

Model Name: GA-H81M-HD3

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 X16 SLOT
15	PCI EXPRESS X1 SLOT
16	PCI SLOT 1,2
17	ITE 8620 LPC IO
18	COM,LPT,KB_MS
19	HWM,FAN CTRL,OV,-PROCHOT
20	DUAL BIOS
21	R_USB30,FP,FUSB,SPK,SATALED
22	CODEC ALC892
23	REAR AUDIO JACK
24	REALTEK RTL8111F
25	DISCRETE POWER
26	ATX
27	VCORE ISL95812_1

SHEET

TITLE

28	VCORE ISL95812_2
29	RT8120_DDR POWER
30	DVI
31	ITE IT8892E
32	USB3 VL805
33	HDMI/DP
34	F_USB30

Gigabyte Technology

Cover Sheet

Title	Document Number		Rev
Size	GA-H81M-HD3		1.07
Custom			
Date:	Monday, September 01, 2014	Sheet	1 of 33

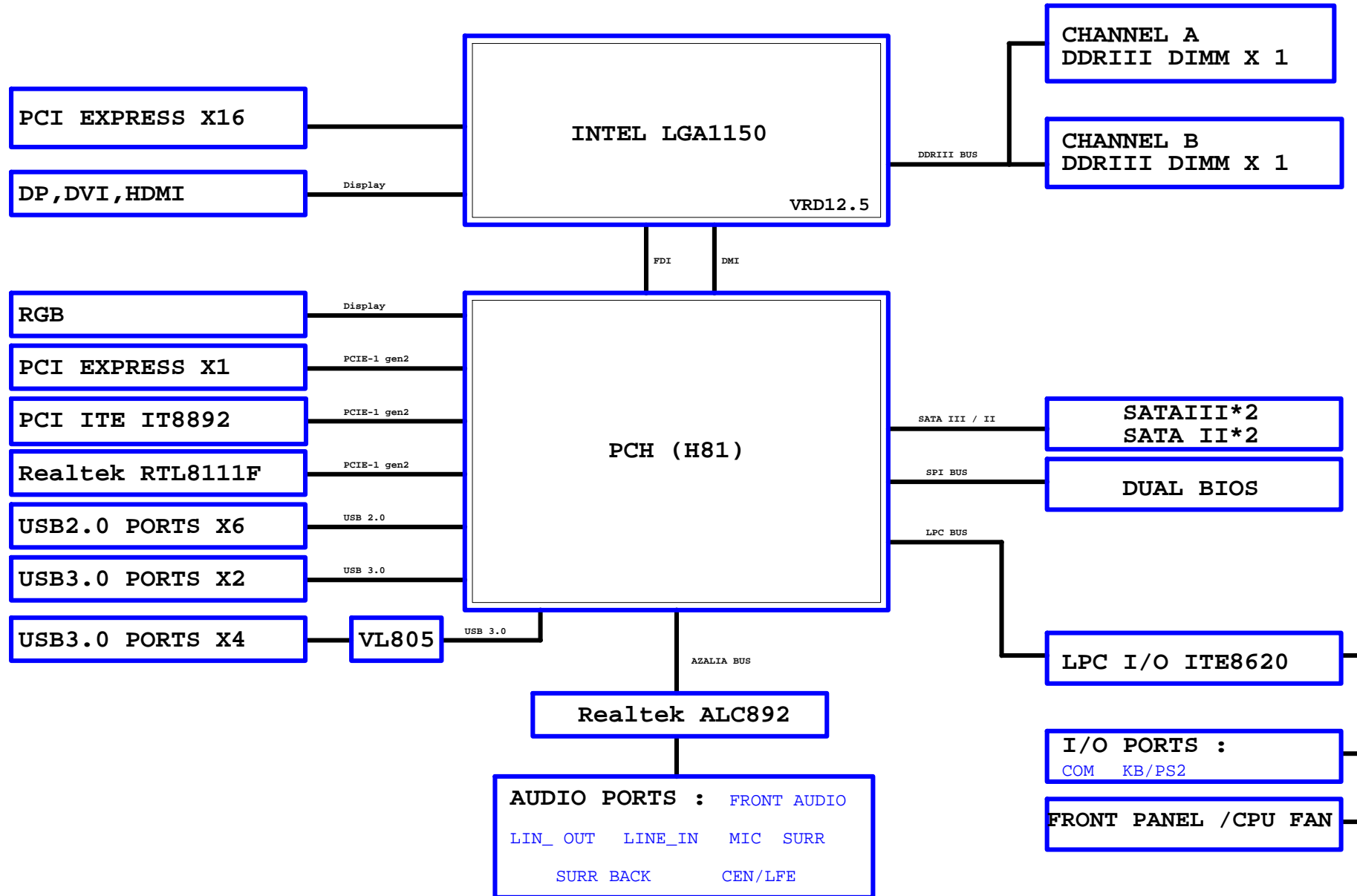
Component value change history

2013/04/22

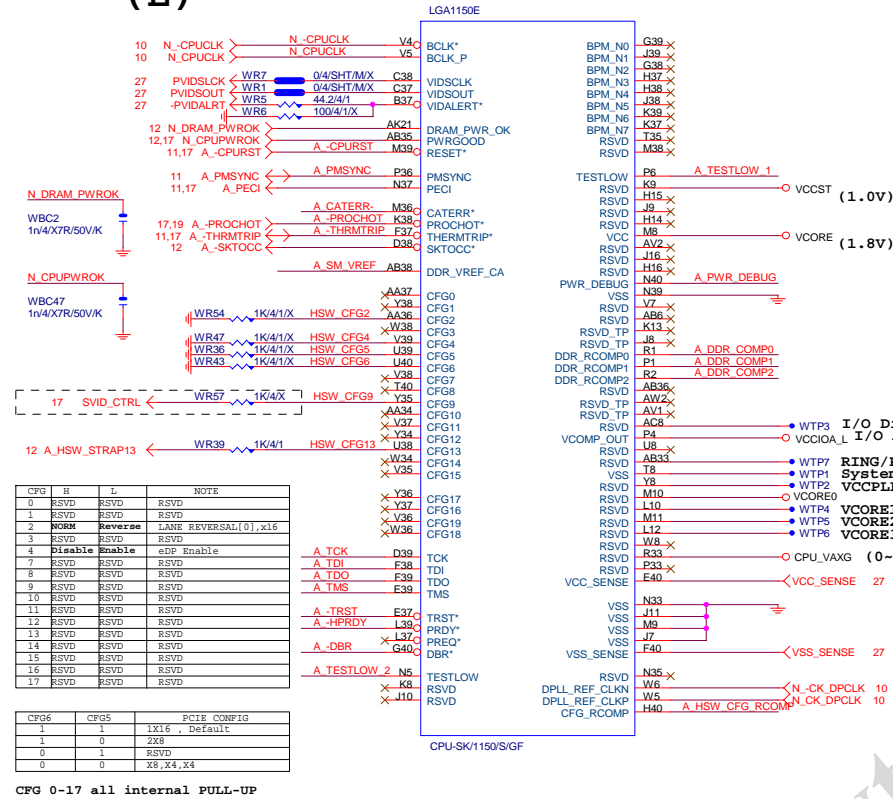
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Circuit or PCB layout change

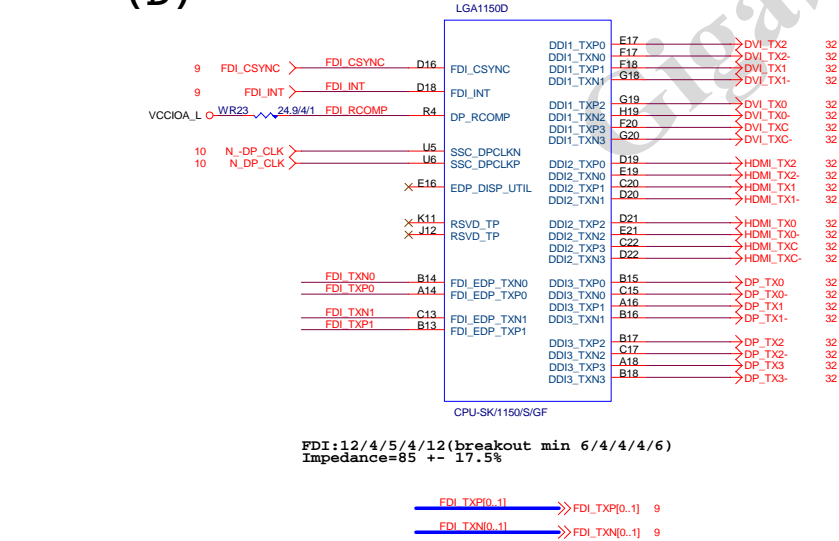
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BLOCK DIAGRAM

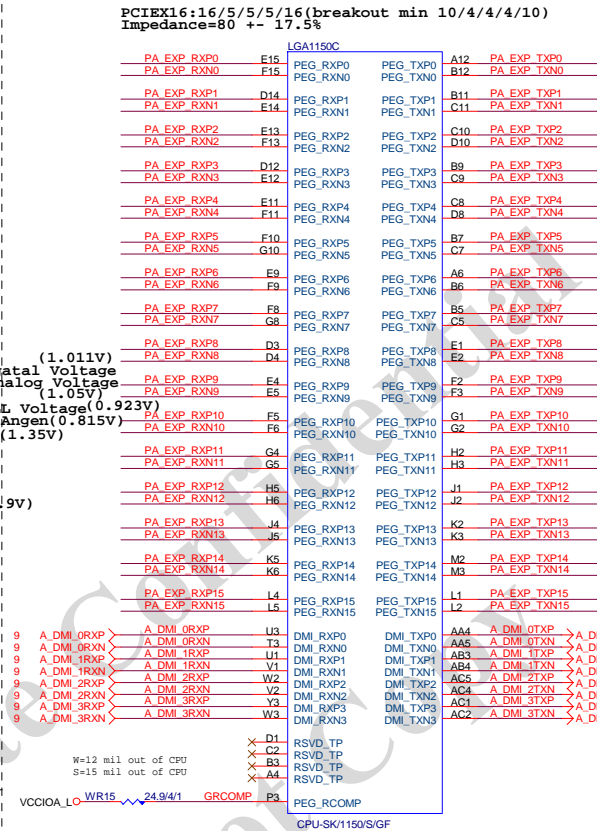
LGA1150 (E)



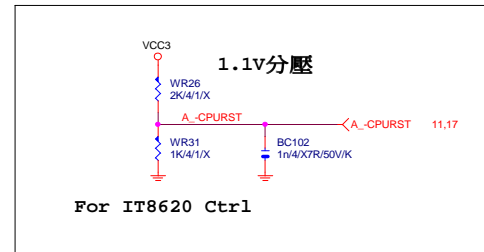
LGA1150 (D)



LGA1155 (C)



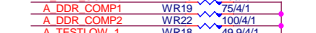
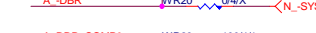
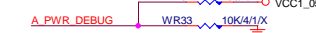
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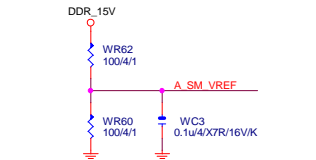
CPU SVID



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SM REF

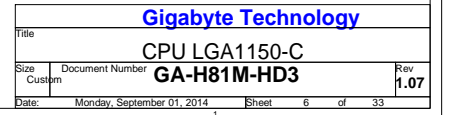
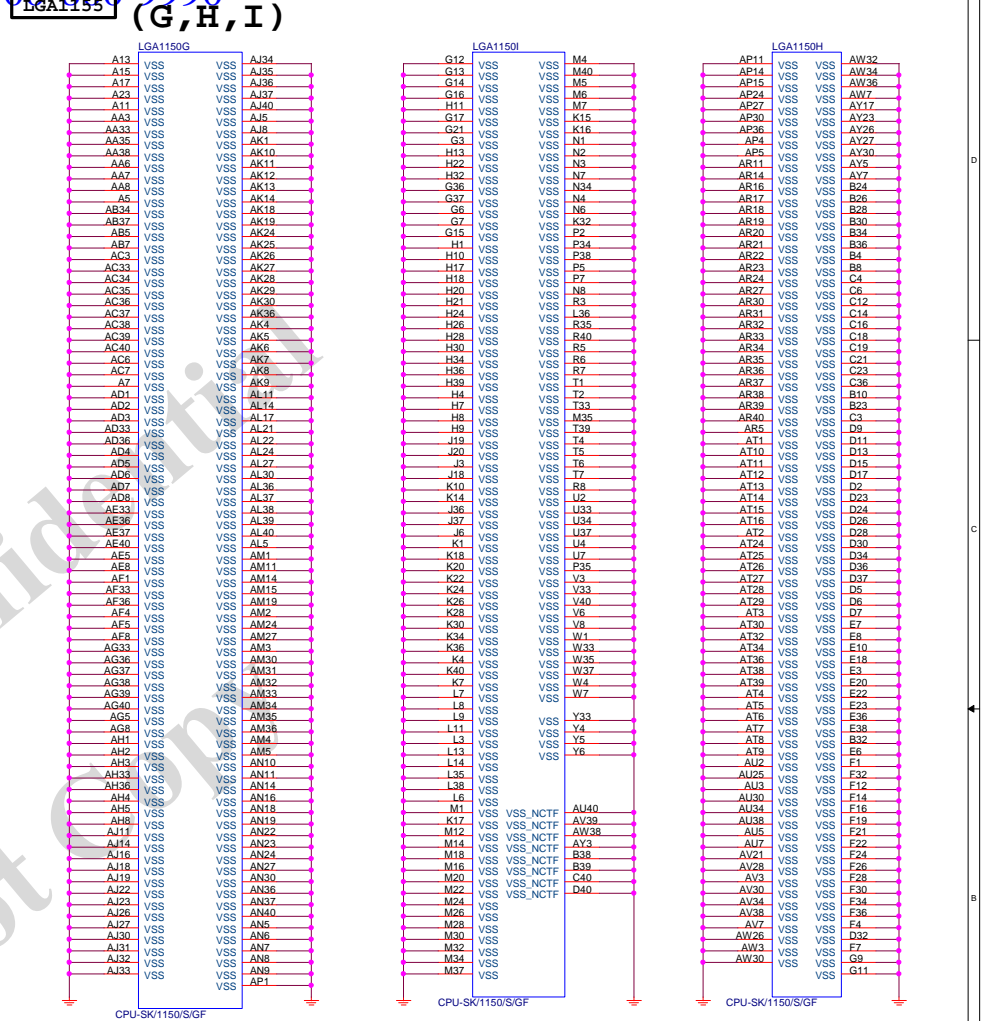


LGA1150 (A)

www.xinxunwei.com 400-800-9990
LGA1150 (B)

LGA1150 (CR)

LGA1150A			
MAAA0	AU13	DDR0_MA0	DDR0_D00
MAAA1	AV16	DDR0_MA1	DDR0_D01
MAAA2	AU16	DDR0_MA2	DDR0_D02
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	AT20	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	AV8	DDR0_ODT1	DDR0_D17
	AW9	DDR0_ODT2	DDR0_D18
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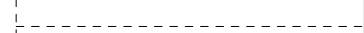




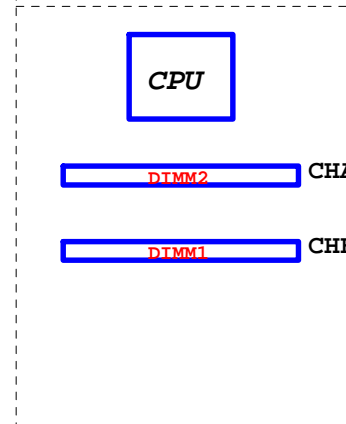
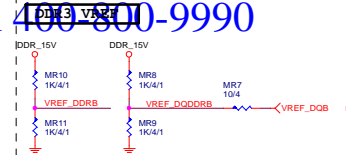
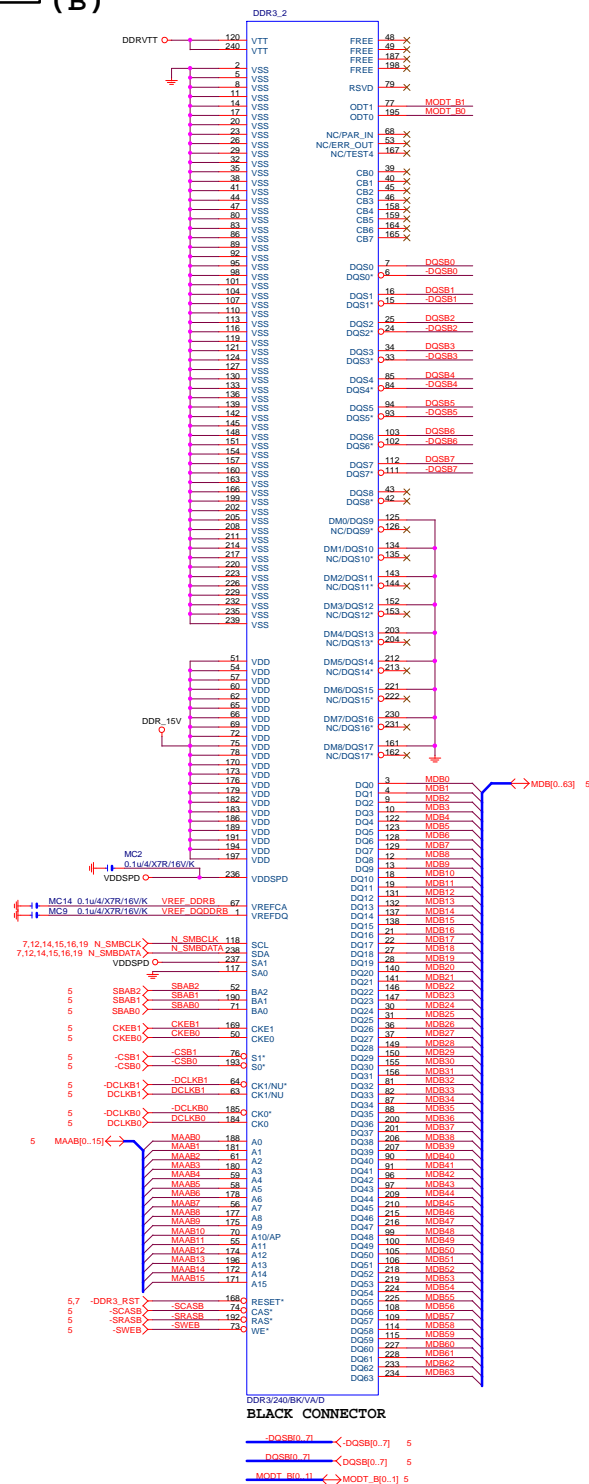
DDR15V Decouple



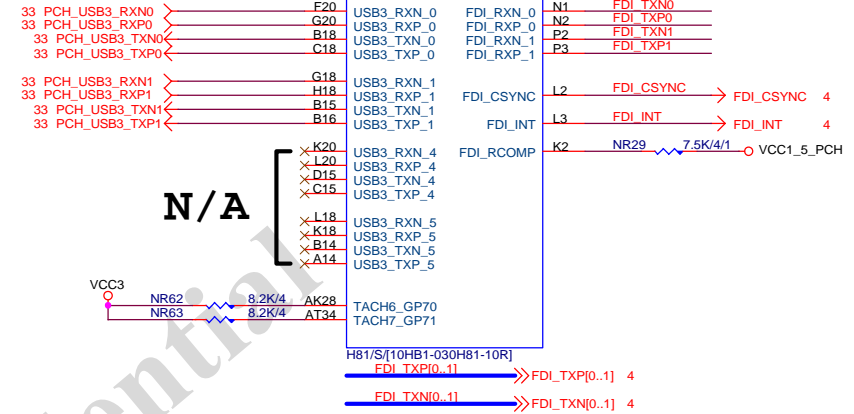
DDRVTT Decouple



Title				Gigabyte Technology	
Size				DDRIII CHANNEL A	
Document Number				GA-H81M-HD3	
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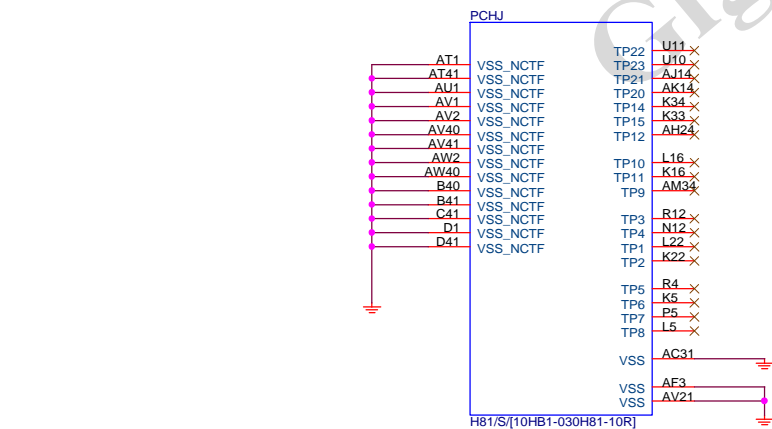


USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
PCHB



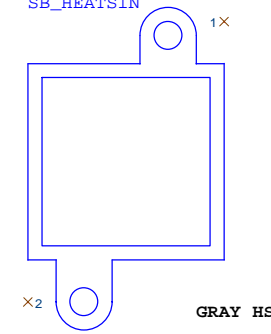
N/A

PCH CLK PD



PCH H/S

SB_HEATSIN



PCH_HS
PCH_HS/[12SP2-S04208-61R_12SP2-S04208-62R_12SP2-S04208-63R]

USB TABLE

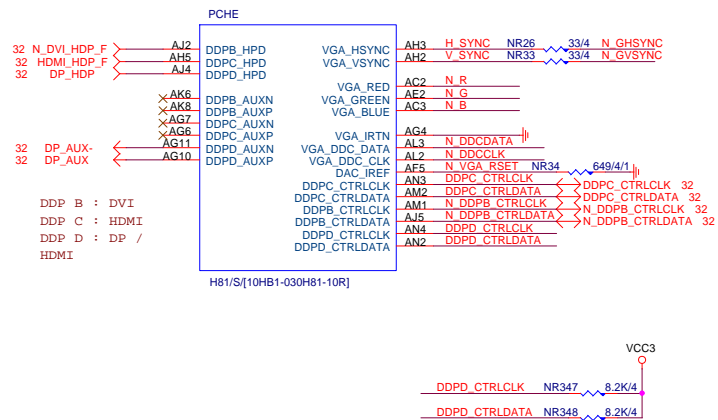
```
OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)
```

USB OC# Configure	
OC0#	R_USB30
OC1#	USB30_LAN
OC2#	N/A
OC3#	N/A
OC4#	F_USB1
OC5#	F_USB2
OC6#	N/A
OC7#	Not Use

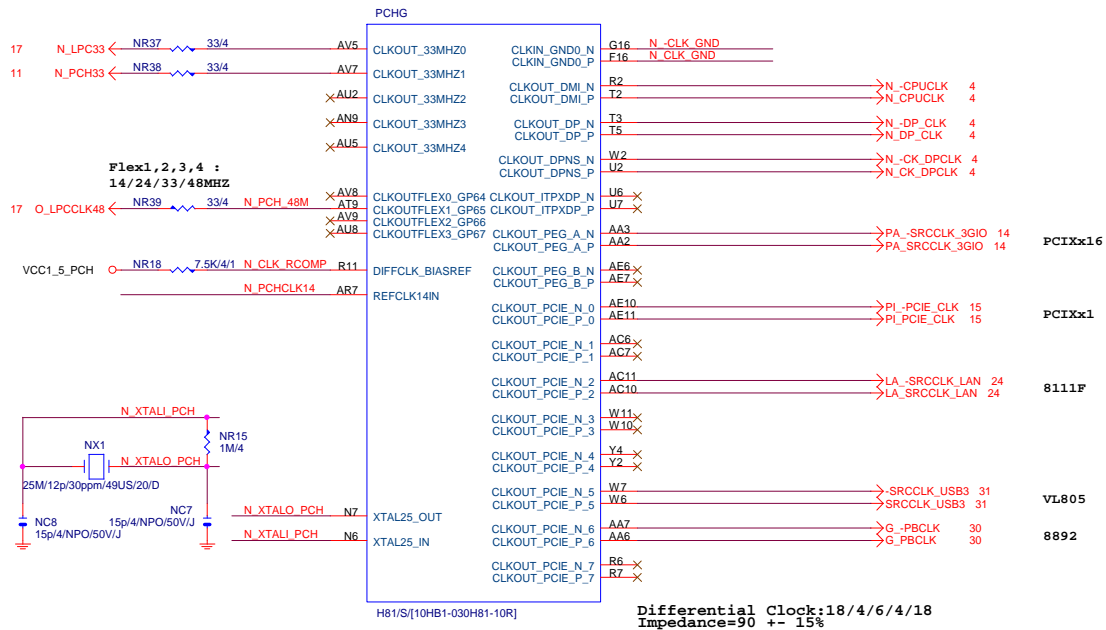
Gigabyte Technology

Title			
PCH FDI,DMI,USB ,PCIE,NVRAM			
Size	Document Number	Rev	
Custom	GA-H81M-HD3	1.07	
Date:	Monday, September 01, 2014	Sheet	9 of 33

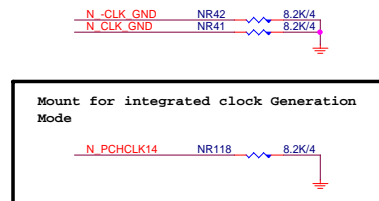
PCH (E)



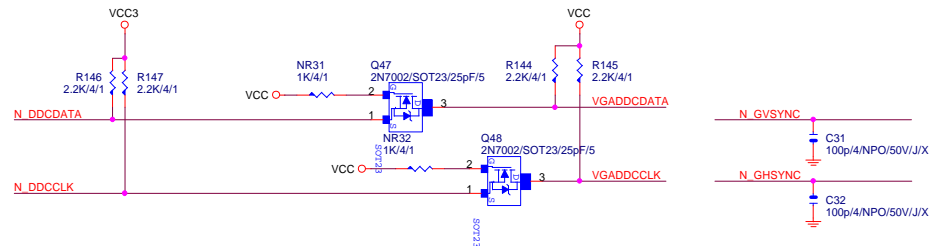
PCH (G)



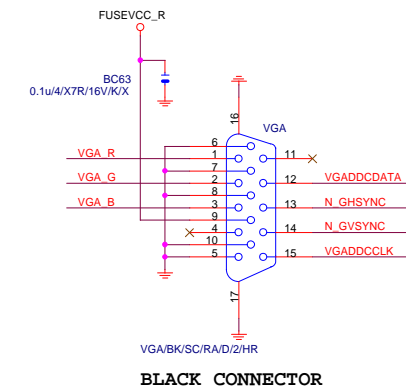
PCH CLK PD



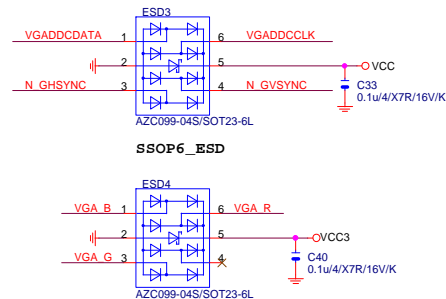
VGA DDC



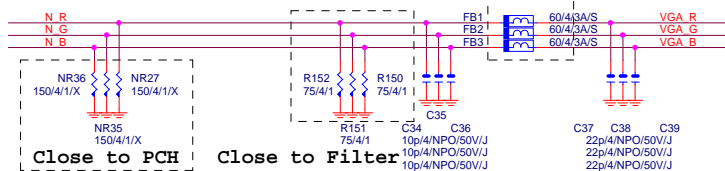
VGA CONNECTOR



VGA ESD



VGA DDC

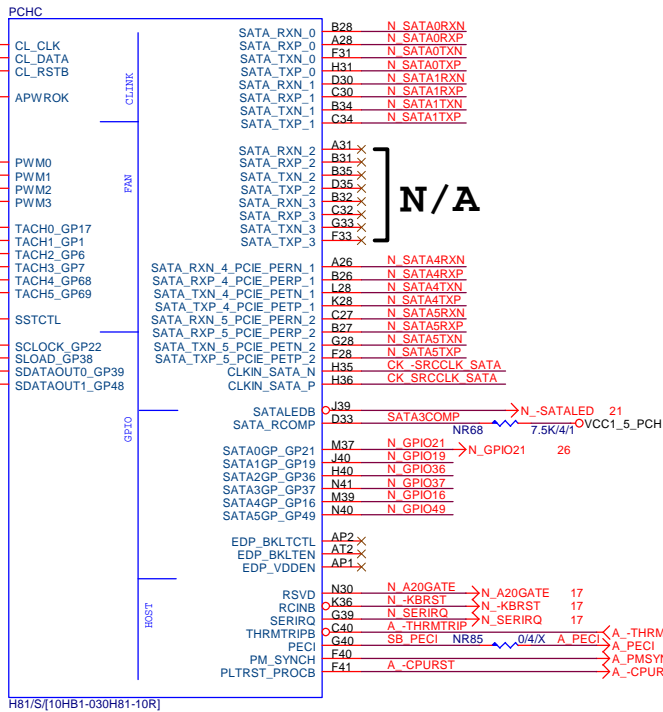


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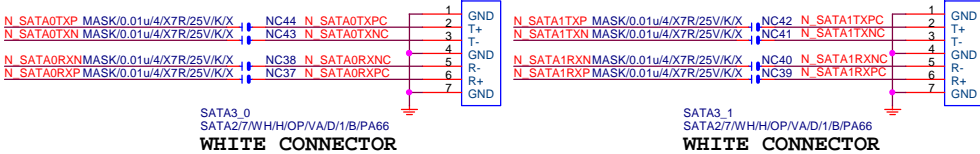
Title		
PCH DISPLAY_CLK BUFFER		
GA-H81M-HD3		
Size	Document Number	Rev
Custom		1.07
Date:	Monday, September 01, 2014	Sheet 10 of 33

PCH (C)

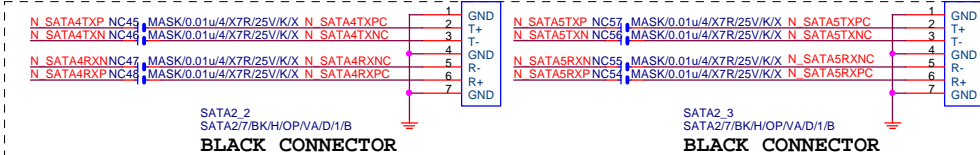
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



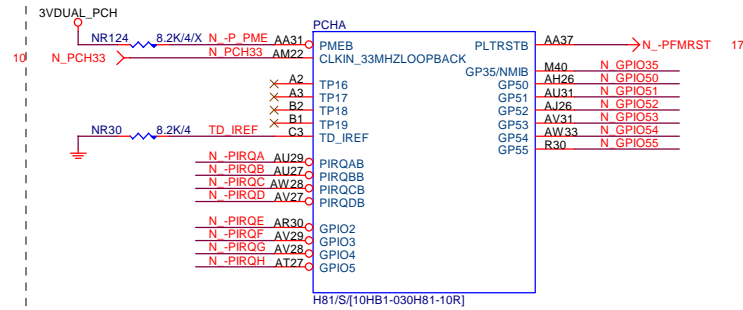
SATA CONNECTOR



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

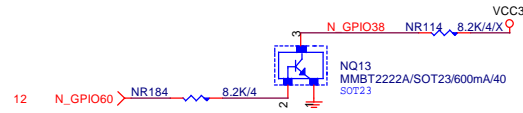


PCH (A)

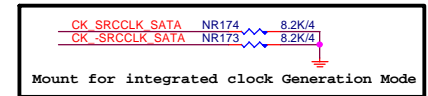


GPIO37 PU VCC3 ENABLE SBA
For H87&B85

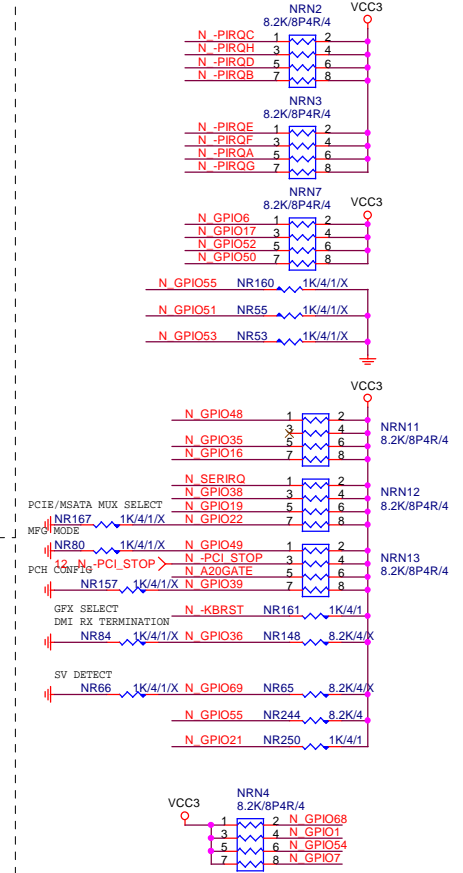
GPIO38 Ctrl



PCH CLK PD



PCH PU/PD



Gigabyte Technology

Title		PCH HOST , SATA, PCI			Rev 1.07
Size Custom	Document Number	GA-H81M-HD3			
Date:	Monday, September 01, 2014	Sheet	11	of	33

HSW_STRAP13

32.768KHZ

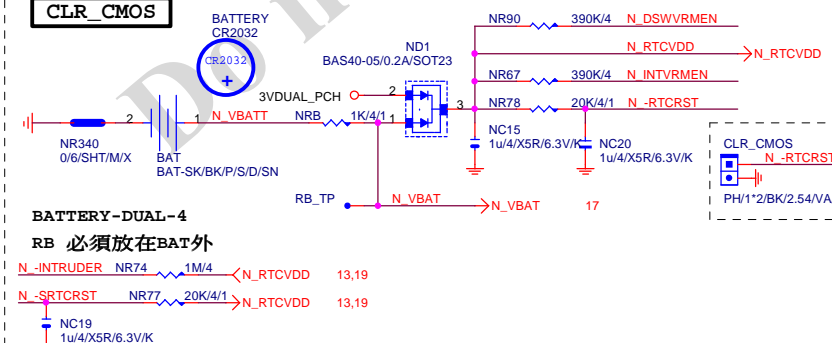
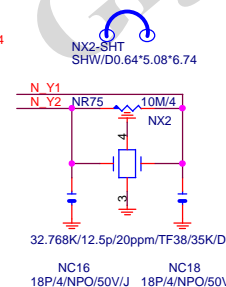
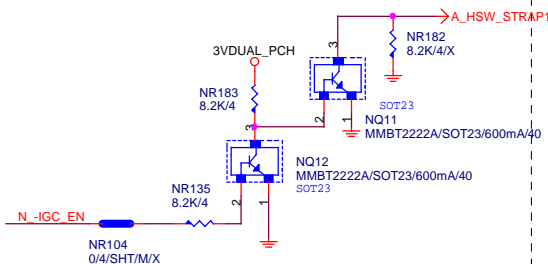
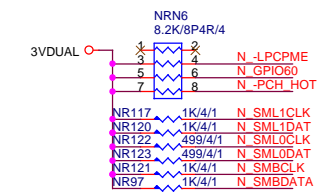
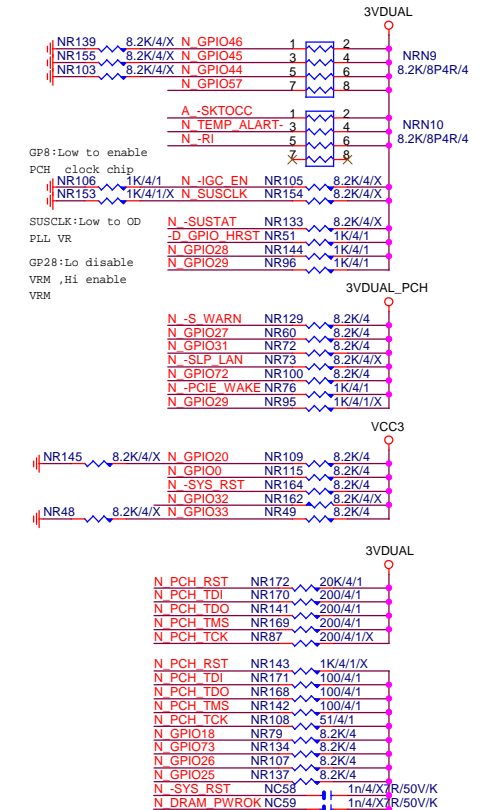
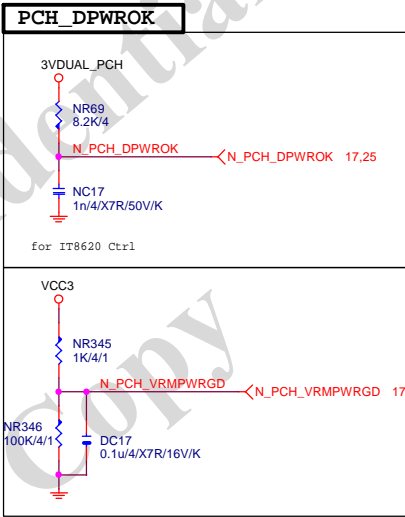
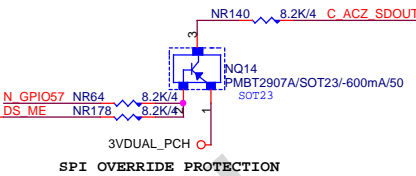
CLR_CMOS

Gigabyte Technology

PCH GPIO , CTRL , AUDIO

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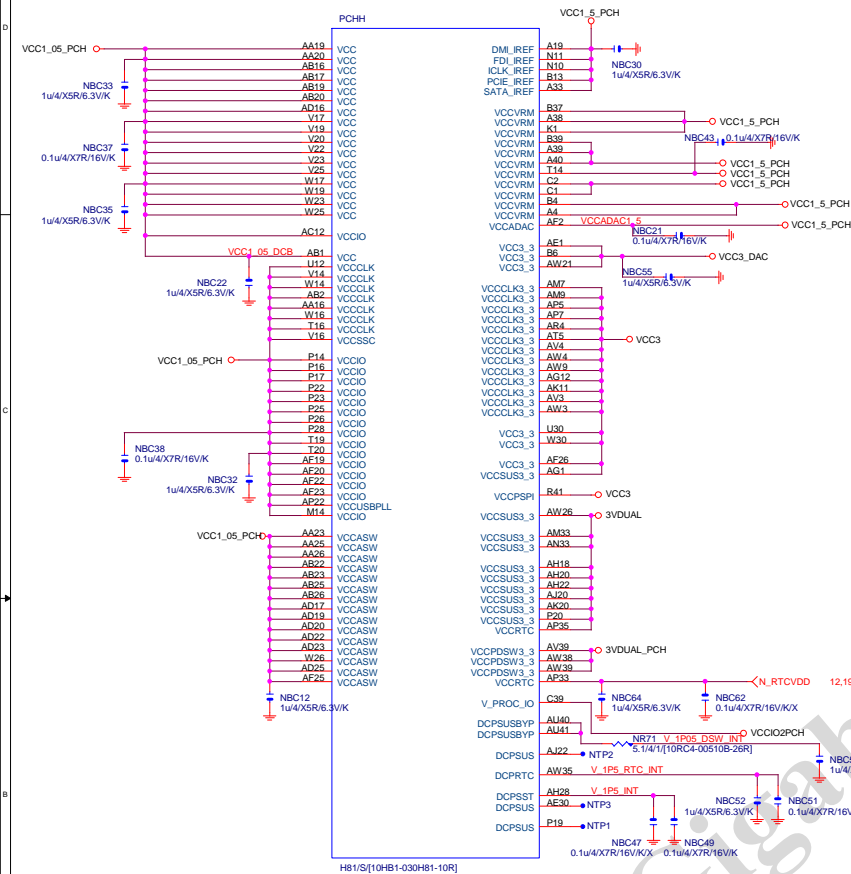


PCH (H)

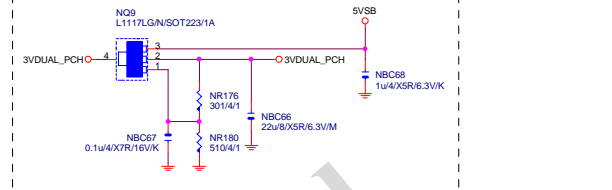
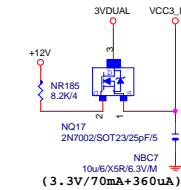
VCC3_DAC

3VDUAL_PCH

SHT_PWR



CLOSE北橋(注意震盪水波紋)



CAP

(3.3V) (X6)

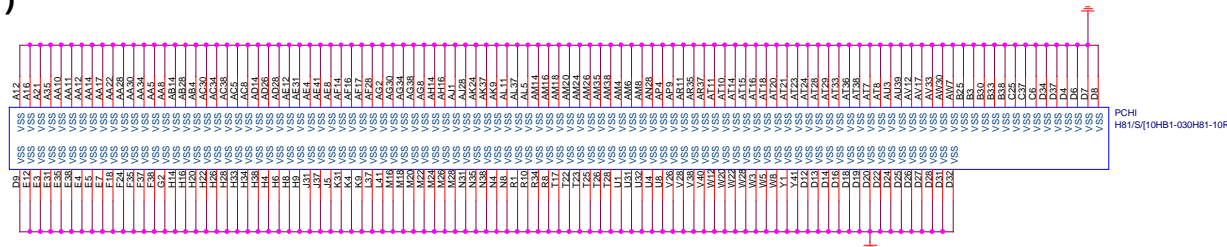
(1.05V) (X5)

(1.05V) (X6)

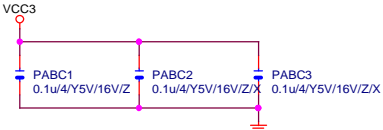
(1.05V) (X2) (3.3V) (X2)

(1.05V) (X10)

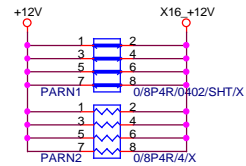
PCH (I)



PCIEX16 CAP



PCIEX16 PROTECT SHT



PCIEX16 AC CAP

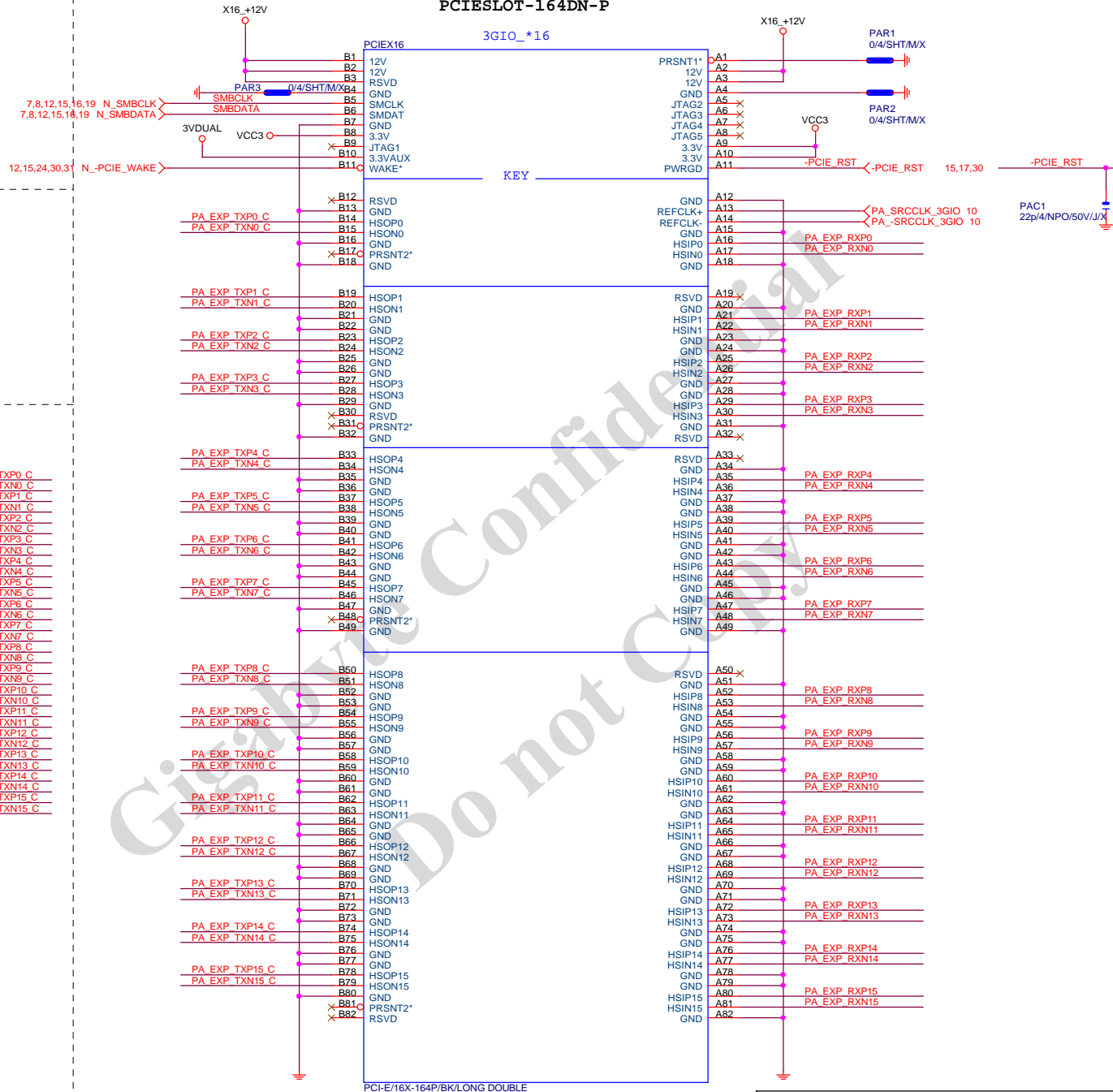
PA EXP TXP0	PAC5	0.22u4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP 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_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

www.xinxunwei.com 400-800-9990

PCIESLOT-164DN-P



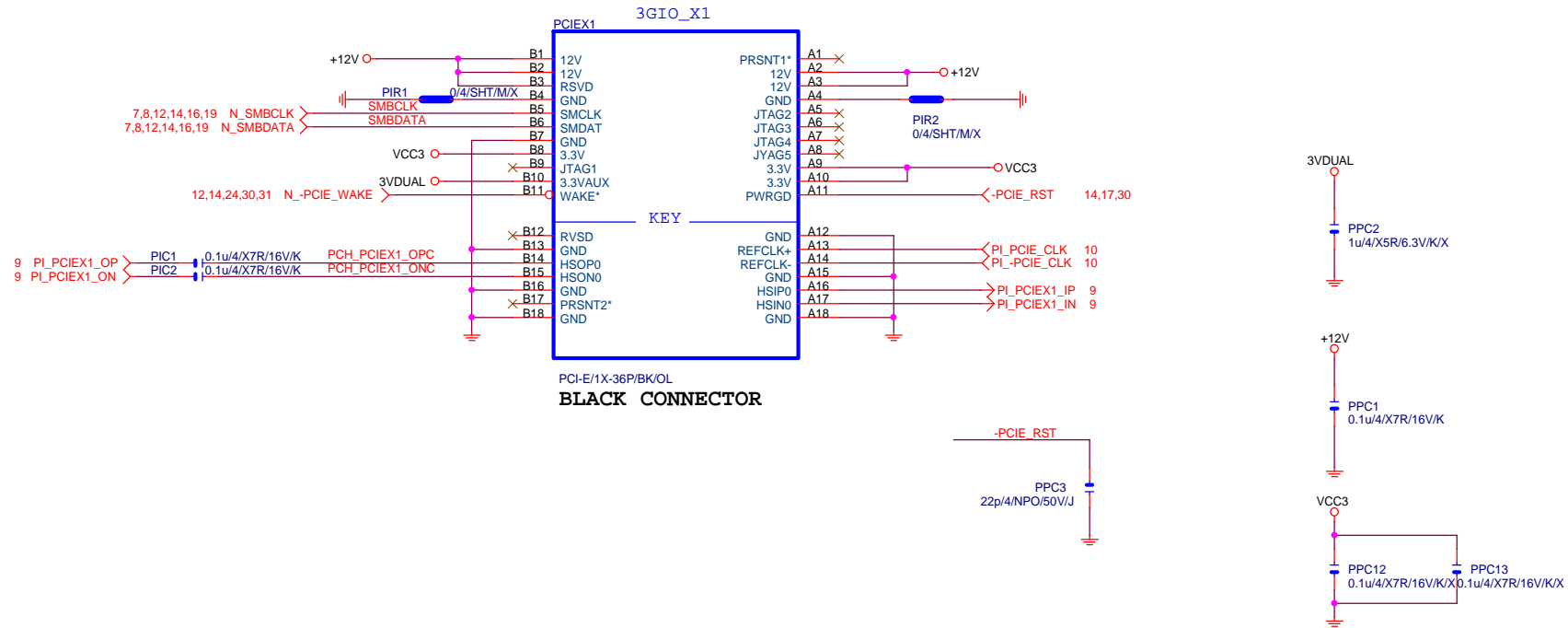
PCI-E/16X-164P/BK/LONG DOUBLE

BLACK CONNECTOR

Gigabyte Technology

Title		
PCI EXPRESS * 16		
Size		Rev
Document Number		1.07
GA-H81M-HD3		
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PCIEX1 SLOT



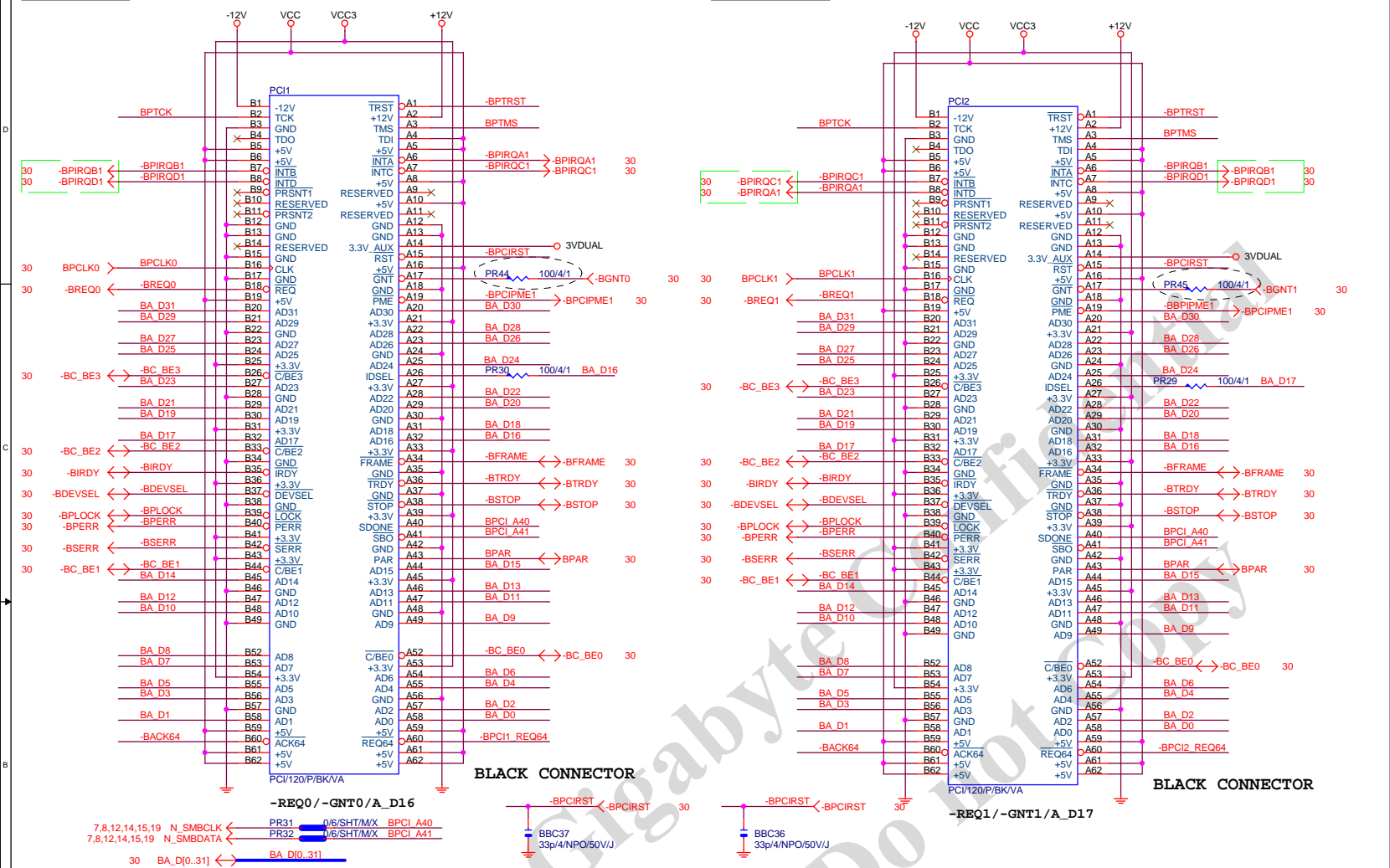
Gigabyte Technology

Title
PCI EXPRESS X 1 PORTSize Custom Document Number
GA-H81M-HD3

Date: Monday, September 01, 2014 Sheet 15 of 33 Rev 1.07

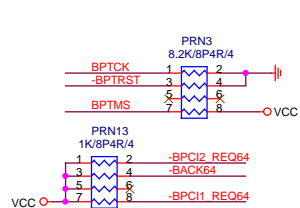
PCI SLOT 1

PCI SLOT 2



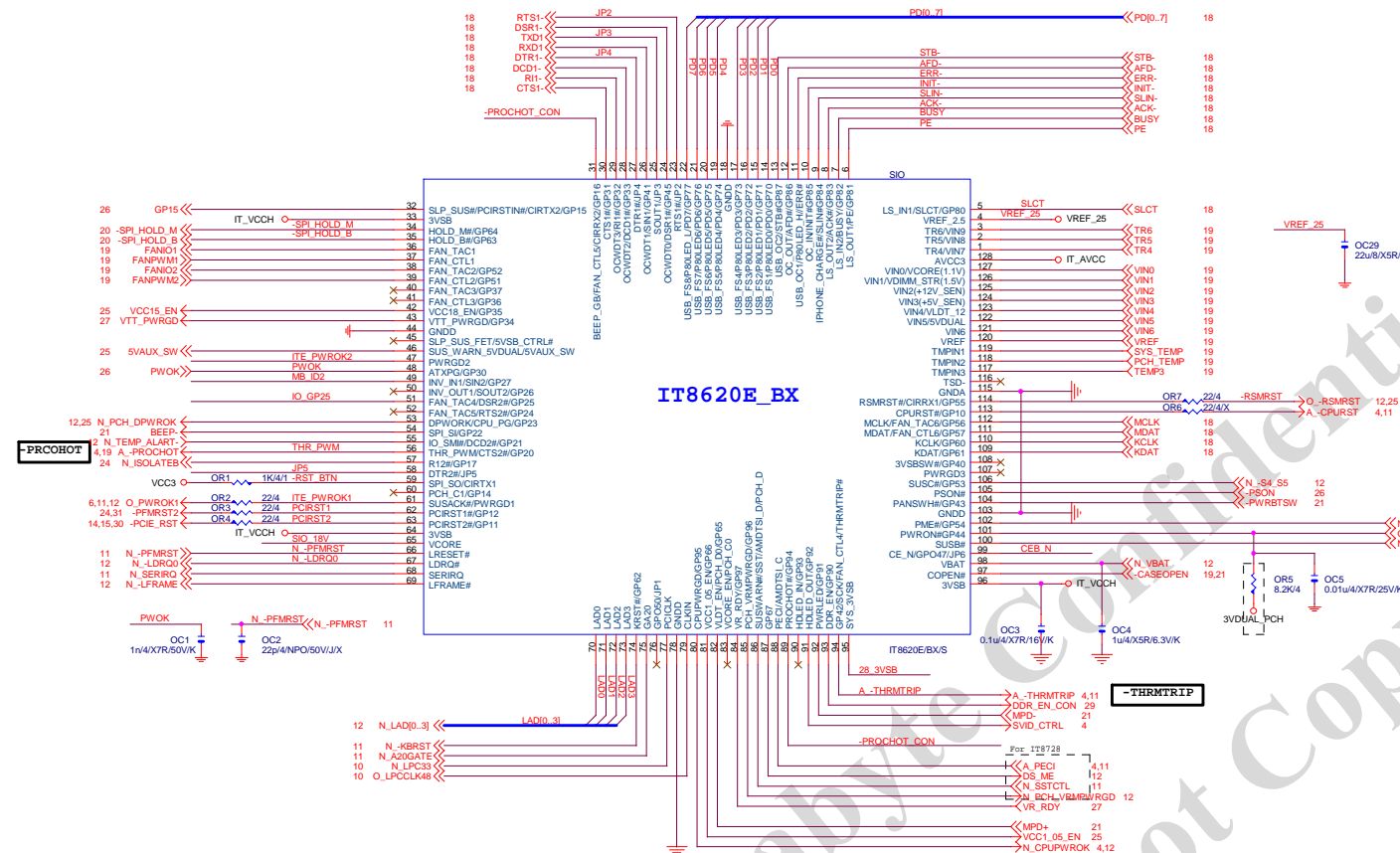
PCI PU

PCI CAP

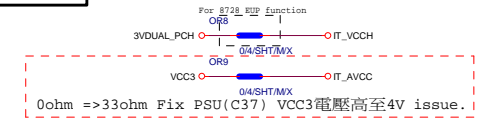


Gigabyte Technology			
Title			
PCI SLOT 1&2			
Size			
Custom			
Document Number			
GA-H81M-HD3			
Date: Monday, September 01, 2014			
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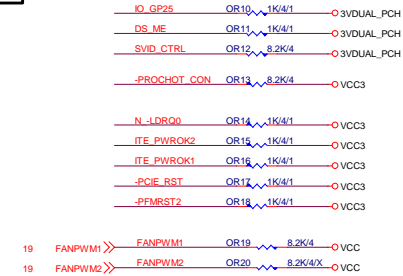
SIO IT8620



PWR SHT



SIO PU

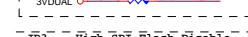


SIO STRAP

H61M-S2 1.1 JP6 stuff pull down

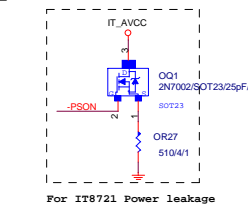


EUF control by FCH

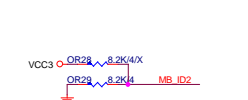


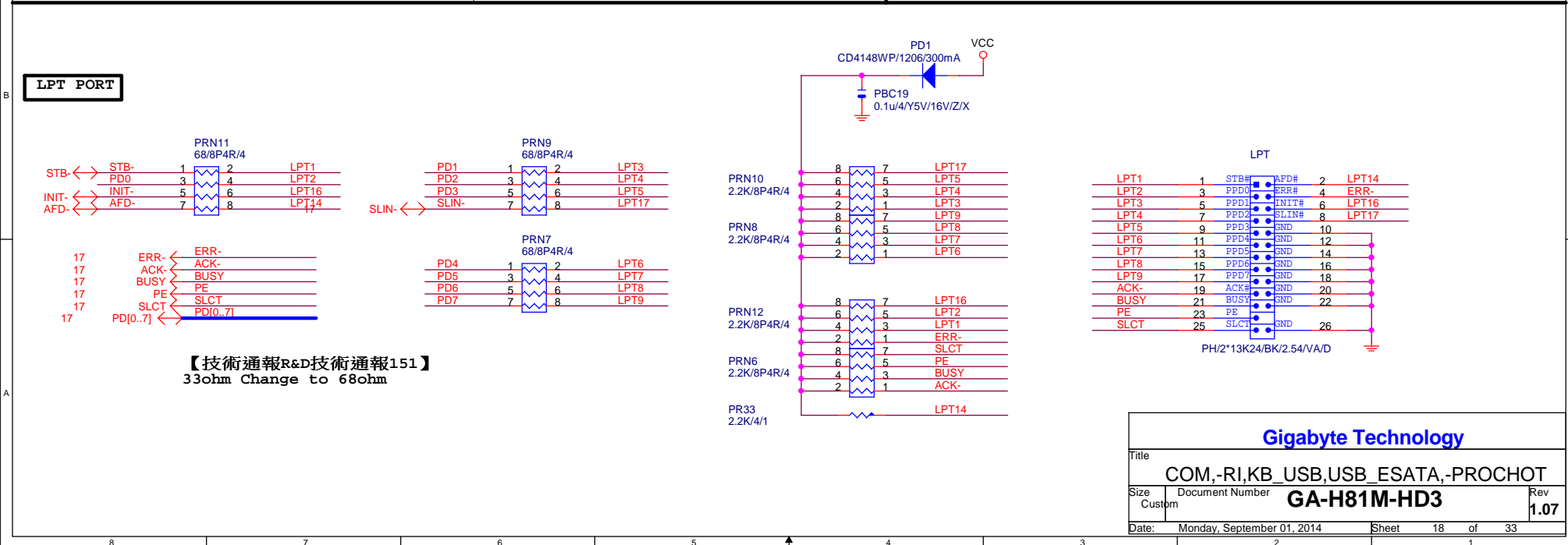
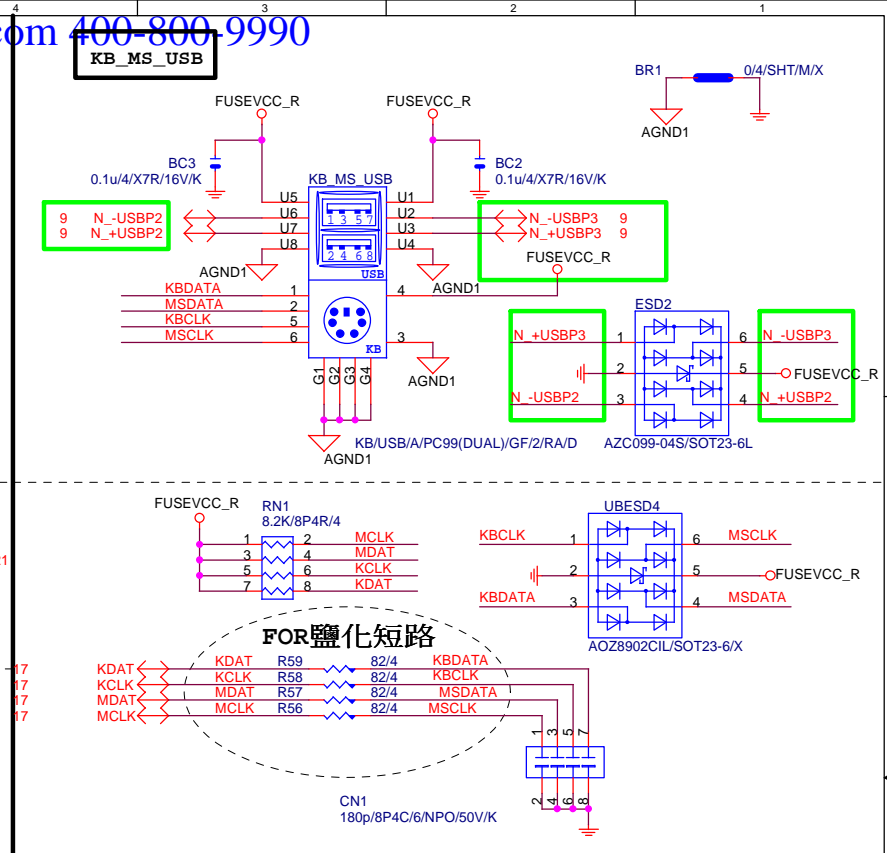
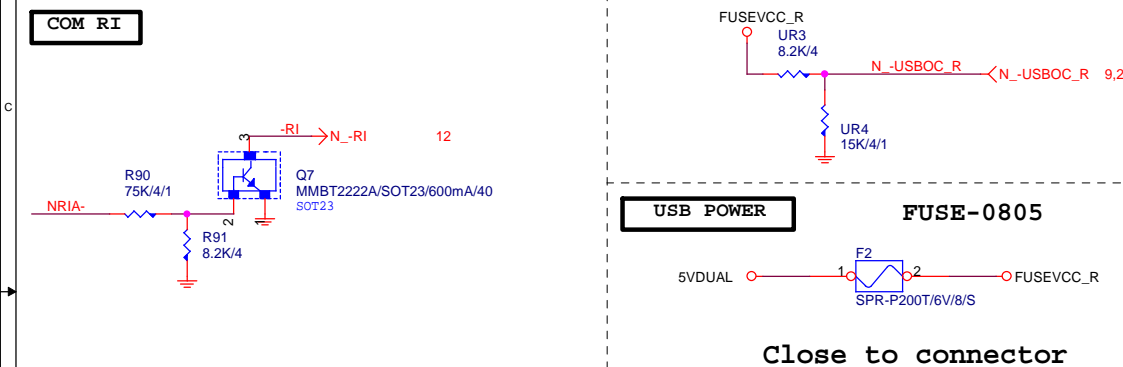
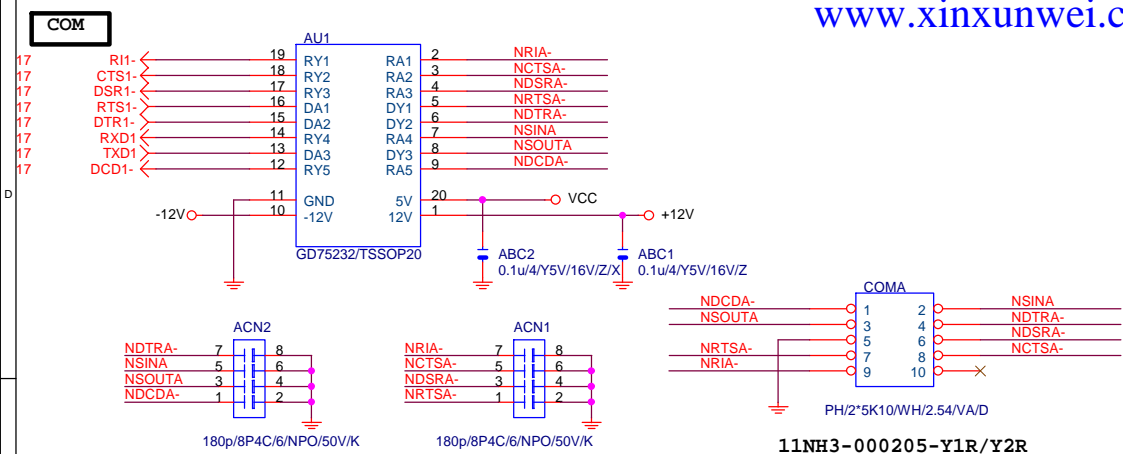
JP3--- High SPI-Flash Disable
Low SPI-Flash Enable

Power leakage

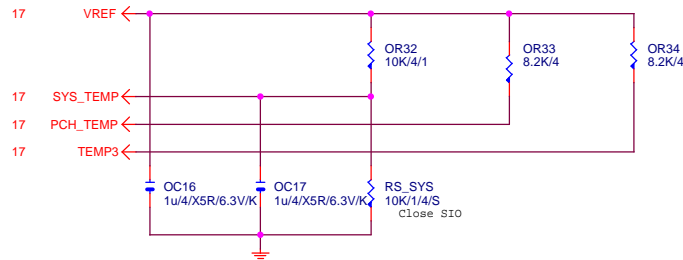


MB ID

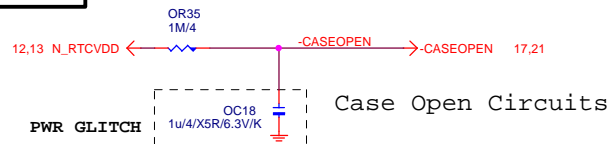




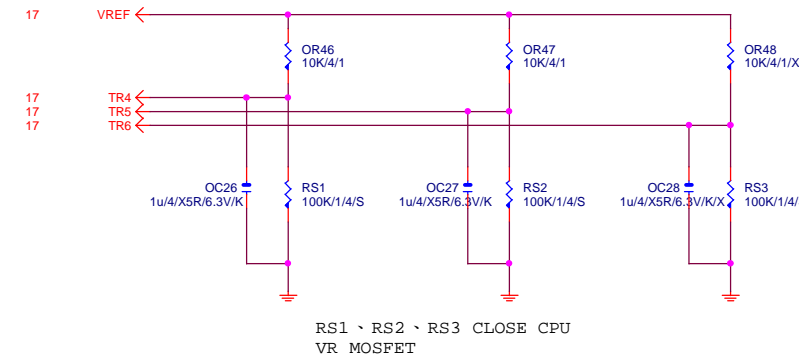
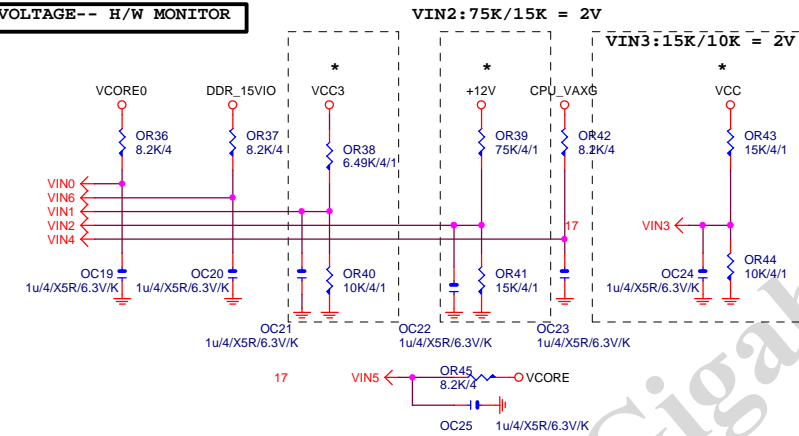
TEMP H/W MONITOR



CASE OPEN



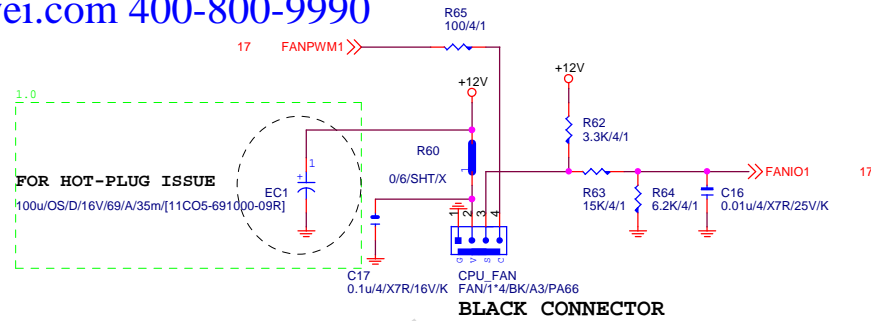
VOLTAGE-- H/W MONITOR



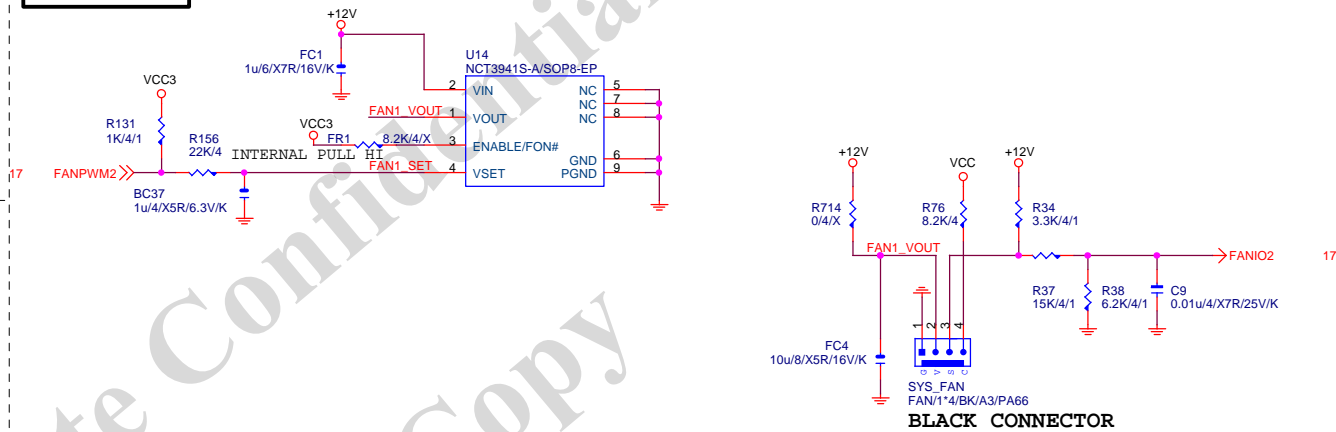
RS1、RS2、RS3 CLOSE CPU VR MOSFET

www.gigabyte.com 400-800-9990

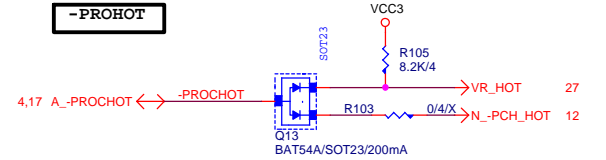
CPU SMART FAN



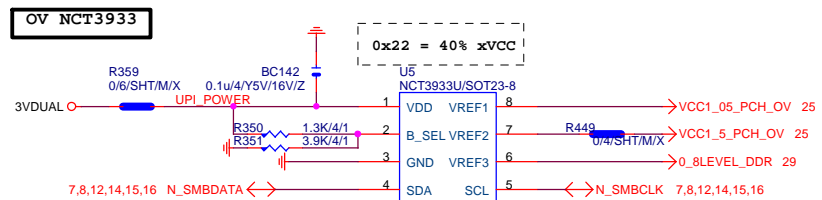
SYS SMART FAN



-PROHOT

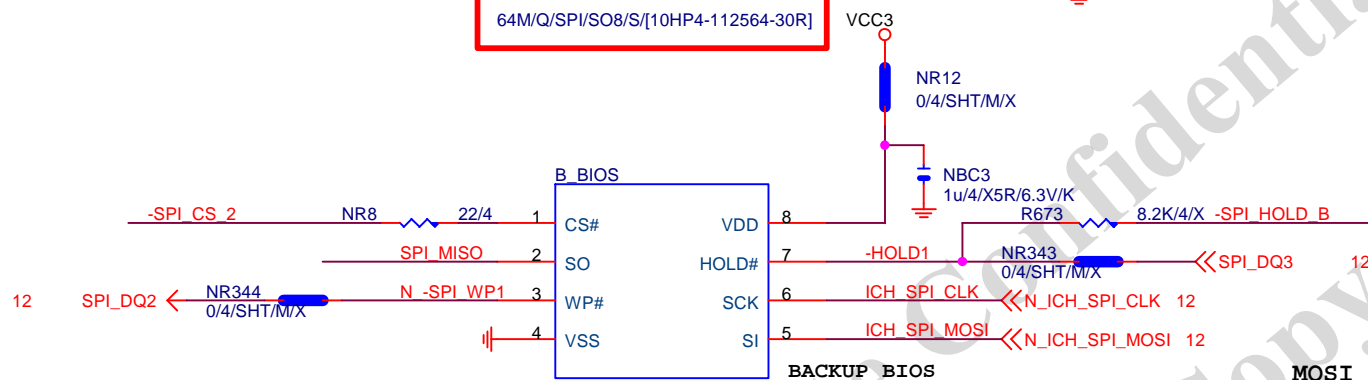
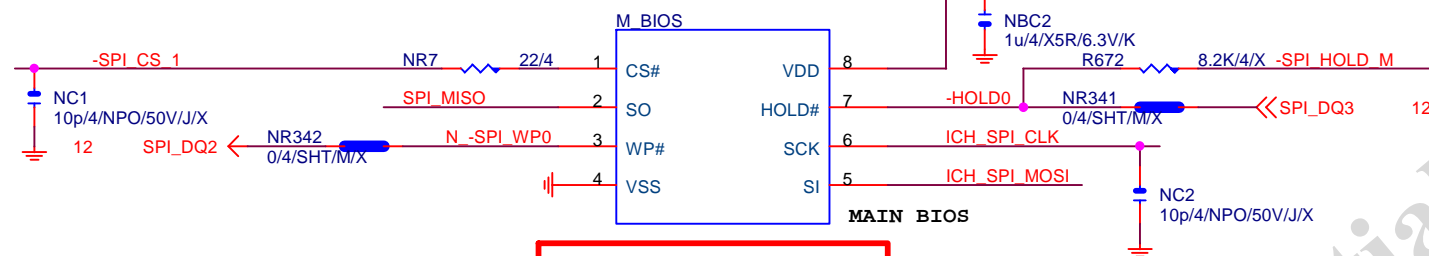


接pwm feedback pin



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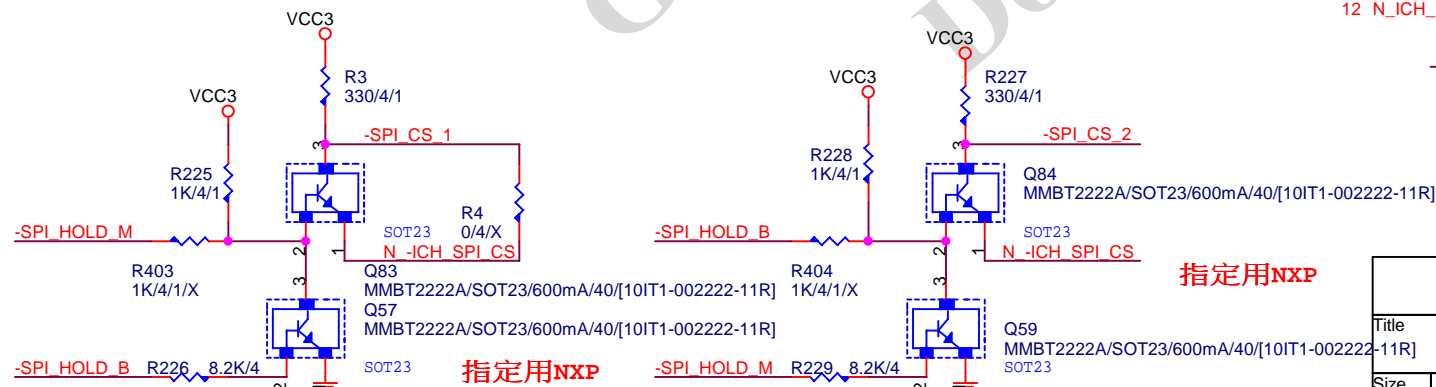
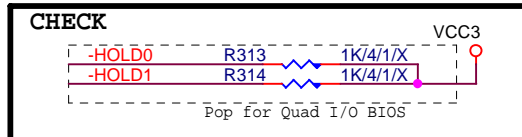
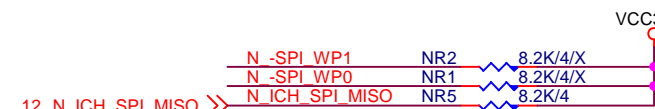
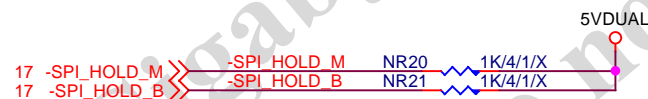
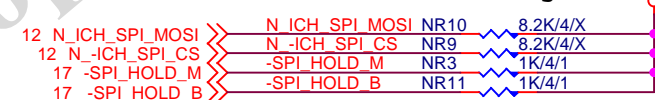
Gigabyte Technology				
Title				
HWM,FAN CTRL_OV				
Size	Document Number			Rev
Custom	GA-H81M-HD3			1.07
Date:	Monday, September 01, 2014		Sheet	19 of 33



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



指定用NXP

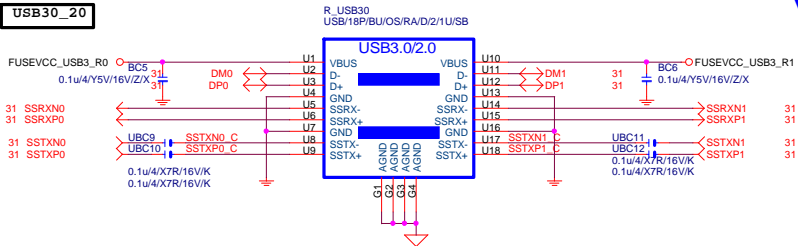
Gigabyte Technology

DUAL BIOS

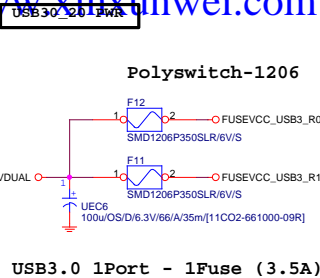
GA-H81M-HD3

Title	DUAL BIOS		Rev
Size	Document Number	GA-H81M-HD3	1.07
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Date:	Monday, September 01, 2014	Sheet	20 of 33

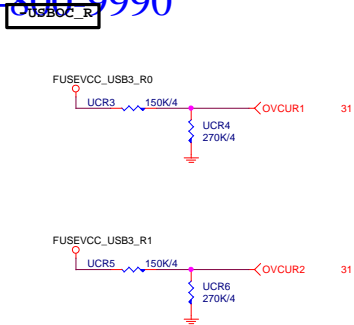
USB30_20



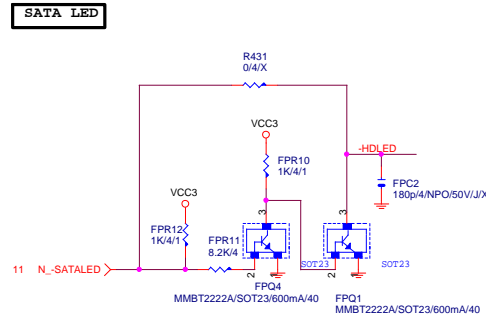
USB30_20



USB30_20

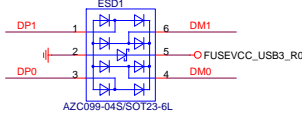


SATA LED

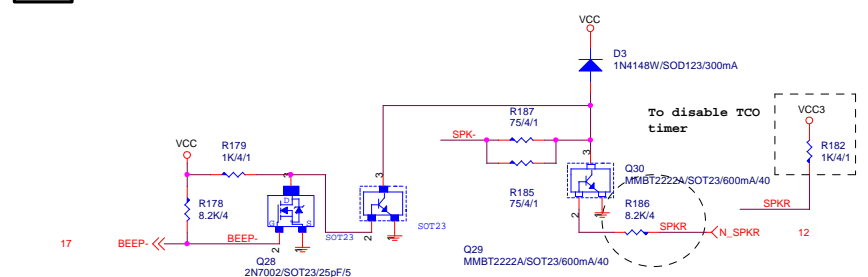


USB30_20 ESD PROTECT

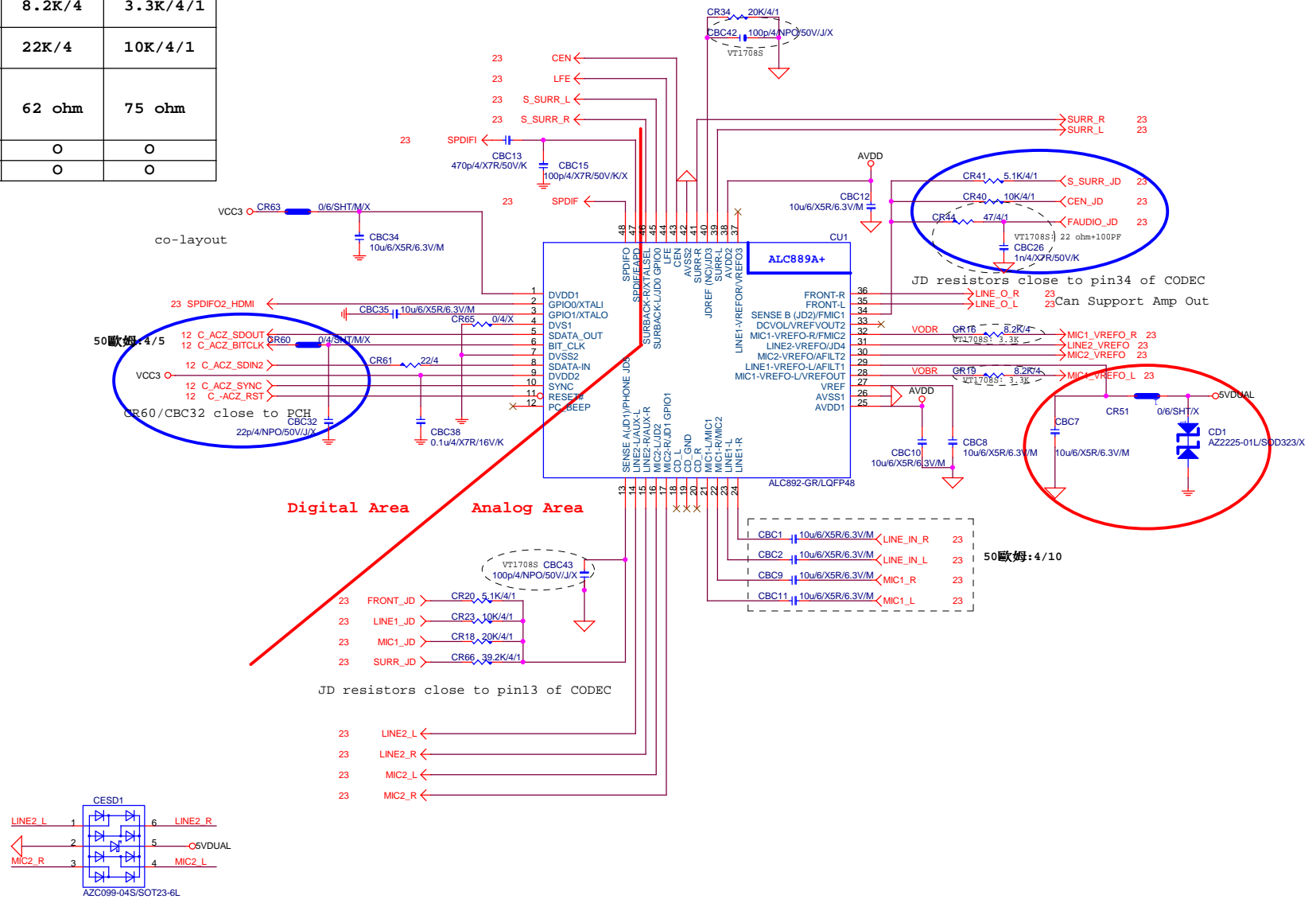
USB3.0 ESD

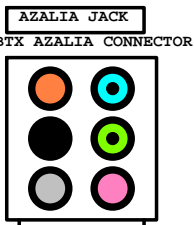
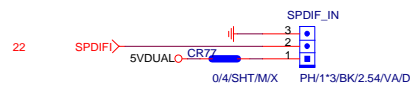
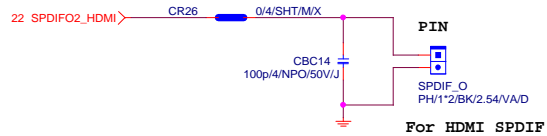
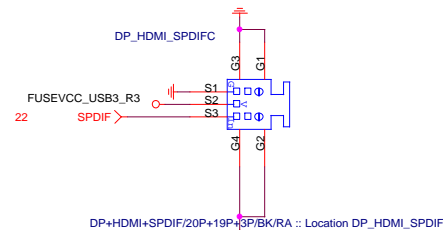
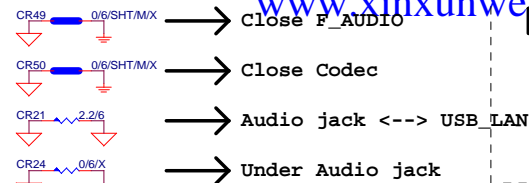


SPKR

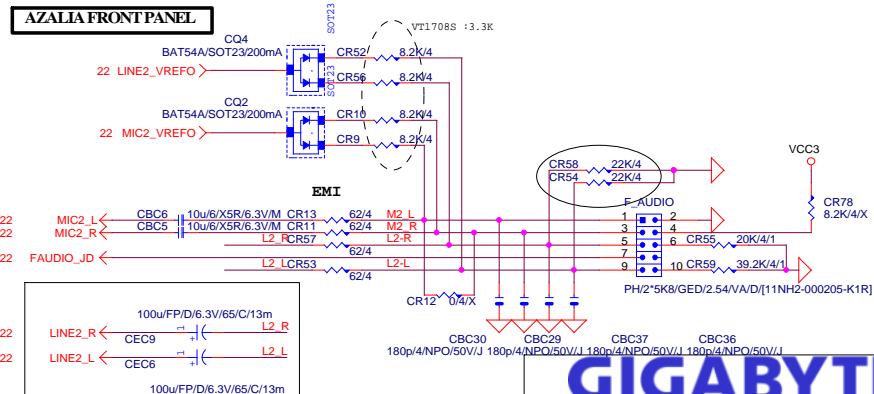
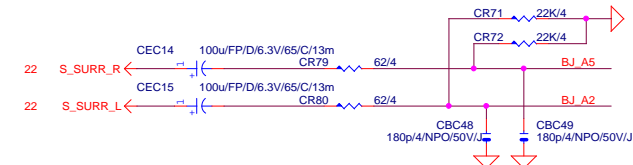
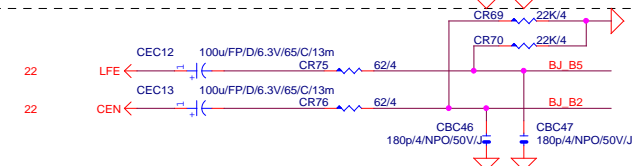
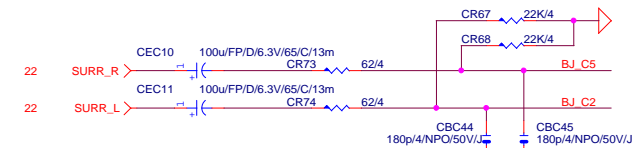
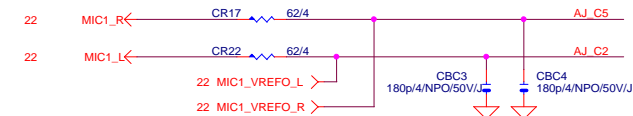
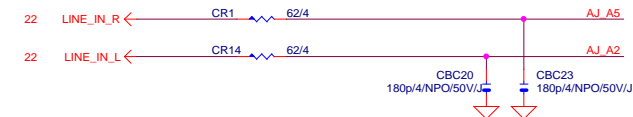
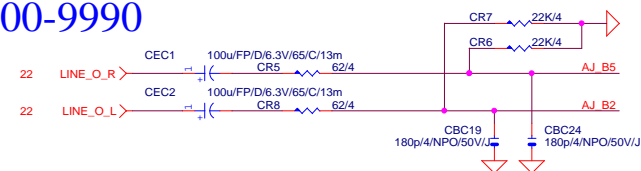
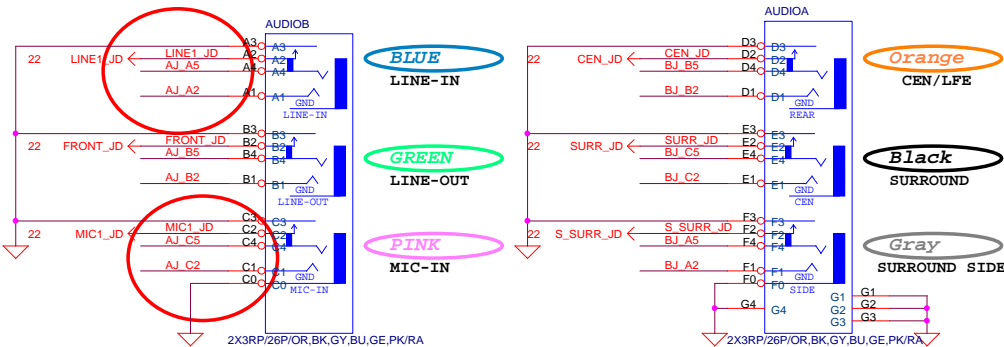


	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR16/CR19 CR52/CR56/CR10/CR9	8.2K/4	8.2K/4	3.3K/4/1
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76	62 ohm	62 ohm	75 ohm
CR51/CD1/CBC7	O	O	O
CESD1	O	O	O



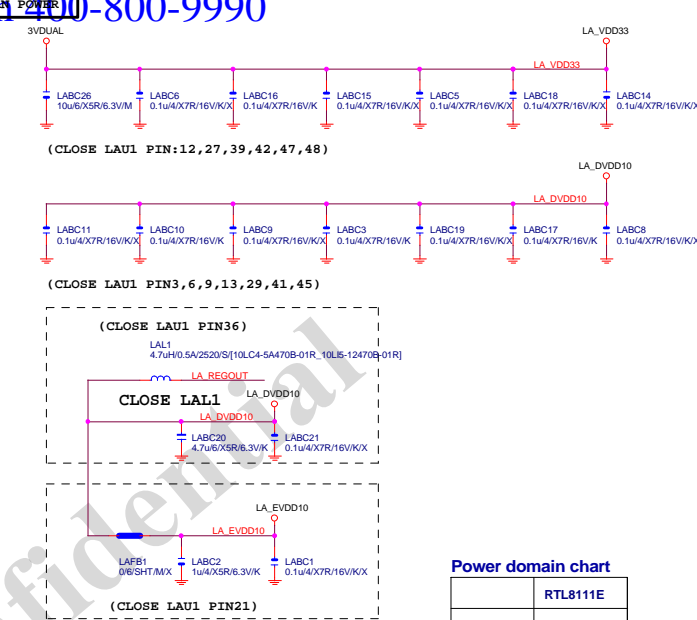
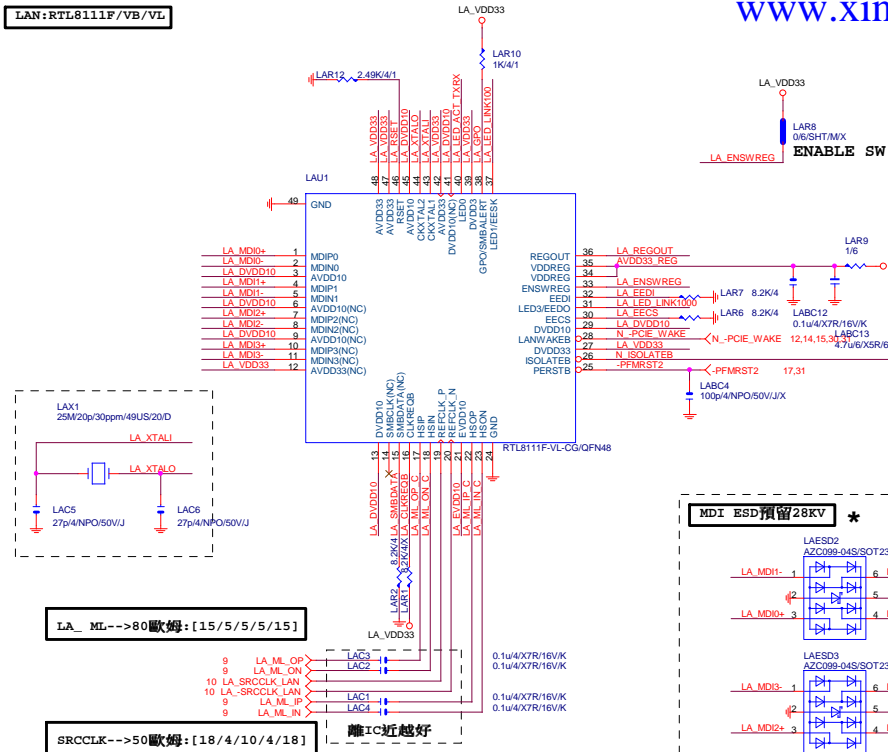


11NR6-403007-21R



Title				AUDIO JACK			
Size	Document Number				Rev		
Custom	GA-H81M-HD3				1.07		
Date:	Monday, September 01, 2014	Sheet	23	of	33		

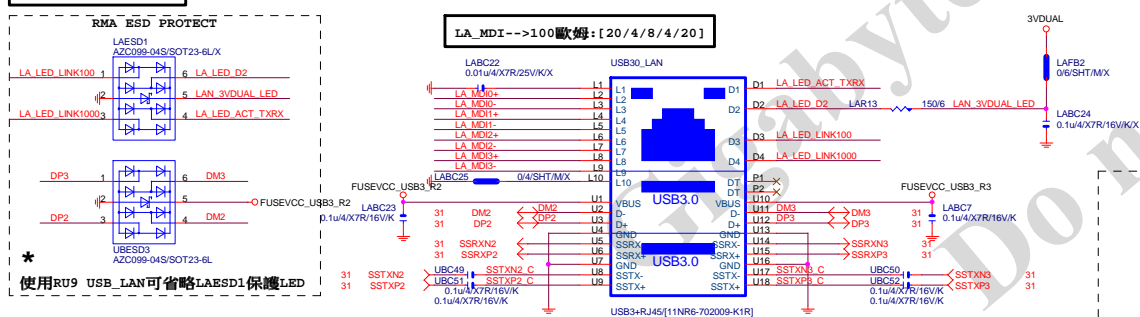
LAN:RTL8111F/VB/VL



Power domain chart

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

USB_LAN CONNECTOR

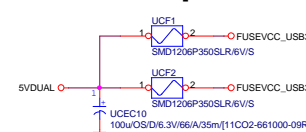


EMI SHORT PAD

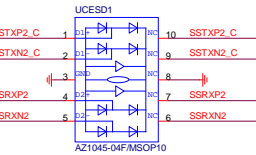
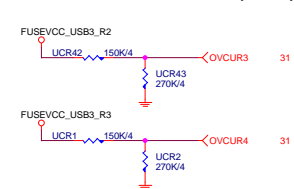
PS:視EMI需求



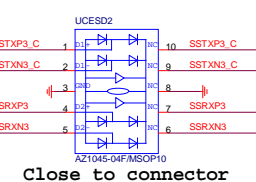
Polyswitch-1206



USB3.0 1Port - 1Fuse (3.5A)



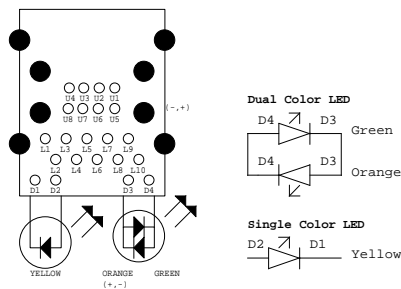
Close to connector



Close to connector

Gigabyte Technology

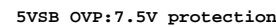
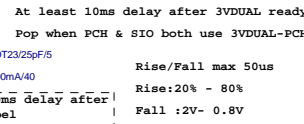
Title	Realtek RTL8111G
Size	Document Number
Custom	GA-H81M-HD3
Date	Monday, September 01, 2014
Sheet	24 of 33
Rev	1.07

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

BOM NOTICE *

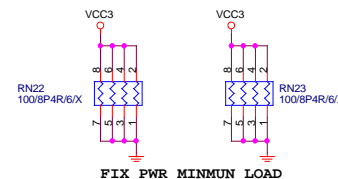
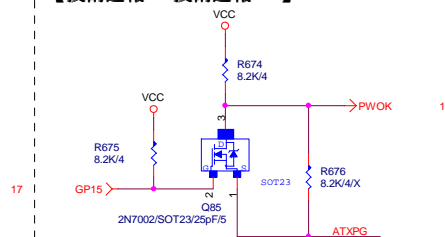
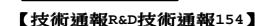
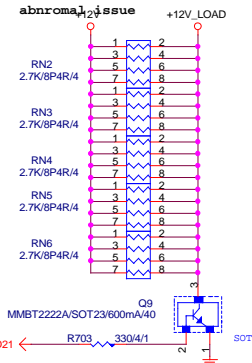
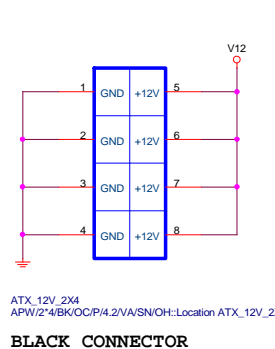
料號 規格 廠商
11NR6-702009-96R 1G LAN (12core) UDE(RU9 ESD+)
[LED獨立走線,可省略外加AZC099料件LAESD1]

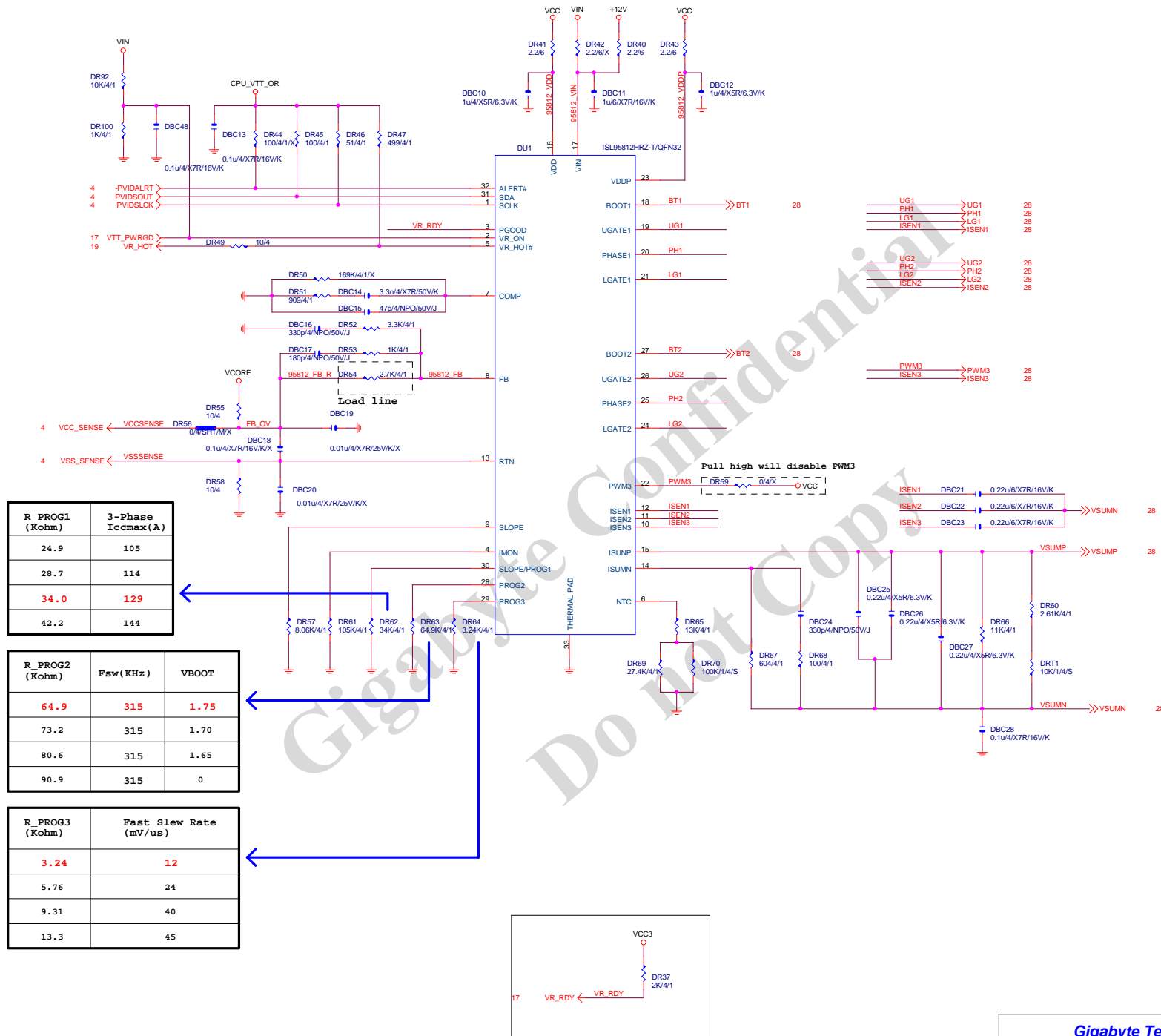
- 9KV ESD BOM:
USB_LAN (RU9):11NR6-702009-96R
- 28KV ESD BOM:
USB_LAN (RU9):11NR6-702009-96R
LAESD2,LAESD3:上件AZC398-04S



Gigabyte Technology

DISCRETE POWER
GA-H81M-HD3

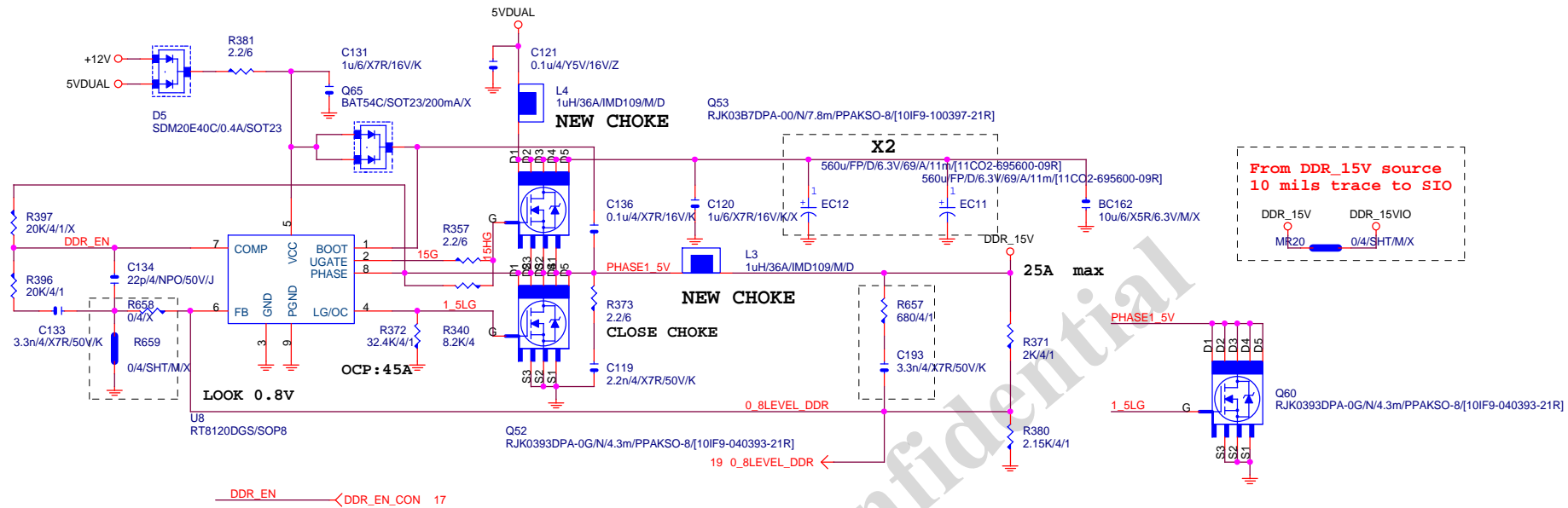




Gigabyte Technology

File			CPU CORE VR-1
Size	Document Number	GA-H81M-HD3	
Custom		Rev	1.07
Date	Monday, September 01, 2014	Sheet	27 of 33

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2X7.99=15.98>11.45A

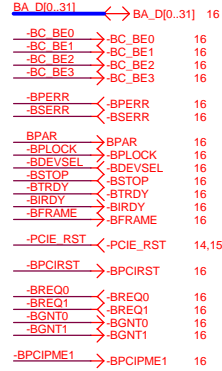
$Rocset = (I_{ocp} * L_{gate, rdson}) / I_{ocset}$
 $Rocset = (45A * 6.7m\Omega) / 10uA = 30K$
 $I_{ocset} = 10uA$

Gigabyte Technology

Title		
RT8120_DDR POWER		
Size	Document Number	Rev
Custom	GA-H81M-HD3	1.07
Date:	Monday, September 01, 2014	Sheet 29 of 33

PCIE TO PCI

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



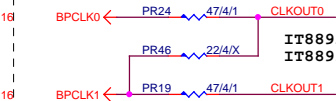
High: Enable PCI CLK 66MHz
Low: Disable PCI CLK 66MHz



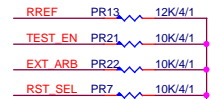
High: PCICLK INPUT form CLK Gen
Low: PCICLK OUTPUT form IT8893 chip

Co-Lay IT8893 (IT8893 CLKOUT1 N/A)

IT8892: PR24 -> 47ohm
IT8893: PR24 -> 22ohm

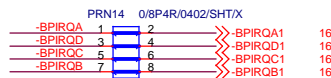


IT8892: PR19 -> O
IT8893: PR19 -> X



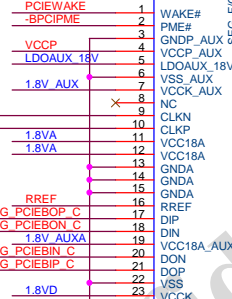
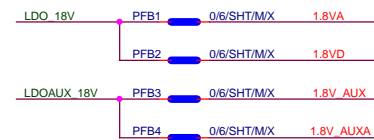
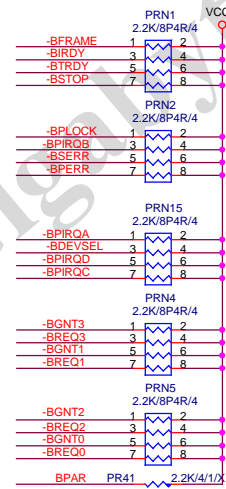
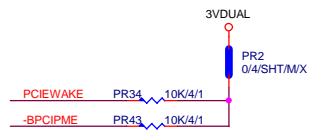
IT8892

PCI slot



PCI slot

chipset side



BA D0
BA D1

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

VCC3

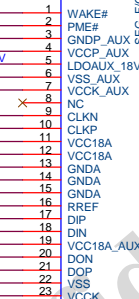
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VCC3

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VCC3

VCC3

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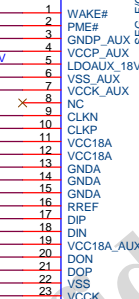
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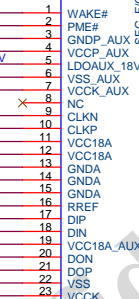
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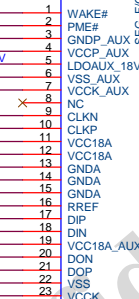
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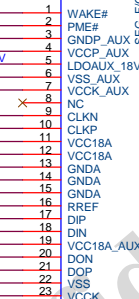
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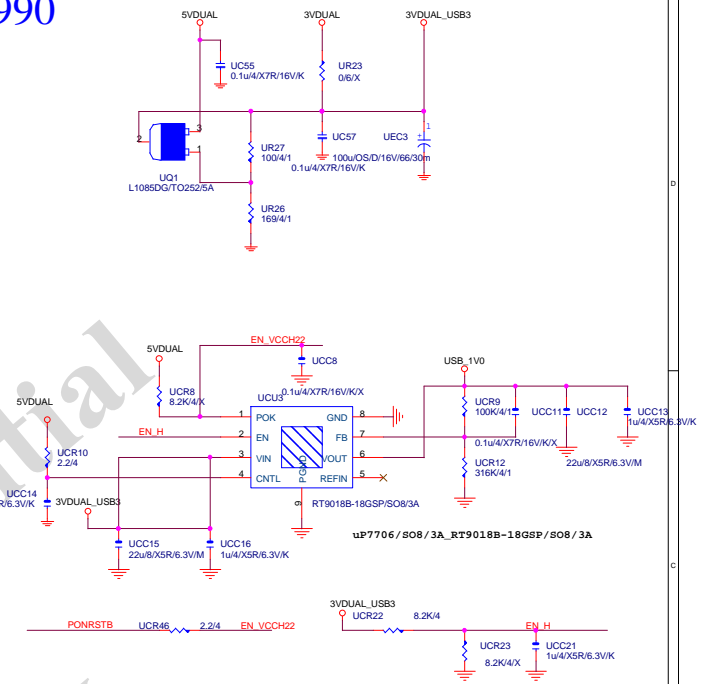
VCC3

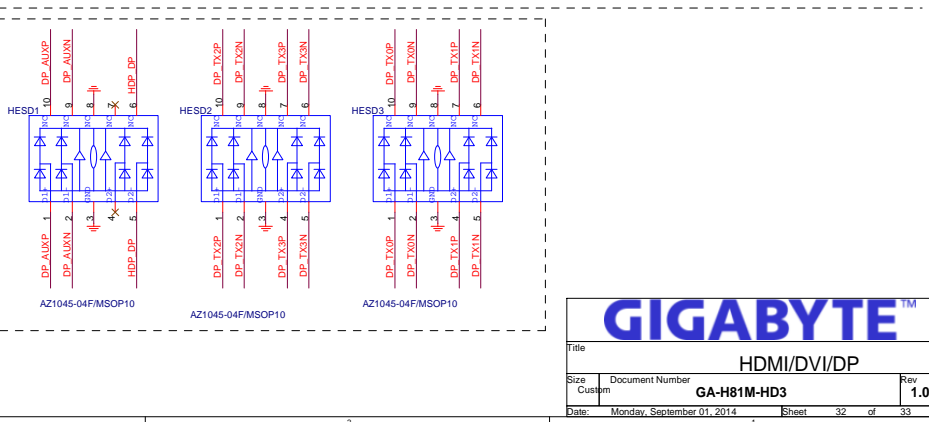
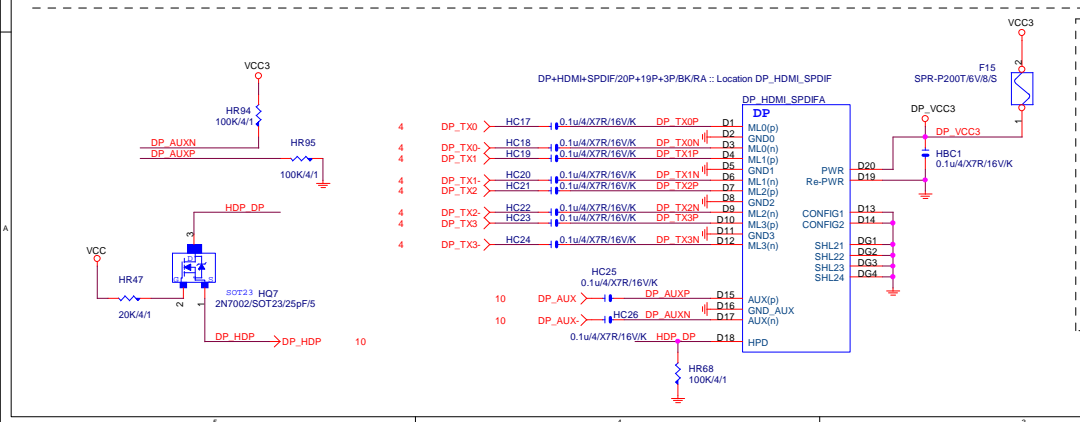
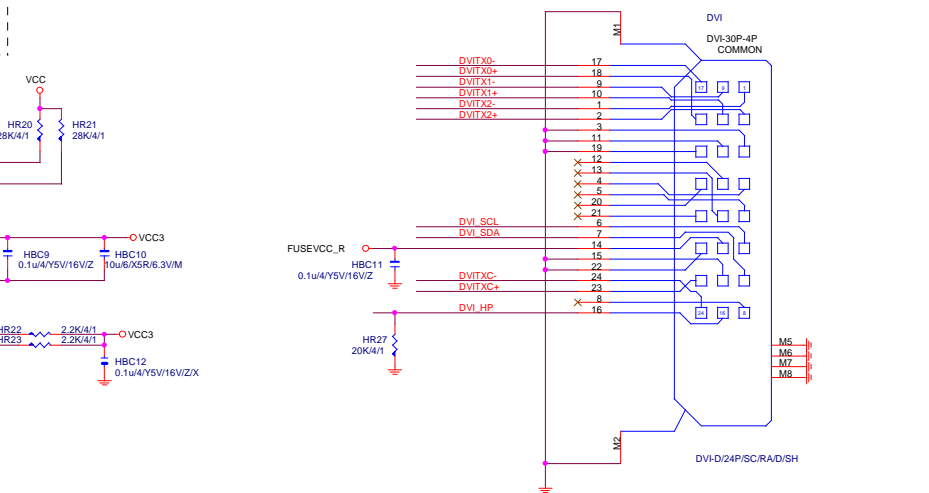
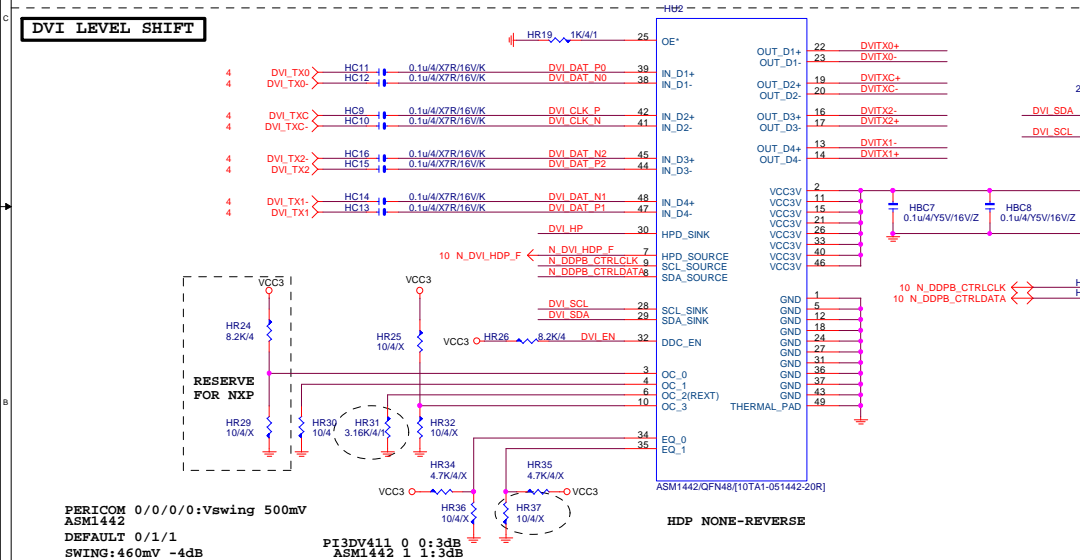
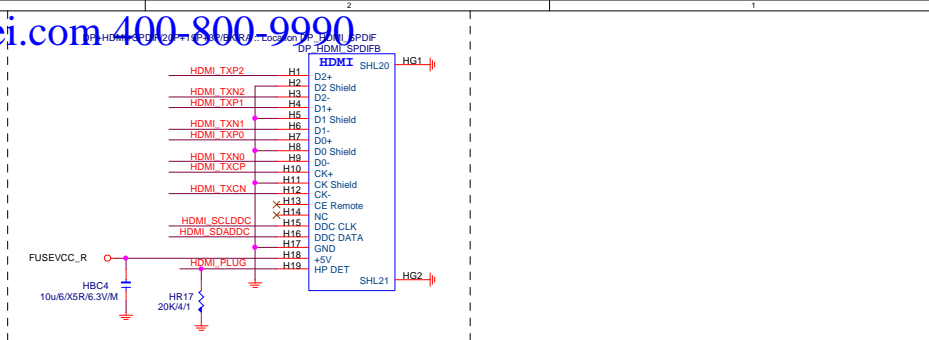
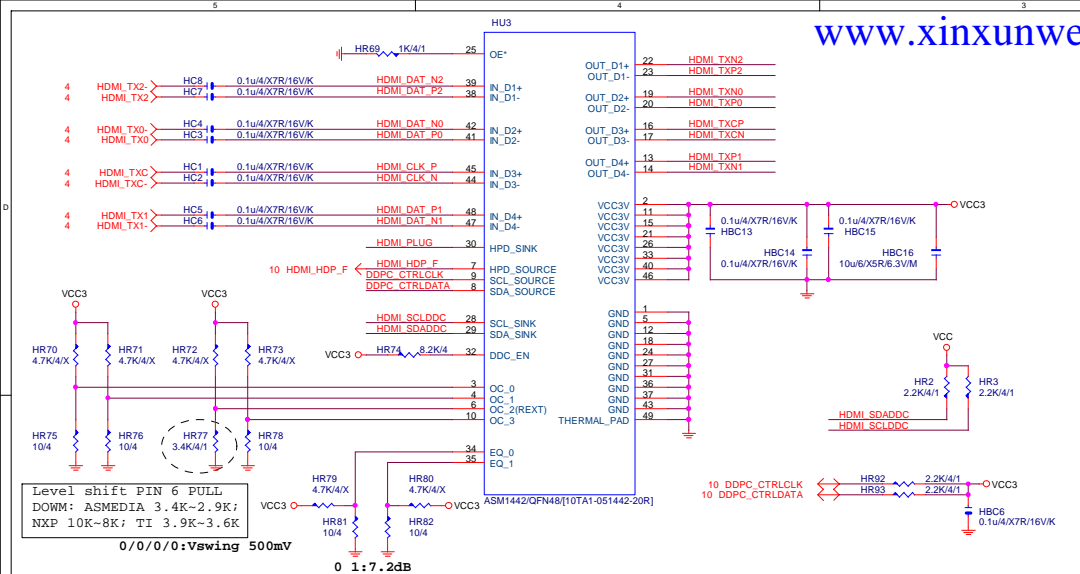
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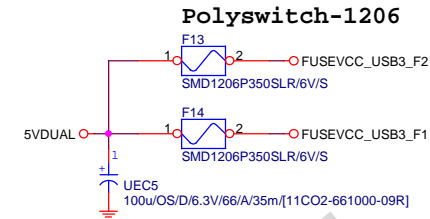
VCC3

VCC3

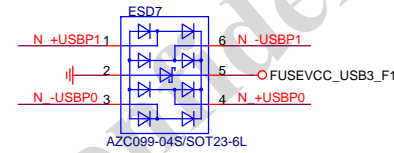
VCC3







BLACK CONNECTOR



Close to connector

