

# Model Name: GA-P67-DS3-B3 1.0

SHEET

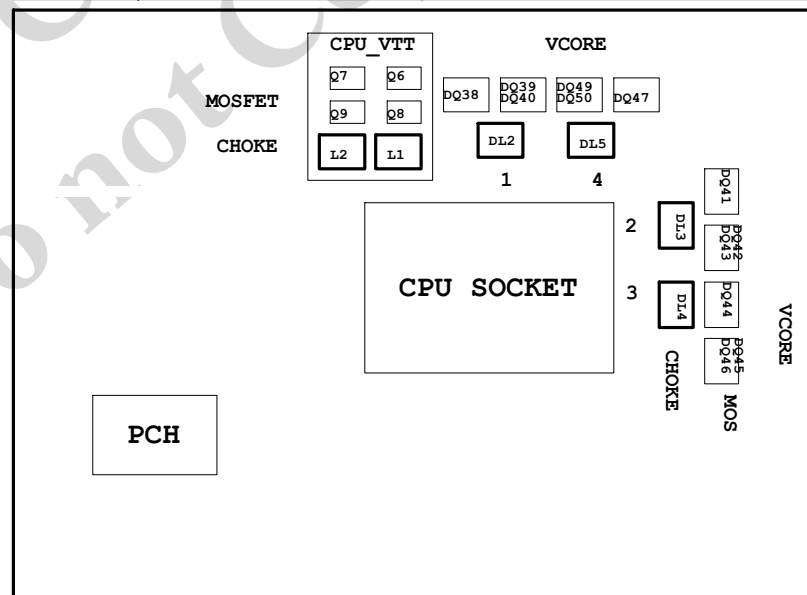
TITLE

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU LGA1155-A
05	CPU LGA1155-B
06	CPU LGA1155-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 SLOT / PCIE X1 SLOT
16	IT8892
17	PCI SLOT 1&2&3
18	I/O ITE8728
19	COM, LPT, TPM
20	Dual BIOS
21	ALC889
22	REAR AUDIO JACK
23	VCORE PWM ISL6364CRZ-1
24	VCORE PWM ISL6364CRZ-2
25	DISCRETE POWER
26	DDR 15V & VCC1 05 PCH PWM ISL6545CBZ
27	CPU VTT PWM ISL95870

SHEET

TITLE

28	VCCSA POWER
29	F PANEL , F USB
30	ATX POWER, CLOCK GEN
31	HWM,KB/MS , FAN CTRL
32	REALTEK RTL8111E
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**GA-P67-DS3-B3**

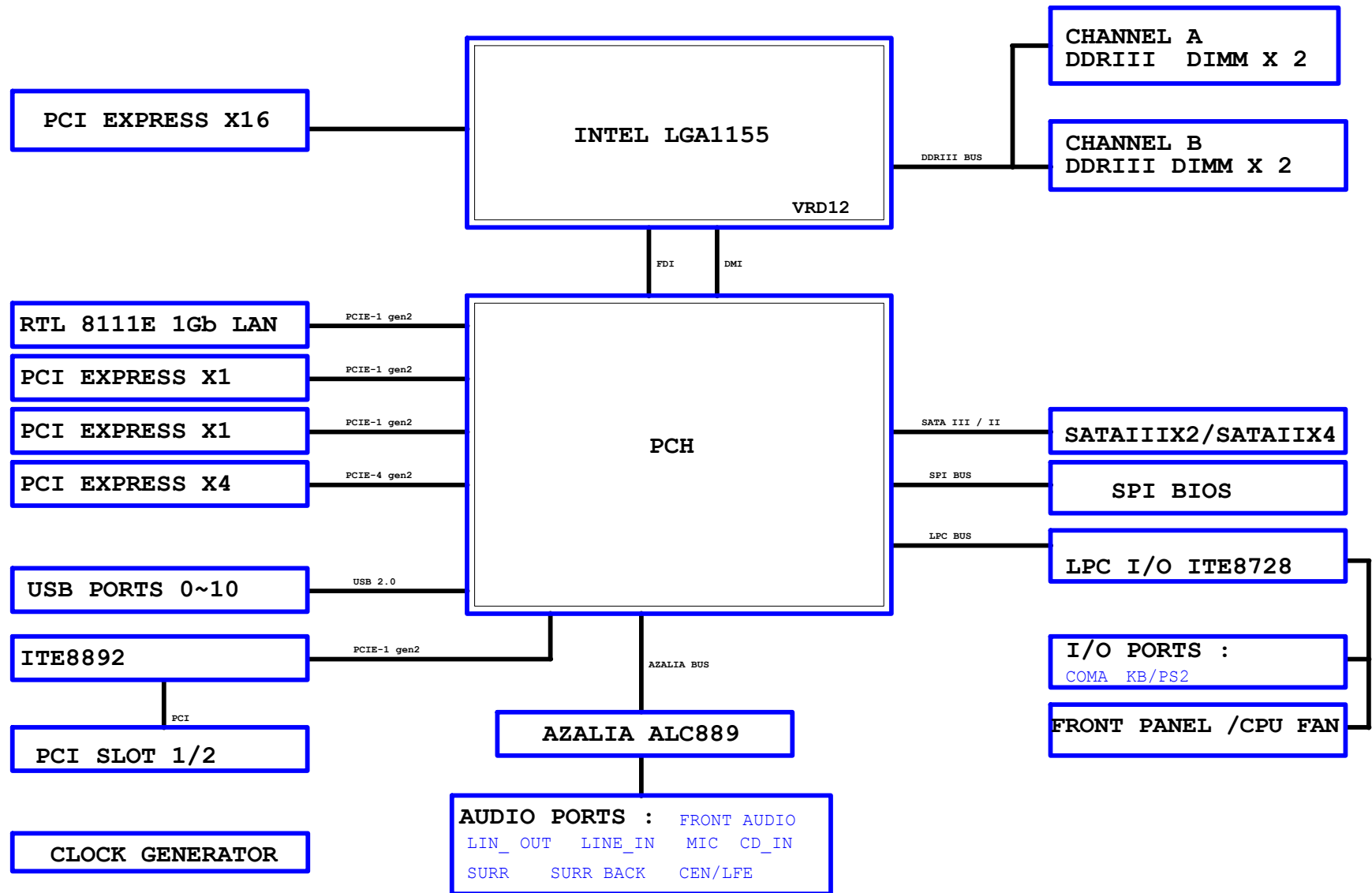
### Component value change history

[illegible]

## Circuit or PCB layout change

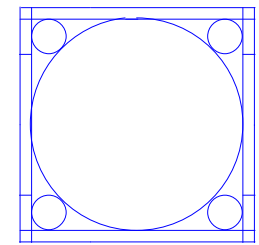
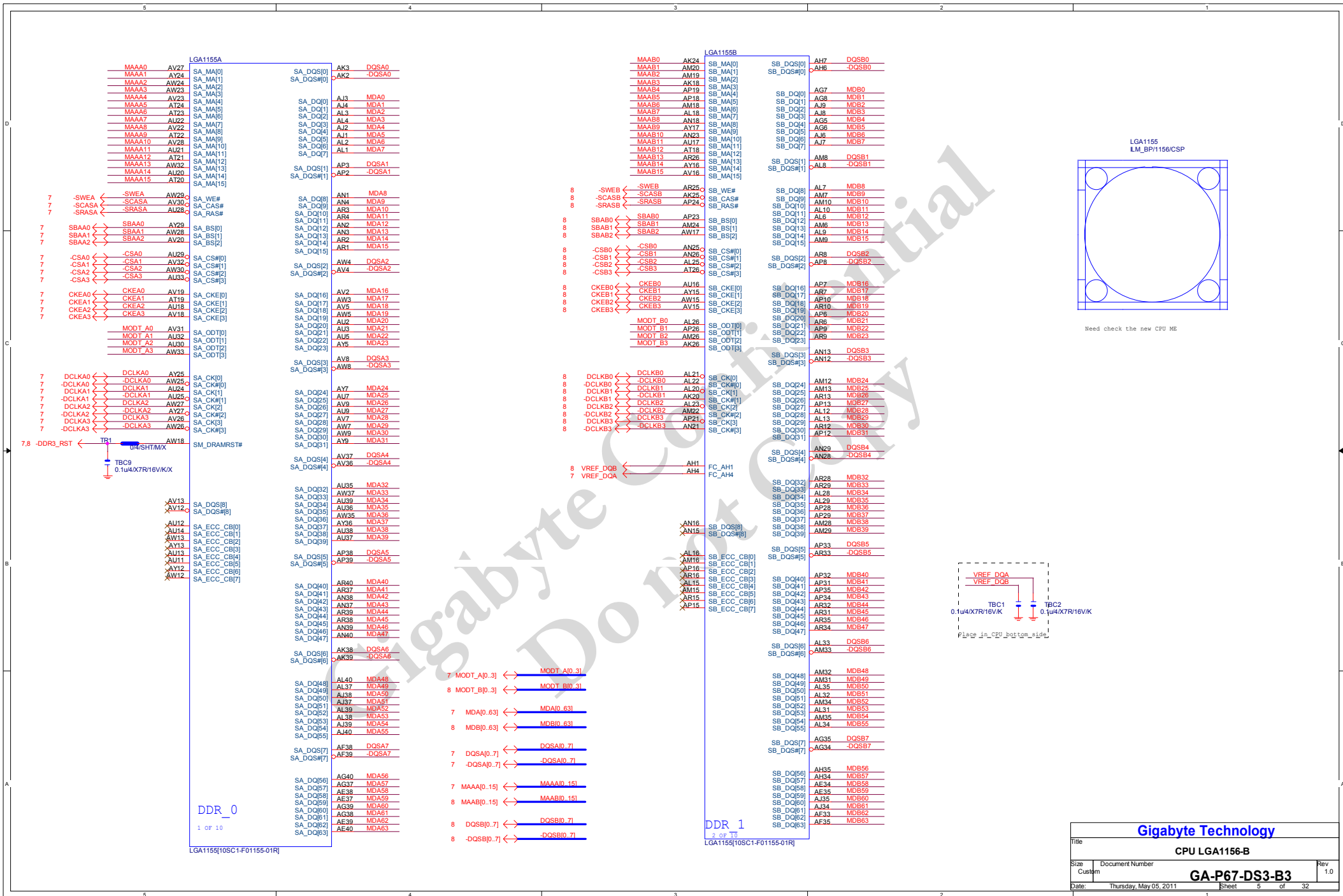
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# BLOCK DIAGRAM

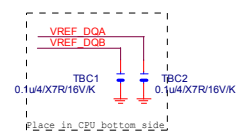


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Title	BLOCK DIAGRAM		
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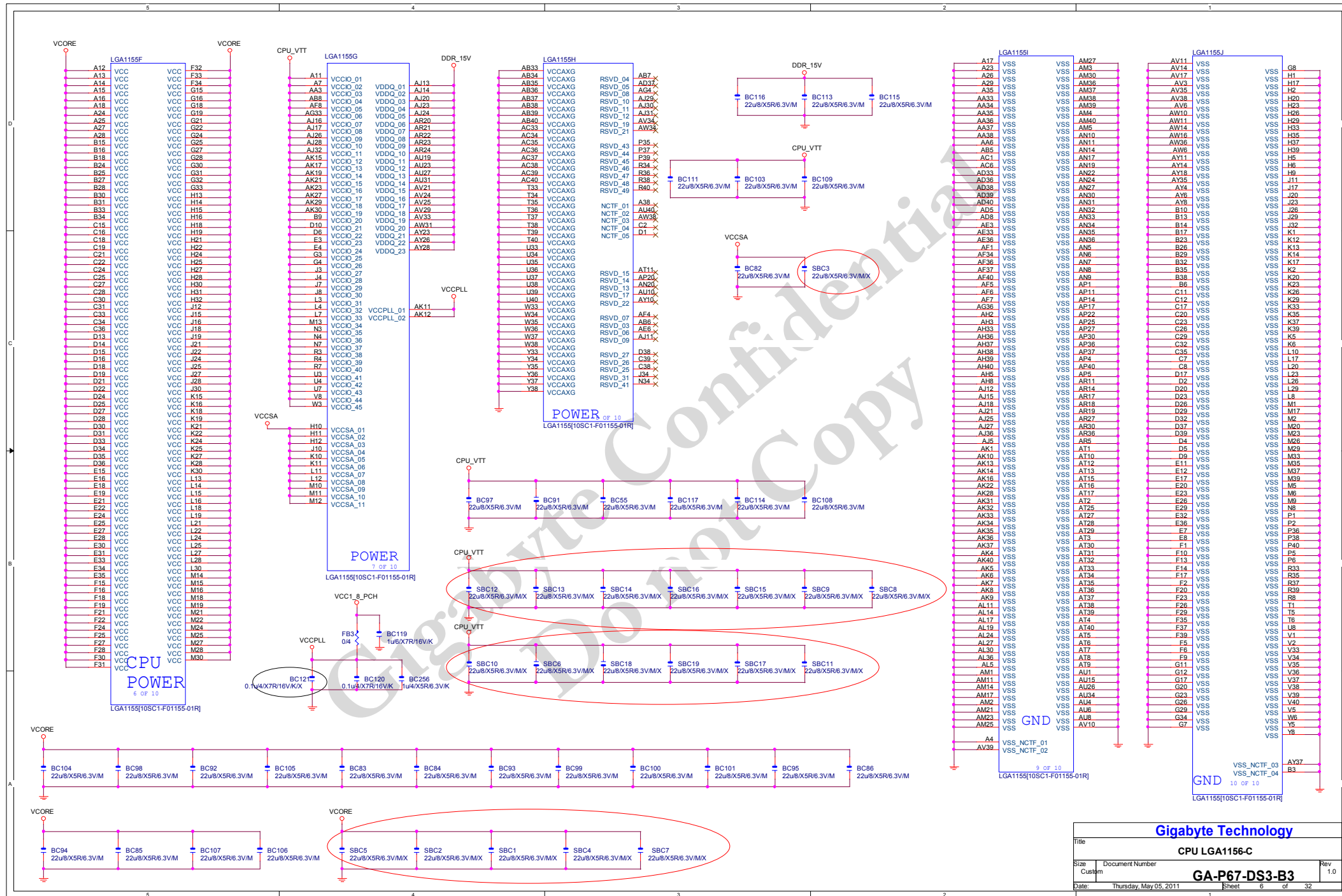




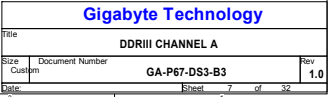
Need check the new CPU ME

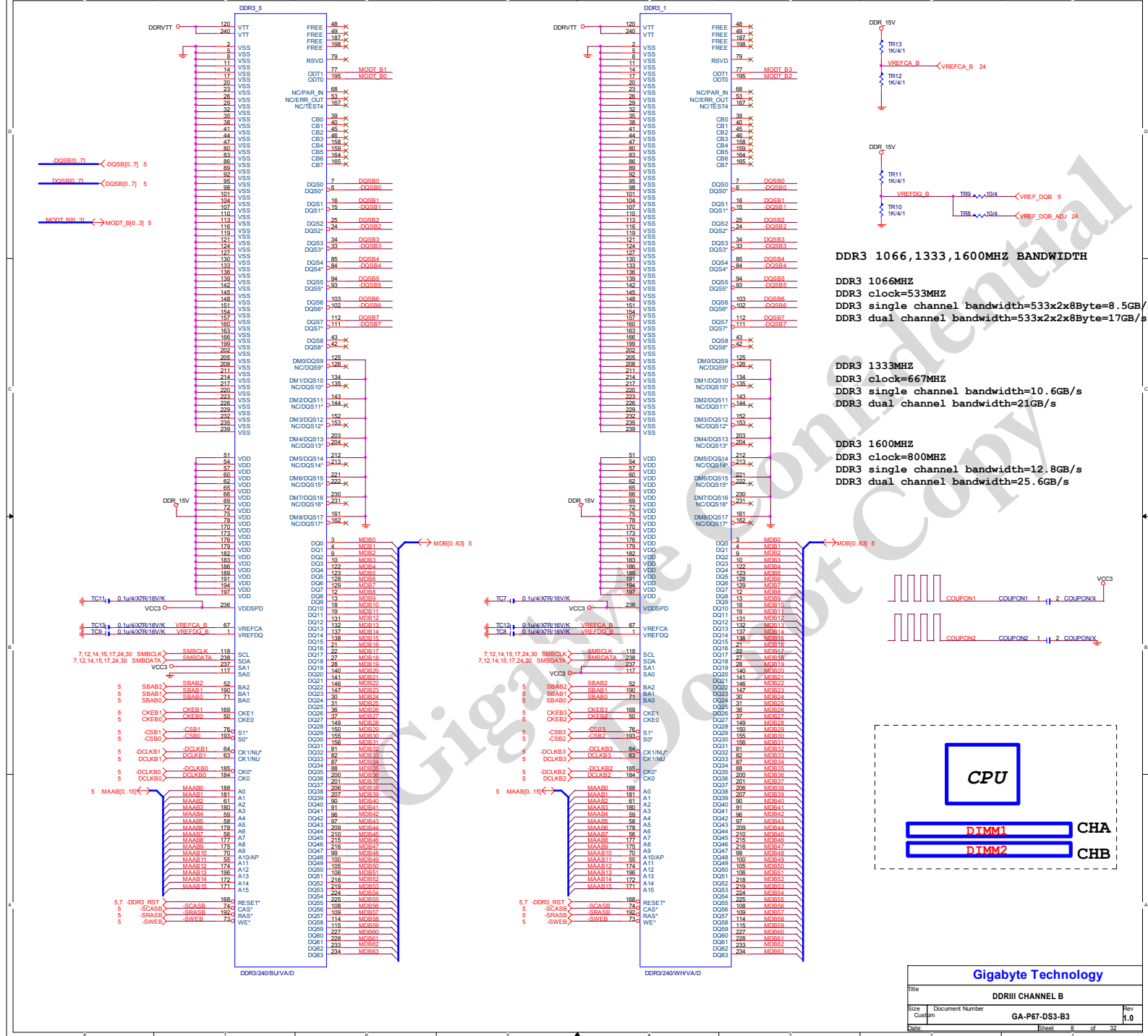


Gigabyte Technology		
Title: CPU LGA1155-B		
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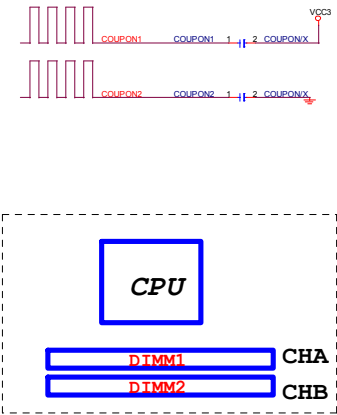


DDR3 1066,1333,1600MHZ BANDWIDTH

DDR3 1066MHZ  
DDR3 clock=533MHZ  
DDR3 single channel bandwidth=533x2x8Byte=8.5GB/s  
DDR3 dual channel bandwidth=533x2x2x8Byte=17GB/s

DDR3 1333MHZ  
DDR3 clock=667MHZ  
DDR3 single channel bandwidth=10.6GB/s  
DDR3 dual channel bandwidth=21GB/s

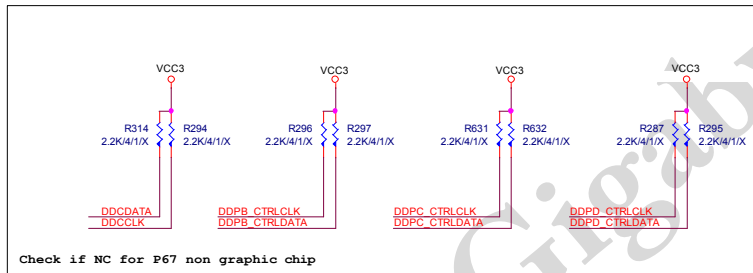
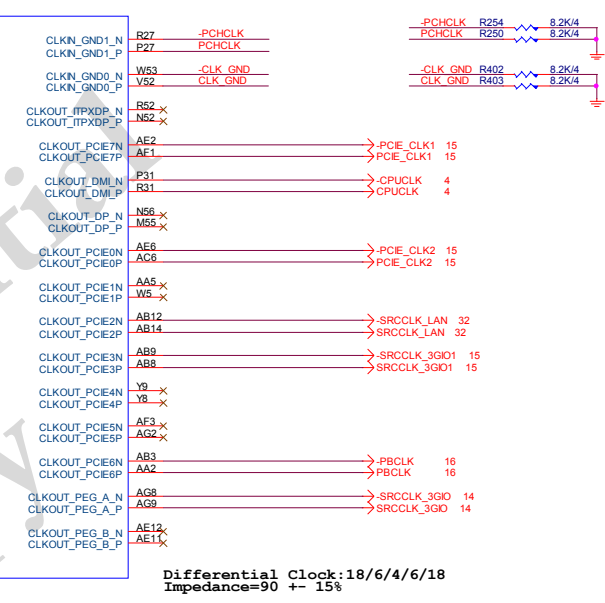
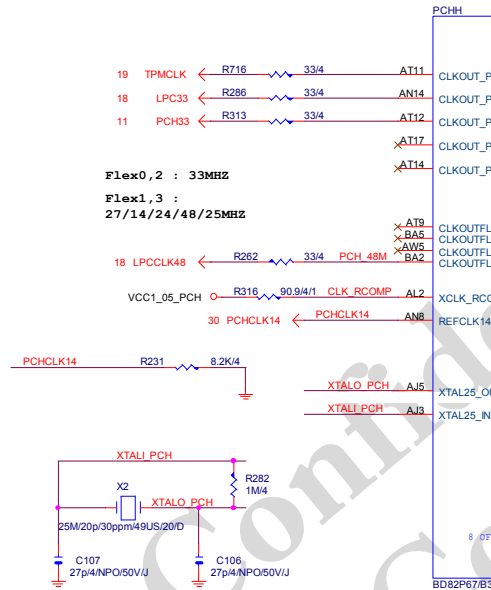
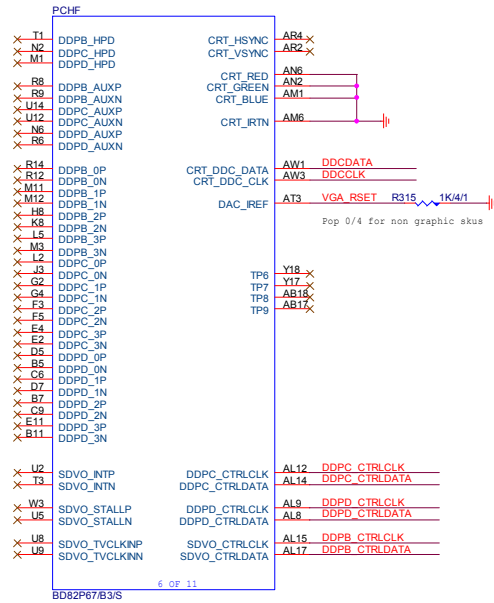
DDR3 1600MHZ  
DDR3 clock=800MHZ  
DDR3 single channel bandwidth=12.8GB/s  
DDR3 dual channel bandwidth=25.6GB/s



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File	DDR3 CHANNEL B		
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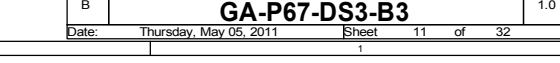
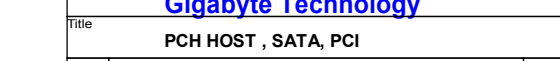
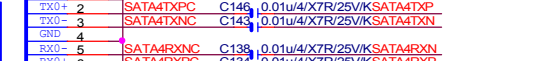
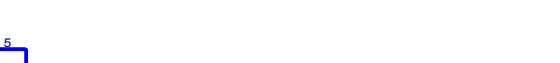
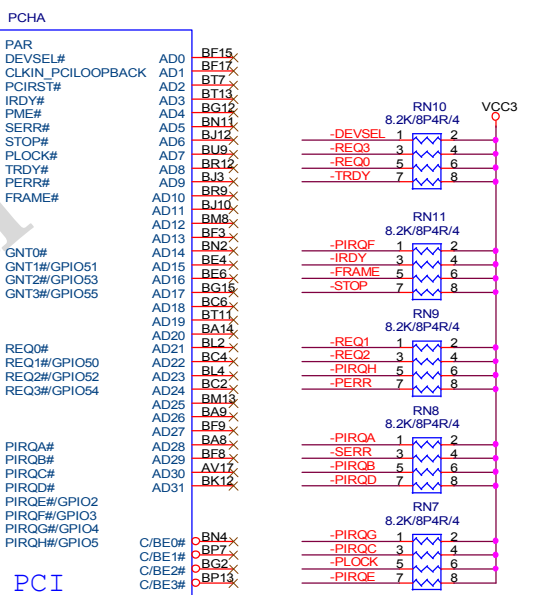
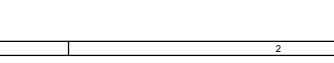
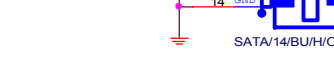
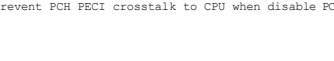
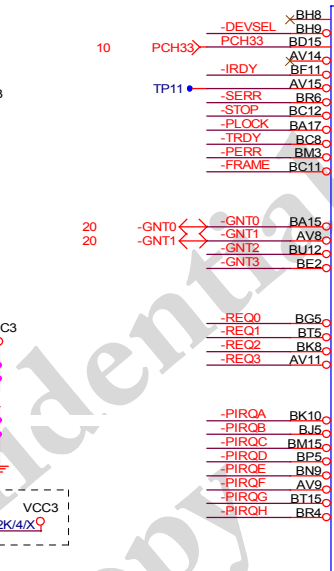
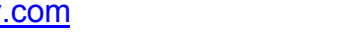
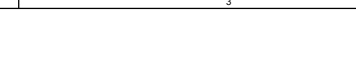
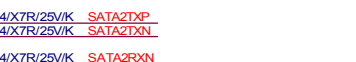
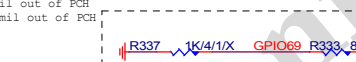
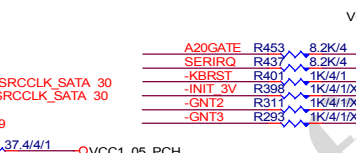
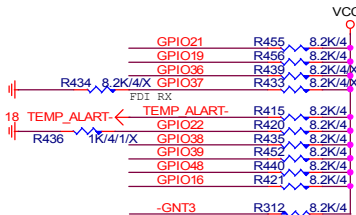
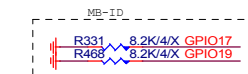
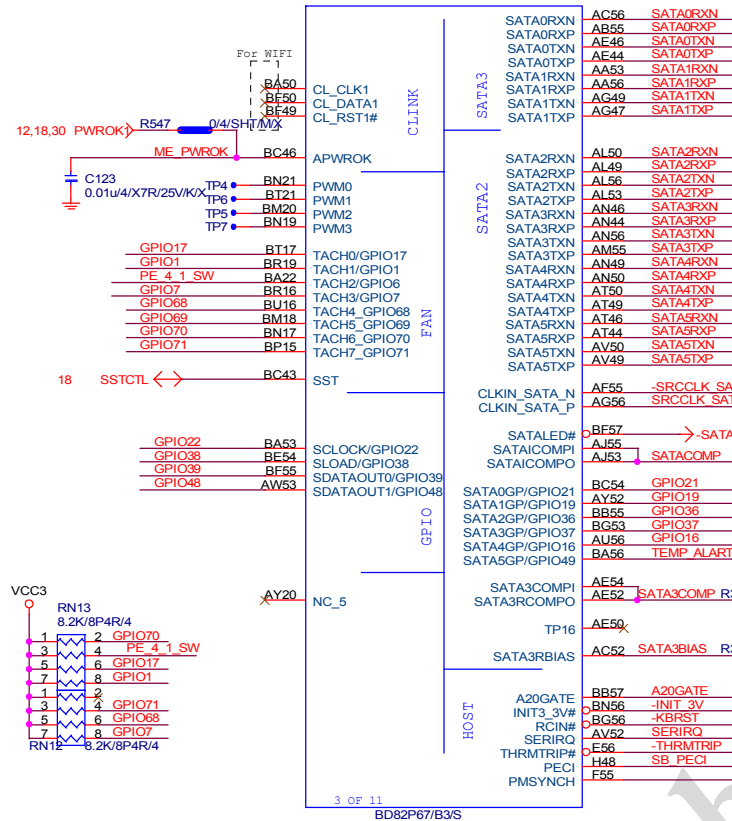






Gigabyte Technology			
Title		PCH DISPLAY , CLK BUFFER	
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SATA:20/4.5/7.5/4.5/20 (breakout min 8/4/4/4/8)  
Impedance=90 +/- 17.5%  
PCHC



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PCH HOST , SATA, PCI			
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PCI-E REV:1.1--> 2.5GHZ

PCE-E X1(單向) BANDWIDTH=2.5GHz\*(8b/10b)=2Gb/s=250MB/s

PCE-E X1(雙向) BANDWIDTH=2.5GHz\*(8b/10b)X2=4Gb/s=500MB/s

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

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

PCI-E REV:2.0--> 5GHZ

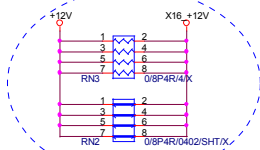
PCI-E/16X-164P/BU-297C/RIGHT PUSH

PCIEX16:16/5/5/16

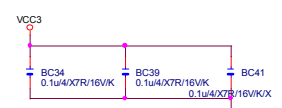
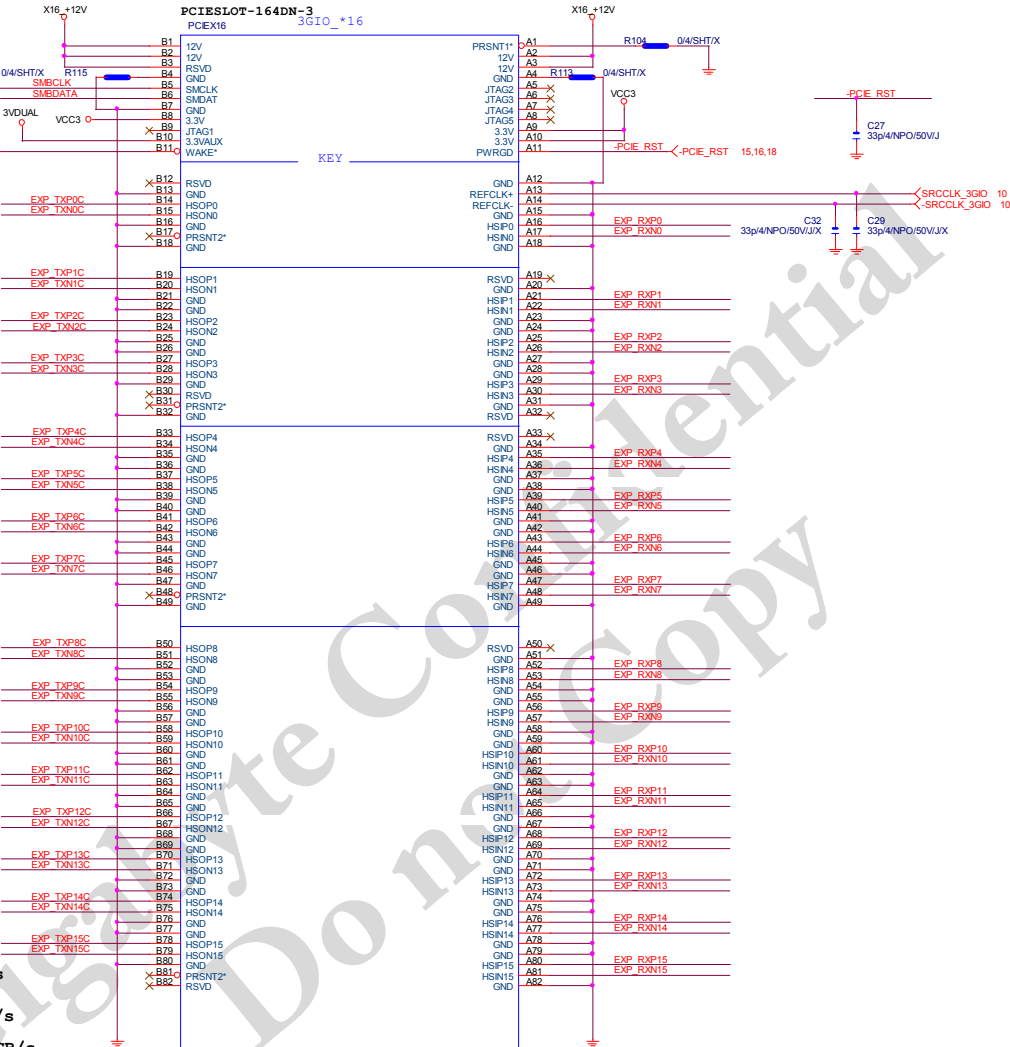
EXP\_RXP[0..15] >> EXP\_RXP[0..15] 4  
EXP\_RXN[0..15] >> EXP\_RXN[0..15] 4  
EXP\_TXP[0..15] >> EXP\_TXP[0..15] 4  
EXP\_TXN[0..15] >> EXP\_TXN[0..15] 4

EXP_TXP0	C43	0.22u4/XSR/6.3VK	EXP_TXP0C
EXP_TXN0	C36	0.22u4/XSR/6.3VK	EXP_TXN0C
EXP_TXP1	C47	0.22u4/XSR/6.3VK	EXP_TXP1C
EXP_TXN1	C49	0.22u4/XSR/6.3VK	EXP_TXN1C
EXP_TXP2	C52	0.22u4/XSR/6.3VK	EXP_TXP2C
EXP_TXN2	C54	0.22u4/XSR/6.3VK	EXP_TXN2C
EXP_TXP3	C57	0.22u4/XSR/6.3VK	EXP_TXP3C
EXP_TXN3	C59	0.22u4/XSR/6.3VK	EXP_TXN3C
EXP_TXP4	C62	0.22u4/XSR/6.3VK	EXP_TXP4C
EXP_TXN4	C64	0.22u4/XSR/6.3VK	EXP_TXN4C
EXP_TXP5	C65	0.22u4/XSR/6.3VK	EXP_TXP5C
EXP_TXN5	C67	0.22u4/XSR/6.3VK	EXP_TXN5C
EXP_TXP6	C68	0.22u4/XSR/6.3VK	EXP_TXP6C
EXP_TXN6	C69	0.22u4/XSR/6.3VK	EXP_TXN6C
EXP_TXP7	C71	0.22u4/XSR/6.3VK	EXP_TXP7C
EXP_TXN7	C75	0.22u4/XSR/6.3VK	EXP_TXN7C
EXP_TXP8	C79	0.22u4/XSR/6.3VK	EXP_TXP8C
EXP_TXN8	C80	0.22u4/XSR/6.3VK	EXP_TXN8C
EXP_TXP9	C81	0.22u4/XSR/6.3VK	EXP_TXP9C
EXP_TXN9	C82	0.22u4/XSR/6.3VK	EXP_TXN9C
EXP_TXP10	C86	0.22u4/XSR/6.3VK	EXP_TXP10C
EXP_TXN10	C91	0.22u4/XSR/6.3VK	EXP_TXN10C
EXP_TXP11	C90	0.22u4/XSR/6.3VK	EXP_TXP11C
EXP_TXN11	C91	0.22u4/XSR/6.3VK	EXP_TXN11C
EXP_TXP12	C92	0.22u4/XSR/6.3VK	EXP_TXP12C
EXP_TXN12	C93	0.22u4/XSR/6.3VK	EXP_TXN12C
EXP_TXP13	C95	0.22u4/XSR/6.3VK	EXP_TXP13C
EXP_TXN13	C96	0.22u4/XSR/6.3VK	EXP_TXN13C
EXP_TXP14	C97	0.22u4/XSR/6.3VK	EXP_TXP14C
EXP_TXN14	C98	0.22u4/XSR/6.3VK	EXP_TXN14C
EXP_TXP15	C99	0.22u4/XSR/6.3VK	EXP_TXP15C
EXP_TXN15	C100	0.22u4/XSR/6.3VK	EXP_TXN15C

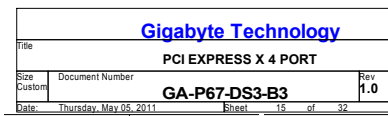
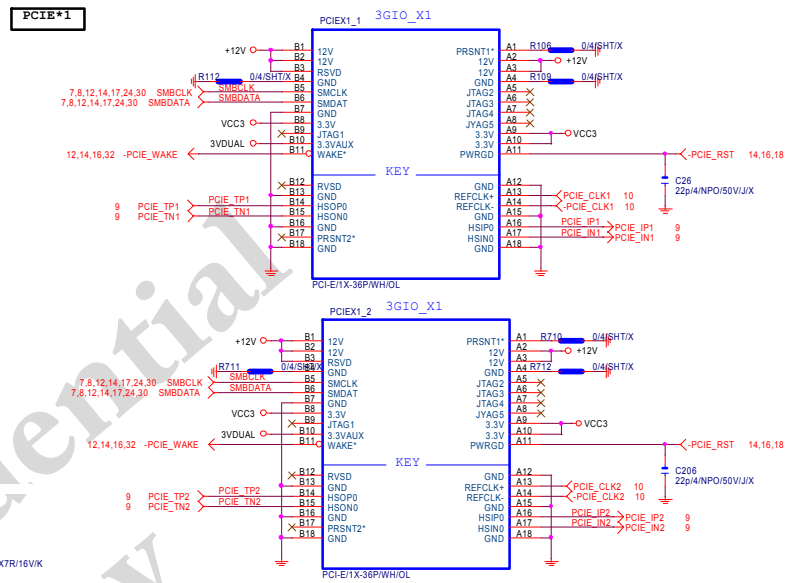
+12V protect short-wire test



PCIESLOT-164DN-3  
PCEX16 3GIO\_\*16

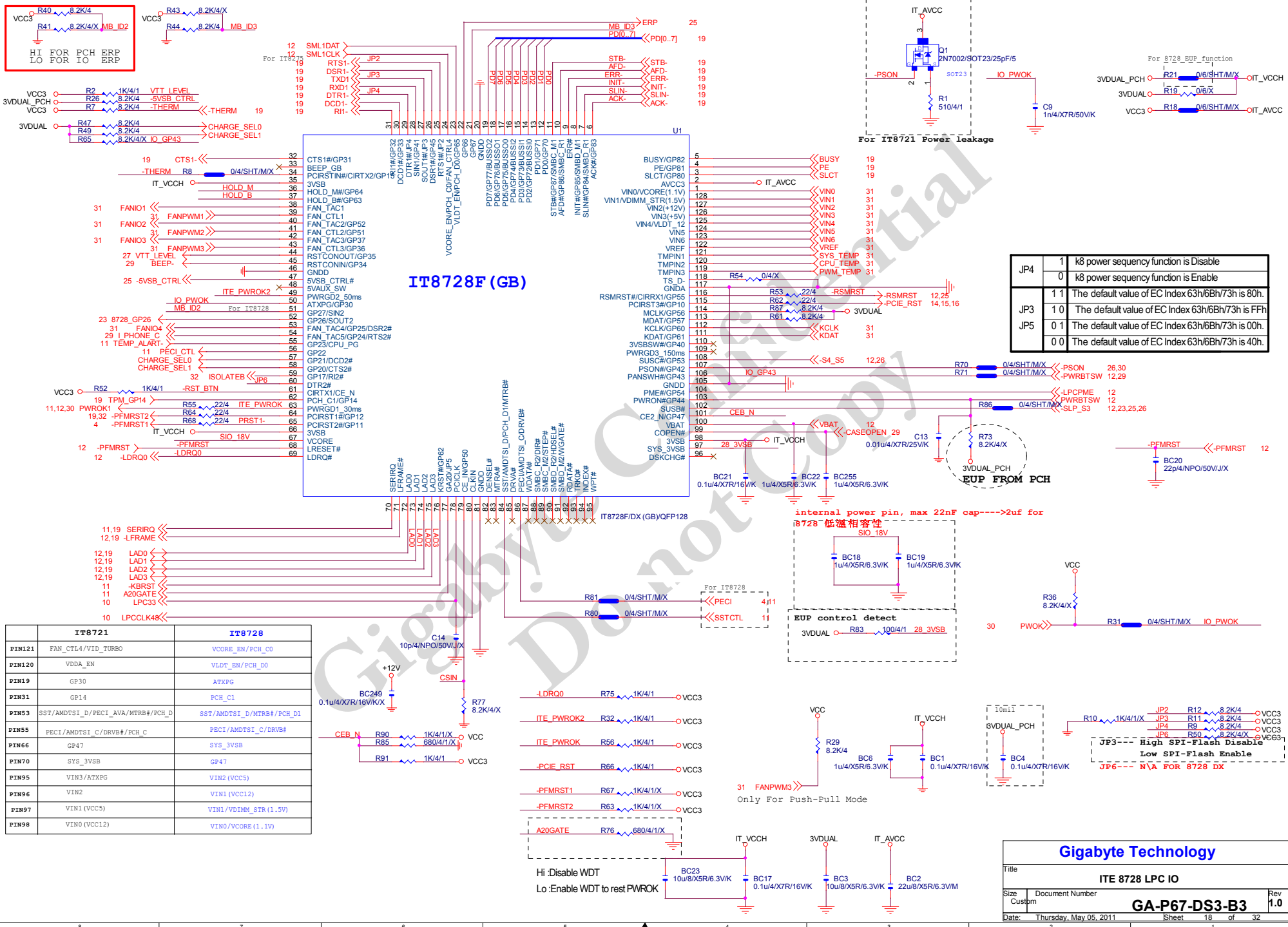










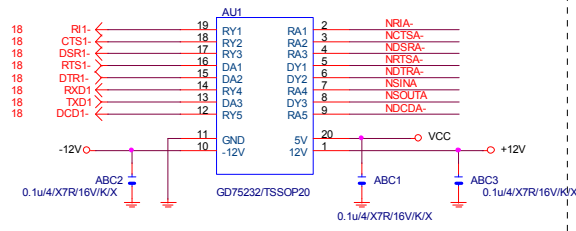


	IT8721	IT8728
PIN121	FAN_CTL4/VID_TURBO	VCORE_EN/PCH_CO
PIN120	VDDA_EN	VLDT_EN/PCH_D0
PIN19	GP30	ATXPG
PIN31	GP14	PCH_C1
PIN53	SST/AMDTSI_D/PECI_AVA/MTRB#/PCH_D	SST/AMDTSI_D/MTRB#/PCH_D1
PIN55	PECI/AMDTSI_C/DRV#B/PCH_C	PECI/AMDTSI_C/DRV#B
PIN66	GP47	SYS_3VSB
PIN70	SYS_3VSB	GP47
PIN95	VIN3/ATXPG	VIN2(VCC5)
PIN96	VIN2	VIN1(VCC12)
PIN97	VIN1(VCC5)	VIN1/VDIMM_STR(1.5V)
PIN98	VIN0(VCC2)	VIN0/VCORE(1.1V)

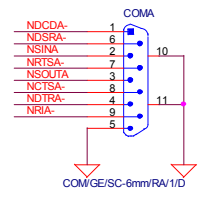
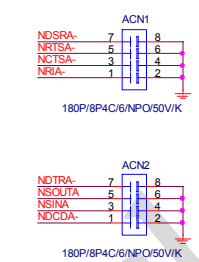
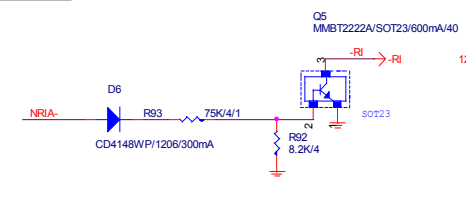
JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
	1 0	The default value of EC Index 63h/6Bh/73h is FFh.
JP5	0 1	The default value of EC Index 63h/6Bh/73h is 00h.
	0 0	The default value of EC Index 63h/6Bh/73h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

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ITE 8728 LPC IO			
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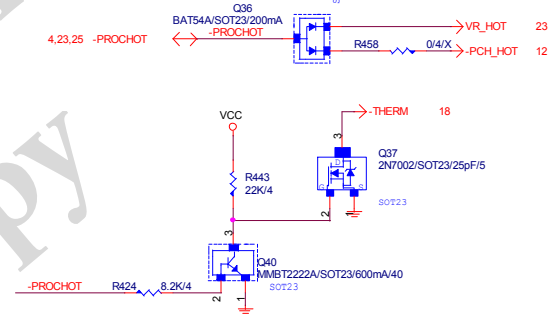
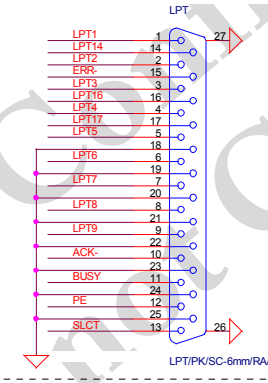
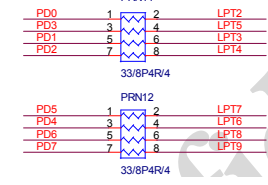
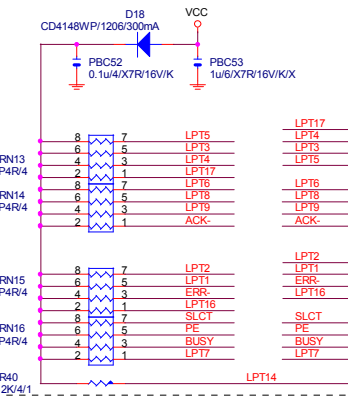
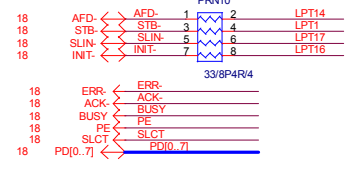
COMA



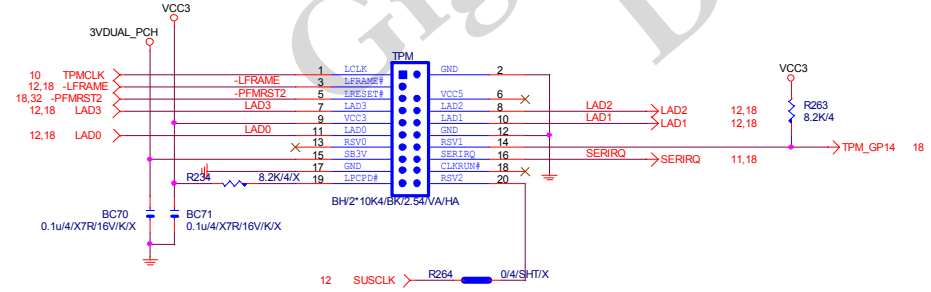
COM RI



LPT PORT



TPM

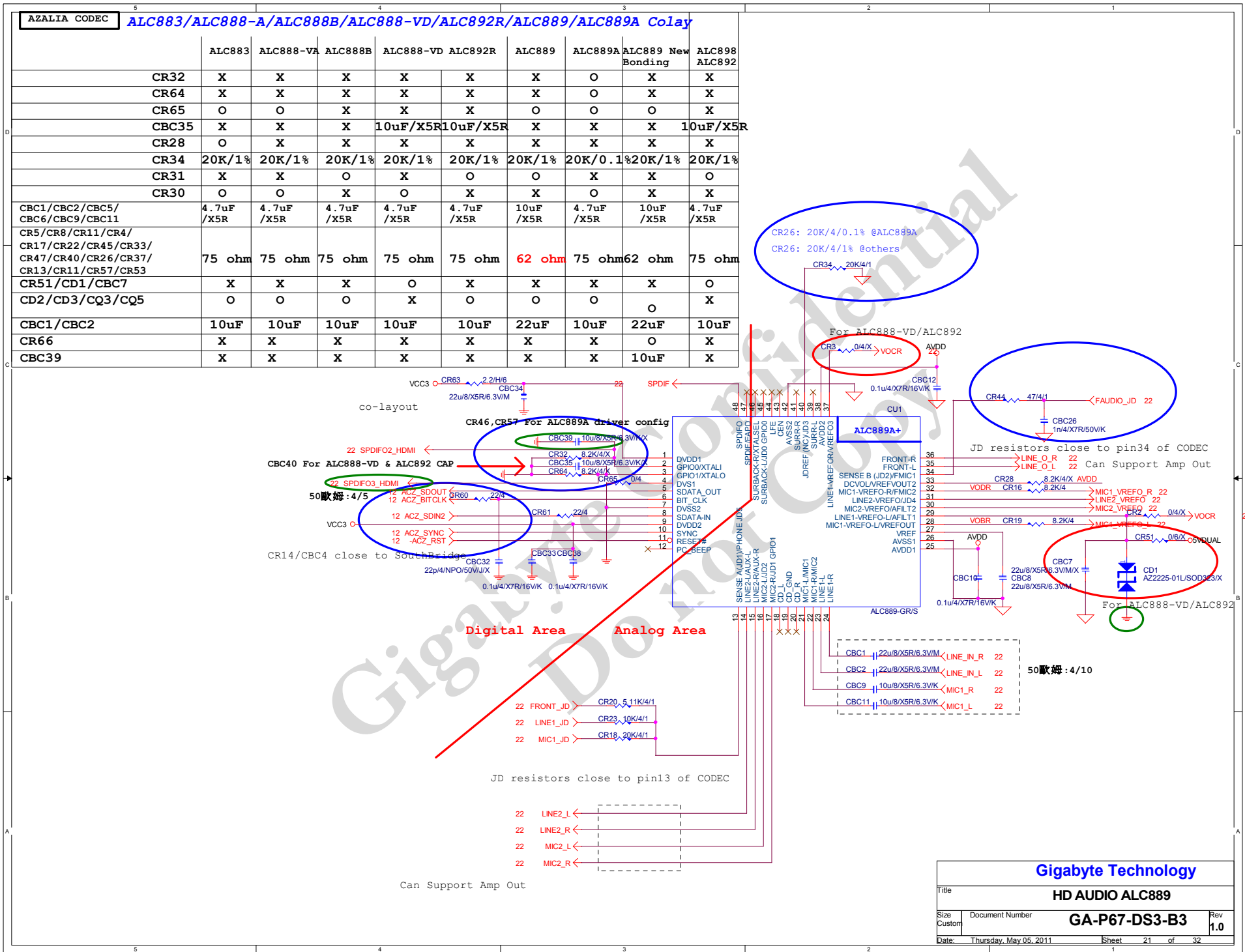


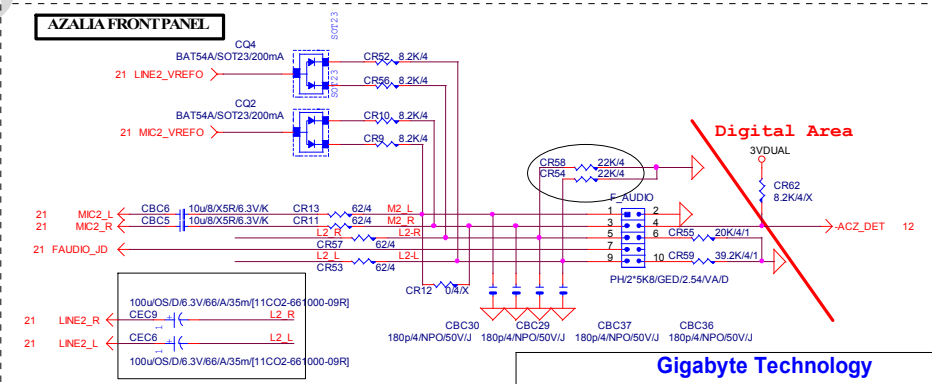
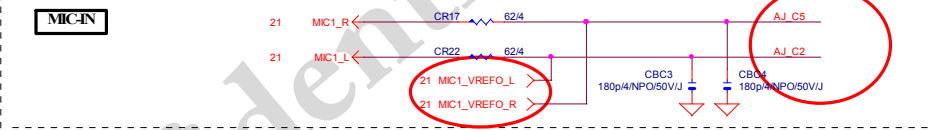
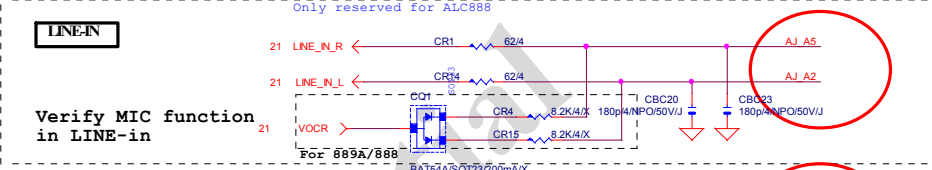
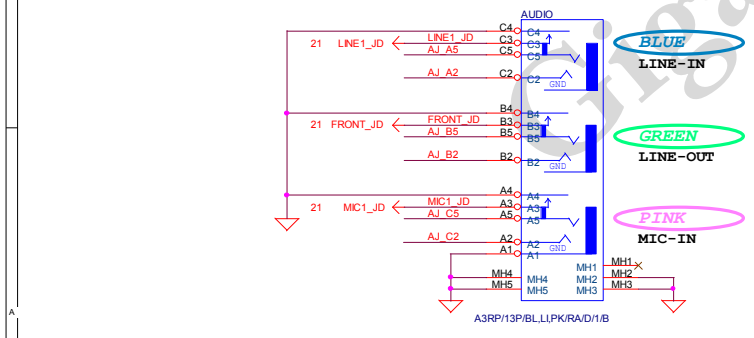
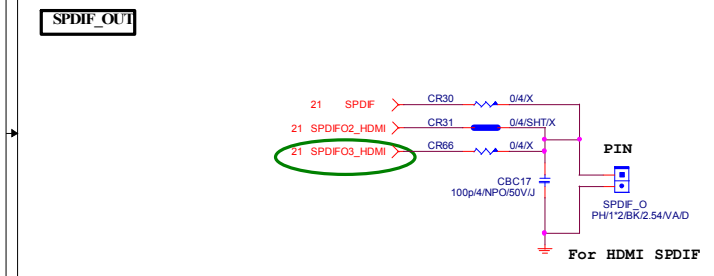
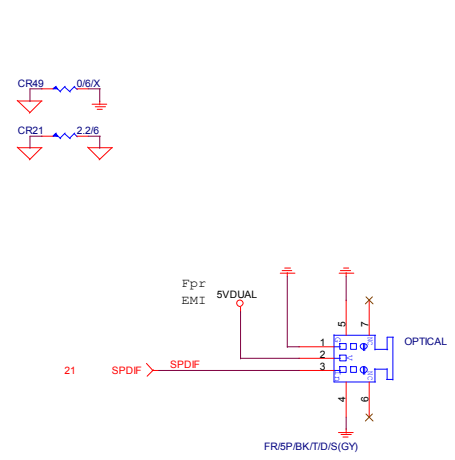
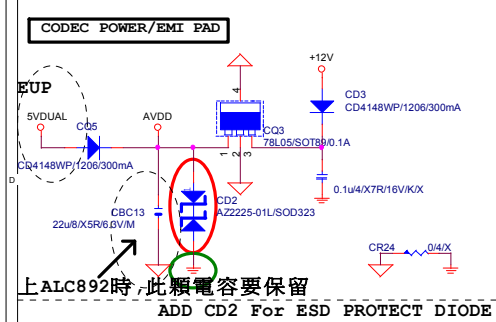
Gigabyte Technology			
Title			
COM & LPT & TPM			
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Do not Copy

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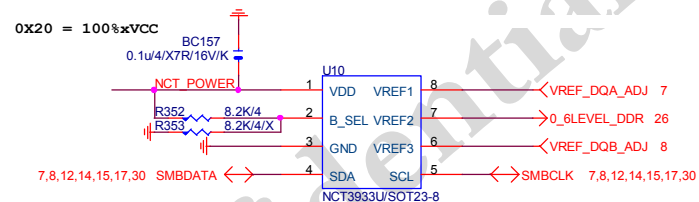
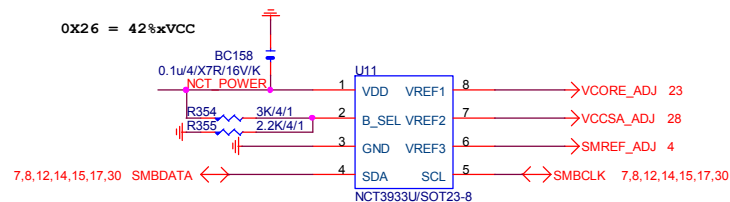
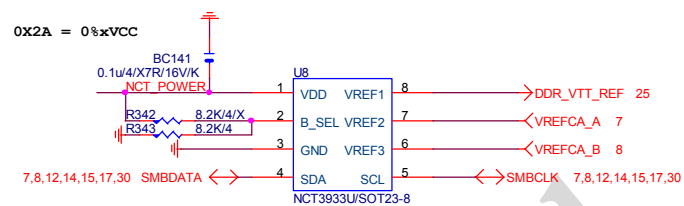
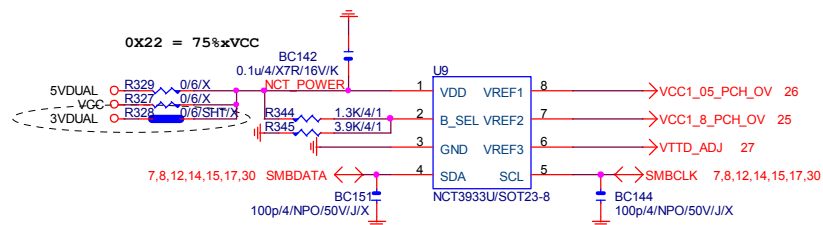






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Title		
AUDIO JACK		
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up6262	0X2A	0X20	0X22	0X26
VREF1	DDRVTT	VREF_DDRA_DQ	VCC1_05_PCH	VCORE
VREF2	VREF_DDRA_CA	DDR15V	VCC1_8_PCH	VCCSA
VREF3	VREF_DDRA_CAV	VREF_DDRB_DQ	CPU_VTT	SMREF

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CPU CORE VR-2			
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5V DUAL

+12V

5V DUAL

D17

R582

2.2k

0.1u4/X7R/16V/K

C126

1u6/X7R/16V/K

L6

1.2uH/20A/HNC0909/F/NMID

SDM20E40C0.4A/SOT23

R601

0.6k

Q1

BAT54C/SOT23/200mA/K

5

COMP

VCC

BOOT

PHASE

1

2

3

4

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89

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)

560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A  
Coefficient=1.7(85°C), 1(105°C)

Coefficient=1.7 (85°C) , 1 (105°C)

VIN Ripple current=4.7X1.7=7.99A(85°C)

-->故固態電容須 $2 \times 7.99 = 15.98 > 11.45A$

OCP :  $I_{peak} = (2 \times I_{ocset} \times R_{ocset}) / R_{dson}$   
typ  $I_{ocset} = 20\mu A$  ,  $R_{ocset} = 4.7k$

```
typ Iocset=20uA , Rocset=4.7k
```

$$\text{OCP} : 53.71\text{A} = (2 \times 20\text{uax}4.7\text{k}) / (7\text{m} // 7\text{m})$$

Remote sense請從最重的負載端點拉回

$$0.6 * [(R_S + R_O) / R_O] = V_{out} = 1.54V$$

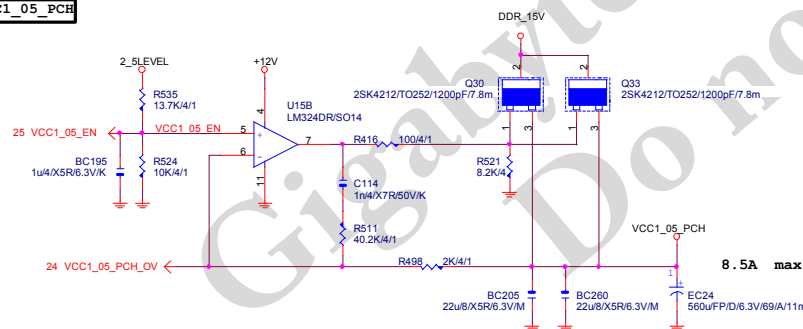
PWR	SEQ
-----	-----

放靠近IC pin4

注意：Rocset的阻值要依據Lo side Rdson改變  
一般Ipeak設定在50~60A即可

一般Ipeak設定在50~60A即可

VCC1\_05\_PCH



VIN=3.3V, VOUT=1.05V, IOUT=8.5A, PHASE=1

IRMS=3.959A

560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A  
Coefficient=1.7(85°C), 1(105°C)

Coefficient=1.7 (85°C) , 1 (105°C)

VIN Ripple current=4.7X1.7=7.99A(85°C)

-->故固態電容須 $2 \times 7.99 = 15.98 > 11.45A$

OCP :  $I_{peak} = (2 \times I_{ocset} \times R_{ocset}) / R_{dson}$

typ Iocset=20uA , Rocset=8.2k

$$\text{OCP} : 46.86\text{A} = (2 \times 20\text{uax}8.2\text{k}) / 7\text{m}$$

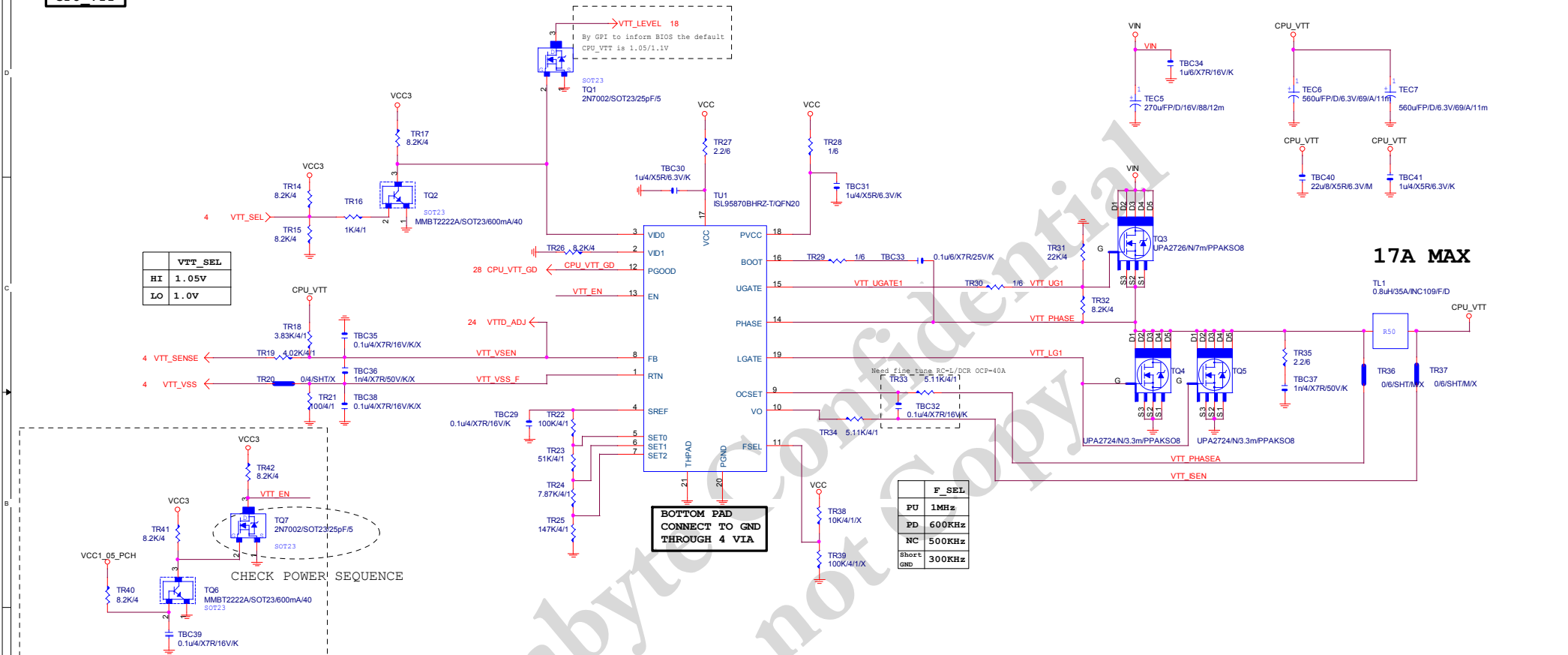
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Title <b>DDR_15V</b>			
Size Custom	Document Number <b>GA-P67-DS3-B3</b>		Rev <b>1.0</b>
Date:	Thursday, May 05, 2011	Sheet 26 of 32	



# CPU\_VTT

VTT_SEL	
HI	1.05V
LO	1.0V

F_SEL	
PU	1MHz
PD	600KHz
NC	500KHz
Short GND	300KHz



17A MAX

GIGABYTE

Title

CPU\_VTT PWM\_ISL95870

Size

Custom

Document Number

GA-P67-DS3-B3

Rev

1.0

Date:

Thursday, May 05, 2011

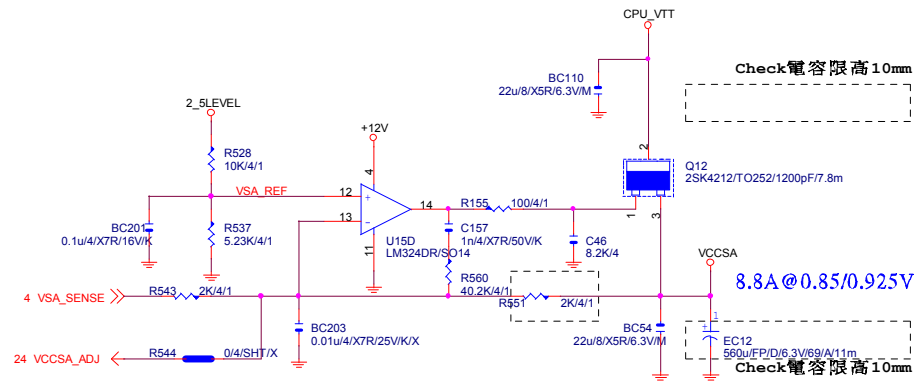
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27

of

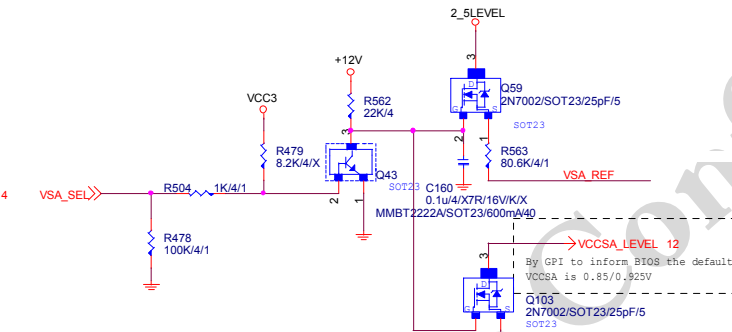
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# VCC\_SA

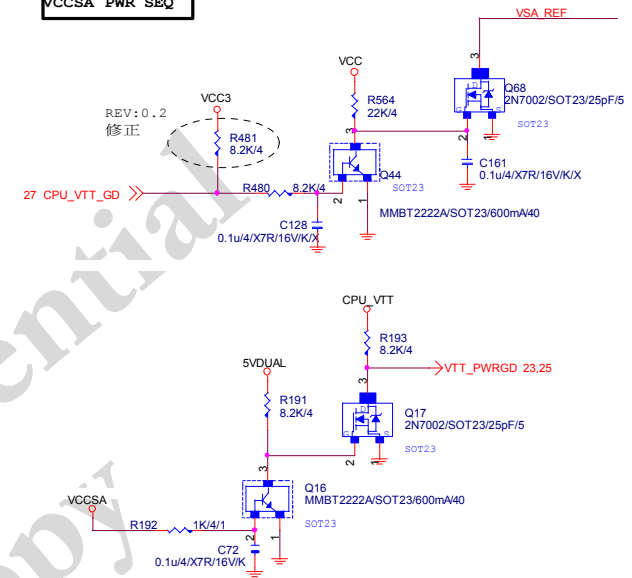


PDG 1.01

VSA_SEL	
HI	0.85V
LO	0.925V



# VCCSA PWR SEQ

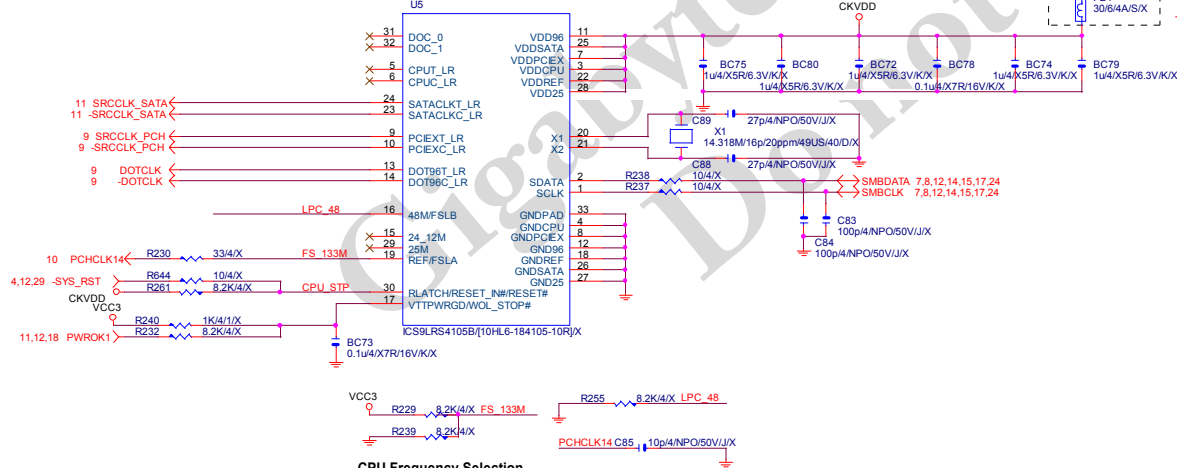
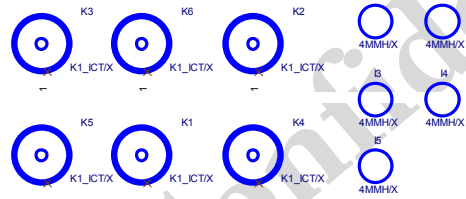
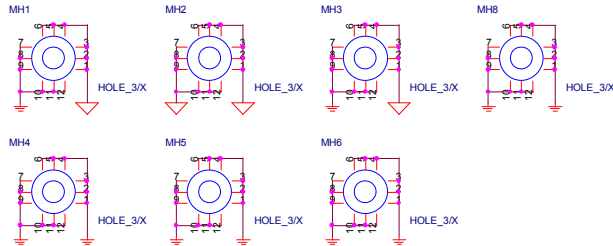
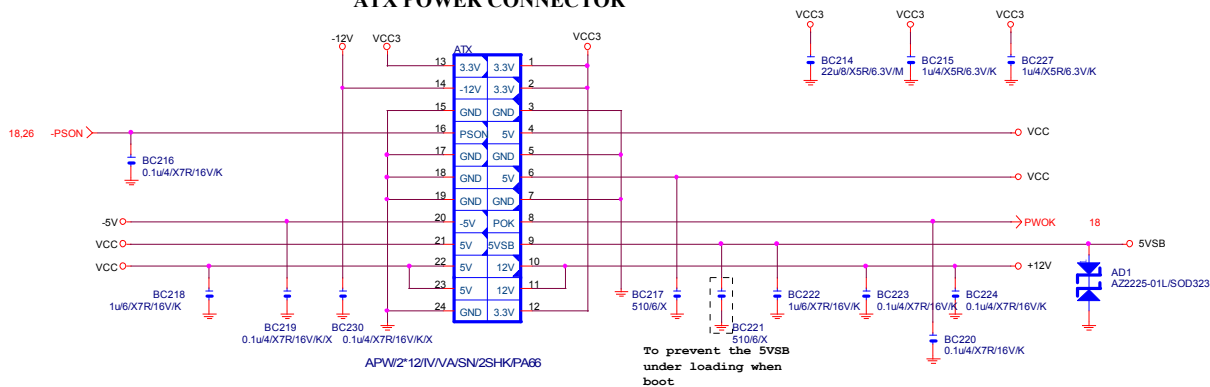


## Gigabyte Technology

CPU VTT PWM_ISL6312		
Title	Document Number	Rev
Size	GA-P67-DS3-B3	1.0
Date	Thursday, May 05, 2011	Sheet 28 of 32



# ATX POWER CONNECTOR

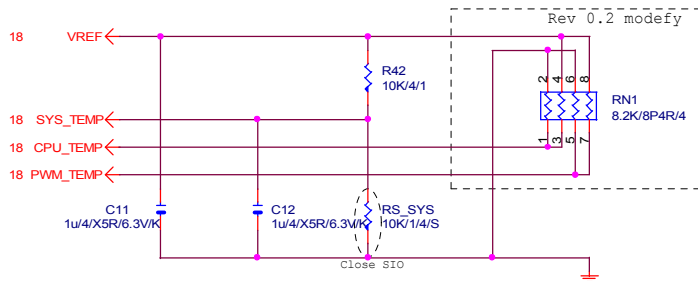


**CPU Frequency Selection**

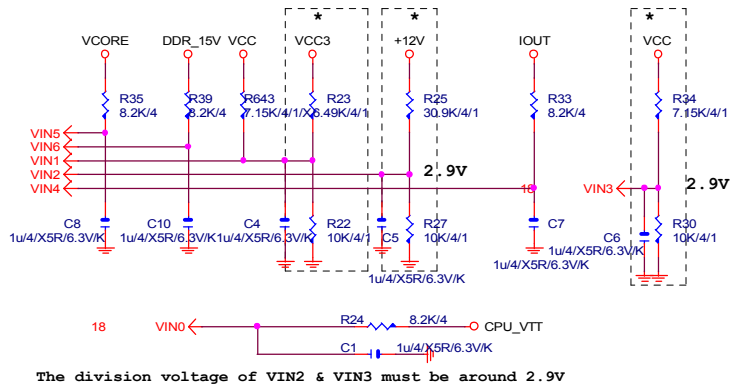
FS	CPU
0	100M <Default>
1	133M

Gigabyte Technology		
Title	ATX POWER CONNECTOR	
Size	Document Number	GA-P67-DS3-B3
Custom	Rev 1.0	
Date	Thursday, May 05, 2011	Sheet 30 of 32

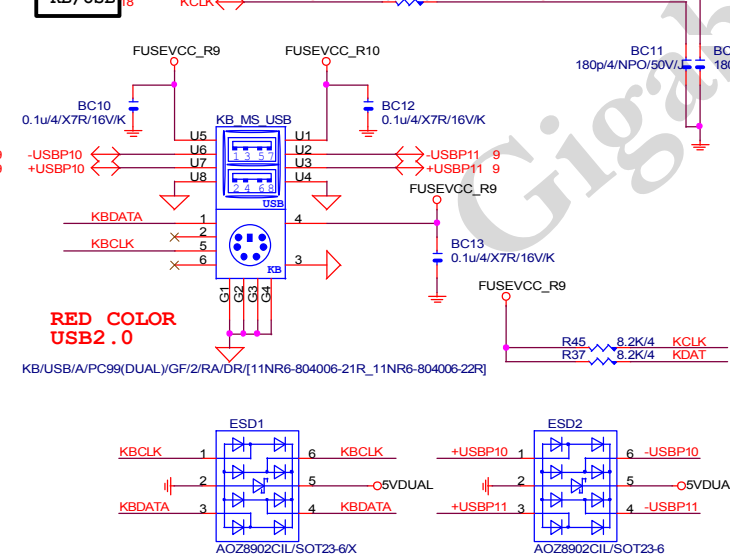
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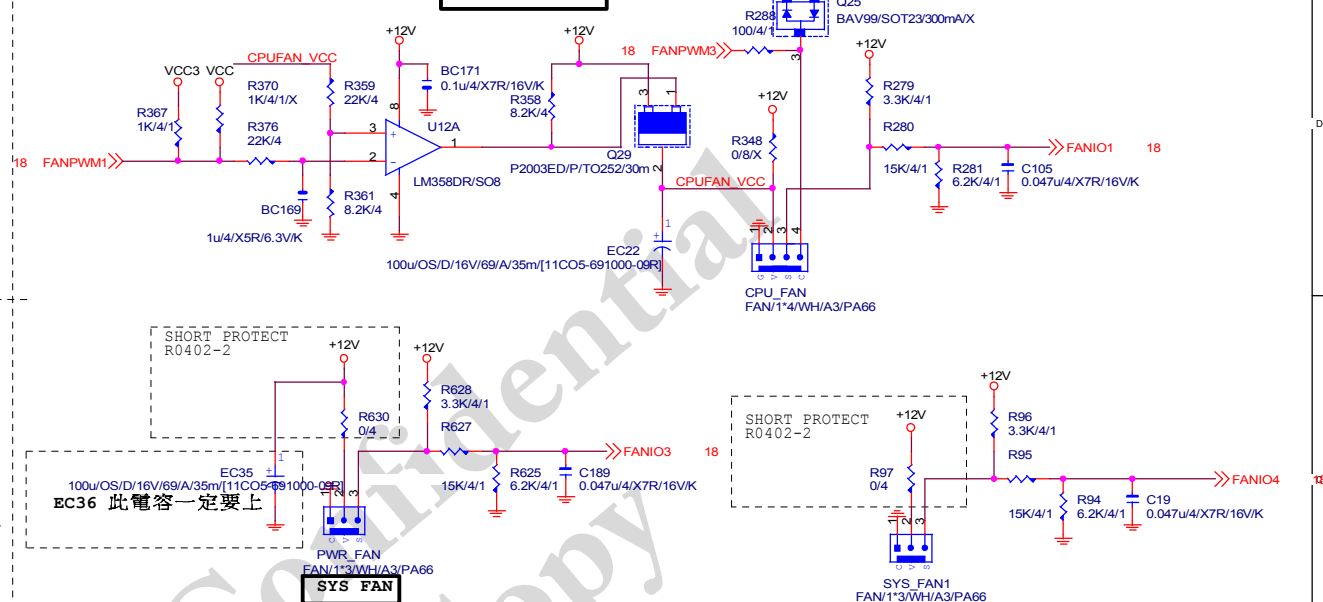
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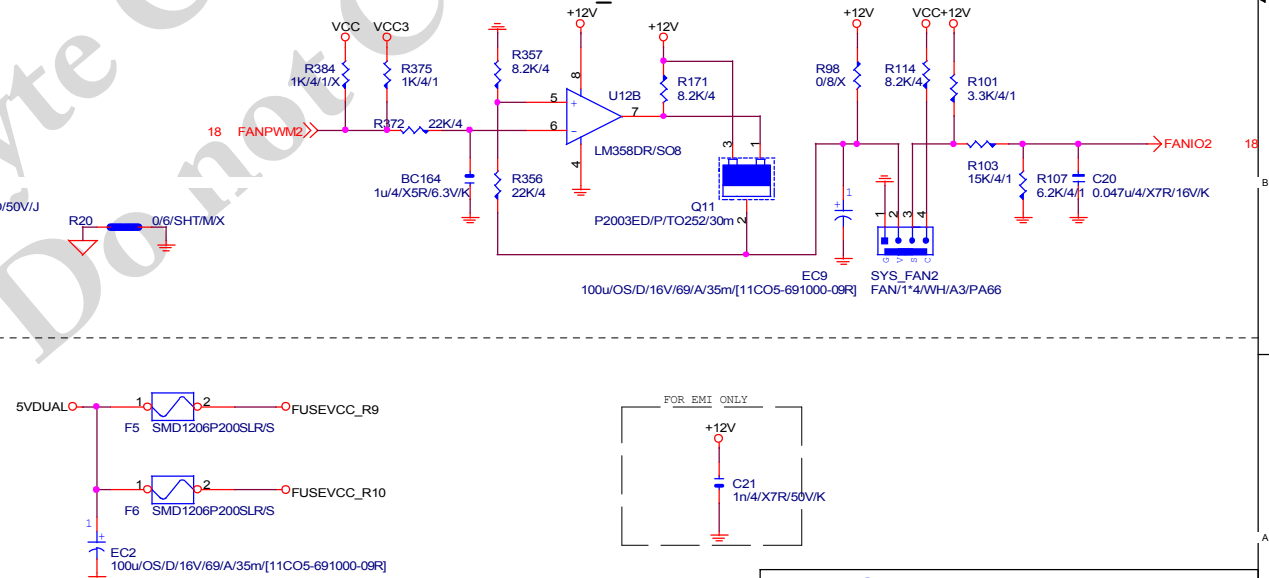
# KB/USB



# CPU SMART FAN



# Linear SYS\_FAN



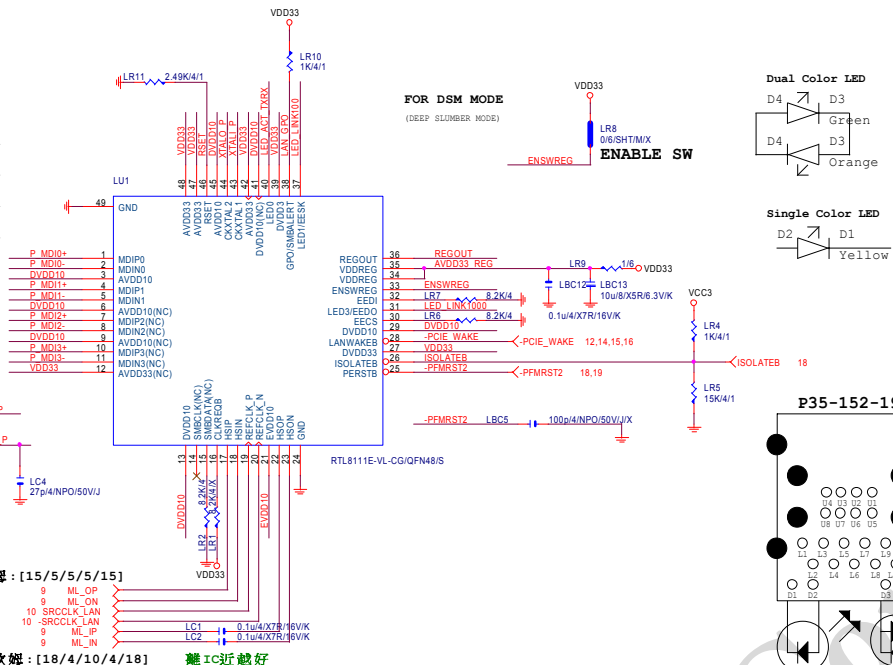
Gigabyte Technology

Title			HWM,KB/MS, FAN CTRL
Size	Document Number	Rev	
Custom	GA-P67-DS3-B3	1.0	
Date:	Thursday, May 05, 2011	Sheet	31 of 32

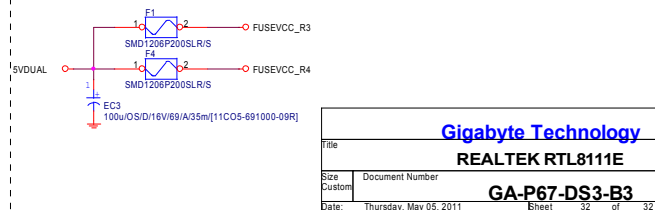
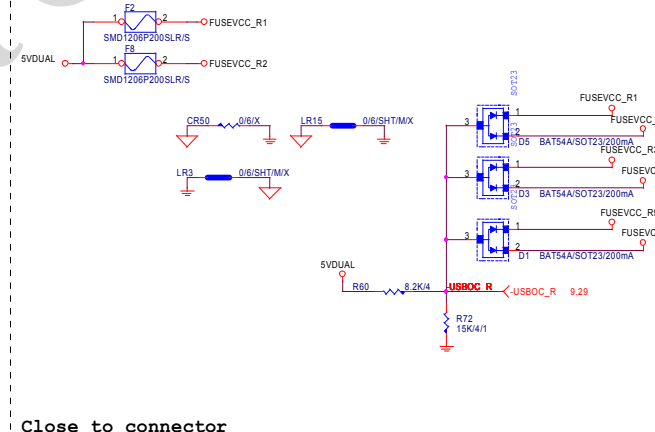
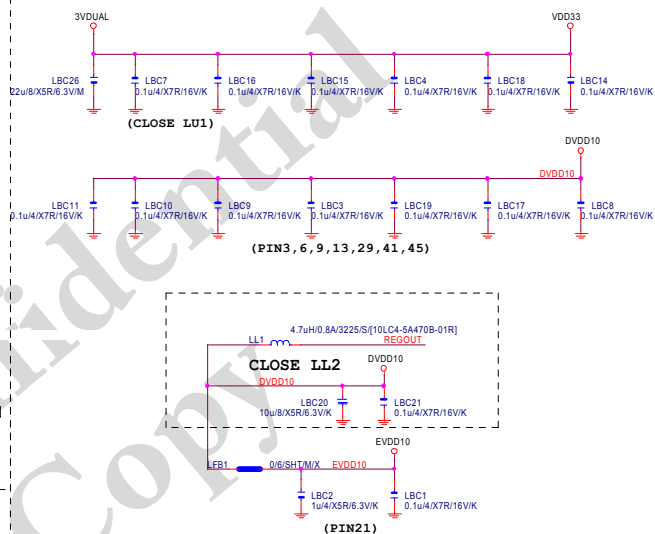
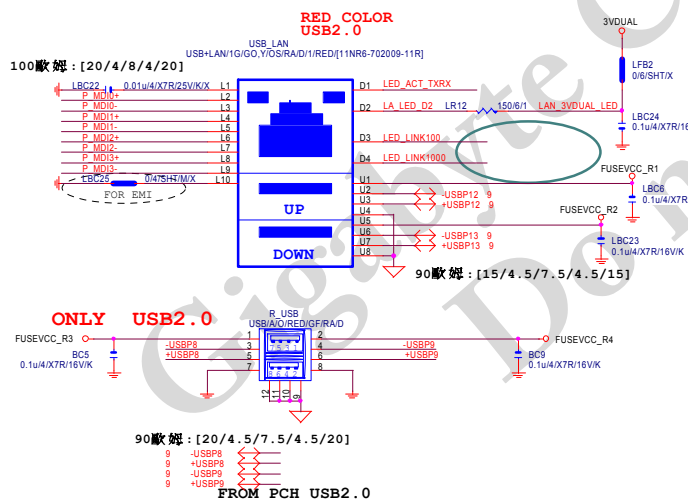
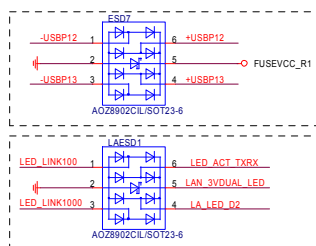
# PCIE-1G LAN

## Power domain chart

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



# USB30\_LAN CONNECTOR



Gigabyte Technology			
REALTEK RTL8111E			
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Custom		1.0	
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