

Model Name: GA-Q87M-D3PH

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,Reserved
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS X16 SLOT
15	PCI EXPRESS X4 / X1 SLOT
16	PCI SLOT
17	ITE 8728 LPC IO
18	KB_MS_USB, R_USB3.0
19	HWM,FAN CTRL,-PROCHOT
20	BIOS,TPM
21	FP,FUSB,SPK,SATALED
22	REALTEK CODEC ALC887
23	REAR AUDIO JACK
24	Realtek LAN RTL8111EP/8111F-VL
25	DISCRETE POWER
26	ATX, M3 POWER
27	VCORE ISL95812_1

SHEET TITLE

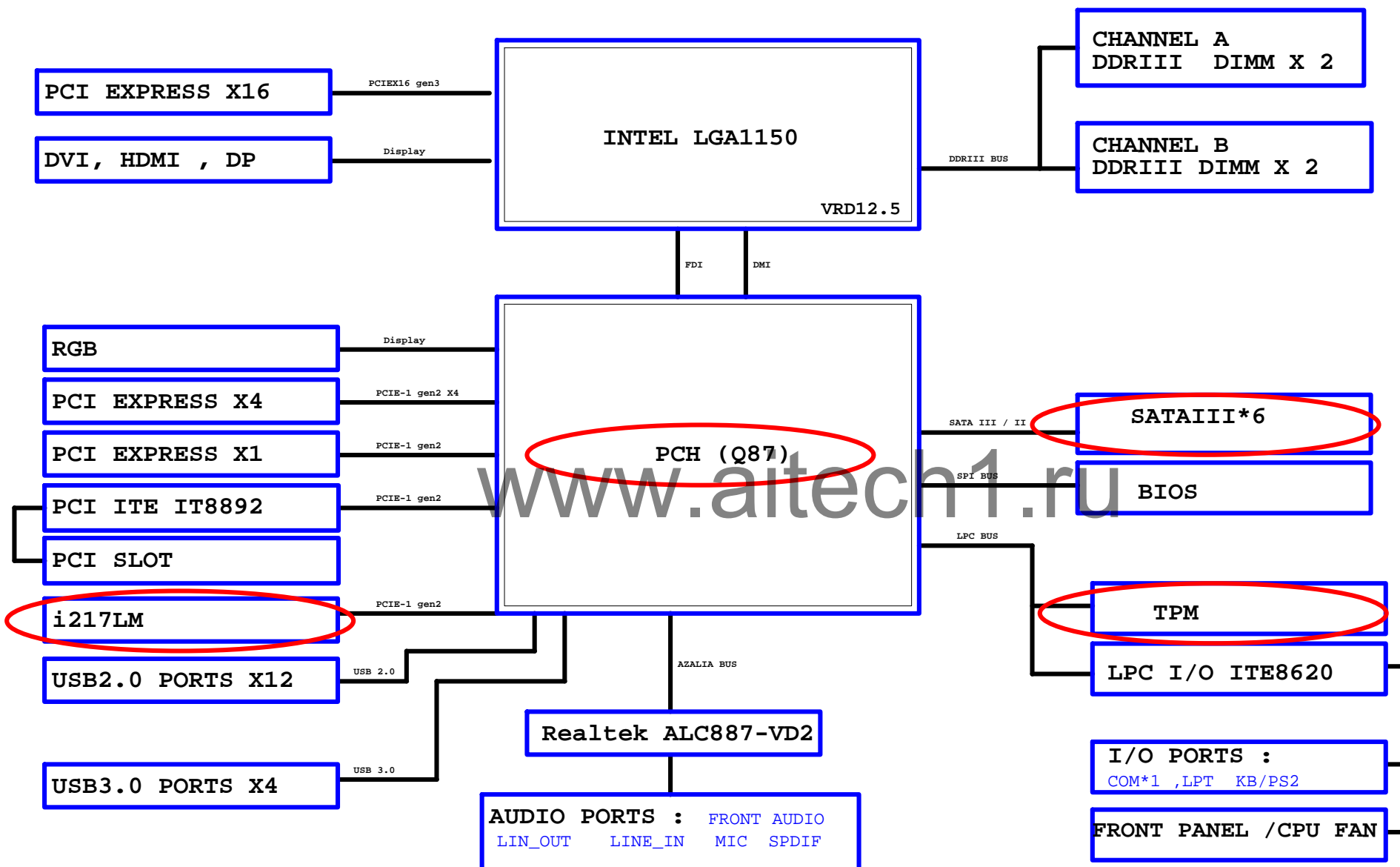
28	VCORE ISL95812_2
29	RT8120_DDR POWER
30	COM A , LPT
31	DVI, HDMI ,DP
32	IT8892E PCI BRIDGE
33	INTEL i217LM PHY

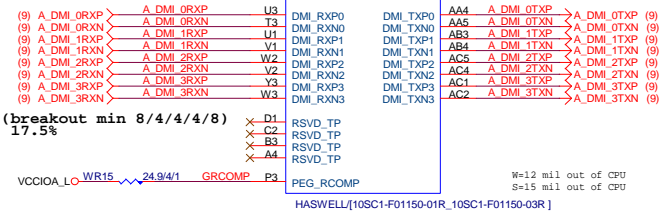
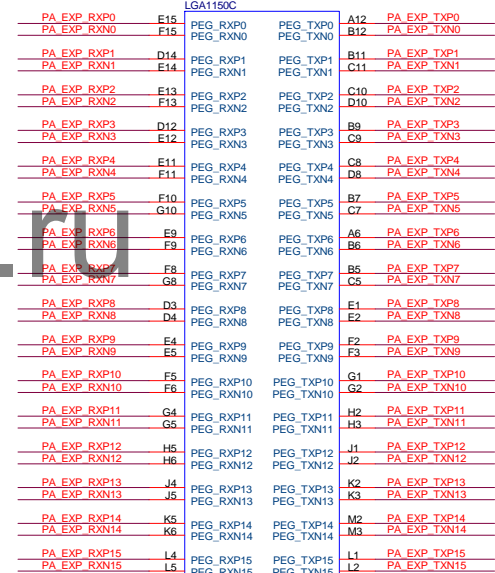
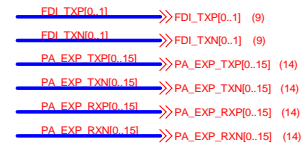
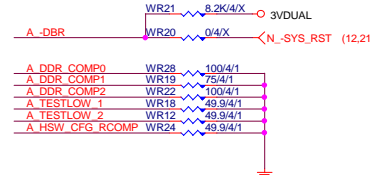
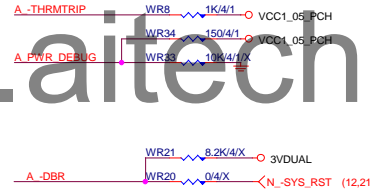
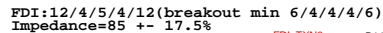
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Gigabyte Technology			
Cover Sheet			
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[illegible][illegible][illegible][illegible][illegible]

BLOCK DIAGRAM





CFG 0-17 all internal PULL-UP

LGA1150A

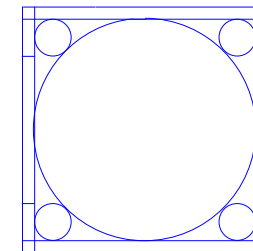
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HASWELL[10SC1-F01150-01R_10SC1-F01150-03R]

LGA1150B

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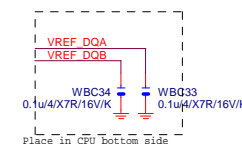
CR
CPU RETAINTION/X

LGA1150



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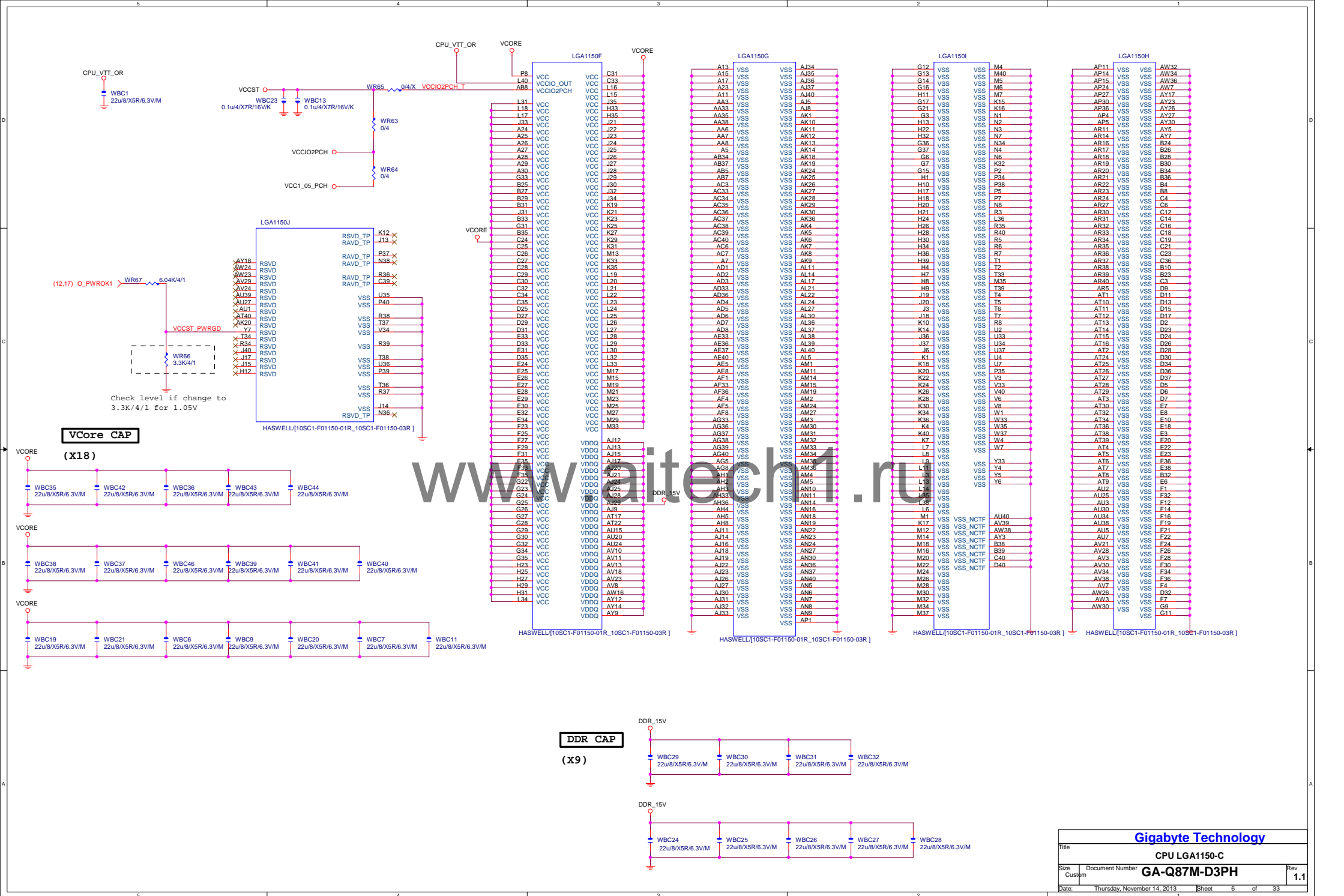
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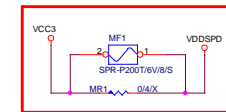
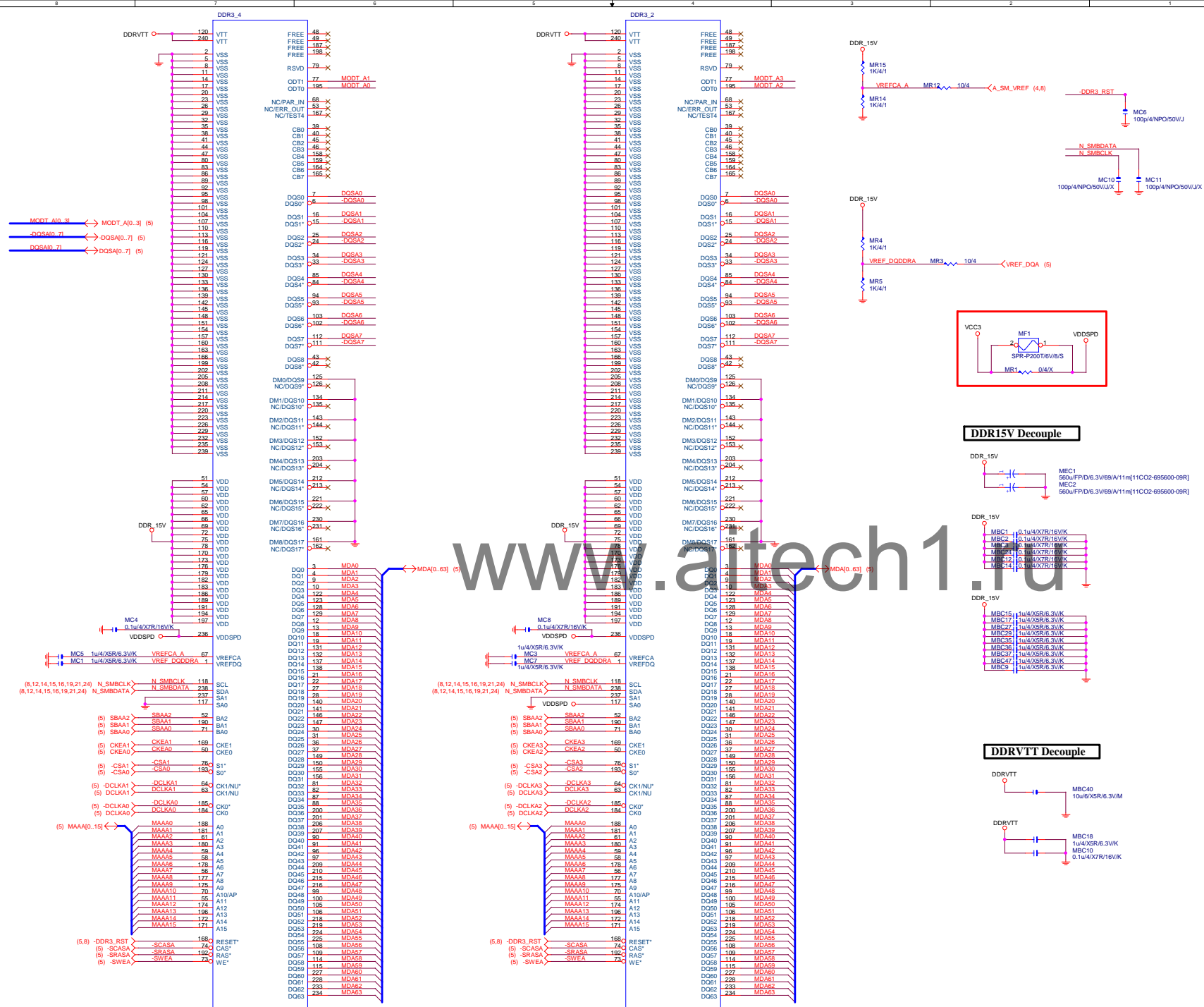


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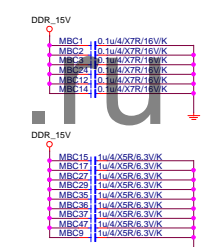
CPU LGA1150-B

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Size	Custom	Document Number	GA-Q87M-D3PH	
Date:	Thursday, November 14, 2013	Sheet	5	of 33

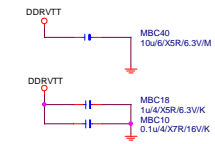




DDR15V Decouple

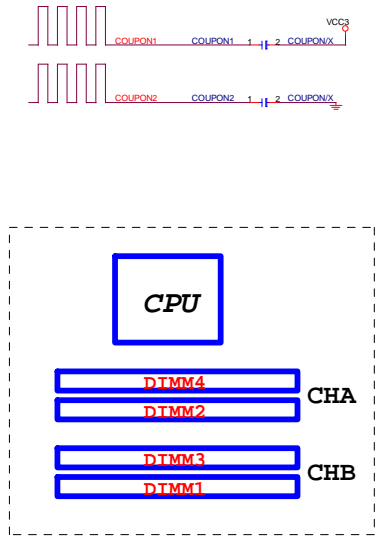
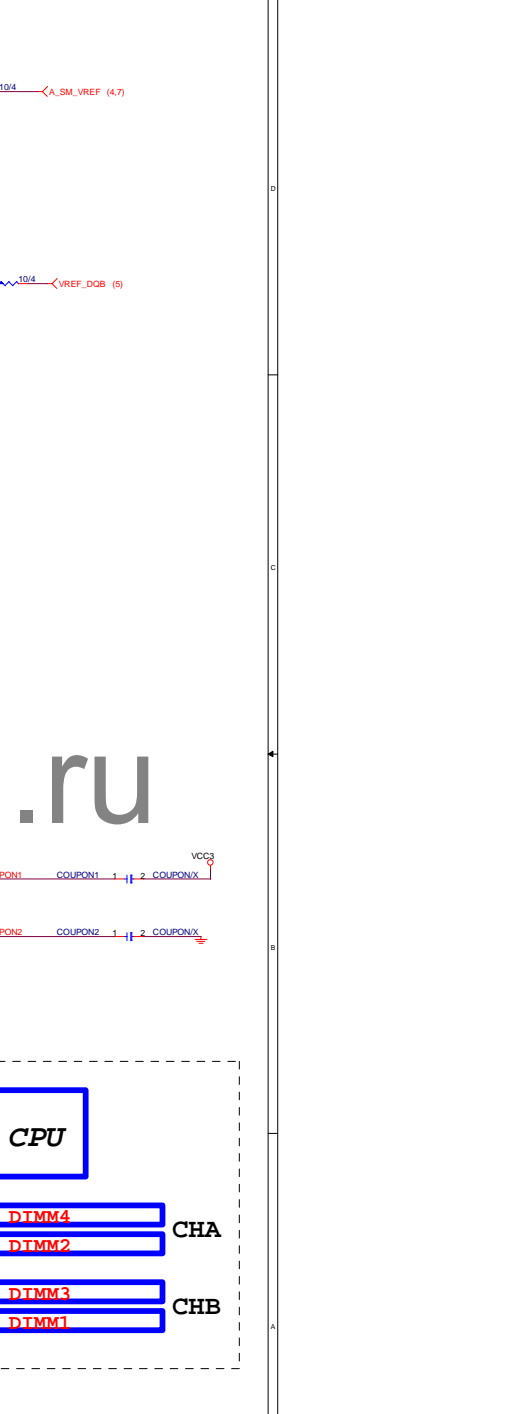
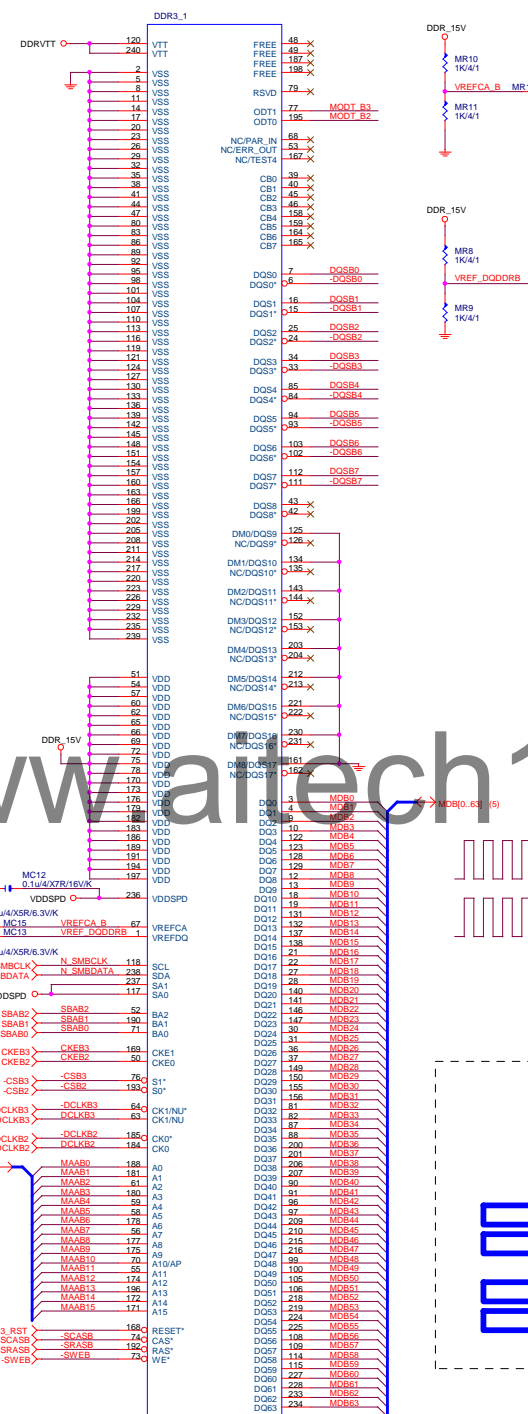
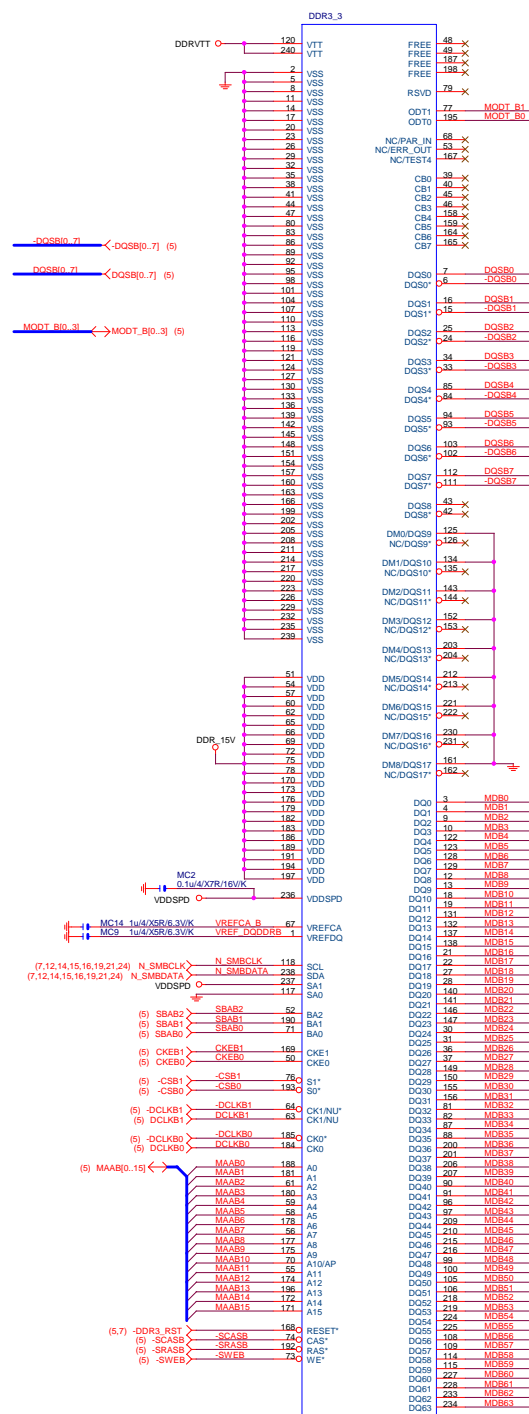


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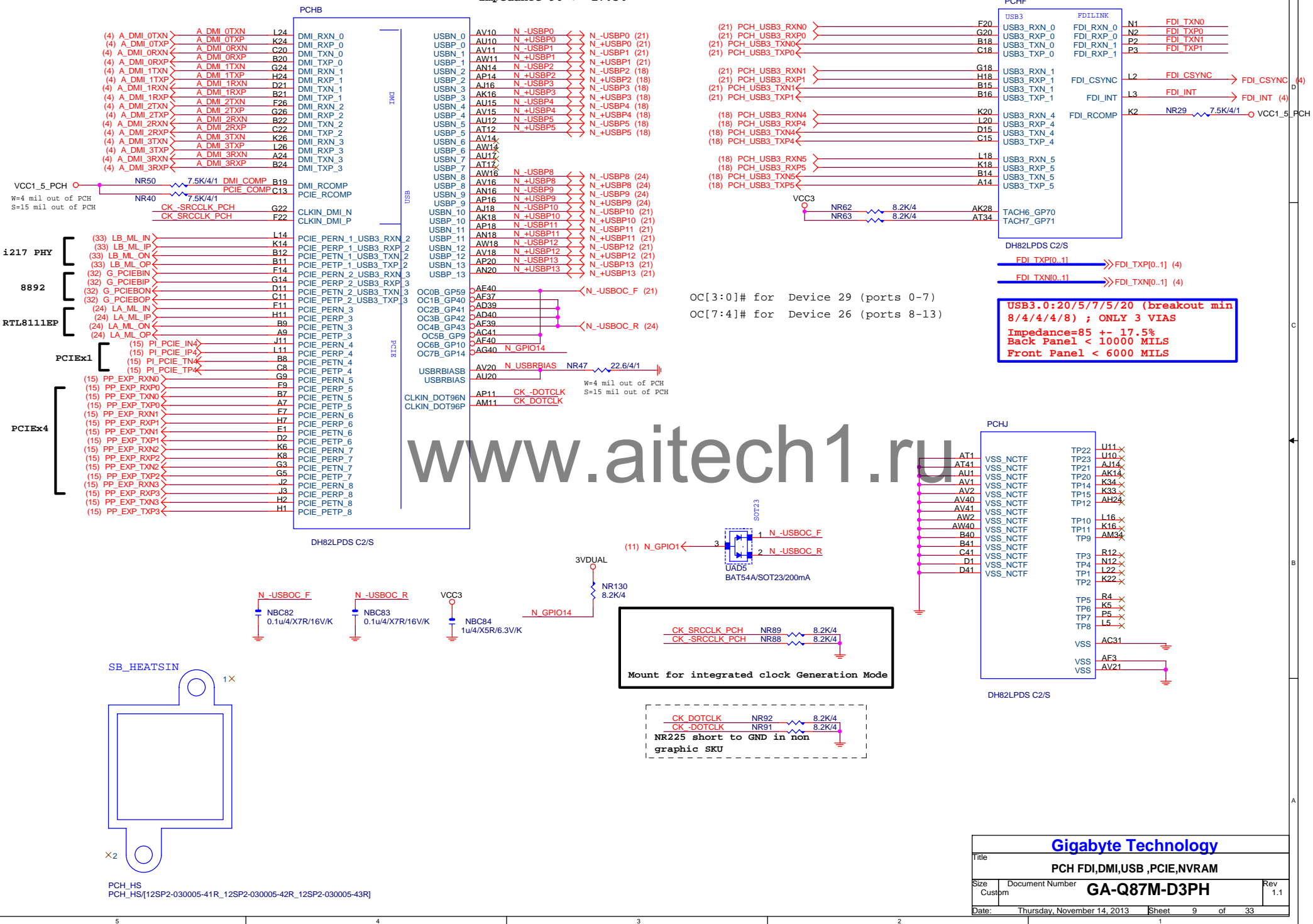


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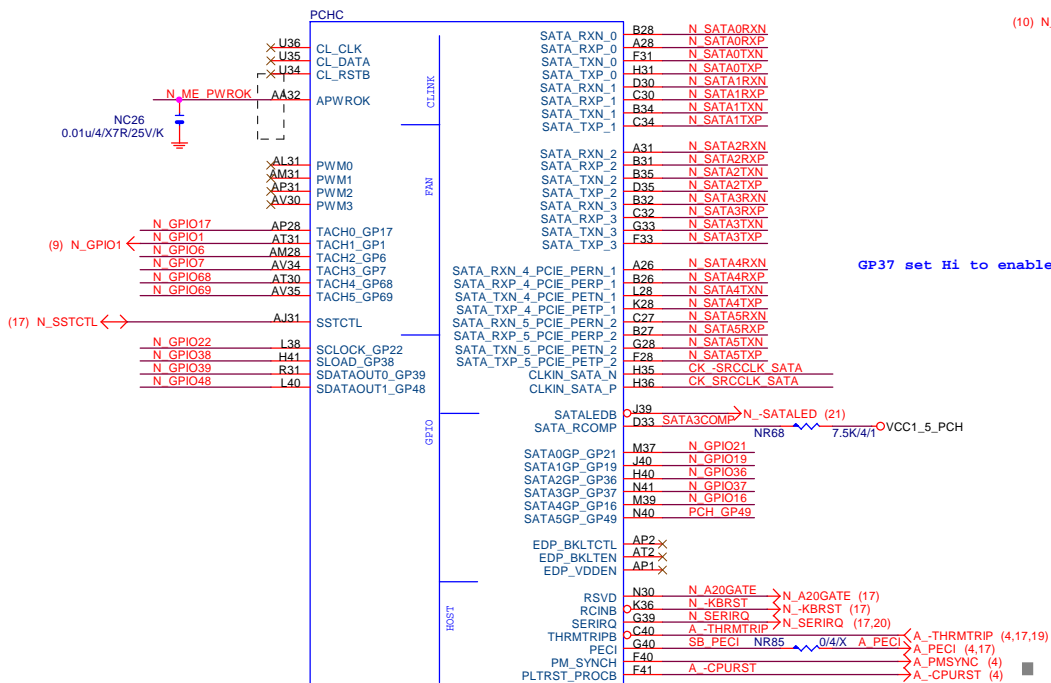
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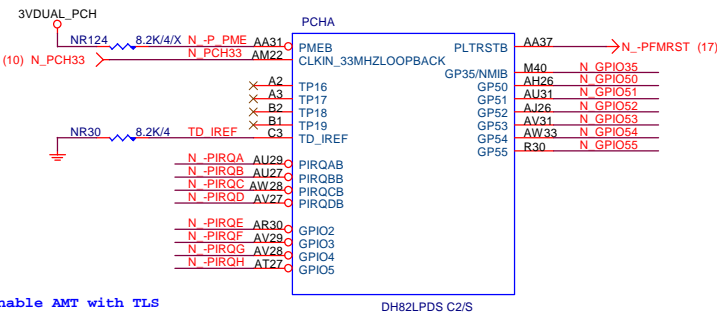
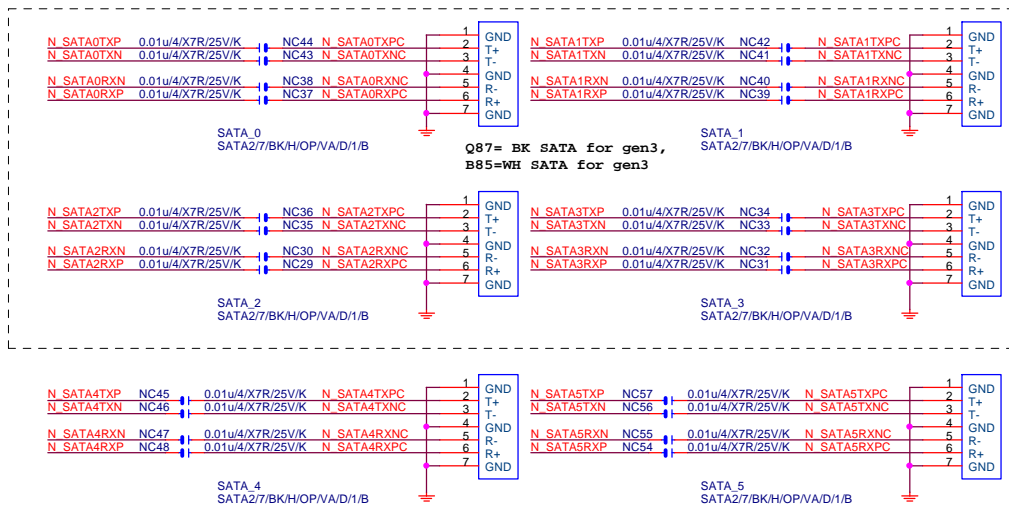
USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



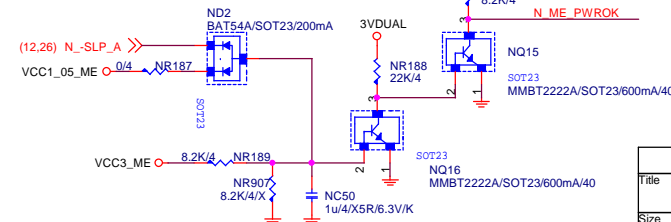
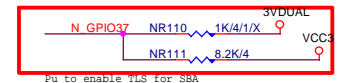
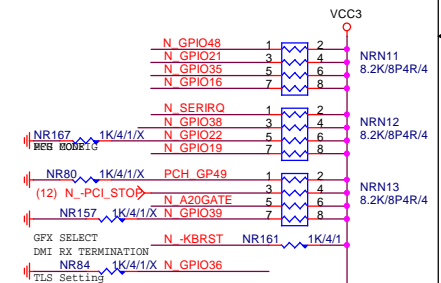
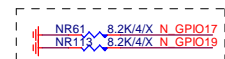
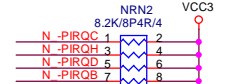
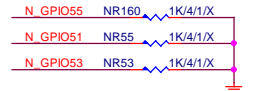
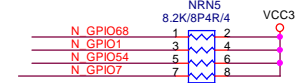
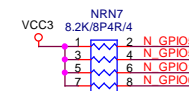
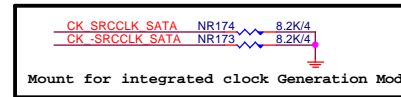

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SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
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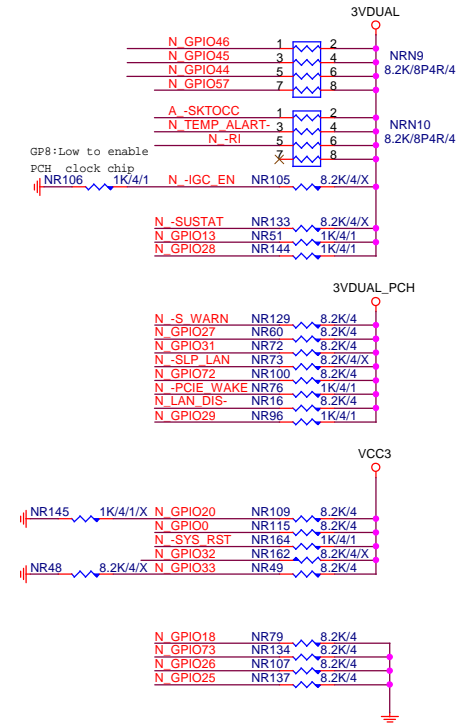
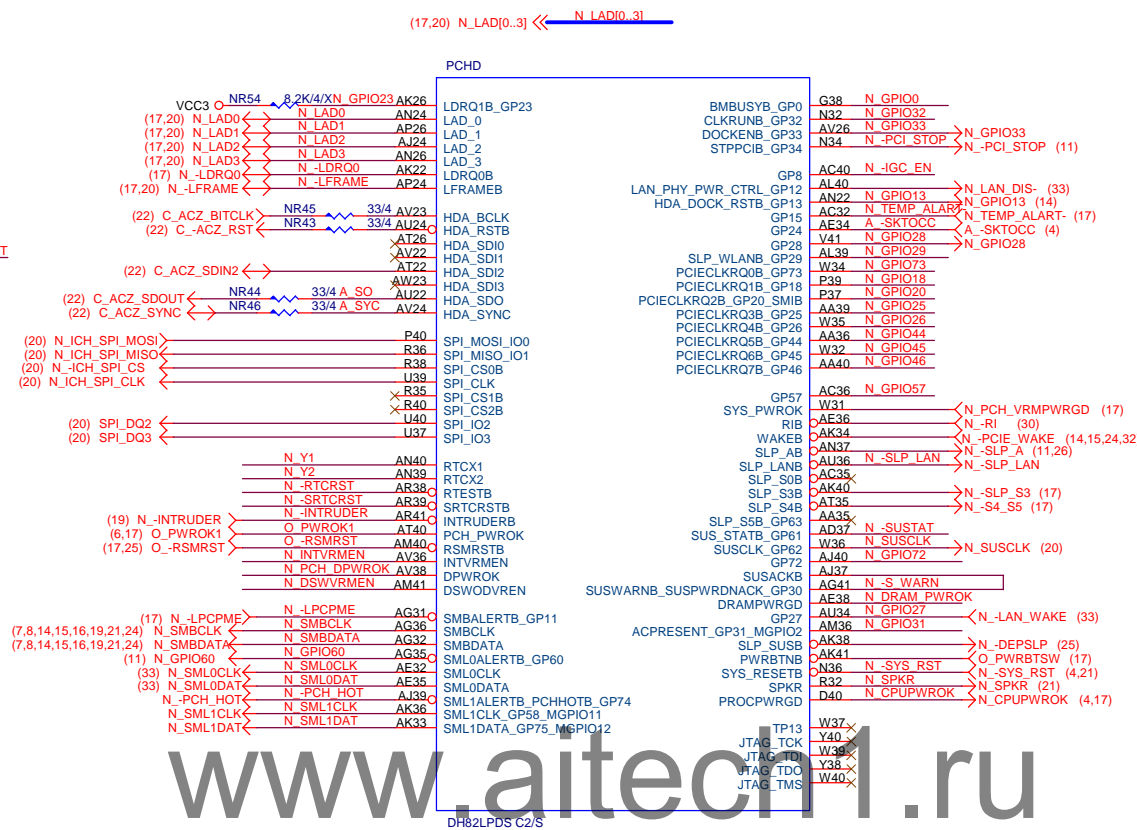
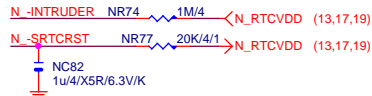
Final need change to
B85 real P/N



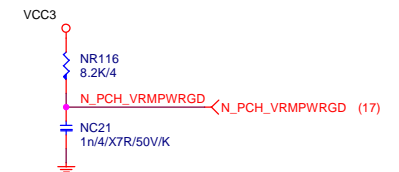
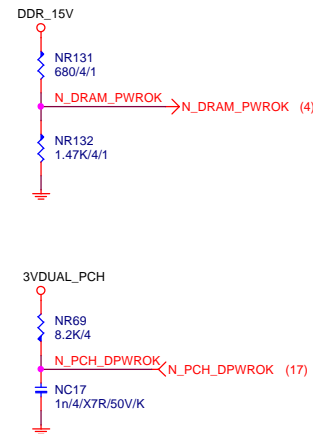
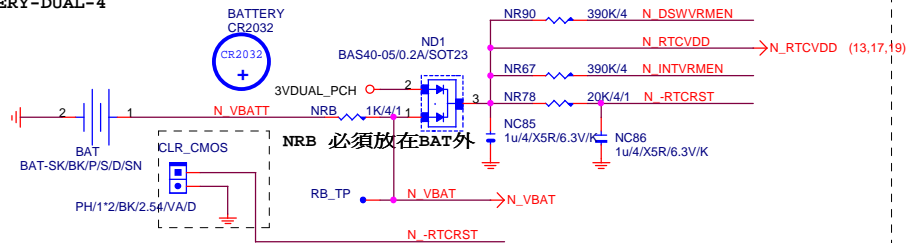
GP37 set Hi to enable AMT with TLS

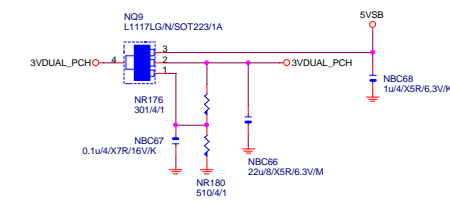
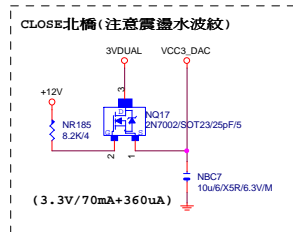
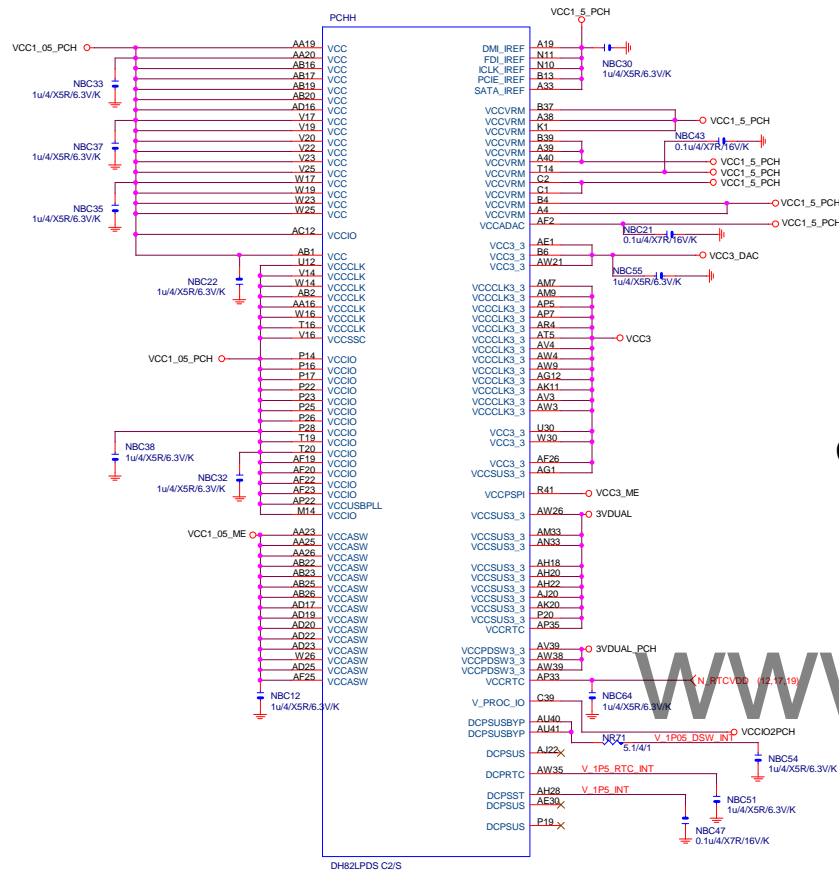


Gigabyte Technology			
Title			
PCH HOST , SATA, PCI			
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Custom			1.1
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BATTERY-DUAL-4





(3.3V) (X6)

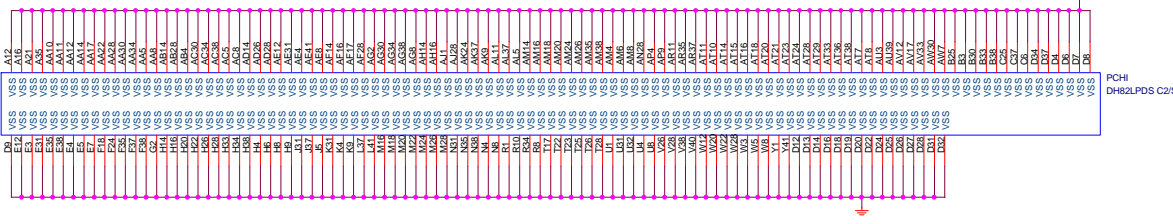
(1.05V) (X5)

(1.05V) (X6)

(1.5V) (X10)

(1.05V) (X2)

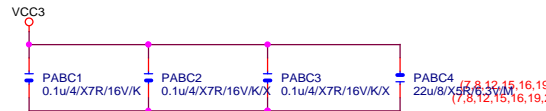
(3.3V) (X2)



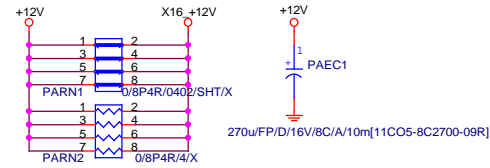
PCIEX16 CAP

PCIEX16 SLOT

PCIESLOT-164DN-P



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PCIEX16 PROTECT SHT
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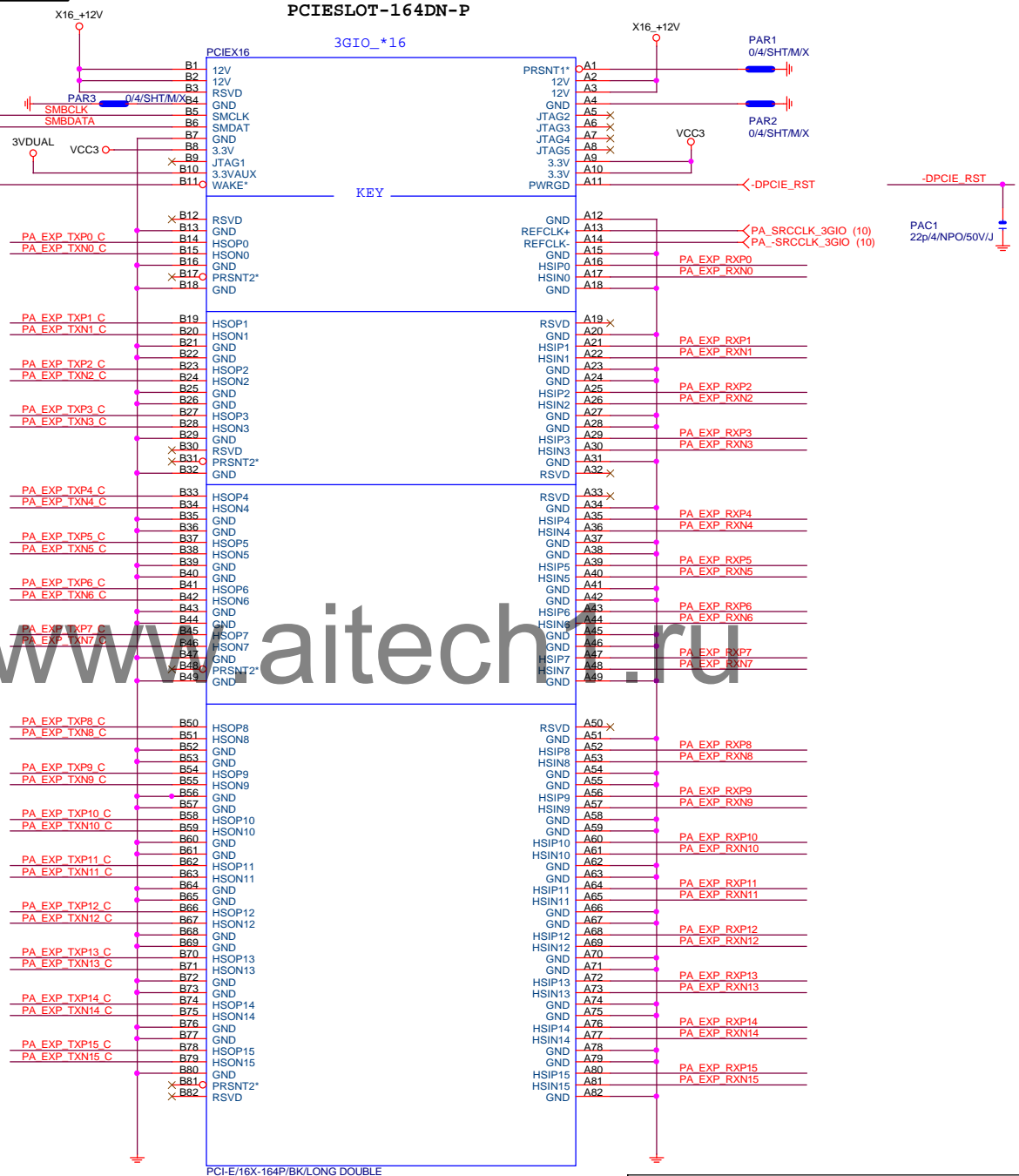
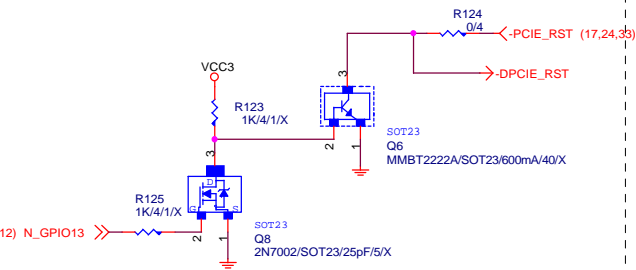


PCIEX16 AC CAP

PA EXP TXP0	PAC5	0.22u4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22u4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22u4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u4/X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u4/X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u4/X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u4/X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u4/X5R/6.3V/K	PA EXP TXP10 C
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PA EXP TXN11	PAC27	0.22u4/X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u4/X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u4/X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u4/X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u4/X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u4/X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u4/X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u4/X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u4/X5R/6.3V/K	PA EXP TXN15 C

PA_EXP_RXP[0..15] >>> PA_EXP_RXP[0..15] (4)
PA_EXP_RXN[0..15] >>> PA_EXP_RXN[0..15] (4)
PA_EXP_TXP[0..15] >>> PA_EXP_TXP[0..15] (4)
PA_EXP_TXN[0..15] >>> PA_EXP_TXN[0..15] (4)

PCIEX16 SOFT RESET



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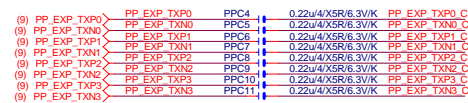
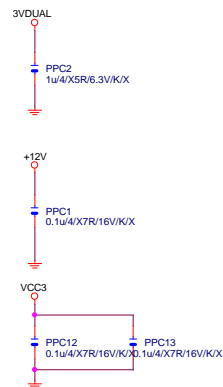
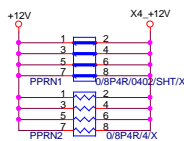
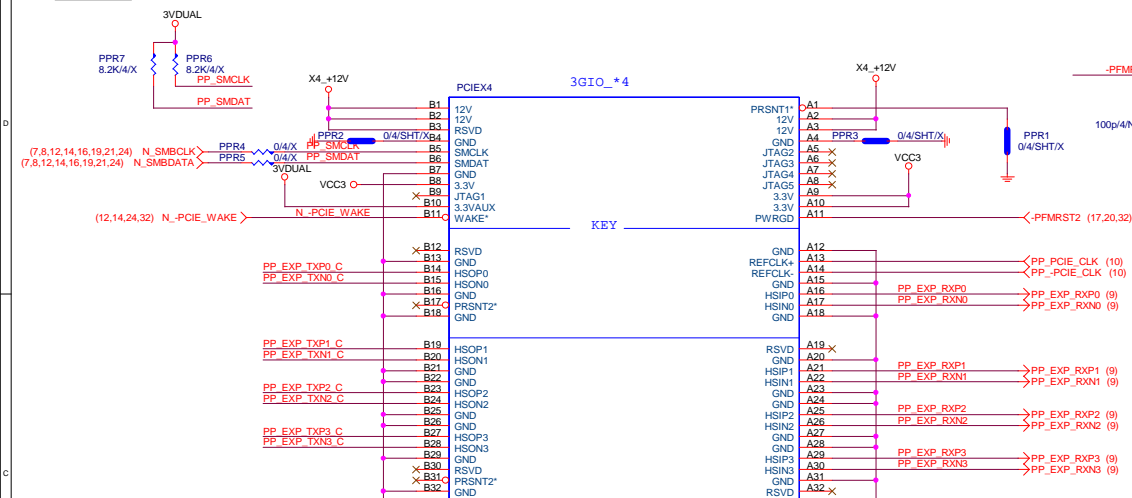
PCI-E/16X-164P/BK/LONG DOUBLE

Gigabyte Technology

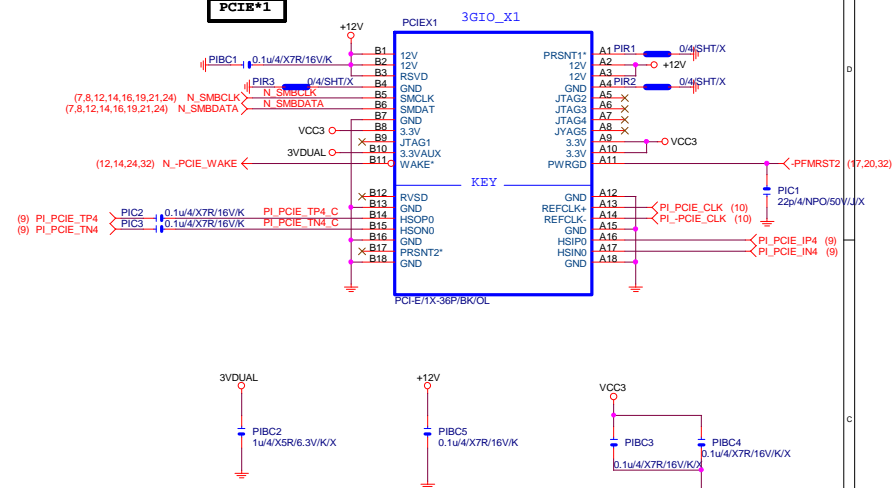
PCI EXPRESS * 16

Title			
PCI EXPRESS * 16			
Size Custom	Document Number	GA-Q87M-D3PH	Rev 1.1
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PCIE*4



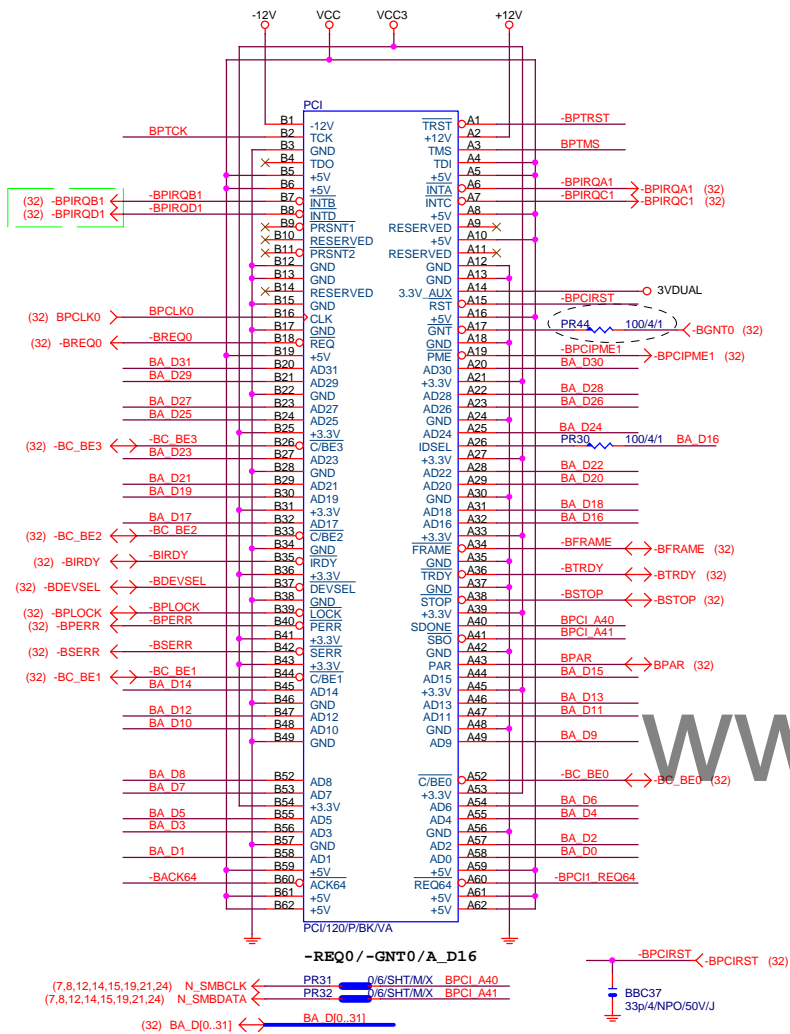
PCIE*1



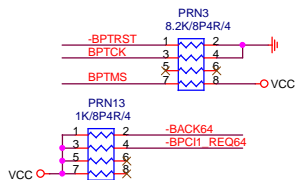
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Gigabyte Technology			
PCI EXPRESS X 1 PORT			
Size	Document Number	Rev	
Custom	GA-Q87M-D3PH	1.1	
Date:	Thursday, November 14, 2013	Sheet	15 of 33

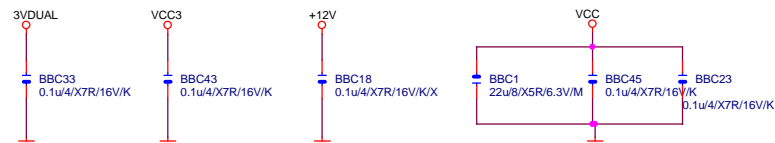
PCI SLOT



PCI	PU
-----	----



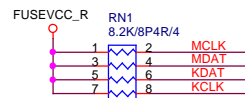
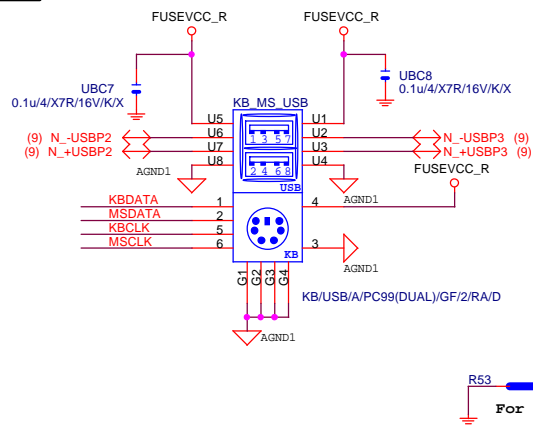
PCI	CAP
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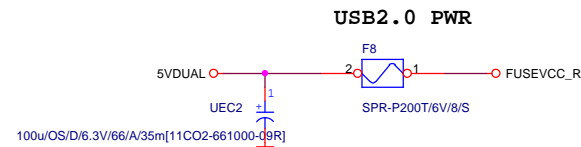
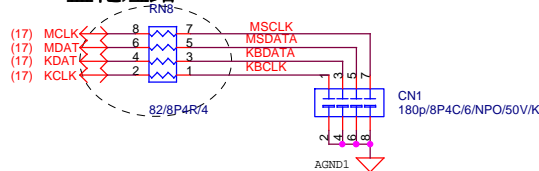
Gigabyte Technology

Title			
PCI SLOT 1&2			
Size Custom	Document Number	GA-Q87M-D3PH	Rev 1.1
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KB/MS



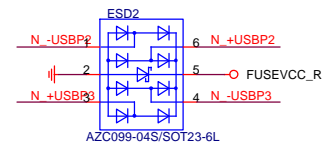
FOR 鹽化短路



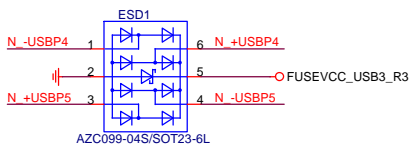
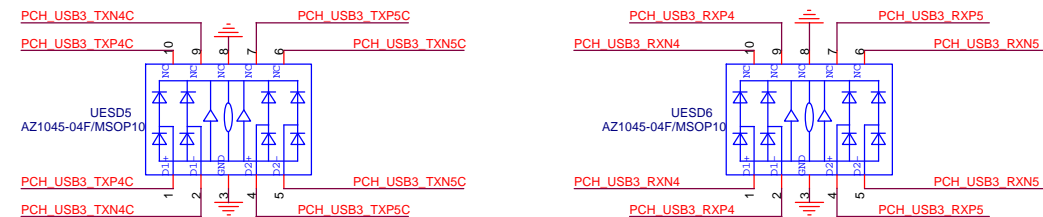
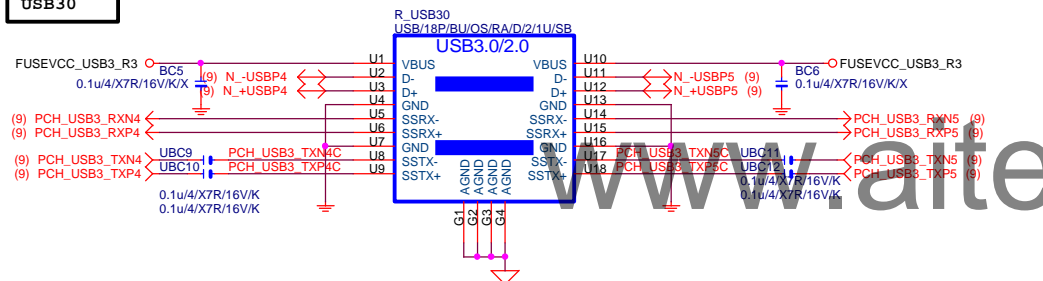
Close to USB connector

KB/MS PWR

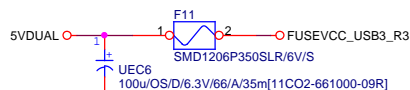
USB2.0 ESD



USB30



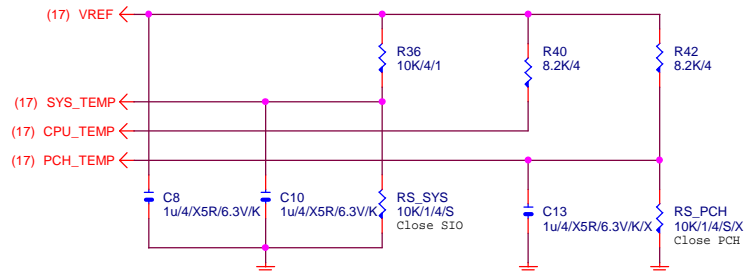
Polyswitch-1206 USB3.0 1Port - 1Fuse (3.5A)



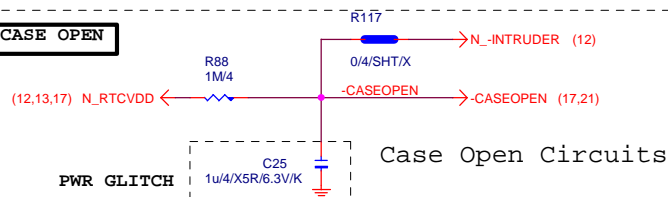
Gigabyte Technology

Title		
KB/MS,RUSB		
Size	Document Number	Rev
Custom	GA-Q87M-D3PH	1.1
Date:	Thursday, November 14, 2013	Sheet 18 of 33

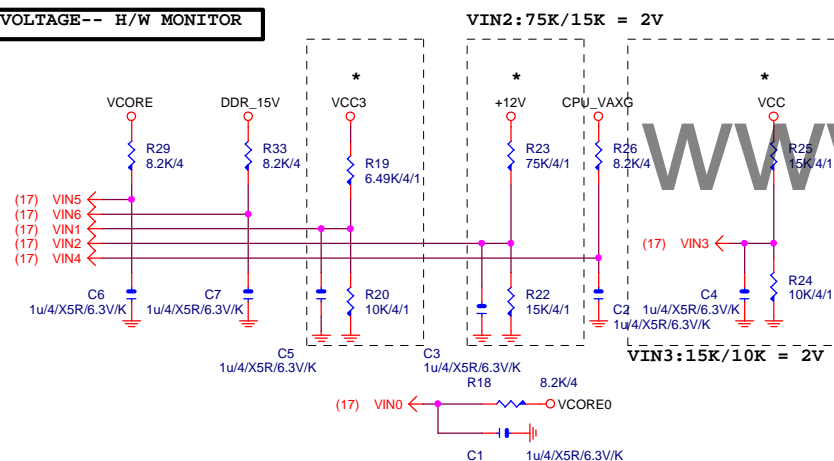
TEMP H/W MONITOR



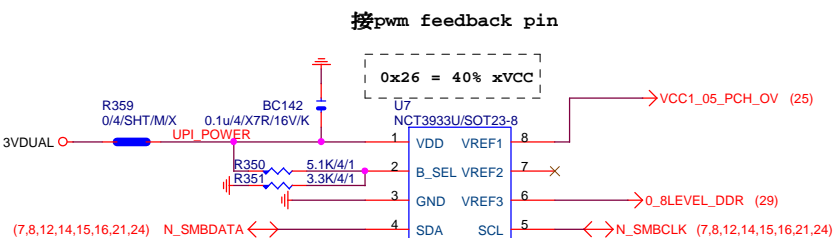
CASE OPEN



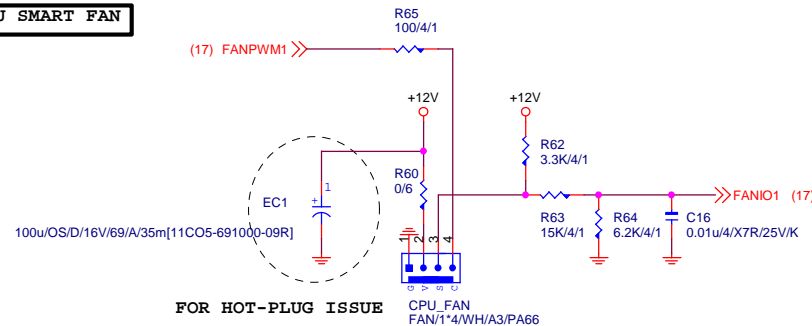
VOLTAGE-- H/W MONITOR



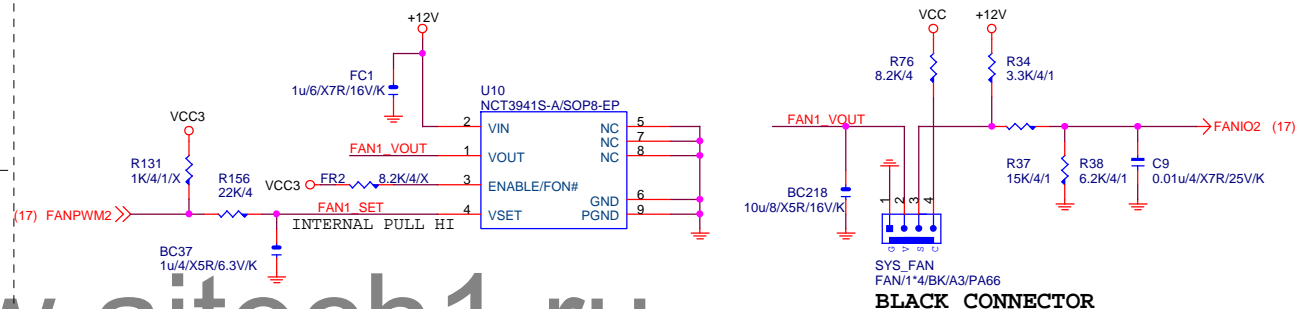
OV NCT3933



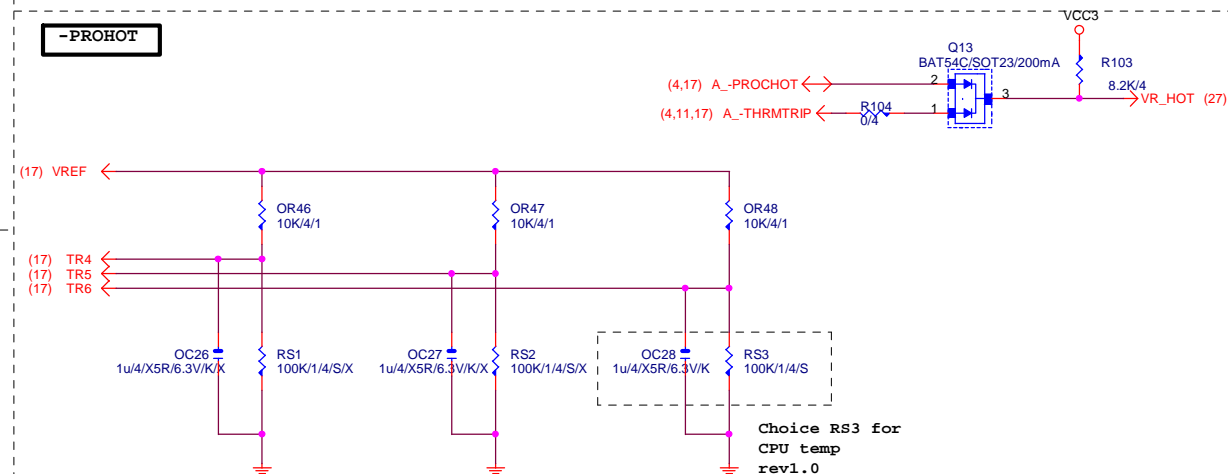
CPU SMART FAN



SYS SMART FAN

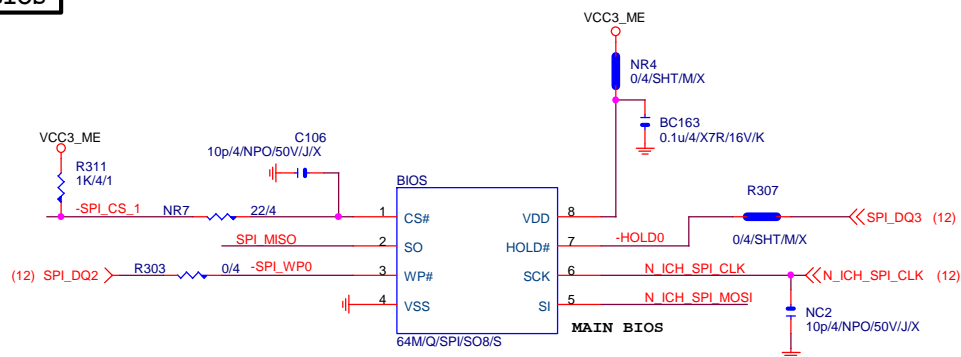


-PROHOT



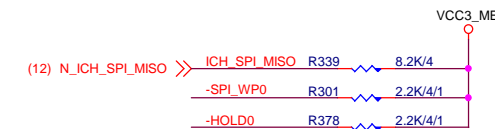
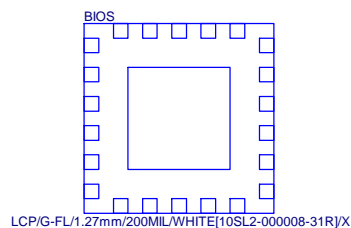
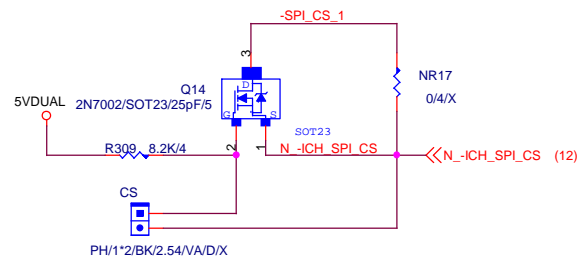
```
RS1、RS2、RS3 CLOSE CPU
VR MOSFET
Select the Hottest point
to setup
```


BIOS



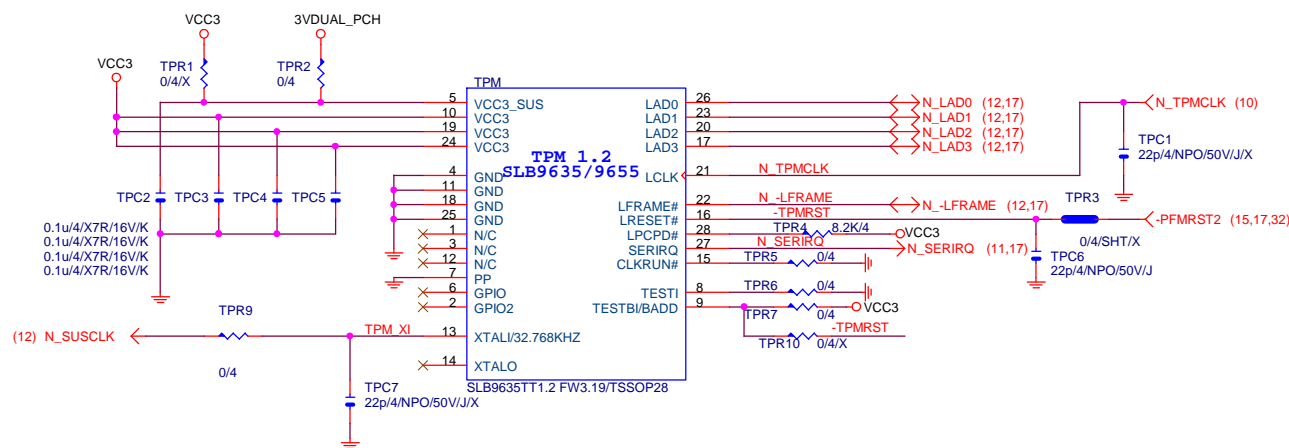
BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	1	1

1 means internal PU
0 means PD 1K



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TPM

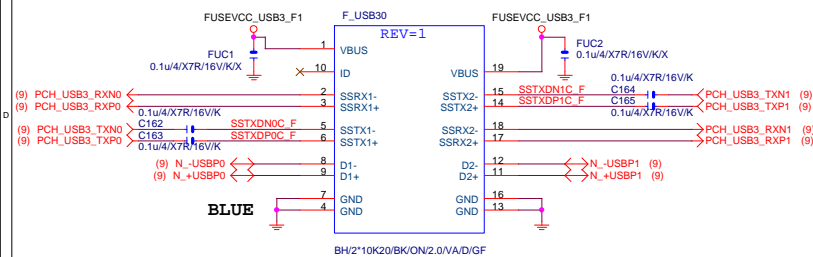


	SLB9635	SLB9655
TPR2, TPR4, TPR5, TPR6, TPR7, TPR9	MOUNT	N/A
TPR1, TPR10	N/A	MOUNT

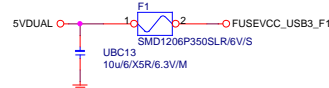
Gigabyte Technology

Title		
DUAL BIOS		
Size	Document Number	Rev
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F_USB30

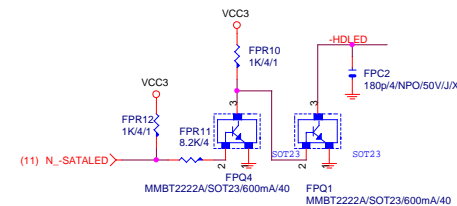


F_USB30 PWR

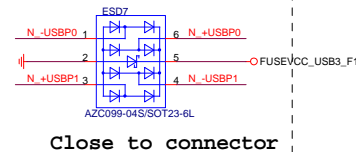
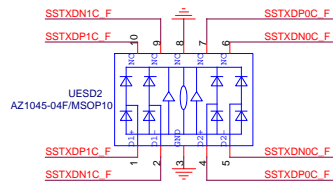
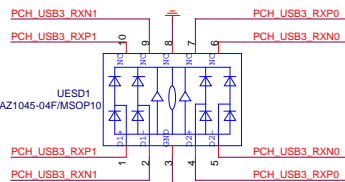


USB3.0 1Port - 1Fuse (3.5A)

SATA LED

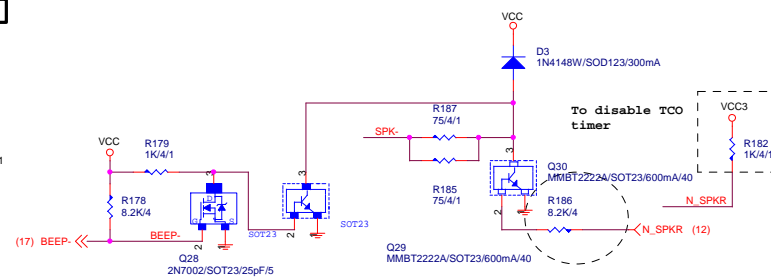


F_USB30 ESD PROTECT

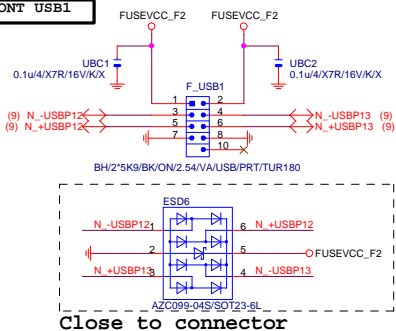


Close to connector

SPKR

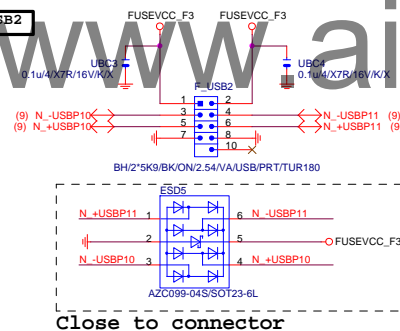


FRONT USB1



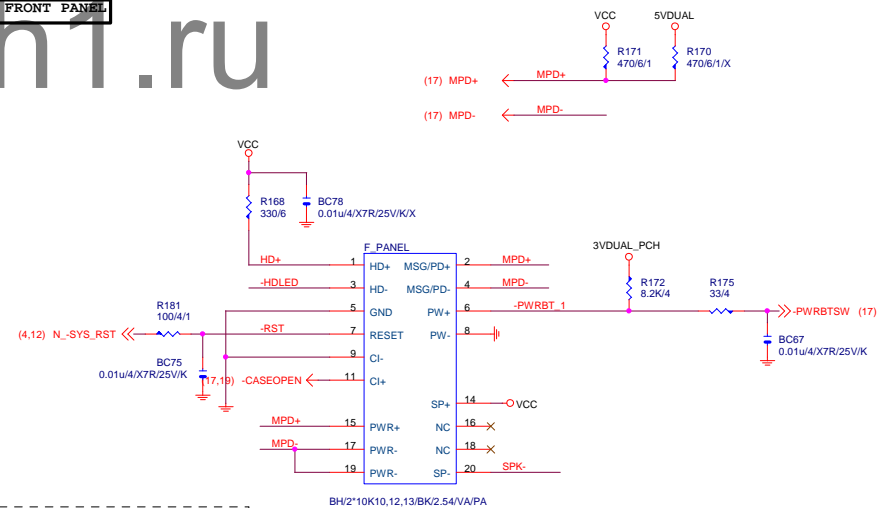
Close to connector

FRONT USB2

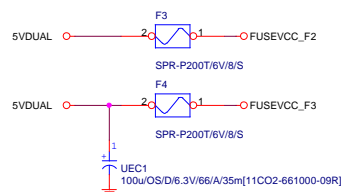


Close to connector

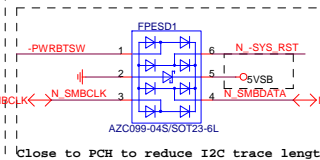
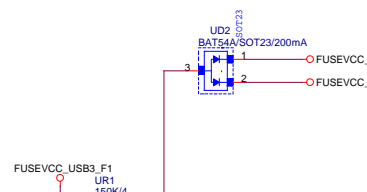
INTEL FRONT PANEL



FUSEVCC_F



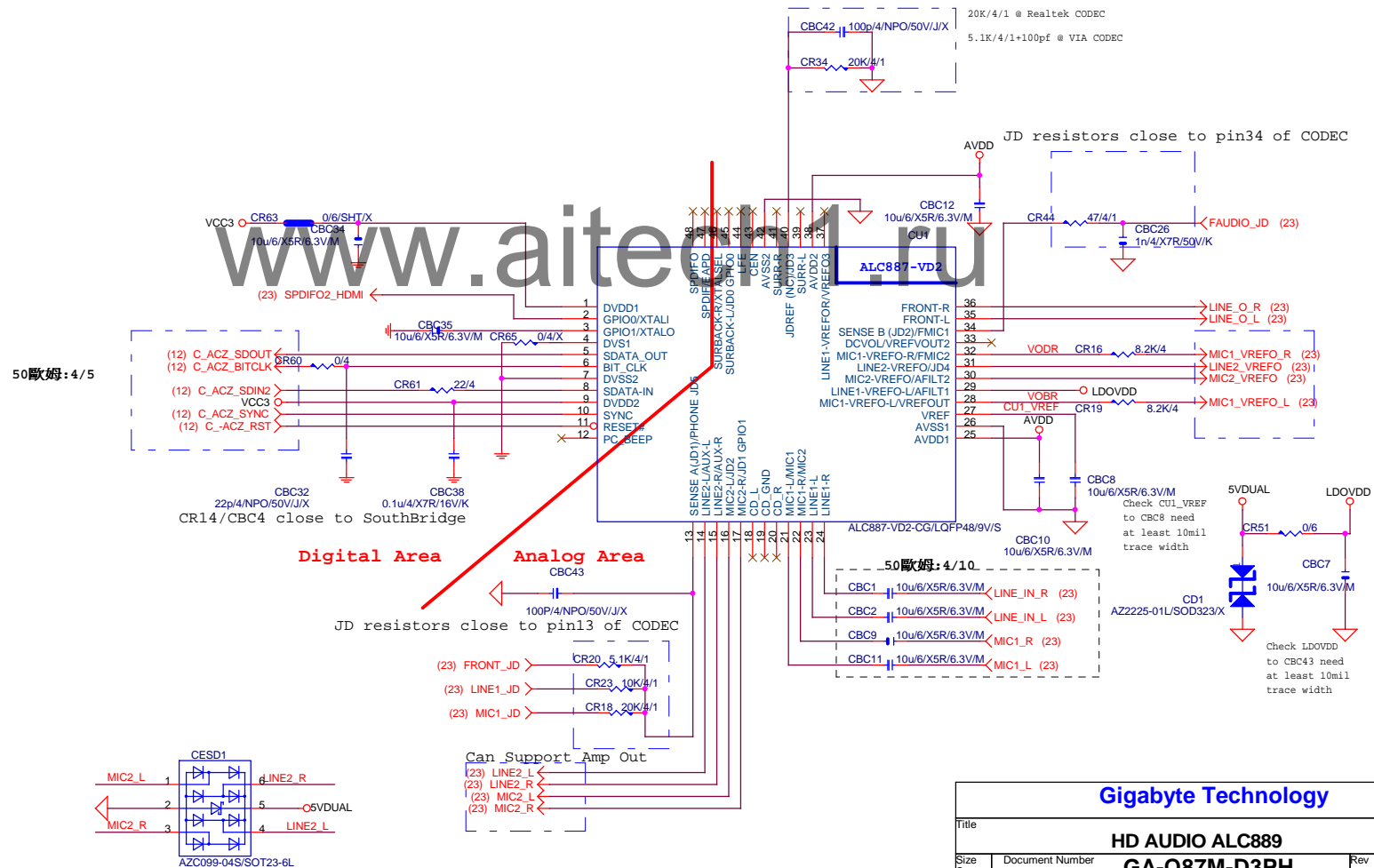
-USB30_F



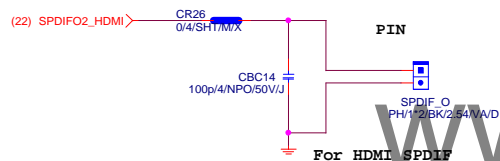
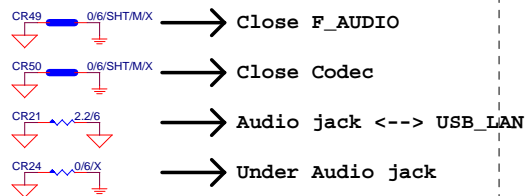
Close to PCH to reduce I2C trace length.

Gigabyte Technology			
Title	FP,F_USB,USB PWR,SPKR,SATA LED		
Size	Document Number	GA-Q87M-D3PH	
Custom			Rev 1.1
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	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

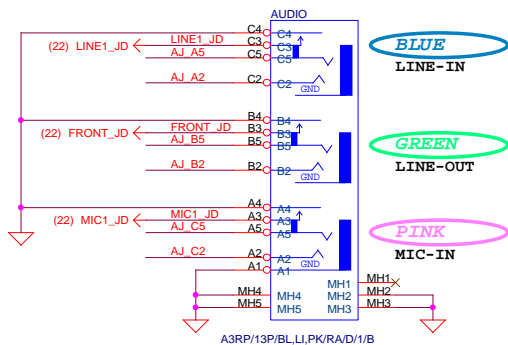


CODEC POWER/EMI PAD

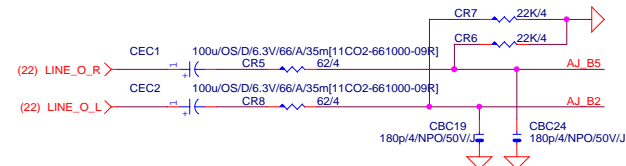


AZALIA JACK

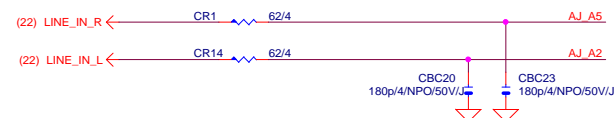
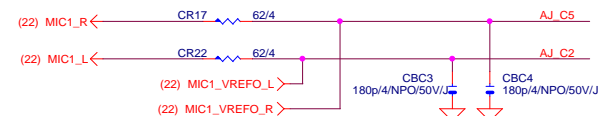
BTX AZALIA CONNECTOR



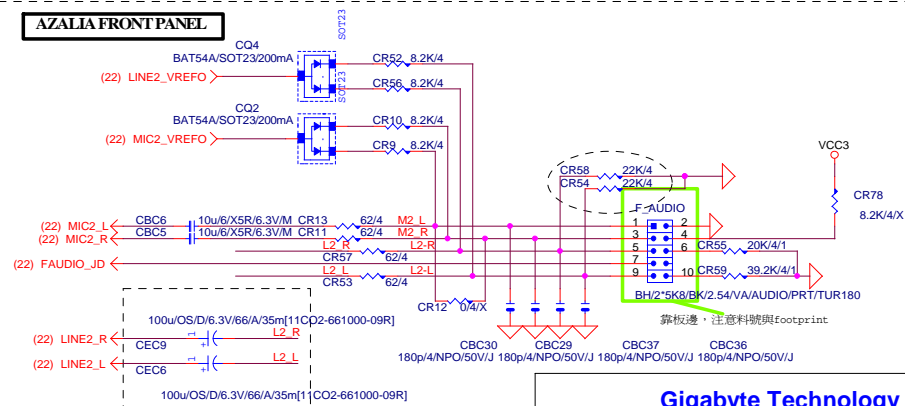
LINE-OUT



LINE-IN

**MIC-IN**

SURROUND

CEN/LFE

Gigabyte Technology

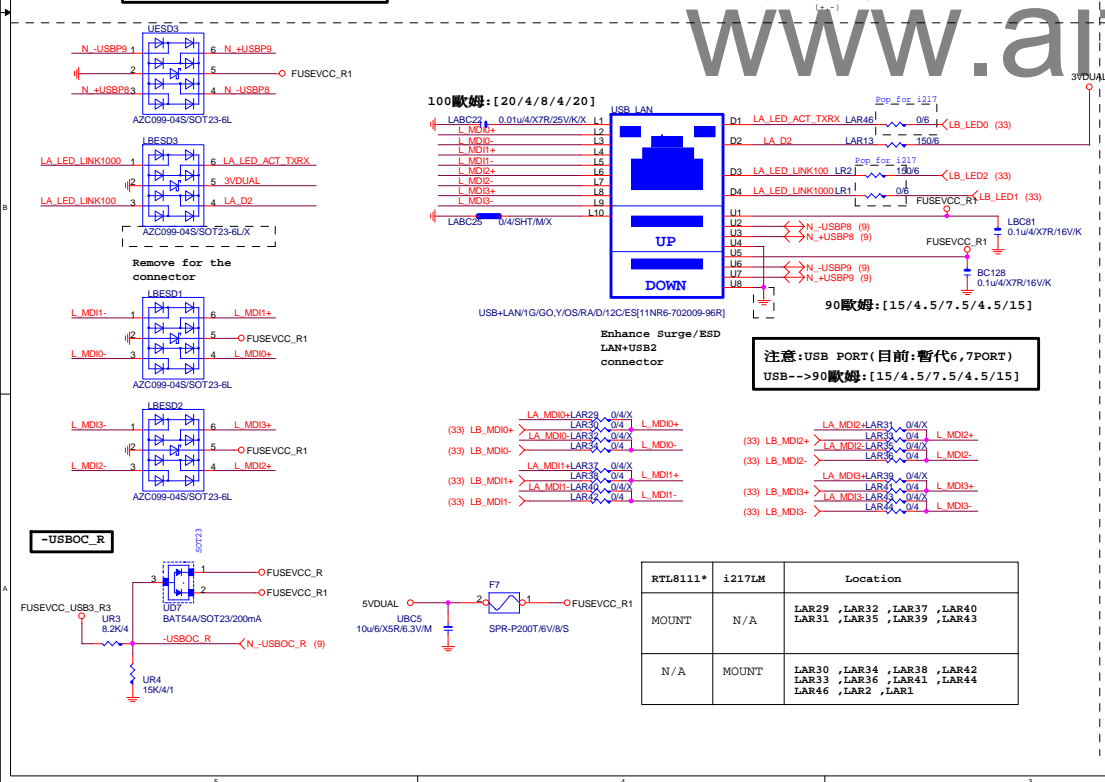
AUDIO JACK

GA-Q87M-D3PH

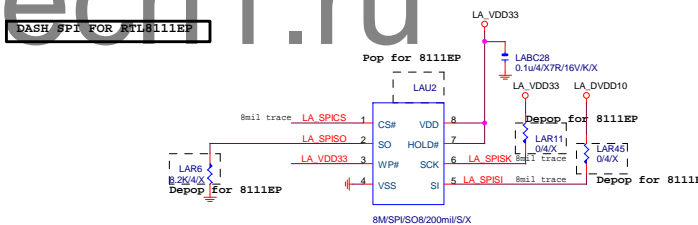
Rev	
1.1	

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LAN:RTL8111F/VB/VL



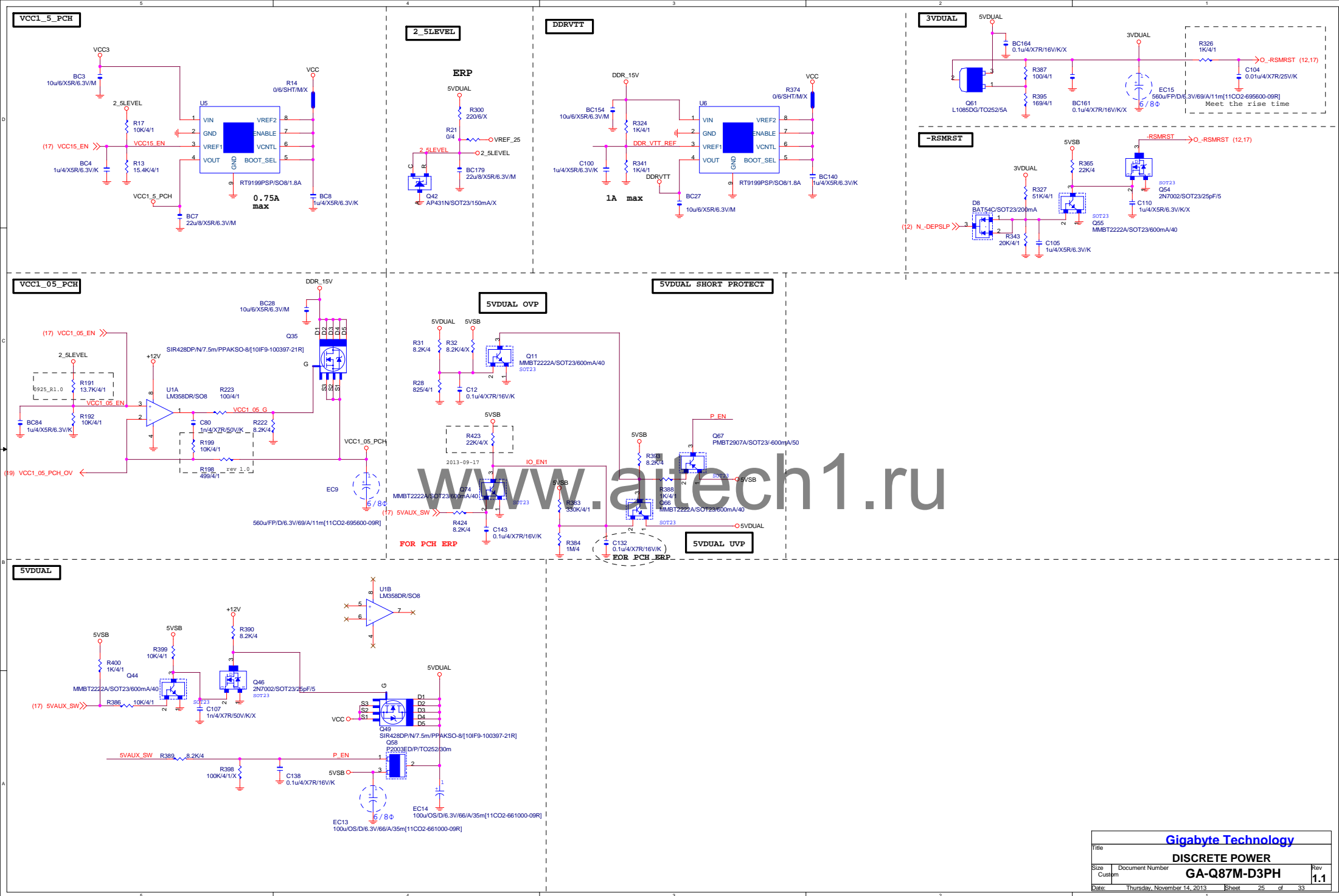
3VDUAL

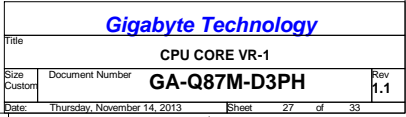


	RTL8111E
AVDD33	3.3V
DVDD33	3.3V
VDDREG	3.3V
DVDD10	1.05V

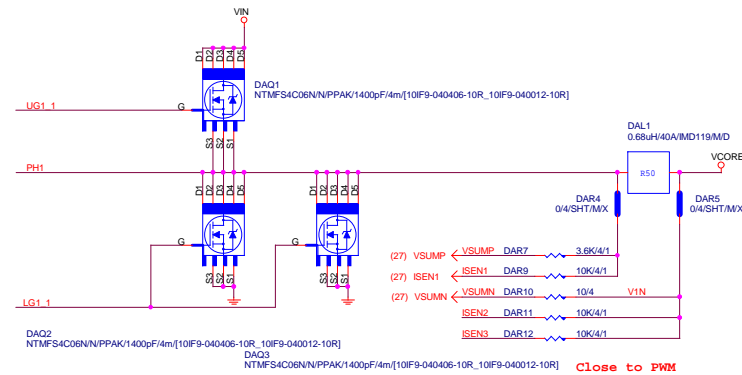
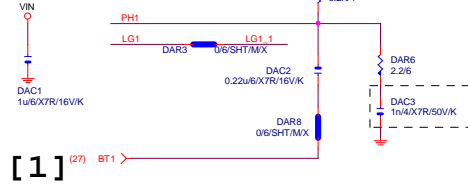
RTL8111EP	RTL8111F-VL	Location
MOUNT	N/A	LAR26 ,LAR27 ,LABC27 ,LAU2
N/A	MOUNT	LAR25 ,LAR6 ,LAR11 ,LAR45 ,LAR28

RTL8111*	i217LM	Location
MOUNT	N/A	LAR29 ,LAR32 ,LAR37 ,LAR40 LAR31 ,LAR35 ,LAR39 ,LAR43
N/A	MOUNT	LAR30 ,LAR34 ,LAR38 ,LAR42 LAR33 ,LAR36 ,LAR41 ,LAR44 LAR46 ,LAR2 ,LAR1

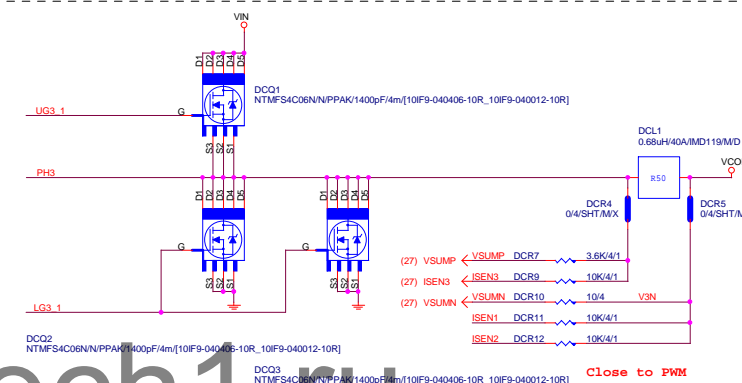
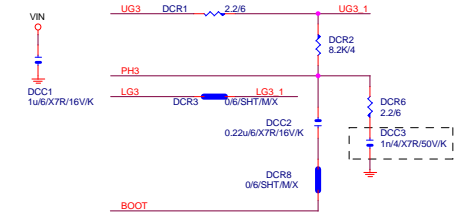
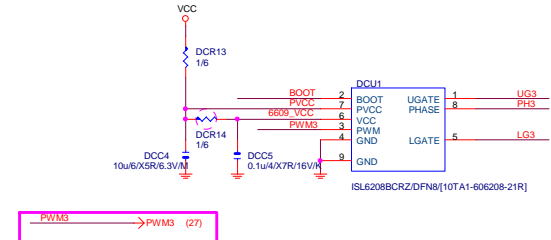




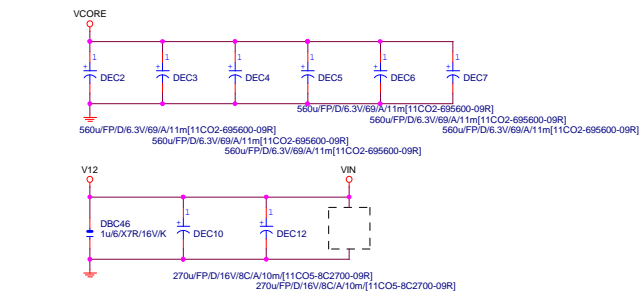
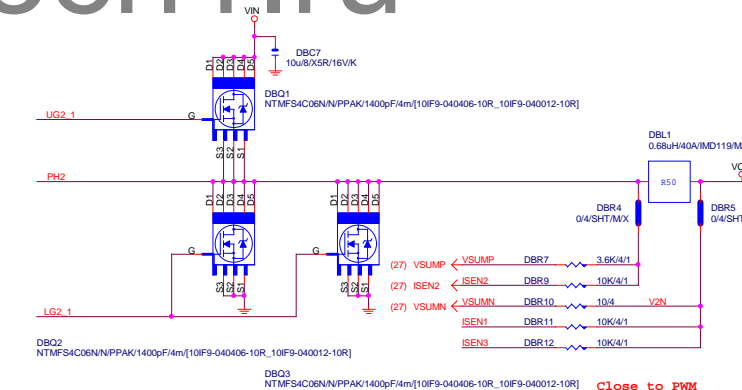
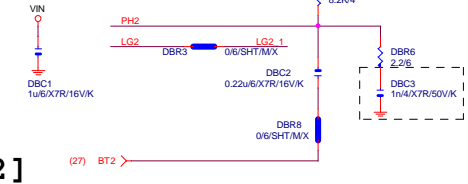
PHASE 1



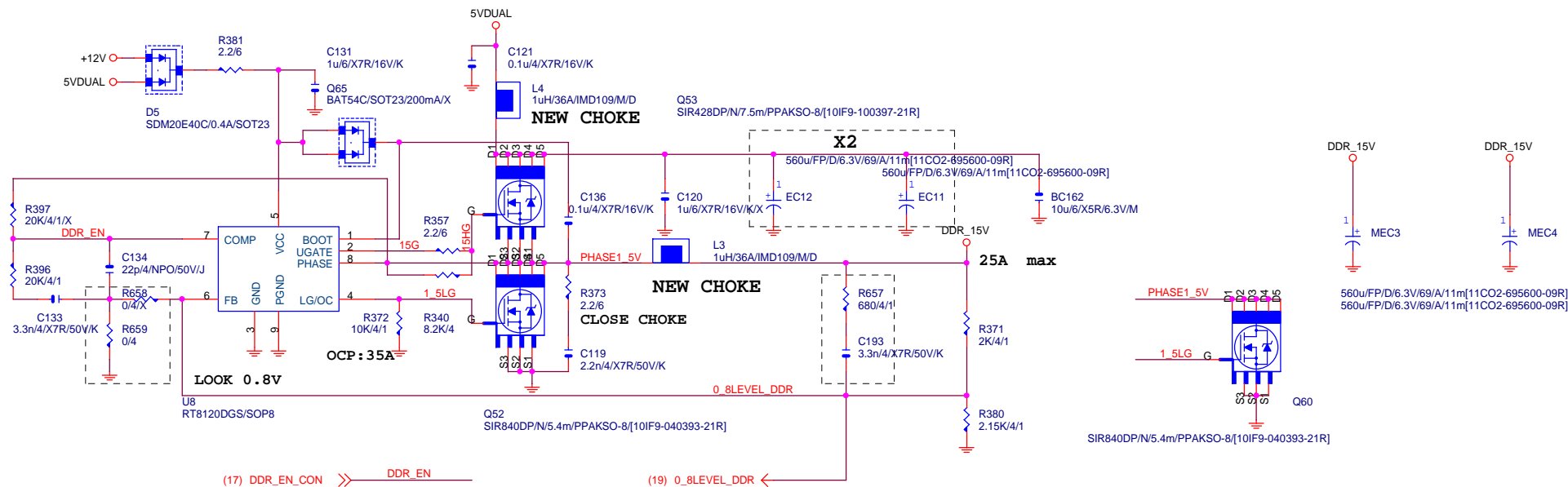
PHASE 3



PHASE 2



Gigabyte Technology			
Title		CPU CORE VR-2	
Size		GA-Q87M-D3PH	
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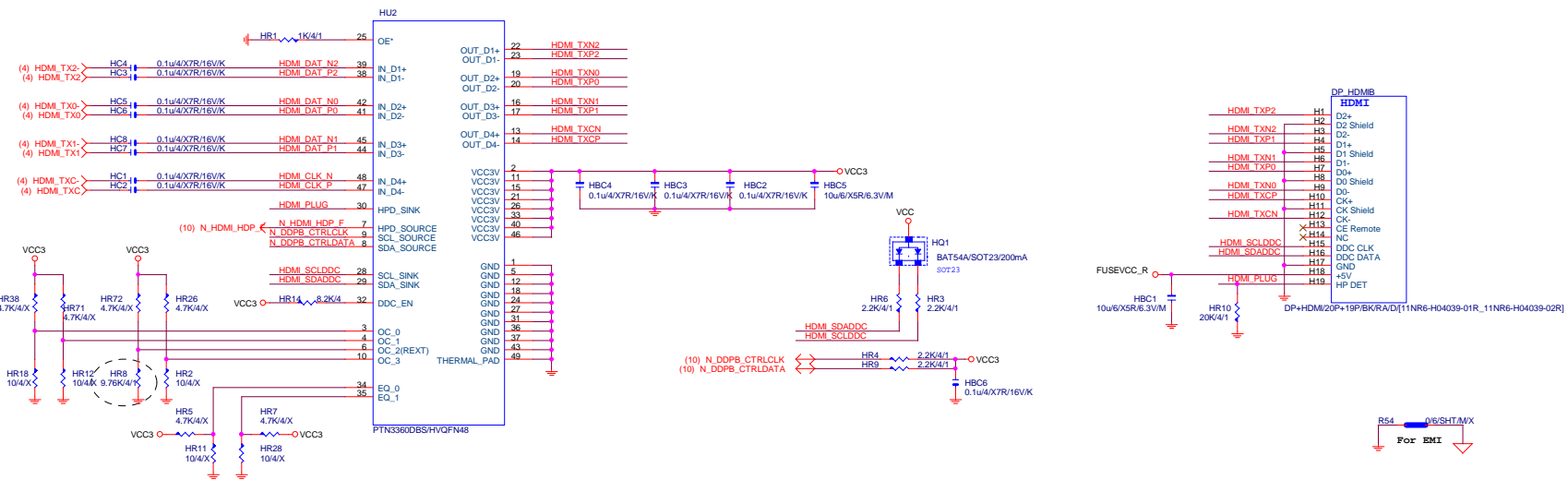
VIN=5V, VOUT=1.5V, IOUT=25A, PHASE=1
 IRMS=11.45A
 560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
 Coefficient=1.7(85°C), 1(105°C)
 VIN Ripple current=4.7X1.7=7.99A(85°C)
 -->故固態電容須2X7.99=15.98>11.45A

$R_{ocset} = (I_{ocp} \cdot L_{gate} \cdot r_{dson}) / I_{ocset}$
 $R_{ocset} = (45A \cdot 6.7m\Omega) / 10\mu A = 30K$
 $I_{ocset} = 10\mu A$

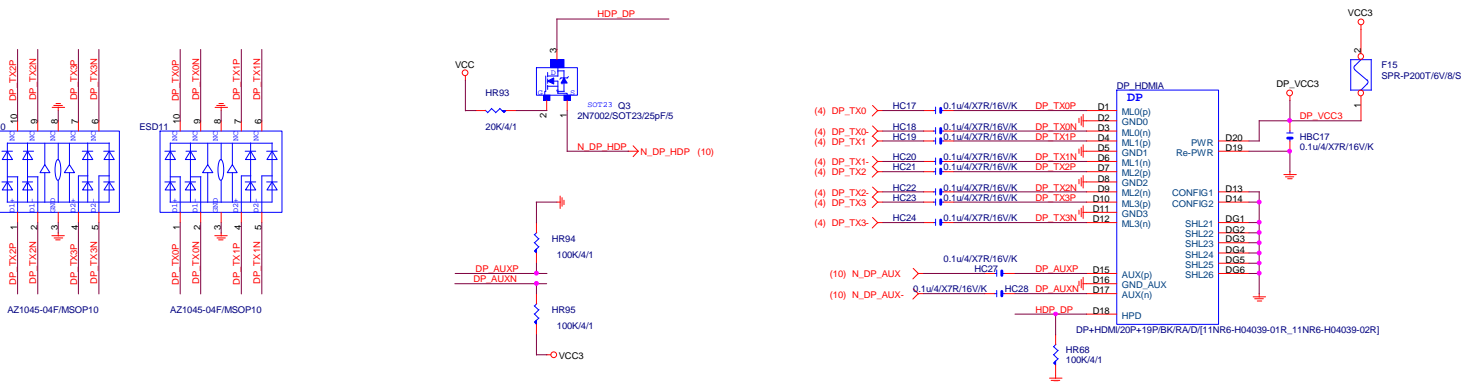
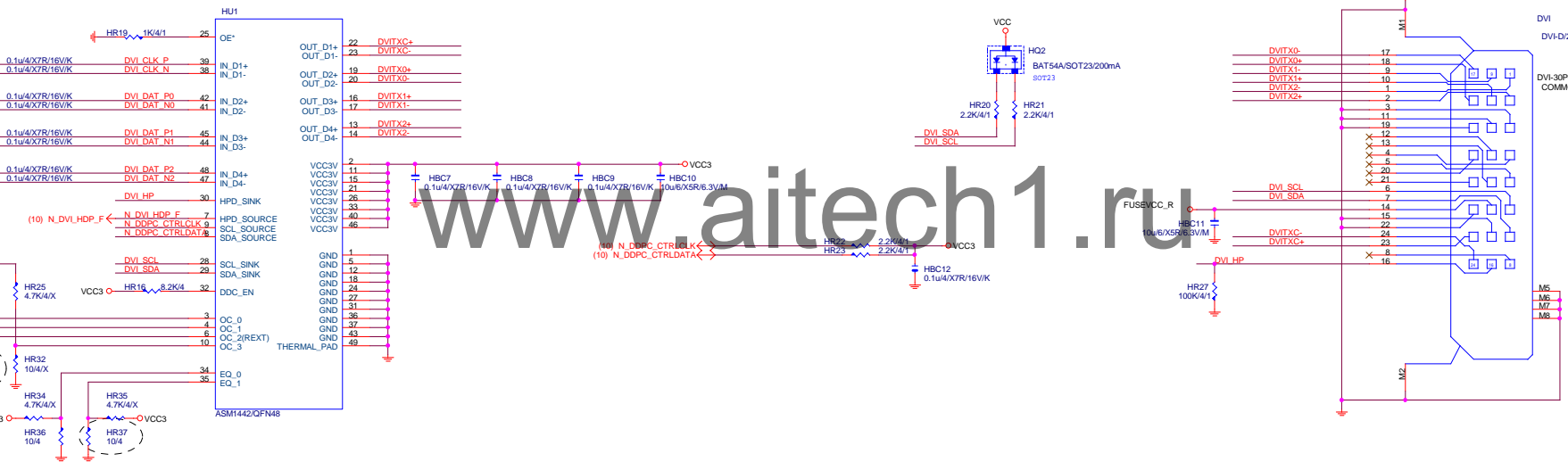
Gigabyte Technology

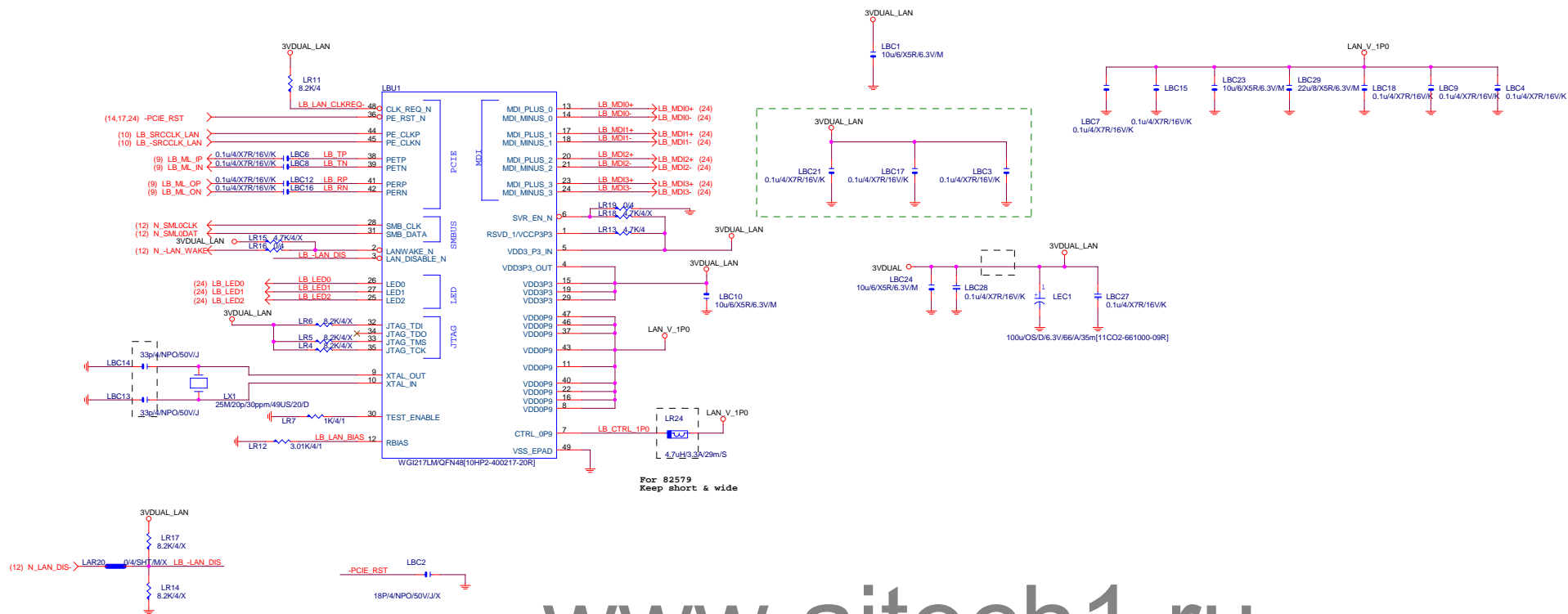
Title		
DDR POWER		
Size	Document Number	Rev
Custom	GA-Q87M-D3PH	1.1
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HDMI LEVEL SHIFT



DVI LEVEL SHIFT





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