

Model Name: GA-H87-HD3

1.02

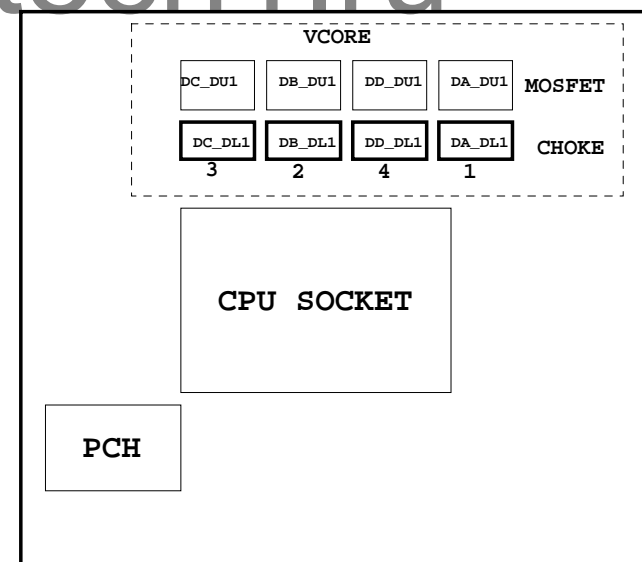
SHEET TITLE

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 ITE8728
19	COM, -PROHOT, R_USB
20	Dual BIOS / LPT
21	ALC892 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
35	
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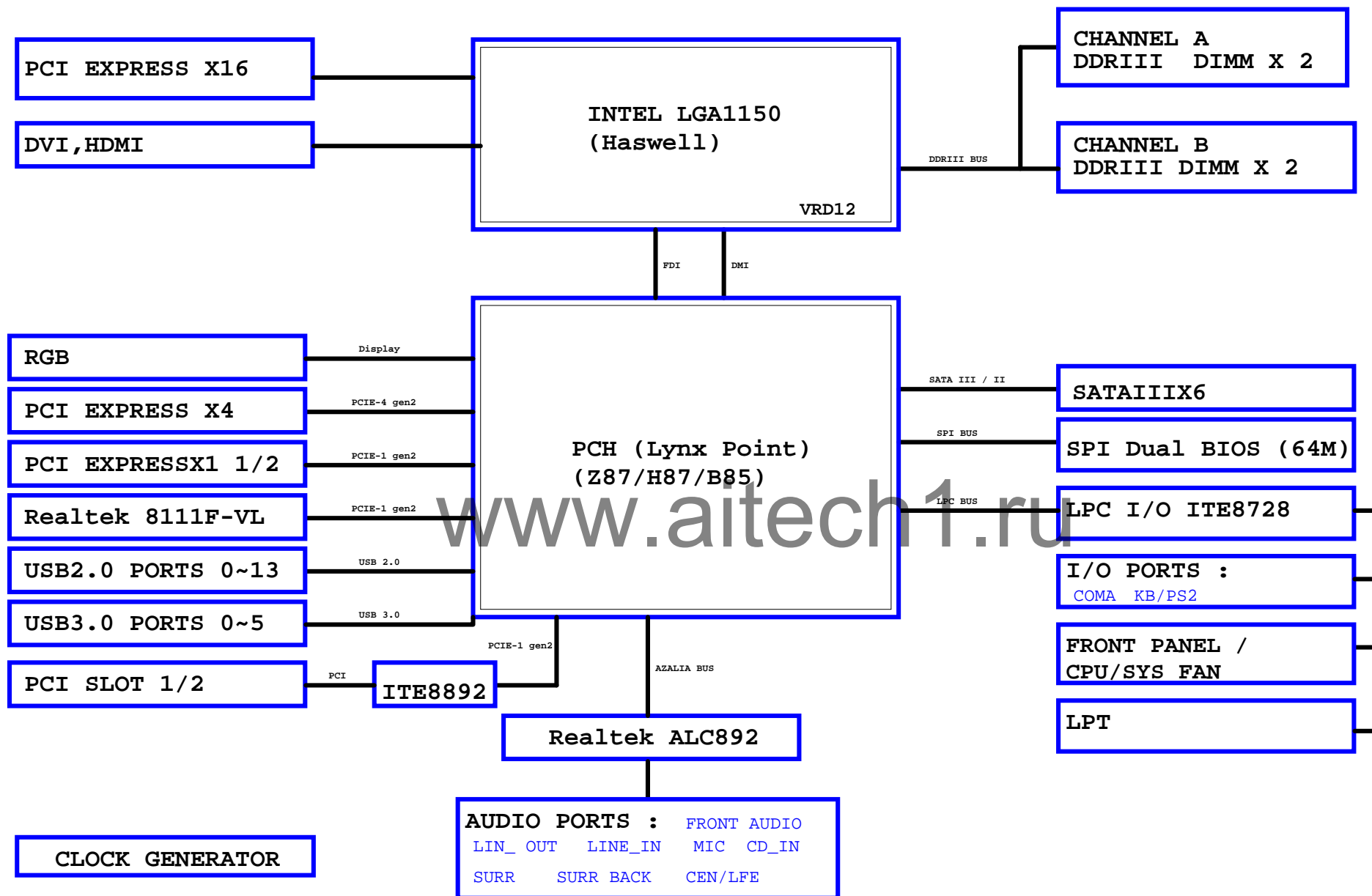
www.aitech1.ru



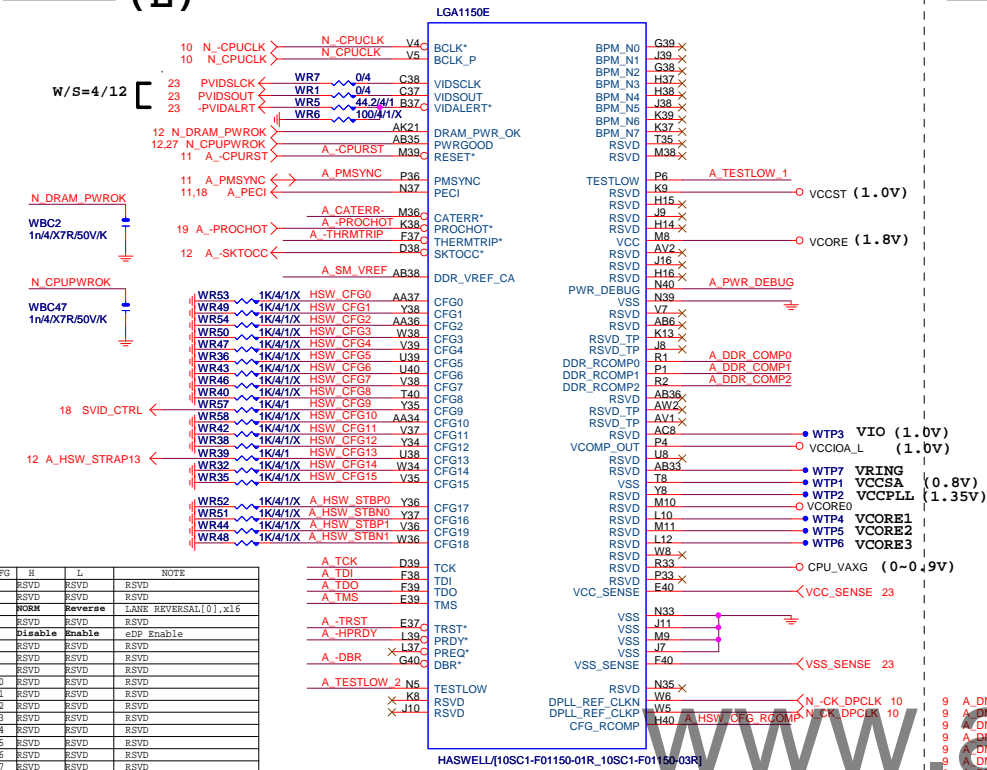
Component value change history

[illegible][illegible]

BLOCK DIAGRAM



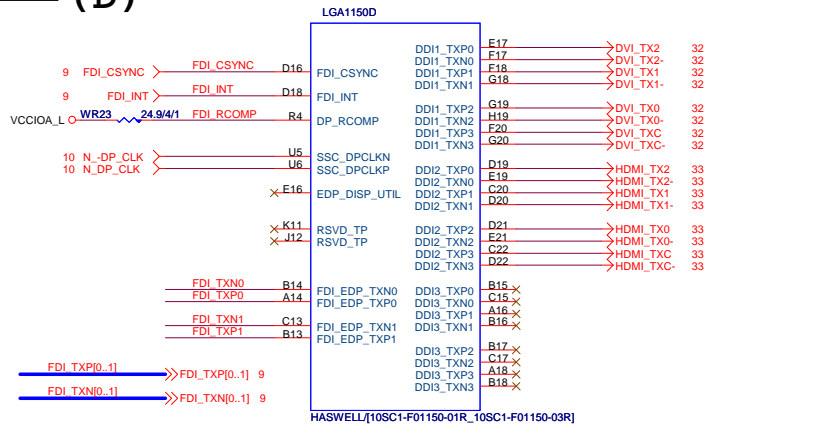
LGA1150 (E)



FG6	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%

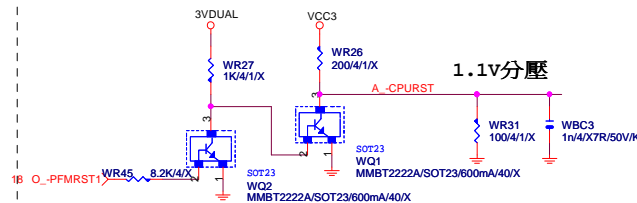
LGA1155 (C)



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

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

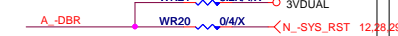
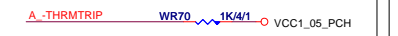
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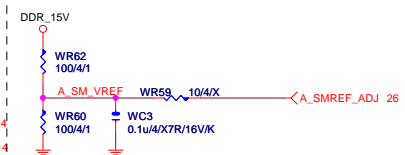
CPU SVID



CPU PU/PD



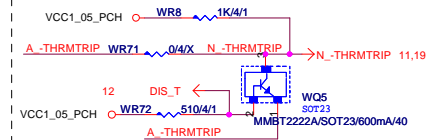
SM REF



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| THRMTRIP DISABLE FOR Z87 OVERCLOCK

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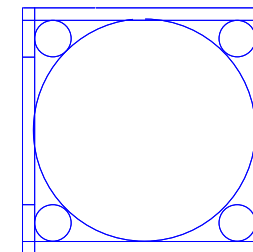


LGA1150A									
		MAAA0	AU13	DDR0_MA0	DDR0_D00	AD38	MDA0		
		MAAA1	AV16	DDR0_MA1	DDR0_D01	AD39	MDA1		
		MAAA2	AU16	DDR0_MA2	DDR0_D02	AF38	MDA2		
		MAAA3	AW17	DDR0_MA3	DDR0_D03	AF39	MDA3		
		MAAA4	AU17	DDR0_MA4	DDR0_D04	AD37	MDA4		
		MAAA5	AW18	DDR0_MA5	DDR0_D05	AD40	MDA5		
		MAAA6	AV17	DDR0_MA6	DDR0_D06	AF37	MDA6		
		MAAA7	AU18	DDR0_MA7	DDR0_D07	AF40	MDA7		
		MAAA8	AV19	DDR0_MA8	DDR0_D08	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	AP39	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	PM37	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	AV37	MDA28		
			AW31	DDR0_ECC6	DDR0_D29	AT35	MDA30		
				DDR0_ECC7	DDR0_D30	AW35	MDA31		
		SBAA0	AY12	DDR0_D31	DDR0_D31	AY6	MDA33		
7		SBAA1	SBAA1	DDR0_BA0	DDR0_D32	AY6	MDA37		
7		SBAA2	AT21	DDR0_BA1	DDR0_D33	AD40	MDA37		
7				DDR0_BA2	DDR0_D34	AW4	MDA35		
7			CKEA0	DDR0_CK0	DDR0_D35	AW6	MDA36		
7			CKEA1	DDR0_CK1	DDR0_D36	AW4	MDA32		
7			CKEA2	DDR0_CK2	DDR0_D37	AW4	MDA38		
7			CKEA3	DDR0_CK3	DDR0_D38	AW4	MDA39		
7				DDR0_CK4	DDR0_D39	AN1	MDA41		
7			CSA0	DDR0_CS_0	DDR0_D40	AN4	MDA42		
7			CSA1	DDR0_CS_N1	DDR0_D41	AN4	MDA43		
7			CSA2	DDR0_CS_N2	DDR0_D42	AN2	MDA44		
7			CSA3	DDR0_CS_N3	DDR0_D43	AN2	MDA45		
7				DDR0_CS_N4	DDR0_D44	AN2	MDA46		
7			DLCKA0	DDR0_CLK_P0	DDR0_D45	AN1	MDA47		
7			DLCKA1	DDR0_CLK_P1	DDR0_D46	AL3	MDA49		
7			DLCKA2	DDR0_CLK_P2	DDR0_D47	AL3	MDA50		
7			DLCKA3	DDR0_CLK_P3	DDR0_D48	AL4	MDA51		
7			DLCKA4	DDR0_CLK_P4	DDR0_D49	AL2	MDA52		
7			DLCKA5	DDR0_CLK_P5	DDR0_D50	AL2	MDA53		
7			DLCKA6	DDR0_CLK_P6	DDR0_D51	AL2	MDA54		
7			DLCKA7	DDR0_CLK_P7	DDR0_D52	AL1	MDA55		
7			DLCKA8	DDR0_CLK_P8	DDR0_D53	AG1	MDA57		
			AW12	RSVD	DDR0_D54	AG2	MDA58		
					DDR0_D55	AG3	MDA59		
					DDR0_D56	AG4	MDA60		
					DDR0_D57	AG5	MDA61		
					DDR0_D58	AG6	MDA62		
					DDR0_D59	AG7	MDA63		
					DDR0_D60	AG8	MDA64		
					DDR0_D61	AG9	MDA65		
					DDR0_D62	AG10	MDA66		
					DDR0_D63	AG11	MDA67		
7		-SRASA	-SRASA	AU12C	DDR0_RAS*	AE39	DSQA0		
7		-SWEA	-SWEA	AU11C	DDR0_WE*	AE39	DSQA1		
				AW20C	RSVD	AE39	DSQA2		
				AW27C	RSVD	AV36	DSQA3		
					DDR0_D5	AE36	DSQA4		
					DDR0_D6	AE37	DSQA5		
7		-SCASA	-SCASA	AU9C	DDR0_CAS*	AF3	DSQA6		
					DDR0_D7	AE3	DSQA7		
7.8		-DDR3_RST	WR61	AK22C	DDR0_RESET*	AV32	DSQA8		
			D4/SH/TMX			AE38	DSQA1		
			WC4			AN38	DSQA2		
			0.1uA/XCTR/16V/KX			AN38	DSQA3		
						AW5	DSQA4		
						AE2	DSQA5		
						AE2	DSQA6		
						AF2	DSQA7		
						AU32			

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

LGA1150B			
MAAB0	AL19	DDR1_MA0	DDR1_D00
MAAB1	AK23	DDR1_MA1	DDR1_D01
MAAB2	AM22	DDR1_MA2	DDR1_D02
MAAB3	AM23	DDR1_MA3	DDR1_D03
MAAB4	AF23	DDR1_MA4	DDR1_D04
MAAB5	AL23	DDR1_MA5	DDR1_D05
MAAB6	AY24	DDR1_MA6	DDR1_D06
MAAB7	AL26	DDR1_MA7	DDR1_D07
MAAB8	AU26	DDR1_MA8	DDR1_D08
MAAB9	AW25	DDR1_MA9	DDR1_D09
MAAB10	AF18	DDR1_MA10	DDR1_D10
MAAB11	AY15	DDR1_MA11	DDR1_DQ11
MAAB12	AL17	DDR1_MA12	DDR1_DQ12
MAAB13	AL25	DDR1_MA13	DDR1_DQ13
MAAB14	AV27	DDR1_MA14	DDR1_DQ14
MAAB15	AY28	DDR1_MA15	DDR1_DQ15
			AB34
MODT_B0	AL16	DDR1_ODT0	DDR1_DQ16
MODT_B1	AM17	DDR1_ODT1	DDR1_DQ17
MODT_B2	AM16	DDR1_ODT2	DDR1_DQ18
MODT_B3	AK15	DDR1_ODT3	DDR1_DQ19
			AP31
			AP32
			AP33
			AP34
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			AP120
			AP121
			AP122
			AP123
			AP124
			AP125
			AP126
			AP127
			AP128

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

LGA1150
ILM_BP/1156/CSP

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)



A13 LGA1150G A134

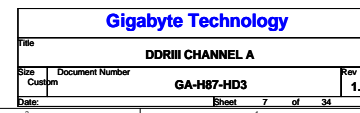
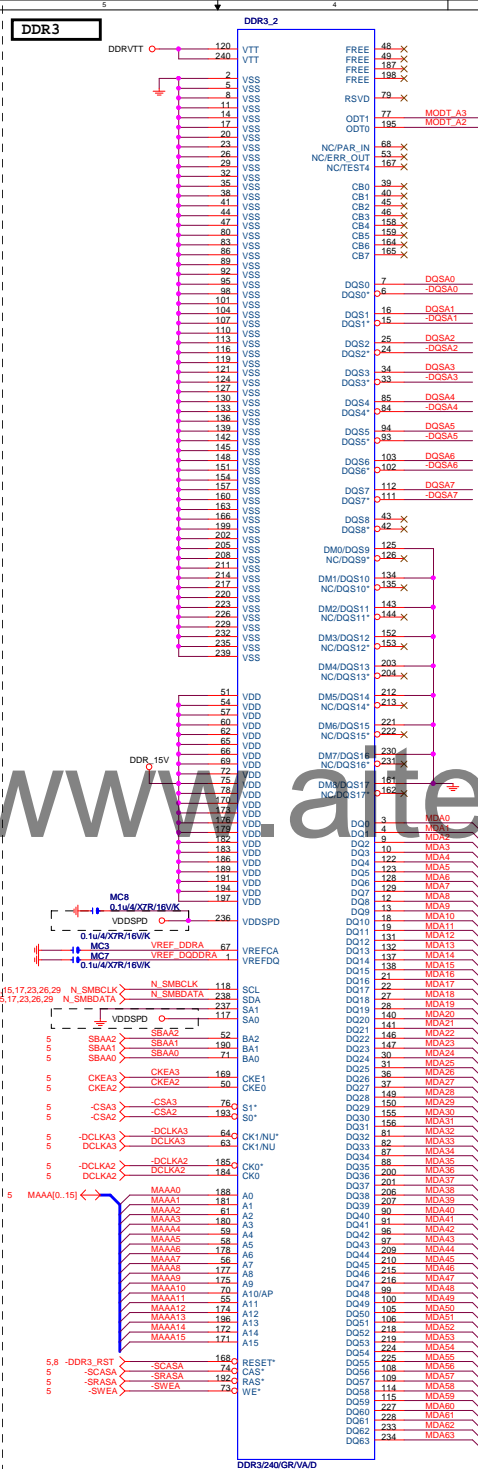


(X30)



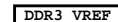
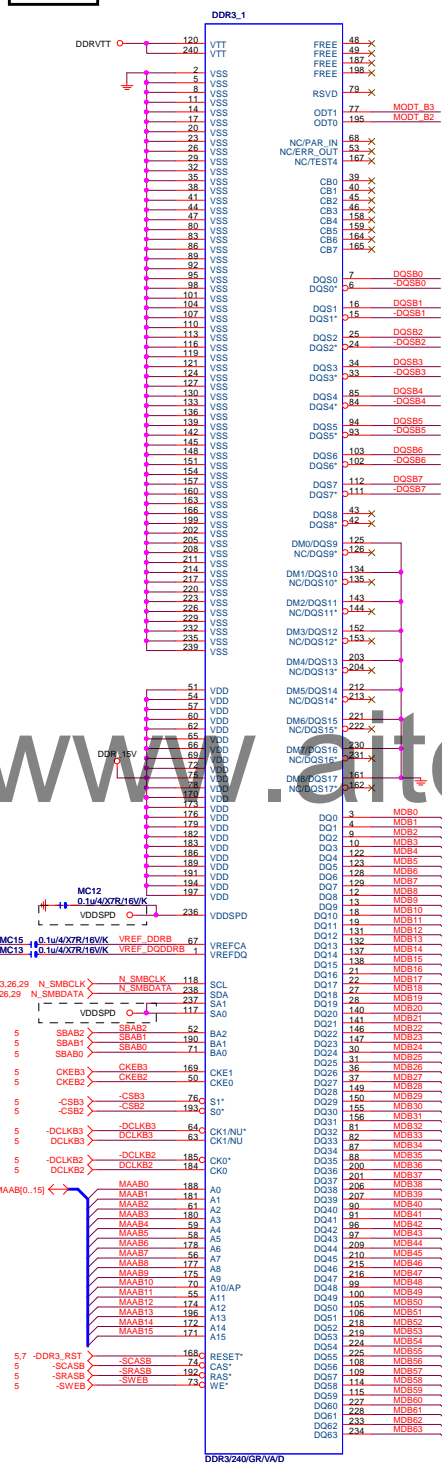
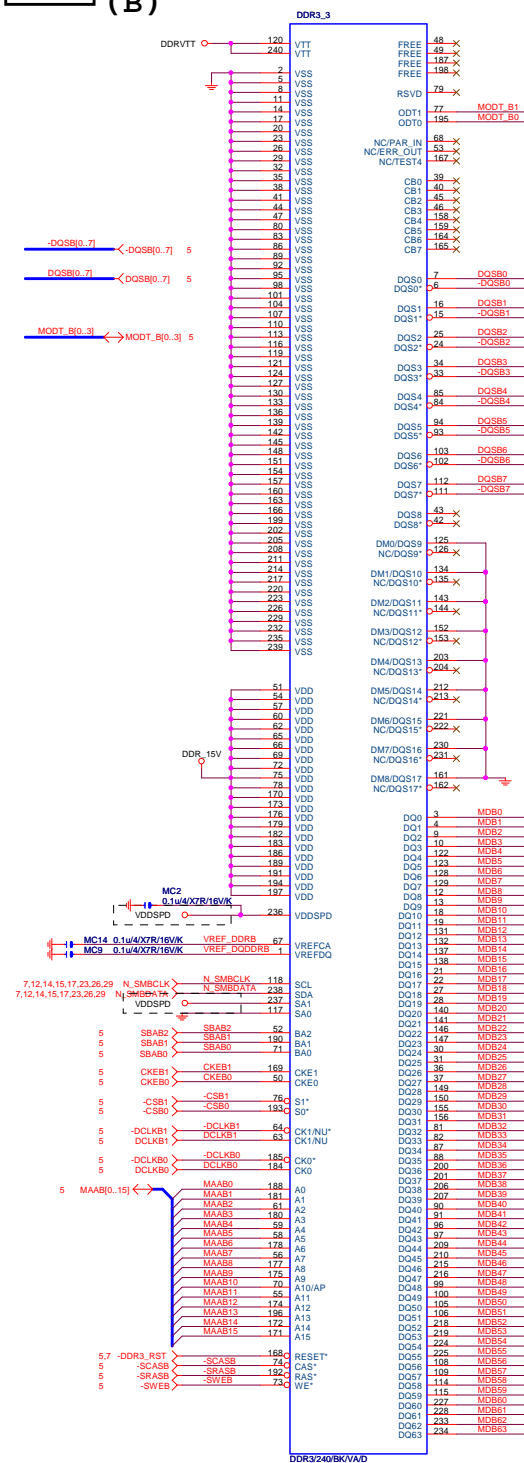
(X15)







(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-H87-HD3		1.0
Date:	Sheet	8	of 34

PCH

(B)

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

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

4 A_DMI_0TXN A_DMI_0TXP L24
4 A_DMI_0TXP A_DMI_0TXP K24
4 A_DMI_0RXN A_DMI_0RXN C20
4 A_DMI_0RXP A_DMI_0RXP B20
4 A_DMI_1TXN A_DMI_1TXN G24
4 A_DMI_1TXP A_DMI_1TXP H24
4 A_DMI_1RXN A_DMI_1RXN D24
4 A_DMI_1RXP A_DMI_1RXP B21
4 A_DMI_2TXN A_DMI_2TXN F26
4 A_DMI_2TXP A_DMI_2TXP G26
4 A_DMI_2RXN A_DMI_2RXN B22
4 A_DMI_2RXP A_DMI_2RXP C22
4 A_DMI_3TXN A_DMI_3TXN K26
4 A_DMI_3TXP A_DMI_3TXP L26
4 A_DMI_3RXN A_DMI_3RXN A24
4 A_DMI_3RXP A_DMI_3RXP B24

VCC1_5_PCH NR50 7.5K/4/1 DMI_COMP B19
NR40 7.5K/4/1 PCIE_COMP C13
29 CK_SRRCLK_PCH CK_SRRCLK_PCH G22
29 CK_SRRCLK_PCH CK_SRRCLK_PCH F22

REAR USB3.0
B85/H81:USB N/A

LAN AR8161

ITE8892 PCI
Bridge

PCIEX4 port1

PCIEX4 port2

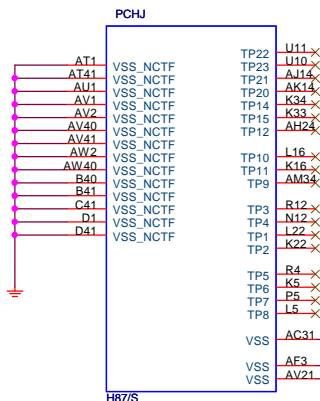
PCIEX4 port3
PCIEX1_1

H81:PCIEX 7/8X
PCIEX4 port4
PCIEX1_2

放靠近 Device & PCI-E Slot

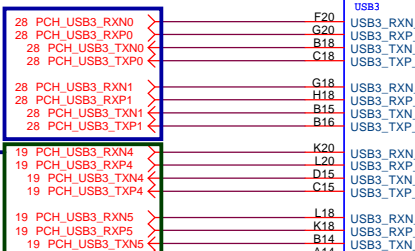
PCH

(J)



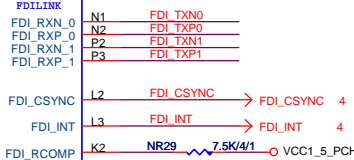
PCH

(F)



PCHF

FDILINK



FDI:12/4/5/4/12
Impedance=85 +- 17.5%

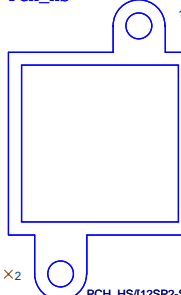
USB3.0:20/5/7/5/20 (breakout min 8/4/4/4/8) ; ONLY 3 VIAS
Impedance=85 +- 17.5%
Back Panel < 10000 MILS
Front Panel < 6000 MILS

Mount for integrated clock Generation Mode

CK_SRRCLK_PCH NR89 8.2K/4
CK_SRRCLK_PCH NR88 8.2K/4
CK_DOTCLK NR92 8.2K/4
CK_DOTCLK NR91 8.2K/4
NR92 short to GND in non graphic SKU

PCH H/S

PCH_HS



USB TABLE

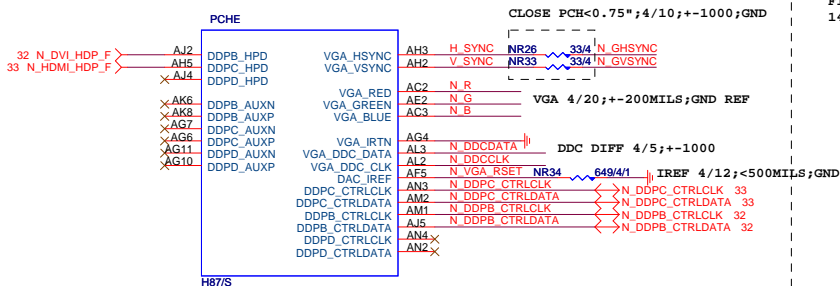
OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)

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

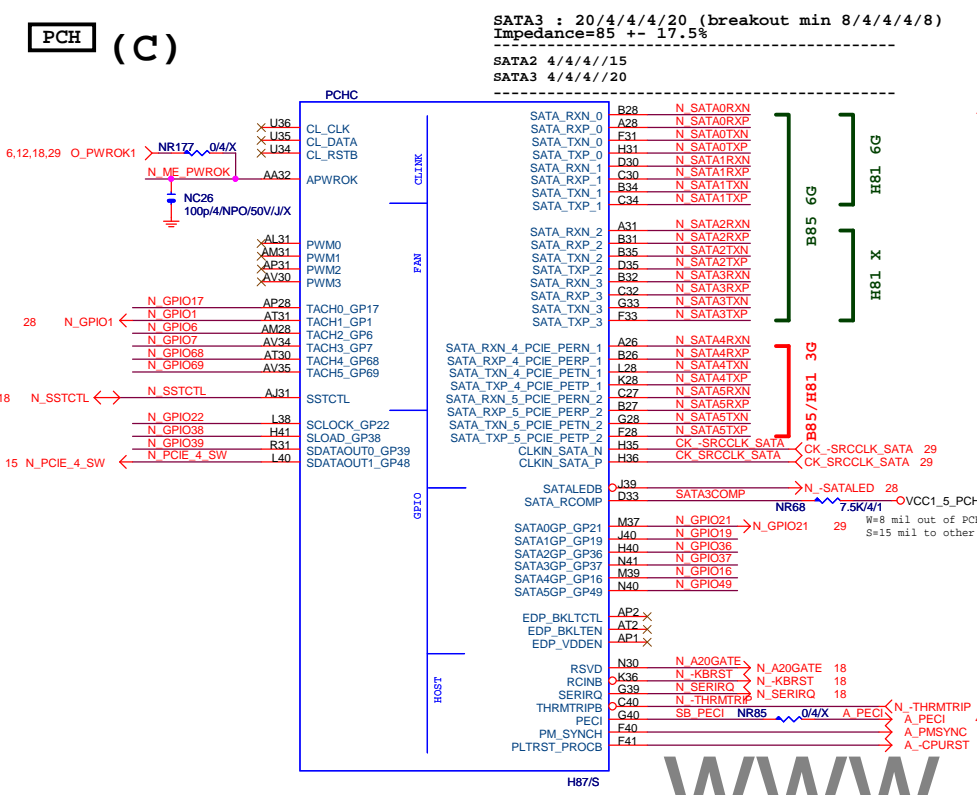
Gigabyte Technology

Title PCH FDI,DMI,USB ,PCIE			
Size Custom	Document Number GA-H87-HD3		Rev 1.02
Date: Friday, March 22, 2013	Sheet 9	of 34	

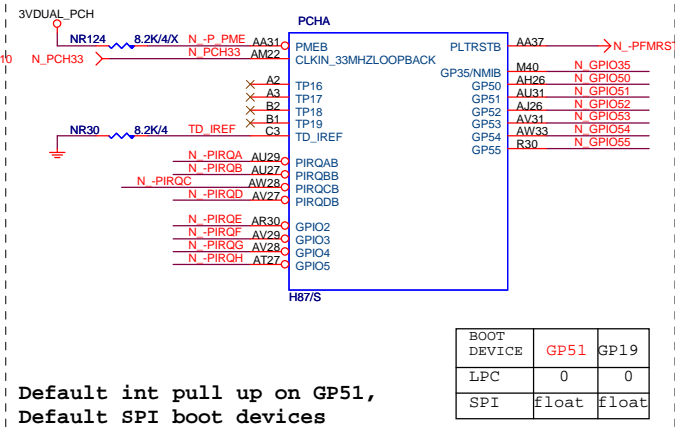
PCH (E)



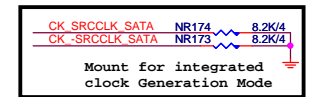
PCH (C)



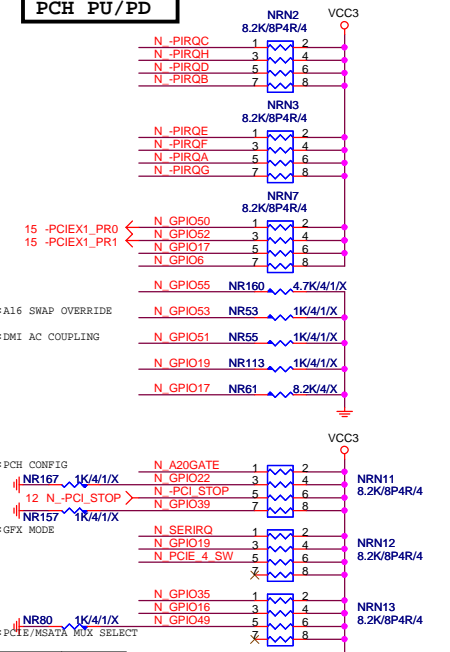
PCH (A)



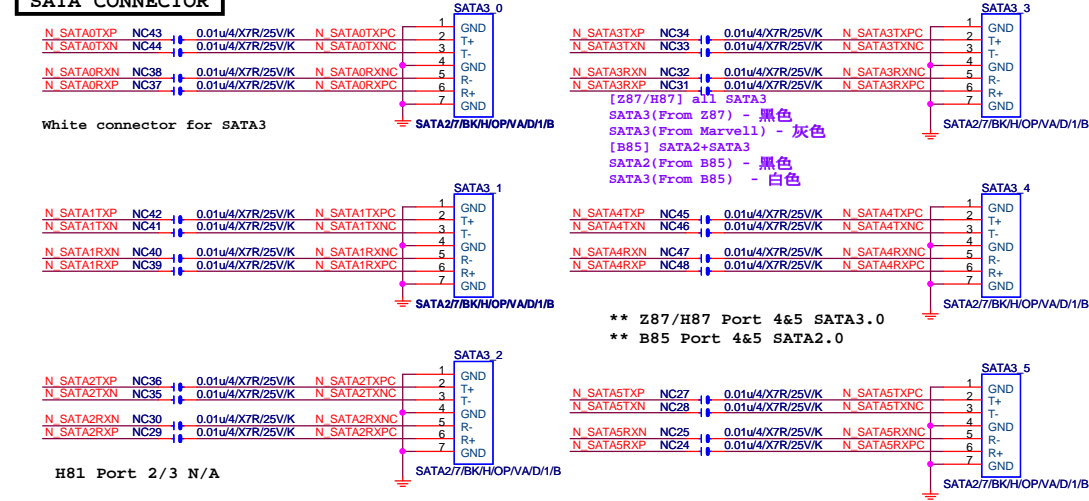
PCH CLK PD



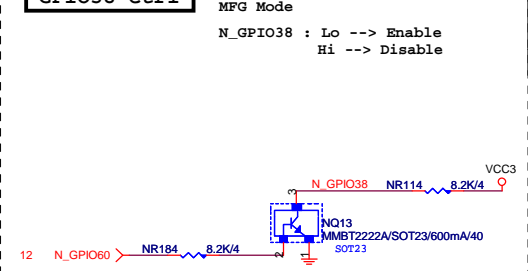
PCH PU/PD



SATA CONNECTOR



GPIO38 Ctrl



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

soft strap	GP16	GP49
0	pcie1	pcie2
1	sata4	sata5

N_GPIO36:DMI RX TERMINATION
NR84 1K/4/1/X
N_GPIO69:SV DETECT
NR66 1K/4/1/X

1111

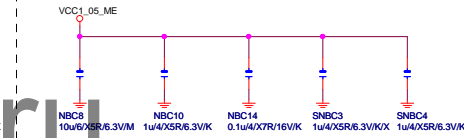
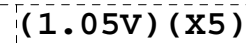
Gigabyte Technology

Title			
PCH HOST , SATA, PCI			
Size	Document Number	Rev	
Custom	GA-H87-HD3	1.02	
Date:	Friday, March 22, 2013	Sheet	11 of 34

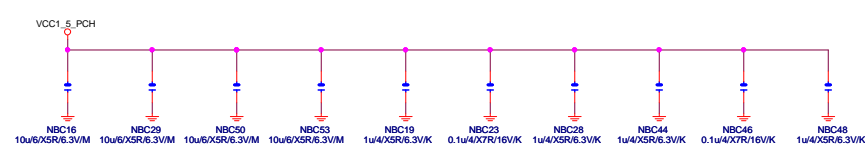
PCH (I)



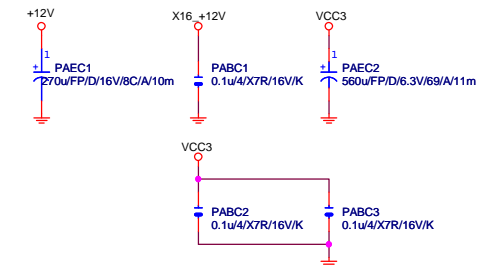
SHT PWR



(1.05V)(x2) (3.3V) (x2)

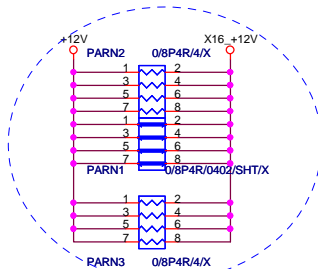


PCIEX16 CAP



PCIEX16	PROTECT	SHT
---------	---------	-----

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



PCIEX16 AC CAP

PA EXP TXP0	PAC5	0.22u4/XSR/6.3VK	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/XSR/6.3VK	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/XSR/6.3VK	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/XSR/6.3VK	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/XSR/6.3VK	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/XSR/6.3VK	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u4/XSR/6.3VK	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u4/XSR/6.3VK	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u4/XSR/6.3VK	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u4/XSR/6.3VK	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u4/XSR/6.3VK	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u4/XSR/6.3VK	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u4/XSR/6.3VK	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u4/XSR/6.3VK	PA EXP TXN6 C
PA EXP TXP7	PAC18	0.22u4/XSR/6.3VK	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22u4/XSR/6.3VK	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u4/XSR/6.3VK	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u4/XSR/6.3VK	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u4/XSR/6.3VK	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u4/XSR/6.3VK	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u4/XSR/6.3VK	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u4/XSR/6.3VK	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u4/XSR/6.3VK	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u4/XSR/6.3VK	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u4/XSR/6.3VK	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u4/XSR/6.3VK	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u4/XSR/6.3VK	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u4/XSR/6.3VK	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u4/XSR/6.3VK	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u4/XSR/6.3VK	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u4/XSR/6.3VK	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u4/XSR/6.3VK	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) BANDWITH=2.5GHz*(8b/10b)X2=4Gb/s=500MB/s

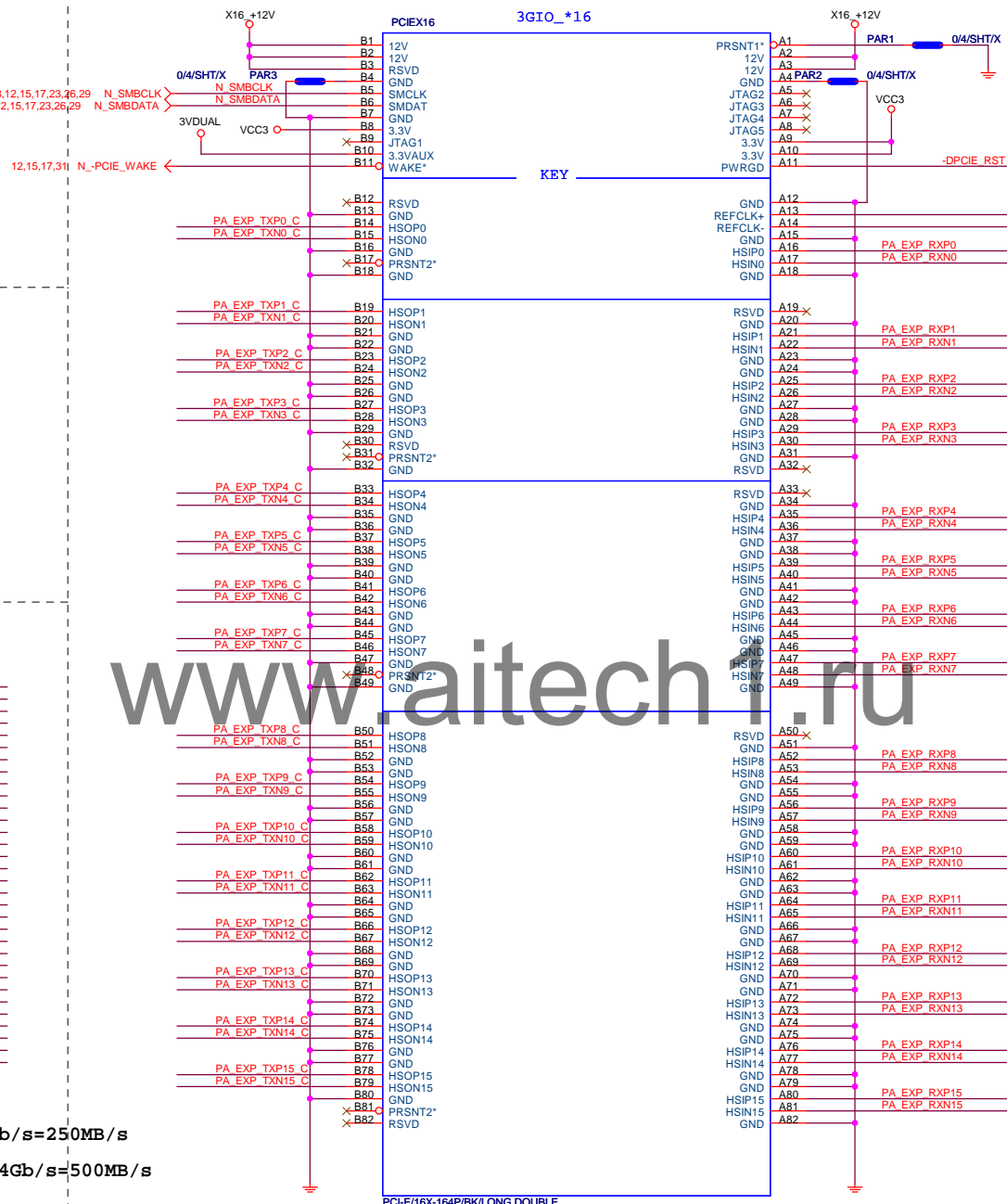
PCE-E X16(單向) BANDWIDTH=2.5GHz*(8b/10b)X16=32Gb/s=4GB/s

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

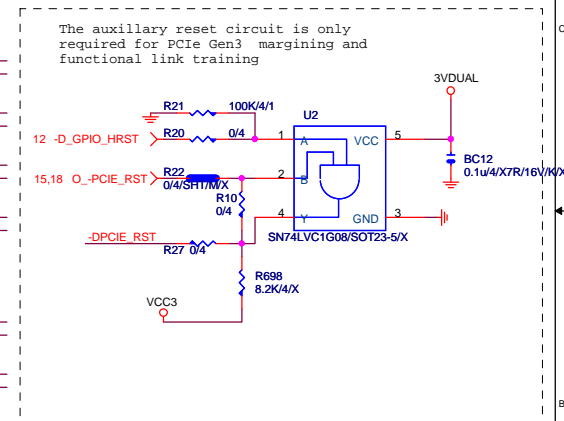
PCI-E REV:2.0--> 5GHZ

PCIEX16 SLOT

PCIESLOT-164DN-C



PCI-E/16X-164P/BK/I QNG DQUBI F

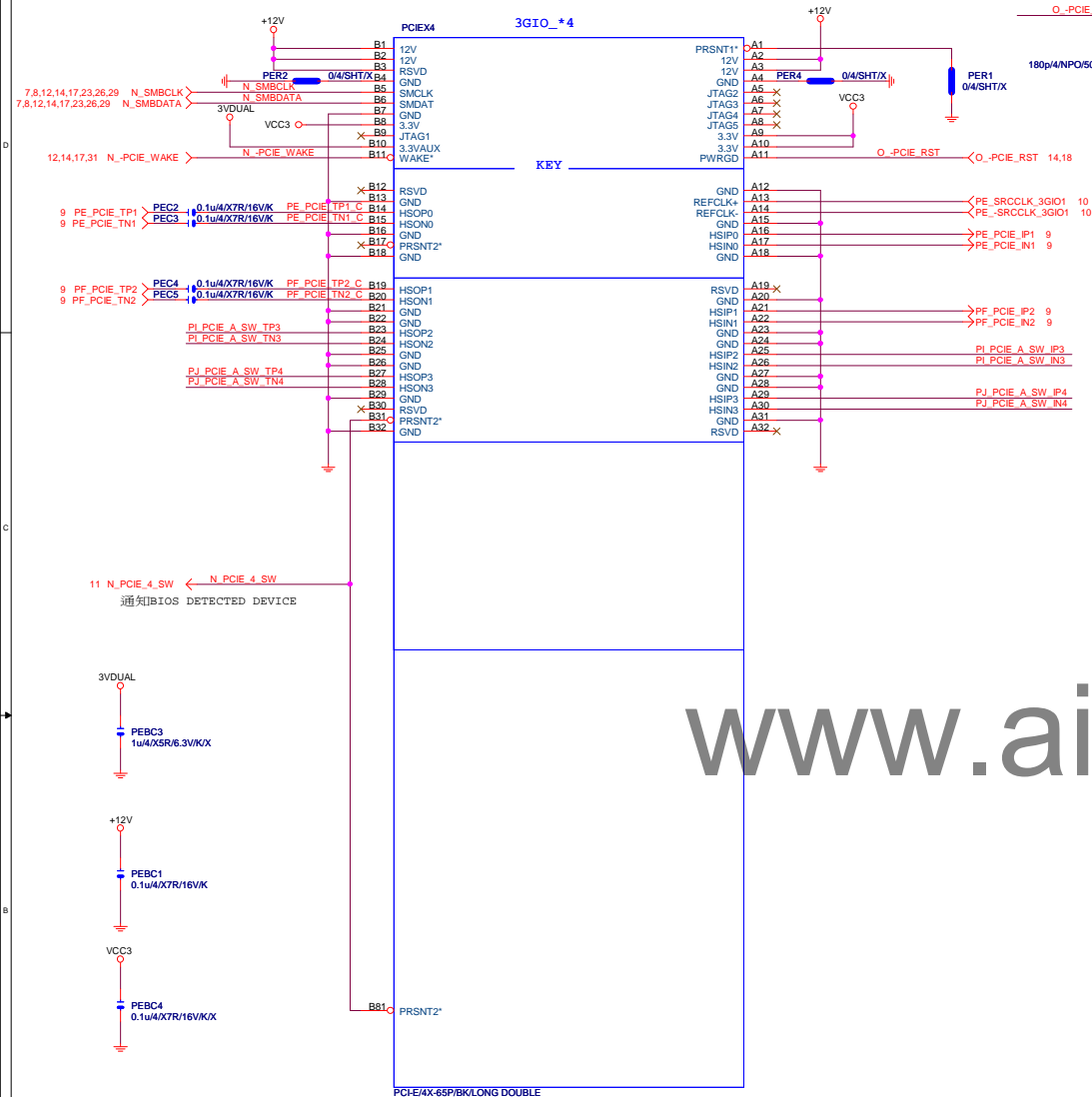


PCIEX16:16/5/5/5/16

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

Gigabyte Technology			
Title PCI EXPRESS * 16			
Size Custom	Document Number GA-H87-HD3	Rev 1.0	
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PCIEX4 SLOT

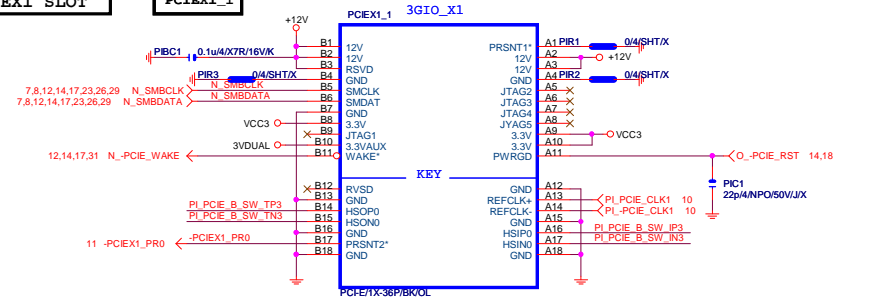


11 N_PCIE_4_SW ← N_PCIE_4_SW
通知BIOS DETECTED DEVICE

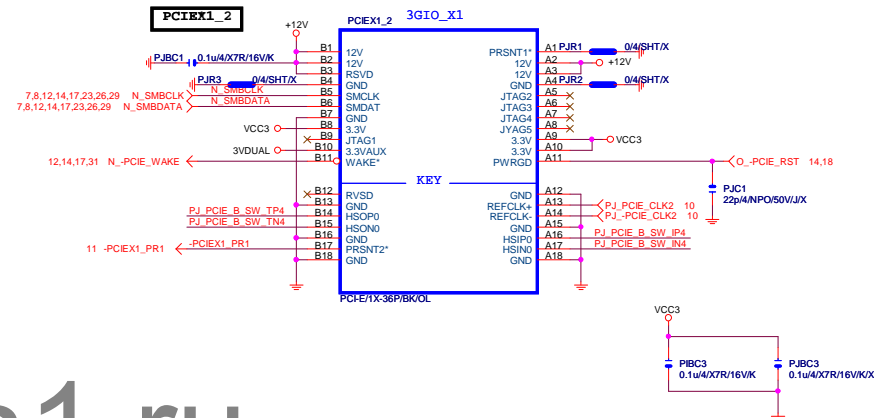
www.aitech1.ru

PCIEX1 SLOT

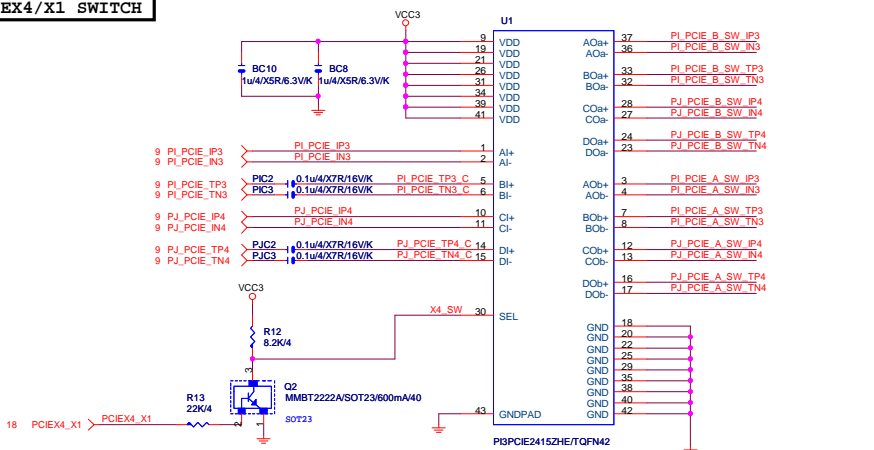
PCIEX1_1



PCIEX1_2



PCIEX4/X1 SWITCH

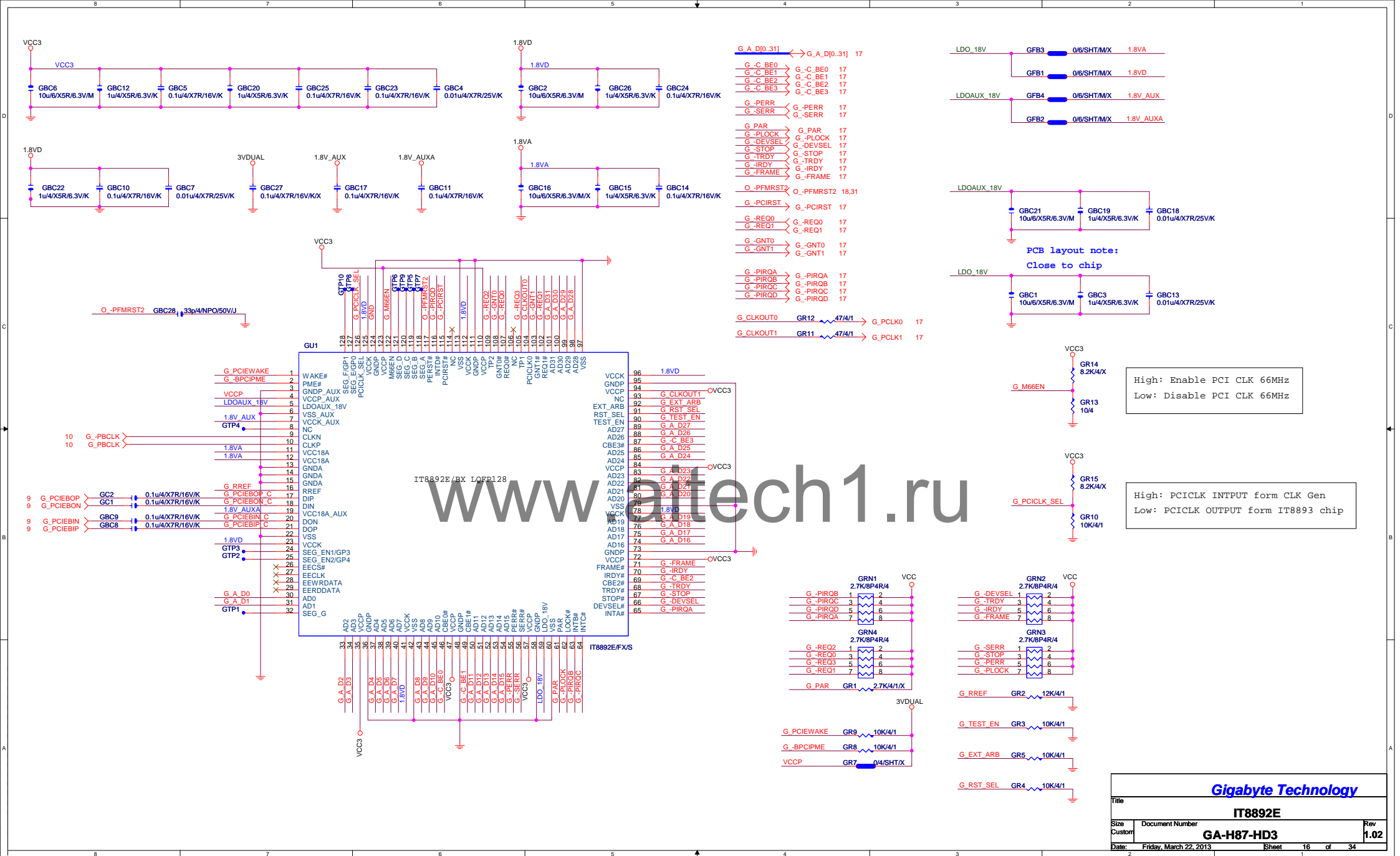


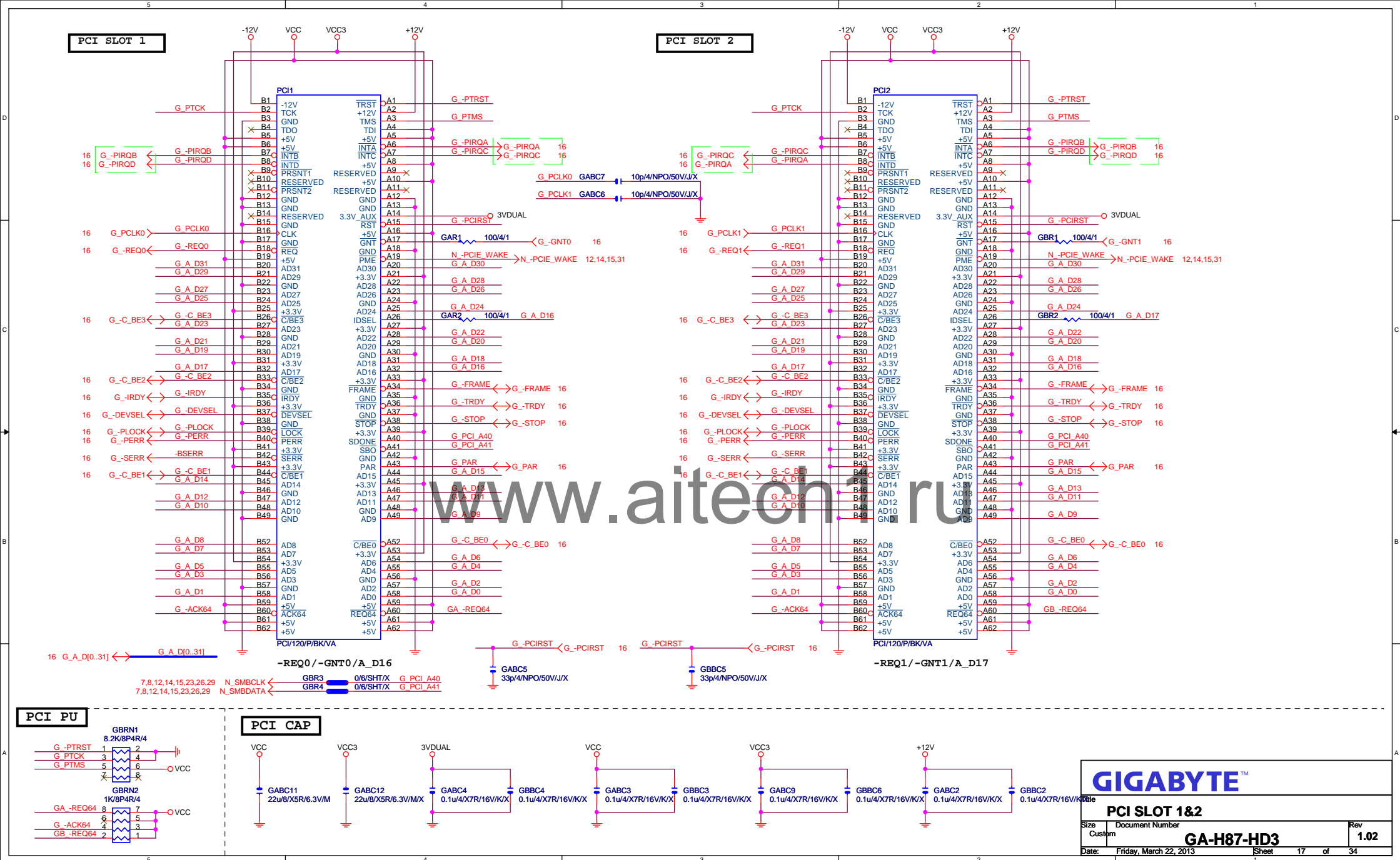
Function	SEL
xI--> x0A	L;PCIEX4 SLOT-->X1
xI--> x0B	H;PCIEX4 SLOT-->X4

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

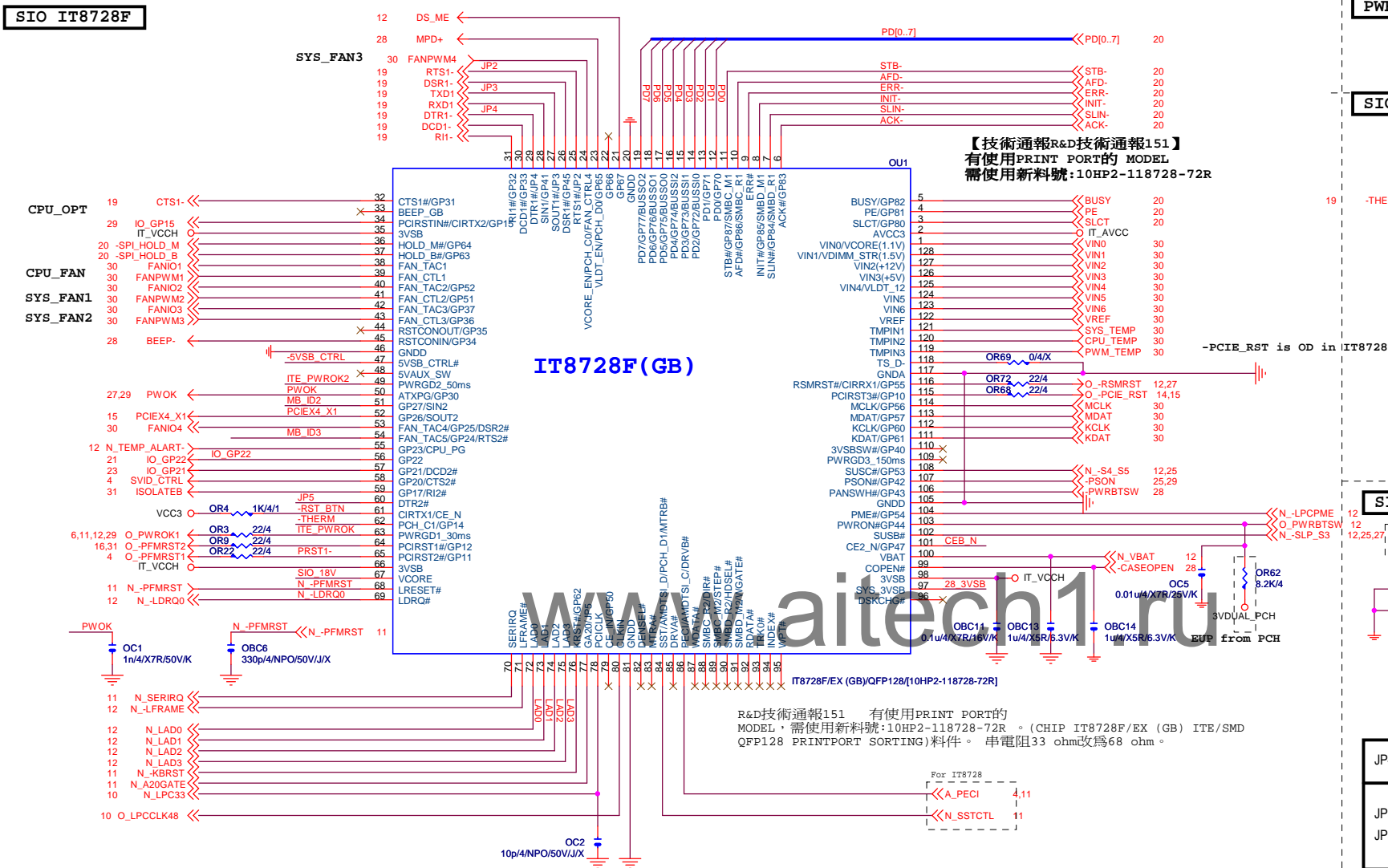
Gigabyte Technology

Title	PCIE X1 1,2	Rev	1.02
Size	Document Number		
Custom	GA-H87-HD3		
Date:	Friday, March 22, 2015	Sheet	15 of 34

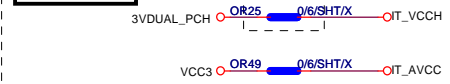




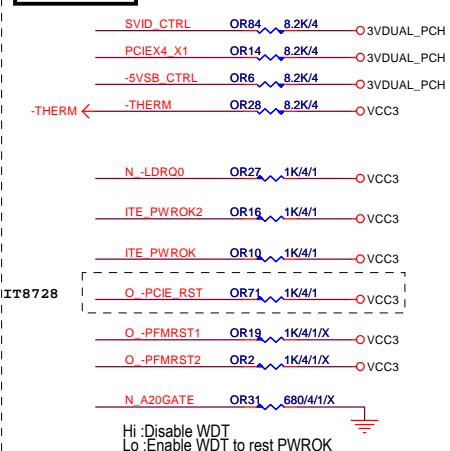
SIO IT8728F



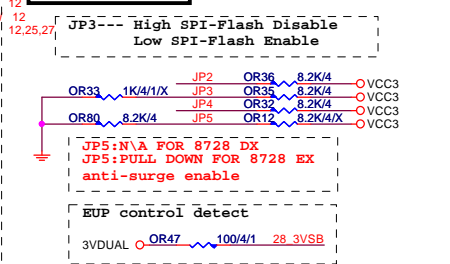
PWR SHT



SIO PU



SIO STRAP

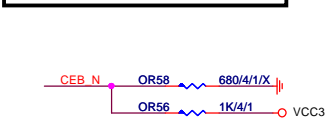


JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
	0 1	The default value of EC Index 63h/6Bh/73h is FFh.
JP5	0 1	The default value of EC Index 63h/6Bh/73h is 00h.
	0 0	The default value of EC Index 63h/6Bh/73h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

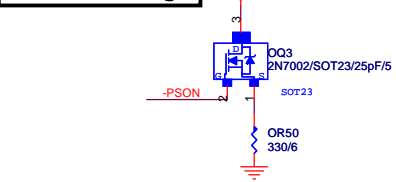
IT8728F NOTE

Pin	Function
PIN121	VCORE_EN/PCH_C0
PIN120	VLDEN/PCH_D0
PIN19	ATXPG
PIN31	PCH_C1
PIN53	SST/AMDTSL_D/MTRB#/PCH_D1
PIN55	PECI/AMDTSL_C/DRV#
PIN66	SYS_3VSB
PIN70	GP47
PIN95	VIN2(VCC5)
PIN96	VIN1(VCC12)
PIN97	VIN1/VDIMM_STR(1.5V)
PIN98	VIN0/VCORE(1.1V)/NC

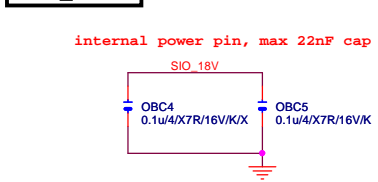
DUAL BIOS OPT STRAP



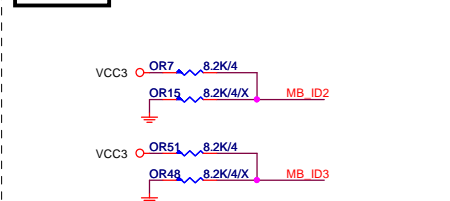
Power leakage



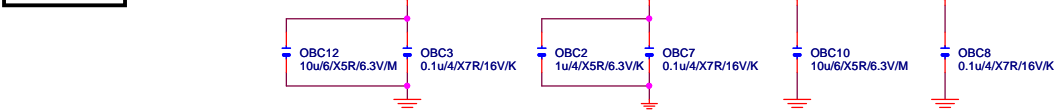
SIO_18V



MB ID

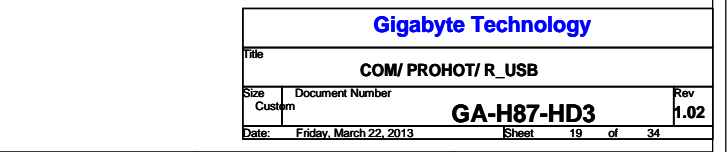
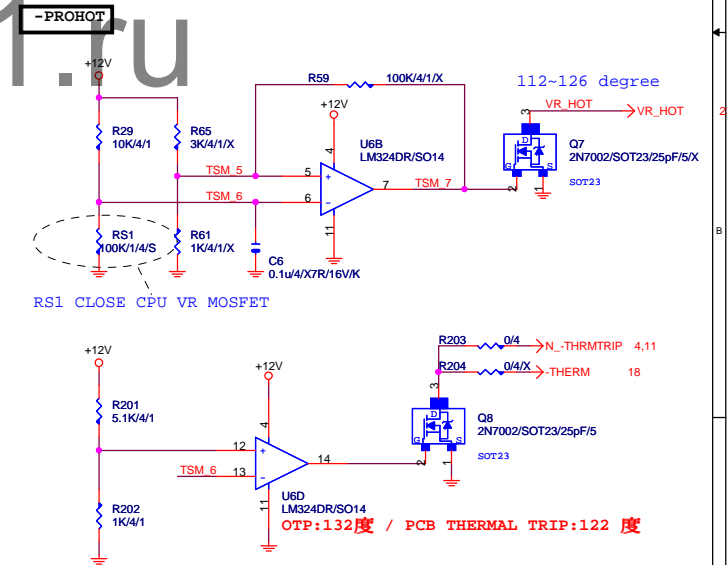
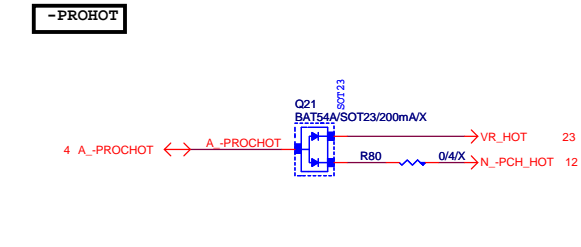
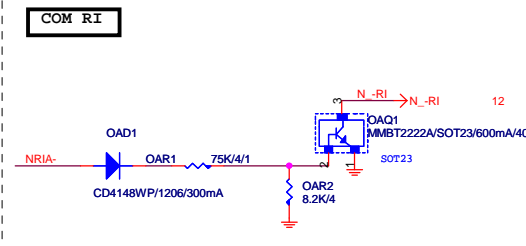


SIO CAP

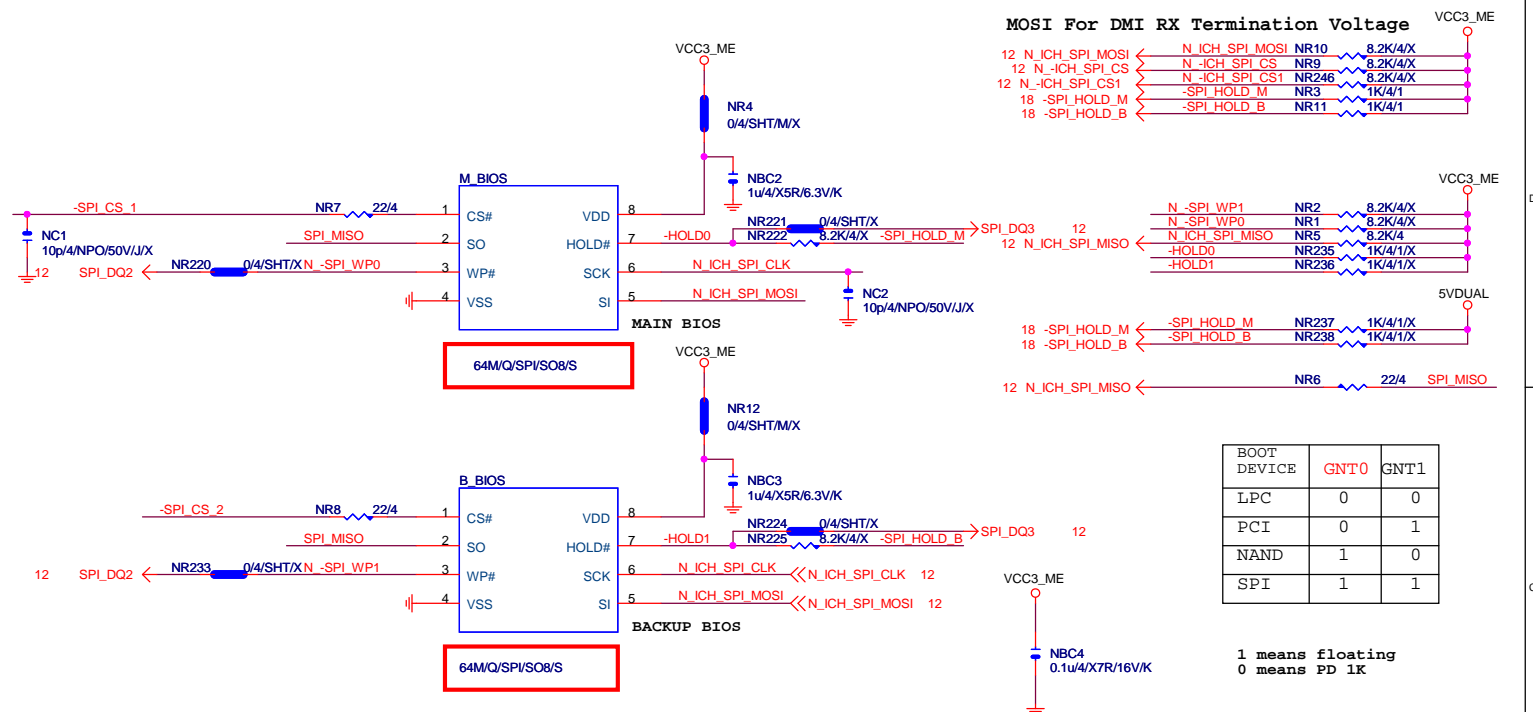
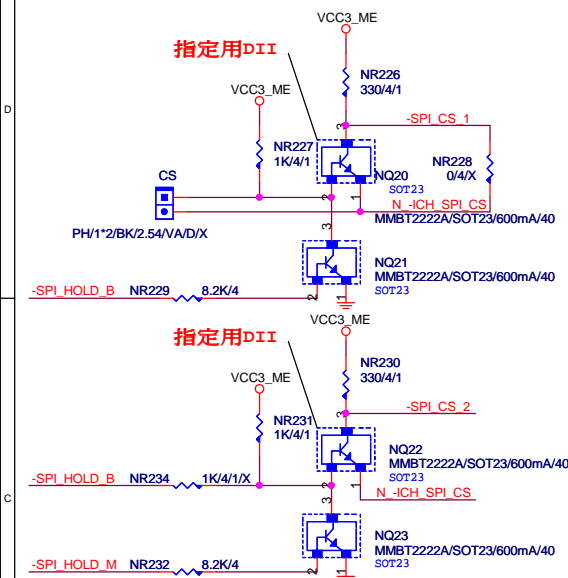


Gigabyte Technology

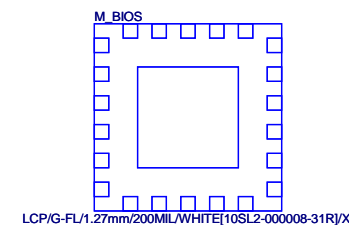
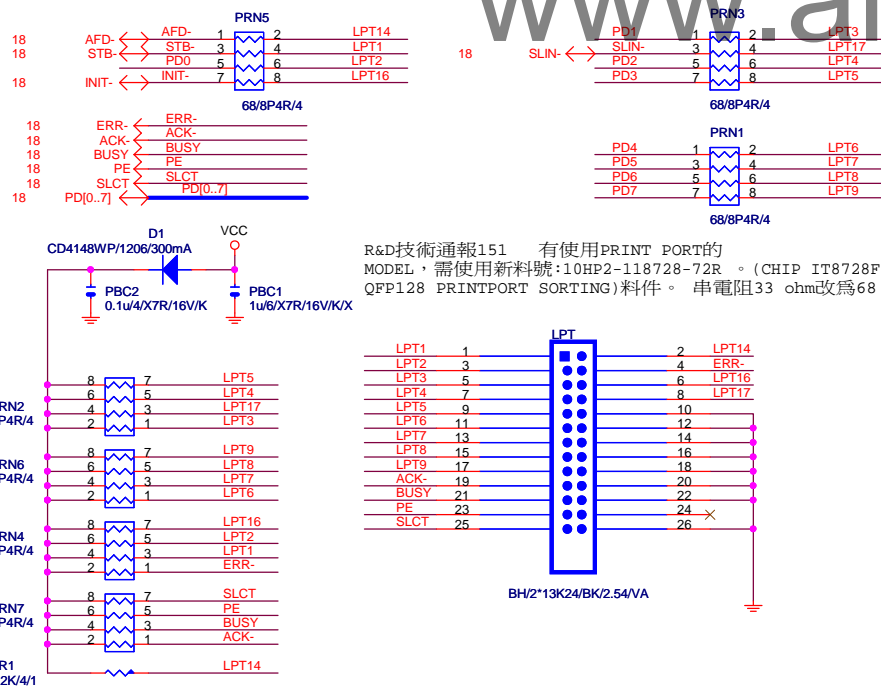
ITE 8728 LPC IO		
Size B	Document Number	Rev 1.02
GA-H87-HD3		
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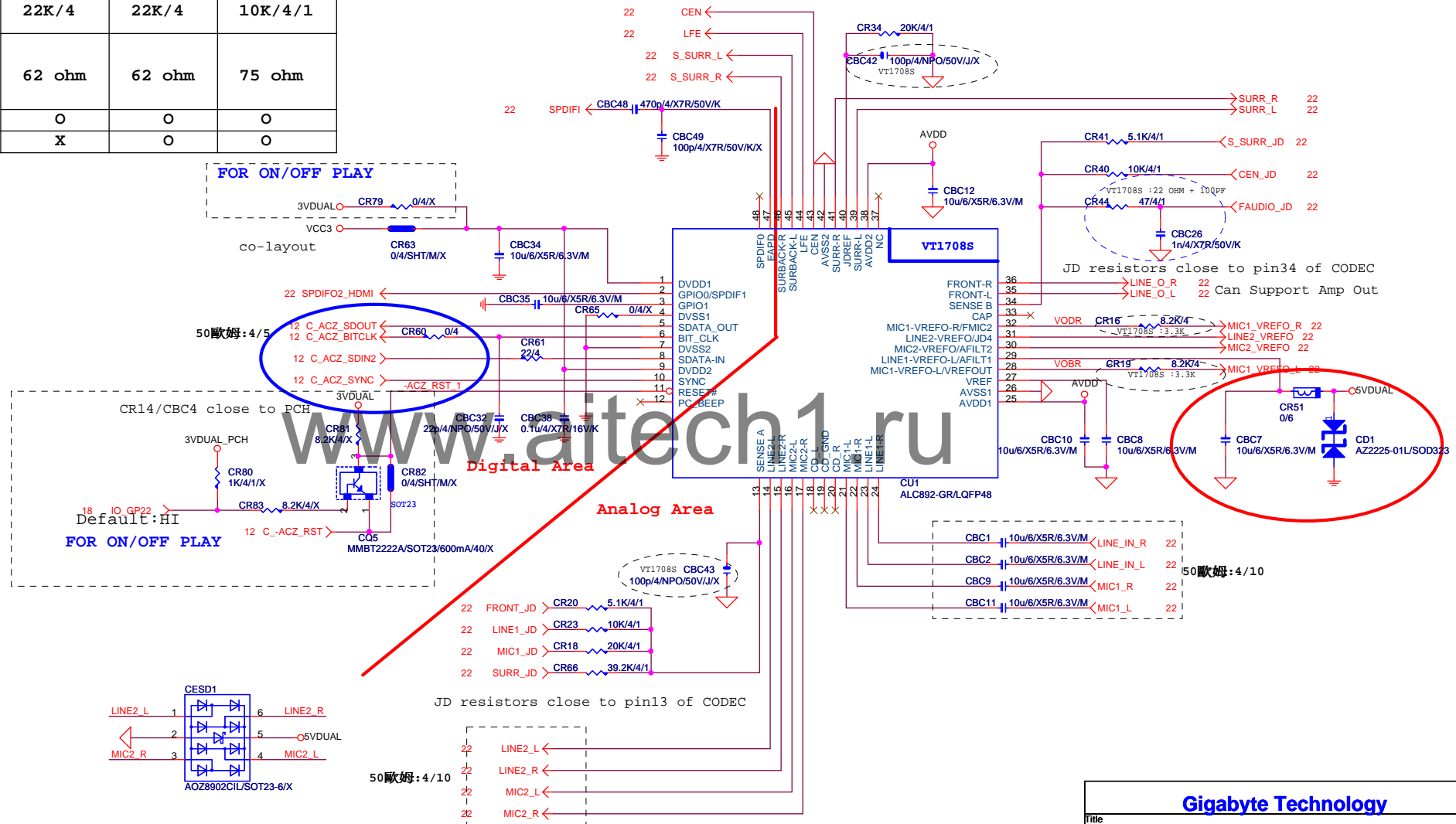
DUAL BIOS



LPT PORT



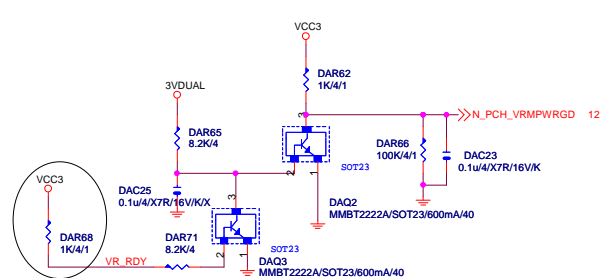
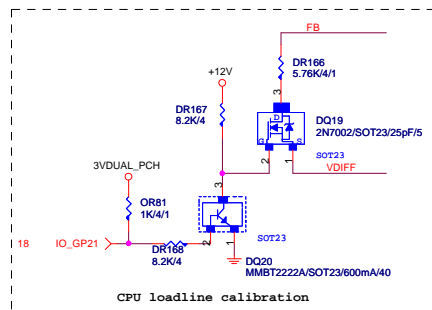
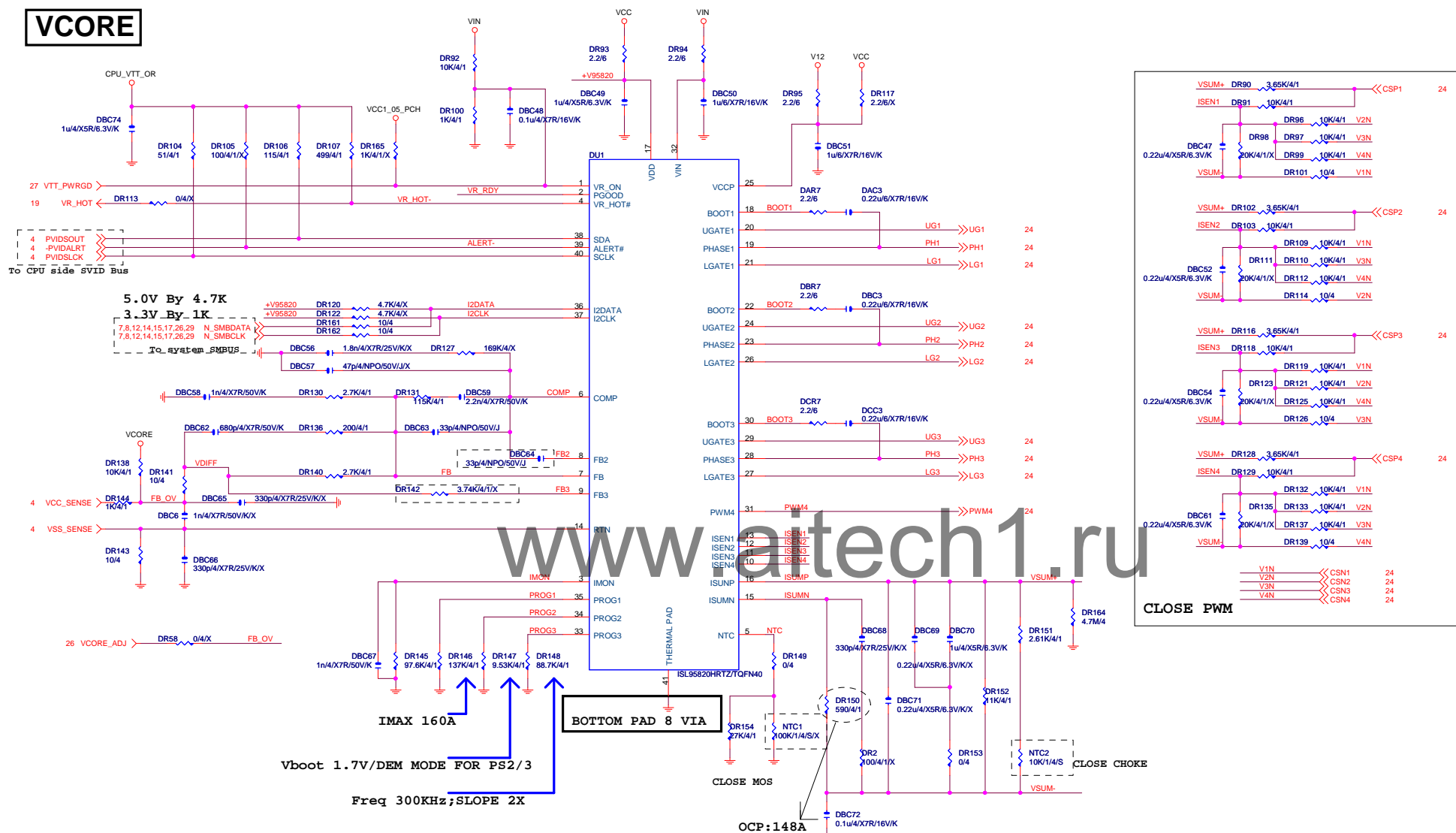
	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR16/CR19 CR52/CR56/CR10/CR9	8.2K/4	8.2K/4	3.3K/4/1
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76	62 ohm	62 ohm	75 ohm
CR51/CD1/CBC7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



Gigabyte Technology

Title	HD AUDIO ALC892	
Size Custom	Document Number	GA-H87-HD3
Date:	Friday, March 22, 2013	Sheet 21 of 34
		Rev 1.02

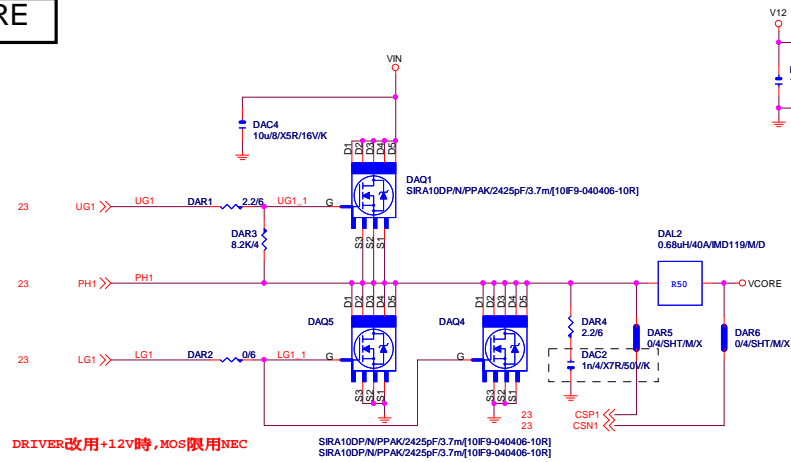
VCORE



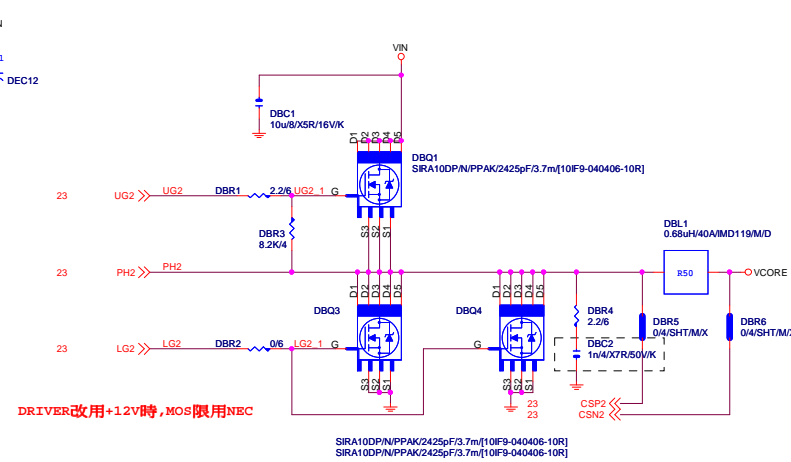
Gigabyte Technology			
Title VCORE_ ISL95820			
Size	Document Number		Rev
Custom	GA-H87-HD3		1
Date:	Friday, March 22, 2013	Sheet	23 of 34

VCORE

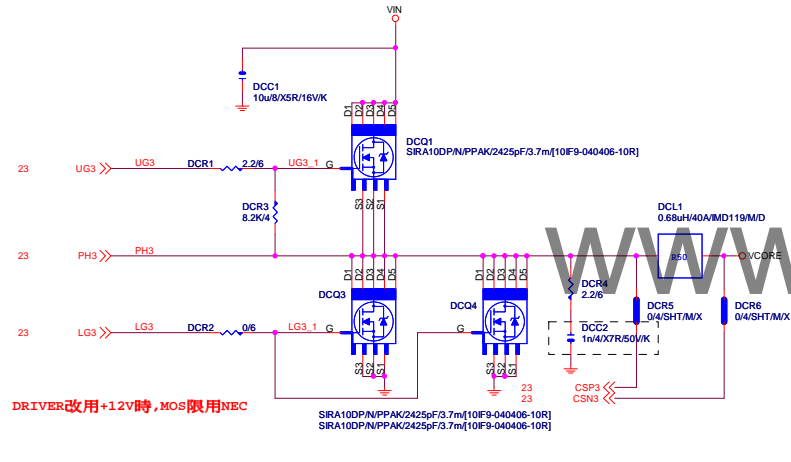
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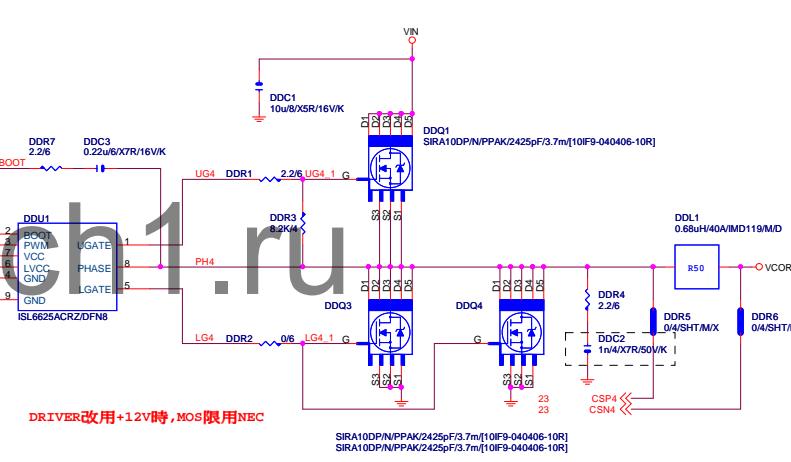
[2]



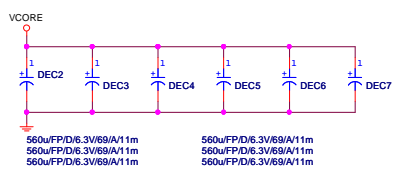
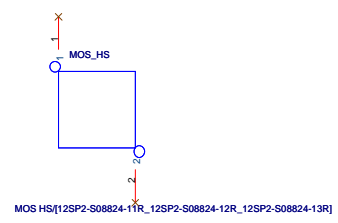
[3]



[4]

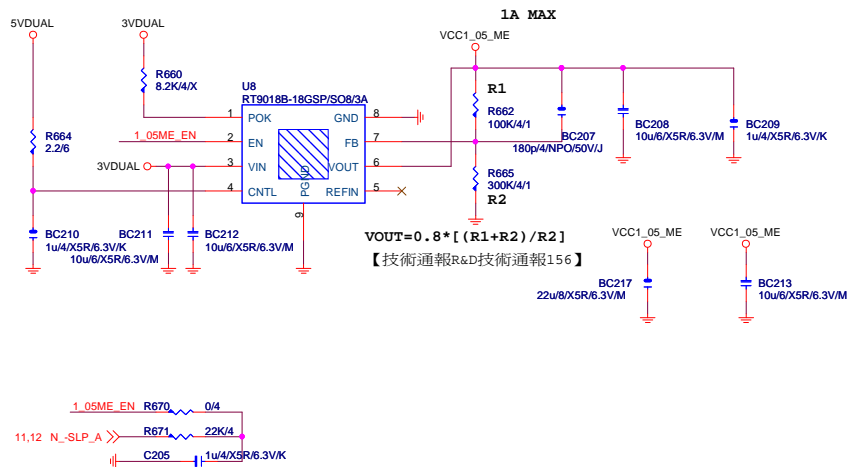


MOSFET HEATSINK

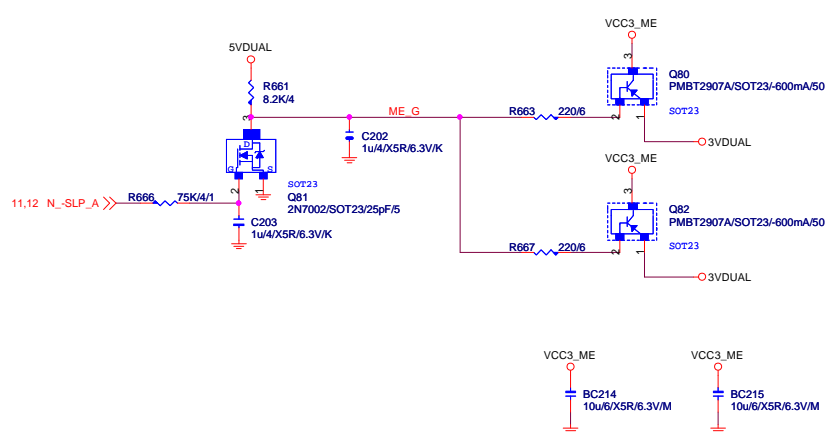


Gigabyte Technology			
Title	ISL95820_2		
Size	Document Number	GA-H87-HD3	
Custom			Rev 1.02
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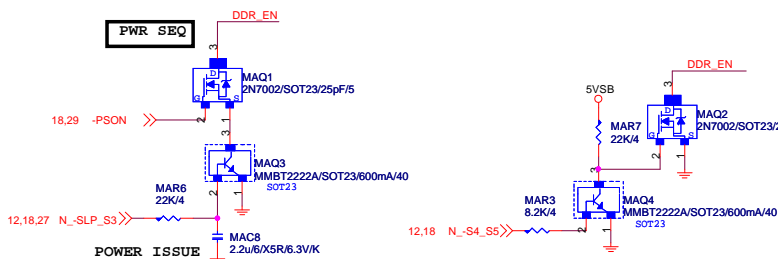
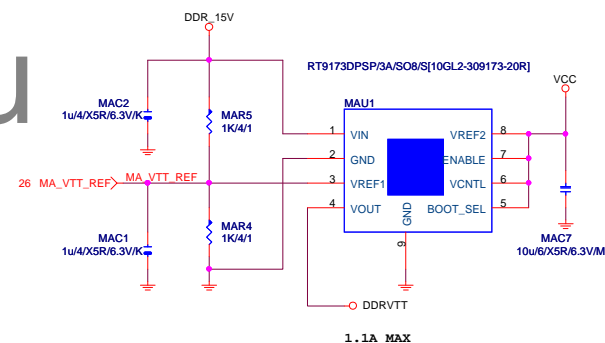
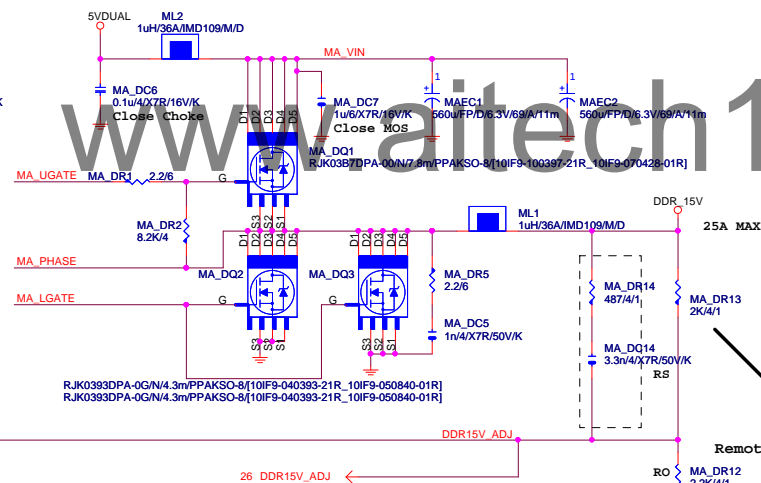
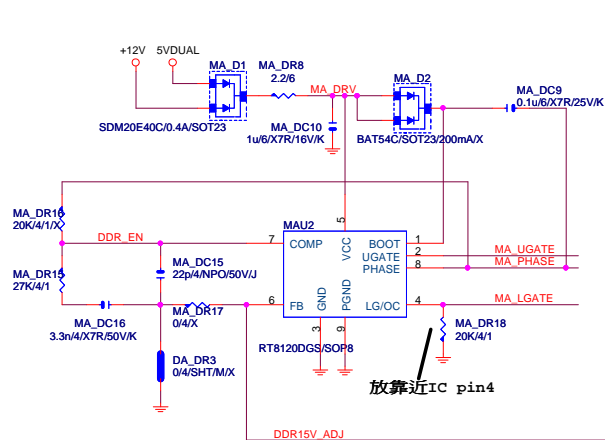
VCC1_05_ME



VCC3_ME



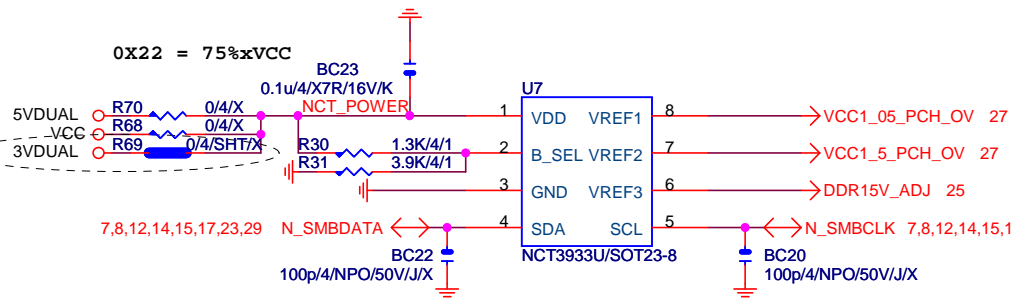
DDR_15V



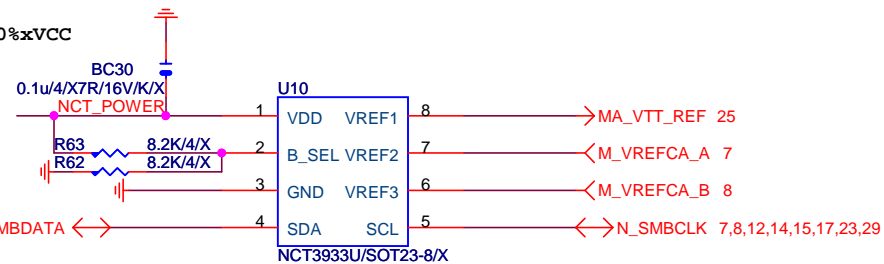
VIN=5V, VOUT=1.5V, IOUT=25A, PHASE=1 1.527V
IRMS=11.45A
560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85°C), 1(105°C)
VIN Ripple current=4.7X1.7=7.99A(85°C)
-->故固態電容須2X7.99=15.98>11.45A

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]

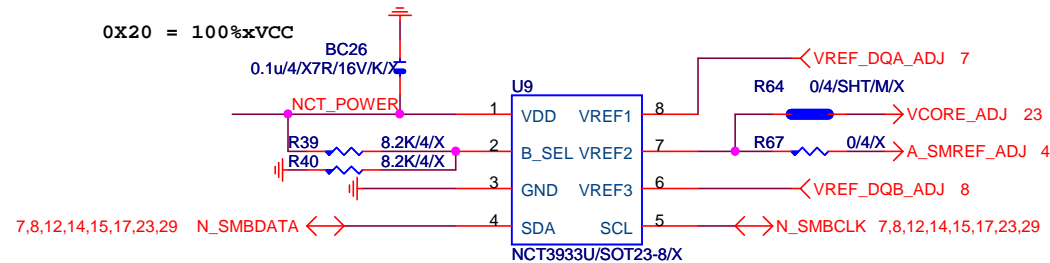
OVER VOLTAGE



0X2A = 0%xVCC



0X20 = 100%xVCC

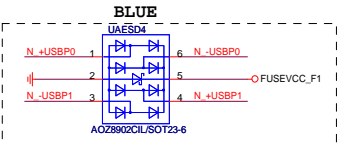
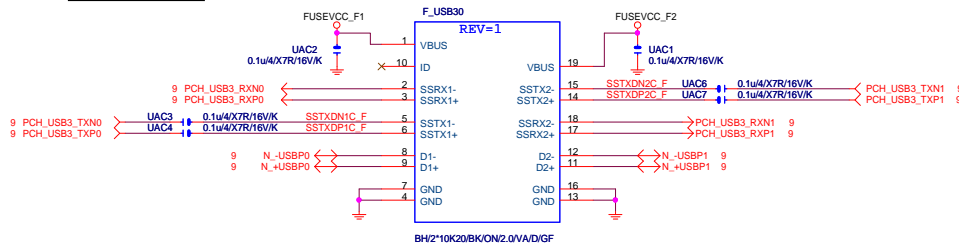


NCT3933	0X2A	0X20	0X22
VREF1	DDRVTT	VREF_DDRA_DQ	PCH Core
VREF2	VREF_DDRA_CA	N/A	VCC1_5_PCH
VREF3	VREF_DDRA_CA	VREF_DDRB_DQ	SMREF

Gigabyte Technology

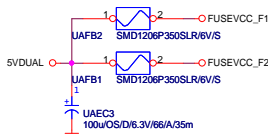
Title		
CPU CORE VR-2		
Size	Document Number	Rev
Custom	GA-H87-HD3	1.02
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Front USB3.0

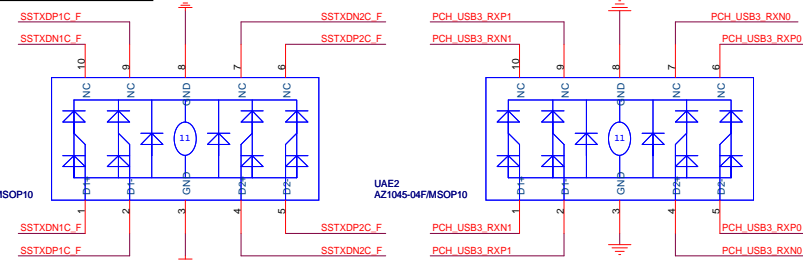


Close to connector

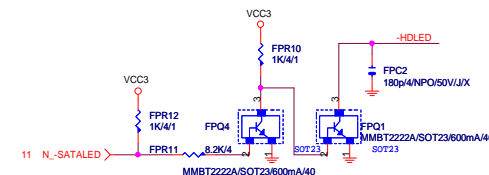
F_USB30 PWR



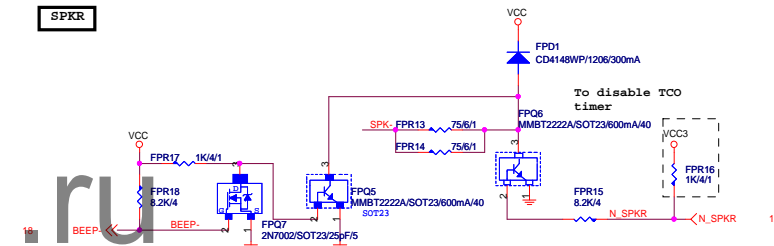
F_USB30 ESD PROTECT



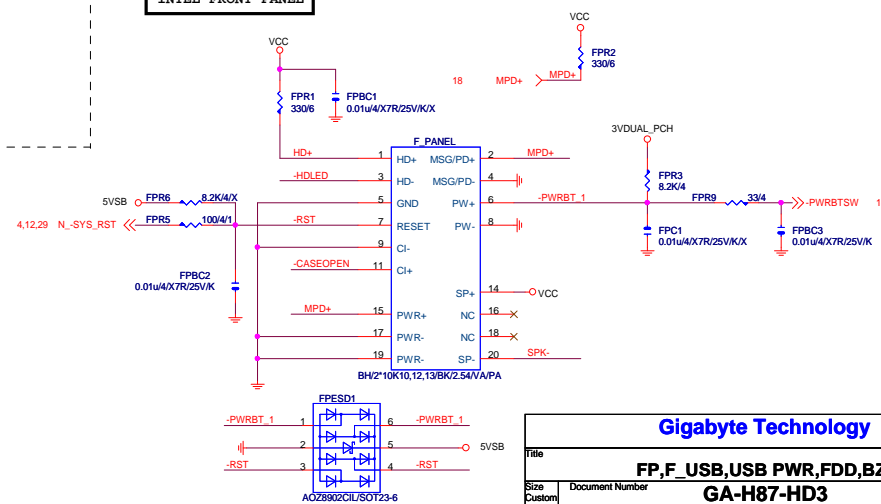
SATA LED



SPKR

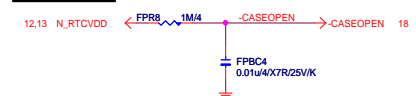


INTEL FRONT PANEL

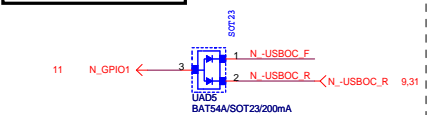


Gigabyte Technology			
Title		FP,F_USB,USB PWR,FDD,BZ	
Size		Document Number	
Custom		GA-H87-HD3	
Date:		Friday, March 22, 2013	
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Rev		1.02	

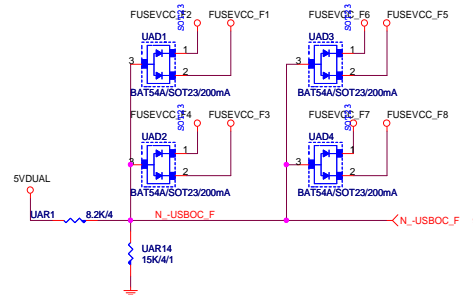
CASE OPEN



F_USB POWER PROTECT

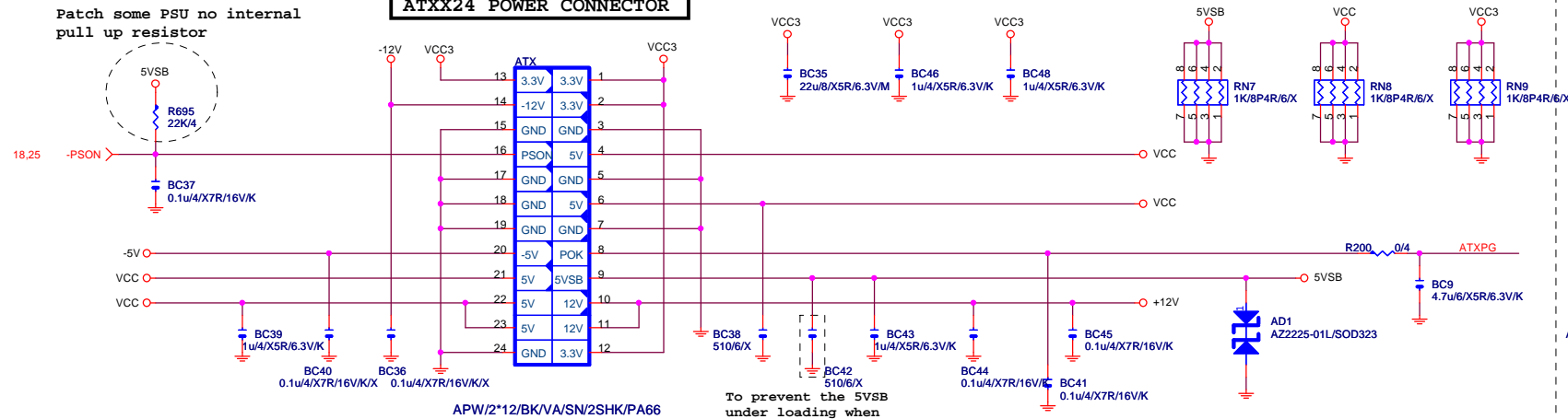


~USBOC_F



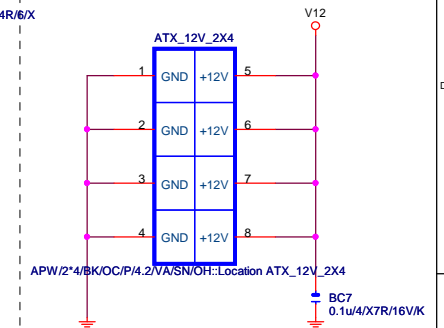
Patch some PSU no internal pull up resistor

ATXX24 POWER CONNECTOR

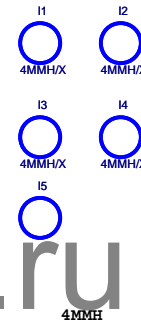
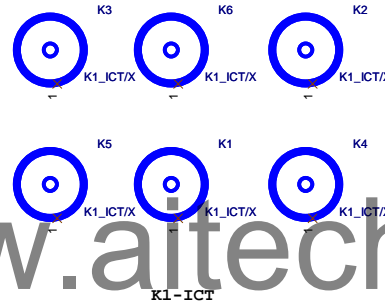
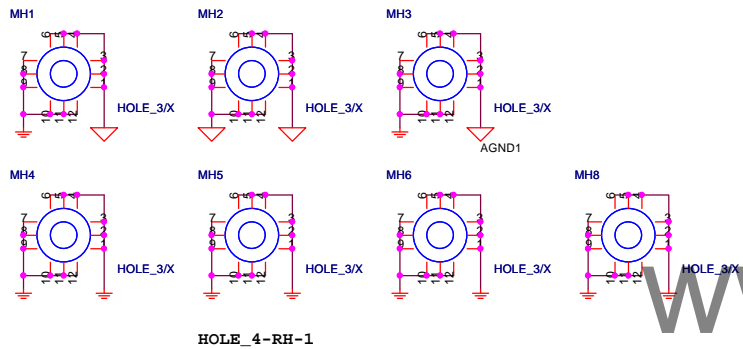


APW/2*12/BK/VA/SN/2SHK/PA66

ATXX4 POWER CONNECTOR

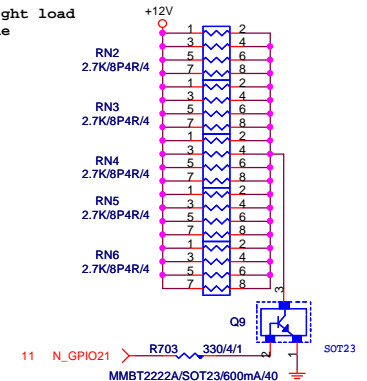


APW/2*4/BK/OC/PA/2/VA/SN/OH:Location ATX_12V_2X4



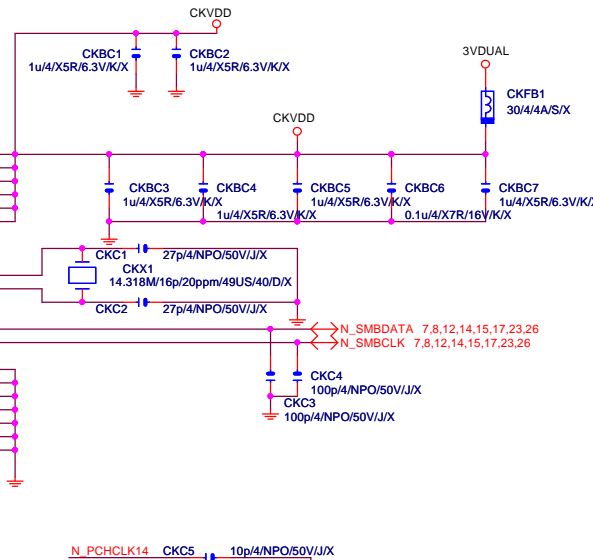
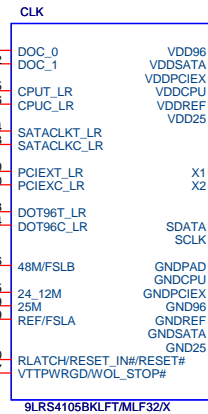
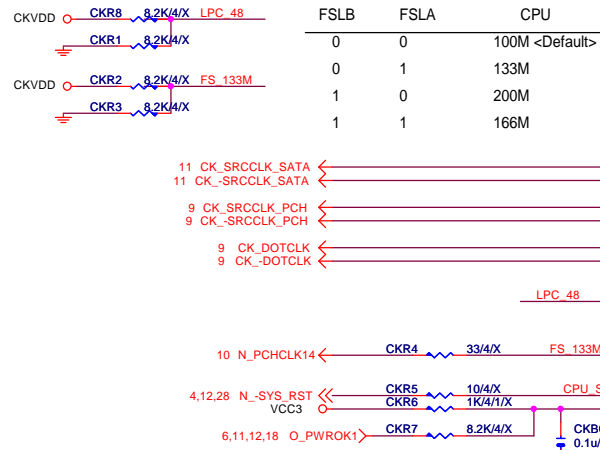
【技術通報R&D技術通報153】

To fix 12V light load abnormal issue



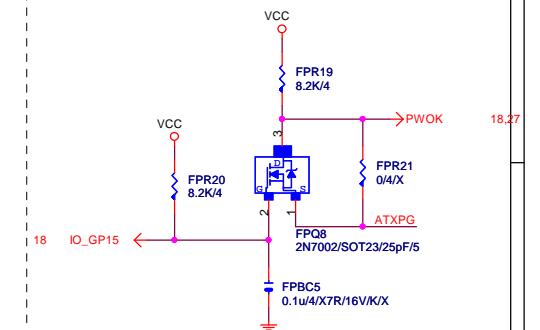
CLK GEN

CPU Frequency Selection



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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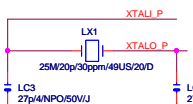
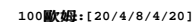
[illegible][illegible]

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

[illegible][illegible][illegible]

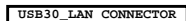
Title			
HWM,KB/MS, FAN CTRL			
Size	Document Number	Rev	
Custom	GA-H87-HD3	1.02	
Date:	Friday, March 22, 2013	Sheet	30 of 34

LAN:INTEL I217



80歐姐:[15/5/5/5/15]

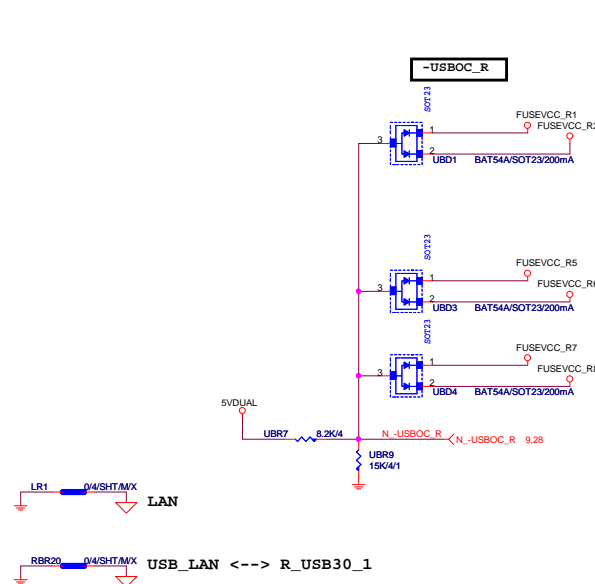
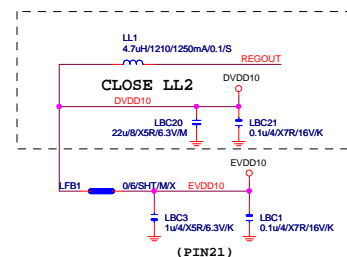
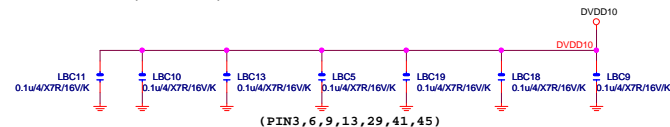
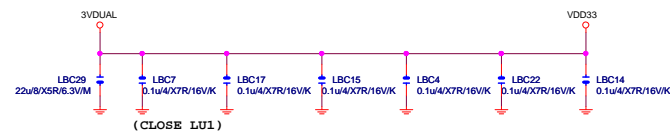
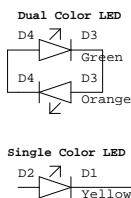
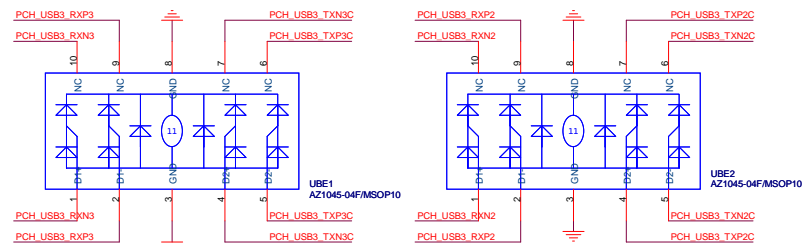
SRCCLK 50歐姆:[18/4/10/4/18]



100歐姆:[20/4/8/4/20]



90 歐姐:[15/4.5/7.5/4.5/15]

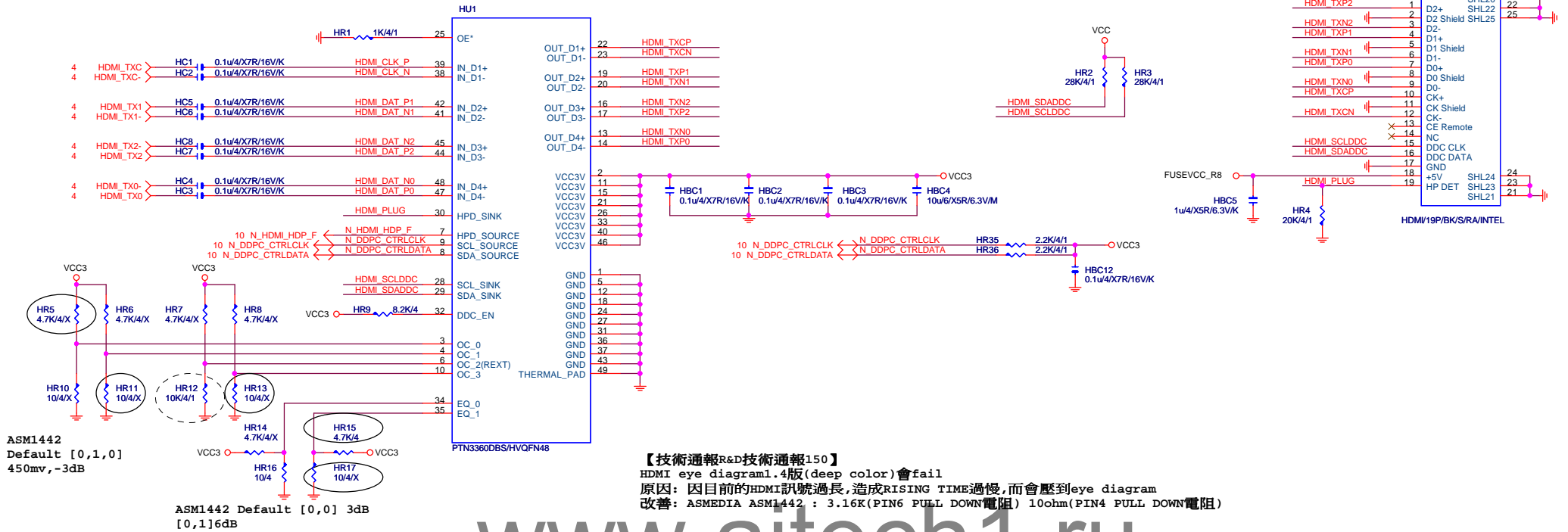


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HDMI LEVEL SHIFT

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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Title	HDMI
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Size	Document Number
Custom	

GA-H87-HD3

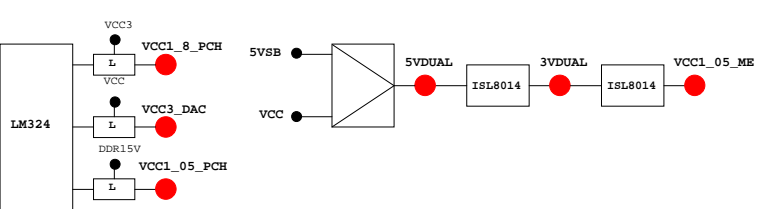
1.02

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PIN NAME	PWR	AFTER PLT35	Default	USAGE	NOTE
GP0	MAIN	H-Z	GPI	GPIO0	N/A
GP1/TACH1	MAIN		GPI	GPIO1	N/A
GP2/PIRQE#	MAIN		GPI	-PIRQE	P/U 8.2K VCC3
GP3/PIRQF#	MAIN		GPI	-PIRQF	P/U 8.2K VCC3
GP4/PIRQG#	MAIN		GPI	-PIRQG	P/U 8.2K VCC3
GP5/PIRQH#	MAIN		GPI	-PIRQH	P/U 8.2K VCC3
GP6/TACH2	MAIN		GPI	PCIEX1 Detect	P/U 8.2K VCC3
GP7/TACH3	MAIN		GPI	GPIO7	P/U 8.2K VCC3
GP8	STBY	H	GPI	GPIO8	N/A
GP9/OC5#	STBY		NATIVE	USB OC5#	N/A
GP10/OC6#	STBY		NATIVE	USB OC6#	N/A
GP11/SMBALERT#	STBY		NATIVE	USB PWR protect	P/U 8.2K 3VDUAL
GP12	STBY	L	GPI	GPIO12	N/A
GP13	STBY	L	GPI	LPCPME#	P/U 8.2K 3VDUAL
GP14/OC7#	STBY		NATIVE	USB OC7#	N/A
GP15	STBY	L	GPI	GPIO15(TLS Enable)	P/U 8.2K 3VDUAL
GP16	MAIN		GPI	GPIO16	P/U 8.2K VCC3
GP17/TACH0	MAIN		GPI	GPIO17	P/U 8.2K VCC3
GP18	MAIN		GPI	Mobile Only	N/A
GP19	MAIN		GPI	GPIO19	P/U 8.2K VCC3
GP20	MAIN		GPI	GPIO20	P/U 8.2K VCC3
GP21	MAIN		GPI	GPIO21	P/U 8.2K VCC3
GP22	MAIN	H-Z	GPI	GPIO22	P/U 8.2K VCC3
GP23	MAIN		GPI	GPIO23	N/A
GP24	STBY	L	GPI	SKTOCC#	N/A
GP25	STBY			Mobile Only	N/A
GP26	STBY			Mobile Only	N/A
GP27	STBY	H	GPO	GPIO27	P/U 8.2K 3VDUAL
GP28	STBY	H	GPO	PWR LED	P/U 8.2K 3VDUAL
GP29	STBY	L	GPI	GPIO29	N/A
GP30	STBY	H-Z	GPI	Mobile Only	N/A
GP31	STBY	H-Z	GPI	Mobile Only	N/A
GP32	MAIN	H	GPO	N/A	N/A
GP33	MAIN	H	GPO	N/A	N/A
GP34	MAIN	H-Z	GPI	-PCI_STOP	P/U 8.2K VCC3
GP35	MAIN	L	GPO	-ACZ_DET	P/U 8.2K VCC3
GP36	MAIN		GPI	N/A	N/A
GP37	MAIN		GPI	N/A	N/A
GP38	MAIN	H-Z	GPI	PCIEX4 Detect	P/U 8.2K VCC3
GP39	MAIN	H-Z	GPI	GPIO39	P/U 8.2K VCC3
GP40	STBY		NATIVE	USB OC1#	N/A
GP41	STBY		NATIVE	USB OC2#	N/A
GP42	STBY		NATIVE	USB OC3#	N/A
GP43	STBY		NATIVE	USB OC4#	N/A
GP44	STBY	L	NATIVE	GPIO44	P/U 8.2K 3VDUAL
GP45	STBY		NATIVE	GPIO45	P/U 8.2K 3VDUAL
GP46	STBY	L	NATIVE	GPIO46	P/U 8.2K 3VDUAL
GP47	STBY			Mobile Only	N/A
GP48	MAIN	H-Z	IN	GPIO48	P/U 8.2K 3VDUAL
GP49	MAIN	H-Z	IN	GPIO49	P/U 8.2K 3VDUAL
GP50	MAIN		NATIVE	-REQ1	P/U 2.2K VCC
GP51	MAIN	H	NATIVE	-GNT1	N/A
GP52	MAIN		NATIVE	-REQ2	P/U 2.2K VCC
GP53	MAIN	H	NATIVE	-GNT2	N/A
GP54	MAIN		NATIVE	-REQ3	P/U 2.2K VCC
GP55	MAIN	H	NATIVE	-GNT3	N/A
GP56	STBY		NATIVE	Mobile Only	N/A
GP57	STBY	H-Z	IN	VCORE_OV1	P/U 8.2K 3VDUAL
GP58	STBY	H-Z	NATIVE	F_USB_OC#	P/U 8.2K 3VDUAL
GP59	STBY		NATIVE	USB_OC0#	N/A
GP60	STBY	H-Z	NATIVE	N/A(Reverse)	P/U 8.2K 3VDUAL
GP61	STBY	L	NATIVE	-SUSTAT	N/A
GP62	STBY	L	NATIVE	SUSCLK	N/A
GP63	STBY	L	NATIVE	GPIO63	N/A
GP64	MAIN	L	NATIVE	CLKOUTFLEX0	N/A
GP65	MAIN	L	NATIVE	CLKOUTFLEX1	N/A
GP66	MAIN	L	NATIVE	CLKOUTFLEX2	N/A
GP67	MAIN	L	NATIVE	CLKOUTFLEX3	N/A
GP72	STBY	H-Z	NATIVE	VCORE_OV4	P/U 8.2K 3VDUAL
GP73	STBY			Mobile Only	N/A
GP74	STBY	H-Z	NATIVE	1_05V_OV2	P/U 8.2K 3VDUAL
GP75	STBY	H-Z	NATIVE	N/A(Reverse)	P/U 8.2K 3VDUAL

PIN NAME	USAGE	NOTE
SVC/PECI_RQT/GP14	-PECI_REQ	
PWROK1/GP13	PWROK1/ITE_PWROK	
KRST#/GP62	-KBRST	
SO/GP50	-ICH_SPI_CS	
IRTX/GP47/CE2_N/JP7	CEB_N	
GP46/IRRX	-LAN2_DSM	
PSION#/GP42	-PSON	
PWROK2#/GP41	PECI_CTL	
PCIRST3#/GP10/VDIMM_STR_EN	-PCIE_RST	
RSMRST#CIRRXX1/GP55	-RSMRST	
PME#/GP54	-LPCPME	
PD5/GP75/BUSS00	N/A	
PIN NAME	USAGE	NOTE
FAN_TAC2/GP52	FANIO2	
FAN_TAC3/GP37	FANIO3	
VIDO3/FAN_TAC4/GP25/DSR2#	FANIO4	
FAN_CTL2/GP51	FANPWM2	
FAN_CTL3/GP36	FANPWM3	
VID4/GP34	BEEP-	
VID3/GP33	TURBO1	
VID2/GP32	TURBO0	
VCORE_GOOD/VID6/GP63	CPUT_LED1_C	
VID5/GP35	CPUT_LED2_C	
VID1/GP31	CPUT_LED3_C	
VID0/GP30	-LAN1_DSM	NBT_LED1_C
SLCT/GP80	CPU_LED1_C	
PE/GP81	CPU_LED2_C	
BUSY/GP82	CPU_LED3_C	
PD3/GP73/BUSSI1	SB_LED1_C	
PD4/GP74/BUSSI2	SB_LED2_C	
VCORE_EN/VID7/GP64	IT_GP64	SB_LED3_C
PD0/GP70	NB_LED1_C	
PD1/GP71	NB_LED2_C	
PD2/GP72/BUSSI0	NB_LED3_C	
GP22/SCK	LOW_PWR_1	
VIDO5/GP27/SIN2	LOW_PWR_2	
PCIRST2#/GP11	-PFMRST1	
PCIRST1#/GP12	-PFMRST2	
3VBSBW#/GP40	CSI_F0	BSEL166_1
SUSC#/GP53	CSI_F1	BSEL166_2
GP23/SI	BSEL166_3/CSISBSL	
VIDO0/GP20/CTS2#	CPUT_LED1_C	BSEL166_4
GP65/VDDA_EN/GB_01	MB_ID2	
PD6/GP76/BUSS01	MB_ID3	
PD7/GP77/BUSS02	MB_ID4	
AFD#/GP86/SMBC_R	2X PIN	FST_2X8
INIT#/GP85/SMBD_M	SEC_2x8	GTLREF_AD2
ACK#/GP83	DDR_LED1_C	
VIDO1/GP21/DCD2#	DDR_LED2_C	
STB#/GP87/SMBC_M	DDR_LED3_C	
PWRON#GP44	VCORE_OV1	
PANSWH#/GP43	PWRBTSW	
KDAT/GP61	-PWRBTSW	
KCLK/GP60	KDAT	
MDAT/GP57	KCLK	
MACL/GP56	MDAT	
GP66/VLDT_EN/GB_02	NBT_LED1_C	MCLK
SVD/PCIRSTIN#/CIRTX/GP15	PWM2_CR	
KDAT/GP61	PWM2_CR	
GP67/CPU_PG/GB_03	EN_LOADLINE	IT_GP67/-EN_PWM2
SLIN#/GP84/SMBD_R	-EN_PWM2	
PSI_L/FAN_CLT5/CIRRXX2/GP16	-THERM	
VIDO4/GP26/SOUT2	DDR18V_PH2_EN	
VIDO2/FAN_TAC5/GP24/DSR2#	DDR18V_LED	
VIDO6/GP17/RI2#	1_IV_PH_EN	
VIDO7/JP6/DTR2#	JP6	
PD5/GP75/BUSS00	SB_LED3_C	



The diagram illustrates the layout of a CPU board, showing the following components and their connections:

- CPU_VTT**: A dashed box containing MOSFETs (TQ3, TQ4), a CHOKE (TL1), and two columns of capacitors (DC_DQ1, DP_DQ1; DC_DQ2, DP_DQ2; DC_DQ3, DP_DQ3; DC_DL1, DP_DL1). It is connected to the CPU_SOCKET via pins 4 and 2.
- VCORE**: A dashed box containing two columns of capacitors (DB_DQ1, DA_DQ1; DB_DQ2, DA_DQ2; DB_DQ3, DA_DQ3; DB_DL1, DA_DL1). It is connected to the CPU_SOCKET via pins 1 and 3.
- VAXG**: A dashed box containing two columns of capacitors (DZ_DQ1, DZ_DQ2; DZ_DQ3, DZ_DQ4; DZ_DL1, DZ_DL2).
- P-PAK**: A dashed box containing a CHOKE.
- CPU_SOCKET**: A large central box representing the CPU socket.
- PCH**: A box representing the Peripheral Component Hub.

線路圖名稱	BIOS選項
Vcore	CPU Vcore
CPU_VTT	CPU Termination
CPU_VAXG	CPU Graphic Core
VCC1_8_PCH	CPU PLL
VCC1_05_PCH	PCH core
3VDUAL	3VDUAL
DDR15V	DRAM voltage
DDRVTT	DRAM Terminatio
VREF_CA_A/VREF_CA_B	DRAM Address Ref
VREF_DQ_A/VREF_DQ_B	DRAM Data Ref

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

	3 pin FAN control	4 pin FAN control	FAN speed	Controller
CPU FAN	FANPWM1	FANPWM3	FANIO1	IT8720
	ICH_FAN_PWM2	ICH_FAN_PWM0	ICH_FAN_TACH0	PCH
SYS FAN	FANPWM2	N/A	FANIO2	IT8720
	ICH_FAN_PWM1	N/A	ICH_FAN_TACH1	PCH
PWR FAN	N/A	N/A	FANIO3	IT8720
			ICH_FAN_TACH2	PCH

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Title			
TABLE LIST			
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