

Model Name: GA-H97-HD3

1.01

SHEET

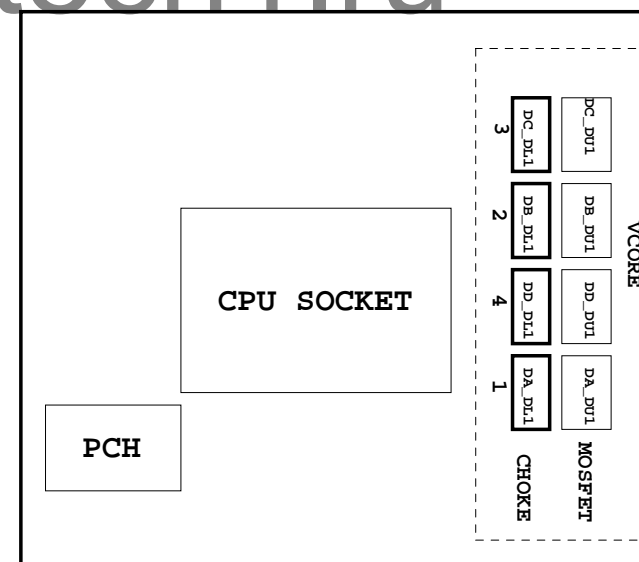
TITLE

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	PCIEX1*2 , PCIEX4 SLOT
16	ITE8892 PCI BRIDGE
17	PCI SLOT 1&2
18	I/O ITE8620
19	COM, -PROHOT, R_USB
20	Dual BIOS / LPT
21	ALC887-VD2 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	DVI
33	HDMI
34	TABLE LIST
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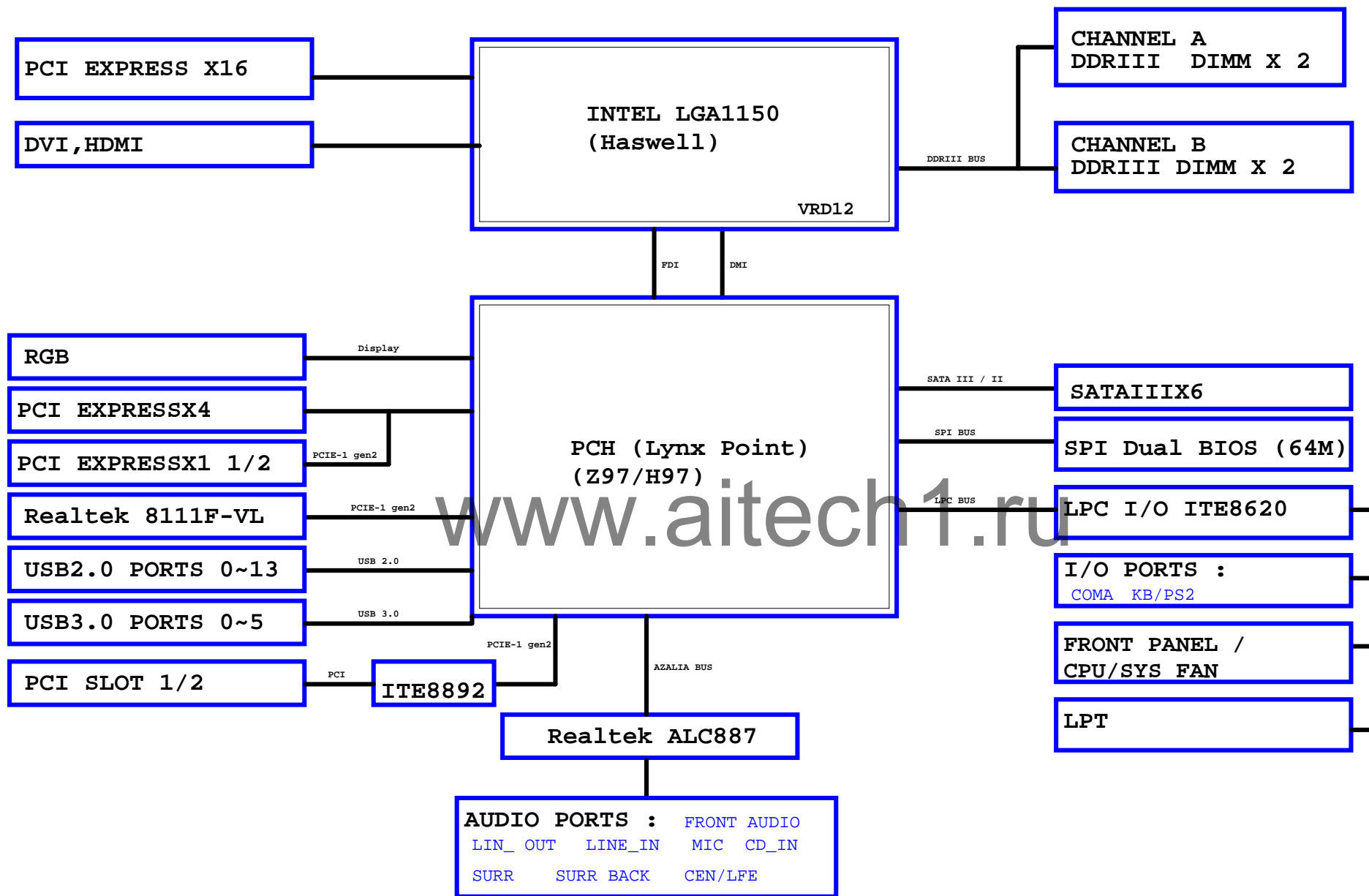
Gigabyte Technology

Title			
Cover Sheet			
Size	Document Number	GA-H97-HD3	
Custom			Rev 1.01
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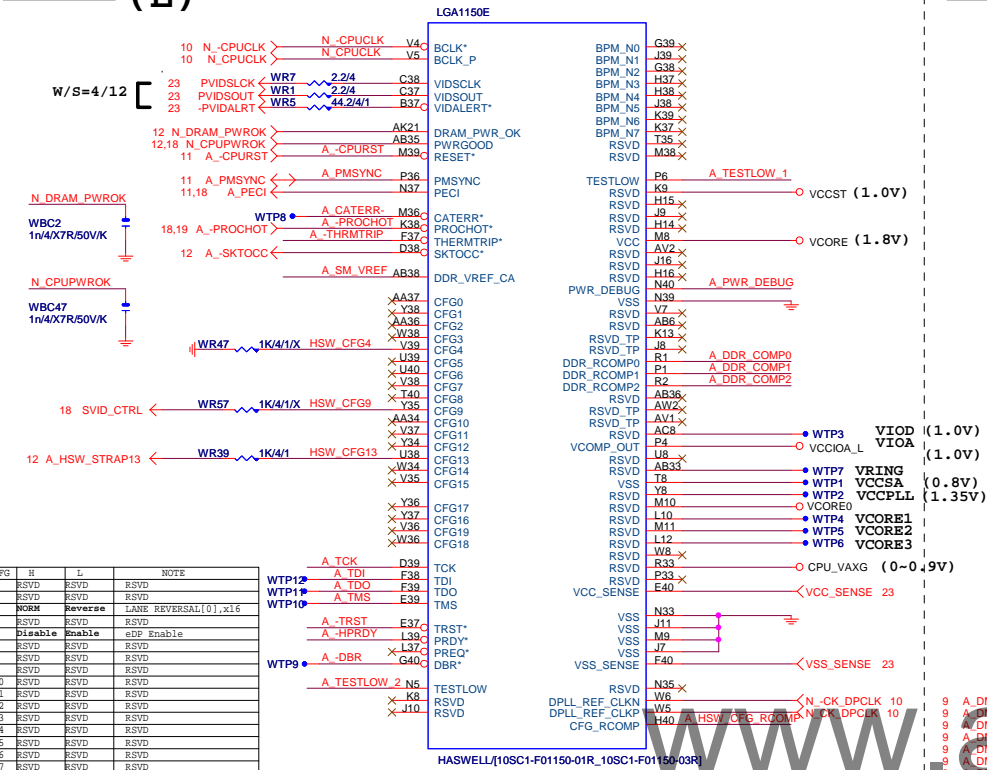
Component value change history

[illegible][illegible]

BLOCK DIAGRAM



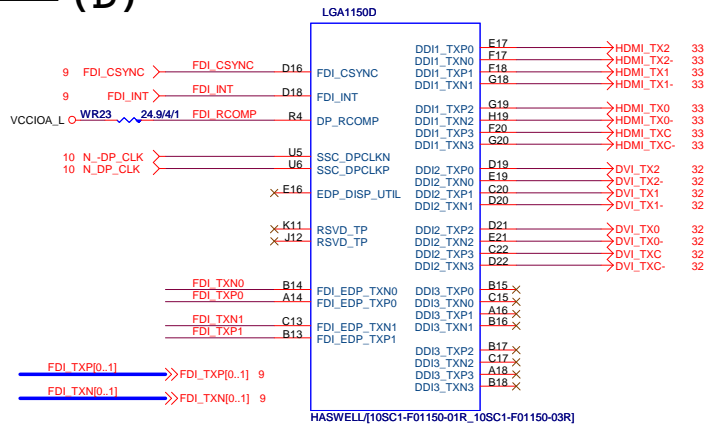
LGA1150 (E)



CFG6	CFG5	PCIE CONFIG
1	1	1x16 , Default
1	0	2x8
0	1	RSVD
0	0	X8, X4, X4

G 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)

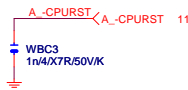


CPU PEG 5/5/5//20 Impedance=80 +- 15%

DMI 4/4/4//15 Impedance=85 +- 15%

-CPURST

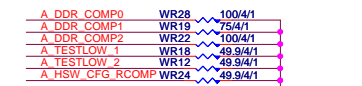
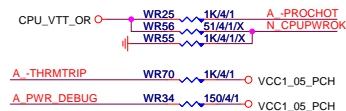
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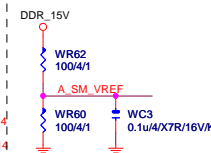
CPU SVID



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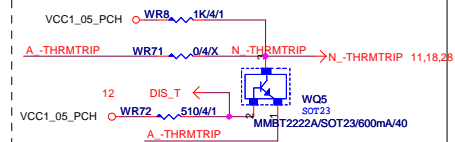
SM REF



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| THRMTRIP DISABLE FOR Z87 OVERCLOCK

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Gigabyte Technology

Title			
CPU LGA1150-A			
Size	Document Number		Rev
Custom	GA-H97-HD3		1.01
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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	MDA3		
		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	AD39	MDA13		
		MAAA9	AU18	DDR0_MA9	DDR0_D09	AD40	MDA9		
		MAAA10	AW11	DDR0_MA10	DDR0_D10	AD38	MDA11		
		MAAA11	AU19	DDR0_MA11	DDR0_D11	AD39	MDA12		
		MAAA12	AV19	DDR0_MA12	DDR0_D12	AD38	MDA8		
		MAAA13	AV19	DDR0_MA13	DDR0_D13	AD37	MDA14		
		MAAA14	AT20	DDR0_MA14	DDR0_D14	AK40	MDA15		
		MAAA15	AU21	DDR0_MA15	DDR0_D15	MDA17			
				DDR0_D16	PM38	MDA21			
		MODT_A0	AW10	DDR0_ODT0	DDR0_D17	PM39	MDA18		
		MODT_A1	AY8	DDR0_ODT1	DDR0_D18	AP37	MDA19		
		MODT_A2	AW9	DDR0_ODT2	DDR0_D19	AM37	MDA20		
		MODT_A3	AU8	DDR0_ODT3	DDR0_D20	AM38	MDA16		
					DDR0_D21	AP37	MDA22		
					DDR0_D22	PM39	MDA25		
			AW33	DDR0_ECC0	DDR0_D23	AV35	MDA29		
			AU31	DDR0_ECC1	DDR0_D24	AW37	MDA29		
			AV31	DDR0_ECC2	DDR0_D25	AV35	MDA26		
			AU33	DDR0_ECC3	DDR0_D26	AV37	MDA27		
			AT33	DDR0_ECC4	DDR0_D27	AT35	MDA27		
			AT31	DDR0_ECC5	DDR0_D28	AU37	MDA24		
			AW31	DDR0_ECC6	DDR0_D29	AT35	MDA30		
				DDR0_ECC7	DDR0_D30	AW35	MDA31		
		SBA0	AV12	DDR0_D31	DDR0_D31	AY6	MDA33		
7		SBA01	SBA1	DDR0_BA0	DDR0_D32	AY6	MDA37		
7		SBA1	AT21	DDR0_BA1	DDR0_D33	AD40	MDA37		
7		SBA2		DDR0_BA2	DDR0_D34	AW4	MDA35		
7			CKEA0	DDR0_KE0	DDR0_D35	AW6	MDA36		
7		CKEA0	CKEA1	DDR0_KE1	DDR0_D36	AW4	MDA32		
7		CKEA1	CKEA2	DDR0_KE2	DDR0_D37	AW4	MDA38		
7		CKEA2	CKEA3	DDR0_KE3	DDR0_D38	AW4	MDA39		
7		CSA0	CSA1	DDR0_CS0	DDR0_D39	AN1	MDA41		
7		CSA1	AV9	DDR0_CS_N1	DDR0_D40	AN4	MDA42		
7		CSA2	AW10	DDR0_CS_N2	DDR0_D41	AN4	MDA43		
7		CSA3	CSA3	DDR0_CS_N3	DDR0_D42	AN2	MDA44		
7					DDR0_D43	AN2	MDA45		
7					DDR0_D44	AN1	MDA46		
7		DLCKA0	DLCKA0	DDR0_CLK_P0	DDR0_D45	AN2	MDA47		
7		DLCKA1	DLCKA1	DDR0_CLK_P1	DDR0_D46	AN1	MDA49		
7		DLCKA2	DLCKA2	DDR0_CLK_P2	DDR0_D47	AL3	MDA50		
7		DLCKA3	DLCKA3	DDR0_CLK_P3	DDR0_D48	AL4	MDA51		
7		DLCKA4	DLCKA4	DDR0_CLK_P4	DDR0_D49	AL2	MDA52		
7		DLCKA5	DLCKA5	DDR0_CLK_P5	DDR0_D50	AL3	MDA53		
7		DLCKA6	DLCKA6	DDR0_CLK_P6	DDR0_D51	AL2	MDA54		
7		DLCKA7	DLCKA7	DDR0_CLK_P7	DDR0_D52	AL1	MDA55		
7		DLCKA8	DLCKA8	DDR0_CLK_P8	DDR0_D53	AG1	MDA57		
			AW12	RSVD	DDR0_D54	AG2	MDA58		
					DDR0_D55	AG3	MDA59		
					DDR0_D56	AG4	MDA61		
					DDR0_D57	AG5	MDA58		
					DDR0_D58	AG6	MDA59		
					DDR0_D59	AG2	MDA60		
					DDR0_D60	AG3	MDA56		
					DDR0_D61	AG3	MDA62		
					DDR0_D62	AE1	MDA63		
7		-SRASA	-SRASA	DDR0_RAS*	DDR0_D63	AE3	DSOA0		
7		-SWEA	-SWEA	DDR0_WE*	DDR0_D64	AE39	DSOA0		
					DDR0_D65	AN39	DSOA2		
					DDR0_D66	AV36	DSOA3		
					DDR0_D67	AE4	DSOA4		
					DDR0_D68	AE3	DSOA5		
7		-SCASA	-SCASA	DDR0_CAS*	DDR0_D69	AP3	DSOA6		
					DDR0_D70	AE3	DSOA7		
7.8		-DDR3_RST	WR61	DDR0_RESET*	DDR0_D71	AV32	DSOA0		
			D4/SH/TMX		DDR0_D72	AE38	DSOA1		
			WC4		DDR0_D73	AN38	DSOA2		
			0.1uA/XCTR/16V/KX		DDR0_D74	AN36	DSOA3		
					DDR0_D75	AW5	DSOA4		
					DDR0_D76	AE2	DSOA5		
					DDR0_D77	AE2	DSOA6		
					DDR0_D78	AE2	DSOA7		
					DDR0_D79	AE2	DSOA7		
					DDR0_D80	AE2	DSOA7		
					DDR0_D81	AE2	DSOA7		
					DDR0_D82	AE2	DSOA7		
					DDR0_D83	AE2	DSOA7		
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					DDR0_D85	AE2	DSOA7		
					DDR0_D86	AE2	DSOA7		
					DDR0_D87	AE2	DSOA7		
					DDR0_D88	AE2	DSOA7		
					DDR0_D89	AE2	DSOA7		
					DDR0_D90	AE2	DSOA7		
					DDR0_D91	AE2	DSOA7		
					DDR0_D92	AE2	DSOA7		
					DDR0_D93	AE2	DSOA7		
					DDR0_D94	AE2	DSOA7		
					DDR0_D95	AE2	DSOA7		
					DDR0_D96	AE2	DSOA7		
					DDR0_D97	AE2	DSOA7		
					DDR0_D98	AE2	DSOA7		
					DDR0_D99	AE2	DSOA7		
					DDR0_D100	AE2	DSOA7		

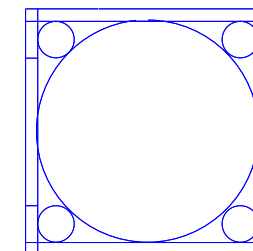
HASWELL/[10SC1-F01150-01R_10SC1-F01150-03R]

LGA1150 (B)

LGA150B				
MAA80	AL19	DDR1_MA0	DDR1_D00	AE34 MD80
MAA81	AK23	DDR1_MA1	DDR1_D01	AE35 MD81
MAA82	AM22	DDR1_MA2	DDR1_D02	AG35 MD82
MAA83	AM23	DDR1_MA3	DDR1_D03	AH35 MD83
MAA84	AP23	DDR1_MA4	DDR1_D04	AD34 MD84
MAA85	AL23	DDR1_MA5	DDR1_D05	AD35 MD85
MAA86	AY24	DDR1_MA6	DDR1_D06	AG34 MD86
MAA87	AZ24	DDR1_MA7	DDR1_D07	AH34 MD87
MAA88	AW25	DDR1_MA8	DDR1_D08	AL34 MD88
MAA89	AW25	DDR1_MA9	DDR1_D09	AL35 MD89
MAA810	AP18	DDR1_MA10	DDR1_D10	AK31 MD810
MAA811	AY25	DDR1_MA11	DDR1_D11	AL31 MD811
MAA812	AZ26	DDR1_MA12	DDR1_D12	AK34 MD812
MAA813	AR15	DDR1_MA13	DDR1_D13	AK35 MD813
MAA814	AY27	DDR1_MA14	DDR1_D14	AK32 MD814
MAA815	AZ28	DDR1_MA15	DDR1_D15	AL32 MD815
MODT B0	AM17	DDR1_ODT0	DDR1_D16	AN34 MD817
MODT B1	AL16	DDR1_ODT1	DDR1_D18	AN34 MD819
MODT B2	AM16	DDR1_ODT2	DDR1_D19	AN31 MD821
MODT B3	AK15	DDR1_ODT3	DDR1_D20	AN35 MD820
			DDR1_D21	AN32 MD818
	AM25	DDR1_ECC0	DDR1_D22	AN32 MD822
	AM25	DDR1_ECC1	DDR1_D23	AM29 MD825
	AP25	DDR1_ECC2	DDR1_D25	AM28 MD828
	AP26	DDR1_ECC3	DDR1_D26	AR29 MD827
	AL26	DDR1_ECC4	DDR1_D28	AR28 MD830
	AR26	DDR1_ECC5	DDR1_D27	AL29 MD824
	AR25	DDR1_ECC6	DDR1_D29	AL28 MD829
	AR25	DDR1_ECC7	DDR1_D30	AP29 MD826
SBAB0	AK17	DDR1_BA0	DDR1_D31	AR12 MD833
SBAB1	AL18	DDR1_BA1	DDR1_D32	AP12 MD834
SBAB2	AW28	DDR1_BA2	DDR1_D33	AL13 MD835
			DDR1_D34	AL12 MD836
CKEB0	AW29	DDR1_CKE0	DDR1_D38	AP13 MD837
CKEB1	AY29	DDR1_CKE1	DDR1_D39	AM13 MD838
CKEB2	AU28	DDR1_CKE2	DDR1_D40	AM12 MD839
CKEB3	AU28	DDR1_CKE3	DDR1_D39	AR9 MD845
CSB0	AP17	DDR1_CS_N0	DDR1_D40	AP9 MD841
CSB1	AN15	DDR1_CS_N1	DDR1_D41	AR6 MD847
CSB2	AN17	DDR1_CS_N2	DDR1_D42	AP6 MD848
CSB3	AL15	DDR1_CS_N3	DDR1_D43	AR10 MD844
			DDR1_D44	AP10 MD846
			DDR1_D45	AR7 MD846
			DDR1_D47	AP7 MD852
DCLKB0	AM20	DDR1_DCLK_P0	DDR1_D48	AN9 MD853
DCLKB1	AP21	DDR1_DCLK_N0	DDR1_D49	AL6 MD850
DCLKB1	AP22	DDR1_DCLK_N1	DDR1_D51	AL7 MD855
DCLKB5	AN20	DDR1_DCLK_P2	DDR1_D52	AM10 MD848
DCLKB2	AN21	DDR1_DCLK_P3	DDR1_D53	AL10 MD849
DCLKB3	AP19	DDR1_DCLK_P3	DDR1_D55	AM6 MD854
DCLKB3	AP20	DDR1_DCLK_P3	DDR1_D56	AM7 MD851
		DDR1_DCLK_N3	DDR1_D57	AH6 MD861
SCASB	AP16	DDR1_CAS*	DDR1_D57	AH7 MD860
SCASB	AL20	RSVD	DDR1_D58	A66 MD859
SWIEB	AM18	DDR1_RAS*	DDR1_D60	A67 MD863
	AK16	DDR1_WE*	DDR1_D61	AJ6 MD856
			DDR1_D62	AJ7 MD857
	AB39	DDR_VREF_D00	DDR1_D62	A66 MD858
	AB40	DDR_VREF_D01	DDR1_D63	A67 MD862
		DDR1_DG5_P0	DDR1_D65	AF35 DQ380
		DDR1_DG5_P1	DDR1_D66	DQ381
		DDR1_DG5_P2	DDR1_D67	AP33 DQ382
		DDR1_DG5_P3	DDR1_D68	AN28 DQ383
		DDR1_DG5_P4	DDR1_D69	AN12 DQ384
		DDR1_DG5_P5	DDR1_D70	AP8 DQ385
		DDR1_DG5_P6	DDR1_D71	AL8 DQ386
		DDR1_DG5_P7	DDR1_D72	AG7 DQ387
		DDR1_DG5_P8	AN25*	
		DDR1_DG5_N0	AF34 DQ380	
		DDR1_DG5_N1	AK33 DQ381	
		DDR1_DG5_N2	AN33 DQ382	
		DDR1_DG5_N3	AN29 DQ383	
		DDR1_DG5_N4	AN13 DQ384	
		DDR1_DG5_N5	AR8 DQ385	
		DDR1_DG5_N6	AM6 DQ386	
		DDR1_DG5_N7	AG7 DQ387	
		DDR1_DG5_N8	AN25*	

HASWELL/10SC1-F01150-01R_10SC1-F01150-03R

LGA1150 (CR)

LGA1150
ILM_BP_CR/115X/NORMAL NI

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]

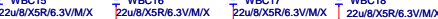
(F, J)



(G,H,I)

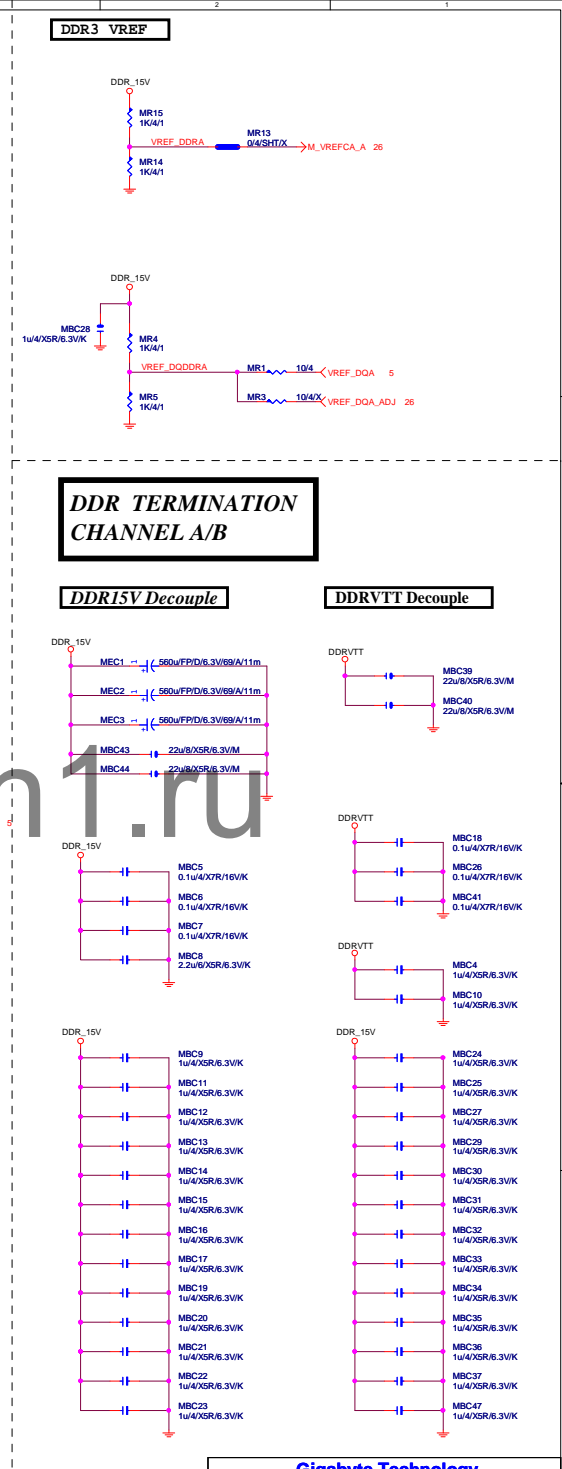


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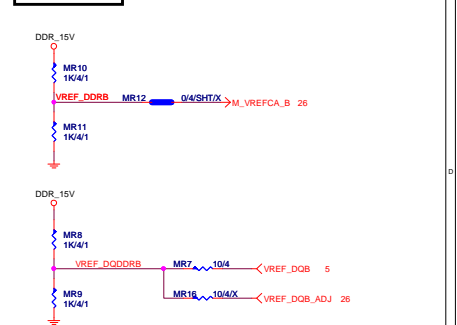
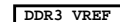
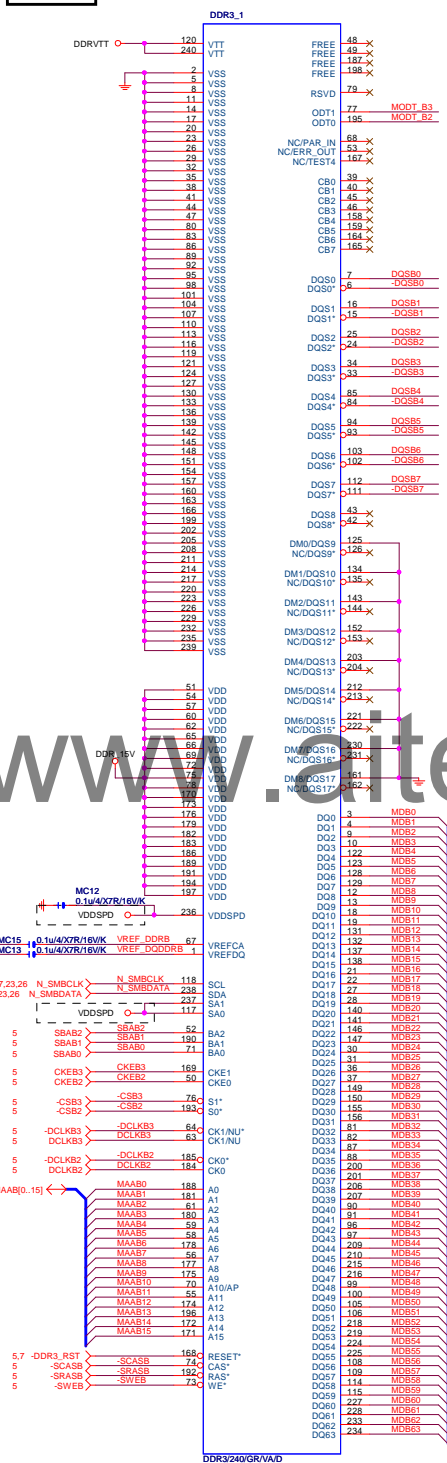
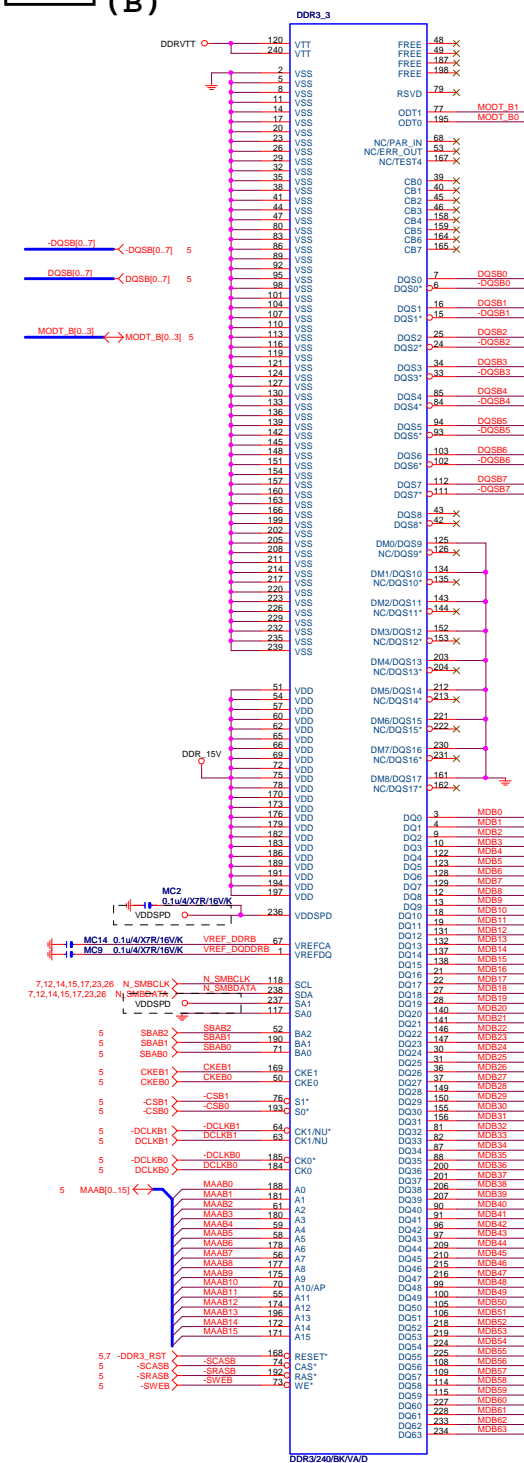
(X15)







(B)



DDR3 1066,1333,1600MHZ BANDWIDTH

| DDR3 1066MHZ

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| DDR3 clock=533MHZ
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DDR3 single channel bandwidth=533x2x8Byte=8.5GB/s

DDR3 dual channel bandwidth=533x2x2x8Byte=17GB/s

DDR3 1333MHZ

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DDR3 clock=667MHZ
```

DDR3 single channel bandwidth=10.6GB/s

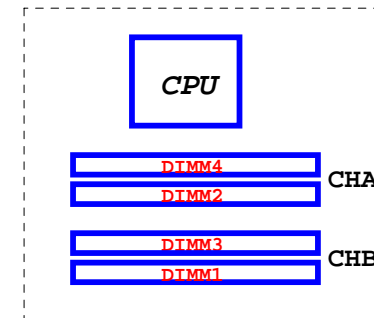
DDR3 dual channel bandwidth=21GB/s

DDR3 1600MHZ

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| DDR3 clock=800MHZ
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DDR3 single channel bandwidth=12.8GB/s

DDR3 dual channel bandwidth=25.6GB/s



CHA

CHB

Gigabyte Technology

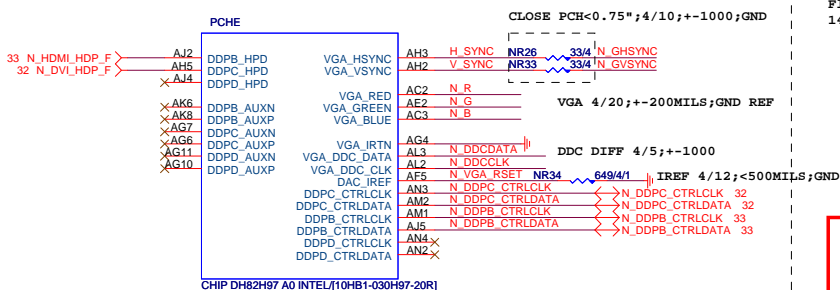
Title				DDRIII CHANNEL B			
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Rev	1.0
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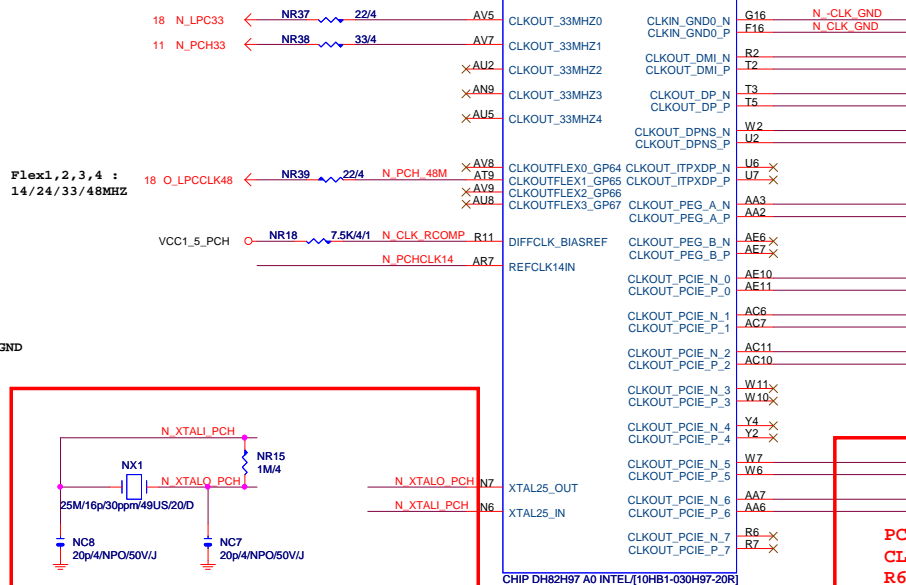
Sheet 8 of

PCH (E)



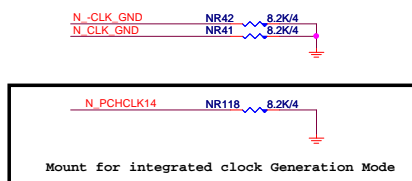
VGA_DISABLE
R,G,B NC OR GND
IRTN / IREF GND
VGA_HSYNC, VGA_VSYNC, DDC_CLK, DDC_DATA NC
POWER_VCCADAC(AF2), VCCADACBG(AE1) GND

PCH (G)

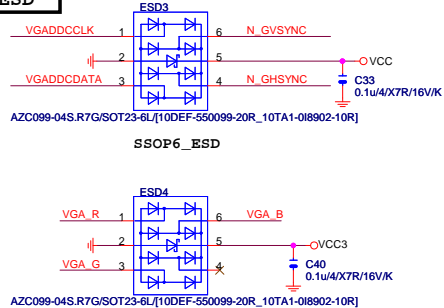


Differential Clock:18/4/6/4/18
Impedance=90 +- 15%

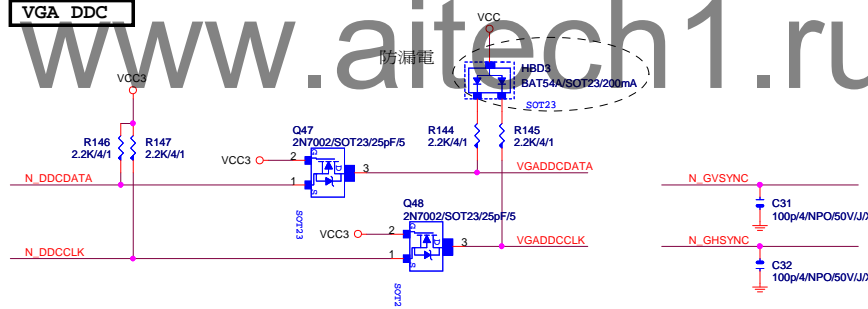
PCH CLK PD



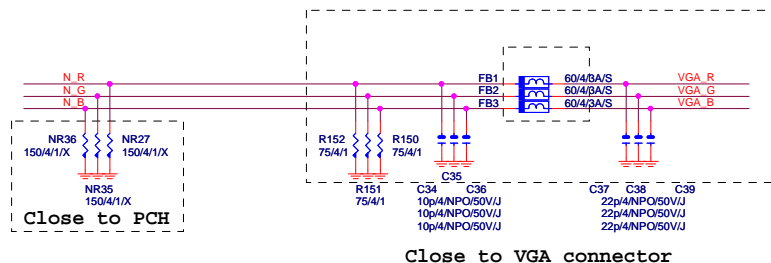
VGA ESD



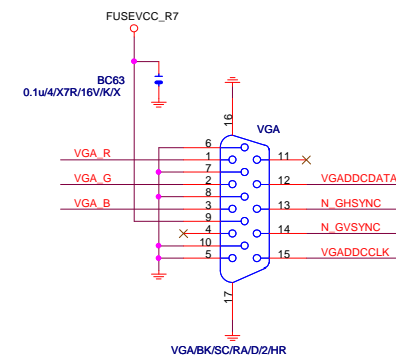
VGA DDC



VGA DDC



VGA CONNECTOR



Gigabyte Technology

Title			
PCH DISPLAY ,CLK BUFFER			
Size	Document Number	Rev	
Custom	GA-H97-HD3	1.01	
Date:	Wednesday, June 18, 2014	Sheet	10 of 34

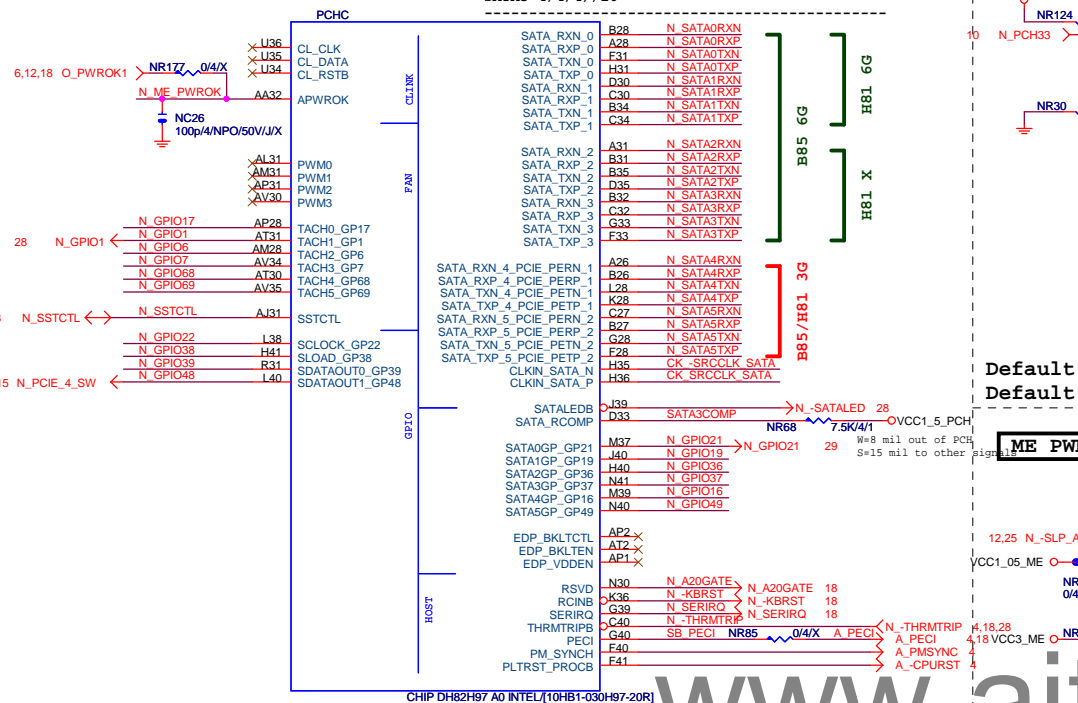
PCH (C)

SATA3 : 20/4/4/4/20 (breakout min 8/4/4/4/8)

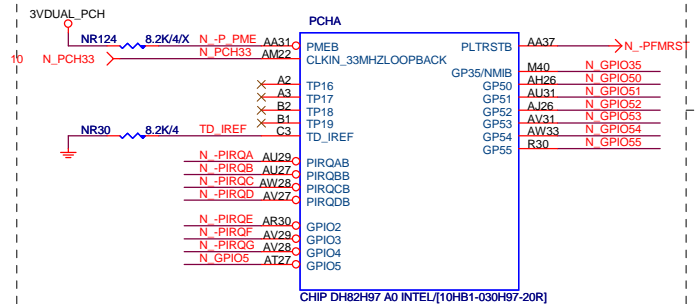
Impedance=85

SATA2 4/4/4//15

SATA3 4/4/4//20



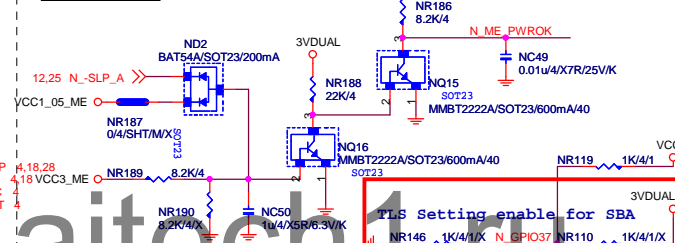
PCH (A)



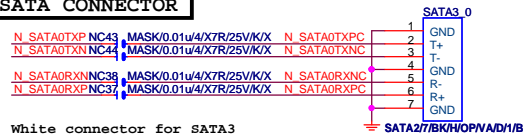
BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	float	float

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

ME PWROK



SATA CONNECTOR



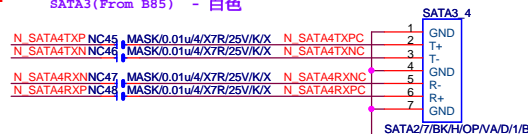
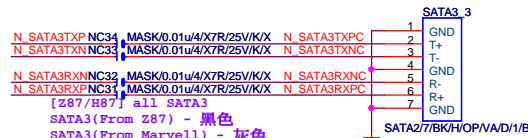
SATA所有電容改SHORT-PAD MASK



SATA所有電容改SHORT-PAD MASK

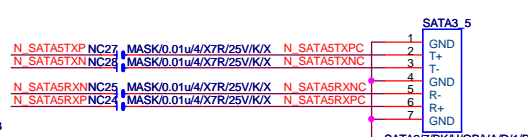


H81 Port 2/3 N/A



```
** Z87/H87 Port 4&5 SATA3.0
```

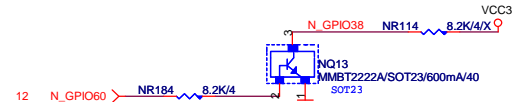
```
** B85 Port 4&5 SATA2.0
```



GPIO38 Ctrl

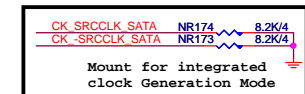
MFG Mode

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

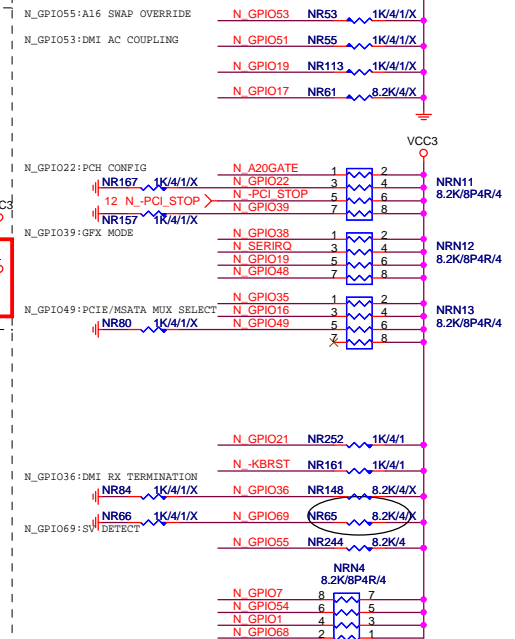
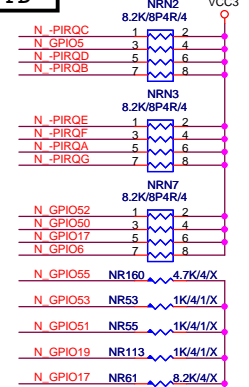


soft strap	GP16	GP49
0	pci1	pci2
1	sata4	sata5

PCH CLK PD



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



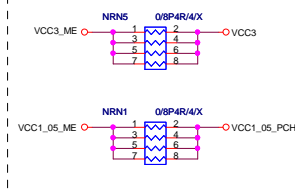
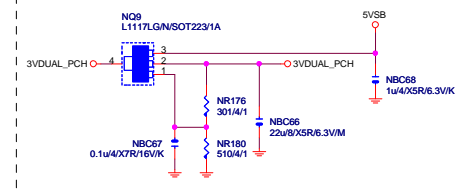
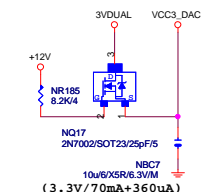
Gigabyte Technology

Title			
PCH HOST , SATA, PCI			
Size	Document Number		Rev
Custom	GA-H97-HD3		1.01
Date:	Wednesday, June 18, 2014	Sheet	11 of 34

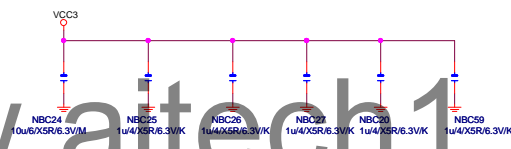
PCH (I)



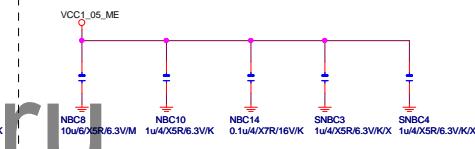
SHT PWR



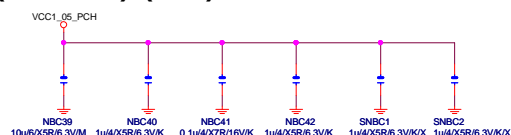
(3.3V) (X6)



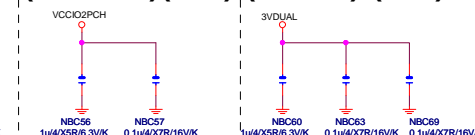
(1.05V) (x5)



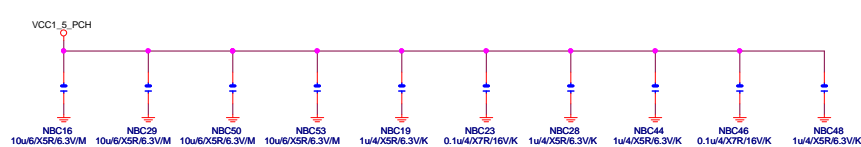
(1.05V) (x6)



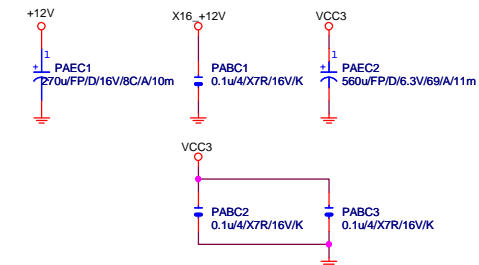
(1.05V)(X2) (3.3V) (X2)



(1.5V) (x10)

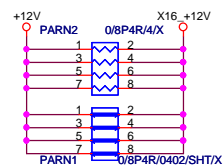


PCIEX16 CAP



PCIEX16 PROTECT SHT

```
+12 protect
short-wire test
```



PCIEX16 AC CAP

PA EXP TXP0	PA65	0.22u4/4X5R6 3VK	PA EXP TXP0 C
PA EXP TXP1	PA64	0.22u4/4X5R6 3VK	PA EXP TXP0 C
PA EXP TXP1	PA68	0.22u4/4X5R6 3VK	PA EXP TXP1 C
PA EXP TXN1	PA67	0.22u4/4X5R6 3VK	PA EXP TXN1 C
PA EXP TXP2	PA68	0.22u4/4X5R6 3VK	PA EXP TXP2 C
PA EXP TXN2	PA69	0.22u4/4X5R6 3VK	PA EXP TXN2 C
PA EXP TXP3	PA610	0.22u4/4X5R6 3VK	PA EXP TXP3 C
PA EXP TXN3	PA611	0.22u4/4X5R6 3VK	PA EXP TXN3 C
PA EXP TXP4	PA612	0.22u4/4X5R6 3VK	PA EXP TXP4 C
PA EXP TXN4	PA613	0.22u4/4X5R6 3VK	PA EXP TXN4 C
PA EXP TXP5	PA614	0.22u4/4X5R6 3VK	PA EXP TXP5 C
PA EXP TXN5	PA615	0.22u4/4X5R6 3VK	PA EXP TXN5 C
PA EXP TXP6	PA616	0.22u4/4X5R6 3VK	PA EXP TXP6 C
PA EXP TXN6	PA617	0.22u4/4X5R6 3VK	PA EXP TXN6 C
PA EXP TXP7	PA618	0.22u4/4X5R6 3VK	PA EXP TXP7 C
PA EXP TXN7	PA619	0.22u4/4X5R6 3VK	PA EXP TXN7 C
PA EXP TXP8	PA620	0.22u4/4X5R6 3VK	PA EXP TXP8 C
PA EXP TXN8	PA621	0.22u4/4X5R6 3VK	PA EXP TXN8 C
PA EXP TXP9	PA622	0.22u4/4X5R6 3VK	PA EXP TXP9 C
PA EXP TXN9	PA623	0.22u4/4X5R6 3VK	PA EXP TXN9 C
PA EXP TXP10	PA624	0.22u4/4X5R6 3VK	PA EXP TXP10 C
PA EXP TXN10	PA625	0.22u4/4X5R6 3VK	PA EXP TXN10 C
PA EXP TXP11	PA626	0.22u4/4X5R6 3VK	PA EXP TXP11 C
PA EXP TXN11	PA627	0.22u4/4X5R6 3VK	PA EXP TXN11 C
PA EXP TXP12	PA628	0.22u4/4X5R6 3VK	PA EXP TXP12 C
PA EXP TXN12	PA629	0.22u4/4X5R6 3VK	PA EXP TXN12 C
PA EXP TXP13	PA630	0.22u4/4X5R6 3VK	PA EXP TXP13 C
PA EXP TXN13	PA631	0.22u4/4X5R6 3VK	PA EXP TXN13 C
PA EXP TXP14	PA632	0.22u4/4X5R6 3VK	PA EXP TXP14 C
PA EXP TXN14	PA633	0.22u4/4X5R6 3VK	PA EXP TXN14 C
PA EXP TXP15	PA634	0.22u4/4X5R6 3VK	PA EXP TXP15 C
PA EXP TXN15	PA635	0.22u4/4X5R6 3VK	PA EXP TXN15 C

PCI-E REV:1.1--> 2.5GHZ

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

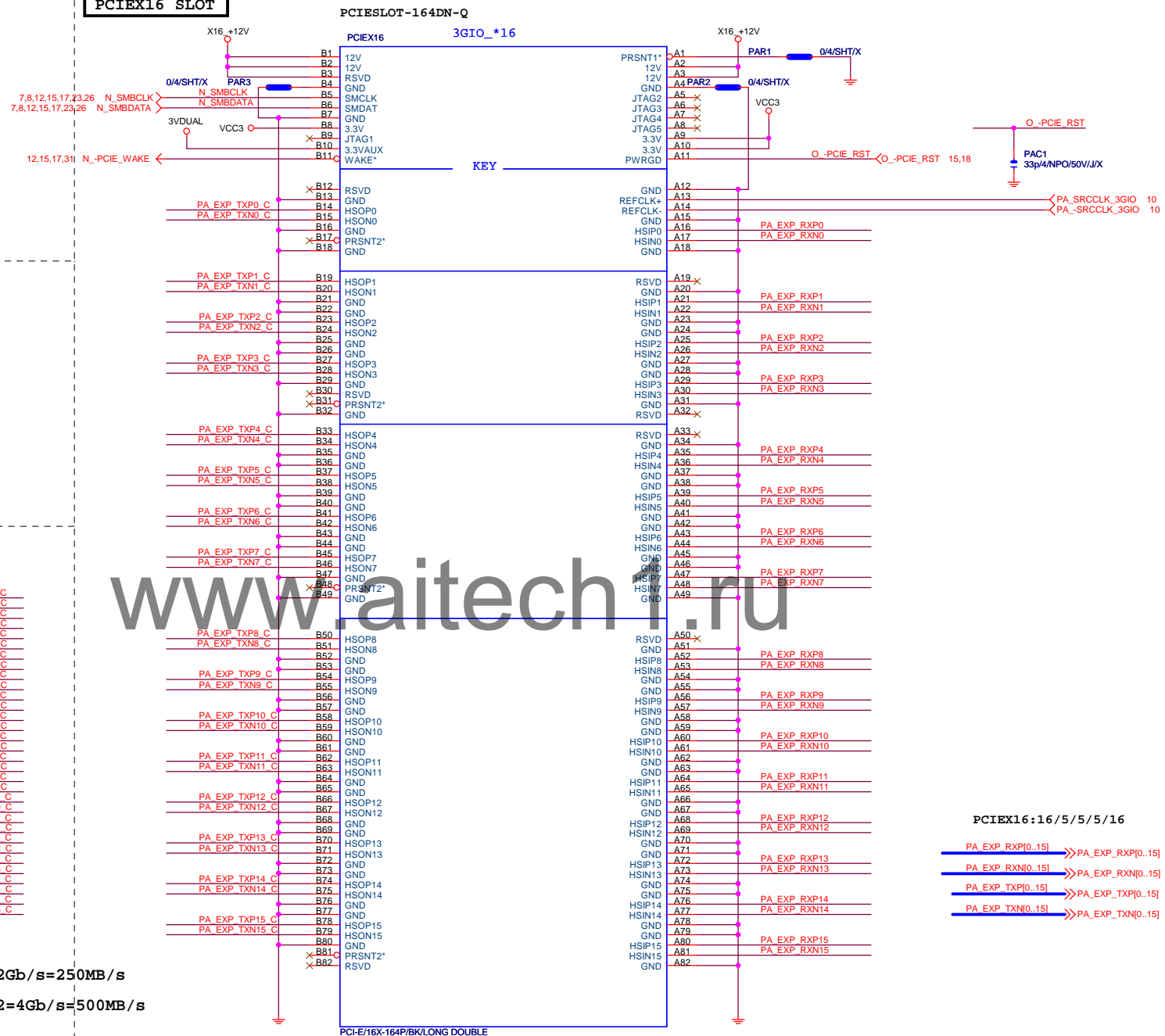
PCE-E X1(雙向) BANDWIDTH=2.5GHz*(8b/10b)X2=4Gb/s=500MB/s

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

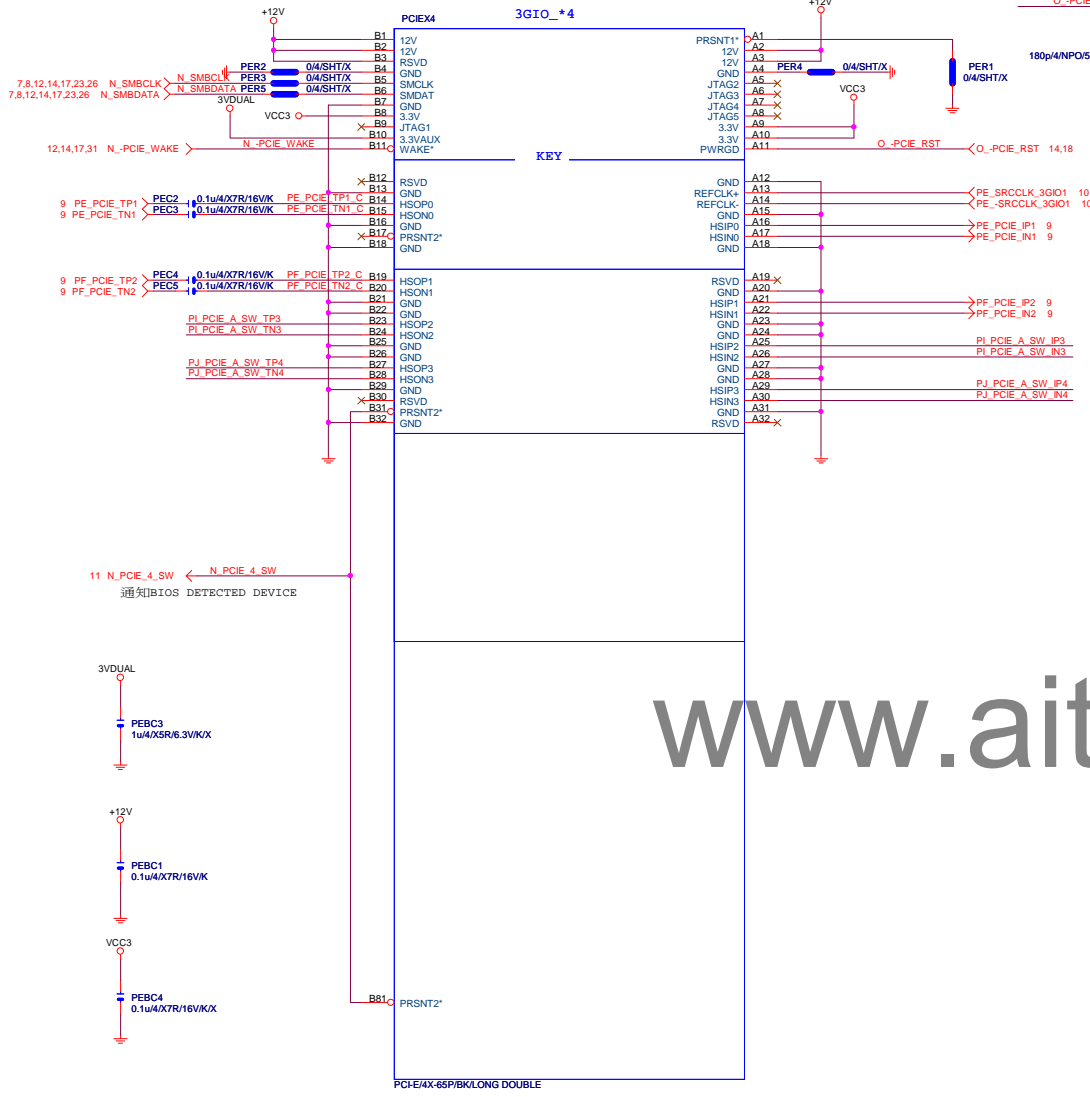
PCIEX16 SLOT



PCIEX16:16/5/5/5/16

PA_EXP_RXP[0..15]	>>>	PA_EXP_RXP[0..15]	4
PA_EXP_RXN[0..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

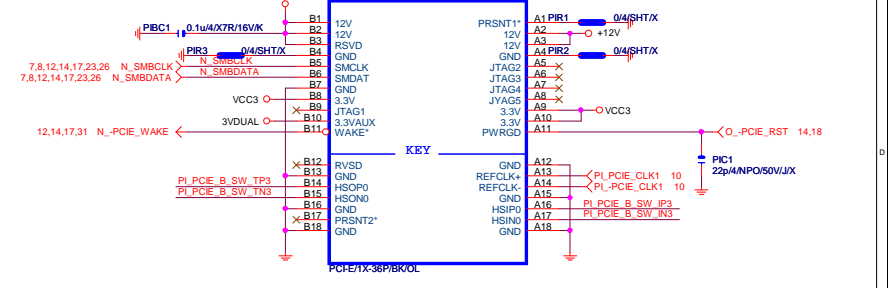
PCIEX4 SLOT



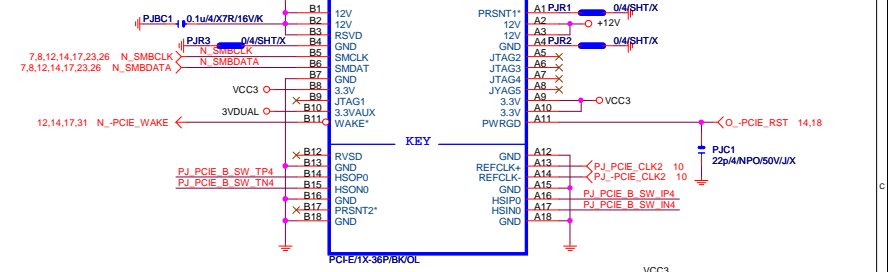
	N_PCIE_4_SW (PCH GPIO48)	PCIEX4_X1 (SIO_GPIO26)
PCIEX4 No devices	H	H
PCIEX4 -> X1	H	H
PCIEX4 Have devices	L	L
PCIEX4 -> X4	L	L
PCIEX1_1/2 --> N/A		

PCIEX1 SLOT

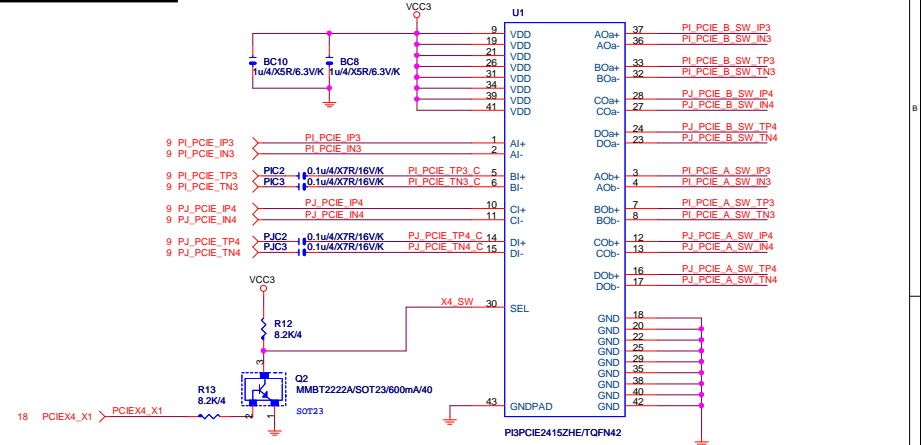
PCIEX1_1



PCIEX1_2



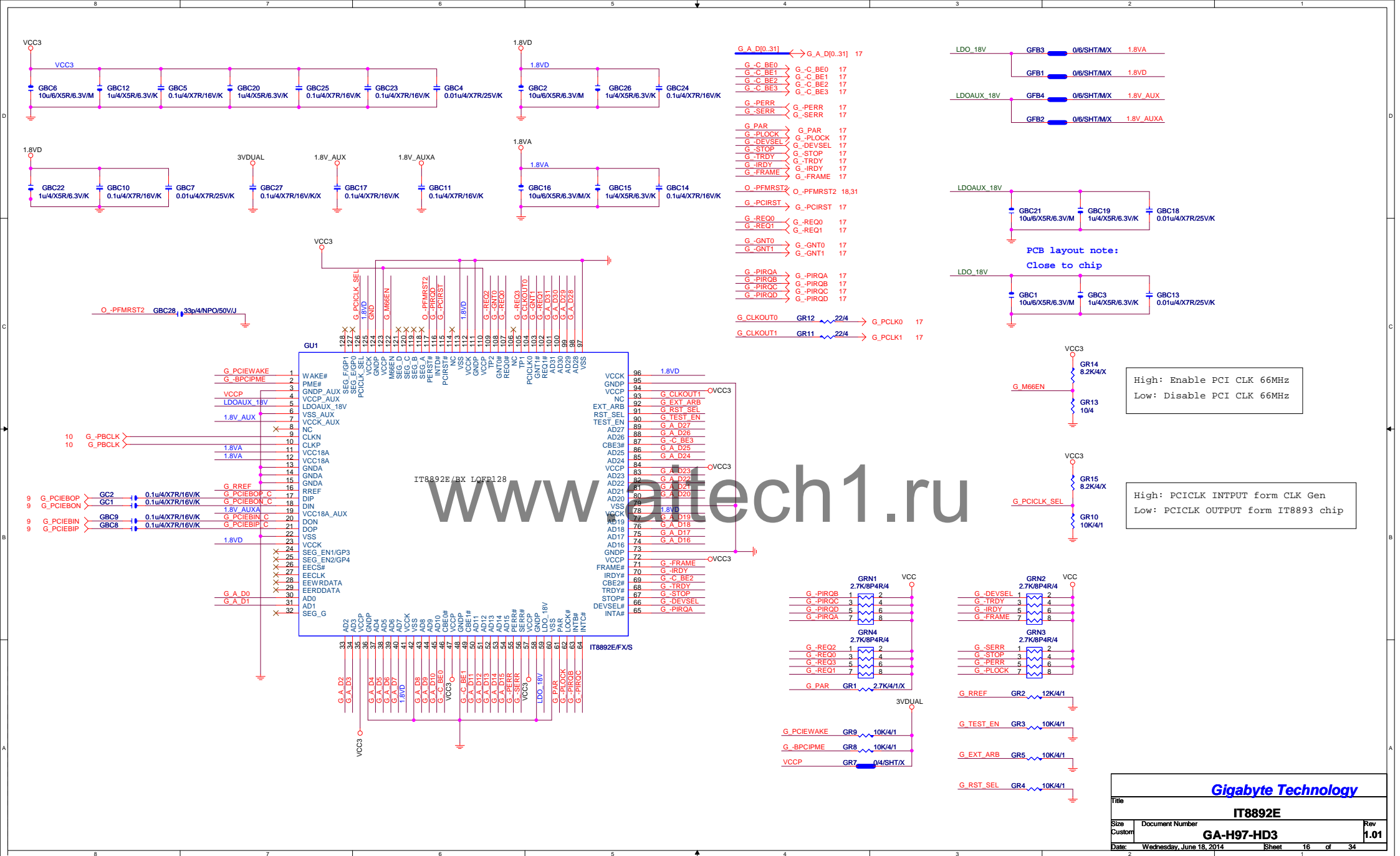
PCIEX4/X1 SWITCH



Algorithm 是先 check X4 有沒有卡。決定要 1個 X4(X4卡優先) or 4 個 x1.

Function	SEL
x1--> x0a	L;PCIEX4 SLOT-->X1
x1--> x0b	H;PCIEX4 SLOT-->X4

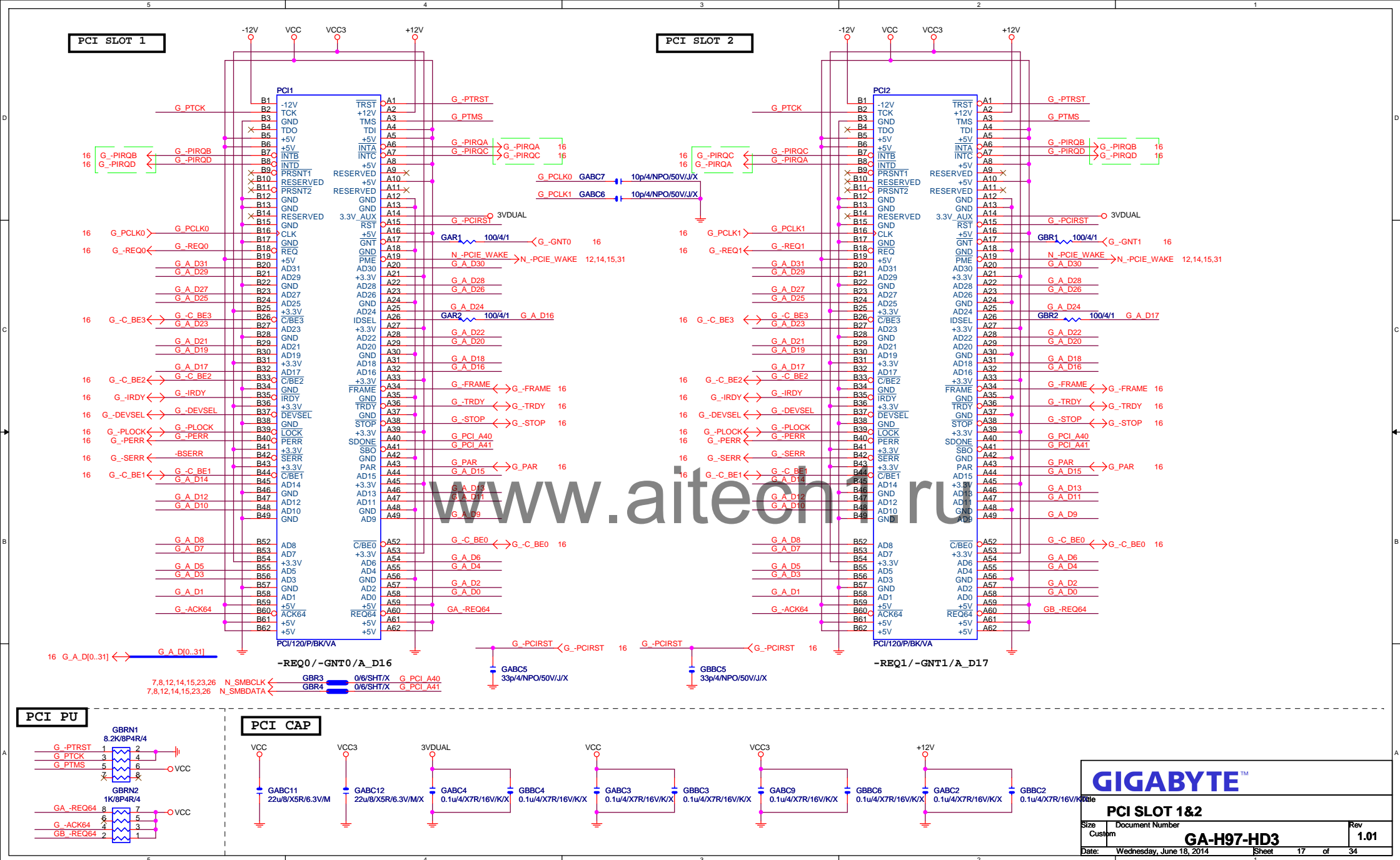
Gigabyte Technology			
Title PCIEX X1 1,2,3			
Size	Document Number	Rev	
Custom	GA-H97-HD3	1.01	
Date:	Wednesday, June 18, 2014	Sheet	15 of 34



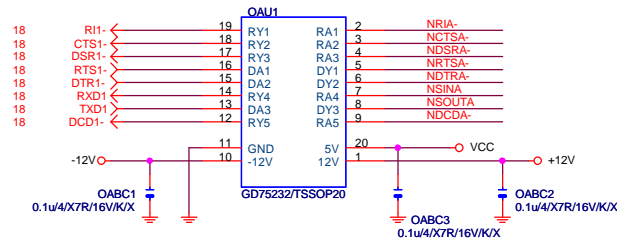
High: Enable PCI CLK 66MHz
Low: Disable PCI CLK 66MHz

High: PCICLK INPUT form CLK Gen
Low: PCICLK OUTPUT form IT8893 chip

Gigabyte Technology		
Title		
IT8892E		
Size	Document Number	Rev
Custom	GA-H97-HD3	1.01
Date:	Wednesday, June 18, 2014	Sheet 16 of 34



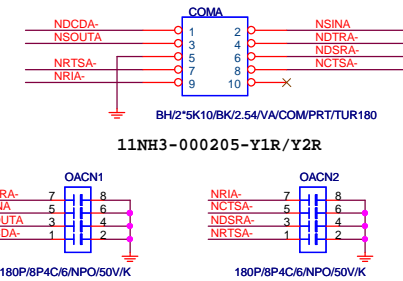
COMA



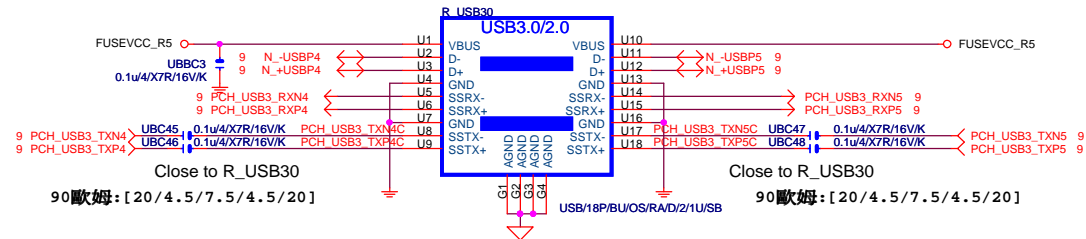
COM RI



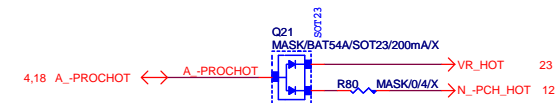
COM BUFFER



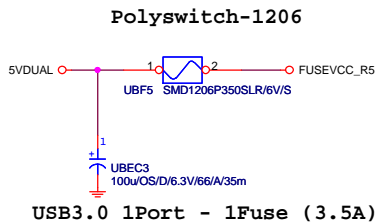
USB30_20 CONNECT



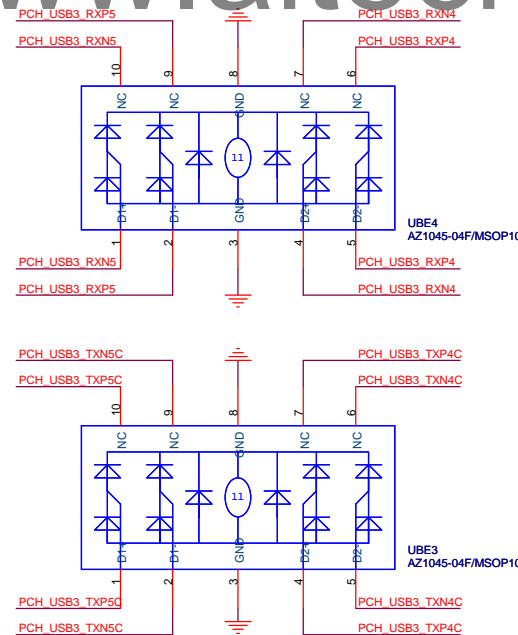
-PROHOT



USB30_PWR

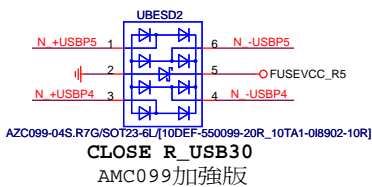


USB30 ESD PROTECT



Thunderbolt pin header

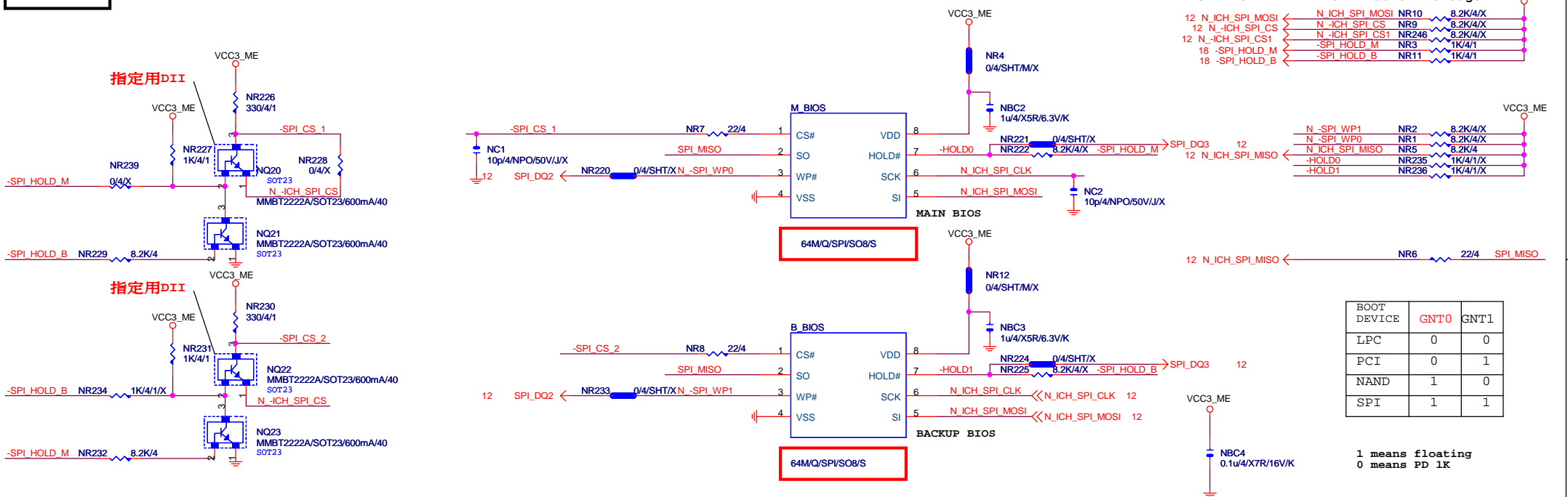
USB20 ESD PROTECT



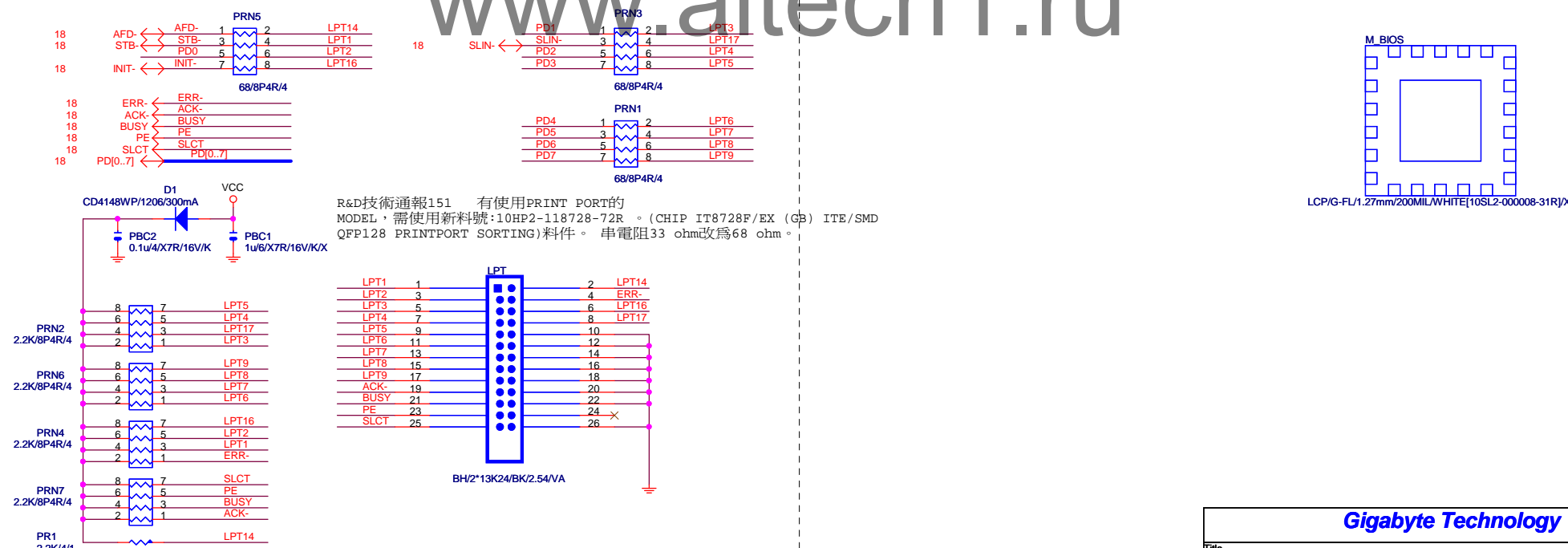
Gigabyte Technology

Title		COM/ PROHOT/ R_USB	
Size	Document Number	GA-H97-HD3	
Custom		Rev 1.01	
Date:	Wednesday, June 18, 2014	Sheet	19 of 34

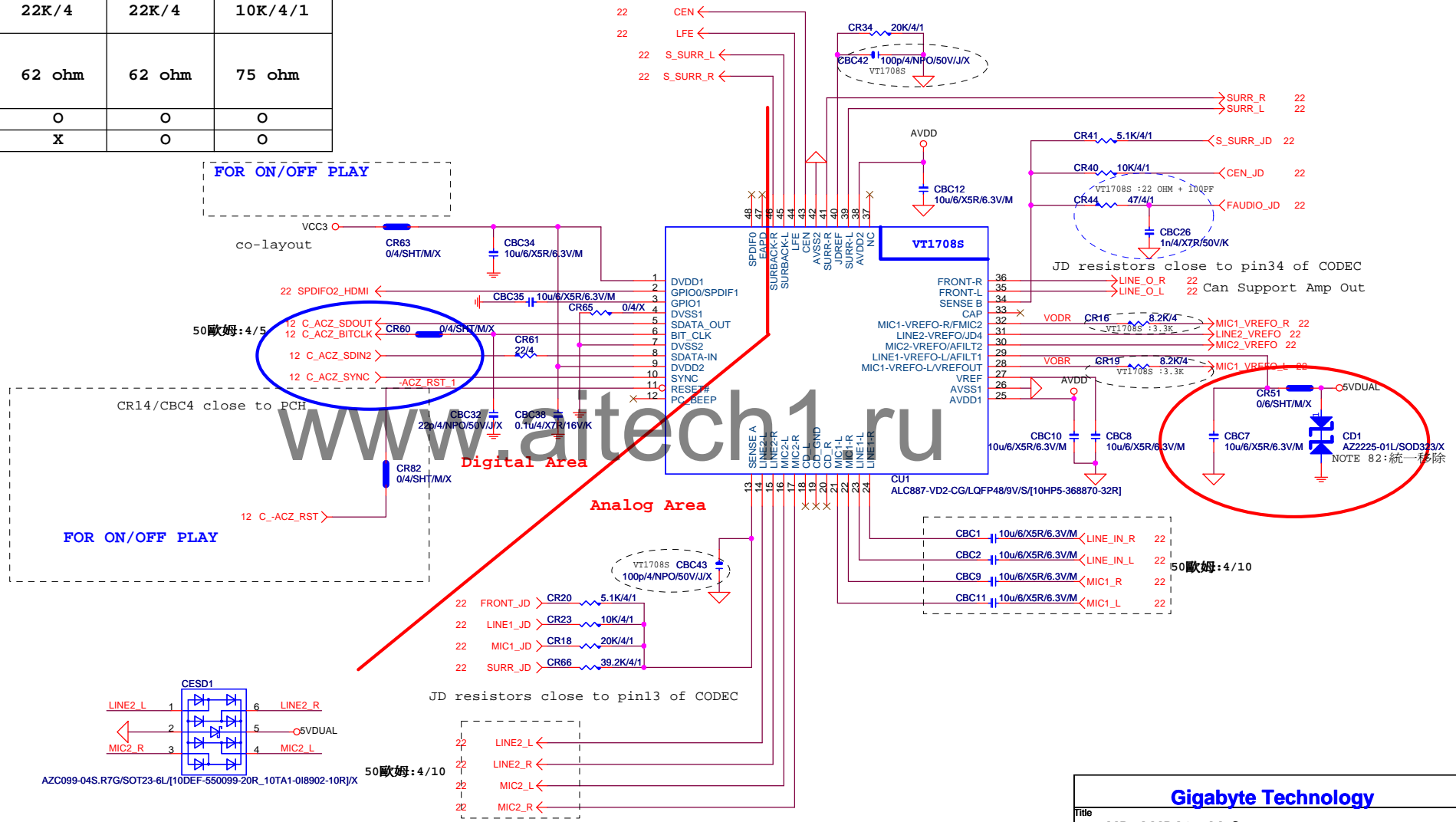
DUAL BIOS

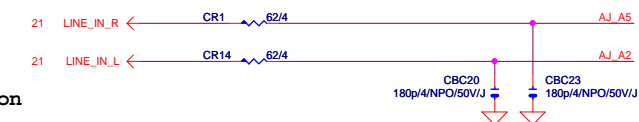
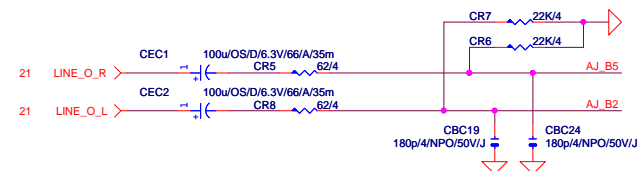
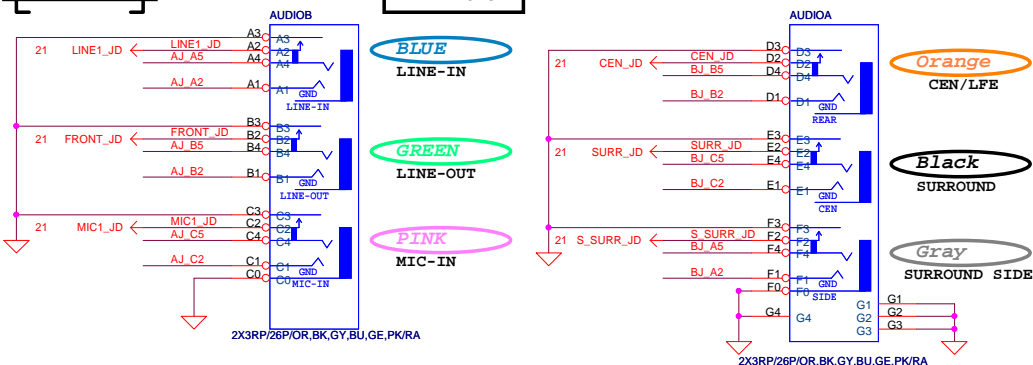
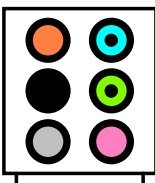
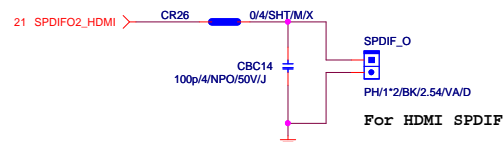
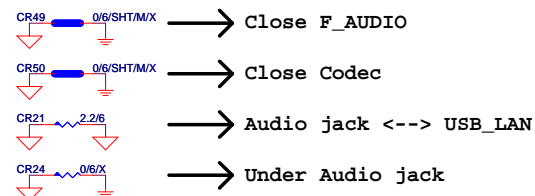


LPT PORT

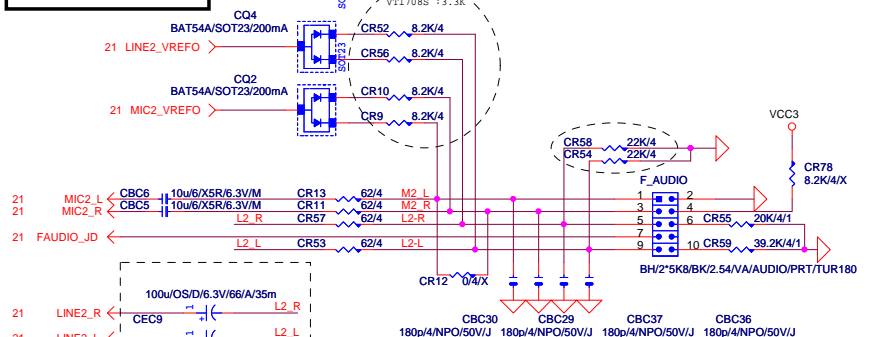
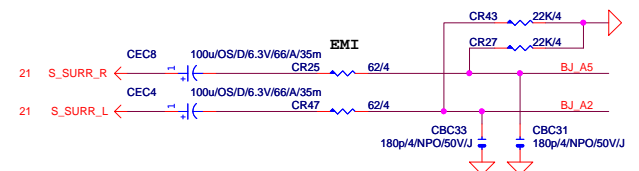
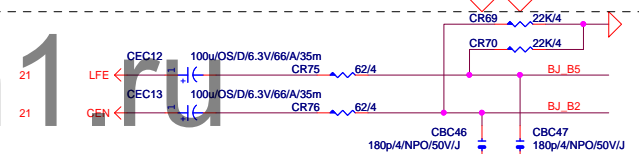
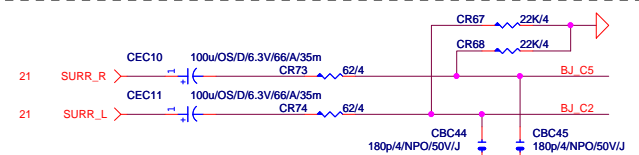
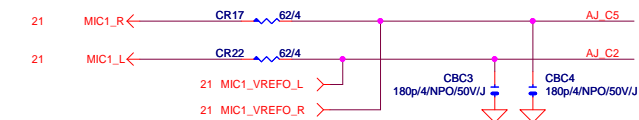


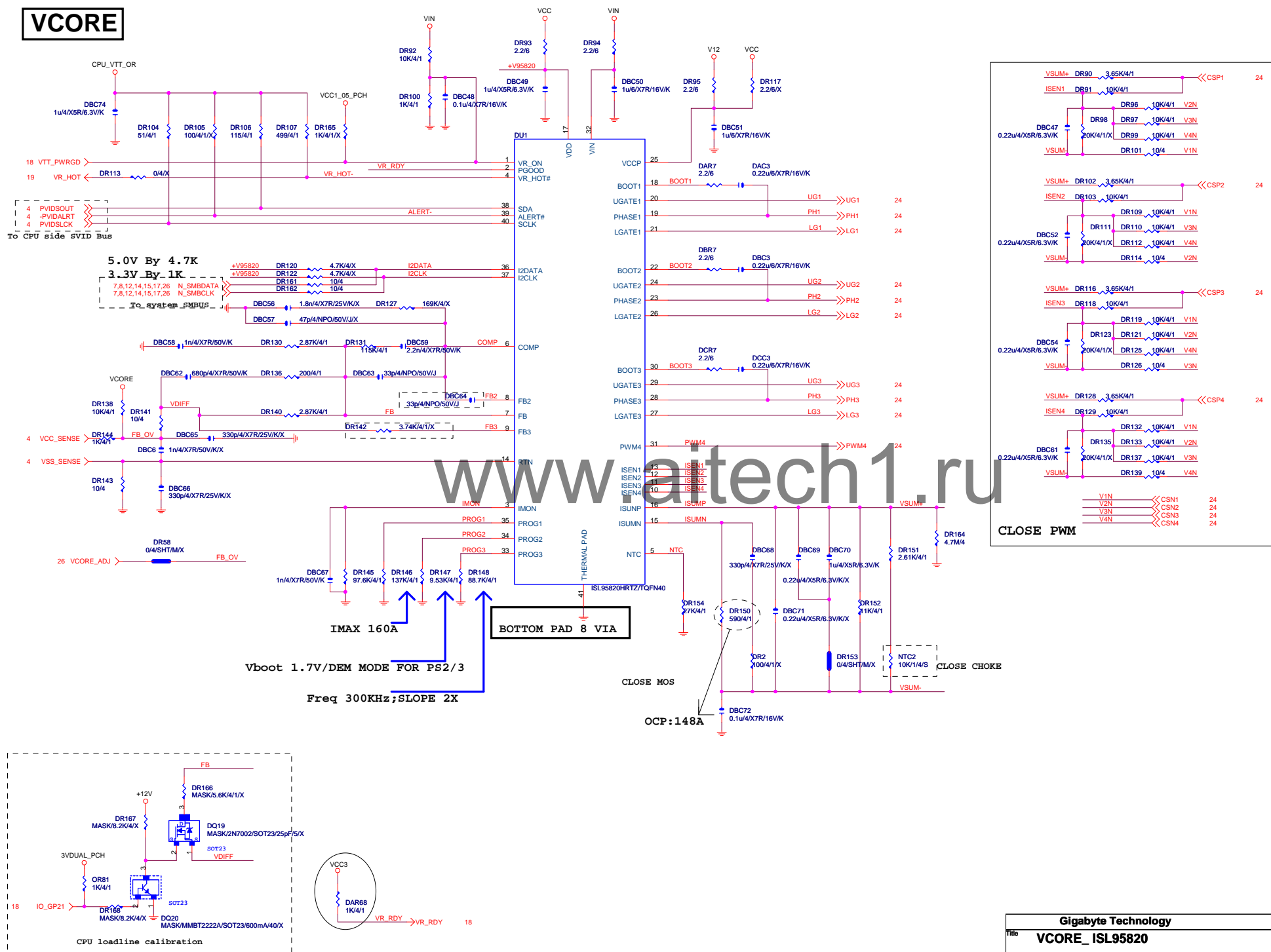
	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR16/CR19 CR52/CR56/CR10/CR9	8.2K/4	8.2K/4	3.3K/4/1
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76	62 ohm	62 ohm	75 ohm
CR51/CD1/CBC7	O	O	O
CESD1	X	O	O





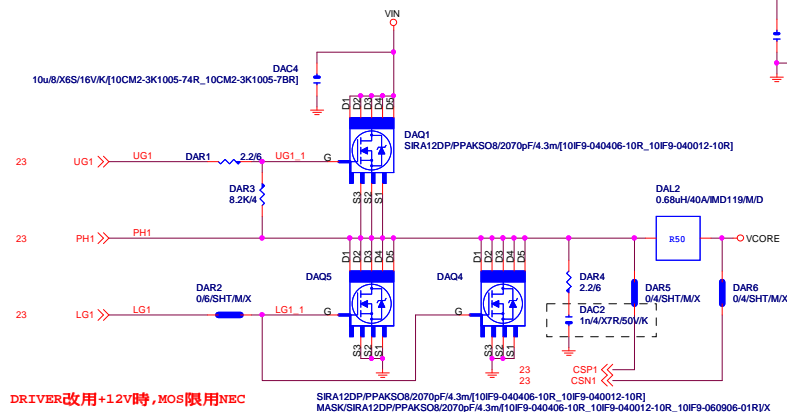
Verify MIC function
in LINE-in



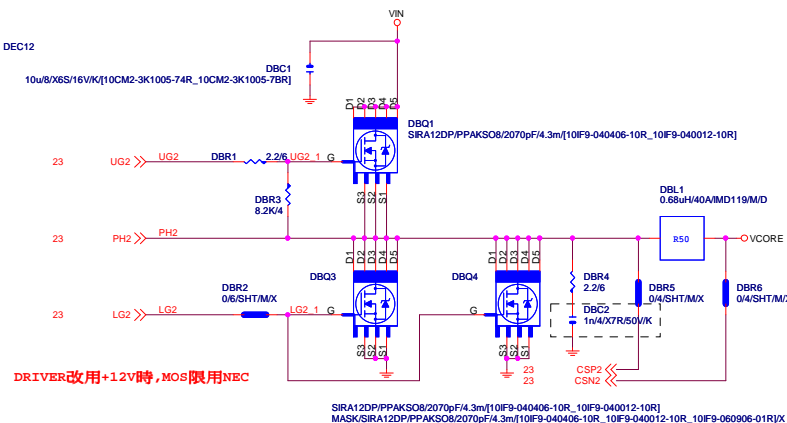
VCORE

VCORE

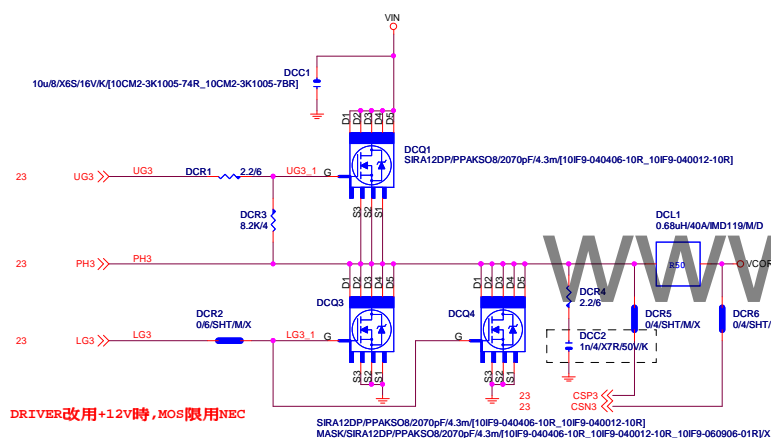
[1]



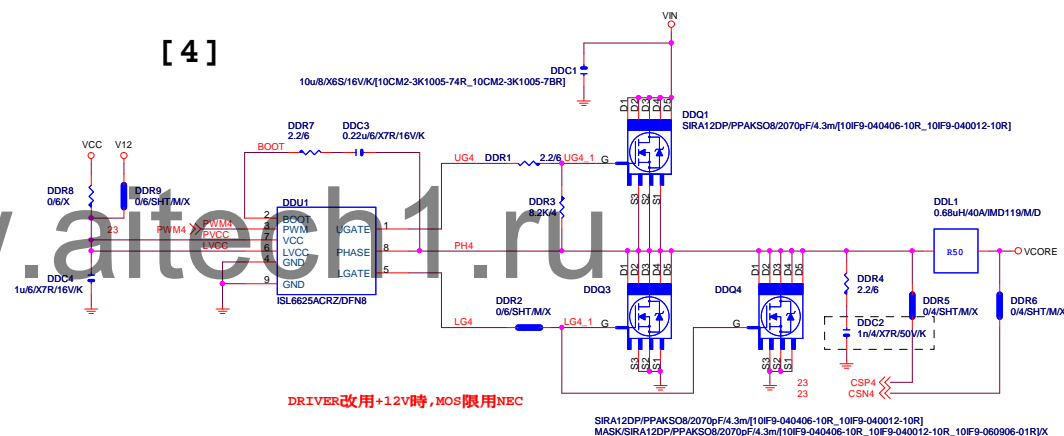
[2]



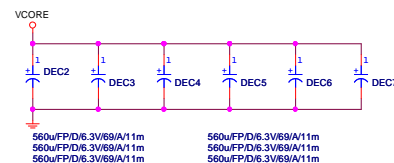
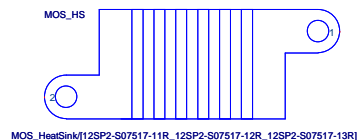
[3]



[4]

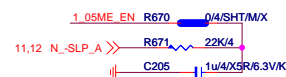
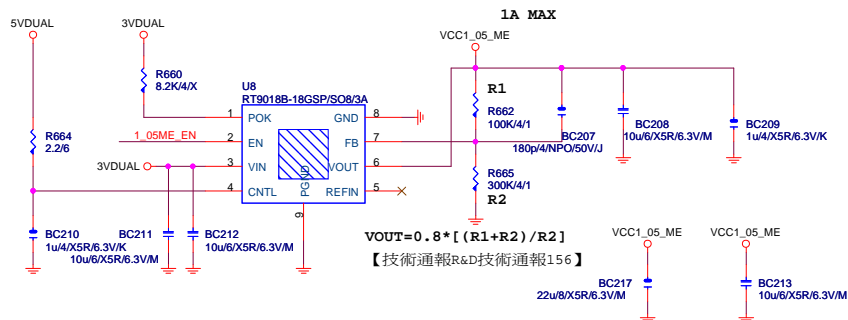


MOSFET HEATSINK

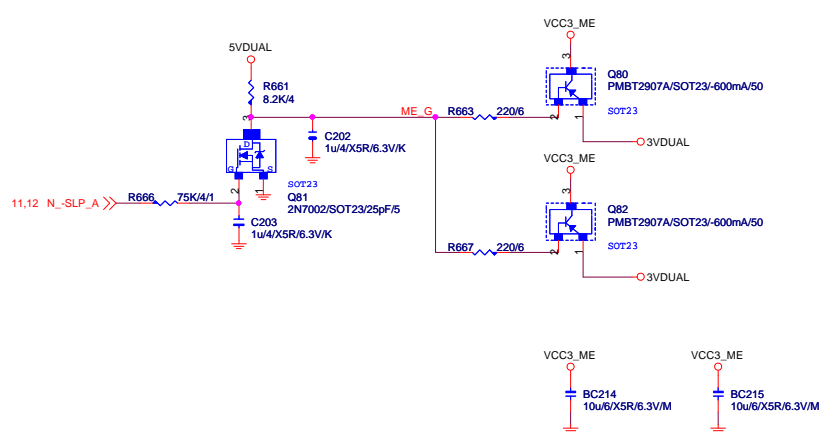


Gigabyte Technology			
Title		ISL95820_2	
Size		Document Number	
Custom		GA-H97-HD3	
Date		Wednesday, June 18, 2014	
		Sheet 24 of 34	
		Rev 1.01	

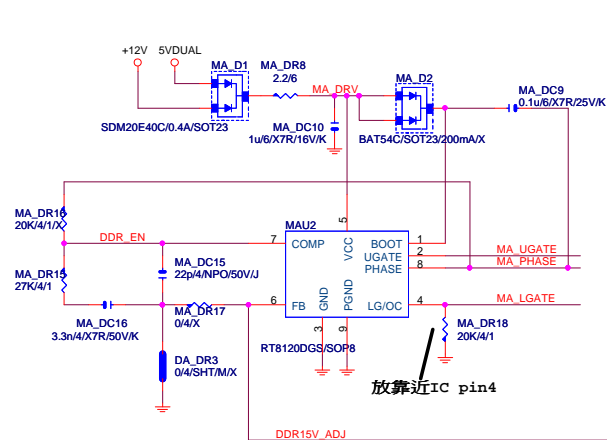
VCC1_05_ME



VCC3_ME



DDR_15V

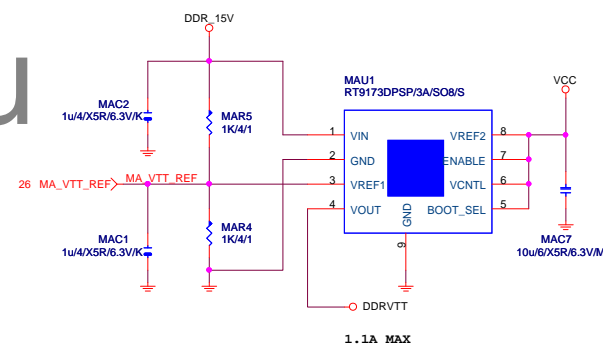


PWR_SEQ

DDR_EN < DDR_EN_CON 18

VIN=5V, VOUT=1.5V, IOUT=25A, PHASE=1
 IRMS=11.45A
 560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
 Coefficient=1.7(85°C), 1(105°C)
 VIN Ripple current=4.7X1.7=7.99A(85°C)
 -->故固態電容須2X7.99=15.98>11.45A
 OCP:35.82A for Rds=6.7m for vishay@4.5V
 OCP:72.727A for Rds=3.3m for renesas@10V
 OCP:48A=Roset*Iocset / Rds(on)
 =12K*10uA / [5//5]

DDRVTT



Remote sense請從最重的負載端點拉回

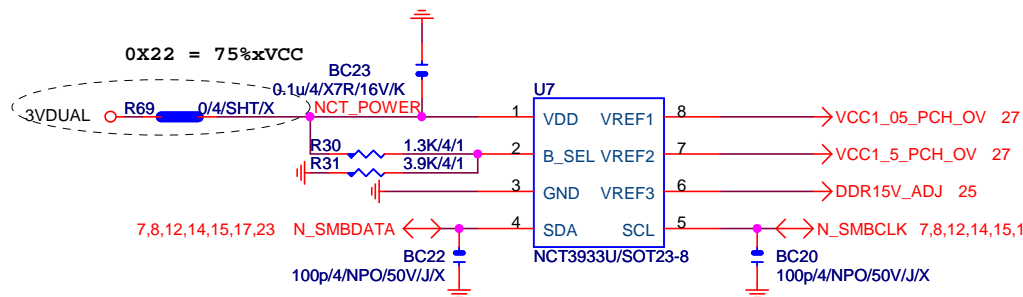
$$0.8 * (1 + RS / RO) = V_{out}$$

$$0.8 * [1 + 2K / (2.26K)] = 1.509V$$

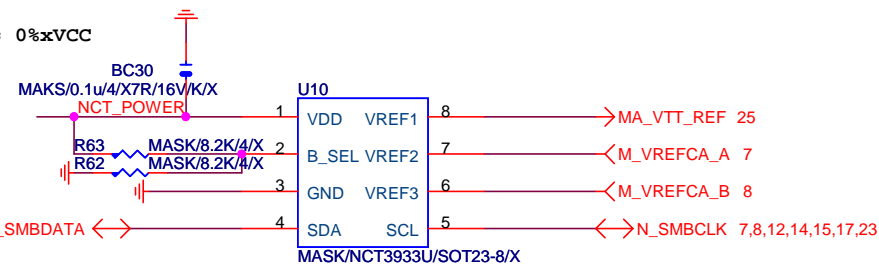
GIGABYTE™

Title			
DDR15V / M3 POWER			
Size	Document Number	Rev	
Custom	GA-H97-HD3	1.01	
Date:	Wednesday, June 18, 2014	Sheet	25 of 34

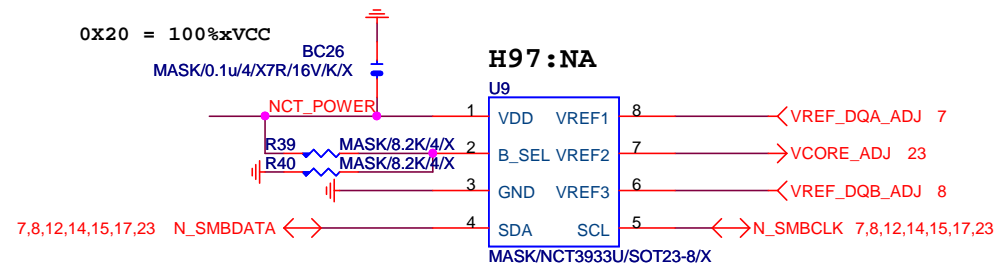
OVER VOLTAGE



0X2A = 0%xVCC



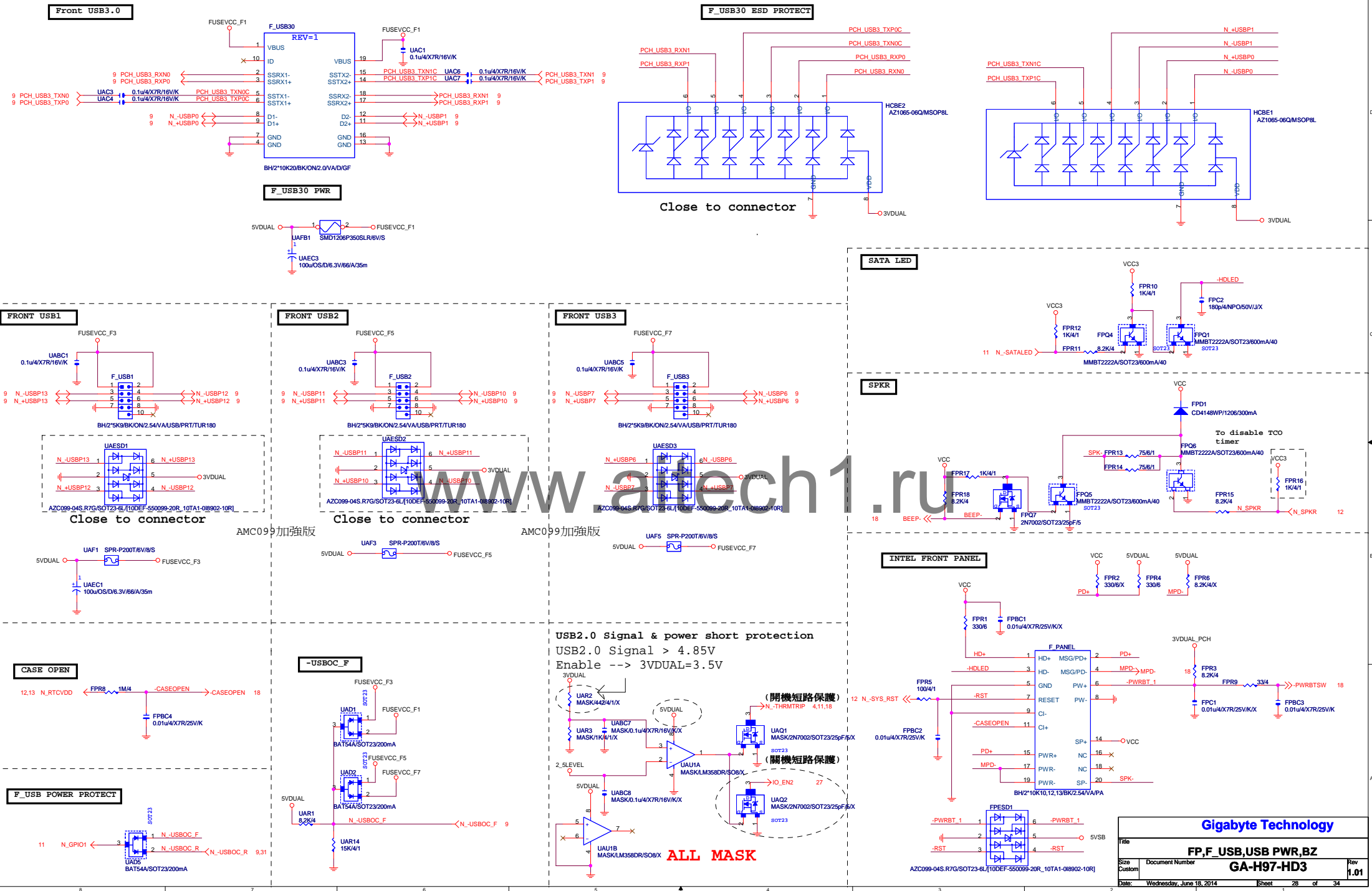
0X20 = 100%xVCC



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

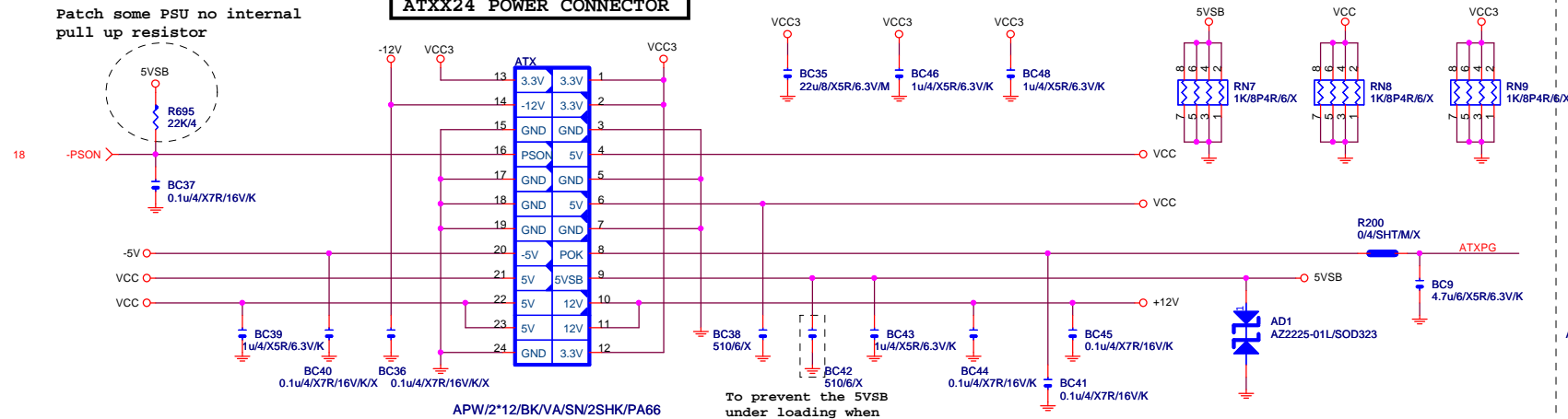
Gigabyte Technology

Title			CPU CORE VR-2		
Size	Document Number				Rev
Custom	GA-H97-HD3				1.01
Date:	Wednesday, June 18, 2014			Sheet	26 of 34

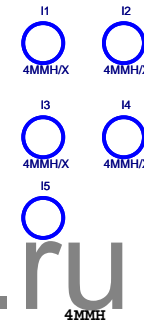
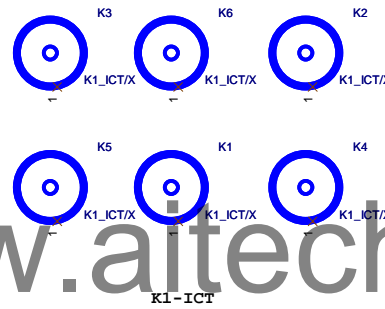
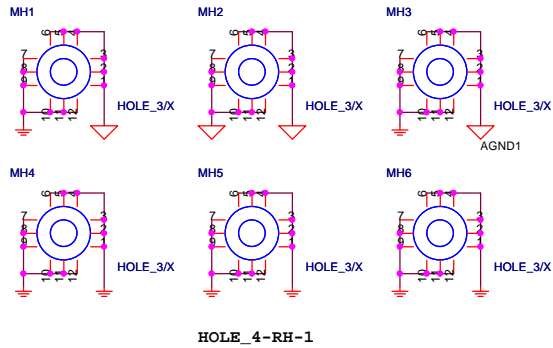
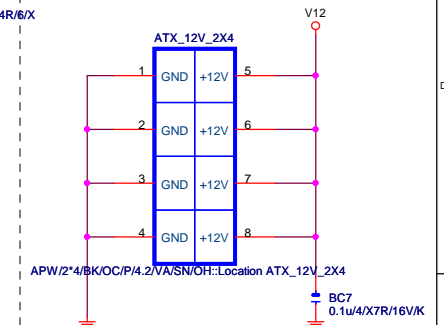


Patch some PSU no internal pull up resistor

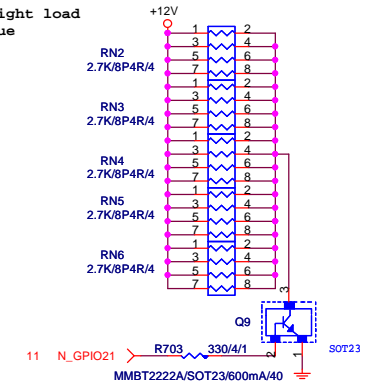
ATXX24 POWER CONNECTOR



ATXX4 POWER CONNECTOR



【技術通報R&D技術通報153】
To fix 12V light load abnormal issue



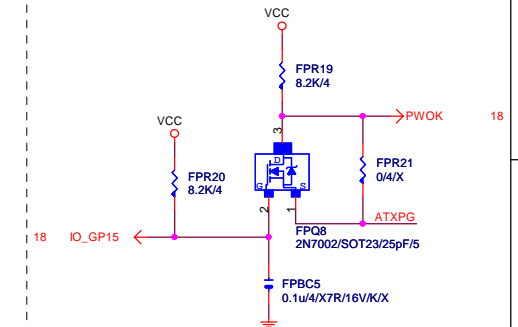
CLK GEN

CPU Frequency Selection

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

PWOK PATCH

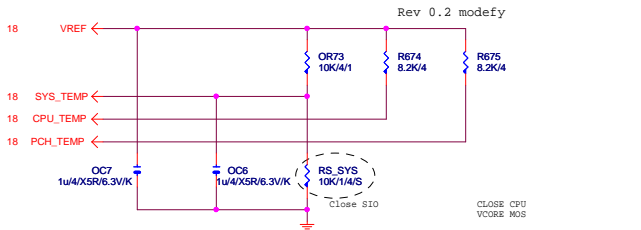
【技術通報R&D技術通報154】



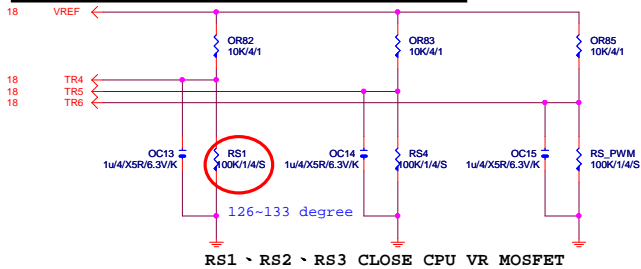
Gigabyte Technology

Title		
ATX POWER CONNECTOR		
Size	Document Number	Rev
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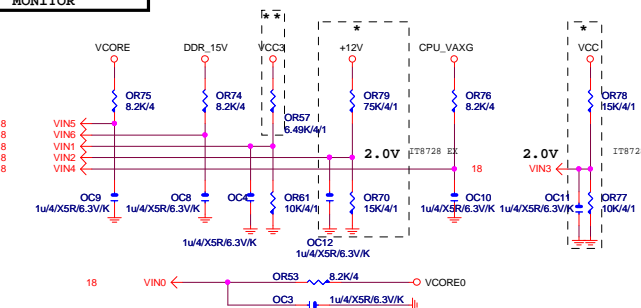
TEMP H/W MONITOR



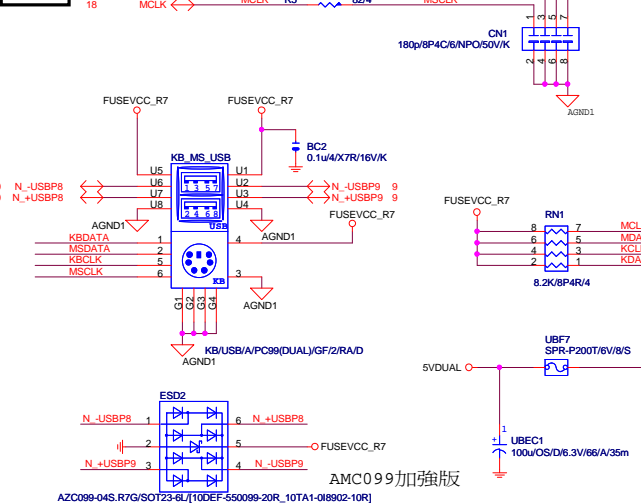
-PROCHOT:有mos heatsink不用prochot function



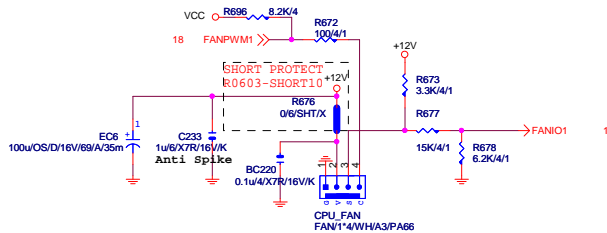
VOLTAGE-- H/W MONITOR



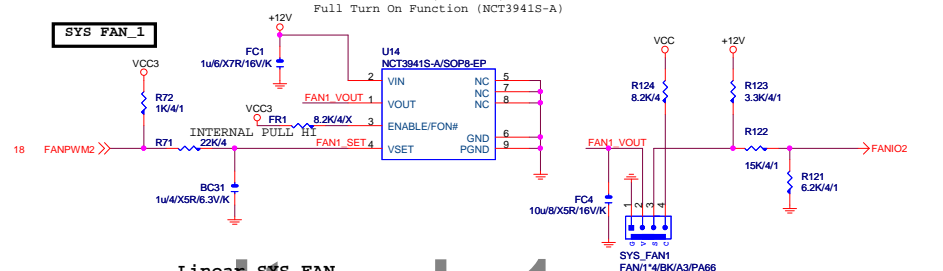
KB/USB



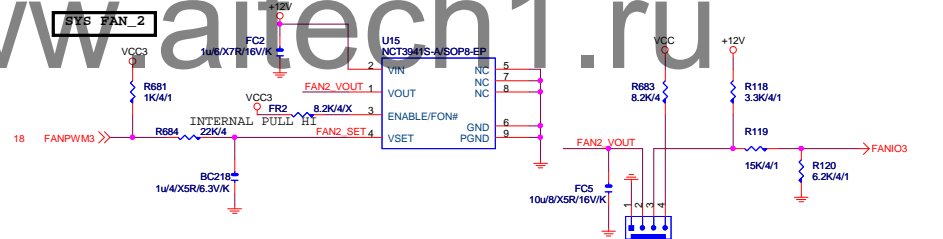
CPU SMART FAN



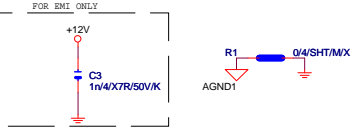
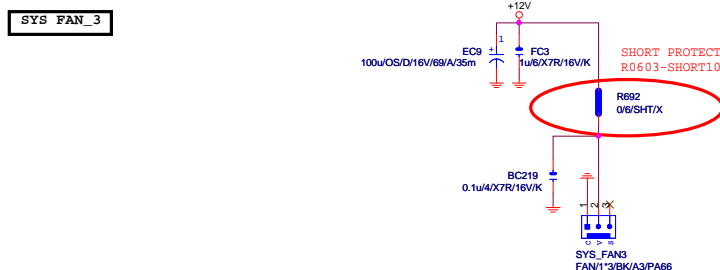
Linear SYS_FAN



Linear SYS_FAN



Linear SYS_FAN



Gigabyte Technology

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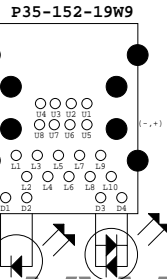
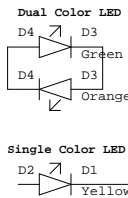
LAN:INTEL I217

100歐姆:[20/4/8/4/20]

80歐姆:[15/5/5/5/15]

SRCCLK 50歐姆:[18/4/10/4/18]

FOR DSM MODE
(DEEP SLEEP MODE)



離IC近越好

USB30_LAN CONNECTOR

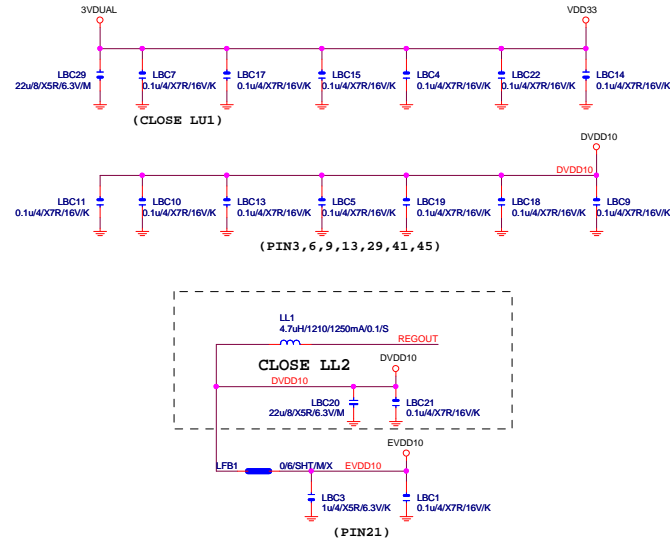
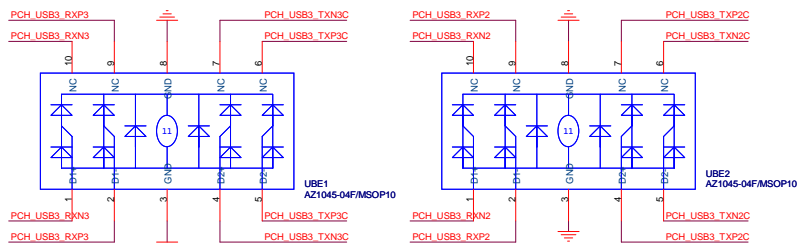
100歐姆:[20/4/8/4/20]

USB30_LAN
USB3-LAN1GGO,YOSRA/DIG30[11NR6-702009-K1R_11NR6-702009-K4R]

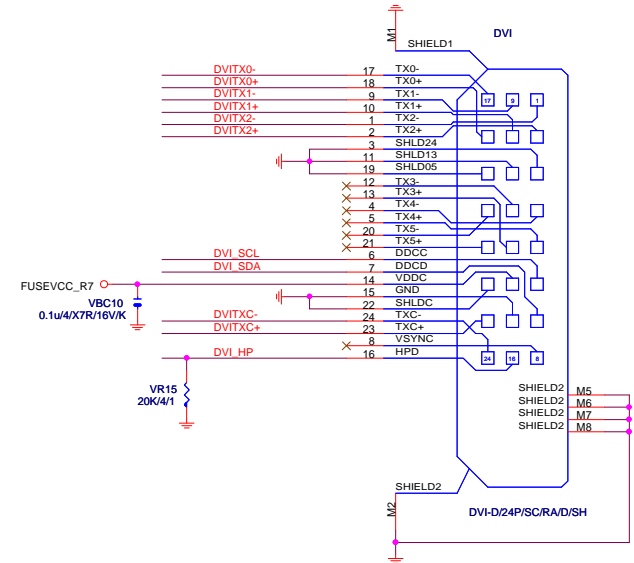
90歐姆:[15/4.5/7.5/4.5/15]

CLOSE USB30_LAN

AMC099加強版



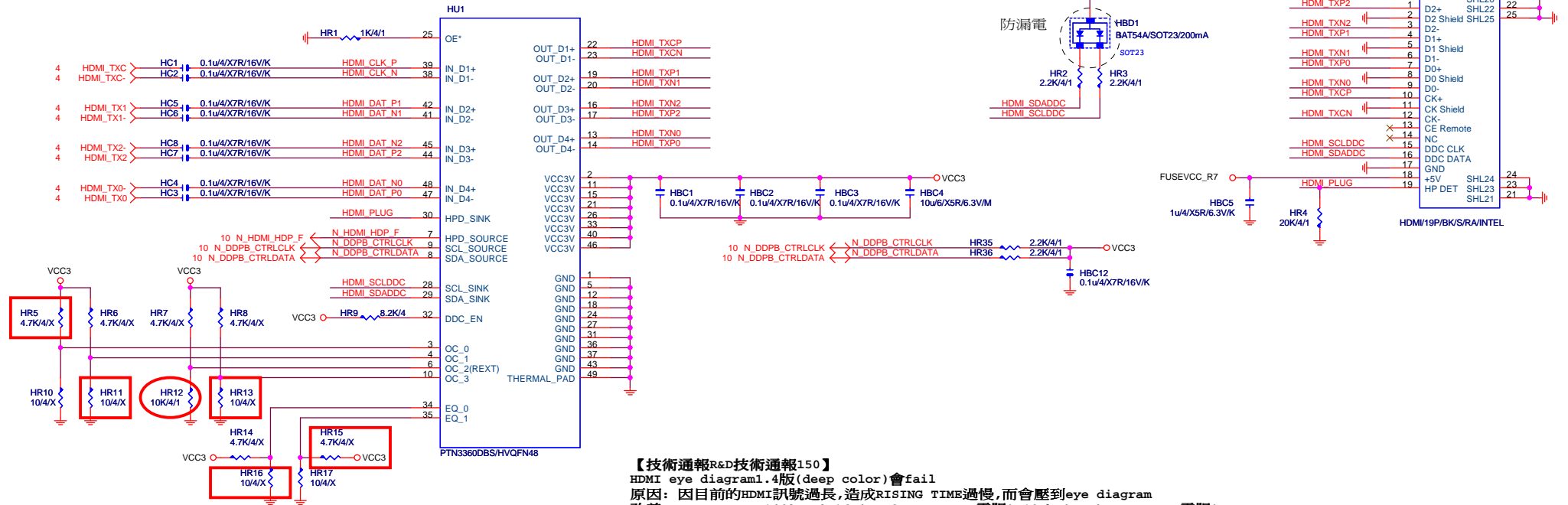
www.aitech1.ru



<i>Gigabyte Technology</i>			
Title			
DVI			
Size	Document Number	GA-H97-HD3	Rev
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HDMI LEVEL SHIFT

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



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

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GIGABYTE™		
Title HDMI		
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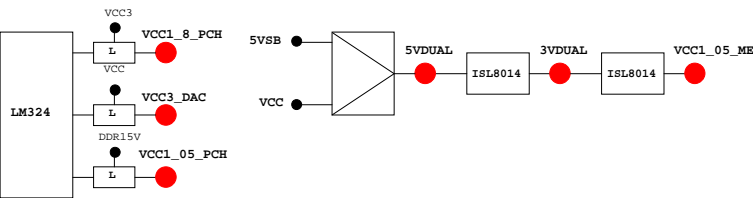
PCB GPIO LIST TABLE

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	PCIE1 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	GPIO12	N/A
GP13	STBY	L	LPCPME#	P/U 8.2K 3VDUAL
GP14/OC7#	STBY	NATIVE	USB OC7#	N/A
GP15	STBY	L	GPIO15(TLS Enable)	P/U 8.2K 3VDUAL
GP16	MAIN	GPI	GPIO16	P/U 8.2K VCC3
GP17/TACH0	MAIN	GPI	GPIO17	P/U 8.2K VCC3
GP18	MAIN	GPI	Mobile Only	N/A
GP19	MAIN	GPI	GPIO19	P/U 8.2K VCC3
GP20	MAIN	GPI	GPIO20	P/U 8.2K VCC3
GP21	MAIN	GPI	GPIO21	P/U 8.2K VCC3
GP22	MAIN	H-Z	GPIO22	P/U 8.2K VCC3
GP23	MAIN	GPI	GPIO23	N/A
GP24	STBY	L	SKTOCC#	N/A
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	PCIE4 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)

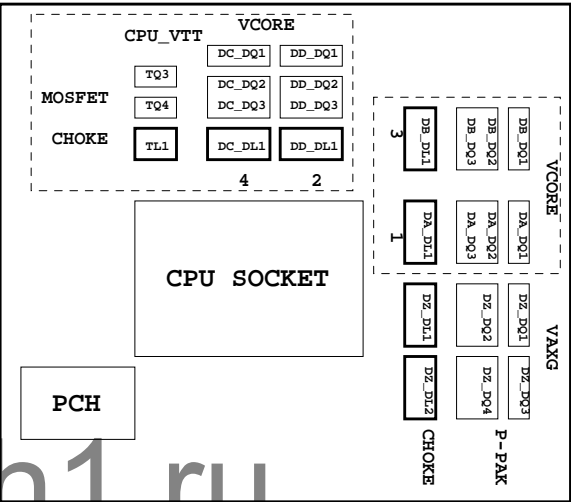
Super I/O ITE8720 GPIO Table

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	
VID05/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	
VID00/GP20/CTS2#	CPUT_LED1_C	BSEL166_4
GP65/VDDA_EN/GB_01	MB_ID2	
PD6/GP76/BUSS01	MB_ID3	
PD7/GP77/BUSS02	MB_ID4	
AFD#/GP86/SMBC_R	2X PIN	FST_2X8
INIT#/GP85/SMBC_M	SEC_2x8	GTLREF_AD2
ACK#/GP83	DDR_LED1_C	
VID01/GP21/DCD2#	DDR_LED2_C	
STB#/GP87/SMBC_M	DDR_LED3_C	
PWRON#/GP44	VCORE_OV1	
PANSWH#/GP43	PWRBTSW	
KDAT/GP61	-PWRBTSW	
KCLK/GP60	KDAT	
MDAT/GP57	KCLK	
MACL/GP56	MDAT	
GP66/VLDT_EN/GB_02	NBT_LED1_C	MCLK
SVD/PCIRSTIN#/CIRTX/GP15	PWM2_CR	
KDAT/GP61	PWM2_CR	
GP67/CPU_PG/GB_03	EN_LOADLINE	IT_GP67/-EN_PWM2
SLIN#/GP84/SMBC_R	-EN_PWM2	
PSI_L/FAN_CLT5/CIRRX2/GP16	-THERM	
VID04/GP26/SOUT2	DDR18V_PH2_EN	
VID02/FAN_TAC5/GP24/DSR2#	DDR18V_LED	
VID06/GP17/RI2#	1_1V_PH_EN	
VID07/JP6/DTR2#	JP6	
PD5/GP75/BUSS00	SB_LED3_C	



PWM各相位的擺法如下：



BIOS超電壓對應表：

線路圖名稱	BIOS選項
Vcore	CPU Vcore
CPU_VTT	CPU Termination
CPU_VAXG	CPU Graphic Core
VCC1_8_PCH	CPU PLL
VCC1_05_PCH	PCH core
3VDUAL	3VDUAL
DDR15V	DRAM voltage
DDRVTT	DRAM 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			
TABLE LIST			
Size C	Document Number	Rev	
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