

Model Name: GA-Q87M-D2H

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	PCI EXPRESSX4 / X1 SLOT
16	PCI SLOT
17	ITE 8728 LPC IO
18	KB_MS, R_USB
19	HWM,FAN CTRL,-PROCHOT
20	DUAL BIOS,TPM
21	FP,FUSB,SPK,SATALED
22	Realtek CODEC
23	REAR AUDIO JACK
24	INTEL i217 PHY
25	DISCRETE POWER
26	ATX, M3 POWER
27	VCORE ISL95820_1

SHEET TITLE

28	VCORE ISL95820_2
29	RT8120_DDR POWER
30	COM , LPT , 80PORT
31	DVI, HDMI ,DP
32	IT8892E PCI BRIDGE

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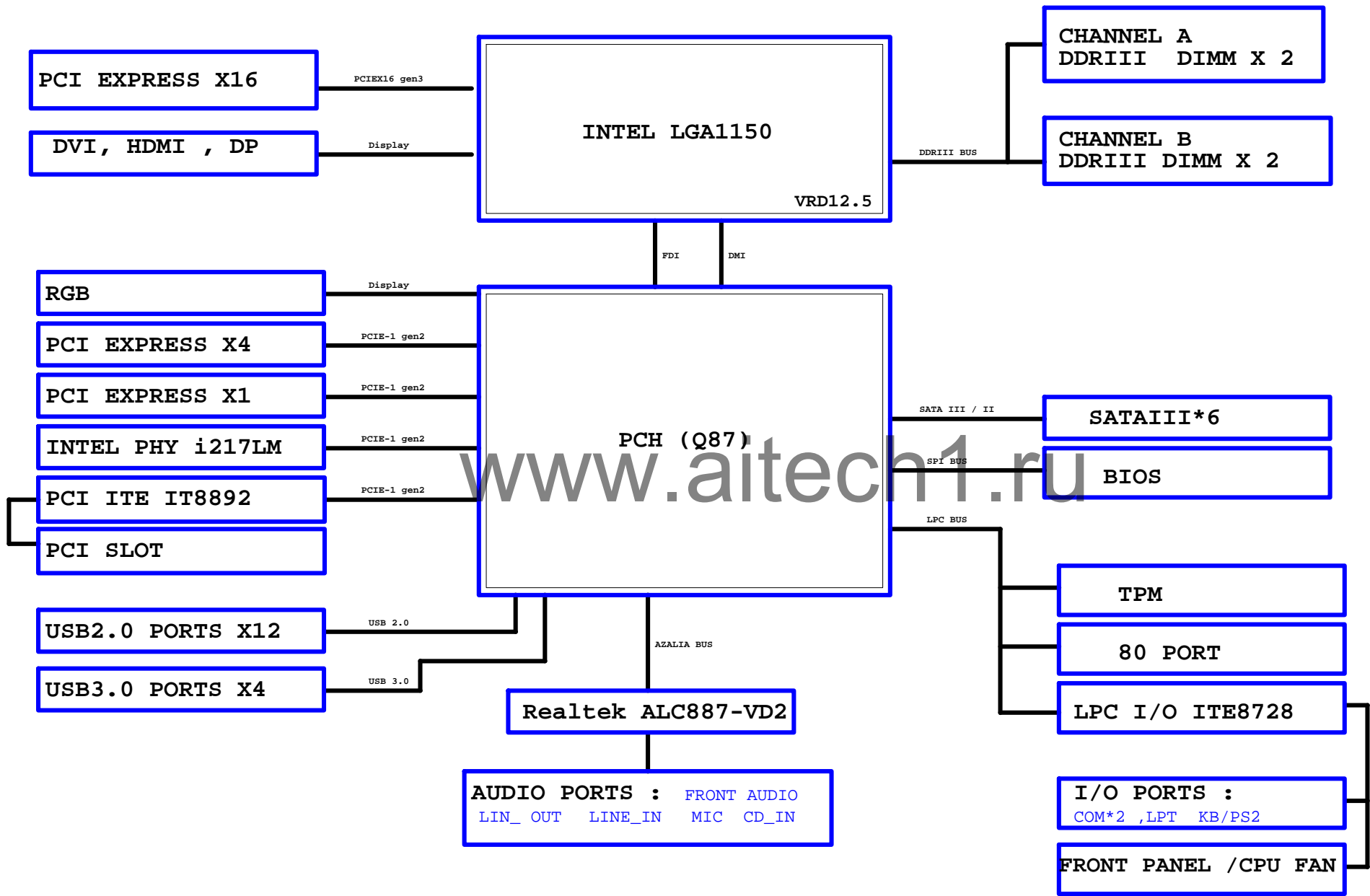
Gigabyte Technology		
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Cover Sheet		
Size Custom	Document Number GA-Q87M-D2H	Rev 1.1
Date: Tuesday, August 06, 2013	Sheet 1 of 32	

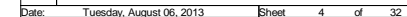
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BLOCK DIAGRAM





LGA1150A

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MAAA2	AU16	DDR0_MA2	DDR0_DQ2	AF38	MDA2
MAAA3	AW17	DDR0_MA3	DDR0_DQ3	AF39	MDA3
MAAA4	AU17	DDR0_MA4	DDR0_DQ4	AD37	MDA4
MAAA5	AW18	DDR0_MA5	DDR0_DQ5	AD40	MDA5
MAAA6	AV17	DDR0_MA6	DDR0_DQ6	AF37	MDA6
MAAA7	AT18	DDR0_MA7	DDR0_DQ7	AF40	MDA7
MAAA8	AU18	DDR0_MA8	DDR0_DQ8	AH39	MDA9
MAAA9	AT19	DDR0_MA9	DDR0_DQ9	AH39	MDA13
MAAA10	AW11	DDR0_MA10	DDR0_DQ10	AK38	MDA10
MAAA11	AV19	DDR0_MA11	DDR0_DQ11	AK39	MDA11
MAAA12	AU19	DDR0_MA12	DDR0_DQ12	AK37	MDA12
MAAA13	AY10	DDR0_MA13	DDR0_DQ13	AH38	MDA8
MAAA14	AT20	DDR0_MA14	DDR0_DQ14	AK37	MDA14
MAAA15	AU21	DDR0_MA15	DDR0_DQ15	AK40	MDA15
MODT_A0	AW10	DDR0_ODT0	DDR0_DQ16	AM39	MDA17
MODT_A1	AY8	DDR0_ODT1	DDR0_DQ17	AP38	MDA18
MODT_A2	AW9	DDR0_ODT2	DDR0_DQ18	AP39	MDA19
MODT_A3	AU8	DDR0_ODT3	DDR0_DQ19	AM37	MDA20
			DDR0_DQ20	AM38	MDA16
			DDR0_DQ21	AP37	MDA22
			DDR0_DQ22	AP40	MDA23
			DDR0_DQ23	AV37	MDA25
			DDR0_DQ24	AW37	MDA29
			DDR0_DQ25	AU35	MDA26
			DDR0_DQ26	AV35	MDA27
			DDR0_DQ27	AT37	MDA28
			DDR0_DQ28	U37	MDA24
			DDR0_DQ29	AT35	MDA30
			DDR0_DQ30	AW35	MDA31
			DDR0_DQ31	AY6	MDA33
			DDR0_DQ32	AU6	MDA37
			DDR0_DQ33	AY4	MDA34
			DDR0_DQ34	AU4	MDA35
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			DDR0_DQ39	AR1	MDA41
			DDR0_DQ40	AR4	MDA45
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			DDR0_DQ42	AN4	MDA43
			DDR0_DQ43	AR2	MDA44
			DDR0_DQ44	AR3	MDA46
			DDR0_DQ45	AN2	MDA47
			DDR0_DQ46	AL1	MDA49
			DDR0_DQ47	AL4	MDA53
			DDR0_DQ48	AJ3	MDA50
			DDR0_DQ49	AJ4	MDA51
			DDR0_DQ50	AL2	MDA52
			DDR0_DQ51	AL3	MDA48
			DDR0_DQ52	AJ2	MDA54
			DDR0_DQ53	AJ1	MDA55
			DDR0_DQ54	AG4	MDA57
			DDR0_DQ55	AG1	MDA61
			DDR0_DQ56	AE3	MDA58
			DDR0_DQ57	AE4	MDA59
			DDR0_DQ58	AG2	MDA60
			DDR0_DQ59	AG3	MDA56
			DDR0_DQ60	AE2	MDA62
			DDR0_DQ61	AE1	MDA63
			DDR0_DQ62	AE39	DQSA0
			DDR0_DQ63	AJ39	DQSA1
			DDR0_DQ64	AN39	DQSA2
			DDR0_DQ65	AV36	DQSA3
			DDR0_DQ66	AV5	DQSA4
			DDR0_DQ67	AP3	DQSA5
			DDR0_DQ68	AK3	DQSA6
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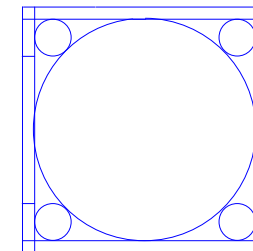
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LGA1150B

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MAAB2	AM22	DDR1_MA2	DDR1_DQ2	AG35	MDB2
MAAB3	AM23	DDR1_MA3	DDR1_DQ3	AH35	MDB3
MAAB4	AP23	DDR1_MA4	DDR1_DQ4	AD34	MDB4
MAAB5	AL23	DDR1_MA5	DDR1_DQ5	AD35	MDB5
MAAB6	AY24	DDR1_MA6	DDR1_DQ6	AG34	MDB6
MAAB7	AV25	DDR1_MA7	DDR1_DQ7	AH34	MDB7
MAAB8	AU26	DDR1_MA8	DDR1_DQ8	AL34	MDB8
MAAB9	AW26	DDR1_MA9	DDR1_DQ9	AL35	MDB9
MAAB10	AP18	DDR1_MA10	DDR1_DQ10	AK31	MDB10
MAAB11	AY25	DDR1_MA11	DDR1_DQ11	AL31	MDB11
MAAB12	AV26	DDR1_MA12	DDR1_DQ12	AK34	MDB12
MAAB13	AR15	DDR1_MA13	DDR1_DQ13	AK35	MDB13
MAAB14	AV27	DDR1_MA14	DDR1_DQ14	AK32	MDB14
MAAB15	AY28	DDR1_MA15	DDR1_DQ15	AL32	MDB15
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			DDR1_DQ17	AP34	MDB21
			DDR1_DQ18	AN31	MDB19
			DDR1_DQ19	AP31	MDB23
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			DDR1_DQ21	AP35	MDB18
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			DDR1_DQ23	AP32	MDB25
			DDR1_DQ24	AM29	MDB26
			DDR1_DQ25	AM28	MDB28
			DDR1_DQ26	AR28	MDB27
			DDR1_DQ27	AR28	MDB30
			DDR1_DQ28	AL29	MDB24
			DDR1_DQ29	AL28	MDB29
			DDR1_DQ30	AP29	MDB26
			DDR1_DQ31	AP28	MDB31
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			DDR1_DQ37	AP13	MDB37
			DDR1_DQ38	AM13	MDB38
			DDR1_DQ39	AM12	MDB39
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			DDR1_DQ54	AM7	MDB51
			DDR1_DQ55	AH6	MDB60
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MODT_B0	AM17	DDR1_ODT0	
MODT_B1	AL16	DDR1_ODT1	
MODT_B2	AM16	DDR1_ODT2	
MODT_B3	AK15	DDR1_ODT3	
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	AP25	DDR1_ECC1	
	AP25	DDR1_ECC2	
	AP26	DDR1_ECC3	
	AL26	DDR1_ECC4	
	AR26	DDR1_ECC5	
	AR26	DDR1_ECC6	
	AR26	DDR1_ECC7	
SBAB0	AK17	DDR1_BA0	
SBAB1	AL18	DDR1_BA1	
SBAB2	AW28	DDR1_BA2	
		DDR1_BA3	
CKEB0	AW29	DDR1_CKE0	
CKEB1	AY29	DDR1_CKE1	
CKEB2	AU28	DDR1_CKE2	
CKEB3	AU29	DDR1_CKE3	
CSB0	AP17	DDR1_CS_N0	
CSB1	AN15	DDR1_CS_N1	
CSB2	AN17	DDR1_CS_N2	
CSB3	AL15	DDR1_CS_N3	
		DDR1_CLK_P0	
		DDR1_CLK_P1	
		DDR1_CLK_N1	
		DDR1_CLK_P2	
		DDR1_CLK_P3	
		DDR1_CLK_N3	
SEASB	AP16	DDR1_CAS* RWD	
SPASB	AM18	DDR1_RAS*	
S*WAB	AK16	DDR1_WE*	
VREF_DQ0	AB39	DDR_VREF_DQ0	
VREF_DQ8	AB40	DDR_VREF_DQ1	
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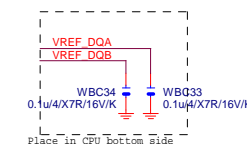
CR
CPU RETAINTION/X

LGA1150



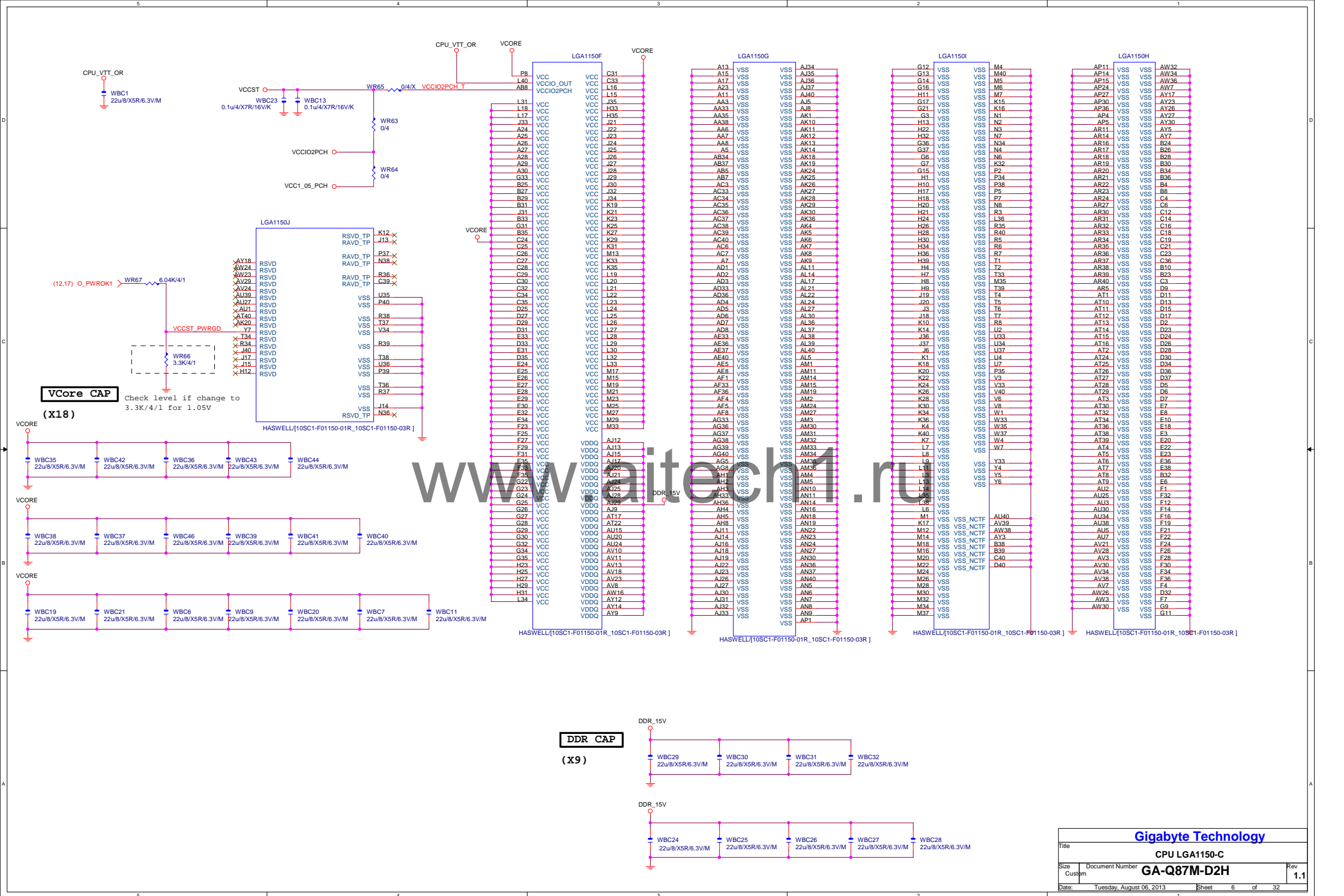
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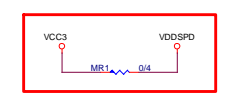
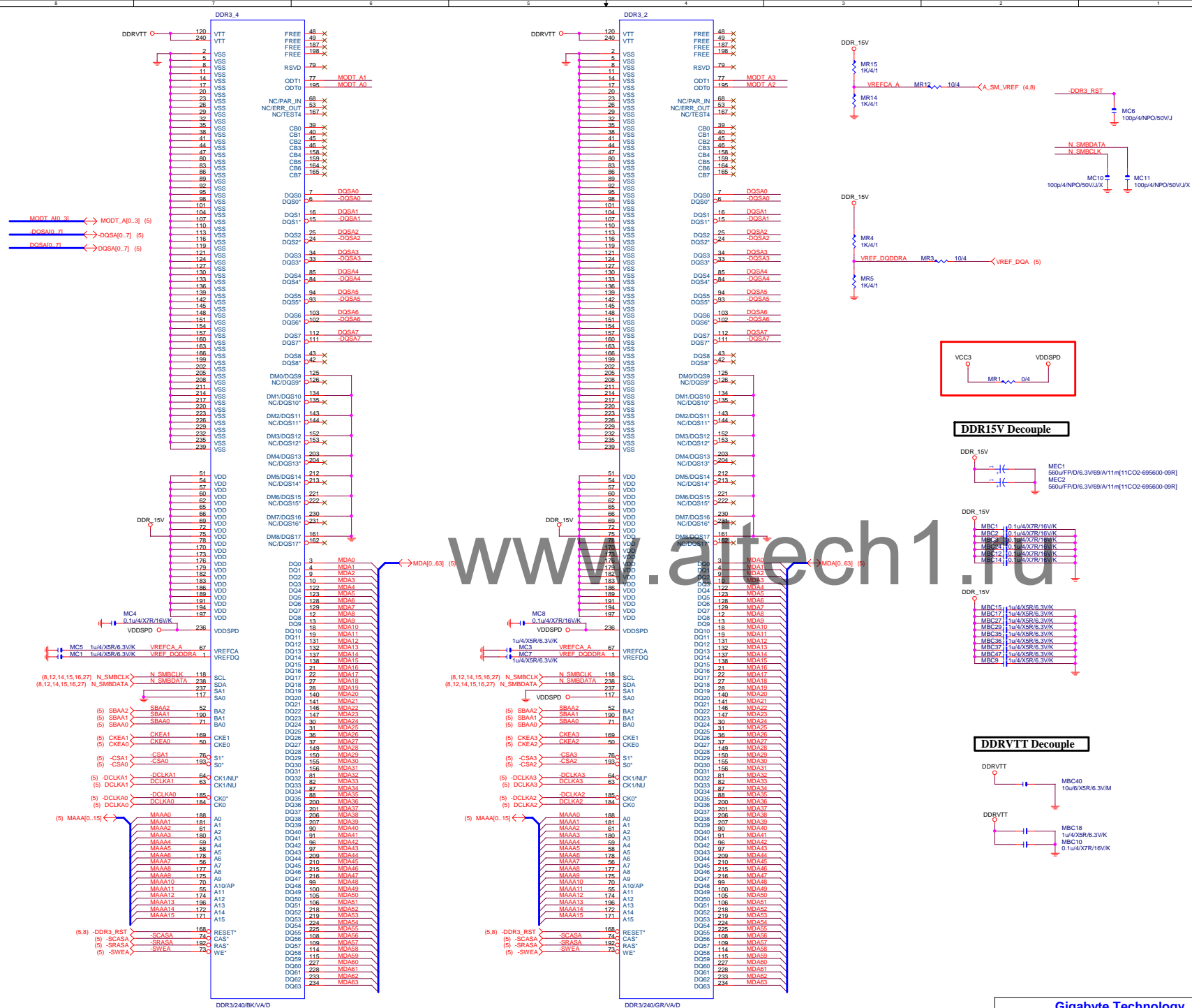
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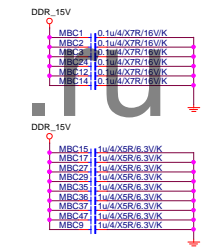
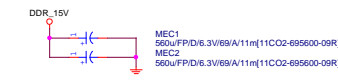
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Size			Rev	
Custom			1.1	
Document Number			GA-Q87M-D2H	
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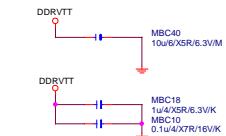




DDR15V Decouple

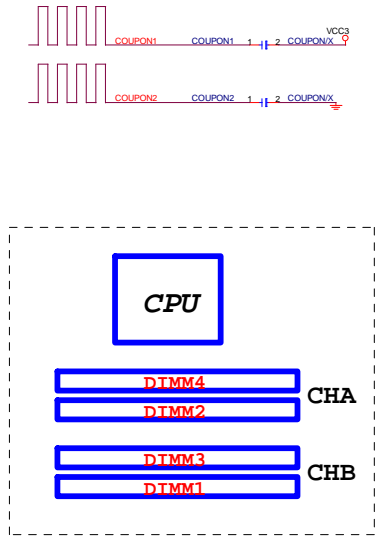
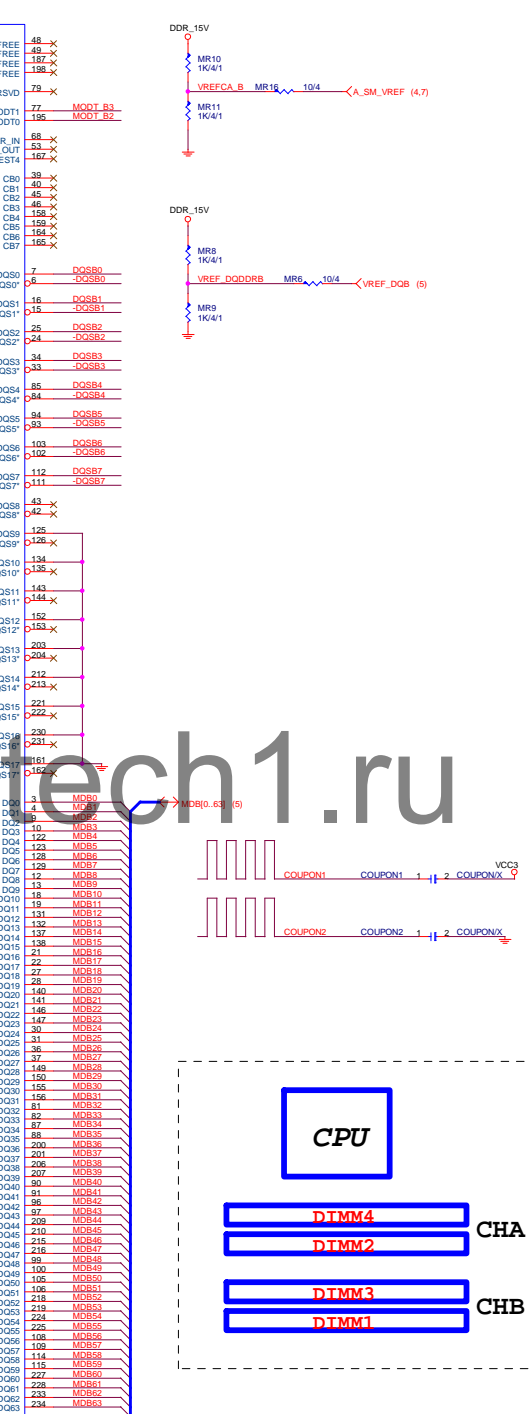
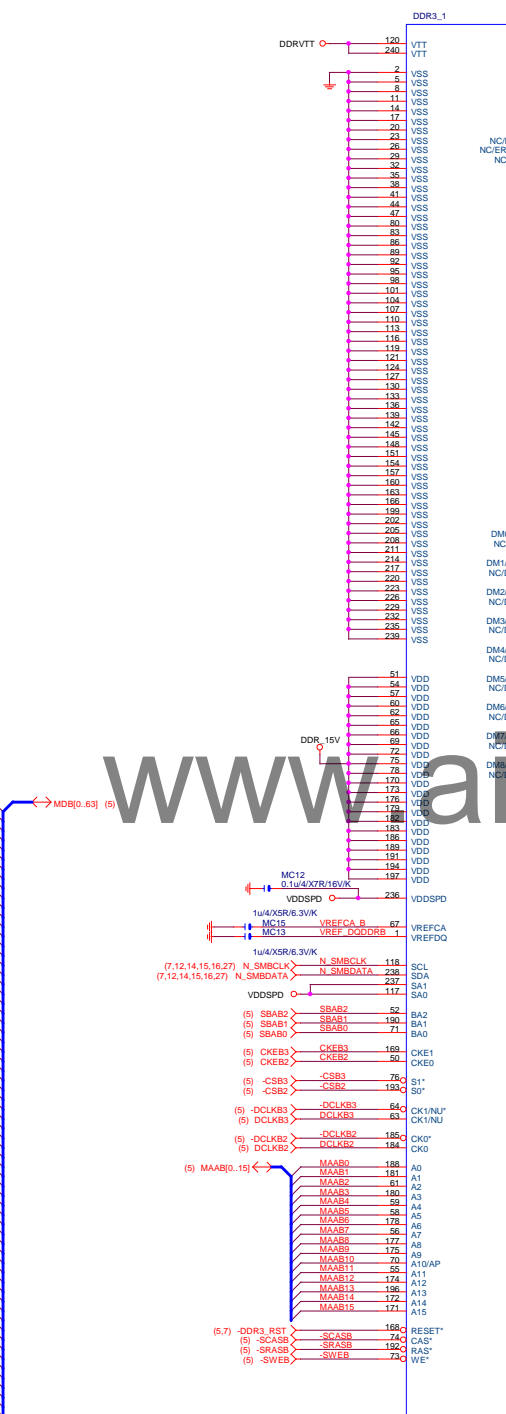
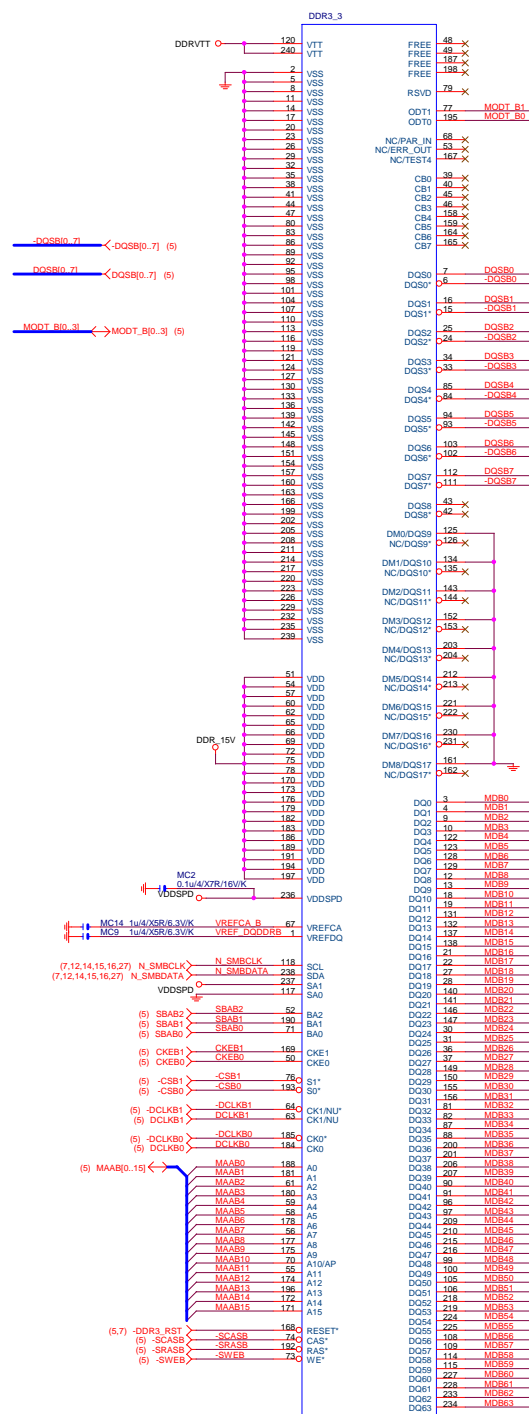


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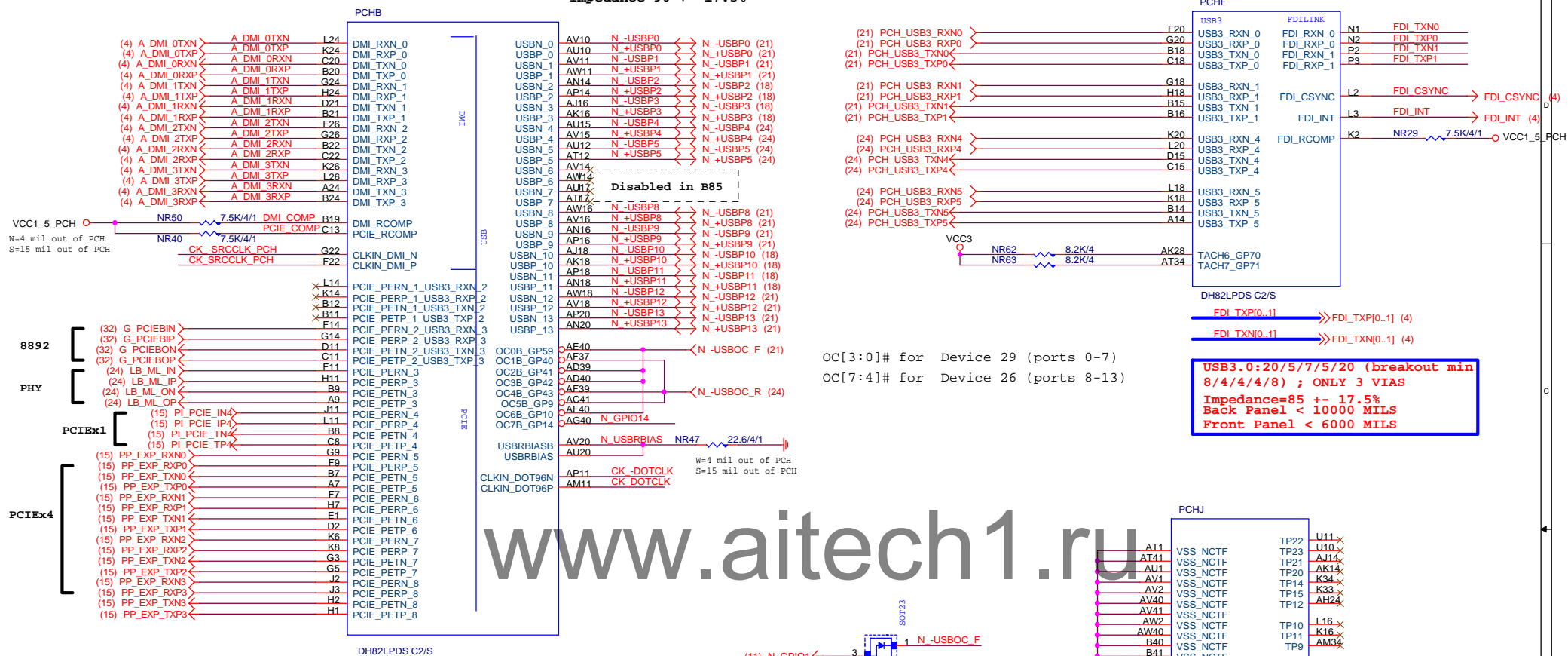


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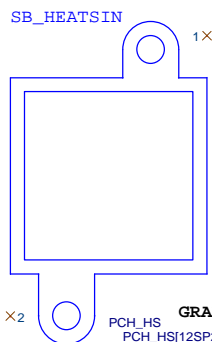
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Size	Document Number	GA-Q87M-D2H	Sheet 7 of 32
Custom			
Date			



USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



LOW COST ICH7 HEATSINK



GRAY HS

PCH_HS
PCH_HS[12SP2-S04209-01R 12SP2-S04209-02R 12SP2-S04209-03R]

(11) N_GPIOT1 ← 3

UAD5
BAT54A/SOT23/200mA

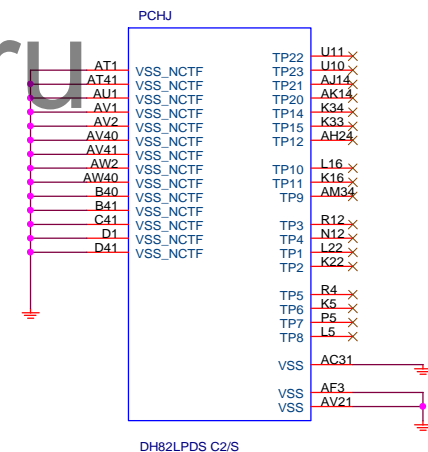

1 N_USBOC_F
2 N_USBOC_R

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CK_SRCCLK_PCH NR88 8.2K/4

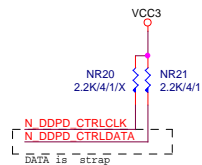
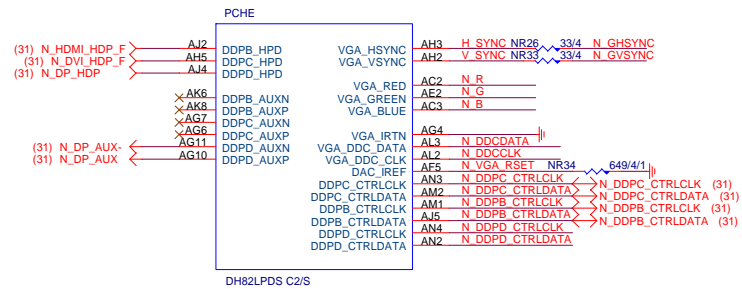
Mount for integrated clock Generation Mode

CK_DOTCLK NR92 8.2K/4
CK_-DOTCLK NR91 8.2K/4

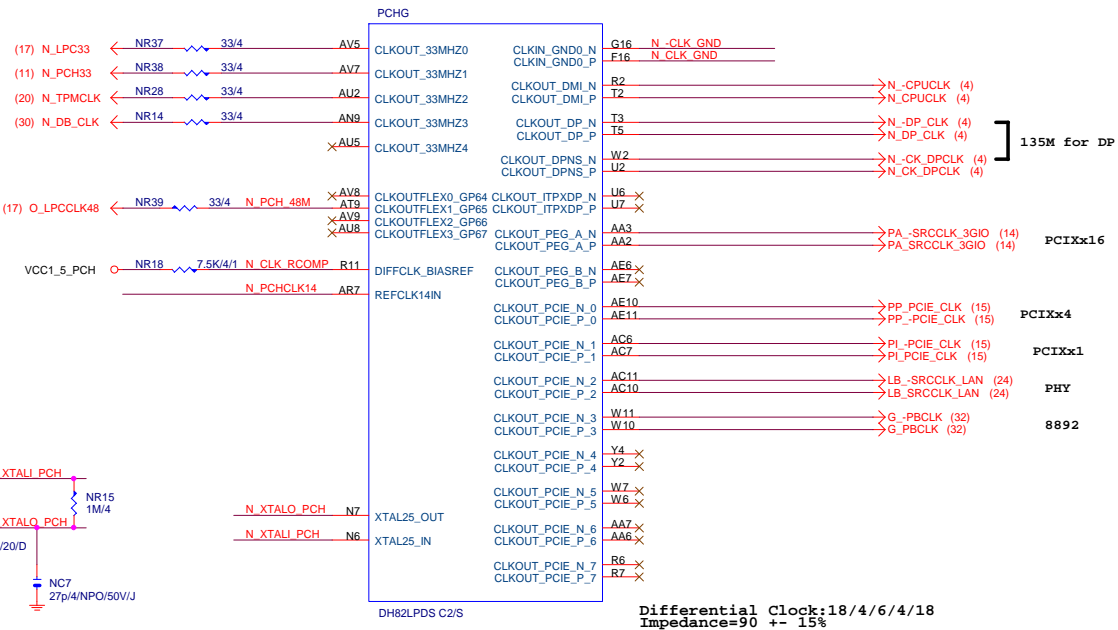
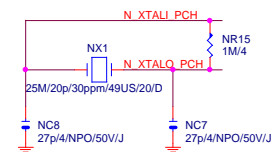
NR225 short to GND in non
graphic SKU



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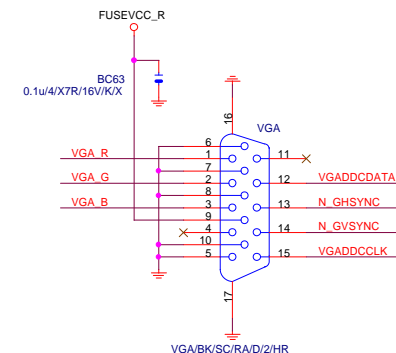
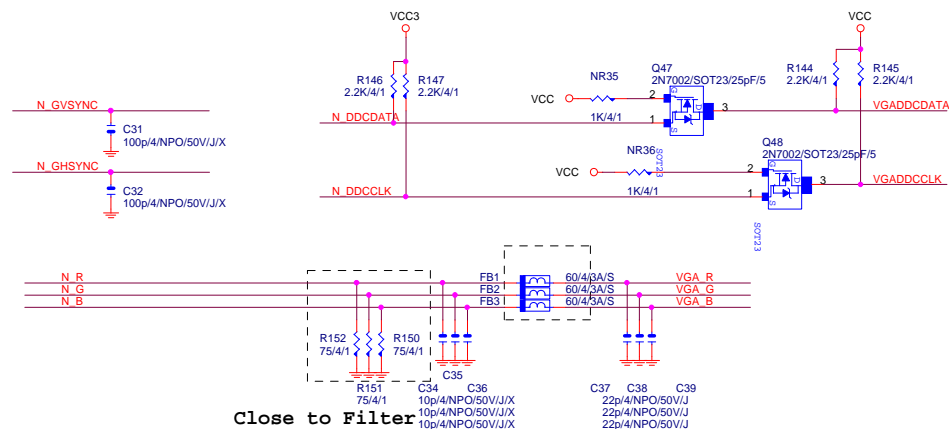
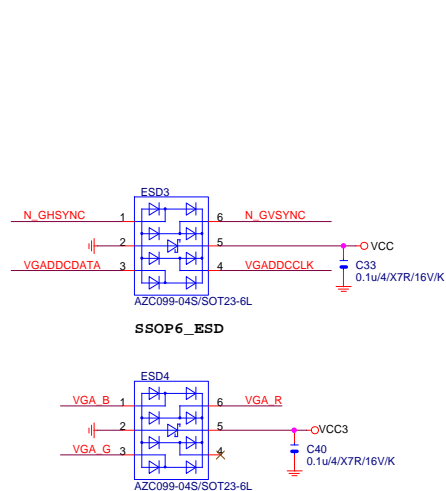
Flex1,2,3,4 : (17) O_LPCCLK48
14/24/33/48MHZ



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

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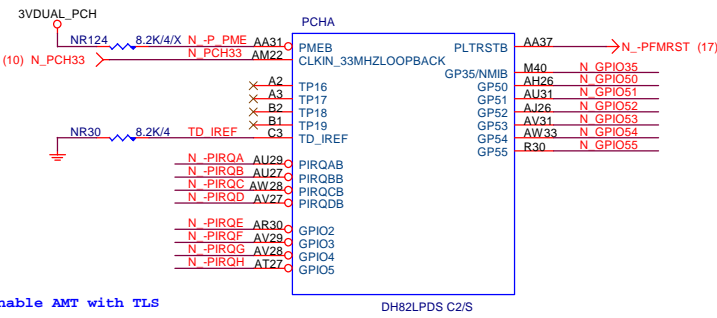
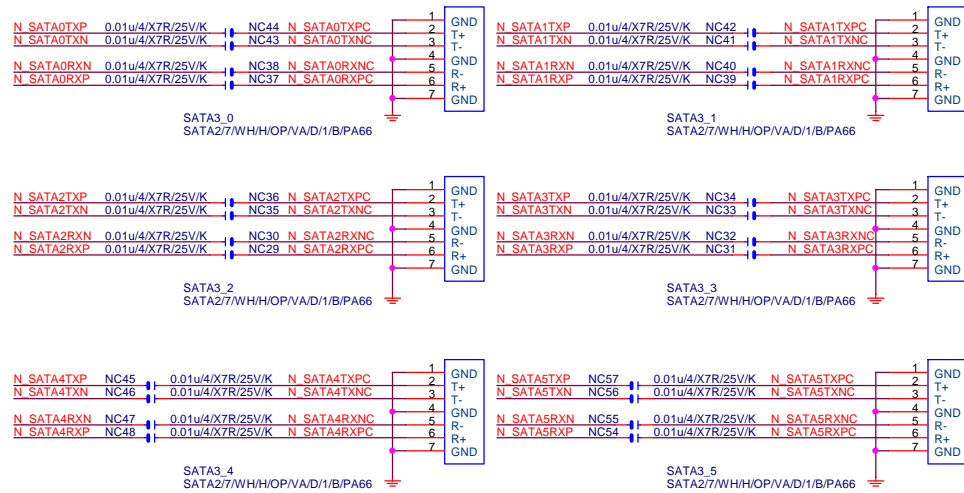
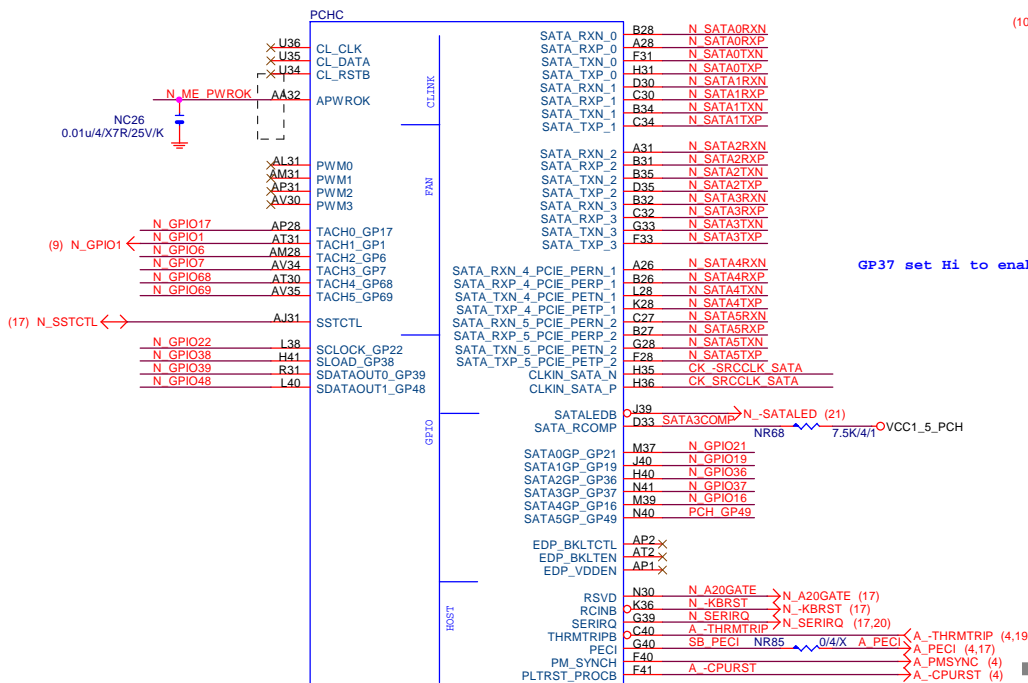
Mount for integrated clock Generation Mode



Gigabyte Technology

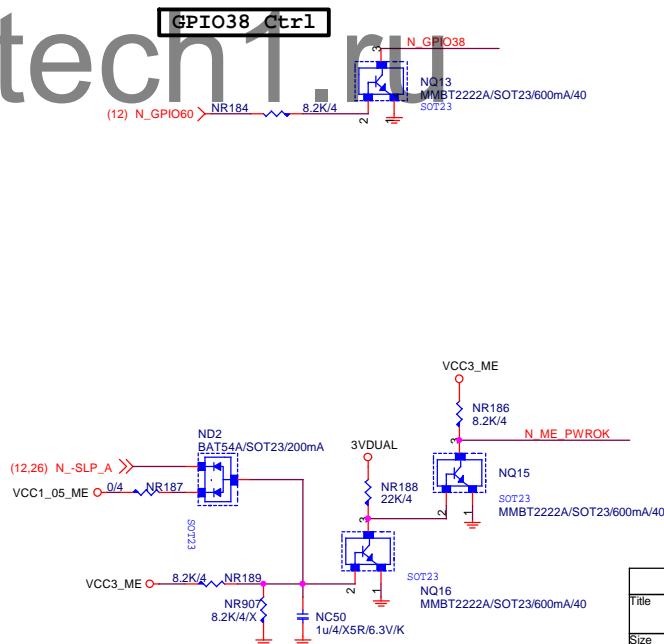
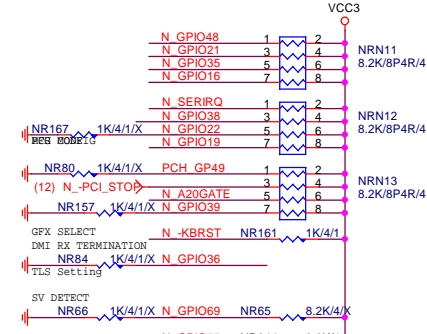
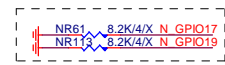
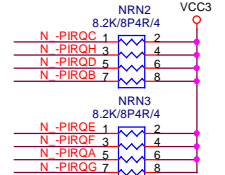
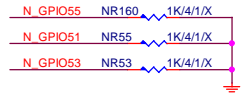
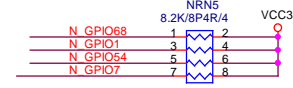
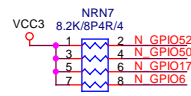
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PCH DISPLAY, CLK BUFFER			
Size	Document Number	Rev	
Custom	GA-Q87M-D2H	1.1	
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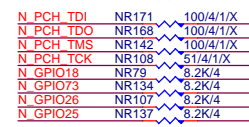
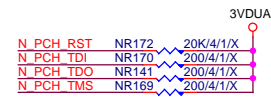
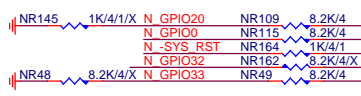
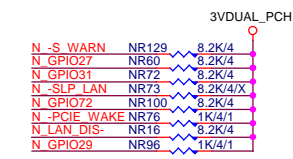
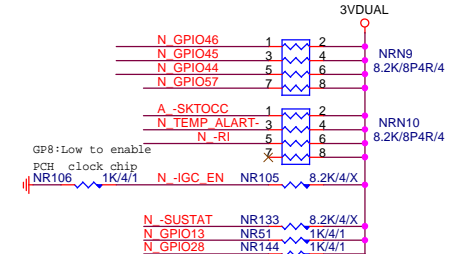
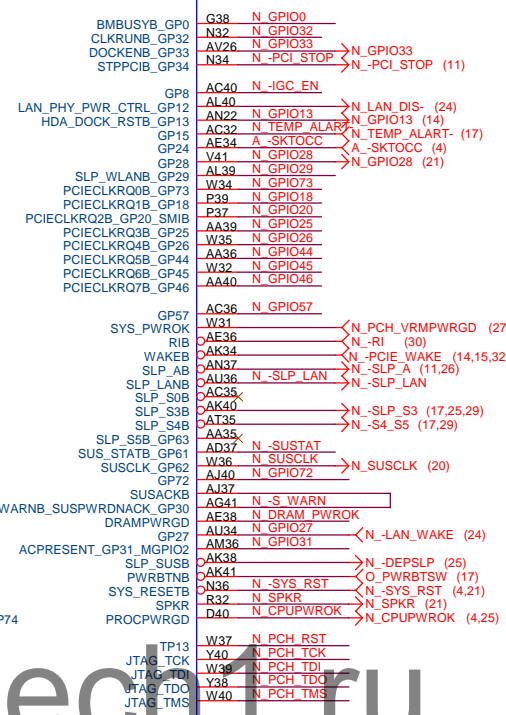
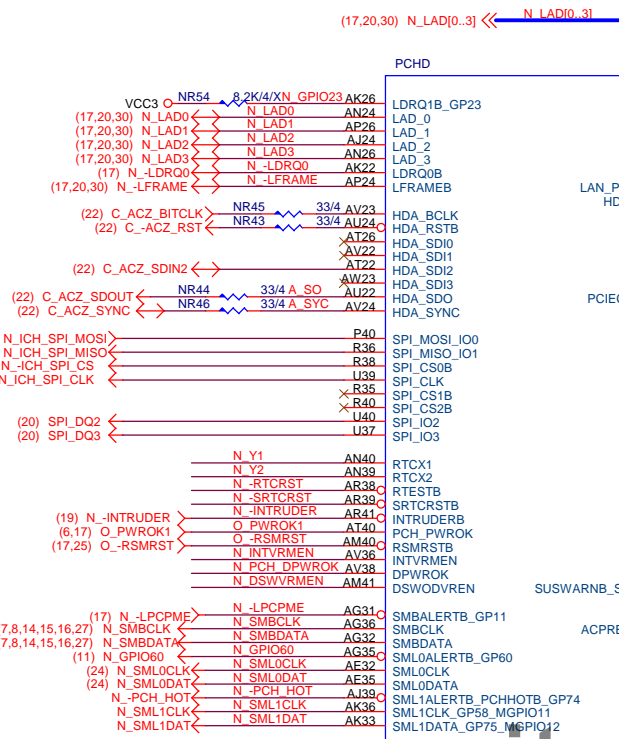
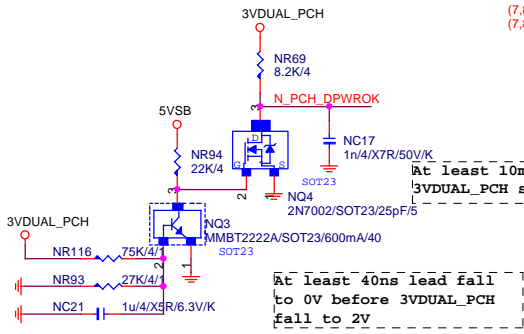
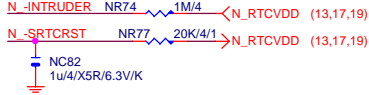
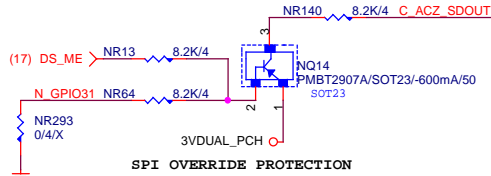
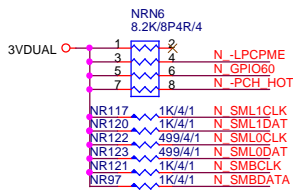
```
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
```



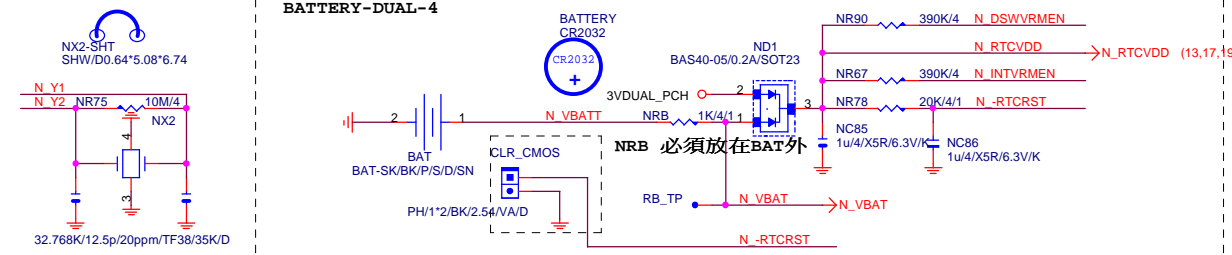
CK SRCCLK SATA NR174 8.2K/4
CK -SRCCLK SATA NR173 8.2K/4

Mount for integrated clock Generation Mode



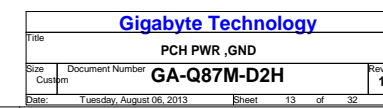


BATTERY-DUAL-4

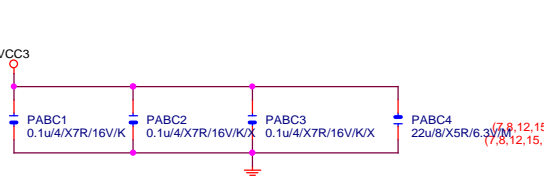


Gigabyte Technology

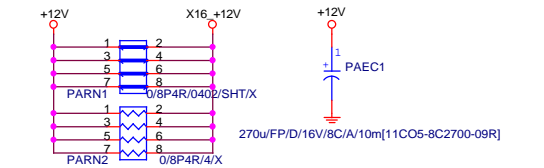
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Size	Document Number	GA-Q87M-D2H	
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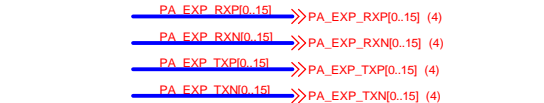
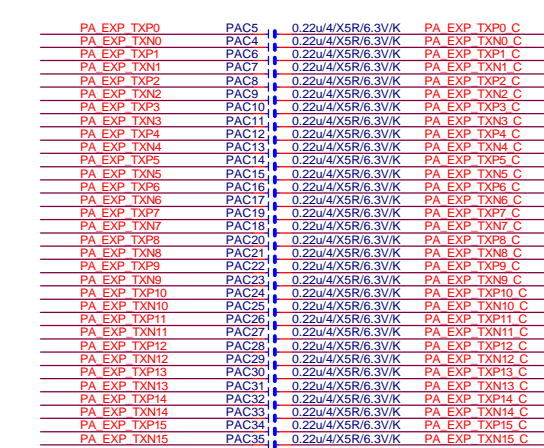
PCIEX16 CAP



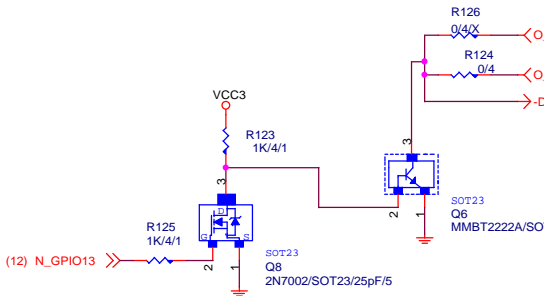
PCIEX16 PROTECT SHT



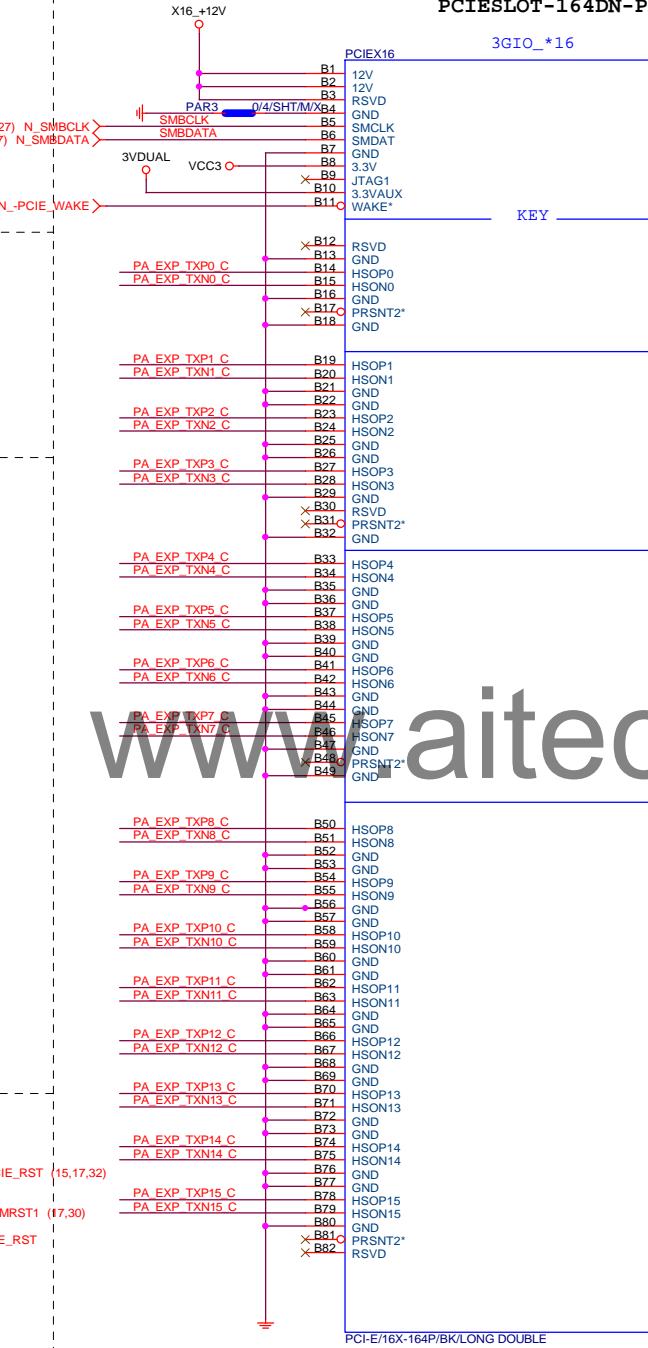
PCIEX16 AC CAP



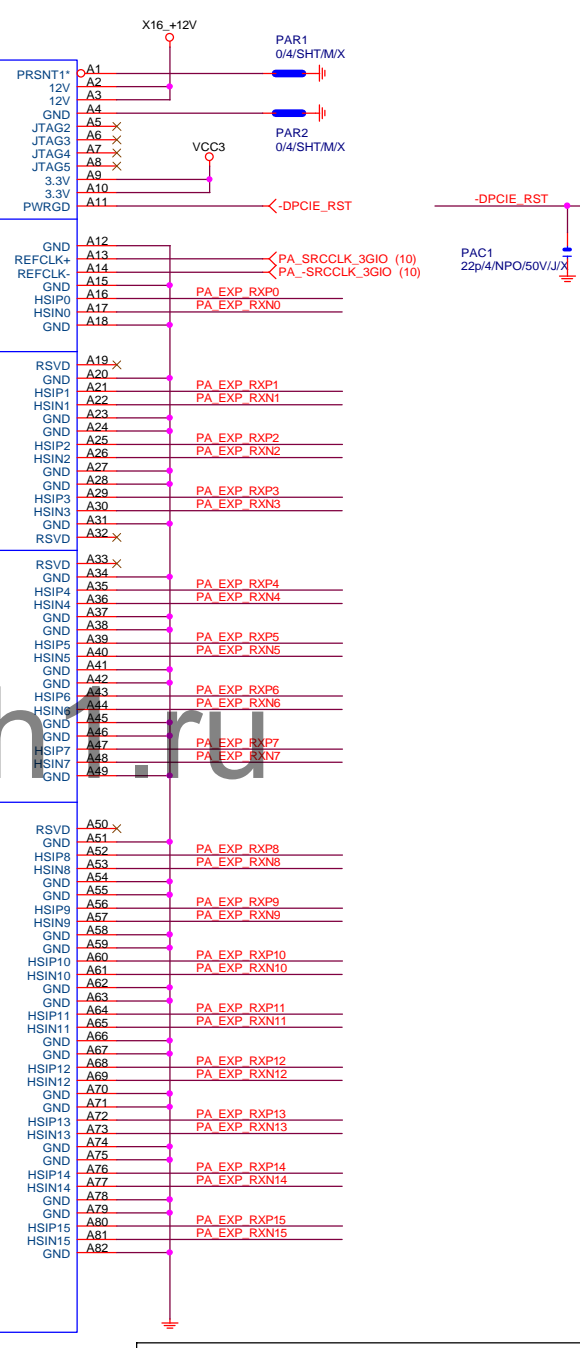
PCIEX16 SOFT RESET



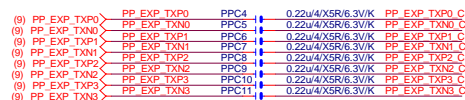
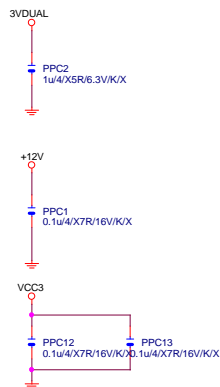
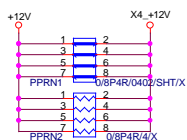
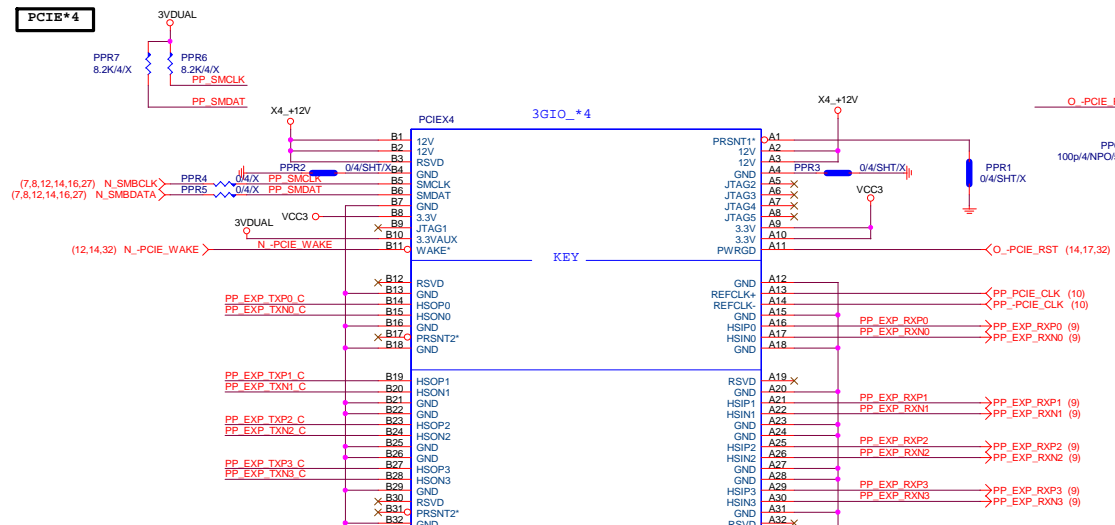
PCIEX16 SLOT



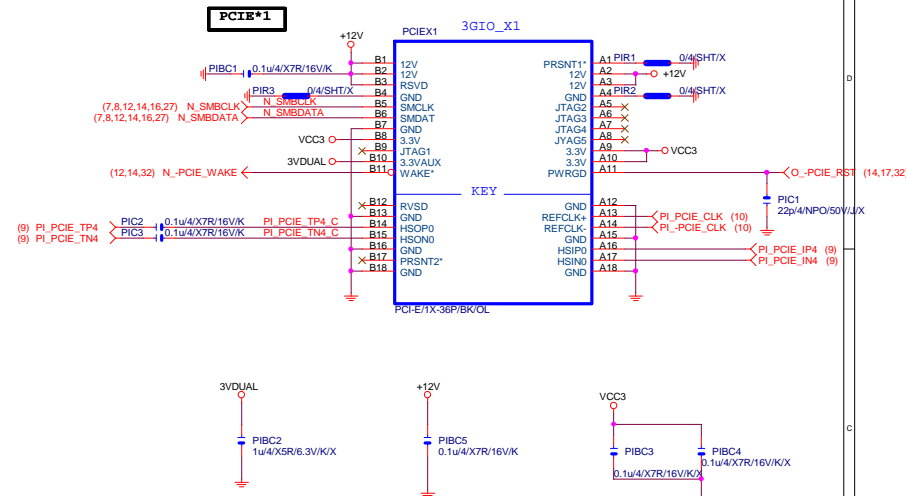
PCIESLOT-164DN-P



PCIE*4



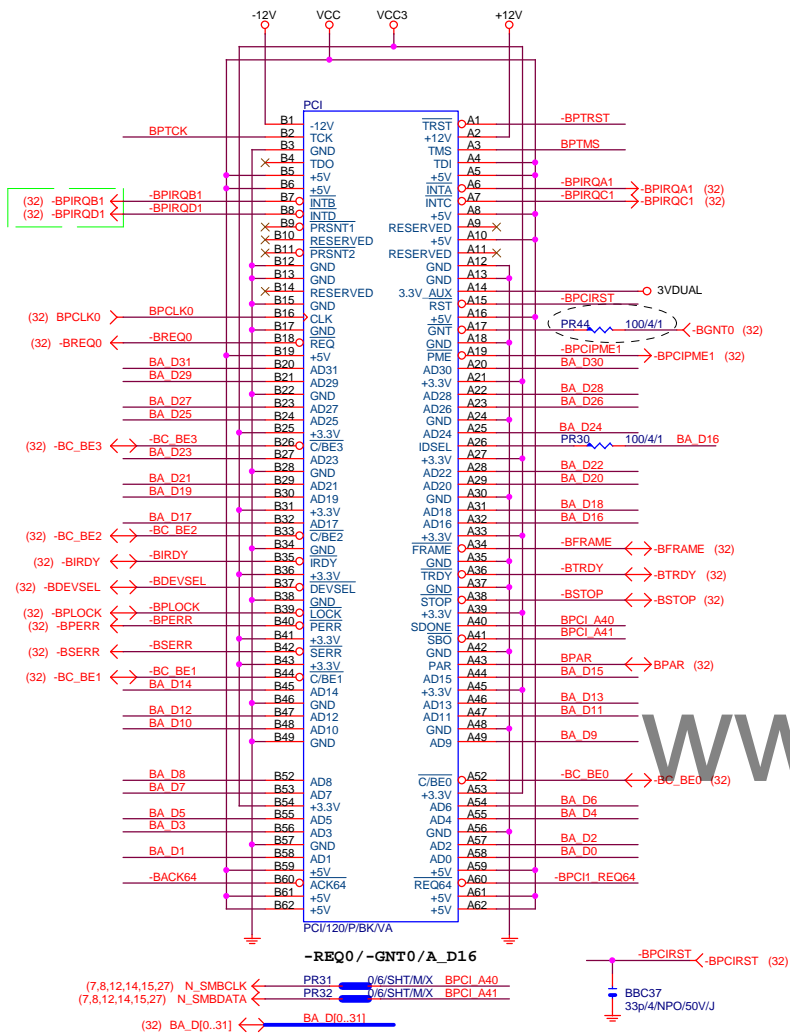
PCIE*1



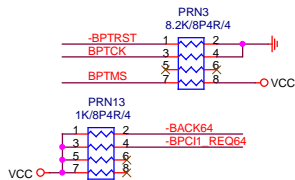
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Gigabyte Technology			
PCI EXPRESS X 1 PORT			
Size	Document Number	Rev	
Custom	GA-Q87M-D2H	1.1	
Date:	Tuesday, August 06, 2013	Sheet	15 of 32

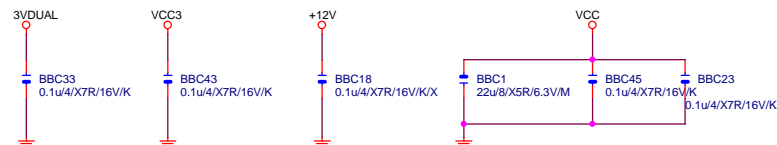
PCI SLOT



PCI PU



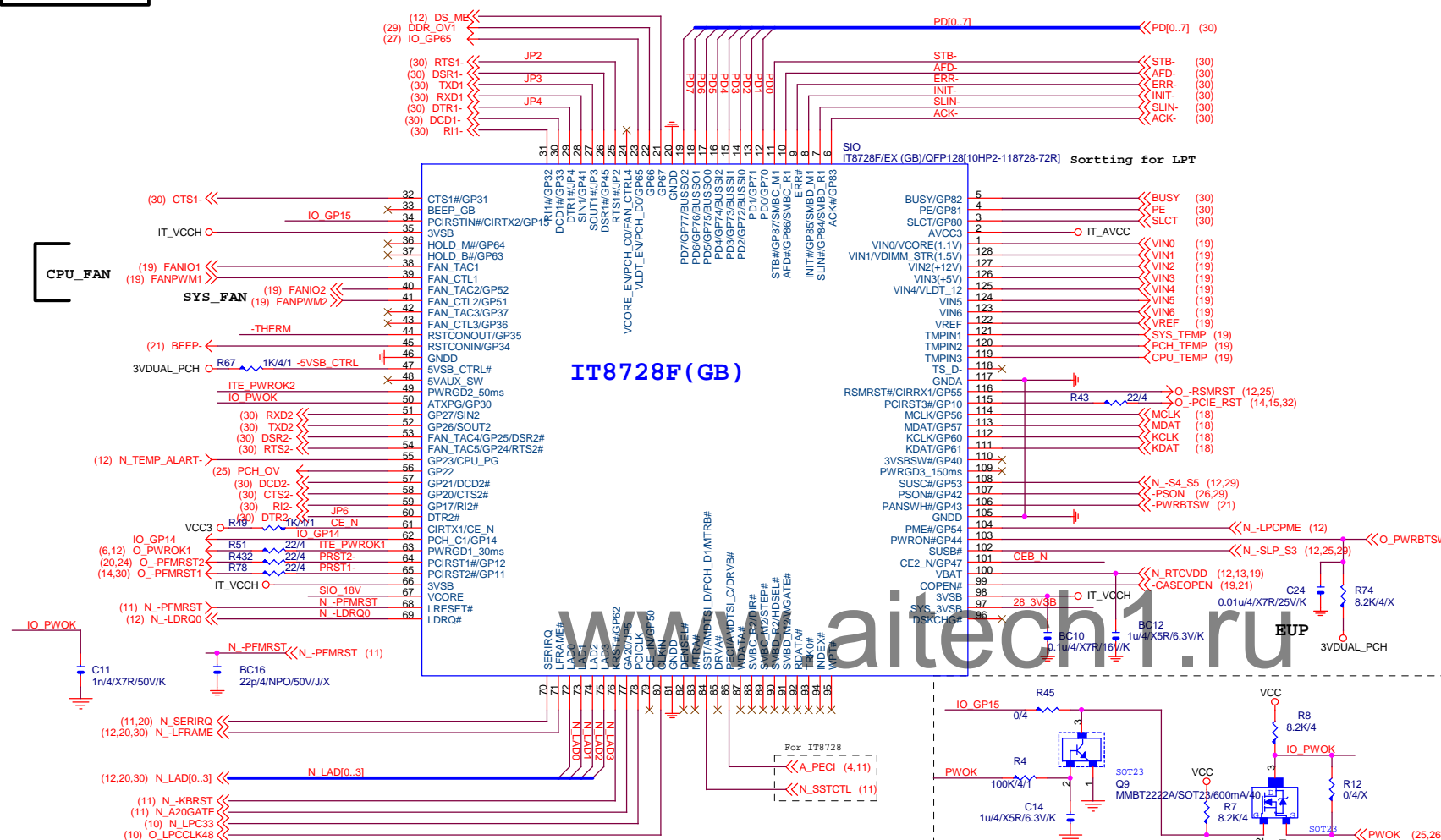
PCI CAP



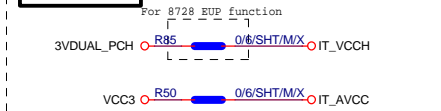
Gigabyte Technology

Title			
PCI SLOT 1&2			
Size Custom	Document Number	GA-Q87M-D2H	Rev 1.1
Date:	Tuesday, August 06, 2013	Sheet 16	of 32

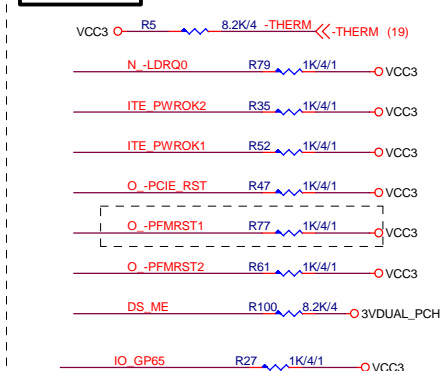
SIO IT8728F



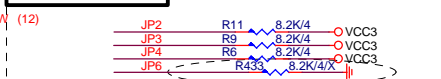
PWR	SHT
-----	-----



SIO	PU
-----	----



SIO STRAP



IT8728-EX
PULL DOWN ENABLE FORCE OVP

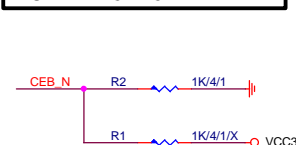
EUP control by PCH

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

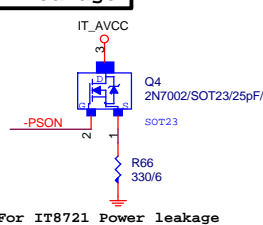
IT8728F NOTE

	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_3V5B
PIN70	GP47
PIN95	VIN2(VCC5)
PIN96	VIN1(VCC12)
PIN97	VIN1/VDIMM_STR(1.5V)
PIN98	VIN0/VCORE(1.1V)/NC

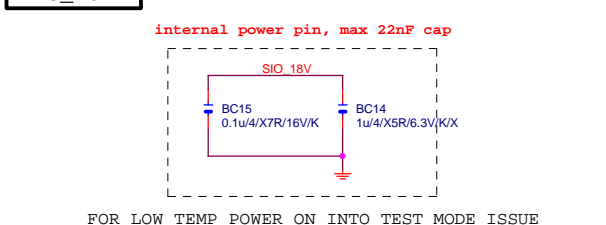
DUAL BIOS OPT STRAP



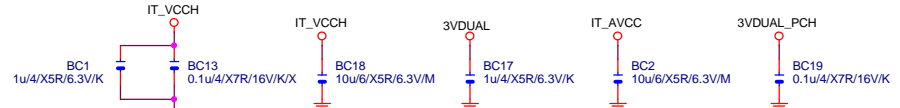
Power leakage



SIO 18V

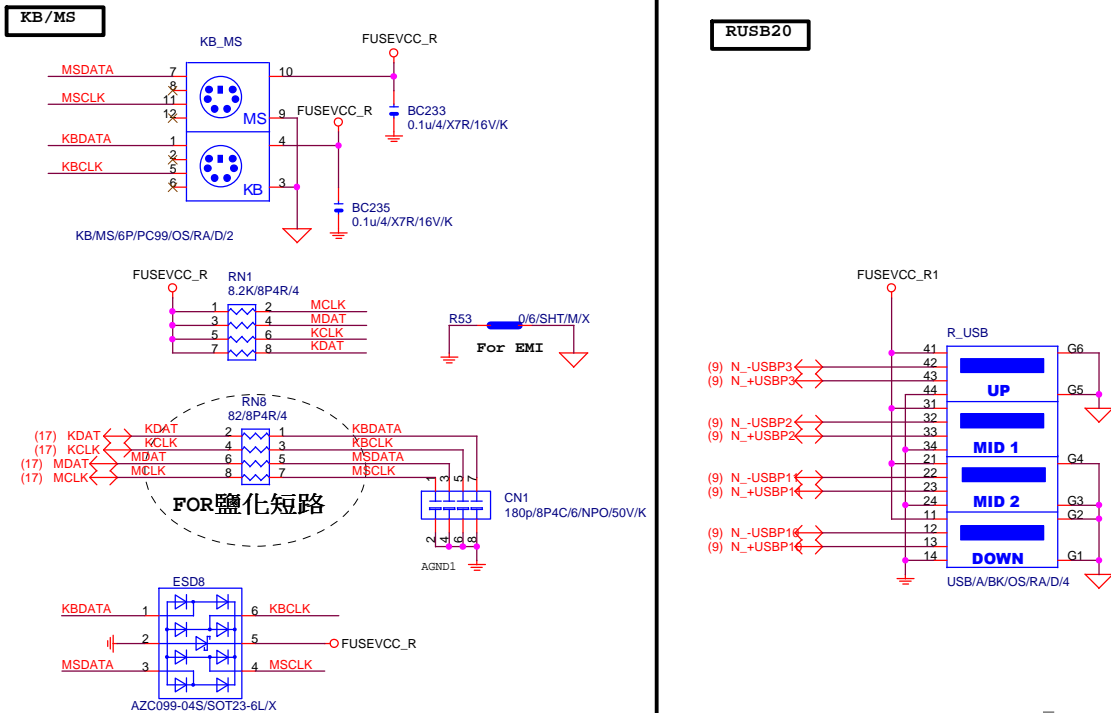


SIO CAP

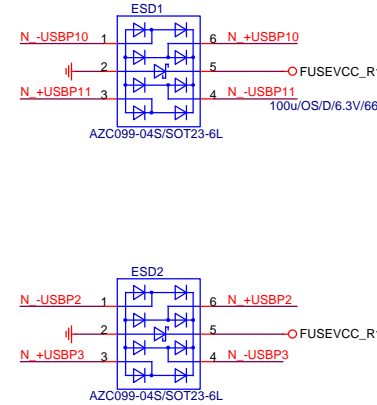


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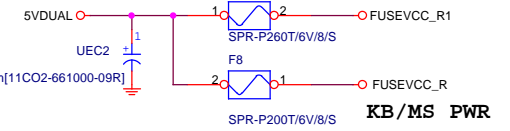
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ITE 8728 LPC IO			
Size	Document Number		Rev
Custom	GA-Q87M-D2H		1.1
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USB2.0 ESD



USB2.0 PWR



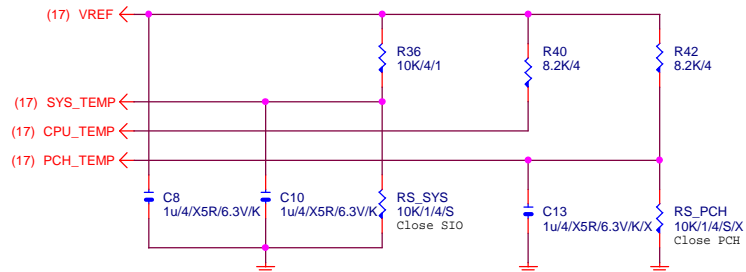
Close to USB connector

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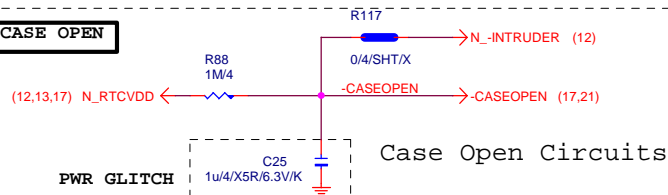
Gigabyte Technology

Title			
KB/MS,RUSB			
Size	Document Number	Rev	
Custom	GA-Q87M-D2H	1.1	
Date:	Tuesday, August 06, 2013	Sheet	18 of 32

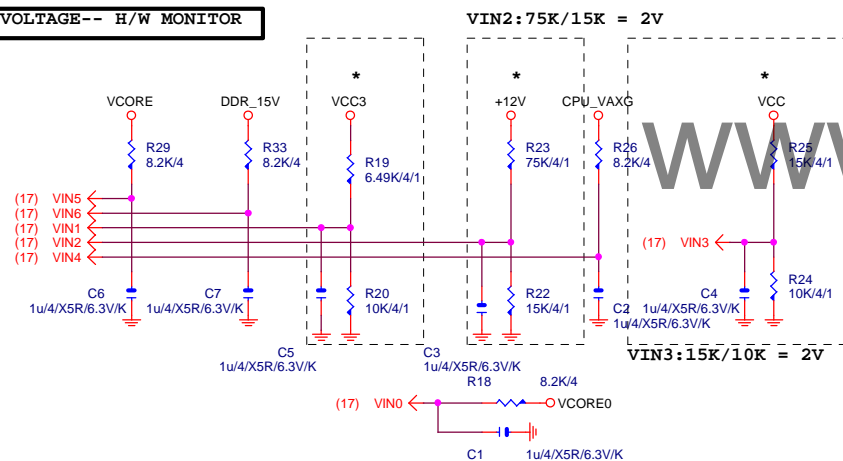
TEMP H/W MONITOR



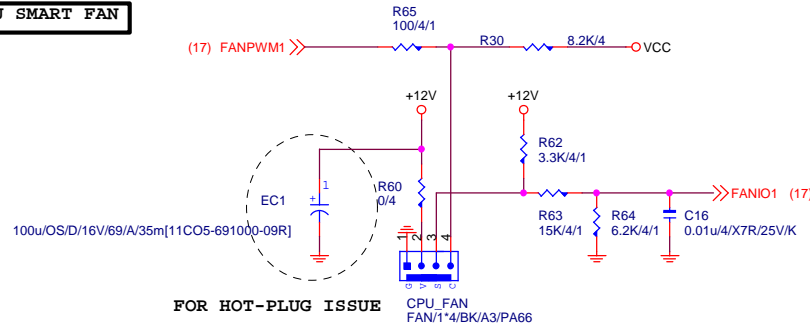
CASE OPEN



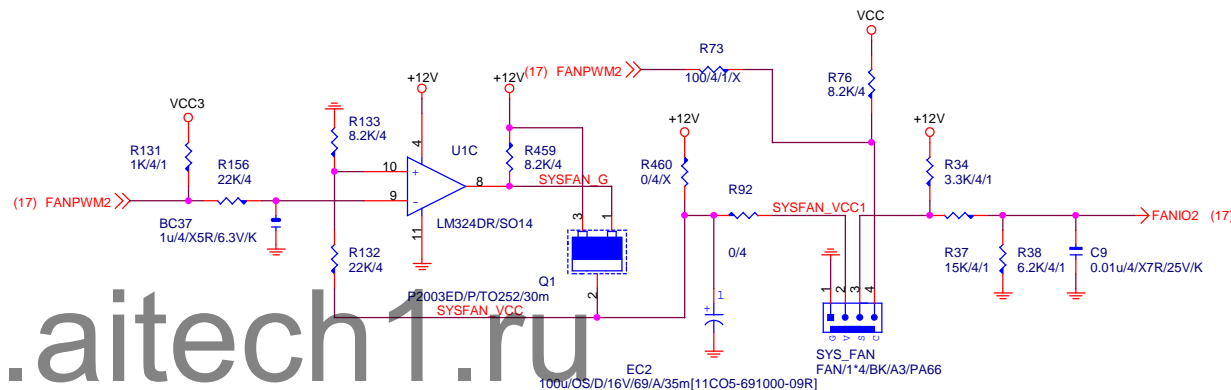
VOLTAGE-- H/W MONITOR



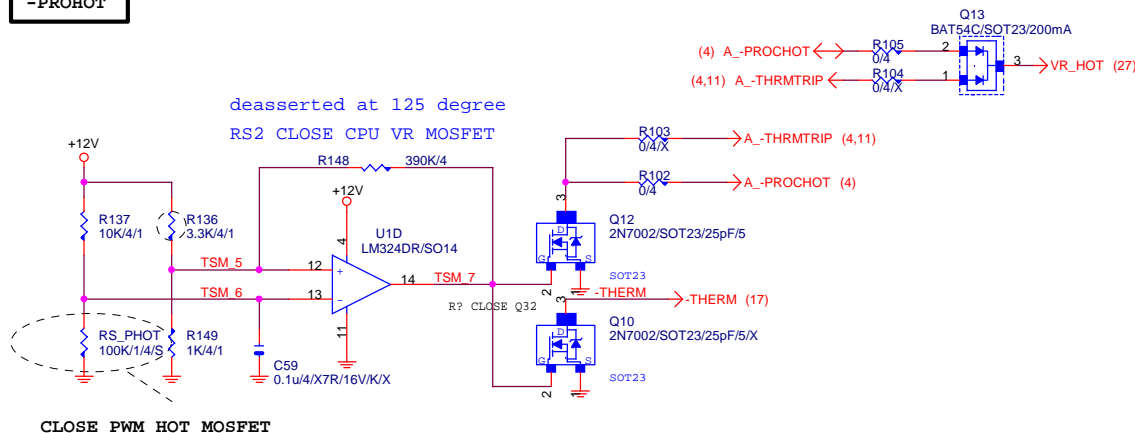
CPU SMART FAN



SYS SMART FAN



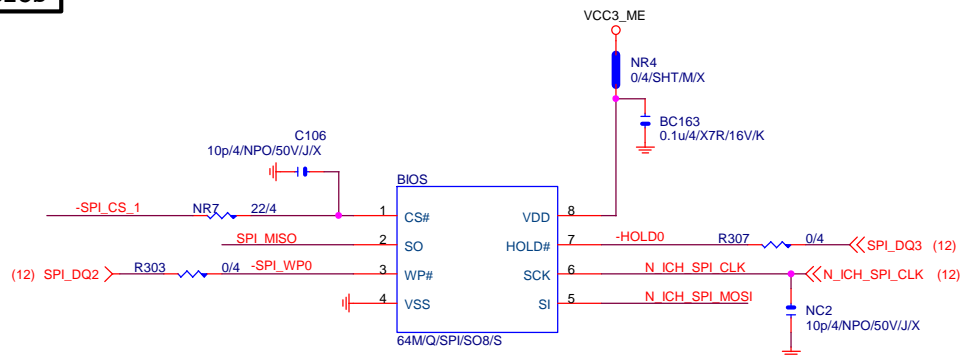
-PROHOT



Gigabyte Technology

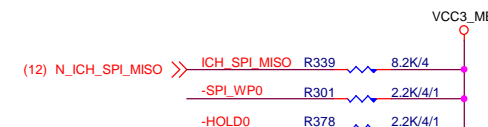
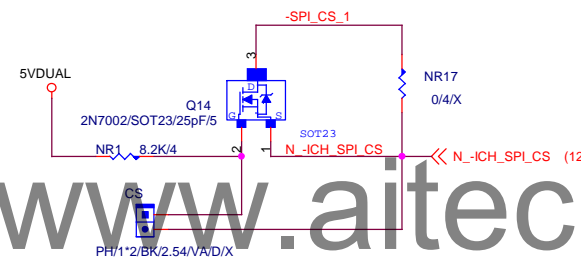
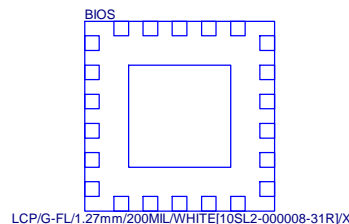
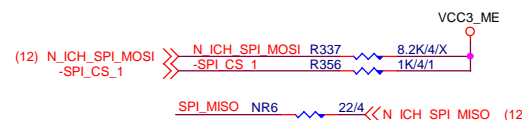
Title			
HWM,FAN CTRL,OV			
Size	Document Number	Rev	
Custom	GA-Q87M-D2H	1.1	
Date:	Tuesday, August 06, 2013	Sheet	19 of 32

BIOS

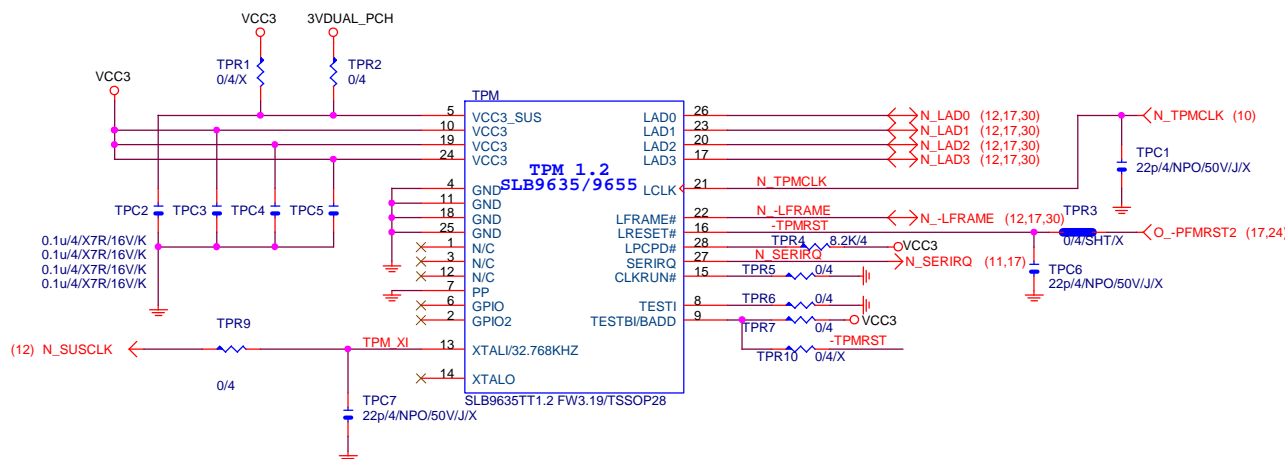


BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	1	1

1 means internal PU
0 means PD 1K



TPM



	SLB9635	SLB9655
TPR2, TPR4, TPR5, TPR6, TPR7, TPR9	MOUNT	N/A
TPR1, TPR10	N/A	MOUNT

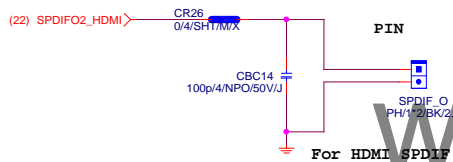
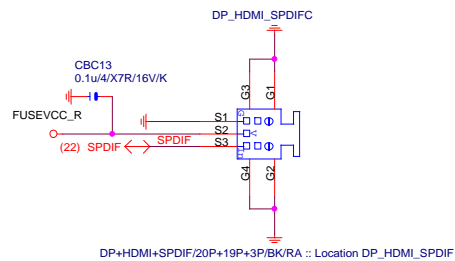
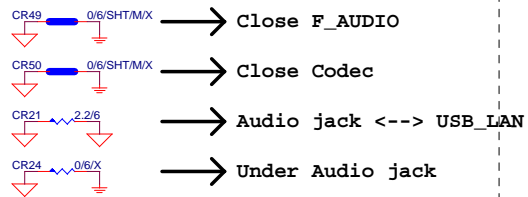
Gigabyte Technology

Title		
BIOS ,TPM		
Size	Document Number	Rev
B	GA-Q87M-D2H	1.1
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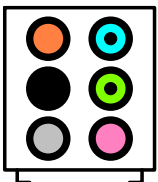
Title			
HD AUDIO ALC889			
Size Custom	Document Number	GA-Q87M-D2H	Rev 1.1
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CODEC POWER/EMI PAD

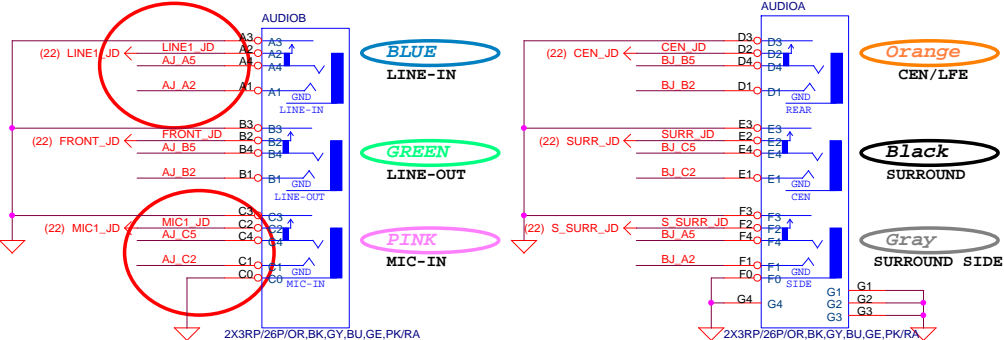


AZALIA JACK

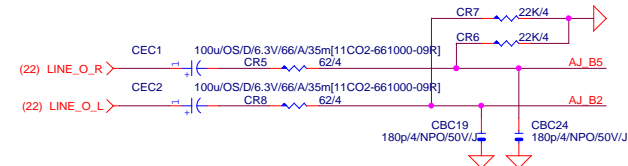
BTX AZALIA CONNECTOR



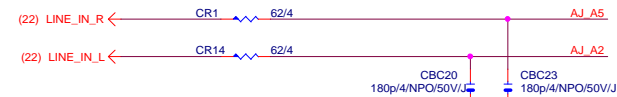
11NR6-403007-21R



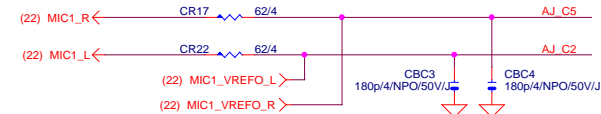
LINE-OUT



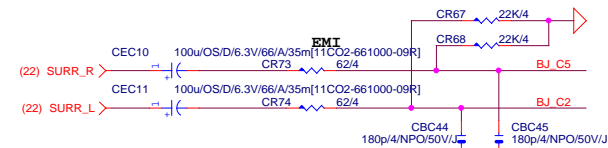
LINE-IN



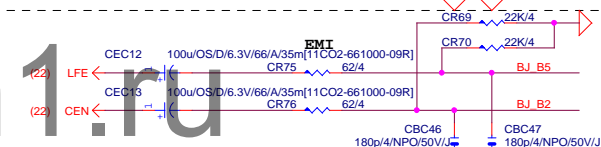
MIC-IN



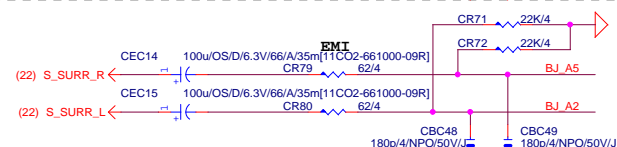
SURROUND



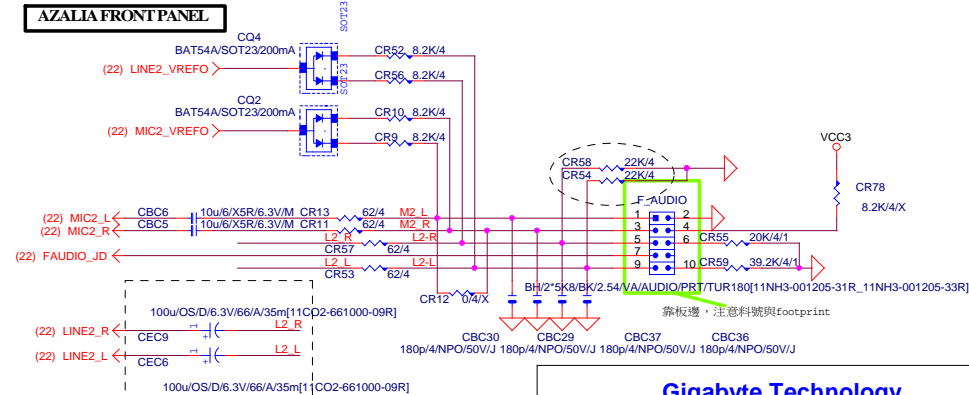
CEN/LFE



SURRBACK

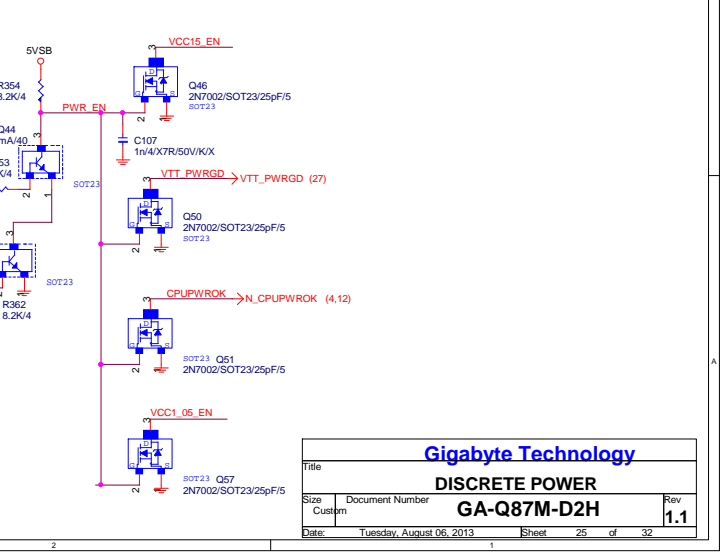
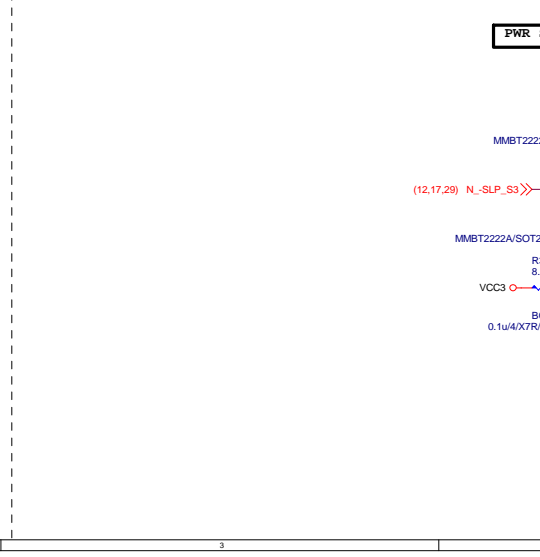
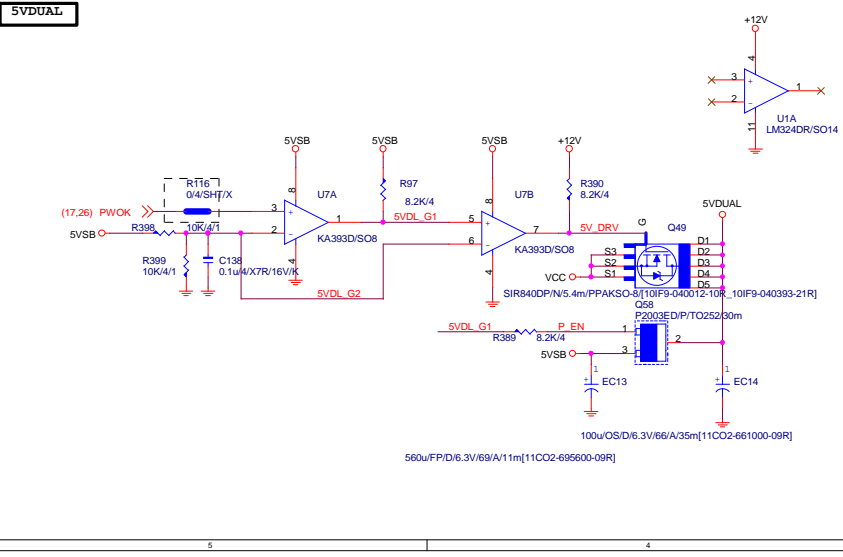
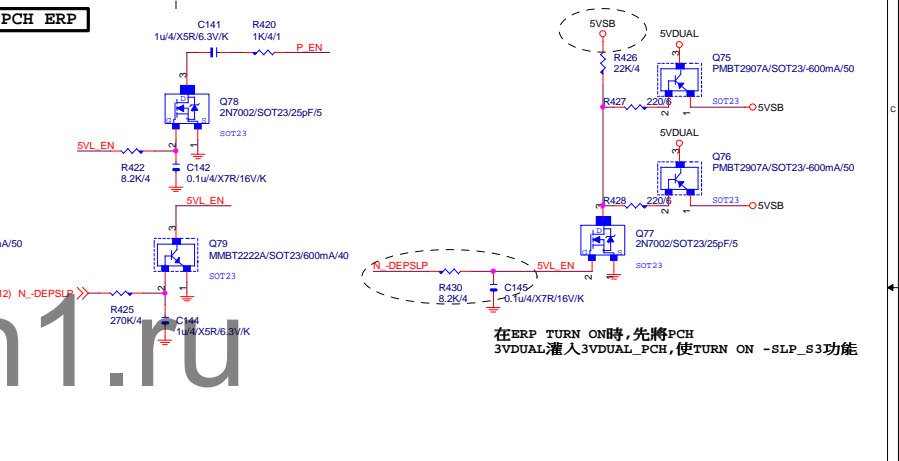
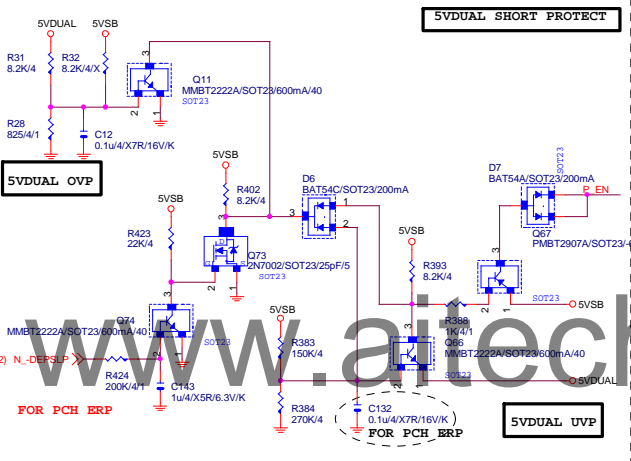
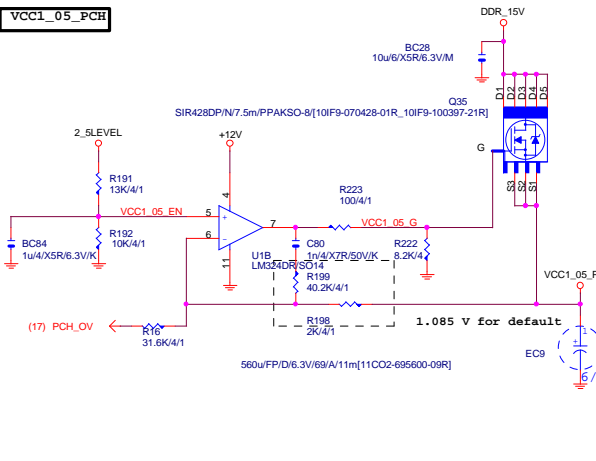
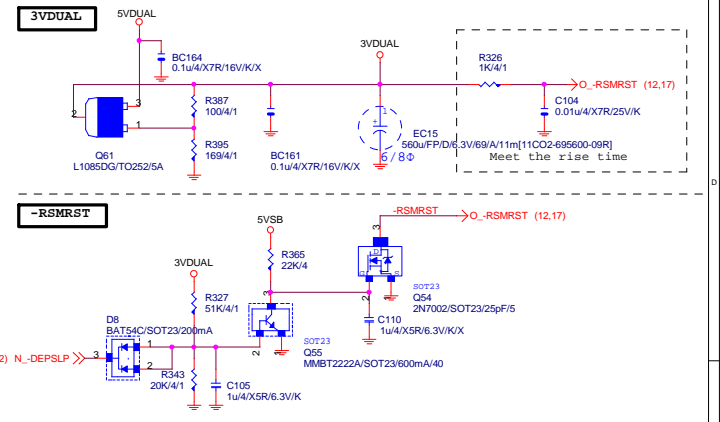
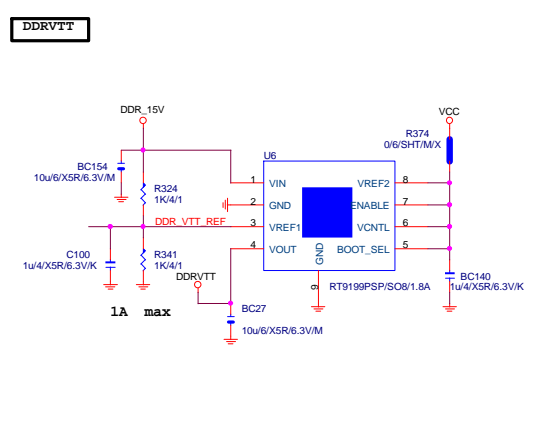
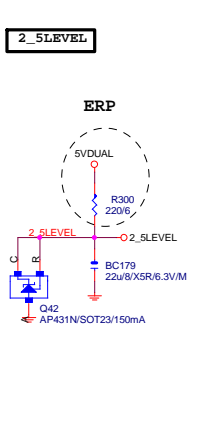
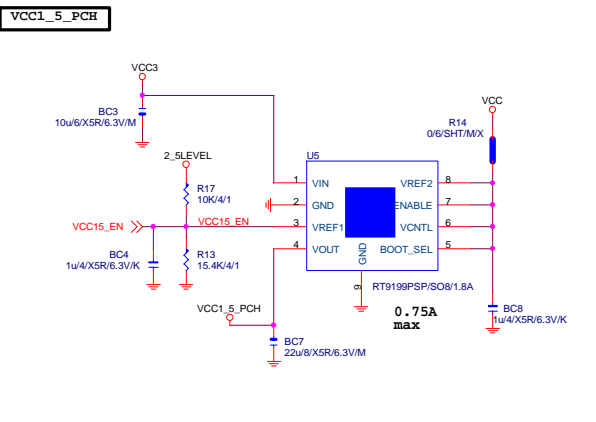


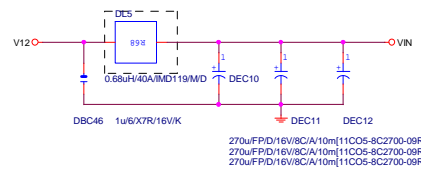
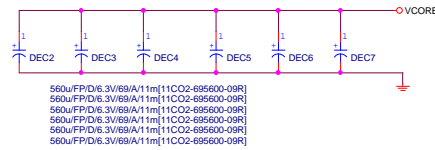
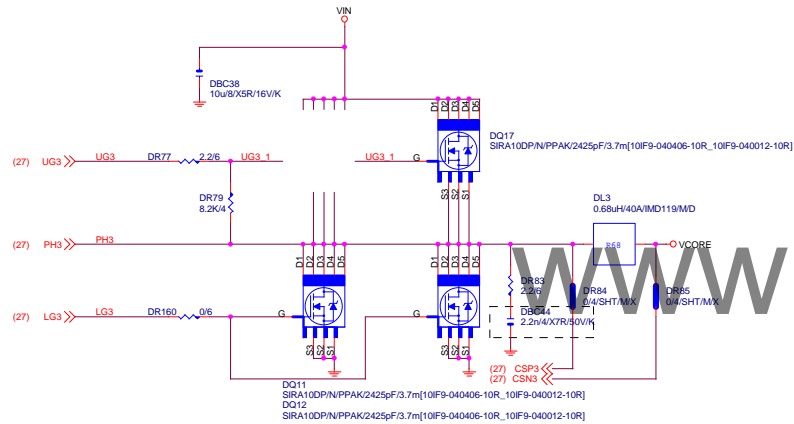
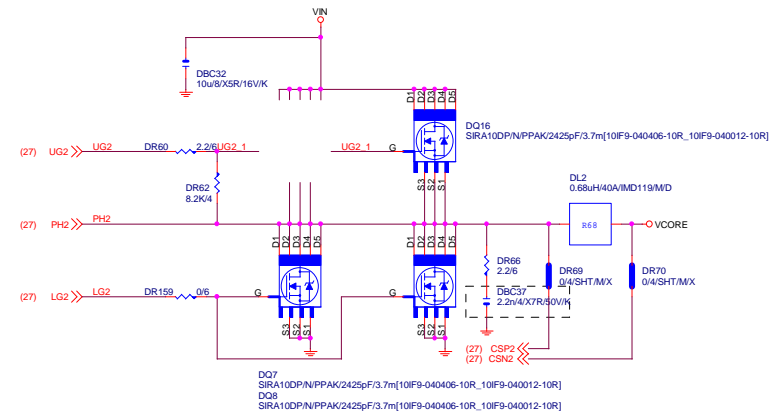
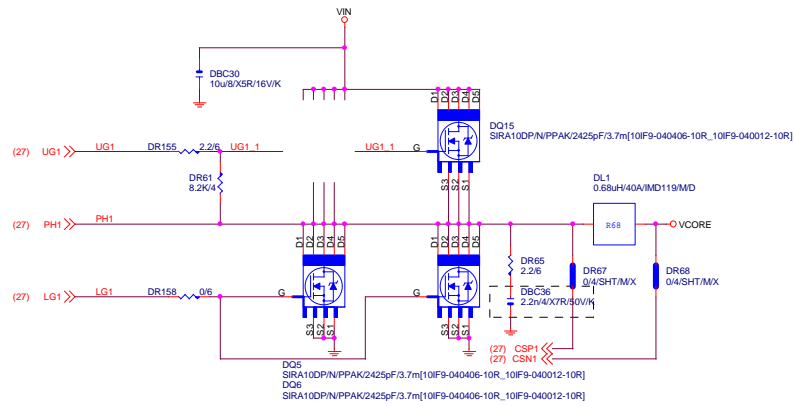
AZALIA FRONT PANEL



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Title			AUDIO JACK
Size			GA-Q87M-D2H
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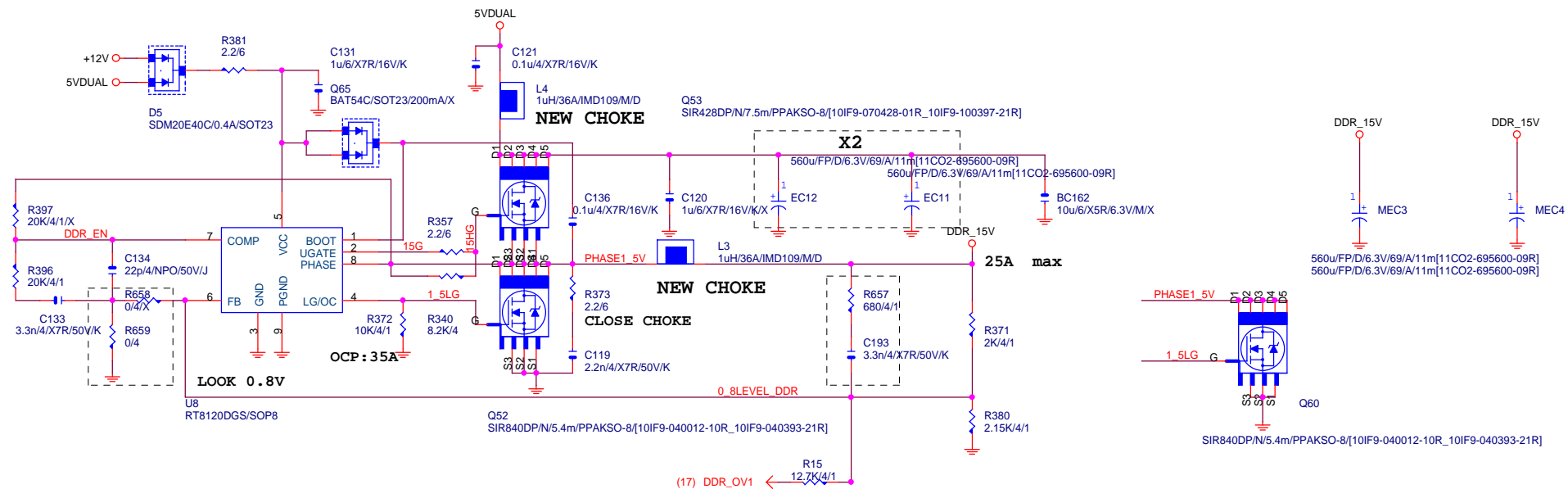




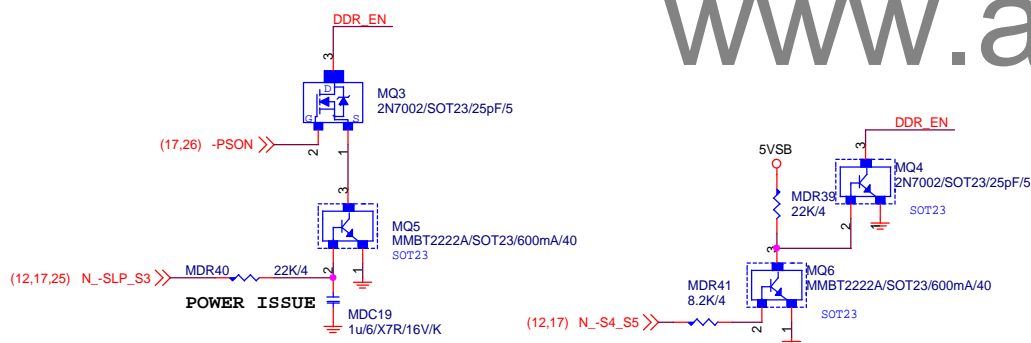
Gigabyte Technology

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Size	Document Number	GA-Q87M-D2H	
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DDR15V



PWR SEQ

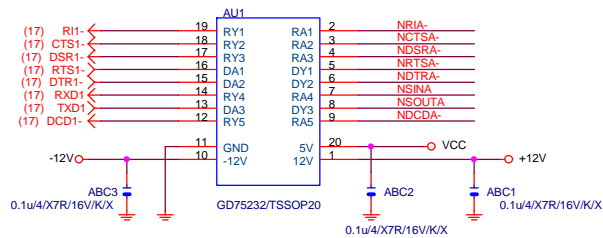


VIN=5V,VOUT=1.5V,IOUT=25A,PHASE=1
IRMS=11.45A
560uF/P/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85°C),1(105°C)
VIN Ripple current=4.7X1.7=7.99A(85°C)
-->故固态电容须2X7.99=15.98>11.45A

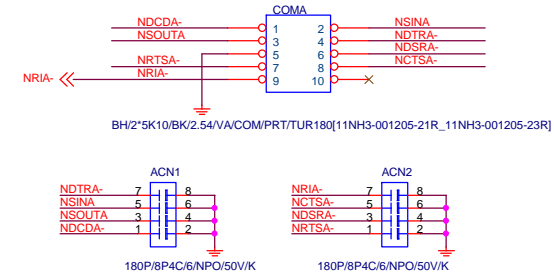
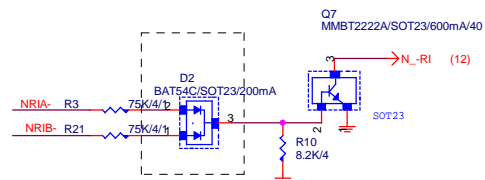
```
Rocset=(Iocp*Lgate,rdson)/Iocset
Rocset=(45A*6.7mOhm)/10uA = 30K
Iocset=10uA
```

<p align="center"><i>Gigabyte Technology</i></p>			
<p>Title</p> <p align="center">DDR POWER</p>			
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Custom			1.1
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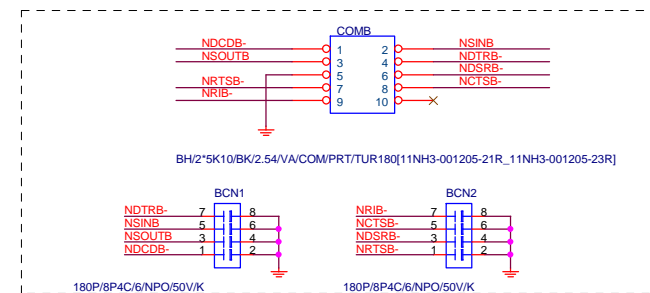
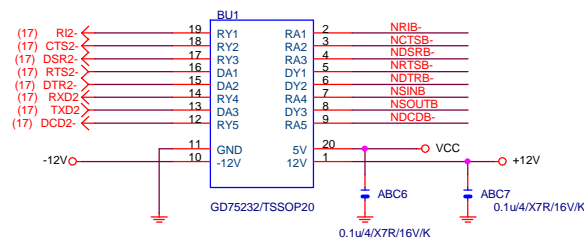
COMA



COM RI

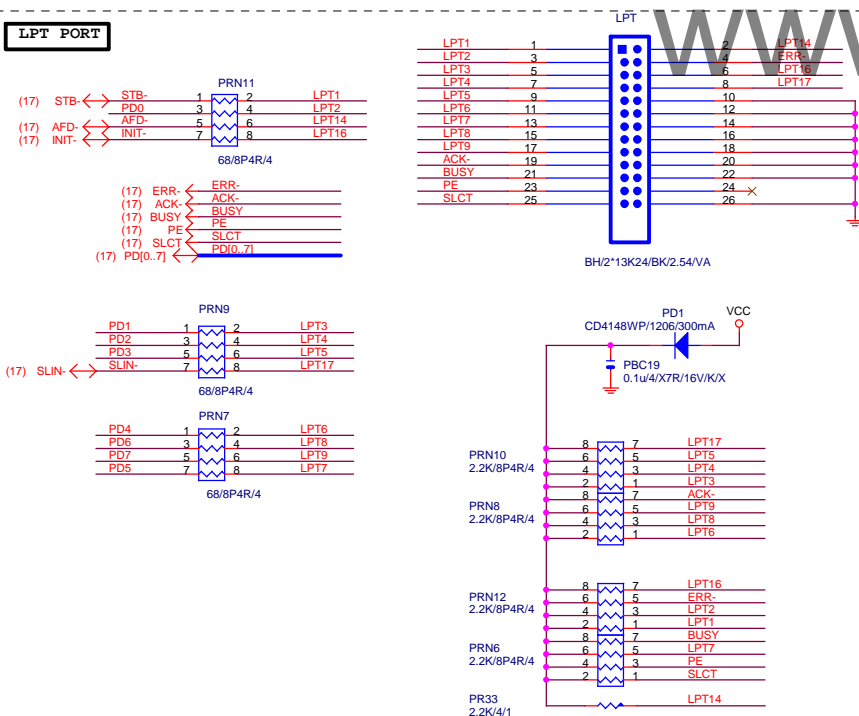


COMB

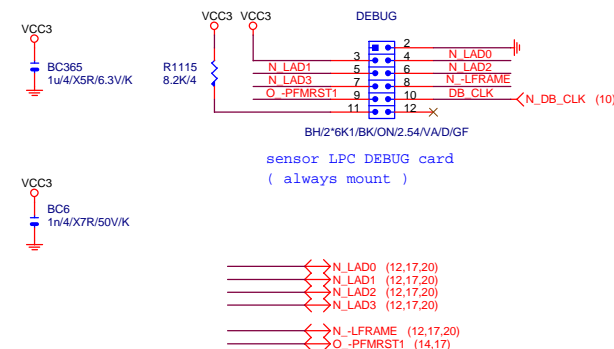


PLACE NEAR COM CONNECTOR

LPT PORT



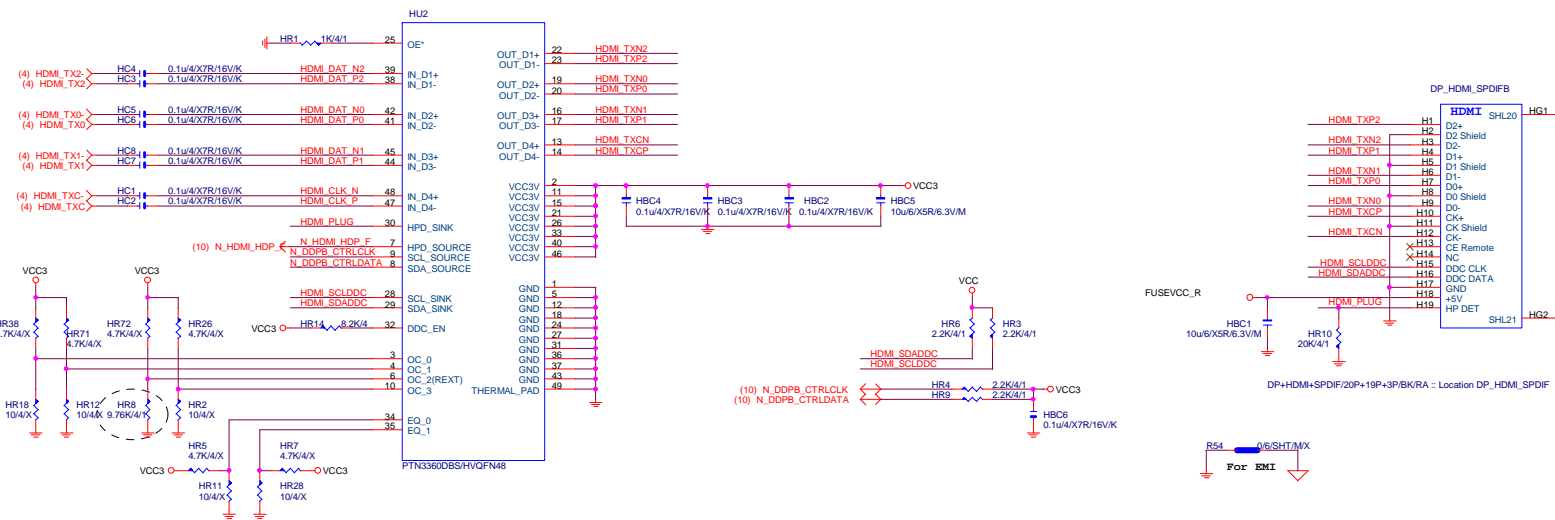
80 PORT



Gigabyte Technology

Title			
COM A/B & LPT & 80 PORT			
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Custom			
GA-Q87M-D2H			
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HDMI LEVEL SHIFT



DVI LEVEL SHIFT

