

Model Name: GA-H81M-HD3

Revision 1.01

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			
Size	Document Number	GA-H81M-HD3	Rev
Custom			1.01
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Model Name: GA-H81M-HD3

Revision 1.01

Component value change history

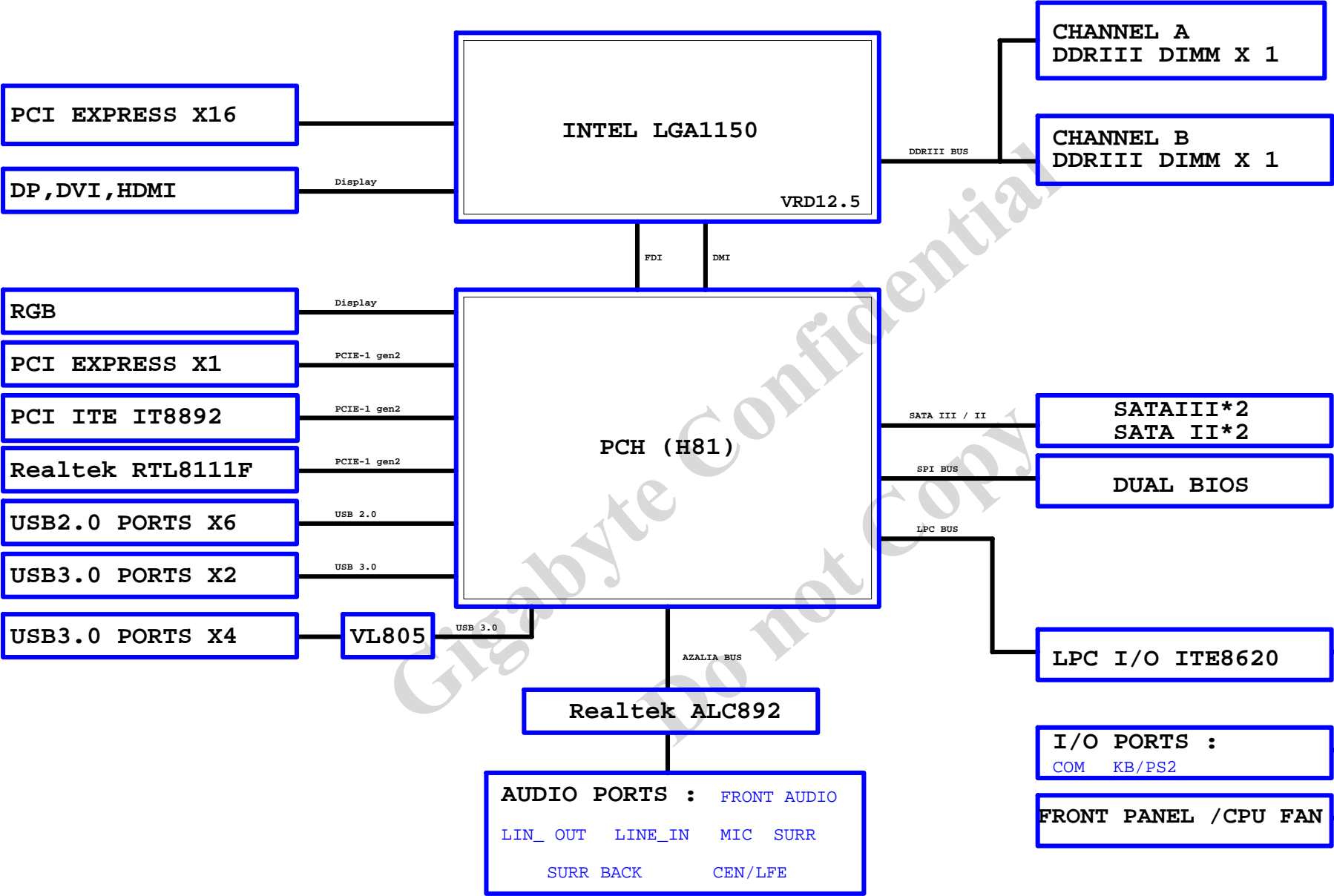
2013/04/22

[illegible]

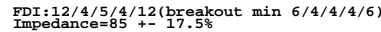
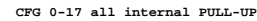
Circuit or PCB layout change

[illegible]

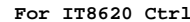
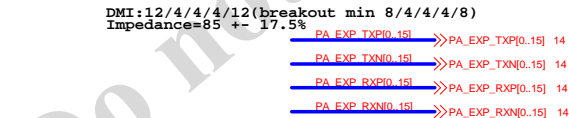
BLOCK DIAGRAM



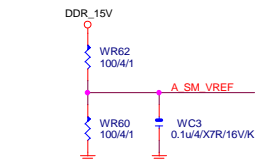
LGA1150 (D)



-CPURST



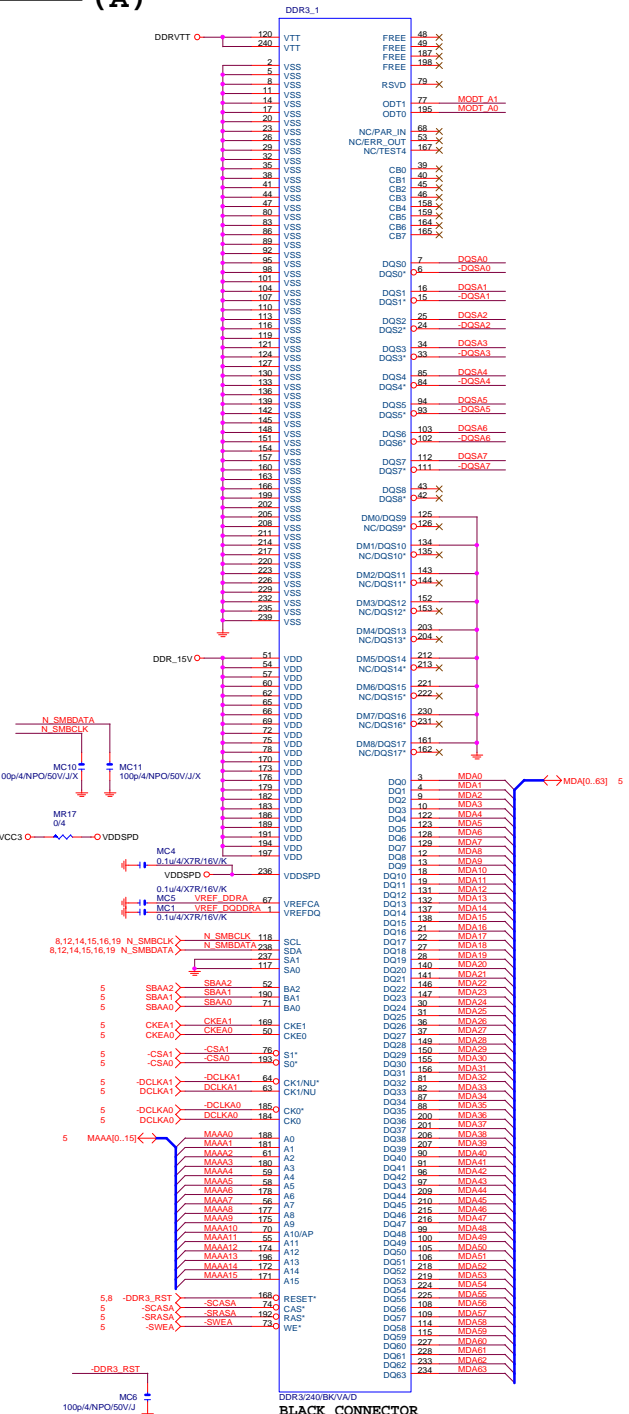
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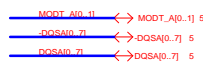
LGA1150A			
MAAA0	AU13	DDR0_MA0	DDR0_D00
MAAA1	AV16	DDR0_MA1	DDR0_D01
MAAA2	AU16	DDR0_MA2	DDR0_D02
MAAA3	AW17	DDR0_MA3	DDR0_D03
MAAA4	AU17	DDR0_MA4	DDR0_D04
MAAA5	AW18	DDR0_MA5	DDR0_D05
MAAA6	AV17	DDR0_MA6	DDR0_D06
MAAA7	AT18	DDR0_MA7	DDR0_D07
MAAA8	AU18	DDR0_MA8	DDR0_D08
MAAA9	AT19	DDR0_MA9	DDR0_D09
MAAA10	AW11	DDR0_MA10	DDR0_D10
MAAA11	AV19	DDR0_MA11	DDR0_D11
MAAA12	AU19	DDR0_MA12	DDR0_D12
MAAA13	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

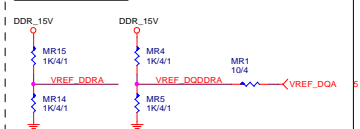
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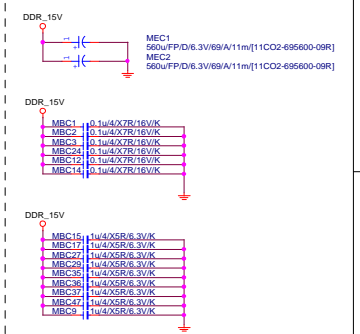
BLACK CONNECTOR



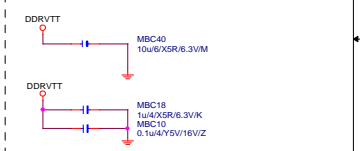
DDR3 VREF



DDR15V Decouple



DDRVTT Decouple

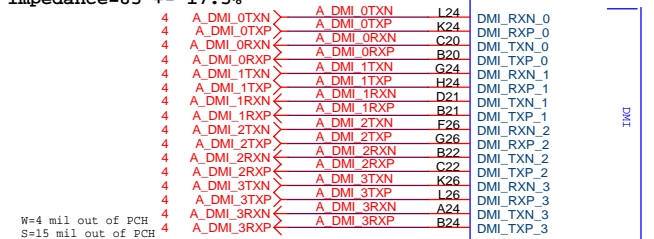


PCH

(B)

DMI:12/4/4/4/12(breakout min 8/4/4/4/8)
Impedance=85 +- 17.5%USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

PCHB

W=4 mil out of PCH
S=15 mil out of PCH

PCIE Only

8111F
8892
PCIEx1
VL805

N/A

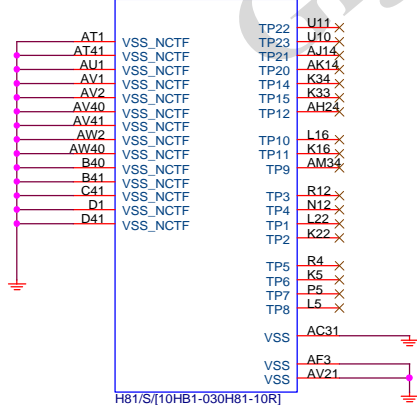
放靠近 Device & PCI-E Slot
Impedance=80 +- 17.5%

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

PCH

(J)

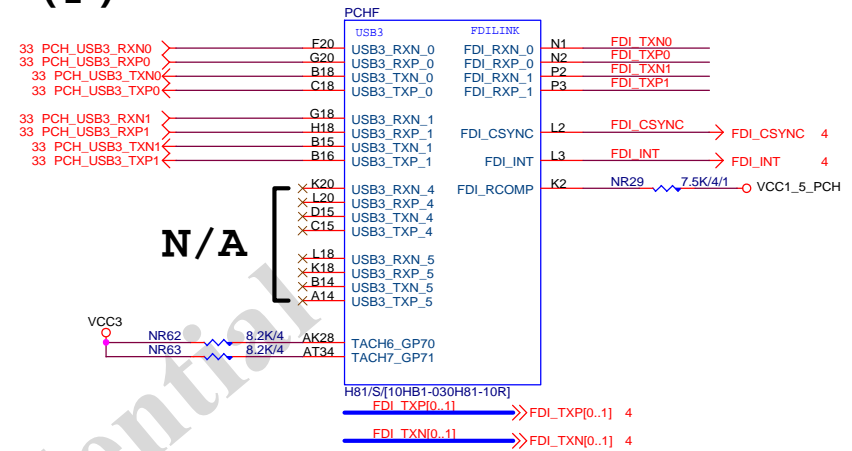
PCHJ



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

PCH

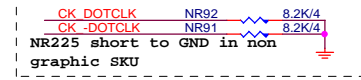
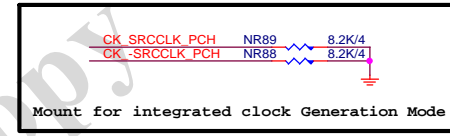
(F)



N/A

USB3.0:20/5/7/5/20 (breakout min 8/4/4/4/8) ; ONLY 3 VIAS
Impedance=85 +- 17.5%
Back Panel < 10000 MILS
Front Panel < 6000 MILS

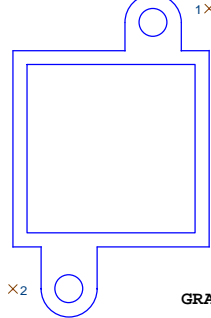
PCH CLK PD



PCH H/S

LOW COST ICH7 HEATSINK

SB_HEATSINK

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

USB TABLE

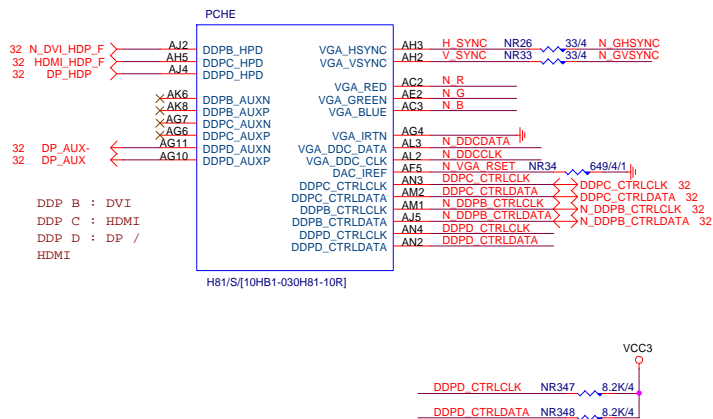
OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)

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

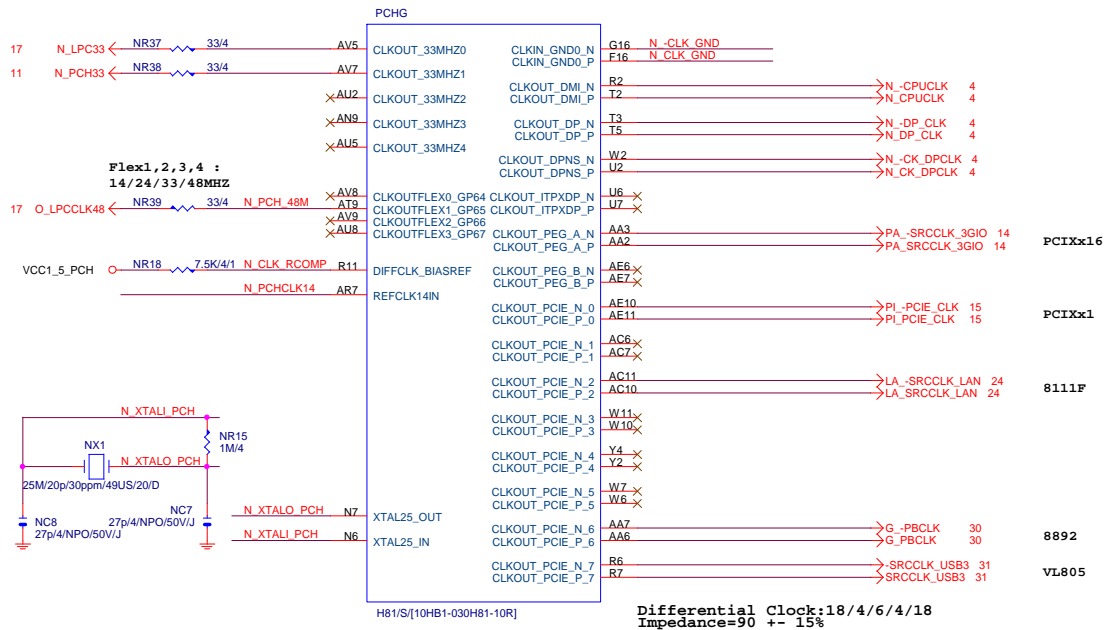
Gigabyte Technology

Title					Rev 1.01
PCH FDI,DMI,USB ,PCIE,NVRAM					
Size	Custom	Document Number	GA-H81M-HD3		
Date:	Friday, September 13, 2013		Sheet	9 of 33	

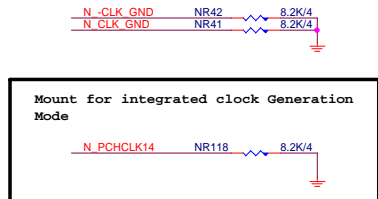
PCH (E)



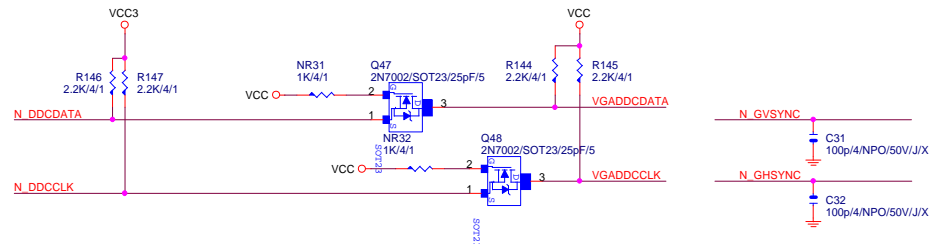
PCH (G)



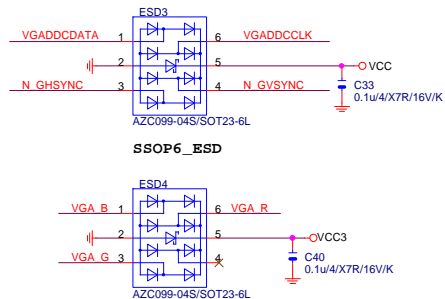
PCH CLK PD



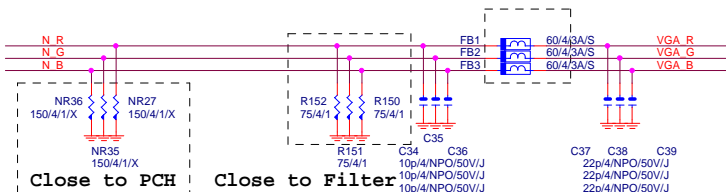
VGA DDC



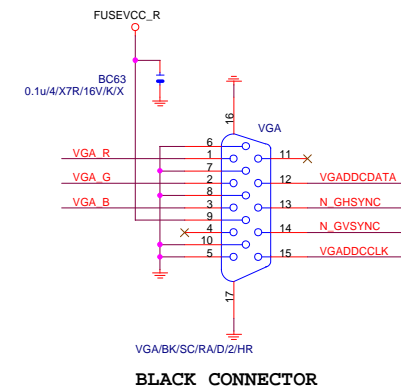
VGA ESD



VGA DDC

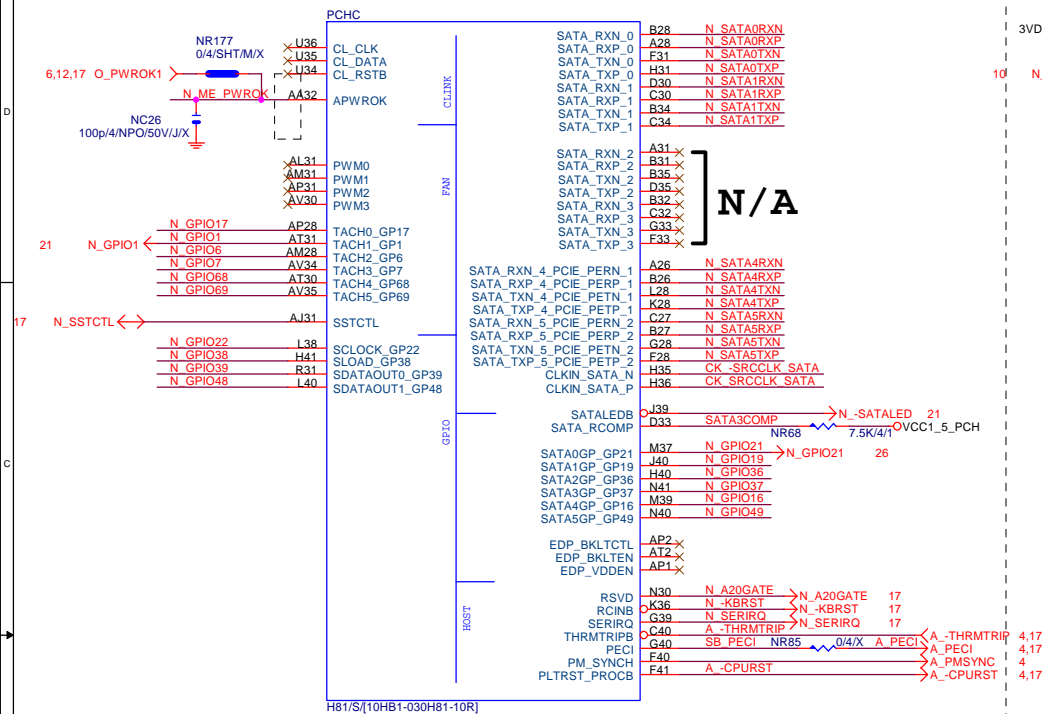


VGA CONNECTOR

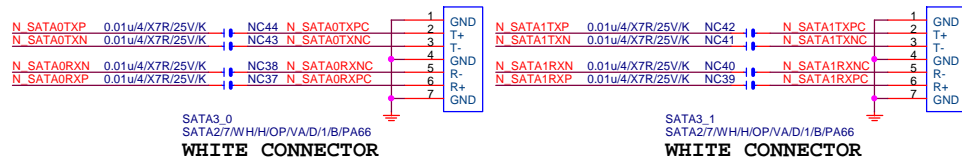


Gigabyte Technology			
Title			
PCH DISPLAY_CLK BUFFER			
Size			
Custom			
Document Number			
GA-H81M-HD3			
Date:			
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1.01			

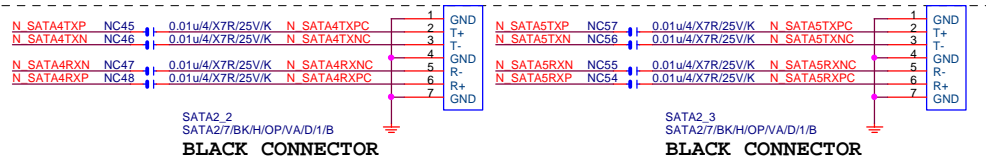
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



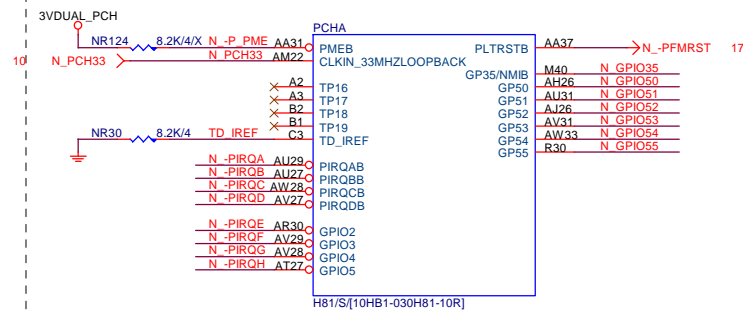
SATA CONNECTOR



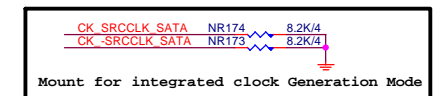
```
** Z87/H87 Port 4&5 SATA3.0
** B85 Port 4&5 SATA2.0
```



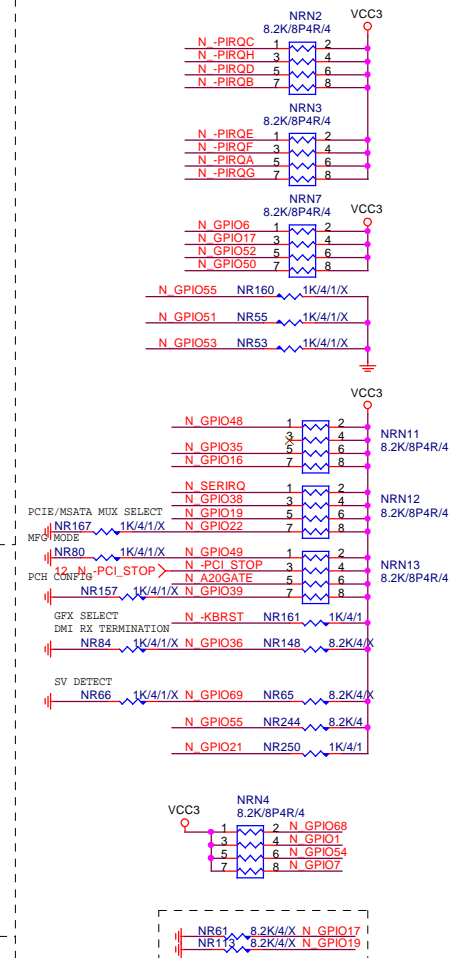
PCH (A)



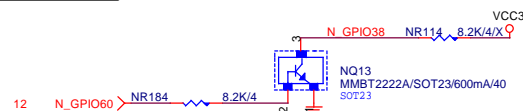
PCH	CLK	PD
-----	-----	----



PCH	PU/PD
-----	-------



GPIO38 Ctrl



Gigabyte Technology

Title			
PCH HOST , SATA, PCI			
Size	Document Number		Rev
Custom	GA-H81M-HD3		1.01
Date:	Friday, September 13, 2013	Sheet	11 of 33

PCH (D)

17 N_LAD[0..3] << N_LAD[0..3]

PCHD

VCC3 O NR54 8.2K/4/XN GPIO23 AK26
17 N_LAD0 << N_LAD0 AN24
17 N_LAD1 << N_LAD1 AP26
17 N_LAD2 << N_LAD2 AN26
17 N_LAD3 << N_LAD3 AN26
17 N_LDRQ0 << N_LDRQ0 AK22
17 N_LFRAME << N_LFRAME AP24

22 C_ACZ_BITCLK << NR45 33/4 AV23
22 C_ACZ_RST << NR43 33/4 AU24
22 C_ACZ_SDIN2 << NR45 33/4 AV23
22 C_ACZ_SYNC << NR46 33/4 A_SO AU22
22 C_ACZ_SYNC << NR46 33/4 A_SYC AV24

20 N_ICH_SPI_MOSI << R36
20 N_ICH_SPI_MISO << R36
20 N_ICH_SPI_CS << R36
20 N_ICH_SPI_CLK << R36

20 SPI_DQ2 << R35
20 SPI_DQ3 << R35
N_Y1 AN40
N_Y2 AN39
N_RTORST AR38
N_SRTORST AR39
N_INTRUDER AR41
O_PWROK1 AT40
O_RSMRST AM40
N_INTRVREN AV36
N_PCH_DPWROK AV38
N_DSVMREN AM41

17 N_LPCPME << N_LPCPME AG31
7,8,14,15,16,19 N_SMBCLK << N_SMBCLK AG36
7,8,14,15,16,19 N_SMBDATA << N_SMBDATA AG32
11 N_GPIO60 << N_GPIO60 AG35
N_SML0CLK AE32
N_SML0DAT AE35
N_PCH_HOT << N_PCH_HOT AJ39
N_SML1CLK AK36
N_SML1DAT AK33

19 N_PCH_HOT << N_PCH_HOT AJ39
N_SML1CLK AK36
N_SML1DAT AK33

H81/S/[10HB1-030H81-10R]
O_PWROK1
NC51 0.01u/4/X7R/25V/K/X
Reserve for EMI test

Reserve for EMI test

HSW_STRAP13

32.768KHZ

CLR_CMOS

BATTERY

ACZ_SDOUT

PCH PU/PD

PCH_DPWROK

Gigabyte Technology

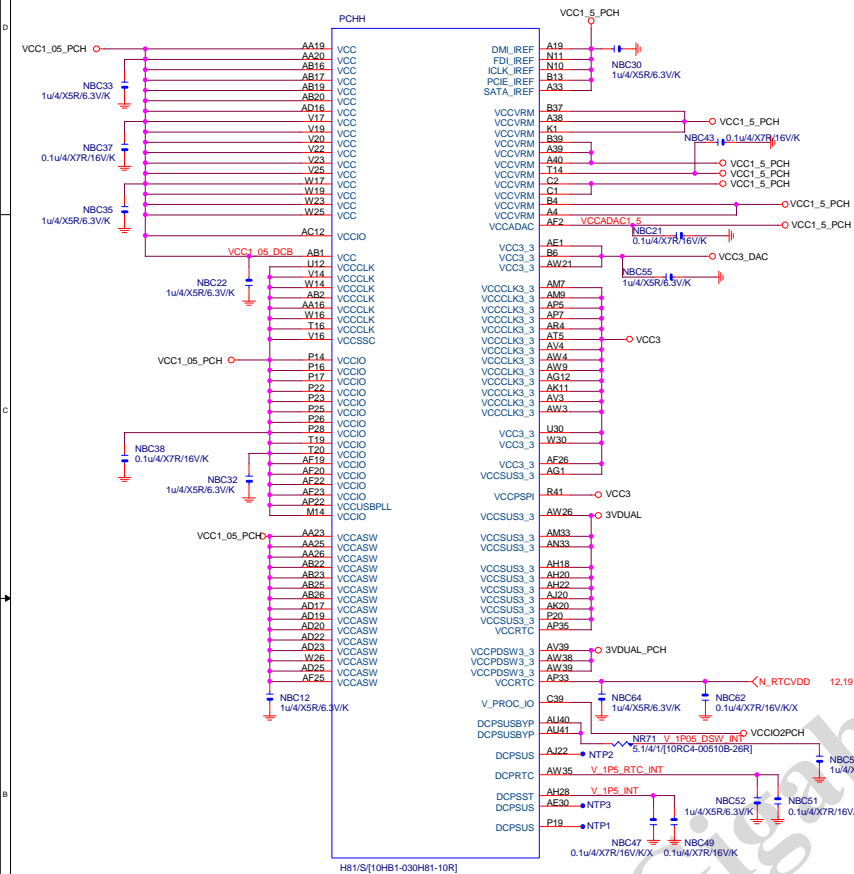
PCH GPIO , CTRL , AUDIO

GA-H81M-HD3

Rev 1.01

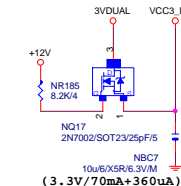
Title	Document Number	Rev
Size	Custom	1.01
Date	Friday, September 13, 2013	Sheet 12 of 33

PCH (H)

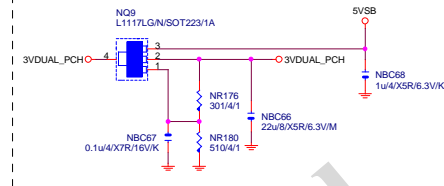


VCC3_DAC

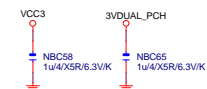
CLOSE北橋(注意震盪水波紋)



3VDUAL_PCH

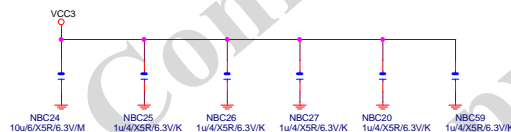


SHT_PWR

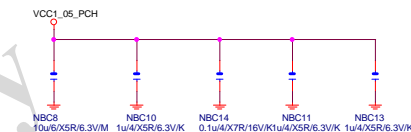


CAP

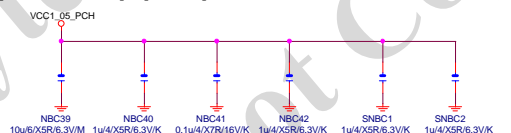
(3.3V) (X6)



(1.05V) (X5)



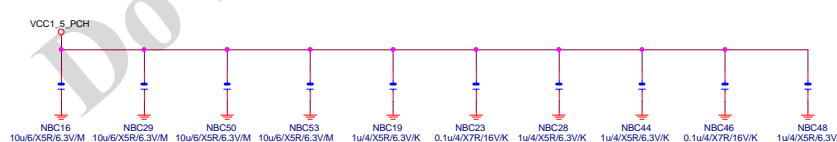
(1.05V) (X6)



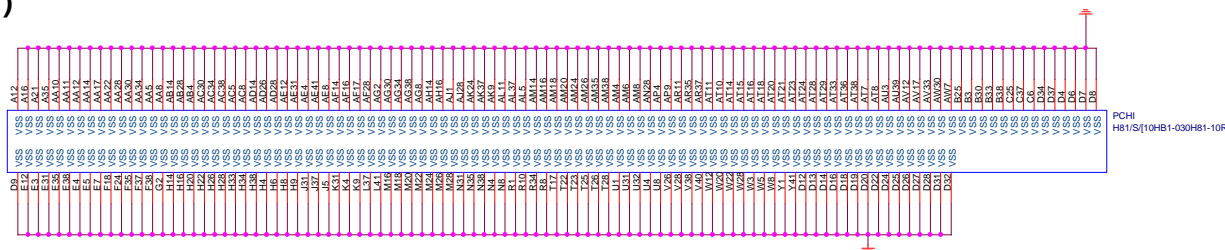
(1.05V) (X2) (3.3V) (X2)



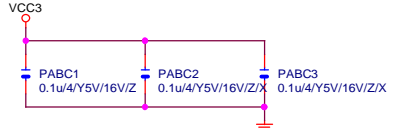
(1.05V) (X10)



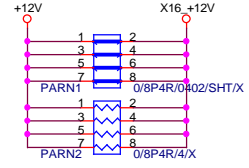
PCH (I)



PCIEX16 CAP



PCIEX16 PROTECT SHT



PCIEX16 AC CAP

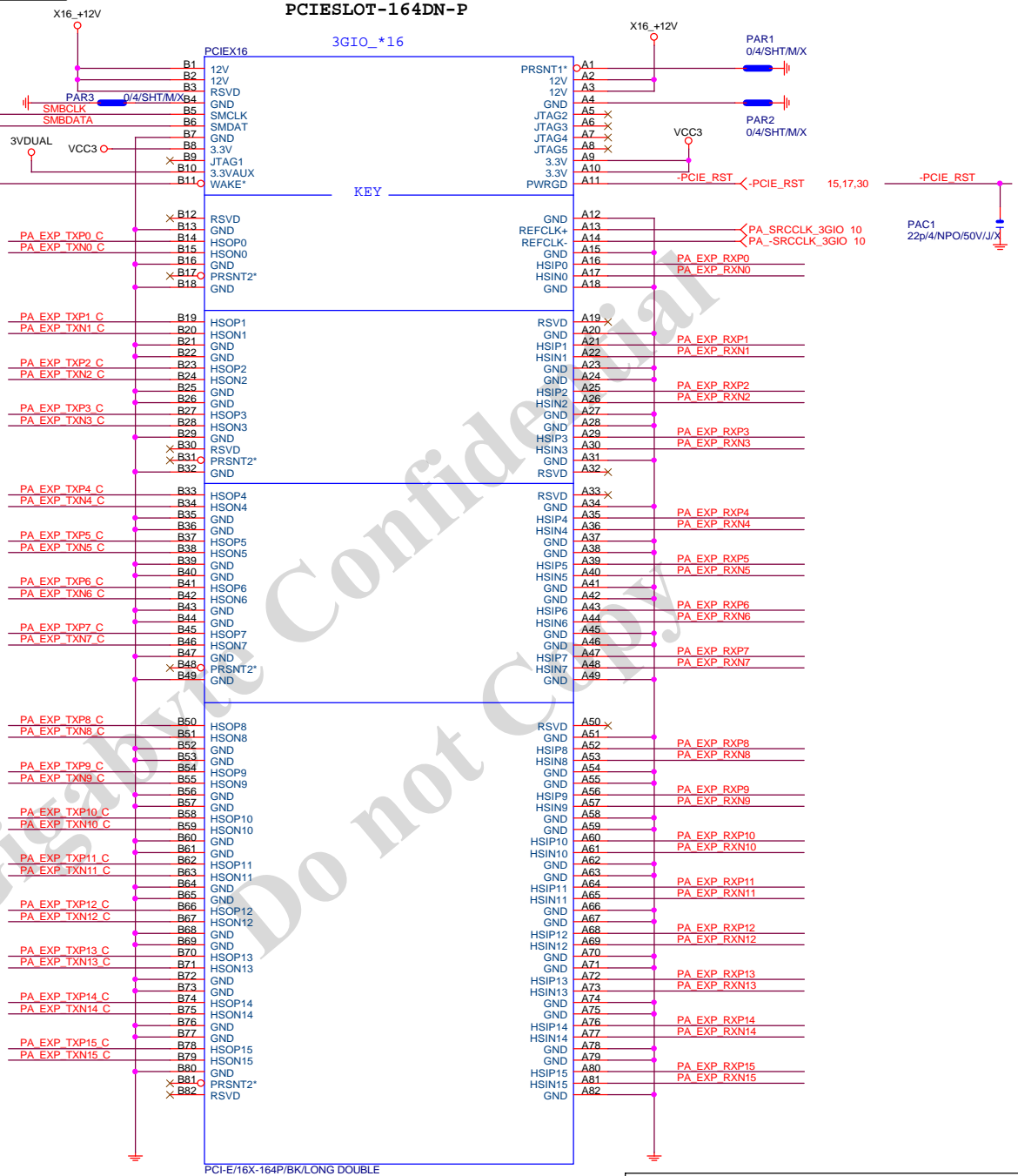
PA EXP TXP0	PAC5	0.22u4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP 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 RXP0.[15] >>> PA_EXP_RXP[0..15] 4
PA EXP RXN0.[15] >>> PA_EXP_RXN[0..15] 4
PA EXP TXP0.[15] >>> PA_EXP_TXP[0..15] 4
PA EXP TXN0.[15] >>> PA_EXP_TXN[0..15] 4

PCIEX16 SLOT

7,8,12,15,16,19 N_SMBCLK
7,8,12,15,16,19 N_SMBDATA
12,15,24,30,31 N_-PCIE_WAKE

PCIESLOT-164DN-P



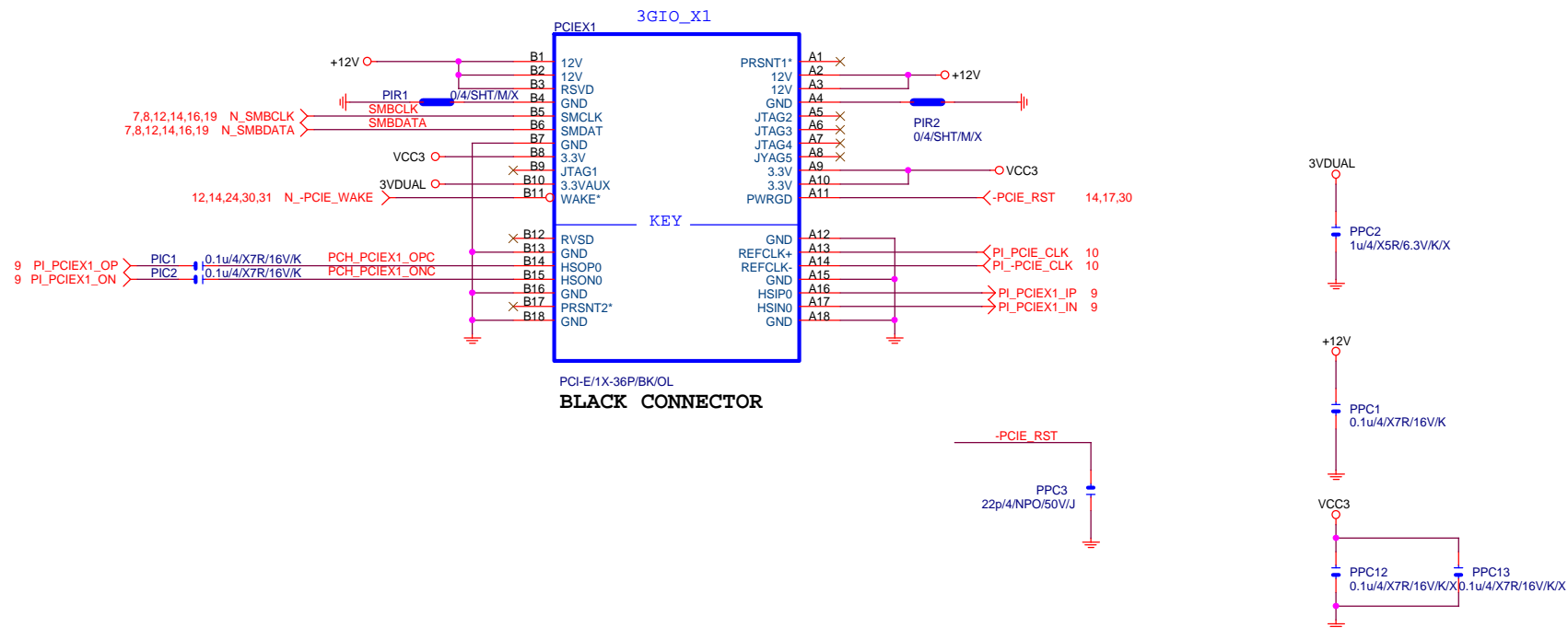
PCI-E/16X-164P/BK/LONG DOUBLE

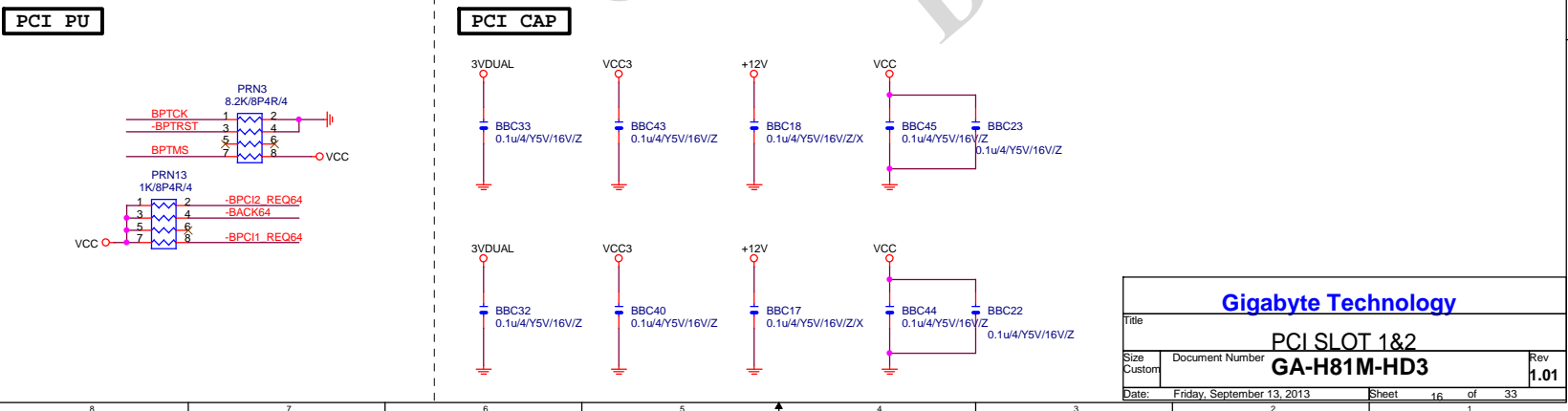
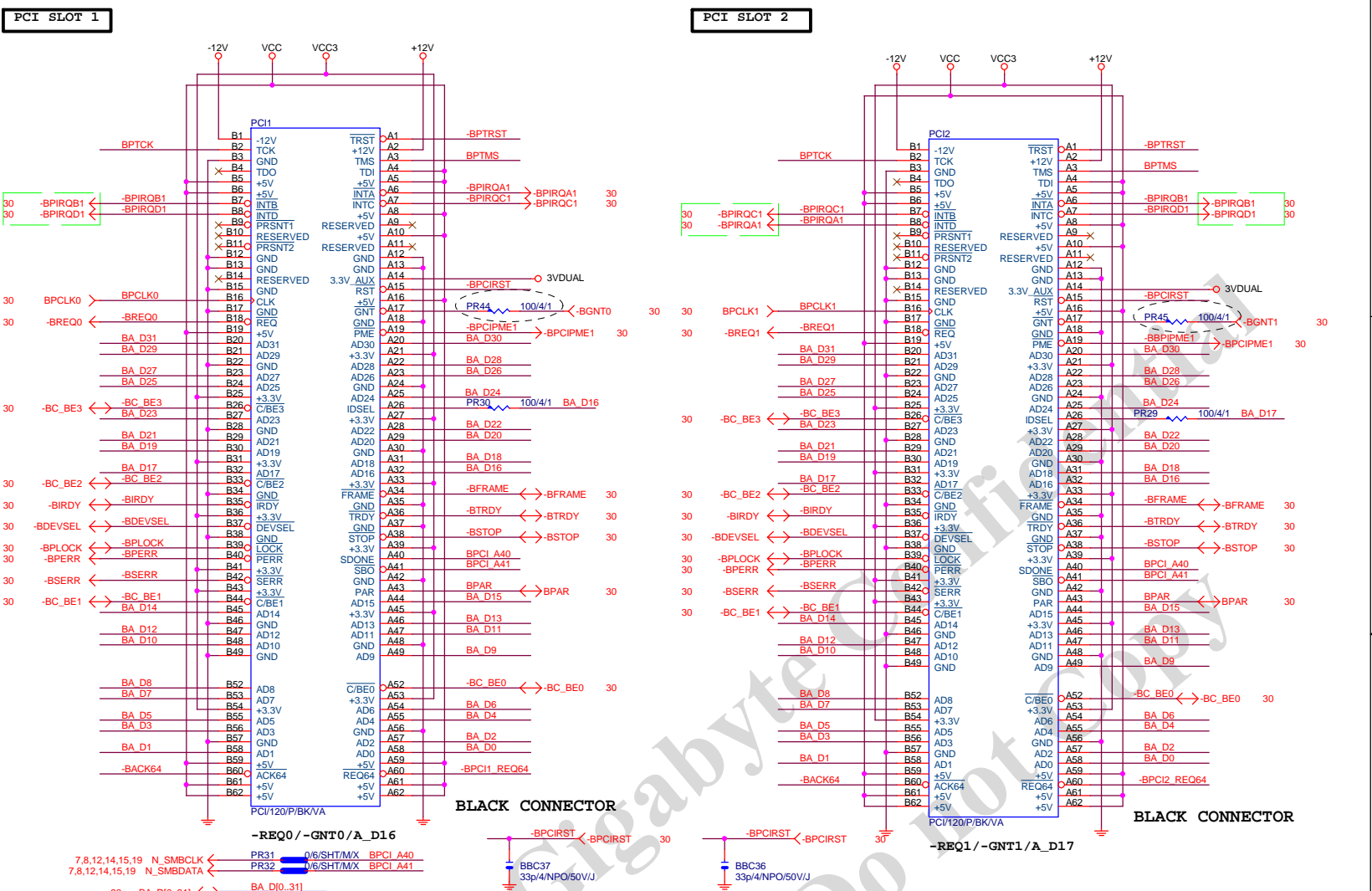
BLACK CONNECTOR

Gigabyte Technology

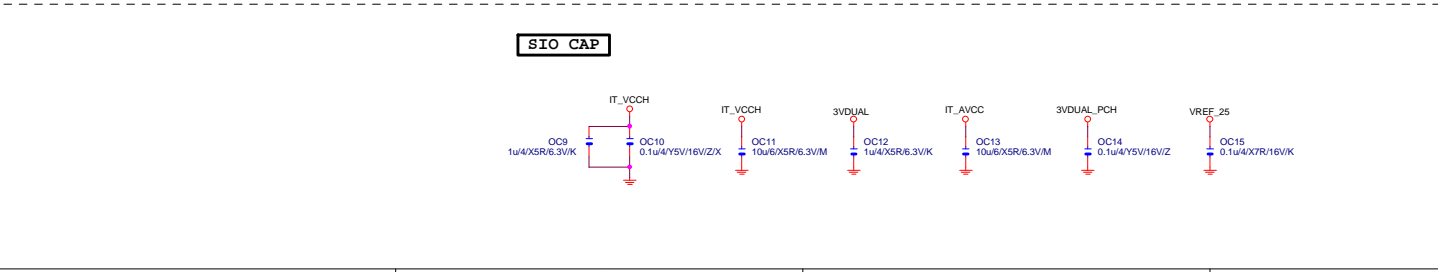
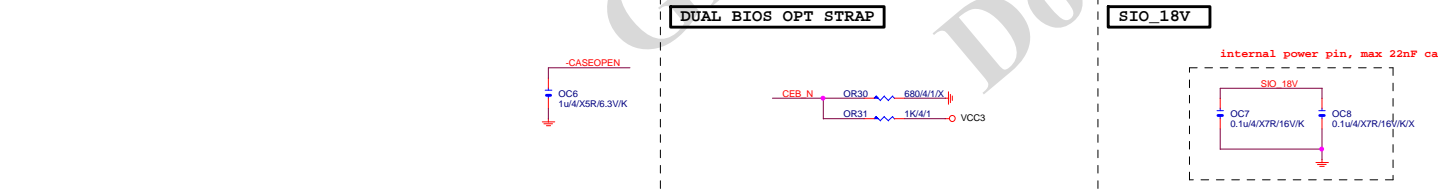
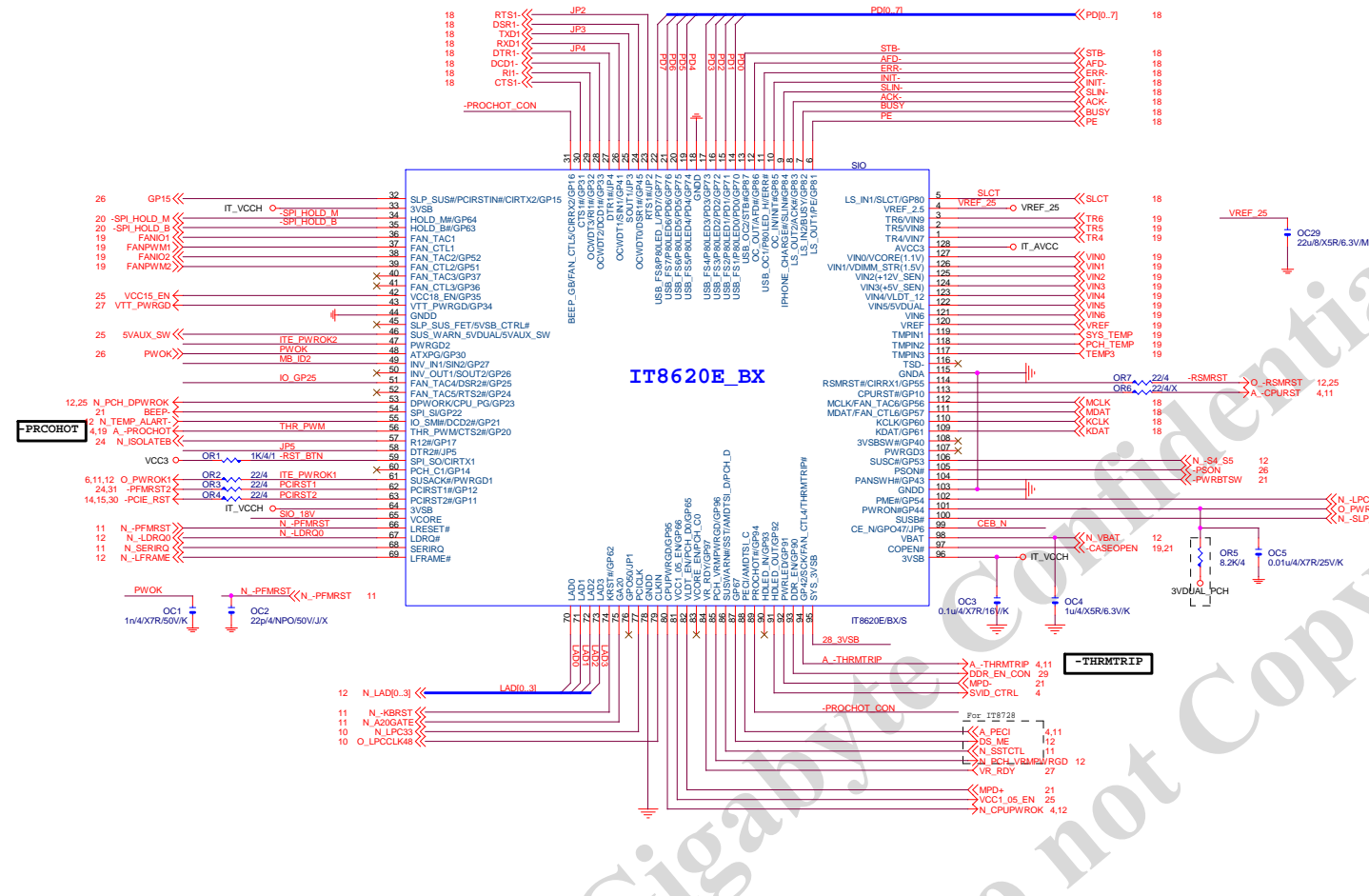
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Size	Document Number	Rev
Custom	GA-H81M-HD3	1.01
Date: Friday, September 13, 2013		Sheet 14 of 33

PCIEX1 SLOT

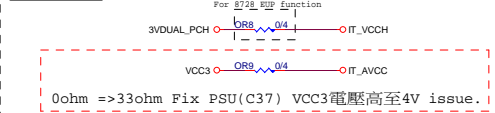




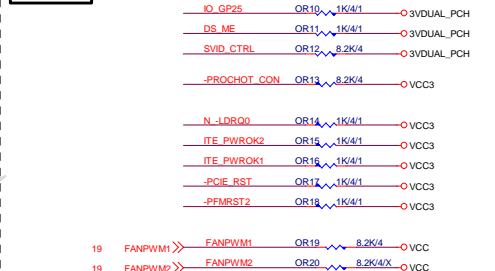
SIO IT8620



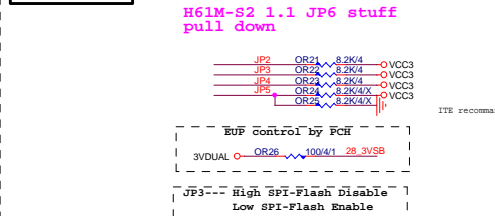
Power SHT



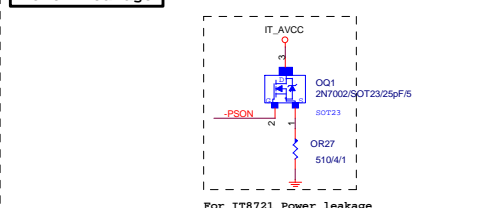
SIO PU



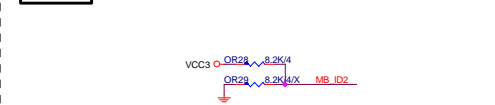
SIO STRAP

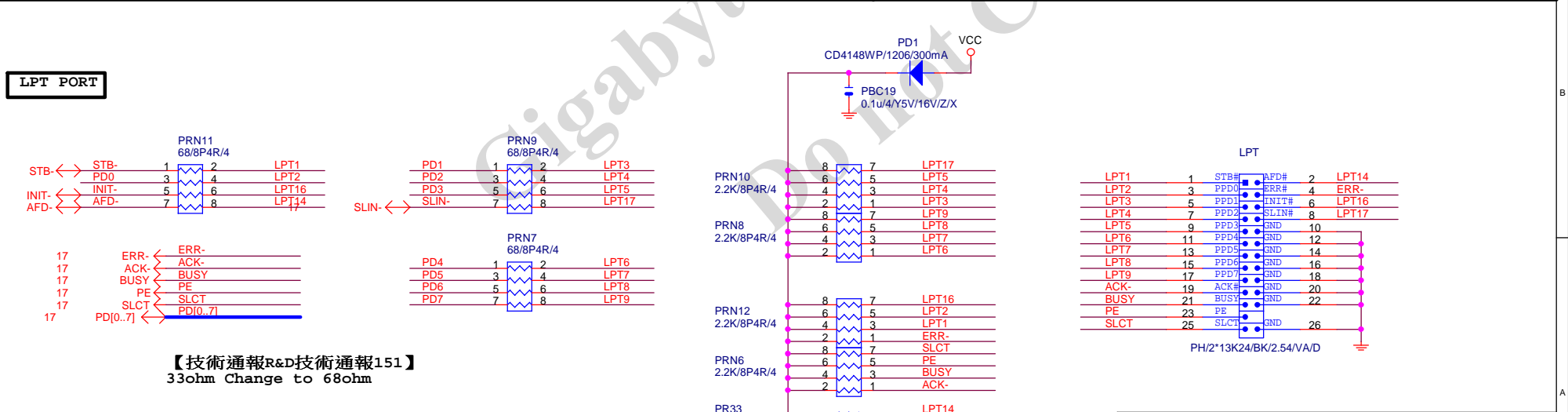
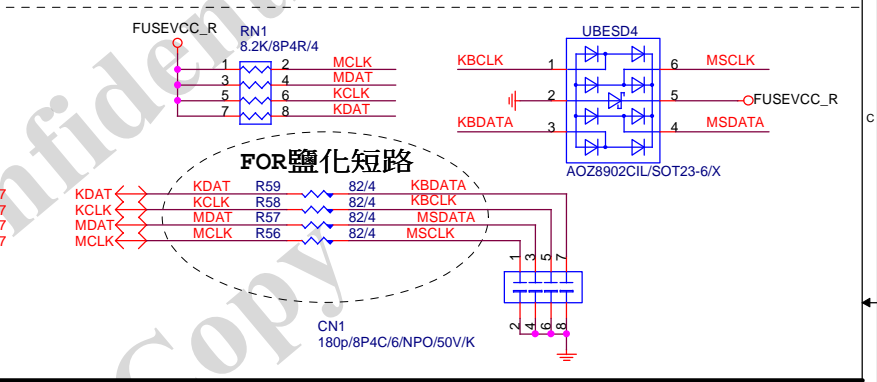
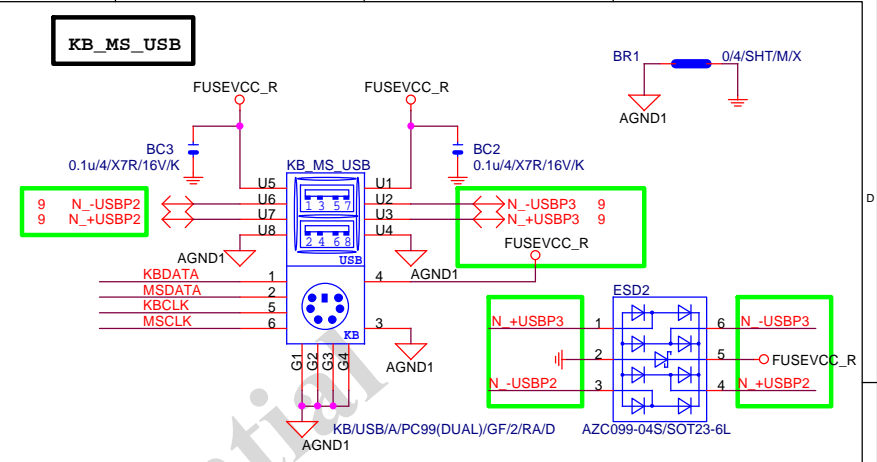
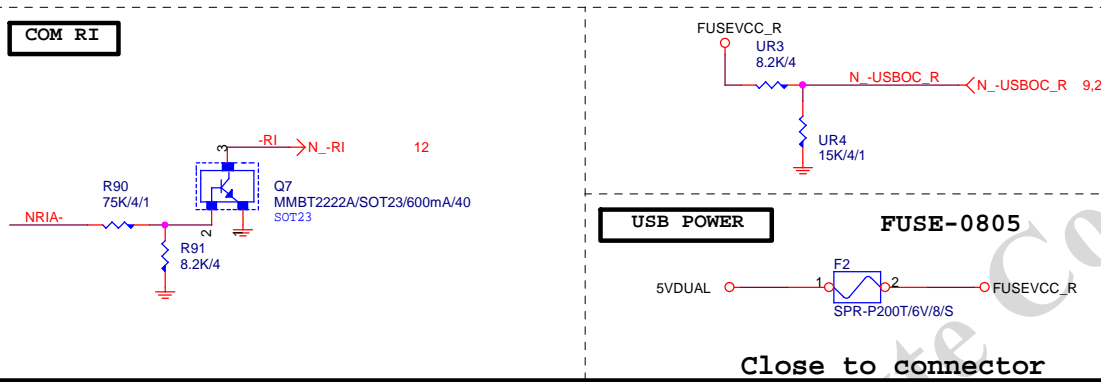
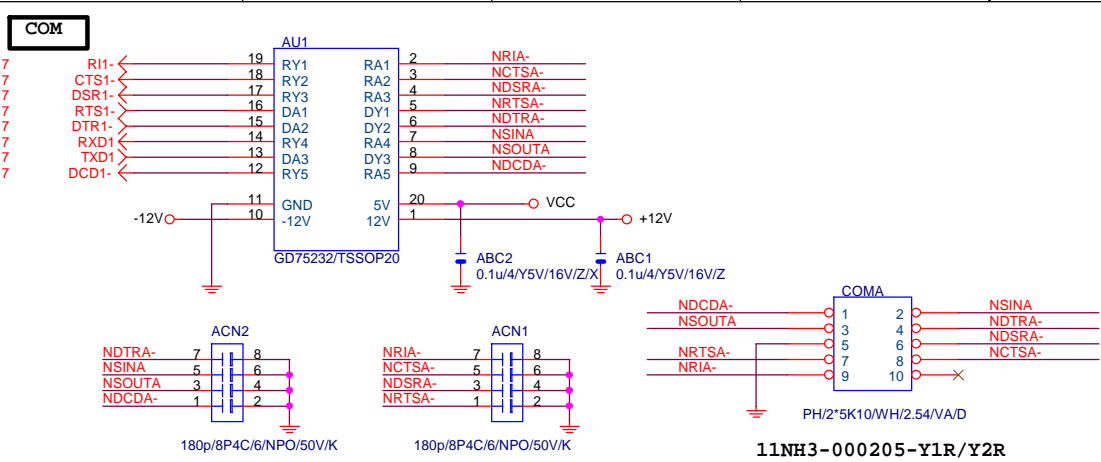


Power leakage



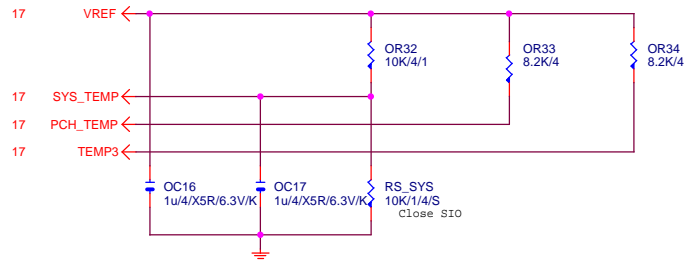
MB ID



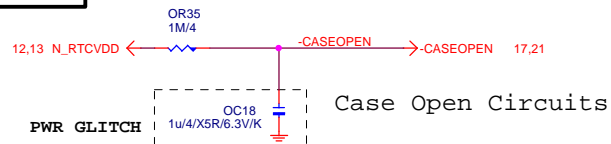


【技術通報R&D技術通報151】
33ohm Change to 68ohm

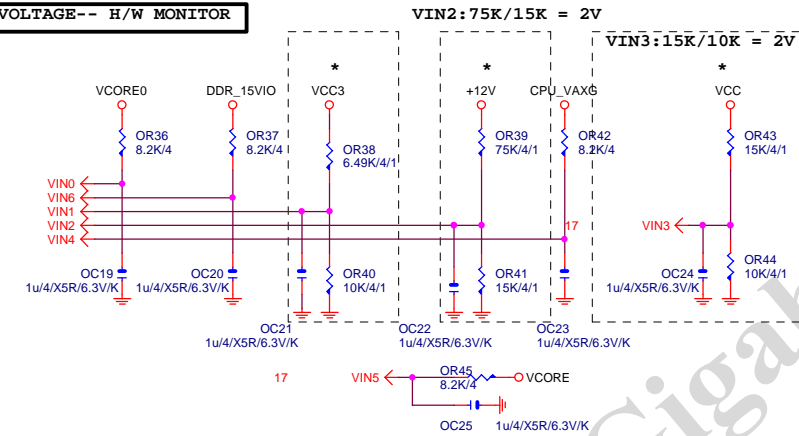
TEMP H/W MONITOR



CASE OPEN

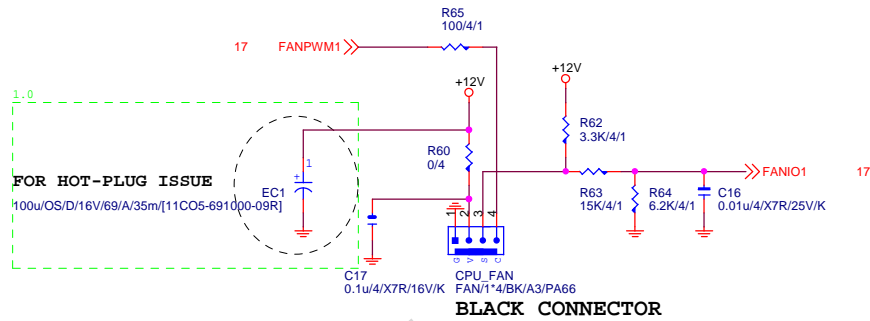


VOLTAGE-- H/W MONITOR

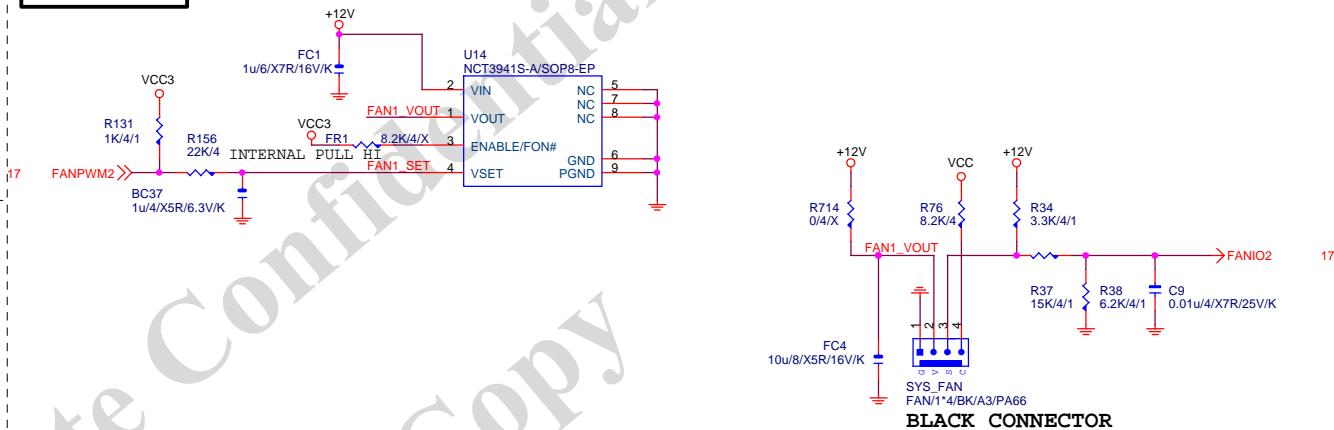


RS1、RS2、RS3 CLOSE CPU
VR MOSFET

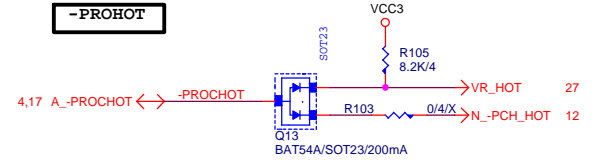
CPU SMART FAN



SYS SMART FAN

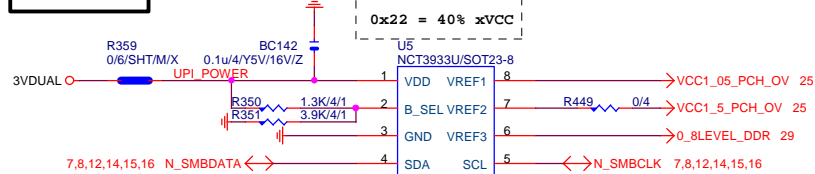


-PROHOT



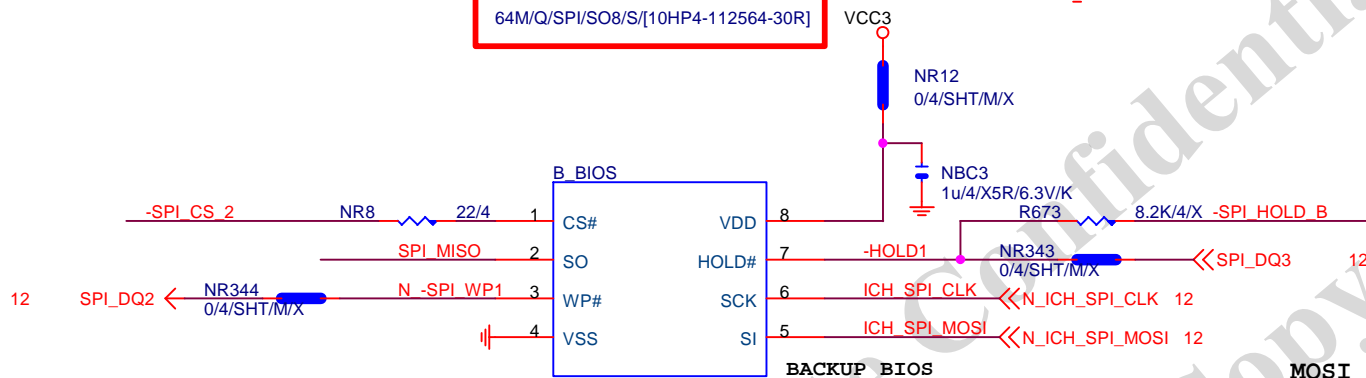
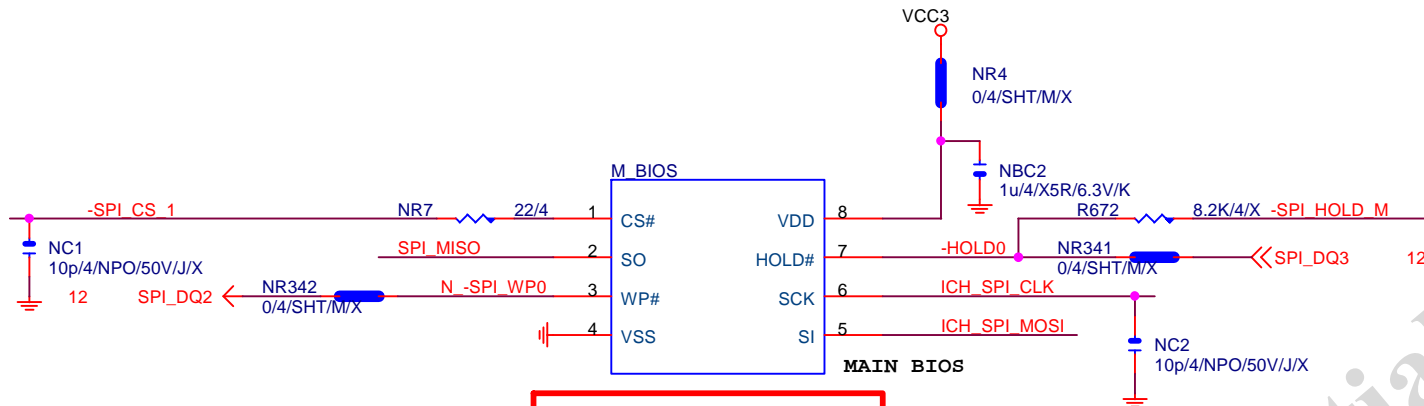
接pwm feedback pin

OV NCT3933



Gigabyte Technology

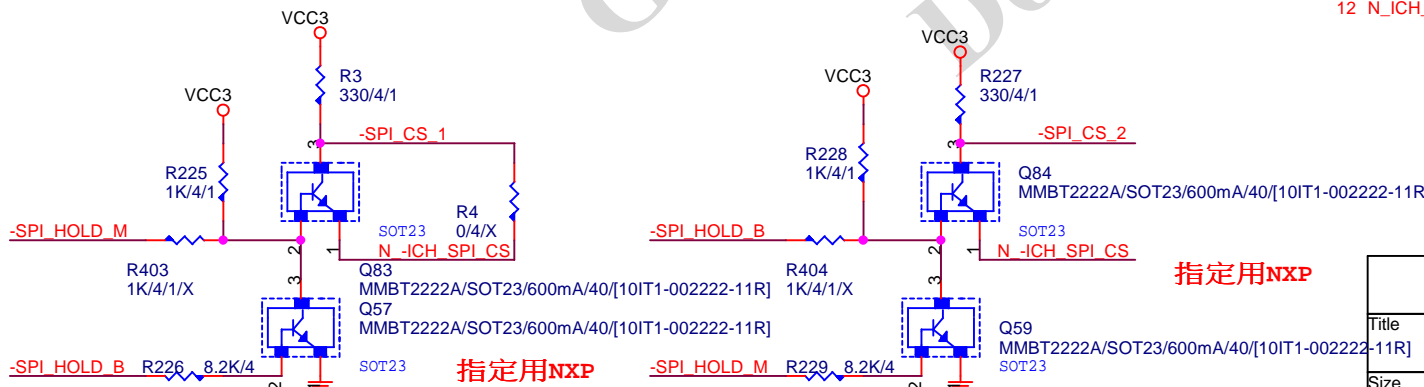
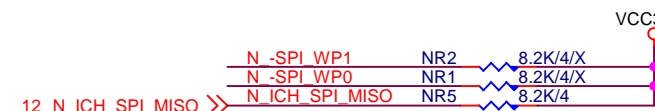
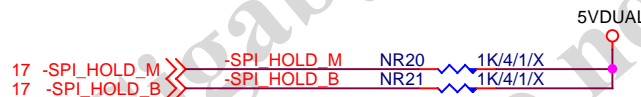
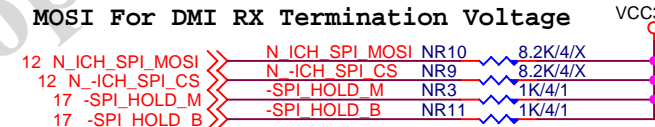
Title				Rev 1.01
HWM,FAN CTRL.OV				
Size Custom	Document Number GA-H81M-HD3			
Date:	Friday, September 13, 2013	Sheet	19 of 33	



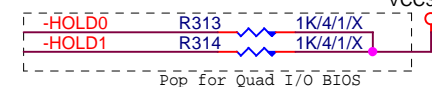
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating
0 means PD 1K

MOSI For DMI RX Termination Voltage



CHECK



Gigabyte Technology

DUAL BIOS

GA-H81M-HD3

Rev
1.01

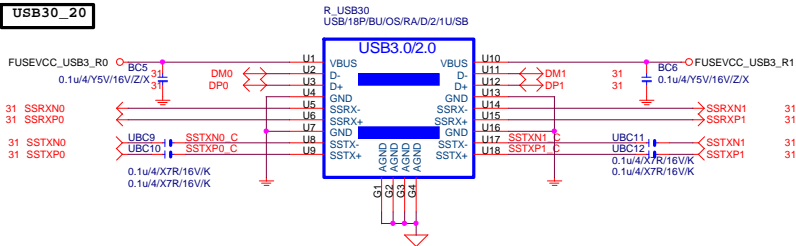
Title
Custom

Document Number

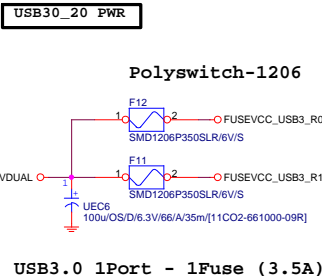
Date: Friday, September 13, 2013

Sheet 20 of 33

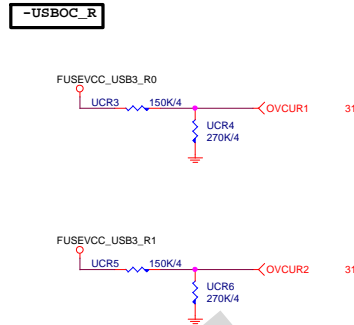
USB30_20



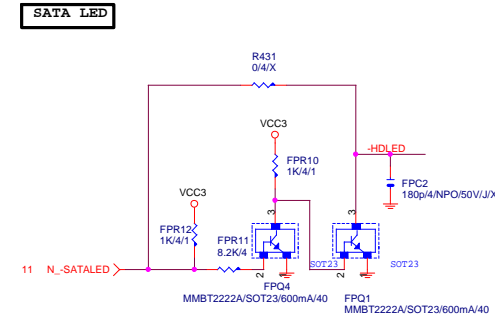
USB30_20 PWR



-USB0C_R

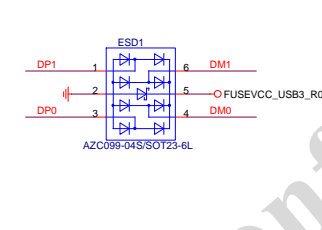


SATA LED

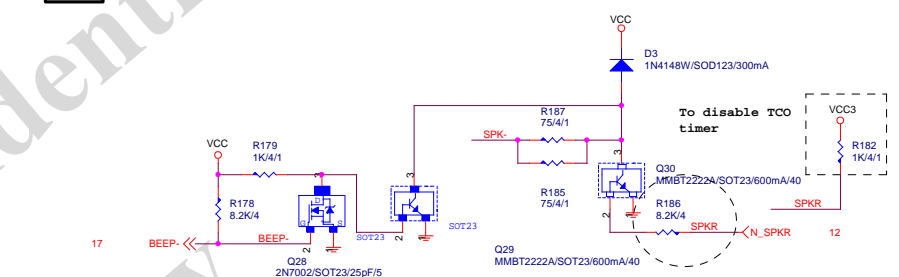


USB30_20 ESD PROTECT

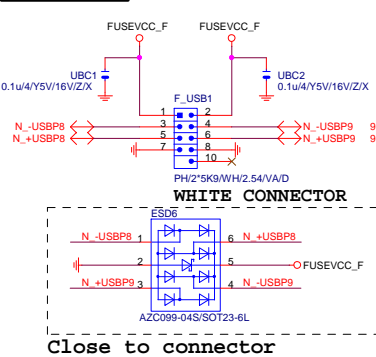
USB3.0 ESD



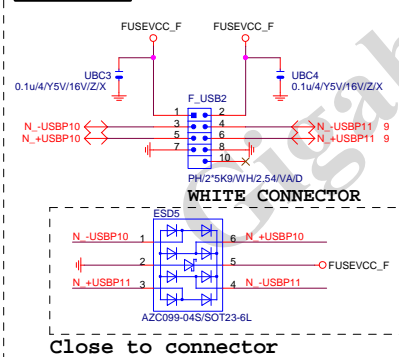
SPKR



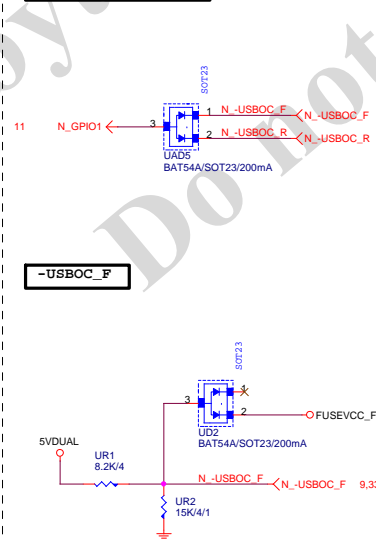
FRONT USB1



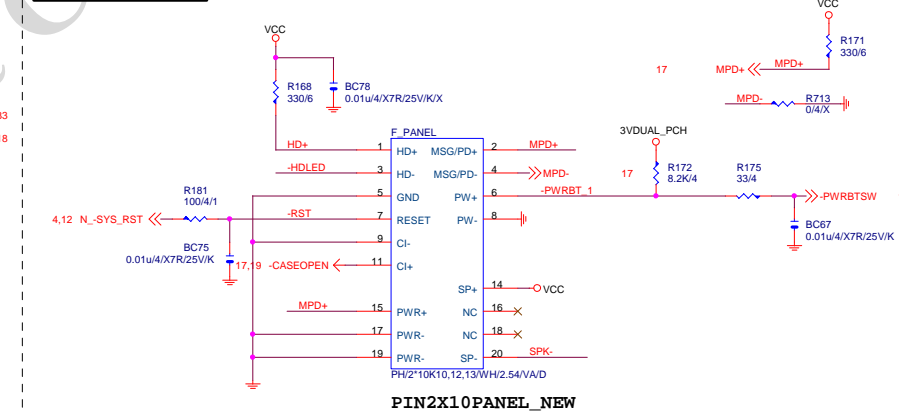
FRONT USB2



USB POWER PROTECT

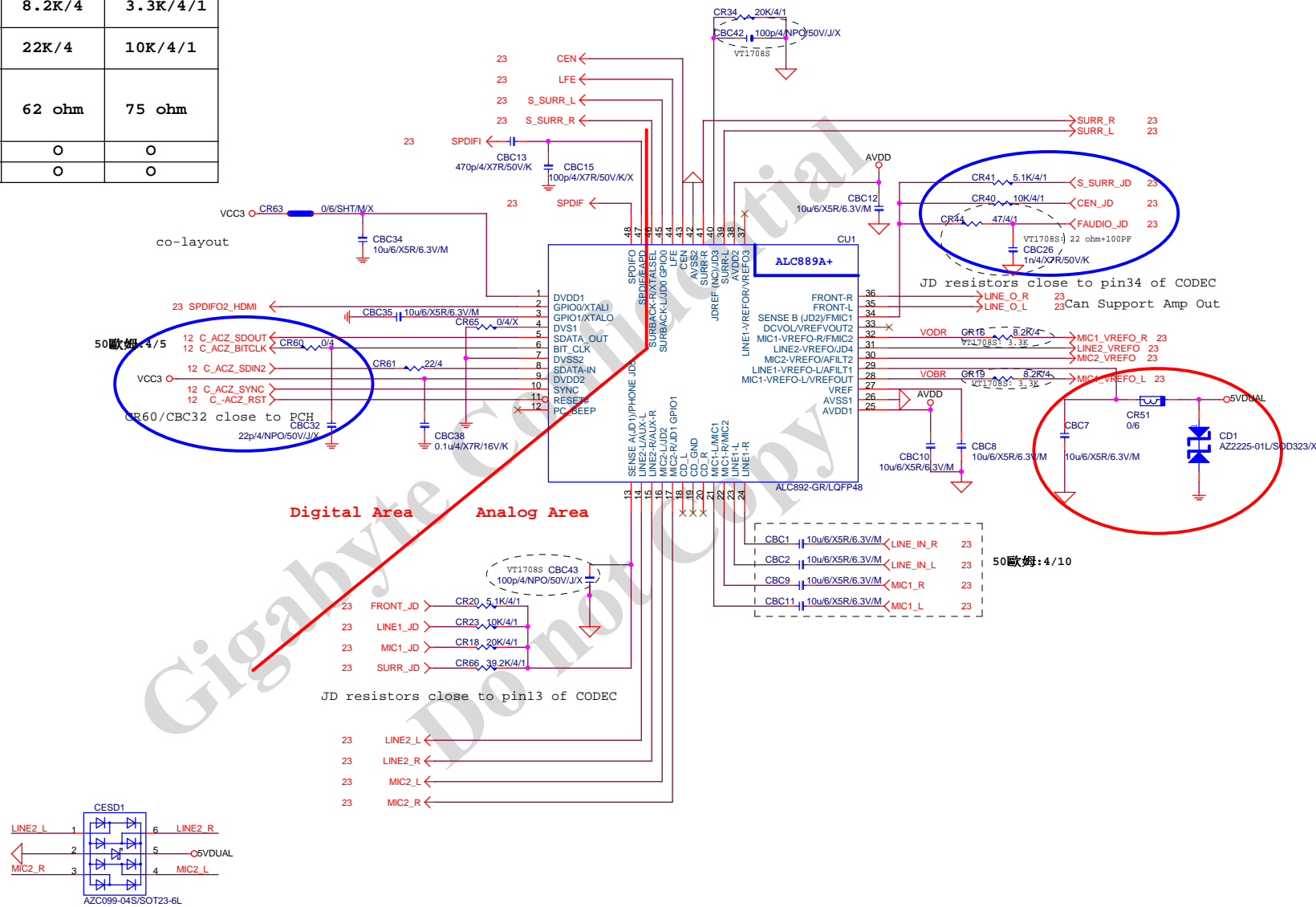


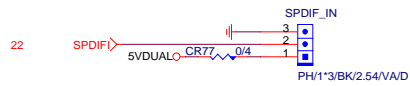
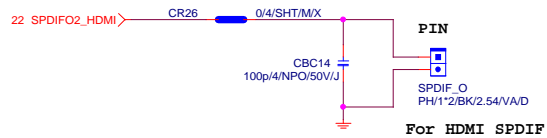
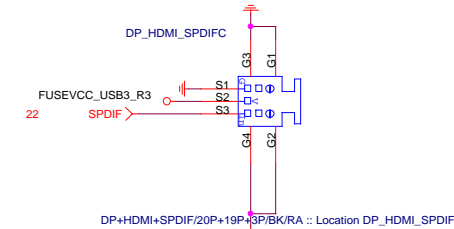
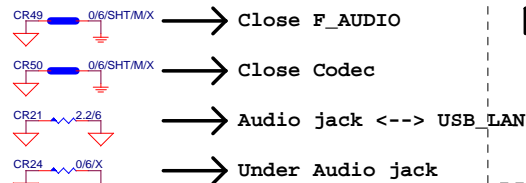
INTEL FRONT PANEL



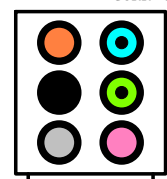
Gigabyte Technology			
Title	FP.F_USB,USB PWR,SPKR,SATA LED		
Size	Custom	Document Number	GA-H81M-HD3
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	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR16/CR19 CR52/CR56/CR10/CR9	8.2K/4	8.2K/4	3.3K/4/1
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

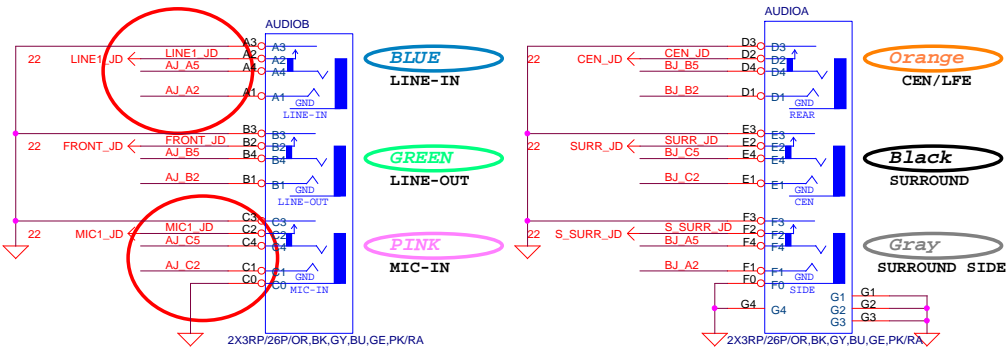




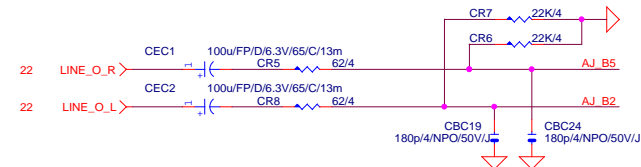
AZALIA JACK
BTX AZALIA CONNECTOR



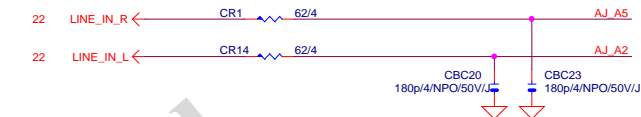
11NR6-403007-21R



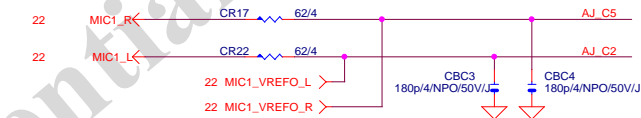
LINE-OUT



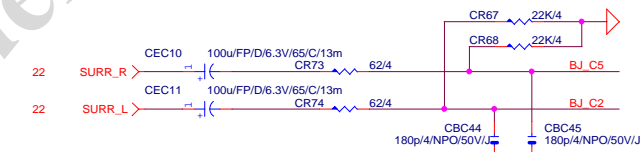
LINE-IN



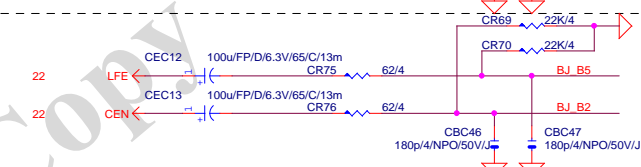
MIC-IN



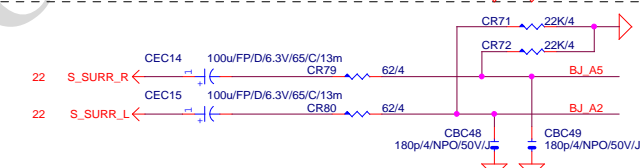
SURROUND



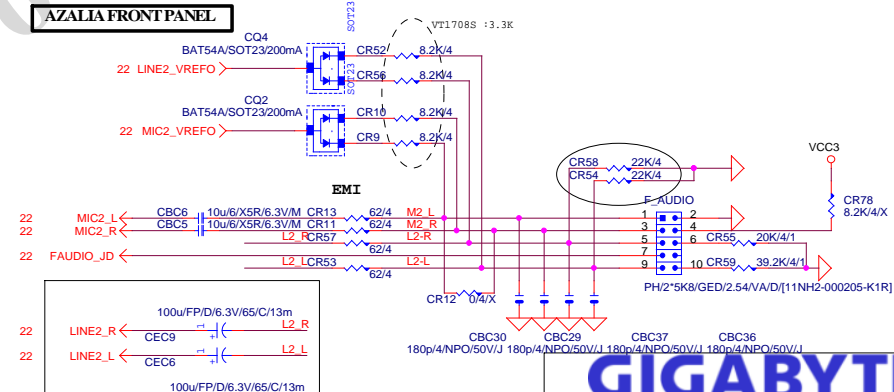
CEN/LFE



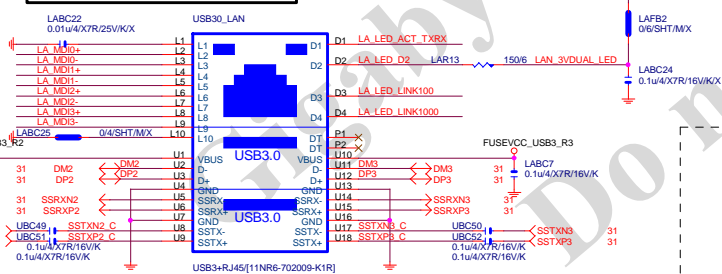
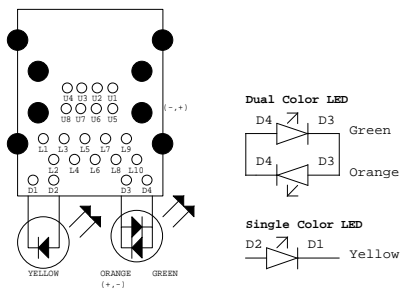
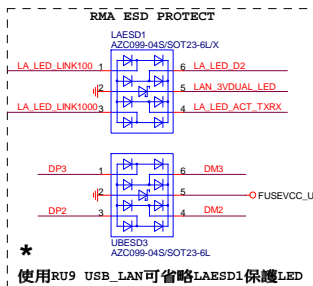
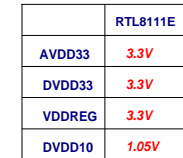
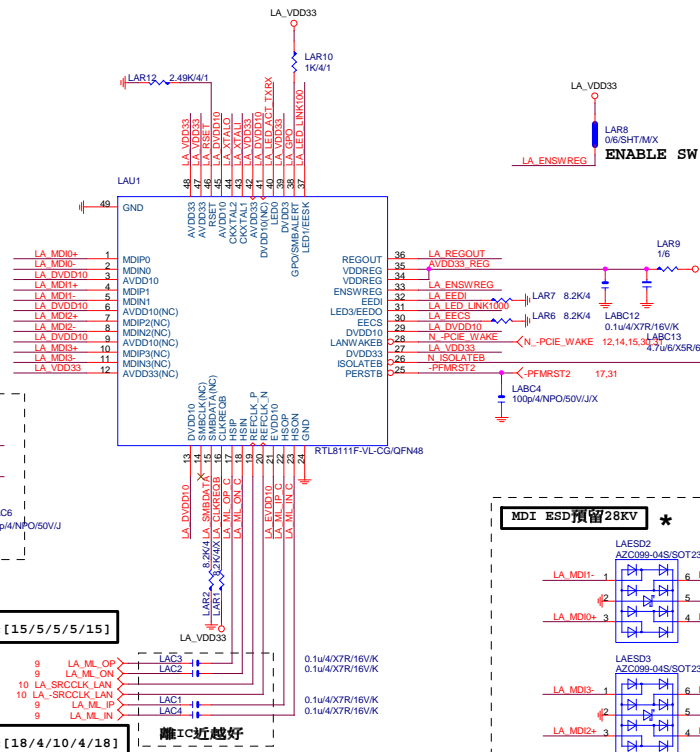
SURRBACK



AZALIA FRONT PANEL



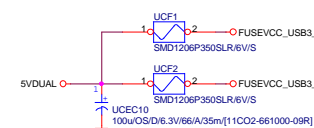
GIGABYTE™			
Title			
AUDIO JACK			
Size	Document Number	Rev	
Custom	GA-H81M-HD3	1.01	
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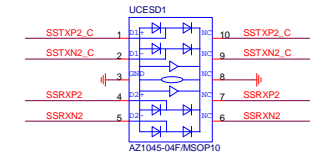
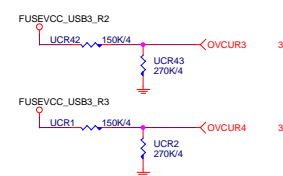
BOM NOTICE *

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]		

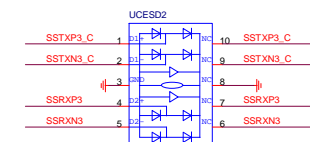
1. 9KV ESD BOM:
USB_LAN (RU9):11NR6-702009-96R
2. 28KV ESD BOM:
USB_LAN (RU9):11NR6-702009-96R
LAESD2, LAESD3: 上件:AZC398-04S



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



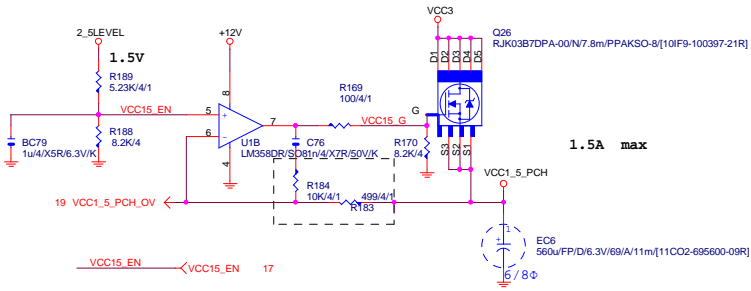
Close to connector



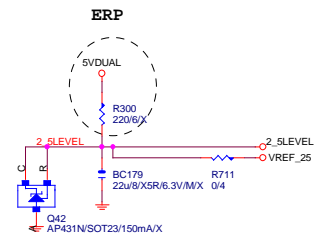
Close to connector

Title			
Realtek RTL8111G			
Size	Document Number	Rev	
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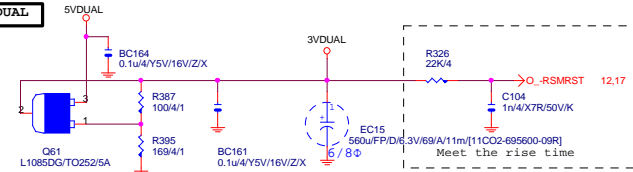
VCC1_5_PCH



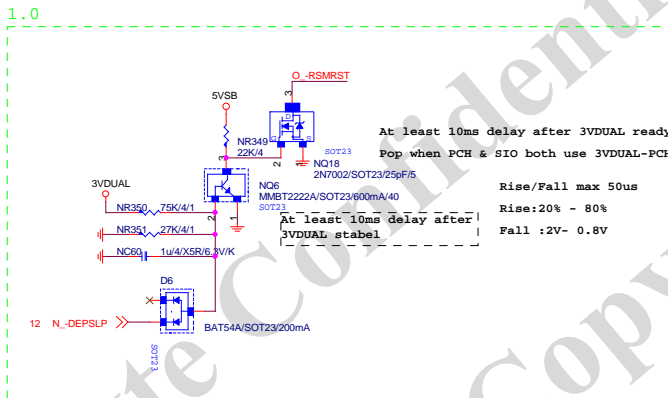
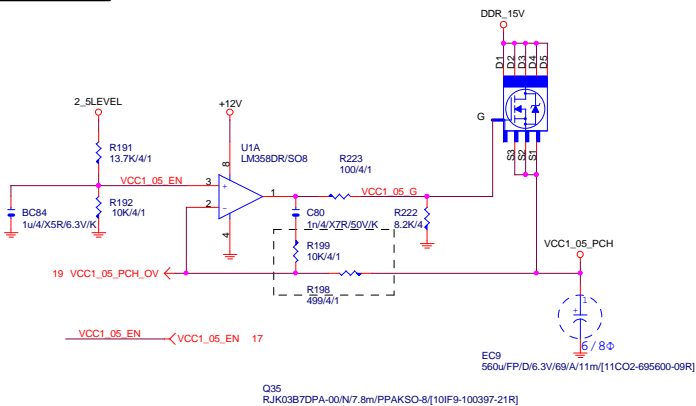
2_5LEVEL



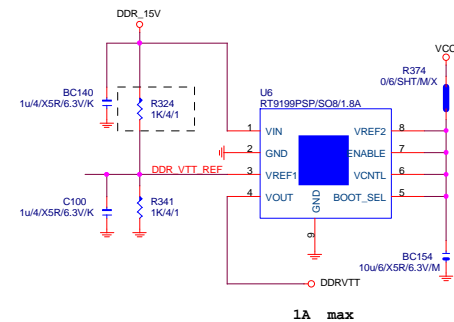
3VDUAL



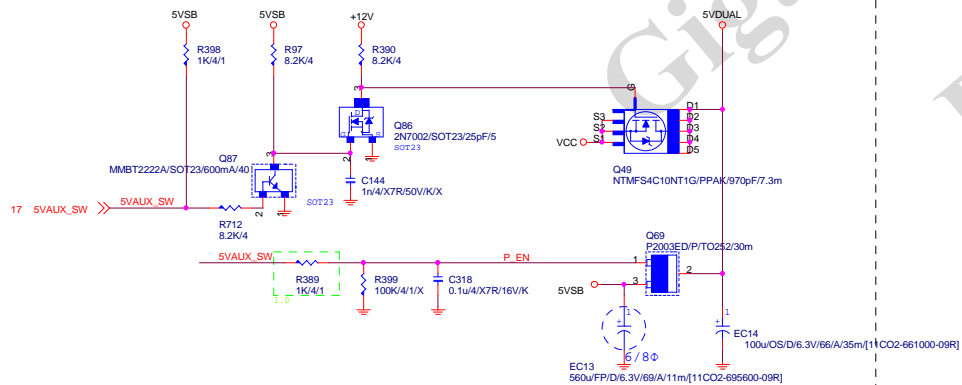
VCC1_05_PCH



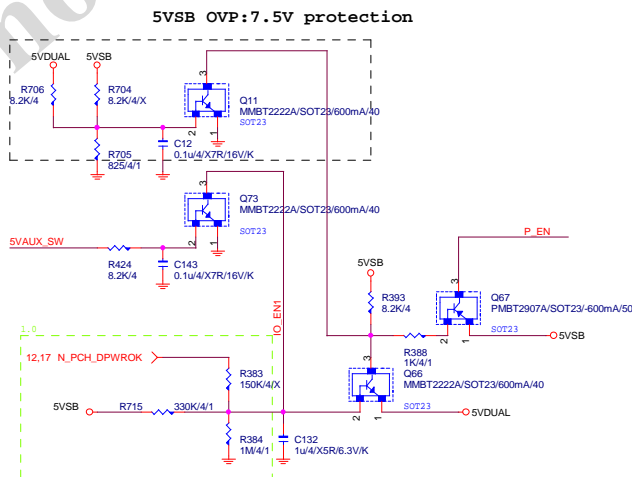
DDRVTT



5VDUAL

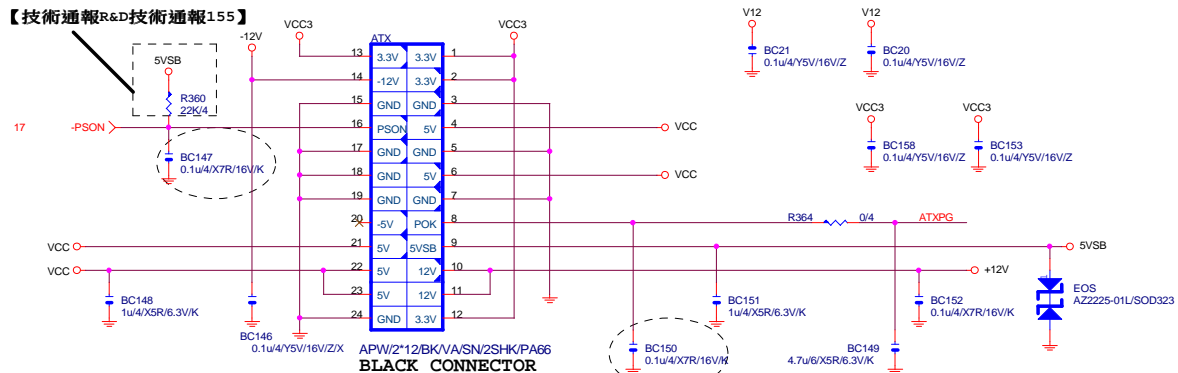


5VDUAL SHORT PROTECT

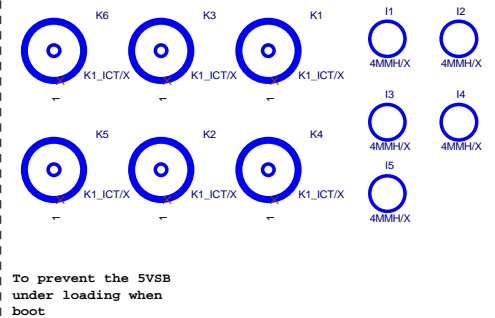
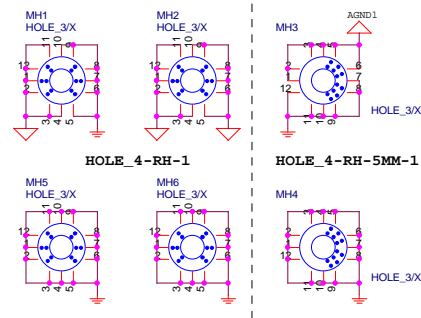
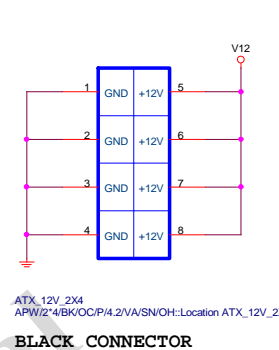


ATXX24 POWER CONNECTOR

【技術通報R&D技術通報155】

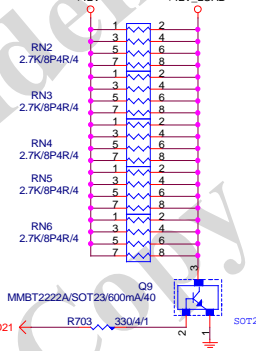


ATXX4 POWER CONNECTOR



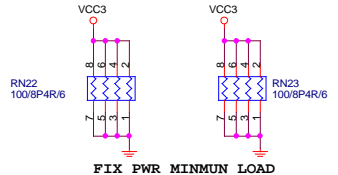
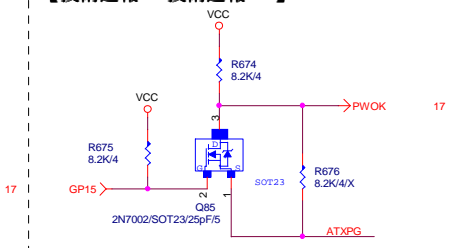
【技術通報R&D技術通報153】

To fix 12V light load abnormal issue



PWOK PATCH

【技術通報R&D技術通報154】

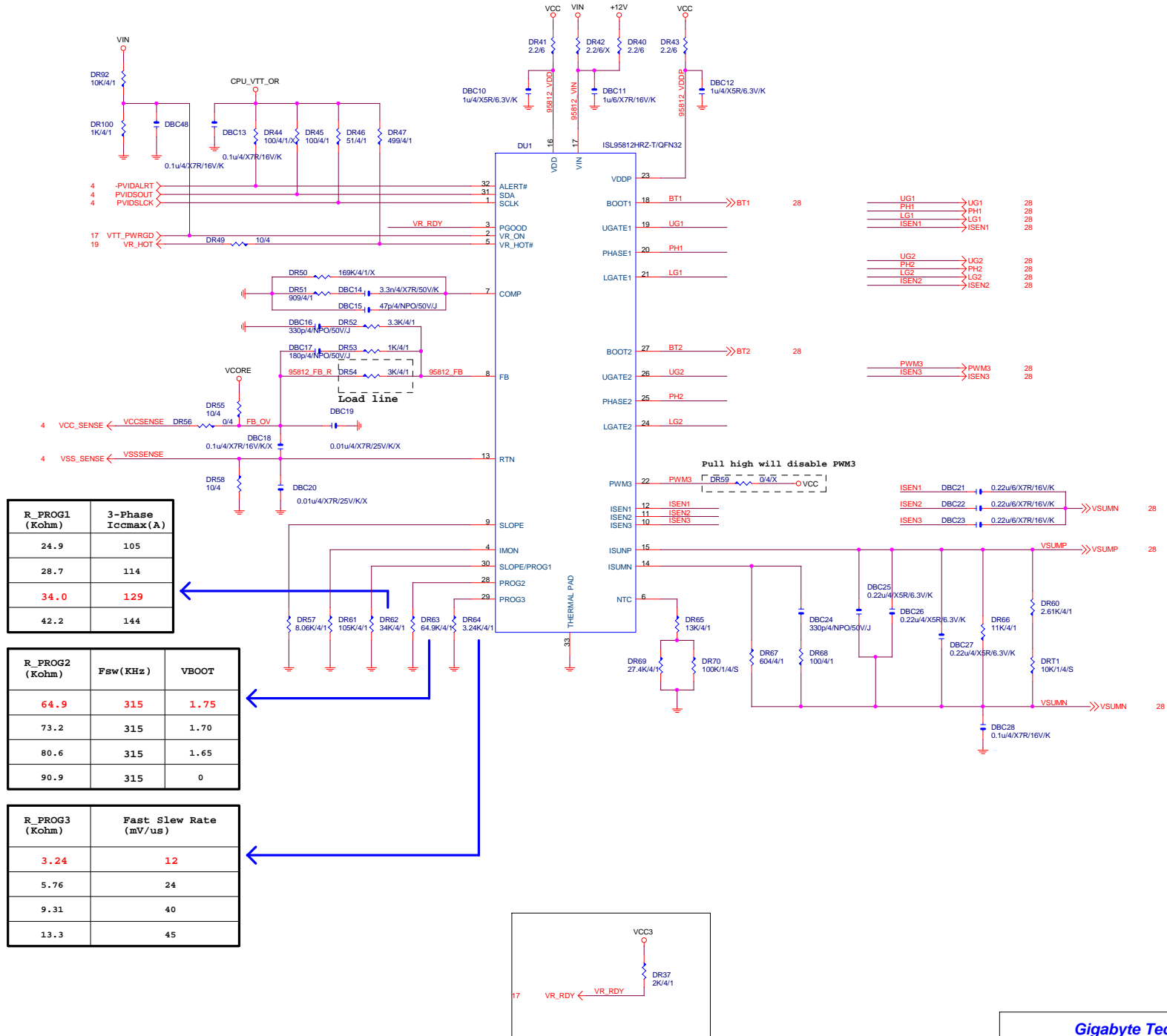


Gigabyte Technology

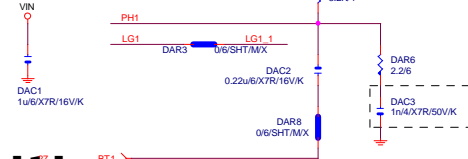
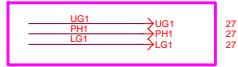
ATX CONNECTOR

GA-H81M-HD3

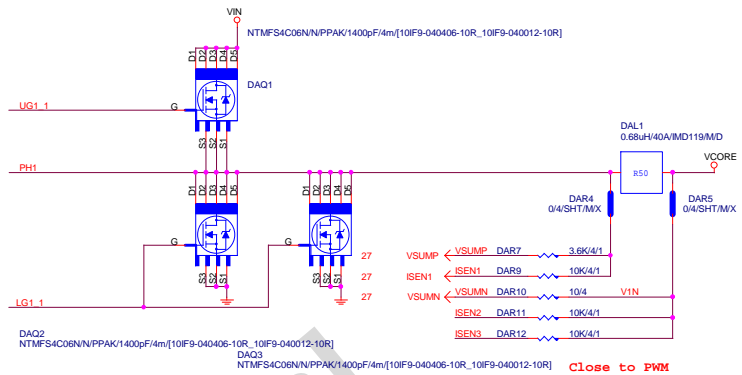
Title	Document Number	Rev
Size	26	1.01
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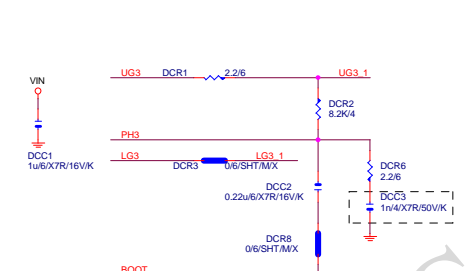
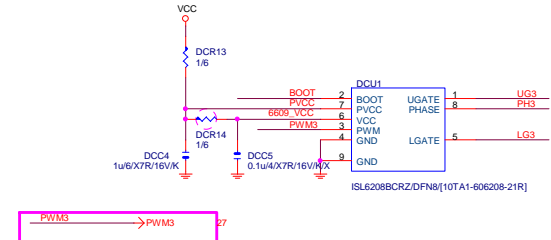
PHASE 1



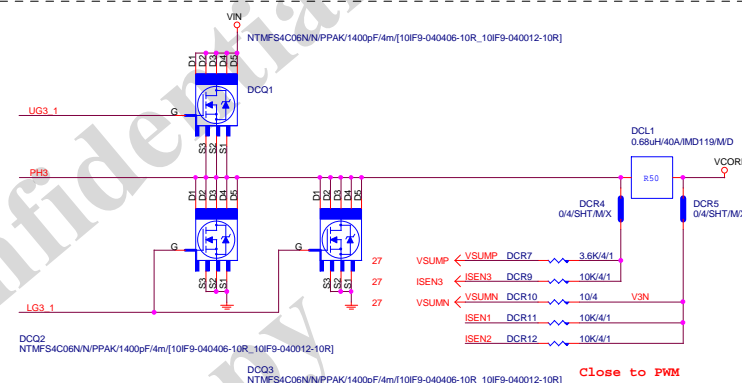
[1]



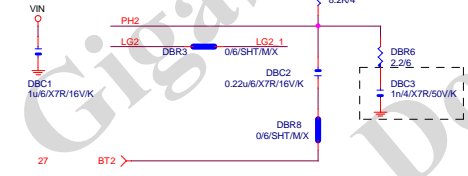
PHASE 3



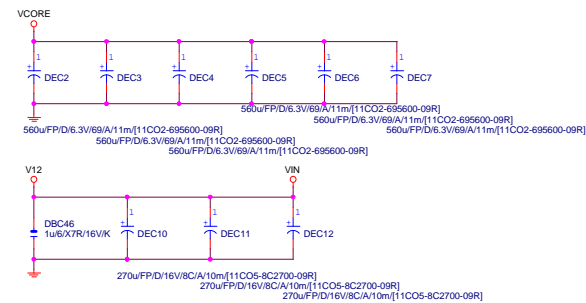
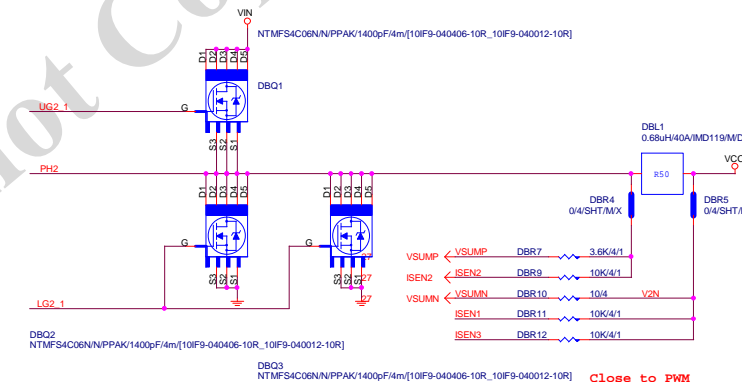
[3]



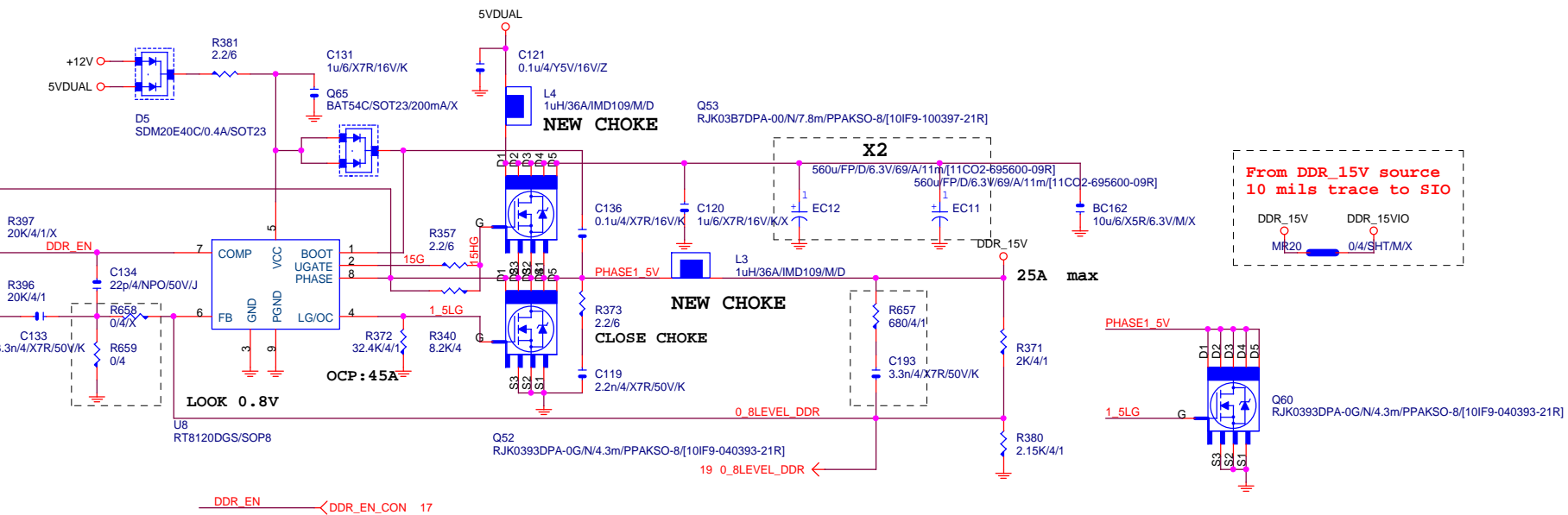
PHASE 2



[2]




DDR15V

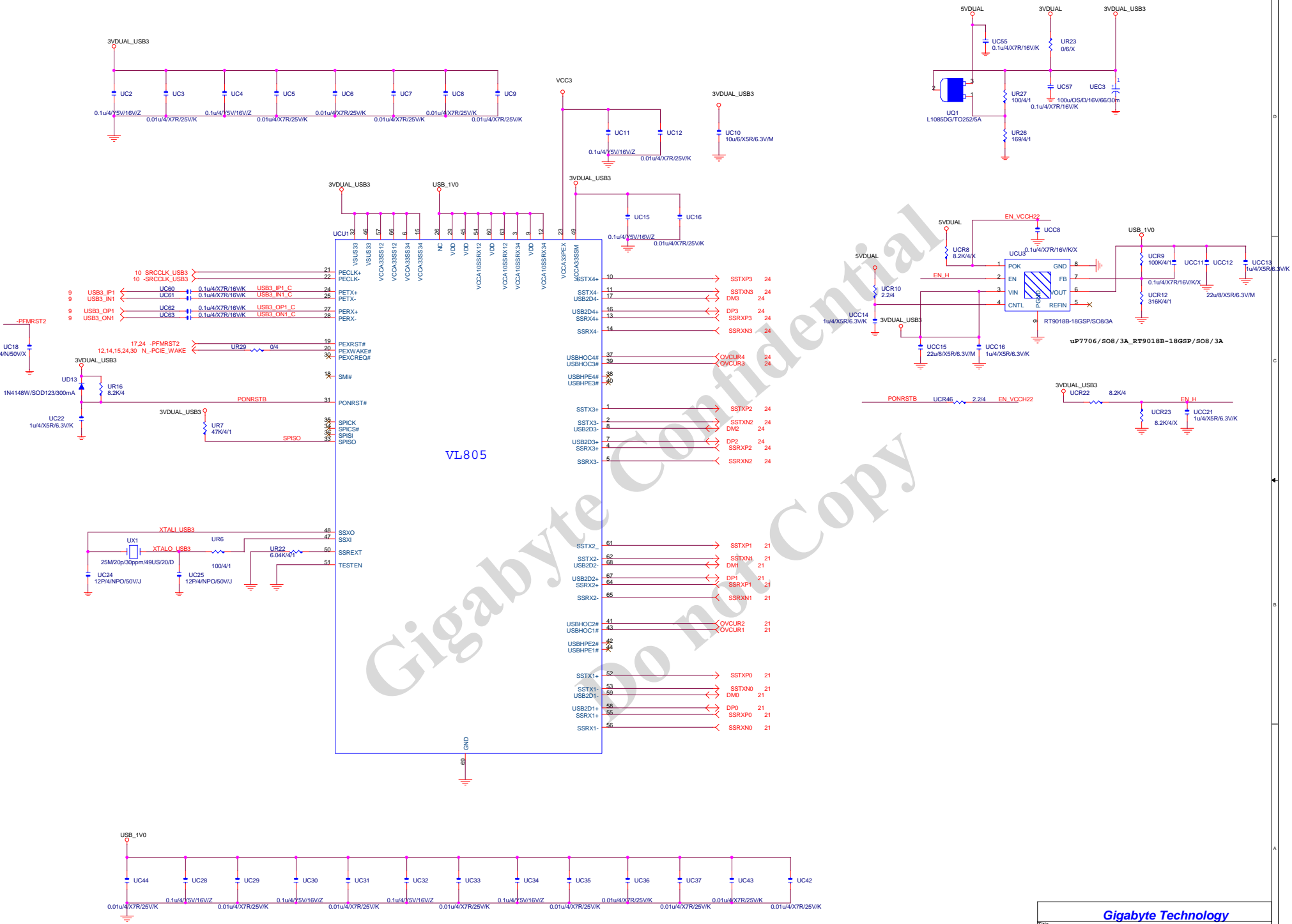


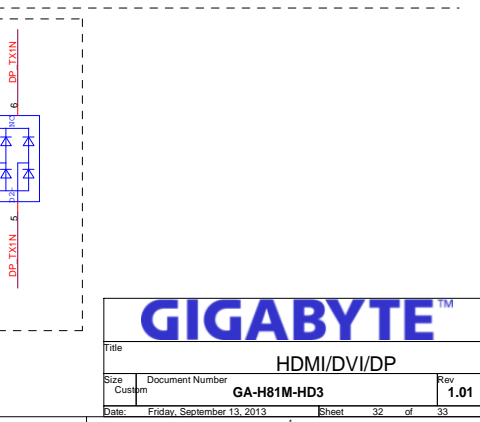
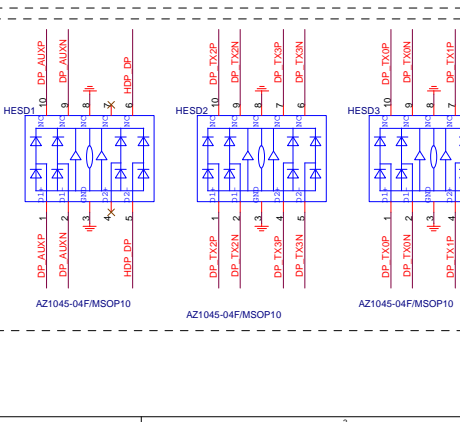
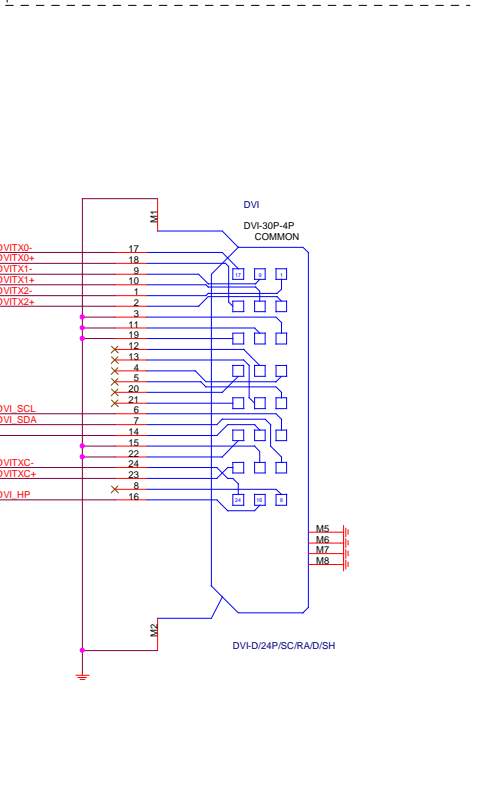
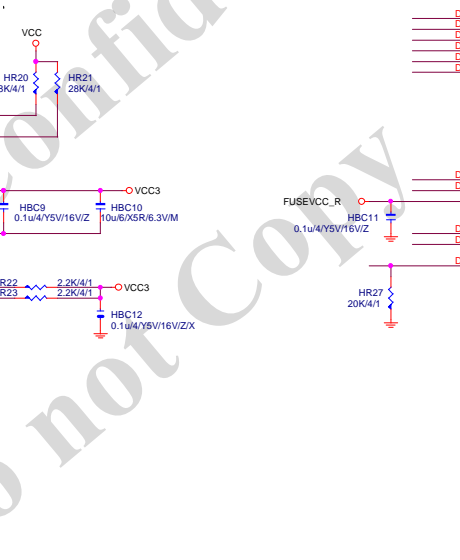
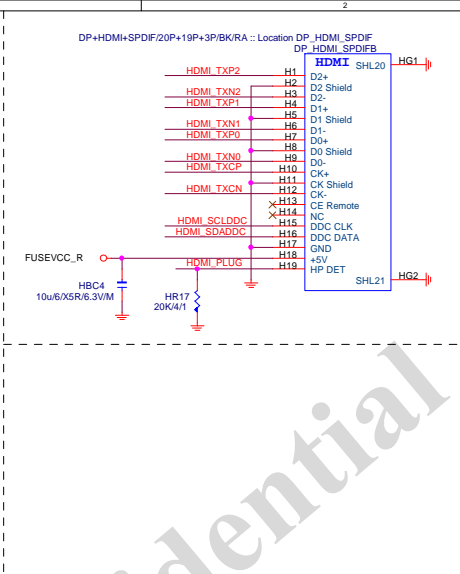
PWR SEQ

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

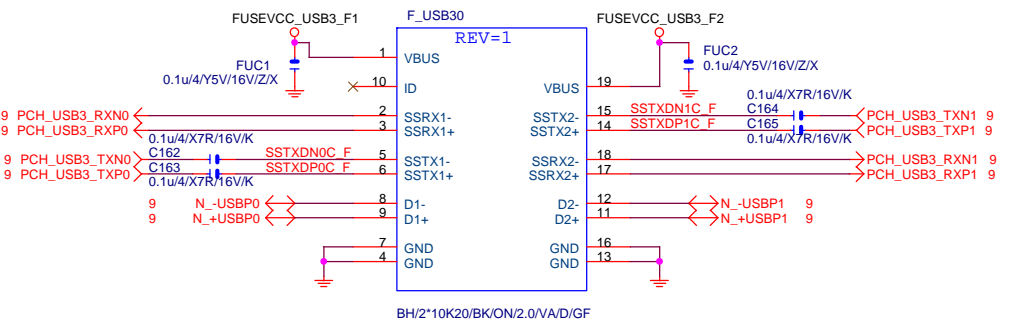
$$\begin{aligned} \text{Rocset} &= (\text{Iocp} * \text{Lgate}, \text{rdson}) / \text{Iocset} \\ \text{Rocset} &= (45\text{A} * 6.7\text{mOhm}) / 10\text{uA} = 30\text{K} \\ \text{Iocset} &= 10\text{uA} \end{aligned}$$

<div style="text-align: center;">  </div>			
Title			
RT8120 DDR POWER			
Size	Document Number		Rev
Custom	GA-H81M-HD3		1.01
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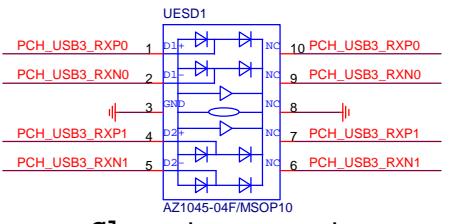




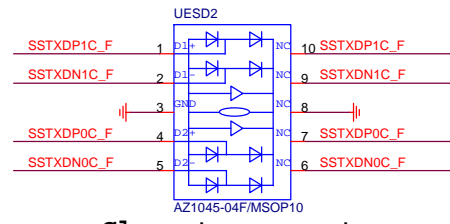
F_USB30



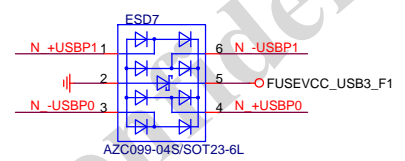
BLACK CONNECTOR



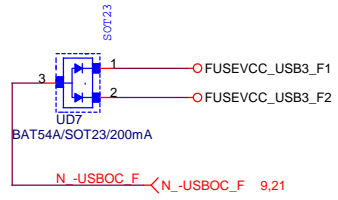
Close to connector



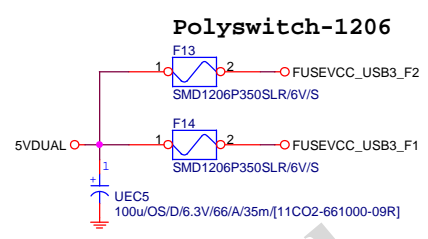
Close to connector



Close to connector



F_USB30 PWR



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