

Model Name: GA-H81M-Gaming 3

Revision 1.0

SHEET

TITLE

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1150-A
05	CPU_LGA1150-B
06	CPU_LGA1150-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH_FDI,DMI,USB,PCIE,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 X1 *2 SLOT
16	ITE 8620 LPC IO
17	COM,KB_MS_USB,USB30_20
18	HWM,FAN CTRL,OV,-PROCHOT
19	DUAL BIOS
20	FP,FUSB,SPK,SATALED
21	Realtek ALC887-VD2
22	REAR AUDIO JACK
23	REALTEK RTL8111G
24	DISCRETE POWER
25	ATX , CLOCK GEN
26	VCORE ISL95812_1
27	VCORE ISL95812_2

SHEET

TITLE

28	RT8120_DDR POWER
29	HDMI

Gigabyte Technology

Cover Sheet

Size Custom	Document Number GA-H81M-Gaming 3	Rev 1.0
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Model Name: GA-H81M-Gaming 3 *Revision 1.0*

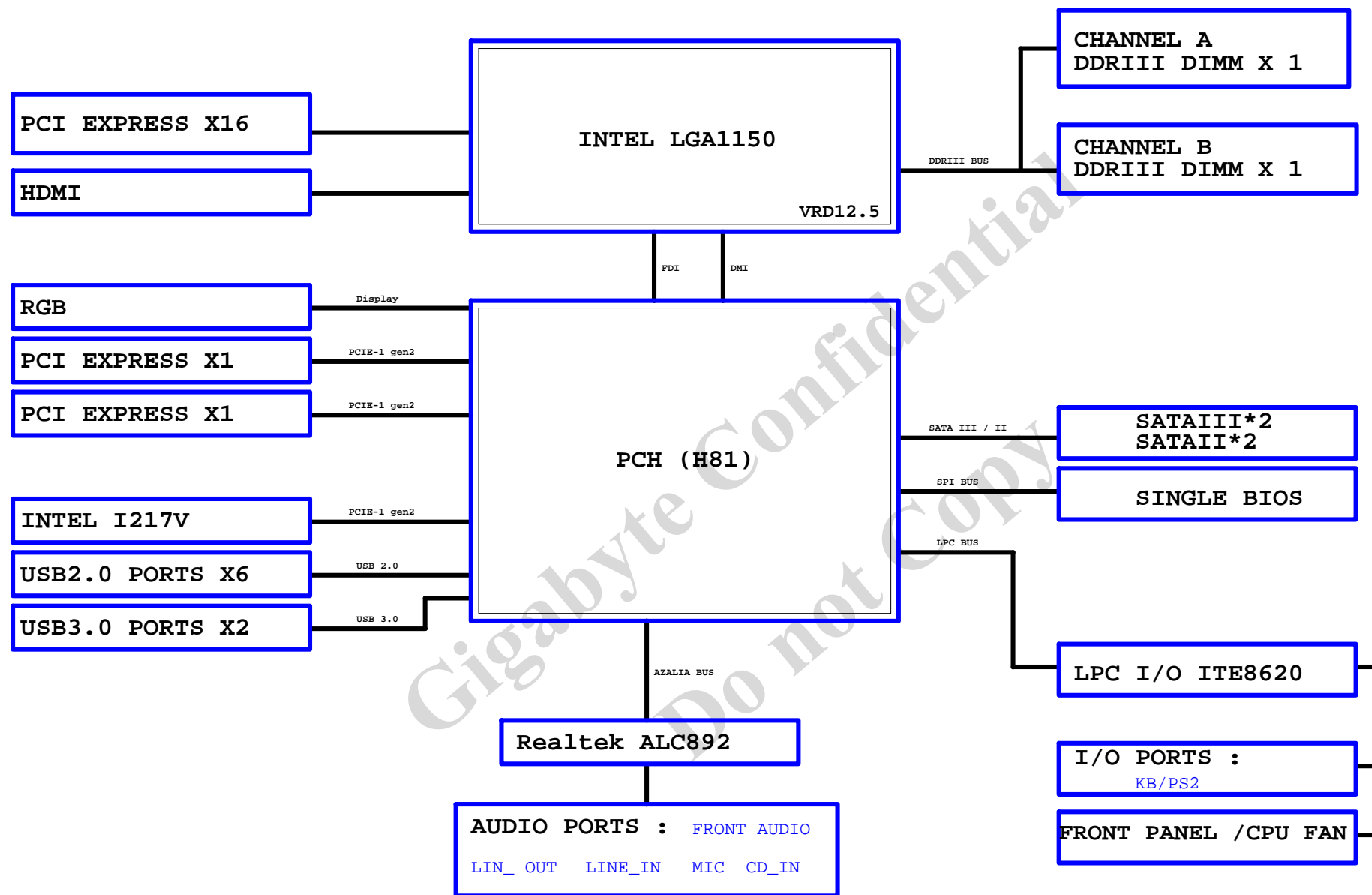
Component value change history

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Circuit or PCB layout change

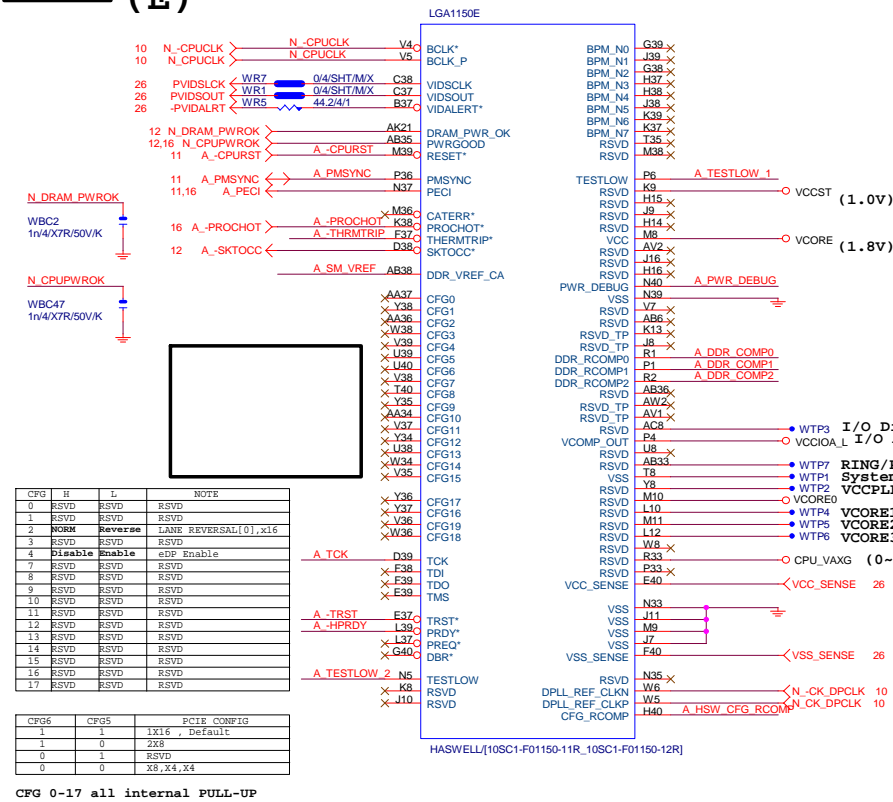
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BLOCK DIAGRAM



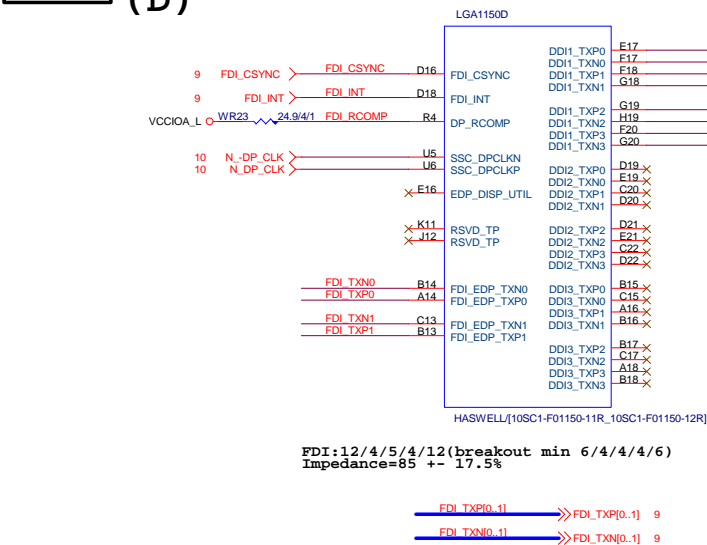
LGA1150

(E)



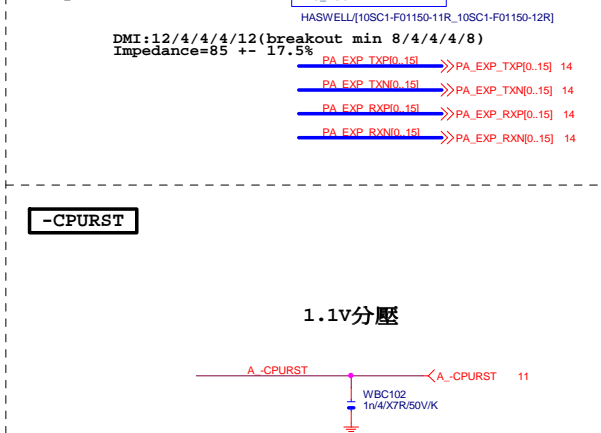
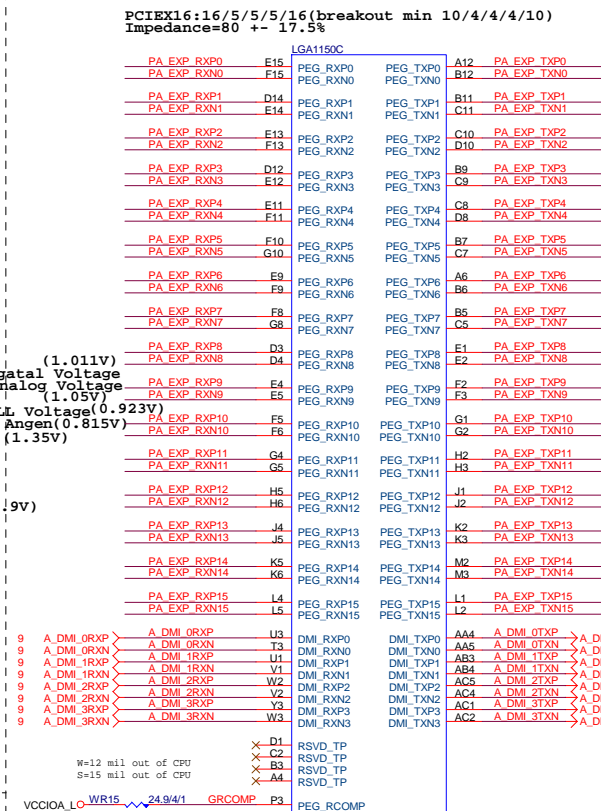
LGA1150

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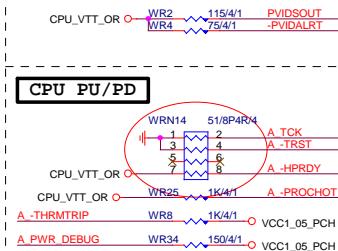


LGA1155

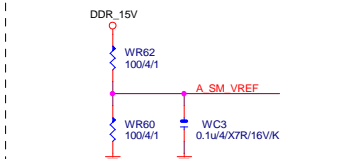
(C)



CPU SVID



SM REF



Gigabyte Technology

CPU LGA1150-A			
Size	Document Number	GA-H81M-Gaming 3	
Custom		Rev	1.0
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LGA1150

(A)

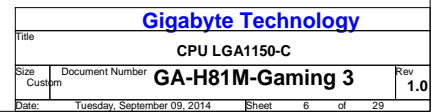
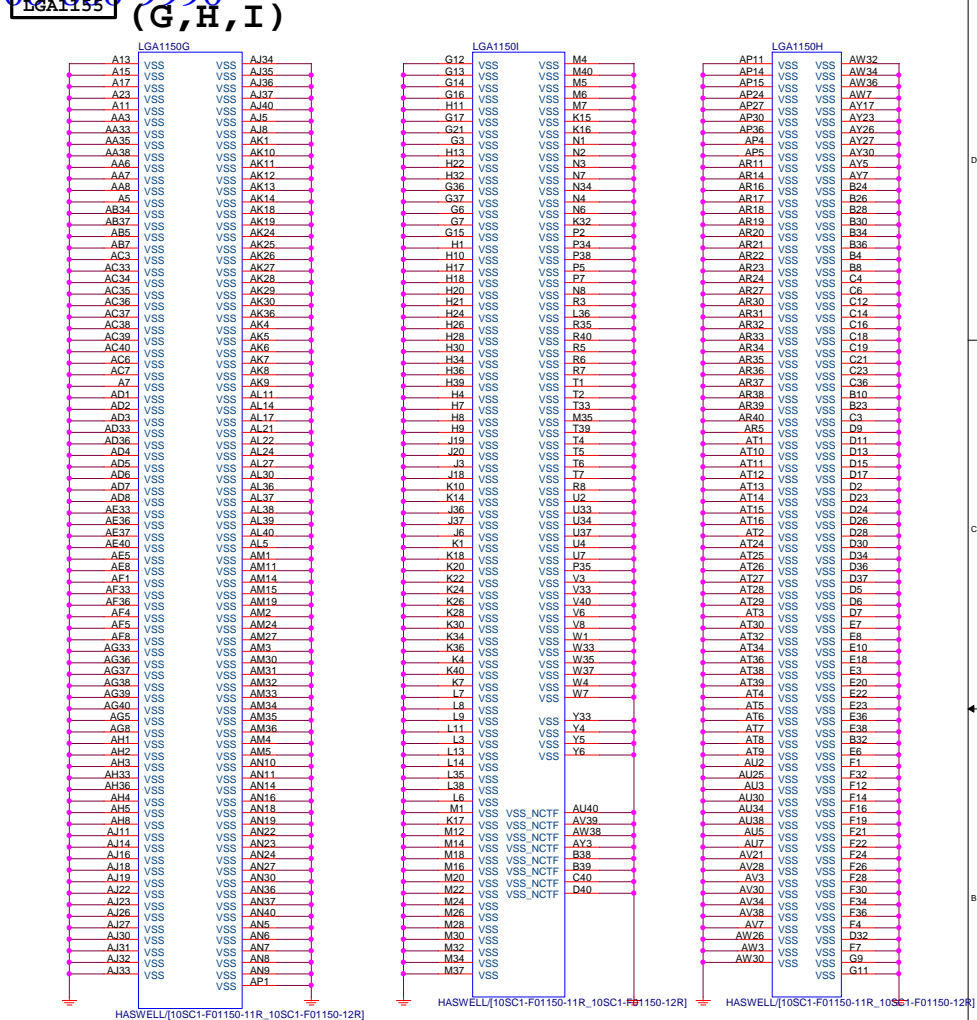
LGA1150

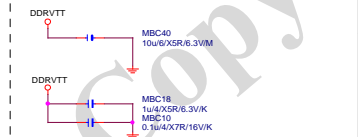
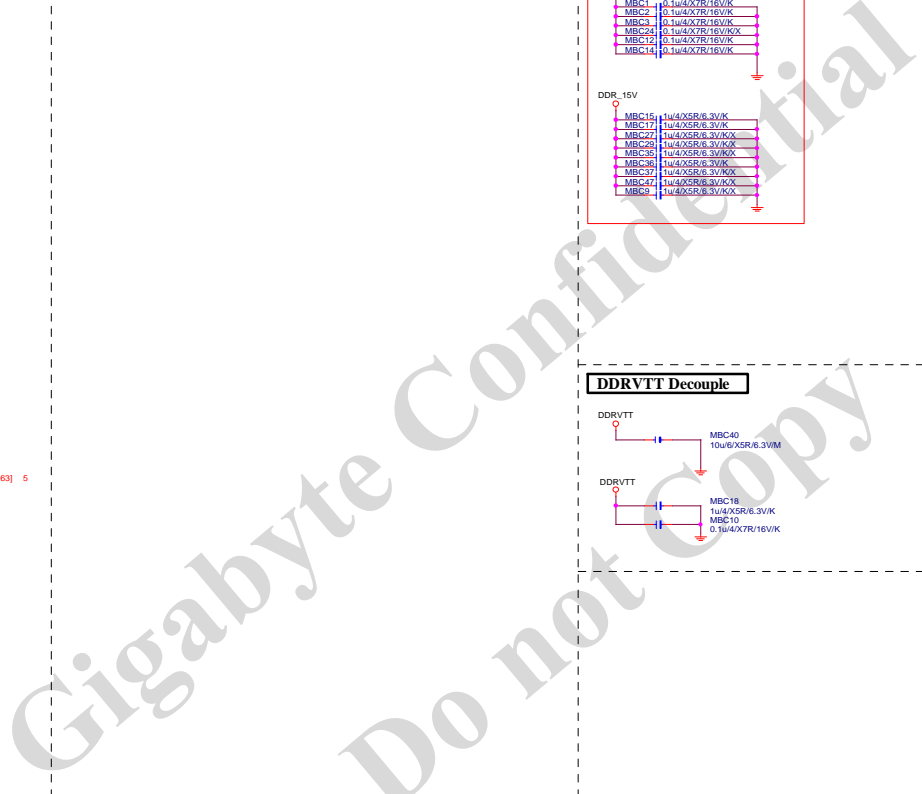
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LGA1150

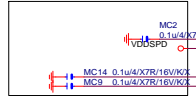
(CR)

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MAAA3	AW17	DDR0_MA3	DDR0_D03
MAAA4	AU17	DDR0_MA4	DDR0_D04
MAAA5	AW18	DDR0_MA5	DDR0_D05
MAAA6	AV17	DDR0_MA6	DDR0_D06
MAAA7	AT18	DDR0_MA7	DDR0_D07
MAAA8	AU18	DDR0_MA8	DDR0_D08
MAAA9	AT19	DDR0_MA9	DDR0_D09
MAAA10	AW11	DDR0_MA10	DDR0_D10
MAAA11	AV19	DDR0_MA11	DDR0_D11
MAAA12	AU19	DDR0_MA12	DDR0_D12
MAAA13	AY10	DDR0_MA13	DDR0_D13
MAAA14	AT20	DDR0_MA14	DDR0_D14
MAAA15	AU21	DDR0_MA15	DDR0_D15
MODT_A0	AW10	DDR0_ODT0	DDR0_D16
MODT_A1	AY8	DDR0_ODT1	DDR0_D17
	AW9	DDR0_ODT2	DDR0_D18
	AW8	DDR0_ODT3	DDR0_D19
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DDR3



CPU

DIMM

DIMM:

DIMM:

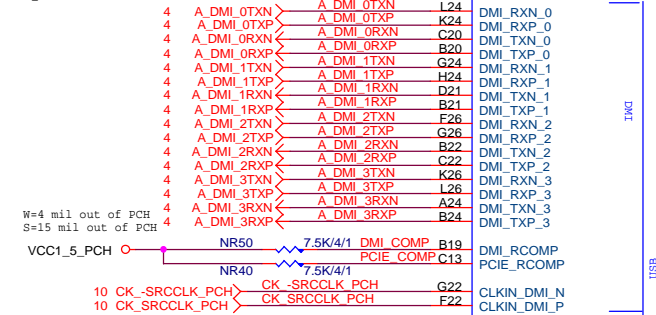
DIMM:

CHA

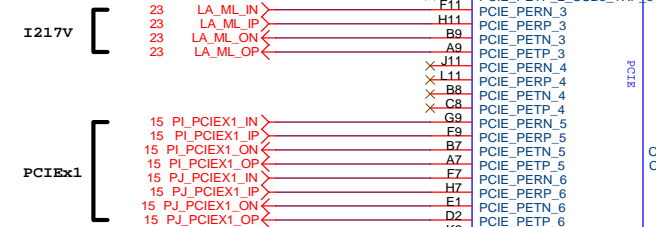
CHB

PCH (B)

DMI:12/4/4/4/12(breakout min 8/4/4/4/8)
Impedance=85 +- 17.5%



PCIE Only

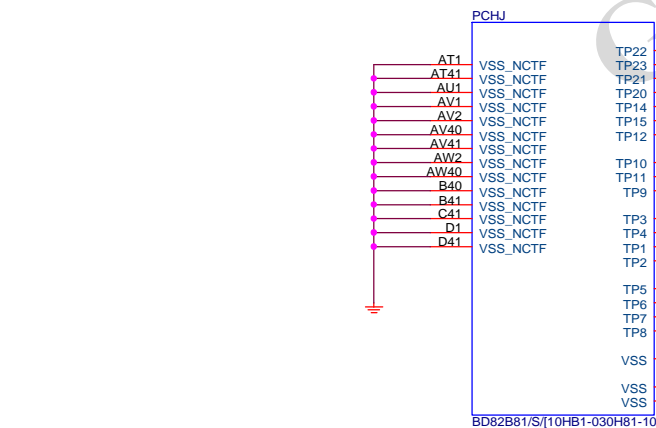


N/A

放靠近 Device & PCI-E Slot
Impedance=80 +- 17.5%

PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)

PCH (J)



BD82B81/S/[10HB1-030H81-10R]

PCH (F)

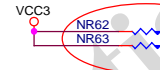
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    17 PCH_USB3_TXN1 <
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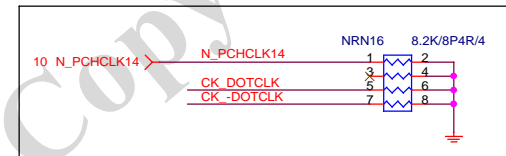
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N/A



PCH CLK PD

Mount for integrated clock Generation Mode

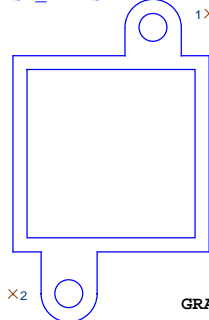


NR225 short to GND in non
graphic SKU

PCH H/S

LOW COST ICH7 HEATSINK

SB_HEATSIN

 \times_2

GRAY HS

PCH_HS
PCH_HS/[12SP2-S03535-01R]

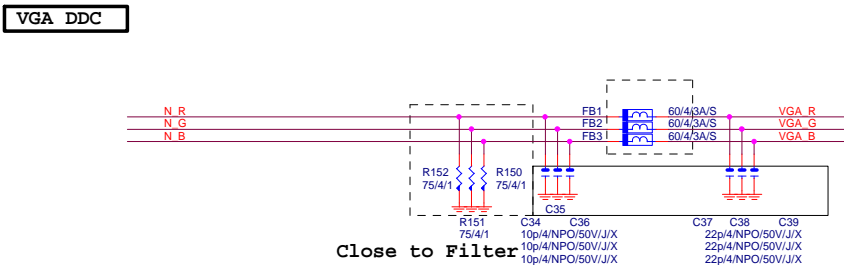
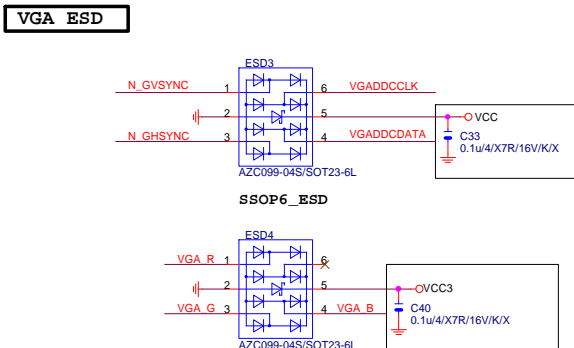
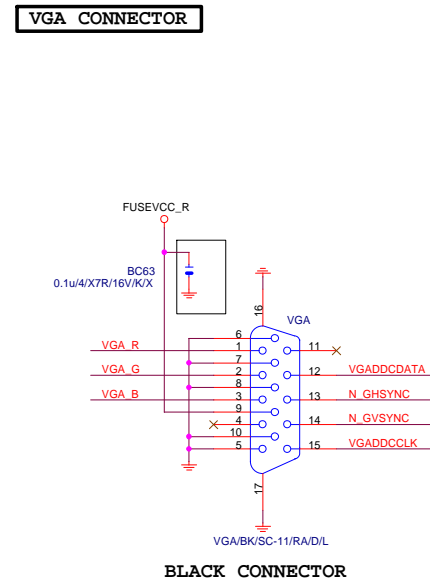
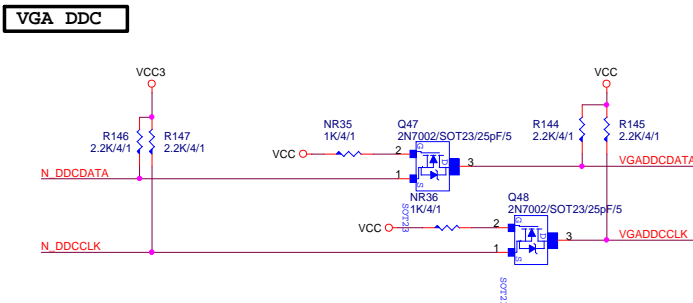
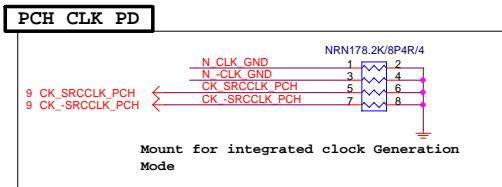
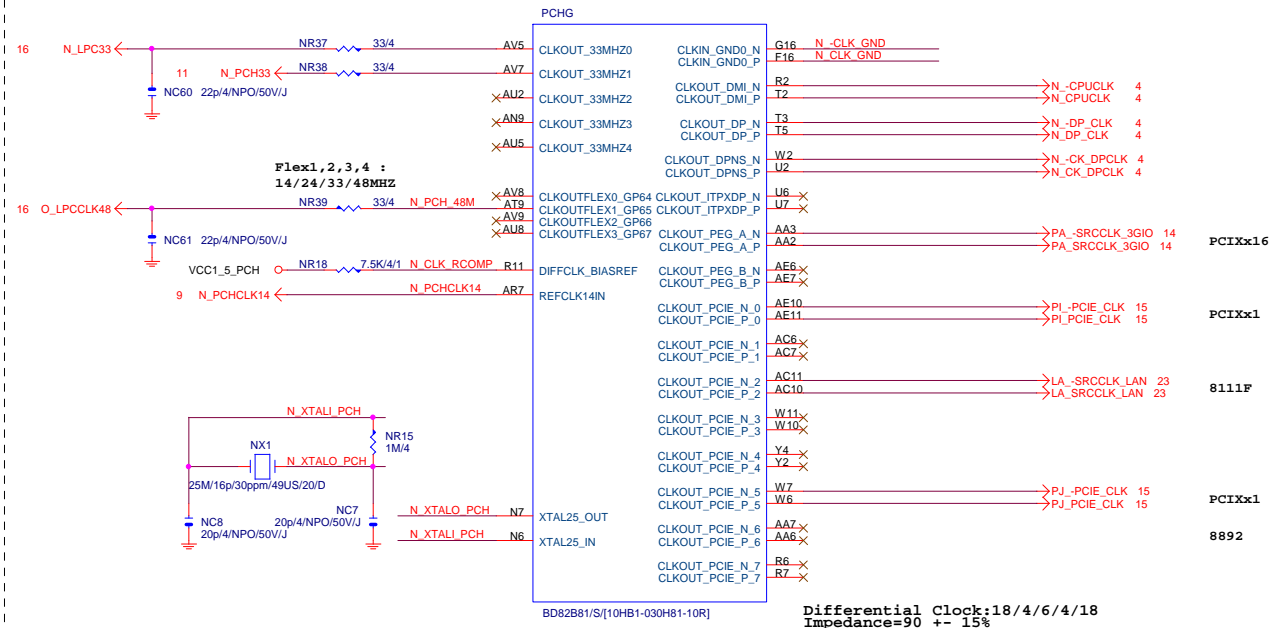
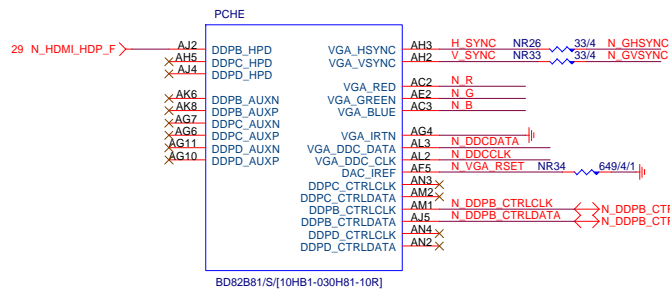
USB TABLE

```
OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)
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USB OC# Configure	
OC0#	R_USB30
OC1#	USB_LAN
OC2#	Not Use
OC3#	N/A
OC4#	F_USB1
OC5#	F_USB2
OC6#	Not Use
OC7#	N/A

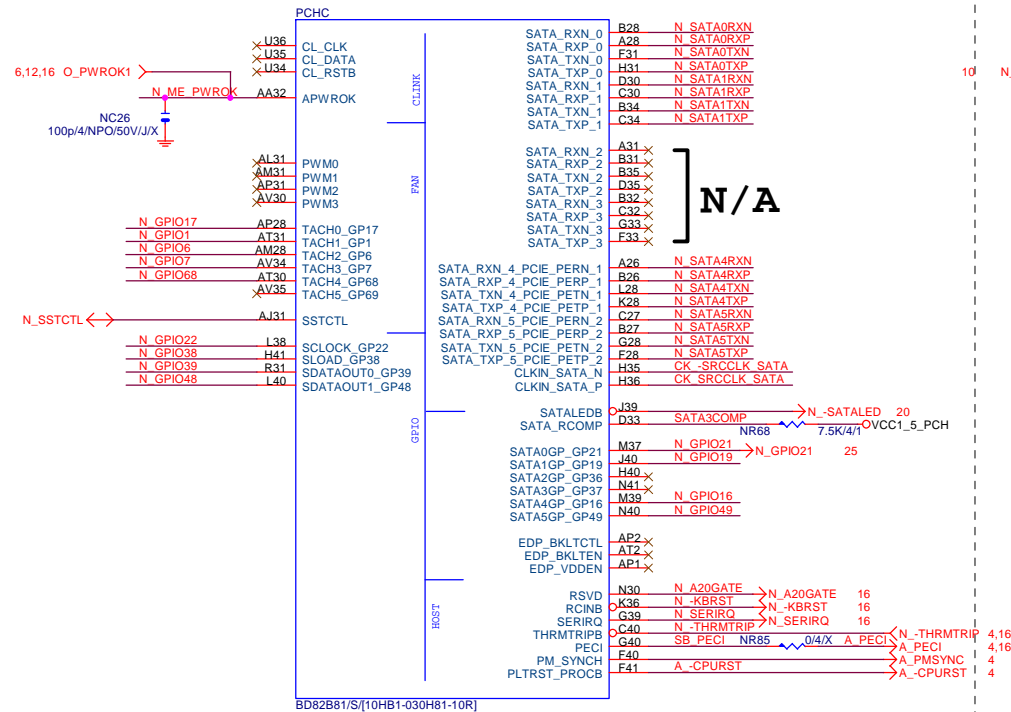
Gigabyte Technology

Title			
PCH FDI,DMI,USB ,PCIE,NVRAM			
Size	Document Number	Rev	
Custom	GA-H81M-Gaming 3	1.0	
Date:	Tuesday, September 09, 2014	Sheet	9 of 29

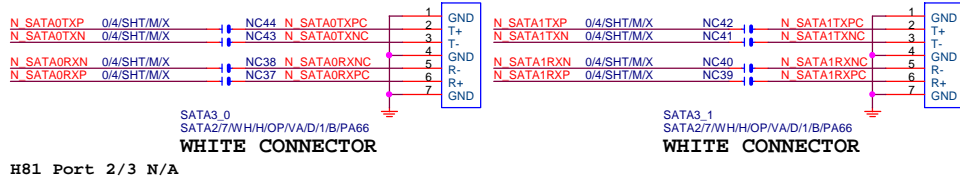


PCH (A)

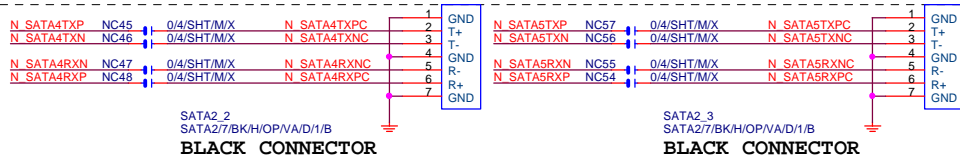
PCH CLK PD



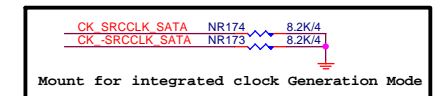
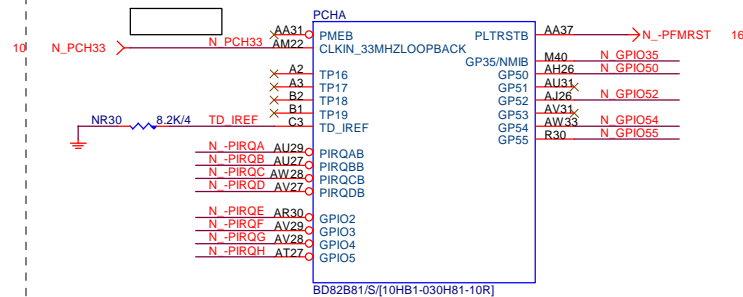
SATA CONNECTOR



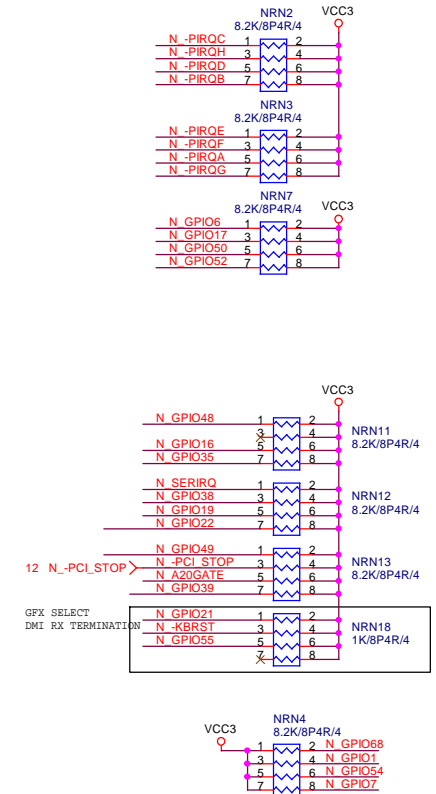
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** Z87/H87 Port 4&5 SATA3.0
** B85 Port 4&5 SATA2.0
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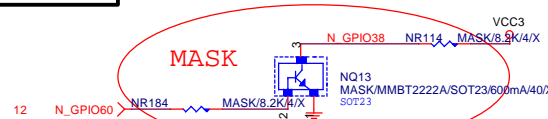
ME PWROK

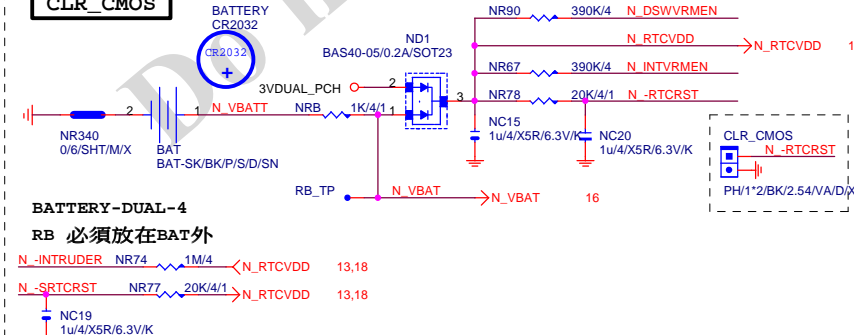
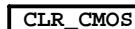
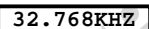
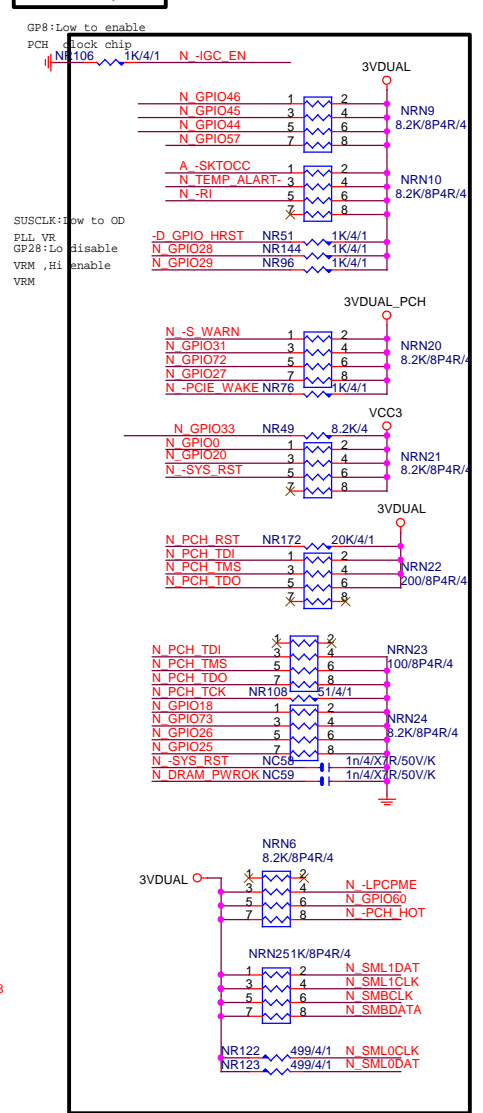


PCH	PU/PD
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GPIO38 Ctrl





Gigabyte Technology

PCH GPIO , CTRL , AUDIO

GA-H81M-Gaming 3

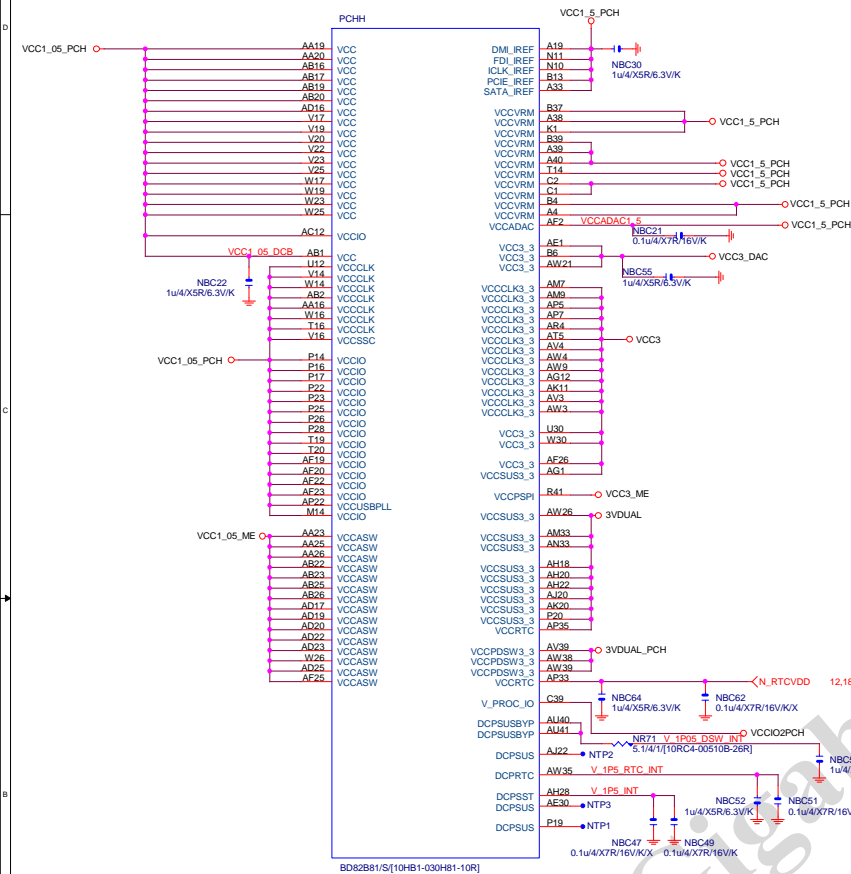
Rev	1.0
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PCH (H)

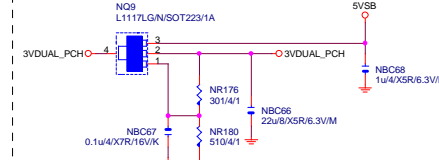
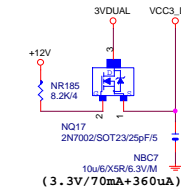
VCC3_DAC

3VDUAL_PCH

SHT_PWR



CLOSE北橋(注意震盪水波紋)



VCC3_ME

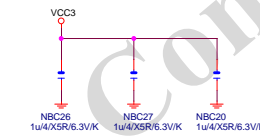
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VCC1_05_ME

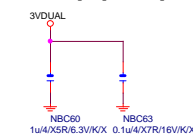
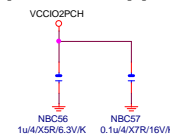
VCC1_05_PCH

CAP

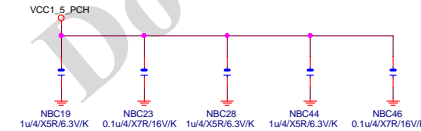
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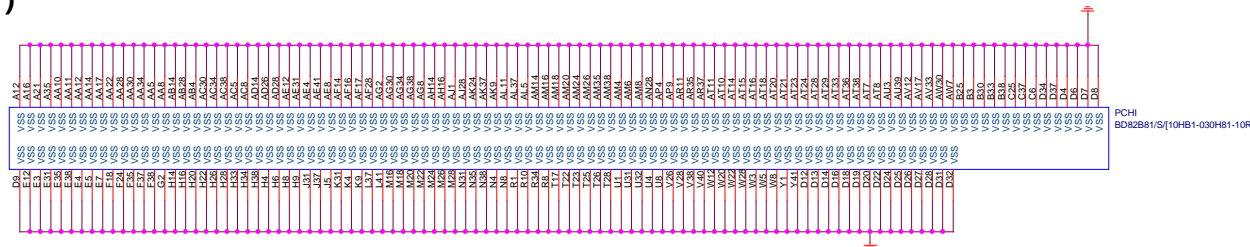
(1.05V)(X2)(3.3V)(X2)



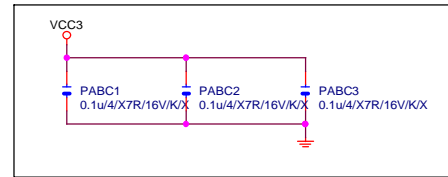
(1.05V)(X10)



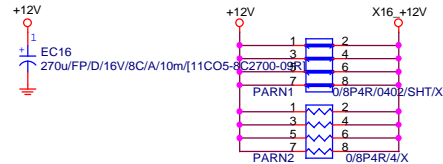
PCH (I)



PCIEX16 CAP



PCIEX16 PROTECT SHT

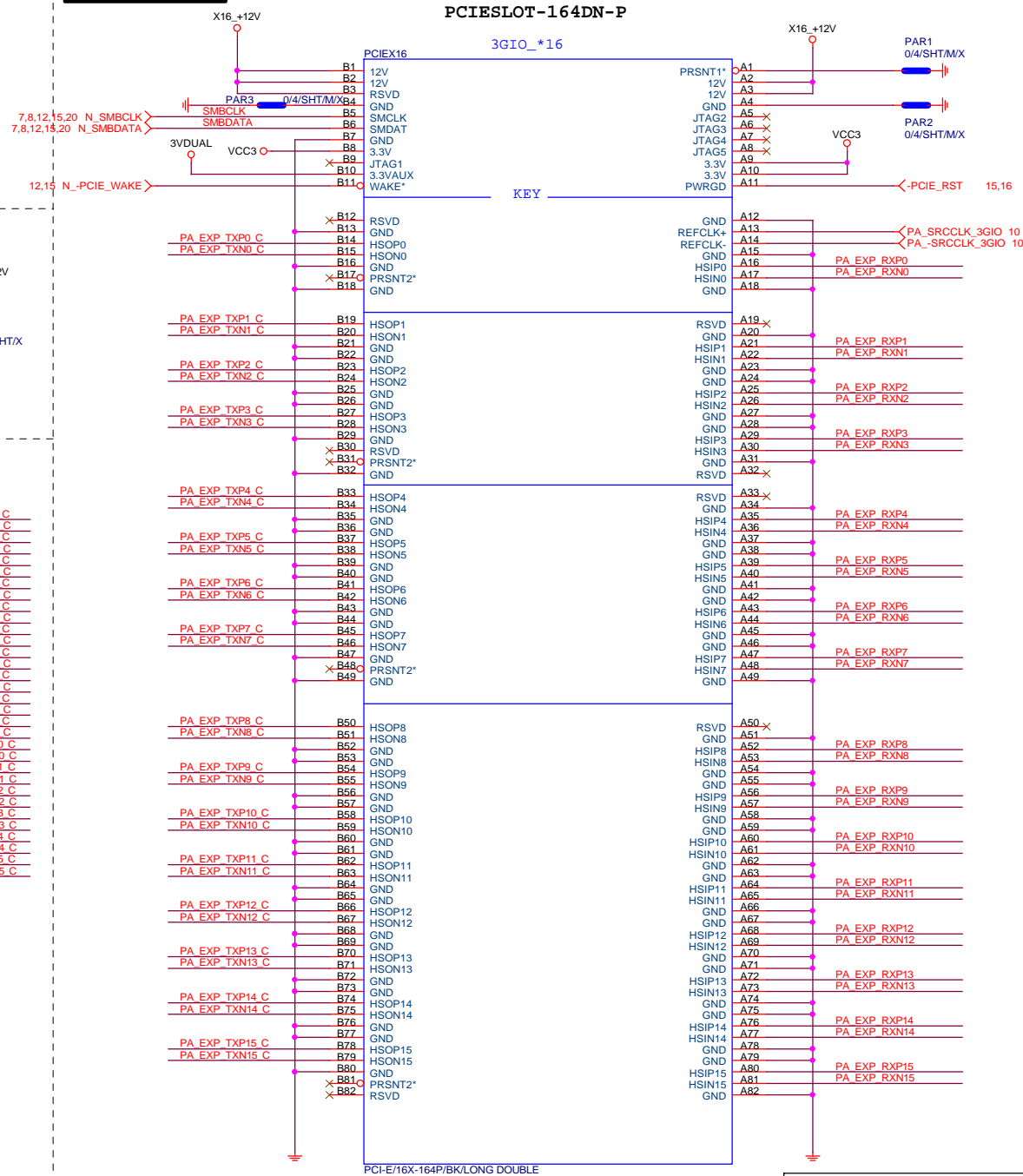


PCIEX16 AC CAP

PA EXP TXP0	PAC5	0.22uF/4X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22uF/4X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22uF/4X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22uF/4X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22uF/4X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22uF/4X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22uF/4X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22uF/4X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22uF/4X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22uF/4X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22uF/4X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22uF/4X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22uF/4X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22uF/4X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22uF/4X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22uF/4X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22uF/4X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22uF/4X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22uF/4X5R/6.3V/K	PA EXP TXP9 C
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PA EXP TXP10	PAC24	0.22uF/4X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22uF/4X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22uF/4X5R/6.3V/K	PA EXP TXP11 C
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PA EXP TXP12	PAC28	0.22uF/4X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22uF/4X5R/6.3V/K	PA EXP TXN12 C
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PA EXP TXN13	PAC31	0.22uF/4X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22uF/4X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22uF/4X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22uF/4X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22uF/4X5R/6.3V/K	PA EXP TXN15 C

PA EXP RXIP0.[15] >> PA_EXP_RXIP[0..15] 4
PA EXP RXN0.[15] >> PA_EXP_RXN[0..15] 4
PA EXP TXIP0.[15] >> PA_EXP_TXIP[0..15] 4
PA EXP TXN0.[15] >> PA_EXP_TXN[0..15] 4

PCIEX16 SLOT



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

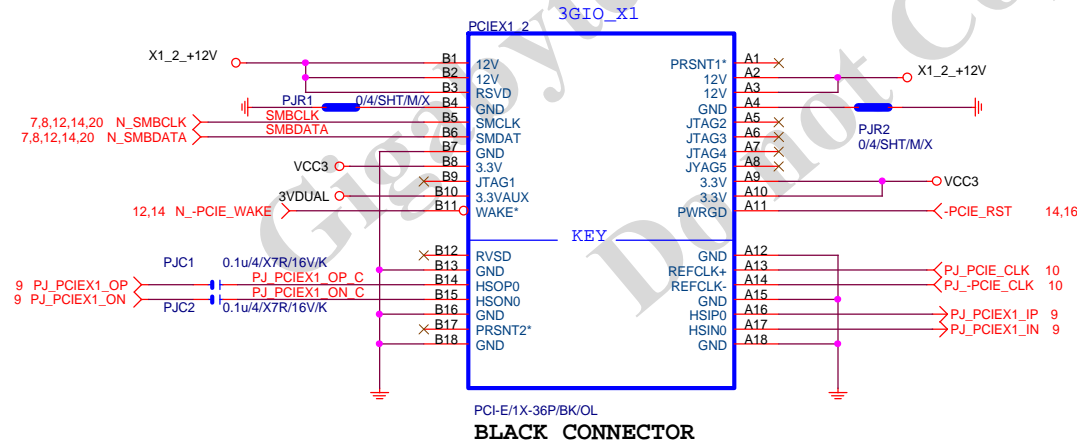
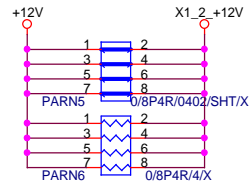
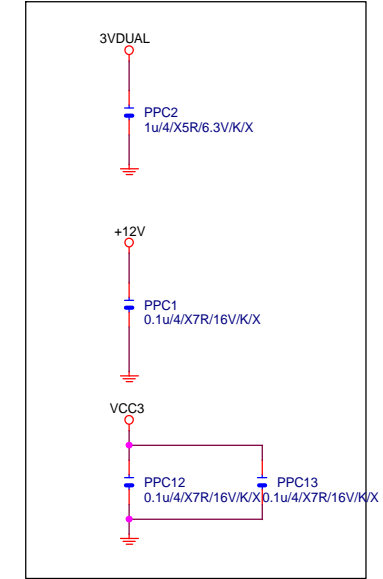
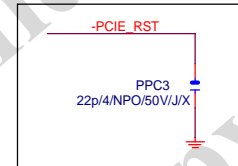
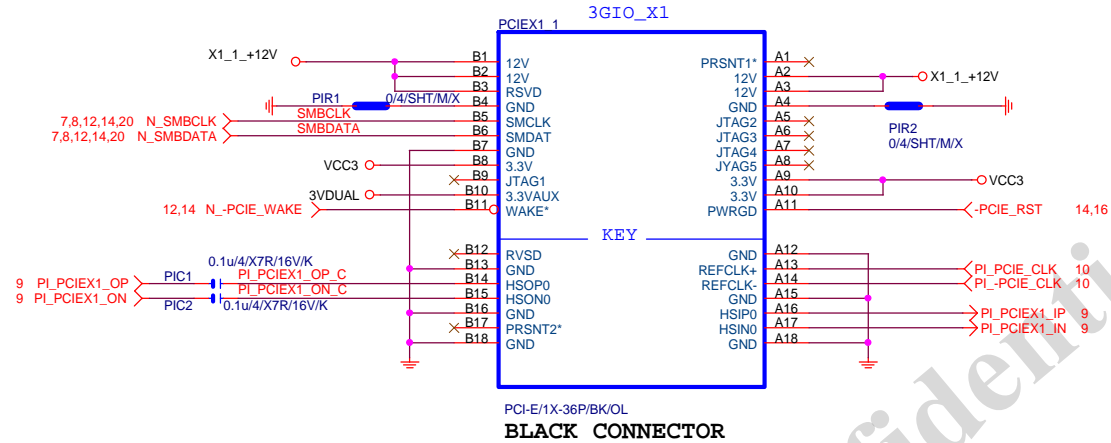
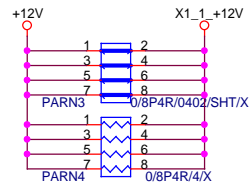
BLACK CONNECTOR

Gigabyte Technology

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Size			Document Number	
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PCIEX1 SLOT

PCIEX1 PROTECT SHT



Gigabyte Technology

PCI EXPRESS X 1 PORT

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3VDUAL_PCH OR8 0.4/4SHT/MX IT_VCCH

VCC3 OR9 0.4/4X IT_AVCC

SIO PU

-PCIRSTIN OR2 8.2K/4 VCC3

-PROCHOT_CON OR13 8.2K/4 VCC3

N_LDRQ0 OR14 1K/4/1 VCC3

ITE_PWROK1 OR15 1K/4/1 VCC3

-PFMRST2 OR16 1K/4/1 VCC3

18 FANPWM1 FANPWM1 OR19 8.2K/4 VCC

SIO STRAP

H61M-S2 1.1 JP6 stuff
pull down

JP4 1 2 VCC3
JP3 3 4 VCC3
JP2 5 6 VCC3
JP5 7 8 VCC3

OR24 8.2K/4X VCC3
OR25 8.2K/4X VCC3

ITE recommend

EUF control by FCH
3VDUAL OR26 100/4/1 28 3VSBJP3 High SPI-Flash Disable
Low SPI-Flash Enable

Power leakage

DDR_EN_CON
OC29 100p/4NPO/50V/JX

MB ID

VCC3 OR49 8.2K/4
OR50 8.2K/4X MB_ID2

DUAL BIOS OPT STRAP

-CASEOPEN
OC6 1u/4XSR/6.3V/K

SIO_18V

internal power pin, max 22nF cap

SIO_18V
OC7 0.1u/4X7R/16V/K
OC8 0.1u/4X7R/16V/K

SIO CAP

IT_VCCH OC9 1u/4XSR/6.3V/KX
IT_VCCH OC10 0.1u/4X7R/16V/KX
3VDUAL OC11 10u/6XSR/6.3V/M
IT_AVCC OC12 1u/4XSR/6.3V/KX
3VDUAL_PCH OC13 10u/6XSR/6.3V/M
VREF_25 OC14 0.1u/4X7R/16V/KX
OC15 0.1u/4X7R/16V/K

Gigabyte Technology

Title			
PCH GPIO, CTRL, AUDIO			
Size	Document Number	GA-H81M-Gaming 3	
C			
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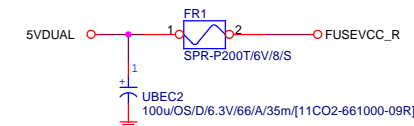
KB/MS

www.xinxunwei.com 400-800-9990

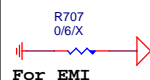
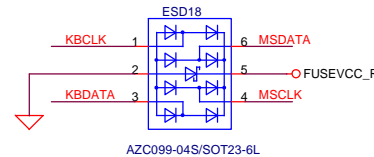
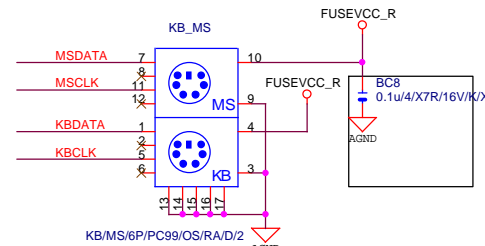
KB_MS ESD

USB2.0 PWR

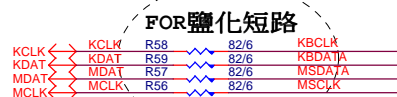
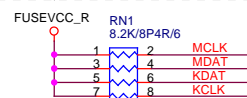
FUSE-0805



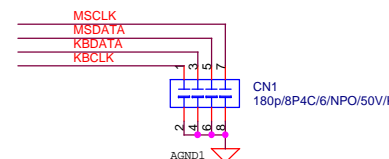
Close to connector



For EMI



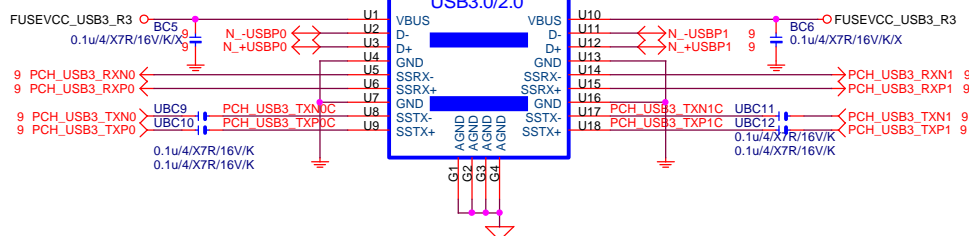
FOR鹽化短路



USB30_20

R_USB30
USB/18P/BU/OS/RA/D/2/1U/5B

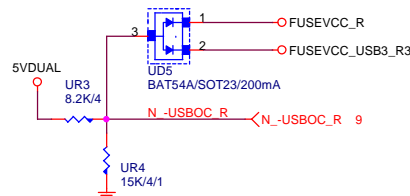
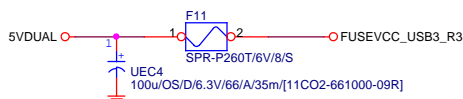
USB3.0/2.0



USB30_20 PWR

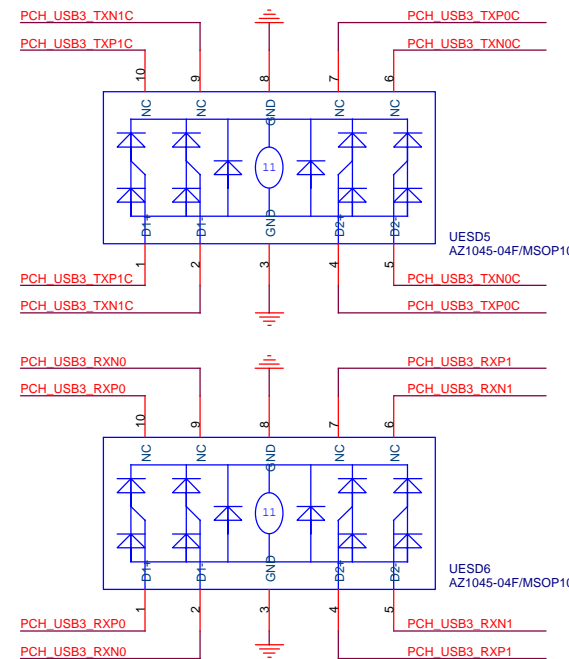
-USBOC_R

Polyswitch-0805

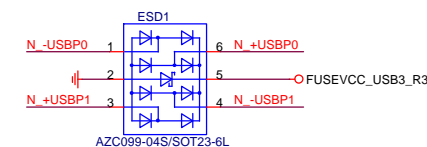


USB30_20 ESD PROTECT

USB3.0 ESD



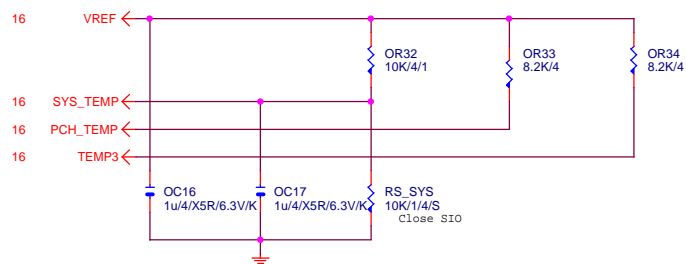
USB POWER PROTECT



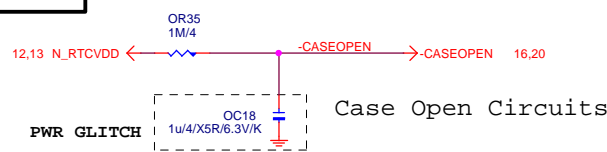
Gigabyte Technology

Title			
COM,-RI,KB_USB,USB_ESATA,-PROCHOT			
Size	Document Number	GA-H81M-Gaming 3	
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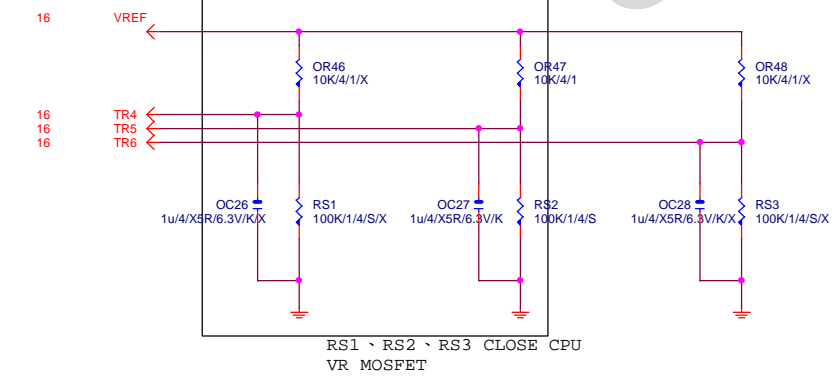
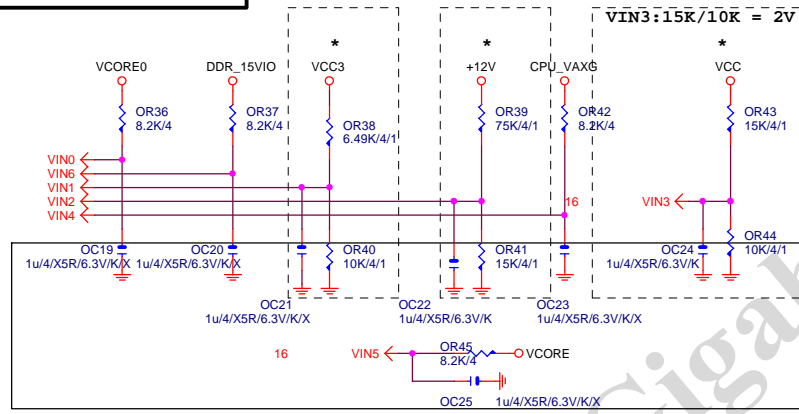
TEMP H/W MONITOR



CASE OPEN

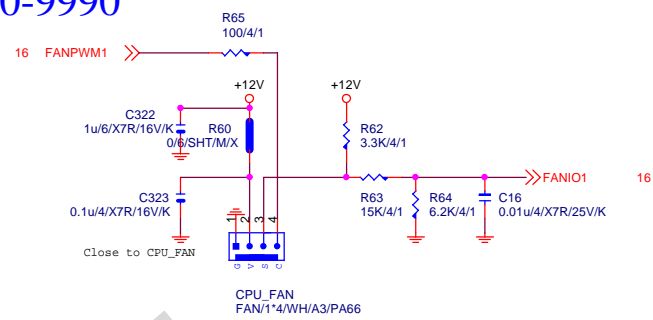


VOLTAGE-- H/W MONITOR



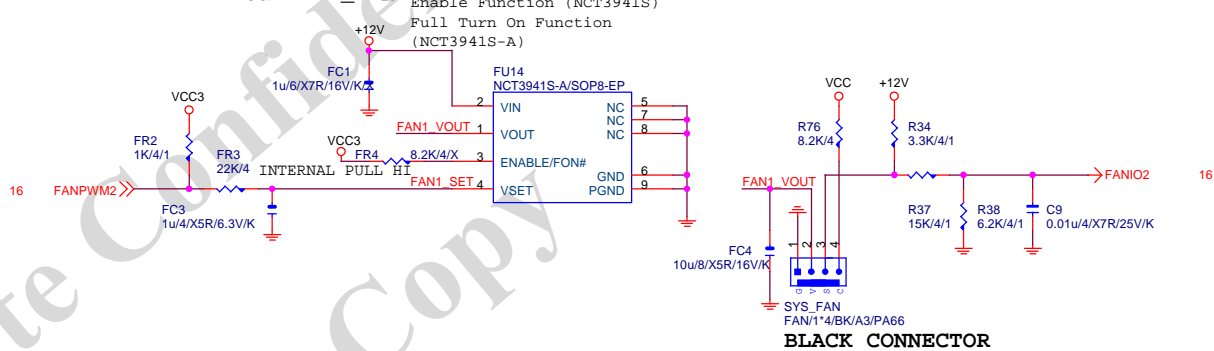
RS1、RS2、RS3 CLOSE CPU VR MOSFET

CPU SMART FAN



SYS SMART FAN

Linear SYS_FAN

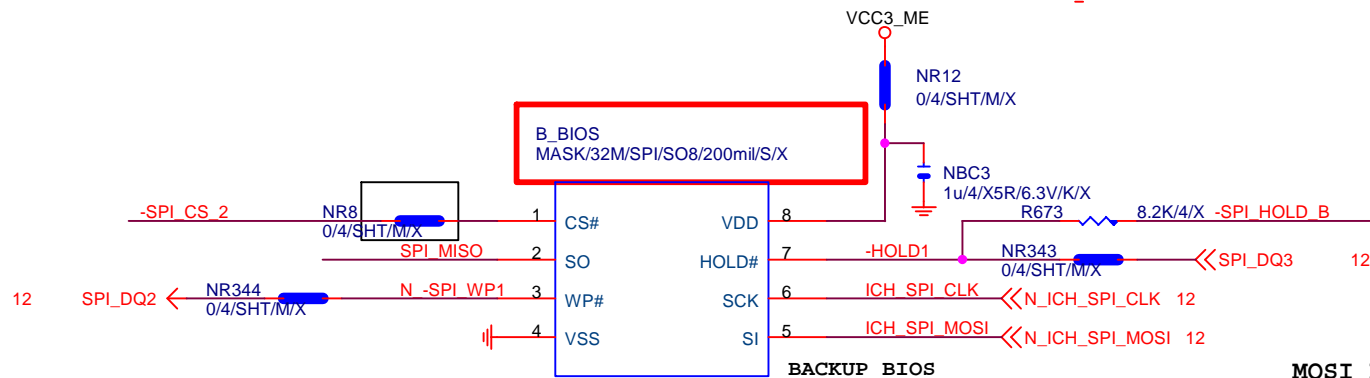
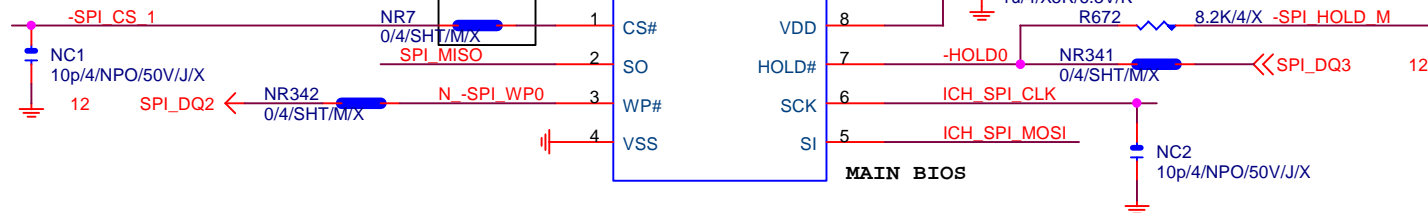


BLACK CONNECTOR

PROHOT

Gigabyte Technology

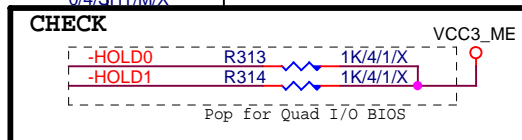
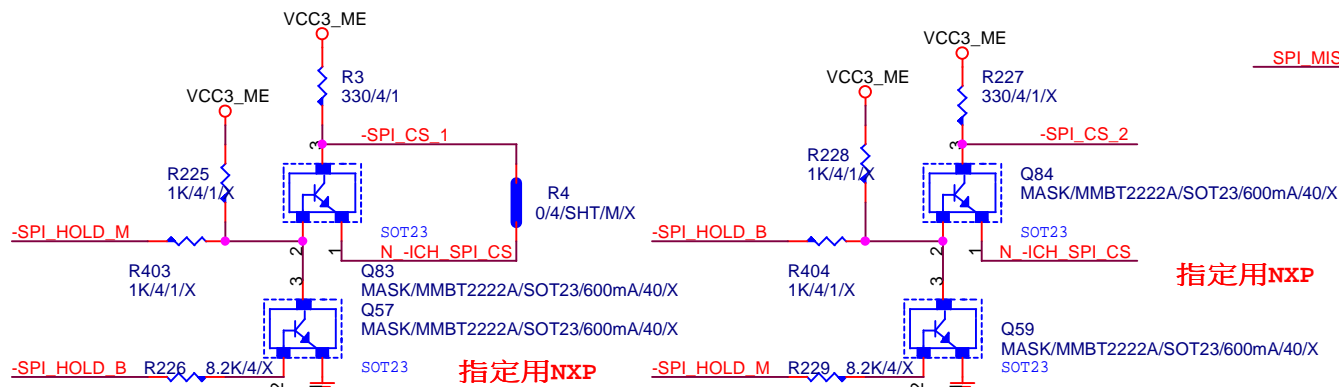
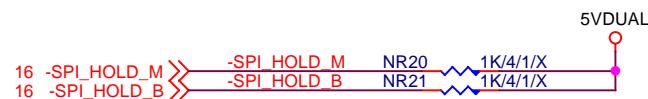
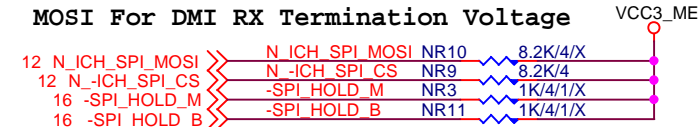
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BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating
0 means PD 1K

MOSI For DMI RX Termination Voltage

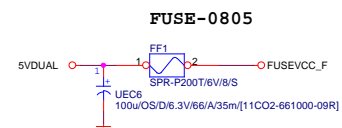
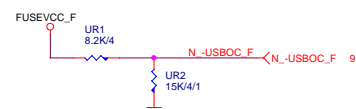
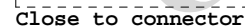
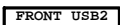
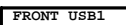
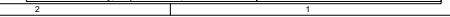
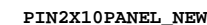


Gigabyte Technology

DUAL BIOS

GA-H81M-Gaming 3

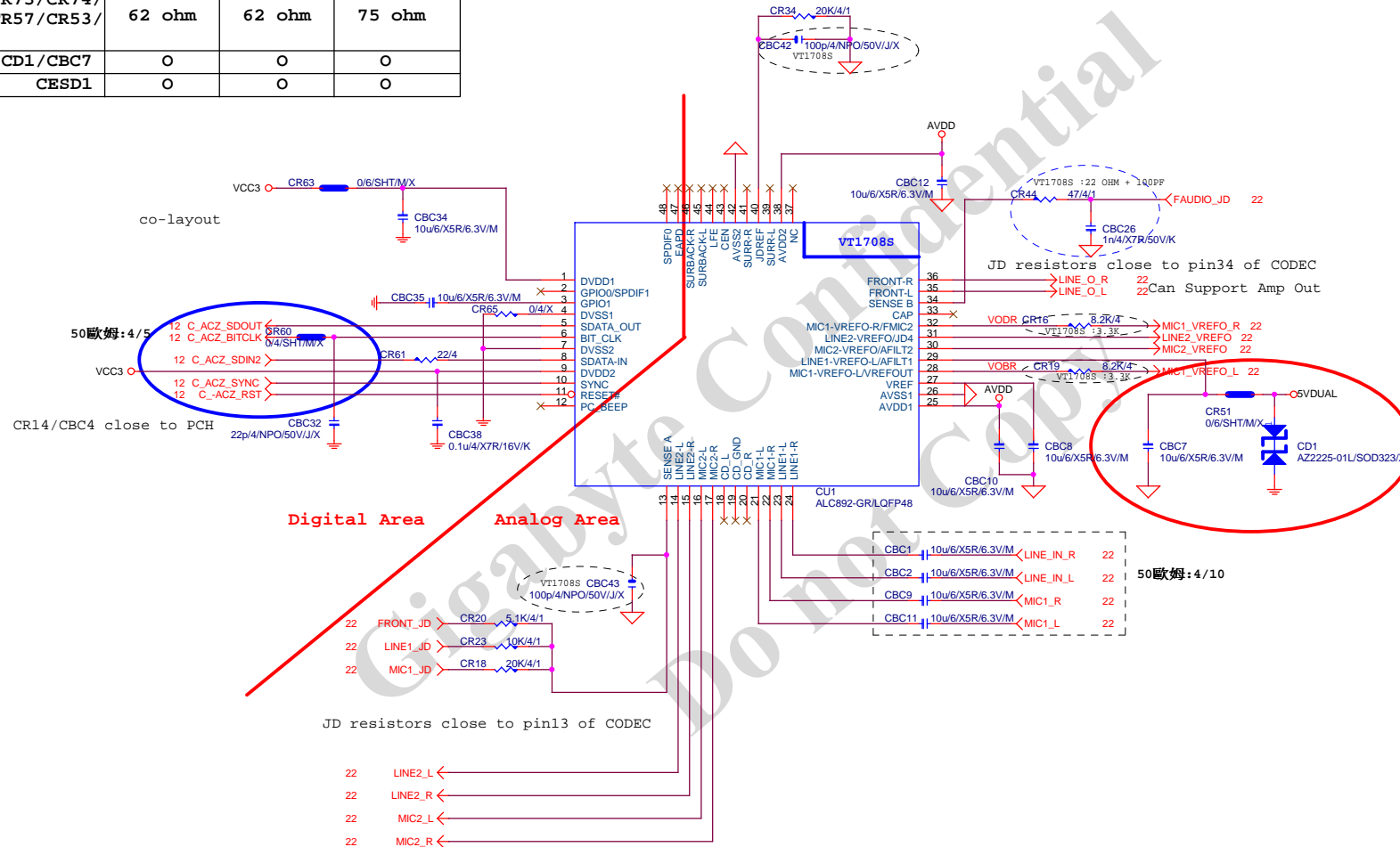
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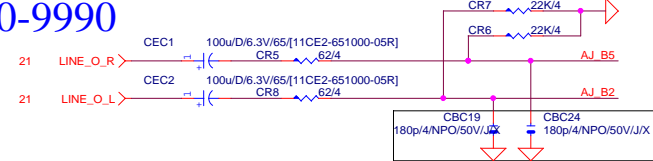
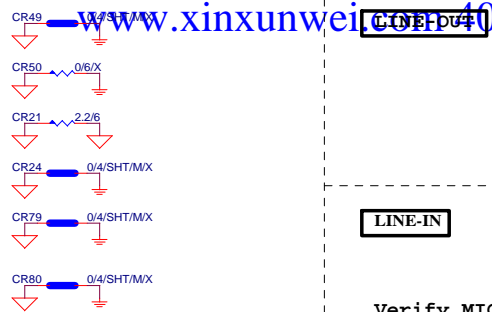
AZALIA CODEC ALC892/ALC887-VD2/VT1708-CE Colay

	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76	62 ohm	62 ohm	75 ohm
CR51/CD1/CBC7	O	O	O
CESD1	O	O	O



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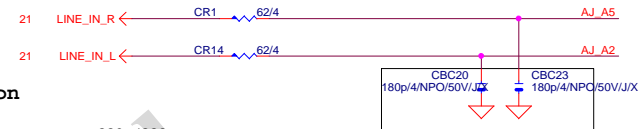
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LINE-IN

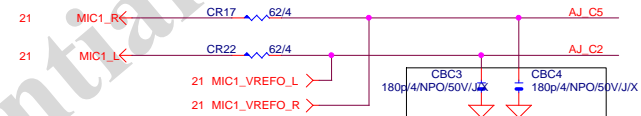
Verify MIC function
in LINE-in

Only reserved for ALC888

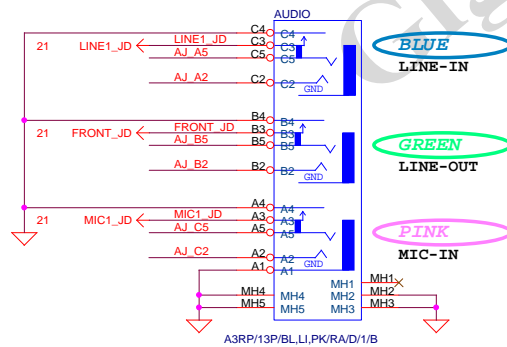


For 889A/888

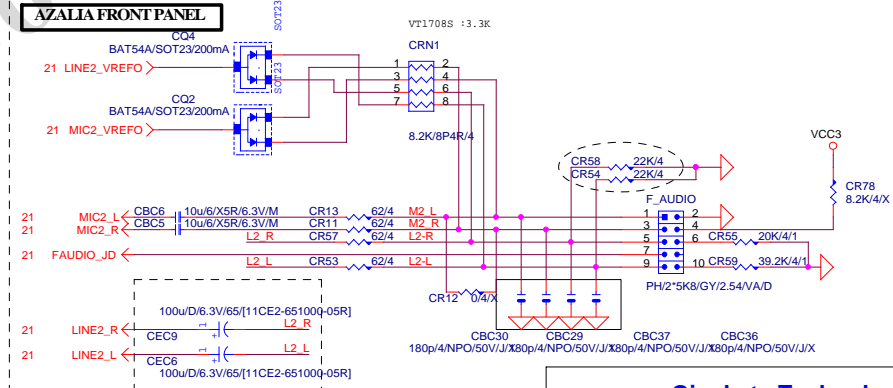
MIC-IN



SPDIF_OUT

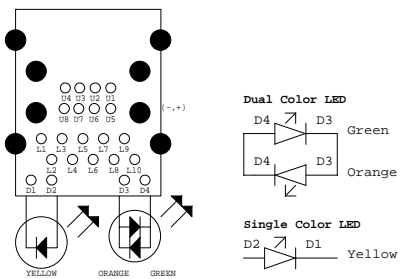
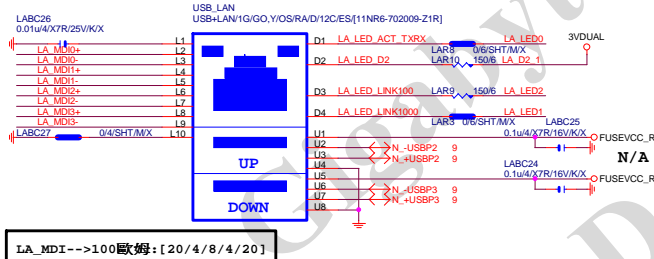
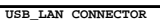
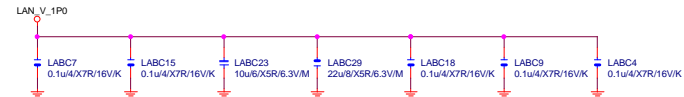


AZALIA FRONT PANEL



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

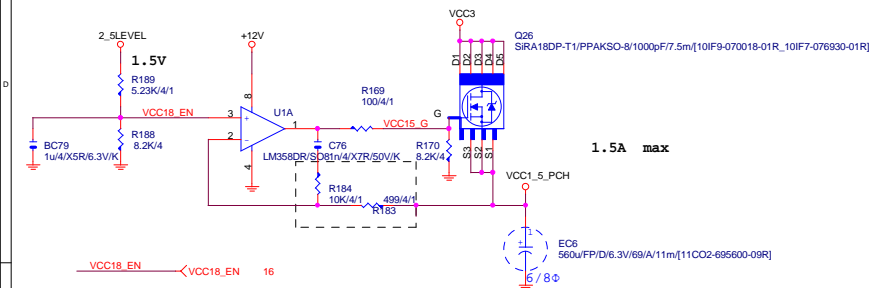
BOM NOTICE *

料號	規格	廠商
11NR6-702009-96R	1G LAN (12core)	UDE(RU9 ESD+)
[LED獨立走線,可省略外加AZC099料件LAESD1]		

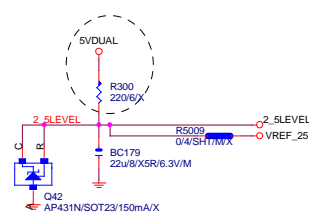
1. 9KV ESD BOM:
USB_LAN (RU9):11NR6-702009-96R

2. 28KV ESD BOM:
USB_LAN (RU9):11NR6-702009-96R
LAESD2, LAESD3: 14AZC398-04S

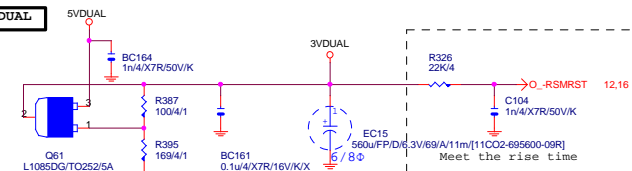
VCC1_8_PCH



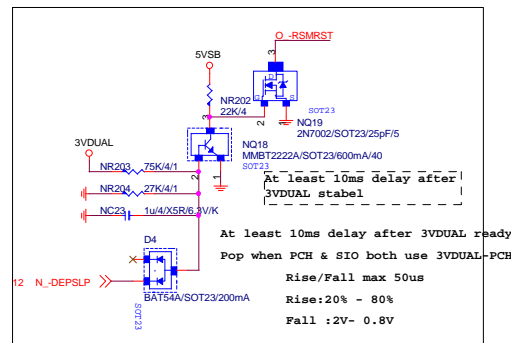
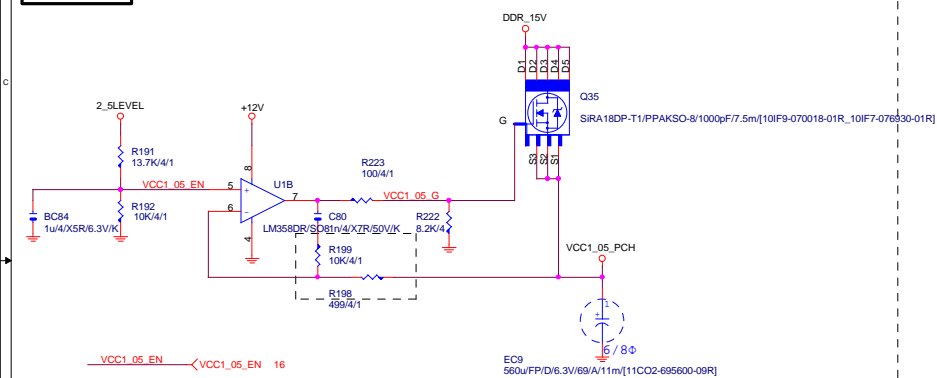
ERP



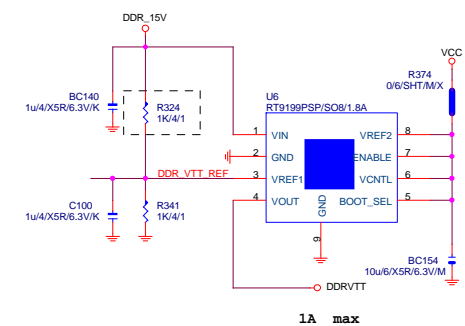
3VDUAL



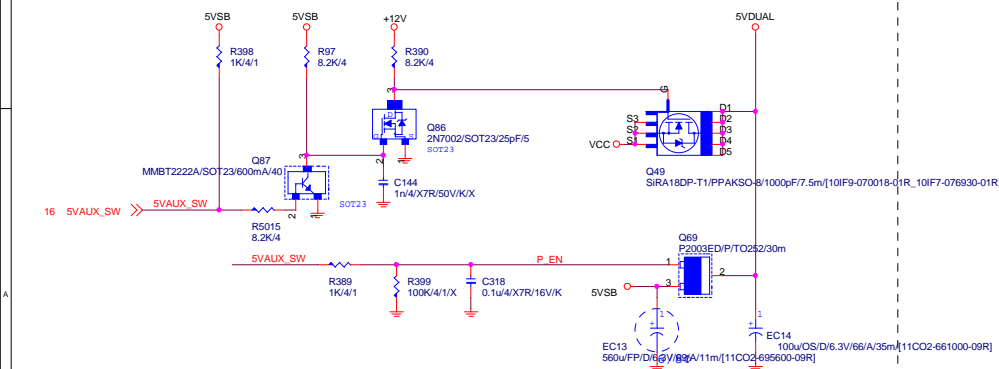
VCC1_05_PCH



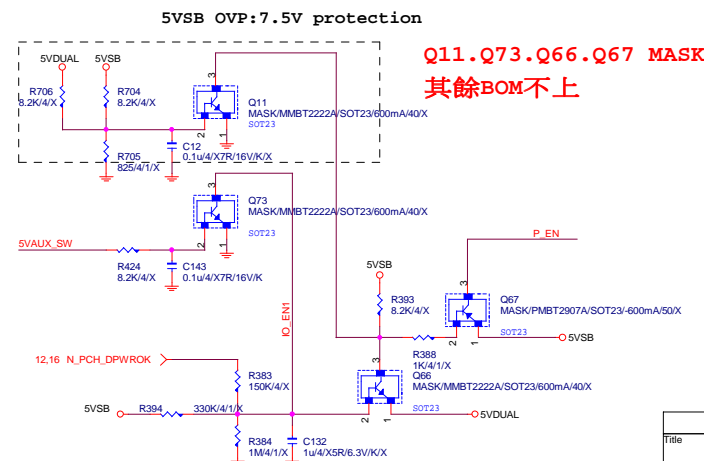
DDRVT



5VDUAL

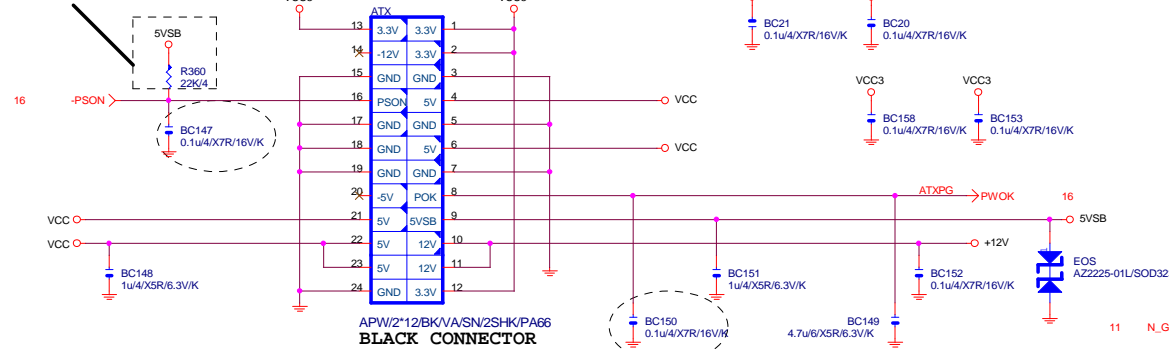


5VDUAL SHORT PROTECT



ATXX24 POWER CONNECTOR

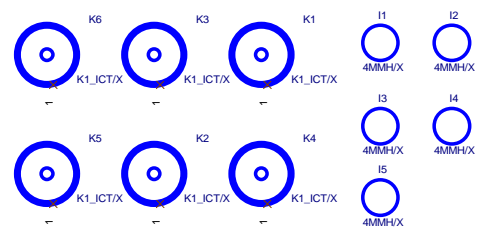
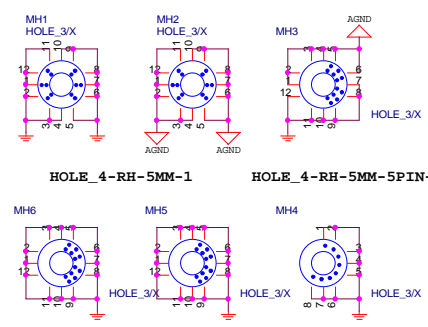
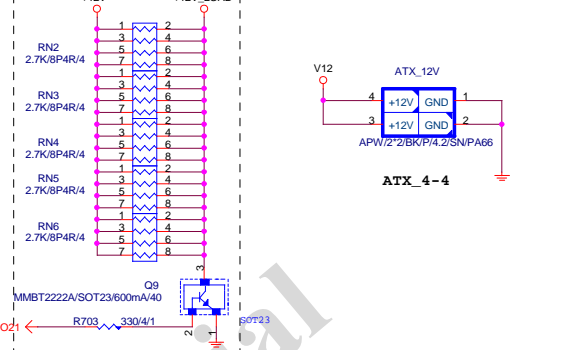
【技術通報R&D技術通報155】



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ATXX4 POWER CONNECTOR

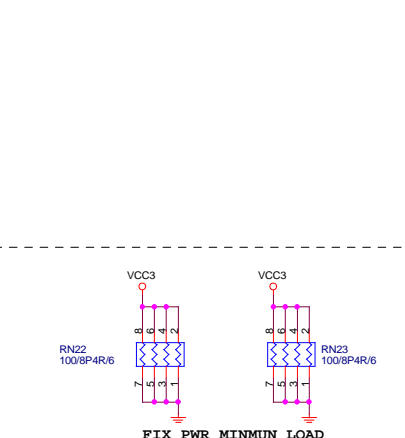
【技術通報R&D技術通報158】



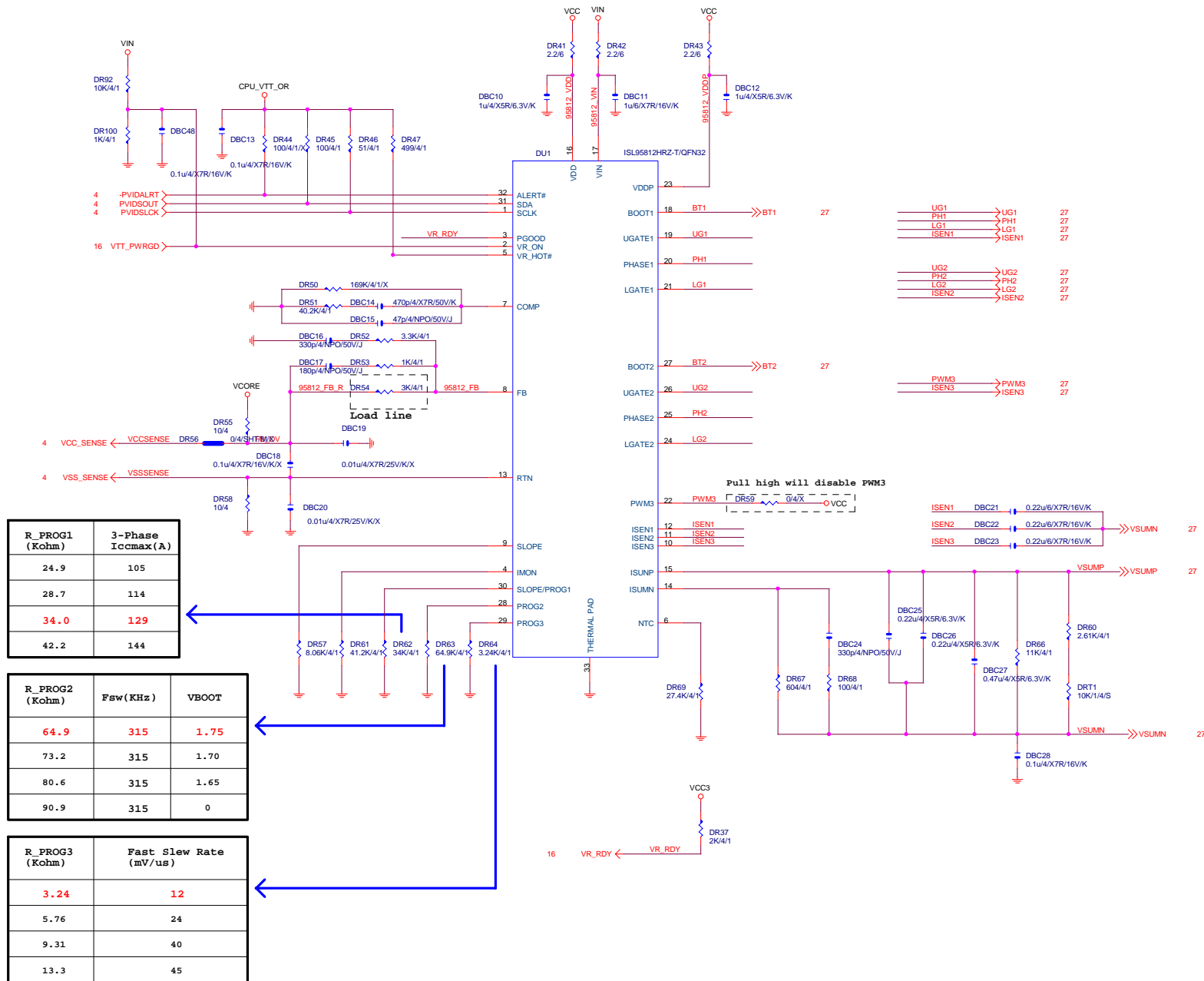
To prevent the 5VSB under loading when boot

PWOK PATCH

【技術通報R&D技術通報154】



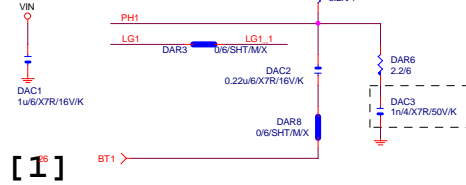
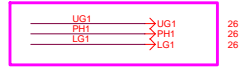
Gigabyte Technology		
ATX CONNECTOR		
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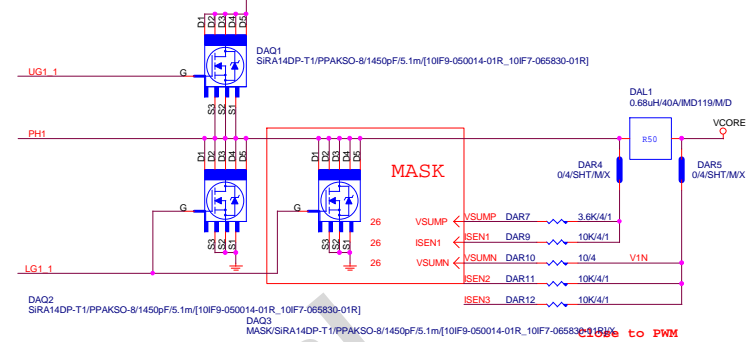
Gigabyte Technology

File			CPU CORE VR-1
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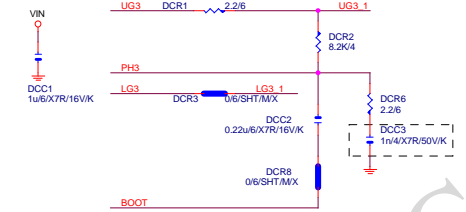
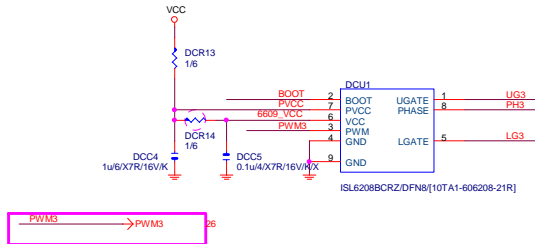
PHASE 1



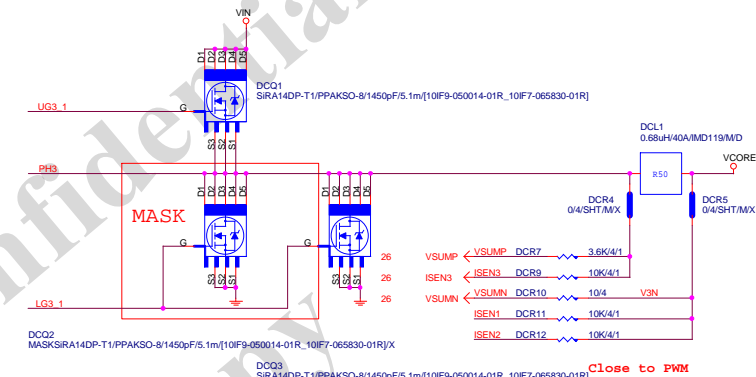
[1]



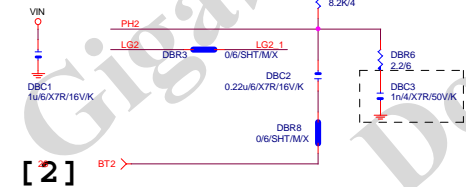
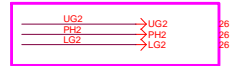
PHASE 3



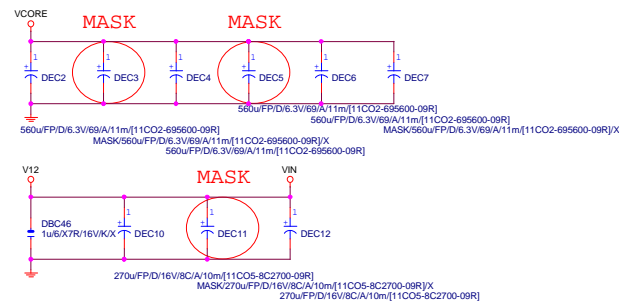
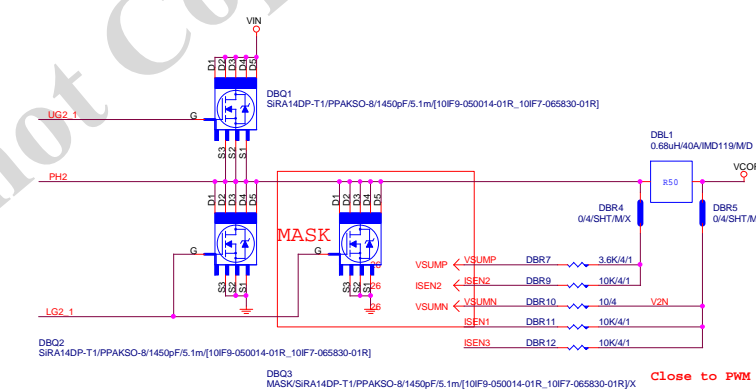
[3]



PHASE 2

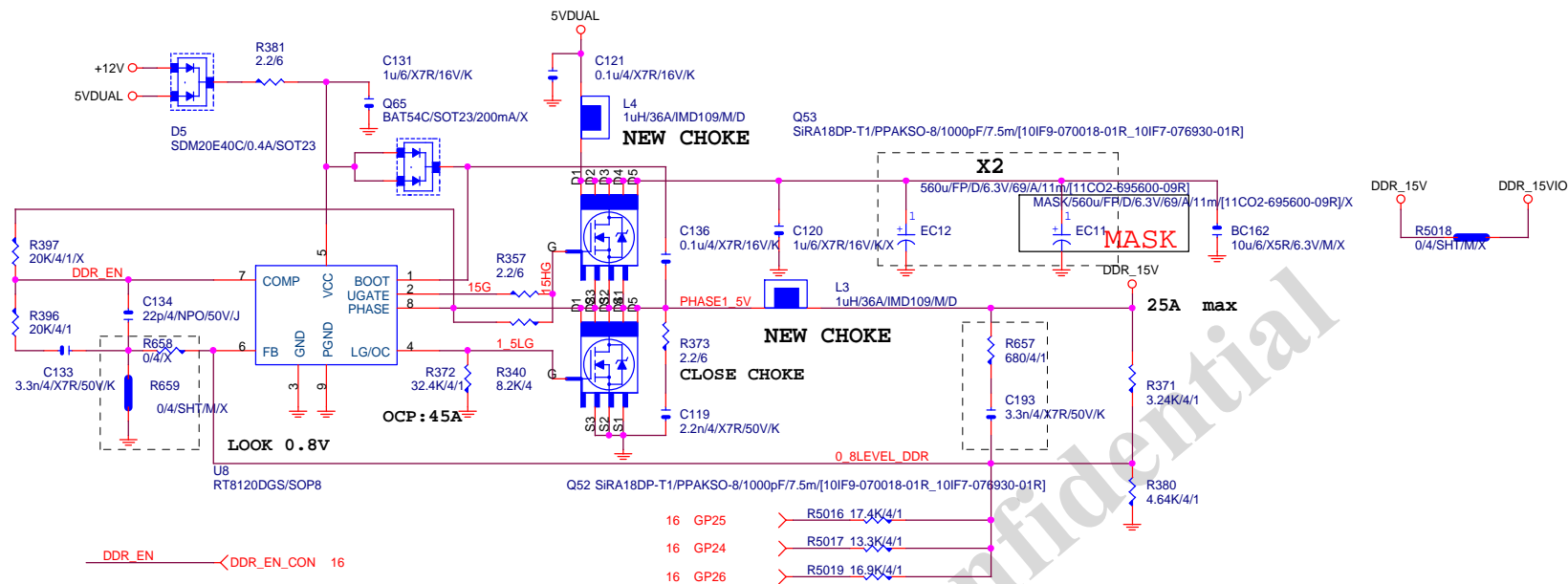


[2]



Gigabyte Technology

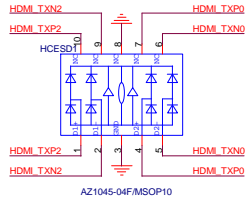
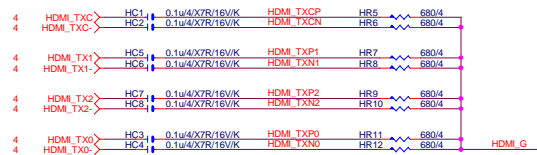
Title		CPU CORE VR-2	
Size	Document Number	GA-H81M-Gaming 3	
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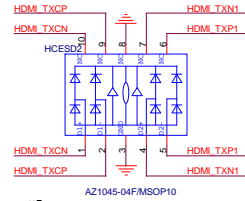
VIN=5V, VOUT=1.5V, IOUT=25A, PHASE=1
IRMS=11.45A
560uF/P/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85°C), 1(105°C)
VIN Ripple current=4.7X1.7=7.99A(85°C)
-->故固態電容須2X7.99=15.98>11.45A

$$\begin{aligned} \text{Rocset} &= (\text{Iocp} * \text{Lgate}, \text{rdson}) / \text{Iocset} \\ \text{Rocset} &= (45\text{A} * 6.7\text{mOhm}) / 10\text{uA} = 30\text{K} \\ \text{Iocset} &= 10\text{uA} \end{aligned}$$

<i>Gigabyte Technology</i>			
Title			
DDR POWER			
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Close to connector



Close to connector

