

Model Name: GA-Z77M-D3H

Revision 1.1

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 1,2
08	DDR III CHANNEL B 1,2
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 EXPRESS*1 SLOT
16	PCI EXPRESS*4 SLOT
17	PCI SLOT1
18	ITE 8728 LPC IO
19	COM,KB_USB,R_USB30
20	HWM,FAN CTRL,OV,-PROCHOT
21	DUAL BIOS
22	FP,FUSB,SPK,SATALED
23	VIA VT2021
24	REAR AUDIO JACK
25	ARTHEROS AR8161/AR8151
26	DISCRETE POWER
27	ATX,CLK GEN

SHEET

TITLE

28	RT8120_CPU_VTT
29	VCORE ISL95836_1
30	VCORE ISL95836_2
31	RT8120_DDR POWER
32	LPT,TPM
33	HDMI/DVI
34	IT8892E

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Title			Cover Sheet
Size	Document Number	GA-Z77M-D3H	
Custom			Rev 1.1
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Revision 1.1

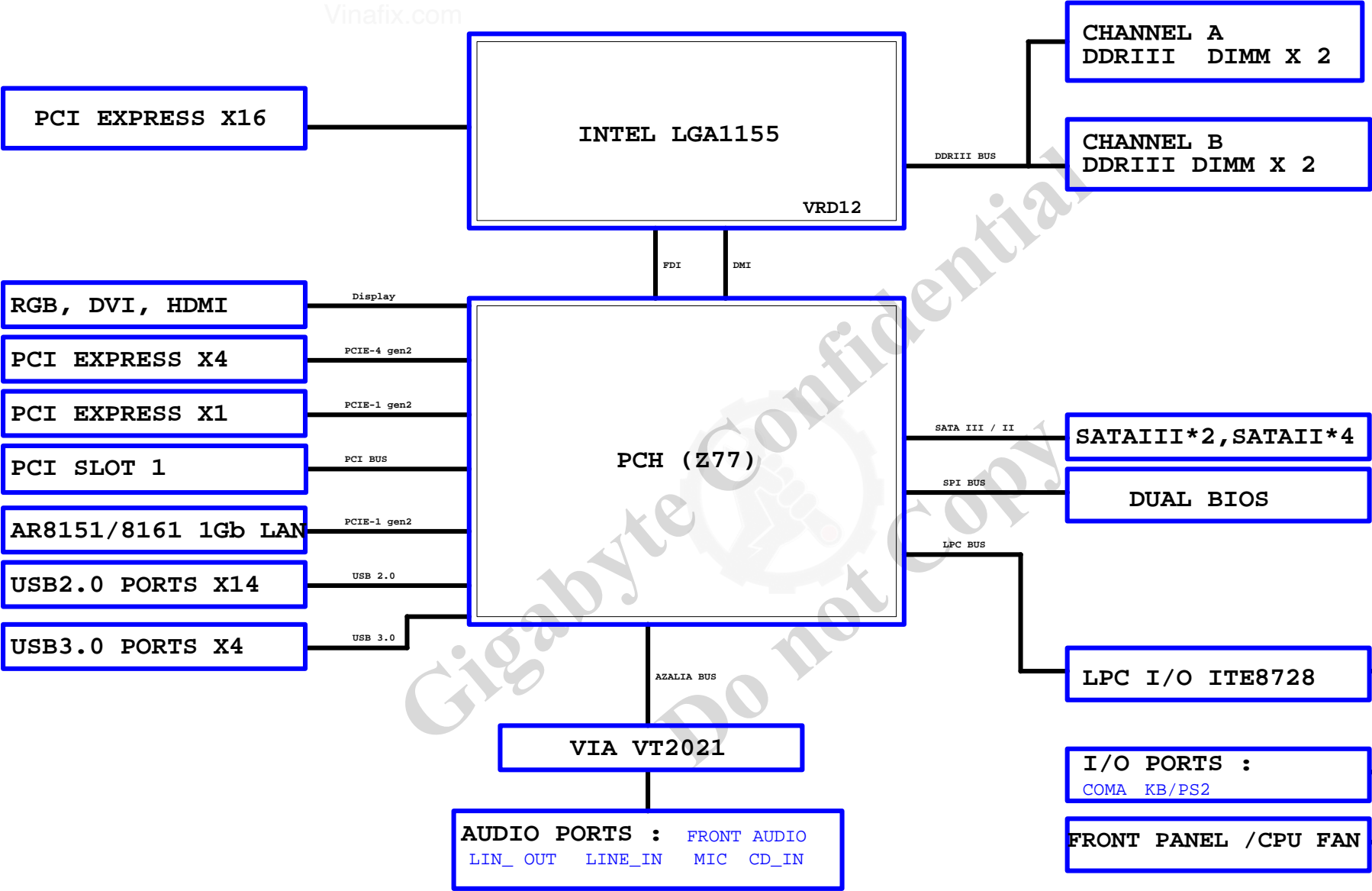
Circuit or PCB layout change

Component value change history

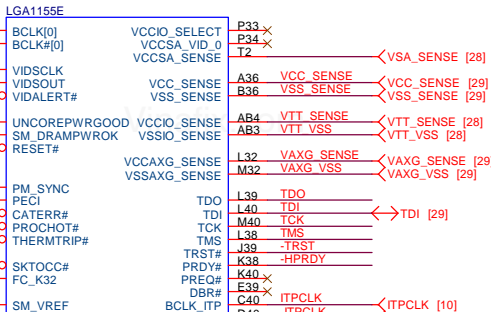
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BLOCK DIAGRAM

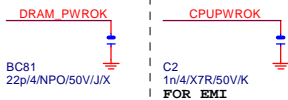


LGA1155E

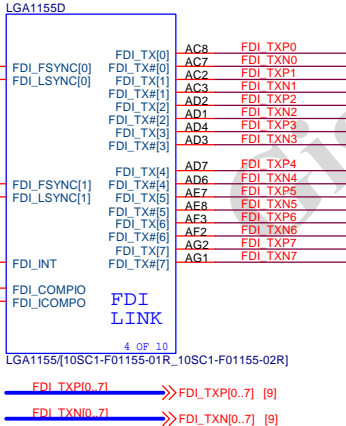


CFG	H	L	NOTE
0	RSVD	RSVD	RSVD
1	RSVD	RSVD	RSVD
2	RSVD	Reverse	LANE REVERSAL[0],x16
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4	RSVD	RSVD	RSVD
7	RSVD	RSVD	RSVD
8	RSVD	RSVD	RSVD
9	RSVD	RSVD	RSVD
10	RSVD	RSVD	RSVD
11	RSVD	RSVD	RSVD
12	RSVD	RSVD	RSVD
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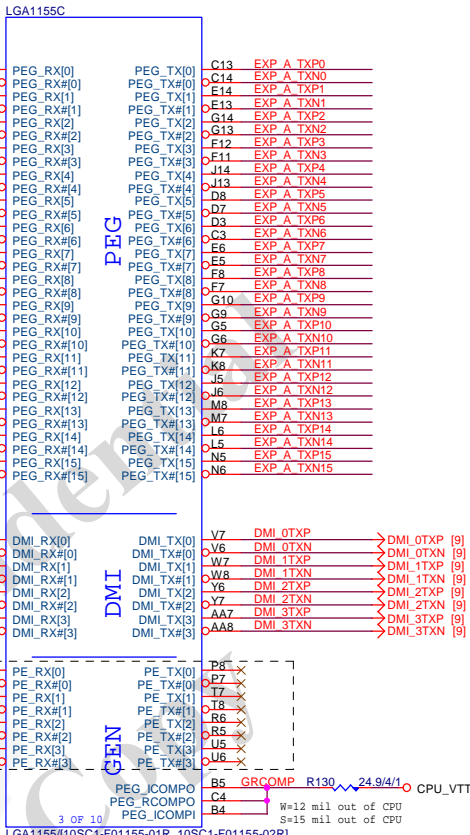
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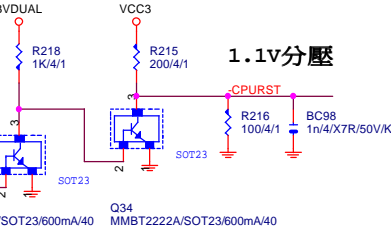
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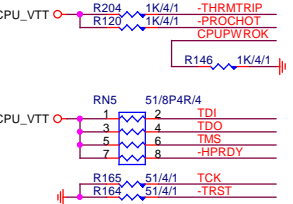
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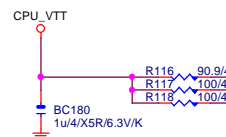
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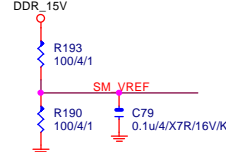
U/PD



VID



F



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Title			
CPU LGA1155-A			
Size	Document Number		Rev
Custom	GA-Z77M-D3H		1.1
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LGA1155A

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MAAA7	AU22	SA_MA[7]	SA_DQ[3]	AL4	MDA3
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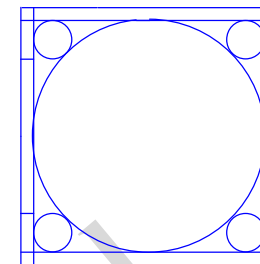
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DDR_1

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LGA1155(10SC1-F01155-01R_10SC1-F01155-02R)

CR
CPU RETENTION/X

LGA1155_P

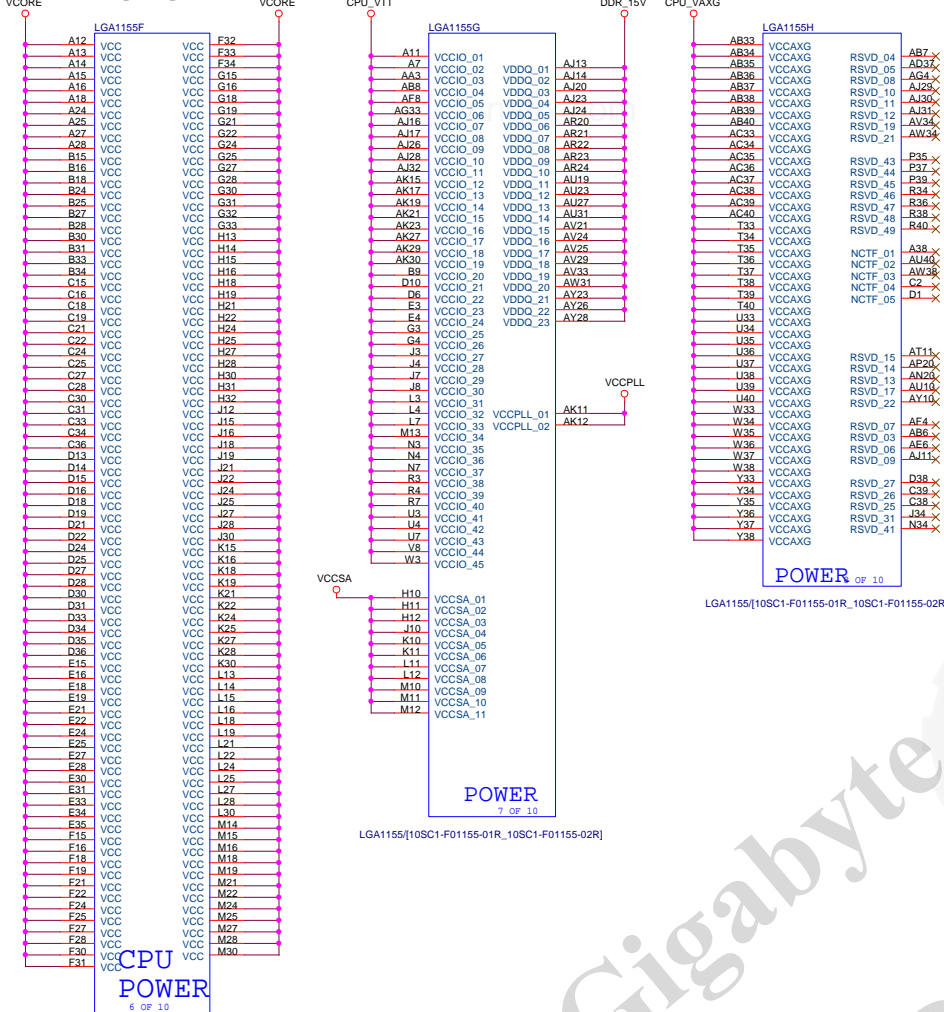


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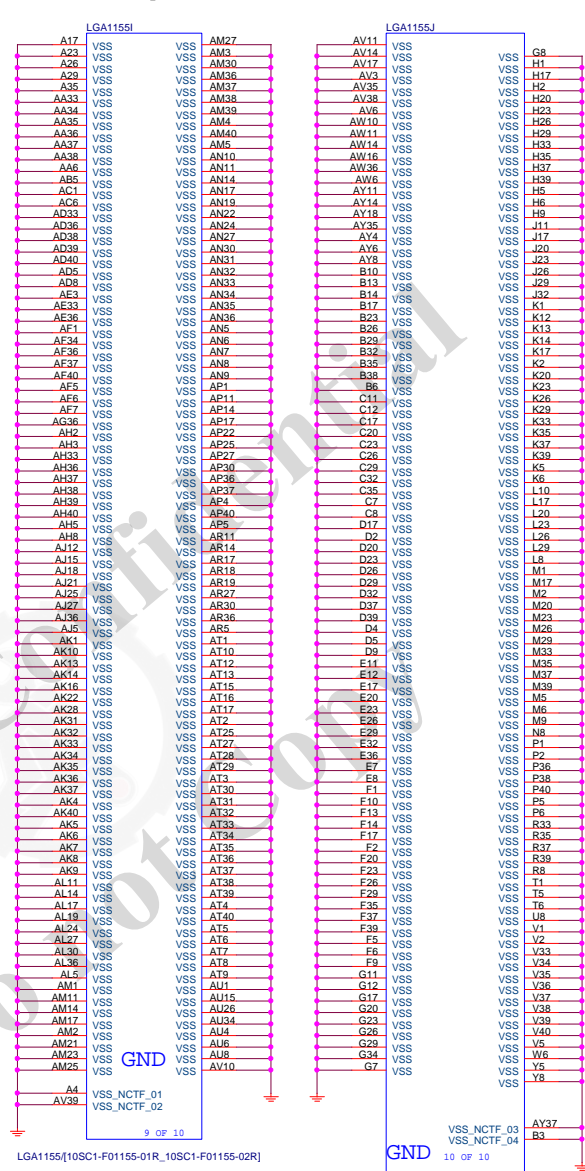
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Size			GA-Z77M-D3H		
Custom			Rev 1.1		
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			Sheet 5 of 34		

LGA1155 (F,G,H)



LGA1155[10SC1-F01155-01R_10SC1-F01155-02R]

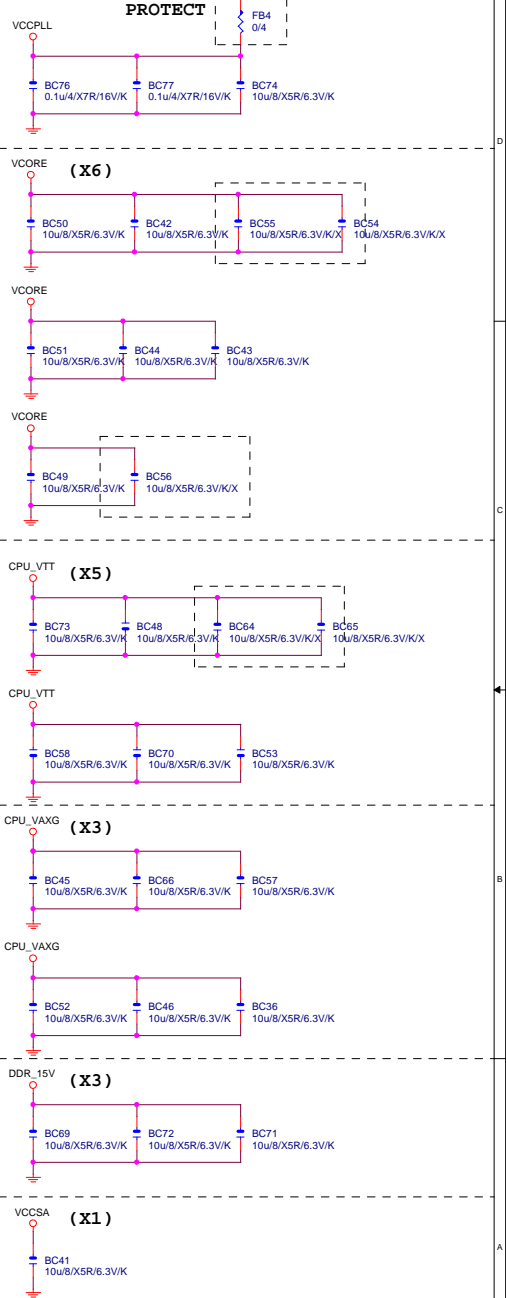
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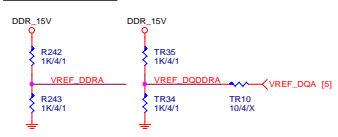
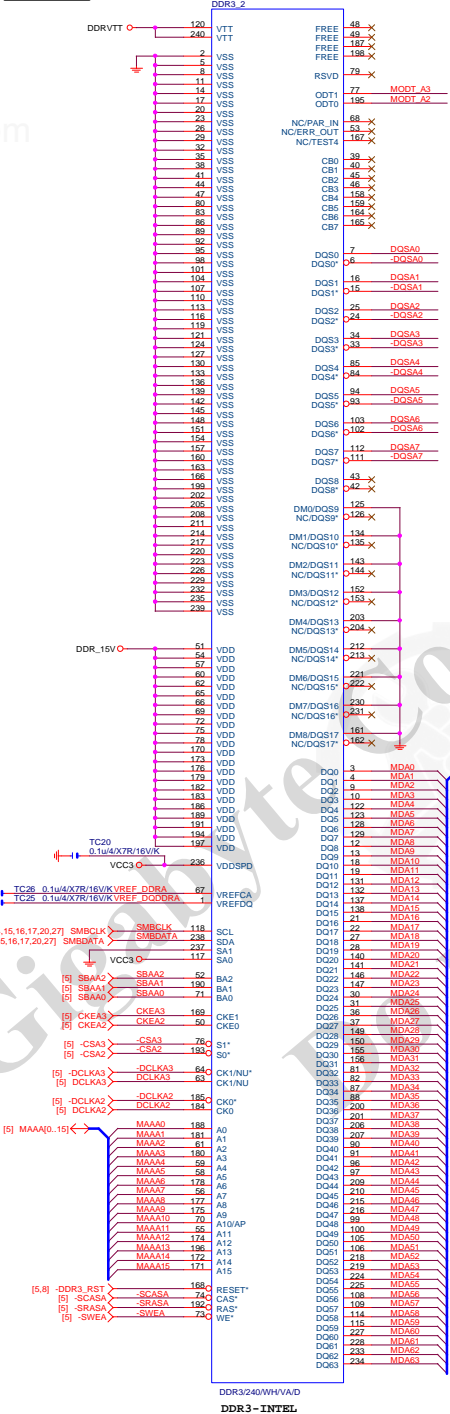
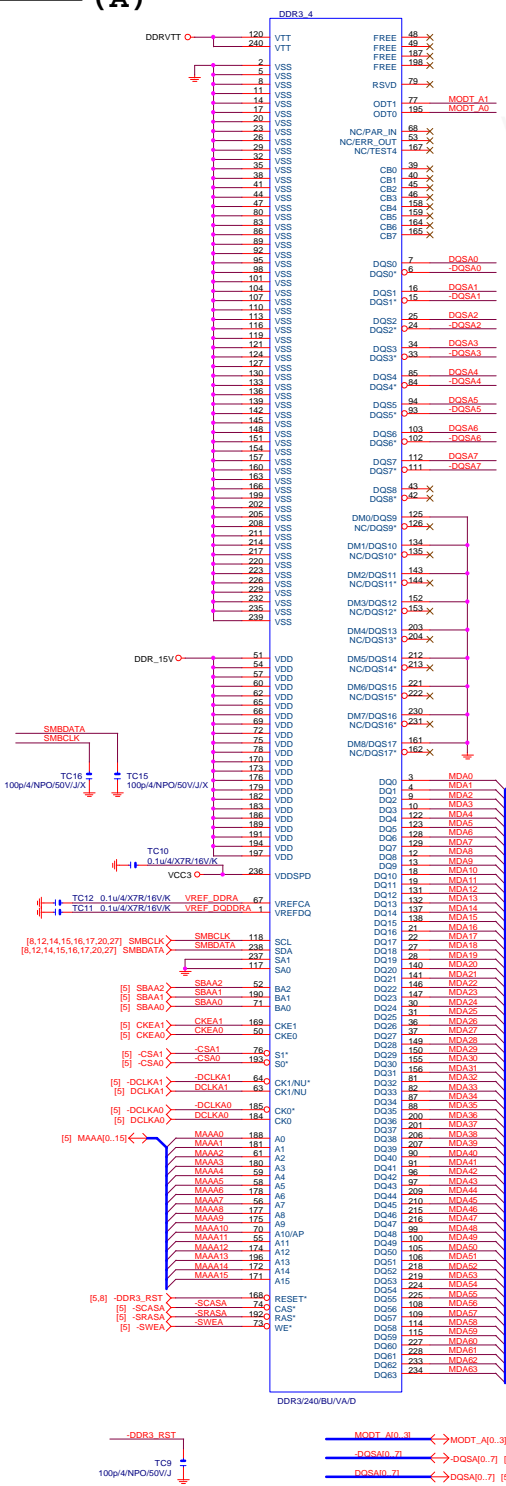
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CAP



Gigabyte Technology			
Title			
CPU LGA1156-C			
Size	Document Number	GA-Z77M-D3H	Rev
Custom			1.1
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(A)



DDR_15V

TEC7
600µF/DPD/8.3V/168/8m
TEC5
560µF/PPD/8.3V/168/8m

DDR_15V

TBC22
0.1µF/4X5R/16V/2Z
TBC24
0.1µF/4Y5V/16V/2Z
TBC11
1µF/4X5R/8.3V/K
TBC21
1µF/4X5R/8.3V/K
TBC17
1µF/4X5R/8.3V/K
TBC16
1µF/4X5R/8.3V/K
TBC18
0.1µF/4Y5V/16V/2Z
TBC15
1µF/4X5R/8.3V/K

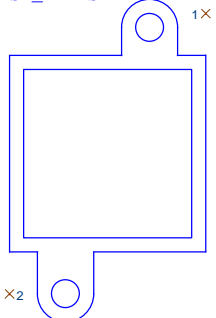
DDR_15V

TBC31
1µF/4X5R/8.3V/K
TBC25
1µF/4X5R/8.3V/K
TBC23
1µF/4X5R/8.3V/K
TBC29
1µF/4X5R/8.3V/K
TBC12
1µF/4X5R/8.3V/K
TBC13
1µF/4X5R/8.3V/K
TBC33
0.1µF/4Y5V/16V/2Z
TBC30
0.1µF/4Y5V/16V/2Z

(B)



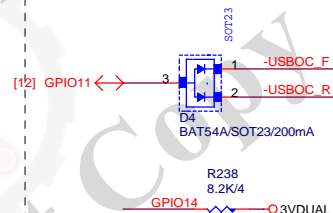
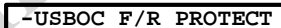
PCH (E)



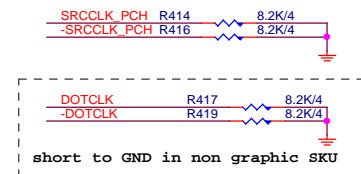
NVRAM

32.4/4/1 for $\overline{\text{ONFI}} \overline{\text{enable}}$

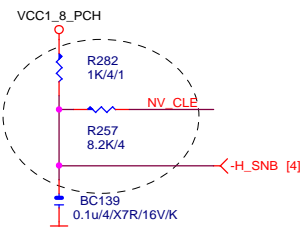
(G)



PCH CLK PD



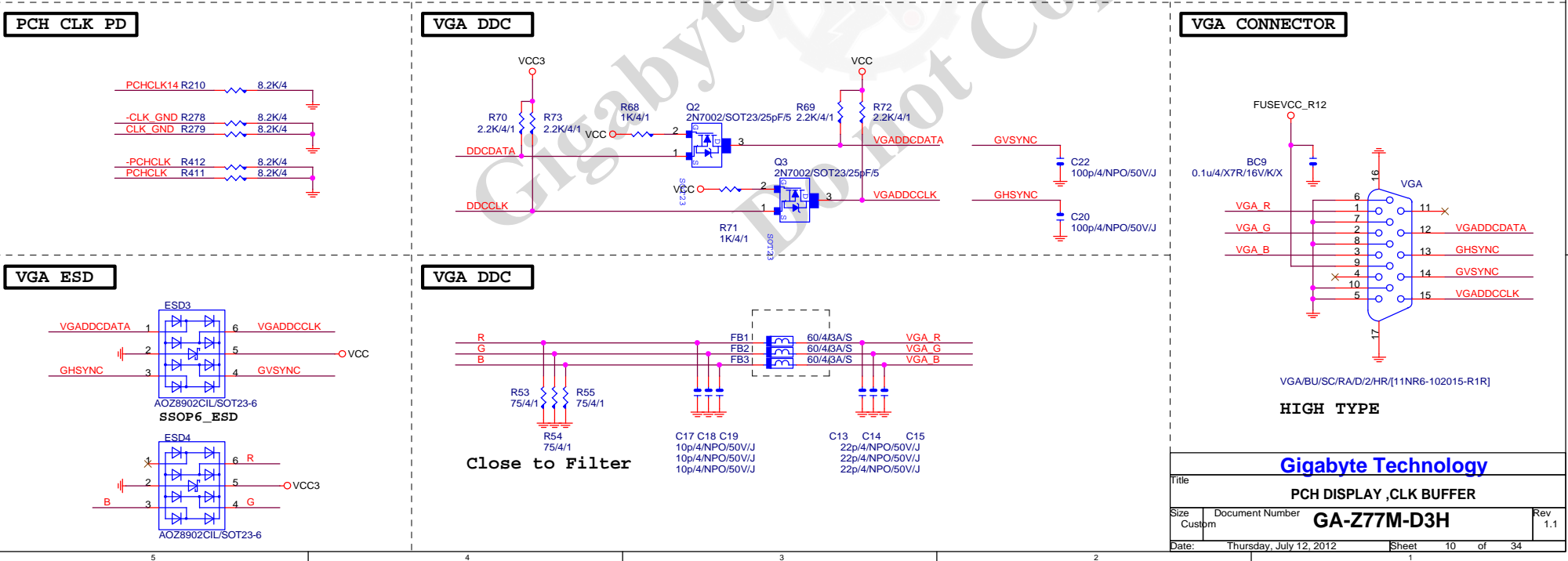
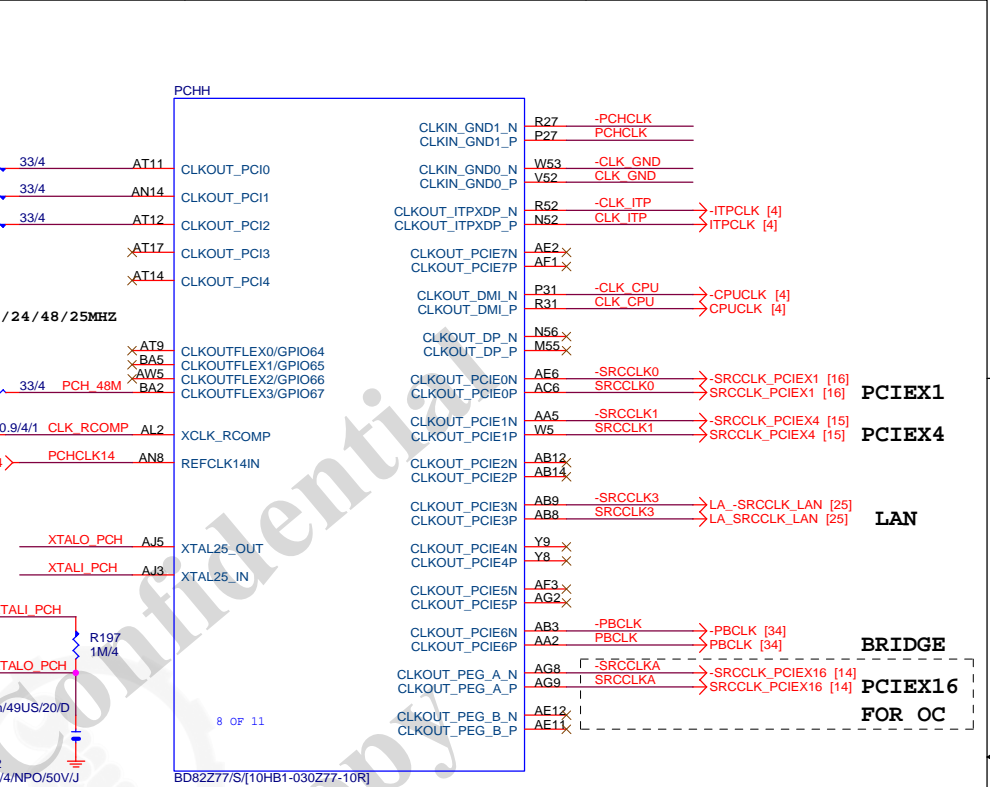
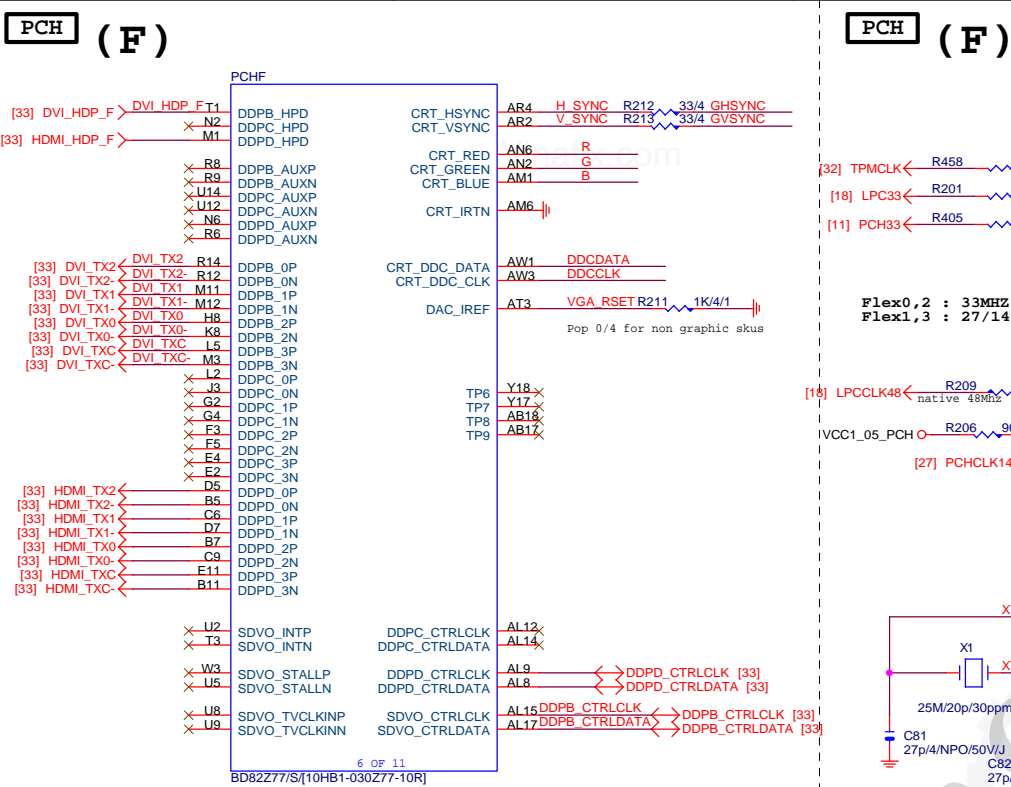
NVRAM PU



USB TABLE

Gigabyte Technology

Title			
PCH FDI,DMI,USB ,PCIE,NVRAM			
Size	Document Number		Rev
Custom	GA-Z77M-D3H		1.
Date:	Thursday, July 12, 2012	Sheet	9 of 34



(C)

PCHC

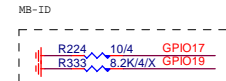


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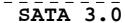


BD82Z77/S/[10HB1-030Z77-10R]

	PCH	PU/PD
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4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	0.00	0.00
8	0.00	0.00
9	0.00	0.00
10	0.00	0.00
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00
14	0.00	0.00
15	0.00	0.00
16	0.00	0.00
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23	0.00	0.00
24	0.00	0.00
25	0.00	0.00
26	0.00	0.00
27	0.00	0.00
28	0.00	0.00
29	0.00	0.00
30	0.00	0.00
31	0.00	0.00
32	0.00	0.00
33	0.00	0.00
34	0.00	0.00
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40	0.00	0.00
41	0.00	0.00
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94	0.00	0.00
95	0.00	0.00
96	0.00	0.00
97	0.00	0.00
98	0.00	0.00
99	0.00	0.00
100	0.00	0.00



H1X7-SATA2-HS-MASK



WHITE COLOR



PCH HOST . SATA. PCI

GA-Z77M-D3H

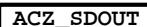
Rev	1 1
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(D)



32.768KHZ

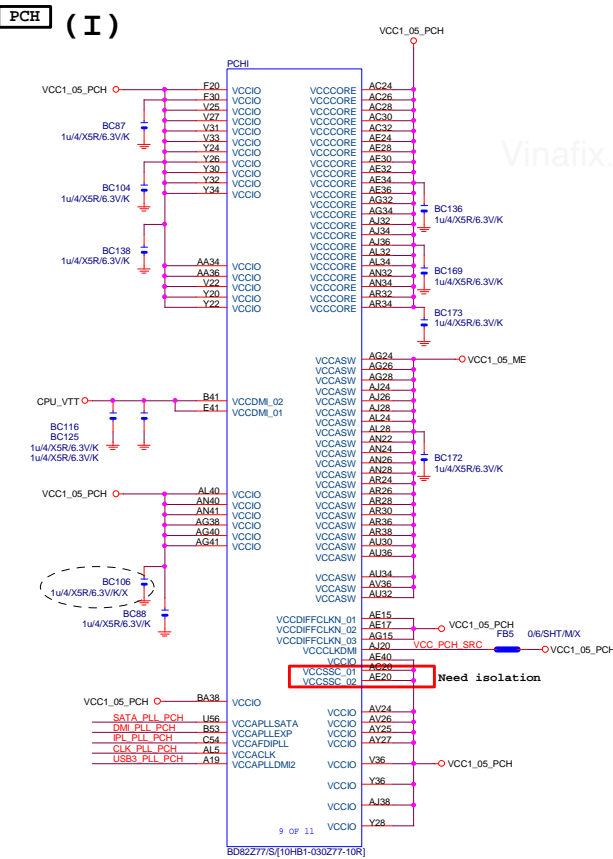


RB 必須放在BAT外

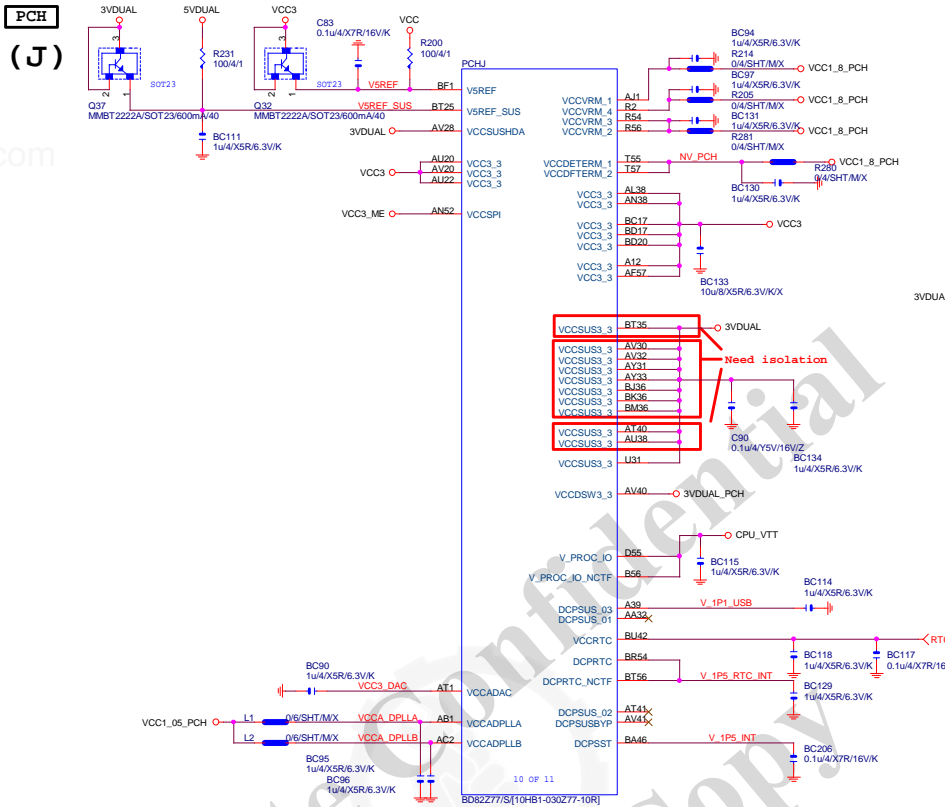


Title			
PCH GPIO , CTRL , AUDIO			
Size	Document Number	Rev	
Custom	GA-Z77M-D3H	1.1	
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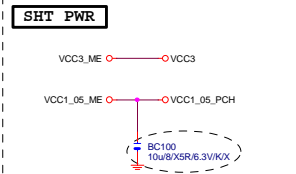
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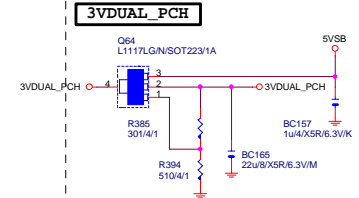
PCH



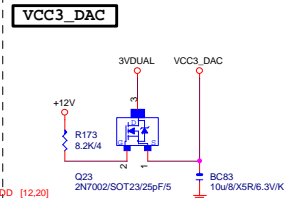
SHT	PWR
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3VDUAL_PCH

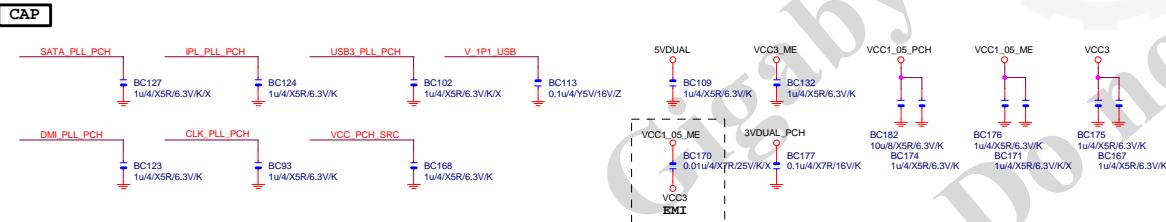


VCC3_DAC

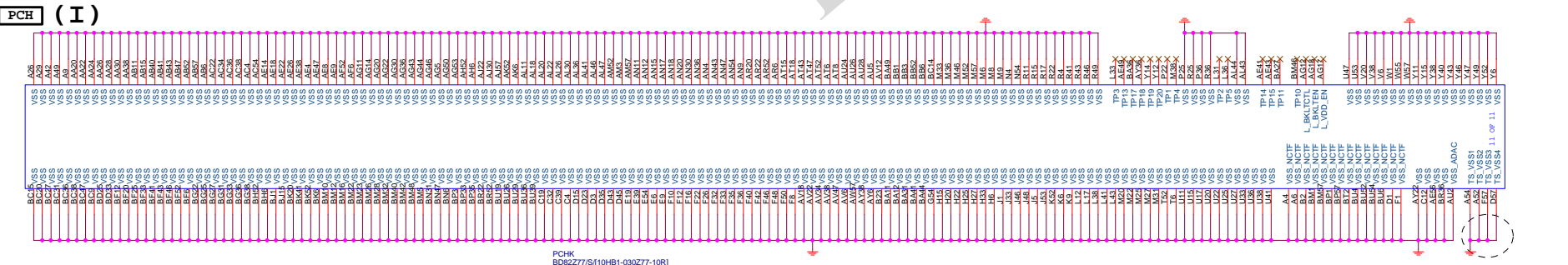


CLOSE北橋(注意震盪水波紋)

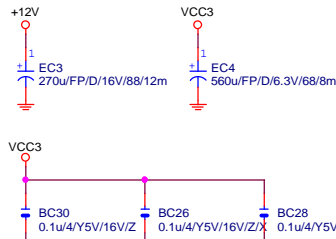
CAP



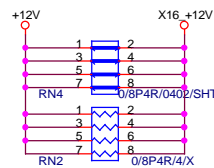
PCH (I)



PCIEX16 CAP



PCIEX16 PROTECT SHT



PCIEX16 AC CAP

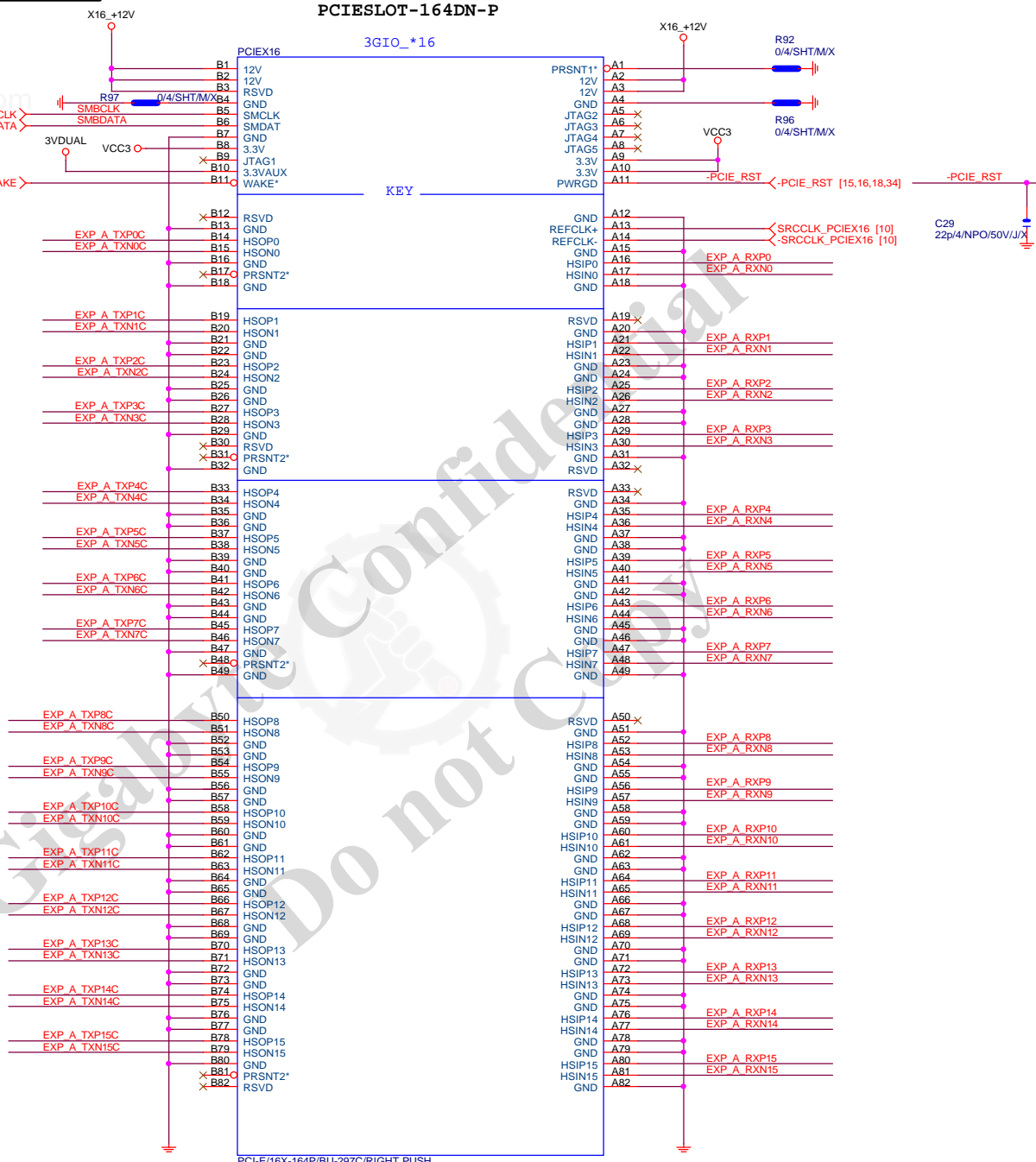
EXP A TXP0	C32	0.22u/4X5R/6.3V/K	EXP A TXP0C
EXP A TXN0	C30	0.22u/4X5R/6.3V/K	EXP A TXN0C
EXP A TXP1	C35	0.22u/4X5R/6.3V/K	EXP A TXP1C
EXP A TXN1	C37	0.22u/4X5R/6.3V/K	EXP A TXN1C
EXP A TXP2	C39	0.22u/4X5R/6.3V/K	EXP A TXP2C
EXP A TXN2	C41	0.22u/4X5R/6.3V/K	EXP A TXN2C
EXP A TXP3	C43	0.22u/4X5R/6.3V/K	EXP A TXP3C
EXP A TXN3	C45	0.22u/4X5R/6.3V/K	EXP A TXN3C
EXP A TXP4	C46	0.22u/4X5R/6.3V/K	EXP A TXP4C
EXP A TXN4	C49	0.22u/4X5R/6.3V/K	EXP A TXN4C
EXP A TXP5	C50	0.22u/4X5R/6.3V/K	EXP A TXP5C
EXP A TXN5	C51	0.22u/4X5R/6.3V/K	EXP A TXN5C
EXP A TXP6	C52	0.22u/4X5R/6.3V/K	EXP A TXP6C
EXP A TXN6	C54	0.22u/4X5R/6.3V/K	EXP A TXN6C
EXP A TXP7	C57	0.22u/4X5R/6.3V/K	EXP A TXP7C
EXP A TXN7	C58	0.22u/4X5R/6.3V/K	EXP A TXN7C
EXP A TXP8	C60	0.22u/4X5R/6.3V/K	EXP A TXP8C
EXP A TXN8	C61	0.22u/4X5R/6.3V/K	EXP A TXN8C
EXP A TXP9	C62	0.22u/4X5R/6.3V/K	EXP A TXP9C
EXP A TXN9	C63	0.22u/4X5R/6.3V/K	EXP A TXN9C
EXP A TXP10	C64	0.22u/4X5R/6.3V/K	EXP A TXP10C
EXP A TXN10	C65	0.22u/4X5R/6.3V/K	EXP A TXN10C
EXP A TXP11	C66	0.22u/4X5R/6.3V/K	EXP A TXP11C
EXP A TXN11	C67	0.22u/4X5R/6.3V/K	EXP A TXN11C
EXP A TXP12	C68	0.22u/4X5R/6.3V/K	EXP A TXP12C
EXP A TXN12	C70	0.22u/4X5R/6.3V/K	EXP A TXN12C
EXP A TXP13	C72	0.22u/4X5R/6.3V/K	EXP A TXP13C
EXP A TXN13	C73	0.22u/4X5R/6.3V/K	EXP A TXN13C
EXP A TXP14	C74	0.22u/4X5R/6.3V/K	EXP A TXP14C
EXP A TXN14	C75	0.22u/4X5R/6.3V/K	EXP A TXN14C
EXP A TXP15	C77	0.22u/4X5R/6.3V/K	EXP A TXP15C
EXP A TXN15	C78	0.22u/4X5R/6.3V/K	EXP A TXN15C

EXP A RXP0.15] >> EXP_A_RXP0.15] [4]
EXP A RXN0.15] >> EXP_A_RXN0.15] [4]
EXP A TXP0.15] >> EXP_A_TXP0.15] [4]
EXP A TXN0.15] >> EXP_A_TXN0.15] [4]

PCIEX16 SLOT

[7,8,12,15,16,17,20,27] SMBCLK
[7,8,12,15,16,17,20,27] SMBDATA

[12,15,16,25,34] -PCIE_WAKE



PCI-E16X-164P/BU-297C/RIGHT PUSH

Gigabyte Technology

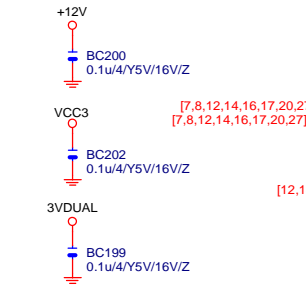
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Size			GA-Z77M-D3H		
Custom			Rev 1.1		
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PCIEX4 CAP

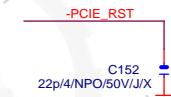
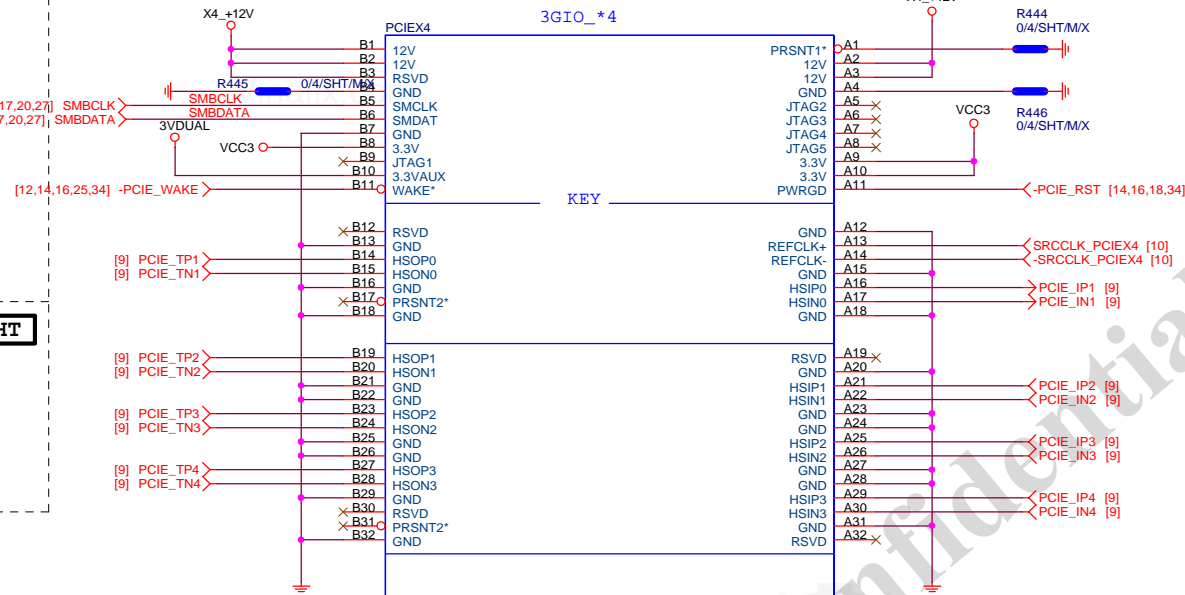
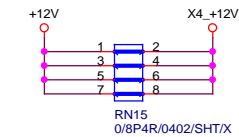
PCIEX4 SLOT

PCIESLOT-64D-98D-P

3GIO_*4

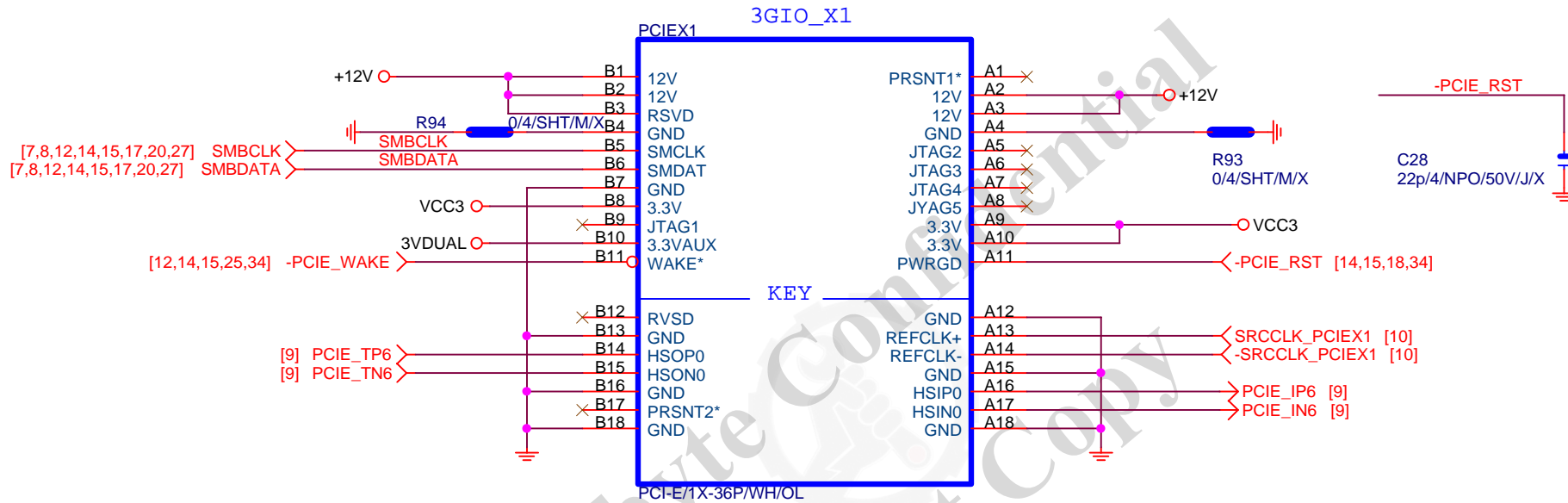


PCIEX16 PROTECT SHT

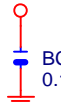


PCI-E/16X-65P/BU/RIGHT PUSH

Gigabyte Technology			
Title			
PCI EXPRESS X 4 PORT			
Size	Document Number	Rev	
Custom	GA-Z77M-D3H	1.1	
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**PCIEX1 CAP**

3VDUAL

BC31
0.1u/4/Y5V/16V/Z/X

+12V

BC23
0.1u/4/Y5V/16V/Z/X

VCC3

BC25
0.1u/4/Y5V/16V/Z/X**Gigabyte Technology**

Title

PCI EXPRESS X 1 PORTSize
A

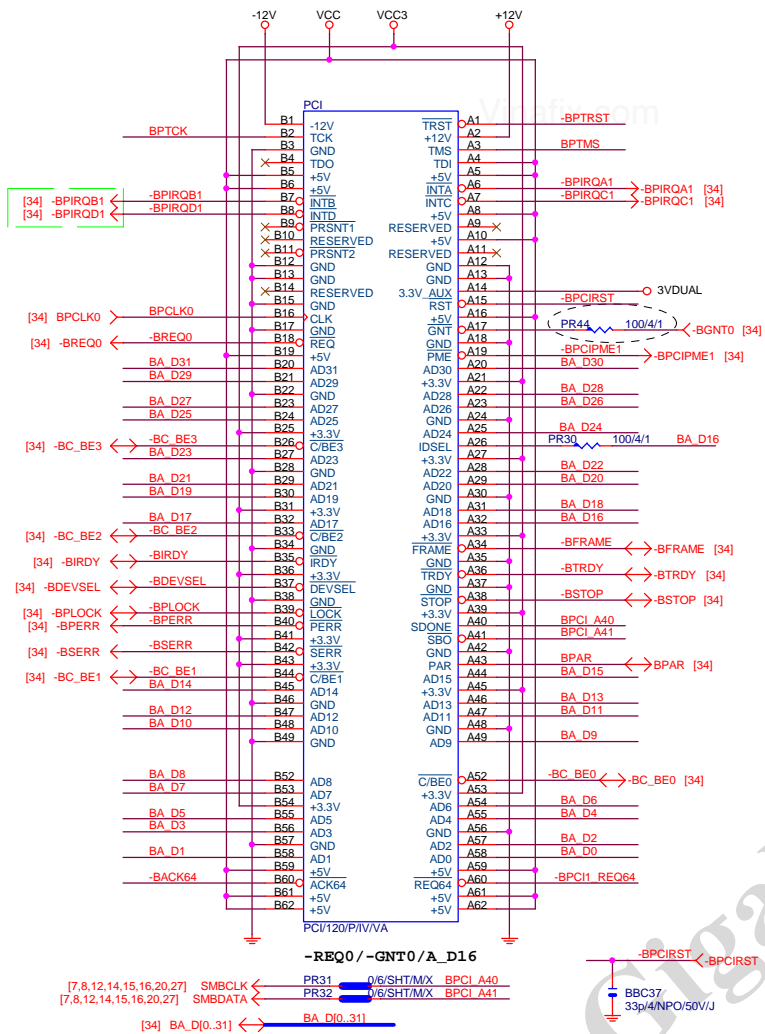
Document Number

GA-Z77M-D3HRev
1.1

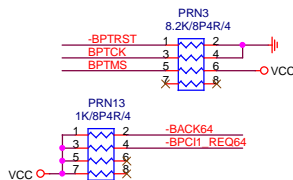
Date: Thursday, July 12, 2012

Sheet 16 of 34

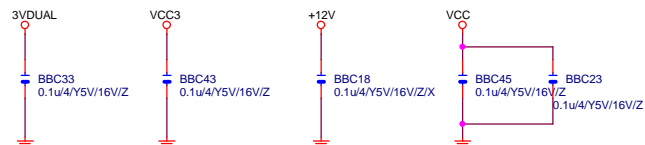
PCI SLOT



PCI	PU
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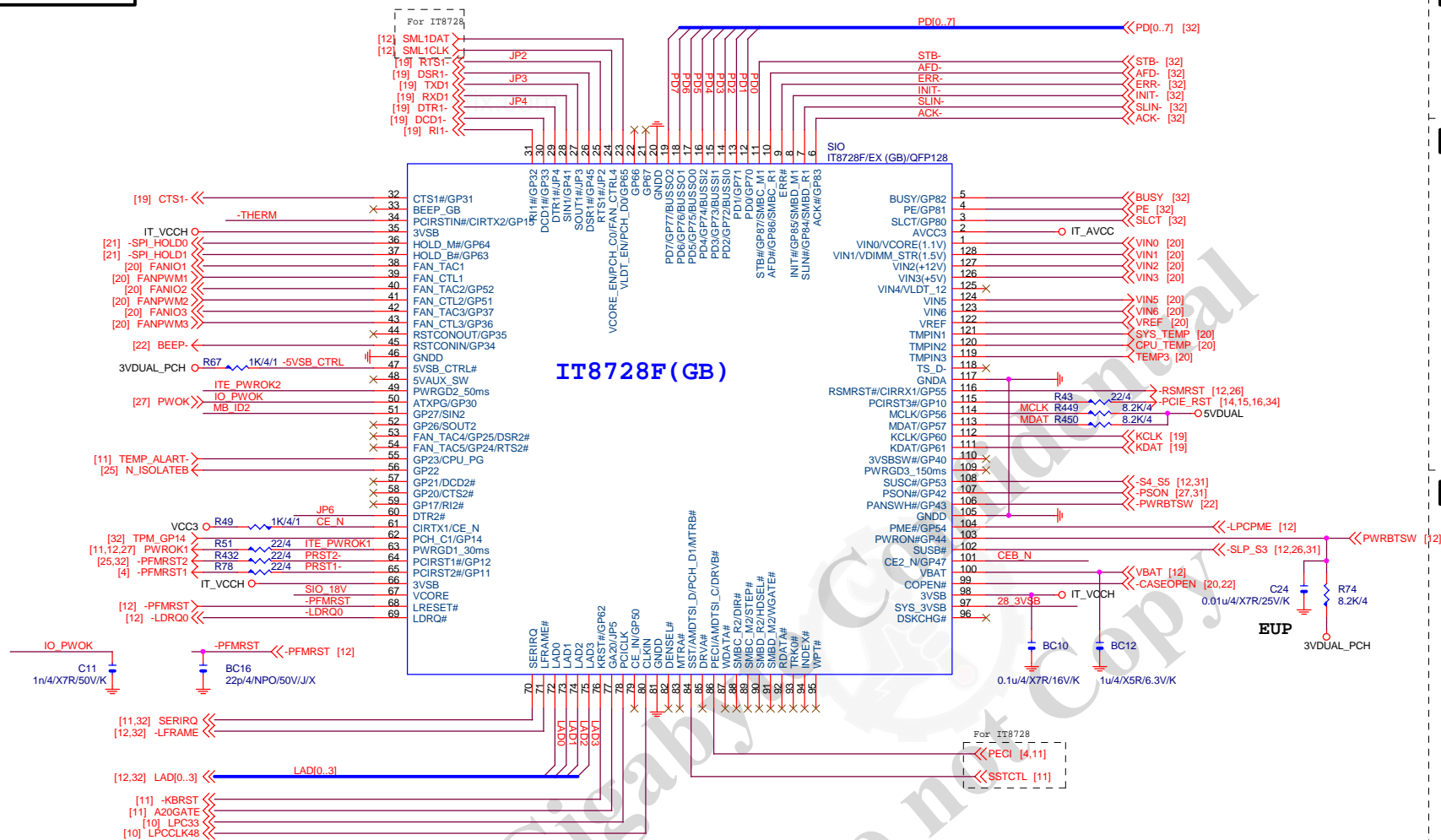
PCI CAP



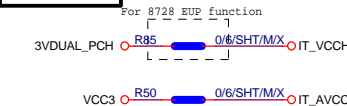
Gigabyte Technology

Title				PCI SLOT 1&2				Rev	
Size Custom		Document Number				GA-Z77M-D3H		1.1	
Date: Thursday, July 12, 2012				Sheet		17		of 34	

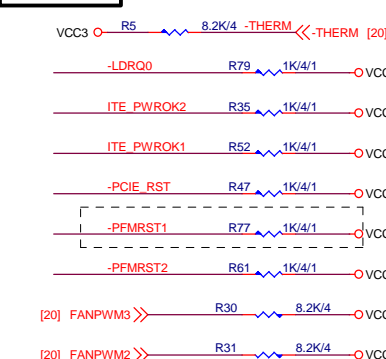
SIO IT8728F



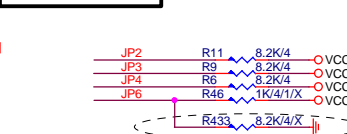
PWR	SHT
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SIO PU



SIO STRAP



IT8728-EX
PULL DOWN ENABLE OVP

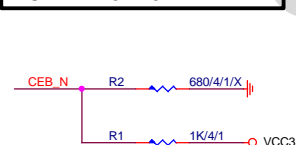
EUP control by PCH

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JP3--- High SPI-Flash Disable
      Low SPI-Flash Enable
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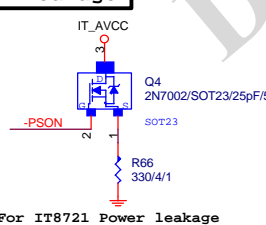
IT8728F NOTE

	IT8728
PIN121	VCORE_EN/PCF_C0
PIN120	VLINT_EN/PCF_D0
PIN19	ATXPG
PIN31	PCF_C1
PIN53	SST/AMDSI_D/MTRB#/PCF_D1
PIN55	PECI/AMDSI_C/DRV#
PIN66	SYS_3VSB
PIN70	GP47
PIN95	VIN2(VCC5)
PIN96	VIN1(VCC12)
PIN97	VIN1/VDIMM_STR(1.5V)
PIN98	VINO/VCORE(1.1V)/NC

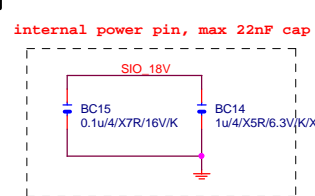
DUAL BIOS OPT STRAP



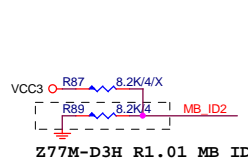
Power leakage



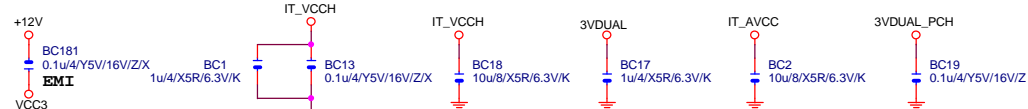
SIO 18V



MB ID

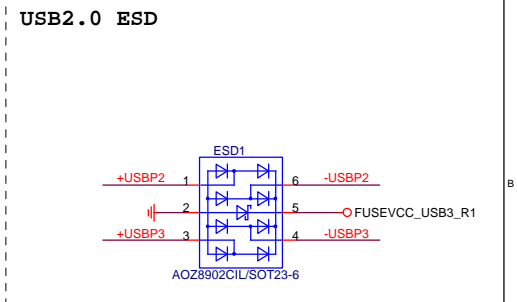
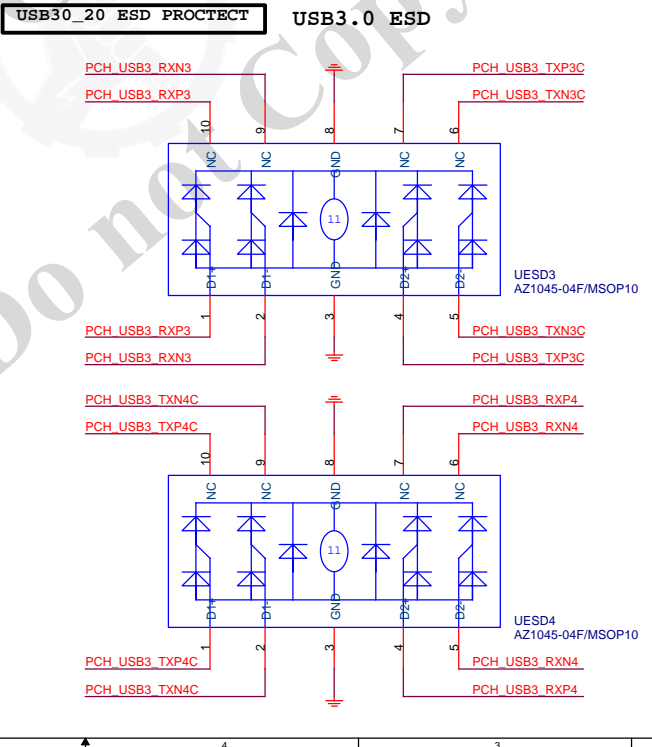
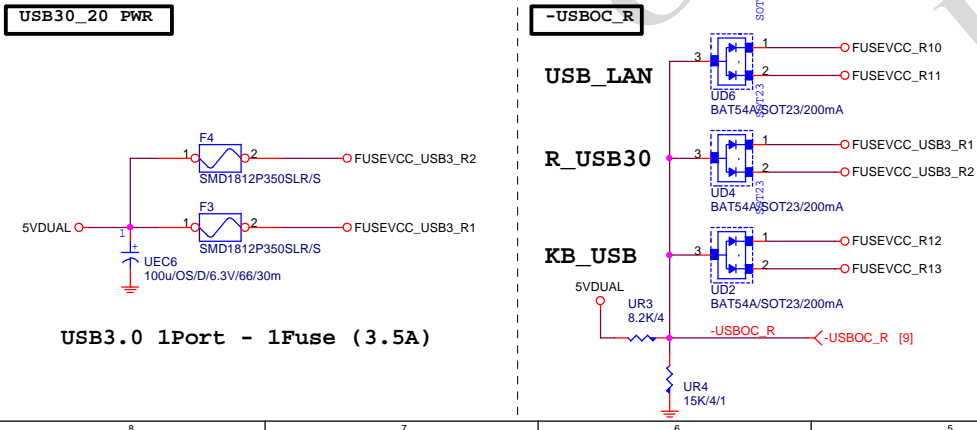
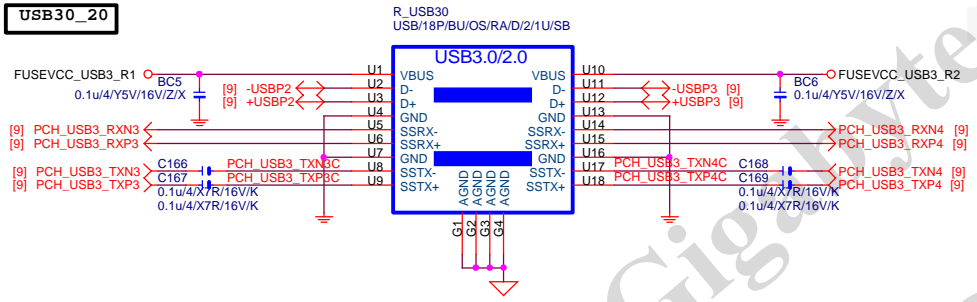
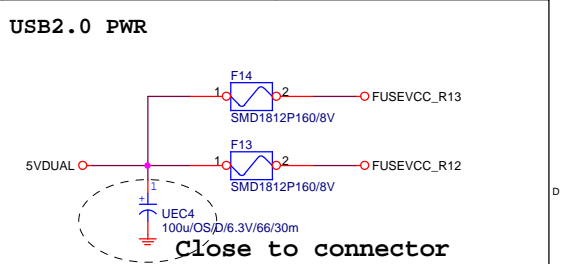
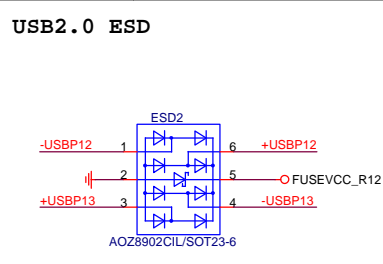
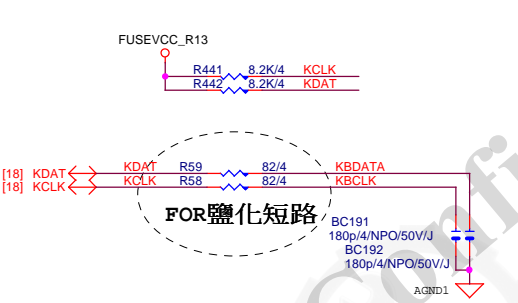
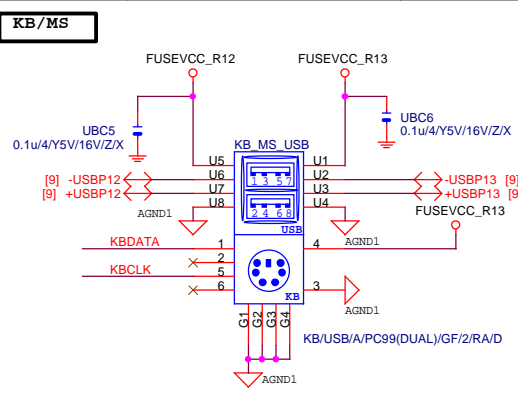
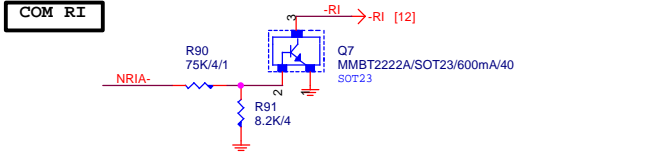
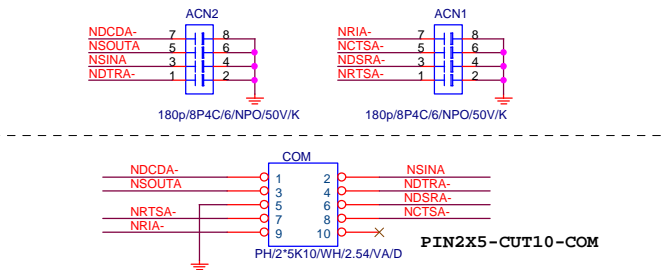
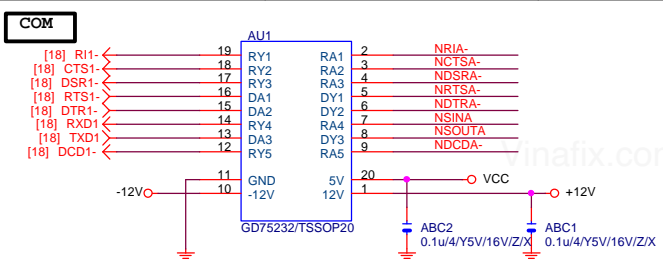


SIO CAP



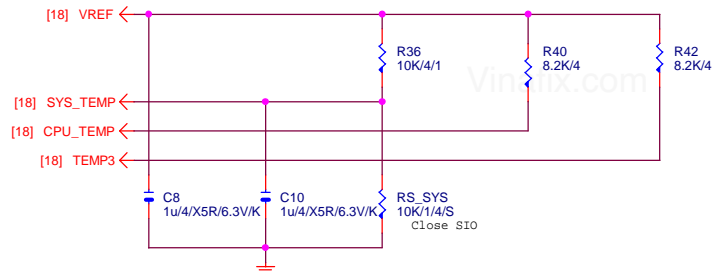
Gigabyte Technology

Title			
ITE 8728 LPC IO			
Size	Document Number		Rev
Custom	GA-Z77M-D3H		1.1
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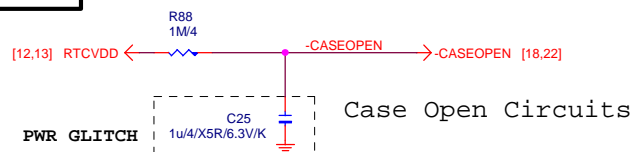


Gigabyte Technology			
COM,-RI,KB_USB,USB_ESATA,-PROCHOT			
GA-Z77M-D3H			
Rev 1.1			
Date: Thursday, July 12, 2012			
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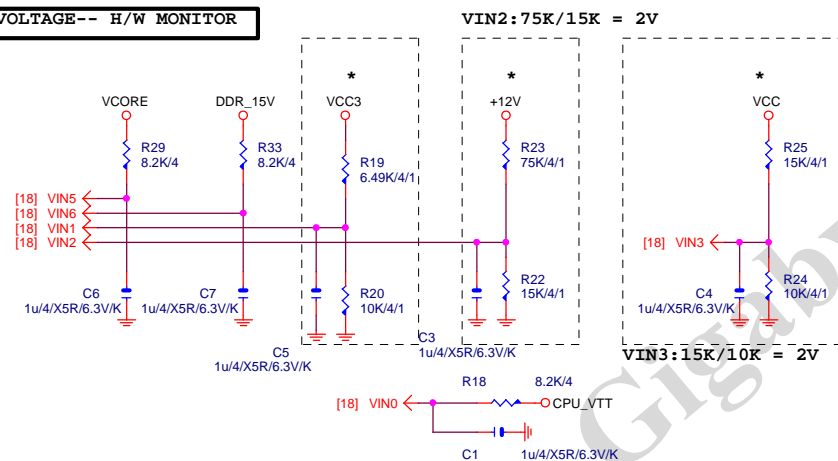
TEMP H/W MONITOR



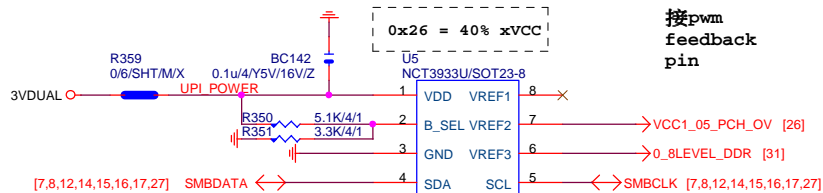
CASE OPEN



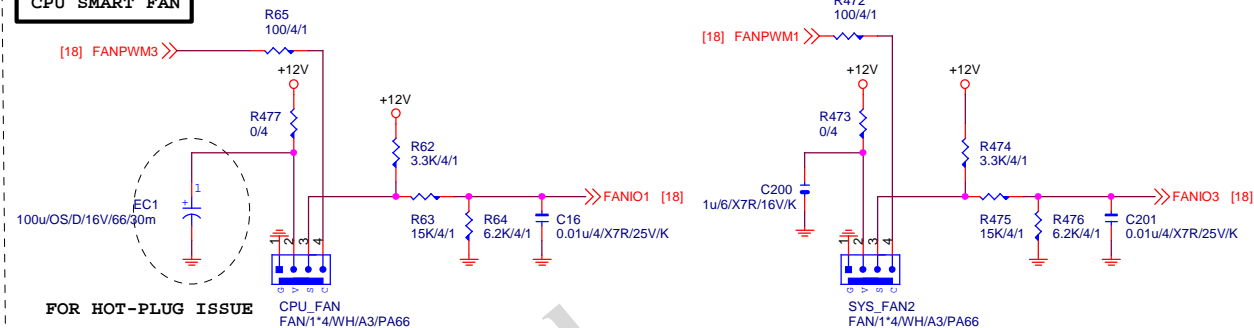
VOLTAGE-- H/W MONITOR



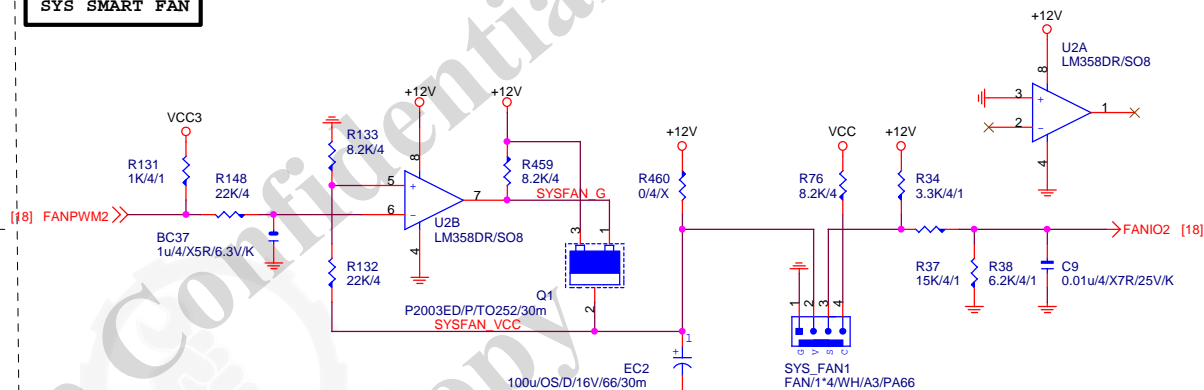
OV NCT3933



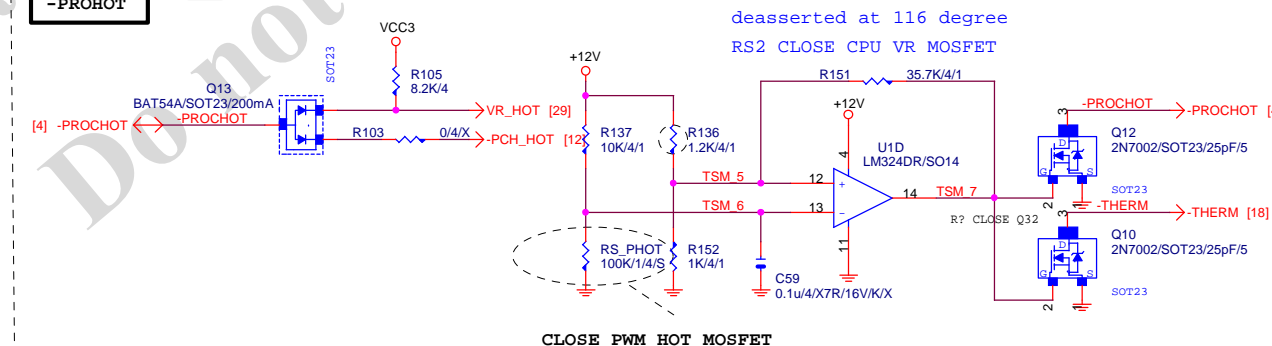
CPU SMART FAN



SYS SMART FAN



-PROHOT

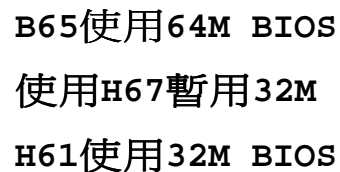


Gigabyte Technology

HWM,FAN CTRL,OV

Size Custom	Document Number GA-Z77M-D3H	Rev 1.1
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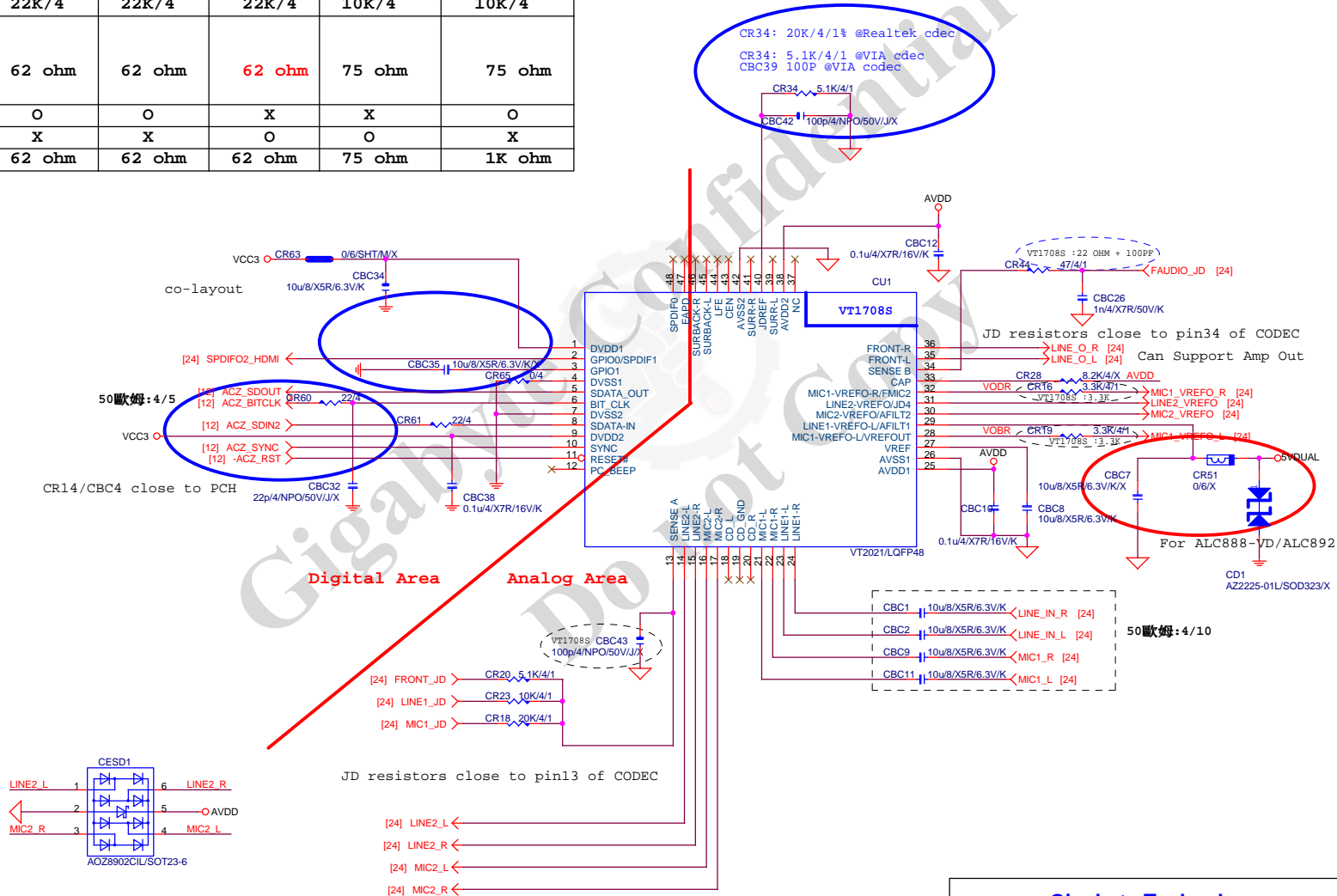
Date:	Thursday, July 12, 2012	Sheet	20	of	34
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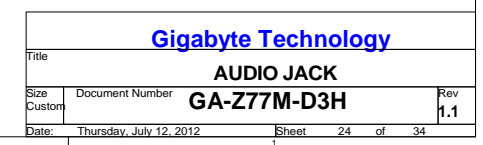
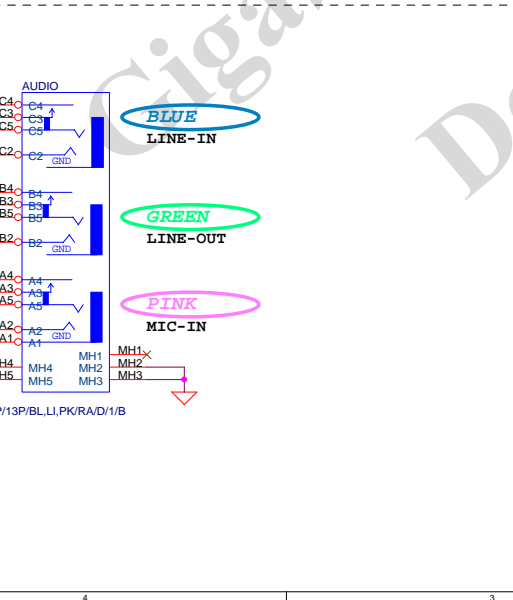


1	means	floating
0	means	PD 1K

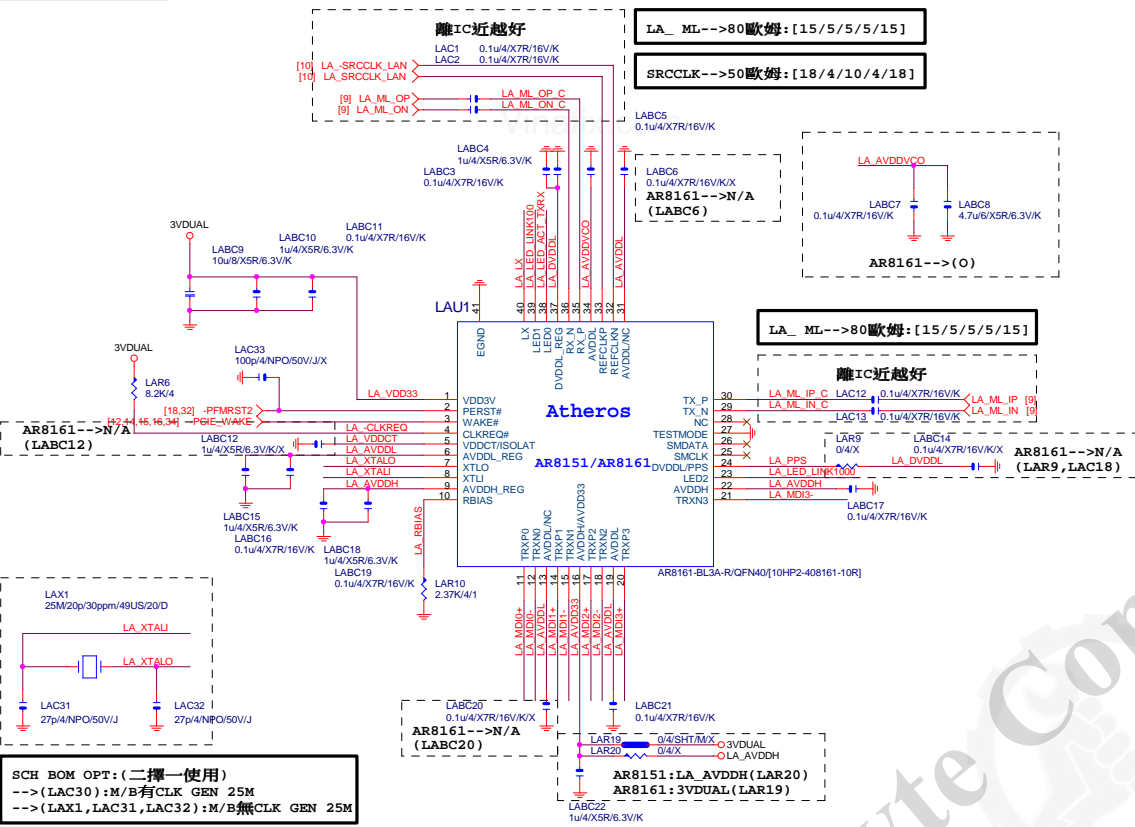
Title				
DUAL BIOS				
Size A	Document Number			Rev
	GA-Z77M-D3H			1.1
Date:	Thursday, July 12, 2012		Sheet	21 of 34

	ALC662	ALC887-VD2	ALC889	VT1708S	VT1708SCE
CR65	X	X	O	O	X
CR64	X	X	X	X	0.1u/4
CBC35	O	O	X	X	O
CR44/CBC6	47ohm+1nF	47ohm+1nF	47ohm+1nF	22ohm+100P	22ohm+100P
CR31	X	O	O	O	O
CR30	O	X	X	X	X
CBC1/CBC2	22uF/X5R	22uF/X5R	22uF/X5R	22uF/X5R	22uF/X5R
CR20	5.11K/4/1	5.11K/4/1	5.11K/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
CBC39/CBC40	N/A	N/A	N/A	100P/4	100P/4
CR6/CR7/CR54/CR58	22K/4	22K/4	22K/4	10K/4	10K/4
CR5/CR8/CR11/CR4/ CR17/CR22/CR45/CR33/ CR47/CR40/CR26/CR37/ CR13/CR11/CR57/CR53	62 ohm	62 ohm	62 ohm	75 ohm	75 ohm
CR51/CD1/CBC7	O	O	X	X	O
CD2/CD3/CQ3/CQ5	X	X	O	O	X
CR1/CR14/CR17/CR22	62 ohm	62 ohm	62 ohm	75 ohm	1K ohm

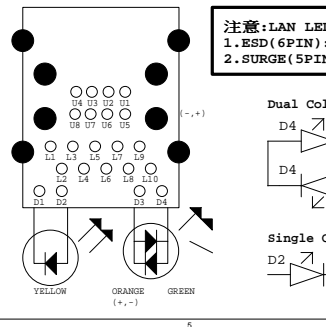
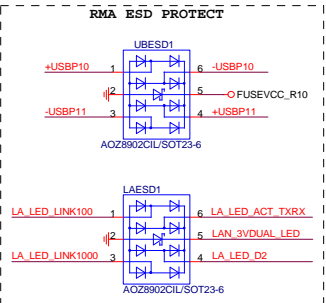




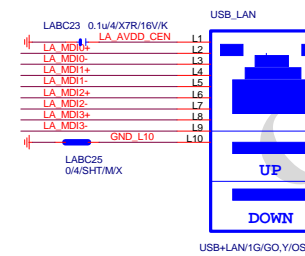
LAN:AR8151/AR8161



USB LAN CONNECTOR



LA_MDI-->100歐姆:[20/4/8/4/20]



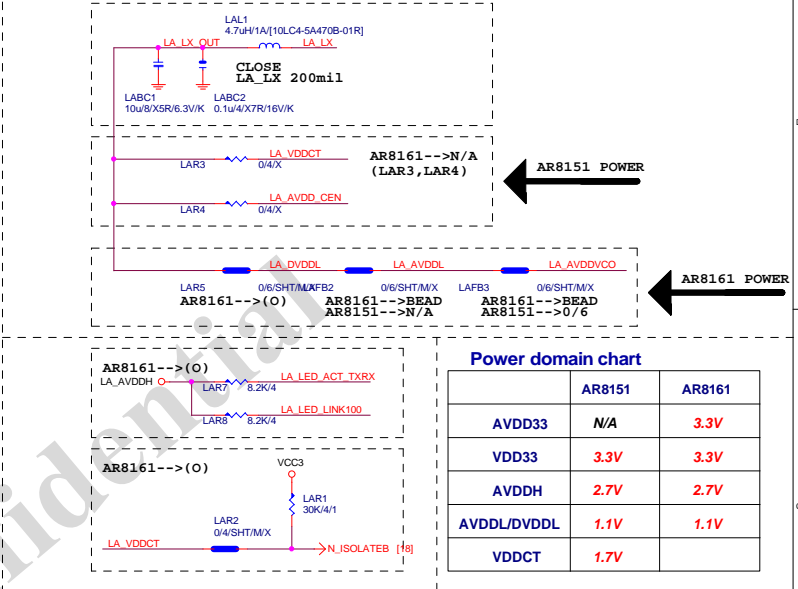
注意:USB PORT(目前:暫代6,7PORT)
USB-->90歐姆:[15/4.5/7.5/4.5/15]

料號	規格	廠商
11NR6-702009-0ER 1G LAN (12core)		UDE
11NR6-702009-91R 1G LAN (8 core)		FOXCONN
11NR6-702009-92R 1G LAN (8 core)		UDE
11NR6-702009-11R 1G LAN (12core/RED)		UDE
11NR6-702009-12R 1G LAN (8 core/RED)		FOXCONN

USB_LAN BOM區分:
1. (紅色/12CORE/三倍): USB+LAN/1G/GO, Y/OS/RA/D/1/RED
2. (黑色/12CORE): USB+LAN/1G/GO, Y/OS/RA/D/1
3. (黑色/8CORE): USB+LAN/1G/GO, Y/OS/RA/D/8C

LAN POWER

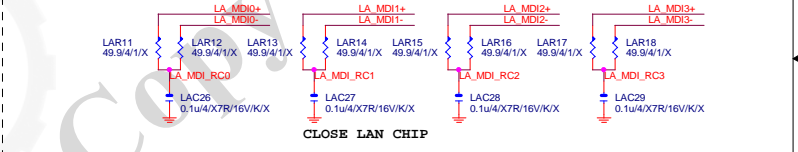
NEW DESIGN ONLY FOR INTERNAL SWR
AR8151: LAR3(O), LAR5(X)
AR8161: LAR5(O), LAR3/LAR4(X)



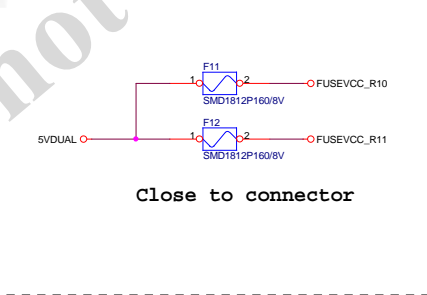
Power domain chart

	AR8151	AR8161
AVDD33	N/A	3.3V
VDD33	3.3V	3.3V
AVDDH	2.7V	2.7V
AVDDL/DVDDL	1.1V	1.1V
VDDCT	1.7V	

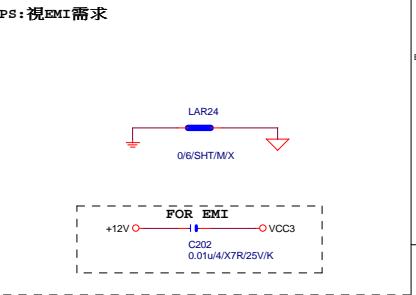
MDI : AR8161-->N/A



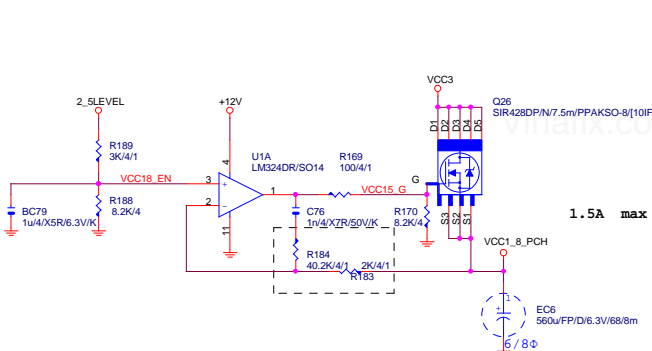
USB X3 POWER



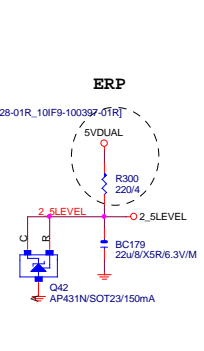
EMI SHORT PAD



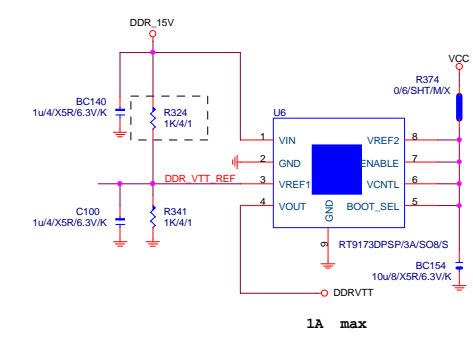
VCC1_8_PCH



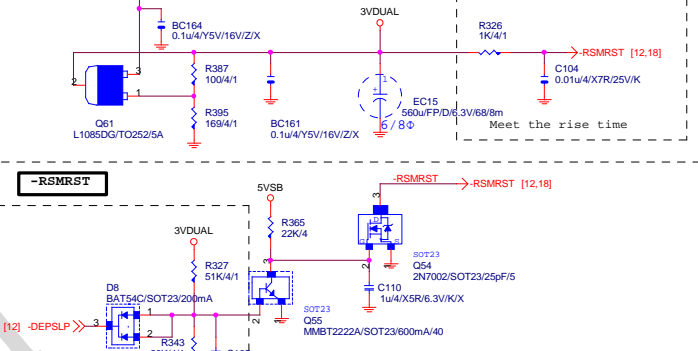
2_5LEVEL



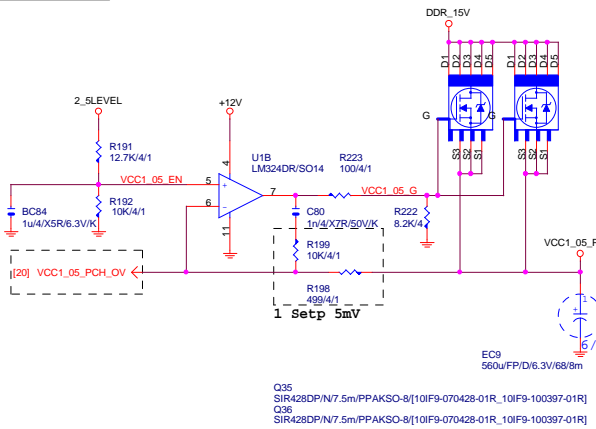
DDRVTT



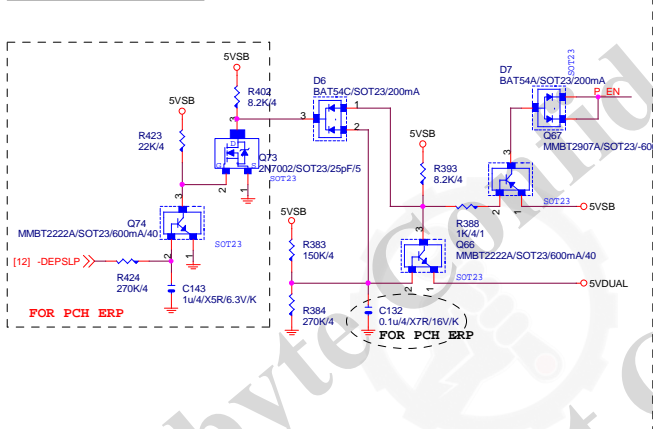
3VDUAL



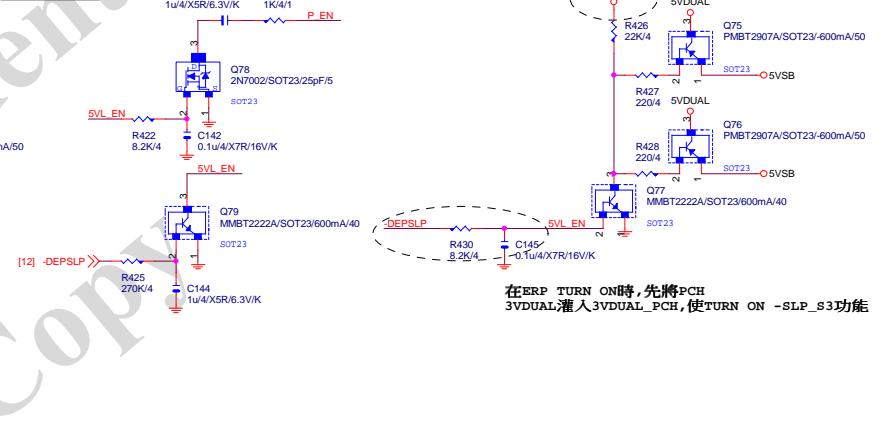
VCC1_05_PCH



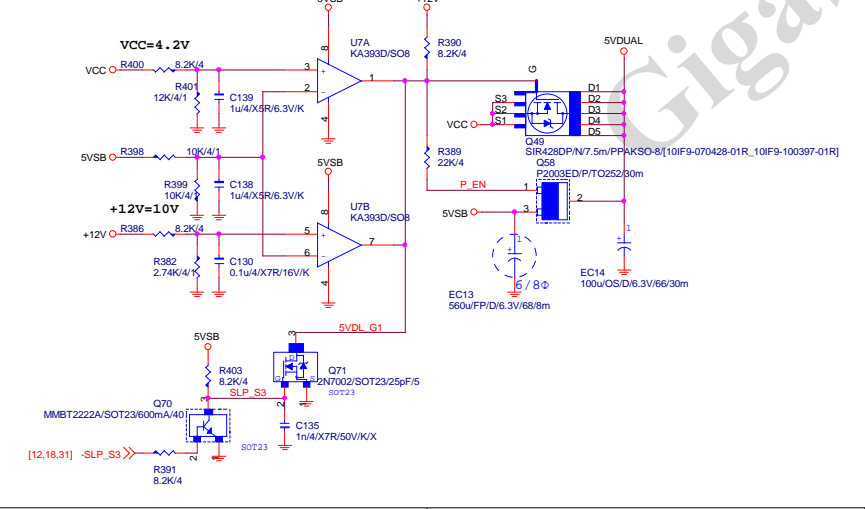
5VDUAL SHORT PROTECT



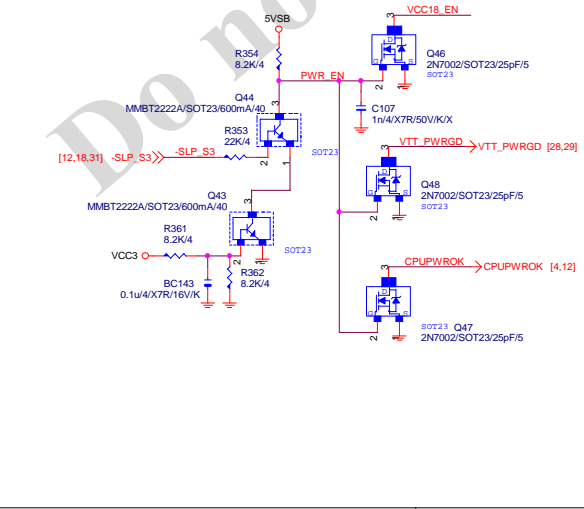
PCH ERP



5VDUAL

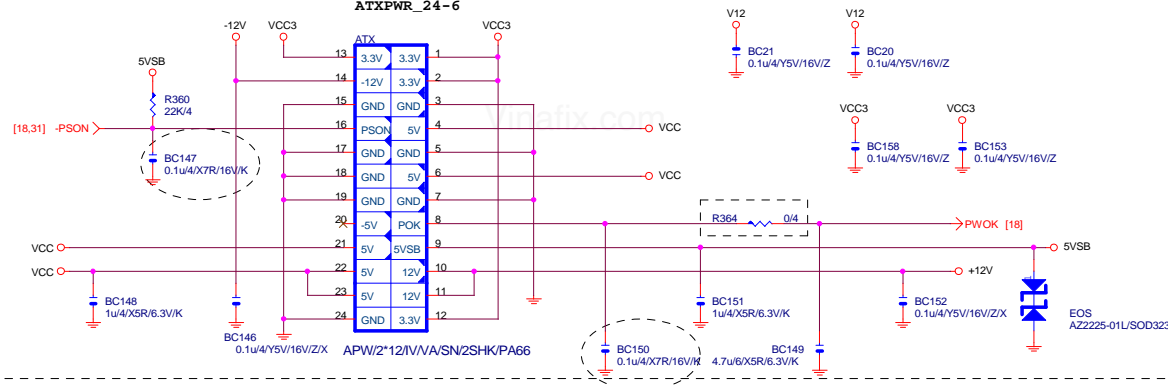


PWR SEQ

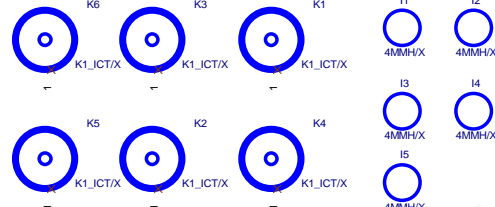
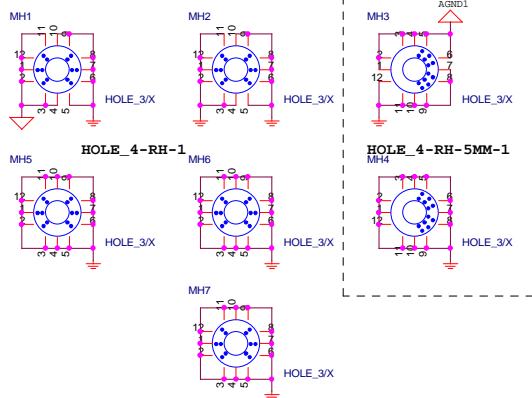
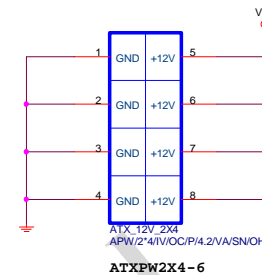


ATXX24 POWER CONNECTOR

ATXPWR_24-6

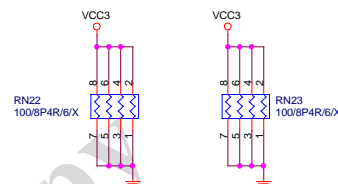


ATXX4 POWER CONNECTOR

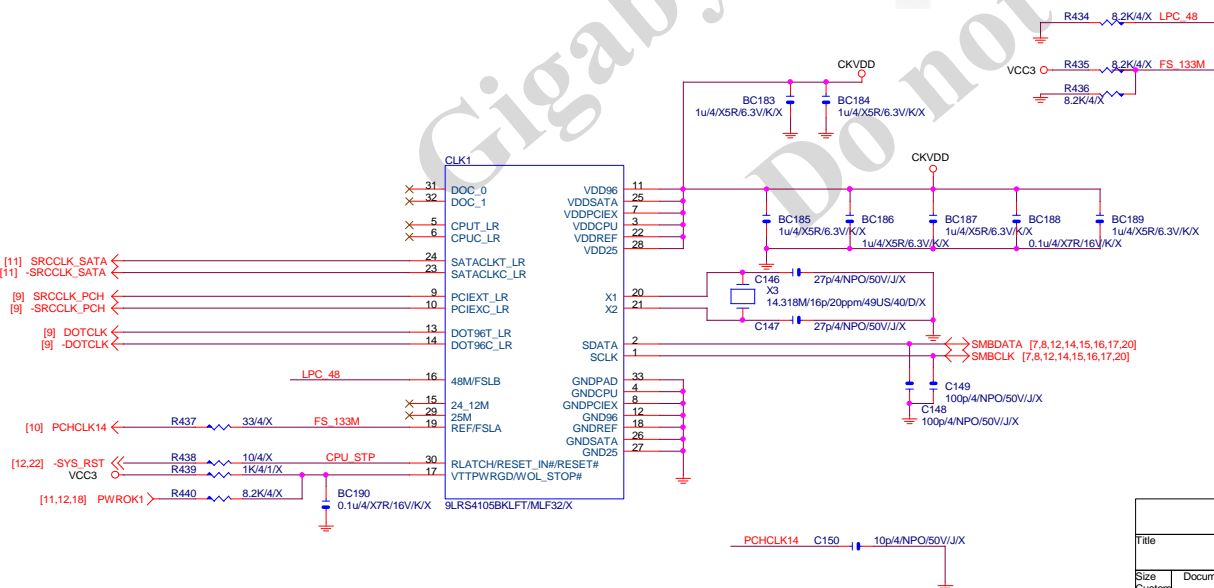


To prevent the 5VSB under loading when boot

FIX PWR MINMUN LOAD

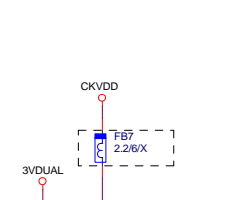


CLK GEN



CPU Frequency Selection

FS	CPU
0	100M <Default>
1	133M



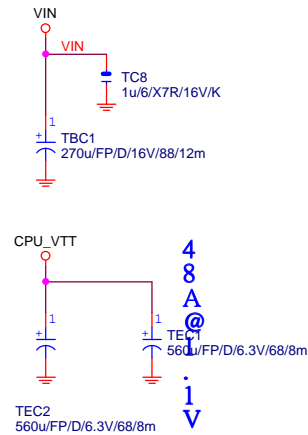
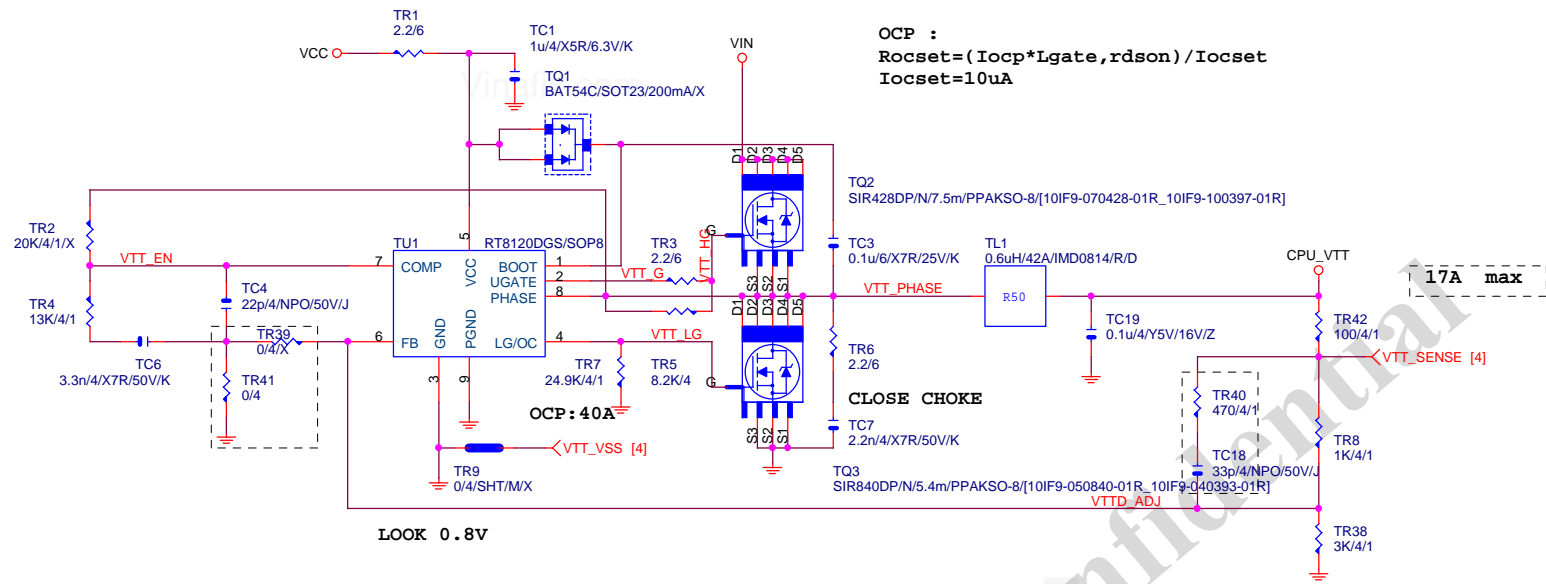
Gigabyte Technology

ATX CONNECTOR

GA-Z77M-D3H

Rev 1.1

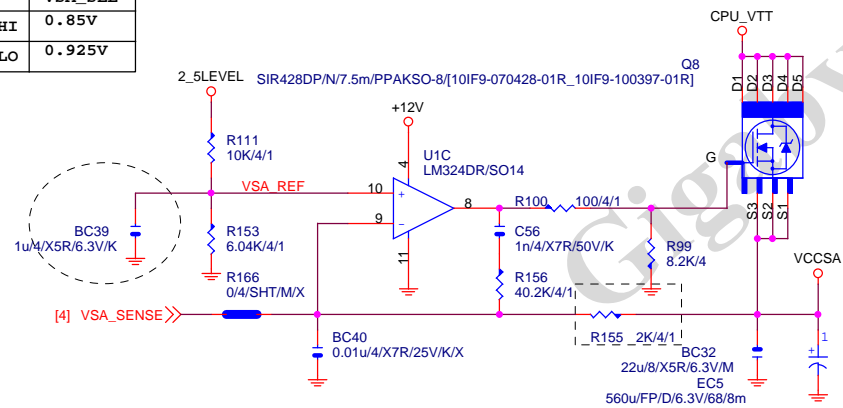
CPU_VTT



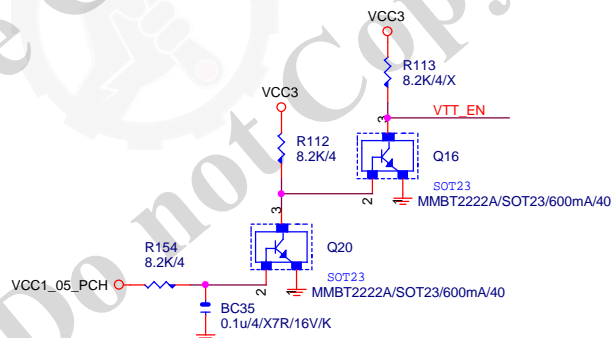
VCCSA

PDG 0.8

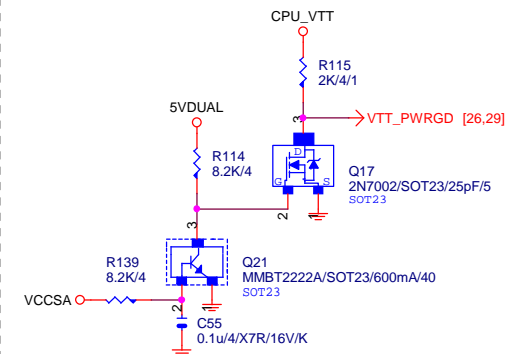
	VSA_SEL
HI	0.85V
LO	0.925V

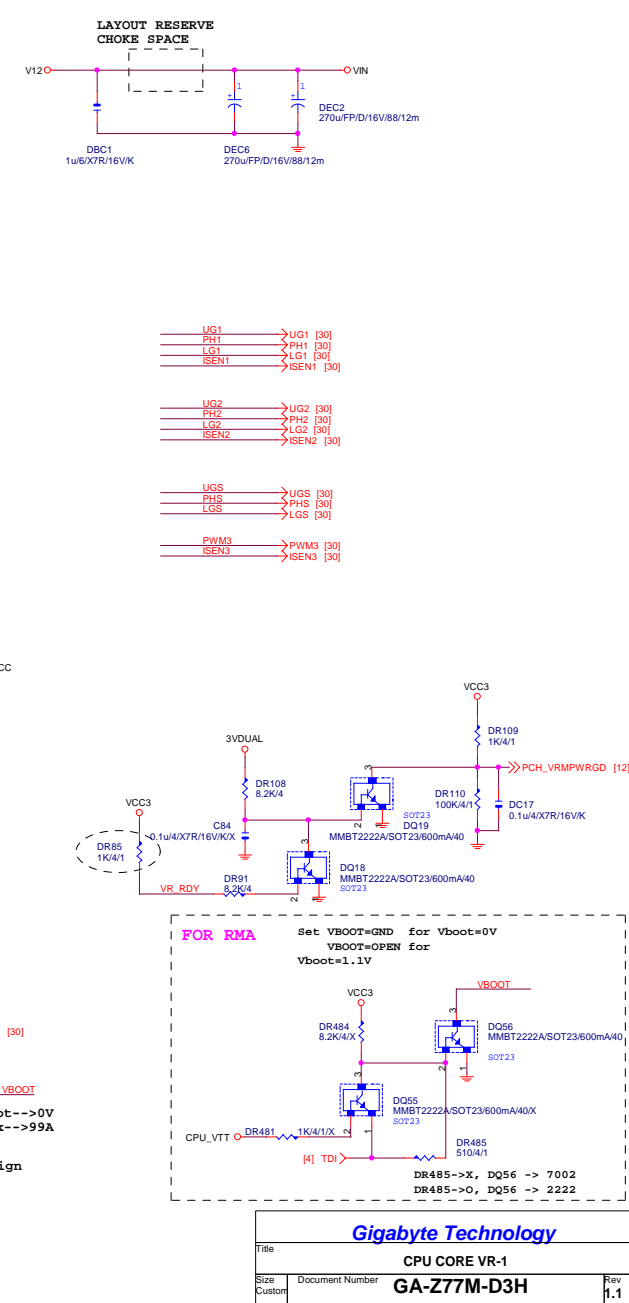


CPU_VTT_PWR_SEQ



VTT_PWRGD





PHASE 1



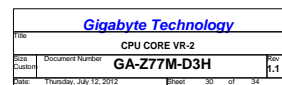
PHASE 3



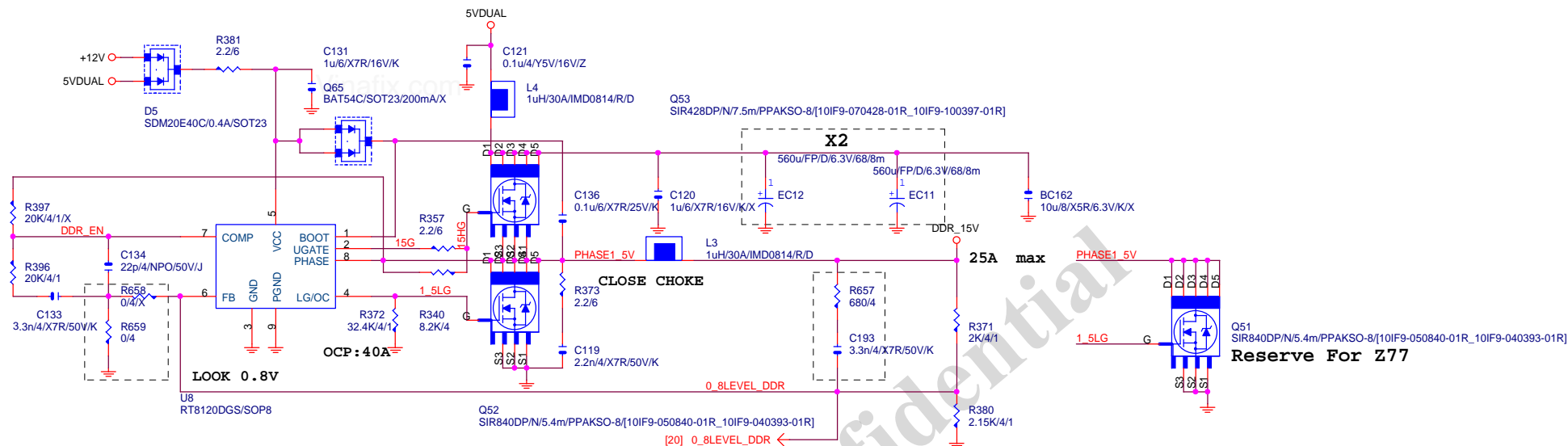
PHASE 2



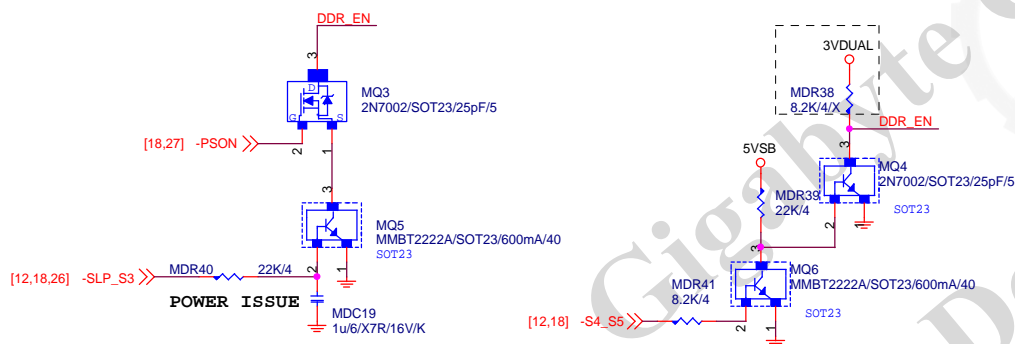
VAXG



DDR15V



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 $2 \times 7.99 = 15.98 > 11.45 \text{A}$

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

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

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Title	DDR POWER
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Custom		

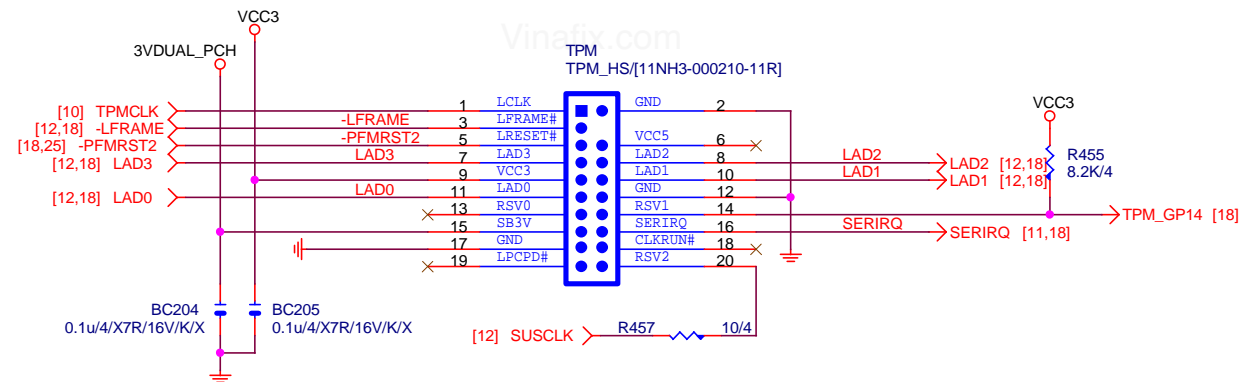
Rev
1 1

Date: Thursday, July 12, 2012

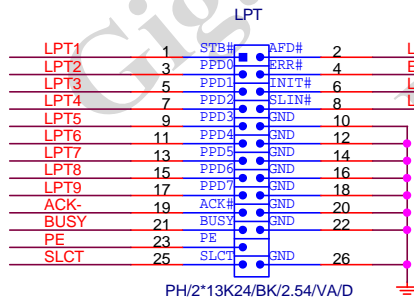
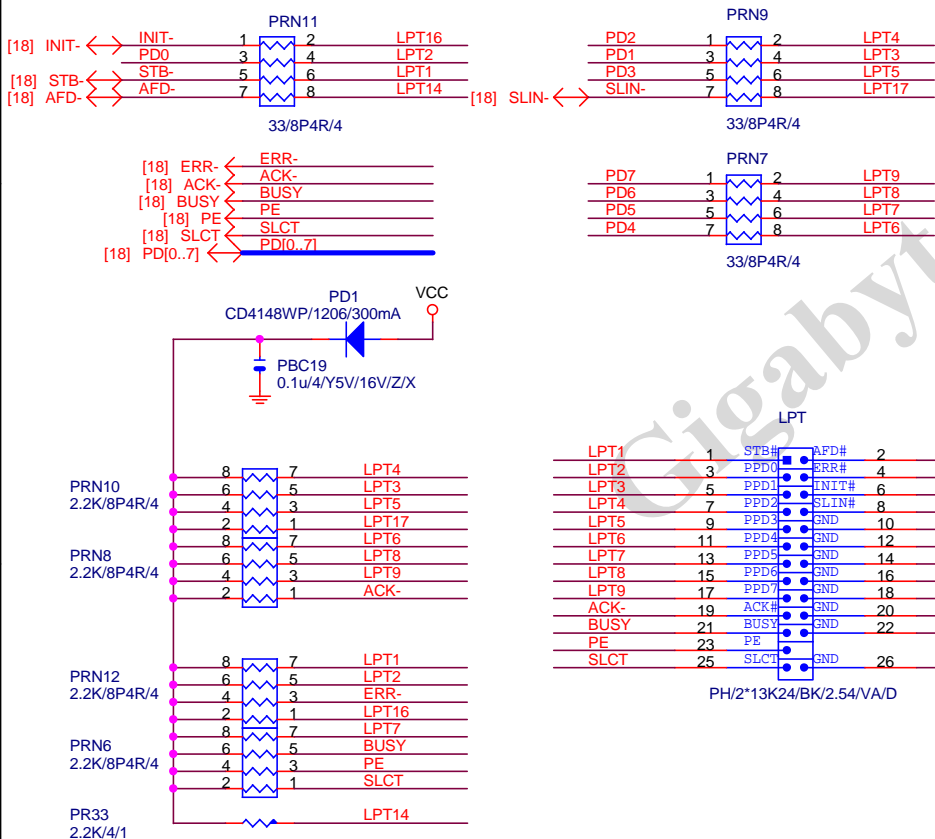
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Sh

TPM



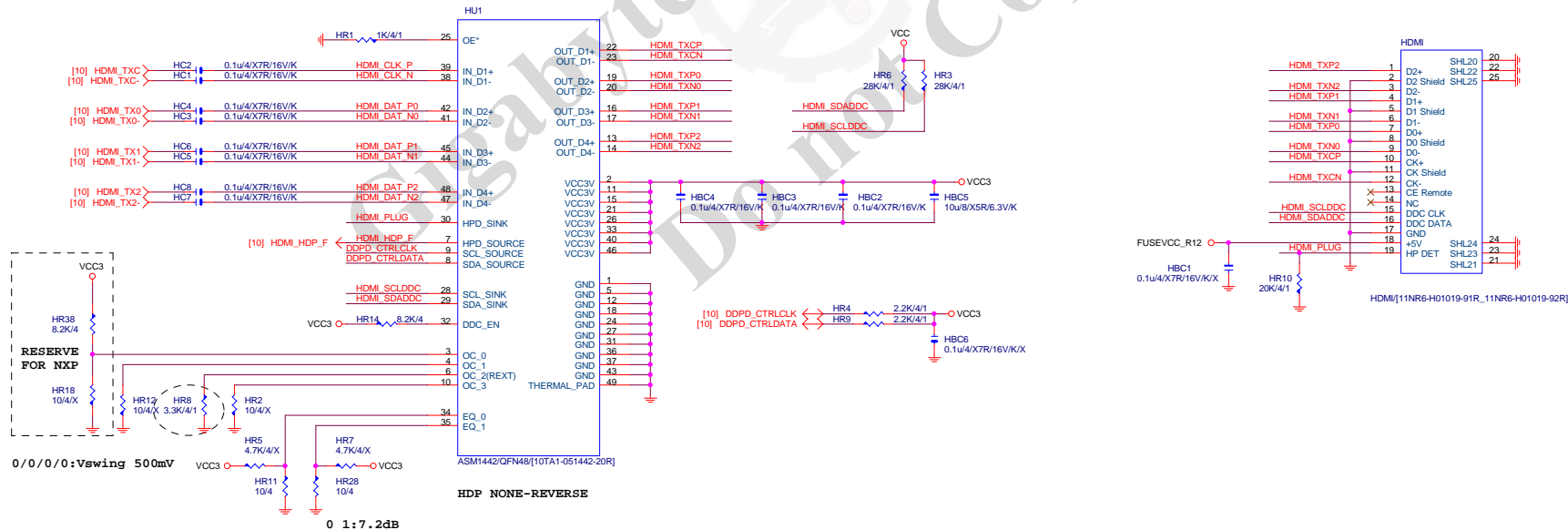
LPT PORT



Gigabyte Technology

Title		
LPT		
Size	Document Number	Rev
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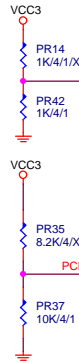
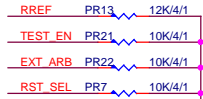
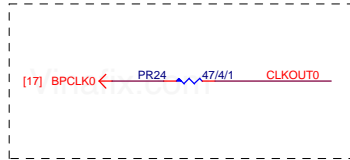
HDMI LEVEL SHIFT



PCIE TO PCI

PCI:5/4/5 Impedance=50 +- 15%

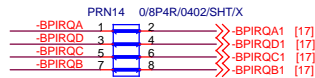
BA D[0..31] <-> BA_D[0..31] [17]
 -BC_BE0 <-> BC_BE0 [17]
 -BC_BE1 <-> BC_BE1 [17]
 -BC_BE2 <-> BC_BE2 [17]
 -BC_BE3 <-> BC_BE3 [17]
 -BPERR <-> BPERR [17]
 -BSERR <-> BSERR [17]
 -BPAR <-> BPAR [17]
 -BPLOCK <-> BPLOCK [17]
 -BDEVSEL <-> BDEVSEL [17]
 -BSTOP <-> BSTOP [17]
 -BTRDY <-> BTRDY [17]
 -BTRDY <-> BTRDY [17]
 -BFRAME <-> BFRAME [17]
 -PCIE_RST <-> PCIE_RST [14,15,16,18]
 -BPCIRST <-> BPCIRST [17]
 -BREQ0 <-> BREQ0 [17]
 -BGNT0 <-> BGNT0 [17]
 -BPCIPME1 <-> BPCIPME1 [17]



High: Enable PCI CLK 66MHz
 Low: Disable PCI CLK 66MHz

High: PCICLK INPUT form CLK Gen
 Low: PCICLK OUTPUT form IT8893 chip

IT8892



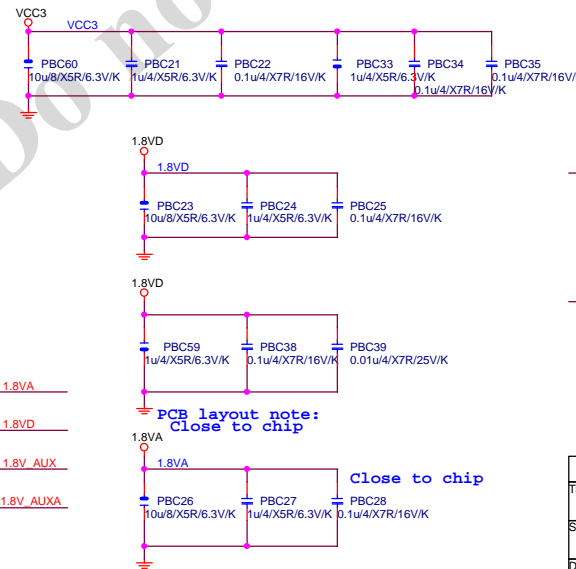
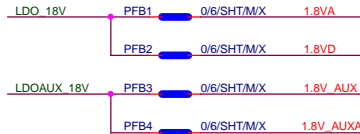
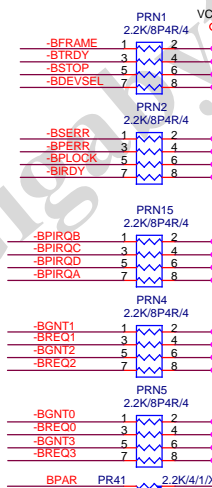
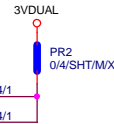
PCI slot



PCI slot

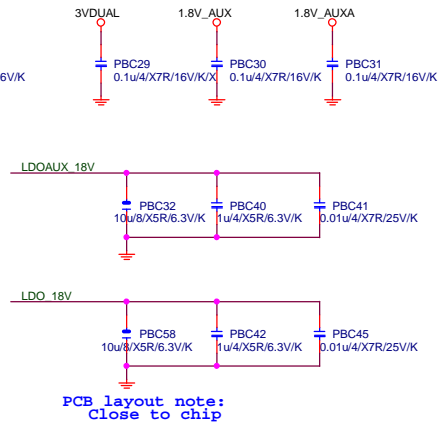


chipset side



PCB layout note:
 Close to chip

Close to chip



PCB layout note:
 Close to chip

Gigabyte Technology

Title				ITE IT8892E		Rev 1.1
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