

Model Name: GA-Q87M-MK

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 EX16 SLOT
15	mSATA/mini PCIE slot
16	PCIEX1 /PCI SLOT
17	ITE 8728 LPC IO
18	KB_MS, R_USB
19	HWM,FAN CTRL,-PROCHOT
20	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
33	INTEL i210 LAN

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Gigabyte Technology		
Cover Sheet		
Title	Document Number	Rev
	GA-Q87M-MK	1.11
Date:	Monday, November 25, 2013	Sheet 1 of 33

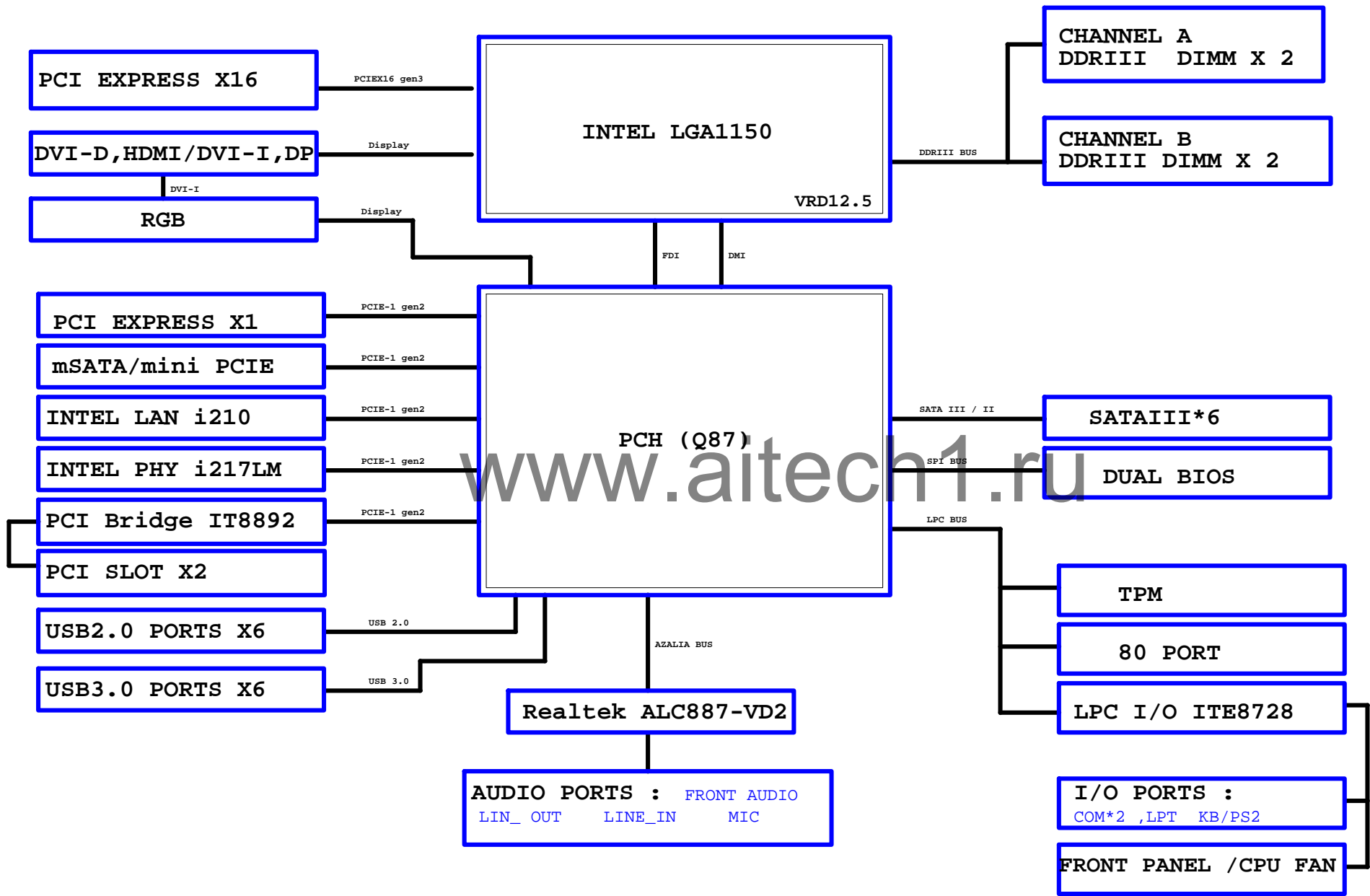
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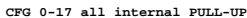
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C

BLOCK DIAGRAM





LGA1150A

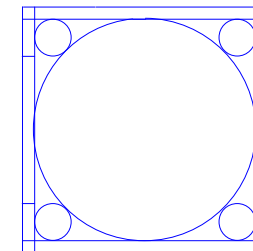
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MAAA11	AV19	DDR0_MA11	DDR0_DQ11	AK39	MDA11
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MODT_A2	AW9	DDR0_ODT2	DDR0_DQ18	AP39	MDA19
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			DDR0_DQ24	AW37	MDA29
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			DDR0_DQ31	AY6	MDA33
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			DDR0_DQ34	AU4	MDA35
			DDR0_DQ35	AW6	MDA36
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			DDR0_DQ38	AY4	MDA39
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			DDR0_DQ45	AN2	MDA47
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			DDR0_DQ47	AL4	MDA53
			DDR0_DQ48	AJ3	MDA50
			DDR0_DQ49	AJ4	MDA51
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			DDR0_DQ55	AG1	MDA61
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			DDR0_DQ57	AE4	MDA59
			DDR0_DQ58	AG2	MDA60
			DDR0_DQ59	AG3	MDA56
			DDR0_DQ60	AE2	MDA62
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LGA1150B

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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
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			DDR1_DQ30	AP29	MDB28
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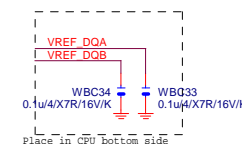
CR
CPU RETAINTION/X

LGA1150



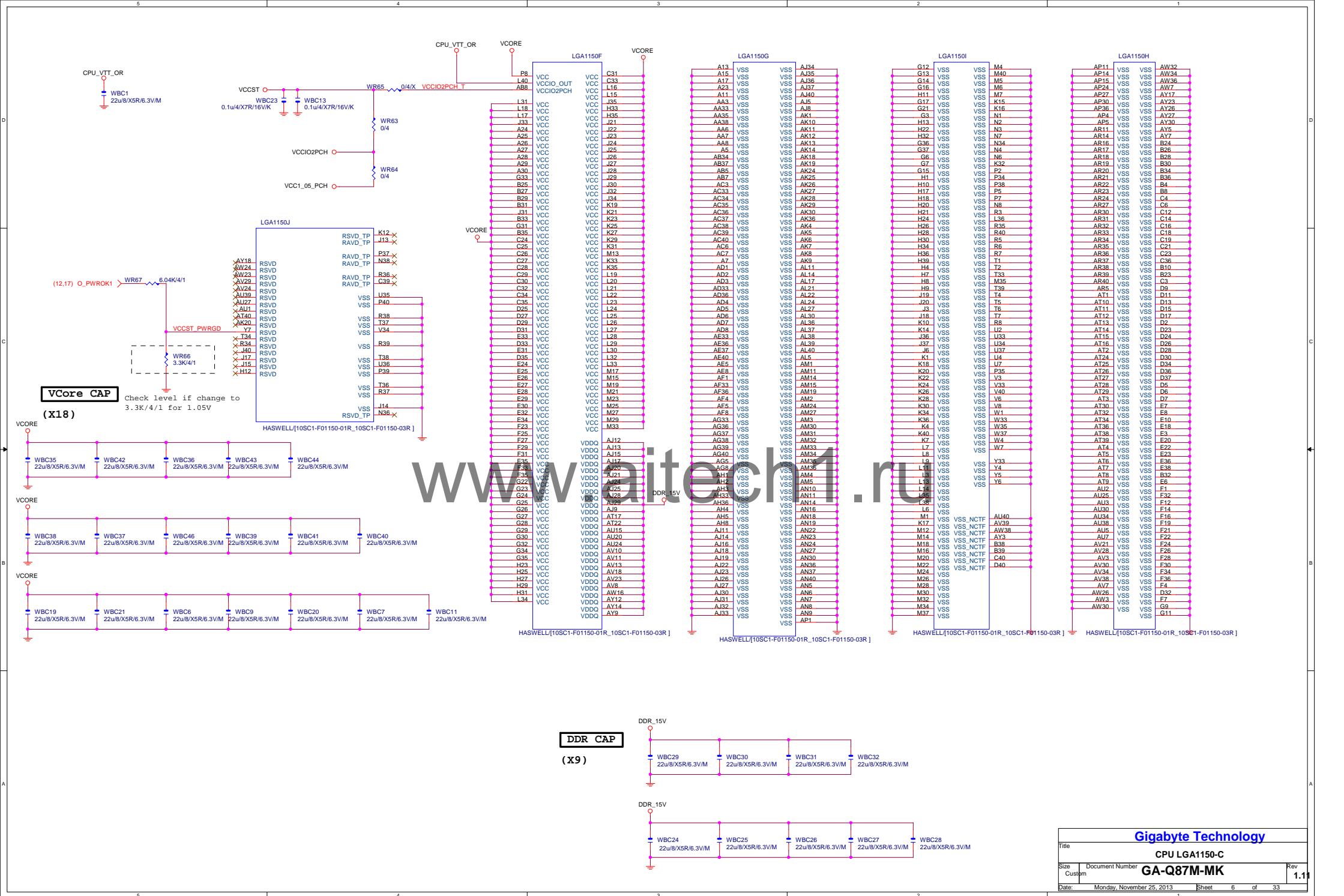
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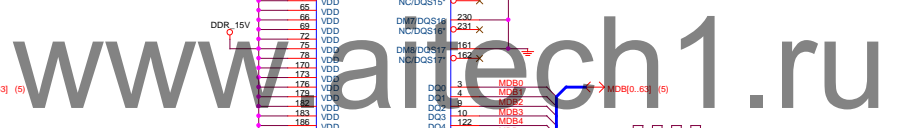
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Gigabyte Technology

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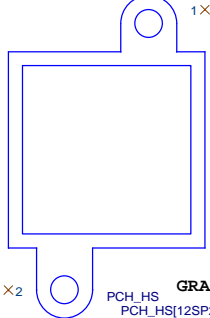
USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



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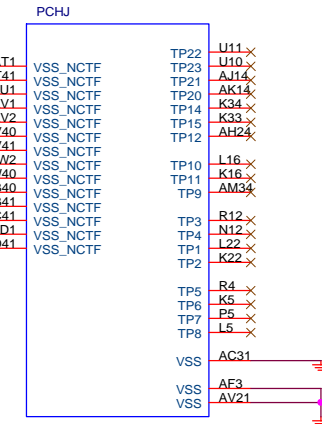
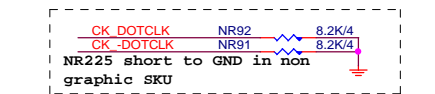
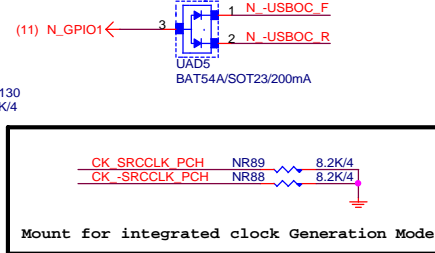
LOW COST ICH7 HEATSINK

SB_HEATSIN



GRAY HS

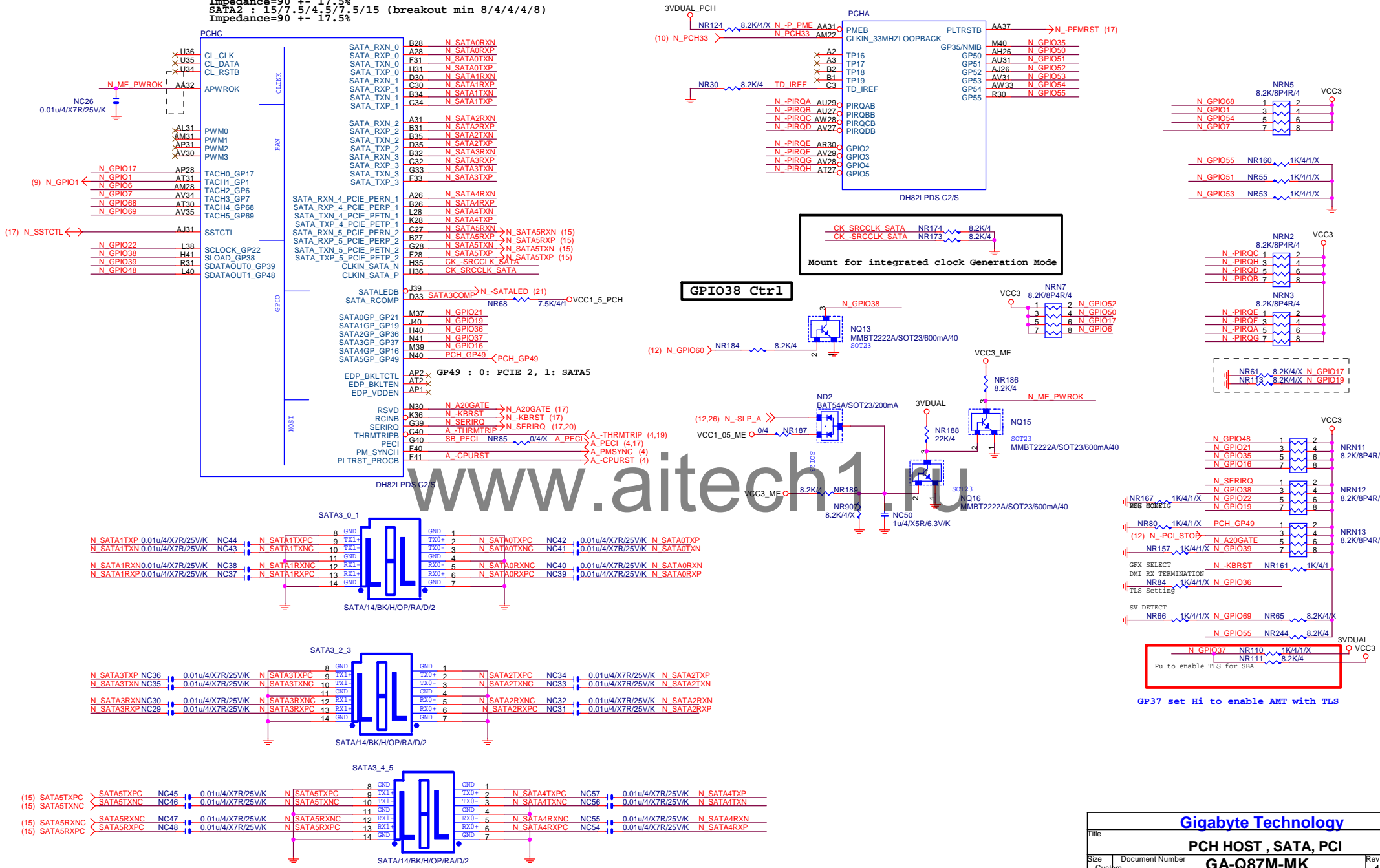
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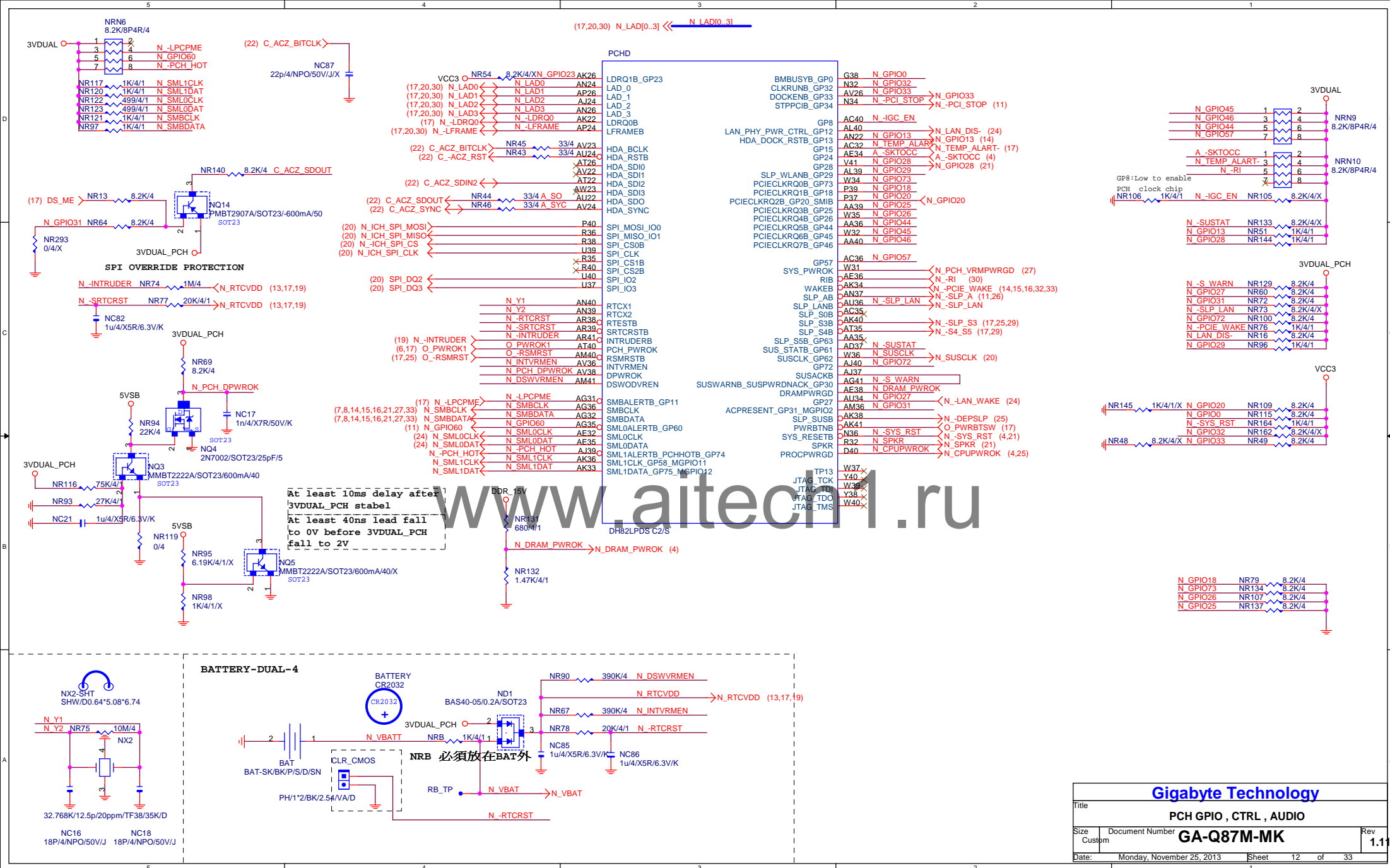


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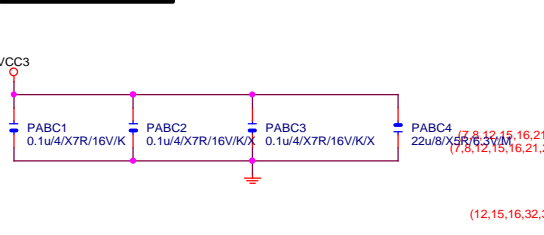
Gigabyte Technology			
Title			
PCH FDI,DMI,USB ,PCIE,NVRAM			
Size	Document Number	GA-Q87M-MK	Rev
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SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

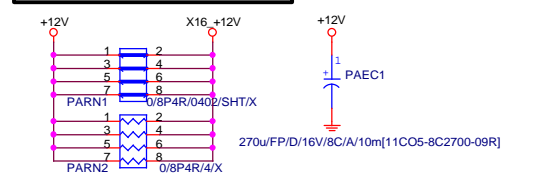




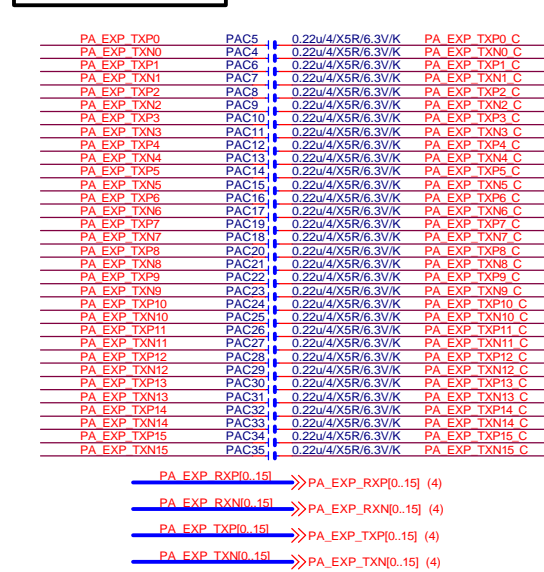
PCIEX16 CAP



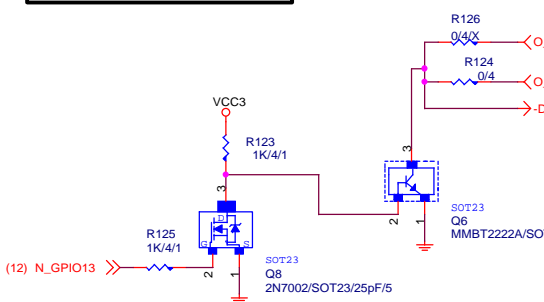
PCIEX16 PROTECT SHT



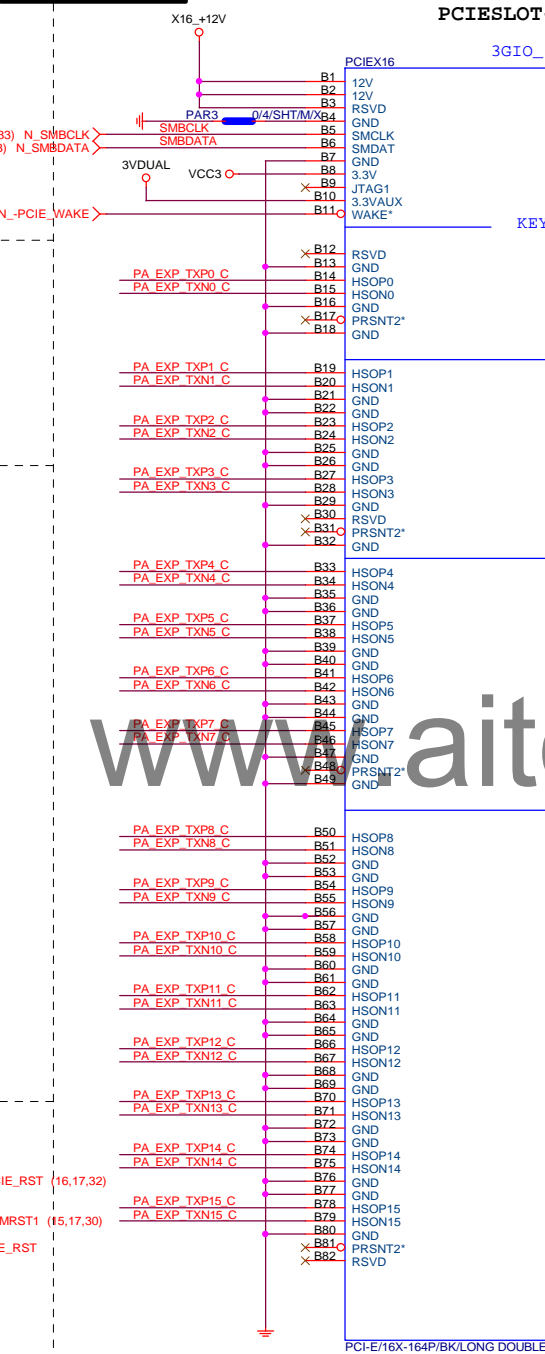
PCIEX16 AC CAP



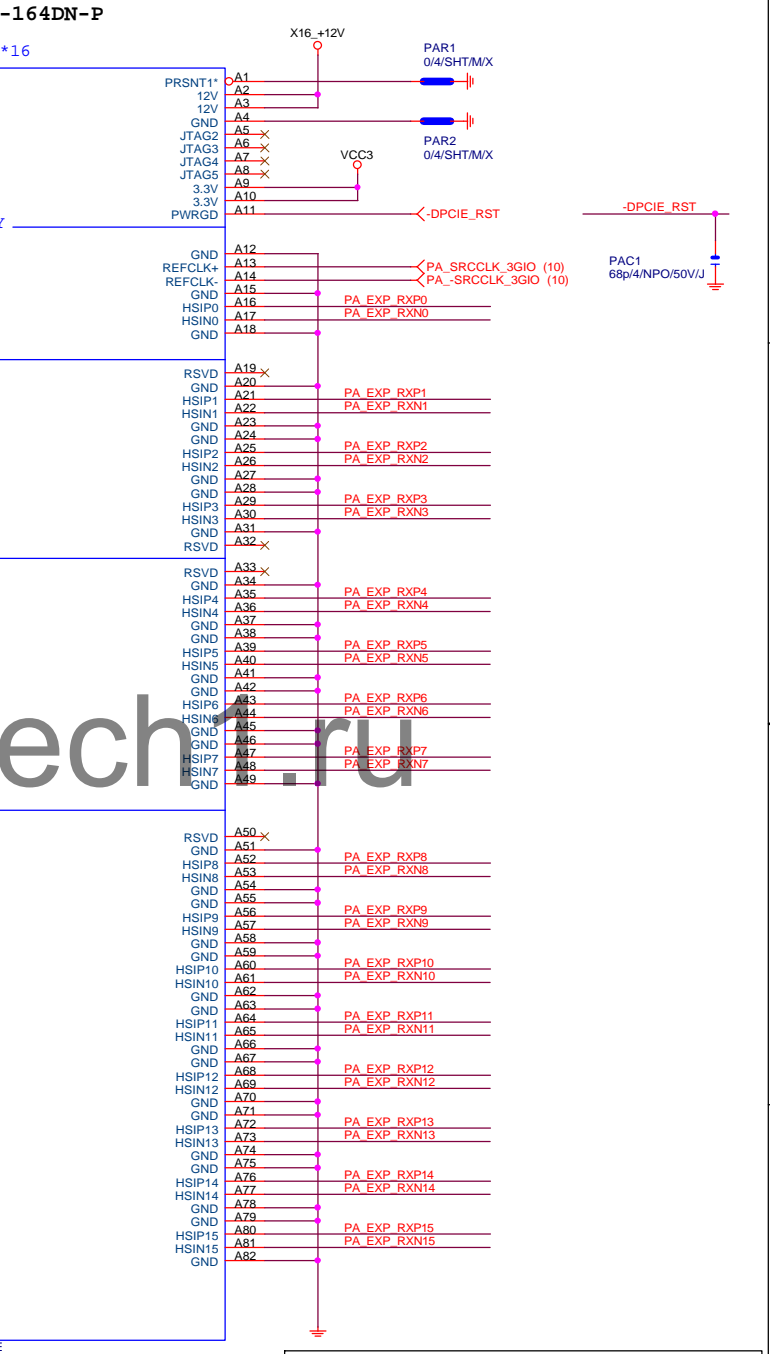
PCIEX16 SOFT RESET



PCIEX16 SLOT



PCIESLOT-164DN-P

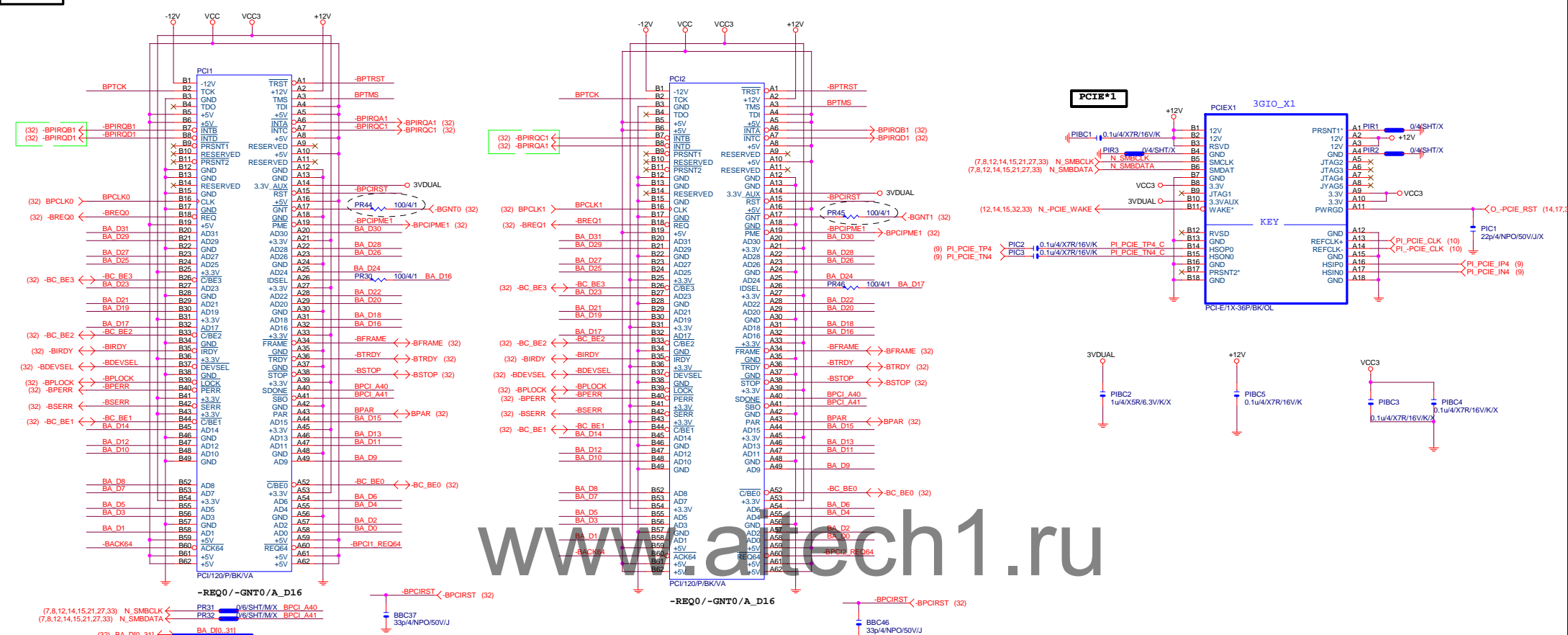


Gigabyte Technology

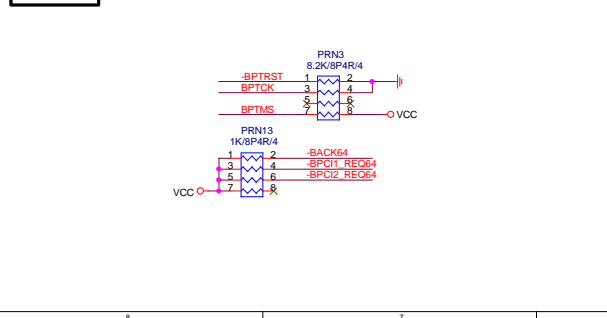
PCI EXPRESS * 16

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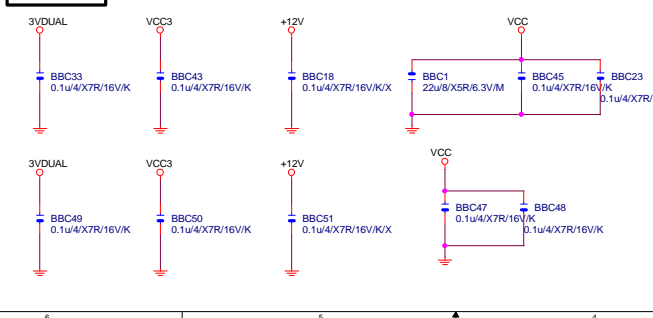
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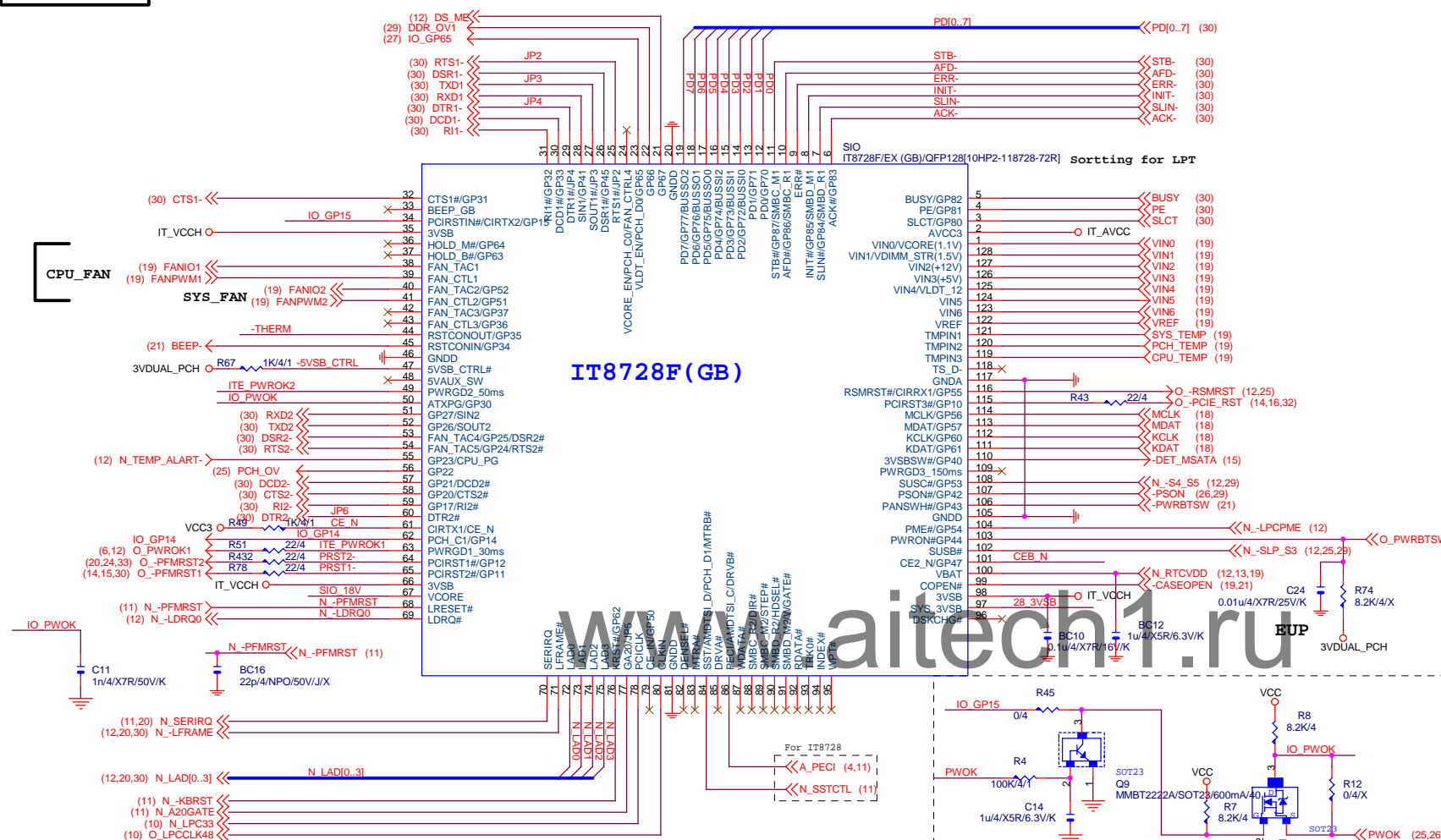
PCI PU



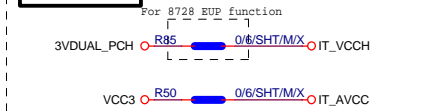
PCI CAP



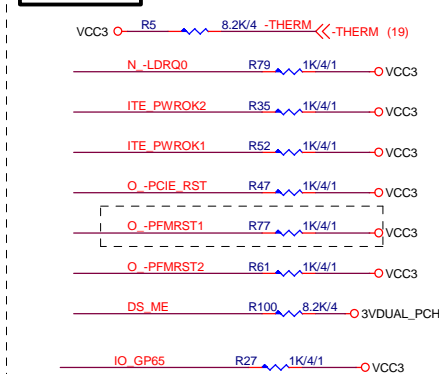
SIO IT8728F



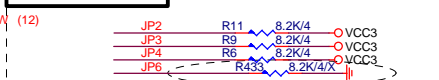
PWR	SHT
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SIO	PU
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SIO STRAP



IT8728-EX
PULL DOWN ENABLE FORCE OVP

EUP control by PCH

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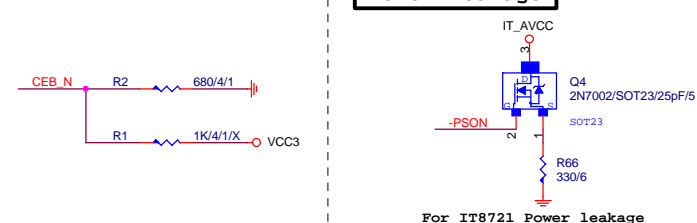
TP3--- High SPI-Flash Disable
      Low SPI-Flash Enable

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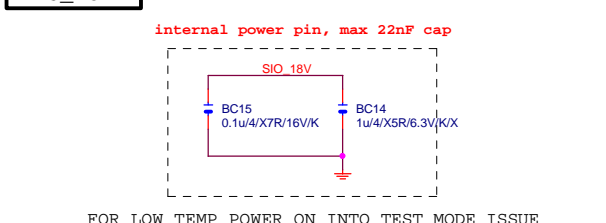
IT8728F NOTE

	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

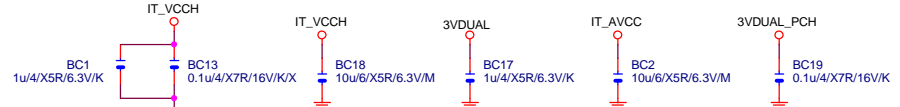
Power leakage



SIO 18V



SIO CAP



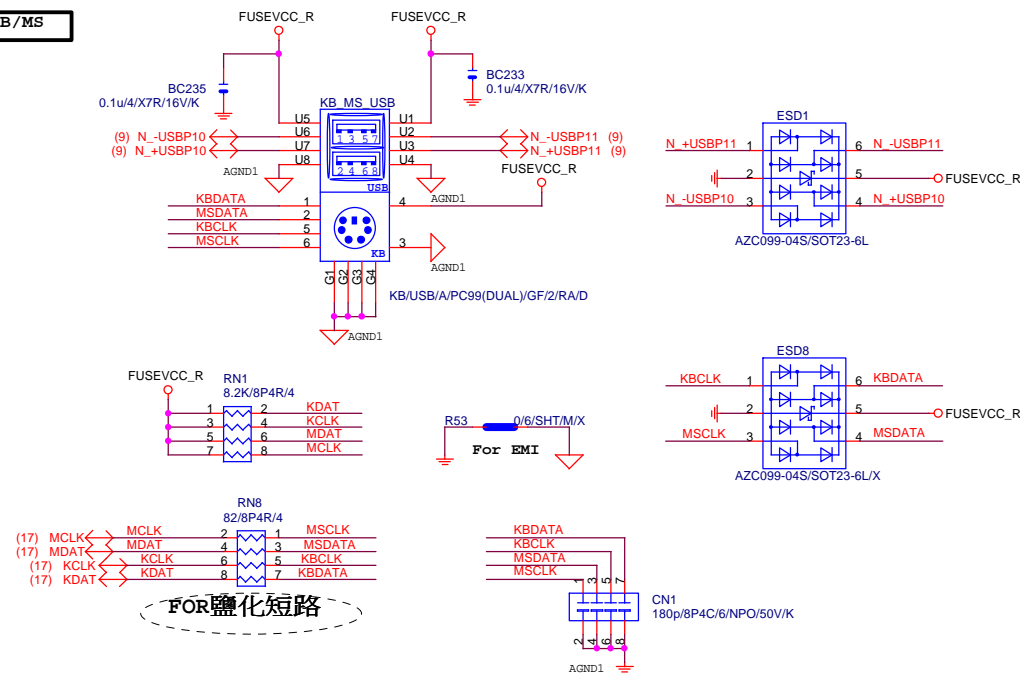
Gigabyte Technology

Title			
ITE 8728 LPC IO			
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KB/MS

USB2.0 ESD

USB2.0 PWR

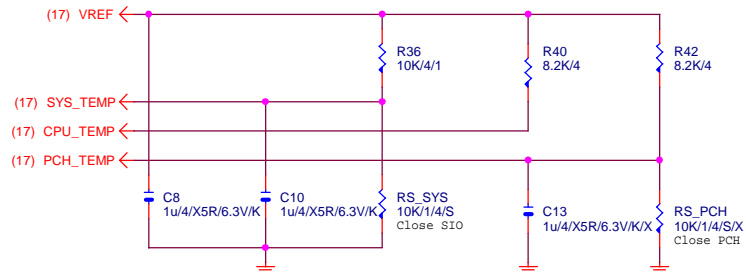


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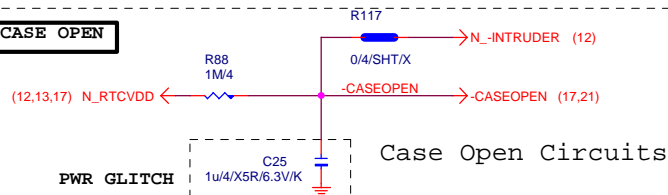
Gigabyte Technology

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KB/MS,RUSB			
Size	Document Number	Rev	
Custom	GA-Q87M-MK	1.11	
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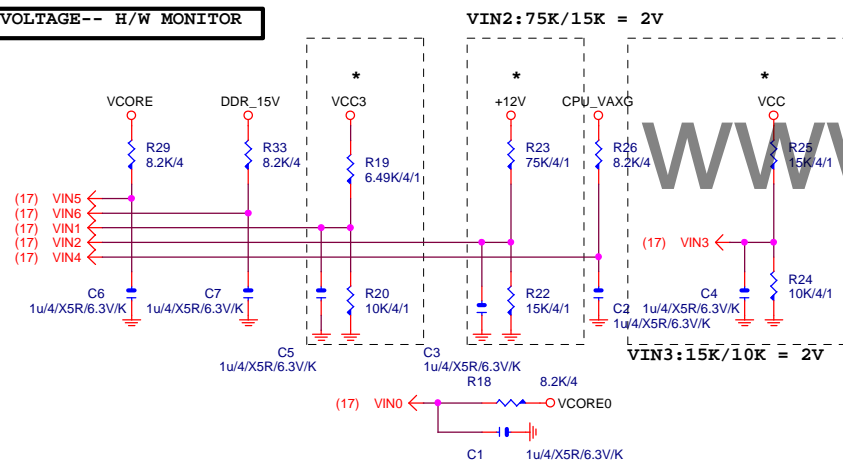
TEMP H/W MONITOR



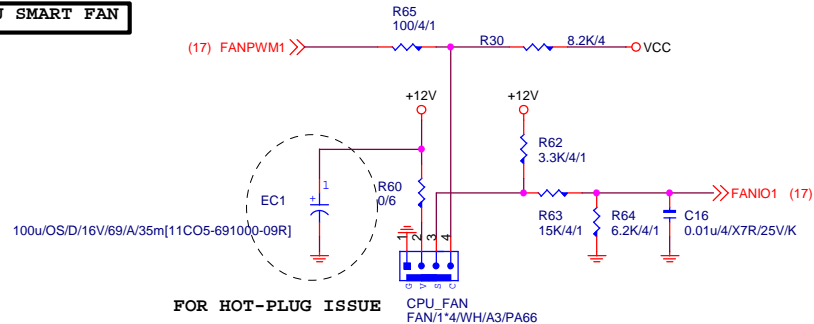
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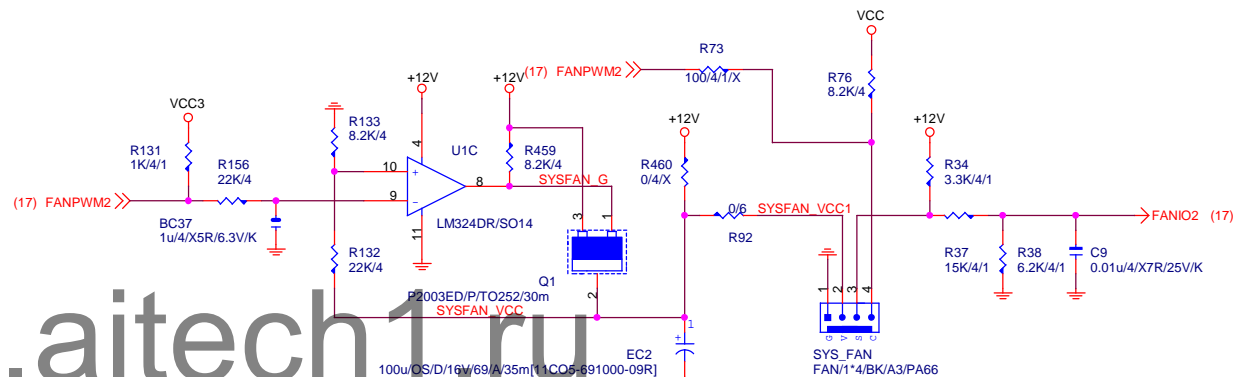
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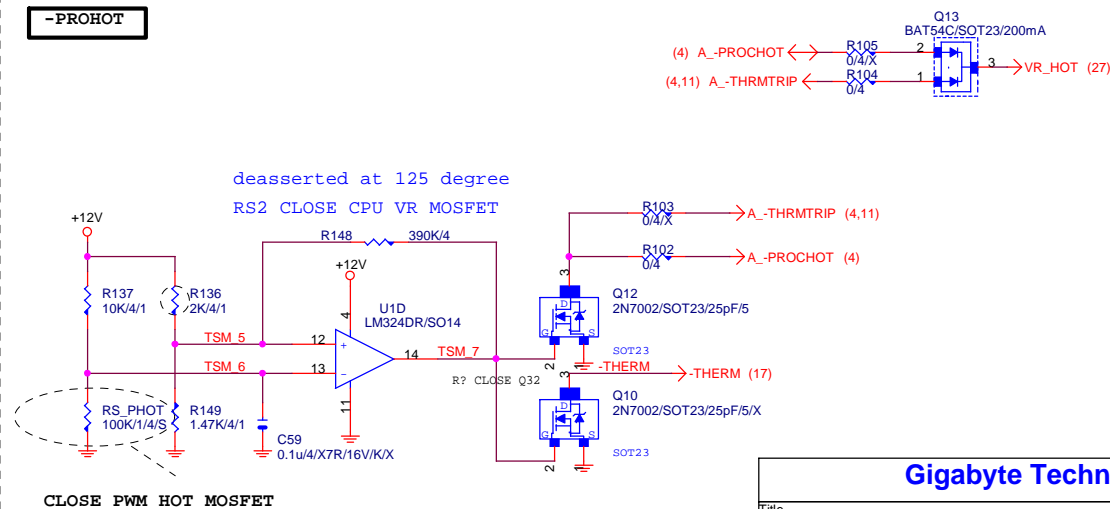
CPU SMART FAN



SYS SMART FAN



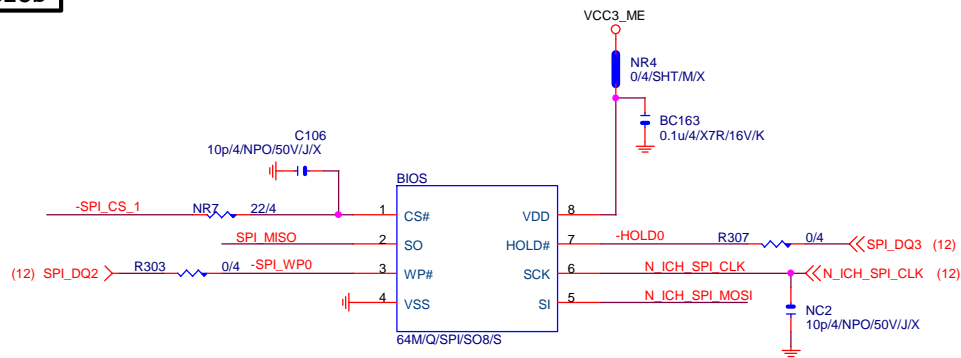
-PROHOT



Gigabyte Technology

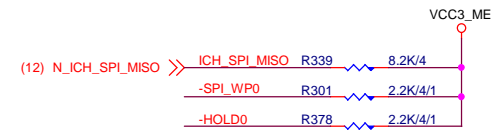
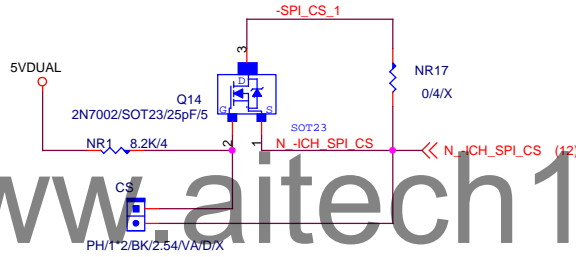
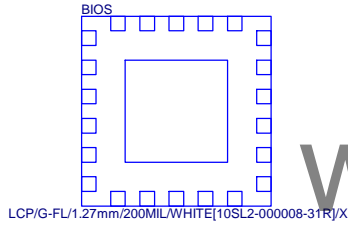
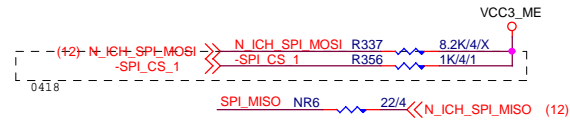
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BIOS



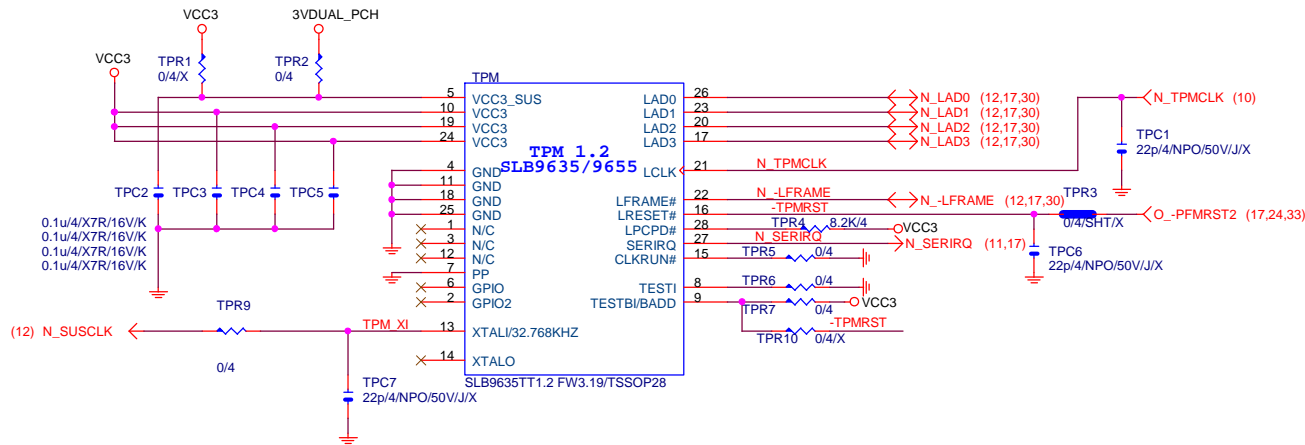
BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	1	1

1 means internal PU
0 means PD 1K



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TPM

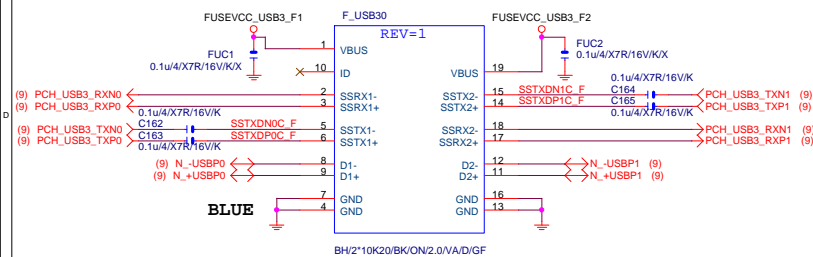


	SLB9635	SLB9655
TPR2, TPR4, TPR5, TPR6, TPR7, TPR9	MOUNT	N/A
TPR1, TPR10	N/A	MOUNT

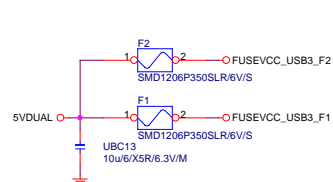
Gigabyte Technology

Title		
BIOS ,TPM		
Size	Document Number	Rev
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F_USB30

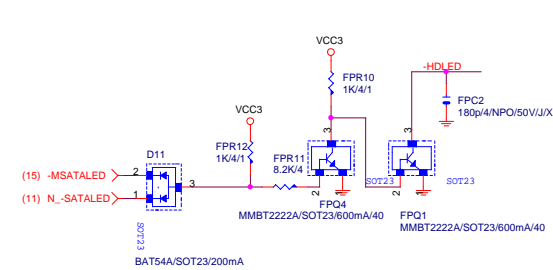


F_USB30 PWR

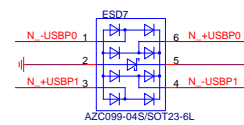


USB3.0 1Port - 1Fuse (3.5A)

SATA LED

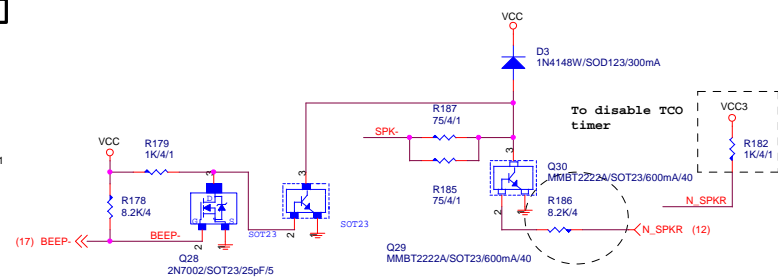


F_USB30 ESD PROTECT

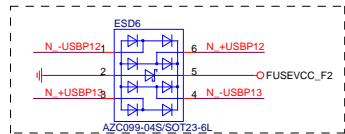
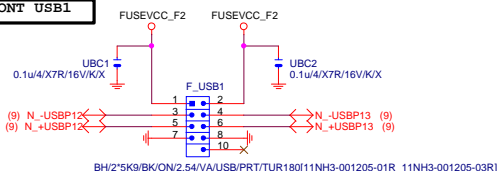


Close to connector

SPKR

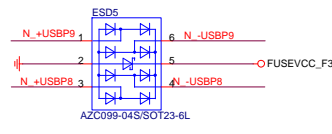
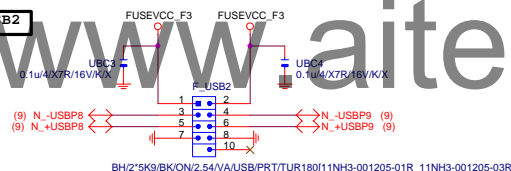


FRONT USB1



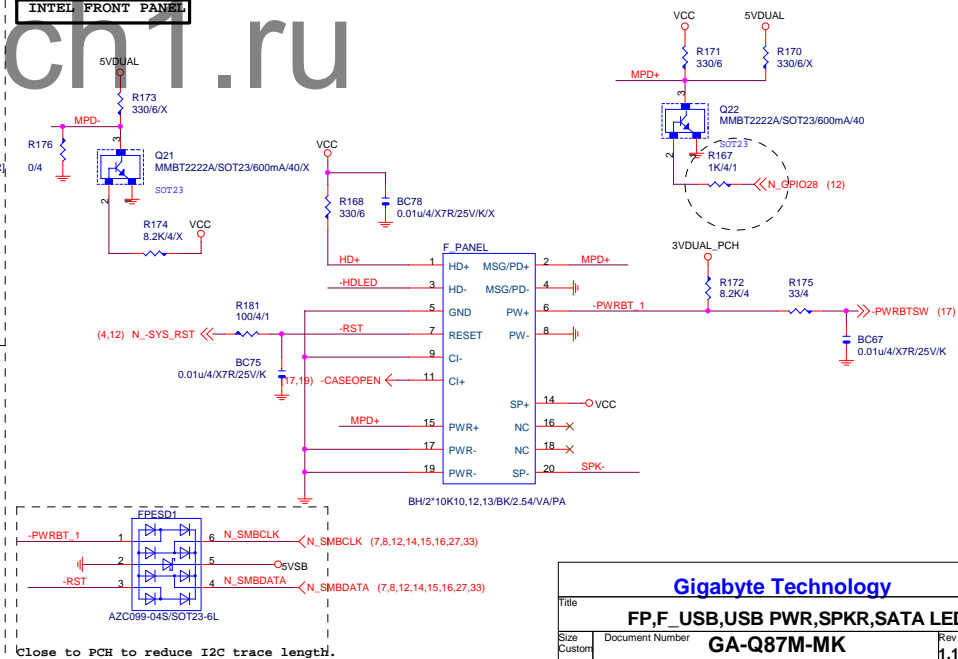
Close to connector

FRONT USB2

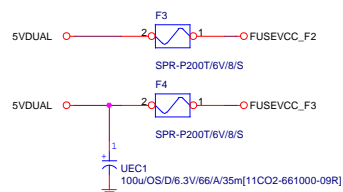


Close to connector

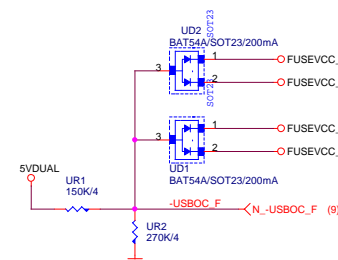
INTEL FRONT PANEL



FUSEVCC_F



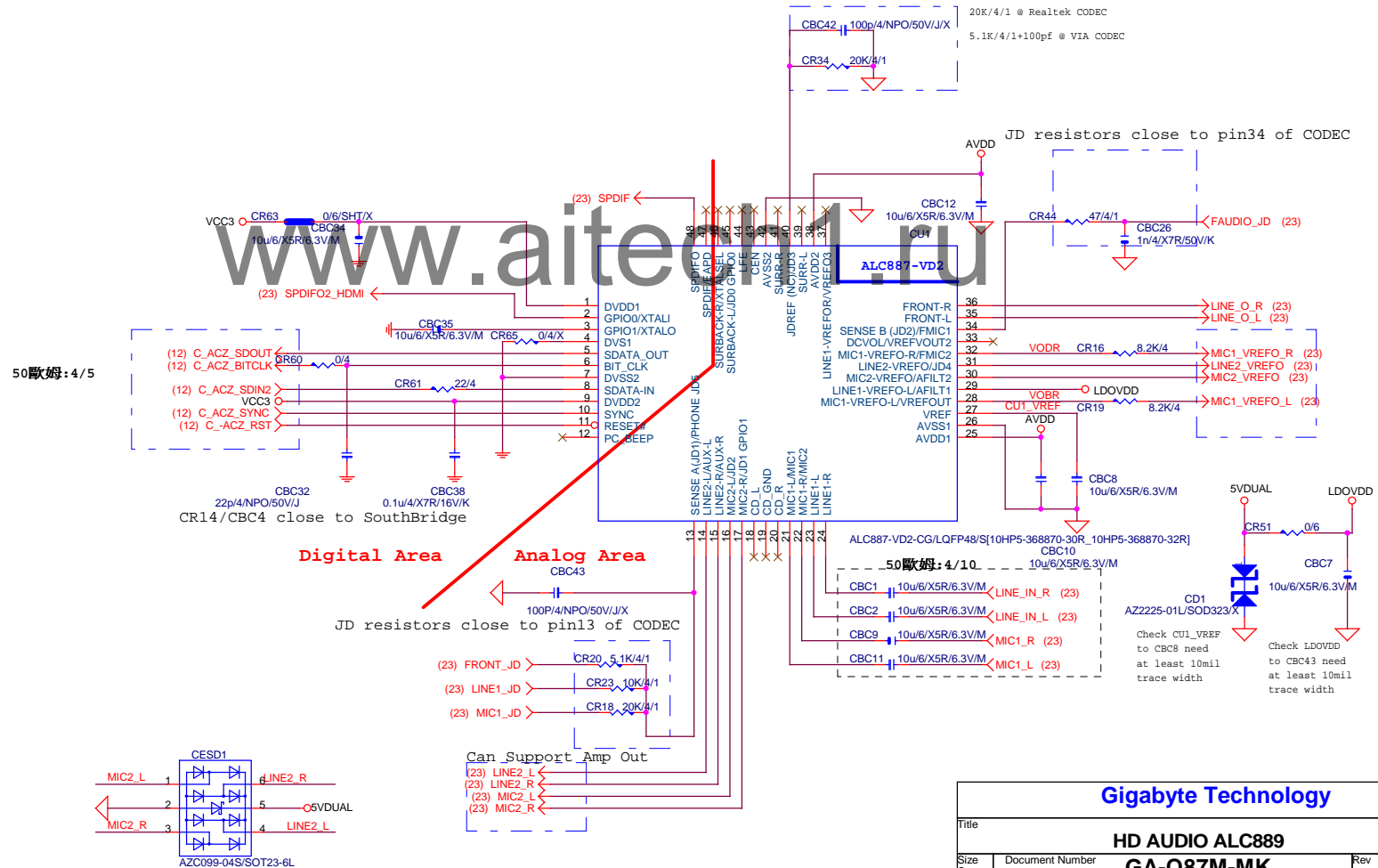
-USB30_F



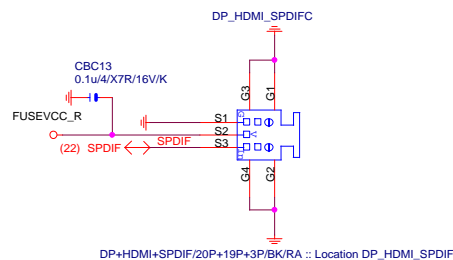
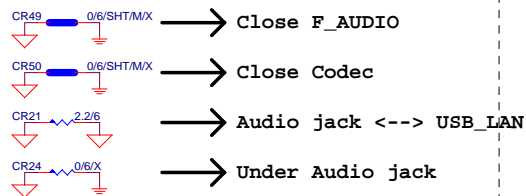
Gigabyte Technology			
FP,F_USB,USB PWR,SPKR,SATA LED			
Size	Document Number	GA-Q87M-MK	
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AZALIA CODEC ALC892/ALC887-VD2/VT1708-CE Colay

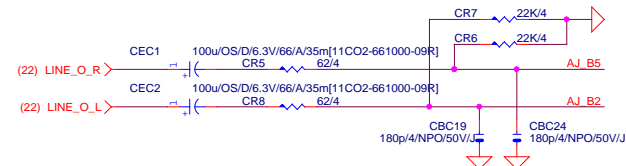
	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70/ CR2/CR4	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76/CR27/CR29	62 ohm	62 ohm	75 ohm
CR16/CR19	8.2K/4	8.2K/4	3.3K/4
CESD1	O	O	O



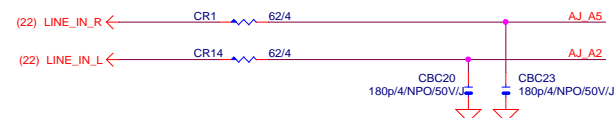
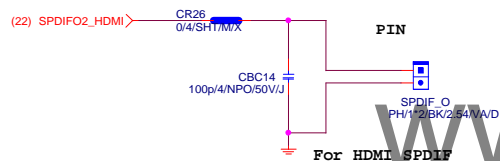
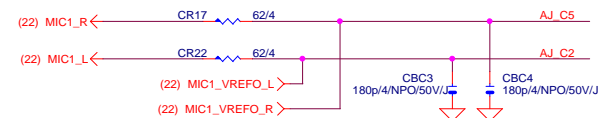
CODEC POWER/EMI PAD



LINE-OUT

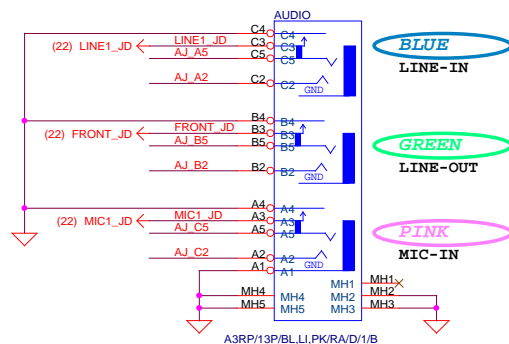


LINE-IN

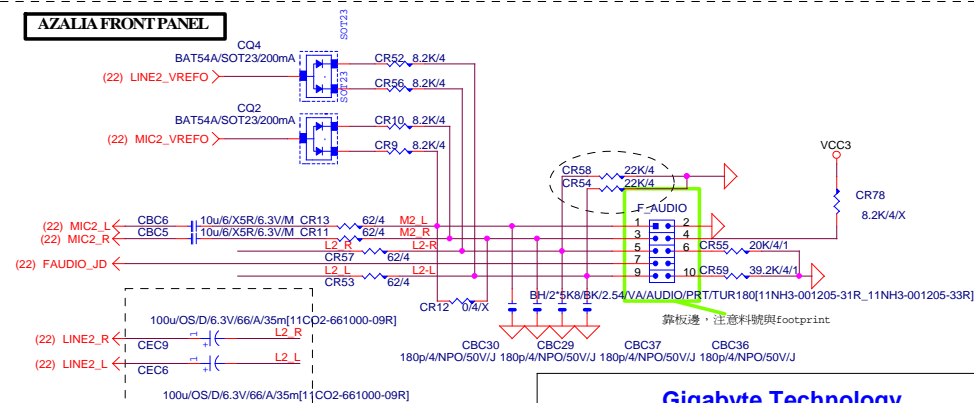
**MIC-IN**

AZALIA JACK

BTX AZALIA CONNECTOR

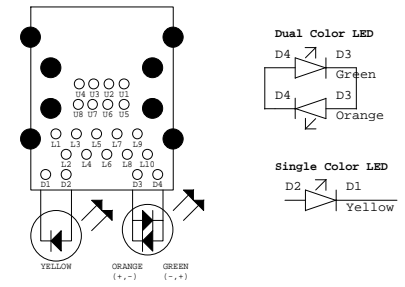
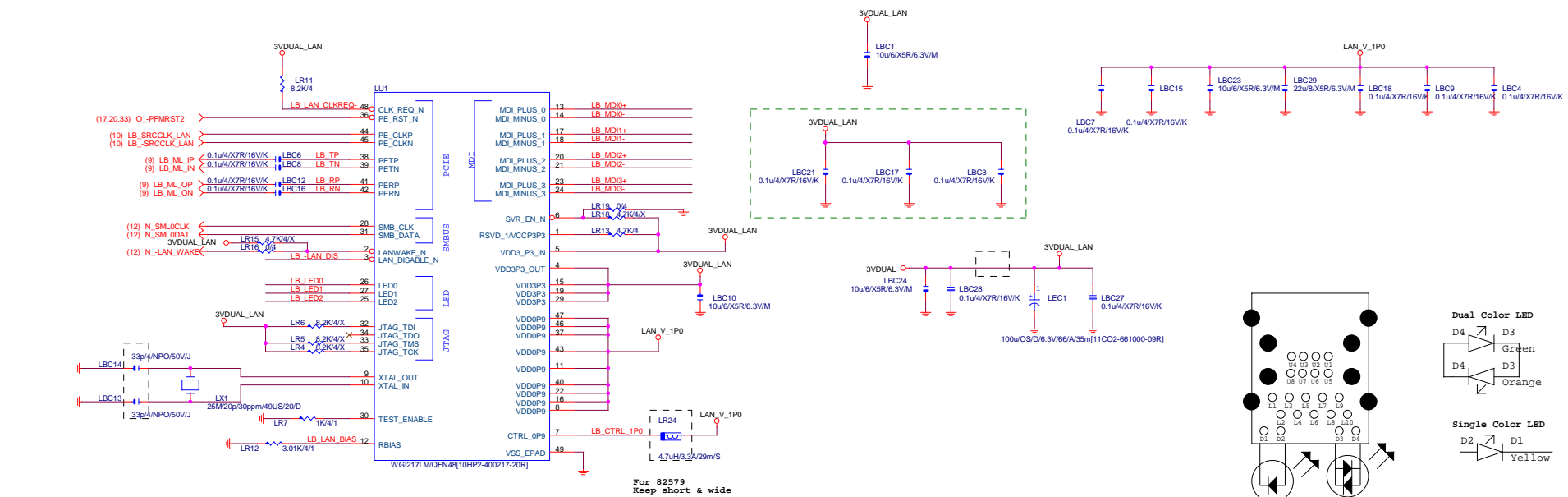


AZALIA FRONT PANEL



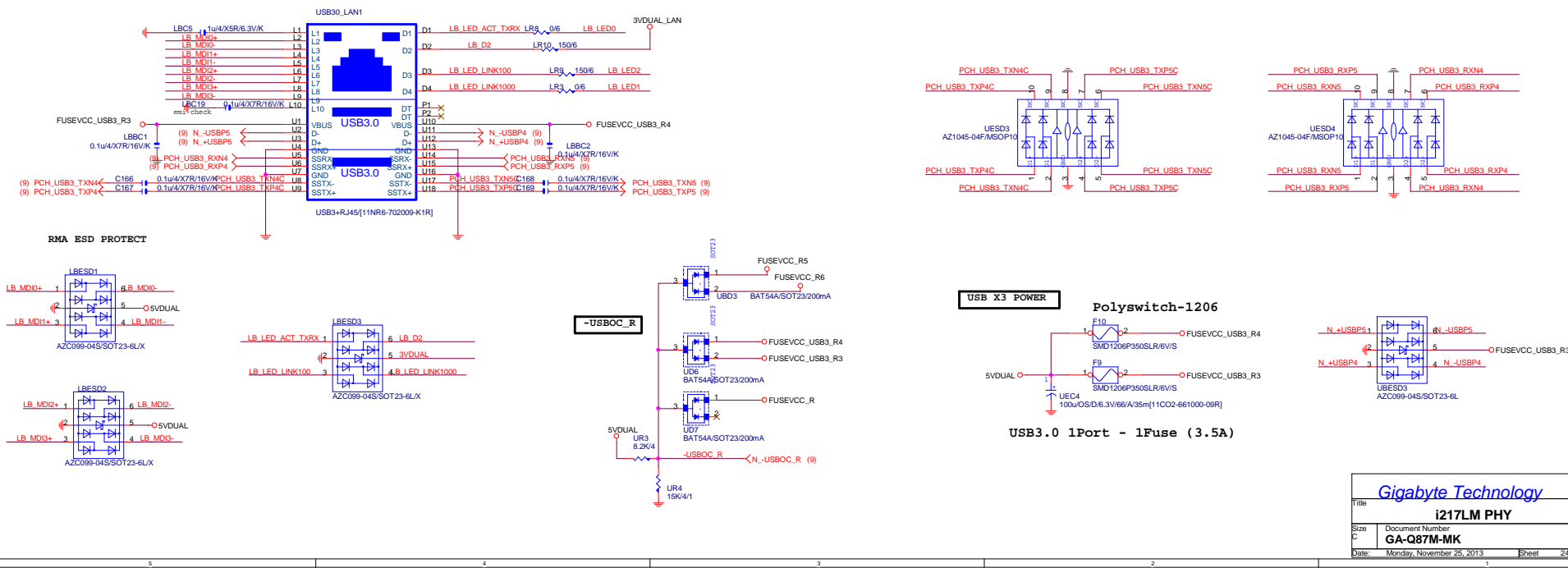
Gigabyte Technology

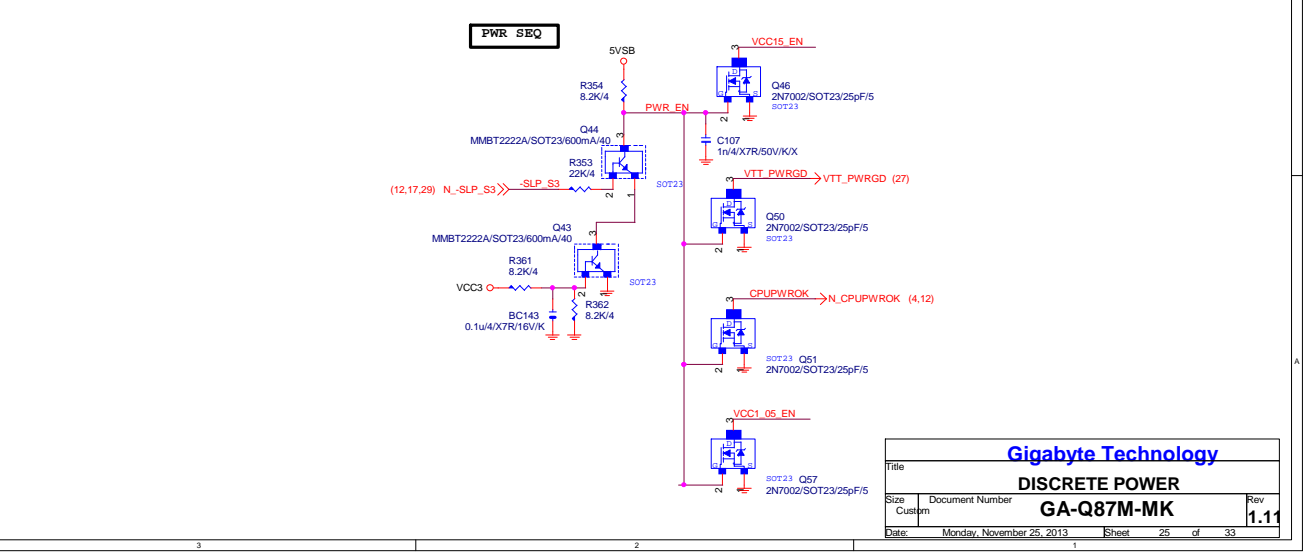
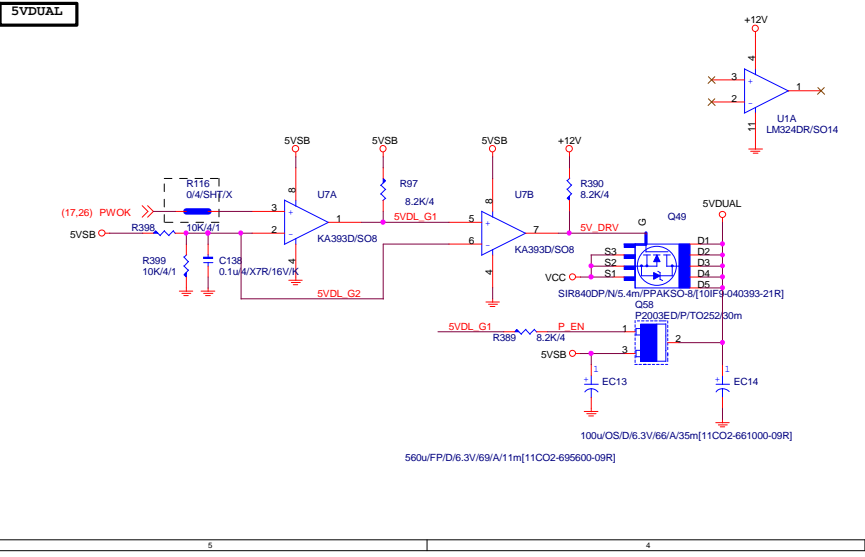
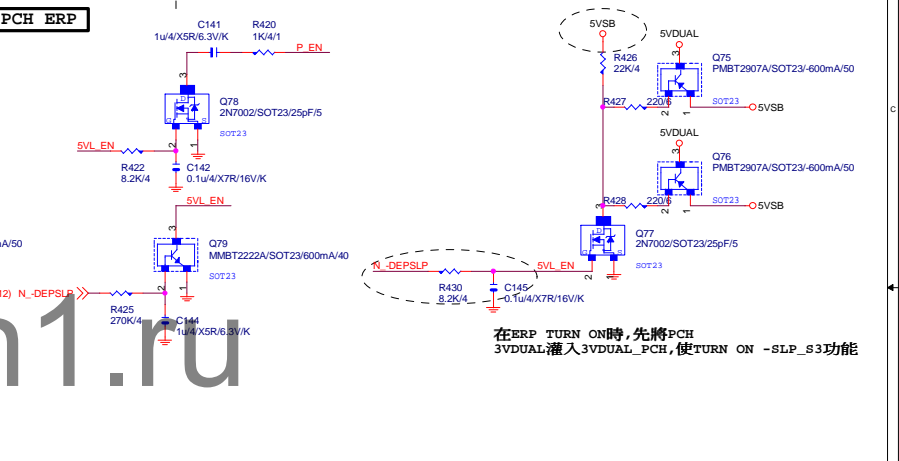
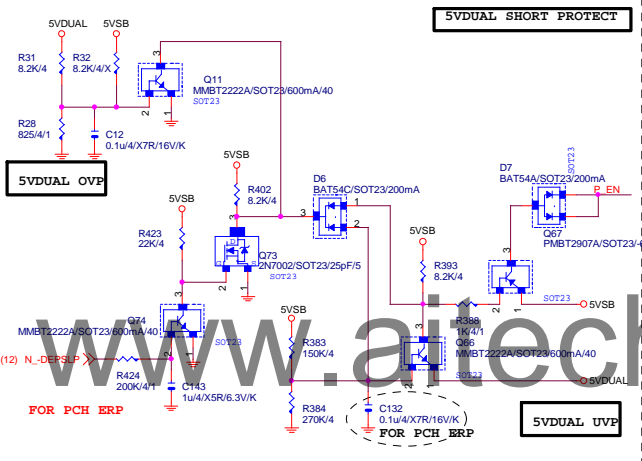
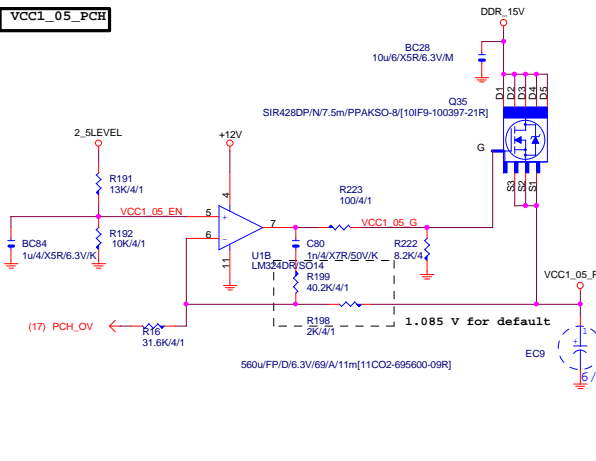
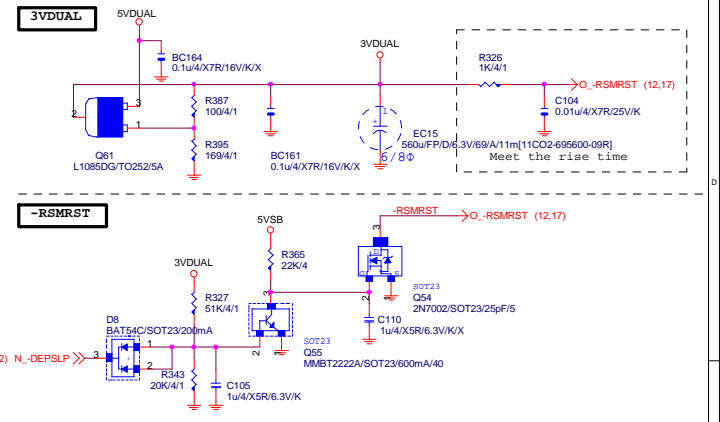
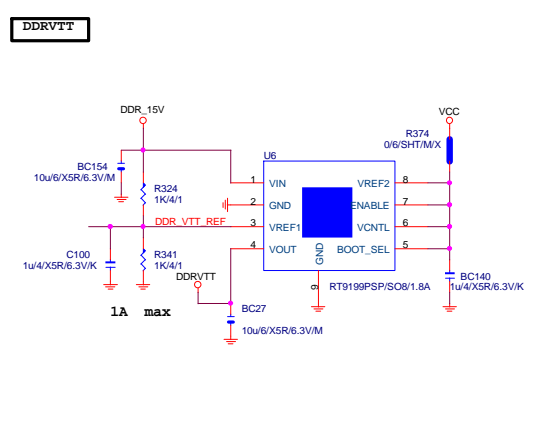
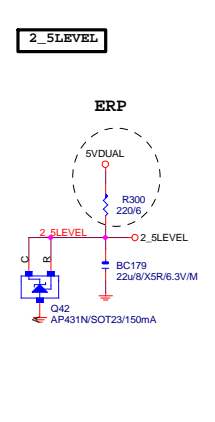
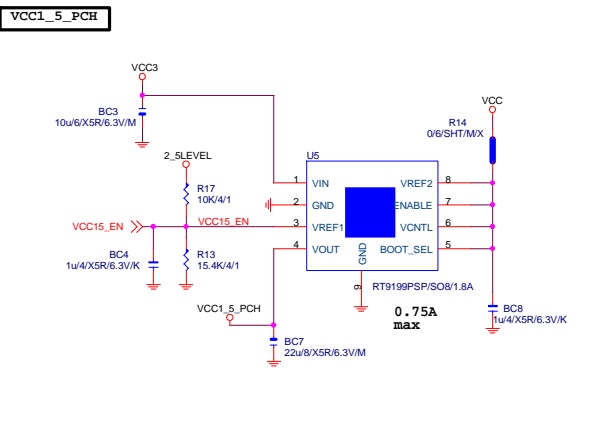
Title			
AUDIO JACK			
Size Custom	Document Number	GA-Q87M-MK	Rev 1.1
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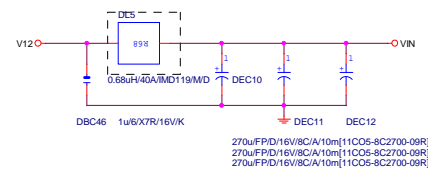
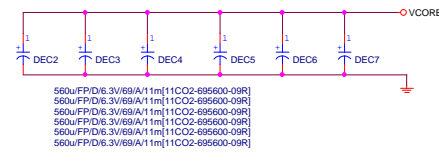
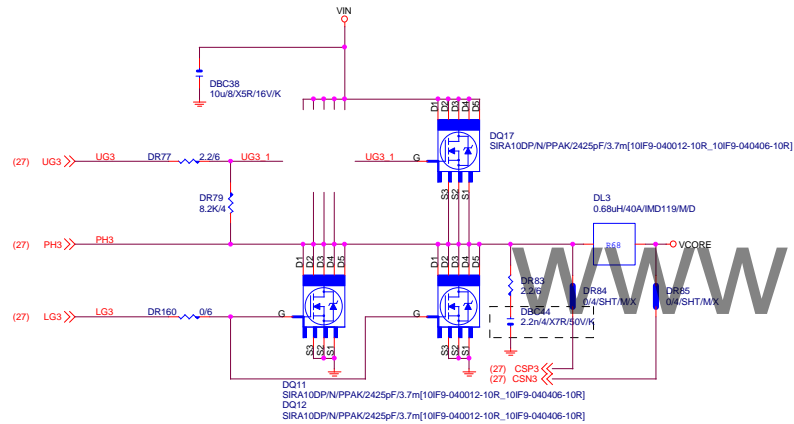
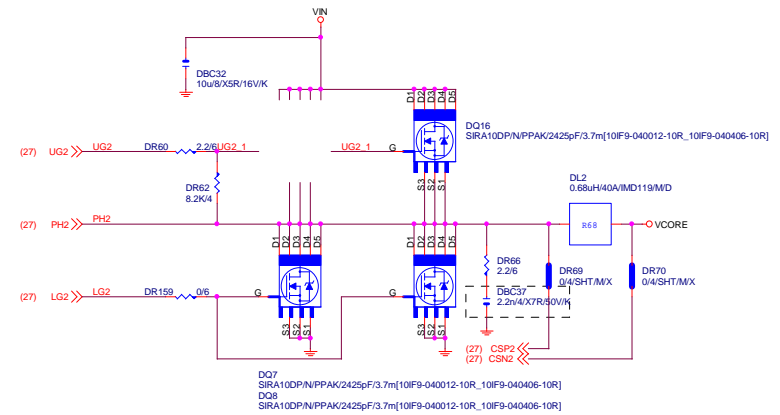
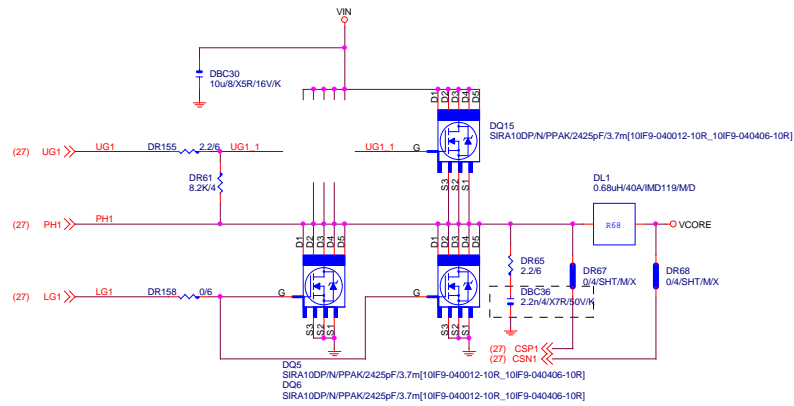


1Gb	Orange	Access	Blinking
100Mb	Green	Link	Yellow
10Mb	Off		

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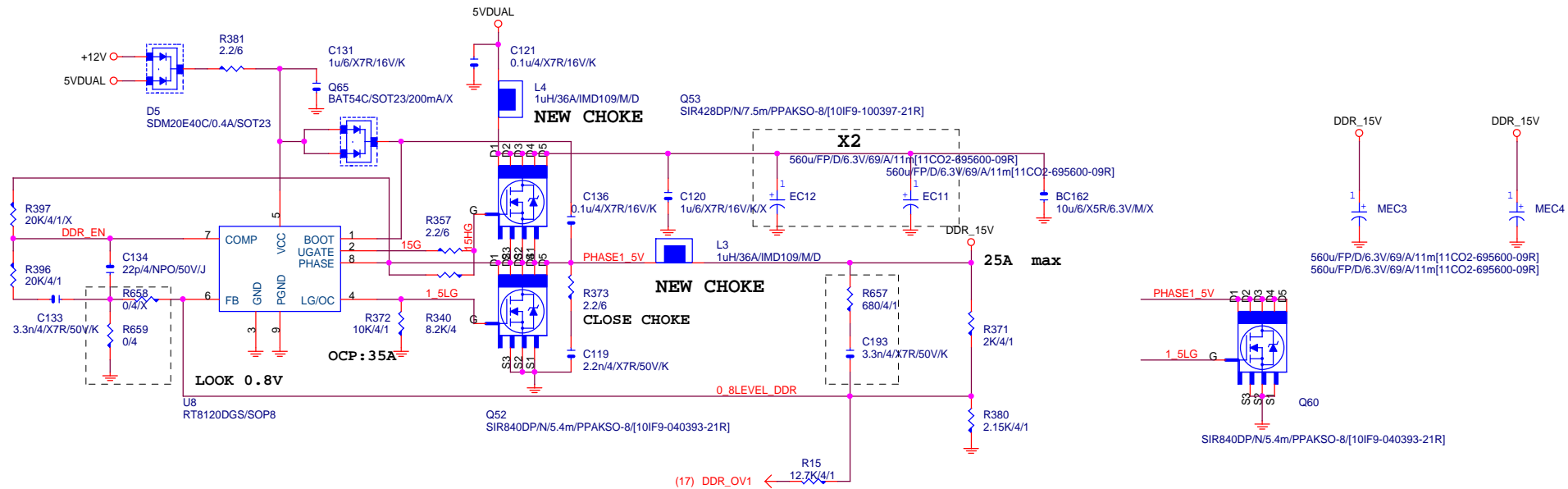




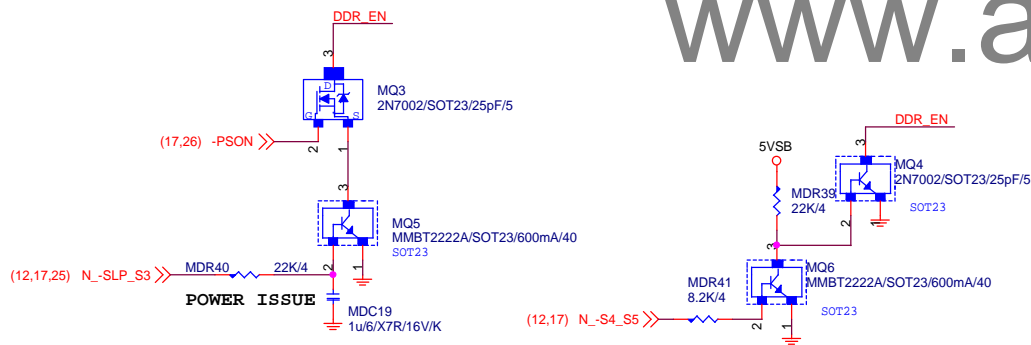
Gigabyte Technology

Title			CPU CORE VR-2
Size	Document Number	GA-Q87M-MK	
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DDR1.5V



PWR_SEQ



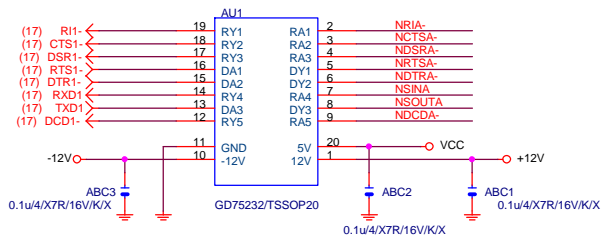
VIN=5V, VOUT=1.5V, IOUT=25A, PHASE=1
 IRMS=11.45A
 560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
 Coefficient=1.7(85°C), 1(105°C)
 VIN Ripple current=4.7X1.7=7.99A(85°C)
 -->故固態電容須2X7.99=15.98>11.45A

$R_{ocset} = (I_{ocp} * L_{gate, rdson}) / I_{ocset}$
 $R_{ocset} = (45A * 6.7m\Omega) / 10\mu A = 30K$
 $I_{ocset} = 10\mu A$

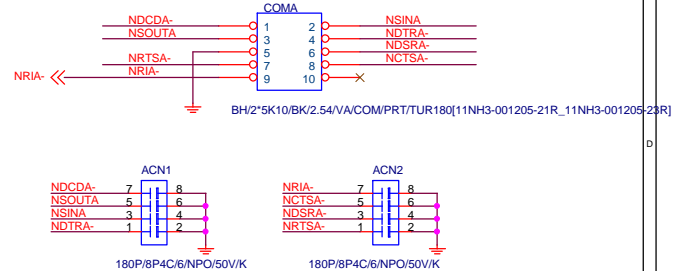
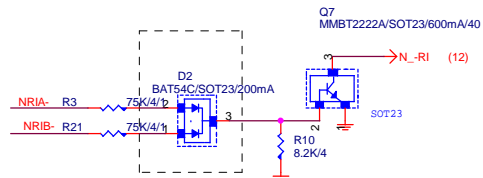
Gigabyte Technology

Title		
DDR POWER		
Size	Document Number	Rev
Custom	GA-Q87M-MK	1.11
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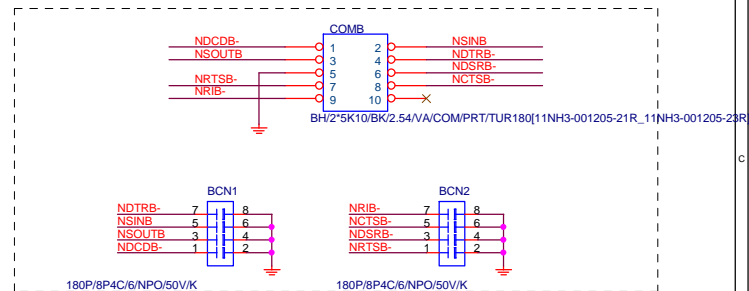
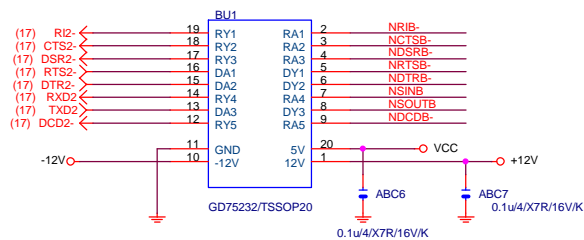
COMA



COM RI

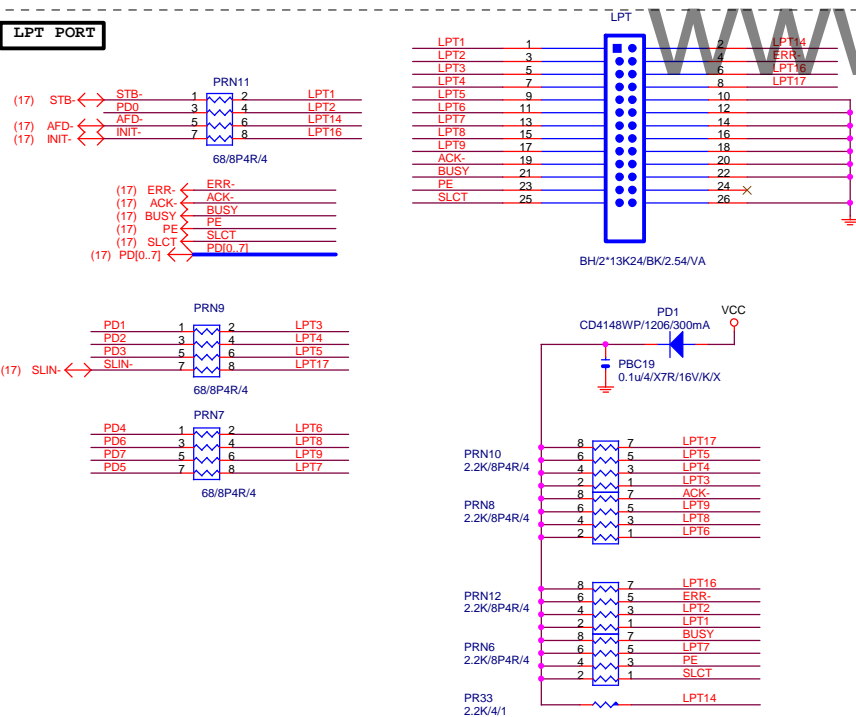


COMB

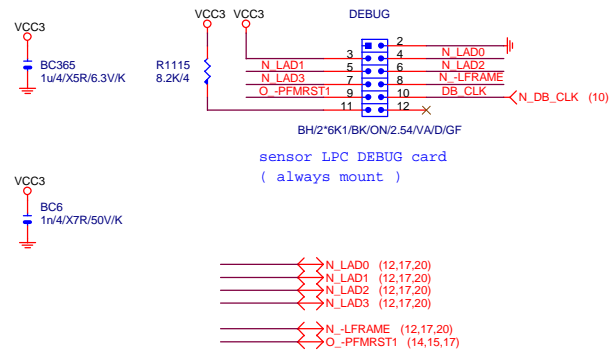


PLACE NEAR COM CONNECTOR

LPT PORT



80 PORT



Gigabyte Technology

Title			
COM A/B & LPT & 80 PORT			
Size	Document Number		Rev
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