

# Model Name: GA-Z77M-D3H-MVP Revision 1.01

SHEET

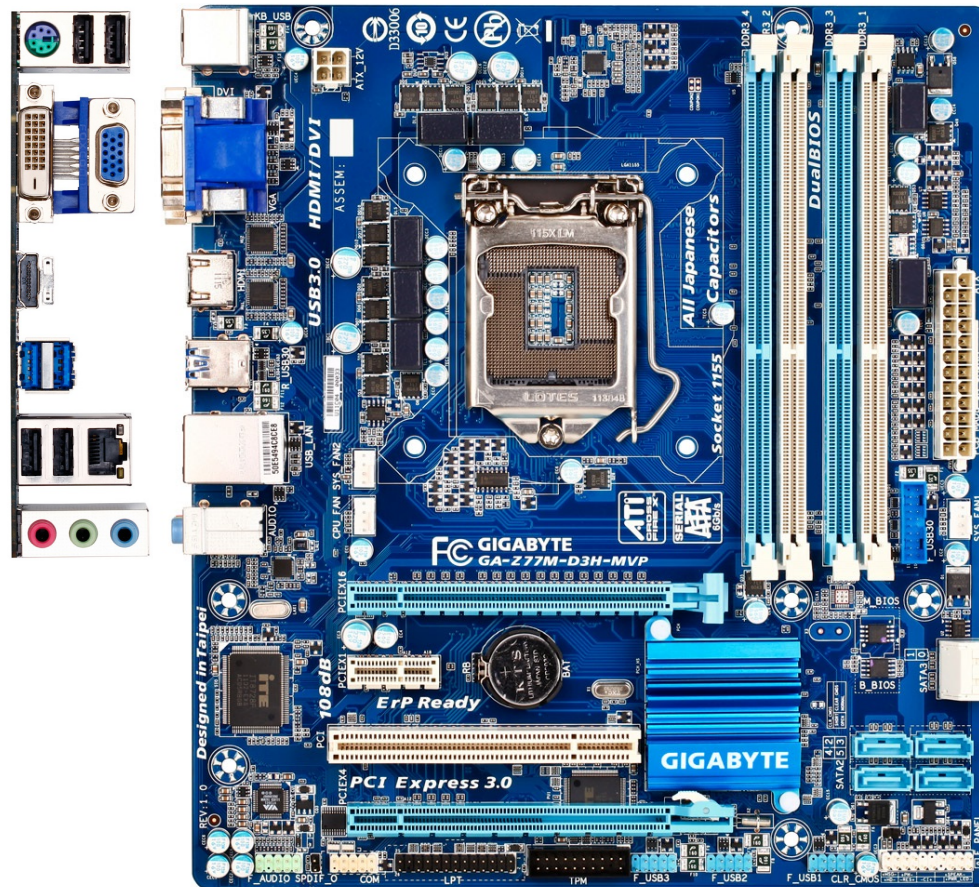
TITLE

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



**Gigabyte Technology**

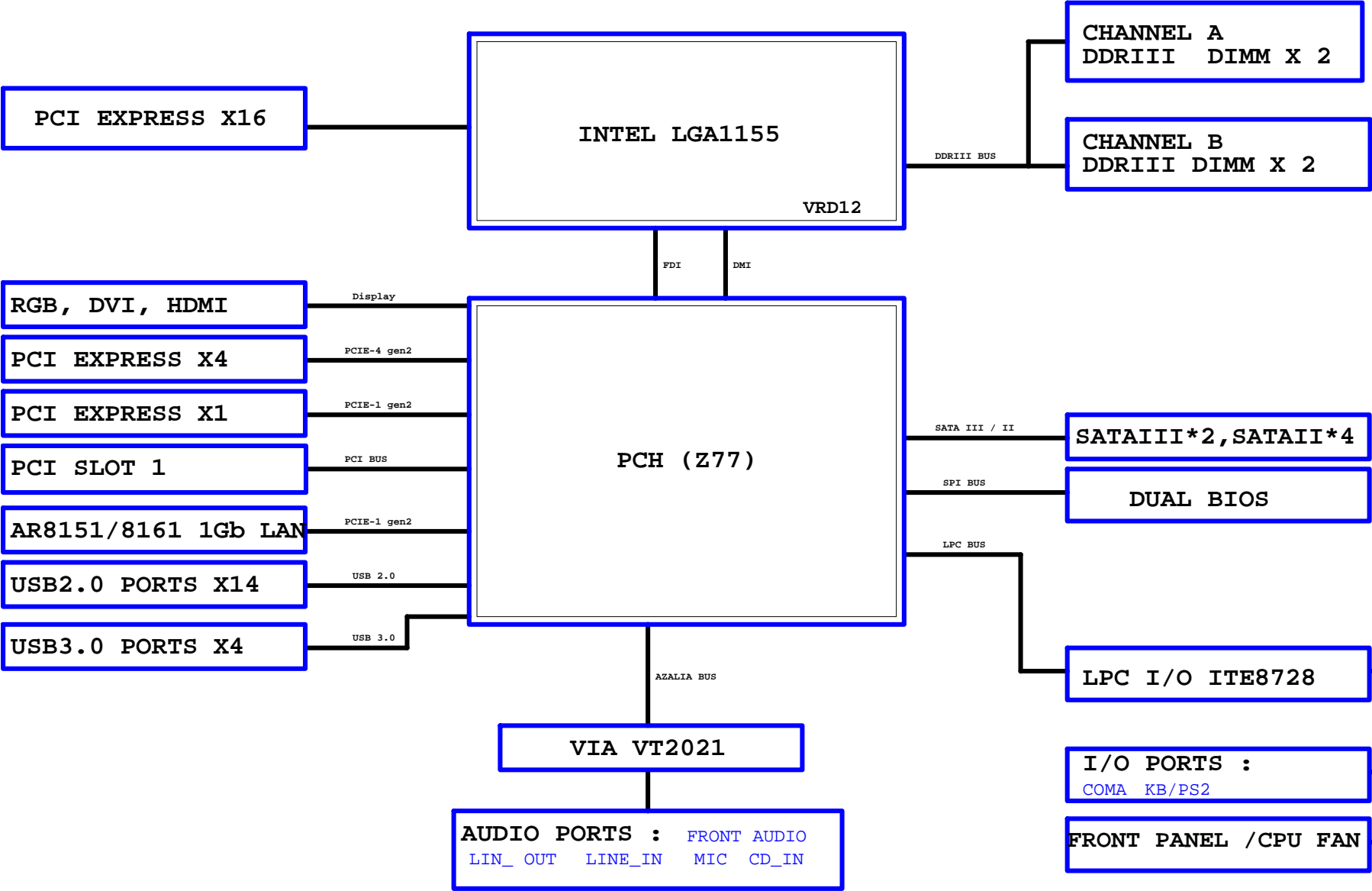
Cover Sheet

Title	Document Number	Rev
Size	GA-Z77M-D3H-MVP	1.01
Custom		
Date:	Friday, April 06, 2012	Sheet 1 of 34

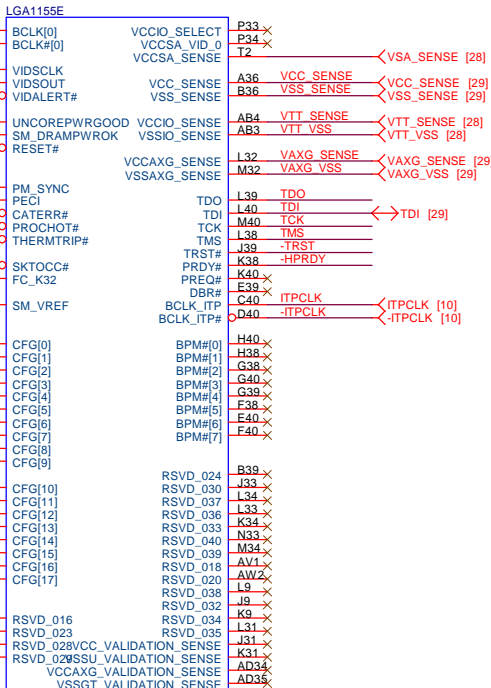
## D

AA

BLOCK DIAGRAM



LGA1155E

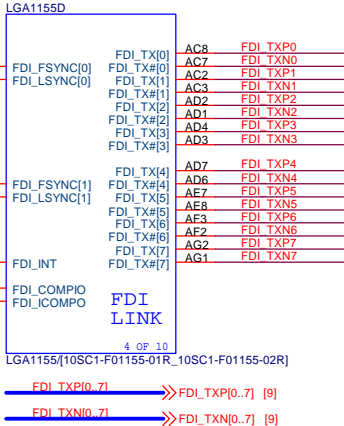


CFG	H	L	NOTE
0	RSDV	RSDV	RSDV
1	RSDV	RSDV	RSDV
2	<b>NORM</b>	<b>Reverse</b>	LANE REVERSAL[0],x16
3	RSDV	RSDV	RSDV
4	RSDV	RSDV	RSDV
7	RSDV	RSDV	RSDV
8	RSDV	RSDV	RSDV
9	RSDV	RSDV	RSDV
10	RSDV	RSDV	RSDV
11	RSDV	RSDV	RSDV
12	RSDV	RSDV	RSDV
13	RSDV	RSDV	RSDV
14	RSDV	RSDV	RSDV
15	RSDV	RSDV	RSDV
16	RSDV	RSDV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

CFG 0-17 all internal PULL-UP



LGA1155D



[LGA1155C](#)

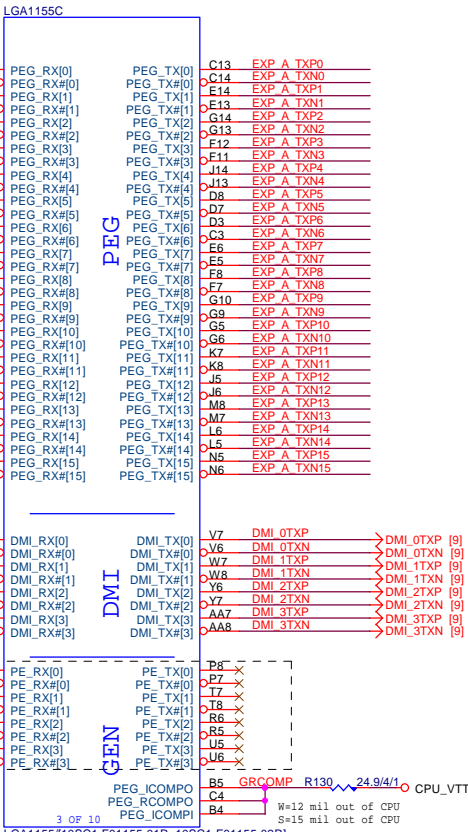


Figure 10 shows the schematic diagram of the CPU\_VTT connection. The CPU\_VTT pin is connected to a network of resistors and jumpers. R204 (1K/4/1) and R120 (1K/4/1) are connected to the CPU\_VTT pin. R146 (1K/4/1) is connected to the CPU\_VTT pin and ground. R5 (51/8P4R/4) is connected to the CPU\_VTT pin and the TDI pin. R165 (51/4/1) and R164 (51/4/1) are connected to the CPU\_VTT pin and ground. The TDI pin is connected to the TDO pin. The TMS pin is connected to the TCK pin. The HPRDY pin is connected to the TRST pin.

CPU\_VTT

BC180  
1u4/X5R/6.3V/K

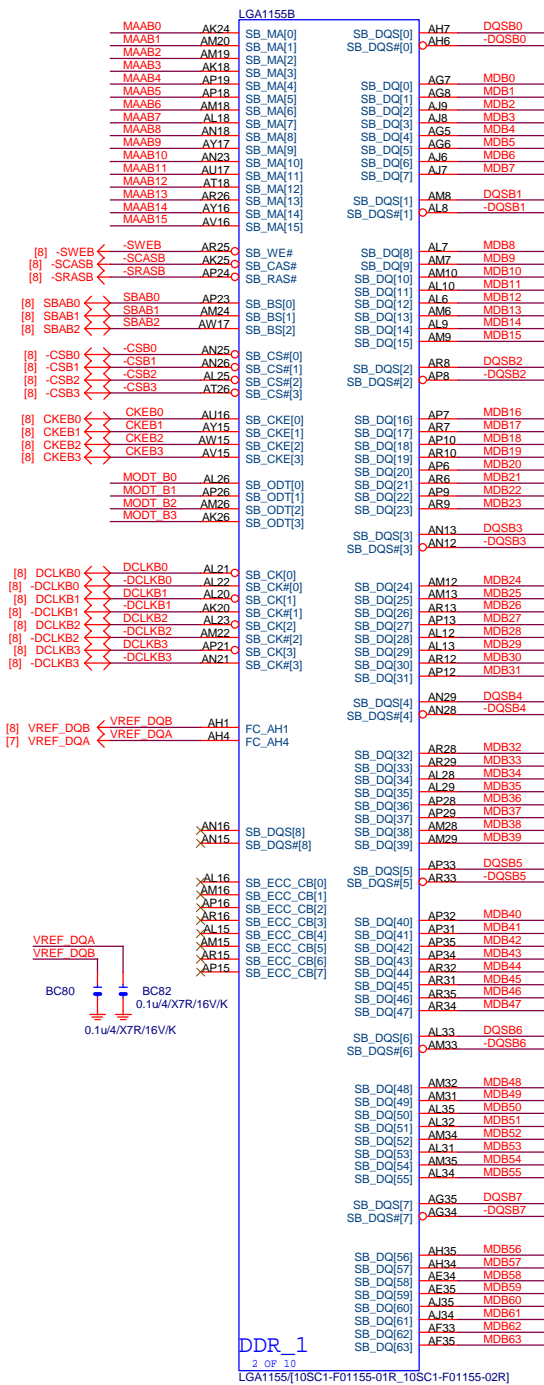
R116 90.9k  
R117 100k  
R118 100k

Title				CPU LGA1155-A			
Size	Document Number					Rev	
Custom	GA-Z77M-D3H-MVP					1.0	
Date:	Friday, April 06, 2012			Sheet	4	of	34

LGA1155 (A)



LGA1155 (B)

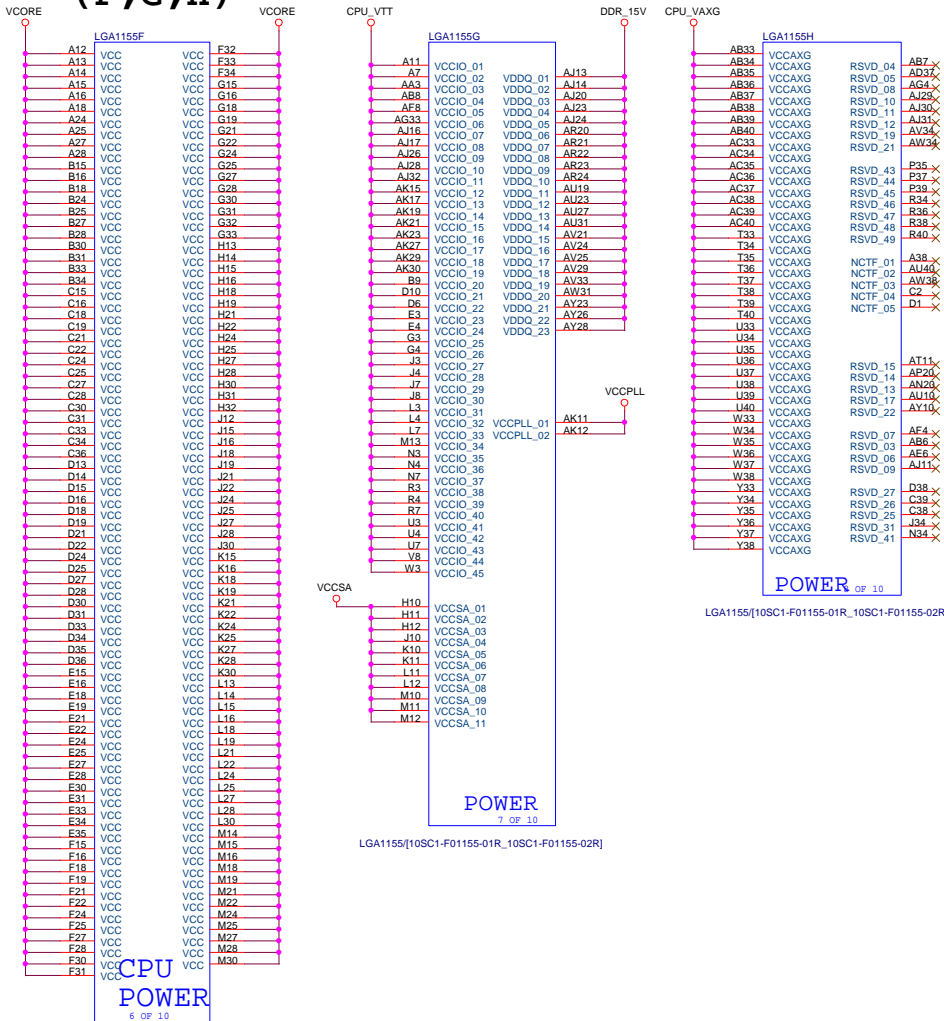


LGA1155 (CR)



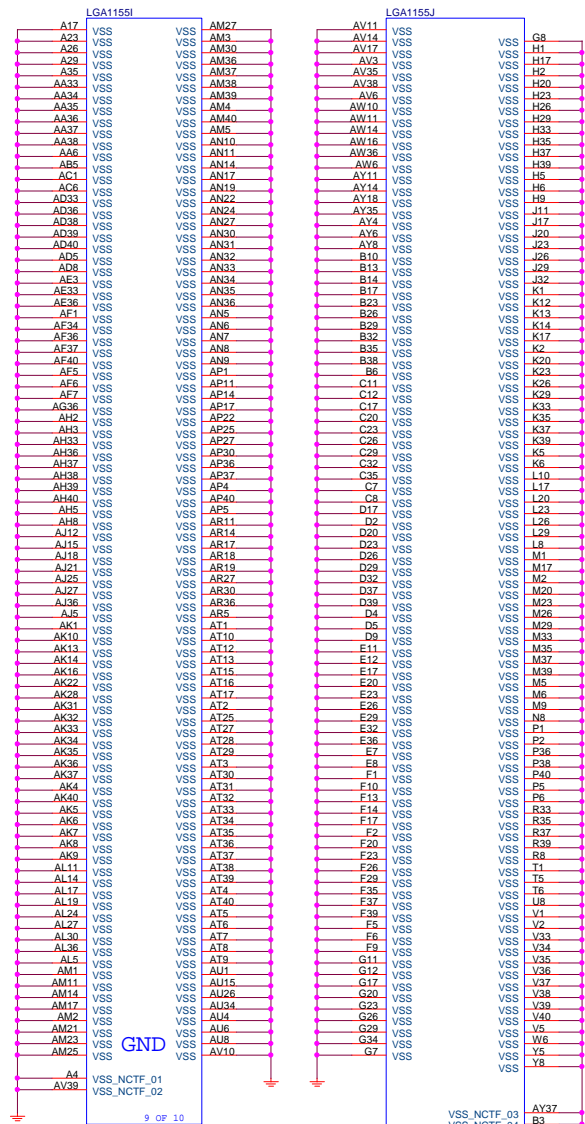


LGA1155 (F,G,H)



LGA1155/[10SC1-F01155-01R\_10SC1-F01155-02R]

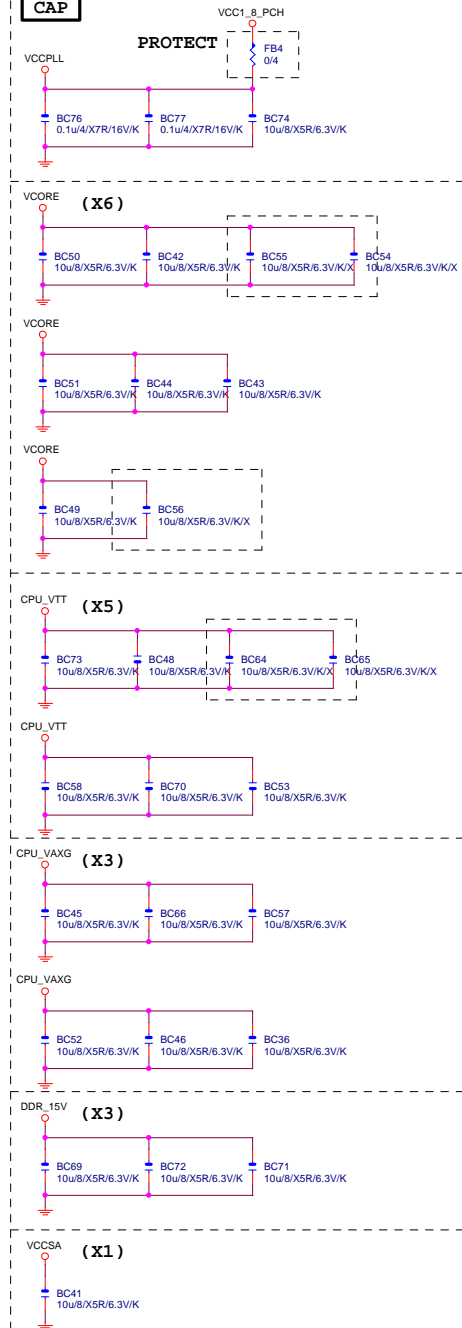
LGA1155 (I,J)



LGA1155/[10SC1-F01155-01R\_10SC1-F01155-02R]

LGA1155/[10SC1-F01155-01R\_10SC1-F01155-02R

## CAP



<b>Gigabyte Technology</b>			
Title		<b>CPU LGA1156-C</b>	
Size	Document Number	<b>GA-Z77M-D3H-MVP</b>	Rev
Custom			<b>1.0</b>
Date:	Friday, April 06, 2012	Sheet	6 of 34

(A)



DDR\_15V



DDR\_15V



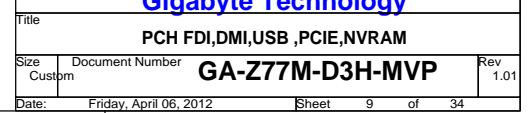
PRODUCT







**(B)**





(C)

PCHC



## H1X7-SATA2-HS-MASK

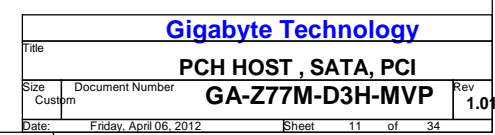
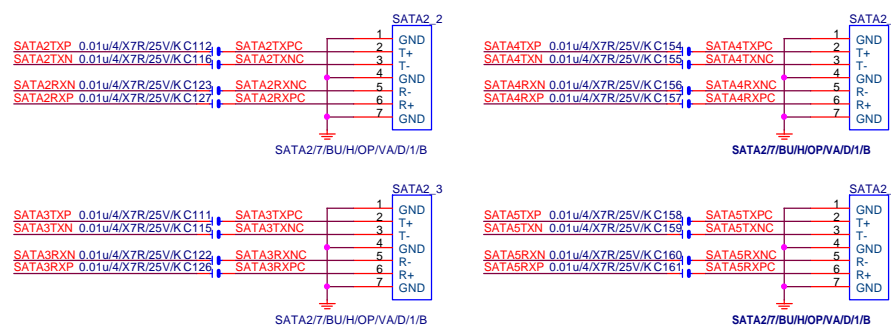
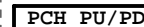


PC



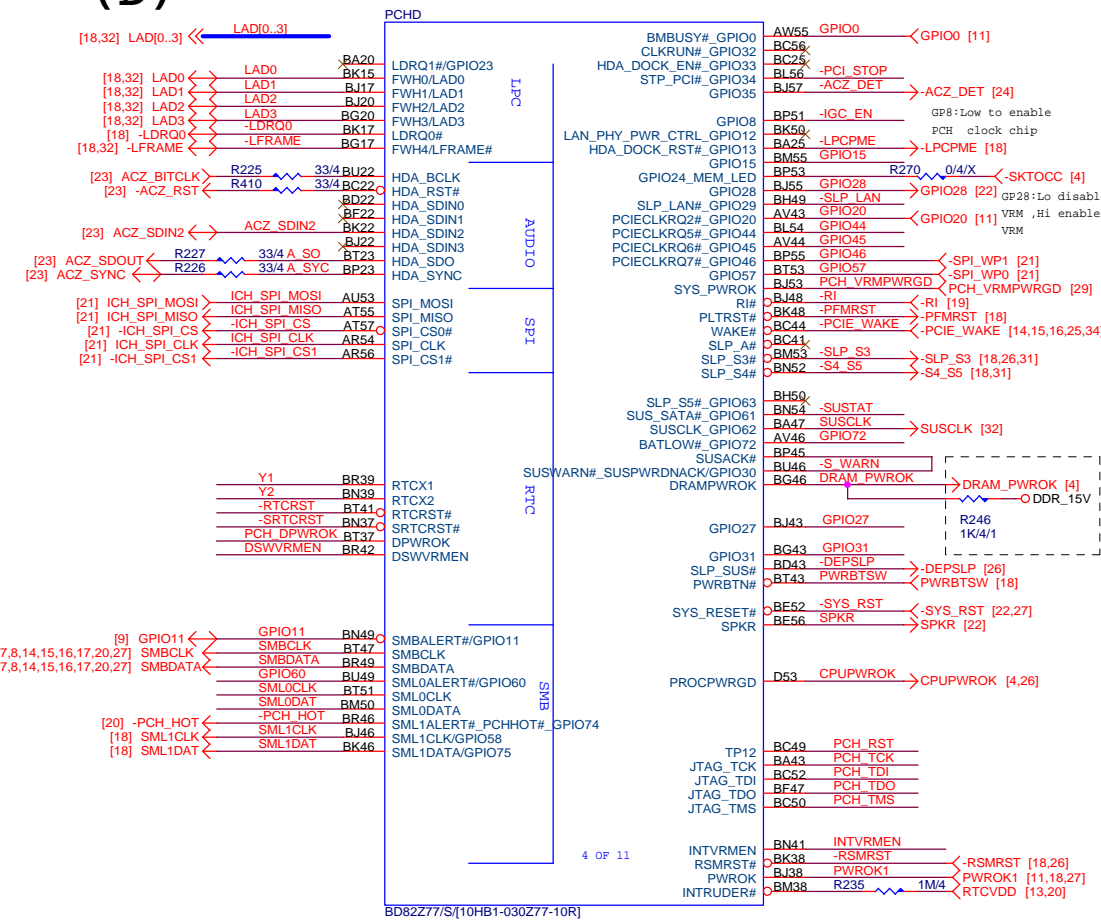
	PCH	PU/PD
1	0.00	0.00
2	0.00	0.00
3	0.00	0.00
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	0.00	0.00
8	0.00	0.00
9	0.00	0.00
10	0.00	0.00
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00
14	0.00	0.00
15	0.00	0.00
16	0.00	0.00
17	0.00	0.00
18	0.00	0.00
19	0.00	0.00
20	0.00	0.00
21	0.00	0.00
22	0.00	0.00
23	0.00	0.00
24	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
35	0.00	0.00
36	0.00	0.00
37	0.00	0.00
38	0.00	0.00
39	0.00	0.00
40	0.00	0.00
41	0.00	0.00
42	0.00	0.00
43	0.00	0.00
44	0.00	0.00
45	0.00	0.00
46	0.00	0.00
47	0.00	0.00
48	0.00	0.00
49	0.00	0.00
50	0.00	0.00
51	0.00	0.00
52	0.00	0.00
53	0.00	0.00
54	0.00	0.00
55	0.00	0.00
56	0.00	0.00
57	0.00	0.00
58	0.00	0.00
59	0.00	0.00
60	0.00	0.00
61	0.00	0.00
62	0.00	0.00
63	0.00	0.00
64	0.00	0.00
65	0.00	0.00
66	0.00	0.00
67	0.00	0.00
68	0.00	0.00
69	0.00	0.00
70	0.00	0.00
71	0.00	0.00
72	0.00	0.00
73	0.00	0.00
74	0.00	0.00
75	0.00	0.00
76	0.00	0.00
77	0.00	0.00
78	0.00	0.00
79	0.00	0.00
80	0.00	0.00
81	0.00	0.00
82	0.00	0.00
83	0.00	0.00
84	0.00	0.00
85	0.00	0.00
86	0.00	0.00
87	0.00	0.00
88	0.00	0.00
89	0.00	0.00
90	0.00	0.00
91	0.00	0.00
92	0.00	0.00
93	0.00	0.00
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

	PCH	PU/PD
1	0.00	0.00
2	0.00	0.00
3	0.00	0.00
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
17	0.00	0.00
18	0.00	0.00
19	0.00	0.00
20	0.00	0.00
21	0.00	0.00
22	0.00	0.00
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
35	0.00	0.00
36	0.00	0.00
37	0.00	0.00
38	0.00	0.00
39	0.00	0.00
40	0.00	0.00
41	0.00	0.00
42	0.00	0.00
43	0.00	0.00
44	0.00	0.00
45	0.00	0.00
46	0.00	0.00
47	0.00	0.00
48	0.00	0.00
49	0.00	0.00
50	0.00	0.00
51	0.00	0.00
52	0.00	0.00
53	0.00	0.00
54	0.00	0.00
55	0.00	0.00
56	0.00	0.00
57	0.00	0.00
58	0.00	0.00
59	0.00	0.00
60	0.00	0.00
61	0.00	0.00
62	0.00	0.00
63	0.00	0.00
64	0.00	0.00
65	0.00	0.00
66	0.00	0.00
67	0.00	0.00
68	0.00	0.00
69	0.00	0.00
70	0.00	0.00
71	0.00	0.00
72	0.00	0.00
73	0.00	0.00
74	0.00	0.00
75	0.00	0.00
76	0.00	0.00
77	0.00	0.00
78	0.00	0.00
79	0.00	0.00
80	0.00	0.00
81	0.00	0.00
82	0.00	0.00
83	0.00	0.00
84	0.00	0.00
85	0.00	0.00
86	0.00	0.00
87	0.00	0.00
88	0.00	0.00
89	0.00	0.00
90	0.00	0.00
91	0.00	0.00
92	0.00	0.00
93	0.00	0.00
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

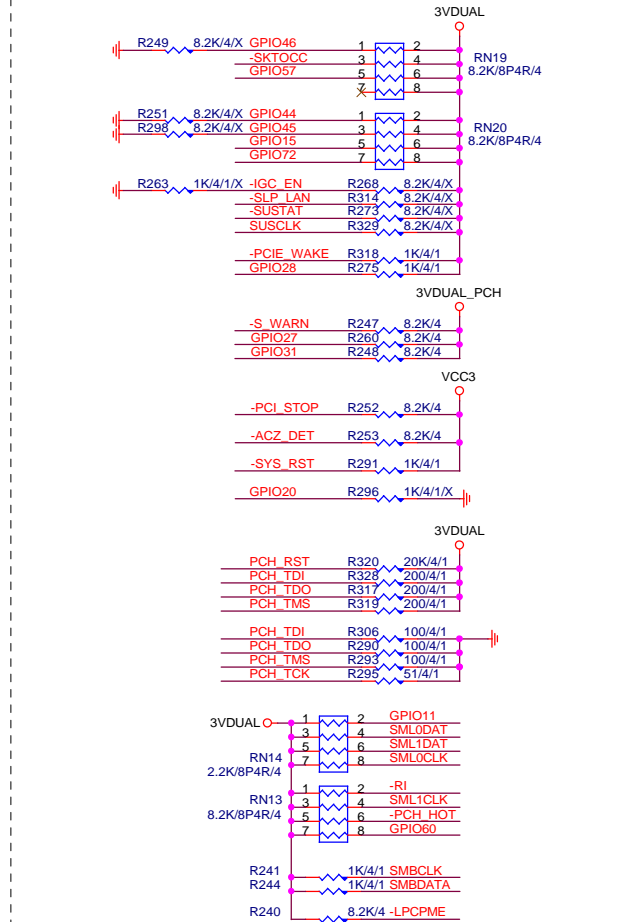


PCH

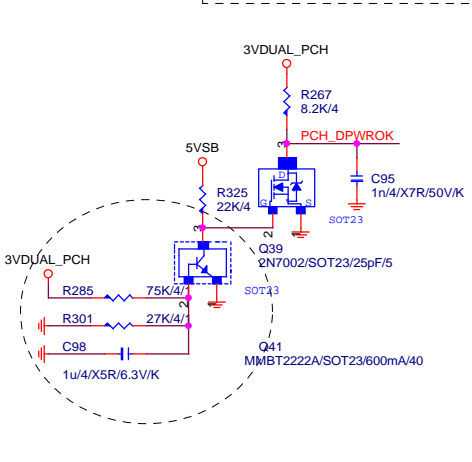
(D)



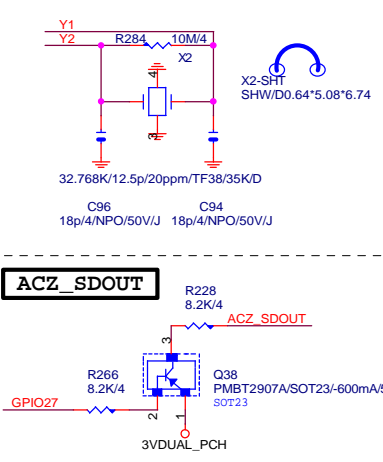
PCH PU/PD



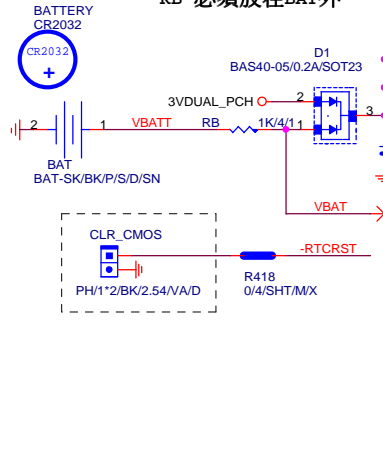
PCH\_DPWROK



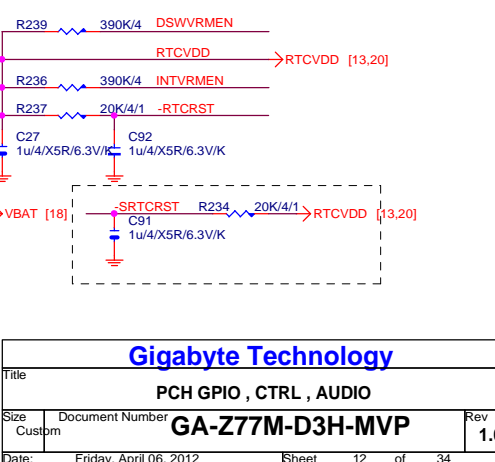
32.768KHZ



CLR\_CMOS

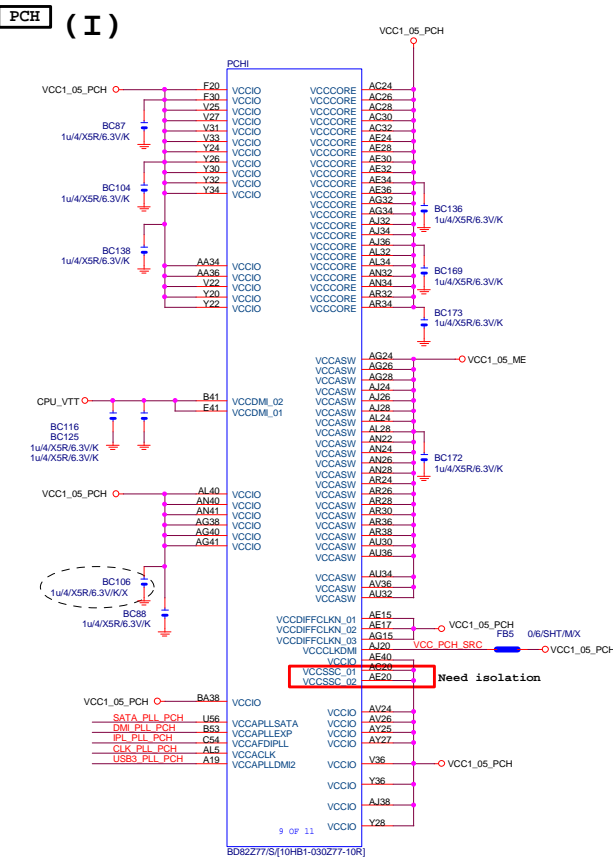


BATTERY-DUAL-4

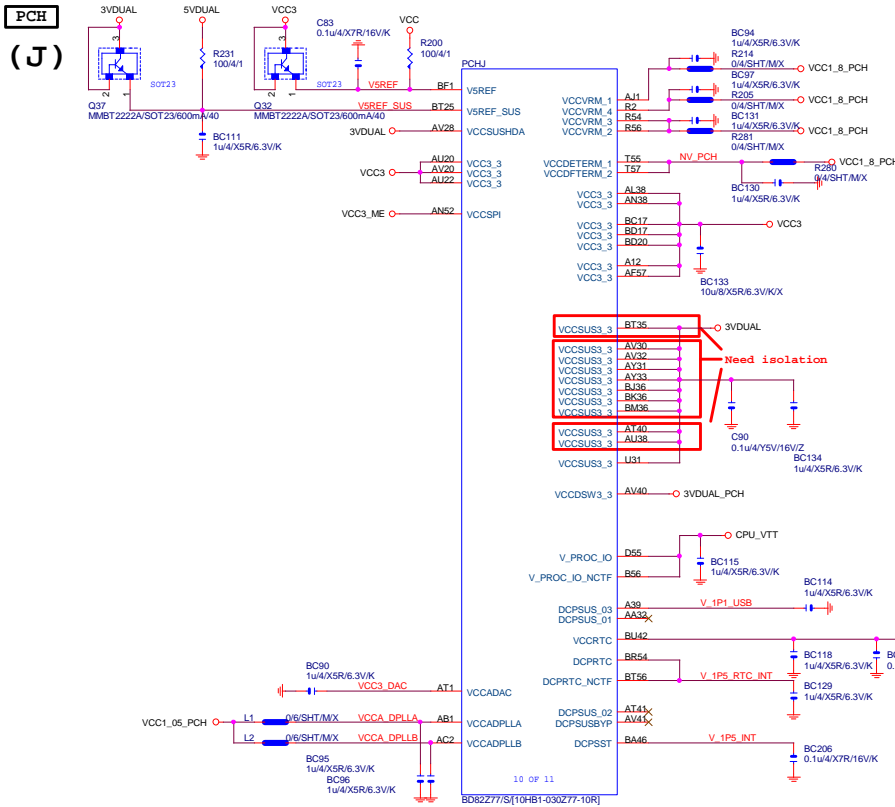


Gigabyte Technology		
Title		
PCH GPIO, CTRL, AUDIO		
Size	Document Number	Rev
Custbrn	GA-Z77M-D3H-MVP	1.01
Date:	Friday, April 06, 2012	Sheet 12 of 34

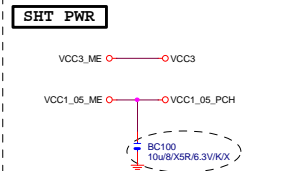
**PCH (I)**



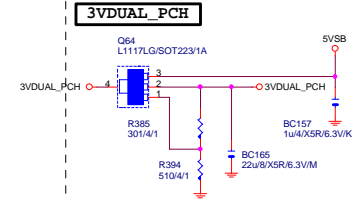
PCH



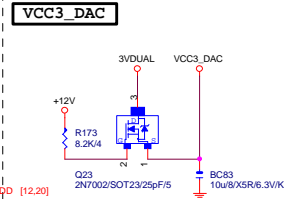
SHT PWR



3VDUAL\_PCH

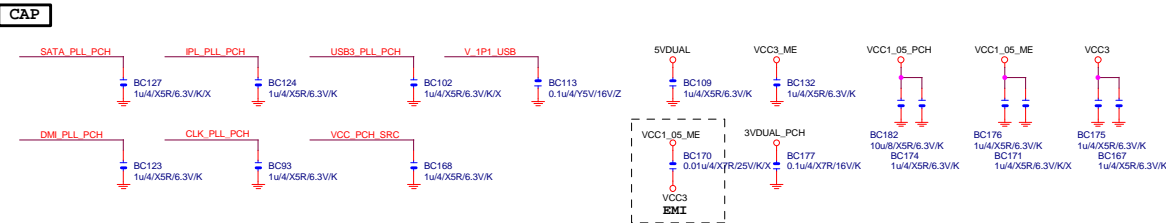


## VCC3\_DAC

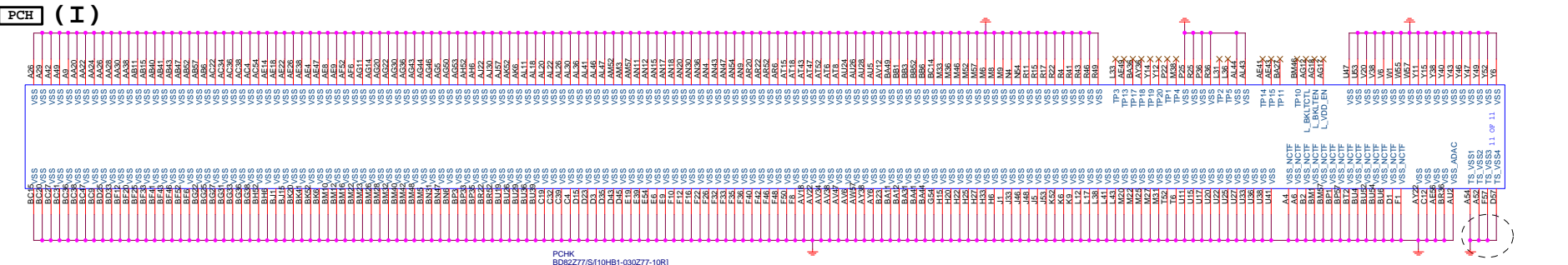


CLOSE北橋(注意震盪水波紋)

## CAP

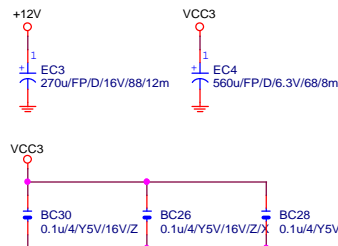


**PCH (I)**

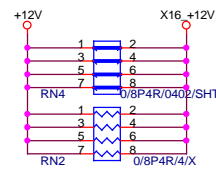




# PCIEX16 CAP



# PCIEX16 PROTECT SHT

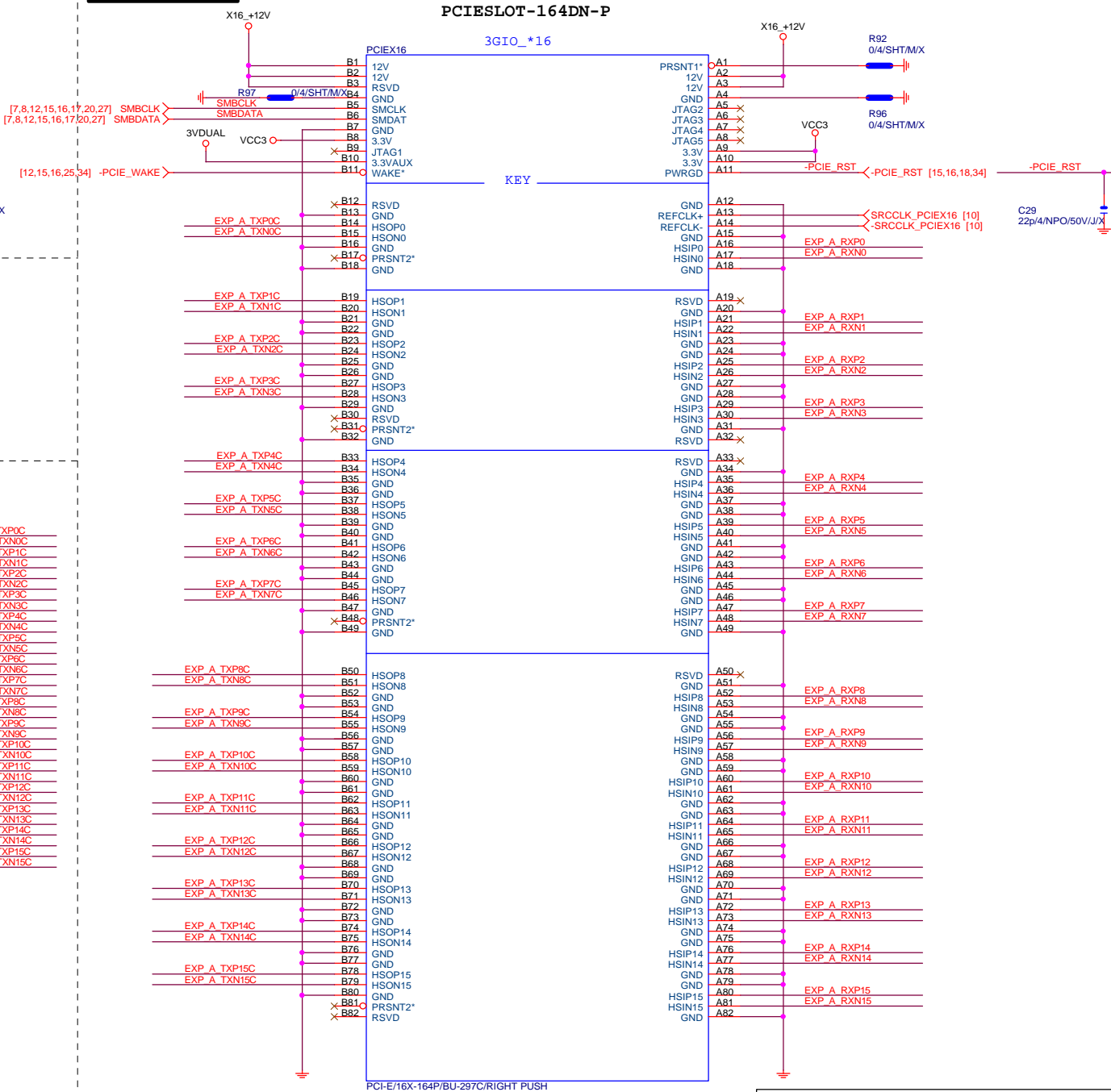


# PCIEX16 AC CAP

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



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

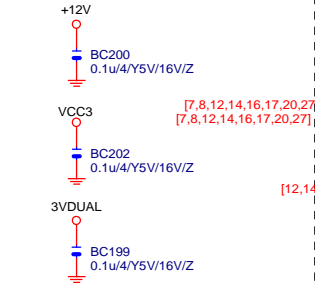
Gigabyte Technology

Title			PCI EXPRESS * 16		
Size			GA-Z77M-D3H-MVP		
Custom			Rev 1.01		
Date: Friday, April 06, 2012			Sheet 14 of 34		

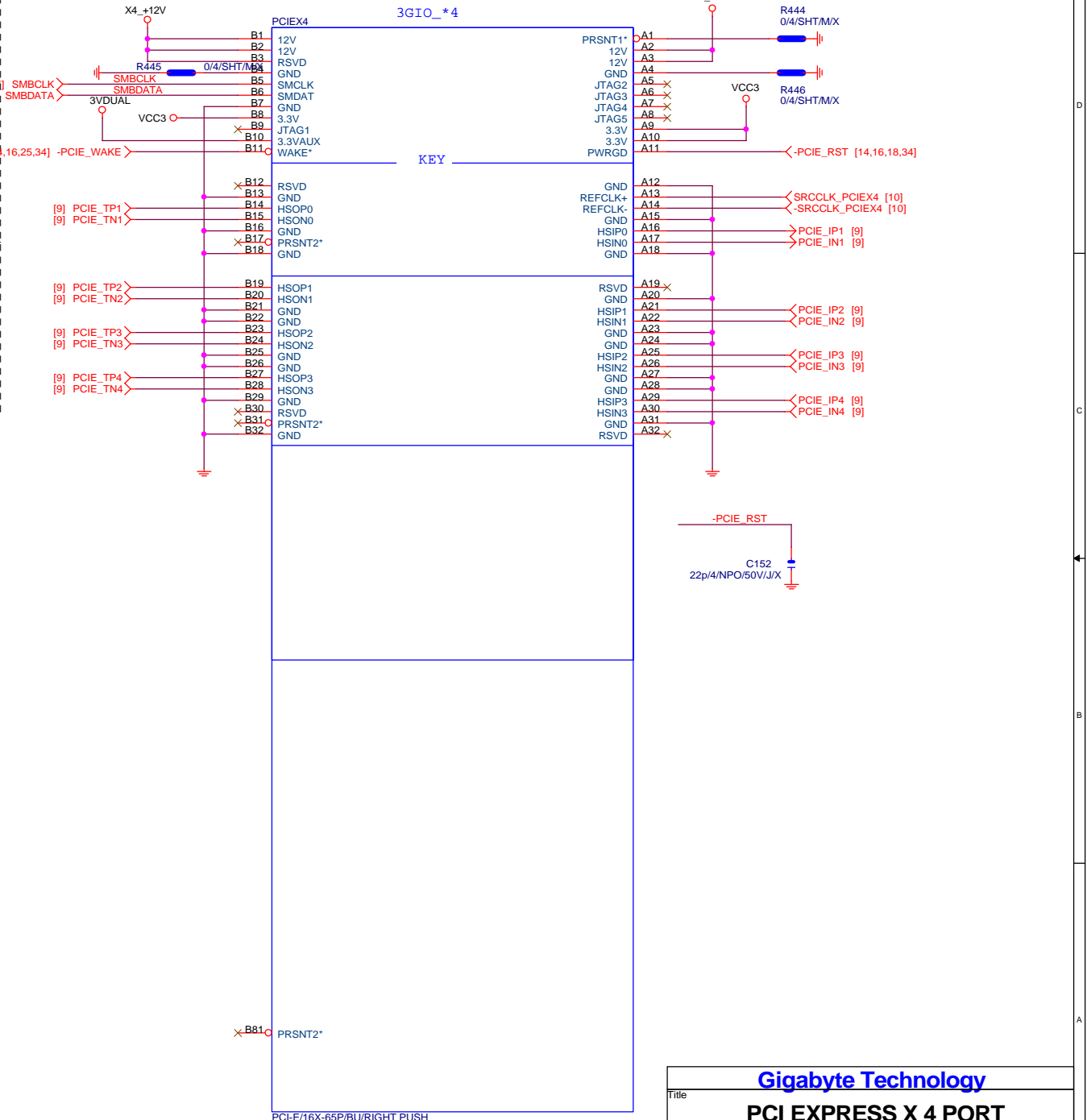
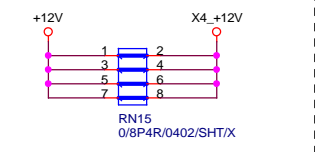
PCIEX4 CAP

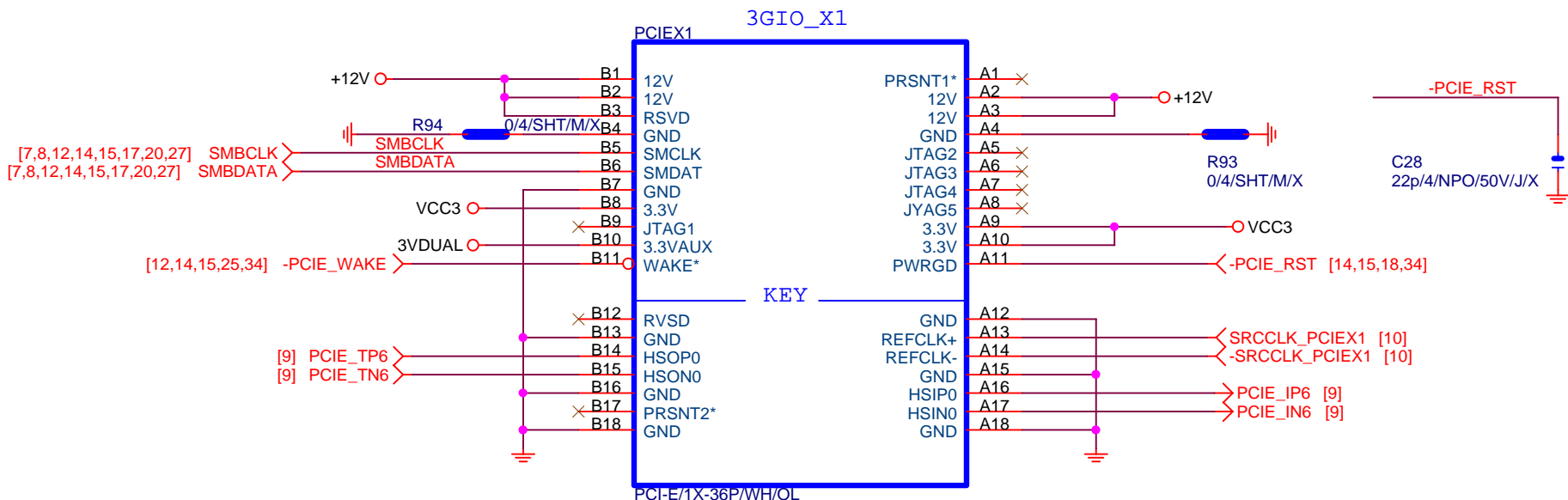
PCIEX4 SLOT

PCIESLOT-64D-98D-P



PCIEX16 PROTECT SHT





**PCIEX1 CAP**

3VDUAL



+12V



VCC3



**Gigabyte Technology**

**PCI EXPRESS X 1 PORT**

**GA-Z77M-D3H-MVP**

Rev  
**1.01**

Title

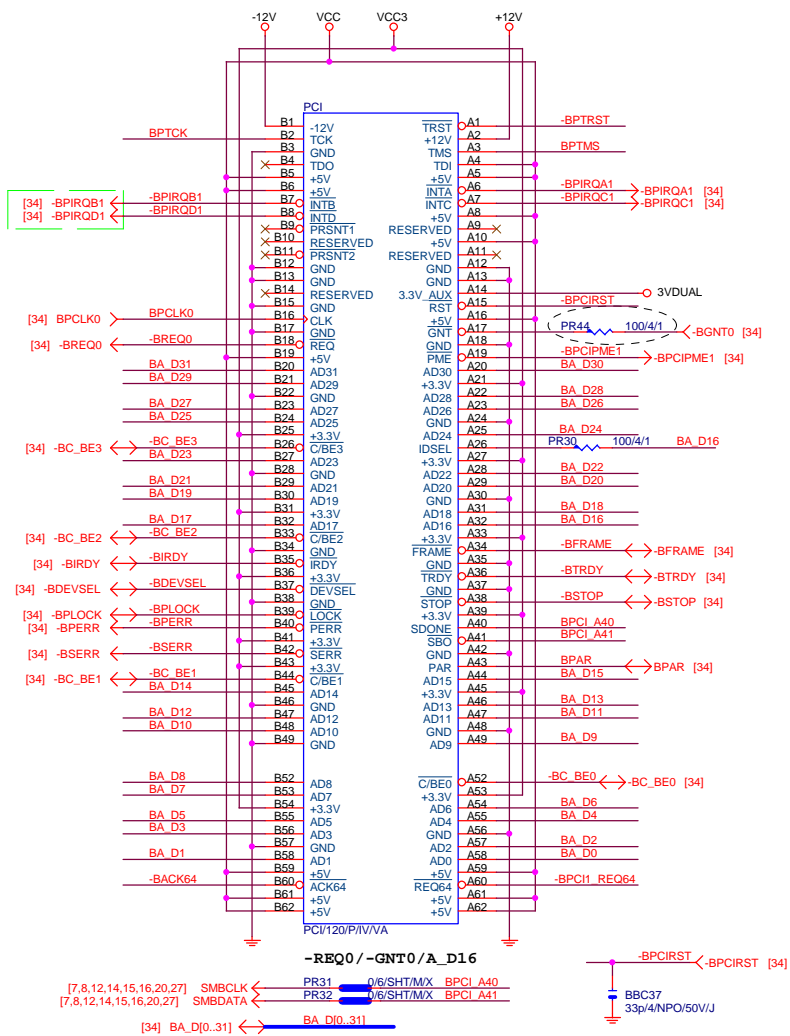
Size  
A

Document Number

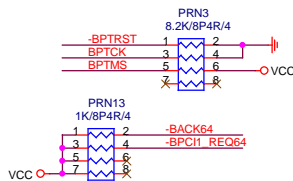
Date: Friday, April 06, 2012

Sheet 16 of 34

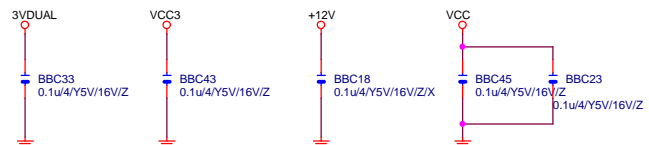
PCI SLOT



PCI	PU
-----	----



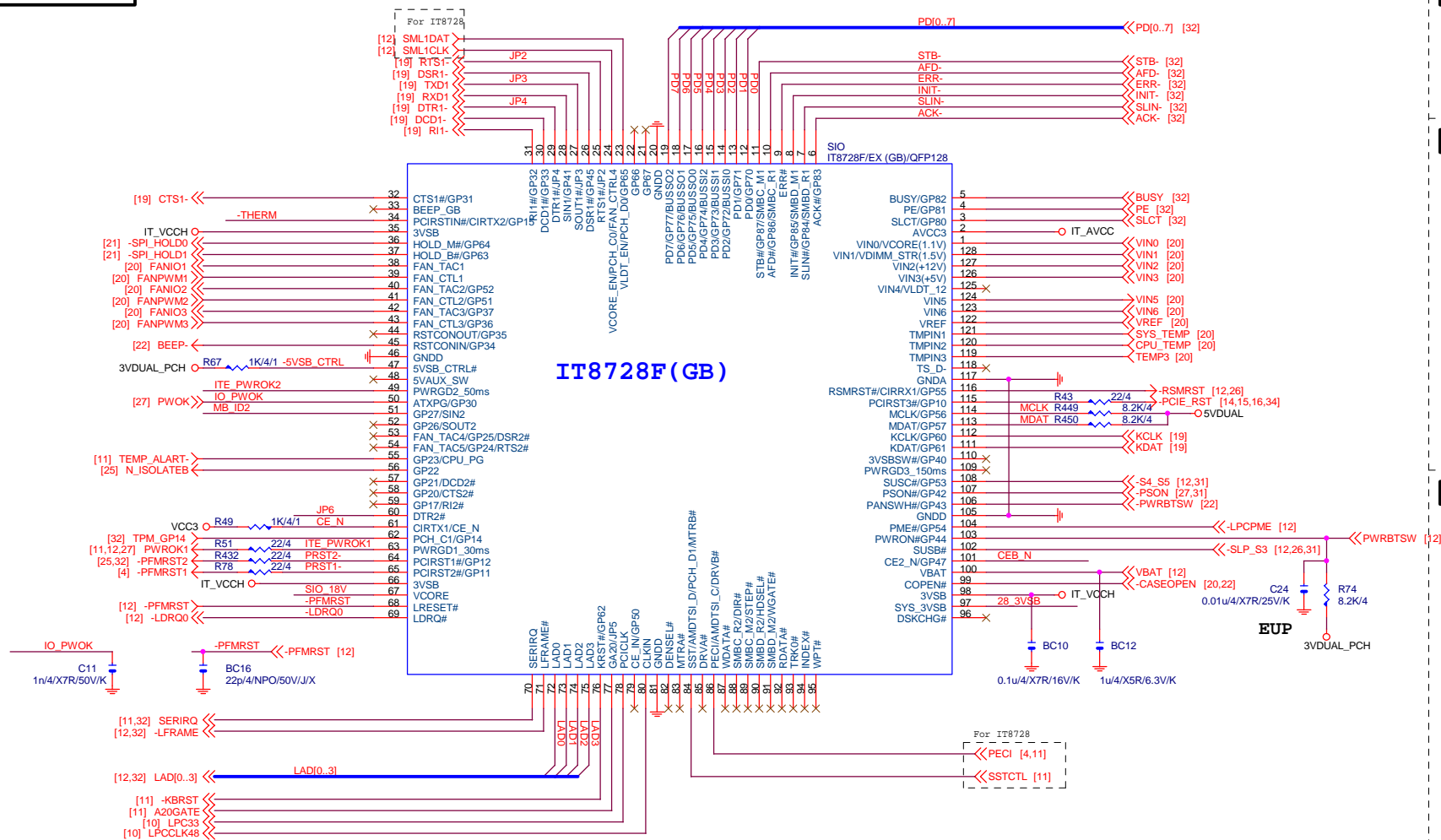
## PCI CAP



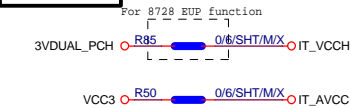
## Gigabyte Technology

Title			
PCI SLOT 1&2			
Size Custom	Document Number	GA-Z77M-D3H-MVP	Rev 1.01
Date:	Friday, April 06, 2012	Sheet 17 of 34	

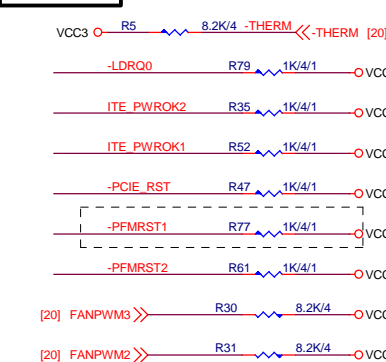
## SIO IT8728F



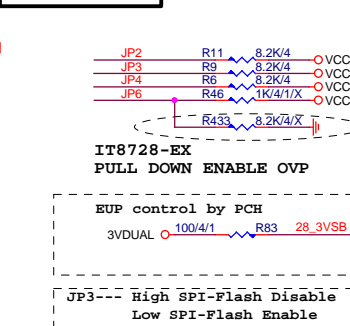
PWR	SHT
-----	-----



## SIO PU



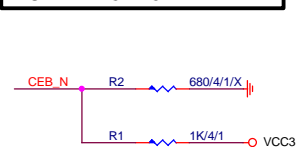
## SIO STRAP



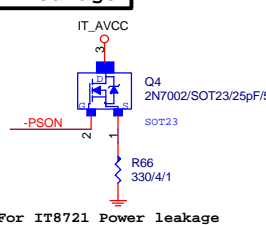
## IT8728F NOTE

	IT8728
PIN121	VCORE_EN/PCH_C0
PIN120	VLDT_EN/PCH_D0
PIN19	ATXPG
PIN31	PCH_C1
PIN53	SST/AMDTSI_D/MTRB#/PCH_D1
PIN55	PECI/AMDTSI_C/DRV#
PIN66	SYS_3VSB
PIN70	GP47
PIN95	VIN2(VCC5)
PIN96	VIN1(VCC12)
PIN97	VIN1/VDIMM_STR(1.5V)
PIN98	VIN0/VCORE(1.1V)/NC

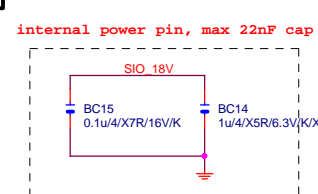
## DUAL BIOS OPT STRAP



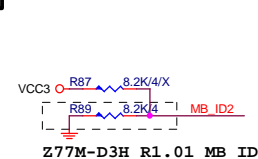
## Power leakage



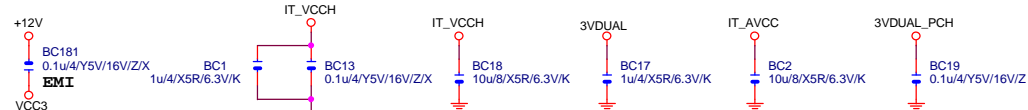
## SIO 18V



## MB ID



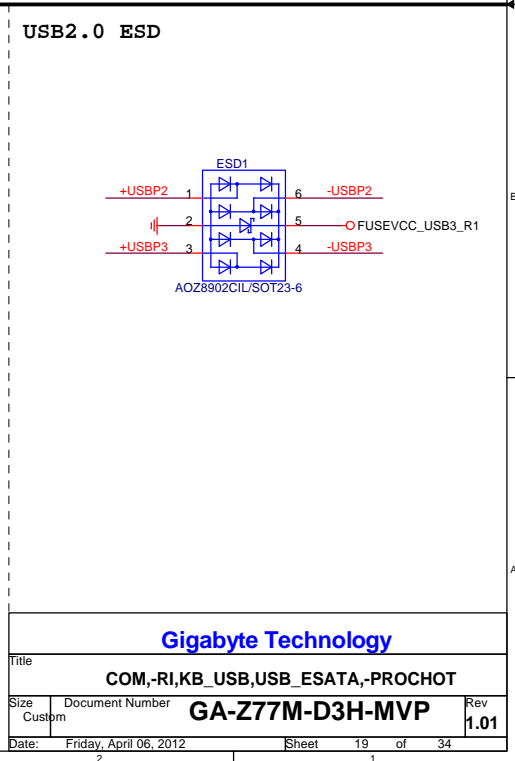
SIO	CAP
-----	-----



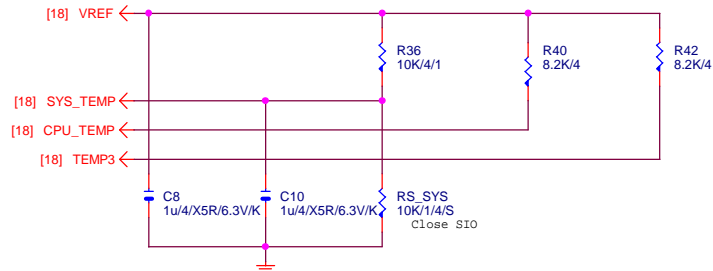
## Gigabyte Technology

Title				ITE 8728 LPC IO			
Size	Custom	Document Number	GA-Z77M-D3H-MVP				Rev
							1.01
Date:	Friday, April 06, 2012			Sheet	18	of	34

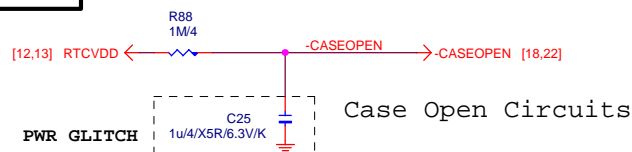




# TEMP H/W MONITOR

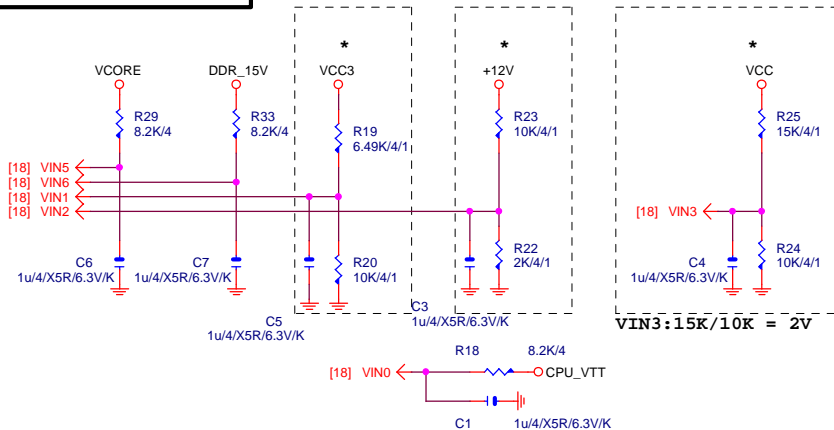


# CASE OPEN

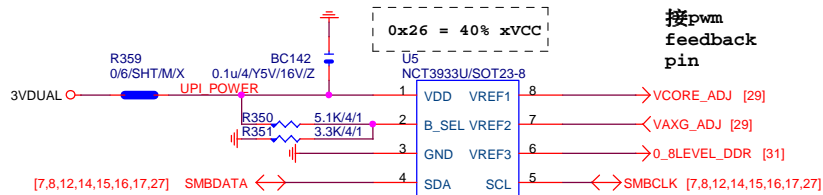


# VOLTAGE-- H/W MONITOR

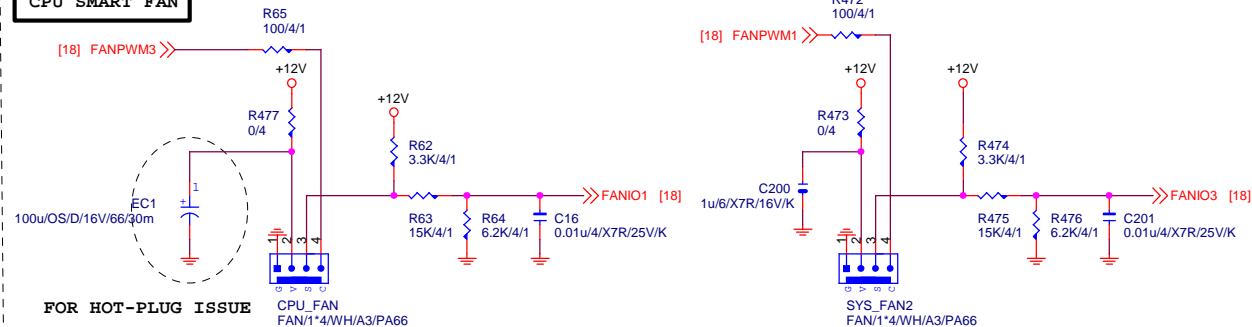
VIN2:10K/2K = 2V



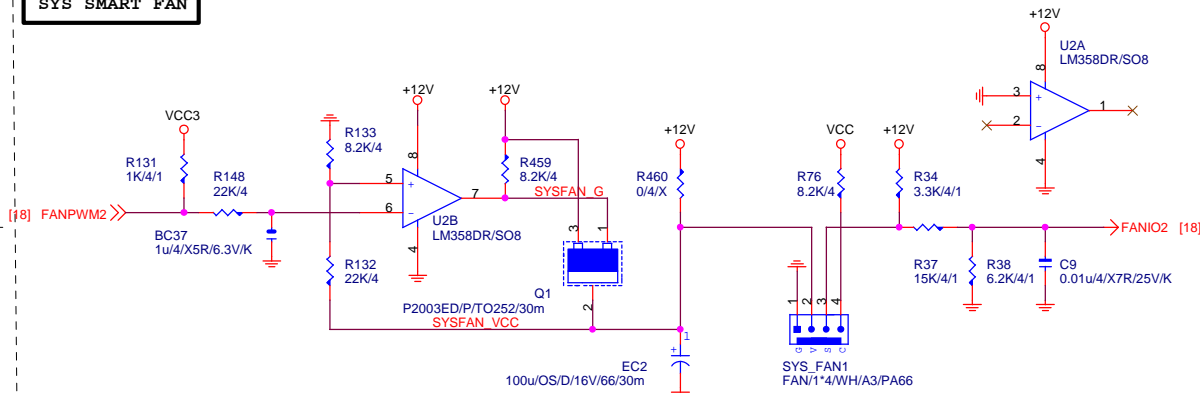
# OV NCT3933



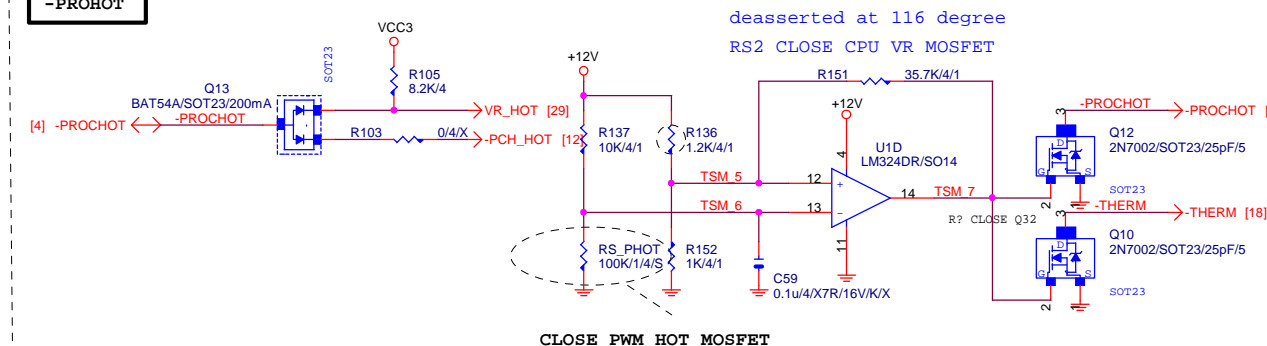
# CPU SMART FAN



# SYS SMART FAN



# -PROHOT

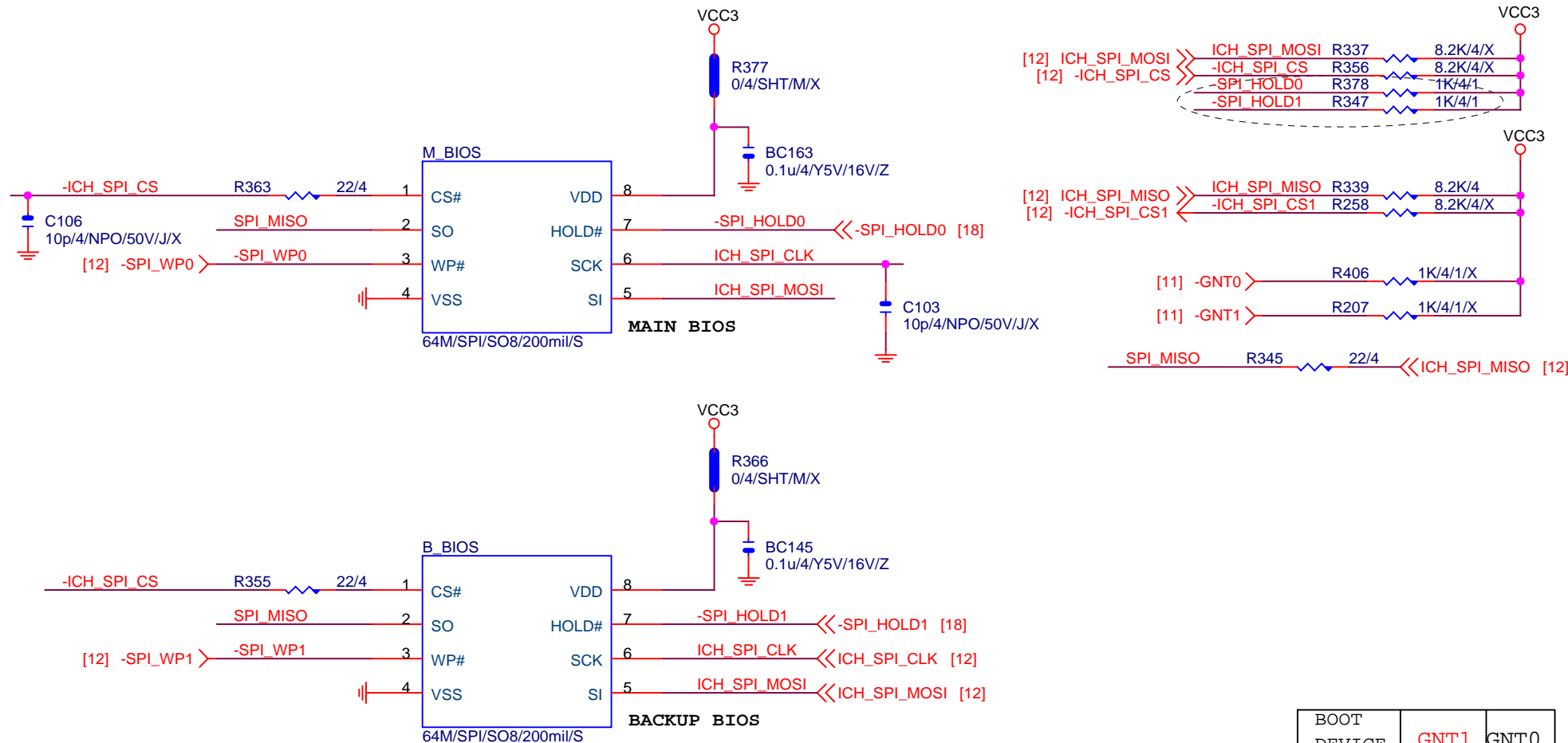


Gigabyte Technology

HWM,FAN CTRL,OV

Title	Document Number	Rev
	GA-Z77M-D3H-MVP	1.01
Date: Friday, April 06, 2012	Sheet 20 of 34	

# DUAL BIOS



B65使用64M BIOS  
使用H67暫用32M  
H61使用32M BIOS

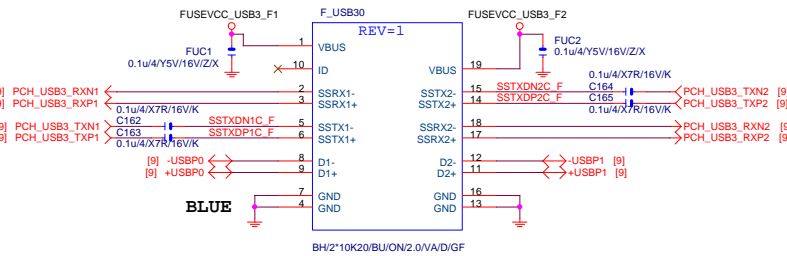
BOOT DEVICE	GNT1	GNT0
LPC	0	0
PCI	0	1
SPI	1	1

1 means floating  
0 means PD 1K

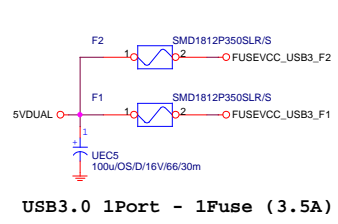
**Gigabyte Technology**

Title		
DUAL BIOS		
Size A	Document Number <b>GA-Z77M-D3H-MVP</b>	Rev <b>1.01</b>
Date:	Friday, April 06, 2012	Sheet 21 of 34

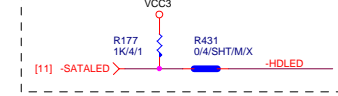
# F\_USB30



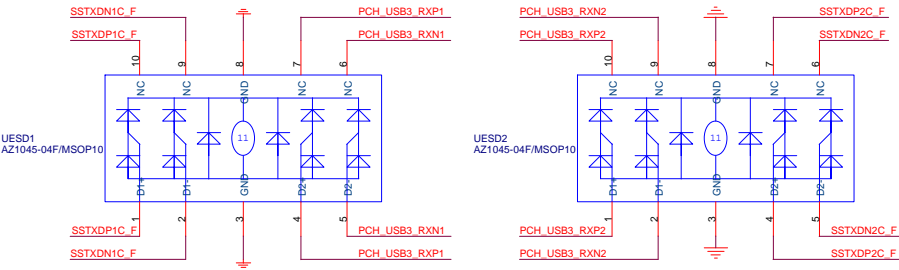
# F\_USB30 PWR



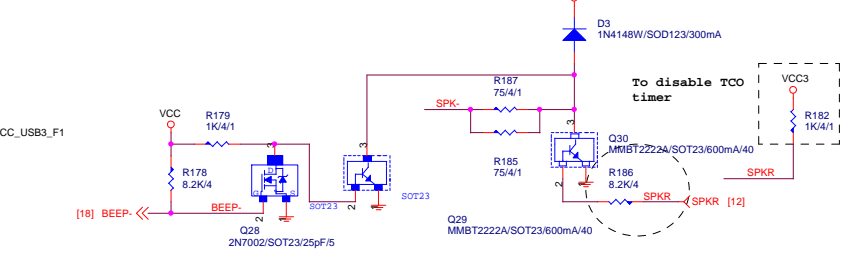
# SATA LED



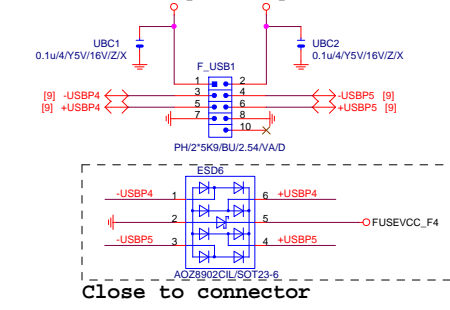
# F\_USB30 ESD PROTECT



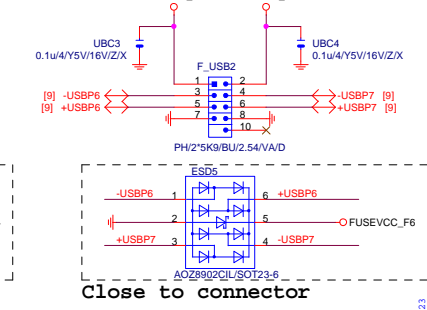
# SPKR



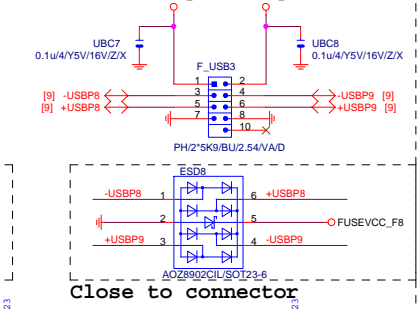
# FRONT USB1



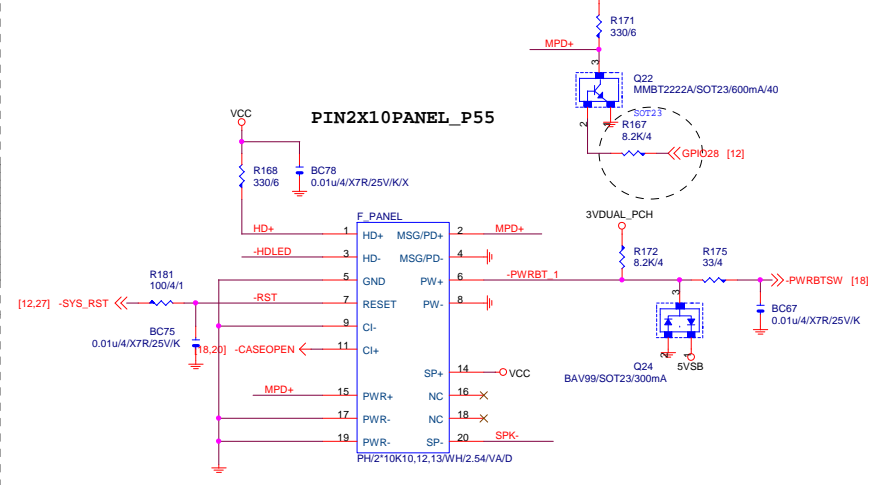
# FRONT USB2



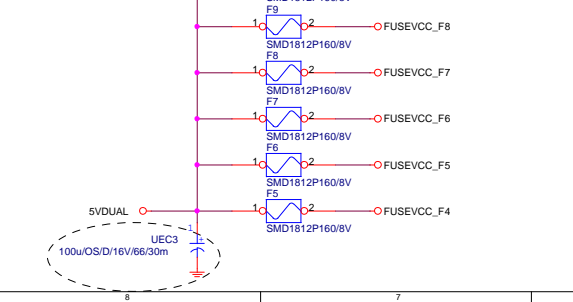
# FRONT USB3



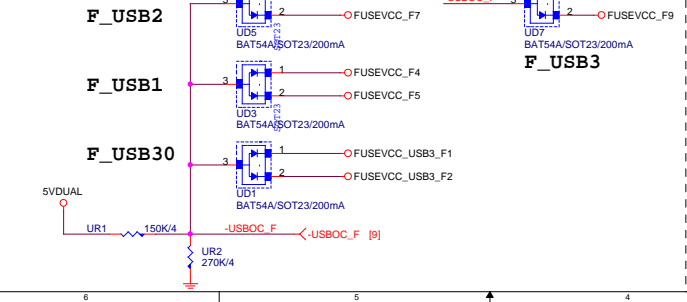
# INTEL FRONT PANEL

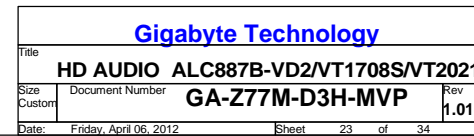


# FUSEVCC\_F

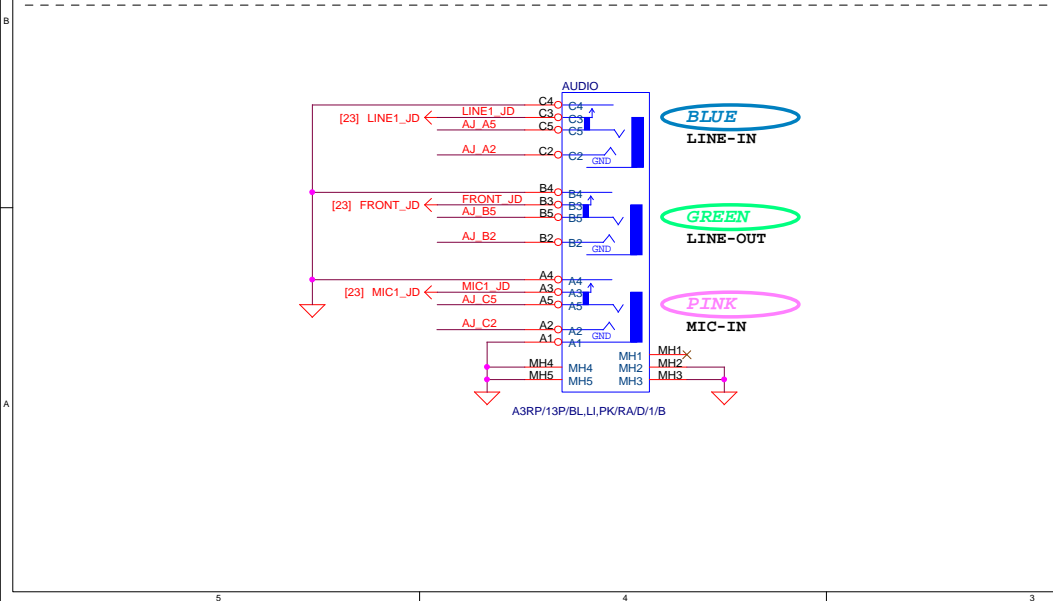


# -USBOC\_F

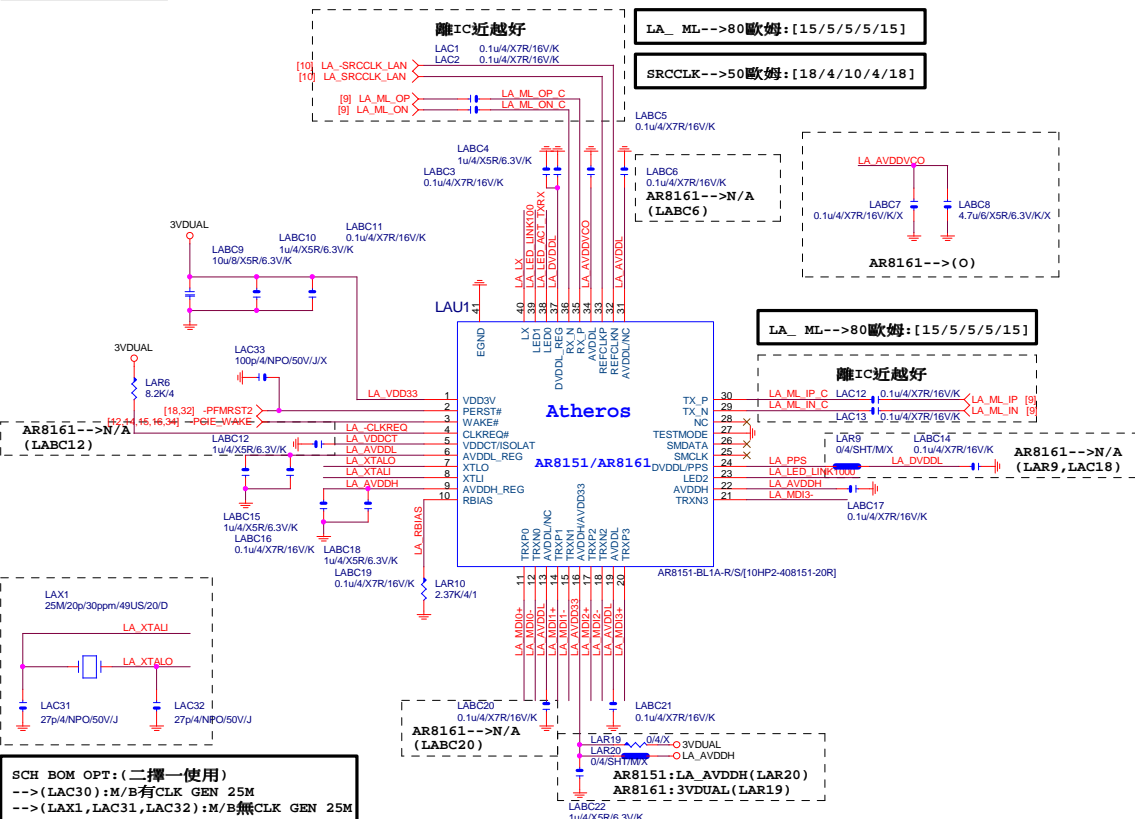


[illegible]

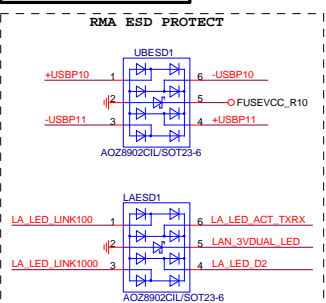




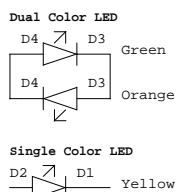
LAN:AR8151/AR8161



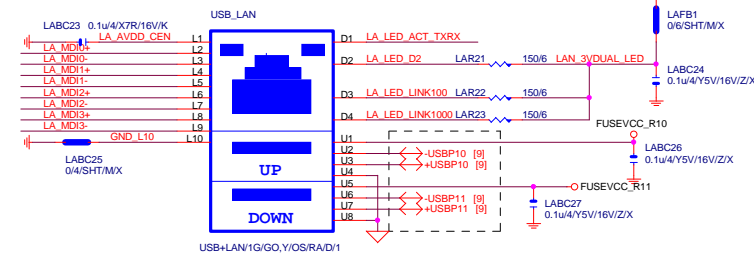
## USB LAN CONNECTOR

[illegible]

**注意:** LAN LED PROTECT: (CO-LAYOUT)  
1.ESD(6PIN):AOZ8902CIL/SOT23-6(DEFAULT)  
2.SURGE(5PIN):AZ2025-04S/SOT23-5L



I.A MDT-->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:

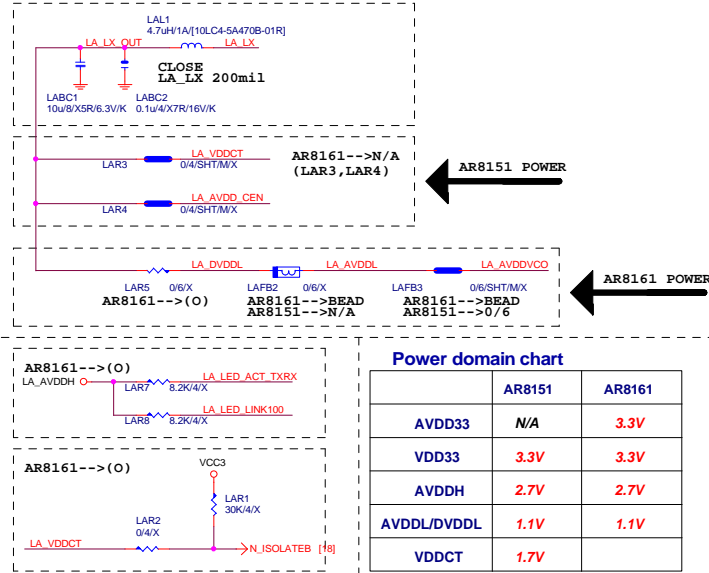
1. (紅色/12CORE/三倍): USB+LAN/1G/GO, Y/OS/RA/D/1/RED
2. (黑色/12CORE): USB+LAN/1G/GO, Y/OS/RA/D/1
3. (黑色/8CORE): USB+LAN/1G/GO, Y/OS/RA/D/8C

## LAN POWER

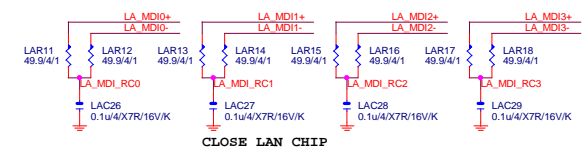
```

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

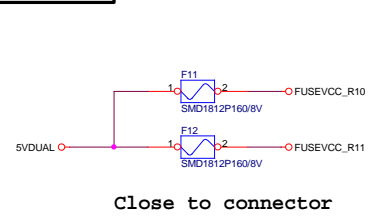
```



MDI : AR8161--&gt;N/A

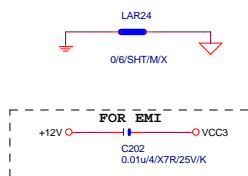


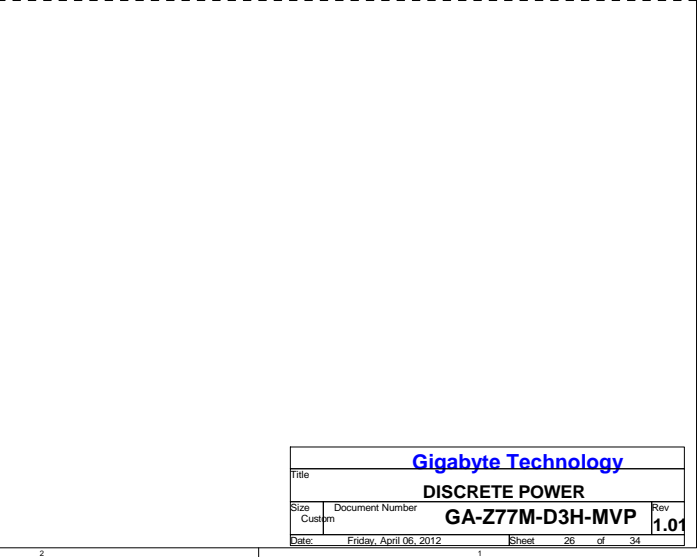
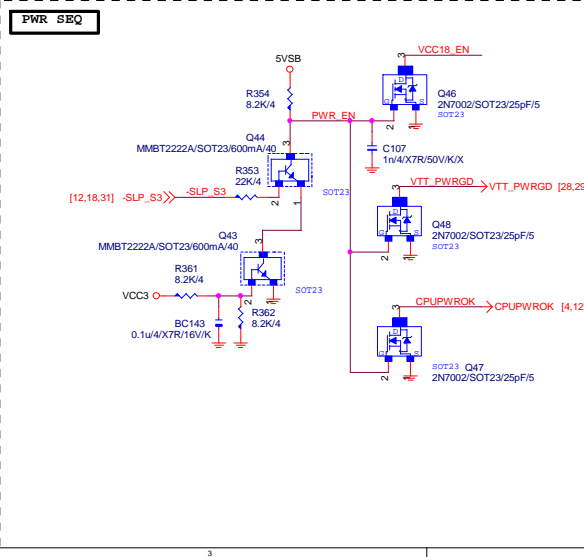
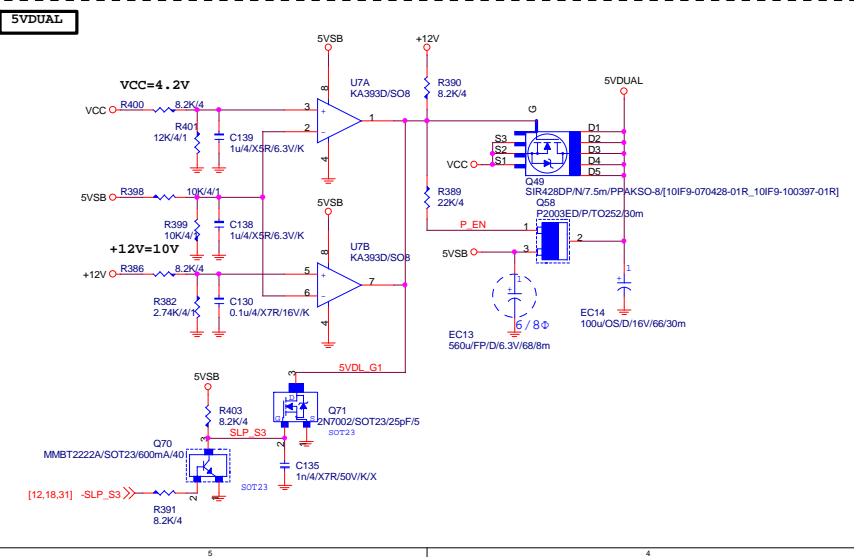
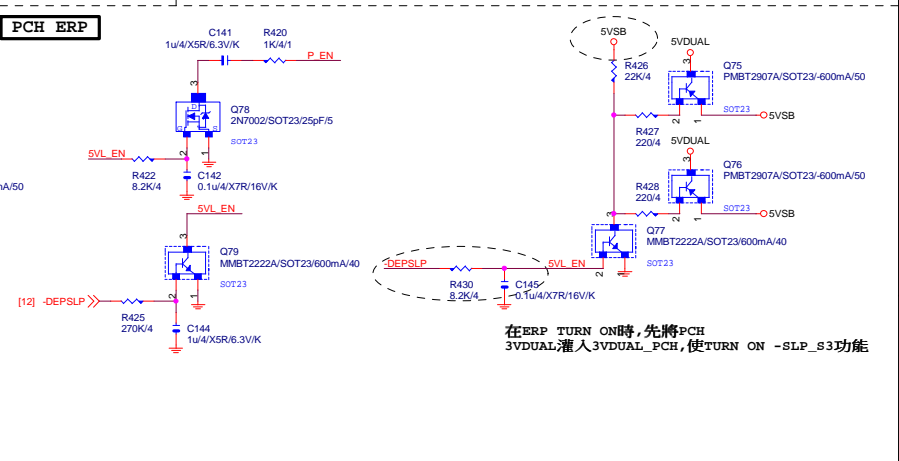
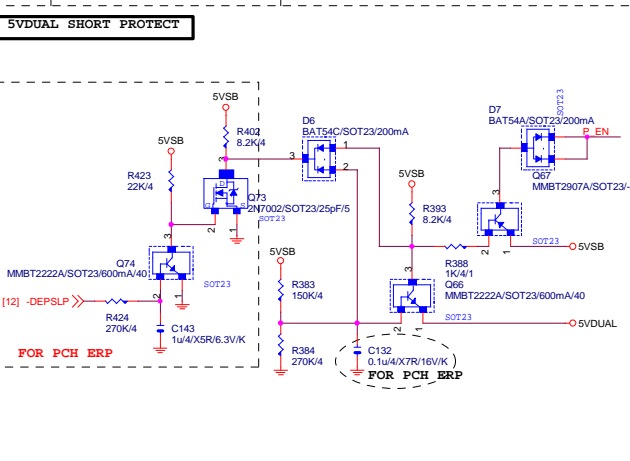
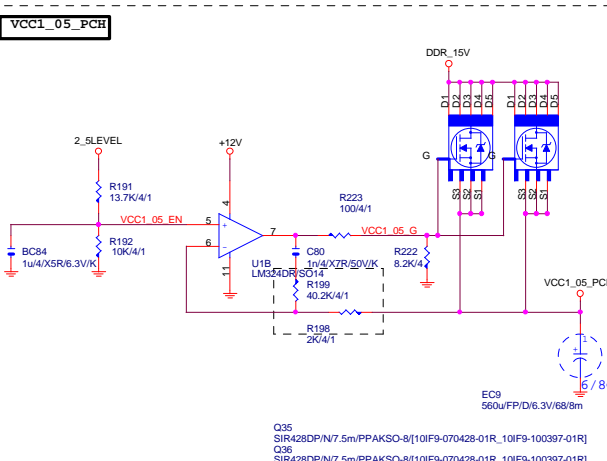
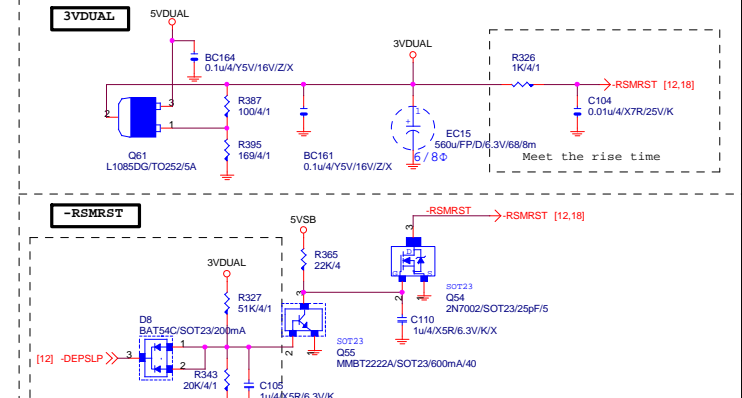
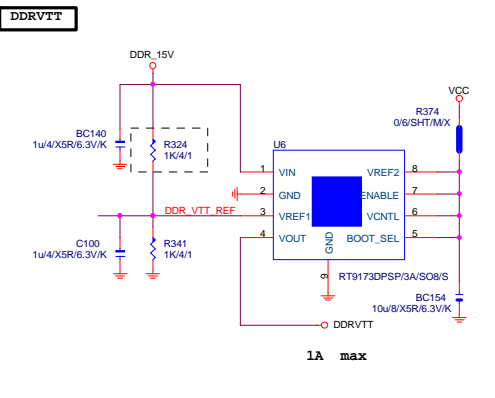
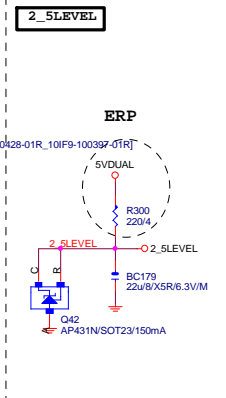
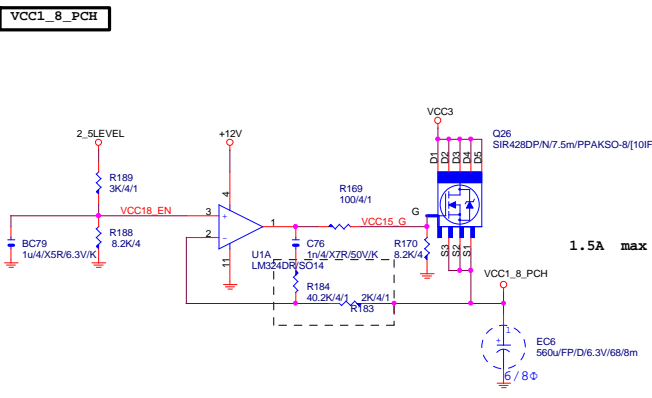
USB X3 POWER



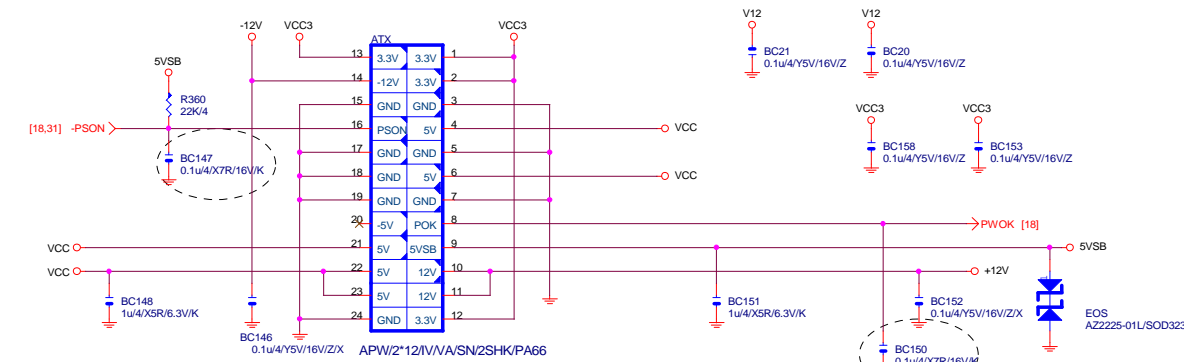
EMI SHORT PAD

PS:視EMI需求

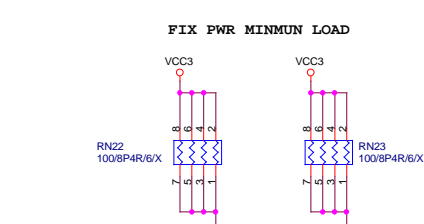
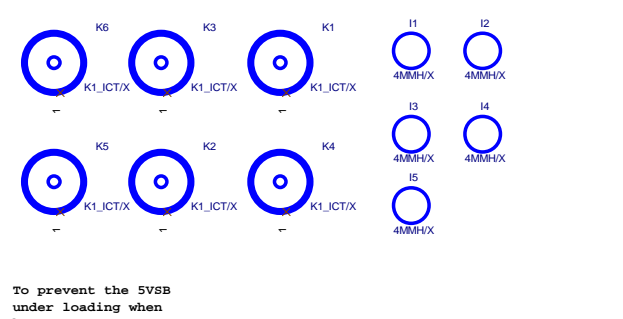
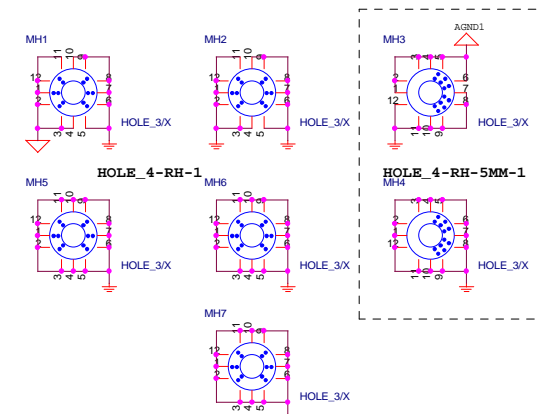
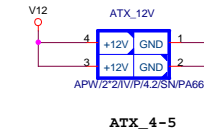




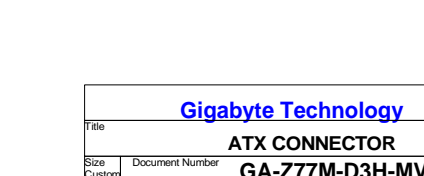
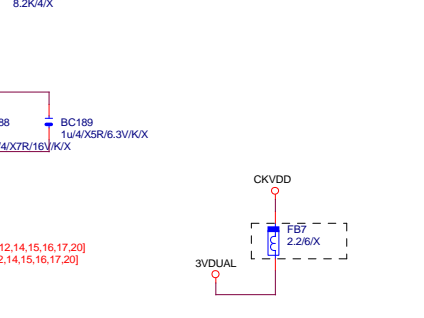
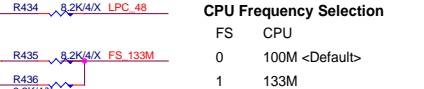
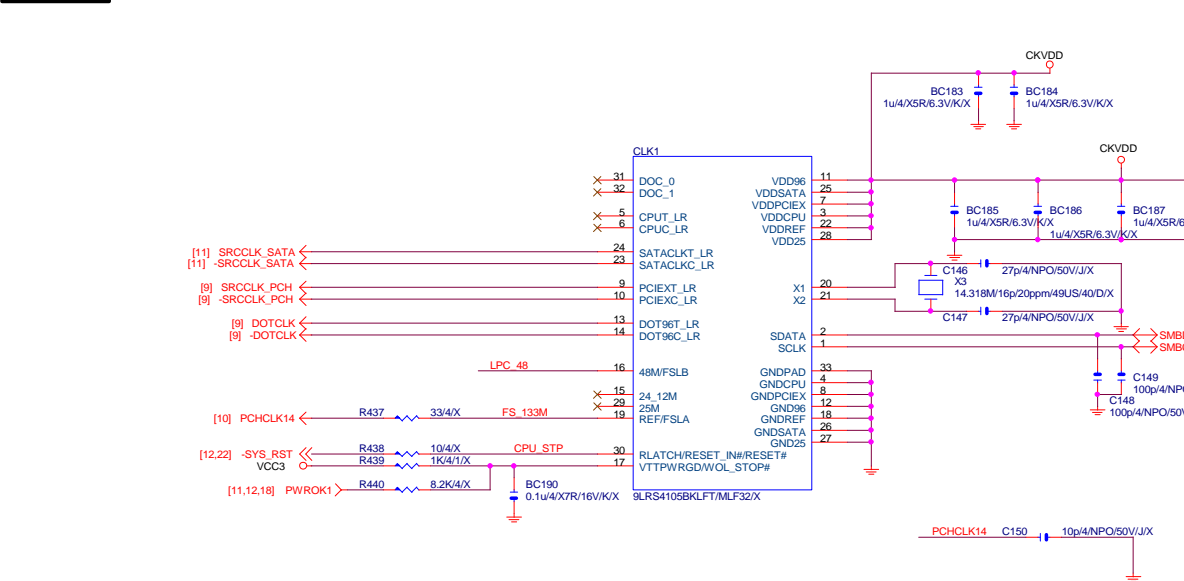
# ATXX24 POWER CONNECTOR



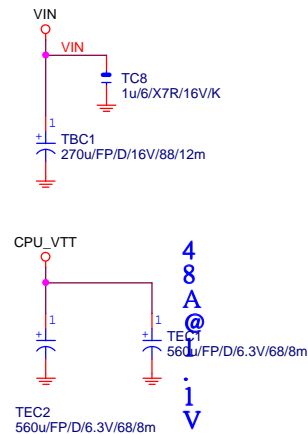
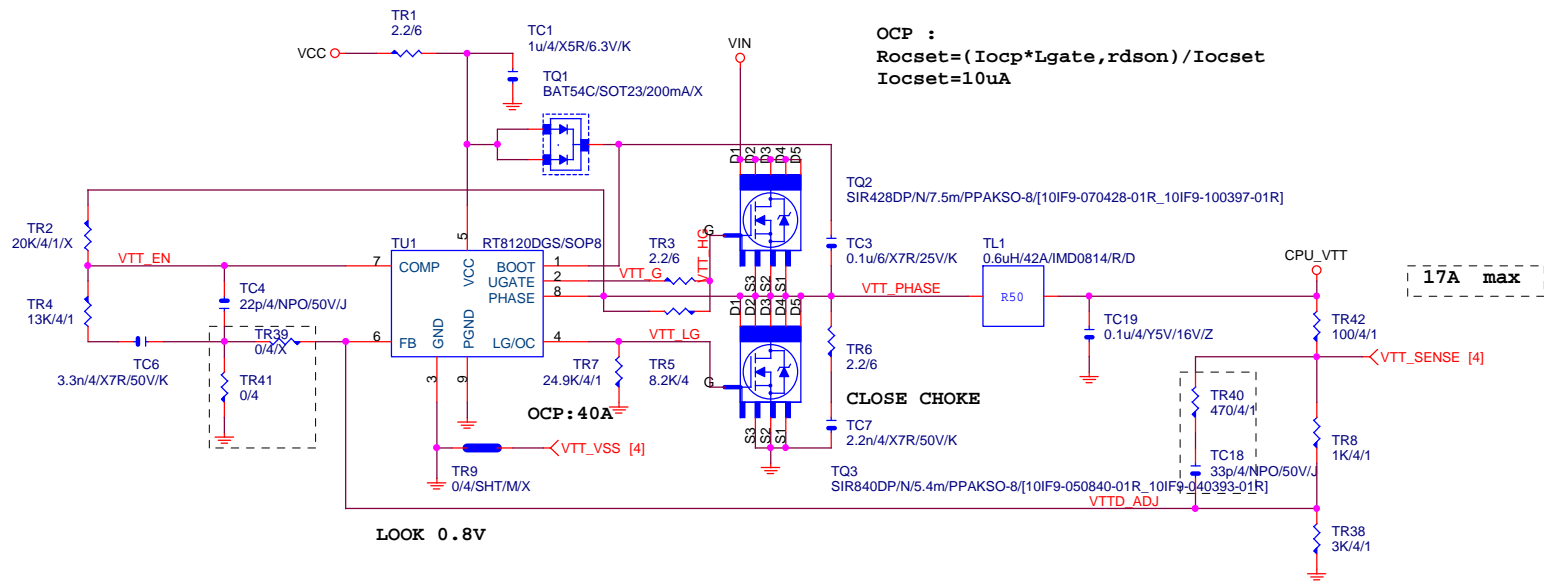
# ATXX4 POWER CONNECTOR



# CLK GEN



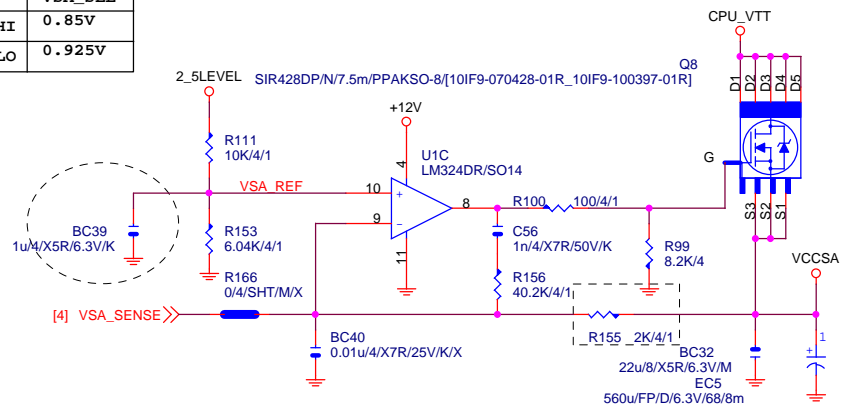
## CPU\_VTT



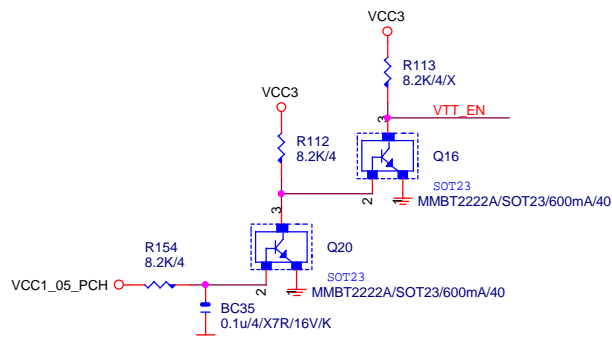
## VCCSA

PDG 0.8

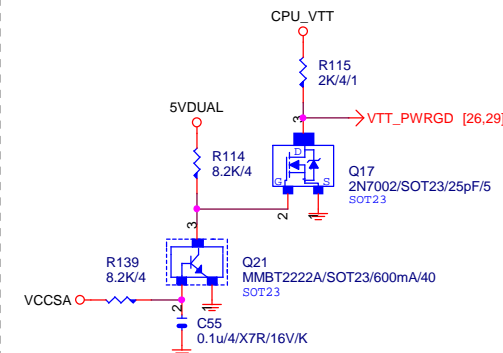
	VSA_SEL
HI	0.85V
LO	0.925V



## CPU\_VTT PWR SEQ



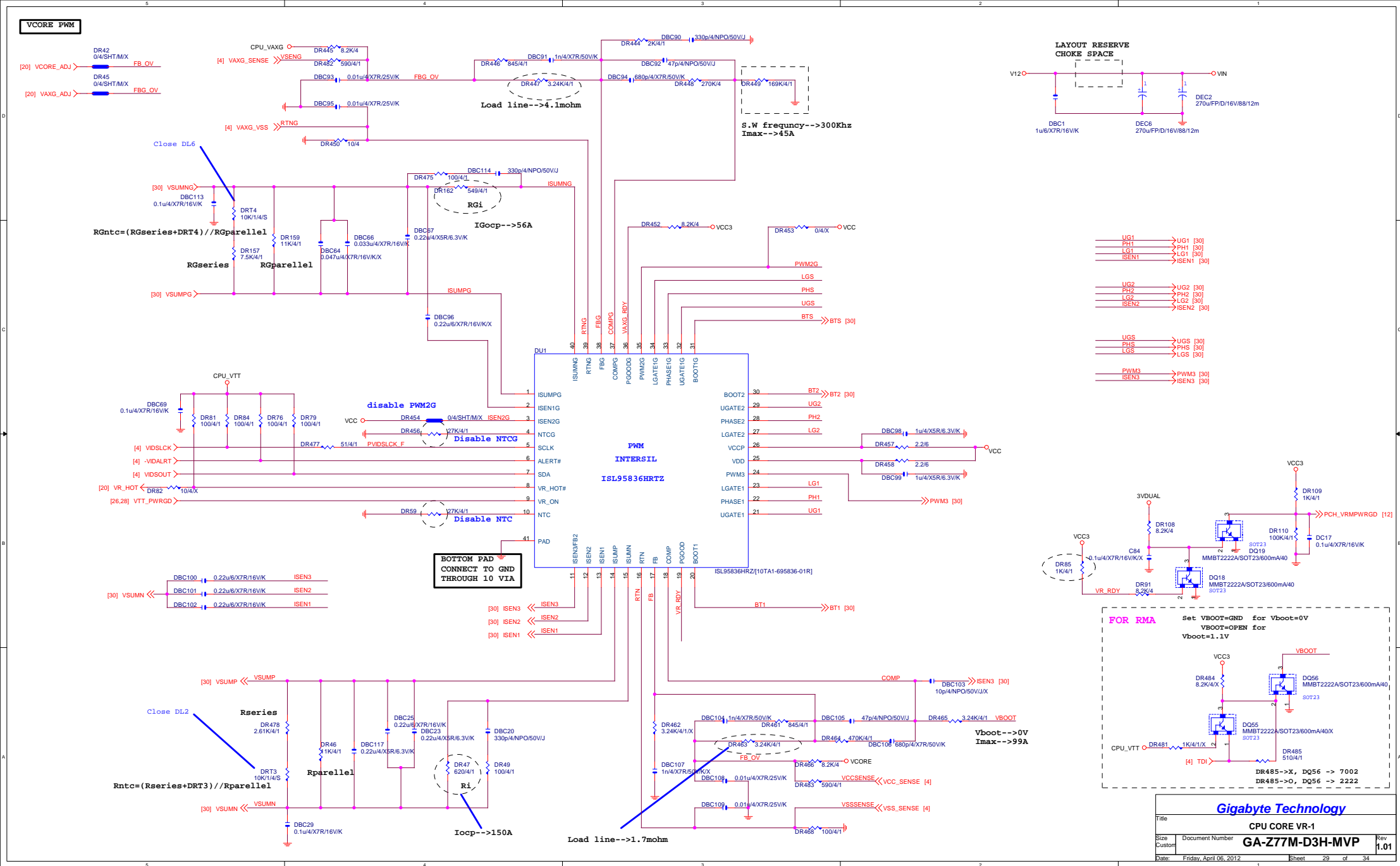
## VTT\_PWRGD



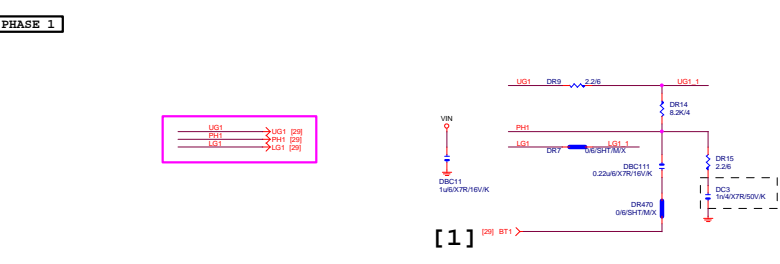
GIGABYTE™

Title			
CPU_VTT PWM_ISL95870CRZ			
Size	Document Number	Rev	
Custm	GA-Z77M-D3H-MVP	1.01	
Date:	Friday, April 06, 2012	Sheet	28 of 34

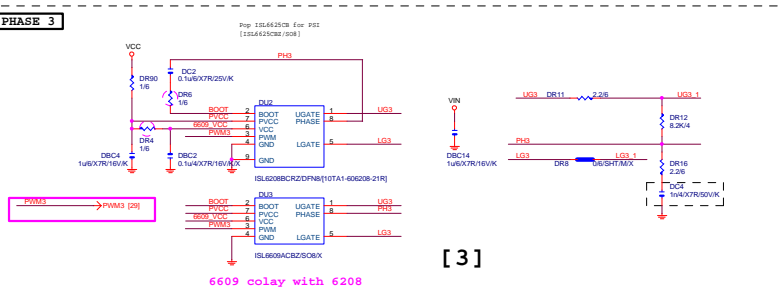




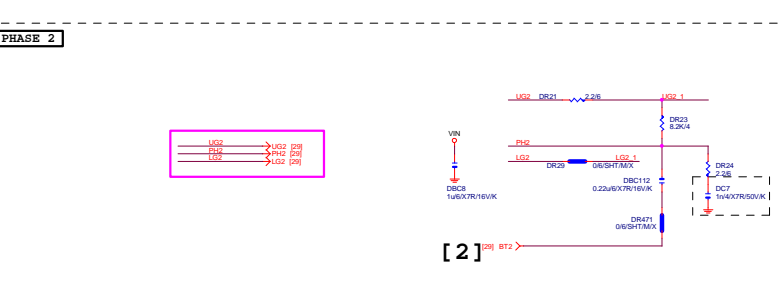
PHASE 1



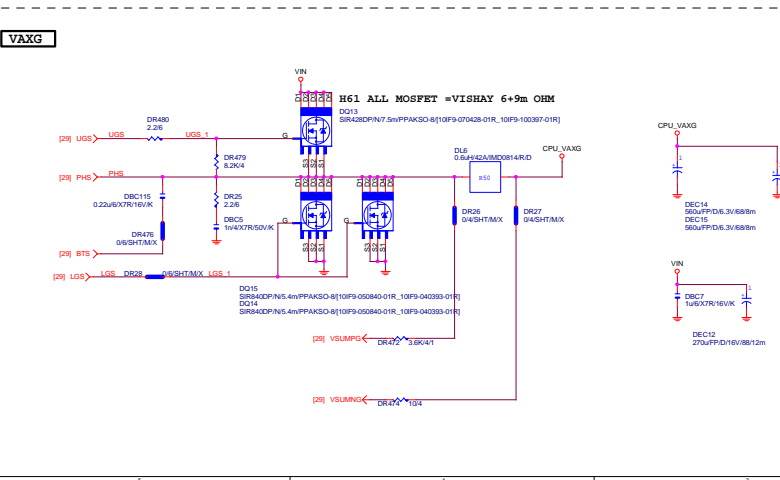
PHASE 3



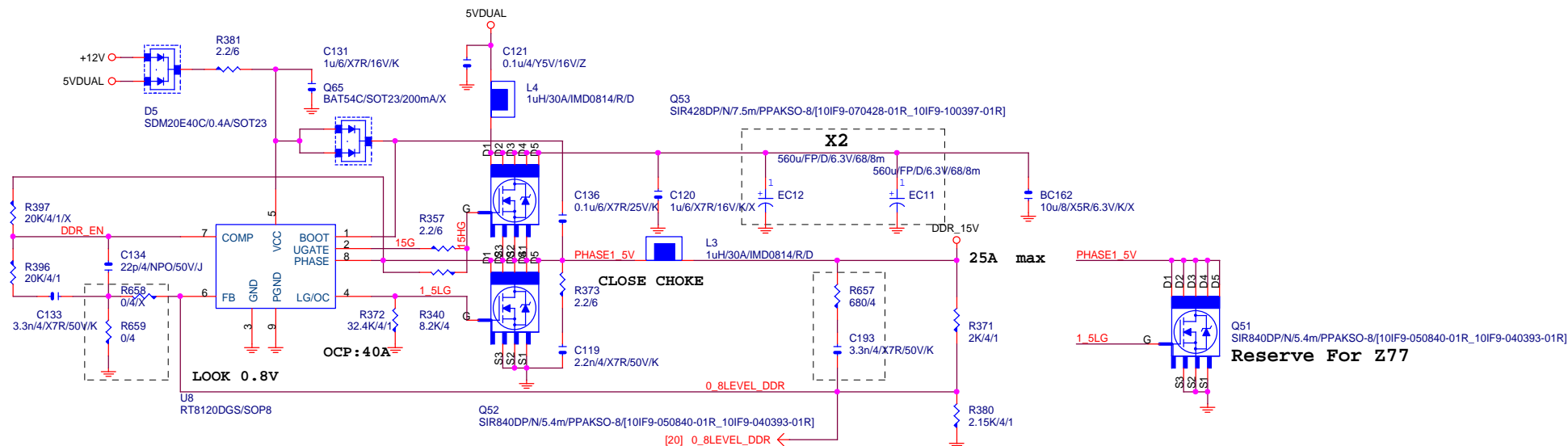
PHASE 2



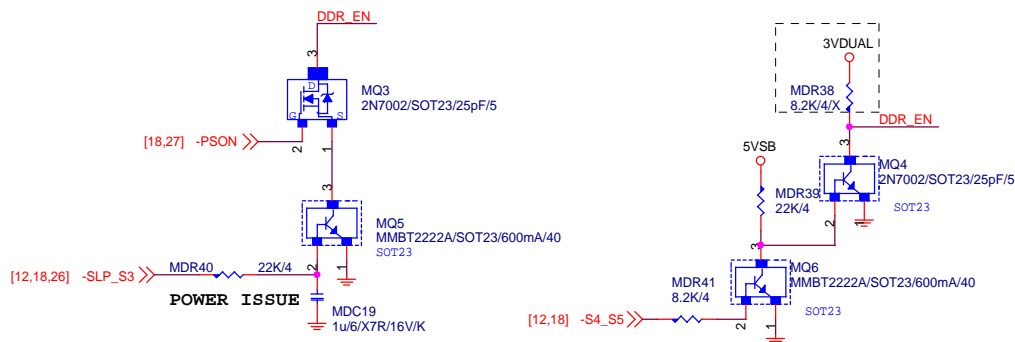
VAXG



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  $I_{ocset} = 20\mu A$  ,  $R_{ocset} = 4.7k$

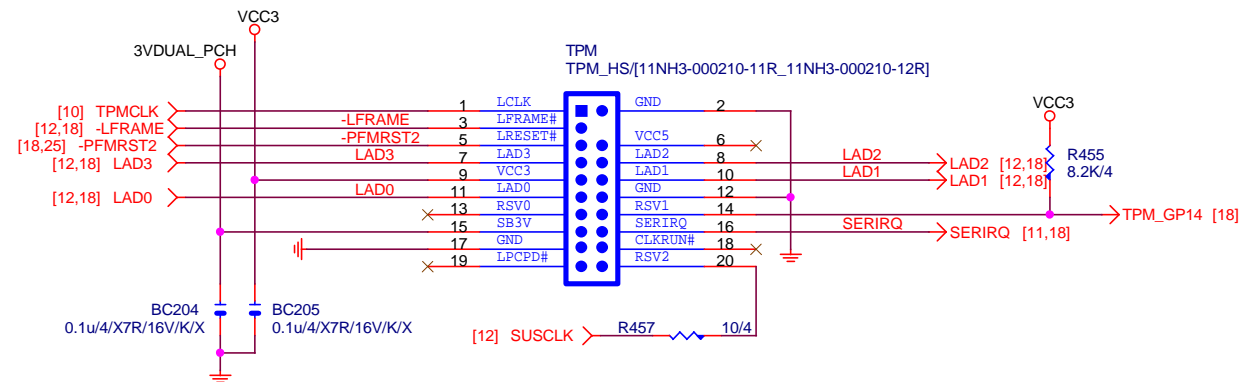
OCP :  $53.71A = (2 \times 20u \times 4.7k) / (7m // 7m)$

## Gigabyte Technology

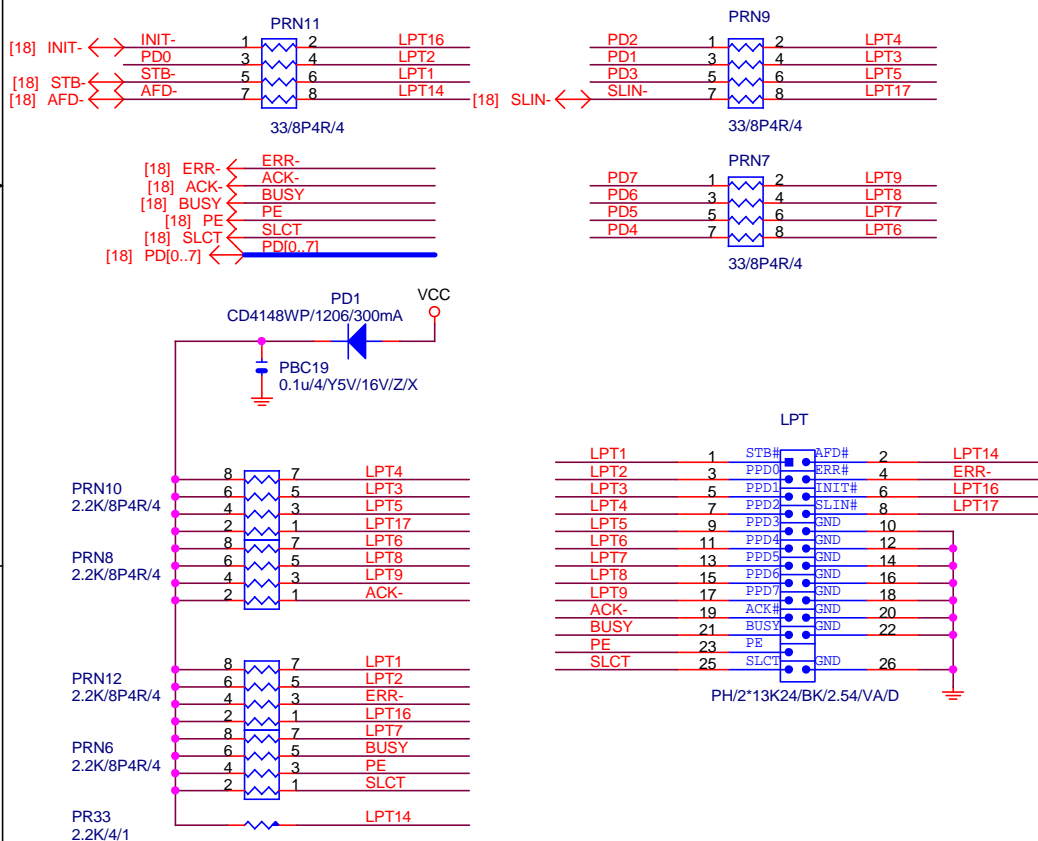
## DDR POWER

Size Custom	Document Number	<b>GA-Z77M-D3H-MVP</b>	Rev	<b>1.01</b>
Date:	Friday, April 06, 2012	Sheet	31	of 34

TPM



LPT PORT



## Gigabyte Technology

Title

**LPT**

Size	
Custom	

Document Number

GA-Z77M-D3H-MVF

Rev  
1.0

Date: Friday, April 06, 2012

Shee

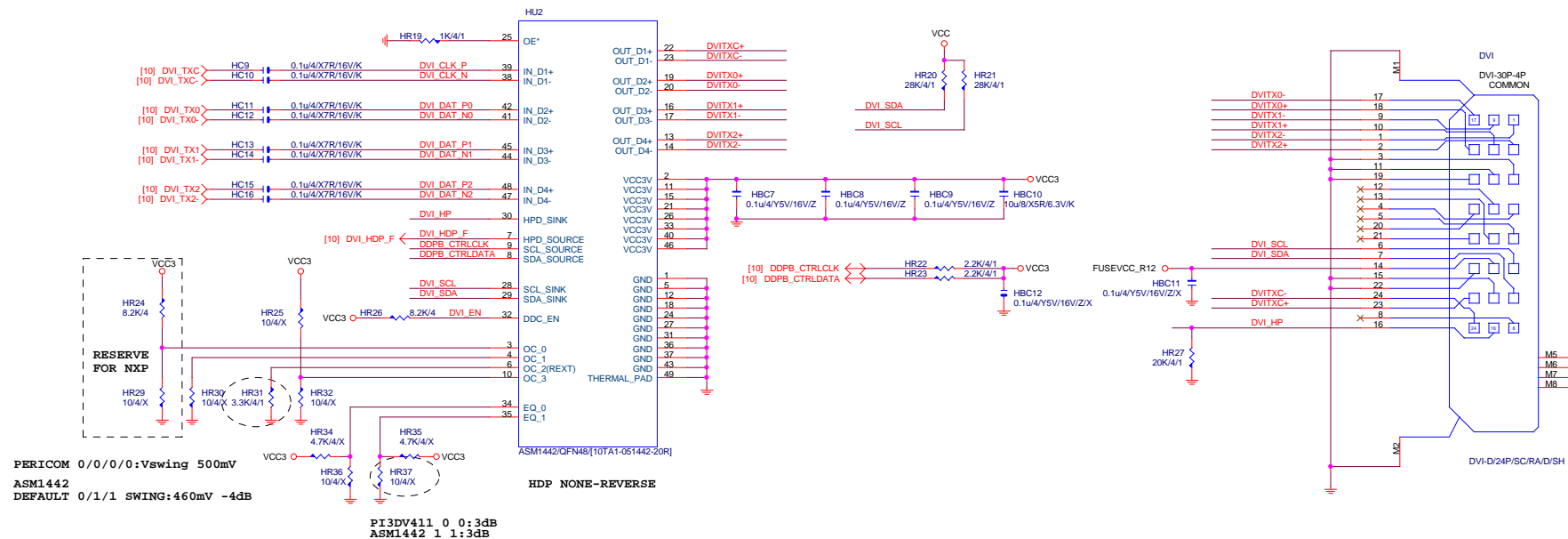
3

Q

---

---

## DVI LEVEL SHIFT



## HDMI LEVEL SHIFT

