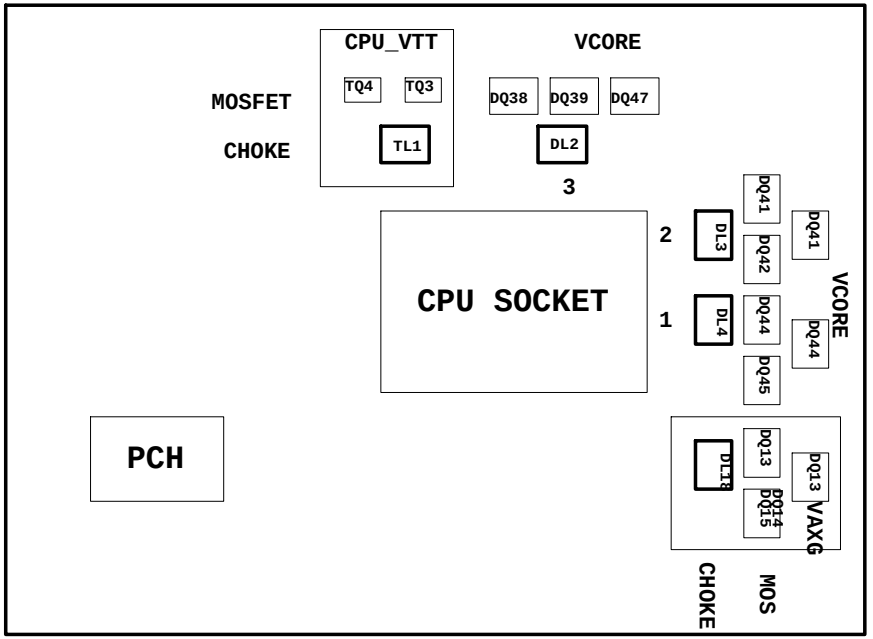
Model Name: GA-Z77P-D3

1.11

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
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	PCI SLOT 1~2
17	I/O ITE8728
18	COM,TPM
19	Dual BIOS
20	ALC887-VD2
21	REAR AUDIO JACK
22	ISL95836_VCORE_1
23	ISL95836_VCORE_2
24	DISCRETE POWER
25	PCH CORE / VOLTAGE CONSOLE
26	RT8120_CPU_VTT
27	VCCSA POWER

SHEET	TITLE
28	F_PANEL , F_USB
29	ATX POWER, CLOCK GEN
30	HWM,KB/MS , FAN CTRL
31	RTL8111F-VL
32	mSATA
33	RT8120_DDR POWER
34	R_USB/HDMI
35	ITE8892
36	
37	
38	
39	
40	



Gigabyte Technology

Title	Cover Sheet	
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 1 of 35	

GA-Z77P-D3
Component value change history

Data	Change Item	Reason
2012/01/11 EBOM:0.1	1.FOR Z77P-D3	
2012/01/18 EBOM:0.2	1.FOR Z77P-D3 FOR THERMAL SOLUTION	
2012/02/13 PBOM:10A	1.FOR Z77P-D3 MP	
2012/02/24 EBOM:11A	1.PCB 1.1 FOR RTL8111F-VL	
2012/03/08 EBOM:11B	1.MB_ID3 R44:LO ---->R43:HI FOR DDR OC 版本	
	2.add BC275 1nf TO IMPROVE ESD 3KV ---->5KV	
	3.R418 442 OHM -----> 1.4K OHM FOR PROCHOT調整	
2012/03/19 PBOM:11C	1.PCB 1.11 FOR DDR OC 版本	2.DEL BC275 1nf

Circuit or PCB layout change

DATE	Change Item	Reason
2011/12/14 PCB:0.1	1.由P75-D3-0.1 修改 成B75-D3V	
2011/12/14 PCB:0.1	1.由B75-D3V-0.1 修改成Z77-DS3H	
1.0	1. DDR DIP 560uF電容移除? (或者BOM要上回去) 2. PCH1_05 MOSFET?	
2011/12/30 PCB:0.1	1.由Z77-DS3H 修改成Z77P-D3	
2012/01/18 PCB:0.2	1.修改CPU VCORE /VAXG POWER PLANE/環溫 SOLUTION 以改善THERMAL	
2012/02/09 PCB:1.0	1.Z77P-D3 for MP	
2012/02/23 PCB:1.1	1.Z77P-D3-1.0 修改lan chip,換成8111F-VL	
2012/03/06 PCB:1.11	1.由1.1---->1.11 改DDR OC	

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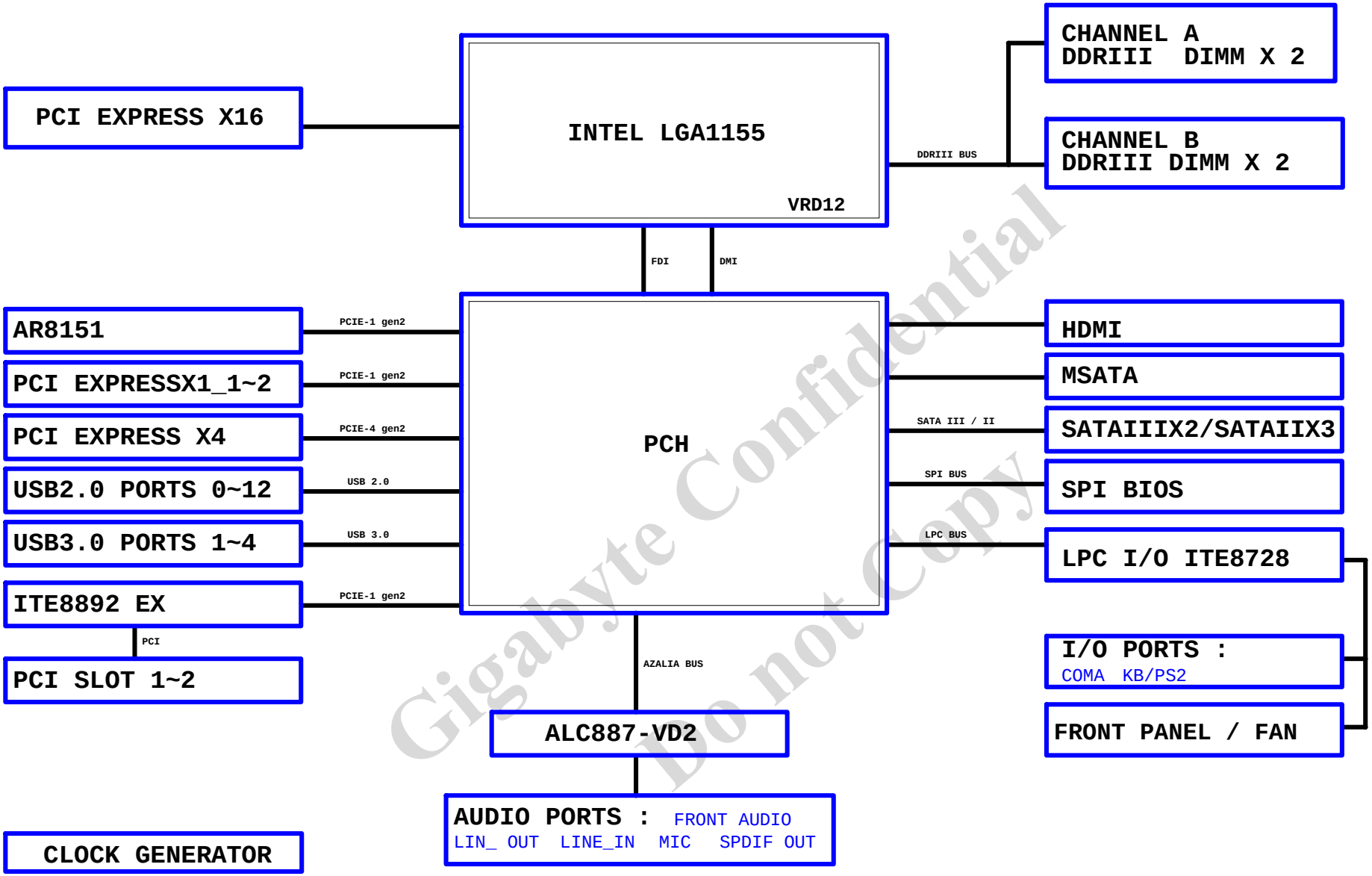
Title: BOM & PCB MODIFY HISTORY

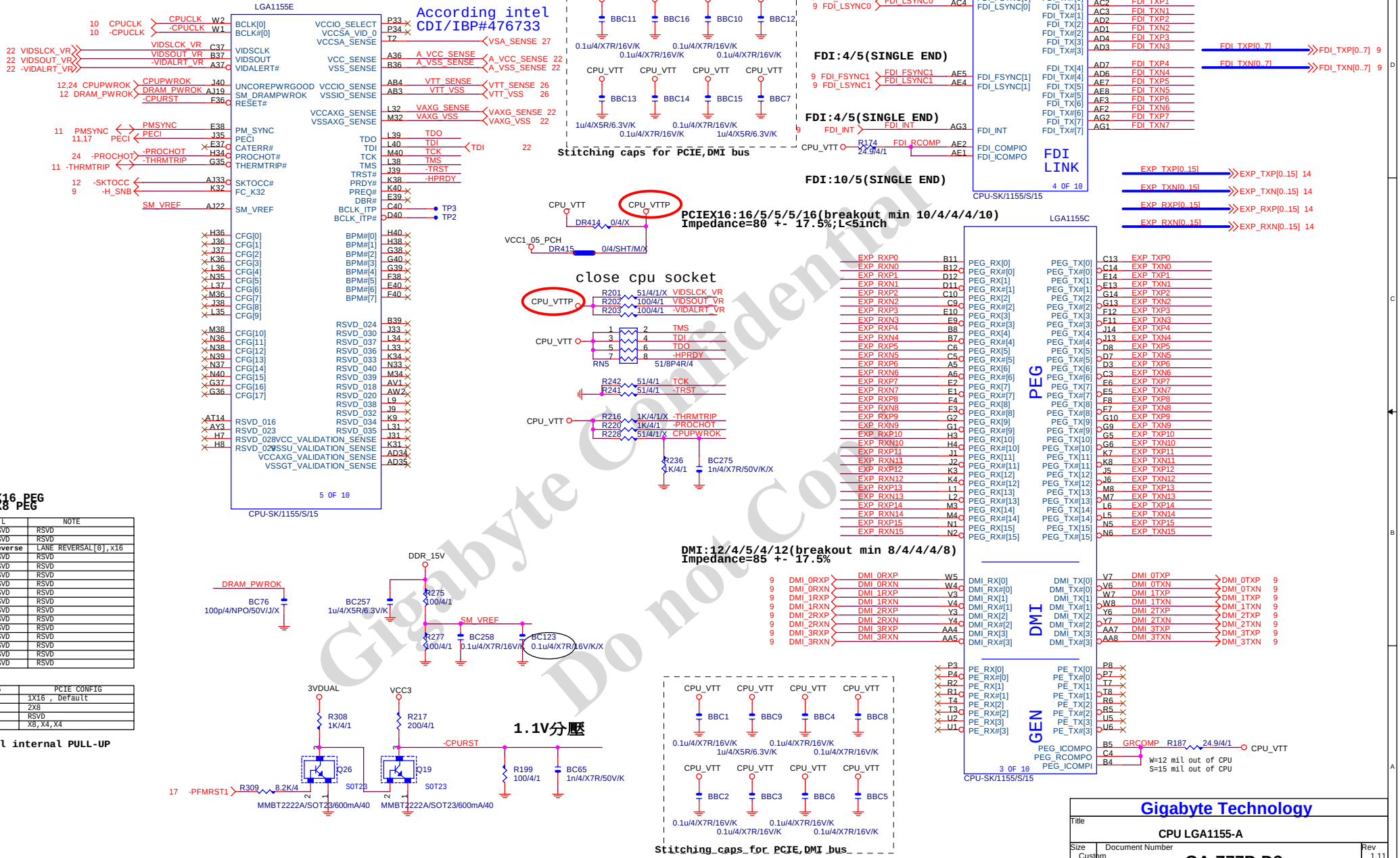
Size: Custom | Document Number: GA-Z77P-D3 | Rev: 1.11

Date: Thursday, March 29, 2012 | Sheet 2 of 35

BLOCK DIAGRAM



Gigabyte Technology		
Title: BLOCK DIAGRAM		
Size: C	Document Number: GA-Z77P-D3	Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 3 of 35	



CFG	H	L	NOTE
0	RSVD	RSVD	RSVD
1	RSVD	RSVD	RSVD
2	**NORM**	**Reverse**	LANE REVERSAL[0],x16
3	RSVD	RSVD	RSVD
4	RSVD	RSVD	RSVD
7	RSVD	RSVD	RSVD
8	RSVD	RSVD	RSVD
9	RSVD	RSVD	RSVD
10	RSVD	RSVD	RSVD
11	RSVD	RSVD	RSVD
12	RSVD	RSVD	RSVD
13	RSVD	RSVD	RSVD
14	RSVD	RSVD	RSVD
15	RSVD	RSVD	RSVD
16	RSVD	RSVD	RSVD
17	RSVD	RSVD	RSVD

CFG6	CFG5	PCIE CONFIG
1	1	1X16 , Default
1	0	2X8
0	1	RSVD
0	0	X8,X4,X4

Title	CPU LGA1155-A
Size	Custom
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Gigabyte Technology

LGA1155A

DDR_0

1 OF 10

CPU-SK/1155/S/15

LGA1155B

DDR_1

2 OF 10

CPU-SK/1155/S/15

LGA1155
ILM_BP/1156/CSP

Need check the new CPU ME

Place in CPU bottom side

Title	CPU LGA1155-B
Size	Custom
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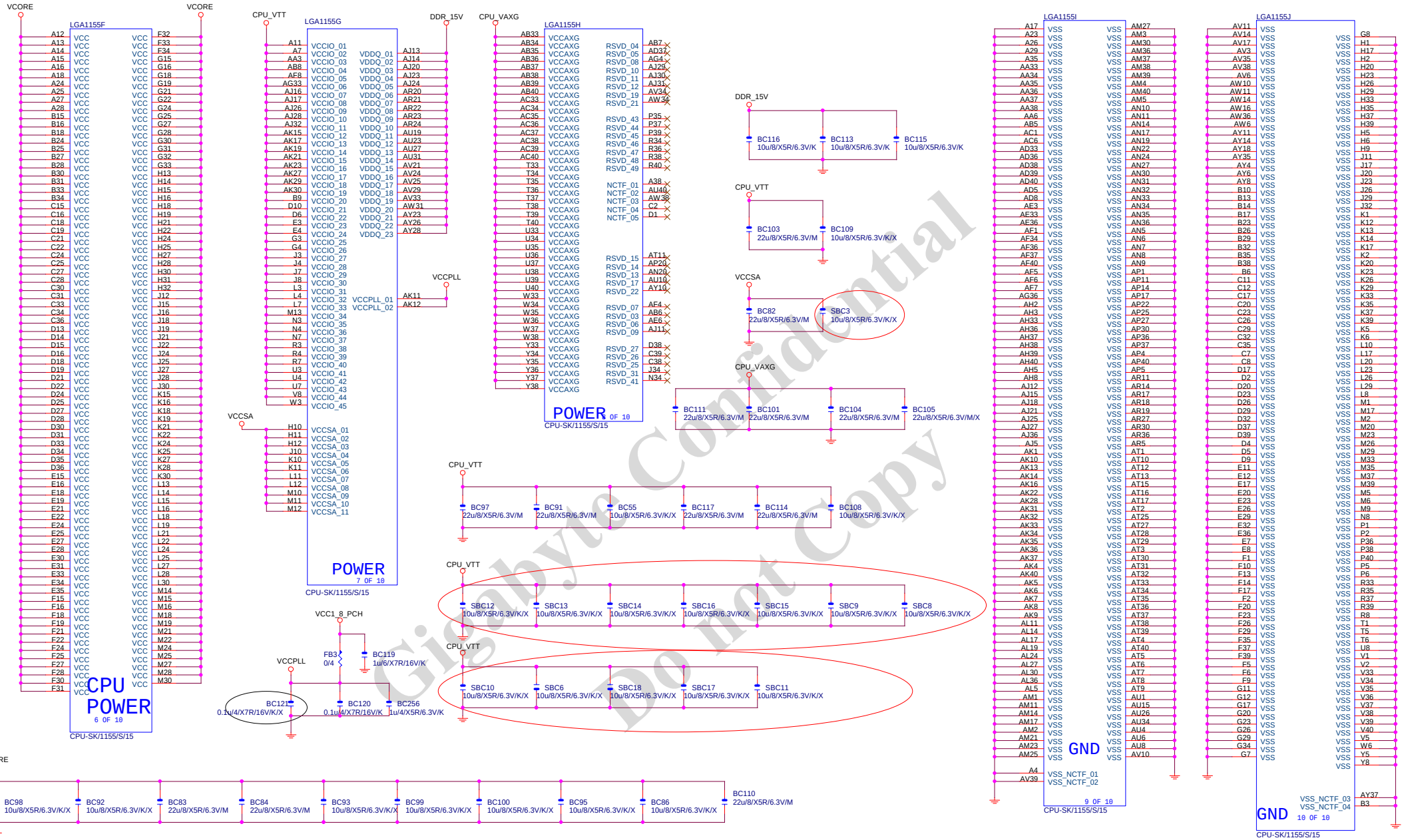
Intel CRB



Gigabyte Technology		
Title	CPU LGA1155-C	
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
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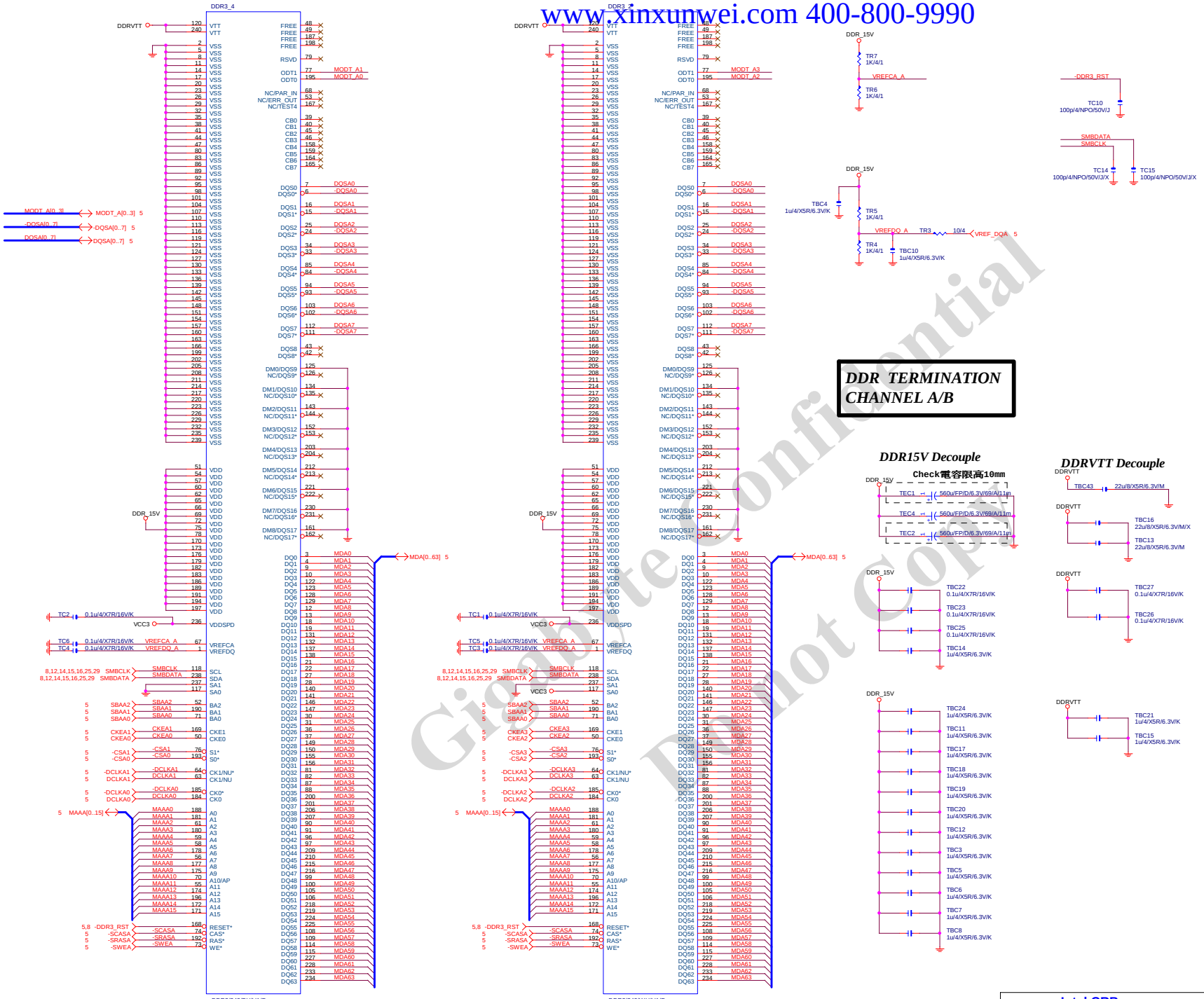
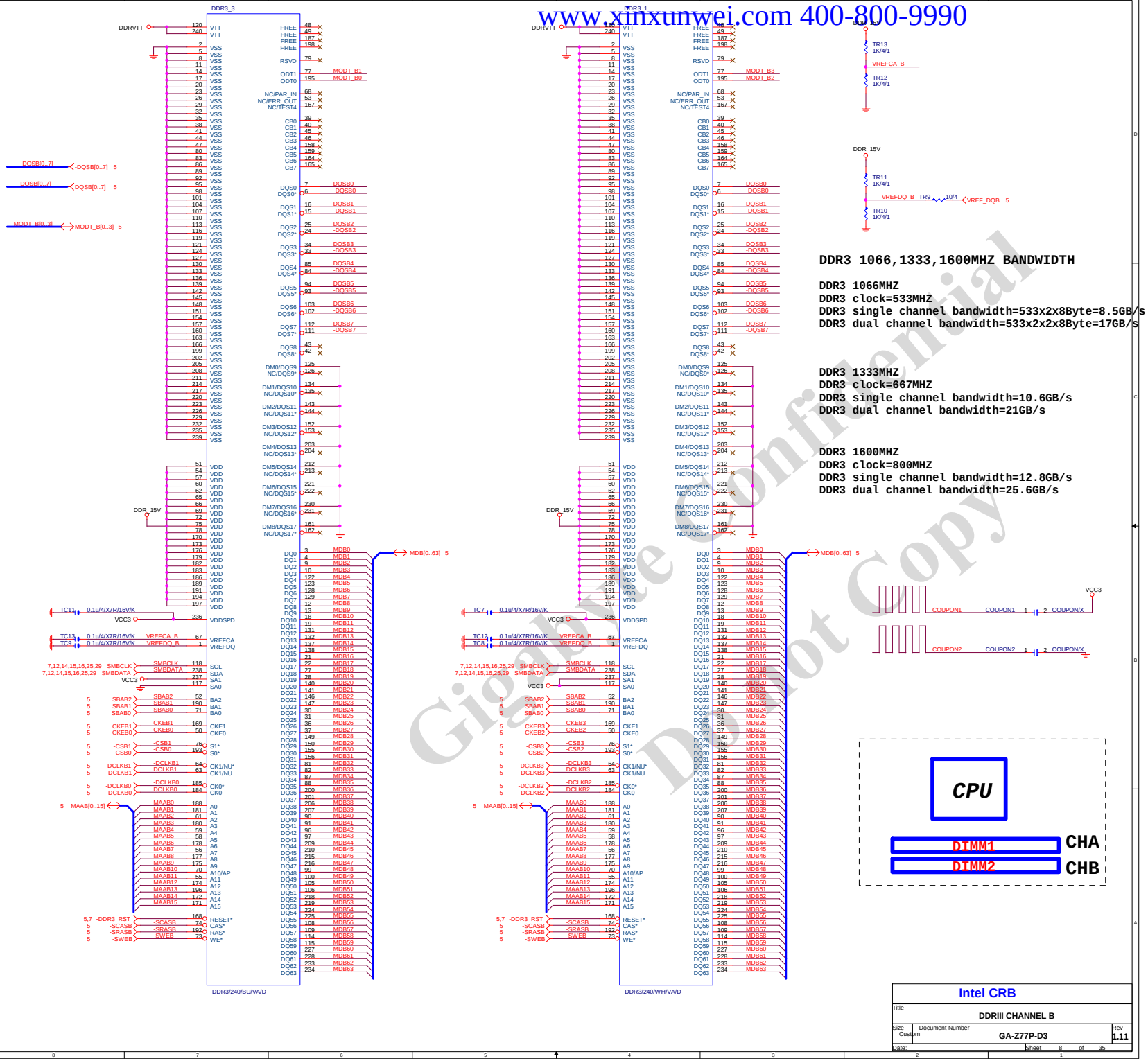


DDR TERMINATION CHANNEL A/B

Intel CRB			
Title: DDRIII CHANNEL A			
Size: Custom	Document Number: GA-Z77P-D3		Rev: 1.11
Date:	Sheet 7 of 35		



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

Intel CRB	
Title	DDRIII CHANNEL B
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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%

USB3.0:20/5/7/5/20 (breakout min 8/4/4/4/8) ; ONLY 3 VIAS
Impedance=85 +- 17.5%
Back Panel < 10000 MILS
Front Panel < 6000 MILS

B75 CHIP USB PORT 6/7 are Disable

OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)

USB OC# Configure	
OC0#	USB0,1
OC1#	USB2,3
OC2#	USB4,5
OC3#	USB6,7
OC4#	USB8,9
OC5#	USB10,11
OC6#	USB12,13
OC7#	Not Use

放靠近 Device & PCI-E Slot

PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)
Impedance=80 +- 17.5%

R102 short to GND in non graphic SKU

NEW 7 MODEL
Footprint: BGAHSINK-75;
3mm孔徑

HEAT SINK/N-BG/GBT MK/Z77/KWOG/[12SP2-S04208-01R_12SP2-S04208-02R_12SP2-S04208-03R]

DMI /FDI termination voltage

Title	PCH FDI,DMI,USB ,PCIE
Size	Custom
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Gigabyte Technology

PCHF

33 OHM close PCH <750mils

SYNC:4/10 (breakout 4/6)

RGB:4/20 (breakout 7.5/10)

DDC:4/5

DAC_IREF:4/12

DVI:15/4/6/4/15 (breakout 8/4/4/4/8)

Flex0,2 : 33MHZ

Flex1,3 : 27/14/24/48/25MHZ

PCHH

120Mhz for DP

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

VGA DDC

Gigabyte Technology	
Title	PCH DISPLAY ,CLK BUFFER
Size: Custom	Document Number: GA-Z77P-D3
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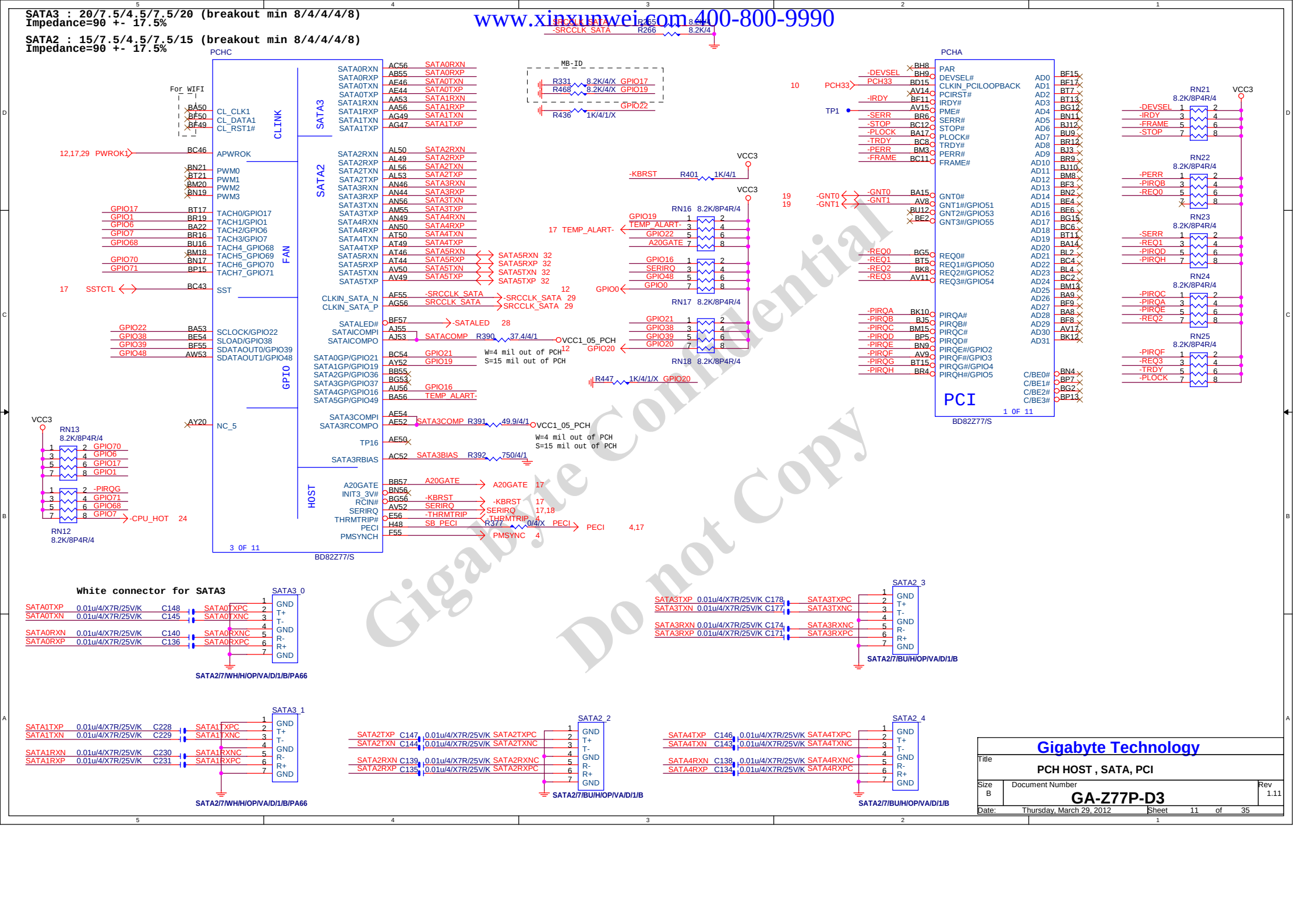
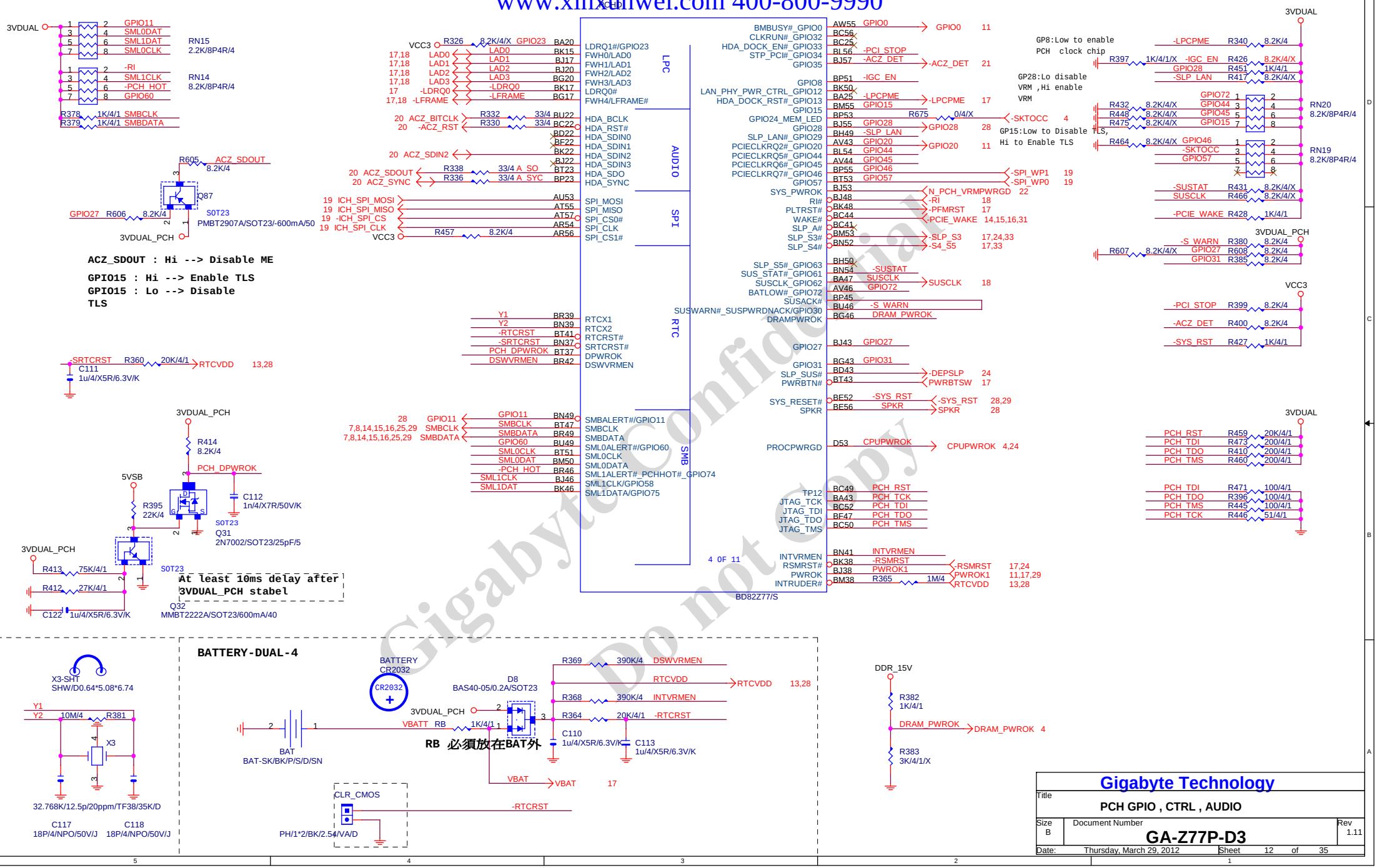
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

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





Gigabyte Technology		
Title: PCH GPIO , CTRL , AUDIO		
Size: B	Document Number: GA-Z77P-D3	Rev: 1.11
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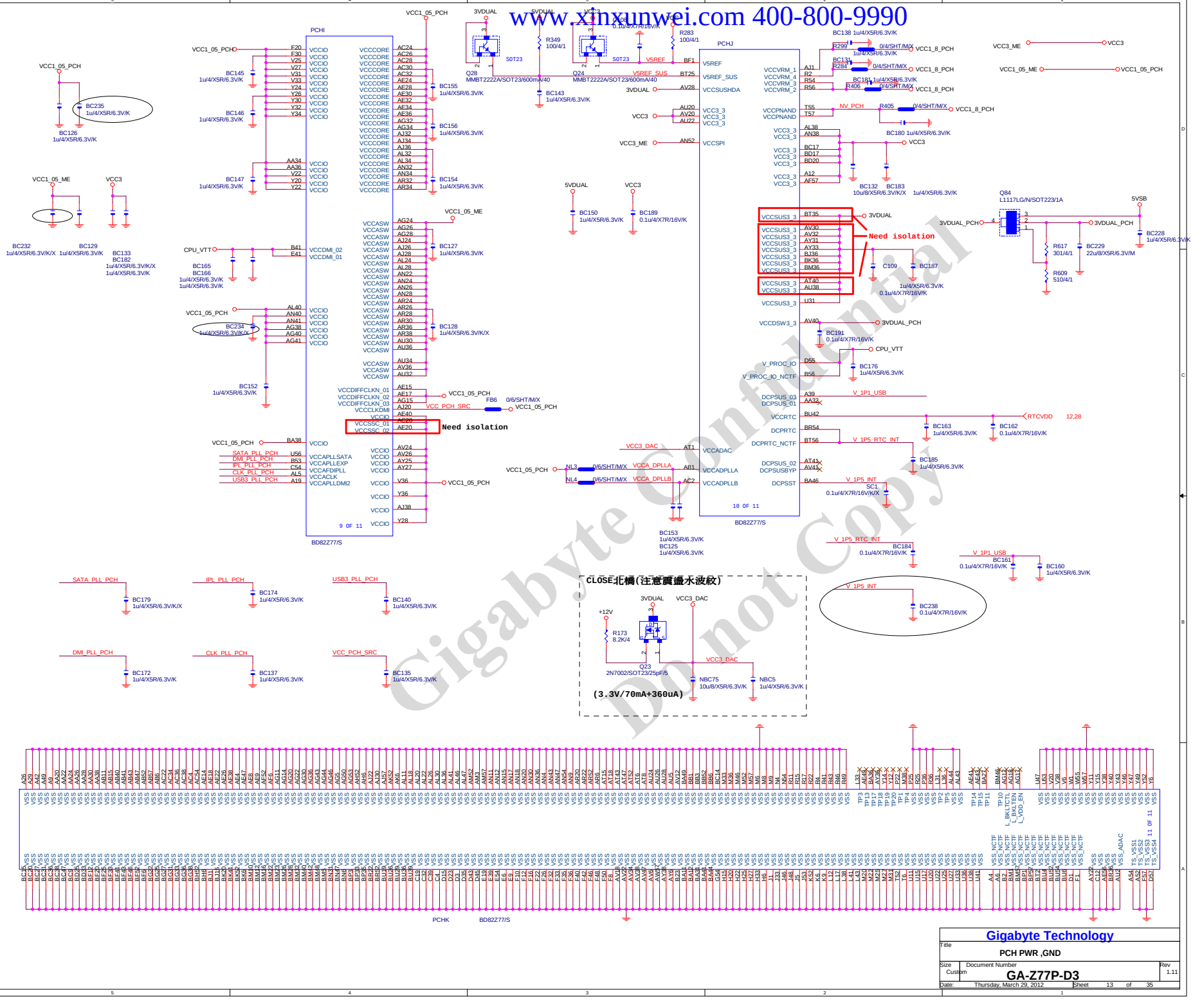

Gigabyte Technology	
Title	PCH PWR ,GND
Size	Custom
Document Number	GA-Z77P-D3
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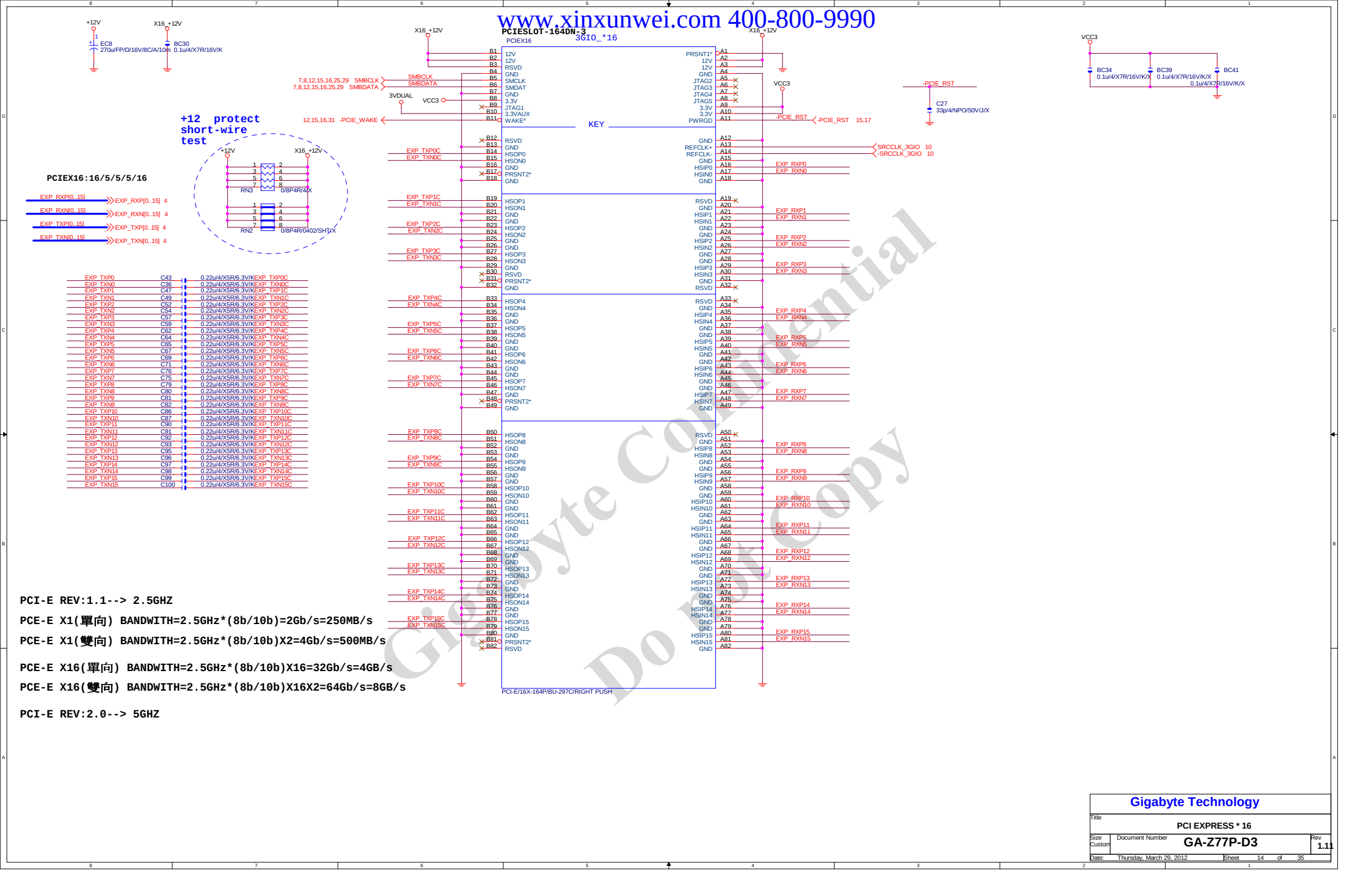

PCI-E REV:1.1--> 2.5GHZ

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

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

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

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

PCI-E REV:2.0--> 5GHZ

Gigabyte Technology	
Title	PCI EXPRESS * 16
Size: Custom	Document Number: GA-Z77P-D3
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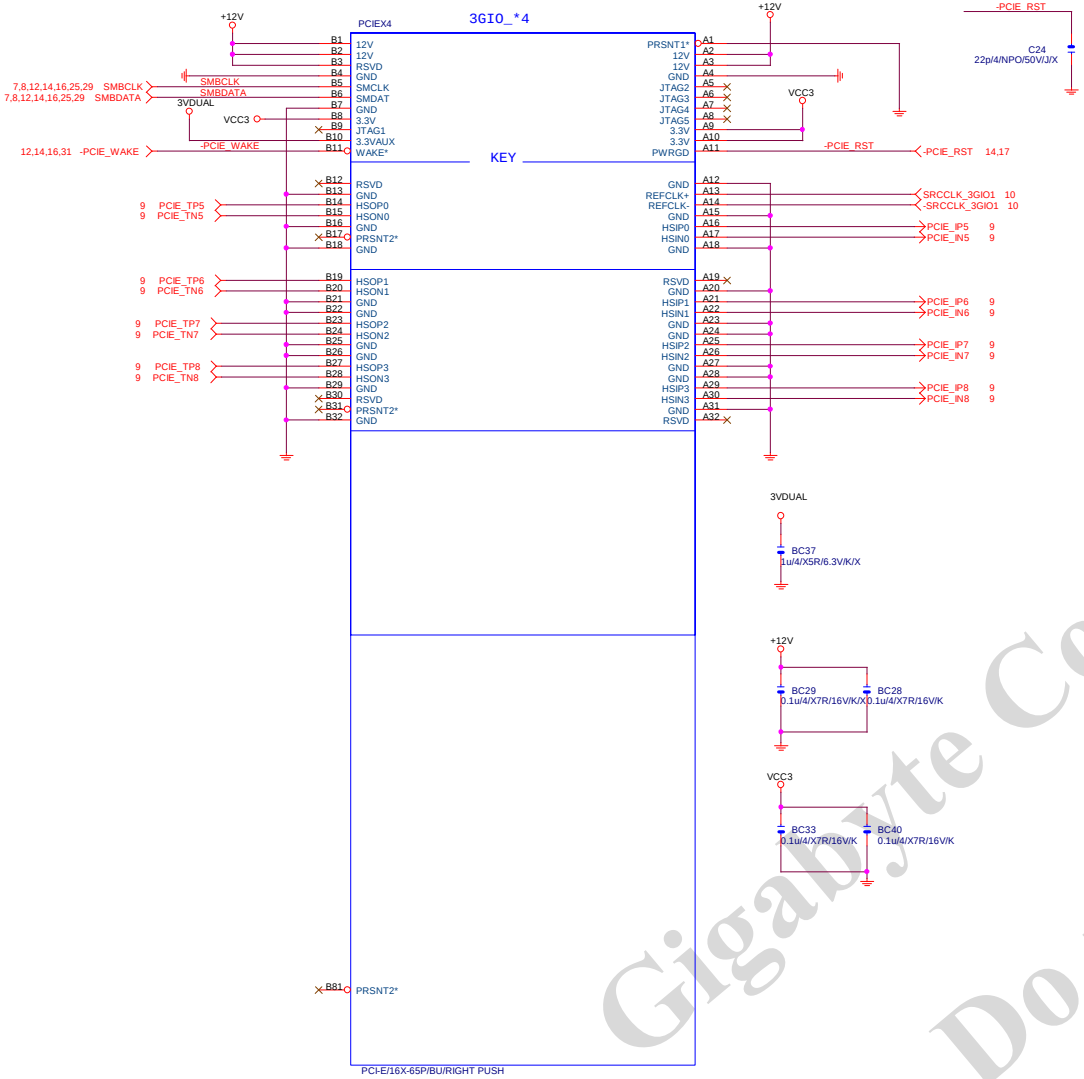
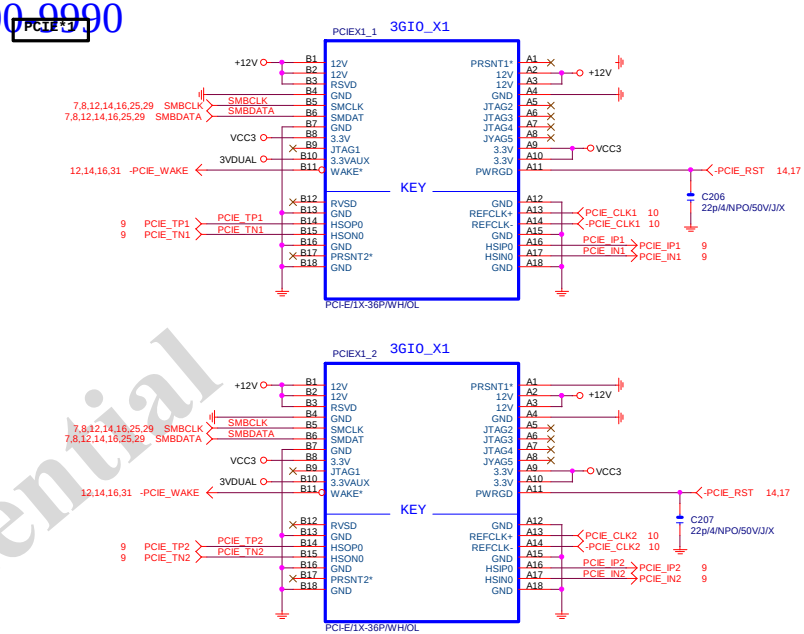
PCIE*4



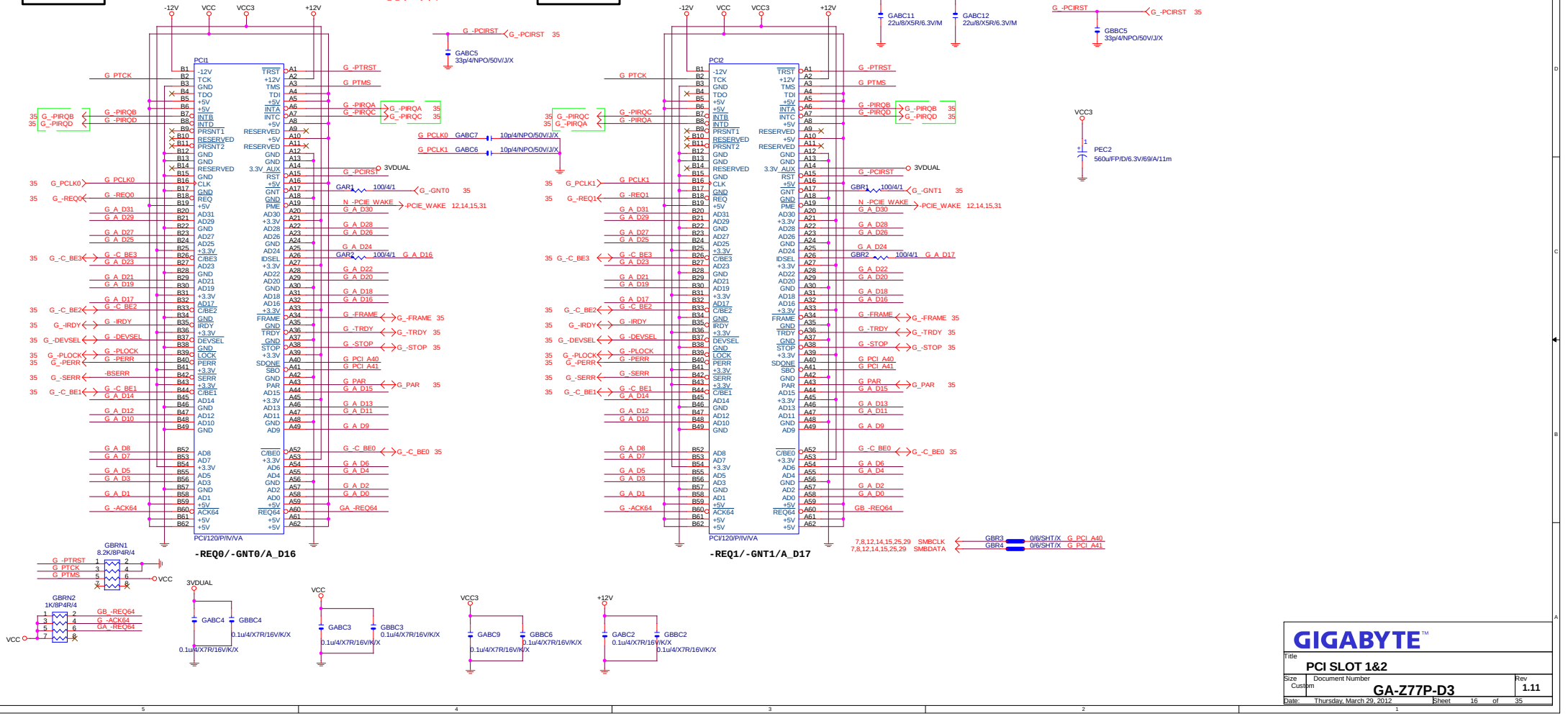
PCIE*1



Gigabyte Technology		
Title: PCI EXPRESS X 4 PORT		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 15 of 35	

PCI SLOT 1

PCI SLOT 2



Title	PCI SLOT 1&2		
Size: Custom	Document Number: GA-Z77P-D3		Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 16 of 35		

HI FOR PCH ERP
LO FOR IO ERP

FOR DDR OC :PULL HI

IT8728F(GB)

IT8728F/EX (GB)/QFP128

VIN2/3:UNUSE:PULL HI

For IT8721 Power leakage

EUP FROM PCH

internal power pin, max 22nF cap---->2uf for 8728 低溫相容性

EUP control detect

Only For Push-Pull Mode

Hi :Disable WDT
Lo :Enable WDT to rest PWROK

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

JP6:N\A FOR 8728 DX
JP6:PULL DOWN FOR 8728 EX
anti-surge enable

	IT8721	IT8728
PIN121	FAN_CTL4/VID_TURBO	VCORE_EN/PCH_C0
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/DRVB#/PCH_C	PECI/AMDTSI_C/DRVB#
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(VCC12)	VIN0/VCORE(1.1V)

JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3 JP5	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
	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.

Gigabyte Technology

Title: ITE 8728 LPC IO

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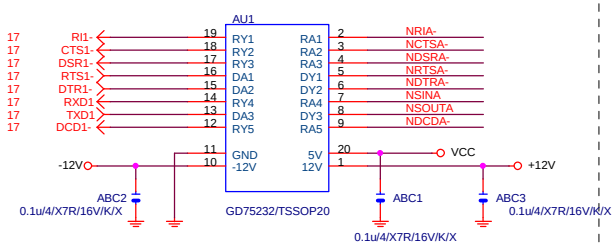
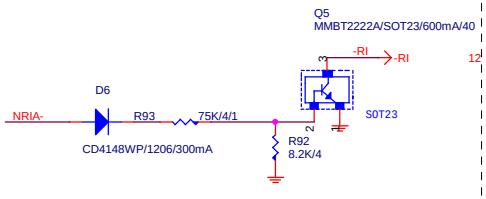
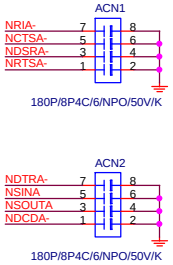
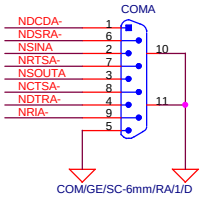
COMA



COM RI

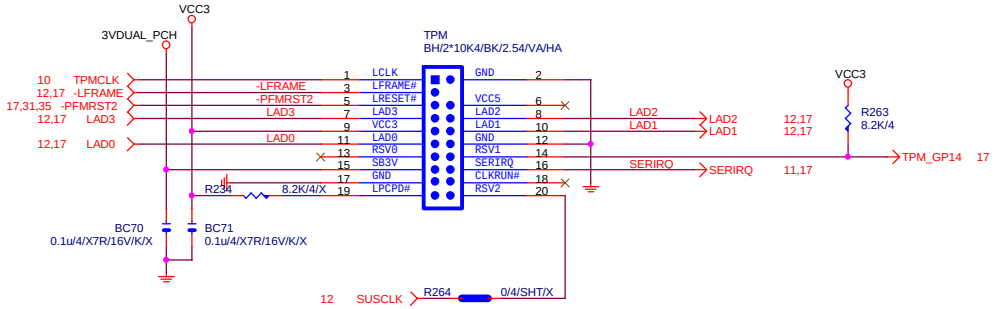




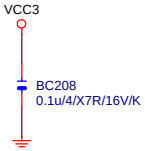


LPT PORT

TPM



Gigabyte Technology		
Title: COM & Print		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 18 of 35	

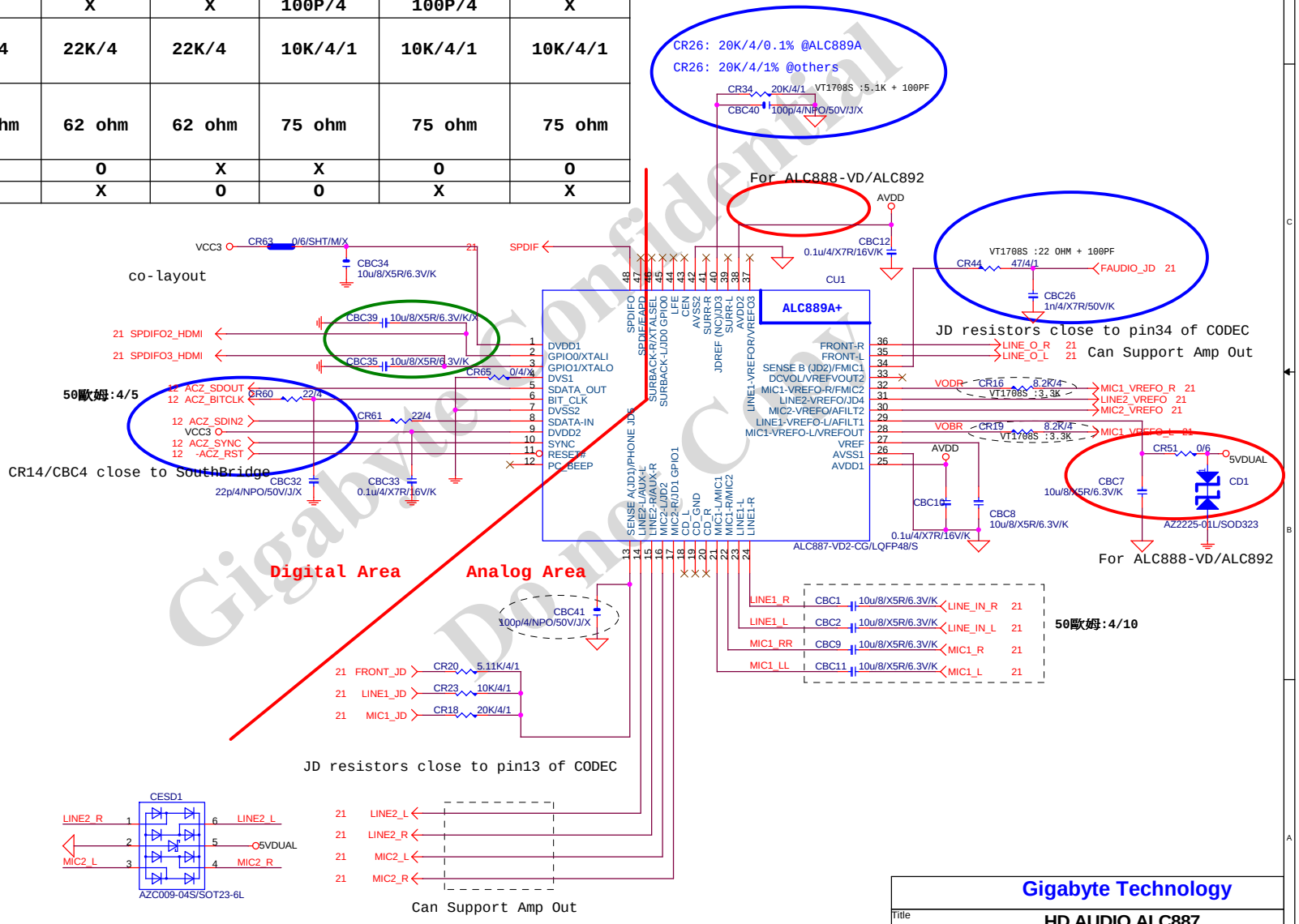


1 means floating
0 means PD 1K

Gigabyte Technology		
Title: BIOS		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 19 of 35	

AZALIA CODEC *ALC887-VD2/ALC889/VT1708S/VT1708SCE/VT2021 Config*

	ALC662	ALC887-VD2	ALC889	VT1708S-CD	VT1708S-CE	VT2021
CR65	X	X	O	O	X	O
CBC35	O	O	X	X	O	X
CR44/CBC26	47ohm+1nF	47ohm+1nF	47ohm+1nF	22ohm+100P	22ohm+100P	47ohm+1nF
CR31	X	O	O	O	O	O
CR30	O	X	X	X	X	X
CBC1/CBC2	10uF/X5R	10uF/X5R	22uF/X5R	10uF/X5R	10uF/X5R	10uF/X5R
CR20	5.11K/4/1	5.11K/4/1	5.11K/4/1	5.1K/4/1	5.1K/4/1	5.1K/4/1
CR34	20K/4/1	20K/4/1	20K/4/1	5.1K/4/1	20K/4/1	5.1K/4/1
CBC40/CBC41	X	X	X	100P/4	100P/4	X
CR6/CR7/CR58/CR54	22K/4	22K/4	22K/4	10K/4/1	10K/4/1	10K/4/1
CR5/CR8/CR1/CR14/CR17/CR22/CR13/CR11/CR57/CR53	62 ohm	62 ohm	62 ohm	75 ohm	75 ohm	75 ohm
CR51/CD1/CBC7	O	O	X	X	O	O
CD2/CD3/CQ5/CQ5	X	X	O	O	X	X



Gigabyte Technology		
Title	HD AUDIO ALC887	
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
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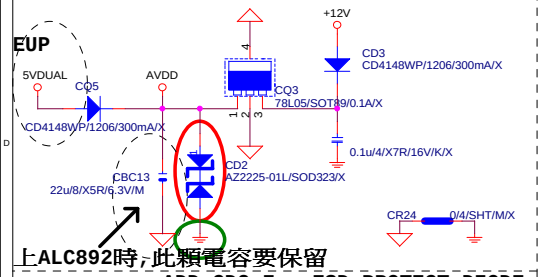
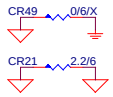
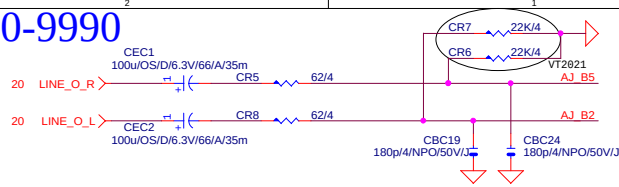
CODEC POWER/EMI PAD



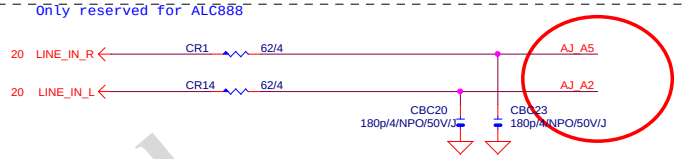


LINE-OUT



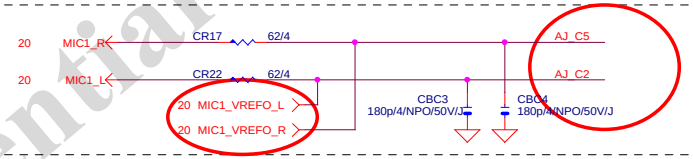
LINE-IN

Only reserved for ALC888

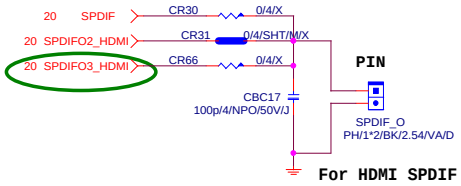


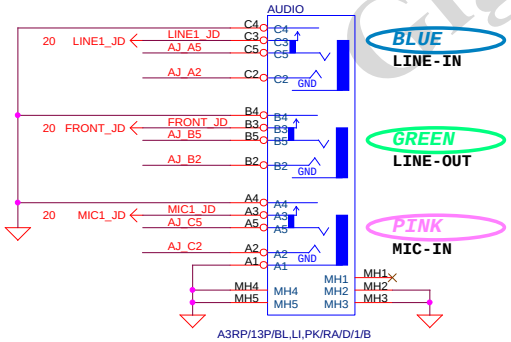
Verify MIC function in LINE-in

MIC-IN

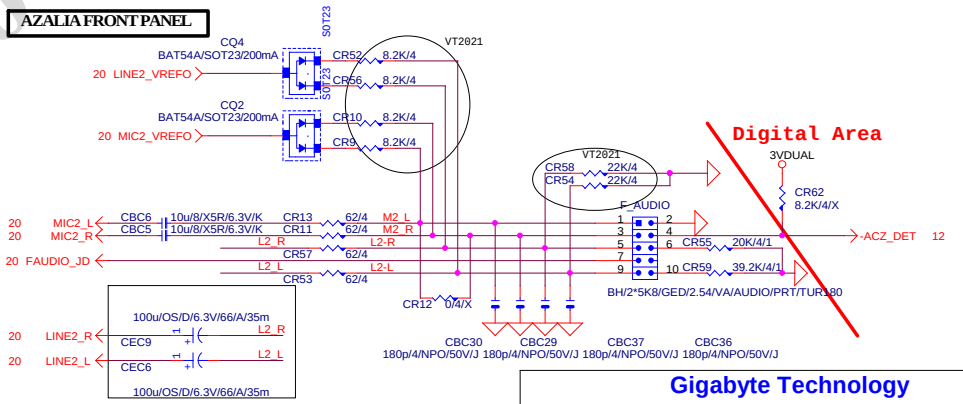


SPDIF_OUT

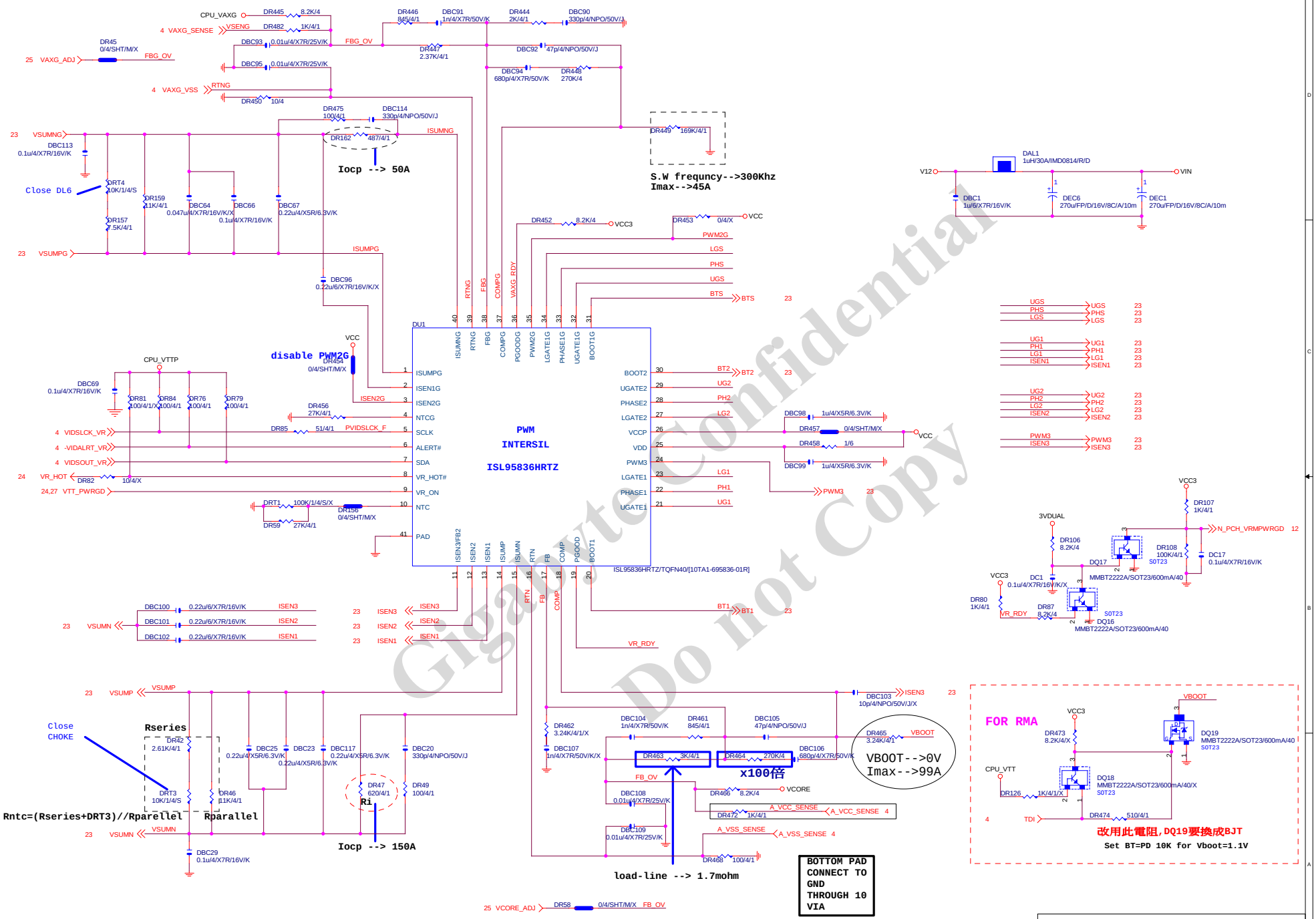


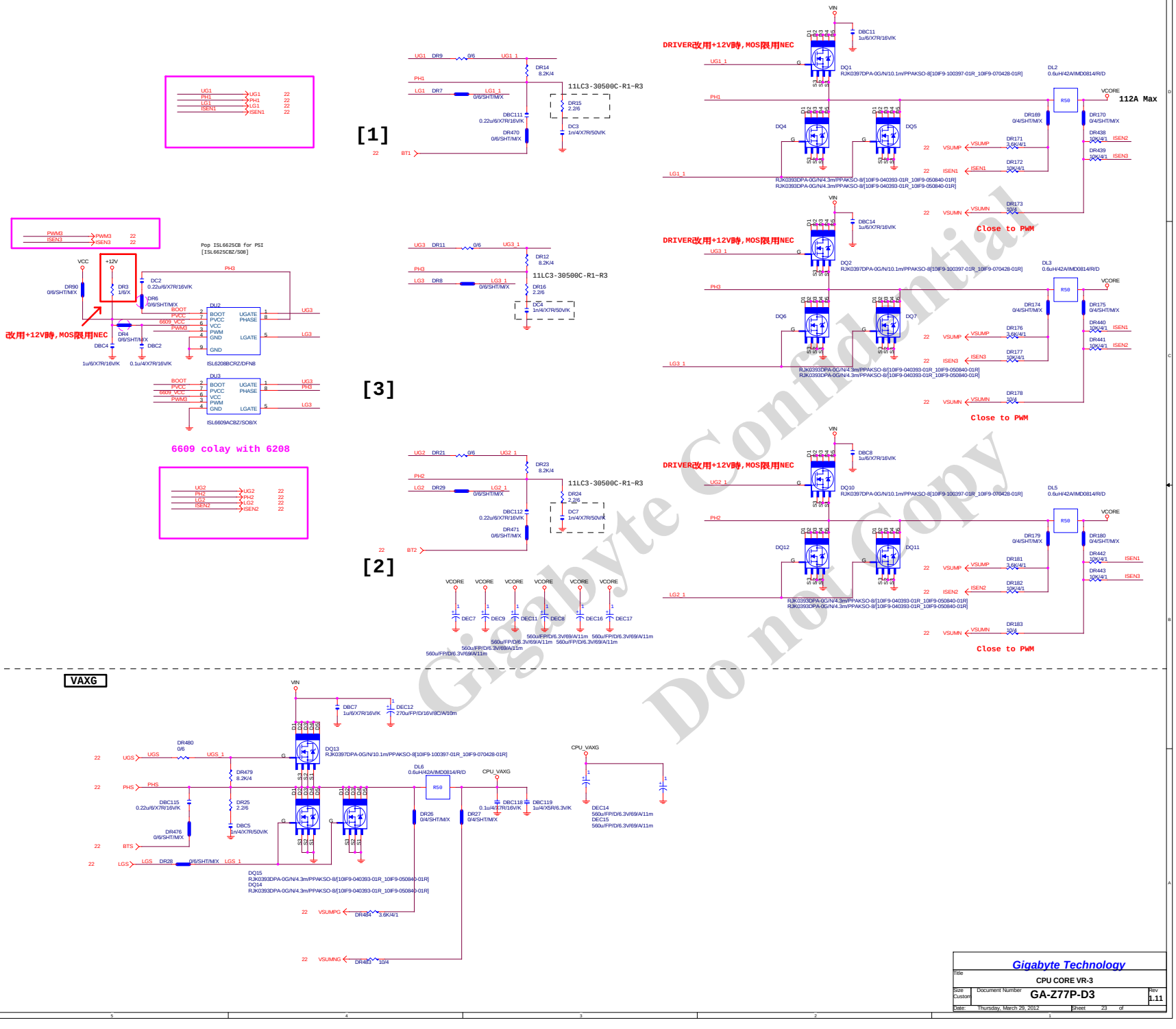


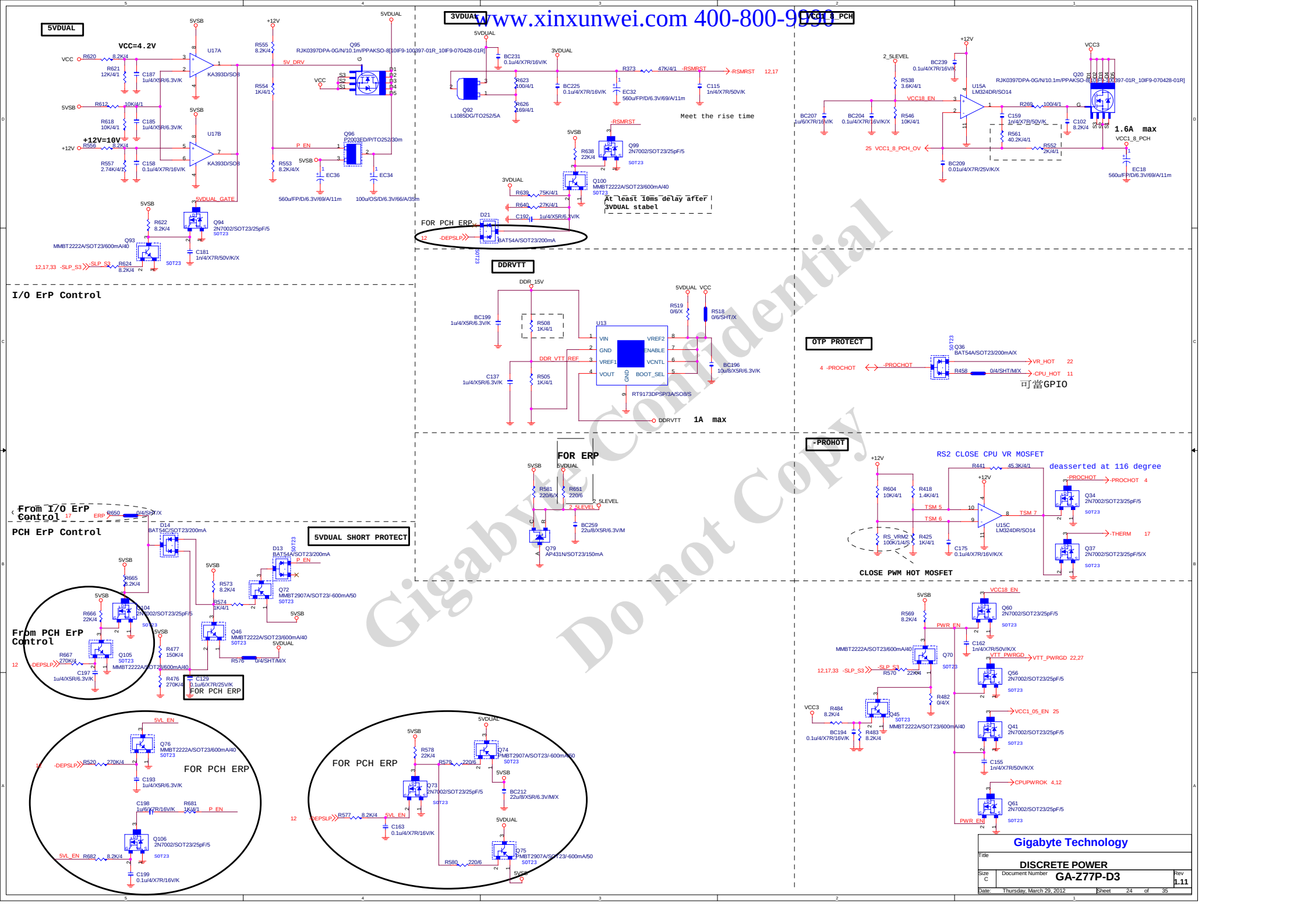
AZALIA FRONT PANEL



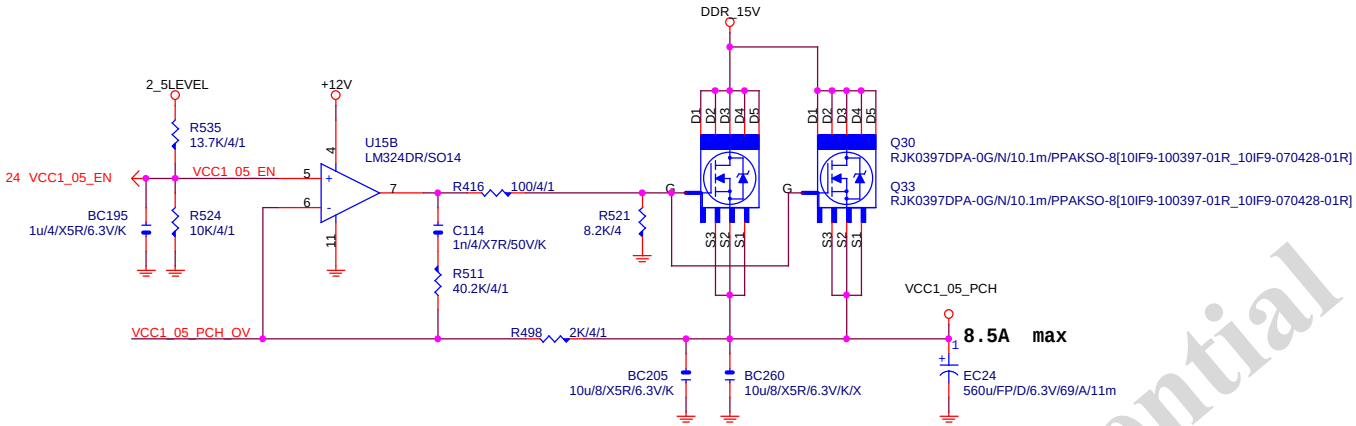
Gigabyte Technology		
Title: AUDIO JACK		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 21 of 35	







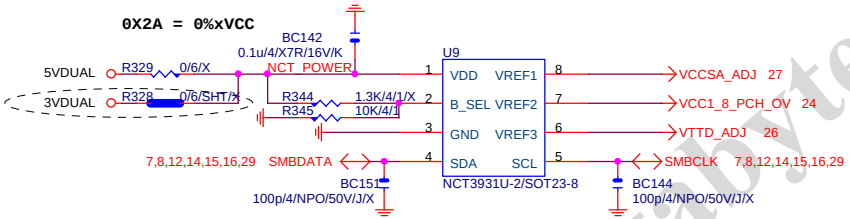
VCC1_05_PCH



Voltage console

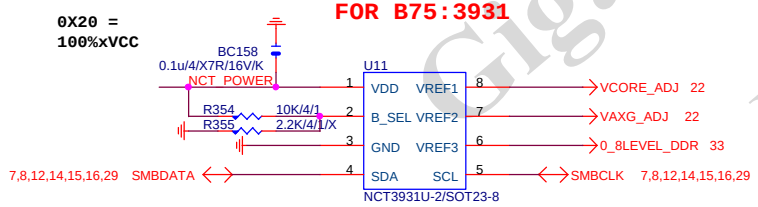
ADDRESS	0X2A	0X20	0X22	0X26
R1(K)	OPEN	10	1.3	3
R2(K)	10	OPEN	3.9	2.2
%VCC	0	100	75	42

0X2A = 0%xVCC



FOR B75:3931

0X20 = 100%xVCC



up6262	0X2A	0X20
VREF1	VCC1_05_PCH	VCORE
VREF2	VCC1_8_PCH	VCCSA
VREF3	CPU_VTT	DDR

Gigabyte Technology

Title: PCH CORE / VOLTAGE CONSOLE

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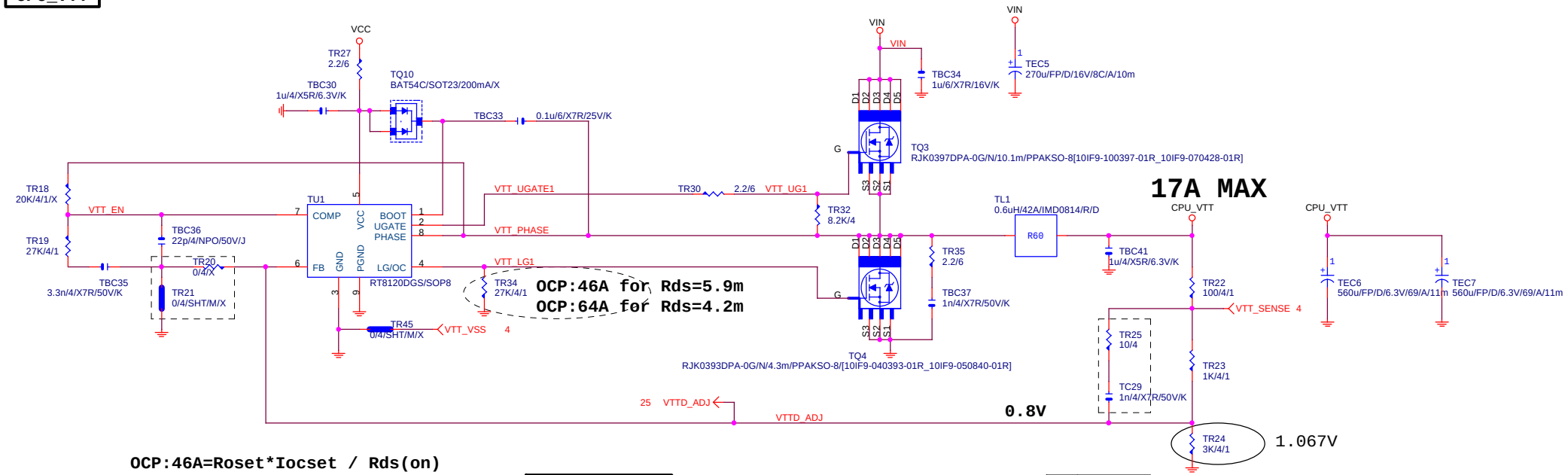
CPU_VTT

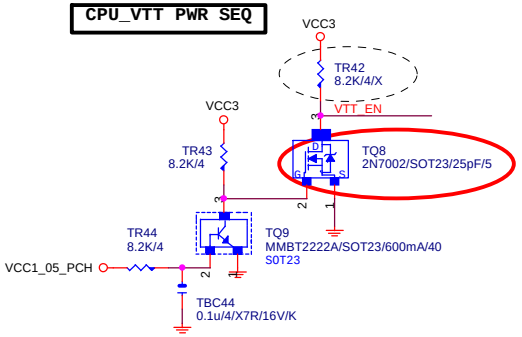


OCP:46A=Roset*Iocset / Rds(on)
=27K*10uA / 5.9m

	VTT_SEL
HI	1.05V
LO	1.0V

According intel CDI/IBP#476733,固定1.05V

CPU_VTT PWR SEQ



GIGABYTE™

Title: RT8120_CPU_VTT		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
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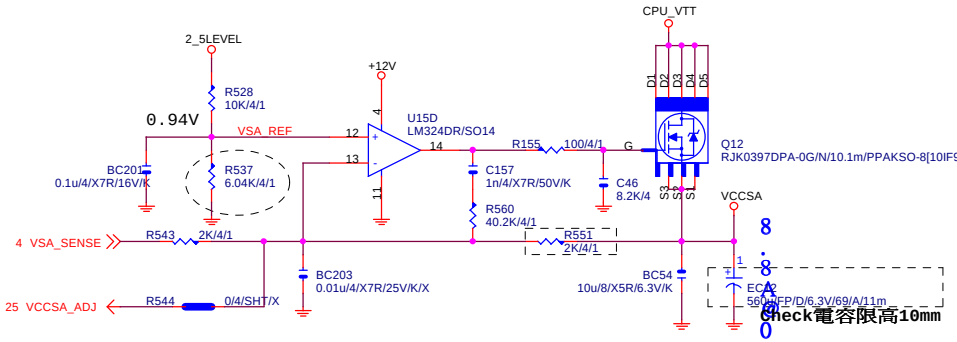
VCC_SA

Check電容限高10mm



8.8A
0.85/0.925V

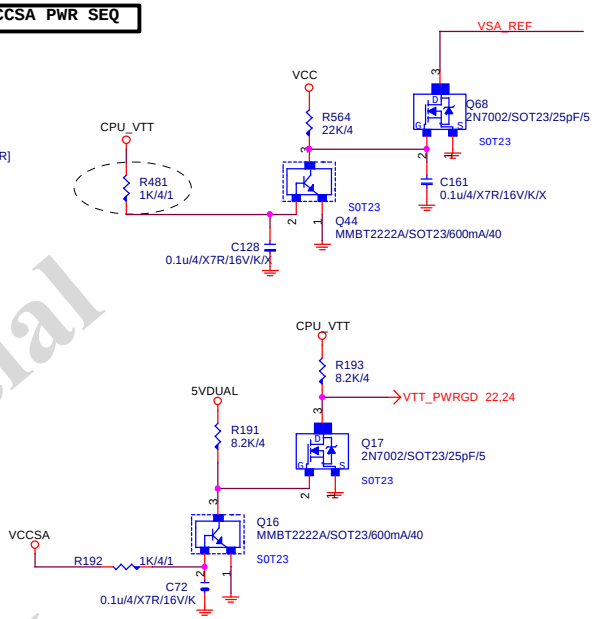
Check電容限高10mm

PDG 1.01

	VSA_SEL
HI	0.85V
LO	0.925V

According intel
CDI/IBP#476733,固定0.925V

VCCSA PWR SEQ



Gigabyte Technology

Title: VCCSA POWER

Size: Custom | Document Number: GA-Z77P-D3 | Rev: 1.11

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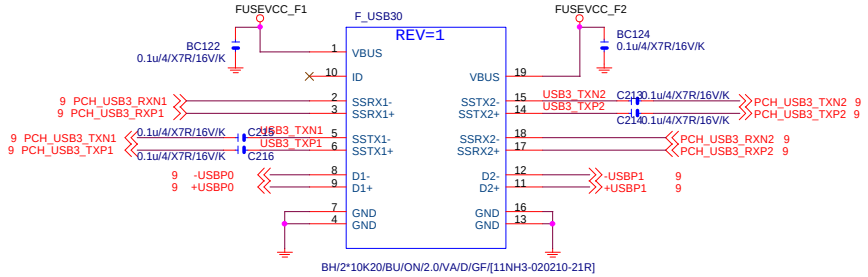
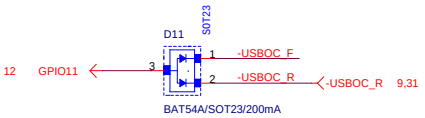
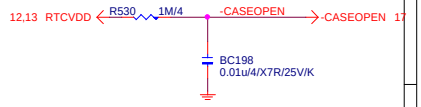
FRONT USB1

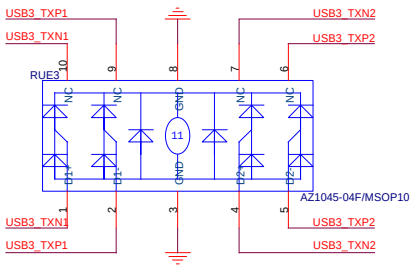


F_USB POWER PROTECT

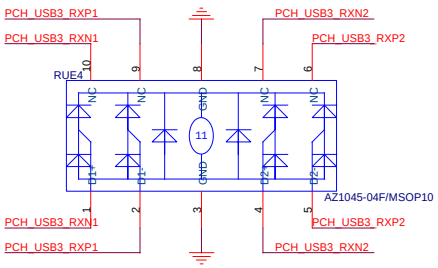


CASE OPEN

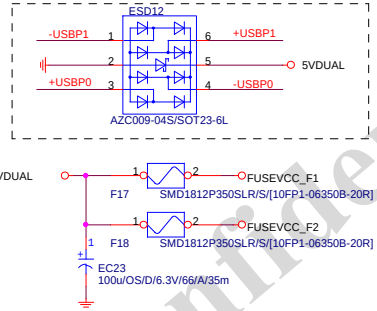




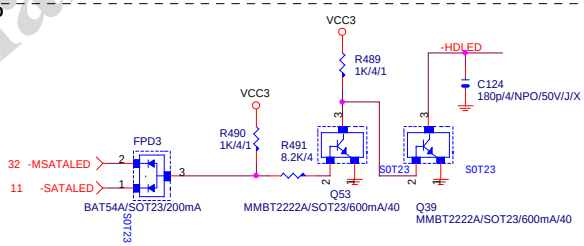
ESD Close to connector



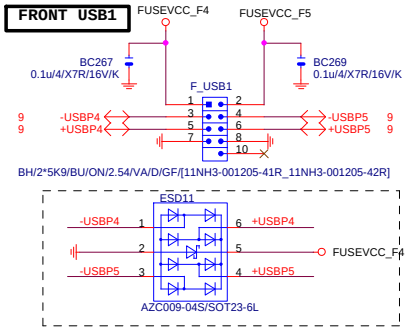
ESD Close to connector



SATA LED

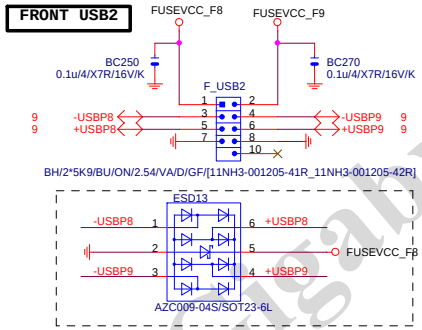


FRONT USB1

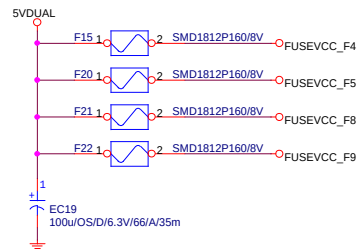


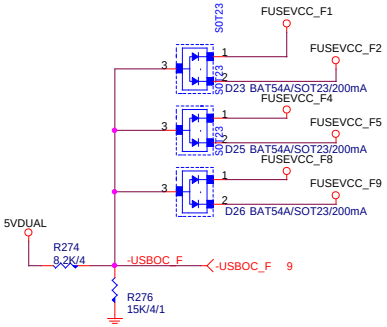
ESD Close to connector

FRONT USB2

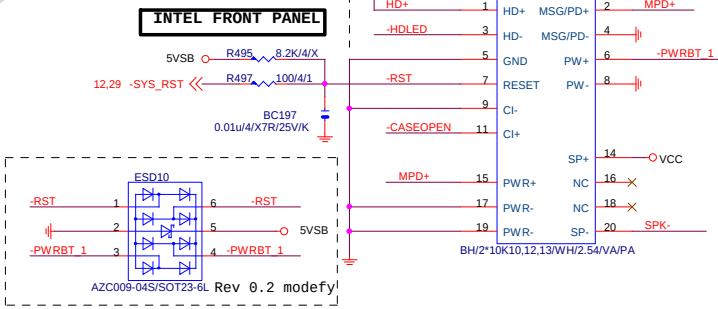


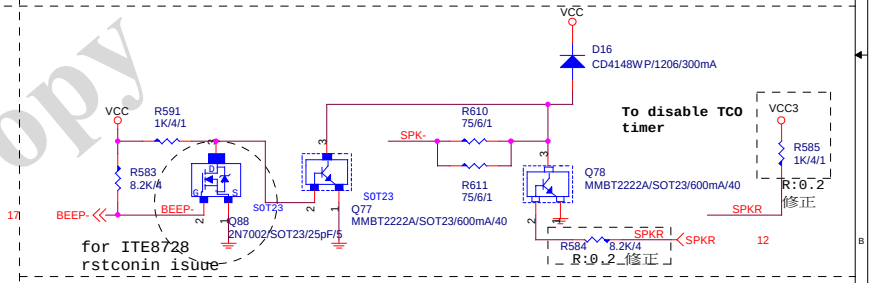
ESD Close to connector

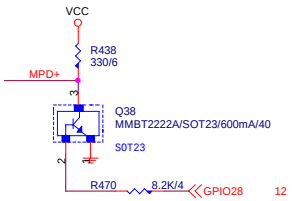




INTEL FRONT PANEL







Gigabyte Technology			
Title: FP,F_USB,USB PWR,FDD,BZ			
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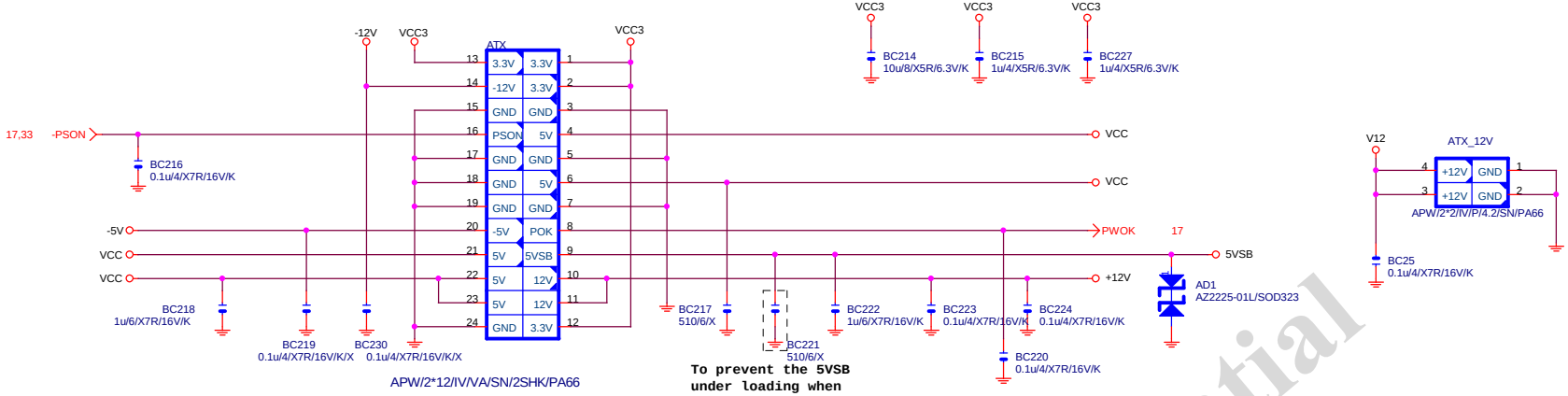
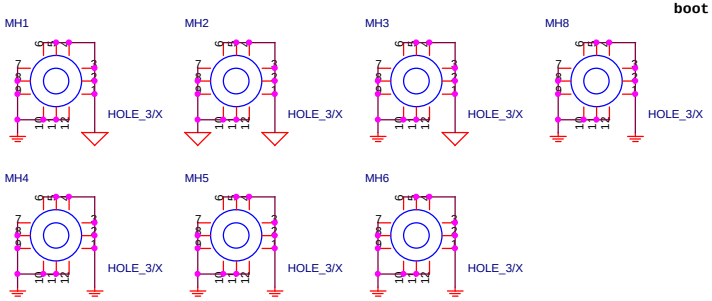
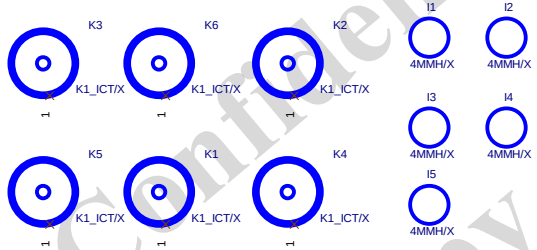
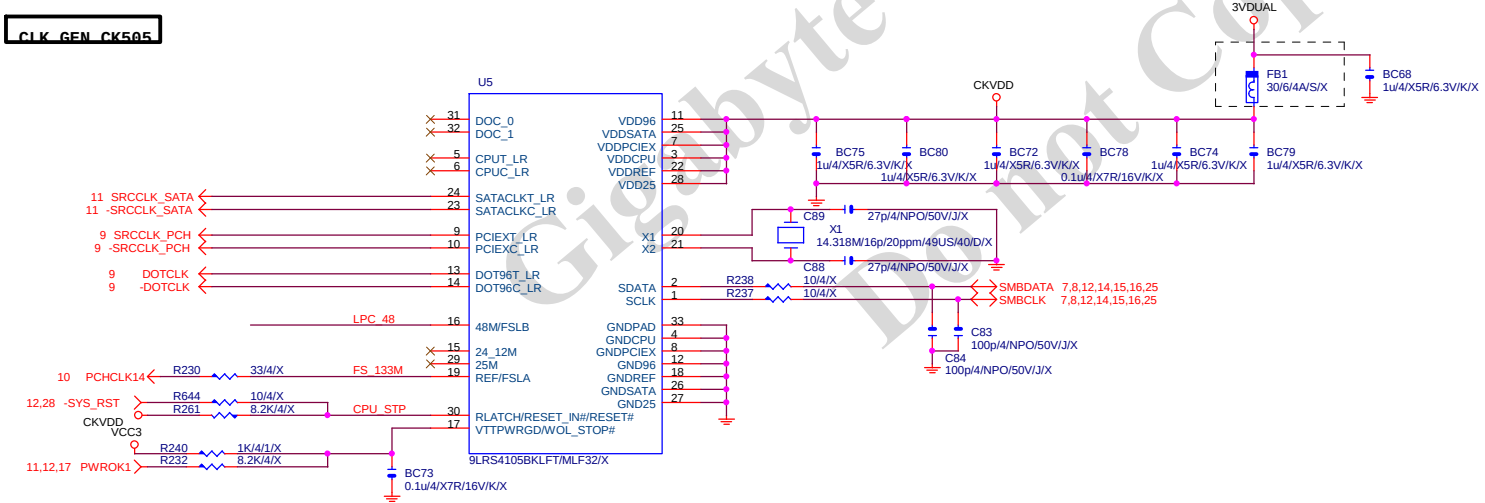
ATX POWER CONNECTOR

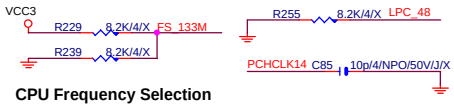






CLK_GEN_CK505





CPU Frequency Selection

FS	CPU
0	100M <Default>
1	133M

Gigabyte Technology	
Title	ATX POWER CONNECTOR
Size: Custom	Document Number: GA-Z77P-D3
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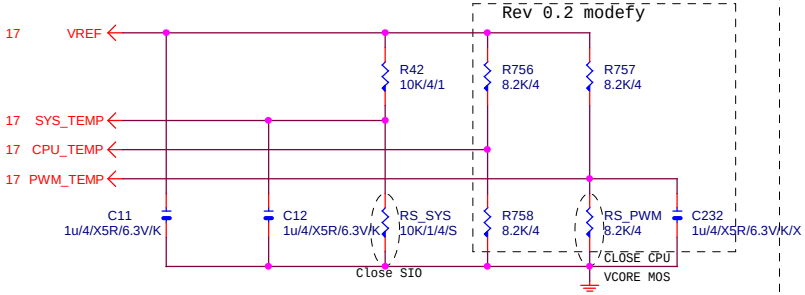
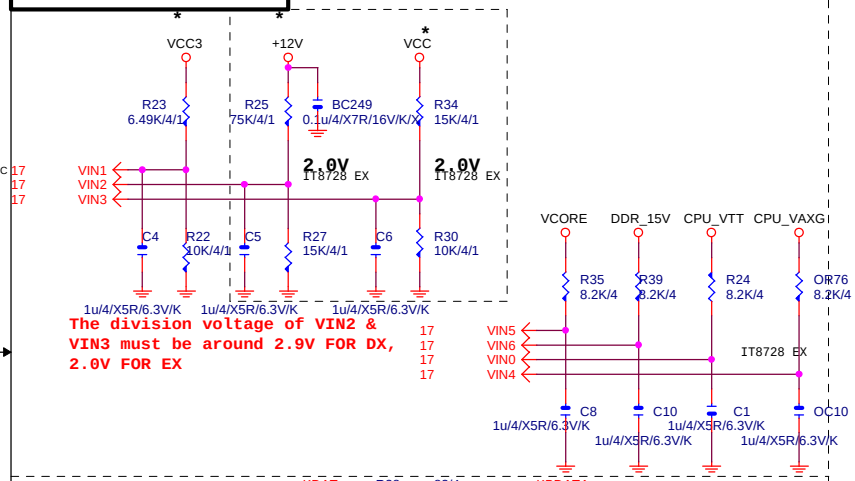
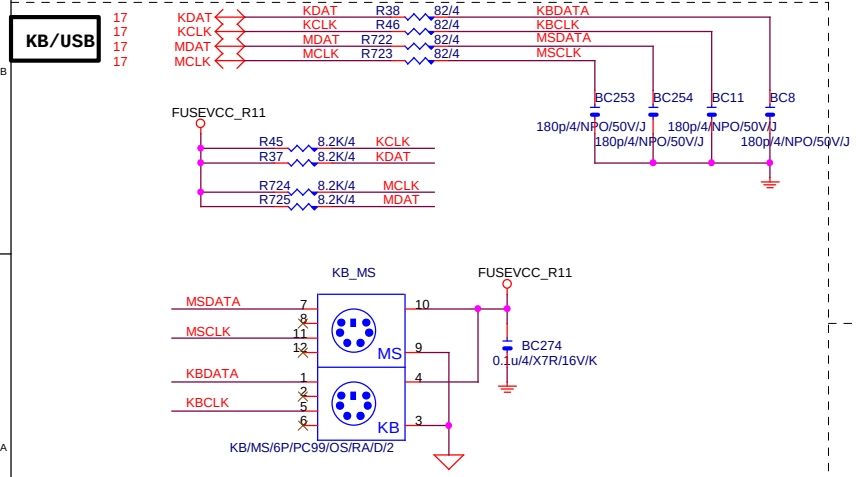
TEMP H/W MONITOR



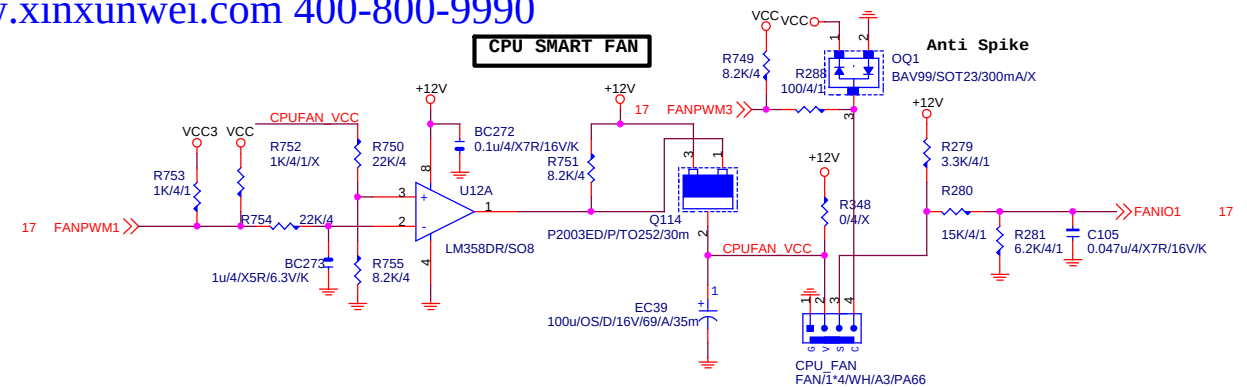
VOLTAGE-- H/W MONITOR

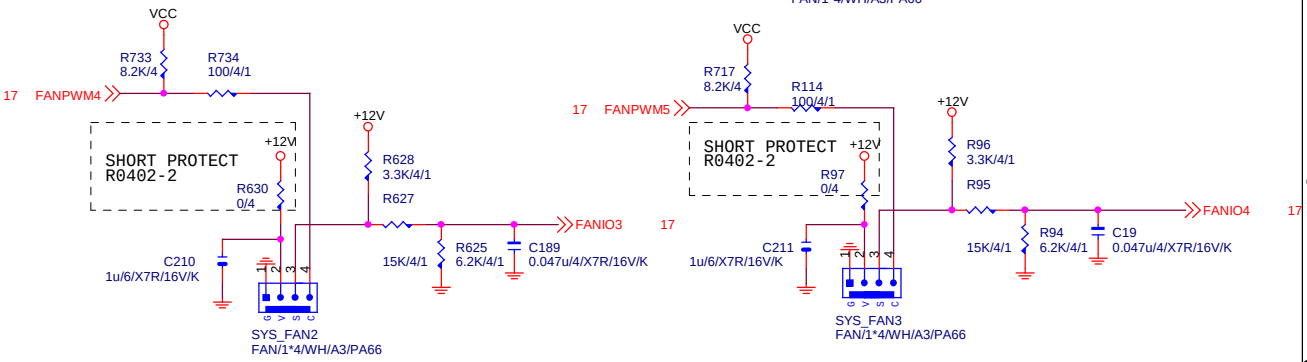


KB/USB



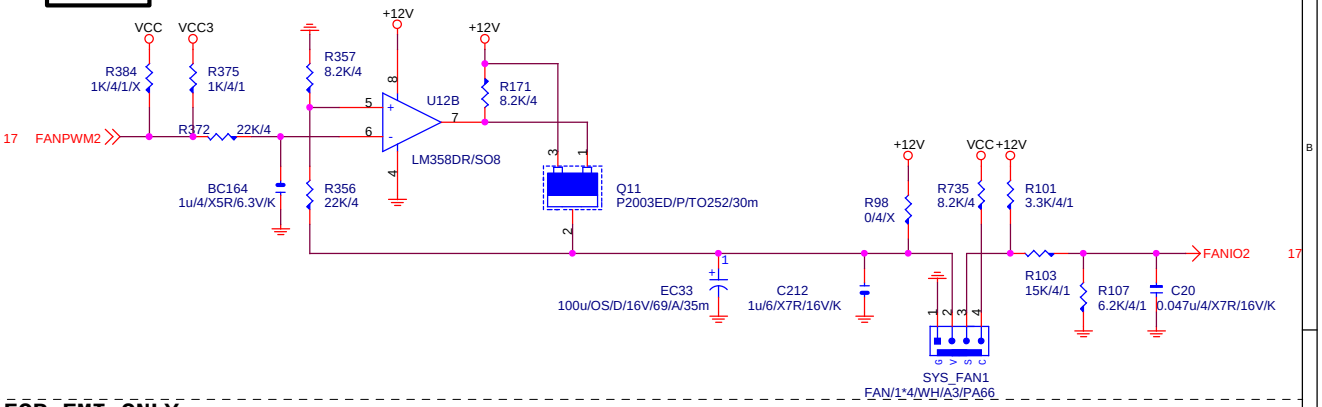
CPU SMART FAN



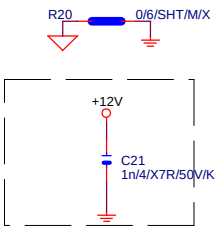


SYS FAN

Linear SYS_FAN



FOR EMI ONLY



Gigabyte Technology		
Title: HWM,KB/MS, FAN CTRL		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
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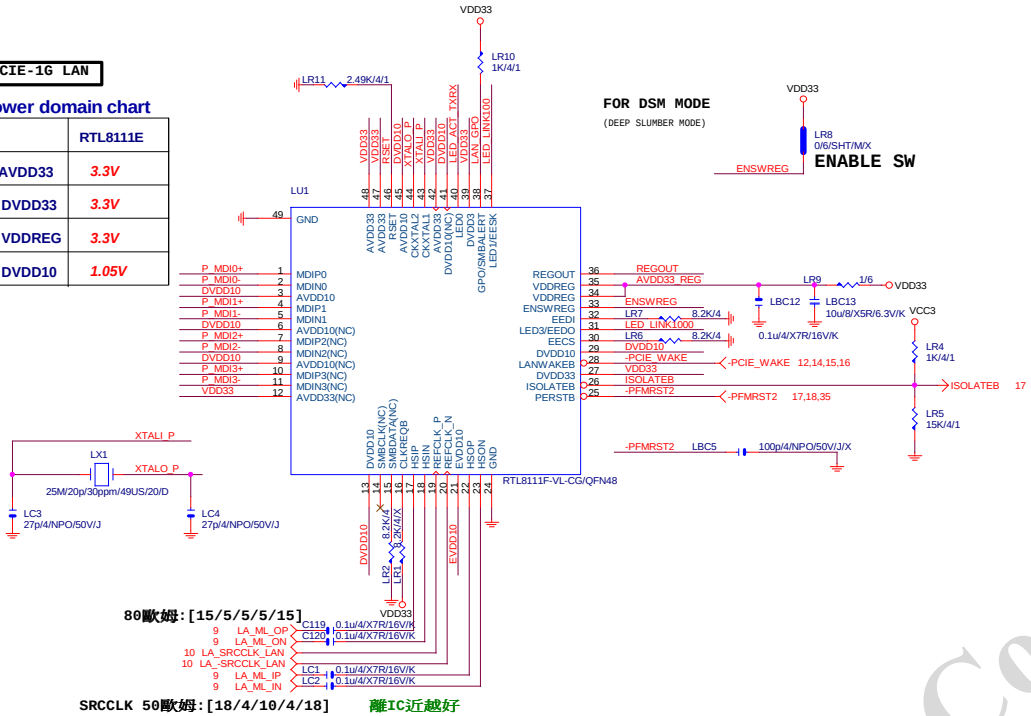
PCIE-1G LAN

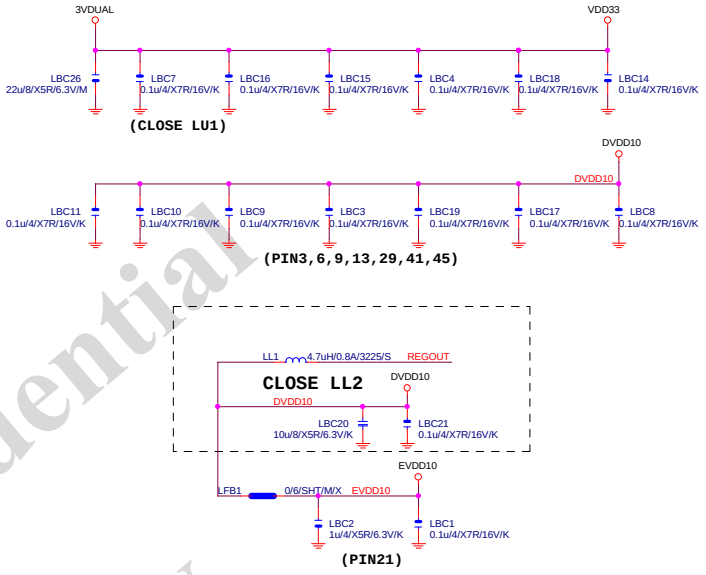
PCIE-1G LAN

Power domain chart

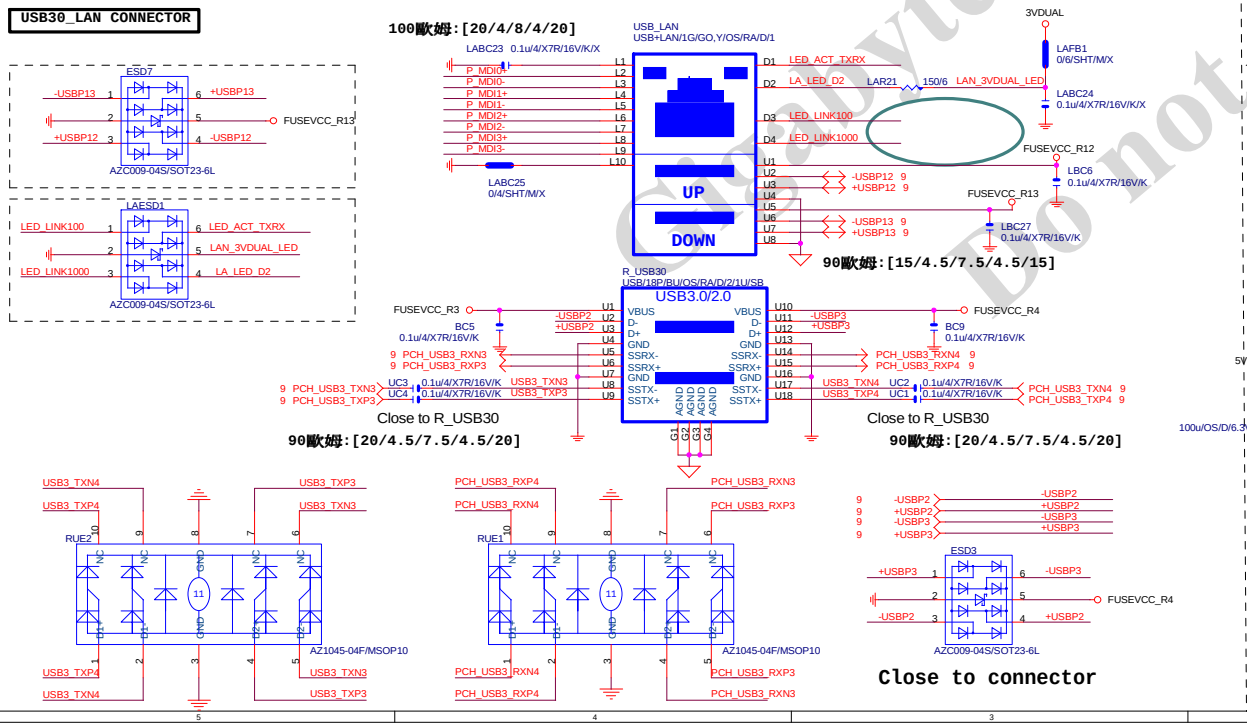
	RTL8111E
AVDD33	3.3V
DVDD33	3.3V
VDDREG	3.3V
DVDD10	1.05V

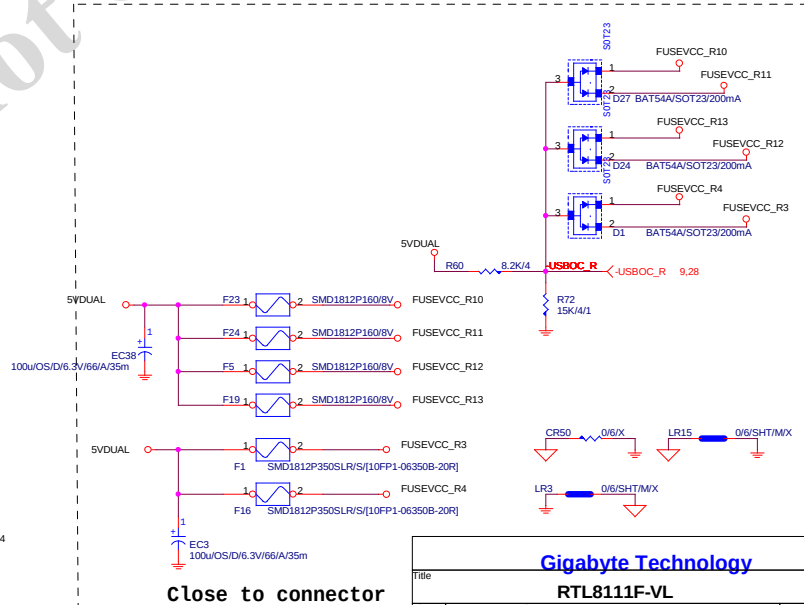


LAN POWER



USB30_LAN CONNECTOR





Title	RTL8111F-VL
Size / Document Number	Custom / GA-Z77P-D3
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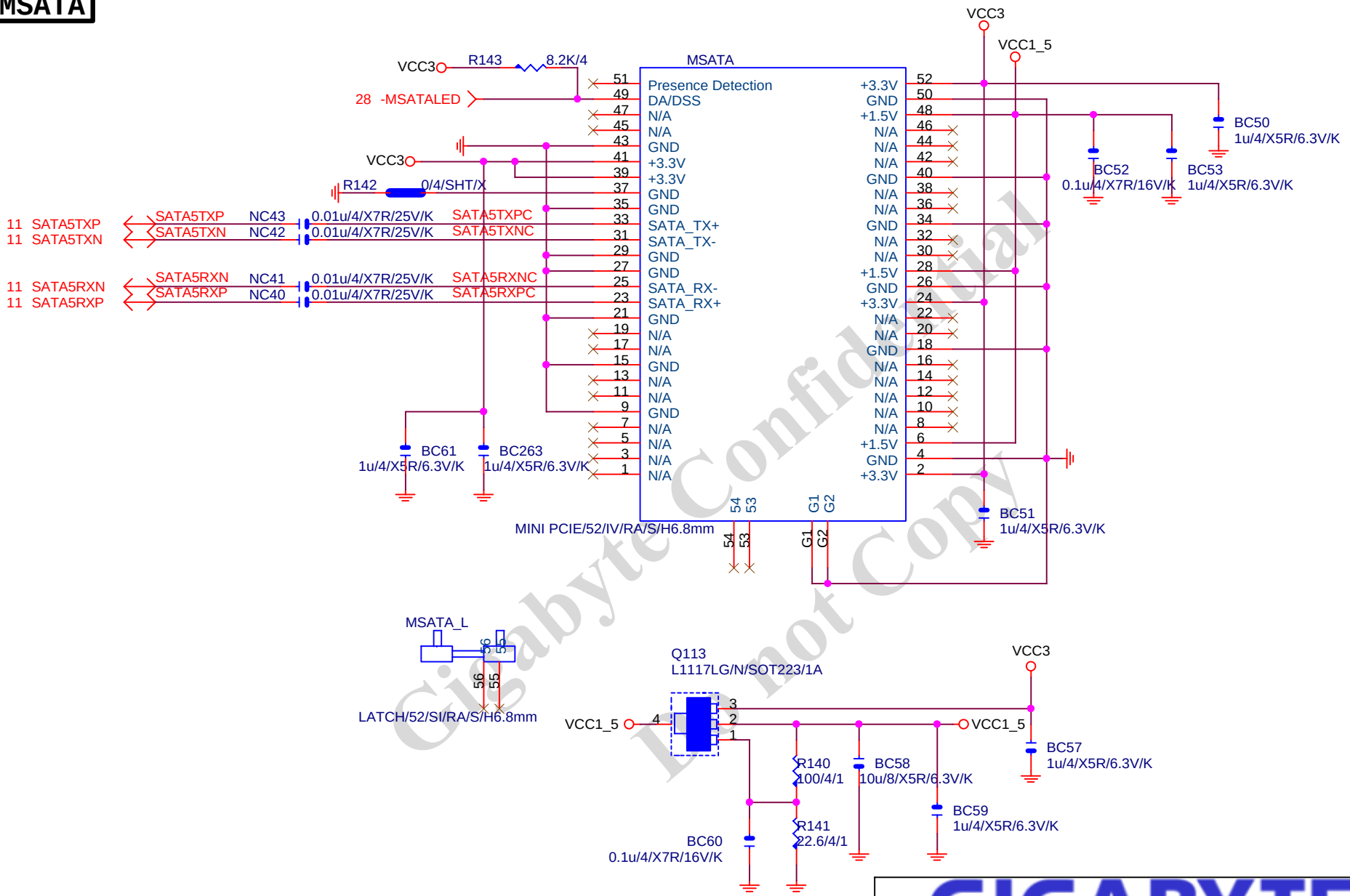
Gigabyte Technology

MSATA



GIGABYTE™

Title: MSATA		
Size: A	Document Number: GA-Z77P-D3	Rev: 1.11
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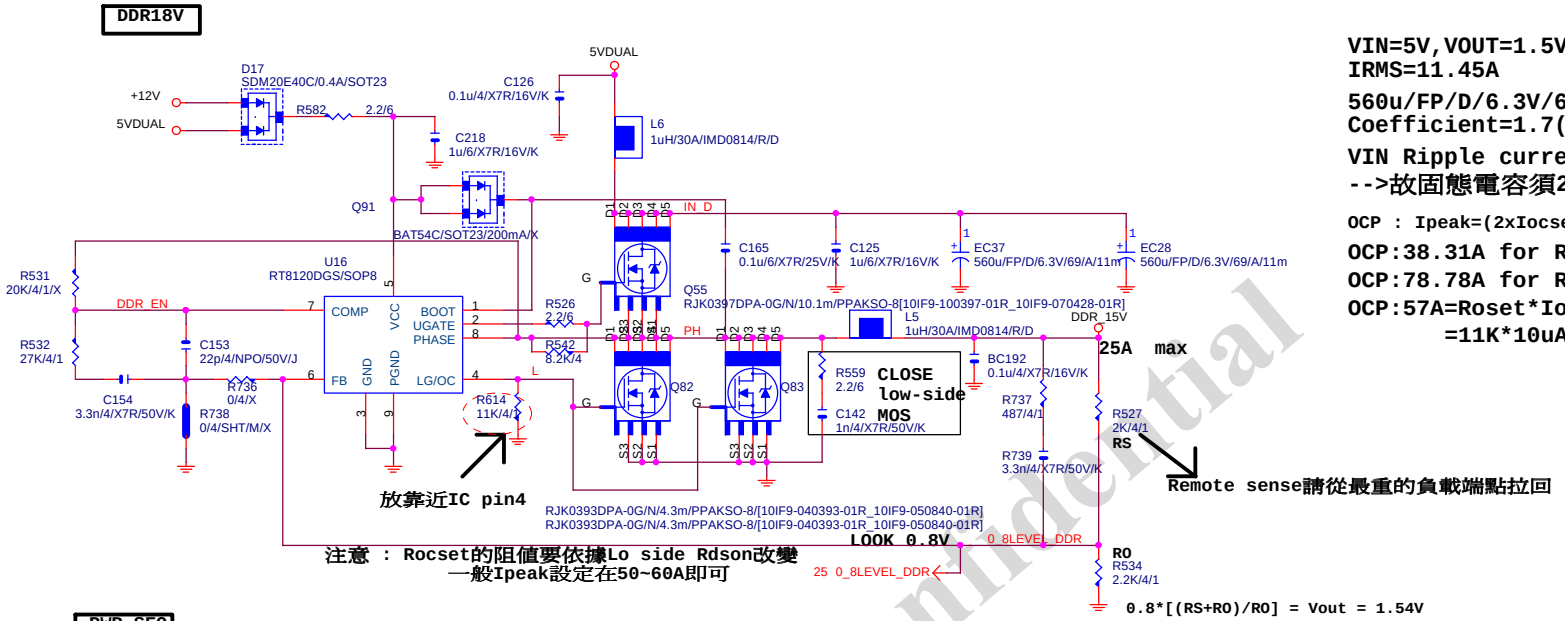


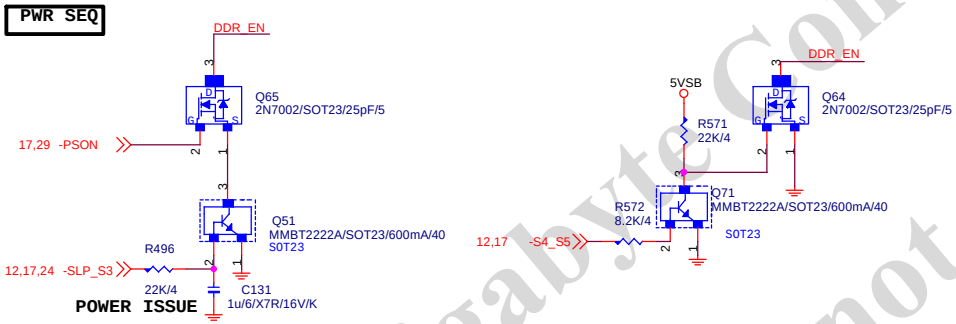
VIN=5V,VOUT=1.5V,IOUT=25A,PHASE=1
IRMS=11.45A

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

VIN Ripple current=4.7X1.7=7.99A(85℃)
-->故固態電容須2X7.99=15.98>11.45A

OCP : Ipeak=(2xIocsetxRocset)/Rdson

OCP:38.31A for Rds=6.7m for vishay@4.5V
OCP:78.78A for Rds=3.3m for renesas@10V
OCP:57A=Roset*Iocset / Rds(on)
=11K*10uA / [5//5]



GIGABYTE™

Title: RT8120		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
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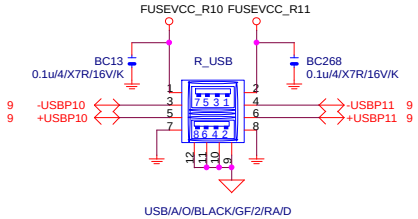
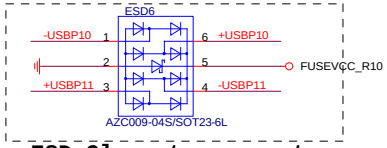
R_USB

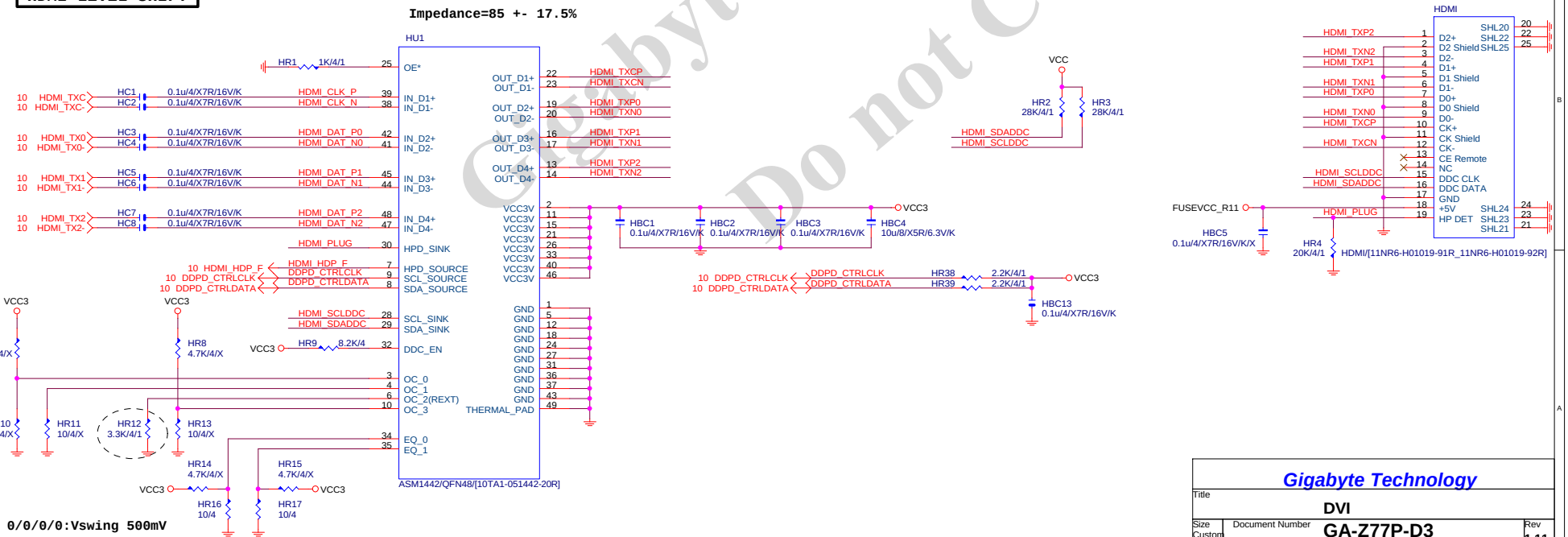




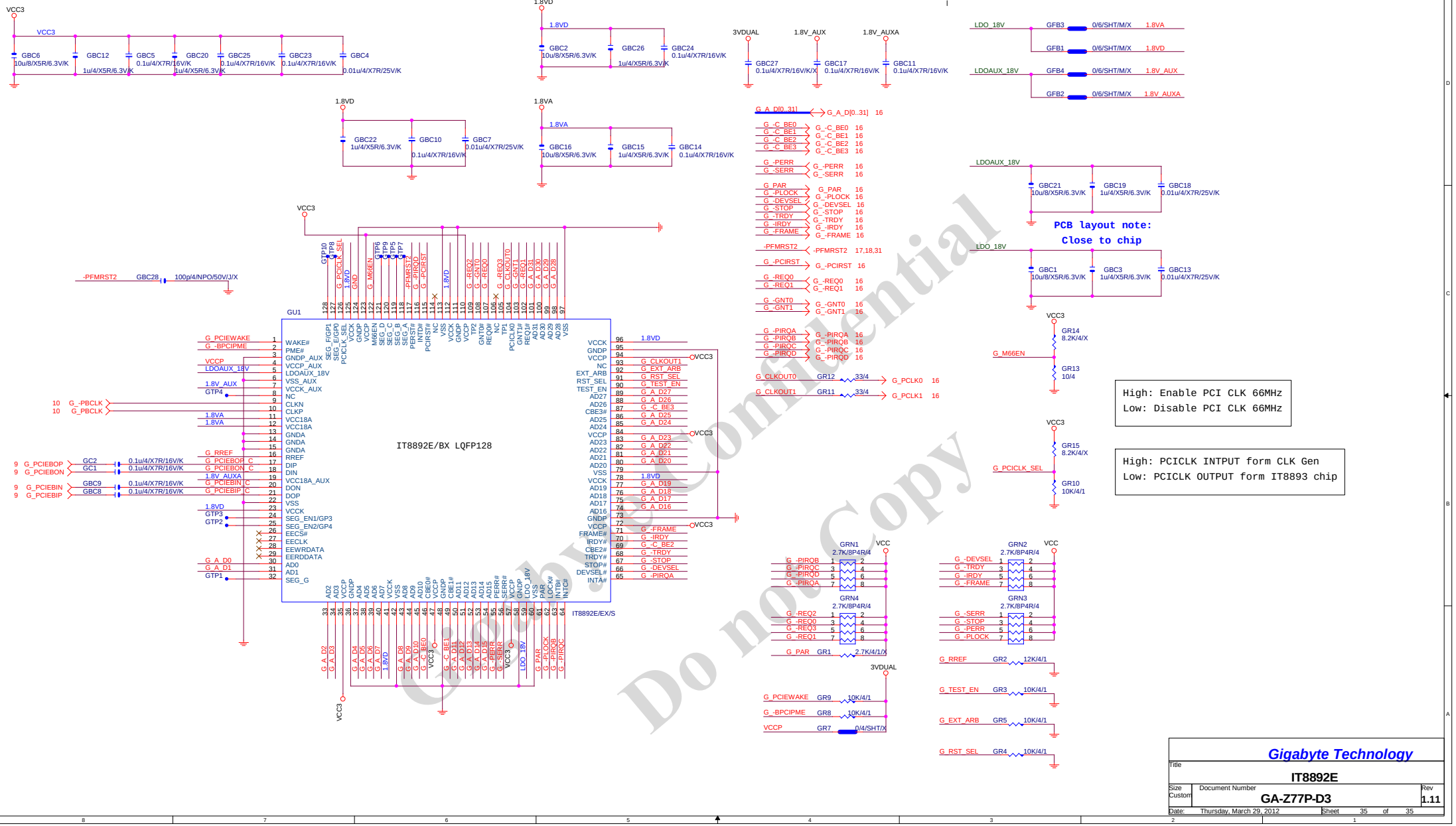
ESD Close to connector

HDMI LEVEL SHIFT

HDMI:20/4/6/4/20
Impedance=85 +- 17.5%



Gigabyte Technology			
Title: DVI			
Size: Custom	Document Number: GA-Z77P-D3		Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 34 of 35		



Gigabyte Technology		
Title: IT8892E		
Size: Custom	Document Number: GA-Z77P-D3	Rev: 1.11
Date: Thursday, March 29, 2012	Sheet 35 of 35	