

Model Name: GA-H81M-S2PH

Revision 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,NVRAM
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	ITE 8620 LPC IO
16	COM,KB_MS,USB PWR
17	IT8892E
18	PCI SLOT 1,2
19	PCI EXPRESS*1 SLOT.LPT
20	HWM,FAN CTRL,OV,-PROCHOT
21	DUAL BIOS
22	FP,F_USB,SPK,SATALED
23	Realtek ALC887-VD2
24	REAR AUDIO JACK
25	REALTEK RTL8111F
26	DISCRETE POWER
27	ATX,DUMMY LOAD

SHEET

TITLE

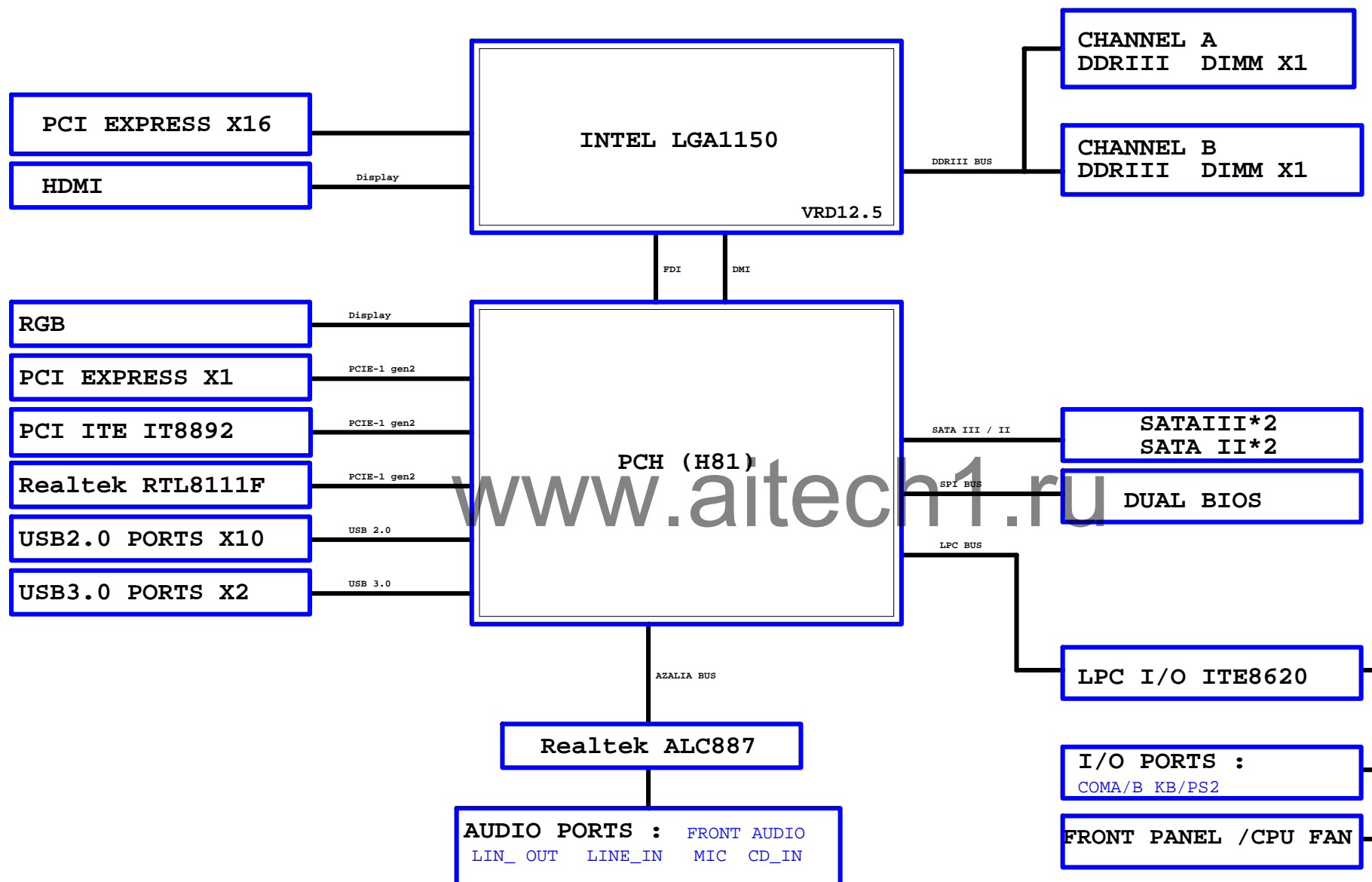
28	RT8120_DDR POWER
29	VCORE ISL95812_1
30	VCORE ISL95812_2
31	HDMI

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Gigabyte Technology

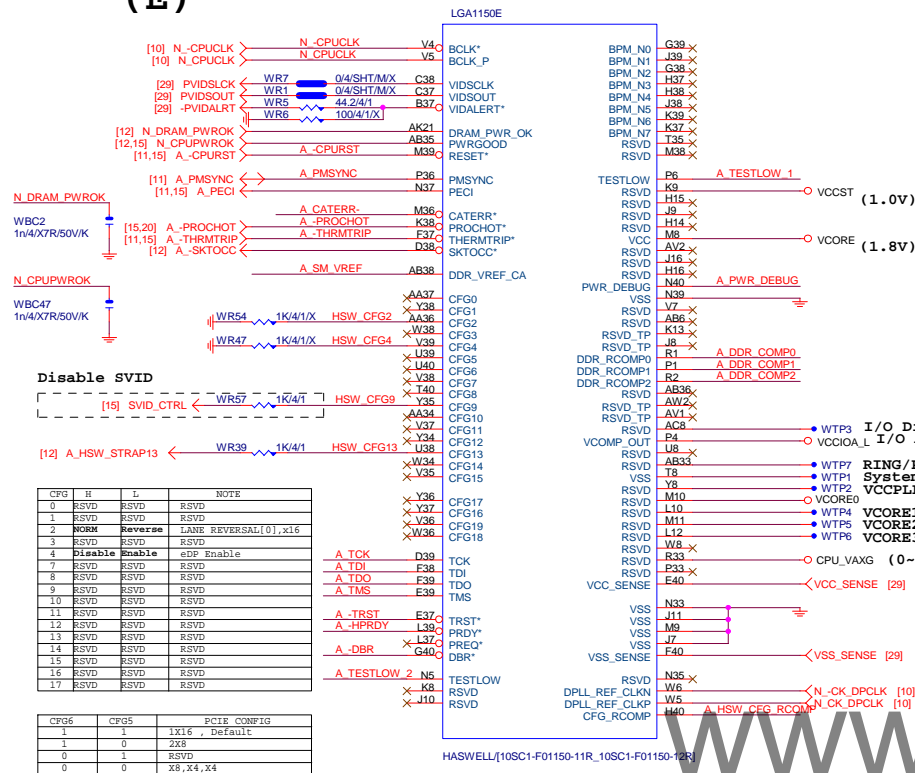
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Size	Document Number	GA-H81M-S2PH	
Custom		Rev	1.02
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BLOCK DIAGRAM



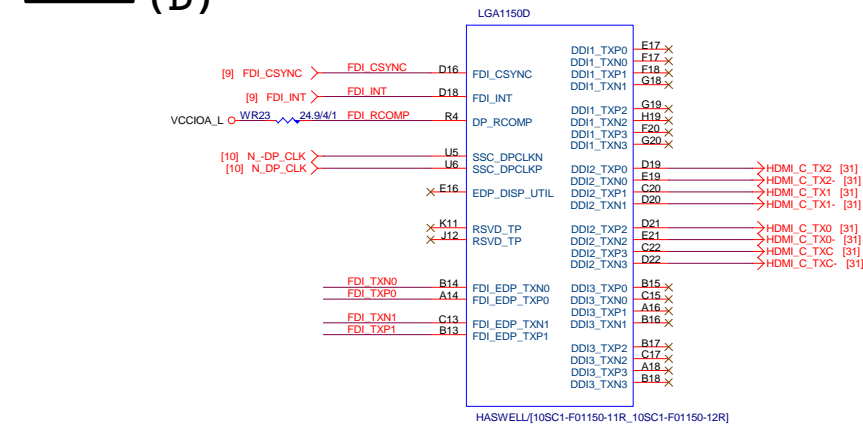
LGA1150

(E)



LGA1150

(D)



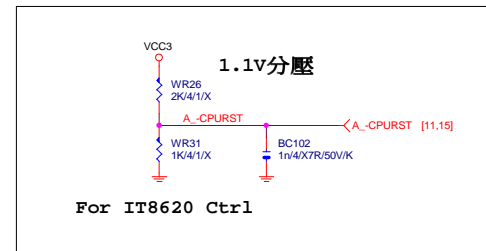
LGA1155

(C)



-CPURST

FOR IT8620 Ctrl1



CPU SVID



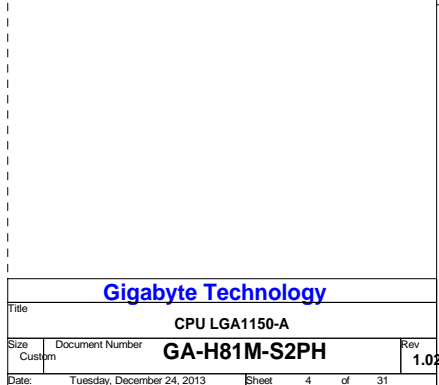
CPU PU/PD



SM REF



THRMTRIP DISABLE



HASWELL/10SC1-F01150-11R_10SC1-F01150-12R

HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]

WBC34 0.1u/4/X7R/16V/K WBC33 0.1u/4/X7R/16V/K

○

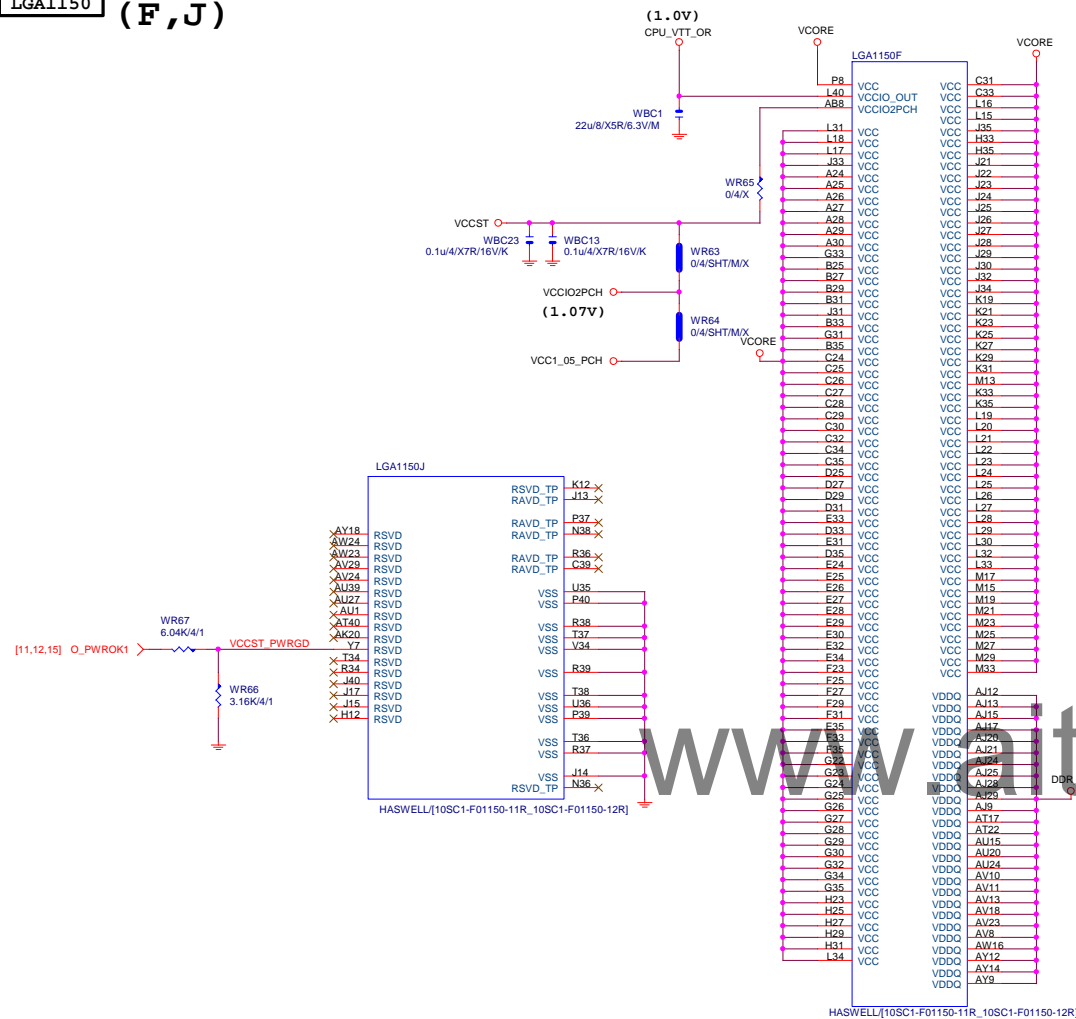
ILM_BP/1156/CSP/ILM_BP/1156/CSP/12KRC-0F0001-52R_12KRC-0F0001-51R

DDR BUS

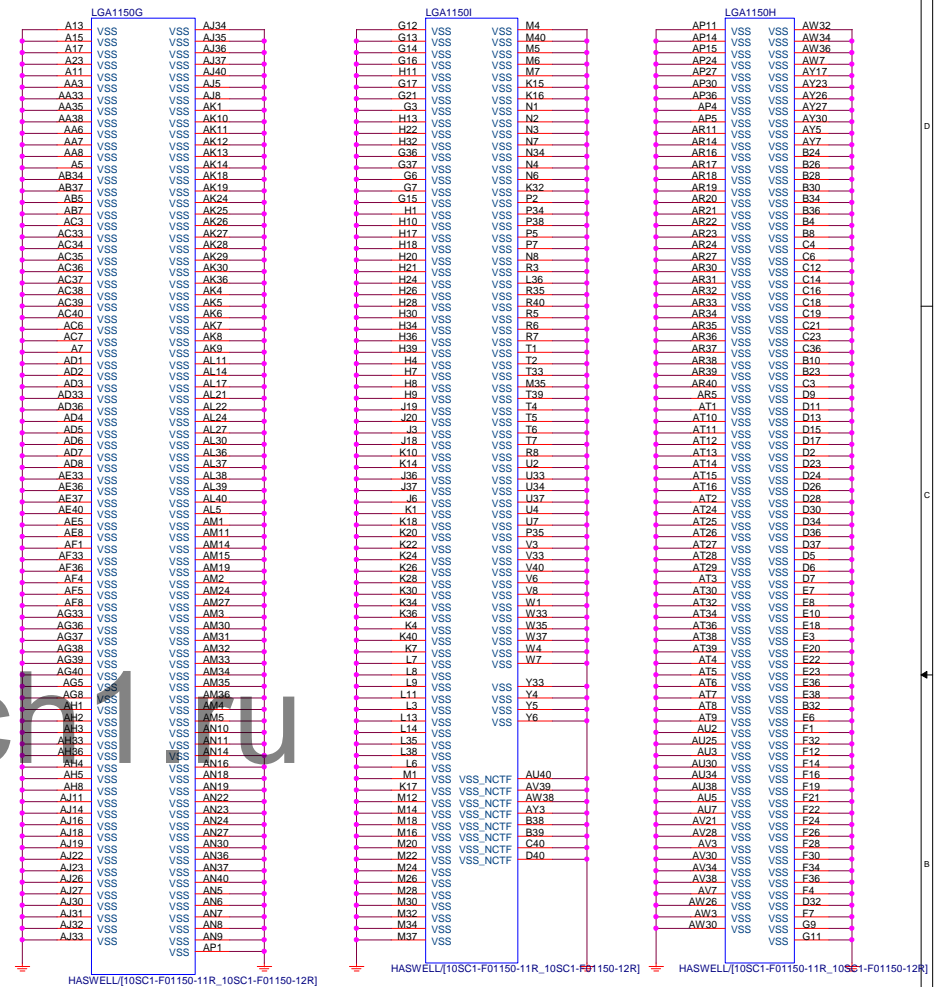
Diagram illustrating the mapping of 8-bit registers to 16-bit registers:

- [7] MODT_A[0..1] ↔ MODT_A[0..1]
- [8] MODT_B[0..1] ↔ MODT_B[0..1]
- [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]

LGA1150 (F, J)

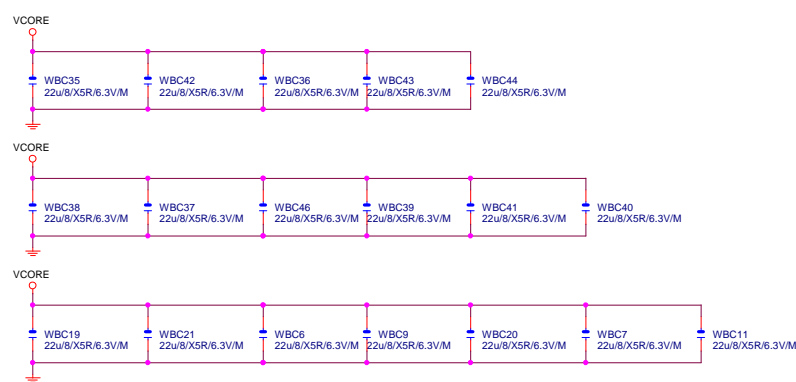


LGA1155 (G,H,I)



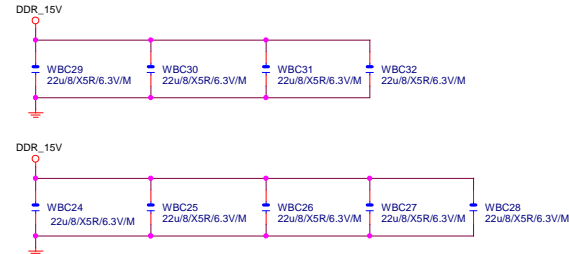
VCore CAP

(X18)



DDR CAP

(x9)



Gigabyte Technology

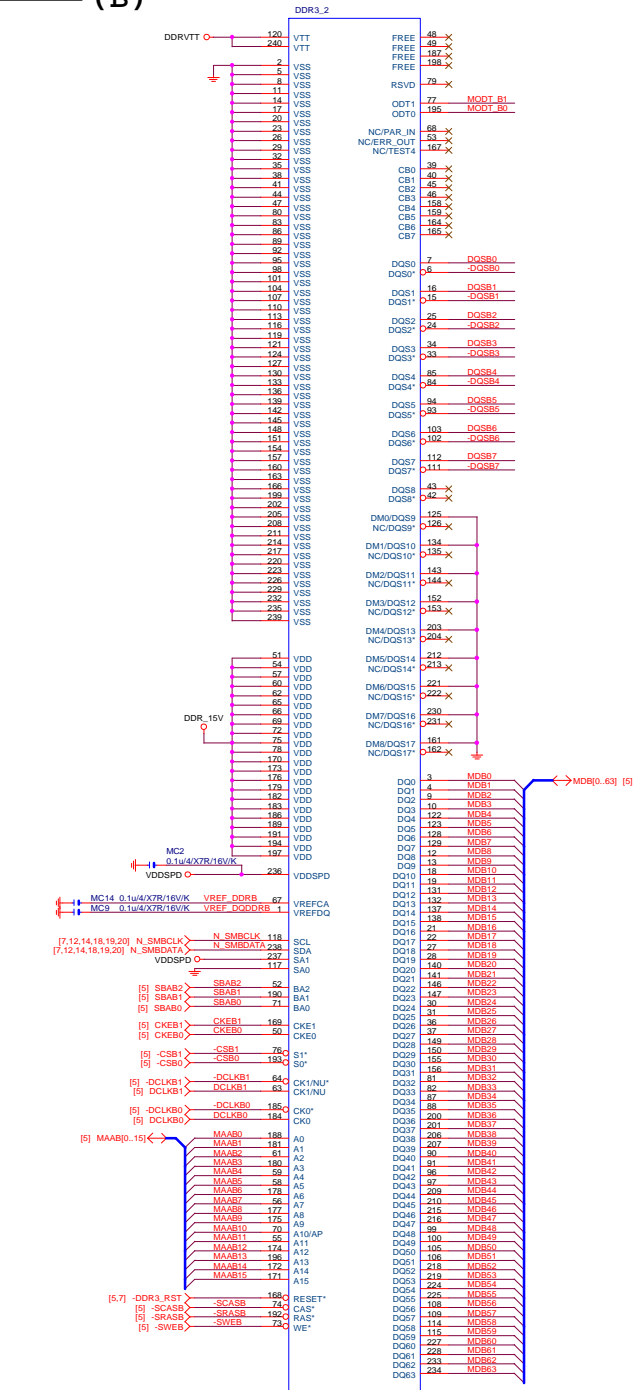
Title	CPU I GA1150-C
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Size	Document Number	GA-H81M-S2PH	Rev	1.00
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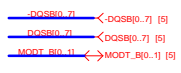
Date:	Tuesday, December 24, 2013	Sheet	6	of	31
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DDR3

(B)

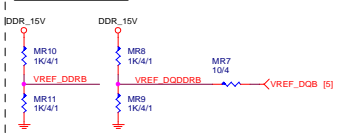


DDR3_240/BK/VA/D
BLACK CONNECTOR

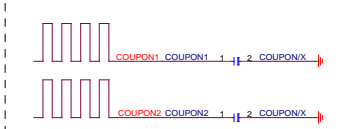


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DDR3 VREF



COUPON



CPU

DTMM1 CHA

DTMM2 CHB

DMI:12/4/4/4/12(breakout min 8/4/4/4/8)

W=4 mil out of PCH
S=15 mil out of PCH

VCC1_5_PCH ○ NR50 7.5K/4/1 DMI_COMP B

```

[25] LA_ML_IN  >
[25] LA_ML_IP  >
[25] LA_ML_ON  >
[25] LA_ML_OP  >

[17] G_PCIEBIN  >
[17] G_PCIEBIP  >
[17] G_PCIEBON  >
[17] G_PCIEBOP  >

[19] PI_PCIEI1_IN  >
[19] PI_PCIEI1_IP  >
[19] PI_PCIEI1_ON  >
[19] PI_PCIEI1_OP  >

```

PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)



PCHB



(1)



VCC3

316



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

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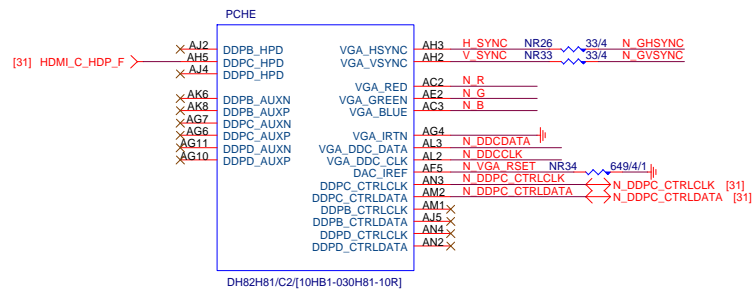
ROLLER, DMLUGB, BOIE NVRAM

PCH FDI,DMI,USB ,PCIE,NVRAM		
Doc	Document Number	Rev

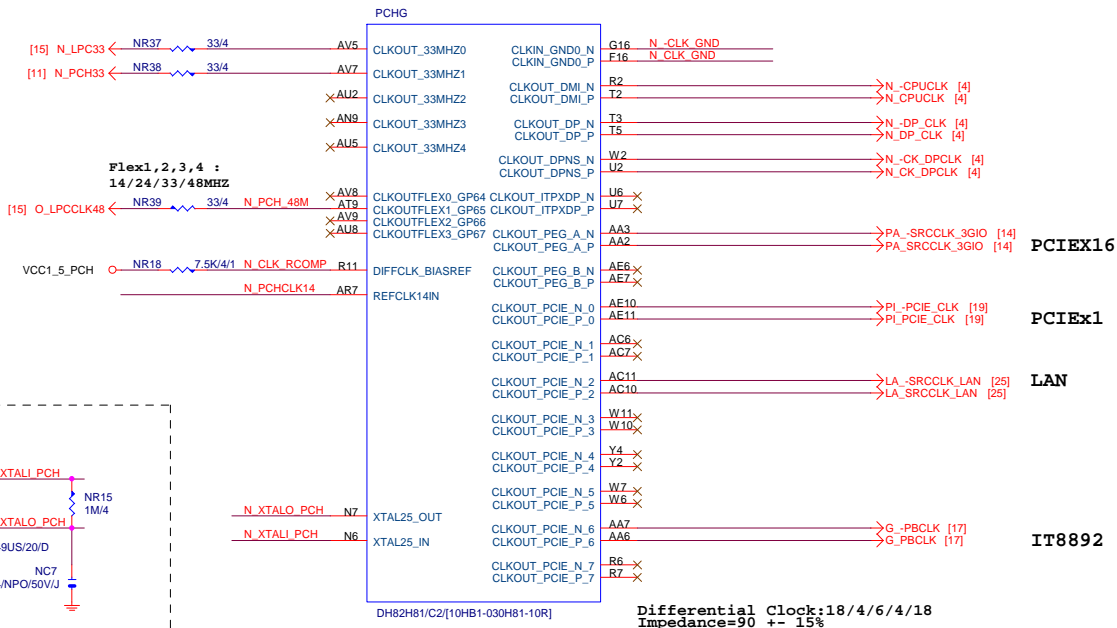
Size	Document Number	Rev
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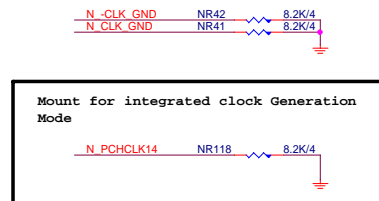
PCH (E)



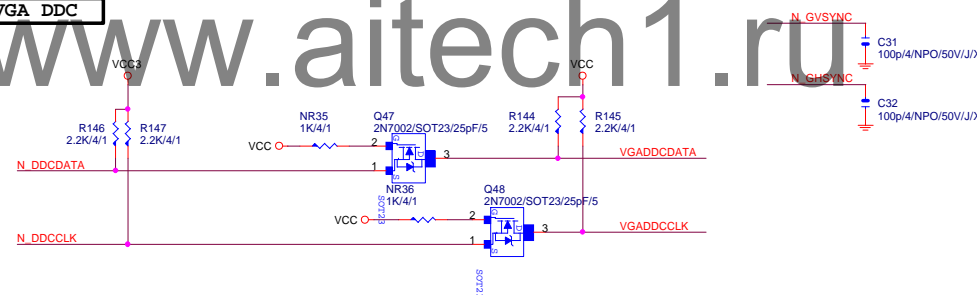
PCH (G)



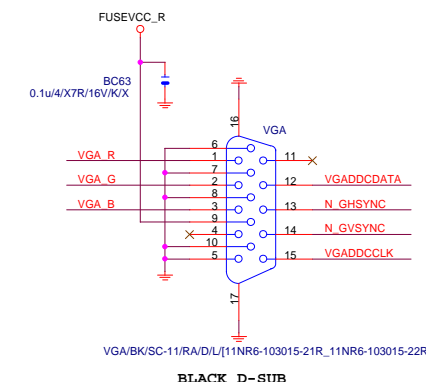
PCH CLK PD



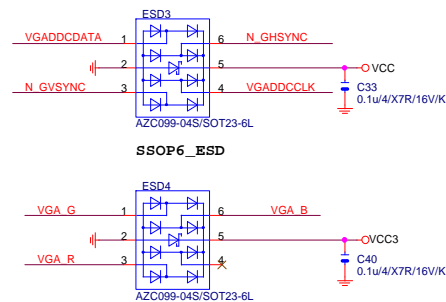
VGA DDC



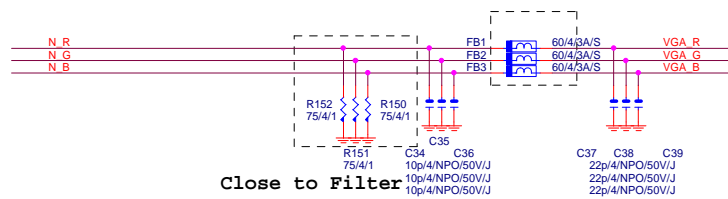
VGA CONNECTOR



VGA ESD



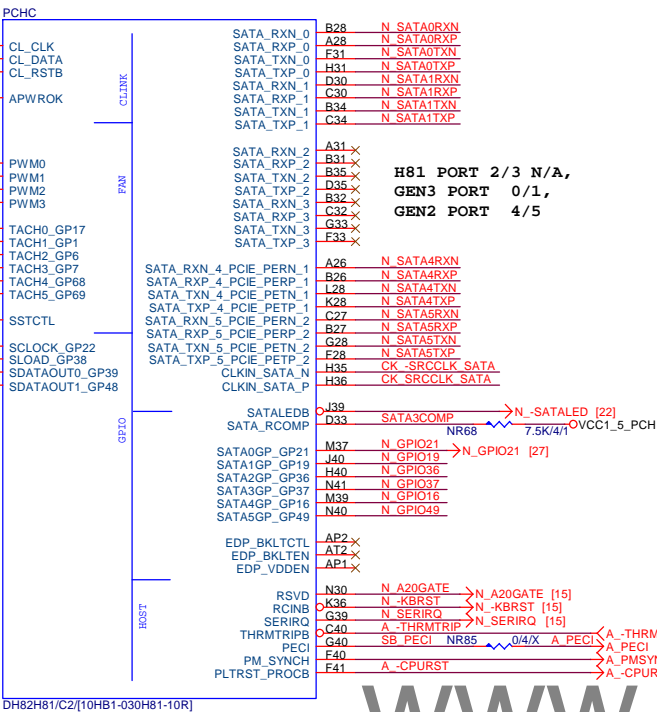
VGA DDC



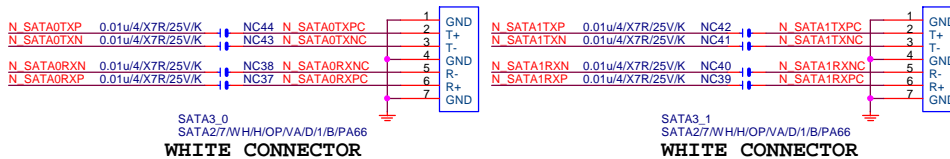
Gigabyte Technology			
Title			
PCH DISPLAY ,CLK BUFFER			
Size	Document Number	GA-H81M-S2PH	Rev
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(C)

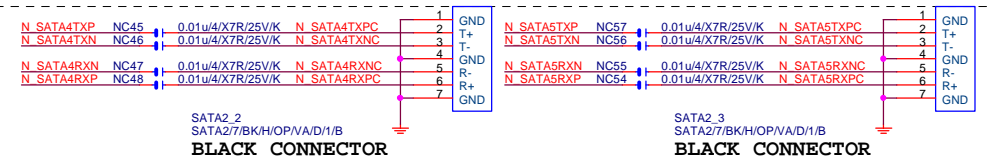
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



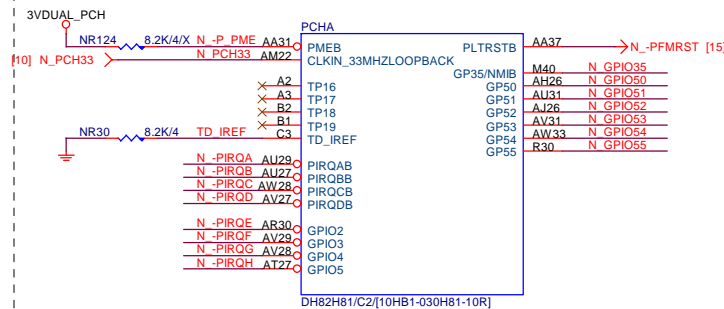
SATA CONNECTOR



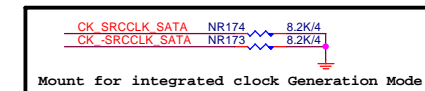
```
** Z87/H87 Port 4&5 SATA3.0
** B85 Port 4&5 SATA2.0
```



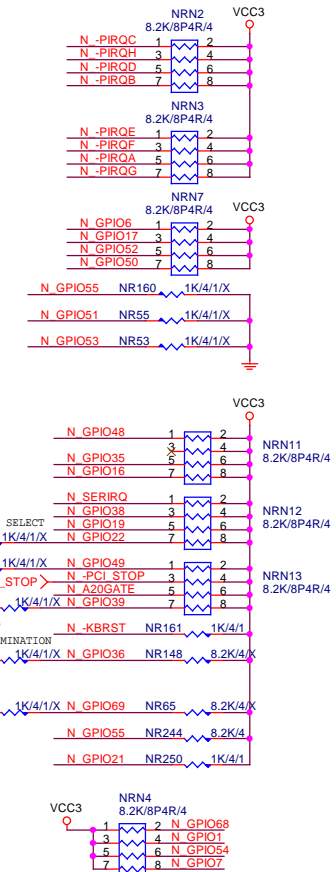
(A)



PCH CLK PD

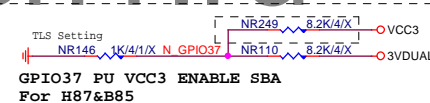


PCH	PU/PD
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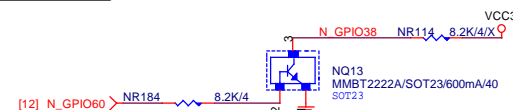


ME PWROK

H81 N/A



GPIO38 Ctrl



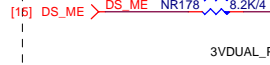
Gigabyte Technology

Title			
PCH HOST , SATA, PCI			
Size	Document Number		Rev
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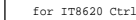
(D)



ACZ SDOUT



PCH_DPWROK



HSW_STRAP13



32.768KHZ

CLR_CMOS



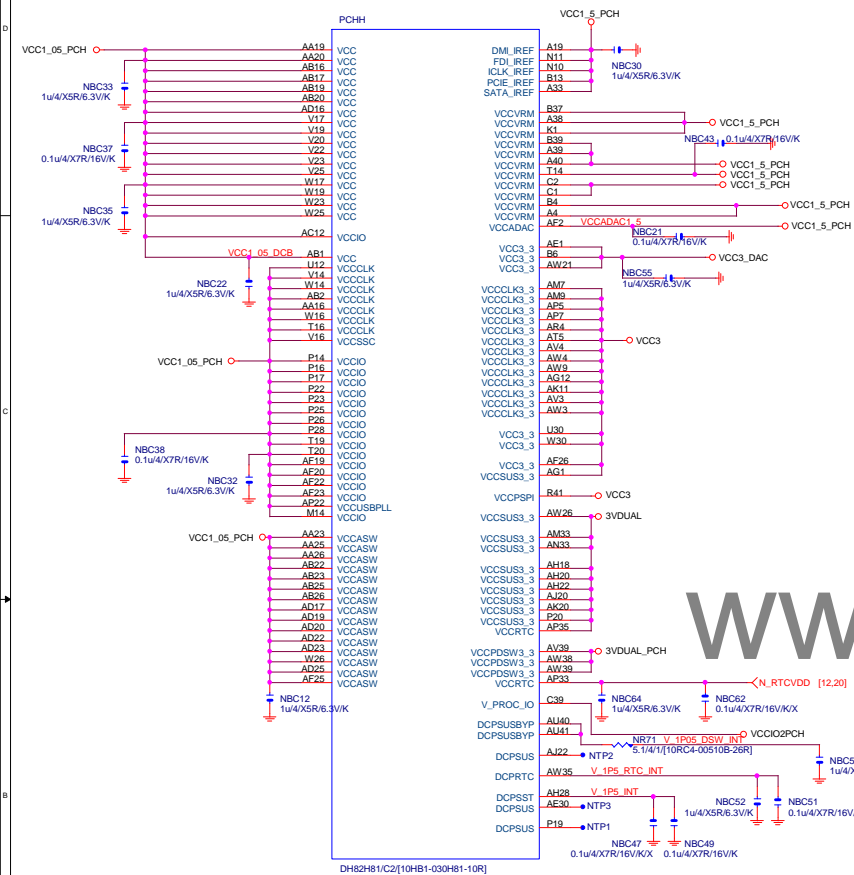
	PCH	PU/PD
1	0.00	0.00
2	0.00	0.00
3	0.00	0.00
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	0.00	0.00
8	0.00	0.00
9	0.00	0.00
10	0.00	0.00
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00
14	0.00	0.00
15	0.00	0.00
16	0.00	0.00
17	0.00	0.00
18	0.00	0.00
19	0.00	0.00
20	0.00	0.00
21	0.00	0.00
22	0.00	0.00
23	0.00	0.00
24	0.00	0.00
25	0.00	0.00
26	0.00	0.00
27	0.00	0.00
28	0.00	0.00
29	0.00	0.00
30	0.00	0.00
31	0.00	0.00
32	0.00	0.00
33	0.00	0.00
34	0.00	0.00
35	0.00	0.00
36	0.00	0.00
37	0.00	0.00
38	0.00	0.00
39	0.00	0.00
40	0.00	0.00
41	0.00	0.00
42	0.00	0.00
43	0.00	0.00
44	0.00	0.00
45	0.00	0.00
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70	0.00	0.00
71	0.00	0.00
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73	0.00	0.00
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87	0.00	0.00
88	0.00	0.00
89	0.00	0.00
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93	0.00	0.00
94	0.00	0.00
95	0.00	0.00
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100	0.00	0.00



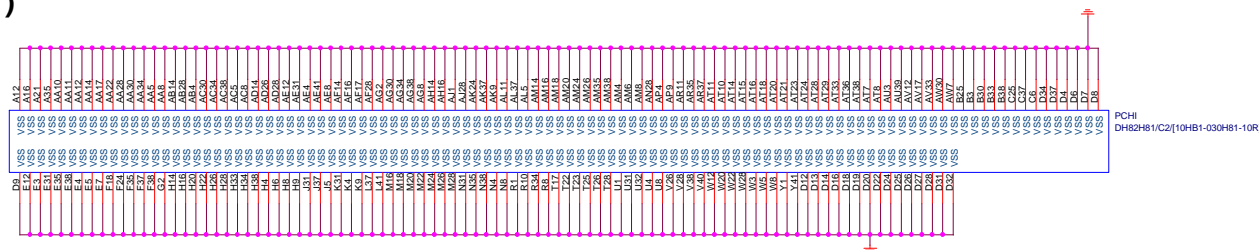
Gigabyte Technology

Title			
PCH GPIO , CTRL , AUDIO			
Size	Document Number	Rev	
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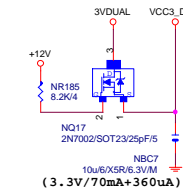
PCH (H)



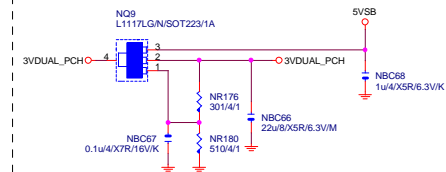
PCH (I)



VCC3_DAC



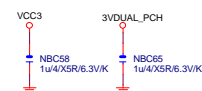
3VDUAL_PCH



SHT PWR

M3 POWER

CAP



(3.3V) (X6)

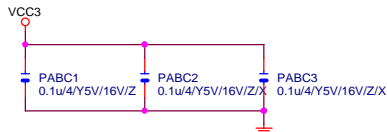
(1.05V) (x5)

(1.05V)(x6)

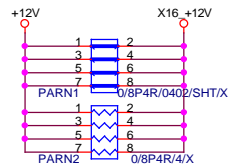
$$(1.05V)(x2) + (3.3V)(x2)$$

(1.05V) (x10)

PCIEX16 CAP



PCIEX16 PROTECT SHT

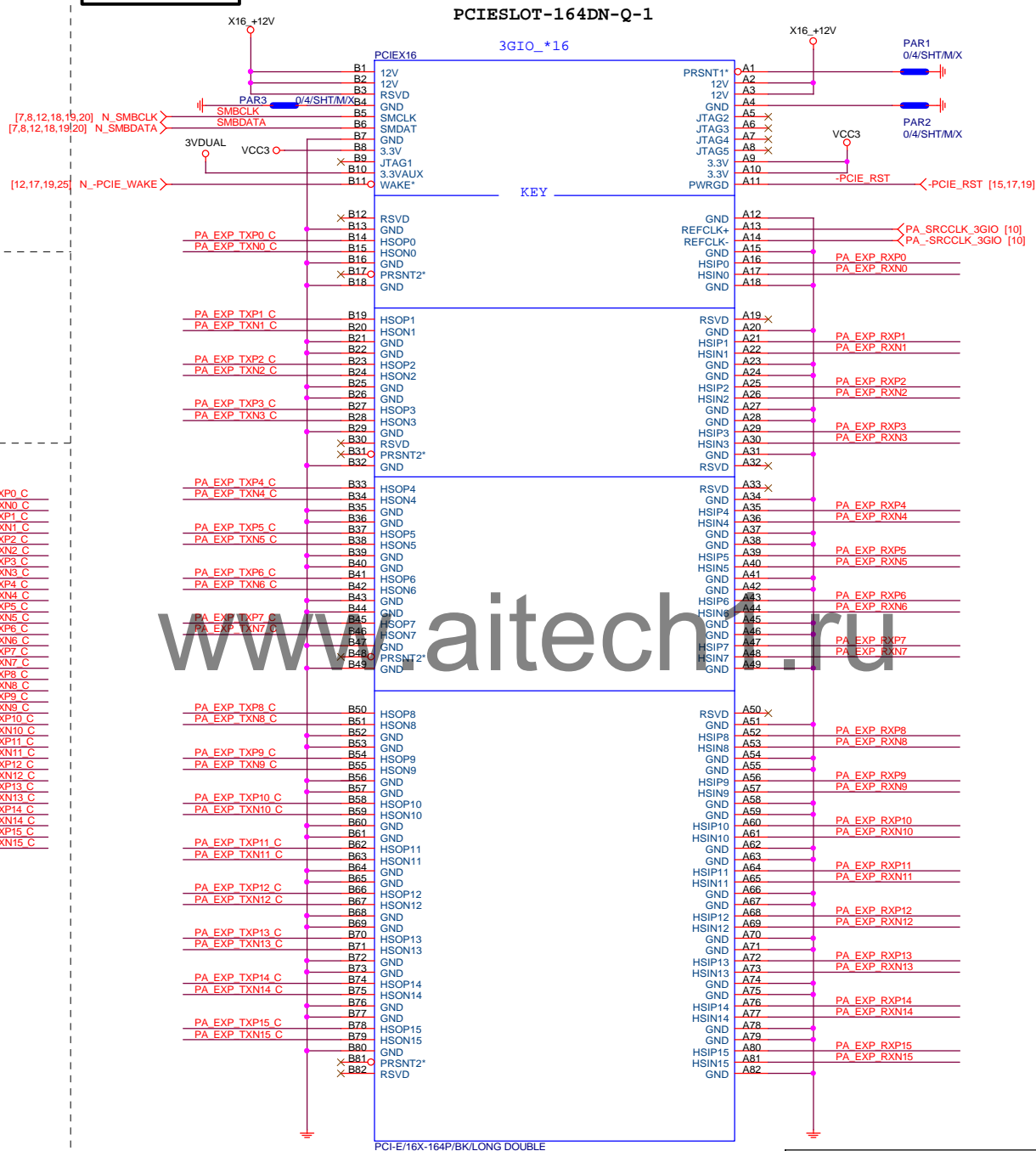


PCIEX16 AC CAP

PA EXP TXP0	PAC5	0.22u/4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u/4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u/4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u/4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u/4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u/4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u/4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u/4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u/4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u/4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u/4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u/4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u/4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u/4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22u/4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22u/4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u/4/X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u/4/X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u/4/X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u/4/X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u/4/X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u/4/X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u/4/X5R/6.3V/K	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u/4/X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u/4/X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u/4/X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u/4/X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u/4/X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u/4/X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u/4/X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u/4/X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u/4/X5R/6.3V/K	PA EXP TXN15 C

PA EXP RXP0[0..15] >>> PA_EXP_RXP[0..15] [4]
PA EXP RXN0[0..15] >>> PA_EXP_RXN[0..15] [4]
PA EXP TXP0[0..15] >>> PA_EXP_TXP[0..15] [4]
PA EXP TXN0[0..15] >>> PA_EXP_TXN[0..15] [4]

PCIEX16 SLOT

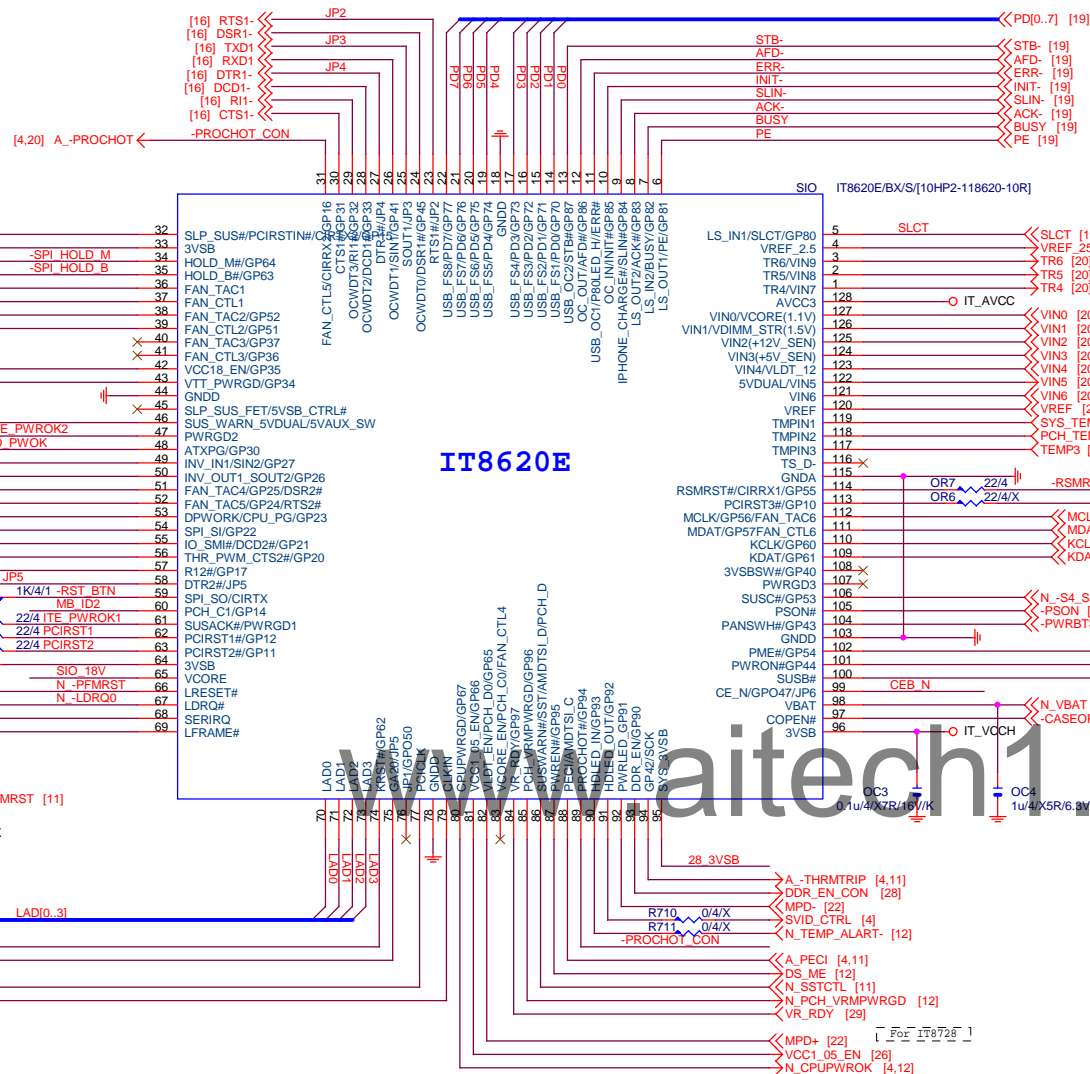


BLACK CONNECTOR

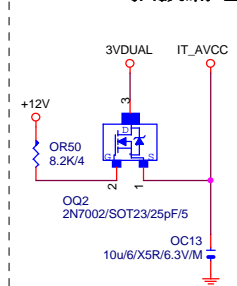
Gigabyte Technology

Title			PCI EXPRESS * 16	
Size	Document Number	GA-H81M-S2PH		Rev
Custom				1.02
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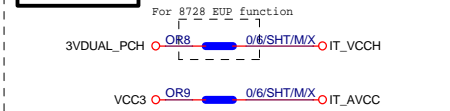
SIO IT8620E



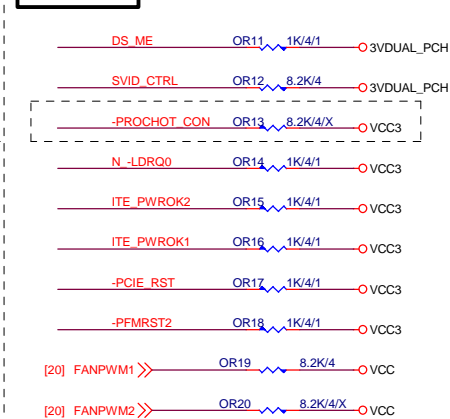
FIX ATX 插拔漏電



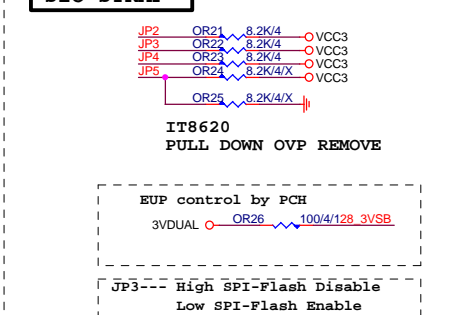
PWR	SHT
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SIO PU



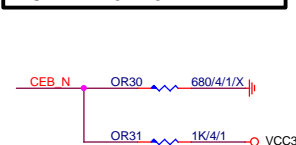
SIO STRAP



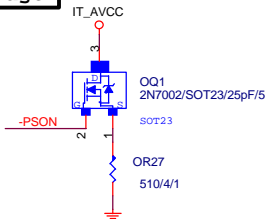
IT8620 NOTE

	IT8728
PIN121	VCORE_EN/PCH_C0
PIN120	VLDT_EN/PCH_D0
PIN19	ATXPG
PIN31	PCH_C1
PIN53	SST/AMDTSI_D/MTRB#/PCH_D1
PIN55	PECI/AMDTSI_C/DRV#
PIN66	SYS_3VSB
PIN70	GP47
PIN95	VIN2(VCC5)
PIN96	VIM1(VCC12)
PIN97	VIN1/VDIMM_STR(1.5V)
PIN98	VINO/VCORE(1.1V)/NC

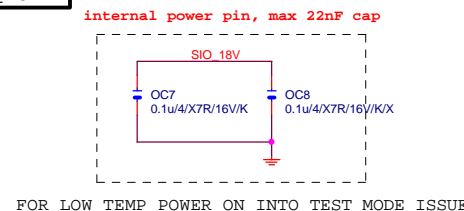
DUAL BIOS OPT STRAP



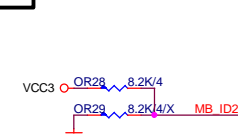
Power leakage



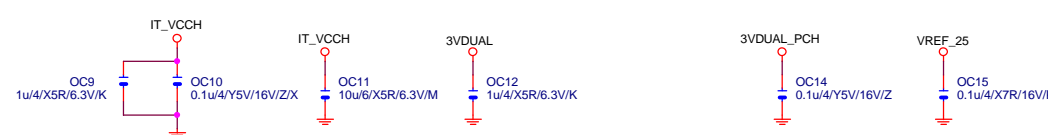
SIO 18V



MB ID



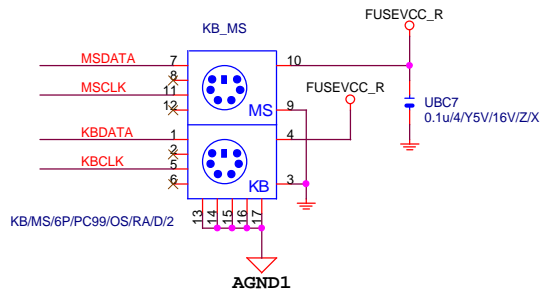
SIO CAP



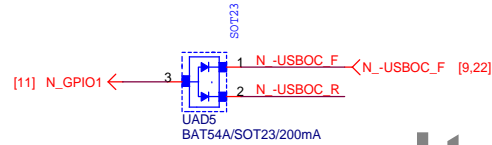
Gigabyte Technology

Title			
ITE 8620 LPC IO			
Size	Document Number	Rev	
Custom	GA-H81M-S2PH	1.02	
Date:	Tuesday, December 24, 2013	Sheet	15 of 31

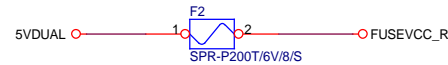
KB/MS



USB POWER PROTECT

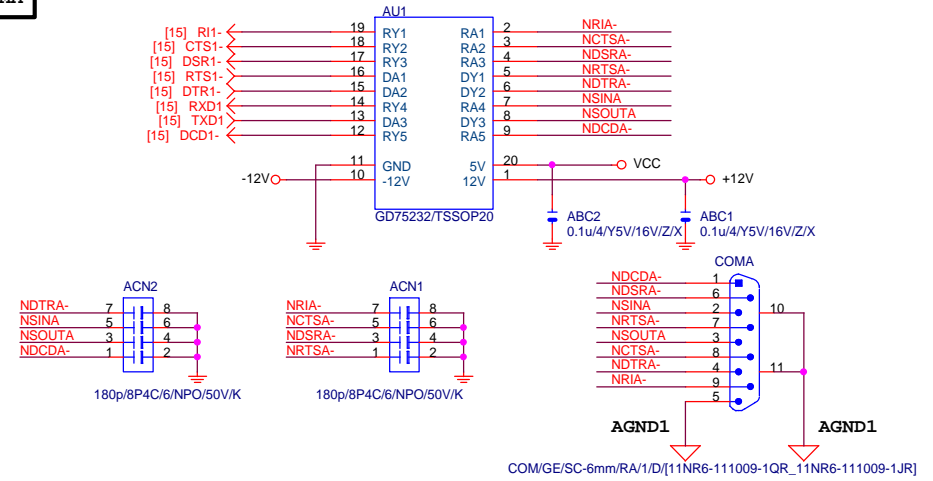


R_USB PWR

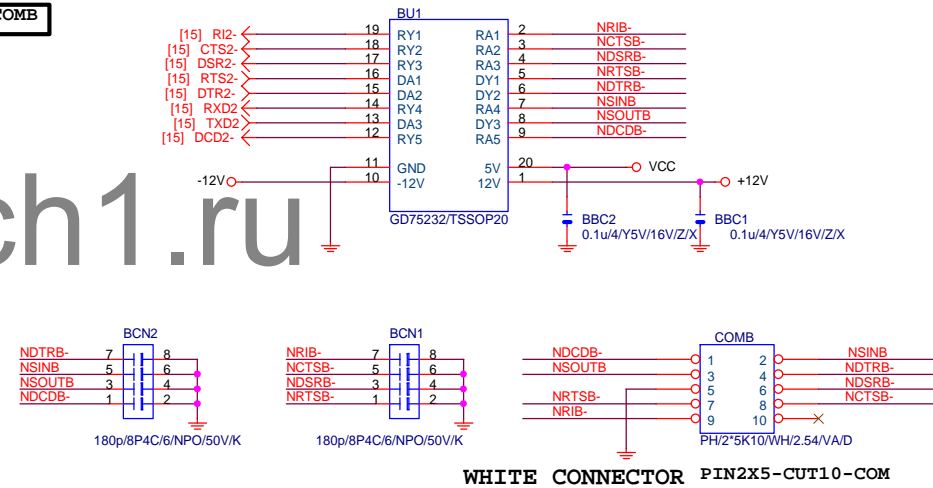


Close to connector
KB_MS_USB 2-Port 2.0A

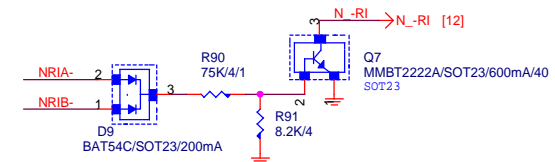
COMA



COMB



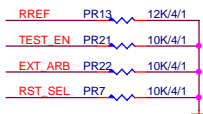
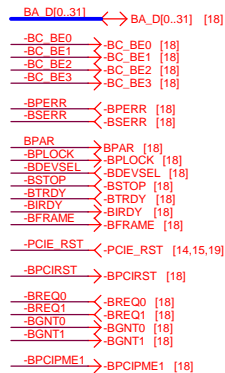
COM RI



Gigabyte Technology			
Title			
COM,-RI,KB_MS			
Size			
Document Number			
GA-H81M-S2PH			
Date:			
Tuesday, December 24, 2013			
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16 of 31			
Rev			
1.02			

PCI TO PCI

PCI:5/4/5 Impedance=50 +- 15%



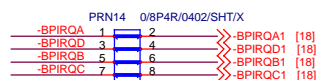
High: Enable PCI CLK 66MHz
 Low: Disable PCI CLK 66MHz



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



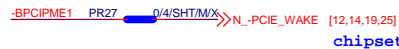
IT8892



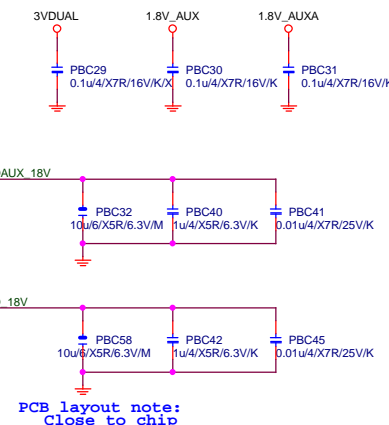
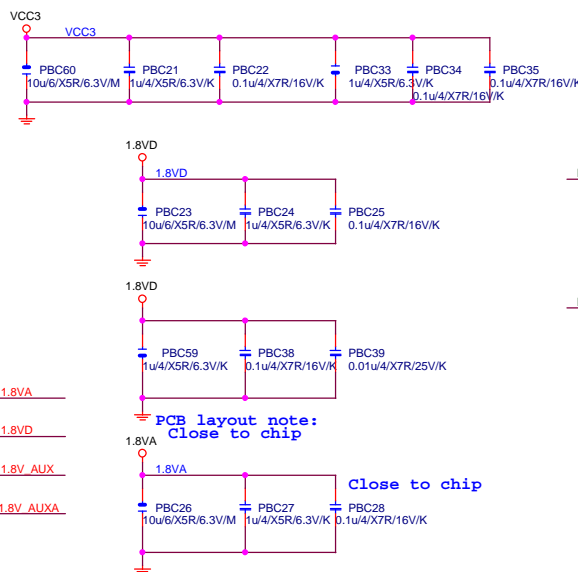
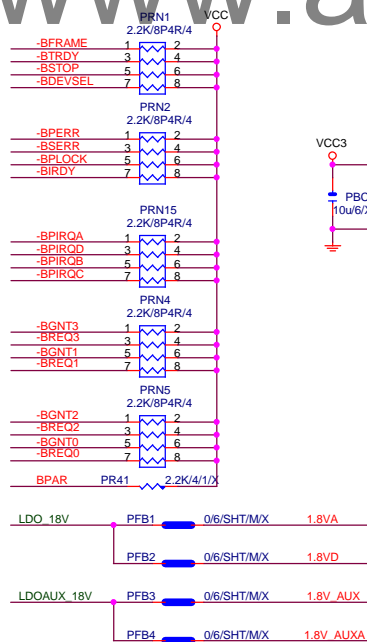
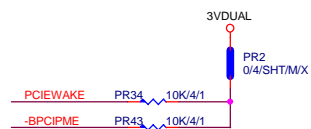
PCI slot



PCI slot



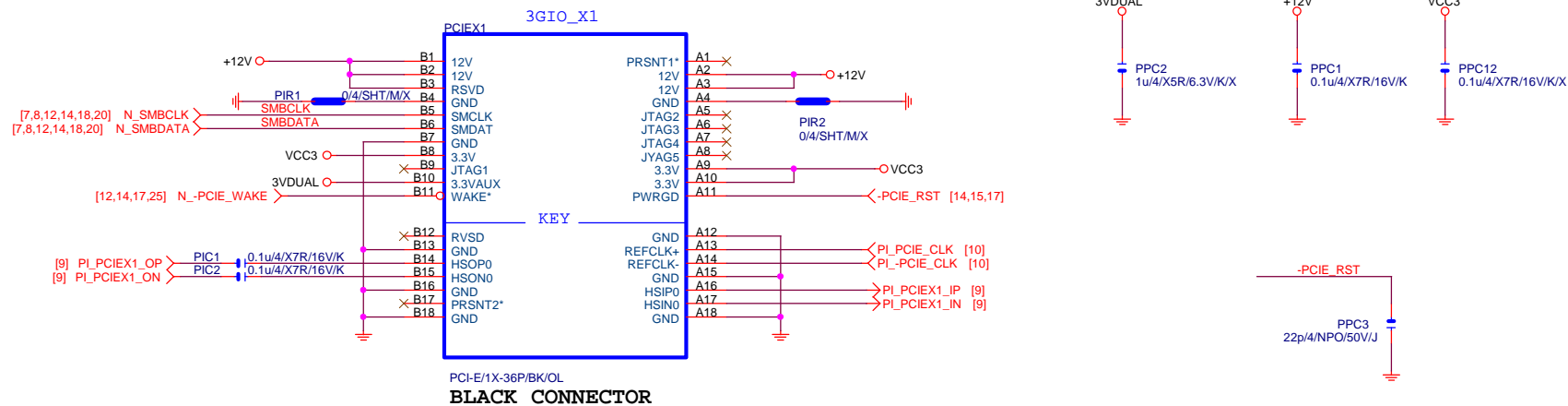
chipset side



Gigabyte Technology

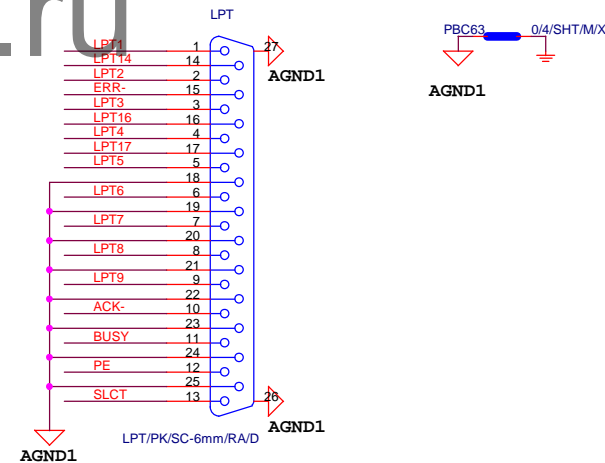
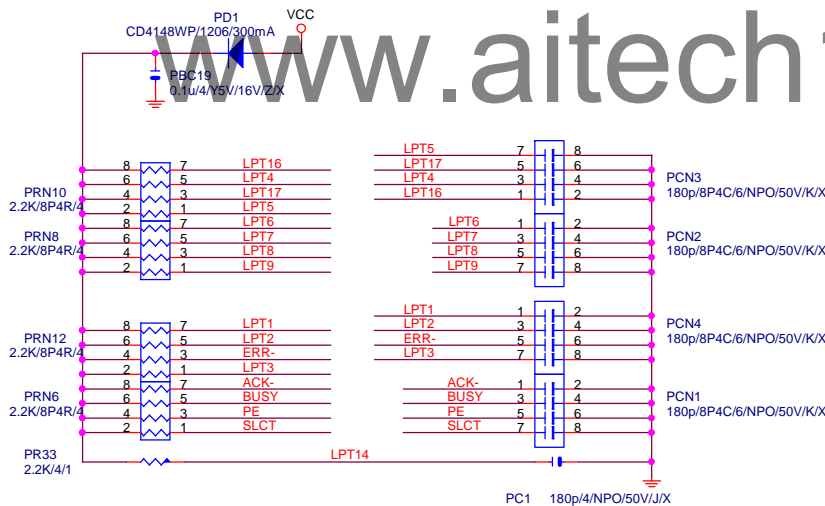
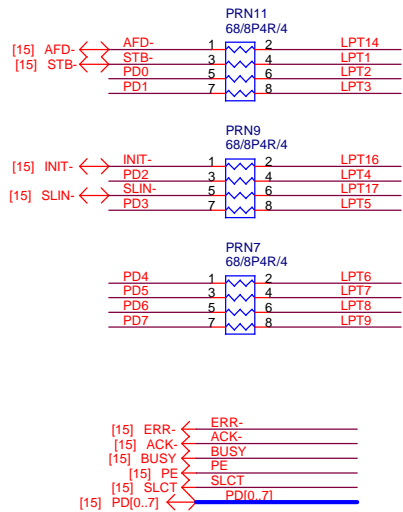
Title					ITE IT8892E		Rev
Size	Custom	Document Number	GA-H81M-S2PH				
						1.0	
Date:	Tuesday, December 24, 2013		Sheet	17	of	31	

PCIEX1 SLOT



LPT PORT

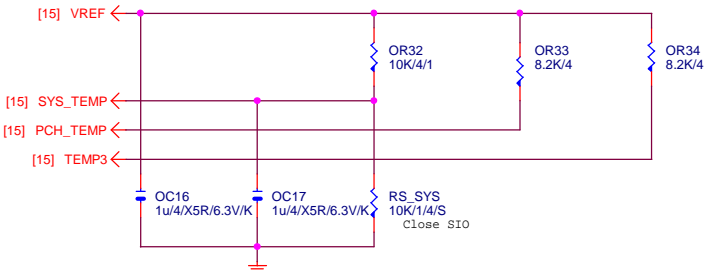
【技術通報R&D技術通報151】
33ohm Change to 68ohm



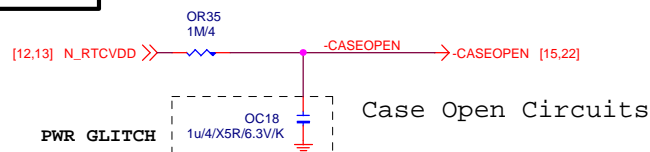
Gigabyte Technology

Title			LPT
Size B	Document Number	GA-H81M-S2PH	
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TEMP H/W MONITOR



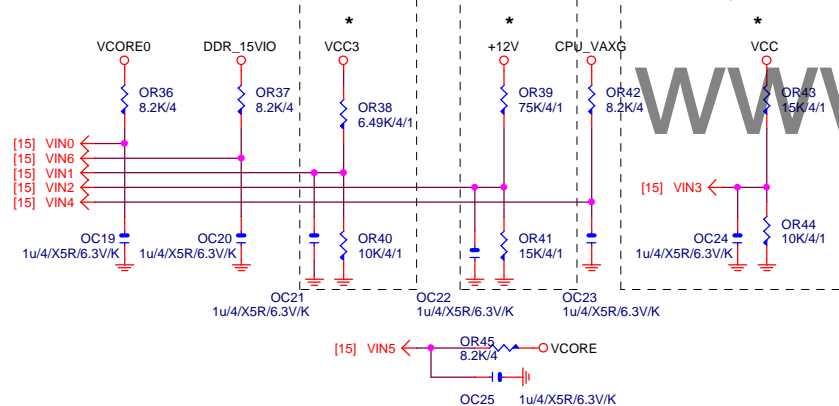
CASE OPEN



VOLTAGE-- H/W MONITOR

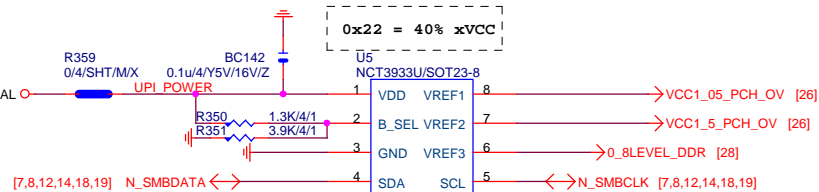
VIN2:75K/15K = 2V

VIN3:15K/10K = 2V



OV NCT3933

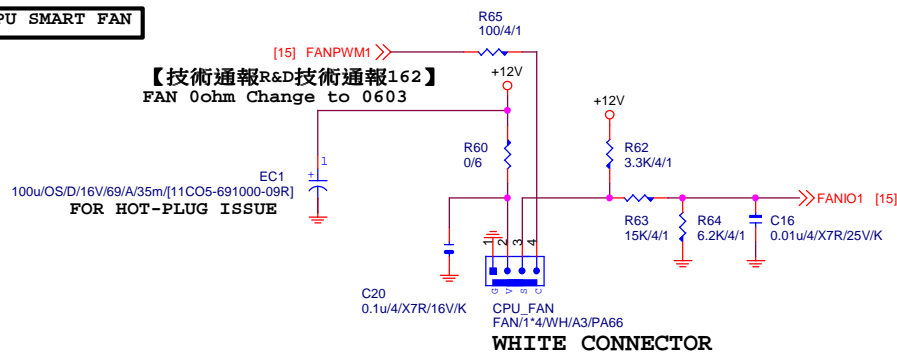
接pwm feedback pin



CPU SMART FAN

【技術通報R&D技術通報162】
FAN 0ohm Change to 0603

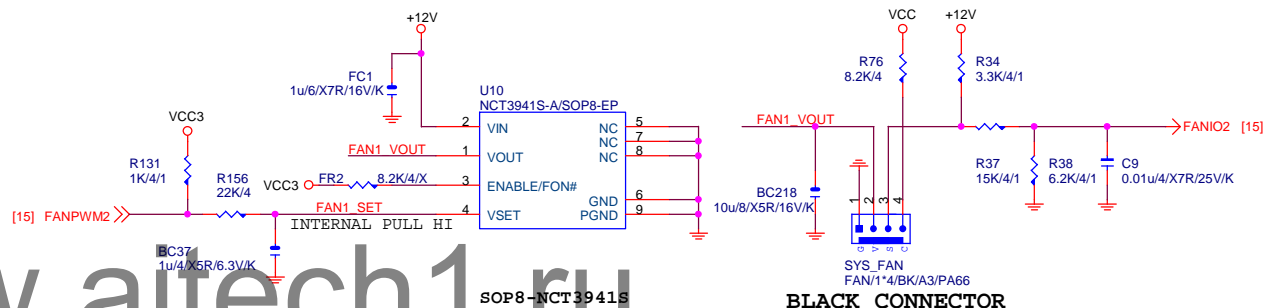
100u/OS/D/16V/69/A/35m/[11CO5-691000-09R]
FOR HOT-PLUG ISSUE



WHITE CONNECTOR

SYS SMART FAN

Linear SYS_FAN

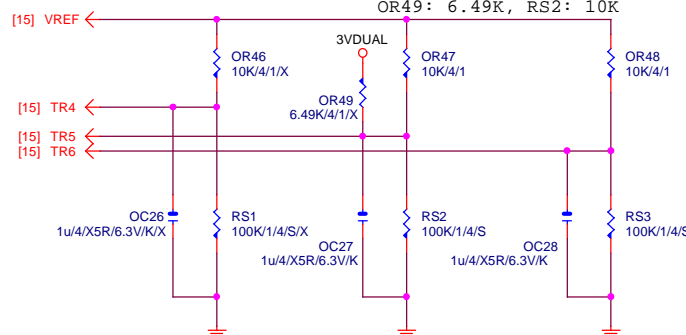


BLACK CONNECTOR

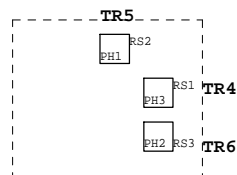
THERMISTOR MONITOR

TEST 3VDUAL Protection

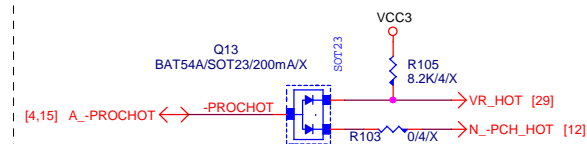
OR49: 6.49K, RS2: 10K



RS1、RS2、RS3 CLOSE CPU
VR MOSFET

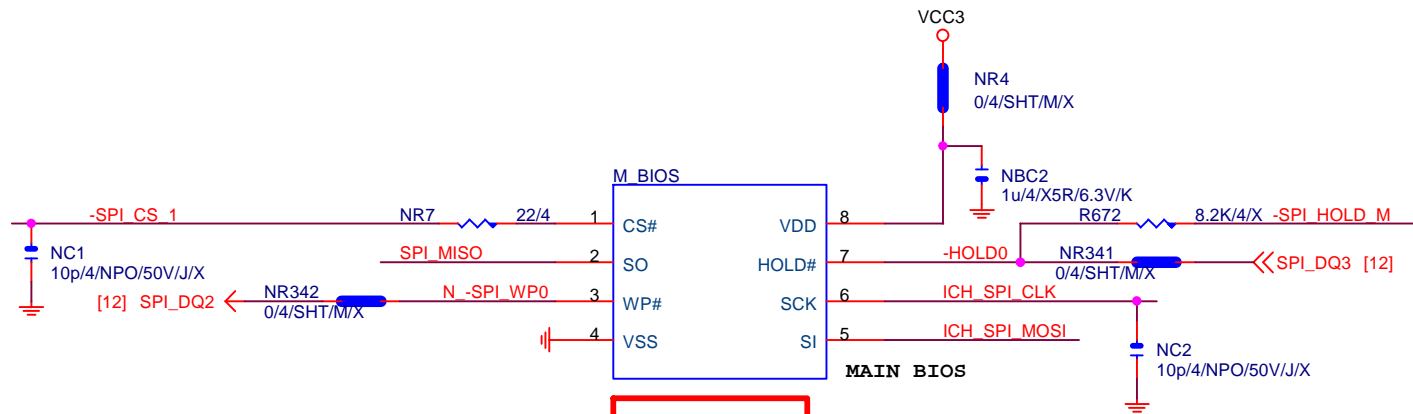


-PROHOT



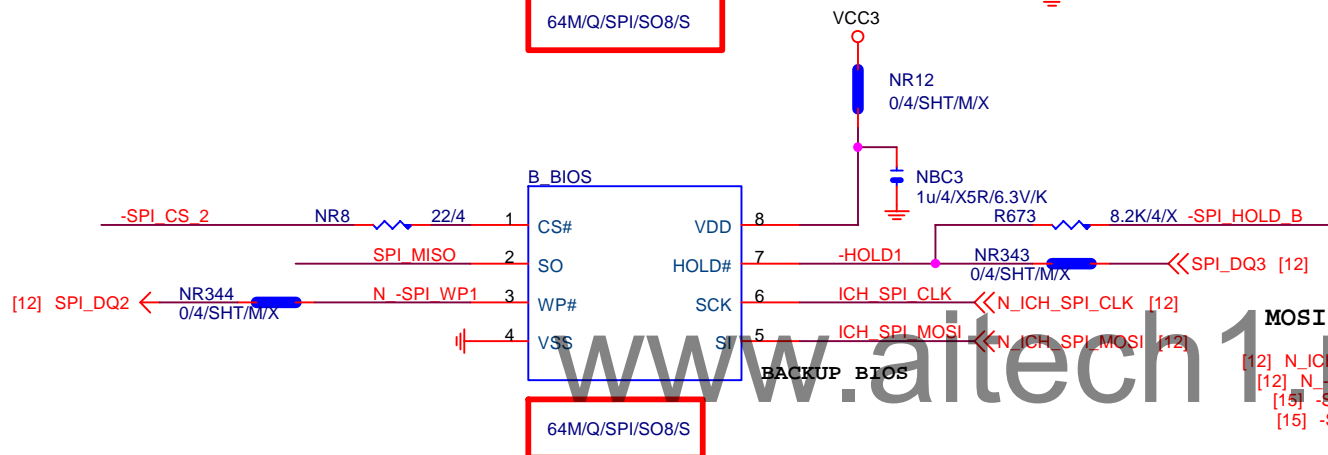
Gigabyte Technology

Title			
HWM,FAN CTRL,OV			
Size	Document Number	Rev	
Custom	GA-H81M-S2PH	1.02	
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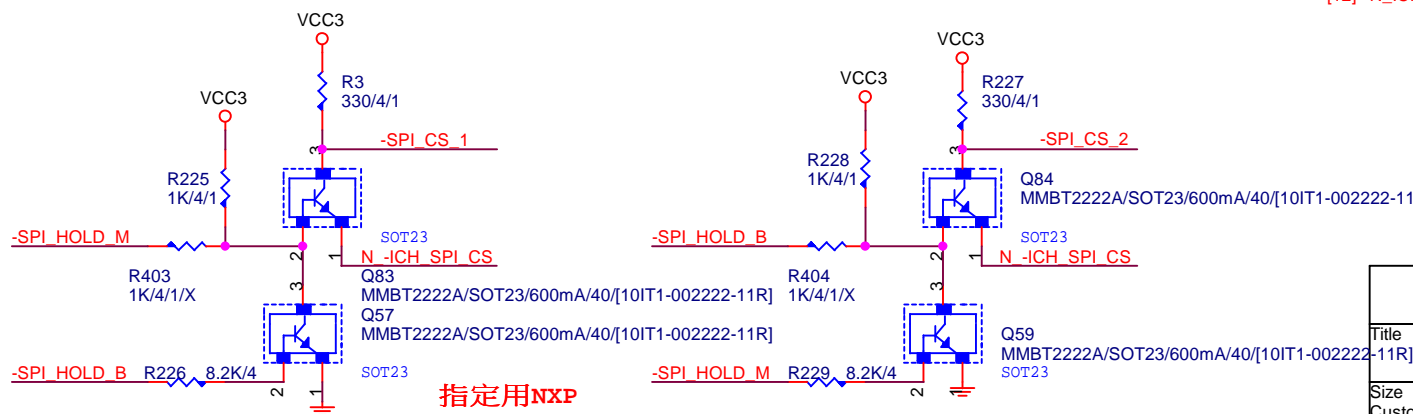
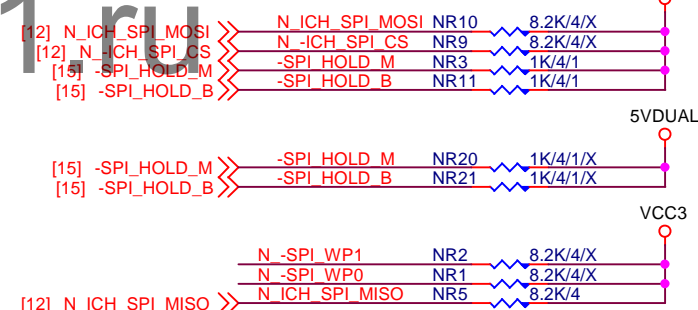


BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

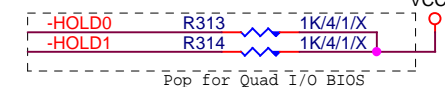
1 means floating
0 means PD 1K



MOSI For DMI RX Termination Voltage



CHECK



Gigabyte Technology

DUAL BIOS

GA-H81M-S2PH

Rev
1.02

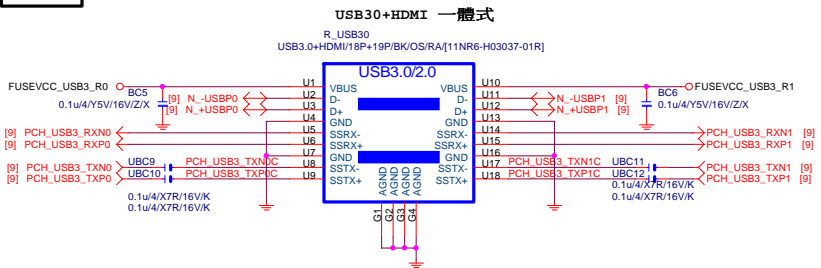
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Size
Custom

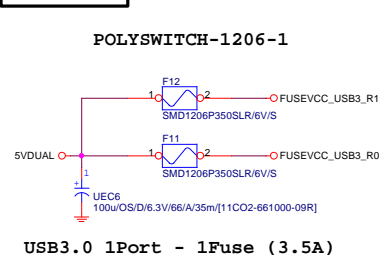
Document Number

Date: Tuesday, December 24, 2013 Sheet 21 of 31

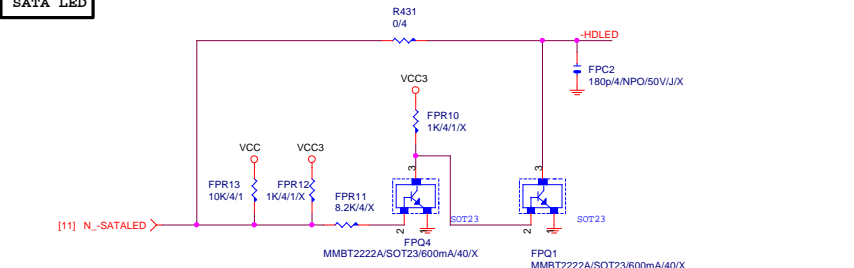
R_USB30



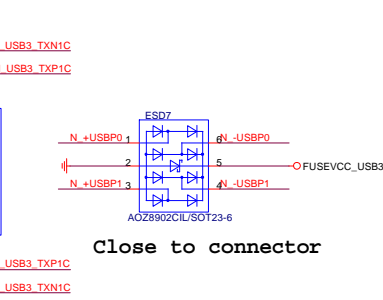
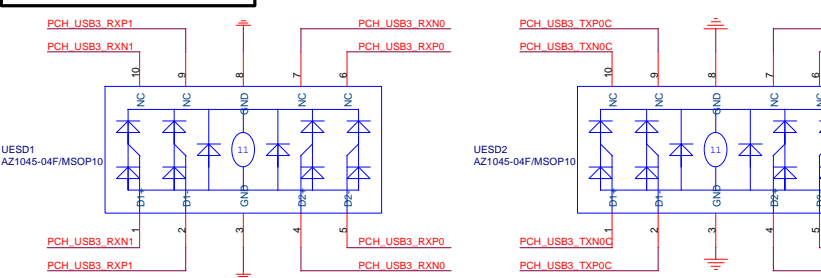
R_USB30 PWR



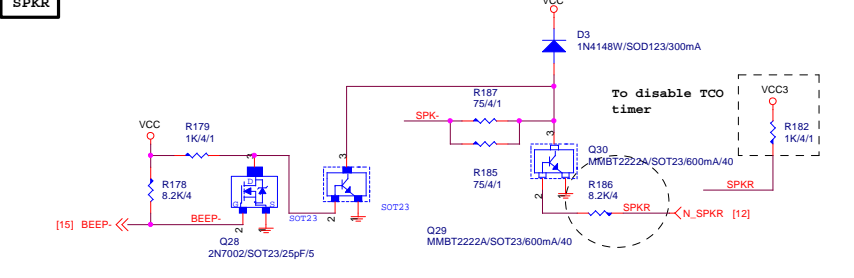
SATA LED



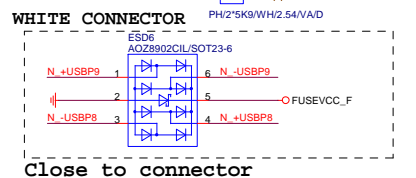
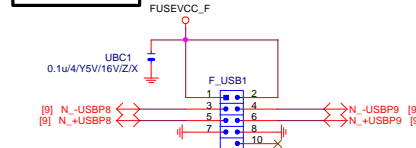
USB30_HDMI ESD PROTECT



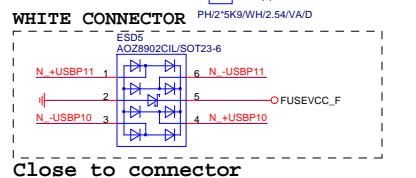
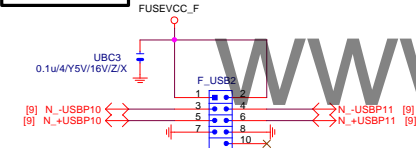
SPKR



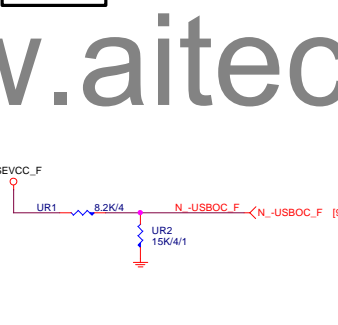
FRONT USB1



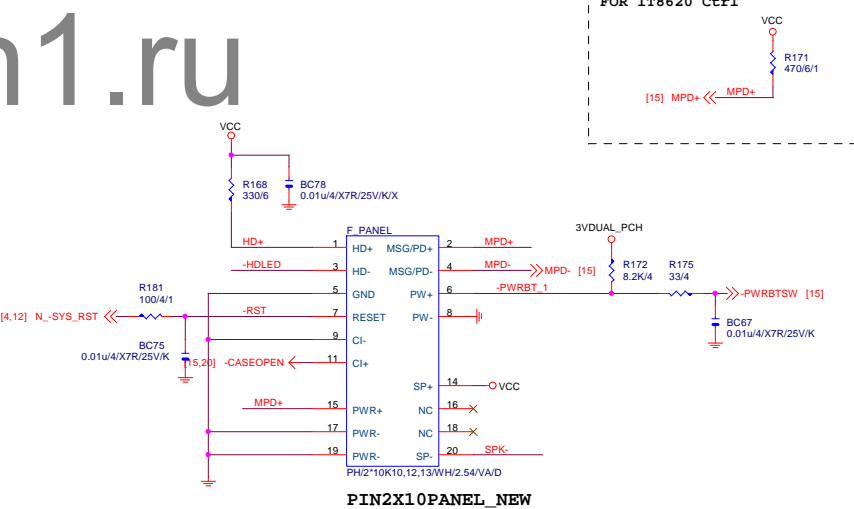
FRONT USB2



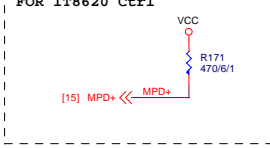
-USBOC_F



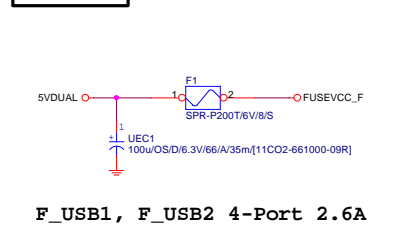
INTEL FRONT PANEL



PWR LED

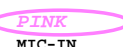
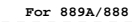
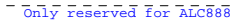
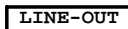


FUSEVCC_F



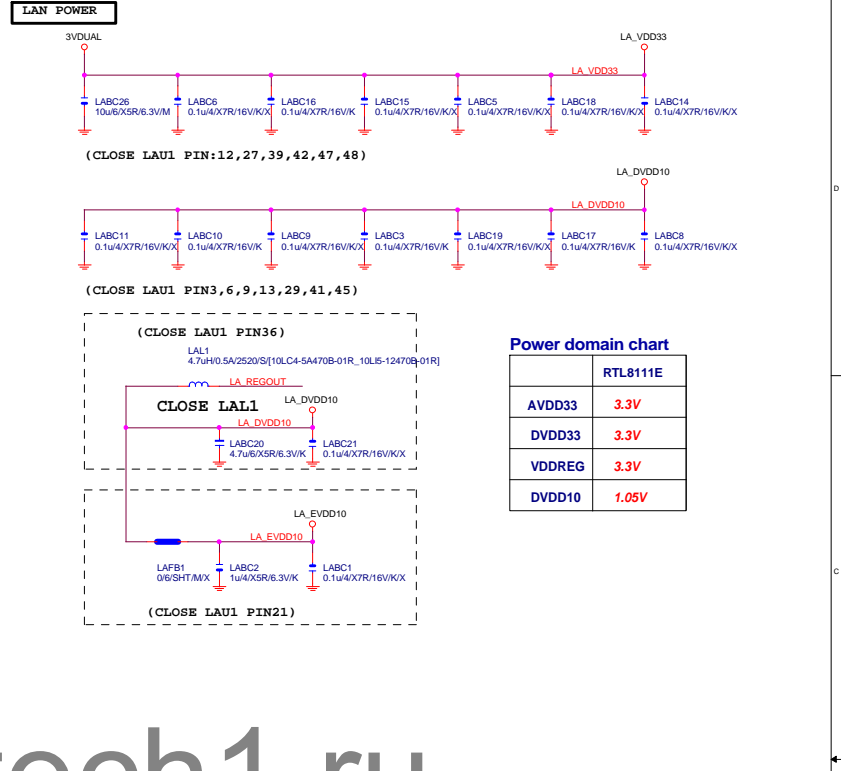
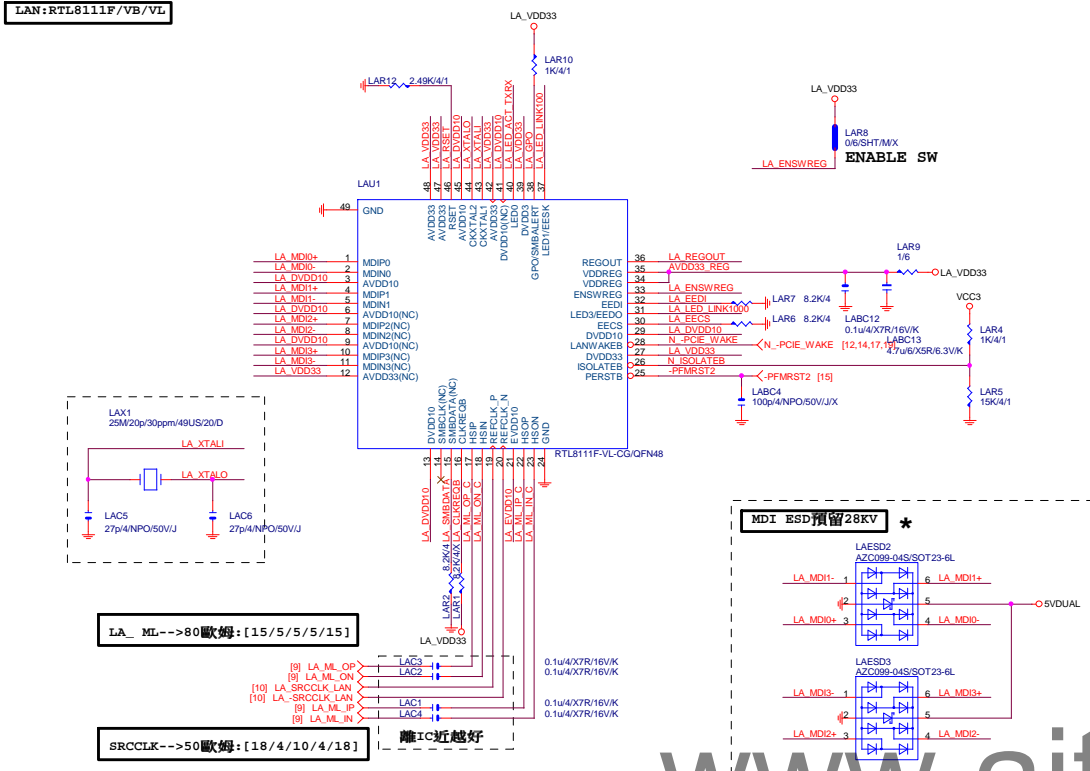
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Gigabyte Technology			
Title	FP,F_USB,USB PWR,SPKR,SATA LED		
Size	Document Number	Rev	
Date	Tuesday, December 24, 2013	Sheet	22 of 31
		1.02	

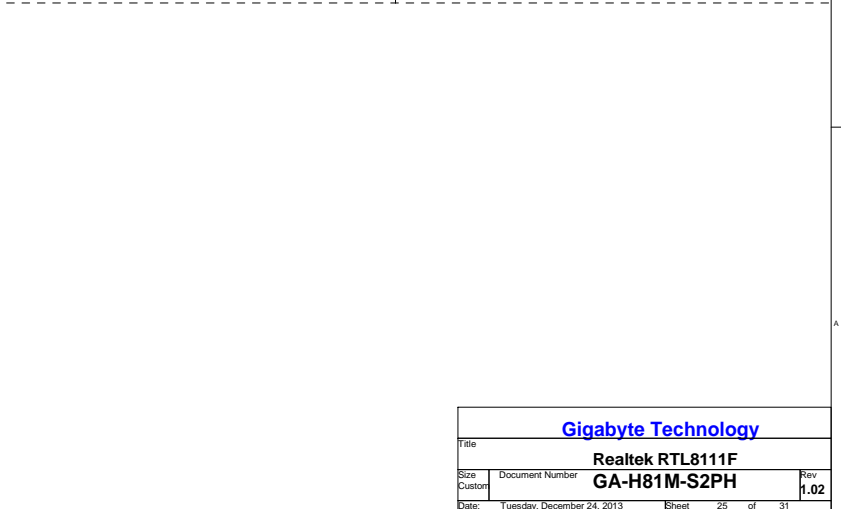
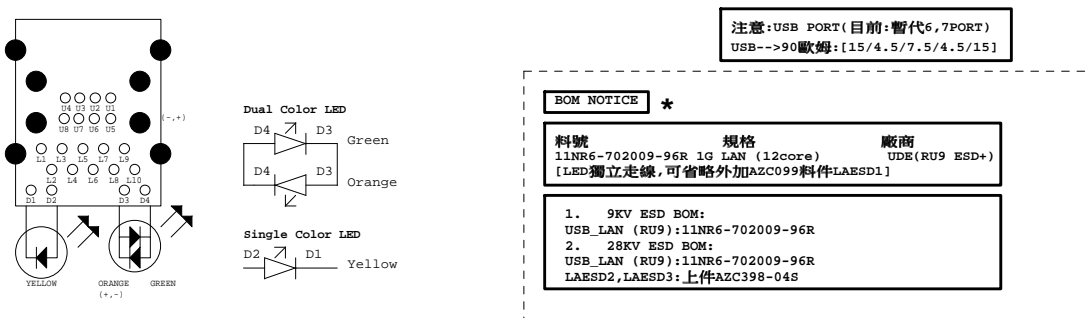
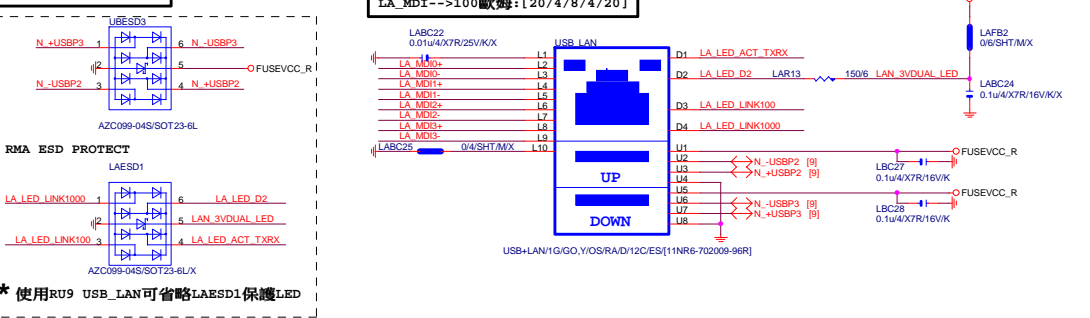


Title			
AUDIO JACK			
Size	Document Number		Rev
Custom	GA-H81M-S2PH		1.02
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LAN:RTL8111F/VB/VL

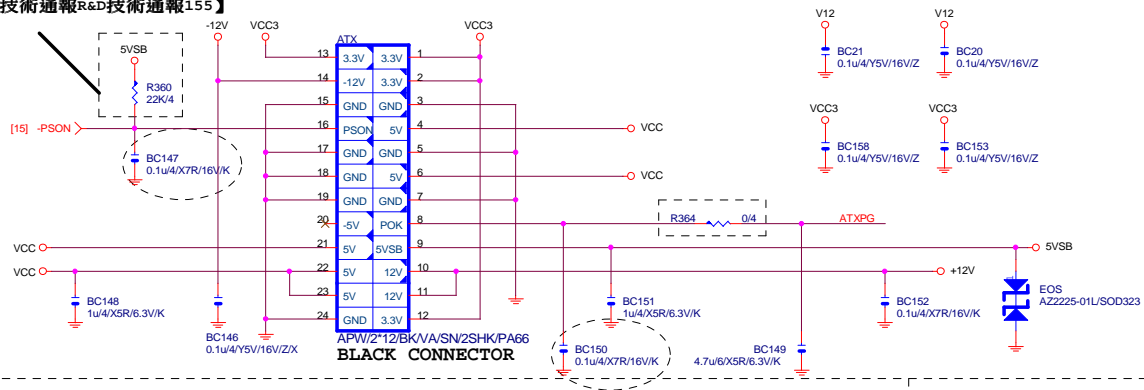


USB LAN CONNECTOR

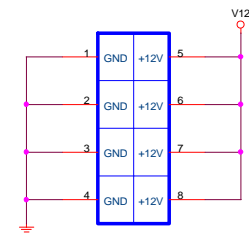


ATXX24 POWER CONNECTOR

【技術通報R&D技術通報155】



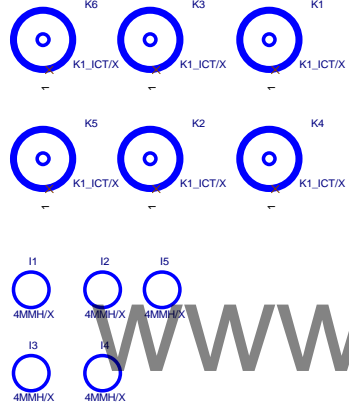
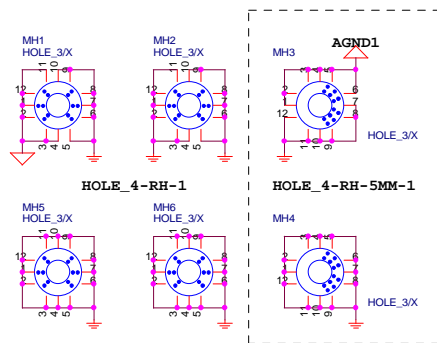
ATXX4 POWER CONNECTOR



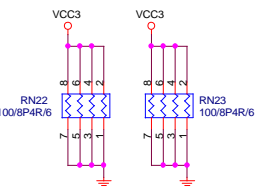
ATX_12V_2X4
APW/Z*4/BK/OC/P/4.2/VA/SN/OH:Location ATX_12V_2X4

BLACK CONNECTOR

MB LOCATION

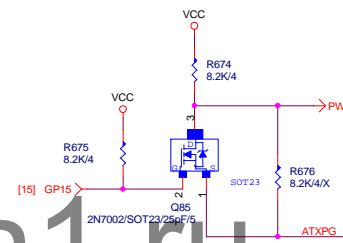


FIX PWR MINMUN LOAD



PWOK PATCH

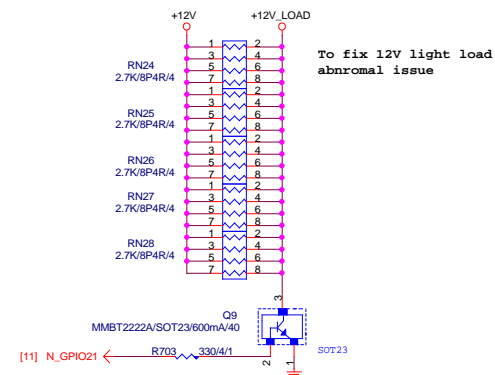
【技術通報R&D技術通報154】



CLK GEN

N/A

【技術通報R&D技術通報153】



To fix 12V light load
abnromal issue

Gigabyte Technology

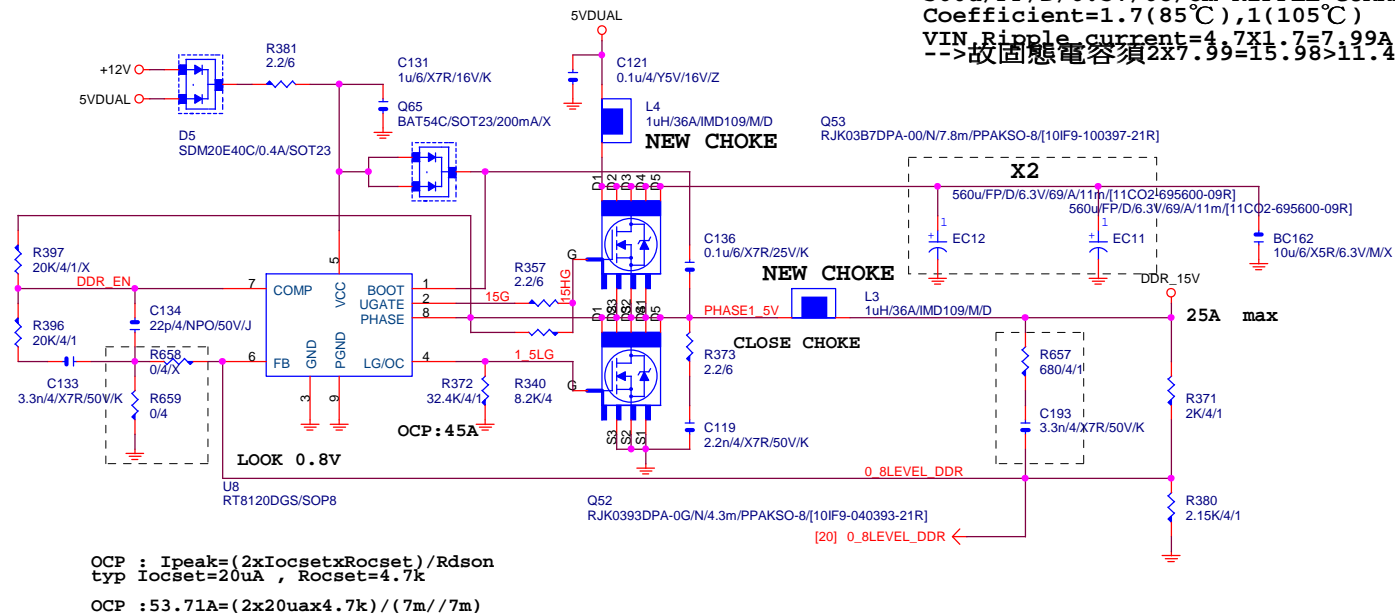
ATX CONNECTOR

GA-H81M-S2PH

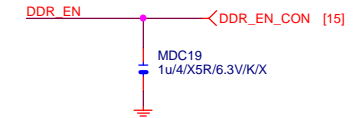
Rev
1.02

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DDR15V



PWR SEQ



From DDR_15V source
10 mils trace to SIO



VCC1_05_ME

Z81 N/A

VCC3_ME

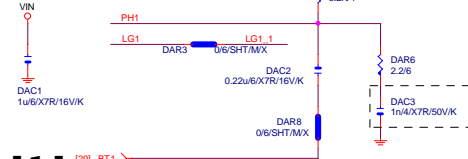
H81 N/A

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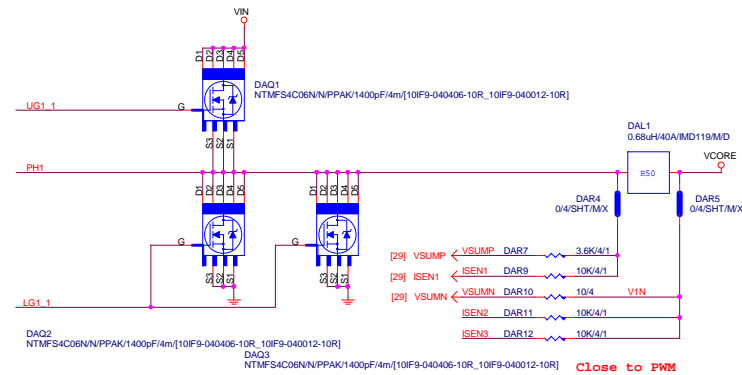
Gigabyte Technology

Title		
DDR & M3 POWER		
Size B	Document Number	Rev
	GA-H81M-S2PH	1.02
Date:	Tuesday, December 24, 2013	Sheet 28 of 31

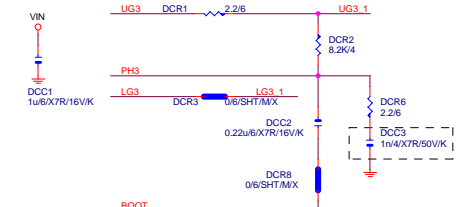
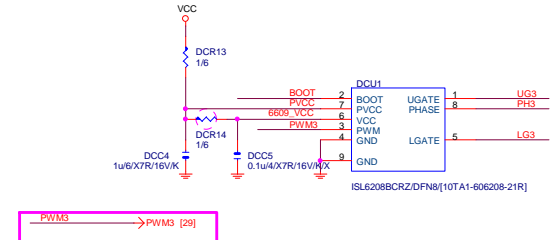
PHASE 1



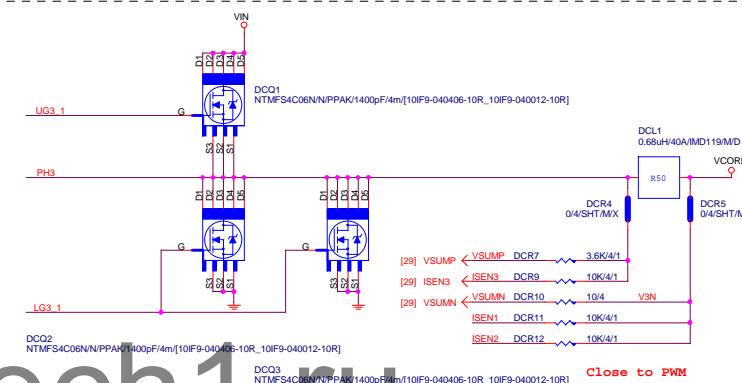
[1] [29] BT1



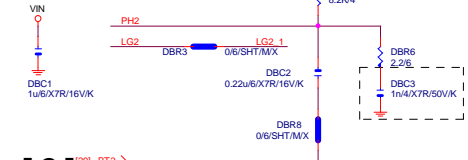
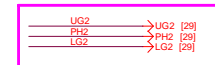
PHASE 3



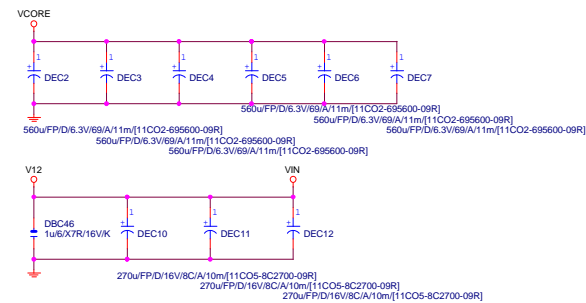
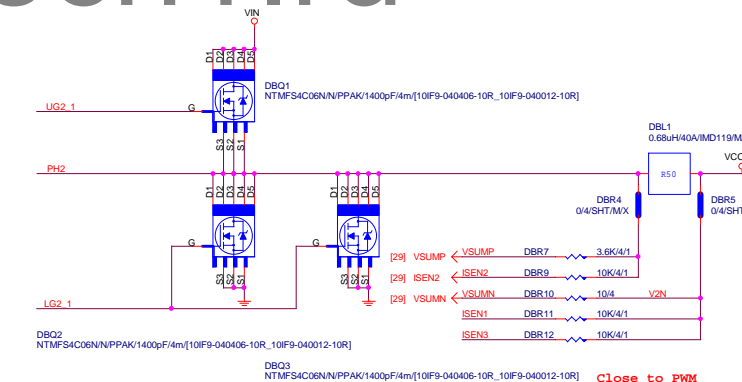
[3] [29] BT2



PHASE 2



[2] [29] BT2



Gigabyte Technology			
Title		CPU CORE VR-2	
Size	Document Number	GA-H81M-S2PH	
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```
ASM1442
Default [0,1,0]
450mv,-3dB
```



<i>Gigabyte Technology</i>			
Title			
HDMI			
Size B	Document Number	GA-H81M-S2PH	Rev 1.02
Date:	Tuesday, December 24, 2013	Sheet	31 of 31