document Number	Rev	
Custom	GA-Z97X-UD5H	1.01	
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**PCH (C)**

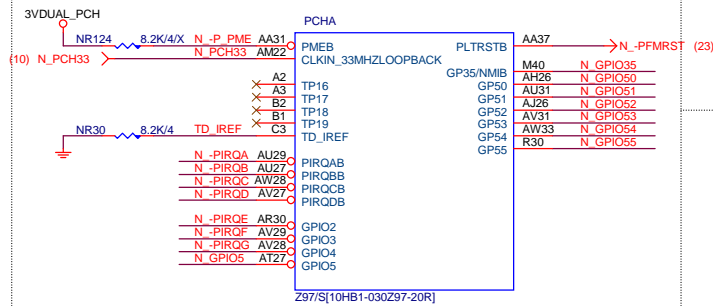
```
SATA3 : 20/4/4/20 (breakout min 8/4/4/4/8)
Impedance=85 +- 17.5%
-----
SATA2 4/4/4//15
SATA3 4/4/4//20
```



## SATA CONNECTOR



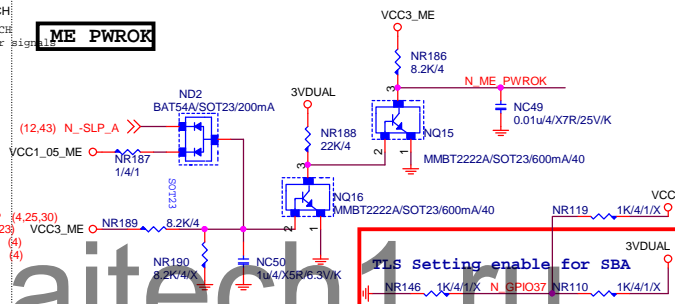
**PCH (A)**



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

BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	float	float

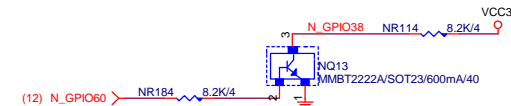
ME PWROK



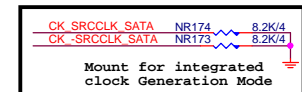
GPI038 Ctrl

**MFG Mode**

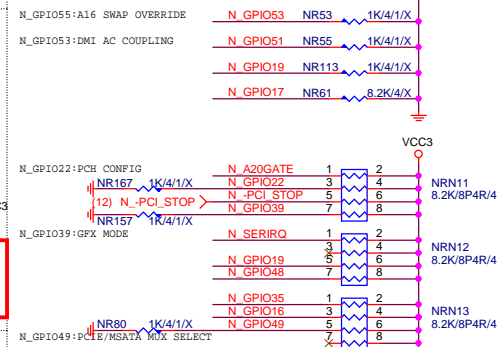
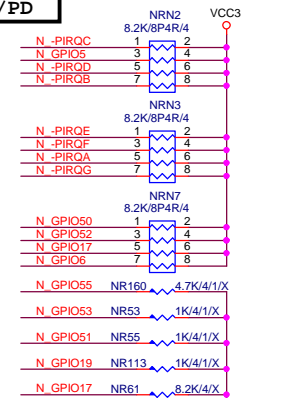
```
N_GPIO38 : Lo --> Enable
           Hi --> Disable
```



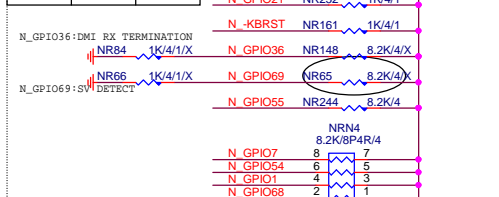
PCH	CLK	PD
-----	-----	----



PCH	PU/PD
-----	-------



soft strap	GP16	GP49
0	pcie1	pcie2
1	sata4	sata5

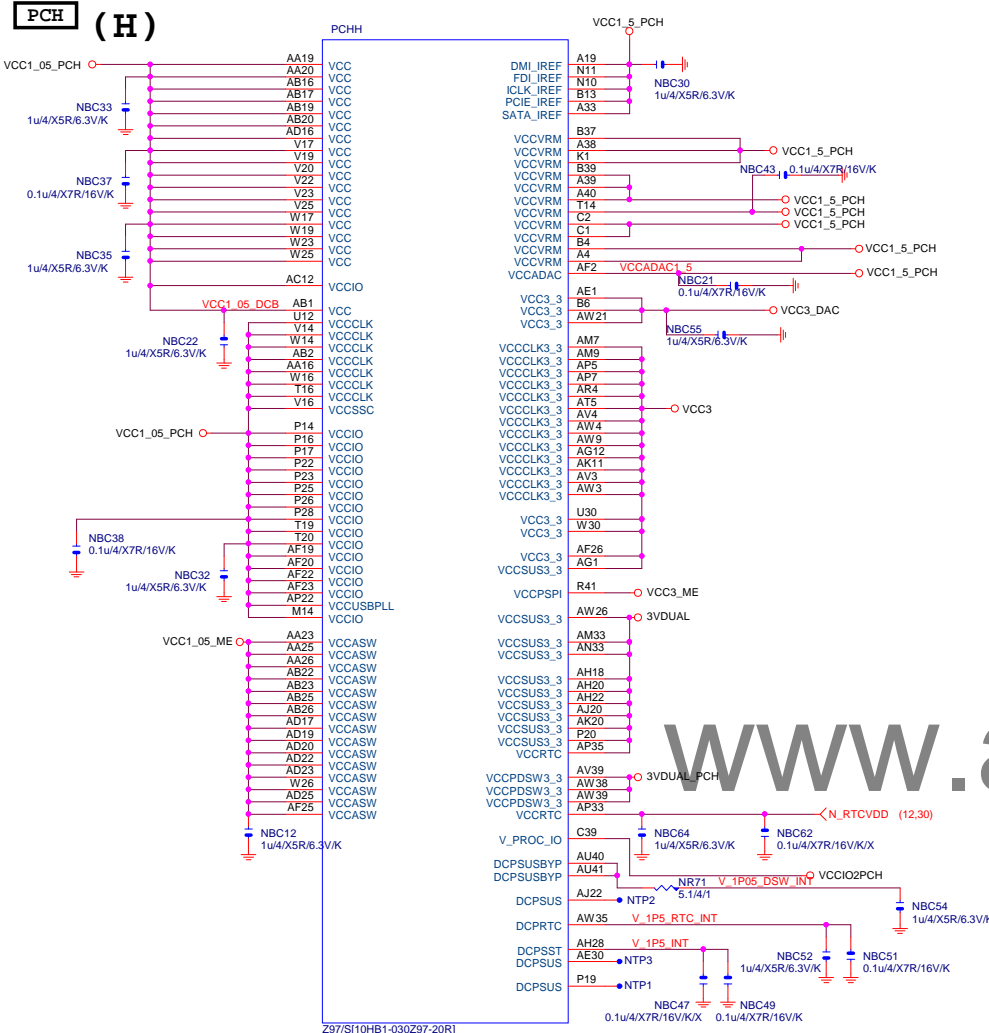


## Gigabyte Technology

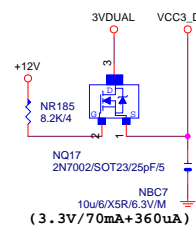
Title			
PCH HOST , SATA, PCI			
Size	Document Number		Rev
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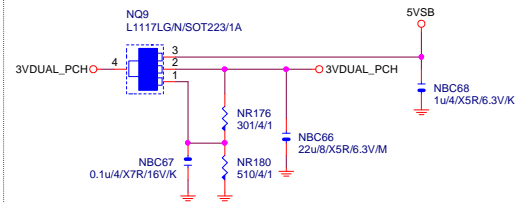




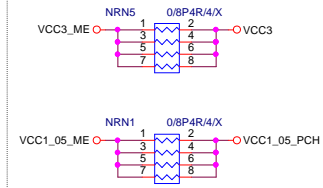
CLOSE北橋(注意震盪水波紋)



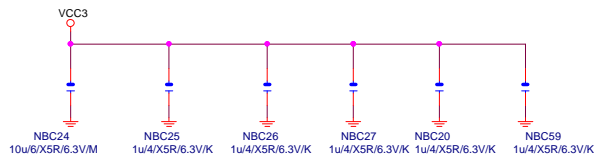
## 3VDUAL\_PCH



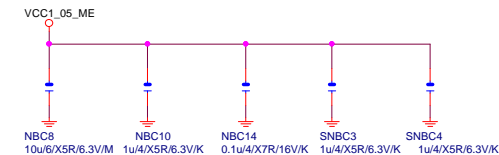
SHT PWR



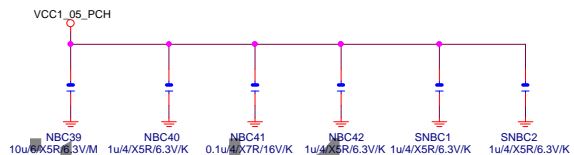
**( 3.3V ) ( X6 )**



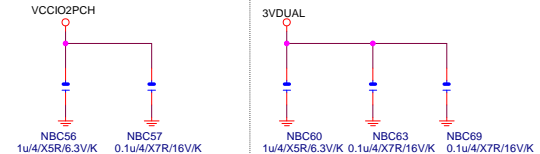
(1.05V) (x5)



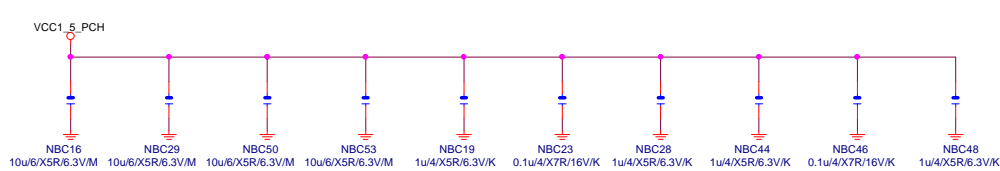
(1.05V) (x6)



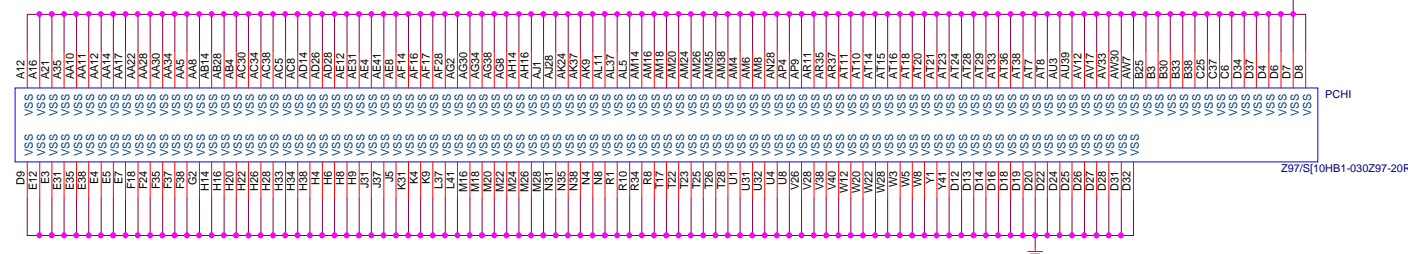
**(1.05V)(X2) (3.3V) (X3)**



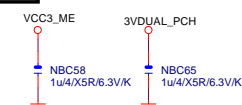
(1.5V) (x10)



**PCH (I)**



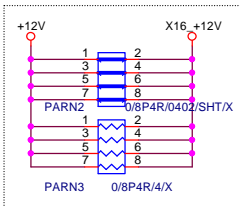
## CAP



## Gigabyte Technology

Title			
PCH PWR ,GND			
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**+12 protect  
short-wire test**



PCIE16:16/5/5/16

PA EXP RXP0.15] >> PA\_EXP\_RXP0.15] (4,17)  
PA EXP RXN0.15] >> PA\_EXP\_RXN0.15] (4,17)  
PA EXP TXP0.15] >> PA\_EXP\_TXP0.15] (4,17)  
PA EXP TXN0.15] >> PA\_EXP\_TXN0.15] (4,17)

PA EXP TXP0	PAC5	0.22u/4/X5R6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC6	0.22u/4/X5R6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC7	0.22u/4/X5R6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC8	0.22u/4/X5R6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC9	0.22u/4/X5R6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC10	0.22u/4/X5R6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC11	0.22u/4/X5R6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC12	0.22u/4/X5R6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC13	0.22u/4/X5R6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC14	0.22u/4/X5R6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC15	0.22u/4/X5R6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC16	0.22u/4/X5R6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC17	0.22u/4/X5R6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC18	0.22u/4/X5R6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22u/4/X5R6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC20	0.22u/4/X5R6.3V/K	PA EXP TXN7 C
PA EXP SW TXP8	PAC21	0.22u/4/X5R6.3V/K	PA EXP SW TXP8 C
PA EXP SW TXN8	PAC22	0.22u/4/X5R6.3V/K	PA EXP SW TXN8 C
PA EXP SW TXP9	PAC23	0.22u/4/X5R6.3V/K	PA EXP SW TXP9 C
PA EXP SW TXN9	PAC24	0.22u/4/X5R6.3V/K	PA EXP SW TXN9 C
PA EXP SW TXP10	PAC25	0.22u/4/X5R6.3V/K	PA EXP SW TXP10 C
PA EXP SW TXN10	PAC26	0.22u/4/X5R6.3V/K	PA EXP SW TXN10 C
PA EXP SW TXP11	PAC27	0.22u/4/X5R6.3V/K	PA EXP SW TXP11 C
PA EXP SW TXN11	PAC28	0.22u/4/X5R6.3V/K	PA EXP SW TXN11 C
PA EXP SW TXP12	PAC29	0.22u/4/X5R6.3V/K	PA EXP SW TXP12 C
PA EXP SW TXN12	PAC30	0.22u/4/X5R6.3V/K	PA EXP SW TXN12 C
PA EXP SW TXP13	PAC31	0.22u/4/X5R6.3V/K	PA EXP SW TXP13 C
PA EXP SW TXN13	PAC32	0.22u/4/X5R6.3V/K	PA EXP SW TXN13 C
PA EXP SW TXP14	PAC33	0.22u/4/X5R6.3V/K	PA EXP SW TXP14 C
PA EXP SW TXN14	PAC34	0.22u/4/X5R6.3V/K	PA EXP SW TXN14 C
PA EXP SW TXP15	PAC35	0.22u/4/X5R6.3V/K	PA EXP SW TXP15 C
PA EXP SW TXN15	PAC36	0.22u/4/X5R6.3V/K	PA EXP SW TXN15 C

PA EXP SW RXP8.15] >> PA\_EXP\_SW\_RXP8.15] (17)  
PA EXP SW RXN8.15] >> PA\_EXP\_SW\_RXN8.15] (17)  
PA EXP SW TXP8.15] >> PA\_EXP\_SW\_TXP8.15] (17)  
PA EXP SW TXN8.15] >> PA\_EXP\_SW\_TXN8.15] (17)

PCI-E REV:1.1--> 2.5GHZ

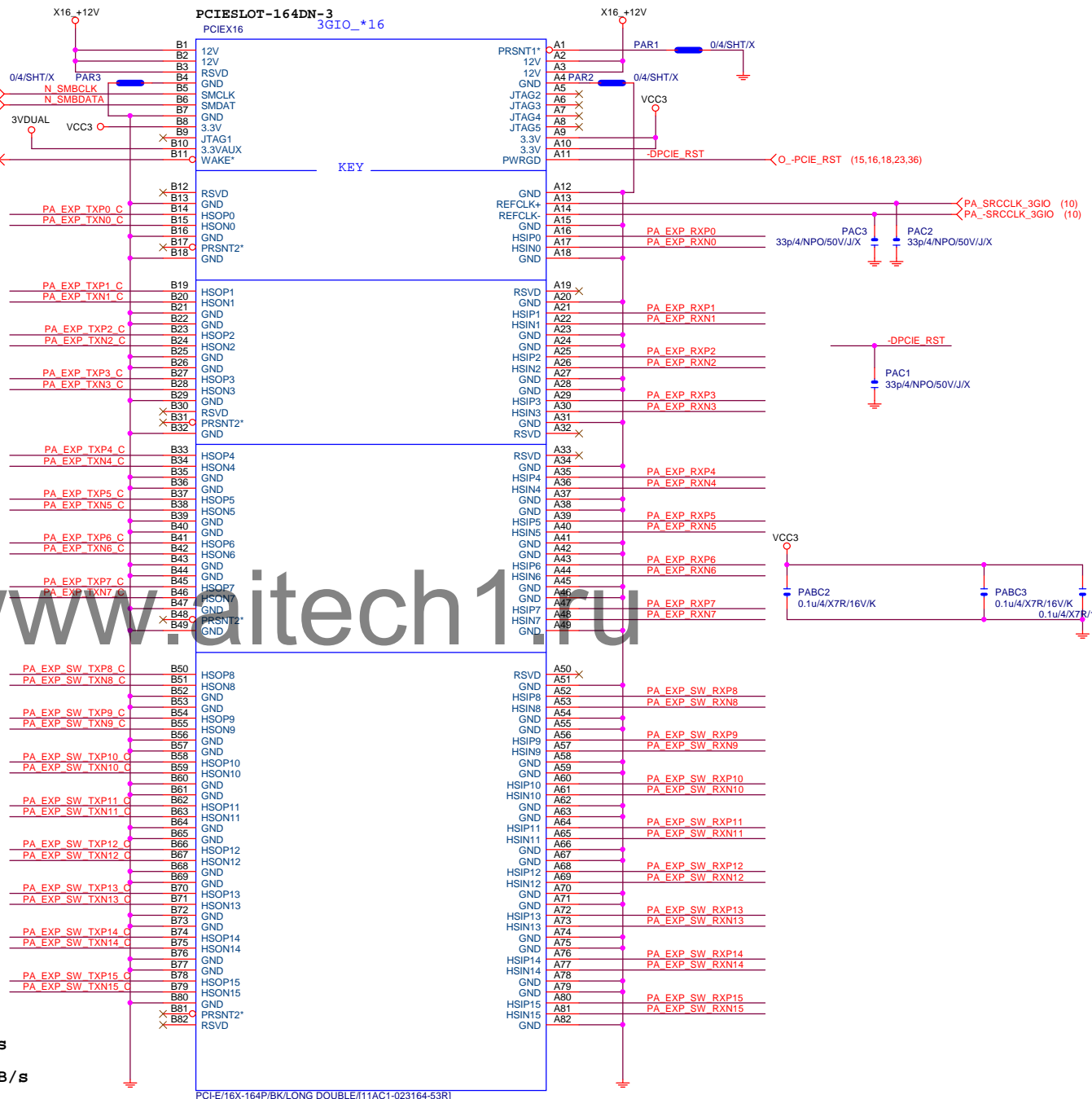
PCE-E X1(單向) BANDWIDTH=2.5GHz\*(8b/10b)=2Gb/s=250MB/s

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

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

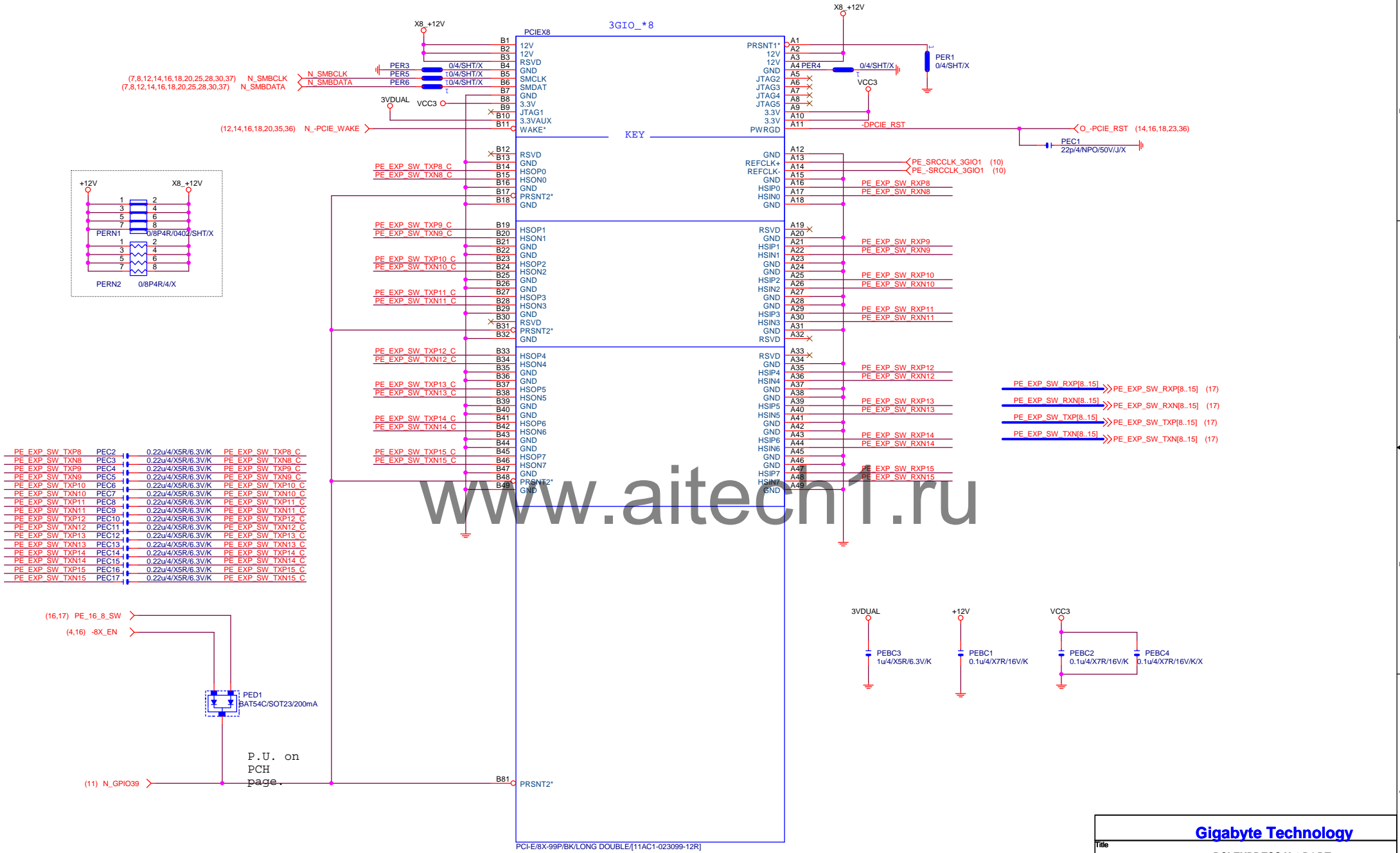
PCE-E X16(雙向) BANDWIDTH=2.5GHz\*(8b/10b)X16X2=64Gb/s=8GB/s

PCI-E REV:2.0--> 5GHZ



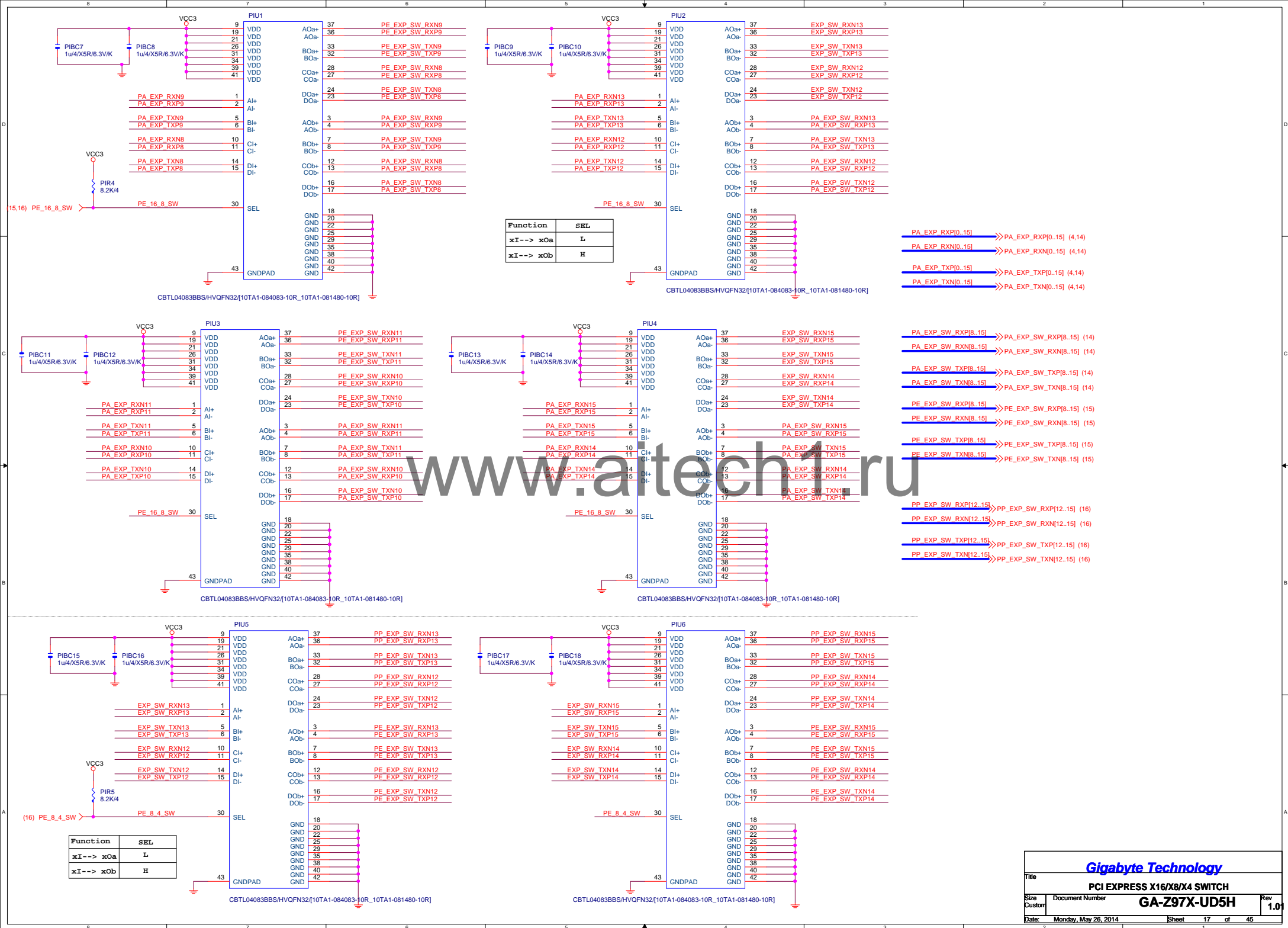
**Gigabyte Technology**

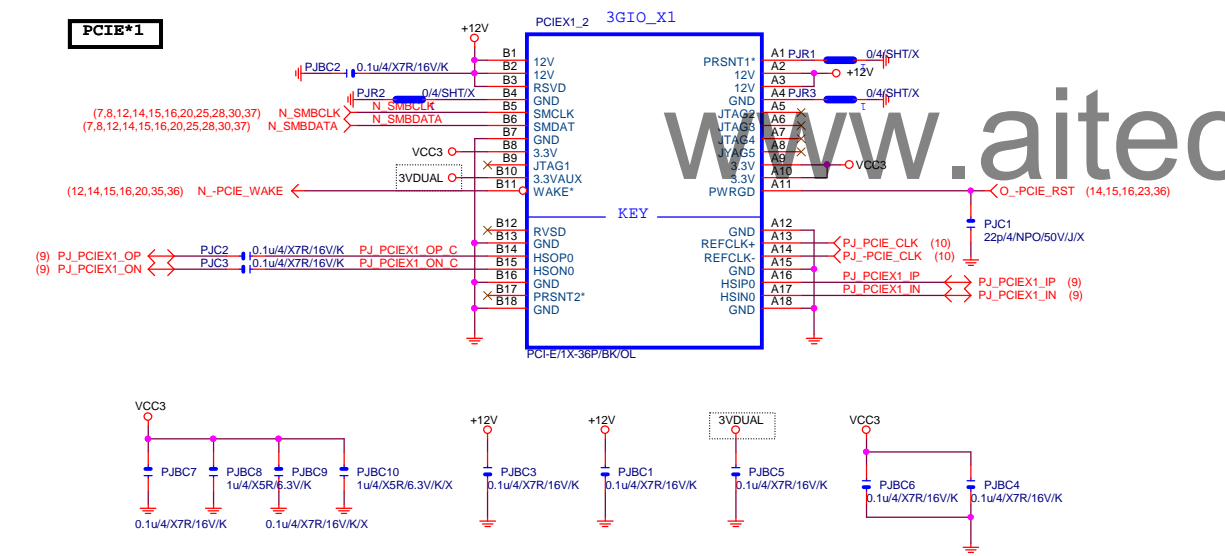
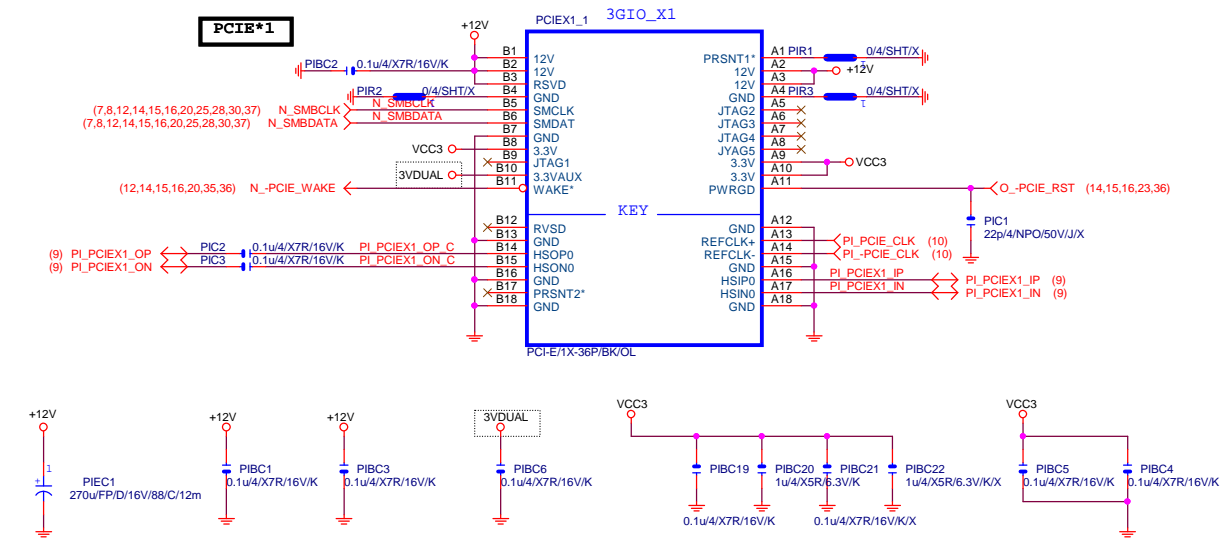
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Size	Document Number	GA-Z97X-UD5H	
Custom		Rev	1.0
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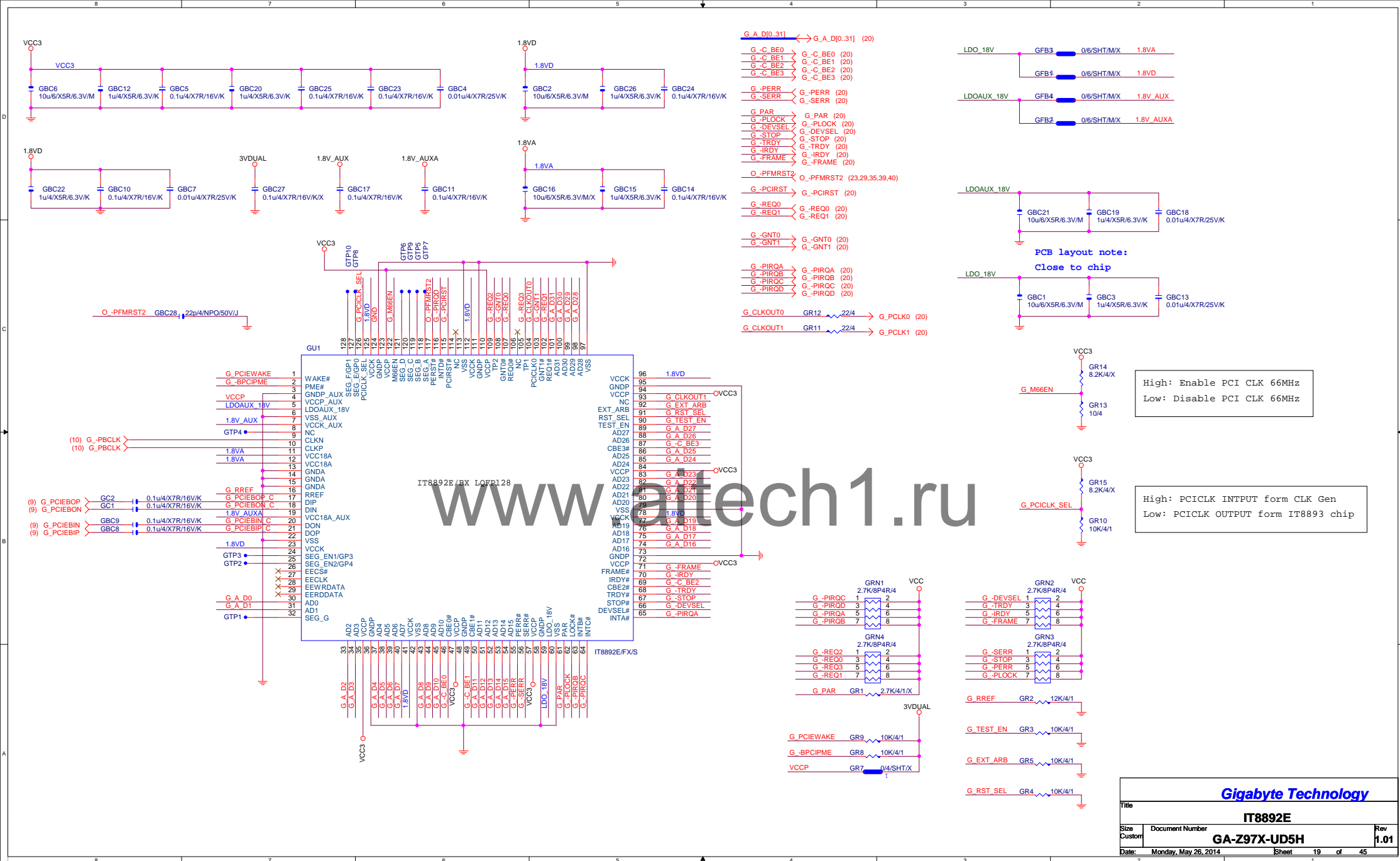


Gigabyte Technology			
PCI EXPRESS X 4 PORT			
Title	Document Number	Rev	1.01
Size	Custom	GA-Z97X-UD5H	
Date:	Monday, May 26, 2014	Sheet	15 of 45

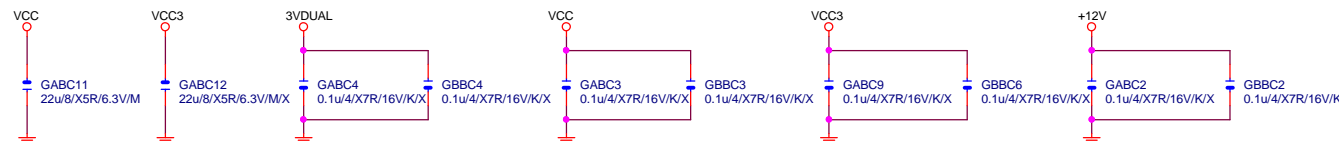
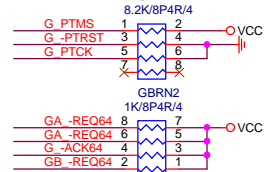
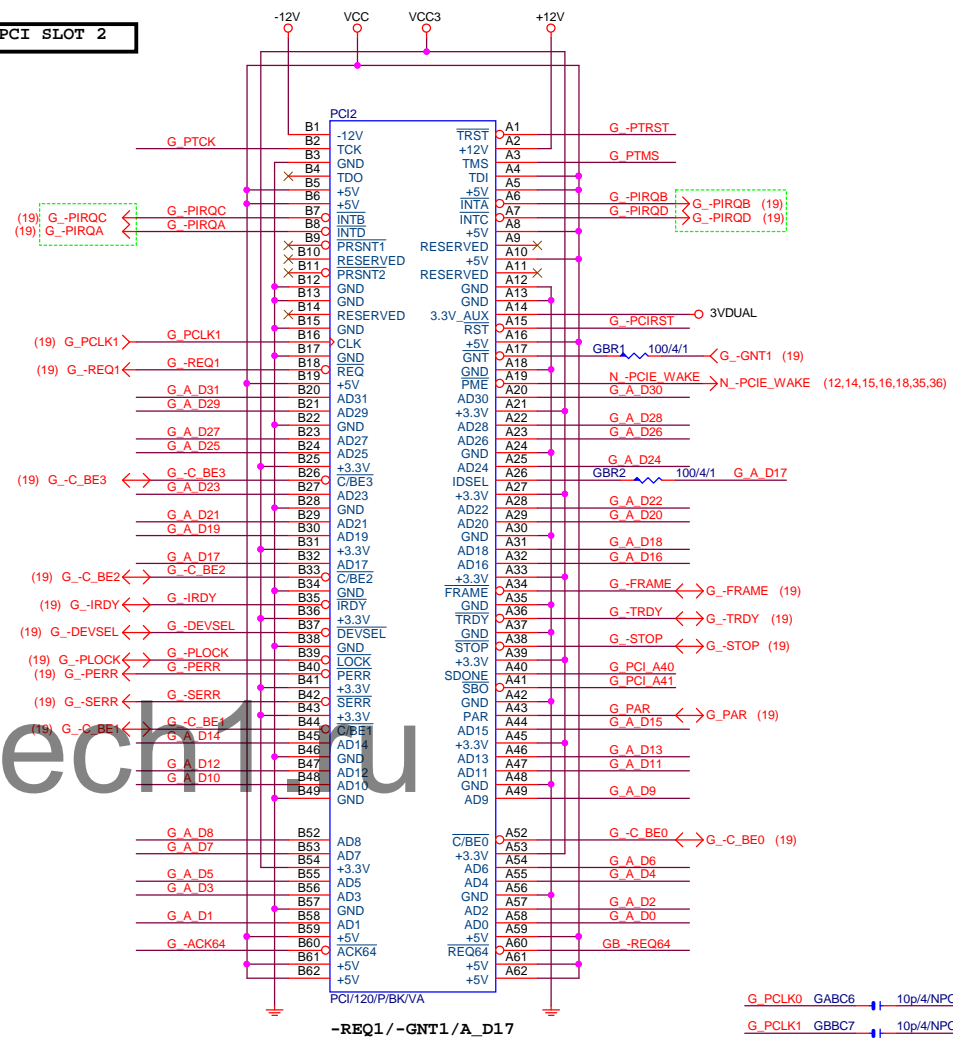
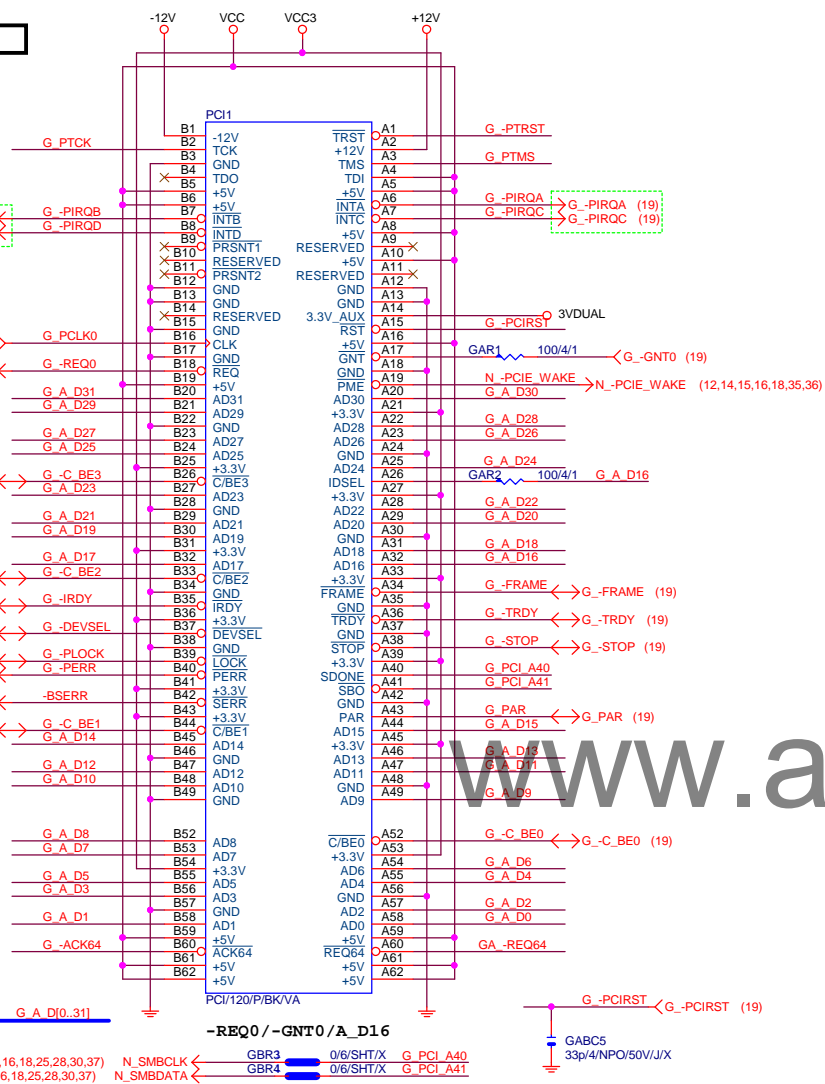














# AZALIA CODEC

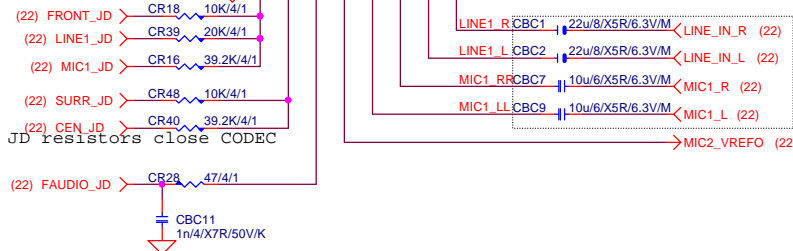
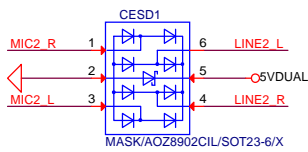
Thermal pad is DGND

Thermal pad is DGND

Digital Area

Analog Area

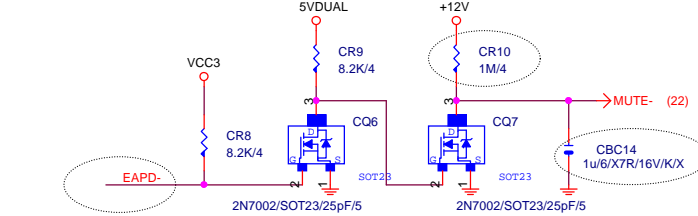
0/6/X For AGND/GND  
moat under Codec  
Body



JD resistors close CODEC

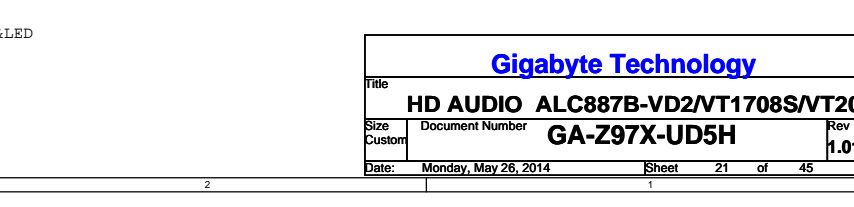
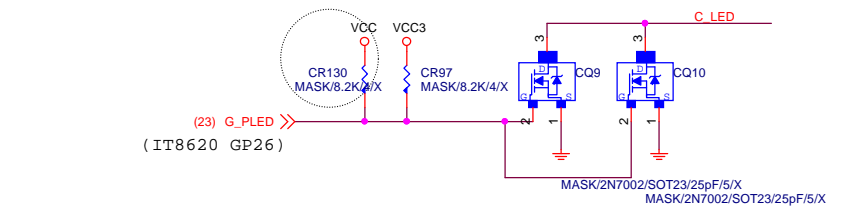
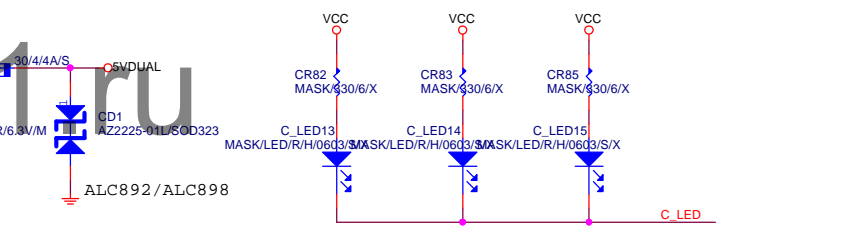
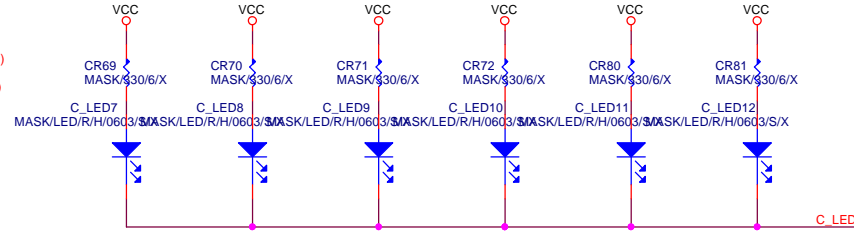
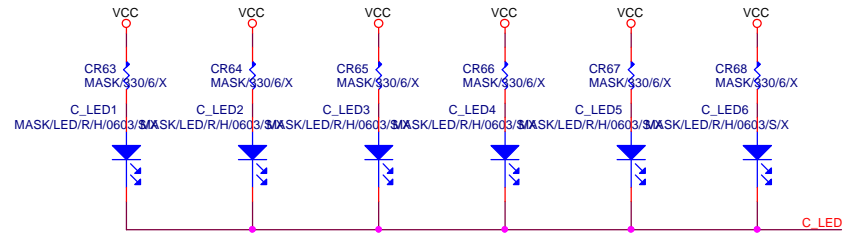
(22) FAUDIO\_ID

CBC11 1n/4/X7R/50V/K

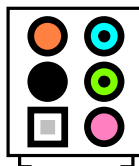
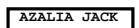


Close to ALC1150

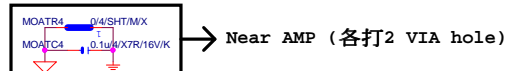
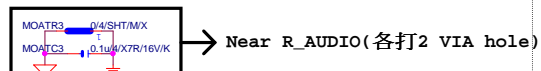
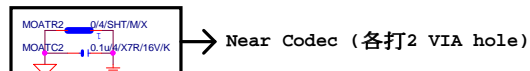
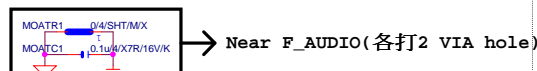
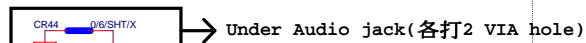
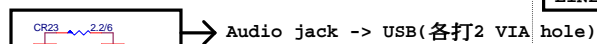
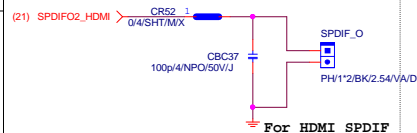
UD5H不上金屬罩&LED



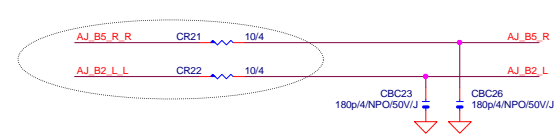
Gigabyte Technology			
Title	HD AUDIO ALC887B-VD2/VT1708S/VT2021		
Size	Document Number	GA-Z97X-UD5H	
Custom		Rev	1.01
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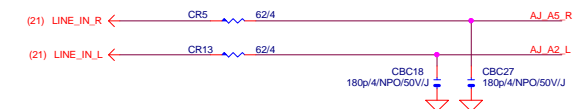
## SPDIF\_OUT



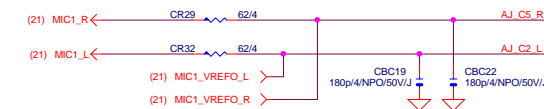
## LINE-OUT



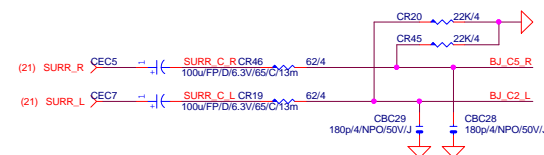
**LINE-IN**



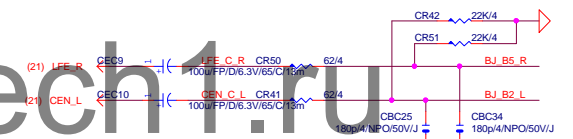
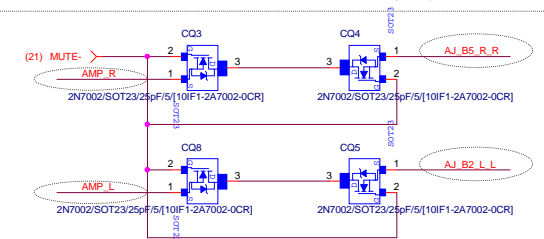
## MIC-IN



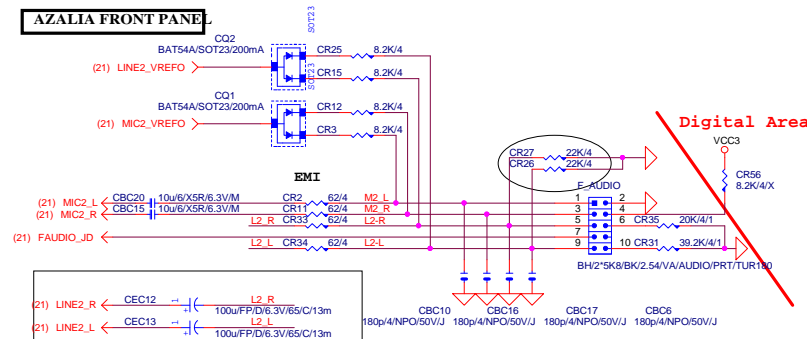
**SURROUND**



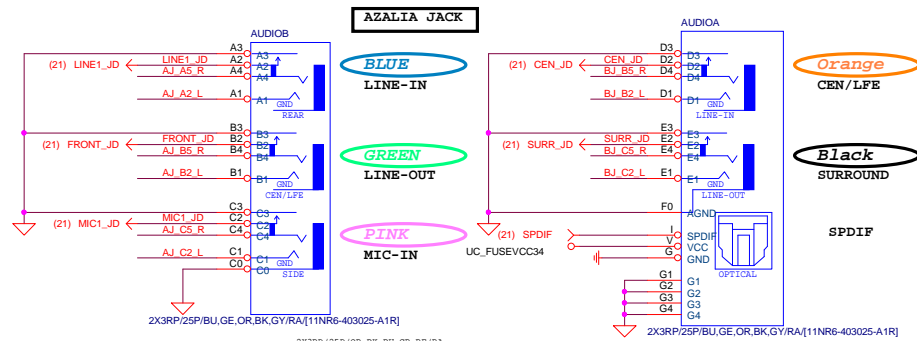
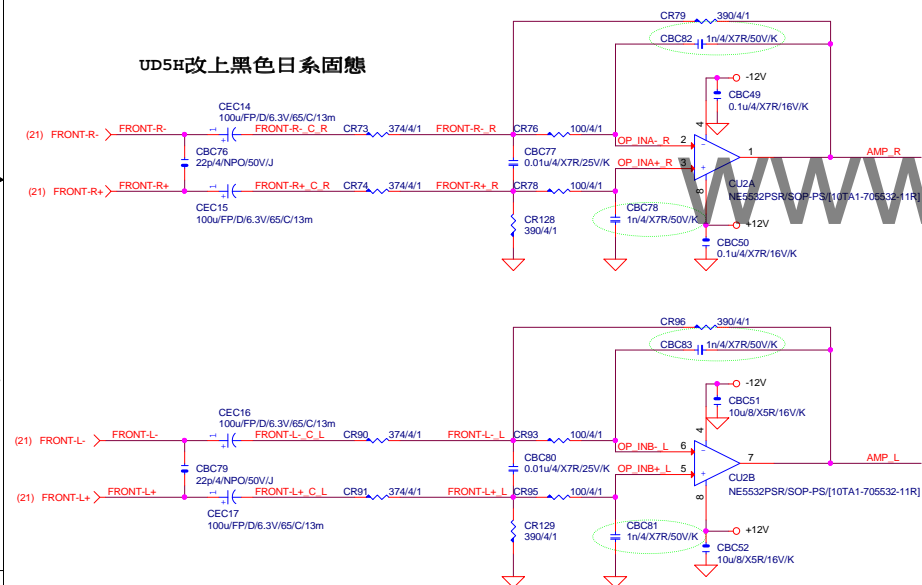
## CEN/LFE

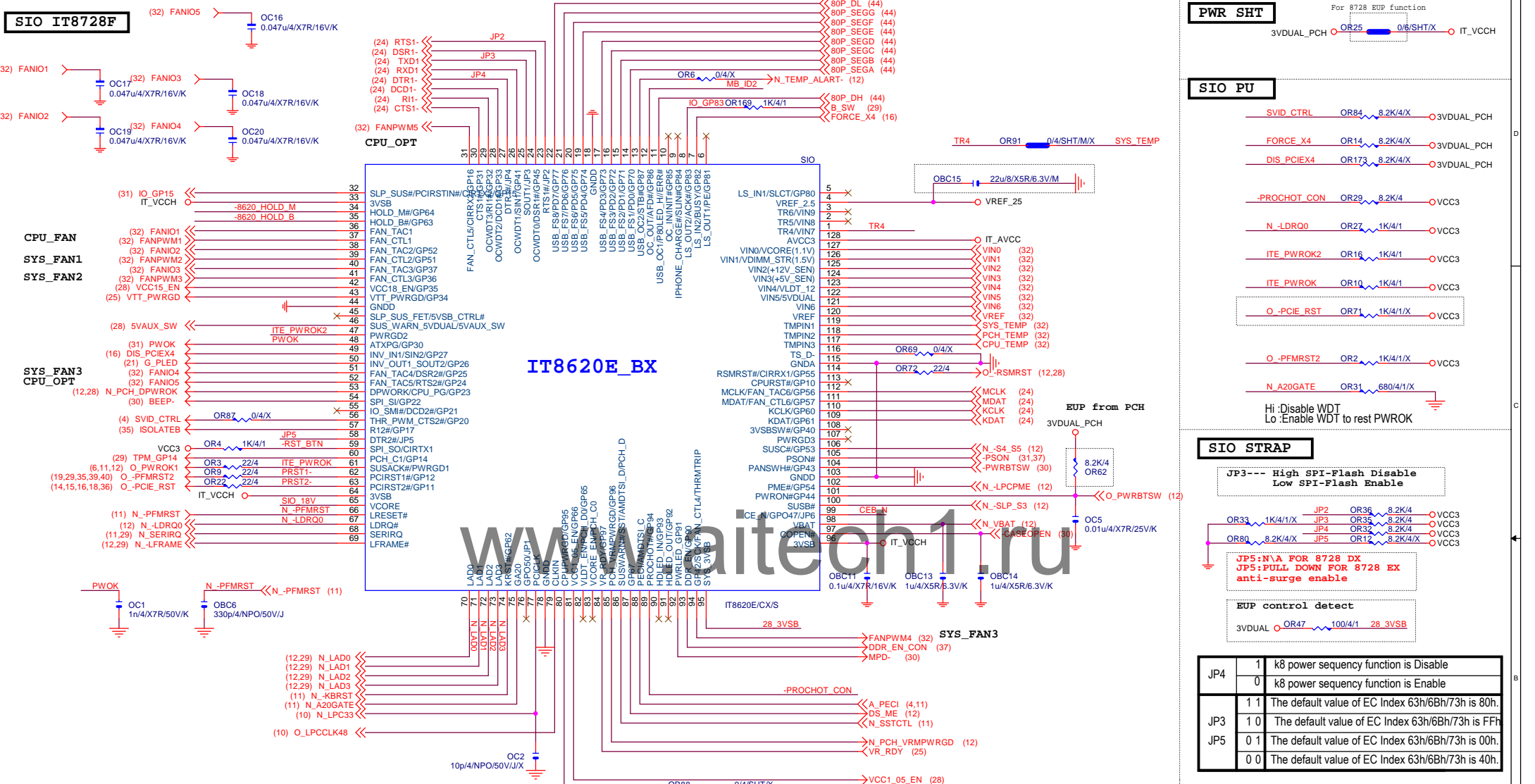
**Anti Pop**

**AZALIA FRONT PANE**



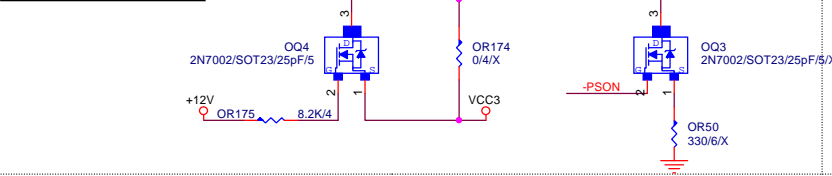
## Differential to Single-End AMPLIFIED



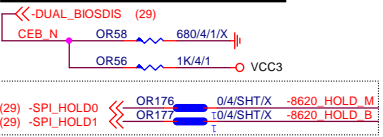


IT8620E GPIO問題匯整	
PIN 50	GP26--- 第一次接上POWER時會拉 LO
PIN 90/91	DEFAULT為HDLED FUNCTION, GP93 BYPASS TO GP92
	高溫時 GP92 會被拉Lo(ITE BUG)
PIN 108	GP40--- POWER ON 時會拉 LO
PIN 111/112	MOUSE 跟FAN6 FUNCTION 擇一使用,不然會互相干擾

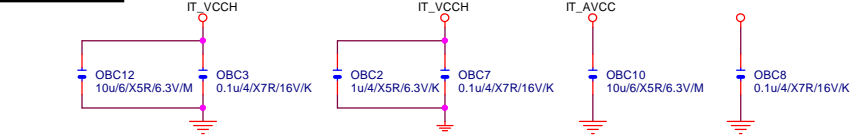
### Power leakage



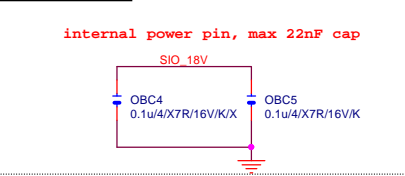
### DUAL BIOS OPT STRAP



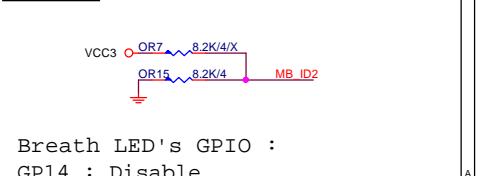
### SIO CAP



### SIO\_18V



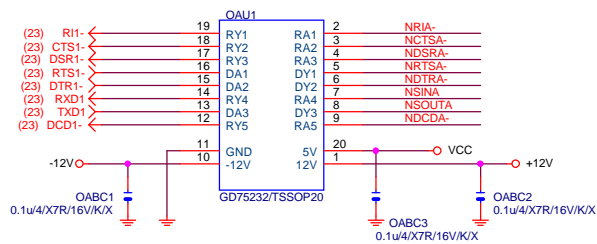
### MB ID



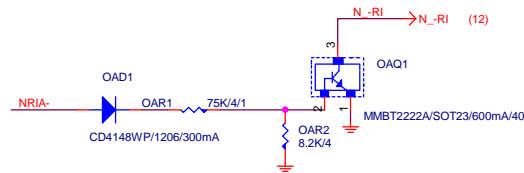
Breath LED's GPIO :	
GP14	: Disable
GP65	: Brightness

Gigabyte Technology	
Title	
ITE 8620CX LPC IO	
Size B	Document Number
GA-Z97X-UD5H	
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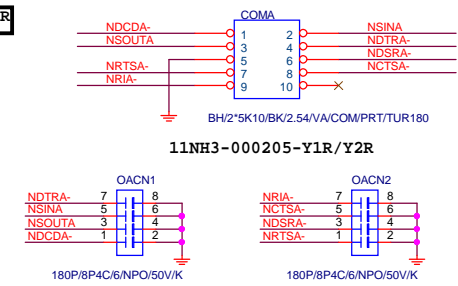
## COMA



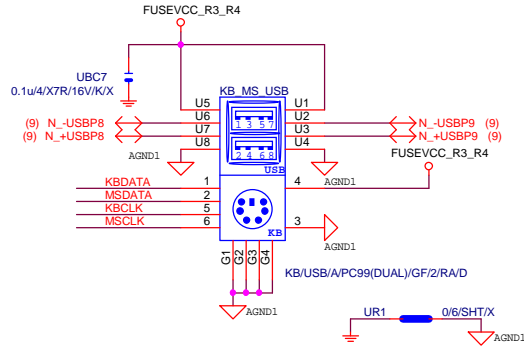
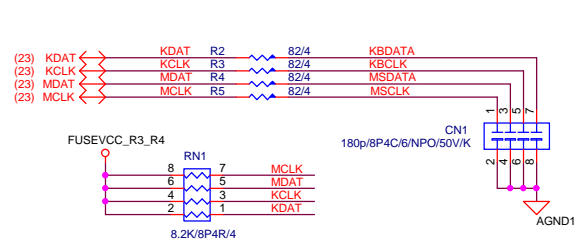
## COM RI



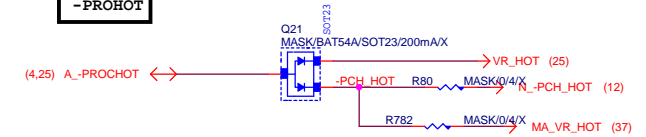
## COM BUFFER



## KB/MS/USB



## -PROHOT

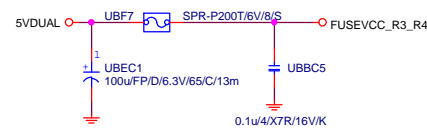


## Thunderbolt pin header

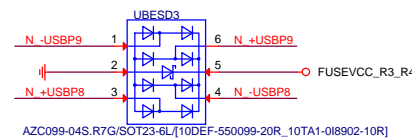
Removed

## R\_USB

## USB20 FUSE

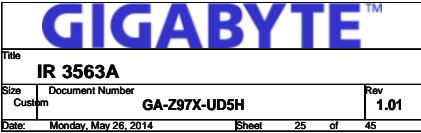


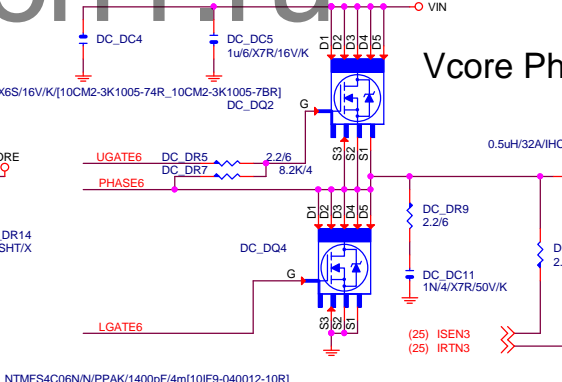
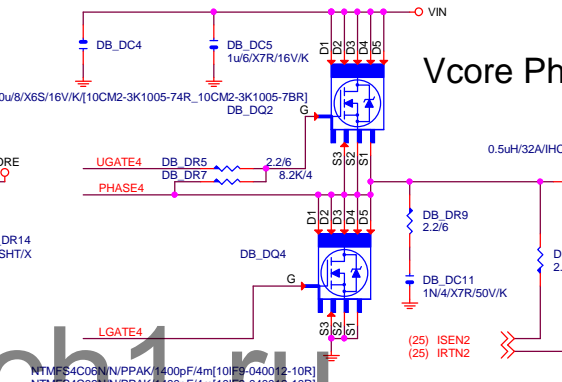
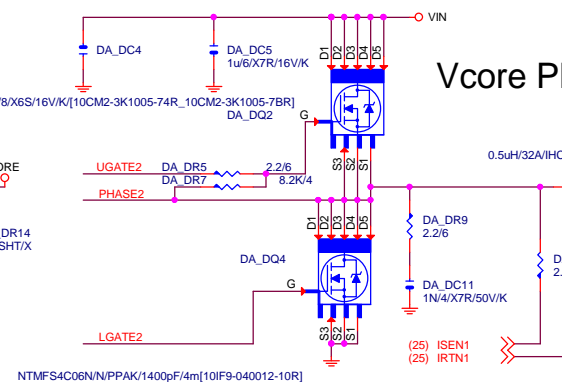
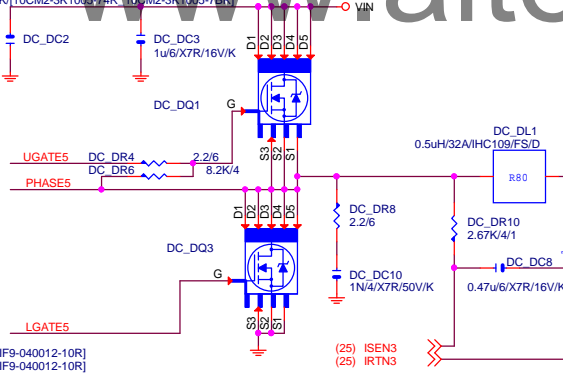
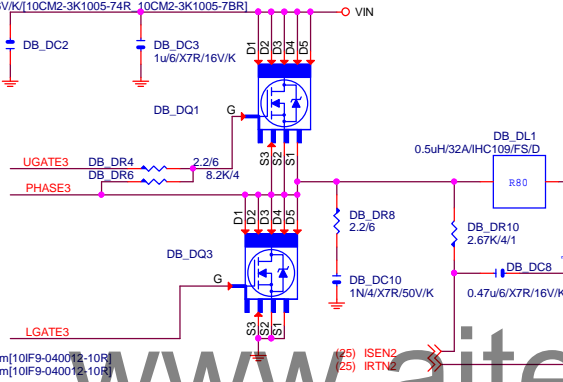
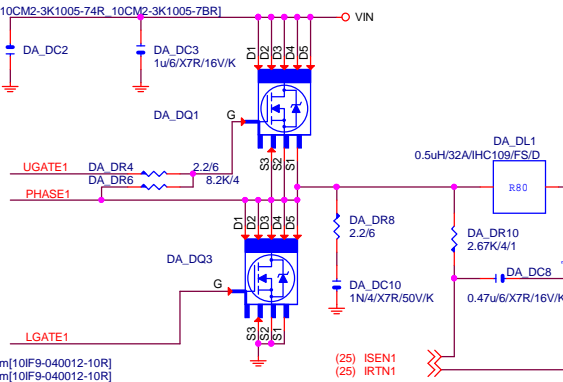
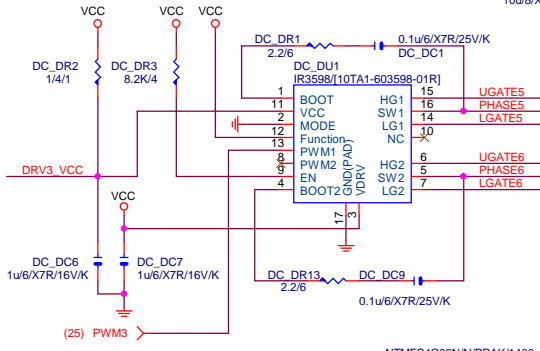
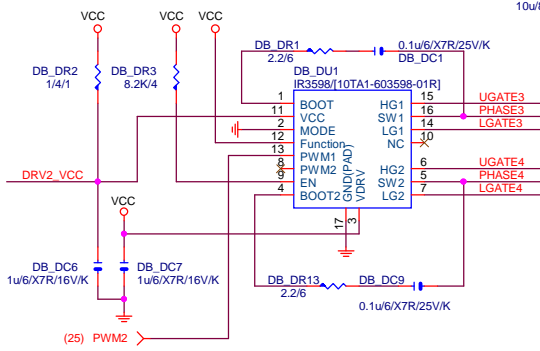
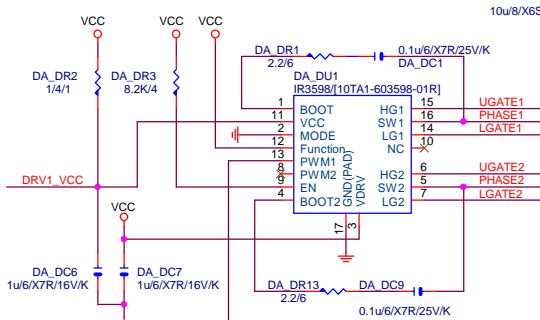
## USB20 ESD PROTECT



Gigabyte Technology

File			
COM/ PROHOT/ R_USB			
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Vcore Phase 1,2

Vcore Phase 3,4

Vcore Phase 5,6

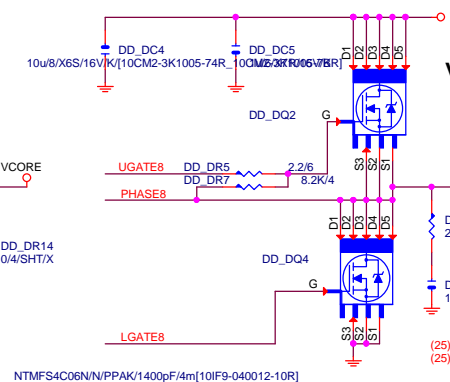
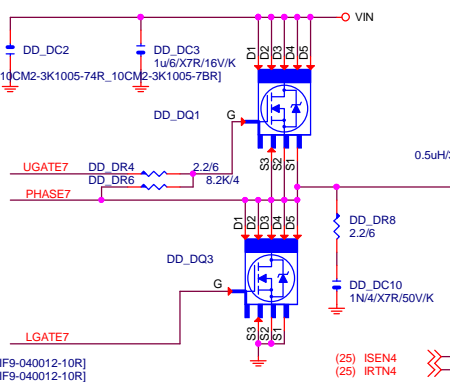
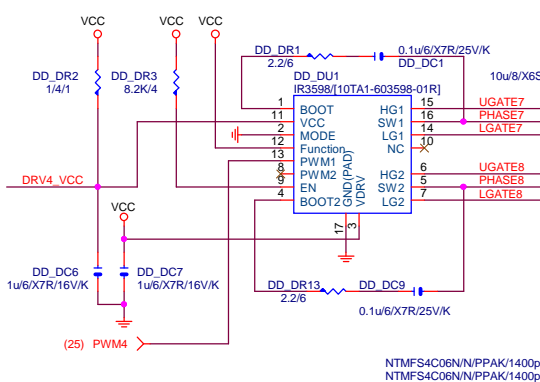
FUNCTION	MODE	PWM MODE	PHASE MODE
0	1	IR ATL	DUAL
1	1	IR ATL	Doubler
0	0	Tri-Saate	DUAL
1	0	Tri-Saate	Doubler
OPEN	0	Tri-Saate	Quad
OPEN	1	IR ATL	Quad

function = 0 --> Quad mode  
function = 1 --> Doubled mode

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

GIGABYTE TECHNOLOGY			
Title	CPU CORE_IR3563B		
Size	Document Number	Rev	
Custom	GA-Z97X-UD5H	1.01	
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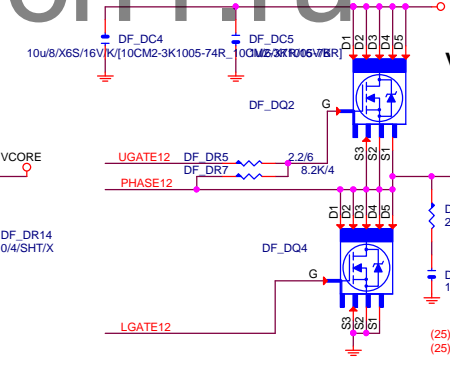
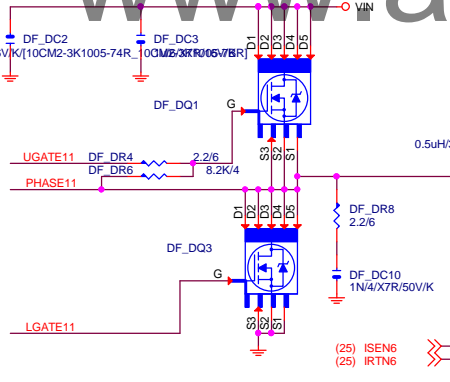
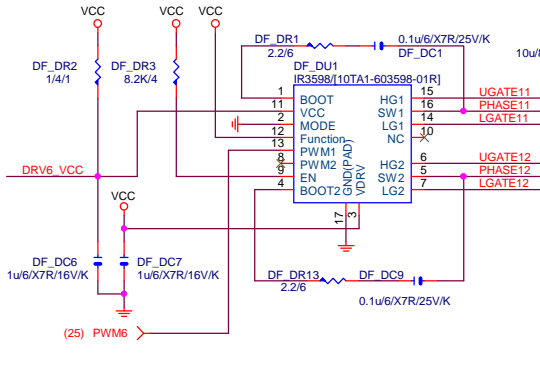
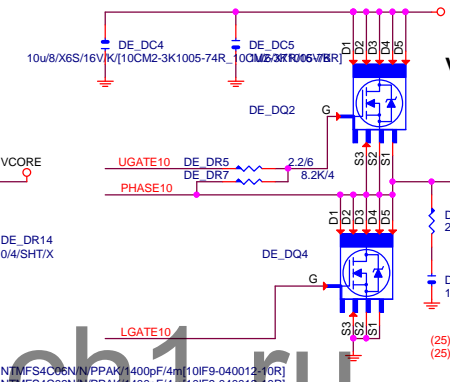
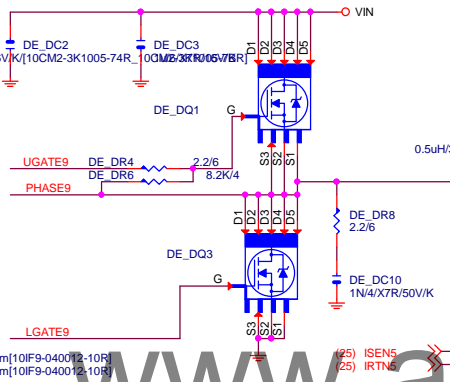
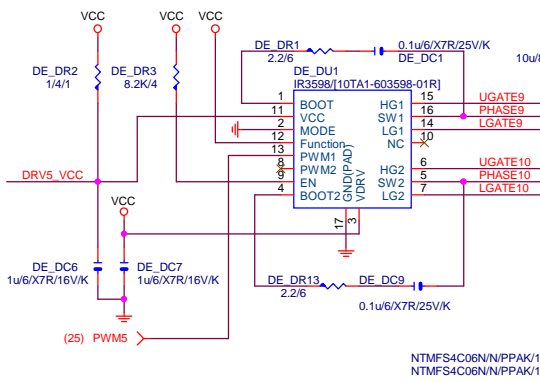




Vcore Phase 7,8

Vcore Phase 9,10

Vcore Phase 11,12



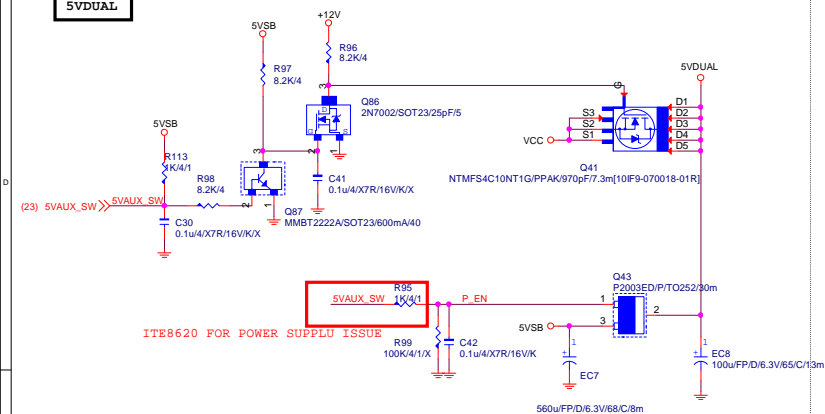
FUNCTION	MODE	PWM MODE	PHASE MODE
0	1	IR ATL	DUAL
1	1	IR ATL	Doubler
0	0	Tri-Sate	DUAL
1	0	Tri-Sate	Doubler
OPEN	0	Tri-Sate	Quad
OPEN	1	IR ATL	Quad

function = 0 --> Quad mode  
function = 1 --> Doubled mode

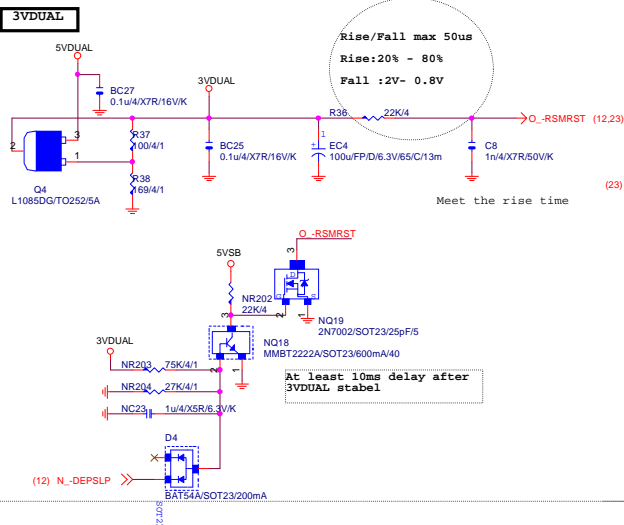
In Quad mode , IC1 pin10 link to IC2 pin10  
IC1 pin9 link to IC2 pin9 without PU

GIGABYTE TECHNOLOGY			
Title	CPU CORE_IR3563B		
Size	Document Number	Rev	
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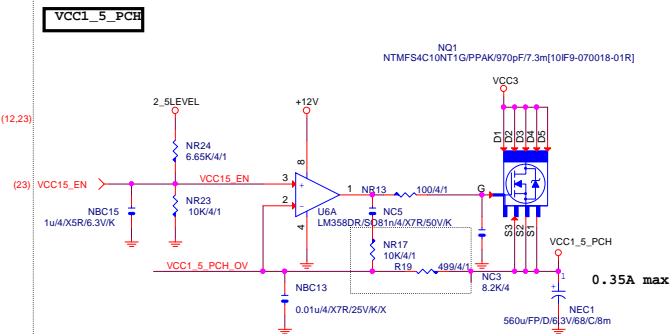
# 5VDUAL



# 3VDUAL

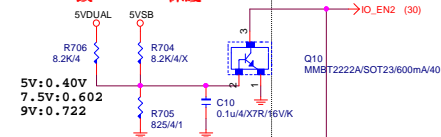


# VCC1\_5\_PCH

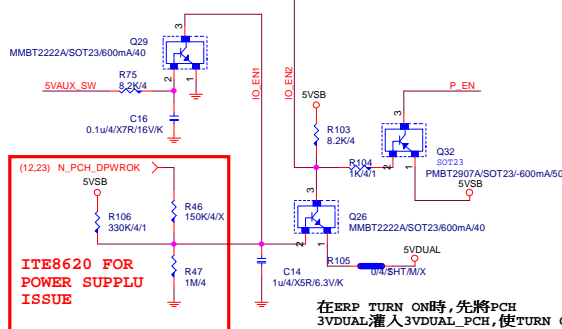


# 5VSB OVP:7.5V protection

NOTE 82:改5VDUAL 6v保護

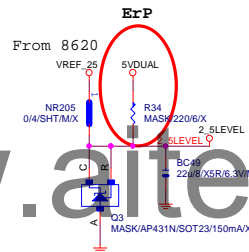


# 5VDUAL SHORT PROTECT

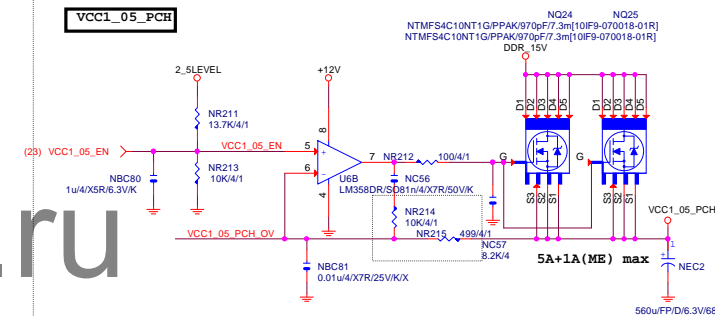


在ERP TURN ON時,先將PCH 3VDUAL灌入3VDUAL\_PCH,使TURN ON -SLP\_S3功能

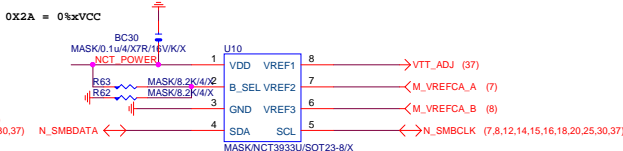
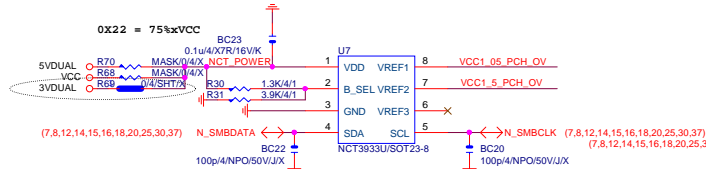
# 2\_5LEVEL



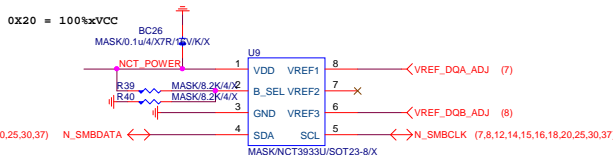
# VCC1\_05\_PCH



# OVER VOLTAGE



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

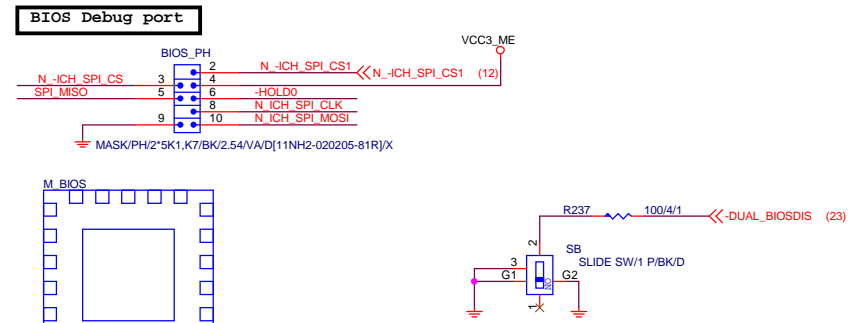
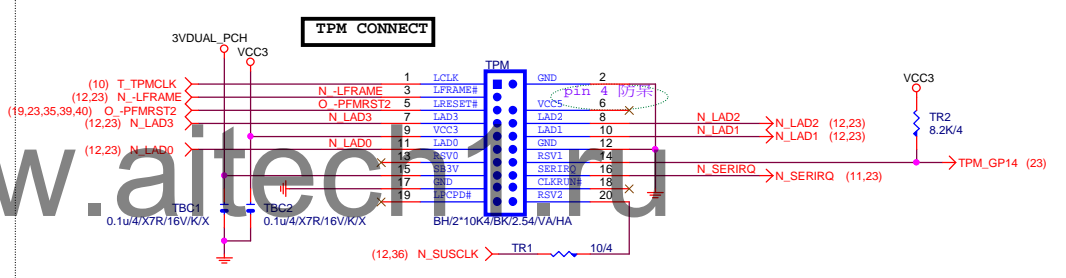
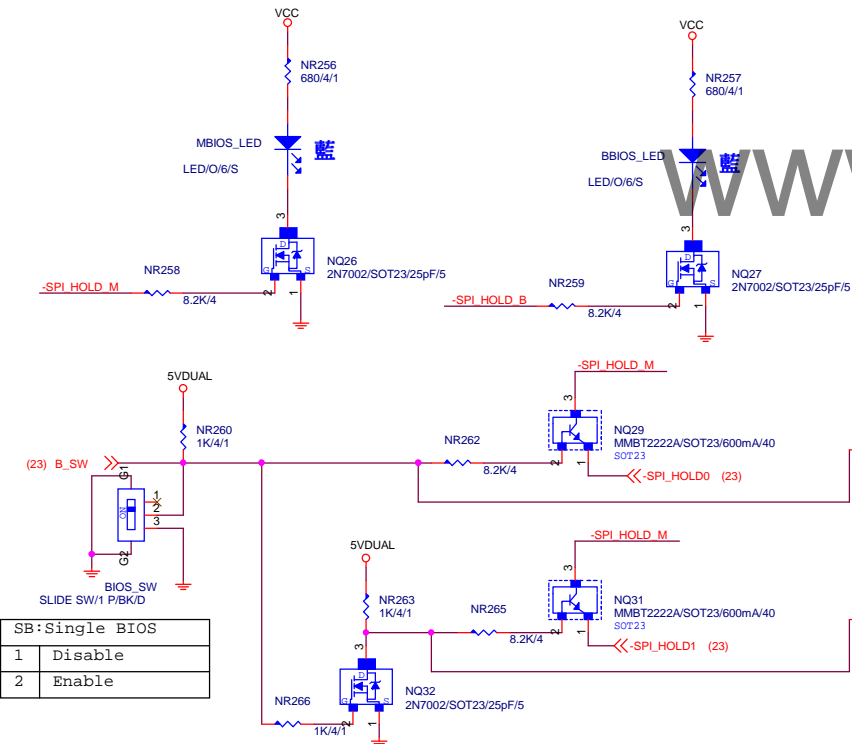
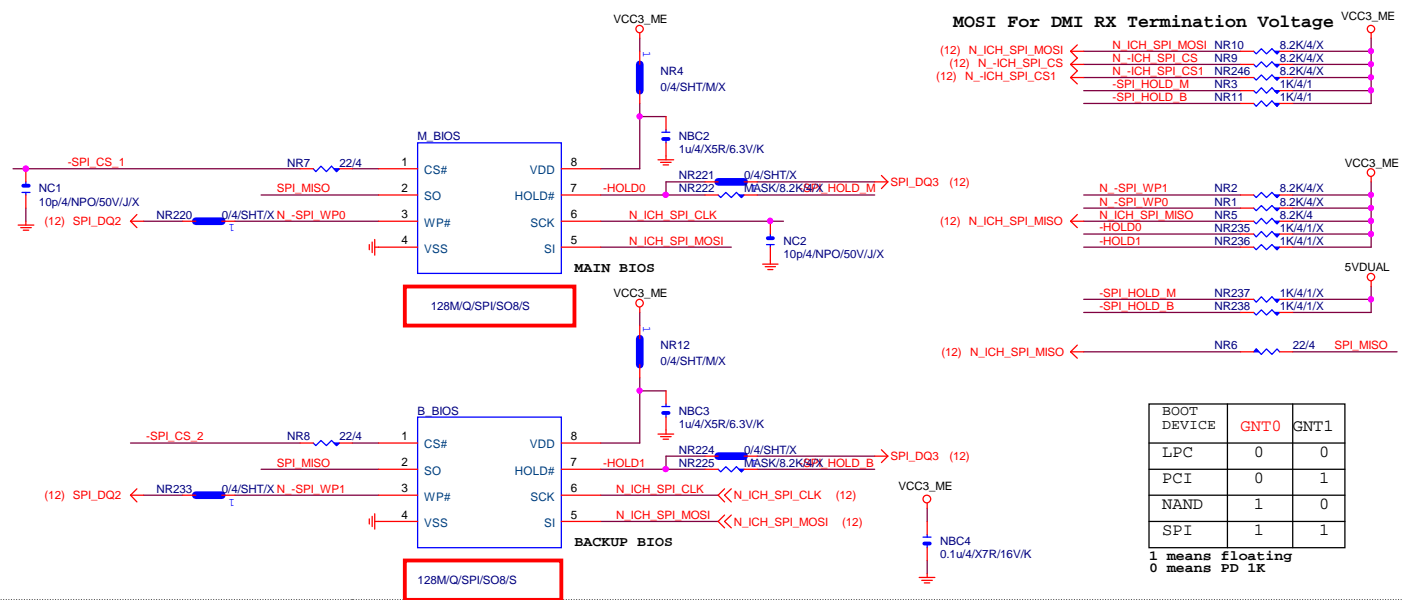
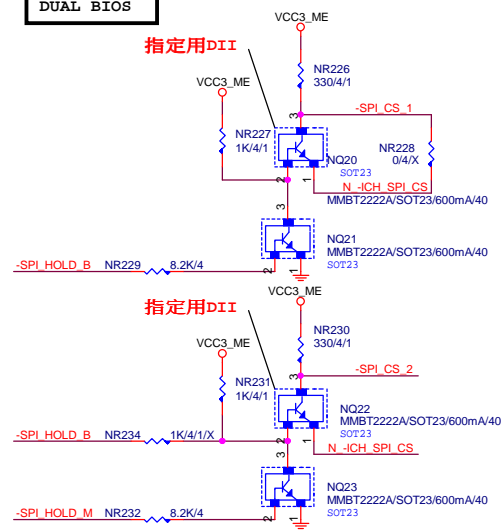


Gigabyte Technology

Title			
DISCRETE POWER			
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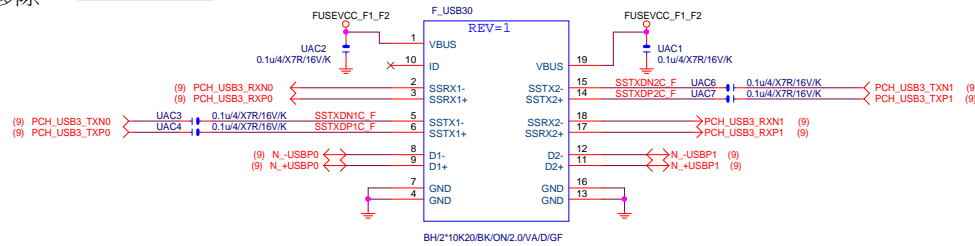
## DUAL BIOS



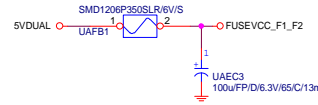
<b>Gigabyte Technology</b>			
<b>Title</b>			
<b>DUAL BIOS, TPM</b>			
<b>Size</b>	<b>Document Number</b>	<b>GA-Z97X-UD5H</b>	<b>Rev</b>
<b>Custom</b>			<b>1.01</b>
<b>Date:</b> Monday, May 26, 2014		<b>Sheet</b> 29 <b>of</b> 45	

0.2  
移除

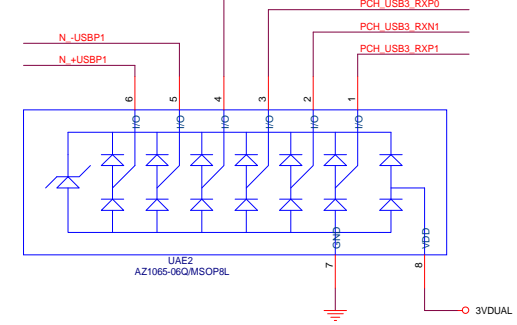
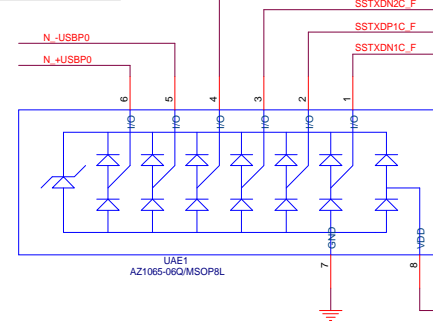
### Front USB3.0



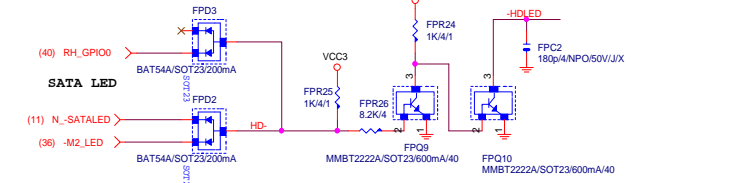
### F\_USB30 PWR



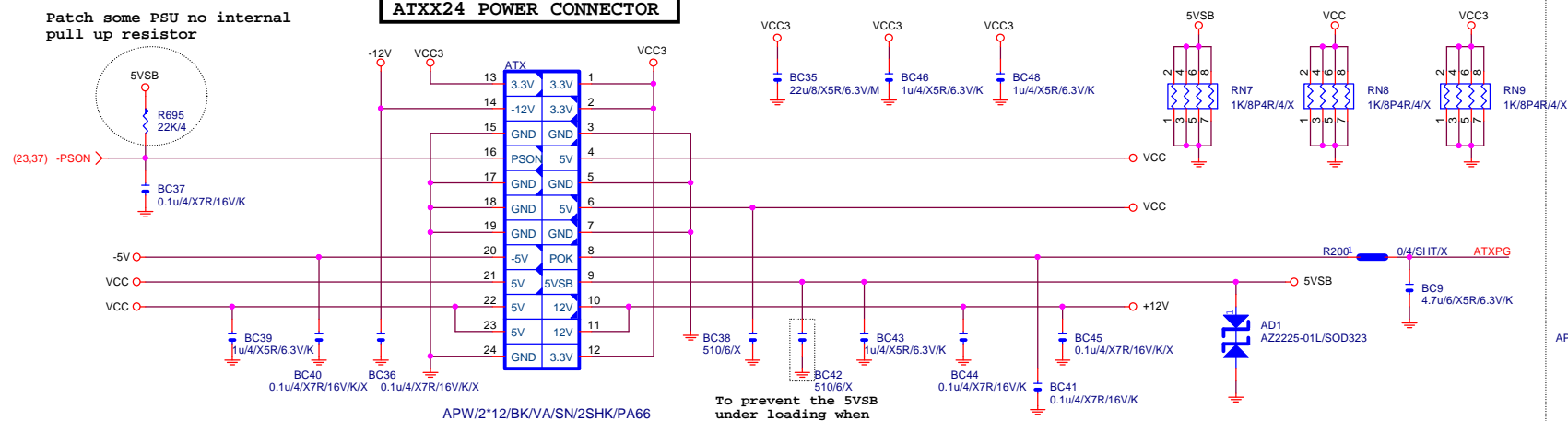
### F\_USB30 ESD PROTECT



### SATA LED SATALED# signal open-collector, pull-up (8.2 kΩ to 10 kΩ) to Vcc3\_3



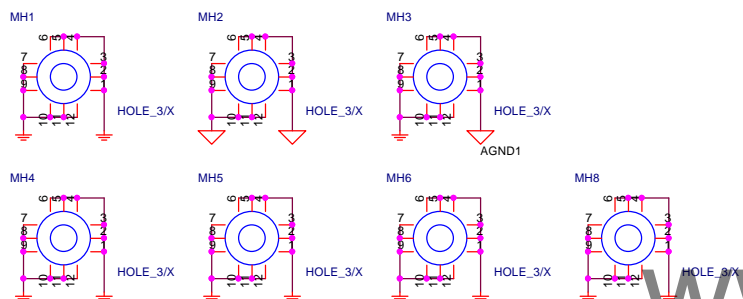
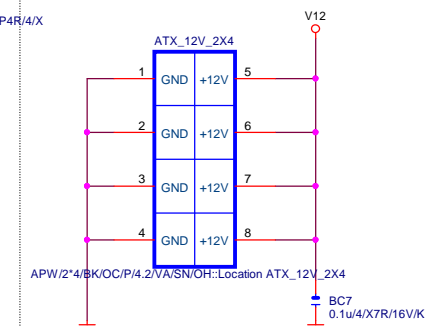
Patch some PSU no internal  
pull up resistor



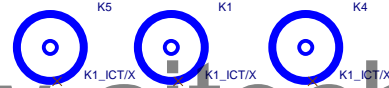
APW/2\*12/BK/VA/SN/2SHK/PA66

To prevent the 5VSB  
under loading when  
boot

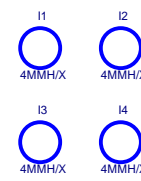
APW/2\*4/BK/OC/P/4.2/VA/SN/OH::Location ATX\_12V\_2X4



HOLE 4-RH-1



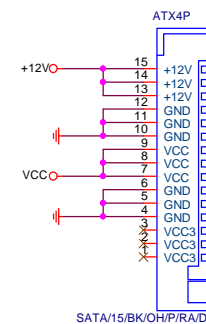
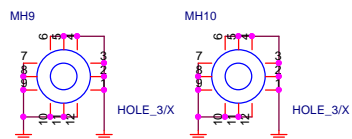
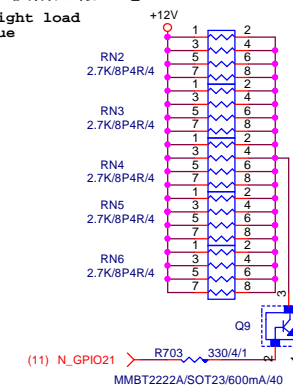
K1-ICT



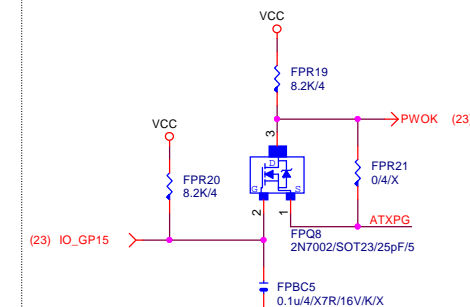
4 MMH

【技術通報R&D技術通報153】

To fix 12V light load  
abnromal issue



## 【技術通報R&amp;D技術通報154】



## Gigabyte Technology

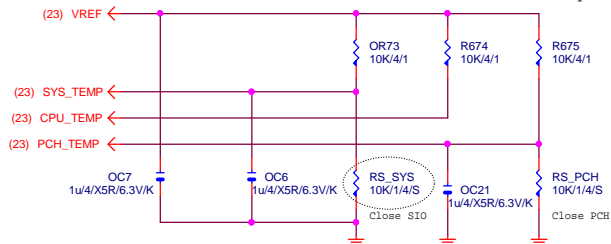
Title	<b>ATX POWER CONNECTOR</b>
-------	----------------------------

Size	Document Number	Rev
Custom	<b>GA-Z97X-UD5H</b>	<b>1.01</b>

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TEMP H/W MONITOR

Rev 0.2 modify



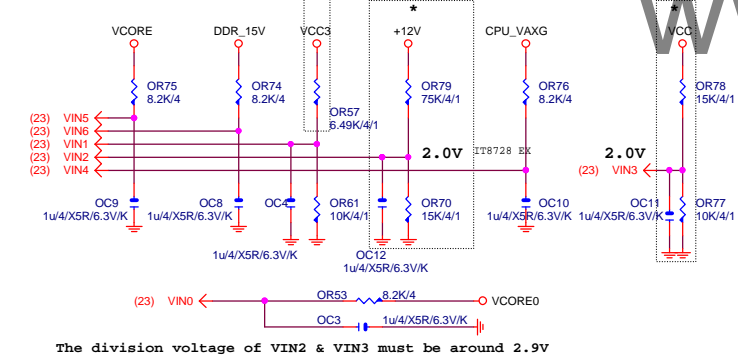
Thrmtrip#改用LM358做

VOLTAGE-- H/W MONITOR

\* IT8728 BX  
\* \* IT8728 CX

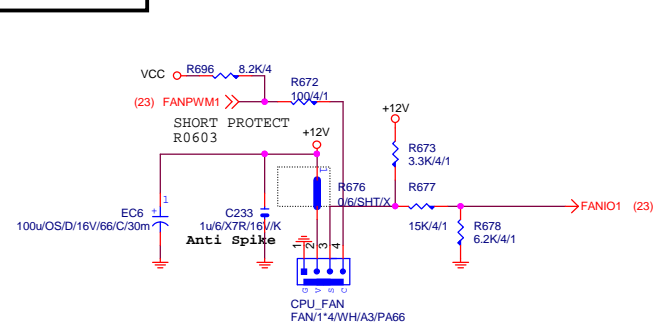
VIN2 must +12V input  
VIN3 must VCC input

1000000



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

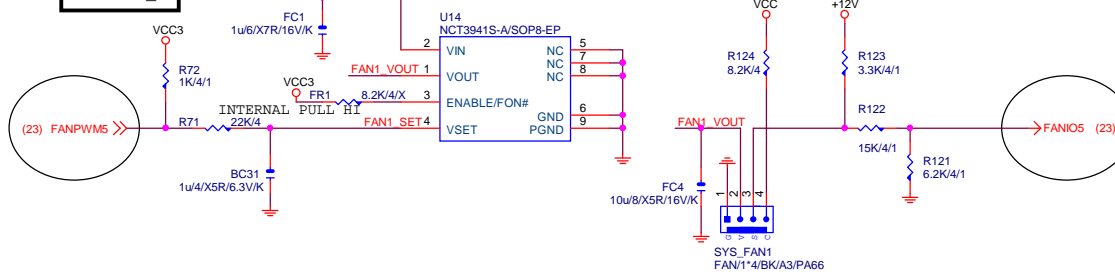
## CPU SMART FAN



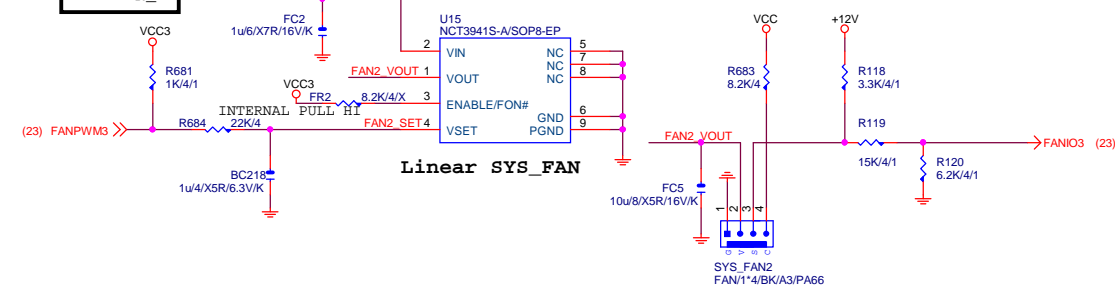
Linear SYS FAN

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

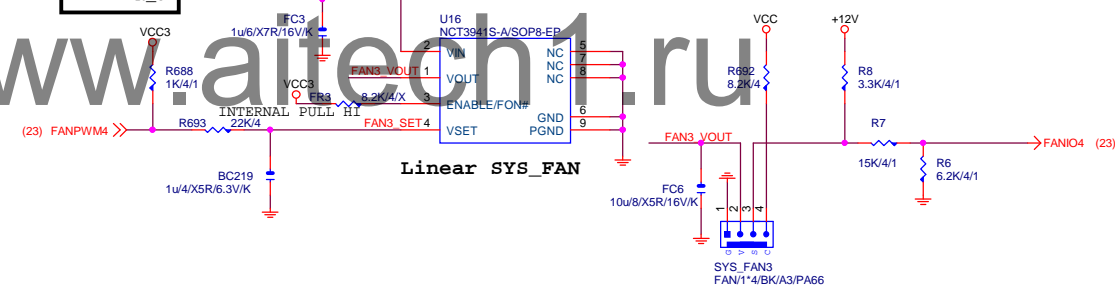
## SYS FAN\_1



## SYS FAN\_2

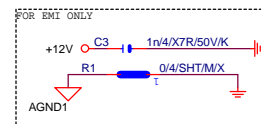
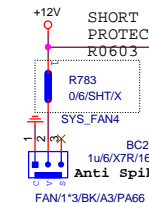
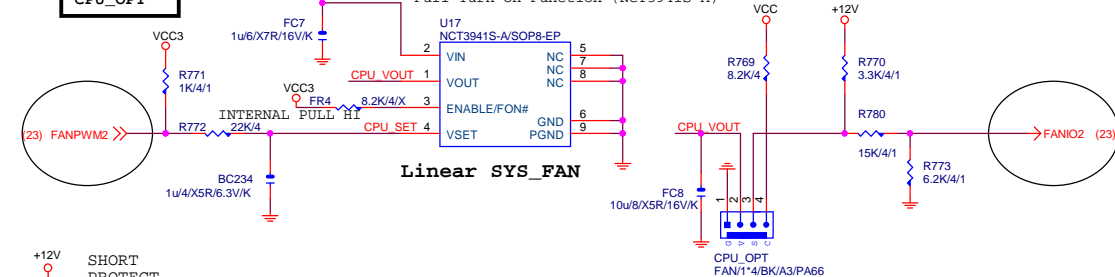


## SYS FAN\_3



## CPU\_OPT

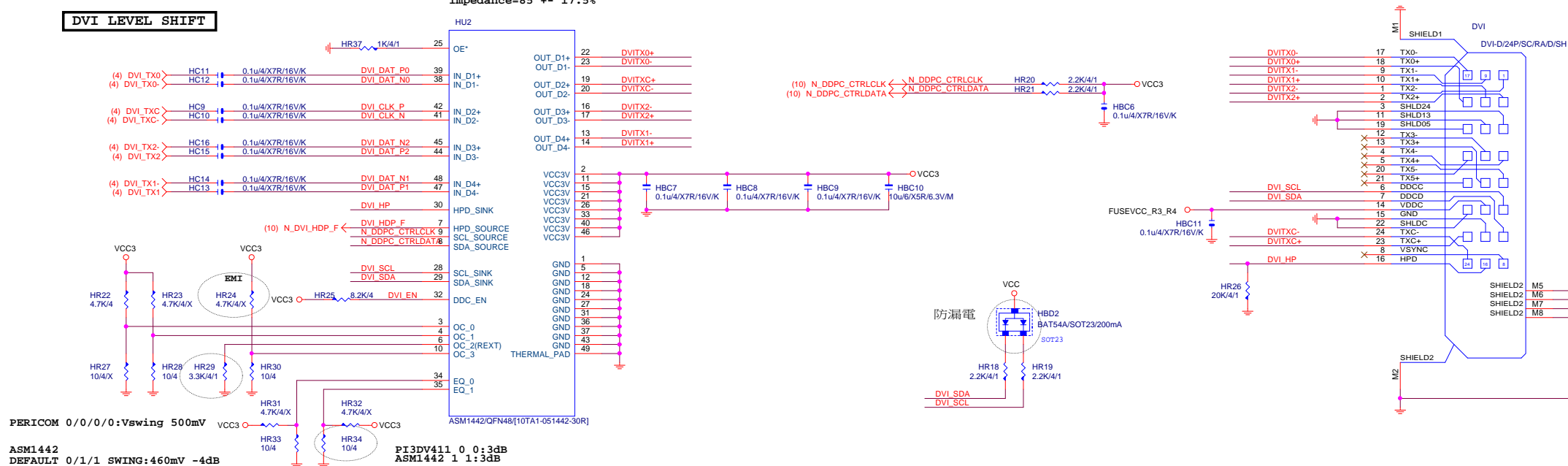
Enable Function (NCT3941S)  
Full Turn On Function (NCT3941S-A)



## Gigabyte Technology

Title					HWM,KB/MS, FAN CTRL				
Size	Document Number								Rev
Custom	GA-Z97X-UD5H								1.01
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DVI:15/4/4/4/15  
Impedance=85 +- 17.5%

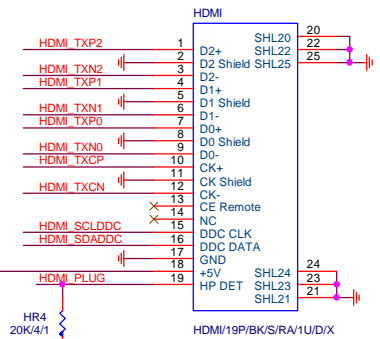
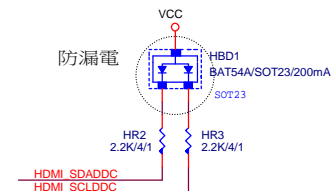
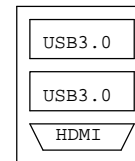
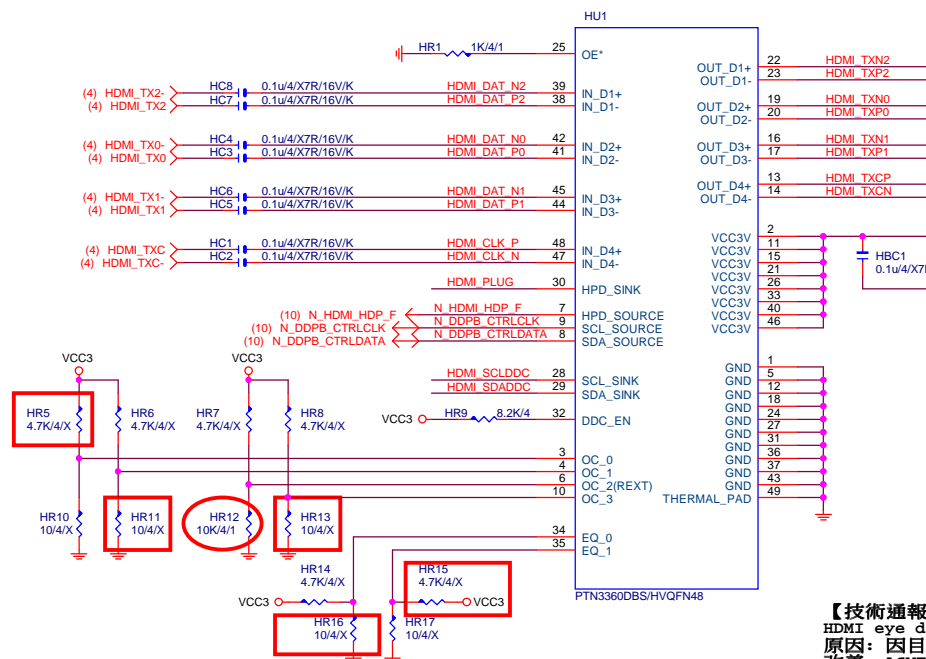


[www.aitech1.ru](http://www.aitech1.ru)

## HDMI LEVEL SHIFT

HDMI:20/4/6/4/20

Impedance=85 +- 17.5%



HDMI與R\_USB共用一個料件

PTN3360:PIN 4/10/34/35 NC PIN,都不上值;只上HR12:10K  
ASM1442:紅色框要上,HR12:3.16K

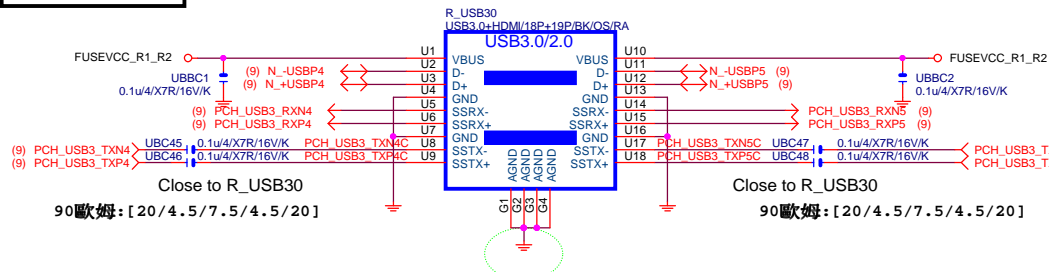
【技術通報R&amp;D技術通報150】

HDMI eye diagram1.4版(deep color)會fail

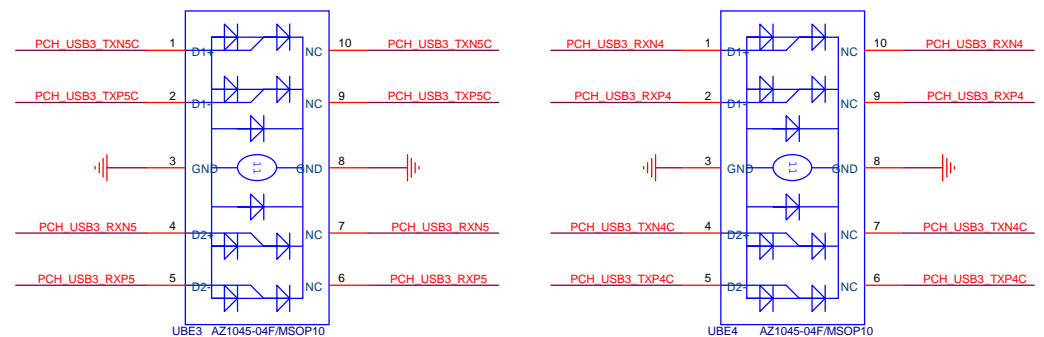
原因：因目前的HDMI訊號過長，造成RISING TIME過慢，而會壓到eye diagram

改善: ASMEDIA ASM1442 : 3.16K(PIN6 PULL DOWN電阻) 10ohm(PIN4 PULL DOWN電阻)

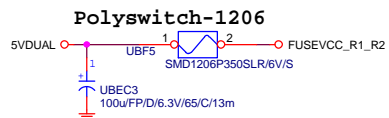
## USB30\_20 CONNECT



USB30 ESD PROTECT

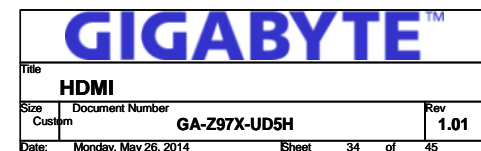
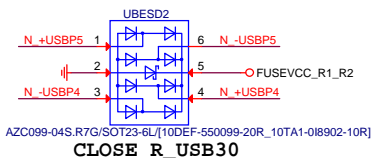


## USB30 PWR

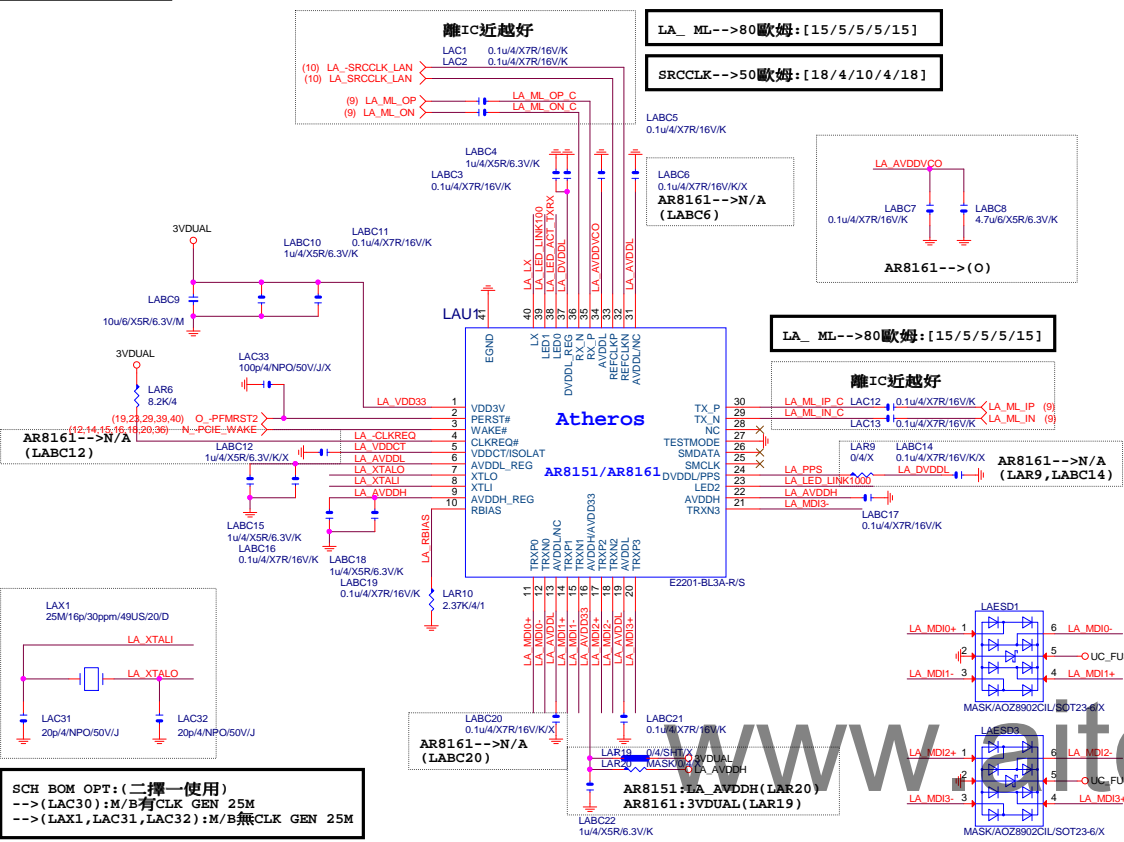


USB3.0 1Port - 1Fuse (3.5A)

USB20 ESD PROTECT

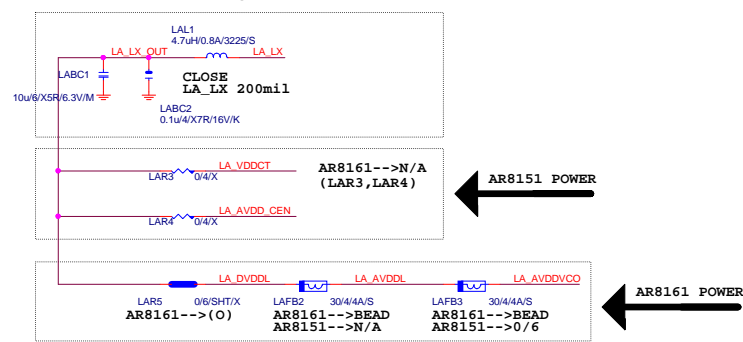


# LAN:AR8151/AR8161



# LAN POWER

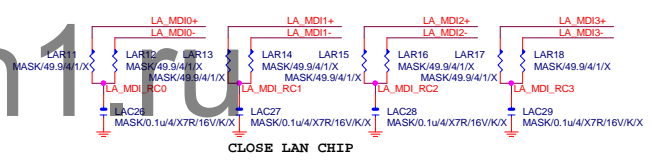
NEW DESIGN ONLY FOR INTERNAL SWR  
AR8151: LAR3(O), LAR5(X)  
AR8161: LAR5(O), LAR3/LAR4(X)



# Power domain chart

	AR8151	AR8161
AVDD33	N/A	3.3V
VDD33	3.3V	3.3V
AVDDH	2.7V	2.7V
AVDDL/DVDDL	1.1V	1.1V
VDDCT	1.7V	

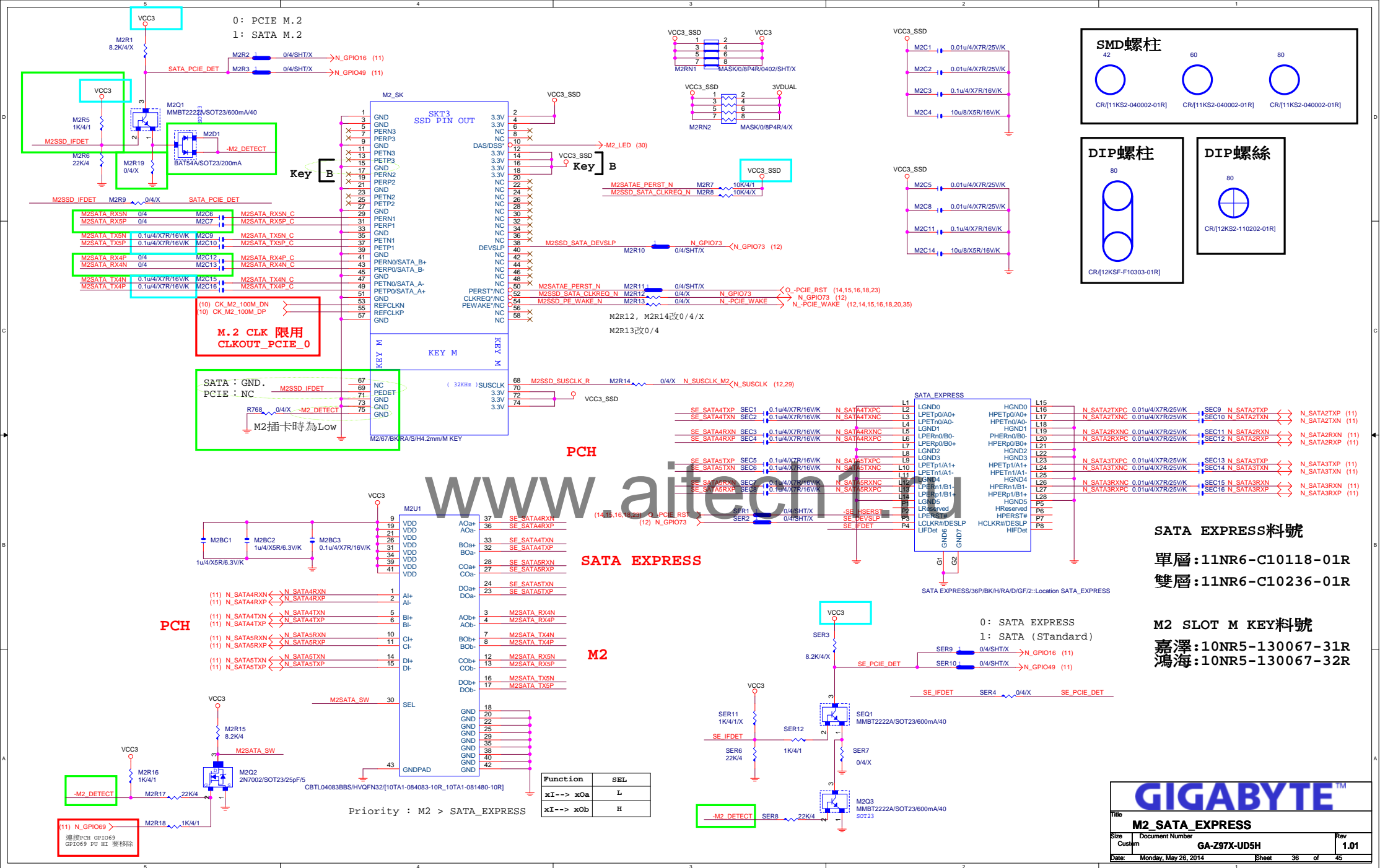
MDI : AR8161-->N/A



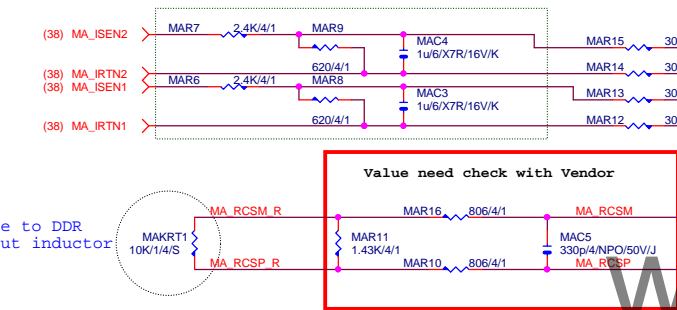
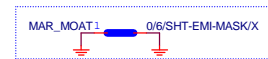
Gigabyte Technology

File		
ARTHEROS AR8151/AR8161		
Size	Document Number	Rev
Custom	GA-Z97X-UD5H	1.0
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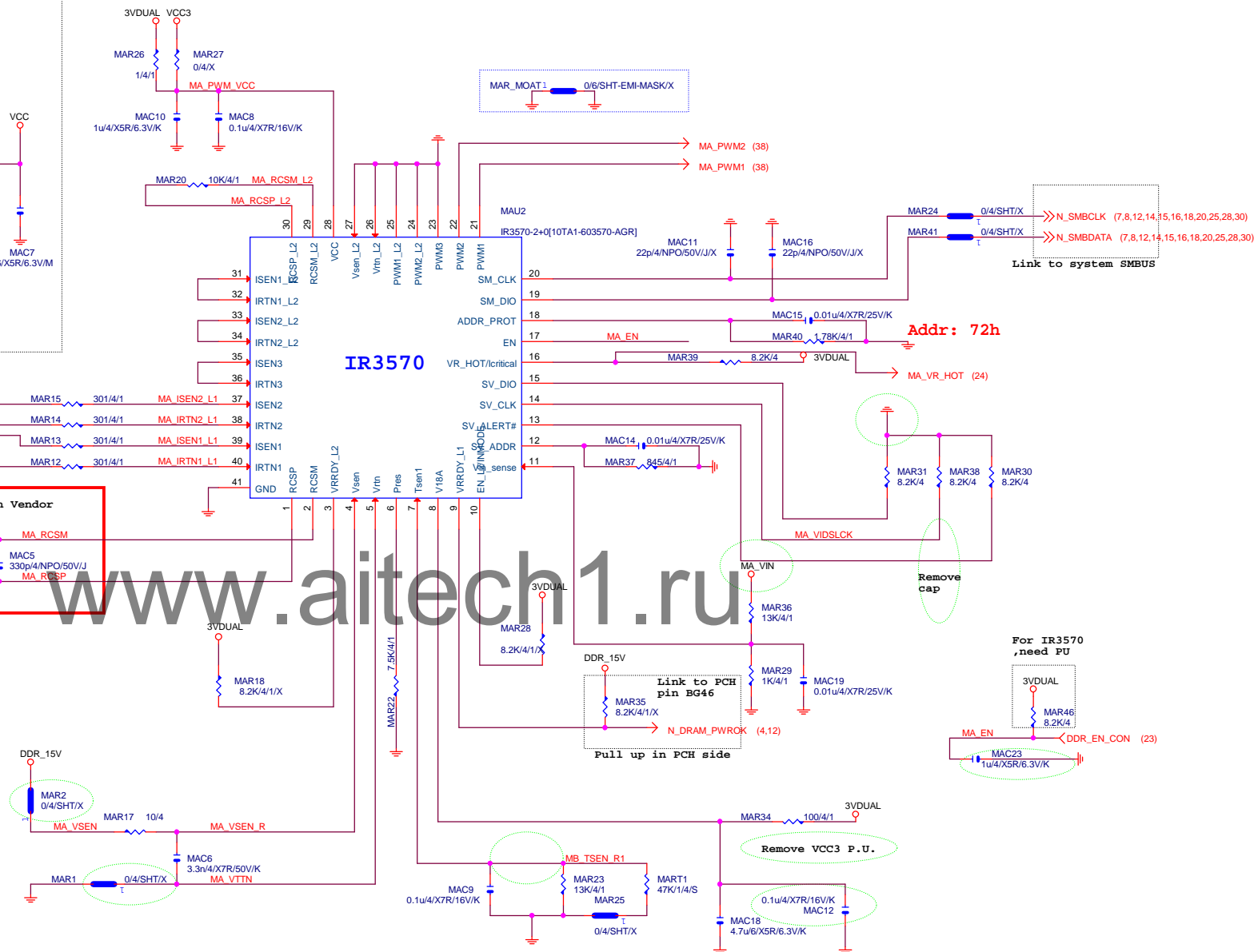
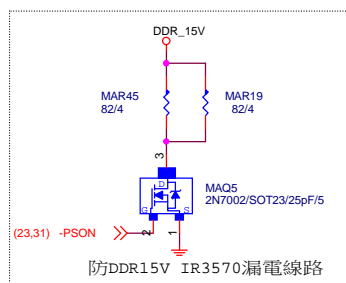






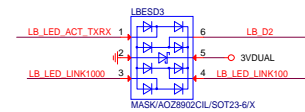
Close to DDR  
output inductor

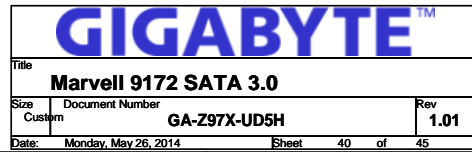
should be routed as differential pair,  
7mil width, 8mil spacing

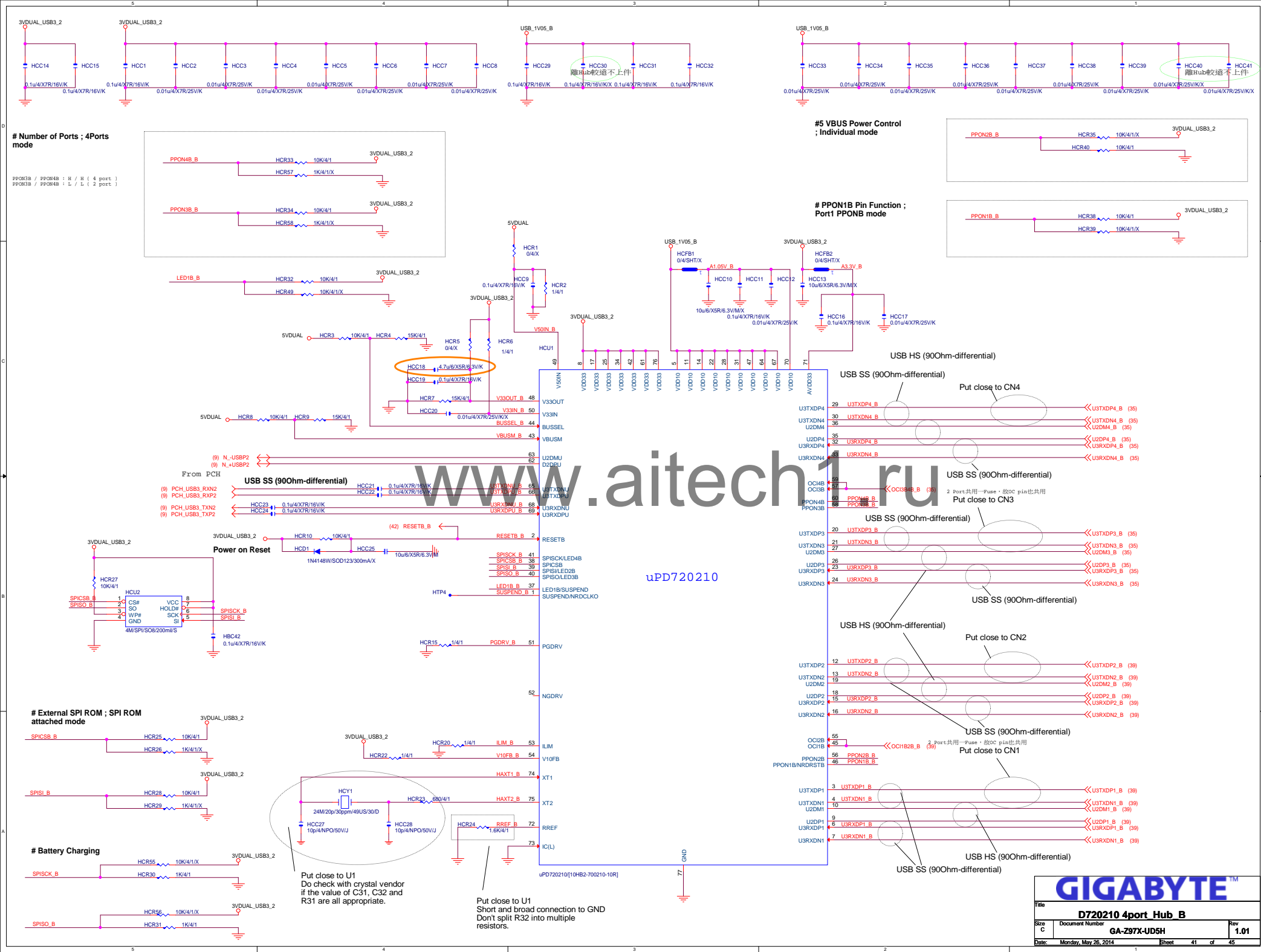
**GIGABYTE™**

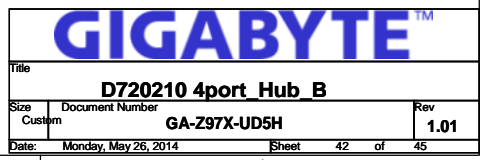
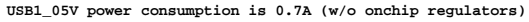
Title				<b>DDR POWER IR3570</b>			
Size	Document Number						Rev
Custom	<b>GA-Z97X-UD5H</b>						<b>1.01</b>
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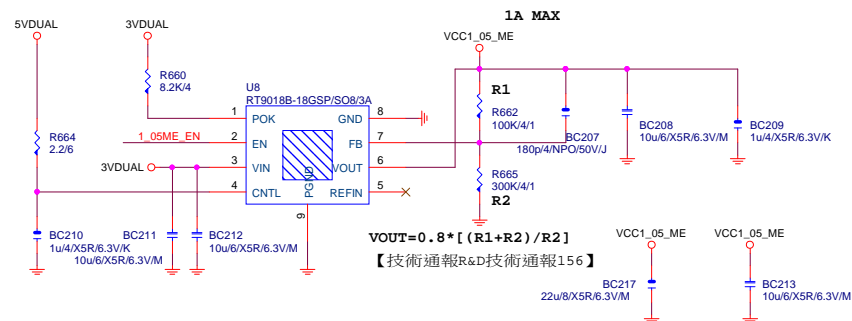




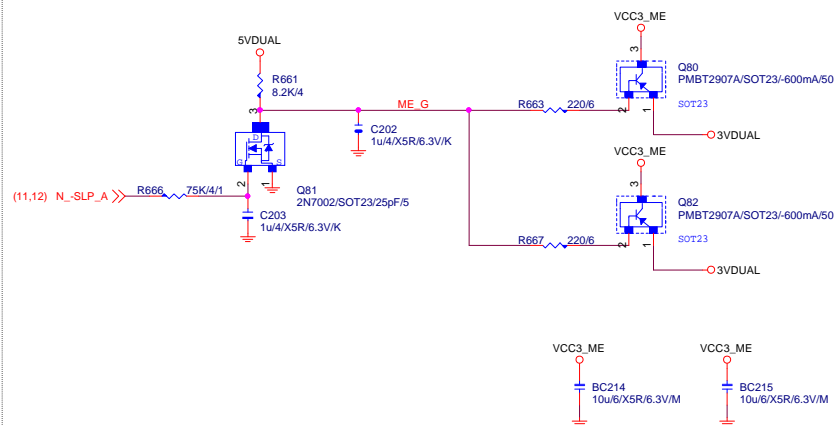




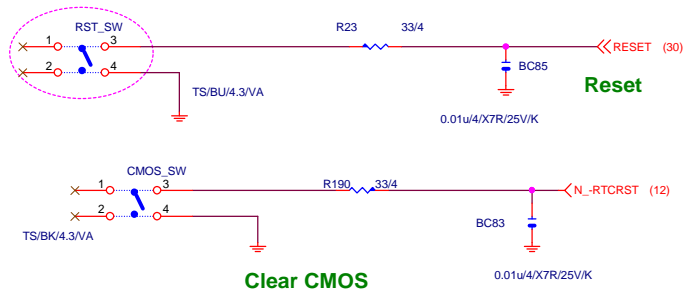
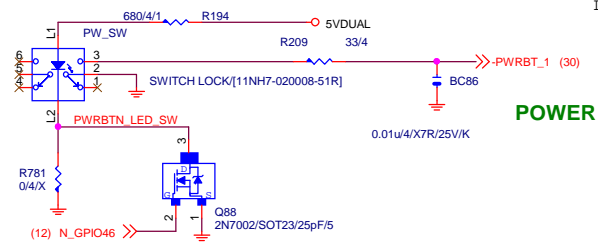
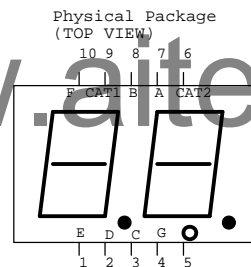
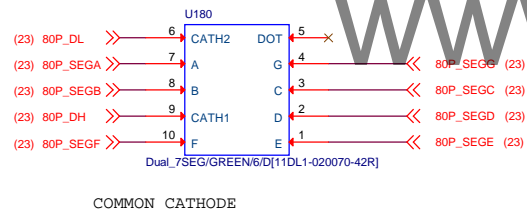
VCC1\_05\_ME



## VCC3\_ME

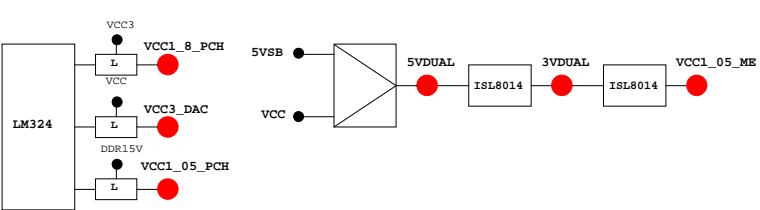


[www.aitech1.ru](http://www.aitech1.ru)

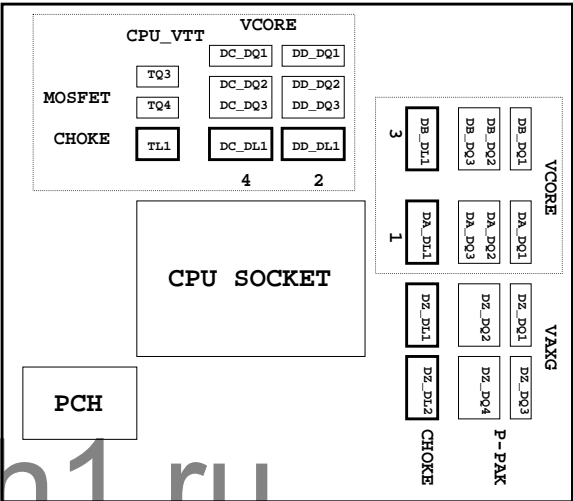
[illegible]

PIN NAME	PWR	AFTER PLUG	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(TL8 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	FWR 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

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#CIRRXX1/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	
VIDO5/GP27/SIN2	LOW_PWR_2	
PCIRST2#/GP11	-PFMRST1	
PCIRST1#/GP12	-PFMRST2	
3VSB5W#/GP40	CSI_F0	BSEL166_1
SUSC#/GP53	CSI_F1	BSEL166_2
GP23/SI	BSEL166_3/CSISBSL	
VIDO0/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/SMB_C_R	2X PIN	FST_2X8
INIT#/GP85/SMBD_M	SEC_2x8	GTLREF_AD2
ACK#/GP83	DDR_LED1_C	
VIDO1/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/CIRRXX2/GP16	-THERM	
VIDO4/GP26/SOUT2	DDR18V_PH2_EN	
VIDO2/FAN_TAC5/GP24/DSR2#	DDR18V_LED	
VIDO6/GP17/RI2#	1_1V_PH_EN	
VIDO7/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 Termination
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

<b>Gigabyte Technology</b>			
Title			
<b>TABLE LIST</b>			
Size C	Document Number	Rev	
	<b>GA-Z97X-UD5H</b>	<b>1.01</b>	
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