

Model Name: GA-H81M-S

SHEET

TITLE

Revision
1.01

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 *1 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

www.xinxunwei.com 400-800-9990

SHEET

TITLE

28	RT8120_DDR POWER

Gigabyte Technology		
Cover Sheet		
Size Custom	Document Number GA-H81M-S	Rev 1.01
Date: Wednesday, June 25, 2014	Sheet 1 of 28	

Revision
1.01

Component value change history

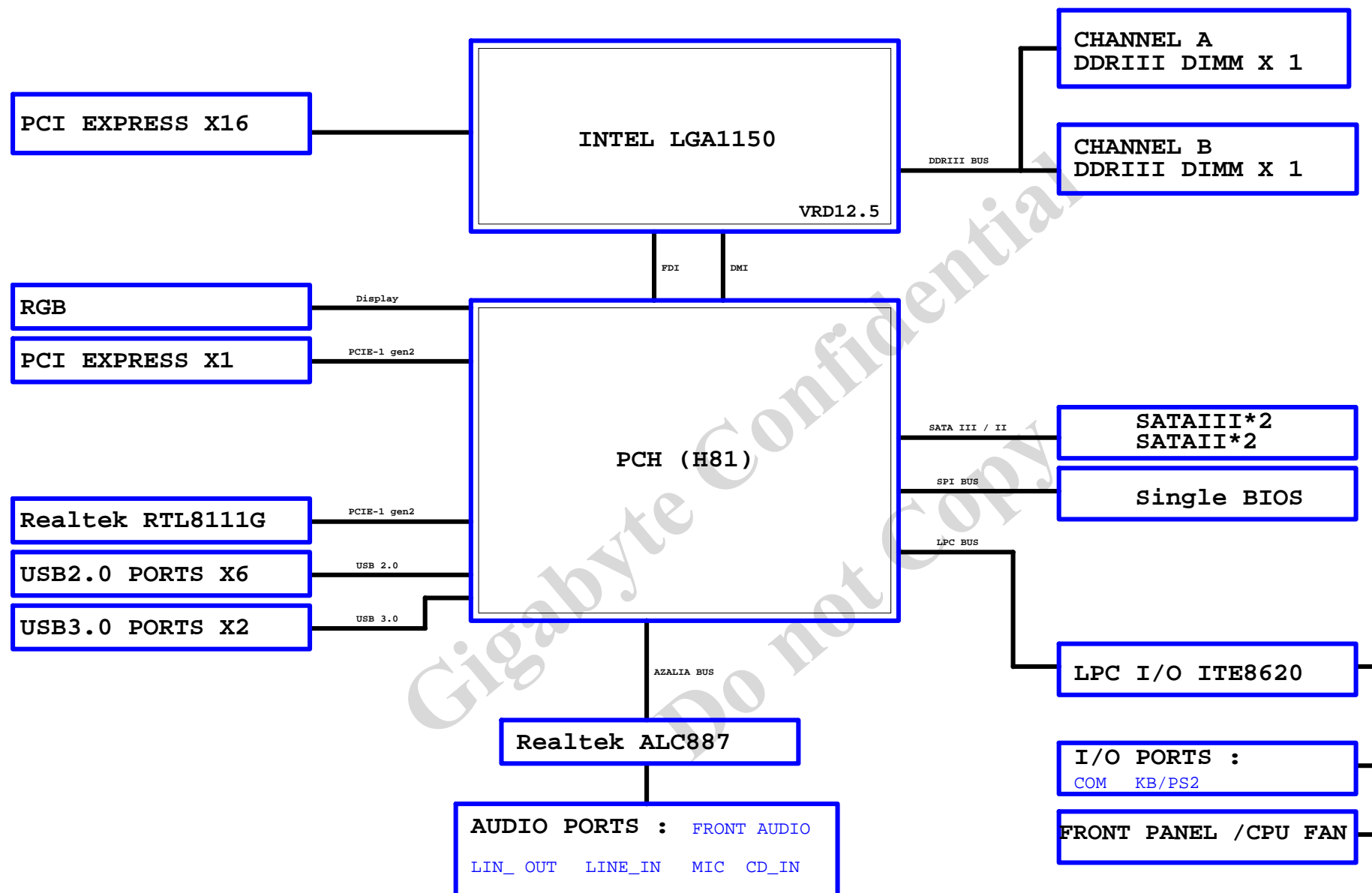
2014/03/06

[illegible]

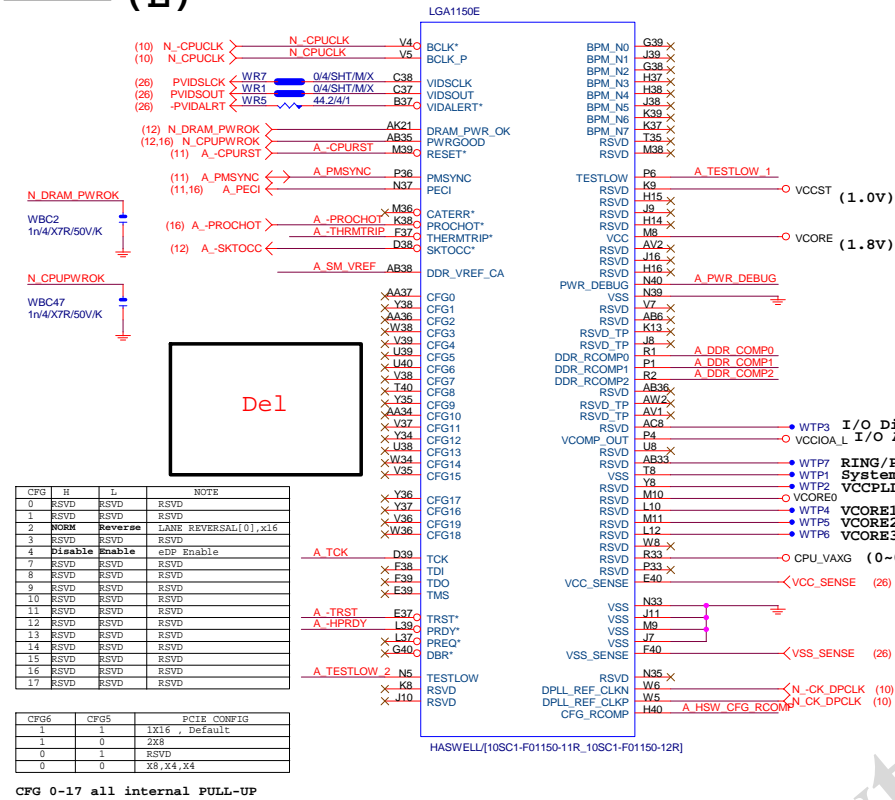
Circuit or PCB layout change

[illegible]

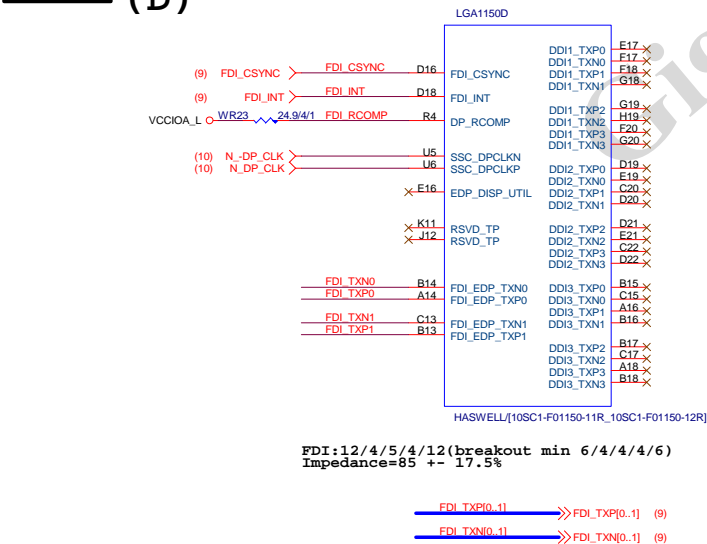
BLOCK DIAGRAM



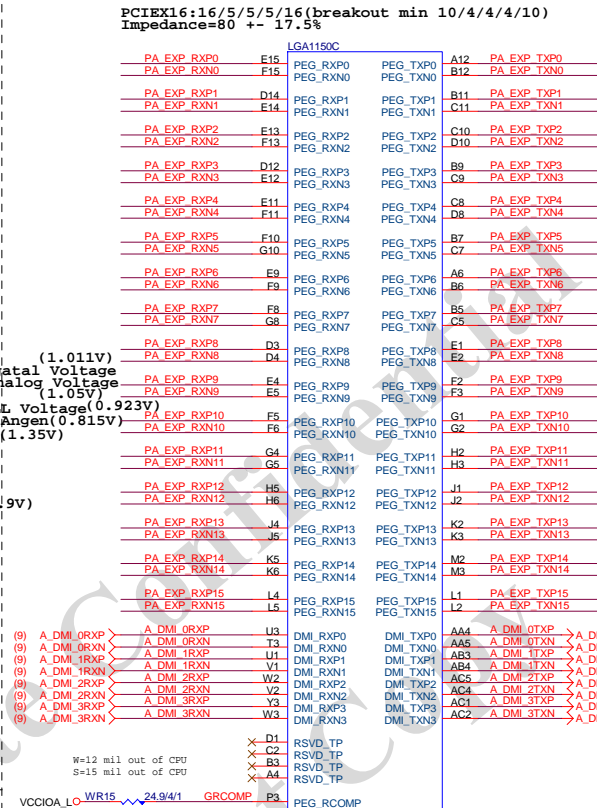
LGA1150 (E)



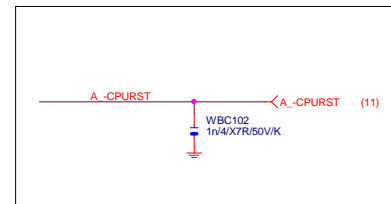
LGA1150 (D)



LGA1155 (C)



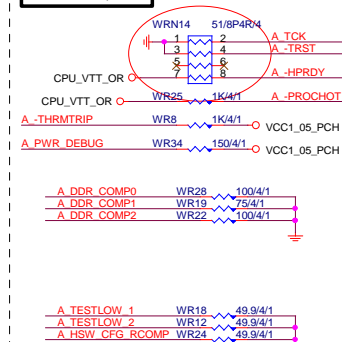
-CPURST



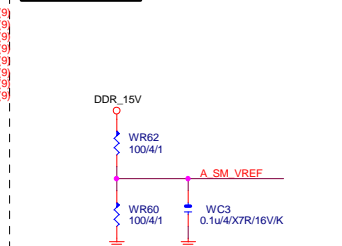
CPU SVID



CPU PU/PD

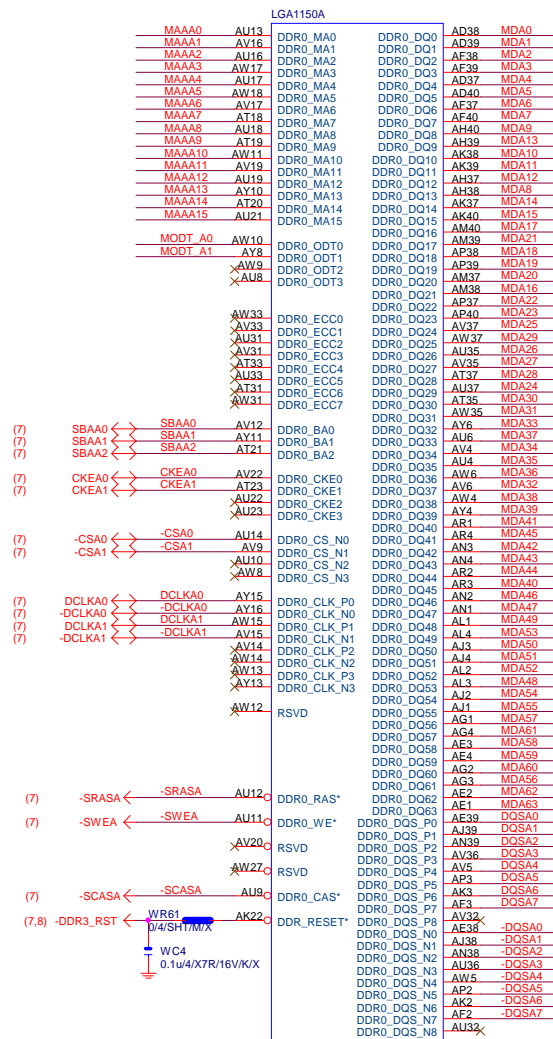


SM REF

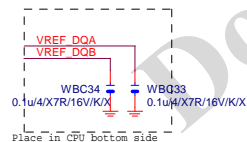


Gigabyte Technology

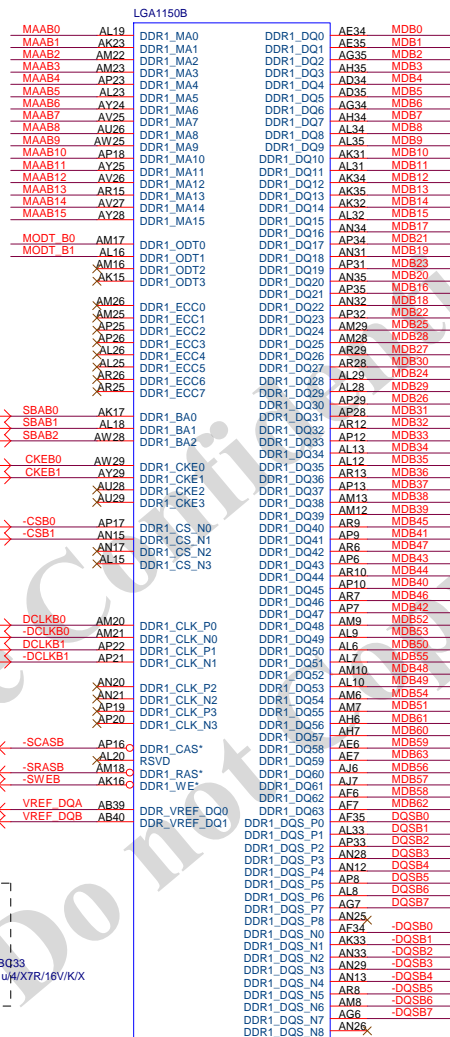
Title			
CPU LGA1150-A			
Size	Document Number		Rev
Custom	GA-H81M-S		1.0
Date:	Wednesday, June 25, 2014	Sheet	4 of 28



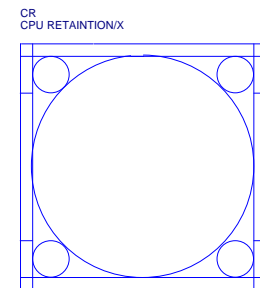
HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]



未上件



HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]

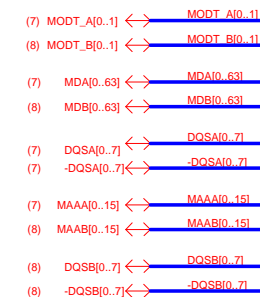


LGA1150

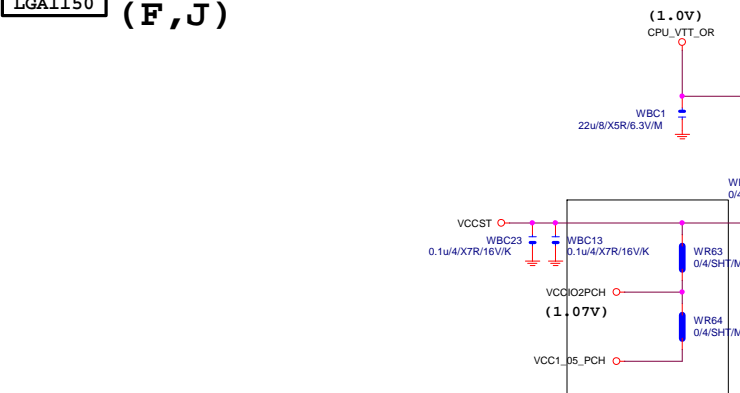


ILM_BP/1156/CSP/ILM_BP/1156/CSP/[12KRC-0F0001-52R_12KRC-0F0001-51R]

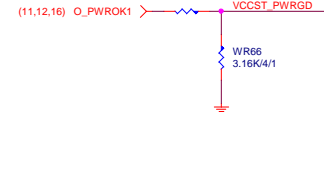
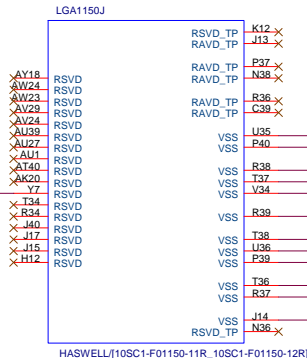
DDR BUS



LGA1150 (F, J)

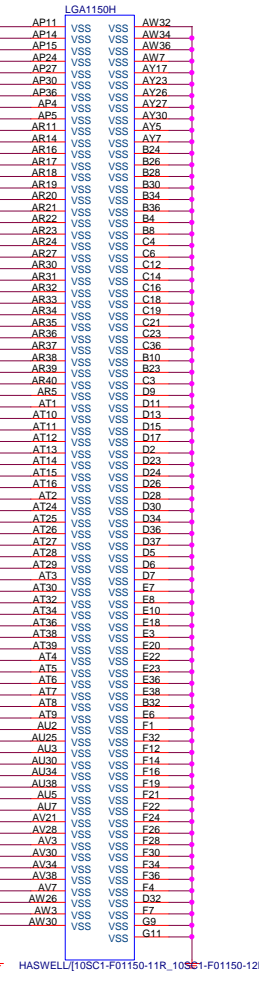
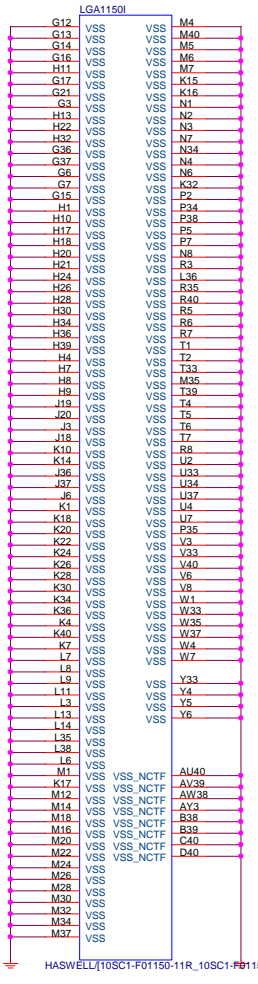
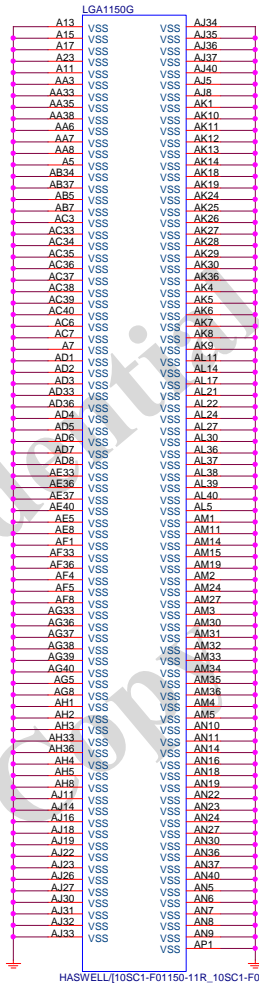


footprint更動



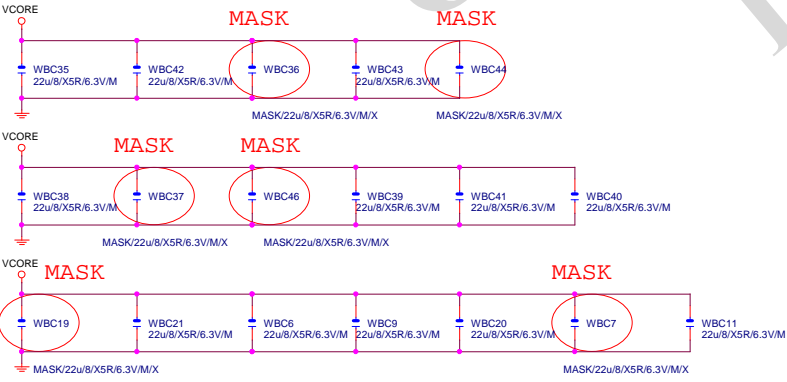
LGA1155 (G, H, I)

LGA1155 (G, H, I)



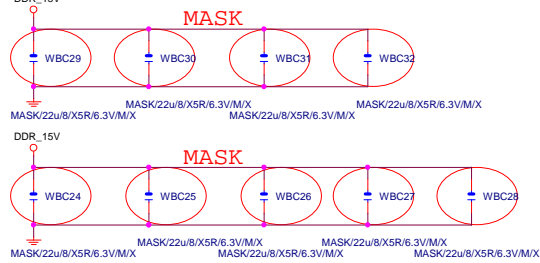
VCore CAP

(X18)

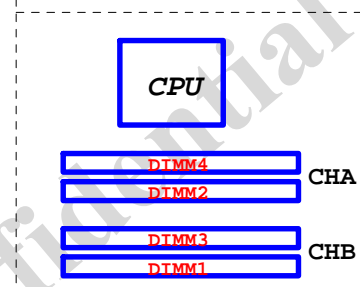
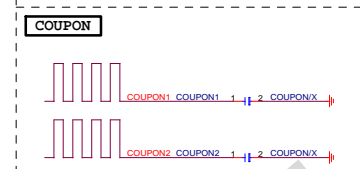
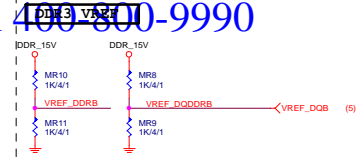
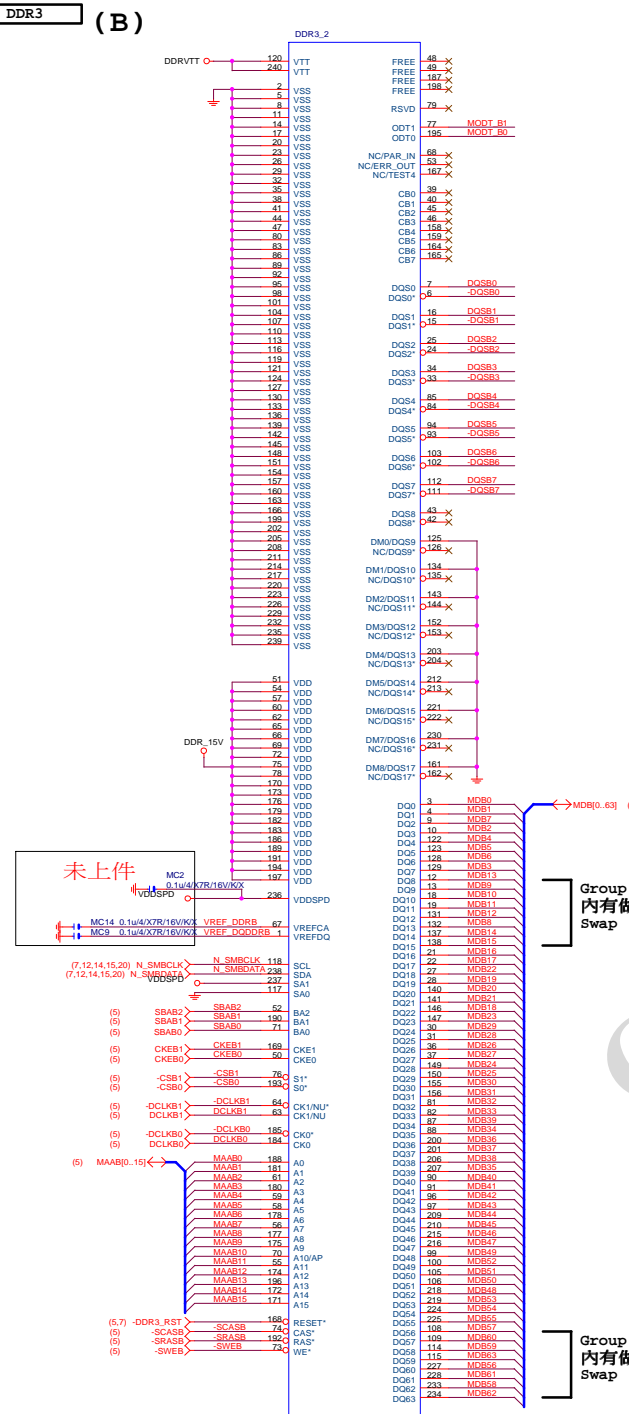


DDR CAP

(X9)



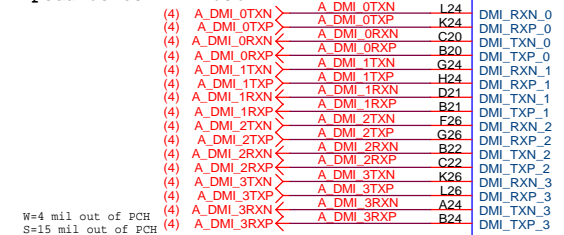




PCH

(B)

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



PCIE Only

8111G

PCIEx1

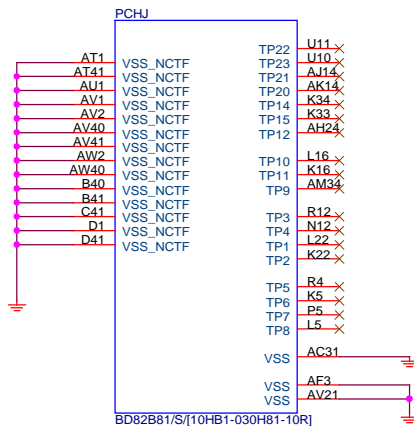
N/A

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)

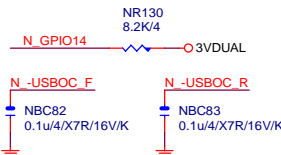
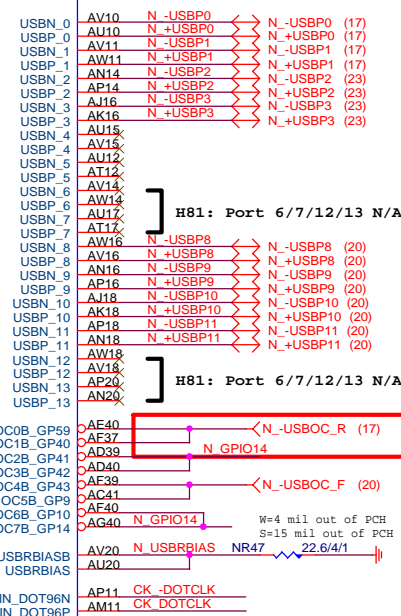


USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

PCHB

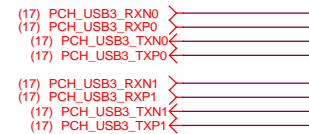
B85: Port 6/7 N/A

H81: Port 6/7/12/13 N/A



PCH

(F)



N/A

未上件

PCH CLK PD

Mount for integrated clock Generation Mode

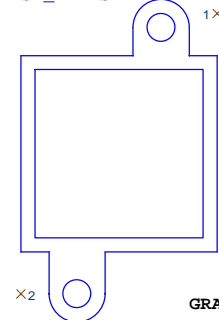


NR225 short to GND in non
graphic SKU

PCH H/S

LOW COST ICH7 HEATSINK

SB_HEATSINK



PCH_HS
PCH_HS[12SP2-030005-43R_12SP2-030005-41R_12SP2-030005-42R]

USB TABLE

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

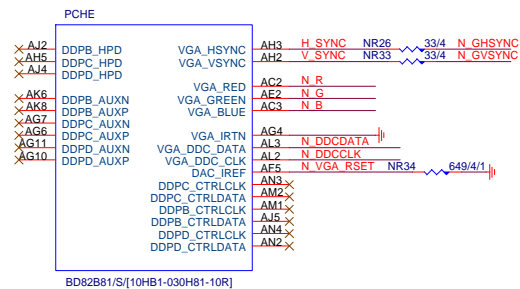
USB OC#	Configure
OC0#	R_USB30
OC1#	USB_LAN
OC2#	Not Use
OC3#	N/A
OC4#	F_USB1
OC5#	F_USB2
OC6#	Not Use
OC7#	N/A

Gigabyte Technology

Title			PCH FDI,DMI,USB ,PCIE,NVRAM	
Size	Document Number	GA-H81M-S		Rev
Custom				1.01
Date:	Wednesday, June 25, 2014	Sheet	9	of 28

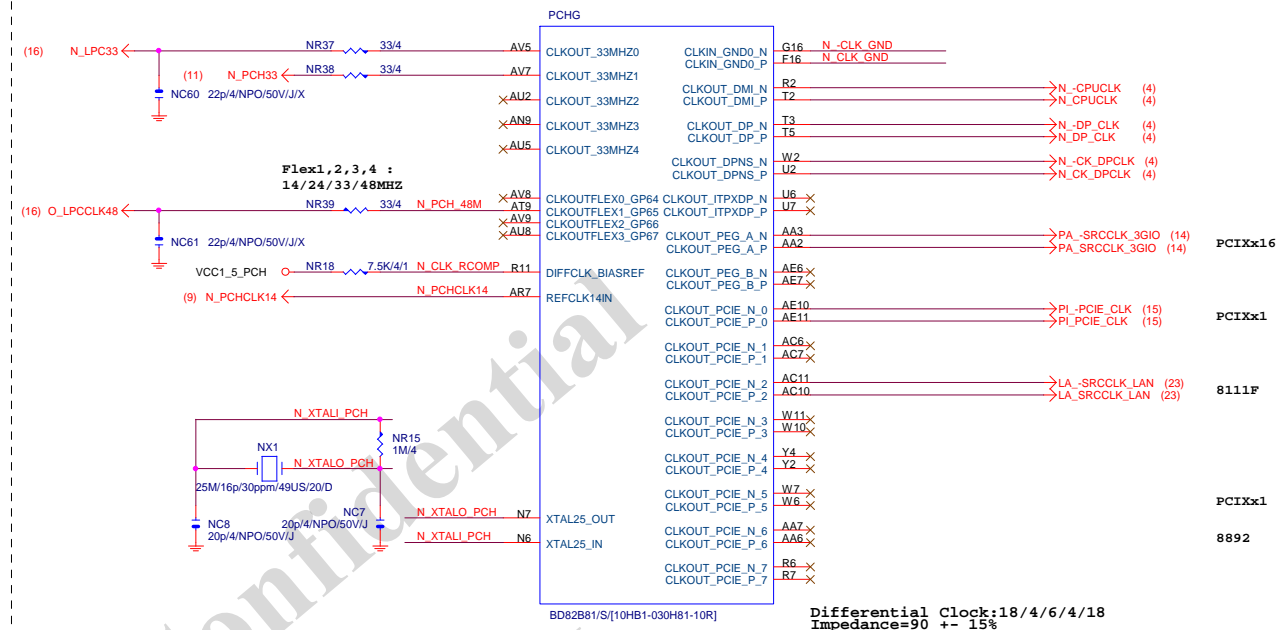
PCH

(E)

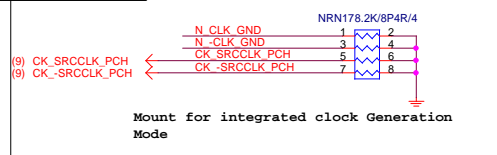


PCH

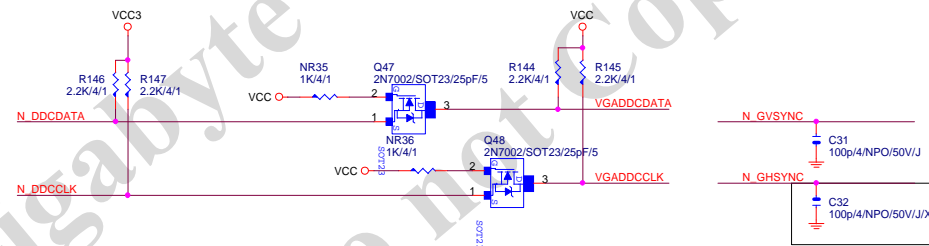
(G)



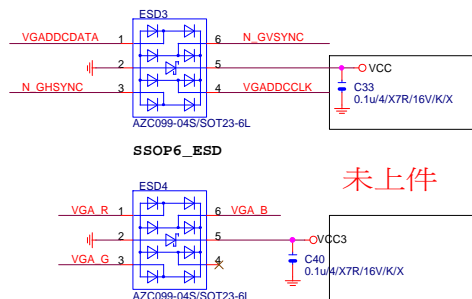
PCH CLK PD



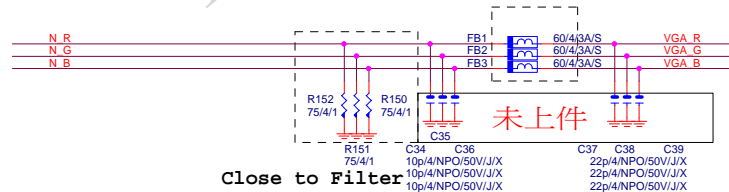
VGA DDC



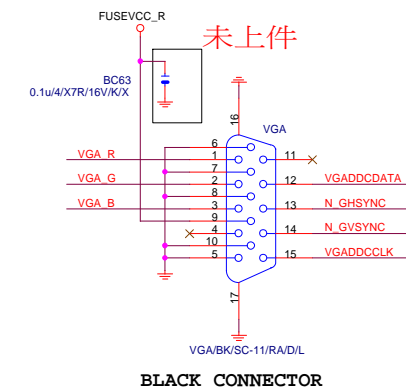
VGA ESD



VGA DDC



VGA CONNECTOR



Gigabyte Technology

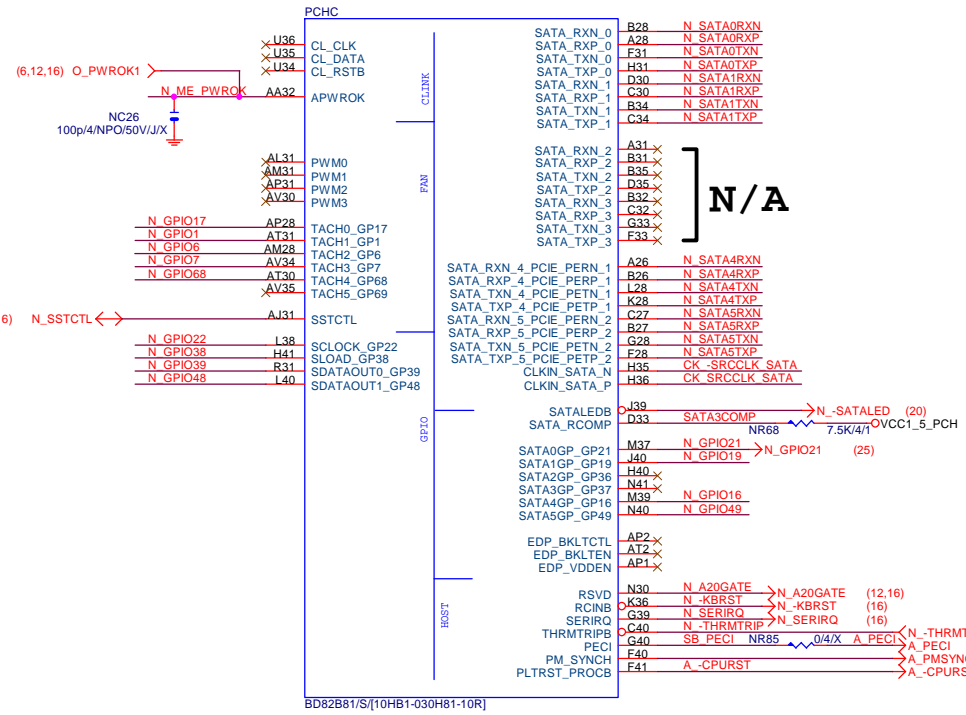
PCH DISPLAY, CLK BUFFER

GA-H81M-S

Title	Document Number	Rev
Size	Custom	1.01
Date:	Wednesday, June 25, 2014	Sheet 10 of 28

PCH (C)

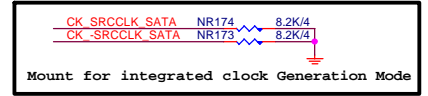
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



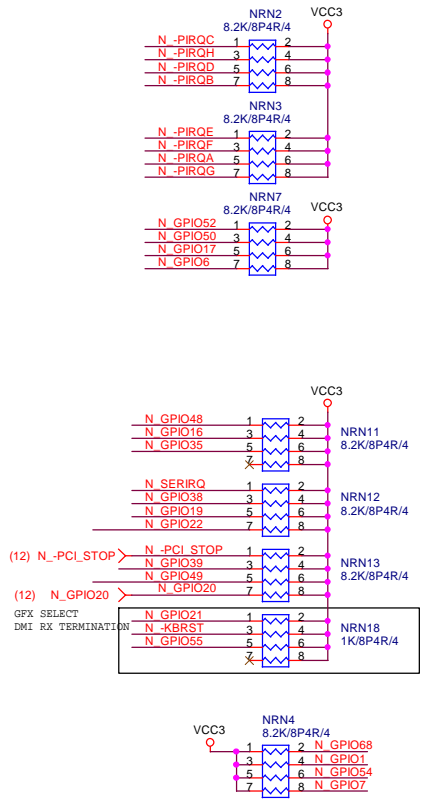
PCH (A)



PCH CLK PD



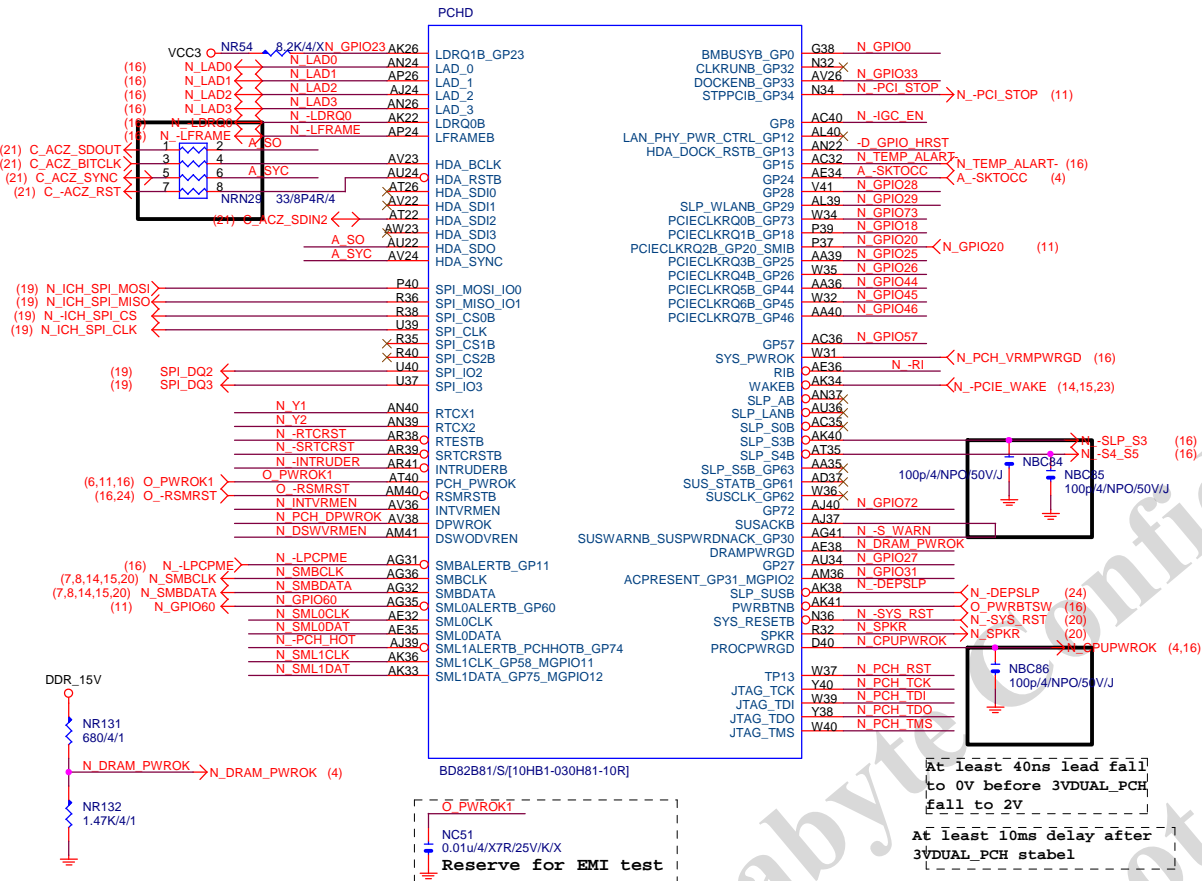
PCH PU/PD



PCH

(D)

(16) N_LAD[0..3] << N_LAD[0..3]



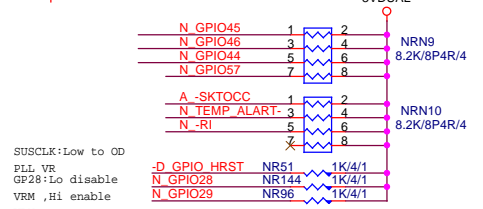
ACZ_SDOUT

PCH PU/PD

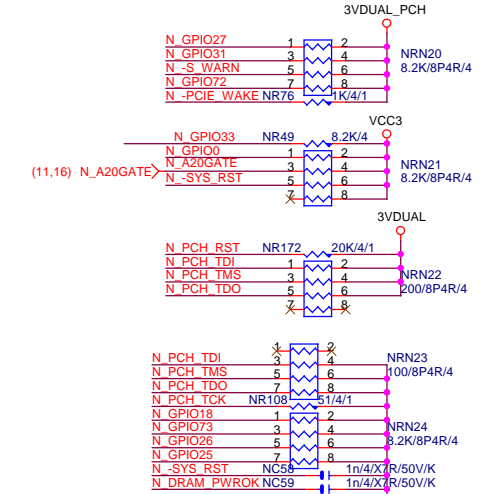
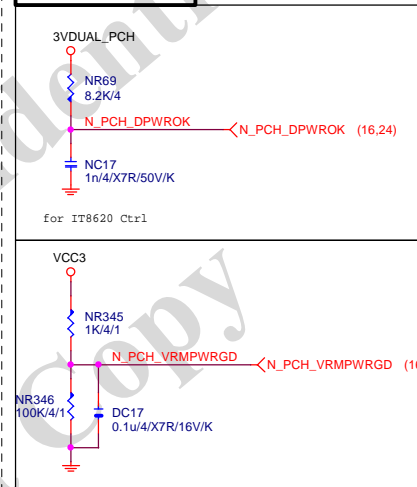
GP8:Low to enable

PCH clock chip

NR106 1K/4/1 N_IGC_EN



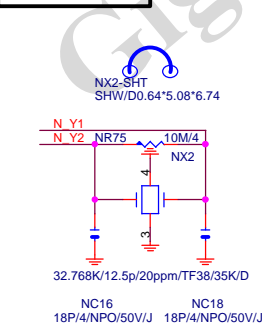
PCH_DPWROK



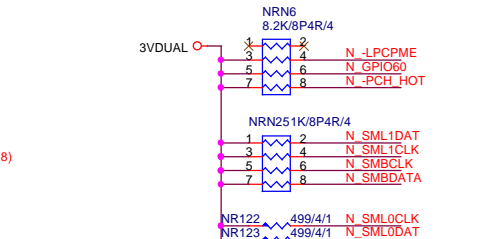
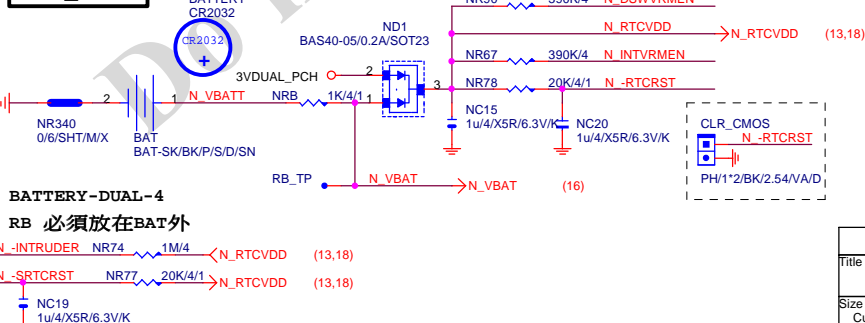
HSW_STRAP13



32.768KHZ

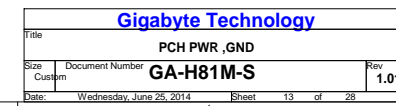


CLR_CMOS

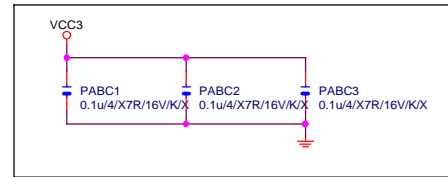


Gigabyte Technology

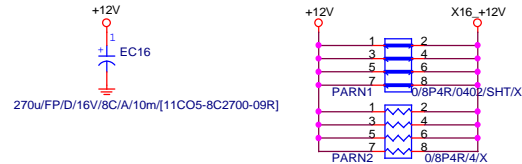
Title			PCH GPIO , CTRL , AUDIO		
Size	Document Number	GA-H81M-S			Rev
Custom					1.01
Date:	Wednesday, June 25, 2014	Sheet	12	of	28



PCIEX16 CAP



PCIEX16 PROTECT SHT

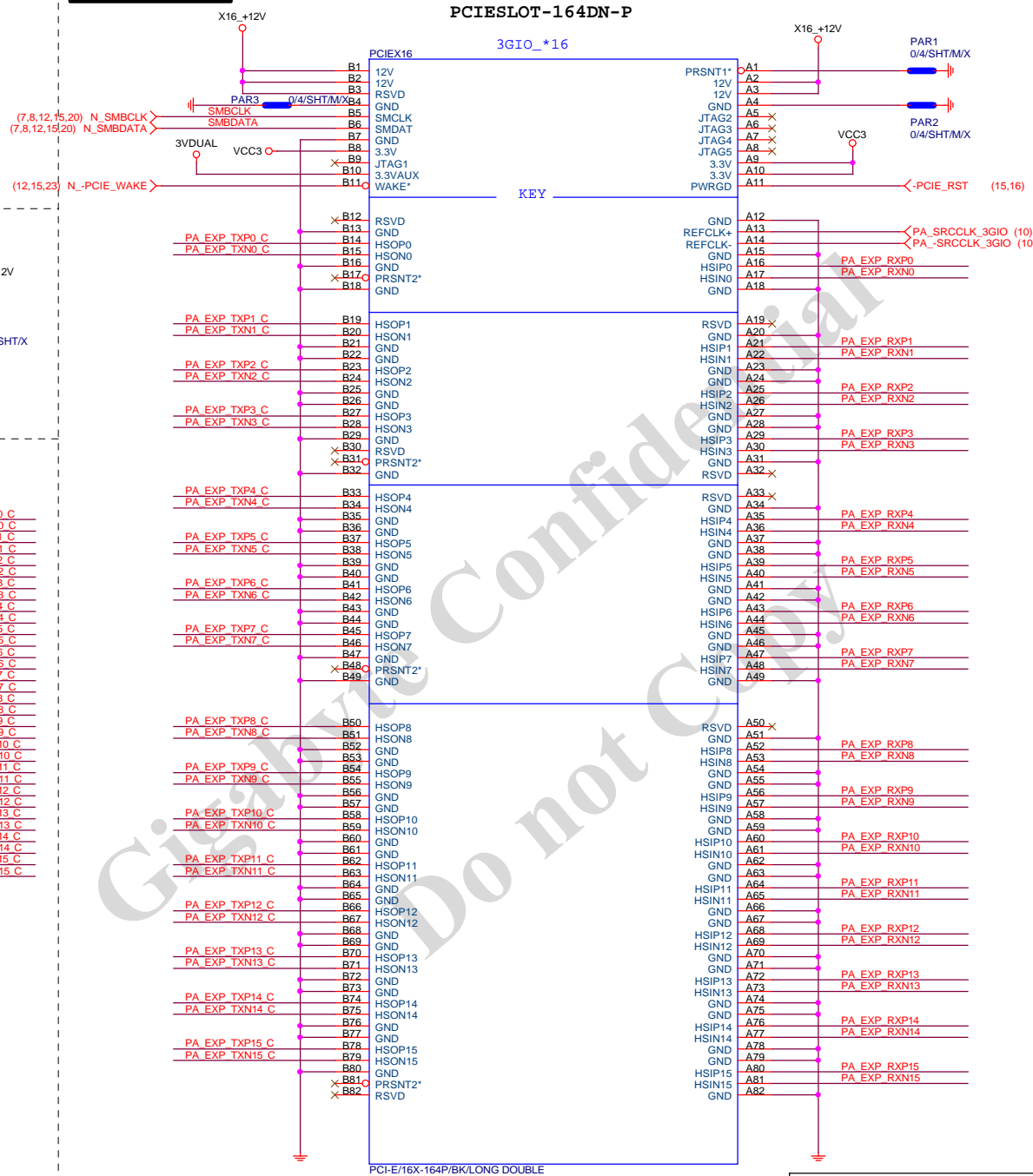


PCIEX16 AC CAP

PA EXP TXP0	PAC5	0.22u4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22u4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22u4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u4/X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u4/X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u4/X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u4/X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u4/X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u4/X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u4/X5R/6.3V/K	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u4/X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u4/X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u4/X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u4/X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u4/X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u4/X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u4/X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u4/X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u4/X5R/6.3V/K	PA EXP TXN15 C

PA EXP RXIP0.15] >> PA_EXP_RXP[0.15] (4)
PA EXP RXN0.15] >> PA_EXP_RXN[0.15] (4)
PA EXP TXIP0.15] >> PA_EXP_TXP[0.15] (4)
PA EXP TXN0.15] >> PA_EXP_TXN[0.15] (4)

PCIEX16 SLOT



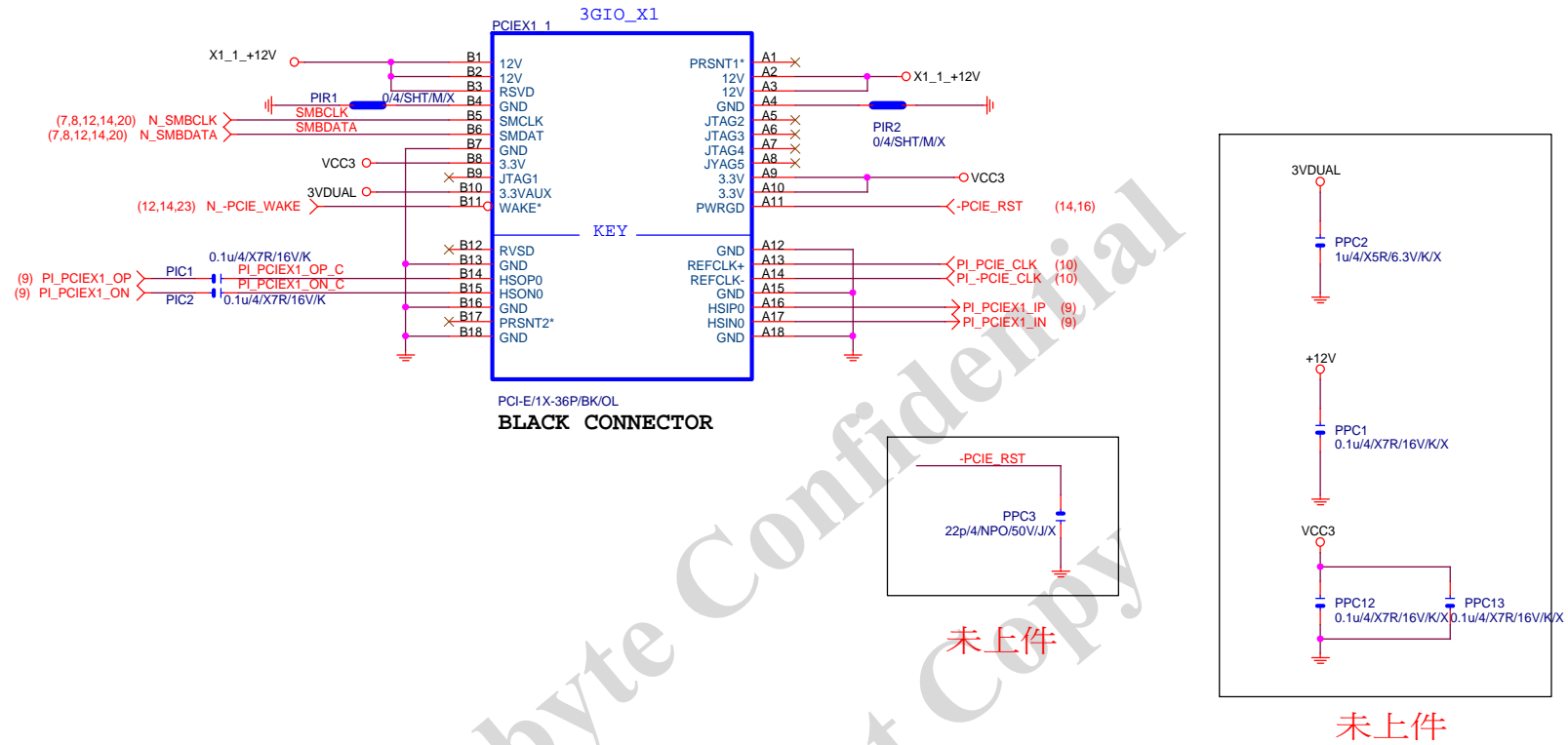
BLACK CONNECTOR

Gigabyte Technology

Title			PCI EXPRESS * 16	
Size	Document Number	GA-H81M-S		Rev
Custom				1.01
Date: Wednesday, June 25, 2014		Sheet	14 of 28	

PCIEX1 SLOT

PCIEX1 PROTECT SHT

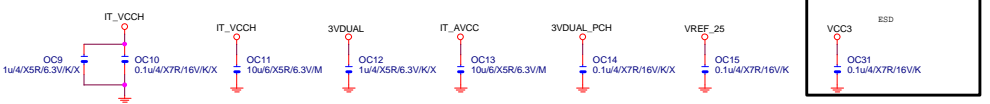
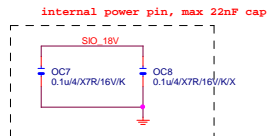
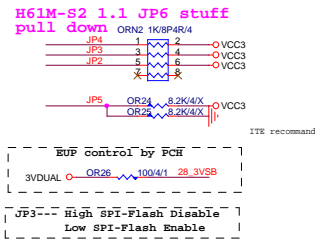
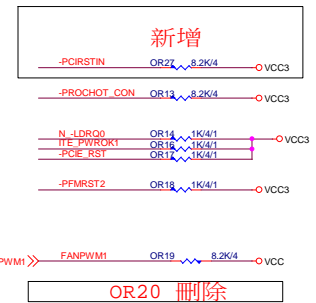


未上件

未上件

Gigabyte Technology

Title			PCI EXPRESS X 1 PORT
Size	Document Number	GA-H81M-S	
Custom			Rev 1.01
Date:	Wednesday, June 25, 2014	Sheet 15 of 28	



未上件

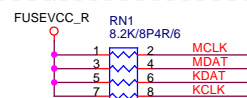
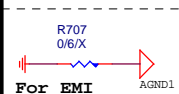
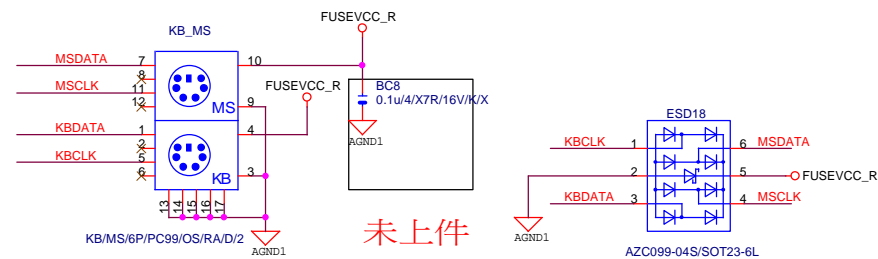
Gigabyte Technology			
Title PCH GPIO , CTRL , AUDIO			
Size C	Document Number GA-H81M-S	Rev 1.01	
Date: Wednesday, June 25, 2014	Sheet 16	of 28	

COM

KB/MS

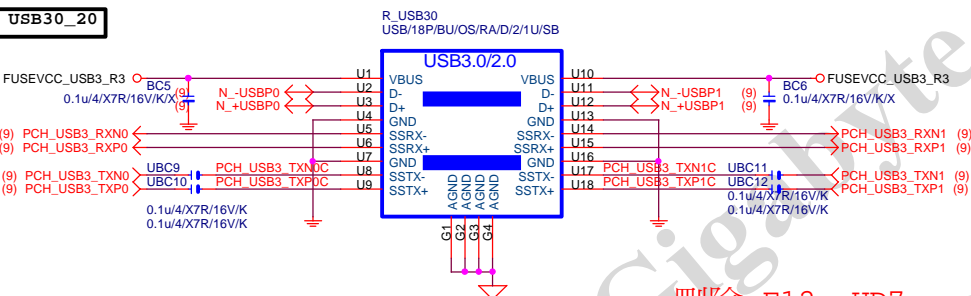
www.xinxunwei.com 400-800-9990

KB MS ESD

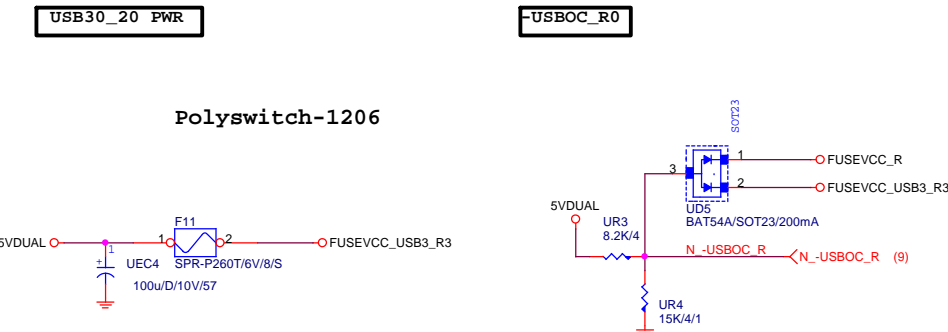


COM RI

USB30_20

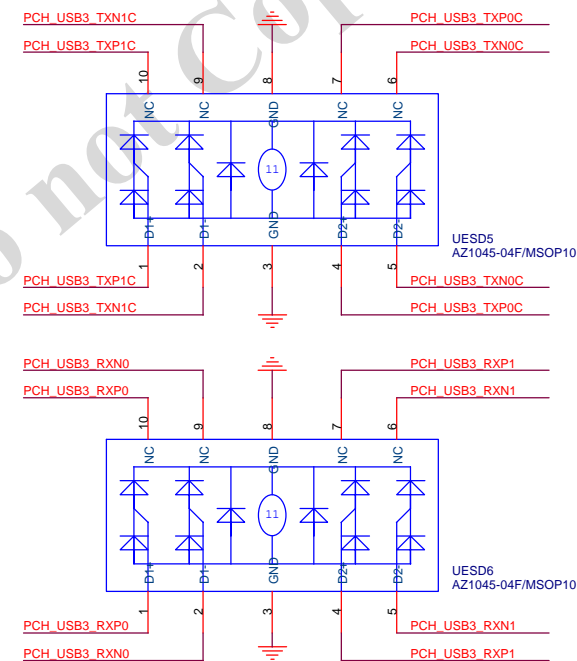


USB30_20 PWR



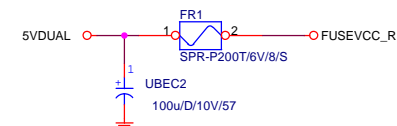
USB30_20 ESD PROTECT

USB3.0 ESD

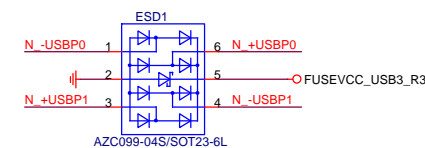


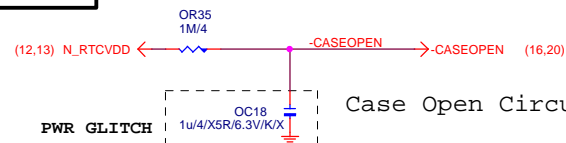
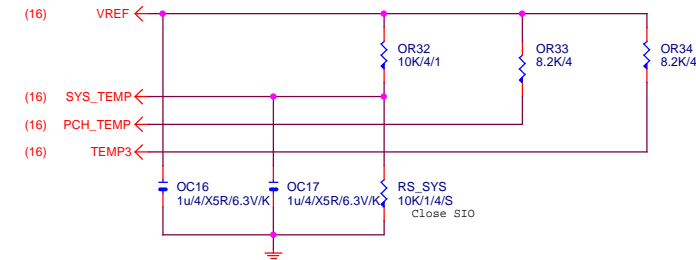
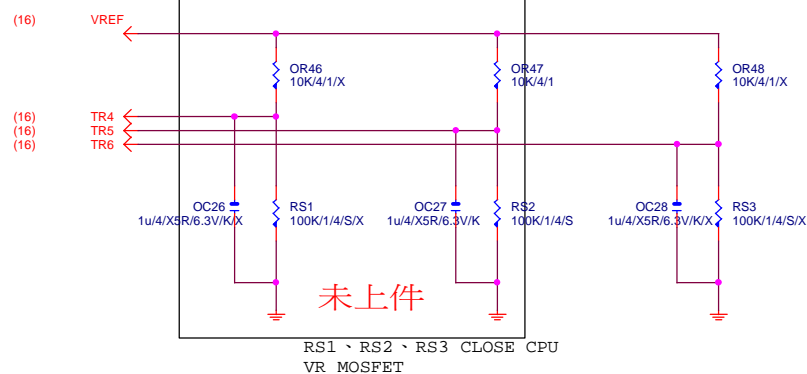
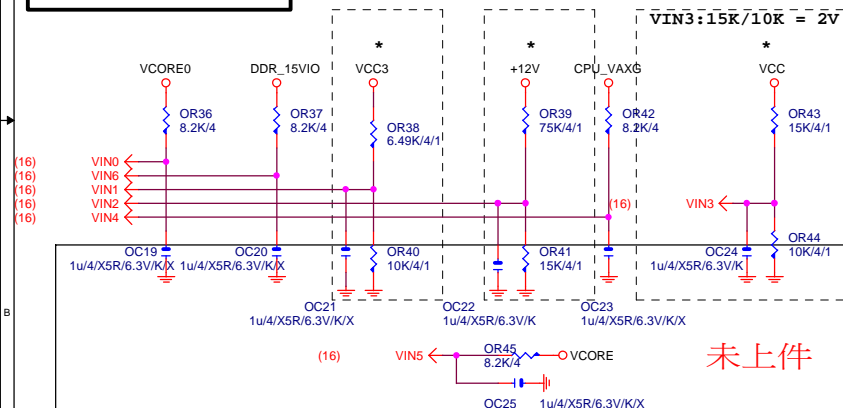
USB2.0 PWR

FUSE-0805

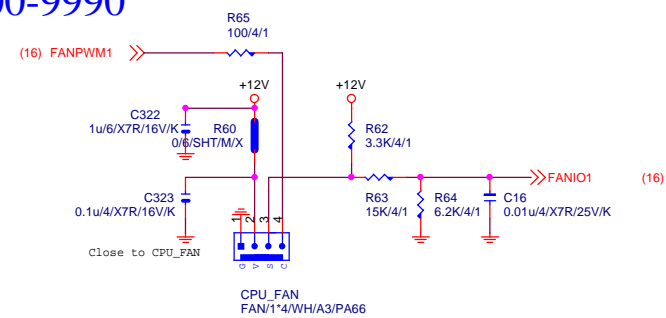


USB POWER PROTECT



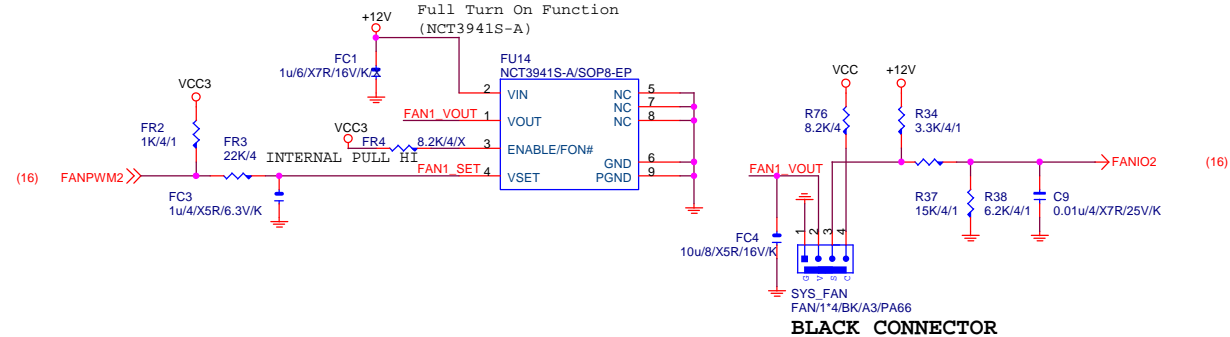

$$\overline{V_{IN3:15K/10K}} = 2V$$


SYS SMART FAN

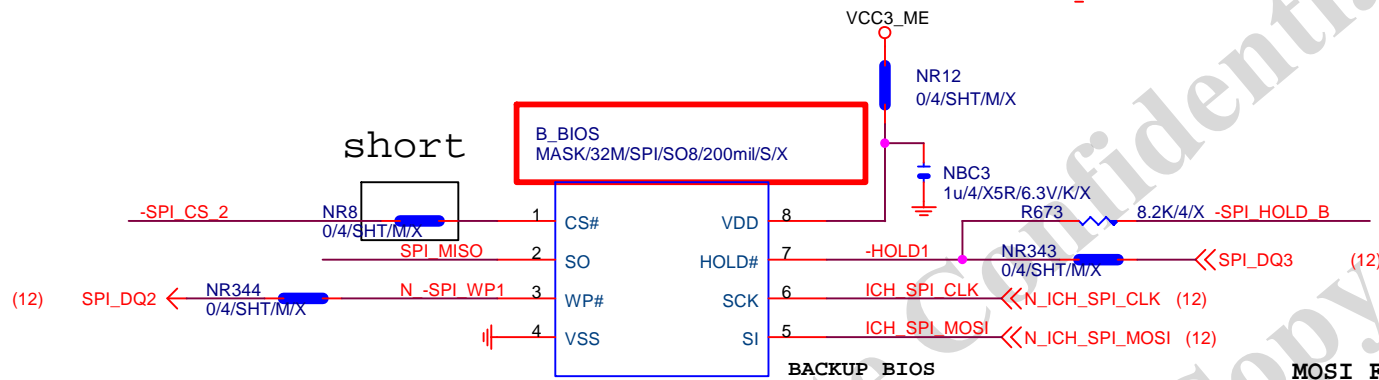


Linear SYS_FAN

Enable Function (NCT3941S)
Full Turn On Function
(NCT3941S-A)



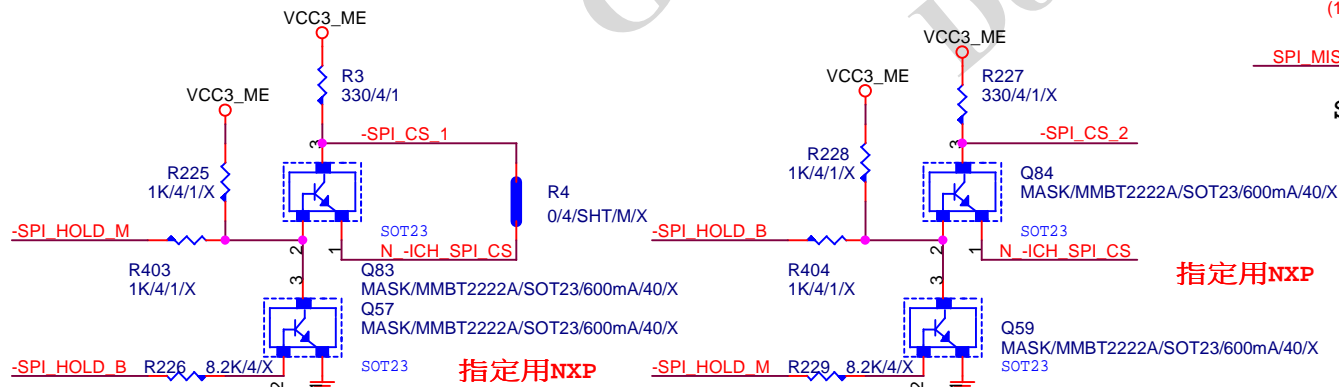
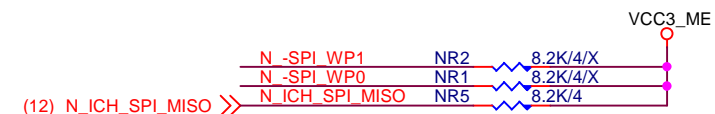
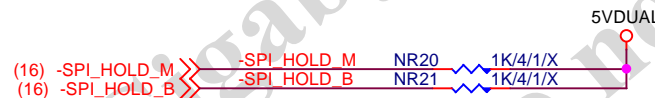
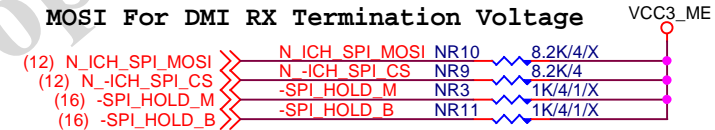
-PROHOT



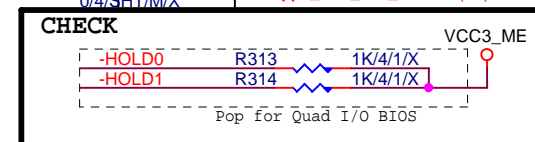
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating
0 means PD 1K

MOSI For DMI RX Termination Voltage



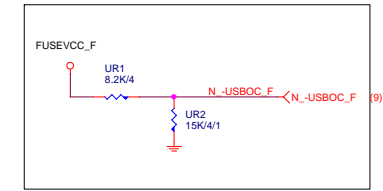
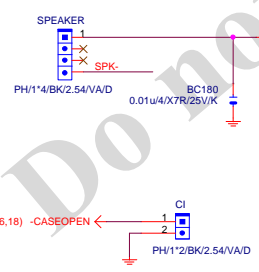
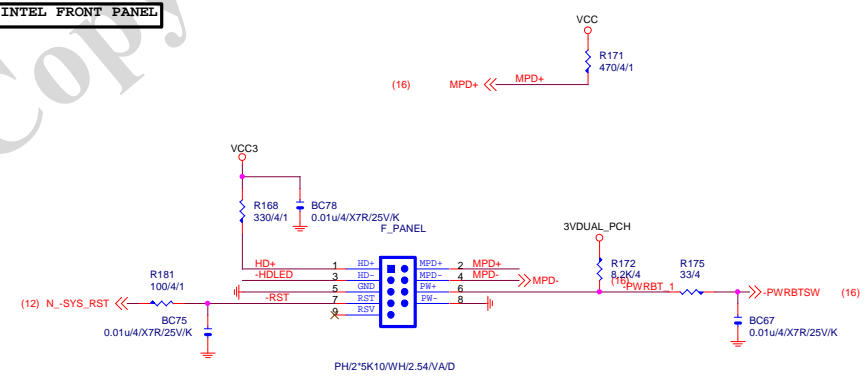
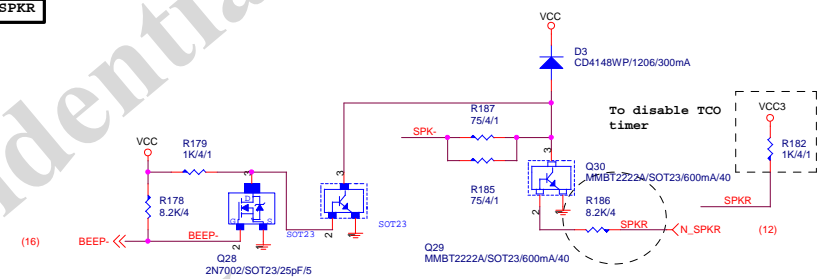
short



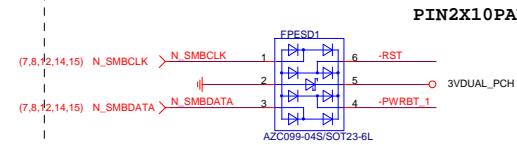
Gigabyte Technology


DUAL BIOS

Title	GA-H81M-S		Rev 1.01
Size Custom	Document Number		
Date: Wednesday, June 25, 2014	Sheet 19	of 28	



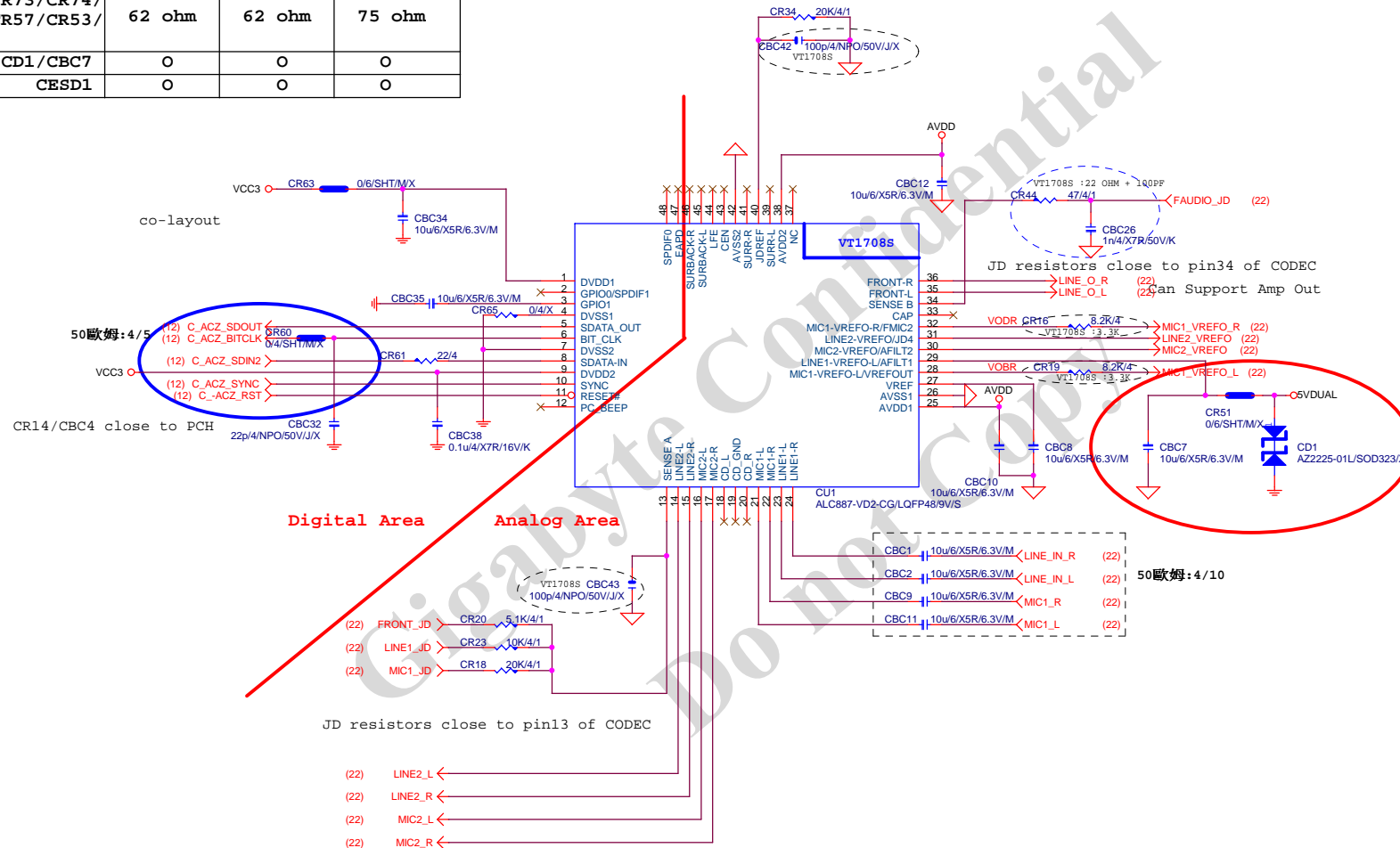
刪UD8，原UR1 5VDUAL改接FUSEVCC_F

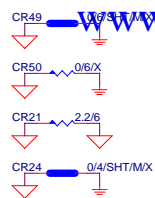


			
FP,F_USB,USB PWR,SPKR,SATA LED			
Size Custom	Document Number GA-H81M-S		Rev 1.01
Date:	Wednesday, June 25, 2014	Sheet 20 of 28	
2		1	

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

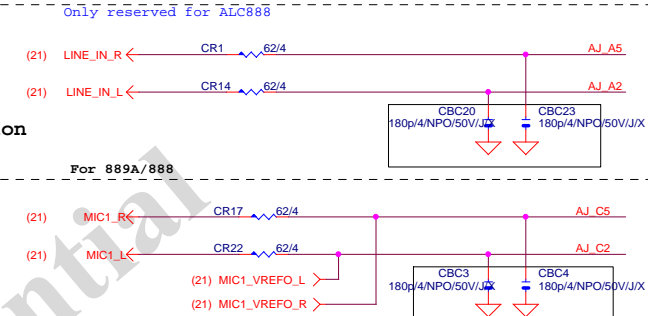




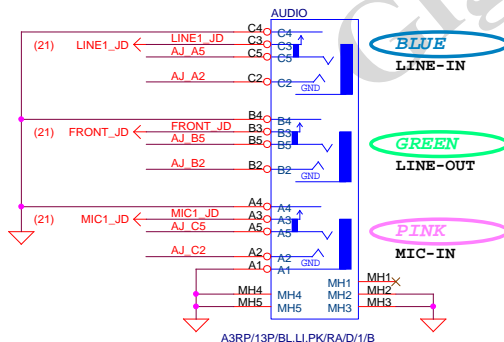
LINE-IN

Verify MIC function
in LINE-in

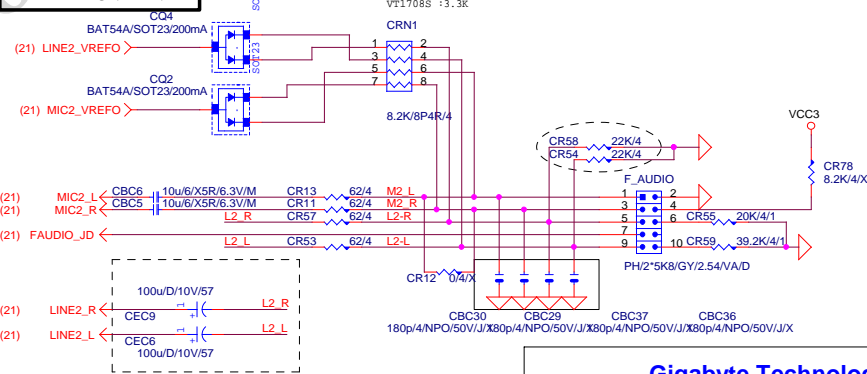
MIC-IN



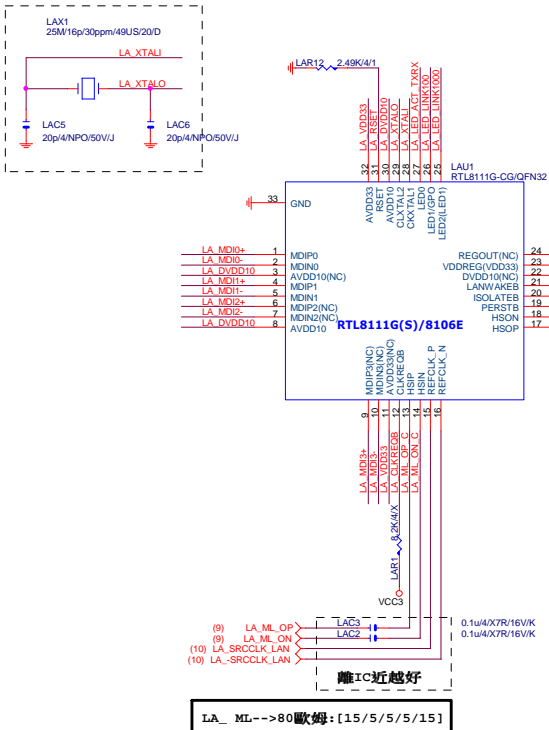
SPDIF_OUT



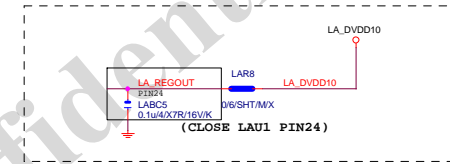
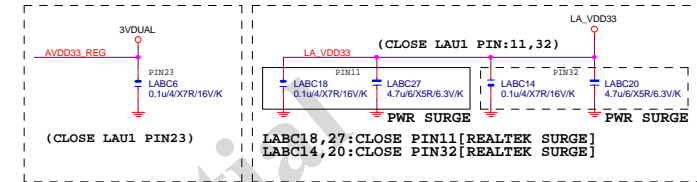
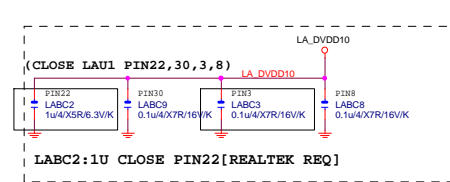
AZALIA FRONT PANEL



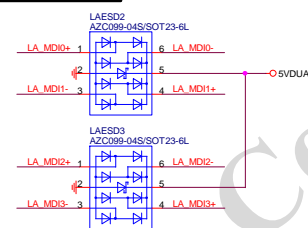
LAN:RTL8111G



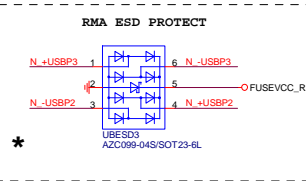
LAN POWER



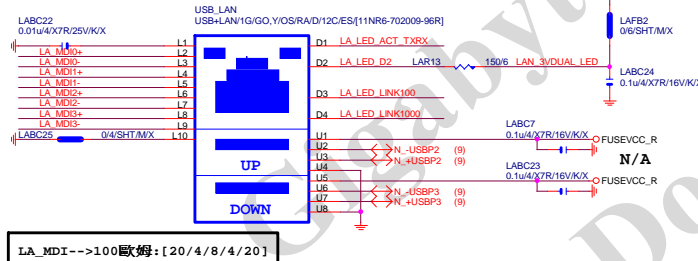
MDI ESD預留28KV *



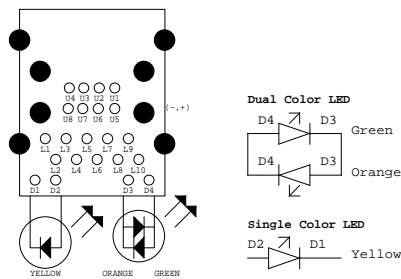
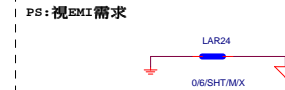
USB LAN CONNECTOR



使用RU9 USB LAN可省略LAESD1保護LED



EMI SHORT PAD

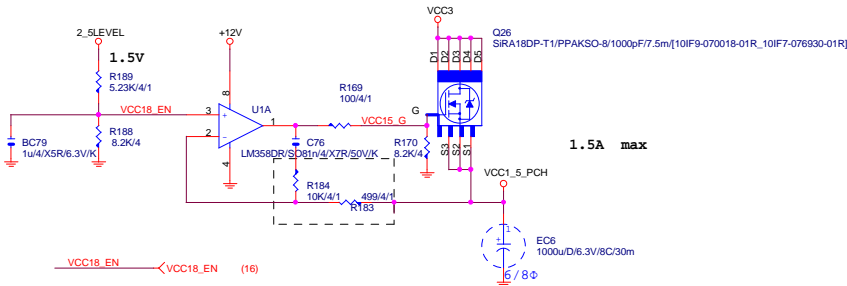
注意:USB PORT(目前:暫代6,7PORT)
USB-->90歐姆:[15/4.5/7.5/4.5/15]

BOM NOTICE *

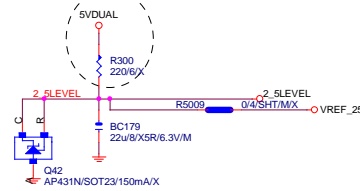
料號 規格 廠商
11NR6-702009-96R 1G LAN (12core) UDE(RU9 ESD+)
[LED獨立走線,可省略外加AZC099料件LAESD1]

- 9KV ESD BOM:
USB LAN (RU9):11NR6-702009-96R
- 28KV ESD BOM:
USB LAN (RU9):11NR6-702009-96R
LAESD2, LAESD3: 上件AZC398-04S

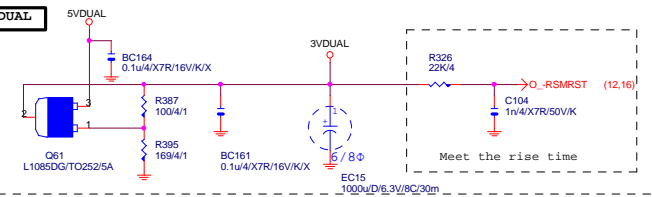
VCC1_8_PCH



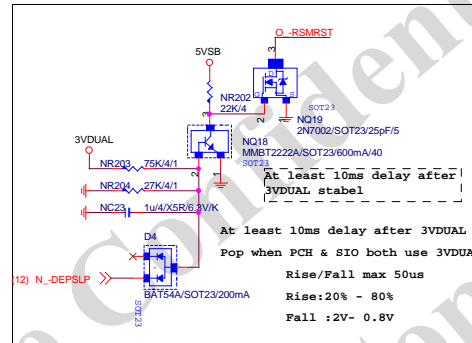
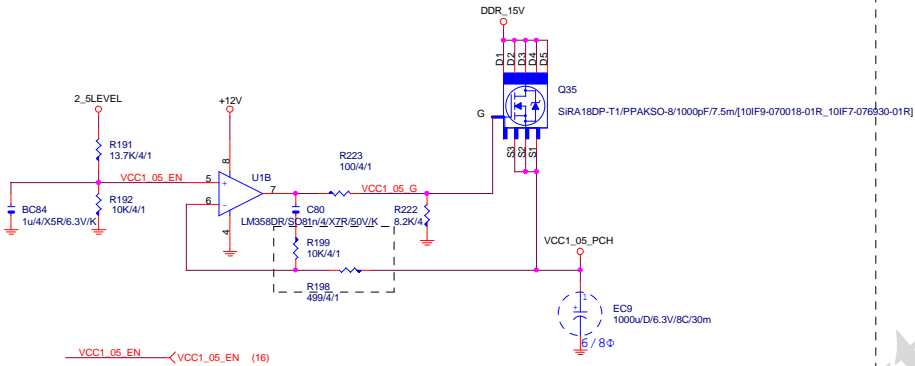
ERP



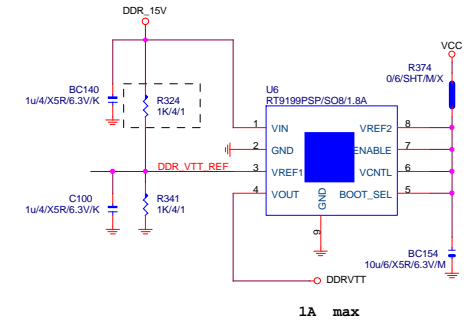
3VDUAL



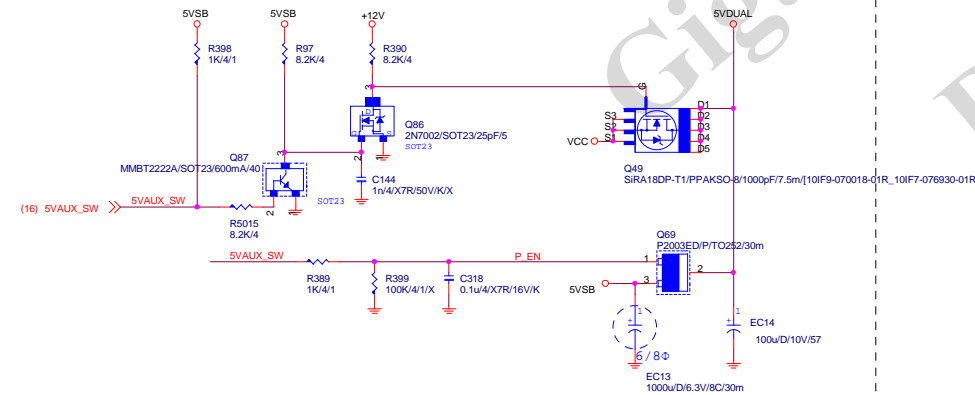
VCC1_05_PCH



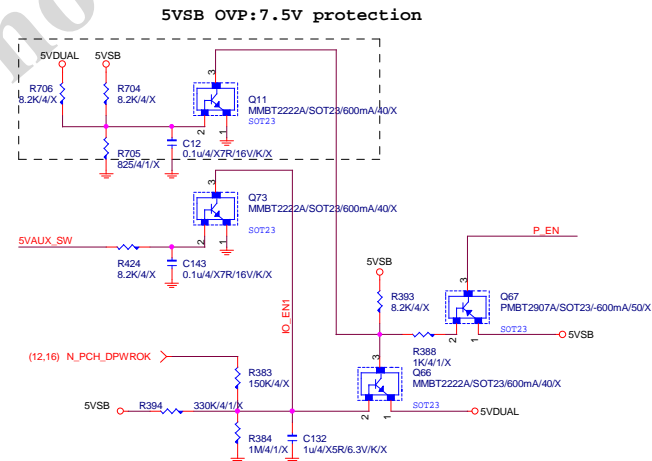
DDRVTT



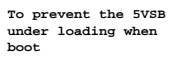
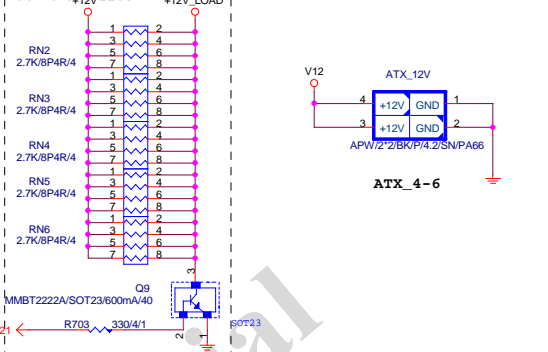
5VDUAL



5VDUAL SHORT PROTECT



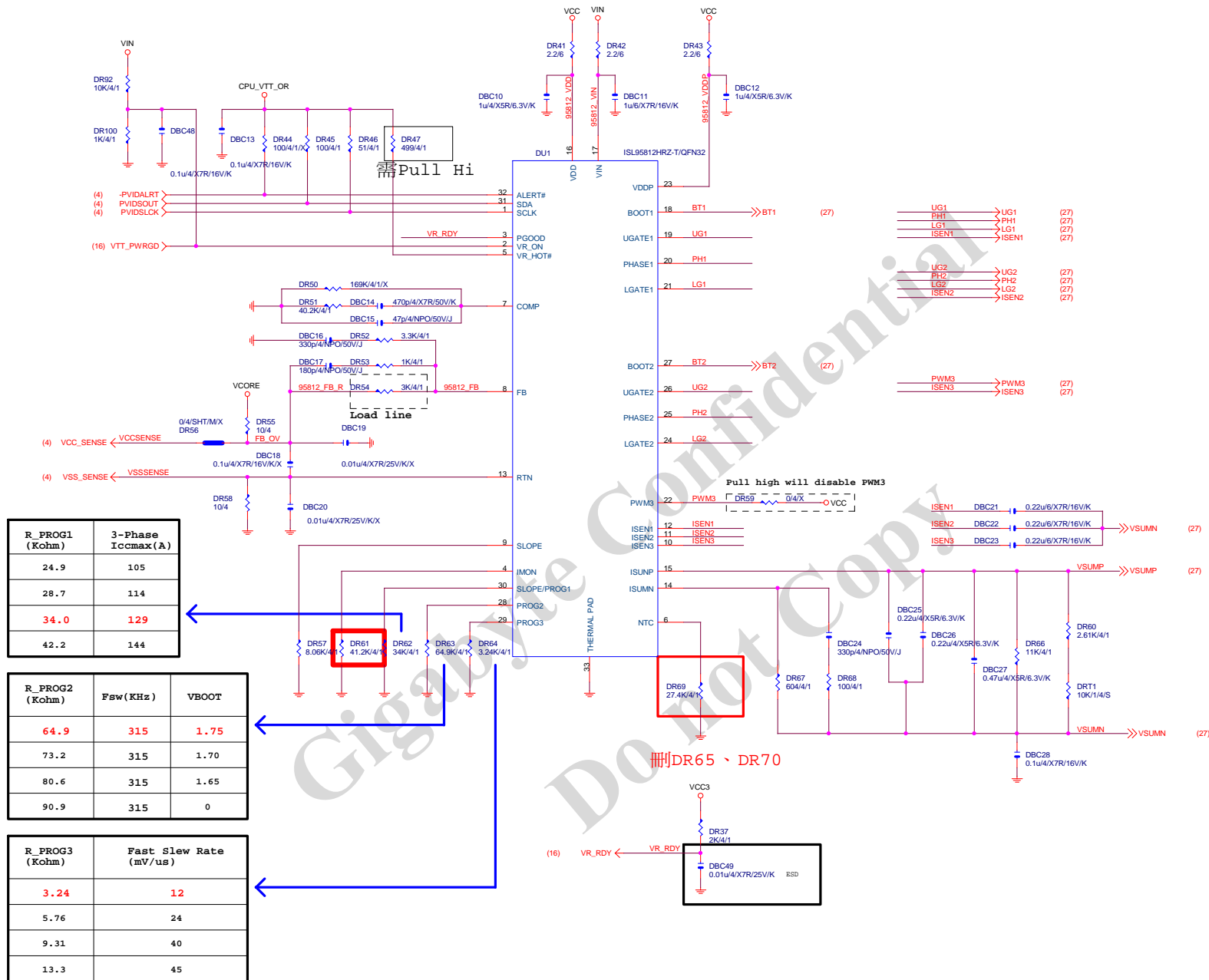
To fix 12V light load
abnromal issue +12V LOAD



【技術通報R&D技術通報154】



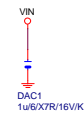
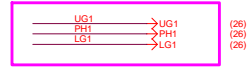
Title			
ATX CONNECTOR			
Size Custom	Document Number	GA-H81M-S	Rev 1.01
Date:	Wednesday, June 25, 2014	Sheet 25 of 28	



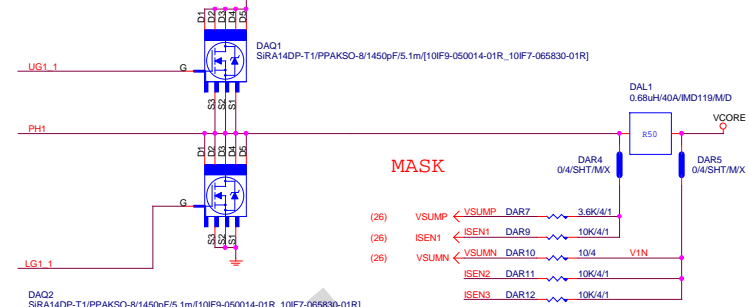
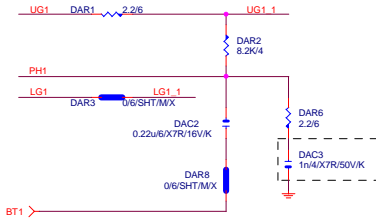
Gigabyte Technology

File			CPU CORE VR-1
Size	Document Number	GA-H81M-S	
Custom		Rev	1.01
Date	Wednesday, June 25, 2014	Sheet	26 of 28

PHASE 1

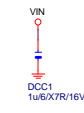
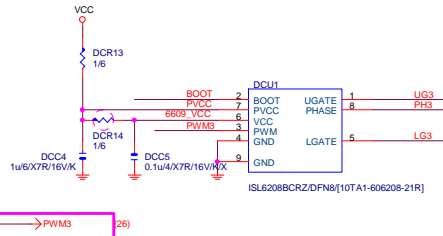


[1]

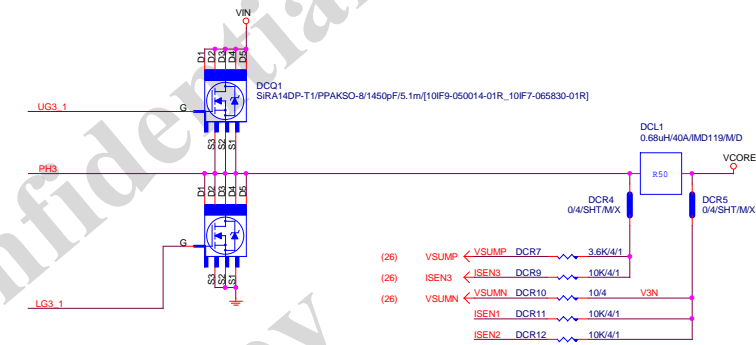
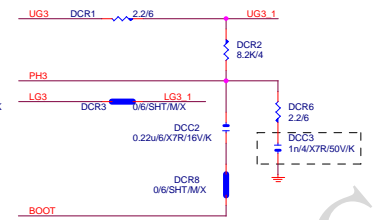


Close to PWM

PHASE 3

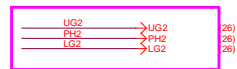


[3]

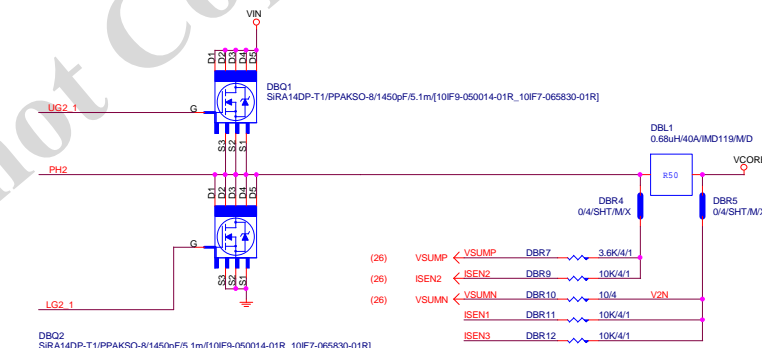
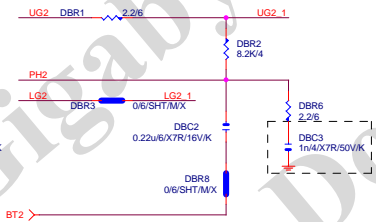


Close to PWM

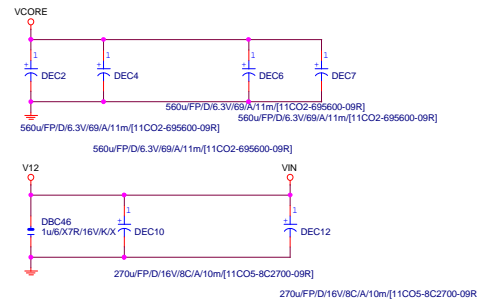
PHASE 2



[2]

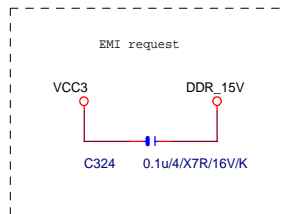
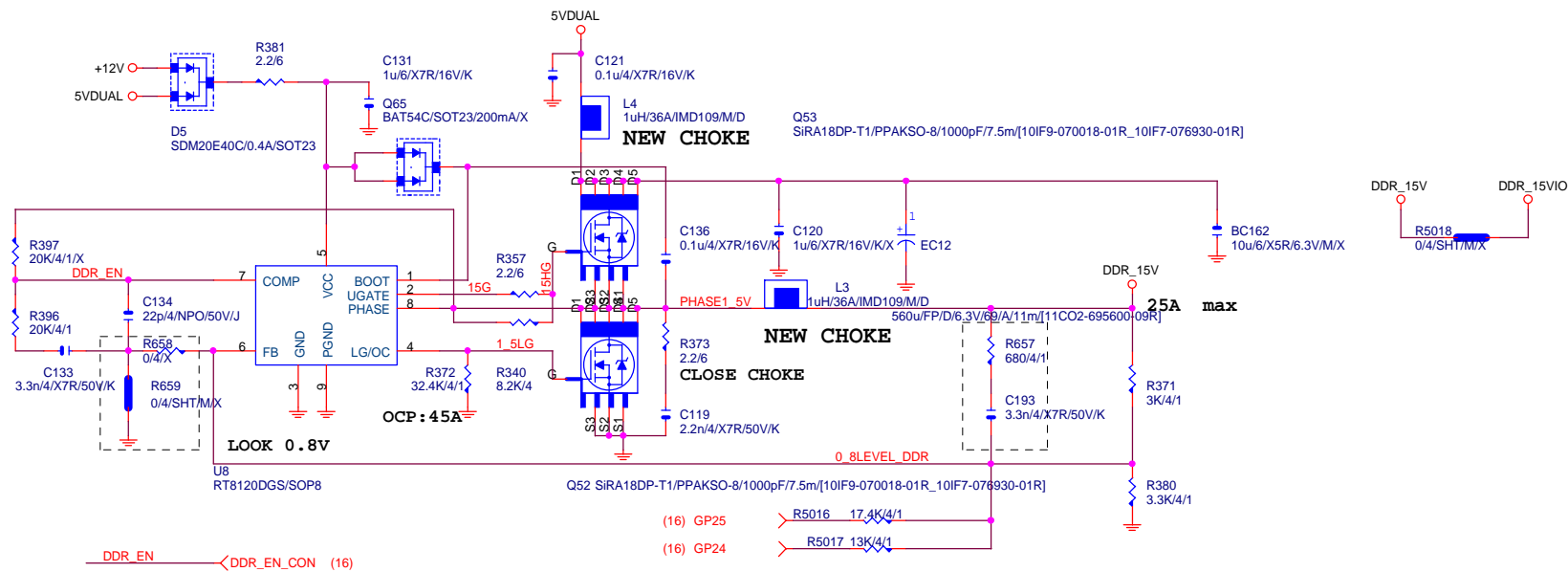


Close to PWM



Gigabyte Technology

Title			CPU CORE VR-2
Size	Document Number	GA-H81M-S	
Custom			Rev 1.01
Date	Wednesday, June 25, 2014	Sheet	27 of 28



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 $2 \times 7.99 = 15.98 > 11.45A$

$$\text{Rocset} = (\text{Iocp} * \text{Lgate}, \text{rdson}) / \text{Iocset}$$

$$R_{ocset} = (45A * 6.7m\Omega) / 10\mu A = 30K$$

Iocset=10uA

Gigabyte Technology

Title	DDR POWER
-------	-----------

Size	Document Number	GA-H81M-S
Custom		

Rev	1.01
-----	------

Date: Wednesday, June 25, 2014

Sheet 28 of 28