

Model Name: GA-Z87P-D3

2.0

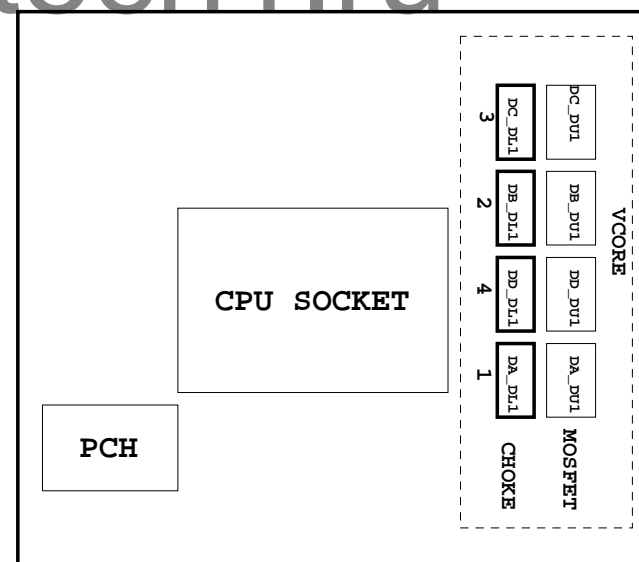
SHEET TITLE

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	PCIEX4 SLOT
16	ITE8892 PCI BRIDGE
17	PCI SLOT 1~4
18	I/O ITE8620
19	COM, -PROHOT, R_USB
20	Dual BIOS / LPT
21	ALC887 CODEC
22	REAR AUDIO JACK
23	VCORE_ ISL95820_1
24	VCORE_ ISL95820_2
25	DDR15V / M3 POWER
26	NCP3933 OVER VOLTAGE
27	DISCRETE POWER

SHEET TITLE

28	F_PANEL , F_USB2.0/3.0
29	ATX POWER, CLOCK GEN
30	HWM , KB/MS , FAN CTRL
31	Realtek 8111F-VL
32	HDMI
33	TABLE LIST
34	
35	
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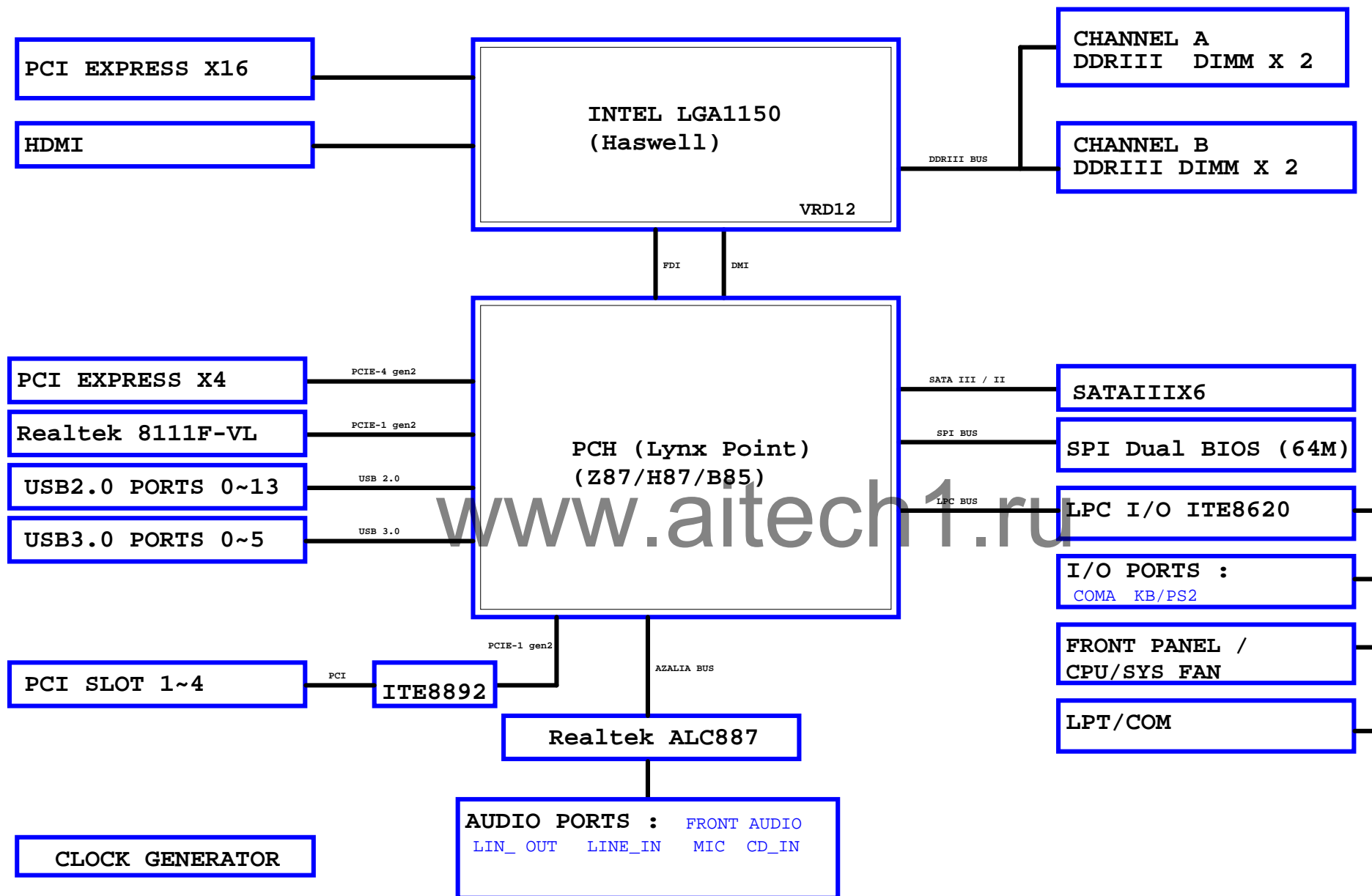


Gigabyte Technology			
Title			
Cover Sheet			
Size	Document Number	GA-Z87P-D3	Rev
Custom			2.0
Date	Thursday, September 26, 2013	Sheet	1 of 33

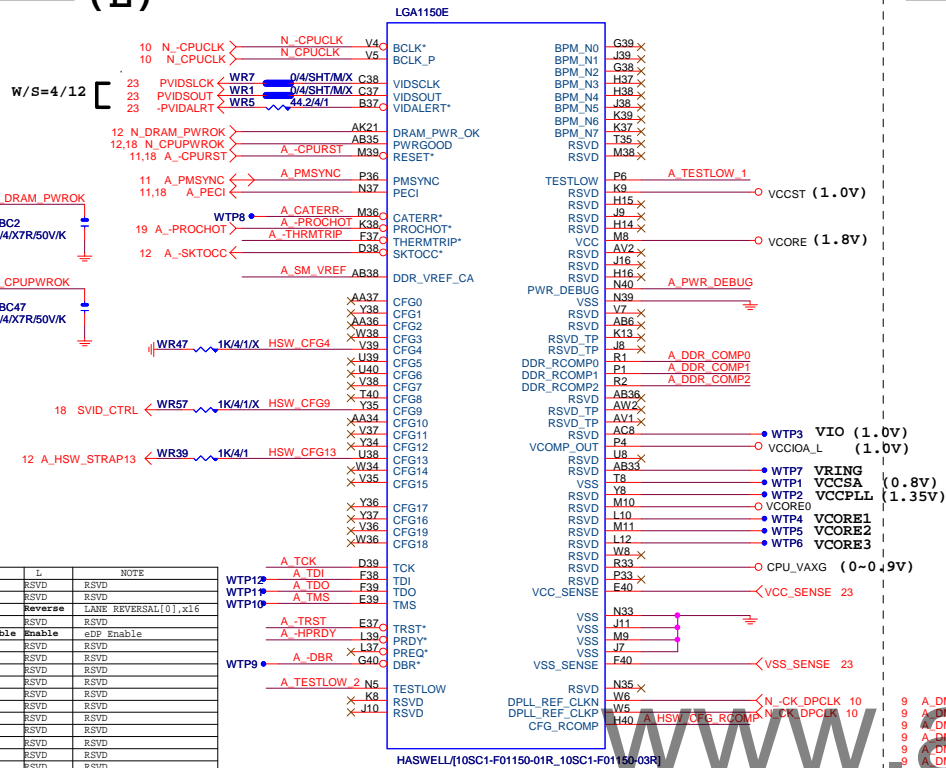
Component value change history

[illegible][illegible]

BLOCK DIAGRAM



LGA1150 (E)

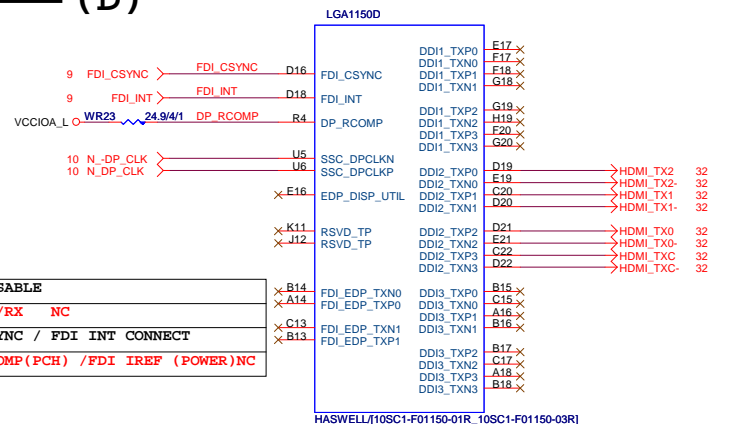


CFG	H	L	NOTE
0	RSVD	RSVD	RSVD
1	RSVD	RSVD	RSVD
2	NORM	Reverse	LANE REVERSAL[0].X16
3	RSVD	RSVD	RSVD
4	Disable	Enable	eDP Enable
7	RSVD	RSVD	RSVD
8	RSVD	RSVD	RSVD
9	RSVD	RSVD	RSVD
10	RSVD	RSVD	RSVD
11	RSVD	RSVD	RSVD
12	RSVD	RSVD	RSVD
13	RSVD	RSVD	RSVD
14	RSVD	RSVD	RSVD
15	RSVD	RSVD	RSVD
16	RSVD	RSVD	RSVD
17	RSVD	RSVD	RSVD

CFG6	CFG5	PCIE CONFIG
1	1	IX16, Default
0	0	2X
0	1	RSVD
0	0	X8, X4, X4

CFG 0-17 all internal PULL-UP

LGA1150 (D)



FDI DISABLE	X B14
FDI TX/RX NC	X A14
FDI CSYNC / FDI INT CONNECT	X C13
FDI RCOMP(PCH) / FDI IREF (POWER) NC	X B13

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

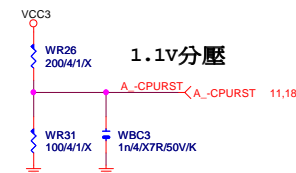
Impedance=85 +- 15%

LGA1155 (C)



CPU PEG 5/5/5/20 Impedance=80 +- 15%
DMI 4/4/4/15 Impedance=85 +- 15%

-CPURST



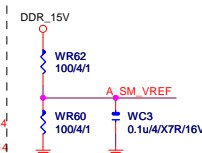
CPU SVID



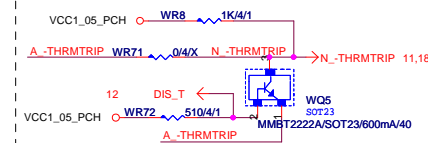
CPU PU/PD



SM REF



THRMTRIP DISABLE FOR Z87 OVERCLOCK



Gigabyte Technology			
CPU LGA1150-A			
Size	Document Number	Rev	2.0
Custom	GA-Z87P-D3		
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LGA1150 (A)

LGA1150A									
		MAAA0	AU13	DDR0_MA0	DDR0_D00	AD38	MDA0		
		MAAA1	AV16	DDR0_MA1	DDR0_D01	AD39	MDA1		
		MAAA2	AU16	DDR0_MA2	DDR0_D02	AF38	MDA2		
		MAAA3	AW17	DDR0_MA3	DDR0_D03	AF39	MDA3		
		MAAA4	AU17	DDR0_MA4	DDR0_D04	AD37	MDA4		
		MAAA5	AW18	DDR0_MA5	DDR0_D05	AD40	MDA5		
		MAAA6	AV17	DDR0_MA6	DDR0_D06	AF37	MDA6		
		MAAA7	AU18	DDR0_MA7	DDR0_D07	AF40	MDA7		
		MAAA8	AV19	DDR0_MA8	DDR0_D08	AH40	MDA8		
		MAAA9	AU18	DDR0_MA9	DDR0_D09	AH39	MDA9		
		MAAA10	AW11	DDR0_MA10	DDR0_D10	AH38	MDA10		
		MAAA11	AV19	DDR0_MA11	DDR0_D11	AH37	MDA11		
		MAAA12	AV19	DDR0_MA12	DDR0_D12	AH38	MDA12		
		MAAA13	AV19	DDR0_MA13	DDR0_D13	AF38	MDA8		
		MAAA14	AT20	DDR0_MA14	DDR0_D14	AH37	MDA14		
		MAAA15	AU121	DDR0_MA15	DDR0_D15	AK40	MDA15		
					DDR0_D16	AM38	MDA21		
		MODT_A0	AW10	DDR0_ODT0	DDR0_D17	AM39	MDA18		
		MODT_A1	AY8	DDR0_ODT1	DDR0_D18	AP37	MDA19		
		MODT_A2	AW9	DDR0_ODT2	DDR0_D19	AP37	MDA20		
		MODT_A3	AU8	DDR0_ODT3	DDR0_D20	AM38	MDA16		
					DDR0_D21	AP37	MDA22		
					DDR0_D22	AP37	MDA23		
			AW33	DDR0_ECC0	DDR0_D23	AU35	MDA29		
			AU31	DDR0_ECC1	DDR0_D24	AW37	MDA29		
			AU31	DDR0_ECC2	DDR0_D25	AU35	MDA26		
			AU31	DDR0_ECC3	DDR0_D26	AU37	MDA27		
			AU33	DDR0_ECC4	DDR0_D27	AU35	MDA27		
			AT33	DDR0_ECC5	DDR0_D28	AU37	MDA24		
			AT31	DDR0_ECC6	DDR0_D29	AT35	MDA30		
			AW31	DDR0_ECC7	DDR0_D30	AW35	MDA31		
		SBAA0	AY12	DDR0_BA0	DDR0_D31	AY6	MDA33		
7		SBAA1	SBAA1	DDR0_BA1	DDR0_D32	AY6	MDA37		
7		SBAA2	SBAA2	DDR0_BA2	DDR0_D33	AY8	MDA37		
					DDR0_D34	AW4	MDA35		
					DDR0_D35	AW6	MDA36		
		CKEA0	CKEA0	DDR0_CK00	DDR0_D36	AW4	MDA32		
7		CKEA1	CKEA1	DDR0_CK01	DDR0_D37	AW4	MDA38		
7		CKEA2	CKEA2	DDR0_CK02	DDR0_D38	AW4	MDA39		
7		CKEA3	CKEA3	DDR0_CK03	DDR0_D39	AN1	MDA41		
					DDR0_D40	AN4	MDA42		
		-CSA0	-CSA1	DDR0_CS_N0	DDR0_D41	AN2	MDA48		
7		-CSA1	AU9	DDR0_CS_N1	DDR0_D42	AN4	MDA43		
7		-CSA2	AU10	DDR0_CS_N2	DDR0_D43	AN2	MDA44		
7		-CSA3	-CSA3	DDR0_CS_N3	DDR0_D44	AN2	MDA45		
					DDR0_D45	AN2	MDA46		
7		DCLKA0	DCLKA0	DDR0_CLK_P0	DDR0_D46	AN1	MDA47		
7		-DCLKA0	-DCLKA0	DDR0_CLK_N0	DDR0_D47	AL1	MDA49		
7		DCLKA1	DCLKA1	DDR0_CLK_P1	DDR0_D48	AL3	MDA50		
7		-DCLKA1	-DCLKA1	DDR0_CLK_N1	DDR0_D49	AL3	MDA50		
7		DCLKA2	DCLKA2	DDR0_CLK_P2	DDR0_D50	AL4	MDA51		
7		-DCLKA2	-DCLKA2	DDR0_CLK_N2	DDR0_D51	AL2	MDA52		
7		DCLKA3	DCLKA3	DDR0_CLK_P3	DDR0_D52	AL2	MDA54		
7		-DCLKA3	-DCLKA3	DDR0_CLK_N3	DDR0_D53	AL2	MDA54		
			AW12	RSVD	DDR0_D54	AL2	MDA55		
					DDR0_D55	AG1	MDA57		
					DDR0_D56	AG4	MDA61		
					DDR0_D57	AE3	MDA58		
					DDR0_D58	AE4	MDA59		
					DDR0_D59	AE2	MDA60		
					DDR0_D60	AE3	MDA56		
					DDR0_D61	AE3	MDA62		
7		-SRASA	-SRASA	DDR0_RAS*	DDR0_D62	AE1	MDA63		
7		-SWEA	-SWEA	DDR0_WE*	DDR0_D63	AE39	DSQA0		
					DDR0_D64	AN39	DSQA2		
					DDR0_D65	AV36	DSQA3		
			AW20	RSVD	DDR0_D66	AE3	DSQA4		
			AW27C	RSVD	DDR0_D67	AP3	DSQA5		
					DDR0_D68	AP3	DSQA6		
7		-SCASA	-SCASA	DDR0_CAS*	DDR0_D69	AE3	DSQA7		
			AU9C		DDR0_D70	AE2	DSQA7		
7.8		-DDR3_RST	WR61 D4/SH/TMX	AK22C	DDR0_RESET*	AV32	DSQA0		
			WC4			AE38	DSQA1		
			0.1uA/XCTR/16V/KX			AN38	DSQA2		
						AN36	DSQA3		
						AW5	DSQA4		
						AE2	DSQA5		
						AE2	DSQA6		
						AE2	DSQA7		
						AU32			

HASWELL/10SC1-F01150-01R 10SC1-F01150-03R]

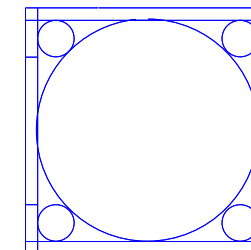
LGA1150 (B)

LGA1150B					
MAA80	AL19	DDR1_MA0	DDR1_DQ0	AE34	MD80
MAA81	AK23	DDR1_MA1	DDR1_DQ1	AE35	MD81
MAA82	AM22	DDR1_MA2	DDR1_DQ2	AE36	MD82
MAA83	AM23	DDR1_MA3	DDR1_DQ3	AH35	MD83
MAA84	AF23	DDR1_MA4	DDR1_DQ4	AD34	MD84
MAA85	AL23	DDR1_MA5	DDR1_DQ5	AD35	MD85
MAA86	AY24	DDR1_MA6	DDR1_DQ6	AG34	MD86
MAA87	AV25	DDR1_MA7	DDR1_DQ7	AH34	MD87
MAA88	AL26	DDR1_MA8	DDR1_DQ8	AH35	MD88
MAA89	AP25	DDR1_MA9	DDR1_DQ9	AK31	MD89
MAA90	AW18	DDR1_MA10	DDR1_DQ10	AK31	MD810
MAA91	AY25	DDR1_MA11	DDR1_DQ11	AL31	MD811
MAA92	AV26	DDR1_MA12	DDR1_DQ12	AL31	MD812
MAA93	AL15	DDR1_MA13	DDR1_DQ13	AK32	MD813
MAA94	AV27	DDR1_MA14	DDR1_DQ14	AL32	MD814
MAA95	AY28	DDR1_MA15	DDR1_DQ15	AL32	MD815
			DDR1_DQ16	AK34	MD821
MODT_B0	AM17	DDR1_ODT0	DDR1_DQ17	AE34	MD819
MODT_B1	AL16	DDR1_ODT1	DDR1_DQ18	AP31	MD823
MODT_B2	AM16	DDR1_ODT2	DDR1_DQ19	AP31	MD820
MODT_B3	AK15	DDR1_ODT3	DDR1_DQ20	AN35	MD816
			DDR1_DQ21	AN32	MD818
	AM26	DDR1_EC00	DDR1_DQ22	AP32	MD822
	AM25	DDR1_EC01	DDR1_DQ23	AM29	MD825
	AE25	DDR1_EC02	DDR1_DQ24	AM29	MD828
	AF26	DDR1_EC03	DDR1_DQ25	AM28	MD827
	AR26	DDR1_EC04	DDR1_DQ26	AR28	MD830
	AR25	DDR1_EC05	DDR1_DQ27	AL28	MD829
	AR26	DDR1_EC06	DDR1_DQ28	AP29	MD826
	AR25	DDR1_EC07	DDR1_DQ29	AP28	MD831
			DDR1_DQ30	AP12	MD832
SBA80	AK17	DDR1_BA0	DDR1_DQ31	AL13	MD834
SBA81	AL18	DDR1_BA1	DDR1_DQ32	AL12	MD835
SBA82	AW28	DDR1_BA2	DDR1_DQ33	AL13	MD836
			DDR1_DQ34	AL12	MD838
CKE80	AW29	DDR1_CKE0	DDR1_DQ35	AL12	MD839
CKE81	AY29	DDR1_CKE1	DDR1_DQ36	AL13	MD840
CKE82	AL29	DDR1_CKE2	DDR1_DQ37	AM13	MD838
CKE83	AL29	DDR1_CKE3	DDR1_DQ38	AM12	MD838
			DDR1_DQ39	AR9	MD845
CS80	AP17	DDR1_CS_N0	DDR1_DQ40	AP9	MD847
CS81	AN15	DDR1_CS_N1	DDR1_DQ41	AP6	MD843
CS82	AN17	DDR1_CS_N2	DDR1_DQ42	AR10	MD844
CS83	AL15	DDR1_CS_N3	DDR1_DQ43	AR7	MD846
			DDR1_DQ44	AP7	MD842
			DDR1_DQ45	AR9	MD852
DCLK80	AM20	DDR1_CLK_P0	DDR1_DQ46	AM6	MD850
DCLK81	AM21	DDR1_CLK_P1	DDR1_DQ47	AM6	MD855
DCLK82	AN21	DDR1_CLK_P2	DDR1_DQ48	AM10	MD848
DCLK83	AP20	DDR1_CLK_P3	DDR1_DQ49	AL10	MD854
DCLK84	AL20	DDR1_CLK_P4	DDR1_DQ50	AM7	MD851
DCLK85	AN19	DDR1_CLK_P5	DDR1_DQ51	AH6	MD861
DCLK86	AP21	DDR1_CLK_P6	DDR1_DQ52	AH7	MD859
DCLK87	AL20	DDR1_CLK_P7	DDR1_DQ53	AE6	MD863
SCASB	AP16C	DDR1_CLK_P8	DDR1_DQ54	AJ6	MD856
SRASB	AM18C	DDR1_CAS*	DDR1_DQ55	AF7	MD859
SWEB	AK16C	DDR1_WE*	DDR1_DQ56	AJ7	MD862
			DDR1_DQ57	AF35	MD850
AB39		DDR_VREF_DQ0	DDR1_DQ58	AL33	CS881
AB40		DDR_VREF_DQ1	DDR1_DQ59	AN28	CS883
			DDR1_DQ60	AN12	DS884
			DDR1_DQ61	AP8	DS885
			DDR1_DQ62	AL8	DS886
				AG7	DS887
			DDR1_DQ63	AN25X	
			DDR1_DQ64	AF34	DS880
			DDR1_DQ65	AK33	DS881
			DDR1_DQ66	AN33	DS882
			DDR1_DQ67	AN29	DS883
			DDR1_DQ68	AN13	DS884
			DDR1_DQ69	AL8	DS885
			DDR1_DQ70	AM8	DS886
			DDR1_DQ71	AG6	DS887
			DDR1_DQ72	AN26X	

HASWELL/10SC1-F01150-01R 10SC1-F01150-03R

LGA1150 (CR)

LGA1150
ILM_BP/1156/CSP/12KRC-0F0001-52R_12KRC-0F0001-51R]



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	MAAA[0..15]	↔	MAAA[0..15]
8	MAAB[0..15]	↔	MAAB[0..15]
8	DQSB[0..7]	↔	DQSB[0..7]
8	-DQSB[0..7]	↔	-DQSB[0..7]

(F, J)



(G,H,I)

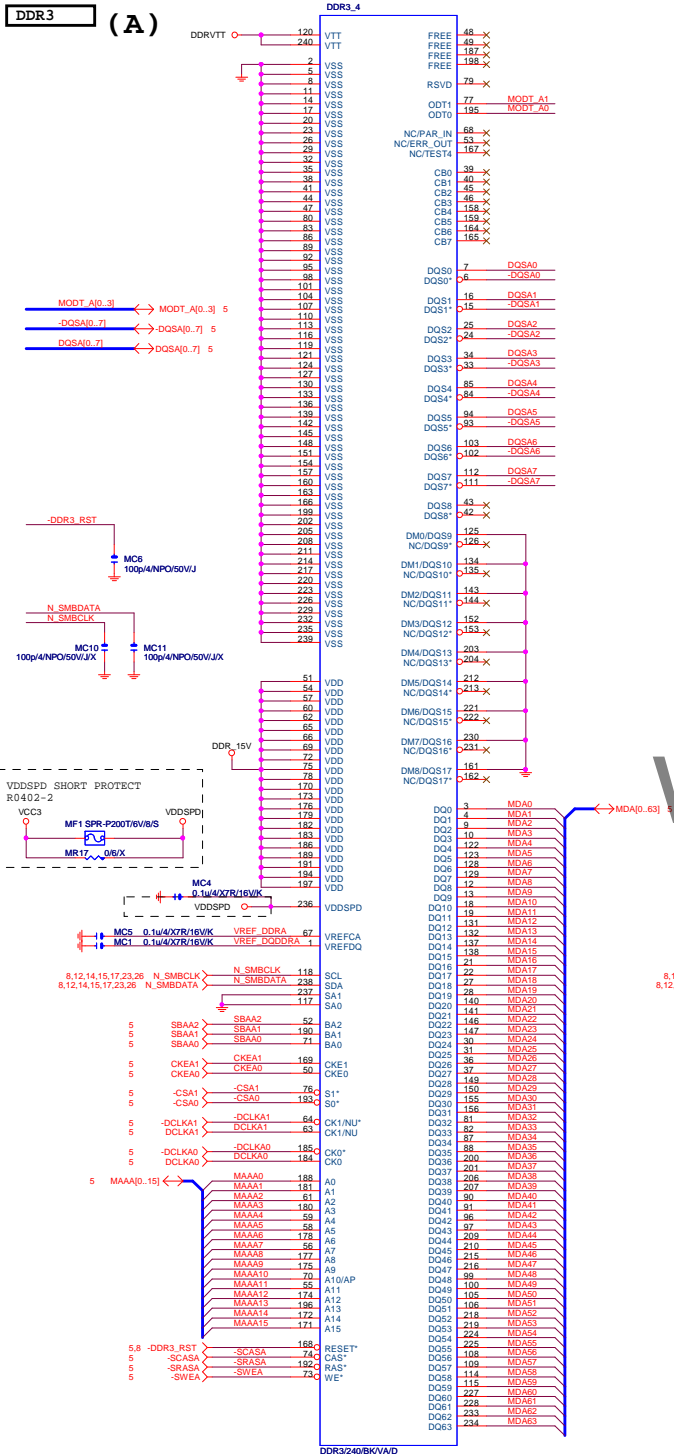


(X30)

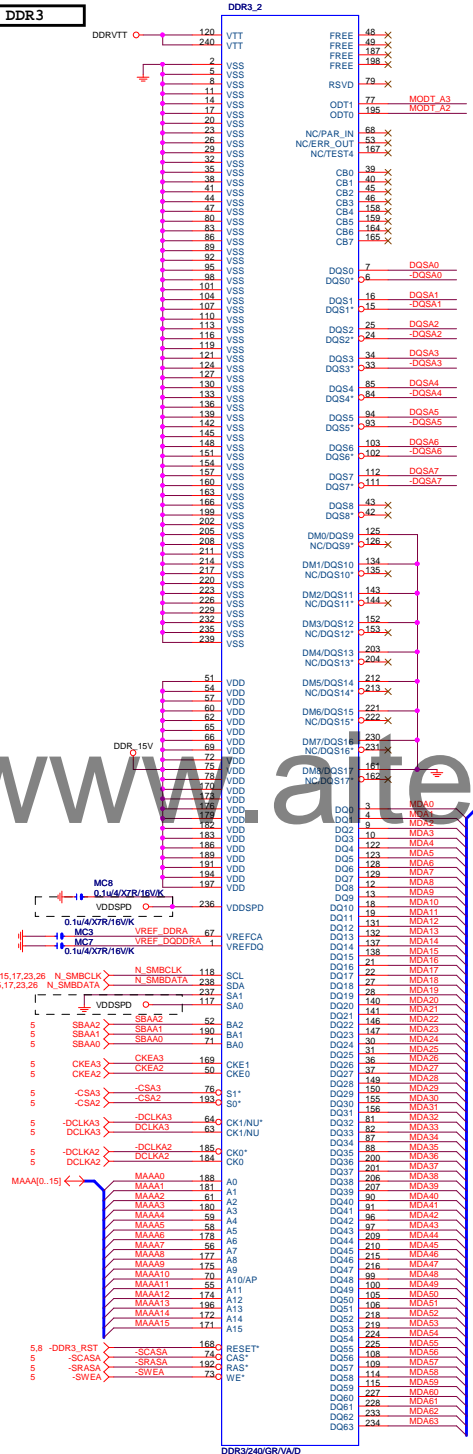
(X15)



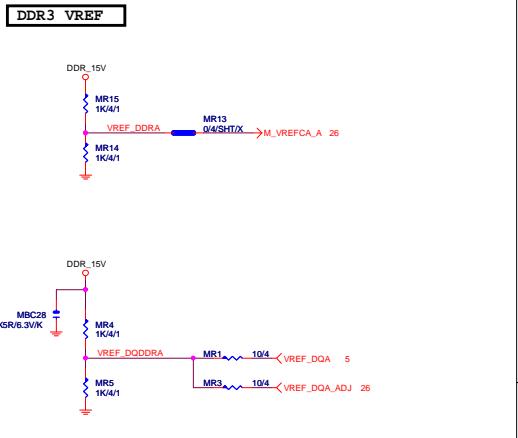
DDR3 (A)



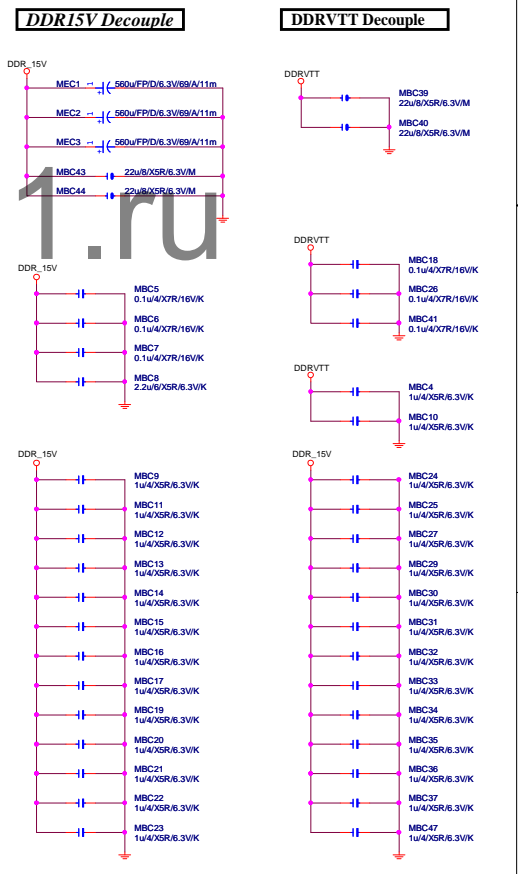
DDR3



DDR3 VREF

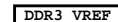
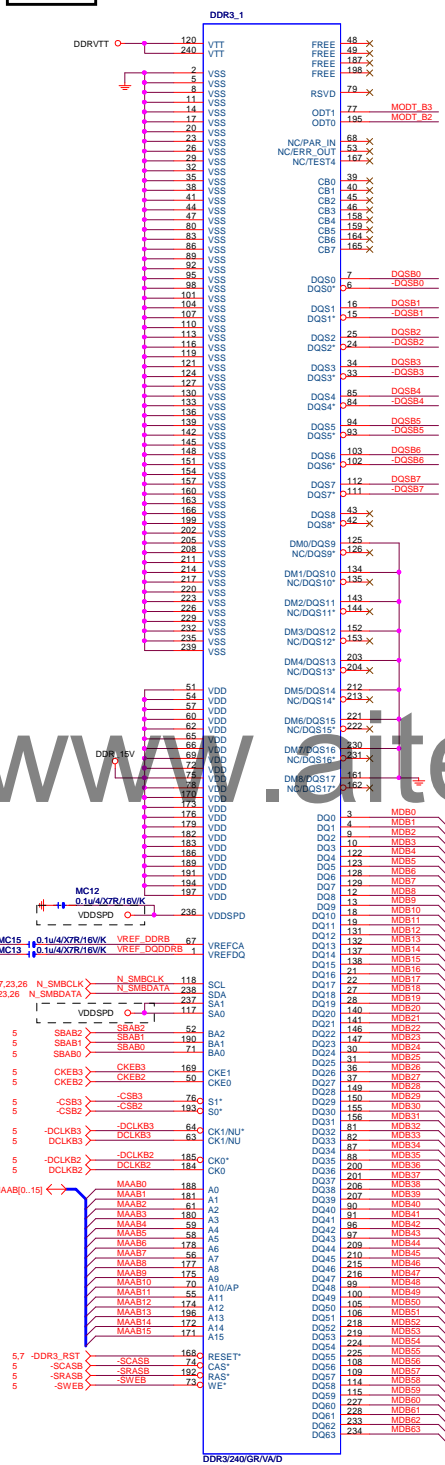
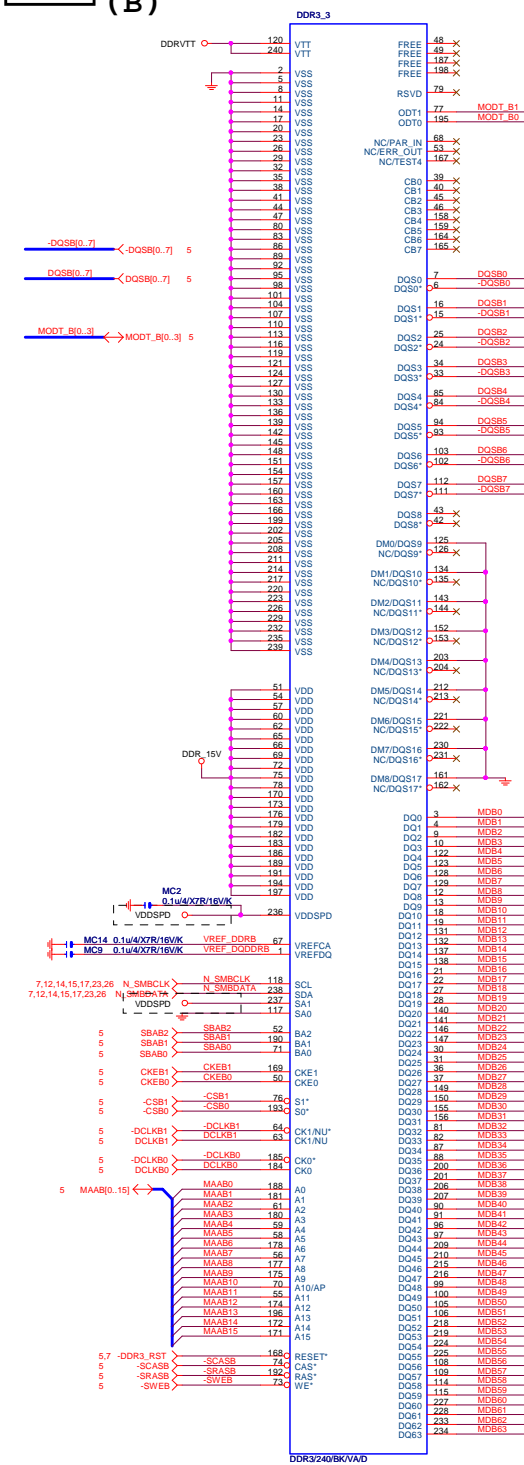


DDR TERMINATION CHANNEL A/B





(B)



```
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



CPU

CHA

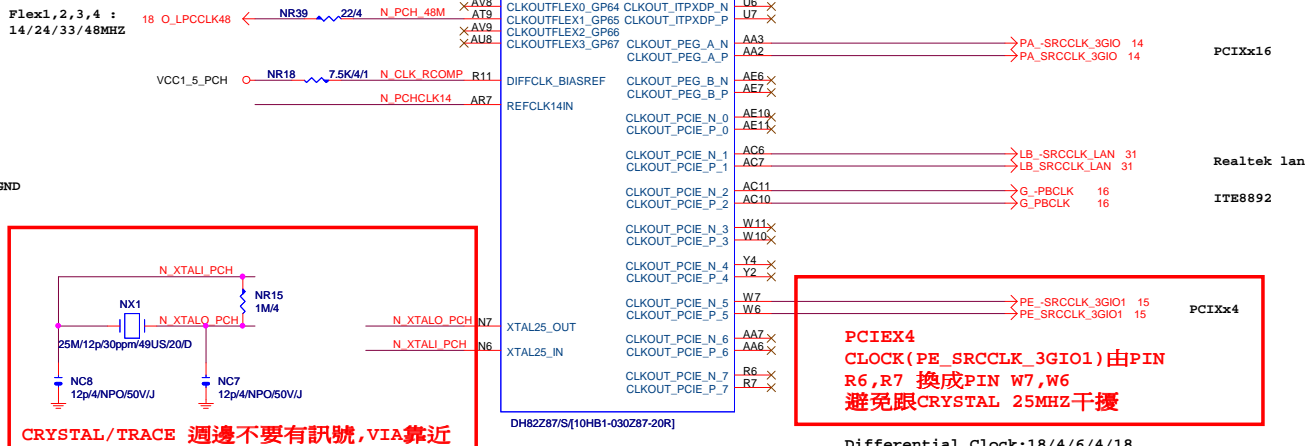
QUIP

Gigabyte Technology

Title				DDRIII CHANNEL B			
Size	Document Number						Rev
Custom	GA-Z87P-D3						2.0
Date:				Sheet	8	of	33

[illegible]

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

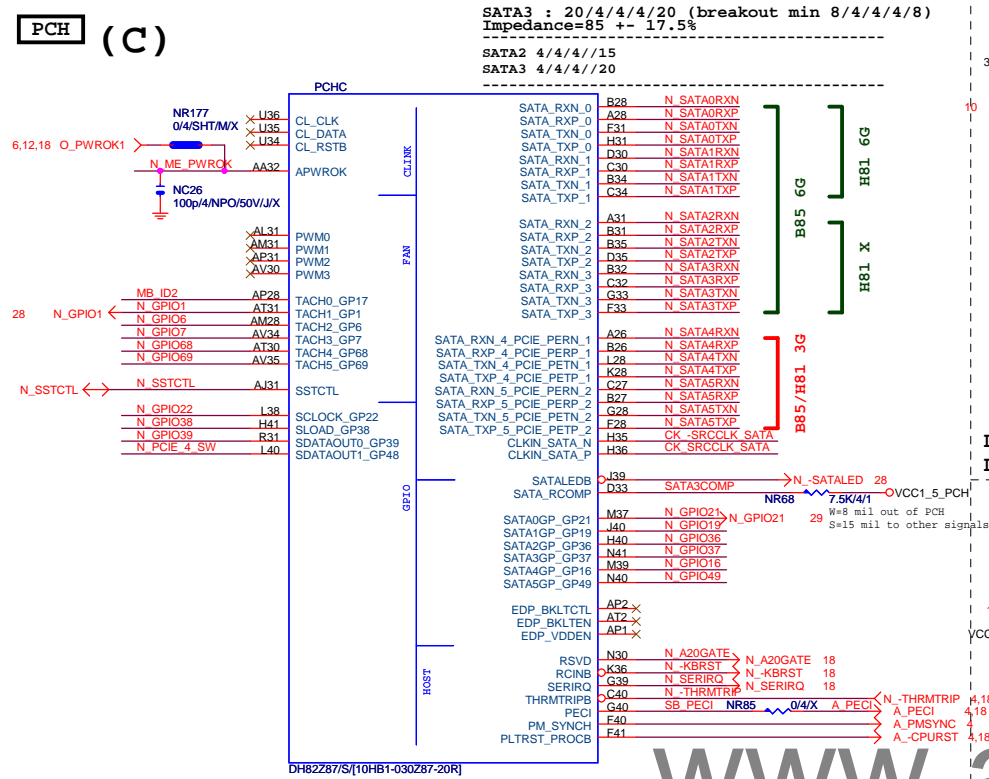


Mount for integrated clock Generation Mode

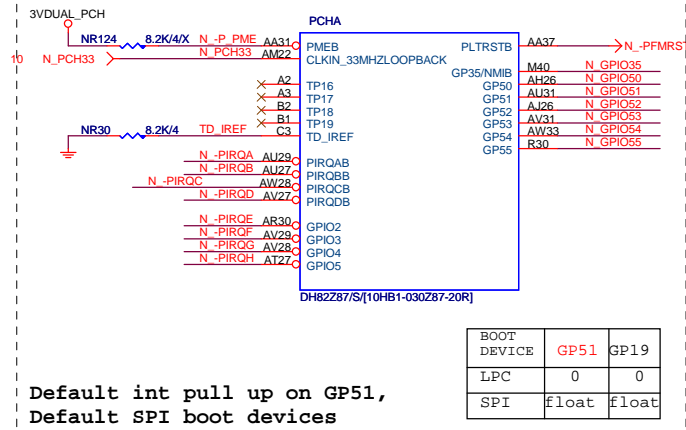
VGA DDC

Gigabyte Technology				
Title				
PCH DISPLAY ,CLK BUFFER				
Size	Document Number			Rev
Custom	GA-Z87P-D3			2.0
Date:	Friday, October 25, 2013	Sheet	10	of 33

PCH (C)



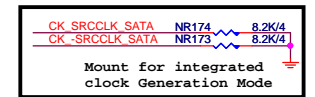
PCH (A)



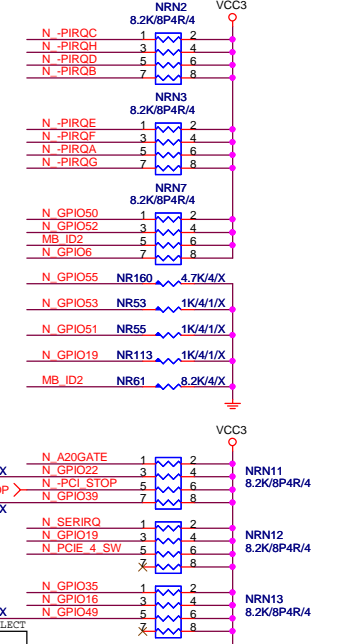
```
Default int pull up on GP51,  
Default SPI boot devices
```

BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	float	float

PCH CLK PD



PCH PU/PD



MB ID

N_GPIO55:A16 SWAP OVERRIDE

N_GPIO53:DMI AC COUPLING

MB ID

N_GPIO22:PCB CONFIG

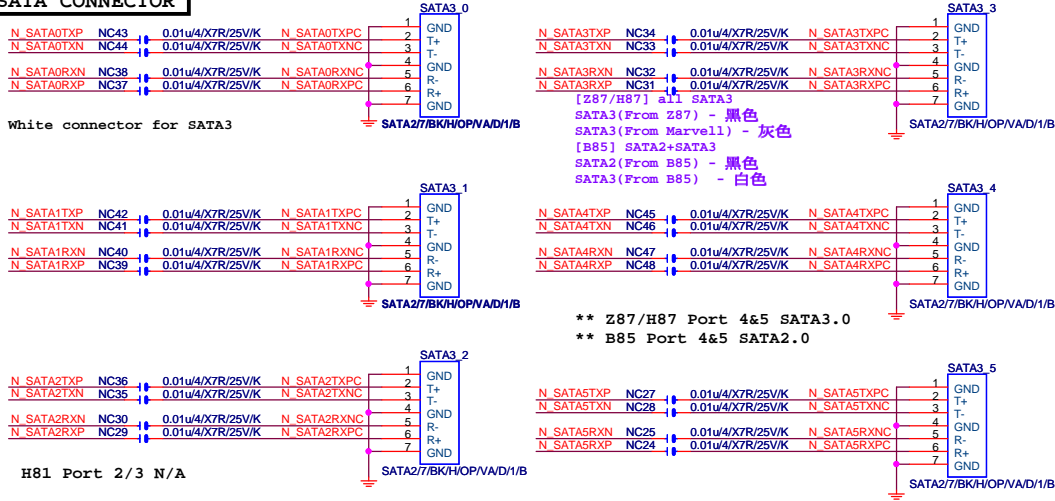
NR167 1K/41X
12 N-PCI STOP X
NR157 1K/41X

N_GPIO39:GFX MODE

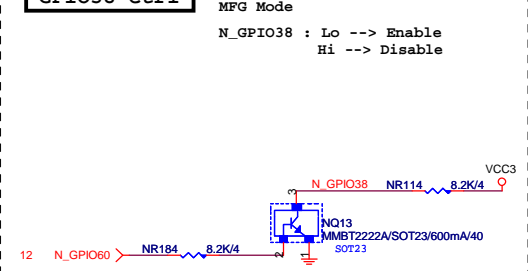
NR80 1K/41X

soft strap	GP16	GP49
0	pciel	pcie2
1	sata4	sata5

SATA CONNECTOR

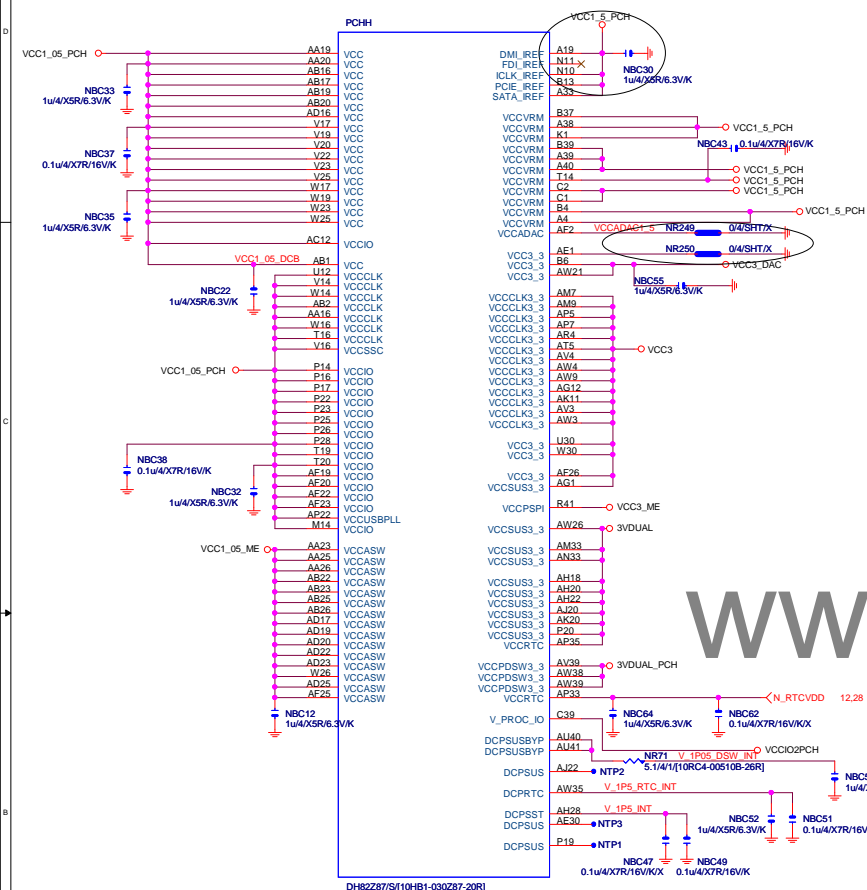


GPIO38 Ctrl



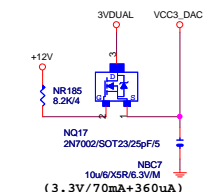
```
MFG Mode
N_GPIO38 : Lo --> Enable
           Hi --> Disable
```


PCH (H)

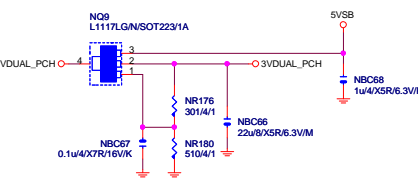


VCC3_DAC

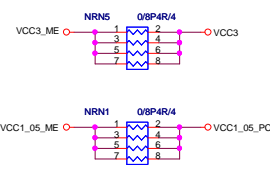
CLOSE北橋(注意震盪水波紋)



3VDUAL_PCH

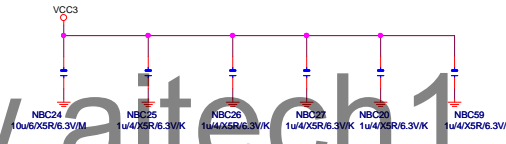


SHT_PWR

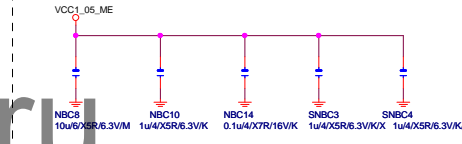


CAP

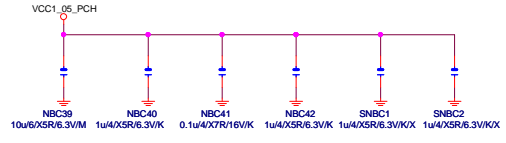
(3.3V) (X6)



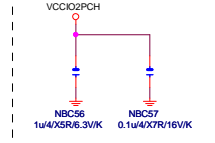
(1.05V) (X5)



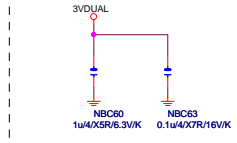
(1.05V) (X6)



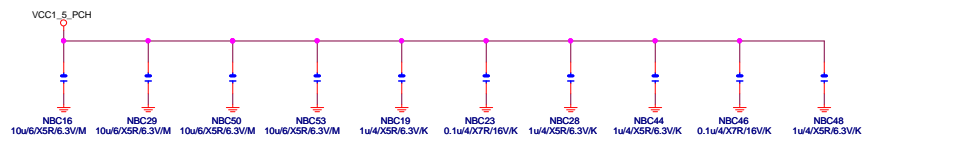
(1.05V) (X2)



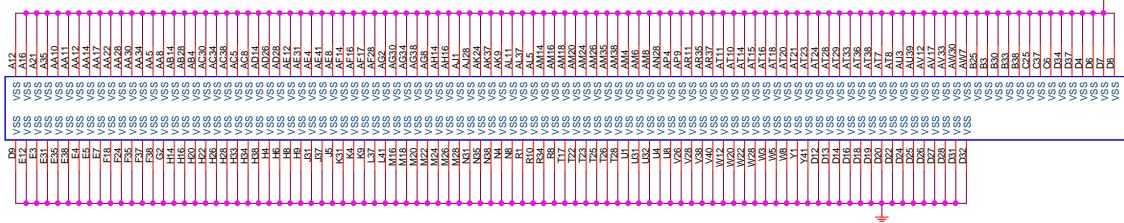
(3.3V) (X2)



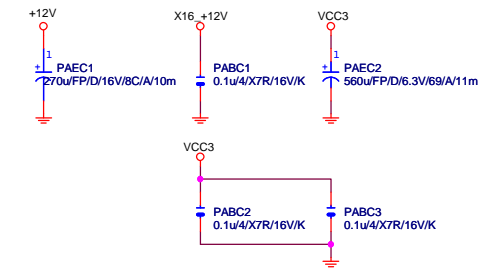
(1.5V) (X10)



PCH (I)

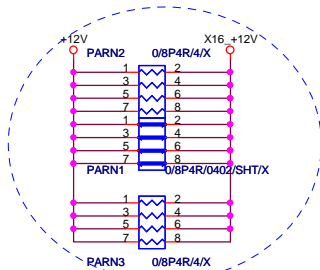


PCIEX16 CAP



PCIEX16 PROTECT SHT

+12 protect short-wire test



PCIEX16 AC CAP

PA EXP TXP0	PAC5	0.22u4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22u4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22u4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u4/X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u4/X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u4/X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u4/X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u4/X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u4/X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u4/X5R/6.3V/K	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u4/X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u4/X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u4/X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u4/X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u4/X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u4/X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u4/X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u4/X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u4/X5R/6.3V/K	PA EXP TXN15 C

PCI-E REV:1.1--> 2.5GHZ

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

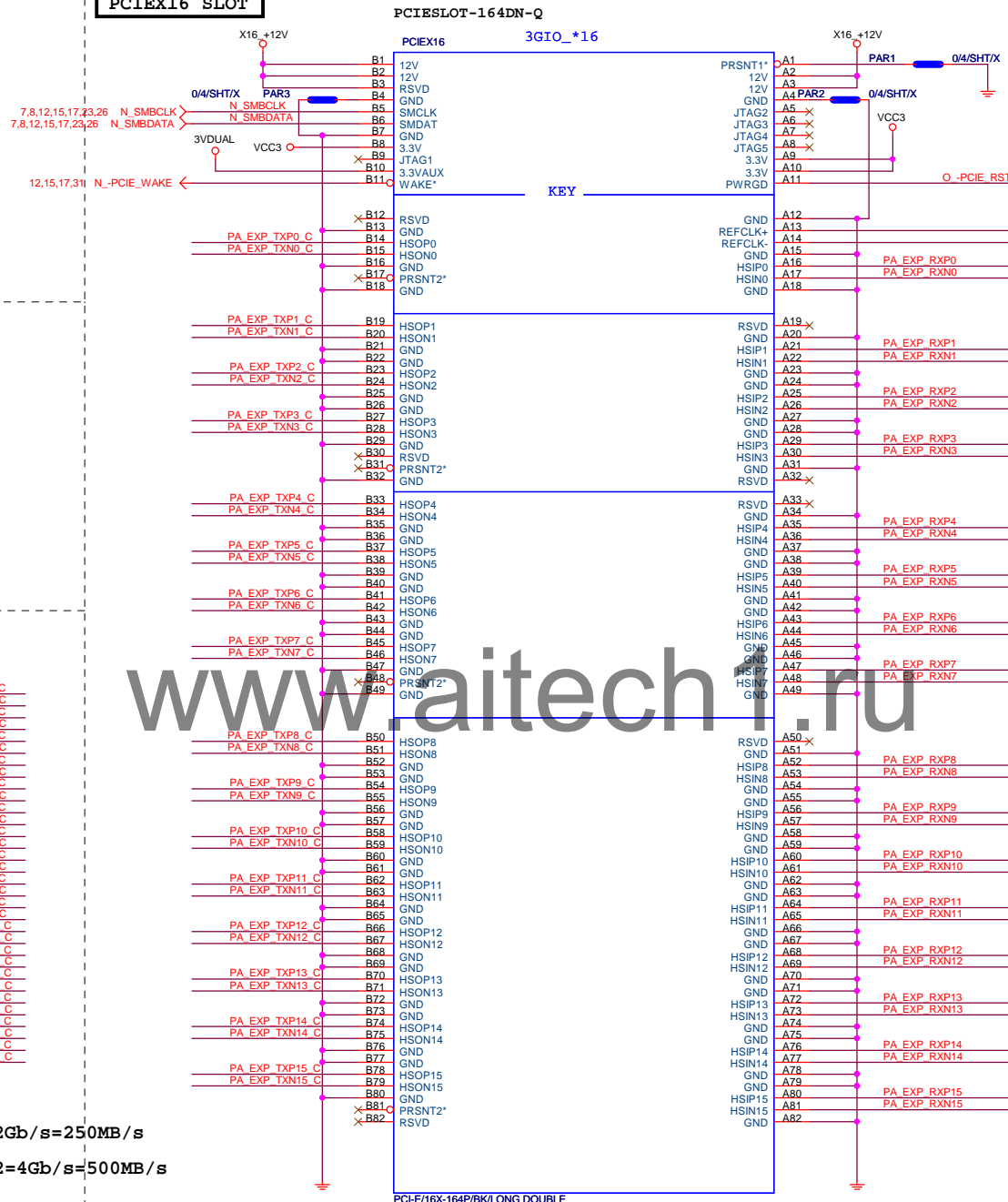
PCE-E X1(雙向) BANDWITH=2.5GHz*(8b/10b)X2=4Gb/s=500MB/s

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

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

PCI-E REV:2.0--> 5GHZ

PCIEX16 SLOT

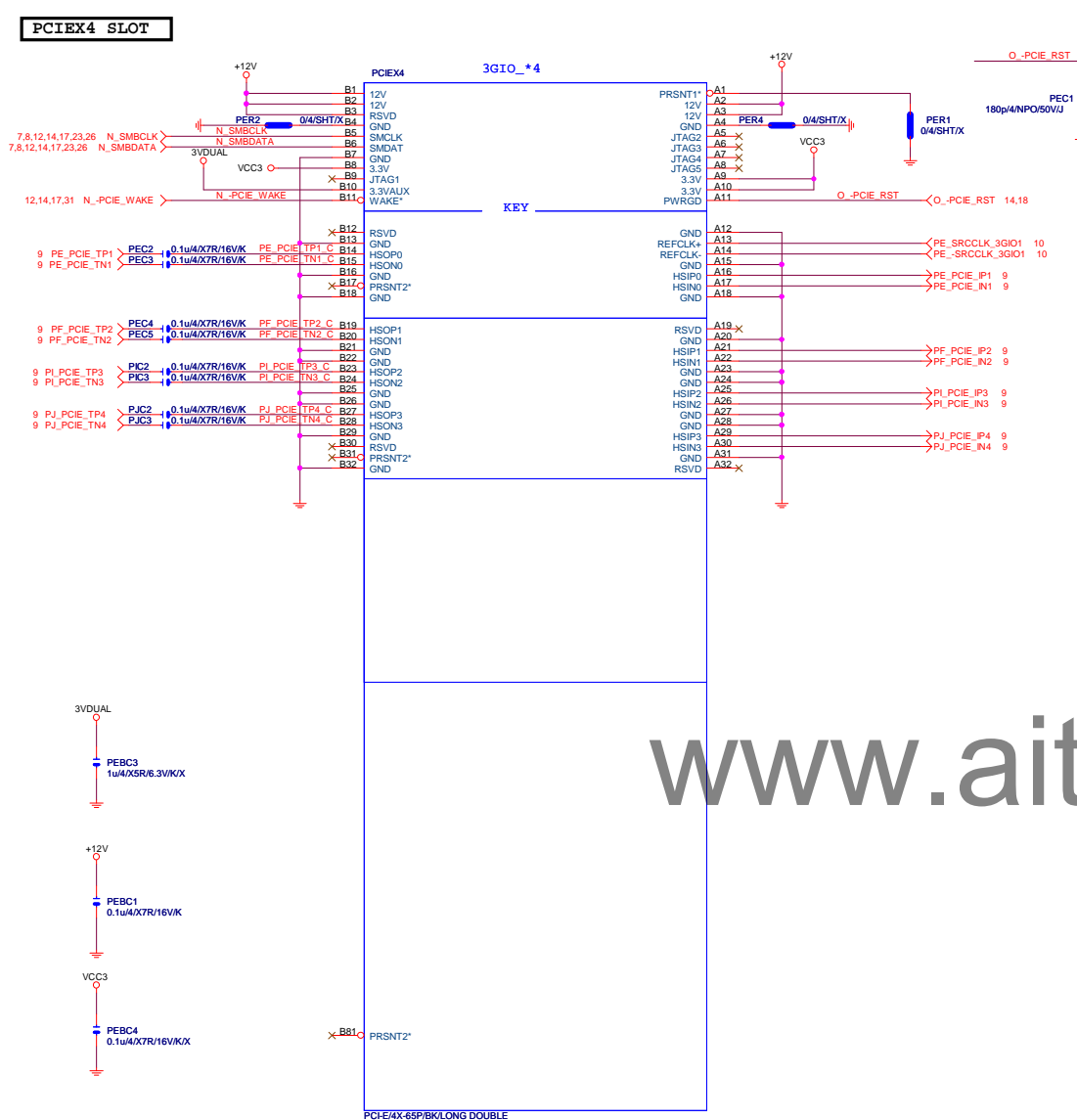


The auxiliary reset circuit is only required for PCIe Gen3 margining and functional link training

PCIEX16:16/5/5/5/16

PA EXP RXP0..15]	>>>PA_EXP_RXP[0..15]	4
PA EXP RXN0..15]	>>>PA_EXP_RXN[0..15]	4
PA EXP TXP[0..15]	>>>PA_EXP_TXP[0..15]	4
PA EXP TXN[0..15]	>>>PA_EXP_TXN[0..15]	4

Gigabyte Technology			
PCI EXPRESS * 16			
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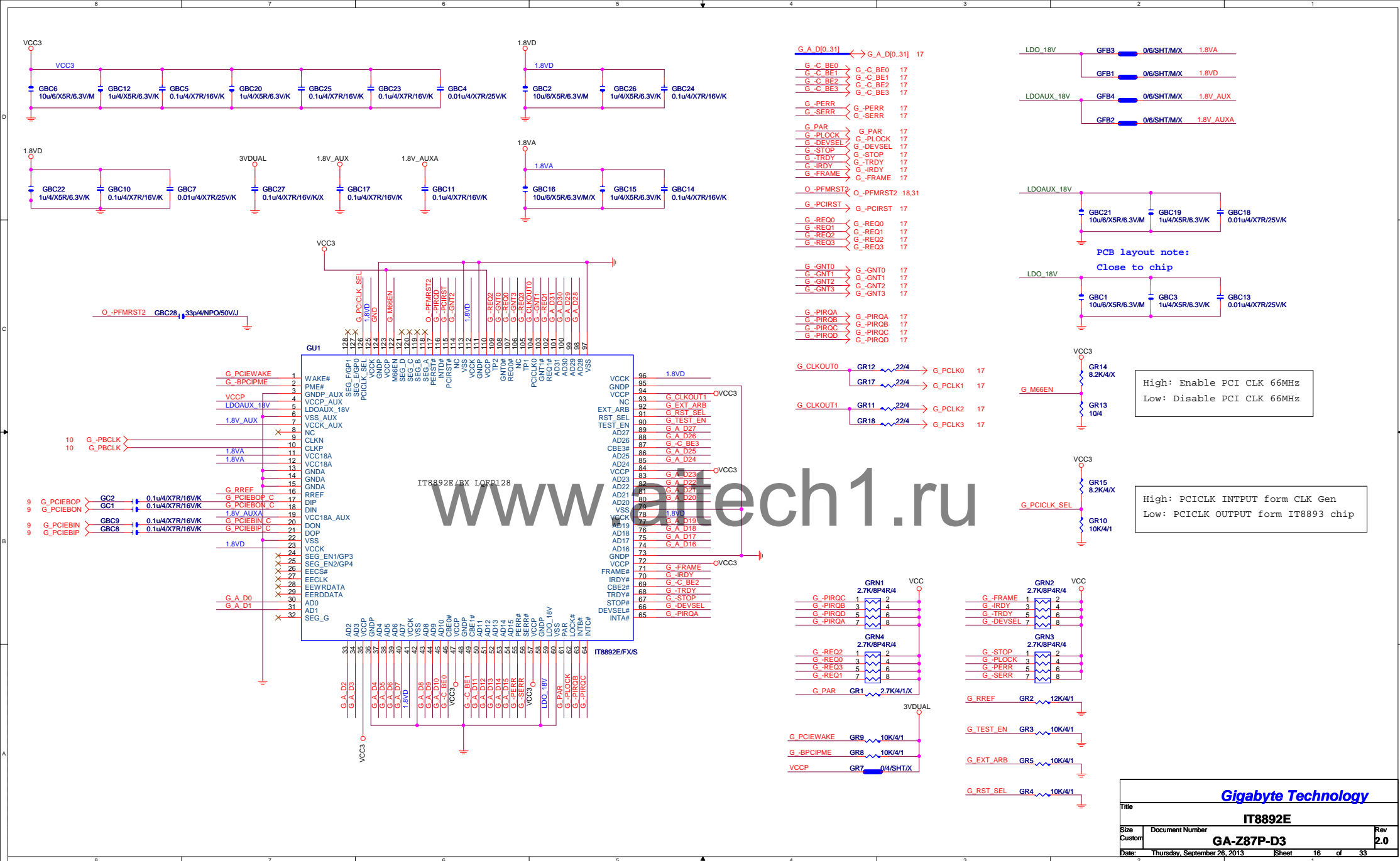
PCIEX1 SLOT

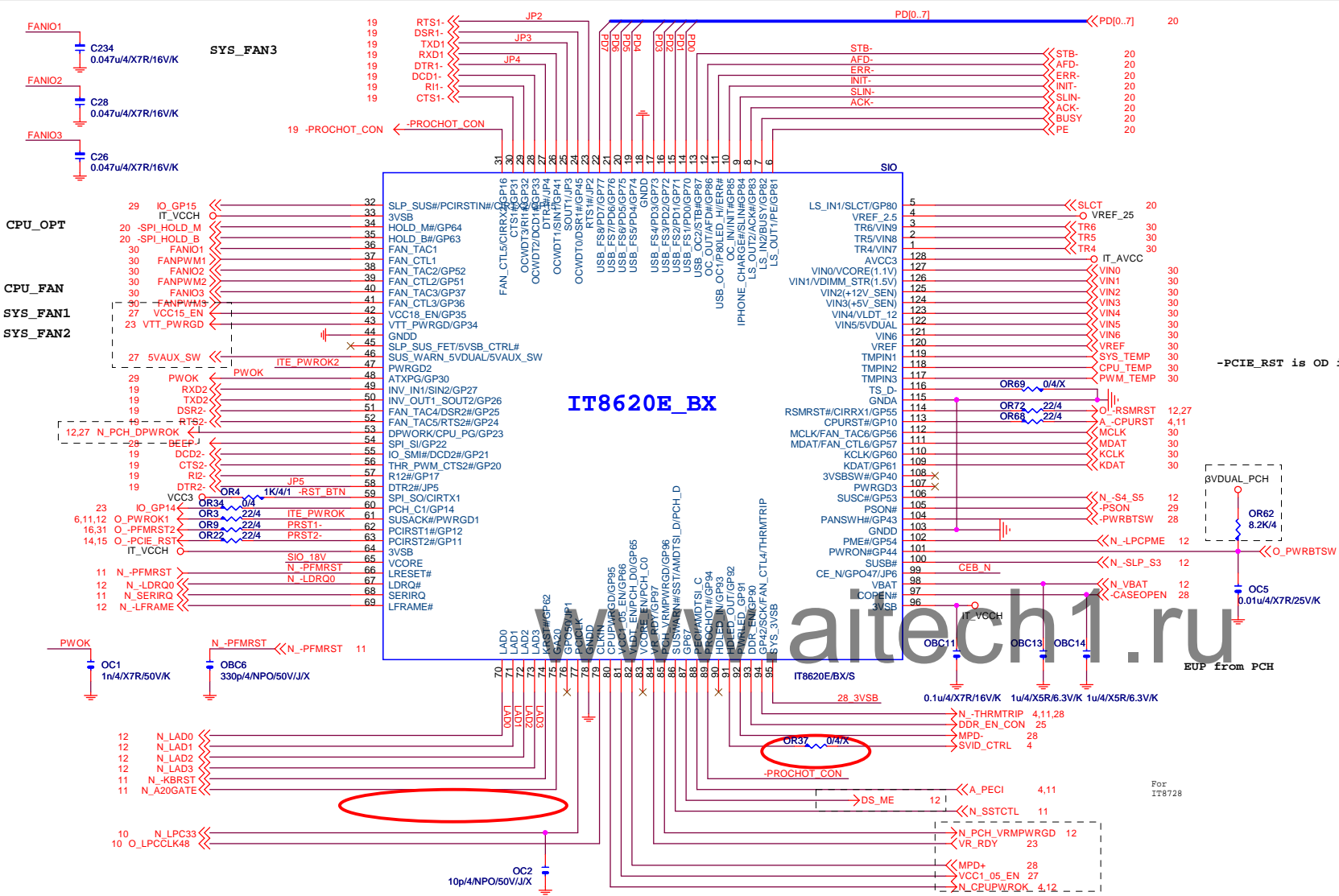
PCIEX1_1

PCIEX4/X1 SWITCH

	N_PCIE_4_SW (PCH_GPIO48)	PCIEX4_X1 (SIO_GPIO26)
P	H	H
C		
PCIEX4 No devices	H	H
PCIEX4 -> X1		
PCIEX4 Have devices		
PCIEX4 -> X4	L	L
PCIEX1_1/2 --> N/A		

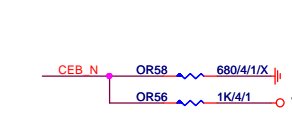
Function	SEL
xI--> x0a	L;PCIEX4 SLOT-->X1
xI--> x0b	H;PCIEX4 SLOT-->X4





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
PIN 108	高溫時 GP92 會被拉Lo(ITE BUG)
PIN 111/112	GP40--- POWER ON 時會拉 LO
PIN 111/112	MOUSE 與 FAN6 FUNCTION 擇一使用, 不然會互相干擾

DUAL BIOS OPT STRAP



Power leakage



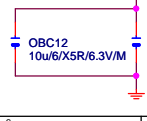
SIO_18V



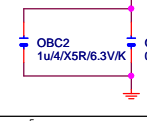
SIO CAP



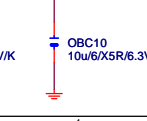
IT_VCC



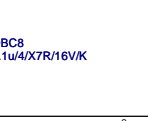
IT_VCC



IT_AVCC



3VDUAL_PCH



PWR SHT



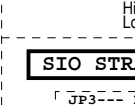
SIO PU



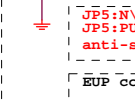
SIO STRAP



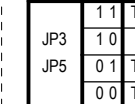
SIO STRAP



SIO STRAP



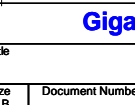
SIO STRAP



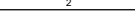
SIO STRAP



SIO STRAP



SIO STRAP



Gigabyte Technology

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For 8728_EUP function

3VDUAL_PCH OR25 0/6/SHT/X IT_VCCH

VCC3 OR49 0/6/SHT/X IT_AVCC

SVID_CTRL OR84 8.2K/4/X 3VDUAL_PCH

-PROCHOT_CON OR29 8.2K/4 VCC3

N_LDRQ0 OR27 1K/4/1 VCC3

ITE_PWROK2 OR16 1K/4/1 VCC3

ITE_PWROK OR10 1K/4/1 VCC3

O_-PCIE_RST OR71 1K/4/1/X VCC3

O_-PFMRST2 OR2 1K/4/1/X VCC3

N_A20GATE OR31 680/4/1/X

Hi :Disable WDT
Lo :Enable WDT to rest PWROK

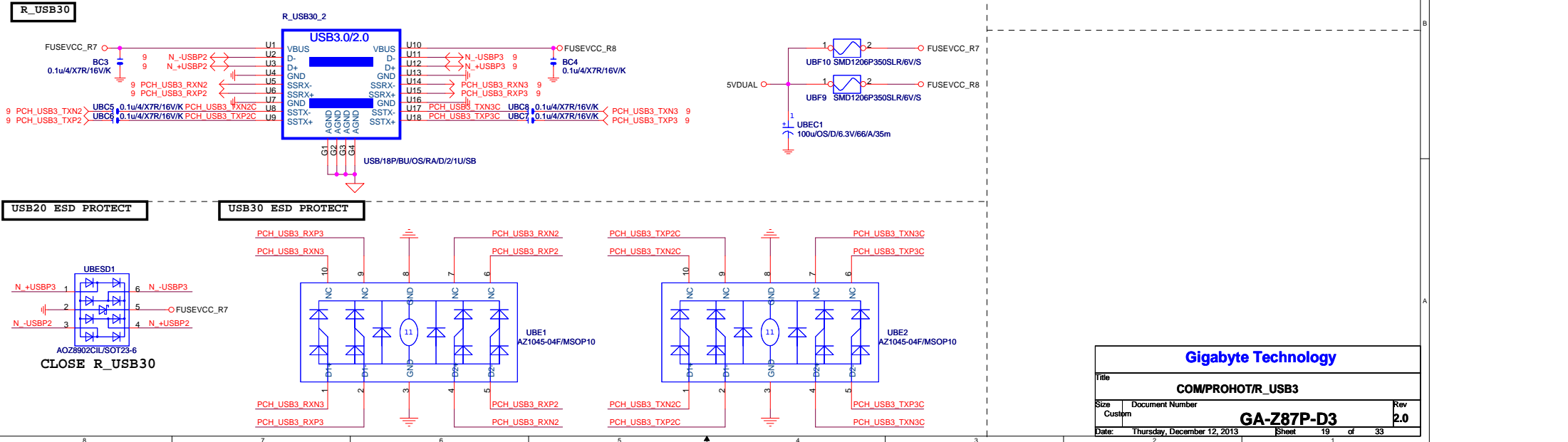
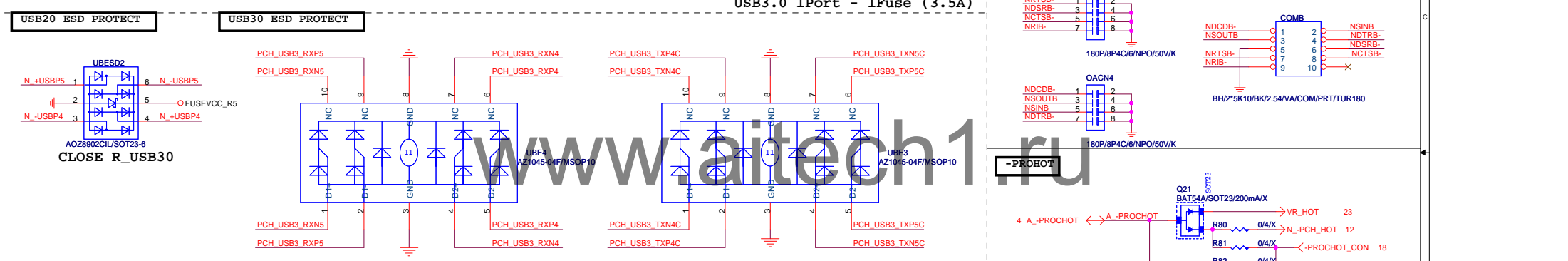
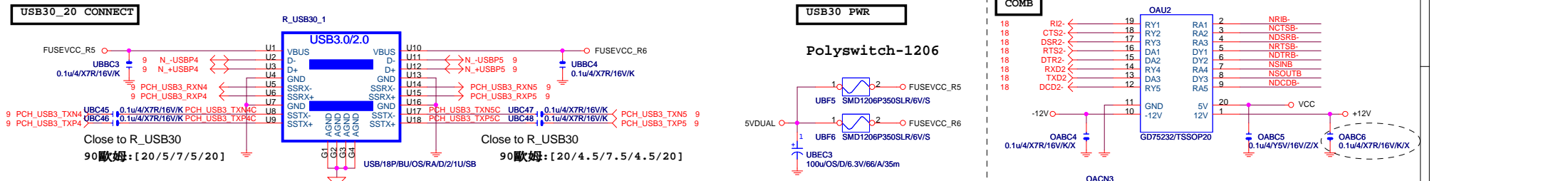
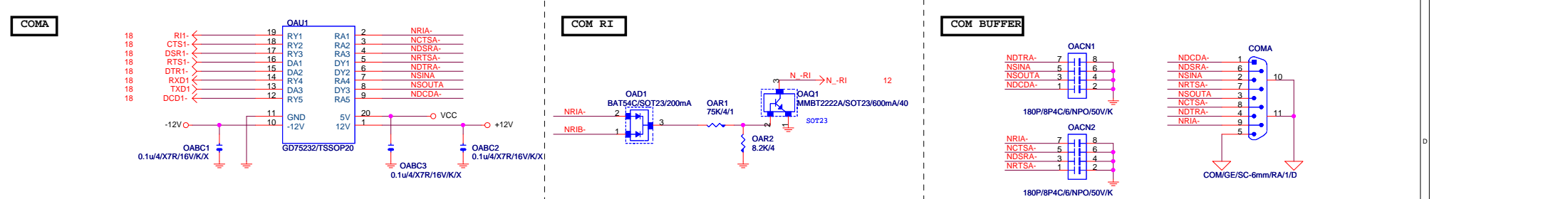
JP3--- High SPI-Flash Disable
Low SPI-Flash Enable

JP5:N/A FOR 8728 DX
JP5:PULL DOWN FOR 8728 EX
anti-surge enable

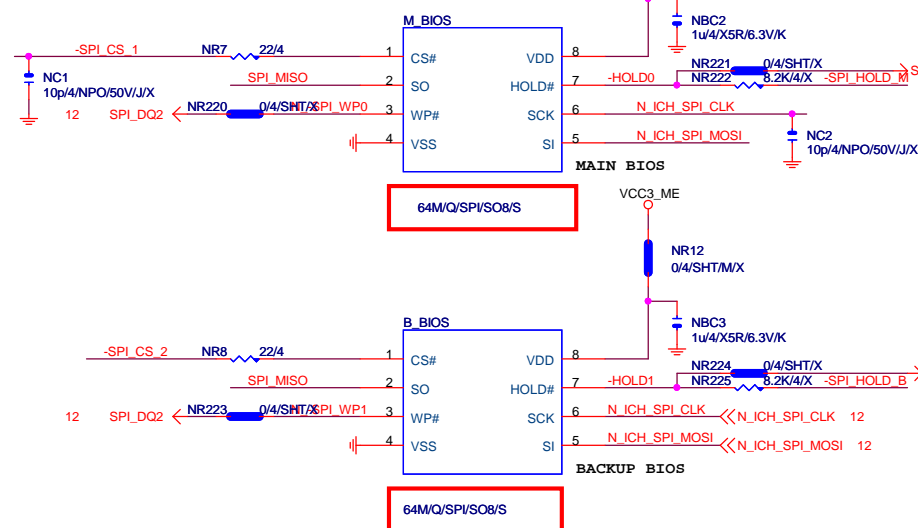
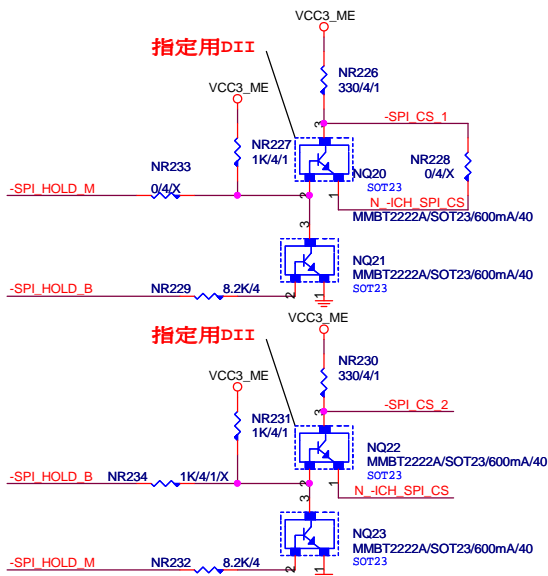
EUP control detect

3VDUAL OR47 100/4/1 28_3VSB

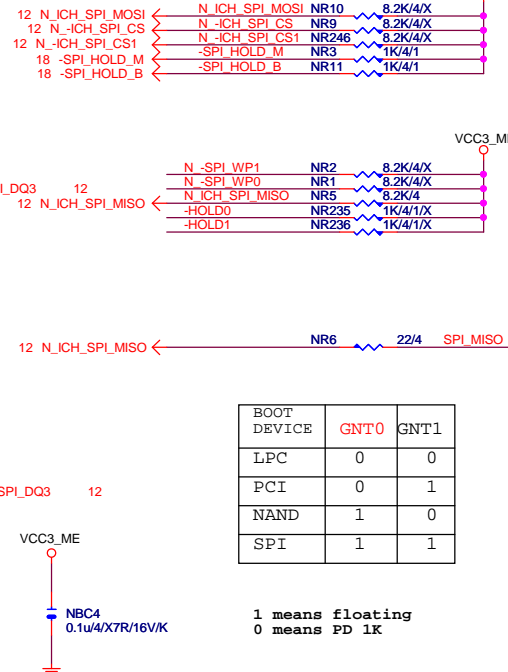
JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
	0 1	The default value of EC Index 63h/6Bh/73h is FFh.
JP5	1 0	The default value of EC Index 63h/6Bh/73h is 00h.
	0 0	The default value of EC Index 63h/6Bh/73h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



DUAL BIOS



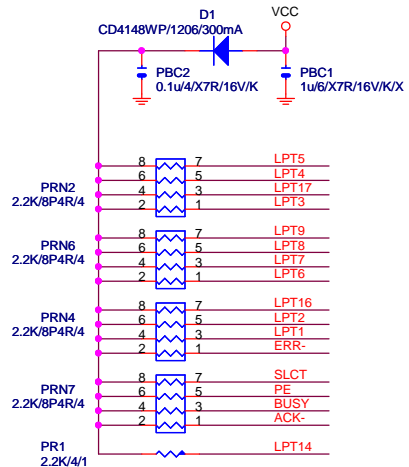
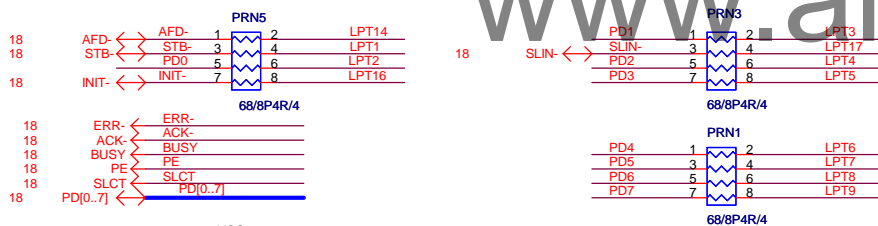
MOSI For DMI RX Termination Voltage



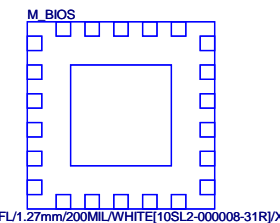
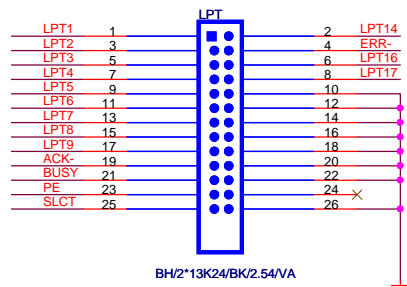
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

```
1 means floating
0 means PD 1K
```

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。

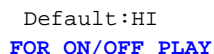


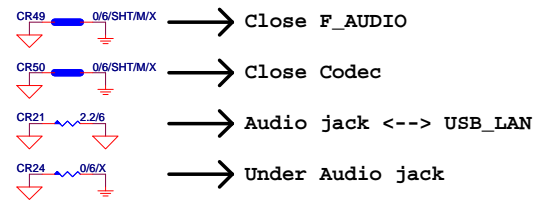
LCP/G-FL/1.27mm/200MIL/WHITE[10SL2-000008-31R]/X

Gigabyte Technology

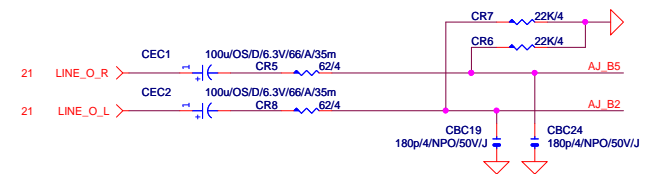
Title				BIOS			
Size	Document Number						Rev
Custom	GA-Z87P-D3						2.0
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FOR ON/OFF PLAY





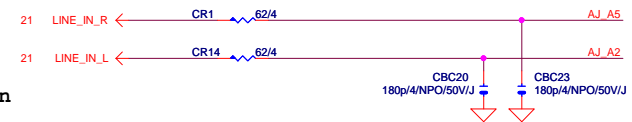
LINE-OUT



LINE-IN

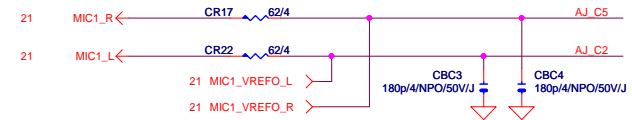
Verify MIC function
 in LINE-in

Only reserved for ALC888



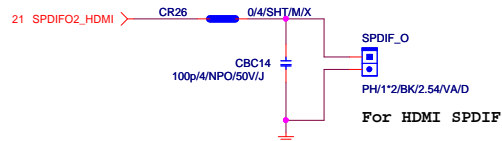
For 889A/888

MIC-IN

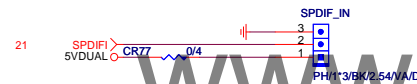


SURROUND

SPDIF_OUT



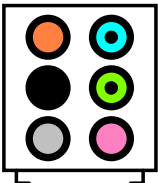
SPDIF_IN



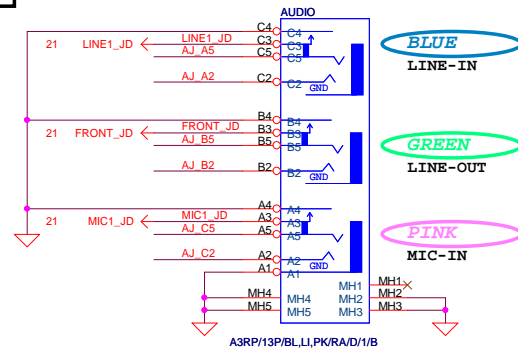
CEN/LFE

SURR BACK

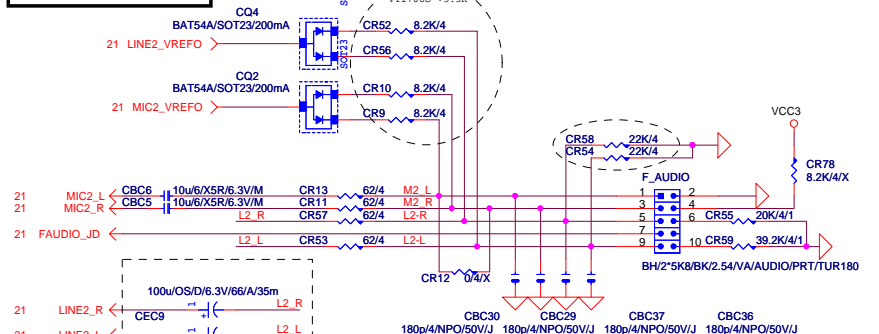
AZALIA JACK



AZALIA JACK



AZALIA FRONT PANEL



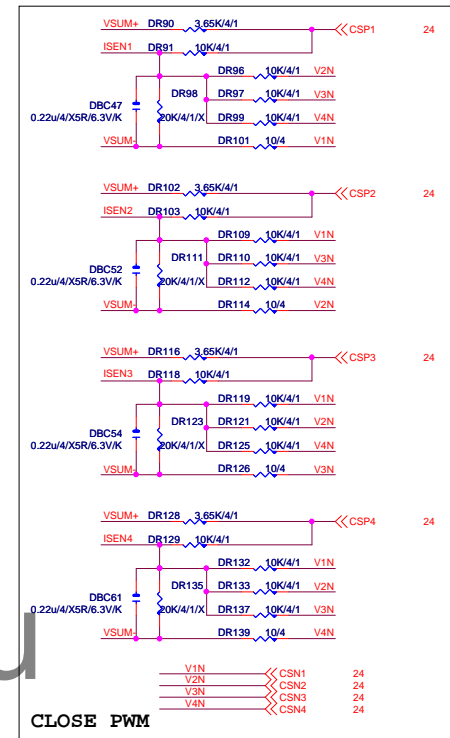
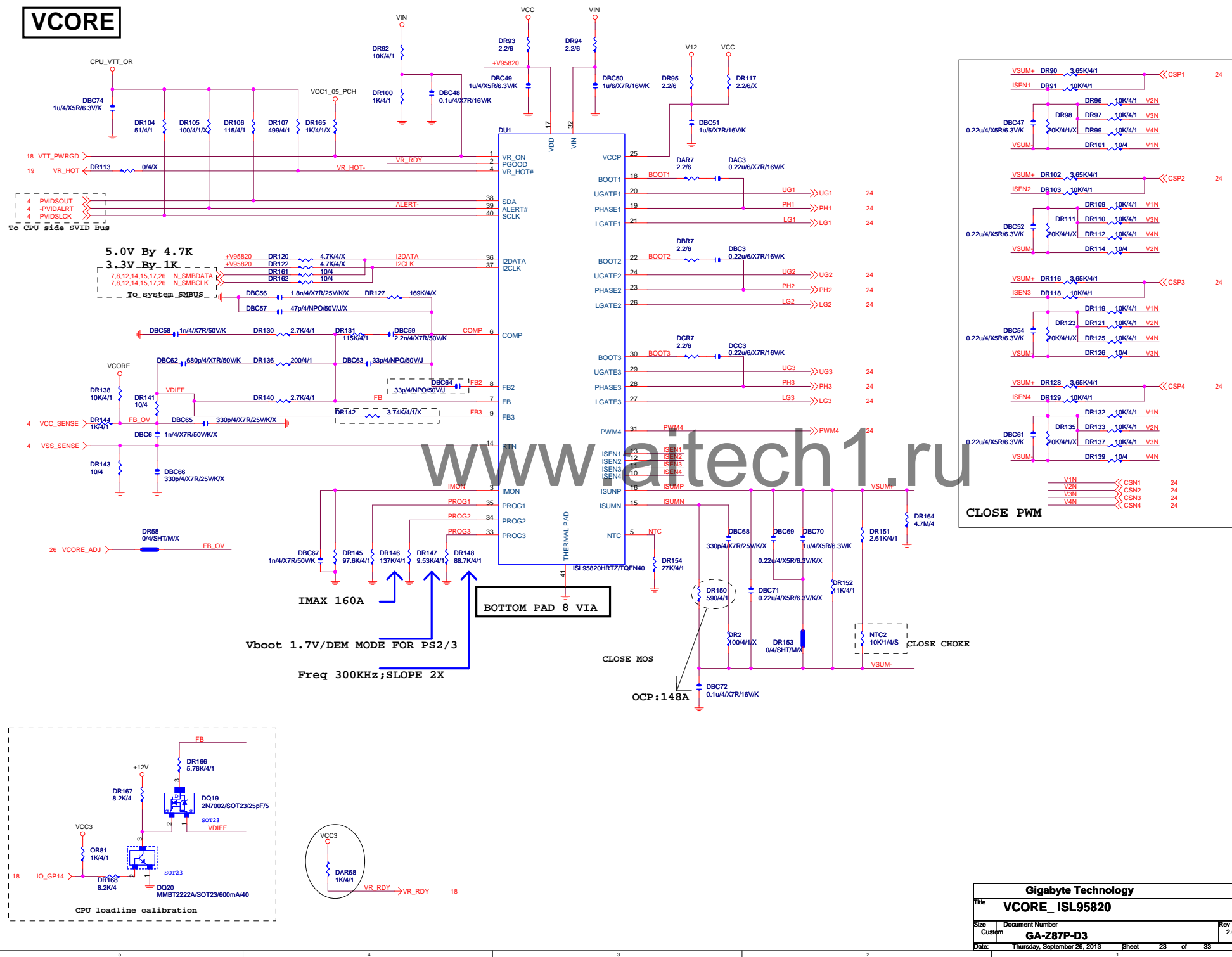
Gigabyte Technology

AUDIO JACK

GA-Z87P-D3

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VCORE



CLOSE PWM

V1N
 V2N
 V3N
 V4N

CSP1
 CSP2
 CSP3
 CSP4

CSN1
 CSN2
 CSN3
 CSN4

[1]



[2]



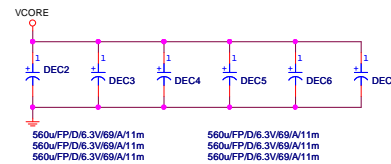
[3]



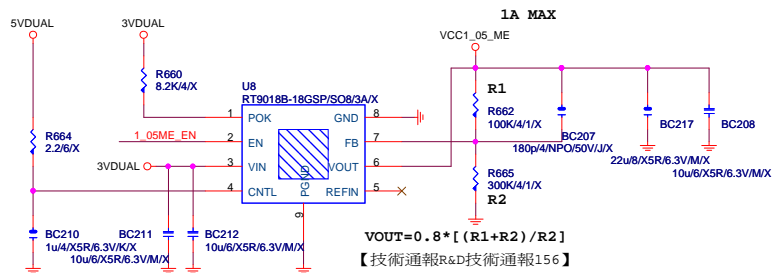
[4]



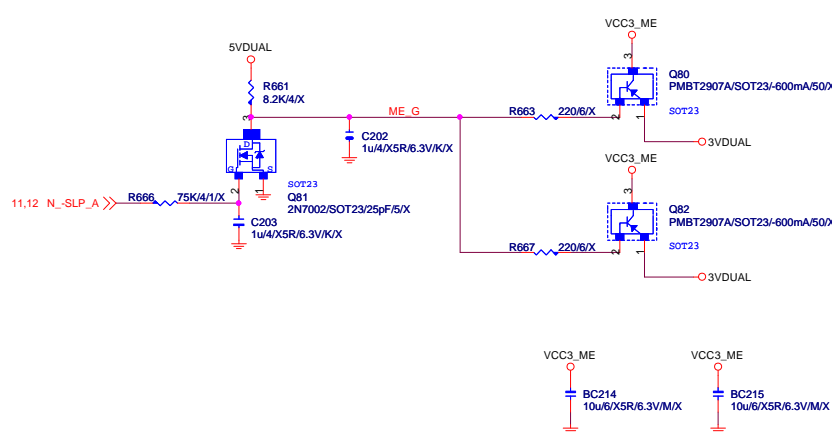
MOS_HeatSink[12SP2-S07517-01R_12SP2-S07517-02R_12SP2-S07517-03R]



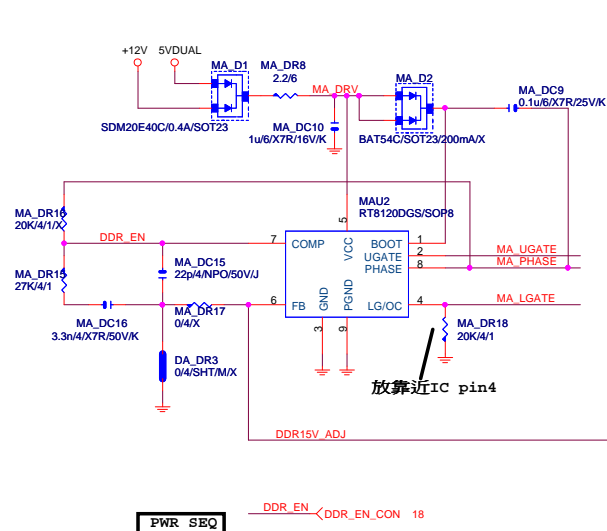
VCC1_05_ME



VCC3_ME

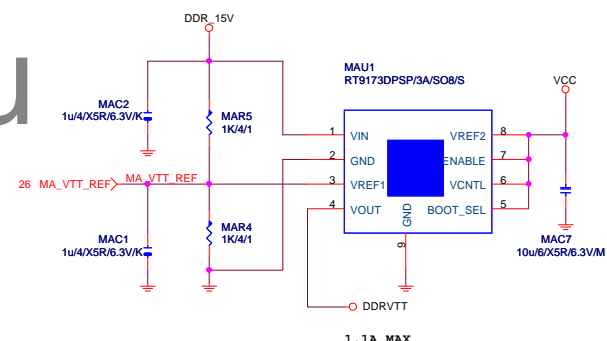


DDR_15V



PWR SEQ DDR_EN < DDR_EN_CON 18

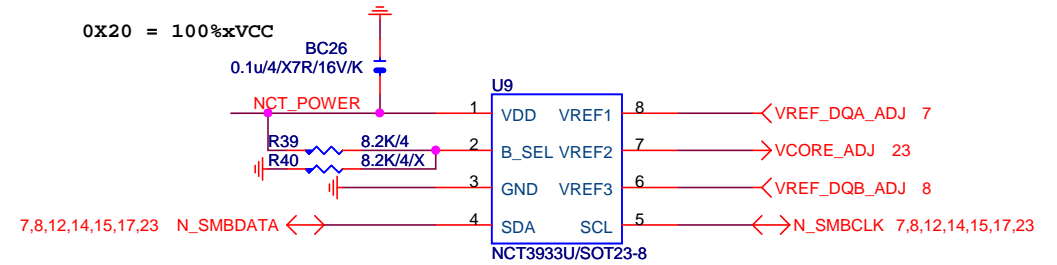
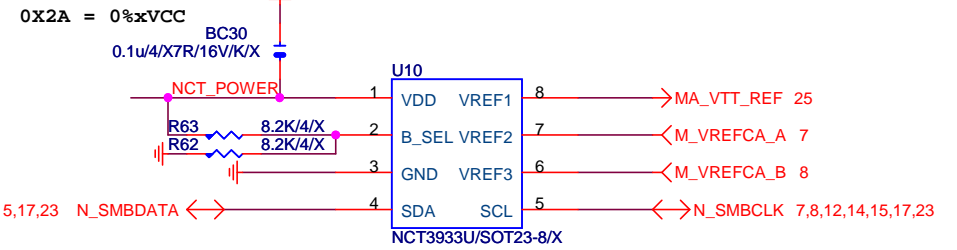
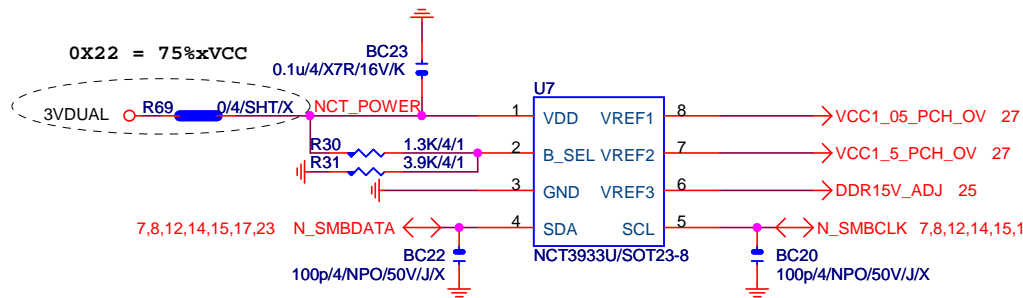
DDR_VTT



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℃), 1(105℃)
VIN Ripple current=4.7X1.7=7.99A(85℃)
-->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™			
Title			
DDR15V / M3 POWER			
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OVER VOLTAGE

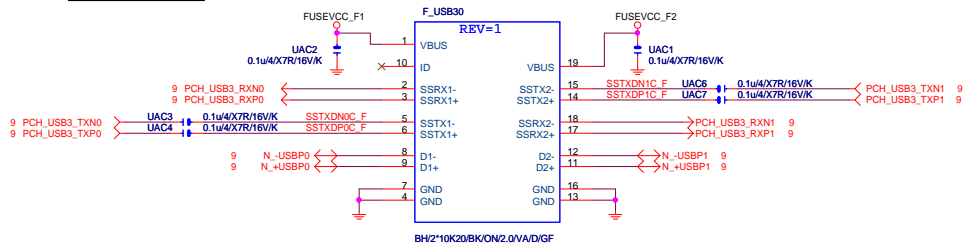


NCT3933	0X2A	0X20	0X22
VREF1	DDRVTT	VREF_DDRA_DQ	PCH Core
VREF2	VREF_DDRA_CA	N/A	VCC1_5_PCH
VREF3	VREF_DDRA_CA	VREF_DDRB_DQ	SMREF

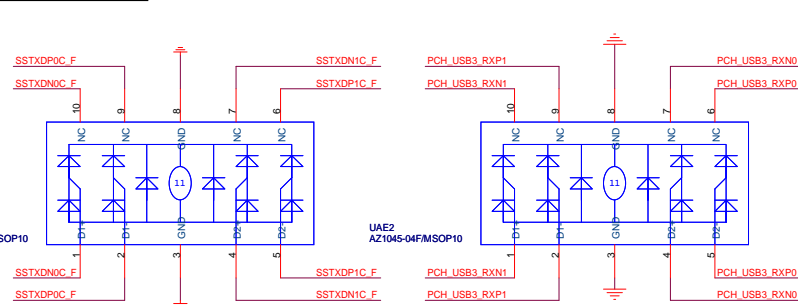
Gigabyte Technology

Title			CPU CORE VR-2
Size	Document Number	GA-Z87P-D3	
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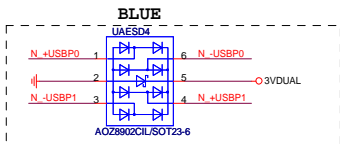
Front USB3.0



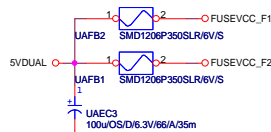
F_USB30 ESD PROTECT



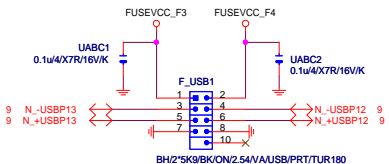
F_USB30 PWR



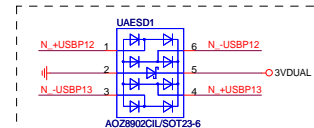
Close to connector



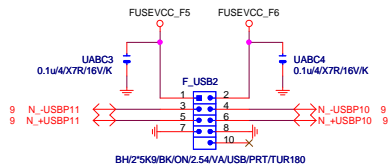
FRONT USB1



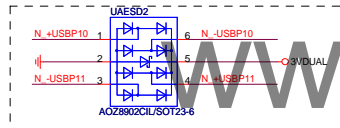
Close to connector



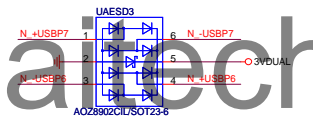
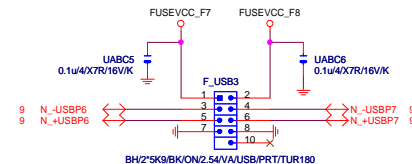
FRONT USB2



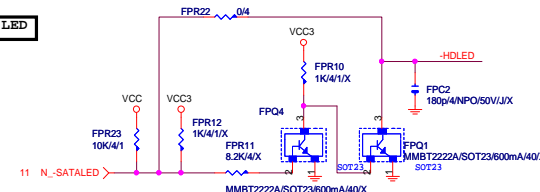
Close to connector



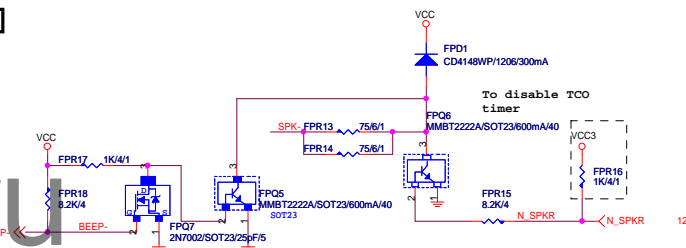
FRONT USB3



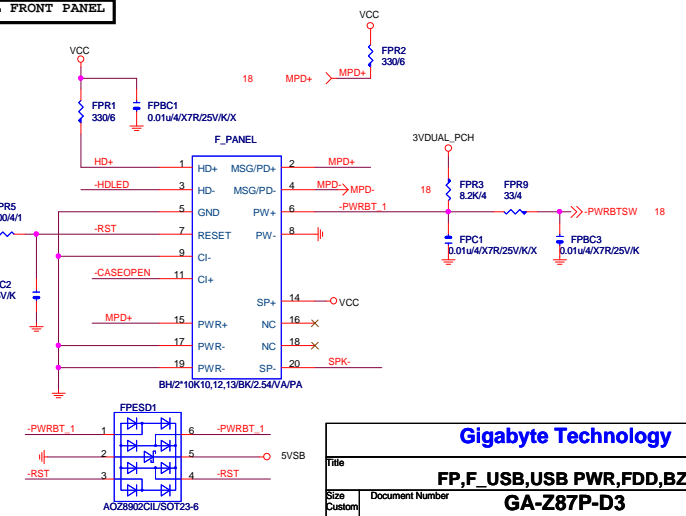
SATA LED



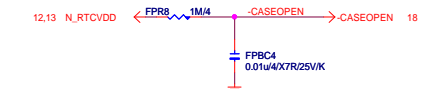
SPKR



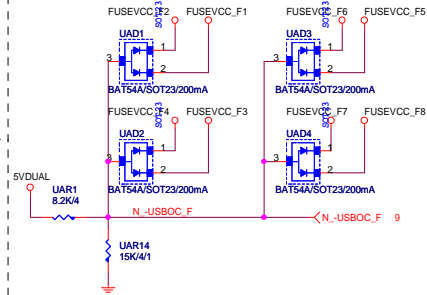
INTEL FRONT PANEL



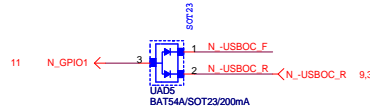
CASE OPEN



-USBOC_F



F_USB POWER PROTECT

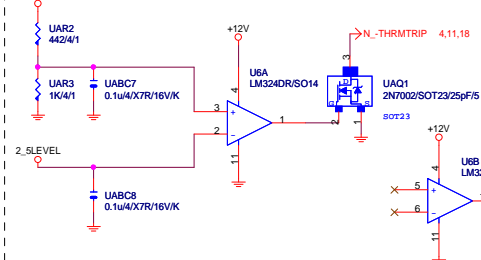


USB2.0 Signal & power short protection

```
USB2.0 Signal > 4.85V
```

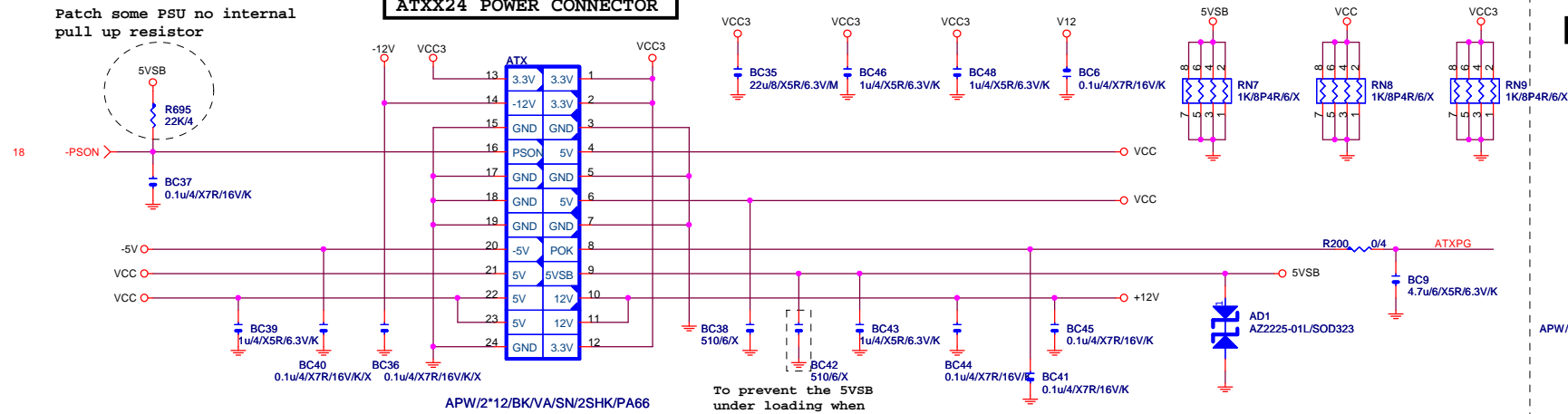
```
| Enable --> 3VUUAL=3.75V
```

3VDUAL

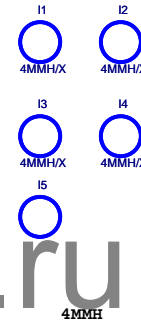
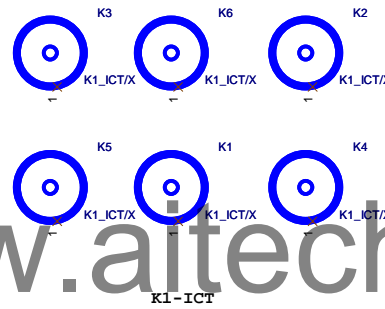
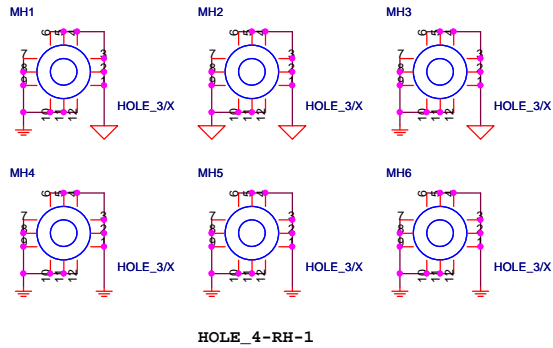
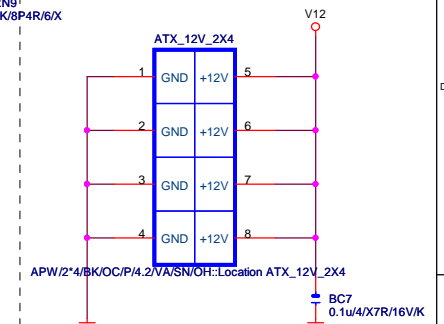


Patch some PSU no internal pull up resistor

ATXX24 POWER CONNECTOR

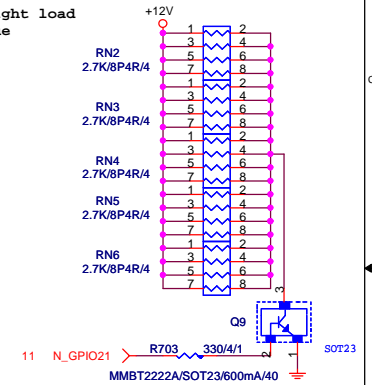


ATXX4 POWER CONNECTOR



【技術通報R&D技術通報153】

To fix 12V light load abnormal issue



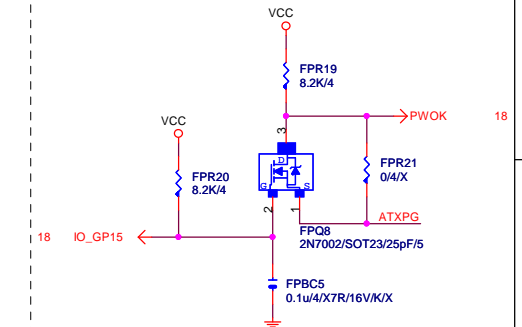
CLK GEN

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&D技術通報154】



Gigabyte Technology

Title		
ATX POWER CONNECTOR		
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[illegible]

18 VREF

18 TR4

18 TR5

18 TR6

OC13 1u4/X5R/6.3V/K

OC14 1u4/X5R/6.3V/K

OC15 1u4/X5R/6.3V/K

RS1 100K/1/4/S

OR2 10K/4/1

OR3 10K/4/1

OR5 10K/4/1

RS4 100K/1/4/S

RS_PWM 100K/1/4/S

126~133 degree

VOLTAGE-- H/W MONITOR

Figure 1: Pin connections for the XB/USB module. The diagram shows the module's pins connected to a microcontroller's pins. The module has pins for KDAT, KCLK, MDAT, MCLK, KBCLK, and MSCLK. The microcontroller has pins for KDAT, KCLK, MDAT, MCLK, KBCLK, and MSCLK. The module also has pins for FUSEVCC_R7, KB_MS, and MS. The microcontroller has pins for FUSEVCC_R7, KB_MS, and MS. The module is connected to a 180pF/8P4C/6/NPO/50V/K capacitor (CN1) and a 0.1uF/4X7R/16V/K capacitor (BC2).

The diagram illustrates a circuit for CPU Fan Anti-Spike Protection. It features a +12V input connected to a network of resistors (R696, R672, R673, R677, R678) and capacitors (C233, BC5, EC6). A signal line FANPWM1 is connected to the circuit. The output is FANIO1. The circuit is labeled "Anti Spike" and "CPU_FAN FAN1*4/WH/A3/PA66".

[illegible]

FOR EMI ONLY

+12V

C3
1n4/X7R/50V/K

A circuit diagram showing a resistor labeled R1 connected to ground. The resistor is represented by a blue rectangle. To the right of the resistor is the label 0/4/SHT/M/X. The ground symbol is a red triangle pointing downwards.

Gigabyte Technology

Title	HWM,KB/MS, FAN CTRL
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Size	Document Number	Rev
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LAN:INTEL I217

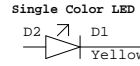
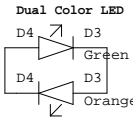
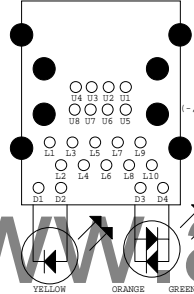
100歐姆:[20/4/8/4/20]

80歐姆:[15/5/5/5/15]

SRCLK 50歐姆:[18/4/10/4/18]

FOR DSM MODE
(DEEP SLEEP MODE)

P35-152-19W9



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USB30_LAN CONNECTOR

100歐姆:[20/4/8/4/20]

90歐姆:[12/5/7/5/12]

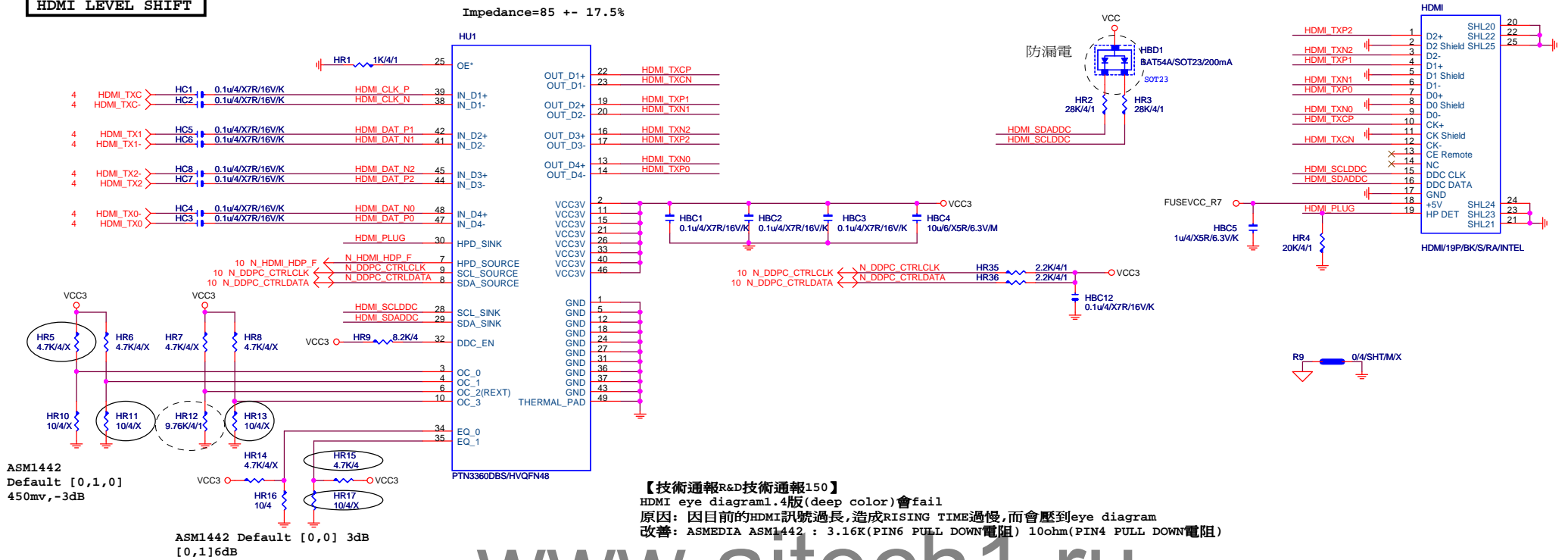
-USB0C_R

Gigabyte Technology

Title			REALTEK 8111F-VL
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HDMI LEVEL SHIFT

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



【技術通報R&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)

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GIGABYTE™

Title	HDMI
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Size	Document Number
Custom	

GA-Z87P-D3

2.0

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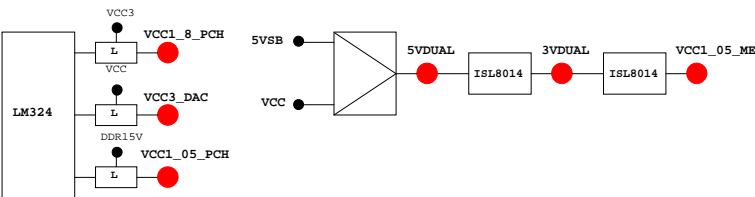
PCB GPIO LIST TABLE

PIN NAME	PWR	Default	USAGE	NOTE
GP0	MAIN	H-Z	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	MAIN	GPIO7	P/U 8.2K VCC3
GP8	STBY	H	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
GP13	STBY	L	GPI	LPCPME#
GP14/OC7#	STBY	NATIVE	USB OC7#	N/A
GP15	STBY	L	GPI	GPIO15(TLS Enable)
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
GP23	MAIN	GPI	GPIO23	N/A
GP24	STBY	L	GPI	SKTOCC#
GP25	STBY		Mobile Only	N/A
GP26	STBY		Mobile Only	N/A
GP27	STBY	H	GPO	GPIO27
GP28	STBY	H	GPO	PWR LED
GP29	STBY	L	GPI	GPIO29
GP30	STBY	H-Z	GPI	Mobile Only
GP31	STBY	H-Z	GPI	Mobile Only
GP32	MAIN	H	GPO	N/A
GP33	MAIN	H	GPO	N/A
GP34	MAIN	H-Z	GPI	-PCI_STOP
GP35	MAIN	L	GPO	-ACZ_DET
GP36	MAIN	GPI	N/A	N/A
GP37	MAIN	GPI	N/A	N/A
GP38	MAIN	H-Z	GPI	PCIEX4 Detect
GP39	MAIN	H-Z	GPI	GPIO39
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
GP45	STBY	NATIVE	GPIO45	P/U 8.2K 3VDUAL
GP46	STBY	L	NATIVE	GPIO46
GP47	STBY		Mobile Only	N/A
GP48	MAIN	H-Z	IN	GPIO48
GP49	MAIN	H-Z	IN	GPIO49
GP50	MAIN	NATIVE	-REQ1	P/U 2.2K VCC
GP51	MAIN	H	NATIVE	-GNT1
GP52	MAIN	NATIVE	-REQ2	P/U 2.2K VCC
GP53	MAIN	H	NATIVE	-GNT2
GP54	MAIN	NATIVE	-REQ3	P/U 2.2K VCC
GP55	MAIN	H	NATIVE	-GNT3
GP56	STBY	NATIVE	Mobile Only	N/A
GP57	STBY	H-Z	IN	VCORE_OV1
GP58	STBY	H-Z	NATIVE	F_USB_OC
GP59	STBY	NATIVE	USB_OC0#	N/A
GP60	STBY	H-Z	NATIVE	N/A(Reverse)
GP61	STBY	L	NATIVE	-SUSTAT
GP62	STBY	L	NATIVE	SUSCLK
GP63	STBY	L	NATIVE	GPIO63
GP64	MAIN	L	NATIVE	CLKOUTFLEX0
GP65	MAIN	L	NATIVE	CLKOUTFLEX1
GP66	MAIN	L	NATIVE	CLKOUTFLEX2
GP67	MAIN	L	NATIVE	CLKOUTFLEX3
GP72	STBY	H-Z	NATIVE	VCORE_OV4
GP73	STBY		Mobile Only	N/A
GP74	STBY	H-Z	NATIVE	1_05V_OV2
GP75	STBY	H-Z	NATIVE	N/A(Reverse)

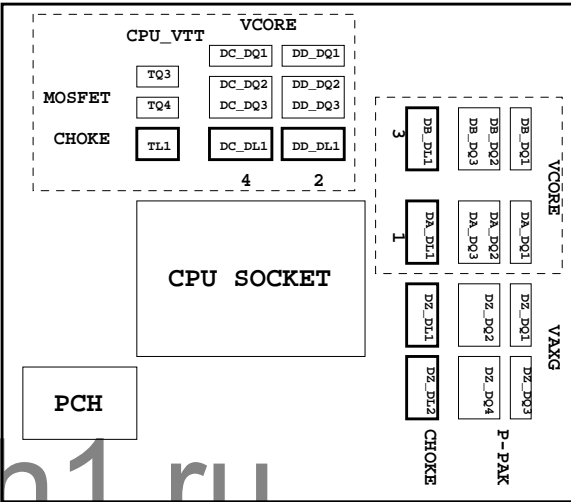
Super I/O ITE8720 GPIO Table

PIN NAME	USAGE	NOTE
SVC/PECI_RQT/GP14	-PECI_REQ	
PWROK1/GP13	PWROK1/ITE_PWROK	
KRST#/GP62	-KBRST	
SO/GP50	-ICH_SPI_CS	
IRTX/GP47/CE2_N/JP7	CEB_N	
GP46/IRRX	-LAN2_DSM	
PSION#/GP42	-PSON	
PWROK2#/GP41	PECI_CTL	
PCIRST3#/GP10/VDIMM_STR_EN	-PCIE_RST	
RSMRST#CIRRX1/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/BUSS11	SB_LED1_C	
PD4/GP74/BUSS12	SB_LED2_C	
VCORE_EN/VID7/GP64	IT_GP64	SB_LED3_C
PD0/GP70	NB_LED1_C	
PD1/GP71	NB_LED2_C	
PD2/GP72/BUSS10	NB_LED3_C	
GP22/SEN	LOW_PWR_1	
VIDO5/GP27/SEN2	LOW_PWR_2	
PCIRST2#/GP11	-PFMRST1	
PCIRST1#/GP12	-PFMRST2	
3VSB5W#/GP40	CSI_F0	BSEL166_1
SUSCH#/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/SMBC_R	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/CIRRX2/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各相位の擺法如下：



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

	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

散熱模組料號：

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

Gigabyte Technology			
Title	TABLE LIST		
Size C	Document Number	Rev	
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